

Programmable Controller MELSEG-F

- **N:N Network**
- **Parallel Link**
- Computer LinkInverter Communication
- Non-Protocol Communication
 Programming Communication
 Remote Maintenance

FX SERIES PROGRAMMABLE CONTROLLERS

USER'S MANUAL

Data Communication Edition

RS-232C Interface

FX3U-232-BD FX1N-232-BD FX3U-232ADP(-MB) FX₀N-232ADP FX3G-232-BD FX-232ADP FX2N-232-BD **FX2N-232IF**

FX2NC-232ADP

RS-485 Interface

FX3U-485-BD FX2NC-485ADP FX3U-485ADP(-MB) FX1N-485-BD FX3G-485-BD FX₀N-485ADP FX3G-485-BD-RJ FX-485ADP

FX2N-485-BD

RS-485/232C Converter

FX-485PC-IF

RS-422 Interface

FX3U-422-BD FX2N-422-BD FX3G-422-BD FX1N-422-BD

USB Interface

FX3U-USB-BD

Ethernet

FX3U-ENET-ADP

Safety Precaution

(Read these precautions before use.)

Before installation, operation, maintenance or inspection of this product, thoroughly read through and understand this manual and all of the associated manuals. Also, take care to handle the module properly and safely.

This manual classifies the safety precautions into two categories: <u>MARNING</u> and <u>MCAUTION</u>.



Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.



Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage.

Depending on the circumstances, procedures indicated by **CAUTION** may also cause severe injury. It is important to follow all precautions for personal safety.

Store this manual in a safe place so that it can be taken out and read whenever necessary. Always forward it to the end user.

1. DESIGN PRECAUTIONS

MARNING

- Make sure to have the following safety circuits outside of the PLC to ensure safe system operation even during external power supply problems or PLC failure.
 - Otherwise, malfunctions may cause serious accidents.
 - 1) Most importantly, have the following: an emergency stop circuit, a protection circuit, an interlock circuit for opposite movements (such as normal vs. reverse rotation), and an interlock circuit (to prevent damage to the equipment at the upper and lower positioning limits).
 - 2) Note that when the PLC CPU detects an error, such as a watchdog timer error, during self-diagnosis, all outputs are turned off. Also, when an error that cannot be detected by the PLC CPU occurs in an input/output control block, output control may be disabled.
 - External circuits and mechanisms should be designed to ensure safe machinery operation in such a case.

 Note that the output current of the service power supply for sensors varies depending on the model and the control of the service power supply for sensors varies depending on the model and the control of the service power supply for sensors varies depending on the model and the control of the service power supply for sensors varies depending on the model and the control of the control of the service power supply for sensors varies depending on the model and the control of the service power supply for sensors varies depending on the model and the control of the service power supply for sensors varies depending on the model and the control of the service power supply for sensors varies depending on the model and the control of the service power supply for sensors varies depending on the model and the control of the service power supply for sensors varies depending on the model and the control of the service power supply for sensors varies depending on the model and the control of the service power supply for sensors varies depending on the model and the control of the service power supply for sensors varies are control of the service power supply for sensors varies are control of the service power supply for sensors are control of the service power supply for sensors are control of the service power supply for sensors are control of the service power supply for sensors are control of the service power supply for sensors are control of the service power supply for sensors are control of the service power supply for sensors are control of the service power supply for sensors are control of the service power supply for sensors are control of the service power supply for sensors are control of the service power supply for sensors are control of the service power supply for sensors are control of the service power supply for sensors are control of the sensors are control of the service power supply for sensors are c
 - 3) Note that the output current of the service power supply for sensors varies depending on the model and the absence/presence of extension blocks. If an overload occurs, the voltage automatically drops, inputs in the PLC are disabled, and all outputs are turned off. External circuits and mechanisms should be designed to ensure safe machinery operation in such a case.
 - 4) Note that when an error occurs in a relay, triac or transistor output device, the output could be held either on or off. For output signals that may lead to serious accidents, external circuits and mechanisms should be designed to ensure safe machinery operation in such a case.

ACAUTION

- Do not bundle the control line together with or lay it close to the main circuit or power line. As a guideline, lay the
 control line at least 100mm (3.94") or more away from the main circuit or power line.
 Noise may cause malfunctions.
- Install module so that excessive force will not be applied to the built-in programming port, power connectors, I/O connectors, communication connectors, or communication cables.
 Failure to do so may result in wire damage/breakage or PLC failure.

2. SECURITY PRECAUTIONS

WARNING

To maintain the security (confidentiality, integrity, and availability) of the programmable controller and the system
against unauthorized access, denial-of-service (DoS) attacks, computer viruses, and other cyberattacks from
unreliable networks and devices via network, take appropriate measures such as firewalls, virtual private networks
(VPNs), and antivirus solutions.

Safety Precaution

(Read these precautions before use.)

3. WIRING PRECAUTIONS

WARNING

- Make sure to cut off all phases of the power supply externally before attempting installation or wiring work. Failure to do so may cause electric shock or damage to the product.
- Make sure to attach the terminal cover, offered as an accessory, before turning on the power or initiating operation after installation or wiring work.

Failure to do so may cause electric shock.

CAUTION

- Make sure to observe the following precautions in order to prevent any damage to the machinery or accidents due to abnormal data written to the PLC under the influence of noise:
 - 1) Do not bundle the main circuit line together with or lay it close to the main circuit, high-voltage line or load line. Otherwise, noise disturbance and/or surge induction are likely to take place. As a guideline, lay the control line at least 100mm (3.94") or more away from the main circuit or high-voltage lines.
 - 2) Ground the shield wire or shield of the shielded cable at one point on the PLC. However, do not use common grounding with heavy electrical systems.
- Make sure to properly wire the terminal block in accordance with the following precautions. Failure to do so may cause electric shock, equipment failures, a short-circuit, wire breakage, malfunctions, or damage to the product.
 - The disposal size of the cable end should follow the dimensions described in the manual.
 - Tightening torque should follow the specifications in the manual.
 - Tighten the screws using a Phillips-head screwdriver No.2 (shaft diameter 6mm (0.24") or less). Make sure that the screwdriver does not touch the partition part of the terminal block.
- Make sure to properly wire to the terminal block (European type) in accordance with the following precautions. Failure to do so may cause electric shock, equipment failures, a short-circuit, wire breakage, malfunctions, or damage to the product.
 - The disposal size of the cable end should follow the dimensions described in the manual.
 - Tightening torque should follow the specifications in the manual.
 - Twist the end of strand wire and make sure that there are no loose wires.
 - Do not solder-plate the electric wire ends.
 - Do not connect more than the specified number of wires or electric wires of unspecified size.
 - Affix the electric wires so that neither the terminal block nor the connected parts are directly stressed.

4. STARTUP AND MAINTENANCE PRECAUTIONS



- Do not touch any terminal while the PLC's power is on.
 - Doing so may cause electric shock or malfunctions.
- Before cleaning or retightening terminals, cut off all phases of the power supply externally. Failure to do so may cause electric shock.
- Before modifying or disrupting the program in operation or running the PLC, carefully read through this manual and the associated manuals and ensure the safety of the operation.
 - An operation error may damage the machinery or cause accidents.
- Do not change the program in the PLC from two or more peripheral equipment devices at the same time. (i.e. from a programming tool and a GOT)
 - Doing so may cause destruction or malfunction of the PLC program.

CAUTION

- Do not disassemble or modify the PLC.
 - Doing so may cause fire, equipment failures, or malfunctions.
 - For repair, contact your local Mitsubishi Electric representative.
- Turn off the power to the PLC before connecting or disconnecting any extension cable.
- Failure to do so may cause equipment failures or malfunctions.
- Turn of the power to the PLC before attaching or detaching the peripheral devices, expansion boards, special adapters, and expansion memory cassette.
 - Failure to do so may cause equipment failures or malfunctions.

FX Series Programmable Controllers User's Manual [Data Communication Edition]

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Foreword

This manual explains the "serial communication" provided for MELSEC-F FX Series Programmable Controllers and should be read and understood before attempting to install or use the unit. Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

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Outline Precautions

- This manual provides information for the use of the FX Series Programmable Controllers. The manual has been written to be used by trained and competent personnel. The definition of such a person or persons is as follows:
 - Any engineer who is responsible for the planning, design and construction of automatic equipment using the product associated with this manual should be of a competent nature, trained and qualified to the local and national standards required to fulfill that role. These engineers should be fully aware of all aspects of safety aspects regarding to automated equipment.
 - 2) Any commissioning or maintenance engineer must be of a competent nature, trained and qualified to the local and national standards required to fulfill the job. These engineers should also be trained in the use and maintenance of the completed product. This includes being familiar with all associated manuals and documentation for the product. All maintenance should be carried out in accordance with established safety practices.
 - 3) All operators of the completed equipment should be trained to use that product in a safe and coordinated manner in compliance with established safety practices. The operators should also be familiar with documentation that is connected with the actual operation of the completed equipment.

Note: The term 'completed equipment' refers to a third party constructed device that contains or uses the product associated with this manual

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine
 or passenger movement vehicles, consult with Mitsubishi Electric.
- This product has been manufactured under strict quality control. However when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions into the system.
- When combining this product with other products, please confirm the standards and codes of regulation to which the user should follow. Moreover, please confirm the compatibility of this product with the system, machines, and apparatuses to be used.
- If there is doubt at any stage during installation of the product, always consult a professional electrical engineer who is qualified and trained in the local and national standards. If there is doubt about the operation or use, please consult your local Mitsubishi Electric representative.
- Since the examples within this manual, technical bulletin, catalog, etc. are used as reference; please use it after confirming the function and safety of the equipment and system. Mitsubishi Electric will not accept responsibility for actual use of the product based on these illustrative examples.
- The content, specification etc. of this manual may be changed for improvement without notice.
- The information in this manual has been carefully checked and is believed to be accurate; however, if you notice any doubtful point, error, etc., please contact your local Mitsubishi Electric representative.

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Table of Contents

A.Common Items	
1. Introduction	A-1
1.1 Communication Types	A-1
1.2 Outline and Features of Communication Types	
1.2.1 CC-Link Network	
1.2.2 Ethernet communication.	
1.2.3 N:N Network	A-7
1.2.4 Parallel Link	
1.2.5 Computer Link	
1.2.6 Inverter Communication	
1.2.7 Non-protocol Communication	
1.2.8 MODBUS Communication	A-12
1.2.9 Programming Communication	
1.2.10 Remote Maintenance	
1.2.11 CC-Link/LT Network	A-17
1.2.12 AnyWireASLINK	
1.2.13 AS-i system	
1.2.14 Internet Mail Sending	
1.2.15 Short Mail Sending	
2. Communication Types and Communication Equipment	A-23
	۸ ۵۵
2.1 Relationship between Equipment and Communication Types	
2.2 Communication Equipment Applicability Map	A-24
2.2 Communication Equipment Applicability Map	A-24 A-24
2.2 Communication Equipment Applicability Map	A-24 A-24 A-28
2.2 Communication Equipment Applicability Map	A-24 A-24 A-28 A-30
2.2 Communication Equipment Applicability Map	A-2 ² A-2 ² A-28 A-30 A-32
2.2 Communication Equipment Applicability Map	A-24 A-24 A-28 A-30 A-32 A-34
2.2 Communication Equipment Applicability Map 2.2.1 FX3U and FX3UC (D, DS, DSS) PLCs 2.2.2 FX3UC-32MT-LT(-2) PLCs 2.2.3 FX3G and FX3GC PLCs 2.2.4 FX3S PLC 2.2.5 FX2N and FX2NC PLCs 2.2.6 FX1S, FX1N, and FX1NC PLCs	A-24 A-24 A-28 A-30 A-32 A-34 A-36
2.2 Communication Equipment Applicability Map	A-24 A-24 A-28 A-30 A-32 A-34 A-36 A-36 A-38
2.2 Communication Equipment Applicability Map 2.2.1 FX3U and FX3UC (D, DS, DSS) PLCs 2.2.2 FX3UC-32MT-LT(-2) PLCs 2.2.3 FX3G and FX3GC PLCs 2.2.4 FX3S PLC 2.2.5 FX2N and FX2NC PLCs 2.2.6 FX1S, FX1N, and FX1NC PLCs 2.2.7 FX0N PLCs 2.2.8 FX1, FX2(FX), FX2C, FX0 and FX0S PLCs (reference)	A-24 A-28 A-30 A-30 A-34 A-36 A-36 A-38 A-38
2.2 Communication Equipment Applicability Map	A-2 ² A-28 A-30 A-32 A-36 A-36 A-38 A-38 A-38 A-40
2.2 Communication Equipment Applicability Map	A-24 A-26 A-27 A-28 A-30 A-32 A-36 A-36 A-38 A-38 A-38 A-40 A-40
2.2 Communication Equipment Applicability Map	A-24 A-26 A-30 A-32 A-36 A-36 A-38 A-38 A-40 A-40 A-41
2.2 Communication Equipment Applicability Map	A-2 ² A-2 ² A-28 A-30 A-32 A-36 A-36 A-36 A-36 A-40 A-40 A-41 A-43
2.2 Communication Equipment Applicability Map	A-2 ² A-2 ² A-2 ² A-30 A-32 A-36 A-36 A-36 A-40 A-40 A-41 A-43 A-45 A-45 A-46 A-47
2.2 Communication Equipment Applicability Map 2.2.1 FX3U and FX3UC (D, DS, DSS) PLCs	A-24 A-24 A-28 A-30 A-32 A-34 A-36 A-38 A-40 A-40 A-41 A-43 A-45 A-45 A-47
2.2 Communication Equipment Applicability Map 2.2.1 FX3U and FX3UC (D, DS, DSS) PLCs 2.2.2 FX3UC-32MT-LT(-2) PLCs 2.2.3 FX3G and FX3GC PLCs 2.2.4 FX3S PLC 2.2.5 FX2N and FX2NC PLCs 2.2.6 FX1S, FX1N, and FX1NC PLCs 2.2.7 FX0N PLCs 2.2.8 FX1, FX2(FX), FX2C, FX0 and FX0S PLCs (reference) 2.3 Combination of Communication Equipment (Block Diagram). 2.3.1 How to look at combination pages 2.3.2 For FX3U Series 2.3.3 For FX3UC(D, DS, DSS) Series 2.3.4 For FX3UC-32MT-LT(-2) 2.3.5 For FX3G Series 2.3.6 For FX3GC Series	A-24 A-28 A-30 A-30 A-32 A-36 A-36 A-38 A-40 A-40 A-41 A-43 A-45 A-45 A-50
2.2 Communication Equipment Applicability Map 2.2.1 FX3U and FX3UC (D, DS, DSS) PLCs 2.2.2 FX3UC-32MT-LT(-2) PLCs 2.2.3 FX3G and FX3GC PLCs 2.2.4 FX3S PLC 2.2.5 FX2N and FX2NC PLCs 2.2.6 FX1S, FX1N, and FX1NC PLCs 2.2.7 FX0N PLCs 2.2.8 FX1, FX2(FX), FX2C, FX0 and FX0S PLCs (reference) 2.3 Combination of Communication Equipment (Block Diagram). 2.3.1 How to look at combination pages 2.3.2 For FX3U Series 2.3.3 For FX3UC(D, DS, DSS) Series 2.3.4 For FX3UC-32MT-LT(-2) 2.3.5 For FX3G Series 2.3.6 For FX3G Series 2.3.7 For FX3S Series	A-24 A-28 A-30 A-30 A-36 A-36 A-38 A-40 A-40 A-41 A-45 A-45 A-50 A-50 A-52
2.2 Communication Equipment Applicability Map 2.2.1 FX3U and FX3UC (D, DS, DSS) PLCs 2.2.2 FX3UC-32MT-LT(-2) PLCs 2.2.3 FX3G and FX3GC PLCs 2.2.4 FX3S PLC 2.2.5 FX2N and FX2NC PLCs 2.2.6 FX1S, FX1N, and FX1NC PLCs 2.2.7 FX0N PLCs 2.2.8 FX1, FX2(FX), FX2C, FX0 and FX0S PLCs (reference) 2.3 Combination of Communication Equipment (Block Diagram). 2.3.1 How to look at combination pages 2.3.2 For FX3U Series 2.3.3 For FX3UC(D, DS, DSS) Series 2.3.4 For FX3UC-32MT-LT(-2) 2.3.5 For FX3G Series 2.3.6 For FX3G Series 2.3.7 For FX3S Series 2.3.8 For FX2N Series	A-24 A-28 A-30 A-30 A-36 A-36 A-38 A-38 A-40 A-40 A-41 A-45 A-45 A-50 A-50 A-52
2.2 Communication Equipment Applicability Map 2.2.1 FX3U and FX3UC (D, DS, DSS) PLCs 2.2.2 FX3UC-32MT-LT(-2) PLCs 2.2.3 FX3G and FX3GC PLCs 2.2.4 FX3S PLC 2.2.5 FX2N and FX2NC PLCs 2.2.6 FX1S, FX1N, and FX1NC PLCs 2.2.7 FX0N PLCs 2.2.8 FX1, FX2(FX), FX2C, FX0 and FX0S PLCs (reference) 2.3 Combination of Communication Equipment (Block Diagram). 2.3.1 How to look at combination pages 2.3.2 For FX3U Series 2.3.3 For FX3UC(D, DS, DSS) Series 2.3.4 For FX3UC-32MT-LT(-2) 2.3.5 For FX3G Series 2.3.6 For FX3G Series 2.3.7 For FX3S Series 2.3.8 For FX2N Series 2.3.9 For FX2NC Series	A-22 A-22 A-26 A-30 A-32 A-36 A-36 A-36 A-40 A-41 A-47 A-45 A-50 A-50 A-55
2.2 Communication Equipment Applicability Map 2.2.1 FX3U and FX3UC (D, DS, DSS) PLCs. 2.2.2 FX3UC-32MT-LT(-2) PLCs 2.2.3 FX3G and FX3GC PLCs. 2.2.4 FX3S PLC. 2.2.5 FX2N and FX2NC PLCs. 2.2.6 FX1S, FX1N, and FX1NC PLCs. 2.2.7 FX0N PLCs. 2.2.8 FX1, FX2(FX), FX2C, FX0 and FX0S PLCs (reference). 2.3 Combination of Communication Equipment (Block Diagram). 2.3.1 How to look at combination pages. 2.3.2 For FX3U Series. 2.3.3 For FX3UC(D, DS, DSS) Series. 2.3.4 For FX3UC-32MT-LT(-2). 2.3.5 For FX3G Series. 2.3.6 For FX3G Series. 2.3.7 For FX3S Series. 2.3.8 For FX2N Series. 2.3.9 For FX2N Series. 2.3.9 For FX2NC Series. 2.3.10 For FX1N Series.	A-22 A-22 A-26 A-30 A-32 A-36 A-36 A-36 A-40 A-40 A-40 A-45 A-55 A-55 A-55
2.2 Communication Equipment Applicability Map 2.2.1 FX3U and FX3UC (D, DS, DSS) PLCs. 2.2.2 FX3UC-32MT-LT(-2) PLCs 2.2.3 FX3G and FX3GC PLCs. 2.2.4 FX3S PLC. 2.2.5 FX2N and FX2NC PLCs. 2.2.6 FX1S, FX1N, and FX1NC PLCs. 2.2.7 FX0N PLCs. 2.2.8 FX1, FX2(FX), FX2C, FX0 and FX0S PLCs (reference). 2.3 Combination of Communication Equipment (Block Diagram). 2.3.1 How to look at combination pages. 2.3.2 For FX3U Series. 2.3.3 For FX3UC(D, DS, DSS) Series. 2.3.4 For FX3UC-32MT-LT(-2). 2.3.5 For FX3G Series. 2.3.6 For FX3G Series. 2.3.7 For FX3S Series. 2.3.8 For FX2N Series. 2.3.9 For FX2N Series. 2.3.10 For FX1N Series. 2.3.11 For FX1NC Series.	A-2 ² A-28 A-30 A-32 A-36 A-36 A-38 A-40 A-40 A-41 A-45 A-50 A-55 A-56 A-56 A-56
2.2 Communication Equipment Applicability Map. 2.2.1 FX3U and FX3UC (D, DS, DSS) PLCs. 2.2.2 FX3UC-32MT-LT(-2) PLCs. 2.2.3 FX3G and FX3GC PLCs. 2.2.4 FX3S PLC. 2.2.5 FX2N and FX2NC PLCs. 2.2.6 FX1S, FX1N, and FX1NC PLCs. 2.2.7 FX0N PLCs. 2.2.8 FX1, FX2(FX), FX2C, FX0 and FX0S PLCs (reference). 2.3 Combination of Communication Equipment (Block Diagram). 2.3.1 How to look at combination pages. 2.3.2 For FX3U Series. 2.3.3 For FX3UC(D, DS, DSS) Series. 2.3.4 For FX3UC-32MT-LT(-2). 2.3.5 For FX3G Series. 2.3.6 For FX3G Series. 2.3.7 For FX3S Series. 2.3.8 For FX2N Series. 2.3.9 For FX1N Series. 2.3.10 For FX1N Series. 2.3.11 For FX1NC Series. 2.3.12 For FX1S Series.	A-22 A-22 A-26 A-30 A-32 A-36 A-36 A-36 A-40 A-40 A-40 A-45 A-50 A-50 A-50 A-50 A-50 A-50 A-50 A-5
2.2 Communication Equipment Applicability Map 2.2.1 FX3U and FX3UC (D, DS, DSS) PLCs. 2.2.2 FX3UC-32MT-LT(-2) PLCs 2.2.3 FX3G and FX3GC PLCs. 2.2.4 FX3S PLC. 2.2.5 FX2N and FX2NC PLCs. 2.2.6 FX1S, FX1N, and FX1NC PLCs. 2.2.7 FX0N PLCs. 2.2.8 FX1, FX2(FX), FX2C, FX0 and FX0S PLCs (reference). 2.3 Combination of Communication Equipment (Block Diagram). 2.3.1 How to look at combination pages. 2.3.2 For FX3U Series 2.3.3 For FX3UC(D, DS, DSS) Series. 2.3.4 For FX3UC-32MT-LT(-2) 2.3.5 For FX3G Series 2.3.6 For FX3G Series 2.3.7 For FX3S Series 2.3.8 For FX2N Series 2.3.9 For FX2N Series 2.3.10 For FX1N Series 2.3.11 For FX1NC Series	A-2 A-2 A-3 A-3 A-3 A-3 A-3 A-3 A-4 A-4 A-4 A-4 A-5 A-5 A-5 A-5 A-6 A-6

3. Outline of Communication Setting in the FX Series	A-65
3.1 Setting Method	A-65
3.2 Communication Setting Using Parameter Method (GX Works2)	A-67
3.2.1 Operating procedure	
3.2.2 Correspondence between parameter setting and each communication type	A-68
3.3 Communication Setting in Parameter Method (FXGP/WIN)	
3.3.1 Operating procedure	
3.3.2 Correspondence between parameter setting and each communication type	
3.4 Extension of Ports (For FX3G, FX3GC, FX3U, FX3UC)	A-72
3.4.1 Extension of Port (For FX3G, FX3GC PLC)	
3.4.2 Extension of Port (For FX3U, FX3UC PLC)	
3.4.3 Limitation when ch1 and ch2 are used at the same time	A-75
4. Version Number	A-76
4.1 Manufacturer's serial number check method	A-76
4.1.1 Checking the nameplate	A-76
4.1.2 Checking the front of the product	A-77
4.2 Version check	A-77
5. Introduction of Manuals (Type, Reading Method and Acquisition Method)	A-78
5.1 Rank and Use Method of This Manual	A-78
5.2 Introduction of Related Manuals	A-79
5.2.1 Manual for communication types in FX PLCs	
5.2.2 Manuals related to FX PLCs	
5.2.3 Communication equipment (option)	A-82
5.2.4 Related options for communication	A-84
6. Abbreviations, Generic Names and Terms Used in This Manual	A-85

B. N:N Network

1.	Outline	B-3
	1.1 Outline of System	B-3
	1.2 Procedures Before Operation	
	1.3 Communication Type Applicability in PLC	
	1.3.1 Applicable versions	
	1.3.2 Version check	
	1.3.3 How to look at the manufacturer's serial number 1.3.4 Products whose production was stopped	
	1.4 Programming Tool Applicability	
	1.4.1 For applicable versions	
	1.4.2 For non-applicable versions (setting an alternative model)	
2.	Specifications	B-9
	2.1 Communication Specifications (Reference)	
	2.2 Link Specifications	
	2.2.1 Link patterns and number of link points in each FX Series	
	Z.Z.Z LITK UTTE	D-11
3.	System Configuration and Equipment Selection	B-12
	3.1 System Configuration	B-12
	3.2 Applicable FX PLC and Communication Equipment	
	o.z yppiisasio i X i zo and commanisation zgapinont	
4.	Wiring	B-18
	-	2 .0
	4.1 Wiring Procedure	
	4.1 Wiring Procedure	B-18
	4.1 Wiring Procedure	B-18 B-19
	4.2 Selecting Cables and Terminal Resistors 4.2.1 Twisted pair cable	B-18 B-19 B-19
	4.2 Selecting Cables and Terminal Resistors 4.2.1 Twisted pair cable	B-18 B-19 B-19 B-19
	4.2 Selecting Cables and Terminal Resistors 4.2.1 Twisted pair cable	B-18 B-19 B-19 B-19 B-20 B-22
	4.2 Selecting Cables and Terminal Resistors 4.2.1 Twisted pair cable 4.2.2 10BASE-T cable 4.2.3 Connecting cables 4.2.4 Connecting terminal resistors 4.3 Connection Diagram	B-18 B-19 B-19 B-19 B-20 B-22 B-23
	4.2 Selecting Cables and Terminal Resistors 4.2.1 Twisted pair cable	B-18 B-19 B-19 B-19 B-20 B-22 B-23
	4.2 Selecting Cables and Terminal Resistors 4.2.1 Twisted pair cable 4.2.2 10BASE-T cable 4.2.3 Connecting cables 4.2.4 Connecting terminal resistors 4.3 Connection Diagram	B-18 B-19 B-19 B-19 B-20 B-22 B-23
	4.2 Selecting Cables and Terminal Resistors 4.2.1 Twisted pair cable	B-18 B-19 B-19 B-19 B-20 B-22 B-23 B-25 B-26
	4.2 Selecting Cables and Terminal Resistors 4.2.1 Twisted pair cable	B-18 B-19 B-19 B-19 B-20 B-22 B-23 B-25 B-26
	4.2 Selecting Cables and Terminal Resistors 4.2.1 Twisted pair cable	B-18 B-19 B-19 B-19 B-20 B-22 B-23 B-25 B-26 B-26 B-26
	4.2 Selecting Cables and Terminal Resistors 4.2.1 Twisted pair cable	B-18 B-19 B-19 B-19 B-20 B-22 B-23 B-25 B-26 B-26 B-27 B-27
	4.2 Selecting Cables and Terminal Resistors 4.2.1 Twisted pair cable	B-18 B-19 B-19 B-19 B-20 B-22 B-23 B-25 B-26 B-26 B-26 B-27 B-27 B-28
5.	4.2 Selecting Cables and Terminal Resistors 4.2.1 Twisted pair cable 4.2.2 10BASE-T cable 4.2.3 Connecting cables 4.2.4 Connecting terminal resistors 4.3 Connection Diagram 4.4 Grounding Communication Setting (Initialization) in FX Programmable Controller 5.1 Check Procedure 5.2 Communication Setting Using Parameter Method (GX Works2) 5.2.1 Operating procedure 5.3 Communication Settings Using Parameter Method (FXGP/WIN)	B-18 B-19 B-19 B-19 B-20 B-22 B-23 B-25 B-26 B-26 B-26 B-27 B-27 B-28
5.	4.2 Selecting Cables and Terminal Resistors 4.2.1 Twisted pair cable. 4.2.2 10BASE-T cable. 4.2.3 Connecting cables. 4.2.4 Connecting terminal resistors. 4.3 Connection Diagram 4.4 Grounding. Communication Setting (Initialization) in FX Programmable Controller 5.1 Check Procedure 5.2 Communication Setting Using Parameter Method (GX Works2) 5.2.1 Operating procedure 5.3 Communication Settings Using Parameter Method (FXGP/WIN) 5.3.1 Operating procedure Test Run (Communication Test)	B-18 B-19 B-19 B-19 B-20 B-22 B-23 B-25 B-26 B-26 B-27 B-27 B-28 B-28
5.	4.2 Selecting Cables and Terminal Resistors 4.2.1 Twisted pair cable	B-18 B-19 B-19 B-19 B-20 B-22 B-23 B-25 B-26 B-26 B-27 B-27 B-28 B-28 B-29
5.	4.2 Selecting Cables and Terminal Resistors 4.2.1 Twisted pair cable. 4.2.2 10BASE-T cable. 4.2.3 Connecting cables. 4.2.4 Connecting terminal resistors. 4.3 Connection Diagram 4.4 Grounding. Communication Setting (Initialization) in FX Programmable Controller 5.1 Check Procedure 5.2 Communication Setting Using Parameter Method (GX Works2) 5.2.1 Operating procedure 5.3 Communication Settings Using Parameter Method (FXGP/WIN) 5.3.1 Operating procedure Test Run (Communication Test)	B-18 B-19 B-19 B-19 B-20 B-22 B-23 B-25 B-26 B-26 B-27 B-27 B-28 B-28 B-29 B-31

7. Creating Programs	B-33
7.1 Checking Contents of Related Devices	
7.2 Creating Programs for Master Station (Station No. 0)	
7.3 Creating Programs for Slave Station (Station No. "n")	B-38
7.4 Cautions on Program Creation	B-40
8. Practical Program Examples	B-41
8.1 Practical Example 1 (Pattern 2)	
8.1.1 System configuration example	
8.1.2 Contents of operations and corresponding program numbers	
8.1.3 Setting contents	
8.1.5 Setting program for slave station (No. 1)	
8.1.6 Setting program for slave station (No. 2)	
9. Troubleshooting	B-48
9.1 Checking FX PLC Version Applicability	B-48
9.2 Checking Communication Status Based on LED Indication	B-48
9.3 Checking Installation and Wiring	B-48
9.4 Checking Sequence Program	B-48
9.5 Checking Setting Contents and Errors	B-50
9.6 Checking Absence/Presence of Data Transfer Errors	
9.6.1 Check while data transfer sequence is being executed	
9.6.2 Checking data transfer sequence errors	
9.6.3 Checking error codes	B-51
10. Related Data	B-54
10.1 Related Device List	B-54
10.1.1 For FX1N, FX1NC, FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs	
10.1.2 For FX0N and FX1S PLCs	B-58
10.2 Details of Related Devices	
10.2.1 Parameter setting [M8038]	
10.2.2 Channel setting [M8179]	B-60
10.2.3 Serial communication error [M8063 and M8438]	B-60
10.2.3 Serial communication error [M8063 and M8438]	B-60 B-61
10.2.3 Serial communication error [M8063 and M8438]	B-60 B-61 B-61
10.2.3 Serial communication error [M8063 and M8438]	B-60 B-61 B-61
10.2.3 Serial communication error [M8063 and M8438]	B-60 B-61 B-61 B-61 B-62 B-62
10.2.3 Serial communication error [M8063 and M8438]	B-60 B-61 B-61 B-61 B-62 B-62 B-62
10.2.3 Serial communication error [M8063 and M8438]	B-60 B-61 B-61 B-61 B-62 B-62 B-62 B-62 B-62 B-62
10.2.3 Serial communication error [M8063 and M8438]	B-60 B-61 B-61 B-61 B-62 B-62 B-62 B-62 B-62 B-62 B-63
10.2.3 Serial communication error [M8063 and M8438]	B-60 B-61 B-61 B-61 B-62 B-62 B-62 B-62 B-62 B-63 B-63
10.2.3 Serial communication error [M8063 and M8438]	B-60 B-61 B-61 B-61 B-62 B-62 B-62 B-62 B-63 B-63 B-63 B-64
10.2.3 Serial communication error [M8063 and M8438]	B-60 B-61 B-61 B-61 B-62 B-62 B-62 B-62 B-63 B-63 B-63 B-64 B-64
10.2.3 Serial communication error [M8063 and M8438]	B-60 B-61 B-61 B-61 B-62 B-62 B-62 B-62 B-63 B-63 B-63 B-64 B-64
10.2.3 Serial communication error [M8063 and M8438]	B-60 B-61 B-61 B-61 B-62 B-62 B-62 B-62 B-63 B-63 B-64 B-64 B-64 B-65 B-65
10.2.3 Serial communication error [M8063 and M8438]	B-60 B-61 B-61 B-61 B-62 B-62 B-62 B-62 B-63 B-63 B-64 B-64 B-64 B-65 B-65 B-65

C. Parallel Link

1.	Outline	C-3
	1.1 Outline of System	
	1.2 Procedures Before Operation	
	1.3 Communication Type Applicability in PLC	
	1.3.1 Applicable versions	
	1.3.2 Version check	
	1.3.3 Products whose production was stopped	
	1.4 Programming Tool Applicability	
	1.4.1 For applicable versions	
	1.4.2 1 of Horr-applicable versions (setting all alternative moder)	0-0
2.	Specifications	C-9
	2.1 Communication Specifications (Reference)	
	2.2 Link Specifications	
	2.2.1 PLC communication type applicability status	
	2.2.2 Link time	
	2.3 Link Device Numbers and Number of Points	
	2.3.2 For FX2(FX), FX2C, FX1N, FX1NC, FX2N, FX2NC, FX3G, FX3GC, FX3U and FX3UC S	
	2.3.2 1 3 1 A2(1 A), 1 A23, 1 A114, 1 A1146, 1 A214, 1 A2146, 1 A30, 1 A306, 1 A30 and 1 A300 0	C11C3 O-12
3.	System Configuration and Selection	C-13
	3.1 System Configuration	C-13
	3.1.1 Rule for connection	C-13
	3.2 Configuration of Each Group	C-14
	3.3 Applicable FX PLC and Communication Equipment	C-18
4.	Wiring	C-24
	4.1 Wiring Procedure	
	4.2 Selecting Cables and Terminal Resistors	C-25
	4.2.1 Twisted pair cable	
	4.2.2 10BASE-T cable	
	4.2.3 Connecting cables	
	4.2.4 Optical fiber cable	
	4.2.5 Connecting terminal resistors	
	4.3 Connection Diagram	
	4.3.2 For FX1S, FX1N, FX1NC, FX2N and FX2NC PLCs	
	4.3.3 For FX2(FX) and FX2C PLCs	
	4.4 Grounding	
	Creationing	O-01
5.	Communication Setting (Initialization) in FX Programmable Controller	C-32
	5.1 Check Procedure	C-32
	5.2 Communication Setting Using Parameter Method (GX Works2)	C-33
	5.2.1 Operating procedure	
	5.3 Communication Setting Using Parameter Method (FXGP/WIN)	
	5.3.1 Operating procedure	

6. Test Run (Communication Test)	-35
6.1 Test Procedure	C-36 C-36
7. Creating Programs	-38
7.1 Regular Parallel Link Mode	C-38 C-40 C-41 C-42 C-42 C-44 C-45
8. Practical Program Examples	-47
8.1 Practical Example 1 (Regular Parallel Link Mode)	C-47 C-47 C-48
9. Troubleshooting	-49
9.1 Checking FX PLC Version Applicability	C-49 C-49 C-49
10. Related Data	-52
10.1 Related Device List	C-53

D. Computer Link

1. Outline	D-3
1.1 Outline of System	D-3
1.2 Procedures Before Operation	D-4
1.3 Communication Type Applicability in PLC	
1.3.1 Applicable versions	
1.3.2 Version check	
1.3.3 How to look at the manufacturer's serial number	
1.3.4 Products whose production was stopped	
1.4 Programming Tool Applicability	
1.4.1 For applicable versions	
1.4.2 For non-applicable versions (setting an alternative model)	D-8
2. Specifications	D-9
2.1 Communication Specifications (Reference)	D-9
2.2 Link Specifications	
2.2.1 Applicable commands and number of device points	
2.2.2 Applicable device ranges	
2.2.3 Link time	D-13
3. System Configuration and Equipment Selection	D-14
3.1 System Configuration	D-14
3.2 Applicable FX PLC and Communication Equipment	D-15
3.2.1 For communication in accordance with RS-232C	
3.2.2 For communication in accordance with RS-485	D-21
4. Wiring	D-27
· · · · · · · · · · · · · · · · · ·	
4.1 Wiring Procedure	
4.2 Selecting Connection Method	
4.2.1 For communication in accordance with RS-232C (1-to-1 connection)	
4.2.2 For communication in accordance with RS-485 (RS-422) (1-to-N connection)	
4.3 Selecting Cables and Terminal Resistors (RS-485)	
4.3.1 Twisted pair cable	
4.3.3 Connecting cables	
4.3.4 Connecting terminal resistors	
4.4 Connection Diagram for RS-232C	
4.4.1 Connection diagram between FX PLC and personal computer	
4.4.2 Connection diagram between FX-485PC-IF and personal computer	
4.5 Connection Diagram for RS-485 and RS-422	
4.5.1 One-pair wiring	
4.5.2 Two-pair wiring	
4.5.3 Switching of 1 pair / 2 paired wiring (FX3G-485-BD-RJ)	
4.6 Grounding	D-39

5. Communication Setting in FX Programmable Controller	D-40
5.1 Communication Setting Methods	D-40
5.2 Communication Setting Using Parameter Method (GX Works2)	D-41
5.2.1 Operating procedure	D-41
5.3 Communication Settings Using Parameter Method (FXGP/WIN)	D-43
5.3.1 Operating procedure	D-43
6. Control Procedures and Setting Methods	D-45
6.1 Data Flow by Link	D-45
6.2 Important Points in Computer Link	
6.2.1 Operations of PLC caused by data transfer	
6.3 How to Understand Control Procedure	D-47
6.4 Basic Formats of Dedicated Protocol	
6.4.1 Control procedure format 1	
6.4.2 Control procedure format 4	
6.4.3 Contents of set items in each control procedure (protocol)	
6.4.4 Time-out time setting	
6.5 Transfer Sequence Time Chart and Communication Time	
6.5.1 When computer reads data from PLC	
6.5.2 When computer writes data to PLC	
6.6 Transfer Data in Character Area	
6.6.1 When bit device memory is read or written	
6.6.2 When word device memory is read or written	
0.0.2 Whom word do not mornerly to road or whiten	
7. Commands	D-58
7. Commands 7.1 BR Command [Reads Device Memory in 1-Bit Units]	
	D-59
7.1 BR Command [Reads Device Memory in 1-Bit Units]	D-59 D-60
7.1 BR Command [Reads Device Memory in 1-Bit Units]	D-59 D-60 D-62
7.1 BR Command [Reads Device Memory in 1-Bit Units]	D-59 D-60 D-62 D-64
7.1 BR Command [Reads Device Memory in 1-Bit Units]	D-59 D-60 D-62 D-64 D-65
7.1 BR Command [Reads Device Memory in 1-Bit Units]	D-59 D-60 D-62 D-64 D-65 D-67
7.1 BR Command [Reads Device Memory in 1-Bit Units]	D-59 D-60 D-62 D-64 D-65 D-67
7.1 BR Command [Reads Device Memory in 1-Bit Units]	D-59 D-60 D-62 D-64 D-65 D-67 D-69 D-70
7.1 BR Command [Reads Device Memory in 1-Bit Units]	D-59 D-60 D-62 D-64 D-65 D-67 D-69 D-70
7.1 BR Command [Reads Device Memory in 1-Bit Units]	D-59 D-60 D-62 D-64 D-65 D-67 D-69 D-70 D-72
7.1 BR Command [Reads Device Memory in 1-Bit Units]	D-59 D-60 D-62 D-64 D-65 D-67 D-69 D-70 D-72 D-73
7.1 BR Command [Reads Device Memory in 1-Bit Units]	D-59 D-60 D-62 D-64 D-65 D-67 D-69 D-70 D-72 D-73 D-73 D-73
7.1 BR Command [Reads Device Memory in 1-Bit Units]	D-59 D-60 D-62 D-64 D-65 D-67 D-69 D-70 D-72 D-73 D-73 D-73 D-73
7.1 BR Command [Reads Device Memory in 1-Bit Units]	D-59 D-60 D-62 D-64 D-65 D-67 D-69 D-70 D-72 D-73 D-73 D-73 D-73 D-74 D-75
7.1 BR Command [Reads Device Memory in 1-Bit Units]	D-59 D-60 D-62 D-64 D-65 D-67 D-69 D-70 D-72 D-73 D-73 D-73 D-74 D-75
7.1 BR Command [Reads Device Memory in 1-Bit Units]	D-59 D-60 D-62 D-64 D-65 D-67 D-69 D-70 D-72 D-73 D-73 D-73 D-74 D-75 D-75 D-75
7.1 BR Command [Reads Device Memory in 1-Bit Units]	D-59 D-60 D-62 D-64 D-65 D-67 D-69 D-70 D-72 D-73 D-73 D-73 D-74 D-75 D-75 D-75 D-75
7.1 BR Command [Reads Device Memory in 1-Bit Units]	D-59 D-60 D-62 D-64 D-65 D-67 D-69 D-70 D-72 D-73 D-73 D-73 D-73 D-74 D-75 D-75 D-75 D-77
7.1 BR Command [Reads Device Memory in 1-Bit Units]	D-59 D-60 D-62 D-64 D-65 D-67 D-69 D-70 D-72 D-73 D-73 D-73 D-75 D-75 D-75 D-75 D-77 D-77
7.1 BR Command [Reads Device Memory in 1-Bit Units]	D-59 D-60 D-62 D-64 D-65 D-67 D-69 D-70 D-72 D-73 D-73 D-73 D-75 D-75 D-75 D-75 D-77 D-77 D-77 D-78 D-78
7.1 BR Command [Reads Device Memory in 1-Bit Units]	D-59 D-60 D-62 D-64 D-65 D-67 D-69 D-70 D-72 D-73 D-73 D-73 D-74 D-75 D-75 D-75 D-77 D-77 D-77 D-78 D-78 D-78
7.1 BR Command [Reads Device Memory in 1-Bit Units]	D-59 D-60 D-62 D-64 D-65 D-67 D-69 D-70 D-72 D-73 D-73 D-73 D-74 D-75 D-75 D-75 D-75 D-77 D-77 D-77 D-77

8. Troubleshooting	D-86
8.1 Checking FX PLC Version Applicability	D-86
8.2 Checking Communication Status Based on LED Indication	D-86
8.3 Checking Installation and Wiring	D-86
8.4 Checking Sequence Program	
8.5 Checking Error Codes	
8.5.1 Error codes when NAK is sent	
8.5.2 Error codes in PLC	
9. Related Data	D-90
9.1 Related Device List	D-90
9.2 Details of Related Devices	D-92
9.2.1 Serial communication error [M8063 and M8438]	
9.2.2 Communication setting keep [M8120]	D-92
9.2.3 Global function ON [M8126 and M8426]	D-92
9.2.4 On-demand send processing [M8127 and M8427]	D-92
9.2.5 On-demand error flag [M8128 and M8428]	D-93
9.2.6 On-demand data word/byte changeover [M8129 and M8429]	
9.2.7 Serial communication error code [D8063 and D8438]	
9.2.8 Communication format setting [D8120 and D8420]	
9.2.9 Station number settings [D8121 and D8421]	
9.2.10 On-demand data head device number specification [D8127 and D8427]	
9.2.11 On-demand data quantity specification [D8128 and D8428]	
9.2.12 Time-out time setting [D8129 and D8429]	
9.2.13 Operation mode display [D8419 and D8439]	
9.3 Communication Setting Method Using Sequence Program	
9.3.1 Setting procedure	
9.3.2 Caution on communication setting using sequence program	
9.4 ASCII Code Table	D-99

E. Inverter Communication

1.	Outline	E-3
	1.1 Outline of System	E-3
	1.2 Procedures Before Operation	
	1.3 Communication Type Applicability in PLC	
	1.3.1 For applicable versions	
	1.3.2 Version check	
	1.3.3 How to look at the manufacturer's serial number	
	1.4 Programming Tool Applicability	
	1.4.1 For applicable versions 1.4.2 For non-applicable versions (setting an alternative model)	
	1.4.2 For non-applicable versions (setting an alternative model)	⊏-1
2.	Specifications	E-8
	2.1 Communication Specifications (Reference)	E-8
	2.2 Connectable Mitsubishi Electric General-purpose Inverters	E-8
	2.3 Link Specifications	
	2.3.1 When monitoring inverter operations (PLC ← inverter)	
	2.3.2 When controlling inverter operations (PLC → inverter)	
	2.3.3 Parameters (PLC ⇔ inverter)	
	2.4 Execution Times in Inverter Communication Instructions	
	2.4.1 Outline	
	2.4.3 Calculation method	
	2.4.0 Calculation example	
3.	System Configuration and Selection	E-16
	3.1 System Configuration	F-16
	3.1 System Configuration	
	3.1 System Configuration	
4.	· · · · · · · · · · · · · · · · · · ·	
4.	3.2 Applicable FX PLC and Communication Equipment	E-23
4.	3.2 Applicable FX PLC and Communication Equipment	E-23 E-24
4.	3.2 Applicable FX PLC and Communication Equipment	E-23 E-24 E-25 E-25
4.	3.2 Applicable FX PLC and Communication Equipment	E-23 E-24 E-25 E-25 E-26
4.	3.2 Applicable FX PLC and Communication Equipment Wiring 4.1 Wiring Procedure 4.2 Selecting Cables and Connection Devices 4.2.1 S500, E500, A500, F500, V500, D700 and E700 Series (PU connector) 4.2.2 A500, F500 and V500 Series (FR-A5NR) 4.2.3 F800, A800, F700 and A700 Series (built-in RS-485 terminal)	E-23 E-24 E-25 E-25 E-26 E-27
4.	3.2 Applicable FX PLC and Communication Equipment Wiring 4.1 Wiring Procedure	E-23 E-24 E-25 E-25 E-26 E-27 E-28
4.	 3.2 Applicable FX PLC and Communication Equipment. Wiring 4.1 Wiring Procedure	E-23 E-24 E-25 E-25 E-26 E-27 E-28 E-29
4.	 3.2 Applicable FX PLC and Communication Equipment. Wiring 4.1 Wiring Procedure	E-23 E-24 E-25 E-25 E-26 E-27 E-28 E-29 E-29
4.	 Wiring 4.1 Wiring Procedure	E-23 E-24 E-25 E-25 E-26 E-27 E-28 E-29 E-29 E-29
4.	4.1 Wiring Procedure 4.2 Selecting Cables and Connection Devices 4.2.1 S500, E500, A500, F500, V500, D700 and E700 Series (PU connector) 4.2.2 A500, F500 and V500 Series (FR-A5NR) 4.2.3 F800, A800, F700 and A700 Series (built-in RS-485 terminal) 4.2.4 E700 Series (FR-E7TR) 4.3 Connection Cables 4.3.1 10BASE-T cable 4.3.2 Twisted pair cable (recommended) 4.3.3 Connecting cables	E-23 E-24 E-25 E-25 E-26 E-27 E-28 E-29 E-29 E-29 E-30
4.	3.2 Applicable FX PLC and Communication Equipment. Wiring 4.1 Wiring Procedure 4.2 Selecting Cables and Connection Devices 4.2.1 S500, E500, A500, F500, V500, D700 and E700 Series (PU connector) 4.2.2 A500, F500 and V500 Series (FR-A5NR) 4.2.3 F800, A800, F700 and A700 Series (built-in RS-485 terminal) 4.2.4 E700 Series (FR-E7TR) 4.3 Connection Cables 4.3.1 10BASE-T cable 4.3.2 Twisted pair cable (recommended) 4.3.3 Connection Devices (RJ45 Connector and Distributor)	E-23 E-24 E-25 E-25 E-26 E-27 E-28 E-29 E-29 E-30 E-31
4.	3.2 Applicable FX PLC and Communication Equipment. Wiring 4.1 Wiring Procedure 4.2 Selecting Cables and Connection Devices 4.2.1 S500, E500, A500, F500, V500, D700 and E700 Series (PU connector) 4.2.2 A500, F500 and V500 Series (FR-A5NR) 4.2.3 F800, A800, F700 and A700 Series (built-in RS-485 terminal) 4.2.4 E700 Series (FR-E7TR) 4.3 Connection Cables 4.3.1 10BASE-T cable 4.3.2 Twisted pair cable (recommended) 4.3.3 Connecting cables 4.4 Connection Devices (RJ45 Connector and Distributor) 4.5 Connecting Terminal Resistors	E-23 E-24 E-25 E-25 E-26 E-27 E-28 E-29 E-29 E-30 E-31 E-32
4.	 4.1 Wiring Procedure 4.2 Selecting Cables and Connection Devices 4.2.1 S500, E500, A500, F500, V500, D700 and E700 Series (PU connector) 4.2.2 A500, F500 and V500 Series (FR-A5NR) 4.2.3 F800, A800, F700 and A700 Series (built-in RS-485 terminal) 4.2.4 E700 Series (FR-E7TR) 4.3 Connection Cables 4.3.1 10BASE-T cable 4.3.2 Twisted pair cable (recommended) 4.3.3 Connecting cables 4.4 Connection Devices (RJ45 Connector and Distributor) 4.5 Connecting Terminal Resistors 4.6 Wiring a Shielding Wire (Class-D grounding) 	E-23 E-24 E-25 E-25 E-26 E-27 E-28 E-29 E-29 E-29 E-30 E-31 E-32 E-33
4.	 Wiring 4.1 Wiring Procedure 4.2 Selecting Cables and Connection Devices 4.2.1 S500, E500, A500, F500, V500, D700 and E700 Series (PU connector) 4.2.2 A500, F500 and V500 Series (FR-A5NR) 4.2.3 F800, A800, F700 and A700 Series (built-in RS-485 terminal) 4.2.4 E700 Series (FR-E7TR) 4.3 Connection Cables 4.3.1 10BASE-T cable 4.3.2 Twisted pair cable (recommended) 4.3.3 Connecting cables 4.4 Connection Devices (RJ45 Connector and Distributor) 4.5 Connecting Terminal Resistors 4.6 Wiring a Shielding Wire (Class-D grounding) 4.7 Connector in Inverter 	E-23 E-24 E-25 E-25 E-26 E-27 E-28 E-29 E-29 E-30 E-31 E-31 E-32 E-33 E-34
4.	 4.1 Wiring Procedure 4.2 Selecting Cables and Connection Devices 4.2.1 S500, E500, A500, F500, V500, D700 and E700 Series (PU connector) 4.2.2 A500, F500 and V500 Series (FR-A5NR) 4.2.3 F800, A800, F700 and A700 Series (built-in RS-485 terminal) 4.2.4 E700 Series (FR-E7TR) 4.3 Connection Cables 4.3.1 10BASE-T cable 4.3.2 Twisted pair cable (recommended) 4.3.3 Connecting cables 4.4 Connection Devices (RJ45 Connector and Distributor) 4.5 Connecting Terminal Resistors 4.6 Wiring a Shielding Wire (Class-D grounding) 	E-23 E-24 E-25 E-25 E-26 E-27 E-28 E-29 E-29 E-30 E-31 E-31 E-32 E-33 E-34 E-36
4.	4.1 Wiring Procedure 4.2 Selecting Cables and Connection Devices 4.2.1 S500, E500, A500, F500, V500, D700 and E700 Series (PU connector) 4.2.2 A500, F500 and V500 Series (FR-A5NR) 4.2.3 F800, A800, F700 and A700 Series (built-in RS-485 terminal) 4.2.4 E700 Series (FR-E7TR) 4.3 Connection Cables 4.3.1 10BASE-T cable 4.3.2 Twisted pair cable (recommended) 4.3.3 Connecting cables 4.4 Connection Devices (RJ45 Connector and Distributor) 4.5 Connecting Terminal Resistors 4.6 Wiring a Shielding Wire (Class-D grounding) 4.7 Connector in Inverter. 4.8 Connection Diagram	E-23 E-24 E-25 E-25 E-26 E-27 E-28 E-29 E-29 E-30 E-31 E-31 E-32 E-34 E-34 E-36 E-36
4.	Wiring 4.1 Wiring Procedure 4.2 Selecting Cables and Connection Devices 4.2.1 S500, E500, A500, F500, V500, D700 and E700 Series (PU connector) 4.2.2 A500, F500 and V500 Series (FR-A5NR) 4.2.3 F800, A800, F700 and A700 Series (built-in RS-485 terminal) 4.2.4 E700 Series (FR-E7TR) 4.3 Connection Cables 4.3.1 10BASE-T cable 4.3.2 Twisted pair cable (recommended) 4.3.3 Connecting Cables 4.4 Connection Devices (RJ45 Connector and Distributor) 4.5 Connecting Terminal Resistors 4.6 Wiring a Shielding Wire (Class-D grounding). 4.7 Connector in Inverter. 4.8 Connection Diagram 4.8.1 For S500, E500, A500, F500 , V500 and D700 Series (PU connector) 4.8.2 For A500, F500 and V500 Series (FR-A5NR). 4.8.3 For E700 Series (PU connector)	E-23 E-24 E-25 E-25 E-26 E-27 E-28 E-29 E-29 E-30 E-31 E-31 E-32 E-34 E-34 E-36 E-36 E-38 E-38
4.	4.1 Wiring Procedure 4.2 Selecting Cables and Connection Devices 4.2.1 S500, E500, A500, F500, V500, D700 and E700 Series (PU connector) 4.2.2 A500, F500 and V500 Series (FR-A5NR) 4.2.3 F800, A800, F700 and A700 Series (built-in RS-485 terminal) 4.2.4 E700 Series (FR-E7TR) 4.3 Connection Cables 4.3.1 10BASE-T cable 4.3.2 Twisted pair cable (recommended) 4.3.3 Connecting cables 4.4 Connection Devices (RJ45 Connector and Distributor) 4.5 Connecting Terminal Resistors 4.6 Wiring a Shielding Wire (Class-D grounding). 4.7 Connector in Inverter. 4.8 Connection Diagram 4.8.1 For S500, E500, A500, F500 , V500 and D700 Series (PU connector) 4.8.2 For A500, F500 and V500 Series (FR-A5NR) 4.8.3 For E700 Series (PU connector) 4.8.4 For E700 Series (FR-E7TR).	E-23 E-24 E-25 E-25 E-26 E-27 E-28 E-29 E-29 E-30 E-31 E-31 E-32 E-34 E-34 E-36 E-36 E-38 E-38 E-39 E-43
4.	### Wiring ### 4.1 Wiring Procedure ### 4.2 Selecting Cables and Connection Devices ### 4.2.1 S500, E500, A500, F500, V500, D700 and E700 Series (PU connector) ### 4.2.2 A500, F500 and V500 Series (FR-A5NR) ### 4.2.3 F800, A800, F700 and A700 Series (built-in RS-485 terminal) ### 4.2.4 E700 Series (FR-E7TR) ### 4.3 Connection Cables ### 4.3.1 10BASE-T cable ### 4.3.2 Twisted pair cable (recommended) ### 4.3.3 Connecting cables ### 4.4 Connection Devices (RJ45 Connector and Distributor) ### 4.5 Connecting Terminal Resistors ### 4.6 Wiring a Shielding Wire (Class-D grounding). ### 4.7 Connector in Inverter. ### 4.8 Connection Diagram ### 4.8.1 For S500, E500, A500, F500, V500 and D700 Series (PU connector) ### 4.8.2 For A500, F500 and V500 Series (FR-A5NR). ### 4.8.3 For E700 Series (PU connector) ### 4.8.4 For E700 Series (FR-E7TR). ### 4.8.5 For F800, A800, F700 and A700 Series (built-in RS-485 terminal).	E-23 E-24 E-25 E-25 E-26 E-27 E-28 E-29 E-29 E-30 E-31 E-31 E-32 E-33 E-34 E-36 E-36 E-36 E-38 E-39 E-39 E-39
4.	4.1 Wiring Procedure 4.2 Selecting Cables and Connection Devices 4.2.1 S500, E500, A500, F500, V500, D700 and E700 Series (PU connector) 4.2.2 A500, F500 and V500 Series (FR-A5NR) 4.2.3 F800, A800, F700 and A700 Series (built-in RS-485 terminal) 4.2.4 E700 Series (FR-E7TR) 4.3 Connection Cables 4.3.1 10BASE-T cable 4.3.2 Twisted pair cable (recommended) 4.3.3 Connecting cables 4.4 Connection Devices (RJ45 Connector and Distributor) 4.5 Connecting Terminal Resistors 4.6 Wiring a Shielding Wire (Class-D grounding). 4.7 Connector in Inverter. 4.8 Connection Diagram 4.8.1 For S500, E500, A500, F500 , V500 and D700 Series (PU connector) 4.8.2 For A500, F500 and V500 Series (FR-A5NR) 4.8.3 For E700 Series (PU connector) 4.8.4 For E700 Series (FR-E7TR).	E-23 E-24 E-25 E-25 E-26 E-27 E-28 E-29 E-29 E-30 E-31 E-31 E-32 E-33 E-34 E-36 E-36 E-36 E-38 E-39 E-43 E-46 E-47

5. Communication Setting in Inverter	E-48
5.1 Communication Port and Applicable Parameters	E-48
5.2 S500 Series (When Connected to RS-485 Port)	E-50
5.2.1 Contents of parameter setting	E-50
5.2.2 Parameter setting method (reference)	E-51
5.3 E500 Series (When Connected to PU Port)	
5.3.1 Contents of parameter setting	
5.3.2 Parameter setting method (reference)	
5.4 V500, F500 and A500 Series (Connection to PU Port)	
5.4.1 Contents of parameter setting	
5.4.2 Parameter setting method (reference)	
5.5 V500, F500 and A500 Series (Connection to FR-A5NR)	
5.5.1 Contents of parameter setting	
5.6 E700, D700 Series (when PU port, FR-E7TR is connected)	
5.6.1 Contents of parameter setting	
5.6.2 Parameter setting method (reference)	
5.7 F700 and A700 Series (when built-in RS-485 terminal is connected)	
5.7.1 Contents of parameter setting	
5.7.2 Parameter setting method (reference)	
5.8 F800 and A800 Series (when built-in RS-485 terminal is connected)	
5.8.1 Contents of parameter setting	
5.8.2 Parameter setting method (reference)	E-68
5.9 Cautions on Setting	E-69
-	
6. Communication Setting in FX Programmable Controller	E-70
6.1 Parameter Assigning Method	F-70
	∟-10
6.2 Communication Setting Using Parameter Method (GX Works2)	E-71
6.2 Communication Setting Using Parameter Method (GX Works2)	E-71 E-71
6.2 Communication Setting Using Parameter Method (GX Works2)	E-71 E-71 E-73
6.2 Communication Setting Using Parameter Method (GX Works2) 6.2.1 Operating procedure 6.3 Communication Setting Using Parameter Method (FXGP/WIN) 6.3.1 Operating procedure	E-71 E-71 E-73
6.2 Communication Setting Using Parameter Method (GX Works2) 6.2.1 Operating procedure 6.3 Communication Setting Using Parameter Method (FXGP/WIN) 6.3.1 Operating procedure 7. Creating Programs (FX2N, FX2NC)	E-71 E-71 E-73 E-73
6.2 Communication Setting Using Parameter Method (GX Works2) 6.2.1 Operating procedure 6.3 Communication Setting Using Parameter Method (FXGP/WIN) 6.3.1 Operating procedure 7. Creating Programs (FX2N, FX2NC) 7.1 Checking Contents of Related Devices	E-71 E-71 E-73 E-73 E-75
6.2 Communication Setting Using Parameter Method (GX Works2) 6.2.1 Operating procedure	E-71 E-73 E-73 E-75 E-75 E-76
6.2 Communication Setting Using Parameter Method (GX Works2) 6.2.1 Operating procedure	E-71E-71E-73E-73E-75E-75E-76E-76
6.2 Communication Setting Using Parameter Method (GX Works2) 6.2.1 Operating procedure	E-71E-71E-73E-73E-75E-75E-76E-76E-76
6.2 Communication Setting Using Parameter Method (GX Works2) 6.2.1 Operating procedure	E-71 E-73 E-73 E-75 E-76 E-76 E-76 E-76 E-76 E-76 E-76
6.2 Communication Setting Using Parameter Method (GX Works2) 6.2.1 Operating procedure	E-71
6.2 Communication Setting Using Parameter Method (GX Works2)	E-71
6.2 Communication Setting Using Parameter Method (GX Works2) 6.2.1 Operating procedure	E-71
6.2 Communication Setting Using Parameter Method (GX Works2)	E-71 E-73 E-73 E-75 E-75 E-76 E-76 E-76 E-78 E-80 E-81 E-81
6.2 Communication Setting Using Parameter Method (GX Works2)	E-71 E-73 E-73 E-75 E-75 E-76 E-76 E-76 E-78 E-80 E-81 E-81 E-81 E-82
6.2 Communication Setting Using Parameter Method (GX Works2)	E-71 E-73 E-73 E-75 E-75 E-76 E-76 E-76 E-78 E-80 E-81 E-81 E-81 E-82 E-82
6.2 Communication Setting Using Parameter Method (GX Works2) 6.2.1 Operating procedure. 6.3 Communication Setting Using Parameter Method (FXGP/WIN) 6.3.1 Operating procedure. 7. Creating Programs (FX2N, FX2NC) 7.1 Checking Contents of Related Devices. 7.2 Common Items in Inverter Communication Instructions 7.2.1 Inverter communication types (EXTR K10 to K13) 7.2.2 Function and operation. 7.2.3 Instruction completion and error flag operation 7.2.4 Cautions on programming. 7.3 Inverter Operation Monitoring Instruction (PLC←Inverter) [EXTR K10] 7.3.1 Function and operation. 7.3.2 Inverter instruction codes. 7.4 Inverter Operation Control Instruction (PLC→Inverter) [EXTR K11] 7.4.1 Function and operation.	E-71 E-73 E-73 E-75 E-75 E-76 E-76 E-76 E-78 E-80 E-81 E-81 E-81 E-82 E-82 E-82
6.2 Communication Setting Using Parameter Method (GX Works2) 6.2.1 Operating procedure	E-71
6.2 Communication Setting Using Parameter Method (GX Works2) 6.2.1 Operating procedure	E-71
6.2 Communication Setting Using Parameter Method (GX Works2) 6.2.1 Operating procedure 6.3 Communication Setting Using Parameter Method (FXGP/WIN) 6.3.1 Operating procedure 7. Creating Programs (FX2N, FX2NC) 7.1 Checking Contents of Related Devices. 7.2 Common Items in Inverter Communication Instructions 7.2.1 Inverter communication types (EXTR K10 to K13). 7.2.2 Function and operation 7.2.3 Instruction completion and error flag operation 7.2.4 Cautions on programming 7.3 Inverter Operation Monitoring Instruction (PLC←Inverter) [EXTR K10] 7.3.1 Function and operation 7.3.2 Inverter instruction codes 7.4 Inverter Operation Control Instruction (PLC→Inverter) [EXTR K11] 7.4.1 Function and operation 7.4.2 Inverter instruction codes 7.5 Inverter Parameter Reading Instruction (PLC←Inverter) [EXTR K12] 7.5.1 Function and operation 7.5.2 Inverter parameter number 7.5.3 Program example of "second parameter specification code"	E-71
6.2 Communication Setting Using Parameter Method (GX Works2) 6.2.1 Operating procedure	E-71 E-73 E-73 E-75 E-75 E-76 E-76 E-76 E-78 E-80 E-81 E-81 E-81 E-82 E-82 E-82 E-82 E-82 E-83 E-83 E-83 E-83 E-83 E-83 E-83
6.2 Communication Setting Using Parameter Method (GX Works2) 6.2.1 Operating procedure	E-71 E-73 E-73 E-75 E-75 E-76 E-76 E-76 E-78 E-80 E-81 E-81 E-81 E-82 E-82 E-82 E-82 E-82 E-83 E-83 E-83 E-83 E-83 E-83 E-84 E-84
6.2 Communication Setting Using Parameter Method (GX Works2) 6.2.1 Operating procedure	E-71 E-73 E-73 E-75 E-75 E-76 E-76 E-76 E-78 E-80 E-81 E-81 E-81 E-82 E-82 E-82 E-82 E-82 E-83 E-83 E-83 E-83 E-83 E-83 E-84 E-84 E-84

7.7 Second Parameter Specification Codes	
7.7.1 5300 Series	
7.7.3 A500 Series	
7.7.5 ASOU Series	⊏-00
8. Practical Program Examples (FX2N, FX2NC)	E-87
8.1 Practical Example 1	
8.1.1 System configuration example	
8.1.2 Contents of operation	
8.1.3 Program example	
8.2 Practical Example 2	
8.2.1 System configuration example	
8.2.2 Contents of operation	
8.2.3 Program example	E-92
9. Creating Programs (FX3S, FX3G, FX3GC, FX3U, FX3UC)	E-96
9.1 Differences between FX2N, FX2NC and FX3S, FX3G, FX3GC, FX3U, FX3UC	E-96
9.2 Contents of Related Devices	E-97
9.3 Common Items in Inverter Communication Instructions	E-98
9.3.1 Inverter communication types (IVCK to IVMC)	
9.3.2 Function and operation	
9.3.3 Instruction completion and error flag operation	
9.3.4 Cautions on programming	
9.4 Inverter Operation Monitoring Instruction (PLC←Inverter) [FNC270 / IVCK]	
9.4.1 Function and operation	
9.4.2 Inverter instruction codes	
9.5 Inverter Operation Control Instruction (PLC→Inverter) [FNC271 / IVDR]	E-105
9.5.1 Function and operation	
9.5.2 Inverter instruction codes	E-105
9.6 Inverter Parameter Reading (PLC←Inverter) [FNC272 / IVRD]	E-106
9.6.1 Function and operation	
9.6.2 Inverter instruction codes	E-106
9.6.3 Program example of "second parameter specification code"	E-106
9.7 Inverter Parameter Writing (PLC→Inverter) [FNC273 / IVWR]	E-108
9.7.1 Function and operation	E-108
9.7.2 Inverter instruction codes	
9.7.3 Program example of "second parameter specification code"	E-108
9.8 Inverter Parameter Batch Writing (PLC→Inverter) [FNC274 / IVBWR]	
9.8.1 Function and operation	E-109
9.9 Controls Operations and Monitors Operations of an Inverter with a Single	
Command (PLC⇔Inverter) [FNC275 / IVMC]	E-110
9.9.1 Function and operation	E-110
9.9.2 Applicable inverters	E-111
9.9.3 Applicable programming tool	E-111
9.10 Second Parameter Specification Codes	E-112
9.10.1 S500 Series	E-112
9.10.2 E500 Series	
9.10.3 A500 Series	
9.10.4 F500 Series	
9.10.5 V500 Series	
9.10.6 F700 Series	
9.10.7 A700 Series	
9.10.8 E700 and D700 Series	
9.10.9 F800 Series	
9.10.10 A800 Series	118

10. Practical Program Examples (FX3S, FX3G, FX3GC, FX3U, FX3UC)	E-119
10.1 Practical Example 1	E-119
10.1.3 Program example	E-120
10.2.1 System configuration example	
10.2.2 Contents of operation	
10.2.3 Program example	E-120
11. Troubleshooting	E-134
11.1 Checking FX PLC Version Applicability (FX2N and FX2NC Series)	
11.2 Checking Communication Status Based on LED Indication	
11.3 Checking Installation	
11.4 Checking Sequence Program	
11.4.1 Checking inverter operation status	
11.6 Error Codes	
11.0 =1.0 00000	
12. Related Data	E-139
12.1 Related Device List (FX2N, FX2NC)	
12.2 Details of Related Devices (FX2N, FX2NC)	
12.2.1 Instruction execution complete [M8029]	
12.2.2 Extension ROM cassette check [M8104]	
12.2.4 Communication error or parameter error [M8156]	
12.2.5 Communication error latch [M8157]	
12.2.6 Extension ROM cassette type code [D8104]	
12.2.7 Extension ROM cassette version [D8105]	
12.2.8 Inverter response waiting time [D8154]	
12.2.9 Step number of instruction using communication port [D8155]	
12.2.10 Error code [D8156]	
12.3 Related Device List (FX3S, FX3G, FX3GC, FX3U, FX3UC)	
12.4 Details of Related Devices (FX3S, FX3G, FX3GC, FX3U, FX3UC)	
12.4.1 Instruction execution complete [M8029]	
12.4.2 Serial communication error [M8063 and M8438]	
12.4.3 Inverter communication ON [M8151 and M8156]	E-145
12.4.4 Inverter communication error [M8152, M8153, M8157 and M8158]	
12.4.5 IVBWR instruction error [M8154 and M8159] (only in FX3U and FX3UC PLCs)	
12.4.6 Serial communication error code [D8063 and D8438]	
12.4.8 Step number of instruction using communication port [D8151 and D8156]	
12.4.9 Inverter communication error code [D8152 and D8157]	
12.4.10 Inverter communication error occurrence step [D8153 and D8158]	
12.4.11 IVBWR instruction error parameter number [D8154 and D8159]	
(only in FX3U and FX3UC PLCs)	
12.4.12 Operation mode display [D8419 and D8439]	
12.5 FREQROL Inverter Parameter List	
12.5.2 Parameters in F700, A700, E700 and D700 Series	
12.5.3 Parameters in F800 and A800 Series	
12.5.4 Communication parameters	

F.Non-Protocol Communication (RS/RS2 Instruction)

1. Outline	F-3
1.1 Outline of System	F-3
1.2 Procedures Before Operation	
1.3 Communication Type Applicability in PLC	
1.3.1 Applicable versions	
1.3.2 Version check	
1.3.3 How to look at the manufacturer's serial number	
1.3.4 Products whose production was stopped	F-8
1.4 Programming Tool Applicability	F-9
1.4.1 For applicable versions	F-9
1.4.2 For non-applicable versions (setting an alternative model)	F-11
2. Specifications	F-12
	F 40
2.1 Communication Specifications (Reference)	
2.2 Data Communication Specifications	
2.2.1 Communication type applicability in PLC	
2.3 Number of Transfer Data	F-14
	F 45
3. System Configuration and Selection	F-15
3.1 System Configuration	F-15
3.2 Applicable FX PLC and Communication Equipment	F-16
3.2.1 For communication in accordance with RS-232C	
3.2.2 For communication in accordance with RS-485	F_22
0.2.2 . 0. 00	I - 22
	1 -22
4. Wiring	F-27
4. Wiring	F-27
4. Wiring 4.1 Wiring Procedure	F-27
4. Wiring 4.1 Wiring Procedure 4.2 Selecting Cables and Terminal Resistors	F-27 F-27F-28
4. Wiring 4.1 Wiring Procedure 4.2 Selecting Cables and Terminal Resistors 4.2.1 When using ch0 in FX3G, FX3GC PLC	F-27F-27F-28F-28
4. Wiring 4.1 Wiring Procedure 4.2 Selecting Cables and Terminal Resistors	F-27 F-28 F-28 F-28
4.1 Wiring Procedure 4.2 Selecting Cables and Terminal Resistors 4.2.1 When using ch0 in FX3G, FX3GC PLC 4.2.2 Twisted pair cable.	F-27 F-28 F-28 F-28 F-28 F-29
4. Wiring 4.1 Wiring Procedure 4.2 Selecting Cables and Terminal Resistors 4.2.1 When using ch0 in FX3G, FX3GC PLC 4.2.2 Twisted pair cable 4.2.3 10BASE-T cable	F-27 F-27 F-28 F-28 F-28 F-29 F-30
4.1 Wiring Procedure 4.2 Selecting Cables and Terminal Resistors 4.2.1 When using ch0 in FX3G, FX3GC PLC 4.2.2 Twisted pair cable. 4.2.3 10BASE-T cable. 4.2.4 Connecting cables	F-27 F-27 F-28 F-28 F-29 F-30 F-32
4. Wiring 4.1 Wiring Procedure 4.2 Selecting Cables and Terminal Resistors 4.2.1 When using ch0 in FX3G, FX3GC PLC 4.2.2 Twisted pair cable 4.2.3 10BASE-T cable 4.2.4 Connecting cables 4.2.5 Connecting terminal resistors	F-27 F-28 F-28 F-28 F-29 F-30 F-32 F-33
4. Wiring 4.1 Wiring Procedure	F-27 F-28 F-28 F-28 F-29 F-30 F-32 F-32 F-33 dance F-33
4.1 Wiring Procedure 4.2 Selecting Cables and Terminal Resistors 4.2.1 When using ch0 in FX3G, FX3GC PLC 4.2.2 Twisted pair cable. 4.2.3 10BASE-T cable. 4.2.4 Connecting cables. 4.2.5 Connecting terminal resistors. 4.3 Connection Diagram. 4.3.1 Connector pin arrangement in communication equipment operating in accorwith RS-232C. 4.3.2 Wiring for communication in accordance with RS-232C.	F-27 F-28 F-28 F-28 F-29 F-30 F-32 F-32 F-33 dance F-33
4.1 Wiring Procedure 4.2 Selecting Cables and Terminal Resistors 4.2.1 When using ch0 in FX3G, FX3GC PLC 4.2.2 Twisted pair cable. 4.2.3 10BASE-T cable. 4.2.4 Connecting cables. 4.2.5 Connecting terminal resistors. 4.3 Connection Diagram 4.3.1 Connector pin arrangement in communication equipment operating in accorwith RS-232C. 4.3.2 Wiring for communication in accordance with RS-232C. 4.3.3 Wiring for communication in accordance with RS-485.	F-27 F-28 F-28 F-28 F-29 F-30 F-32 F-33 rdance F-33 F-33 F-33 F-35
4.1 Wiring Procedure 4.2 Selecting Cables and Terminal Resistors 4.2.1 When using ch0 in FX3G, FX3GC PLC 4.2.2 Twisted pair cable 4.2.3 10BASE-T cable 4.2.4 Connecting cables 4.2.5 Connecting terminal resistors 4.3 Connection Diagram 4.3.1 Connector pin arrangement in communication equipment operating in accorwith RS-232C 4.3.2 Wiring for communication in accordance with RS-232C	F-27 F-28 F-28 F-28 F-29 F-30 F-32 F-33 rdance F-33 F-33 F-33 F-35
4.1 Wiring Procedure 4.2 Selecting Cables and Terminal Resistors 4.2.1 When using ch0 in FX3G, FX3GC PLC 4.2.2 Twisted pair cable 4.2.3 10BASE-T cable 4.2.4 Connecting cables 4.2.5 Connecting terminal resistors 4.3 Connection Diagram 4.3.1 Connector pin arrangement in communication equipment operating in accorwith RS-232C 4.3.2 Wiring for communication in accordance with RS-232C 4.3.3 Wiring for communication in accordance with RS-485 4.4 Grounding	F-27 F-28 F-28 F-28 F-29 F-30 F-32 F-33 rdance F-33 F-33 F-33 F-35
4.1 Wiring Procedure 4.2 Selecting Cables and Terminal Resistors 4.2.1 When using ch0 in FX3G, FX3GC PLC 4.2.2 Twisted pair cable 4.2.3 10BASE-T cable 4.2.4 Connecting cables 4.2.5 Connecting terminal resistors 4.3 Connection Diagram 4.3.1 Connector pin arrangement in communication equipment operating in accorwith RS-232C 4.3.2 Wiring for communication in accordance with RS-232C 4.3.3 Wiring for communication in accordance with RS-485 4.4 Grounding 5. Communication Setting in FX Programmable Controller	F-27 F-28 F-28 F-28 F-29 F-30 F-30 F-32 F-32 F-33 dance F-33 F-35 F-39
4.1 Wiring Procedure	F-27 F-28 F-28 F-28 F-29 F-30 F-32 F-32 F-33 dance F-33 F-35 F-35 F-39 F-40
4.1 Wiring Procedure 4.2 Selecting Cables and Terminal Resistors 4.2.1 When using ch0 in FX3G, FX3GC PLC 4.2.2 Twisted pair cable 4.2.3 10BASE-T cable 4.2.4 Connecting cables 4.2.5 Connecting terminal resistors 4.3 Connection Diagram 4.3.1 Connector pin arrangement in communication equipment operating in accorwith RS-232C 4.3.2 Wiring for communication in accordance with RS-232C 4.3.3 Wiring for communication in accordance with RS-485 4.4 Grounding 5. Communication Setting in FX Programmable Controller 5.1 Communication Setting Method Mechanism 5.2 Communication Setting Using Parameter Method (GX Works2)	F-27 F-28 F-28 F-28 F-28 F-29 F-30 F-30 F-32 F-33 Tdance F-33 F-35 F-35 F-39 F-40 F-40 F-41
4.1 Wiring Procedure 4.2 Selecting Cables and Terminal Resistors 4.2.1 When using ch0 in FX3G, FX3GC PLC 4.2.2 Twisted pair cable 4.2.3 10BASE-T cable 4.2.4 Connecting cables 4.2.5 Connecting terminal resistors 4.3 Connection Diagram 4.3.1 Connector pin arrangement in communication equipment operating in accorwith RS-232C 4.3.2 Wiring for communication in accordance with RS-232C 4.3.3 Wiring for communication in accordance with RS-485 4.4 Grounding 5. Communication Setting in FX Programmable Controller 5.1 Communication Setting Method Mechanism 5.2 Communication Setting Using Parameter Method (GX Works2) 5.2.1 Operating procedure.	F-27 F-28 F-28 F-28 F-28 F-29 F-30 F-30 F-32 F-33 dance F-33 F-35 F-35 F-40 F-40 F-41 F-41
4.1 Wiring Procedure 4.2 Selecting Cables and Terminal Resistors 4.2.1 When using ch0 in FX3G, FX3GC PLC 4.2.2 Twisted pair cable 4.2.3 10BASE-T cable 4.2.4 Connecting cables 4.2.5 Connecting terminal resistors 4.3 Connection Diagram 4.3.1 Connector pin arrangement in communication equipment operating in accorwith RS-232C 4.3.2 Wiring for communication in accordance with RS-232C 4.3.3 Wiring for communication in accordance with RS-485 4.4 Grounding 5. Communication Setting in FX Programmable Controller 5.1 Communication Setting Method Mechanism 5.2 Communication Setting Using Parameter Method (GX Works2)	F-27 F-28 F-28 F-28 F-28 F-29 F-30 F-30 F-32 F-33 dance F-33 F-35 F-35 F-40 F-40 F-41 F-41 F-41 F-43

6. Creating Programs (RS Instruction)	F-45
6.1 Checking Contents of Related Devices	F-45
6.2 How to Use RS Instruction	
6.2.1 Applicable frames	
6.2.2 Function and operation	
6.2.3 Send/receive data and amount of data	F-48
6.2.4 Operation when data is sent	F-50
6.2.5 Operation when data is received	F-50
6.3 Operation of Control Line	F-52
6.3.1 FX2N (before Ver. 2.00), FX2(FX), FX2C, FX0N, FX1S, FX1N and FX1NC PLCs	F-52
6.3.2 FX2N (Ver. 2.00 or later), FX2NC, FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs	F-54
6.4 Important Points in Creating Programs	F-56
6.5 Communication Error	F-56
7. Practical Program Example (RS Instruction)	F-57
- Tractical Frogram Example (No instruction)	1 -01
7.1 Example of Printing Using RS Instruction (Using RS-232C Connection)	F-57
8. Creating Programs (RS2 Instruction)	F-59
8.1 Checking Contents of Related Devices	F-59
8.2 How to Use RS2 Instruction	
8.2.1 Applicable frames	
8.2.2 Function and operation	
8.2.3 Send/receive data and amount of data	F-66
8.2.4 Operation when data is sent	F-68
8.2.5 Operation when data is received	F-68
8.2.6 Sum check code	F-71
8.3 Operation of Control Line	F-72
8.4 Important Points in Creating Programs	F-75
8.5 Communication Error	
9. Practical Program Example (RS2 Instruction)	F-76
9.1 Example of Printing Using RS2 Instruction (Using RS-232C Connection)	F-76
10. When Combined with Another Communication	F-78
10.1 Other Communication Type Used Together	F-78
10.2 When Combined with Programming Communication	
10.2.1 For FX2N and FX2NC PLCs	
10.2.2 For FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs	
10.3 When Combined with Computer Link Communication	
10.4 When Combined with Programming Communication	
10.5 Using RS2 Instruction and Computer Link Communication Together	
10.6 Communication Setting Method Using Sequence Program	
10.6.1 Communication setting for RS instruction	
10.6.2 Communication setting for RS2 instruction	

11. Troubleshooting	F-87
11.1 Checking FX PLC Version Applicability	F-87
11.2 Checking Communication Status Based on LED Indication	
11.3 Checking Installation	
11.4 Checking Sequence Program	
11.4.1 Checking communication port settings (in FX3S, FX3G, FX3GC, FX3U and FX3UC	•
11.5 Checking the Absence/Presence of Errors	F-89
12. Related Data	F-90
12.1 Related Device List (RS Instruction)	F-90
12.2 Details of related devices (RS instruction)	
12.2.1 Serial communication error [M8063]	
12.2.2 Communication setting keep [M8120]	
12.2.3 Sending wait flag [M8121]	
12.2.4 Sending request [M8122]	
12.2.5 Receiving complete flag [M8123]	
12.2.6 Carrier detection flag [M8124]	
12.2.7 Time-out check flag [M8129]	
12.2.8 Serial communication error code [D8063]	
12.2.9 Communication format setting [D8120]	
12.2.10 Remaining amount of data to be sent [D8122]	
12.2.11 Amount of data already received [D8123]	
12.2.12 Header [D8124]	
12.2.13 Terminator [D8125]	
12.2.14 Time-out time setting time [D8129]	
12.2.15 Communication parameter display [D8405]	
12.2.16 Operation mode display [D8419]	F-96
12.3 Related Devices (RS2 Instruction)	F-96
12.4 Details of Related Devices (RS2 Instruction)	
12.4.1 Serial communication error [M8062, M8063 and M8438]	
12.4.2 Sending wait flag [M8371, M8401 and M8421]	
12.4.3 Sending request [M8372, M8402 and M8422]	
12.4.4 Receiving complete flag [M8373, M8403 and M8423]	
12.4.5 Carrier detection flag [M8404 and M8424]	
12.4.6 Data set ready (DSR) flag [M8405 and M8425]	
12.4.7 Time-out check flag [M8379, M8409 and M8429]	
12.4.8 Serial communication error code [D8062, D8063 and D8438]	
12.4.9 Communication format setting [D8370, D8400 and D8420]	
12.4.10 Amount of remaining send data [D8372, D8402 and D8422]	
12.4.11 Amount of data already received [D8373, D8403 and D8423]	F-102
12.4.12 Communication parameter display [D8405 and D8425]	F-102
12.4.13 Time-out time setting [D8379, D8409 and D8429]	F-102
12.4.14 Header [D8380, D8381, D8410, D8411, D8430 and D8431]	F-103
12.4.15 Terminator [D8382, D8383, D8412, D8413, D8432 and D8433]	F-103
12.4.16 Receiving sum (receive data) [D8384, D8414 and D8434]	
12.4.17 Receiving sum (calculation result) [D8385, D8415 and D8435]	
12.4.18 Sending sum [D8386, D8416 and D8436]	
12.4.19 Operation mode display [D8389, D8419 and D8439]	F-105
12.5 ASCII Code Table	F-106

G.Non-Protocol Communication (FX_{2N}-232IF)

1. Outline	G-3
1.1 Features	G-3
1.2 Procedures Before Operation	G-4
1.3 Communication Type Applicability in PLC	
1.3.1 Applicable versions	
1.3.2 Products whose production was stopped	G-5
1.4 Programming Tool Applicability	G-6
1.4.1 For applicable versions	
1.4.2 For non-applicable versions (setting an alternative model)	G-7
2. Specification	G-8
2.1 Communication Specifications	G-8
3. System Configuration and Selection	G-9
3.1 System Configuration	G-9
3.2 Applicable FX PLC and Communication Equipment	
3.3 Connection to PLC	
4. Wiring	G-12
4.1 Pin Arrangement	
	G-12
4.1 Pin Arrangement	G-12 ine) G-12
4.1 Pin Arrangement	G-12 ine)G-12)G-13
4.1 Pin Arrangement	G-12 ine) G-12) G-13 G-13 G-13

5. Creating Programs	G-14
5.1 Outline of Communication between FX PLC and 232IF	G-14
5.1.1 For FROM and TO instructions	G-14
5.1.2 For direct specification of buffer memory (U□\G□)	G-14
5.2 FROM and TO Instructions	
5.2.1 FROM instruction	
5.2.2 TO instruction	
5.3 Direct Specification of Buffer Memory (U□\G□)	G-17
5.4 Buffer Memory (BFM)	
5.4.1 Buffer memory list	
5.4.2 Communication format <bfm #0=""></bfm>	
5.4.3 Command <bfm #1=""></bfm>	
5.4.4 Maximum number of receivable bytes <bfm #2=""></bfm>	G-25
5.4.5 Receiving timeout time <bfm #3=""></bfm>	
5.4.6 Sending header <bfm #4="" #5="" (highest-order="" (lowest-order="" 2="" and="" bfm="" bytes)=""></bfm>	
5.4.7 Sending terminator <bfm #6="" #7="" (highest-order="" (lowest-order="" 2="" and="" bfm="" bytes)=""></bfm>	
5.4.8 Receiving header <bfm #8="" #9="" (highest-order="" (lowest-order="" 2="" and="" bfm="" bytes)="">.</bfm>	
5.4.9 Receiving terminator <bfm #10="" #11="" (highest-order="" (lowest-order="" 2="" and="" bfm="" bytes)="" bytes)<="" td=""><td>> G-26</td></bfm>	> G-26
5.4.10 Receiving suspension waiting time <bfm #12=""></bfm>	G-26
5.4.11 Amount of remaining send data <bfm #13=""></bfm>	G-26
5.4.12 Amount of received data buffers <bfm #14=""></bfm>	G-26
5.4.13 Sending sum result <bfm #15=""></bfm>	G-27
5.4.14 Receiving sum result <bfm #16=""></bfm>	
5.4.15 Time from CS ON to sending start <bfm #20=""></bfm>	G-27
5.4.16 Time from actual sending completion to RS OFF <bfm #21=""></bfm>	G-27
5.4.17 Status <bfm #28=""></bfm>	G-28
5.4.18 Error code <bfm #29=""></bfm>	
5.4.19 Model code <bfm #30=""></bfm>	G-29
5.4.20 Number of bytes to be sent <bfm #1000=""></bfm>	G-29
5.4.21 Send data buffer <bfm #1001="" 1256="" to=""></bfm>	
5.4.22 Number of received bytes <bfm #2000=""></bfm>	
5.4.23 Receive data buffer <bfm #2001="" 2256="" to=""></bfm>	
5.4.24 Preliminary receive data buffer for interlink connection mode <bfm #2257="" 2271="" to=""></bfm>	
5.5 Operation of Control Line	G-30
5.5.1 When control line is not provided [BFM #0, (b9, b8) = (0, 0)]	G-30
5.5.2 When control line is in standard RS-232C mode [BFM #0, (b9, b8) = (0, 1)]	G-31
5.5.3 When control line is in RS-232C interlink mode [BFM #0, (b9, b8) = (1, 1)]	G-32
6. Practical Program Examples	G-33
6.1 Example of Sending/Receiving 16-Bit Buffer Length Data	G-33
6.2 Sending/Receiving 8-Bit Buffer Length Data	G-31
7. Troubleshooting	G-41
7.1 Check Items	G-41
7.2 Error Codes	G-41

H.Programming Communication

1. Outline	H-3
1.1 Outline of System 1.2 Procedures Before Operation	H-4H-5H-5H-5H-6
2. System Configuration and Selection	H-9
2.1 System Configuration	H-9H-10H-11H-12H-23H-23H-24
3. Selecting Connection Cables	H-25
3.1 Connection Procedure 3.2 Connector Shape in Each Product	H-26 H-27 H-27
4. Connection Cables and Interfaces	H-32
4.1 Simplified Tables 4.1.1 Cable connector shape correspondence table 4.1.2 Cable combination simplified table 4.2 Cable Connection Diagrams 4.2.1 Personal computer connection cable - No. A 4.2.2 Connector conversion cable (commercial product) - No. B 4.2.3 FX-10P/FX-20P/FX-30P connection cable - No. C	H-32 H-33 H-35 H-35
5. Communication Setting (Initialization) in FX Programmable Controller	H-38
5.1 Check Procedure 5.2 Communication Setting Using Parameter Method (GX Works2) 5.2.1 Operating procedure 5.3 Communication Setting Using Parameter Method (FXGP/WIN) 5.3.1 Operating procedure	H-39 H-39 H-40

6. Connection Setting for Personal Computer	H-41
6.1 Connection Setting (GX Works2)	H-41
6.1.1 Setting RS-232C or USB, communication port, and transmission speed	
6.1.2 Setting for using GOT transparent function	H-44
6.1.3 Setting communication time check and number of retries	H-45
6.2 Connection Setting (FXGP/WIN)	H-46
6.2.1 Setting communication port and transmission speed	H-46
6.3 Communication Test (GX Works2)	H-47
7. Troubleshooting	H-48
7.1 Checking PLC Version Applicability	H-48
7.2 Checking Programming Tool Applicability	
7.3 Checking Communication Status Based on LED Indication	
7.4 Checking Installation	
7.5 Checking Parameters in PLC	
7.6 Checking Sequence Program	
7.7 Checking Programming Tool Setting	
7.8 Checking Absence/Presence of Errors	
7.9 Operation mode display [D8419 and D8439] (FX3S, FX3G, FX3GC, FX3U, FX3UC)	

I.Remote Maintenance

1.	Outline	I-3
	1.1 Outline of System	I-3
	1.1.1 Maintenance for programs in PLC	
	1.1.2 File transfer between personal computers (supported only by FXGP/WIN)	
	1.2 Procedures Before Operation	
	1.3 Communication Type Applicability in PLC	
	1.3.1 Applicable versions	
	1.3.2 Version check	
	1.3.3 Products whose production was stopped	
	1.4 Programming Tool Applicability	
	1.4.1 Programming tool for setting modem connected to PLC 1.4.2 Programming software for remote maintenance	
	1.4.3 Cautions on using FXGP/WIN	
	1.4.0 Gautions on using 1 AGI / WIN	1-12
2.	Specifications	I-13
	2.1 Communication Specifications (Reference)	I-13
3.	System Configuration and Selection	I-14
	3.1 System Configuration	1.14
	3.2 Setting Applicable FX PLC and Communication Equipment	
	3.3 Selecting Modem	
	3.3.1 List of moderns whose operations are committed	1-2 1
4.	Wiring	I-23
	4.1 Wiring Procedure	I-23
	4.2 Connection Diagram	I-24
	How to Cotus Modorno on the DLC Cide	1.05
5.	How to Setup Modems on the PLC Side	I-25
	5.1 Setting Using GX Works2	
	5.1.1 Setting communication by way of RS-232C port	
	5.1.2 Modem initialization setting using parameter method	
	5.1.3 Setting AT command for unregistered modem	
	5.2 Setting Using FXGP/WIN	
	5.2.2 Modem initialization setting using parameter method	
	5.2.3 Setting AT command for unregistered modem	
	5.3 Cautions on Use	
6.	How to Setup Modems on the PC Side for Remote Access	I-38
	6.1 Setting Using GX Works2	
	6.1.1 Registering AT command for connected modem	
	6.1.2 Creating telephone directory (if necessary)	
	6.2 Setting Using FXGP/WIN	
	6.2.1 Registering AT command for connected modem	
	n z z Redistenno ime connection destination	1-45

7. Connecting Line	I-46
7.1 Preparing for Connection of PLC 7.2 Line Connection Procedure 7.2.1 For GX Works2 7.2.2 For FXGP/WIN	I-47 I-47
8. Troubleshooting	I-54
8.1 Checking FX PLC Applicability. 8.2 Checking Programming Tool Applicability. 8.3 Checking Communication Status Based on LED Indication. 8.4 Checking Installation. 8.5 Checking Modem Specifications. 8.6 Checking Setting in PLC. 8.6.1 Checking parameters in PLC. 8.6.2 Checking AT command setting. 8.6.3 Checking sequence program. 8.7 Checking Programming Tool Setting. 8.8 Checking Absence/Presence of Errors. 8.9 Operation mode display [D8419 and D8439] (FX3S, FX3G, FX3GC, FX3U, FX3UC)	I-54
9. Related Information	I-60
9.1 ASCII Code Table	I-60
Appendix A: Discontinued models	Apx1

1. Introduction

This manual explains the communication types supported by FX PLCs.

This chapter explains the serial communication (in accordance with RS-232C, RS-485/RS-422), various link communication types, etc. and states the applicable FX PLCs.

1.1 Communication Types

The table below shows the communication types supported by the FX Series.

Link			Reference subsection			
CC-Link	 Connects FX PLCs as remote device stations to the CC-Link syster whose master station is a MELSEC A/QnA PLC. Connects FX PLCs as remote device stations and intelligent devic stations to the CC-Link system whose master station is a MELSEC Q PLC. Constructs a CC-Link system whose master station is an FX PLC. 		1.2.1			
	Application	Line control in the decentralized or centralized method and information transfer from/to the host network.				
N:N Network	Function	Easily enables data link between FX PLCs.	1.2.3			
IN.IN INCLWOIK	Application	Line control in the decentralized or centralized method.	1.2.3			
Parallel link	Function	Easily enables data link between FX PLCs.	1.2.4			
rafallel liftk	Application Line control in the decentralized or centralized method.					
Computer link	Connects a personal computer or another computer as the master					
	Application	Data acquisition and centralized control.				
Inverter	Function	Communicates with and controls Mitsubishi Electric inverter FREQROL.				
communication	Application	Operation monitoring, writing of control values, referencing and changing parameters, etc.	1.2.6			
MODBUS Function communication		Enables MODBUS communication with MODBUS-compatible equipment in accordance with RS-232C or RS-485.				
	Application	Line control in the decentralized or centralized method.				
Ethernet commu	nication		Reference subsection			
Function		Connects the FX PLC to a high-order system such as personal computer or workstation via Ethernet (100BASE-TX or 10BASE-T) using TCP/IP or UDP/IP communication protocol.	1.2.2			
	Application	Line control in the decentralized or centralized method and information transfer from/to the host network.				
General-purpose	serial commu	nication	Reference subsection			
Non-protocol	Function	Receives and sends data from/to various pieces of equipment with an RS-232C or RS-485 interface in non-protocol procedures.	1.2.7			
communication Application		Data reception and sending from/to a personal computer, bar code reader, printer and other various measuring instruments.				
Sequence progra	am		Reference subsection			
Programming Function communication		Adds RS-232C, RS-422, USB and Ethernet ports in addition to the provided RS-422 port in PLCs.				
Communication	Application	Simultaneously connection of two display units, programming tools, etc.				
Remote maintenance	Function	Connects with a PLC located in a remote location through a modem and telephone line to enable program transfer and remote monitoring access.	1.2.10			
	Application	Maintenance of sequence programs in FX PLCs.				

I/O link			Reference subsection		
CC-Link/LT	Function	ction Constructs a CC-Link/LT system whose master station is an FX PLC.			
(built in FX3UC-32MT- LT(-2))	Application	Wire-conserving network inside control panel and unit.	1.2.11		
AnyWireASLINK	Function	Constructs an AnyWireASLINK system whose master station is an FX PLC.	1.2.12		
	Application	Wire-conserving network inside control panel and unit.			
AS-i system	Function	unction Constructs an AS-i (Actuator Sensor Interface) system whose master block is an FX PLC.			
	Application	Wire-conserving network inside control panel and unit.			
MELSEC I/O link	Function	Installs remote I/O units near I/O equipment in remote locations to conserve wiring.	_		
	Application	ON/OFF control of I/O equipment in a remote location.			
Electronic mail se	ending		Reference subsection		
Internet mail	Function Sends internet mail to personal computers and cellular phones usin the RS-232C communication in PLCs.		1.2.14		
internet man	Application	Monitoring of unmanned facilities, facilities located in remote locations and facilities inside factories.	1.2.14		
Short mail	Function	Sends short mails to cellular phones in the NTT DoCoMo network.	1.2.15		
Shortman	Application Notice of material shortage, error contents, operating time, etc.		1.2.13		

D

1.2 **Outline and Features of Communication Types**

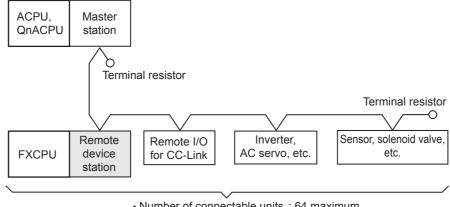
This section outlines the communication types supported by FX PLCs.

1.2.1 **CC-Link Network**

- → For details, refer to the FX2N-16CCL-M USER'S MANUAL.
- → For details, refer to the FX3U-16CCL-M USER'S MANUAL.
 - → For details, refer to the FX2N-32CCL USER'S MANUAL.
 - → For details, refer to the FX3U-64CCL USER'S MANUAL.

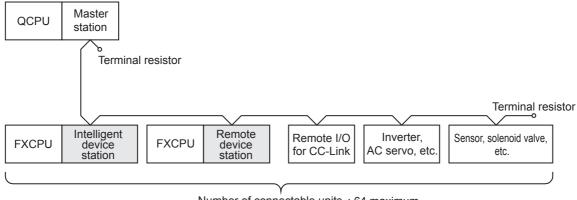
1. Outline

1) When the master station is an A/QnA PLC



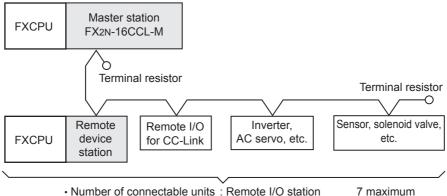
- Number of connectable units : 64 maximum
- · Total extension distance : 1200 m (3937' 0")

2) When the master station is a Q PLC



- · Number of connectable units : 64 maximum
- · Total extension distance : 1200 m (3937' 0")

3) When the master station is an FX2N-16CCL-M

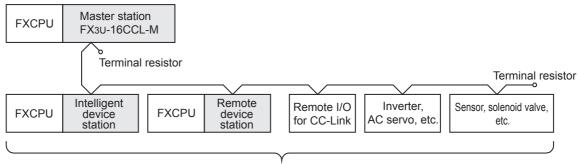


• Number of connectable units : Remote I/O station

: Remote device station 8 maximum

: 1200 m (3937' 0") · Total extension distance

4) When the master station is an FX3U-16CCL-M



• Number of connectable units : Remote I/O station

8 maximum

: Remote device station + Intelligent device station*1

8 maximum

· Total extension distance

: 1200 m (3937' 0")

*1. Local stations can not be connected.

2. Applicable PLCs

✓: Applicable (If applicable versions of main units are limited, they are described inside ().) -: Not applicable

PLC		FX2(FX), FX2C	FXon	FX1S	FX1N	FX1NC	FX2N, FX2NC	FX3S	FX3G, FX3GC	FX3U, FX3UC
FX Series master station connectivity	FX ₂ N- 16CCL-M	_	_	_	√ (Ver. 1.10 or later)	√	√ (Ver. 2.20 or later)	_	✓	✓
	FX3U- 16CCL-M	_	_	_	_	_	_	_	√*2	√*2 (Ver. 2.20 or later)
FX Series remote device station connectivity	FX ₂ N- 32CCL	_	~	_	√	√	√		✓	√
FX Series intelligent device station connectivity	FX3U- 64CCL	_			_	_	_	_	√*3	√*3 (Ver. 2.20 or later)

- FX3G and FX3GC PLCs Ver. 2.00 or later, or FX3U and FX3UC PLCs Ver. 3.10 or later support the access function to other FX Series PLC main units connected to FX3U-64CCL.
- The table below shows versions of GX Works2 and GX Developer that support the access function to other FX Series PLC main units via CC-Link.

	PLC connected	PLC main unit accessed						
	through	FX3G	FX3GC	FX3U	FX3UC			
GX Developer	QCPU(Q mode)	Ver. 8.78G or later	_	Ver. 8.72A or later	Ver. 8.72A or later			
-	QCPU(Q mode)	Ver. 1.08J or later	Ver. 1.77F or later	Ver. 1.08J or later	Ver. 1.08J or later			
GX Works2	FXCPU ^{*2} + FX3U-16CCL-M	Ver. 1.87R or later	Ver. 1.87R or later	Ver. 1.73B or later	Ver. 1.73B or later			

3. Communication targets

Equipment operating in accordance with the CC-Link standard

4. Function

Master station allows connection of remote device station, remote I/O station (inverters, AC servos, sensors, solenoid valves, etc.) supporting the CC-Link network to achieve data link.

FX PLCs are classified as master stations, remote device stations or intelligent device stations.

5. Applications

Decentralized or centralized control of the line, reception and sending of information from/to the host network,

6. Detailed information on CC-Link

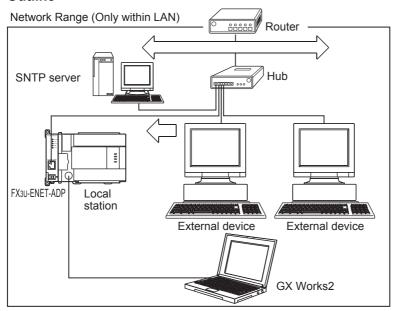
For details on CC-Link and connectable equipment, refer to the CC-Link Partner Association's homepage or catalogues (issued by the CC-Link Partner Association).

→ CC-Link Partner Association's homepage: http://www.cc-link.org/

1.2.2 Ethernet communication

→ For details, refer to FX3U-ENET-ADP User's Manual.

1. Outline



2. Applicable PLCs

- ✓: Applicable (If applicable versions of main units are limited, they are described inside ().)
- -: Not applicable

PLC	FX2(FX),FX2C	FXON	FX1s,FX1N,FX1NC	FX2N,FX2NC	FX3S	FX3G, FX3GC	FX3U, FX3UC
Communication applicability	_	_	_	1	√ *1	√ (Ver. 2.00 or later)	(Ver. 3.10 or later)

^{*1.} The FX3U-ENET-ADP Ver. 1.20 or later is applicable to the FX3S PLC.

3. Applicable software

Use the following version when setting the FX3U-ENET-ADP or connecting using MELSOFT:

Product name	Model name	Applicability
GX Works2	SW□DNC-GXW2-E	Ver. 1.73B or later*2

*2. Ver. 1.492N or later supports the FX3S PLC.

Ver. 1.87R or later supports the FX3G, FX3GC PLCs.

Caution

Setting and others are disabled when using nonapplicable versions.

4. Communication targets

Ethernet-compatible equipment

5. Function

The FX₃U-ENET-ADP can connect FX₃S, FX₃G, FX₃G, FX₃U, FX₃UC Series PLCs to a high-order system such as personal computer via Ethernet (100BASE-TX or 10BASE-T) using TCP/IP or UDP communication protocol.

6. Applications

- Collects and changes the PLC data. (Communication using the MELSEC communication protocol)
- 2) Reads, writes and verifies programs, and monitors and tests device values in the main unit remotely. (Communicates with GX Works2 via Ethernet through MELSOFT connection.)
- 3) Executes monitoring remotely using a web browser. (The data monitoring function enables monitoring the information and device values in the main unit and FX3U-ENET-ADP using a web browser.)

M1448 to M1511

D70 to D77

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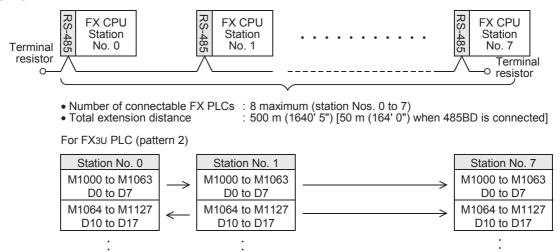
1.2.3 N:N Network

→ Refer to the "N:N Network" section.

M1448 to M1511

D70 to D77

1. Outline



2. Applicable PLCs

✓: Applicable (If applicable versions of main units are limited, they are described inside ().) —: Not applicable

PLC	FX2(FX),FX2C	FXon	FX1s,FX1n, FX1nc	FX2N	FX2NC	FX3S	FX3G, FX3GC	FX3U, FX3UC
Communication applicability	_	(Ver. 2.00 or later)	✓	√ (Ver. 2.00 or later)	\	√	√	√

3. Communication targets

Between FX0N, FX1S, FX1N, FX1NC, FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U and FX3UC Series PLCs

M1448 to M1511

D70 to D77

4. Function

This network allows up to eight connected FX PLCs to automatically transfer data among the connected PLCs.

In the network, data can be transferred among PLCs for devices determined in the refresh range, and those devices can be monitored by every PLC.

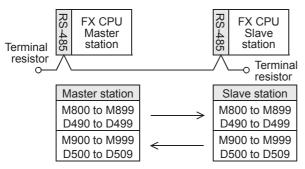
5. Applications

By this network, data link can be achieved in a small-scale system, and the machine information can be transferred between machines.

1.2.4 Parallel Link

 \rightarrow Refer to the "Parallel Link" section.

1. Outline



100 bit devices (M) and 10 word devices (D)

- Number of connectable FX PLCs: 2
- Total extension distance: 500 m (1640' 5") [50 m (164' 0") when 485BD is connected]*1
- *1. The distance is different for the FX2-40AW/AP.

2. Applicable PLCs

✓:Applicable (If applicable versions of main units are limited, they are described inside ().)—:Not applicable

PLC	FX2(FX),FX2C	FXon	FX1s,FX1n, FX1nc	FX2N	FX2NC	FX3S	FX3G, FX3GC	FX3U, FX3UC
Communication applicability	✓	√ (Ver. 1.20 or later)	✓	√ (Ver. 1.04 or later)	√	√	✓	✓

3. Communication targets

Between FX2(FX), FX2C, FX0N, FX1S, FX1N, FX1NC, FX2N, FX2NC, FX3G, FX3G, FX3G, FX3U and FX3UC Series PLCs

4. Function

This network automatically transfers data for 100 bit devices (M) and 10 data registers (D) between two PLCs of the same series.

Between PLCs in the FX_{0N}, FX_{1S} or FX_{3S} Series, data can be transferred for 50 bit devices (M) and 10 data registers (D).

5. Applications

Information can be transferred between two FX PLCs.

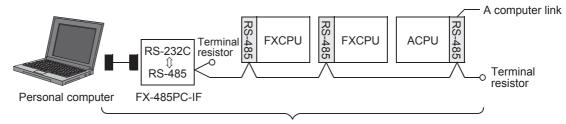
(It is recommended to use the N:N Network when connecting two PLCs of the same series among the FX1S, FX1N, FX1NC, FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U and FX3UC Series. N:N Network functionality supports linking of up to eight FX PLC units, therefore it offers excellent future expandability options.)

1.2.5 **Computer Link**

→ Refer to the "Computer Link" section.

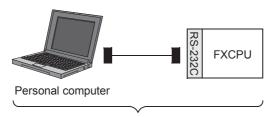
1. Outline

1) 1-to-N connection (RS-485)



- Number of connectable FX/A PLCs : 16 maximum Total extension distance : 500 m (1640' 5") [50 m (164' 0") when 485BD is connected]

2) 1-to-1 connection (RS-232C)



- Number of connectable FX PLCs:
- Total extension distance

2. Applicable PLCs

√: Applicable (If applicable versions of main units are limited, they are described inside ().) -: Not applicable

PLC	FX2(FX),FX2C	FXon	FX1s,FX1n, FX1nc	FX2N	FX2NC	FX3S	FX3G, FX3GC	FX3U, FX3UC
Communication applicability	√ (Ver. 3.30 or later)	√ (Ver. 1.20 or later)	√	√ (Ver. 1.06 or later)	✓	✓	✓	✓

3. Communication targets

Between FX2(FX), FX2C, FX0N, FX1S, FX1N, FX1NC, FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U, FX3UC Series PLCs, A Series PLCs and personal computers

4. Function

This link allows connection of up to sixteen FX or A (including A1FX CPU) PLCs to a personal computer for data transfer when the personal computer directly specifies devices in the connected PLCs.

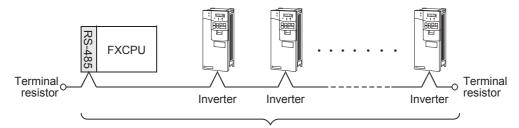
5. Applications

By this link, production, inventory, etc. can be controlled.

1.2.6 Inverter Communication

→ Refer to the "Inverter Communication" section.

1. Outline



• Number of connectable inverters : 8 maximum

• Total extension distance : 500 m (1640' 5") [50 m (164' 0") when 485BD is connected]

2. Applicable PLCs

✓:Applicable—:Not applicable

PLC	FX2(FX),FX2C	FXon	FX1s,FX1n,FX1nc	FX2N, FX2NC	FX3S	FX3G, FX3GC	FX3U, FX3UC
Communication applicability	_	_	_	√	√	√	✓

3. Communication targets

- For FX2N or FX2NC PLC FREQROL Series (S500, E500 and A500) inverters
- 2) For FX3S, FX3G, FX3GC, FX3U or FX3UC PLC FREQROL Series (S500, E500, A500, F500, V500, D700, E700, A700, F700, A800 and F800) inverters

The table below shows PLC versions applicable to each inverter.

PLC	FREQROL-S500/ E500/A500	FREQROL-F500/ V500	7							
FX2N, FX2NC	Ver. 3.00 or later	/er. 3.00 or later —								
FX3S		Ver.1.10 or later								
FX3G		Ver. 1.10	or later		Ver.2.22 or later					
FX3GC		Ver. 1.4	or later		Ver.2.22 or later					
FX3U		Ver. 2.20 or later Ver. 2.32 or later								
FX3UC	Ver. 1.00	0 or later	Ver. 2.20 or later	Ver. 2.32 or later	Ver.3.11 or later					

4. Function

This communication allows the connection of inverters (computer link) in accordance with RS-485 to control operations and change parameters.

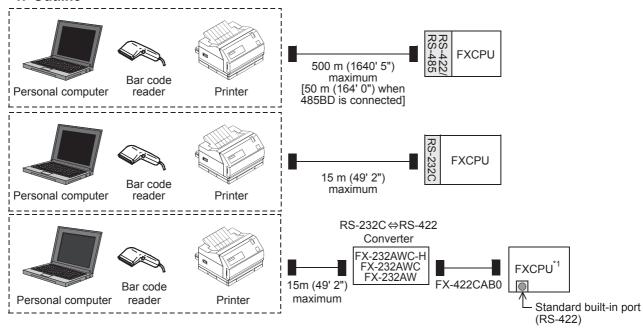
5. Applications

Operations with up to eight inverters can be controlled from a PLC.

1.2.7 Non-protocol Communication

ightarrow Refer to the "Non-protocol Communication (RS/RS2 instruction)" section. ightarrow Refer to the "Non-protocol Communication (FX2N-232IF)" section.

1. Outline



*1. Available only in FX3G, FX3GC PLC.

2. Applicable PLCs

- ✓:Applicable (If applicable versions of main units are limited, they are described inside ().)
- —:Not applicable
- 1) Non-protocol communication (RS instruction)

PLC	FX2(FX),FX2C	FX0N	FX1s,FX1n,FX1nc	FX2N	FX2NC	FX3S	FX3G, FX3GC	FX3U, FX3UC
Communication applicability	√ (Ver. 3.00 or later)	√ (Ver. 1.20 or later)	✓	√ (Ver. 1.06 or later)	<	√	~	√

2) Non-protocol communication (RS2 instruction)

PLC	FX2(FX),FX2C	FXon	FX1s,FX1n,FX1nc	FX2N,FX2NC	FX3S	FX3G, FX3GC	FX3U, FX3UC
Communication applicability	_	_	_	_	✓	√	✓

3) Non-protocol communication (FX2N-232IF)

PLC	FX2(FX),FX2C	FXon	FX1s,FX1n,FX1nc	FX2N,FX2NC	FX3S	FX3G, FX3GC	FX3U, FX3UC
Communication applicability	_	_	_	~	_	_	✓

3. Communication targets

Bar code readers, printers, personal computers (micro computer boards), measuring instruments, etc.

4. Function

This communication allows non-protocol serial communication between equipment with an RS-232C or RS-422/RS-485 interface.

5. Applications

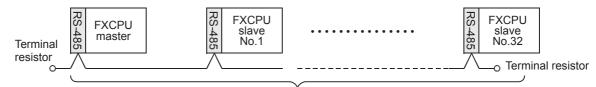
Communication with a bar code reader, printer, personal computer (micro computer board), measuring instrument, etc.

1.2.8 MODBUS Communication

→ For details, refer to FX3S/FX3G/FX3G/FX3U/FX3UC User's Manual - MODBUS Serial Communication Edition.

1. Outline

1) In the case of the RS-485



• Number of connectable units: Master 1

: Slave 32 maximum

• Total extension distance : 500 m (1640'5") maximum

2) In the case of the RS-232C



· Number of connectable units: Master 1

: Slave 1

• Total extension distance : 15 m (49'2") maximum

2. Applicable PLCs

✓:Applicable (If applicable versions of main units are limited, they are described inside ().)
—:Not applicable

PLC	FX2(FX),FX2C	FXon	FX1s,FX1n,FX1nc	FX2N,FX2NC	FX3S	FX3G	FX3GC	FX3U, FX3UC
Communication applicability	_		_	_	√	√ (Ver. 1.30 or later)	√	√ (Ver. 2.40 or later)

3. Communication targets

MODBUS-compatible equipment

4. Function

This function enables MODBUS communication with MODBUS-compatible equipment in accordance with RS-232C or RS-485.

5. Applications

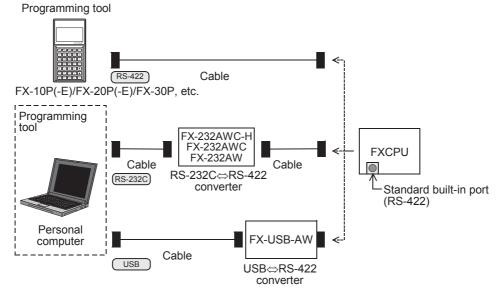
Line control in the decentralized or centralized method.

Programming Communication 1.2.9

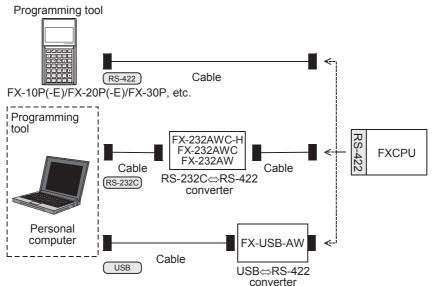
→ Refer to the "Programming Communication" section.

1. Outline

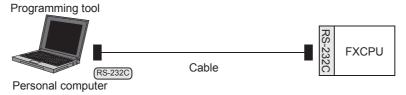
1) Standard built-in port in accordance with RS422 (programming tool or personal computer)



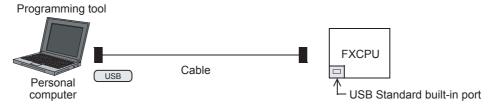
Communication equipment operating in accordance with RS-422 (programming tool or personal computer)



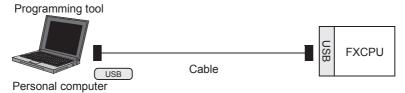
3) Communication equipment operating in accordance with RS-232C (personal computer)

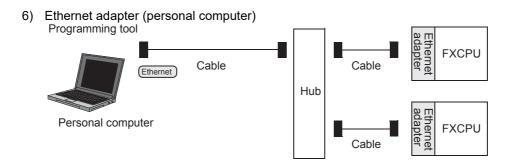


4) Standard built-in port in accordance with USB (personal computer)



5) Communication equipment operating in accordance with USB (personal computer)





2. Applicable PLCs

√: Applicable (If applicable versions of main units are limited, they are described inside ().) -: Not applicable

PLC		FX2(FX), FX2C	FXon	FX1S, FX1N	FX1NC	FX2N	FX2NC
Standard built-in port accordance with RS-		✓	✓	✓	✓	✓	✓
Communication equipment operating in accordance with RS-422(-BD)		_	_	√	_	√	_
Communication	(-BD)	_		✓		√	
equipment operating in accordance with RS-232C	(ADP)	_	_	✓	√	✓	√
Standard built-in port accordance with USE		_	_	_	_	_	_
Communication equipoperating in accordar USB(-BD)*1		_	_	_	_	_	_
Ethernet adapter		_	_	_	_	_	
PLC		FX3S	F X 3G	FX3GC	F X 3U	FX3UC (D, DS, DSS)	FX3UC (LT, LT-2)
Standard built-in port in accordance with RS-422		✓	✓	√	✓	√	✓

						(5, 50, 500)	(=:, =: =)
Standard built-in port accordance with RS-		√	✓	√	✓	✓	√
Communication equipment operating in accordance with RS-422(-BD)		√	√	_	√	-	✓
Communication	(-BD)	✓	✓	_	✓		✓
equipment operating in accordance with RS-232C	(ADP)	√	✓	√	√	√	√
Standard built-in port accordance with USE		√	✓	✓	_	_	_
Communication equipment operating in accordance with USB(-BD)*1		_	_	_	√	_	√
Ethernet adapter		√*2	√ (Ver. 2.00 or later)	(Ver. 2.00 or later)	√ (Ver. 3.10 or later)	(Ver. 3.10 or later)	(Ver. 3.10 or later)

^{*1.} When using USB communication with a model that does not support USB communication equipment (-BD), use the FX-USB-AW.

However, FX2(FX) and FX2C PLCs do not support the FX-USB-AW. Use the standard built-in port in accordance with USB in the FX3S, FX3G and FX3GC PLCs.

3. Communication targets

Personal computer and programming tool

4. Function

This communication allows connection of a personal computer or programming tool to a standard port built in a PLC or optional connector to execute sequence programs.

5. Applications

- 1) Programs can be changed and monitored using a personal computer or programming tool.
- 2) A personal computer (for changing programs) can be directly connected in accordance with RS-232C.
- 3) While the standard programming connector built in an FX PLC is used for connecting a display unit, a personal computer or programming tool can be connected at the same time for monitoring and transferring data.

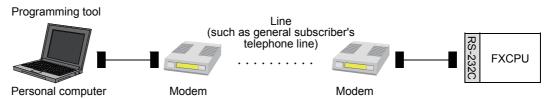
The FX3U-ENET-ADP Ver. 1.20 or later is applicable to the FX3S PLC.

1.2.10 Remote Maintenance

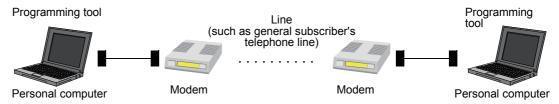
→ Refer to the "Remote Maintenance" section.

1. Outline

1) Remote access (GX Works2, GX Developer or FXGP/WIN)



2) File transfer (FXGP/WIN)



2. Applicable PLCs

✓:Applicable (If applicable versions of main units are limited, they are described inside ().)

—:Not applicable	

PLC	FX2(FX),FX2C	FXon	FX1s,FX1n,FX1nc	FX2N, FX2NC	FX3S	FX3G, FX3GC	FX3U, FX3UC
Communication applicability	_	_	✓	✓	✓	✓	✓

3. Communication target

Personal computer (GX Works2, GX Developer or FXGP/WIN)

4. Function

This communication allows connection between a modem on the PLC side and a modem on the personal computer side through a line (cellular phone or general subscriber's telephone line) for PLC monitoring or transferring from the personal computer.

The FXGP/WIN allows transfer of file data between personal computers.

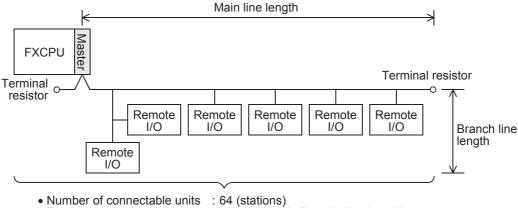
5. Applications

By this communication, programs in a PLC located in a remote location can be changed and maintained.

CC-Link/LT Network 1.2.11

→ For FX3UC-32MT-LT(-2) built-in CC-Link/LT master, refer to FX3UC Hardware Edition. → For the FX2N-64CL-M, refer to FX2N-64CL-M USER'S MANUAL (Detailed Volume).

1. Outline



• Total extension length 500 m (1640' 5") (main line length)

2. Applicable PLCs

✓: Applicable (If applicable versions of main units are limited, they are described inside ().)

-: Not applicable

PLC	FX2(FX),FX2C	FXon	FX1S	FX1N,FX1NC	FX2N, FX2NC	FX3S	FX3G, FX3GC	FX3U, FX3UC
Communication applicability	_	1		✓	✓	I	✓	✓

3. Communication target

Equipment operating in accordance with the CC-Link/LT network standard

4. Function

This network allows remote control of I/O information for sensors, lamps, etc.

Input (X) numbers and output (Y) numbers can be handled, and I/O points can be assigned continuously even if 2-point or 4-point type remote I/O units are being used.

5. Applications

Wire conservation for inputs and outputs.

6. Detailed information on CC-Link/LT

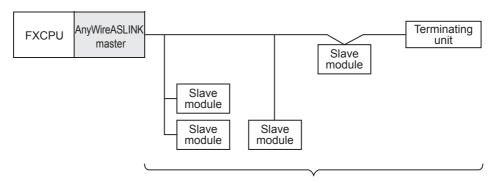
For product information on CC-Link, refer to the CC-Link Partner Association's homepage or catalogues (issued by the CC-Link Partner Association).

→ CC-Link Partner Association's homepage: http://www.cc-link.org/

1.2.12 AnyWireASLINK

→ For details, refer to the FX3U-128ASL-M User's Manual.

1. Outline



- · Number of connectable units : 128 maximum
- ·Total extension distance : 200 m (656' 2")

The FX3U-128ASL-M AnyWireASLINK master block is jointly developed and manufactured by Mitsubishi Electric and Anywire Corporation.

2. Applicable PLCs

- \checkmark :Applicable (If applicable versions of main units are limited, they are described inside ().)
- -: Not applicable

PLC	FX2(FX), FX2C	FXon	FX1S	FX1N, FX1NC	FX2N, FX2NC	FX3S	FX3G, FX3GC	FX3U, FX3UC
Communication applicability	_	_	_	_	_	_	√	(Ver. 2.20 or later)

3. Communication targets

Slave modules for AnyWireASLINK

4. Function

This network allows remote control of I/O information for sensors and LED.

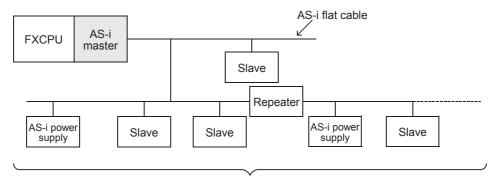
5. Applications

Wire conservation for inputs and outputs.

1.2.13 AS-i system

→ For details, refer to the FX2N-32ASI-M User's Manual.

1. Outline



- Number of connectable units : 31 slave units
 Total extension distance : 100 m (328' 1") [300 m (984' 3") maximum when two repeaters are connected]
- Terminal resistors are not required.

2. Applicable PLCs

√: Applicable (If applicable versions of main units are limited, they are described inside ().) -: Not applicable

PLC	FX2(FX),FX2C	FX ₀ N	FX1S	FX1N,FX1NC	FX2N	FX2NC	FX3S	FX3G, FX3GC	FX3U, FX3UC
Communication applicability	_	✓	_	✓	✓	√*1		1	✓

FX2NC-□MT-D/UL and FX2NC-□M□-DSS(-T-DS) PLCs are not applicable.

3. Communication targets

Slave units (sensors and actuators) for AS-i

4. Function

This network allows remote control of I/O information for sensors and actuators (slave units). The automatic address assignment function enables easy replacement of a slave unit when it has failed.

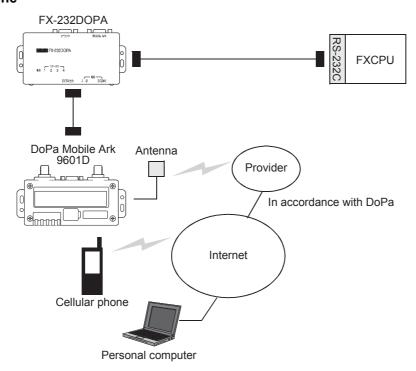
5. Applications

Wire conservation for inputs and outputs.

1.2.14 Internet Mail Sending

→ For the detains, refer to the FX-232DOPA USERS MANUAL. (Only Japanese manual is available for this product.)

1. Outline



2. Applicable PLCs

✓:Applicable (If applicable versions of main units are limited, they are described inside ().)

-: Not applicable

PLC	FX2(FX),FX2C	FXon	FX1S	FX1N,FX1NC	FX2N, FX2NC	FX3S	FX3G, FX3GC	FX3U, FX3UC
Communication applicability	_	_	✓	✓	\		_	✓

3. Communication targets

Personal computer and cellular phone which can receive internet mails

4. Function

This setting sends an electronic mail from a PLC to notify the facility operation status, etc. to a personal computer or cellular phone which can receive electronic mails.

This function is applicable through dial-up connection to a mail server using a combination of FX-232DOPA and DoPa Mobile Ark9601D by NTT DoCoMo.

5. Applications

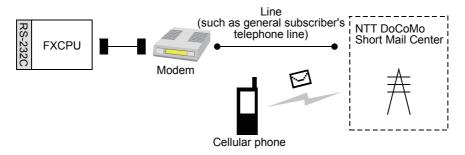
Monitoring of unmanned facilities, monitoring of facilities located in distant places, monitoring of facilities inside factories and distribution of logging data

В

1.2.15 Short Mail Sending

ightarrow For details, refer to the FX1s/FX1n/FX2n/FX1nc/FX2nc PLC PROGRAMMING MANUAL. (Only the Japanese Manual is available.)

1. Outline



2. Applicable PLCs

 \checkmark :Applicable (If applicable versions of main units are limited, they are described inside ().)

-: Not applicable

PLC	FX2(FX), FX2C	FXon	FX1S	FX1N, FX1NC	FX2N	FX2NC	FX3S	FX3G, FX3GC	FX3U, FX3UC
Communication applicability	_	_	_		√ (Ver. 3.00 or later)	√ (Ver. 3.00 or later)	l	1	1

3. Communication targets

Cellular phones by NTT DoCoMo with a contract for i-mode or short mail

4. Function

This function sends a short mail from a PLC to notify the facility operation status, etc. to a cellular phone by NTT DoCoMo which can receive short mails.

This function is applicable through connection in a line to a Short Mail Center of NTT DoCoMo.

5. Applications

Monitoring of unmanned facilities, monitoring of facilities located in distant places and monitoring of facilities in factories

MEMO

2. Communication Types and Communication Equipment

This chapter explains which communication types are supported by serial ports of communication equipment and connectors of networks.

For the communication equipment required in the system configuration, refer to a description later.

→ Refer to "2.3 Combination of Communication Equipment (Block Diagram)".

2.1 Relationship between Equipment and Communication Types

The figure below shows the relationship between communication equipment and communication types:

Communication adapter

Link

- N:N Network
- Parallel link
- Computer link
- Inverter communication
- MODBUS communication

Ethernet communication

Ethernet

General-purpose serial communication

 Non-protocol communication (RS/RS2 instruction)

Sequence program

- Programming communication
- Remote maintenance

Electronic mail sending

- Internet mail
- Short mail

Built-in port

I/O link

 CC-Link/LT (built in for FX3UC-32MT-LT(-2))

General-purpose serial communication

 Non-protocol communication (RS2 instruction)

Sequence program

Programming communication

Communication types

FX PLC main unit

Expansion board

Link

- N:N Network
- Parallel link
- Computer link
- Inverter communication

General-purpose serial communication

 Non-protocol communication (RS/RS2 instruction)

Sequence program

- Programming communication
- Remote maintenance

Electronic mail sending

- Internet mail
- Short mail

Special function equipment

Link

CC-Link

General-purpose serial communication

 Non-protocol communication (FX2N-232IF)

I/O link

- CC-Link/LT
- AnyWireASLINK
- AS-i system
- MELSEC I/O LINK

Electronic mail sending

Internet mail

2.2 Communication Equipment Applicability Map

The table below shows the communication types applicable in each FX Series and includes the supporting communication equipment. The communication types can be used when a built-in port or piece of communication equipment is connected, but some of them may not be applicable at the same time.

2.2.1 FX3u and FX3uc (D, DS, DSS) PLCs

PLC	Communication	Communication				Data Lini	K		
FLO	equipment	specifications	CC-Link	N:N Network	Parallel link	Computer link	Inverter communication	MODBUS communication	
Manu	al name (Obtain manua	ls if necessary.) →	Product manual		Т	his manual		MODBUS Communication Edition	
·	FX3U-USB-BD	USB		_	_	_	_	_	
	FX3U-232-BD			_	_	✓	_	_	
	FX3U-232ADP(-MB)*1	RS-232C		_	_	✓	_	√ *6	
	FX2N-232IF			_	_	_	_	_	
	FX3U-485-BD	RS-485		√*5	√*5	✓	✓	_	
	FX3U-485ADP(-MB)*1	N3-403		√*5	√*5	✓	✓	√ *6	
	FX3U-422-BD	RS-422		_	_	_	—	_	
FX3U	Standard built-in port	N3-422		_	_	_	_	_	
PLC	FX2N-16CCL-M		√*2						
	FX3U-16CCL-M		√*3*4						
	FX2N-32CCL		√	-					
	FX3U-64CCL		✓						
	FX2N-64CL-M	_	_						
	FX3U-128ASL-M		_						
	FX2N-32ASI-M		_						
	FX2N-16LNK-M		_						
	FX3U-ENET-ADP*1		_						

- *1. The expansion board is required to connect the FX3U PLC.
- *2. The FX2N-16CCL-M cannot be used at the same time with the FX3U-16CCL-M, FX3U-128ASL-M and/ or FX2N-32ASI-M.
- *3. The FX3∪-16CCL-M cannot be used at the same time with the FX2N-16CCL-M and/or FX2N-32ASI-M.
- *4. The FX3U-16CCL-M can be used at the same time with the FX3U-128ASL-M when CC-Link parameters are set using network parameters.
- *5. Two channels cannot be set at the same time in N:N Network and parallel link. N:N Network and parallel link cannot be used together.
- *6 . Only the FX3U-485ADP-MB and FX3U-232ADP-MB support MODBUS communication.
- *7. The FX3U-128ASL-M cannot be used at the same time with the FX2N-16CCL-M and/or FX2N-32ASI-M.
- *8. The FX2N-32ASI-M cannot be used at the same time with the FX3U-16CCL-M, FX3U-128ASL-M and/ or FX2N-16CCL-M.
- *9. Two channels cannot be set at the same time in remote maintenance.

Ethernet communication	General-purpose communication	1	Nire-reduci	ng networl	(Sequence	program	Mail sending
Ethernet	Non-protocol communication	CC-Link/ LT	AnyWire ASLINK	AS-i system	MELSEC- I/O LINK	Programming	Remote maintenance	Internet mail sending
Product manual	This manual		Product	manual		This m	nanual	FX-232DOPA User's Manual
	_					√	_	_
	✓					✓	√*9	✓
	✓					✓	√*9	✓
	✓					_	_	✓
	√					_		_
	✓					_	_	_
	_					√	_	_
	_					√		_
_					_			
_		_	_	_	_			
_		_		_	_			
_					_			
_		✓		_	_			
_			√*4*7	-	_			
_		_	_	√*8	_			
_		_	_		✓			
✓					_			

PLC	Communication	Communication				Data Link	K		
PLC	equipment	specifications	CC-Link	N:N Network	Parallel link	Computer link	Inverter communication	MODBUS communication	
Manu	al name (Obtain manua	ls if necessary.) →	Product manual		TI	his manual		MODBUS Communication Edition	
	FX3U-232ADP(-MB)	RS-232C		_	_	✓	_	√ *6	
	FX2N-232IF*1	113-2320		_	_	_	_	_	
	FX3U-485ADP(-MB)	RS-485		√*5	√*5	✓	✓	√ *6	
	Standard built-in port	RS-422		_	_	_	_	_	
	FX2N-16CCL-M*1		√*2						
FX3UC	FX3U-16CCL-M*1		√*3*4						
(D,DS, DSS)	FX2N-32CCL*1		✓						
PLC	FX3U-64CCL*1		✓						
	FX2N-64CL-M*1	_	_	-					
	FX3U-128ASL-M*1		_	-					
	FX2N-32ASI-M*1		_						
	FX2N-16LNK-M*1		_						
	FX3U-ENET-ADP		_						

- *1. The FX2NC-CNV-IF or FX3UC-1PS-5V is required to connect to the FX3UC PLC.
- *2. The FX2N-16CCL-M cannot be used at the same time with the FX3U-16CCL-M, FX3U-128ASL-M and/ or FX2N-32ASI-M.
- *3. The FX3U-16CCL-M cannot be used at the same time with the FX2N-16CCL-M and/or FX2N-32ASI-M.
- *4. The FX3U-16CCL-M can be used at the same time with the FX3U-128ASL-M when CC-Link parameters are set using network parameters.
- *5. Two channels cannot be set at the same time in N:N Network and parallel link. N:N Network and parallel link cannot be used together.
- *6. Only the FX3U-485ADP-MB and FX3U-232ADP-MB support MODBUS communication.
- *7. The FX3U-128ASL-M cannot be used at the same time with the FX2N-16CCL-M and/or FX2N-32ASI-M.
- *8. The FX2N-32ASI-M cannot be used at the same time with the FX3U-16CCL-M, FX3U-128ASL-M and/ or FX2N-16CCL-M.
- *9. Two channels cannot be set at the same time in remote maintenance.

Ethernet communication	General-purpose communication	,	Wire-reduci	ng networl	k	Sequence	program	Mail sending
Ethernet	Non-protocol communication	CC-Link/ LT	AnyWire ASLINK	AS-i system	MELSEC- I/O LINK	Programming	Remote maintenance	Internet mail sending
Product manual	This manual		Product	manual		This n	nanual	FX-232DOPA User's Manual
	√					✓	√ *9	✓
	✓					_		✓
	✓					_	_	_
	_					✓	_	_
_		_	_	_	_			
_		_	_	_	_			
_		_	_	_	_			
_		_	_	_	_			
_		✓	_	_	_			
_		_	√*4*7	_	_			
_		_	_	√*8	_			
_		_	_	_	√			
√		_		_	_			
					1			

2.2.2 FX3UC-32MT-LT(-2) PLCs

PLC	Communication	Communication				Data Link	(
PLC	equipment	specifications	CC-Link	N:N Network	Parallel link	Computer link	Inverter communication	MODBUS communication	
Manu	al name (Obtain manua	s if necessary.) →	Product manual		TI	his manual		MODBUS Communication Edition	
	FX3U-USB-BD	USB		_	_	_	_	_	
	FX3U-232-BD			_	_	✓	_	_	
	FX3U-232ADP(-MB)*1	RS-232C		_	_	✓	_	√* 7	
	FX2N-232IF*2			_	_	_	_	_	
	FX3U-485-BD	RS-485		√*6	√*6	✓	✓	_	
	FX3U-485ADP(-MB)*1	113-403		√ *6	√*6	✓	✓	√*7	
	FX3U-422-BD	RS-422		_	_	_	_	_	
FX3UC-	Standard built-in port	110-422		_	_	_	_	_	
32MT-	FX2N-16CCL-M*2		√*3						
LT(-2) PLC	FX3U-16CCL-M*2		√*4*5						
	FX2N-32CCL*2		✓						
	FX3U-64CCL*2		✓						
	FX2N-64CL-M*2	_	_						
	Built-in type CC-Link/ LT master		_						
	FX3U-128ASL-M*2		_						
	FX2N-32ASI-M*2		_						
	FX3U-ENET-ADP*1		_						

- *1. The expansion board is required to connect the FX3UC-32MT-LT(-2) PLC.
- *2. The FX2NC-CNV-IF or FX3UC-IPS-5V is required to connect the FX3UC-32MT-LT(-2) PLC.
- *3. The FX2N-16CCL-M cannot be used at the same time with the FX3U-16CCL-M, FX3U-128ASL-M and/ or FX2N-32ASI-M.
- *4. The FX₃∪-16CCL-M cannot be used at the same time with the FX₂N-16CCL-M and/or FX₂N-32ASI-M.
- *5. The FX3U-16CCL-M can be used at the same time with the FX3U-128ASL-M when CC-Link parameters are set using network parameters.
- *6. Two channels cannot be set at the same time in N:N Network and parallel link. N:N Network and parallel link cannot be used together.
- *7. Only the FX3U-485ADP-MB and FX3U-232ADP-MB support MODBUS communication.
- *8. For the FX2N-64CL-M, refer to FX2N-64CL-M User's Manual. For FX3UC built-in CC-Link/LT master, refer to FX3UC Hardware Edition.
- *9. The FX3U-128ASL-M cannot be used at the same time with the FX2N-16CCL-M and/or FX2N-32ASI-M.
- *10. The FX2N-32ASI-M cannot be used at the same time with the FX3U-16CCL-M, FX3U-128ASL-M and/ or FX2N-16CCL-M.
- *11. Two channels cannot be set at the same time in remote maintenance.

Ethernet communication	General-purpose communication	1	Wire-reduci	ng networl	(Sequence	program	Mail sending
Ethernet	Non-protocol communication	CC-Link/ LT	AnyWire ASLINK	AS-i system	MELSEC- I/OLINK	Programming	Remote maintenance	Internet mail sending
Product manual	This manual		Product	manual		This m	nanual	FX-232DOPA User's Manual
						✓	_	_
	✓					✓	√ *11	✓
	✓					✓	√*11	✓
	√					_	_	✓
	✓					_	_	_
	√					_	_	_
	_					✓	_	_
	_					✓		
_		_	_		_			
_			_	_	_			
_		_	_	_	_			
_		_	_	_	_			
_		√*8	_	_	_			
_		√*8		_	_			
_		_	√*5*9	_	_			
_		_	_	√*10	_			
✓		_	_	_	_			
					•			

2.2.3 FX3G and FX3GC PLCs

PLC	Communication	Communication				Data Lini	(
PLC	equipment	specifications	CC-Link	N:N Network	Parallel link	Computer link	Inverter communication	MODBUS communication	
Manu	al name (Obtain manua	ls if necessary.) →	Product manual		TI	his manual		MODBUS Communication Edition	
	Standard built-in port	USB		_	_	_	_	_	
	FX3G-232-BD	RS-232C			_	✓	_	_	
	FX3U-232ADP(-MB)*1	110-2020		_	_	✓	_	√*6	
	FX3G-485-BD			√*5	√*5	✓	✓	_	
	FX3G-485-BD-RJ	RS-485		√*5	√*5	√	✓	_	
	FX3U-485ADP(-MB)*1			√*5	√*5	✓	√	√*6	
ΓV	FX3G-422-BD	RS-422		_	_	_	_	_	
FX3G PLC	Standard built-in port	R5-422		_	_	_	_	_	
	FX2N-16CCL-M		√*2			_			
	FX3U-16CCL-M		√*3*4	-					
	FX2N-32CCL		✓						
	FX3U-64CCL	_	√						
	FX2N-64CL-M		_	-					
	FX3U-128ASL-M		_						
	FX3U-ENET-ADP*1		_						
	Standard built-in port	USB		_	_	_	_	_	
	FX3U-232ADP(-MB)	RS-232C		-	_	✓	_	√ *6	
	FX3U-485ADP(-MB)	RS-485		√ *5	√ *5	✓	✓	√*6	
	Standard built-in port	RS-422		_	_	_	_	—	
FX3GC	FX2N-16CCL-M*10		√*2						
PLC	FX3U-16CCL-M*10		√*3*4						
	FX2N-32CCL*10		✓						
	FX3U-64CCL*10	_	✓						
	FX2N-64CL-M*10		_						
	FX3U-128ASL-M*10		_						
	FX3U-ENET-ADP								

- *1. The FX3G-CNV-ADP is required to connect the FX3G PLC.
- *2. The FX2N-16CCL-M cannot be used at the same time with the FX3U-16CCL-M and/or FX3U-128ASL-M.
- *3. The FX3U-16CCL-M cannot be used at the same time with the FX2N-16CCL-M.
- *4. The FX3U-16CCL-M can be used at the same time with the FX3U-128ASL-M when CC-Link parameters are set using network parameters.
- *5. Two channels cannot be set at the same time in N:N Network and parallel link. N:N Network and parallel link cannot be used together.
- *6. Only the FX3U-485ADP-MB and FX3U-232ADP-MB support MODBUS communication.
- *7. Only the RS2 instruction is supported.
- *8. The FX₃∪-128ASL-M cannot be used at the same time with the FX₂N-16CCL-M.
- *9. Two channels cannot be set at the same time in remote maintenance.
- *10. The FX2NC-CNV-IF or FX3UC-1PS-5V is required to connect the FX3GC PLC.

Ethernet communication	General-purpose communication	'	Wire-reduci	ng networl	(Sequence	program	Mail sending
Ethernet	Non-protocol communication	CC-Link/ LT	AnyWire ASLINK	AS-i system	MELSEC- I/O LINK	Programming	Remote maintenance	Internet mail sending
Product manual	This manual		Product	manual		This m	nanual	FX-232DOPA User's Manual
	_					✓	_	_
	✓					✓	√*9	_
	✓					✓	√*9	_
	✓					_	_	_
	✓					_	_	_
	✓					_	_	_
	_					√	_	_
	√*7					√	_	_
_		_	_	_	_			
_		_	_	_	_			
_		_	_	_	_			
_		_	_	_	_			
_		✓	_	_	_			
_			√*4*8	_	_			
✓		_	_	_	_			
	_					√	_	_
	✓					✓	√*9	_
	✓					_		_
	√*7					✓	_	_
_		_	_	_	_			
_			_	_	_			
_			_	_	_			
_		_	_	_	_			
_		✓	_		_			
_		_	√*4*8	_	_			
✓		_	_		_			

2.2.4 FX3S PLC

PLC	Communication	Communication specifications		Data Link							
PLO	equipment		CC-Link	N:N Network	Parallel link	Computer link	Inverter communication	MODBUS communication			
Manual name (Obtain manuals if necessary.) →			Product manual	I his manual I Communication I							
	Standard built-in port	USB		_	_	_	_	_			
	FX3G-232-BD	RS-232C		_	_	✓	_	_			
	FX3U-232ADP(-MB)*1			_	_	✓	_	√*2			
EV	FX3G-485-BD			√	✓	√	✓	_			
FX3S PLC	FX3G-485-BD-RJ	RS-485		✓	✓	✓	✓	_			
. 20	FX3U-485ADP(-MB)*1			✓	✓	✓	✓	√*2			
	FX3G-422-BD	RS-422		_	_	_	_	_			
	Standard built-in port	110-422		_	_	_	_	_			
	FX3u-ENET-ADP*1	_	_								

^{*1.} The FX3S-CNV-ADP is required to connect the FX3S PLC.

^{*2.} Only the FX3U-485ADP-MB and FX3U-232ADP-MB support MODBUS communication.

Ethernet communication	General-purpose communication	wire-reducing network			Sequence	program	Mail sending
Ethernet	Non-protocol communication	CC-Link/LT	AS-i system	MELSEC-I/O LINK	Programming	Remote maintenance	Internet mail sending
Product manual	This manual		Product manua	al	This n	nanual	FX-232DOPA User's Manual
	_				✓	_	_
	✓				✓	✓	_
	✓				✓	✓	_
	✓				_	_	_
	✓				_		
	✓				_		
	_				✓	_	
	_				√	_	_
√			_				

2.2.5 FX2N and FX2NC PLCs

-1.0	Communication	Communication			Lin	ık		
PLC	equipment	specifications	CC-Link	N:N Network	Parallel link	Computer link	Inverter communication	
Manu	Manual name (Obtain manuals if necessary.) \rightarrow		Product manual					
	FX2N-232-BD			_	_	✓	_	
	FX2NC-232ADP*1	DO 0000		_	_	✓	_	
	FX0N-232ADP*1	RS-232C		_	_	√*3	_	
	FX2N-232IF	<u>-</u>		_	_	_	_	
	FX2N-485-BD			✓	✓	✓	✓	
	FX2NC-485ADP*1	RS-485		√	✓	✓	✓	
FX ₂ N	FX0N-485ADP*1			√	√	√	✓	
PLC	FX2N-422-BD	RS-422		_	_	_	_	
	Standard built-in port	110-422		_	_	_	_	
	FX2N-16CCL-M		√*2					
	FX2N-32CCL		✓					
	FX2N-64CL-M	_	_					
	FX2N-32ASI-M							
	FX2N-16LNK-M		_		,			
	FX2NC-232ADP	-			_	✓	_	
	FX0N-232ADP	RS-232C		_	_	√*3	_	
	FX2N-232IF*4			_	_		_	
	FX2NC-485ADP	RS-485		✓	✓	✓	✓	
FX2NC	FX0N-485ADP			✓	✓	✓	✓	
PLC	Standard built-in port	RS-422		_	_	_	_	
	FX2N-16CCL-M*4	_	√*2					
	FX2N-32CCL*4		✓					
	FX2N-64CL-M*4	_	_					
	FX ₂ N-32ASI-M ^{*4}							
	FX2N-16LNK-M*4		_					

- *1. The FX2N-CNV-BD is required to connect the FX2N PLC.
- *2. The FX2N-16CCL-M cannot be used at the same time with the FX2N-32ASI-M.
- *3. It is recommended to use a connector or thin type FX2NC-232ADP (9-pin D-Sub).
- *4. The FX2NC-CNV-IF is required to connect the FX2NC PLC.
- *5. The FX2NC-□MT-D/UL and FX2NC-□M□-DSS(-T-DS) does not support this connection.

General-purpose communication		I/O link		Sequence	program	Mail	sending
Non-protocol communication	CC-Link/ LT	AS-i system	MELSEC-I/O LINK	Programming	Remote maintenance	Internet mail sending	Short mail sending
This manual		Product mai	nual	This m	anual	FX-232DOPA User's Manual	FX1s, FX1n, FX2n, FX1nc, FX2nc Programming Manual
✓				√	✓	✓	\checkmark
✓				✓	✓	✓	✓
√*3				√*3	√*3	√*3	√*3
√				_	_	✓	_
✓				_	_	_	_
√				_	_	_	_
✓				_	_	_	_
_				√		_	_
				✓		_	_
	_	_	_				
	_	_	_				
	✓	_					
	_	√*2	_				
	_	_	✓				
✓				√	√	✓	✓
√*3				√*3	√*3	√*3	√*3
✓				_	_	✓	_
√				_		_	_
√				_		_	_
				√			
	_		_				
	_	_					
	✓	_					
	_	√*2*5	_				
	_	_	√				

2.2.6 FX1s, FX1N, and FX1NC PLCs

PLC	Communication	Communication			Lin	k		
PLC	equipment	specifications	CC-Link	N:N Network	Parallel link	Computer link	Inverter communication	
Manu	al name (Obtain manua	lls if necessary.) →	Product manual					
	FX1N-232-BD			_	_	✓	_	
	FX2NC-232ADP*1	RS-232C		_	_	✓	_	
	FX0N-232ADP*1			_	_	√*2	_	
FX1S	FX1N-485-BD			√	√	✓	_	
PLC	FX2NC-485ADP*1	RS-485		✓	✓	✓	_	
	FX0N-485ADP*1	1		✓	√	✓	_	
	FX1N-422-BD	RS-422		_	_	_	_	
	Standard built-in port	RS-422		_	_	_	_	
	FX1N-232-BD			_	_	✓	_	
	FX2NC-232ADP*1	RS-232C		_	_	✓	_	
	FX0N-232ADP*1			_	_	√*2	_	
	FX1N-485-BD			√	✓	✓	_	
	FX2NC-485ADP*1	RS-485		✓	√	✓	_	
FX1N	FX0N-485ADP*1]		✓	✓	✓	_	
PLC	FX1N-422-BD	RS-422		_	_	_	_	
	Standard built-in port	110-422		_	_	_	_	
	FX2N-16CCL-M		√ *3					
	FX2N-32CCL		✓					
	FX2N-64CL-M	_	_					
	FX2N-32ASI-M							
	FX2N-16LNK-M		_					
	FX2NC-232ADP	RS-232C		_	_	✓	_	
	FX0N-232ADP	110 2020		_	_	√*2	_	
	FX2NC-485ADP	RS-485		✓	✓	✓	_	
	FX0N-485ADP			✓	✓	✓	_	
FX1NC	Standard built-in port	RS-422		_	_	_	_	
PLC	FX2N-16CCL-M*4		√ *3					
	FX2N-32CCL*4		✓					
	FX2N-64CL-M*4] –	_					
	FX2N-32ASI-M*4		_					
	FX2N-16LNK-M*4		_					

^{*1.} The FX1N-CNV-BD is required to connect the FX1s or FX1N PLC.

^{*2.} It is recommended to use a connector or thin type FX2NC-232ADP (9-pin D-Sub).

^{*3.} The FX2N-16CCL-M cannot be used at the same time with the FX2N-32ASI-M.

^{*4.} The FX2NC-CNV-IF is required to connect the FX1NC PLC.

General-purpose communication		I/O link		Sequence	program	Mail sending
Non-protocol communication	CC-Link/LT	AS-i system	MELSEC-I/O LINK	Programming	Remote maintenance	Internet mail sending
This manual		Product manua	I	This m	nanual	FX-232DOPA User's Manual
√				✓	✓	✓
√				✓	√	✓
√*2				√*2	√* ²	√* ²
√				_		
√				_	_	_
√				_	_	_
_				✓	_	_
_				✓	_	_
√				✓	✓	✓
√				✓	✓	✓
√*2				√*2	√ ^{*2}	√* ²
√				_	_	_
√				_	_	_
√				_	_	_
_				✓	_	_
_				✓	_	_
	_	_				
	_	_	_			
	✓	_	-			
	_	√ *3	_			
	_	_	✓			
√				√	✓	✓
√*2				√*2	√*2	√*2
√				_	_	_
√				_	_	_
_				✓	_	_
	_	_	_			
	_	_	_			
	✓	_				
	_	√*3	_			
	_	_	✓			

2.2.7 FXon PLCs

PLC	Communication	Communication specifications		Link						
1 20	equipment		CC-Link	N:N Network	Parallel link	Computer link	Inverter communication			
Manual name (Obtain manuals if necessary.) →		Product manual	This manual							
	FX2NC-232ADP	RS-232C		_	_	✓	_			
	FX0N-232ADP	13-2320		_	_	√*1	_			
	FX2NC-485ADP	DC 405		✓	✓	✓	_			
	FX0N-485ADP	RS-485		✓	✓	✓	_			
FX ₀ N	Standard built-in port	RS-422		_	_	_	_			
PLC	FX2N-16CCL-M									
	FX2N-32CCL		✓							
	FX2N-64CL-M	_	_							
	FX2N-32ASI-M		_							
	FX2N-16LNK-M]	_							

^{*1.} It is recommended to use a connector or thin type FX2NC-232ADP (9-pin D-Sub).

2.2.8 FX1, FX2(FX), FX2C, FX0 and FX0S PLCs (reference)

PLC	Communication	Communication		Link						
PLG	equipment	specifications	CC-Link	N:N Network	Parallel link	Computer link	Inverter communication			
Manua	Manual name (Obtain manuals if necessary.) →			Product This manual						
FX1 PLC	Standard built-in port	RS-422		_	_	_	_			
	FX-232ADP	RS-232C		_	_	✓	_			
FX2(FX)	FX-485ADP	RS-485		_	_	✓	_			
PLC	FX-40AW	_		_	✓	_	_			
FX2C PLC	FX-40AP	Optical communication		_	✓	_	_			
	Standard built-in port	RS-422		_	_	_	_			
FX0 PLC	Standard built-in port	RS-422		_	_	_	_			
FX0S PLC	Standard built-in port	RS-422		_	_	_	_			

^{*1.} Only Japanese manual is available for this product.

^{*2.} Only Japanese manual is available for this product.

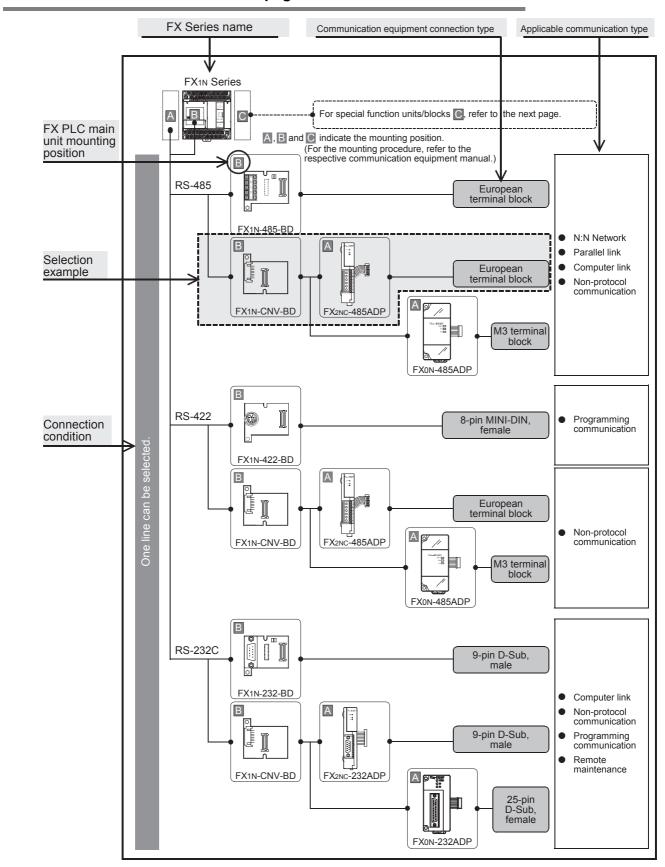
General-purpose communication		I/O link		Sequence	program	Mail sending
Non-protocol communication	CC-Link/LT	AS-i system	MELSEC-I/O LINK	Programming	Remote maintenance	Internet mail sending
This manual		Product manua	I	This m	FX-232DOPA User's Manual ^{*2}	
√				_	_	_
√*1				_	_	_
✓				_	_	_
✓				_	_	_
_				✓	_	_
	_	_	_			
	_	_	_			
	✓	_	_			
	_	✓	_			
	_	_	√			

General-purpose communication		I/O link		Sequence	program	Mail sending
Non-protocol communication	CC-Link/LT	AS-i system	MELSEC-I/O LINK	Programming	Remote maintenance	Internet mail sending
This manual	I	Product manua	I	This m	nanual	FX-232DOPA User's Manual*1
				✓		_
√				_	_	_
_				_	_	_
_				_	_	_
_				_	_	_
_				✓	_	_
_				√	_	_
_				✓	_	

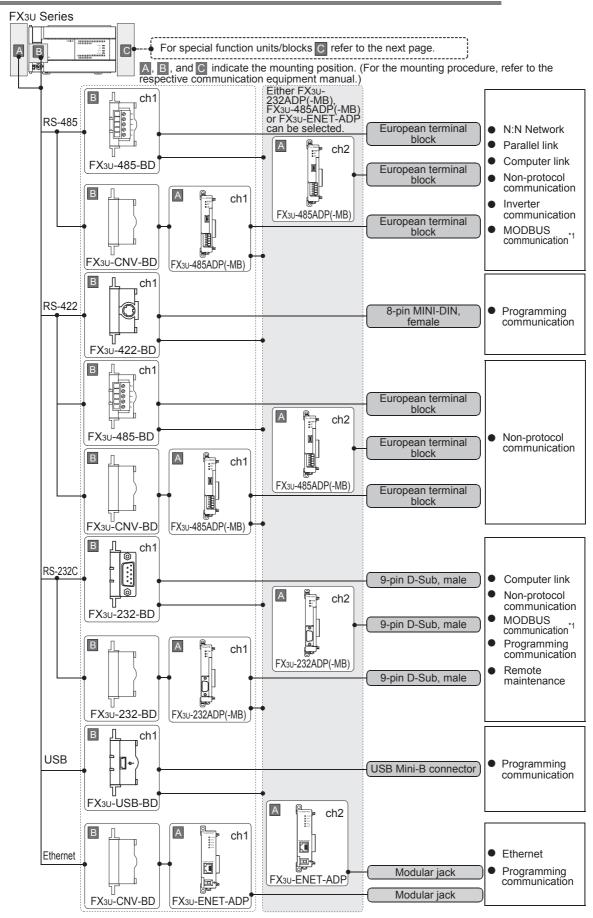
2.3 Combination of Communication Equipment (Block Diagram)

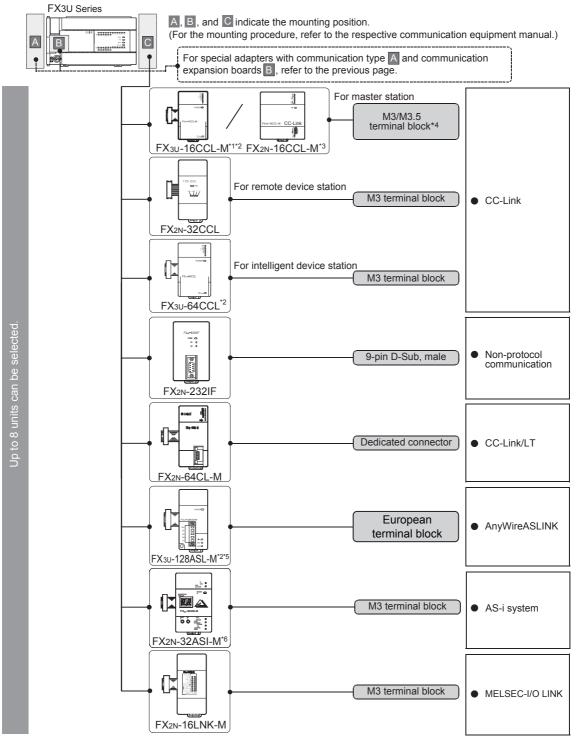
The block diagram below shows combinations of optional communication equipment applicable in each FX Series.

2.3.1 How to look at combination pages



2.3.2 For FX3U Series





- *1. The FX3U-16CCL-M cannot be used at the same time with the FX2N-16CCL-M and/or the FX2N-32ASI-M.
- *2. Only one unit can be connected to the main unit.
- *3. The FX2N-16CCL-M cannot be used at the same time with the FX3U-16CCL-M, FX3U-128ASL-M and/or the FX2N-32ASI-M.
- *4. The terminal screw size is "M3" in the FX3U-16CCL-M. The terminal screw size is "M3.5" in the FX2N-16CCL-M.
- *5. The FX3U-128ASL-M cannot be used at the same time with the FX2N-16CCL-M and/or FX2N-32ASI-M.
- *6. The FX2N-32ASI-M cannot be used at the same time with the FX3U-16CCL-M, FX3U-128ASL-M and/or the FX2N-16CCL-M.
 Only one station can be used for the whole system.

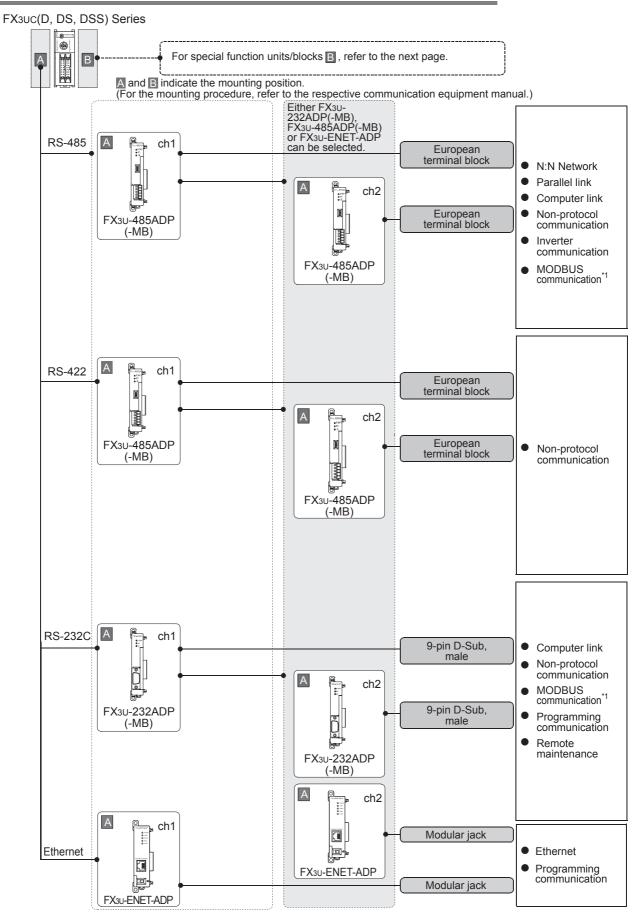
Limitation in the number of connectable units

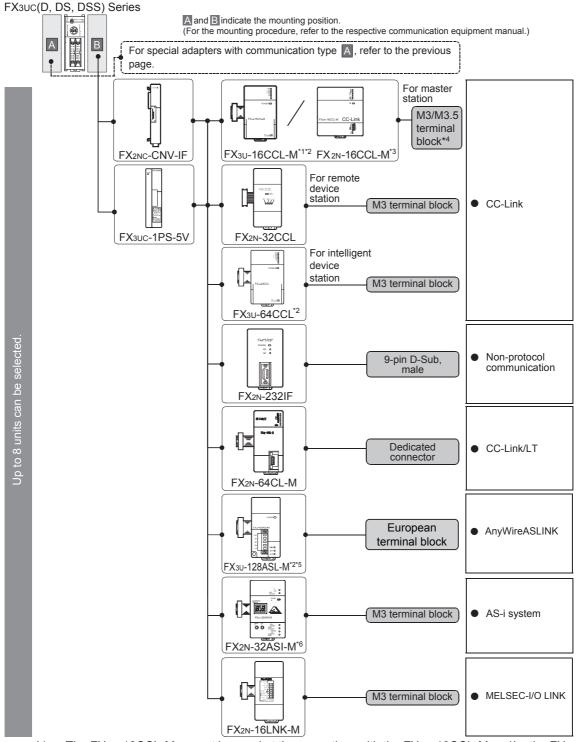
Connected special function units/blocks operate using the 24V DC or 5V DC power supply of the PLC.

Therefore, the total current consumption larger than the plc current capacity reduces the number of connectable units.

→ For details, refer to the respective FX PLC manual.

2.3.3 For FX3UC(D, DS, DSS) Series





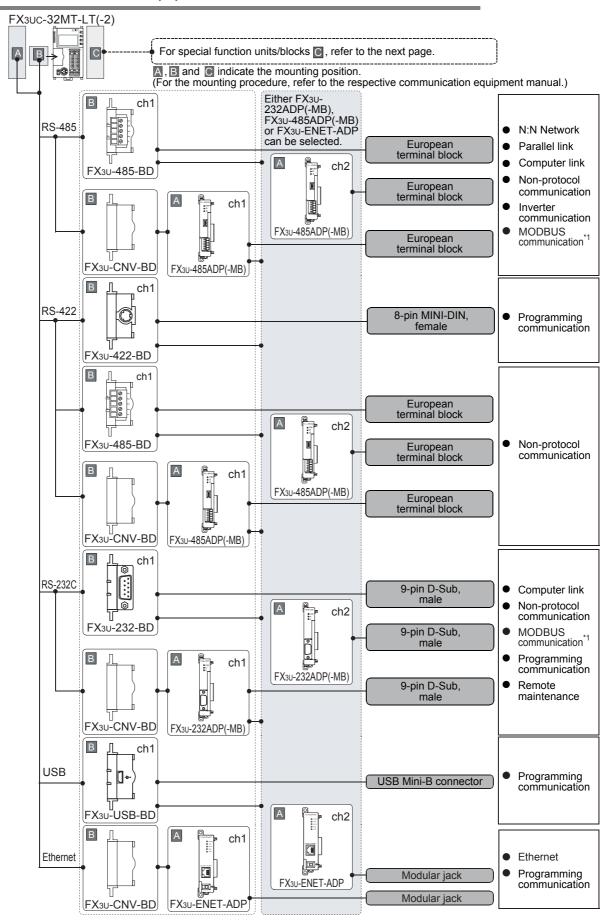
- *1. The FX3U-16CCL-M cannot be used at the same time with the FX2N-16CCL-M and/or the FX2N-32ASI-M.
- *2. Only one unit can be connected to the main unit.
- The FX2N-16CCL-M cannot be used at the same time with the FX3U-16CCL-M, FX3U-128ASL-M and/or the FX2N-32ASI-M. *3.
- *4 The terminal screw size is "M3" in the FX3U-16CCL-M. The terminal screw size is "M3.5" in the FX2N-16CCL-M.
- *5. The FX3U-128ASL-M cannot be used at the same time with the FX2N-16CCL-M and/or FX2N-32ASI-M.
- The FX2N-32ASI-M cannot be used at the same time with the FX3U-16CCL-M, FX3U-128ASL-M and/or the FX2N-16CCL-M. Only one station can be used for the whole system. *6.

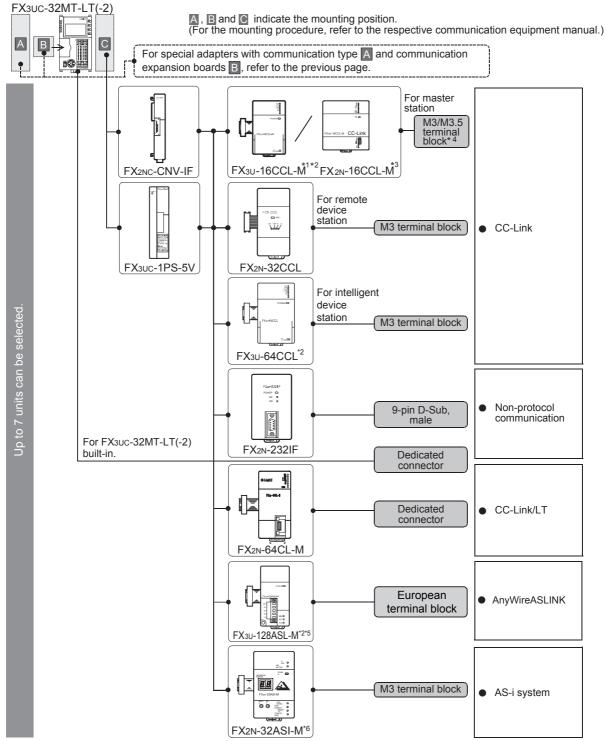
Limitation in the number of connectable units

Connected special function units/blocks operate using the 24V DC or 5V DC power supply of the PLC. Accordingly, when the total current consumption is larger than the current capacity of the PLC, it is necessary to add the power block FX3UC-1PS-5V.

→ For details, refer to the respective FX PLC manual.

2.3.4 For FX3uc-32MT-LT(-2)





- *1. The FX3U-16CCL-M cannot be used at the same time with the FX2N-16CCL-M and/or the FX2N-32ASI-M.
- *2. Only one unit can be connected to the main unit.
- *3. The FX2N-16CCL-M cannot be used at the same time with the FX3U-16CCL-M, FX3U-128ASL-M and/or the FX2N-32ASI-M.
- *4. The terminal screw size is "M3" in the FX3U-16CCL-M. The terminal screw size is "M3.5" in the FX2N-16CCL-M.
- *5. The FX3U-128ASL-M cannot be used at the same time with the FX2N-16CCL-M and/or FX2N-32ASI-M.
- *6. The FX2N-32ASI-M cannot be used at the same time with the FX3U-16CCL-M, FX3U-128ASL-M and/or the FX2N-16CCL-M.
 Only one station can be used for the whole system.

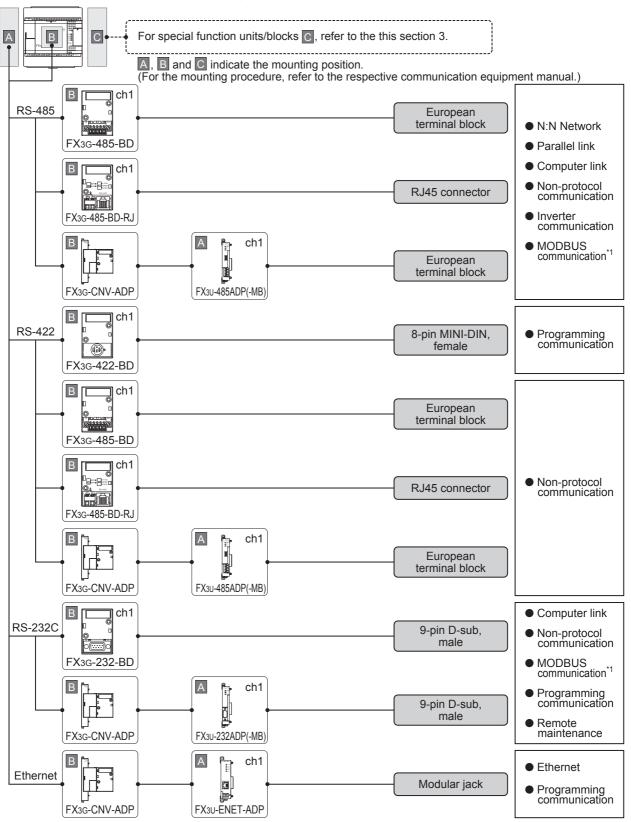
Limitation in the number of connectable units

Connected special function units/blocks operate using the 24V DC or 5V DC power supply of the PLC. Accordingly, when the total current consumption is larger than the current capacity of the PLC, it is necessary to add the power block FX₃UC-1PS-5V.

→ For details, refer to the respective FX PLC manual.

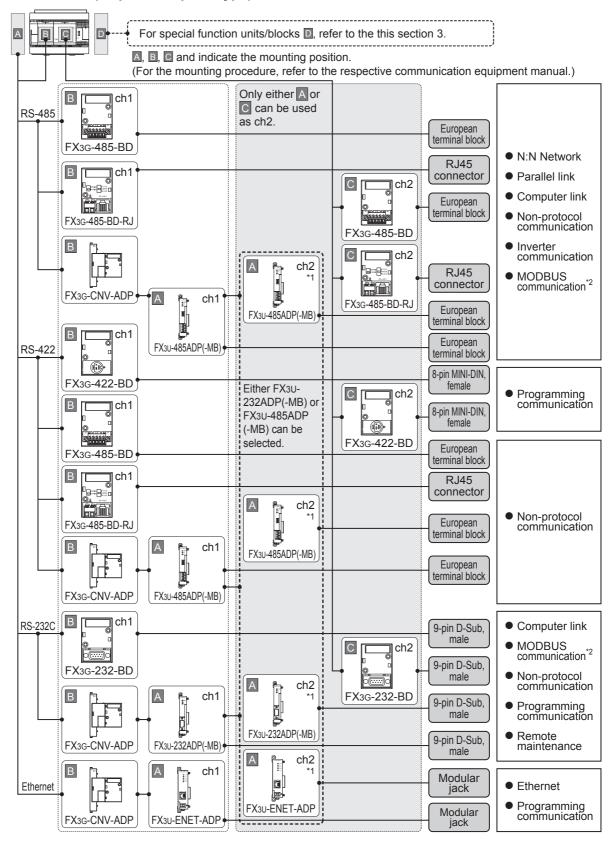
2.3.5 For FX3G Series

1. FX3G Series (14-point, 24-point type)



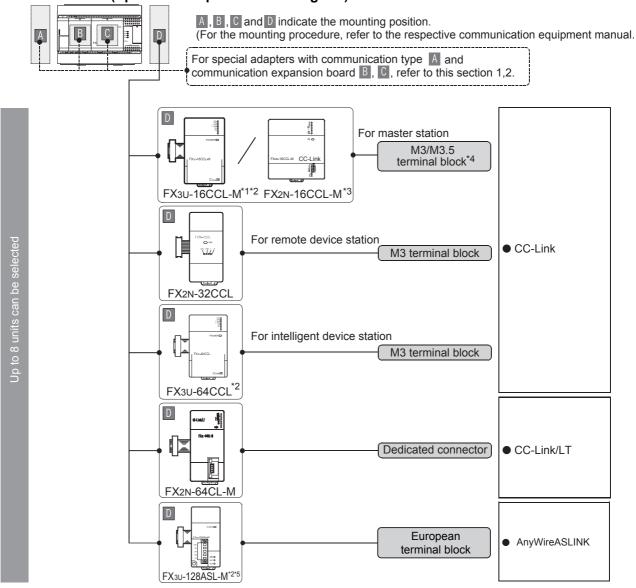
*1. Only the FX3U-485ADP-MB and FX3U-232ADP-MB support MODBUS communication.

2. FX3G Series (40-point, 60-point type)



- *1. Ch2 is not available when the FX3G-8AV-BD, FX3G-4EX-BD or FX3G-2EYT-BD is used.
- *2. Only the FX3U-485ADP-MB and FX3U-232ADP-MB support MODBUS communication.

3. FX3G Series (Special unit/special block diagram)



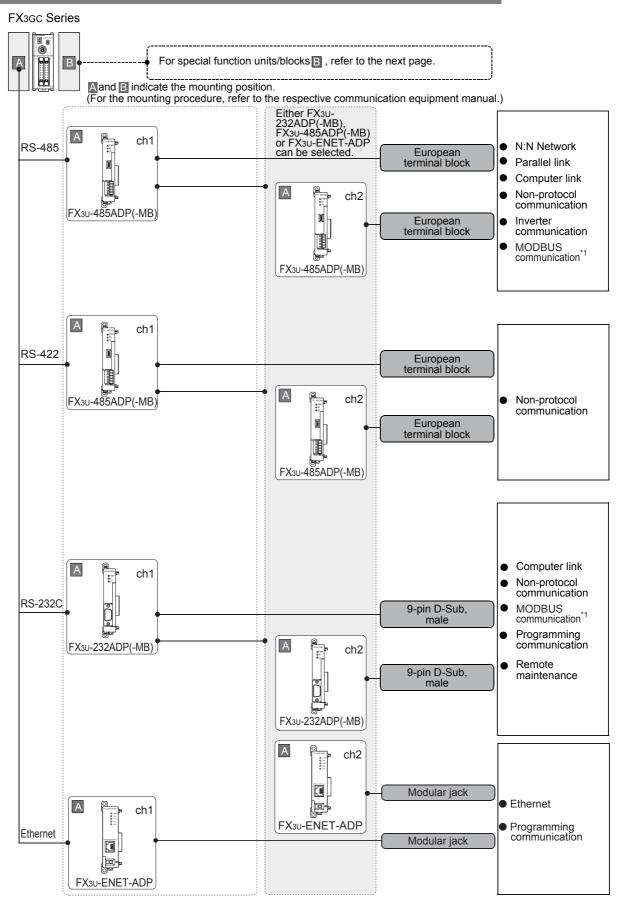
- *1. The FX3U-16CCL-M cannot be used at the same time with the FX2N-16CCL-M.
- *2. Only one unit can be connected to the main unit.
- *3. The FX2N-16CCL-M cannot be used at the same time with the FX3U-16CCL-M and/or FX3U-128ASL-M.
- *4. The terminal screw size is "M3" in the FX3U-16CCL-M. The terminal screw size is "M3.5" in the FX2N-16CCL-M.
- The FX3U-128ASL-M cannot be used at the same time with the FX2N-16CCL-M. *5.

Limitation in the number of connectable units

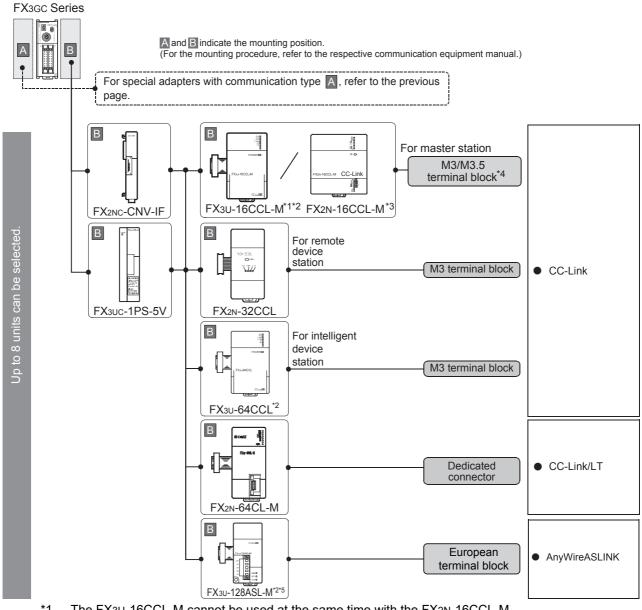
Connected special function units/blocks operate using the 24V DC or 5V DC power supply of the PLC. Accordingly, the number of connectable units depends on the system configuration.

→ For details, refer to the respective FX PLC manual.

2.3.6 For FX3GC Series



*1. Only the FX3U-485ADP-MB and FX3U-232ADP-MB support MODBUS communication.



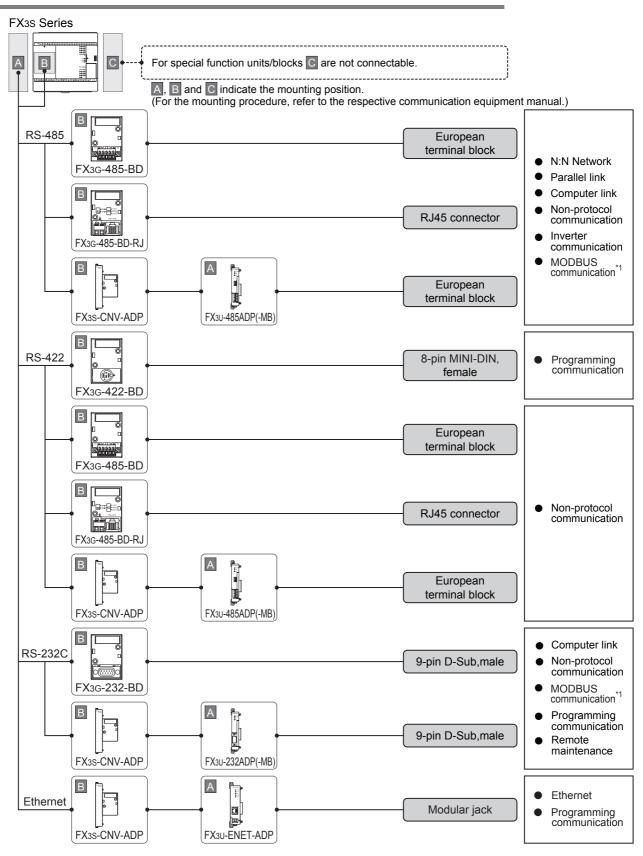
- *1. The FX3U-16CCL-M cannot be used at the same time with the FX2N-16CCL-M.
- *2. Only one unit can be connected to the main unit.
- *3. The FX2N-16CCL-M cannot be used at the same time with the FX3U-16CCL-M and/or FX3U-128ASL-M.
- *4. The terminal screw size is "M3" in the FX3U-16CCL-M. The terminal screw size is "M3.5" in the FX2N-16CCL-M.
- *5. The FX3U-128ASL-M cannot be used at the same time with the FX2N-16CCL-M.

Limitation in the number of connectable units

Connected special function units/blocks operate using the 24V DC or 5V DC power supply of the PLC. Accordingly, when the total current consumption is larger than the current capacity of the PLC, it is necessary to add the power block FX3UC-1PS-5V.

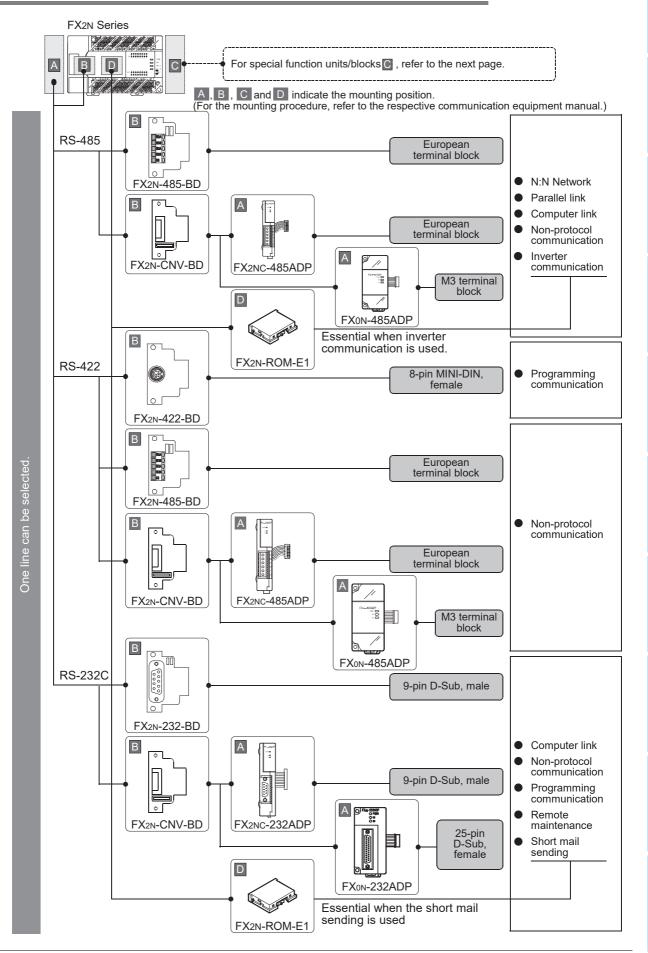
→ For details, refer to the respective FX PLC manual.

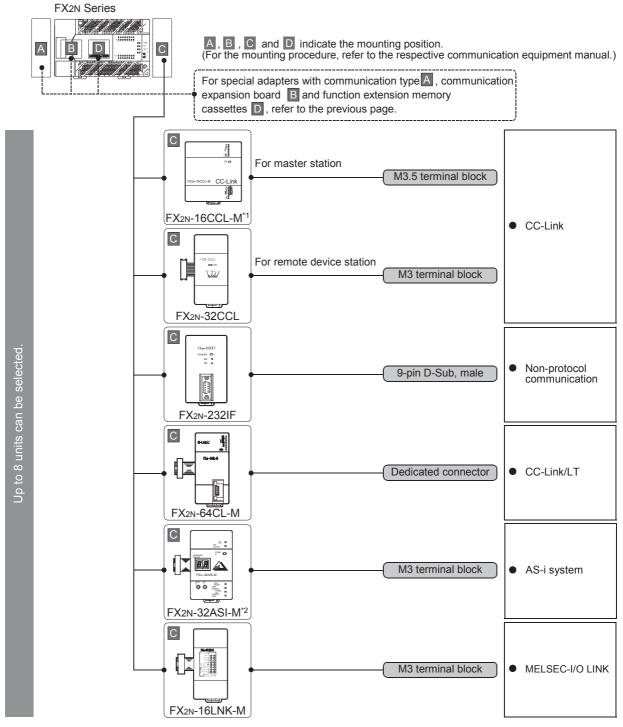
2.3.7 For FX3s Series



*1. Only the FX3U-485ADP-MB and FX3U-232ADP-MB support MODBUS communication.

For FX2N Series 2.3.8





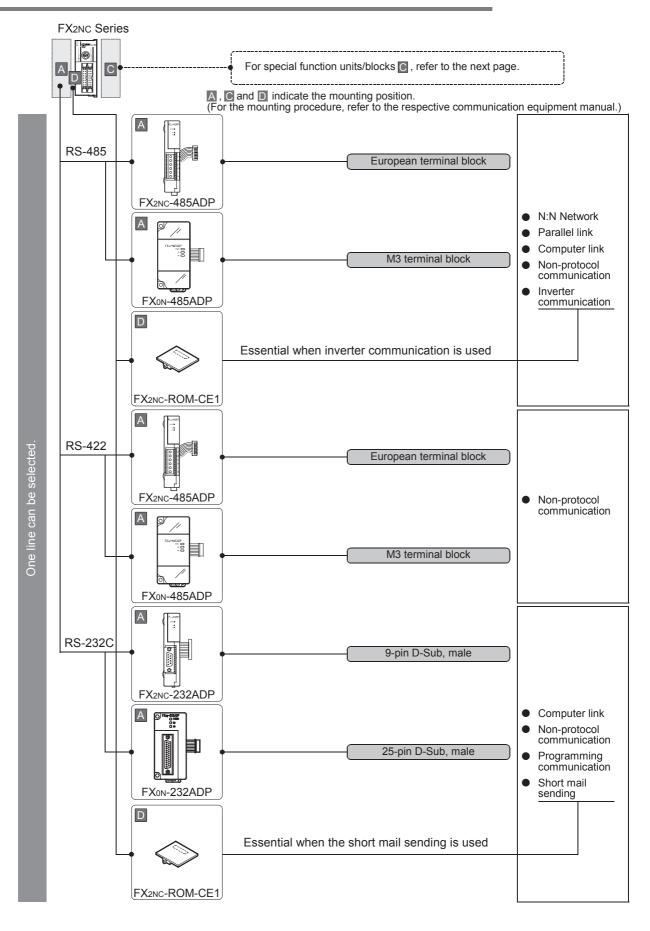
- *1. The FX2N-16CCL-M cannot be used at the same time with the FX2N-32ASI-M.
- *2. The FX2N-32ASI-M cannot be used at the same time with the FX2N-16CCL-M.

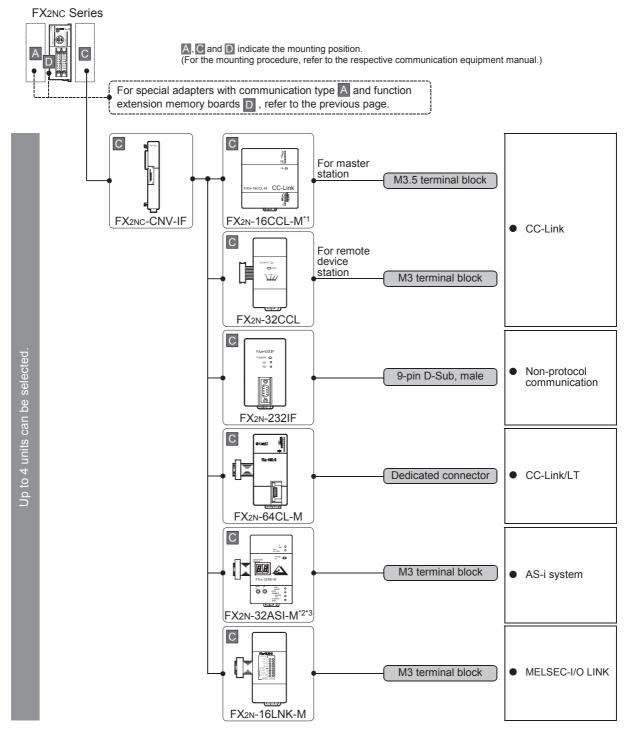
Limitation in the number of connectable units

Connected special function units/blocks operate using the 24V DC or 5V DC power supply of the PLC. Therefore, the total current consumption larger than the PLC current capacity reduces the number of connectable units.

 \rightarrow For details, refer to the respective FX PLC manual.

2.3.9 For FX2NC Series





- *1. The FX2N-16CCL-M cannot be used at the same time with the FX2N-32ASI-M.
- *2. The FX2N-32ASI-M cannot be used at the same time with the FX2N-16CCL-M.
- *3. The FX2NC-□MT-D/UL and FX2NC-□M□-DSS(-T-DS) are not supported.

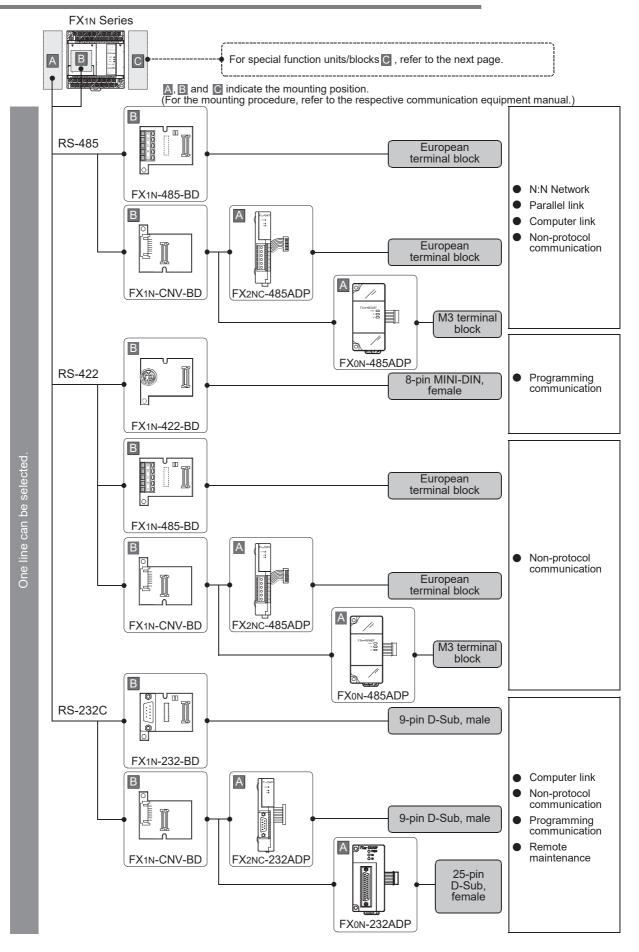
Limitation in the number of connectable units

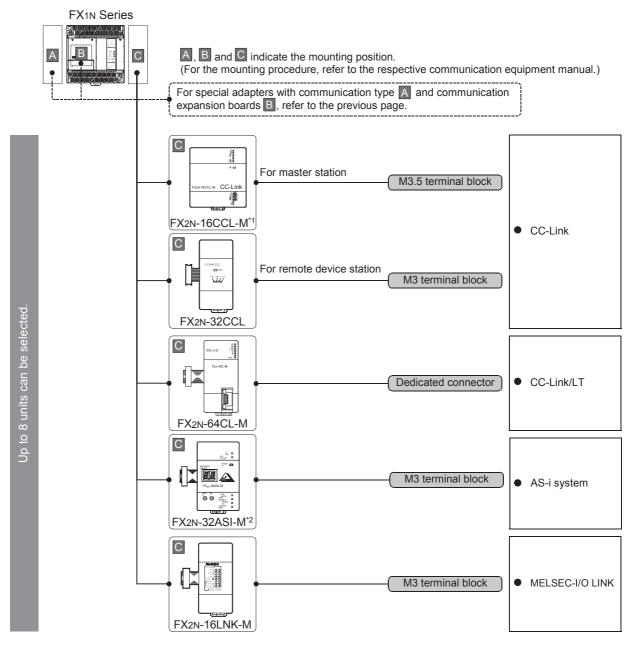
Connected special function units/blocks operate using the 24V DC or 5V DC power supply of the PLC. Therefore, the total current consumption larger than the plc current capacity reduces the number of connectable units.

→ For details, refer to the respective FX PLC manual.

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2.3.10 For FX1N Series





- *1. The FX2N-16CCL-M cannot be used at the same time with the FX2N-32ASI-M.
- *2. The FX2N-32ASI-M cannot be used at the same time with the FX2N-16CCL-M.

Limitation in the number of connectable units

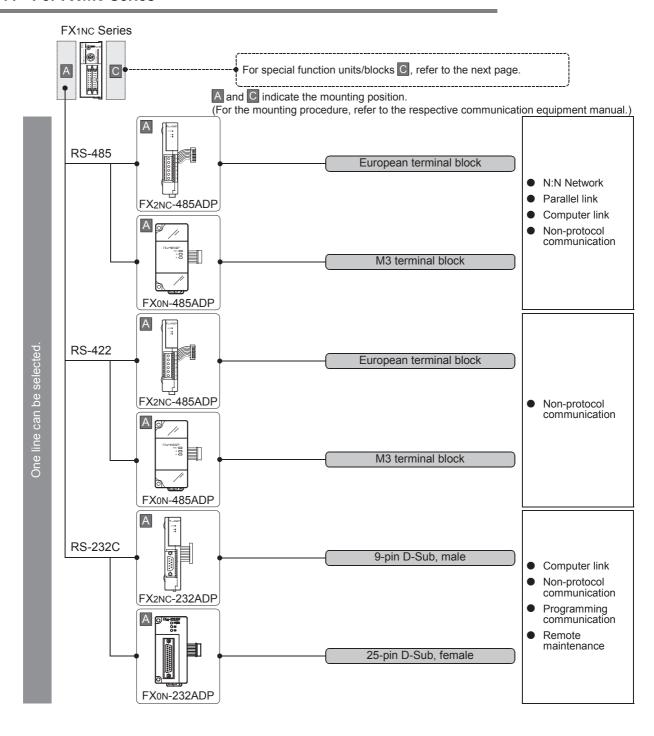
Connected special function units/blocks operate using the 24V DC or 5V DC power supply of the PLC. Accordingly, the number of connectable units depends on the system configuration.

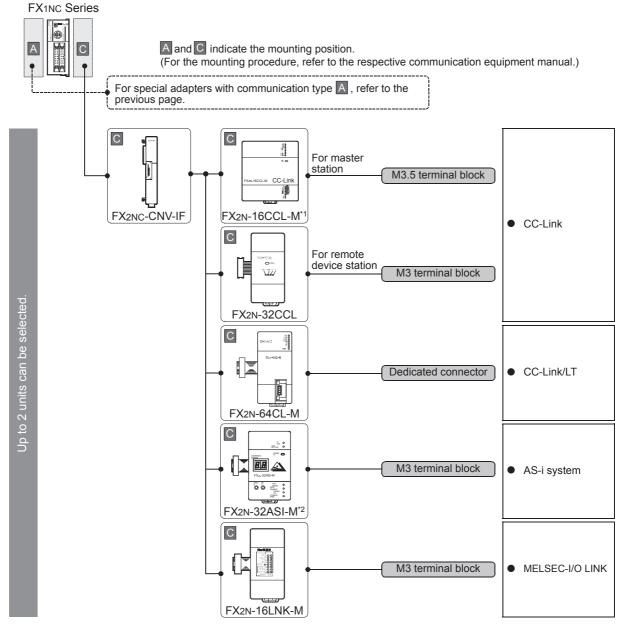
 \rightarrow For details, refer to the respective FX PLC manual.

2.3 Combination of Communication Equipment (Block Diagram)

D

2.3.11 For FX1NC Series





- *1. The FX2N-16CCL-M cannot be used at the same time with the FX2N-32ASI-M.
- *2. The FX2N-32ASI-M cannot be used at the same time with the FX2N-16CCL-M.

Limitation in the number of connectable units

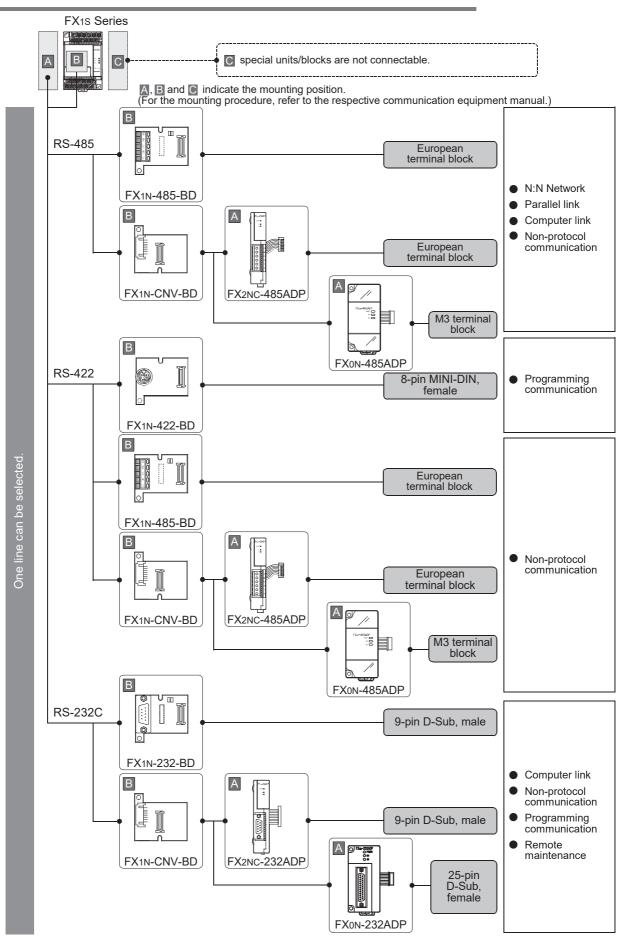
Connected special function units/blocks operate using the 24V DC or 5V DC power supply of the PLC. Accordingly, the number of connectable units depends on the system configuration.

→ For details, refer to the respective FX PLC manual.

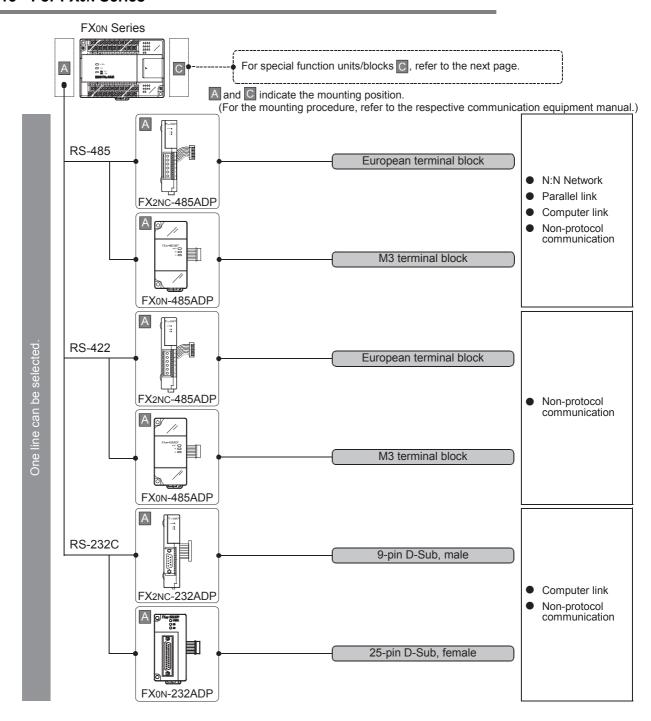
2.3 Combination of Communication Equipment (Block Diagram)

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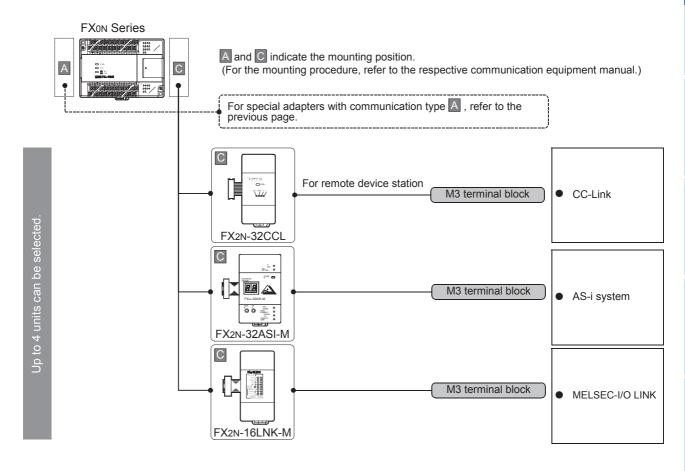
2.3.12 For FX1s Series



2.3.13 For FXon Series



2.3 Combination of Communication Equipment (Block Diagram)

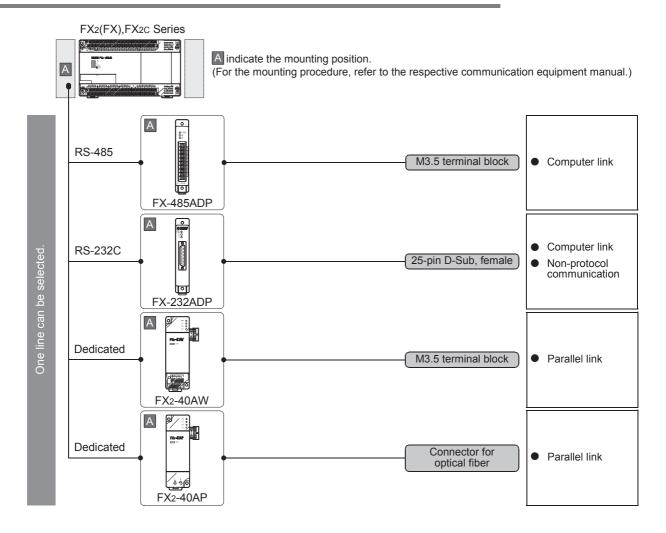


Limitation in the number of connectable units

Connected special function units/blocks operate using the 24V DC or 5V DC power supply of the PLC. Therefore, the total current consumption larger than the plc current capacity reduces the number of connectable units.

 \rightarrow For details, refer to the respective FX PLC manual.

2.3.14 For FX2(FX) and FX2C Series (reference)



3.1 Setting Method

D

Outline of Communication Setting in the FX Series

This chapter describes which communication parameters can be changed for the following communication types, and provides methods on how to change them.

- Computer link
- Inverter communication
- Non-protocol communication (RS/RS2 instruction)
- Internet mail sending

3.1 Setting Method

The following two communication setting methods are available for FX PLCs. Either method can be used, but the method using parameters is recommended.

1. Setting methods

- 1) Specify the settings using parameters in the programming tool Register the settings in parameters, transfer it to the PLC and turn the PLC's power OFF and then ON. (This method is not available in FX2(FX), FX2C, and FX0N PLCs.) (This method is not available for ch0 in FX3G, FX3GC PLCs.)
- 2) Directly specify the settings in a sequence program Prepare a sequence program which sets the communication format, station number and time-out time setting, and then transfer the program to the PLC.

Caution

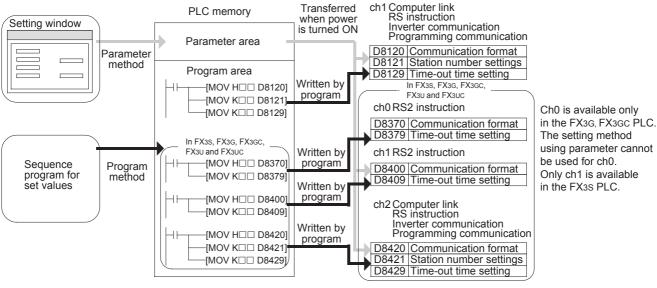
Regardless of the method chosen above, a PLC operates the same way. If both methods are selected, priority is given to the method using parameters.

2. Communication setting method availability in each FX PLC

FX Series	FX2(FX),FX2C	FXon	FX1S	FX1N,FX1NC	FX2N,FX2NC	FX3S	FX3G,FX3GC	FX3U,FX3UC
Parameter method	_	_	✓	✓	✓	✓	√*1	✓
Program method	✓	✓	✓	✓	✓	✓	✓	✓

Only ch1 and ch2 are available.

3. Setting flow



When both methods are selected at the same time, priority is given to the contents set using the parameter method.

A-65

4. Time at which the settings become valid

- Specifying the settings using parameters in the programming tool:
 When the PLC power is turned ON, the contents of the parameters are automatically transferred to the PLC.
 - As soon as the parameters are transferred to the PLC, the settings become valid.
- 2) Directly specifying the settings in a sequence program: To enable the settings, write data after turning the PLC mode to RUN from STOP, and then reboot the PLC's power.

3.2 Communication Setting Using Parameter Method (GX Works2)

C

3.2 Communication Setting Using Parameter Method (GX Works2)

Communication settings may be changed by the parameter method with GX Works2, GX Developer, FXGP/WIN for Windows and FX-30P handy programming panel. This section describes how to change parameters with GX Works2.

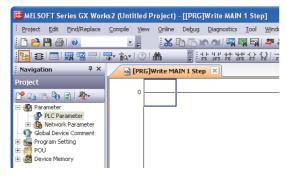
→ For details on FXGP/WIN operating procedure, refer to section 3.3.
 → For details on GX Developer operating procedure, refer to GX Developer Operating Manual.
 → For details on FX-30P operating procedure, refer to FX-30P Operation Manual.

3.2.1 Operating procedure

With GX Works2 open, follow the steps in this section for activating the serial communication setting method.

1 Opening the parameter setting window

In the project view area of the navigation window, double-click [Parameter] \rightarrow [PLC Parameter]. If the navigation window is not displayed, select [View] \rightarrow [Docking Window] \rightarrow [Navigation] from the menu bar.

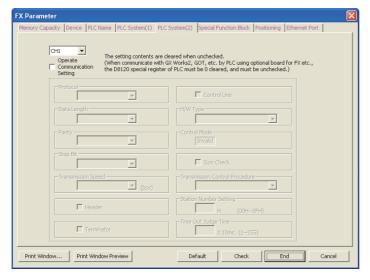


2 Setting the serial communication (parameters)

Click the [PLC System(2)] tab on the dialog box.

When using programming communication, parallel link, N:N Network or remote maintenance, do not check the "Operate Communication Setting" box.

When using computer link, inverter communication or non-protocol communication (RS/RS2 instruction) function, check the "Operate Communication Setting" box, and then set each item. Click [End].



3 Writing parameters to the PLC

Select [Online] \rightarrow [Write to PLC] from the menu bar, click [Parameter + Program], and then click [Execute].

3.2.2 Correspondence between parameter setting and each communication type

The table below shows the communication types and set items which can be set using parameters:

Set item	Contents	CC-Link network	MODBUS communication	Ethernet communication	N:N Network	Parallel link	Computer link	Inverter communication	RS Non-protocol communication RS2 (RS/RS2 instruction)	Non-protocol communication (FX2N-232IF)	Short mail sending	Internet mail sending	CC-Link/LT network	AnyWireASLINK	AS-i system	Programming communication	Remote maintenance	Remarks
Protocol	Non-protocol communication Dedicated protocol	-					<u></u> ✓	✓	✓—	-		✓—						
Data length	7-bit 8-bit						√ √	✓	√ ✓			<u></u> ✓						
Parity	None Odd Even	-					✓ ✓ ✓	✓✓	√ ✓			✓ —						
Stop bit	1-bit 2-bit	tting.	tting.	tting.	tting.	tting.	✓	✓	√ √	tting.	tting.	✓—	tting.	tting.	setting.	tting.	tting.	
Transmission speed (bps)	38400*1 19200 9600 4800 2400 1200 600 300	ition is not executed in this setting	ition is not executed in this setting	ition is not executed in this setting	ition is not executed in this setting.	ition is not executed in this setting	\[\langle \] \[\	> > > >	\frac{\sqrt{\sqrt{\chi}}{\sqrt{\chi}}	ition is not executed in this setting	ition is not executed in this setting		ition is not executed in this setting	ition is not executed in this setting	ion is not executed in this	ition is not executed in this setting.	ition is not executed in this setting	
Header	Invalid/valid	nice	nice	nica	nice	nica	_		✓	nica	nice	_	nice	nice	nica	nice	nica	
Terminator	Invalid/valid	nm	nm	nm	communicat	nm	_	_	✓	communicat	communicat	✓	nm	communicat	communicat	nmu	nm	
Control cable Hardware type	Invalid/valid Regular/ RS-232C RS-485	This communicat	This communicat	This communicat	This con	This communicat	<u></u> ✓		✓ ✓	This con	This con	<u></u> ✓	This communicat	This con	This con	This communicati	This communicat	
Control mode	Invalid						_	_	_			_						Not selectable
Sum check	Invalid/valid	-					√	_	_ <	-		_						JCICOLADIC
Transmission control procedure	Format 1 Format 4						✓ ✓	_	- ✓- ✓			<u> </u>						
Station number settings	00 to 0F						✓	_	_			_						
Time-out time setting	1 to 255			L			√	_	✓	L				L				
Reference	page	_	_	_	В	С	D	Ε	F	G		_	_	_		Н	I	

^{*1.} Only available for FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs.

3.3 Communication Setting in Parameter Method (FXGP/WIN)

Communication settings may be changed by the parameter method with GX Works2, GX Developer, FXGP/WIN for Windows and FX-30P handy programming panel. This section describes how to change parameters with FXGP/WIN.

Ch0 and Ch 2 cannot be set using FXGP/WIN.

→ For details on GX Works2 operating procedure, refer to section 3.2. → For details on GX Developer operating procedure, refer to GX Developer Operating Manual. → For details on FX-30P operating procedure, refer to FX-30P Operation Manual.

3.3.1 **Operating procedure**

This subsection explains the serial communication setting method. Suppose that FXGP/WIN is already started up.

Adjusting serial setting (parameter)

Select [Option] \rightarrow [Serial setting (parameter)] from the toolbar.

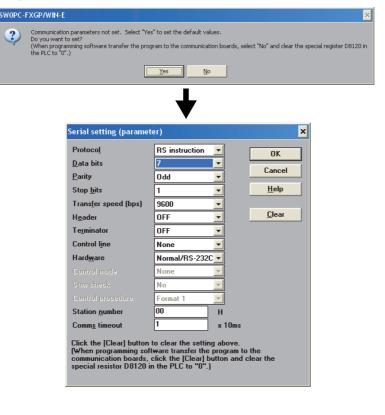
The following dialog appears according to absence/presence of parameter settings.

1. When there are no parameter settings

There is no communication setting.

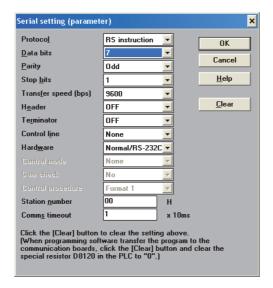
When using the programming communication, parallel link, N:N Network or remote maintenance, click the [No] button.

When using computer link, inverter communication, or non-protocol communication (RS instruction) function, click the [Yes] button.



2. When there are already parameter settings

There is communication setting. Confirm the setting contents. When using programming communication, parallel link, N:N Network or remote maintenance, click the [Clear] button.



3.3 Communication Setting in Parameter Method (FXGP/WIN)

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3.3.2 Correspondence between parameter setting and each communication type

The table below shows the communication types and items which can be set using parameters:

Set item	Contents	CC-Link network	MODBUS communication	Ethernet communication	N:N Network	Parallel link	Computer link	Inverter communication	Non-protocol communication (RS instruction)	Non-protocol communication (FX2N-232IF)	Short mail sending	Internet mail sending	CC-Link/LT network	AnyWireASLINK	AS-i system	Programming communication	Remote maintenance	Remarks
Protocol	Non-protocol communication Dedicated protocol						-	✓ 	✓ 			✓ 						
Data length	7-bit 8-bit						✓	√ ✓	√ √			<u> </u>						
Parity	None Odd Even	- - -					✓ ✓	✓ ✓	✓ ✓			✓ —				_		
Stop bit	1-bit 2-bit	s setting.	s setting	s setting	s setting	s setting	✓	✓ ✓	√ √	s setting	s setting.	✓ —	s setting	s setting	s setting	s setting	s setting	
Baud rate (bps)	19200 9600 4800 2400 1200 600 300	cation is not executed in this	cation is not executed in this setting	cation is not executed in this setting	cation is not executed in this setting	cation is not executed in this setting.	✓✓✓✓✓	<!--</td--><td>✓✓✓✓✓</td><td>cation is not executed in this setting</td><td>ication is not executed in this</td><td></td><td>cation is not executed in this setting.</td><td>cation is not executed in this setting</td><td>cation is not executed in this setting</td><td>cation is not executed in this setting.</td><td>cation is not executed in this setting</td><td></td>	✓✓✓✓✓	cation is not executed in this setting	ication is not executed in this		cation is not executed in this setting.	cation is not executed in this setting	cation is not executed in this setting	cation is not executed in this setting.	cation is not executed in this setting	
Header	Invalid/valid						_	_	✓		nica	_						
Terminator	Invalid/valid	mul	mul	ını	mul	ını	_		✓	mm	mul	✓	mul	mul	ını	mul	mul	
Control cable Hardware type	Invalid/valid Regular/RS-232C RS-485	This commun	This commun	This commun	This commun	This commun	<u></u> ✓	_ _ ✓	✓ ✓ ✓	This commun	This commun	_ ✓	This commun	This commun	This commun	This commun	This commun	
Control mode	Invalid						_	_	_			_						Not selectable
Sum check	Invalid/valid						✓	 	_			_						
Transmission control procedure	Format 1 Format 4 00 to 0F						✓ ✓	_	_			_ _						
Station number settings Time-out time setting	1 to 255						./		_									
Reference					В	С	D	E	F	G						Н	1	
Releience	paye	_			ם	U	ט		ר	J						П		

3.4 Extension of Ports (For FX3G, FX3GC, FX3U, FX3UC)

In FX3G, FX3GC, FX3U and FX3UC PLCs, up to two communication port channels can be connected using a communication expansion board and communication special adapter.

Point

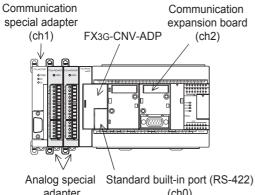
- Only one channel can be connected to the FX3G PLC (14-point and 24-point type).
- The standard built-in port (RS-422) can be used as ch0 when the non-protocol communication function (RS2 instruction) is used in the FX3G, FX3GC PLC.
 - → Refer to the "Non-protocol Communication (RS/RS2 instruction)" section.
- When a CF card special adapter is connected to the PLC, it is handled in the same way as a communication special adapter, and occupies one communication port channel.
 - → For details, refer to FX3U-CF-ADP User's Manual.
- When a FX3U-8AV-BD, FX3G-8AV-BD, FX3G-4EX-BD or FX3G-2EYT-BD is connected to the PLC, it is handled in the same way as a communication expansion board, and occupies one communication port channel.
- When the FX3U-ENET-ADP is used, one communication port is occupied. Only one FX3U-ENET-ADP unit can be connected at the last stage (left end) of the main unit and special adapters.
 - → For details, refer to FX3U-ENET-ADP User's Manual.

3.4.1 Extension of Port (For FX3G, FX3GC PLC)

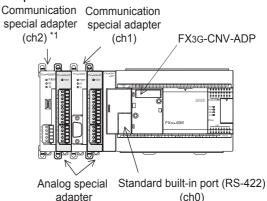
1. For FX3G PLC (40-point, 60-point type)

The communication expansion board connected to the option connector 1 or the first communication special adapter works as ch1, and the communication expansion board connected to the option connector 2 or the second communication special adapter works as ch2.

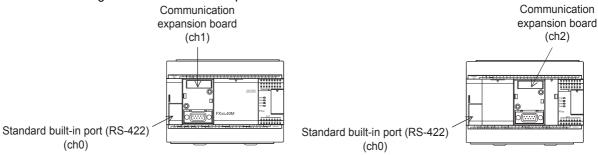
 When using a communication expansion board and a communication special adapter together



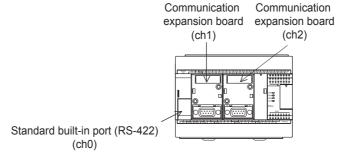
When using two communication special adapters



- Ch2 is not available when the FX3G-8AV-BD, FX3G-4EX-BD or FX3G-2EYT-BD is used.
- · When using one communication expansion board

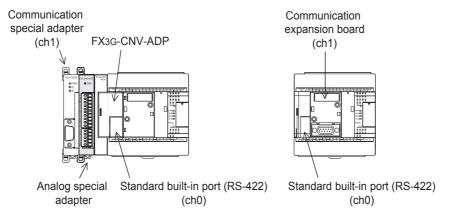


· When using two communication expansion board

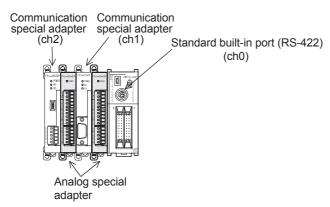


2. For FX3G PLC (14-point, 24-point type)

One communication port channel can be connected to the FX3G PLC main unit (14-point and 24-point type). It is not allowed to connect two communication special adapters.



3. For FX3GC PLC



3.4.2 Extension of Port (For FX3U, FX3UC PLC)

When a communication expansion board and communication special adapter are used, the board is handled as ch 1 and the adapter is handled as ch 2.

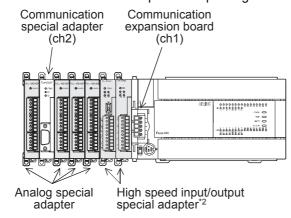
When connecting two communication special adapters using the FX3U-CNV-BD*1, the one closer to the main unit is handled as ch 1 and the farther one is handled as ch 2.

When a FX₃U-8AV-BD or CF card special adapter is used, however, it occupies one communication port

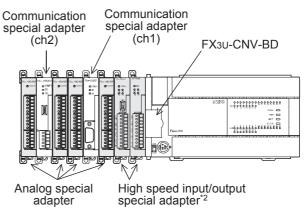
*1. When using the FX3UC(D, DS, DSS) PLC, the FX3U-CNV-BD is not required.

1. For FX3U PLC

 When using a communication expansion board and a communication special adapter together

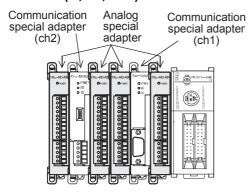


When using two communication special adapters



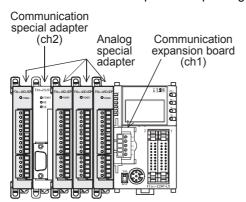
*2. When using high speed special input/output adapters, make sure to connect them to the PLC main unit first before connecting communication special adapters, CF card special adapter and analog special adapters.

2. For FX3UC(D,DS,DSS) PLC

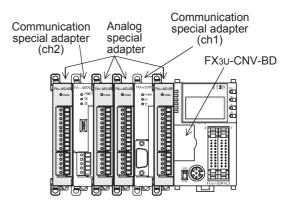


3. For FX3uc-32MT-LT(-2) PLC

 When using a communication expansion board and a communication special adapter together



When using two communication special adapters

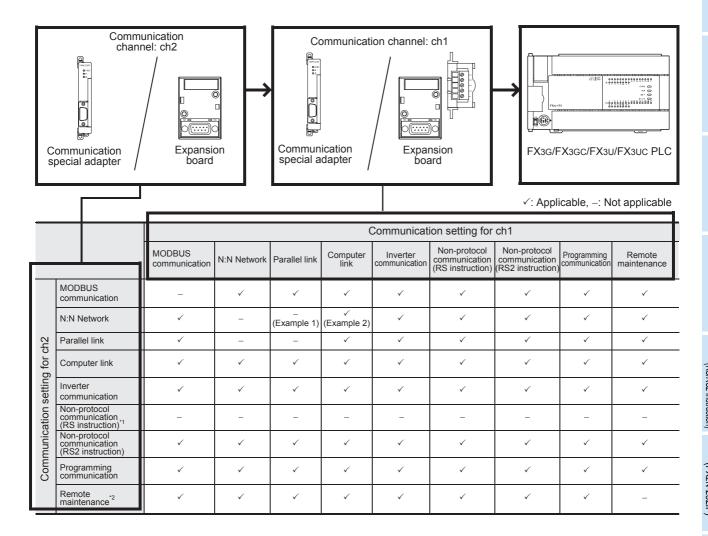


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3.4.3 Limitation when ch1 and ch2 are used at the same time

When using ch1 and ch2 at the same time, available communication type combinations are limited. For details, refer to the table below.

When a CF card special adapter, FX3U-8AV-BD, FX3G-8AV-BD, FX3G-4EX-BD, FX3G-2EYT-BD or the FX3U-ENET-ADP is used, one communication port (1ch) is occupied. However, the occupied communication port does not apply any restrictions to the combination of communication functions when ch1 and ch2 are used at the same time.



- *1. Ch2 cannot be set for non-protocol communication (RS instruction).
- *2. When using remote maintenance on ch2, use GX Works2 or GX Developer.
 - → For applicable versions of GX Works2 and GX Developer, refer to I. Remote Maintenance Subsection 1.4.1 or 1.4.2.

Example 1:

When "parallel link" is set for ch1, the "N:N Network" cannot be set for ch2.

Example 2:

When "computer link" is set for ch1, the "N:N Network" can be set for ch2.

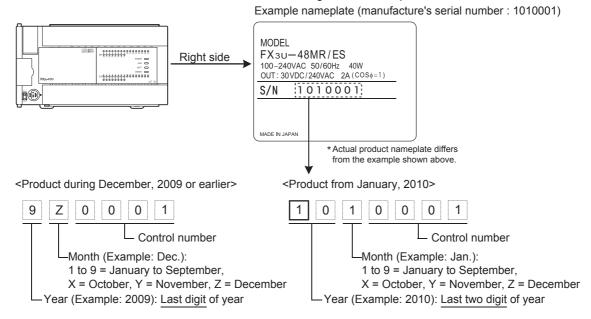
4. Version Number

4.1 Manufacturer's serial number check method

The year and month of production of the PLC main unit can be checked on the nameplate, and "LOT" indicated on the front of the product.

4.1.1 Checking the nameplate

The year and month of production of the PLC main unit can be checked from the manufacturer's serial number "S/N" indicated on the label adhered to the right side of the product.

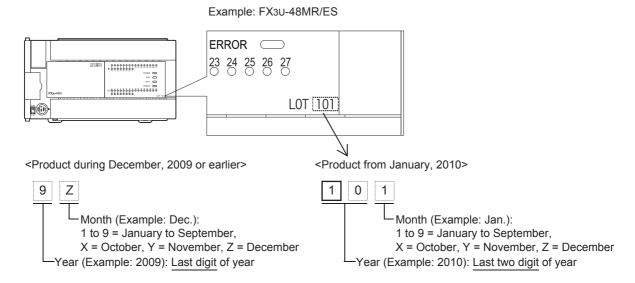


4.1.2 Checking the front of the product

The year and month of production of the PLC main unit can be checked from the manufacturer's serial number "LOT" on the front (at the bottom) of the product.

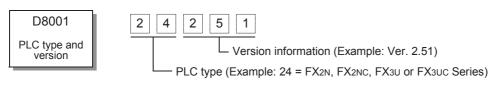
The "LOT" indication is provided only with the following PLC main units.

Main unit	"LOT" indication adoption time
FX3S Series PLC	March 2013 and later (From first product)
FX3G Series PLC	October 2008 and later
FX3GC Series PLC	January 2012 and later (From first product)
FX3U Series PLC	January 2009 and later
FX3UC Series PLC	January 2009 and later



4.2 Version check

The PLC version can be checked by reading the last three digits of device D8001.

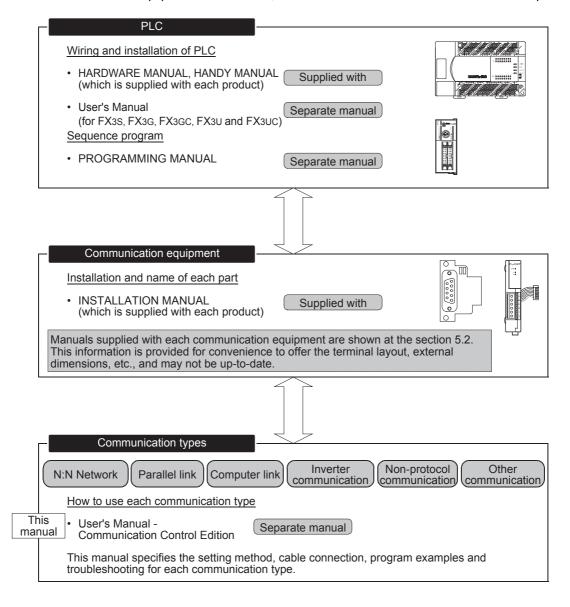


5. Introduction of Manuals (Type, Reading Method and Acquisition Method)

This chapter specifies the manuals related to PLC main units for each communication type.

5.1 Rank and Use Method of This Manual

When communication equipment is connected, an FX PLC can offer various communication options.



5.2 Introduction of Related Manuals

This section shows major manuals required to use the communication types in this manual. Manuals for PLC main units and manuals for communication equipment are classified separately. "Separate manual" shown in the "Included/separate manual" column indicates that the manual is supplied separately. "Included" indicates that the manual is included with each product.

5.2.1 Manual for communication types in FX PLCs

Manual name	Manual number	Included/separate document	Contents						
Manuals for data communication	า								
FX Series User's Manual - Data Communication Edition	JY997D16901	Separate manual (this manual)	Describes the contents of communication types supported by FX Series PLCs.						
FX3s/FX3G/FX3GC/FX3U/FX3UC Series User's Manual - MODBUS Serial Communication Edition	JY997D26201	Separate manual	Explains the MODBUS serial communication network in FX3S/FX3G/FX3G/FX3U/FX3UC PLCs.						

5.2.2 Manuals related to FX PLCs

For instructions used in sequence programs, refer to the PROGRAMMING MANUAL. For hardware specifications and wiring of the PLC, refer to the HANDY MANUAL or USERS MANUAL.

Manual name	Manual number	Included/separate document	Contents
Manuals for PLC main unit			
■ FX3∪ Series For detailed explanation, refer	to the FX3U Series U	Jser's Manual - Hardware	Edition.
FX3U Series Hardware Manual	JY997D50301	Included	I/O specifications, wiring and installation of the PLC main unit FX3U extracted from the FX3U Series User's Manual - Hardware Edition.
FX3U Series User's Manual - Hardware Edition	JY997D16501	Separate manual	Details about the hardware including I/O specifications, wiring, installation and maintenance of the FX3U PLC main unit.
■ FX3UC Series For detailed explanation, refer	to the FX3UC Series	User's Manual - Hardwar	re Edition.
FX3UC(D, DS, DSS) Series Hardware Manual	Series JY997D50501 Included		I/O specifications, wiring and installation of the PLC main unit FX3UC (D, DS, DSS) extracted from the FX3UC Series User's Manual - Hardware Edition.
FX3UC-32MT-LT-2 Series Hardware Manual	JY997D31601	Included	I/O specifications, wiring and installation of the PLC main unit FX3Uc-32MT-LT-2 extracted from the FX3Uc Series User's Manual - Hardware Edition.
FX3UC Series User's Manual - Hardware Edition	JY997D28701	Separate manual	Details about the hardware including I/O specifications, wiring, installation and maintenance of the FX3UC PLC main unit.
■ FX3G Series For detailed explanation, refer	to the FX3G Series	User's Manual - Hardward	e Edition.
FX3G Series Hardware Manual	JY997D46001	Included	I/O specifications, wiring and installation of the PLC main unit FX3G extracted from the FX3G Series User's Manual - Hardware Edition.
FX3G Series User's Manual - Hardware Edition	JY997D31301	Separate manual	Details about the hardware including I/O specifications, wiring, installation and maintenance of the FX3G PLC main unit.

Manual name	Manual number	Contents							
■ FX3GC Series For detailed explanation, refe	r to the FX3GC Series	u User's Manual - Hardwa	are Edition						
FX3GC Series Hardware Manual	yplanation, refer to the FX3GC Series User's Manual - Hardwa JY997D45201 Included		I/O specifications, wiring and installation of the PLC main unit FX3GC extracted from the FX3GC Series User's Manual - Hardware Edition.						
FX3GC Series User's Manual - Hardware Edition	JY997D45401	Separate manual	Details about the hardware including I/O specifications, wiring, installation and maintenance of the FX3GC PLC main unit.						
■ FX3s Series For detailed explanation, refe	er to the FX3S Series l	Jser's Manual - Hardwar	re Edition.						
FX3s Series Hardware Manual	JY997D48301	Included	I/O specifications, wiring and installation of the PLC main unit FX3s extracted from the FX3s Series User's Manual - Hardware Edition.						
FX3S-30M□/E□-2AD Hardware Manual	JY997D51701	Included	I/O specifications, built-in analog specifications, wiring and installation of the PLC main unit FX3S-30M□/E□-2AD extracted from the FX3S Series User's Manual - Hardware Edition.						
FX3s Series User's Manual - Hardware Edition	JY997D48601	Separate manual	Details about the hardware including I/O specifications, wiring, installation and maintenance of the FX3s PLC main unit.						
■ FX2N Series									
FX2n Series HARDWARE MANUAL	JY992D66301	Included	Describes the contents of the FX2N PLC hardware including the specifications, wiring and installation procedure.						
■ FX2NC Series	•								
FX2NC (DSS, DS) Series HARDWARE MANUAL	JY992D76401	Included	Describes the contents of the FX2NC(DSS, DS) PLC hardware including the specifications, wiring and installation procedure.						
FX2NC (D/UL) Series HARDWARE MANUAL	JY992D87201	Included	Describes the contents of the FX2NC(D/UL) PLC hardware including the specifications, wiring and installation procedure.						
■ FX1N Series									
FX1N Series HARDWARE MANUAL	JY992D89301	Included	Describes the contents of the FX1N PLC hardware including the specifications, wiring and installation procedure.						
■ FX1NC Series ^{*1}									
FX1NC Series HANDY MANUAL	JY992D92101	Included	Describes the contents of the FX1NC PLC hardware including the specifications, wiring and installation procedure.						
■ FX1S Series	•								
FX18 Series HARDWARE MANUAL	JY992D83901	Included	Describes the contents of the FX1s PLC hardware including the specifications, wiring and installation procedure.						
■ FXon Series		<u> </u>	1						
Xon Series JY992D47501		Included	Describes the contents of the FXon PLC hardware including the specifications, wiring and installation procedure.						
■ FX2(FX) Series		1	-						
FX Series HARDWARE MANUAL	JY992D47401	Included	Describes the contents of the FX PLC hardware including the specifications, wiring and installation procedure.						
■ FX2c Series ^{*2}		1	-						
FX2C Series HANDY MANUAL	JY992D59001	Included	Describes the contents of the FX2C PLC hardware including the specifications, wiring and installation procedure.						

^{*1.} FX1NC Series PLC Manual is available only in Japanese.

^{*2.} FX2C Series PLC Manual is available only in Japanese.

Manual name	Manual number	Included/separate document	Contents
Manuals for programming			
FX3S/FX3G/FX3GC/FX3U/FX3UC Programming Manual - Basic & Applied Instruction Edition	JY997D16601	Separate manual	Explains basic instructions and applied instructions available in the FX3s/FX3G/FX3GC/FX3U/FX3UC PLC.
FX1s, FX1n, FX2n, FX1nc, FX2nc PROGRAMMING MANUAL	JY992D88101	Separate manual	Explains instructions applicable in the FX1s, FX1N, FX2N, FX1NC and FX2NC PLCs.
FX0, FX0S, FX0N, FX1, FX2, FX2C PROGRAMMING MANUAL	JY992D48301	Separate manual	Explains instructions available in the FX0, FX0s, FX0N, FX1, FX2, FX2C PLCs.
MELSEC-Q/L/F Structured Programming Manual (Fundamentals)	SH080782	Separate manual	Programming methods, specifications, functions, etc. required to create structured programs
FXCPU Structured Programming Manual [Device & Common]	JY997D26001	Separate manual	Devices, parameters, etc. provided in structured projects of GX Works2
FXCPU Structured Programming Manual [Basic & Applied Instruction]	JY997D34701	Separate manual	Sequence instructions provided in structured projects of GX Works2
FXCPU Structured Programming Manual [Application Functions]	JY997D34801	Separate manual	Application functions provided in structured projects of GX Works2

5.2.3 Communication equipment (option)

The table below specifies the manuals for communication equipment operating in accordance with RS-232C, RS-422, RS-485 or USB and for the Ethernet adapter.

Manual name	Manual number	Included/separate document	Contents
For communication in accorda	ance with RS-232C		
FX3U-232-BD INSTALLATION MANUAL	JY997D12901	Included	Describes the contents of the RS-232C communication expansion board, FX3U-232-BD hardware including the specifications and installation procedure.
FX3G-232-BD INSTALLATION MANUAL	JY997D32001	Included	Describes the contents of the RS-232C communication expansion board, FX3G-232-BD hardware including the specifications and installation procedure.
FX2N-232-BD USER'S GUIDE	JY992D63201	Included	Describes the contents of the RS-232C communication expansion board, FX2N-232-BD hardware including the specifications and installation procedure.
FX1N-232-BD USER'S GUIDE	JY992D84401	Included	Describes the contents of the RS-232C communication expansion board, FX1N-232-BD hardware including the specifications and installation procedure.
FX3U-232ADP INSTALLATION MANUAL	JY997D13701	Included	Describes the contents of the RS-232C communication special adapter, FX3U-232ADP hardware including the specifications and installation procedure.
FX3U-232ADP-MB INSTALLATION MANUAL	JY997D26401	Included	Describes the contents of the RS-232C communication special adapter, FX3U-232ADP-MB hardware including the specifications and installation procedure.
FX2NC-232ADP INSTALLATION MANUAL	JY997D01101	Included	Describes the contents of the RS-232C communication special adapter, FX2NC-232ADP hardware including the specifications and installation procedure.
FX0N-232ADP INSTALLATION MANUAL	JY992D51201	Included	Describes the contents of the RS-232C communication special adapter, FX0N-232ADP hardware including the specifications and installation procedure.
FX-232ADP USER'S GUIDE	JY992D48801	Included	Describes the contents of the RS-232C communication special adapter, FX-232ADP hardware including the specifications and installation procedure.
FX2N-232IF HARDWARE MANUAL	JY992D73501	Included	Describes the contents of the RS-232C communication special extension block, FX2N-232IF hardware including the specifications and installation procedure.
For communication in accorda	ance with RS-422		
FX3U-422-BD INSTALLATION MANUAL	JY997D13101	Included	Describes the contents of the RS-422 communication expansion board, FX3U-422-BD hardware including the specifications and installation procedure.
FX3G-422-BD INSTALLATION MANUAL	JY997D32101	Included	Describes the contents of the RS-422 communication expansion board, FX3G-422-BD hardware including the specifications and installation procedure.
FX2N-422-BD USER'S GUIDE	JY992D66101	Included	Describes the contents of the RS-422 communication expansion board, FX2N-422-BD hardware including the specifications and installation procedure.

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models	Discontinued

Manual name	Manual number	Included/separate document	Contents
FX1N-422-BD USER'S MANUAL	JY992D84101	Included	Describes the contents of the RS-422 communication expansion board, FX1N-422-BD hardware including the specifications and installation procedure.
For communication in accorda	ance with RS-485(422)	
FX3U-485-BD INSTALLATION MANUAL	JY997D13001	Included	Describes the contents of the RS-485 communication special expansion board, FX3U-485-BD hardware including the specifications and installation procedure.
FX3G-485-BD INSTALLATION MANUAL	JY997D32201	Included	Describes the contents of the RS-485 communication special expansion board, FX3G-485-BD hardware including the specifications and installation procedure.
FX3G-485-BD-RJ INSTALLATION MANUAL	JY997D51501	Included	Describes the contents of the RS-485 communication special expansion board, FX3G-485-BD-RJ hardware including the specifications and installation procedure.
FX2N-485-BD HARDWARE MANUAL	JY992D73401	Included	Describes the contents of the RS-485 communication expansion board, FX2N-485-BD including the specifications and installation procedure.
FX1N-485-BD USER'S GUIDE	JY992D84201	Included	Describes the contents of the RS-485 communication expansion board, FX1N-485-BD hardware including the specifications and installation procedure.
FX3U-485ADP INSTALLATION MANUAL	JY997D13801	Included	Describes the contents of the RS-485 communication special adapter, FX3U-485ADP hardware including the specifications and installation procedure.
FX3U-485ADP-MB INSTALLATION MANUAL	JY997D26301	Included	Describes the contents of the RS-485 communication special adapter, FX3U-485ADP-MB hardware including the specifications and installation procedure.
FX2NC-485ADP INSTALLATION MANUAL	JY997D01201	Included	Describes the contents of the RS-485 communication special adapter, FX2NC-485ADP hardware including the specifications and installation procedure.
FX0N-485ADP INSTALLATION MANUAL	JY992D53101	Included	Describes the contents of the RS-485 communication special adapter, FX0N-485ADP hardware including the specifications and installation procedure.
For communication in accorda	ance with USB		
FX3U-USB-BD USER'S MANUAL	JY997D13501	Included	Describes the contents of the USB communication expansion board, FX3U-USB-BD hardware including the specifications and installation procedure.
For communication in accorda	ance with Ethernet		
FX3U-ENET-ADP INSTALLATION MANUAL	JY997D47401	Included	Describes the contents of the Ethernet communication special adapter, FX3U-ENET-ADP hardware including the specifications and installation procedure.
FX3U-ENET-ADP USER'S MANUAL	JY997D45801	Separate manual	Describes FX3U-ENET-ADP Ethernet communication special adapter details.

5.2.4 Related options for communication

The table below specifies the manuals for products required to use communication equipment (options) above in the system configuration.

Manual name	Manual number	Included/separate document	Contents
Connector conversion board			
FX3U-CNV-BD INSTALLATION MANUAL	JY997D13601	Included	Describes the contents of the FX3U-CNV-BD special adapter connection board hardware including the installation procedure.
FX2N-CNV-BD	JY992D63601	Included	Describes the contents of the FX2N-CNV-BD special adapter connection board hardware including the installation procedure.
FX1N-CNV-BD	JY992D84701	Included	Describes the contents of the FX1N-CNV-BD special adapter connection board hardware including the installation procedure.
Connector conversion adapter			
FX3G-CNV-ADP INSTALLATION MANUAL	JY997D32301	Included	Describes the contents of the FX3G-CNV-ADP special adapter connection conversion adapter hardware including the installation procedure
FX3S-CNV-ADP INSTALLATION MANUAL	JY997D48801	Included	Describes the contents of the FX3s-CNV-ADP special adapter connection conversion adapter hardware including the installation procedure
RS-485/RS-232C converter for	computer link comn	nunication	
FX-485-PC-IF-SET HARDWARE MANUAL	JY992D81801	Included	Describes the contents of the FX-485-PC-IF-SET interface unit hardware including the specifications and installation procedure.
FX-30P			
FX-30P INSTALLATION MANUAL	JY997D34201	Included	Describes the contents of the FX-30P Handy Programming Panel hardware including the specifications and installation procedure.
FX-30P OPERATION MANUAL	JY997D34401	Separate manual	Describes the contents of the FX-30P Handy Programming Panel hardware including the specifications and installation procedure as well as programming operations.

6. Abbreviations, Generic Names and Terms Used in This Manual

The table below shows abbreviations, generic names and terms used in this manual.

1. Programmable controllers

Abbreviation/ generic name	Name
Programmable controllers	
FX PLC or FX CPU	Generic name of FX1, FX2(FX), FX2C, FX0, FX0s, FX0N, FX1s, FX1N, FX1NC, FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U and FX3UC Series PLCs
FX3U Series	Generic name of FX3U Series PLCs
FX3U PLC or main unit	Generic name of FX₃∪ Series PLC main units
FX3UC Series	Generic name of FX3UC Series PLCs
FX3UC PLC or main unit	Generic name of FX3UC Series PLC main units
X3G Series	Generic name of FX3G Series PLCs
FX3G PLC or main unit	Generic name of FX3G Series PLC main units
X3GC Series	Generic name of FX3GC Series PLCs
FX3GC PLC or main unit	Generic name of FX3GC Series PLC main units
X3S Series	Generic name of FX3S Series PLCs
FX3s PLC or main unit	Generic name of FX3S Series PLC main units
X _{2N} Series	Generic name of FX2N Series PLCs
FX2N PLC or main unit	Generic name of FX2N Series PLC main units
X2NC Series	Generic name of FX2NC Series PLCs
FX2NC PLC or main unit	Generic name of FX2NC-□M□(-T), FX2NC-□MT-D/UL, and FX2NC-□M□-DSS(-T-DS) Series PLC main units
FX2NC-□M□(-T) PLC	FX2NC-16MR-T, FX2NC-16MT, FX2NC-32MT, FX2NC-64MT, and FX2NC-96MT
FX2NC-□MT-D/UL PLC	FX2NC-16MT-D/UL, FX2NC-32MT-D/UL, FX2NC-64MT-D/UL, and FX2NC-96MT-D/UL
FX2NC-□M□-DSS (-T-DS) PLC	FX2NC-16MR-T-DS, FX2NC-16MT-DSS, FX2NC-32MT-DSS, FX2NC-64MT-DSS, and FX2NC-96MT-DSS
X1N Series	Generic name of FX1N Series PLCs
FX1N PLC or main unit	Generic name of FX1N Series PLC main units
X1NC Series	Generic name of FX1NC Series PLCs
FX1NC PLC or main unit	Generic name of FX1NC Series PLC main units Only Japanese manual is available for this product.
X1s Series	Generic name of FX1s Series PLCs
FX1S PLC or main unit	Generic name of FX1s Series PLC main units
X _{0N} Series	Generic name of FX0N Series PLCs
FX _{0N} PLC or main unit	Generic name of FX0N Series PLC main units
X ₀ Series	Generic name of FX ₀ Series PLCs
FX ₀ PLC or main unit	Generic name of FX ₀ Series PLC main units
X ₀ S Series	Generic name of FX0S Series PLCs
FX0S PLC or main unit	Generic name of FX0s Series PLC main units
X2(FX) Series	Generic name of FX2(FX) Series PLCs
FX2(FX) PLC or main unit	Generic name of FX2(FX) Series PLC main units
X ₂ C Series	Generic name of FX2c Series PLCs
FX2C PLC or main unit	Generic name of FX2c Series PLC main units

Abbreviation/ generic name	Name
FX1 Series	Generic name of FX1 Series PLCs
FX1 PLC or main unit	Generic name of FX1 Series PLC main units Only Japanese manual is available for this product.
Q PLC	Generic name of CPU units QCPU (Q mode) and QCPU (A mode)
QCPU (Q mode)	Generic name of CPU units Q00JCPU, Q00CPU, Q01CPU, Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, and Q25HCPU
QCPU (A mode)	Generic name of CPU units Q02CPU-A, Q02HCPU-A, and Q06HCPU-A
QnA PLC	Generic name of CPU units QnACPU (large type) and QnACPU (small type)
QnACPU (large type) Generic name of CPU units Q2ACPU, Q2ACPU-S1, Q3ACPU, Q4ARCPU	
QnACPU (small type)	Generic name of CPU units Q2ASCPU, Q2ASCPU-S1, Q2ASHCPU, and Q2ASHCPU-S1
A PLC	Generic name of CPU units ACPU (large type), ACPU (small type), and A1FXCPU
ACPU (large type) Generic name of CPU units AnUCPU, AnACPU, AnNCPU, and A0J2(H)CPU	
ACPU (small type)	Generic name of CPU units A2US(H)CPU, AnS(H)CPU, and A1SJ(H)CPU
A1FXCPU Generic name of CPU unit A1FXCPU	

2. Expansion boards and special adapters

Abbreviation/ generic name	Name
Expansion board	
Expansion board	Generic name of input/output expansion board, communication expansion boards, special adapter connection boards, analog expansion boards and analog potentiometer expansion boards
Input/output expansion board	Generic name of input/output expansion board
4EX-BD	FX3G-4EX-BD
2EYT-BD	FX3G-2EYT-BD
Communication expansion board or communication board	Generic name of communication expansion boards
232BD	FX3U-232-BD, FX3G-232-BD, FX2N-232-BD, and FX1N-232-BD
422BD	FX3U-422-BD, FX3G-422-BD, FX2N-422-BD, and FX1N-422-BD
485BD	FX3U-485-BD, FX3G-485-BD, FX3G-485-BD-RJ, FX2N-485-BD, and FX1N-485-BD
USBBD	FX3U-USB-BD
Analog expansion board	Generic name of analog expansion board
2AD-BD	FX3G-2AD-BD
1DA-BD	FX3G-1DA-BD
Analog potentiometer expansion board	Generic name of analog potentiometer expansion board
8AV-BD	FX3U-8AV-BD, FX3G-8AV-BD
Special adapter connection board or connector conversion board	Generic name of CNVBD
CNVBD	FX3U-CNV-BD, FX2N-CNV-BD, and FX1N-CNV-BD
Special adapters	
Special adapter	Generic name of high speed input/output special adapters, CF card special adapter, communication special adapters and analog special adapters
High speed input/output special adapter	Generic name of high speed input special adapters and high speed output special adapters
2HSY-ADP	FX3U-2HSY-ADP
4HSX-ADP	FX3U-4HSX-ADP

Common
Items

B

D

Abbreviation/ generic name	Name
CF card special adapter	Generic name of CF card special adapter
CF-ADP	FX3U-CF-ADP
Communication special adapter or communication adapter	Generic name of communication special adapters
232ADP	FX3U-232ADP(-MB), FX2NC-232ADP, FX0N-232ADP, and FX-232ADP
485ADP	FX3U-485ADP(-MB), FX2NC-485ADP, FX0N-485ADP, and FX-485ADP
ENET-ADP	FX3U-ENET-ADP
Special adapters	
Special adapter connection conversion adapter or connection conversion adapter	Generic name of CNVADP
CNVADP	FX3G-CNV-ADP, FX3S-CNV-ADP

3. Extension equipment

Abbreviation/ generic name		Name
Extension equipment		
Ex	tension equipment	Generic name of extension blocks, powered extension units, special function blocks and special function units
Special function unit Generic name of special function		Generic name of special function units
	Special function block	Generic name of special function block
	232IF	Generic name of FX2N-232IF

4. Networks

Abbreviation/ generic name		Name
Op	en field networks CC-Link	and CC-Link/LT
CC	C-Link equipment	Generic name of CC-Link master station and CC-Link remote device stations and CC-Link intelligent device stations
	CC-Link master (station)	Generic name of CC-Link master station with model name FX2N-16CCL-M or FX3U-16CCL-M
	CC-Link remote station	Generic name of remote I/O stations and remote device stations
	CC-Link intelligent device station	Generic name of CC-Link intelligent device station with model name FX3U-64CCL
CC	C-Link/LT equipment	Generic name of CC-Link/LT master station, CC-Link/LT remote I/O stations, power supply adapters, and dedicated power supplies
	CC-Link/LT master	Generic name of built-in type CC-Link/LT master and (additional) CC-Link/LT master
	Built-in type CC-Link/LT master	Generic name of built-in type CC-Link/LT master built in to the FX3UC-32MT-LT(-2)
	(Additional) CC-Link/LT master	Generic name of CC-Link/LT master station with model name FX2N-64CL-M
	Power supply adapter	Generic name of units connecting the power supply to the CC-Link/LT system
	Dedicated power supply	Generic name of power supplies connected to the CC-Link/LT system
An	yWire	
An	yWireASLINK master	Generic name of AnyWireASLINK master station with model name FX3∪-128ASL-M
AS	S-i system	
AS	S-i master	Generic name of AS-i system master station with model name FX2N-32ASI-M
ME	ESEC I/O LINK	
MELSEC I/O LINK master		Generic name of MELSEC I/O LINK master station with model name FX2N-16LNK-M
Eth	nernet	
Ethernet adapter		Generic name of Ethernet communication special adapter with model name FX ₃ U-ENET-ADP

5. Peripheral equipment

Abbreviation/ generic name	Name		
Peripheral equipment			
Peripheral equipment	Generic name of programming software, handy programming panels, and display units		
Programming tools			
Programming tool	Generic name of programming software and handy programming panels		
Programming software	Generic name of programming software		
GX Works2	Generic name of programming software packages SW□DNC-GXW2-J and SW□DNC-GXW2-E		
GX Developer	Generic name of programming software packages SW□D5C-GPPW-J and SW□D5C-GPPW-E		
FXGP/WIN	Generic name of programming software packages FX-PCS/WIN and FX-PCS/WIN-E		
Handy programming panel (HPP)	Generic name of FX-30P, FX-20P(-E)-SET0, FX-20P(-E), FX-10P-SET0 and FX-10P(-E)		
Display units			
GOT1000 Series	Generic name of GT16, GT15, GT14, GT11 and GT10		
GOT-900 Series	Generic name of GOT-A900 and GOT-F900 Series		
GOT-A900 Series	Generic name of GOT-A900 Series		
GOT-F900 Series	Generic name of GOT-F900 Series		
Internet mail sending tools			
Mail sending units	Generic name of FX-232DOPA mail sending units		
FX-232DOPA	FX-232DOPA mail sending main units Only Japanese manual is available for this product. These products can only be used in Japan.		

6. Others

Abbreviation/ generic name	Name
Inverters	
FREQROL inverter	Generic name of Mitsubishi Electric F800, A800, F700, A700, E700, D700, V500, F500, A500, E500, and S500 Series inverters
Communication	
Communication equipment	Generic name of communication equipment operating in accordance with RS-232C, communication equipment operating in accordance with RS-422, communication equipment operating in accordance with RS-485, communication equipment operating in accordance with USB, and communication equipment operating in accordance with Ethernet
Communication equipment operating in accordance with RS-232C	Generic name of 232BD, 232ADP, and 232IF
Communication equipment operating in accordance with RS-422	Generic name of 422BD
Communication equipment operating in accordance with RS-485	Generic name of 485BD and 485ADP
Communication equipment operating in accordance with USB	Generic name of USB BD
Communication equipment operating in accordance with Etherne	Generic name of special adapter connectable to the Ethernet

-	-
	Common Items
E	3
	N:N Network

Vetwork

Parallel Link

mputer Link

D

Inverter Communication

Non-Protocol
Communicatio

Abbreviation/ generic name	Name		
Personal computers			
Personal computer	Personal computers supporting Windows in which GX Works2, GX Developer or FXGP/WIN is installed Refer to the manual for each software product for supported Windows versions.		
Windows	Generic name of Windows 95, Windows 98, Windows Me, Windows NT4.0, Windows 2000, Windows XP, Windows Vista, Windows 7, Windows 8.1 and Windows 10		
Windows 95	Abbreviation of Microsoft® Windows® 95		
Windows 98	Abbreviation of Microsoft® Windows® 98		
Windows Me	Abbreviation of Microsoft® Windows® Millennium Edition		
Windows NT4.0	Abbreviation of Microsoft® Windows NT®4.0 Workstation		
Windows 2000	Abbreviation of Microsoft® Windows® 2000 Professional		
Windows XP	Abbreviation of Microsoft® Windows® XP Professional and Microsoft® Windows® XP Home Edition		
Windows Vista	Abbreviation of Microsoft [®] Windows Vista [®] Ultimate Operating System Microsoft [®] Windows Vista [®] Enterprise Operating System Microsoft [®] Windows Vista [®] Business Operating System Microsoft [®] Windows Vista [®] Home Premium Operating System Microsoft [®] Windows Vista [®] Home Basic Operating System		
Windows 7	Abbreviation of Microsoft® Windows® 7 Enterprise Operating System Microsoft® Windows® 7 Ultimate Operating System Microsoft® Windows® 7 Professional Operating System Microsoft® Windows® 7 Home Premium Operating System Microsoft® Windows® 7 Starter Operating System		
Windows 8	Abbreviation of Microsoft® Windows® 8 Operating System Microsoft® Windows® 8 Pro Operating System Microsoft® Windows® 8 Enterprise Operating System		
Windows 8.1	Abbreviation of Microsoft [®] Windows [®] 8.1 Operating System Microsoft [®] Windows [®] 8.1 Pro Operating System Microsoft [®] Windows [®] 8.1 Enterprise Operating System		
Windows 10 Microsoft® Windows® 10 Home Operating System Microsoft® Windows® 10 Pro Operating System Microsoft® Windows® 10 Enterprise Operating System Microsoft® Windows® 10 Education Operating System			

MEMO

Discontinued models

FX Series Programmable Controllers User's Manual [Data Communication Edition]

B. N:N Network

Foreword

This manual explains the "N:N Network" provided for the MELSEC-F FX Series Programmable Controllers and should be read and understood before attempting to install or use the unit.

Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward

Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

This manual confers no industrial property rights or any rights of any other kind, nor does it confer any patent licenses. Mitsubishi Electric Corporation cannot be held responsible for any problems involving industrial property rights which may occur as a result of using the contents noted in this manual.

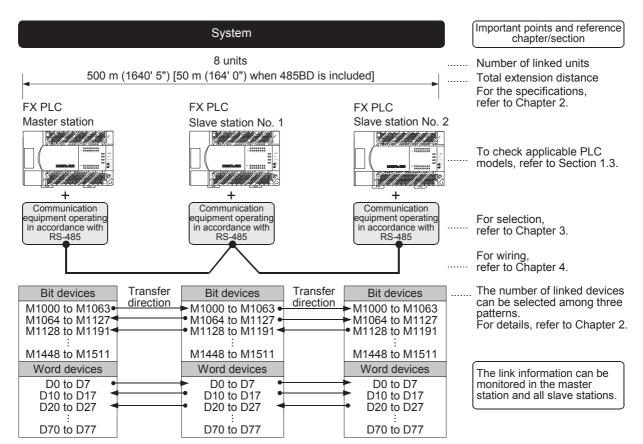
1. Outline

This chapter explains the N:N Network.

1.1 Outline of System

The N:N Network allows connection of up to eight FX PLCs via mutually linked devices through communication in accordance with RS-485.

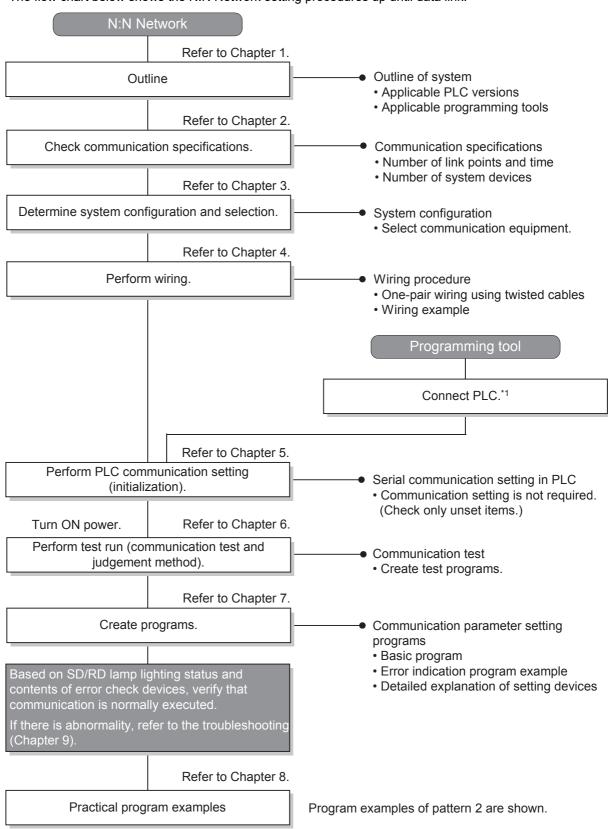
- 1) One of three patterns can be selected according to the number of devices to be linked (except FX0N and FX1s PLCs).
- 2) Data link is automatically updated among a maximum of eight FX PLCs.
- 3) The available total extension distance is 500 m (1640' 5") maximum (when only the 485ADP is used in the configuration).



The figure above shows the maximum number of linked devices. There are differences in the specifications and limitations depending on the selected link pattern and FX Series.

1.2 Procedures Before Operation

The flow chart below shows the N:N Network setting procedures up until data link:



^{*1} For the method to connect a programming tool to a PLC, refer to the "Programming Communication" section in this manual or the respective programming tool manual.

For details on operating procedures, refer to the respective programming tool manual.

1.3 Communication Type Applicability in PLC

1.3.1 Applicable versions

The communication type is applicable in the following versions.

- ✓: Applicable (If applicable versions of main units are limited, they are described inside ().)
- -: Not applicable

PLC	Applicability (applicable version)	Remarks
FX3UC Series	✓	
FX3U Series	✓	
FX3GC Series	✓	
FX3G Series	✓	
FX3S Series	✓	
FX2NC Series	✓	
FX2N Series	√ (Ver. 2.00 or later)*1	
FX1NC Series	✓	
FX1N Series	✓	
FX1s Series	✓	The link device range is limited.
FX ₀ N Series	√ (Ver. 2.00 or later)*1	The link device range is limited.
FX0s Series	_	N:N Network option is not provided.
FX ₀ Series	_	N:N Network option is not provided.
FX2C Series	_	N:N Network option is not provided.
FX2(FX) Series	_	N:N Network option is not provided.
FX1 Series	_	N:N Network option is not provided.

^{*1.} Applicable in products manufactured in October, 1997 and later (manufacturer's serial No.: 7X**** and later).

1.3.2 Version check

The PLC version can be checked by reading the last three digits of device D8001.

→ For a detailed description of the version check, refer to A. Common Items Section 4.2.

1.3.3 How to look at the manufacturer's serial number

The year and month of production of the PLC main unit can be checked on the nameplate, and "LOT" indicated on the front of the product.

ightarrow For a detailed description of the How to look at the manufacturer's serial number, refer to A. Common Items Section 4.1.

1.3.4 Products whose production was stopped

Production was stopped for some models of MELSEC-F Series PLCs and programming tools described in this manual. For models whose production was stopped, refer to Appendix A.

To see the latest available products, refer to the general catalog.

1.4 Programming Tool Applicability

1.4.1 For applicable versions

The programming tool is applicable for each FX Series from the following version:

1. English versions

FXBUD PLCS SWIDSC(F)-GPPW-E Ver. 1.08J or later FX-30P Ver. 1.00 or later Ver. 1.50 or lat	Product name	Model name	Applicable version	Remarks
GX Developer SW□D5C(F)-GPPW-E Ver. 8.18U or later FX.30P Ver. 1.00 or later Ver. 1.00 or later GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX3c PLC GX Works2 SW□DNC-GXW2-E Ver. 1.08J or later FX.30P Ver. 1.00 or later Ver. 1.00 or later FX.30P GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX3c PLC GX Works2 SW□DNC-GXW2-E Ver. 1.77F or later Ver. 1.30 or later Ver. 1.30 or later FX.30P GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX3s PLC GX Works2 SW□DNC-GXW2-E Ver. 1.492N or later Ver. 1.50 or later Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX3s PLC GX Works2 SW□DNC-GXW2-E Ver. 1.492N or later Ver. 1.50 or later Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX3s PLC GX Works2 SW□DNC-GXW2-E Ver. 1.08J or later Ver. 1.00 or later SW2 A or later FX-ROSWIN-E SW0-CFXGP/WIN-E Ver. 1.00 or later FX-ROSWIN-E SW0-CFXGP/WIN-E Ver. 1.00 or later Ver. 1.00 or later FX-ROSWIN-E Ver. 1.00 or later FX-ROSWIN-E Ver. 1.00 or later FX-ROSWIN-E Ver. 1.00 or later F940CGT-TWD-E F940GGT-SWD-E (Ver. 1.00 or later) F940GGT-TWD-E F940GGT-SWD-E (Ver. 1.00 or later) F940GGT-BD-HE, F940GGT-SBD-HE (Ver. 1.00 or later) F940GGT-BD-HE, F940GGT-SBD-HE (Ver. 1.00 or later) F940GGT-BD-RH-E, F940GGT-SBD-RH-E (Ver. 1.00 or later) F940GGT-BD-RH-E, F940GGT-BD-RH-E, F940GGT-BD-RH-E, F940GGT-BD-RH-E, F940GGT-BD-RH-E,	FX3U and FX3UC PLCs			
FX-30P	GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later	
Refer to manuals of GOT 1000 Series display units for applicable models and versions supporting the list editor function. Page 100	GX Developer	SW□D5C(F)-GPPW-E	Ver. 8.18U or later	-
FXsc PLC	FX-30P	<u>.</u>	Ver. 1.00 or later	
GX Works2 SW□DNC-GXW2-E GX Developer SW□D5C(F)-GPPW-E FX-30P GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX3cc PLC GX Works2 SW□DNC-GXW2-E GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX3cp GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX3s PLC GX Works2 SW□DNC-GXW2-E GX Works2 SW□DNC-GXW2-E GOT1000 Series display units FX3pp GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX2n and FX2nC PLCs GX Works2 SW□DNC-GXW2-E GX Works2 SW□DNC-GXW2-E GX Works2 SW□DNC-GXW2-E GX Works2 SW□DNC-GXW2-E GX Developer SW□D5C(F)-GPPW-E FX-PCSWIN-E FX-20P-E(-SET0) Ver. 1.08 I or later FX-20P-E(-SET0) Ver. 3.00 or later FX-20P-BAD-H-E F940GOT-WD-E F940GOT-WD-E F940GOT-WD-E F940GOT-WD-E F940GOT-WD-E F940GOT-WD-E F940GOT-BD-H-E F940GOT-BD-H	GOT1000 Series d	isplay units		
SV Developer SW□D5C(F)-GPPW-E Ver. 8.72A or later Ver. 1.00 or later Ver. 1.00 or later Refer to manuals of GOT1000 Series display units Refer to manuals of GOT1000 Series display units Refer to manuals of GOT1000 Series display units Ver. 1.30 or later FX-30P Ver. 1.30 or later Ver. 1.30 or later SW□DNC-GXW2-E Ver. 1.492N or later PX-30P Ver. 1.50 or later PX-30P Ver. 1.00 or later PX-20P-E(-SET0) Ver. 3.00 or later PX-20P-E(-SET0) Ver. 3.00 or later PX-20P-E(-SET0) Ver. 3.00 or later PX-30P Ver. 3.00 or later PX-30P Ver. 3.00 or later PX-30P-E Ver. 3.00 or later PX-30P-E PX-30	FX3G PLC			
FX-30P GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX2N Morks2 SW_DNC-GXW2-E GX Works2 SW_DNC-GXW2-E GOT1000 Series display units FX30P GOT1000 Series display units FX30P GX Works2 SW_DNC-GXW2-E GX Works2 SW_DNC-GXW2-E FX-30P Ver. 1.492N or later FX-30P Ver. 1.50 or later FX-30P GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX2N and FX2NC PLCS GX Works2 SW_DNC-GXW2-E GX Developer SW_DSC(F)-GPPW-E FX-20P-E(-SET0) FX-20P-MFXC-E FX-20P-E(-SET0) FX-20P-MFXC-E FX-10P-E GOT-900 Series display units F940GOT-18D-H-E F9	GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later	
Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX36C PLC GX Works2 SW□DNC-GXW2-E Ver. 1.77F or later FX-30P Ver. 1.30 or later GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX38 PLC GX Works2 SW□DNC-GXW2-E Ver. 1.492N or later - FX-30P Ver. 1.50 or later - FX-30P Ver. 1.50 or later - GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX2N and FX2NC PLCS GX Works2 SW□DNC-GXW2-E Ver. 1.08J or later GX Developer SW□D5C(F)-GPPW-E SW2 A or later FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 1.00 or later FX-20P-MFXC-B Ver. 1.00 or later FX-20P-MFXC-B Ver. 3.00 or later FX-20P-MFXC-B Ver. 3.00 or later F940GOT-WD-E F940GOT-WD-E F940GOT-SBD-H-E (Ver. 1.00 or later) F940GOT-BD-H-E F940GOT-SBD-H-E (GX Developer	SW□D5C(F)-GPPW-E	Ver. 8.72A or later	-
EXSIGN PLC SW□DNC-GXW2-E Ver. 1.77F or later FX-30P Ver. 1.30 or later	FX-30P	•	Ver. 1.00 or later	
SX Works2	GOT1000 Series d	isplay units		
FX-30P Ver. 1.30 or later Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX38 PLC GX Works2	FX3GC PLC			
Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX:30 P	GX Works2	SW□DNC-GXW2-E	Ver. 1.77F or later	
FX30P Ver. 1.492N or later SW□DNC-GXW2-E Ver. 1.492N or later SW□DNC-GXW2-E Ver. 1.492N or later SW□DNC-GXW2-E Ver. 1.50 or later SW□DNC-GXW2-E Ver. 1.00 or later SW□DNC-GXW2-E Ver. 1.08J or later SW□DNC-GXW2-E Ver. 1.08J or later SW□DNC-GXW2-E Ver. 1.08J or later SW2 A or later SW2 A or later SW2-DNC-GXW2-E Ver. 1.00 or later SW2-DNC-GXW2-E Ver. 1.00 or later SW2-DNC-GXW2-E Ver. 1.00 or later FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 1.00 or later FX-20P-E(-SET0) Ver. 3.00 or later FX-20P-E(-SET0) Ver. 3.00 or later F940GOT-WD-E F940GOT-WD	FX-30P	•	Ver. 1.30 or later	-
GX Works2 SW□DNC-GXW2-E Ver. 1.492N or later - FX-30P Ver. 1.50 or later - GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX2N and FX2NC PLCs GX Works2 SW□DNC-GXW2-E Ver. 1.08J or later GX Developer SW□D5C(F)-GPPW-E SW2 A or later FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 1.00 or later FX-30P Ver. 1.00 or later FX-20P-E(-SET0) FX-20P-MFXC-E FX-10P-E Ver. 3.00 or later GOT-F900 Series display units F940WGOT-TWD-E F940GOT-WD-E F940GOT-*BD-H-E F940GOT-BD-H-E F940GOT-BD-H F940GOT-BD-H F940GOT-BD-H F940GOT-BD-H F940GOT-BD-H F940GOT-BD-H F940GOT-BD-H	GOT1000 Series d	isplay units		
FX-30P	FX3S PLC			
Refer to manuals of GOT1000 Series display units models and versions supporting the list editor function. FX2N and FX2NC PLCS GX Works2 SW□DNC-GXW2-E Ver. 1.08J or later GX Developer SW□D5C(F)-GPPW-E SW2 A or later FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 1.00 or later FX-20P-E(-SET0) FX-20P-MFXC-E FX-10P-E Ver. 3.00 or later F940WGOT-TWD-E F940GOT-*WD-E F940GOT-*WD-E F940GOT-*BD-H-E F940GOT-*BD-H-E GOT1000 Series display units F940WGOT-BD-H-E, F940GOT-SBD-H-E (Ver. 1.00 or later) F940GOT-BD-H-E, F940GOT-SBD-H-E (Ver.	GX Works2	SW□DNC-GXW2-E	Ver. 1.492N or later	-
FX2N and FX2NC PLCS	FX-30P	•	Ver. 1.50 or later	-
GX Works2 SW□DNC-GXW2-E Ver. 1.08 J or later GX Developer SW□D5C(F)-GPPW-E SW2 A or later FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 1.00 or later FX-30P Ver. 1.00 or later FX-20P-E(-SET0) FX-20P-MFXC-E FX-10P-E Ver. 3.00 or later GOT-F900 Series display units F940WGOT-TWD-E F940WGOT-TWD-E F940GOT-*WD-E F940GOT-*BD-H-E F940GOT-*BD-H-E F940GOT-BD-H-E F940GOT-BD-H-E F940GOT-BD-H-E F940GOT-BD-H-E F940GOT-BD-H-E F940GOT-BD-RH-E F940GOT-	GOT1000 Series d	isplay units		
GX Developer SW□D5C(F)-GPPW-E SW2 A or later FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 1.00 or later FX-30P Ver. 1.00 or later FX-20P-E(-SET0) FX-20P-MFXC-E Ver. 3.00 or later FX-10P-E Ver. 3.00 or later FX-10P-E GOT-F900 Series display units F940WGOT-TWD-E F940GOT-*WD-E F940GOT-*WD-E F940GOT-*BD-H-E F940GOT-*BD-H-E F940GOT-*BD-H-E F940GOT-*BD-H-E F940GOT-*BD-RH-E F9	FX2N and FX2NC P	LCs		
FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 1.00 or later FX-30P Ver. 1.00 or later - FX-20P-E(-SET0) Ver. 3.00 or later - FX-10P-E Ver. 3.00 or later - GOT-F900 Series display units F940WGOT-TWD-E (Ver. 1.00 or later) F940WGOT-WD-E (Ver. 1.00 or later) F940WGOT-*WD-E F940WGOT-LWD-E, F940GOT-SWD-E (Ver. 1.00 or later) F940GOT-LBD-H-E, F940GOT-SBD-H-E (Ver. 1.00 or later) F940GOT-*BD-H-E F940GOT-LBD-RH-E, F940GOT-SBD-RH-E (Ver. 1.00 or later) F940GOT-LBD-RH-E, F940GOT-SBD-RH-E (Ver. 1.00 or later) GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX1s, FX1N and FX1NC PLCs Ver. 1.08J or later GX Developer SW□DDC-GXW2-E Ver. 1.08J or later FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 3.00 or later FX-30P Ver. 1.00 or later - FX-20P-E(-SET0) Ver. 4.00 or later	GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later	
FX-30P Ver. 1.00 or later FX-20P-E(-SET0) Ver. 3.00 or later FX-20P-MFXC-E Ver. 3.00 or later FX-10P-E Ver. 3.00 or later GOT-F900 Series display units F940WGOT-TWD-E (Ver. 1.00 or later) F940WGOT-*WD-E F940GOT-LWD-E, F940GOT-SWD-E (Ver. 1.00 or later) F940GOT-*BD-H-E F940GOT-LBD-H-E, F940GOT-SBD-H-E (Ver. 1.00 or later) F940GOT-*BD-RH-E F940GOT-LBD-RH-E, F940GOT-SBD-RH-E (Ver. 1.00 or later) GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX1s, FX1N and FX1NC PLCs Ver. 1.08J or later GX Works2 SW□DNC-GXW2-E Ver. 1.08J or later GX Developer SW□DSC(F)-GPPW-E SW5 A or later FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 3.00 or later FX-30P Ver. 1.00 or later - FX-20P-E(-SET0) Ver. 4.00 or later	GX Developer	SW□D5C(F)-GPPW-E	SW2 A or later	
FX-20P-E(-SET0) FX-20P-MFXC-E FX-10P-E GOT-F900 Series display units F940WGOT-TWD-E F940GOT-*WD-E F940GOT-*WD-E F940GOT-*BD-H-E F940GOT-*BD-H-E F940GOT-*BD-H-E F940GOT-*BD-RH-E F940GOT-*BD-H-E F940GOT-*BD-RH-E F9	FX-PCS/WIN-E	SW0PC-FXGP/WIN-E	Ver. 1.00 or later	
FX-20P-MFXC-E FX-10P-E GOT-F900 Series display units F940WGOT-TWD-E F940GOT-*WD-E F940GOT-*WD-E F940GOT-*BD-H-E F940GOT-*BD-RH-E GOT1000 Series display units FX1s, FX1n and FX1nc PLCs GX Works2 GX Developer GX Developer FX-20P-E(-SET0) FX-20P-MFXD-E FX-20P-MFXD-E Ver. 3.00 or later Ver. 3.00 or later Ver. 3.00 or later Ver. 4.00 or later Ver. 3.00 or later Ver. 1.00 or later Ver. 1.00 or later) F940GOT-WD-E F940GOT-SWD-E F940GOT-SBD-H-E F940GOT-SBD-H-E F940GOT-SBD-RH-E F94	FX-30P	•	Ver. 1.00 or later	-
GOT-F900 Series display units F940WGOT-TWD-E F940GOT-*WD-E F940GOT-*WD-E F940GOT-*BD-H-E F940GOT-*BD-H-E F940GOT-*BD-RH-E F940GOT-*BD-RH-E F940GOT-*BD-RH-E F940GOT-*BD-RH-E F940GOT-BD-RH-E F940GOT-BD-RH-E F940GOT-SBD-RH-E F940GOT-SWD-E F940GOT-SWD-F F940GOT-SW			Ver. 3.00 or later	
F940WGOT-TWD-E F940GOT-WD-E F940GOT-WD-E F940GOT-WD-E F940GOT-WD-E F940GOT-BD-H-E	FX-10P-E		Ver. 3.00 or later	
models and versions supporting the list editor function. FX1s, FX1N and FX1NC PLCs GX Works2 SW□DNC-GXW2-E Ver. 1.08J or later GX Developer SW□D5C(F)-GPPW-E SW5 A or later FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 3.00 or later FX-30P Ver. 1.00 or later FX-20P-E(-SET0) FX-20P-MFXD-E Ver. 4.00 or later	GOT-F900 Series display units F940WGOT-TWD-E F940GOT-*WD-E F940GOT-*BD-H-E		F940GOT-LWD-E, F940 F940GOT-LBD-H-E, F94 F940GOT-LBD-RH-E, F9	GOT-SWD-E (Ver. 1.00 or later) 10GOT-SBD-H-E (Ver. 1.00 or later) 1940GOT-SBD-RH-E (Ver. 1.00 or later)
GX Works2 SW□DNC-GXW2-E Ver. 1.08J or later GX Developer SW□D5C(F)-GPPW-E SW5 A or later FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 3.00 or later FX-30P Ver. 1.00 or later FX-20P-E(-SET0) FX-20P-MFXD-E Ver. 4.00 or later	GOT1000 Series d	GOT1000 Series display units		
GX Developer SW□D5C(F)-GPPW-E SW5 A or later FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 3.00 or later FX-30P Ver. 1.00 or later - FX-20P-E(-SET0) FX-20P-MFXD-E Ver. 4.00 or later	FX1S, FX1N and FX	FX1s, FX1n and FX1nc PLCs		
FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 3.00 or later FX-30P Ver. 1.00 or later - FX-20P-E(-SET0) FX-20P-MFXD-E Ver. 4.00 or later	GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later	
FX-30P	GX Developer	SW□D5C(F)-GPPW-E	SW5 A or later	
FX-20P-E(-SET0) FX-20P-MFXD-E Ver. 4.00 or later	FX-PCS/WIN-E	SW0PC-FXGP/WIN-E	Ver. 3.00 or later	
FX-20P-MFXD-E Ver. 4.00 or later	FX-30P	·	Ver. 1.00 or later	-
FX-10P-E Ver. 4.00 or later	,		Ver. 4.00 or later	
	FX-10P-E		Ver. 4.00 or later	

hvidels

Product name	Model name	Applicable version	Remarks	
GOT-F900 Series disp	ay units			
F940WGOT-TWD-E		F940WGOT-TWD-E (Ve	r. 1.00 or later)	
		F940GOT-LWD-E, F940	F940GOT-LWD-E, F940GOT-SWD-E (Ver. 1.00 or later)	
F940GOT-*BD-H-E F940GOT-LBD-H-E,		F940GOT-LBD-H-E, F94	F940GOT-SBD-H-E (Ver. 1.00 or later)	
			F940GOT-LBD-RH-E, F940GOT-SBD-RH-E (Ver. 1.00 or later)	
GOT1000 Series display units			Γ1000 Series display units for applicable porting the list editor function.	

2. Japanese versions

Product name	Model name	Applicable version	Remarks
FX3U and FX3UC PI	_Cs		
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later	
GX Developer	SW□D5C(F)-GPPW-J	Ver. 8.13P or later	-
FX-30P	-	Ver. 1.00 or later	
GOT1000 Series di	splay units		T1000 Series display units for applicable oporting the list editor function.
FX3G PLC			
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later	
GX Developer	SW□D5C(F)-GPPW-J	Ver. 8.72A or later	-
FX-30P	-1	Ver. 1.00 or later	
GOT1000 Series di	splay units		T1000 Series display units for applicable oporting the list editor function.
FX3GC PLC			
GX Works2	SW□DNC-GXW2-J	Ver. 1.77F or later	
FX-30P	- 1	Ver. 1.30 or later	-
GOT1000 Series di	splay units		T1000 Series display units for applicable oporting the list editor function.
FX3S PLC			
GX Works2	SW□DNC-GXW2-J	Ver. 1.492N or later	
FX-30P	-1	Ver. 1.50 or later	-
GOT1000 Series di	splay units		T1000 Series display units for applicable oporting the list editor function.
FX2N and FX2NC PI	LCs		
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later	
GX Developer	SW□D5C(F)-GPPW-J	SW2 A or later	
FX-PCS/WIN	SW0PC-FXGP/WIN	Ver. 2.00 or later	
FX-PCS-KIT/98	SW1PC-FXGP/98(-3,-5)	Ver. 4.00 or later	
FX-PCS/98-3	SW1PC-FXGP/98-3	Ver. 4.00 or later	
FX-PCS-KIT/V-3	SW1PC-FXGP/V3	Ver. 2.00 or later	-
FX-A7PHP-KIT	SW1RX-GPPFX	Ver. 3.00 or later	
FX-30P		Ver. 1.00 or later	
FX-20P(-SET0) FX-20P-MFXC		Ver. 4.00 or later	
FX-10P(-SET0)		Ver. 3.00 or later	
GOT-F900 Series display units F940WGOT-TWD F940GOT-*WD F940GOT-*BD-H F940GOT-*BD-RH		F940GOT-LBD-H, F9400	I 1.00 or later) DT-SWD (Ver. 1.00 or later) GOT-SBD-H (Ver. 1.00 or later) 0GOT-SBD-RH (Ver. 1.00 or later)
GOT1000 Series display units			Γ1000 Series display units for applicable porting the list editor function.

Product name	Model name	Applicable version	Remarks
FX1S, FX1N and FX	INC PLCs		
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later	
GX Developer	SW□D5C(F)-GPPW-J	SW5 A or later	
FX-PCS/WIN	SW0PC-FXGP/WIN	Ver. 4.00 or later	
FX-PCS/98-3	SW1PC-FXGP/98-3	Ver. 5.00 or later	<u>_</u>
FX-30P	-	Ver. 1.00 or later	
FX-20P(-SET0) FX-20P-MFXD		Ver. 5.00 or later	
FX-10P(-SET0)		Ver. 4.00 or later	
GOT-F900 Series di F940WGOT-TWD F940GOT-*WD F940GOT-*BD-H F940GOT-*BD-RH	F940WGOT-TWD (Ver. 1.00 or later) WD F940GOT-LWD, F940GOT-SWD (Ver. 1.00 or later) BD-H F940GOT-LBD-H, F940GOT-SBD-H (Ver. 1.00 or later)		OT-SWD (Ver. 1.00 or later) GOT-SBD-H (Ver. 1.00 or later)
GOT1000 Series display units		Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function.	

1.4.2 For non-applicable versions (setting an alternative model)

Even programming tool not applicable to a PLC can create programs when an alternative model is set. In this case, however, programming is enabled only in the function ranges provided for the alternative PLC model such as instructions and program size.

Model to be programmed	Model to be set		Priority: High → Low		
FX3UC Series	FX3UC	\rightarrow	FX2N	\rightarrow	FX2(FX)
FX3U Series	FX3UC, FX3U	\rightarrow	FX2N	\rightarrow	FX2(FX)
FX3GC Series	FX3G, FX3GC	\rightarrow	FX ₁ N ^{*1}	\rightarrow	FX2N ^{*1}
FX3G Series	FX3G	\rightarrow	FX1N ^{*1}	\rightarrow	FX2N ^{*1}
FX3S Series	FX3S	\rightarrow	FX3G	\rightarrow	FX1N ^{*1}
FX2NC Series	FX2NC, FX2N	\rightarrow	FX2(FX)		
FX2N Series	FX2N	\rightarrow	FX2(FX)		
FX1NC Series	FX1NC, FX1N	\rightarrow	FX2N	\rightarrow	FX2(FX)
FX1N Series	FX1N	\rightarrow	FX2N	\rightarrow	FX2(FX)
FX1S Series	FX1S	\rightarrow	FX2(FX)		
FX ₀ N Series	FX0N	\rightarrow	FX2(FX)		
FXos Series	FX0S	\rightarrow	FX2(FX)		
FX ₀ Series	FX0	\rightarrow	FX2(FX)		
FX2C Series	FX2C, FX2(FX)	\rightarrow	FX2(FX)		
FX2(FX) Series	FX2(FX)				
FX1 Series	FX1				

^{*1. &}quot;FX2N" is selected when the FX-10P(-E) is used.

Point

In the FX3s PLC, set the memory capacity for PLC parameters to 4,000 steps or less.

2. Specifications

This chapter explains the communication specifications and performance.

2.1 Communication Specifications (Reference)

Communication is executed according to the (fixed) specifications shown in the table below. Specification items such as baud rate cannot be changed.

Item		Specifications	Remarks
Number of connectable units		8 maximum	
Transmiss	ion standard	RS-485 standard	
Maximum total extension distance		500 m (1640' 5") or less [50 m (164' 0") or less when 485BD is included in system]	Distance varies depending on communication equipment type.
Protocol ty	/pe	N:N Network	
Control pro	ocedure	_	
Communic	cation method	Half-duplex, bidirectional communication	
Baud rate		38400 bps	
	Start bit		
Character	Data bit	Fixed	
format	Parity bit	Fixed	
	Stop bit		
Header		Fixed	
Terminator		I IAGU	
Control lin	е	_	
Sum check		Fixed	

2.2 Link Specifications

2.2.1 Link patterns and number of link points in each FX Series

The number of occupied link points varies depending on the number of slave stations used.

For example, when three slave stations are connected in "Pattern 1", M1000 to M1223 and D0 to D33 are occupied, and unoccupied devices can be used as general devices for control.

(Link devices for unconnected slave stations can be used as general devices for control, but it is recommended to leave them in the unoccupied status if slave stations may be added in the future.)

√: Applicable

—: Not applicable

PLC Series	Pattern 0	Pattern 1	Pattern 2
FX3U, FX3UC Series	✓	✓	✓
FX3G, FX3GC Series	✓	✓	✓
FX3S Series	✓	✓	✓
FX2N, FX2NC Series	✓	✓	✓
FX1N, FX1NC Series	✓	✓	✓
FX1S Series	✓	_	_
FX _{0N} Series	✓	_	_

		Patter	n 0	Patterr	Pattern 1		Pattern 2	
Statio	n No.	Bit device (M)	Word device (D)	Bit device (M)	Word device (D)	Bit device (M)	Word device (D)	
		0	4 in each station	32 in each station	4 in each station	64 in each station	8 in each station	
Master station	Station No. 0	_	D 0 to D 3	M1000 to M1031	D 0 to D 3	M1000 to M1063	D 0 to D 7	
	Station No. 1	_	D10 to D13	M1064 to M1095	D10 to D13	M1064 to M1127	D10 to D17	
	Station No. 2	_	D20 to D23	M1128 to M1159	D20 to D23	M1128 to M1191	D20 to D27	
	Station No. 3	_	D30 to D33	M1192 to M1223	D30 to D33	M1192 to M1255	D30 to D37	
Slave stations	Station No. 4	_	D40 to D43	M1256 to M1287	D40 to D43	M1256 to M1319	D40 to D47	
	Station No. 5	_	D50 to D53	M1320 to M1351	D50 to D53	M1320 to M1383	D50 to D57	
	Station No. 6	_	D60 to D63	M1384 to M1415	D60 to D63	M1384 to M1447	D60 to D67	
	Station No. 7	_	D70 to D73	M1448 to M1479	D70 to D73	M1448 to M1511	D70 to D77	

2.2 Link Specifications

2.2.2 Link time

The link time indicates the cycle time in which link devices are updated.

The link time varies depending on the number of linked units (master station and slave stations) and the number of linked devices as shown in the table below.

Unit: ms

Number of	Pattern 0	Pattern 1	Pattern 2
linked stations	0 bit-devices 4 word-devices	32 bit-devices 4 word-devices	64 bit-devices 8 word-devices
2	18	22	34
3	26	32	50
4	33	42	66
5	41	52	83
6	49	62	99
7	57	72	115
8	65	82	131

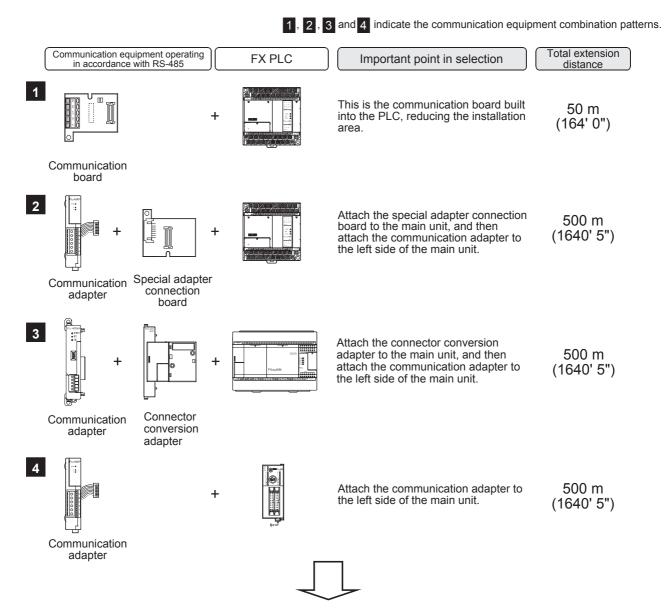
3. System Configuration and Equipment Selection

This chapter explains the configuration of the communication equipment operating in accordance with RS-485 and the system selection required by FX PLCs.

3.1 System Configuration

This section outlines the system configuration required to use the N:N Network.

Connect (optional) equipment operating in accordance with RS-485 to the FX PLC main unit.



For communication equipment combinations for each FX Series, refer to the next page.

3.2 Applicable FX PLC and Communication Equipment

Select a (optional) communication equipment combination, and put a check mark in the "Check" column. During selection, pay attention to the following:

- In the table below, only the external dimensions are different between the units shown in "FX2NC-485ADP/ FX0N-485ADP". Select either one.
- In the table below, only the cable is different between the units shown in "FX3G-485-BD/FX3G-485-BD-RJ". Select either one.
- N:N Network is not provided for the FX1, FX2(FX), FX2C, FX0 and FX0s PLCs.

FX Series	Communication equipment (option)	Total extension distance	Check
FXON	FX2NC-485ADP (European terminal block) FX0N-485ADP (Terminal block)	500 m (1640' 5")	
	FX1N-485-BD (European terminal block)	50 m (164' 0")	
FX1s	FX1N-CNV-BD FX2NC-485ADP FX1N-CNV-BD FX0N-485ADP (Terminal block)	500 m (1640' 5")	
	FX1N-485-BD (European terminal block)	50 m (164' 0")	
FX1N	FX1N-CNV-BD FX2NC-485ADP FX1N-CNV-BD FX0N-485ADP (Terminal block)	500 m (1640' 5")	
	FX2N-485-BD	50 m (164' 0")	
FX2N	FX2N-CNV-BD FX2NC-485ADP FX2N-CNV-BD FX0N-485ADP (European terminal block)	500 m (1640' 5")	

FX Series	Communication equipment (option)	Total extension distance	Check
	FX3G-485-BD FX3G-485-BD-RJ (European terminal block) (RJ45 connector)	50 m (164' 0")	
FX3S	FX3s-CNV-ADP FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	
Fixed M	FX3G-485-BD FX3G-485-BD-RJ (European terminal block) (RJ45 connector)	50 m (164' 0")	
FX3G (14-point, 24-point type)	FX3G-CNV-ADP FX3u-485ADP(-MB) (European terminal block)	500 m (1640' 5")	
	When using channel 1 (ch 1)		
755-45M	FX3G-485-BD FX3G-485-BD-RJ (European terminal block) (RJ45 connector) The communication equipment works as ch1 when connected to the option connector 1.	50 m (164' 0")	
FX3G (40-point, 60-point type)	FX3G-CNV-ADP FX3u-485ADP(-MB) (European terminal block)	500 m (1640' 5")	

FX Series	Communication equipment (option)	Total extension distance	Check
755-5M	ch2 ch2 FX3G-485-BD FX3G-485-BD-RJ (European terminal block) (RJ45 connector) The communication equipment works as ch2 when connected to the option connector 2.	50 m (164' 0")	
FX3G (40-point, 60-point type)	ch1 ch2 FX3G-CNV-ADP FX3U-□ADP(-MB) FX3U-485ADP(-MB) (Where □ represents (European terminal block) 232 and 485). Ch2 is not available when the FX3G-8AV-BD, FX3G-4EX-BD or FX3G-2EYT-BD is connected to the option connector 2.	500 m (1640' 5")	
	When using channel 1 (ch 1) ch1 FX3U-485-BD (European terminal block)	50 m (164' 0")	
FX3U	FX3U-CNV-BD FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	

FX Series	Communication equipment (option)	Total extension distance	Check
	When using channel 2 (ch 2)		
	Ch1 FX3U-□-BD (Where □ represents 232, 422, 485, USB and 8AV). When a FX3U-8AV-BD is used, it occupies one communication port channel.	500 m (1640' 5")	
Teams 1001111	ch1 ch2		
F X 3U	FX3U-CNV-BD FX3U-232ADP(-MB), FX3U-485ADP(-MB) FX3U-485ADP(-MB), (European terminal block) FX3U-CF-ADP When a FX3U-CF-ADP is used, it occupies one communication port channel.	500 m (1640' 5")	
FX1NC	FX2NC-485ADP (European terminal block) FX0N-485ADP (Terminal block)	500 m (1640' 5")	
FX2NC	FX2NC-485ADP (European terminal block) (Terminal block)	500 m (1640' 5")	
	When using channel 1 (ch 1) ch1 FX3U-485ADP(-MB) (European terminal block) When using channel 2 (ch 2)	500 m (1640' 5")	
FX3GC	ch1 ch2 FX3U-□ADP(-MB) (Where □ represents 232 and 485). ch2 FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	

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FX Series	Communication equipment (option)	Total extension distance	Check
	Ch1 Ch1 FX3U-485ADP(-MB) (European terminal block) When using channel 2 (ch 2)	500 m (1640' 5")	
FX3UC (D, DS, DSS)	ch1 FX3U-232ADP(-MB), FX3U-485ADP(-MB) FX3U-485ADP(-MB), FX3U-CF-ADP When a FX3U-CF-ADP is used, it occupies one communication port channel.	500 m (1640' 5")	
	ch1 FX3U-485-BD (European terminal block)	50 m (164' 0")	
130 6	r Ch1 FX3U-CNV-BD FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	
FX3UC-32MT-LT (-2)	when using channel 2 (ch 2) ch1 FX3U-□-BD (Where □ represents 232, 422, 485, USB and 8AV). When a FX3U-8AV-BD is used, it occupies one communication port channel.	500 m (1640' 5")	
	ch1 ch2 FX3U-CNV-BD FX3U-232ADP(-MB), FX3U-485ADP(-MB) FX3U-485ADP(-MB), European terminal block) FX3U-CF-ADP When a FX3U-CF-ADP is used, it occupies one communication port channel.	500 m (1640' 5")	

4. Wiring

This chapter explains the wiring.

WIRING PRECAUTIONS



- Make sure to cut off all phases of the power supply externally before attempting installation or wiring work. Failure to do so may cause electric shock or damage to the product.
- Make sure to attach the terminal cover, offered as an accessory, before turning on the power or initiating operation after installation or wiring work.
 Failure to do so may cause electric shock.

WIRING PRECAUTIONS



- Make sure to observe the following precautions in order to prevent any damage to the machinery or accidents due to abnormal data written to the PLC under the influence of noise:
 - 1) Do not bundle the main circuit line together with or lay it close to the main circuit, high-voltage line or load line. Otherwise, noise disturbance and/or surge induction are likely to take place. As a guideline, lay the control line at least 100mm (3.94") or more away from the main circuit or high-voltage lines.
 - 2) Ground the shield wire or shield of the shielded cable at one point on the PLC. However, do not use common grounding with heavy electrical systems.
- Make sure to properly wire the terminal block in accordance with the following precautions.
 Failure to do so may cause electric shock, equipment failures, a short-circuit, wire breakage, malfunctions, or damage to the product.
 - The disposal size of the cable end should follow the dimensions described in the manual.
 - Tightening torque should follow the specifications in the manual.
 - Tighten the screws using a Phillips-head screwdriver No.2 (shaft diameter 6mm (0.24") or less). Make sure that the screwdriver does not touch the partition part of the terminal block.
- Make sure to properly wire to the terminal block (European type) in accordance with the following precautions.
 Failure to do so may cause electric shock, equipment failures, a short-circuit, wire breakage, malfunctions, or damage to the product.
 - The disposal size of the cable end should follow the dimensions described in the manual.
 - Tightening torque should follow the specifications in the manual.
 - Twist the end of strand wire and make sure that there are no loose wires.
 - Do not solder-plate the electric wire ends.
 - Do not connect more than the specified number of wires or electric wires of unspecified size.
 - Affix the electric wires so that neither the terminal block nor the connected parts are directly stressed.

4.1 Wiring Procedure

1 Preparing for wiring

Prepare cables and terminal resistors required for wiring.

 \rightarrow For details, refer to Section 4.2.

2 Turning OFF the power to the PLC

Before starting any wiring work, make sure that the PLC power is OFF.

3 Connecting the power supply (FX0N-485ADP only)

Connect the power supply to the 24V DC power terminal.

4 Wiring communication equipment

Connect communication equipment operating in accordance with RS-485.

 \rightarrow For details, refer to Section 4.3.

C

D

Remote Maintenance

4.2 **Selecting Cables and Terminal Resistors**

Select cables using the procedure described below.

4.2.1 Twisted pair cable

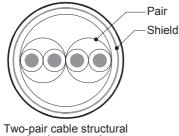
Use shielded twisted pair cables for connecting communication equipment operating in accordance with RS-

The table below shows recommended model names and manufacturers of cables used for wiring.

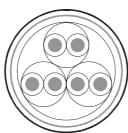
1. Recommended cables

Manufacturer	Model name	Remarks
	SPEV(SB)-0.2-2P	Two-pair cable of 0.2 mm ²
Mitsubishi Cable Industries, Ltd.	SPEV(SB)-MPC-0.2 × 3P	Three-pair cable of 0.2 mm ²
	SPEV(SB)-0.5-2P	Two-pair cable of 0.5 mm ²
Showa Holdings Co., Ltd.	KMPEV-SB CWS-178 0.2SQ × 2P	Two-pair cable of 0.2 mm ²
Showa Holdings Co., Etc.	KMPEV-SB CWS-178 0.5SQ × 2P	Two-pair cable of 0.5 mm ²
Sumitomo Electric Industries, Ltd.	DPEV SB 0.3 × 3P	Three-pair cable of 0.3 mm ²
Sumitomo Liectric maustries, Eta.	DPEV SB 0.5 × 3P	Three-pair cable of 0.5 mm ²
The Furukawa Electric Co., Ltd.	D-KPEV-SB 0.2 × 3P	Three-pair cable of 0.2 mm ²
The Fulukawa Liectife Co., Etc.	D-KPEV-SB 0.5 × 3P	Three-pair cable of 0.5 mm ²
Fujikura Ltd.	IPEV-SB 2P × 0.3 mm ²	Two-pair cable of 0.3 mm ²
i djikura Eta.	IPEV-SB 2P × 0.5 mm ²	Two-pair cable of 0.5 mm ²

2. Cable structural drawing (reference)



drawing example



Three-pair cable structural drawing example

4.2.2 10BASE-T cable

10BASE-T cables used in LAN wiring for a personal computer can be connected to FX3G-485-BD-RJ.

1. Selection procedure when purchasing

1) Cable type : 10BASE-T cable (Category 3 or higher)

2) Connection specifications: Straight type

3) Connector : RJ45 connector (Connector with metal frame is used)

2. Cautions on using commercial cables

Pay attention to the following point when purchasing commercial cables.

· Use shielded cables. Make sure to connect the shield to the metal frame of the connector, and perform class D grounding.

4.2.3 Connecting cables

1. European type terminal block

The FX3G-485-BD-RJ terminal block is used for grounding.

The other options use shielded twisted pair cables for connecting communication equipment operating in accordance with RS-485.

The table below shows applicable cables and tightening torques.

	Cable size when	Cable size when	Bar terminal with	Tightening	htening Tool size	
	one cable is connected	two cables are connected	Insulating sleeve (cable size)	torque	Α	В
FX3U-485-BD FX3G-485-BD FX3U-485ADP (-MB)	AWG22 to AWG20	AWG22	Applicable (AWG22 to AWG20)	0.22 to 0.25 N·m	0.4 (0.01")	2.5 (0.09")
FX3G-485-BD- RJ	AWG20 to AWG16		Not applicable	0.5 to 0.6 N·m	0.6 (0.03")	3.5 (0.14")
FX2N-485-BD FX1N-485-BD	AWG26	to AWG16	Not applicable	0.5 to 0.6 N·m	0.6 (0.03")	3.5 (0.14")
FX2NC-485ADP	AWG26 to AWG16	AWG26 to AWG20	Not applicable	0.4 to 0.5 N·m	0.6 (0.03")	3.5 (0.14")

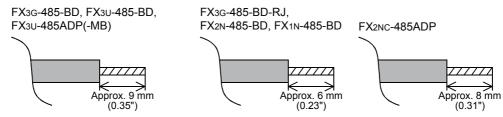
Do not tighten terminal screws with a torque outside the above-mentioned range.

Failure to do so may cause equipment failures or malfunctions.

With regard to the cable end treatment, use a stranded cable or solid cable as it is, or use a bar terminal with insulating sleeve.

FX3G-485-BD-RJ, FX2N-485-BD, FX1N-485-BD and FX2NC-485ADP cannot use a bar terminal with insulating sleeve.

- · When using a stranded cable or solid cable as it is
 - Twist the end of a stranded cable so that wires do not get barbed.
 - Do not plate the end of the cable.

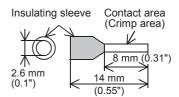


When using a bar terminal with insulating sleeve
Because it is difficult to insert a cable into an insulating sleeve
depending on the thickness of the cable sheath, select the proper cable
according to the outline drawing.

<Reference>

Manufacturer	Model name	Caulking tool
Phoenix Contact Co., Ltd.	AI 0.5-8WH	CRIMPFOX 6*1 (or CRIMPFOX 6T-F*2)

*1. Old model name : CRIMPFOX ZA 3*2. Old model name : CRIMPFOX UD 6



For size A and size B, refer to the table above.

screwdriver with a straight tip.

Tool

When tightening a terminal on the European terminal block, use a small commercial straight shape screwdriver whose tip is shown in the figure to the right.

Note

If the diameter of screwdriver grip is too small, tightening torque will not be able to be achieved. To achieve the appropriate tightening torque shown in the previous page, use the following screwdriver or an appropriate replacement (grip diameter: approximately 25mm (0.98")).

<Reference>

FX3U-485-BD, FX3G-485-BD, FX3U-485ADP(-MB)

Manufacturer	Model name
Phoenix Contact Co., Ltd.	SZS 0.4 × 2.5

FX3G-485-BD-RJ, FX2N-485-BD, FX1N-485-BD, FX2NC-485ADP

Manufacturer Model name	
Phoenix Contact Co., Ltd.	SZF 1-0.6 × 3.5

2. Terminal block

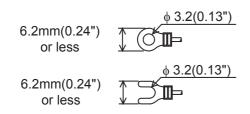
In the FX0N-485ADP and FX-485ADP, the terminal screw size is "M3".

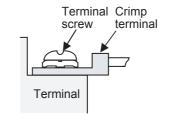
Make sure to use a crimp-style terminal with the following sizes.

Make sure that the tightening torque is 0.5 to 0.8 N·m.

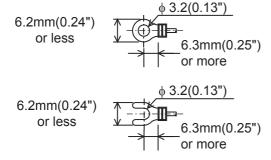
Do not tighten terminal screws with a torque outside the above-mentioned range. Failure to do so may cause equipment failures or malfunctions.

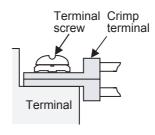
· When wiring one cable to one terminal





· When wiring two cables to one terminal





4.2.4 Connecting terminal resistors

Make sure to provide a terminal resistor at the end of each line. In the case of one-pair wiring, connect a terminal resistor to the RDA-RDB signal terminal of the communication equipment.

Brown Precision 1 1 1 =110 Ω (10¹)

1. Terminal resistor type

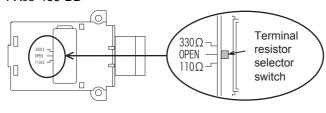
Use two terminal resistors of 110 Ω . 1/2 W.

Among the terminal resistors supplied with the communication equipment, select ones with the color codes shown to the right.

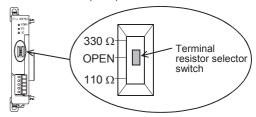
2. When using the FX3U-485-BD, FX3G-485-BD, FX3G-485-BD-RJ or FX3U-485ADP(-MB)

The FX₃U-485-BD, FX₃G-485-BD, FX₃G-485-BD-RJ and FX₃U-485ADP(-MB) have built-in terminal resistors. Set the terminal resistor selector switch accordingly.

FX3U-485-BD



• FX3U-485ADP(-MB)



FX3G-485-BD

Remove the upper terminal block before changing over the switch in the FX3G-485-BD.

Removal: Loosen the terminal block mounting screws, and remove the terminal block.

Installation: Attach the terminal block, and tighten the terminal block mounting screws.

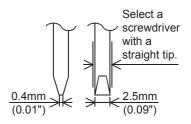
Tightening torque: 0.4 to 0.5 N·m

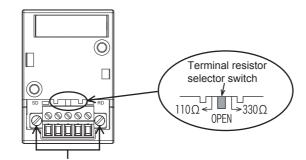
Do not tighten terminal screws with a torque outside the above-mentioned range. Failure to do so may cause equipment failures or malfunctions.

For installation and removal of the terminal block, use the recommended tool shown below or a tool having straight tip (such as screwdriver) as shown in the right figure.

<Reference>

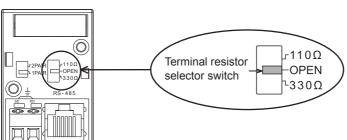
Manufacturer	Model name
Phoenix Contact Co., Ltd.	SZS 0.4 × 2.5





Terminal block mounting screws

FX3G-485-BD-RJ



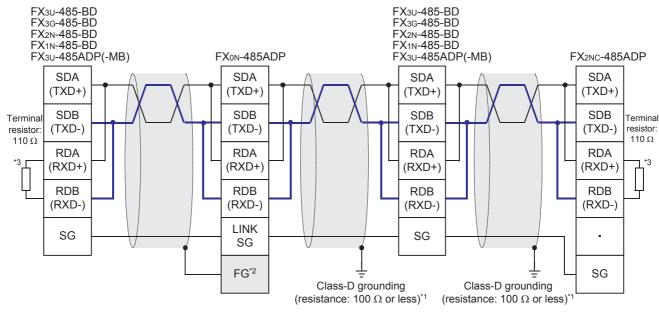
D

C

Ε

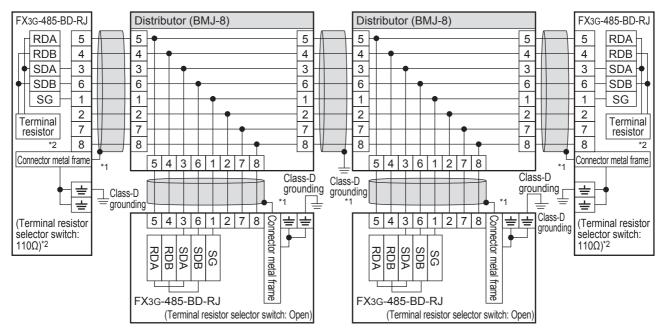
4.3 **Connection Diagram**

Use one-pair wiring for an N:N Network.



- *1 Make sure to perform Class-D grounding on the shield of a twisted pair cable connected to the FX2N-485-BD, FX1N-485-BD, FX3U-485-BD, FX3G-485-BD, FX2NC-485ADP or FX3U-485ADP(-MB).
- *2 Make sure to connect the FG terminal to the 🛓 (grounding) terminal in the PLC requiring Class-D grounding. If the grounding terminal is not provided in the PLC, perform Class-D grounding directly.
- *3 Make sure to provide a terminal resistor at the end of each line.
 - The FX3U-485-BD, FX3G-485-BD and FX3U-485ADP(-MB) have a built-in terminal resistor. Set the terminal resistor selector switch accordingly
 - The FXon-485ADP, FX2nc-485ADP, FX2n-485-BD and FX1n-485-BD are supplied together with terminal resistors.

FX3G-485-BD-RJ



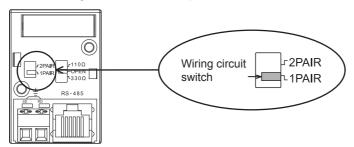
- *1. Use shielded cables, and make sure to perform class D grounding on the shield.

 When using the terminal block to connect ground, wire the ground wire only to either one of two poles of the terminal block.
- *2. Make sure to provide a terminal resistor at the end of each line. Set the terminal resistor selector switch accordingly.

Prepare the following devices if necessary.

Product name	Model name	Manufacturer
RJ45 connector	TM11AP-88P	HIROSE ELECTRIC CO., LTD.
	BMJ-8 BMJ-8-28N (No internal connection of the No. 2 and 8 pin) (Do not use a plug with terminal resistor)	HACHIKO ELECTRIC CO., LTD.

The FX3G-485-BD-RJ has a built-in wiring circuit switch. Set the wiring circuit switch to 1 pair.

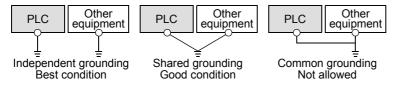


4.4 Grounding

Grounding should be performed as stated below.

- The grounding resistance should be 100Ω or less.
- Independent grounding should be performed for best results.

 When independent grounding can not be performed, perform "shared grounding" as shown in the following figure.
 - ightarrow For details, refer to the Hardware Edition of each series.



- The grounding wire size should be AWG 14 (2 mm²) or larger.
- The grounding point should be close to the PLC, and all grounding wires should be as short as possible.

5. Communication Setting (Initialization) in FX Programmable Controller

The communication setting is not required in FX PLCs for the N:N network.

Using the following procedure, verify that the communication setting is not specified for another communication type and verify that the setting is correct.

When using this communication function in ch1 in an FX3S, FX3G, FX3GC, FX3U or FX3UC PLC, check D8120 and D8400 using the following procedure.

When using this communication function in ch2 in an FX3G, FX3GC, FX3U or FX3UC PLC, check D8420 using the following procedure.

In other PLCs, use D8120 for verification.

5.1 Check Procedure

1 Monitoring D8120 (D8400, D8420)

Turn ON the power to the PLC while it is in STOP mode, and monitor D8120 (D8400, D8420).

1. When the value of D8120 (D8400, D8420) is "0"

The communication setting is not provided.

2. When the value of D8120 (D8400, D8420) is any value other than "0"

The communication setting is provided.

2 Checking absence/presence of parameter setting

Check for the absence/presence using the GX Works2, GX Developer, FXGP/WIN or FX-30P.

- 1) GX Works2 operating procedure (For details, refer to Section 5.2.)
- 2) FXGP/WIN operating procedure (For details, refer to Section 5.3.)
 - → For details on GX Developer operating procedure, refer to GX Developer Operating Manual.
 → For details on FX-30P operating procedure, refer to FX-30P Operation Manual.

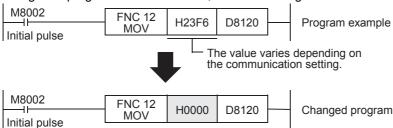
3 Checking absence/presence of sequence program setting

Check whether or not a write instruction is programmed for D8120 (D8400, D8420).

1. When such an instruction is programmed

Program example: (for D8120)

Change the program as shown below, and then change the PLC mode from STOP to RUN.



2. When such an instruction is not programmed

Proceed to the next step.

4 Monitoring D8120 (D8400, D8420) again, and confirming that its value is "0"

C

5.2 Communication Setting Using Parameter Method (GX Works2)

Communication setting may be changed using the parameter method with GX Works2, GX Developer, FXGP/WIN for Windows and FX-30P handy programming panel. This section describes how to change parameters with GX Works2.

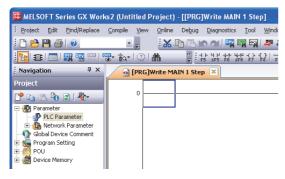
→ For details on FXGP/WIN operating procedure, refer to section 5.3.
 → For details on GX Developer operating procedure, refer to GX Developer Operating Manual.
 → For details on FX-30P operating procedure, refer to FX-30P Operation Manual.

5.2.1 Operating procedure

This subsection explains the serial communication setting method. Suppose that GX Works2 is already started up.

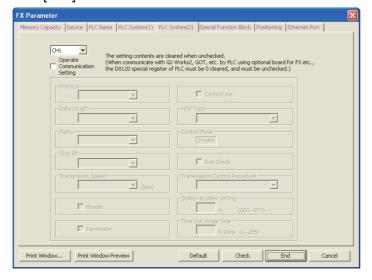
1 Opening the parameter setting window

In the project view area of the navigation window, double-click [Parameter] \rightarrow [PLC Parameter]. If the navigation window is not displayed, select [View] \rightarrow [Docking Window] \rightarrow [Navigation] from the menu bar.



2 Setting the serial communication (parameters)

Select a channel to be used, and click the [PLC System(2)] tab on the dialog box. Make sure that the "Operate Communication Setting" check box is clear. If a check mark is there, clear it. Click [End].



3 Writing parameters and program to the PLC

Select [Online] \rightarrow [Write to PLC] from the menu bar, click [Parameter + Program], and then click [Execute].

5.3 Communication Settings Using Parameter Method (FXGP/WIN)

Communication setting may be changed using the parameter method with GX Works2, GX Developer, FXGP/WIN for Windows and FX-30P handy programming panel. This section describes how to change parameters with FXGP/WIN.

Ch2 cannot be set using FXGP/WIN.

→ For details on GX Works2 operating procedure, refer to section 5.2.
 → For details on GX Developer operating procedure, refer to GX Developer Operating Manual.
 → For details on FX-30P operating procedure, refer to FX-30P Operation Manual.

5.3.1 Operating procedure

This subsection explains the serial communication setting method. Suppose that FXGP/WIN is already started up.

1 Adjusting serial setting (parameter)

Double-click [Option] → [Serial setting (parameter)] from the toolbar. The following dialog box appears according to absence/presence of parameter settings.

1. When there are no parameter settings

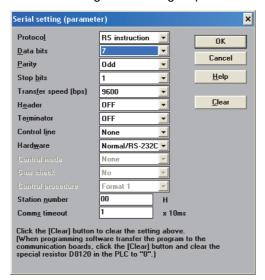
The dialog box shown below appears to indicate that there are no communication settings. Click the [No] button.

In this case, the next step is not required.



2. When there are already parameter settings

The dialog box shown below appears to indicate that there are communication settings. Click the [Clear] button to delete the communication settings from parameters. Transfer parameters to the PLC using the following step.



2 Writing a sequence program (parameters) to the PLC

Select [PLC] \rightarrow [Transfers] \rightarrow [Write] from the toolbar, and click [OK] button.

6. Test Run (Communication Test)

This chapter explains the communication test procedures for the N:N Network.

It is recommended to first wire the master station and slave stations, initialize communication settings in the FX PLCs, and then execute the communication test using the following procedure to confirm proper operation.

6.1 Test Procedure

1 Creating programs for the communication test

Create new programs for the communication test for the master station and slave stations.

 \rightarrow For program examples, refer to Section 6.2.

2 Transferring the program to each PLC

Turn ON the power to each PLC, and transfer the program.

3 Validating the communication setting

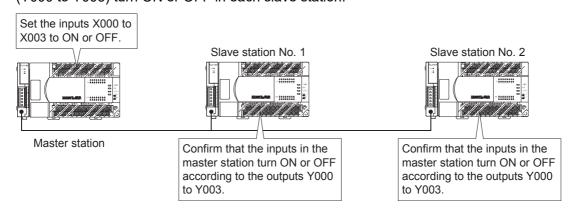
When the PLC is in RUN mode, set it to STOP mode once, and then set it to RUN mode again. Or turn OFF the power of the master station and all slave stations in communication, and then turn ON the power of these stations at the same time.

4 Confirming flashing of the communication status indicator lamps (SD and RD)

Confirm that the built-in SD and RD lamps of the communication equipment are flashing. If they are off, take proper action while referring to the troubleshooting procedures described later.

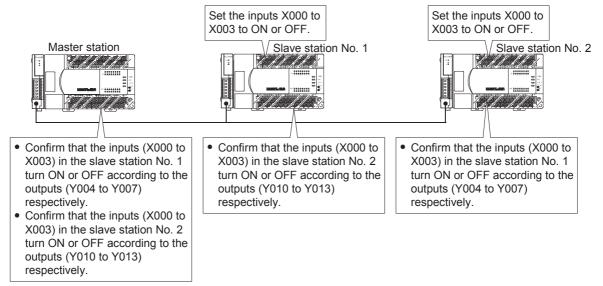
5 Confirming the link of the master station

Set the PLC inputs (X000 to X003) to ON or OFF in the master station, and confirm that the outputs (Y000 to Y003) turn ON or OFF in each slave station.



6 Confirming the link of slave stations

Set the PLC inputs (X000 to X003) to ON or OFF in each slave station, and confirm that the outputs (Y004 to Y007, Y010 to Y013, Y014 to Y017... Y030 to Y033) turn ON or OFF in each slave station.



→ If unable to establish link, refer to "Chapter 9. Troubleshooting".

Assignment of inputs and outputs (link devices)

The table below shows devices used in the test programs shown later:

	Station No.	Input (X)	Link device	Output (Y)
0	Master station	X000 to X003	D0	Y000 to Y003
1	Slave station No. 1	X000 to X003	D10	Y004 to Y007
2	Slave station No. 2	X000 to X003	D20	Y010 to Y013
3	Slave station No. 3	X000 to X003	D30	Y014 to Y017
4	Slave station No. 4	X000 to X003	D40	Y020 to Y023
5	Slave station No. 5	X000 to X003	D50	Y024 to Y027
6	Slave station No. 6	X000 to X003	D60	Y030 to Y033
7	Slave station No. 7	X000 to X003	D70	Y034 to Y037

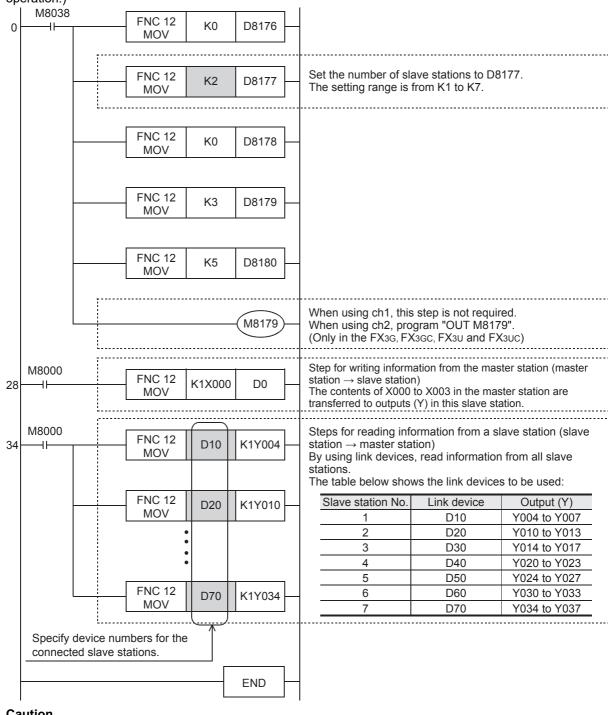
Apx.A Discontinued models

6.2 Creating Programs for the Communication Testing

Create the programs shown below for the master station and each slave station. (In the communication test, set the refresh range to pattern 0.)

6.2.1 Creating a program for the master station

Create the program shown below for the communication test. (This program is not required during actual operation.)



Caution

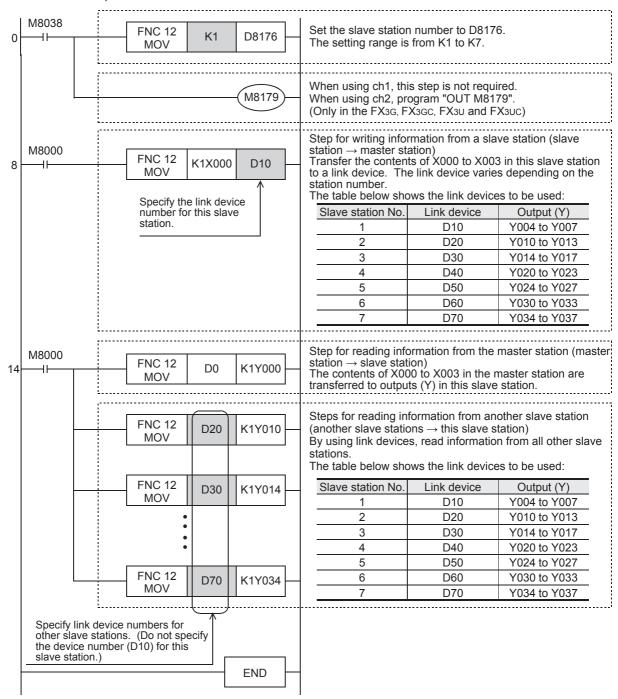
- When using a PLC (such as an FX1s and FX3s Series PLC) with a small number of outputs, transfer information from slave stations to auxiliary relays (M), etc., and then monitor the auxiliary relays using a programming tool. (Example: Change "K1Y004" to "K1M4".)
- In the circuit from step 34, create a program for link devices (MOV instruction) for all connected slave stations.

6.2.2 Creating a program for each slave station

Create the program shown below for the communication test. (This program is not required during actual operation.)

Determine the station number of each slave station, and then transfer a program corresponding to the station number to each slave station.

Assign station numbers from "1" in the ascending order. (Use one station number only once. Do not skip station numbers.)



Caution

- When using a PLC (such as an FX1s and FX3s Series PLC) with a small number of outputs, transfer information from slave stations to auxiliary relays (M), etc., and then monitor the auxiliary relays using a programming tool. (Example: Change "K1Y004" to "K1M4".)
- 2) In the circuit from step 14, specify link devices for other slave stations.

7. Creating Programs

This chapter explains how to set the N:N Network and how to create programs.

In N:N Network, pattern 0, 1 or 2 can be set according to the refresh range value. The number of used devices varies depending on the pattern.

In N:N Network using (including) the FXon or FX1s Series, only pattern 0 is applicable.

7.1 Checking Contents of Related Devices

The tables below show the devices used by the N:N Network.

1. Devices for setting the N:N Network

These devices are used for setting the N:N Network. Setting these devices is essential for using N:N Network.

Device	Name	Description	Set value
M8038	Parameter setting	This device is a flag for setting communication parameters, and is used to check for absence/presence of N:N Network program also. Do not set this device to ON in the sequence program.	
M8179	Channel setting	Set the channel of the communication port to be used (in the FX3G, FX3GC, FX3U and FX3UC). When "OUT M8179" program does not exist: ch 1 When "OUT M8179" program exists: ch 2	
D8176	Station number settings	Set the station number used in the N:N Network. Master station: 0, slave station: 1 to 7 [Initial value: 0]	0 to 7
D8177	Slave station quantity setting	Set the total number of slave stations. This setting is not required in PLCs working as slave stations. [Initial value: 7]	1 to 7
D8178	Refresh range setting	Select the desired pattern of device points used for communication. This setting is not required in PLCs working as slave stations. [Initial value: 0] Only pattern 0 is applicable when a FXon or FX1s Series is included.	0 to 2
D8179	Number of retries	When a response is not given even after communication is repeated the specified number of times, it is regarded as an error. Errors in other stations can be checked. This setting is not required in PLCs working as slave stations. [Initial value: 3]	0 to 10
D8180	Monitoring time	Set the time (50 to 2550 ms) for communication error in 10 ms units. This setting is not required in PLCs working as slave stations. [Initial value: 5]	5 to 255

2. Devices for determining errors in the N:N Network

These devices are used for determining errors in the N:N Network. Use them to output link errors to the outside and interlock sequence programs.

Different devices are used between the FX0N/FX1s Series and the FX1N/FX1NC/FX2N/FX3NC/FX3S/FX3G/FX3G/FX3U/FX3UC Series. Use devices according to the PLCs used.

	Device			
FX0N, FX1S FX1N, FX1NC, FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U, FX3UC		Name	Description	
M504	M8183	Master station data transfer sequence error	This device turns ON when a data transfer sequence error occurs in the master station.	
M505 to M511 ^{*1} M8184 to M8190 ^{*2}		Slave station data transfer sequence error	This device turns ON when a data transfer sequence error occurs in a slave station.	
M503	M8191	Data transfer sequence ON	This device remains ON while the N:N Network is operating.	

^{*1.} Station No. 1: M505, Station No. 2: M506, Station No. 3: M507... Station No. 7: M511

3. Link devices

These devices are used for sending and receiving information among the PLCs. The device numbers used and number of devices vary depending on the station number set in D8176 (station number settings) and the pattern set in D8178 (refresh range setting).

1) In the case of pattern 0

Station No.	0 (master station)	1	2	3	4	5	6	7
Word device (4 points for each station)	D0 to D3	D10 to D13	D20 to D23	D30 to D33	D40 to D43	D50 to D53	D60 to D63	D70 to D73

2) In the case of pattern 1

Station No.	0 (master station)	1	2	3	4	5	6	7
Bit devices (32 points for each station)	M1000 to M1031	M1064 to M1095	M1128 to M1159	M1192 to M1223	M1256 to M1287	M1320 to M1351	M1384 to M1415	M1448 to M1479
Word device (4 points for each station)	D0 to D3	D10 to D13	D20 to D23	D30 to D33	D40 to D43	D50 to D53	D60 to D63	D70 to D73

3) In the case of pattern 2

Station No.	0 (master station)	1	2	3	4	5	6	7
Bit devices (64 points for each station)	M1000 to M1063	M1064 to M1127	M1128 to M1191	M1192 to M1255	M1256 to M1319	M1320 to M1383	M1384 to M1447	M1448 to M1511
Word device (8 points for each station)	D0 to D7	D10 to D17	D20 to D27	D30 to D37	D40 to D47	D50 to D57	D60 to D67	D70 to D77

Caution

When creating a program, do not change the information in devices used by other stations. If such information is changed, other stations will not operate normally.

^{*2.} Station No. 1: M8184, Station No. 2: M8185, Station No. 3: M8186... Station No. 7: M8190

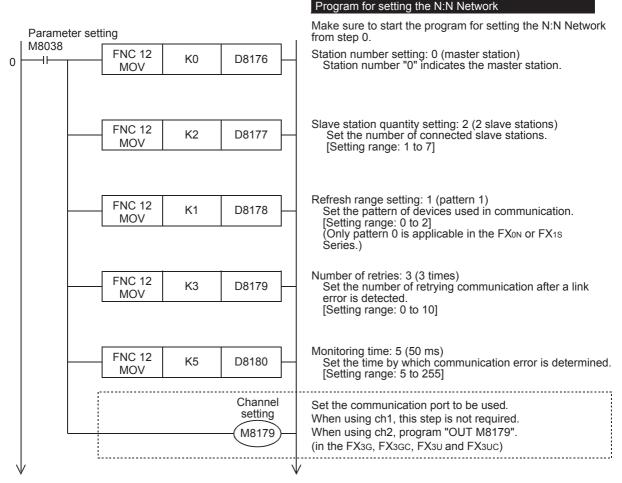
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Discontinued models

7.2 Creating Programs for Master Station (Station No. 0)

Create programs for the master station.

Arbitrarily create programs for reading and writing link devices.

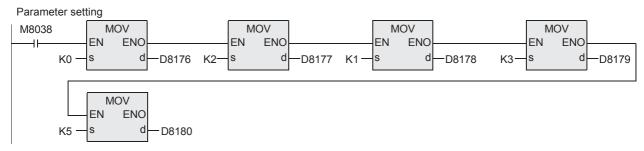


Cautions on setting up the N:N Network

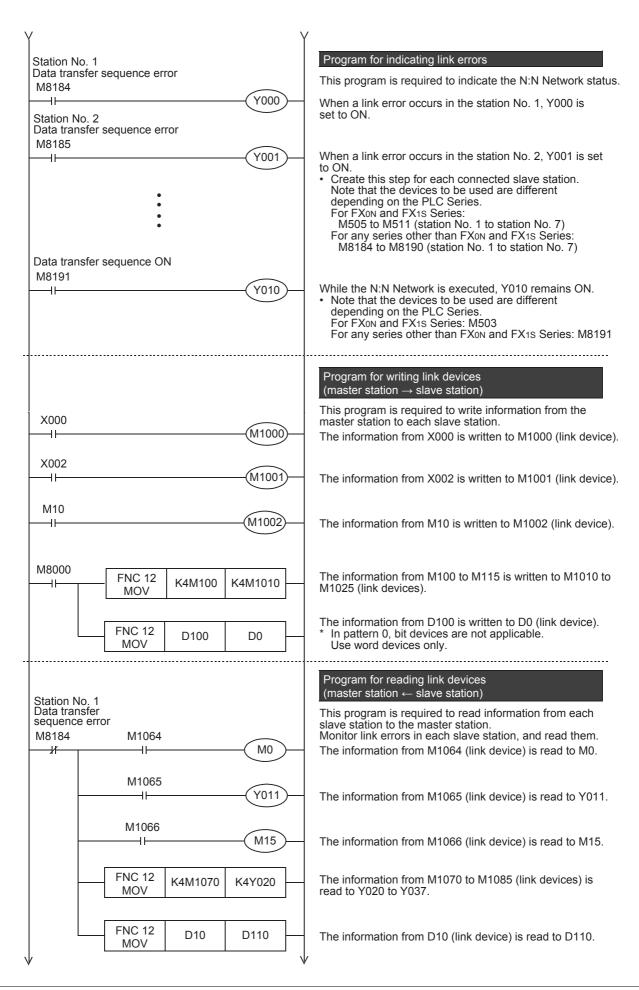
Note the following cautions when creating a program using Structured Ladder, FBD or ST programming in the FX1s, FX1n, FX1nC, FX2n or FX2nC PLC.

• When setting up the N:N Network in a program using Structured Ladder or FBD programming, connect the ENO output to the EN input for the MOV instruction.

<Program example>

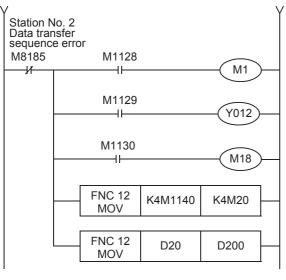


 When setting up the N:N Network in a program using ST programming, use the MOV instruction as shown in the following program example.



E

Discontinued models



The information from M1128 (link device) is read to M1.

The information from M1129 (link device) is read to Y012.

The information from M1130 (link device) is read to M18.

The information from M1140 to M1155 (link devices) is read to M20 to M35.

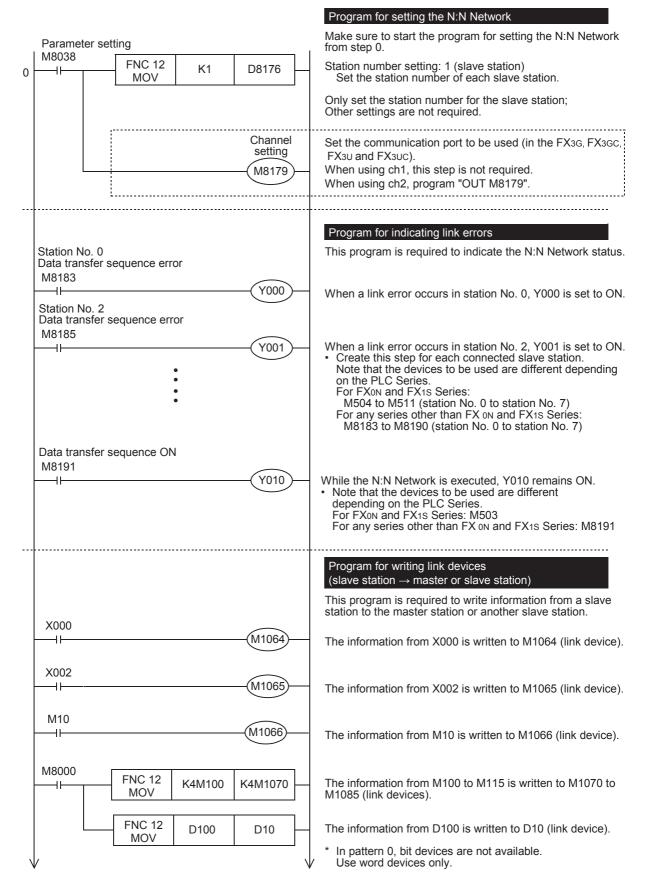
The information from D20 (link device) is read to D200.

→ For details on link devices, refer to Section 7.1. → For cautions on program creation, refer to Section 7.4.

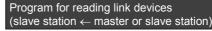
7.3 Creating Programs for Slave Station (Station No. "n")

Create programs for the slave stations.

Arbitrarily create programs for reading and writing link devices.



D



This program is required to read information from the master station or another slave station to a slave station. Monitor link errors in each slave station, and read them.

The information from M1000 (link device) is read to M0.

The information from M1001 (link device) is read to Y011.

The information from M1002 (link device) is read to M15.

The information from M1010 to M1025 (link devices) is read to Y020 to Y037.

The information from D0 (link device) is read to D110.

The information from D1128 (link device) is read to M1.

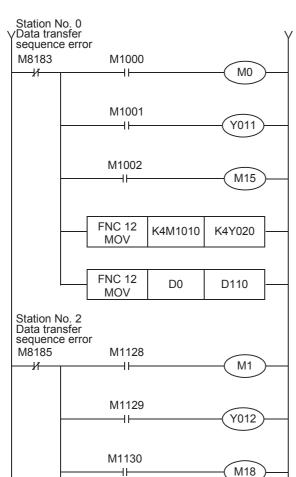
The information from D1129 (link device) is read to Y012.

The information from D1130 (link device) is read to M18.

The information from M1140 to M1155 (link devices) is read to M20 to M35.

The information from D20 (link device) is read to D200.

→ For details on link devices, refer to Section 7.1.
 → For cautions on program creation, refer to Section 7.4.



FNC 12

MOV

FNC 12

MOV

K4M1140

D20

K4M20

D200

7.4 Cautions on Program Creation

1. Effect on the operation cycle

When the N:N Network is used, the operation cycle in each PLC becomes longer by about 10% regardless of the number of linked stations and adopted communication patterns.

2. Program for setting the N:N Network

- Make sure to create a program for setting the N:N Network from step 0 using M8038 (drive contact).
 Otherwise, the N:N Network is disabled.
- 2) Do not set M8038 to ON using a program or programming tool.
- 3) Set station numbers consecutively. If a station number that is used twice or more is skipped, link will not be achieved normally.
- 4) Pay close attention when setting up the N:N Network for the master station in a program using Structured Ladder, FBD or ST programming in the FX1s, FX1N, FX1NC, FX2N or FX2NC PLC. For details, refer to Section 7.2.

3. Program for reading link devices

Do not change the contents of link devices at other stations.

 When a link error (data transfer sequence error) occurs, the link device information is held in the status just before occurrence of the link error.

Create a fail-safe program which does not cause abnormality even if a link error occurs.

4. Cautions on using FX0N/FX1S PLCs

1) Link pattern when FX0N/FX1S PLCs are used or included

When FX0N/FX1S PLCs are included in the system, make sure to set pattern 0 in D8178 (refresh range setting).

If any other pattern is set, data transfer error occurs in all FX0N/FX1S PLCs included in the system, and the link time becomes longer.

2) When user devices are occupied as system devices

In FX0N/FX1s PLCs, M503 to M511 and D201 to D255 are handled as devices dedicated to the N:N Network, and cannot be handled as general devices any more. Do not set these devices to ON or OFF using a user program, display unit or programming tool.

If these devices are set to ON or OFF, the N:N Network may malfunction.

5. Cautions on using FX3G/FX3GC/FX3U/FX3UC PLCs

- 1) Only ch 1 or ch 2 can be set in the N:N Network.
- 2) Do not use the N:N Network and parallel link at the same time. (For example, it is not allowed to use ch1 for the N:N Network and use ch2 for parallel link.)

6. Link device update timing

Link device update in N:N network is executed in the interrupt processing.

Because the interrupt processing is generated asynchronously from operations of the sequence program, it may be performed during ladder operation.

8. Practical Program Examples

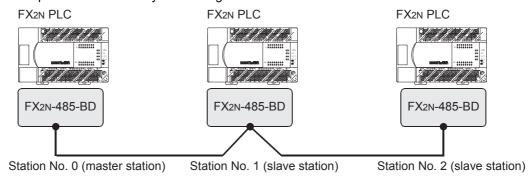
This chapter shows practical programs.

8.1 Practical Example 1 (Pattern 2)

This program example adopts pattern 2 which uses the maximum number of link devices. When an FX0N or FX1S PLC is included, however, only pattern 0 is applicable.

8.1.1 System configuration example

The example below shows a system configuration in which three FX PLCs are linked.



- Refresh range: 64-bit devices and 8 word devices (pattern 2)
- Number of retries: 5Monitoring time: 70 ms

8.1.2 Contents of operations and corresponding program numbers

The program examples shown later execute the data processing shown in the table below. The operation No. corresponds to the operation [1] (for example) indicated in the programs shown later.

Operation No.		Data source	Data change destination and contents		
Bit device li	nk				
[1]	Master station	Inputs X000 to X003	Slave station No. 1	Outputs Y010 to Y013	
ניו	waster station	(M1000 to M1003)	Slave station No. 2	Outputs Y010 to Y013	
[2]	Slave station No. 1	Inputs X000 to X003	Master station	Outputs Y014 to Y017	
[2]	Slave Station No. 1	(M1064 to M1067)	Slave station No. 2	Outputs Y014 to Y017	
[2]	Slave station No. 2	Inputs X000 to X003	Master station	Outputs Y020 to Y023	
[3]	Slave Station No. 2	(M1128 to M1131)	Slave station No. 1	Outputs Y020 to Y023	
Word device	e link				
[4]	Master station	Data register D1	Slave station No. 1	Set value of counter C1	
[+]	Slave station No. 1	Contact of counter C1 (M1070)	Master station	Output Y005	
[5]	Master station	Data register D2	Slave station No. 2	Set value of counter C2	
[0]	Slave station No. 2	Contact of counter C2 (M1140)	Master station	Output Y006	
[6]	Slave station No. 1	Data register D10	Master station	Slave station No. 1 (D10) + Slave	
[o]	Slave station No. 2	Data register D20	Master Station	station No. 2 (D20) is stored to D3.	
[7]	Master station	Data register D0	Slave station No. 1	Master station (D0) + Slave station	
[7]	Slave station No. 2	Data register D20	Slave Station No. 1	No. 2 (D20) is stored to D11.	
101	Master station	Data register D0	Slave station No. 2	Master station (D0) + Slave station	
[8]	Slave station No. 1	Data register D10	Siave Station No. 2	No. 1 (D10) is stored to D21.	

8.1.3 Setting contents

The program examples shown later adopt the following communication parameters:

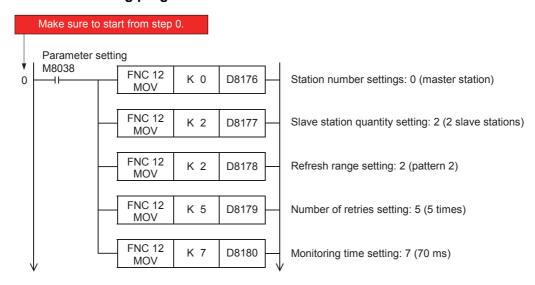
System device	Master station	Station No. 1	Station No. 2	Contents
D8176	K 0	K 1	K 2	Station number settings
D8177	K 2	_	_	Total number of slave stations: 2
D8178	K 2	_	_	Refresh range: Pattern 2
D8179	K 5	_	_	Number of retries: 5
D8180	K 7	_	_	Monitoring time: 70 ms

8.1.4 Setting program for master station

For the master station setting program, refer to the program shown below.

The program shown below consists of three blocks, "parameter setting program", "error indication program" and "operation program".

1. Parameter setting program

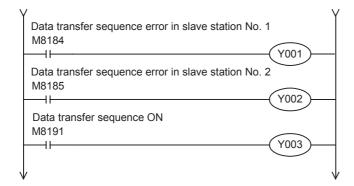


Caution

Pay close attention when setting up the N:N Network for the master station in a program using Structured Ladder, FBD or ST programming in the FX1s, FX1N, FX1NC, FX2N or FX2NC PLC. For details, refer to Section 7.2.

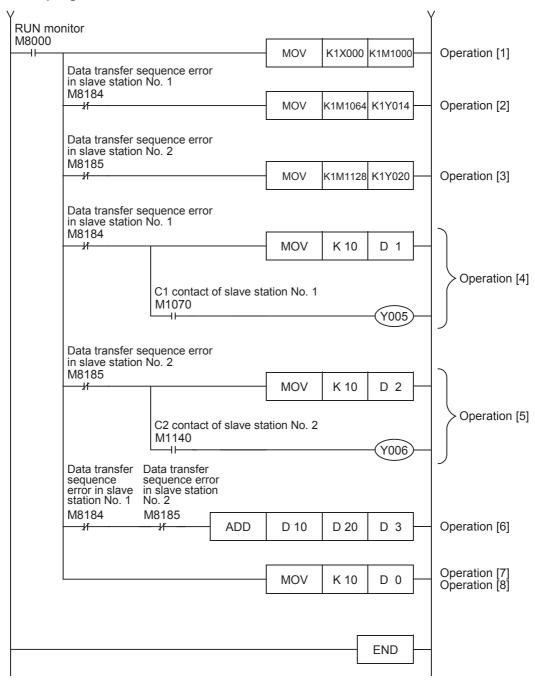
2. Error indication program

Because the master station does not recognize errors within itself (the master station), programs for errors within itself are not required.



D

3. Operation program



8.1.5 Setting program for slave station (No. 1)

For the slave station setting program, refer to the program shown below.

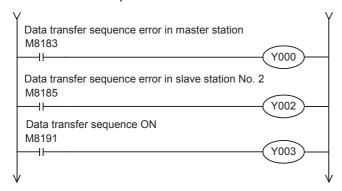
The program shown below consists of three blocks, "parameter setting program", "error indication program" and "operation program".

1. Parameter setting program



2. Error indication program

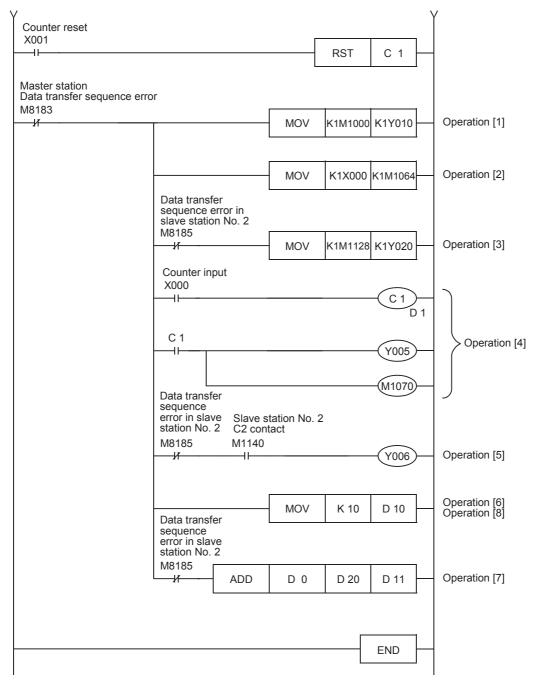
Because slave station No. 1 does not recognize errors within itself (slave station No. 1), programs for errors within itself are not required.



D

C

3. Operation program

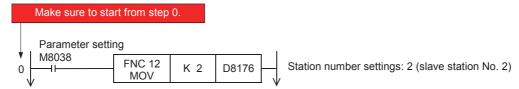


8.1.6 Setting program for slave station (No. 2)

For the slave station setting program, refer to the program shown below.

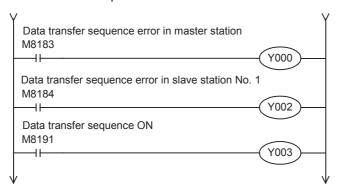
The program shown below consists of three blocks, "parameter setting program", "error indication program" and "operation program".

1. Parameter setting program

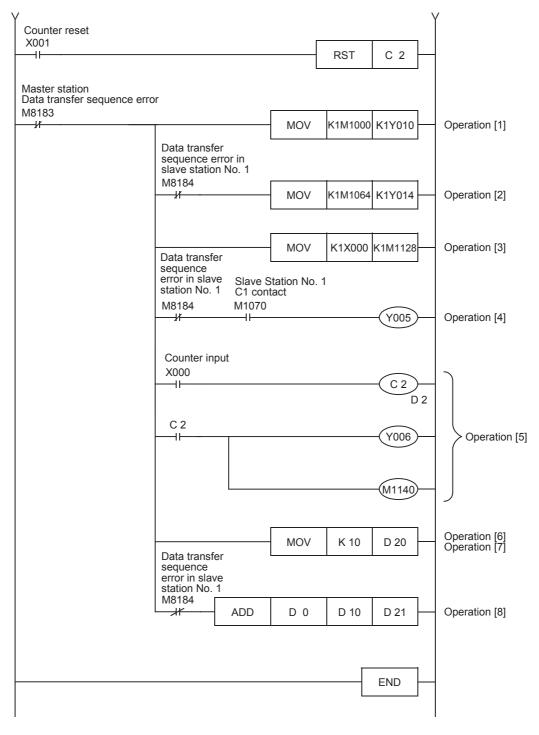


2. Error indication program

Because slave station No. 2 does not recognize errors within itself (slave station No. 2), programs for errors within itself are not required.



3. Operation program



9. Troubleshooting

This chapter explains troubleshooting.

9.1 Checking FX PLC Version Applicability

Verify that the FX Series PLC main unit is an applicable version.

→ For the version applicability check, refer to Section 1.3.

9.2 Checking Communication Status Based on LED Indication

Check the status of the "RD" and "SD" indicator LEDs provided in the optional equipment.

LED s	status	Operation status	
RD	SD		
Flashing	Flashing	Data is being sent or received.	
Flashing	Off	Data is received, but is not sent.	
Off	Flashing	Data is sent, but is not received.	
Off	Off	Data is not sent nor received.	

While the N:N Network is executed normally, both LEDs flash brightly.

If they do not flash, check the wiring and the communication setting in the master and slave stations.

9.3 Checking Installation and Wiring

1. Mounting status

If the communication equipment is not securely connected to the PLC, communication is not possible.

→ For mounting method, refer to the respective communication equipment manual.

2. Power supply (For FXon-485ADP)

The FX0N-485ADP requires a driving power supply. Verify that the power supply is correctly provided.

3. Wiring

Verify that the wiring to all communication equipment is correct. If the communication equipment is wired incorrectly, communication is not possible.

→ For wiring method check, refer to Chapter 4.

9.4 Checking Sequence Program

1. Communication setting in the sequence program

Verify that the parallel link is not set. Using both the parallel link and the N:N Network at the same time is not allowed.

Verify that the communication format (D8120, D8400 and D8420) is set correctly. Communication is not possible if a communication port is set twice or more.

After changing any setting, make sure to reboot the PLC's power.

→ For communication setting, refer to Chapter 5.

2. Communication setting using parameters

Verify that the communication settings using parameters are suitable for use. Do not set parameters for the N:N Network. If the communication settings are not suitable for use, communication will not function correctly. After changing the setting, make sure to reboot the PLC's power.

 \rightarrow For the communication setting, refer to Chapter 5.

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Discontinued models

3. Ethernet port setting (in FX3s, FX3G, FX3Gc, FX3U and FX3UC PLCs)

Verify that the same channel is not used in the Ethernet port setting. Do not set the channel used in N:N network. After changing the setting, make sure to reboot the PLC's power.

4. N:N network and MODBUS communication (in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

If N:N network and MODBUS communication are set in a same channel, N:N network is executed, but MODBUS communication is ignored.

In this case, the error "Communication port is occupied in another communication, (Error code 203)" is stored in D8402/D8422 for the corresponding channel in the PLC.

→ For details of MODBUS communication errors and error devices, refer to the FX3S/FX3G/FX3GC/ FX3U/FX3UC Series User's Manual - MODBUS Serial Communication Edition.

5. Presence of VRRD and VRSC instructions

1) Except FX3G, FX3U and FX3UC PLCs Verify that the VRRD and VRSC instructions are not used in the program. If these instructions are used, delete them, reboot the PLC's power.

2) In FX3G PLC

- In the case of the 14 points and 24-point type Verify that the VRRD and VRSC instructions are not used in the program. If these instructions are used, delete them, reboot the PLC's power.

- In the case of the 40 points and 60-point type Verify that the VRRD and VRSC instructions are not used in the program. If these instructions are used in the program, the communication function is not available in ch2. Use ch1, or delete these instructions. After deleting these instructions, reboot the PLC's power.

3) In FX3U and FX3UC PLCs

Verify that the VRRD and VRSC instructions are not used in the program. If these instructions are used in the program, the communication function is not available in ch1. Use ch2, or delete these instructions.

After deleting these instructions, reboot the PLC's power.

6. Presence of RS instruction (except FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the RS instruction is not used in the program. If this instruction is used, delete it, reboot the PLC's power.

7. Presence of RS and RS2 instructions (in FX3s, FX3G, FX3Gc, FX3U and FX3UC PLCs)

Verify that the RS and RS2 instructions are not being used for the same channel. If these instructions are used for the same channel, delete them, reboot the PLC's power.

8. Presence of EXTR instruction (in FX2N and FX2NC PLCs)

Verify that the EXTR instruction is not used in the program. If this instruction is used, delete it, then reboot the PLC's power.

9. Presence of IVCK, IVDR, IVRD, IVWR, IVBWR^{*1}, and IVMC instructions (in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the IVCK, IVDR, IVRD, IVWR, IVBWR and IVMC instructions are not being used for the same

If these instructions are used for the same channel, delete them, reboot the PLC's power.

Only available for FX3U and FX3UC PLCs.

10.Presence of ADPRW instructions (in FX3s, FX3G, FX3Gc, FX3U and FX3Uc PLCs)

Verify that the ADPRW instructions are not being used for the same channel.

If these instructions are used for the same channel, delete them, and reboot the PLC's power.

11.Presence of FLCRT, FLDEL, FLWR, FLRD, FLCMD, and FLSTRD instructions (in FX3U and FX3UC PLCs)

Verify that the FLCRT, FLDEL, FLWR, FLRD, FLCMD and FLSTRD instructions are not being used for the same channel.

If these instructions are used for the same channel, delete them, reboot the PLC's power.

9.5 Checking Setting Contents and Errors

1. Checking the setting contents

Verify that the N:N Network is set correctly.

Each FX PLC has devices for checking the setting. Verify that the correct contents are stored in the devices shown in the table below.

Device	Name	Description
D8173	Station number settings status	Provided to check the station number.
D8174	Slave station quantity setting status	Provided to check the number of slave stations.
D8175	Refresh range setting status	Provided to check the refresh range.

If the correct contents are not stored in the devices above, check the sequence program.

2. Checking setting errors

1) Error flags

If the parameter setting includes an error, the serial communication error flag turns ON. Verify that the devices shown in the table below are ON.

Device	Name	Description
M8063	Serial communication error 1 (ch 1)	Turns ON when abnormality occurs during serial communication using ch 1.
M8438	Serial communication error 2 (ch 2)	Turns ON when abnormality occurs during serial communication using ch 2.

When using the N:N Network on ch 1, check M8063.

When using the N:N Network on ch 2, check M8438.

Error codes

When the serial communication error flag turns ON, the error code is stored in the device specified in the table below.

Device	Name	Error code	Description
D8063	Serial communication error code 1 (ch 1)	6308	N:N Network parameter setting error
D0003	denal communication error code 1 (cir 1)	6309	N:N Network setting error
D8438	Serial communication error code 2 (ch 2)	3808	N:N Network parameter setting error
D0430	denai communication error code 2 (cri 2)	3809	N:N Network setting error

Caution

The serial communication error flags and serial communication error codes are not cleared even when communication is restored.

Serial communication errors are cleared in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs when the power is turned off and on.

Serial communication errors are cleared in other PLCs when the mode is switched from STOP to RUN.

9.6 Checking Absence/Presence of Data Transfer Errors

Verify that link errors have not occurred in the master station and slave stations. Link errors can be checked using the flags specified below.

9.6.1 Check while data transfer sequence is being executed

While the N:N Network is being executed, the data transfer sequence ON flag remains ON. Verify that the device specified in the table below is ON.

FX Series	Device	Name	Description
FX1N, FX1NC, FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U, FX3UC	M8191	Data transfer sequence ON flag	Remains ON while data transfer is being executed.
FX0N, FX1S	M503		

9.6.2 Checking data transfer sequence errors

When a link error occurs in the master station or slave station, the data transfer sequence error flag turns ON. The data transfer sequence error flag varies depending on the FX Series and station number. Refer to the table below.

FX Series	Master station	Slave station No. 1	Slave station No. 2	Slave station No. 3	Slave station No. 4	Slave station No. 5	Slave station No. 6	Slave station No. 7
FX1N, FX1NC, FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U, FX3UC	M8183	M8184	M8185	M8186	M8187	M8188	M8189	M8190
FX0N, FX1S	M504	M505	M506	M507	M508	M509	M510	M511

9.6.3 Checking error codes

When a data transfer sequence error occurs, the corresponding data transfer sequence error flag turns ON, and the error code is stored in the corresponding data register.

→ For error codes, refer to the next page.

1. Error storing device

The data register used to store the data transfer error code varies depending on the FX Series and station number. Refer to the table below.

FX Series	Master station	Slave station No. 1	Slave station No. 2	Slave station No. 3	Slave station No. 4	Slave station No. 5	Slave station No. 6	Slave station No. 7
FX1N, FX1NC, FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U, FX3UC	D8211	D8212	D8213	D8214	D8215	D8216	D8217	D8218
FX0N, FX1S	D211	D212	D213	D214	D215	D216	D217	D218

2. Error code list

The data register for storing the data transfer error code stores the corresponding error code. When a data transfer sequence error occurs, refer to the error code list shown below, and confirm the check points.

Error code	Error name	Station in which error occurred	Station which detected error	Contents of error	Check point
01H	Monitoring timeout	L	М	Slave station did not respond to the sending request from the master station within the monitoring time.	Wiring and power supply
02H	Station number error	L	М	An unexpected slave station responded to the sending request by the master station.	Station number settings
03H	Counter error	L	M	The counter value included in the parameter data is different from the counter value given by a slave station.	Wiring
04H	Message format error	L	M, L	The message given by the slave station is incorrect.	Wiring, power supply and station number settings
11H	Monitoring timeout	М	L	The master station did not give a sending request to the next slave station within the monitoring timer.	Wiring and power supply
14H	Message format error	М	L	The message from the master station is incorrect.	Wiring, power supply and station number settings
21H	Slave station no response error	L	L*1	The specified slave station does not exist.	Wiring, power supply and station number settings

Error code	Error name	Station in which error occurred	Station which detected error	Contents of error	Check point
22H	Station number error	L	L*1	An unexpected slave station responded to the sending request by the master station.	Station number settings
23H	Counter error	L	L*1	The counter value included in the parameter data is different from the counter value given by a slave station.	Wiring
31H	Parameter not received	L	L*2	Before parameters had been received, sending request was received from the master station.	Wiring and power supply

M: Master station, L: Slave station

^{*1.} Any slave station other than the slave station in which error occurred

^{*2.} Station in which error occurred

MEMO

10. Related Data

10.1 Related Device List

10.1.1 For FX1N, FX1NC, FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs

1. Bit devices

Device number	Name	Description	Initial value	Detec- tion	R/W	
Devices for co	ommunication setting					
M8038	Parameter setting	Communication parameter setting flag	_	M, L	R	_
M8179	Channel setting	Sets the communication port channel to be used (in the FX3G, FX3GC, FX3U and FX3UC).	_	M, L	R/W	
Devices for cl	necking communicatio	n status				
M8063	Serial communication error 1 (ch 1)	Turns ON when abnormality occurs in serial communication using ch 1.	_	M, L	R	
M8438	Serial communication error 2 (ch 2)	Turns ON when abnormality occurs in serial communication using ch 2 (in the FX3G, FX3GC, FX3U and FX3UC).	_	M, L	R	
M8183	Data transfer sequence error	Turns ON when a data transfer sequence error occurs in the master station.	_	L	R	
M8184 to M8190	Data transfer sequence error	Turns ON when a data transfer sequence error occurs in a slave station. However, data transfer sequence errors within the slave station itself cannot be detected.	_	M, L	R	
M8191	Data transfer sequence ON	Remains ON while data transfer is being executed.	_	M, L	R	

R : Read only (used as a contact in program)

R/W: Read or Write

M : Master station (station No. 0)L : Slave station (station No. 1 to 7)

Master station	Slave station No. 1	Slave station No. 2	Slave station No. 3	Slave station No. 4	Slave station No. 5	Slave station No. 6	Slave station No. 7
✓	✓	✓	✓	✓	✓	✓	✓
✓	√	√	√	✓	✓	✓	✓
✓	✓	✓	✓	✓	✓	✓	✓
√	√	√	√	√	√	√	✓
_	~	√	✓	√	√	√	✓
√	M8184	M8185	M8186	M8187	M8188	M8189	M8190
✓	✓	✓	√	√	√	√	√

2. Word devices (data registers)

Device number	Name	Description	Initial value	Detec- tion	R/W	
Devices for	checking					
D8173	Corresponding station number settings status	Provided to check the station number.	_	M, L	R	
D8174	Slave station quantity setting status	Provided to check the number of slave stations.	_	M, L	R	
D8175	Refresh range setting status	Provided to check the refresh range.	_	M, L	R	
D8063	Serial communication error code 1 (ch 1)	Stores the serial communication error code for ch 1.	_	M, L	R	
D8419	Operation mode display (ch 1)	Stores the communication type being used by ch 1. (in the FX3s, FX3G, FX3GC, FX3U and FX3UC)	_	M, L	R	
D8438	Serial communication error code 2 (ch 2)	Stores the serial communication error code for ch 2. (in the FX3G, FX3GC, FX3U and FX3UC)	_	M, L	R	
D8439	Operation mode display (ch 2)	Stores the communication type being used by ch 2. (in the FX3G, FX3GC, FX3U and FX3UC)	_	M, L	R	
Devices for	communication setting					
D8176	Corresponding station number settings	Provided to set the station number.	0	M, L	R/W	
D8177	Slave station quantity setting	Provided to set the number of slave stations used in communication.	7	М	R/W	
D8178	Refresh range setting	Provided to set the refresh range.	0	М	R/W	
D8179	Number of retries	Provided to set the number of retry times.	3	М	R/W	
D8180	Monitoring time	Provided to set the no-response monitoring time.	5	М	R/W	
Devices for	checking communication	n status				
D8201	Present link scan time	Current value of the network cycle time	_	М	R	
D8202	Maximum link scan time	Maximum value of the network cycle time	_	М	R	
D8203	Data transfer sequence error count	Amount of data sequence errors that occurred in the master station	_	L	R	
D8204 to D8210	Data transfer sequence error count	Amount of data sequence errors that occurred in a slave station. However, data sequence errors occurring within the slave station itself cannot be counted.		M, L	R	
D8211	Data transmission error code	Stores the error code for the master station.	_	L	R	
D8212 to D8218	Data transmission error code	Stores the error code for a slave station. However, data sequence errors occurring within the slave station itself cannot be counted.	_	M, L	R	

R : Read only R/W : Read or Write

M : Master station (station No. 0)L : Slave station (station No. 1 to 7)

Master station	Slave station No. 1	Slave station No. 2	Slave station No. 3	Slave station No. 4	Slave station No. 5	Slave station No. 6	Slave station No. 7
	,						
✓	✓	√	√	✓	√	√	✓
√	✓	√	√	✓	√	√	✓
✓	√						
✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓	√	✓	✓	√	✓
✓	✓	✓	√	✓	✓	√	✓
✓	✓	✓	√	√	√	√	√
✓	✓	✓	✓	√	✓	✓	√
✓	_	_	_	_	_	_	_
√	_	_	_	_	_	_	_
√	_	_	_	_	_	_	_
✓	_	_	_	_	_	_	_
✓	_	_	_	_	_	_	_
✓	_	_	_		_	_	
_	✓	✓	✓	✓	✓	✓	✓
✓	D8204	D8205	D8206	D8207	D8208	D8209	D8210
✓	_	_	_	_	_	_	_
√	D8212	D8213	D8214	D8215	D8216	D8217	D8218

10.1.2 For FXon and FX1s PLCs

1. Bit devices

Device number	Name	Description	Initial value	Detec- tion	R/W	
Devices for co	mmunication setting					
M8038	Parameter setting	Communication parameter setting flag	_	M, L	R	
Devices for ch	ecking communication statu					
M504	Data transfer sequence error	Turns ON when a data transfer sequence error occurs in the master station.		L	R	
M505 to M511	Data transfer sequence error	Turns ON when a data transfer sequence error occurs in a slave station. However, data transfer sequence errors within the slave station itself cannot be detected.	_	M, L	R	
M503	Data transfer sequence ON	Remains ON while data transfer is being executed.		M, L	R	

R: Read only (used as a contact in program)

2. Word devices (data registers)

Device number	Name	Description	Initial value	Detec- tion	R/W	
Devices for ch	ecking					
D8173	Corresponding station number settings status	Provided to check the station number.	_	M, L	R	
D8174	Slave station quantity setting status	Provided to check the number of slave stations.	_	M, L	R	
D8175	Refresh range setting status	Provided to check the refresh range.	_	M, L	R	
Devices for co	mmunication setting					
D8176	Corresponding station number settings	Provided to set the station number.	0	M, L	R/W	
D8177	Slave station quantity setting	Provided to set the number of slave stations used in communication.	7	М	R/W	
D8178	Refresh range setting	Provided to set the refresh range.	0	М	R/W	
D8179	Number of retries	Provided to set the number of retries.	3	М	R/W	
D8180	Monitoring time	Provided to set the no-response monitoring time.	5	М	R/W	
Devices for ch	ecking communication statu	s				
D201	Present link scan time	Stores the current value of the network cycle time.	_	М	R	
D202	Maximum link scan time	Stores the maximum value of the network cycle time.	_	М	R	
D203	Data transfer sequence error count	Stores the amount of data sequence errors that occurred in the master station.	_	L	R	
D204 to D210	Data transfer sequence error count	Amount of data sequence errors that occurred in a slave station. However, data sequence errors that occurred within the slave station itself cannot be counted.		M, L	R	
D211	Data transmission error code	Stores the error code for the master station.		L	R	
D212 to D218	Data transmission error code	Stores the error code for a slave station. However, data sequence errors that occurred within the slave station itself cannot be counted.	_	M, L	R	
D219 to D255	Not applicable	Provided for the internal processing.	_	_	_	

R: Read only R/W: Read or Write

M: Master station (station No. 0) L: Slave station (station No. 1 to 7)

M: Master station (station No. 0) L: Slave station (station No. 1 to 7)

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D

Master station	Slave station No. 1	Slave station No. 2	Slave station No. 3	Slave station No. 4	Slave station No. 5	Slave station No. 6	Slave station No. 7
✓	✓	✓	✓	✓	✓	✓	✓
	<u> </u>						
_	√	✓	✓	✓	✓	✓	✓
√	M505	M506	M507	M508	M509	M510	M511
√	√	✓	✓	√	√	✓	✓

Master station	Slave station No. 1	Slave station No. 2	Slave station No. 3	Slave station No. 4	Slave station No. 5	Slave station No. 6	Slave station No. 7
✓	✓	√	✓	√	√	✓	√
✓	√	✓	✓	✓	✓	✓	√
✓	✓	✓	✓	✓	✓	✓	√
✓	√	✓	✓	✓	✓	✓	✓
✓	_	_	_	_	_	_	_
 ✓	_	_	_	_	_	_	_
✓	_	_		_	_		_
✓	_	_	_	_	_	_	_
✓	_	_	_	_	_	_	_
✓	_	_	_	_	_	_	_
 _	✓	✓	✓	✓	✓	✓	✓
√	D204	D205	D206	D207	D208	D209	D210
 √	_	_		_	_	_	_
√	D212	D213	D214	D215	D216	D217	D218
_	_	_	_	_	_	_	_

10.2 Details of Related Devices

The devices described below are used in the N:N Network.

10.2.1 Parameter setting [M8038]

This device works as the communication parameter setting flag.

1. Stations requiring program setting

Setting is required for the master station and slave stations.

2. Detailed contents

"LD M8038" provided in step 0 starts the parameter setting, and the last instruction in this circuit block finishes the setting.

(This sequence program is not executed in every scan cycle.)

3. Cautions on use

Do not set this device to ON using a program or programming tool.

10.2.2 Channel setting [M8179]

This device works as the channel setting flag (in the FX3G, FX3GC, FX3U and FX3UC).

1. Stations requiring program setting

Setting is required for the master station and slave stations.

2. Detailed contents

When using ch 2 as the communication port, set this device to ON in the sequence program.

When using ch 1, the sequence program is not required.

10.2.3 Serial communication error [M8063 and M8438]

These devices turn ON when an error is included in the parameters used to set the N:N Network. (M8438 is available in the FX3G, FX3GC, FX3U and FX3UC.)

1. Stations requiring program setting

Setting is required for the master station and slave stations to check the communication status.

2. Detailed contents

M8063 turns ON when an error is included in the parameters used to set N:N Network using ch 1.

M8438 turns ON when an error is included in the parameters used to set N:N Network using ch 2.

3. Cautions on use

Do not set these devices to ON using a program or programming tool.

Serial communication errors are not cleared even when communication is restored.

Serial communication errors are cleared in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs when the power is turned off and on.

Serial communication errors are cleared in other PLCs when the mode is switched from STOP to RUN.

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Data transfer sequence error [M8138 to M8190] [M504 to M511]

These devices turn ON when a data transfer sequence error occurs in the master station or a slave station.

1. Stations requiring program setting

Setting is required for the master station and slave stations. However, setting for the station itself is not required.

2. Detailed contents

A used device varies depending on the FX Series.

FX Series	Master station	Slave station No. 1	Slave station No. 2	Slave station No. 3	Slave station No. 4	Slave station No. 5	Slave station No. 6	Slave station No. 7
FX1N, FX1NC, FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U, FX3UC	M8183	M8184	M8185	M8186	M8187	M8188	M8189	M8190
FX0N, FX1S	M504	M505	M506	M507	M508	M509	M510	M511

3. Cautions on use

Data transfer sequence errors in a station itself cannot be detected.

Do not set these devices to ON using a program or programming tool.

10.2.5 Data transfer sequence ON [M8191] [M503]

This device remains ON while data transfer is being from or to in the master station or slave station.

1. Stations requiring program setting

Setting is required for the master station and slave stations.

2. Detailed contents

The device used varies depending on the FX Series.

FX Series	Data transfer sequence ON
FX1N, FX1NC, FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U, FX3UC	M8191
FX0N, FX1S	M503

3. Cautions on use

Do not set this device to ON using a program or programming tool.

10.2.6 Serial communication error code [D8063 and D8438]

These devices store the serial communication error code (D8438 is available in the FX3G, FX3GC, FX3U and FX3UC).

1. Stations requiring program setting

Setting is required for the master station and slave stations to check the error code.

2. Detailed contents

The following error code is stored when a serial communication error occurs.

Error	code	
ch1	ch2	Description
D8063	D8438	
6308	3808	N:N Network parameter setting error
6309	3809	N:N Network setting error

3. Cautions on use

Serial communication errors are not cleared even after communication has recovered its normal status. Serial communication errors are cleared in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs when the power is turned off and on.

Serial communication errors are cleared in other PLCs when the mode is switched from STOP to RUN.

10.2.7 Corresponding station number settings status [D8173]

This device is used to check the station's own station number settings status.

1. Stations requiring program setting

Setting is required for the master station and slave stations to check the setting status.

2. Detailed contents

The contents stored in the corresponding station number settings device D8176 are stored in D8173.

3. Cautions on use

Do not change the preset numeric value using a program or programming tool.

10.2.8 Slave station quantity setting status [D8174]

Use this device to check the number of slave stations set in the master station.

1. Stations requiring program setting

Setting is required for the master station and slave stations to check the setting status.

2. Detailed contents

The contents stored in the slave station quantity setting device D8177 in the master station are stored in D8174.

3. Cautions on use

Do not change a preset numeric value using a program or programming tool.

10.2.9 Refresh range setting status [D8175]

Use this device to check the refresh range set in the master station.

1. Stations requiring program setting

Setting is required for the master station and slave stations to check the setting status.

2. Detailed contents

The contents stored in the refresh range setting device D8178 in the master station are stored in D8175.

3. Cautions on use

Do not change a preset numeric value using a program or programming tool.

10.2.10 Station number settings [D8176]

Set a value ranging from 0 to 7 to the special data register D8176 (initial value: 0).

1. Stations requiring program setting

The master and slave stations require program setting.

2. Detailed contents

Set value	Description				
0	Master station				
1 t∩ 7	Slave station number Examples: "1" → Station No. 1, "5" → Station No. 5				

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10.2.11 Slave station quantity setting [D8177]

Set a value ranging from 1 to 7 to the special data register D8177 (initial value: 7).

1. Stations requiring program setting

The master station requires program setting, and slave stations do not require program setting.

2. Detailed contents

Set value	lue Description			
0	Not applicable			
1	One slave station is connected.			
2 Two slave stations are connected				
3 Three slave stations are connected				

Set value Description			
4	Four slave stations are connected.		
5	Five slave stations are connected.		
6	Six slave stations are connected.		
7	Seven slave stations are connected.		

10.2.12 Refresh range setting [D8178]

Set a value ranging from 0 to 2 to the special data register D8178 (initial value: 0).

1. Stations requiring program setting

The master station requires program setting, and slave stations do not require program setting.

2. Pattern applicability in FX PLC

FX Series	Pattern (set value)					
FA Series —	Pattern 0 (0)	Pattern 1 (1)	Pattern 2 (2)			
FX0N PLC	✓	Not applicable	Not applicable			
FX1s PLC	✓	Not applicable	Not applicable			
FX1N, FX1NC PLC	√	✓	✓			
FX2N, FX2NC PLC	✓	✓	✓			
FX3S PLC	√	✓	✓			
FX3G, FX3GC PLC	✓	✓	✓			
FX3U, FX3UC PLC	✓	✓	✓			

3. Number and assignment of link devices

The number of link devices varies depending on the selected pattern, but the head device number remains the same

It is recommended to leave unused numbers in the unused status to enable pattern change in the future.

	Pattern 0		Patterr	n 1	Pattern 2		
Station No.	Bit device (M)	Word device (D)	Bit device (M)	Word device (D)	Bit device (M)	Word device (D)	
	0	4 in each station	32 in each station	4 in each station	64 in each station	8 in each station	
0	_	D 0 to D 3	M1000 to M1031	D 0 to D 3	M1000 to M1063	D 0 to D 7	
1	_	D10 to D13	M1064 to M1095	D10 to D13	M1064 to M1127	D10 to D17	
2	-	D20 to D23	M1128 to M1159	D20 to D23	M1128 to M1191	D20 to D27	
3	_	D30 to D33	M1192 to M1223	D30 to D33	M1192 to M1255	D30 to D37	
4	_	D40 to D43	M1256 to M1287	D40 to D43	M1256 to M1319	D40 to D47	
5	_	D50 to D53	M1320 to M1351	D50 to D53	M1320 to M1383	D50 to D57	
6	-	D60 to D63	M1384 to M1415	D60 to D63	M1384 to M1447	D60 to D67	
7		D70 to D73	M1448 to M1479	D70 to D73	M1448 to M1511	D70 to D77	

4. Cautions on use

1) Cautions on using FXoN and FX1s PLCs

When FX0N and/or FX1s PLCs are included in the system, make sure to set the refresh range to pattern 0

If any other pattern is selected, data transfer error will occur in all FX0N and FX1s PLCs included in the system, and the link time will become longer.

2) Occupied devices

The devices used in each pattern are occupied for the N:N Network in all stations.

Make sure that such devices are not used in general programs.

10.2.13 Number of retries [D8179]

Set a value ranging from 0 to 10 to the special data register D8179 (initial value: 3).

1. Stations requiring program setting

The master station requires program setting, and slave stations do not require program setting.

2. Detailed contents

When any response is not given after the specified number of retries, the irresponsive station is regarded as having a data transfer sequence error by other stations.

10.2.14 Monitoring time setting [D8180]

Set a vale ranging from 5 to 255 to the special data register D8180 in "10 ms" units (initial value: 5 [50 ms]).

1. Stations requiring program setting

The master station requires program setting, and slave stations do not require program setting.

2. Detailed contents

If data transfer between the master station and a slave station requires time longer than the monitoring time set here, the master station or slave station is regarded as abnormal.

10.2.15 Present link scan time [D8201] [D201]

This device stores the current value of the network cycle in the N:N Network (unit: 10 ms).

1. Stations requiring program setting

The master station requires program setting.

2. Detailed contents

The device used varies depending on the FX Series.

FX Series	Data transfer sequence ON
FX1N, FX1NC, FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U, FX3UC	D8201
FX0N, FX1S	D201

3. Cautions on use

Do not change the preset numeric value using a program or programming tool.

10.2.16 Maximum link scan time [D8202] [D202]

This device stores the maximum value of the network cycle in the N:N Network (unit: 10 ms).

1. Stations requiring program setting

The master station requires program setting.

2. Detailed contents

The device used varies depending on the FX Series.

FX Series	Data transfer sequence ON
FX1N, FX1NC, FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U, FX3UC	D8202
FX0N, FX1S	D202

3. Cautions on use

Do not change the preset numeric value using a program or programming tool.

10.2.17 Data transfer sequence error count [D8203 to D8210] [D203 to D210]

These devices store the amount of data transfer sequence errors that occurred in the master station and slave stations.

1. Stations requiring program setting

The master and slave stations require program setting. However, setting for the station itself is not required.

2. Detailed contents

The device used varies depending on the FX Series.

FX Series	Master station	Slave station No. 1	Slave station No. 2	Slave station No. 3	Slave station No. 4	Slave station No. 5	Slave station No. 6	Slave station No. 7
FX1N, FX1NC, FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U, FX3UC	D8203	D8204	D8205	D8206	D8207	D8208	D8209	D8210
FX0N, FX1S	D203	D204	D205	D206	D207	D208	D209	D210

3. Cautions on use

Data transfer sequence errors that occurred within the station itself cannot be detected. Do not change a preset numeric value using the program or programming tool.

10.2.18 Data transfer error code [D8211 to D8218] [D211 to D218]

These devices store the error code in the master station and slave stations.

1. Stations requiring program setting

The master station requires program setting. However, this setting for the station itself is not required.

2. Detailed contents

1) The device used varies depending on the FX Series.

FX Series	Master station	Slave station No. 1	Slave station No. 2	Slave station No. 3	Slave station No. 4	Slave station No. 5	Slave station No. 6	Slave station No. 7
FX1N, FX1NC, FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U, FX3UC	D8211	D8212	D8213	D8214	D8215	D8216	D8217	D8218
FX0N, FX1S	D211	D212	D213	D214	D215	D216	D217	D218

2) Error code list

Error code	Error name	Station in which error occurred	Station which detected error	Contents of error	Check point
01H	Monitoring timeout	L	М	Slave station did not respond to the sending request from the master station within the monitoring time.	Wiring and power supply
02H	Station number error	L	М	An unexpected slave station responded to the sending request by the master station.	Station number settings
03H	Counter error	L	М	The counter value included in the parameter data is different from the counter value given by a slave station.	Wiring
04H	Message format error	L	M, L	The message given by the slave station is incorrect.	Wiring, power supply and station number settings
11H	Monitoring timeout	М	L	The master station did not give a sending request to the next slave station within the monitoring timer.	Wiring and power supply
14H	Message format error	М	L	The message from the master station is incorrect.	Wiring, power supply and station number settings
21H	Slave station no response error	L	L*1	The specified slave station does not exist.	Wiring, power supply and station number settings
22H	Station number error	L	L*1	An unexpected slave station responded to the sending request by the master station.	Station number settings
23H	Counter error	L	L*1	The counter value included in the parameter data is different from the counter value given by a slave station.	Wiring
31H	Parameter not received	L	L*2	Before parameters had been received, sending request was received from the master station.	Wiring and power supply

M: Master station, L: Slave station

3. Cautions on use

Data transfer sequence errors that occurred within the station itself cannot be detected. Do not change the preset numeric value using a program or programming tool.

^{*1.} Any slave station other than the slave station in which error occurred

^{*2.} Station in which error occurred

10.2.19 Operation mode display [D8419 and D8439]

These devices store the communication type being used. (in the FX3S, FX3G, FX3GC, FX3U and FX3UC)

1. Detailed contents

These devices store the code of the communication type currently being used in the communication port. When communication port ch1 is used, D8419 stores the communication type. When communication port ch2 is used, D8439 stores the communication type.

The table below shows the contents of the communication type codes.

Code	Description
0	Programming communication
1	PP modem mode
2	Protocol dedicated to computer link
3	N:N Network
4	RS instruction
5	RS2 instruction
6	Parallel link
7	Inverter instruction
8	Variable analog potentiometer expansion board is used.
9	MODBUS communication
10	CF-ADP
11	ENET-ADP
12	Input/output expansion board is used.
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Parallel Link

FX Series Programmable Controllers User's Manual [Data Communication Edition]

C. Parallel Link

Foreword

This manual explains "parallel link" provided for the MELSEC-F FX Series Programmable Controllers and should be read and understood before attempting to install or use the unit.

Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

This manual confers no industrial property rights or any rights of any other kind, nor does it confer any patent licenses. Mitsubishi Electric Corporation cannot be held responsible for any problems involving industrial property rights which may occur as a result of using the contents noted in this manual.

Parallel

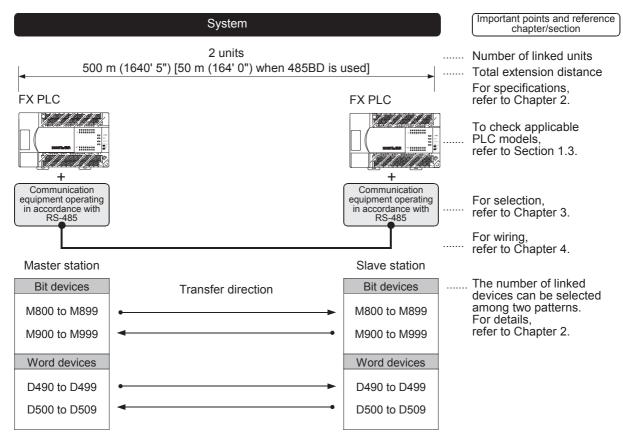
1. Outline

This chapter explains the parallel link.

1.1 Outline of System

The parallel link allows connection between two FX PLCs of the same series to mutually link devices.

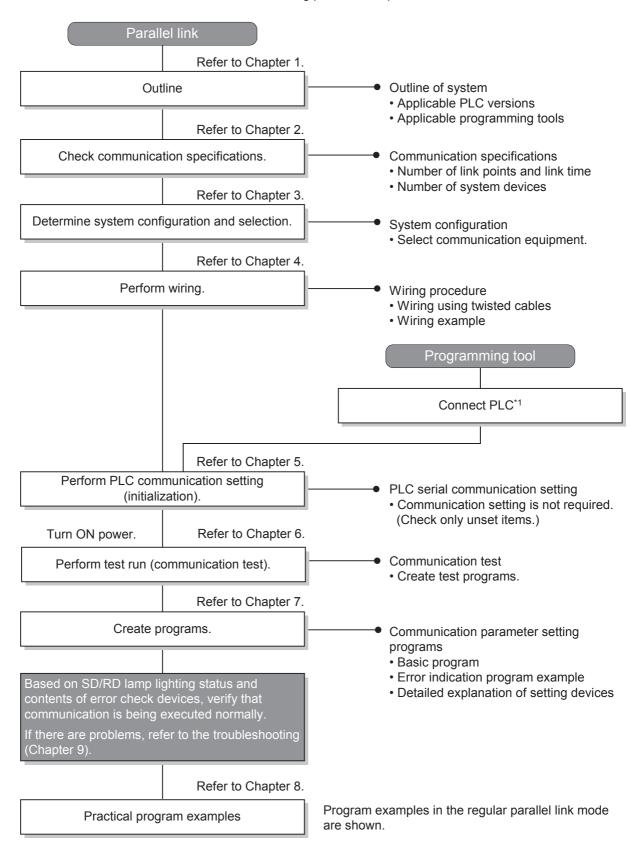
- 1) According to the number of devices to be linked, either pattern can be selected between the regular mode and the high speed mode.
- 2) Data link is automatically updated between up to two FX PLCs.
- 3) The total extension distance is 500 m (1640' 5") maximum (when only the 485ADPs are used except, when the 485BDs are used with FX2(FX)/FX2c PLCs).



The figure above shows the maximum number of linked devices. There are differences in the specifications and limitation depending on the selected link pattern and FX Series.

1.2 Procedures Before Operation

The flow chart below shows the Parallel Link setting procedures up until data link:



^{*1} For the programming tool to PLC connection procedure, refer to the "Programming Communication" section in this manual or the respective programming tool manual.

For details on operating procedures, refer to the respective programming tool manual.

Communication Type Applicability in PLC 1.3

1.3.1 **Applicable versions**

The communication types are applicable in the following versions.

- √ : Applicable (If applicable versions of main units are limited, they are described inside ().)
- -: Not applicable

PLC	Applicability (applicable version)	Remarks
FX3UC Series	✓	
FX3U Series	✓	
FX3GC Series	✓	
FX3G Series	✓	
FX3S Series	✓	The link device range is limited.
FX2NC Series	✓	
FX2N Series	✓ (Ver. 1.04 or later)	
FX1NC Series	✓	
FX1N Series	✓	
FX1S Series	✓	The link device range is limited.
FXon Series	√ (Ver. 1.20 or later)	The link device range is limited.
FXos Series	_	Parallel link is not provided.
FX ₀ Series	_	Parallel link is not provided.
FX2C Series	√	The high-speed link mode is supported in Ver. 3.07 and later.
FX2(FX) Series	✓	The high-speed link mode is supported in Ver. 3.07 and later.
FX1 Series	_	Parallel link is not provided.

1.3.2 Version check

The PLC version can be checked by reading the last three digits of device D8001.

→ For a detailed description of the version check, refer to A. Common Items Section 4.2.

1.3.3 Products whose production was stopped

Production was stopped for some models of MELSEC-F Series PLCs and programming tools described in this manual. For models whose production was stopped, refer to Appendix A.

To see the latest available products, refer to the general catalog.

1.4 Programming Tool Applicability

1.4.1 For applicable versions

The programming tool is applicable of main units for each FX Series from the following version:

1. English versions

FX30 and FX30 PLCs SWIDNC-GXW2-E Ver. 1.08J or later	Product name	Model name	Applicable version	Remarks	
GX Developer SW□D5C(F)-GPPW-E Ver. 8.18U or later FX-30P Ver. 1.00 or later Ver. 1.00 or later Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX36 PLC GX Works2 SW□DNC-GXW2-E Ver. 1.08 or later FX-30P Ver. 1.00 or later FX-30P Ver. 1.00 or later FX-30P Ver. 1.00 or later FX-30P Ver. 1.30 or later FX-30P Ver. 1.50 or later FX-30P Ver. 1.00 or later FX-30P Ver. 1.00 or later FX-30P Ver. 1.00 or later FX-20P-MEVC-E Ver. 1.00 or later FX-30P Ver. 3.00 or later	FX3U and FX3UC P	LCs			
FX-30P	GX Works2		Ver. 1.08J or later		
Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX36 PLC GX Works2 SW□DNC-GXW2-E GX Developer SW□D5C(F)-GPPW-E FX.30P GOT1000 Series display units FX36 PLC GX Works2 SW□DNC-GXW2-E GX Works2 SW□DNC-GXW2-E GX Works2 SW□DNC-GXW2-E FX.30P GOT1000 Series display units FX58 PLC GX Works2 SW□DNC-GXW2-E GX Works2 SW□DNC-GXW2-E GX Works2 SW□DNC-GXW2-E FX.30P FX30P GOT1000 Series display units FX58 PLC GX Works2 SW□DNC-GXW2-E GX Works2 SW□DNC-GXW2-E FX.30P GOT1000 Series display units FX58 PLC GX Works2 SW□DNC-GXW2-E GX Works2 SW□DNC-GXW2-E GX Works2 SW□DNC-GXW2-E FX.30P GOT1000 Series display units FX58 PLC GX Works2 SW□DNC-GXW2-E GY Developer SW□D5C(F)-GPPW-E GX Works2 SW□DNC-GXW2-E GY Developer SW□D5C(F)-GPPW-E FX-30P Ver. 1.08 or later FX-20P-E(SET0) FX-20P-MFXC-E FX-10P-E Ver. 3.00 or later F940GOT-WD-E F940GOT-WD-E F940GOT-WD-E F940GOT-WD-E F940GOT-WD-E F940GOT-BD-H-E F940GOT-BD-H-E F940GOT-BD-H-E F940GOT-BD-H-E F940GOT-BD-H-E F940GOT-BD-H-E F940GOT-BD-H-E F940GOT-BD-R-E F940GOT-	GX Developer	SW□D5C(F)-GPPW-E	Ver. 8.18U or later	-	
Models and versions supporting the list editor function.	FX-30P	<u> </u>	Ver. 1.00 or later		
GX Works2 SW□DNC-GXW2-E GX Developer SW□D5C(F)-GPPW-E FX-30P GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX3cc PLC GX Works2 SW□DNC-GXW2-E GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX3cc PLC GX Works2 SW□DNC-GXW2-E GX Works2 SW□DNC-GXW2-E FX-30P Ver. 1.30 or later FX-30P Ver. 1.492N or later FX-30P GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX3 pLC GX Works2 SW□DNC-GXW2-E GX Works2 SW□DNC-GXW2-E GX Developer SW□D5C(F)-GPPW-E FX-PCS-WIN-E FX-PCS-WIN-E FX-20P-E(-SET0) FX-20P-E(-SET0) FX-20P-E(-SET0) FX-20P-MFXC-E FX-10P-E FY-10P-E GOT-F900 Series display units F940WGOT-TWD-E F940GOT-BD-H-E F940GOT-BD-RH-E F940GOT-B	GOT1000 Series di	isplay units			
GX Developer SW□D5C(F)-GPPW-E Ver. 8.72A or later Ver. 1.00 or later Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX3cP LC GX Works2 SW□DNC-GXW2-E Ver. 1.30 or later FX.30P Ver. 1.30 or later Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX3 PLC GX Works2 SW□DNC-GXW2-E Ver. 1.492N or later FX.30P Ver. 1.50 or later FX.30P Ver. 1.50 or later FX.30 P Ver. 1.50 or later FX.30P SW□DNC-GXW2-E Ver. 1.03 or later FX.30P Ver. 1.00 or later FX.30P SW□D5C(F)-GPPW-E SW2 A or later FX.30P SW□D5C(F)-GPPW-E SW2 A or later FX.30P Ver. 1.00 or later FX.20P-E(-SET0) FX.20P-MFXC-E Ver. 3.00 or later FX.20P-E(-SET0) FX.20P-MFXC-E FX.30P Ver. 3.00 or later FX.40P-E Ver. 3.00 or later FX.40P-E Ver. 3.00 or later FX.40P-E FX.4	FX3G PLC				
Ver. 1.00 or later	GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later		
Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX3cc PLC GX Works2 SWIDNC-GXW2-E Ver. 1.77F or later FX-30P Ver. 1.30 or later GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX3s PLC GX Works2 SWIDNC-GXW2-E Ver. 1.492N or later FX-30P Ver. 1.50 or later GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX2N and FX2NC PLCS GX Works2 SWIDNC-GXW2-E Ver. 1.08J or later GX Developer SWIDDC-GXW2-E Ver. 1.08J or later FX-20P MFX-CE SW2 A or later FX-20P-E(-SET0) Ver. 1.00 or later FX-20P-E(-SET0) Ver. 3.00 or later FX-20P-E(-SET0) Ver. 3.00 or later F940GOT-WD-E F940GOT-WD-E F940GOT-SBD-H-E (Ver. 1.00 or later) F940GOT-BD-H-E F940GOT-BD-H-E F940GOT-SBD-H-E (Ver. 1.00 or later) F940GOT-BD-H-E (Ver. 1.00 or later) F940GOT-BD-H-E F940GOT-BD-H-E F940GOT-BD-H-E (Ver. 1.00 or later) F940GOT-BD-H-E F940GOT-BD-H-E F940GOT-BD-H-E (Ver. 1.00 or later) F940GOT-BD-H-E F940GOT-BD-H-E (Ver. 1.00 or later) F940GOT-BD-H-		SW□D5C(F)-GPPW-E	Ver. 8.72A or later	-	
### Models and versions supporting the list editor function. #### FX30P GOT1000 Series display units #### Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. ###################################	FX-30P		Ver. 1.00 or later		
SX Works2 SW□DNC-GXW2-E Ver. 1.30 or later Ver. 1.30 or later SX-30P Ver. 1.30 or later Ver. 1.30 or later Ver. 1.30 or later SX-30P Ver. 1.30 or later Ver. 1.492N or later Ver. 1.492N or later SX-30P Ver. 1.50 or later Ver. 1.08J or later Ver. 1.08J or later Ver. 1.08J or later Ver. 1.00 or later Ver. 1.00 or later Ver. 1.00 or later Ver. 1.00 or later Ver. 3.00 or later Ver. 4.00 or later Ver. 4.	GOT1000 Series di	isplay units			
FX:30P GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX:s PLC GX Works2 SW□DNC-GXW2-E GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX:30P FX:20P FX:20P FX:20P GX Works2 SW□DNC-GXW2-E FX-PCS/WIN-E FX-PCS/WIN-E FX-PCS/WIN-E FX-20P-E(-SET0) FX-20P-MFXC-E FX-20P-MFXC-E FX-10P-E GOT-F900 Series display units F940WGOT-TWD-E F940GOT-WD-E F940GOT-WD-E F940GOT-WD-E F940GOT-BD-H-E F940GOT-BD-H-E F940GOT-BD-H-E F940GOT-BD-RH-E F940GOT-BD-RH	FX3GC PLC				
Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX3 PLC	GX Works2	SW□DNC-GXW2-E	Ver. 1.77F or later		
models and versions supporting the list editor function. FX3 PLC GX Works2 SW□DNC-GXW2-E Ver. 1.492N or later FX-30P Ver. 1.50 or later GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX2N and FX2NC PLCS GX Works2 SW□DNC-GXW2-E Ver. 1.08J or later GX Developer SW□DSC(F)-GPPW-E SW2 A or later FX-PCSWIN-E SW0PC-FXGP/WIN-E Ver. 1.00 or later FX-30P Ver. 1.00 or later FX-30P Ver. 3.00 or later FX-20P-E(-SET0) FX-20P-MFXC-E FX-10P-E Ver. 3.00 or later FX-10P-E Ver. 3.00 or later F940GOT-WD-E F940GOT-WD-E F940GOT-WD-E F940GOT-WD-E F940GOT-BD-H-E F940GOT-LBD-H-E F940GOT-LBD-H-E, F940GOT-SBD-H-E (Ver. 1.00 or later) F940GOT-BD-RH-E F940GOT-BD-RH-E, F940GOT-SBD-RH-E (Ver. 1.00 or later) F940GOT-BD-RH-E, F940GOT-SBD-RH-E (Ver. 1	FX-30P		Ver. 1.30 or later	-	
GX Works2 SW□DNC-GXW2-E Ver. 1.492N or later FX-30P Ver. 1.50 or later GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX2N and FX2NC PLCS GX Works2 SW□DNC-GXW2-E Ver. 1.08J or later GX Developer SW□D5C(F)-GPPW-E SW2 A or later FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 1.00 or later FX-30P Ver. 1.00 or later FX-20P-E(-SET0) FX-20P-MFXC-E FX-10P-E Ver. 3.00 or later GOT-F900 Series display units F940WG0T-*WD-E F940GOT-*WD-E F940GOT-*BD-H-E F940GOT-*BD-H-E F940GOT-*BD-H-E F940GOT-BD-H-E, F940GOT-SBD-H-E (Ver. 1.00 or later) F940GOT-BD-H-E, F940GOT-SBD-H-E (Ver. 1.00 or later) GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX1S, FX1N and FX1NC PLCS GX Works2 SW□DNC-GXW2-E SW5 A or later FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 3.00 or later FX-20P-E(-SET0) FX-20P-E(-SET0) FX-20P-E(-SET0) FX-20P-MFXD-E Ver. 4.00 or later	GOT1000 Series di	isplay units			
FX-30P Ver. 1.50 or later Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX2N and FX2NC PLCS GX Works2 SW□DNC-GXW2-E Ver. 1.08J or later GX Developer SW□D5C(F)-GPPW-E SW2 A or later FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 1.00 or later FX-30P Ver. 3.00 or later FX-20P-E(-SET0) FX-20P-MFXC-E FX-10P-E Ver. 3.00 or later GOT-F900 Series display units F940WG0T-TWD-E F940G0T-*WD-E F940G0T-*BD-H-E F940G0T-*BD-H-E F940G0T-*BD-H-E F940G0T-*BD-H-E F940GOT-BD-H-E, F940GOT-SBD-H-E (Ver. 1.00 or later) F940GOT-BD-RH-E F940GOT-BD-RH-E, F940GOT-SBD-RH-E (Ver. 1.00 or later) F940GOT-BD-RH-E, F940GOT-SBD-RH-E (Ver. 1.00 or later) FX15, FX1N and FX1NC PLCS GX Works2 SW□DNC-GXW2-E GX Developer SW□D5C(F)-GPPW-E FX-20P-E(-SET0) FX-20P-E(-SET0) FX-20P-E(-SET0) FX-20P-E(-SET0) FX-20P-MFXD-E Ver. 4.00 or later Ver. 4.00 or later - Ver. 4.00 or later - Ver. 4.00 or later - Ver. 4.00 or later	FX3S PLC				
Refer to manuals of GOT1000 Series display units models and versions supporting the list editor function. FX2N and FX2NC PLCS GX Works2 SW□DNC-GXW2-E Ver. 1.08J or later GX Developer SW□D5C(F)-GPPW-E SW2 A or later FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 1.00 or later FX-20P-E(-SET0) FX-20P-MFXC-E FX-10P-E Ver. 3.00 or later GOT-F900 Series display units F940WGOT-TWD-E F940GOT-WD-E F940GOT-*BD-H-E F940GOT-*BD-H-E F940GOT-*BD-H-E GOT1000 Series display units F940WGOT-BD-RH-E GOT1000 Series display units F940GOT-BD-RH-E GOT1000 Series display units F940GOT-BD-RH-E GOT1000 Series display units FY3-10 F SY0-10 F	GX Works2	SW□DNC-GXW2-E	Ver. 1.492N or later		
FX2N and FX2NC PLCs	FX-30P		Ver. 1.50 or later	-	
GX Works2 SW□DNC-GXW2-E Ver. 1.08 J or later GX Developer SW□D5C(F)-GPPW-E SW2 A or later FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 1.00 or later FX-30P Ver. 1.00 or later FX-20P-E(-SET0) FX-20P-MFXC-E Ver. 3.00 or later FX-10P-E Ver. 3.00 or later GOT-F900 Series display units F940WGOT-TWD-E F940WGOT-TWD-E F940GOT-WD-E F940GOT-WD-E F940GOT-BD-H-E F940GOT-LBD-H-E F940GOT-LBD-RH-E F940GOT-BD-RH-E F94	GOT1000 Series di	isplay units			
GX Developer SW□D5C(F)-GPPW-E SW2 A or later FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 1.00 or later FX-30P Ver. 1.00 or later - FX-20P-E(-SET0) Ver. 3.00 or later - FX-20P-MFXC-E Ver. 3.00 or later - FX-10P-E Ver. 3.00 or later - GOT-F900 Series display units F940WGOT-TWD-E (Ver. 1.00 or later) F940GOT-*WD-E F940WGOT-LWD-E, F940GOT-SWD-E (Ver. 1.00 or later) F940GOT-*BD-H-E F940GOT-LBD-H-E, F940GOT-SBD-H-E (Ver. 1.00 or later) F940GOT-*BD-RH-E F940GOT-LBD-RH-E, F940GOT-SBD-RH-E (Ver. 1.00 or later) GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX1s, FX1N and FX1NC PLCs Ver. 1.08J or later GX Developer SW□D5C(F)-GPPW-E SW5 A or later FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 3.00 or later FX-30P Ver. 1.00 or later - FX-20P-E(-SET0) Ver. 4.00 or later	FX2N and FX2NC P	LCs			
FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 1.00 or later FX-30P Ver. 1.00 or later - FX-20P-E(-SET0) Ver. 3.00 or later - FX-20P-MFXC-E Ver. 3.00 or later - FX-10P-E Ver. 3.00 or later - GOT-F900 Series display units F940WGOT-TWD-E (Ver. 1.00 or later) F940GOT-*WD-E F940GOT-LWD-E, F940GOT-SWD-E (Ver. 1.00 or later) F940GOT-*BD-H-E F940GOT-LBD-H-E, F940GOT-SBD-H-E (Ver. 1.00 or later) F940GOT-BD-RH-E F940GOT-LBD-RH-E, F940GOT-SBD-RH-E (Ver. 1.00 or later) GOT1000 Series display units Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX1s, FX1N and FX1NC PLCs Ver. 1.08J or later GX Developer SW□D5C(F)-GPPW-E SW5 A or later FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 3.00 or later FX-30P Ver. 1.00 or later - FX-20P-E(-SET0) Ver. 4.00 or later	GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later		
FX-30P	GX Developer	SW□D5C(F)-GPPW-E	SW2 A or later		
FX-20P-E(-SET0) FX-20P-MFXC-E FX-10P-E GOT-F900 Series display units F940WGOT-TWD-E F940GOT-*WD-E F940GOT-*BD-H-E F940GOT-*BD-H-E F940GOT-*BD-H-E F940GOT-*BD-H-E F940GOT-*BD-H-E F940GOT-*BD-H-E F940GOT-BD-H-E F940GOT-BD-H F940GOT	FX-PCS/WIN-E	SW0PC-FXGP/WIN-E	Ver. 1.00 or later		
FX-20P-MFXC-E FX-10P-E GOT-F900 Series display units F940WGOT-TWD-E F940GOT-*WD-E F940GOT-*WD-E F940GOT-*BD-H-E F940GOT-*BD-H-E F940GOT-BD-RH-E F940GOT-BD-R	FX-30P	•	Ver. 1.00 or later	-	
GOT-F900 Series display units F940WGOT-TWD-E F940GOT-*WD-E F940GOT-*WD-E F940GOT-*BD-H-E F940GOT-*BD-H-E F940GOT-*BD-RH-E F940GOT-*BD-RH-E F940GOT-*BD-RH-E F940GOT-*BD-RH-E F940GOT-*BD-RH-E F940GOT-SBD-RH-E F940GOT-SBD-H-E F940GOT-SWD-E F940GOT-SWD-F F940GOT-SW			Ver. 3.00 or later		
F940WGOT-TWD-E F940GOT-*WD-E F940GOT-*WD-E F940GOT-*BD-H-E F940GOT-*BD-H-E F940GOT-*BD-RH-E F940GOT-*BD-RH-E F940GOT-*BD-RH-E F940GOT-LBD-H-E, F940GOT-SBD-H-E (Ver. 1.00 or later) F940GOT-LBD-RH-E, F940GOT-SBD-RH-E (Ver. 1.00 or later) F940GOT-LBD-RH-E, F940GOT-SBD-RH-E (Ver. 1.00 or later) F940GOT-LBD-RH-E, F940GOT-SBD-RH-E (Ver. 1.00 or later) Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function. FX1s, FX1n and FX1nc PLCs GX Works2 SW□DNC-GXW2-E Ver. 1.08J or later GX Developer SW□D5C(F)-GPPW-E SW5 A or later FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 3.00 or later FX-30P Ver. 1.00 or later FX-20P-E(-SET0) FX-20P-MFXD-E Ver. 4.00 or later	FX-10P-E		Ver. 3.00 or later		
models and versions supporting the list editor function. FX1s, FX1n and FX1nc PLCs GX Works2 SW□DNC-GXW2-E Ver. 1.08J or later GX Developer SW□D5C(F)-GPPW-E SW5 A or later FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 3.00 or later FX-30P Ver. 1.00 or later FX-20P-E(-SET0) FX-20P-MFXD-E Ver. 4.00 or later	GOT-F900 Series display units F940WGOT-TWD-E F940GOT-*WD-E F940GOT-*BD-H-E		F940GOT-LWD-E, F940GOT-SWD-E (Ver. 1.00 or later) F940GOT-LBD-H-E, F940GOT-SBD-H-E (Ver. 1.00 or later)		
GX Works2 SW□DNC-GXW2-E Ver. 1.08J or later GX Developer SW□D5C(F)-GPPW-E SW5 A or later FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 3.00 or later FX-30P Ver. 1.00 or later FX-20P-E(-SET0) FX-20P-MFXD-E Ver. 4.00 or later	GOT1000 Series display units				
GX Developer SW□D5C(F)-GPPW-E SW5 A or later FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 3.00 or later FX-30P Ver. 1.00 or later - FX-20P-E(-SET0) FX-20P-MFXD-E Ver. 4.00 or later	FX1S, FX1N and FX	(1NC PLCs			
FX-PCS/WIN-E SW0PC-FXGP/WIN-E Ver. 3.00 or later FX-30P Ver. 1.00 or later - FX-20P-E(-SET0) FX-20P-MFXD-E Ver. 4.00 or later		SW□DNC-GXW2-E			
FX-30P	GX Developer	SW□D5C(F)-GPPW-E	SW5 A or later		
FX-20P-E(-SET0) FX-20P-MFXD-E Ver. 4.00 or later		SW0PC-FXGP/WIN-E			
FX-20P-MFXD-E Ver. 4.00 or later	FX-30P	FX-30P		-	
FX-10P-E Ver. 4.00 or later			Ver. 4.00 or later		
	FX-10P-E		Ver. 4.00 or later		

px.A Discontinued models

Product name	Model name	Applicable version	Remarks		
GOT-F900 Series display units					
F940WGOT-TWD-E		F940WGOT-TWD-E (Ver.	1.00 or later)		
F940GOT-*WD-E		F940GOT-LWD-E, F940G	F940GOT-LWD-E, F940GOT-SWD-E (Ver. 1.00 or later)		
F940GOT-*BD-H-E		F940GOT-LBD-H-E, F940	F940GOT-LBD-H-E, F940GOT-SBD-H-E (Ver. 1.00 or later)		
F940GOT-*BD-RH-E		F940GOT-LBD-RH-E, F94	F940GOT-LBD-RH-E, F940GOT-SBD-RH-E (Ver. 1.00 or later)		
GOT1000 Series display units			Γ1000 Series display units for applicable porting the list editor function.		

2. Japanese versions

Product name	Model name	Applicable version	Remarks
FX3U and FX3UC PL	_Cs		
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later	
GX Developer	SW□D5C(F)-GPPW-J	Ver. 8.13P or later	-
FX-30P		Ver. 1.00 or later	
GOT1000 Series dis	GOT1000 Series display units		T1000 Series display units for applicable oporting the list editor function.
FX3G PLC			
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later	
GX Developer	SW□D5C(F)-GPPW-J	Ver. 8.72A or later	-
FX-30P		Ver. 1.00 or later	
GOT1000 Series dis	splay units		T1000 Series display units for applicable oporting the list editor function.
FX3GC PLC			
GX Works2	SW□DNC-GXW2-J	Ver. 1.77F or later	_
FX-30P		Ver. 1.30 or later	-
GOT1000 Series dis	splay units		T1000 Series display units for applicable oporting the list editor function.
FX3S PLC			
GX Works2	SW□DNC-GXW2-J	Ver. 1.492N or later	
FX-30P		Ver. 1.50 or later	-
GOT1000 Series dis	splay units	Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function.	
FX2N and FX2NC PL	_Cs		
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later	
GX Developer	SW□D5C(F)-GPPW-J	SW2 A or later	
FX-PCS/WIN	SW0PC-FXGP/WIN	Ver. 2.00 or later	
FX-PCS-KIT/98	SW1PC-FXGP/98(-3,-5)	Ver. 4.00 or later	
FX-PCS/98-3	SW1PC-FXGP/98-3	Ver. 4.00 or later	
FX-PCS-KIT/V-3	SW1PC-FXGP/V3	Ver. 2.00 or later	-
FX-A7PHP-KIT	SW1RX-GPPFX	Ver. 3.00 or later	
FX-30P		Ver. 1.00 or later	
FX-20P(-SET0) FX-20P-MFXC		Ver. 4.00 or later	
FX-10P(-SET0)		Ver. 3.00 or later	
GOT-F900 Series display units F940WGOT-TWD F940GOT-*WD F940GOT-*BD-H F940GOT-*BD-RH		F940GOT-LBD-H, F9400	I.00 or later) OT-SWD (Ver. 1.00 or later) GOT-SBD-H (Ver. 1.00 or later) 0GOT-SBD-RH (Ver. 1.00 or later)
GOT1000 Series display units			Γ1000 Series display units for applicable oporting the list editor function.

Product name	Model name	Applicable version	Remarks
FX1S, FX1N and FX1NC PLCs			
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later	
GX Developer	SW□D5C(F)-GPPW-J	SW5 A or later	
FX-PCS/WIN	SW0PC-FXGP/WIN	Ver. 4.00 or later	
FX-PCS/98-3	SW1PC-FXGP/98-3	Ver. 5.00 or later	<u>_</u>
FX-30P		Ver. 1.00 or later	
FX-20P(-SET0) FX-20P-MFXD		Ver. 5.00 or later	
FX-10P(-SET0)		Ver. 4.00 or later	
GOT-F900 Series display units F940WGOT-TWD F940GOT-*WD F940GOT-*BD-H F940GOT-*BD-RH		F940GOT-LBD-H, F9400	I.00 or later) DT-SWD (Ver. 1.00 or later) GOT-SBD-H (Ver. 1.00 or later) 0GOT-SBD-RH (Ver. 1.00 or later)
GOT1000 Series display units			Γ1000 Series display units for applicable porting the list editor function.

1.4.2 For non-applicable versions (setting an alternative model)

Even programming tool not applicable to a PLC can create programs when an alternative model is set. In this case, however, programming is enabled only in the function ranges provided for the alternative PLC model such as instructions and program size.

Model to be programmed	Model to be set	Model to be set Priority: High → Low			v
FX3UC Series	FX3UC	\rightarrow	FX2N	\rightarrow	FX2(FX)
FX3U Series	FX3UC, FX3U	\rightarrow	FX2N	\rightarrow	FX2(FX)
FX3GC Series	FX3G, FX3GC	\rightarrow	FX ₁ N ^{*1}	\rightarrow	FX2N ^{*1}
FX3G Series	FX3G	\rightarrow	FX1N*1	\rightarrow	FX2N ^{*1}
FX3S Series	FX3S	\rightarrow	FX3G	\rightarrow	FX1N ^{*1}
FX2NC Series	FX2NC, FX2N	\rightarrow	FX2(FX)		
FX2N Series	FX2N	\rightarrow	FX2(FX)		
FX1NC Series	FX1NC, FX1N	\rightarrow	FX ₂ N	\rightarrow	FX2(FX)
FX1N Series	FX1N	\rightarrow	FX ₂ N	\rightarrow	FX2(FX)
FX1S Series	FX1S	\rightarrow	FX2(FX)		
FX0N Series	FX0N	\rightarrow	FX2(FX)		
FX0s Series	FX0S	\rightarrow	FX2(FX)		
FX ₀ Series	FX0	\rightarrow	FX2(FX)		
FX2C Series	FX2C, FX2(FX)	\rightarrow	FX2(FX)		
FX2(FX) Series	FX2(FX)				
FX1 Series	FX1				

^{*1. &}quot;FX2N" is selected when the FX-10P(-E) is used.

Point

In the FX3S PLC, set the memory capacity for PLC parameters to 4,000 steps or less.

Specifications

This chapter explains the communication specifications and performance of the parallel link.

2.1 **Communication Specifications (Reference)**

The parallel link is executed using the (fixed) communication specifications shown in the table below. Specification items such as baud rate cannot be changed.

	Item	Specifications	Remarks
Number of	connectable units	2 maximum (1:1)	
Transmiss	ion standard	RS-485 or RS-422 standard	
Maximum total extension	FX3UC, FX3U, FX3GC, FX3G, FX3S, FX2NC, FX2N, FX1NC, FX1N, FX1S, FX0N PLCs		
distance	FX2(FX), FX2C PLCs	Wire link: 10 m (32' 9") or less Optical fiber: 50 m (164' 0") or less	Wire link: FX2-40AW Optical fiber: FX2-40AP
Protocol ty	/ре	Parallel link	
Control pro	ocedure	_	
Communio	cation method	Half-duplex, bidirectional communication	
	FX3UC, FX3U, FX3GC, FX3G, FX3S PLCs	115200bps	
Baud rate	FX2NC, FX2N, FX1NC, FX1N, FX1S, FX0N, FX2C, FX2(FX) PLCs	19200bps	
	Start bit		
Character	Data bit	Fixed	
format	Parity bit	Fixeu	
	Stop bit		
Header		Fixed	
Terminator	r	Lixed	
Control lin	е	_	
Sum check	(Fixed	

2.2 Link Specifications

2.2.1 PLC communication type applicability status

 \checkmark : Applicable (If applicable versions of main units are limited, they are described inside ().)

—: Not applicable

PLC	Regular parallel link mode applicability (applicable version)	High speed parallel link mode applicability (applicable version)
FX3UC Series	✓	✓
FX3U Series	✓	✓
FX3GC Series	✓	✓
FX3G Series	✓	✓
FX3S Series	✓	✓
FX2NC Series	✓	✓
FX2N Series	✓ (Ver. 1.04 or later)	√ (Ver. 1.04 or later)
FX1NC Series	✓	✓
FX1N Series	✓	✓
FX1S Series	✓	✓
FXon Series	✓ (Ver. 1.20 or later)	√ (Ver. 1.20 or later)
FXos Series	_	_
FX ₀ Series	_	_
FX2C Series	✓	√ (Ver. 3.07 or later)
FX2(FX) Series	✓	✓ (Ver. 3.07 or later)

2.2.2 Link time

The link time indicates the cycle time in which link devices are updated.

The link time varies depending on the link mode as shown in the tables below.

1. For FX3S, FX3G, FX3GC, FX3U and FX3UC Series

Link mode	Time
Regular parallel link mode	15 ms + Master station operation cycle (ms) + Slave station operation cycle (ms)
High speed parallel link mode	5 ms + Master station operation cycle (ms) + Slave station operation cycle (ms)

2. For FX2(FX), FX2C, FX0N, FX1S, FX1N, FX1NC, FX2N and FX2NC Series

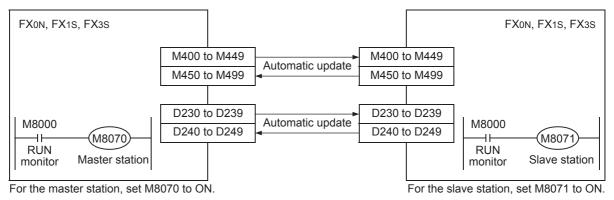
Link mode	Time
Regular parallel link mode	70 ms + Master station operation cycle (ms) + Slave station operation cycle (ms)
High speed parallel link mode	20 ms + Master station operation cycle (ms) + Slave station operation cycle (ms)

2.3 Link Device Numbers and Number of Points

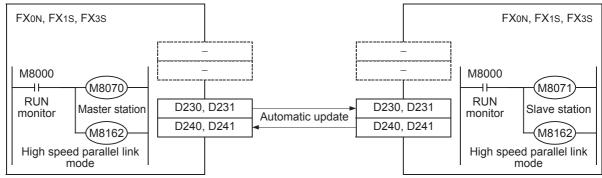
2.3.1 For FX_{0N}, FX_{1S} and FX_{3S} Series

Mode	Regular para	Regular parallel link mode		High speed parallel link mode	
Mode	Bit device (M)	Word device (D)	Bit device (M)	Word device (D)	
Туре	50 in each station	10 in each station	0	2 in each station	
Master station	M400 to M449	D230 to D239	_	D230, D231	
Slave station	M450 to M499	D240 to D249	_	D240, D241	

1. Regular parallel link mode



2. High speed parallel link mode



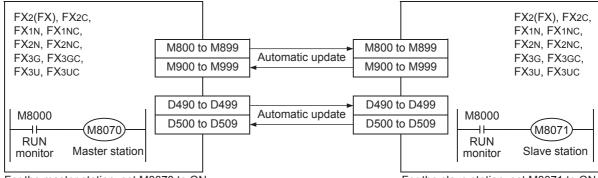
For the master station, set M8070 and M8162 to ON.

For the slave station, set M8071 and M8162 to ON.

2.3.2 For FX2(FX), FX2C, FX1N, FX1NC, FX2N, FX2NC, FX3G, FX3GC, FX3U and FX3UC Series

Mode	Regular para	Regular parallel link mode		High speed parallel link mode	
WIOGE	Bit device (M)	Word device (D)	Bit device (M)	Word device (D)	
Туре	100 in each station	10 in each station	0	2 in each station	
Master station	M800 to M899	D490 to D499	_	D490, D491	
Slave station	M900 to M999	D500 to D509	_	D500, D501	

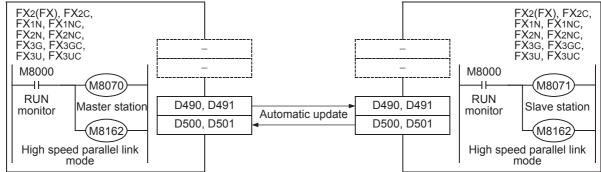
1. Regular parallel link mode



For the master station, set M8070 to ON.

For the slave station, set M8071 to ON.

2. High speed parallel link mode



For the slave station, set M8071 and M8162 to ON.

3. System Configuration and Selection

This chapter explains the configuration of communication equipment operating in accordance with RS-485 and the system selection required by FX PLCs.

3.1 System Configuration

This section outlines the system configuration required to use the parallel link.

Add (optional) communication equipment operating in accordance with RS-485 to an FX PLC main unit.

3.1.1 Rule for connection

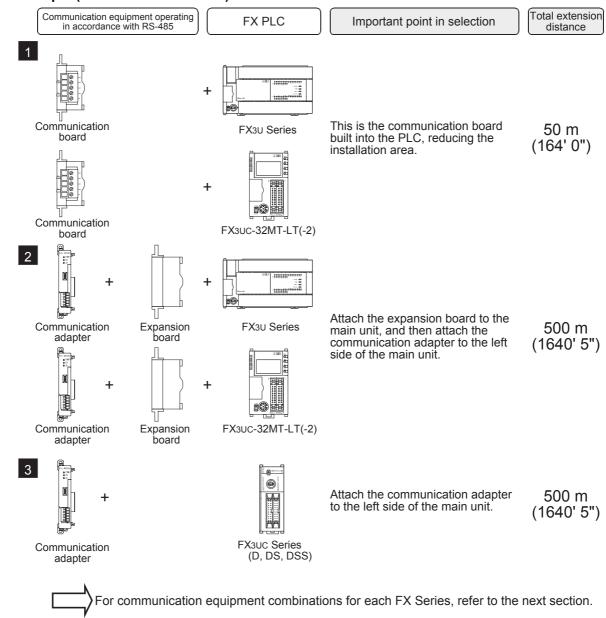
When using the parallel link, PLCs in the same group can be connected as shown in the table below.

Group	PLC Series
1	FX3U and FX3UC Series
2	FX3G and FX3GC Series
3	FX3s Series
4	FX2N and FX2NC Series
5	FX1N and FX1NC Series
6	FX1s Series
7	FX0N Series
8	FX2(FX) and FX2C Series

3.2 Configuration of Each Group

1, 2 and 3 indicate the communication equipment combination patterns.

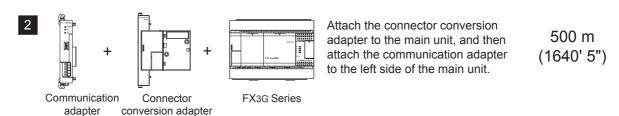
1. Group 1 (FX3U and FX3UC PLCs)

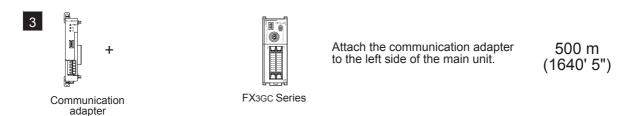


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2. Group 2 (FX3G and FX3GC PLCs)

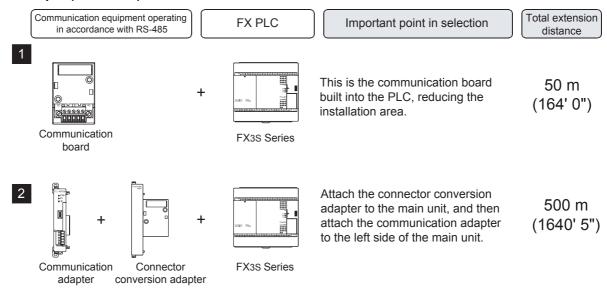






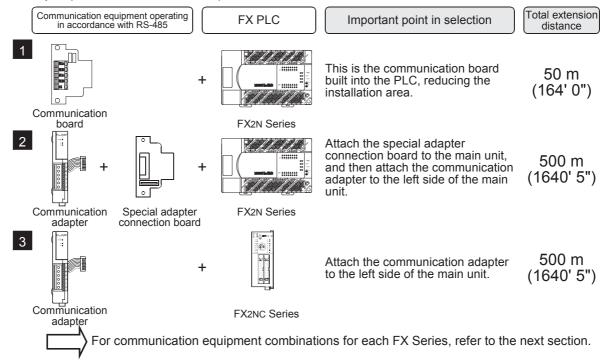
For communication equipment combinations for each FX Series, refer to the next section.

3. Group 3 (FX3S PLC)

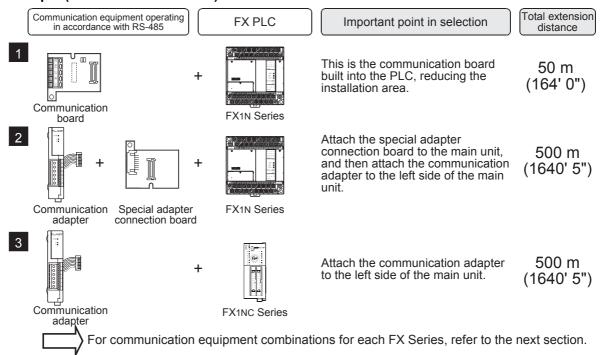


For communication equipment combinations for each FX Series, refer to the next section.

4. Group 4 (FX2N and FX2NC PLCs)



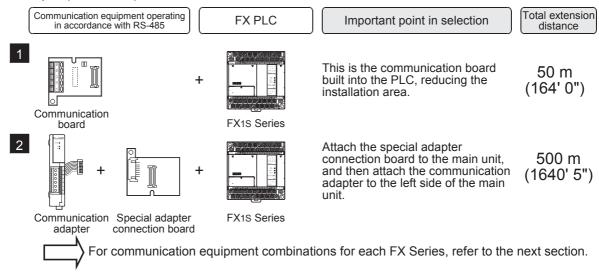
5. Group 5 (FX1N and FX1NC PLCs)



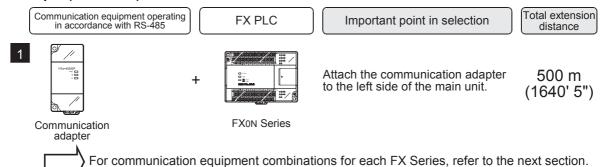
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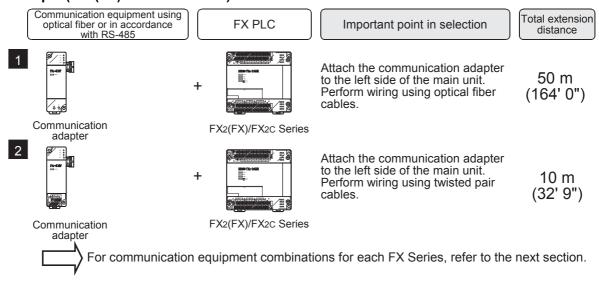
6. Group 6 (FX1S PLC)



7. Group 7 (FXon PLC)



8. Group 8 (FX2(FX) and FX2C PLCs)



3.3 Applicable FX PLC and Communication Equipment

Select a (optional) communication equipment combination, and put a check mark in the "Check" column. During selection, pay attention to the following:

- In the table below, only the external dimensions are different between the units shown in "FX2NC-485ADP/ FX0N-485ADP". Select either one.
- In the table below, only the cable is different between the units shown in "FX3G-485-BD/FX3G-485-BD-RJ". Select either one.
- The parallel link is not provided for the FX1, FX0 and FX0s PLCs.

FX Series	Communication equipment (option)	Total extension distance	Check
FXon	FX2NC-485ADP (European terminal block) (Terminal block)	500 m (1640' 5")	
	FX1N-485-BD (European terminal block)	50 m (164' 0")	
FX1s	FX1N-CNV-BD FX2NC-485ADP FX1N-CNV-BD FX0N-485ADP (European terminal block)	500 m (1640' 5")	
	FX1N-485-BD (European terminal block)	50 m (164' 0")	
FX1N	FX1N-CNV-BD FX2NC-485ADP FX1N-CNV-BD FX0N-485ADP (Terminal block)	500 m (1640' 5")	
FX2N	FX2N-485-BD	50 m (164' 0")	
	FX2N-CNV-BD FX2NC-485ADP FX2N-CNV-BD FX0N-485ADP (European terminal block)	500 m (1640' 5")	

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Apx.A Discontinued models

FX Series	Communication equipment (option)	Total extension distance	Check
	FX3G-485-BD FX3G-485-BD-RJ (European terminal block) (RJ45 connector)	50 m (164' 0")	
FX3S	FX3s-CNV-ADP FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	
2000 100 100 100 100 100 100 100 100 100	FX3G-485-BD FX3G-485-BD-RJ (European terminal block) (RJ45 connector)	50 m (164' 0")	
FX3G (14-point, 24-point type)	FX3G-CNV-ADP FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	
FX3G	ch1 ch1 FX3G-485-BD FX3G-485-BD-RJ (European terminal block) The communication equipment works as ch1 when connected to the option connector 1.	50 m (164' 0")	
(40-point, 60-point type)	ch1 FX3G-CNV-ADP FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	

FX Series	Communication equipment (option)	Total extension distance	Check
	When using channel 2 (ch 2)		
770,000	ch2 ch2 FX3G-485-BD FX3G-485-BD-RJ (RJ45 connector) The communication equipment works as ch2 when connected to the option connector 2.	50 m (164' 0")	
FX3G (40-point, 60-point type)	oint, 60-point	500 m (1640' 5")	
	when using channel 1 (ch 1) ch1 FX3U-485-BD (European terminal block)	50 m (164' 0")	
FX 3U	FX3U-CNV-BD FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	

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FX Series	Communication equipment (option)	Total extension distance	Check
	when using channel 2 (ch 2) ch1 ch2		
	FX3U-D-BD (Where Depresents 232, 422, 485, USB and 8AV). FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	
100	When a FX3U-8AV-BD is used, it occupies one communication port channel.		
FX3U	FX3U-CNV-BD FX3U-232ADP(-MB), FX3U-485ADP(-MB) FX3U-485ADP(-MB), (European terminal block) FX3U-CF-ADP When a FX3U-CF-ADP is used, it occupies one communication port channel.	500 m (1640' 5")	
FX1NC	FX2NC-485ADP (European terminal block) (Terminal block)	500 m (1640' 5")	
FX2NC	FX2NC-485ADP (European terminal block) (Terminal block)	500 m (1640' 5")	
	When using channel 1 (ch 1) ch1		
	FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	
FX3GC	when using channel 2 (ch 2) ch1 ch2 FX3U-□ADP(-MB) (Where □ represents 232 and 485). ch2 FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	

FX Series	Communication equipment (option)	Total extension distance	Check
	When using channel 1 (ch 1)		
	Ch1 FX3U-485ADP(-MB) (European terminal block) When using channel 2 (ch 2)	500 m (1640' 5")	
FX3UC (D, DS, DSS)	ch1 FX3U-232ADP(-MB), FX3U-485ADP(-MB), FX3U-CF-ADP When a FX3U-CF-ADP is used, it occupies one communication port channel.	500 m (1640' 5")	
	when using channel 1 (ch 1) ch1 FX3U-485-BD (European terminal block)	50 m (164' 0")	
	FX3u-CNV-BD FX3u-485ADP(-MB) (European terminal block)	500 m (1640' 5")	
77.55 dd d	When using channel 2 (ch 2)		
FX3UC-32MT-LT (-2)	Ch1 FX3U-□-BD (Where □ represents 232, 422, 485, USB and 8AV). When a FX3U-8AV-BD is used, it occupies one communication port channel.	500 m (1640' 5")	
	FX3U-CNV-BD FX3U-232ADP(-MB), FX3U-485ADP(-MB), FX3U-485ADP(-MB), Evaluation FX3U-CF-ADP is used, it occupies one communication port channel.	500 m (1640' 5")	

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Communication
(RS/RS2 Instruction)

FX Series	Communication equipment (option)	Total extension distance	Check
© Be complete to the complete	FX2-40AP (for optical fiber)	50 m (164' 0")	
FX2(FX)	FX2-40AW (for wire link)	10 m (32' 9")	
	FX2-40AP (for optical fiber)	50 m (164' 0")	
FX2C	FX2-40AW (for wire link)	10 m (32' 9")	

4. Wiring

This chapter explains the wiring.

WIRING PRECAUTIONS



- Make sure to cut off all phases of the power supply externally before attempting installation or wiring work. Failure to do so may cause electric shock or damage to the product.
- Make sure to attach the terminal cover, offered as an accessory, before turning on the power or initiating operation after installation or wiring work.
 Failure to do so may cause electric shock.

WIRING PRECAUTIONS



- Make sure to observe the following precautions in order to prevent any damage to the machinery or accidents due to abnormal data written to the PLC under the influence of noise:
 - 1) Do not bundle the main circuit line together with or lay it close to the main circuit, high-voltage line or load line. Otherwise, noise disturbance and/or surge induction are likely to take place. As a guideline, lay the control line at least 100mm (3.94") or more away from the main circuit or high-voltage lines.
 - 2) Ground the shield wire or shield of the shielded cable at one point on the PLC. However, do not use common grounding with heavy electrical systems.
- Make sure to properly wire the terminal block in accordance with the following precautions.
 Failure to do so may cause electric shock, equipment failures, a short-circuit, wire breakage, malfunctions, or damage to the product.
 - The disposal size of the cable end should follow the dimensions described in the manual.
 - Tightening torque should follow the specifications in the manual.
 - Tighten the screws using a Phillips-head screwdriver No.2 (shaft diameter 6mm (0.24") or less). Make sure that the screwdriver does not touch the partition part of the terminal block.
- Make sure to properly wire to the terminal block (European type) in accordance with the following precautions.
 Failure to do so may cause electric shock, equipment failures, a short-circuit, wire breakage, malfunctions, or damage to the product.
 - The disposal size of the cable end should follow the dimensions described in the manual.
 - Tightening torque should follow the specifications in the manual.
 - Twist the end of strand wire and make sure that there are no loose wires.
 - Do not solder-plate the electric wire ends.
 - Do not connect more than the specified number of wires or electric wires of unspecified size.
 - Affix the electric wires so that neither the terminal block nor the connected parts are directly stressed.

4.1 Wiring Procedure

1 Preparing for wiring

Prepare cables and terminal resistors required for wiring.

 \rightarrow For details, refer to Section 4.2.

2 Turning OFF the power to the PLC

Before starting any wiring work, make sure that the power to the PLC is OFF.

3 Connecting the power supply (FX0N-485ADP only)

Connect the power supply to the 24V DC power terminal.

4 Wiring communication equipment

Connect communication equipment operating in accordance with RS-485.

→ For details, refer to Section 4.3.

Remote Maintenance

4.2 Selecting Cables and Terminal Resistors

Select cables using the procedure described below.

4.2.1 Twisted pair cable

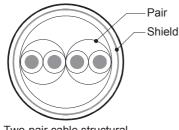
Use shielded twisted pair cables for connecting communication equipment operating in accordance with RS-

The table below shows recommended model names and manufacturers of cables used for wiring.

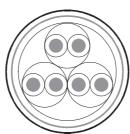
1. Recommended cables

Manufacturer	Model name	Remarks
	SPEV(SB)-0.2-2P	Two-pair cable of 0.2 mm ²
Mitsubishi Cable Industries, Ltd.	SPEV(SB)-MPC-0.2 × 3P	Three-pair cable of 0.2 mm ²
	SPEV(SB)-0.5-2P	Two-pair cable of 0.5 mm ²
Showa Holdings Co., Ltd.	KMPEV-SB CWS-178 0.2SQ × 2P	Two-pair cable of 0.2 mm ²
Griowa Flordings Co., Etd.	KMPEV-SB CWS-178 0.5SQ × 2P	Two-pair cable of 0.5 mm ²
Sumitomo Electric Industries, Ltd.	DPEV SB 0.3 × 3P	Three-pair cable of 0.3 mm ²
Curintomo Electric industries, Eta.	DPEV SB 0.5 × 3P	Three-pair cable of 0.5 mm ²
The Furukawa Electric Co., Ltd.	D-KPEV-SB 0.2 × 3P	Three-pair cable of 0.2 mm ²
The Futurawa Liectife Co., Etc.	D-KPEV-SB 0.5 × 3P	Three-pair cable of 0.5 mm ²
Fujikura Ltd.	IPEV-SB 2P × 0.3 mm ²	Two-pair cable of 0.3 mm ²
i ujikula Liu.	IPEV-SB 2P × 0.5 mm ²	Two-pair cable of 0.5 mm ²

2. Cable structural drawing (reference)



Two-pair cable structural drawing example



Three-pair cable structural drawing example

4.2.2 10BASE-T cable

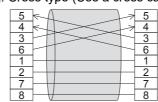
10BASE-T cables used in LAN wiring for a personal computer can be connected to FX3G-485-BD-RJ.

1. Selection procedure when purchasing

: 10BASE-T cable (Category 3 or higher)

2) Connection specifications: One-pair wiring: Straight type

Two-pair wiring: Cross type (Use a cross cable with the following connection)



3) Connector : RJ45 connector (Connector with metal frame is used)

2. Cautions on using commercial cables

Pay attention to the following point when purchasing commercial cables.

· Use shielded cables. Make sure to connect the shield to the metal frame of the connector, and perform class D grounding.

4.2.3 Connecting cables

1. European type terminal block

The FX3G-485-BD-RJ terminal block is used for grounding.

The other options use shielded twisted pair cables for connecting communication equipment operating in accordance with RS-485.

The table below shows applicable cables and tightening torques.

	Cable size when	Cable size when	Bar terminal with	Tightening	Tool size	
	one cable is connected	two cables are connected	are Insulating sleeve forgue		Α	В
FX3U-485-BD FX3G-485-BD FX3U-485ADP (-MB)	AWG22 to AWG20	AWG22	Applicable (AWG22 to AWG20)	0.22 to 0.25 N·m	0.4 (0.01")	2.5 (0.09")
FX3G-485-BD- RJ	AWG20 to AWG16		Not applicable	0.5 to 0.6 N·m	0.6 (0.03")	3.5 (0.14")
FX2N-485-BD FX1N-485-BD	AWG26	to AWG16	Not applicable	0.5 to 0.6 N·m	0.6 (0.03")	3.5 (0.14")
FX2NC-485ADP	AWG26 to AWG16	AWG26 to AWG20	Not applicable	0.4 to 0.5 N·m	0.6 (0.03")	3.5 (0.14")

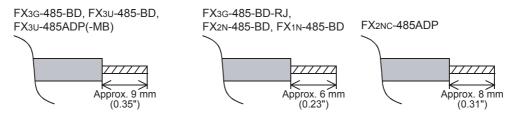
Do not tighten terminal screws with a torque outside the above-mentioned range.

Failure to do so may cause equipment failures or malfunctions.

With regard to the cable end treatment, use a stranded cable or solid cable as it is, or use a bar terminal with insulating sleeve.

FX3G-485-BD-RJ, FX2N-485-BD, FX1N-485-BD and FX2NC-485ADP cannot use a bar terminal with insulating sleeve.

- · When using a stranded cable or solid cable as it is
 - Twist the end of a stranded cable so that wires do not get barbed.
 - Do not plate the end of the cable.

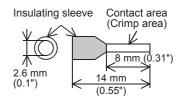


When using a bar terminal with insulating sleeve
Because it is difficult to insert a cable into an insulating sleeve
depending on the thickness of the cable sheath, select the proper cable
according to the outline drawing.

<Reference>

Manufacturer	Model name	Caulking tool
Phoenix Contact Co., Ltd.	AI 0.5-8WH	CRIMPFOX 6*1 (or CRIMPFOX 6T-F*2)
		(Of CRIMPFOX 61-F -)

*1. Old model name : CRIMPFOX ZA 3*2. Old model name : CRIMPFOX UD 6



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Tool

When tightening a terminal on the European terminal block, use a small commercial straight shape screwdriver whose tip is shown in the figure to the right.

Select a screwdriver with a straight tip. A B For size A and size B, refer to the table above.

Note

If the diameter of screwdriver grip is too small, tightening torque will not be able to be achieved. To achieve the appropriate tightening torque shown in the previous page, use the following screwdriver or an appropriate replacement (grip diameter: approximately 25mm (0.98")).

<Reference>

FX3U-485-BD, FX3G-485-BD, FX3U-485ADP(-MB)

Manufacturer	Model name
Phoenix Contact Co., Ltd.	SZS 0.4 × 2.5

FX3G-485-BD-RJ, FX2N-485-BD, FX1N-485-BD, FX2NC-485ADP

Manufacturer	Model name
Phoenix Contact Co., Ltd.	SZF 1-0.6 × 3.5

2. Terminal block

In the FX0N-485ADP and FX-485ADP, the terminal screw size is "M3".

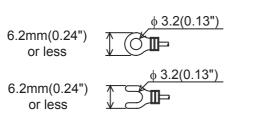
Make sure to use a crimp-style terminal with the following sizes.

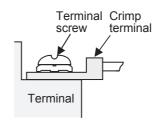
Make sure that the tightening torque is 0.5 to 0.8 N·m.

Do not tighten terminal screws with a torque outside the above-mentioned range.

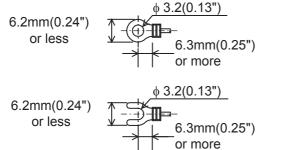
Failure to do so may cause equipment failures or malfunctions.

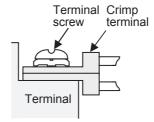
• When wiring one cable to one terminal





When wiring two cables to one terminal





4.2.4 Optical fiber cable

Two optical fiber cables are required.

1. Cable types

Cable	Length	Remarks
F-OFC-M10	10 m (32' 9")	Optical connector CA9104AP manufactured by Hitachi is already connected.
F-OFC-M30	30 m (98' 5")	Optical connector CA9104AP manufactured by Hitachi is already connected.
F-OFC-M50	50 m (164' 0")	Optical connector CA9104AP manufactured by Hitachi is already connected.

2. Cautions on wiring

Separate the optical connector from strong electric cables as much as possible.

Connect devices with the smallest load to the output terminals Y000 to Y003 which are located near the optical connector.

4.2.5 Connecting terminal resistors

In the case of one-pair wiring, connect a terminal resistor to the RDA-RDB signal terminal of the communication equipment.

In the case of two-pair wiring, connect a terminal resistor to the RDA-RDB signal terminal and SDA-SDB terminal of the communication equipment.

1. Terminal resistor type

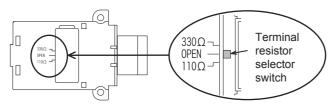
In the case of one-pair wiring, use two terminal resistors of 110 Ω , 1/2 W. In the case of two-pair wiring, use four terminal resistors of 330 Ω , 1/4 W. Among the terminal resistors supplied with the communication equipment, select ones with the color codes shown to the right.

2. When using the FX3U-485-BD, FX3G-485-BD, FX3G-485-BD-RJ or FX3U-485ADP(-MB)

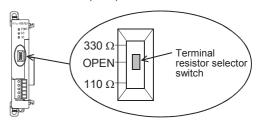
The FX3U-485-BD, FX3G-485-BD, FX3G-485-BD-RJ and FX3U-485ADP(-MB) have built-in terminal resistors.

Set the terminal resistor selector switch accordingly.

FX3U-485-BD



FX3U-485ADP(-MB)



FX3G-485-BD

Remove the upper terminal block before changing over the switch in the FX3G-485-BD.

Removal: Loosen the terminal block mounting screws, and remove the terminal block.

Installation: Attach the terminal block, and tighten the terminal block mounting screws.

Model name

Tightening torque: 0.4 to 0.5 N·m

Do not tighten terminal screws with a torque outside the above-mentioned range. Failure to do so may cause equipment failures or malfunctions.

For installation and removal of the terminal block, use the recommended tool shown below or a tool having straight tip (such as screwdriver) as shown in the right figure.

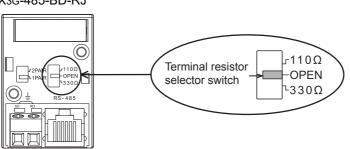
<Reference>

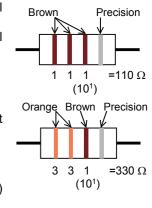
Manufacturer

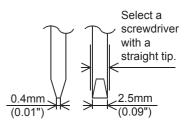
Phoenix Contact Co., Ltd.	SZS 0.4 × 2.5
	Terminal resistor selector switch $\frac{110\Omega}{\text{OPEN}} \approx 330\Omega$

Terminal block mounting screws

FX3G-485-BD-RJ







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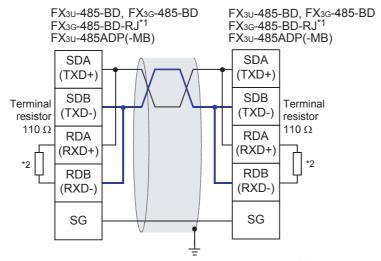
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4.3 Connection Diagram

4.3.1 For FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs

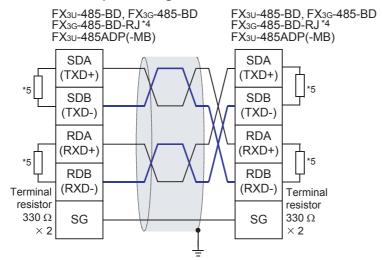
1. In the case of one-pair wiring



Class-D grounding (resistance: 100 Ω or less)*3

- Inside FX3G-485-BD-RJ, SDA and RDA are connected and SDB and RDB are connected respectively when 1-pair wiring is adopted. Signals are not connected to pins Nos. 4 and 5 of the RJ45 connector. For cables of FX3G-485-BD-RJ, refer to Subsection 4.2.2. Make sure to perform class D grounding on the shield of connected cables.
- The FX3U-485-BD, FX3G-485-BD, FX3G-485-BD-RJ and FX3U-485ADP(-MB) have a built-in terminal resistor. Set the terminal resistor selector switch to 110 Ω .
- *3. Make sure to perform Class-D grounding on the shield of a twisted pair cable connected to the FX3U-485-BD, FX3G-485-BD or FX3U-485ADP(-MB).

2. In the case of two-pair wiring

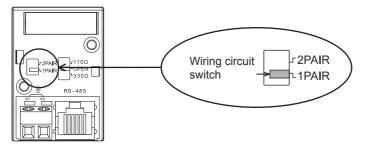


Class-D grounding (resistance: 100 Ω or less)*6

- For cables of FX3G-485-BD-RJ, refer to Subsection 4.2.2. Make sure to perform class D grounding on the shield of connected cables.
- The FX3U-485-BD, FX3G-485-BD, FX3G-485-BD-RJ and FX3U-485ADP(-MB) have a built-in terminal resistor. Set the terminal resistor selector switch to 330 Ω .
- Make sure to perform Class-D grounding on the shield of a twisted pair cable connected to the FX3U-485-BD, FX3G-485-BD or FX3U-485ADP(-MB).

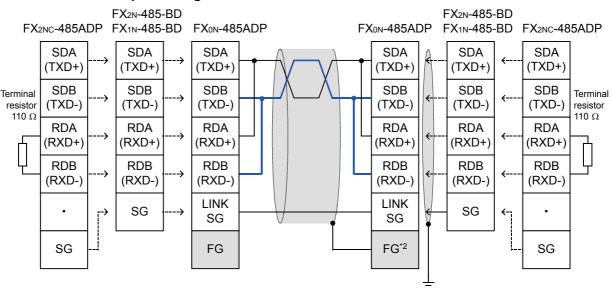
3. Switching of 1 pair / 2 paired wiring (FX3G-485-BD-RJ)

The FX3G-485-BD-RJ has a built-in wiring circuit switch. Set the wiring circuit switch to 1 pair / 2 pair.



4.3.2 For FX1s, FX1N, FX1NC, FX2N and FX2NC PLCs

1. In the case of one-pair wiring



Class-D grounding (resistance: 100 Ω or less)*1

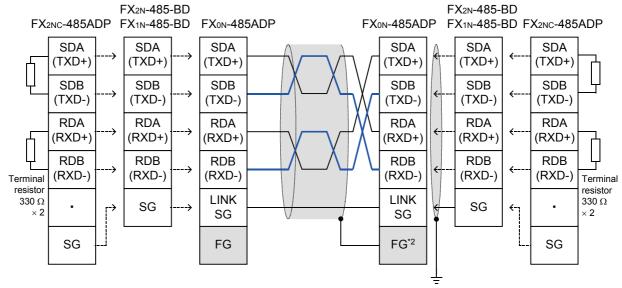
- *1. Make sure to perform Class-D grounding on the shield of a twisted pair cable connected to the FX2N-485-BD, FX1N-485-BD or FX2NC-485ADP.
- *2. Make sure to connect the FG terminal to the (grounding) terminal in the PLC requiring Class-D grounding.

 If the grounding terminal is not provided in the PLC, perform Class-D grounding directly.

4.4 Grounding

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2. In the case of two-pair wiring

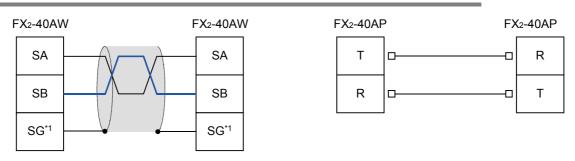


Class-D grounding (resistance: 100 Ω or less)*1

- *1. Make sure to perform Class-D grounding on the shield of a twisted pair cable connected to the FX2N-485-BD, FX1N-485-BD or FX2NC-485ADP.
- *2. Make sure to connect the FG terminal to the (grounding) terminal in the PLC requiring Class-D grounding.

 If the grounding terminal is not provided in the PLC, perform Class-D grounding directly.

4.3.3 For FX2(FX) and FX2c PLCs

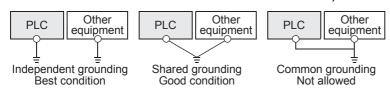


*1. Connect the SG terminal to the SG terminal in each PLC (main unit).

4.4 Grounding

Grounding should be performed as stated below.

- The grounding resistance should be 100Ω or less.
- Independent grounding should be performed for best results.
 When independent grounding can not be performed, perform "shared grounding" as shown in the following figure.
 - \rightarrow For details, refer to the Hardware Edition of each series.



- The grounding wire size should be AWG 14 (2 mm²) or larger.
- The grounding point should be close to the PLC, and all grounding wires should be as short as possible.

5. Communication Setting (Initialization) in FX Programmable Controller

The communication setting is not required in FX PLCs for parallel link.

If the communication setting is already provided for another communication type or for checking the existing communication setting, perform the following procedure.

When using this communication function in ch1 in an FX3S, FX3G, FX3GC, FX3U or FX3UC PLC, check D8120 and D8400 using the following procedure.

When using this communication function in ch2 in an FX3G, FX3GC, FX3U or FX3UC PLC, check D8420 using the following procedure.

In other PLCs, use D8120 for verification.

5.1 Check Procedure

1 Monitoring D8120 (D8400, D8420)

Turn ON the power to the PLC while it is in STOP mode, and monitor D8120 (D8400, D8420).

1. When the value of D8120 (D8400, D8420) is "0"

The communication setting is not provided.

2. When the value of D8120 (D8400, D8420) is any value other than "0"

The communication setting is provided.

2 Checking absence/presence of parameter setting

Check absence/presence using the GX Works2, GX Developer, FXGP/WIN or FX-30P.

- 1) GX Works2 operating procedure (For details, refer to Section 5.2.)
- 2) FXGP/WIN operating procedure (For details, refer to Section 5.3.)
 - ightarrow For details on GX Developer operating procedure, refer to GX Developer Operating Manual. ightarrow For details on FX-30P operating procedure, refer to FX-30P Operation Manual.

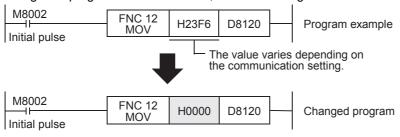
3 Checking absence/presence of sequence program setting

Check whether or not a write instruction is programmed for D8120 (D8400, D8420).

1. When such an instruction is programmed

Program example: (for D8120)

Change the program as shown below, and then change the PLC mode from STOP to RUN.



2. When such an instruction is not programmed

Proceed to the next step.

4 Monitoring D8120 (D8400, D8420) again, and confirming that its value is "0"

Communication settings may be changed using the parameter method with GX Works2, GX Developer, FXGP/WIN for Windows and FX-30P handy programming panel. This section describes how to change parameters with GX Works2.

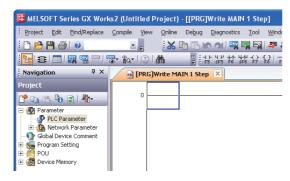
→ For details on FXGP/WIN operating procedure, refer to section 5.3.
 → For details on GX Developer operating procedure, refer to GX Developer Operating Manual.
 → For details on FX-30P operating procedure, refer to FX-30P Operation Manual.

5.2.1 Operating procedure

This subsection explains the serial communication setting method. Suppose that GX Works2 is already started up.

1 Opening the parameter setting window

In the project view area of the navigation window, double-click [Parameter] \rightarrow [PLC Parameter]. If the navigation window is not displayed, select [View] \rightarrow [Docking Window] \rightarrow [Navigation] from the menu bar.



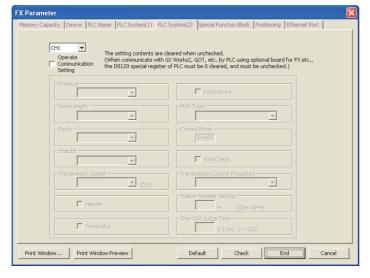
2 Setting the serial communication (parameters)

Click the [PLC System(2)] tab in the dialog box.

Select a channel to be used, and make sure that the "Operate Communication Setting" box is cleared.

If a check mark is there, clear it.

Click [End].



Writing parameters and program to the PLC

Select [Online] \rightarrow [Write to PLC] from the menu bar, click [Parameter + Program], and then click [Execute].

Common Items

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N:N Network

Parallel Link

D Computer

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Inverter Communication

Non-Protocol
Communication
(BS/BS) Instruction

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on-Protocol ommunication X2N-232IF)

> Programm Communic

Remote Maintenance

Apx.A Discontinued models

5.3 Communication Setting Using Parameter Method (FXGP/WIN)

Communication settings may be changed using the parameter method with GX Works2, GX Developer, FXGP/WIN for Windows and FX-30P handy programming panel. This section describes how to change parameters with FXGP/WIN.

Ch2 cannot be set using FXGP/WIN.

→ For details on GX Works2 operating procedure, refer to section 5.2.
 → For details on GX Developer operating procedure, refer to GX Developer Operating Manual.
 → For details on FX-30P operating procedure, refer to FX-30P Operation Manual.

5.3.1 Operating procedure

This subsection explains the serial communication setting method. Suppose that FXGP/WIN is already started up.

1 Adjusting serial setting (parameter)

Double-click [Option] → [Serial setting (parameter)] from the toolbar. The following dialog box appears according to absence/presence of parameter settings.

1. When there are no parameter settings

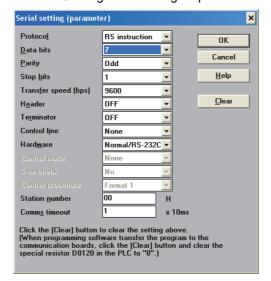
The dialog box shown below appears to indicate that there are no communication settings. Click the [No] button.

In this case, the next step is not required.



2. When there are already parameter settings

The dialog box shown below appears to indicate that there are communication settings. Click the [Clear] button to delete the communication settings from parameters. Transfer parameters to the PLC using the following step.



2 Writing a sequence program (parameters) to the PLC

Select [PLC] → [Transfers] → [Write] from the toolbar, and click [OK] button.

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6. Test Run (Communication Test)

This chapter explains the communication test procedures for the parallel link.

It is recommended to wire the master station and slave station, initialize communication settings in the FX PLCs, and then execute the communication test using the following procedure to confirm the proper operation.

6.1 Test Procedure

1 Creating programs for the communication test

Create new programs for the communication test for the master station and slave station.

→ For program examples, refer to Section 6.2.

2 Transferring the program to each PLC

Turn ON the power to each PLC, and transfer the program.

3 Validating the communication setting

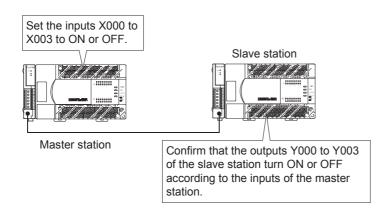
When the PLC is in RUN mode, set it to STOP mode once, and then set it to RUN mode again. Or turn OFF the power of the master station and slave station, and then turn ON the power to both stations at the same time.

4 Confirming flashing of the communication status indicator lamps (SD and RD)

Confirm that the built-in SD and RD lamps of the communication equipment are flashing. If they are off, take proper action while referring to the troubleshooting procedures described later.

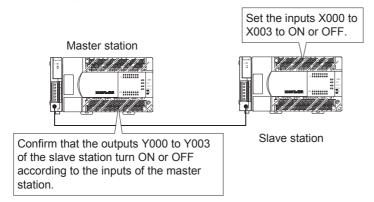
5 Confirming the link of the master station

Set the PLC inputs (X000 to X003) to ON or OFF in the master station, and confirm that the outputs (Y000 to Y003) turn ON or OFF in the slave station.



6 Confirming the link of the slave station

Set the PLC inputs (X000 to X003) to ON or OFF in the slave station, and confirm that the outputs (Y000 to Y003) turn ON or OFF in the master station.



 \rightarrow If unable to establish link, refer to "9. Troubleshooting".

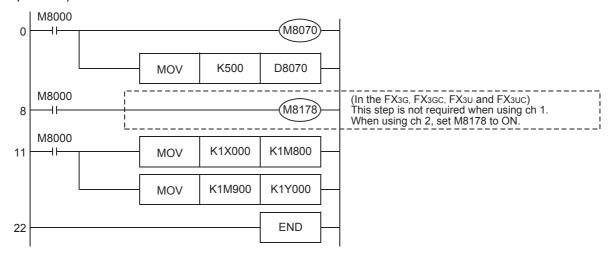
6.2 Creating Programs for the Communication Test

Create the programs shown below for the master station and slave station.

6.2.1 For FX2(FX), FX2C, FX1N, FX1NC, FX2N, FX2NC, FX3G, FX3GC, FX3U or FX3UC Series

1. Program for communication test (for the master station)

Create the program shown below for the communication test. (This program is not required during actual operation.)

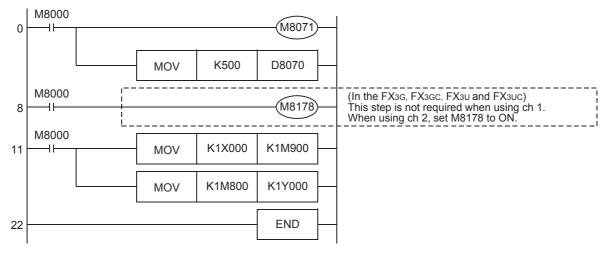


N:N Network

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2. Program for communication test (for the slave station)

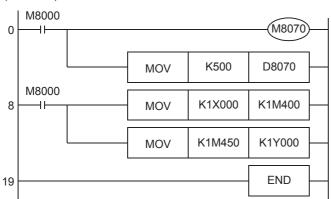
Create the program shown below for the communication test. (This program is not required during actual operation.)



6.2.2 For FX0N, FX1S or FX3S Series

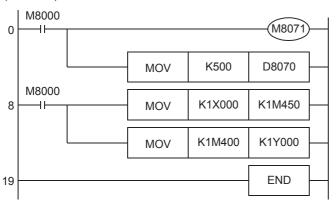
1. Master station communication test program

Create the program shown below for the communication test. (This program is not required during actual operation.)



2. Slave station communication test program

Create the program shown below for the communication test. (This program is not required during actual operation.)



7. Creating Programs

The parallel link has two modes, regular parallel link mode and high speed parallel link mode. Program settings and the number of device to be used are different in each mode. When connecting FX PLCs in the parallel link, use the same mode in both PLCs.

7.1 Regular Parallel Link Mode

This section explains the program setting method in the regular parallel link mode.

7.1.1 Checking contents of related devices

The tables below show devices used in the parallel link.

1. Devices for setting the parallel link

These devices are used for setting the parallel link. The setting of these devices is essential to use the parallel link.

Device	Name	Description
M8070	Parallel link master station declare	Set this device to ON when linking a PLC as the master station.
M8071	Parallel link slave station setting	Set this device to ON when linking a PLC as the slave station.
M8178	Channel setting	Set the channel of communication port to be used (in the FX3G, FX3GC, FX3U and FX3UC). When this device is OFF: ch1 When this device is ON: ch2
D8070	Error judgement time (ms)	Set the time for judging error in the parallel link data communication. [Initial value: 500]

2. Devices for judging errors in the parallel link

These devices are used for judging errors in the parallel link. Use them to output link errors to the outside and interlock sequence programs.

Device	Name	Description
M8072	Parallel link ON	This device remains ON while the parallel link is executed.
M8073	Master/slave station setting error	This device turns ON when there is an error in the setting of the master station or slave station.
M8063	Link error	This device turns ON when a communication error occurs.

N:N Network

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3. Link devices

1) Sending devices for the master station

These devices are used for sending the information from the master station to the slave station.

To prevent malfunctions, do not change the setting of these devices in the slave station.

The device numbers used and number of devices vary depending on the PLC type. For applicable devices, refer to the tables below.

a) For FX2(FX), FX2C, FX1N, FX1NC, FX2N, FX2NC, FX3G, FX3GC, FX3U or FX3UC Series

Device		Number of devices	Description
Bit device	M800 to M899	100	The devices in the slave station are automatically updated
Word device	D490 to D499	10	to the status of devices in the master station.

b) For FX0N, FX1S or FX3S Series

Dev	vice	Number of devices	Description
Bit device	M400 to M449	50	The devices in the slave station are automatically updated
Word device	D230 to D239	10	to the status of devices in the master station.

2) Sending devices for the slave station

These devices are used for sending the information from the slave station to the master station.

To prevent malfunctions, do not change the setting of these devices in the master station.

The device numbers used and number of devices vary depending on the PLC type. For applicable devices, refer to the tables below.

a) For FX2(FX), FX2C, FX1N, FX1NC, FX2N, FX2NC, FX3G, FX3GC, FX3U or FX3UC Series

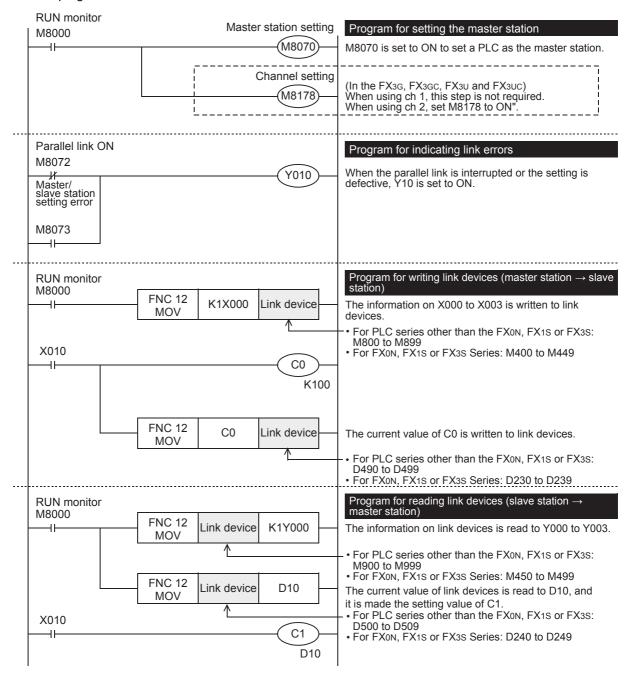
Device		Number of devices	Description
Bit device	M900 to M999	100	The devices in the master station are automatically updated
Word device	D500 to D509	10	to the status of devices in the slave station.

b) For FX0N, FX1s or FX3s Series

Device		Number of devices	Description
Bit device	M450 to M499	50	The devices in the master station are automatically updated
Word device	D240 to D249	10	to the status of devices in the slave station.

7.1.2 Creating programs for master station

Create programs for the master station.

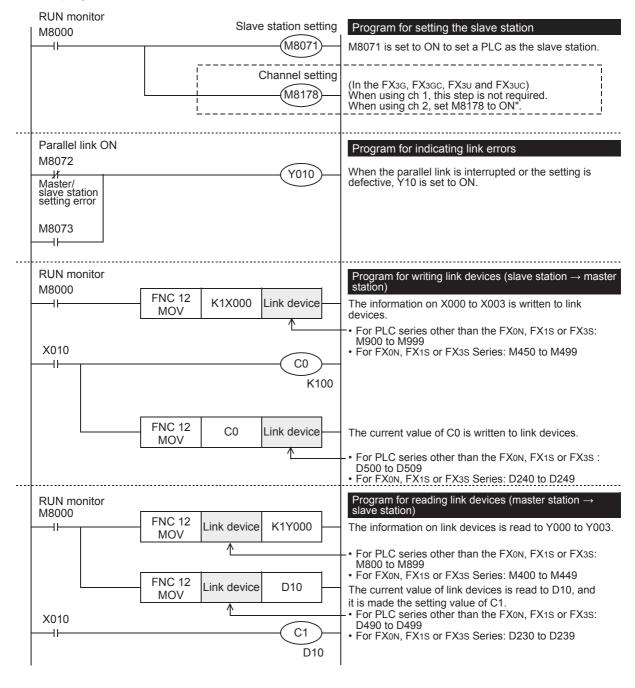


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7.1.3 Creating programs for slave station

Create programs for the slave station.



7.2 High Speed Parallel Link Mode

This section explains the program setting method in the high speed parallel link mode.

7.2.1 Checking contents of related devices

The tables below show devices used in the parallel link.

1. Devices for setting the parallel link

These devices are used for setting the parallel link. Setting of these devices is essential in using the parallel link.

Device	Name	Description
M8070	Parallel link master station declare	Set this device to ON when linking a PLC as the master station.
M8071	Parallel link slave station declare	Set this device to ON when linking a PLC as the slave station.
M8162	High speed parallel link mode	Set this device to ON when using the high speed parallel link mode.
M8178	Channel setting	Set the channel of communication port to be used (in the FX3G, FX3GC, FX3U and FX3UC). When this device is OFF: ch1 When this device is ON: ch2
D8070	Error judgement time (ms)	Set the time for judging error in the parallel link data communication. [Initial value: 500]

2. Devices for judging errors in the parallel link

These devices are used for judging errors in the parallel link. Use them to output link errors to the outside and interlock sequence programs.

Device	Name	Description
M8072	Parallel link ON	This device remains ON while the parallel link is executed.
M8073	Master/slave station setting error	This device turns ON when there is an error in the setting of the master station or slave station.
M8063	Link error	This device turns ON when a communication error occurs.

3. Link devices

1) Sending devices for the master station

These devices are used for sending the information from the master station to the slave station.

To prevent malfunctions, do not change the setting of these devices in the slave station.

The device numbers used and number of devices vary depending on the PLC type. For applicable devices, refer to the tables below.

a) For FX2(FX), FX2C, FX1N, FX1NC, FX2N, FX2NC, FX3G, FX3GC, FX3U or FX3UC Series

Device		Number of devices	Description
Word device	D490, D491	2	The devices in the slave station are automatically updated to the status of devices in the master station.

b) For FX0N, FX1S or FX3S Series

Device		Number of devices	Description
Word device	D230, D231	7	The devices in the slave station are automatically updated to the status of devices in the master station.

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2) Sending devices for the slave station

These devices are used for sending the information from the slave station to the master station. To prevent malfunctions, do not change the setting of these devices in the master station. The device numbers used and number of devices vary depending on the PLC type. For applicable devices, refer to the tables below.

a) For FX2(FX), FX2C, FX1N, FX1NC, FX2N, FX2NC, FX3G, FX3GC, FX3U or FX3UC Series

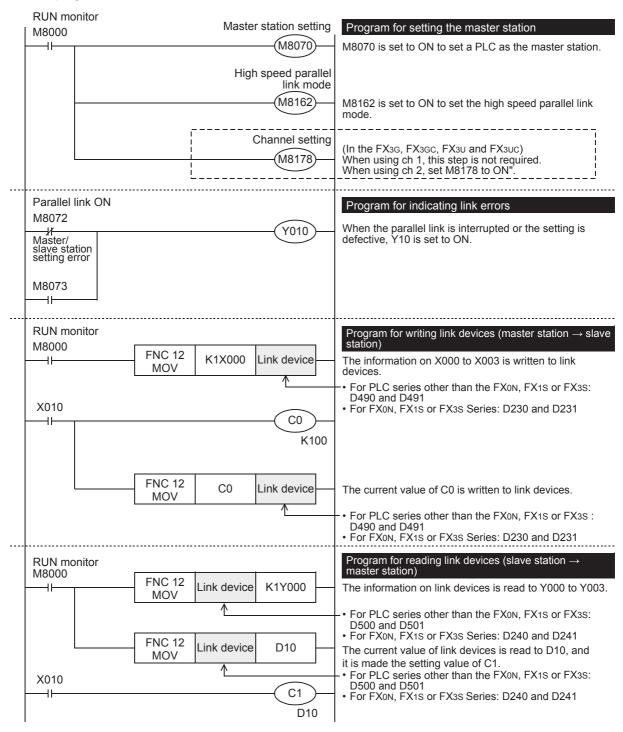
Device		Number of devices	Description
Word device	D500, D501	2	The devices in the master station are automatically updated to the status of devices in the slave station.

b) For FX_{0N}, FX_{1S} or FX_{3S} Series

Device		Number of devices	Description
Word device	D240, D241	2	The devices in the master station are automatically updated to the status of devices in the slave station.

7.2.2 Creating programs for master station

Create programs for the master station.

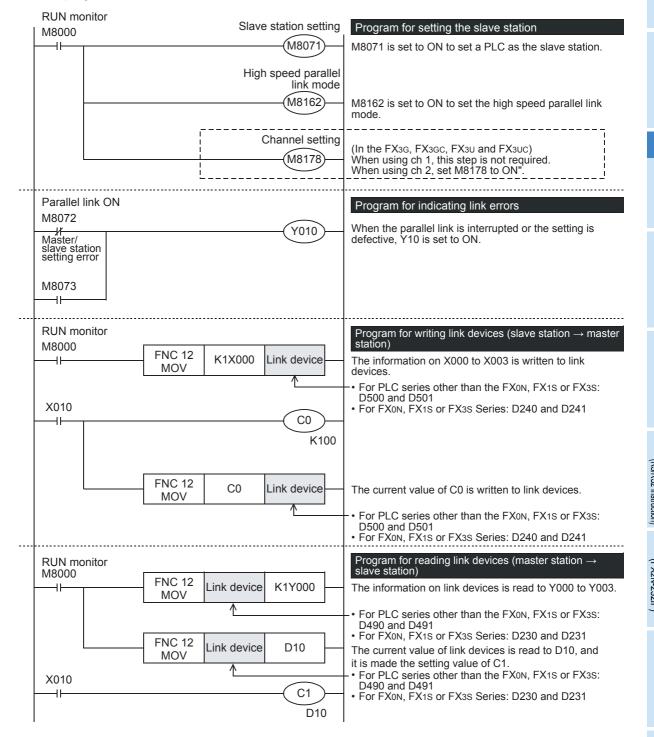


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7.2.3 Creating programs for slave station

Create programs for the slave station.



7.3 Cautions on Program Creation

7.3 Cautions on Program Creation

1. Program for reading link devices

- 1) Do not change the contents of link devices for the other station.
- 2) When a link error occurs, the link device information remains the same as the status just before the error. Create a fail-safe program which does not cause abnormality even if a link error occurs.

2. Cautions on using FX3G, FX3GC, FX3U, FX3UC PLCs

- 1) Only ch1 or ch2 can be set in the parallel link.
- Do not use the N:N Network and the parallel link at the same time.
 (For example, it is not allowed to use ch1 for the N:N Network and simultaneously use ch2 for the parallel link.)

8.1 Practical Example 1 (Regular Parallel Link Mode)

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Practical Program Examples 8.

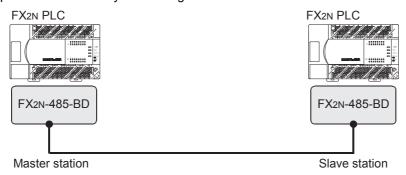
This chapter shows practical programs examples.

8.1 **Practical Example 1 (Regular Parallel Link Mode)**

When many link devices are required, use the regular parallel link mode.

8.1.1 System configuration example

The example below shows a system configuration in which two FX2N PLCs are linked.



- Link range: 100-bit devices and 10-word devices (regular parallel link mode)
- Error judgement time: 500 ms

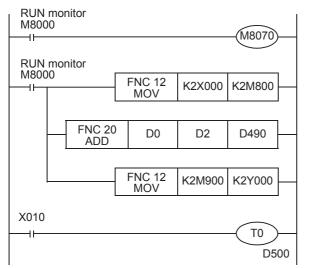
8.1.2 **Setting contents**

The program examples shown later adopt the following communication parameters:

Device	Description	
M8070	Parallel link master station setting	
M8071	Parallel link slave station setting	
D8070	Communication error judgement time	

8.1.3 Program for master station

For the master station, refer to the program shown below.



The ON/OFF status of inputs X000 to X007 in the master station is output to Y000 to Y007 in the slave station.

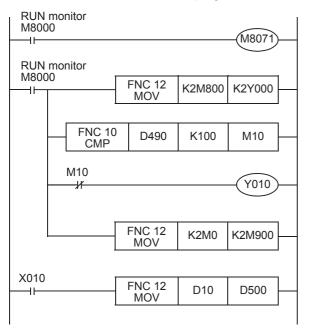
When the calculation result (D0 + D2) in the master station is moved to D490 of the slave station.

The ON/OFF status of M0 to M7 in the slave station is output to Y000 to Y007 in the master station.

The value of D10 in the slave station is stored to the timer setting (T0) in the master station.

8.1.4 Program for slave station

For the slave station, refer to the program shown below.



The ON/OFF status of inputs X000 to X007 in the master station is output to Y000 to Y007 in the slave station.

When the calculation result (D0 + D2) in the master station is 100 or less, Y010 is set to ON in the slave station.

The ON/OFF status of M0 to M7 in the slave station is output to Y000 to Y007 in the master station.

The value of D10 in the slave station stored to the timer setting (T0) in the master station.

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9. Troubleshooting

This chapter explains troubleshooting.

9.1 Checking FX PLC Version Applicability

Verify that the FX PLC main unit is an applicable version.

 \rightarrow For the version applicability check, refer to Section 1.3.

9.2 Checking Communication Status Based on LED Indication

Check the status of the "RD" and "SD" indicator LEDs provided in the optional equipment.

LED s	status	Operation status	
RD	SD	Operation status	
Flashing	Flashing	Data is being sent or received.	
Flashing	Off	Data is received, but is not sent.	
Off	Flashing	Data is sent, but is not received.	
Off	Off	Data is not sent or received.	

While the parallel link is executed normally, both LEDs flash brightly.

If they do not flash, check the wiring and the communication setting in the master and slave stations.

9.3 Checking Installation and Wiring

1. Mounting status

If the communication equipment is not securely connected to the PLC, communication is not possible.

→ For the mounting method, refer to the respective communication equipment manual.

2. Power supply (for FX0N-485ADP)

The FX0N-485ADP requires a driving power supply. Verify that the power supply is correctly provided.

3. Wiring

Verify that the wiring to all communication equipment is correct. If the communication equipment is wired incorrectly, communication is not possible.

→ For wiring method check, refer to Chapter 4.

9.4 Checking Sequence Program

1. Communication setting in the sequence program

Verify that N:N Network (D8173 to D8180) is not set. Using both the parallel link and N:N Network at the same time is not allowed.

Verify that the communication format (D8120, D8400 and D8420) is set correctly. Communication is not possible if a communication port is set twice or more.

After changing any setting, make sure to cycle power to the PLC.

→ For communication setting, refer to Chapter 5.

2. Communication setting using parameters

Verify that the communication settings using parameters are suitable for use. If the communication settings are not suitable for the purpose of use, communication will not function correctly.

After changing any setting, make sure to reboot the PLC's power.

→ For communication setting, refer to Chapter 5.

3. Ethernet port setting (in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the same channel is not used in the Ethernet port setting. Do not set the channel used in parallel link. After changing the setting, make sure to reboot the PLC's power.

4. Presence of VRRD and VRSC instructions

1) Except FX3G, FX3U and FX3UC PLCs

Verify that the VRRD and VRSC instructions are not used in the program.

If these instructions are used, delete them, reboot the PLC's power.

In FX3G PLC

- In the case of the 14 points and 24-point type

Verify that the VRRD and VRSC instructions are not used in the program.

If these instructions are used, delete them, reboot the PLC's power.

- In the case of the 40 points and 60-point type

Verify that the VRRD and VRSC instructions are not used in the program.

If these instructions are used in the program, the communication function is not available in ch2.

Use ch1, or delete these instructions.

After deleting these instructions, reboot the PLC's power.

3) In FX3u and FX3uc PLCs

Verify that the VRRD and VRSC instructions are not used in the program.

If these instructions are used in the program, the communication function is not available in ch1.

Use ch2, or delete these instructions.

After deleting these instructions, reboot the PLC's power.

5. Presence of RS instruction (except FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the RS instruction is not used in the program.

If this instruction is used, delete it, reboot the PLC's power.

6. Presence of RS and RS2 instructions (in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the RS and RS2 instructions are not being used for the same channel.

If these instructions are used for the same channel, delete them, reboot the PLC's power.

7. Presence of EXTR instruction (in FX2N and FX2NC PLCs)

Verify that the EXTR instruction is not used in the program.

If this instruction is used, delete it, then reboot the PLC's power.

8. Presence of IVCK, IVDR, IVRD, IVWR, IVBWR*1, and IVMC instructions (in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the IVCK, IVDR, IVRD, IVWR, IVBWR and IVMC instructions are not being used for the same channel.

If these instructions are used for the same channel, delete them, reboot the PLC's power.

*1. Only available for FX3U and FX3UC PLCs.

9. Presence of ADPRW instructions (in FX3s, FX3g, FX3gc, FX3u and FX3uc PLCs)

Verify that the ADPRW instructions are not being used for the same channel.

If these instructions are used for the same channel, delete them, and reboot the PLC's power.

10.Presence of FLCRT, FLDEL, FLWR, FLRD, FLCMD, and FLSTRD instructions (in FX3U and FX3UC PLCs)

Verify that the FLCRT, FLDEL, FLWR, FLRD, FLCMD and FLSTRD instructions are not being used for the same channel.

If these instructions are used for the same channel, delete them, reboot the PLC's power.

D

9.5 Checking Absence/Presence of Errors

Verify that errors have not occurred in the master station and slave station. Errors can be checked using the flags shown below.

1. Checking the device M8072

While the parallel link is established, M8072 remains ON. If M8072 is OFF, an error has occurred in the parallel link setting or communication.

2. Checking the device M8073

If the parallel link is not set correctly, M8073 turns ON.

If M8073 is ON, verify that the master station and slave station are set correctly in sequence programs.

3. Devices for checking link errors

1) Checking the error flags M8063 and M8438 (in the FX3G, FX3GC, FX3U and FX3UC) If a communication error occurs in the parallel link, the serial communication error flag turns ON. When ch1 is used, M8063 turns ON. When ch2 is used in the FX3G, FX3GC, FX3U and FX3UC, M8438 turns ON.

When the serial communication error flag turns ON, the error code is stored in D8063 or D8438.

2) Checking the error code

When a communication error occurs in parallel link using ch 1, the error code is stored in D8063. When a communication error occurs in parallel link using ch 2, the error code is stored in D8438. The table below shows the details of error codes.

Device	Error code	Description	Action
	0000	No error	
D8063	6312	Character error in parallel link	
D0003	6313	Sum check error in parallel link	Verify that the parallel link
	6314	Format error in parallel link	setting programs are set
D8438 (in FX3G, FX3GC, FX3U and FX3UC)	0000	No error	correctly. Check the wirin
	3812	Character error in parallel link	also.
	3813	Sum check error in parallel link	
	3814	Format error in parallel link	

Caution

The devices for checking link errors are not cleared even after communication errors are reset. Serial communication errors are cleared in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs when the power is turned off and on.

Serial communication errors are cleared in other PLCs when the mode is switched from STOP to RUN.

10. Related Data

10.1 Related Device List

1. Bit devices

Device number	Name	Description	Initial value	Detec- tion	R/W
Devices for co	ommunication setting				
M8070	Parallel link master station setting	Links a PLC as the master station when it turns ON.	-	М	W
M8071	Parallel link slave station setting	Links a PLC as the slave station when it turns ON.	-	L	W
M8162	High speed parallel link mode	Turns ON when two-word device communication mode is selected.	-	M, L	W
M8178	Channel setting	Sets the communication port to be used. (in the FX3G, FX3GC, FX3U and FX3UC) OFF: ch1, ON: ch2		M, L	W
Devices for c	hecking communicatio	n status			
M8072	Parallel link ON	Remains ON while the parallel link is being executed.	_	M, L	R
M8073	Parallel link setting error	Turns ON when an error is included in the setting contents of the master station or slave station.	-	M, L	R
M8063	Serial communication error 1 (ch 1)	Turns ON when an error occurs in serial communication using ch 1.	-	M, L	R
M8438	Serial communication error 2 (ch 2)	Turns ON when an error occurs in serial communication using ch 2. (in the FX3G, FX3GC, FX3U and FX3UC)	-	M, L	R

R: Read only (used as a contact in program)

W: Write only M: Master station

L: Slave station

2. Word devices (data registers)

Device number	Name	Description	Initial value	Detec- tion	R/W
Devices for co	ommunication setting				
D8070	Error judgement time	Sets the error judgement time for data communication in the parallel link.	500	M, L	W
Devices for cl	hecking communication	n status			
D8063	Serial communication error code 1 (ch 1)	Stores the error code when an error occurs in serial communication using ch 1.		M, L	R
D8438	Serial communication error code 2 (ch 2)	Stores the error code when an error occurs in serial communication using ch 2. (in the FX3G, FX3GC, FX3U and FX3UC)	0000	M, L	R
Devices for c					
D8419	Operation mode display (ch 1)	Stores the communication type being used by ch 1. (in the FX3S, FX3G, FX3GC, FX3U and FX3UC)		M, L	R
D8439	Operation mode display (ch 2)	Stores the communication type being used by ch 2. (in the FX3G, FX3GC, FX3U and FX3UC)		M, L	R

R: Read only

W: Write only

M: Master station

L: Slave station

D

10.2 Details of Related Devices

The devices described below are used in parallel link.

10.2.1 Parallel link master station declare [M8070]

When this device is set to ON, the PLC is handled as the master station in the parallel link.

1. Applicable stations

The master station requires program setting.

2. Detailed contents

In the FX PLC to be handled as the master station, set M8070 to "normally ON" using M8000.

3. Cautions on use

Set this device to ON in a sequence program.

10.2.2 Channel setting [M8178]

This device works as the channel setting flag (in the FX3G, FX3GC, FX3U and FX3UC).

1. Applicable stations

The master and slave station require program setting.

2. Detailed contents

When using ch 2 as the communication port, set this device to ON in the sequence program. When using ch 1, the sequence program is not required.

10.2.3 Parallel link slave station declare [M8071]

When this device is set to ON, the PLC is handled as the slave station in the started communication.

1. Applicable stations

The slave station requires program setting.

2. Detailed contents

In the FX PLC to be handled as a slave station, set M8071 to "normally ON" using M8000.

3. Cautions on use

Set this device to ON using a sequence program.

10.2.4 High-speed parallel link mode [M8162]

When M8162 turns OFF, the regular parallel link mode is selected. When M8162 turns ON, the high-speed parallel link mode is selected.

1. Applicable stations

The master and slave station require program setting.

2. Detailed contents

The table below shows the number of link devices.

PLC	Regular parallel link mode		High-speed parallel link mode	
1 20	Bit device (M)	Word device (D)	Bit device (M)	Word device (D)
FX2(FX), FX2C, FX1N, FX1NC, FX2N, FX2NC, FX3G, FX3GC, FX3U, FX3UC	100 in each station	10 in each station	0	2 in each station
FX0N, FX1S, FX3S	50 in each station	10 in each station	0	2 in each station

3. Cautions on use

Set this device to ON using a sequence program.

10.2.5 Parallel link ON [M8072]

This device is provided to verify that the parallel link is being executed.

1. Applicable stations

The master and slave station may check parallel link status.

2. Detailed contents

M8072 remains ON while the parallel link is being executed normally, and remains OFF while the parallel link is not being executed normally.

10.2.6 Parallel link setting error [M8073]

This device is provided to verify that the setting is correct in the master station and slave station in the parallel link.

1. Applicable stations

The master and slave station may check parallel link status.

2. Detailed contents

M8073 remains OFF when the setting is correct in the master station or slave station, and turns ON when the setting is incorrect.

10.2.7 Serial communication error [M8063 and M8438]

These devices are provided to check communication errors. (M8438 is available only in the FX3G, FX3GC, FX3U and FX3UC.)

1. Applicable stations

The master and slave station may check parallel link status.

2. Detailed contents

M8063 turns ON when an error occurs using parallel link on ch 1. When M8063 turns ON, the error code is stored in D8063.

M8438 turns ON when an error occurs using parallel link on ch 2. When M8438 turns ON, the error code is stored in D8438.

3. Cautions on use

Do not set these devices to ON using a program or programming tool.

Serial communication errors are not cleared even when communication is restored.

Serial communication errors are cleared in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs when the power is turned off and on.

Serial communication errors are cleared in other PLCs when the mode is switched from STOP to RUN.

10.2.8 Error judgement time setting [D8070]

This device is provided to set the error judgment time (initial value: 500 ms).

1. Applicable stations

The master and slave station may check parallel link status.

2. Detailed contents

When data transmission requires more time than the time set here, it is regarded as error.

3. Cautions on use

Set the error judgment time for the master station to a value twice or more the scan time in the slave station. If the error judgment time is less than twice the scan time, a serial communication error may occur.

D

10.2.9 Serial communication error code [D8063 and D8438]

These devices store the serial communication error code. (D8438 is available only in the FX3G, FX3GC, FX3U and FX3UC.)

1. Applicable stations

The master and slave station may check the serial communication error code.

2. Detailed contents

The table below shows the details of error codes.

Device	Error code	Description	Action
D8063 6312 (ch 1) 6313 6314		No error	
		Character error in parallel link	
		Sum check error in parallel link	Verify that the parallel link
		Format error in parallel link	setting programs are
	0000	No error	correct, and check the wiring
D8438	3812	Character error in parallel link	also.
(ch 2)	3813	Sum check error in parallel link	
	3814	Format error in parallel link	

3. Cautions on use

Do not set this device to ON using a program or programming tool.

Serial communication errors code are not cleared even when communication is restored.

Serial communication errors are cleared in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs when the power is turned off and on.

Serial communication errors are cleared in other PLCs when the mode is switched from STOP to RUN.

10.2.10 Operation mode display [D8419 and D8439]

These devices store the communication type being used. (in the FX3S, FX3G, FX3GC, FX3U and FX3UC)

1. Detailed contents

These devices store the code of the communication type currently being used in the communication port. When communication port ch1 is used, D8419 stores the communication type.

When communication port ch2 is used, D8439 stores the communication type.

The table below shows the contents of the communication type codes.

Code	Description	
0	Programming communication	
1	PP modem mode	
2	Protocol dedicated to computer link	
3	N:N Network	
4	RS instruction	
5	RS2 instruction	
6	Parallel link	
7	Inverter instruction	
8	Variable analog potentiometer expansion board is used.	
9	MODBUS communication	
10	CF-ADP	
11	ENET-ADP	
12	Input/output expansion board is used.	

MEMO

Apx.A Discontinue models

FX Series Programmable Controllers User's Manual [Data Communication Edition]

D. Computer Link

Foreword

This manual explains "computer link" provided for the MELSEC-F FX Series Programmable Controllers and should be read and understood before attempting to install or use the unit.

Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

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1.1 Outline of System

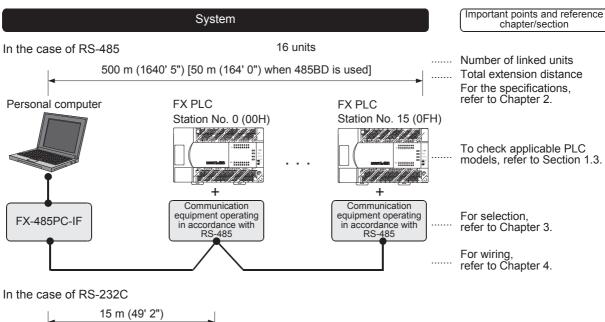
1. Outline

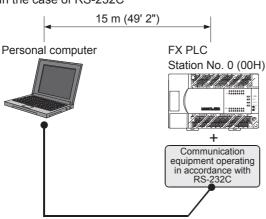
This chapter explains computer link.

1.1 Outline of System

Computer link allows connection of up to sixteen FX PLCs and A PLCs to a personal computer working as the master station to link data.

- 1) Up to sixteen PLCs can be connected in computer link.
- 2) Applicable computer link protocols are the same as dedicated supported computer link protocols units in the A Series PLC. (But the supported formats and commands are limited.)

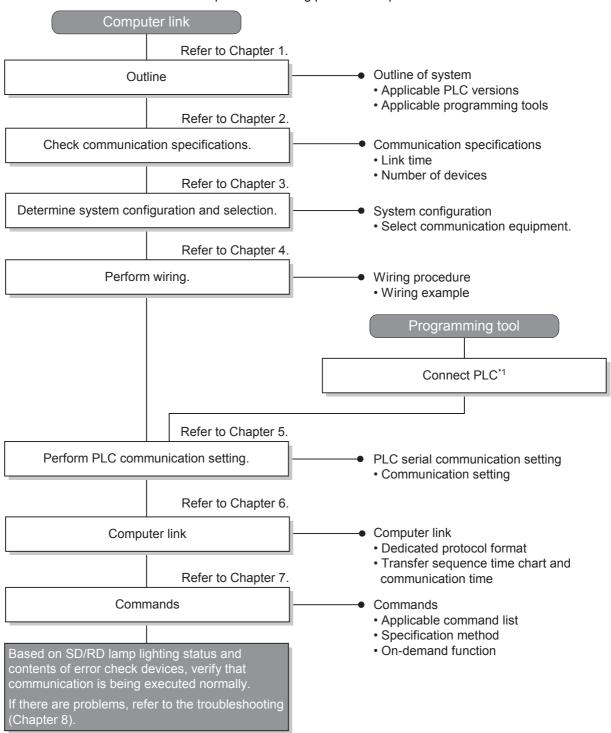




The number of devices handled all at once varies depending on the command and the types of devices.

1.2 Procedures Before Operation

The flow chart below shows the Computer Link setting procedures up until data link.



^{*1} For the programming tool to PLC connection procedure, refer to the "Programming Communication" section in this manual or the respective programming tool manual.

For details on operating procedures, refer to the respective programming tool manual.

1.3 Communication Type Applicability in PLC

1.3.1 Applicable versions

The communication type is applicable in the following versions.

- ✓: Applicable (If applicable versions of main units are limited, they are described inside ().)
- -: Not applicable

PLC	Applicability (applicable version)	Remarks
FX3UC Series	✓	
FX3U Series	✓	
FX3GC Series	✓	
FX3G Series	✓	
FX3S Series	✓	
FX2NC Series	✓	
FX2N Series	✓ (Ver. 1.06 or later)	The version can be checked by monitoring D8001.
FX1NC Series	✓	
FX1N Series	✓	
FX1S Series	✓	
FX ₀ N Series	✓ (Ver. 1.20 or later)	The version can be checked by monitoring D8001.
FX ₀ S Series	_	Computer link is not provided.
FX ₀ Series	_	Computer link is not provided.
FX2C Series	√ (Ver. 3.30 or later) ^{*1}	
FX2(FX) Series	√ (Ver. 3.30 or later) ^{*1}	
FX1 Series	_	Computer link is not provided.

^{*1.} Applicable in products manufactured in June, 1996 and later (manufacturer's serial No.: 66**** and later).

1.3.2 Version check

The PLC version can be checked by reading the last three digits of device D8001.

→ For a detailed description of the version check, refer to A. Common Items Section 4.2.

1.3.3 How to look at the manufacturer's serial number

The year and month of production of the PLC main unit can be checked on the nameplate, and "LOT" indicated on the front of the product.

→ For a detailed description of the How to look at the manufacturer's serial number, refer to A. Common Items Section 4.1.

1.3.4 Products whose production was stopped

Production was stopped for some models of MELSEC-F Series PLCs and programming tools described in this manual. For models whose production was stopped, refer to Appendix A.

To see the latest available products, refer to the general catalog.

1.4 Programming Tool Applicability

1.4.1 For applicable versions

The programming tool is applicable for each FX Series from the following version shown:

1. English versions

Product name	Model name	Applicable version	Remarks
FX3U and FX3UC P	PLCs		
GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later	
GX Developer	SW□D5C(F)-GPPW-E	Ver. 8.18U or later	-
FX-30P		Ver. 1.00 or later	
GOT1000 Series d	GOT1000 Series display units		1000 Series display units for applicable porting the list editor function.
FX3G PLC			
GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later	
GX Developer	SW□D5C(F)-GPPW-E	Ver. 8.72A or later	-
FX-30P		Ver. 1.00 or later	
GOT1000 Series d	isplay units		1000 Series display units for applicable porting the list editor function.
FX3GC PLC			
GX Works2	SW□DNC-GXW2-E	Ver. 1.77F or later	
FX-30PSW□DNC-	·GXW2-E	Ver. 1.30 or later	-
GOT1000 Series d	isplay units		1000 Series display units for applicable porting the list editor function.
FX3S PLC			
GX Works2	SW□DNC-GXW2-E	Ver. 1.492N or later	
FX-30P	-	Ver. 1.50 or later	-
GOT1000 Series d	isplay units		1000 Series display units for applicable porting the list editor function.
FX2N and FX2NC P	PLCs		
GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later	
GX Developer	SW□D5C(F)-GPPW-E	SW2 A or later	
FX-PCS/WIN-E	SW0PC-FXGP/WIN-E	Ver. 1.00 or later	
FX-30P	-	Ver. 1.00 or later	-
FX-20P-E(-SET0) FX-20P-MFXC-E		Ver. 3.00 or later	
FX-10P-E		Ver. 3.00 or later	
GOT-F900 Series display units F940WGOT-TWD-E F940GOT-*WD-E F940GOT-*BD-H-E F940GOT-*BD-RH-E		F940GOT-LBD-H-E, F94	GOT-SWD-E (Ver. 1.00 or later) 0GOT-SBD-H-E (Ver. 1.00 or later) 040GOT-SBD-RH-E (Ver. 1.00 or later)
GOT1000 Series d	GOT1000 Series display units		T1000 Series display units for applicable porting the list editor function.
FX1S, FX1N and FX1NC PLCs			
GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later	
GX Developer	SW□D5C(F)-GPPW-E	SW5 A or later	
FX-PCS/WIN-E	SW0PC-FXGP/WIN-E	Ver. 3.00 or later Ver. 1.00 or later	
FX-30P	FX-30P		-
FX-20P-E(-SET0) FX-20P-MFXD-E		Ver. 4.00 or later	
FX-10P-E		Ver. 4.00 or later	

Product name	Model name	Applicable version	Remarks		
GOT-F900 Series display units					
F940WGOT-TWD-E		F940WGOT-TWD-E (Ve	F940WGOT-TWD-E (Ver. 1.00 or later)		
F940GOT-*WD-E		F940GOT-LWD-E, F940	F940GOT-LWD-E, F940GOT-SWD-E (Ver. 1.00 or later)		
F940GOT-*BD-H-E		F940GOT-LBD-H-E, F94	F940GOT-LBD-H-E, F940GOT-SBD-H-E (Ver. 1.00 or later)		
F940GOT-*BD-RH-E		F940GOT-LBD-RH-E, F940GOT-SBD-RH-E (Ver. 1.00 or later)			
GOT1000 Series display units			Γ1000 Series display units for applicable porting the list editor function.		

2. Japanese versions

Product name	Model name	Applicable version	Remarks	
FX3U and FX3UC Pl	_Cs			
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later		
GX Developer	SW□D5C(F)-GPPW-J	Ver. 8.13P or later	-	
FX-30P		Ver. 1.00 or later		
GOT1000 Series dis	splay units		T1000 Series display units for applicable oporting the list editor function.	
FX3G PLC				
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later		
GX Developer	SW□D5C(F)-GPPW-J	Ver. 8.72A or later	-	
FX-30P		Ver. 1.00 or later		
GOT1000 Series dis	splay units		T1000 Series display units for applicable oporting the list editor function.	
FX3GC PLC				
GX Works2	SW□DNC-GXW2-J	Ver. 1.77F or later		
FX-30P	•	Ver. 1.30 or later	-	
GOT1000 Series dis	splay units		T1000 Series display units for applicable oporting the list editor function.	
FX3S PLC				
GX Works2	SW□DNC-GXW2-J	Ver. 1.492N or later		
FX-30P		Ver. 1.50 or later	-	
GOT1000 Series dis	splay units	Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function.		
FX2N and FX2NC PL	_Cs			
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later		
GX Developer	SW□D5C(F)-GPPW-J	SW2 A or later		
FX-PCS/WIN	SW0PC-FXGP/WIN	Ver. 2.00 or later		
FX-PCS-KIT/98	SW1PC-FXGP/98(-3,-5)	Ver. 4.00 or later		
FX-PCS/98-3	SW1PC-FXGP/98-3	Ver. 4.00 or later		
FX-PCS-KIT/V-3	SW1PC-FXGP/V3	Ver. 2.00 or later	-	
FX-A7PHP-KIT	SW1RX-GPPFX	Ver. 3.00 or later		
FX-30P	•	Ver. 1.00 or later		
FX-20P(-SET0) FX-20P-MFXC		Ver. 4.00 or later		
FX-10P(-SET0)		Ver. 3.00 or later		
GOT-F900 Series display units F940WGOT-TWD F940GOT-*WD F940GOT-*BD-H F940GOT-*BD-RH		F940GOT-LBD-H, F9400	1.00 or later) DT-SWD (Ver. 1.00 or later) GOT-SBD-H (Ver. 1.00 or later) 0GOT-SBD-RH (Ver. 1.00 or later)	
GOT1000 Series dis	splay units		Γ1000 Series display units for applicable porting the list editor function.	

Product name	Model name	Applicable version	Remarks	
FX1S, FX1N and FX	INC PLCs			
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later		
GX Developer	SW□D5C(F)-GPPW-J	SW5 A or later		
FX-PCS/WIN	SW0PC-FXGP/WIN	Ver. 4.00 or later		
FX-PCS/98-3	SW1PC-FXGP/98-3	Ver. 5.00 or later	<u>_</u>	
FX-30P	-	Ver. 1.00 or later		
FX-20P(-SET0) FX-20P-MFXD		Ver. 5.00 or later		
FX-10P(-SET0)		Ver. 4.00 or later		
GOT-F900 Series d F940WGOT-TWD F940GOT-*WD F940GOT-*BD-H F940GOT-*BD-RH	isplay units	F940WGOT-TWD (Ver. 1.00 or later) F940GOT-LWD, F940GOT-SWD (Ver. 1.00 or later) F940GOT-LBD-H, F940GOT-SBD-H (Ver. 1.00 or later) F940GOT-LBD-RH, F940GOT-SBD-RH (Ver. 1.00 or later)		
GOT1000 Series dis	splay units	Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function.		

1.4.2 For non-applicable versions (setting an alternative model)

Even programming tool not applicable to a PLC can create programs when an alternative model is set. In this case, however, programming is enabled only in the function ranges provided for the alternative PLC model such as instructions and program size.

Model to be programmed	Model to be set		Priority:	$High \to Lo$	w
FX3UC Series	FX3UC	\rightarrow	FX2N	\rightarrow	FX2(FX)
FX3U Series	FX3U, FX3UC	\rightarrow	FX2N	\rightarrow	FX2(FX)
FX3GC Series	FX3G, FX3GC	\rightarrow	FX1N*1	\rightarrow	FX2N ^{*1}
FX3G Series	FX3G	\rightarrow	FX ₁ N ^{*1}	\rightarrow	FX2N ^{*1}
FX3S Series	FX3S	\rightarrow	FХзG	\rightarrow	FX ₁ N ^{*1}
FX2NC Series	FX2NC, FX2N	\rightarrow	FX2(FX)		
FX2N Series	FX2N	\rightarrow	FX2(FX)		
FX1NC Series	FX1NC, FX1N	\rightarrow	FX2N	\rightarrow	FX2(FX)
FX1N Series	FX1N	\rightarrow	FX2N	\rightarrow	FX2(FX)
FX1s Series	FX1S	\rightarrow	FX2(FX)		
FX0N Series	FXon	\rightarrow	FX2(FX)		
FXos Series	FX0S	\rightarrow	FX2(FX)		
FX ₀ Series	FX0	\rightarrow	FX2(FX)		
FX2C Series	FX2C, FX2(FX)	\rightarrow	FX2(FX)		
FX2(FX) Series	FX2(FX)				
FX1 Series	FX1				

^{*1. &}quot;FX2N" is selected when the FX-10P(-E) is used.

Point

In the FX3S PLC, set the memory capacity for PLC parameters to 4,000 steps or less.

Арх.А

Specifications

This chapter explains the communication specifications and performance.

2.1 **Communication Specifications (Reference)**

Communication is executed within the specifications shown in the table below. The baud rate, etc. can be changed in the parameter settings of a programming tool or in a sequence program.

Item		Specifications	Remarks		
Number of connectable units		16 maximum			
Transmission standard		RS-485 or RS-232C standard			
Maximum total extension distance		RS-485: 500 m (1640' 5") or less [50 m (164' 0") or less when 485BD is included in system] RS-232C: 15 m (49' 2") or less	Distance varies depending on communication equipment type.		
Protocol type		Computer link (dedicated protocol)	Formats 1 and 4 are applicable.		
Control procedure		_			
Communication method		Half-duplex, bidirectional communication			
Baud rate		300, 600, 1200, 2400, 4800, 9600, 19200 or 38400*1 bps			
	Start bit	Fixed			
Character	Data bit	7 or 8-bit			
format	Parity bit	None, odd or even			
	Stop bit	1 or 2-bit			
Header		Fixed			
Terminator		Fixed			
Control line		Fixed			
Sum check		Provided or not provided			

^{*1.} FX3u and FX3uc Series PLC Ver. 2.41 or later, and FX3s, FX3G, FX3GC Series PLC is applicable.

2.2 Link Specifications

2.2.1 Applicable commands and number of device points

Name		Command			Number of points processed in one-time update			
		Sym- bol	ASCII code	Contents of processing	FX0N, FX1S	FX2(FX), FX2C, FX1N, FX1NC, FX2N, FX2NC	FX3S, FX3G, FX3GC, FX3U, FX3UC	
		Unit: Bit	BR	42H, 52H	Reads bit devices in 1 point units.	54	256	256
		Unit: Word	WR	57H, 52H	Reads bit devices in 16 point units.	13 words 208 points	32 words 512 points	32 words 512 points
					Read word devices in 1 point units.	13 ^{*4}	64 ^{*2}	64 ^{*2}
			QR ^{*1}	51H, 52H	Reads bit devices in 16 point units.	_	_	32 words 512 points
					Read word devices in 1 point units.	_	_	64 ^{*2}
		Unit: Bit	BW	42H, 57H	Writes bit devices in 1 point units.	46	160	160
			ww	57H, 57H	Writes bit devices in 16 point units.	10 words 160 points	10 words 160 points	10 words 160 points
mer	writing	Unit:			Writes word devices in 1 point units.	11 ^{*5}	64 ^{*2}	64 ^{*2}
Device memory		Word	QW ^{*1}	51H, 57H	Writes bit devices in 16 point units.	_	_	10 words 160 points
					Writes word devices in 1 point units.	_	_	64 ^{*2}
	Test (random	Unit: Bit	ВТ	42H, 54H	Specifies bit devices arbitrarily in 1 point units, and sets or resets them.	10	20	20
		Unit: Word	WT	57H, 54H	Specifies bit devices arbitrarily in 16 point units, and sets or resets them.	6 words 96 points	10 words 160 points	10 words 160 points
					Specifies word devices arbitrarily in 1 point units, and writes them.	6 ^{*3}	10 ^{*3}	10 ^{*3}
			QT ^{*1}	51H, 54H	Specifies bit devices arbitrarily in 16 point units, and sets or resets them.	_	_	10 words 160 points
			Qi.	3111, 5411	Specifies word devices arbitrarily in 1 point units, and writes them.	_	_	10 ^{*3}
	Remote RUN		RR	52H, 52H	Requests remote RUN or remote			
PLC	Remote STOP		RS	52H, 53H	STOP to PLC.	- -		_
	PLC model name reading		PC	50H, 43H	Reads PLC model name.			
Global		GW	47H, 57H	Turns global signal ON or OFF (M8126 in FX Series) in all PLCs connected in computer link.	1 1		1	
On-demand		_	_	Set the sending request flag to ON in PLC (only when 1-to-1 connection is adopted in system configuration).	Maximum quantity specified in sequence program: 13 words	Maximum quantity specified in sequence program: 64 words	Maximum quantity specified in sequence program: 64 words	
Loop-back test		TT	54H, 54H	Returns received characters back to the computer as they are.	25 characters	254 characters	254 characters	

^{*1.} Available only in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs.

^{*2. 32} points when 32-bit counters (C200 to C255) are specified.

^{*3. 32-}bit counters (C200 to C255) are not applicable.

^{*4. 6} points when 32-bit counters (C200 to C255) are specified.

^{*5. 5} points when 32-bit counters (C200 to C255) are specified.

2.2.2 Applicable device ranges

The tables below show devices and device number ranges applicable for the device memory access.

• Construct each of the BR, BW, BT, WR, WW, and WT commands in five characters.

• Construct each of the QR, QW, and QT commands in seven characters.

Device + Device number = 7 characters

$$\begin{pmatrix}
1 \text{ character} \\
2 \text{ characters for timer or counter}
\end{pmatrix}
\begin{pmatrix}
6 \text{ characters} \\
5 \text{ characters for timer or counter}
\end{pmatrix}$$

1. Bit devices

FX PLCs do not support timer coils (TC) and counter coils (CC).

			Device	numbe	r range (character)			Device number		vailab mman	
Device	FX1S	FXon	FX2(FX), FX2C	FX1N, FX1NC	FX2N, FX2NC	FX3S	FX3G, FX3GC	FX3U, FX3UC	expression Decimal/ Octal	BR, BW, BT	WR, WW, WT	QR, QW, QT
Input relay	X0000 to X0017	X0000 to X0177	X0000 to X0267	X0000 to X0177	X0000 to X0337	X0000 to X0017	X0000 to X0177	X0000 to X0377		✓	✓	
(X)			_			X000000 to X000017	X000000 to X000177	X000000 to X000377	Octal		_	✓
Output relay	Y0000 to Y0015	Y0000 to Y0177	Y0000 to Y0267	Y0000 to Y0177	Y0000 to Y0337	Y0000 to Y0015	Y0000 to Y0177	Y0000 to Y0377	Ootai	√	✓	_
(Y)			_			Y000000 to Y000015	Y000000 to Y000177	Y000000 to Y000377		✓ —	_	✓
Auxil- iary	M0000 t	o M0511	M0000 to	M1535	M0000 to M3071	M0000 to M1535	M0000 to	o M7679		✓	✓	_
relay (M)	_					M000000 to M001535	M0000 M000				_	✓
State relay	S0000 to S0127 S0000 to S0999			\$0000 to \$0255	S0000 to	o S4095		√	✓	_		
(S)	_					S000000 to S000255		S0000 S004			_	✓
Special	M8000 t	o M8254	M800	00 to M82	255	M8	000 to M85	511		✓	✓	_
auxiliary relay (M)			_				8000 to M00		Desimal		_	✓
Timer	TS000 t	o TS063	TS00	00 to TS2	255	TS000 to TS137	TS000 to TS319	TS000 to TS511	Decimal	✓	_	_
contact (T)			_			TS00000 to TS00137	TS00000 to TS00319	TS00000 to TS00511		_	_	_
Counter	CS000 to CS031 CS235 to CS255	CS000 to CS031 CS235 to CS254	CS00	CS000 to CS255		CS000 to CS031 CS200 to CS255	CS000 to	o CS255		√	_	_
(C)			_			CS00000 to CS00031 CS00200 to CS00255	CS000 CS00			_	wwi, wt	_

2. Word devices

			Devic	e numbe	r range (character)			Device Avail number comm			
Device	FX1S	FX0N	FX2(FX), FX2C	FX1N, FX1NC	FX2N, FX2NC	FX3S	FX3G, FX3GC	FX3U, FX3UC	expression Decimal/ Octal	BR, BW, BT	WR, WW, WT	QR, QW, QT
Timer	TN00 TN0		TN0	00 to TN2	255	TN000 to TN137	TN000 to TN319	TN000 to TN511			✓	
value (T)	011000	011000	_			TN00000 to TN00137 CN000	TN00000 to TN00319	TN00000 to TN00511			_	✓
Counter current	CN000 to CN031 CN235 to CN255	to CN031 CN235 to	CN0	CN000 to CN255			CN000 to	o CN255			√ *1	_
value (C)						CN00000 to CN00031 CN00200 to CN00255		000 to 0255			1	√ *1
Data register	D0000 to D0000 to D0999		D000 D79	00 to 999	D0000 to D2999	D0000 t	o D7999	Decimal	_	~	_	
(D)	_			D000000 to D002999	D000	000 to 7999				✓		
File register (D)	_	D1000 to D2499	D1000 to D2999			_					\ 	
RAM file register	_	_	D6000 to D7999			_					√	
(D) Exten-					_		DOOO t	o R9999			<u> </u>	
sion register (R)							R000000 to	R000000 to R032767			, —	<u> </u>
Special data	D800 D82		D80	00 to D82	255	D8	000 to D85	511			✓	_
register (D)			_			D008	000 to D00	8511				✓

^{*1.} The WT and QT commands do not support 32-bit counters (C200 to C255).

Caution

- 1) When using bit devices in a command requiring specification in 1-word units, make sure that the head device number is a multiple of "8".
- 2) Special auxiliary relays and special data registers are classified into ones for read only, write only and ones for system only.
 - If data is written to any range in which writing is not allowed, an error may occur in the PLC. For details on special auxiliary relays and special data registers, refer to the manual of the PLC.
- 3) In FX1s, FX1n, FX1nc, FX2n, FX2nc, FX3s, FX3G, FX3G, FX3U and FX3Uc PLCs, the PLCs cannot access the program area (in the built-in RAM, memory cassette and built-in EEPROM) when users set file registers (D).
 - In FX3U and FX3UC PLCs, extension registers (R) cannot access extension file registers (ER) in a mounted memory cassette.
 - In FX3G, FX3GC PLCs, extension registers (R) cannot access extension file registers (ER).

2.2.3 Link time

1. Data transfer



2. Data transfer time

Time to read continuous word devices (timers, counters or data registers) in one station = $(21^{*1} + 4 \times \text{Number})$ of read points^{*2}) × Time to send or receive 1 character (ms) + Interval time + Maximum scan time (special data register D8012) in PLC × 3 + Message waiting time

Time to write continuous word devices (timers, counters or data registers) in one station = $(20^{*1} + 4 \times \text{Number})$ of written points*2) x Time to send or receive 1 character (ms) + Interval time + Maximum scan time (special data register D8012) in PLC + Message waiting time

This is the number of characters when the protocol format 1 is used and the sum check is not provided.

When the protocol format 4 is used, add "4" to this value.

When the sum check is provided, add "4" to this value also.

The number of points is counted in 1-word units.

3. Time to send or receive one character

The table below shows the time required to send or receive one character when the start bit is 1-bit, the data length is 7-bit, the parity is 1-bit, and the stop bit is 1-bit.

Transmission speed (baud rate) (bps)	Time to send or receive 1 character (ms)
300	33.34
600	16.67
1200	8.34
2400	4.17
4800	2.08
9600	1.04
19200	0.52
38400 ^{*3}	0.26

The tables below show the data transfer times depending on the number of continuously read or written word devices at the transmission speeds of 9600 bps and 19200 bps when the message waiting time is 0 ms*4, the maximum scan time is 20 ms, and the interval time is 100 ms.

<When the transmission speed is 9600 bps> Unit : sec
<When the transmission speed is 19200 bps> Unit : sec

Number of	Number of stations				Number of	Nui	mber of stati	ons
data points	1	8 16 data points	data points	1	8	16		
10	0.3	1.9	3.7		10	0.2	1.6	3.2
32	0.4	2.6	5.2	_	32	0.3	2.0	3.9
64	0.5	3.7	7.3	_	64	0.4	2.5	5.0

When the types of read or written devices increase, "Data transfer time shown in above table × Number of device types" is required.

When the number of read or written points exceeds "64"*5, the transfer time increase.

Accordingly, for achieving efficient data transfer, it is recommended to decrease the number of types of transferred devices and use as many continuous device numbers as possible.

- *3. Available only in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs.
- The message waiting time is "0" when the RS-485 interface and two-pair wiring are used. The message waiting time is "0" also when the RS-232C interface is used. When one-pair wiring is adopted, a message waiting time of 70 to 150 ms is required for each transfer. Add this message waiting time.
- The maximum number of points is as follows for the FX0N and FX1S PLCs: Maximum number of read points : 13

Maximum number of written points: 11

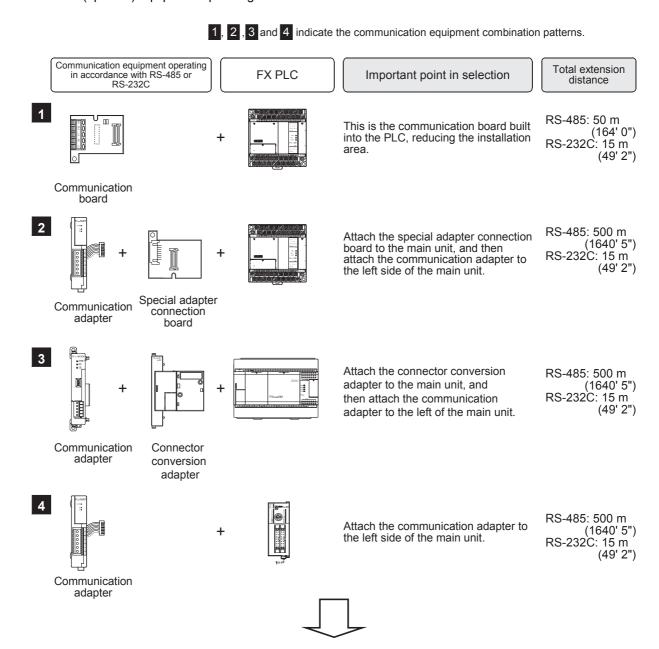
3. System Configuration and Equipment Selection

This chapter explains the system configuration and communication equipment selection operating in accordance with RS-485 or RS-232C required by FX PLCs.

3.1 System Configuration

This section outlines the system configuration required to use computer link.

Connect (optional) equipment operating in accordance with RS-485 or RS-232C to the FX PLC main unit.



For communication equipment combinations for each FX Series, refer to the next page.

C

3.2 Applicable FX PLC and Communication Equipment

Select a (optional) communication equipment combination, and put a check mark in the "Check" column. During selection, pay attention to the following:

- In the table below, only the external dimensions are different between the units shown in "FX2NC-485ADP/ FX0N-485ADP". Select either one.
- In the table below, only the outside dimensions and D-SUB connector shape are different between units shown in "FX2NC-232ADP/FX0N-232ADP". Select either one.
- In the table below, only the cable is different between the units shown in "FX3G-485-BD/FX3G-485-BD-RJ". Select either one.
- Computer link is not provided for the FX1, FX0 or FX0s PLCs.

3.2.1 For communication in accordance with RS-232C

FX Series	Communication equipment (option)	Total extension distance	Check
FXON	FX2NC-232ADP FX0N-232ADP (9-pin D-Sub, male) (25-pin D-Sub, female)	15 m (49' 2")	
	FX1N-232-BD (9-pin D-Sub, male)	15 m (49' 2")	
FX1S	FX1N-CNV-BD FX2NC-232ADP FX1N-CNV-BD FX0N-232ADP (25-pin D-Sub, female)	15 m (49' 2")	
	FX1N-232-BD (9-pin D-Sub, male)	15 m (49' 2")	
FX1N	FX1N-CNV-BD FX2NC-232ADP FX1N-CNV-BD FX0N-232ADP (25-pin D-Sub, female)	15 m (49' 2")	

FX Series	Communication equipment (option)	Total extension distance	Check
	FX2N-232-BD (9-pin D-Sub, male)	15 m (49' 2")	
FX2N	FX2N-CNV-BD FX2NC-232ADP (9-pin D-Sub, male) FX2N-CNV-BD FX0N-232ADP (25-pin D-Sub, female)	15 m (49' 2") 15 m (49' 2")	
	FX ₃ G-232-BD (9-pin D-Sub, male)		
FX3S	FX3S-CNV-ADP FX3U-232ADP(-MB) (9-pin D-Sub, male)		
Pro-201	FX3G-232-BD (9-pin D-Sub, male)		
FX3G (14-point, 24-point type)	FX3G-CNV-ADP FX3U-232ADP(-MB) (9-pin D-Sub, male)		

Communication equipment (option)	distance	Check
When using channel 1 (ch 1)		
ch1 FX3G-232-BD (9-pin D-Sub, male) The communication equipment works as ch1 when connected to the option connector 1.	15 m (49' 2")	
FX3G-CNV-ADP FX3U-232ADP(-MB) (9-pin D-Sub, male)	15 m (49' 2")	
ch2 FX3G-232-BD (9-pin D-Sub, male) The communication equipment works as ch2 when connected to the option connector 2.	15 m (49' 2")	
chl ch2 + + + + + + + + + + + + + + + + + + +	15 m (49' 2")	
	Ch1 FX3G-232-BD (9-pin D-Sub, male) The communication equipment works as ch1 when connected to the option connector 1. Ch1 FX3G-CNV-ADP FX3U-232ADP(-MB) (9-pin D-Sub, male) When using channel 2 (ch 2) Ch2 FX3G-232-BD (9-pin D-Sub, male) The communication equipment works as ch2 when connected to the option connector 2. Ch1 FX3G-CNV-ADP FX3U-DADP(-MB) (Where prepresents 232 and 485). FX3U-232ADP(-MB) (9-pin D-Sub, male)	ch1 FX3G-232-BD (9-pin D-Sub, male) The communication equipment works as ch1 when connected to the option connector 1. ch1 FX3G-CNV-ADP FX3U-232ADP(-MB) (9-pin D-Sub, male) When using channel 2 (ch 2) ch2 ch2 FX3G-CNV-ADP FX3U-DADP(-MB) (9-pin D-Sub, male) The communication equipment works as ch2 when connected to the option connector 2. ch2 FX3G-CNV-ADP FX3U-DADP(-MB) (Where Directions (9-pin D-Sub, male) 232 and 485). Ch2 is not available when the FX3G-8AV-BD, FX3G-4EX-BD or

FX Series	Communication equipment (option)	Total extension distance	Check
	When using channel 1 (ch 1) ch1 FX3U-232-BD (9-pin D-Sub, male)	15 m (49' 2")	
	FX3U-CNV-BD FX3U-232ADP(-MB) (9-pin D-Sub, male)	15 m (49' 2")	
FX3U	When using channel 2 (ch 2) ch1 ch2 FX3U-□-BD (Where □ represents 232, 422, 485, USB and 8AV) When a FX3U-8AV-BD is used, it occupies one communication port	15 m (49' 2")	
	channel. ch1 ch2 FX3U-CNV-BD FX3U-232ADP(-MB), FX3U-485ADP(-MB), FX3U-485ADP(-MB), FX3U-CF-ADP When a FX3U-CF-ADP is used, it occupies one communication port channel.	15 m (49' 2")	
FX1NC	FX2NC-232ADP (9-pin D-Sub, male) (25-pin D-Sub, female)	15 m (49' 2")	
FX2NC	FX2NC-232ADP FX0N-232ADP (9-pin D-Sub, male) (25-pin D-Sub, female)	15 m (49' 2")	

FX Series	Communication equipment (option)	Total extension distance	Check
	when using channel 1 (ch 1) ch1 FX3U-232ADP(-MB) (9-pin D-Sub, male) When using channel 2 (ch 2)	15 m (49' 2")	
FX3GC	FX3U-232ADP(-MB), FX3U-485ADP(-MB) (9-pin D-Sub, male)	15 m (49' 2")	
8 ⊕	when using channel 1 (ch 1) ch1 FX3U-232ADP(-MB) (9-pin D-Sub, male) When using channel 2 (ch 2)	15 m (49' 2")	
FX3UC (D, DS, DSS)	ch1	15 m (49' 2")	
	When a FX3U-CF-ADP is used, it occupies one communication port channel.		

FX Series	Communication equipment (option)	Total extension distance	Check
	When using channel 1 (ch 1)		
	ch1 FX3U-232-BD (9-pin D-Sub, male)	15 m (49' 2")	
اد الله الله الله الله الله الله الله ال	r Ch1 FX3U-CNV-BD FX3U-232ADP(-MB) (9-pin D-Sub, male)	15 m (49' 2")	
3.3	When using channel 2 (ch 2) ch1 ch2		
FX3UC-32MT-LT (-2)	ch1 FX3U-□-BD (Where □ represents 232, 422, 485, USB and 8AV) When a FX3U-8AV-BD is used, it occupies one communication port channel.	15 m (49' 2")	
	ch1 ch2 FX3U-CNV-BD FX3U-232ADP(-MB), FX3U-232ADP(-MB) FX3U-485ADP(-MB), (9-pin D-Sub, male) FX3U-CF-ADP When a FX3U-CF-ADP is used, it occupies one communication port	15 m (49' 2")	
	channel.		
FX2(FX)	FX-232ADP (25-pin D-Sub, female)	15 m (49' 2")	
FX2C	FX-232ADP (25-pin D-Sub, female)	15 m (49' 2")	
-	(F 300) (3.1.0.0)		

3.2.2 For communication in accordance with RS-485

FX Series	Communication equipment (option)	Total extension distance	Check
FXON	FX2NC-485ADP (European terminal block) (Terminal block)	500 m (1640' 5")	
FX1s FX1n-CNV-	FX1N-485-BD (European terminal block)	50 m (164' 0")	
	FX1N-CNV-BD FX2NC-485ADP FX1N-CNV-BD FX0N-485ADP (European terminal block)	500 m (1640' 5")	
	FX1N-485-BD (European terminal block)	50 m (164' 0")	
FX1N	FX1N-CNV-BD FX2NC-485ADP FX1N-CNV-BD FX0N-485ADP (Terminal block)	500 m (1640' 5")	
	FX2N-485-BD	50 m (164' 0")	
FX2N	FX2N-CNV-BD FX2NC-485ADP FX2N-CNV-BD FX0N-485ADP (European terminal block)	500 m (1640' 5")	

FX Series	Communication equipment (option)	Total extension distance	Check
	FX3G-485-BD FX3G-485-BD-RJ (European terminal block) (RJ45 connector)	50 m (164' 0")	
FX3S	FX3s-CNV-ADP FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	
ESS TO SECOND TO	FX3G-485-BD FX3G-485-BD-RJ (European terminal block) (RJ45 connector)	50 m (164' 0")	
FX3G (14-point, 24-point type)	FX3G-CNV-ADP FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	
	When using channel 1 (ch 1) chl chl		
750-40M	FX3G-485-BD FX3G-485-BD-RJ (European terminal block) (RJ45 connector) The communication equipment works as ch1 when connected to the option connector 1.	50 m (164' 0")	
FX3G (40-point, 60-point type)	FX3G-CNV-ADP FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	

FX Series	Communication equipment (option)	Total extension distance	Check
750-031	Ch2 ch2 Ch2 FX3G-485-BD (European terminal block) (RJ45 connected to the option connected 2.	50 m (164' 0")	
FX3G (40-point, 60-point type)	chl ch2 FX3G-CNV-ADP FX3U- ADP(-MB) FX3U-485ADP(-MB) (Where represents (European terminal block) 232 and 485). Ch2 is not available when the FX3G-8AV-BD, FX3G-4EX-BD or FX3G-2EYT-BD is connected to the option connector 2.	500 m (1640' 5")	
	ch1 FX3U-485-BD (European terminal block)	50 m (164' 0")	
FX3U	FX3U-CNV-BD FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	

FX Series	Communication equipment (option)	Total extension distance	Check
	When using channel 2 (ch 2)		
35 111111111111111111111111111111111111	Ch1 FX3U-□-BD (Where □ represents 232, 422, 485, USB and 8AV). When a FX3U-8AV-BD is used, it occupies one communication port channel.	500 m (1640' 5")	
10	ch1 ch2		
FX3U	FX3U-CNV-BD FX3U-232ADP(-MB), FX3U-485ADP(-MB) (European terminal block) FX3U-CF-ADP is used, it occupies one communication	500 m (1640' 5")	
	port channel.		
FX1NC	FX2NC-485ADP (European terminal block) FX0N-485ADP (Terminal block)	500 m (1640' 5")	
FX2NC	FX2NC-485ADP (European terminal block) FX0N-485ADP (Terminal block)	500 m (1640' 5")	
	When using channel 1 (ch 1)		
	ch1 FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	
FX3GC	when using channel 2 (ch 2) ch1 FX3U-□ADP(-MB) (Where □ represents 232 and 485). FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	

FX Series	Communication equipment (option)	Total extension distance	Check
	When using channel 1 (ch 1)		
	Ch1 FX3U-485ADP(-MB) (European terminal block) When using channel 2 (ch 2)	500 m (1640' 5")	
FX3UC (D, DS, DSS)	ch1 FX3U-232ADP(-MB), FX3U-485ADP(-MB) FX3U-485ADP(-MB), FX3U-CF-ADP When a FX3U-CF-ADP is used, it occupies one communication port channel.	500 m (1640' 5")	
	When using channel 1 (ch 1)		
	ch1 FX3U-485-BD (European terminal block)	50 m (164' 0")	
	ch1 FX3U-CNV-BD FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	
	When using channel 2 (ch 2)		
FX3UC-32MT-LT (-2)	ch1 FX3U-□-BD (Where □ represents 232, 422, 485, USB and 8AV). When a FX3U-8AV-BD is used, it occupies one communication port channel.	500 m (1640' 5")	
	Ch1 Ch2 FX3U-CNV-BD FX3U-232ADP(-MB), FX3U-485ADP(-MB) FX3U-485ADP(-MB), (European terminal block) FX3U-CF-ADP When a FX3U-CF-ADP is used, it occupies one communication port channel.	500 m (1640' 5")	

FX Series	Communication equipment (option)	Total extension distance	Check
FX2	FX-485ADP (Terminal block)	500 m (1640' 5")	
FX2C	FX-485ADP (Terminal block)	500 m (1640' 5")	

D

Wiring

This chapter explains the wiring.

WIRING PRECAUTIONS



- Make sure to cut off all phases of the power supply externally before attempting installation or wiring work. Failure to do so may cause electric shock or damage to the product.
- Make sure to attach the terminal cover, offered as an accessory, before turning on the power or initiating operation after installation or wiring work. Failure to do so may cause electric shock.

WIRING PRECAUTIONS



- Make sure to observe the following precautions in order to prevent any damage to the machinery or accidents due to abnormal data written to the PLC under the influence of noise:
 - 1) Do not bundle the main circuit line together with or lay it close to the main circuit, high-voltage line or load line. Otherwise, noise disturbance and/or surge induction are likely to take place. As a guideline, lay the control line at least 100mm (3.94") or more away from the main circuit or high-voltage lines.
 - 2) Ground the shield wire or shield of the shielded cable at one point on the PLC. However, do not use common grounding with heavy electrical systems.
- Make sure to properly wire the terminal block in accordance with the following precautions. Failure to do so may cause electric shock, equipment failures, a short-circuit, wire breakage, malfunctions, or damage to the product.
 - The disposal size of the cable end should follow the dimensions described in the manual.
 - Tightening torque should follow the specifications in the manual.
 - Tighten the screws using a Phillips-head screwdriver No.2 (shaft diameter 6mm (0.24") or less). Make sure that the screwdriver does not touch the partition part of the terminal block.
- Make sure to properly wire to the terminal block (European type) in accordance with the following precautions. Failure to do so may cause electric shock, equipment failures, a short-circuit, wire breakage, malfunctions, or damage to the product.
 - The disposal size of the cable end should follow the dimensions described in the manual.
 - Tightening torque should follow the specifications in the manual.
 - Twist the end of strand wire and make sure that there are no loose wires.
 - Do not solder-plate the electric wire ends.
 - Do not connect more than the specified number of wires or electric wires of unspecified size.
 - Affix the electric wires so that neither the terminal block nor the connected parts are directly stressed.

4.1 Wiring Procedure

4.1 Wiring Procedure

1 Selecting the connection method

Select the wiring method suitable to the application.

→ For details, refer to Section 4.2.

2 Preparing for wiring

Prepare cables and terminal resistors required for wiring.

 \rightarrow For details, refer to Section 4.3.

3 Turning OFF the PLC power

Before starting any wiring work, make sure that the PLC power is OFF.

4 Connecting the power supply (FX0N-485ADP only)

Connect the power supply to the 24V DC power terminal.

5 Wiring communication equipment

Connect communication equipment operating in accordance with RS-485 or RS-232C.

ightarrow For communication in accordance with RS-232C, refer to Section 4.4.

 \rightarrow For communication in accordance with RS-485, refer to Section 4.5.

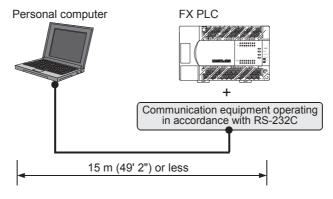
C

4.2 Selecting Connection Method

When using computer link, communication can be achieved in accordance with RS-232C or RS-485 (422). In FX3G, FX3GC, FX3U and FX3UC PLCs, computer link is applicable in up to two channels at the same time. In such a case, communication can be achieved in accordance with RS-232C on both channels, in accordance with RS-485 on both channels, or in accordance with RS-232C on one channel and RS-485 on the other channel.

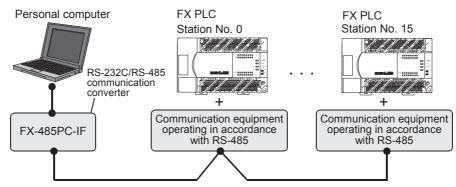
4.2.1 For communication in accordance with RS-232C (1-to-1 connection)

With communication in accordance with RS-232C, 1-to-1 connection is applicable. Make sure that the total extension distance is 15 m (49' 2") or less.



4.2.2 For communication in accordance with RS-485 (RS-422) (1-to-N connection)

With communication in accordance with RS-485 (RS-422), up to 16 PLCs can be connected. Make sure that the total extension distance is 500 m (1640' 5") or less [50 m (164' 0") or less when 485BD is included].



One-pair wiring and two-pair wiring are applicable for communication in accordance with RS-485 (RS-422). The wiring method is determined for each application. Refer to the table below, and perform suitable wiring.

		One-pair wiring	Two-pair wiring
Computer link*1	When the message waiting time*2 should be 70 ms or less	_	✓
	When the message waiting time*2 may be more than 70 ms	⊙*3	✓
	When the on-demand function is used	_	✓

- ⊙: Recommended wiring method, √: Applicable wiring method, —: Non-applicable wiring method
- *1. When computer link is added to an existing system, adopt the wiring method used in the existing system.
- *2. For the message waiting time, refer to Subsection 6.4.3.
- *3. "Echo transfer" is generated when the FX-485PC-IF is used in the one-pair wiring. Take proper countermeasures in the computer so that the echo transfer can be ignored.

4.3 Selecting Cables and Terminal Resistors (RS-485)

Select cables using the procedure described below.

4.3.1 Twisted pair cable

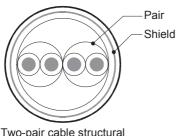
Use shielded twisted pair cables for connecting communication equipment operating in accordance with RS-

The table below shows recommended model names and manufacturers of cables used in wiring.

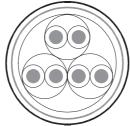
1. Recommended cables

Manufacturer	Model name	Remarks		
	SPEV(SB)-0.2-2P	Two-pair cable of 0.2 mm ²		
Mitsubishi Cable Industries, Ltd.	SPEV(SB)-MPC-0.2 × 3P	Three-pair cable of 0.2 mm ²		
	SPEV(SB)-0.5-2P	Two-pair cable of 0.5 mm ²		
Showa Holdings Co., Ltd.	KMPEV-SB CWS-178 0.2SQ × 2P	Two-pair cable of 0.2 mm ²		
Showa Holdings Co., Etd.	KMPEV-SB CWS-178 0.5SQ × 2P	Two-pair cable of 0.5 mm ²		
Sumitomo Electric Industries, Ltd.	DPEV SB 0.3 × 3P	Three-pair cable of 0.3 mm ²		
Sumitorio Electric maustries, Eta.	DPEV SB 0.5 × 3P	Three-pair cable of 0.5 mm ²		
The Furukawa Electric Co., Ltd.	D-KPEV-SB 0.2 × 3P	Three-pair cable of 0.2 mm ²		
The Fulukawa Liectife Co., Etc.	D-KPEV-SB 0.5 × 3P	Three-pair cable of 0.5 mm ²		
Fujikura Ltd.	IPEV-SB 2P × 0.3 mm ²	Two-pair cable of 0.3 mm ²		
i djindid Etd.	IPEV-SB 2P × 0.5 mm ²	Two-pair cable of 0.5 mm ²		

2. Cable structural drawing (reference)



Two-pair cable structural drawing example



Three-pair cable structural drawing example

4.3.2 10BASE-T cable

10BASE-T cables used in LAN wiring for a personal computer can be connected to FX3G-485-BD-RJ.

1. Selection procedure when purchasing

1) Cable type : 10BASE-T cable (Category 3 or higher)

2) Connection specifications: Straight type

3) Connector : RJ45 connector (Connector with metal frame is used)

2. Cautions on using commercial cables

Pay attention to the following point when purchasing commercial cables.

• Use shielded cables. Make sure to connect the shield to the metal frame of the connector, and perform class D grounding.

Insulating sleeve

2.6 mm (0.1") Contact area (Crimp area)

.8 mm (0.31")

14 mm (0.55")

4.3.3 Connecting cables

1. European type terminal block

The FX3G-485-BD-RJ terminal block is used for grounding.

The other options use shielded twisted pair cables for connecting communication equipment operating in accordance with RS-485.

The table below shows applicable cables and tightening torques.

	Cable size when	Cable size when	Bar terminal with	Tightening	Tool size		
	one cable is connected	two cables are connected	Insulating sleeve (cable size)	torque	Α	В	
FX3U-485-BD FX3G-485-BD FX3U-485ADP (-MB)	AWG22 to AWG20	AWG22	Applicable (AWG22 to AWG20)	0.22 to 0.25 N·m	0.4 (0.01")	2.5 (0.09")	
FX3G-485-BD- RJ	AWG20	to AWG16	Not applicable	0.5 to 0.6 N·m	0.6 (0.03")	3.5 (0.14")	
FX2N-485-BD FX1N-485-BD	AWG26	to AWG16	Not applicable	0.5 to 0.6 N·m	0.6 (0.03")	3.5 (0.14")	
FX2NC-485ADP	AWG26 to AWG16	AWG26 to AWG20	Not applicable	0.4 to 0.5 N·m	0.6 (0.03")	3.5 (0.14")	

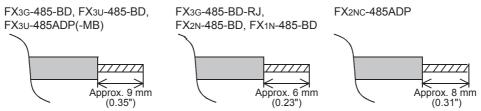
Do not tighten terminal screws with a torque outside the above-mentioned range.

Failure to do so may cause equipment failures or malfunctions.

With regard to the cable end treatment, use a stranded cable or solid cable as it is, or use a bar terminal with insulating sleeve.

FX3G-485-BD-RJ, FX2N-485-BD, FX1N-485-BD and FX2NC-485ADP cannot use a bar terminal with insulating sleeve.

- · When using a stranded cable or solid cable as it is
 - Twist the end of a stranded cable so that wires do not get barbed.
 - Do not plate the end of the cable.



When using a bar terminal with insulating sleeve
Because it is difficult to insert a cable into an insulating sleeve
depending on the thickness of the cable sheath, select the proper cable
according to the outline drawing.

<Reference>

Manufacturer	Model name	Caulking tool
Phoenix Contact Co., Ltd.	AI 0.5-8WH	CRIMPFOX 6*1 (or CRIMPFOX 6T-F*2)

*1. Old model name : CRIMPFOX ZA 3*2. Old model name : CRIMPFOX UD 6



screwdriver with a

straight tip.

For size A and size B, refer to the table above.

Tool

When tightening a terminal on the European terminal block, use a small commercial straight shape screwdriver whose tip is shown in the figure to the right.

Note

If the diameter of screwdriver grip is too small, tightening torque will not be able to be achieved. To achieve the appropriate tightening torque shown in the previous page, use the following screwdriver or an appropriate replacement (grip diameter: approximately 25mm (0.98")).

<Reference>

FX3U-485-BD, FX3G-485-BD, FX3U-485ADP(-MB)

Manufacturer	Model name
Phoenix Contact Co., Ltd.	SZS 0.4 × 2.5

FX3G-485-BD-RJ, FX2N-485-BD, FX1N-485-BD, FX2NC-485ADP

Manufacturer	Model name
Phoenix Contact Co., Ltd.	SZF 1-0.6 × 3.5

2. Terminal block

In the FX0N-485ADP and FX-485ADP, the terminal screw size is "M3".

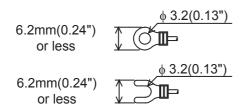
Make sure to use a crimp-style terminal with the following sizes.

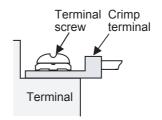
Make sure that the tightening torque is 0.5 to 0.8 N·m.

Do not tighten terminal screws with a torque outside the above-mentioned range.

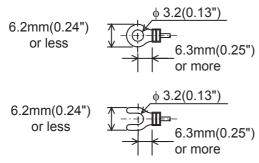
Failure to do so may cause equipment failures or malfunctions.

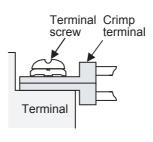
· When wiring one cable to one terminal





· When wiring two cables to one terminal





Precision

=110 Ω

=330 Ω

Brown

Orange

3 3 1

1

 (10^1)

 (10^1)

Brown Precision

Ε

D

4.3.4 Connecting terminal resistors

Make sure to provide a terminal resistor at the end of each line.

In the case of one-pair wiring, connect a terminal resistor to the RDA-RDB signal terminal of the communication equipment.

In the case of two-pair wiring, connect a terminal resistor to the RDA-RDB signal terminal and SDA-SDB terminal of the communication equipment.

1. Terminal resistor type

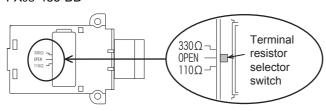
In the case of one-pair wiring, use two terminal resistors of 110 Ω , 1/2 W. In the case of two-pair wiring, use four terminal resistors of 330 Ω , 1/4 W. Among the terminal resistors supplied with the communication equipment, select ones with the color codes shown to the right.

2. When using the FX3U-485-BD, FX3G-485-BD, FX3G-485-BD-RJ or FX3U-485ADP(-MB)

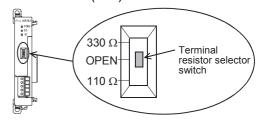
The FX3U-485-BD, FX3G-485-BD, FX3G-485-BD-RJ and FX3U-485ADP(-MB) have built-in terminal resistors.

Set the terminal resistor selector switch accordingly.

FX3U-485-BD



FX3U-485ADP(-MB)



FX3G-485-BD

Remove the upper terminal block before changing over the switch in the FX3G-485-BD.

Removal: Loosen the terminal block mounting screws, and remove the terminal block. Installation: Attach the terminal block, and tighten the terminal block mounting screws.

Model name

Tightening torque: 0.4 to 0.5 N•m

Do not tighten terminal screws with a torque outside the above-mentioned range. Failure to do so may cause equipment failures or malfunctions.

For installation and removal of the terminal block, use the recommended tool shown below or a tool having straight tip (such as screwdriver) as shown in the right figure.

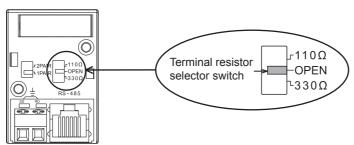
<Reference>

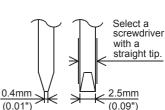
Manufacturer

Phoenix Contact Co., Ltd.	SZS 0.4 × 2.5
	Terminal resistor selector switch $110\Omega < 000000000000000000000000000000000$

Terminal block mounting screws

FX3G-485-BD-RJ





4.4 Connection Diagram for RS-232C

Representative wiring examples are shown in this section. When pin numbers in the external equipment are different, wire the pins as shown below.

4.4.1 Connection diagram between FX PLC and personal computer

PLC side					Exte	nal equi		perating in a S-232C	accordar	nce	
Name	FX3U-232-BD FX3G-232-BD FX2N-232-BD FX2N-232-BD FX2N-232-BD FX-232ADP			Name	When 0		Name		DR and e used		
	FX1N-232-BD FX3U-232ADP(-MB)	232ADP	232ADP	DP 1. 7. =0=7.3.	7(202/13)		9-pin D-Sub	25-pin D-Sub		9-pin D-Sub	25-pin D-Sub
FG	- 1			FG	-	1	FG	-	1		
RD(RXD)	2 3		3		RD(RXD)	2	3	RD(RXD)	2	3	
SD(TXD)	3			2		SD(TXD)	3	2	SD(TXD)	3	2
ER(DTR)	TR) 4		2	20	/	RS(RTS)	7	4	ER(DTR)	4	20
SG(GND)	5 7		7	\times	SG(GND)	5	7	SG(GND)	5	7	
DR(DSR)	6 6		6	/ \	CS(CTS)	8	5	DR(DSR)	6	6	

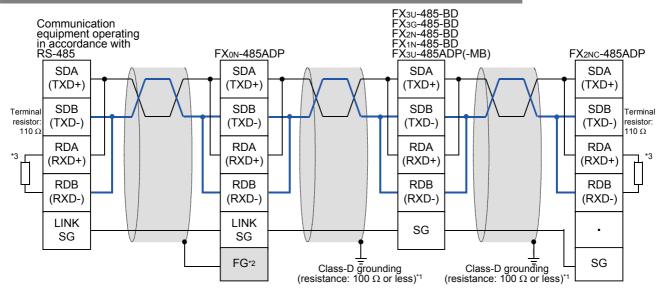
4.4.2 Connection diagram between FX-485PC-IF and personal computer

485PC	C-IF]	Personal computer
Signal name	Pin No.		Signal name
SD (TXD)	2		SD (TXD)
RD (RXD)	3		RD (RXD)
RS (RTS)	4 ;		RS (RTS)
CS (CTS)	5 :		CS (CTS)
DR (DSR)	6 ;		DR (DSR)
SG (GND)	7		SG (GND)
ER (DTR)	20		ER (DTR)

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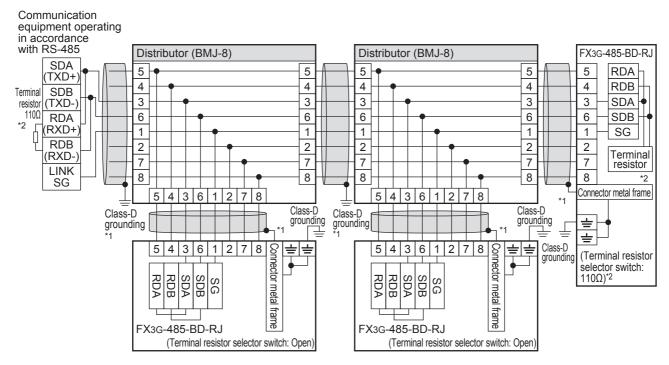
4.5 Connection Diagram for RS-485 and RS-422

4.5.1 One-pair wiring



- Make sure to perform Class-D grounding on the shield of a twisted pair cable connected to the FX2N-485-BD, FX1N-485-BD, FX3G-485-BD, FX3U-485-BD, FX2NC-485ADP or FX3U-485ADP(-MB).
- Make sure to connect the FG terminal to the \(\frac{1}{2} \) (grounding) terminal in the PLC requiring Class-D grounding. If the grounding terminal is not provided in the PLC, perform Class-D grounding directly.
- *3. Make sure to provide a terminal resistor at the end of each line.
 - The FX3U-485-BD, FX3G-485-BD and FX3U-485ADP(-MB) have a built-in terminal resistor. Set the terminal resistor selector switch accordingly
 - The FX0N-485ADP, FX2NC-485ADP, FX2N-485-BD and FX1N-485-BD are supplied together with terminal resistors.

• FX3G-485-BD-RJ



- *1. Use shielded cables, and make sure to perform class D grounding on the shield.

 When using the terminal block to connect ground of FX3G-485-BD-RJ, wire the ground wire only to either one of two poles of the terminal block.
- *2. Make sure to provide a terminal resistor at the end of each line. Set the FX3G-485-BD-RJ terminal resistor selector switch accordingly.

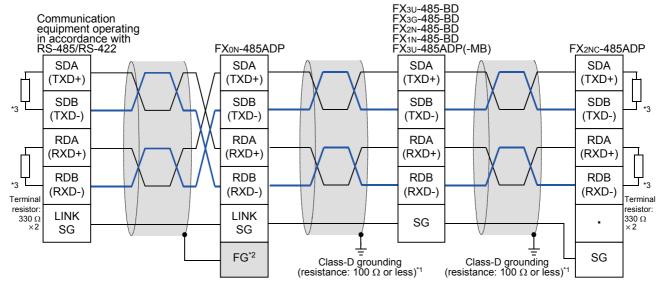
Prepare the following devices if necessary.

Product name	Model name	Manufacturer
RJ45 connector	TM11AP-88P	HIROSE ELECTRIC CO., LTD.
Distributor	BMJ-8 BMJ-8-28N (No internal connection of the No. 2 and 8 pin) (Do not use a plug with terminal resistor)	HACHIKO ELECTRIC CO., LTD.

D

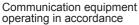
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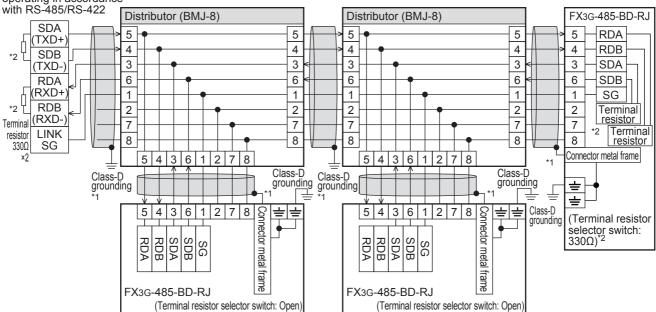
4.5.2 Two-pair wiring



- Make sure to perform Class-D grounding on the shield of a twisted pair cable connected to the FX2N-485-BD, FX1N-485-BD, FX3G-485-BD, FX3U-485-BD, FX2NC-485ADP or FX3U-485ADP(-MB).
- Make sure to connect the FG terminal to the \(\frac{1}{2} \) (grounding) terminal in the PLC requiring Class-D grounding. If the grounding terminal is not provided in the PLC, perform Class-D grounding directly.
- Make sure to provide a terminal resistor at the end of each line.
 - The FX3U-485-BD, FX3G-485-BD and FX3U-485ADP(-MB) have a built-in terminal resistor. Set the terminal resistor selector switch accordingly.
 - The FX0N-485ADP, FX2NC-485ADP, FX2N-485-BD and FX1N-485-BD are supplied together with terminal resistors.

• FX3G-485-BD-RJ





- *1. Use shielded cables, and make sure to perform class D grounding on the shield.

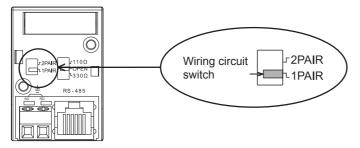
 When using the terminal block to connect ground of FX3G-485-BD-RJ, wire the ground wire only to either one of two poles of the terminal block.
- *2. Make sure to provide a terminal resistor at the end of each line. Set the FX3G-485-BD-RJ terminal resistor selector switch accordingly.

Prepare the following devices if necessary.

Product name	Model name	Manufacturer
RJ45 connector	TM11AP-88P	HIROSE ELECTRIC CO., LTD.
Distributor	BMJ-8 BMJ-8-28N (No internal connection of the No. 2 and 8 pin) (Do not use a plug with terminal resistor)	HACHIKO ELECTRIC CO., LTD.

4.5.3 Switching of 1 pair / 2 paired wiring (FX3G-485-BD-RJ)

The FX3G-485-BD-RJ has a built-in wiring circuit switch. Set the wiring circuit switch to 1 pair / 2 pair.

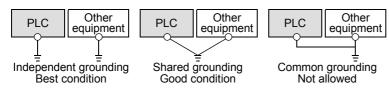


4.6 Grounding

Grounding should be performed as stated below.

- The grounding resistance should be 100Ω or less.
- Independent grounding should be performed for best results.
 When independent grounding can not be performed, perform "shared grounding" as shown in the following figure.

→ For details, refer to the Hardware Edition of each series.



- The grounding wire size should be AWG 14 (2 mm²) or larger.
- The grounding point should be close to the PLC, and all grounding wires should be as short as possible.

5. Communication Setting in FX Programmable Controller

This chapter explains the communication setting method types and setting methods for computer link.

5.1 Communication Setting Methods

This section explains the communication setting methods and setting procedures in FX PLCs.

1. Setting method types

- Specifying the setting using parameters in the sequence programming software:
 Register the setting as parameters by executing communication setting on the personal computer screen using the sequence programming software, and transfer them to a PLC.
 (This method using parameters is not available for FX2(FX), FX2C, or FX0N PLCs.)
- Specifying the setting by writing data to special data registers:
 Create a sequence program specifying the communication format, station number settings and time-out time setting, and then transfer the sequence program to a PLC.

Caution

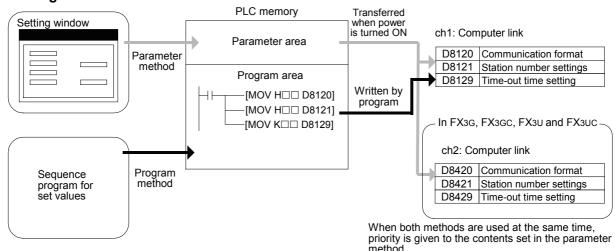
A PLC operates in the same way regardless of the selected method shown above. If both methods are selected, priority is given to the method using parameters.

2. Communication setting method applicability for each FX Series

FX Series	Specification using parameters	Specification using special data registers
FX1s, FX1n, FX1n, FX2n, FX2nc, FX3s, FX3G(ch1), FX3Gc(ch1), FX3U(ch1), FX3U(ch1)	√ (Recommended)	√
FX3G(ch2), FX3GC(ch2), FX3U(ch2), FX3UC(ch2)	✓	_
FX2(FX), FX2C, FX0N	_	✓

- → For the detailed contents of special data registers, refer to Section 9.2.
- → Setting data write method to special data registers, refer to Section 9.3.

3. Setting data flow



C

G

4. Time at which the settings become valid

1) When specifying the setting using parameters:

When the PLC power is turned ON, the parameters set using the parameter setting window in the sequence programming software are automatically transferred to the PLC.

As soon as the parameters are transferred to the PLC, the setting becomes valid.

After the program (parameters) are transferred to the PLC, it is necessary to reboot the PLC's power.

2) When specifying the setting by writing data to special data registers: Set the PLC mode from STOP to RUN, write the required data, reboot the PLC's power. As soon as the PLC power is turned ON, the setting becomes valid.

Caution

Since the special data registers (D8120, D8121, D8129) is a battery backed area in the case of the FX2N, FX2NC, FX3U and FX3UC series, a value cannot be normally saved when the battery is discharge (or after a battery error occurs).

Therefore, keep in mind that a computer link setting may not be possible in this case.

5.2 Communication Setting Using Parameter Method (GX Works2)

Communication settings may be changed via the parameter method with GX Works2, GX Developer, FXGP/WIN for Windows and FX-30P handy programming panel. This section describes how to change parameters with GX Works2.

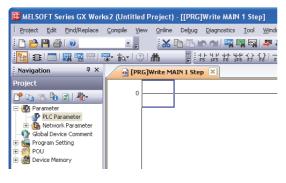
→ For details on FXGP/WIN operating procedure, refer to section 5.3.
 → For details on GX Developer operating procedure, refer to GX Developer Operating Manual.
 → For details on FX-30P operating procedure, refer to FX-30P Operation Manual.

5.2.1 Operating procedure

This subsection explains the serial communication setting method. Suppose that GX Works2 is already started up.

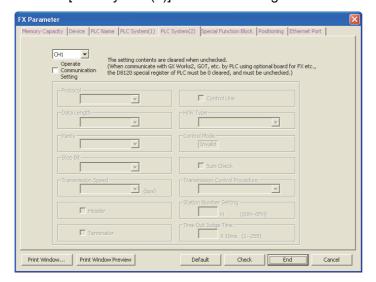
1 Opening the parameter setting window

In the project view area of the navigation window, double-click [Parameter] \rightarrow [PLC Parameter]. If the navigation window is not displayed, select [View] \rightarrow [Docking Window] \rightarrow [Navigation] from the menu bar.



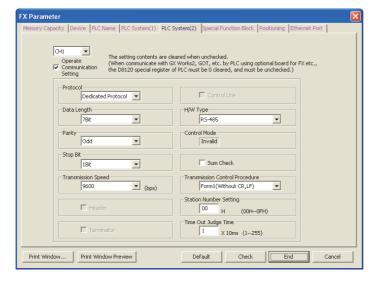
2 Setting the serial communication (parameters)

Click the [PLC System(2)] tab on the dialog box.



3 Setting the serial communication (parameters)

Select a channel and check the box labeled "Operate Communication Setting" box, then adjust the parameters for that channel. Click [End].



Adjust the settings on the personal computer to match those set here.

4 Writing parameters to the PLC

Select [Online] \rightarrow [Write to PLC] from the menu bar, click [Parameter + Program], and then click [Execute].

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5.3 Communication Settings Using Parameter Method (FXGP/WIN)

Communication settings may be changed by the parameter method with GX Works2, GX Developer, FXGP/WIN for Windows and FX-30P handy programming panel. This section describes how to change parameters with FXGP/WIN.

Ch2 cannot be set using FXGP/WIN.

→ For details on GX Works2 operating procedure, refer to section 5.2.
 → For details on GX Developer operating procedure, refer to GX Developer Operating Manual.
 → For details on FX-30P operating procedure, refer to FX-30P Operation Manual.

5.3.1 Operating procedure

This subsection explains the serial communication setting method. Suppose that FXGP/WIN is already started up.

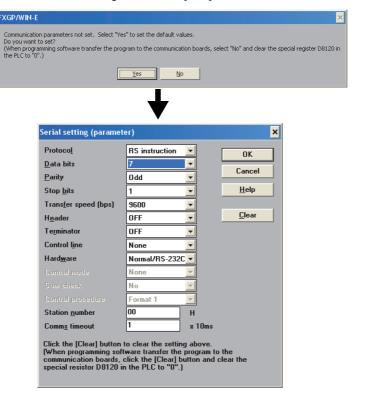
1 Displaying the serial setting (parameter)

Select [Option] → [Serial setting (parameter)] from the toolbar.

The following dialog box appears according to absence/presence of parameter setting.

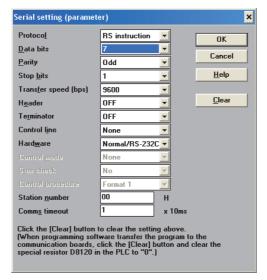
1. When there are no parameter settings

There are no communication settings. Click the [Yes] button.



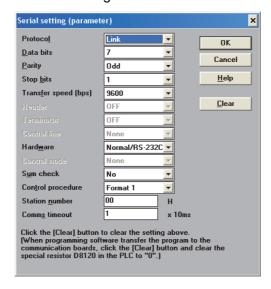
2. When there are already parameter settings

The existing communication setting contents are displayed.



2 Adjusting serial setting (parameter)

Execute the communication setting as shown below.



Adjust the settings on the personal computer to match those set here.

3 Writing a sequence program (parameters) to the PLC

Select [PLC] \rightarrow [Transfers] \rightarrow [Write] from the toolbar, and click [OK] button.

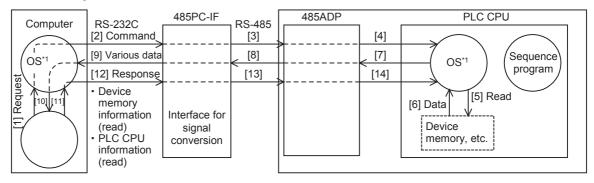
Control Procedures and Setting Methods

6.1 **Data Flow by Link**

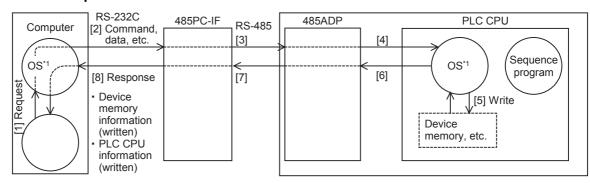
The figures below show images of data flow achieved when data is read from or written to a PLC CPU and the status is controlled.

In the case of communication in accordance with RS-232C, ignore "485PC-IF" and regard "485ADP" as "232ADP".

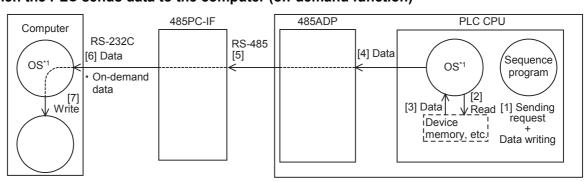
1. When the computer reads data from the PLC



2. When the computer writes data to the PLC



3. When the PLC sends data to the computer (on-demand function)



The OS (standing for "Operating System") indicates the software used to efficiently operate the resources including the CPUs, memories, terminals, files, and networks using user programs, etc.

6.2 Important Points in Computer Link

This section explains important points to be understood before creating programs for computer link.

6.2.1 Operations of PLC caused by data transfer

The PLC operations and scan time using computer link are as described below.

1. While the PLC is in RUN mode

For requests from the computer, the PLC executes access for one request during each END processing. Sending and receiving are executed as interrupts.

Accordingly, when sending and receiving are executed, the scan time is longer by about 10%. The scan time can be checked in D8010 to D8012 in the PLC.

2. Condition in which the transfer sequence in the PLC is initialized

The transfer sequence in the PLC is initialized in the following cases:

- When the power is turned ON
- When regular sending/receiving is completed
- When the control code "EOT" or "CL" is received in each format
- When the control code "NAK" is sent
- When the time-out time setting is detected

→ For details on the time-out time setting, refer to Subsection 6.4.4.

3. Occurrence of framing error in the computer

When a commercial interface in accordance with RS-485 is used in the computer, a framing error may occur while nothing is sent from the PLC to the computer depending on the interface in the computer.

To cope with this nonconformity, let the computer ignore any data until the PLC sends STX, ACK or NAK.

4. Response of "NAK" from the PLC

When an error is detected, the PLC sends NAK to the computer.

5. Command sending from the computer

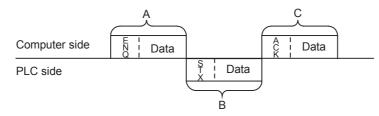
When sending commands from the computer to the PLC, wait for the interval times in the following table or more after the PLC finishes receiving data in response to the previous command, and then send the next command.

PLC	Interval times
FX3U, FX3UC	300 μs
FX2N, FX2NC, FX3S, FX3G, FX3GC	100 μs
FX2(FX), FX2C, FX0N, FX1S, FX1N, FX1NC	two scan times

6.3 How to Understand Control Procedure

This section explains how to understand the transfer data shown in the later description of each function.

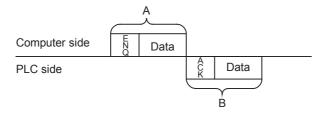
1. When the computer reads data from the PLC (computer \leftarrow PLC)



- [1] Parts A and C indicate transfer from the computer to the PLC.
- [2] Part B indicates transfer from the PLC to the computer.
- [3] Create a program in the computer so that each data is transferred in turn from the left to the right, and that the data is transferred in the order "A → B → C" as a whole.

 (Example: In the part A, data is transferred in turn from the right starting from "ENQ".)

2. When the computer writes data to the PLC (computer \rightarrow PLC)



- [1] Part A indicates transfer from the computer to the PLC.
- [2] Part B indicates transfer from the PLC to the computer.
- [3] Create a program in the computer so that each data is transferred in turn from the left to the right, and that the data is transferred in the order "A → B" as a whole.

(Example: In the part A, data is transferred in turn from the right starting from "ENQ".)

6.4 Basic Formats of Dedicated Protocol

There are two types of control procedures in dedicated protocols.

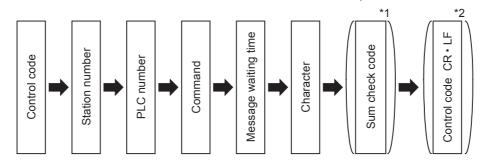
CR and LF are not added to each block in format 1. CR and LF are added to each block in format 4.

(The format names are the same as those used in the computer link units for A Series PLCs.)

This section explains the contents of control procedures and the contents of each item specified in the control procedures in each format.

The basic format of control procedures (protocols) is as shown below:

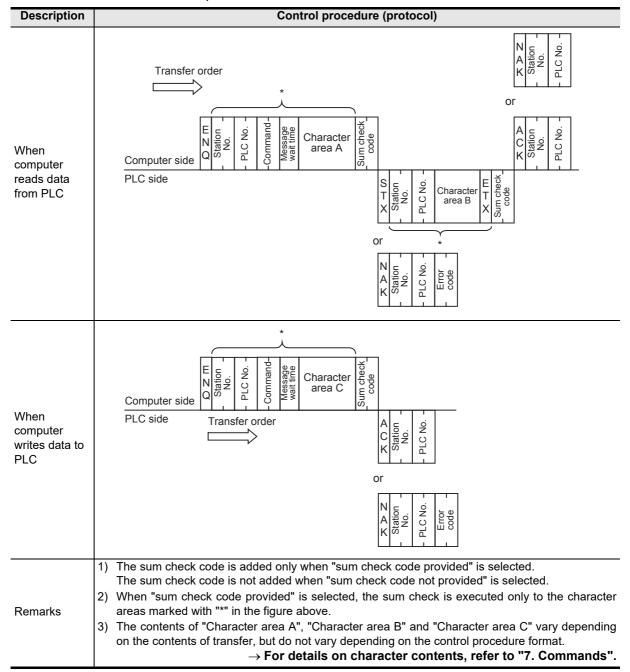
→ For details, refer to Subsections 6.4.1 and 6.4.2.



- *1. Whether or not the sum check code is added can be specified using a parameter.
- *2. Whether or not the control code is added can be specified by selecting the protocol type.

6.4.1 Control procedure format 1

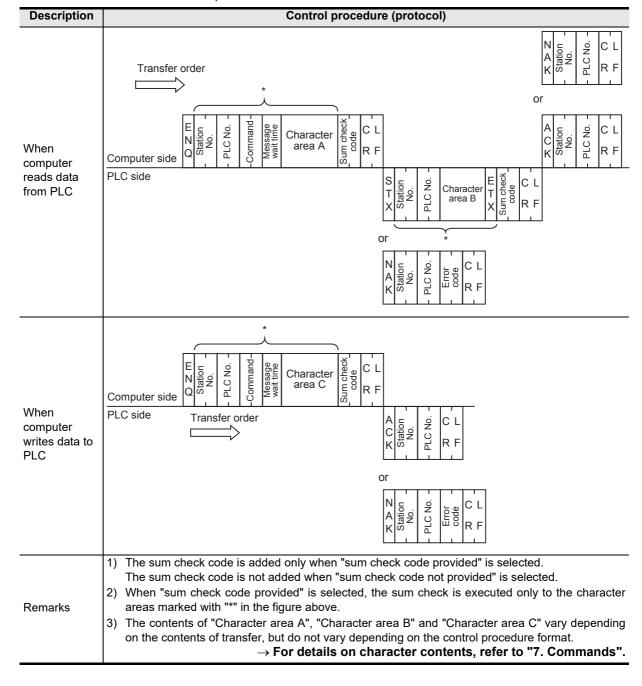
The table below shows the control procedure for format 1.



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6.4.2 Control procedure format 4

The table below shows the control procedure for format 4.



6.4.3 Contents of set items in each control procedure (protocol)

This subsection explains the contents of the data used in each control procedure.

1. Control codes

The table below shows control codes.

Signal name	Code	Description
STX	02H	Start of Text
ETX	03H	End of Text
EOT	04H	End of Transmission
ENQ	05H	Enquiry
ACK	06H	Acknowledge

Signal name	Code	Description
LF	0AH	Line Feed
CL	0CH	Clear
CR	0DH	Carriage Return
NAK	15H	Negative Acknowledge

- When the PLC receives ENQ or ACK, it initializes the transfer sequence and begins receiving.
- 2) When the PLC receives EOT or CL as shown below, it initializes the transfer sequence. At this time, the PLC gives no response.

For format 1	For format 4
or Computer side	E C L O T R F or C C L Computer side L R F PLC side

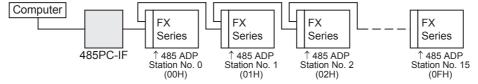
3) In FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs, a waiting time of 2 scan times or more is required from sending of the EOT/CL code from the computer to sending of the next message.

2. Station number

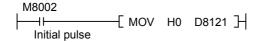
The station number indicates a number provided in each PLC to determine to which PLC the computer accesses.

The station number is specified in hexadecimal.

- In FX Series PLCs, set the station number using parameters. The setting range is from 00H to 0FH.
- · For the station number setting method in A Series PLCs, refer to the respective A Series PLC manual.



In FX2(FX), FX2C and FX0N PLCs, set a value to D8121.



 \rightarrow For details on the program, refer to Section 9.3.

Cautions on setting station numbers

- 1) Do not overlap station numbers. If the same number is set for two or more stations, the transfer data is destroyed and normal communication is not possible.
- 2) It is not necessary to set consecutive station numbers as shown in the setting example above. Any station numbers in the setting range (00H to 0FH) are applicable.

(Examples: Station numbers may be set arbitrarily. Some station numbers may be skipped.)

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3. PLC number

The PLC number is used to identify a PLC to be accessed when computer link is combined with the MELSECNET (II) or MELSECNET/B in A Series PLCs. The PLC number of each FX Series PLC is fixed to "FFH", and converted into two-digit ASCII code.

When the on-demand function is used, however, the PLC number is automatically changed to "FEH" by the PLC.

For the PLC number of an A Series PLC used together with the MELSECNET (II) or MELSECNET/B, refer to the respective A Series PLC manual.

4. Command

A command specifies the contents of access executed by the computer to a PLC.

A command is converted into a two-digit ASCII code.

→ For an explanation of commands, refer to Chapter 7.

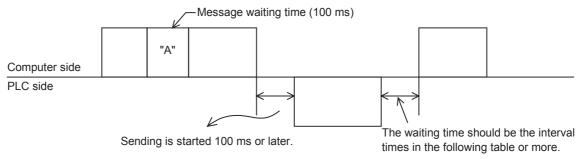
5. Message waiting time

The message waiting time should be specified because some computers require more time before receiving additional data. Set the waiting time according to the specifications of each computer.

Set the waiting time within the range from 0 to 150 ms in 10-ms units. 10 ms is handled as "1H", and a value ranging from "0H (0)" to "FH (15)" is converted into a one-digit ASCII code.

When executing communication using the 485PC-IF in a 1-to-N system adopting the one-pair wiring, make sure to set the message waiting time to 70 ms (7) or more. When the scan time of a PLC in the system exceeds 70 ms, set the message waiting time to the maximum scan time or higher.

Example: When the message waiting time is set to 100 ms



PLC	Interval times
FX3U, FX3UC	300 μs
FX2N, FX2NC, FX3S, FX3G, FX3GC	100 μs
FX2(FX), FX2C, FX0N, FX1S, FX1N, FX1NC	two scan times

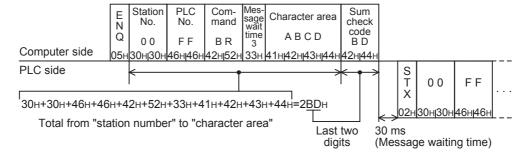
6. Sum check code

The sum check code indicates a two-digit ASCII code converted from the least significant byte (8-bit) of the sum check target data added as hexadecimal data.

Using the FX PLC parameters, set whether or not the sum check code is added in the message.

- When "sum check code provided" is selected, the sum check code is added in the message during sending. During receiving, the sum check code is compared with the value calculated from the received data to check the received data.
- When "sum check code not provided" is selected, the sum check code is not added, so the received data is not checked either. A calculation example of the sum check code is shown below.

Example: When the station number "0", PLC number "FF", command "BR (device memory batch read)", message waiting time "30 ms" and data "ABCD" are transferred in format 1, the sum check code value is as shown below:



C

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6.4.4 Time-out time setting

When the receiving of data from the computer is interrupted and is not restarted within the preset time (time-out time setting), the PLC regards the situation as a timeout error and initializes the transfer sequence.

1. Time-out time setting range

The time-out time setting can be set using parameters or sequence program.

In the FX2(FX), FX2c and FX0N Series, however, the parameter setting method is not applicable.

When setting the time-out time setting in a sequence program, write a value for ch1 to D8129, and a value for ch2 (in the FX3G, FX3GC, FX3U and FX3UC Series) to D8429 (unit: 10 ms).

However, D8429 (ch2) cannot be set in sequence programs.

The setting range is different between the parameter method and the sequence program method.

1) Details of setting range

FX Series		Setting range in parameter	Setting range in sequence program (D8129 (ch1) and D8429 (ch2))
FX2(FX), FX2C		Not applicable	1 to 3276 (10 to 32760 ms)
FXon		Not applicable	1 to 255 (10 to 2550 ms)
FX1s, FX1n, FX1nc		1 to 255 (10 to 2550 ms)	1 to 255 (10 to 2550 ms)
FX2N, FX2NC, FX3S		1 to 255 (10 to 2550 ms)	1 to 3276 (10 to 32760 ms)
FX3G, FX3GC, FX3U, FX3UC	ch1	1 to 255 (10 to 2550 ms)	1 to 3276 (10 to 32760 ms)
	ch2	1 to 3276 (10 to 32760 ms)	Not applicable

When the set value is "0", it is handled as "100 ms".

2) Example of setting program

When setting the time-out time setting to 60 ms

 \rightarrow For details on the program, refer to Section 9.3.

2. Caution on programming

The time-out time setting is not updated until the next character data is received. Set a time to receive a character according to the transmission speed (baud rate).

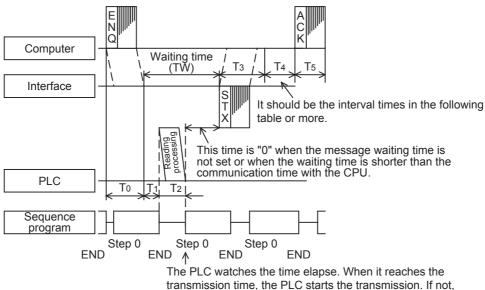
For one character (12-bit), the minimum set value of the time-out time setting is as shown below:

Baud rate (bps)	Time to receive one character (ms)	Time-out time setting (minimum set value)
300	40	50 ms (5)
600	20	30 ms (3)
1200	10	20 ms (2)
2400	5	10 ms (1)
4800	2.5	10 ms (1)
9600	1.25	10 ms (1)
19200	0.625	10 ms (1)
38400	0.312	10 ms (1)

6.5 Transfer Sequence Time Chart and Communication Time

This section explains the communication time chart between the computer and the PLC. As shown in the figures below, communication between the computer and the PLC is always executed after "END". The scan time is extended by the communication time.

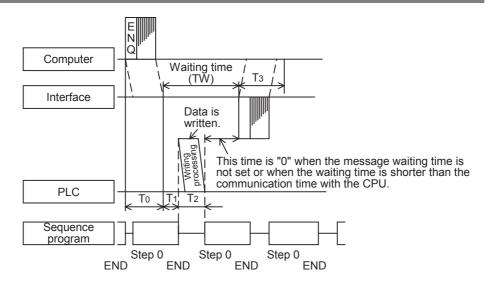
6.5.1 When computer reads data from PLC



The PLC watches the time elapse. When it reaches the transmission time, the PLC starts the transmission. If not, the PLC evaluate the time elapse in the END process of the next step.

PLC	Interval times
FX3U, FX3UC	300 μs
FX2N, FX2NC, FX3S, FX3G, FX3GC	100 μs
FX2(FX), FX2C, FX0N, FX1S, FX1N, FX1NC	two scan times

6.5.2 When computer writes data to PLC



D

6.5.3 Transfer time in transfer sequence

This subsection explains how to calculate the approximate time after the computer starts data transfer and the PLC gives a response until all communication is completed.

For the contents of T0 to T5, refer to the previous page.

1. When the computer reads data from the PLC

Communication time = T0 + (T1 + Longer time between T2 and TW) + T3 + T4 + T5

T0, T3, T5 =
$$\frac{1}{\text{Baud rate}} \times \text{Number of bits in one character} \underbrace{(1 + \frac{7(8)}{4} + \frac{0(1)}{4} + \frac{1(2)}{4})}_{\times \text{ Number of characters}} \times \frac{1}{\text{Start}} \underbrace{(1 + \frac{7(8)}{4} + \frac{0(1)}{4} + \frac{1(2)}{4})}_{\times \text{ Stop bit}} \times \frac{1}{\text{Data length}} \times \frac{1}{\text{Parity bit}} \times \frac{1}{\text{Stop bit}} \times \frac{1}{\text{Data length}} \times \frac{1}{\text{Cor } 8} \times \frac{$$

- T1: Maximum one scan time (Because data is read from the PLC during the END processing while the PLC is in RUN mode, reading requires up to one scan time depending on the sending timing. Reading requires about 1 ms while the PLC is in STOP mode.)
- T2: END processing time in the PLC executing data transfer
- T4: Scan time or longer (In the case of wiring in the 1-to-N configuration, T4 should be longer than the time-out time setting (D8129) extended by one scan time.)
- TW: Message waiting time

2. When the computer writes data to the PLC

Communication time = T0 + (T1 + Longer time between T2 and TW) + T3

T0, T3 =
$$\frac{1}{\text{Baud rate}}$$
 × Number of bits in one character $(1 + 7 (8) + 0 (1) + 1 (2))$
× Number of characters Start Data length Parity bit bit $(7 \text{ or } 8)$ $(0 \text{ or } 1)$ $(1 \text{ or } 2)$

- T1: Maximum one scan time (Because data is written to the PLC during the END processing while the PLC is in RUN mode, writing requires up to one scan time depending on the sending timing. Writing requires about 1 ms while the PLC is in STOP mode.)
- T2: END processing time in the PLC executing data transfer
- TW: Message waiting time

6.6 Transfer Data in Character Area

This section explains the transfer data in the character area sent and received between the computer and a PLC using each command.

The transfer data explained below is handled as the character area B in reading and the character area C in writing.

→ For character areas, refer to Subsections 6.4.1 and 6.4.2.

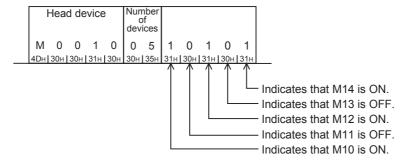
6.6.1 When bit device memory is read or written

The bit device memory is handled in 1-bit (1-point) units or in 1-word (16-point) units. The transfer data in each case is explained below.

1) In 1-bit (1-point) units

When the bit device memory is handled in 1-bit (1-point) units, a specified number of devices starting from the specified head device are expressed in turn from the left end in "1 (31H)" for the ON status or "0 (30H)" for the OFF status.

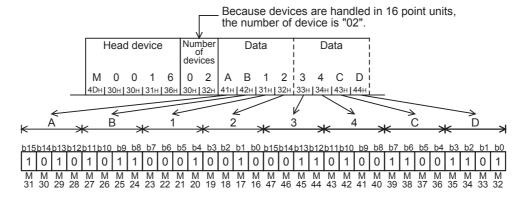
Example: When indicating the ON/OFF status of five devices starting from M10



2) In 1-word (16-point)" units

When the bit device memory is handled in 1-word (16-point) units, one word is expressed in 4-bit units in turn from the most significant bit in hexadecimal.

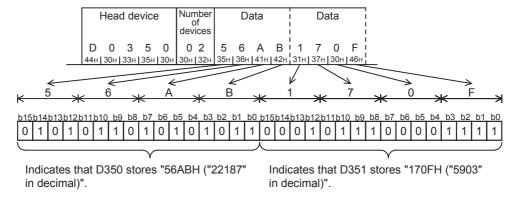
Example: When indicating the ON/OFF status of 32 devices starting from M16



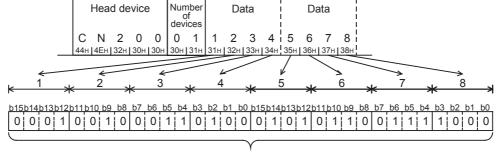
6.6.2 When word device memory is read or written

In the case of word device memory, one word is expressed in 4-bit units in turn from the most significant bit in hexadecimal.

Example 1: When indicating the contents stored in the data registers D350 and D351



Example 2: When indicating the contents stored in the 32-bit counter C200*1



Indicates that C200 stores "12345678H ("305,419,896" in decimal)".

For indicating the current value of C200, use "CN200".

7. Commands

This chapter explains specification methods and specification examples of commands in dedicated protocols used in computer link communication type.

For control procedures in dedicated protocols, refer to "6. Control Procedures and Setting Methods". The table below shows a reference section for each command.

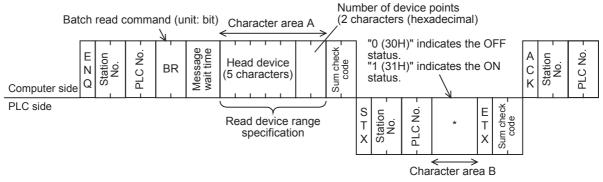
		Appli		
Command	Contents of processing	FX3S, FX3G, FX3GC, FX3U, FX3UC	FX2(FX), FX2C, FX0N, FX1S, FX1N, FX1NC, FX2N, FX2NC	Reference section
BR	Reads bit devices in 1-point units.	✓	✓	7.1
WR	Reads bit devices in 16-point units, or word devices in 1-point units.	√	✓	7.2
QR	Reads bit devices in 16-point units, or word devices in 1-point units.	√	_	7.3
BW	Writes bit devices in 1-point units.	✓	✓	7.4
WW	Writes bit devices in 16-point units, or word devices in 1-point units.	✓	✓	7.5
QW	Writes bit devices in 16-point units, or word devices in 1-point units.	✓	_	7.6
ВТ	Specifies bit devices arbitrarily in 1-point units, and sets or resets them (forcibly sets them to ON or OFF).	~	✓	7.7
WT	Specifies bit devices arbitrarily in 16-point units, and sets or resets them (forcibly sets them to ON or OFF). Or specifies word devices arbitrarily in 1-point units, and writes data to them.	√	✓	7.8
QT	Specifies bit devices arbitrarily in 16-point units, and sets or resets them (forcibly sets them to ON or OFF). Or specifies word devices arbitrarily in 1-point units, and writes data to them.	~	_	7.9
RR	Sets a PLC to RUN mode in remote control.	✓	✓	7.10
RS	Sets a PLC to STOP mode in remote control.	C to STOP mode in remote		7.10
PC	Reads the PLC model name code.	✓	✓	7.11
GW	Turns the global function ON or OFF in all linked PLCs.	✓	✓	7.12
_	Offers the on-demand function (by which a PLC gives a sending request), and does not offer any command.	√	√	7.13
TT	Returns received characters back to the computer as they are.	√	√	7.14

7.1 BR Command [Reads Device Memory in 1-Bit Units]

This section explains the control procedure specification method and specification example when the bit device memory is read all at once.

1. Specification method

The specification method in the control procedure format 1 is shown below:



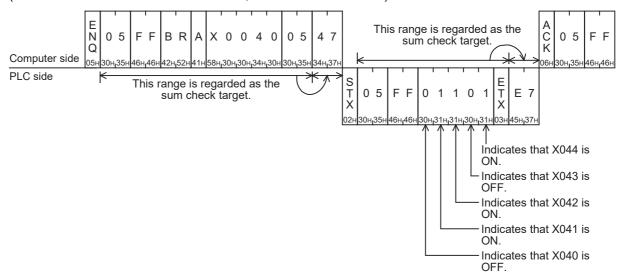
Data on specified number of device points (Characters of specified number of device points)

- 1) Specify the device point range while satisfying the following conditions:
 - $1 \le$ Number of device points $\le 256^{*1}$ (Use "00H" to specify 256 points.)
 - Head device number + Number of device points -1 ≤ Maximum device number
- 2) Express the station number, PLC number, number of device points and sum check code in hexadecimal.
 - *1. 54 in the FXon and FX1s Series

2. Specification example

When reading the contents of five devices X040 to X044 in the PLC whose station number is 5 (while the message waiting time is set to 100 ms)

(When X040 and X043 are OFF and X041, X042 and X044 are ON)



Point

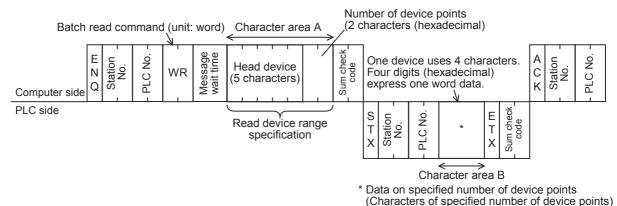
The message wait time is specified in 10-ms units within the range from 0 to 150 ms, and expressed in hexadecimal within the range from 0 to FH. For example, "100 ms" is expressed as "A".

7.2 WR Command [Reads Device Memory in 1-Word Units]

This section explains the control procedure specification method and specification examples when the word device memory is read all at once or when the bit device memory is read (in 16-point units) all at once.

1. Specification method

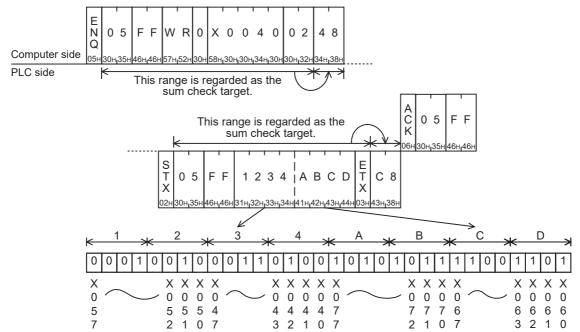
The specification method in the control procedure format 1 is shown below:



- 1) Specify the device point range while satisfying the following conditions:
 - 1 ≤ Number of device points ≤ 64*1 (32*1 in case of bit devices)
 - Head device number + Number of device points ("Number of devices x 16" in case of bit devices) -1 ≤
 Maximum device number
 - When 32-bit devices (CN200 to CN255) are read, one device point is handled as two word data. Accordingly, up to 32 device points*2 can be specified.
- 2) Express the station number, PLC number, number of device points and sum check code in hexadecimal.
 - *1. Up to 13 device points in the FX0N and FX1S Series
 - *2. Up to 6 device points in the FX0N and FX1s Series

2. Specification examples

Example 1: When reading the contents of thirty-two devices from X040 to X077 in the PLC whose station number is 5 (while the message waiting time is set to 0 ms)



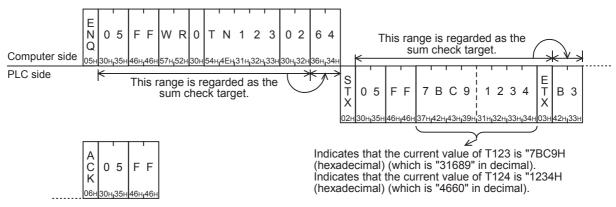
Ε

D

Point

The WR command handles data in 1-word units. When reading thirty-two devices from X040 to X077, specify the number of device points as "02" (One point specifies 16 devices.)

Example 2: When reading the present value of two devices from T123 and T124 in the PLC whose station number is 5 (while the message waiting time is set to 0 ms)

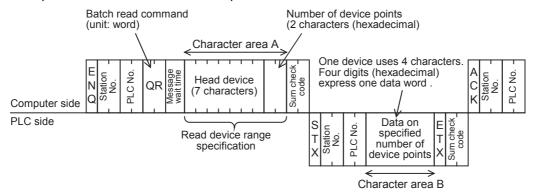


7.3 QR Command [Reads Device Memory in 1-Word Units]

This section explains the control procedure specification method and specification examples when the word device memory is read all at once or when the bit device memory is read (in 16-point units) all at once. This command is available only in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs.

1. Specification method

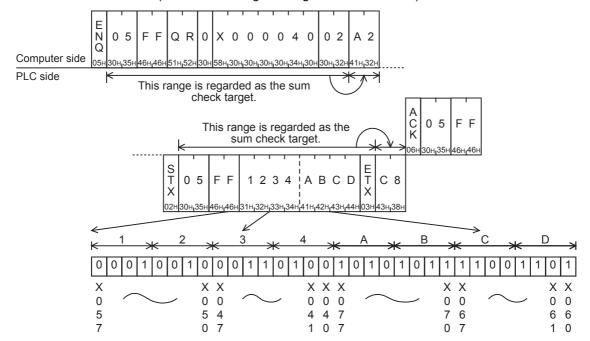
The specification method in the control procedure format 1 is shown below:

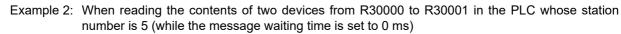


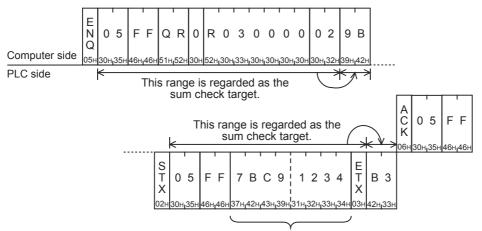
- 1) Specify the device point range while satisfying the following conditions:
 - 1 ≤ Number of device points ≤ 64 (32 for bit devices)
 - Head device number + Number of device points ("Number of devices × 16" for bit devices) -1 ≤ Maximum device number
 - When 32-bit devices (CN00200 to CN00255) are read, one device point is handled as two word data. Accordingly, up to 32 device points can be specified.
- 2) Express the station number, PLC number, number of device points and sum check code in hexadecimal.

2. Specification examples (For FX3U and FX3UC PLCs)

Example 1: When reading the contents of thirty-two devices from X040 to X077 in the PLC whose station number is 5 (while the message waiting time is set to 0 ms)







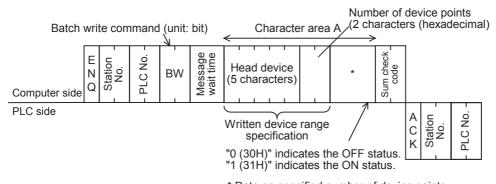
Indicates that the value of R30000 is "7BC9H" (hexadecimal) (which is "31689" in decimal).
Indicates that the value of R30001 is "1234H" (hexadecimal) (which is "4660" in decimal).

7.4 BW Command [Writes Device Memory in 1-Bit Units]

This section explains the control procedure specification method and shows a specification example when the bit device memory is written all at once.

1. Specification method

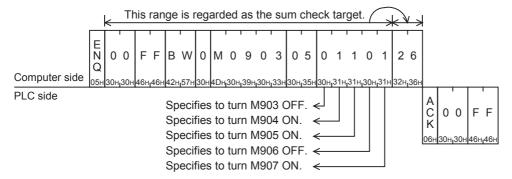
The specification method in the control procedure format 1 is shown below:



- * Data on specified number of device points (Characters of specified number of device points)
- 1) Specify the device point range while satisfying the following conditions:
 - 1 ≤ Number of device points ≤ 160^{*1}
 - Head device number + Number of device points -1 ≤ Maximum device number
- 2) Express the station number, PLC number, number of device points and sum check code in hexadecimal respectively.
 - *1. 46 in the FXoN and FX1S Series

2. Specification example

When writing data to five devices from M903 to M907 in the PLC whose station number is 0 (while the message waiting time is set to 0 ms)



Remote Maintenance

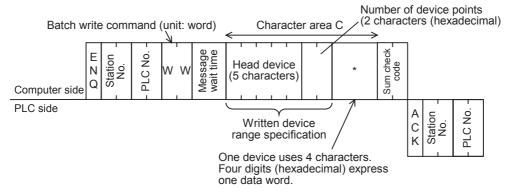
Discontinued

7.5 WW Command [Writes Device Memory in 1-Word Units]

This section explains the control procedure specification method and shows a specification examples when the word device memory is written all at once or when the bit device memory is written (in 16-point units) all at once.

1. Specification method

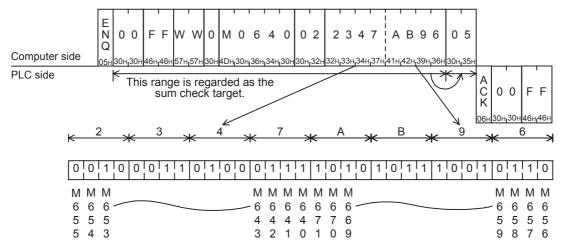
The specification method in the control procedure format 1 is shown below:



- Data on specified number of device points (Characters of specified number of device points)
- 1) Specify the device point range while satisfying the following conditions:
 - 1 ≤ Number of device points ≤ 64^{*1} (10 in case of bit devices)
 - Head device number + Number of device points ("Number of devices x 16" in case of bit devices) -1 ≤ Maximum device number
 - When 32-bit devices (CN200 to CN255) are written, one device point is handled as two word data. Accordingly, up to 32 device points² can be specified.
- 2) Express the station number, PLC number, number of device points and sum check code in hexadecimal.
- *1. Up to 11 device points in the FXon and FX1S Series
- *2. Up to 5 device points in the FX0N and FX1S Series

2. Specification examples

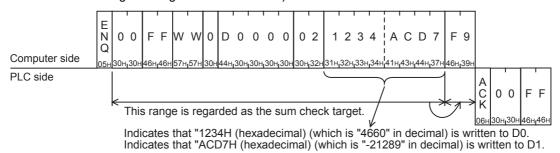
Example 1: When writing data to thirty-two devices from M640 to M671 in the PLC whose station number is 0 (while the message waiting time is set to 0 ms)



Point

The WW command handles data in 1-word units. When writing data to thirty-two devices from M640 to M671, specify the number of device points as "02" (One point specifies 16 devices.)

Example 2: When writing data to two devices D0 and D1 in the PLC whose station number is 0 (while the message waiting time is set to 0 ms)



Ε

D

G

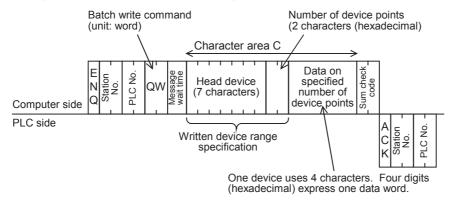
7.6 QW Command [Writes Device Memory in 1-Word Units]

This section explains the control procedure specification method and shows a specification examples when the word device memory is written all at once or when the bit device memory is written (in 16-point units) all at once.

This command is available only in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs.

1. Specification method

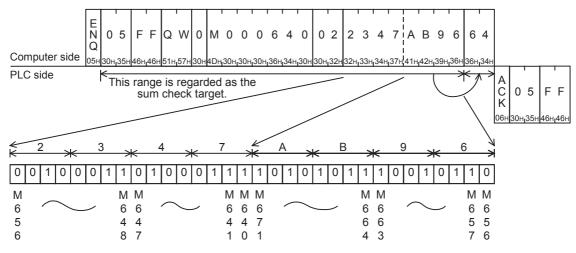
The specification method in the control procedure format 1 is shown below:



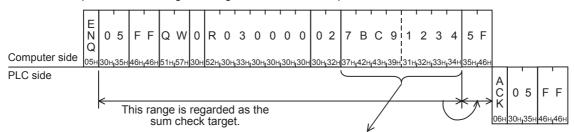
- 1) Specify the device point range while satisfying the following conditions:
 - 1 ≤ Number of device points ≤ 64 (10 in case of bit devices)
 - Head device number + Number of device points ("Number of devices × 16" in case of bit devices) -1 ≤ Maximum device number
 - When 32-bit devices (CN00200 to CN00255) are written, one device point is handled as two word data.
 Accordingly, up to 32 device points can be specified.
- 2) Express the station number, PLC number, number of device points and sum check code in hexadecimal.

2. Specification examples (For FX3U and FX3UC PLCs)

Example 1: When writing data to thirty-two devices from M640 to M671 in the PLC whose station number is 5 (while the message waiting time is set to 0 ms)



Example 2: When writing data to two devices from R30000 to R30001 in the PLC whose station number is 5 (while the message waiting time is set to 0 ms)



Indicates that "7BC9H (hexadecimal) (which is "31689" in decimal) is written to R30000. Indicates that "1234H (hexadecimal) (which is "4660" in decimal) is written to R30001.

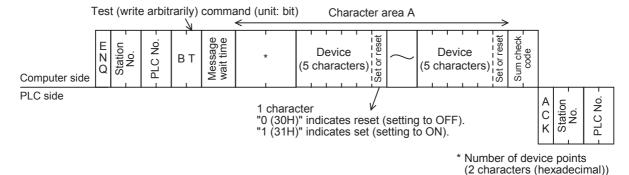
Ε

7.7 BT Command [Tests Device Memory in 1-Bit Units (by Writing Arbitrarily)]

This section explains the control procedure specification method and shows a specification example when the bit device memory is specified arbitrarily and written all at once.

1. Specification method

The specification method in the control procedure format 1 is shown below:

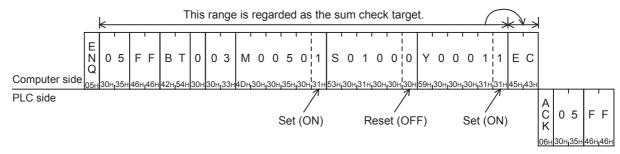


Point

- 1) Specify the device point range while satisfying the following conditions:
 - 1 ≤ Number of device points ≤ 20^{*1}
- 2) Express the station number, PLC number, number of device points and sum check code in hexadecimal.
- *1. 10 in the FXon and FX1s Series

2. Specification example

When writing data for setting M50 to ON, S100 to OFF and Y001 to ON in the PLC whose station number is 5 (while the message waiting time is set to 0 ms)

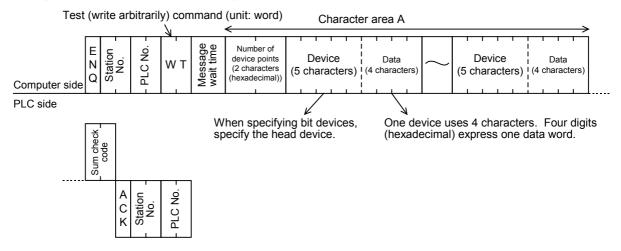


7.8 WT Command [Tests Device Memory in 1-Word Units (by Writing Arbitrarily)]

This section explains the control procedure specification method and shows a specification example when the word device memory and bit device memory (in 16-point units) are specified arbitrarily and written all at once. Word devices and bit devices (in 16-point units) can be specified together. However, the WT command cannot handle 32-bit word devices C200 to C255 (CN200 to CN255).

1. Specification method

The specification method in the control procedure format 1 is shown below:

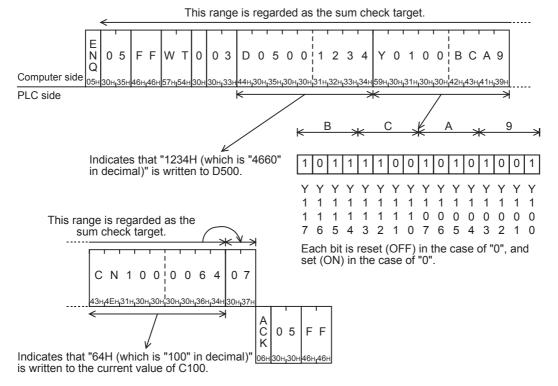


- 1) Specify the device point range while satisfying the following conditions:
 - 1 ≤ Number of device points ≤ 10^{*1} (in unit of 10^{*1} in case of bit devices (One unit indicates 16 points.))
- 2) Express the station number, PLC number, number of device points and sum check code in hexadecimal.
- 3) The WT command cannot handle 32-bit word devices C200 to C255 (CN200 to CN255).
 - *1. 6 in the FX0N and FX1s Series

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2. Specification example

When writing data for setting the current value of D500 to "1234H", Y100 to Y117 to "BCA9H" and the current value of C100 to "64H" in the PLC whose station number is 5 (while the message waiting time is set to 0 ms)



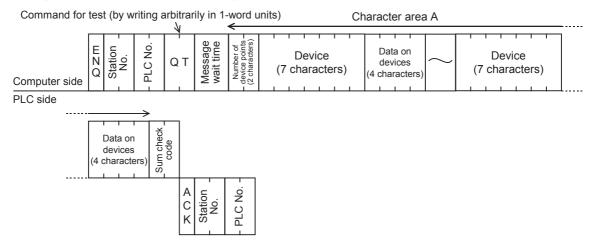
7.9 QT Command [Tests Device Memory in 1-Word Units (by Writing Arbitrarily)]

This section explains the control procedure specification method and shows a specification example when the word device memory and bit device memory (in 16-point units) are specified arbitrarily and written all at once. Word devices and bit devices (in 16-point units) can be specified together. However, the QT command cannot handle 32-bit word devices C200 to C255 (CN00200 to CN00255).

This command is available only in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs.

1. Specification method

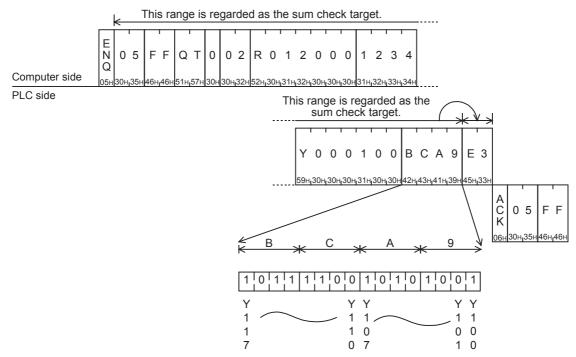
The specification method in the control procedure format 1 is shown below:



- 1) Specify the device point range while satisfying the following conditions:
 - 1 ≤ Number of device points ≤ 10 (in unit of 10 in case of bit devices (One unit indicates 16 points.))
- 2) Express the station number, PLC number, number of device points and sum check code in hexadecimal.
- 3) Word devices and bit devices (in 16-point units) can be specified together.
- 4) The QT command cannot handle 32-bit word devices C200 to C255 (CN00200 to CN00255).

2. Specification example

When writing data for setting the current value of R12000 to "1234H" and Y100 to Y117 to "BCA9H" in the PLC whose station number is 5 (while the message waiting time is set to 0 ms)



7.10 RR/RS Command [Remotely Sets PLC to RUN/STOP Mode]

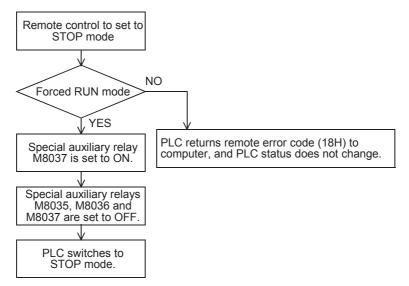
This section explains the control procedure specification method and shows a specification example when the computer remotely sets the PLC mode to RUN or STOP.

7.10.1 Contents of remote control to set RUN or STOP mode

When the computer executes remote control of the PLC mode to RUN or STOP, the forced RUN mode is activated in the PLC, and the special auxiliary relays M8035, M8036 and M8037 are controlled as follows:

- Remote RUN mode control When the RR command (which sets remote RUN mode in control) is executed in the computer, the PLC sets M8035 and M8036 to activate the forced RUN mode.
 - If the RR command is executed while the PLC is in RUN mode, however, the PLC status does not change, and the PLC returns the remote error code (18H) to the computer.
- Remote STOP mode control When the RS command (which sets remote STOP mode in control) is executed in the computer, the PLC executes the following processing.

If the RS command is executed while the PLC is in STOP mode, the PLC status does not change, and the PLC returns the remote error code (18H) to the computer.



7.10.2 Condition validating remote control to set RUN or STOP mode

- Remote RUN mode control The PLC is in STOP mode. (The built-in RUN/STOP selector switch is set to STOP.) (In an FX2(FX) or FX2c PLC, the RUN terminal in the PLC is OFF, and the built-in RUN/STOP selector switch is set to STOP.)
- Remote STOP mode control The PLC is in RUN mode (forced RUN mode) without using the RUN terminal or built-in RUN/STOP selector switch.

Point

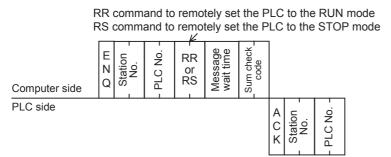
When the PLC power is turned OFF and then ON after the RR command is executed by the computer, all of the special auxiliary relays M8035, M8036 and M8037 are set to OFF. As a result, the PLC switches to STOP mode.

7.10.3 Remote control specification method and specification examples

This subsection explains the control procedure specification method and specification examples when remote RUN or STOP mode control is executed.

1. Specification method

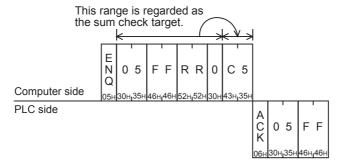
The specification method in the control procedure format 1 is shown below:



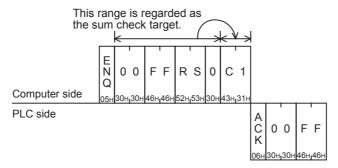
Express the station number, PLC number, number of device points and sum check code in hexadecimal respectively.

2. Specification examples

Example 1: When remotely setting the PLC whose station number is 5 to RUN mode (while the message waiting time is set to 0 ms)



Example 2: When remotely setting the PLC whose station number is 0 to STOP mode (while the message waiting time is set to 0 ms)



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PC Command [Reads PLC Model Name] 7.11

This section explains the control procedure specification method and specification example when the model name of a PLC linked to the computer is read.

7.11.1 PLC model name (CPU) and read contents

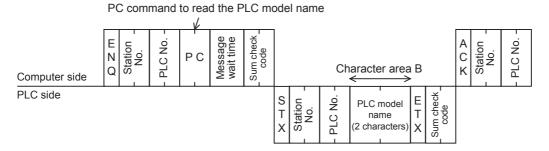
PLC model name (CPU)	Model name code (hexadecimal)
FX2(FX), FX2C	8DH
FXon	8EH
FX1S	F2H
FX1N, FX1NC	9EH
FX2N, FX2NC	9DH
FX3S	F5H
FX3G, FX3GC	F4H
FX3U, FX3UC	F3H
A0J2HCPU	98H
A1CPU, A1NCPU	A1H
A1SCPU, A1SJCPU	98H
A2CPU(-S1), A2NCPU(-S1), A2SCPU	A2H
A2ACPU	92H
A2ACPU-S1	93H

PLC model name (CPU)	Model name code (hexadecimal)
A2CCPU	9AH
A2USCPU	82H
A2CPU-S1, A2USCPU-S1	83H
A3CPU, A3NCPU	A3H
A3ACPU	94H
A3HCPU, A3MCPU	A4H
A3UCPU	84H
A4UCPU	85H
A52GCPU	9AH
A73CPU	A3H
A7LMS-F	A3H
AJ72P25/R25	ABH
AJ72LP25/BR15	8BH

7.11.2 Control procedure specification method and specification example

1. Specification method

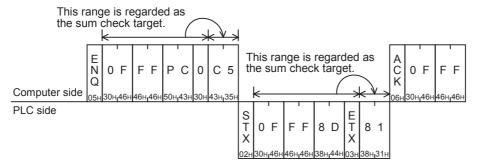
The specification method for control procedure format 1 is shown below:



Express the station number, PLC number, number of device points and sum check code in hexadecimal respectively.

2. Specification example

When reading the model name of the PLC whose station number is 15 (while the message waiting time is set to 0 ms)



The example above indicates that the model name of the target PLC is the FX2(FX) or FX2c Series.

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GW Command [Offers Global Function] 7.12

The global function executed in the computer sets a special auxiliary relay to ON or OFF in all PLCs linked to the computer in the multi-drop link method. For A Series PLCs, however, refer to the respective A Series PLC

This section explains the control procedure specification method and specification example when the global function is used.

7.12.1 Contents of control

The global function sets a special auxiliary relay to ON or OFF in all FX Series PLCs linked to the computer. M8126 is set to ON or OFF in PLCs except the FX3G, FX3GC, FX3U and FX3UC Series.

In FX3G, FX3GC, FX3U and FX3UC PLCs, M8126 is set to ON or OFF in computer link using ch1, and M8426 is set to ON or OFF in computer link using ch2.

In A Series PLCs, Xn2 is set to ON or OFF for all PLCs linked to the computer.

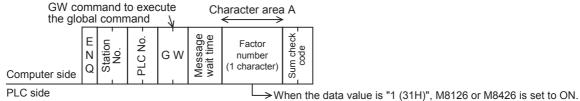
- In the control procedure, specify the station number "FFH" so that all stations are handled as targets. If any value other than "FFH" is specified, a special auxiliary relay is set to ON or OFF only in a station with the specified station number.
- In this function, PLCs do not give any response to the GW command from the computer.
- · When the PLC power is turned OFF or when the PLC is set to STOP mode, the special auxiliary relay M8126 or M8426 is set to OFF and the processing request in the global function is cleared.

7.12.2 Global function control procedure specification method and specification example

This subsection explains the control procedure specification method and specification example when the global function is executed from the computer.

1. Specification method

The specification method in the control procedure format 1 is shown below:

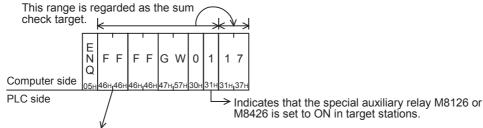


When the data value is "0 (30H)", M8126 or M8426 is set to OFF.

Express the station number, PLC number, number of device points and sum check code in hexadecimal respectively.

2. Specification example

When setting to ON the special auxiliary relay M8126 of M8426 in all FX PLCs (In all of A Series PLCs in computer link, however, Xn2 is set to ON.)



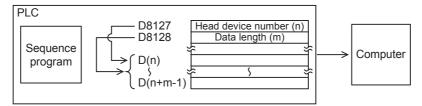
Specify "FFH" for handling all stations as targets When handling only one station as a target, specify the station number (ranging from 00 to 0F) of the target station.

7.13 On-demand Function

When there is data to be sent from a PLC to the computer, the on-demand function can specify the data register area storing the data to be sent, and let the PLC start sending.

When data is sent between the computer and a PLC, only the computer can start data transmission.

When there is emergency data to be sent from a PLC to the computer, the on-demand function is applicable to let the PLC begin sending data to the computer.



Point

This function is applicable when the computer and the PLC CPU have the 1-to-1 configuration.

7.13.1 Special data registers and special auxiliary relays used in on-demand function

The tables below show the special data registers and special auxiliary relays used in the on-demand function.

1. In all PLCs except FX3G, FX3GC, FX3U and FX3UC PLCs and when ch1 is used in FX3G, FX3GC, FX3U and FX3UC PLCs

Device	Name	Description
M8127 ^{*1}	On-demand send processing	Remains ON while the on-demand function is being executed. ON: On-demand data is being sent. OFF: Sending of on-demand data is completed.
M8128	On-demand error flag	Turns ON when an error is included in a specified value to be sent in the on- demand function. ON: Error is included. OFF: Error is not included.
M8129	On-demand byte/word changeover	Specifies the unit (byte or word) of data handled in the on-demand function. ON: Unit = Byte (8-bit) OFF: Unit = Word (16-bit)
D8127	On-demand head device number specification	Sets the head data register device number containing the data to be sent using the on-demand function in a sequence program.
D8128	On-demand data quantity specification	Sets the amount of data to be sent using the on-demand function in a sequence program.

^{*1.} FX0N, FX1S, FX1N and FX1NC PLCs do not support this device.

7.13 On-demand Function

2. When ch2 is used in FX3G, FX3GC, FX3U and FX3UC PLCs

Device	Name	Description
M8427	On-demand send processing	Remains ON while the on-demand function is being executed. ON: On-demand data is being sent. OFF: Sending of on-demand data is completed.
M8428	On-demand error flag	Turns ON when an error is included in a specified value to be sent in the on-demand function. ON: Error is included. OFF: Error is not included.
M8429	On-demand byte/word changeover	Specifies the unit (byte or word) of data handled in the on-demand function. ON: Unit = Byte (8-bit) OFF: Unit = Word (16-bit)
D8427	On-demand head device number specification	Sets the head data register device number containing the data to be sent using the on-demand function in a sequence program.
D8428	On-demand data quantity specification	Sets the amount of data to be sent using the on-demand function in a sequence program.

Point

- The on-demand send processing signal (M8127 or M8427) turns ON when the PLC gives a request to send data to the computer, and turns OFF when sending of the specified data is completed. Use this signal for interlock to prevent giving two or more on-demand requests at the same time.
- While the on-demand send processing signal is ON, the PLC cannot receive commands sent from the computer.
- Amount of on-demand data and number of data registers used for sending according to the unit specification (word or byte)

When the specified unit is a word:

The amount of on-demand data is equivalent to the number of data registers to be sent.

When the specified unit is a byte:

Two on-demand data units use one data register for sending.

Example: When the amount of on-demand data is "5", the number of data registers for sending is "3".

7.13.2 Control procedures in on-demand function

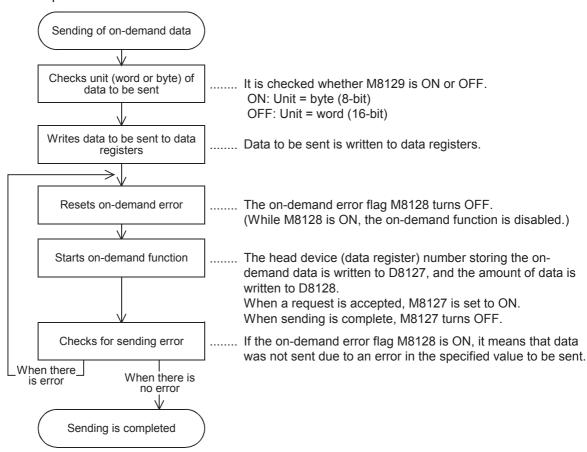
This subsection explains the control procedures for the on-demand function.

When using ch2 in an FX3G, FX3GC, FX3U or FX3UC Series PLC, exchange special auxiliary relays (M) and special data registers (D) according to the table below.

All PLCs except FX3G, FX3GC, FX3U and FX3UC PLCs FX3G, FX3GC, FX3U and FX3UC PLCs (ch1)		FX3G, FX3GC, FX3u and FX3uc PLCs (ch2)
M8127*1	\leftrightarrow	M8427
M8128		M8428
M8129		M8429
D8127		D8427
D8128		D8428

^{*1.} FX0N, FX1S, FX1N and FX1NC PLCs do not support this device.

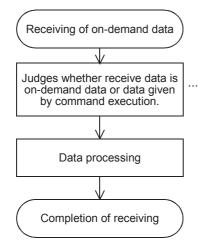
1) Control procedure in the PLC



7.13 On-demand Function

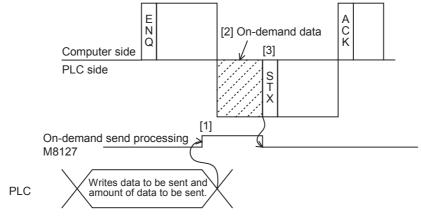
D

2) Control procedure in the computer



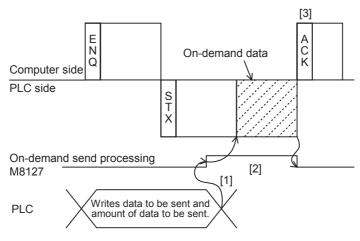
....... To the on-demand data, the PLC adds "FE" as the PLC number. Only when the PLC number of the received data is "FE", the received data should be processed as on-demand data.

 Time chart when the on-demand function is requested While the computer is sending data



- [1] As soon as an on-demand request is given, the on-demand send processing signal M8127 turns ON.
- [2] After receiving of command data (ENQ ~) from the computer is completed, the PLC sends on-demand data.
- [3] After the sending of on-demand data is complete, the PLC sends response data (STX \sim) to the command data (ENQ \sim).

While the computer is receiving data



- [1] As soon as an on-demand request is given, the on-demand send processing signal M8127 turns ON.
- [2] After the sending of response data (STX ~) to the command data (ENQ ~) from the computer is completed, the PLC sends on-demand data.
- [3] After the receiving of on-demand data is complete, the computer sends response data (ACK ~) to the sending of the response data (STX ~) from the PLC.

7.13.3 On-demand function specification method and specification examples

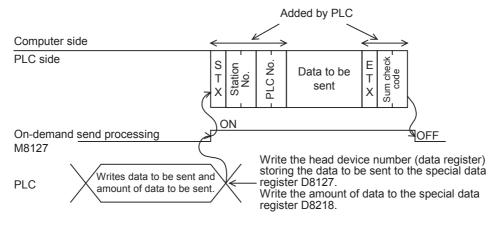
This subsection explains the on-demand function specification method and specification examples. When using ch2 in an FX3G, FX3GC, FX3U or FX3UC Series PLC, exchange special auxiliary relays (M) and special data registers (D) according to the table below.

All PLCs except FX3G, FX3GC, FX3U and FX3UC PLCs FX3G, FX3GC, FX3U and FX3UC PLCs (ch1)		FX3G, FX3GC, FX3U and FX3UC PLCs (ch2)
M8127*1	\leftrightarrow	M8427
M8128		M8428
M8129		M8429
D8127		D8427
D8128		D8428

^{*1.} FXon, FX1s, FX1n and FX1nc PLCs do not support this device.

1. Specification method

The specification method in the control procedure format 1 is shown below:



- 1) Specify the data quantity specification range while satisfying the following condition:
 - Amount of data ≤ 40H (= 64 in decimal)
- 2) The PLC adds "FE" as the PLC number.
- 3) Express the station number, PLC number, number of device points and sum check code in hexadecimal.

IMPORTANT

Do not use the on-demand function when the system configuration is not 1-to-1 type.

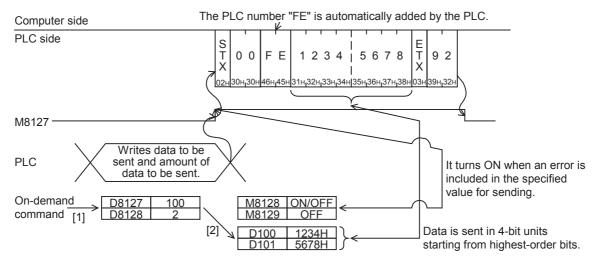
If the on-demand function is used in the multi-drop link system in which the computer and PLC CPUs have the 1-to-N configuration, the transfer data and on-demand send data in the control procedure format 1 or 4 are destroyed, and normal data sending is not possible.

7.13 On-demand Function

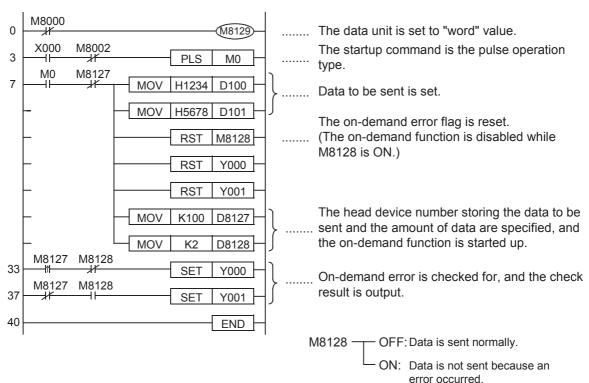
C

2. Specification example 1

When sending the data stored in the data registers D100 and D101 by a trigger from a sequence program (when the station number is 0 and the data unit to be sent is set to "word")

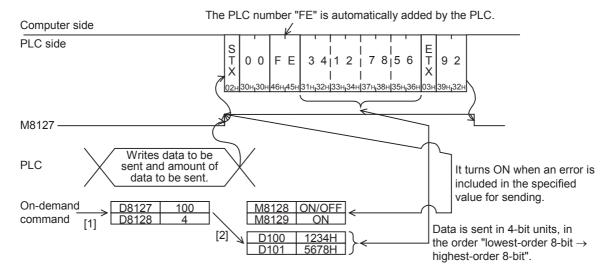


Sequence program example

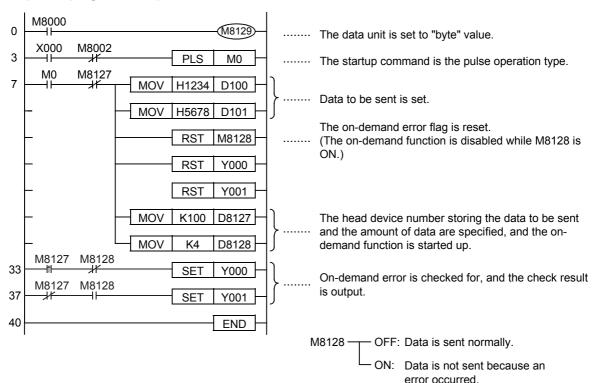


3. Specification example 2

When sending the data stored in the data registers D100 and D101 by a trigger from a sequence program (when the station number is 0 and the data unit to be sent is set to "byte")



Sequence program example



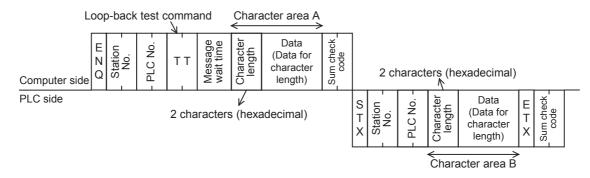
D

7.14 TT Command [Loop-back Test]

The loop-back test function checks whether or not communication between the computer and a PLC is normal. This section explains the control procedure specification method and specification example when the loopback test function is used.

1. Specification method

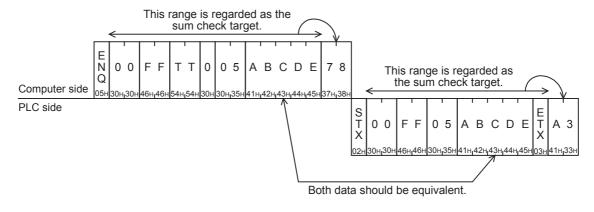
The specification method in the control procedure format 1 is shown below:



- 1) Specify the character length specification range while satisfying the following condition:
 - 1 ≤ Character length ≤ 254
- 2) Express the station number, PLC number, number of device points and sum check code in hexadecimal respectively.

2. Specification example

When executing the loop-back test to the PLC whose station number is 0 using the data "ABCDE" (while the message waiting time is set to 0 ms)



8. Troubleshooting

This chapter explains troubleshooting.

8.1 Checking FX PLC Version Applicability

Verify that the FX PLC main unit is an applicable version.

→ For the version applicability check, refer to Section 1.3.

8.2 Checking Communication Status Based on LED Indication

Check the status of the "RD(RXD)" and "SD(TXD)" indicator LEDs provided in the optional equipment.

LED s	status	Operation status			
RD(RXD)	SD(TXD)	Operation status			
Flashing	Flashing	Data is being sent or received.			
Flashing	Off	Data is received, but is not sent.			
Off	Flashing	Data is sent, but is not received.			
Off	Off	Data is not sent or received.			

While computer link is executed normally, both LEDs flash brightly.

If they do not flash, check the wiring, station number settings and communication setting.

8.3 Checking Installation and Wiring

1. Mounting status

If the communication equipment is not securely connected to the PLC, communication is not possible.

→ For mounting method, refer to the respective communication equipment manual.

2. Power supply (for FX0N-485ADP)

The FX0N-485ADP requires a driving power supply. Verify that the power supply is provided correctly.

3. Wiring

Verify that the wiring to all communication equipment is correct. If the communication equipment is wired incorrectly, communication is not possible.

→ For wiring method check, refer to Chapter 4.

8.4 Checking Sequence Program

1. Communication setting in the sequence program

Verify that the parallel link and N:N Network are not set. Verify that the communication format (D8120, D8400 and D8420) is set correctly. Communication is not possible if a communication port is set twice or more. After changing any setting, make sure to reboot the PLC's power.

2. Communication setting using parameters

Verify that the communication settings using parameters is suitable to the purpose of use.

If the communication settings are not suitable to the purpose of use, communication will not function correctly. After changing any setting, make sure to reboot the PLC's power.

3. Ethernet port setting (in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the same channel is not used in the Ethernet port setting. Do not set the channel used in computer link. After changing the setting, make sure to reboot the PLC's power.

D

4. Presence of VRRD and VRSC instructions

1) Except FX3G, FX3U and FX3UC PLCs

Verify that the VRRD and VRSC instructions are not used in the program. If these instructions are used, delete them, reboot the PLC's power.

- 2) In FX3G PLC
 - In the case of the 14 points and 24-point type
 Verify that the VRRD and VRSC instructions are not used in the program.
 If these instructions are used, delete them, reboot the PLC's power.
 - In the case of the 40 points and 60-point type
 Verify that the VRRD and VRSC instructions are n

Verify that the VRRD and VRSC instructions are not used in the program.

If these instructions are used in the program, the communication function is not available in ch2. Use ch1, or delete these instructions.

After deleting these instructions, reboot the PLC's power.

3) In FX3U and FX3UC PLCs

Verify that the VRRD and VRSC instructions are not used in the program.

If these instructions are used in the program, the communication function is not available in ch1. Use ch2, or delete these instructions.

After deleting these instructions, reboot the PLC's power.

5. Presence of RS instruction (except FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the RS instruction is not used in the program.

If this instruction is used, delete it, reboot the PLC's power.

6. Presence of RS and RS2 instructions (in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the RS and RS2 instructions are not being used for the same channel.

If these instructions are used for the same channel, delete them, reboot the PLC's power.

7. Presence of EXTR instruction (in FX2N and FX2NC PLCs)

Verify that the EXTR instruction is not used in the program.

If this instruction is used, delete it, then reboot the PLC's power.

8. Presence of IVCK, IVDR, IVRD, IVWR, IVBWR*1, and IVMC instructions (in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the IVCK, IVDR, IVRD, IVWR, IVBWR and IVMC instructions are not being used for the same channel.

If these instructions are used for the same channel, delete them, reboot the PLC's power.

*1. Only available for FX3U and FX3UC PLCs.

9. Presence of ADPRW instructions (in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the ADPRW instructions are not being used for the same channel.

If these instructions are used for the same channel, delete them, and reboot the PLC's power.

10.Presence of FLCRT, FLDEL, FLWR, FLRD, FLCMD, and FLSTRD instructions (in FX3U and FX3UC PLCs)

Verify that the FLCRT, FLDEL, FLWR, FLRD, FLCMD and FLSTRD instructions are not being used for the same channel.

If these instructions are used for the same channel, delete them, reboot the PLC's power.

8.5 Checking Error Codes

8.5.1 Error codes when NAK is sent

The table below shows error codes and contents of errors when NAK is sent in communication between the computer and a PLC.

As an error code, a two-digit ASCII code (hexadecimal) within the range from 00H to FFH is sent.

When two or more errors occur at the same time, priority is given to the error code with the smallest number, and the error code with the smallest number is sent.

When any error shown below occurs, the entire transfer sequence is initialized.

Error code list

Error code (hexadecimal)	Error item	Contents of error	Action			
02H	Sum check error	Sum check error has occurred. The sum check code included in the received data is different from the sum value calculated from the received data.	Check the data sent from the computer and the contents of the sum check. Modify either one, and then execute communication again.			
03Н	Protocol error	The communication protocol is abnormal. A control procedure set using parameters was ignored, and a different control procedure was adopted in communication. Or the adopted control procedure was partially different from the preset control procedure. Or a command specified in the preset control procedure does not exist.	Check the contents of parameters and the contents of control procedure. Modify either contents, and then execute communication again. Refer to the command list shown in Chapter 7, modify the specified command etc., and then execute communication again.			
06Н	Character area error	 An error occurred in the character area A, B or C. Or a specified command does not exist. 1) The control procedure set using parameters is different. 2) A specified device number does not exist in the target PLC. 3) A device number is not set with the specified number of characters (5 or 7 characters). 	Check the contents of the character areas A, B and C, modify the contents if necessary, and then execute communication again. Refer to "2.2.2 Applicable device ranges", modify the number of characters used to specify the device number, and then execute communication again.			
07H	Character error	ASCII code data to be written to a device is not hexadecimal.	Check the data to be written to the device, modify it if necessary, and then execute communication again.			
0АН	PLC number error	A station with the corresponding PLC number does not exist.	Check the PLC number included in the message, modify it if necessary, and then execute communication again. The PLC number should be "FFH" in all FX Series PLCs.			
10H	PLC number error	A station with the corresponding PLC number does not exist.	Check the PLC number included in the message, modify it if necessary, and then execute communication again. The PLC number should be "FFH" in all FX Series PLCs.			
18H	Remote control error	Remote control to set the RUN or STOP mode is disabled. The RUN or STOP mode is determined in the PLC hardware (by using the RUN/ STOP selector switch, etc.).	Set the PLC mode to RUN or STOP using the forced RUN mode.			

8.5.2 Error codes in PLC

When an error is included in a message sent from the computer to a PLC, an error occurs in the PLC. When such an error occurs, the serial communication error flag turns ON.

When PLCs other then FX3G, FX3GC, FX3U and FX3UC PLCs are used or when ch1 is used in an FX3G, FX3GC, FX3U or FX3UC PLC, the special auxiliary relay M8063 turns ON as an error flag. When ch2 is used in an FX3G, FX3GC, FX3U or FX3UC PLC, the special auxiliary relay M8438 turns ON as an error flag.

When a serial communication error occurs, the error code is stored in D8063 if M8063 turns ON, or stored in D8438 if M8438 turns ON.

The error code list is shown below:

Device	Error code	Error item	Contents of error	Action			
	6301	Parity, overrun or framing error	Check the transfer specifications set using parameters, and execute communication again.				
D8063 (ch1)	6305	Command error	When the station number was FF, any command other than "GW" was received.	Check the specified command, modify it if necessary, and then execute communication again.			
()	6306	Monitoring timeout	The received message was insufficient. Because normal message was not received within the time-out time setting, the transfer sequence was initialized.	The message is insufficient. Check the transfer program in the computer, modify it if necessary, and then execute communication again.			
	3801	Parity, overrun or framing error	The transfer data is abnormal.	Check the transfer specifications set using parameters, and execute communication again.			
D8438 (ch2)	3805	Command error	When the station number was FF, any command other than "GW" was received.	Check the specified command, modify it if necessary, and then execute communication again.			
	3806	Monitoring timeout	The received message was insufficient. Because normal message was not received within the time-out time setting the transfer sequence was initialized.	The message is insufficient. Check the transfer program in the computer, modify it if necessary, and then execute communication again.			

Serial communication errors and serial communication error code are not cleared even when communication is restored.

Serial communication errors are cleared in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs when the power is turned off and on.

Serial communication errors are cleared in other PLCs when the mode is switched from STOP to RUN.

9. Related Data

9.1 Related Device List

1. Bit devices

Device	Name	Description	R/W
M8063	Serial communication error 1	Turns ON when an error occurs in serial communication using ch 1.	R
M8120	Communication setting keep	Keeps the communication setting status (for FXon PLCs).	R/W
M8126	Global function ON	Turns ON or OFF when the global command (GW) is received from the computer (for ch 1).	R
M8127*1	On-demand send processing	Remains ON while the on-demand function is being executed (for ch 1). ON: On-demand data is being sent. OFF: Sending of on-demand data is completed.	R
M8128	On-demand error flag	Turns ON when an error is included in a specified value for data sending used in the on-demand function (for ch 1).	R
M8129	On-demand data byte/word switch	Specifies the unit (byte or word) of data handled in the on- demand function (for ch 1). ON: Unit = Byte (8-bit) OFF: Unit = Word (16-bit)	R/W
M8426	Global function ON	Turns ON or OFF when the global command (GW) is received from the computer (for ch 2).	R
M8427	On-demand send processing	Remains ON while the on-demand function is being executed (for ch 2). ON: On-demand data is being sent. OFF: Sending of on-demand data is completed.	R
M8428	On-demand error flag	Turns ON when an error is included in a specified value for data sending used in the on-demand function (for ch 2).	R
M8429	On-demand data byte/word switch	Specifies the data unit (byte or word) handled in the on- demand function (for ch 2). ON: Unit = Byte (8-bit) OFF: Unit = Word (16-bit)	R/W
M8438	Serial communication error 2	Turns ON when an error occurs in serial communication using ch 2.	R

R: Read only R/W: Read or Write

^{*1.} FX0N, FX1S, FX1N and FX1NC PLCs do not support this device.

2. Word devices

Device	Name	Description	R/W
D8063	Serial communication error code 1	Stores the error code when an error occurs in serial communication (for ch 1).	R
D8120	Communication format setting	Sets the communication format (for ch 1).	R/W
D8121	Station number settings	Sets the station number in computer link (for ch 1).	R/W
D8127	On-demand data head device number specification	Sets the head data register device number containing the data to be sent using the on-demand function (for ch 1).	R/W
D8128	On-demand data quantity specification	Sets the amount of data to be sent using the on-demand function (for ch 1).	R/W
D8129	Time-out time setting	Sets the evaluation time for error when the receiving of data from the computer is interrupted (for ch 1).	R/W
D8419	Operation mode display (ch 1)	Stores the communication type being used (for ch 1).	R
D8420	Communication format setting	Sets the communication format (for ch 2).	R/W
D8421	Station number settings	Sets the station number in computer link (for ch 2).	R/W
D8427	On-demand data head device number specification	Sets the head data register device number containing the data to be sent using the on-demand function (for ch 2).	R/W
D8428	On-demand data quantity specification	Sets the amount of data to be sent using the on-demand function (for ch 2).	R/W
D8429	Time-out time setting	Sets the evaluation time for error when the receiving of data from the computer is interrupted (for ch 2).	R/W
D8438	Serial communication error code 2	Stores the error code when an error occurs in serial communication (for ch 2).	R
D8439	Operation mode display (ch 2)	Stores the communication type being used (for ch 2).	R

R: Read only R/W: Read or Write

9.2 Details of Related Devices

The devices described below are used for computer link.

9.2.1 Serial communication error [M8063 and M8438]

These devices turn ON when an error occurs during serial communication.

1. Detailed contents

These devices work as the serial communication error flags.

In all PLCs except FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port, M8063 turns ON.

For FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port ch1, M8063 turns ON.

In FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port ch2, M8438 turns ON.

When serial communication error flags turn ON, a corresponding error code is stored in D8063 and D8438.

2. Cautions on use

Serial communication errors code are not cleared even when communication is restored.

Serial communication errors are cleared in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs when the power is turned off and on.

Serial communication errors are cleared in other PLCs when the mode is switched from STOP to RUN.

9.2.2 Communication setting keep [M8120]

Set this device to ON in a sequence program so that the communication setting is kept (for FX0N PLCs).

1. Detailed contents

In an FX0N PLC, set M8120 to ON in a sequence program so that the communication format setting and station number settings are kept.

2. Cautions on use

In an FX0N PLC, the communication setting status is kept only when M8120 is set to ON. In any PLC other than FX0N PLCs, setting of M8120 is not required.

9.2.3 Global function ON [M8126 and M8426]

These devices turn ON/OFF when the PLC receives the global command (GW) from personal computers.

1. Detailed contents

When the computer sends the global command, the global ON flag turns ON or OFF in all connected stations. In all PLCs except FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port, M8126 turns ON or OFF.

For FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port ch1, M8126 turns ON or OFF. In FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port ch2, M8426 turns ON or OFF.

2. Cautions on use

The global ON flag turns OFF from ON when the PLC power is turned OFF or when the PLC mode is changed to STOP.

9.2.4 On-demand send processing [M8127 and M8427]

These devices remain ON while the on-demand function is being executed.

1. Detailed contents

When a PLC gives data sending request using the on-demand function, the on-demand send processing flag turns ON.

In FX2(FX), FX2C, FX2N, FX2NC and FX3S PLCs and in FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port ch1, M8127 turns ON/OFF.

In FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port ch2, M8427 turns ON/OFF.

2. Cautions on use

Use these devices for interlock to prevent generation of two or more on-demand requests at the same time.

C

E

9.2.5 On-demand error flag [M8128 and M8428]

These devices turn ON when an error is included in a specified value for data sending used with the ondemand function.

1. Detailed contents

When the amount of on-demand data is incorrect, the on-demand error flag turns ON. In all PLCs except FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port, M8128 turns ON. For FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port ch1, M8128 turns ON. In FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port ch2, M8428 turns ON.

2. Cautions on use

While the on-demand error flag is ON, data sending is disabled for the on-demand function. When sending data from a PLC using the on-demand function, set to OFF the on-demand error flag.

9.2.6 On-demand data word/byte changeover [M8129 and M8429]

These devices specify the unit (word or byte) of on-demand data.

1. Detailed contents

Use this device to specify the data unit sent using the on-demand function.

Set these devices to ON to specify "byte" (8-bit). Set these devices to OFF to specify "word" (16-bit). In all PLCs except FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port, use M8129.

For FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port ch1, use M8129.

In FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port ch2, use M8429.

2. Cautions on use

When the unit is set to "word", the amount of on-demand data units is equivalent to the number of data registers for sending.

When the unit is set to "byte", two on-demand data units use one data register for sending.

Example: When the amount of on-demand data is "5", the amount of data registers for sending is "3".

9.2.7 Serial communication error code [D8063 and D8438]

These devices store the error codes during serial communication.

1. Detailed contents

When the serial communication error flag (M8063 or M8438) turns ON, a corresponding error code is stored in these devices.

In all PLCs except FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port, an error code is stored in D8063.

For FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port ch1, an error code is stored in D8063.

In FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port ch2, an error code is stored in D8438. The error code list is shown below:

Device	Error code	Error item	Contents of error			
	6301	Parity, overrun or framing error	The transfer data is abnormal.			
D8063 (ch1)	6305	Command error	When the station number was FF, any command other than "GW" was received.			
6306		Monitoring timeout	The received message was insufficient. Because normal message was not received within the time-out time setting, the transfer sequence was initialized.			
	3801	Parity, overrun or framing error	The transfer data is abnormal.			
D8438 (ch2)	3805	Command error	When the station number was FF, any command other than "GW" was received.			
(5112)	3806	Monitoring timeout	The received message was insufficient. Because normal message was not received within the time-out time setting, the transfer sequence was initialized.			

2. Cautions on use

Error codes are not cleared even after communication recovers its normal status.

Serial communication errors are cleared in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs when the power is turned off and on.

Serial communication errors are cleared in other PLCs when the mode is switched from STOP to RUN.

9.2.8 Communication format setting [D8120 and D8420]

These devices set the serial communication format.

1. Detailed contents

These devices set the serial communication format. In FX1s, FX1N, FX1NC, FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs, the contents set in parameters are transferred to these devices when the power is turned ON.

In FX2(FX), FX2c and FX0N PLCs, set the communication format using a sequence program, and then turn ON the power.

In all PLCs except FX3G, FX3GC, FX3U and FX3UC PLCs using communication port ch1, use D8120.

Set the communication format using parameters when using the communication port ch2 in FX3G, FX3GC, FX3U and FX3UC PLCs.

Use D8420 for confirmation.

The tables below show the setting details.

· Contents of D8120

Bit No.	Name		Contents					
DIL NO.	Name		0 (bit = OFF)		1 (bit = ON)			
b0	Data length		7-bit		8-bit			
b1 b2	Parity	b2, b1 (0, 0): No (0, 1): Oo (1, 1): Ev						
b3	Stop bit		1-bit		2-bit			
b4 b5 b6 b7	Baud rate (bps)	b7, b6, b (0, 0, 1, 1 (0, 1, 0, 0 (0, 1, 0, 1 (0, 1, 1, 0)): 300)): 600)): 1200	(0, 1, (1, 0, (1, 0,	5, b5, b4 1, 1): 4800 0, 0): 9600 0, 1): 19200 1, 0): 38400 ^{*1}			
b8	Header		Not provided		Provided (D8124) Initial value: STX (02H)			
b9	Terminator		Not provided		Provided (D8125) Initial value: ETX (03H)			
b10 b11	Control line	Com- puter link	b11, b10 (0, 0): RS-485/RS-422 i (1, 0): RS-232C interfac					
b12		Not applicable						
b13	Sum check		Not added		Added			
b14	Protocol		Not used		Used			
b15	Control procedure		Format 1		Format 4			

^{*1.} This setting is available only in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs.

Contents of D8420

Bit No.	Name	Contents						
BIL NO.	Name		0 (bit = OFF)	1 (bit = ON)				
b0	Data length		7-bit	8-bit				
b1 b2	Parity	b2, b1 (0, 0): No (0, 1): Oo (1, 1): Ev						
b3	Stop bit		1-bit	2-bit				
b4 b5 b6 b7	Baud rate (bps)	b7, b6, b (0, 0, 1, 7) (0, 1, 0, 0) (0, 1, 0, 7) (0, 1, 1, 0)	1): 300 (0, 0): 600 (1, 0): 1200 (1, 0)	6, b5, b4 , 1, 1): 4800 , 0, 0): 9600 , 0, 1): 19200 , 1, 0): 38400				
b8	Header		Not provided	Provided				
b9	Terminator		Not provided	Provided				
b10 b11 b12	Control line	Com- puter link	b12, b11, b10 (0, 0, 0): RS-485/RS-422 inter (0, 1, 0): RS-232C interface	face				
b13	Sum check		Not added	Added				
b14	Protocol		Not used	Used				
b15	Control procedure		Format 1	Format 4				

2. Cautions on use

Do not use both the parameters and communication format setting devices (D8120 or D8420) at the same time. If the communication format is set using both methods at the same time, priority is given to the setting using parameters.

When setting the communication format device (D8120) in an FX0N PLC, set the communication setting latched (battery backed) device (M8120) to ON.

When using computer link, make sure to set the header (b8) and terminator (b9) to "not provided". And set the protocol (b14) to "used".

If the communication format is set using the special data register, the setting becomes valid when the power is turned ON after the setting is written to the special data register.

9.2.9 Station number settings [D8121 and D8421]

These devices set the station number in computer link.

1. Detailed contents

Set the station number of each PLC used in computer link. The applicable setting range is from 0 to 15 (from H00 to H0F).

In FX1s, FX1n, FX1nc, FX2n, FX2nc, FX3s, FX3G, FX3Gc, FX3U and FX3UC PLCs, the contents set using parameters are stored when the power is turned ON.

In FX2(FX), FX2c and FX0N PLCs, set the station number using a sequence program, and then turn ON the

In all PLCs except FX3G, FX3GC, FX3U and FX3UC PLCs and in FX3G, FX3GC, FX3U and FX3UC PLCs using communication port ch1, use D8121.

Set the station number using parameters when using the communication port ch2 in FX3G, FX3GC, FX3U and FX3UC PLCs.

Use D8421 for confirmation.

2. Cautions on use

Do not use both the parameters and station number settings device (D8121) at the same time. If the station number is set using both methods at the same time, priority is given to the setting using a parameter.

When setting the station number settings device (D8121) in an FXoN PLC, set the communication setting latched (battery backed) device (M8120) to ON.

9.2.10 On-demand data head device number specification [D8127 and D8427]

These devices set the head data register device number containing the data to be sent using the on-demand function in a sequence program.

1. Detailed contents

These devices set the head data register device number containing the data to be sent using the on-demand function.

In all PLCs except FX3G, FX3GC, FX3U and FX3UC PLCs and in FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port, use D8127.

For FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port ch1, use D8127.

In FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port ch2, use D8427.

If there is an error in the set data, the on-demand error flag (M8128 or M8428) turns ON.

2. Cautions on use

When setting the on-demand data head device number specification device (D8127 or D8427), set the flag using the pulse operation type.

While the on-demand send processing flag (M8127 or M8427) is ON, do not write data.

9.2.11 On-demand data quantity specification [D8128 and D8428]

These devices set the amount of data to be sent from a PLC using the on-demand function in a sequence program.

1. Detailed contents

These devices set the amount of data to be sent using the on-demand function. Set the amount of data 64 or less.

In all PLCs except FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port, use D8128.

For FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port ch1, use D8128.

In FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port ch2, use D8428.

If an error is included in the set data, the on-demand error flag (M8128 or M8428) turns ON.

2. Cautions on use

When setting the on-demand data quantity specification device (D8128 or D8428), set the flag using the pulse operation type.

While the on-demand send processing flag (M8127 or M8427) is ON, do not write data.

9.2.12 Time-out time setting [D8129 and D8429]

These devices set the evaluation time for error when receiving of data from the computer is interrupted.

1. Detailed contents

These devices set the error evaluation time in 10-ms units used when the receiving of data from the computer is interrupted.

In all PLCs except FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port, use D8129.

For FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port ch1, use D8129.

Set the time-out time setting using parameters when using the communication port ch2 in FX3G, FX3GC, FX3U and FX3UC PLCs.

Use D8429 for confirmation.

The table below shows the setting range.

FX Series	Setting range
FX0N, FX1S, FX1N, FX1NC	1 to 255 (10 to 2550 ms) (When "0" is set, it is handled as "100 ms".)
FX2(FX), FX2C, FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U, FX3UC	1 to 3276 (10 to 32760 ms) (When "0" is set, it is handled as "100 ms".)

2. Cautions on use

Do not set the time-out time setting parameter and the time-out time (D8129) at the same time. The priority is given to the parameter setting.

When setting the time-out time setting device (D8129) in an FXoN PLC, set the communication setting latched (battery backed) device (M8120) to ON.

Make sure that the time-out time setting is not shorter than the time required to receive one character at the set baud rate.

9.2.13 Operation mode display [D8419 and D8439]

These devices store the communication type being used. (in the FX3S, FX3G, FX3GC, FX3U and FX3UC)

1. Detailed contents

These devices store the code of the communication type currently being used in the communication port. When communication port ch1 is used, D8419 stores the communication type. When communication port ch2 is used, D8439 stores the communication type.

•

The table below shows the contents of the communication type codes.

Code	Description
0	Programming communication
1	PP modem mode
2	Protocol dedicated to computer link
3	N:N Network
4	RS instruction
5	RS2 instruction
6	Parallel link
7	Inverter instruction
8	Variable analog potentiometer expansion board is used.
9	MODBUS communication
10	CF-ADP
11	ENET-ADP
12	Input/output expansion board is used.

9.3 Communication Setting Method Using Sequence Program

When adjusting the communication setting using a sequence program, transfer values to D8120 (communication format), D8121 (station number settings) and D8129 (time-out time setting), and then turn the power ON.

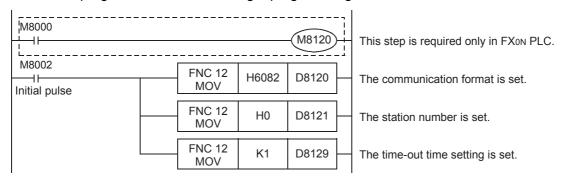
This section explains the communication setting method using a sequence program.

9.3.1 Setting procedure

Perform the following procedure to set the communication using a sequence program.

1 Creating a program using a programming tool

Create the program shown below using a programming tool.



→ For details on these devices, refer to Section 9.2.

2 Writing the sequence program to the PLC

Transfer the created program to the PLC.

3 Setting the PLC mode to RUN

Set the PLC to RUN mode, and execute the program.

4 Turning the PLC power OFF and then ON

Turn OFF the PLC power, and then turn it to ON so that the communication setting becomes valid.

9.3.2 Caution on communication setting using sequence program

- Do not set the communication using a sequence program and parameters at the same time.
 If the communication is set using both methods at the same time, priority is given to the setting using parameters.
- 2) Since the special data registers (D8120, D8121, D8129) is a battery backed area in the case of the FX2N, FX2NC, FX3U and FX3UC series, a value cannot be normally saved when the battery is discharge (or after a battery error occurs).

Therefore, keep in mind that a computer link setting may not be possible in this case.

9.4 ASCII Code Table

<ASCII code table (8-bit code expressed in hexadecimal)> The ASCII codes A1H to DFH indicate Japanese characters.

Hexa deci- mal	0	1	2	3	4	5	6	7	8	9	A	В	С	D	Е	F
0		DLE	SP	0	@	Р	`	р				_	9	Ę		
1	SOH	DC1	!	1	Α	Q	а	q			0	7	Ŧ	4		
2	STX	DC2	"	2	В	R	b	r			Γ	1	ッ	¥		
3	ETX	DC3	#	3	С	S	С	S			J	ڻ ر	Ŧ	ŧ		
4	E0T	DC4	\$	4	D	T	d	t			,	I	١	t		
5	ENQ	NAK	%	5	Е	U	е	u				t	t	1		
6	ACK	SYN	&	6	F	٧	f	٧			Ŧ	Ъ	-	3		
7	BEL	ETB	,	7	G	W	g	w			7	+	Z	ā		
8	BS	CAN	(8	Н	Х	h	Х			1	ク	ネ	IJ		
9	HT	EM)	9	1	Υ	i	У			'n	r	1	N		
Α	LF	SUB	*	:	J	Z	j	Z			I	٦	Λ	V		
В	VT	ESC	+	;	K	[k	{			t	Ħ	Ł	П		
С	FF	FS	,	<	L	∖*1					t	シ	7	7		
D	CR	GS	_	=	M]	m	}			1	ス	^	ン		
Е	S0	RS		>	N	^	n	~			3	t	*	*		
F	SI	US	/	?	0	_	0	DEL			ッ	y	₹	۰		

^{*1. \ (}ASCII CODE:5C) symbol is displayed as "\u00e4" in Japanese.

MEMO

FX Series Programmable Controllers User's Manual [Data Communication Edition]

E. Inverter Communication

Foreword

This manual explains "inverter communication" provided for the MELSEC-F FX Series Programmable Controllers and should be read and understood before attempting to install or use the unit. Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

This manual confers no industrial property rights or any rights of any other kind, nor does it confer any patent licenses. Mitsubishi Electric Corporation cannot be held responsible for any problems involving industrial property rights which may occur as a result of using the contents noted in this manual.

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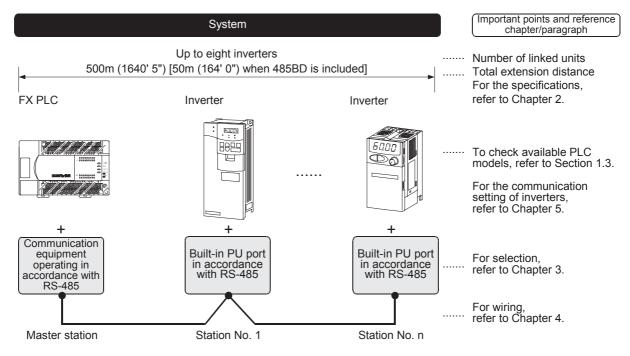
1. Outline

This chapter explains inverter communication.

1.1 Outline of System

Inverter communication allows connection between an FX PLC and up to eight inverters to monitor operations of inverters, give various commands to inverters and read and write inverter parameters through communication via RS-485 .

- Mitsubishi Electric general-purpose inverters FREQROL F800, A800, F700, A700, E700, D700, V500, F500, A500, E500 and S500 (containing the communication type) Series can be linked. (FX2N and FX2NC PLCs support only the A500, E500, and S500 (containing the communication function) Series inverters.)
- 2) Inverter operations can be monitored, various command can be given to inverters, and parameters can be read or written in inverters.
- 3) The total extension distance is 500m (1640' 5") maximum (for the system configured with 485ADP only).



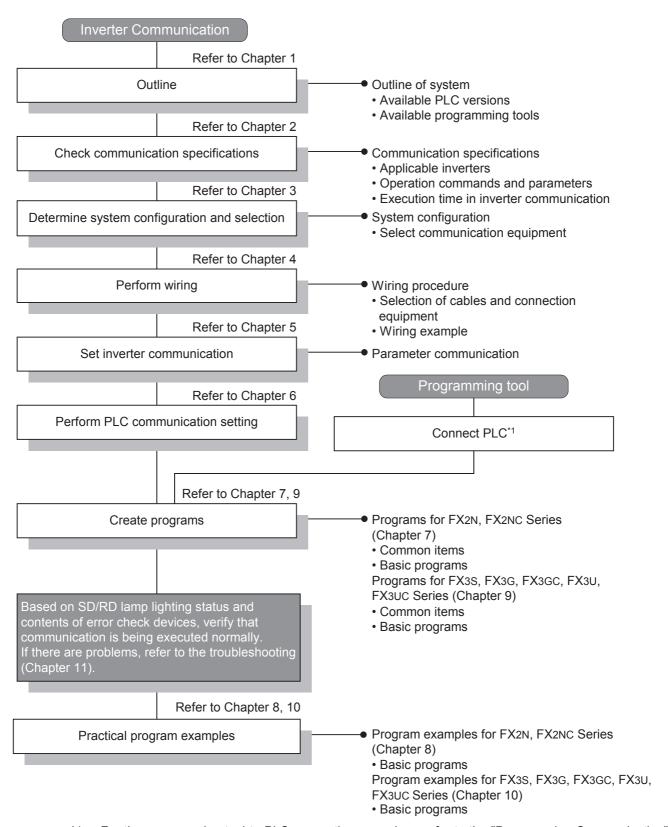
Point

Inverter operations, reading/writing parameters, and monitor output can be performed with the PLC function by writing a prepared sequence program to the inverter.

The inverter PLC function differs from the inverter communication function.

1.2 Procedures Before Operation

The flow chart below shows the Inverter Communication setting and sequence programs creation procedures up until data link:



*1. For the programming tool to PLC connection procedure, refer to the "Programming Communication" section in this manual or the respective programming tool manual.

For details on operation method, refer to the respective programming tool manual.

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Remote Maintenance

Communication Type Applicability in PLC 1.3

1.3.1 For applicable versions

The communication types are applicable for the following versions.

✓: Applicable —: Not applicable

PLC	Applicability	Remarks
FX3UC Series	√*1	
FX3U Series	√*1	1
FX3GC Series	√*1	F800, A800, F700, A700, E700, D700, V500, F500, A500, E500 and S500 Series inverters can be connected.
FX3G Series	√*1	
FX3S Series	√*1]
FX2NC Series	√*1	A500, E500 and S500 Series inverters can be
FX2N Series	√*1	connected.
FX1NC Series	_	Inverter communication is not provided.
FX ₁ N Series	_	Inverter communication is not provided.
FX18 Series	_	Inverter communication is not provided.
FX ₀ N Series	_	Inverter communication is not provided.
FX0S Series	_	Inverter communication is not provided.
FX ₀ Series	_	Inverter communication is not provided.
FX2C Series	_	Inverter communication is not provided.
FX2(FX) Series	_	Inverter communication is not provided.
FX1 Series	_	Inverter communication is not provided.

The table below shows PLC versions applicable to each inverter.

		• •				
PLC	FREQROL-S500/ E500/A500 FREQROL-F500/ V500		FREQROL-F700/ A700	FREQROL-D700/ E700	FREQROL-A800/ F800	
FX3UC	Ver.1.00 or later		1.00 or later Ver.2.20 or later		Ver.3.11 or later	
FX3U		Ver.2.20 or later	Ver.2.32 or later	Ver.3.11 or later		
FX3GC		Ver.2.22 or later				
FX3G		Ver.2.22 or later				
FX3S		Ver.1.10 or later				
FX2N, FX2NC	Ver.3.00 or later		_	_		

1.3.2 Version check

The PLC version can be checked by reading the last three digits of device D8001.

ightarrow For a detailed description of the version check, refer to A. Common Items Section 4.2.

1.3.3 How to look at the manufacturer's serial number

The year and month of production of the PLC main unit can be checked on the nameplate, and "LOT" indicated on the front of the product.

> → For a detailed description of the How to look at the manufacturer's serial number, refer to A. Common Items Section 4.1.

1.4 Programming Tool Applicability

1.4.1 For applicable versions

The programming tool is applicable for each FX Series from the version shown:

1. English versions

Product name	Model name	Applicable version	Remarks		
FX3U and FX3UC P	LCs				
GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later	The IVMC instruction is supported in Ver. 1.48A or later.		
GX Developer	SW□D5C(F)-GPPW-E	Ver. 8.18U or later	The IVMC instruction is not supported.		
FX-30P		Ver. 1.00 or later	The IVMC instruction is supported in Ver. 1.20 or later.		
GOT1000 Series d	isplay units		T1000 Series display units for applicable oporting the list editor function.		
FX3G PLC					
GX Works2 SW□DNC-GXW2-E		Ver. 1.08J or later	The IVMC instruction is supported in Ver. 1.62Q or later.		
GX Developer	SW□D5C(F)-GPPW-E	Ver. 8.72A or later	The IVMC instruction is not supported.		
FX-30P		Ver. 1.00 or later	The IVMC instruction is supported in Ver. 1.50 or later.		
GOT1000 Series d	isplay units		T1000 Series display units for applicable oporting the list editor function.		
FX3GC PLC					
GX Works2	SW□DNC-GXW2-E	Ver. 1.77F or later	-		
FX-30P		Ver. 1.30 or later	The IVMC instruction is supported in Ver. 1.50 or later.		
GOT1000 Series d	isplay units		Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function.		
FX3S PLC					
GX Works2	SW□DNC-GXW2-E	Ver. 1.492N or later	_		
FX-30P		Ver. 1.50 or later			
GOT1000 Series d	isplay units		T1000 Series display units for applicable oporting the list editor function.		
FX2N and FX2NC P	LCs				
GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later			
GX Developer	SW□D5C(F)-GPPW-E	SW7 A or later			
FX-PCS/WIN-E	SW0PC-FXGP/WIN-E	Ver. 3.10 or later	The versions shown on the left		
FX-30P		Ver. 1.00 or later	supporting EXTR instruction		
FX-20P-E(-SET0) FX-20P-MFXD-E		Ver. 4.10 or later	are applicable.		
FX-10P-E		Ver. 4.10 or later			
GOT-F900 Series of F940WGOT-TWD- F940GOT-*WD-E F940GOT-*BD-H-E F940GOT-*BD-RH	E	F940GOT-LBD-H-E, F940GOT-LBD-RH-E, F940GOT-LBD-R	GOT-SWD-E (Ver. 6.30 or later) DGOT-SBD-H-E (Ver. 6.30 or later) 40GOT-SBD-RH-E (Ver. 6.30 or later)		
GOT1000 Series d	isplay units		T1000 Series display units for applicable oporting the list editor function.		

hvidels models

2. Japanese versions

Product name	Product name Model name		Remarks		
FX3u and FX3uc P	LCs				
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later	The IVMC instruction is supported in Ver. 1.45X or later.		
GX Developer	SW□D5C(F)-GPPW-J	Ver. 8.13P or later	The IVMC instruction is not supported.		
FX-30P	•	Ver. 1.00 or later	The IVMC instruction is supported in Ver. 1.20 or later.		
GOT1000 Series d	isplay units		T1000 Series display units for applicable pporting the list editor function.		
FX3G PLC					
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later	The IVMC instruction is supported in Ver. 1.56J or later.		
GX Developer	SW□D5C(F)-GPPW-J	Ver. 8.72A or later	The IVMC instruction is not supported.		
FX-30P	•	Ver. 1.00 or later	The IVMC instruction is supported in Ver. 1.50 or later.		
GOT1000 Series d	isplay units		T1000 Series display units for applicable pporting the list editor function.		
FX3GC PLC					
GX Works2	SW□DNC-GXW2-J	Ver. 1.77F or later	-		
FX-30P		Ver. 1.30 or later	The IVMC instruction is supported in Ver. 1.50 or later.		
GOT1000 Series d	isplay units	Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function.			
FX3S PLC					
GX Works2	SW□DNC-GXW2-J	Ver. 1.492N or later	_		
FX-30P		Ver. 1.50 or later			
GOT1000 Series d	isplay units		T1000 Series display units for applicable pporting the list editor function.		
FX2N and FX2NC P	LCs				
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later			
GX Developer	SW□D5C(F)-GPPW-J	SW7 A or later			
FX-PCS/WIN	SW0PC-FXGP/WIN	Ver. 4.20 or later	The versions shown on the left		
FX-30P		Ver. 1.00 or later	supporting EXTR instruction		
FX-20P(-SET0) FX-20P-MFXD		Ver. 5.10 or later	are applicable.		
FX-10P(-SET0)		Ver. 4.10 or later			
GOT-F900 Series of F940WGOT-TWD F940GOT-*WD F940GOT-*BD-H F940GOT-*BD-RH		F940GOT-LBD-H, F940	1.30 or later) OT-SWD (Ver. 6.30 or later) GOT-SBD-H (Ver. 6.30 or later) IOGOT-SBD-RH (Ver. 6.30 or later)		
GOT1000 Series d	isplay units		T1000 Series display units for applicable pporting the list editor function.		

1.4.2 For non-applicable versions (setting an alternative model)

In FX2N, FX2NC, FX3G, FX3U and FX3UC PLCs, it is not possible to create programs using programming tools of inapplicable versions.

Select "FX3G" in model selection when creating programs using a programming tool whose version is not applicable to the FX3s and FX3GC PLC.

Point

In the FX3S PLC, set the memory capacity for PLC parameters to 4,000 steps or less.

2. Specifications

This chapter explains the communication specifications and performance.

2.1 Communication Specifications (Reference)

Item		Specifications	Remarks
Number of	connectable units	8 maximum	
Transmissi	ion standard	RS-485 standard	
Maximum total extension distance		500 m (1640' 5") or less when 485ADP is used 50 m (164' 0") or less when 485BD is used	Distance varies depending on communication equipment type.
Protocol type		Inverter computer link	Link startup mode
Control procedure		Asynchronous system	
Communication method		Half-duplex, bidirectional communication	
Baud rate		4800, 9600, 19200 or 38400 ^{*1} bps	Any one can be selected.
		ASCII	
Start bit		-	
Character Data bit		7-bit	
format	Parity bit	Even	
	Stop bit	1-bit	

^{*1.} FX3u and FX3uc Series PLC Ver. 2.41 or later, and FX3s, FX3G, FX3Gc Series PLC is applicable.

2.2 Connectable Mitsubishi Electric General-purpose Inverters

Series	Built-in PU connector	FR-A5NR (option)	Remarks
FREQROL-S500	√	_	Only models containing the RS-485 communication type can be connected.
FREQROL-E500	✓	_	
FREQROL-A500	✓	✓	
FREQROL-F500	✓	✓	Only available for FX3S, FX3G, FX3GC, FX3U
FREQROL-V500	✓	✓	and FX3uc PLCs.
Series	Built-in PU connector	Built-in RS-485 terminal	Remarks
FREQROL-A700	_	✓	
FREQROL-F700	_	✓	Only available for FX3S, FX3G, FX3GC FX3U
FREQROL-A800	_	✓	and FX3UC PLCs.
FREQROL-F800	_	✓	
Series	Built-in PU connector	FR-E7TR (option)	Remarks
FREQROL-D700	✓	_	Only available for FX3S, FX3G, FX3GC, FX3U
FREQROL-E700	✓	✓	and FX3UC PLCs.

D

2.3 Link Specifications

The tables below show applicable parameters and operation commands.

2.3.1 When monitoring inverter operations (PLC ← inverter)

Instruction code		Applicable inverter			
(hexadecimal)	Read contents	F800, A800, F700, A700, E700, D700	V500, F500, A500	E500	S500
Н7В	Operation mode	✓	✓	✓	✓
H6F	Output frequency [number of rotations]	✓	✓	√	✓
H70	Output current	✓	✓	√	✓
H71	Output voltage	✓	✓	✓	_
H72	Special monitor	✓	✓	_	_
H73	Special monitor selection number	✓	✓	_	_
H74	Alarm definition	✓	✓	✓	✓
H75	Alarm definition	✓	✓	✓	✓
H76	Alarm definition	✓	✓	✓	_
H77	Alarm definition	✓	✓	✓	_
H79	Inverter status monitor (extended)	✓	_	_	_
H7A	Inverter status monitor	✓	✓	✓	✓
H6E	Set frequency (EEPROM)	✓	✓	✓	✓
H6D	Set frequency (RAM)	✓	✓	✓	✓
H7F	Link parameter expansion setting	Refer to Subsection 9.4.2			
H6C	Second parameter changing				

2.3.2 When controlling inverter operations (PLC \rightarrow inverter)

Instruction code		Applicable inverter						
(hexadecimal)	Written contents	F800, A800, F700, A700, E700, D700	V500	F500, A500	E500, S500			
HFB	Operation mode	✓	✓	✓	✓			
HF3	Special monitor selection number	✓	✓	✓	_			
HF9	Run command (expansion)	✓		_	_			
HFA	Run command	✓	✓	✓	✓			
HEE	Set frequency (EEPROM)	✓	✓	✓	✓			
HED	Set frequency (RAM)	✓	✓	✓	✓			
HFD	Inverter reset	✓	✓	✓	✓			
HF4	Alarm definition all clear	✓	_	✓	✓			
HFC	All parameter all clear	✓	√	✓	√			
HFC	User clear	_	_	✓	_			
HFF	Link parameter expansion setting	✓	√	✓	√			

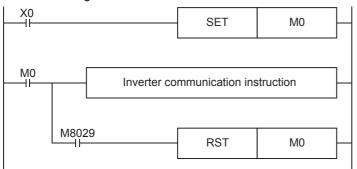
2.3.3 Parameters (PLC ⇔ inverter)

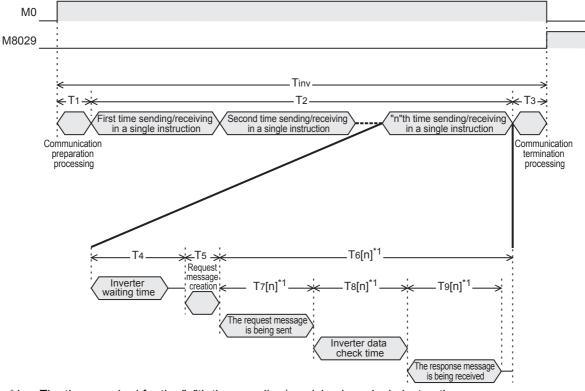
For inverter parameters which can be changed (read and written), refer to "12. Related Detailed Data" later.

2.4 Execution Times in Inverter Communication Instructions

2.4.1 Outline

The period of time after one inverter communication instruction is driven until communication with the inverter is completed (M8029 turns ON) is regarded as the required time for the inverter communication instruction as shown in the figure below.





*1. The time required for the "n"th time sending/receiving in a single instruction.

Some inverter communication instructions execute several times of sending/receiving in a single instruction. The following table shows the number of times of sending/receiving in each communication instruction.

Inve	erter communication instruction	Number of times of sending/receiving in per instruction			
	IVDR	1			
	IVCK	1			
IVPD	Change of the 2nd parameter is unnecessary	2			
Change of the 2nd parameter is necessary*2		3			
IVWR	Change of the 2nd parameter is unnecessary	2			
IVVVK	Change of the 2nd parameter is necessary*2	3			
IVBWR Number of times of communication S2*		$\underbrace{\text{S2}^{\bullet}}$ \times 2 + Number of parameters *2 requiring change of the 2nd parameter			
	IVMC	1			

^{*2.} For parameters requiring change of the 2nd parameter, refer to section 9.10.

2.4.2 Calculation method

Calculate the required time "Tinv" for inverter communication instruction in units of "ms" as follows. "INT(n)" in the calculation formula indicates an integer obtained by truncating decimal places of "n".

1. Length of 1 character

In inverter communication, the communication setting is as shown in following table.

The length of 1 character is as shown in the following calculation expression.

Length of 1 character = Start bit + Data length + Parity bit + Stop bit

= 10[bit]

Name	Set value	bit
Start bit	-	1
Data length	7	7
Parity bit	Even number	1
Stop bit	1	1
Tota	10	

2. Execution times in inverter communication instructions

Execution times in inverter communication instructions is as shown in the following calculation expression.

$$\begin{aligned} & \text{Tinv} = \text{T1} + \text{T2} + \text{T3} \\ & \text{T1} = \text{1[ms]} \\ & \text{T2} = & \text{1n} \times (\text{T4} + \text{T5}) + & \frac{\sum \text{T6[n][ms]}}{\text{Sending and receiving frequency}} \\ & & \text{T6[1]} + \text{T6[2]} + \text{T6[3]} + \cdots \end{aligned}$$

 $T_3 = 1[ms]$

Calculate "T4", "T5" and "T6 [n]" as shown in the following table.

Communication time	Calculation method
T4	= $(INT(\frac{15}{Scan time}) + 1) \times Scan time$
T5	= 1[ms]
Te[n]	• For Scan time < $T7[n]+T8[n]+T9[n]$ = $(INT(\frac{T7[n]+T8[n]+T9[n]}{Scan time}) + 1) \times Scan time$ • For Scan time $\geq T7[n]+T8[n]+T9[n]$ = $(INT(\frac{T7[n]+T8[n]+T9[n]}{Scan time}) + 2) \times Scan time$
T7[n]+T9[n]	= { (\frac{1}{Communication speed [bps]}) \times (\frac{Number of sending and receiving characters*1 \times \text{Length of 1 character}}{1 \text{1 character}}) \text{\$\text{Number of sending and 1 character}}}
T8[n]	= Data check time in inverters*4

Remote Maintenance

Refer to the following table for the number of sent/received characters.

Inverter Parameter/			First		Second			Third		
communication instruction	instruction code	Sending	Receiving	Total	Sending	Receiving	Total	Sending	Receiving	Total
IVRD	Change of the 2nd parameter is unnecessary.	11	4	15	9	11	20	-	-	-
IVIL	Change of the 2nd parameter is necessary.	11	4	15	11	4	15	9	11	20
	HF3, HFA, HFF	11	4	15	-	-	-	-	-	-
IVDR	HFD	13	0*3	13	-	-	-	-	-	-
	Other than above	13	4	17	-	-	-	-	-	-
IVCK	H73, H7A, H7F, H6C	9	9	18	-	-	-	-	-	-
IVOR	Other than above	9	11	20	-	-	-	-	-	-
IVWR	Change of the 2nd parameter is unnecessary.	11	4	15	13	4	17	-	-	-
TVVVIX	Change of the 2nd parameter is necessary.	11	4	15	11	4	15	13	4	17
IVBWR*2	Change of the 2nd parameter is unnecessary.	11	4	15	13	4	17	-	-	-
IVDVVK -	Change of the 2nd parameter is necessary.	11	4	15	11	4	15	13	4	17
IVMC	-	19	19	38	-	-	-	-	-	-

*2. Indicates the number of sent/received characters required to write 1 parameter.

The IVBWR instruction executes parameter writing by the number of times of communication (S2*).

- The inverter gives no response because the inverter is being reset.
 - The PLC waits for 2.2 s until reset of the inverter is completed, and then completes execution of the inverter communication instruction.
- Refer to the following table for the data check time in inverters. Make sure to refer to the manual of the inverter used, and confirm the data check time for the communication command used.

Item	Data check time
Various monitors, operation command, set frequency (RAM)	<12ms
Parameters read/write, set frequency (EEPROM)	<30ms
Parameter all clear/all clear	<5s
Reset instruction	No response (The PLC waits for 2.2 s until reset of the inverter is completed, and then completes execution of the inverter communication instruction.)

The IVWR, IVRD and IVBWR instructions automatically change expansion parameters and the 2nd

The data check time for the last (2nd or 3rd) sending/receiving in the IVWR and IVRD instructions and the data check time for the last sending/receiving of each parameter writing in the IVBWR instruction correspond to parameter reading/writing (< 30 ms).

The data check time for sending and receiving (expansion parameter change and 2nd parameter change) other than the above correspond to various monitors (< 12 ms).

2.4.3 Calculation example

This is a calculation example for the following communication settings and scan time when communicating with an inverter.

Communication speed = 19200[bps] Length of 1 character = 10[bit] Scan time = 10[ms]

> $T_{inv} = T_1 + T_2 + T_3 = 114[ms]$ $T_1 = 1[ms], T_3 = 1[ms]$

1. Calculation example 1

Calculation of required time when Pr. 3 is read by the IVRD instruction

```
Calculate "T2" as follows because Pr.3 does not require change of the 2nd parameter.  T2 = \underbrace{2 \times (T4 + T5)}_{\text{Sending and receiving}} + \underbrace{\frac{T6[1]}{\text{The first sending and receiving}}_{\text{The second sending and receiving}}_{\text{Tre second sending and receiving}} + \underbrace{\frac{T6[2]}{\text{The second sending and receiving}}_{\text{Tre second sending and receiving}}}_{\text{Tre second sending and receiving}}   T4 = (INT(\frac{15}{10}) + 1) \times 10 = 20 \text{[ms]}   T5 = 1 \text{[ms]}   T6[1] = (INT(\frac{T7[1] + T8[1] + T9[1]}{10}) + 1) \times 10 = (INT(\frac{19.8}{10}) + 1) \times 10 = 20 \text{[ms]}   T7[1] + T8[1] + T9[1] = ((\frac{1}{19200}) \times (11 + 4) \times 10) \times 1000 = 7.8 \text{[ms]}   T8[1] = 12 \text{[ms]}   T6[2] = (INT(\frac{T7[2] + T8[2] + T9[2]}{10}) + 1) \times 10 = (INT(\frac{40.4}{10}) + 1) \times 10 = 50 \text{[ms]}   T7[2] + T8[2] + T9[2] = 10.4 + 30 = 40.4 \text{[ms]}   T7[2] + T9[2] = ((\frac{1}{19200}) \times (9 + 11) \times 10) \times 1000 = 10.4 \text{[ms]}   T8[2] = 30 \text{[ms]}
```

2. Calculation example 2

 $T_{inv} = T_1 + T_2 + T_3 = 1 + 112 + 1 = 114[ms]$

Calculation of required time when Pr.902 is read by the IVRD instruction

```
T_{inv} = T_1 + T_2 + T_3 = 155[ms]
T_1 = 1[ms], T_3 = 1[ms]
Calculate "T2" as follows because Pr.902 requires change of the 2nd parameter.
T_2 = 3 \times (T4 + T5) + \underbrace{T6[1]}_{\text{The first}} + \underbrace{T6[2]}_{\text{The second receiving}} + \underbrace{T6[3]}_{\text{The third sending and receiving}} = 3 \times (20 + 1) + 20 + 20 + 50 = 153 [ms]
T4 = (INT(\frac{15}{10}) + 1) \times 10 = 20[ms]
T6[1] = ( \ INT( \ \frac{T7[1] + T8[1] + T9[1]}{10} \ ) + 1 \ ) \times 10 = ( \ INT( \frac{19.8}{10} ) + 1 \ ) \times 10 = 20[ms]
 T7[1] + T8[1] + T9[1] = 7.8 + 12 = 19.8[ms]
   T7[1] + T9[1] = (\frac{1}{19200}) \times (11+4) \times 10) \times 1000 = 7.8[ms]
   T8[1] = 12[ms]
T6[2] = ( INT( \frac{\text{T7[2]} + \text{T8[2]} + \text{T9[2]}}{10} ) + 1 ) × 10 = ( INT( \frac{19.8}{10} ) + 1 ) × 10 = 20[ms]
  T_7[2] + T_8[2] + T_9[2] = 7.8 + 12 = 19.8[ms]
   T7[2] + T9[2] = ((\frac{1}{19200}) \times (11+4) \times 10) \times 1000 = 7.8[ms]
   T8[2] = 12[ms]
T<sub>6</sub>[3] = (INT(\frac{T_7[3] + T_8[3] + T_9[3]}{10}) + 1) × 10 = (INT(\frac{40.4}{10}) + 1) × 10 = 50[ms]
  T7[3] + T8[3] + T9[3] = 10.4 + 30 = 40.4[ms]
   T7[3] + T9[3] = ((\frac{1}{19200}) \times (9+11) \times 10) \times 1000 = 10.4[ms]
   T8[3] = 30[ms]
T_{inv} = T_1 + T_2 + T_3 = 1 + 153 + 1 = 155[ms]
```

3. Calculation example 3

Calculation of required time when Pr. 10 to Pr. 14 [S2*) = 5] are written by the IVBWR instruction

$$T_{inv} = T_1 + T_2 + T_3 = 512[ms]$$

 $T_{inv} = T_1 + T_2 + T_3 = 1 + 510 + 1 = 512[ms]$

$$T_1 = 1[ms], T_3 = 1[ms]$$

Calculate "T2" as follows because Pr.10 to Pr. 14 do not require change of the 2nd parameter and the time required for writing is same in each parameter.

$$T2 = \underbrace{\left(2 \times (\text{T4+T5}) + \text{T6}[1] + \text{T6}[2]\right)}_{\text{Time required to write Pr. }10} + \underbrace{\left(2 \times (\text{T4+T5}) + \text{T6}[3] + \text{T6}[4]\right)}_{\text{Time required to write Pr. }11} + \cdots$$

$$= \underbrace{5}_{1} \times \left(2 \times (\text{T4+T5}) + \text{T6}[1] + \text{T6}[2]\right) = 5 \times \left(2 \times (20+1) + 20 + 40\right) = 510 [\text{ms}]$$

$$\underbrace{52}_{2}$$

$$T4 = \left(1 \text{NT}\left(\frac{15}{10}\right) + 1\right) \times 10 = 20 [\text{ms}]$$

$$T5 = 1 [\text{ms}]$$

$$T6[1] = \left(1 \text{NT}\left(\frac{\text{T7}[1] + \text{T8}[1] + \text{T9}[1]}{10}\right) + 1\right) \times 10 = \left(1 \text{NT}\left(\frac{19.8}{10}\right) + 1\right) \times 10 = 20 [\text{ms}]$$

$$T7[1] + T8[1] + T9[1] = 7.8 + 12 = 19.8 [\text{ms}]$$

$$T7[1] + T9[1] = \left(\left(\frac{1}{19200}\right) \times (11+4) \times 10\right) \times 1000 = 7.8 [\text{ms}]$$

$$T8[1] = 12 [\text{ms}]$$

$$T6[2] = \left(1 \text{NT}\left(\frac{\text{T7}[2] + \text{T8}[2] + \text{T9}[2]}{10}\right) + 1\right) \times 10 = \left(1 \text{NT}\left(\frac{38.9}{10}\right) + 1\right) \times 10 = 40 [\text{ms}]$$

$$T7[2] + T8[2] + T9[2] = \left(\left(\frac{1}{19200}\right) \times (13+4) \times 10\right) \times 1000 = 8.9 [\text{ms}]$$

$$T8[2] = 30 [\text{ms}]$$

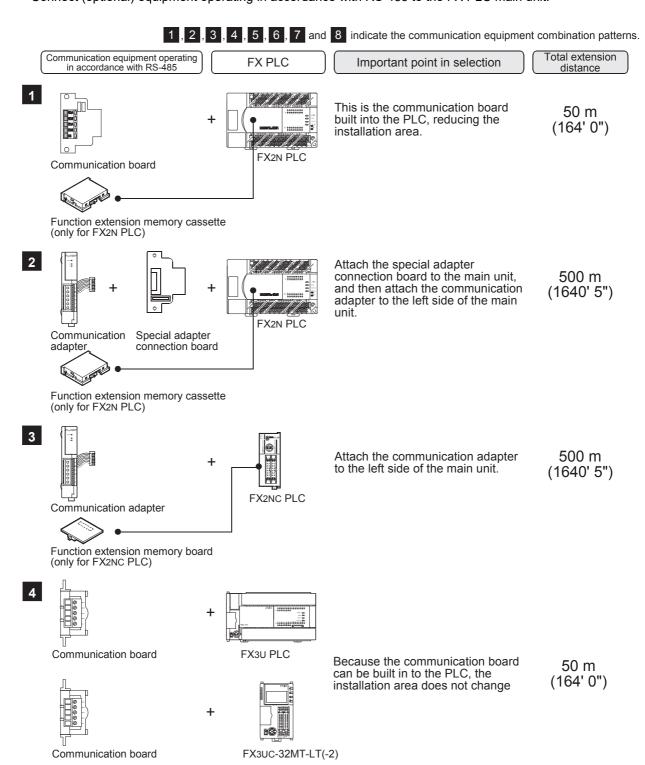
3. System Configuration and Selection

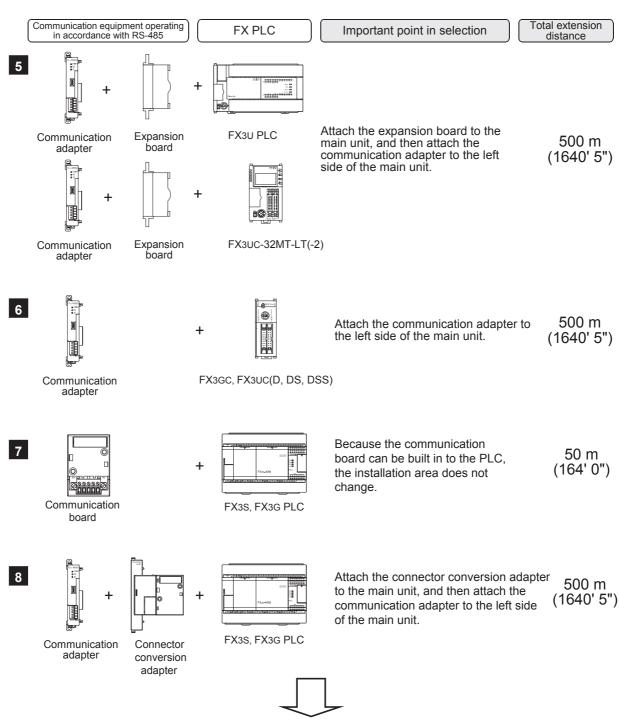
This chapter explains the system configuration and communication equipment selection operating in accordance with RS-485 required by FX PLCs.

3.1 System Configuration

This section outlines the system configuration required to use inverter communication.

Connect (optional) equipment operating in accordance with RS-485 to the FX PLC main unit.





3.2 Applicable FX PLC and Communication Equipment

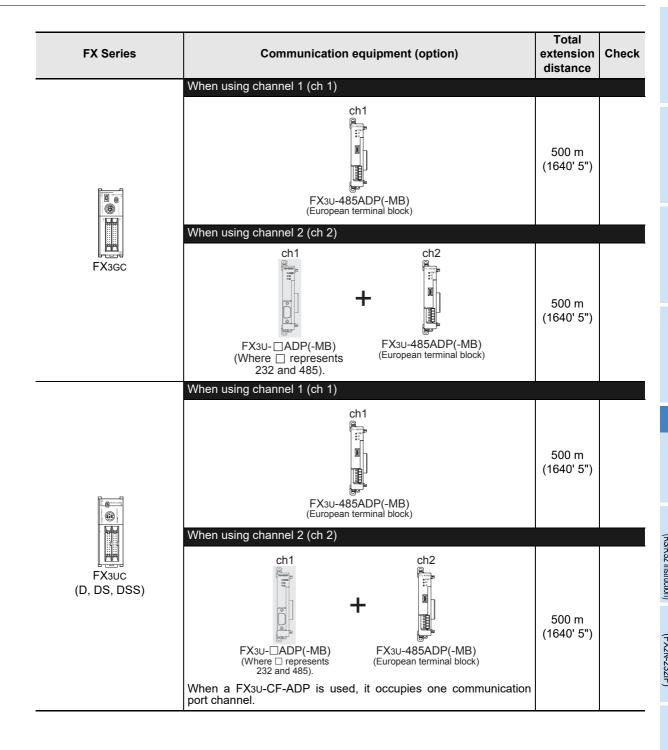
Select a (optional) communication equipment combination, and put a check mark in the "Check" column. During selection, pay attention to the following:

- In the table below, only the external dimensions are different between the units shown in "FX2NC-485ADP/ FX0N-485ADP". Select either one.
- In the table below, only the cable is different between the units shown in "FX3G-485-BD/FX3G-485-BD-RJ". Select either one.
- Inverter communication is not provided for the FX1, FX2(FX), FX2C, FX0, FX0S, FX0N, FX1S, FX1N and FX1NC PLCs.

FX Series	Communication equipment (option)	Total extension distance	Check
FX2N	FX2N-485-BD	50 m (164' 0")	
FX _{2N} -ROM-E1 (Function extension memory cassette)	FX2N-CNV-BD FX2NC-485ADP FX2N-CNV-BD FX0N-485ADP (European terminal block)	500 m (1640' 5")	
FX3S	FX3G-485-BD FX3G-485-BD-RJ (European terminal block) (RJ45 connector)	50 m (164' 0")	
	FX3s-CNV-ADP FX3u-485ADP(-MB) (European terminal block)	500 m (1640' 5")	
FX3G (14-point, 24-point type)	FX3G-485-BD FX3G-485-BD-RJ (European terminal block) (RJ45 connector)	50 m (164' 0")	
	FX3G-CNV-ADP FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	

FX Series	Communication equipment (option)	Total extension distance	Check
	When using channel 1 (ch 1)		
	chl chl FX3G-485-BD FX3G-485-BD-RJ (European terminal block) (RJ45 connector) The communication equipment works as ch1 when connected to the option connector 1.	50 m (164' 0")	
	+ FX3G-CNV-ADP FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	
FX3G (40-point, 60-point type)	Ch2 ch2 Ch2 ch2 FX3G-485-BD FX3G-485-BD-RJ (RJ45 connector) The communication equipment works as ch2 when connected to the option connector 2.	50 m (164' 0")	
	ch1 ch2 + FX3G-CNV-ADP FX3U-□ADP(-MB) FX3U-485ADP(-MB) (Where □ represents (European terminal block) 232 and 485). Ch2 Ch2 Ch2 FX3G-CNV-ADP FX3U-□ADP(-MB) FX3U-485ADP(-MB) (European terminal block) 232 and 485).	500 m (1640' 5")	
	FX3G-2EYT-BD is connected to the option connector 2.		

FX Series	Communication equipment (option)	Total extension distance	Check
	When using channel 1 (ch 1)		
	ch1 FX3U-485-BD (European terminal block)	50 m (164' 0")	
	FX3U-CNV-BD FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	
FX3U	when using channel 2 (ch 2) ch1 FX3U-□-BD (Where □ represents 232, 422, 485, USB and 8AV). When a FX3U-8AV-BD is used, it occupies one communication port channel.	500 m (1640' 5")	
	ch1 ch2 FX3U-CNV-BD FX3U-232ADP(-MB), FX3U-485ADP(-MB) FX3U-485ADP(-MB), (European terminal block) FX3U-CF-ADP When a FX3U-CF-ADP is used, it occupies one communication port channel.	500 m (1640' 5")	
FX2NC + FX2NC-ROM-CE1 (Function extension memory board)	FX2NC-485ADP (European terminal block) FX0N-485ADP (Terminal block)	500 m (1640' 5")	



FX Series	Communication equipment (option)	Total extension distance	Check
	When using channel 1 (ch 1)		
	Ch1 FX3U-485-BD (European terminal block)	50 m (164' 0")	
	rX3u-CNV-BD FX3u-485ADP(-MB) (European terminal block)	500 m (1640' 5")	
77 da	When using channel 2 (ch 2)		
FX3UC-32MT-LT(-2)	Ch1 FX3U-□-BD (Where □ represents 232, 422, 485, USB and 8AV). When a FX3U-8AV-BD is used, it occupies one communication port channel.	500 m (1640' 5")	
	ch1 ch2 FX3U-CNV-BD FX3U-232ADP(-MB), FX3U-485ADP(-MB) FX3U-CF-ADP When a FX3U-CF-ADP is used, it occupies one communication port channel.	500 m (1640' 5")	

Wiring

This chapter explains the wiring.

WIRING PRECAUTIONS



- Make sure to cut off all phases of the power supply externally before attempting installation or wiring work. Failure to do so may cause electric shock or damage to the product.
- Make sure to attach the terminal cover, offered as an accessory, before turning on the power or initiating operation after installation or wiring work. Failure to do so may cause electric shock.

WIRING PRECAUTIONS

!\CAUTION

- Make sure to observe the following precautions in order to prevent any damage to the machinery or accidents due to abnormal data written to the PLC under the influence of noise:
- 1) Do not bundle the main circuit line together with or lay it close to the main circuit, high-voltage line or load line. Otherwise, noise disturbance and/or surge induction are likely to take place. As a guideline, lay the control line at least 100mm (3.94") or more away from the main circuit or high-voltage lines.
- 2) Ground the shield wire or shield of the shielded cable at one point on the PLC. However, do not use common grounding with heavy electrical systems.
- Make sure to properly wire the terminal block in accordance with the following precautions. Failure to do so may cause electric shock, equipment failures, a short-circuit, wire breakage, malfunctions, or damage to the product.
 - The disposal size of the cable end should follow the dimensions described in the manual.
 - Tightening torque should follow the specifications in the manual.
 - Tighten the screws using a Phillips-head screwdriver No.2 (shaft diameter 6mm (0.24") or less). Make sure that the screwdriver does not touch the partition part of the terminal block.
- Make sure to properly wire to the terminal block (European type) in accordance with the following precautions. Failure to do so may cause electric shock, equipment failures, a short-circuit, wire breakage, malfunctions, or damage to the product.
 - The disposal size of the cable end should follow the dimensions described in the manual.
 - Tightening torque should follow the specifications in the manual.
 - Twist the end of strand wire and make sure that there are no loose wires.
 - Do not solder-plate the electric wire ends.
 - Do not connect more than the specified number of wires or electric wires of unspecified size.
 - Affix the electric wires so that neither the terminal block nor the connected parts are directly stressed.

4.1 Wiring Procedure

1 Confirming the connection method

Confirm the inverter connection method.

→ For details, refer to Section 4.2.

2 Preparing for wiring

Prepare cables, distributors and terminal resistors required for wiring.

- \rightarrow For connection cables, refer to Section 4.3.
 - → For distributors, refer to Section 4.4.
- \rightarrow For terminal resistors, refer to Section 4.5.

3 Turning OFF the PLC power

Before starting any wiring work, make sure that the PLC power is OFF.

4 Connecting the power supply (FX0N-485ADP only)

Connect the power supply to the 24V DC power terminal.

5 Wiring communication equipment

Connect communication equipment with communication port of inverters (PU port, built-in terminal for RS-485, FR-A5NR, FR-7TR).

 \rightarrow For details, refer to Section 4.8.

6 Connecting terminal resistors

Connect terminal resistors to the communication equipment of the PLC and the RDA-RDB signal terminal in the last inverter.

 \rightarrow For details, refer to Section 4.5.

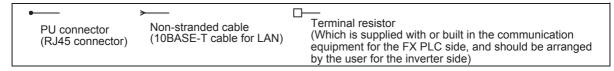
Wiring a shielding wire (Class-D grounding)

When using a twisted pair cable, wire a shielding wire.

 \rightarrow For details, refer to Section 4.6.

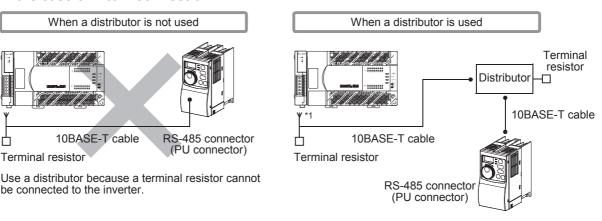
4.2 Selecting Cables and Connection Devices

When connecting equipment operating in accordance with RS-485, use the following connection method with 10BASE-T or shielded twisted pair cables.

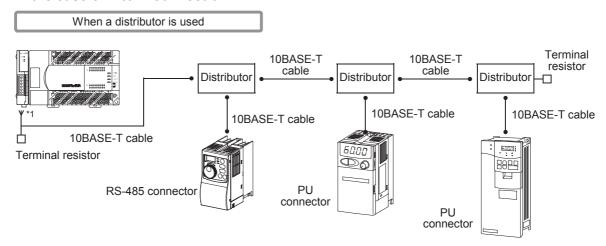


4.2.1 S500, E500, A500, F500, V500, D700 and E700 Series (PU connector)

1. In the case of 1-to-1 connection



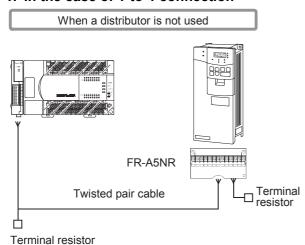
2. In the case of 1-to-N connection



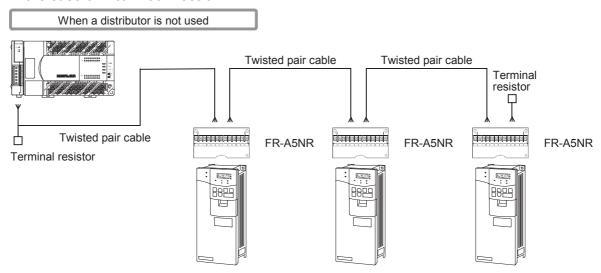
11. When using FX3G-485-BD-RJ, use the PU connector (RJ45 connector) for connection.

4.2.2 A500, F500 and V500 Series (FR-A5NR)

1. In the case of 1-to-1 connection



2. In the case of 1-to-N connection

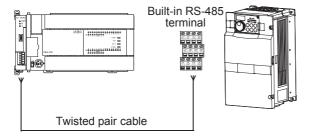


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4.2.3 F800, A800, F700 and A700 Series (built-in RS-485 terminal)

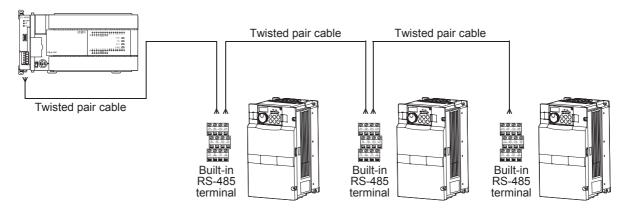
1. In the case of 1-to-1 connection

Set the terminal resistor switch in the inverter to "100 Ω ".



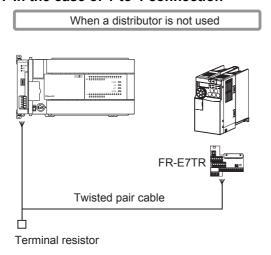
2. In the case of 1-to-N connection

Set the terminal resistor switch in the last inverter to "100 Ω ".

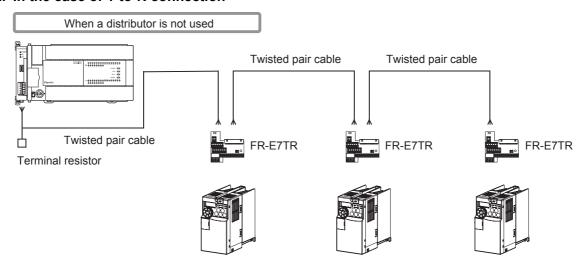


4.2.4 E700 Series (FR-E7TR)

1. In the case of 1-to-1 connection



2. In the case of 1-to-N connection



4.3 Connection Cables

D

4.3 **Connection Cables**

4.3.1 10BASE-T cable

10BASE-T cables used in LAN wiring for a personal computer can be connected.

1. Selection procedure when purchasing

: 10BASE-T cable (Category 3 or 5) 1) Cable type

2) Connection specifications : Straight type 3) Connector : RJ45 connector

2. Cautions on using commercial cables

Pay attention to the following point when purchasing commercial cables.

• 5V DC is output to the PU connector in the inverters for supplying power to the PU. It is necessary to cut pins No. 2 and 8 of commercial cables to prevent wiring to pins No. 2 and 8. (It is recommended to use the distributor BMJ-8-28N).

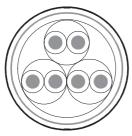
4.3.2 Twisted pair cable (recommended)

The table below shows recommended model names and manufacturers of cables used in wiring. Use commercial three-pair type twisted pair cables of 0.3 mm² or more.

1. Recommended cable list

Manufacturer	Model name	Remarks
Sumitomo Electric Industries, Ltd.	DPEV SB 0.3 × 3P	Three-pair cable of 0.3 mm ²
Cumitomo Electric maastres, Eta.	DPEV SB 0.5 × 3P	Three-pair cable of 0.5 mm ²
The Furukawa Electric Co., Ltd.	D-KPEV-SB 0.5 × 3P	Three-pair cable of 0.5 mm ²

2. Cable structural drawing (reference)



Three-pair cable structural drawing example

3. Point of contact

For details on cables such as specifications and price, contact each cable manufacturer.

4.3.3 Connecting cables

1. European type terminal block

The FX3G-485-BD-RJ terminal block is used for grounding.

The other options use shielded twisted pair cables for connecting communication equipment operating in accordance with RS-485.

The table below shows applicable cables and tightening torques.

	Cable size when	Cable size when	Bar terminal with	Tightening	Tool	size
	one cable is connected	two cables are connected	Insulating sleeve (cable size)	torque	Α	В
FX3U-485-BD FX3G-485-BD FX3U-485ADP (-MB)	AWG22 to AWG20	AWG22	Applicable (AWG22 to AWG20)	0.22 to 0.25 N·m	0.4 (0.01")	2.5 (0.09")
FX3G-485-BD- RJ	AWG20	to AWG16	Not applicable	0.5 to 0.6 N·m	0.6 (0.03")	3.5 (0.14")
FX2N-485-BD	AWG26	to AWG16	Not applicable	0.5 to 0.6 N·m	0.6 (0.03")	3.5 (0.14")
FX2NC-485ADP	AWG26 to AWG16	AWG26 to AWG20	Not applicable	0.4 to 0.5 N·m	0.6 (0.03")	3.5 (0.14")

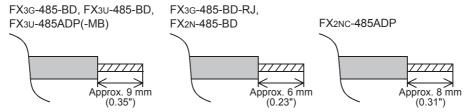
Do not tighten terminal screws with a torque outside the above-mentioned range.

Failure to do so may cause equipment failures or malfunctions.

With regard to the cable end treatment, use a stranded cable or solid cable as it is, or use a bar terminal with insulating sleeve.

FX3G-485-BD-RJ, FX2N-485-BD and FX2NC-485ADP cannot use a bar terminal with insulating sleeve.

- · When using a stranded cable or solid cable as it is
 - Twist the end of a stranded cable so that wires do not get barbed.
 - Do not plate the end of the cable.

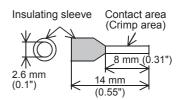


 When using a bar terminal with insulating sleeve Because it is difficult to insert a cable into an insulating sleeve depending on the thickness of the cable sheath, select the proper cable according to the outline drawing.

<Reference>

Manufacturer	Model name	Caulking tool
Phoenix Contact Co., Ltd.	AI 0.5-8WH	CRIMPFOX 6*1 (or CRIMPFOX 6T-F*2)

*1. Old model name : CRIMPFOX ZA 3*2. Old model name : CRIMPFOX UD 6



For size A and size B, refer to the table above.

screwdriver with a

straight tip.

D

Tool

When tightening a terminal on the European terminal block, use a small commercial straight shape screwdriver whose tip is shown in the figure to the right.

Note

If the diameter of screwdriver grip is too small, tightening torque will not be able to be achieved. To achieve the appropriate tightening torque shown in the previous page, use the following screwdriver or an appropriate replacement (grip diameter: approximately 25mm (0.98")). <Reference>

FX3U-485-BD, FX3G-485-BD, FX3U-485ADP(-MB)

Manufacturer	Model name
Phoenix Contact Co., Ltd.	SZS 0.4 × 2.5

FX3G-485-BD-RJ, FX2N-485-BD, FX2NC-485ADP

Manufacturer	Model name	
Phoenix Contact Co., Ltd.	SZF 1-0.6 × 3.5	

2. Terminal block

In the FX0N-485ADP, the terminal screw size is "M3".

Make sure to use a crimp-style terminal with the following sizes.

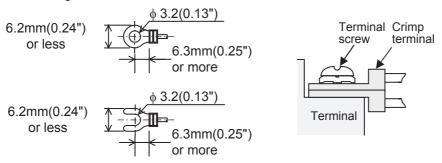
Make sure that the tightening torque is 0.5 to 0.8 N·m.

Do not tighten terminal screws with a torque outside the above-mentioned range. Failure to do so may cause equipment failures or malfunctions.

· When wiring one cable to one terminal



· When wiring two cables to one terminal



4.4 Connection Devices (RJ45 Connector and Distributor)

Prepare the following devices if necessary.

repaire the fellowing devices it research.			
Product name	Model name	Manufacturer	
RJ45 connector	5-554720-3	Tyco Electronics Japan G.K.	
Distributor	BMJ-8 BMJ-8-28N (No internal connection of the No. 2 and 8 pin) (Do not use a plug with terminal resistor)	HACHIKO ELECTRIC CO., LTD.	

4.5 Connecting Terminal Resistors

Connect a terminal resistor to both the communication equipment of the FX PLC and the RDA-RDB signal terminal in the last inverter.

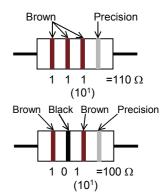
→ For details on connection, refer to each wiring diagram.

1. Terminal resistor types

Prepare the following two types of terminal resistors.

Among the terminal resistors supplied with the communication equipment, select ones with the color codes shown to the right.

- 1) On the FX PLC side, use a terminal resistor of 110 Ω , 1/2 W supplied together with the communication equipment operating in accordance with RS-485.
- 2) On the inverter side (PU connector except FR-A5NR, FR-E7TR), use a terminal resistor of 100 Ω , 1/2 W (not supplied).
- 3) On the inverter side (FR-A5NR), use a terminal resistor chip (supplied together with the FR-A5NR).
- 4) On the inverter side (FR-E7TR), use the terminal resistor switch.



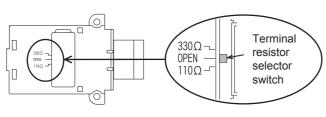
2. Connecting a terminal resistor to the FX PLC

Connect a terminal resistor between the RDA and RDB terminals of the communication equipment.

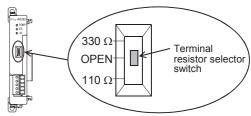
3. When using the FX3U-485-BD, FX3G-485-BD, FX3G-485-BD-RJ or FX3U-485ADP(-MB)

The FX3G-485-BD, FX3U-485-BD, FX3G-485-BD-RJ and FX3U-485ADP(-MB) have built-in terminal resistors. Set the terminal resistor selector switch accordingly.

FX3U-485-BD



FX3U-485ADP(-MB)



FX3G-485-BD

Remove the upper terminal block before changing over the switch in the FX3G-485-BD.

Removal: Loosen the terminal block mounting screws, and remove the terminal block. Installation: Attach the terminal block, and tighten the terminal block mounting screws.

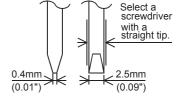
Tightening torque: 0.4 to 0.5 N·m

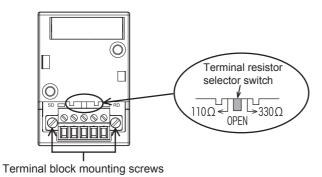
Do not tighten terminal screws with a torque outside the above-mentioned range. Failure to do so may cause equipment failures or malfunctions.

For installation and removal of the terminal block, use the recommended tool shown below or a tool having straight tip (such as screwdriver) as shown in the right figure.

<Reference>

Manufacturer	Model name	
Phoenix Contact Co., Ltd.	SZS 0.4 × 2.5	

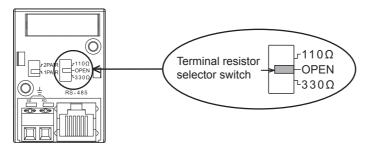




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Discontinued models

FX3G-485-BD-RJ

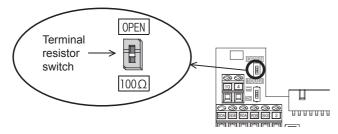


4. Connecting a terminal resistor to the inverter

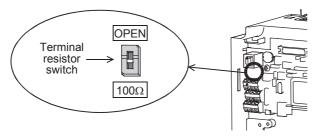
Communication may be affected by noise echo depending on the transmission speed and transmission distance. When communication is hindered by noise echo, connect a terminal resistor to the inverter.

- 1) When the PU connector or RS-485 connector (S500 Series) is used
 - Connect a terminal resistor between pin No. 3 (RDA) and pin No. 6 (RDB).
 - Connect a distributor to the PU terminal because terminal resistors cannot be connected.
 - Connect a terminal resistor only to the inverter located furthest away from the FX PLC.
- 2) When the FR-A5NR is used in connection
 - Connect a terminal resistor chip (which is supplied together with the FR-A5NR) between the RDB and RDR terminals in the most distant inverter.
- 3) When the FR-E7TR is used in connection

A terminal resistor is built into the FR-E7TR. Set the terminal resistor switch in the E700 Series inverter located at the end to " 100Ω ".



4) When the inverter built-in RS-485 terminal is used A terminal resistor is built into the RS-485 terminal. Set the terminal resistor switch in the F700/A700 Series inverter located at the end to " 100Ω ".



4.6 Wiring a Shielding Wire (Class-D grounding)

Perform Class-D grounding only to one side of a cable according to the absence/presence of the grounding terminal.

→ For details on connection, refer to each wiring diagram.

- 1. When the FG terminal is provided in the communication equipment
 - Connect the FG terminal to the (grounding) terminal of the PLC requiring Class-D grounding.
- **2.** When the FG terminal is not provided in the communication equipment Perform Class-D grounding directly to the shielding wire of the cable.

4.7 Connector in Inverter

1. In the case of PU port connector

Pin No.	Signal name	Remarks
8	P5S	Not used
7	SG	
6	RDB	
5	SDA	
4	SDB	
3	RDA	
2	P5S	Not used
1	SG	

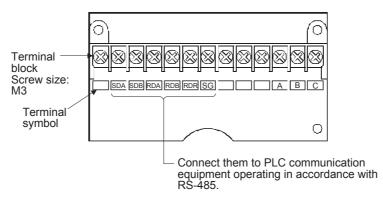
When seen from inverter front (receptacle side)



The pins Nos. 2 and 8 (P5S) are provided for the power supply of the operation panel or parameter unit. Do not wire them into inverter communication.

2. In the case of computer link using the FR-A5NR

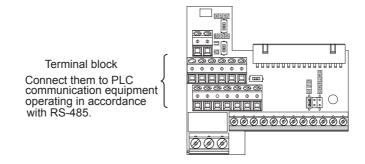
Attach the FR-5NR to an A500, F500 or V500 Series inverter.



 \rightarrow For details, refer to the instruction manual of the FR-A5NR.

3. In the case of computer link using the FR-E7TR

Attach the FR-E7TR to an E700 Series inverter.

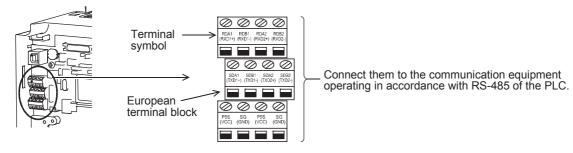


 \rightarrow For details, refer to the instruction manual of the FR-E7TR.

Parallel Link

4. In the case of built-in RS-485 terminal

F800, A800, F700 and A700 Series inverters are equipped with a built-in RS-485 terminal.

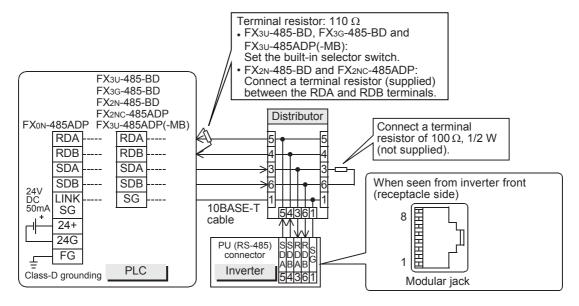


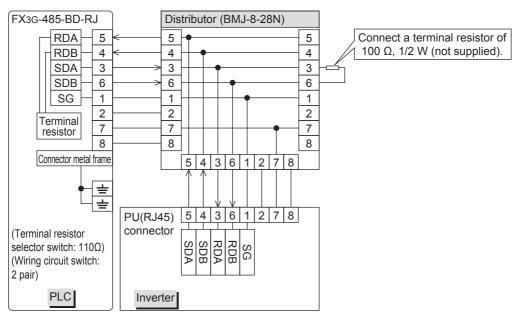
 \rightarrow For details, refer to the instruction respective inverter manual.

4.8 Connection Diagram

4.8.1 For S500, E500, A500, F500, V500 and D700 Series (PU connector)

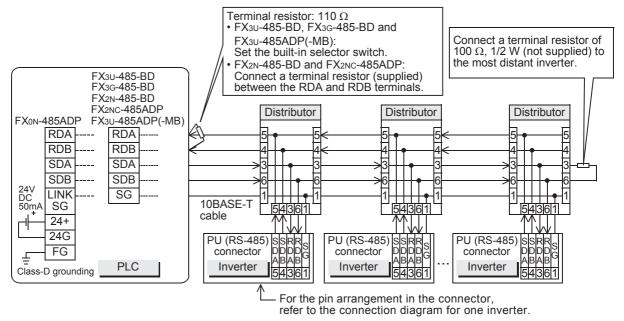
1. When one inverter is connected

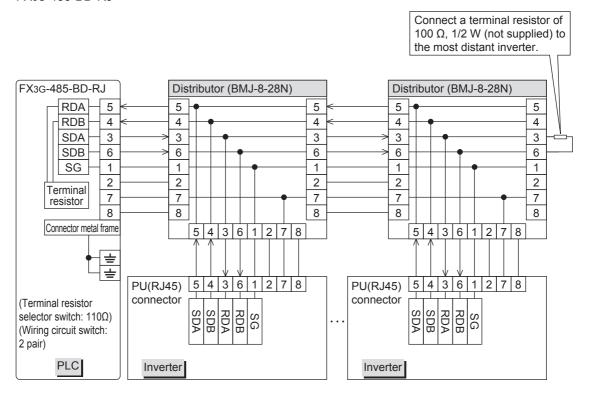




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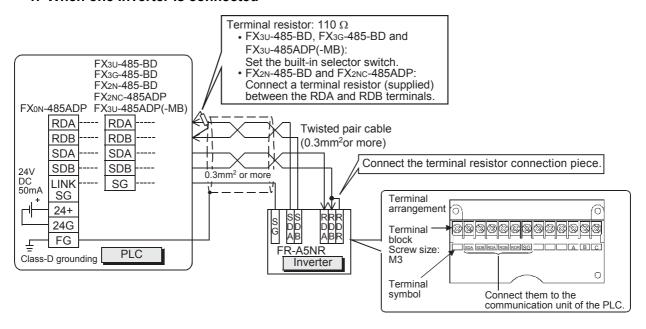
2. When two or more (up to eight) inverters are connected



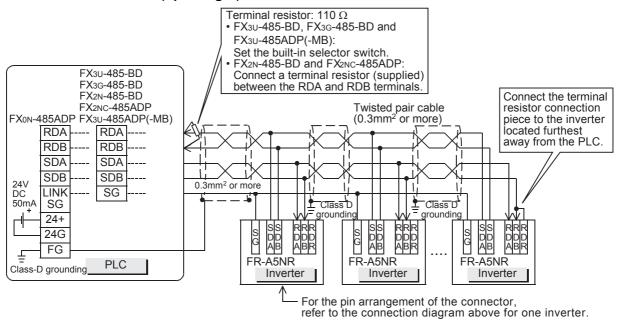


4.8.2 For A500, F500 and V500 Series (FR-A5NR)

1. When one inverter is connected



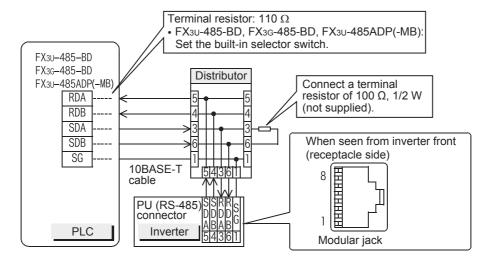
2. When two or more (up to eight) inverters are connected

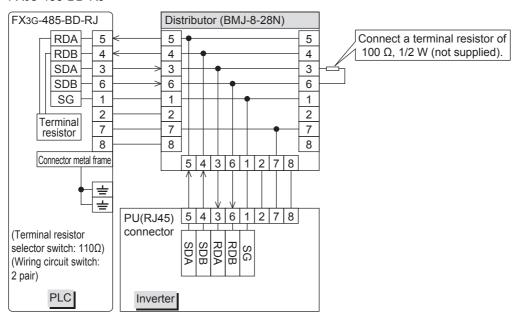


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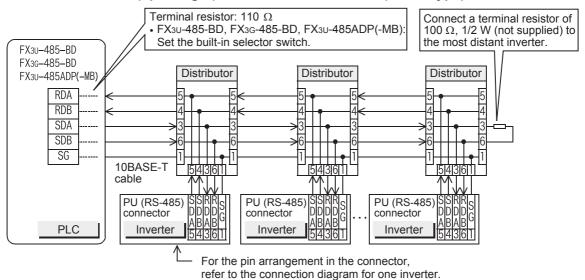
4.8.3 For E700 Series (PU connector)

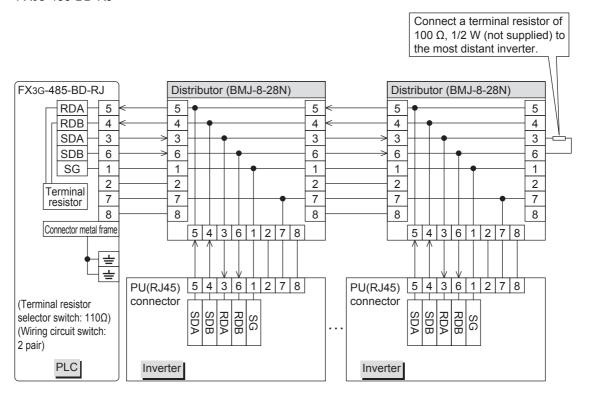
1. When one inverter is connected (4-wire type)





2. When two or more (up to eight) inverters are connected (4-wire type)

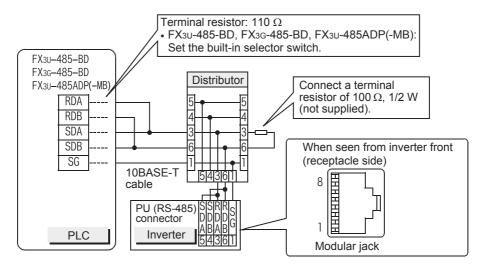


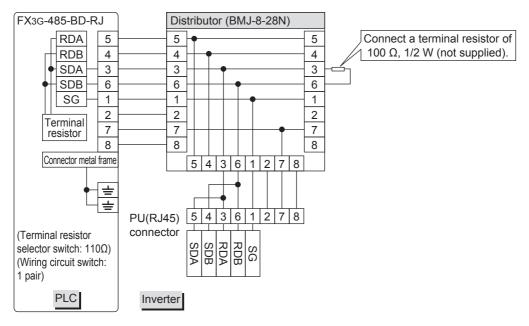


4.8 Connection Diagram

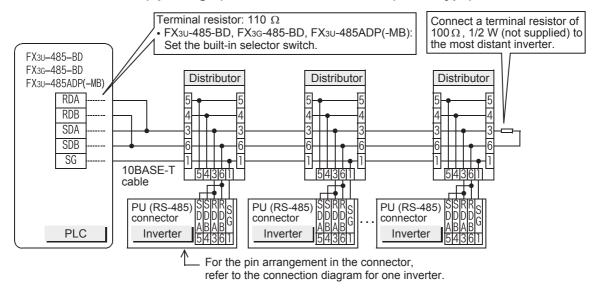
D

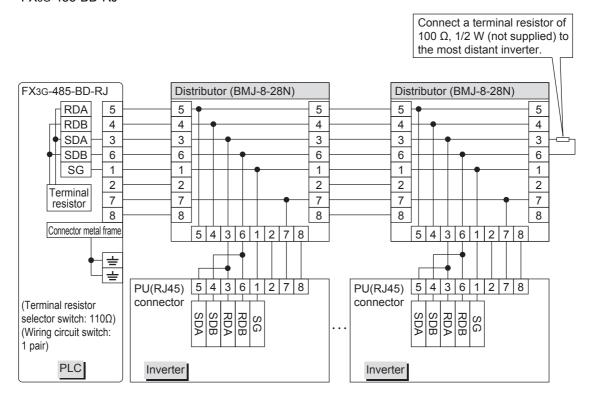
3. When one inverter is connected (2-wire type)





4. When two or more (up to eight) inverters are connected (2-wire type)

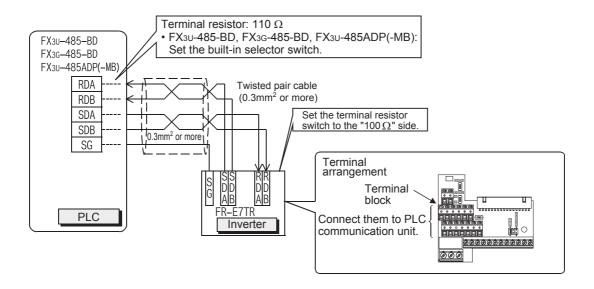




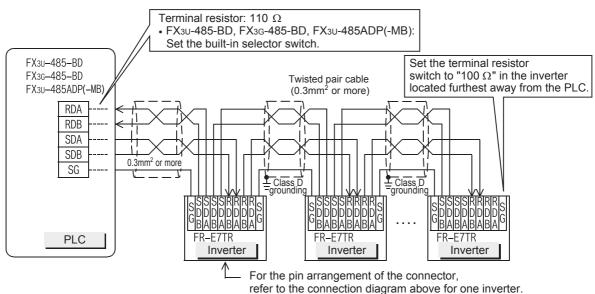
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4.8.4 For E700 Series (FR-E7TR)

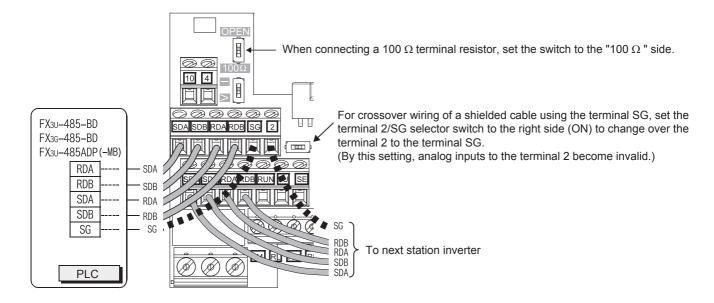
1. When one inverter is connected (4-wire type)



2. When two or more (up to eight) inverters are connected (4-wire type)

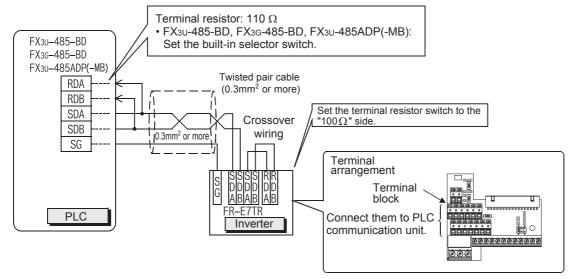


When adopting branches, perform the wiring as shown below: (4-wire type)

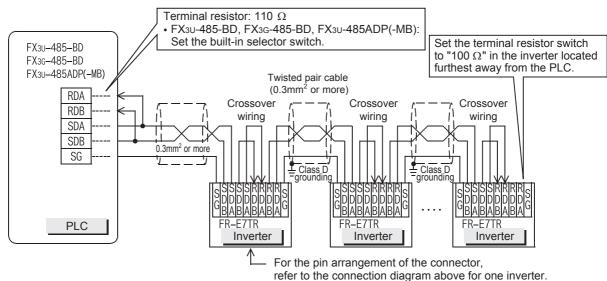


D

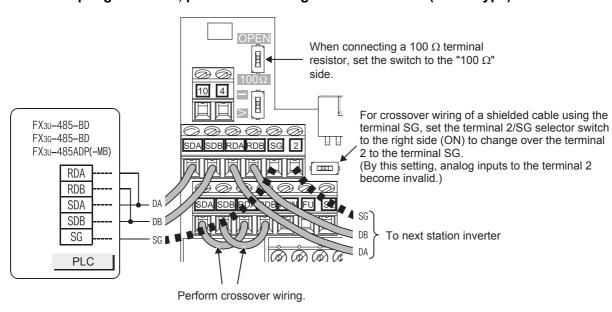
3. When one inverter is connected (2-wire type)



4. When two or more (up to eight) inverters are connected (2-wire type)

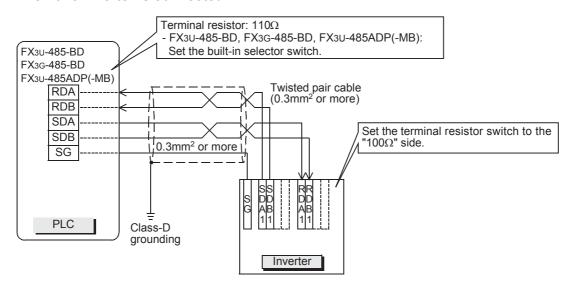


When adopting branches, perform the wiring as shown below: (2-wire type)

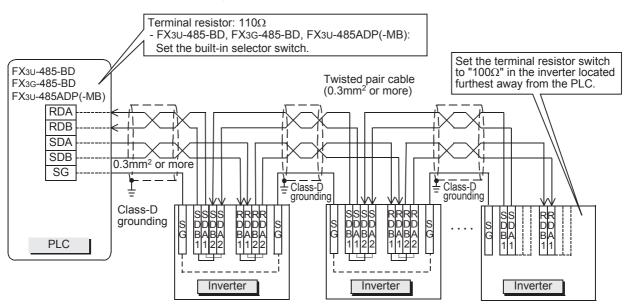


4.8.5 For F800, A800, F700 and A700 Series (built-in RS-485 terminal)

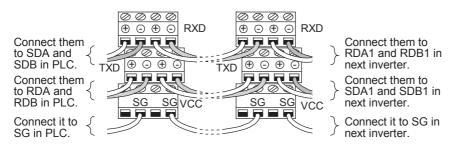
1. When one inverter is connected



2. When two or more (up to eight) inverters are connected

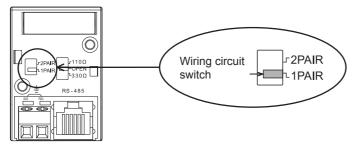


When adopting branches, perform the wiring as shown below:



4.8.6 Switching of 1 pair / 2 paired wiring (FX3G-485-BD-RJ)

The FX3G-485-BD-RJ has a built-in wiring circuit switch. Set the wiring circuit switch to 1 pair / 2 pair.

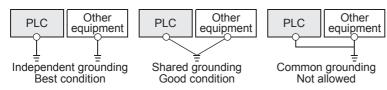


4.9 Grounding

Grounding should be performed as stated below.

- The grounding resistance should be 100Ω or less.
- Independent grounding should be performed for best results.
 When independent grounding can not be performed, perform "shared grounding" as shown in the following figure.

→ For details, refer to the Hardware Edition of each series.



- The grounding wire size should be AWG 14 (2 mm²) or larger.
- The grounding point should be close to the PLC, and all grounding wires should be as short as possible.

5. Communication Setting in Inverter

Before connecting an inverter to a PLC, set parameters related to communication in the inverter parameter unit (PU) in advance using the procedure described in this chapter.

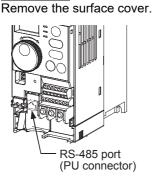
If these parameters are overwritten from the PLC after the inverter is connected, communication will be disabled.

If these parameters are changed by mistake, they should be set again.

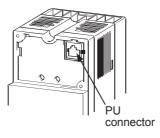
5.1 Communication Port and Applicable Parameters

When connecting an inverter to a PLC, it is necessary to set parameters corresponding to the communication port in advance.

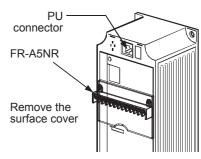
S500 Series



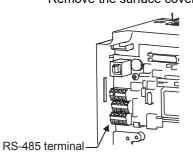
E500 Series Remove the operation panel.



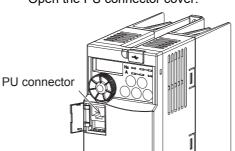
A500, F500 and V500 Series Remove the operation panel.



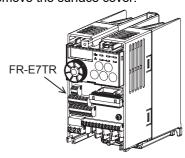
F700 and A700 Series
Remove the surface cover.



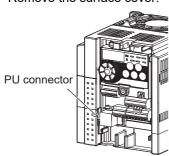
E700 Series
Open the PU connector cover.



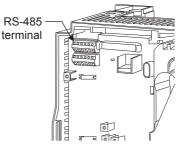
Remove the surface cover.



<u>D700 Series</u> Remove the surface cover.



Remove the surface cover.



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Model	Model classification	Inverter connection destination	Parameters applicable in inverter	Reference section
S500 Series	Only models with built-in RS-485 port	RS-485 port	Pr79, n1 to n12	5.2
E500 Series	Models with built-in PU port	PU port	Pr79, Pr117 to Pr124	5.3
A500 Series	Models with built-in PU port	PU port	Pr79, Pr117 to Pr124	5.4
A300 Selles	Option	FR-A5NR computer link	Pr79, Pr331 to Pr342	5.5
F500 Series	Models with built-in PU port	PU port	Pr79, Pr117 to Pr124	5.4
F300 Selles	Option	FR-A5NR computer link	Pr79, Pr331 to Pr342	5.5
V500 Series	Models with built-in PU port	PU port	Pr79, Pr117 to Pr124	5.4
vous Series	Option	FR-A5NR computer link	Pr79, Pr331 to Pr342	5.5
D700 Series	Models having built-in PU port	PU port	Pr79, Pr117 to Pr124, Pr340, Pr549	5.6
	Models having built-in PU port	PU port	Pr79, Pr117 to Pr124, Pr.340, Pr549	
E700 Series	Option	FR-E7TR control terminal option		5.6
A700 Series	Models with built-in RS-485 terminal	RS-485 terminal	Pr79, Pr331 to Pr342, Pr549	5.7
F700 Series	Models with built-in RS-485 terminal	RS-485 terminal	Pr79, Pr331 to Pr342, Pr549	5.7
A800 Series	Models with built-in RS-485 terminal	RS-485 terminal	Pr79, Pr331 to Pr342, Pr549 PN000, PN001, PN030 to PN038, PD000, PD001, PD010, PD011	5.8
F800 Series	Models with built-in RS-485 terminal	RS-485 terminal	Pr79, Pr331 to Pr342, Pr549 PN000, PN001, PN030 to PN038, PD000, PD001, PD010, PD011	5.8

5.2 S500 Series (When Connected to RS-485 Port)

5.2.1 Contents of parameter setting

1. Contents of communication setting (essential items)

The table below shows parameters which should be set in all cases.

Parameter No.	Parameter item	Set value	Setting contents
n1	Communication station number	00 to 31	Up to eight inverters can be connected.
		48	4800 bps
n2	Communication speed	96	9600 bps
		192	19200 bps (standard)
n3	Stop bit length	10	Data length: 7-bit/Stop bit: 1-bit
n4	Parity check presence/absence	2	Even parity present
n7	Wait time setting		Set with communication data
n11	CR/LF selection	1	With CR, without LF
Pr79	Operation mode selection	0	External operation mode is selected when power is turned ON.
n10	Link start mode selection	1	Computer link operation
n6	Communication check time interval		Communication check suspension

2. Parameters which should be adjusted between test operation and actual operation

Parameter No.	Parameter item	Set value	Setting contents
n5	Number of communication retries		Set the value shown on the left during adjustment, and set a value from 1 to 10 during operation.

3. Others (which should be set if necessary)

The table below shows parameters to be considered when using various system configuration and inverters. For the method of use, refer to the respective inverter manual.

Parameter No.	Parameter item	Set value	Setting contents
n12	EEPROM write selection	0 or 1	0: Written to RAM and EEPROM 1: Written to RAM only. Not written to EEPROM
n8	Operation command write	0 or 1	0: PLC 1: External
n9	Speed command write	0 or 1	0: PLC 1: External
Pr37	Speed display*1	0 or 0.1 to 999	0: Frequency display, setting 0.1 to 999: Machine speed at 60Hz.

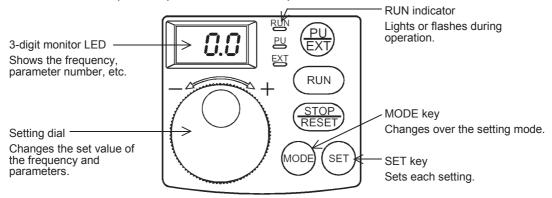
^{*1.} This inverter communication function cannot read or write Pr37. Set Pr37 to "0" when setting or monitoring the frequency in the PLC.

If any value other than "0" is set and the instruction code HFF is set to "01", the frequency may not be set or monitored normally.

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5.2.2 Parameter setting method (reference)

This subsection explains the parameter setting method using the operation panel. For details on the operation panel, refer to the respective inverter manual.



The operating procedure example below shows a case in which the baud rate is set to 19,200 bps.

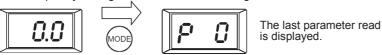
1 Confirming the RUN indicator and the operation mode

Confirm that the operation is stopped (that the RUN indicator is OFF).

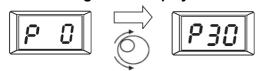
2 Selecting the parameter setting mode

Press the MODE key, and select the parameter setting mode.

Monitor/frequency setting mode Parameter setting mode



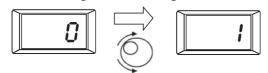
- 3 Setting the set value of Pr. 30 to "1" (This step is not necessary if Pr. 30 is already set to "1".)
 - 1. Turn the setting dial to display "P30".



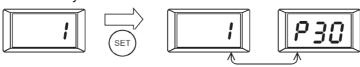
2. Press the SET key to read the currently set value.



3. Turn the setting dial to change the set value to "1".



Press the SET key to set "1".

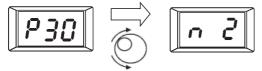


The set value and parameter number are displayed alternately.

When the set value and parameter number are displayed alternately, the setting is completed.

4 Setting the set value of "n2" to "192" ("192" indicates the baud rate of 19200 bps.)

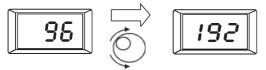
Turn the setting dial to display "n2".



Press the SET key to read the currently set value.



Turn the setting dial to change the set value to "192".



Press the SET key to set "192".



The set value and parameter number are displayed alternately.

When the set value and parameter number are displayed alternately, the setting is completed.

5 Changing other parameters in the same way as step 4

ightarrow For details on the parameters to be set, refer to Subsection 5.2.1.

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5.3 E500 Series (When Connected to PU Port)

5.3.1 Contents of parameter setting

1. Contents of communication setting (essential items)

The table below shows parameters which should be set in all cases.

Parameter No.	Parameter item	Set value	Setting contents
Pr117	Communication station number	00 to 31	Up to eight inverters can be connected.
		48	4800 bps
Pr118	Communication speed	96	9600 bps
		192	19200 bps (standard)
Pr119	Stop bit / Data length	10	Data length: 7-bit/Stop bit: 1-bit
Pr120	Parity check presence/absence	2	Even parity present
Pr123	Waiting time setting	9999	Set with communication data
Pr124	CR•LF presence/absence selection	1	With CR, without LF
Pr79	Operation mode selection	0	External operation mode is selected when power is turned ON.
Pr122	Communication check time interval	9999	Communication check suspension

2. Parameters which should be adjusted between test operation and actual operation

Parameter No.	Parameter item	Set value	Setting contents
Pr121	Number of	aaaa	Set the value shown on the left during adjustment, and
	communication retries		set a value from 1 to 10 during operation.

3. Others (which should be set if necessary)

The table below shows parameters to be considered when using various system configuration and inverters. For the method of use, refer to the respective inverter manual.

Parameter No.	Parameter item	Set value	Setting contents
Pr37	Speed display*1	0 or 0.01 to 9998	0: Frequency display, setting 0.01 to 9998: Machine speed at 60Hz.
Pr146	Frequency setting command selection*2	0, 1, 9999	0 : The built-in frequency setting knob is valid. 1 : The built-in frequency setting knob is invalid. 9999 : The built-in frequency setting knob is valid when the frequency is set to "0 Hz" by the keys.
Pr342	EEPROM write selection (only in 400 V class)	0 or 1	0: EEPROM is written. 1: RAM is written.

*1. This inverter communication function cannot read or write Pr37.

Set Pr37 to "0" when setting or monitoring the frequency in the PLC.

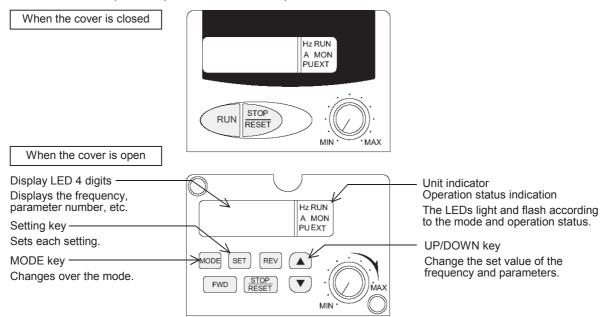
If any value other than "0" is set to Pr37 and the instruction code HFF is set to "01", the frequency may not be set or monitored normally (in the 400 V class).

(In the 200 V and 100 V classes, the frequency may not be set or monitored normally if any value other than "0" is set to Pr37 without regard to the setting of the instruction code HFF.)

*2. When changing the frequency from the PLC, set "1" or "9999".

5.3.2 Parameter setting method (reference)

This subsection explains the parameter setting method using the operation panel. For details on the operation panel, refer to the respective inverter manual.



The operating procedure example below shows a case in which the baud rate is set to 19200 bps.

1 Confirming the RUN indicator and the operation mode indicator

Confirm that the operation is stopped (that the RUN indicator is Off).

2 Selecting the parameter setting mode

Press the MODE key, and select the parameter setting mode.

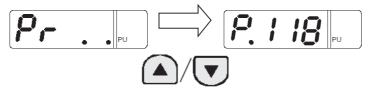


*1. The frequency setting mode is displayed only in the PU operation mode.

3 Reading the parameter (Pr. 118)

There are two methods to read the parameter number:

Method to read the parameter number using the UP and DOWN keys
 Press the UP and DOWN keys, and display the parameter number to be read.



· Method to set each digit of the parameter number

a) Press the SET key to flash the most significant digit. Set a numeric value using the UP and DOWN keys.



b) Press the SET key to flash the middle digit. Set a numeric value using the UP and DOWN keys.



c) Press the SET key to flash the least significant digit. Set a numeric value using the UP and DOWN keys.



4 Setting the set value of Pr. 118 to "192" ("192" indicates the baud rate of 19200 bps.)

1. Press the SET key to read the currently set value. Change the set value using the UP and DOWN keys.



2. Press and hold the SET key for 1.5 seconds to set "192".



3. Press the SET key to display the next parameter.



5 Change other parameters in the same way as step 3.

 \rightarrow For details on parameters to be set, refer to Subsection 5.3.1.

5.4 V500, F500 and A500 Series (Connection to PU Port)

5.4.1 Contents of parameter setting

1. Contents of communication setting (essential items)

The table below shows parameters which should be set in any case.

Parameter No.	Parameter item	Set value	Setting contents
Pr117	Communication station number	00 to 31	Up to eight inverters can be connected.
		48	4800 bps
Pr118	Communication speed	96	9600 bps
		192	19200 bps (standard)
Pr119	Stop bit length/data length	10	Data length: 7-bit/Stop bit: 1-bit
Pr120	Parity check presence/absence	2	2: Even parity
Pr123	Waiting time setting	9999	Set in communication data
Pr124	CR•LF presence/absence selection	1	CR: Provided, LF: Not provided
Pr79	Operation mode selection	0	External operation mode is selected when power is turned ON.
Pr122	Communication check time interval	9999	Communication check is stopped.

2. Parameters which should be adjusted between test operation and actual operation

Parameter No.	Parameter item	Set value	Setting contents
Pr121	Number of communication retries	i aaaa	Set the value shown on the left during adjustment, and set a value from 1 to 10 during operation.

3. Others (which should be set if necessary)

The table below shows parameters to be considered when using various system configuration and inverters. For the method of use, refer to the respective inverter manual.

Parameter No.	Parameter item	Set value	Setting contents
Pr342	EEPROM write selection	0 or 1	0: EEPROM are written. 1: RAM is written.

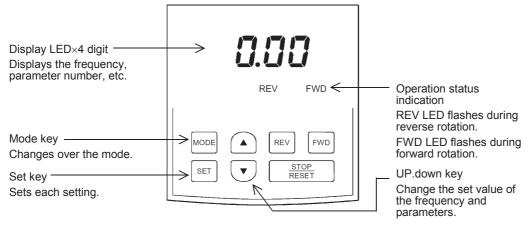
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5.4.2 Parameter setting method (reference)

This subsection explains the parameter setting method using the operation panel. For details on the operation panel, refer to the respective inverter manual.



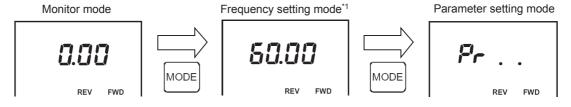
The operating procedure example below shows a case in which the baud rate is set to 19200 bps.

1 Confirming the RUN indicator and the operation mode indicator

Confirm that the operation is stopped (that both the REV and FWD indicators are Off).

2 Selecting the parameter setting mode

Press the MODE key, and select the parameter setting mode.

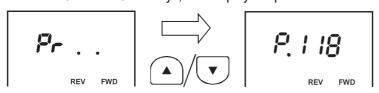


*1. The frequency setting mode is displayed only during the PU operation mode.

Reading the parameter (Pr. 118)

There are two methods to read the parameter number:

Method to read the parameter number using the UP and DOWN keys
 Press the UP and DOWN keys, and display the parameter number to be read.



- · Method to set each digit of the parameter number
 - a) Press the SET key to flash the most significant digit. Set a numeric value using the UP and DOWN keys.



b) Press the SET key to flash the middle digit. Set a numeric value using the UP and DOWN keys.



c) Press the SET key to flash the least significant digit. Set a numeric value using the UP and DOWN keys.



- 4 Setting the set value of Pr. 118 to "192" ("192" indicates the baud rate of 19200 bps.)
 - 1. Press the SET key to read the currently set value. Change the set value using the UP and DOWN keys.



2. Press and hold the SET key for 1.5 seconds to set "192".



The set value and parameter number are displayed alternately.

3. Press the SET key to display the next parameter



The set value and parameter number are displayed alternately.

5 Changing other parameters in the same way as step 3

 \rightarrow For details on the parameters to be set, refer to Subsection 5.4.1.

5.5 V500, F500 and A500 Series (Connection to FR-A5NR)

5.5.1 Contents of parameter setting

1. Contents of communication setting (essential items)

The table below shows parameters which should be set in all cases.

Parameter No.	Parameter item	Set value	Setting contents
Pr331	Communication station number	00 to 31	Up to eight inverters can be connected.
		48	4800 bps
Pr332	Communication speed	96	9600 bps (standard)
		192	19200 bps
Pr333	Stop bit / Data length	10	Data length: 7-bit/Stop bit: 1-bit
Pr334	Parity check presence/absence	2	2: Even parity
Pr337	Waiting time setting	9999	Set in communication data
Pr341	CR, LF presence/absence selection	1	CR: Provided, LF: Not provided
Pr79	Operation mode selection	0	External operation mode is selected when power is turned ON.
Pr340	Link startup mode selection	1	Computer link
Pr336	Communication check time interval	9999	Communication check is stopped.

2. Parameters which should be adjusted between test operation and actual operation

Parameter No.	Parameter item	Set value	Setting contents	
Pr335	Number of communication	9999	Set the value shown on the left during adjustment,	
retries	0000	and set a value from 1 to 10 during operation.		

3. Others (which should be set if necessary)

The table below shows parameters to be considered when using various system configuration and inverters. For the method of use, refer to the respective inverter manual.

Parameter No.	Parameter item	Set value	Setting contents
Pr342	EEPROM write selection	0 or 1	0: EEPROM is written. 1: RAM is written.
Pr338	Operation command right	0 or 1	0: PLC 1: Outside
Pr339	Speed command write	0 or 1	0: PLC 1: Outside

5.5.2 Parameter setting method (reference)

The parameter setting method is the same as that for the V500, F500 and A500 Series (connection to the PU port).

→ For the parameter setting method, refer to Subsection 5.4.2.

5.6 E700, D700 Series (when PU port, FR-E7TR is connected)

5.6.1 Contents of parameter setting

1. Contents of communication setting (essential items)

The table below shows parameters which should be set in all cases.

Parameter No.	Parameter item	Set value	Setting contents
Pr117	PU communication station number	00 to 31	Up to eight inverters can be connected.
		48	4800 bps
Pr118	PU communication speed	96	9600 bps
FILIO	P Communication speed	192	19200 bps (standard)
		384	38400 bps
Pr119	PU communication stop bit length	10	Data length: 7-bit/Stop bit: 1-bit
Pr120	PU communication parity check	2	2: Even parity
Pr123	PU communication waiting time setting	9999	Set in communication data
Pr124	PU communication CR/LF presence/ absence selection	1	CR: Provided, LF: Not provided
Pr79	Operation mode selection	0	External operation mode is selected when power is turned ON.
Pr549	Protocol selection	0	Mitsubishi inverter (computer link operation) protocol
Pr340	Communication startup mode selection	1 or 10	Network operation mode Network operation mode Operation mode can be changed between the PU operation mode and network operation mode from the operation panel.

2. Parameters which should be adjusted between test operation and actual operation

Parameter No.	Parameter item	Set value	Setting contents
Pr121	Number of PU communication retries	9999	Set the value shown on the left during adjustment, and set a value from 1 to 10 during operation.
Pr122	PU communication check time interval	9999	Set the value shown on the left during adjustment, and set a proper value in accordance with the system specification during operation.

Caution on setting the PU communication check time interval (Pr122)

Description	Set value
During adjustment or when communication with the PLC is not executed periodically	9999
When communication with the PLC is not executed	0 (Initial Value)
Set the communication time in the following cases When it is necessary to monitor absence of communication for a certain time and stop the inverter in such a case while communication with the PLC is being executed When it is necessary to stop the motor at the point which the PLC mode is changed from RUN to STOP	0.1 to 999.8 sec

3. Others (which should be set if necessary)

The table below shows parameters to be considered when using various system configuration and inverters. For the method of use, refer to the respective inverter manual.

Parameter No.	Parameter item	Set value	Setting contents
Pr37	Speed display*1		0: Frequency display, setting 0.01 to 9998: Machine speed at 60Hz.
Pr146	Built-in potentiometer switching*2	0 or 1	Built-in frequency setting potentiometer valid Built-in frequency setting potentiometer invalid
Pr342	Communication EEPROM write selection	0 or 1	0: EEPROM is written. 1: RAM is written.

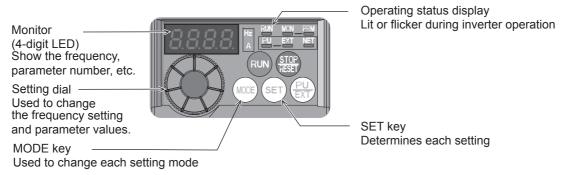
- *1. This inverter communication function cannot read or write Pr37.

 Set Pr37 to "0" when setting or monitoring the frequency in the PLC.

 If any value other than "0" is set to Pr37 and the instruction code HFF is set to "01", the frequency may not be set or monitored normally.
- *2. Set Pr146 to "1" when changing the frequency from the PLC.

5.6.2 Parameter setting method (reference)

This subsection explains the parameter setting method using the operation panel. For details on the operation panel, refer to the respective inverter manual.



The operating procedure example below shows a case in which the baud rate is set to 19200 bps.

1 Confirming the RUN indicator and the operation mode indicator

Confirm that the operation is stopped (that the RUN indicator is off).

2 Selecting the parameter setting mode

Press the MODE key, and select the parameter setting mode.



- 3 Setting the parameter Pr. 160 to "0" (This step is not required if Pr. 160 is already set to "0".)
 - 1. Turn the setting dial until "Pr. 160" is displayed.



2. Press the SET key to read the current set value.



3. Turn the setting dial, and change the set value to "0".



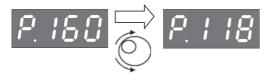


The set value and parameter number are displayed alternately.

The set value and parameter number are displayed alternately, and the setting is completed.

4 Setting the parameter Pr. 118 to "192" ("192" indicates the baud rate of 19200 bps.)

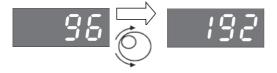
Turn the setting dial until "Pr. 118" is displayed.



Press the SET key to read the current set value.



Turn the setting dial, and change the set value to "192".



Press the SET key to determine the set value.



The set value and parameter number are displayed alternately.

The set value and parameter number are displayed alternately, and the setting is completed.

5 Changing other parameters in the same way as step 4

 \rightarrow For details on the parameters to be set, refer to Subsection 5.6.1.

Common

B

N:N Networ

C Paral

D

Inverter Commu

Non-Pr

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Non-Protocol
Communicatio
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Н

Programming Communication

Remote
Maintenance

Apx.A Discontinuo

5.7 F700 and A700 Series (when built-in RS-485 terminal is connected)

5.7.1 Contents of parameter setting

1. Contents of communication setting (essential items)

The table below shows parameters which should be set in all cases.

Parameter No.	Parameter item	Set value	Setting contents
Pr331	RS-485 communication station	00 to 31	Up to eight inverters can be connected.
		48	4800 bps
Pr332	RS-485 communication speed	96	9600 bps (standard)
F1332	RS-465 Communication speed	192	19200 bps
		384	38400 bps
Pr333	RS-485 communication stop bit length	10	Data length: 7-bit/Stop bit: 1-bit
Pr334	RS-485 communication parity check selection	2	2: Even parity
Pr337	RS-485 communication waiting time setting	9999	Set in communication data
Pr341	RS-485 communication CR/LF selection	1	CR: Provided, LF: Not provided
Pr79	Operation mode selection	0	External operation mode is selected when power is turned ON.
Pr340	Communication startup mode selection	1	Computer link
Pr336	RS-485 communication check time interval	9999	Communication check is stopped.
Pr549	Protocol selection	0	Mitsubishi inverter (computer link) protocol

2. Parameters which should be adjusted between test operation and actual operation

Parameter No.	Parameter item	Set value	Setting contents
Pr335	RS-485 communication number of retries		Set the value shown on the left during adjustment, and set a value from 1 to 10 during operation.

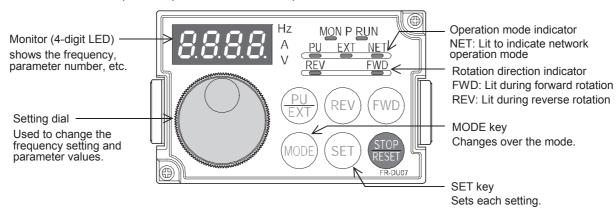
3. Others (which should be set if necessary)

The table below shows parameters to be considered when using various system configuration and inverters. For the method of use, refer to the respective inverter manual.

Parameter No.	Parameter item	Set value	Setting contents
Pr342	Communication EEPROM write selection	0 or 1	0: EEPROM is written. 1: RAM is written.
Pr338	Communication operation command source	0 or 1	0: PLC 1: Outside
Pr339	Communication operation command source	0 or 1	0: PLC 1: Outside

5.7.2 Parameter setting method (reference)

This subsection explains the parameter setting method using the operation panel. For details on the operation panel, refer to the respective inverter manual.



The operating procedure example below shows a case in which the baud rate is set to 19200 bps.

Confirming the RUN indicator and the operation mode indicator

Confirm that the operation is stopped (that the RUN indicator is off).

Selecting the parameter setting mode

Press the MODE key, and select the parameter setting mode.



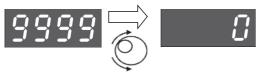
- Setting the parameter Pr. 160 to "0" (This step is not required if Pr. 160 is already set to "0".)
 - 1. Turn the setting dial until "Pr. 160" is displayed.



2. Press the SET key to read the current set value.



3. Turn the setting dial, and change the set value to "0".



Press the SET key to determine the set value.



The set value and parameter number are displayed alternately.

The set value and parameter number are displayed alternately, and the setting is completed.

4 Setting the parameter Pr. 332 to "192" ("192" indicates the baud rate of 19200 bps.)

Turn the setting dial until "Pr. 332" is displayed.



Press the SET key to read the current set value.



Turn the setting dial, and change the set value to "192".



Press the SET key to determine the set value.



The set value and parameter number are displayed alternately.

The set value and parameter number are displayed alternately, and the setting is completed.

5 Change other parameters in the same way as step 4

 \rightarrow For details on the parameters to be set, refer to Subsection 5.7.1.

F800 and A800 Series (when built-in RS-485 terminal is connected) 5.8

Contents of parameter setting 5.8.1

1. Contents of communication setting (essential items)

The table below shows parameters which should be set in all cases.

Parameter No.	Parameter group	Parameter item	Set value	Setting contents
Pr331	N030	RS-485 communication station	00 to 31	Up to eight inverters can be connected.
			48	4800 bps
Pr332	N031	RS-485 communication speed	96	9600 bps (standard)
F1332	14031	170-403 communication speed	192	19200 bps
			384	38400 bps
D 000	_	RS-485 communication stop bit length/data length	10	Data length: 7-bit/Stop bit: 1-bit
Pr333	N032	RS-485 communication data length	1	Data length: 7 bits
	N033	RS-485 communication stop bit length	0	Stop bit: 1 bit
Pr334	N034	RS-485 communication parity check selection	2	2: Even parity
Pr337	N037	RS-485 communication waiting time setting	9999	Set in communication data
Pr341	N038	RS-485 communication CR/LF selection	1	CR: Provided, LF: Not provided
Pr79	D000	Operation mode selection	0	External operation mode is selected when power is turned ON.
Pr340	D001	Communication startup mode selection	1	Computer link
Pr549	N000	Protocol selection	0	Mitsubishi inverter (computer link) protocol

2. Parameters which should be adjusted between test operation and actual operation

Parameter No.	Parameter group	Parameter item	Setting contents			
Pr335	N035	RS-485 communication number of retries	9999	Set the value shown on the left during adjustment, and set a value from 1 to 10 during operation.		
Pr336	N036	RS-485 communication check time interval	9999	Set the value shown on the left during adjustment, and set a value in accordance with the system specification during operation.		

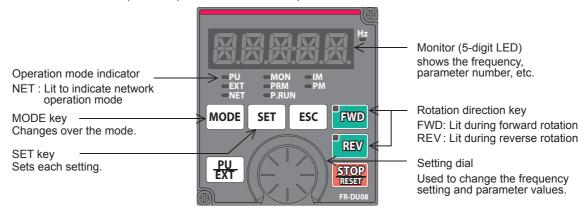
3. Others (which should be set if necessary)

The table below shows parameters to be considered when using various system configuration and inverters. For the method of use, refer to the respective inverter manual.

Parameter No.	Parameter group	Parameter item	Set value	Setting contents
Pr342	N001	Communication EEPROM write selection	0 or 1	O: Write to EEPROM and RAM. 1: Write to RAM only.
Pr338	D010	Communication operation command source	0 or 1	0: PLC 1: Outside
Pr339	D011	Communication operation command source	0 or 1	0: PLC 1: Outside

5.8.2 Parameter setting method (reference)

This subsection explains the parameter setting method using the operation panel. For details on the operation panel, refer to the respective inverter manual.



The operating procedure example below shows a case in which the baud rate is set to 19200 bps.

1 Confirming the RUN indicator and the operation mode indicator

Confirm that the operation is stopped (that the P.RUN indicator is off).

2 Selecting the parameter setting mode

Press the MODE key, and select the parameter setting mode.



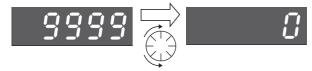
- 3 Setting the parameter Pr. 160 to "0" (This step is not required if Pr. 160 is already set to "0".)
 - 1. Turn the setting dial until "Pr. 160" is displayed.



2. Press the SET key to read the current set value.



3. Turn the setting dial, and change the set value to "0".



Press the SET key to determine the set value.

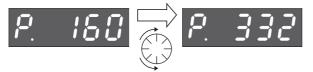


The set value and parameter number are displayed alternately.

The set value and parameter number are displayed alternately, and the setting is completed.

4 Setting the parameter Pr. 332 to "192" ("192" indicates the baud rate of 19200 bps.)

Turn the setting dial until "Pr. 332" is displayed.



Press the SET key to read the current set value.



Turn the setting dial, and change the set value to "192".



Press the SET key to determine the set value.



The set value and parameter number are displayed alternately.

The set value and parameter number are displayed alternately, and the setting is completed.

5 Change other parameters in the same way as step 4

→ For details on the parameters to be set, refer to Subsection 5.8.1.

5.9 Cautions on Setting

1. Setting of the "communication check time interval" and "RS-485 communication check time interval"

Description	Set value
During adjustment or when communication with the PLC is not executed periodically	Value shown in table
When communication with the PLC is not executed	0
Set the communication time in the following cases: When it is necessary to monitor the absence of communication for a certain time and stop the inverter in such a case while communication with the PLC is being executed When it is necessary to stop the motor at the point which the PLC mode is changed from RUN to STOP	0.1 to 999.8 sec

6. Communication Setting in FX Programmable Controller

This chapter explains the communication setting method for inverter communication. Set non-protocol communication for inverter communication.

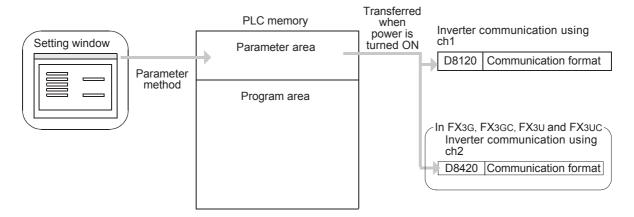
6.1 Parameter Assigning Method

Use parameters for communication setting in the FX PLC.

1. Parameter assigning method

Register the communication setting in the sequence programming software parameters, and transfer the parameters to the PLC.

2. Setting flow



6.2 Communication Setting Using Parameter Method (GX Works2)

Communication settings may be changed via the parameter method with GX Works2, GX Developer, FXGP/WIN for Windows and FX-30P handy programming panel. This section describes how to change parameters with GX Works2.

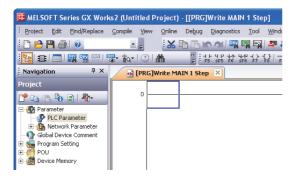
→ For details on FXGP/WIN operating procedure, refer to section 6.3.
 → For details on GX Developer operating procedure, refer to GX Developer Operating Manual.
 → For details on FX-30P operating procedure, refer to FX-30P Operation Manual.

6.2.1 Operating procedure

This subsection explains the serial communication setting method. Suppose that GX Works2 is already started up.

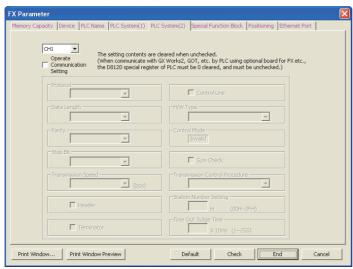
1 Opening the parameter setting window

In the project view area of the navigation window, double-click [Parameter] \rightarrow [PLC Parameter]. If the navigation window is not displayed, select [View] \rightarrow [Docking Window] \rightarrow [Navigation] from the menu bar.



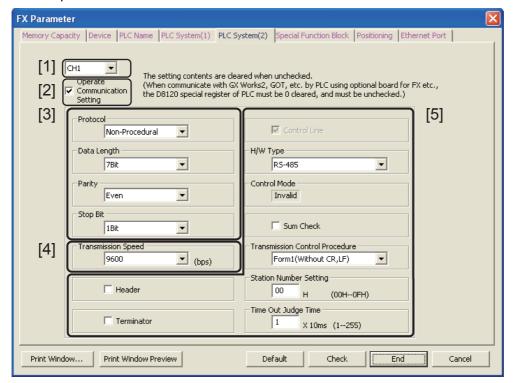
2 Setting the serial communication (parameters)

Click the [PLC System(2)] tab in the FX Parameter window.



3 Setting the serial communication (parameters)

Set the parameters as shown below:



- [1] Set the channel to be used. (This parameter can be set only in the FX3G, FX3GC, FX3U and FX3UC PLCs.)
- [2] Check the "Operate Communication Setting" box.
- [3] Set "Protocol" to "Non-procedural", "Data Length" to "7Bit", "Parity" to "Even", and "Stop Bit" to "1Bit".
- [4] Set "Transmission Speed" to either "4800", "9600", "19200" or "38400^{*1}", and make sure that the set value here is the same as the set value in the inverters.
- [5] Ignore these items.
 - *1. This transmission speed is supported only in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs.

Click [End].

4 Writing parameters and program to the PLC

Select [Online] \rightarrow [Write to PLC] from the menu bar, click [Parameter + Program], and then click [Execute].

6.3 Communication Setting Using Parameter Method (FXGP/WIN)

Communication settings may be changed via the parameter method with GX Works2, GX Developer, FXGP/WIN for Windows and FX-30P handy programming panel. This section describes how to change parameters with FXGP/WIN. Ch2 cannot be set using FXGP/WIN.

→ For details on GX Works2 operating procedure, refer to section 6.2.
 → For details on GX Developer operating procedure, refer to GX Developer Operating Manual.
 → For details on FX-30P operating procedure, refer to FX-30P Operation Manual.

6.3.1 Operating procedure

This subsection explains the serial communication setting method. Suppose that FXGP/WIN is already started up.

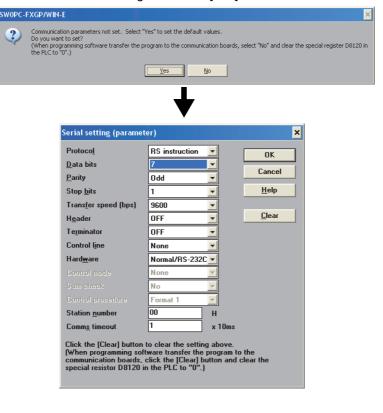
1 Displaying serial setting (parameter)

Select [Option] → [Serial setting (parameter)] from the toolbar.

The following dialog box appears according to absence/presence of parameter setting.

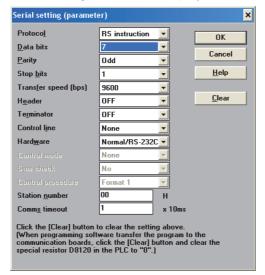
1. When there are no parameter settings

There are no communication settings. Click the [Yes] button.



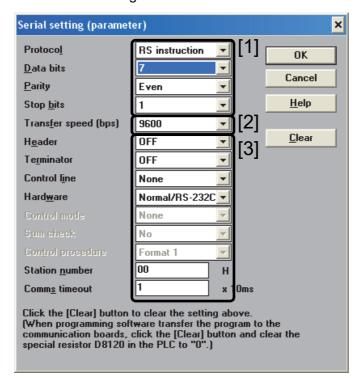
2. When there are already parameter settings

The existing communication setting contents are displayed.



2 Adjusting serial setting (parameter)

Execute the communication setting as shown below.



- [1] Set "Protocol" to "RS instruction", "Data bits" to "7", "Parity" to "Even", and "Stop bits" to "1".
- [2] Set "Transfer speed [bps]" to either "4800", "9600" or "19200", and make sure that the set value here is the same as the set value in the inverters.
- [3] Ignore these items.

3 Writing a sequence program (parameters) to the PLC

Select [PLC] \rightarrow [Transfers] \rightarrow [Write] from the toolbar, and click [OK] button.

7. Creating Programs (FX2N, FX2NC)

This chapter explains how to create programs which change inverter parameters and give operation commands to inverters.

As explanation, a program example is shown for each applied instruction.

7.1 Checking Contents of Related Devices

The tables below show the devices used in inverter communication in FX2N and FX2NC PLCs.

1. Bit devices

Device No.	Name	Description	R/W
M8029	Instruction execution complete	Turns ON when execution of EXTR instruction is completed, and remains ON for 1 scan. Turns ON also when execution of instruction is completed if M8156 (communication error or parameter error) turns ON.	D
M8104	Extension ROM cassette check	Remains ON while an extension ROM cassette is attached.	R
M8154	Unused	_	R
M8155	Communication port busy	Remains ON while the communication port is used by an EXTR instruction.	R
M8156	Communication error or parameter error	Turns ON when a communication error is caused by an EXTR instruction.	R
M8157	Communication error latch*1	Turns ON when a communication error occurs.	R

R: Read only (used as a contact in program)

2. Word devices

Device No.	Name	Description	R/W
D8104	Extension ROM cassette type code	Stores the extension ROM cassette type code (value: K1).	R
D8105	Extension ROM cassette version	Stores the extension ROM cassette version. (value: K100 = Ver. 1.00).	R
D8154	Inverter response waiting time	Sets the inverter response waiting time.	R/W
D8155	Step number of instruction using communication port	Stores the step number of the EXTR instruction using the communication port.	R
D8156	Error code ^{*1}	Stores an error code when a communication error is caused by an EXTR instruction.	R
D8157	Error occurrence step number latch*1	Stores the instruction step number in which a communication error has occurred. (Stores K-1 when no error has occurred.)	R

R: Read only W: Write only R/W: Read or Write

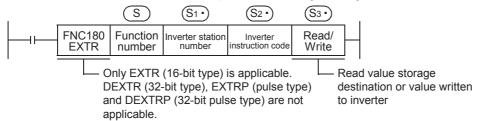
*1. Cleared when the PLC mode is changed from STOP to RUN.

^{*1.} Cleared when the PLC mode is changed from STOP to RUN.

7.2 Common Items in Inverter Communication Instructions

7.2.1 Inverter communication types (EXTR K10 to K13)

An FX2N and FX2NC PLC and inverter execute communication using EXTR (FNC180) instruction. EXTR instruction can be described in four types of methods, from "EXTR K10" to "EXTR K13", depending on the data communication direction and parameter writing/reading direction.



Instruction	Function number (S)	Function	Control direction	Detailed explanation
	K10	Monitors inverter operations	PLC ← inverter	7.3
EXTR(FNC180)	K11	Controls inverter operations	PLC → inverter	7.4
EXTR(FNC160)	K12	Reads inverter parameters	PLC ← inverter	7.5
	K13	Writes inverter parameters	PLC → inverter	7.6

7.2.2 Function and operation

1. Communication start timing

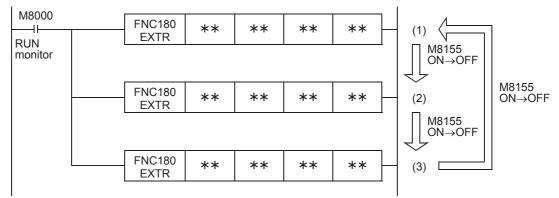
At the rising edge (OFF \rightarrow ON) of the drive condition, the PLC starts communication with an inverter.

Even if the drive condition turns OFF during communication with an inverter, the PLC executes communication until the end.

When the drive condition is always ON, the PLC executes communication repeatedly.

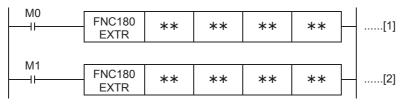
2. Simultaneous driving of EXTR instructions and communication processing

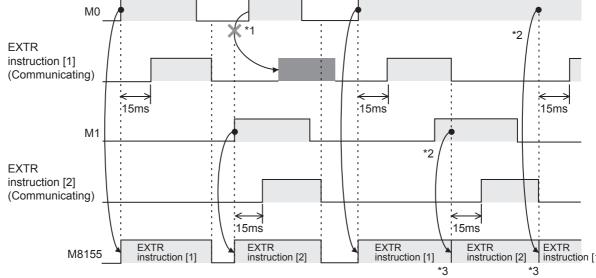
- 1) Driving instructions at the same time
 - Two or more EXTR functions (K10 to K13) can be programmed, and driven at the same time.
 - When two or more instructions are driven at the same time during communication, the next EXTR instruction in the program is executed after the current communication with an inverter is finished.



 The PLC waits for 15 ms after acquiring the communication port, and then starts communication using EXTR instructions. Even if the drive condition turns ON, the PLC does not start execution of the EXTR instruction until the communication port busy flag M8155 turns OFF from ON if M8155 was set to ON by another EXTR instruction.

The PLC frees the communication port, and then executes EXTR instructions driven in the next step and so on.

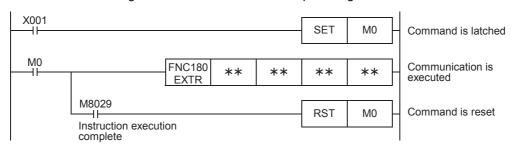




- *1. The PLC does not execute the instruction even if M8155 is turned OFF because the drive contact is OFF.
- *2. When two or more instructions are driven at the same time during communication, the next EXTR instruction is executed after the current instruction is completed.
- *3. M8155 remains OFF until the next EXTR instruction is driven after execution of the current EXTR instruction is completed.
- 2) Cautions on programming

When the drive contact for another EXTR instruction is driven by a pulse signal during communication with an inverter, the communication is not executed.

When communicating with inverters for two or more items, let the drive contact for the EXTR instruction remain ON until sending is completed. After communication with all inverters is completed, set the drive contact to OFF using the instruction execution complete flag M8029.



3. Communication complete flag (M8029)

When communication with an inverter is completed, the instruction execution complete flag M8029 turns ON, and remains ON for 1 scan.

For details on using M8029 method, refer to program examples shown below.

7.2.3 Instruction completion and error flag operation

When two or more EXTR instructions are programmed, the following flags turn ON or OFF according to the execution result of each EXTR instruction.

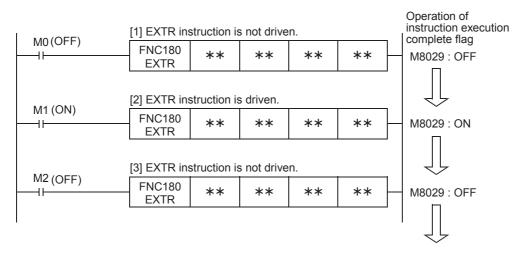
For acquiring the result of each EXTR instruction, make sure to provide these flags just below each EXTR instruction.

Device number	Description
M8029	Instruction execution complete
M8156	Communication error or parameter error
D8156	Error code

1. Operation of M8029 (instruction execution complete flag)

M8029 (instruction execution complete flag) operates as shown below.

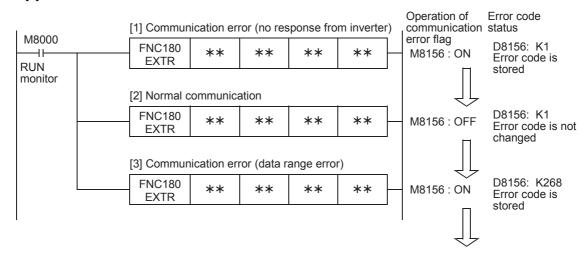
In the program below, M0 and M2 turn OFF and M1 turn ON when communication is completed.



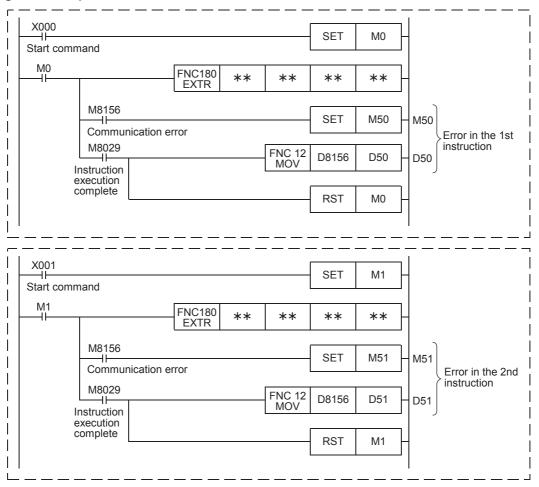
2. Operations of M8156 (error flag) and D8156 (error code)

M8156 (error flag) and D8156 (error code) operate as shown below.

In the program below, a communication error occurs in [1] and [3], and communication is completed normally in [2].



3. Program examples



7.2.4 Cautions on programming

1. Using the EXTR instruction together with another instruction

- · The EXTR instruction cannot be used together with the RS instruction.
- The EXTR instruction cannot be used together with a EXTR K0 instruction.

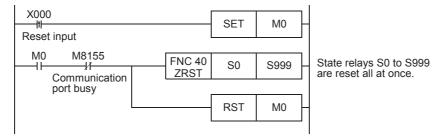
2. When programming the EXTR instruction in a state of a STL instruction

Make sure to let the state relay remain ON until communication with an inverter is completed. If the state relay is set to OFF during communication, the EXTR instruction is stopped in the middle of execution, and another EXTR instruction cannot be started. Program a sequence while observing the following cautions

 Add M8029 (instruction execution complete flag) ON condition to the state relay transfer condition, and provide such an interlock that the state relay ON/OFF status does not change during communication with an inverter.

If the state changes during communication, communication may not be performed normally.

 When resetting many state relays all at once using ZRST (FNC 40) instruction, etc., make sure that the M8155 (communication port busy) OFF condition is established.



3. Using the EXTR instruction in a program flow

The EXTR instruction cannot be used in the following program flows

Program flow disabling the EXTR instruction	Remarks
Between CJ and P instructions	Conditional jump
Between FOR and NEXT instructions	Repeat
Between P and SRET instructions	Subroutine
Between I and IRET instructions	Interrupt routine

4. Caution on write during RUN

- Condition in which the EXTR instruction can be written
 While the PLC is in the STOP status, the EXTR instruction can be written during RUN.
- 2) Condition in which the EXTR instruction cannot be written The EXTR instruction cannot be written during RUN. If the EXTR instruction is written during RUN while communication or if the EXTR instruction is deleted in RUN mode, communication may be disabled after that. (In such a case, set the PLC to STOP, and then to RUN mode again to initialize the status.)

5. When using the E500 Series

Parameters Nos. 922 and 923 in the E500 Series cannot be used in inverter communication.

Inverter Operation Monitoring Instruction (PLC←Inverter) [EXTR K10] 7.3

EXTR K10 instruction reads the operation status of an inverter to the PLC.

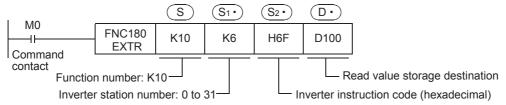
7.3.1 **Function and operation**

When an "instruction code" specified for computer link operation in inverters is specified in EXTR instruction, a value in the inverter is read to ① .

1. Applicable devices

	Bit device						Word device								Others				
Operand type		Sy	/ster	n/Us	er		Dig	jit spe	cificat	ion		yster User			Index		Constant		Pointer
	Х	Υ	М	Т	С	S	KnX	KnY	KnM	KnS	Т	С	D	٧	Z	Modification	K	Н	Р
S																	✓	✓	
(S1•)													✓			✓	✓	✓	
S2•													✓			✓	✓	✓	
D•								✓	✓	✓			✓			✓			

2. Program example



7.3.2 Inverter instruction codes

The table below shows inverter instruction codes which can be specified in (S2.). For the instruction codes, refer to the pages explaining computer link in detail in each inverter manual.

(S2•)		A	oplicable invert	er
Inverter instruction code (hexadecimal)	Read contents	A500	E500	S500
H7B	Operation mode	√	✓	✓
H6F	Output frequency [speed]	✓	✓	✓
H70	Output current	√	✓	✓
H71	Output voltage	✓	✓	_
H72	Special monitor	✓	_	_
H73	Special monitor selection No.	√	_	_
H74	Alarm definition	✓	✓	✓
H75	Alarm definition	√	✓	✓
H76	Alarm definition	✓	✓	_
H77	Alarm definition	√	✓	_
H7A	Inverter status monitor	✓	✓	✓
H6E	Set frequency read (E2PROM)	√	✓	✓
H6D	Set frequency read (RAM)	√	✓	✓
H7F	Link parameter expansion setting	These codes of	annot be specif	fied in S2•) in
H6C	ruction. omatically proce	essed when a		

7.4 Inverter Operation Control Instruction (PLC→Inverter) [EXTR K11]

This instruction writes a control value required to operate an inverter from the PLC to the inverter.

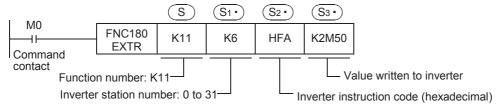
7.4.1 Function and operation

When an "instruction code" specified for computer link operation in inverters is specified in EXTR instruction, a value specified in (S3) is written to the specified item in the inverter.

1. Applicable devices

	Bit device				Word device									Others					
Operand type	- System/Liser		Digit specification			System/ User		Index			Constant		Pointer						
	Х	Υ	М	Т	С	S	KnX	KnY	KnM	KnS	Т	С	D	٧	Z	Modification	K	Н	Р
S																	✓	✓	
S1•													✓			✓	✓	✓	
S2•													✓			✓	✓	✓	
<u>S3•</u>							✓	✓	✓	✓			✓			✓	✓	✓	

2. Program example



7.4.2 Inverter instruction codes

The table below shows inverter instruction codes which can be specified in S2. For the instruction codes, refer to the pages explaining computer link in detail in each inverter manual.

S2•		Applicable inverter							
Inverter instruction code (hexadecimal)	Read contents	A500	E500	S500					
HFB	Operation mode	✓	✓	✓					
HF3	Special monitor selection No.	✓	_	_					
HFA	Run command	✓	✓	✓					
HEE	Set frequency write (EEPROM)	✓	✓	✓					
HED	Set frequency write (RAM)	✓	✓	✓					
HFD*1	Inverter reset	✓	✓	✓					
HF4	Alarm definition batch clear	✓	✓	✓					
HFC	Parameter all clear	✓	✓	✓					
HFC	User clear	√	_	_					

^{*1.} The instruction code "HFD (inverter reset)" does not request response from the inverter. Accordingly, even if inverter reset is executed to a station number in which an inverter is not connected, error does not occur.

It takes about 2.2 seconds to complete execution of inverter reset.

C

7.5 **Inverter Parameter Reading Instruction (PLC←Inverter) [EXTR K12]**

This instruction reads a parameter of an inverter to the PLC.

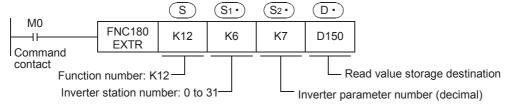
7.5.1 **Function and operation**

When a parameter number of an inverter is specified in EXTR instruction, the value of the parameter in the inverter is read to ①.

1. Applicable devices

	Bit device					Word device										Others			
Operand type	System/User				Digit specification			System/ User		Index			Constant		Pointer				
	Χ	Υ	М	Т	С	S	KnX	KnY	KnM	KnS	Т	С	D	٧	Z	Modification	K	Н	Р
S																	✓	✓	
S1•													✓			✓	√	√	
S2•													✓			✓	>	>	
D·													✓			√			

2. Program example



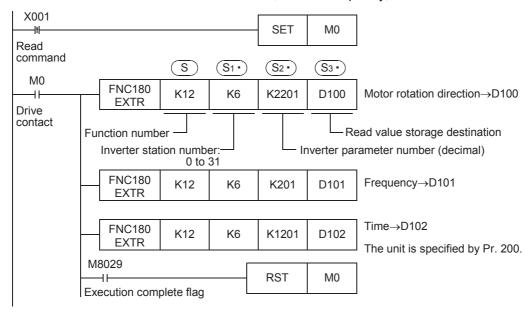
7.5.2 Inverter parameter number

Refer to related data shown later.

7.5.3 Program example of "second parameter specification code"

In the program example shown below, the parameter number 201 (frequency: 201, time: 1201, motor rotation direction: 2201) is read from the A500 inverter whose station number is 6.

Read devices: D100 = Motor rotation direction, D101 = Frequency, D102 = Time



7.6 Inverter Parameter Writing Instruction (PLC→Inverter) [EXTR K13]

This instruction writes a value from the PLC to a parameter in an inverter.

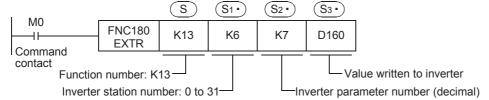
7.6.1 Function and operation

When a parameter number in an inverter is specified in EXTR instruction, the value of S3 is written to the specified item in the inverter.

1. Applicable devices

	Bit device				Word device									Others					
Operand type	- System/		m/User			Digit specification			System/ User		Index			Constant		Pointer			
	Х	Υ	М	Т	С	S	KnX	KnY	KnM	KnS	Т	С	D	٧	Z	Modification	K	Н	Р
S																	✓	✓	
<u>S1•</u>													✓			✓	✓	✓	
S2•													✓			✓	✓	✓	
<u>S3•</u>													✓			✓	✓	✓	

2. Program example

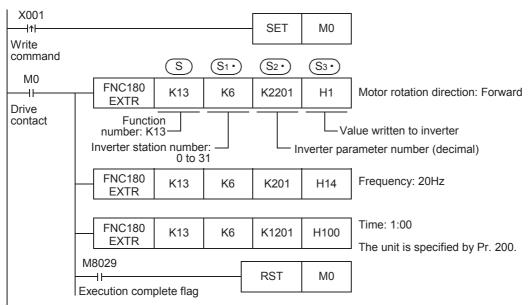


7.6.2 Inverter parameter number

Refer to related data shown later.

7.6.3 Program example of "second parameter specification code"

In the program example shown below, data is written from the PLC to parameter number 201 (frequency: 201, time: 1201, motor rotation direction: 2201) in the A500 inverter.



7.7 Second Parameter Specification Codes

When handling the following parameters in computer link operation, it is necessary to select second parameters.

In EXTR K12 and EXTR K13 instructions, when a value shown in the tables below is set to \bigcirc 32. , the extension parameter and second parameter are automatically overwritten, and the parameter values are then read or written.

7.7.1 S500 Series

1. Second parameter specification codes for parameter numbers C2 to C7

Parameter No.	Name	Second parameter specification code [Value to be specified in S2 in EXTR instruction for parameter No. (decimal)]
C2	Frequency setting voltage bias frequency	902
C3	Frequency setting voltage bias	1902
C4	Frequency setting voltage gain	903
C5	Frequency setting current bias frequency	904
C6	Frequency setting current bias	1904
C7	Frequency setting current gain	905

7.7.2 E500 Series

1. Second parameter specification codes for parameter numbers 902 to 905

Parameter No.	Name	Second parameter specification code [Value to be specified in S2* in EXTR instruction for parameter No. (decimal)]								
110.		Offset/Gain (H00)	Analog (H01)	Terminal analog value (H02)						
902	Frequency setting voltage bias	902	1902	2902						
903	Frequency setting voltage gain	903	1903	2903						
904	Frequency setting current bias	904	1904	2904						
905	Frequency setting current gain	905	1905	2905						

7.7.3 A500 Series

1. Second parameter specification codes for parameter numbers 201 to 230

Parameter		Second parameter specification code [Value to be specified in S2• in EXTR instruction for parameter No. (decimal)]									
No.	Name	Operation frequency read/write	Time read/write	Rotation direction write/read							
201	Program set 1	201	1201	2201							
202	Program set 1	202	1202	2202							
203	Program set 1	203	1203	2203							
204	Program set 1	204	1204	2204							
205	Program set 1	205	1205	2205							
206	Program set 1	206	1206	2206							
207	Program set 1	207	1207	2207							
208	Program set 1	208	1208	2208							
209	Program set 1	209	1209	2209							
210	Program set 1	210	1210	2210							
211	Program set 2	211	1211	2211							
212	Program set 2	212	1212	2212							
213	Program set 2	213	1213	2213							
214	Program set 2	214	1214	2214							
215	Program set 2	215	1215	2215							
216	Program set 2	216	1216	2216							
217	Program set 2	217	1217	2217							
218	Program set 2	218	1218	2218							
219	Program set 2	219	1219	2219							
220	Program set 2	220	1220	2220							
221	Program set 3	221	1221	2221							
222	Program set 3	222	1222	2222							
223	Program set 3	223	1223	2223							
224	Program set 3	224	1224	2224							
225	Program set 3	225	1225	2225							
226	Program set 3	226	1226	2226							
227	Program set 3	227	1227	2227							
228	Program set 3	228	1228	2228							
229	Program set 3	229	1229	2229							
230	Program set 3	230	1230	2230							

2. Second parameter specification codes for parameter numbers 902 to 905

Parameter No.	Name	[Value to be spe	Second parameter specification code [Value to be specified in S2 in EXTR instruction for parameter No. (decimal)]									
		Offset/Gain (H00)	Analog (H01)	Terminal analog value (H02)								
902	Frequency setting voltage bias	902	1902	2902								
903	Frequency setting voltage gain	903	1903	2903								
904	Frequency setting current bias	904	1904	2904								
905	Frequency setting current gain	905	1905	2905								

8. Practical Program Examples (FX2N, FX2NC)

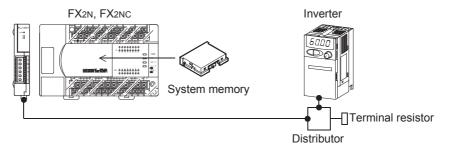
This chapter explains practical programs for inverter communication.

8.1 Practical Example 1

This fundamental program example monitors operations of an inverter, controls operations of an inverter and writes parameters to an inverter.

8.1.1 System configuration example

An FX PLC is connected to an inverter.



8.1.2 Contents of operation

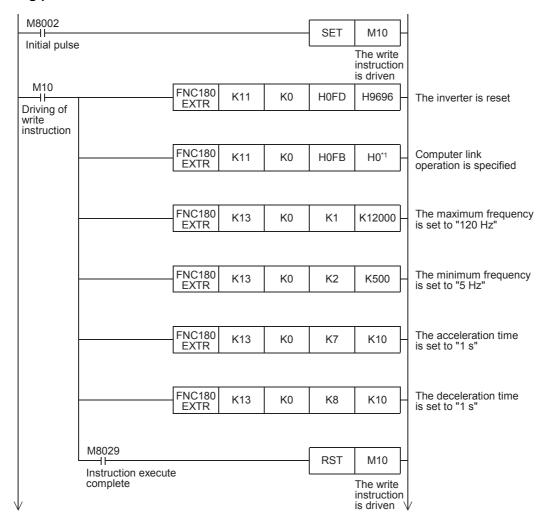
As an example of operation control, an inverter can be stopped (X000), rotated forward (X001) and rotated reverse (X002).

By changing the contents of D10, the speed can be changed.

The contents of D10 can be changed from a sequence program or display unit.

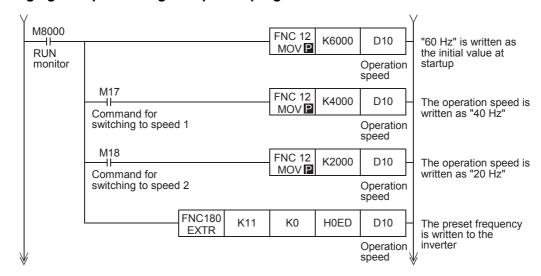
8.1.3 Program example

1. Writing parameters to an inverter while the PLC is in RUN mode

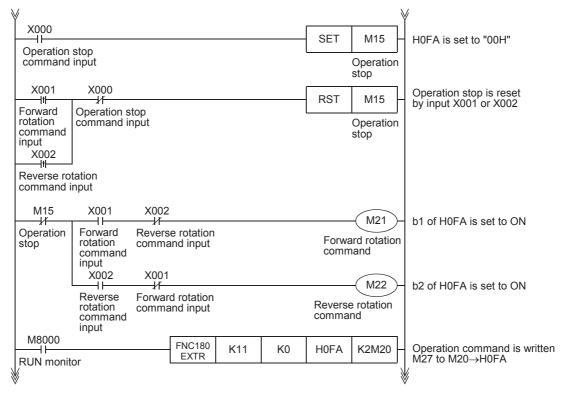


*1. When using an E500 Series inverter, use "H2" to specify computer link operation.

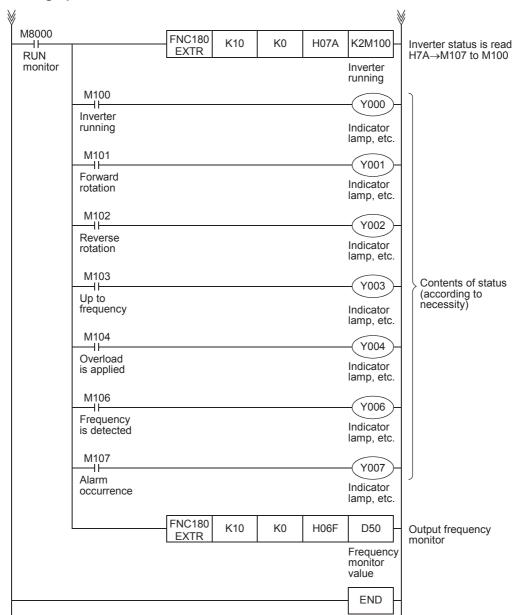
2. Changing the speed using a sequence program



3. Controlling operations of an inverter



4. Monitoring operations of an inverter



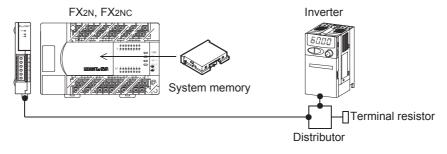
Ε

8.2 Practical Example 2

This program executes the same control as practical example 1 shown above.

8.2.1 System configuration example

An FX PLC is connected to an inverter.



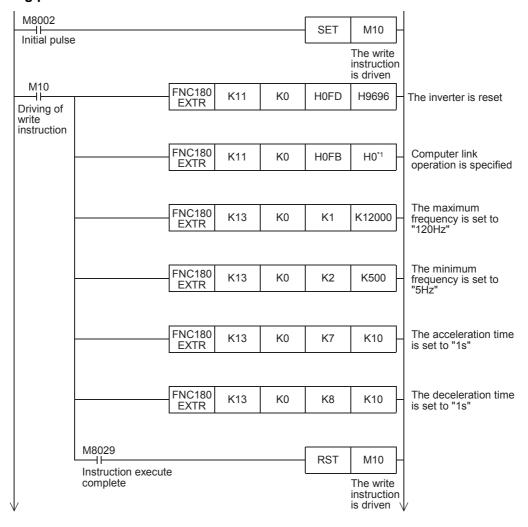
8.2.2 Contents of operation

The differences from practical example 1 are that the inverter status is not read while data is written to an inverter, and that the contents to be written are detected and written to an inverter only when the contents to be written are changed.

Because communication between the PLC and the inverter is minimum in this program, the communication time is reduced and the response time is improved.

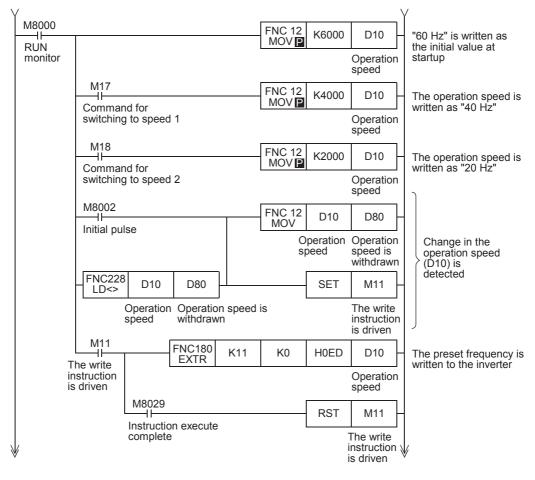
8.2.3 Program example

1. Writing parameters to an inverter while the PLC is in RUN mode

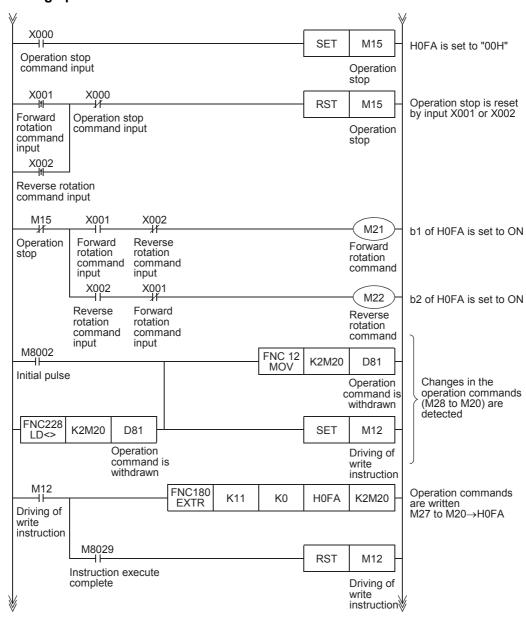


*1. When using an E500 Series inverter, use "H2" to specify computer link operation.

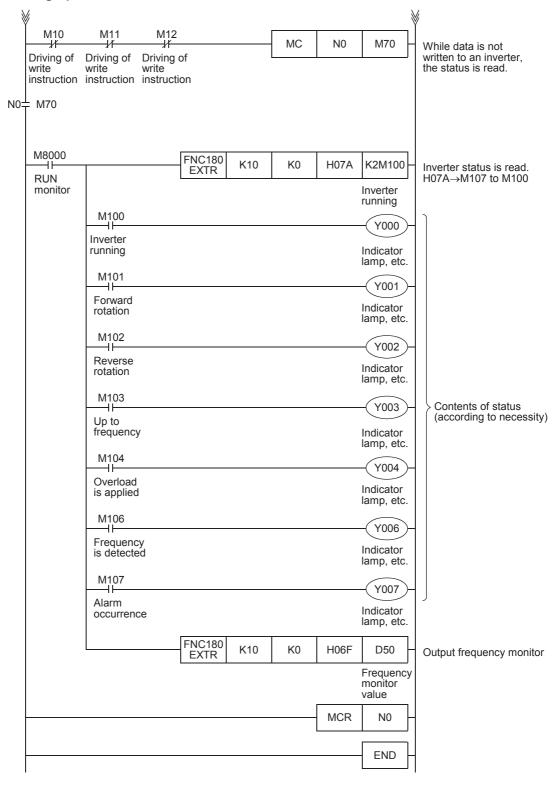
2. Changing the speed using a sequence program



3. Controlling operations of an inverter



4. Monitoring operations of an inverter



9. Creating Programs (FX3S, FX3G, FX3GC, FX3U, FX3UC)

This chapter explains how to create programs which change parameters of inverters and give operation commands to inverters.

As explanation, a program example is shown for each applied instruction.

9.1 Differences between FX2N, FX2NC and FX3S, FX3G, FX3GC, FX3U, FX3UC

Instruction devices used in inverter communication are different between FX3S, FX3G, FX3GC, FX3UC PLCs and FX2N, FX2NC PLCs.

When using a program for FX2N, FX2NC PLCs in FX3S, FX3G, FX3GC, FX3U, FX3UC PLCs, change the devices according to the tables below.

1. Inverter communication instructions

Function	FX2N,FX2NC	FX3S,FX3G,FX3GC,FX3U,FX3UC
Monitoring operation of an inverter	EXTR(K10)	IVCK
Controlling operation of an inverter	EXTR(K11)	IVDR
Reading parameters from an inverter	EXTR(K12)	IVRD
Writing parameters to an inverter	EXTR(K13)	IVWR
Writing parameters to an inverter all at once	_	IVBWR*1
Controls operations and monitors operations of an inverter with a single command	_	IVMC

^{*1.} Only available for FX3U and FX3UC PLCs.

2. Related devices

1) Bit devices

Function	FX2N,FX2NC	FX3S,FX3G,FX3GC,FX3U,FX3UC				
i dilction	I AZN,I AZNO	ch1	ch2			
Instruction execution complete	M8029	M8029	M8029			
Communication error (shared by all communication)	M8063*2	M8063*5	M8438 ^{*5}			
Inverter communicating	M8155	M8151	M8156			
Inverter communication error	M8156	M8152*3	M8157 ^{*3}			
Inverter communication error latch*3	M8157	M8153	M8158			
IVBWR instruction error*4	_	M8154 ^{*3}	M8159 ^{*3}			

^{*2.} In the FX2N and FX2NC PLCs, M8063 does not turn ON when an inverter communication error occurs.

2) Word devices

Function	FX2N,FX2NC	FX3S,FX3G,FX3GC,FX3U,FX3UC					
FullClion	FA2N,FA2NC	ch1	ch2				
Error code (shared by all communication)	D8063	D8063*6	D8438 ^{*6}				
Response wait time of inverter communication	D8154	D8150 ^{*6}	D8155 ^{*6}				
Step number of instruction during inverter communication	D8155	D8151	D8156				
Inverter communication error code*7	D8156	D8152	D8157				
Inverter communication error occurrence step*7	D8157	D8153	D8158				
IVBWR instruction error parameter number*7*8	_	D8154	D8159				
Operation mode display	_	D8419	D8439				

^{*6.} Cleared when PLC power supply is turned from OFF to ON.

^{*3.} Cleared when the PLC mode is changed from STOP to RUN.

^{*4.} The IVBWR instruction is supported only in FX3U and FX3UC PLCs.

^{*5.} Cleared when PLC power supply is turned from OFF to ON.

^{*7.} Cleared when the PLC mode is changed from STOP to RUN.

^{*8.} The IVBWR instruction is supported only in FX3U and FX3UC PLCs.

9.2 Contents of Related Devices

The tables below show devices used for inverter communication in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs.

1. Bit devices

Device No.		Name	Description						
ch1	ch2	Name	Description						
M8029		Instruction execution complete	Turns ON when execution of inverter communication instruction is completed, and remains ON for 1 scan. Turns ON also when execution of instruction is completed if inverter communication error flag (M8152 or M8157) turns ON.	R					
M8063	M8438	Serial communication error*1	Turns ON when an error occurs in any type of communication.	R					
M8151	M8156	Inverter communicating	Remains ON while inverter communication is being executed.	R					
M8152	M8157	Inverter communication error*2	Turns ON when an error occurs during communication with an inverter.	R					
M8153	M8158	Inverter communication error latch*2	Turns ON when an error occurs during communication with an inverter.	R					
M8154	M8159	IVBWR instruction error*2, *3	Turns ON when an error is caused by IVBWR instruction.	R					

R: Read only (used as a contact in program)

- *1. Cleared when PLC power supply is turned from OFF to ON.
- *2. Cleared when the PLC mode is changed from STOP to RUN.
- *3. The IVBWR instruction is supported only in FX3U and FX3UC PLCs.

2. Word devices

Device No.		Name	Description					
ch1	ch2	Name	Description	R/W				
D8063	D8438	Error code for serial communication*4	Stores a communication error code.	R				
D8150	D8155	Inverter communication response waiting time*4	Sets the response wait time of inverter communication.	R/W				
D8151	D8156	Step number of instruction executing inverter communication	Stores the step number of an instruction during inverter communication.	R				
D8152	D8157	Error code for inverter communication*5	Stores an inverter communication error code.	R				
D8153	D8158	Step where inverter communication error occurred*5	Latches a step number in which inverter communication error has occurred.*7	R				
D8154	D8159	Error parameter number of IVBWR instruction*5*6	Stores a parameter number in which an IVBWR instruction error has occurred.	R				
D8419	D8439	Operation mode display	Stores the communication type being used.	R				

R: Read only W: Write only R/W: Read or Write

*4. Cleared when PLC power supply is turned from OFF to ON.

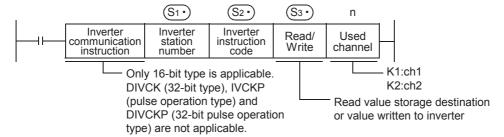
- *5. Cleared when the PLC mode is changed from STOP to RUN.
- *6. The IVBWR instruction is supported only in FX3U and FX3UC PLCs.
- *7. Updated only for the first error occurrence, and not for the second error occurrence or later.

9.3 Common Items in Inverter Communication Instructions

9.3.1 Inverter communication types (IVCK to IVMC)

Execute inverter communication using the following applied instructions.

There are six types of applied instructions, "IVCK (FNC270) to IVMC (FNC275)", depending on the data communication direction and parameter reading/writing direction.



Instruction	Function	Control direction	Detailed explanation
IVCK(FNC270)	Monitors operations of an inverter.	PLC ← inverter	9.4
IVDR(FNC271)	Controls operations of an inverter.	PLC → inverter	9.5
IVRD(FNC272)	Reads a parameter from an inverter.	PLC ← inverter	9.6
IVWR(FNC273)	Writes a parameter to an inverter.	PLC → inverter	9.7
IVBWR(FNC274)*1	Writes parameters to an inverter all at once.	PLC → inverter	9.8
IVMC(FNC275)	Controls operations and monitors operations of an inverter with a single command	PLC ⇔ inverter	9.9

^{*1.} Only available for FX3U and FX3UC PLCs.

9.3.2 Function and operation

1. Communication start timing

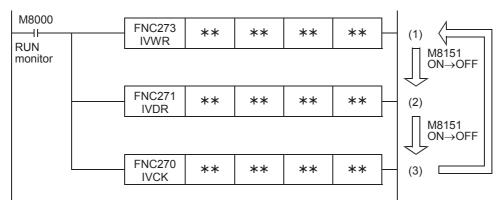
At the rising edge (OFF \rightarrow ON) of the drive condition, the PLC starts communication with an inverter.

Even if the drive condition turns OFF during communication with an inverter, the PLC executes communication until the last instruction.

When the drive condition is always ON, the PLC executes communication repeatedly.

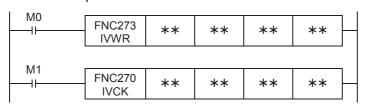
2. Simultaneous driving of instructions and communication processing

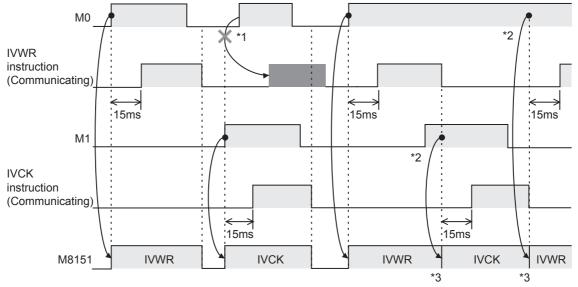
- 1) Driving instructions at the same time
 - Two or more IVCK (FNC270) to IVMC (FNC275) instructions can be programmed, and driven at the same time.
 - When two or more instructions are driven at the same time in the channel used for communication, the latter inverter communication instruction in the program is executed after the current communication with the inverter has finished.



9.3 Common Items in Inverter Communication Instructions

The PLC waits for 15 ms after acquiring the communication port, and then starts communication using inverter communication instructions. Even if the drive condition turns ON, the PLC does not start execution of an inverter communication instruction until the communication port busy flag M8151 turns OFF from ON, if M8151 is already set to ON by another inverter communication instruction.
 The PLC frees the communication port, and then executes inverter communication instructions driven in the next step and so on.

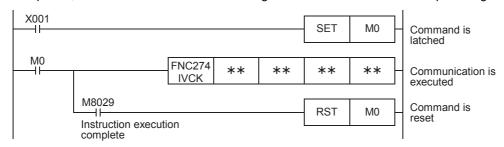




- *1. The PLC does not execute the instruction even if M8151 is turned OFF because the drive contact is OFF.
- *2. When two or more instructions are driven at the same time during communication, the next inverter communication instruction is executed after the current instruction is completed.
- *3. M8151 remains OFF until the next inverter communication instruction is driven after execution of the current inverter communication instruction is completed.

2) Cautions on programming

When communicating with inverters for two or more items, let the drive contact for inverter communication instruction remain ON until sending is completed. After communication with all inverters is completed, set the drive contact to OFF using the instruction execution complete flag M8029.



3. Communication complete flag (M8029)

When communication with an inverter is completed, the instruction execution complete flag M8029 turns ON, and remains ON for 1 scan.

For the M8029 use method, refer to program examples shown below.

9.3.3 Instruction completion and error flag operation

When two or more inverter communication instructions are programmed, the following flags turn ON or OFF according to the execution result of each inverter communication instruction.

To acquire the result of each inverter communication instruction, make sure to provide these flags just below each inverter communication instruction.

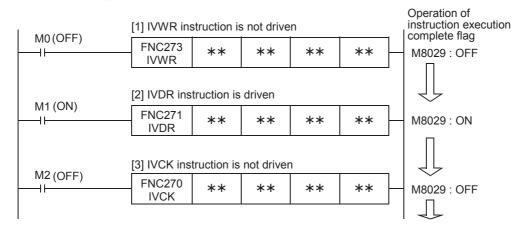
	rice nber	Description			
ch1	ch2				
M8029		Instruction execution complete			
M8063 M8438		Serial communication error			
M8152	M8157	Inverter communication error			
M8153	M8158	Inverter communication error latch			
M8154	M8159	IVBWR instruction error*1			

Device number		Description
ch1 ch2		
D8063 D8438		Serial communication error code
D8152	D8157	Inverter communication error code
D8153	D8158	Step in which inverter communication error occurred
D8154 D8159		IVBWR error parameter number*1

^{*1.} The IVBWR instruction is supported only in FX3U and FX3UC PLCs.

1. Operation of M8029 (instruction execution complete flag)

The operation of M8029 (instruction execution complete flag) represents the state in which the IVDR instruction is completed while M0, M2 are off and M1 is ON.



2. Processing of communication errors

The following two types of processing are executed for communication errors.

The parity error/overrun error/framing error flags (shown in the upper column) turns ON when an error occurs in any type of communication.

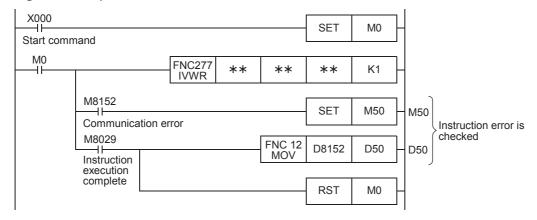
The error flag shown in the lower column turns ON when an error occurs during communication with an inverter.

		Bit c	levice			Word	d device							
ch1	ch2	ch1	ch2	ch1	ch2	ch1	ch2	Description						
M8063	M8438	M8152	M8157	M8153 M8159		D8063	D8438							
0	N	Ol	FF	OI	FF	6301	3801	Parity error, overrun error or framing error						
0	N	0	N	O (only at f	N irst time)	0.370 .3870		Any inverter communication error other than those above						

When inverter communication error flag turns ON, the step number is stored in the inverter communication error occurrence step device (D8153 or D8158).

Create the program shown below for each corresponding instruction to check the inverter communication error code (stored in D8152 or D8157).

3. Program example



9.3.4 Cautions on programming

1. Using an inverter communication instruction together with another instruction

- An inverter communication instruction using ch1 cannot be used together with a RS instruction.
- An inverter communication instruction cannot be used together with a RS2 instruction if the RS2 instruction uses the same channel.

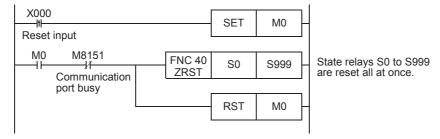
2. When programming an inverter communication instruction in a state of a STL instruction

Make sure to let the state relay remain ON until communication with an inverter is completed. Program a sequence while observing the following cautions

 Add M8029 (instruction execution complete flag) ON condition to the state relay transfer condition, and provide such interlock that the state relay ON/OFF status does not change during communication with an inverter.

If the state changes during communication, communication may not be performed normally.

 When resetting many state relays all at once using the ZRST (FNC 40) instruction, etc., make sure that the M8151 or M8156 (communication port busy) condition is OFF.



3. Using an inverter communication instruction in a program flow

An inverter communication instruction cannot be used in the following program flows

Program flow disabling the inverter communication instruction	Remarks
Between CJ and P instructions	Conditional jump
Between FOR and NEXT instructions	Repeat
Between P and SRET instructions	Subroutine
Between I and IRET instructions	Interrupt routine

4. Caution on writing during RUN

- Condition in which inverter communication instruction can be written:
 While the PLC is in the STOP status, inverter communication instruction can be written during RUN.
- 2) Condition in which inverter communication instruction cannot be written: Inverter communication instruction cannot be written during RUN. If an inverter communication instruction is written during RUN during communication or if an inverter communication instruction is deleted while in RUN, communication may be disabled after that. (In such a case, set the PLC to STOP, and then to RUN mode again to initialize the status.)

5. When using the E500 Series

Parameters Nos. 922 and 923 in the E500 Series cannot be used in inverter communication.

C

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6. Cautions when using the password function for inverter

1) When a communication error occurs

When a communication error occurs in an inverter communication instruction, the FX PLC automatically retries communication up to 3 times^{*1}.

Hence, when a password disable error occurs in the inverter in which "display of the number of times of password disable error" is enabled using Pr297, please note that the number of times of password disable error displayed in accordance with the setting of Pr297 may not be the same as the actual number of times of password input error as described below.

Do not execute automatic retry (re-driving of an inverter instruction) using a sequence program when writing data to Pr297.

Cases in which a password reset error occurs in an inverter communication instruction, and the actual number of times of reset error in such cases

- When a wrong password is written to Pr297 due to a password input error When the writing instruction is executed once, a password reset error occurs 3 times.
- When the password cannot be written correctly to Pr297 due to noise, etc.
 A password reset error occurs up to 3 times.

2) When registering the password

When registering the password in the inverter using an inverter communication instruction, write the password to Pr297, read Pr297, and then confirm that registration of the password is completed normally*3.

If writing of the password to Pr297 is not completed normally due to noise, etc., the FX PLC automatically retries writing, and the registered password may be reset by the retry.

- *1. The FX PLC executes the first communication, and then retries communication twice (3 time in total).
- *2. When "display of the number of times of password disable error" is enabled using Pr297 and when a password disable error occurs 5 times, the "reading/writing restriction" cannot be disabled even if the right password is input. For recovery from this status, it is necessary to all-clear all parameters.
- *3. When the value given as a result of reading Pr297 is "0" to "4", registration of the password is completed normally.

9.4 Inverter Operation Monitoring Instruction (PLC←Inverter) [FNC270 / IVCK]

The IVCK instruction reads the operation status of an inverter to the PLC.

9.4.1 Function and operation

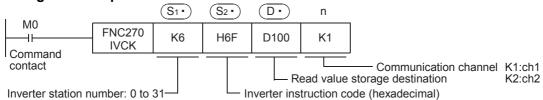
When an "instruction code" specified for computer link operation in the inverters is specified in the IVCK (FNC270) instruction, a value in the inverter is read to (D.).

1. Applicable devices

0			Bit	De	evie	ces	;		Word Devices											Others				
Oper- and Type			System/User Digit Specification System/Us		Iser	Special Index		Con- stant		Real Number	Charac- ter String	Pointer												
. , , ,	Χ	Υ	М	T	С	S	D□.b	KnX	KnY	KnM	KnS	T	С	D	R	U□\G□	٧	Z	Modify	K	Н	Е	"□"	Р
S1•														✓	▲ 1	▲ 2			✓	✓	✓			
S2•														✓	▲ 1	▲ 2			✓	✓	✓			
D·									✓	✓	✓			✓	▲ 1	▲ 2			✓					
n																				✓	✓			

- ▲1: Only available for FX3G, FX3GC, FX3U and FX3UC PLCs.
- ▲2: Only available for FX3U and FX3UC PLCs.

2. Program example



9.4.2 Inverter instruction codes

The table below shows inverter instruction codes which can be specified in (S2*). Any instruction codes not shown in the table below may cause communication errors. Use only instruction codes shown below. For the instruction codes, refer to the pages explaining computer link in detail in each inverter manual.

(S2•)		Ар	plicable	inverter				
Inverter Instruction code (hexadecimal)	Read contents	F800, A800, F700, A700, E700, D700	V500	F500, A500	E500	S500		
H7B	Operation mode	✓	✓	✓	✓	✓		
H6F	Output frequency [speed]	✓	√*1	✓	✓	✓		
H70	Output current	✓	√	✓	✓	√		
H71	Output voltage	✓	✓	✓	✓	_		
H72	Special monitor	✓	✓	✓	_	_		
H73	Special monitor selection No.	✓	✓	✓	_	_		
H74	Alarm definition	✓	✓	✓	✓	✓		
H75	Alarm definition	✓	✓	✓	✓	✓		
H76	Alarm definition	✓	✓	✓	✓	_		
H77	Alarm definition	✓	✓	✓	✓	_		
H79	Inverter status monitor (expansion)	✓	_	_	_			
H7A	Inverter status monitor	✓	✓	✓	✓	✓		
H6E	Set frequency read (E2PROM)	✓	√*1	✓	✓	✓		
H6D	Set frequency read (RAM)	✓	√*1	✓	✓	✓		
H7F	Link parameter expansion setting	These codes cannot	be spe	cified in (S2*)	of the	IVCK		
H6C	Second parameter changing	instruction. They are automatically processed when a "second parameter specification code" is specified the IVRD instruction.						

^{*1.} Please write "0" to instruction code HFF (Link parameter expansion setting) just before the IVCK instruction when reading frequency.

When "0" is not written, reading of the frequency may not be executed normally.

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9.5 Inverter Operation Control Instruction (PLC→Inverter) [FNC271 / IVDR]

This instruction writes a control value required to operate an inverter from the PLC to the inverter.

Function and operation 9.5.1

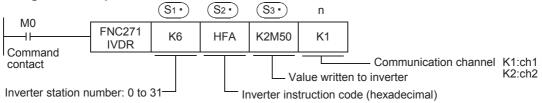
When an "instruction code" specified for computer link operation in the inverters is specified in the IVDR (FNC271) instruction, the value specified in (S3*) is written to the specified item of the inverter.

1. Applicable devices

0			Bit	De	evie	ces	;					W	ord	De	vices	5						Ot	hers	
Oper- and Type			Sy	ster	n/U	lser		Dię	Digit Specification			S	yste	m/L	Jser	Special Unit		Inc	dex	_	on- ant	Real Number	Charac- ter String	Pointer
. , , ,	Χ	Υ	М	Т	С	S	D□.b	KnX	KnY	KnM	KnS	Т	С	D	R	U□\G□	٧	Z	Modify	K	Н	Е	"□"	Р
S1•														✓	▲ 1	▲2			✓	✓	✓			
<u>S2•</u>														✓	▲ 1	▲2			√	✓	✓			
<u>S3•</u>								✓	✓	✓	✓			✓	▲ 1	▲2			√	✓	✓			
n																				✓	✓			

- ▲1: Only available for FX3G, FX3GC, FX3U and FX3UC PLCs.
- ▲2: Only available for FX3U and FX3UC PLCs.

2. Program example



9.5.2 Inverter instruction codes

The table below shows inverter instruction codes which can be specified in S2. For the instruction codes, refer to the pages explaining computer link in detail in each inverter manual.

(S2•)		Арр	licable	inverter	
Inverter Instruction code (hexadecimal)	Write contents	F800, A800, F700, A700, E700, D700	V500	F500, A500	E500, S500
HFB	Operation mode	✓	✓	✓	✓
HF3	Special monitor selection No.	✓	✓	✓	_
HF9	Run command (expansion)	✓	_	_	_
HFA	Run command	✓	✓	✓	✓
HEE	Set frequency write (EEPROM)	✓	√ *3	✓	✓
HED	Set frequency write (RAM)	✓	√ *3	✓	✓
HFD ^{*1}	Inverter reset ^{*2}	✓	✓	✓	✓
HF4	Alarm definition batch clear	√	_	✓	√
HFC	Parameter all clear	✓	✓	✓	✓
HFC	User clear	_	_	✓	_
HFF	Link parameter expansion setting	✓	✓	✓	✓

- The instruction code "HFD (inverter reset)" does not request a response from the inverter. Accordingly, even if inverter reset is executed to a station number at which an inverter is not connected, error does not occur.
 - It takes about 2.2 seconds to complete execution of inverter reset.
- When resetting the inverter, please specify H9696 as the operand (S3*) of the IVDR instruction. *2. Do not use H9966.
- Please write "0" to instruction code HFF (Link parameter expansion setting) just before the IVDR instruction when writing frequency.
 - When "0" is not written, writing of the frequency may not be executed normally.

Inverter Parameter Reading (PLC←Inverter) [FNC272 / IVRD] 9.6

This instruction reads a parameter of an inverter to the PLC.

9.6.1 **Function and operation**

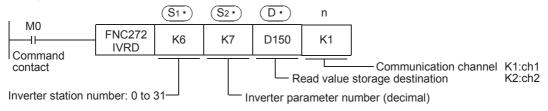
When a parameter number of an inverter is specified in IVRD (FNC272) instruction, the value of the parameter is read to ① .

1. Applicable devices

0			Bit	De	evic	ces	;					W	ord	De	vices	5						Ot	hers	
Oper- and Type			Sy	ster	n/U	lser	•	Dię	Digit Specification			S	yste	m/L	lser	Special Unit		Ind	dex	_	on- ant	Real Number	Charac- ter String	Pointer
.,,,,	Χ	Υ	М	Τ	С	S	D□.b	KnX	KnY	KnM	KnS	Т	С	D	R	U□\G□	٧	Z	Modify	K	Н	E	"□"	Р
S1•														✓	▲ 1	▲2			✓	✓	✓			
<u>S2•</u>														✓	▲ 1	▲2			✓	✓	✓			
D·														\	▲ 1	▲2			✓					
n																				✓	✓			

- ▲1: Only available for FX3G, FX3GC, FX3U and FX3UC PLCs. ▲2: Only available for FX3U and FX3UC PLCs.

2. Program example



9.6.2 Inverter instruction codes

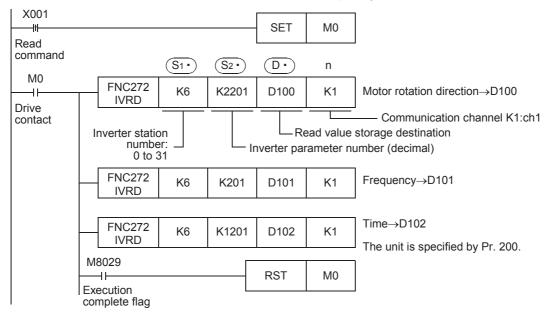
Refer to related data shown later.

Program example of "second parameter specification code" 9.6.3

→ For second parameter specification code, refer to Section 9.9.

In the program example shown below, the parameters (frequency: 201, time: 1201, motor rotation direction: 2201) are read from the A500 inverter whose station number is 6.

Read devices: D100 = Motor rotation direction, D101 = Frequency, D102 = Time



9.7 Inverter Parameter Writing (PLC→Inverter) [FNC273 / IVWR]

This instruction writes a value from the PLC to a parameter in an inverter.

9.7.1 Function and operation

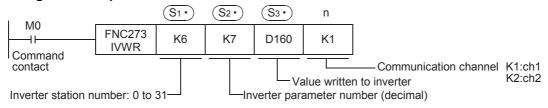
When a parameter number in an inverter is specified in IVWR (FNC273) instruction, the value of S_{3*} is written to the specified item in the inverter.

1. Applicable devices

0			Bit	De	evie	ces	,					W	ord	De	vices	3						Ot	hers	
Oper- and Type			Sy	ster	n/U	lser		Dię	git Spe	ecificat	ion	S	yste	m/L	Iser	Special Unit		Ind	dex	_	on- ant	Real Number	Charac- ter String	Pointer
. , , ,	Χ	Υ	М	Τ	С	S	D□.b	KnX	KnY	KnM	KnS	Т	С	D	R	U□\G□	٧	Z	Modify	K	Н	E	"□"	Р
S1•														✓	▲ 1	▲2			✓	✓	✓			
<u>S2•</u>														✓	▲ 1	▲2			✓	✓	✓			
<u>S3•</u>														\	▲ 1	▲2			✓	>	✓			
n																				✓	✓			

- ▲1: Only available for FX3G, FX3GC, FX3U and FX3UC PLCs.
- ▲2: Only available for FX3U and FX3UC PLCs.

2. Program example



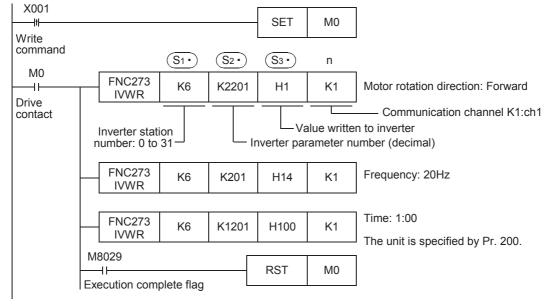
9.7.2 Inverter instruction codes

Refer to related data shown later.

9.7.3 Program example of "second parameter specification code"

→ For second parameter specification code, refer to Section 9.9.

In the program example shown below, data is written from the PLC to the parameters (frequency: 201, time: 1201, motor rotation direction: 2201) in the A500 inverter.



9.8 Inverter Parameter Batch Writing (PLC→Inverter) [FNC274 / IVBWR]

This instruction writes values from the PLC to parameters in an inverter all at once. The IVBWR instruction is supported only in FX3U and FX3UC PLCs.

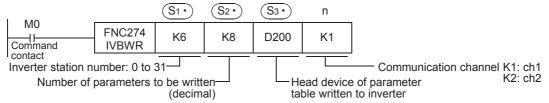
9.8.1 Function and operation

When a parameter number in an inverter is specified in the IVBWR (FNC274) instruction, the values of and later are written to the specified items in the inverter all at once.

1. Applicable devices

Oner			Bit	t De	vic	es						Wo	rd	Dev	ice	s						Ot	hers	
Oper- and Type		System/User				Dię	git Spe	ecificat	ion	Sy	ster	n/Us	ser	Special Unit		Ind	dex	Co sta		Real Number	Charac- ter String	Pointer		
.,,,,	Χ	Υ	М	Т	С	S	D□.b	KnX	KnY	KnM	KnS	Т	С	D	R	U□\G□	٧	Z	Modify	K	Н	E	"□"	Р
S1•														✓	✓	✓			✓	✓	✓			
<u>S2•</u>														\	\	✓			√	\	✓			
<u>S3•</u>														>	>	✓			✓					
n																				✓	✓			

2. Program example



The following table shows values (two word devices/point) in a specified table which are written to a number of consecutive parameters specified in S2* starting from a word device specified in S3*.

<u>S</u> 3•	D200	Parameter No. 1
S3 • +1	D201	Value 1 written to parameter
<u>S3•</u> +2	D202	Parameter No. 2
S3 • +3	D203	Value 2 written to parameter
:	:	:
:	:	:
S3 • +14	D214	Parameter No. 8
S3• +15	D215	Value 8 written to parameter

 $(S_2 \cdot) \times 2 = \text{Number of occupied word devices}$

9.9 Controls Operations and Monitors Operations of an Inverter with a Single Command(PLC⇔Inverter)[FNC275 / IVMC]

This instruction writes 2 types of settings (operation command and set frequency) to the inverter, and reads 2 types of data (inverter status monitor, output frequency, etc.) from the inverter at the same time. The following PLC versions support the IVMC instruction.

PLC	Applicable version
FX3S	Ver. 1.00 or later
FX3G, FX3GC	Ver. 1.40 or later
FX3U, FX3UC	Ver. 2.70 or later

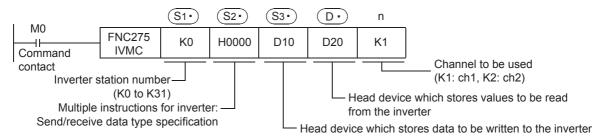
9.9.1 Function and operation

1. Applicable devices

0			Bit	De	evio	ces						W	ord	De	vices	3						Ot	hers	
Oper- and Type			Sy	ster	n/U	ser		Dię	git Spe	ecificat	ion	S	yste	m/L	Jser	Special Unit		Ind	dex	_	on- ant	Real Number	Charac- ter String	Pointer
.,,,,	Х	Υ	М	Τ	С	S	D□.b	KnX	KnY	KnM	KnS	T	С	D	R	U□\G□	٧	Z	Modify	K	Н	E	"□"	Р
S1•														✓	▲ 1	▲2			√	✓	✓			
S2•														✓	▲ 1	▲ 2			✓	✓	✓			
<u>S3•</u>														✓	▲ 1	▲ 2			✓					
D·														✓	▲ 1	▲ 2			✓					
n																				>	✓			

- ▲1: Only available for FX3G, FX3GC, FX3U and FX3UC PLCs.
- ▲2: Only available for FX3U and FX3UC PLCs.

2. Program example



3. Send/receive data type S2.

The table below shows valid send data 1 and 2 and receive data 1 and 2 specified by the send/receive data type \S_{2^*} .

S2• Send/receive		d data nts to Inverter)		ceive data ents from Inverter)
data type (HEX)	Data 1 (S3•)	Data 2 (S3• +1)	Data 1 (🕩)	Data 2 (🕞 +1)
H0000		Set frequency		Output frequency (speed)
H0001	Run command	(RAM)	Inverter status monitor	Special monitor
H0010	(expansion)	Set frequency	(expansion)	Output frequency (speed)
H0011		(RAM, EEPROM)		Special monitor

Caution

· Number of occupied devices

Two devices are occupied respectively by $\S_{3^{\bullet}}$ and $\boxed{\mathbb{D}^{\bullet}}$. Make sure not to use those devices in another control.

C

D

- If a device number outside the range due to indexing, etc. is specified in (D•), the receive data from the inverter is not stored in \bigcirc . However, values set in \bigcirc 3 and \bigcirc 3 +1 may be written to the inverter.
- If any unspecified value is set in (S2*), unexpected data may be written to and read from the inverter, and values of $(D \cdot)$ and $(D \cdot)$ +1 may be updated.
- · IVMC instruction reads the inverter status at the time of communication with the inverter, and stores the read status to (D.). Accordingly, the status written by the IVMC instruction can be read by a next or later read instruction (IVCK or IVMC).

9.9.2 Applicable inverters

This instruction is applicable to the following inverters:

- FREQROL-A800 (Applicable in all)
- FREQROL-F800 (Applicable in all)
- · FREQROL-E700 (February 2009 and later)
- FREQROL-D700 (Applicable in all)

 \rightarrow For details, refer to the respective inverter manual.

9.9.3 Applicable programming tool

The following programming tools support this instruction.

1. English versions

Product name	Model name	Applicable version	Remarks
FX3u and FX3uc PL	Cs		
GX Works2	SW□DNC-GXW2-E	Ver. 1.48A or later	_
FX-30P		Ver. 1.20 or later	-
FX3G PLC			
GX Works2	SW□DNC-GXW2-E	Ver. 1.62Q or later	_
FX-30P		Ver. 1.50 or later	_
FX3GC PLC			
GX Works2	SW□DNC-GXW2-E	Ver. 1.77F or later	_
FX-30P		Ver. 1.50 or later	
FX3S PLC			
GX Works2	SW□DNC-GXW2-E	Ver. 1.492N or later	_
FX-30P		Ver. 1.50 or later	

2. Japanese versions

Product name	Model name	Applicable version	Remarks
FX3U and FX3UC PL	.Cs		
GX Works2	SW□DNC-GXW2-J	Ver. 1.45X or later	
FX-30P		Ver. 1.20 or later	-
FX3G PLC			
GX Works2	SW□DNC-GXW2-J	Ver. 1.56J or later	
FX-30P		Ver. 1.50 or later	_
FX3GC PLC			
GX Works2	SW□DNC-GXW2-J	Ver. 1.77F or later	
FX-30P		Ver. 1.50 or later	<u>-</u>
FX3S PLC			
GX Works2	SW□DNC-GXW2-J	Ver. 1.492N or later	_
FX-30P	•	Ver. 1.50 or later	<u>-</u>

9.10 Second Parameter Specification Codes

When handling the following parameters in computer link operation, it is necessary to select second parameters.

In IVRD, IVWR, and IVBWR *1 instructions, when a value shown in the tables below is set in \S_{2^*} (\S_{3^*} in IVBWR *1 instruction), the extension parameter and second parameter are automatically overwritten, and parameter values are either read or written.

*1. The IVBWR instruction is supported only in FX3U and FX3UC PLCs.

9.10.1 S500 Series

1. Second parameter specification codes for parameter numbers C2 to C7

Parameter No.	Name	Second parameter specification code [(decimal) value to be specified in S2 in IVRD/IVWR instruction for parameter number]
C2	Frequency setting voltage bias frequency	902
C3	Frequency setting voltage bias	1902
C4	Frequency setting voltage gain	903
C5	Frequency setting current bias frequency	904
C6	Frequency setting current bias	1904
C7	Frequency setting current gain	905

9.10.2 E500 Series

1. Second parameter specification codes for parameter numbers 902 to 905

Parameter No.	Name	Second parameter specification code [(decimal) value to be specified in S2* in IVRD/IVWR instruction for parameter number]		in IVRD/IVWR
		Offset/Gain (H00)	Analog (H01)	Analog value of terminal (H02)
902	Frequency setting voltage bias	902	1902	2902
903	Frequency setting voltage gain	903	1903	2903
904	Frequency setting current bias	904	1904	2904
905	Frequency setting current gain	905	1905	2905

9.10.3 A500 Series

1. Second parameter specification codes for parameter numbers 201 to 230 and 902 to 905

		Second	parameter specificati	on code	
Parameter No.	Name	[(decimal) value to be specified in S2* in IVRD/IVWR instruction for parameter number]			
NO.		Operation frequency read/write	Time read/write	Rotation direction write/read	
201	Program set 1	201	1201	2201	
202	Program set 1	202	1202	2202	
203	Program set 1	203	1203	2203	
204	Program set 1	204	1204	2204	
205	Program set 1	205	1205	2205	
206	Program set 1	206	1206	2206	
207	Program set 1	207	1207	2207	
208	Program set 1	208	1208	2208	
209	Program set 1	209	1209	2209	
210	Program set 1	210	1210	2210	
211	Program set 2	211	1211	2211	
212	Program set 2	212	1212	2212	
213	Program set 2	213	1213	2213	
214	Program set 2	214	1214	2214	
215	Program set 2	215	1215	2215	
216	Program set 2	216	1216	2216	
217	Program set 2	217	1217	2217	
218	Program set 2	218	1218	2218	
219	Program set 2	219	1219	2219	
220	Program set 2	220	1220	2220	
221	Program set 3	221	1221	2221	
222	Program set 3	222	1222	2222	
223	Program set 3	223	1223	2223	
224	Program set 3	224	1224	2224	
225	Program set 3	225	1225	2225	
226	Program set 3	226	1226	2226	
227	Program set 3	227	1227	2227	
228	Program set 3	228	1228	2228	
229	Program set 3	229	1229	2229	
230	Program set 3	230	1230	2230	

2. Second parameter specification codes for parameter numbers 902 to 905

Parameter No.	Name	Second parameter specification code [(decimal) value to be specified in S2* in IVRD/IVWR instruction for parameter number]		in IVRD/IVWR
		Offset/Gain (H00)	Analog (H01)	Analog value of terminal (H02)
902	Frequency setting voltage bias	902	1902	2902
903	Frequency setting voltage gain	903	1903	2903
904	Frequency setting current bias	904	1904	2904
905	Frequency setting current gain	905	1905	2905

9.10.4 F500 Series

1. Second parameter specification codes for parameter numbers 902 to 905

Parameter No.	Name	Second parameter specification code [(decimal) value to be specified in S2* in IVRD/ IVWR instruction for parameter number]		
NO.		Offset/Gain (H00)	Analog (H01)	Analog value of terminal (H02)
902	Frequency setting voltage bias	902	1902	2902
903	Frequency setting voltage gain	903	1903	2903
904	Frequency setting current bias	904	1904	2904
905	Frequency setting current gain	905	1905	2905

9.10.5 V500 Series

1. Second parameter specification codes for parameter numbers 902 to 905

Parameter No.	Name	Second parameter specification code [(decimal) value to be specified in S2· in IVRD/ IVWR instruction for parameter number]		
NO.		Offset/Gain (H00)	Analog (H01)	Analog value of terminal (H02)
902	Speed setting No. 2 bias	902	1902	2902
903	Speed setting No. 2 gain	903	1903	2903
904	Torque command No. 3 bias	904	1904	2904
905	Torque command No. 3 gain	905	1905	2905
917	No.1 terminal bias (speed)	917	1917	2917
918	No.1 terminal gain (speed)	918	1918	2918
919	No.1 terminal bias (torque/magnetic flux)	919	1919	2919
920	No.1 terminal gain (torque/magnetic flux)	920	1920	2920

9.10.6 F700 Series

1. Second parameter specification codes for parameter numbers 125, 126, and C2 to C7

Parameter No.	Name	Second parameter specification code [(decimal) value to be specified in S2 in IVRD/IVWR instruction for parameter number]
C2	Terminal 2 frequency setting bias frequency	902
C3	Terminal 2 frequency setting bias	1902
125	Terminal 2 frequency setting gain frequency	903
C4	Terminal 2 frequency setting gain	1903
C5	Terminal 4 frequency setting bias frequency	904
C6	Terminal 4 frequency setting bias	1904
126	Terminal 4 frequency setting gain frequency	905
C7	Terminal 4 frequency setting gain	1905

9.10.7 A700 Series

1. Second parameter specification codes for parameter numbers 125, 126, C2 to C7, C12 to C19, and C38 to C41

Parameter	Mana	Second parameter specification code [(decimal) value to be specified in S2• in IVRD/IVWR instruction for parameter number]	
No.	Name		
C2	Terminal 2 frequency setting bias frequency	902	
C3	Terminal 2 frequency setting bias	1902	
125	Terminal 2 frequency setting gain frequency	903	
C4	Terminal 2 frequency setting gain	1903	
C5	Terminal 4 frequency setting bias frequency	904	
C6	Terminal 4 frequency setting bias	1904	
126	Terminal 4 frequency setting gain frequency	905	
C7	Terminal 4 frequency setting gain	1905	
C12	Bias frequency (speed) for terminal No. 1	917	
C13	Bias (speed) for terminal No. 1	1917	
C14	Gain frequency (speed) for terminal No. 1	918	
C15	Gain (speed) for terminal No. 1	1918	
C16	Bias command (torque) for terminal No. 1	919	
C17	Bias (torque) for terminal No. 1	1919	
C18	Gain command (torque) for terminal No. 1	920	
C19	Gain (torque) for terminal No. 1	1920	
C38	Bias command (torque) for terminal No. 4	932	
C39	Bias (torque) for terminal No. 4	1932	
C40	Gain command (torque) for terminal No. 4	933	
C41	Gain (torque) for terminal No. 4	1933	

9.10.8 E700 and D700 Series

1. Second parameter specification codes for parameter numbers 125, 126, C2 to C7 and C22 to C25

Parameter No.	Name	Second parameter specification code [(decimal) value to be specified in S2· in IVRD/IVWR instruction for parameter number]
C2	Terminal 2 frequency setting bias frequency	902
	Terminal 2 frequency setting bias	1902
03	Terminal 2 analog value	2902 (Only the IVRD instruction)
125	Terminal 2 frequency setting gain frequency	903
C4	Terminal 2 frequency setting gain	1903
04	Terminal 2 analog value	2903 (Only the IVRD instruction)
C5	Terminal 4 frequency setting bias frequency	904
C6	Terminal 4 frequency setting bias	1904
Co	Terminal 4 analog value	2904 (Only the IVRD instruction)
126	Terminal 4 frequency setting gain frequency	905
	Terminal 4 frequency setting gain	1905
C1	Terminal 4 analog value	2905 (Only the IVRD instruction)
C22	Frequency setting voltage bias frequency (built-in potentiometer)	922
C23	Frequency setting voltage bias (built-in potentiometer)	1922
C24	Frequency setting voltage gain frequency (built-in potentiometer)	923
C25	Frequency setting voltage gain (built-in potentiometer)	1923

9.10.9 F800 Series

1. Second parameter specification codes for parameter numbers Pr125, Pr126, C2 to C19 and C38 to C41

Parameter		Second parameter specification code	
No.	Name	[(decimal) value to be specified in S2* in IVRD/IVWR instruction for parameter number]	
C2	Terminal 2 frequency setting bias frequency	902	
C3	Terminal 2 frequency setting bias	1902	
125	Terminal 2 frequency setting gain frequency	903	
C4	Terminal 2 frequency setting gain	1903	
C5	Terminal 4 frequency setting bias frequency	904	
C6	Terminal 4 frequency setting bias	1904	
126	Terminal 4 frequency setting gain frequency	905	
C7	Terminal 4 frequency setting gain	1905	
C12	Terminal 1 bias frequency (speed)	917	
C13	Terminal 1 bias (speed)	1917	
C14	Terminal 1 gain frequency (speed)	918	
C15	Terminal 1 gain (speed)	1918	
C16	Terminal 1 bias command (torque)	919	
C17	Terminal 1 bias (torque)	1919	
C18	Terminal 1 gain command (torque)	920	
C19	Terminal 1 gain (torque)	1920	
C8	Current output bias signal	930	
C9	Current output bias current	1930	
C10	Current output gain signal	931	
C11	Current output gain current	1931	
C38	Terminal 4 bias command (torque)	932	
C39	Terminal 4 bias (torque)	1932	
C40	Terminal 4 gain command (torque)	933	
C41	Terminal 4 gain (torque)	1933	
C42	PID display bias coefficient	934	
C43	PID display bias analog value	1934	
C44	PID display gain coefficient	935	
C45	PID display gain analog value	1935	

9.10.10 A800 Series

1. Second parameter specification codes for parameter numbers Pr125, Pr126, C2 to C19 and C38 to C41

Parameter		Second parameter specification code	
No.	Name	[(decimal) value to be specified in S2 in IVRD/IVWR instruction for parameter number]	
C2	Terminal 2 frequency setting bias frequency	902	
C3	Terminal 2 frequency setting bias	1902	
125	Terminal 2 frequency setting gain frequency	903	
C4	Terminal 2 frequency setting gain	1903	
C5	Terminal 4 frequency setting bias frequency	904	
C6	Terminal 4 frequency setting bias	1904	
126	Terminal 4 frequency setting gain frequency	905	
C7	Terminal 4 frequency setting gain	1905	
C12	Terminal 1 bias frequency (speed)	917	
C13	Terminal 1 bias (speed)	1917	
C14	Terminal 1 gain frequency (speed)	918	
C15	Terminal 1 gain (speed)	1918	
C16	Terminal 1 bias command (torque)	919	
C17	Terminal 1 bias (torque)	1919	
C18	Terminal 1 gain command (torque)	920	
C19	Terminal 1 gain (torque)	1920	
C8	Current output bias signal	930	
C9	Current output bias current	1930	
C10	Current output gain signal	931	
C11	Current output gain current	1931	
C38	Terminal 4 bias command (torque)	932	
C39	Terminal 4 bias (torque)	1932	
C40	Terminal 4 gain command (torque)	933	
C41	Terminal 4 gain (torque)	1933	
C42	PID display bias coefficient	934	
C43	PID display bias analog value	1934	
C44	PID display gain coefficient	935	
C45	PID display gain analog value	1935	

10. Practical Program Examples (FX3S, FX3G, FX3GC, FX3U, FX3UC)

This chapter explains practical programs for inverter communication.

10.1 Practical Example 1

This fundamental program example monitors operations of an inverter, controls operations of the inverter and writes parameters to the inverter.

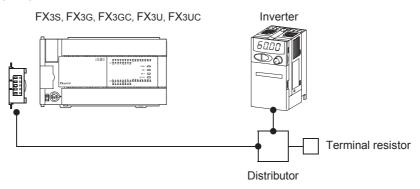
Programs can be made simpler and the communication time can be reduced by using the IVMC instruction as long as the PLC and inverter support the IVMC instruction.

For details on PLC versions support the IVMC instruction, refer to section 9.9.

Refer to "9.9.2 Applicable inverters" for supported inverters.

10.1.1 System configuration example

An FX PLC (ch 1) is connected to an inverter.



10.1.2 Contents of operation

As an example of operation control, an inverter can be stopped (X000), rotated forward (X001) and rotated reverse (X002).

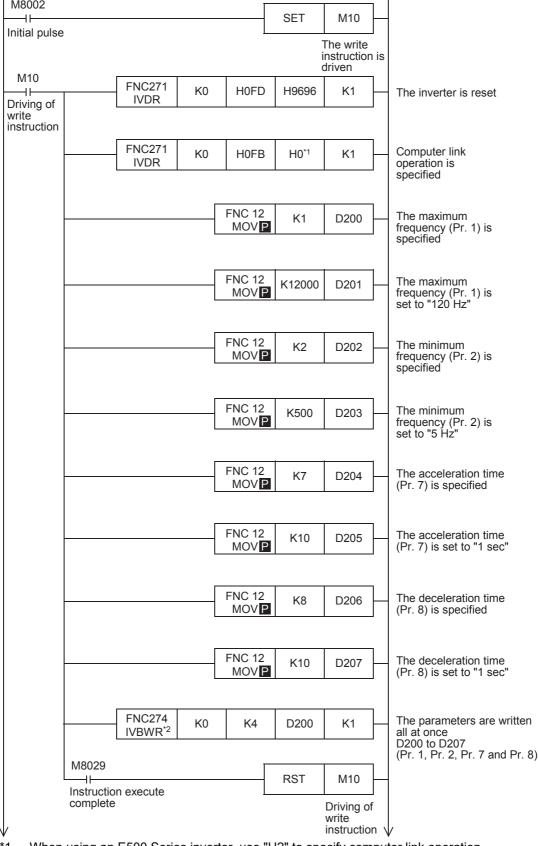
By changing the contents of D10^{*1}, the speed can be changed.

The contents of D10^{*1} can be changed from a sequence program or display unit.

*1. D11 when the IVMC instruction is used

10.1.3 Program example

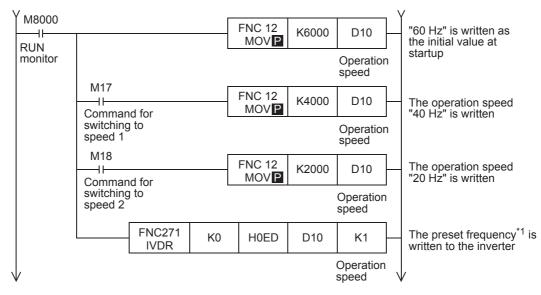
1. Writing parameters to an inverter while the PLC is in RUN mode



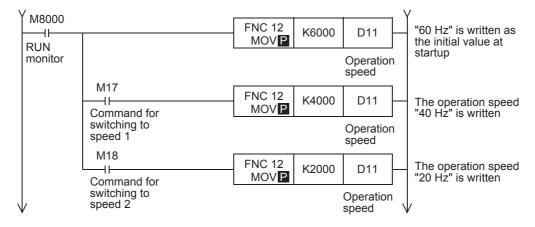
- *1. When using an E500 Series inverter, use "H2" to specify computer link operation.
- *2. The FX3S, FX3G and FX3GC PLC does not support the IVBWR instruction. Use the IVWR instruction instead.

2. Changing the speed using a sequence program

· When the IVMC instruction is not used

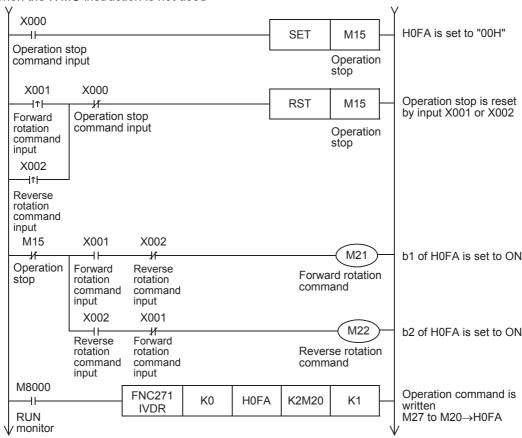


- *1. For the V500 Series inverter, write "0" to instruction code HFF (Link parameter expansion setting) just before writing the set frequency in the program.
- · When the IVMC instruction is used

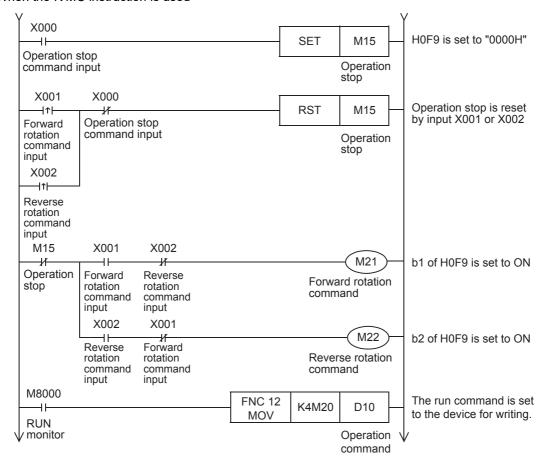


3. Controlling operations of an inverter

· When the IVMC instruction is not used

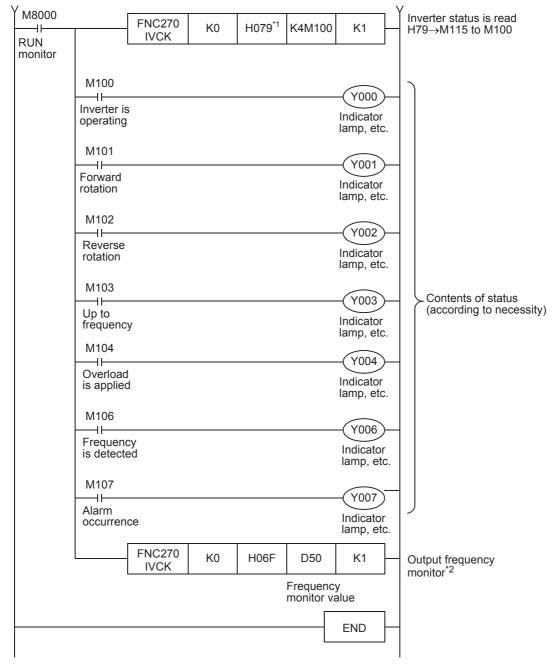


· When the IVMC instruction is used



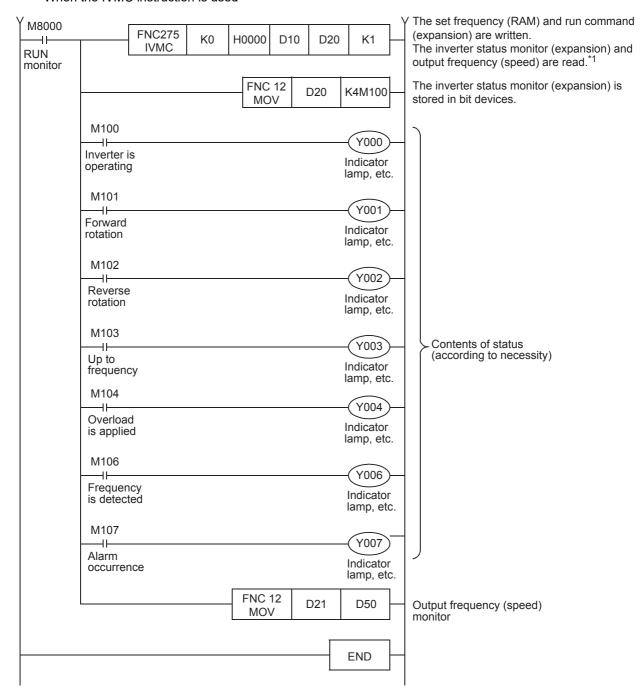
4. Monitoring operations of an inverter

· When the IVMC instruction is not used



- *1. S500, E500, A500, F500 and V500 Series inverters do not support the command code H79 (Inverter status monitor (extended)). Use the command code H7A (Inverter status monitor).
- *2. For the V500 Series inverter, write "0" to instruction code HFF (Link parameter expansion setting) just before reading the output frequency monitor in the program.

· When the IVMC instruction is used



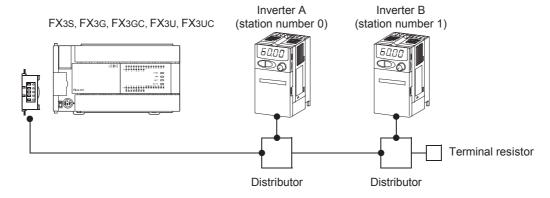
- *1. The IVMC instruction reads the inverter status at the time of communication with the inverter, and stores it in (D•).
 - Accordingly, the inverter status written by the IVMC instruction can be read when the next reading instruction (IVCK, IVMC, etc.) is executed.

Practical Example 2 10.2

This program executes the same control as practical example 1 shown earlier from one communication port (ch1) to two inverters (Station number: 0 and 1).

10.2.1 System configuration example

An FX PLC (ch1) is connected to two inverters (Station number: 0 and 1).



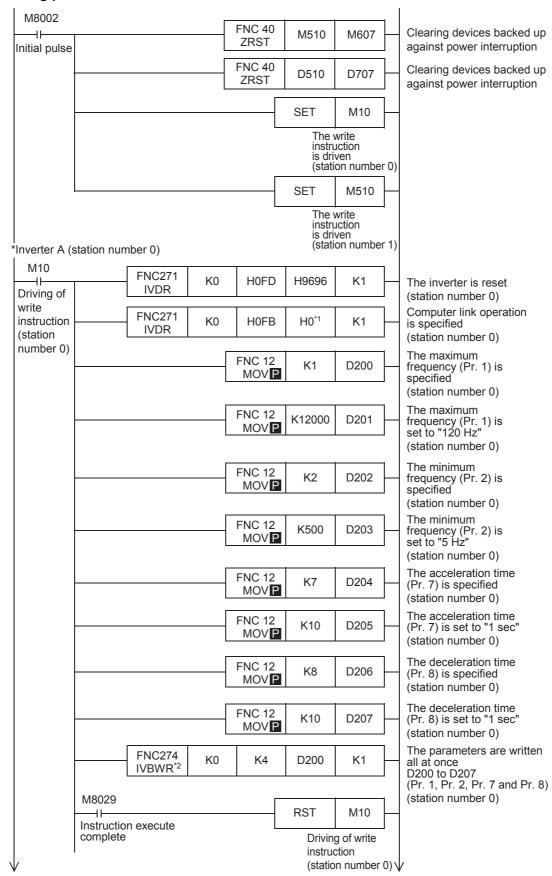
10.2.2 Contents of operation

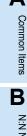
Differences from the practical example 1 are the following three points:

- The PLC executes communication from one communication port to two inverters.
- Status is not being read when a write to inverter command is given.
- The PLC only writes when it detects that contents to be written have changed since last being written.

10.2.3 Program example

1. Writing parameters to an inverter while the PLC is in RUN mode





N:N Network

Parallel Link

D Computer

ter Link

Inverter Communication

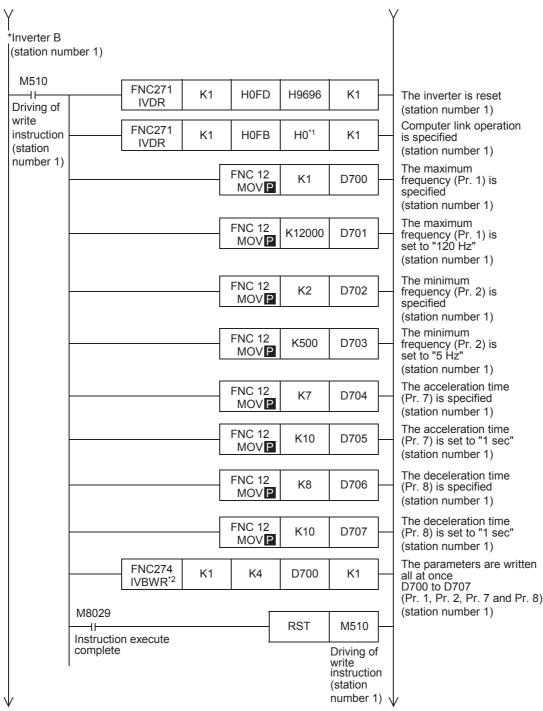
Non-Protocol
Communication

G Non-Pro

H Programm Communio

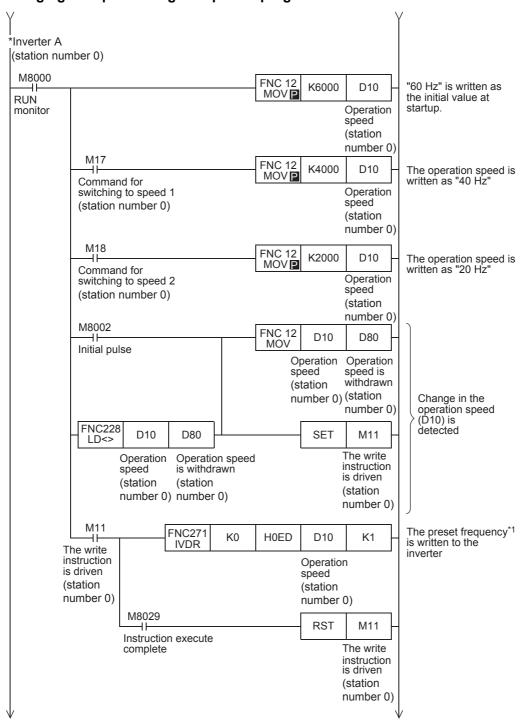
RemoteMaintenance

Apx.A Discontinued models



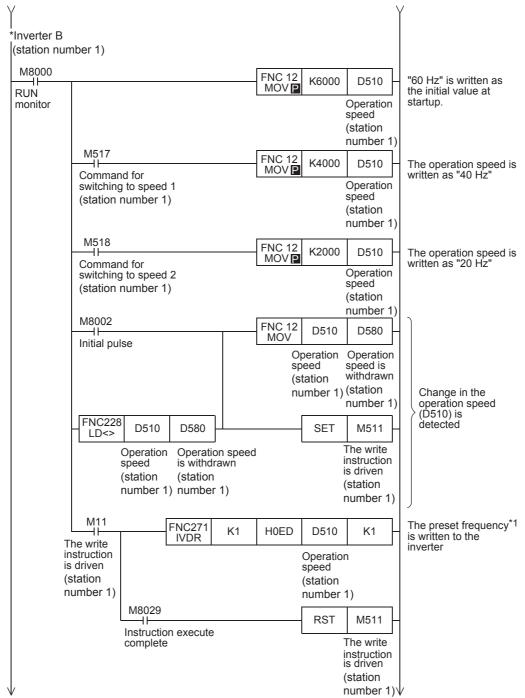
- *1. When using an E500 Series inverter, use "H2" to specify computer link operation.
- *2. The FX3S, FX3G and FX3GC PLC does not support the IVBWR instruction. Use the IVWR instruction instead.

2. Changing the speed using a sequence program



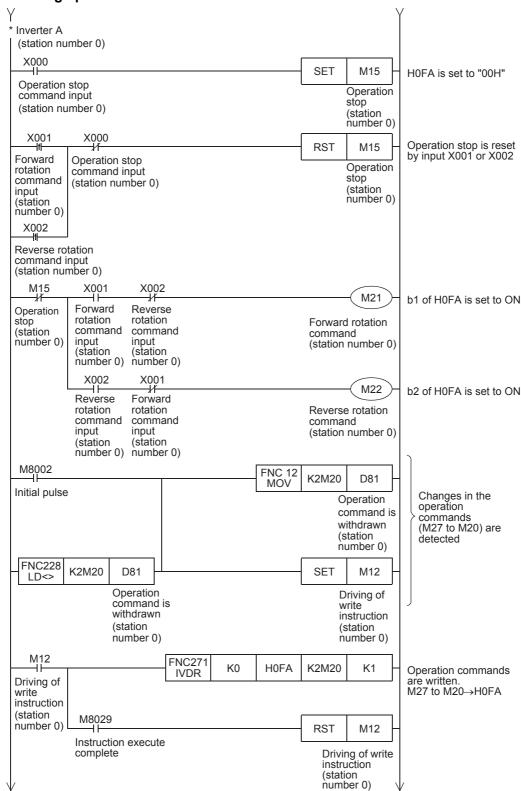
*1. For the V500 Series inverter, write "0" to instruction code HFF (Link parameter expansion setting) just before writing the set frequency in the program.

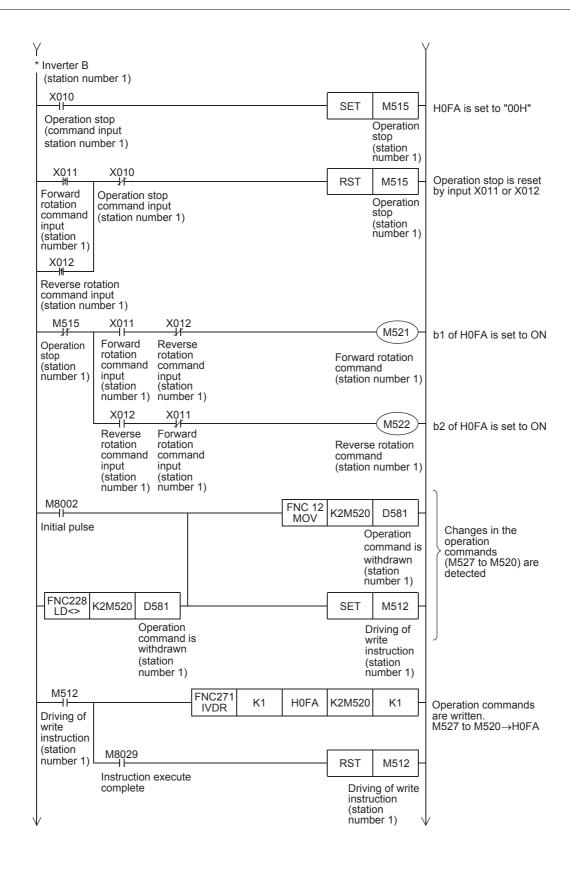




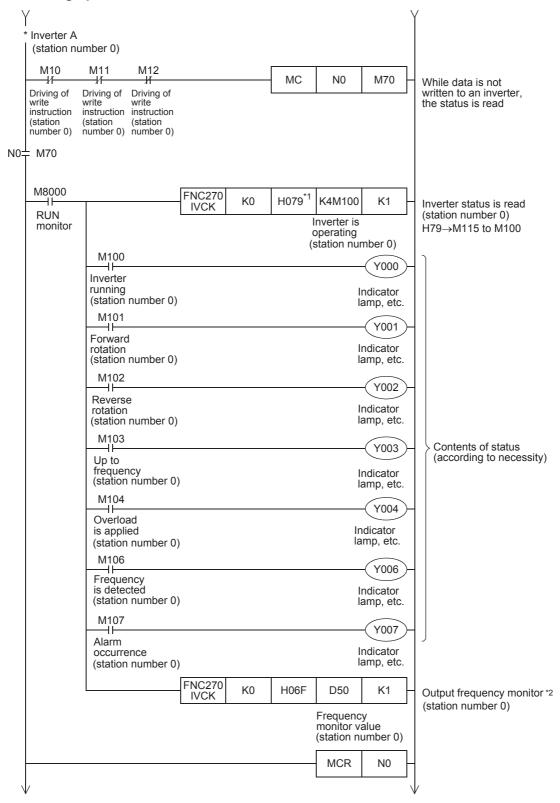
*1. For the V500 Series inverter, write "0" to instruction code HFF (Link parameter expansion setting) just before writing the set frequency in the program.

3. Controlling operations of an inverter





4. Monitoring operations of an inverter



- *1. S500, E500, A500, F500 and V500 Series inverters do not support the command code H79 (Inverter status monitor (extended)). Use the command code H7A (Inverter status monitor).
- *2. For the V500 Series inverter, write "0" to instruction code HFF (Link parameter expansion setting) just before reading the output frequency monitor in the program.

- *1. S500, E500, A500, F500 and V500 Series inverters do not support the command code H79 (Inverter status monitor (extended)). Use the command code H7A (Inverter status monitor).
- *2. For the V500 Series inverter, write "0" to instruction code HFF (Link parameter expansion setting) just before reading the output frequency monitor in the program.

A Common Items

N:N Network

C

Parallel Link

D Computer Link

Inverter Communication

F Non-F

otocol unication **G**

Non-Protocol Communicatic (FX2N-232IF)

Н

Programming Communication

Remote Maintenance

Apx.A Discontinued models

11. Troubleshooting

This chapter explains troubleshooting and error codes.

11.1 Checking FX PLC Version Applicability (FX2N and FX2NC Series)

Verify that the FX PLC main unit is an applicable version for inverter communication.

→ For version applicability, refer to Section 1.3.

11.2 Checking Communication Status Based on LED Indication

Check the status of the "RD(RXD)" and "SD(TXD)" indicator LEDs provided in the optional equipment.

LED status		Operation status
RD	SD	Operation status
Flashing	Flashing	Data is being sent or received.
Flashing	Off	Data is received, but is not sent.
Off	Flashing	Data is sent, but is not received
Off	Off	Data is not sent nor received.

11.3 Checking Installation

1. Mounting status

If the communication equipment is not securely connected to the PLC, communication is not possible.

→ For mounting method, refer to the respective communication equipment manual.

2. Power supply (for FX0N-485ADP)

The FX0N-485ADP requires a driving power supply. Verify that the power supply is provided correctly.

3. Wiring

Verify that the wiring to all communication equipment is correct. If the communication equipment is wired incorrectly, communication is not possible.

 \rightarrow For wiring method check, refer to Chapter 4.

11.4 Checking Sequence Program

1. Communication setting in the sequence program

Verify that N:N Network (D8173 to D8180) and parallel link (M8070 and M8071) are not set. After changing any setting, make sure to turn OFF the PLC power, and then turn the power ON again.

2. Communication setting using parameters

Verify that the communication settings using parameters are correct. If the contents of the parameters do not agree, communication will not function correctly.

After changing any parameters, make sure to turn OFF the PLC power, and then turn the power ON again.

3. Ethernet port setting (in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the same channel is not used in the Ethernet port setting. Do not set the channel used in inverter communication. After changing the setting, make sure to reboot the PLC's power.

nued

4. Presence of VRRD and VRSC instructions

1) Except FX3G, FX3U and FX3UC PLCs

Verify that the VRRD and VRSC instructions are not used in the program.

If these instructions are used, delete them, turn OFF the PLC power, and then turn the power ON again.

- 2) In FX3G PLC
 - In the case of the 14 points and 24-point type

Verify that the VRRD and VRSC instructions are not used in the program.

If these instructions are used, delete them, turn OFF the PLC power, and then turn the power ON again.

- In the case of the 40 points and 60-point type

Verify that the VRRD and VRSC instructions are not used in the program.

If these instructions are used in the program, the communication function is not available in ch2. Use ch1, or delete these instructions.

After deleting these instructions, turn OFF the PLC power, and then turn the power ON again.

3) In FX3U and FX3UC PLCs

Verify that the VRRD and VRSC instructions are not used in the program.

If these instructions are used in the program, the communication function is not available in ch1. Use ch2, or delete these instructions.

After deleting these instructions, reboot the PLC's power.

5. Presence of RS instruction (in FX2N and FX2NC PLCs)

Verify that the RS instruction is not used in the program.

If this instruction is used, delete it, turn OFF the PLC power, and then turn the power ON again.

6. Presence of RS and RS2 instructions (in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the RS and RS2 instructions are not being used for the same channel.

If these instructions are used for the same channel, delete them, turn OFF the PLC power, and then turn the power ON again.

7. Presence of ADPRW instructions (in FX3s, FX3g, FX3gc, FX3u and FX3uc PLCs)

Verify that the ADPRW instructions are not being used for the same channel.

If these instructions are used for the same channel, delete them, and reboot the PLC's power.

8. Presence of FLCRT, FLDEL, FLWR, FLRD, FLCMD, and FLSTRD instructions (in FX3U and FX3UC PLCs)

Verify that the FLCRT, FLDEL, FLWR, FLRD, FLCMD and FLSTRD instructions are not being used for the same channel.

If these instructions are used for the same channel, delete them, reboot the PLC's power.

11.4.1 Checking inverter operation status

1. When the operation mode of an inverter is not changed over to computer link mode

- 1) Verify that the inverter is set to the external operation mode.
- 2) Verify that no signal is being input to the external terminals STF and STR.
- 3) Verify that the correct operation mode changeover program is being executed.

2. When an inverter cannot be started even in computer link mode

- 1) Verify that the program for starting the inverter is executed correctly.
- 2) Verify that the operation command and speed command are set correctly.
- 3) Verify that the allowable communication time interval is set correctly.

3. When an inverter is stopped by an alarm during operation due to defective communication

- 1) Verify that a communication cable is connected correctly between the PLC and the inverter. (Check for poor contact or wire breakage.)
- 2) Verify that a sequence program is created so that communication is executed with each inverter within a constant cycle. Set the communication check time interval to a large value, and check the communication
- 3) Verify that the allowable communication time interval is set correctly.
- 4) Verify that terminal resistors are wired correctly.

11.5 Checking Absence/Presence of Errors

Verify that the error flag is not ON.

If the error flag is ON, check the error code and take proper countermeasures.

 \rightarrow For error codes, refer to the next page.

11.6 Error Codes

When a communication error occurs, the error flag turns ON, and the error code is stored in the data register. For error codes, refer to the table below.

1. Error storing devices

FX Series	FX Series Error flag		Data register for s	storing error code
FX2N,FX2NC	M8156		D8156	
FX3S,FX3G,FX3GC,FX3U,FX3UC	ch1	ch2	ch1	ch2
1 733,1 733,1 7336,1 730,1 7300	M8152	M8157	D8152	D8157

2. Error code list

Error code (DEC)		Contents of error			
0	Normal end	(No Errors)			
1	_	Inverter did not give response.			
2	Timeout error	Sending from inverter was aborted midway.			
3	Station number error	Unspecified station gave response.			
4	Sum check error	The sum of data sent back by the inverter did not match.			
5	Parameter number specification error	In writing or reading a parameter, an improper parameter number was specified. At this time, error code (K6706) is set to D8067. K6706: Out-of-range data value for operand in applied instruction.			
6	Communication port occupied by another communication type	Because the port is being used for another communication type, it cannot be used for communication with the inverter. At this time, error code (K6762) is set to D8067. K6762: The port specified in inverter communication instruction is being used by another communication type.	_		
7	Station number outside setting range	A value outside the allowable range is set to the station number. At this time, error code (K6706) is set to D8067. K6706: Out-of-range data value for operand in applied instruction.			
8	Sending timeout error*1	Sending to the inverter was not completed within the specified time.			
9	Received data error*1	Wrong data was received from the inverter.			
256	Computer NAK error	Inverter sent the error code H0. The number of retries exceeded the allowable number because of an error in the transfer request data.			
257	Parity error	Inverter sent the error code H1. The contents are different from the specified parity.	When errors have occurred		
258	Sum check error	Inverter sent the error code H2. The sum check code in the computer is different from the sum value calculated from the data received by the inverter.	consecutively beyond the allowable number of		
259	Protocol error	Inverter sent the error code H3. Syntax error is included in the data received by the inverter, receiving of data was not completed within the specified time, or CR/LF does not agree with the parameters.	retries, inverter is brought to an alarm stop.		
260	Framing error	Inverter sent the error code H4. The stop bit length is different from the initial set value.			

Error code (DEC)		Contents of error	Inverter operation
261	Overrun error	Inverter sent the error code H5. Before receiving the completed data in the inverter, the computer sent the next set of data.	When errors have occurred consecutively beyond the allowable number of retries, inverter is brought to an alarm stop.
262	Undefined	Inverter sent the error code H6. Not defined currently in inverter.	_
263	Character error	Inverter sent the error code H7. An unused character (other than 0 to 9, A to F and control codes) was received.	Inverter does not accept received data, but is not brought to an alarm stop.
264	Undefined	Inverter sent the error code H8. Not defined currently in inverter.	
265	Undefined	Inverter sent the error code H9. Not defined currently in inverter.	_
266	Mode error	Inverter sent the error code HA. A parameter was written in a mode other than computer link mode, or while the inverter was operating.	Inverter does not accept
267	Instruction code error	Inverter sent the error code HB. Instruction code error. Non-existing instruction code was specified.	received data, but is not
268	Data range error	Inverter sent the error code HC. In writing a parameter or operation frequency, data outside the allowable range was specified.	brought to an alarm stop.
269	Undefined	Inverter sent the error code HD. Not defined currently in inverter.	
270	Undefined	Inverter sent the error code HE. Not defined currently in inverter.	_
271	Undefined	Inverter sent the error code HF. Not defined currently in inverter.	

^{*1.} This error code is supported only in FX3S/FX3G/FX3GC/FX3U/FX3UC PLCs.

3. IVMC instruction error codes

When errors occur in the send data of the IVMC instruction, the following error codes are stored. It is recommended to check error codes in hexadecimal.

Refer to the error code list earlier in this section for other errors.

Error code (HEX)					
IVMC instruction error information b15 to b8	Send data2 error information b7 to b4	Send data1 error information b3 to b0	Contents of error	Inverter operation	
H00	H0	H0	No error has occurred in both send data 1 and send data 2. Normal end	_	
	110	НА	The inverter sent error code HA to send data 1 of the IVMC instruction. A parameter was written in a mode other than computer link mode or while the inverter was operating. The inverter did not accept the received data, but was not stopped by alarm.	The inverter accepts data corresponding to	
	HU	H0 HB	The inverter sent error code HB to send data 1 of the IVMC instruction. Non-existing instruction code was specified.	send data 2, and is not brought to an alarm stop.	
		нс	НС	The inverter sent error code HC to send data 1 of the IVMC instruction. Data outside the allowable range was specified.	
H02	HA HO		The inverter sent error code HA to send data 2 of the IVMC instruction. A parameter was written in a mode other than computer link mode or while inverter was operating. The inverter did not accept the received data, but was not stopped by alarm.	The inverter accepts data corresponding to	
		H0	The inverter sent error code HB to send data 2 of the IVMC instruction. Non-existing instruction code was specified.	send data 1, and is not brought to an alarm stop.	
			The inverter sent error code HC to send data 2 of the IVMC instruction. Data outside the allowable range was specified.		
	HA to HC	HA to HC	The inverter sent error codes to both send data 1 and send data 2 of the IVMC instruction. Refer to the contents of the error of the corresponding error codes of send data 1 and send data 2 for details of error codes.	The inverter does not accept data corresponding to send data 1 and 2, but is not brought to an alarm stop.	

12.1 Related Device List (FX2N, FX2NC)

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12. Related Data

This chapter shows various technical information.

12.1 Related Device List (FX2N, FX2NC)

The tables below show special auxiliary relays and special data registers used in inverter communication (EXTR K10 to EXTR K13).

1. Bit devices

Device No.	Name	Description	R/W
M8029	Instruction execution complete	Turns ON when execution of EXTR instruction is completed, and remains ON for 1 scan. Turns ON also when execution of instruction is completed if M8156 (communication error or parameter error) turns ON.	D
M8104	Extension ROM cassette check	Remains ON while an extension ROM cassette is attached.	R
M8154	Unused	_	R
M8155	Communication port busy	Remains ON while the communication port is used by an EXTR instruction.	R
M8156	Communication error or parameter error	Turns ON when a communication error is caused by an EXTR instruction.	R
M8157	Communication error latch*1	Turns ON when a communication error is caused by an EXTR instruction.	R

R: Read only (used as a contact in program)

2. Word devices

Device No.	Name	Description	R/W
D8104	Extension ROM cassette type code	Stores the type code of an extension ROM cassette (value: K1).	R
D8105	Extension ROM cassette version	Stores the version of an extension ROM cassette (value: K100 = Ver. 1.00).	R
D8154	Inverter response waiting time	Sets the inverter response waiting time.	R/W
D8155	Step number of instruction using the communication port	Stores the step number of EXTR instruction using the communication port.	R
D8156	Error code ^{*1}	Stores an error code when a communication error is caused by an EXTR instruction.	R
D8157	Error occurrence step number latch*1	Stores the instruction step number in which a communication error has occurred. (Stores K-1 when no error has occurred.)	R

R: Read only W: Write only R/W: Read or Write

*1. Cleared when the PLC mode is changed from STOP to RUN.

^{*1.} Cleared when the PLC mode is changed from STOP to RUN.

12.2 Details of Related Devices (FX2N, FX2NC)

The following devices are special devices used in inverter communication.

12.2.1 Instruction execution complete [M8029]

When execution of an inverter communication instruction is completed, this device turns ON.

1. Detailed contents

When execution of an inverter communication instruction is completed, M8029 turns ON, and remains ON for 1 scan.

When an error occurs in an inverter communication instruction, M8029 turns ON.

2. Cautions on use

M8029 is used as the execution complete flag for other instructions (such as positioning instructions). When using M8029, provide the contact just under the instruction whose execution completion is to be checked.

12.2.2 Extension ROM cassette check [M8104]

This device remains ON while an extension ROM cassette is attached.

1. Detailed contents

M8104 remains ON while an extension ROM cassette is attached.

- FX2N FX2N-ROM-E1
- FX2NC..... FX2NC-ROM-CE1

2. Cautions on use

While M8104 is OFF, EXTR instructions cannot be used.

12.2.3 Communication port busy [M8155]

This device remains ON while the communication port is being used by an EXTR instruction.

1. Detailed contents

M8155 remains ON while communication with an inverter is executed by an EXTR instruction. When M8155 turns ON, D8155 stores the step number of an instruction using the communication port. While M8155 is ON, another EXTR instruction cannot be executed.

12.2.4 Communication error or parameter error [M8156]

This device turns ON when an error is caused in communication with an inverter by an EXTR instruction.

1. Detailed contents

M8156 turns ON when an error is caused in communication with an inverter by an EXTR instruction. When M8156 turns ON. D8156 stores the error code.

2. Cautions on use

M8156 is set to OFF by an EXTR instruction located in the next step in the program. When using M8156, provide it just under the EXTR instruction whose error is to be checked.

12.2.5 Communication error latch [M8157]

This device turns ON when the communication error flag M8156 turns ON.

1. Detailed contents

M8157 turns ON when a communication error occurs and M8156 turns ON. When M8157 turns ON, D8157 stores the step number in which the error has occurred.

2. Cautions on use

M8157 remains ON until the PLC mode is changed from STOP to RUN.

12.2.6 Extension ROM cassette type code [D8104]

This device stores the type code of an extension ROM cassette.

1. Detailed contents

While the following ROM is attached to an FX PLC, D8104 stores its model code.

- FX2N FX2N-ROM-E1 (model code: K1)
- FX2NC..... FX2NC-ROM-CE1 (model code: K1)

12.2.7 Extension ROM cassette version [D8105]

This device stores the version of an extension ROM cassette.

1. Detailed contents

While an extension ROM is attached, D8105 stores its version information (K100 = Ver. 1.00).

12.2.8 Inverter response waiting time [D8154]

This device sets the response waiting time of an inverter.

1. Detailed contents

D8154 sets the response waiting time of an inverter. Set a value within the range from "1 to 32767" (unit: 100 ms) to D8154. When "0" or a negative value is set, it is handled as "100 ms".

12.2.9 Step number of instruction using communication port [D8155]

This device stores the step number of an instruction occupying the communication port.

1. Detailed contents

D8155 stores the step number of EXTR instruction using the communication port.

12.2.10 Error code [D8156]

This device stores the error code when an error is caused in communication with an inverter by an EXTR instruction.

1. Detailed contents

D8156 stores one of the following error codes when an error is caused in communication with an inverter by the EXTR instruction.

Error code (DEC)	Contents of error	Inverter operation		
0	Normal end (no error)			
1	Inverter did not give response.			
2	Timeout error. This code interlocks with M8156. Sending from inverter was aborted midway through.			
3	An unspecified station gave response.			
4	The sum of data sent back by the inverter did not match.	<u>—</u> .		
5	In writing or reading a parameter, an improper parameter number was specified. At this time, the error code K6706 is set to D8067.			
6	Because the port is being used for another communication, it cannot be used for communication with the inverter. At this time, the error code K6762 is set to D8067.			
7	A value outside the allowable range is set to the station number. At this time, error code (K6706) is set to D8067.			
256	Inverter sent the error code H0. Computer NAK error. An error was included in the transfer request data from the computer beyond the allowable number of retries.			
257	Inverter sent the error code H1. Parity error. The contents are different from the specified parity.			
258	Inverter sent the error code H2. Sum check error. The sum check code in the computer is different from the sum value calculated from the data received by inverter.	When errors have occurred consecutively beyond		
259	Inverter sent the error code H3. Protocol error. Syntax error is included in the data received by the inverter, and the receiving of data has not been completed within the specified time, or CR/LF does not agree with the parameters. the allowable number of retries, inverter is brought to an alarm stop.			
260	Inverter sent the error code H4. Framing error. The stop bit length is different from the initial set value.			
261	Inverter sent the error code H5. Overrun error. Before receiving the completed data in the inverter, the computer sent the next set of data.			
262	Inverter sent the error code H6. Not defined currently in inverter.	_		
263	Inverter sent the error code H7. Character error. An unused character (other than 0 to 9, A to F and control codes) was received.	Inverter does not accept the received		
264	Inverter sent the error code H8. Not defined currently in inverter.	data, but is not brought to an alarm stop.		
265	Inverter sent the error code H9. Not defined currently in inverter.	_		

Error code (DEC)	Contents of error	Inverter operation
266	Inverter sent the error code HA. Mode error. A parameter was written in a mode other than computer link mode, or while inverter was operating. Inverter does not accept the received data, but is not stopped by alarm.	Inverter does not accept the received
267	Inverter sent the error code HB. Instruction code error. Non-existing instruction code was specified.	data, but is not brought to an alarm
268	Inverter sent the error code HC. Data range error. In writing a parameter or operation frequency, data outside the allowable range was specified. Inverter does not accept the received data, but is not stopped by alarm.	stop.
269	Inverter sent the error code HD. Not defined currently in inverter.	
270	Inverter sent the error code HE. Not defined currently in inverter.	_
271	Inverter sent the error code HF. Not defined currently in inverter.	

12.2.11 Error occurrence step number latch [D8157]

This device stores the step number in which the communication error has occurred.

1. Detailed contents

When M8157 turns ON, D8157 stores the step number in which communication error has occurred. When errors have occurred in two or more instructions, D8157 holds the step number of the instruction in which an error occurred first.

When no error has occurred, D8157 stores "-1".

12.3 Related Device List (FX3S, FX3G, FX3GC, FX3U, FX3UC)

The tables below show special auxiliary relays and special data registers used in inverter communication (FNC270 (IVCK) to FNC275 (IVMC)).

The FX3G PLC (14-point, 24-point type) and FX3S PLC does not support ch2.

1. Bit devices

Devic	e No.	Name	Description	
ch1	ch2	Name	Description	R/W
M8029		Instruction execution complete	Turns ON when the execution of inverter communication instruction is completed, and remains ON for 1 scan. Turns ON also when the execution of instruction is completed if inverter communication error flag (M8152 or M8157) turns ON.	R
M8063	M8438	Serial communication error*1	Turns ON when an error occurs in any type of communication.	R
M8151	M8156	Inverter communicating	Remains ON while inverter communication is being executed.	R
M8152	M8157	Inverter communication error*2	Turns ON when an error occurs during communication with an inverter.	R
M8153	M8158	Inverter communication error latch*2	Turns ON when an error occurs during communication with an inverter.	R
M8154	M8159	IVBWR instruction error*2, *3	Turns ON when an error is caused by IVBWR instruction.	R

R: Read only (used as a contact in program)

- *1. Cleared when PLC power supply is turned from OFF to ON.
- *2. Cleared when the PLC mode is changed from STOP to RUN.
- *3. The IVBWR instruction is supported only in FX3U and FX3UC PLCs.

2. Word devices

Devic	e No.	Name	Description	
ch1	ch2	Name	Description	R/W
D8063	D8438	Error code for serial communication*4	Stores a communication error code.	R
D8150	D8155	Inverter communication response waiting time*4	Sets the response wait time of inverter communication.	R/W
D8151	D8156	Step number of instruction executing inverter communication	Stores the step number of an instruction executing inverter communication.	R
D8152	D8157	Error code for inverter communication*5	Stores an inverter communication error code.	R
D8153	D8158	Inverter communication error occurring step latch*5	Latches a step number in which an inverter communication error has occurred.*7	R
D8154	D8159	Error parameter number of IVBWR instruction*5*6	Stores a parameter number in which an IVBWR instruction error has occurred.	R
D8419	D8439	Operation mode display	Stores the communication type being used.	R

R: Read only

W: Write only

R/W: Read or Write

- *4. Cleared when PLC power supply is turned from OFF to ON.
- *5. Cleared when the PLC mode is changed from STOP to RUN.
- *6. The IVBWR instruction is supported only in FX3U and FX3UC PLCs.
- *7. Updated only for the first error occurrence, and not for the second error occurrence or later.

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12.4 Details of Related Devices (FX3S, FX3G, FX3GC, FX3U, FX3UC)

The following devices are special devices used in inverter communications. The FX3G PLC (14-point, 24-point type) and FX3S PLC does not support ch2.

12.4.1 Instruction execution complete [M8029]

When execution of an inverter communication instruction is completed, this device turns ON.

1. Detailed contents

When execution of an inverter communication instruction is completed, M8029 turns ON, and remains ON for 1 scan.

When an error occurs in an inverter communication instruction, M8029 turns ON, and remains ON for 1 scan in the same way.

2. Cautions on use

M8029 is used as the execution complete flag for other instructions (such as positioning instructions). When using M8029, provide the contact just under the instruction whose execution completion is to be checked.

12.4.2 Serial communication error [M8063 and M8438]

These devices turn ON when an error occurs during communication with an inverter.

1. Detailed contents

M8063 or M8438 turns ON when a parity error, overrun error or framing error occurs during communication with inverters or when on inverter communication error occurs.

M8063 turns ON when an error occurs during communication using ch1. When M8063 turns ON, D8063 stores the error code.

M8438 turns ON when an error occurs during communication using ch2. When M8438 turns ON, D8438 stores the error code.

2. Cautions on use

Serial communication errors are not cleared even when communication is restored. Clear them by turning off and on the PLC.

12.4.3 Inverter communication ON [M8151 and M8156]

These devices remain ON while the communication port is used by an inverter communication instruction.

1. Detailed contents

M8151 or M8156 remains ON while communication with an inverter is executed by an inverter communication instruction.

M8151 remains ON while communication port ch1 is used. While M8151 remains ON, D8151 stores the step number of an instruction using the communication port.

M8156 remains ON while communication port ch2 is used. While M8156 remains ON, D8156 stores the step number of an instruction using the communication port.

2. Cautions on use

While M8151 or M8156 remains ON, another inverter communication instruction cannot be executed.

12.4.4 Inverter communication error [M8152, M8153, M8157 and M8158]

These devices turn ON when an error occurs in an inverter communication instruction.

1. Detailed contents

M8152 or M8157 turn ON when an error occurs in an inverter communication instruction.

M8152 turn ON when an error occurs during communication using communication port ch1. When M8152 turn ON, D8152 stores the error code and D8153 stores the error step number.

M8157 turn ON when an error occurs during communication using communication port ch2. When M8157 turn ON, D8157 stores the error code and D8158 stores the error step number.

To D8152, D8153, D8157 and D8158 are updated only for the first error occurrence, and not for the second error occurrence or later.

2. Cautions on use

M8152 and M8157 do not turn OFF even if the communication recovers its normal status. Clear them by switching the PLC mode from STOP to RUN.

12.4.5 IVBWR instruction error [M8154 and M8159] (only in FX3U and FX3UC PLCs)

These devices turn ON when an error occurs in IVBWR instruction.

1. Detailed contents

M8154 or M8159 turns ON when a parameter number of set value specified in IVBWR instruction is outside the allowable range.

M8154 turns ON when an error occurs in IVBWR instruction using communication port ch1. When M8154 turns ON, D8154 stores the rejected parameter number.

M8159 turns ON when an error occurs in IVBWR instruction using the communication port ch2. When M8159 turns ON, D8159 stores the rejected parameter number.

2. Cautions on use

IVBWR instruction errors are not cleared even when communication is restored. Clear them by turning off and on the PLC.

12.4.6 Serial communication error code [D8063 and D8438]

These devices store the error code when the serial communication error flag turns ON.

1. Detailed contents

When an error occurs in an inverter communication instruction, D8063 or D8438 stores one of the following error codes.

Error	code	
ch1	ch2	Contents
D8063	D8438	
6301	3801	Parity error, framing error or overrun error
6320	3820	Inverter communication error

2. Cautions on use

Serial communication error codes are not cleared even when communication is restored. Clear them by switching the PLC mode from STOP to RUN.

12.4.7 Inverter response waiting time [D8150 and D8155]

These devices set the response waiting time of the inverter.

1. Detailed contents

Set the response waiting time of an inverter.

When using communication port ch1, set a value to D8150.

When using communication port ch2, set a value to D8155.

Set a value within the range from "1 to 32767" (unit: 100 ms).

If "0" or negative value is set, it is handled as "100 ms".

12.4.8 Step number of instruction using communication port [D8151 and D8156]

These devices store the step number of the instruction occupying the communication port.

1. Detailed contents.

D8151 or D8156 stores the step number of the inverter communication instruction using the communication

D8151 stores the step number using communication port ch1.

D8156 stores the step number using communication port ch2.

2. Cautions on use

A decimal value without sign is stored as the step number in D8151 and D8156.

12.4.9 Inverter communication error code [D8152 and D8157]

These devices store an error code when a communication error is caused by an inverter communication instruction.

1. Detailed contents

Special data registers shown below respectively store inverter communication errors, depending on each communication port.

- D8152 stores the error code of an error in communication using communication port ch1.
- D8157 stores the error code of an error in communication using communication port ch2.

2. Error codes

The following error codes are stored.

(DEC)		Inverter operation
0 No	Normal end (no error)	
1 In	nverter did not give response.	
2	imeout error. This code interlocks with M8156. Sending from inverter was aborted midway through.	
3 Ar	n unspecified station gave response.	
4 Th	he sum of data sent back by the inverter did not match.	
2 1	n writing or reading a parameter, an improper parameter number was specified. At this time, the error code K6706 is set to D8067.	_
6 us	Because the port is being used for another communication type, it cannot be used for communication with the inverter. At this time, the error code K6762 is set to D8067.	
/	A value outside the allowable range is set to the station number. At this time, error code (K6706) is set to D8067.	
8 Se	Sending to the inverter was not completed within the specified time.	
9 W	Vrong data was received from the inverter.	

Error code (DEC)	Contents of error	Inverter operation						
256	Inverter sent the error code H0. Computer NAK error. An error was included in the transfer request data from the computer beyond the allowable number of retries.							
257	Inverter sent the error code H1. Parity error. The contents are different from the specified parity.							
258	Inverter sent the error code H2. Sum check error. The sum check code in the computer is different from the sum value calculated from the data received by the inverter.	When errors have occurred consecutively beyond the allowable						
259	Inverter sent the error code H3. Protocol error. Syntax error is included in the data received by the inverter, and the receiving of data was not completed within the specified time, or CR/LF does not agree with the parameters.	number of retries, inverter is brought to an alarm stop.						
260	Inverter sent the error code H4. Framing error. The stop bit length is different from the initial set value.							
261	Inverter sent the error code H5. Overrun error. Before receiving the completed data in the inverter, the computer sent the next set of data.							
262	Inverter sent the error code H6. Not defined currently in inverter.	_						
263	Inverter sent the error code H7. Character error. An unused character (other than 0 to 9, A to F and control codes) is received.	Inverter does not accept the received data, but is not brought to an alarm stop.						
264	Inverter sent the error code H8. Not defined currently in inverter.							
265	Inverter sent the error code H9. Not defined currently in inverter.							
266	Inverter sent the error code HA. Mode error. A parameter was written in a mode other than computer link mode or while inverter was operating. Inverter does not accept the received data, but is not stopped by alarm.							
267	Inverter sent the error code HB. Instruction code error. Non-existing instruction code was specified.	the received data, but is not brought to an alarm						
268	Inverter sent the error code HC. Data range error. In writing a parameter or operation frequency, data outside the allowable range was specified. Inverter does not accept the received data, but is not stopped by alarm.							
269	Inverter sent the error code HD. Not defined currently in inverter.							
270	Inverter sent the error code HF							
271	Inverter sent the error code HF. Not defined currently in inverter.							

3. IVMC instruction error codes

When errors occur in the send data of the IVMC instruction, the following error codes are stored. It is recommended to check error codes in hexadecimal. Refer to the error code list earlier in this section for other errors.

	Error code (HEX)					
IVMC instruction error information b15 to b8	Send data2 error information b7 to b4	Send data1 error information b3 to b0	Contents of error	Inverter operation		
H00	HO	H0	No error has occurred in both send data 1 and send data 2. Normal end	_		
		НА	The inverter sent error code HA to send data 1 of the IVMC instruction. A parameter was written in a mode other than computer link mode or while the inverter was operating. The inverter did not accept the received data, but was not stopped by alarm.	The inverter accepts data corresponding to send data 2, and is not brought to an alarm stop. The inverter accepts data corresponding to send data 1, and is not brought to an alarm stop.		
	H0	НВ	The inverter sent error code HB to send data 1 of the IVMC instruction. Non-existing instruction code was specified.			
		HC	The inverter sent error code HC to send data 1 of the IVMC instruction. Data outside the allowable range was specified.			
H02	НА		The inverter sent error code HA to send data 2 of the IVMC instruction. A parameter was written in a mode other than computer link mode or while inverter was operating. The inverter did not accept the received data, but was not stopped by alarm.			
	НВ	H0	The inverter sent error code HB to send data 2 of the IVMC instruction. Non-existing instruction code was specified.			
	HC		The inverter sent error code HC to send data 2 of the IVMC instruction. Data outside the allowable range was specified.			
	HA to HC	HA to HC	The inverter sent error codes to both send data 1 and send data 2 of the IVMC instruction. Refer to the contents of the error of the corresponding error codes of send data 1 and send data 2 for details of error codes.	The inverter does not accept data corresponding to send data 1 and 2, but is not brought to an alarm stop.		

12.4.10 Inverter communication error occurrence step [D8153 and D8158]

These devices store the step number in which an inverter communication error has occurred.

1. Detailed contents

D8153 or D8158 stores the step number of the instruction causing an inverter communication error.

D8153 stores the step number in which an error has occurred in communication using communication port ch1.

D8158 stores the step number in which an error has occurred in communication using communication port ch2.

When errors that occurred in two or more instructions, D8153 or D8158 holds the step number in which the error occurred first.

When no error has occurred, D8153 or D8158 stores "-1".

2. Cautions on use

A decimal value without the sign is stored as the step number in D8153 and D8158.

12.4.11 IVBWR instruction error parameter number [D8154 and D8159] (only in FX3U and FX3UC PLCs)

These devices store the parameter number in which an error has occurred when IVBWR instruction error flag "M8154 or M8159" turns ON.

1. Detailed contents

D8154 or D8159 stores the parameter number which was not written by IVBWR instruction.

D8154 stores the parameter number which was not written in communication using communication port ch1. D8159 stores the parameter number which was not written in communication using communication port ch2. When errors that occurred in two or more IVBWR instructions, D8154 or D8159 holds the parameter number in which the error occurred first.

12.4.12 Operation mode display [D8419 and D8439]

These devices store the communication type being used.

1. Detailed contents

These devices store the code of the communication type currently being used in the communication port. When communication port ch1 is used, D8419 stores the communication type.

When communication port ch2 is used, D8439 stores the communication type.

The table below shows the contents of the communication type codes.

Code	Description
0	Programming communication
1	PP modem mode
2	Protocol dedicated to computer link
3	N:N Network
4	RS instruction
5	RS2 instruction
6	Parallel link
7	Inverter instruction
8	Variable analog potentiometer expansion board is used.
9	MODBUS communication
10	CF-ADP
11	ENET-ADP
12	Input/output expansion board is used.

12.5 FREQROL Inverter Parameter List

This section shows the list of parameters provided in FREQROL F800, A800, F700, A700, E700, V500, F500, A500, E500 and S500 Series inverters.

For details on each function, refer to the respective inverter manual.

12.5.1 Parameters in V500, F500, A500, E500, and S500 Series

The following parameters are provided in FREQROL inverters. (For details, make sure to refer to the respective inverter manual.)

	FRE	QROL V500 Series	FREC	QROL F500 Series	FRE	QROL A500 Series	FRE	QROL E500 Series	FREC	QROL S500 Series
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
	0	Torque boost (manual)	0	Torque boost	0	Torque boost*3	0	Torque boost*3	0	Torque boost*3
	1	Maximum speed (simple mode)	1	Maximum frequency						
	2	Minimum speed (simple mode)	2	Minimum frequency						
	3	Base frequency	3	Base frequency	3	Base frequency	3	Base frequency*3	3	Base frequency*3
Basic functions	4	Multi-speed setting (high speed) (simple mode)	4	Multi-speed setting (high speed)						
	5	Multi-speed setting (middle speed) (simple mode)	5	Multi-speed setting (middle speed)						
	6	Multi-speed setting (low speed) (simple mode)	6	Multi-speed setting (low speed)						
	7	Acceleration time (simple mode)	7	Acceleration time						
	8	Deceleration time (simple mode)	8	Deceleration time						
	9	Electronic thermal O/L relay	9	Electronic thermal O/L relay	9	Electronic thermal O/L relay	9	Electronic thermal O/L relay	9	Electronic thermal O/L relay
	10	DC injection brake operation speed	10	DC injection brake operation frequency						
	11	DC injection brake operation time	11	DC injection brake operation time	11	DC injection brake operation time	11	DC injection brake operation time	11	DC injection brake operation time
Standard operation	12	DC injection brake voltage	12	DC injection brake voltage	12	DC injection brake voltage	12	DC injection brake voltage	12	DC injection brake voltage
functions	13	Starting speed	13	Starting frequency						
	_	_	14	Load pattern selection	14	Load pattern selection*3	14	Load pattern selection*3	14	Load pattern selection*3
	15	Jog speed setting	15	Jog frequency						
	16	Jog acceleration/ deceleration time	16	Jog acceleration/ deceleration time	16	Jog acceleration/ deceleration time	16	Jog acceleration/ deceleration time	16	Jog acceleration/ deceleration time
Standard operation	17	MRS input selection	17	MRS input selection	17	MRS input selection	_	_	17	RUN key rotation direction selection
function (V500 Series operation	_	_	_	_	18	High speed maximum frequency	18	High speed maximum frequency	_	_
selection functions)	19	Base frequency voltage	19	Base frequency voltage	19	Base frequency voltage ^{*3}	19	Base frequency voltage ^{*3}	19	Base frequency voltage ^{*3}

	FRE	QROL V500 Series	FRE	QROL F500 Series	FRE	QROL A500 Series	FRE	QROL E500 Series	FRE	QROL S500 Series
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
	20	Acceleration/ deceleration reference speed	20	Acceleration/ deceleration reference frequency	20	Acceleration/ deceleration reference frequency	20	Acceleration/ deceleration reference frequency	20	Acceleration/ deceleration reference frequency
	21	Acceleration/ deceleration time increment	21	Acceleration/ deceleration time increment	21	Acceleration/ deceleration time increment	21	Acceleration/ deceleration time increment	21	Stall preventing function selection
	22	Torque restriction level	22	Stall prevention operation level	22	Stall prevention operation level	22	Stall prevention operation level	22	Stall prevention operation level
	_	_	23	Stall prevention operation level compensation factor at double speed	23	Stall prevention operation level compensation factor at double speed	23	Stall prevention operation level compensation factor at double speed	23	Stall prevention operation level compensation factor at double speed
	24	Multi-speed setting (speed 4)	24	Multi-speed setting (speed 4)	24	Multi-speed setting (speed 4)	24	Multi-speed setting (speed 4)	24	Multi-speed setting (speed 4)
	25	Multi-speed setting (speed 5)	25	Multi-speed setting (speed 5)	25	Multi-speed setting (speed 5)	25	Multi-speed setting (speed 5)	25	Multi-speed setting (speed 5)
	26	Multi-speed setting (speed 6)	26	Multi-speed setting (speed 6)	26	Multi-speed setting (speed 6)	26	Multi-speed setting (speed 6)	26	Multi-speed setting (speed 6)
	27	Multi-speed setting (speed 7)	27	Multi-speed setting (speed 7)	27	Multi-speed setting (speed 7)	27	Multi-speed setting (speed 7)	27	Multi-speed setting (speed 7)
Standard operation function	28	Multi-speed input compensation	28	Multi-speed input compensation	28	Multi-speed input compensation	_	_	28	Stall preventing operation reduction starting frequency
(V500 Series operation	29	Acceleration/ deceleration pattern	29	Acceleration/ deceleration pattern	29	Acceleration/ deceleration pattern	29	Acceleration/ deceleration pattern	29	Acceleration/ deceleration pattern
selection functions)	30	Regenerative function selection	30	Regenerative function selection	30	Regenerative function selection	30	Regenerative function selection	30	Extended function display selection
	31	Speed jump 1A	31	Frequency jump 1A	31	Frequency jump 1A	31	Frequency jump 1A	31	Frequency jump 1A
	32	Speed jump 1B	32	Frequency jump 1B	32	Frequency jump 1B	32	Frequency jump 1B	32	Frequency jump 1B
	33	Speed jump 2A	33	Frequency jump 2A	33	Frequency jump 2A	33	Frequency jump 2A	33	Frequency jump 2A
	34	Speed jump 2B	34	Frequency jump 2B	34	Frequency jump 2B	34	Frequency jump 2B	34	Frequency jump 2B
	35	Speed jump 3A	35	Frequency jump 3A	35	Frequency jump 3A	35	Frequency jump 3A	35	Frequency jump 3A
	36	Speed jump 3B	36	Frequency jump 3B	36	Frequency jump 3B	36	Frequency jump 3B	36	Frequency jump 3B
	37	Speed display	37	Speed display	37	Speed display	37	Speed display*8	37	Speed display*8
			38	Automatic torque boost			38	Frequency at 5V (10V) input	38	Frequency setting voltage gain frequency
	_	_	39	Automatic torque boost operation starting current	_	_	39	Frequency at 20mA input	39	Frequency setting current gain frequency
			_	_			_	_	40	Start-time ground fault detection selection
	41	Up-to-speed sensitivity	41	Up-to-frequency sensitivity	41	Up-to-frequency sensitivity	41	Up-to-frequency sensitivity	41	Up-to-frequency sensitivity
Output terminal	42	Speed detection	42	Output frequency detection	42	Output frequency detection	42	Output frequency detection	42	Output frequency detection
functions	43	Speed detection for reverse rotation	43	Output frequency detection for reverse rotation	43	Output frequency detection for reverse rotation	43	Output frequency detection for reverse rotation	43	Output frequency detection for reverse rotation

	FRE	QROL V500 Series	FRE	QROL F500 Series	FRE	QROL A500 Series	FRE	QROL E500 Series	FREQROL S500 Series	
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
	44	Second acceleration/ deceleration time	44	Second acceleration/ deceleration time	44	Second acceleration/ deceleration time	44	Second acceleration/ deceleration time	44	Second acceleration/ deceleration time
	45	Second deceleration time	45	Second deceleration time	45	Second deceleration time	45	Second deceleration time	45	Second deceleration time
			46	Second torque boost	46	Second torque boost*3	46	Second torque boost*3	46	Second torque boost*3
Second			47	Second V/F (base frequency)	47	Second V/F (base frequency)*3	47	Second V/F (base frequency)*3	47	Second V/F (base frequency)*3
functions	_	_	48	Second stall prevention operation current	48	Second stall prevention operation current	48	Second electronic thermal O/L relay		
			49	Second stall prevention operation frequency	49	Second stall prevention operation frequency	_	_	_	_
	50	Second speed detection	50	Second output frequency detection	50	Second output frequency detection				
	52	DU/PU main display data selection	52	DU/PU main display data selection	52	DU/PU main display data selection	52	Operation panel/ PU main display data selection	52	Control panel display data selection
	53	PU level display data selection	53	PU level display data selection	53	PU level display data selection	-	_	53	Frequency setting operation selection
Display functions	54	DA1 terminal function selection	54	FM terminal function selection	54	FM terminal function selection	54	FM terminal function selection	54	FM (AM) terminal function selection
	55	Speed monitoring reference	55	Frequency monitoring reference	55	Frequency monitoring reference	55	Frequency monitoring reference	55	Frequency monitoring reference
	56	Current monitoring reference	56	Current monitoring reference	56	Current monitoring reference	56	Current monitoring reference	56	Current monitoring reference
Restart	57	Restart coasting time	57	Restart coasting time	57	Restart coasting time	57	Restart coasting time	57	Restart coasting time
restart	58	Restart cushion time	58	Restart cushion time	58	Restart cushion time	58	Restart cushion time	58	Restart cushion time
Additional function	59	Remote setting function selection	59	Remote setting function selection	59	Remote setting function selection	59	Remote setting function selection	59	Remote setting function selection
	60	Intelligent mode selection	60	Intelligent mode selection	60	Intelligent mode selection	60	Shortest acceleration/ deceleration mode		
			61	Reference I for intelligent mode	61	Reference I for intelligent mode	61	Reference current		
			62	Reference I for intelligent mode acceleration	62	Reference I for intelligent mode acceleration	62	Reference current for acceleration	_	_
Operation selecting functions			63	Reference I for intelligent mode deceleration	63	Reference I for intelligent mode deceleration	63	Reference current for deceleration		
Tarrottorio			_	_	64	Starting frequency for elevator mode	_	_		
	65	Retry selection	65	Retry selection	65	Retry selection	65	Retry selection	66	Retry selection
		_	66	Stall prevention operation level reduction starting frequency	66	Stall prevention operation level reduction starting frequency	66	Stall prevention operation level reduction starting frequency	-	_
	67	Number of retries at alarm occurrence	67	Number of retries at alarm occurrence	67	Number of retries at alarm occurrence	67	Number of retries at alarm occurrence	67	Number of retries at alarm occurrence

	FRE	QROL V500 Series	FRE	QROL F500 Series	FRE	QROL A500 Series	FRE	QROL E500 Series	FREC	QROL S500 Series
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
	68	Retry waiting time	68	Retry waiting time						
	69	Retry count display erasure	69	Retry count display erasure	69	Retry count display erase	69	Retry count display erasure	69	Retry count display erase
	70	Special regenerative brake duty	_	_	70	Special regenerative brake duty	70	Special regenerative brake duty	-	_
	71	Applied motor	71	Applied motor						
	72	PWM frequency selection (simple mode)	72	PWM frequency selection	72	PWM frequency selection	72	PWM frequency selection	72	PWM frequency selection
	73	Speed setting signal	73	0 to 5V/0 to 10V selection	73	0 to 5V/0 to 10V selection	73	0 to 5V/0 to 10V selection	73	0 to 5V/0 to 10V selection
Operation	_	_	74	Filter time constant	74	Filter time constant	74	Filter time constant	74	Input filter time constant
selecting functions	75	Reset selection/ disconnected PU detection/PU stop selection	75	Reset selection/ PU stop selection						
	_	_	76	Alarm code output selection	76	Alarm code output selection		_		_
	77	Parameter write disable selection (simple mode)	77	Parameter write disable selection	77	Parameter write disable selection	77	Parameter write disable selection	77	Parameter write disable selection
	78	Reverse rotation prevention selection	78	Reverse rotation prevention selection						
	79	Operation mode selection (simple mode)	79	Operation mode selection	79	Operation mode selection	79	Operation mode selection	79	Operation mode selection
	80	Motor capacity			80	Motor capacity	80	Motor capacity		
	81	Number of motor poles			81	Number of motor poles	-	_		
	82	Motor excitation current (no load current)*1			82	Motor excitation current*5	82	Motor excitation current		
	83	Rated motor voltage			83	Rated motor voltage	83	Rated motor voltage		
	84	Rated motor frequency			84	Rated motor frequency	84	Rated motor frequency		
	_	_			89	Speed control gain	_	_		
Motor	90	Motor constant R1 ^{*1}	_	_	90	Motor constant (R1)*5	90	Motor constant (R1)	_	_
constant	91	Motor constant R2 ^{*1}			91	Motor constant (R2)*5				
	92	Motor constant L1 ^{*1}			92	Motor constant (L1)*5				
	93	Motor constant L2*1			93	Motor constant (L2)*5	_	_		
	94	Motor constant X*1			94	Motor constant (X)*5				
	95	Online auto tuning selection (simple mode)			95	Online auto tuning selection				
	96	Auto tuning setting/status			96	Auto tuning setting/status	96	Auto tuning setting/status		

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	FRE	QROL V500 Series	FRE	QROL F500 Series	FRE	QROL A500 Series	FRE	QROL E500 Series	FREC	ROL S500 Series
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
			100	V/F 1 (first frequency)	100	V/F 1 (first frequency)*3				
			101	V/F 1 (first frequency voltage)	101	V/F 1 (first frequency voltage)*3				
			102	V/F 2 (second frequency)	102	V/F 2 (second frequency)*3				
			103	V/F 2 (second frequency voltage)	103	V/F 2 (second frequency voltage)*3				_
5-point flexible		_	104	V/F 3 (third frequency)	104	V/F 3 (third frequency)*3			_	
V/F character- istics	_		105	V/F 3 (third frequency voltage)	105	V/F 3 (third frequency voltage)*3	_	_		
			106	V/F 4 (fourth frequency)	106	V/F 4 (fourth frequency)*3				
			107	V/F 4 (fourth frequency voltage)	107	V/F 4 (fourth frequency voltage)*3				
			108	V/F 5 (fifth frequency)	108	V/F 5 (fifth frequency)*3				
			109	V/F 5 (fifth frequency voltage)	109	V/F 5 (fifth frequency voltage)*3				
	110	Third acceleration /deceleration time			110	Third acceleration /deceleration time				
	111	Third deceleration time			111	Third deceleration time				
				_	112	Third torque boost*3				
					113	Third V/F (base frequency)*3		_	_	_
Third functions	_		_		114	Third stall prevention operation current				
					115	Third stall prevention operation frequency				
	116	Third speed detection			116	Third output frequency detection				
	117	Communication station number	117	Communication station number	117	Communication station number	117	Communication station number		
	118	Communication speed	118	Communication speed	118	Communication speed	118	Communication speed		
	119	Stop bit length/ data length	119	Stop bit length/ data length	119	Stop bit length/ data length	119	Stop bit length		
Communication functions	120	Parity check presence/ absence	120	Parity check presence/ absence	120	Parity check presence/ absence	120	Parity check presence/ absence	_	_
	121	Number of communication retries	121	Number of communication retries	121	Number of communication retries	121	Number of communication retries		
	122	Communication check time interval	122	Communication check time interval	122	Communication check time interval	122	Communication check time interval		

	FRE	QROL V500 Series	FRE	QROL F500 Series	FRE	QROL A500 Series	FRE	QROL E500 Series	FREC	QROL S500 Series
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
Communi-	123	Waiting time setting	123	Waiting time setting	123	Waiting time setting	123	Waiting time setting		
cation functions	124	CR and LF presence/absence selection	124	CR and LF presence/absence selection	124	CR and LF presence/absence selection	124	CR and LF presence/absence selection	l	_
	128	PID action selection	128	PID action selection	128	PID action selection	128	PID action selection	88	PID action selection
	129	PID proportional band	129	PID proportional band	129	PID proportional band	129	PID proportional band	89	PID proportional band
	130	PID integral time	130	PID integral time	130	PID integral time	130	PID integral time	90	PID integral time
PID	131	Maximum	131	Maximum	131	Maximum	131	Maximum	91	PID maximum
control	132	Minimum	132	Minimum	132	Minimum	132	Minimum	92	PID minimum
	133	PID action set point for PU operation	133	PID action set point for PU operation	133	PID action set point for PU operation	133	PID action set point for PU operation	93	PID action set point for PU operation
	134	PID differential time	134	PID differential time	134	PID differential time	134	PID differential time	94	PID differential time
			135	Commercial power supply- inverter switch- over sequence output terminal selection	135	Commercial power supply- inverter switch- over sequence output terminal selection				
Commer-			136	MC switch-over interlock time	136	MC switch-over interlock time				
cial power supply-			137	Start waiting time	137	Start waiting time				
inverter switch- over			138	Commercial power supply- inverter switch- over selection at alarm occurrence	138	Commercial power supply- inverter switch- over selection at alarm occurrence	_			
			139	Automatic inverter- commercial power supply switch- over frequency	139	Automatic inverter- commercial power supply switch- over frequency				
	140	Backlash acceleration stopping speed	140	Backlash acceleration stopping frequency*2	140	Backlash acceleration stopping frequency*2				
Backlash	141	Backlash acceleration stopping time	141	Backlash acceleration stopping time*2	141	Backlash acceleration stopping time*2	_	_	_	_
Dasillasii	142	Backlash deceleration stopping speed	142	Backlash deceleration stopping frequency*2	142	Backlash deceleration stopping frequency*2				
	143	Backlash deceleration stopping time	143	Backlash deceleration stopping time*2	143	Backlash deceleration stopping time*2				
Display	144	Speed setting switchover	144	Speed setting switchover	144	Speed setting switchover	_	_	_	_
functions	145	PU display language selection	145	PU display language selection	145	PU display language selection	145	PU display language selection	n13 (145)	PU display language

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	FREC	QROL V500 Series		QROL F500 Series		QROL A500 Series		QROL E500 Series	FREC	QROL S500 Series				
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name				
		_	_	_	_	_	146	Frequency setting command selection						
Additional functions	_		148	Stall prevention operation level at 0 V input	148	Stall prevention operation level at 0 V input		_	-	_				
			149	Stall prevention operation level at 10 V input	149	Stall prevention operation level at 10 V input								
	150	Output current detection level			150	Output current detection level	150	Output current detection level	48	Output current detection level				
Current detection	151	Output current detection period	_	_	151	Output current detection period	151	Output current detection period	49	Output current detection signal delay time				
detection	152	Zero current detection level	152	Zero current detection level	152	Zero current detection level	152	Zero current detection level	50	Zero current detection level				
	153	Zero current detection period	153	Zero current detection period	153	Zero current detection period	153	Zero current detection period	51	Zero current detection time				
	_	_	154	Voltage reduction selection during stall prevention operation	154	Voltage reduction selection during stall prevention operation	_	_						
Sub							155	RT activated condition	155	RT signal activated condition				
functions	156	Stall prevention operation selection	156	Stall prevention operation selection	156	Stall prevention operation selection	156	Stall prevention operation selection		_				
	157	OL signal output timer	157	OL signal output waiting time	157	OL signal waiting time								
	158	DA2 terminal function selection	158	AM terminal function selection	158	AM terminal function selection	_	_						
Additional function	160	Extended function selection (simple mode)	160	User group read selection	160	User group read selection	160	User group read selection	_	_				
Restart after	162	Automatic restart after instantaneous power failure selection	162	Automatic restart after instantaneous power failure selection	162	Automatic restart after instantaneous power failure selection								
instanta- neous	163	First cushion time for restart	163	First cushion time for restart	163	First cushion time for restart	_	_	_	_				
power failure	164	First cushion voltage for restart	164	First cushion voltage for restart	164	First cushion voltage for restart								
	165	Restart current restriction level	165	Restart stall prevention operation level	165	Restart stall prevention operation level								
Initial monitor	_	_	170	Watt-hour meter clear	170	Watt-hour meter clear	_	_						
value	171	Actual operation hour meter clear	171	Actual operation hour meter clear	171	Actual operation hour meter clear	171	Actual operation hour meter clear		_				
			173	User group 1 registration	173	User group 1 registration	173	User group 1 registration						
User		_	174	User group 1 deletion	174	User group 1 deletion	174	User group 1 deletion		_				
functions	_	_	175	User group 2 registration	175	User group 2 registration	175	User group 2 registration		_				
			176	User group 2 deletion	176	User group 2 deletion	176	User group 2 deletion						

	FRE	QROL V500 Series	FRE	QROL F500 Series	FRE	QROL A500 Series	FREC	QROL E500 Series	FREC	QROL S500 Series		
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name		
	180	DI1 terminal function selection	180	RL terminal function selection	180	RL terminal function selection	180	RL terminal function selection	60	RL terminal function selection		
	181	DI2 terminal function selection	181	RM terminal function selection	181	RM terminal function selection	181	RM terminal function selection	61	RM terminal function selection		
	182	DI3 terminal function selection	182	RH terminal function selection	182	RH terminal function selection	182	RH terminal function selection	62	RH terminal function selection		
	183	DI4 terminal function selection	183	RT terminal function selection	183	RT terminal function selection	183	MRS terminal function selection				
			184	AU terminal function selection	184	AU terminal function selection						
	_	_	185	JOG terminal function selection	185	JOG terminal function selection	_	_		_		
Terminal assignment			186	CS terminal function selection	186	CS terminal function selection						
functions	187	STR terminal function selection	_	_	_	_	_	_	63	STR terminal function selection		
	190	DO1 terminal function selection	190	RUN terminal function selection	190	RUN terminal function selection	190	RUN terminal function selection	64	RUN terminal function selection		
	191	DO2 terminal function selection	191	SU terminal function selection	191	SU terminal function selection	191	FU terminal function selection	_	_		
	192	DO3 terminal function selection	192	IPF terminal function selection	192	IPF terminal function selection	192	A/B/C terminal function selection	65	A/B/C terminal function selection		
	_				193	OL terminal function selection	193	OL terminal function selection				
		_	194	FU terminal function selection	194	FU terminal function selection	_	_	_	_		
	195	A/B/C terminal function selection	195	A/B/C terminal function selection	195	A/B/C terminal function selection						
Additional function	_	_	199	User's initial value setting	199	User's initial value setting	_	_		_		
						200	Programmed operation minute/ second selection					
					201	Program set 1						
						Program set 1						
					203	Program set 1						
					204	Program set 1						
						Program set 1						
						Program set 1						
						Program set 1						
						Program set 1						
						Program set 1						
Programmed	_	_	_	_		Program set 1	_	_	_	_		
operation						Program set 2						
						Program set 2						
						Program set 2						
						Program set 2 Program set 2						
						Program set 2						
						Program set 2						
						Program set 2						
						Program set 2						
						Program set 2						
						Program set 3						
						Program set 3						
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	·		FREQROL F500 Series		FREC	QROL A500 Series	FRE	QROL E500 Series	FREQROL S500 Serie			
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name		
					224	Program set 3						
					225	Program set 3						
					226	Program set 3						
Programmed	_	_	_	_	227	Program set 3		_	_	_		
operation					228	Program set 3						
					229	Program set 3						
					230	Program set 3						
					231	Timer setting						
	232	Multi-speed setting (speed 8)			232	Multi-speed setting (speed 8)	232	Multi-speed setting (speed 8)	80	Multi-speed setting (speed 8)		
	233	Multi-speed setting (speed 9)			233	Multi-speed setting (speed 9)	233	Multi-speed setting (speed 9)	81	Multi-speed setting (speed 9)		
	234	Multi-speed setting (speed 10)			234	Multi-speed setting (speed 10)	234	Multi-speed setting (speed 10)	82	Multi-speed setting (speed 10)		
Multi-	235	Multi-speed setting (speed 11)			235	Multi-speed setting (speed 11)	235	Multi-speed setting (speed 11)	83	Multi-speed setting (speed 11)		
speed operation	236	Multi-speed setting (speed 12)		_	236	Multi-speed setting (speed 12)	236	Multi-speed setting (speed 12)	84	Multi-speed setting (speed 12)		
	237	Multi-speed setting (speed 13)			237	Multi-speed setting (speed 13)	237	Multi-speed setting (speed 13)	85	Multi-speed setting (speed 13)		
	238	Multi-speed setting (speed 14)			238	Multi-speed setting (speed 14)	238	Multi-speed setting (speed 14)	86	Multi-speed setting (speed 14)		
	239	Multi-speed setting (speed 15)			239	Multi-speed setting (speed 15)	239	Multi-speed setting (speed 15)	87	Multi-speed setting (speed 15)		
	240	Soft-PWM setting	240	Soft-PWM setting	240	Soft-PWM setting	240	Soft-PWM setting	70	Soft-PWM setting		
	244	Cooling fan operation selection	244	Cooling fan operation selection	244	Cooling fan operation selection	244	Cooling fan operation selection	76	Cooling fan operation selection		
	_								245	Rated motor slip	95	Rated motor slip
				_			246	Slip compensation response time	96	Slip compensation time constant		
Sub functions			_		_	_	247	Constant-output region slip compensation selection	97	Constant-output region slip compensation selection		
							_	_	98	Automatic torque boost selection (motor capacity)		
							249	Earth (ground) fault detection at start*6	99	Motor primary resistance		
Stop selecting function	250	Stop selection	_	_	250	Stop selection	250	Stop selection	_	_		
Additional	251	Output phase failure protection selection	251	Output phase failure protection selection	251	Output phase failure protection selection	251	Output phase failure protection selection	-	_		
functions	252	Override bias	252	Override bias	252	Override bias						
	253	Override gain	253	Override gain	253	Override gain						
	261	Power failure stop selection			261	Power failure stop selection						
Power failure stop	262	Subtraction speed at deceleration start	_	_	262	Subtraction frequency at deceleration start	_	_	_	_		
functions	263	Subtraction starting speed			263	Subtraction starting frequency						
	264	Power-failure deceleration time 1			264	Power-failure deceleration time 1						

	FRE	QROL V500 Series	FRE	QROL F500 Series	FREC	QROL A500 Series	FREC	ROL E500 Series	FREC	QROL S500 Series
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
Power	265	Power-failure deceleration time 2			265	Power-failure deceleration time 2				
failure stop functions	266	Power-failure deceleration time switchover speed	_	_	266	Power-failure deceleration time switchover frequency	_	_	_	_
Function selection	_	_	_	_	270	Stop-on-contact/ load torque high speed frequency control selection		_	_	_
					271	High speed setting maximum current				
High speed frequency	_	_	_	_	272	Middle speed setting minimum current	_	_	_	_
control					273	Current averaging range				
					274	Current averaging filter constant				
Stop-on-	_	_	_	_	275	Stop-on-contact exciting current low speed multiplying factor		_	_	_
Contact					276	Stop-on-contact PWM carrier frequency				
	278	Brake opening speed			278	Brake opening frequency*4				
	279	Brake opening current				279	Brake opening current*4			
	280	Brake opening current detection time			280	Brake opening current detection time*4	_	_	_	_
Brake	281	Brake operation time at start		_	281	Brake operation time at start*4				
sequence function	282	Brake operation speed	_		282	Brake operation frequency*4				
	283	Brake operation time at stop			283	Brake operation time at stop*4				
	284	Deceleration detection function selection			284	Deceleration detection function selection*4				
	285	Overspeed detection speed			285	Overspeed detection frequency				
	286	Droop gain			286	Droop gain				
Droop control	287	Droop filter constant	_	_	287	Droop filter constant		_		_
functions	288	Droop function activation selection			_	_				
40 1.55	300	BCD input bias	300	BCD code input bias	300	BCD code input bias			_	_
12-bit digital input	301	BCD input gain	301	BCD code input gain	301	BCD code input gain	_	- -		
iiiput	302	Binary input bias	302 Binary input bias	302	Binary input bias		1			
	303	Binary input gain	303	Binary input gain	303	Binary input gain				

A Common Items	
B N:N Network	
C Parallel Link	
D Computer Link	
Inverter Communication	
Non-Protocol Communication (RS/RS2 Instruction)	
G Non-Protocol Communication (FX2N-232IF)	
Programming Communication	
Remote Maintenanc	

	FREQROL V500 Series						FREC	QROL E500 Series			
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	
12-bit digital input	304	Digital input and analog compensation input enable/ disable selection	304	Selection of whether digital input and analog compensation input are enabled or disabled	304	Selection of whether digital input and analog compensation input are enabled or disabled	_	_	_	_	
	305	Read timing operation selection	305	Data read timing signal on/off selection	305	Data read timing signal on/off selection					
	306	Analog output signal selection	306	Analog output signal selection	306	Analog output signal selection					
	307	Setting for zero analog output	307	Setting for zero analog output	307	Setting for zero analog output					
	308	Setting for maximum analog output	308	Setting for maximum analog output	308	Setting for maximum analog output					
	309	Analog output signal voltage/ current switchover	309	Analog output signal voltage/ current switchover	309	Analog output signal voltage/ current switchover					
Analog	310	Analog meter voltage output selection	310	Analog meter voltage output selection	310	Analog meter voltage output selection					
output/ digital output	311	Setting for zero analog meter voltage output	311	Setting for zero analog meter voltage output	311	Setting for zero analog meter voltage output	-	_	_	_	
	312	Setting for maximum analog meter voltage output	312	Setting for maximum analog meter voltage output	312	Setting for maximum analog meter voltage output					
	313	Y0 output selection	313	Y0 output selection	313	Y0 output selection					
	314	Y1 output selection	314	Y1 output selection	314	Y1 output selection					
	315	'	315	Y2 output selection	315	Y2 output selection					
	316	Y3 output selection	316	Y3 output selection	316	Y3 output selection					
	317	Y4 output selection	317	Y4 output selection	317	Y4 output selection					
		Y5 output selection	318	Y5 output selection	318	Y5 output selection					
	319	Y6 output selection RA1 output selection	319	Y6 output selection RA1 output selection	319	Y6 output selection RA1 output selection					
Relay output	321	RA2 output selection	321	RA2 output selection	321	RA2 output selection	_	_	_	_	
•	322	RA3 output selection	322	RA3 output selection	322	RA3 output selection					
Digital nput	329	Digital input unit selection	1	_	1	_	1		1	_	
Relay utput	330	RA output selection	330	RA output selection	330	RA output selection	_	_	_	_	
	331	Communication station number	331	Inverter station number	331	Communication station number			n1 (331)	Communication station number	
Computer link function (S500 Series communi- cation parameter)	332	Communication speed	332	Communication speed	332	Communication speed				Communication speed	
	333	Stop bit length/ data length	333	Stop bit length/ data length	333	Stop bit length/ data length	_	_		Stop bit length/ data length	
	334	Parity check presence/ absence	334	Parity check yes/ no	334	Parity check yes/ no			n4 (334)	Parity check presence/ absence	
	335	Number of communication retries	335	Communication retry count	335	Communication retry count			n5 (335)	Number of communication retries	

Apx.A Discontinued models

	FRE	QROL V500 Series	FRE	QROL F500 Series	FREC	QROL A500 Series	FREC	QROL E500 Series	FREC	ROL S500 Series
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
	336	Communication check time interval	336	Communication check time interval	336	Communication check time interval	_	_	n6 (336)	Communication check time interval
Computer	337	Waiting time setting	337	Waiting time setting	337	Waiting time setting			n7 (337)	Wait time setting
link function	338	Operation command source	338	Operation command write	338	Operation command right	338	Operation command source	n8 (338)	Operation command write
(S500 Series	339	Speed command source	339	Speed command write	339	Speed command write	339	Speed command source	n9 (339)	Speed command write
communi- cation	340	Link startup mode selection	340	Link startup mode selection	340	Link startup mode selection	340	Link startup mode selection	n10 (340)	Link start mode selection
parameter)	341	CR and LF presence/absence selection	341	CR and LF yes/no selection	341	CR and LF yes/no selection	_	_	n11 (341)	CR and LF selection
	342	E ² PROM write selection	342	E ² PROM write selection	342	E ² PROM write selection	342	E ² PROM write selection	n12 (342)	E ² PROM write selection
	345	DeviceNet address (lower)	345	DeviceNet address startup data (lower byte)	345	DeviceNet address startup data (lower byte)	345	DeviceNet address startup data (lower byte)		
DeviceNet	346	DeviceNet baud rate (lower)	346	DeviceNet baud rate startup data (lower byte)	346	DeviceNet baud rate startup data (lower byte)	346	DeviceNet baud rate startup data (lower byte)		
communi- cation	347	DeviceNet address (higher)			347	DeviceNet address startup data (higher byte)	347	DeviceNet address startup data (higher byte)	_	
	348	DeviceNet baud rate (higher)		_	348	DeviceNet baud rate startup data (higher byte)	348	DeviceNet baud rate startup data (higher byte)		
	350	Stop position command selection			350	Stop position command selection				
	351	Orientation switchover speed			351	Orientation switchover speed				
					352	Creep speed				
					353	Creep switch position				
	_	_			354	Position loop switchover position				
Orientation control/					355	DC injection start position				
encoder feedback	356	Internal stop position command	_	_	356	Internal stop position command	_	_	_	_
control/	357	In-position zone			357	In-position zone				
pulse train input	_	_			358	Servo torque selection				
	359	Orientation encoder rotation direction			359	Encoder rotation direction				
	360	External position command selection			360	12-bit data selection				
	361	Position shift			361	Position shift				
	362	Orientation position loop gain			362	Position loop gain				
	_	_			363	Completion signal output delay time				

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	Dr		FREC	QROL F500 Series	FREC	QROL A500 Series	·		FREQROL S500 Series	
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
					364	Encoder stop check time				
					365	Orientation censored limit				
	_	_			366	Reconfirmation time				
					367	Speed feedback range Feedback gain				
		Number of			368	Number of				
	369	orientation encoder pulse			369	orientation encoder pulse				
					370	Control mode selection				
	_	_			371	Torque characteristic selection				
Orientation					372	Speed control P gain				
control/ encoder feedback			_	_	373	Speed control I gain	_	_	_	_
control/ pulse train	374	Over-speed detection level			374	Over-speed detection level				
input					375	Servo lock gain				
		—			376	Disconnection detection selection				
	380	Acceleration S pattern 1			380	Acceleration S pattern 1				
	381	Deceleration S pattern 1			381	Deceleration S pattern 1				
	382	Acceleration S pattern 2			382	Acceleration S pattern 2				
	383	Deceleration S pattern 2			383	Deceleration S pattern 2				
	384	Input pulse division scaling factor			384	Input pulse division scaling factor				
	385	Speed for zero input pulse			385	Frequency for zero input pulse				
	386	Speed for maximum input pulse			386	Frequency for maximum input pulse				
			387	Initial communication delay time			387	Initial communication delay time		
			388	Send time interval at hart beat			388	Send time interval at hart beat		
LONWORKS			389	Minimum sending time at hart beat			389	Minimum sending time at hart beat		
communication		_	390	% setting reference frequency		_	390	% setting reference frequency	_	_
			391	Receive time interval at heart beat			391	Receive time interval at heart beat		
			392	Event-driven detection width			392	Event-driven detection width		

	FRE	QROL V500 Series	FREC	ROL F500 Series	FREC	ROL A500 Series	FREC	QROL E500 Series	FREC	ROL S500 Series
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
	393	Orientation selection								
	394	Number of machine side gear teeth								
	395	Number of motor side gear teeth								
Orientation selection	396	Orientation speed gain (P term)	_	_	_	_	_	_	_	_
	397	Orientation speed integral time								
	398	Orientation speed gain (D term)								
	399	Orientation deceleration ratio								
	400	DI11 terminal function selection								
	401	DI12 terminal function selection								
	402	DI13 terminal function selection								
	403	DI14 terminal function selection			_	_		_		
Extension input	404	DI15 terminal function selection	_	_						_
	405	DI16 terminal function selection								
	406	High resolution analog input selection								
	407	Motor temperature detection filter								
	410	DO11 terminal function selection								
Extension	411	DO12 terminal function selection								
output	412	DO13 terminal function selection	_	_	_	_	_	_	_	_
	413	Encoder pulse output division ratio								
	419	Position command source selection								
	420	Command pulse scaling factor numerator								
Positioning control	421	Command pulse scaling factor denominator	_	_	_	_	_	_	_	_
COHUOI	422	Position loop gain Position feed								
	423	forward gain								
	424	Position command acceleration/ deceleration time constant								

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S	Common Items
	ns B N:N Network
_	C Parallel Link
_	D Computer Link
	Ε
	Inverter Communication
_	Non-Protocol Communication (RS/RS2 Instruction)
	Non-Protocol Communication (FX2N-232IF)
_	H Programming Communication
	Remote Maintenance
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			FREC	QROL F500 Series	FREC	ROL A500 Series	FREC	ROL E500 Series	FREQROL S500 Series		
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	
	425	Position feed forward command filter									
	426	In-position width									
Positioning	427	Excessive level error									
control	428	Command pulse selection	_	_		_		_		_	
	429	Clear signal selection									
	430	Pulse monitor selection									
Torque	432	Pulse train torque command bias	_	_		_	_	_	_	_	
command	433	Pulse train torque command gain									
		IP address 1 IP address 2									
		IP address 3									
		IP address 4									
		Sub-net mask 1									
	439	Sub-net mask 2									
Position control	440	Sub-net mask 3	_	_	_	_	_	_	_	_	
ontiol	441	Sub-net mask 4									
	442	Gateway address 1									
	443	Gateway address 2									
	444	Gateway address 3									
	445	Gateway address 4									
	446	Password									
Torque	447	Digital torque command bias	_	_	_	_	_	_	_	_	
command	448	Digital torque command gain									
	450	Second applied motor Second motor									
Motor	451	control method selection									
constant	452	Second electronic thermal O/L relay	_	_	_	_	_	_	_	_	
	453	Second motor capacity									
	454	Number of second motor poles									
	464	Digital position control sudden stop deceleration time									
Position	465	First position feed amount lower 4 digits				_	_	_	_	_	
control	466	First position feed amount upper 4 digits	_								
	467	Second position feed amount lower 4 digits									

	FRE	QROL V500 Series	FREC	QROL F500 Series	FREC	QROL A500 Series	FREC	QROL E500 Series	FREC	QROL S500 Series
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
	468	Second position feed amount upper 4 digits								
	469	Third position feed amount lower 4 digits								
	470	Third position feed amount upper 4 digits								
	471	Fourth position feed amount lower 4 digits								
	472	Fourth position feed amount upper 4 digits								
	473	digits								
	474	Fifth position feed amount upper 4 digits								
	475	Sixth position feed amount lower 4 digits								
	476	Sixth position feed amount upper 4 digits			_					
Position	477	Seventh position feed amount lower 4 digits								
control	478	Seventh position feed amount upper 4 digits		_		_	_	_	_	_
	479	Eighth position feed amount lower 4 digits								
	480	Eighth position feed amount upper 4 digits								
	481	Ninth position feed amount lower 4 digits								
	482	Ninth position feed amount upper 4 digits								
	483	Tenth position feed amount lower 4 digits								
	484	Tenth position feed amount upper 4 digits								
	485	Eleventh position feed amount lower 4 digits								
	486	Eleventh position feed amount upper 4 digits								
	487	Twelfth position feed amount lower 4 digits								

		Common Items
	E	N:N Network
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		Computer Link
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	nication	F
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(RS/RS2 Instruction)	nication Communication	F Non-P
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RS2 Instruction)	nication Communication	Non-Protocol
RS2 Instruction)	nication Communication	Non-Protocol

	Pr		FRE	QROL F500 Series	FRE	QROL A500 Series	FRE	QROL E500 Series	FREQROL S500 Series		
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	
	488	Twelfth position feed amount upper 4 digits									
	489	Thirteenth position feed amount lower 4 digits									
	490	Thirteenth position feed amount upper 4 digits									
Position control	491	Fourteenth position feed amount lower 4 digits	_	_	_	_	_	_	_	_	
	492	Fourteenth position feed amount upper 4 digits									
	493	Fifteenth position feed amount lower 4 digits									
	494	Fifteenth position feed amount upper 4 digits									
	495	Remote output selection									
Remote output	496	Remote output data 1	_	_	_	_	_	_	_	_	
	497	Remote output data 2									
	499	Action selection at SSCNET communication interruption	_	_	_	_	_	_			
Communi- cation (F500 Series	500	Communication error recognition waiting time	500	Auxiliary motor operation	500	Communication error recognition waiting time	500	Communication error recognition waiting time			
Advanced PID control functions)	501	Communication error occurrence count display	501	Motor switch-over selection	501	Communication error occurrence count display	501	Communication error occurrence count display		_	
,	502	Stop mode selection at communication error	502	MC switching interlock time	502	Communication error-time stop mode selection	502	Stop mode selection at communication error			
			503	Start waiting time	503	Capacitor life timer					
			504	Auxiliary motor connection-time deceleration time	504	Capacitor life alarm output setting time					
Capacitor life (F500			505	Auxiliary motor disconnection-time acceleration time							
Series Advanced	_	_	506	Output stop detection time			_	_	_	_	
PID control functions)			507	Output stop detection level	_	_					
			508	Output stop cancel process value level							
			509	Auxiliary motor 1 starting frequency							

	FRE	QROL V500 Series	FREC	QROL F500 Series	FREC	QROL A500 Series	FREC	ROL E500 Series	FREC	QROL S500 Series
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
Capacitor				Auxiliary motor 2 starting frequency Auxiliary motor 3 starting frequency Auxiliary motor 1 stopping						
life (F500 Series Advanced PID control functions)	_	_	513	frequency Auxiliary motor 2 stopping frequency Auxiliary motor 3 stopping frequency	_	_		_	-	_
			515 516	Auxiliary motor start delay time Auxiliary motor start delay time						
Restart after instanta- neous power failure	_	_	_	_	611	Restart acceleration time		_	_	_
	800	Control system selection (simple mode)			_					
	801	Torque characteristic selection							_	_
	802	Pre-excitation selection								
Operation	803	Constant output region torque characteristic selection					_	_		
selecting function	804	Torque command source selection	_	_						
	805	Torque command source (RAM)								
	806	Torque command source (RAM, EEPROM)								
	807	Speed restriction selection								
	808	Forward rotation speed restriction								
	809	Reverse rotation speed restriction								
Construct	810	Torque restriction input method selection								
Control system function	812	Torque restriction level (regeneration)								
(A500 Series vector control)	813	Torque restriction level (3rd quadrant)	_	-	_	_		_		_
	814	Torque restriction level (4th quadrant)								

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	N:N Network
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	C Parallel Link
	D
	Computer Link
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	Inverter Communication
	F
	Non-Protocol Communication (RS/RS2 Instruction)
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	FRE	QROL V500 Series	FREC	QROL F500 Series	FREC	QROL A500 Series	FREC	QROL E500 Series	FREC	ROL S500 Series
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
	815	Torque restriction level 2			_	_				
	816	Acceleration			816	Acceleration torque restriction level				
	817	Deceleration torque restriction level			817	Deceleration torque restriction level				
	818	Easy gain tuning response level setting (simple mode)								
	819	Easy gain tuning selection (simple mode)								
	820	Speed control P gain 1								
	821	Speed control integral time 1								
	822	Speed setting filter 1								
Control	823	Speed detection filter 1								
system function	824	Torque control P gain 1		_	_					
(A500 Series vector	825	Torque control integral time 1					_	_	_	_
control)	826	Torque setting filter 1								
	827	Torque detection filter 1				_				
	828	Model speed control gain								
	830	Speed control P gain 2								
	831	Speed control integral time 2								
	832	Speed setting filter 2								
	833	Speed detection filter 2								
	834	Torque control P gain 2								
	835	Torque control integral time 2								
	836	Torque setting filter 2								
	837	Torque detection filter 2								
	840	Torque bias selection								
	841	Torque bias 1								
Torque	842	Torque bias 2								
biases	843	Torque bias 3	_	_	_	_	_	_	_	_
	844	Torque bias filter								
	845	Torque bias operation time								

Function Pr		FRE	QROL V500 Series	FREC	QROL F500 Series	FREC	QROL A500 Series	FREC	QROL E500 Series	FREC	ROL S500 Series
846 balance	Function		Name		Name		Name		Name		Name
Second Part		846	balance compensation								
848 Fall-time torque Sajan Saj		847		_	_	_	_	_	_	_	_
Number of encoder pulses	biases	848									
Social encoder pulses Social encoder pulses Social encoder rotation Step Encoder rotation Step Encoder rotation Step Encoder rotation Step Social encoder		849	offset adjustment								
Seed Excitation ratio Seed Excitation ratio Seed Excitation ratio Seed Excitation ratio Seed S		851	encoder pulses								
Additional 859 Torque current		852									
Sec		854	Excitation ratio								
862 frequency 863 Notch filter depth 864 Torque detection 865 Low speed detection 866 Low speed detection 867 Torque monitoring reference 887 All output filter 888 No. 1 terminal assignment 888 function assignment 888 function assignment 870 Speed deviation level 874 OLT level setting 875 Speed restriction 876 Torque setting 877 Speed feed forward/model adaptive speed control selection 877 Speed feed forward/model adaptive speed control selection 878 Speed feed forward filter 879 Speed feed forward filter 879 Speed feed forward for the speed control selection 880 Load inertia ratio 880 Load inertia ratio Speed feed forward gain 880 Speed feed forward gain 880 Speed feed forward gain 880 Maintenance 881 Maintenance 881 Maintenance 881 Maintenance 881 Maintenance 881 Maintenance 881 Maintenance 882 Maintenance Maintenance 881 Maintenance Maintenance 882 Maintenance Maintenance 883 Maintenance 884 Maintenance 884 Maintenance 885 Maintenance 886 Maintenance 887 Maintenance 888 Maintenance 889 Maintenance 889 Maintenance 880 Maintenanc	Additional	859	Torque current								
864 Torque detection 865 Low speed	functions	862			_		_		_		_
B65		863	Notch filter depth								
Display See Torque monitoring reference See DA1 output filter See		864	Torque detection								
Display functions Rot		865									
Second Protection Seco		866		_	_	_	_	_	_	_	_
Assignment See Speed deviation Speed dev	tunctions	867	DA1 output filter								
Protection functions	assign- ment	868	function	_	_		_	_	_	_	_
functions 871 time time 373 Speed restriction 374 OLT level setting 375 Fault definition 376 Fault definition 377 Fault definition 377 Fault definition 378 Faul		870	level								
S74 OLT level setting		871	time	_	_	_	_	_	_	_	_
Speed feed forward/model adaptive speed control system functions Speed feed forward/model adaptive speed control system functions Speed feed forward filter Speed feed forward torque restriction Speed feed forward did not											
Selecting functions			-								
Speed feed Spe		875									
Speed feed forward filter Speed feed forward torque restriction		876	protector input						_		_
Control system functions 878 forward filter Speed feed forward torque restriction 880 Load inertia ratio 881 Speed feed forward gain Maintenance functions Maintenance output setting time 891 Maintenance output timer 892 Maintenance		877	forward/model adaptive speed								
functions 879 Speed feed forward torque restriction 880 Load inertia ratio 881 Speed feed forward gain 890 Maintenance output setting time 891 Maintenance output timer 892 Maintenance 893 Maintenance 894 Maintenance 895 Maintenance 896 Maintenance 897 Maintenance		878									
881 Speed feed forward gain 890 Maintenance output setting time 891 Maintenance output timer 892 Maintenance			forward torque restriction	_	_		_	_	_	_	_
Maintenance functions Maintenance output setting time 891 Maintenance output timer 892 Maintenance		880									
Maintenance functions Maintenance output setting time 891 Maintenance output timer 892 Maintenance		881									
functions output timer output t		890									
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	FRE	QROL V500 Series	FREC	QROL F500 Series	FREC	QROL A500 Series	FREC	QROL E500 Series	FREC	QROL S500 Series
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
	900	DA1 terminal calibration	900	FM terminal calibration	900	FM terminal calibration	900	FM terminal calibration	C1 (900 (901))	FM (AM) terminal calibration
	901	DA2 terminal calibration	901	AM terminal calibration	901	AM terminal calibration	_	_	_	_
	902	Speed setting No. 2 bias	902	Frequency setting voltage bias	902	Frequency setting voltage bias	902	Frequency setting voltage bias	C2 (902)	Frequency setting voltage bias frequency
		Z Sido		voltage blas		voltage blad		voltago blas	C3 (902)	_
	903	Speed setting No. 2 gain	903	Frequency setting voltage gain	903	Frequency setting voltage gain	903	Frequency setting voltage gain	C4 (903)	Frequency setting voltage gain
	904	Torque command No. 3 bias	904	Frequency setting current bias	904	Frequency setting current bias	904	Frequency setting current bias	C5 (904)	Frequency setting current bias frequency
									C6 (904)	Frequency setting current bias
	905	Torque command No. 3 gain	905	Frequency setting current gain	905	Frequency setting current gain	905	Frequency setting current gain	C7 (905)	Frequency setting current gain
	_	_							C8 (269)	Parameter set by manufacturer. Do not set.
	917	No. 1 terminal bias (speed)								
Calibration	918	No. 1 terminal gain (speed)					_	_		
functions	919	No. 1 terminal bias (torque/								
		magnetic flux) No. 1 terminal	·							
	920	gain (torque/ magnetic flux)								
			_	_	_	-	922	Built-in frequency setting potentiometer bias*7		
		_					923	Built-in frequency setting potentiometer gain*7	_	_
	925	Motor temperature detection calibration								
	926	No. 6 terminal bias (speed)								
	927	No. 6 terminal gain (speed)					_	_		
	928	No. 6 terminal bias (torque)								
	929	No. 6 terminal gain (torque)								
	990	PU buzzer control	990	PU buzzer control	990	PU Buzzer control	990	PU buzzer control		PU buzzer sound control
Additional functions	991	PU contrast adjustment	991	PU contrast adjustment	991	PU contrast adjustment	991	PU contrast adjustment		PU contrast adjustment
. anotions	_	_	_	_	_	_	_	_	n16 (992)	PU main display screen data selection

	FREC	QROL V500 Series	FREC	QROL F500 Series	FREC	QROL A500 Series	FREC	QROL E500 Series	FREC	QROL S500 Series
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
Additional functions	_	_	_	_	_	_	_	_	n17 (993)	PU disconnection detection/PU setting lock

The parameters Pr. 77 and Pr. 79 cannot be written in computer link operation using the FR-A5NR.

- *1. Can be read or written when the parameter Pr. 77 is set to "801".
- *2. Can be read or written when the parameter Pr. 29 is set to "3".
- *3. Indicates a parameter whose setting is ignored when the advanced magnetic flux vector control mode is selected.
- *4. Can be set when the parameters Pr. 80 and Pr. 81 are not set to "9999" and the parameter Pr. 60 is set to "7" or "8".
- *5. Can be read or written when the parameters Pr. 80 and Pr. 81 are not set to "9999" and the parameter Pr. 77 is set to "801".
- *6. Can be set only in the 200 V/100 V class.
- *7. Cannot be used in inverter communication.
- *8. This inverter communication function cannot read or write Pr. 37.

 Set Pr. 37 to "0" when setting or monitoring the frequency in the PLC.

 If any value other than "0" is set to Pr. 37 and the instruction code HFF is set to "01", the frequency may not be set or monitored normally (in the 400 V class of the E500 series and S500 series).

 (In the 200 V and 100 V classes of the E500 series, the frequency may not be set or monitored normally if any value other than "0" is set to Pr. 37 without regard to the setting of the instruction code HFF.)

12.5.2 Parameters in F700, A700, E700 and D700 Series

The following parameters are provided in the F700, A700, E700 and D700 Series inverters. (For details, make sure to refer to the respective inverter manual.)

	FI	REQROL F700 Series	F	REQROL A700 Series	F	REQROL E700 Series	FREQROL D700 Series		
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	
	0	Torque boost	0	Torque boost	0	Torque boost	0	Torque boost	
	1	Maximum frequency	1	Maximum frequency	1	Maximum frequency	1	Maximum frequency	
	2	Minimum frequency	2	Minimum frequency	2	Minimum frequency	2	Minimum frequency	
	3	Base frequency	3	Base frequency	3	Base frequency	3	Base frequency	
	4	Multi-speed setting (high speed)	4	Multi-speed setting (high speed)	4	Multi-speed setting (high speed)	4	Multi-speed setting (high speed)	
Basic functions	5	Multi-speed setting (middle speed)	5	Multi-speed setting (middle speed)	5	Multi-speed setting (middle speed)	5	Multi-speed setting (middle speed)	
	6	Multi-speed setting (low speed)	6	Multi-speed setting (low speed)	6	Multi-speed setting (low speed)	6	Multi-speed setting (low speed)	
	7	Acceleration time	7	Acceleration time	7	Acceleration time	7	Acceleration time	
	8	Deceleration time	8	Deceleration time	8	Deceleration time	8	Deceleration time	
	9	Electronic thermal O/L relay	9	Electronic thermal O/L relay	9	Electronic thermal O/L relay	9	Electronic thermal O/L relay	
	10	DC injection brake operation frequency	10	DC injection brake operation frequency	10	DC injection brake operation frequency	10	DC injection brake operation frequency	
DC injection brake	11	DC injection brake operation time	11	DC injection brake operation time	11	DC injection brake operation time	11	DC injection brake operation time	
	12	DC injection brake operation voltage	12	DC injection brake operation voltage	12	DC injection brake operation voltage	12	DC injection brake operation voltage	
_	13	Starting frequency	13	Starting frequency	13	Starting frequency	13	Starting frequency	
_	14	Load pattern selection	14	Load pattern selection	14	Load pattern selection	14	Load pattern selection	
	15	Jog frequency	15	Jog frequency	15	Jog frequency	15	Jog frequency	
Jog operation	16	Jog acceleration/ deceleration time	16	Jog acceleration/ deceleration time	16	Jog acceleration/ deceleration time	16	Jog acceleration/ deceleration time	
_	17	MRS input selection	17	MRS input selection	17	MRS input selection	17	MRS input selection	
_	18	High speed maximum frequency	18	High speed maximum frequency	18	High speed maximum frequency	18	High speed maximum frequency	
_	19	Base frequency voltage	19	Base frequency voltage	19	Base frequency voltage	19	Base frequency voltage	
Acceleration/	20	Acceleration/ deceleration reference frequency	20	Acceleration/ deceleration reference frequency	20	Acceleration/ deceleration reference frequency	20	Acceleration/ deceleration reference frequency	
times	21	Acceleration/ deceleration time increments	21	Acceleration/ deceleration time increments	21	Acceleration/ deceleration time increments		_	
	22	Stall prevention operation level	22	Stall prevention operation level (torque limit level)	22	Stall prevention operation level	22	Stall prevention operation level	
Stall prevention	23	Stall prevention operation level compensation factor at double speed	23	Stall prevention operation level compensation factor at double speed	23	Stall prevention operation level compensation factor at double speed	23	Stall prevention operation level compensation factor at double speed	
	24	Multi-speed setting (speed 4)	24	Multi-speed setting (speed 4)	24	Multi-speed setting (speed 4)	24	Multi-speed setting (speed 4)	
Multi-speed	25	Multi-speed setting (speed 5)	25	Multi-speed setting (speed 5)	25	Multi-speed setting (speed 5)	25	Multi-speed setting (speed 5)	
setting	26	Multi-speed setting (speed 6)	26	Multi-speed setting (speed 6)	26	Multi-speed setting (speed 6)	26	Multi-speed setting (speed 6)	
	27	Multi-speed setting (speed 7)	27	Multi-speed setting (speed 7)	27	Multi-speed setting (speed 7)	27	Multi-speed setting (speed 7)	
_	28	Multi-speed input compensation selection	28	Multi-speed input compensation selection	_	_	_	_	

	FI	REQROL F700 Series	FI	REQROL A700 Series	FI	REQROL E700 Series	FREQROL D700 Series		
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	
_	29	Acceleration/ deceleration pattern selection	29	Acceleration/ deceleration pattern selection	29	Acceleration/ deceleration pattern selection	29	Acceleration/ deceleration pattern selection	
_	30	Regenerative function selection	30	Regenerative function selection	30	Regenerative function selection	30	Regenerative function selection	
	31	Frequency jump 1A	31	Frequency jump 1A	31	Frequency jump 1A	31	Frequency jump 1A	
	32	Frequency jump 1B	32	Frequency jump 1B	32	Frequency jump 1B	32	Frequency jump 1B	
Frequency jump	33	Frequency jump 2A	33	Frequency jump 2A	33	Frequency jump 2A	33	Frequency jump 2A	
	34	Frequency jump 2B	34	Frequency jump 2B	34	Frequency jump 2B	34	Frequency jump 2B	
	35	Frequency jump 3A	35	Frequency jump 3A	35	Frequency jump 3A	35	Frequency jump 3A	
	36	Frequency jump 3B	36	Frequency jump 3B	36	Frequency jump 3B	36	Frequency jump 3B	
_	37	Speed display	37	Speed display	37	Speed display*1	37	Speed display*1	
_	_	_	_	_	40	RUN key rotation direction selection	40	RUN key rotation direction selection	
	41	Up-to-frequency sensitivity	41	Up-to-frequency sensitivity	41	Up-to-frequency sensitivity	41	Up-to-frequency sensitivity	
Frequency detection	42	Output frequency detection	42	Output frequency detection	42	Output frequency detection	42	Output frequency detection	
	43	Output frequency detection for reverse rotation	43	Output frequency detection for reverse rotation	43	Output frequency detection for reverse rotation	43	Output frequency detection for reverse rotation	
	44	Second acceleration/ deceleration time	44	Second acceleration/ deceleration time	44	Second acceleration/ deceleration time	44	Second acceleration/ deceleration time	
	45	Second deceleration time	45	Second deceleration time	45	Second deceleration time	45	Second deceleration time	
	46	Second torque boost	46	Second torque boost	46	Second torque boost	46	Second torque boost	
Second	47	Second V/F (base frequency)	47	Second V/F (base frequency)	47	Second V/F (base frequency)	47	Second V/F (base frequency)	
functions	48	Second stall prevention operation current	48	Second stall prevention operation current	48	Second stall prevention operation current	48	Second stall prevention operation current	
	49	Second stall prevention operation frequency	49	Second stall prevention operation frequency	_	_	_	_	
	50	Second output frequency detection	50	Second output frequency detection					
	51	Second electronic thermal O/L relay	51	Second electronic thermal O/L relay	51	Second electronic thermal O/L relay	51	Second electronic thermal O/L relay	
	52	DU/PU main display data selection	52	DU/PU main display data selection	52	DU/PU main display data selection	52	DU/PU main display data selection	
Monitor	54	FM terminal function selection	54	FM terminal function selection	54	FM terminal function selection	54	FM terminal function selection	
functions	55	Frequency monitoring reference	55	Frequency monitoring reference	55	Frequency monitoring reference	55	Frequency monitoring reference	
	56	Current monitoring reference	56	Current monitoring reference	56	Current monitoring reference	56	Current monitoring reference	
Automatic	57	Restart coasting time	57	Restart coasting time	57	Restart coasting time	57	Restart coasting time	
restart functions	58	Restart cushion time	58	Restart cushion time	58	Restart cushion time	58	Restart cushion time	
_	59	Remote function selection	59	Remote function selection	59	Remote function selection	59	Remote function selection	
_	60	Energy saving control selection	60	Energy saving control selection	60	Energy saving control selection	60	Energy saving control selection	

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Inverter Communication

Non-Protocol
Communication
(RS/RS) Instruction

Non-Protocol
Communication

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	FI	REQROL F700 Series	F	REQROL A700 Series	FI	REQROL E700 Series	FI	REQROL D700 Series
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
			61	Reference current	61	Reference current		
Automatic			62	Reference value at acceleration	62	Reference value at acceleration		
acceleration /deceleration	_	_	63	Reference value at deceleration	63	Reference value at deceleration	_	_
			64	Starting frequency for elevator mode	_	_		
_	65	Retry selection						
_	66	Stall prevention operation reduction starting frequency	66	Stall prevention operation reduction starting frequency	66	Stall prevention operation reduction starting frequency	66	Stall prevention operation reduction starting frequency
	67	Number of retries at alarm occurrence	67	Number of retries at alarm occurrence	67	Number of retries at fault occurrence	67	Number of retries at fault occurrence
Retry	68	Retry waiting time						
	69	Retry count display erase						
_	70	Special regenerative brake duty						
_	71	Applied motor						
_	72	PWM frequency selection						
_	73	Analog input selection						
_	74	Input filter time constant						
_	75	Reset selection/ disconnected PU detection/PU stop selection						
_	76	Alarm code output selection	76	Alarm code output selection	_	_	_	_
_	77	Parameter write selection						
_	78	Reverse rotation prevention selection						
_	79	Operation mode selection						
	80	Motor capacity (simple magnetic flux vector control)	80	Motor capacity	80	Motor capacity	80	Motor capacity
			81	Number of motor poles	81	Number of motor poles	I	_
Simple magnetic			82	Motor excitation current	82	Motor excitation current	82	Motor excitation current
flux vector			83	Motor rated voltage	83	Motor rated voltage	83	Motor rated voltage
control	_	_	84	Rated motor frequency	84	Rated motor frequency	84	Rated motor frequency
			89	Speed control gain (magnetic flux vector)	89	Speed control gain (advanced magnetic flux vector)	_	_
	90	Motor constant (R1)						
			91	Motor constant (R2)	91	Motor constant (R2)		
			92	Motor constant (L1)	92	Motor constant (L1)		
			93	Motor constant (L2)	93	Motor constant (L2)	_	_
_	_	_	94	Motor constant (X)	94	Motor constant (X)		
			95	Online auto tuning selection		_		
			96	Auto tuning setting/ status	96	Auto tuning setting/ status	96	Auto tuning setting/ status

	F	REQROL F700 Series	F	REQROL A700 Series	FI	REQROL E700 Series	FREQROL D700 Series		
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	
	100	V/F1 (first frequency)	100	V/F1(first frequency)					
	101	V/F1 (first frequency voltage)	101	V/F1(first frequency voltage)					
	102	V/F2 (second frequency)	102	V/F2(second frequency)					
	103	V/F2 (second frequency voltage)	103	V/F2(second frequency voltage)					
Adjustable 5	104	V/F3 (third frequency)	104	V/F3(third frequency)					
points V/F	105	V/F3 (third frequency voltage)	105	V/F3(third frequency voltage)					
	106	V/F4 (fourth frequency)	106	V/F4(fourth frequency)					
	107	V/F4 (fourth frequency voltage)	107	V/F4(fourth frequency voltage)					
	108	V/F5 (fifth frequency)	108	V/F5(fifth frequency)	_	_	_	_	
	109	V/F5 (fifth frequency voltage)	109	V/F5(fifth frequency voltage)					
			110	Third acceleration/ deceleration time					
			111	Third deceleration time					
			112	Third torque boost					
Third	_	_	113	Third V/F (base frequency)					
functions			114	Third stall prevention operation current					
			115	Third stall prevention operation frequency					
			116	Third output frequency detection					
	117	PU communication station	117	PU communication station number	117	PU communication station number	117	PU communication station number	
	118	PU communication speed	118	PU communication speed	118	PU communication speed	118	PU communication speed	
	119	PU communication stop bit length.	119	PU communication stop bit length	119	PU communication stop bit length	119	PU communication stop bit length	
PU connector	120	PU communication parity check	120	PU communication parity check	120	PU communication parity check	120	PU communication parity check	
communication	121	Number of PU communication retries	121	Number of PU communication retries	121	Number of PU communication retries	121	Number of PU communication retries	
	122	PU communication check time interval	122	PU communication check time interval	122	PU communication check time interval	122	PU communication check time interval	
	123	PU communication waiting time setting	123	PU communication waiting time setting	123	PU communication waiting time setting	123	PU communication waiting time setting	
	124	PU communication CR/ LF presence/absence selection	124	PU communication CR/ LF presence/absence selection	124	PU communication CR/LF selection	124	PU communication CR/LF selection	
_	125	Terminal 2 frequency setting gain frequency	125	Terminal 2 frequency setting gain frequency	125	Terminal 2 frequency setting gain frequency	125	Terminal 2 frequency setting gain frequency	
_	126	Terminal 4 frequency setting gain frequency	126	Terminal 4 frequency setting gain frequency	126	Terminal 4 frequency setting gain frequency	126	Terminal 4 frequency setting gain frequency	

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Inverter Communication

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(RS/RS2 Instruction)

Non-Protocol
Communication

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	FI	REQROL F700 Series		REQROL A700 Series		REQROL E700 Series	FREQROL D700 Series		
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	
	127	PID control automatic switchover frequency	127	PID control automatic switchover frequency	127	PID control automatic switchover frequency	127	PID control automatic switchover frequency	
	128	PID action selection	128	PID action selection	128	PID action selection	128	PID action selection	
	129	PID proportional band	129	PID proportional band	129	PID proportional band	129	PID proportional band	
PID operation	130	PID integral time	130	PID integral time	130	PID integral time	130	PID integral time	
	131	PID maximum	131	PID upper limit	131	PID upper limit	131	PID upper limit	
	132	PID minimum	132	PID lower limit	132	PID lower limit	132	PID lower limit	
	133	PID action set point	133	PID action set point	133 PID action set point		133	PID action set point	
	134	PID differential time	134	PID differential time	134	PID differential time	134	PID differential time	
	135	Commercial power- supply switchover sequence output terminal selection	135	Electronic bypass sequence selection					
	136	MC switchover interlock time	136	MC switchover interlock time					
Commercial power	137	Waiting time at a start	137	Start waiting time					
supply-inverter switch-over	138	Commercial power- supply operation switchover selection at an alarm	138	Bypass selection at an alarm					
	139	Automatic switchover frequency between inverter and commercial power-supply operation	139	Automatic switchover frequency from inverter to bypass operation	_	_	_	_	
	140	Backlash acceleration stopping frequency	140	Backlash acceleration stopping frequency					
Backlash	141	Backlash acceleration stopping time	141	Backlash acceleration stopping time					
measures	142	Backlash deceleration stopping frequency	142	Backlash deceleration stopping frequency					
	143	Backlash deceleration stopping time	143	Backlash deceleration stopping time					
_	144	Speed setting switchover	144	Speed setting switchover					
PU	145	PU display language selection	145	PU display language selection	145	PU display language selection	145	PU display language selection	
_	_	_	_	_	146	Built-in potentiometer switching	146	Built-in potentiometer switching	
	148	Stall prevention level at 0V input.	148	Stall prevention level at 0V input	_	_	_	_	
	149	Stall prevention level at 10V input.	149	Stall prevention level at 10V input					
Current	150	Output current detection level	150	Output current detection level	150	Output current detection level	150	Output current detection level	
detection	151	Output current detection signal delay time	151	Output current detection signal delay time	151	Output current detection signal delay time	151	Output current detection signal delay time	
	152	Zero current detection level	152	Zero current detection level	152	Zero current detection level	152	Zero current detection level	
	153	Zero current detection time	153	Zero current detection time	153	Zero current detection time	153	Zero current detection time	
_	154	Voltage reduction selection during stall prevention operation	154	Voltage reduction selection during stall prevention operation		_	_	_	
_	155	RT signal reflection time selection	155	RT signal function validity condition selection					
_	156	Stall prevention operation selection	156	Stall prevention operation selection	156	Stall prevention operation selection	156	Stall prevention operation selection	

	FI	REQROL F700 Series	FI	REQROL A700 Series	FI	REQROL E700 Series	FF	REQROL D700 Series
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
	157	OL signal output timer	157	OL signal output timer	157	OL signal output timer	157	OL signal output timer
	158	AM terminal function selection	158	AM terminal function selection				
_	159	Automatic switchover ON range between commercial power–supply and inverter operation	159	Automatic switchover frequency range from bypass to inverter operation	_		_	_
_	160	User group read selection	160	User group read selection	160	User group read selection	160	Extended function display selection
_	161	Frequency setting/key lock operation selection	161	Frequency setting/key lock operation selection	161	Frequency setting/key lock operation selection	161	Frequency setting/key lock operation selection
	162	Automatic restart after instantaneous power failure selection	162	Automatic restart after instantaneous power failure selection	162	Automatic restart after instantaneous power failure selection	162	Automatic restart after instantaneous power failure selection
Automatic	163	First cushion time for restart	163	First cushion time for restart		_		_
restart functions	164	First cushion voltage for restart	164	First cushion voltage for restart				
	165	Stall prevention operation level for restart	165	Stall prevention operation level for restart	165	Stall prevention operation level for restart	165	Stall prevention operation level for restart
Current	166	Output current detection signal retention time	166	Output current detection signal retention time			166	Output current detection signal retention time
detection	167	Output current detection operation selection	167	Output current detection operation selection		_	167	Output current detection operation selection
Cumulative	170	Cumulative power meter clear	170	Watt-hour meter clear	170	Watt-hour meter clear	170	Watt-hour meter clear
monitor clear	171	Operation hour meter clear	171	Operation hour meter clear	171	Operation hour meter clear	171	Operation hour meter clear
	172	User group registered display/batch clear	172	User group registered display/batch clear	172	User group registered display/batch clear		
User group	173	User group registration	173	User group registration	173	User group registration	_	_
	174	User group clear	174	User group clear	174	User group clear		
	178	STF terminal function selection	178	STF terminal function selection	178	STF terminal function selection	178	STF terminal function selection
	179	STR terminal function selection	179	STR terminal function selection	179	STR terminal function selection	179	STR terminal function selection
	180	RL terminal function selection	180	RL terminal function selection	180	RL terminal function selection	180	RL terminal function selection
	181	RM terminal function selection	181	RM terminal function selection	181	RM terminal function selection	181	RM terminal function selection
	182	RH terminal function selection	182	RH terminal function selection	182	RH terminal function selection	182	RH terminal function selection
Input terminal function	183	RT terminal function selection	183	RT terminal function selection	183	MRS terminal function selection		
assignment	184	AU terminal function selection	184	AU terminal function selection	184	RES terminal function selection		
	185	JOG terminal function selection	185	JOG terminal function selection				
	186	CS terminal function selection	186	CS terminal function selection			_	_
	187	MRS terminal function selection	187	MRS terminal function selection	_	_		
	188	STOP terminal function selection	188	STOP terminal function selection				
	189	RES terminal function selection	189	RES terminal function selection				

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	FI	REQROL F700 Series	FI	REQROL A700 Series	F	REQROL E700 Series	FREQROL D700 Series	
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
	190	RUN terminal function selection	190	RUN terminal function selection	190	RUN terminal function selection	190	RUN terminal function selection
	191	SU terminal function selection	191	SU terminal function selection	191	FU terminal function selection	_	_
0	192	IPF terminal function selection	192	IPF terminal function selection	192	A,B,C terminal function selection	192	A,B,C terminal function selection
Output terminal function assignment	193	OL terminal function selection	193	OL terminal function selection				
uooigiiiioiii	194	FU terminal function selection	194	FU terminal function selection				
	195	ABC1 terminal function selection	195	ABC1 terminal function selection		_		_
	196	ABC2 terminal function selection	196	ABC2 terminal function selection				
	232	Multi-speed setting (speed 8)	232	Multi-speed setting (speed 8)	232	Multi-speed setting (speed 8)	232	Multi-speed setting (speed 8)
	233	Multi-speed setting (speed 9)	233	Multi-speed setting (speed 9)	233	Multi-speed setting (speed 9)	233	Multi-speed setting (speed 9)
	234	Multi-speed setting (speed 10)	234	Multi-speed setting (speed 10)	234	Multi-speed setting (speed 10)	234	Multi-speed setting (speed 10)
Multi-speed	235	Multi-speed setting (speed 11)	235	Multi-speed setting (speed 11)	235	Multi-speed setting (speed 11)	235	Multi-speed setting (speed 11)
setting	236	Multi-speed setting (speed 12)	236	Multi-speed setting (speed 12)	236	Multi-speed setting (speed 12)	236	Multi-speed setting (speed 12)
	237	Multi-speed setting (speed 13)	237	Multi-speed setting (speed 13)	237	Multi-speed setting (speed 13)	237	Multi-speed setting (speed 13)
	238	Multi-speed setting (speed 14)	238	Multi-speed setting (speed 14)	238	Multi-speed setting (speed 14)	238	Multi-speed setting (speed 14)
	239	Multi-speed setting (speed 15)	239	Multi-speed setting (speed 15)	239	Multi-speed setting (speed 15)	239	Multi-speed setting (speed 15)
_	240	Soft–PWM operation selection	240	Soft-PWM operation selection	240	Soft-PWM operation selection	240	Soft-PWM operation selection
_	241	Analog input display unit switchover	241	Analog input display unit switchover	241	Analog input display unit switchover	241	Analog input display unit switchover
_	242	Terminal 1 added compensation amount (terminal 2)	242	Terminal 1 added compensation amount (terminal 2)		_		_
_	243	Terminal 1 added compensation amount (terminal 4)	243	Terminal 1 added compensation amount (terminal 4)				
_	244	Cooling fan operation selection	244	Cooling fan operation selection	244	Cooling fan operation selection	244	Cooling fan operation selection
	245	Rated slip	245	Rated slip	245	Rated slip	245	Rated slip
Slip	246	Slip compensation time constant	246	Slip compensation time constant	246	Slip compensation time constant	246	Slip compensation time constant
compensation	247	Constant-power region slip compensation selection	247	Constant-power region slip compensation selection	247	Constant-power region slip compensation selection	247	Constant-power range slip compensation selection
_	_	_	_	_	249	Earth (ground) fault detection at start	249	Earth (ground) fault detection at start
_	250	Stop selection	250	Stop selection	250	Stop selection	250	Stop selection
_	251	Output phase failure protection selection	251	Output phase failure protection selection	251	Output phase loss protection selection	251	Output phase loss protection selection
Frequency compensation	252	Override bias	252	Override bias	_	_	_	_
function	253	Override gain	253	Override gain				

	FI	REQROL F700 Series	FI	REQROL A700 Series	FI	REQROL E700 Series	FI	REQROL D700 Series
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
	255	Life alarm status display	255	Life alarm status display	255	Life alarm status display	255	Life alarm status display
	256	Inrush current limit circuit life display	256	Inrush current limit circuit life display	256	Inrush current limit circuit life display	256	Inrush current limit circuit life display
Life check	257	Control circuit capacitor life display	257	Control circuit capacitor life display	257	Control circuit capacitor life display	257	Control circuit capacitor life display
	258	Main circuit capacitor life display	258	Main circuit capacitor life display	258	Main circuit capacitor life display	258	Main circuit capacitor life display
	259	Main circuit capacitor life measuring	259	Main circuit capacitor life measuring	259	Main circuit capacitor life measuring	259	Main circuit capacitor life measuring
_	260	PWM frequency automatic switchover	_		_	_	260	PWM frequency automatic switchover
	261	Power failure stop selection	261	Power failure stop selection	261	Power failure stop selection	261	Power failure stop selection
	262	Subtracted frequency at deceleration start	262	Subtracted frequency at deceleration start				
Power failure	263	Subtraction starting frequency	263	Subtraction starting frequency				
stop	264	Power–failure deceleration time 1	264	Power-failure deceleration time 1	_	_	_	_
	265	Power–failure deceleration time 2	265	Power-failure deceleration time 2				
	266	Power failure deceleration time switchover frequency	266	Power failure deceleration time switchover frequency				
_	267	Terminal 4 input selection	267	Terminal 4 input selection	267	Terminal 4 input selection	267	Terminal 4 input selection
_	268	Monitor decimal digits selection	268	Monitor decimal digits selection	268	Monitor decimal digits selection	268	Monitor decimal digits selection
_			270	Stop-on contact/load torque high speed frequency control selection	270	Stop-on contact control selection		
			271	High-speed setting maximum current				
Load torque high speed fre-			272	Middle-speed setting minimum current				
quency control			273	Current averaging range		_		
	_	_	274	Current averaging filter time constant			_	_
Stop-on con- tact control			275	Stop-on contact excitation current low speed multiplying factor	275	Stop-on contact excitation current low speed multiplying factor		
			276	PWM carrier frequency at stop-on contact	276	PWM carrier frequency at stop-on contact		
_			_	_	277	Stall prevention operation current switchover		

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	FI	REQROL F700 Series	FI	REQROL A700 Series	FI	REQROL E700 Series	FREQROL D700 Series	
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
			278	Brake opening frequency	278	Brake opening frequency		
			279	Brake opening current	279	Brake opening current		
			280	Brake opening current detection time	280	Brake opening current detection time		
			281	Brake operation time at start	281	Brake operation time at start		
Brake sequence function			282	Brake operation frequency	282	Brake operation frequency		
lunction			283	Brake operation time at stop	283	Brake operation time at stop		
			284	Deceleration detection function selection				
			285	Overspeed detection frequency (Speed deviation excess detection frequency)	-	_	_	_
	_	_	286	Droop gain	286	Droop gain		
Droop control			287	Droop filter time constant	287	Droop filter time constant		
			288	Droop function activation selection	_	_		
_			291	Pulse train I/O selection				
_			292	Automatic acceleration/ deceleration	292	Automatic acceleration/ deceleration		
_			293	Acceleration/ deceleration separate selection	293	Acceleration/ deceleration separate selection		
_			294	UV avoidance voltage gain	_	_		
_					295	Magnitude of frequency change setting	295	Magnitude of frequency change setting
Password			_	_		_	296	Password lock level
function								Password lock/unlock
					298	Frequency search gain	298	Frequency search gain
_	299	Rotation direction detection selection at restarting	299	Rotation direction detection selection at restarting	299	Rotation direction detection selection at restarting	299	Rotation direction detection selection at restarting
	300	BCD input bias			300	BCD input bias		
	301	BCD input gain			301	BCD input gain		
	302	BIN input bias			302	BIN input bias		
D. //	303	BIN input gain			303	BIN input gain		
Digital input	304	Digital input and analog input compensation enable/disable selection		_	304	Digital input and analog input compensation enable/disable selection		_
	305	Read timing operation selection			305	Read timing operation selection		

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	FI	REQROL F700 Series	F	REQROL A700 Series	FREQROL E700 Series FREQROL D700 S			REQROL D700 Series
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
	306	Analog output signal selection			306	Analog output signal selection		
	307	Setting for zero analog output			307	Setting for zero analog output		
	308	Setting for maximum analog output			308	Setting for maximum analog output		
Analog output	309	Analog output signal voltage/current switchover			309	Analog output signal voltage/current switchover		
	310	Analog meter voltage output selection			310	Analog meter voltage output selection		
	311	Setting for zero analog meter voltage output			311	Setting for zero analog meter voltage output		
	312	Setting for maximum analog meter voltage output	_	_	312	Setting for maximum analog meter voltage output		
	313	DO0 output selection			313	DO0 output selection		
	314	DO1 output selection			314	DO1 output selection		
	315	DO2 output selection			315	DO2 output selection		
Digital output	316	DO3 output selection			316	DO3 output selection		
	317	DO4 output selection			317	DO4 output selection		
	318	DO5 output selection			318	DO5 output selection		
	319	DO6 output selection			319	DO6 output selection		
	320	RA1 output selection			320	RA1 output selection		
Relay output	321	RA2 output selection			321	RA2 output selection		
	322	RA3 output selection			322	RA3 output selection		
Analog output	323	AM0 0V adjustment			323	AM0 0V adjustment		
7 maiog oatpat	324	AM1 0mA adjustment			324	AM1 0mA adjustment		
_	329	Digital input unit selection			329	Digital input unit selection		
	331	RS-485 communication station	331	RS-485 communication station number				
	332	RS-485 communication speed	332	RS-485 communication speed				
	333	RS-485 communication stop bit length	333	RS-485 communication stop bit length				
RS-485 communication	334	RS-485 communication parity check selection	334	RS-485 communication parity check selection	_	_		
	335	RS-485 communication number of retries	335	RS-485 communication retry count				
	336	RS-485 communication check time interval	336	RS-485 communication check time interval				
	337	RS-485 communication waiting time setting	337	RS-485 communication waiting time setting				

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Inverter Communication

Non-Protocol
Communication
(RS/RS2) Instruction

Non-Protocol
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Programming Communicat

Remote
Maintenance

	FI	REQROL F700 Series	FI	REQROL A700 Series	FREQROL E700 Series FREQROL D7		REQROL D700 Series	
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
	338	Communication operation command source	338	Communication operation command source	338	Communication operation command source	338	Communication operation command source
	339	Communication speed command source	339	Communication speed command source	339	Communication speed command source	339	Communication speed command source
RS-485	340	Communication startup mode selection	340	Communication startup mode selection	340	Communication startup mode selection	340	Communication startup mode selection
communication	341	RS-485 communication CR/LF selection	341	RS-485 communication CR/LF selection	_	_	_	_
	342	Communication EEPROM write selection	342	Communication EEPROM write selection	342	Communication EEPROM write selection	342	Communication EEPROM write selection
	343	Communication error count	343	Communication error count	343	Communication error count	343	Communication error count
DeviceNet	345	DeviceNet address						
	346	DeviceNet baud rate	_	_	_	_		
CC-Link	349	Communication reset selection						
			380	Acceleration S-pattern 1				
S-pattern acceleration/			381	Deceleration S-pattern 1				
deceleration C			382	Acceleration S-pattern 2				
			383	Deceleration S-pattern 2				
		_	384	Input pulse division scaling factor				
Pulse train input			385	Frequency for 0 input pulse			_	_
			386	Frequency for maximum input pulse				
	387	Initial communication delay time						
	388	Send time interval at heart beat						
LONWORKS	389	Minimum sending time at heart beat						
communication	390	% setting reference frequency		_		_		
	391	Receive time interval at heart beat						
	392	Event driven detection width						
			450	Second applied motor	450	Second applied motor	450	Second applied motor
			451	Second motor control method selection				
			453	Second motor capacity				
			454	Number of second motor poles				
Second motor constants	_	_	455	Second motor excitation current	_	_	_	_
			456	Rated second motor voltage				
			457	Rated second motor frequency				
			458	Second motor constant (R1)				

	FI	REQROL F700 Series	Fi	REQROL A700 Series	FI	REQROL E700 Series	FI	REQROL D700 Series
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
			459	Second motor constant (R2)				
			460	Second motor constant (L1)				
Second motor constants	_	_	461	Second motor constant (L2)	_	_	_	_
			462	Second motor constant (X)				
			463	Second motor auto tuning setting/status				
Damata autout	495	Remote output selection						
Remote output	496	Remote output data 1						
	497	Remote output data 2	497	Remote output data 2	497	Remote output data 2		
	500	Communication error execution waiting time			500	Communication error execution waiting time		_
Communication error	501	Communication error occurrence count display	_	_	501	Communication error occurrence count display		
	502	Stop mode selection at communication error			502	Stop mode selection at communication error	502	Stop mode selection at communication error
	503	Maintenance timer						
Maintenance	504	Maintenance timer alarm output set time	504	Maintenance timer alarm output set time	504	Maintenance timer alarm output set time	504	Maintenance timer alarm output set time
			516	S-pattern time at a start of acceleration				
S-pattern accel- eration/deceler-			517	S-pattern time at a completion of acceleration		_		
ation D	_	_	518	S-pattern time at a start of deceleration		_		
			519	S-pattern time at a completion of deceleration				
					541	Frequency command sign selection (CC-Link)	_	_
CC-Link	542	Communication station number (CC-Link)		_	542	Communication station number (CC–Link)		
oo Liiik	543	Baud rate (CC-Link)			543	Baud rate selection (CC-Link)		
	544	CC-Link extended setting			544	CC-Link extended setting		
USB			547	USB communication station number	547	USB communication station number		
005			548	USB communication check time interval	548	USB communication check time interval		
	549	Protocol selection						
Communication	550	NET mode operation command source selection	550	NET mode operation command source selection	550	NET mode operation command source selection	_	_
	551	PU mode operation command source selection		PU mode operation command source selection		PU mode operation command source selection	551	PU mode operation command source selection
	555	Current average time		Current average time	555	Current average time	555	Current average time
Current	556	Data output mask time	556	Data output mask time	556	Data output mask time	556	·
average monitor	557	Current average value monitor signal output reference current	557	Current average value monitor signal output reference current	557	Current average value monitor signal output reference current	557	Current average value monitor signal output reference current

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Inverter Communication

Non-Protocol
Communication
(RS/RS2 Instruction)

Non-Protocol Communication

Programming Communication

Remote
Maintenance

	FREQROL F700 Series FREQROL A700 Series FREQROL E700 Series		FI	FREQROL D700 Series				
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
_	_	_	_	_	_	_	561	PTC thermistor protection level
_	563	Energization time carrying-over times	563	Energization time carrying-over times	563	Energization time carrying-over times	563	Energization time carrying-over times
_	564	Operating time carrying–over times	564	Operating time carrying–over times	564	Operating time carrying–over times	564	Operating time carrying–over times
Second motor constants	_	_	569	Second motor speed control gain		_	_	_
_	571	Holding time at a start	571	Holding time at a start	571	Holding time at a start	571	Holding time at a start
_	_	_	574	Second motor online auto tuning			_	_
	575	Output interruption detection time	575	Output interruption detection time	_	_	575	Output interruption detection time
PID control	576	Output interruption detection level	576	Output interruption detection level			576	Output interruption detection level
	577	Output interruption release level	577	Output interruption cancel level			577	Output interruption cancel level
_	611	Acceleration time at a restart	611	Acceleration time at a restart	611	Acceleration time at a restart	611	Acceleration time at a restart
_			_	_	653	Speed smoothing control	653	Speed smoothing control
_			_	_	665	Regeneration avoidance frequency gain	665	Regeneration avoidance frequency gain
_			684	Tuning data unit switchover	_	_		
_			800	Control method selection	800	Control method selection		
			803	Constant power range torque characteristic selection				
Torque command			804	Torque command source selection				
command			805	Torque command value (RAM)				
			806	Torque command value (RAM,EEPROM)				
			807	Speed limit selection				
Speed limit			808	Forward rotation speed limit				
			809	Reverse rotation speed limit			_	_
			810	Torque limit input method selection	_	_		
			811	Set resolution switchover				
			812	Torque limit level (regeneration)				
Torque limit			813	Torque limit level (3rd quadrant)				
			814	Torque limit level				
			815	Torque limit level 2				
			816	Torque limit level during				
			817	Torque limit level during deceleration				

	FI	REQROL F700 Series	FI	REQROL A700 Series	FF	REQROL E700 Series	FI	REQROL D700 Series
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
Easy gain			818	Easy gain tuning response level setting				
tuning			819	Easy gain tuning selection				
			820	Speed control P gain 1				
			821	Speed control integral time 1				
				Speed setting filter 1				
			824	Torque control P gain 1				
			825	Torque control integral time 1				
				Torque setting filter 1				
			827	Torque detection filter 1				
Adjustment function			828	Model speed control gain		_		
			830	'				
			831	Speed control integral time 2				
				Speed setting filter2				
		_	834	Torque control P gain 2				
			835	Torque control integral time 2			_	_
			836	Torque setting filter2				
			837	Torque detection filter 2				
			849	Analog input off set adjustment				
			850	Control operation selection				
			858	Terminal 4 function assignment				
Torque bias			859	Torque current	859	Torque current		
Torque bias			860	Second motor torque current				
			862	Notch filter time constant				
				Notch filter depth				
				Torque detection	_	_		
			865	Low speed detection				
Indication function			866	Torque monitoring reference				
	867	AM output filter	867	AM output filter				
_	_	_	868	Terminal 1 function assignment				
Protective	872	Input phase failure protection selection	872	Input phase failure protection selection	872	Input phase loss protection selection	872	Input phase loss protection selection
Functions			874	OLT level setting				
			875	Fault definition				

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	FREQROL F700 Series			REQROL A700 Series	FREQROL E700 Series			FREQROL D700 Series	
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	
			877	Speed feed forward control/model adaptive speed control selection					
Control system			878	Speed feed forward filter					
functions	_	_	879	Speed feed forward torque limit	_	_	_	_	
			880	Load inertia ratio					
			881	Speed feed forward gain					
	882	Regeneration avoidance operation selection	882	Regeneration avoidance operation selection	882	Regeneration avoidance operation selection	882	Regeneration avoidance operation selection	
	883	Regeneration avoidance operation level	883	Regeneration avoidance operation level	883	Regeneration avoidance operation level	883	Regeneration avoidance operation level	
Regeneration avoidance function	884	Regeneration avoidance at deceleration detection sensitivity	884	Regeneration avoidance at deceleration detection sensitivity	_	_	_	_	
	885	Regeneration avoidance compensation frequency limit value	885	Regeneration avoidance compensation frequency limit value	885	Regeneration avoidance compensation frequency limit value	885	Regeneration avoidance compensation frequency limit value	
	886	Regeneration avoidance voltage gain	886	Regeneration avoidance voltage gain	886	Regeneration avoidance voltage gain	886	Regeneration avoidance voltage gain	
Free parameter	888	Free parameter 1	888	Free parameter 1	888	Free parameter 1	888	Free parameter 1	
Tice parameter	889	Free parameter 2	889	Free parameter 2	889	Free parameter 2	889	Free parameter 2	
	891	Cumulative power monitor digit shifted times	891	Cumulative power monitor digit shifted times			891	Cumulative power monitor digit shifted times	
	892	Load factor	892	Load factor					
	893	Energy saving monitor reference (motor capacity)	893	Energy saving monitor reference (motor capacity)					
Energy saving monitor	894	Control selection during commercial power– supply operation	894	Control selection during commercial power-supply operation	_	_			
monitor	895	Power saving rate reference value	895	Power saving rate reference value			_	_	
	896	Power unit cost	896	Power unit cost					
	897	Power saving monitor average time	897	Power saving monitor average time					
	898	Power saving cumulative monitor clear	898	Power saving cumulative monitor clear					
	899	Operation time rate (estimated value)	899	Operation time rate (estimated value)					

	FR	EQROL F700 Series	FR	EQROL A700 Series	FR	EQROL E700 Series	FR	EQROL D700 Series
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
	C0 (900)	FM terminal calibration	C0 (900)	FM terminal calibration	C0 (900)	FM terminal calibration	C0 (900)	FM terminal calibration
	C1 (901)	AM terminal calibration	C1 (901)	AM terminal calibration	—	_	—	_
	C2 (902)	Terminal 2 frequency setting bias frequency	C2 (902)	Terminal 2 frequency setting bias frequency	C2 (902)	Terminal 2 frequency setting bias frequency	C2 (902)	Terminal 2 frequency setting bias frequency
	C3 (902)	Terminal 2 frequency setting bias	C3 (902)	Terminal 2 frequency setting bias	C3 (902)	Terminal 2 frequency setting bias	C3 (902)	Terminal 2 frequency setting bias
	125 (903)	Terminal 2 frequency setting gain frequency	125 (903)	Terminal 2 frequency setting gain frequency	125 (903)	Terminal 2 frequency setting gain frequency	125 (903)	Terminal 2 frequency setting gain frequency
	C4 (903)	Terminal 2 frequency setting gain	C4 (903)	Terminal 2 frequency setting gain	C4 (903)	Terminal 2 frequency setting gain	C4 (903)	Terminal 2 frequency setting gain
	C5 (904)	Terminal 4 frequency setting bias frequency	C5 (904)	Terminal 4 frequency setting bias frequency	C5 (904)	Terminal 4 frequency setting bias frequency	C5 (904)	Terminal 4 frequency setting bias frequency
	C6 (904)	Terminal 4 frequency setting bias	C6 (904)	Terminal 4 frequency setting bias	C6 (904)	Terminal 4 frequency setting bias	C6 (904)	Terminal 4 frequency setting bias
	126 (905)	Terminal 4 frequency setting gain frequency	126 (905)	Terminal 4 frequency setting gain frequency	126 (905)	Terminal 4 frequency setting gain frequency	126 (905)	Terminal 4 frequency setting gain frequency
	C7 (905)	Terminal 4 frequency setting gain	C7 (905)	Terminal 4 frequency setting gain	C7 (905)	Terminal 4 frequency setting gain	C7 (905)	Terminal 4 frequency setting gain
			C12 (917)	Bias frequency (speed) for terminal No.1				
Calibration			C13 (917)	Bias (speed) for terminal No.1				
parameters			C14 (918)	Gain frequency (speed) for terminal No.1			_	
			C15 (918)	Gain (speed) for terminal No.1				
			C16 (919)	Bias command (torque) for terminal No.1		_		_
			C17 (919)	Bias (torque) for terminal No.1				
	_	_	C18 (920)	Gain command (torque) for terminal No.1				
				Gain (torque) for terminal No.1				
					C22 (922)	Frequency setting voltage bias frequency (built-in potentiometer)	C22 (922)	Frequency setting voltage bias frequency (built-in potentiometer)
				_	C23 (922)	Frequency setting voltage bias (built-in potentiometer)	C23 (922)	Frequency setting voltage bias (built-in potentiometer)
					C24 (923)	Frequency setting voltage gain frequency (built-in potentiometer)	C24 (923)	Frequency setting voltage gain frequency (built-in potentiometer)
					C25 (923)	Frequency setting voltage gain (built-in potentiometer)	C25 (923)	Frequency setting voltage gain (built-in potentiometer)

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	FREQROL F700 Series		FREQROL A700 Series		FR	REQROL E700 Series	FREQROL D700 Series		
Function	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	
			C38 (932)	Terminal 4 bias command (torque/magnetic flux)					
Calibration	Calibration		C39 (932)	Terminal 4 bias (torque/magnetic flux)					
parameters		_	C40 (933)	Terminal 4 gain command (torque/magnetic flux)	_	_	_	-	
			C41 (933)	Gain (torque) for terminal No.4					
_	989	Parameter copy alarm release	_	_					
PU	990	PU buzzer control	990	PU buzzer control	990	PU buzzer control	990	PU buzzer control	
10	991	PU contrast adjustment	991	PU contrast adjustment	991	PU contrast adjustment	991	PU contrast adjustment	

This inverter communication function cannot read or write Pr. 37. Set Pr. 37 to "0" when setting or monitoring the frequency in the PLC. If any value other than "0" is set and the instruction code HFF is set to "01", the frequency may not be set or monitored normally.

12.5.3 Parameters in F800 and A800 Series

The following parameters are provided in FREQROL inverters. Pr. No.1000 and later are not supported. (For details, make sure to refer to the respective inverter manual.)

		FI	REQROL F800 Series		F	REQROL A800 Series
Function	Pr No.	Pr Group	Name	Pr No.	Pr Group	Name
	0	G000	Torque boost	0	G000	Torque boost
	1	H400	Maximum frequency	1	H400	Maximum frequency
	2	H401	Minimum frequency	2	H401	Minimum frequency
	3	G001	Base frequency	3	G001	Base frequency
	4	D301	Multi-speed setting (high speed)	4	D301	Multi-speed setting (high speed)
Basic functions	5	D302	Multi-speed setting (middle speed)	5	D302	Multi-speed setting (middle speed)
	6	D303	Multi-speed setting (low speed)	6	D303	Multi-speed setting (low speed)
	7	F010	Acceleration time	7	F010	Acceleration time
	8	F011	Deceleration time	8	F011	Deceleration time
		H000	Electronic thermal O/L relay		H000	Electronic thermal O/L relay
	9	C103	Rated motor current	9	C103	Rated motor current
DC injection	10	G100	DC injection brake operation frequency	10	G100	DC injection brake operation frequency
brake	11	G101	DC injection brake operation time	11	G101	DC injection brake operation time
	12	G110	DC injection brake operation voltage	12	G110	DC injection brake operation voltage
_	13	F102	Starting frequency	13	F102	Starting frequency
_	14	G003	Load pattern selection	14	G003	Load pattern selection
	15	D200	Jog frequency	15	D200	Jog frequency
Jog operation	16	F002	Jog acceleration/deceleration time	16	F002	Jog acceleration/deceleration time
_	17	T720	MRS input selection	17	T720	MRS input selection
_	18	H402	High speed maximum frequency	18	H402	High speed maximum frequency
	19	G002	Base frequency voltage	19	G002	Base frequency voltage
Acceleration/	20	F000	Acceleration/deceleration reference frequency	20	F000	Acceleration/deceleration reference frequency
deceleration times	21	F001	Acceleration/deceleration time increments	21	F001	Acceleration/deceleration time increments
	22	H500	Stall prevention operation level	22	H500	Stall prevention operation level (Torque limit level)
Stall prevention	23	H610	Stall prevention operation level compensation factor at double speed	23	H610	Stall prevention operation level compensation factor at double speed
	24	D304	Multi-speed setting (4 speed)	24	D304	Multi-speed setting (4 speed)
Multi-speed	25	D305	Multi-speed setting (5 speed)	25	D305	Multi-speed setting (5 speed)
setting	26	D306	Multi-speed setting (6 speed)	26	D306	Multi-speed setting (6 speed)
	27	D307	Multi-speed setting (7 speed)	27	D307	Multi-speed setting (7 speed)
_	28	D300	Multi-speed input compensation selection	28	D300	Multi-speed input compensation selection
_	29	F100	Acceleration/deceleration pattern selection	29	F100	Acceleration/deceleration pattern selection
_	30	E300	Regenerative function selection	30	E300	Regenerative function selection
	31	H420	Frequency jump 1A	31	H420	Frequency jump 1A
	32	H421	Frequency jump 1B	32	H421	Frequency jump 1B
Fraguanaviuma	33	H422	Frequency jump 2A	33	H422	Frequency jump 2A
Frequency jump	34	H423	Frequency jump 2B	34	H423	Frequency jump 2B
	35	H424	Frequency jump 3A	35	H424	Frequency jump 3A
	36	H425	Frequency jump 3B	36	H425	Frequency jump 3B

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		F	REQROL F800 Series		F	REQROL A800 Series
Function	Pr No.	Pr Group	Name	Pr No.	Pr Group	Name
	37	M000	Speed display	37	M000	Speed display
	41	M441	Up-to-frequency sensitivity	41	M441	Up-to-frequency sensitivity
Frequency	42	M442	Output frequency detection	42	M442	Output frequency detection
detection	43	M443	Output frequency detection for reverse rotation	43	M443	Output frequency detection for reverse rotation
	44	F020	Second acceleration/deceleration time	44	F020	Second acceleration/deceleration time
	45	F021	Second deceleration time	45	F021	Second deceleration time
	46	G010	Second torque boost	46	G010	Second torque boost
	47	G011	Second V/F (base frequency)	47	G011	Second V/F (base frequency)
Second functions	48	H600	Second stall prevention operation level	48	H600	Second stall prevention operation level
	49	H601	Second stall prevention operation frequency	49	H601	Second stall prevention operation frequency
	50	M444	Second output frequency detection	50	M444	Second output frequency detection
		H010	Second electronic thermal O/L relay	5 4	H010	Second electronic thermal O/L rela
	51	C203	Rated second motor current	51	C203	Rated second motor current
	52	M100	Operation panel main monitor selection	52	M100	Operation panel main monitor selection
Monitor	54	M300	FM/CA terminal function selection	54	M300	FM/CA terminal function selection
functions	55	M040	Frequency monitoring reference	55	M040	Frequency monitoring reference
	56	M041	Current monitoring reference	56	M041	Current monitoring reference
Automatic	57	A702	Restart coasting time	57	A702	Restart coasting time
restart	58	A703	Restart cushion time	58	A703	Restart cushion time
	59	F101	Remote function selection	59	F101	Remote function selection
	60	G030	Energy saving control selection	60	G030	Energy saving control selection
			0. 0	61	F510	Reference current
Automatic				62	F511	Reference value at acceleration
acceleration/ deceleration	_	_		63	F512	Reference value at deceleration
deceleration				64	F520	Starting frequency for elevator mod
_	65	H300	Retry selection	65	H300	Retry selection
	66	H611	Stall prevention operation reduction starting frequency	66	H611	Stall prevention operation reduction starting frequency
	67	H301	Number of retries at fault occurrence	67	H301	Number of retries at fault occurrence
Retry	68	H302	Retry waiting time	68	H302	Retry waiting time
•	69	H303	Retry count display erase	69	H303	Retry count display erase
	_	_	_	70	G107	Special regenerative brake duty
	71	C100	Applied motor	71	C100	Applied motor
	72	E600	PWM frequency selection	72	E600	PWM frequency selection
	73	T000	Analog input selection	73	T000	Analog input selection
	74	T002	Input filter time constant	74	T002	Input filter time constant
		_	Reset selection/disconnected PU detection/PU stop selection		_	Reset selection/disconnected PU detection/PU stop selection
		E100	Reset selection		E100	Reset selection
_	75	E101	Disconnected PU detection	75	E101	Disconnected PU detection
		E102	PU stop selection		E102	PU stop selection
		E107	Reset limit		E107	Reset limit
_	76	M510	Fault code output selection	76	M510	Fault code output selection
	77	E400	Parameter write selection	77	E400	Parameter write selection

		FI	REQROL F800 Series	FREQROL A800 Series				
Function	Pr	Pr	Name	Pr	Pr	Name		
Tunction	No.	Group		No.	Group	130000		
_	78	D020	Reverse rotation prevention selection	78	D020	Reverse rotation prevention selection		
_	79	D000	Operation mode selection	79	D000	Operation mode selection		
	80	C101	Motor capacity	80	C101	Motor capacity		
	81	C102	Number of motor poles	81	C102	Number of motor poles		
	82	C125	Motor excitation current	82	C125	Motor excitation current		
	83	C104	Rated motor voltage	83	C104	Rated motor voltage		
	84	C105	Rated motor frequency	84	C105	Rated motor frequency		
	89	G932	Speed control gain (Advanced magnetic flux vector)	89	G932	Speed control gain (Advanced magnetic flux vector)		
Motor constants	90	C120	Motor constant (R1)	90	C120	Motor constant (R1)		
	91	C121	Motor constant (R2)	91	C121	Motor constant (R2)		
	92	C122	Motor constant (L1)/ d-axis inductance (Ld)	92	C122	Motor constant (L1)/ d-axis inductance (Ld)		
	93	C123	Motor constant (L2)/ q-axis inductance (Lq)	93	C123	Motor constant (L2)/ q-axis inductance (Lq)		
	94	C124	Motor constant (X)	94	C124	Motor constant (X)		
	95	C111	Online auto tuning selection	95	C111	Online auto tuning selection		
	96	C110	Auto tuning setting/status	96	C110	Auto tuning setting/status		
	100	G040	V/F1 (first frequency)	100	G040	V/F1 (first frequency)		
	101	G041	V/F1 (first frequency voltage)	101	G041	V/F1 (first frequency voltage)		
	102	G042	V/F2 (second frequency)	102	G042	V/F2 (second frequency)		
	103	G043	V/F2 (second frequency voltage)	103	G043	V/F2 (second frequency voltage)		
Adjustable 5	104	G044	V/F3 (third frequency)	104	G044	V/F3 (third frequency)		
points V/F	105	G045	V/F3 (third frequency voltage)	105	G045	V/F3 (third frequency voltage)		
	106	G046	V/F4 (fourth frequency)	106	G046	V/F4 (fourth frequency)		
	107	G047	V/F4 (fourth frequency voltage)	107	G047	V/F4 (fourth frequency voltage)		
	108	G048	V/F5 (fifth frequency)	108	G048	V/F5 (fifth frequency)		
	109	G049	V/F5 (fifth frequency voltage)	109	G049	V/F5 (fifth frequency voltage)		
	_	_	_	110	F030	Third acceleration/deceleration time		
	111	F031	Check valve deceleration time	111	F031	Third deceleration time		
				112	G020	Third torque boost		
Third functions				113	G021	Third V/F (base frequency)		
	_	_	_	114	H602	Third stall prevention operation level		
				115	H603	Third stall prevention operation frequency		
				116	M445	Third output frequency detection		
	117	N020	PU communication station number	117	N020	PU communication station number		
	118	N021	PU communication speed	118	N021	PU communication speed		
	119	_	PU communication stop bit length/data length	119	_	PU communication stop bit length/data length		
	119	N022	PU communication data length	119	N022	PU communication data length		
PU connector		N023	PU communication stop bit length		N023	PU communication stop bit length		
communication	120	N024	PU communication parity check	120	N024	PU communication parity check		
	121	N025	Number of PU communication retries	121	N025	Number of PU communication retries		
	122	N026	PU communication check time interval	122	N026	PU communication check time interval		
	123	N027	PU communication waiting time setting	123	N027	PU communication waiting time setting		
	124	N028	PU communication CR/LF selection	124	N028	PU communication CR/LF selection		

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Inverter Communication

Non-Protocol
Communication
(RS/RS) Instruction

Non-Protocol
Communication

Discontinued models

		F	REQROL F800 Series	FREQROL A800 Series					
Function	Pr No.	Pr Group	Name	Pr No.	Pr Group	Name			
_	125	T022	Terminal 2 frequency setting gain frequency	125	T022	Terminal 2 frequency setting gain frequency			
_	126	T042	Terminal 4 frequency setting gain frequency	126	T042	Terminal 4 frequency setting gain frequency			
	127	A612	PID control automatic switchover frequency	127	A612	PID control automatic switchover frequency			
	128	A610	PID action selection	128	A610	PID action selection			
	129	A613	PID proportional band	129	A613	PID proportional band			
PID operation	130	A614	PID integral time	130	A614	PID integral time			
	131	A601	PID upper limit	131	A601	PID upper limit			
	132	A602	PID lower limit	132	A602	PID lower limit			
	133	A611	PID action set point	133	A611	PID action set point			
	134	A615	PID differential time	134	A615	PID differential time			
	135	A000	Electronic bypass sequence selection	135	A000	Electronic bypass sequence selection			
	136	A001	MC switchover interlock time	136	A001	MC switchover interlock time			
Bypass	137	A002	Start waiting time	137	A002	Start waiting time			
	138	A003	Bypass selection at a fault	138	A003	Bypass selection at a fault			
	139	A004	Automatic switchover frequency from inverter to bypass operation	139	A004	Automatic switchover frequency from inverter to bypass operation			
	140	F200	Backlash acceleration stopping frequency	140	F200	Backlash acceleration stopping frequency			
Backlash	141	F201	Backlash acceleration stopping time	141	F201	Backlash acceleration stopping time			
measures	142	F202	Backlash deceleration stopping frequency	142	F202	Backlash deceleration stopping frequency			
	143	F203	Backlash deceleration stopping time	143	F203	Backlash deceleration stopping time			
_	144	M002	Speed setting switchover	144	M002	Speed setting switchover			
PU	145	E103	PU display language selection	145	E103	PU display language selection			
_	147	F022	Acceleration/deceleration time switching frequency	147	F022	Acceleration/deceleration time switching frequency			
	148	H620	Stall prevention level at 0 V input	148	H620	Stall prevention level at 0 V input			
	149	H621	Stall prevention level at 10 V input	149	H621	Stall prevention level at 10 V input			
	150	M460	Output current detection level	150	M460	Output current detection level			
Current detection	151	M461	Output current detection signal delay time	151	M461	Output current detection signal delay time			
	152	M462	Zero current detection level	152	M462	Zero current detection level			
	153	M463	Zero current detection time	153	M463	Zero current detection time			
_	154	H631	Voltage reduction selection during stall prevention operation	154	H631	Voltage reduction selection during stall prevention operation			
_	155	T730	RT signal function validity condition selection	155	T730	RT signal function validity condition selection			
_	156	H501	Stall prevention operation selection	156	H501	Stall prevention operation selection			
_	157	M430	OL signal output timer	157	M430	OL signal output timer			
_	158	M301	AM terminal function selection	158	M301	AM terminal function selection			
_	159	A005	Automatic switchover frequency range from bypass to inverter operation	159	A005	Automatic switchover frequency range from bypass to inverter operation			
_	160	E440	User group read selection	160	E440	User group read selection			
_	161	E200	Frequency setting/key lock operation selection	161	E200	Frequency setting/key lock operation selection			

		FI	REQROL F800 Series		FREQROL A800 Series				
Function	Pr No.	Pr Group	Name	Pr No.	Pr Group	Name			
	162	A700	Automatic restart after instantaneous power failure selection	162	A700	Automatic restart after instantaneous power failure selection			
Automatic restart functions	163	A704	First cushion time for restart	163	A704	First cushion time for restart			
restart functions	164	A705	First cushion voltage for restart	164	A705	First cushion voltage for restart			
	165	A710	Stall prevention operation level for restart	165	A710	Stall prevention operation level for restart			
Current	166	M433	Output current detection signal retention time	166	M433	Output current detection signal retention time			
detection	167	M464	Output current detection operation selection	167	M464	Output current detection operation selection			
Cumulative	170	M020	Watt-hour meter clear	170	M020	Watt-hour meter clear			
monitor clear	171	M030	Operation hour meter clear	171	M030	Operation hour meter clear			
Haan massin	172	E441	User group registered display/batch clear	172	E441	User group registered display/batch clear			
User group	173	E442	User group registration	173	E442	User group registration			
	174	E443	User group clear	174	E443	User group clear			
	178	T700	STF terminal function selection	178	T700	STF terminal function selection			
	179	T701	STR terminal function selection	179	T701	STR terminal function selection			
	180	T702	RL terminal function selection	180	T702	RL terminal function selection			
	181	T703	RM terminal function selection	181	T703	RM terminal function selection			
	182	T704	RH terminal function selection	182	T704	RH terminal function selection			
Input terminal function	183	T705	RT terminal function selection	183	T705	RT terminal function selection			
assignment	184	T706	AU terminal function selection	184	T706	AU terminal function selection			
3	185	T707	JOG terminal function selection	185	T707	JOG terminal function selection			
	186	T708	CS terminal function selection	186	T708	CS terminal function selection			
	187	T709	MRS terminal function selection	187	T709	MRS terminal function selection			
	188	T710	STOP terminal function selection	188	T710	STOP terminal function selection			
	189	T711	RES terminal function selection	189	T711	RES terminal function selection			
	190	M400	RUN terminal function selection	190	M400	RUN terminal function selection			
	191	M401	SU terminal function selection	191	M401	SU terminal function selection			
Output terminal	192	M402	IPF terminal function selection	192	M402	IPF terminal function selection			
function	193	M403	OL terminal function selection	193	M403	OL terminal function selection			
assignment	194	M404	FU terminal function selection	194	M404	FU terminal function selection			
	195	M405	ABC1 terminal function selection	195	M405	ABC1 terminal function selection			
	196	M406	ABC2 terminal function selection	196	M406	ABC2 terminal function selection			
	232	D308	Multi-speed setting (8 speed)	232	D308	Multi-speed setting (8 speed)			
	233	D309	Multi-speed setting (9 speed)	233	D309	Multi-speed setting (9 speed)			
	234	D310	Multi-speed setting (10 speed)	234	D310	Multi-speed setting (10 speed)			
Multi-speed	235	D311	Multi-speed setting (11 speed)	235	D311	Multi-speed setting (11 speed)			
setting	236	D312	Multi-speed setting (12 speed)	236	D312	Multi-speed setting (12 speed)			
	237	D313	Multi-speed setting (13 speed)	237	D313	Multi-speed setting (13 speed)			
	238	D314	Multi-speed setting (14 speed)	238	D314	Multi-speed setting (14 speed)			
	239	D315	Multi-speed setting (15 speed)	239	D315	Multi-speed setting (15 speed)			
_	240	E601	Soft-PWM operation selection	240	E601	Soft-PWM operation selection			
_	241	M043	Analog input display unit switchover	241	M043	Analog input display unit switchover			
_	242	T021	Terminal 1 added compensation amount (terminal 2)	242	T021	Terminal 1 added compensation amount (terminal 2)			

FREQROL F800 Series					FREQROL A800 Series			
Function	Pr No.	Pr Group	Name	Pr No.	Pr Group	Name		
_	243	T041	Terminal 1 added compensation amount (terminal 4)	243	T041	Terminal 1 added compensation amount (terminal 4)		
_	244	H100	Cooling fan operation selection	244	H100	Cooling fan operation selection		
	245	G203	Rated slip	245	G203	Rated slip		
Slip	246	G204	Slip compensation time constant	246	G204	Slip compensation time constant		
compensation	247	G205	Constant-power range slip compensation selection	247	G205	Constant-power range slip compensation selection		
_	248	A006	Self power management selection	248	A006	Self power management selection		
_	249	H101	Earth (ground) fault detection at start	249	H101	Earth (ground) fault detection at start		
_	250	G106	Stop selection	250	G106	Stop selection		
_	251	H200	Output phase loss protection selection	251	H200	Output phase loss protection selection		
Frequency	252	T050	Override bias	252	T050	Override bias		
compensation function	253	T051	Override gain	253	T051	Override gain		
_	254	A007	Main circuit power OFF waiting time	254	A007	Main circuit power OFF waiting time		
Life check	255	E700	Life alarm status display	255	E700	Life alarm status display		
	256	E701	Inrush current limit circuit life display	256	E701	Inrush current limit circuit life display		
	257	E702	Control circuit capacitor life display	257	E702	Control circuit capacitor life display		
	258	E703	Main circuit capacitor life display	258	E703	Main circuit capacitor life display		
	259	E704	Main circuit capacitor life measuring	259	E704	Main circuit capacitor life measuring		
_	260	E602	PWM frequency automatic switchover	260	E602	PWM frequency automatic switchover		
	261	A730	Power failure stop selection	261	A730	Power failure stop selection		
	262	A731	Subtracted frequency at deceleration start	262	A731	Subtracted frequency at deceleration start		
Power failure	263	A732	Subtraction starting frequency	263	A732	Subtraction starting frequency		
stop	264	A733	Power-failure deceleration time 1	264	A733	Power-failure deceleration time 1		
	265	A734	Power-failure deceleration time 2	265	A734	Power-failure deceleration time 2		
	266	A735	Power failure deceleration time switchover frequency	266	A735	Power failure deceleration time switchover frequency		
_	267	T001	Terminal 4 input selection	267	T001	Terminal 4 input selection		
_	268	M022	Monitor decimal digits selection	268	M022	Monitor decimal digits selection		
_	_	_	_	270	A200	Stop-on contact/load torque high- speed frequency control selection		
Load torque				271	A201	High-speed setting maximum current		
high speed				272	A202	Middle-speed setting minimum current		
frequency		_	_	273	A203	Current averaging range		
control				274	A204	Current averaging filter time constant		
Stop-on contact control	_	_	_	275	A205	Stop-on contact excitation current low-speed multiplying factor		
				276	A206	PWM carrier frequency at stop-on contact		

		FI	REQROL F800 Series	FREQROL A800 Series			
Function	Pr No.	Pr Group	Name	Pr No.	Pr Group	Name	
		_		278	A100	Brake opening frequency	
				279	A101	Brake opening current	
				280	A102	Brake opening current detection time	
				281	A103	Brake operation time at start	
Brake sequence	_			282	A104	Brake operation frequency	
function				283	A105	Brake operation time at stop	
				284	A106	Deceleration detection function selection	
					A107	Overspeed detection frequency	
				285	H416	Speed deviation excess detection frequency	
				286	G400	Droop gain	
Droop control	_	_	_	287	G401	Droop filter time constant	
				288	G402	Droop function activation selection	
_	289	M431	Inverter output terminal filter	289	M431	Inverter output terminal filter	
_	290	M044	Monitor negative output selection	290	M044	Monitor negative output selection	
_	291	D100	Pulse train I/O selection	291	D100	Pulse train I/O selection	
_	_	_	_	292	A110 F500	Automatic acceleration/deceleration	
_	_	_	_	293	F513	Acceleration/deceleration separate selection	
_	294	A785	UV avoidance voltage gain	294	A785	UV avoidance voltage gain	
_	295	E201	Frequency change increment amount setting	295	E201	Frequency change increment amount setting	
Password	296	E410	Password lock level	296	E410	Password lock level	
function	297	E411	Password lock/unlock	297	E411	Password lock/unlock	
_	298	A711	Frequency search gain	298	A711	Frequency search gain	
_	299	A701	Rotation direction detection selection at restarting	299	A701	Rotation direction detection selection at restarting	
	_	_	_	313	M410	DO0 output selection	
CC-Link IE				314	M411	DO1 output selection	
				315	M412	DO2 output selection	
	331	N030	RS-485 communication station number	331	N030	RS-485 communication station number	
	332	N031	RS-485 communication speed	332	N031	RS-485 communication speed	
	333	3 — N032	RS-485 communication stop bit length/data length	333	_	RS-485 communication stop bit length/data length	
RS-485 communication			PU communication data length	333	N032	PU communication data length	
		N033	PU communication stop bit length		N033	PU communication stop bit length	
	334	N034	RS-485 communication parity check selection	334	N034	RS-485 communication parity check selection	
	335	N035	RS-485 communication retry count	335	N035	RS-485 communication retry count	
	336	N036	RS-485 communication check time interval	336	N036	RS-485 communication check time interval	
	337	N037	RS-485 communication waiting time setting	337	N037	RS-485 communication waiting time setting	
	338	D010	Communication operation command source	338	D010	Communication operation command source	
	339	D011	Communication speed command source	339	D011	Communication speed command source	

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Non-Protocol
Communication
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		FI	REQROL F800 Series	FREQROL A800 Series			
Function	Pr No.	Pr Group	Name	Pr No.	Pr Group	Name	
RS-485 communication	340	D001	Communication startup mode selection	340	D001	Communication startup mode selection	
	341	N038	RS-485 communication CR/LF selection	341	N038	RS-485 communication CR/LF selection	
	342	N001	Communication EEPROM write selection		N001	Communication EEPROM write selection	
	343	N080	Communication error count	343	N080	Communication error count	
_	_	_	_	349	N010	Communication reset selection	
				350	A510	Stop position command selection	
				351	A526	Orientation speed	
				352	A527	Creep speed	
				353	A528	Creep switchover position	
				354	A529	Position loop switchover position	
			_	355	A530	DC injection brake start position	
				356	A531	Internal stop position command	
				357	A532	Orientation in-position zone	
Orientation	_	_		358	A533	Servo torque selection	
control				359	C141	Encoder rotation direction	
				360	A511	16-bit data selection	
				361	A512	Position shift	
				362	A520	Orientation position loop gain	
				363	A521	Completion signal output delay tim	
				364	A522	Encoder stop check time	
				365	A523	Orientation limit	
				366	A524	Recheck time	
	_	_	_	367	G240	Speed feedback range	
				368	G240	Feedback gain	
Encoder				369	C140	Number of encoder pulses	
feedback	374	H800	Overspeed detection level	374	H800	Overspeed detection level	
recuback		—	— —	376	C148	Encoder signal loss detection enable/disable selection	
				380	F300	Acceleration S-pattern 1	
S-pattern	-	_			F301	Deceleration S-pattern 1	
acceleration/			_	381 382	F301	Acceleration S-pattern 2	
deceleration C				383	F302	Deceleration S-pattern 2	
	201	D101	Input pulse division scaling factor			Input pulse division scaling factor	
Dulco train innut	384	D101 D110	Input pulse division scaling factor Frequency for zero input pulse	384 385	D101 D110	Frequency for zero input pulse	
Pulse train input						Frequency for maximum input pulse	
	386	D111	Frequency for maximum input pulse	386	D111	Frequency for maximum input puls	
_	390	N054	% setting reference frequency	_			
	_			393	A525	Orientation selection	
		_		394	A540	Number of machine side gear teetl	
Orientation control			_	395	A541	Number of motor side gear teeth	
				396	A542	Orientation speed gain (P term)	
				397	A543	Orientation speed integral time	
				398	A544	Orientation speed gain (D term)	
				399	A545	Orientation deceleration ratio	

		FI	REQROL F800 Series	FREQROL A800 Series			
Function	Pr No.	Pr Group	Name	Pr No.	Pr Group	Name	
PLC function	414	A800	PLC function operation selection	414	A800	PLC function operation selection	
	415	A801	Inverter operation lock mode setting	415	A801	Inverter operation lock mode setting	
	416	A802	Pre-scale function selection	416	A802	Pre-scale function selection	
	417	A803	Pre-scale setting value	417	A803	Pre-scale setting value	
				419	B000	Position command source selection	
				420	B001	Command pulse scaling factor numerator (electronic gear numerator)	
				421	B002	Command pulse multiplication denominator (electronic gear denominator)	
				422	B003	Position control gain	
Position control	_	_	_	423	B004	Position feed forward gain	
				424	B005	Position command acceleration/ deceleration time constant	
				425	B006	Position feed forward command filter	
				426	B007	In-position width	
				427	B008	Excessive level error	
				428	B009	Command pulse selection	
				429	B010	Clear signal selection	
				430	B011	Pulse monitor selection	
CC-Link IE	_	_	_	434	N110	Network number (CC-Link IE)	
				435	N111	Station number (CC-Link IE)	
_	_	_	_	446	B012	Model position control gain	
	450	C200	Second applied motor	450	C200	Second applied motor	
	_	_	_	451	G300	Second motor control method selection	
	453	C201	Second motor capacity	453	C201	Second motor capacity	
	454	C202	Number of second motor poles	454	C202	Number of second motor poles	
	455	C225	Second motor excitation current	455	C225	Second motor excitation current	
	456	C204	Rated second motor voltage	456	C204	Rated second motor voltage	
Second motor	457	C205	Rated second motor frequency	457	C205	Rated second motor frequency	
constants	458	C220	` '		Second motor constant (R1)		
	459	C221	Second motor constant (R2)	459	C221	Second motor constant (R2)	
	460	C222	Second motor constant (L1)/ d-axis inductance (Ld)	460	C222	Second motor constant (L1)/ d-axis inductance (Ld)	
	461	C223	Second motor constant (L2)/ q-axis inductance (Lq)	461	C223	Second motor constant (L2)/ q-axis inductance (Lq)	
	462	C224	Second motor constant (X)	462	C224	Second motor constant (X)	
	463	C210	Second motor auto tuning setting/ status	463	C210	Second motor auto tuning setting/ status	
	_	_		464	B020	Digital position control sudden stop deceleration time	
				465	B021	First target position lower 4 digits	
Cimple nesition				466	B022	First target position upper 4 digits	
Simple position control			_	467	B023	Second target position lower 4 digits	
30111101				468	B024	Second target position upper 4 digits	
				469	B025	Third target position lower 4 digits	
				470	B026	Third target position upper 4 digits	
				471	B027	Fourth target position lower 4 digits	

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		F	REQROL F800 Series	FREQROL A800 Series			
Function	Pr No.	Pr Group	Name	Pr No.	Pr Group	Name	
				472	B028	Fourth target position upper 4 digits	
				473	B029	Fifth target position lower 4 digits	
				474	B030	Fifth target position upper 4 digits	
				475	B031	Sixth target position lower 4 digits	
				476	B032	Sixth target position upper 4 digits	
				477	B033	Seventh target position lower 4 digits	
				478	B034	Seventh target position upper 4 digits	
				479	B035	Eighth target position lower 4 digits	
				480	B036	Eighth target position upper 4 digits	
				481	B037	Ninth target position lower 4 digits	
				482	B038	Ninth target position upper 4 digits	
Simple position	_	_	_	483	B039	Tenth target position lower 4 digits	
control				484	B040	Tenth target position upper 4 digits	
				485	B041	Eleventh target position lower 4 digits	
				486	B042	Eleventh target position upper 4 digits	
				487	B043	Twelfth target position lower 4 digits	
				488	B043	Twelfth target position upper 4 digits	
				489	B044 B045	Thirteenth target position lower 4 digits	
					B045 B046		
				490		Thirteenth target position upper 4 digits	
				491	B047	Fourteenth target position lower 4 digits	
				492	B048	Fourteenth target position upper 4 digits	
				493	B049	Fifteenth target position lower 4 digits	
				494	B050	Fifteenth target position upper 4 digits	
	495	M500	Remote output selection	495	M500	Remote output selection	
Remote output	496	M501	Remote output data 1	496	M501	Remote output data 1	
	497	M502	Remote output data 2	497	M502	Remote output data 2	
	498	A804	PLC function flash memory clear	498	A804	PLC function flash memory clear	
_	-	_	_	500	N011	Communication error execution waiting time	
_	_	_	_	501	N012	Communication error occurrence count display	
_	502	N013	Stop mode selection at communication error	502	N013	Stop mode selection at communication error	
	503	E710	Maintenance timer 1	503	E710	Maintenance timer 1	
Maintenance	504	E711	Maintenance timer 1 warning output set time	504	E711	Maintenance timer 1 warning output set time	
	505	M001	Speed setting reference	505	M001	Speed setting reference	
	514	H324	Emergency drive dedicated retry waiting time	_	_	_	
_	515	H322	Emergency drive dedicated retry count	_	_	_	
				516	F400	S-pattern time at a start of acceleration	
S-pattern				517	F401	S-pattern time at a completion of acceleration	
acceleration/ deceleration D	_	_	_	518	F402	S-pattern time at a start of deceleration	
				519	F403	S-pattern time at a completion of deceleration	
	522	G105	Output stop frequency	522	G105	Output stop frequency	

FREQROL F800 Series			FREQROL A800 Series			
Function	Pr No.	Pr Group	Name	Pr No.	Pr Group	Name
_	523	H320	Emergency drive mode selection	_	_	_
_	524	H321	Emergency drive running speed		_	_
_	539	N002	MODBUS-RTU communication check time interval	539	N002	MODBUS-RTU communication check time interval
_		1	_	541	N100	Frequency command sign selection
	547	N040	USB communication station number	547	N040	USB communication station number
USB	548	N041	USB communication check time interval	548	N041	USB communication check time interval
	549	N000	Protocol selection	549	N000	Protocol selection
Communication	550	D012	NET mode operation command source selection	550	D012	NET mode operation command source selection
	551	D013	PU mode operation command source selection	551	D013	PU mode operation command source selection
_	552	H429	Frequency jump range	552	H429	Frequency jump range
PID control	553	A603	PID deviation limit	553	A603	PID deviation limit
1 1D control	554	A604	PID signal operation selection	554	A604	PID signal operation selection
	555	E720	Current average time	555	E720	Current average time
Current average	556	E721	Data output mask time	556	E721	Data output mask time
value monitor	557	E722	Current average value monitor signal output reference current	557	E722	Current average value monitor signal output reference current
_	560	A712	Second frequency search gain	560	A712	Second frequency search gain
_	561	H020	PTC thermistor protection level	561	H020	PTC thermistor protection level
_	563	M021	Energization time carrying-over times	563	M021	Energization time carrying-over times
_	564	M031	Operating time carrying-over times	564	M031	Operating time carrying-over times
Second motor constants	569	G942	Second motor speed control gain	569	G942	Second motor speed control gain
Multiple rating	570	E301	Multiple rating setting	570	E301	Multiple rating setting
_	571	F103	Holding time at a start	571	F103	Holding time at a start
_	573	A680 T052	4 mA input check selection	573	A680 T052	4 mA input check selection
_	574	C211	Second motor online auto tuning	574	C211	Second motor online auto tuning
	575	A621	Output interruption detection time	575	A621	Output interruption detection time
PID control	576	A622	Output interruption detection level	576	A622	Output interruption detection level
	577	A623	Output interruption cancel level	577	A623	Output interruption cancel level
	578	A400	Auxiliary motor operation selection			
	579	A401	Motor connection function selection	_	_	_
	580	A402	MC switching interlock time			
	581	A403	Start waiting time			
	582	A404	Auxiliary motor connection-time deceleration time			
Pump function	583	A405	Auxiliary motor disconnection-time acceleration time			
	584	A406	Auxiliary motor 1 starting frequency			_
	585	A407	Auxiliary motor 2 starting frequency			
	586	A408	Auxiliary motor 3 starting frequency			
	587	A409	Auxiliary motor 1 stopping frequency			
	588	A410	Auxiliary motor 2 stopping frequency			

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	FREQROL F800 Series			FREQROL A800 Series			
Function	Pr No.	Pr Group	Name	Pr No.	Pr Group	Name	
5 ();	589	A411	Auxiliary motor 3 stopping frequency				
Pump function	590	A412	Auxiliary motor start detection time	_	_		
	591	A413	Auxiliary motor stop detection time				
	592	A300	Traverse function selection	592	A300	Traverse function selection	
	593	A301	Maximum amplitude amount	593	A301	Maximum amplitude amount	
Traverse	594	A302	Amplitude compensation amount during deceleration	594	A302	Amplitude compensation amount during deceleration	
function	595	A303	Amplitude compensation amount during acceleration	595	A303	Amplitude compensation amount during acceleration	
	596	A304	Amplitude acceleration time	596	A304	Amplitude acceleration time	
	597	A305	Amplitude deceleration time	597	A305	Amplitude deceleration time	
_	598	H102	Undervoltage level	598	H102	Undervoltage level	
_	599	T721	X10 terminal input selection	599	T721	X10 terminal input selection	
	600	H001	First free thermal reduction frequency 1	600	H001	First free thermal reduction frequency 1	
Electronic	601	H002	First free thermal reduction ratio 1	601	H002	First free thermal reduction ratio 1	
thermal O/L relay	602	H003	First free thermal reduction frequency 2	602	H003	First free thermal reduction frequency 2	
,	603	H004	First free thermal reduction ratio 2	603	H004	First free thermal reduction ratio 2	
	604	H005	First free thermal reduction frequency 3	604	H005	First free thermal reduction frequency 3	
_	606	T722	Power failure stop external signal input selection	606	T722	Power failure stop external signal input selection	
_	607	H006	Motor permissible load level	607	H006	Motor permissible load level	
_	608	H016	Second motor permissible load level	608	H016	Second motor permissible load level	
PID control	609	A624	PID set point/deviation input selection	609	A624	PID set point/deviation input selection	
	610	A625	PID measured value input selection	610	A625	PID measured value input selection	
_	611	F003	Acceleration time at a restart	611	F003	Acceleration time at a restart	
				635	M610	Cumulative pulse clear signal selection	
Cumulative pulse monitor	_	_	_	636	M611	Cumulative pulse division scaling factor	
panee memer				637	M612	Control terminal option—Cumulative pulse division scaling factor	
				638	M613	Cumulative pulse storage	
				639	A108	Brake opening current selection	
				640	A109	Brake operation frequency selection	
				641	A130	Second brake sequence operation selection	
				642	A120	Second brake opening frequency	
Brake sequence				643	A121	Second brake opening current	
function	_	_	_	644	A122	Second brake opening current detection time	
				645	A123	Second brake operation time at start	
				646	A124	Second brake operation frequency	
				647	A125	Second brake operation time at stop	
				648	A126	Second deceleration detection function selection	

FREQROL F800 Series					FREQROL A800 Series			
Function	Pr No.	Pr Group	Name	Pr No.	Pr Group	Name		
Brake sequence			_	650	A128	Second brake opening current selection		
function				651	A129	Second brake operation frequency selection		
Speed	653	G410	Speed smoothing control	653	G410	Speed smoothing control		
smoothing control	654	G411	Speed smoothing cutoff frequency	654	G411	Speed smoothing cutoff frequency		
	655	M530	Analog remote output selection	655	M530	Analog remote output selection		
Analog remote	656	M531	Analog remote output 1	656	M531	Analog remote output 1		
output function	657	M532	Analog remote output 2	657	M532	Analog remote output 2		
	658	M533	Analog remote output 3	658	M533	Analog remote output 3		
	659	M534	Analog remote output 4	659	M534	Analog remote output 4		
Increased	660	G130	Increased magnetic excitation deceleration operation selection	660	G130	Increased magnetic excitation deceleration operation selection		
magnetic excitation	661	G131	Magnetic excitation increase rate	661	G131	Magnetic excitation increase rate		
deceleration	662	G132	Increased magnetic excitation current level	662	G132	Increased magnetic excitation current level		
_	663	M060	Control circuit temperature signal output level	663	M060	Control circuit temperature signal output level		
	665	G125	Regeneration avoidance frequency gain	665	G125	Regeneration avoidance frequency gain		
_	668	A786	Power failure stop frequency gain	668	A786	Power failure stop frequency gain		
_	673	G060	SF-PR slip amount adjustment operation selection	673	G060	SF-PR slip amount adjustment operation selection		
_	674	G061	SF-PR slip amount adjustment gain	674	G061	SF-PR slip amount adjustment gain		
				679	G420	Second droop gain		
				680	G421	Second droop filter time constant		
Second droop control	_	_	_	681	G422	Second droop function activation selection		
				682	G423	Second droop break point gain		
				683	G424	Second droop break point torque		
_	684	C000	Tuning data unit switchover	684	C000	Tuning data unit switchover		
	686	E712	Maintenance timer 2	686	E712	Maintenance timer 2		
Maintenance	687	E713	Maintenance timer 2 warning output set time	687	E713	Maintenance timer 2 warning output set time		
Maintenance	688	E714	Maintenance timer 3	688	E714	Maintenance timer 3		
	689	E715	Maintenance timer 3 warning output set time	689	E715	Maintenance timer 3 warning output set time		
_	_	_	_	690	H881	Deceleration check time		
	692	H011	Second free thermal reduction frequency 1	692	H011	Second free thermal reduction frequency 1		
E	693	H012	Second free thermal reduction ratio 1	693	H012	Second free thermal reduction ratio 1		
Electronic thermal O/L	694	H013	Second free thermal reduction frequency 2	694	H013	Second free thermal reduction frequency 2		
relay	695	H014	Second free thermal reduction ratio 2	695	H014	Second free thermal reduction ratio 2		
	696	H015	Second free thermal reduction frequency 3	696	H015	Second free thermal reduction frequency 3		
_	699	T740	Input terminal filter	699	T740	Input terminal filter		

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		FI	REQROL F800 Series	FREQROL A800 Series			
Function	Pr No.	Pr Group	Name	Pr No.	Pr Group	Name	
	702	C106	Maximum motor frequency	702	C106	Maximum motor frequency	
	706	C130	Induced voltage constant (phi f)	706	C130	Induced voltage constant (phi f)	
	707	C107	Motor inertia (integer)	707	C107	Motor inertia (integer)	
	711	C131	Motor Ld decay ratio	711	C131	Motor Ld decay ratio	
	712	C132	Motor Lq decay ratio	712	C132	Motor Lq decay ratio	
Motor constants	717	C182	Starting resistance tuning compensation	717	C182	Starting resistance tuning compensation	
	721	C185	Starting magnetic pole position detection pulse width	721	C185	Starting magnetic pole position detection pulse width	
	724	C108	Motor inertia (exponent)	724	C108	Motor inertia (exponent)	
	725	C133	Motor protection current level	725	C133	Motor protection current level	
	726	N050	Auto Baudrate/Max Master				
	727	N051	Max Info Frames				
BACnet MS/TP protocol	728	N052	Device instance number (Upper 3 digits)	_	_	_	
	729	N053	Device instance number (Lower 4 digits)				
	738	C230	Second motor induced voltage constant (phi f)	738	C230	Second motor induced voltage constant (phi f)	
	739	C231	Second motor Ld decay ratio	739	C231	Second motor Ld decay ratio	
	740	C232	Second motor Lq decay ratio	740	C232	Second motor Lq decay ratio	
	741	C282	Second starting resistance tuning compensation	741	C282	Second starting resistance tuning compensation	
Motor constants	742	C285	Second motor magnetic pole detection pulse width	742	C285	Second motor magnetic pole detection pulse width	
	743	C206	Second motor maximum frequency	743	C206	Second motor maximum frequency	
	744	C207	Second motor inertia (integer)	744	C207	Second motor inertia (integer)	
	745	C208	Second motor inertia (exponent)	745	C208	Second motor inertia (exponent)	
	746	C233	Second motor protection current level	746	C233	Second motor protection current level	
_	_	_	_	747	G350	Second motor low-speed range torque characteristic selection	
	753	A650	Second PID action selection	753	A650	Second PID action selection	
	754	A652	Second PID control automatic switchover frequency	754	A652	Second PID control automatic switchover frequency	
PID control	755	A651	Second PID action set point	755	A651	Second PID action set point	
PID CONIIO	756	A653	Second PID proportional band	756	A653	Second PID proportional band	
	757	A654	Second PID integral time	757	A654	Second PID integral time	
	758	A655	Second PID differential time	758	A655	Second PID differential time	
	759	A600	PID unit selection	759	A600	PID unit selection	
	760	A616	Pre-charge fault selection	760	A616	Pre-charge fault selection	
	761	A617	Pre-charge ending level	761	A617	Pre-charge ending level	
	762	A618	Pre-charge ending time	762	A618	Pre-charge ending time	
	763	A619	Pre-charge upper detection level	763	A619	Pre-charge upper detection level	
DID pro chargo	764	A620	Pre-charge time limit	764	A620	Pre-charge time limit	
PID pre-charge function	765	A656	Second pre-charge fault selection	765	A656	Second pre-charge fault selection	
	766	A657	Second pre-charge ending level	766	A657	Second pre-charge ending level	
	767	A658	Second pre-charge ending time	767	A658	Second pre-charge ending time	
	768	A659	Second pre-charge upper detection level	768	A659	Second pre-charge upper detection level	
	769	A660	Second pre-charge time limit	769	A660	Second pre-charge time limit	

	FREQROL F800 Series			FREQROL A800 Series			
Function	Pr No.	Pr Group	Name	Pr No.	Pr Group	Name	
Monitor	774	M101	Operation panel monitor selection 1	774	M101	Operation panel monitor selection 1	
Monitor functions	775	M102	Operation panel monitor selection 2	775	M102	Operation panel monitor selection 2	
	776	M103	Operation panel monitor selection 3	776	M103	Operation panel monitor selection 3	
_	777	A681 T053	4 mA input check operation frequency	777	A681 T053	4 mA input check operation frequency	
_	778	A682 T054	4 mA input check filter	778	A682 T054	4 mA input check filter	
_	779	N014	Operation frequency during communication error	779	N014	Operation frequency during communication error	
_		_	_	788	G250	Low speed range torque characteristic selection	
_	791	F070	Acceleration time in low-speed range	791	F070	Acceleration time in low-speed range	
_	792	F071	Deceleration time in low-speed range	792	F071	Deceleration time in low-speed range	
_	799	M520	Pulse increment setting for output power	799	M520	Pulse increment setting for output power	
_	800	G200	Control method selection	800	G200	Control method selection	
_	1	_	_	802	G102	Pre-excitation selection	
			- 8 - 8 8	803	G210	Constant output range torque characteristic selection	
Torque	_	_		804	D400	Torque command source selection	
command				805	D401	Torque command value (RAM)	
				806	D402	Torque command value (RAM,EEPROM)	
		_	_	807	H410	Speed limit selection	
Speed limit				808	H411	Forward rotation speed limit/ speed limit	
				809	H412	Reverse rotation speed limit/ reverse-side speed limit	
				810	H700	Torque limit input method selection	
				811	D030	Set resolution switchover	
				812	H701	Torque limit level (regeneration)	
Torque limit	_	_	_	813	H702	Torque limit level (3rd quadrant)	
-				814	H703	Torque limit level (4th quadrant)	
				815	H710	Torque limit level 2	
				816	H720	Torque limit level during acceleration	
				817 818	H721 C112	Torque limit level during deceleration Easy gain tuning response level	
Easy gain tuning	_	_	_	819	C113	setting Easy gain tuning selection	
	820	G211	Speed control P gain 1	820	G211	Speed control P gain 1	
	821	G212	Speed control integral time 1	821	G212	Speed control integral time 1	
	822	T003	Speed setting filter 1	822	T003	Speed setting filter 1	
A ali: t t	_	_	_	823	G215	Speed detection filter 1	
Adjustment function	824	G213	Torque control P gain 1 (current loop proportional gain)	824	G213	Torque control P gain 1 (current loop proportional gain)	
	825	G214	Torque control integral time 1 (current loop integral time)	825	G214	Torque control integral time 1 (current loop integral time)	
	_	_	_	826	T004	Torque setting filter 1	

FREQROL F800 Series

FREQROL A800 Series

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	FREQROL F800 Series		FREQROL A800 Series			
Function	Pr No.	Pr Group	Name	Pr No.	Pr Group	Name
	827	G216	Torque detection filter 1	827	G216	Torque detection filter 1
	_	_	_	828	G224	Model speed control gain
	830	G311	Speed control P gain 2	830	G311	Speed control P gain 2
	831	G312	Speed control integral time 2	831	G312	Speed control integral time 2
Adjustment	832	T005	Speed setting filter 2	832	T005	Speed setting filter 2
function	_	_	_	833	G315	Speed detection filter 2
	834	G313	Torque control P gain 2	834	G313	Torque control P gain 2
	835	G314	Torque control integral time 2	835	G314	Torque control integral time 2
	_	_	_	836	T006	Torque setting filter 2
	837	G316	Torque detection filter 2	837	G316	Torque detection filter 2
				840	G230	Torque bias selection
				841	G231	Torque bias 1
				842	G232	Torque bias 2
				843	G233	Torque bias 3
Torque bias	_	_	_	844	G234	Torque bias filter
				845	G235	Torque bias operation time
				846	G236	Torque bias balance compensation
				847	G237	Fall-time torque bias terminal 1 bias
				848	G238	Fall-time torque bias terminal 1 gain
	849	T007	Analog input offset adjustment	849	T007	Analog input offset adjustment
	_	_	_	850	G103	Brake operation selection
				851	C240	Control terminal option-Number of encoder pulses
				852	C241	Control terminal option-Encoder rotation direction
				853	H417	Speed deviation time
				854	G217	Excitation ratio
Additional function				855	C248	Control terminal option-Signal loss detection enable/disable selection
Tarrottori	858	T040	Terminal 4 function assignment	858	T040	Terminal 4 function assignment
	859	C126	Torque current/Rated PM motor current	859	C126	Torque current/Rated PM motor current
	860	C226	Second motor torque current/Rated PM motor current	860	C226	Second motor torque current/ Rated PM motor current
				862	C242	Encoder option selection
	_	_	_	863	M600	Control terminal option-Encoder pulse division ratio
	864	M470	Torque detection	864	M470	Torque detection
_	_	_	_	865	M446	Low speed detection
Indication function	866	M042	Torque monitoring reference	866	M042	Torque monitoring reference
_	867	M321	AM output filter	867	M321	AM output filter
_	868	T010	Terminal 1 function assignment	868	T010	Terminal 1 function assignment
_	869	M334	Current output filter	869	M334	Current output filter
_	870	M440	Speed detection hysteresis	870	M440	Speed detection hysteresis
	872	H201	Input phase loss protection selection	872	H201	Input phase loss protection selection
Protective	_	_	_	873	H415	Speed limit
Functions	874	H730	OLT level setting	874	H730	OLT level setting
	_	_	_	875	H030	Fault definition

	FREQROL F800 Series					FREQROL A800 Series			
Function	Pr No.	Pr Group	Name	Pr No.	Pr Group	Name			
_	_		_	876	H022	Thermal protector input			
				877	G220	Speed feed forward control/model adaptive speed control selection			
Control system				878	G221	Speed feed forward filter			
functions		_	_	879	G222	Speed feed forward torque limit			
				880	C114	Load inertia ratio			
				881	G223	Speed feed forward gain			
	882	G120	Regeneration avoidance operation selection	882	G120	Regeneration avoidance operation selection			
Regeneration	883	G121	Regeneration avoidance operation level	883	G121	Regeneration avoidance operation level			
avoidance function	884	G122	Regeneration avoidance at deceleration detection sensitivity	884	G122	Regeneration avoidance at deceleration detection sensitivity			
	885	G123	Regeneration avoidance compensation frequency limit value	885	G123	Regeneration avoidance compensation frequency limit value			
	886	G124	Regeneration avoidance voltage gain	886	G124	Regeneration avoidance voltage gain			
Free parameters	888	E420	Free parameter 1	888	E420	Free parameter 1			
rice parameters	889	E421	Free parameter 2	889	E421	Free parameter 2			
	891	M023	Cumulative power monitor digit shifted times	891	M023	Cumulative power monitor digit shifted times			
	892	M200	Load factor	892	M200	Load factor			
	893	M201	Energy saving monitor reference (motor capacity)	893	M201	Energy saving monitor reference (motor capacity)			
Energy saving	894	M202	Control selection during commercial power-supply operation	894	M202	Control selection during commercial power-supply operation			
monitor	895	M203	Power saving rate reference value	895	M203	Power saving rate reference value			
	896	M204	Power unit cost	896	M204	Power unit cost			
	897	M205	Power saving monitor average time	897	M205	Power saving monitor average time			
	898	M206	Power saving cumulative monitor clear	898	M206	Power saving cumulative monitor clear			
	899	M207	Operation time rate (estimated value)	899	M207	Operation time rate (estimated value)			
	C0 (900)	M310	FM/CA terminal calibration	C0 (900)	M310	FM/CA terminal calibration			
	C1 (901)	M320	AM terminal calibration	C1 (901)	M320	AM terminal calibration			
	C2 (902)	T200	Terminal 2 frequency setting bias frequency	C2 (902)	T200	Terminal 2 frequency setting bias frequency			
	C3 (902)	T201	Terminal 2 frequency setting bias	C3 (902)	T201	Terminal 2 frequency setting bias			
Calibration	125 (903)	T202	Terminal 2 frequency setting gain frequency	125 (903)	T202	Terminal 2 frequency setting gain frequency			
parameters	C4 (903)	T203	Terminal 2 frequency setting gain	C4 (903)	T203	Terminal 2 frequency setting gain			
	C5 (904)	T400	Terminal 4 frequency setting bias frequency	C5 (904)	T400	Terminal 4 frequency setting bias frequency			
	C6 (904)	T401	Terminal 4 frequency setting bias	C6 (904)	T401	Terminal 4 frequency setting bias			
	126 (905)	T402	Terminal 4 frequency setting gain frequency	126 (905)	T402	Terminal 4 frequency setting gain frequency			
	C7 (905)	T403	Terminal 4 frequency setting gain	C7 (905)	T403	Terminal 4 frequency setting gain			

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		FI	REQROL F800 Series		F	REQROL A800 Series
Function	Pr No.	Pr Group	Name	Pr No.	Pr Group	Name
	C12 (917)	T100	Terminal 1 bias frequency (speed)	C12 (917)	T100	Terminal 1 bias frequency (speed
	C13 (917)	T101	Terminal 1 bias (speed)	C13 (917)	T101	Terminal 1 bias (speed)
	C14 (918)	T102	Terminal 1 gain frequency (speed)	C14 (918)	T102	Terminal 1 gain frequency (speed
	C15 (918)	T103	Terminal 1 gain (speed)	C15 (918)	T103	Terminal 1 gain (speed)
	C16 (919)	T110	Terminal 1 bias command (torque)	C16 (919)	T110	Terminal 1 bias command (torque
	C17 (919)	T111	Terminal 1 bias (torque)	C17 (919)	T111	Terminal 1 bias (torque)
	C18 (920)	T112	Terminal 1 gain command (torque)	C18 (920)	T112	Terminal 1 gain command (torque
	C19 (920)	T113	Terminal 1 gain (torque)	C19 (920)	T113	Terminal 1 gain (torque)
	C8 (930)	M330	Current output bias signal	C8 (930)	M330	Current output bias signal
Calibration	C9 (930)	M331	Current output bias current	C9 (930)	M331	Current output bias current
parameters	C10 (931)	M332	Current output gain signal	C10 (931)	M332	Current output gain signal
	C11 (931)	M333	Current output gain current	C11 (931)	M333	Current output gain current
	C38 (932)	T410	Terminal 4 bias command (torque)	C38 (932)	T410	Terminal 4 bias command (torque
	C39 (932)	T411	Terminal 4 bias (torque)	C39 (932)	T411	Terminal 4 bias (torque)
	C40 (933)	T412	Terminal 4 gain command (torque)	C40 (933)	T412	Terminal 4 gain command (torque
	C41 (933)	T413	Terminal 4 gain (torque)	C41 (933)	T413	Terminal 4 gain (torque)
	C42 (934)	A630	PID display bias coefficient	C42 (934)	A630	PID display bias coefficient
	C43 (934)	A631	PID display bias analog value	C43 (934)	A631	PID display bias analog value
	C44 (935)	A632	PID display gain coefficient	C44 (935)	A632	PID display gain coefficient
	C45 (935)	A633	PID display gain analog value	C45 (935)	A633	PID display gain analog value
	977	E302	Input voltage mode selection	977	E302	Input voltage mode selection
	989	E490	Parameter copy alarm release	989	E490	Parameter copy alarm release
PU	990	E104	PU buzzer control	990	E104	PU buzzer control
N4 - ''	991	E105	PU contrast adjustment	991	E105	PU contrast adjustment
Monitor functions	992	M104	Operation panel setting dial push monitor selection	992	M104	Operation panel setting dial push monitor selection
Oroop control	_	_	_	994	G403	Droop break point gain
				995	G404	Droop break point torque
	997	H103	Fault initiation	997	H103	Fault initiation
_	998	E430	PM parameter initialization	998	E430	PM parameter initialization
_	999	E431	Automatic parameter setting	999	E431	Automatic parameter setting

12.5.4 Communication parameters

The table below shows the parameters corresponding to each communication port.

- The PU port is common in the V500, F500, A500, and E500 Series.
- In the E500 Series, only the PU port is provided.
- In the V500, F500, and A500 Series, communication parameters for the FR-A5NR computer link are provided.
- In the S500 Series containing RS-485 communication, the following parameters are applicable.
- In the D700 and E700 Series, communication parameters for the PU port are provided.
- In the E700 Series, communication parameters for the FR-E7TR computer link can be used.
- In the F800, A800, F700, and A700 Series, communication parameters for the built-in RS-485 terminal are provided.

Funct ion	F50	REQROL V500, 0, A500 and E500 eries (PU port)	F Se	REQROL V500, F500 and A500 eries (FR-A5NR computer link)	FREQROL S500 Series (Built-in port in accordance with RS-485)		FREQROL D700 and E700 Series (PU port) (FR-E7TR computer link)		FREQROL F800, A800, F700 and A700 Series (Built-in RS-485 terminal)	
	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name	Pr No.	Name
	117	Communication station number	331	Communication station number	n1 331	Communication station number	117	PU communication station number	331	RS-485 communication station
	118	Communication speed	332	Communication speed	n2 332	Communication speed	118	PU communication speed	332	RS-485 communication speed
	119	Stop bit length/ Data length	333	Stop bit length/ Data length	n3 333	Stop bit length/ Data length	119	PU communication stop bit length	333	RS-485 communication stop bit length
	120	Parity check presence/absence	334	Parity check presence/absence	n4 334	Parity check presence/absence	120	PU communication parity check	334	RS-485 communication parity check selection
	121	Number of communication retries	335	Number of communication retries	n5 335	Number of times of communication retries	121	Number of PU communication retries	335	RS-485 communication number of retries
Com- muni-	122	Communication check time interval	336	Communication check time interval	n6 336	Communication check time interval	122	PU communication check time interval	336	RS-485 communication check time interval
cation type	123	Waiting time setting	337	Waiting time setting	n7 337	Waiting time setting	123	PU communication waiting time setting	337	RS-485 communication waiting time setting
			338	Operation command right	n8 338	Operation command right	338	Communication operation command source	338	Communication operation command source
	-	_	339	Speed command write	n9 339	Speed command right	339	Communication frequency command source	339	Communication speed command source
	_	_	340	Link startup mode selection	n10 340	Link startup mode selection	340	Communication startup mode selection	340	Communication startup mode selection
	124	CR, LF presence/ absence selection	341	CR, LF presence/ absence selection	n11 341	Absence/presence of CR and LF	124	PU communication CR/LF presence/ absence selection	341	RS-485 communication CR/ LF selection
	_	_	342	E ² PROM write selection	n12 342	E ² PROM write selection	342	Communication EEPROM write selection	342	Communication EEPROM write selection
	_	_	_	_	_	_	549	Protocol selection	549	Protocol selection

FX Series Programmable Controllers User's Manual [Data Communication Edition]

F. Non-Protocol Communication (RS/RS2 Instruction)

Foreword

This manual explains "non-protocol communication" provided for the MELSEC-F FX Series Programmable Controllers and should be read and understood before attempting to install or use the unit. Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

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1.1 Outline of System

D

1. Outline

This chapter explains Non-protocol communication.

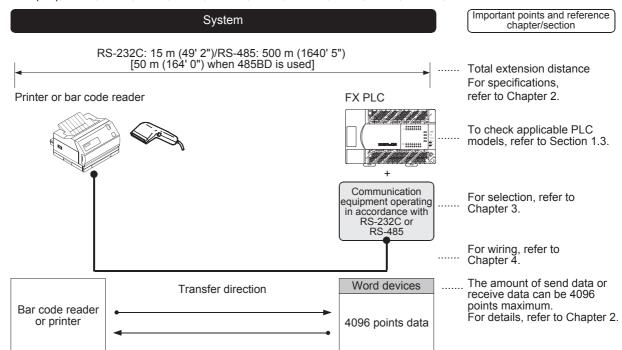
1.1 Outline of System

Non-protocol communication exchanges non-protocol data using a printer, bar code reader, etc. In FX Series PLCs, non-protocol communication is available using the RS and RS2 instructions. The RS2 instruction is dedicated to the FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs. In FX3G, FX3GC PLCs, the RS2 instruction allows communication using three channels at the same time. In FX3U, FX3UC PLCs, the RS2 instruction allows communication using two channels at the same time.

- 1) Up to 4096 points of data can be sent, and up to 4096 points of data can be received. In the case of FX2N and FX2NC PLCs, make sure that the total number of sent and received data is 8000 points or less.
- 2) Data transfer is enabled when the connected equipment supports non-protocol serial communication.
- 3) The applicable total extension distance is 15m (49' 2") maximum in accordance with RS-232C communication, and 500m (1640' 5") maximum in accordance with RS-485 communication [50m (164' 0") when 485BD connection is used].

1. RS instruction

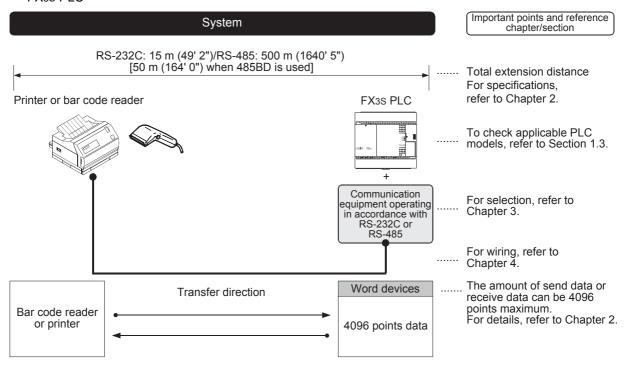
FX2(FX), FX2C, FX0N, FX1S, FX1N, FX1NC, FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs



In PLCs except for the FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs, the amount of send data or receive data can be 256 points maximum.

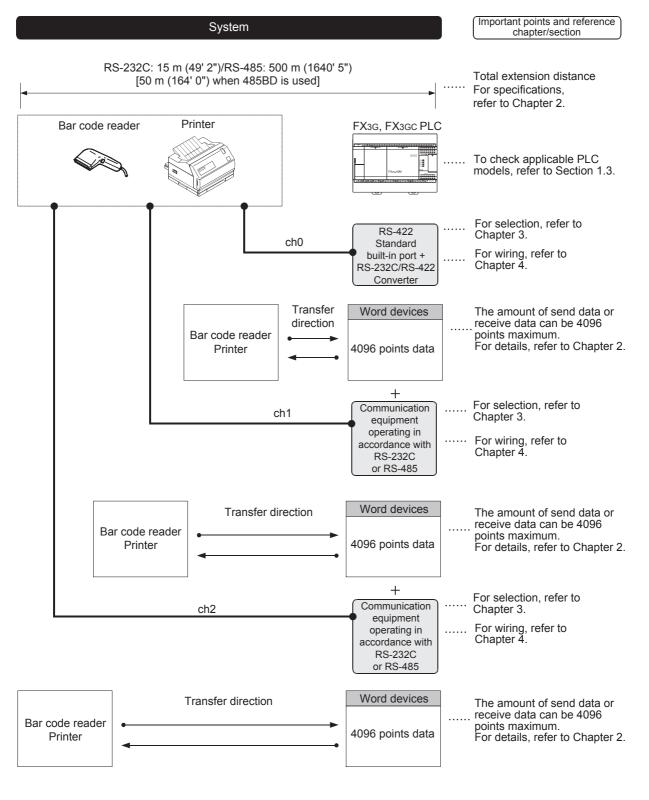
2. RS2 instruction

FX3S PLC

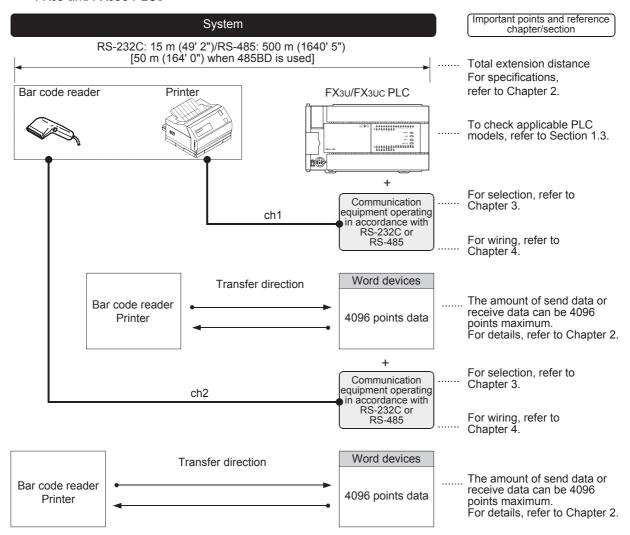


D

FX3G and FX3GC PLCs

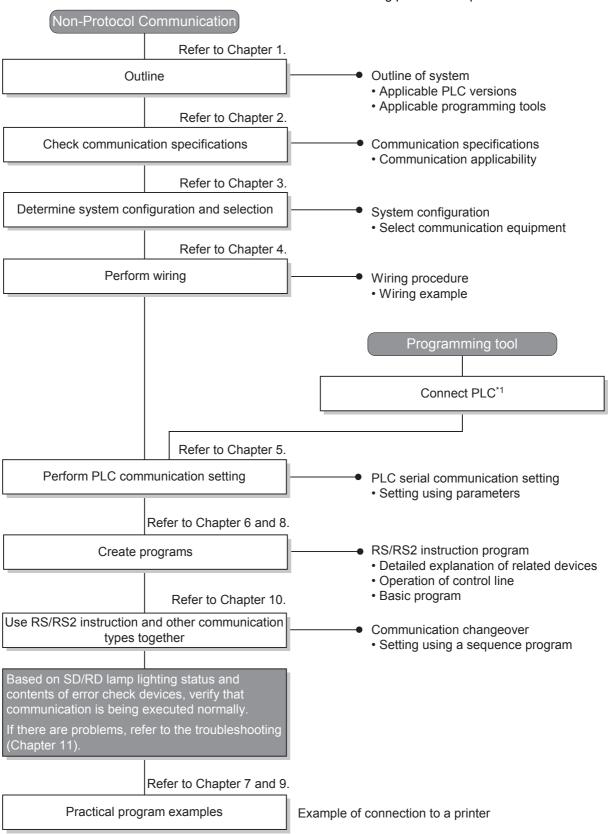


FX3U and FX3UC PLCs



1.2 **Procedures Before Operation**

The flow chart below shows the Non-Protocol Communication setting procedures up until data link:



^{*1} For the programming tool to PLC connection procedure, refer to the "Programming Communication" section in this manual or the respective programming tool manual.

For details on operating procedures, refer to the respective programming tool manual.

1.3 Communication Type Applicability in PLC

1.3.1 Applicable versions

The communication types are applicable in the following versions.

- ✓: Applicable (If applicable versions of main units are limited, they are described inside ().)
- -: Not applicable

PLC	Applicability (applicable version)	Remarks	
FX3UC Series	✓	Full-duplex communication/half-duplex communication	
FX3U Series	✓	Full-duplex communication/half-duplex communication	
FX3GC Series	✓	Full-duplex communication/half-duplex communication	
FX3G Series	✓	Full-duplex communication/half-duplex communication	
FX3S Series	√	Full-duplex communication/half-duplex communication	
FX2NC Series	✓	Full-duplex communication/half-duplex communication	
FX2N Series	✓ (Ver. 1.06 or later)	Full-duplex communication (Ver. 2.00 or later)/half-duplex communication	
FX1NC Series	✓	Half-duplex communication	
FX1N Series	✓	Half-duplex communication	
FX1S Series	✓	Half-duplex communication	
FX _{0N} Series	✓ (Ver. 1.20 or later)	Half-duplex communication	
FX0S Series	_	Non-protocol communication is not provided	
FX ₀ Series	—	Non-protocol communication is not provided	
FX2C Series	✓	Half-duplex communication	
FX2(FX) Series	√ (Ver. 3.07 or later)*1	Half-duplex communication	
FX1 Series	_	Non-protocol communication is not provided	

^{*1.} Applicable in products manufactured in January, 1994 (manufacturer's serial No.: 41****) and later.

1.3.2 Version check

The PLC version can be checked by reading the last three digits of device D8001.

→ For a detailed description of the version check, refer to A. Common Items Section 4.2.

1.3.3 How to look at the manufacturer's serial number

The year and month of production of the PLC main unit can be checked on the nameplate, and "LOT" indicated on the front of the product.

ightarrow For a detailed description of the How to look at the manufacturer's serial number, refer to A. Common Items Section 4.1.

1.3.4 Products whose production was stopped

Production was stopped for some models of MELSEC-F Series PLCs and programming tools described in this manual. For models whose production was stopped, refer to Appendix A.

To see the latest available products, refer to the general catalog.

1.4 Programming Tool Applicability

1.4.1 For applicable versions

The programming tool is applicable for each FX Series from the version shown.

1. English versions

Product name	Model name	Applicable version	Remarks
FX3U and FX3UC P	LCs		
GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later	
GX Developer	SW□D5C(F)-GPPW-E	Ver. 8.18U or later	-
FX-30P		Ver. 1.00 or later	
GOT1000 Series di	splay units		000 Series display units for applicable orting the list editor function.
FX3G PLC			
GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later	
GX Developer SW□D5C(F)-GPPW-E		Ver. 8.72A or later	-
FX-30P		Ver. 1.00 or later	
GOT1000 Series di	splay units		000 Series display units for applicable orting the list editor function.
FX3GC PLC			
GX Works2	SW□DNC-GXW2-E	Ver. 1.77F or later	
FX-30P		Ver. 1.30 or later	_
GOT1000 Series di	splay units		000 Series display units for applicable orting the list editor function.
FX3S PLC			
GX Works2	SW□DNC-GXW2-E	Ver. 1.492N or later	
FX-30P		Ver. 1.50 or later	-
GOT1000 Series di	enlav unite		000 Series display units for applicable
		models and versions suppo	orting the list editor function.
FX2N and FX2NC P			
GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later	
GX Developer	SW□D5C(F)-GPPW-E	SW2 A or later	
FX-PCS/WIN-E	SW0PC-FXGP/WIN-E	Ver. 1.00 or later	
FX-30P		Ver. 1.00 or later	-
FX-20P-E(-SET0) FX-20P-MFXC-E		Ver. 3.00 or later	
FX-10P-E		Ver. 3.00 or later	
GOT-F900 Series display units F940WGOT-TWD-E F940GOT-*WD-E F940GOT-*BD-H-E F940GOT-*BD-RH-E			
GOT1000 Series di	splay units		000 Series display units for applicable orting the list editor function.
FX1S, FX1N and FX	(1NC PLCs		
FX1s, FX1N and FX GX Works2	(1nc PLCs SW□DNC-GXW2-E	Ver. 1.08J or later	
		Ver. 1.08J or later SW5 A or later	
GX Works2 GX Developer	SW□DNC-GXW2-E		
GX Works2 GX Developer FX-PCS/WIN-E	SW□DNC-GXW2-E SW□D5C(F)-GPPW-E	SW5 A or later	<u>-</u>
GX Works2	SW□DNC-GXW2-E SW□D5C(F)-GPPW-E	SW5 A or later Ver. 3.00 or later	-

Product name	Model name	Applicable version	Remarks		
GOT-F900 Series dis	splay units				
F940WGOT-TWD-E		F940WGOT-TWD-E (Ver.	1.00 or later)		
F940GOT-*WD-E		F940GOT-LWD-E, F940GOT-SWD-E (Ver. 1.00 or later)			
F940GOT-*BD-H-E		F940GOT-LBD-H-E, F940	GOT-SBD-H-E (Ver. 1.00 or later)		
F940GOT-*BD-RH-E		F940GOT-LBD-RH-E, F94	0GOT-SBD-RH-E (Ver. 1.00 or later)		
GOT1000 Series disp	olay units		T1000 Series display units for applicable porting the list editor function.		

2. Japanese versions

Product name	Model name	Applicable version	Remarks
FX3u and FX3uc P	LCs		
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later	
GX Developer	SW□D5C(F)-GPPW-J	Ver. 8.13P or later	-
FX-30P		Ver. 1.00 or later	
GOT1000 Series di	isplay units		1000 Series display units for applicable porting the list editor function.
FX3G PLC			
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later	
GX Developer	SW□D5C(F)-GPPW-J	Ver. 8.72A or later	-
FX-30P		Ver. 1.00 or later	
GOT1000 Series di	isplay units		1000 Series display units for applicable porting the list editor function.
FX3GC PLC			
GX Works2	SW□DNC-GXW2-J	Ver. 1.77F or later	
FX-30P		Ver. 1.30 or later	-
GOT1000 Series di	isplay units		1000 Series display units for applicable porting the list editor function.
FX3S PLC			
GX Works2	SW□DNC-GXW2-J	Ver. 1.492N or later	
FX-30P		Ver. 1.50 or later	-
GOT1000 Series di	isplay units		1000 Series display units for applicable porting the list editor function.
FX2N and FX2NC P	LCs		
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later	
GX Developer	SW□D5C(F)-GPPW-J	SW2 A or later	
FX-PCS/WIN	SW0PC-FXGP/WIN	Ver. 2.00 or later	
FX-PCS-KIT/98	SW1PC-FXGP/98(-3,-5)	Ver. 4.00 or later	
FX-PCS/98-3	SW1PC-FXGP/98-3	Ver. 4.00 or later	
FX-PCS-KIT/V-3	SW1PC-FXGP/V3	Ver. 2.00 or later	-
FX-A7PHP-KIT	SW1RX-GPPFX	Ver. 3.00 or later	
FX-30P	-	Ver. 1.00 or later	
FX-20P(-SET0) FX-20P-MFXC		Ver. 4.00 or later	
FX-10P(-SET0)		Ver. 3.00 or later	
GOT-F900 Series display units F940WGOT-TWD F940GOT-*WD F940GOT-*BD-H F940GOT-*BD-RH		F940GOT-LBD-H, F940G	.00 or later) T-SWD (Ver. 1.00 or later) OT-SBD-H (Ver. 1.00 or later) GOT-SBD-RH (Ver. 1.00 or later)
GOT1000 Series di	isplay units		1000 Series display units for applicable porting the list editor function.

D

Product name	Model name	Applicable version	Remarks
FX1S, FX1N and FX	INC PLCs		
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later	
GX Developer	SW□D5C(F)-GPPW-J	SW5 A or later	
FX-PCS/WIN	SW0PC-FXGP/WIN	Ver. 4.00 or later	
FX-PCS/98-3	SW1PC-FXGP/98-3	Ver. 5.00 or later	_
FX-30P	FX-30P		
FX-20P(-SET0) FX-20P-MFXD		Ver. 5.00 or later	
FX-10P(-SET0)		Ver. 4.00 or later	
GOT-F900 Series d F940WGOT-TWD F940GOT-*WD F940GOT-*BD-H F940GOT-*BD-RH	lisplay units	F940GOT-LBD-H, F9400	1.00 or later) OT-SWD (Ver. 1.00 or later) GOT-SBD-H (Ver. 1.00 or later) 0GOT-SBD-RH (Ver. 1.00 or later)
GOT1000 Series di	splay units		Γ1000 Series display units for applicable porting the list editor function.

For non-applicable versions (setting an alternative model) 1.4.2

Even programming tool not applicable to a PLC can create programs when an alternative model is set. In this case, however, programming is enabled only in the ranges provided for the alternative PLC model such as instructions and program size.

Model to be programmed	Model to be set		Priority	: High \rightarrow Lo	w
FX3UC Series	FX3UC	\rightarrow	FX2N	\rightarrow	FX2(FX)
FX3U Series	FX3U, FX3UC	\rightarrow	FX2N	\rightarrow	FX2(FX)
FX3GC Series	FX3G, FX3GC	\rightarrow	FX ₁ N ^{*1}	\rightarrow	FX2N*1
FX3G Series	FX3G	\rightarrow	FX ₁ N ^{*1}	\rightarrow	FX ₂ N ^{*1}
FX3S Series	FX3S	\rightarrow	FX3G	\rightarrow	FX1N ^{*1}
FX2NC Series	FX2NC, FX2N	\rightarrow	FX2(FX)		
FX2N Series	FX2N	\rightarrow	FX2(FX)		
FX1NC Series	FX1NC, FX1N	\rightarrow	FX2N	\rightarrow	FX2(FX)
FX1N Series	FX1N	\rightarrow	FX2N	\rightarrow	FX2(FX)
FX1S Series	FX1S	\rightarrow	FX2(FX)		
FX ₀ N Series	FX0N	\rightarrow	FX2(FX)		
FX0S Series	FX0S	\rightarrow	FX2(FX)		
FX ₀ Series	FX0	\rightarrow	FX2(FX)		
FX2C Series	FX2C, FX2(FX)	\rightarrow	FX2(FX)		
FX2(FX) Series	FX2(FX)				
FX1 Series	FX1				

^{*1. &}quot;FX_{2N}" is selected when the FX-10P(-E) is used.

Point

In the FX3S PLC, set the memory capacity for PLC parameters to 4,000 steps or less.

2. Specifications

This chapter explains the communication specifications and performance of non-protocol communication.

2.1 Communication Specifications (Reference)

Non-protocol communication is executed in the communication specifications shown in the table below.

	Item	Specifi	cations	Remarks
Transmiss	ion standard	RS-485 or RS-422 standard RS-232C standard		
Maximum total extension distance	FX3UC, FX3U, FX3GC, FX3G, FX3S, FX2NC, FX2N, FX1NC, FX1N, FX1S, FX0N PLCS	500 m (1640' 5") or less when using 485ADP 50 m (164' 0") or less when using 485BD		
	FX2(FX), FX2C PLCs	_		
Protocol ty	ype	_	_	
Control pr	ocedure	Non-protocol communication		
Communication method		Half-duplex, bidirecti full-duplex, bidirecti	Method varies depending on FX Series.	
Baud rate		300, 600, 1200, 2400, 4800,		
	Start bit	-	_	These items are set using
Character	Data bit	7 or	8-bit	parameters or using
format	Parity bit	None, od	d or even	D8120, D8370, D8400 or
Stop bit 1		1 or	2-bit	D8420.
Header		Provided or not provided		
Terminato	r	Provided or not provided		
Control lin	e	_	Provided or not provided	
Sum chec	k	Provided or not provided		Sum check is provided only with RS2 instruction.

^{*1.} FX3U, FX3UC Series PLC Ver. 2.41 or later, and FX3S, FX3G, FX3GC Series PLCs is applicable.

2.2 Data Communication Specifications

2.2.1 Communication type applicability in PLC

1. Full-duplex communication

 \checkmark : Applicable (If applicable versions of main units are limited, they are described inside ().)

-: Not applicable

PLC Series	Applicability of communication in accordance with RS-485 (applicable version)	Applicability of communication in accordance with RS-232C (applicable version)
FX3UC Series	_	✓
FX3U Series	_	✓
FX3GC Series	_	✓
FX3G Series	_	✓
FX3S Series	_	✓
FX2NC Series	_	✓
FX2N Series	√ (Ver. 2.00 or later)*1	✓ (Ver. 2.00 or later)
FX1NC Series	_	_
FX ₁ N Series	_	_
FX1S Series	_	_
FX ₀ N Series	_	_
FXos Series	_	_
FX ₀ Series	_	_
FX2C Series	_	_
FX2(FX) Series	_	_

^{*1.} Only the FX2N-485-BD is applicable.

2. Half-duplex communication

 \checkmark : Applicable (If applicable versions of main units are limited, they are described inside ().) —: Not applicable

PLC Series	Applicability of communication in accordance with RS-485 (applicable version)	Applicability of communication in accordance with RS-232C (applicable version)
FX3UC Series	✓	✓
FX3U Series	✓	✓
FX3GC Series	✓	✓
FX3G Series	√	✓
FX3S Series	√	✓
FX2NC Series	✓	✓
FX2N Series	✓ (Ver. 1.06 or later)	√ (Ver. 1.06 or later)
FX1NC Series	✓	✓
FX1N Series	✓	✓
FX18 Series	✓	✓
FX _{0N} Series	✓ (Ver. 1.20 or later)	✓ (Ver. 1.20 or later)
FX0S Series	_	_
FX ₀ Series	_	_
FX2C Series	_	✓
FX2(FX) Series	_	√ (Ver. 3.00 or later)*2

^{*2.} Communication is applicable in products manufactured in November, 1994 (manufacturer's serial No.: 4Y****) and later.

2.3 Number of Transfer Data

FX Series	Number of send/receive data	Remarks
FX3UC Series	0 to 4096 points	
FX3U Series	0 to 4096 points	
FX3GC Series	0 to 4096 points	
FX3G Series	0 to 4096 points	
FX3S Series	0 to 4096 points	
FX2NC Series	0 to 4096 points	The total number of sent and received data should be 8000
FX2N Series	0 to 4096 points	points or less.
FX1NC Series	0 to 256 points	
FX1N Series	0 to 256 points	
FX18 Series	0 to 256 points	
FX ₀ N Series	0 to 256 points	
FX0s Series	_	
FX ₀ Series	_	
FX2C Series	0 to 256 points	
FX2(FX) Series	0 to 256 points	

Computer Link

3. System Configuration and Selection

This chapter explains the system configuration and communication equipment selection operating in accordance with RS-485 or RS-232 required by FX PLCs.

3.1 System Configuration

This section outlines the system configuration required to use non-protocol communication.

Connect (optional) equipment operating in accordance with RS-485 or RS-232C to the FX PLC main unit.



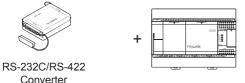
Communication equipment operating in accordance with RS-485 or RS-232C

FX PLC

Important point in selection

Total extension distance

1



Connect the RS-232C/RS-422 converter to the standard port (RS-422) RS-232 built in the PLC.

RS-232: 15 m (49' 2")

2

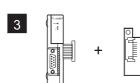


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This is the communication board built into the PLC, reducing the installation area.

RS-485: 50 m (164' 0") RS-232C: 15 m (49' 2")

Communication board





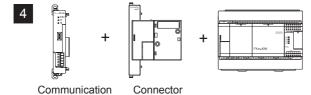
Attach the special adapter connection board to the main unit, and then attach the communication adapter to the left side of the main unit.

RS-485: 500 m (1640' 5") RS-232C: 15 m (49' 2")

Communication adapter

adapter

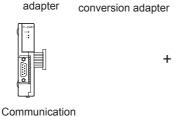
Special adapter connection board



Attach the connector conversion adapter to the main unit, and then attach the communication adapter to the left side of the main unit.

RS-485: 500 m (1640' 5") RS-232C: 15 m (49' 2")

5





Attach the communication adapter to the left side of the main unit.

RS-485: 500 m (1640' 5") RS-232C: 15 m (49' 2")

For communication equipment combinations for each FX Series, refer to the next page.

3.2 Applicable FX PLC and Communication Equipment

Select a communication equipment combination, and put a check mark in the "Check" column. During selection, pay attention to the following:

- In the table below, only the external dimensions are different between the units shown in "FX2NC-485ADP/ FX0N-485ADP". Select either one.
- In the table below, only the outside dimensions and D-SUB connector shape are different between units shown in "FX2NC-232ADP/FX0N-232ADP". Select either one.
- In the table below, only the cable is different between the units shown in "FX3G-485-BD/FX3G-485-BD-RJ". Select either one.
- Non-protocol communication is not provided for the FX1, FX0, FX0s PLCs.

3.2.1 For communication in accordance with RS-232C

FX Series	Communication equipment (option)	Total extension distance	Check
FXON	FX2NC-232ADP FX0N-232ADP (9-pin D-Sub, male) (25-pin D-Sub, female)	15 m (49' 2")	
	FX1N-232-BD (9-pin D-Sub, male)	15 m (49' 2")	
FX1s	FX1N-CNV-BD FX2NC-232ADP (9-pin D-Sub, male) FX1N-CNV-BD FX0N-232ADP (25-pin D-Sub, female)	15 m (49' 2")	
FX1N	FX1N-232-BD (9-pin D-Sub, male)	15 m (49' 2")	
	FX1N-CNV-BD FX2NC-232ADP (9-pin D-Sub, male) FX1N-CNV-BD FX0N-232ADP (25-pin D-Sub, female)	15 m (49' 2")	

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B

N Network

Parallel Link

D Computer Li

L Inverter Communica

Non-Protocol
Communication
(RS/RS2) Instruction

Non-Protocol
Communication

Programmir Communica

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FX Series	Communication equipment (option)	Total extension distance	Check
	FX ₂ N-232-BD (9-pin D-Sub, male)	15 m (49' 2")	
FX2N	FX2N-CNV-BD FX2NC-232ADP FX2N-CNV-BD FX0N-232ADP (25-pin D-Sub, female)	15 m (49' 2")	
	FX3G-232-BD (9-pin D-SUB, male)	15 m (49' 2")	
FX3S	FX3s-CNV-ADP FX3U-232ADP(-MB) (9-pin D-SUB, male)	15 m (49' 2")	
FX3G Standard built-in port RS-422 (8-pin MINI-DIN)	When using channel 0 (ch 0) FX-232AW FX-232AWC FX-232AWC-H	15 m (49' 2")	
Px=0-00 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	When using channel 1 (ch 1) FX3G-232-BD (9-pin D-Sub, male)	15 m (49' 2")	
FX3G (14-point, 24-point type)	FX3G-CNV-ADP FX3U-232ADP(-MB) (9-Pin D-Sub, male)	15 m (49' 2")	

FX Series	Communication equipment (option)	Total extension distance	Check
	When using channel 1 (ch 1)		
	ch1 FX3G-232-BD (9-pin D-Sub, male) The communication equipment works as ch1 when connected to the option connector 1.	15 m (49' 2")	
	FX3G-CNV-ADP FX3U-232ADP(-MB) (9-pin D-Sub, male) When using channel 2 (ch 2)	15 m (49' 2")	
FX3G (40-point, 60-point type)	ch2 FX3G-232-BD (9-pin D-Sub, male) The communication equipment works as ch2 when connected to the option connector 2.	15 m (49' 2")	
	ch1 ch2 FX3G-CNV-ADP FX3U-□ADP(-MB) FX3U-232ADP(-MB) (9-pin D-Sub, male) 232 and 485). Ch2 is not available when the FX3G-8AV-BD, FX3G-4EX-BD or FX3G-2EYT-BD is connected to the option connector 2.	15 m (49' 2")	

FX Series	Communication equipment (option)	Total extension distance	Check
	Ch1 Ch1 FX3U-232-BD (9-pin D-Sub, male)	15 m (49' 2")	
	FX3U-CNV-BD FX3U-232ADP(-MB) (9-pin D-Sub, male)	15 m (49' 2")	
FX3U	When using channel 2 (ch 2) ch1 FX3U-□-BD (Where □ represents 232, 422, 485, USB and 8AV) When a FX3U-8AV-BD is used, it occupies one communication port	15 m (49' 2")	
	channel. ch1 ch2 FX3U-CNV-BD FX3U-232ADP(-MB), FX3U-232ADP(-MB) FX3U-485ADP(-MB), (9-pin D-Sub, male) FX3U-CF-ADP When a FX3U-CF-ADP is used, it occupies one communication port channel.	15 m (49' 2")	
FX1NC	FX2NC-232ADP (9-pin D-Sub, male) (25-pin D-Sub, female)	15 m (49' 2")	
FX2NC	FX2NC-232ADP (9-pin D-Sub, male) FX0N-232ADP (25-pin D-Sub, female)	15 m (49' 2")	

FX Series	Communication equipment (option)	Total extension distance	Check
FX3GC Standard built-in port RS-422 (8-pin MINI-DIN)	FX-232AW FX-232AWC FX-232AWC-H When using channel 1 (ch 1)	15 m (49' 2")	
	ch1 FX3U-232ADP(-MB) (9-pin D-Sub, male) When using channel 2 (ch 2)	15 m (49' 2")	
FX3GC	ch1 FX3U-□ADP(-MB) (Where □ represents 232 and 485). ch2 FX3U-232ADP(-MB) (9-pin D-Sub, male)	15 m (49' 2")	
FX3UC (D, DS, DSS)	Ch1 Ch1 FX3U-232ADP(-MB) (9-pin D-Sub, male) When using channel 2 (ch 2)	15 m (49' 2")	
	ch1 FX3U-232ADP(-MB), FX3U-485ADP(-MB), FX3U-CF-ADP When a FX3U-CF-ADP is used, it occupies one communication port channel.	15 m (49' 2")	

FX Series	Communication equipment (option)	Total extension distance	Check
	When using channel 1 (ch 1)		
	FX ₃ U-232-BD (9-pin D-Sub, male)	15 m (49' 2")	
	FX3U-CNV-BD FX3U-232ADP(-MB) (9-pin D-Sub, male)	15 m (49' 2")	
FX3UC-32MT-LT (-2)	When using channel 2 (ch 2) ch1 FX3U-□-BD (Where □ represents 232, 422, 485, USB and 8AV) When a FX3U-8AV-BD is used, it occupies one communication port channel.	15 m (49' 2")	
	ch1 ch2 FX3U-CNV-BD FX3U-232ADP(-MB), FX3U-232ADP(-MB) FX3U-485ADP(-MB), FX3U-CF-ADP When a FX3U-CF-ADP is used, it occupies one communication port channel.	15 m (49' 2")	
EX2(FX)	FX-232ADP (25-pin D-Sub, female)	15 m (49' 2")	
FX2C	FX-232ADP (25-pin D-Sub, female)	15 m (49' 2")	

Арх.А

3.2.2 For communication in accordance with RS-485

FX Series	Communication equipment (option)	Total extension distance	Check
FXON	FX2NC-485ADP (European terminal block) (Terminal block)	500 m (1640' 5")	
	FX1N-485-BD (European terminal block)	50 m (164' 0")	
FX1s	FX1N-CNV-BD FX2NC-485ADP FX1N-CNV-BD FX0N-485ADP (Terminal block)	500 m (1640' 5")	
	FX1N-485-BD (European terminal block)	50 m (164' 0")	
FX1N	FX1N-CNV-BD FX2NC-485ADP FX1N-CNV-BD FX0N-485ADP (Terminal block)	500 m (1640' 5")	
FX2N	FX2N-485-BD	50 m (164' 0")	
	FX2N-CNV-BD FX2NC-485ADP FX2N-CNV-BD FX0N-485ADP (European terminal block)	500 m (1640' 5")	

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H Programm Communio

Maintenan

Apx.A Discontinued models

FX Series	Communication equipment (option)	Total extension distance	Check
FX3S	FX3G-485-BD FX3G-485-BD-RJ (European terminal block) (RJ45 connector)	50 m (164' 0")	
	FX3s-CNV-ADP FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	
FX3G (14-point, 24-point type)	FX3G-485-BD FX3G-485-BD-RJ (European terminal block) (RJ45 connector)	50 m (164' 0")	
	FX3G-CNV-ADP FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	
	When using channel 1 (ch 1)		
FX3G (40-point, 60-point type)	ch1 ch1 FX3G-485-BD FX3G-485-BD-RJ (European terminal block) (RJ45 connector) The communication equipment works as ch1 when connected to the option connector 1.	50 m (164' 0")	
	ch1 FX3G-CNV-ADP FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	

FX Series	Communication equipment (option)	Total extension distance	Check
	When using channel 2 (ch 2)		
FX3G (40-point, 60-point type)	ch2 ch2 FX3G-485-BD FX3G-485-BD-RJ (RJ45 connector) The communication equipment works as ch2 when connected to the option connector 2.	50 m (164' 0")	
	FX3G-CNV-ADP FX3U-□ADP(-MB) (Where □ represents 232 and 485). Ch2 is not available when the FX3G-8AV-BD, FX3G-4EX-BD or FX3G-2EYT-BD is connected to the option connector 2.	500 m (1640' 5")	
	when using channel 1 (ch 1) ch1 FX3U-485-BD (European terminal block)	50 m (164' 0")	
FX3U	FX3U-CNV-BD FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	

FX Series	Communication equipment (option)	Total extension distance	Check
	When using channel 2 (ch 2)		
FX3U	ch1 FX3U-□-BD (Where □ represents 232, 422, 485, USB and 8AV). When a FX3U-8AV-BD is used, it occupies one communication port channel.	500 m (1640' 5")	
	ch1 ch2 FX3U-CNV-BD FX3U-232ADP(-MB), FX3U-485ADP(-MB), FX3U-485ADP(-MB), FX3U-CF-ADP When a FX3U-CF-ADP is used, it occupies one communication port channel.	500 m (1640' 5")	
FX1NC	FX2NC-485ADP FX0N-485ADP (European terminal block) (Terminal block)	500 m (1640' 5")	
FX2NC	FX2NC-485ADP FX0N-485ADP (European terminal block) (Terminal block)	500 m (1640' 5")	
FX3GC	Ch1 Ch1 FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	
	Ch1 Ch2 FX3U-□ADP(-MB) (Where □ represents 232 and 485). Ch2 FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	

FX Series	Communication equipment (option)	Total extension distance	Check
	When using channel 1 (ch 1)		
FX3UC (D, DS, DSS)	Ch1 FX3U-485ADP(-MB) (European terminal block) When using channel 2 (ch 2)	500 m (1640' 5")	
	ch1 FX3U-232ADP(-MB), FX3U-485ADP(-MB), FX3U-485ADP(-MB), FX3U-CF-ADP When a FX3U-CF-ADP is used, it occupies one communication port channel.	500 m (1640' 5")	
FX3UC-32MT-LT (-2)	Ch1 FX3U-485-BD (European terminal block)	50 m (164' 0")	
	FX3U-CNV-BD FX3U-485ADP(-MB) (European terminal block)	500 m (1640' 5")	
	when using channel 2 (ch 2) ch1 FX3U-□-BD (Where □ represents 232, 422, 485, USB and 8AV). When a FX3U-8AV-BD is used, it occupies one communication port channel.	500 m (1640' 5")	
	FX3U-CNV-BD FX3U-232ADP(-MB), FX3U-485ADP(-MB) FX3U-CF-ADP When a FX3U-CF-ADP is used, it occupies one communication port channel.	500 m (1640' 5")	

4.1 Wiring Procedure

4. Wiring

This chapter explains the wiring.

WIRING PRECAUTIONS



- Make sure to cut off all phases of the power supply externally before attempting installation or wiring work.
 Failure to do so may cause electric shock or damage to the product.
- Make sure to attach the terminal cover, offered as an accessory, before turning on the power or initiating operation after installation or wiring work.
 Failure to do so may cause electric shock.

WIRING PRECAUTIONS



- Make sure to observe the following precautions in order to prevent any damage to the machinery or accidents due to abnormal data written to the PLC under the influence of noise:
 - 1) Do not bundle the main circuit line together with or lay it close to the main circuit, high-voltage line or load line. Otherwise, noise disturbance and/or surge induction are likely to take place. As a guideline, lay the control line at least 100mm (3.94") or more away from the main circuit or high-voltage lines.
 - 2) Ground the shield wire or shield of the shielded cable at one point on the PLC. However, do not use common grounding with heavy electrical systems.
- Make sure to properly wire the terminal block in accordance with the following precautions.
 Failure to do so may cause electric shock, equipment failures, a short-circuit, wire breakage, malfunctions, or damage to the product.
 - The disposal size of the cable end should follow the dimensions described in the manual.
 - Tightening torque should follow the specifications in the manual.
 - Tighten the screws using a Phillips-head screwdriver No.2 (shaft diameter 6mm (0.24") or less). Make sure that the screwdriver does not touch the partition part of the terminal block.
- Make sure to properly wire to the terminal block (European type) in accordance with the following precautions.
 Failure to do so may cause electric shock, equipment failures, a short-circuit, wire breakage, malfunctions, or damage to the product.
 - The disposal size of the cable end should follow the dimensions described in the manual.
 - Tightening torque should follow the specifications in the manual.
 - Twist the end of strand wire and make sure that there are no loose wires.
 - Do not solder-plate the electric wire ends.
 - Do not connect more than the specified number of wires or electric wires of unspecified size.
 - Affix the electric wires so that neither the terminal block nor the connected parts are directly stressed.

4.1 Wiring Procedure

1 Preparing for wiring

Prepare cables and terminal resistors required for wiring.

 \rightarrow For details, refer to Section 4.2.

2 Turning OFF the PLC power

Before starting any wiring work, make sure that the PLC power is OFF.

3 Connecting the power supply (FX0N-485ADP only)

Connect the power supply to the 24V DC power terminal.

4 Wiring communication equipment

Connect communication equipment operating in accordance with RS-485 or RS-232C.

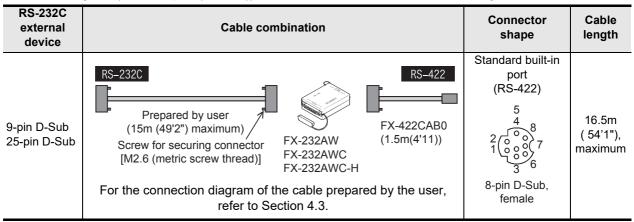
 \rightarrow For details, refer to Section 4.3.

4.2 Selecting Cables and Terminal Resistors

Select cables using the procedure described below.

4.2.1 When using ch0 in FX3G, FX3GC PLC

When using ch0 (standard port (RS-422)) in the FX3G, FX3GC PLC, use the following cables.



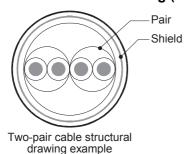
4.2.2 Twisted pair cable

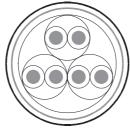
Use twisted pair cables for connecting communication equipment operating in accordance with RS-485. The table below shows recommended model names and manufacturers of cables used for wiring.

1. Recommended cables

Manufacturer	Model name	Remarks	
	SPEV(SB)-0.2-2P	Two-pair cable of 0.2 mm ²	
Mitsubishi Cable Industries, Ltd.	SPEV(SB)-MPC-0.2 × 3P	Three-pair cable of 0.2 mm ²	
	SPEV(SB)-0.5-2P	Two-pair cable of 0.5 mm ²	
Showa Holdings Co., Ltd.	KMPEV-SB CWS-178 0.2SQ × 2P	Two-pair cable of 0.2 mm ²	
Gridwa Holdings Co., Etd.	KMPEV-SB CWS-178 0.5SQ × 2P	Two-pair cable of 0.5 mm ²	
Sumitomo Electric Industries, Ltd.	DPEV SB 0.3 × 3P	Three-pair cable of 0.3 mm ²	
Sumitomo Liectric maustries, Eta.	DPEV SB 0.5 × 3P	Three-pair cable of 0.5 mm ²	
The Furukawa Electric Co., Ltd.	D-KPEV-SB 0.2 × 3P	Three-pair cable of 0.2 mm ²	
The Futurawa Liectife Co., Etc.	D-KPEV-SB 0.5 × 3P	Three-pair cable of 0.5 mm ²	
Fujikura Ltd.	IPEV-SB 2P × 0.3 mm ²	Two-pair cable of 0.3 mm ²	
i ajikura Liu.	IPEV-SB 2P × 0.5 mm ²	Two-pair cable of 0.5 mm ²	

2. Cable structural drawing (reference)





Three-pair cable structural drawing example

4.2.3 10BASE-T cable

10BASE-T cables used in LAN wiring for a personal computer can be connected to FX3G-485-BD-RJ.

1. Selection procedure when purchasing

1) Cable type : 10BASE-T cable (Category 3 or higher)

2) Connection specifications: Straight type

: RJ45 connector (Connector with metal frame is used)

2. Cautions on using commercial cables

Pay attention to the following point when purchasing commercial cables.

• Use shielded cables. Make sure to connect the shield to the metal frame of the connector, and perform class D grounding.

4.2.4 Connecting cables

1. European type terminal block

The FX3G-485-BD-RJ terminal block is used for grounding.

The other options use shielded twisted pair cables for connecting communication equipment operating in accordance with RS-485.

The table below shows applicable cables and tightening torques.

	Cable size when	Cable size when	Tightening			size	
	one cable is connected	two cables are connected	Insulating sleeve (cable size)	torque	Α	В	
FX3U-485-BD FX3G-485-BD FX3U-485ADP (-MB)	AWG22 to AWG20	AWG22	Applicable (AWG22 to AWG20)	0.22 to 0.25 N·m	0.4 (0.01")	2.5 (0.09")	
FX3G-485-BD- RJ	AWG20 to AWG16		Not applicable	0.5 to 0.6 N·m	0.6 (0.03")	3.5 (0.14")	
FX2N-485-BD FX1N-485-BD	AWG26	to AWG16	Not applicable	0.5 to 0.6 N·m	0.6 (0.03")	3.5 (0.14")	
FX2NC-485ADP	AWG26 to AWG16	AWG26 to AWG20	Not applicable	0.4 to 0.5 N·m	0.6 (0.03")	3.5 (0.14")	

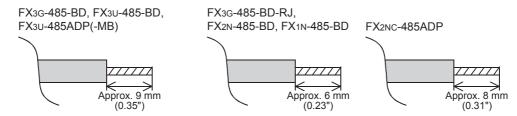
Do not tighten terminal screws with a torque outside the above-mentioned range.

Failure to do so may cause equipment failures or malfunctions.

With regard to the cable end treatment, use a stranded cable or solid cable as it is, or use a bar terminal with an insulating sleeve.

FX3G-485-BD-RJ, FX2N-485-BD, FX1N-485-BD and FX2NC-485ADP cannot use a bar terminal with insulating sleeve.

- · When using a stranded cable or solid cable as it is
 - Twist the end of a stranded cable so that wires do not get barbed.
 - Do not plate the end of the cable.

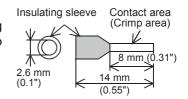


When using a bar terminal with an insulating sleeve
Because it is difficult to insert a cable into an insulating sleeve depending
on the thickness of the cable sheath, select the proper cable according to
the outline drawing.

<Reference>

Manufacturer	Model name	Caulking tool		
Phoenix Contact Co., Ltd.	AI 0.5-8WH	CRIMPFOX 6*1		
T HOCHIX CONTACT CO., Ltd.	AI 0.5-0VIII	(or CRIMPFOX 6T-F ^{*2})		

*1. Old model name : CRIMPFOX ZA 3 *2. Old model name : CRIMPFOX UD 6



D

Tool

When tightening a terminal on the European terminal block, use a small commercial straight shape screwdriver whose tip is shown in the figure to the right.

Note

If the diameter of screwdriver grip is too small, tightening torque will not be able to be achieved. To achieve the appropriate tightening torque shown in the previous page, use the following screwdriver or an appropriate replacement (grip diameter: approximately 25mm (0.98")).

<Reference>

FX3U-485-BD, FX3G-485-BD, FX3U-485ADP(-MB)

Manufacturer	Model name
Phoenix Contact Co., Ltd.	SZS 0.4 × 2.5

FX3G-485-BD-RJ, FX2N-485-BD, FX1N-485-BD, FX2NC-485ADP

Manufacturer	Model name		
Phoenix Contact Co., Ltd.	SZF 1-0.6 × 3.5		

2. Terminal block

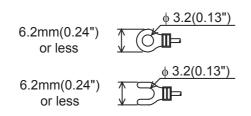
In the FX0N-485ADP and FX-485ADP, the terminal screw size is "M3".

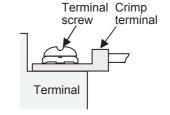
Make sure to use a crimp-style terminal with the following sizes.

Make sure that the tightening torque is 0.5 to 0.8 N·m.

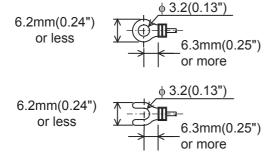
Do not tighten terminal screws with a torque outside the above-mentioned range. Failure to do so may cause equipment failures or malfunctions.

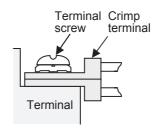
· When wiring one cable to one terminal





· When wiring two cables to one terminal





screwdriver with a

straight tip.

4.2 Selecting Cables and Terminal Resistors

Precision

=110 Ω

 $=330 \Omega$

1

3 1

 (10^1)

 (10^1)

Brown Precision

Brown

Orange

4.2.5 Connecting terminal resistors

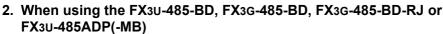
Make sure to provide a terminal resistor at the end of each line.

In the case of one-pair wiring, connect a terminal resistor between the RDA-RDB signal terminals of the communication equipment.

In the case of two-pair wiring, connect a terminal resistor between the RDA-RDB signal terminals and SDA-SDB terminal of in the communication equipment.

1. Terminal resistor type

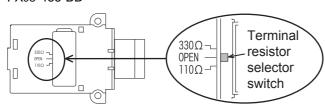
In the case of one-pair wiring, use two terminal resistors of 110 Ω , 1/2 W. In the case of two-pair wiring, use four terminal resistors of 330 Ω , 1/4 W. Among the terminal resistors supplied together with the communication equipment, select ones with the color codes shown to the right.



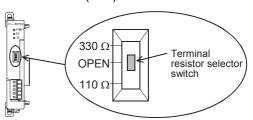
The FX3U-485-BD, FX3G-485-BD, FX3G-485-BD-RJ and FX3U-485ADP(-MB) have built-in terminal resistors.

Set the terminal resistor selector switch accordingly.

FX3U-485-BD



FX3U-485ADP(-MB)



FX3G-485-BD

Remove the upper terminal block before changing over the switch in the FX3G-485-BD.

Removal: Loosen the terminal block mounting screws, and remove the terminal block.

Installation: Attach the terminal block, and tighten the terminal block mounting screws.

Model name

Tightening torque: 0.4 to 0.5 N•m

Do not tighten terminal screws with a torque outside the above-mentioned range. Failure to do so may cause equipment failures or malfunctions.

For installation and removal of the terminal block, use the recommended tool shown below or a tool having straight tip (such as screwdriver) as shown in the right figure.

<Reference>

Manufacturer

Phoenix Contact Co., Ltd.	SZS 0.4 × 2.5
SD RD	Terminal resistor selector switch $110\Omega < 0$ PEN

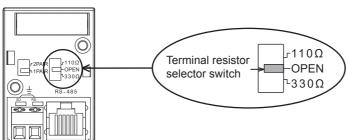
Select a screwdriver with a straight tip.

0.4mm
(0.01")

2.5mm
(0.09")

Terminal block mounting screws

FX3G-485-BD-RJ



4.3 Connection Diagram

4.3.1 Connector pin arrangement in communication equipment operating in accordance with RS-232C

	FX0N-232ADP, FX1N-232-BD, FX2N-232-BD FX-232AW, FX20C-232ADP, FX3U-232-BD FX-232AWC, FX3G-232-BD, FX3G-232-BD, FX20C-232ADP(-MB) 5-pin D-Sub (female) connector connector connector		32-BD 3)	Signal name	Function		
	8		-		1*1	CD (DCD)	Receive carrier detection
25 0 13	3	25 0 13	3		2	RD (RXD)	Receive data input
188	2	0000	2	5009	3	SD (TXD)	Send data output
00000000	20	000	20*2	000	4	ER (DTR)	Data terminal ready
0000	7	0000	7	1 6	5	SG (GND)	Signal ground
14 1	6	14 0001	6*2		6	DR (DSR)	Data set ready
	1		_			FG	Frame ground

^{*1.} The FX2NC-232ADP does not use the CD (DCD) signal.

4.3.2 Wiring for communication in accordance with RS-232C

Representative wiring examples are shown in this subsection. When pin numbers in the external equipment are different, wire the pins as shown below.

1. When connected equipment has the terminal specifications

	PLC										
	9-pin D-Sub (female)	connector	25-pin D-Sub (male	e) connector		External equipment operating in accordance with RS-23					
Name	FX ₃ U-232-BD FX ₂ N-232-BD	FX2NC-	FXon-232ADP FX-232AW				CS,	RS		DR,	ER
	FX3G-232-BD FX1N-232-BD FX3U-232ADP(-MB)	232ADP	FX-232AWC FX-232AWC-H	FX-232ADP		Name	9-pin D-Sub	25-pin D-Sub	Name	9-pin D-Sub	25-pin D-Sub
FG		_		1		FG	_	1	FG	_	1
RD(RXD)	2		3		\ _	RD(RXD)	2	3	RD(RXD)	2	3
SD(TXD)	3		2			SD(TXD)	3	2	SD(TXD)	3	2
ER(DTR) *1	4		20*	2	\ /	RS(RTS)	7	4	ER(DTR)	4	20
SG(GND)	5		7		$\vdash \!\!\! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \! \!$	SG(GND)	5	7	SG(GND)	5	7
DR(DSR) *1	6		6	*2	/ \	CS(CTS)	8	5	DR(DSR)	6	6

^{*1.} When the control line is not used, wiring is not required for this signal.

Because the interlink mode [provided only in FX2N, FX2NC, FX3S, FX3G(except ch0), FX3UC PLCs] uses the control line, wiring is required for this signal.

^{*2.} Only the FXon-232ADP uses the ER (DTR) and DR (DSR) signals.

^{*2.} Only the FX0N-232ADP and FX-232ADP uses the ER (DTR) and DR (DSR) signals.

2. When connected equipment has the modem specifications

		PLC									
	9-pin D-Sub (female)	connector	25-pin D-Sub (ma	ale) connector	1	External equipment operating			g in accord		
Name	FX3U-232-BD FX3G-232-BD FX2N-232-BD FX1N-232-BD FX3U-232ADP(-MB)	FX2NC- 232ADP	FX _{0N} -232ADP FX-232AW FX-232AWC FX-232AWC-H	FX-232ADP		Name	9-pin D-Sub	25-pin D-Sub	Name	9-pin D-Sub	25-pin D-Sub
FG		_		1		FG	-	1	FG	-	1
CD(DCD)	1		_ *1	8		CD(DCD)	1	8	CD(DCD)	1	8
RD(RXD)	2			3		RD(RXD)	2	3	RD(RXD)	2	3
SD(TXD)	3		2	2		SD(TXD)	3	2	SD(TXD)	3	2
ER(DTR)	4		2	0*2		RS(RTS)	7	4	ER(DTR)	4	20
SG(GND)	5		-	7	_	SG(GND)	5	7	SG(GND)	5	7
DR(DSR)	6		(3 *2	<u> </u>	CS(CTS)	8	5	DR(DSR)	6	6

^{*1.} The FX0N-232ADP, FX2NC-232ADP, FX-232AW, FX-232AWC and FX-232AWC-H do not use the CD (DCD) signal.

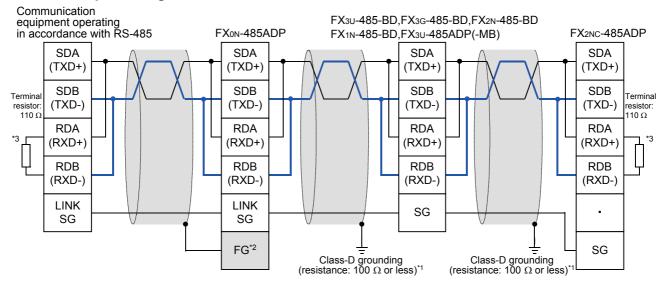
 $^{^{*}}$ 2. Only the FX0N-232ADP and FX-232ADP uses the ER (DTR) and DR (DSR) signals.

4.3 Connection Diagram

4.3.3 Wiring for communication in accordance with RS-485

One-pair wiring and two-pair wiring (for RS-422) are applicable for communication in accordance with RS-485. Perform proper wiring according to the external equipment.

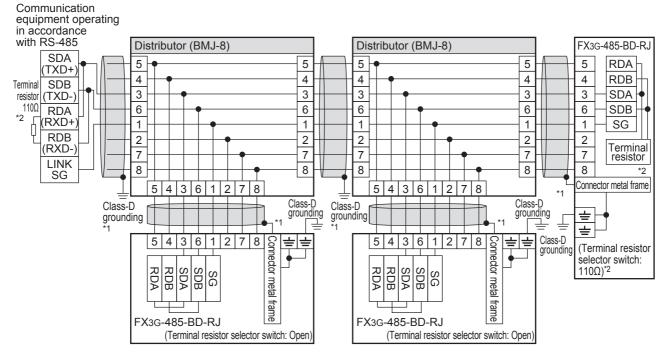
1. One-pair wiring



- *1 Make sure to perform Class-D grounding on the shield of a twisted pair cable connected to the FX2N-485-BD, FX1N-485-BD, FX3G-485-BD, FX3U-485-BD, FX2NC-485ADP or FX3U-485ADP(-MB).
- Make sure to connect the FG terminal to the (grounding) terminal in the PLC requiring Class-D grounding.
- *3. If the grounding terminal is not provided in the PLC, perform Class-D grounding directly.
- *4. Make sure to provide a terminal resistor at the end of each line.
 - The FX3U-485-BD and FX3U-485ADP(-MB) have a built-in terminal resistor. Set the terminal resistor selector switch accordingly.
 - The FX3G-485-BD, FX0N-485ADP, FX2NC-485ADP, FX2N-485-BD and FX1N-485-BD are supplied together with terminal resistors.

When using the FX2N-485-BD, signal loop between the PLC and the external device occurs since the FX2N-485-BD has a full-duplex interface.

FX3G-485-BD-RJ



- *1. Use shielded cables, and make sure to perform class D grounding on the shield.

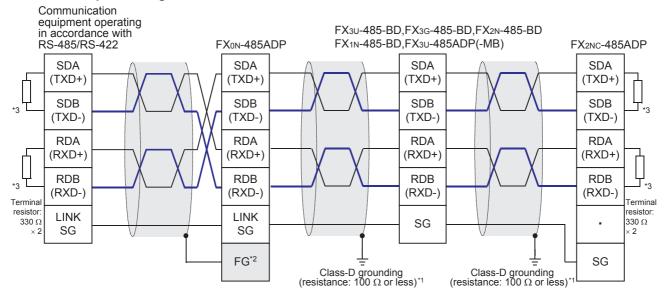
 When using the terminal block to connect ground of FX3G-485-BD-RJ, wire the ground wire only to either one of two poles of the terminal block.
- *2. Make sure to provide a terminal resistor at the end of each line. Set the FX3G-485-BD-RJ terminal resistor selector switch accordingly.

Prepare the following devices if necessary.

Product name	Model name	Manufacturer
RJ45 connector	TM11AP-88P	HIROSE ELECTRIC CO., LTD.
	BMJ-8 BMJ-8-28N (No internal connection of the No. 2 and 8 pin) (Do not use a plug with terminal resistor)	HACHIKO ELECTRIC CO., LTD.

D

2. Two-pair wiring

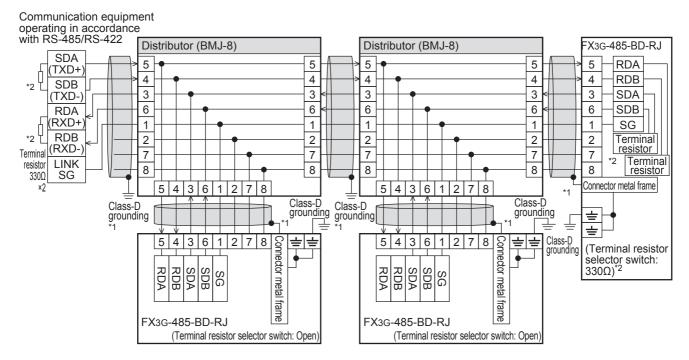


- *1. Make sure to perform Class-D grounding on the shield of a twisted pair cable connected to the FX2N-485-BD, FX1N-485-BD, FX3G-485-BD, FX3U-485-BD, FX2NC-485ADP or FX3U-485ADP(-MB).
- Make sure to connect the FG terminal to the 🛓 (grounding) terminal in the PLC requiring Class-*2. D grounding.

If the grounding terminal is not provided in the PLC, perform Class-D grounding directly.

- *3. Make sure to provide a terminal resistor at the end of each line.
 - The FX3G-485-BD, FX3U-485-BD and FX3U-485ADP(-MB) have a built-in terminal resistor. Set the terminal resistor selector switch accordingly.
 - The FX0N-485ADP, FX2NC-485ADP, FX2N-485-BD and FX1N-485-BD are supplied together with terminal resistors.

FX3G-485-BD-RJ



- *1. Use shielded cables, and make sure to perform class D grounding on the shield.

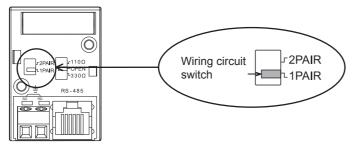
 When using the terminal block to connect ground of FX3G-485-BD-RJ, wire the ground wire only to either one of two poles of the terminal block.
- *2. Make sure to provide a terminal resistor at the end of each line. Set the FX3G-485-BD-RJ terminal resistor selector switch accordingly.

Prepare the following devices if necessary.

Product name	Model name	Manufacturer
RJ45 connector	TM11AP-88P	HIROSE ELECTRIC CO., LTD.
Distributor	BMJ-8 BMJ-8-28N (No internal connection of the No. 2 and 8 pin) (Do not use a plug with terminal resistor)	HACHIKO ELECTRIC CO., LTD.

3. Switching of 1 pair / 2 paired wiring (FX3G-485-BD-RJ)

The FX3G-485-BD-RJ has a built-in wiring circuit switch. Set the wiring circuit switch to 1 pair / 2 pair.

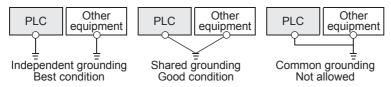


4.4 Grounding

Grounding should be performed as stated below.

- The grounding resistance should be $100\Omega\mbox{ or less.}$
- Independent grounding should be performed for best results.
 When independent grounding can not be performed, perform "shared grounding" as shown in the following figure.

→ For details, refer to the Hardware Edition of each series.



- The grounding wire size should be AWG 14 (2 mm²) or larger.
- The grounding point should be close to the PLC, and all grounding wires should be as short as possible.

5. Communication Setting in FX Programmable Controller

This chapter explains the communication setting types and setting methods for non-protocol communication using RS/RS2 instruction.

5.1 Communication Setting Method Mechanism

This section explains the communication setting method types and setting procedures in FX PLCs.

1. Setting method types

- 1) Specifying the setting using parameters:
 - Set the parameters by adjusting communication settings on the personal computer screen using the sequence programming software, and transfer them to a PLC.
 - (This method using parameters is not available in FX2(FX), FX2C and FX0N PLCs.)
 - (This method using parameters is not available for ch0 in FX3G, FX3GC PLCs.)
- Specifying the settings by writing data to special data registers:
 Prepare a sequence program which sets the communication format and time-out time setting, and then transfer the program to the PLC.

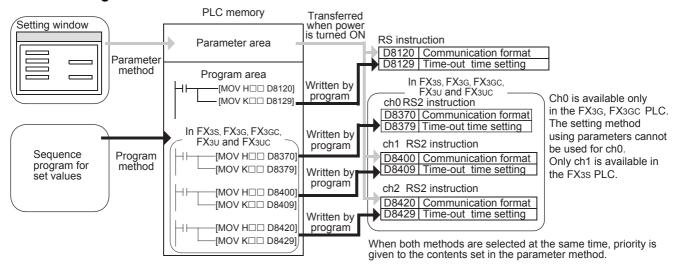
Caution

A PLC operates in the same way without regard to a selected method shown above. If both methods are selected, priority is given to the method using parameters.

2. Communication setting method applicability in each FX Series

FX Series	Specification using parameters	Specification by writing settings data to special data registers
FX1s, FX1n, FX1nc, FX2n, FX2nc, FX3s, FX3g (ch1, ch2), FX3GC (ch1, ch2), FX3Uc	√ (Recommended)	√
FX2(FX), FX2C, FX0N, FX3G (ch0), FX3GC (ch0)	_	✓

3. Setting data flow



D

4. Time at which the settings become valid

1) When specifying the settings by parameters

When the PLC power is turned ON, the contents of parameters set on the parameter setting window using sequence programming software are automatically transferred to D8120, D8129, D8400, D8409, D8420 and D8429 in the PLC.

As soon as the parameters are transferred to the PLC, the settings become valid.

After the program parameters are transferred to the PLC, it is necessary to turn OFF the PLC power once, and then turn it ON again.

In FX3S, FX3G, FX3GC PLC, after the programs (parameters) are transferred to the PLC, turn the power ON from OFF, set the PLC mode to RUN from STOP, and the settings become valid.

2) When specifying the settings by writing data to special data registers

After writing a sequence program, set the PLC mode from STOP to RUN to write the preset data to D8120, D8400, D8420 or D8370. After that, set the PLC mode to STOP once, and then set it to RUN again. Or turn OFF the PLC power once, and then turn it ON again.

As soon as the PLC mode is set to RUN from STOP or the PLC power is turned ON from OFF, the settings become valid.

In FX3s, FX3G, FX3GC PLC, after writing the preset data, turn the power ON from OFF, set the PLC mode to RUN from STOP, and the settings become valid.

If change of the setting becomes necessary while the RS or RS2 instruction is being driven, set the RS or RS2 instruction to OFF, set D8120, D8400, D8420 and D8370 to "0", and then set a new value to them.

5.2 Communication Setting Using Parameter Method (GX Works2)

Communication settings may be changed via the parameter method with GX Works2, GX Developer, FXGP/WIN for Windows and FX-30P handy programming panel. It is not possible to set ch0 in FX3G and FX3GC PLCs using parameters. This section describes how to change parameters with GX Works2.

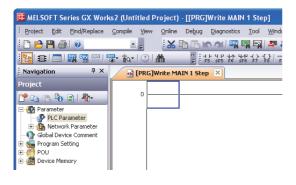
→ For details on FXGP/WIN operating procedure, refer to section 5.3. → For details on GX Developer operating procedure, refer to GX Developer Operating Manual. → For details on FX-30P operating procedure, refer to FX-30P Operation Manual.

5.2.1 Operating procedure

This subsection explains the serial communication setting method. Suppose that GX Works2 is already started up.

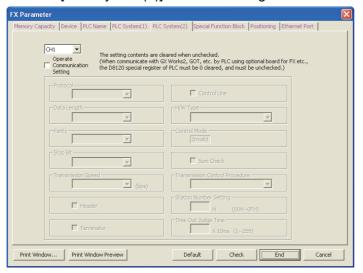
Opening the parameter setting window

In the project view area of the navigation window, double-click [Parameter] → [PLC Parameter]. If the navigation window is not displayed, select [View] \rightarrow [Docking Window] \rightarrow [Navigation] from the menu bar.



2 Setting the serial communication (parameters)

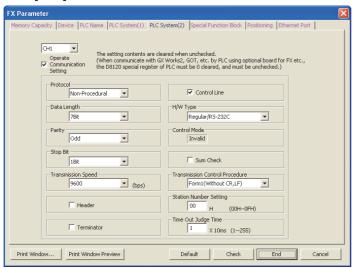
Click the [PLC System(2)] tab in the dialog box



3 Setting the serial communication (parameters)

Select a channel and check the "Operate Communication Setting" box, then adjust the parameters for that channel.

Execute the setting according to the connected communication equipment. Click [End].



Caution

When setting "H/W Type" to "RS485", check the "Control Line" box.

4 Writing parameters to the PLC

Select [Online] \rightarrow [Write to PLC] from the menu bar, click [Parameter + Program], and then click [Execute].

5.3 Communication Setting Using Parameter Method (FXGP/WIN)

Communication settings may be changed via the parameter method with GX Works2, GX Developer, FXGP/WIN for Windows and FX-30P handy programming panel. It is not possible to set ch0 in FX3G and FX3GC PLCs using parameters. This section describes how to change parameters with FXGP/WIN. Ch0, ch2 cannot be set using FXGP/WIN.

→ For details on GX Works2 operating procedure, refer to section 5.2. → For details on GX Developer operating procedure, refer to GX Developer Operating Manual. → For details on FX-30P operating procedure, refer to FX-30P Operation Manual.

5.3.1 Operating procedure

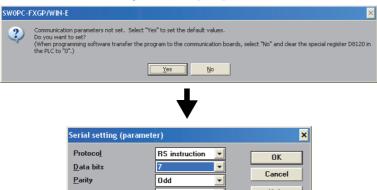
This subsection explains the serial communication setting method. Suppose that FXGP/WIN is already started up.

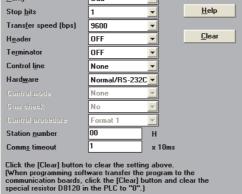
Displaying serial setting (parameter)

Select [Option] → [Serial setting (parameter)] from the toolbar. The following dialog box appears according to absence/presence of the parameter settings.

1. When there is no parameter setting

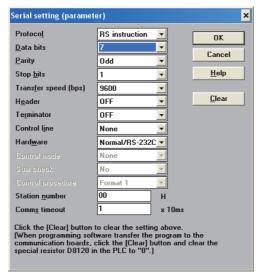
There is no communication setting. Click the [Yes] button.





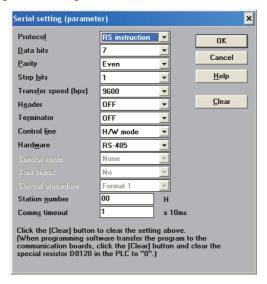
2. When there are already parameter settings.

The existing communication setting contents are displayed.



2 Adjusting serial setting (parameter)

Execute the settings according to the connected communication equipment.



Caution

When setting "Hardware" to "RS-485", set "Control line" to "H/W mode".

3 Writing a sequence program (parameters) to the PLC

Select [PLC] \rightarrow [Transfers] \rightarrow [Write] from the toolbar, and click [OK] button.

6. Creating Programs (RS Instruction)

This chapter explains how to create programs for non-protocol communication using RS instruction and how such programs operate.

6.1 Checking Contents of Related Devices

The tables below show devices used in non-protocol communication using the RS instruction.

1. Bit devices

Device	Name	Description	R/W
M8063	Serial communication error (ch1)	This device turns ON when a communication error occurs. When this device (serial communication error) turns ON, D8063 stores the corresponding error code.	R
M8120	Communication setting keep	This device keeps the communication setting status (for FX0N PLC).	W
M8121	Sending wait flag	This device remains ON while the PLC is waiting to send.	R
M8122	Sending request	When this device is set to ON, the PLC starts to send.	R/W
M8123	Receiving complete flag	This device turns ON when receiving is completed. While this device (receiving complete flag) is ON, the PLC cannot receive any data.	R/W
M8124	Carrier detection flag	This device turns ON in synchronization with the CD signal.	R
M8129 ^{*1}	Time-out check flag	This device turns ON when data receiving is suspended and the next set of data is not given within the time set by the timeout settings device (D8129).	
M8161	8-bit processing mode	This device sets the send/receive data bit length to 16-bit or 8-bit. ON: 8-bit mode OFF: 16-bit mode	W

R: Read only W: Write only R/W: Read or Write

2. Word devices

Device	Name	Description	R/W
D8063	Error code number of serial communication error	When the serial communication error flag (M8063) turns ON, this device stores the corresponding error code.	R/W
D8120	Communication format setting	This device sets the communication format.	R/W
D8122	Remaining amount of data to be sent	This device stores the amount of remaining data to be sent.	R
D8123	Amount of data already received	This device stores the amount of received data.	R
D8124	Header	This device sets the header (initial value: STX (H02)).	R/W
D8125	Terminator	This device sets the terminator (initial value: ETX (H03)).	R/W
D8129 ^{*2}	Time-out time setting	This device sets the timeout time.	R/W
D8405 ^{*3}	Communication parameter display	This device stores communication parameters set in the PLC.	R
D8419 ^{*3}	Operation mode display	This device stores the communication type being used.	R

R: Read only W: Write only R/W: Read or Write

- *2. Not provided in FX2N PLC before Ver. 2.00, and FX2(FX), FX2C, FX0N PLCs.
- *3. Provided only in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs.

^{*1.} Not provided in FX2N PLC before Ver. 2.00, and FX2(FX), FX2C, FX0N PLCs.

6.2 How to Use RS Instruction

This section explains the function, operation and programming method of RS instruction.

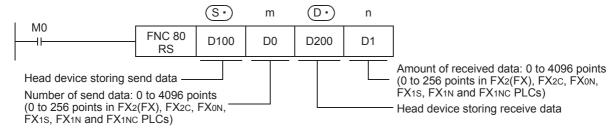
1. Applicable devices

0	Bit Devices											Wo	ord	Dev	ice	s				Others					
Oper- and Type			Sy	ster	n/U	ser		Digit Specification			Sy	System/User			Special Unit	Index		Con- stant		Real Number	Charac- ter String	Pointer			
.,,,,	Χ	Υ	М	Τ	С	S	D□.b	KnX	KnY	KnM	KnS	Т	С	D	R	U□\G□	٧	Z	Modify	K	Н	E	"□"	Р	
S∙														✓	A				✓						
m														✓	▲					✓	✓				
D·														✓	•				✓						
n														\	lack					\	✓				

▲: Applicable only in FX3G, FX3GC, FX3U, FX3UC PLCs.

m, n: 0 to 4096 points in FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs (However, "m + n" should not be more than 8000 points in FX2N and FX2NC PLCs.) 0 to 256 points in FX2(FX), FX2C, FX0N, FX1S, FX1N and FX1NC PLCs

2. Program example



6.2.1 Applicable frames

Message frames used in communication can be selected by setting the communication format. The table below shows the message frames applicable to the RS instruction.

1	Data	Header: Not provided Terminator: Not provided
2	Data Terminator	Header: Not provided Terminator: Provided
3	Header Data	Header: Provided Terminator: Not provided
4	Header Data Terminator	Header: Provided Terminator: Provided

1. Header

When "header provided" is selected in the communication format settings, the lowest-order byte of D8124 is used.

When data is sent, the lowest-order byte of D8124 is added at the head of the specified send data to be sent. When data is received, receiving begins when the data on lowest-order byte of D8124 is received.

2. Terminator

When "terminator provided" is selected in the communication format settings, the lowest-order byte of D8125 is used.

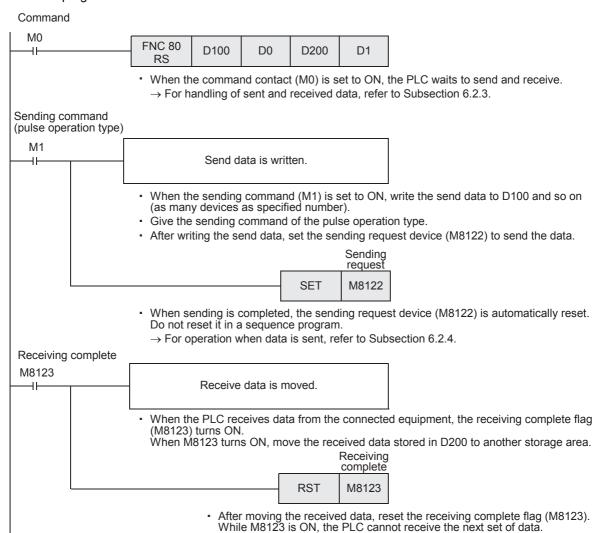
When data is sent, the lowest-order byte of D8125 is added at the end of the specified send data. When data is received, receiving is completed*1 when the data on lowest-order byte of D8125 is received.

*1. Receiving is completed also when the amount of received data specified by the RS instruction is received or when the receiving of data is suspended and the next set of data is not executed within the timeout time set by D8129.

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6.2.2 **Function and operation**

RS instruction specifies the head device storing the sent data sent from the PLC, amount of data, head device storing the received data and the maximum allowable amount of received data. Create a program as shown below.

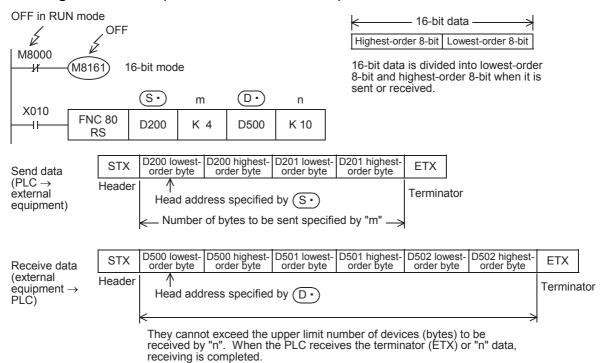


→ For the operation when data is received, refer to Subsection 6.2.5.

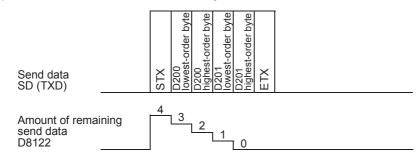
6.2.3 Send/receive data and amount of data

RS instruction can handle sent and received data in two modes, 16-bit mode and 8-bit mode. Data is handled as shown below in each mode. (In the examples shown below, "header provided" and "terminator provided" are selected in the communication setting.)

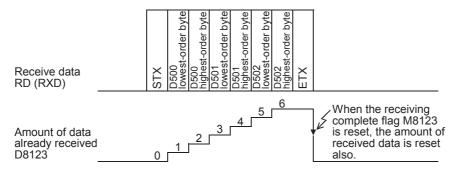
1. Handling of 16-bit data (when M8161 is set to OFF)



1) Send data and amount of remaining send data



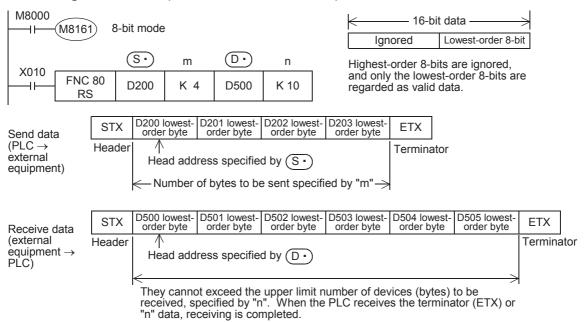
2) Receive data and amount of data already received



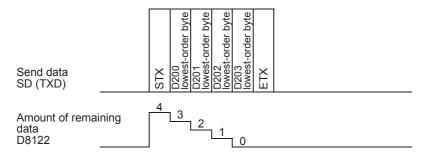
Caution on other instructions using M8161

M8161 is shared by RS, ASCI, HEX, CCD, and CRC (provided only in FX3U and FX3UC PLCs) instructions. If M8161 is changed during the sending/receiving operation of the RS instruction, the data may not be received normally.

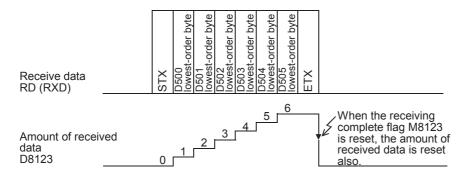
2. Handling of 8-bit data (when M8161 is set to ON)



1) Send data and amount of remaining data



2) Receive data and amount of received data



Caution on other instructions using M8161

M8161 is shared by RS, ASCI, HEX, CCD, and CRC (provided only in FX3U and FX3UC PLCs) instructions. If M8161 is changed during the sending/receiving operation of the RS instruction, the data may not be received normally.

6.2.4 Operation when data is sent

When the sending request flag (M8122) is set to ON while RS instruction is driven, the PLC sends the data stored in the data registers \bigcirc to (\bigcirc +m-1) specified by the RS instruction.

When sending of the data is complete, the sending request flag (M8122) is automatically set to OFF.

1. Time at which sending is started

When RS instruction is executed after the sending request flag (M8122) is set to ON, the PLC starts to send. When sending begins, the PLC sends the data stored in the data registers specified by the RS instruction in interrupt processing regardless of the operation cycle.

2. Time at which sending is completed

When all send data is sent, sending is completed. (If the terminator is set, the terminator is included in the send data.)

3. Cautions on sending

When sending data, observe the following cautions

- 1) While the sending request flag (M8122) is ON, do not change the amount of send data or contents of send data.
- 2) Do not set the sending request flag (M8122) to OFF in a sequence program. If the send data is changed while the sending request flag (M8122) is ON or if the sending request flag (M8122) is set to OFF in a sequence program, correct data will not be sent.

6.2.5 Operation when data is received

When RS instruction is executed, the PLC waits to receive. When the PLC receives data from the connected equipment and receiving is completed, the receiving complete flag (M8123) is set to ON.

When the PLC receives data, it stores the received data to the data registers to (+n-1) specified by the RS instruction.

While the receiving complete flag (M8123) is ON, the PLC cannot receive new data.

1. Time at which receiving is started

When the PLC receives data while it is waiting to receive, it starts receiving data.

When receiving begins, the PLC stores the received data in interrupt processing regardless of the operation cycle.

When the header (D8124) is specified in the communication format, however, the PLC starts receiving when it receives the code set in the header. And the PLC stores the received data except the header.

2. Time at which receiving is completed

Receiving is completed in the following three conditions. When either condition is established, receiving is completed.

- 1) When the PLC receives as much data as specified by the RS instruction
- 2) When "terminator provided" is selected in the communication format, and the PLC receives the code set in the terminator (D8125)
- 3) When data receiving is suspended and the PLC does not receive the next set of data within the time set in the time-out time setting device (D8129)

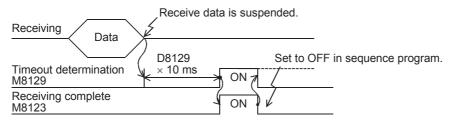
At this time, the time-out check flag (M8129) turns ON.

(The time-out check flag is not provided in FX2N PLC before Ver. 2.00, and FX2(FX), FX2C, FX0N PLCs.)

3. Operation of the time-out check flag (which is not provided in FX2N PLC before Ver. 2.00, and FX2(FX), FX2C, FX0N PLCs)

When data receiving is suspended, counting of the timeout time is started immediately. If the PLC does not receive the next set of data within the time-out time setting set by D8129, the time-out check flag (M8129) is set to ON. At this time, the receiving complete flag (M8123) is set to ON also.

The time-out time setting (D8129) can be set to a value from 1 to 255 (10 ms to 2550 ms).



The time-out check flag (M8129) does not turn OFF automatically.

Set it to OFF in the sequence program. (When M8123 is set to OFF, M8129 is also set to OFF.)

Using this function, the PLC can receive data from equipment where the amount of send data varies without the terminator.

4. When the control line is set to interlink mode

When interlink mode is selected as the communication format, the following sequence is adopted from the start of receiving to completion:

- 1) When the amount of data already received becomes "number of bytes to be received -30", the control line ER (DTR) turns OFF.
 - When the control line ER (DTR) turns OFF, the external equipment should suspend data sending. After the control line ER (DTR) turns OFF, the PLC can receive up to 30 characters (bytes).
- 2) When the external equipment suspends data sending, the PLC sets the time-out check flag (M8129) and receiving complete flag (M8123) to ON after the time-out time setting (D8129). Move the received data in a sequence program, and then set the receiving complete flag (M8123) and time-out check flag (M8129) to OFF.
- 3) When the receiving complete flag (M8123) is set to OFF, the control line ER (DTR) turns ON. When the control line ER (DTR) turns ON, resume sending data from the external equipment.
- 4) Repeat steps 1) to 3) until data receiving is completed.

5. Cautions on receiving

When receiving data, observe the following cautions:

- 1) While the receiving complete flag (M8123) is ON, the PLC cannot receive the next set of data. When the receiving complete flag is set to OFF, the PLC waits to receive.
- 2) If the RS instruction is driven while the amount of received data "n" is "0", the operation of the receiving complete flag (M8123) varies depending on the PLC as follows:
 - FX1S, FX1N, FX1NC PLCs The receiving complete flag (M8123) remains OFF even after the RS instruction is driven, but the PLC does not wait to receive.
 - FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U, FX3UC PLCs The receiving complete flag (M8123) turns ON after the RS instruction is driven.

To make the PLC wait to receive, set the amount of received data "n" to "1" or more, and set the receiving complete flag (M8123) to OFF from ON.

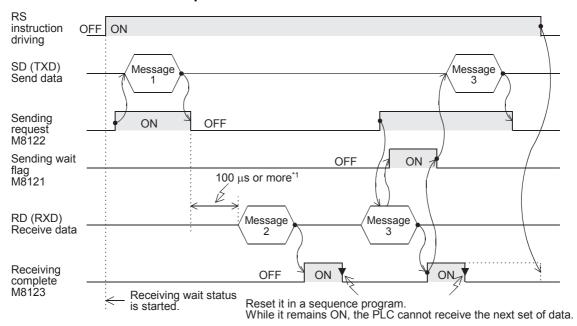
6.3 Operation of Control Line

6.3.1 FX2N (before Ver. 2.00), FX2(FX), FX2C, FX0N, FX1S, FX1N and FX1NC PLCs

FX2N PLCs before Ver. 2.00, and FX2(FX), FX2C, FX0N, FX1S, FX1N, FX1NC PLCs execute half-duplex, bidirectional communication.

When the sending flag is set to ON during receiving, the sending wait flag M8121 turns ON. When the receiving complete flag turns ON from OFF, the PLC starts to send.

1. When the control line is not provided

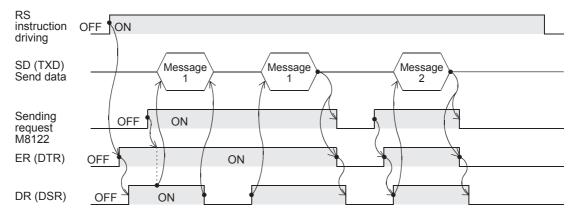


*1. Set it to 2 scan times or more in FX2(FX), FX2C, FX0N, FX1S, FX1N and FX1NC PLCs.

2. When the control line is in the standard mode

Use this mode when only sending or receiving.

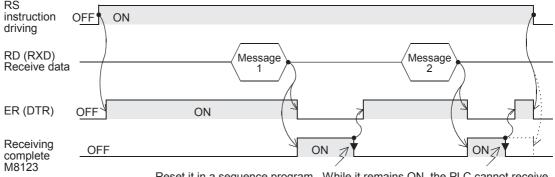
1) When only sending is executed



C

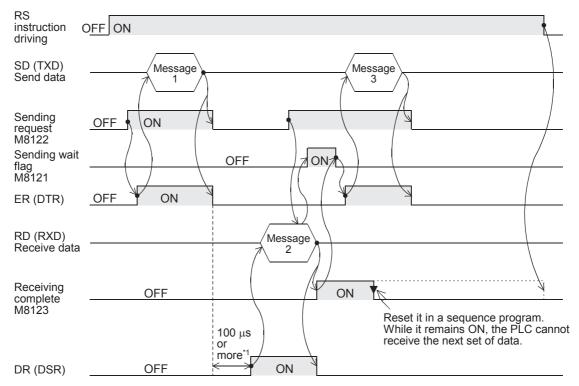
D

2) When only receiving is executed [The DR (DSR) signal is not used.]



Reset it in a sequence program. While it remains ON, the PLC cannot receive the next set of data.

3. When the control line is in the modem mode



*1. Set it to 2 scan times or more in FX2(FX), FX2C, FX0N, FX1S, FX1N and FX1NC PLCs.

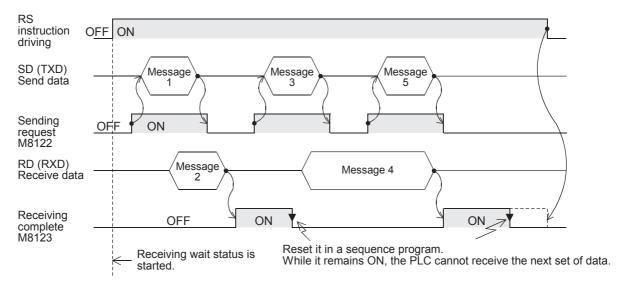
6.3.2 FX2N (Ver. 2.00 or later), FX2NC, FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs

FX2N PLCs Ver. 2.00 or later, and FX2NC, FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs execute full-duplex, bidirectional communication. When executing half-duplex, bidirectional communication, pay attention not to set the sending request to ON while receiving. If the sending request is set to ON, the PLC starts to send. As a result, the external equipment may not be able to receive data, and the sent and received data may be destroyed.

In full-duplex, bidirectional communication, the sending wait flag M8121 does not turn ON.

In FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs, however, the sending wait flag M8121 remains ON while the DR (DSR) is OFF, the PLC waits to send, and the control line is in the standard mode or interlink mode.

1. Without control line

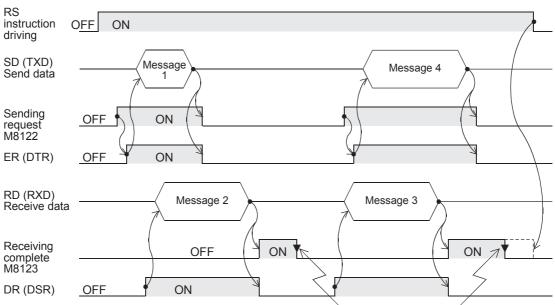


2. When the control line is in the standard mode

Use this mode when only sending or receiving.

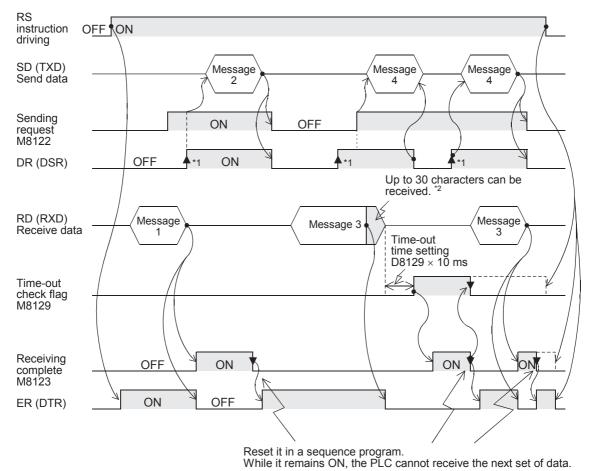
The control line and transfer sequence are equivalent to those in FX2N PLCs (before Ver. 2.00). Refer to Subsection 6.3.1.

3. When the control line is in the modem mode



Reset it in a sequence program.
While it remains ON, the PLC cannot receive the next set of data.

4. When the control line is in the interlink mode



While it remains ON, the PLC cannot receive the next set of data.

- *1. On the external equipment side, set the DR (DSR) signal to ON when the external equipment is ready to receive.
 - The FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U or FX3UC PLC sends the send data when both the DR (DSR) signal and the sending request turn ON.
- *2. In the interlink mode, the PLC sets ER (DTR) to OFF when the amount of data already received becomes "Number of bytes to be received -30", and asks the external equipment to stop sending. After that, the PLC can only receive up to 30 characters. In this case, temporarily stop sending, and then send the remaining data after the ER (DTR) signal turns ON again.
 - When sending is stopped, the PLC finishes receiving after the time-out time setting is reached. When sending is not stopped, the PLC finishes receiving after it has received the final send data or 30 characters. Accordingly, make sure that the amount of received data is "30 + α ".

6.4 Important Points in Creating Programs

- The RS instruction can be used as many times as necessary in a program, but make sure that only one RS instruction is driven at a time.
 - For multiple RS instructions to be driven, make sure the OFF time is longer than one scan time.
- 2) In FX2(FX), FX2C, FX0N, FX1s, FX1N and FX1NC PLCs, make sure to provide an interval of two scan times or more between completion of sending and the start of receiving or between completion of receiving and the start of sending.
 - In FX2N PLCs before Ver. 2.00, provide an interval of 100 μs or more.
 - In FX2N PLCs Ver. 2.00 or later, FX2NC, FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs, this interval is not necessary.
- 3) While a RS instruction is being driven, change of D8120 is prohibited.

 To change D8120, set the RS instruction to OFF, set D8120 to "0", and then set a new value to D8120.
- 4) In the interlink mode, set the amount of received data n to "31" or more.

 If it is set to "30" or less, the control line ER (DTR) is set to OFF as soon as the PLC receives data. As a result, the received data may be partially skipped.
- 5) Do not use another instruction which uses the same communication port. If such an instruction is used, communication may not function normally.
 - ${\sf FX3S,\,FX3G,\,FX3GC,\,FX3U} \ and \ {\sf FX3UC\,\,PLCs:\,\,RS2} \ instruction, \ {\sf IVDR} \ instruction, \ {\sf etc.}$
 - FX2N and FX2NC PLCs: EXTR instruction
- 6) When RS-485 communication is executed in FX₃U and FX₃UC PLCs, it may take 300 μs until the PLC starts receiving after it has completed sending. Assure 300 μs or more in counterpart equipment as the period from completion of receiving to start of

6.5 Communication Error

sendina.

When a communication error occurs, the error flag M8063 turns ON and D8063 stores the error code.

Error code	Description
6301	Parity error, overrun error or framing error
6302	Defective communication character
6304	Defective data format
6305	Defective command
6306	Monitoring time out

→ Confirm the contents in "Chapter 11. Troubleshooting".

7.1 Example of Printing Using RS Instruction (Using RS-232C Connection)

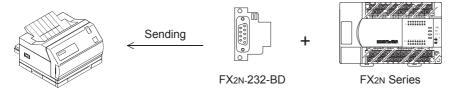
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7. Practical Program Example (RS Instruction)

7.1 Example of Printing Using RS Instruction (Using RS-232C Connection)

In this example, a printer with an RS-232C interface is connected to a PLC, and data sent from the PLC is printed.

1. System configuration



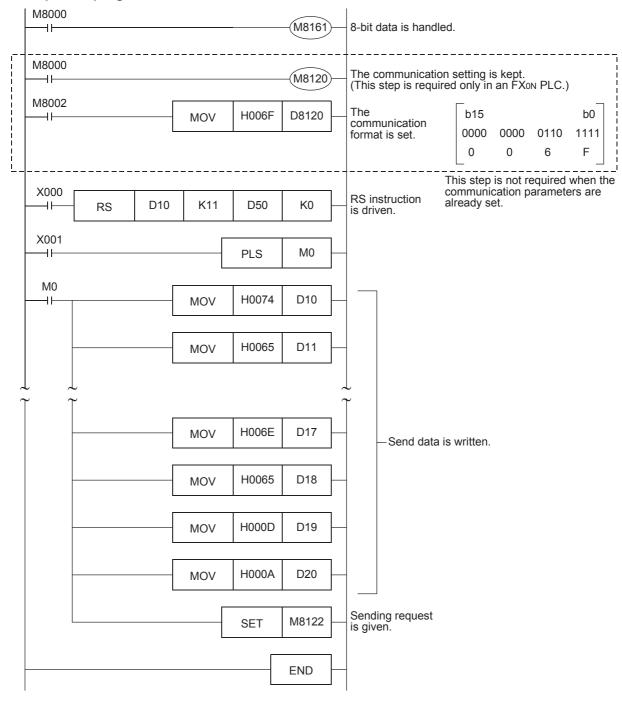
Use a communication cable suitable to the pin arrangement of the printer connector. (For representative wiring, refer to Chapter 4.)

2. Communication format

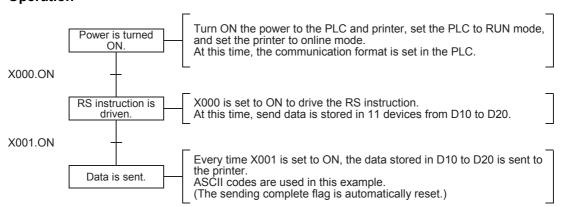
Align the communication format in the PLC with that in the printer used. (The table below shows the communication format in the main unit.)

`	, , , , , , , , , , , , , , , , , , ,
Data length	8-bit
Parity	Even
Stop bit	2-bit
Baud rate	2400 bps
Header	Not provided
Terminator	Not provided
Control line (hardware)	Not provided
Communication method (protocol)	Non-protocol method

3. Sequence program



4. Operation



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8. Creating Programs (RS2 Instruction)

This chapter explains how to create programs for non-protocol communication using RS2 instruction and how such programs operate.

The RS2 instruction is dedicated to the FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs.

RS2 instruction has the following additional functions which are not provided in the RS instruction:

- 1) Up to 4 characters (bytes) can be specified as the header and terminator.
- 2) The sum check can be added automatically.
- 3) The communication port (channel) can be specified.

8.1 Checking Contents of Related Devices

The tables below show devices used in non-protocol communication using RS2 instruction. Available channels vary depending on the main unit. For details, refer to Section 3.2.

1. Bit devices

	Device		Name	Description	R/W
ch0	ch1	ch2	Name	Description	IX/VV
M8062	M8063	M8438	Serial communication error	This device turns ON when a communication error occurs. When this device (serial communication error) turns ON, D8062, D8063 or D8438 stores the corresponding error code.	
M8371	M8401	M8421	Sending wait flag	This device remains ON while the PLC is waiting to send.	R
M8372	M8402	M8422	Sending request	When this device is set to ON, the PLC starts to send.	R/W
M8373	M8403	M8423	Receiving complete flag	This device turns ON when receiving is completed. While this device (receiving complete flag) is ON, the PLC cannot receive any receive data.	R/W
_	M8404	M8424	Carrier detection flag	This device turns ON in synchronization with the CD (DCD) signal.	R
_	M8405	M8425	Data set ready (DSR) flag*1	This device turns ON in synchronization with the DR (DSR) signal.	R
M8379	M8409	M8429	Time-out check flag	This device turns ON when data receiving is suspended and the next set of receive data is not given within the time set by the time-out time setting device.	

R: Read only W: Write only R/W: Read or Write

*1. FX3U, FX3UC PLCs Ver. 2.30 or later, and FX3S, FX3G, FX3GC PLCs is applicable.

2. Word devices

	Device		None					D			R/W						
ch0	ch1	ch2	Name		When the serial communication error flag turns ON, this device stores the corresponding error code. This device sets the communication format. This device stores the amount of remaining send data. This device stores the amount of data already received. This devices stores communication parameters set in the PLC. This device sets the timeout time. These devices set the headers 1 to 4. Header 1 2 3 4 Data Header 1 Data Header DB380 D8410 D8430 H02												
D8062	D8063	D8438	Serial communication error code						flag turns ON,	this device	R/W						
D8370	D8400	D8420	Communication format setting	This dev	ice s	ets the co	mm	unication for	mat.		R/W						
D8372	D8402	D8422	Amount of remaining send data	This dev	ice s	tores the a	amo	ount of remai	ning send data.		R						
D8373	D8403	D8423	Amount of data already received	This dev	ice s	tores the a	amo	ount of data a	already received	I.	R						
_	D8405	D8425	Communication parameter display	This dev	his devices stores communication parameters set in the PLC.												
D8379	D8409	D8429	Time-out time setting	This dev	This device sets the timeout time.												
D8380	D8410	D8430	Header 1 and header 2	1	He 2	ader 3 ch0	4	Dat	ch2	value	R/W						
				1		est-order	(lo	owest-order rte)	(lowest-order byte)	H02 (STX)							
				2	D83 (high	nest-order	(h	3410 ighest-order rte)	D8430 (highest-order byte)	H00							
D8381	D8411	D8431	Header 3 and header 4	3	D83 (low- byte	est-order	(lc	3411 owest-order rte)	D8431 (lowest-order byte)	H00	R/W						
				4	D83 (high byte	nest-order	(h	3411 ighest-order rte)	D8431 (highest-order byte)	H00							
									ders are not pro used to set the								

	Device		Nome			Description			R/W
ch0	ch1	ch2	Name			Description			R/VV
D8382	D8412	D8432	Terminator 1 and terminator 2	\$	Data	Terminators 1 to Terminat 1 2 3	•		R/W
				Termi- nator	ch0	ch1	ch2	Initial value	
				1	D8382 (lowest-order byte)	D8412 (lowest-order byte)	D8432 (lowest-order byte)	H03 (ETX)	
				2	D8382 (highest-order byte)	D8412 (highest-order byte)	D8432 (highest-order byte)	H00	
D8383	D8413	D8433	Terminator 3 and	3	D8383 (lowest-order byte)	D8413 (lowest-order byte)	D8433 (lowest-order byte)	H00	R/W
			terminator 4	4	D8383 (highest-order byte)	D8413 (highest-order byte)	D8433 (highest-order byte)	H00	
				provided	l. ea before H00		or 1, terminato		
D8384	D8414	D8434	Receiving sum (receive data)	This dev	ice stores the re	eceived sum ch	eck value.		R
D8385	D8415	D8435	Receiving sum (calculation result)	This dev		e sum check v	/alue calculated	d from the	R
D8386	D8416	D8436	Sending sum	This dev	ice stores the s	um check value	added to the s	end data.	R
D8389	D8419	D8439	Operation mode display	This dev	ice stores the c	urrent commun	ication being ex	ecuted.	R

R: Read only W: Write only R/W: Read or Write

8.2 How to Use RS2 Instruction

This section explains the function, operation and programming method of the RS2 instruction. Available channels vary depending on the main unit. For details, refer to Section 3.2.

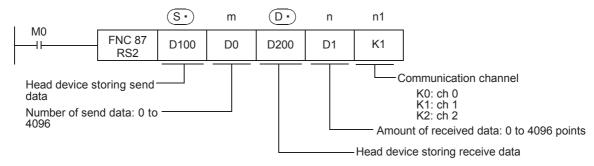
1. Applicable devices

0	Bit Devices											Wo	ord	Dev	ice	s				Others					
Oper- and Type			Sy	ster	n/U	ser		Digit Specification				Sy	System/User			Special Unit	Index			Con- stant		Real Number	Charac- ter String	Pointer	
.,,,,	Х	Υ	М	Τ	С	S	D□.b	KnX	KnY	KnM	KnS	T	С	D	R	U□\G□	٧	Z	Modify	K	Н	E	"□"	Р	
S ∙														✓	•				✓						
m														✓	▲					✓	✓				
D•														✓	•				✓						
n														✓	•					✓	✓				
n1																				✓	✓				

▲: Only available for FX3G, FX3GC, FX3U and FX3UC PLCs.

m, n: 0 to 4096 points n1: K0, K1 or K2

2. Program example



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8.2.1 Applicable frames

Message frames used in communication can be selected by setting the communication format. The table below shows message frames applicable to the RS2 instruction.

1		Data			
2		Data	CR+LF		
3		Data	Terminator		
4		Data	Terminator	CR+LF	
5		Data	Terminator	Sum check	
6		Data	Terminator	Sum check CR+LF	
7	Header	Data			
8	Header	Data	CR+LF		
9	Header	Data	Terminator		
10	Header	Data	Terminator	CR+LF	
11	Header	Data	Terminator	Sum check	
12	Header	Data	Terminator	Sum check CR+LF	

1. Header

When "header provided" is selected in the communication format settings, the values of D8380 and D8381 are used for ch0, and the values of D8410 and D8411 are used for ch1, and the values of D8430 and D8431 are used for ch2.

Up to four headers can be set.

Header	Header 1	Header 2	Header 3	Header 4
ch0	D8380 (lowest-order byte)	D8380 (highest-order byte)	D8381 (lowest-order byte)	D8381 (highest-order byte)
ch1	D8410 (lowest-order byte)	D8410 (highest-order byte)	D8411 (lowest-order byte)	D8411 (highest-order byte)
ch2	D8430 (lowest-order byte)	D8430 (highest-order byte	D8431 (lowest-order byte)	D8431 (highest-order byte)

When data is sent, the data set in the devices above is added at the head of the specified send data. When data is received, receiving begins when the data set in the devices above is received continuously.

Even if "header provided" is selected, headers are not provided if header 1 is set to "00H". The area before 00H (in 1-byte units) is used to set the headers.

Caution

Set the header before driving the RS2 instruction. Do not change the setting while the RS2 instruction is being driven.

2. Terminator

When "terminator provided" is selected in the communication format settings, the values of D8382 and D8383 are used for ch0, and the values of D8412 and D8413 are used for ch1, and the values of D8432 and D8433 are used for ch2.

Up to four terminators can be set.

Terminator	Terminator 1	Terminator 2	Terminator 3	Terminator 4
ch0	D8382 (lowest-order byte)	D8382 (highest-order byte)	D8383 (lowest-order byte)	D8383 (highest-order byte)
ch1	D8412 (lowest-order byte)	D8412 (highest-order byte)	D8413 (lowest-order byte)	D8413 (highest-order byte)
ch2	D8432 (lowest-order byte)	D8432 (highest-order byte)	D8433 (lowest-order byte)	D8433 (highest-order byte)

When data is sent, the data set in the devices above is added at the end of the specified send data. When data is received, receiving is completed*1 when the data set in the devices above is received.

Even if "terminator provided" is selected, terminators are not provided if terminator 1 is set to "00H". The area before 00H (in 1-byte units) is used to set the terminators.

Caution

Set the terminator before driving the RS2 instruction. Do not change the setting while the RS2 instruction is being driven.

*1. Receiving is also completed when the amount of received data specified by the RS2 instruction is finished receiving or when data receiving is suspended and the next set of data is not received within the time-out time setting device (D8379, D8409 or D8429).

3. Sum check

When "sum check provided" is selected in the communication format setting, the sum check is executed for the sent and received data.

When selecting "sum check provided", make sure to select "terminator provided".

When data is sent, the sum of "data" + "terminator" is calculated, and added to the send data.

When data is received, it is checked whether or not the received sum is equivalent to the sum calculated by the PLC.

→ For details on sum check, refer to Subsection 8.2.6.

4. CR + LF

When "CR + LF provided" is selected in the communication format setting, the character code of "CR + LF" is added at the end of the send data.

When data is received, receiving is completed when "CR + LF" is received continuously.

However, receiving is also completed when the specified amount of received data is received or when data receiving is suspended and the next set of data is not received within the time-out time setting. Make sure that "CR" is not included in the message.

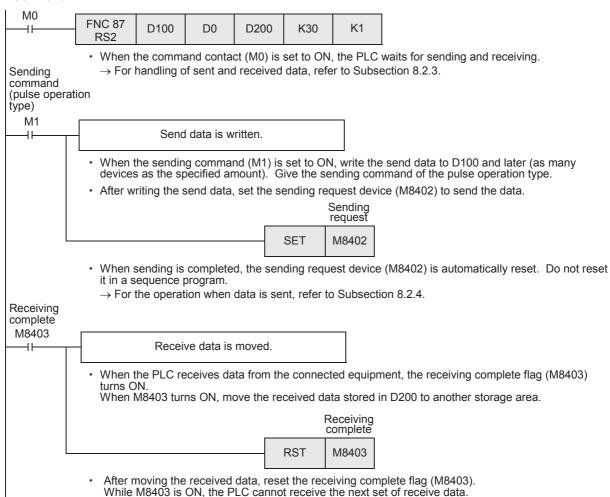
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8.2.2 **Function and operation**

RS2 instruction specifies the head device storing the send data from the PLC, amount of data, head device storing the received data and maximum allowable amount of received data. Create a program as shown below.

Command



→ For the operation when data is received, refer to Subsection 8.2.5.

Send/receive data and amount of data 8.2.3

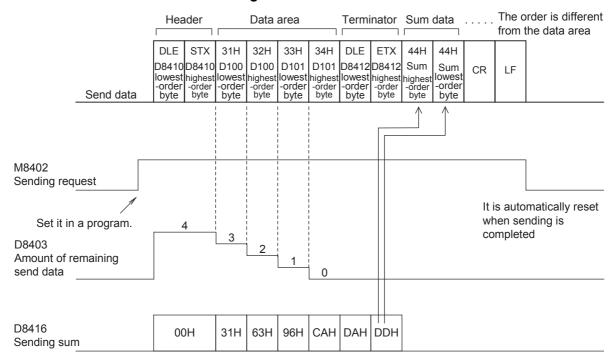
RS2 instruction can handle send data and receive data while storing two characters in one data register.



Communication format setting

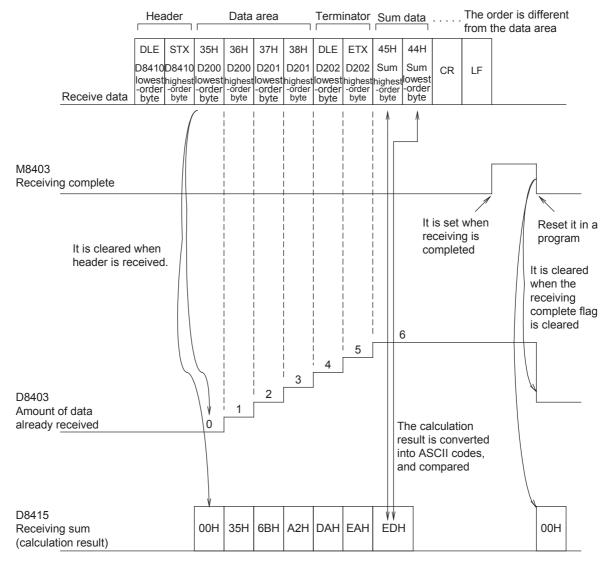
- Control line not provided
- [DLE + STX (D8410: 0210H D8411: 0000H)] [DLE + ETX (D8412: 0310H D8413: 0000H)] Headers provided
- Terminators provided
- Sum check provided
- · CR + LF added

1. Send data and amount of remaining send data



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2. Receive data and amount of data already received



Caution

The 8-bit mode is not applicable in RS2 instruction.

8.2.4 Operation when data is sent

When the sending request flag is set to ON while RS2 instruction is driven, the PLC sends the data stored in the specified data registers (S*) to ((S*) +m-1).

When using communication port ch0, set M8372.

When using communication port ch1, set M8402.

When using communication port ch2, set M8422.

When sending of the data is completed, the sending request flag is automatically set to OFF.

1. Time at which sending is started

When RS2 instruction is executed after the sending request flag is set to ON, the PLC starts to send. When sending is started, the PLC sends the data stored in the data registers specified by RS2 instruction in interrupt processing regardless of the operation cycle.

2. Time at which sending is completed

When all send data*1 is sent, sending is completed.

*1. The "terminators", "sum check" and "CR + LF" set in the communication format are included also in the send data.

3. Cautions on sending

When sending data, observe the following cautions

- 1) While the sending request flag is ON, do not change the amount of send data or the contents of the send data.
- 2) Do not set the sending request flag to OFF in a sequence program. If the send data is changed while the sending request flag is ON or if the sending request flag is set to OFF in a sequence program, correct data is not sent.

8.2.5 Operation when data is received

When RS2 instruction is executed, the PLC waits to receive. When the PLC receives data from the connected equipment and receiving is completed, the receiving complete flag is set to ON.

When communication port ch0 is used, M8373 turns ON.

When communication port ch1 is used, M8403 turns ON.

When communication port ch2 is used, M8423 turns ON.

When the PLC receives data, it stores the received data to the data registers \bigcirc to (\bigcirc +n-1) specified by the RS2 instruction.

While the receiving complete flag is ON, the PLC cannot receive new data.

1. Time at which receiving is started

When the PLC receives data while it is waiting to receive, it starts receiving data.

When receiving begins, the PLC stores the received data in interrupt processing regardless of the operation cycle.

When the headers are specified in the communication format, however, the PLC starts receiving when it continuously receives the codes set in the headers. The PLC stores the received data except the headers.

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2. Time at which receiving is completed

Receiving is completed in the following three conditions. When either condition is established, receiving is completed.

- 1) When the PLC receives the amount of receive data specified by the RS2 instruction
- 2) When the "terminators", "sum check" and "CR + LF" set in the communication format are received normally.

Ī	 Data	CR+LF		
			-	
	 Data	Terminator		
			-	-
	 Data	Terminator	CR+LF	
				•
	 Data	Terminator	Sum check	
				•
	 Data	Terminator	Sum check	CR+LF
_				

3) When data receiving is suspended and the PLC does not receive the next set of data within the time set within the time-out time setting device (D8379, D8409 or D8429), the time-out check flag (M8379, M8409 or M8429) turns ON.

3. Operation of time-out check flag

When data receiving is suspended, if the PLC does not receive the next set of data within the preset time-out time setting, the time-out check flag is set to ON.

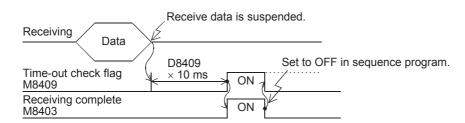
At this time, the receiving complete flag is also set to ON.

The time-out judgment time can be set in the following range:

Setting range for ch0 and ch2: 1 to 3,276 (10 to 32,760 ms)

Setting range for ch1: 1 to 255 (10 to 2,550 ms)

Name	ch0	ch1	ch2
Time-out check flag	M8379	M8409	M8429
Time-out time setting	D8379	D8409	D8429



The time-out check flag does not turn OFF automatically. Set it to OFF in the sequence program. (When the receiving complete flag is set to OFF, the time-out check flag is also set to OFF.)

By using this function, the PLC can receive data from equipment where the amount of send data varies without the terminator.

4. When the control line is set to the interlink mode

When the interlink mode is selected in the communication format, the following sequence is adopted from start of receiving to completion of receiving:

- When the amount of data already received becomes "preset amount of received data -30", the control line ER (DTR) turns OFF.
 - When the control line ER (DTR) turns OFF, the external equipment should suspend data sending. After the control line ER (DTR) turns OFF, the PLC can receive up to 30 characters (bytes).
- 2) When the external equipment suspends data sending, the PLC sets the time-out check flag and receiving complete flag to ON after the preset time-out time setting.
 - Move the received data in a sequence program, and then set the receiving complete flag and time-out check flag to OFF.
- 3) When the receiving complete flag is set to OFF, the control line ER (DTR) turns ON. When the control line ER (DTR) turns ON, restart data sending from the external equipment.
- 4) Repeat steps 1) to 3) until data receiving is completed.

5. Cautions on receiving

When receiving data, observe the following cautions

- 1) While the receiving complete flag is ON, the PLC cannot receive the next set of receive data. When the receiving complete flag is set to OFF, the PLC waits to receive.
- 2) If the RS2 instruction is driven while the amount of received data "n" is "0", the receiving complete flag (M8373, M8403, M8423) turns ON. To make the PLC wait to receive, set the amount of received data "n" to "1" or more, and set the receiving complete flag (M8373, M8403, M8423) to OFF from ON.
- 3) Set the amount of received data to a value including "terminators", "sum check" and "CR+LF". If the specified amount of received data is small, the serial communication error flag (M8062, M8063 or M8438) turns ON.

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8.2.6 Sum check code

The sum check code indicates a two-digit ASCII code converted from the lowest-order byte (8-bit) of the result (sum) acquired by adding the sum check target data as hexadecimal data.

By setting a parameter, set whether or not the sum check code is added in the message.

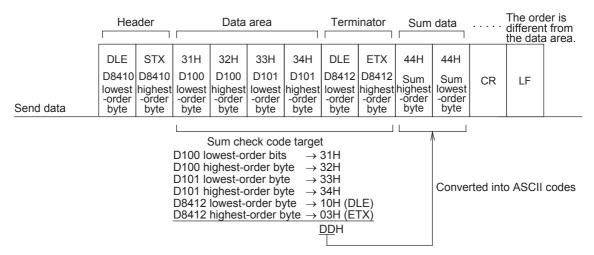
- When "sum check provided" is selected, the sum check code is added in the message during sending. During receiving, the sum check code is compared with the value calculated from the received data to check the received data.
- When "sum check not provided" is selected, the sum check code is not added, so the received data is not checked either.

A calculation example of the sum check code is shown below.

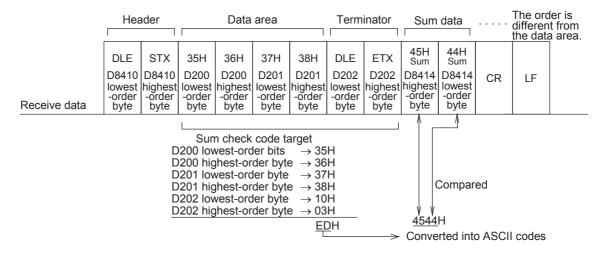
Example: When the communication format (parameters) is set as follows

- Control line not provided
- Headers provided [DLE+STX (D8410: 0210H, D8411: 0000H)]
- Terminators provided [DLE+ETX (D8412: 0310H, D8413: 0000H)]

In the case of send data



In the case of receive data



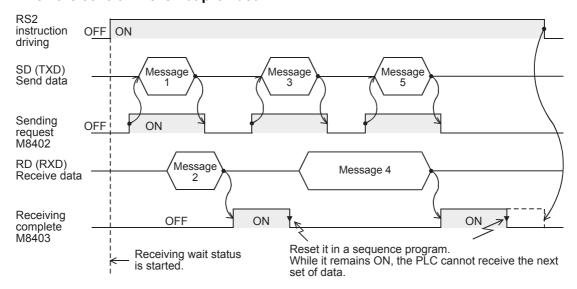
8.3 Operation of Control Line

FX3s, FX3G, FX3G, FX3G and FX3UC PLCs execute full-duplex, bidirectional communication. When executing half-duplex, bidirectional communication, pay attention not to set the sending request to ON while receiving. If the sending request is set to ON, the PLC starts to send. As a result, the external equipment may not be able to receive data, and the sent and received data may be destroyed.

In full-duplex, bidirectional communication, the sending wait flag M8371, M8401, and M8421 does not turn ON.

However, the sending wait flag M8371, M8401, and M8421 remains ON while the DR (DSR) is OFF, the PLC waits to send, and the control line is in the standard mode or interlink mode.

1. When the control line is not provided



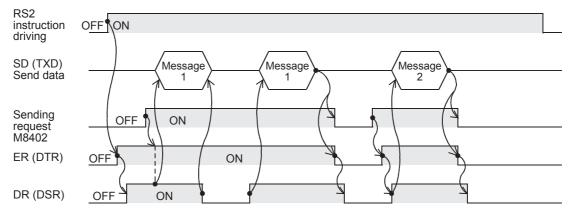
C

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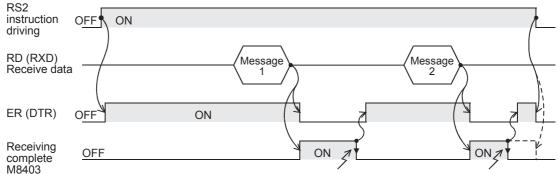
2. When the control line is in the standard mode

Use this mode when only sending or receiving.

1) When only sending is executed

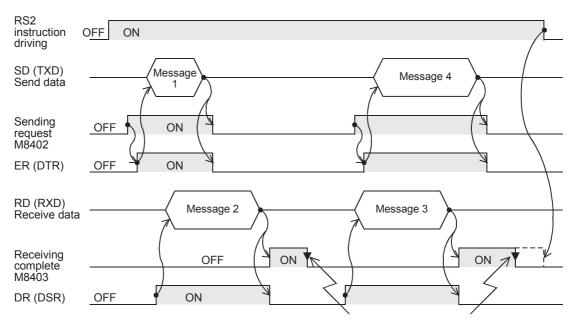


2) When only receiving is executed [The DR (DSR) signal is not used.]



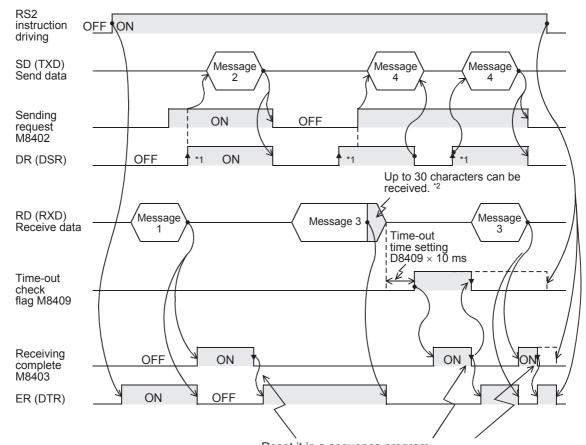
Reset it in a sequence program. While it remains ON, the PLC cannot receive the next set of data.

3. When the control line is in the modem mode



Reset it in a sequence program. While it remains ON, the PLC cannot receive the next set of data.

4. When the control line is in the interlink mode



Reset it in a sequence program. While it remains ON, the PLC cannot receive the next set of data.

- *1. On the external equipment side, set the DR (DSR) signal to ON when the external equipment is ready to receive.
 - The FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs sends the send data when both the DR (DSR) signal and the sending request turn ON.
- *2. In the interlink mode, the PLC sets ER (DTR) to OFF when the amount of data already received becomes "Number of bytes to be received -30", and asks the external equipment to stop sending. After that, the PLC can only receive up to 30 characters. In this case, temporarily stop sending, and then send the remaining data after the ER (DTR) signal turns ON again.
 - When sending is stopped, the PLC finishes receiving after the time-out time setting is reached. When sending is not stopped, the PLC finishes receiving after it has received the final send data or 30 characters. Accordingly, make sure that the number of receive characters are "30 + α ".

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8.4 Important Points in Creating Programs

- The RS2 instruction can be used as many times as necessary in a program, but make sure that only one RS2 instruction is driven in each communication port at a time.
 For multiple RS instructions to be driven, make sure the OFF time is longer than one scan time.
- 2) Do not use another instruction (such as a RS instruction or IVDR instruction) which uses the same communication port. If such an instruction is used, communication may not function normally.
- 3) While a RS2 instruction is being driven, change of D8370, D8400 or D8420 is prohibited. To change D8370, D8400 or D8420, set the RS2 instruction to OFF, set D8400 or D8420 to "0", and then set a new value to D8400 or D8420.
- 4) In the interlink mode, set the amount of received data "n" to "31" or more. If it is set to "30" or less, the control line ER (DTR) is set to OFF as soon as the PLC receives data.
- 5) FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs execute full-duplex, bidirectional communication. When using half-duplex, bidirectional communication, pay attention not to turn ON the sending request flag while receiving.
- 6) When using the header and terminator, set them before driving the RS2 instruction. Do not change the setting while the RS2 instruction is being driven.
- 7) When RS-485 communication is executed in FX₃U and FX₃UC PLCs, it may take 300 μs until the PLC starts receiving after it has completed sending.
 Assure 300 μs or more in counterpart equipment as the period from completion of receiving to start of sending.

8.5 Communication Error

When a communication error occurs, the error flag M8062 turns ON during communication using ch0, the error flag M8063 turns ON during communication using ch1, or the error flag M8438 turns ON during communication using ch2. D8063 or D8438 stores the error code respectively.

Error code			Description
D8062 (ch0)	D8063 (ch1)	D8438 (ch2)	Description
6201	6301	3801	Parity error, overrun error or framing error
6202	6302	3802	Defective communication character
6203	6303	3803	Receive data sum mismatch
6204	6304	3804	Defective data format
6205	6305	3805	Defective command
6206	6306	3806	Monitoring timeout

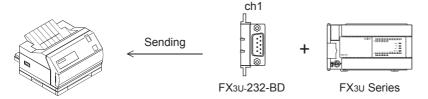
→ Confirm the contents in "Chapter 11. Troubleshooting".

9. Practical Program Example (RS2 Instruction)

9.1 Example of Printing Using RS2 Instruction (Using RS-232C Connection)

In this example, a printer with the RS-232C interface is connected to a PLC, and the data sent from the PLC is printed.

1. System configuration



Use a communication cable suitable to the pin arrangement of the connector of the printer used.

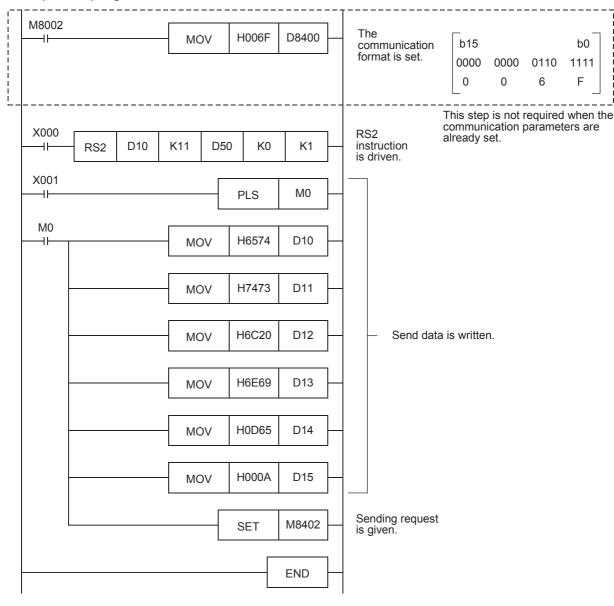
Communication format

Align the communication format in the PLC with that in the printer used. (The table below shows the communication format in the main unit.)

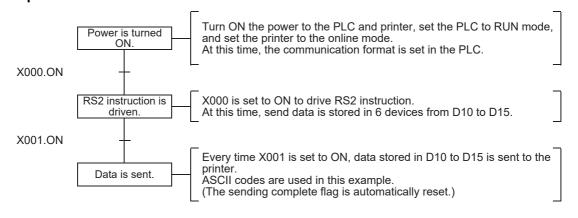
Data length	8-bit
Parity	Even
Stop bit	2-bit
Baud rate	2400 bps
Header	Not provided
Terminator	Not provided
Control line (H/W)	Standard/RS-232C, provided
Communication method (protocol)	Non-protocol method
CR, LF	Not provided

9.1 Example of Printing Using RS2 Instruction (Using RS-232C Connection)

2. Sequence program



3. Operation



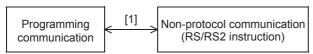
10. When Combined with Another Communication

This chapter explains how to use non-protocol communication (RS or RS2 instruction) together with another communication type.

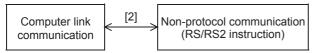
10.1 Other Communication Type Used Together

In FX PLCs, the following communication types can be changed over.

When changing over the communication types above, it is necessary to set the communication using a sequence program.



[1] Applicable only in FX2N PLCs Ver. 2.01 or later, and FX2NC, FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs.



[2] Applicable only in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs.

The tables below show devices used in sequence programs.

1) RS instruction

Device	Name	Description
D8120	Communication format setting	Sets the communication format.
D8419	Operation mode display (in FX3s, FX3G, FX3Gc, FX3U and FX3UC)	Allows the communication type being executed to be checked.

2) RS2 instruction

Available channels vary depending on the main unit.

For details, refer to Section 3.2.

	Device		Name	Description
ch0	ch1	ch2	Name	Bescription
D8370	D8400	D8420	Communication format setting	Sets the communication format.
D8389	D8419	D8439	Operation mode display	Allows the communication type being executed to be checked.

→ For the communication setting method, refer to Section 10.6.

 \rightarrow For details on the operation mode display, refer to Subsection 11.4.1.

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10.2 When Combined with Programming Communication

In FX2N PLCs Ver. 2.01 or later, and FX2NC, FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs, non-protocol communication in accordance with RS-232C using RS instruction can be changed over to the programming communication for peripheral equipment.

10.2.1 For FX2N and FX2NC PLCs

In FX2N PLCs Ver. 2.01 or later, and FX2NC PLCs, non-protocol communication using RS instruction by way of RS-232C port in the FX2N-232-BD (for FX2N PLCs), FX0N-232ADP or FX2NC-232ADP can be changed over to the communication with a programming tool (programming communication) by the following methods. If the external equipment executes another type of communication while the programming communication is selected, the PLC sends back "NAK".

1. When changing over using RUN mode and STOP mode

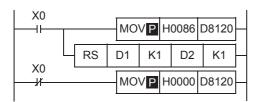
Set the communication format to one of the settings shown below to use non-protocol communication (in accordance with RS-232C) using the RS instruction while in RUN mode and then use the programming communication while in STOP mode.

Item	Contents				
item	H0086	H0186	H0286	H0386	
Data length		7-	bit		
Parity bit	Even				
Stop bit	1-bit				
Baud rate (bps)	9600 bps				
Header	Not provided	Provided	Not provided	Provided	
Terminator	Not provided		Prov	ided	
Control line	Not provided				

2. When changing over using the RS instruction while in RUN mode

When changing over non-protocol communication using RS instruction to the programming communication while in RUN mode, set RS instruction to OFF, and then overwrite the communication format (D8120) to

Before starting up RS instruction again, make sure to properly overwrite the communication format (D8120) used in the RS instruction.



In this setting also, the communication mode can be changed over using RUN mode and STOP mode if the condition shown in 1 above is satisfied.

3. Caution on using the RS instruction and programming communication together

Do not use the communication setting by parameters. Use the communication format device (D8120).

10.2.2 For FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs

In FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs, non-protocol communication using RS instruction can be changed over to communication with a programming tool (programming communication) by the following methods.

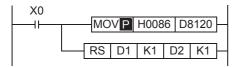
If the external equipment executes another type of communication while the programming communication is selected, the PLC sends back "NAK".

In FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs, the communication type operating in the communication port can be checked in the operation mode display device (D8419).

1. When changing over using RUN mode and STOP mode

Set the communication format as shown below to use non-protocol communication (in accordance with RS-232C) using RS instruction while in RUN mode and then use the programming communication while in STOP mode.

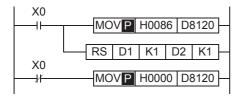
Make sure to set the communication format used in the RS instruction to D8120, and write it before executing the RS instruction.



2. When changing over using the RS instruction while in RUN mode

When changing over non-protocol communication using RS instruction to the programming communication while in RUN mode, set RS instruction to OFF, and then overwrite the communication format (D8120) to "H0000".

Before starting up RS instruction again, make sure to properly overwrite the communication format (D8120) used in the RS instruction.



3. Caution on using the RS instruction and programming communication together

Do not use the communication setting by parameters. Use the communication format device (D8120).

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10.3 When Combined with Computer Link Communication

In FX3s, FX3G, FX3GC, FX3U and FX3UC PLCs, non-protocol communication (in accordance with RS-232C or RS-485) using the RS instruction can be changed over to a protocol dedicated to computer link by the following methods.

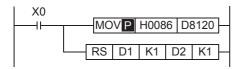
The protocol supported by the communication port can be checked in the operation mode display device (D8149).

1. When changing over using RUN mode and STOP mode

Set the communication format as shown below to use non-protocol communication (in accordance with RS-232C or RS-485) using the RS instruction while in RUN mode and then use computer link while in STOP mode.

Set computer link using parameters.

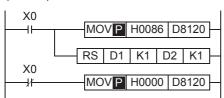
Make sure to set the communication format used in the RS instruction to D8120, and write it before executing the RS instruction.



2. When changing over using the RS instruction while in RUN mode

When changing over non-protocol communication using the RS instruction to computer link while in RUN mode, set the RS instruction to OFF, and then overwrite the communication format (D8120) to "H0000". Set computer link using parameters.

Before starting up the RS instruction again, make sure to properly overwrite the communication format (D8120) used in the RS instruction.



10.4 When Combined with Programming Communication

In FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs, non-protocol communication using RS2 instruction can be changed over to communication with a programming tool (programming communication) by the following methods.

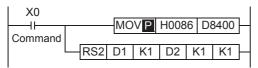
If the external equipment executes another type of communication while the programming communication is selected, the PLC sends back "NAK".

In FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs, the communication type operating in the communication port can be checked in the operation mode display devices (D8389, D8419 and D8439).

1. When changing over using RUN mode and STOP mode

Set the communication format as shown below to use non-protocol communication (in accordance with RS-232C) using the RS2 instruction while in RUN mode and then use the programming communication while in STOP mode.

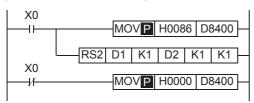
Make sure to set the communication format used in the RS2 instruction to D8370, D8400 or D8420, and write it before executing the RS2 instruction.



2. When changing over using the RS2 instruction while in RUN mode

When changing over non-protocol communication using the RS2 instruction to the programming communication while in RUN mode, set the RS2 instruction to OFF, and then overwrite the communication format (D8370, D8400 or D8420) to "H0000".

Before starting up the RS2 instruction again, make sure to properly overwrite the communication format (D8370, D8400 or D8420) used in the RS2 instruction.



3. Caution on using the RS2 instruction and programming communication together

Do not use the communication setting by parameters. Use the communication format device (D8370, D8400 or D8420).

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10.5 Using RS2 Instruction and Computer Link Communication Together

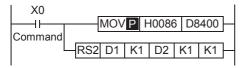
In FX3s, FX3G, FX3GC, FX3U and FX3UC PLCs, non-protocol communication (in accordance with RS-232C or RS-485) using RS2 instruction can be changed over to computer link by the following methods.

In FX3s, FX3G, FX3GC, FX3U and FX3UC PLCs, the communication type operating in the communication port can be checked in the operation mode display devices (D8389, D8419 and D8439).

1. When changing over using RUN mode and STOP mode

Set the communication format as shown below to use non-protocol communication (in accordance with RS-232C) using RS2 instruction while in RUN mode and then use a protocol for computer link while in STOP mode. Set computer link using parameters.

Make sure to set the communication format used in the RS2 instruction to D8370, D8400 or D8420, and write it before executing the RS2 instruction.



Non-protocol communication (in accordance with RS-485) cannot be changed over to computer link using RUN mode and STOP mode.

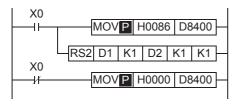
When changing over non-protocol communication (in accordance with RS-485) to computer link, refer to "2. When changing over using the RS2 instruction while in RUN mode" below.

2. When changing over using the RS2 instruction while in RUN mode

When changing over non-protocol communication using the RS2 instruction to computer link while in RUN mode, set the RS2 instruction to OFF, and then overwrite the communication format (D8370, D8400 or D8420) to "H0000".

Set computer link using parameters.

Before starting up the RS2 instruction again, make sure to properly overwrite the communication format (D8370, D8400 or D8420) used in the RS2 instruction.



10.6 Communication Setting Method Using Sequence Program

In the setting method using a sequence program, transfer values to the communication format device (D8120, D8400 or D8420).

This section explains related devices and the setting method using a sequence program.

10.6.1 Communication setting for RS instruction

The following device is used in the communication setting.

1. D8120 (communication format)

By setting values to D8120, the data length, parity, baud rate, etc. can be set.

The table below shows the contents of D8120.

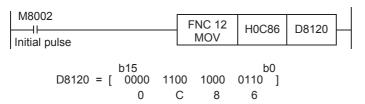
Bit No.	Namo	Name		Cont	tents
DIL NO.	Name		0 (bit = OFF)		1 (bit = ON)
b0	Data length		7-bit		8-bit
b1 b2	Parity	b2, b1 (0, 0): Not (0, 1): Od (1, 1): Eve	ď		
b3	Stop bit		1-bit		2-bit
b4 b5 b6 b7	Baud rate (bps)	(0, 0, 1, 1): 300 (0, 1, (0, 1, 0, 0): 600 (1, 0, 0, 1): 1200 (1, 0, 0, 0)		6, b5, b4 1, 1): 4800 0, 0): 9600 0, 1): 19200 1, 0): 38400*1	
b8	Header		Not provided		Provided (D8124) initial value: STX (02H)
b9	Terminator		Not provided		Provided (D8125) initial value: ETX (03H)
b10 b11	Control line	Non-protocol communication	protocol (1, 0): Interlink mode <rs-2320 (1,="" (fx2n="" (fx3u,="" 1):="" 2.00="" <rs-232c="" b10<="" b11,="" fx3uc="" interface,="" mode="" modem="" plcs="" plcs)="" rs-com-="" td="" ver.=""><td>C interface> interface> or later, and FX2NC, FX3S, FX3G, FX3GC, 485/RS-422 interface*2></td></rs-2320>		C interface> interface> or later, and FX2NC, FX3S, FX3G, FX3GC, 485/RS-422 interface*2>
b12		link (1, 0): RS-232C interface Not applicable			
b13 ^{*3}	Sum check	Not added		Added	
b14 ^{*3}	Protocol		Not used		Used
b15 ^{*3}	Control procedure		Format 1		Format 4

^{*1.} This setting is available only in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs.

^{*2.} When using the RS-485/RS-422 interface, only FX0N, FX1S, FX1N, FX1NC, FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs are applicable.

^{*3.} Make sure to set as "0" when using non-protocol communication.

To set the communication type, use the following program.



Data length	7-bit
Parity	Even
Stop bit	1-bit
Baud rate	9600 bps
Protocol	Non-protocol
Header	Not provided
Terminator	Not provided
Control line	Modem mode

10.6.2 Communication setting for RS2 instruction

The following devices are used in the communication setting.

When using communication port ch0, set D8370.

When using communication port ch1, set D8400.

When using communication port ch2, set D8420.

1. D8370, D8400 and D8420 (communication format)

By setting values to D8400 or D8420, the data length, parity, baud rate, etc. can be set. The table below shows the contents of D8400 and D8420.

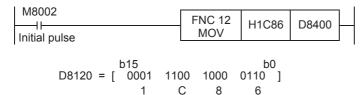
Bit No.	Name	Contents			
DIL NO.	Name	0 (bit = OFF)	1 (bit = ON)		
b0	Data length	7-bit	8-bit		
b1 b2	Parity	b2, b1 (0, 0): Not provided (0, 1): Odd (1, 1): Even			
b3	Stop bit	1-bit	2-bit		
b4 b5 b6 b7	Baud rate (bps)	(0, 0, 1, 1): 300 (0, 1 (0, 1, 0, 0): 600 (1, 0 (0, 1, 0, 1): 1200 (1, 0	06, b5, b4 , 1, 1): 4800 , 0, 0): 9600 , 0, 1): 19200 , 1, 0): 38400		
b8	Header	Not provided	Provided ^{*1}		
b9	Terminator	Not provided	Provided*1		
b10 b11 b12	Control line	b12, b11, b10 (0, 0, 0): Not provided <rs-232 (0, 0, 1): Standard mode <rs-232 (0, 1, 0): Interlink mode <rs-232 (0, 1, 0): Interlink mode <rs-233 (0, 1, 1): Modem mode <rs-233 (1, 1, 1): Communication in acco <rs-485 interlink<="" rs-422="" td=""><td>232C interface> 32C interface> 2C interface> cordance with RS-485</td></rs-485></rs-233 </rs-233 </rs-232 </rs-232 </rs-232 	232C interface> 32C interface> 2C interface> cordance with RS-485		
b13	Sum check	Not added	Added ^{*4}		
b14 ^{*3}	Protocol	Not used	Used		
b15	Control proce- dure (CR, LF)	CR, LF: Not used (Format 1)	CR, LF: Used (Format 4)		

^{*1.} In RS2 instruction, up to four headers and up to four terminators can be set.

- *2. The control line is not available in FX3G, FX3GC PLCs when ch0 is used. Set "(1, 1, 1)".
- *3. Make sure to set as "0" when using non-protocol communication.
- *4. When executing non-protocol communication using RS2 instruction, add the sum check code after the terminators.

Make sure to set the terminators when adding the sum check code.

To set the communication type, use the following program.



Data length	7-bit
Parity	Even
Stop bit	1-bit
Baud rate	9600 bps
Protocol	Non-protocol
Header	Not provided
Terminator	Not provided
Control line	Communication in accordance with RS-485

11. Troubleshooting

This chapter explains troubleshooting and error codes.

11.1 Checking FX PLC Version Applicability

Verify that the FX PLC main unit is an applicable version in non-protocol communication.

 \rightarrow For version applicability, refer to Section 1.3.

11.2 Checking Communication Status Based on LED Indication

Check the status of the "RD" and "SD" indicator LEDs provided in the optional equipment.

LED s	status	Operation status
RD	SD	Operation status
Flashing	Flashing	Data is being sent or received.
Flashing	Off	Data is received, but is not sent.
Off	Flashing	Data is sent, but is not received
Off	Off	Data is not sent nor received.

11.3 Checking Installation

1. Mounting status

If the communication equipment is not securely connected to the PLC, communication is not possible.

→ For mounting method, refer to the respective communication equipment manual.

2. Power supply (for FX0N-485ADP)

The FX₀N-485ADP requires a driving power supply. Verify that the power supply is provided correctly.

3. Wiring

Verify that the wiring to an communication equipment is correct. If the communication equipment is wired incorrectly, communication is not possible.

→ For wiring method check, refer to Chapter 4.

11.4 Checking Sequence Program

1. Communication settings in a sequence program

Verify that N:N Network (D8176 to D8180) and parallel link (M8070 and M8071) are not set.

Verify that the communication format (D8120, D8370, D8400 or D8420) is set correctly. If a communication port is set more than once, communication is not possible.

2. Communication settings using parameters

Verify that the communication settings using parameters are correct. If the contents of the settings do not agree, communication will not function correctly.

After changing any settings, make sure to turn OFF the PLC power, and then turn the power ON again.

3. Ethernet port setting (in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the same channel is not used in the Ethernet port setting. Do not set the channel used in non-protocol communication (RS/RS2 Instruction). After changing the setting, make sure to reboot the PLC's power.

4. Presence of VRRD and VRSC instructions

1) Except FX3G, FX3U and FX3UC PLCs

Verify that the VRRD and VRSC instructions are not used in the program.

If these instructions are used, delete them, turn OFF the PLC power, and then turn the power ON again.

- 2) In FX3G PLC
 - In the case of the 14 points and 24-point type
 - Verify that the VRRD and VRSC instructions are not used in the program.
 - If these instructions are used, delete them, turn OFF the PLC power, and then turn the power ON again.
 - In the case of the 40 points and 60-point type
 - Verify that the VRRD and VRSC instructions are not used in the program.

If these instructions are used in the program, the communication function is not available in ch2.

Use ch1, or delete these instructions.

After deleting these instructions, turn OFF the PLC power, and then turn the power ON again.

3) In FX3U and FX3UC PLCs

Verify that the VRRD and VRSC instructions are not used in the program.

If these instructions are used in the program, the communication function is not available in ch1.

Use ch2, or delete these instructions.

After deleting these instructions, reboot the PLC's power.

5. Presence of IVCK, IVDR, IVRD, IVWR, IVBWR*1, and IVMC instructions (in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the IVCK, IVDR, IVRD, IVWR, IVBWR and IVMC instructions are not being used for the same channel.

If these instructions are used for the same channel, revise them, turn OFF the PLC power, and then turn the power ON again.

*1. Only available for FX3U and FX3UC PLCs.

6. Presence of ADPRW instructions (in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the ADPRW instructions are not being used for the same channel.

If these instructions are used for the same channel, delete them, and reboot the PLC's power.

7. Presence of EXTR instruction (in FX2N and FX2NC PLCs)

Verify that the EXTR instruction is not used in the program.

If this instruction is used, delete it, turn OFF the PLC power, and then turn the power ON again.

8. Presence of RS and RS2 instructions

Verify that two or more RS/RS2 instructions are not being driven for the same channel.

If two or more RS/RS2 instructions are driven, modify the program so that only one RS/RS2 instruction is driven.

9. Presence of FLCRT, FLDEL, FLWR, FLRD, FLCMD, and FLSTRD instructions (in FX3U and FX3UC PLCs)

Verify that the FLCRT, FLDEL, FLWR, FLRD, FLCMD and FLSTRD instructions are not being used for the same channel.

If these instructions are used for the same channel, delete them, reboot the PLC's power.

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11.4.1 Checking communication port settings (in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

1. Checking the operation mode

In FX3s, FX3G, FX3GC, FX3U and FX3UC PLCs, the communication port operation status can be checked. D8389 stores the communication type code currently adopted in communication port ch0. D8419 stores the communication type code currently adopted in communication port ch1. D8439 stores the communication type code currently adopted in communication port ch2. The table below shows the contents of the communication type codes.

Code	Description
0	Programming communication
1	PP modem mode
2	Protocol dedicated to computer link
3	N:N Network
4	RS instruction
5	RS2 instruction
6	Parallel link
7	Inverter instruction
8	The variable analog potentiometer expansion board is used.
9	MODBUS communication
10	CF-ADP
11	ENET-ADP
12	Input/output expansion board is used.

If the operation mode is different, check the parameters and sequence programs.

11.5 **Checking the Absence/Presence of Errors**

1. Checking for communication errors

When a communication error occurs, the serial communication error flag turns ON. When the communication port ch0 is used in FX3G, FX3GC PLCs, M8062 turns ON. In all PLCs except FX3G, FX3Gc, FX3U and FX3UC PLCs using the communication port, M8063 turns ON. For FX3G, FX3GC, FX3U and FX3UC PLCs using the communication port ch1, M8063 turns ON. When communication port ch2 is used in FX3G, FX3GC, FX3U and FX3UC PLCs, M8438 turns ON. When the serial communication error flag turns ON, D8062, D8063 or D8438 stores the corresponding error code. Available channels vary depending on the main unit. \rightarrow For details, refer to Section 3.2.

2. Checking the error code

When the serial communication error flag turns ON, a corresponding error code shown below is stored in D8063 or D8438.

Error code			Contents of error	
ch0 (D8062)	ch1 (D8063)	ch2 (D8438)	Contents of error	
6201	6301	3801	Parity error, overrun error or framing error	
6202	6302	3802	Defective communication character	
6203	6303	3803	Communication data sum mismatch	
6204	6304	3804	Defective data format	
6205	6305	3805	Defective command	
6206	6306	3806	Monitoring timeout	
_	6307	3807	Modem initialization error	
_	6308	3808	N:N Network parameter error	
_	6309	3809	N:N Network setting error	
_	6312	3812	Parallel link parameter error	
_	6313	3813	Parallel link sum error	
_	6314	3814	Parallel link format error	
_	6320	3820	Inverter communication error	
_	6330	3830	Memory access error	
_	6340	3840	Special adapter connection error	

When an error code above is stored, check the following items:

- Wiring
- Parameter settings

12. Related Data

12.1 Related Device List (RS Instruction)

1. Bit devices

Device	Name	Description	R/W
M8063	Serial communication error flag	This device turns ON when a communication error occurs.	R
M8120	Communication setting keep	This device keeps the communication setting status (for FX0N PLC).	W
M8121	Sending wait flag	This device remains ON while the PLC is waiting to send.	R
M8122	Sending request	When this device is set to ON by SET instruction, the PLC starts to send.	R/W
M8123	Receiving complete flag	This device turns ON when receiving is completed.	R/W
M8124	Carrier detection flag	This device turns ON and OFF in synchronization with the CD signal.	R
M8129 ^{*1}	Time-out check flag	This device turns ON when data receiving is suspended and the next set of receive data is not given within the time set by the time-out time setting device (D8129).	
M8161	8-bit processing mode	This device sets the send/receive data to 16-bit data or 8-bit data.	W

R: Read only W: Write only R/W: Read or Write

2. Word devices

Device	Name	Description	R/W
D8063	Error code number of serial communication error	When the serial communication error flag (M8063) turns ON, this device stores the corresponding error code.	R/W
D8120	Communication format setting	This device sets the communication format.	R/W
D8122	Remaining amount of data to be sent	This device stores the amount of remaining send data.	R
D8123	Amount of data already received	This device stores the amount of data already received.	R
D8124	Header	This device sets the header (initial value: STX (H02)).	R/W
D8125	Terminator	This device sets the terminator (initial value: ETX (H03)).	R/W
D8129 ^{*2}	Time-out time setting	This device sets the time-out time.	R/W
D8405*3	Communication parameter display	This device stores communication parameters set in the PLC.	R
D8419 ^{*3}	Operation mode display	This device stores the communication type being used.	R

R: Read only W: Write only R/W: Read or Write

^{*1.} Not provided in FX2N PLCs before Ver. 2.00, and FX2(FX), FX2C, FX0N PLCs.

^{*2.} Not provided in FX2N PLCs before Ver. 2.00, and FX2(FX), FX2C, FX0N PLCs.

^{*3.} Provided only in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs.

12.2 Details of related devices (RS instruction)

D

12.2 Details of related devices (RS instruction)

This section explains devices used during non-protocol communication.

12.2.1 Serial communication error [M8063]

This device turns ON when an error occurs during serial communication.

1. Detailed contents

This device works as the serial communication error flag.

When this device turns ON, a corresponding error code is stored in D8063.

2. Cautions on use

The serial communication error flag does not turn OFF even after communication recovers its normal status. Serial communication errors are cleared in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs when the power is turned off and on.

Serial communication errors are cleared in other PLCs when the mode is switched from STOP to RUN.

12.2.2 Communication setting keep [M8120]

Set this device to ON in a sequence program so that the communication setting is kept (for FX0N PLCs).

1. Detailed contents

In FXON PLCs, set M8120 to ON in a sequence program so that the communication format setting is kept.

2. Cautions on use

In FX0N PLCs, the communication setting status is kept only when M8120 is set to ON. In any PLC other than the FX0N PLCs, setting of M8120 is not required.

12.2.3 Sending wait flag [M8121]

This device remains ON while the PLC is waiting to send.

1. Detailed contents

- In full-duplex communication in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs
 While the control line is set to the standard or interlink mode in a communication parameter, when the control line DR (DSR) turns OFF while sending data, the PLC waits to send and M8121 turns ON.
- In full-duplex communication in all PLCs except FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs M8121 does not turn ON.
- In half-duplex communication
 When the sending request device is set to ON while data is being received, the PLC waits to send and M8121 turns ON.

12.2.4 Sending request [M8122]

When this device is set to ON by the SET instruction, the PLC starts to send.

1. Detailed contents

When this device is set to ON by the SET instruction, the PLC starts to send. When sending is completed, this device is automatically set to OFF.

2. Cautions on use

When setting this device to ON, set the drive condition in the pulse type.

In FX2N PLCs before Ver. 2.00, and FX2(FX), FX2C, FX0N, FX1S, FX1N, FX1NC PLCs, note the following contents:

- While the PLC is receiving data, next data is sent after the receiving is finished. During this period, the sending wait flag remains ON.
- From when the head data is received until the receiving complete flag turns ON, it is regarded as data is being received. If a sending request is given while the head data is being received, data is confused.

12.2.5 Receiving complete flag [M8123]

This device turns ON when receiving is completed.

1. Detailed contents

This device turns ON when receiving is completed.

Receiving is completed in one of the following three conditions.

- · When the PLC receives the amount of receive data specified by RS instruction
- When "terminator provided" is selected in the communication format, and the PLC receives the code set in the terminator
- When data receiving is suspended and the PLC does not receive the next set of data within the time set in the time-out time setting device

When the receiving complete flag turns ON, transfer the received data to another storage destination, and then set this flag to OFF.

When this flag is set to OFF, the PLC waits to receive.

2. Cautions on use

When RS instruction is driven while the amount of received data is set to "0", the PLC does not wait to receive. In such a case, set the amount of received data to "1" or more, set the receiving complete flag to ON, and then set it to OFF.

12.2.6 Carrier detection flag [M8124]

This device turns ON and OFF in synchronization with the CD (DCD) signal.

1. Detailed contents

The CD (DCD) signal (channel receiving carrier detection) turns ON when the modem line is established.

While the carrier detection flag is OFF, the dial number can be sent.

While the carrier detection flag is ON, data can be sent and received.

12.2.7 Time-out check flag [M8129]

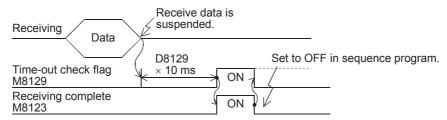
This device turns ON when data receiving is suspended, and the next set of receive data is not given within the time set by the time-out time setting device.

1. Detailed contents

This device turns ON when data receiving is suspended and the next set of receive data is not given within the time set by the time-out time setting device. The receiving complete flag also turns ON.

The time-out check flag turns OFF when the PLC waits to receive.

Using this function, the PLC can receive data from equipment where the amount of send data varies without the terminator.



12.2 Details of related devices (RS instruction)

12.2.8 Serial communication error code [D8063]

When a serial communication error occurs, this device stores the corresponding error code.

1. Detailed contents

When a serial communication error occurs, this device stores the corresponding error code shown below.

Error code	Contents of error
6301	Parity error, overrun error or framing error
6302	Defective communication character
6303	Communication data sum mismatch
6304	Defective data format
6305	Defective command
6306	Monitoring timeout
6307	Modem initialization error
6308	N:N Network parameter error
6309	N:N Network setting error
6312	Parallel link character error
6313	Parallel link sum error
6314	Parallel link format error
6320	Inverter communication error
6321	MODBUS communication error
6330	Memory access error
6340	Special adapter connection error

2. Cautions on use

Serial communication error code are not cleared even when communication is restored.

Serial communication errors are cleared in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs when the power is turned off and on.

Serial communication errors are cleared in other PLCs when the mode is switched from STOP to RUN.

12.2.9 Communication format setting [D8120]

This device sets the communication format.

1. Detailed contents

This device can set the data length, parity, baud rate, etc.

The table below shows the contents of the communication format setting.

Bit No.	Name	Con	ents	
DIL NO.	Name	0 (bit = OFF)	1 (bit = ON)	
b0	Data length	7-bit	8-bit	
b1 b2	Parity	b2, b1 (0, 0): Not provided (0, 1): Odd (1, 1): Even		
b3	Stop bit	1-bit	2-bit	
b4 b5 b6 b7	Baud rate (bps)	(0, 0, 1, 1): 300 (0, 1, 0, 0): 600 (0, 1, 0, 0): 1200 (1, 0, 0, 0): 600	5, b5, b4 1, 1): 4800 0, 0): 9600 0, 1): 19200 1, 0): 38400 ^{*1}	
b8	Header	Not provided	Provided (D8124) Initial value: STX (02H)	
b9	Terminator	Not provided	Provided (D8125) Initial value: ETX (03H)	
b10 b11	Control line	b11, b10 (0, 0): Not provided <rs-232c interface=""> (0, 1): Standard mode <rs-232c interface=""> (1, 0): Interlink mode <rs-232c interface=""> (FX2N PLC Ver. 2.00 or later, and FX2NC, FX3S, FX3G, FX3C) (1, 1): Modem mode</rs-232c></rs-232c></rs-232c>		
b12	_	link (1, 0): RS-232C interface		
b13 ^{*3}	Sum check	Not applicable Not added Added		
b13°	Protocol	Not used	Used	
b14 b15*3	Control procedure	Format 1	Format 4	

^{*1.} This setting is available only in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs.

- *2. When using the RS-485/RS-422 interface, only FX0N, FX1S, FX1N, FX1NC, FX2N, FX2NC, FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs are applicable.
- *3. Make sure to set as "0" when using non-protocol communication.

2. Cautions on use

- In all PLCs except FX2(FX), FX2C and FX0N PLCs, the communication format can be set using parameters.
- Even if the communication format is changed while the RS instruction is being driven, it is not reflected.
- When setting the communication format in FX_{0N} PLCs, set the communication setting latched (battery backed) device (M8120) to ON.

12.2.10 Remaining amount of data to be sent [D8122]

This device stores the amount of remaining send data.

1. Detailed contents

This device stores the amount of remaining send data in 8-bit (1 byte) units. Only data in communication frames are regarded as targets of counting.

12.2 Details of related devices (RS instruction)

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12.2.11 Amount of data already received [D8123]

This device stores the amount of data already received.

1. Detailed contents.

This device stores the amount of data already received in 8-bit (1 byte) units.

12.2.12 Header [D8124]

This device sets the header.

1. Detailed contents

When "header provided" is selected in the communication format setting, the lowest-order byte of D8124 is used.

When data is sent, the data in the lowest-order byte of D8124 is added at the head of the specified send data. When data is received, receiving begins when the data in the lowest-order byte of D8124 is received.

12.2.13 Terminator [D8125]

This device sets the terminator.

1. Detailed contents

When "terminator provided" is selected in the communication format setting, the lowest-order byte of D8125 is used.

When data is sent, the lowest-order byte of D8125 is added at the end of the specified send data. When data is received, receiving is completed when the data in the lowest-order byte of D8125 is received.

12.2.14 Time-out time setting time [D8129]

This device sets the time-out time setting.

1. Detailed contents

This device sets the error evaluation time (in 10-ms units) used when receiving of data is interrupted. The setting range is from 1 to 255 (10 ms to 2550 ms).

When "0" is set in D8129, the time-out time is set to 100 ms.

2. Cautions on use

- In all PLCs except FX2(FX), FX2c and FX0N PLCs, the time-out time setting can be set using a parameter.
- Even if the time-out time setting is changed while the RS instruction is being driven, it is not reflected. After changing the setting, set the RS instruction to OFF and ON.
- When setting the time-out time setting in FX_{0N} PLCs, set the communication setting latched (battery backed) device (M8120) to ON.

12.2.15 Communication parameter display [D8405]

This device stores the communication parameters set in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs.

1. Detailed contents

When the PLC power is turned ON, D8405 stores the contents of the communication parameters. The contents of the parameters are the same as those of the communication format setting device (D8120).

12.2.16 Operation mode display [D8419]

This device stores the communication type being used.

1. Detailed contents

This device stores the code of the communication type currently being used by the communication port. The table below shows the contents of the codes.

Code	Description
0	Programming communication
1	PP modem mode
2	Protocol dedicated to computer link
3	N:N Network
4	RS instruction
5	RS2 instruction
6	Parallel link
7	Inverter instruction
8	Variable analog potentiometer expansion board is used.
9	MODBUS communication
10	CF-ADP
11	ENET-ADP
12	Input/output expansion board is used.

2. Cautions on use

This device stores "4" while RS instruction is driven or when the RS instruction is not changed over to another mode.

12.3 Related Devices (RS2 Instruction)

Available channels vary depending on the main unit. For details, refer to Section 3.2.

1. Bit devices

	Device		Name	Description	R/W
ch0	ch1	ch2	Name	Description	IVV
M8062	M8063	M8438	Serial communication error	This device turns ON when a communication error occurs. When this device (serial communication error) turns ON, D8062, D8063 or D8438 stores the corresponding error code.	R
M8371	M8401	M8421	Sending wait flag	This device remains ON while the PLC is waiting to send.	R
M8372	M8402	M8422	Sending request	When this device is set to ON, the PLC starts to send.	R/W
M8373	M8403	M8423	Receiving complete flag	This device turns ON when receiving is completed. While this device (receiving complete flag) is ON, the PLC cannot receive any receive data.	R/W
_	M8404	M8424	Carrier detection flag	This device turns ON in synchronization with the CD (DCD) signal.	R
_	M8405	M8425	Data set ready (DSR) flag ^{*1}	This device turns ON in synchronization with the DR (DSR) signal.	R
M8379	M8409	M8429	Time-out check flag	This device turns ON when data receiving is suspended and the next set of receive data is not given within the time set by the time-out time setting device.	R/W

R: Read only W: Write only R/W: Read or Write

^{*1.} FX3U, FX3UC PLCs Ver. 2.30 or later, and FX3S, FX3G, FX3GC PLCs is applicable.

D

2. Word devices

	Device		Name	Description	R/W
ch0	ch1	ch2	Name	Description	IX/ VV
D8062	D8063	D8438	Serial communication error code	When the serial communication error flag turns ON, this device stores the corresponding error code.	R
D8370	D8400	D8420	Communication format setting	This device sets the communication format.	R/W
D8372	D8402	D8422	Amount of remaining send data	This device stores the amount of remaining send data.	R
D8373	D8403	D8423	Amount of data already received	This device stores the amount of data already received.	R
	D8405	D8425	Communication parameter display	This device stores communication parameters set in the PLC.	R
D8379	D8409	D8429	Time-out time setting	This device sets the timeout time.	R/W
D8380	D8410	D8430	Header 1 and header 2	These devices set the headers 1 to 4.	R/W
D8381	D8411	D8431	Header 3 and header 4	These devices set the headers 1 to 4.	R/W
D8382	D8412	D8432	Terminator 1 and terminator 2	These devices set the terminators 1 to 4.	R/W
D8383	D8413	D8433	Terminator 3 and terminator 4	These devices set the terminators 1 to 4.	R/W
D8384	D8414	D8434	Receiving sum (receive data)	This device stores the received sum check value.	R
D8385	D8415	D8435	Receiving sum (calculation result)	This device stores the sum check value calculated from the received data.	R
D8386	D8416	D8436	Sending sum	This device stores the sum check value added to the send data.	R
D8389	D8419	D8439	Operation mode display	This device stores the communication type being used.	R

R: Read only W: Write only R/W: Read or Write

12.4 **Details of Related Devices (RS2 Instruction)**

Available channels vary depending on the main unit. For details, refer to Section 3.2.

12.4.1 Serial communication error [M8062, M8063 and M8438]

These devices turn ON when an error occurs during serial communication.

1. Detailed contents

These devices work as serial communication error flags.

M8062 turns ON when an error occurs in serial communication using communication port ch0.

M8063 turns ON when an error occurs in serial communication using communication port ch1.

M8438 turns ON when an error occurs in serial communication using communication port ch2.

When M8063 turns ON, a corresponding error code is stored in D8063.

When M8438 turns ON, a corresponding error code is stored in D8438.

2. Cautions on use

Serial communication errors are not cleared even when communication is restored. Cleared when the power is turned off and on.

12.4.2 Sending wait flag [M8371, M8401 and M8421]

These devices remain ON while the PLC is waiting to send.

1. Detailed contents

M8371 remains ON while the PLC is waiting to send in communication using communication port ch0. M8401 remains ON while the PLC is waiting to send in communication using communication port ch1. M8421 remains ON while the PLC is waiting to send in communication using communication port ch2.

In full-duplex communication

While the control line is set to the standard or interlink mode in the communication parameter, when the control line DR (DSR) turns OFF while sending data, the PLC waits to send and M8401 or M8421 turns ON.

· In half-duplex communication

When the sending request device is set to ON while data is being received, the PLC waits to send and M8401 or M8421 turns ON.

12.4.3 Sending request [M8372, M8402 and M8422]

When these devices are set to ON by SET instruction, the PLC starts to send.

1. Detailed contents

When these devices are set to ON by SET instruction, the PLC starts to send. When sending is completed, these devices are automatically set to OFF.

When communication port ch0 is used, M8372 is set.

When communication port ch1 is used, M8402 is set.

When communication port ch2 is used, M8422 is set.

2. Cautions on use

When setting these devices to ON, set the drive condition in the pulse type.

12.4.4 Receiving complete flag [M8373, M8403 and M8423]

These devices turn ON when receiving is completed.

1. Detailed contents

These devices turn ON when receiving is completed.

When communication port ch0 is used, M8373 is set.

When communication port ch1 is used, M8403 is set.

When communication port ch2 is used, M8423 is set.

Receiving is completed in one of the following three conditions.

- · When the PLC receives the amount of receive data specified by the RS2 instruction
- · When the terminators are set, and the PLC receives the code set by the terminator
- When data receiving is suspended and the PLC does not receive the next set of data within the time set by the time-out time setting device

When the receiving complete flag turns ON, transfer the received data to another storage destination, and then set this flag to OFF.

When this flag is set to OFF, the PLC waits to receive.

2. Cautions on use

When the RS2 instruction is driven while the amount of received data is set to "0", the PLC does not wait to receive. To make the PLC wait to receive it is necessary to set the amount of received data "n" to "1" or more and set the receiving complete flag to OFF from ON.

12.4 Details of Related Devices (RS2 Instruction)

D

12.4.5 Carrier detection flag [M8404 and M8424]

These devices turn ON/OFF in synchronization with the CD (DCD) signal.

1. Detailed contents

The CD (DCD) signal (channel receiving carrier detection) turns ON when the modem line is established.

When communication port ch1 is used, M8404 turns ON/OFF.

When communication port ch2 is used, M8424 turns ON/OFF.

While the carrier detection flag is OFF, the dial number can be sent.

While the carrier detection flag is ON, data can be sent and received.

12.4.6 Data set ready (DSR) flag [M8405 and M8425]

These devices turn ON/OFF in synchronization with the DR (DSR) signal.

1. Detailed contents

The state of DR (DSR) signal can be checked when executing RS2 instruction.

When communicating port ch1 is used, M8405 turns ON/OFF.

When communication port ch2 is used, M8425 turns ON/OFF.

The images of M8405 and M8425 are updated during END processing.

12.4.7 Time-out check flag [M8379, M8409 and M8429]

These devices turn ON when data receiving is suspended, and the next set of receive data is not given within the time set by the time-out time setting device.

1. Detailed contents

These devices turn ON when data receiving is suspended and the next set of receive data is not given within the time set by the time-out time setting device. The receiving complete flag also turns ON.

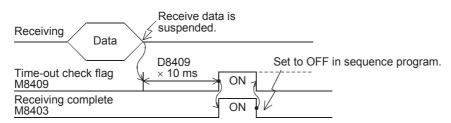
When communication port ch0 is used, M8379 turns ON.

When communication port ch1 is used, M8409 turns ON.

When communication port ch2 is used, M8429 turns ON.

The time-out check flag turns OFF when the PLC waits to receive.

Using this function, the PLC can receive data from equipment where the amount of send data varies without the terminators.



12.4.8 Serial communication error code [D8062, D8063 and D8438]

When a serial communication error occurs, these devices store the corresponding error codes.

1. Detailed contents

When a serial communication error occurs, these devices store the corresponding error codes shown below. When communication port ch0 is used, M8062 turns ON.

When communication port ch1 is used, M8063 turns ON.

When communication port ch2 is used, M8438 turns ON.

	Error code		Contents of error
ch0 (D8062)	ch1 (D8063)	ch2 (D8438)	Contents of error
6201	6301	3801	Parity error, overrun error or framing error
6202	6302	3802	Incorrect communication character
6203	6303	3803	Communication data sum mismatch
6204	6304	3804	Incorrect data format
6205	6305	3805	Incorrect command
6206	6306	3806	Monitoring timeout
_	6307	3807	Modem initialization error
_	6308	3808	N:N Network parameter error
_	6309	3809	N:N Network setting error
_	6312	3812	Parallel link parameter error
_	6313	3813	Parallel link sum error
_	6314	3814	Parallel link format error
_	6320	3820	Inverter communication error
_	6321	3821	MODBUS communication error
_	6330	3830	Memory access error
	6340	3840	Special adapter connection error

2. Cautions on use

Serial communication error codes are not cleared even when communication is restored. Cleared when the power is turned off and on.

C

12.4.9 Communication format setting [D8370, D8400 and D8420]

These devices set the communication format.

1. Detailed contents

These devices can set the data length, parity, baud rate, etc.

When communication port ch0 is used, D8370 sets the communication format.

When communication port ch1 is used, D8400 sets the communication format.

When communication port ch2 is used, D8420 sets the communication format.

The table below shows the contents of the communication format settings. Computer link setting is not applicable for D8370, D8400.

Bit No.	Name	Contents						
Bit No.	Name	0 (b	it = OFF)	1 (bit = ON)				
b0	Data length		7-bit	8-bit				
b1 b2	Parity	b2, b1 (0, 0): Not provide (0, 1): Odd (1, 1): Even	d					
b3	Stop bit		1-bit		2-bit			
b4 b5 b6 b7	Baud rate (bps)	b7, b6, b5, b4 (0, 0, 1, 1): 300 (0, 1, 0, 0): 600 (0, 1, 0, 1): 1200 (0, 1, 1, 0): 2400	(0, 1, (1, 0, (1, 0,	.6, b5, b4 , 1, 1): 4800 , 0, 0): 9600 , 0, 1): 19200 , 1, 0): 38400				
b8 ^{*1}	Header	Not	provided	Provided ^{*2}				
b9 ^{*1}	Terminator	Not	provided	Provided ^{*2}				
b10 b11 b12	Control line	Non-protocol communication*3						
		Computer link	b12, b11, b10 (0, 0, 0): RS-485/RS-42 (0, 1, 0): RS-232C inter					
b13	Sum check	No	t added	F	Added ^{*4}			
b14 ^{*5}	Protocol	N	ot used	Used				
b15	Control procedure	Non-protocol communication	CR, LF: Not used (Format 1)	Non-protocol communication	CR, LF: Used (Format 2)			
D10	(CR, LF)	Computer link	CR, LF: Not used (Format 1)	Computer link	CR, LF: Used (Format 4)			

^{*1.} Make sure to set as "0" when using computer link.

Make sure to set the terminators when adding the sum check.

2. Cautions on use

- In FX3s, FX3U and FX3UC PLCs, the communication format can be set using parameters.
- Even if the communication format is changed while the RS2 instruction is being driven, it is not reflected.
- In FX3G and FX3GC PLCs, the communication format can be set only for ch1 and ch2 using parameters.

^{*2.} In RS2 instruction, up to four headers and up to four terminators can be set.

The control line is not available in FX3G, FX3GC PLCs when ch0 is used. Set "(1, 1, 1)".

When executing non-protocol communication using RS2 instruction, add the sum check after the terminators.

^{*5.} Make sure to set as "0" when using non-protocol communication.

12.4.10 Amount of remaining send data [D8372, D8402 and D8422]

These devices store the amount of remaining send data.

1. Detailed contents

These devices store the amount of remaining send data in 8-bit (1 byte) units.

When communication port ch0 is used, D8372 stores the value.

When communication port ch1 is used, D8402 stores the value.

When communication port ch2 is used, D8422 stores the value.

Only data in communication frames are regarded as the targets of counting.

12.4.11 Amount of data already received [D8373, D8403 and D8423]

These devices store the amount of data already received.

1. Detailed contents.

These devices stores the amount of data already received in 8-bit (1 byte) units.

When communication port ch0 is used, D8373 stores the value.

When communication port ch1 is used, D8403 stores the value.

When communication port ch2 is used, D8423 stores the value.

12.4.12 Communication parameter display [D8405 and D8425]

These devices store the communication parameters set in the PLC.

1. Detailed contents

When the PLC power is turned ON, these devices store the contents of the communication parameters.

The setting contents are the same as those of the communication format setting device.

When communication port ch1 is used, D8405 stores the contents.

When communication port ch2 is used, D8425 stores the contents.

12.4.13 Time-out time setting [D8379, D8409 and D8429]

These devices set the time-out time setting.

1. Detailed contents

These devices set the error evaluation time (in 10 ms units) used when receiving of data is interrupted.

When communication port ch0 is used, D8379 sets the time.

When communication port ch1 is used, D8409 sets the time.

When communication port ch2 is used, D8429 stores the time.

Setting range for ch0 and ch2: 1 to 3,276 (10 to 32,760 ms)

Setting range for ch1: 1 to 255 (10 to 2,550 ms)

When "0" is set in these devices, the time-out time is set to 100 ms.

2. Cautions on use

Even if the time-out time setting is changed while the RS2 instruction is being driven, it is not reflected. After changing the setting, set the RS2 instruction to OFF and ON.

12.4.14 Header [D8380, D8381, D8410, D8411, D8430 and D8431]

These devices set the headers 1, 2, 3 and 4.

1. Detailed contents

When "header provided" is selected in the communication format setting, the headers are set in the sent and received data.

Up to four headers can be set in each channel.

When communication port ch0 is used, D8380 and D8381 set the headers.

When communication port ch1 is used, D8410 and D8411 set the headers.

When communication port ch2 is used, D8430 and D8431 set the headers.

The headers are set in the following order.

Header	Header 1	Header 2	Header 3	Header 4
ch0	D8380 (lowest-order byte)	D8380 (highest-order byte)	D8381 (lowest-order byte)	D8381 (highest-order byte)
ch1	D8410 (lowest-order byte)	D8410 (highest-order byte)	D8411 (lowest-order byte)	D8411 (highest-order byte)
ch2	D8430 (lowest-order byte)	D8430 (highest-order byte	D8431 (lowest-order byte)	D8431 (highest-order byte)

When data is sent, the data set in the headers is added at the head of the specified send data.

When data is received, receiving begins when the data set in the headers is received.

Header							
1	2	3	4	Data (

2. Cautions on use

Even if "header provided" is selected, headers are not provided if header 1 is set to "H00". The area before "H00" (in 1-byte units) is used to set the headers.

12.4.15 Terminator [D8382, D8383, D8412, D8413, D8432 and D8433]

These devices set the terminators 1, 2, 3 and 4.

1. Detailed contents

When "terminator provided" is selected in the communication format setting, the terminators are set in the sent and received data.

Up to four terminators can be set in each channel.

When communication port ch0 is used, D8382 and D8383 set the terminators.

When communication port ch1 is used, D8412 and D8413 set the terminators.

When communication port ch2 is used, D8432 and D8433 set the terminators.

The terminators are set in the following order.

Terminator	Terminator 1	Terminator 2	Terminator 3	Terminator 4
ch0	D8382 (lowest-order byte)	D8382(highest-order byte)	D8383 (lowest-order byte)	D8383 (highest-order byte)
ch1	D8412 (lowest-order byte)	D8412(highest-order byte)	D8413 (lowest-order byte)	D8413 (highest-order byte)
ch2	D8432 (lowest-order byte)	D8432 (highest-order byte)	D8433 (lowest-order byte)	D8433 (highest-order byte)

When data is sent, the data set in the terminators is added at the end of the specified send data.

When data is received, receiving is completed when the data set in the terminators is received.

"			Term	inator	
8	Data	1	2	3	4

2. Cautions on use

Even if "terminator provided" is selected, terminators are not provided if terminator 1 is set to "H00". The area before "H00" (in 1-byte units) is used to set the terminators.

12.4.16 Receiving sum (receive data) [D8384, D8414 and D8434]

These devices store the received sum check value.

1. Detailed contents

When "sum check provided" is selected in the communication format setting, the sum check is executed for the sent and received data.

These devices store the sum added to the received data sent from the external equipment.

When communication port ch0 is used, D8384 stores the receiving sum.

When communication port ch1 is used, D8414 stores the receiving sum.

When communication port ch2 is used, D8434 stores the receiving sum.

2. Cautions on use

When selecting "sum check provided", make sure to also select "terminator provided".

12.4.17 Receiving sum (calculation result) [D8385, D8415 and D8435]

These devices store the sum check value calculated using the received data.

1. Detailed contents

When "sum check provided" is selected in the communication format settings, the sum check is executed for the sent and received data.

These devices store the sum calculated by the FX PLC from the data received sent from the external equipment.

When communication port ch0 is used, D8385 stores the receiving sum.

When communication port ch1 is used, D8415 stores the receiving sum.

When communication port ch2 is used, D8435 stores the receiving sum.

2. Cautions on use

When selecting "sum check provided", make sure to also select "terminator provided".

12.4.18 Sending sum [D8386, D8416 and D8436]

These devices store the sum check value added to the send data.

1. Detailed contents

When "sum check provided" is selected in the communication format settings, the sum check is executed for the sent and received data.

These devices store the sum calculated from the send data.

When communication port ch0 is used, D8386 stores the sending sum.

When communication port ch1 is used, D8416 stores the sending sum.

When communication port ch2 is used, D8436 stores the sending sum.

2. Cautions on use

When selecting "sum check provided", make sure to select "terminator provided".

12.4.19 Operation mode display [D8389, D8419 and D8439]

These devices store the communication type being used.

1. Detailed contents

These devices store the code of the communication type currently being used in the communication port.

When communication port ch0 is used, D8389 stores the communication type.

When communication port ch1 is used, D8419 stores the communication type.

When communication port ch2 is used, D8439 stores the communication type.

The table below shows the contents of the communication type codes.

Code	Description
0	Programming communication
1	PP modem mode
2	Protocol dedicated to computer link
3	N:N Network
4	RS instruction
5	RS2 instruction
6	Parallel link
7	Inverter instruction
8	Variable analog potentiometer expansion board is used.
9	MODBUS communication
10	CF-ADP
11	ENET-ADP
12	Input/output expansion board is used.

2. Cautions on use

These devices store "5" while RS2 instruction is being driven or when RS2 instruction is not changed over to another mode.

12.5 ASCII Code Table

<ASCII code table (8-bit code expressed in hexadecimal)> The ASCII codes A1H to DFH indicate Japanese characters.

Hexa deci- mal	0	1	2	3	4	5	6	7	8	9	Α	В	С	D	E	F
0		DLE	SP	0	@	Р	`	р				-	4	<i>'''</i>		
1	SOH	DC1	!	1	Α	Q	а	q			0	7	Ŧ	L		
2	STX	DC2	"	2	В	R	b	r			Γ	1	ッ	¥		
3	ETX	DC3	#	3	С	S	С	S			J	ゥ	Ŧ	ŧ		
4	E0T	DC4	\$	4	D	T	d	t			,	I	ŀ	ヤ		
5	ENQ	NAK	%	5	Е	U	е	u				オ	t	1		
6	ACK	SYN	&	6	F	٧	f	V			Ŧ	ħ	=	Ξ		
7	BEL	ETB	,	7	G	W	g	w			7	+	Z	Ē		
8	BS	CAN	(8	Н	Х	h	х			1	ク	ネ	IJ		
9	HT	EM)	9	1	Υ	i	у			ڻ ر	τ	1	N		
Α	LF	SUB	*	:	J	Z	j	Z			I	П	/\	ν		
В	VT	ESC	+	;	K	[k	{			t	Ħ	Ł	П		
С	FF	FS	,	<	L	<u></u> *1	1				t	シ	フ	7		
D	CR	GS	_	=	M]	m	}			1	λ	۸	ン		
E	S0	RS		>	N	^	n	~			3	t	*	*		
F	SI	US	/	?	0	_	0	DEL			ŋ	y	₹	0		

^{*1. \ (}ASCII CODE:5C) symbol is displayed as "\u00e4" in Japanese.

FX Series Programmable Controllers User's Manual [Data Communication Edition]

G. Non-Protocol Communication (FX2N-232IF)

Foreword

This manual explains "non protocol communication" provided for the MELSEC-F FX Series Programmable Controllers using the FX2N-232IF and should be read and understood before attempting to install or use the unit.

Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

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1. Outline

The communication special function block operating in accordance with RS-232C, FX2N-232IF (hereafter referred to as "232IF"), is connected to an FX2N, FX3U, FX2NC, or FX3UC PLC to exchange serial data in the full-duplex method between equipment with RS-232C interfaces such as a personal computer, bar code reader or printer.

For the contents of the hardware, refer to the "FX2N-232IF Hardware Manual".

1.1 Features

1. Two or more 232IF (operating in accordance with RS-232C) blocks can be connected.

Two or more RS-232C interface blocks can be connected to an FX PLC.

- 1) For FX2N, FX3U and FX3UC*1 PLCs
 Up to eight blocks can be connected to one PLC.
 - *1. Up to seven blocks can be connected to the FX3UC-32MT-LT(-2) PLC.
- 2) For FX2NC PLCs
 Up to four blocks can be connected to one PLC.

2. Non-protocol communication

Communication is executed in the full-duplex, asynchronous system, non-protocol method. The communication format can be specified using the buffer memory (BFM).

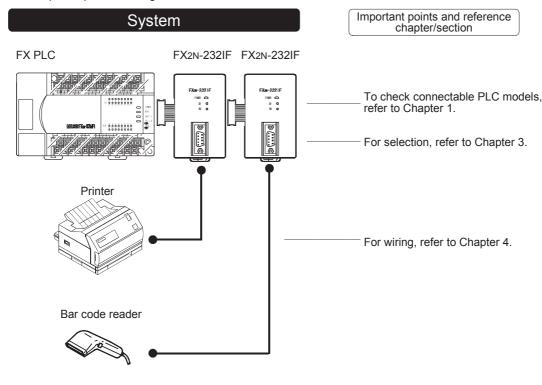
The FROM and TO instructions are applicable for the buffer memory. (In FX3U and FX3UC PLCs, other instructions are also applicable.)

3. Send/receive data buffer of 512 bytes/256 words

The send data buffer and receive data buffer can store 512 bytes/256 words independently. In the RS-232C interlink connection mode, the 232IF can receive data beyond 512 bytes/256 words.

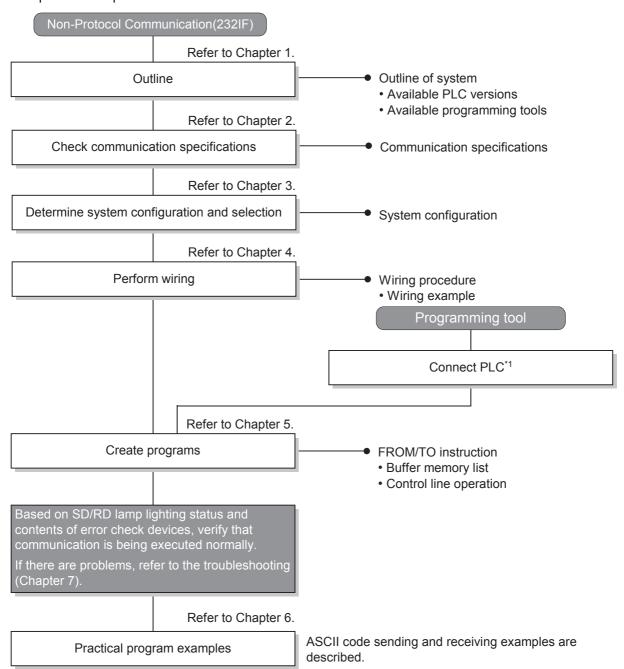
4. Built-in ASCII-Hexadecimal conversion function

By using this built-in conversion function, hexadecimal numeric values (0 to F) inside the send data buffer can be converted into ASCII code when being sent, and received ASCII code can be converted into hexadecimal values (0 to F) when being stored in the receive data buffer.



1.2 Procedures Before Operation

The flow chart below shows the Non-Protocol Communication (operating in accordance with 232IF) setting procedures up until data link:



^{*1} For the programming tool to PLC connection procedure, refer to the "Programming Communication" section in this manual or the respective programming tool manual.

For details on operating procedures, refer to the respective programming tool manual.

1.3 Communication Type Applicability in PLC

1.3.1 Applicable versions

The communication types are applicable in the following versions.

✓: Applicable (If applicable versions of main units are limited, they are described inside ().)

-: Not applicable

PLC	Applicability	Remarks
FX3UC Series	✓	
FX3U Series	✓	
FX3GC Series	_	232IF is not connectable.
FX3G Series	_	232IF is not connectable.
FX3S Series	_	232IF is not connectable.
FX2NC Series	✓	
FX2N Series	✓	
FX1NC Series	_	232IF is not connectable.
FX1N Series	_	232IF is not connectable.
FX1s Series	_	232IF is not connectable.
FX0N Series	_	232IF is not connectable.
FX0S Series	_	232IF is not connectable.
FX ₀ Series	_	232IF is not connectable.
FX2C Series	_	232IF is not connectable.
FX2(FX) Series	_	232IF is not connectable.
FX1 Series	_	232IF is not connectable.

1.3.2 Products whose production was stopped

Production was stopped for some models of MELSEC-F Series PLCs and programming tools described in this manual. For models whose production was stopped, refer to Appendix A.

To see the latest available products, refer to the general catalog.

1.4 Programming Tool Applicability

1.4.1 For applicable versions

The programming tool is applicable for each FX Series from the version shown:

1. English versions

Product name	Model name	Applicable version	Remarks				
FX3U and FX3UC PL	.Cs						
GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later					
GX Developer	SW□D5C(F)-GPPW-E	Ver. 8.18U or later	-				
FX-30P		Ver. 1.00 or later					
GOT1000 Series dis	splay units		Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function.				
FX2N and FX2NC PL	.Cs						
GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later					
GX Developer	SW□D5C(F)-GPPW-E	SW2 A or later					
FX-PCS/WIN-E	SW0PC-FXGP/WIN-E	Ver. 1.00 or later					
FX-30P		Ver. 1.00 or later	-				
FX-20P-E(-SET0) FX-20P-MFXC-E		Ver. 3.00 or later					
FX-10P-E		Ver. 3.00 or later					
GOT-F900 Series d F940WGOT-TWD-E F940GOT-*WD-E F940GOT-*BD-H-E F940GOT-*BD-RH-		F940WGOT-TWD-E (Ver. 1.00 or later) F940GOT-LWD-E, F940GOT-SWD-E (Ver. 1.00 or later) F940GOT-LBD-H-E, F940GOT-SBD-H-E (Ver. 1.00 or later) F940GOT-LBD-RH-E, F940GOT-SBD-RH-E (Ver. 1.00 or later)					
GOT1000 Series dis	splay units	Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function.					

2. Japanese versions

Product name	Product name Model name		Remarks		
FX3U and FX3UC PL	.Cs				
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later			
GX Developer	SW□D5C(F)-GPPW-J	Ver. 8.13P or later	-		
FX-30P	-	Ver. 1.00 or later			
GOT1000 Series dis	play units		T1000 Series display units for applicable oporting the list editor function.		
FX2N and FX2NC PL	.Cs				
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later			
GX Developer	SW□D5C(F)-GPPW-J	SW2 A or later			
FX-PCS/WIN	SW0PC-FXGP/WIN	Ver. 2.00 or later			
FX-PCS-KIT/98	SW1PC-FXGP/98(-3,-5)	Ver. 4.00 or later			
FX-PCS/98-3	SW1PC-FXGP/98-3	Ver. 4.00 or later			
FX-PCS-KIT/V-3	SW1PC-FXGP/V3	Ver. 2.00 or later	-		
FX-A7PHP-KIT	SW1RX-GPPFX	Ver. 3.00 or later			
FX-30P	1	Ver. 1.00 or later			
FX-20P(-SET0) FX-20P-MFXC		Ver. 4.00 or later			
FX-10P(-SET0)		Ver. 3.00 or later			
GOT-F900 Series di F940WGOT-TWD F940GOT-*WD F940GOT-*BD-H F940GOT-*BD-RH	splay units	F940WGOT-TWD (Ver. 1.00 or later) F940GOT-LWD, F940GOT-SWD (Ver. 1.00 or later) F940GOT-LBD-H, F940GOT-SBD-H (Ver. 1.00 or later) F940GOT-LBD-RH, F940GOT-SBD-RH (Ver. 1.00 or later)			
GOT1000 Series dis	play units	Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function.			

1.4.2 For non-applicable versions (setting an alternative model)

Even programming tool not applicable to a PLC can create programs when an alternative model is set. In this case, however, programming is enabled only in the ranges provided for the alternative PLC model such as instructions and program size.

Model to be programmed	Model to be set	Priority: High → Low							
FX3UC Series	FX3UC	\rightarrow	FX2N	\rightarrow	FX2(FX)				
FX3U Series	FX3U, FX3UC	\rightarrow	FX2N	\rightarrow	FX2(FX)				
FX2NC Series	FX2NC, FX2N	\rightarrow	FX2(FX)						
FX2N Series	FX2N	\rightarrow	FX2(FX)						

2. Specification

This chapter explains the communication specifications.

2.1 Communication Specifications

Non-protocol communication type is used in the communication specifications shown in the table below.

	Item	Specifications	Remarks
Transmissi	ion standard	RS-232C standard	
Maximum t	otal extension distance	15 m (49' 2")	
Protocol ty	pe	Non-protocol communication	
Communic	ation method	Full-duplex, asynchronous system	
Baud rate		300/600/1200/2400/4800/9600/19200 bps	
	Start bit	_	
Character	Data bit	7-bit/8-bit	
format	Parity bit	None, odd or even	
	Stop bit	1-bit/2-bit	
Header		Provided or not provided	Up to four bytes can be
Terminator		Provided or not provided	specified.
Control line	e	Provided or not provided	
Sum check		Provided or not provided	

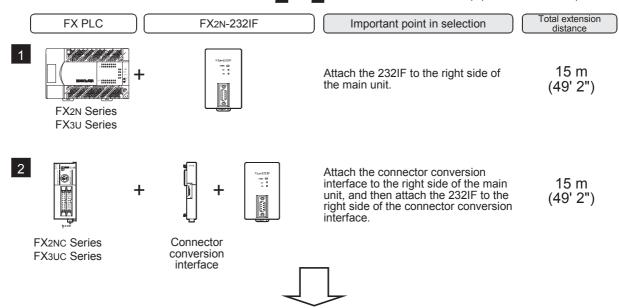
3. System Configuration and Selection

This chapter explains the system configuration and selection of the FX PLC and 232IF.

3.1 System Configuration

This section outlines the system configuration required to use the 232IF.





For communication equipment combinations for each FX Series, refer to the next section.

3.2 Applicable FX PLC and Communication Equipment

Select a 232IF combination, and put a check mark in the "Check" column. During selection, pay attention to the following:

 The capacity of the 5V DC power supplied from the PLC is limited. The current consumption at 5V DC of the 232IF is 40 mA. Make sure that total current consumption at 5V DC including other blocks does not exceed the specified value.

FX Series	Communication equipment (option)	Total extension distance	Check
FX2N	FX2N-232IF (9-pin D-Sub, male)	15 m (49' 2")	
FX2NC	+ FX2NC-CNV-IF FX2N-232IF (9-pin D-Sub, male)	15 m (49' 2")	

FX Series	Communication equipment (option)	Total extension distance	Check
FX3U	FX2N-232IF (9-pin D-Sub, male)	15 m (49' 2")	
	FX2NC-CNV-IF FX2N-232IF (9-pin D-Sub, male)	15 m (49' 2")	
FX3UC	FX3UC-1PS-5V FX2N-232IF (9-pin D-Sub, male)	15 m (49' 2")	

3.3 Connection to PLC

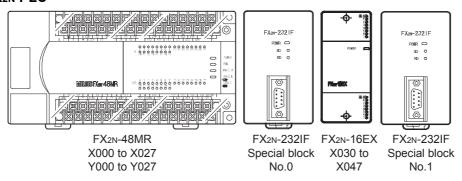
The 232IF can be directly connected to an FX PLC main unit or to the right side of another function block or powered extension unit.

The unit number is assigned to each special unit/block in the order "No. 0, No. 1, No. 2 ..." from the unit/block nearest to the main unit. (for FX3UC-32MT-LT(-2) PLC, the unit number is assigned in the order "No. 1, No. 2, No. 3 ...".)

Up to eight 232IF units can be connected to an FX2N/FX3U/FX3UC*1 PLC, up to four 232IF units can be connected to an FX2NC PLC.

*1. Up to seven 232IF units can be connected to an FX3UC-32MT-LT(-2) PLC.

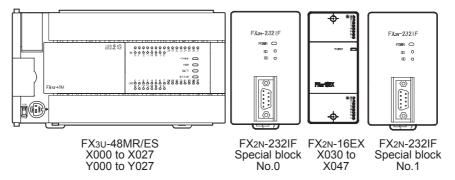
1. For FX_{2N} PLC



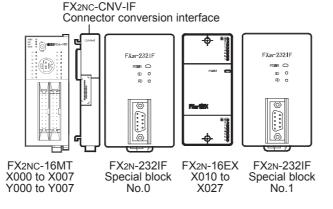
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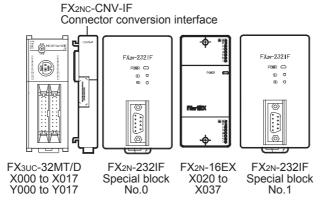
2. For FX3U PLC



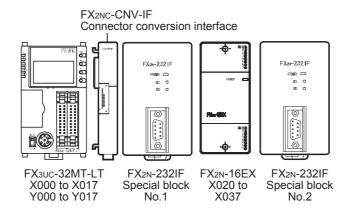
3. For FX2NC PLC



4. For FX3uc(D, DS, DSS) PLC



5. For FX3uc-32MT-LT(-2) PLC

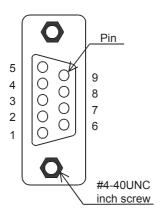


4. Wiring

This chapter explains the wiring.

4.1 Pin Arrangement

The table below shows the pin arrangement of the 232IF. Example of applicable connector: 17JE-13090-02 (D8C2) by DDK Ltd.



Pin No.	Signal name	Function	Signal direction 232IF: External equipment
1	CD(DCD)	Carrier detection	←
2	RD(RXD)	Receive data (with LED indicator)	←
3	SD(TXD)	Send data (with LED indicator)	→
4	ER(DTR)	Data terminal ready	\rightarrow
5	SG(GND)	Signal ground	_
6	DR(DSR)	Data set ready	←
7	RS(RTS)	Sending request (receiving enable)*1	→
8	CS(CTS)	Sending enable	←
9	CI(RI)	Calling indicator	←

^{*1.} The signal inside () is adopted in the interlink connection mode.

4.2 Connection to External Equipment with Terminal Specifications (without Control Line)

BFM # 0 (communication format): b9 = 0, b8 = 0 (control line not provided)

PL	C side	RS-232	2C external eq	uipment side
Name	FX ₂ N-232IF	Name	9-pin D-Sub	25-pin D-Sub
SD(TXD)	3	SD(TXD)	3	2
RD(RXD)	2	RD(RXD)	2	3
SG(GND)	5	SG(GND)	5	7

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4.3 Connection to External Equipment with Terminal Specifications (with Control Line)

4.3.1 Standard RS-232C mode

Cross cable, BFM #0 (communication format): b9 = 0, b8 = 1 (standard RS-232C mode)

PL	C side			RS-232	C external eq	uipment side
Name	FX ₂ N-232IF			Name	9-pin D-Sub	25-pin D-Sub
SD(TXD)	3	_		SD(TXD)	3	2
RD(RXD)	2			RD(RXD)	2	3
RS(RTS)	7	Н		RS(RTS)	7	4
CS(CTS)	8	Ц	\downarrow L	CS(CTS)	8	5
CD(DCD)	1	*1	*1	CD(DCD)	1	8
ER(DTR)	4	/		ER(DTR)	4	20
DR(DSR)	6	*2	*2	DR(DSR)	6	6
SG(GND)	5			SG(GND)	5	7

When the FX2N-232IF receives the RS (request to send) signal at its carrier to send (CS) pin, the FX2N-232IF transfers signals as if the external equipment exists.

- *1. It is not necessary to connect the CD signal if monitoring the CD signal is not required. For the CD signal, the 232IF indicates only the status.
- *2. The 232IF indicates only the status.

4.3.2 Interlink connection mode

Interlink serial cross cable, BFM #0 (communication format): b9 = 1, b8 = 1 (RS-232C interlink connection mode)

PL	C side		RS-232	2C external eq	uipment side
Name	FX2N-232IF		Name	9-pin D-Sub	25-pin D-Sub
SD(TXD)	3	/	SD(TXD)	3	2
RD(RXD)	2		RD(RXD)	2	3
RS(RTS)	7	*1 /*1	RS(RTS)	7	4
CS(CTS)	8		CS(CTS)	8	5
ER(DTR)	4	*2 *2	ER(DTR)	4	20
DR(DSR)	6	2	DR(DSR)	6	6
SG(GND)	5		SG(GND)	5	7

In the interlink connection mode, the 232IF can receive data larger than 512 bytes which is the upper limit of the received data buffer in the 232IF.

- *1. In this mode, the request to send (RS) signal works as the receiving enable signal for the 232IF. When the 232IF receives data beyond the maximum number of receivable bytes, it turns OFF which works as the receive ready signal (RS signal) to ask the external equipment to stop sending. At this time, by withdrawing the data located in the received data buffer using a sequence program, the 232IF can receive remaining data.
- *2. The 232IF indicates only the status.

4.4 Connection to External Equipment with Modem Specifications

Straight cable, BFM #0 (communication format): b9 = 0, b8 = 1 (standard RS-232C mode)

PL	C side			RS-232	2C external eq	uipment side
Name	FX2N-232IF			Name	9-pin D-Sub	25-pin D-Sub
SD(TXD)	3			SD(TXD)	3	2
RD(RXD)	2			RD(RXD)	2	3
RS(RTS)	7			RS(RTS)	7	4
CS(CTS)	8			CS(CTS)	8	5
CD(DCD)	1	*1	*1	CD(DCD)	1	8
ER(DTR)	4	*2	*2	ER(DTR)	4	20
DR(DSR)	6	- 2	- 2	DR(DSR)	6	6
SG(GND)	5	*3	*3	SG(GND)	5	7
CI(RI)	9	3	3	CI(RI)	9	22

- *1. It is not necessary to connect the CD signal if monitoring the CD signal is not required. For the CD signal, the 232IF indicates only the status.
- *2. The 232IF indicates only the status.
- *3. It is not necessary to connect the CI signal if monitoring of the CI signal is not required. For the CI signal, the 232IF indicates only the status.

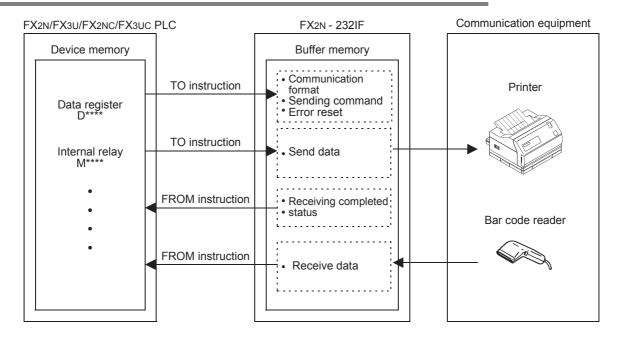
5. Creating Programs

This chapter explains how to create programs for non-protocol communication type using the 232IF.

5.1 Outline of Communication between FX PLC and 232IF

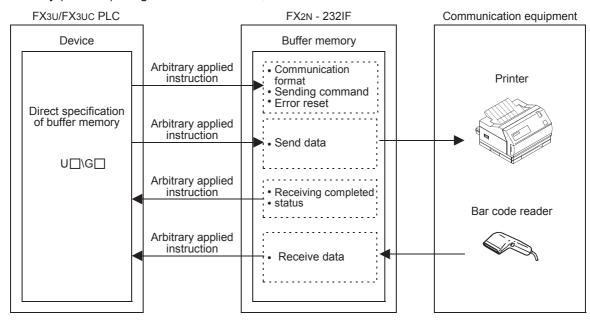
An FX PLC and 232IF transfer data between each other through the buffer memory (BFM).

5.1.1 For FROM and TO instructions



5.1.2 For direct specification of buffer memory (U□\G□)

FX3U and FX3UC PLCs allow not only FROM and TO instructions but also direct specification of the buffer memory ($U\Box \G\Box$) using the MOV instruction, etc.



5.2 FROM and TO Instructions

This section explains how to use FROM and TO instructions.

5.2.1 FROM instruction

FROM instruction reads data of the buffer memory in a special block.

1. Applicable devices

For FX2N /FX2NC PLCs

0		В	it De	evice	es					Word	d Dev	ices						Oth	ners
Operand Type		S	yster	n Us	er			Digit Spe	cification		Sys	tem (Jser		Ind	dex	Con	stant	Pointer
.,,,,	Х	Υ	М	Т	С	S	KnX	KnY	KnM	Т	С	D	V Z Modify			K	Н	Р	
m1													✓				✓	✓	
m2													✓				✓	✓	
D·								√	✓	✓	✓	✓	✓	√	√	✓			
n													✓				√	✓	

For FX3U/FX3UC PLCs

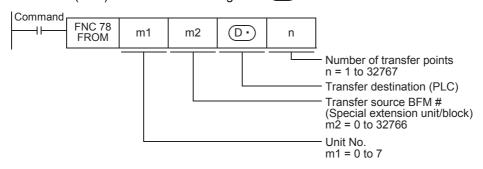
0			Bit	De	vic	es						Wo	ord	Dev	ice	S				Others						
Oper- and Type			Sy	ster	n U	ser		Dię	git Spe	ecificat	ion	Sy	ster	n Us	er	Special Unit		Ind	dex	Co sta		Real Number	Charac- ter String			
. , pc	Χ	Υ	М	Т	С	S	D□.b	KnX	KnX KnY KnM KnS				С	D	R	U□\G□	٧	Z	Modify	K	Н	Е	"□"	Р		
m1														✓	✓					✓	✓					
m2														✓	✓					✓	✓					
D·									✓	✓	✓	✓	✓	✓	✓		✓	✓	✓							
n														✓	✓					✓	✓					

2. Function and operation

1) 16-bit operation (FROM and FROMP)

Special function block (BFM) → PLC (word device)

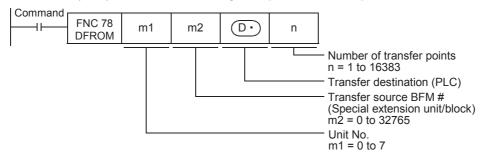
"n" 16-bit data starting from buffer memory (BFM) No. m2 inside the special function block No. m1 are transferred (read) to "n" devices starting from (D•) inside the PLC.



2) 32-bit operation (DFROM and DFROMP)

Special function block (BFM) \rightarrow PLC (word device)

"n" 32-bit data starting from buffer memory (BFM) No. m2 inside the special function block No. m1 are transferred (read) to "n" devices starting from [① +1, ①] inside the PLC.



5.2.2 TO instruction

TO instruction writes data to the buffer memory in a special function block.

1. Applicable devices

• For FX2N /FX2NC PLCs

Onemand		В	it De	evice	s					Word	l Dev	ices					Others			
Operand Type		S	yster	n Use	er			Digit Spe	cification		Sys	tem L	Jser		Ind	dex	Cons	stant	Pointer	
.,,,,,	Х	Υ	М	T	С	S	KnX	KnY	KnM	KnS	T	С	D	V	Z	Modify	K	Н	Р	
m1													✓				✓	✓		
m2													✓				✓	✓		
<u>s•</u>							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		
n													✓				✓	✓		

For FX3U/FX3UC PLCs

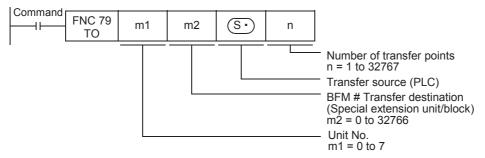
0			Bit	De	vic	es						Wo	ord	Dev	ice	s				Others					
Oper- and Type			Sy	ster	n U	ser		Dię	git Spe	ecificat	ion	Sy	ster	n Us	ser	Special Unit		Ind	dex	Co sta		Real Number	Charac- ter String	Pointer	
.,,,,	Χ	Υ	М	Τ	С	S	D□.b	KnX	KnY	KnM	KnS	T	С	D	R	U□\G□	٧	Z	Modify	K	Н	E	"□"	Р	
m1														✓	✓					✓	✓				
m2														✓	✓					✓	✓				
S∙								✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓				
n														✓	✓					✓	✓				

2. Function and operation

1) 16-bit operation (TO and TOP)

PLC (word device) → Special function block (BFM)

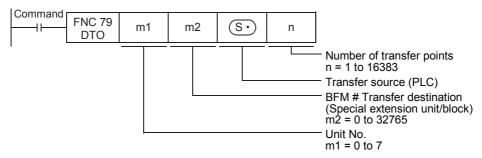
"n" 16-bit data starting from (S•) inside the PLC are transferred (written) to "n" buffer memories starting from buffer memory No. m2 inside the special function block No. m1.



2) 32-bit operation (DTO and DTOP)

$\textbf{PLC (word device)} \rightarrow \textbf{Special function block (BFM)}$

"n" 32-bit data starting from [S +1, S] inside the PLC are transferred (written) to "n" buffer memories starting from the buffer memory No. m2 inside the special function block No. m1.



5.3 Direct Specification of Buffer Memory (U□\G□)

In FX3U and FX3UC PLCs, one is able to directly specify buffer memories and read/write data from/to the specified buffer memories even with instructions other than the FROM and TO.

1. How to specify a buffer memory directly

When directly specifying a buffer memory, put the following setting directly into the source or destination of the command.

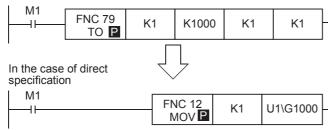


Example 1: When reading data from buffer memory No. 4 in special function block No. 1, and transferring it to D0

In the case of FROM instruction M8000 FNC 78 K1 K4 DO K₁ **FROM** In the case of direct specification M8000 FNC 12 U1\G4 D0 MOV

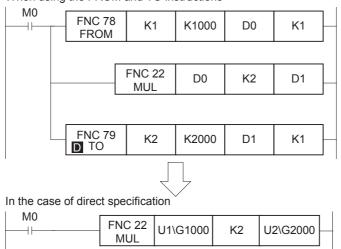
Example 2: When writing the numeric value K1 to buffer memory No. 1000 in special function block No. 1 (pulse operation type)

In the case of TO instruction



Example 3: When multiplying the value stored in buffer memory No. 1000 in special function block No. 1 by the numeric value "K2", and writing the multiplication result to buffer memories Nos. 2000 and 2001 in special function block No. 2

When using the FROM and TO instructions



Caution

The FX3UC-32MT-LT(-2) PLC main unit has a built-in CC-Link/LT master. When using special function blocks, set the block numbers. starting from "1".

5.4 Buffer Memory (BFM)

This section explains the contents of the buffer memory (BFM).

5.4.1 Buffer memory list

BFM No.	Name Setting range		Initial value	R/W	
#0	Communication format		0087H	W	
#1	Command		0	W	
#2	Maximum number of receivable bytes	1 to 512 (when data length is 16-bit) 1 to 256 (when data length is 8-bit) "0" is handled as "512" or "256"	0	W	
#3	Receiving timeout time	1 to 32767 (× 10 ms) "0" is handled as "no timeout time".	0	W	
#4 #5	Sending header (lowest-order 2 bytes) Sending header (highest-order 2 bytes)	4 bytes maximum, 0 suppression	0 (no header) 0	W	
#6 #7	Sending terminator (lowest-order 2 bytes) Sending terminator (highest-order 2 bytes)	4 bytes maximum, 0 suppression	0 (no terminator) 0	W	
#8 #9	Receiving header (lowest-order 2 bytes) Receiving header (highest-order 2 bytes)	4 bytes maximum, 0 suppression	0 (no header) 0	W	
#10 #11	Receiving terminator (lowest-order 2 bytes) Receiving terminator (highest-order 2 bytes)	4 bytes maximum, 0 suppression	0 (no terminator) 0	W	
#12	Receiving suspension waiting time (in interlink connection mode) 0 to 32767(× 10 ms)		0	W	
#13	Amount of remaining send data	0 to 512 (when data length is 16-bit) 0 to 256 (when data length is 8-bit)	0	R	
#14	Amount of received data buffers	0 to 256+15 ^{*1}	0	R	
#15	Sending sum result		0	R	
#16	Receiving sum result		0	R	
#20	Time from CS ON to sending start	0 to 32,767(× 10 ms)	0	W	
#21	Time from actual sending completion to RS OFF (complete flag ON)	0 to 32,767(× 10 ms)	0	W	
#28	Status		0	R	
#29	Error code		0	R	
#30	Model code		K7030	R	
#1000	0 to 512		0	W	
#1001 to #1256	Send data buffer		0	W	
#2000 Number of received bytes (who 0 to		0 to 512+30 ^{*1} (when data length is 16-bit) 0 to 256+15 ^{*1} (when data length is 8-bit)	0	R	
#2001 to #2256	Receive data buffer		0	R	

BFM No.	Name	Setting range	Initial value	R/W
#2257 to #2271	Preliminary receive data buffer for interlink connection mode		0	R

R: Read only W: Read or Write

Caution

Buffer memories specified as "W: For write" can be read also. Do not use undefined buffer memory numbers in programs.

^{*1.} Provided for preliminary buffers for the interlink connection mode.

5.4.2 Communication format <BFM #0>

Bit	Contents	0	1	Initial value	
b0	Data length	7-bit	8-bit	1 : 8-bit	
b1 b2	Parity	(00) : Not provided (01) : Odd (11) : Even		(11) : Even	
b3	Stop bit	1-bit	2-bit	0 : 1-bit	
b4 b5 b6 b7	Baud rate (bps)	(0011): 300 (0100): 600 (0101): 1200 (0110): 2400 (0111): 4800 (1000): 9600 (1001): 19200		(1000) : 9600 bps	
b8		(00): Not provided			
bo b9	Control line	(01) : Standard RS-2320	(00) : Not provided		
		(11): RS-232C interlink			
b10 b11	CR and LF addition	(00): Both CR and LF are not added. (01): Only CR is added. (11): Both CR and LF are added.		(00) : Not provided	
		(00): Both check sum a conversion are not provi			
b12 b13	Absence/presence of check sum and ASCII-Hexadecimal conversion	(01): Only ASCII-hexad provided.	(00) : Not provided		
סומ		(10): Only check sum is			
		(11) : Both check sum a conversion are provided			
b14	Send/receive data buffer data length	16-bit	8-bit	0 : 16-bit	
b15	Undefined (cannot be used)	_	_	0 : Undefined	

The communication format setting contents are determined when the sending/receiving enable command (BFM #1, b0) turns ON.

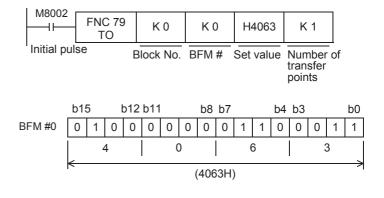
Accordingly, it is necessary to transfer the communication format setting in advance using TO instruction before setting the sending/receiving enable command to ON.

However, the sending header and sending terminator are determined when the sending command (BFM #1, b1) turns ON. And the receiving header and receiving terminator are determined when the sending/receiving enable command (BFM #1, b0) turns ON and the receiving complete flag reset command (BFM #1, b2) turns ON. Accordingly, if only the header and terminator are changed in the middle of communication, such change will become valid at the next sending/receiving operation, (so it is not necessary to turn OFF the sending/receiving enable command).

Example of communication format setting (specified in hexadecimal constant)

When specifying the communication format as shown in the table below, use the following program.

Data length	8-bit
Parity	Odd
Stop bit	1-bit
Baud rate	2400 bps
Control line	Not provided
CR and LF	Not added
Check sum	Not provided
ASCII-hexadecimal conversion	Not provided
Buffer data length	8-bit



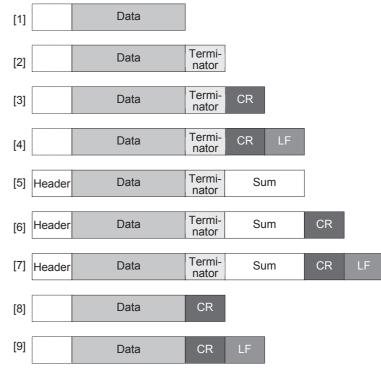
1. Communication format

Select the communication format to be used to send and receive data in the 232IF from the formats shown to the right.

- The header can be specified before the data in the communication format.
- In the communication format [1], hexadecimal (binary) values and ASCII codes can be sent and received.

When using the communication formats [2] to [9], make sure to use ASCII codes as the sent and received data.

The received data should not include the header, terminator or CR. (In communication formats [4], [7] and [9], the data area after "CR" is not received.)
By specifying b13 and b12 of BFM #0, the ASCII-Hexadecimal conversion function can be used



- 3) ASCII codes "01H" to "1FH" can be used as the head terminator.
- 4) In the RS-232C interlink connection mode, the communication formats [2] to [7] are valid.

2. b0 to b7 (data length, parity, stop bit and baud rate)

Align the setting of b0 to b7 with the communication specifications in the connected external equipment.

3. b9 and b8 (control line)

for communication.

- 1) When "control line not provided (b9 = 0, b8 = 0)" is specified, data is transferred using only the SD and RD signals without using the control line.
- 2) When the "standard RS-232C mode (b9 = 0, b8 = 1)" is specified, use a cross cable to connect equipment with the terminal specifications, and use a straight cable to connect equipment with the modem specifications.
- 3) When the "RS-232C interlink connection mode (b9 = 1, b8 = 1)" is specified, the sending request (RS) signal works as the receiving enable signal for the 232IF. When the 232IF receives data beyond the maximum number of receivable bytes (BFM #2), it turns OFF the receiving enable (RS) signal to ask the external equipment to suspend sending.

At this time, by withdrawing the contents of the received data buffer to data registers in the PLC using a sequence program, the 232IF can continuously receive the remaining data.

When this mode is specified, make sure to perform the interlink connection for RS-232C.

→ For the wiring of equipment according to each setting, refer to Chapter 4.

→ For the operation of the control line, refer to Section 5.5.

4. b11 and b10 (CR and LF addition)

The following specification methods are applicable:

- 1) Both CR and LF are not added (b11 = 0, b10 = 0).
- 2) Only CR is added (b11 = 0, b10 = 1).
- 3) Both CR and LF are added (b11 = 1, b10 = 1). For the CR/LF addition format, refer to the communication format list above.

5. b13 and b12 (absence/presence of check sum and ASCII-Hexadecimal conversion)

The following specification methods are applicable:

- 1) Neither the check sum nor ASCII-Hexadecimal conversion are provided (b13 = 0, b12 = 0).
- 2) Only the ASCII-Hexadecimal conversion is provided (b13 = 0, b12 = 1).
- 3) Only the check sum is provided (b13 = 1, b12 = 0).
- 4) Both the check sum and ASCII-Hexadecimal conversion are provided (b13 = 1, b12 = 1). For the check sum addition format, refer to the communication format list above.

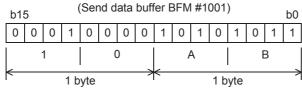
<ASCII-Hexadecimal conversion>

When "ASCII-Hexadecimal conversion provided" is specified, the hexadecimal numeric value data (0 to F) inside the send data buffer (BFM #1001 to 1256) is converted into ASCII data before being sent. And the received ASCII data is converted into the hexadecimal numeric value data (0 to F) before being stored in the received data buffer (BFM #2001 to 2256).

The number of sent/received bytes at this time indicates the amount of hexadecimal data.

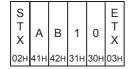
<Sending format during conversion from hexadecimal data into ASCII data>

Example: When the send data is "10ABH", the header is "STX" and the terminator is "ETX"



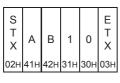
The number of sent bytes is "2".

Data is converted into ASCII data when being sent.

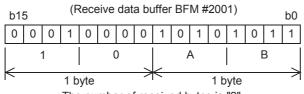


<Receiving format in conversion from ASCII data into hexadecimal data>

Example: When the received data is "10ABH", the header is "STX" and the terminator is "ETX"







The number of received bytes is "2".

6. b14 (send/receive data buffer data length)

The data is handled as shown below according to the buffer data length.

1) 16-bit (b14 = 0)

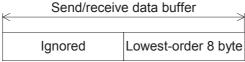
Send/receive data buffer Highest-order 8 byte Lowest-order 8 byte

16-bit data is divided into lowest-order 8-bit and highestorder 8-bit when being sent or received.

Example of send data buffer

S	BFM	BFM	BFM	BFM	Е
Т	#1001	#1001	#1002	#1002	Т
Χ	lowest- order byte	highest- order byte	lowest- order byte	highest- order byte	Χ

2) 8-bit (b14 = 1)



Highest-order 8-bit are ignored. Only lowest-order 8-bit are sent and received as valid data.

Example of send data buffer

S	BFM	BFM	BFM	BFM	Ε	
Т	#1001 lowest- order byte	#1002 lowest- order byte	#1003 lowest- order byte	#1004 lowest- order byte	T X	

5.4.3 Command <BFM #1>

BFM #1 gives the command for sending or receiving data or resetting the status information to the 232IF.

Bit	Contents		
b0	Sending/receiving enable (ER ON)		
b1	Sending command		
b2	Receiving complete flag reset command		
b3	Error reset		

1. b0 (sending/receiving enable)

While b0 is ON, the 232IF can send and receive data.

Because the contents of the following set items are determined at the rising edge of b0, transfer these values in advance using the TO instruction before setting b0 to ON:

- BFM #0 (communication format)
- BFM #9 and 8 (receiving header)
- BFM #11 and 10 (receiving terminator)

At the rising edge of b0, the error occurrence status (BFM #28, b3) and error code (BFM #29) are cleared.

2. b1 (sending command)

At the rising edge of b1, the contents of the send data buffer (BFM #1001 to 1256) in the amount of bytes specified (BFM #1000) are sent to the external equipment.

When sending is completed, the sending complete status (BFM #28, b0) is set to ON. When the next sending command (b1) is given, the sending complete status (BFM #28, b0) is automatically set to OFF.

When the sending command is given, the contents of the following set items are determined:

- BFM #5 and 4 (sending header)
- BFM #7 and 6 (sending terminator)

3. b2 (receiving complete flag reset command)

When b2 is set to ON, the following items are cleared:

- BFM #28, b1 (receiving complete)
- BFM #2000 (number of received bytes)
- BFM #2001 to 2256 (receive data buffer)

After receiving is completed, it is necessary to clear the receiving complete status (BFM #28, b1) because the 232IF cannot receive next data while b1 of the BFM #28 remains ON.

When the receiving complete flag reset command is given, the contents of the following set items are determined:

- BFM #9 and 8 (receiving header)
- BFM #11 and 10 (receiving terminator)

In the RS-232C interlink connection mode (BFM #0, b9 = 1, b8 =1), the receiving complete flag reset command works as the receiving continue command for receiving data beyond the maximum number of receivable bytes (BFM #2), and clears the following items:

- BFM #28, b4 (receiving suspended)
- BFM #2000 (number of received bytes)
- BFM #2001 to 2256 (receive data buffer)
- BFM #2257 to 2271 (preliminary receive data buffer)

The receiving enable (RS) signal is automatically set to ON.

4. b3 (error reset)

When b3 is set to ON, the contents of the error occurrence status (BFM #28, b3) and error code (BFM #29) are cleared.

C

5.4.4 Maximum number of receivable bytes <BFM #2>

Setting range: 1 to 512 bytes (when the buffer data length is 16-bit)

1 to 256 bytes (when the buffer data length is 8-bit)

"0" is handled as "512" or "256 bytes". The initial value is "0".

This bit specifies the maximum number of bytes which can be received by the 232IF.

When the 232IF receives the maximum number of receivable bytes, it sets the receiving complete flag (BFM #28, b1) to ON.

If the receiving terminator (BFM #11 and 10) or receiving timeout time (BFM #3) are set, the 232IF recognizes that receiving is completed even if the already received data does not reach the maximum number of receivable bytes when either condition is satisfied.

5.4.5 Receiving timeout time <BFM #3>

Setting range: 1 to 32767 (x 10 ms)

"0" is regarded as no timeout time. The initial value is "0".

This bit specifies the waiting time limit for receive data.

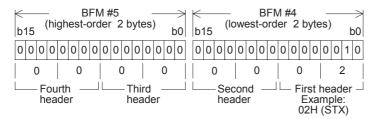
When the 232IF does not receive the next set of data within the receiving timeout time after the receiving edge of each data, the receiving timeout flag (BFM #28, b2) turns ON. At this time, the 232IF recognizes that receiving is completed, and sets the receiving complete flag (BFM #28, b1) to ON.

Sending header <BFM #5 (highest-order 2 bytes) and BFM #4 (lowest-order 2 5.4.6 bytes)>

Setting range: 4 bytes maximum, 0 suppression

The initial value is "0" (no sending header).

Up to four headers can be specified for the 232IF send data. When the number of headers is less than 4, "0"s in upper positions are ignored (0 suppression) and are not transferred.



The transfer order is "fourth header → third header → second header → first header" when four headers are set.

5.4.7 Sending terminator <BFM #7 (highest-order 2 bytes) and BFM #6 (lowest-order 2 bytes)>

Setting range: 4 bytes maximum, 0 suppression

The initial value is "0" (no sending terminator).

Up to four terminators can be specified for the 232IF send data. When the number of terminators is less than 4, "0"s in upper positions are ignored (0 suppression) and are not transferred.

For the terminator transferred first, specify ASCII code from "01H" to "1FH". (For other terminators after that, any ASCII code other than "01H" to "1FH" can be specified.)

The register structure and transfer order are the same as those of the sending header described above.

5.4.8 Receiving header <BFM #9 (highest-order 2 bytes) and BFM #8 (lowest-order 2 bytes)>

Setting range: 4 bytes maximum, 0 suppression

The initial value is "0" (no sending header).

Up to four headers can be specified for the 232IF received data. When the number of headers is less than 4, "0"s in upper positions are ignored (0 suppression) and are not transferred.

The register structure and transfer order are the same as those of the sending header described above.

5.4.9 Receiving terminator <BFM #11 (highest-order 2 bytes) and BFM #10 (lowest-order 2 bytes)>

Setting range: 4 bytes maximum, 0 suppression

The initial value is "0" (no sending terminator).

Up to four terminators can be specified for the 232IF received data. When the number of terminators is less than 4, "0"s in upper positions are ignored (0 suppression) and are not transferred.

For the terminator received first, specify an ASCII code from "01H" to "1FH". (For other terminators after that, any ASCII code other than "01H" to "1FH" can be specified.)

The register structure and transfer order are the same as those of the sending header described above.

5.4.10 Receiving suspension waiting time <BFM #12>

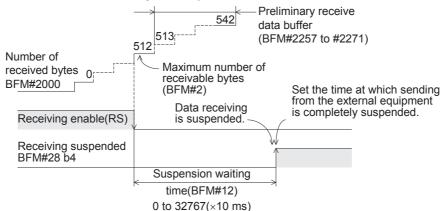
Setting range: 0 to 32767 (x 10 ms)

The initial value is "0 ms".

When the 232IF receives data beyond the maximum number of receivable bytes (BFM #2) in the RS-232C interlink connection mode (BFM #0, b9 = 1, b8 = 1), it sets the receiving enable (RS) signal to OFF to ask the external equipment to suspend sending.

BFM #12 sets the time after the receiving enable (RS) signal is set to OFF until the receiving suspended status bit (BFM #28, b4) is set to ON. Make sure that the time set by BFM #12 is longer than the time between when the 232IF sets the receiving enable (RS) signal to OFF until the external equipment completely suspends sending.

If the receiving suspended status bit (BFM #28, b4) is set to ON before the external equipment stops sending, the 232IF cannot receive the remaining data any more.



5.4.11 Amount of remaining send data <BFM #13>

Stored value: 0 to 512 (when the buffer data length is 16-bit)

0 to 256 (when the buffer data length is 8-bit)

This buffer stores the value set in the number of bytes to be sent (BFM #1000) subtracted by the number of already sent data.

5.4.12 Amount of received data buffers <BFM #14>

Stored value: 0 to 256+15 ("15" is provided for the preliminary receive data buffer.)

This buffer stores the amount of received data buffers which have already received data among the received data buffers BFM #2001 to 2256 and preliminary receive data buffers for interlink connection mode BFM #2257 to 2271.

E

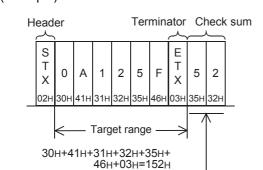
5.4.13 Sending sum result <BFM #15>

Initial value: 0

This buffer stores the value of the check sum added to the send data.

The sum check target range and check sum calculation method are as shown below.

Sum check target range and check sum calculation method (Example)



The sum of the data including the terminators but not the first header (first one byte only) is calculated, the least significant byte of the calculation result is converted into ASCII code, and the data is sent and received. The ASCII data is arranged in the order of "upper digit, lower digit".

5.4.14 Receiving sum result <BFM #16>

Initial value: 0

This buffer stores the sum check value of the received data.

If the check sum value added to the received data is different from the receiving sum result, "receiving sum check error" occurs.

The sum check target range and check sum calculation method are the same as those shown in "5.4.13 Sending sum result" above.

5.4.15 Time from CS ON to sending start <BFM #20>

Set value: 0 to 32767 (\times 10 ms)

Initial value: 0 ms

This buffer sets the time between when the sending enable (CS) signal is set to ON until the 232IF actually starts to send.

When "control line not provided" is specified, this buffer sets the time after the sending command is given until sending starts.

Set proper time according to the modem, etc.

5.4.16 Time from actual sending completion to RS OFF <BFM #21>

Set value: 0 to 32767 (x 10 ms)

Initial value: 0 ms

This buffer sets the time between when the 232IF completes sending until RS signal turns OFF and the sending complete flag (BFM #28, b0) turns ON.

Set proper time according to the modem, etc.

G-27

5.4.17 Status <BFM #28>

Bit	Contents		Bit	Contents
b0	Sending complete		b8	RS(RTS)
b1	Receiving complete		b9	ER(DTR)
b2	Receiving timeout	•	b10	Undefined
b3	Error occurrence		b11	Undefined
b4	Receiving suspended		b12	DR(DSR)
b5	Undefined		b13	CD(DCD)
b6	Sending		b14	DS(CTS)
b7	Receiving		b15	CI(RI)

This buffer stores the 232IF status and sending/receiving result as the status information. The PLC can read this buffer using the FROM instruction.

1. b0 (sending complete)

When sending the specified amount of bytes (BFM #1000) is completed, the sending complete flag (b0) is set to ON

The sending complete flag (b0) is automatically set to OFF when the next sending command (BFM #1, b1) is set to ON.

2. b1 (receiving complete)

When the maximum number of receivable bytes (BFM #2) are received, the receiving complete flag (b1) is set to ON

If the receiving terminator (BFM #11 and 10) or receiving timeout time (BFM #3) is set, the 232IF recognizes that receiving is completed even if the already received data does not reach the maximum number of received bytes when either condition is satisfied.

It is necessary to set this receiving complete flag to OFF in a sequence program. The 232IF is not ready to receive the next set of data while this bit is ON. Use the receiving complete flag reset command (BFM #1, b2) to set this bit to OFF.

3. b2 (receiving timeout)

When the receiving timeout time (BFM #3) is reached during receiving, the receiving timeout bit (b2) is set to ON. And the receiving complete flag (b1) is also set to ON.

The receiving timeout status (b2) is set to OFF when the receiving complete flag reset command (BFM #1, b2) is executed.

4. b3 (error occurrence)

When an error occurs during sending or receiving, the error occurrence status bit (b3) is set to ON and the contents of the error are stored in the error code (BFM #29).

5. b4 (receiving suspended)

When the 232IF receives data beyond the maximum number of receivable bytes (BFM #2) in the RS-232C interlink connection mode (BFM #0, b9 = 1, b8 = 1), it sets the receiving enable (RS) signal to OFF and asks the external equipment to suspend sending. After the receiving suspension waiting time (BFM #12), the 232IF sets the receiving suspended status bit (b4) to ON.

To receive data beyond the maximum number of receivable bytes (BFM #2) in the interlink connection mode, it is necessary to monitor the rising edge of this receiving suspended status bit (b4) in the sequence program, and withdraw the number of received bytes (BFM #2000) or amount of received data buffers (BFM #14) from the received data buffer (BFM #2001 to 2271) to data registers inside the PLC.

6. b6 (sending)

This bit remains ON from when the sending command (BFM #1, b1) is given until the sending complete flag (BFM #28, b0) is set to ON.

7. b7 (receiving)

This bit remains ON from when the head data is received until the receiving complete flag (BFM #28, b1) is set to ON

8. b8 (RS), b9 (ER), b12 (DR), b13 (CD), b14 (CS) and b15 (CI)

These bits indicate the operation status by their ON/OFF status.

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5.4.18 Error code <BFM #29>

For the error codes, refer to Section 7.2.

5.4.19 Model code <BFM #30>

The model code of the 232IF is "K7030".

The model code is a specific code assigned to each special extension module. By reading the model code in the PLC, the equipment type can be checked.

5.4.20 Number of bytes to be sent <BFM #1000>

Setting range: 0 to 512 bytes (when the buffer data length is 16-bit)

0 to 256 bytes (when the buffer data length is 8-bit)

This buffer specifies how many bytes should be sent among the 512 bytes/256 words in the 16-bit send data buffer (BFM #1001 to 1256).

5.4.21 Send data buffer <BFM #1001 to 1256>

The send data buffer is a section of 16-bit buffers for storing the send data. The send data buffers can store up to 512 bytes/256 words.

Structure of send/receive data buffer

Example: BFM #1001 (16-bit buffer) Highest-order byte Lowest-order byte b15 h0 0 0 0 0 0 0 1 0 0 0 0 0 1 1 2 3 32H=241H=A 1 byte 1 byte

1 word

Values in the send data buffers and receive data buffers are handled as hexadecimal values.

5.4.22 Number of received bytes <BFM #2000>

Stored value: 0 to 512+30*1 bytes (when the buffer data length is 16-bit)

0 to 256+15^{*1} bytes (when the buffer data length is 8-bit)

This buffer stores the number of bytes received from the external equipment. The value stored in this buffer is cleared when the receiving complete flag reset command (BFM #1, b2) is given.

*1. "30" or "15" bytes are provided for the preliminary buffer in the interlink connection mode.

5.4.23 Receive data buffer <BFM #2001 to 2256>

The received data buffer is a section of 16-bit buffers for storing the data received from the external equipment. The received data buffer can store up to 512 bytes/256 words.

The received data buffer structure is same as the send data buffer structure.

The contents of the received data buffer are cleared when the receiving complete flag reset command (BFM #1, b2) is given.

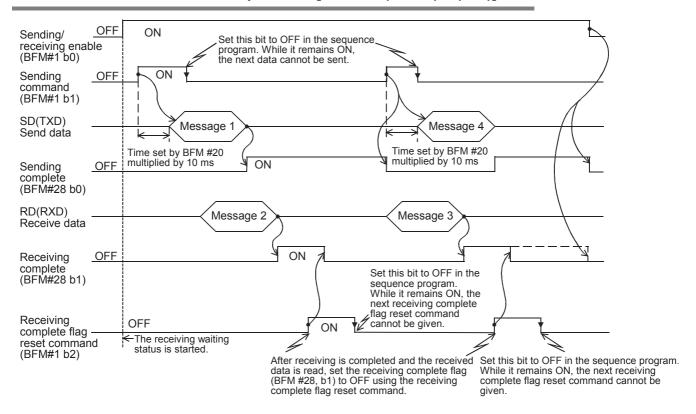
5.4.24 Preliminary receive data buffer for interlink connection mode <BFM #2257 to 2271>

The preliminary receive data buffer is provided for storing the data beyond 512 bytes in the interlink connection mode. The preliminary receive data buffers are used to receive the data sent after the receiving enable (RS) signal is set to OFF until the external equipment suspends sending.

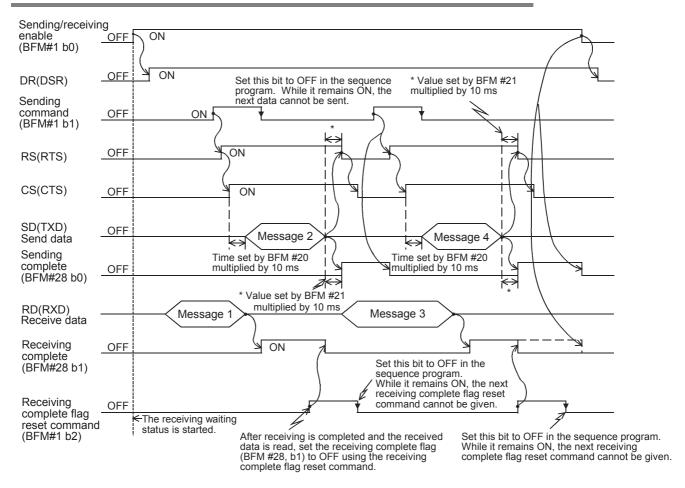
The contents of the preliminary receive data buffer are cleared when the receiving complete flag reset command (BFM #1, b2) is given.

5.5 Operation of Control Line

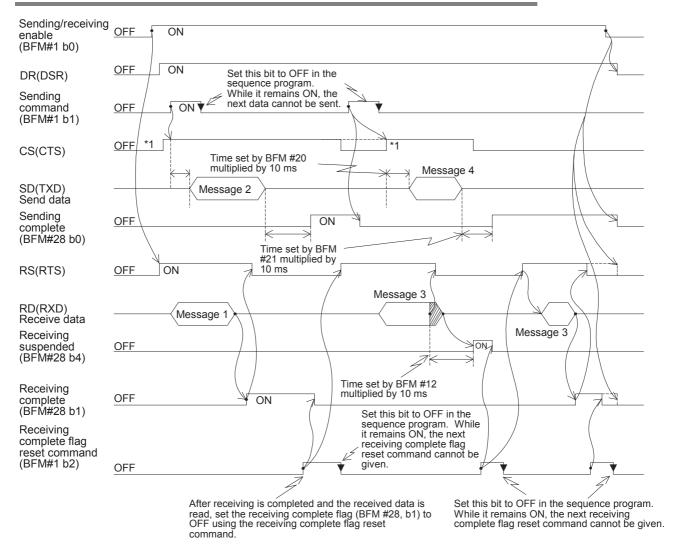
5.5.1 When control line is not provided [BFM #0, (b9, b8) = (0, 0)]



When control line is in standard RS-232C mode [BFM #0, (b9, b8) = (0, 1)] 5.5.2



5.5.3 When control line is in RS-232C interlink mode [BFM #0, (b9, b8) = (1, 1)]



- *1. Make sure that the CS (CTS) signal turns ON in the 232IF while the external equipment is ready to receive.
- *2. When the amount of data already received exceeds the maximum number of receivable bytes specified by BFM #2, the RS (RTS) signal turns OFF. Accordingly, sending is suspended from the external equipment within 30 bytes when the send/receive data buffer data length is 16-bit (BFM #0, b14= 0), or within 15 bytes when the send/receive data buffer data length is 8-bit (BFM #0, b14= 1). If sending is not suspended, the 232IF cannot receive all sent data.
- *3. Read the amount of received bytes (BFM #14) from the received data buffer (BFM #2001 to 2271) to data registers in the PLC, and then set it to ON.

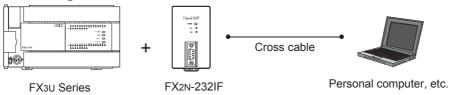
6.1 Example of Sending/Receiving 16-Bit Buffer Length Data

6. Practical Program Examples

6.1 Example of Sending/Receiving 16-Bit Buffer Length Data

In this example, the 16-bit buffer length data is sent and received between the 232IF and equipment with the terminal specifications. In this example, ASCII codes stored in the data registers D201 to D205 in the PLC are sent to the external equipment, and the data received from the external equipment is stored to data registers D301 to D304 in the PLC.

1. System configuration



2. Example of setting buffer memory

Suppose that each buffer memory not described here is set to the initial value.

1) Communication format <BFM #0>

Bit	Contents	Setting	
b0	Data length	(1): 8-bit	_
b1 b2	Parity	(1,1) : Even	-
b3	Stop bit	(1): 2-bit	-
b4 b5 b6 b7	Baud rate	(1001) : 19200 bps	-
b8 b9	Control line	(00) : Not provided	-
b10 b11	CR and LF addition	(00) : Not provided	-
b12 b13	Absence/presence of check sum and ASCII-Hexadecimal conversion	(00) : Not provided	-
b14	Send/receive data buffer data length	(0): 16-bit	← Iten
b15	Undefined	_	-

← Item to specify 16-bit data

b1	5						b8 I	b7							b0	
0	0	0	0	0	0	0	0	1	0	0	1	1	1	1	1	
	(0			()			Ç	9			ı	F		(009Гн)

2) Command <BFM #1>

 $M0 \rightarrow b0$: Sending/receiving enable (ER ON)

M1 → b1: Sending command

M2 → b2: Receiving complete flag reset command

 $M3 \rightarrow b3$: Error reset

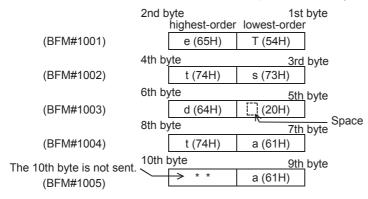
 Maximum number of receivable bytes <BFM #2> 8 bytes 4) Header and terminator <BFM #4 to 11> BFM #4 and 8 (sending header and receiving header): 02H (STX) BFM #6 and 10 (sending terminator and receiving terminator): 03H (ETX)

5) Status <BFM #28>

b0 → M10: Sending complete	b8 \rightarrow M18: RS(RTS)
b1 → M11: Receiving complete	b9 \rightarrow M19: ER(DTR)
b2 → M12: Receiving timeout	b10 \rightarrow M20: Undefined
b3 → M13: Error occurrence	b11 \rightarrow M21: Undefined
b4 → M14: Receiving suspended	b12 \rightarrow M22: DR(DSR)
$b5 \rightarrow M15$: Undefined	b13 \rightarrow M23: CD(DCD)
b6 → M16: Sending	b14 \rightarrow M24: CS(CTS)
b7 → M17: Receiving	$b15 \rightarrow M25$: CI(RI)

- 6) Number of bytes to be sent <BFM #1000> 9 bytes
- 7) Send data buffer <BFM #1001 and later>

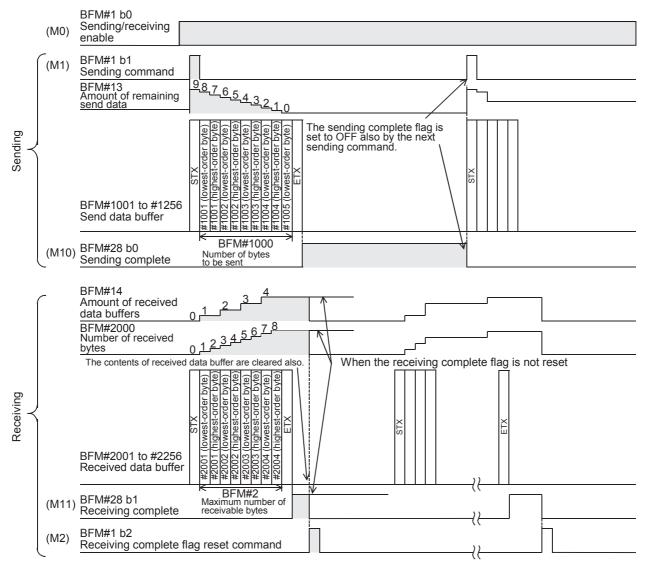
The send data "Test data" in ASCII codes is provided to 9 bytes (as specified in BFM#1000).



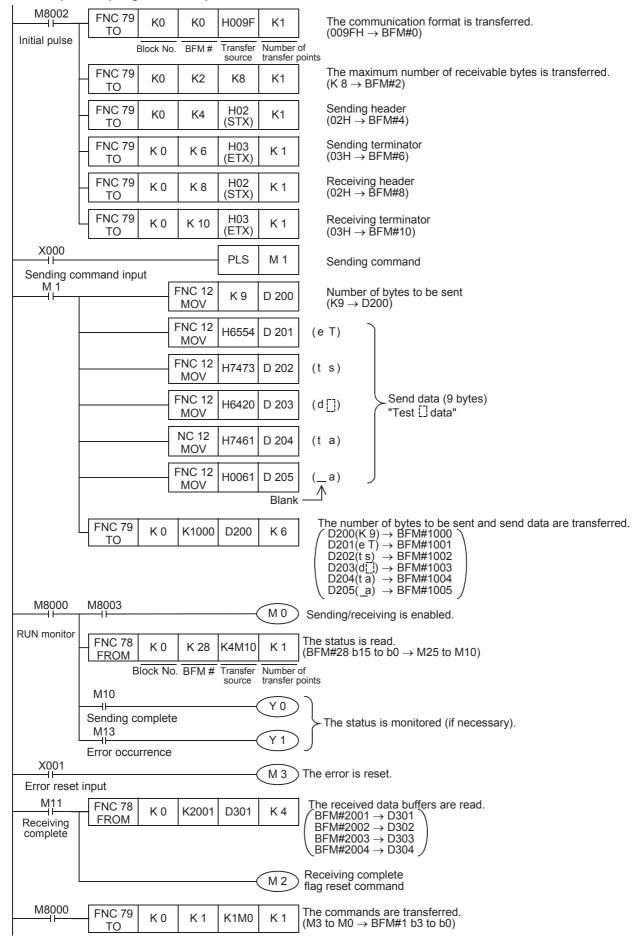
8) Receive data buffer <BFM #2001 and later>

Eight bytes specified by the maximum number of receivable bytes (BFM #2) are read to data registers D301 to D304 in the PLC.

3. Operation chart



4. Sequence program example

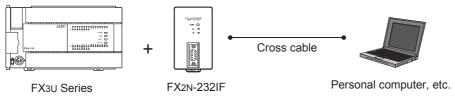


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6.2 Sending/Receiving 8-Bit Buffer Length Data

In this example, the 8-bit buffer length data is sent and received between the 232IF and equipment with the terminal specifications. In this example, ASCII codes stored in the data registers D201 to D209 in the PLC are sent to the external equipment, and the data received from the external equipment is stored to data registers D301 to D308 in the PLC.

1. System configuration



2. Example of setting buffer memory

Suppose that each buffer memory not described here is set to the initial value.

1) Communication format <BFM #0>

Bit	Contents	Setting
b0	Data length	(1): 8-bit
b1 b2	Parity	(1,1): Even
b3	Stop bit	(1): 2-bit
b4 b5 b6 b7	Baud rate	(1001): 19200 bps
b8 b9	Control line	(00) : Not provided
b10 b11	CR and LF addition	(00) : Not provided
	Absence/presence of check sum and ASCII- Hexadecimal conversion	(00) : Not provided
b14	Send/receive data buffer data length	(1): 8-bit
b15	Undefined	_

b1	5	b8 b7										b0				
0	1	0	0	0	0	0	0	1	0	0	1	1	1	1	1	
	-	4			()			Ç	9			ı	=		(409Гн)

2) Command <BFM #1>

 $M0 \rightarrow b0$: Sending/receiving enable (ER ON)

 $M1 \rightarrow b1$: Sending command

M2 → b2: Receiving complete flag reset command

 $M3 \rightarrow b3$: Error reset

- Maximum number of receivable bytes <BFM #2> 8 bytes
- 4) Header and terminator <BFM #4 to 11> BFM #4 and 8 (sending header and receiving header): 02H (STX) BFM #6 and 10 (sending terminator and receiving terminator): 03H (ETX)

```
5) Status <BFM #28> b0 \rightarrow M10: Sending complete b8 \rightarrow M18: RS(RTS) b1 \rightarrow M11: Receiving complete b9 \rightarrow M19: ER(DTR) b2 \rightarrow M12: Receiving timeout b10 \rightarrow M20: Undefined
```

 $\begin{array}{lll} b2 \rightarrow M12: \ Receiving \ timeout \\ b3 \rightarrow M13: \ Error \ occurrence \\ b4 \rightarrow M14: \ Receiving \ suspended \\ b5 \rightarrow M15: \ Undefined \\ \end{array} \begin{array}{ll} b10 \rightarrow M20: \ Undefined \\ b11 \rightarrow M21: \ Undefined \\ b12 \rightarrow M22: \ DR(DSR) \\ b5 \rightarrow M15: \ Undefined \\ \end{array}$

 $\begin{array}{ll} b6 \rightarrow M16: Sending & b14 \rightarrow M24: CS(CTS) \\ b7 \rightarrow M17: Receiving & b15 \rightarrow M25: CI(RI) \end{array}$

6) Number of bytes to be sent <BFM #1000> 9 bytes

7) Send data buffer <BFM #1001 and later>

The send data "Test data" in ASCII code is provided to 9 bytes (as specified in BFM #1000).

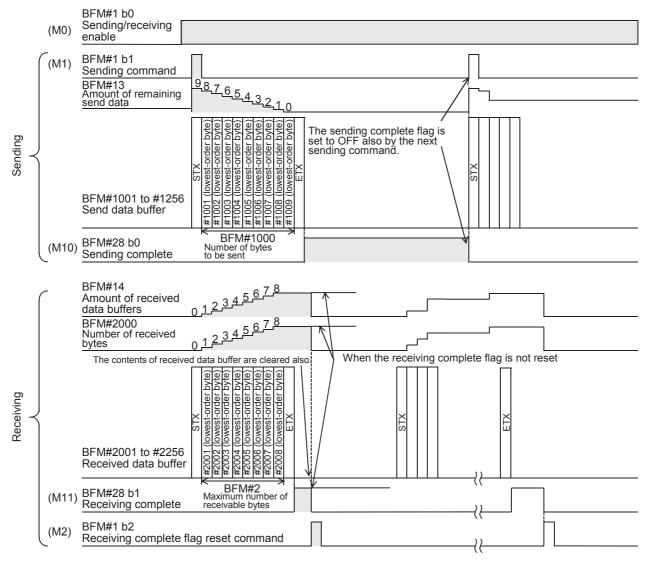
	highest-order	lowest-order 1st byte			6th byte
(BFM#1001)	Ignored	T (54H)	(BFM#1006)	Ignored	d (64H)
		2nd byte			7th byte
(BFM#1002)	Ignored	e (65H)	(BFM#1007)	Ignored	a (61H)
		3rd byte			8th byte
(BFM#1003)	Ignored	s (73H)	(BFM#1008)	Ignored	t (74H)
		4th byte			9th byte
(BFM#1004)	Ignored	t (74H)	(BFM#1009)	Ignored	a (61H)
		5th byte			
(BFM#1005)	Ignored	(20H)			
	Space —	7			

8) Receive data buffer <BFM #2001 and later>

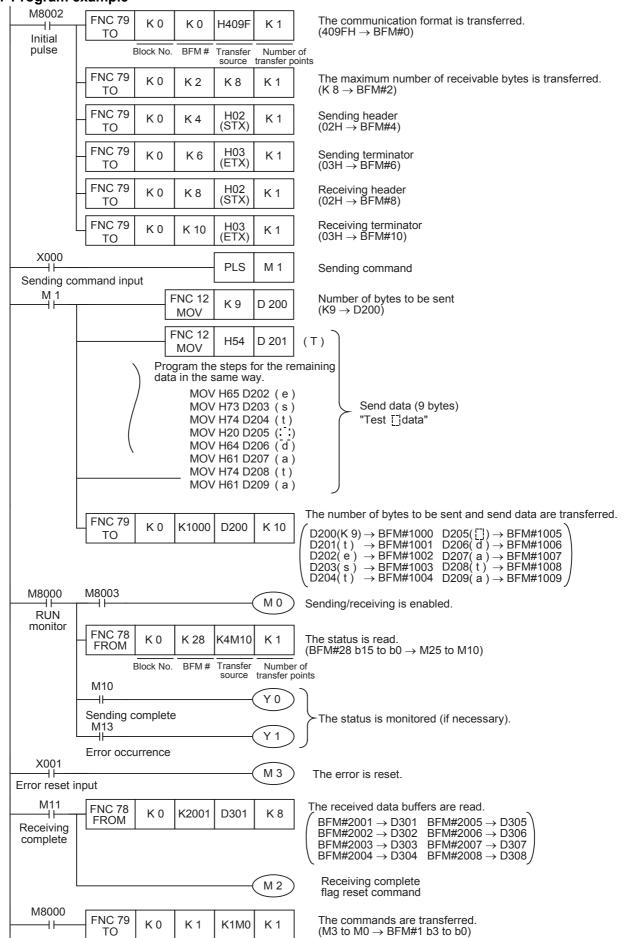
Eight bytes specified by the maximum number of receivable bytes (BFM #2) are read to data registers D301 to D308 in the PLC.

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3. Operation chart



4. Program example



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7. Troubleshooting

7.1 Check Items

- 1) Check the POWER LED of the 232IF.
 - While the POWER LED is ON, the drive power is being supplied normally.
 - If the POWER LED is OFF, the drive power is not being supplied normally.
- 2) Verify that the power supply is correctly wired to terminals of the 232IF.
- 3) Check the SD LED and RD LED of the 232IF.
 - If the RD LED does not turn ON when the 232IF receives data or if the SD LED does not turn ON when the 232IF sends data, check the connection and wiring.
 - If the RD LED turns ON when the 232IF receives data or if the SD LED turn ON when the 232IF sends data, the installation and wiring are normal.
- 4) Verify that the communication setting (BFM #0) in the 232IF is aligned correctly with the communication setting in the external equipment. If the communication setting is not aligned correctly, align it.
- 5) Check the timing at which data is sent and received. For example, when sending data, verify that the external equipment is ready to receive.
- 6) When the terminator is not used, verify that the quantity of data to be sent matches the receivable data quantity. If the quantity of send data may vary, use the terminator.
- 7) Verify that the external equipment is operating normally.
- 8) Verify that the adopted data format is uniform. If the data format is different, modify it.

7.2 Error Codes

When an error occurs while data is being sent or received, the 232IF sets bit 3 of the BFM #28 to ON, and stores the corresponding error code to the BFM #29.

Code	Contents	Cause and countermeasures
0	No error	_
1	Receiving parity error, overrun error or framing error	The communication format such as the baud rate does not agree. The control timing does not agree.
2	Undefined	_
3	Defective received character	The received data is not ASCII code.
4	Receiving sum check error	The sent sum does not agree with the received sum result (BFM #16).
5	Receive data buffer overflow (only in interlink connection mode)	The number of received bytes exceeds "512+30" bytes. Decrease the maximum number of receivable bytes (BFM #2), and increase the pre-liminary receive data buffer area.
6	Baud rate setting error	Non-existing baud rate is specified.
7	Receiving CR error	CR is not located in the specified position.
8	Receiving LF error	LF is not located in the specified position.
9	Head sending/receiving terminator setting error	The head terminator is something other than 01H to 1FH.
10	Receiving terminator error	The terminator is not located in the specified position. Or the terminato does not agree.
11	Undefined	_
12	Transmission order error	The transmission order does not agree.

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Common terns

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Communication (RS/RS2 Instruction)

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Programming Communication

Remote
Maintenance

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models

FX Series Programmable Controllers User's Manual [Data Communication Edition]

H. Programming Communication

Foreword

This manual explains "programming communication" provided for the MELSEC-F FX Series Programmable Controllers and should be read and understood before attempting to install or use the unit. Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

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D

1.1 Outline of System

Outline

This chapter explains programming communication.

1.1 **Outline of System**

Programming communication transfers programs and monitors devices when a PLC programming tool is connected.

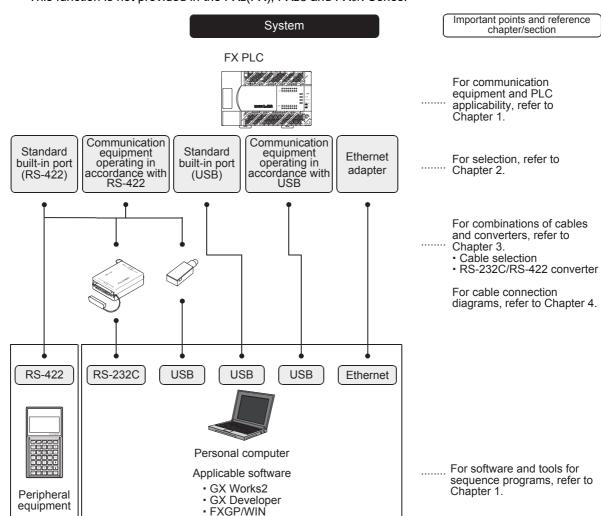
- 1) A PLC can be directly connected to the RS-232C port in a personal computer with one cable.
- 2) Sequence programs can be transferred and devices can be monitored through the USB port in a personal computer.

This function is not provided for the FX2(FX) and FX2C Series.

- 3) Sequence programs can be transferred and devices can be monitored through the Ethernet port in a personal computer.
 - This function is provided for the FX3S, FX3G, FX3GC, FX3U and FX3UC Series.
- 4) It is possible to monitor devices using one programming tool, and change programs using another programming tool.

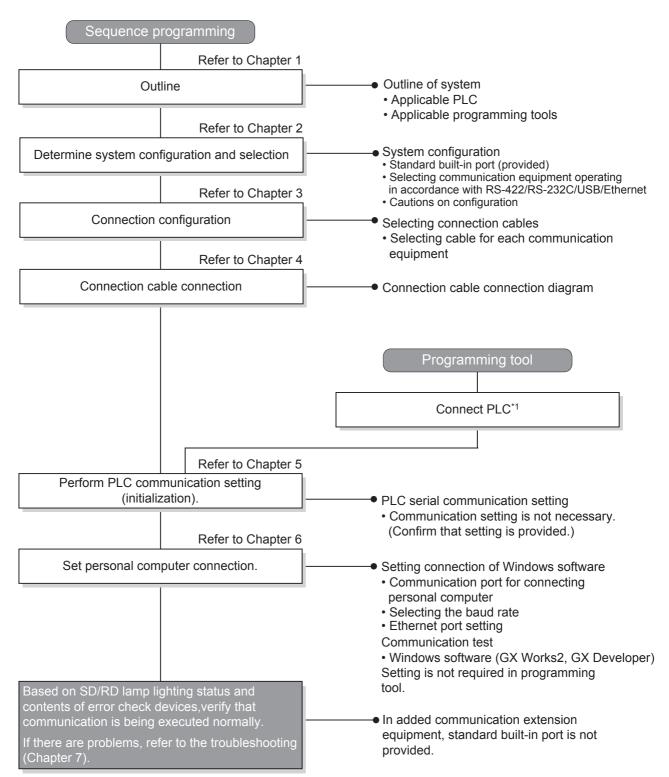
This function is not provided for the FX2(FX), FX2C and FX0N Series.

Two HMIs or one HMI and one programming tool can be connected at the same time. This function is not provided in the FX2(FX), FX2C and FX0N Series.



1.2 Procedures Before Operation

The flow chart below shows the programming communication setting procedures up until data link:



^{*1} For the programming tool to PLC connection procedure, refer to the "Programming Communication" section in this manual or the respective programming tool manual.

For details on operation methods, refer to the respective programming tool manual.

models

1.3 Communication Type Applicability in PLC

1.3.1 Applicable PLC

The table below shows communication ports applicable in each PLC.

- √: Applicable (If applicable versions of main units are limited, they are described inside ().)
- -: Not applicable

PLC	Standard built-in port in accordance with RS-422	Optional communication equipment operating in accordance with RS-422	equip opera accor with R	oment ting in dance S-232C	Standard built-in port in accordance with USB	Optional communication equipment operating in accordance with USB	Ethernet adapter	Remarks
		(-BD)	(-BD)	(ADP)		(-BD)*1		
FX3UC(D, DS, DSS) Series	√	_	_	√	_	_	√ (Ver. 3.10 or later)	
FX3UC-32MT- LT(-2)	√	√	√	✓	_	√	√ (Ver. 3.10 or later)	
FX3U Series	✓	✓	√	✓	_	✓	√ (Ver. 3.10 or later)	
FX3GC Series	~	_	_	✓	√	_	√ (Ver. 2.00 or later	
FX3G Series	✓	✓	√	√	√	_	√ (Ver. 2.00 or later	
FX3S Series	✓	✓	✓	✓	✓	_	√*2	
FX2NC Series	√	_	_	✓	_	_	_	
FX2N Series	✓	✓	✓	✓	_	_	_	
FX1NC Series	✓	_	_	✓	_	_	_	
FX1N Series	✓	✓	✓	✓	_	_	_	
FX18 Series	✓	✓	✓	✓	_	_	_	
FX ₀ N Series	✓	_	_	_	_	_	_	
FX0s Series	√	_	_	_	_	_	_	The programming communication function is not available for any optional communication equipment.
FX ₀ Series	✓	_	_	_	_	_	_	
FX2C Series	✓	_	_	_	_	_	_	
FX2(FX) Series	✓	_	_	_	_	_	_	
FX1 Series	✓	_	_	_	_	_	_	

^{*1.} When using USB communication with a model that does not support USB communication equipment (-BD), use the FX-USB-AW.

However, FX2(FX), FX2C and FX1 PLCs do not support the FX-USB-AW. Use the built-in USB port in FX3S, FX3G, FX3GC PLCs.

1.3.2 Products whose production was stopped

Production was stopped for some models of MELSEC-F Series PLCs and programming tools described in this manual. For models whose production was stopped, refer to Appendix A.

To see the latest available products, refer to the general catalog.

^{*2.} The FX3U-ENET-ADP Ver. 1.20 or later is applicable to the FX3S PLC.

1.4 Programming Tool Applicability

1.4.1 For applicable versions

The programming tool is applicable for each FX Series from the version shown:

1. English versions

Product name	Model name	Applicable version	Remarks			
FX3u and FX3uc PL	Cs					
GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later	The setting of the FX3U-ENET-ADP is supported in Ver. 1.73B or later.			
GX Developer	SW□D5C(F)-GPPW-E	Ver. 8.18U or later				
FX-30P	1	Ver. 1.00 or later	⁻			
GOT1000 Series dis	play units		T1000 Series display units for applicable oporting the list editor function.			
FX3G PLC						
GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later	The setting of the FX3U-ENET-ADP is supported in Ver. 1.87R or later.			
GX Developer	SW□D5C(F)-GPPW-E	Ver. 8.72A or later				
FX-30P	1	Ver. 1.00 or later	<u>-</u>			
GOT1000 Series dis	play units		T1000 Series display units for applicable oporting the list editor function.			
FX3GC PLC						
GX Works2	SW□DNC-GXW2-E	Ver. 1.77F or later	The setting of the FX3U-ENET-ADP is supported in Ver. 1.87R or later.			
FX-30P	1	Ver. 1.30 or later	-			
GOT1000 Series dis	play units		T1000 Series display units for applicable oporting the list editor function.			
FX3S PLC						
GX Works2	SW□DNC-GXW2-E	Ver. 1.492N or later				
FX-30P	•	Ver. 1.50 or later				
GOT1000 Series dis	play units		T1000 Series display units for applicable opporting the list editor function.			
FX2N and FX2NC PL						
GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later				
GX Developer	SW□D5C(F)-GPPW-E	SW2 A or later				
FX-PCS/WIN-E	SW0PC-FXGP/WIN-E	Ver. 1.00 or later				
FX-30P		Ver. 1.00 or later	- -			
FX-20P-E(-SET0) FX-20P-MFXC-E		Ver. 3.00 or later				
FX-10P-E		Ver. 3.00 or later				
GOT-F900 Series di F940WGOT-TWD-E F940GOT-*WD-E F940GOT-*BD-H-E F940GOT-*BD-RH-E	. ,	F940GOT-LWD-E, F940G F940GOT-LBD-H-E, F940	F940WGOT-TWD-E (Ver. 1.00 or later) F940GOT-LWD-E, F940GOT-SWD-E (Ver. 1.00 or later) F940GOT-LBD-H-E, F940GOT-SBD-H-E (Ver. 1.00 or later) F940GOT-LBD-RH-E, F940GOT-SBD-RH-E (Ver. 1.00 or later)			
GOT1000 Series dis			T1000 Series display units for applicable oporting the list editor function.			
FX1S, FX1N and FX1						
GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later				
GX Developer	SW□D5C(F)-GPPW-E	SW5 A or later				
FX-PCS/WIN-E	SW0PC-FXGP/WIN-E	Ver. 3.00 or later				
FX-30P		Ver. 1.00 or later	- -			
FX-20P-E(-SET0) FX-20P-MFXD-E		Ver. 4.00 or later				
FX-10P-E		Ver. 4.00 or later				

Product name	Model name	Applicable version	Remarks				
GOT-F900 Series displ	ay units						
F940WGOT-TWD-E		F940WGOT-TWD-E (Ver.	1.00 or later)				
F940GOT-*WD-E		F940GOT-LWD-E, F940G	F940GOT-LWD-E, F940GOT-SWD-E (Ver. 1.00 or later)				
F940GOT-*BD-H-E		F940GOT-LBD-H-E, F940	F940GOT-LBD-H-E, F940GOT-SBD-H-E (Ver. 1.00 or later)				
F940GOT-*BD-RH-E		F940GOT-LBD-RH-E, F94	F940GOT-LBD-RH-E, F940GOT-SBD-RH-E (Ver. 1.00 or later)				
GOT1000 Series displa	y units	Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function.					

2. Japanese versions

Product name	Model name	Applicable version	Remarks		
FX3U and FX3UC P	LCs				
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later	The setting of the FX3U-ENET-ADP is supported in Ver. 1.90U or later.		
GX Developer	SW□D5C(F)-GPPW-J	Ver. 8.13P or later			
FX-30P	·	Ver. 1.00 or later	⁻		
GOT1000 Series di	splay units		T1000 Series display units for applicable pporting the list editor function.		
FX3G PLC					
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later	The setting of the FX3U-ENET-ADP is supported in Ver. 1.90U or later.		
GX Developer	SW□D5C(F)-GPPW-J	Ver. 8.72A or later	_		
FX-30P		Ver. 1.00 or later	1		
GOT1000 Series di	splay units		T1000 Series display units for applicable pporting the list editor function.		
FX3GC PLC					
GX Works2	SW□DNC-GXW2-J	Ver. 1.77F or later	The setting of the FX3U-ENET-ADP is supported in Ver. 1.90U or later.		
FX-30P		Ver. 1.30 or later	-		
GOT1000 Series di	splay units		T1000 Series display units for applicable pporting the list editor function.		
FX3S PLC					
GX Works2	SW□DNC-GXW2-J	Ver. 1.492N or later			
FX-30P	•	Ver. 1.50 or later	⁻		
GOT1000 Series di	splay units		T1000 Series display units for applicable pporting the list editor function.		
FX2N and FX2NC P	LCs				
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later			
GX Developer	SW□D5C(F)-GPPW-J	SW2 A or later	1		
FX-PCS/WIN	SW0PC-FXGP/WIN	Ver. 2.00 or later	1		
FX-PCS-KIT/98	SW1PC-FXGP/98(-3,-5)	Ver. 4.00 or later			
FX-PCS/98-3	SW1PC-FXGP/98-3	Ver. 4.00 or later	1		
FX-PCS-KIT/V-3	SW1PC-FXGP/V3	Ver. 2.00 or later	-		
FX-A7PHP-KIT	SW1RX-GPPFX	Ver. 3.00 or later	7		
FX-30P	•	Ver. 1.00 or later			
FX-20P(-SET0) FX-20P-MFXC		Ver. 4.00 or later			
FX-10P(-SET0)		Ver. 3.00 or later	1		
GOT-F900 Series of F940WGOT-TWD F940GOT-*WD F940GOT-*BD-H F940GOT-*BD-RH		F940GOT-LBD-H, F940	1.00 or later) OT-SWD (Ver. 1.00 or later) GOT-SBD-H (Ver. 1.00 or later) IOGOT-SBD-RH (Ver. 1.00 or later)		
GOT1000 Series di	splay units	Refer to manuals of GOT1000 Series display units for applicable models and versions supporting the list editor function.			

Product name	Model name	Applicable version	Remarks			
FX1S, FX1N and FX	INC PLCs					
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later				
GX Developer	SW□D5C(F)-GPPW-J	SW5 A or later				
FX-PCS/WIN	SW0PC-FXGP/WIN	Ver. 4.00 or later				
FX-PCS/98-3	SW1PC-FXGP/98-3	Ver. 5.00 or later	_			
FX-30P		Ver. 1.00 or later	_			
FX-20P(-SET0)		Ver. 5.00 or later				
FX-20P-MFXD		Ver. 5.00 or later				
FX-10P(-SET0)		Ver. 4.00 or later				
GOT-F900 Series d	isplay units					
F940WGOT-TWD		F940WGOT-TWD (Ver.	1.00 or later)			
F940GOT-*WD		F940GOT-LWD, F940G0	OT-SWD (Ver. 1.00 or later)			
F940GOT-*BD-H		F940GOT-LBD-H, F9400	GOT-SBD-H (Ver. 1.00 or later)			
F940GOT-*BD-RH		F940GOT-LBD-RH, F940GOT-SBD-RH (Ver. 1.00 or later)				
GOT1000 Series dis	snlav units	Refer to manuals of GOT1000 Series display units for applicable				
	pricy diffic	models and versions supporting the list editor function.				

1.4.2 For non-applicable versions (setting an alternative model)

Even programming tool not applicable to a PLC can create programs when an alternative model is set. In this case, however, programming is enabled only in the ranges provided for the alternative PLC model such as instructions and program size.

Model to be programmed	Model to be set		Priority:	$High \to Lov$	W
FX3UC Series	FX3UC	\rightarrow	FX2N	\rightarrow	FX2(FX)
FX3U Series	FX3U, FX3UC	\rightarrow	FX2N	\rightarrow	FX2(FX)
FX3GC Series*1	FX3G, FX3GC	\rightarrow	FX1N ^{*2}	\rightarrow	FX2N ^{*2}
FX3G Series*1	FX3G	\rightarrow	FX1N ^{*2}	\rightarrow	FX2N ^{*2}
FX3S Series*1	FX3S	\rightarrow	FХзG	\rightarrow	FX1N ^{*2}
FX2NC Series	FX2NC, FX2N	\rightarrow	FX2(FX)		
FX2N Series	FX2N	\rightarrow	FX2(FX)		
FX1NC Series	FX1NC, FX1N	\rightarrow	FX2N	\rightarrow	FX2(FX)
FX1N Series	FX1N	\rightarrow	FX2N	\rightarrow	FX2(FX)
FX1S Series	FX1S	\rightarrow	FX2(FX)		
FX _{0N} Series	FX ₀ N	\rightarrow	FX2(FX)		
FX0S Series	FX0S	\rightarrow	FX2(FX)		
FX ₀ Series	FX0	\rightarrow	FX2(FX)		
FX2C Series	FX2C, FX2(FX)	\rightarrow	FX2(FX)		
FX2(FX) Series	FX2(FX)	\rightarrow	FX2(FX)		
FX1 Series	FX1				

^{*1.} When performing communication using the standard built-in USB port, use a programming tool whose version supports the FX3G PLC.

Point

In the FX3S PLC, set the memory capacity for PLC parameters to 4,000 steps or less.

^{*2. &}quot;FX2N" is selected when the FX-10P(-E) is used.

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2. System Configuration and Selection

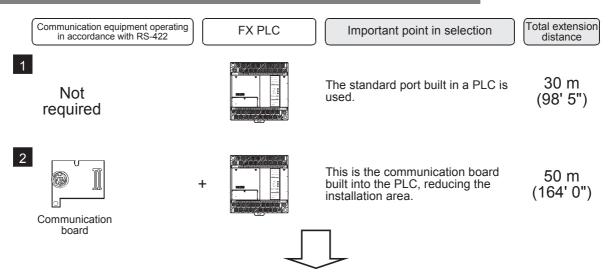
This chapter explains the system configuration and selection of communication equipment operating in accordance with RS-422, RS-232C or USB and Ethernet adapter required by FX PLCs.

2.1 System Configuration

This section outlines the system configuration required to use programming communication.

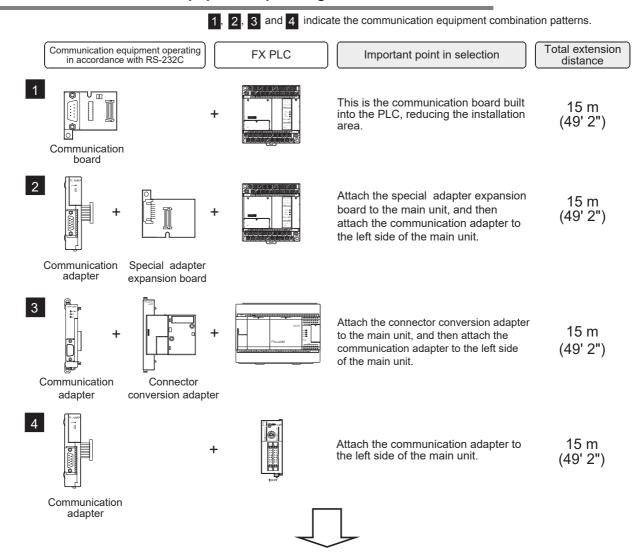
Connect (optional) communication equipment operating in accordance with RS-422, RS-232C, USB or Ethernet adapter to a built-in port of the FX PLC or the FX PLC main unit.

2.1.1 For communication equipment operating in accordance with RS-422



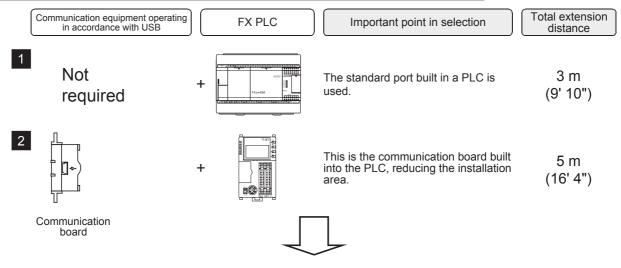
For communication equipment combinations for each FX Series, refer to the next section.

2.1.2 For communication equipment operating in accordance with RS-232C



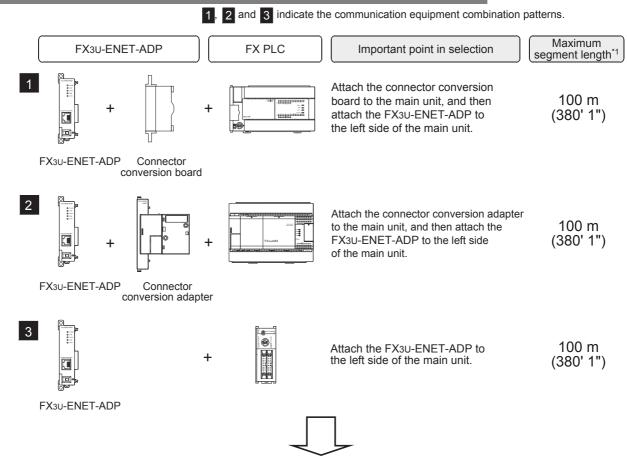
For communication equipment combinations for each FX Series, refer to the next section.

2.1.3 For communication equipment operating in accordance with USB



For communication equipment combinations for each FX Series, refer to the next section.

2.1.4 For Ethernet adapter



For communication equipment combinations for each FX Series, refer to the next section.

*1. Indicates the distance between the hub and a node.

The maximum distance varies depending on the Ethernet equipment used.

2.2 Applicable FX PLC and Communication Equipment

Select a communication equipment combination, and put a check mark in the "Check" column. During selection, pay attention to the following:

- In the table below, only the outside dimensions and D-SUB connector shape are different between units shown in "FX2NC-232ADP/FX0N-232ADP". Select either one.
- Only one unit of communication equipment can be connected.
- In the FX0, FX0s and FX0N Series, only the standard built-in port (8-pin MINI-DIN) is provided.
- In the FX1, FX2(FX) and FX2c Series, only the standard built-in port (25-pin D-Sub type) is provided.

FX Series	Communication equipment (option)	Total extension distance	Check
	FX1N-422-BD (8-pin MINI-DIN)	50 m (164' 0")	
FX1s	FX1N-232-BD (9-pin D-Sub)	15 m (49' 2")	
Standard built-in port (8-pin MINI- DIN)	+ + + + + + + + + + + + + + + + + + +	15 m (49' 2")	
FX1N	FX1N-422-BD (8-pin MINI-DIN)	50 m (164' 0")	
	FX1N-232-BD (9-pin D-Sub)	15 m (49' 2")	
Standard built-in port (8-pin MINI- DIN)	FX1N-CNV-BD FX2NC-232ADP (9-pin D-Sub) FX1N-CNV-BD FX2NC-232ADP (25-pin D-Sub)	15 m (49' 2")	

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FX Series	Communication equipment (option)	Total extension distance	Check
	FX ₂ N-422-BD (8-pin MINI-DIN)	50 m (164' 0")	
FX2N Standard built-in	FX2N-232-BD (9-pin D-Sub)	15 m (49' 2")	
port (8-pin MINI- DIN)	FX2N-CNV-BD FX2NC-232ADP (9-pin D-Sub) FX2N-CNV-BD FX0N-232ADP (25-pin D-Sub)	15 m (49' 2")	
	FX3G-422-BD (8-pin MINI-DIN)	50 m (164' 0")	
FX3S	FX3G-232-BD (9-pin D-SUB, male)	15 m (49' 2")	
RS-422 Standard built-in port (8-pin MINI-DIN) USB Standard built-in port (Mini-B)	FX3s-CNV-ADP FX3u-232ADP(-MB) (9-pin D-SUB, male)	15 m (49' 2")	
*1. In	FX3s-CNV-ADP FX3u-ENET-ADP (RJ45 type modular jack) dicates the distance between the hub and a node.	Maximum segment length ^{*1} 100 m (328' 1")	

Indicates the distance between the hub and a node.

The maximum distance varies depending on the Ethernet equipment used.

FX Series	Communication equipment (option)	Total extension distance	Check
	FX3G-422-BD (8-pin MINI-DIN)	50 m (164' 0")	
FX3G (14-point,24-point	FX3G-232-BD (9-pin D-SUB, male)	15 m (49' 2")	
type) RS-422 Standard built-in port (8-pin MINI-DIN) USB Standard built-in port	FX3G-CNV-ADP FX3U-232ADP(-MB) (9-pin D-sub, male)	15 m (49' 2")	
(Mini-B)	FX3G-CNV-ADP FX3U-ENET-ADP (RJ45 type modular jack)	Maximum segment length ^{*1} 100 m (328' 1")	

Indicates the distance between the hub and a node.
 The maximum distance varies depending on the Ethernet equipment used.

FX Series	Communication equipment (option)	Total extension distance	Check
	When using channel 1 (ch 1)		
	FX3G-422-BD (8-pin MINI-DIN) The communication equipment works as ch1 when connected to the option connector 1.	50 m (164' 0")	
FX3G (40-point,60-point type) RS-422 Standard	Ch1 FX3G-232-BD (9-pin D-Sub, male) The communication equipment works as ch1 when connected to the option connector 1.	15 m (49' 2")	
built-in port (8-pin MINI-DIN) USB Standard built-in port (Mini-B)	ch1 FX3G-CNV-ADP FX3U-232ADP(-MB) (9-pin D-Sub, male)	15 m (49' 2")	
	FX3G-CNV-ADP FX3U-ENET-ADP (RJ45 type modular jack)	Maximum segment length ^{*1} 100 m (328' 1")	

. Indicates the distance between the hub and a node.

The maximum distance varies depending on the Ethernet equipment used.

FX Series	Communication equipment (option)	Total extension distance	Check
	ch2 ch2 FX3G-422-BD (8-pin MINI-DIN) The communication equipment works as ch2 when connected to	50 m (164' 0")	
FX3G (40-point,60-point	the option connector 2. ch2 FX3G-232-BD (9-pin D-sub, male) The communication equipment works as ch2 when connected to the option connector 2.	15 m (49' 2")	
type) RS-422 Standard built-in port (8-pin MINI-DIN) USB Standard built-in port (Mini-B)	ch1 ch2 FX3G-CNV-ADP FX3U-□ADP(-MB) (Where □ represents 232 and 485). Ch2 FX3U-232ADP(-MB) (9pin D-SUB, male) 232 and 485). Ch2 is not available when the FX3G-8AV-BD, FX3G-4EX-BD or FX3G-2EYT-BD is connected to the option connector 2.	15 m (49' 2")	
	ch1 ch2 + + + FX3G-CNV-ADP FX3U-□ADP(-MB) (When □ represents 232 and 485). Ch2 is not available when the FX3G-8AV-BD, FX3G-4EX-BD or FX3G-2EYT-BD is connected to the option connector 2.	Maximum segment length ^{*1} 100 m (328' 1")	

*1. Indicates the distance between the hub and a node.

The maximum distance varies depending on the Ethernet equipment used.

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FX Series	Communication equipment (option)	Total extension distance	Check
V	when using channel 1 (ch 1) ch1 FX3U-422-BD (8-pin MINI-DIN)	50 m (164' 0")	
â.	ch1 FX3U-232-BD (9-pin D-Sub, male)	15 m (49' 2")	
FX3U Standard built-in port (8-pin MINI-DIN)	ch1 ↓ ↓ ↓ FX₃u-USB-BD (USB Mini-B connector)	5 m (16' 4")	
*1. Inc	FX3U-CNV-BD FX3U-232ADP(-MB) (9-pin D-Sub, male)	15 m (49' 2")	
	FX3U-CNV-BD FX3U-ENET-ADP (RJ45 type modular jack)	Maximum segment length ^{*1} 100 m (328' 1")	

Indicates the distance between the hub and a node.
 The maximum distance varies depending on the Ethernet equipment used.

FX Series	Communication equipment (option)	Total extension distance	Check
	When using channel 2 (ch 2) ch1 ch2 FX3U-□-BD (Where □ represents 232, 422, 485, USB and 8AV). FX3U-232ADP(-MB) (9-pin D-Sub, male)	15 m (49' 2")	
	When a FX3U-8AV-BD is used, it occupies one communication port channel.		
FX3U Standard built-in port (8-pin MINI-DIN)	+ Ch1 Ch2 + FX3U-CNV-BD FX3U-232ADP(-MB), FX3U-485ADP(-MB), FX3U-CF-ADP When a FX3U-CF-ADP is used, it accurates an accumulation part.	15 m (49' 2")	
	When a FX3U-CF-ADP is used, it occupies one communication port channel.		
	ch1 ch2 FX3U-CNV-BD FX3U-232ADP(-MB), FX3U-ENET-ADP (RJ45 type modular jack) FX3U-CF-ADP is used, it occupies one communication port channel.	Maximum segment length ^{*1} 100 m (328' 1")	
FX1NC Standard built-in port (8-pin MINI- DIN)	FX ₂ NC-232ADP FX ₀ N-232ADP (9-pin D-Sub)	15 m (49' 2")	
FX2NC Standard built-in port (8-pin MINI- DIN)	FX2NC-232ADP FX0N-232ADP (9-pin D-Sub)	15 m (49' 2")	

*1. Indicates the distance between the hub and a node.

The maximum distance varies depending on the Ethernet equipment used.

FX Series	Communication equipment (option)	Total extension distance	Check
	When using channel 1 (ch 1) ch1 FX3U-232ADP(-MB) (9-pin D-Sub, male)	15 m (49' 2")	
	Ch1 Ch2 FX3U-□ADP(-MB) (Where □ represents 232 and 485). Ch2 FX3u-232ADP(-MB) (9-pin D-Sub, male)	15 m (49' 2")	
	ch1 ch2 FX3U-□ADP(-MB) (Where □ represents 232 and 485).	Maximum segment length ^{*1} 100 m (328' 1")	

Indicates the distance between the hub and a node.
 The maximum distance varies depending on the Ethernet equipment used.

FX Series	Communication equipment (option)	Total extension distance	Check
	When using channel 1 (ch 1)		
	ch1 FX3U-232ADP(-MB) (9-pin D-Sub, male)	15 m (49' 2")	
	When using channel 2 (ch 2)		
FX3UC (D, DS, DSS) Standard built-in port (8-pin MINI- DIN)	ch1 FX3U-232ADP(-MB), FX3U-485ADP(-MB), FX3U-CF-ADP When a FX3U-CF-ADP is used, it occupies one communication port channel.	15 m (49' 2")	
	ch1 ch2 FX3U-232ADP(-MB), FX3U-ENET-ADP (RJ45 type modular jack) FX3U-CF-ADP When a FX3U-CF-ADP is used, it occupies one communication port channel.	Maximum segment length ^{*1} 100 m (328' 1")	

*1. Indicates the distance between the hub and a node.

The maximum distance varies depending on the Ethernet equipment used.

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FX Series	Communication equipment (option)	Total extension distance	Check
FX3UC-32MT-LT (-2) Standard built-in port (8-pin MINI-DIN)	When using channel 1 (ch 1) ch1 FX3U-422-BD (8-pin MINI-DIN)	50 m (164' 0")	
	ch1 FX3U-232-BD (9-pin D-Sub, male)	15 m (49' 2")	
	Ch1 FX3∪-USB-BD (USB Mini-B connector)	5 m (16' 4")	
	Ch1 FX3U-CNV-BD FX3U-232ADP(-MB) (9-pin D-Sub, male)	15 m (49' 2")	
	ch1 FX3U-CNV-BD FX3U-ENET-ADP (RJ45 type modular jack)	Maximum segment length ^{*1} 100 m (328' 1")	

*1. Indicates the distance between the hub and a node.

The maximum distance varies depending on the Ethernet equipment used.

FX Series	Communication equipment (option)	Total extension distance	Check
	When using channel 2 (ch 2)		
FX3UC-32MT-LT (-2) Standard built-in port (8-pin MINI-DIN)	Ch1 FX3U-□-BD (Where □ represents 232, 422, 485, USB and 8AV). When a FX3U-8AV-BD is used, it occupies one communication port channel.	15 m (49' 2")	
	ch1 FX3U-□-BD (Where □ represents 232, 422, 485, USB and 8AV). When a FX3U-8AV-BD is used, it occupies one communication port channel.	Maximum segment length ^{*1} 100 m (328' 1")	
	ch1 ch2 FX3U-CNV-BD FX3U-232ADP(-MB), FX3U-232ADP(-MB) FX3U-485ADP(-MB), (9-pin D-Sub, male) FX3U-CF-ADP When a FX3U-CF-ADP is used, it occupies one communication port channel.	15 m (49' 2")	
	ch1 ch2 FX3U-CNV-BD FX3U-232ADP(-MB), FX3U-ENET-ADP (RJ45 type modular jack) FX3U-CF-ADP is used, it occupies one communication port channel.	Maximum segment length ^{*1} 100 m (328' 1")	

^{*1.} Indicates the distance between the hub and a node.

The maximum distance varies depending on the Ethernet equipment used.

2.3 Caution on Selection

Some caution should be observed when using a programming tool with optional FX PLC communication equipment.

Consider the following contents during selection.

2.3.1 When using 422BD

1. Current consumption at 5V DC of the expansion board

When the 422BD is attached to a PLC, it consumes the following current:

- 1) For FX3u and FX3uc-32MT-LT(-2) PLCs
 The FX3u-422-BD consumes 20 mA at 5V DC from the FX3u/FX3uc-32MT-LT(-2) PLC.
- 2) For FX2N PLCs
 The FX2N-422-BD consumes 60 mA at 5V DC from the FX2N PLC.

2. Current consumption of the special extension equipment and peripheral equipment

Make sure that the current consumption at 5V DC including the 422BD described above, special extension equipment, and peripheral equipment shown below does not exceed the power capacity at 5V DC in the FX2N/FX3U/FX3UC PLC.

Peripheral equipment	Connection cable	Current consumption at 5V DC*1
FX-30P		115 mA ^{*2}
FX-20P(-E)	FX-20P-CAB0 or FX-20P-CAB + FX-20P-CADP	180 mA
FX-10P(-E)		120 mA
	<f2-232cab (for="" 14-pin="" 25-pin="" 9-pin="" d-sub)="" d-sub),="" f2-232cab-1="" f2-232cab-2="" half-pitch)="" or=""> + FX-232AW(C) + FX-422CAB0</f2-232cab>	220 mA
Personal computer (for programming)	<f2-232cab (for="" 14-pin="" 25-pin="" 9-pin="" d-sub)="" d-sub),="" f2-232cab-1="" f2-232cab-2="" half-pitch)="" or=""> + FX-232AWC-H + FX-422CAB0</f2-232cab>	120 mA
	USB cable (for connecting personal computer: A plug) (for connecting FX-USB-AW: USB Mini-B plug) + FX-USB-AW	15 mA
FX-10DU(-E)	FX-20P-CAB0 or FX-20P-CAB + FX-20P-CADP	220 mA
FX-20DU(-E)	FX-20DU-CAB0	180 mA
FX-10DM(-E)	FX-20P-CAB0 or FX-20P-CAB + FX-20P-CADP	220 mA
FX-25DU(-E), FX-30DU(-B)(-E),	FX-50DU-CAB0(-1M, -10M, -20M, -30M)	0 mA
FX-40DU(-B)(-ES), FX-40DU-TK(B)(-E), FX-50DU-TK(S)(-E), and ET-50 Series	FX-40DU-CAB(-10M, -20M, -30M) + FX-422AW0	160 mA
F940GOT-SWD(LWD)(-E), F930GOT-BWD(-E), ET-940 Series F930GOT-BBD-K(-E), and F920GOT-BBD-K	FX-50DU-CAB0(-1M, -10M, -20M, -30M, L)	0 mA
F940 Handy GOT (RH type)	F9GT-H(RH)CAB2-150 + F9GT-H(RH)CAB-3M(-10M) or F9GT- HCAB-3M(-10M) + F9GT-HCNB + FX-50DU-CAB0(-1M)	0 mA
F920GOT-BBD5-K	FX-50DU-CAB0(-1M)	220 mA
F920 Handy GOT RH type	F9GT-HCAB2-150, F9GT-HCAB-3M(-10M)	0 mA
GOT-A900 Series (CPU direct connection type)	FX9GT-CAB0(-150,-10M)	0 mA
GOT1000 Series (CPU direct connection type)	GT01-C□R4-8P (Where □ represents 10, 30, 100, or 300.)	0 mA
GOT1000 Series (GT10 5V DC power supply type)	GT10-C□R4-8P (Where □ represents 10, or 30.)	220 mA

- *1. The power consumption of the FX3U-422-BD and FX2N-422-BD is not included.
- *2. When the intensity of the LCD backlight is set at the initial value 4. If the LCD backlight is set at the maximum value 8, it is handled as "155mA".

3. Connection of the FX-2PIF

The FX-2PIF cannot be connected to the 422BD. Connect it to the standard port.

2.3.2 When using 232BD or 232ADP

When the 232BD or 232ADP is attached to a PLC, it consumes the current shown in the table below. Make sure that the power capacity of 5V DC in the FX1NC, FX2N, FX2NC, FX3U and FX3UC PLCs is not exceeded.

✓: Applicable—: Not attachable

Model name	Power consumption at 5 VDC	FX1NC	FX2N	FX2NC	F X 3U	FX3UC (D, DS, DSS)	FX3UC (LT, LT(-2))
FX3U-232-BD	20 mA	_	_	_	✓	_	✓
FX2N-232-BD	20 mA	_	✓	_	_	_	_
FX3U-232ADP(-MB)	30 mA	_	_	_	✓	✓	✓
FX2NC-232ADP	100 mA	√	√	✓		_	_
FX0N-232ADP	200 mA	✓	✓	✓	_	_	_

2.3.3 Other cautions

1. For FX1s, FX1N, FX1NC and FX2N (whose version is before Ver. 2.00) PLCs

- Verify that the communication format is in the initial status (D8120 = K0).
 Check the communication parameters using the peripheral equipment.
 If the communication is set so that non-protocol procedure (RS instruction) or a dedicated protocol is used, clear the setting to "0" using the peripheral equipment.
- 2) If RS instruction is used in the program, delete it, turn OFF the PLC power, and then turn it ON again.

2. For FX2N (Ver. 2.00 or later) and FX2NC (versions earlier than Ver. 3.00) PLCs

- Verify that the communication format is in the initial status (D8120 = K0).
 Check the communication parameters using the peripheral equipment.
 If the communication is set so that non-protocol procedure (RS instruction) or a dedicated protocol is used, clear the setting to "0" using the peripheral equipment.
- 2) If RS instruction is used in the program, do not execute it. If it is executed, the PLC operates according to RS instruction.

3. For FX2N (Ver. 3.00 or later) and FX2NC (Ver. 3.00 or later) PLCs

- Verify that the communication format is in the initial status (D8120 = K0).
 Check the communication parameters using the peripheral equipment.
 If the communication is set so that non-protocol procedure (RS instruction) or a dedicated protocol is used, clear the setting to "0" using the peripheral equipment.
- 2) If RS instruction is used in the program, do not execute it. If it is executed, the PLC operates according to RS instruction.
- 3) If EXTR instruction is used in the program, delete it, turn OFF the PLC power, and then turn it ON again.

4. For FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs

- 1) Verify that the communication format for the communication port used in programming communication is set correctly (D8370, D8120, D8400, D8420 = K0).
 - Check whether the communication parameters are set correctly using the peripheral equipment.
- 2) Verify that the RS or RS2 instructions are not executed in the program for the communication port used in programming communication.
 - Do not execute RS and RS2 instructions.
- 3) If an inverter communication instruction is used in the program for the communication port used in programming communication, delete it, turn OFF the PLC power, and then turn it ON again.

5. Connection of (5V power type) GOT unit

When using the (5V power type) GOT unit together with the FX3S, FX3G PLC, connect only one GOT unit to either the standard built-in port (RS-422) or the FX3G-422-BD. It is not allowed to connect two GOT units to the FX3S, FX3G PLC at the same time.

C

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3. Selecting Connection Cables

This chapter explains the connection cable selection method.

3.1 Connection Procedure

1 Checking the connector shape

Check the shape (male or female, etc.) of the connector of the connected programming tool (such as personal computer) and the shape of the connector of the PLC, and verify that connection is possible.

2 Connecting the cable connector to the programming tool

Check the shape of the cable connector for the programming tool, and connect the cable correctly.

3 Connecting the cable connector to the PLC

Check the cable connector for the PLC, and connect the cable correctly. The cable connector has one of the following shapes:

- 8-pin MINI-DIN, male
- 25-pin D-Sub, male
- 9-pin D-Sub, female
- USB Mini-B plug
- RJ45 type modular

1. Selecting a connection cable

According to the combination of the connected programming tool and PLC (communication equipment), select the proper cable.

3.2 Connector Shape in Each Product

Model name (series)	Connector shape
PLC	
FX1, FX2(FX) and FX2C PLCs	13 1 25 14 25-pin D-Sub, female
FX0, FX0s, FX0n, FX1s, FX1n, FX1nc, FX2n, FX2nc, FX3s, FX3G, FX3GC, FX3U and FX3UC PLCs	5 4 8 1 0 0 0 0 7 3 6 8-pin MINI-DIN, female
FX3S, FX3G, FX3GC PLCs	USB Mini-B connector
PLC (communication equi	pment)
FX1N-422-BD FX2N-422-BD FX3G-422-BD FX3U-422-BD	5 4 8 1 0 0 0 0 7 3 6 8-pin MINI-DIN, female
FXon-232ADP	13 1 25 14 25-pin D-Sub, female
FX1N-232-BD FX2N-232-BD FX3G-232-BD FX3U-232-BD FX2NC-232ADP FX3U-232ADP(-MB)	5 1 9 6 9-pin D-Sub, male
FX3u-USB-BD	USB Mini-B connector
FX3u-ENET-ADP	8 1 RJ45 type modular jack

Model name (series)	Connector shape
Handy programming pane	el
FX-10P(-E), FX-10P-SET0(-E), FX-20P(-E), FX-20P-SET0(-E), FX-30P	5 4 8 1 0 0 0 0 0 7 3 6 8-pin MINI-DIN, female
Personal computer	
	5 1 9 6 9-pin D-Sub, male
PC-AT compatible machine	USB A connector
	8 1 RJ45 type modular jack
PC-9800 Series (NEC)	7 1 14 8 14-pin Half-pitch, female
1 0 3000 denes (NEO)	13 1 © 25 14 25-pin D-Sub, female
	_

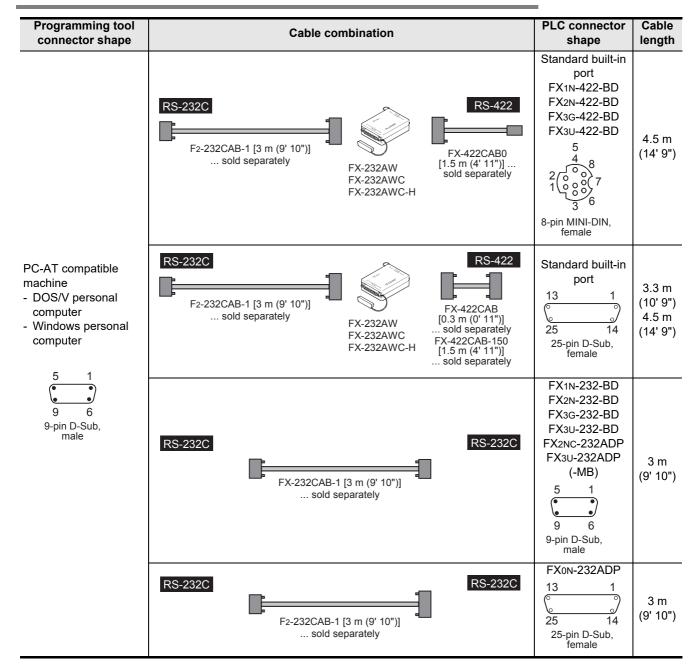
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3.3 Combinations of Connection Cables

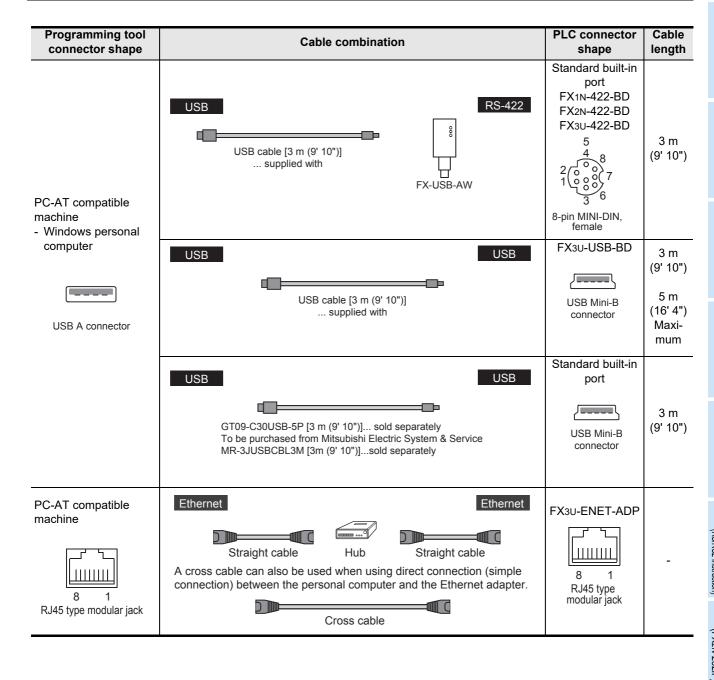
3.3.1 Handy programming panel

Programming tool connector shape	Cable combination	PLC connector shape	Cable length
TEXT	RS-422 FX-20P-CAB0 [1.5 m (4' 11")] sold separately	Standard built-in port FX1N-422-BD FX2N-422-BD FX3G-422-BD FX3U-422-BD 5 4 8 9 1 0 8 8-pin MINI-DIN, female	1.5 m (4' 11")
FX-10P(-E) FX-20P(-E) 5 4 8 1 0 0 0 7 0 0 6 8-pin MINI-DIN, female	FX-20P-CAB [1.5 m (4' 11")] supplied with FX-20P-CADP [0.3 m (0' 11")] sold separately	Standard built-in port 5 4 8 7 7 3 6 8-pin MINI-DIN, female	1.8 m (5' 10")
	RS-422 FX-20P-CAB [1.5 m (4' 11")] supplied with	Standard built-in port 13 1 25-pin D-Sub, female	1.5 m (4' 11")
FX-10P-SET0(-E) FX-20P-SET0(-E) FX-30P	RS-422 FX-20P-CAB0 [1.5 m (4' 11")] supplied with	Standard built-in port FX1N-422-BD FX2N-422-BD FX3G-422-BD FX3U-422-BD 5 4 8 9 1 9 8 8-pin MINI-DIN, female	1.5 m (4' 11")
2 1 0 0 7 3 6 8-pin MINI-DIN, female	RS-422 FX-20P-CAB [1.5 m (4' 11")] sold separately	Standard built-in port 13 1 25 14 25-pin D-Sub, female	1.5 m (4' 11")

3.3.2 Personal computer

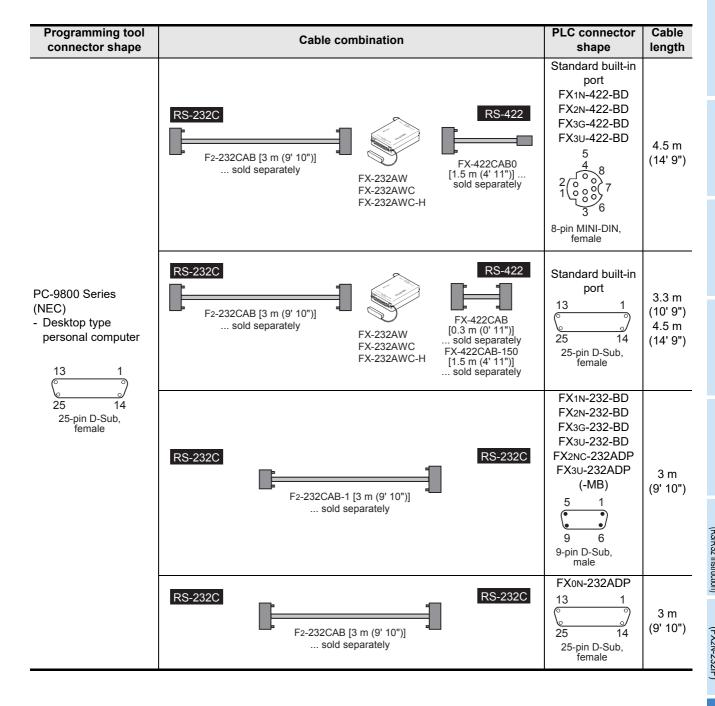


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Programming tool connector shape	Cable combination	PLC connector shape	Cable length
	F2-232CAB-2 [3 m (9' 10")] sold separately FX-232AW FX-232AW FX-232AWC FX-232AWC-H FX-232AWC-H RS-422 FX-422CAB0 [1.5 m (4' 11")] sold separately	Standard built-in port FX1N-422-BD FX2N-422-BD FX3G-422-BD FX3U-422-BD 5 4 8 -pin MINI-DIN, female	4.5 m (14' 9")
PC-9800 Series (NEC) - Notebook type personal computer	F2-232CAB-2 [3 m (9' 10")] sold separately FX-232AW FX-232AWC FX-232AWC-H FX-422CAB [0.3 m (0' 11")] sold separately FX-422CAB-150 [1.5 m (4' 11")] sold separately	Standard built-in port 13 1 25 14 25-pin D-Sub, female	3.3 m (10' 9") 4.5 m (14' 9")
14 8 14-pin Half- pitch, female	RS-232C FX-232CAB-2 [3 m (9' 10")] sold separately	FX1N-232-BD FX2N-232-BD FX3G-232-BD FX3U-232-BD FX2NC-232ADP (-MB) 5 1 (-MB) 9 6 9-pin D-Sub, male	3 m (9' 10")
	RS-232C F2-232CAB-2 [3 m (9' 10")] sold separately	FX0N-232ADP 13	3 m (9' 10")

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4. Connection Cables and Interfaces

4.1 Simplified Tables

4.1.1 Cable connector shape correspondence table

From the shape of connectors at both ends of a cable, the cable model name can be known.



B Side	3 4 6 7		1 5	1 13	13 1
A Side	8-pin MINI-DIN, male	USB Mini-B plug	6 9 9-pin D-Sub, female	14 25 25-pin D-Sub, male	25 14 25-pin D-Sub, female
3 4 6 7 5 8-pin MINI-DIN, male	FX-20P-CAB0		ı	FX-20P-CAB FX-422CAB0	FX-20P-CADP
USB Mini-B connector	FX-USB-AW (converter)		_	-	_
USB A plug	_	USB cable Provided as an accessory of FX- USB-AW and FX3U-USB-BD GT09-C30USB-5P MR-J3USBCBL3M	_		_
1 5	_	_	FX-232CAB-1	F2-232CAB-1	_
1 7 8 14 14-pin Half-pitch, male	_	_	FX-232CAB-2	F2-232CAB-2	_
1 13 14 25 25-pin D-Sub, male	_	_	F2-232CAB-1	F2-232CAB	_

4.1.2 Cable combination simplified table

From the shape of the programming tool connector and PLC connector, combinations of the cable, converter and communication equipment can be checked.

Interface	RS-422		RS-	RS-232C		Ethernet
Standard port	FX0,FX0s, FX0N,FX1s, FX1N,FX1NC, FX2N,FX2NC, FX3S,FX3G, FX3GC,FX3U, FX3UC	FX1,FX2(FX), FX2C,A,QnA	_	_	FX3S, FX3G, FX3GC	_
Communication equipment	FX1N-422-BD FX2N-422-BD FX3G-422-BD FX3U-422-BD	_	FX1N-232-BD FX2N-232-BD FX3G-232-BD FX3U-232-BD FX2NC-232ADP FX3U-232ADP (-MB)	FXon-232ADP	FX3U-USB-BD	FX3u-ENET-ADP
		C	onnector in PL	.C		
	5 4 8 0 0 0 0 0 7 3 6 8-pin MINI-DIN, female	13 1 (° ° °) 25 14 25-pin D-Sub, female	5 1	13 1 (° ° °) 25 14 25-pin D-Sub, female	USB Mini-B connector	8 1 RJ45 type modular jack

	Interface RS-422		RS-232C		USB	Ethernet	
	5 4 8 1 0 0 0 0 7 7 8-pin MINI-DIN, female	FX-20P-CAB0 or FX-20P-CAB + FX-20P-CADP	FX-20P-CAB	_	_	_	_
	USB A connector	FX-USB-AW ^{*1} + USB cable (included)	_	_	_	USB cable (included) GT09-C30USB-5P*2 or MR-J3USBCBL3M*2	_
amming tool	5 1 9 6 9-pin D-Sub, male	F2-232CAB-1 + FX-232AW FX-232AWC-H + FX-422CAB0	F2-232CAB-1 + FX-232AW FX-232AWC-H + FX-422CAB or FX-422CAB-150	FX-232CAB-1	F2-232CAB-1	_	_
Connector in programming tool	7 1 14 8 14-pin Half-pitch, female	F2-232CAB-2 + FX-232AW FX-232AWC-FX-232AWC-H + FX-422CAB0	F2-232CAB-2 + FX-232AW FX-232AWC-H + FX-422CAB or FX-422CAB-150	FX-232CAB-2	F2-232CAB-2	_	_
	13 1 25 14 25-pin D-Sub, female	F2-232CAB + FX-232AW FX-232AWC-H + FX-422CAB0	F2-232CAB + FX-232AW FX-232AWC-H + FX-422CAB or FX-422CAB-150	F2-232CAB-1	F2-232CAB	_	J
	8 1 RJ45 type modular jack	_	_	_	_	_	Cable conforming to Ethernet standard practice

^{*1.} FX3S, FX3G, FX3GC PLC is not applicable.

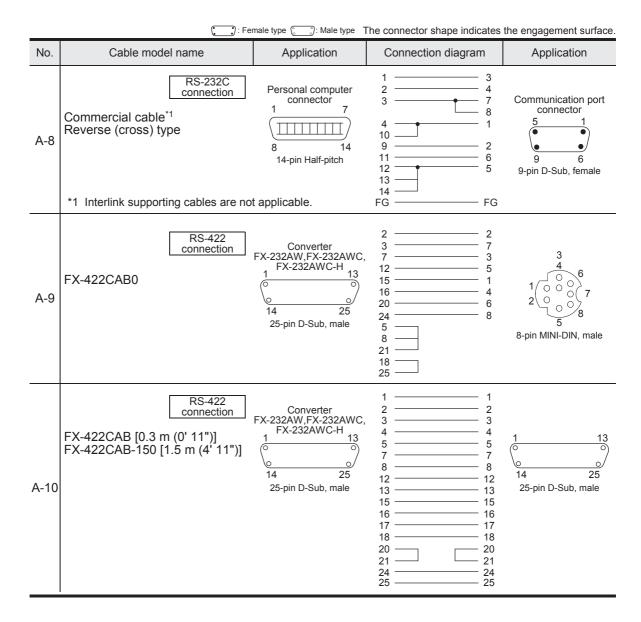
^{*2.} For the standard built-in port (USB) in the FX3S, FX3G, FX3GC PLC, use the GT09-C30USB-5P or MR-J3USBCBL3M.

4.2 Cable Connection Diagrams

This section explains cable connection diagrams required for connection.

4.2.1 Personal computer connection cable - No. A

	• • Fe	male type 💮 : Male type	The connector shape indicates	the engagement surface.
No.	Cable model name	Application	Connection diagram	Application
A-1	RS-232C connection	Personal computer connector 1 13 13 14 25 25-pin D-Sub, male	1 2 2 3 3 5 6 7 7 20	Communication port connector 1 13 0 0 14 25 25-pin D-SUB, male
A-2	RS-232C connection Commercial cable*1 Reverse (cross) type *1 Interlink supporting cables are no	Personal computer connector 5 1 9 6 9-pin D-Sub, female t applicable.	1	Communication port connector 1 13 13 14 25 25-pin D-Sub, male
A-3	RS-232C connection	Personal computer connector 1 13 0 0 14 25 25-pin D-Sub, male	1 Shield 2 2 2 3 3 3 5 8 6 4 7 5 5	Communication port connector 5 1 9 6 9-pin D-Sub, female
A-4	RS-232C connection F2-232CAB-2	Personal computer connector 1 7 1 8 14 14-pin Half-pitch	1 2 20 4 9 3 11 5 6 14 7 7	Communication port connector 1 13 0 0 14 25 25-pin D-Sub, male
A-5	RS-232C connection FX-232CAB-1	Personal computer connector 5 1 9 6 9-pin D-Sub, female	2 3 6 8 8 5 4	Communication port connector 5 1 9 6 9-pin D-Sub, female
A-6	RS-232C connection Commercial cable*1 Reverse (cross) type *1 Interlink supporting cables are no	Personal computer connector 5 1 9 6 9-pin D-Sub, female t applicable.	1	Communication port connector 5 1 9 6 9-pin D-Sub, female
A-7	RS-232C connection FX-232CAB-2	Personal computer connector 1 7 1 8 14 14-pin Half-pitch	1 3 4 4 4 9 2 2 11 6 8 14 5 5	Communication port connector 5 1 9 6 9-pin D-Sub, female



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4.2.2 Connector conversion cable (commercial product) - No. B

	: Fe	male type 💮 🖰: Male type	The connector shape indicates	the engagement surface.
No.	Cable model name	Application	Connection diagram	Application
B-1	RS-232C connection Connector conversion cable (normal type)	5 1 9 6 9-pin D-Sub, female	1 — 8 2 — 3 3 — 2 4 — 20 5 — 7 6 — 6 7 — 4 8 — 5 9 — 22 FG — FG	1 13 O O O 14 25 25-pin D-Sub, male
B-2	RS-232C connection Connector conversion cable (normal type)	1 7 S 14 14-pin Half-pitch	12	1 13 0 0 0 14 25 25-pin D-Sub, male
B-3	RS-422 connection FX-20P-CADP	1 13 14 25 25-pin D-Sub, female	2	3 4 0 6 7 2 0 8 8-pin MINI-DIN, male

4.2.3 FX-10P/FX-20P/FX-30P connection cable - No. C

	: Female type :: Male type The connector shape indicates the engagement surface.							
No.	Cable model name	Application	Connection diagram	Application				
C-1	RS-422 connection FX-20P-CAB0	Programming tool 3 4 6 7 2 8-pin MINI-DIN, male	1 — 1 2 — 2 3 — 3 4 — 4 5 — 5 6 — 6 7 — 7 8 — 8	Communication port connector 3 4 6 6 7 2 0 8 8 8-pin MINI-DIN, male				
C-2	RS-422 connection	Programming tool 3 4 6 7 2 8-pin MINI-DIN, male	2 2 3 7 7 3 5 12 1 15 4 16 6 20 8 24 4 8 21 13 17	1 13 O O O O 14 25 25-pin D-Sub, male				

5. Communication Setting (Initialization) in FX Programmable Controller

This chapter explains the communication setting method for executing programming communication using optional communication equipment operating in accordance with RS-422, RS-232C or USB.

For program communication settings in the FX3U-ENET-ADP, refer to the FX3U-ENET-ADP User's Manual.

The setting described here is not required when the standard built-in port^{*1} is used.

When using this communication function in an FX1s, FX1N, FX1NC, FX2N or FX2NC PLC, check D8120 using the following procedure.

When using this communication function in ch1 in an FX3S, FX3G, FX3GC, FX3U or FX3UC PLC, check D8120 and D8400 using the following procedure.

When using this communication function in ch2 in an FX3G, FX3GC, FX3U or FX3UC PLC, check D8420 using the following procedure.

*1. When using the standard built-in port for non-protocol communication (RS2 instruction) in an FX3G or FX3GC PLC, connect the programming software to the standard built-in USB port.

5.1 Check Procedure

1 Monitoring D8120 (D8400, D8420)

Turn ON the PLC power while it is in STOP mode, and monitor D8120 (D8400, D8420).

1. When the value of D8120 (D8400, D8420) is "0"

The communication setting is not provided.

2. When the value of D8120 (D8400, D8420) is any value other than "0"

The communication setting is provided.

2 Checking absence/presence of the parameter setting

Check absence/presence using GX Works2, GX Developer, FXGP/WIN or FX-30P.

- 1) GX Works2 operating procedure (For details, refer to Section 5.2.)
- 2) FXGP/WIN operating procedure (For details, refer to Section 5.3.)
 - → For details on GX Developer operating procedure, refer to GX Developer Operating Manual.

 → For details on FX-30P operating procedure, refer to FX-30P Operation Manual.

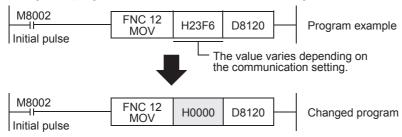
3 Checking absence/presence of sequence program setting

Check whether or not a write instruction is programmed for D8120 (D8400, D8420).

1. When such an instruction is programmed

Program example: (for D8120)

Change the program as shown below, and then change the PLC mode from STOP to RUN.



2. When such an instruction is not programmed

Proceed to the next step.

4 Monitor D8120 (D8400, D8420) again, and confirming that its value is "0"

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Communication Setting Using Parameter Method (GX Works2) 5.2

Communication settings may be changed via the parameter method with GX Works2, GX Developer, FXGP/WIN for Windows and FX-30P handy programming panel. This section describes how to change parameters with GX Works2.

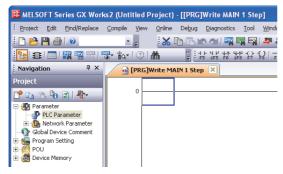
→ For details on FXGP/WIN operating procedure, refer to section 5.3. → For details on GX Developer operating procedure, refer to GX Developer Operating Manual. → For details on FX-30P operating procedure, refer to FX-30P Operation Manual. → For details on FX3U-ENET-ADP, refer to FX3U-ENET-ADP User's Manual.

5.2.1 Operating procedure

This subsection explains the serial communication setting method. Suppose that GX Works2 is already started up.

Opening the parameter setting window

In the project view area of the navigation window, double-click [Parameter] → [PLC Parameter]. If the navigation window is not displayed, select [View] \rightarrow [Docking Window] \rightarrow [Navigation] from the menu bar.

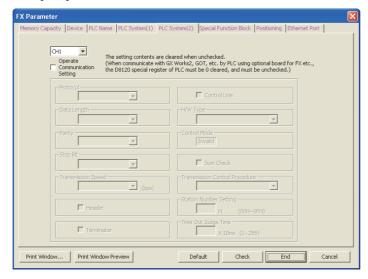


2 **Setting the serial communication (parameters)**

Click the [PLC System(2)] tab on the dialog box.

Select a channel to be used, and make sure that the "Operate Communication Setting" box is cleared.

If a check mark is there, clear it. Click [End].



Writing parameters and program to the PLC

Select [Online] \rightarrow [Write to PLC] from the menu bar, click [Parameter + Program], and then click [Execute].

5.3 Communication Setting Using Parameter Method (FXGP/WIN)

Communication settings may be changed via the parameter method with GX Works2, GX Developer, FXGP/WIN for Windows and FX-30P handy programming panel. This section describes how to change parameters with FXGP/WIN. FXGP/WIN cannot set ch2.

→ For details on GX Works2 operating procedure, refer to section 5.2. → For details on GX Developer operating procedure, refer to GX Developer Operating Manual. → For details on FX-30P operating procedure, refer to FX-30P Operation Manual.

5.3.1 **Operating procedure**

This subsection explains the serial communication setting method. Suppose that FXGP/WIN is already started up.

Adjusting serial setting (parameter)

Select [Option] \rightarrow [Serial setting (parameter)] from the toolbar.

The following dialog box appears according to absence/presence of parameter settings.

1. When there are no parameter settings

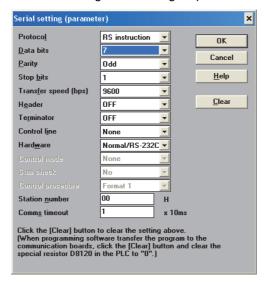
The dialog box shown below appears to indicate that there are no communication settings. Click the [No] button.

In this case, the next step is not required.



2. When there are already parameter settings

The dialog box shown below appears to indicate that there are communication settings. Click the [Clear] button to delete the communication settings from parameters. Transfer parameters to the PLC using the following step.



Writing a sequence program (parameters) to the PLC

Select [PLC] \rightarrow [Transfers] \rightarrow [Write] from the toolbar, and click [OK] button.

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Discontinued models

6. Connection Setting for Personal Computer

This chapter explains the setting method for connecting a personal computer and a PLC. GX Works2, GX Developer and FXGP/WIN for Windows, are applicable. The setting method is different in the software packages.

→ For details on GX Developer operating procedure, refer to GX Developer Operating Manual.

6.1 Connection Setting (GX Works2)

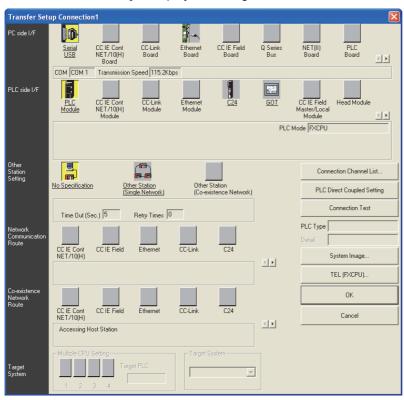
GX Works2, Windows software for personal computers, has the following items to be set. Set each item according to the connection status.

- · RS-232C, USB, Ethernet
- · Communication port
- Transmission speed
- This setting is required to use the transparent function in the GOT (described later).
- · Communication time check
- · Number of retries

Each set item can be checked and changed on the Transfer Setup dialog box.

This section explains the setting using communication in accordance with RS-232C and USB. For connection and setting of the FX3U-ENET-ADP, refer to the FX3U-ENET-ADP User's Manual.

In the project view area of the navigation window, double-click [Connection Destination View] \rightarrow [Connection destination data name] to display the dialog box shown below.



Point

In GX Works2, [Transfer Setup] can be selected even while the monitor function window is open.

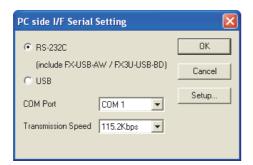
6.1.1 Setting RS-232C or USB, communication port, and transmission speed

The setting procedures for RS-232C/USB, communication port and transmission speed are described below:

→ For details on GX Developer operating procedure, refer to GX Developer Operating Manual.

1 Displaying the "PC side I/F Serial Setting" window.

Double-click the "Serial" icon on the Transfer Setup dialog box. The window below appears.



2 Selecting "RS-232C" or "USB"

- 1. Connection for selecting "RS-232C (include FX-USB-AW/FX3U-USB-BD)"
 - Connect the PLC to the RS-232C port in the personal computer.
 - Connect the PLC to the USB port in the personal computer using the FX-USB-AW or FX3U-USB-BD.

2. Connection for selecting "USB"

- Connect the PLC to the USB port in the personal computer using the transparent function at the USB port in the GOT1000 Series.
- Connect the standard USB port of the PLC to the USB port of the personal computer. (FX3S, FX3G, FX3GC)

Caution

For achieving communication using the standard built-in USB port, installation of the USB driver is required. For the USB driver installation method and procedure, refer to the following manual.

- → For details on GX Works2 operating procedure, refer to GX Works2 Version 1 Operating Manual (Common).
 - → For details on GX Developer operating procedure, refer to GX Developer Operating Manual (Startup).

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3 Setting the communication port and transmission speed (when "RS-232C" is selected in the step 2)

Set these items according to the connection status.

COM port: Select the communication port in the personal computer to be used (among

COM1 to COM63).

Transmission speed:Set the communication speed with the FX PLC.

The applicable transmission speed varies depending on each FX PLC. Refer to the table below.

Communication speed	FX1	FX2(FX), FX2C	FX0, FX0S	FXon	FX1S	FX1N, FX1NC	FX2N, FX2NC	FX3S*1	FX3G, FX3GC*1	FX3U, FX3UC ^{*2}
9.6 kbps	✓	√	✓	✓	✓	✓	✓	✓	✓	✓
19.2 kbps	_	_	_	_	_	✓	✓	✓	✓	✓
38.4 kbps	_	_	_	_	_	_	_	✓	✓	✓
57.6 kbps	_	_	_	_	_	_	_	✓	✓	✓
115.2 kbps	_	_	_	_	_	_	_	✓	✓	✓

For achieving communication at 38.4, 57.6, or 115.2 kbps in an FX3S, FX3G and FX3GC PLC, the FX-232AWC-H is required.

For achieving communication at 38.4, 57.6, or 115.2 kbps in an FX3U and FX3UC PLC, the FX-232AWC-H, FX-USB-AW, or FX3U-USB-BD is required.

6.1.2 Setting for using GOT transparent function

Arrange the setting in accordance with the connection status of the used equipment. This subsection explains the setting when the GOT and PLC are directly connected (by serial connection).

→ For the GX Developer operation procedures, refer to the GX Developer Operating Manual.

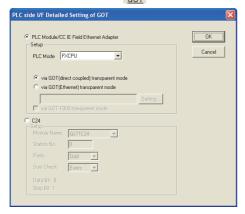
[Transparent function of the GOT1000 Series]

The following setting is required when connecting the FX3S/FX3G/FX3G/FX3U/FX3UC PLC using the transparent function of the GOT1000 Series.

If the following setting is not provided, a communication error will occur.

1 Displaying the "PLC side I/F Detailed Setting of GOT" window

Double-click GOT on the Transfer Setup dialog box to display the window shown below.



2 Setting the CPU unit

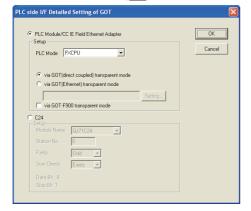
Set "PLC Mode" to "FXCPU", and select "via GOT(direct coupled) transparent mode".

[Transparent function of the GOT-F900 Series]

The following setting is required when connecting the FX3S/FX3G/FX3G/FX3U/FX3UC PLC using the transparent function of the GOT-F900 Series.

1 Displaying the "PLC side I/F Detailed Setting of GOT" window

Double-click GOT on the Transfer Setup dialog box to display the window shown below.



2 Setting the CPU unit

Set "PLC Mode" to "FXCPU", and select "via GOT(direct coupled) transparent mode". Check "via GOT-F900 transparent mode". However, it cannot be checked if "USB" is selected on the "PC side I/F Serial Setting" window.

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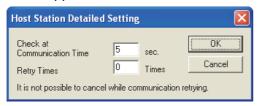
6.1.3 Setting communication time check and number of retries

The setting procedure for the communication time check and number of retries is described below:

ightarrow For details on GX Developer operating procedure, refer to GX Developer Operating Manual.

1 Displaying the communication time check/number of retries setting window

Double-click the "No Specification" icon on the Transfer Setup dialog box. The window below appears.



2 Setting the communication time check and number of retries

Check at communication time: Set the time for evaluating error (1 to 9999 sec). If data from the PLC is not received within this time, it is regarded as error.

Initial value: 5 sec

Retry times: Set the number of retries to be executed when a communication error has occurred (0

to 5).

Initial value: 0

Set the items above if necessary.

6.2 Connection Setting (FXGP/WIN)

FXGP/WIN, Windows software for personal computers, has the following set items. Set each item according to the connection status.

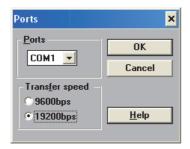
- · Communication port
- · Transmission speed

6.2.1 Setting communication port and transmission speed

The setting procedure for the communication port and transmission speed is described below:

1 Displaying the communication port/transmission speed setting window

Select [PLC] \rightarrow [Ports] from the toolbar. The window below appears.



2 Setting the communication port and transmission speed

Set these items according to the connection status.

Ports: Select the communication port in the personal computer to be used (among COM1 to COM9).

Transfer speed: Set the communication speed with the FX PLC.

The applicable transmission speed varies depending on the FX Series. Refer to the table below.

Communication speed	FX1	FX2(FX), FX2C	FX0, FX0S	FXon	FX1S	FX1N, FX1NC	FX2N, FX2NC	FX3S*1	FX3G, FX3GC*1	FX3U, FX3UC ^{*2}
9.6 kbps	√	✓	✓	✓	✓	✓	✓	✓	✓	√
19.2 kbps		_	_	_	_	✓	✓	✓	✓	✓
38.4 kbps	_	_	_	_	_	_	_	_	_	_
57.6 kbps	_	_	_	_	_	_	_	_	_	_
115.2 kbps	_	_	_	_	_	_	_	_	_	_

^{*1.} The FX3S, FX3G and FX3GC Series cannot be selected. Select the FX1N Series, and then create the program.

^{*2.} The FX3U and FX3UC Series cannot be selected. Select the FX2N Series, and then create the program.

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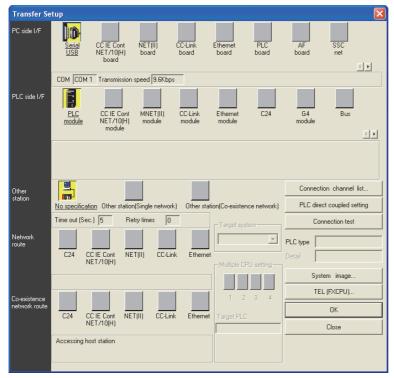
6.3 Communication Test (GX Works2)

GX Works2, Windows software for personal computers, has a function to test communication with PLC. Execute the communication test using the following procedure:

This section explains the method using GX Works2.

In the project view area of the navigation window, double-click [Connection **Destination View**] \rightarrow [Connection destination data name].

The window below appears.

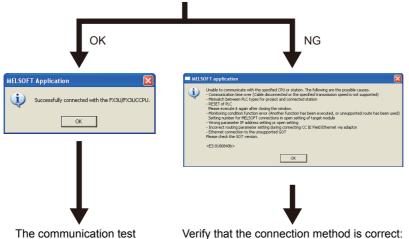


Caution

In GX Works2, [Transfer Setup] can be selected even while the monitor function window is open.

2 **Executing the communication test**

Click [Connection test] button to execute the communication test.



finished normally

- Port (COM) number in the personal computer
- Cable configuration

Click [OK] button.

7. Troubleshooting

This chapter explains troubleshooting.

7.1 Checking PLC Version Applicability

When executing programming communication using an FX PLC and communication equipment operating in accordance with RS-422 or RS-232C, verify that the FX PLC is an applicable version.

→ For the version applicability check, refer to Section 1.3.

7.2 Checking Programming Tool Applicability

Verify that the programming tool version is applicable for programming communication.

→ For the version applicability check, refer to Section 1.4.

7.3 Checking Communication Status Based on LED Indication

Check the status of the "RXD (RD)" and "TXD (SD)" indicator LEDs provided in the optional equipment.

LED s	status	Operation status	
RXD (RD)	TXD (SD)		
Flashing	Flashing	Data is being sent or received.	
Flashing	Off	Data is received, but is not sent.	
Off	Flashing	Data is sent, but is not received	
Off	Off	Data is not sent nor received.	

7.4 Checking Installation

1. Mounting status

If the communication equipment is not securely connected to the PLC, communication is not possible.

→ For the mounting method, refer to the respective communication equipment manual.

7.5 Checking Parameters in PLC

1. Checking the communication setting

Verify that non-protocol communication or computer link communication is not set in the parameters of the FX PLC. If such communication is already set, programming communication with optional communication equipment cannot be used.

 \rightarrow For the setting of parameters in the PLC, refer to Chapter 5.

7.6 Checking Sequence Program

1. Checking the contents of the communication setting

Verify that no communication format (D8120, D8400 and D8420, N:N Network: D8173 to D8180, and Parallel Link: M8070 and M8071) is being used in the sequence program.

If any communication format is being used in the sequence program, communication will not function correctly.

7.6 Checking Sequence Program

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2. Ethernet port setting (in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the same channel is not used in the Ethernet port setting. Do not set the channel used in programming communication.

After changing the setting, make sure to reboot the PLC's power.

3. Presence of VRRD and VRSC instructions

1) Except FX3G, FX3U and FX3UC PLCs

Verify that the VRRD and VRSC instructions are not used in the program.

If these instructions are used, delete them, turn OFF the PLC power, and then turn the power ON again.

- 2) In FX3G PLC
 - In the case of the 14 points and 24-point type

Verify that the VRRD and VRSC instructions are not used in the program.

If these instructions are used, delete them, turn OFF the PLC power, and then turn the power ON again.

In the case of the 40 points and 60-point type

Verify that the VRRD and VRSC instructions are not used in the program.

If these instructions are used in the program, the communication function is not available in ch2.

Use ch1, or delete these instructions.

After deleting these instructions, turn OFF the PLC power, and then turn the power ON again.

3) In FX3U and FX3UC PLCs

Verify that the VRRD and VRSC instructions are not used in the program.

If these instructions are used in the program, the communication function is not available in ch1.

Use ch2. or delete these instructions.

After deleting these instructions, reboot the PLC's power.

4. Presence of RS instruction (except FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the RS instruction is not used in the program.

If this instruction is used, delete it, turn OFF the PLC power, and then turn the power ON again.

5. Presence of RS and RS2 instructions (in FX3s, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the RS and RS2 instructions are not being used for the same channel.

If these instructions are used for the same channel, revise them, turn OFF the PLC power, and then turn the power ON again.

6. Presence of EXTR instruction (in FX2N and FX2NC PLCs)

Verify that the EXTR instruction is not used in the program.

If this instruction is used, delete it, turn OFF the PLC power, and then turn the power ON again.

7. Presence of IVCK, IVDR, IVRD, IVWR, IVBWR^{*1}, and IVMC instructions (in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the IVCK, IVDR, IVRD, IVWR, IVBWR and IVMC instructions are not being used for the same channel.

If these instructions are used for the same channel, revise them, turn OFF the PLC power, and then turn the power ON again.

*1. Only available for FX3U and FX3UC PLCs.

8. Presence of ADPRW instructions (in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the ADPRW instructions are not being used for the same channel.

If these instructions are used for the same channel, delete them, and reboot the PLC's power.

9. Presence of FLCRT, FLDEL, FLWR, FLRD, FLCMD, and FLSTRD instructions (in FX3U and FX3UC PLCs)

Verify that the FLCRT, FLDEL, FLWR, FLRD, FLCMD and FLSTRD instructions are not being used for the same channel.

If these instructions are used for the same channel, delete them, reboot the PLC's power.

H-49

7.7 Checking Programming Tool Setting

Verify that the setting contents in the programming tool are correct.

1. Checking the communication port

Verify that the communication port is set correctly.

2. Checking the transmission speed

Verify that the transmission speed is set correctly.

→ For the programming tool setting, refer to Chapter 6.

7.8 Checking Absence/Presence of Errors

1. Checking M8062 (except FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

When a communication error occurs in the standard built-in port, M8062 turns ON and D8062 stores the corresponding error code.

2. Checking the error code (D8062)

D8062 stores either of the following error codes:

	Error code	Contents of error	
	6201 ^{*1}	Parity error, overrun error or framing error	
	6202	Defective communication character	
D8062	6203	Communication data sum mismatch	
	6204	Defective data format	
	6205	Defective command	

3. Checking M8063 and M8438

When a communication errors occur in optional communication equipment, M8063 turns ON and D8063 stores the corresponding error code during communication using ch1, and M8438 turns ON and D8438 stores the corresponding error code during communication using ch2.

4. Checking the error code

Programming Communication

D8063 and D8438 store either of the following error codes:

Error code		Contents of error			
D8063 (ch1)	D8438 (ch2)	Sometics of circle			
6301 ^{*1}	3801	Parity error, overrun error or framing error			
6302	3802	Defective communication character			
6303	3803	Communication data sum mismatch			
6304	3804	Defective data format			
6305	3805	Defective command			
6306	3806	Monitoring timeout			
6307	3807	Modem initialization error			
6308	3808	N:N Network parameter error			
6309	3809	N:N Network setting error			
6312	3812	Parallel link parameter error			
6313	3813	Parallel link sum error			
6314	3814	Parallel link format error			
6320	3820	Inverter communication error			
6321	3821	MODBUS communication error			
6330	3830	Memory access error			
6340	3840	Special adapter connection error			

In the FX1N, FX1NC, FX2N and FX2NC Series, a communication error may occur during automatic alignment of the transmission speed when programming communication is executed while the transmission speed of the peripheral equipment is set to 19.2 kbps because the transmission speed at power ON is set to 9.6 kbps in the main unit.

Accordingly, when a communication error occurs at start of communication and problems are expected if the error flag (special auxiliary relay) remains ON, clear the error flag for the corresponding channel. When problems are expected if the error flag turns ON, execute programming communication after setting the transmission speed of the peripheral equipment to 9.6 kbps at power ON of the PLC. In other series, the error flag for the corresponding channel does not turn ON even if the transmission speed is automatically aligned.

(The error code is stored in the special data register for the corresponding channel.)

7.9 Operation mode display [D8419 and D8439] (FX3S, FX3G, FX3GC, FX3U, FX3UC)

These devices store the communication type being used.

1. Detailed contents

These devices store the code of the communication type currently being used in the communication port. When communication port ch1 is used, D8419 stores the communication type. When communication port ch2 is used, D8439 stores the communication type.

The table below shows the contents of the communication type codes.

Code	Description			
0	Programming communication			
1	PP modem mode			
2	Protocol dedicated to computer link			
3	N:N Network			
4	RS instruction			
5	RS2 instruction			
6	Parallel link			
7	Inverter instruction			
8	Variable analog potentiometer expansion board is used.			
9	MODBUS communication			
10	CF-ADP			
11	ENET-ADP			
12	Input/output expansion board is used.			

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Discontinued models

FX Series Programmable Controllers User's Manual [Data Communication Edition]

I. Remote Maintenance

Foreword

This manual explains "remote maintenance" provided for the MELSEC-F FX Series Programmable Controllers and should be read and understood before attempting to install or use the unit. Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

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Parallel Link

1. Outline

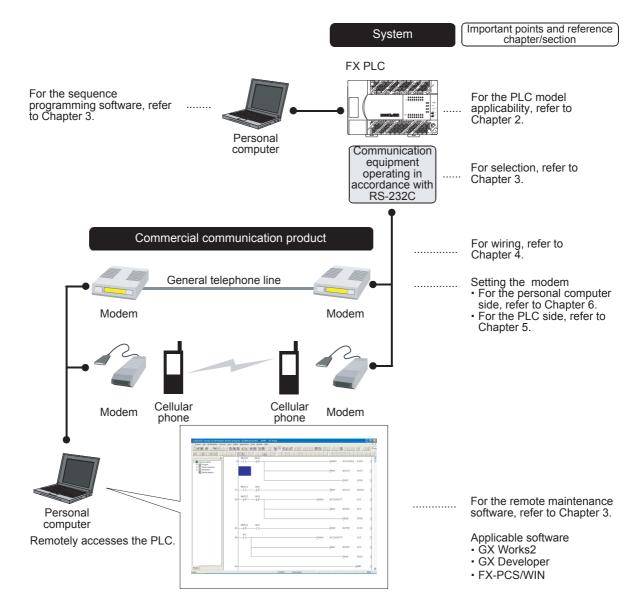
This chapter explains remote maintenance.

1.1 Outline of System

Remote maintenance performs program transfer and device monitoring using Windows programming software with a PLC connected to the telephone line by way of a modem.

1.1.1 Maintenance for programs in PLC

- 1) Sequence programs can be changed by transferring and writing programs during RUN.
- Maintenance can be performed by device monitoring, PLC diagnosis, forced ON/OFF and changing set values and current values.
- 3) A line can be established from a personal computer to a modem connected to a PLC.

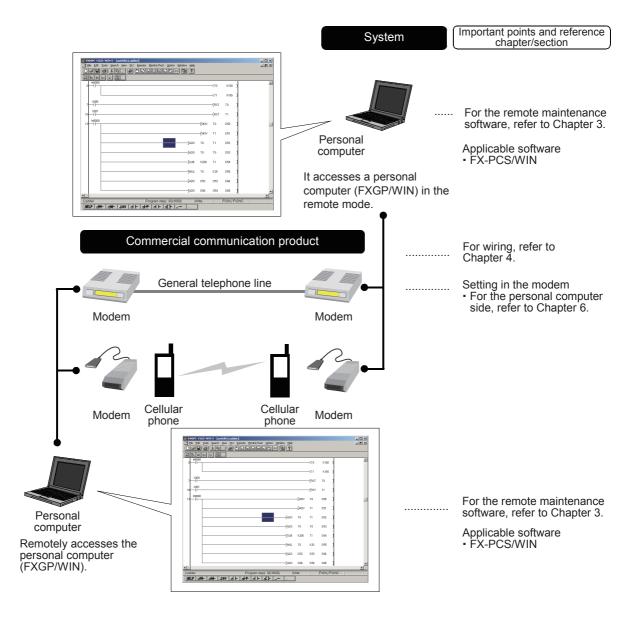


1.1.2 File transfer between personal computers (supported only by FXGP/WIN)

This manual does not describe the operating procedure for this function, but the modem setting contents and setting procedure in personal computers can be used as reference.

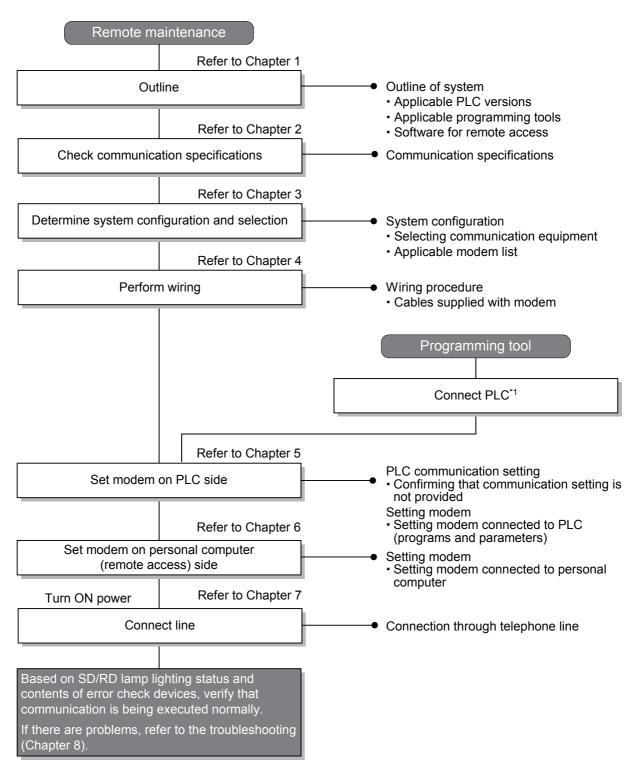
For the detailed explanation of this function, refer to the "FX-PCS/WIN SOFTWARE MANUAL".

1) Transferring sequence program files between personal computers



1.2 Procedures Before Operation

The flow chart below shows the remote maintenance setting procedures up until communication:



^{*1} For the programming tool to PLC connection procedure, refer to the "Programming Communication" section in this manual or the respective programming tool manual.

For details on operating procedures, refer to the respective programming tool manual.

1.3 Communication Type Applicability in PLC

1.3.1 Applicable versions

The communication types are applicable in the following versions.

✓: Applicable —: Not applicable

PLC	Applicability	Remarks
FX3UC Series	✓	
FX3U Series	✓	
FX3GC Series	✓	
FX3G Series	✓	
FX3S Series	✓	
FX2NC Series	✓	
FX2N Series	✓	ME3314 (OMRON) is applicable to Ver. 2.01 and later.
FX1NC Series	✓	
FX1N Series	✓	
FX1S Series	✓	
FX ₀ N Series	_	This function is not available
FX0S Series	_	This function is not available
FX ₀ Series	_	This function is not available
FX2C Series	_	This function is not available
FX2(FX) Series	_	This function is not available
FX1 Series	_	This function is not available

1.3.2 Version check

The PLC version can be checked by reading the last three digits of device D8001.

→ For a detailed description of the version check, refer to A. Common Items Section 4.2.

1.3.3 Products whose production was stopped

Production was stopped for some models of MELSEC-F Series PLCs and programming tools described in this manual. For models whose production was stopped, refer to Appendix A.

To see the latest available products, refer to the general catalog.

1.4 Programming Tool Applicability

1.4.1 Programming tool for setting modem connected to PLC

The tables below show programming tools applicable for modem setting using parameters and sequence programs.

→ For programming software on remote maintenance, refer to Subsection 1.4.2

For applicable versions

The programming tool is applicable for each FX Series from the version shown:

1. English versions

Product name	Model name	Applicable version	Remarks
FX3U and FX3UC PI	LCs		
GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later	
GX Developer	SW□D5C(F)-GPPW-E	Ver. 8.13P or later	
FX-30P	1	Ver. 1.00 or later	
FX3G PLC			
GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later	
GX Developer	SW□D5C(F)-GPPW-E	Ver. 8.72A or later	-
FX-30P	1	Ver. 1.00 or later	
FX3GC PLC			
GX Works2	SW□DNC-GXW2-E	Ver. 1.77F or later	
FX-30P	-	Ver. 1.30 or later	-
FX3S PLC			
GX Works2	SW□DNC-GXW2-E	Ver. 1.492N or later	
FX-30P	1	Ver. 1.50 or later	-
FX2N and FX2NC P	LCs		
GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later	
GX Developer	SW□D5C(F)-GPPW-E	SW2 A or later	
FX-PCS/WIN-E	SW0PC-FXGP/WIN-E	Ver. 1.00 or later	-
FX-30P	1	Ver. 1.00 or later	
FX1S, FX1N and FX	INC PLCs	<u>.</u>	
GX Works2	SW□DNC-GXW2-E	Ver. 1.08J or later	
GX Developer	SW□D5C(F)-GPPW-E	SW5 A or later	
FX-PCS/WIN-E	SW0PC-FXGP/WIN-E	Ver. 3.00 or later	<u>-</u>
FX-30P	1	Ver. 1.00 or later	

2. Japanese versions

Product name	Model name	Applicable version	Remarks
FX3U and FX3UC PL	_Cs		
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later	
GX Developer	SW□D5C(F)-GPPW-J	Ver. 8.13P or later	-
FX-30P		Ver. 1.00 or later	
FX3G PLC			
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later	
GX Developer	SW□D5C(F)-GPPW-J	Ver. 8.72A or later	-
FX-30P		Ver. 1.00 or later	
FX3GC PLC			
GX Works2	SW□DNC-GXW2-J	Ver. 1.77F or later	
FX-30P		Ver. 1.30 or later	<u>-</u>
FX3S PLC			
GX Works2	SW□DNC-GXW2-J	Ver. 1.492N or later	
FX-30P		Ver. 1.50 or later	<u>-</u>
FX2N and FX2NC PL	_Cs		
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later	
GX Developer	SW□D5C(F)-GPPW-J	SW2 A or later	
FX-PCS/WIN	SW0PC-FXGP/WIN	Ver. 2.10 or later	
FX-PCS-KIT/98	SW1PC-FXGP/98(-3,-5)	Ver. 4.00 or later	
FX-PCS/98-3	SW1PC-FXGP/98-3	Ver. 4.00 or later	_
FX-PCS-KIT/V-3	SW1PC-FXGP/V3	Ver. 2.00 or later	
FX-A7PHP-KIT	SW1RX-GPPFX	Ver. 3.00 or later	
FX-30P		Ver. 1.00 or later	
FX1S, FX1N and FX	1NC PLCs		
GX Works2	SW□DNC-GXW2-J	Ver. 1.07H or later	
GX Developer	SW□D5C(F)-GPPW-J	SW5 A or later	
FX-PCS/WIN	SW0PC-FXGP/WIN	Ver. 4.00 or later	-
FX-PCS/98-3	SW1PC-FXGP/98-3	Ver. 5.00 or later	
FX-30P		Ver. 1.00 or later	

In the case of non-applicable versions (setting an alternative model)

For FX1s, FX2N and FX2NC PLCs, it is not possible to create programs using programming tools of inapplicable versions.

For FX1N, FX1NC, FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs of the following versions, it is possible to create programs by setting an alternative model. In this case, however, created programs are limited to the function range (such as instructions and program size) supported by the selected alternative model. Any programming tool not shown below is not applicable.

1. English versions

Model to be programmed	Product name (Model name is shown below.)	Version allowing setting of alternative model	Setting an alternative model	Remarks	
FX3U, FX3UC	GX Developer SW□D5C(F)-GPPW-E	SW2 A or later ^{*1}	FX2N	The PP modem mode (ch1) and PP modem mode (ch2) cannot be	
Series	FX-PCS/WIN-E SW0PC-FXGP/WIN-E	Ver. 1.00 or later	1 7/214	set.	
	GX Works2 SW□DNC-GXW2-E	Ver. 1.64S or later	FX3G		
FX3G, FX3GC Series	GX Developer SW□D5C(F)-GPPW-E	SW2 A or later ^{*2}	- FX1N ^{*3}	The PP modem mode (ch1) and PP modem mode (ch2) cannot be set.	
	FX-PCS/WIN-E SW0PC-FXGP/WIN-E	Ver. 1.00 or later	FAIN		
	GX Works2 SW□DNC-GXW2-E	Ver. 1.08J or later	FX3G		
FX3S Series	GX Developer SW□D5C(F)-GPPW-E	Ver. 8.72A or later	17.00		
1 700 Ochos	GX Developer SW□D5C(F)-GPPW-E	SW2 A or later ^{*2}	FX1N*3	The PP modem mode (ch1)	
	FX-PCS/WIN-E SW0PC-FXGP/WIN-E	Ver. 1.00 or later	FAIN	cannot be set.	
FX1N, FX1NC	GX Developer SW□D5C(F)-GPPW-E	SW2 A or later*4	FX2N		
Series	FX-PCS/WIN-E SW0PC-FXGP/WIN-E	Ver. 1.00 or later	I AZN		

- *1. An alternative model can be set in GX Developer SW2 A to Ver. 8.18U.
- *2. An alternative model can be set in GX Developer SW2 A to Ver. 8.72A.
- *3. Select "FX2N" in model selection when "FX1N" is not supported.
- *4. An alternative model can be set in GX Developer SW2 A to SW5 A.

2. Japanese versions

Model to be programmed	Product name (Model name is shown below.)	Version allowing setting of alternative model	Setting an alternative model	Remarks
	GX Developer SW□D5C(F)-GPPW-J	SW2 A or later ^{*1}		
	FX-PCS/WIN SW0PC-FXGP/WIN	Ver. 2.10 or later		
FX3U, FX3UC	FX-PCS-KIT/98 SW1PC-FXGP/98(-3,-5)	Ver. 4.00 or later	FX2N	The PP modem mode (ch1) and PP modem mode (ch2) cannot be
Series	FX-PCS/98-3 SW1PC-FXGP/98-3	Ver. 4.00 or later	FAZIN	set.
	FX-PCS-KIT/V-3 SW1PC-FXGP/V3	Ver. 2.00 or later	-	
	FX-A7PHP-KIT SW1RX-GPPFX	Ver. 3.00 or later		
	GX Works2 SW□DNC-GXW2-J	Ver. 1.64S or later	FX3G	
	GX Developer SW□D5C(F)-GPPW-J	SW2 A or later ^{*2}		
	FX-PCS/WIN SW0PC-FXGP/WIN	Ver. 2.10 or later	-	The PP modem mode (ch1) and PP modem mode (ch2) cannot be set.
FX3G, FX3GC Series	FX-PCS-KIT/98 SW1PC-FXGP/98(-3,-5)	Ver. 4.00 or later	FX1N ^{*3}	
	FX-PCS/98-3 SW1PC-FXGP/98-3	Ver. 4.00 or later		
	FX-PCS-KIT/V-3 SW1PC-FXGP/V3	Ver. 2.00 or later		
	FX-A7PHP-KIT SW1RX-GPPFX	Ver. 3.00 or later	-	
	GX Works2 SW□DNC-GXW2-J	Ver. 1.07H or later	- FX3G	
FX3S Series	GX Developer SW□D5C(F)-GPPW-J	Ver. 8.72A or later	FASG	
1 A33 Selles	GX Developer SW□D5C(F)-GPPW-J	SW2 A or later*2	FX1N*3	The PP modem mode (ch1)
	FX-PCS/WIN SW0PC-FXGP/WIN	Ver. 3.00 or later	FAIN	cannot be set.
	GX Developer SW□D5C(F)-GPPW-J	SW2 A or later*4		
	FX-PCS/WIN SW0PC-FXGP/WIN	Ver. 2.10 or later		
FX1N, FX1NC	FX-PCS-KIT/98 SW1PC-FXGP/98(-3,-5)	Ver. 4.00 or later	FX2N	
Series	FX-PCS/98-3 SW1PC-FXGP/98-3	Ver. 4.00 or later	I AZIN	
	FX-PCS-KIT/V-3 SW1PC-FXGP/V3	Ver. 2.00 or later		
	FX-A7PHP-KIT SW1RX-GPPFX	Ver. 3.00 or later		

^{*1.} An alternative model can be set in GX Developer SW2 A to Ver. 8.13P.

Point

In the FX3s PLC, set the memory capacity for PLC parameters to 4,000 steps or less.

^{*2.} An alternative model can be set in GX Developer SW2 A to Ver. 8.72A.

^{*3.} Select "FX2N" in model selection when "FX1N" is not supported.

^{*4.} An alternative model can be set in GX Developer SW2 A to SW5 A.

1.4.2 Programming software for remote maintenance

The table below shows programming software for the personal computer which uses remote access.

 \rightarrow For the applicability of programming tools for setting the modem, refer to Subsection 1.4.1.

In the case of applicable versions

The programming software is applicable from the following versions:

1. English versions

Product name	Model name	Applicable version	Remarks
FX3U and FX3UC PI	LCs		
GX Works2	SW□DNC-GXW2-E	Ver. 1.64S or later	
GX Developer	SW□D5C(F)-GPPW-E	Ver. 8.18U or later	_
FX3G PLC			
GX Works2	SW□DNC-GXW2-E	Ver. 1.64S or later	
GX Developer	SW□D5C(F)-GPPW-E	Ver. 8.72A or later	-
FX3GC PLC			
GX Works2	SW□DNC-GXW2-E	Ver. 1.77F or later	-
FX3S PLC			
GX Works2	SW□DNC-GXW2-E	Ver. 1.492N or later	
FX2N and FX2NC PI	LCs		
GX Works2	SW□DNC-GXW2-E	Ver. 1.64S or later	
GX Developer	SW□D5C(F)-GPPW-E	SW2 A or later	-
FX-PCS/WIN-E	SW0PC-FXGP/WIN-E	Ver. 1.00 or later	
FX1s, FX1N and FX	1NC PLCs		
GX Works2	SW□DNC-GXW2-E	Ver. 1.64S or later	
GX Developer	SW□D5C(F)-GPPW-E	SW5 A or later	-
FX-PCS/WIN-E	SW0PC-FXGP/WIN-E	Ver. 3.00 or later	

2. Japanese versions

Product name	Model name	Applicable version	Remarks
FX3u and FX3uc Pl	_Cs		
GX Works2	SW□DNC-GXW2-J	Ver. 1.64S or later	-
GX Developer	SW□D5C(F)-GPPW-J	Ver. 8.13P or later	When connecting the programming software to a PLC in which the PP modem mode (ch1) or PP modem mode (ch2) is set, use Ver. 8.18U or later.
FX3G PLC			
GX Works2	SW□DNC-GXW2-J	Ver. 1.64S or later	
GX Developer	SW□D5C(F)-GPPW-J	Ver. 8.72A or later	_
FX3GC PLC			
GX Works2	SW□DNC-GXW2-J	Ver. 1.77F or later	-
FX3S PLC			
GX Works2	SW□DNC-GXW2-J	Ver. 1.492N or later	-
FX2N and FX2NC PI	_Cs		
GX Works2	SW□DNC-GXW2-J	Ver. 1.64S or later	
GX Developer	SW□D5C(F)-GPPW-J	SW2 A or later	-
FX-PCS/WIN	SW0PC-FXGP/WIN	Ver. 2.10 or later	
FX1s, FX1N and FX	1NC PLCs		
GX Works2	SW□DNC-GXW2-J	Ver. 1.64S or later	
GX Developer	SW□D5C(F)-GPPW-J	SW5 A or later	1 -
FX-PCS/WIN	SW0PC-FXGP/WIN	Ver. 4.00 or later	

In the case of non-applicable versions

A non-applicable programming software version cannot offer remote maintenance.

If your programming software is a non-applicable version, upgrade versions.

To upgrade versions, contact your dealer.

1.4.3 Cautions on using FXGP/WIN

1. The remote maintenance function cannot be used when FXGP/WIN is used in the following versions of Windows:

- Windows NT® 4.0
- Windows® 2000
- Windows® XP

2. For FX3u and FX3uc Series

The models "FX3U" and "FX3UC" cannot be selected.

"FX2N" can be selected and set as the alternative model.

However, FXGP/WIN cannot be connected to a PLC in which the PP modem mode is set.

3. For FX3S, FX3G and FX3GC Series

The models "FX3S", "FX3G" and "FX3GC" cannot be selected.

"FX1N" can be selected and set as the alternative model.

However, FXGP/WIN cannot be connected to a PLC in which the PP modem mode is set.

2. Specifications

This chapter explains the communication specifications and performance.

2.1 Communication Specifications (Reference)

Communication is executed according to the (fixed) specifications shown in the table below. Specification items such as baud rate cannot be changed.

Only modems supporting the communication specifications below can be used.

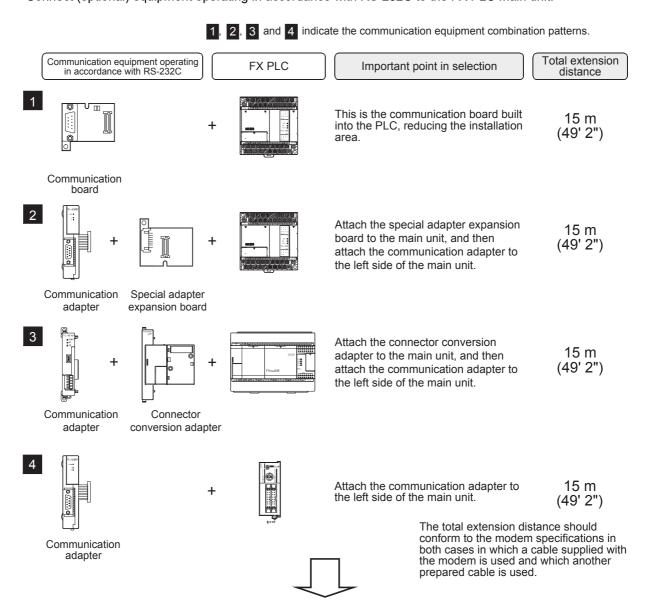
	Item	Mode	Modem mode	
Transmiss	ion standard	RS-2320	C standard	
Maximum	total extension distance	15 m (49	' 2") or less	
Protocol ty	/ре	Mode	m mode	
Communic	ation method	Half-duplex, asy	nchronous system	
Baud rate		960	0 bps	Modem ↔ PLC Modem ↔ Personal computer
	Start bit	1	-bit	
Character format	Data bit	7-bit	8-bit	When PP modem mode (ch1) or PP modem mode (ch2) is set, "Data bit: 8-bit" and "Parity bit:
	Parity bit	Even	Not provided	Not provided" are set automatically.
	Stop bit	1	-bit	
Header		Fixed		
Terminato	r			
Control lin		Not provided		
Sum check		Fixed		
Applicable				
FX3UC Sei	ries	✓	✓	
FX3U Seri	es	✓	✓	
FX3GC Se	ries	✓	✓	
FX3G Seri	es	✓	✓	
FX3S Serie	es	✓	✓	
FX2NC Sei	ries	✓	_	
FX2N Seri	es	✓	_	
FX1NC Sei	ries	✓	_	
FX1N Seri	es	✓	_	
FX1S Serie	es	✓	_	

3. System Configuration and Selection

This chapter explains the configuration of communication equipment operating in accordance with RS-232C and selection of the system required by FX PLCs.

3.1 System Configuration

This section outlines the system configuration required to use remote maintenance. Connect (optional) equipment operating in accordance with RS-232C to the FX PLC main unit.



For communication equipment combinations for each FX Series, refer to the next page.

D

3.2 Setting Applicable FX PLC and Communication Equipment

Select a communication equipment combination, and put a check mark in the "Check" column. During selection, pay attention to the following:

- In the table below, only the outside dimensions and D-SUB connector shape are different between units shown in "FX2NC-232ADP/FX0N-232ADP". Select either one.
- Remote maintenance is not provided for the FX1, FX2(FX), FX2C, FX0, FX0S and FX0N PLCs.

FX Series	Communication equipment (option)	Total extension distance	Check
	FX1N-232-BD (9-pin D-Sub)	15 m (49' 2")	
FX1S	+ + + + + + + + + + + + + + + + + + +	15 m (49' 2")	
	FX1N-232-BD (9-pin D-Sub)	15 m (49' 2")	
FX1N	FX1N-CNV-BD FX2NC-232ADP (9-pin D-Sub) (25-pin D-Sub)	15 m (49' 2")	
FX2N	FX ₂ N-232-BD (9-pin D-Sub)	15 m (49' 2")	
	FX2N-CNV-BD FX2NC-232ADP (9-pin D-Sub) FX2N-CNV-BD FX2NC-232ADP (25-pin D-Sub)	15 m (49' 2")	

FX Series	Communication equipment (option)	Total extension distance	Check
FX3S	FX3G-232-BD (9-pin D-Sub, male)	15 m (49' 2")	
	FX3S-CNV-ADP FX3U-232ADP(-MB) (9-pin D-Sub, male)	15 m (49' 2")	
77.0-244	FX3G-232-BD (9-pin D-Sub, male)	15 m (49' 2")	
FX3G (14-point,24-point type)	FX3G-CNV-ADP FX3U-232ADP(-MB) (9-pin D-Sub, male)	15 m (49' 2")	
Pos-via	ch1 ch1 FX3G-232-BD (9-pin D-Sub, male) The communication equipment works as ch1 when connected to the option connector 1.	15 m (49' 2")	
FX3G (40-point,60-point type)	ch1 FX3G-CNV-ADP FX3U-232ADP(-MB) (9pin D-SUB, male)	15 m (49' 2")	

FX Series	Communication equipment (option)	Total extension distance	Check
	When using channel 2 (ch 2) ^{*1}		
FX3G (40-point,60-point type)	ch2 FX3G-232-BD (9-pin D-Sub, male) The communication equipment works as ch2 when connected to the option connector 2.	15 m (49' 2")	
	ch1 ch2 FX3G-CNV-ADP FX3U-□ADP(-MB) FX3U-232ADP(-MB) (Where □ represents (9-pin D-Sub, male) 232 and 485). Ch2 is not available when the FX3G-8AV-BD, FX3G-4EX-BD or FX3G-2EYT-BD is connected to the option connector 2.	15 m (49' 2")	
	When using channel 1 (ch 1) ch1 FX3U-232-BD (9-pin D-Sub, male)	15 m (49' 2")	
FX3U	FX3U-CNV-BD FX3U-232ADP(-MB) (9-pin D-Sub, male)	15 m (49' 2")	

^{*1.} When using ch2 in an FX3G PLC, it can be set only in the PP modem mode (ch2).

FX Series	Communication equipment (option)	Total extension distance	Check
	When using channel 2 (ch 2) ^{*1}		
22 131111111111111111111111111111111111	Ch1 FX3U-□-BD (Where □ represents 232, 422, 485, USB and 8AV) When a FX3U-8AV-BD is used, it occupies one communication port channel.	15 m (49' 2")	
FX3U	FX3U-CNV-BD FX3U-232ADP(-MB), FX3U-485ADP(-MB), FX3U-CF-ADP FX3U-CF-ADP Ch1 Ch2 FX3U-CN2 FX3U-232ADP(-MB), (9-pin D-Sub, male)	15 m (49' 2")	
	When a FX3U-CF-ADP is used, it occupies one communication port channel.		
FX1NC	FX2NC-232ADP (9-pin D-Sub) (25-pin D-Sub)	15 m (49' 2")	
FX2NC	FX2NC-232ADP FX0N-232ADP (9-pin D-Sub) (25-pin D-Sub)	15 m (49' 2")	
	When using channel 1 (ch 1)		
	ch1 FX3U-232ADP(-MB) (9-pin D-Sub, male)	15 m (49' 2")	
FX3GC	Ch1 Ch2 Ch2 FX3U-□ADP(-MB) (Where □ represents 232 and 485). Ch2 FX3U-232ADP(-MB) (9-pin D-Sub, male)	15 m (49' 2")	

- *1. When using ch2 in an FX3U PLC, it can be set only in the PP modem mode (ch2).
- *2. When using ch2 in an FX3GC PLC, it can be set only in the PP modem mode (ch2).

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	Common Items
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Inverter Communication

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Non-Protocol
Communication
(RS/RS2 Instruction)

FX Series	Communication equipment (option)	Total extension distance	Check
	When using channel 1 (ch 1)	· 	
FX3UC (D, DS, DSS)	ch1 FX3U-232ADP(-MB) (9-pin D-Sub, male)	15 m (49' 2")	
	when using channel 2 (ch 2)*1 ch1 ch2 FX3U-232ADP(-MB), FX3U-485ADP(-MB), FX3U-CF-ADP When a FX3U-CF-ADP is used, it occupies one communication port channel.	15 m (49' 2")	
FX3UC-32MT-LT (-2)	when using channel 1 (ch 1) ch1 FX3U-232-BD (9-pin D-Sub, male)	15 m (49' 2")	
	FX3U-CNV-BD FX3U-232ADP(-MB) (9-pin D-Sub, male)	15 m (49' 2")	
	When using channel 2 (ch 2)*1 ch1 FX3U-□-BD (Where □ represents 232, 422, 485, USB and 8AV) When a FX3U-8AV-BD is used, it occupies one communication port channel.	15 m (49' 2")	
	FX3U-CNV-BD FX3U-232ADP(-MB), FX3U-232ADP(-MB) (9-pin D-Sub, male) FX3U-CF-ADP When a FX3U-CF-ADP is used, it occupies one communication port channel.	15 m (49' 2")	

^{*1.} When using ch2 in an FX3UC PLC, it can be set only in the PP modem mode (ch2).

3.3 Selecting Modem

In FX PLCs, the modems PV-AF288 (manufactured by AIWA CO., LTD.) and ME3314B (manufactured by OMRON Corporation) are applicable.

When "user registration mode", "PP modem mode (ch1)", or "PP modem mode (ch2)" is selected in the modem initialization setting in an FX PLC, other modems are also applicable.

The tables below show the communication specifications in the "user registration mode", "PP modem mode (ch1)", and "PP modem mode (ch2)". Select a modem supporting the communication specifications shown below.

1. User registration mode

ltem	Contents
Communication method	Half-duplex, asynchronous system
Baud rate	9600 bps
Start bit	1-bit
Data bit	7-bit
Parity bit	Even
Stop bit	1-bit
Control line	Not provided

If the modem used does not support the communication specifications shown above, communication is not possible.

2. PP modem mode (ch1) and PP modem mode (ch2)

Item	Contents
Communication method	Half-duplex, asynchronous system
Baud rate	9600 bps
Start bit	1-bit
Data bit	8-bit
Parity bit	Not provided
Stop bit	1-bit
Control line	Not provided

If the modem used does not support the communication specifications shown above, communication is not possible.

3.3.1 List of modems whose operations are confirmed

The tables below show already tested modems and their associated AT command.

1. Modem on the PLC side

The PLC has a command to initialize the PV-AF288 (manufactured by AIWA CO., LTD.) and ME3314B (manufactured by OMRON Corporation). This command can be used only by setting parameters using the GX Works2, GX Developer or FXGP/WIN software.

For other modems, input and set the AT command shown below in ASCII code to a data register (D1000 and later usually, and D200 or later in the FX1S PLC).

\rightarrow For the	setting	procedure,	refer to	Chapter 5.
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Manufacturer	AT com	AT command setting for modem on PLC side			
Modem model name	GX Works2 (SW□DNC -GXW2)	GX Developer (SW□D5C -GPPW)	FX-PCS/WIN	AT command	Remarks
Manufactured	by I-O DATA	DEVICE, INC.			
DFML-560ER		mmand shown right	_	ATE0Q1S0=2&D0&K0&W0&Y0%C3	
DFML-K56F*1	Input AT command shown on right		wn on right	ATE0Q1S0=2&D0&K0&W0&Y0\Q0%C3	
Manufactured	by AIWA CO.	, LTD.			
PV-AF288 ^{*1}	Select AIWA modem (PV-AF288)		ATE0S0=2Q1&D0&M5\Q0\J0&W		
PV-BF5606*1	Input AT	command show	vn on right	ATE0S0=2&D0Q1&K0&W	
Manufactured	by OMRON C	orporation			
ME3314B ^{*1}	Select ON	MRON modem ((ME3314B)	ATE0S0=2Q1&D0&H0&R1S15=8&W	In FX2N PLC, Ver. 2.01 and later are applicable.
ME5614E*1	Input AT command shown on right		ATE0S0=2&D0Q1&K0&W	Modem version: F/W Ver. 2.300	
ME5614E2*1			_		
ME5614D*1	Input AT	command show	wn on right	ATE0S0=2&D0Q1&K0&W	Modem version: F/W Ver. 2.300

^{*1.} Production is finished as of August, 2010.

2. Modem on the personal computer side for remote access

The table below shows modems whose operations are already confirmed. Input and set the AT command shown below using a programming tool in the personal computer on the remote access side. FXGP/WIN has a command to initialize the PV-AF288, PV-AF3360 (manufactured by AIWA CO., LTD.), ME3314B, ME5614D, ME5614E and ME5614E2*2 (manufactured by OMRON Corporation). This command can be used only by setting a parameter.

→ For the setting procedure, refer to Chapter 6.

Manufacturer	AT commar	nd setting for m	odem on personal computer side for remote access	
Modem model name	GX Works2 (SW□DNC -GXW2)	GX Developer (SW□D5C -GPPW)	FX-PCS/WIN	Remarks
Manufactured	by I-O DATA I	DEVICE, INC.		
DFML-560ER	AT&C1E0Q0	S0=2&K0&D0	_	
Manufactured	by AIWA CO.,	LTD.		
PV-AF288 ^{*1}		_	Select this model (AT command is shown for reference) ATE0S0=2Q0V1&M4\J0\Q0	
PV-AF3360 ^{*1}	_		Select this model (AT command is shown for reference) ATE0S0=2Q0V1S15=8&H0&R1	
PV-BF5606*1	ATE0S0=2&K0&D0		Select this model (AT command is shown for reference) ATE0S0=2&K0	
Manufactured	by OMRON Co	orporation		
ME3314B*1	-	_	Select this model (AT command is shown for reference) ATE0S0=2Q0V1S15=8&H0&R1	
ME5614E ^{*1}	ATE0S0=2&K	0&D0	Select this model (AT command is shown for reference)	Modem version: F/W Ver. 2.300
ME5614E2 *1*2	7112000 Zuit	0420	ATE0S0=2&K0W0	
ME5614D*1	ATE0S0=2&K	0&D0	Select this model (AT command is shown for reference) ATE0S0=2&K0W0	Modem version: F/W Ver. 2.300

^{*1.} Production is finished as of August, 2010.

^{*2.} When used the FXGP/WIN, select the model "ME5614E".

Parallel Link

4. Wiring

This chapter explains the wiring.

4.1 Wiring Procedure

1 Turning OFF the PLC power

Before starting any wiring work, make sure that the PLC power is OFF.

2 Checking the connector shape

When a cable is included with the modem, check the shape of the RS-232C connector in the personal computer to be connected, the shape of the connector in the communication equipment operating in accordance with RS-232C for the PLC, and male or female type.

3 Connecting the RS-232C ports in the modem and the PLC with a cable

Check the shape of the connector (number of pins) in the communication equipment operating in accordance with RS-232C to be connected to the PLC. Each cable has either connector shape:

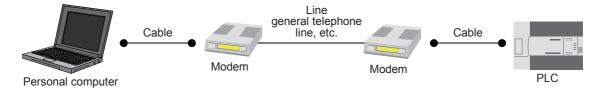
- 9-pin D-Sub, female
- 25-pin D-Sub, male
- 4 Connecting the personal computer and the modem with a cable for remote access

Check the shape of the RS-232C connector (number of pins) on the personal computer for remote access.

4.2 Connection Diagram

1. To connect the modem, use a cable included with the modem or cable described in the modem manual.

Remote access



2. The table below shows the pin arrangement in the communication equipment operating in accordance with RS-232C for the FX PLC.

FX0N-232ADP 25-pin D-Sub, female		FX1n-232-BD, FX2n-232-BD, FX2nc- FX3G-232-BD, FX3U-232-BD FX3U-232ADP(-MB) 9-pin D-Sub, male	•	Signal name	Function
			1 ^{*1}	CD	Receiving carrier detection
25	3		2	RD (RXD)	Receive data input
0000	2	50009	3	SD (TXD)	Send data output
000000000000000000000000000000000000000	20	10006	4	ER (DTR)	Data terminal ready
14 1	7		5	SG (GND)	Signal ground
14 ~1	6		6	DR (DSR)	Data set ready

^{*1.} The FX2NC-232ADP does not use the CD signal.

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5. How to Setup Modems on the PLC Side

This chapter explains how to set parameters for initialization using the AT command and set the communication specifications including the transmission speed for a modem connected to the PLC.

The setting method using GX Works2 and the setting method using FXGP/WIN are explained.

→ For applicable programming tools, refer to Subsection 1.4.2.

ightarrow For details on GX Developer operating procedure, refer to GX Developer Operating Manual.

5.1 Setting Using GX Works2

This section explains the modem initialization setting and communication setting methods. Suppose that GX Works2 is already started up.

Screens for the FX3U PLC are shown as examples.

5.1.1 Setting communication by way of RS-232C port

It is not necessary to set the serial communication with a modem.

However, it is necessary to verify that another communication type is not used and whether the communication setting is correct using the following procedure.

In FX PLCs, the communication setting can be executed using either of the following two methods:

1) Writing the value "0" to the data register D8120 using a sequence program
If another communication type is already set for another application, delete the sequence program which writes a value to D8120.

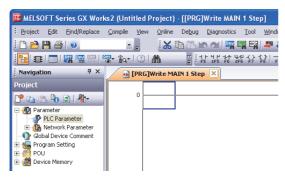
When setting remote maintenance to ch1 in an FX3S/FX3G/FX3G/FX3U/FX3UC PLC, write the value "0" to the data register D8120, D8400.

When setting remote maintenance to ch2 in an FX3G/FX3GC/FX3U/FX3UC PLC, write the value "0" to the data register D8420.

Setting parameters using a sequence programming tool
 By using the following procedure, verify that another communication type is not set.

1 Opening the PLC parameter setting window

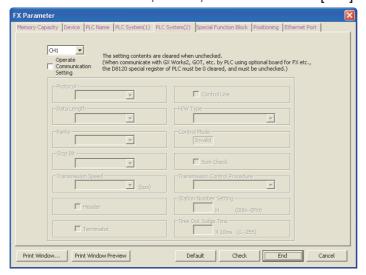
In the project view area of the navigation window, double-click [Parameter] \rightarrow [PLC Parameter]. If the navigation window is not displayed, select [View] \rightarrow [Docking Window] \rightarrow [Navigation] from the menu bar.



2 Checking the serial communication (parameter) setting

Click the [PLC System(2)] tab on the dialog box.

Make sure that the "Operate Communication Setting" box is cleared, and click the [End] button. If a check mark is there, clear it, and then click the [End] button.

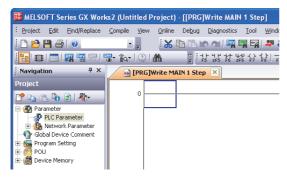


Modem initialization setting using parameter method 5.1.2

This subsection explains how to select the AT command for initialization registered in the PLC and how to set the AT command for an unregistered modem.

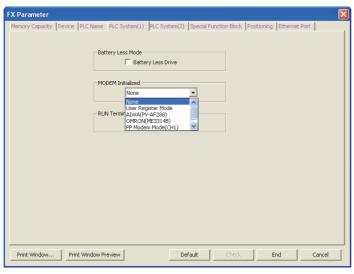
Opening the PLC parameter setting window

In the project view area of the navigation window, double-click [Parameter] → [PLC Parameter]. If the navigation window is not displayed, select [View] \rightarrow [Docking Window] \rightarrow [Navigation] from the menu bar.



Selecting the modem initialization method

Click the [PLC System(1)] tab on the dialog box. Select a modem to be connected in "MODEM Initialized", and click the [End] button.



Set item Description		Modem model name	Manufacturer
None	Select this item when remote maintenance is not used.	_	_
User Register Mode	Select this item when the modem to be used is not registered.	Unregistered modem	_
AIWA(PV-AF288)	Select the corresponding item when either	PV-AF288	AIWA CO., LTD.
OMRON(ME3314B)	modem is to be used.	ME3314B	OMRON Corporation
PP Modem Mode (CH1)*1	Select this item when the modem to be used satisfying the PP modem mode specifications is not registered.	Unregistered modem	_
PP Modem Mode (CH2)*2	Select this item when remote maintenance is executed in ch2.	Unregistered modem	_

^{*1.} When an FX3S, FX3G, FX3GC, FX3U and FX3UC PLC is used

3 Setting the AT command for the unregistered modem

When "User Register Mode", "PP Modem Mode (CH1)", or "PP Modem Mode (CH2)" is selected in "MODEM Initialized", the AT command setting is required. For the AT command setting method for unregistered modems, refer to Subsection 5.1.3.

The AT command setting is not required when "AIWA[PV-AF288]" or "OMRON(ME3314B)" is selected.

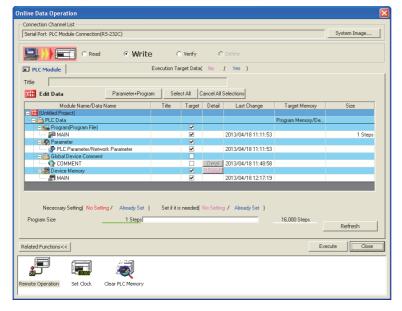
4 Writing the parameter and program to the PLC

Select [Online] \rightarrow [Write to PLC] from the menu bar.

Click [Parameter] → [PLC Parameter/Network Parameter] in the project tree.

When the AT command is set for an unregistered modem, next put a check mark next to "Device Memory" → "MAIN".

After placing the check mark, click the [Execute] button to write the contents to the FX PLC.



^{*2.} When an FX3G, FX3GC, FX3U and FX3UC PLC is used

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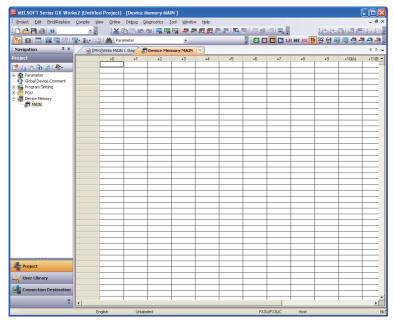
5.1.3 Setting AT command for unregistered modem

Only when "MODEM Initialized" is set to "User Register Mode", "PP Modem Mode (CH1)", or "PP Modem Mode (CH2)", execute the following setting.

(The modem initialization setting depends on the setting contents of the [PLC System(1)] tab displayed when [Parameter] \rightarrow [PLC Parameter] is selected.)

1 Display a device memory

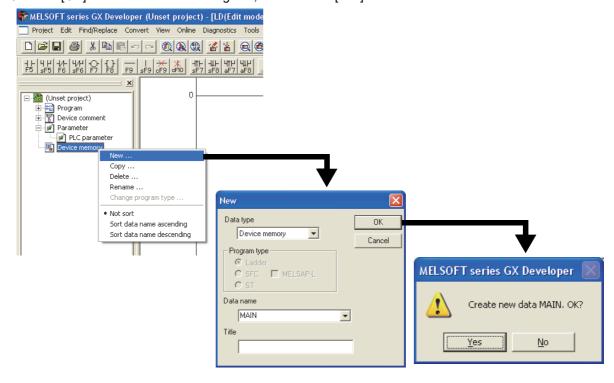
In the project view area of the navigation window, double-click [Device Memory] \rightarrow [Device memory data name].



Caution

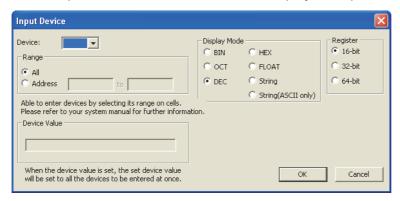
In GX Developer, select "Device memory" in the project tree, right-click it to display the submenu, and select "New".

Click the [OK] button on the New dialog box, and click the [Yes] button.

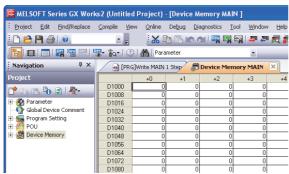


2 Displaying the device list

Select "Input Device" on the Edit menu to display the Input Device dialog box.



Set "Device", "Range", "Display Mode" and "Register", and click [OK].



The device (data register) number to be set varies depending on the PLC as shown below:

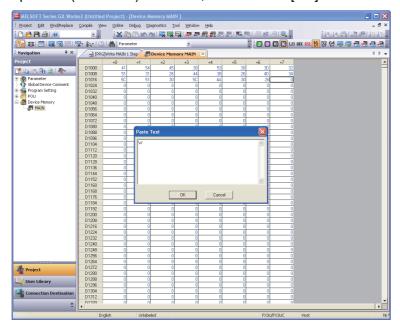
PLC	Device range
FX1N, FX1NC, FX2N, FX2NC, FX3G, FX3GC, FX3U and FX3UC PLC	D1000 to D1059
FX1s and FX3s PLC	D200 to D255

3 Inputting the AT command

Input the AT command to D1000 (D200 For FX1s and FX3s PLCs) and later. Input one character to one word.

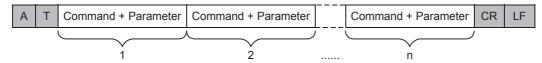
Click the data register to be input, and select "Paste Text" on the edit menu to display the Paste Text dialog box.

Input one (half-width) character, and click the [OK] button.



1. AT command structure

For initializing a modem, use the AT command developed by Hayes. The Hayes AT command is generally expressed in the following format:



For details on the AT command, refer to the manual of the modem to be used.

2. Input example of the AT command for initialization, Example: ATE0S0 = 2Q1&D0&M4\Q0\J0&W

Data register No.	ASCII code	Hexadecimal value	Data register No.	ASCII code	Hexadecimal value
D1000	Α	41	D1013	&	26
D1001	Т	54	D1014	М	4D
D1002	Е	45	D1015	4	34
D1003	0	30	D1016	1	5C
D1004	S	53	D1017	Q	51
D1005	0	30	D1018	0	30
D1006	=	3D	D1019	/	5C
D1007	2	32	D1020	J	4A
D1008	Q	51	D1021	0	30
D1009	1	31	D1022	&	26
D1010	&	26	D1023	W	57
D1011	D	44	D1024	CR	0D
D1012	0	30	D1025	LF	0A



Inputting "CR" and "LF"

It is necessary to input "CR" and "LF" at the end of the AT command. Input "0D" and "0A" (hexadecimal values) to data registers respectively.

	+0	+1	+2	+3
D1000	41	54	45	30
D1008	51	31	26	44
D1016	50	51	30	50
D1024	D	Α	0	0
D1032	0	0	0	0
D1040	0	0	0	0

If "CR (0DH)" and "LF (0AH)" are not input at the end of the AT command, remote maintenance is not possible.

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5.2 Setting Using FXGP/WIN

This section explains the modem initialization setting and communication setting methods.

5.2.1 Setting communication by way of RS-232C port

It is not necessary to set the serial communication with a modem.

However, it is necessary to verify that another communication type is not used and whether the communication setting is correct using the following procedure.

In FX PLCs, the communication setting can be executed using either of the following two methods:

- Writing the value "0" to the data register D8120 using a sequence program
 If another communication type is already set for another application, delete the sequence program which writes a value to D8120.
- 2) Setting parameters using a sequence programming tool
 By using the following procedure, verify that the communication setting is not provided.

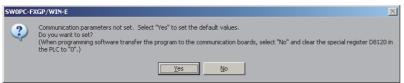
1 Checking the serial setting (parameter)

Select [Option] → [Serial setting (parameter)] from the toolbar.

The following dialog box appears according to absence/presence of parameter setting.

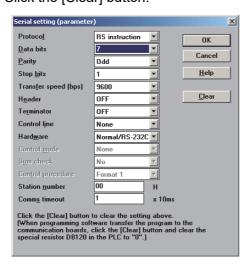
1. When there is no parameter setting

The dialog box shown below appears to indicate that there is no communication setting. Click the [No] button.



2. When there are already parameter settings

The dialog box shown below appears to indicate that the communication setting is being used. Click the [Clear] button.



5.2.2 Modem initialization setting using parameter method

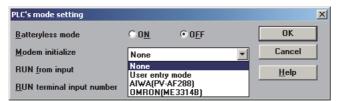
This subsection explains how to select the AT command for initialization registered in advance in the PLC and how to set the AT command for an unregistered modem.

1 Setting the PLC mode

Click [Option] \rightarrow [PLC's mode setting] from the toolbar.

2 Selecting the modem initialization method

Select a modem to be connected in "Modem initialize", and click the [OK] button.



Set item	Description	Modem model name	Manufacturer
None	Select this item when remote maintenance is not used.	_	_
User entry mode	Select this item when the modem to be used is not registered.	Unregistered modem	_
AIWA(PV-AF288)	Select corresponding item when either	PV-AF288	AIWA CO., LTD.
OMRON(ME3314B)	modem is to be used.	ME3314B	OMRON Corporation

3 Setting the AT command for an unregistered modem

When "User entry mode" is selected in "Modem initialize", the AT command setting is required. For the AT command setting method for unregistered modems, refer to Subsection 5.2.3. The AT command setting is not required when "AIWA(PV-AF288)" or "OMRON(ME3314B)" is selected.

4 Writing the program to the PLC

Click [PLC] \rightarrow [Transfers] \rightarrow [Write] from the toolbar to display the "Program write" dialog box. Select "All range", and click the [OK] button.



When the AT command is set for an unregistered modem, transfer the register also. Click [PLC] \rightarrow [Register data transfers] \rightarrow [Write] from the toolbar to display the Write dialog box. Place a check mark (\checkmark) next to "Data register", and click the [OK] button.



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5.2.3 Setting AT command for unregistered modem

Only when "User entry mode" is selected in "Modem initialize", execute the following setting. (The modem initialization setting depends on the setting contents of the window displayed when [Option] \rightarrow [PLC's mode setting] is selected from the toolbar.)

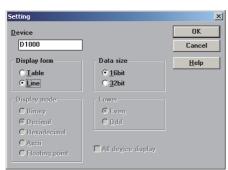
Displaying the device list

Select [View] → [Register view] from the toolbar.



2 **Executing the display setting**

Select the set items as shown in the table below, and click the [OK] button.



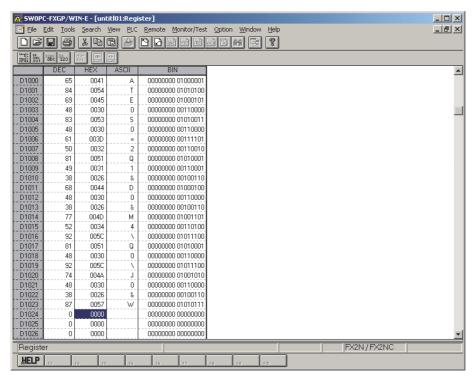
Item	Contents of setting
Display form	Line
Data size	16bit

The device (data register) number to be set varies depending on the PLC as shown below:

PLC	Device range
FX1n/FX1nc/FX2n/FX2nc/FX3G/FX3Gc/FX3U/FX3UC PLC	D1000 to D1059
FX1s/FX3s PLC	D200 to D255

3 Inputting the AT command

Input the AT command to the "ASCII" column of D1000 and later. Input one (half-width) character to one word.

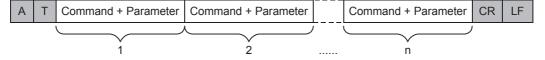


Make sure to input "CR (0DH)" and "LF (0AH)" at the end of the AT command. If they are not input, remote maintenance is not possible.

The "CR" and "LF" input method is explained in the next step.

1. AT command structure

For initializing a modem, use the AT command developed by Hayes. The Hayes AT command is generally expressed in the following format:



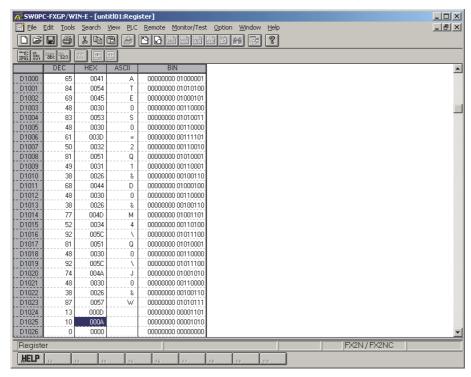
For details on the AT command, refer to the manual of the modem to be used.

2. Input example of the AT command for initialization, Example: ATE0S0 = 2Q1&D0&M4\Q0\J0&W

Data register No.	ASCII code	Hexadecimal value	Data register No.	ASCII code	Hexadecimal value
D1000	Α	41	D1013	&	26
D1001	Т	54	D1014	М	4D
D1002	Е	45	D1015	4	34
D1003	0	30	D1016	\	5C
D1004	S	53	D1017	Q	51
D1005	0	30	D1018	0	30
D1006	=	3D	D1019	\	5C
D1007	2	32	D1020	J	4A
D1008	Q	51	D1021	0	30
D1009	1	31	D1022	&	26
D1010	&	26	D1023	W	57
D1011	D	44	D1024	CR	0D
D1012	0	30	D1025	LF	0A

4 Inputting "CR" and "LF"

It is necessary to input "CR" and "LF" at the end of the AT command. Input "000D" and "000A" (hexadecimal values) to data registers respectively.



If "CR (0DH)" and "LF (0AH)" are not input at the end of the AT command, remote maintenance is disabled.

5.3 Cautions on Use

1. Cautions on inputting the AT command for initialization to the PLC

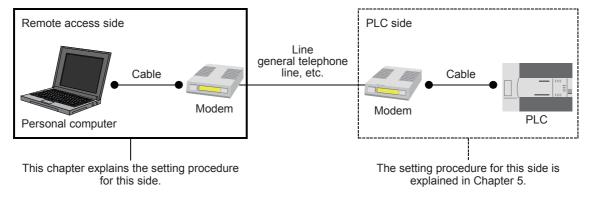
- 1) The AT command finishes sending when "0" (hexadecimal value) is read.
- 2) When creating a sequence program, make sure that the input area for the modem initialization command is different from the data register area used by general sequence programs.
- 3) Make sure to input "CR (0DH)" and "LF (0AH)" at the end of the AT command. If they are not input, remote maintenance is disabled.

6. How to Setup Modems on the PC Side for Remote Access

This chapter explains how to set a modem connected to the personal computer for remote access. The setting method using GX Works2 and the setting method using FXGP/WIN are explained respectively.

→ For applicable programming tools, refer to Subsection 1.4.2.

→ For details on GX Developer operating procedure, refer to GX Developer Operating Manual.



6.1 Setting Using GX Works2

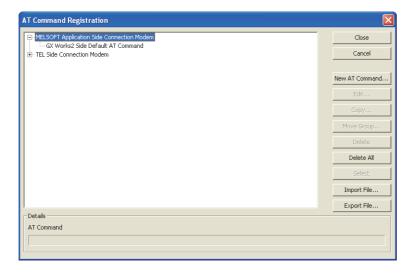
This section explains the line connection setting method using GX Works2.

6.1.1 Registering AT command for connected modem

This subsection explains how to register the AT command for initializing a modem connected to the personal computer.

1 Setting the AT command

Select [Tools] \rightarrow [Set TEL Data/Connect via Modem] \rightarrow [AT Command Registration] from the menu bar to display the following dialog box.



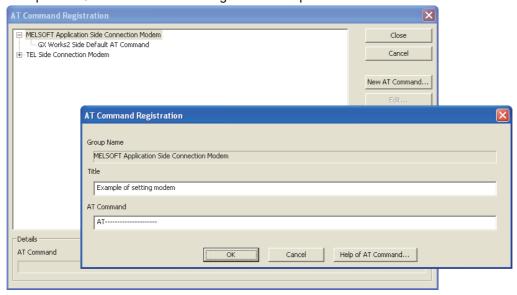
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2 Registering the AT command for the connected modem

Select "Modem at MELSOFT Application Side" in the project tree, and click the [New AT Command] button.

Input "Title" and "AT Command", and click the [OK] button.

- Input a name easy to understand such as the modem model name to "Title".
- Input "AT Command" while referring to the description below.



1. In the case of a modem whose operation is confirmed

For such a modem, input the following AT command.

Modem manufacturer name	Modem model name	AT command set value	Remarks
I-O DATA DEVICE, INC.	DFML-560ER	AT&C1E0Q0S0=2&K0&D0	
AIWA CO., LTD.	PV-BF5606	ATE0S0=2&K0&D0	
OMRON Corporation	ME5614E	ATE0S0=2&K0&D0	Modem version: F/W Ver. 2.300
OMNON Corporation	ME5614E2	A1E030-2000000	
OMRON Corporation	ME5614D	ATE0S0=2&K0&D0	Modem version: F/W Ver. 2.300

2. In the case of any other modem (whose operation is not confirmed)

Click the [Help of AT Command] button.

Refer to the contents of the help and the manual of the connected modem, create the AT command.

3. Contents of help for the AT command

The table below shows the contents of description about [Help of AT Command]. Setting example: AT&C1Q0V1\N3&D0&K0

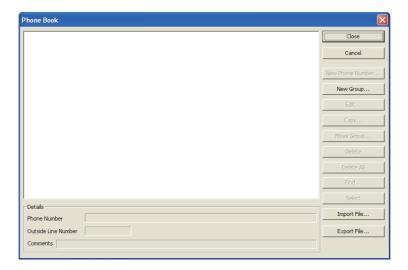
AT command	Description		
AT&Cn	Set the mode in which the CD signal is set to ON when the carrier from the counterpart is received.		
ATQn	Set the AT command so that the result code for the AT command is sent back.		
ATVn	Set the AT command so that the response to the AT command is given in a character string.		
AT\Nn	The MNP automatic selection mode is recommended. When the MNP block size is a set item, "128 bytes maximum per block" is general. When the MNP automatic selection mode cannot be specified, specify the direct mode in the asynchronous communication mode.		
AT&Dn	Set the ER signal to "normally ON".		
AT&Kn (AT&Hn&In&Rn)	Set "no flow control".		
AT&Xn	When a converter is used, set "no dial tone". It is not necessary to set this item when a converter is not used.		

6.1.2 Creating telephone directory (if necessary)

This subsection explains the method to register the telephone number of the counterpart (line connected to the modem of the desired PLC).

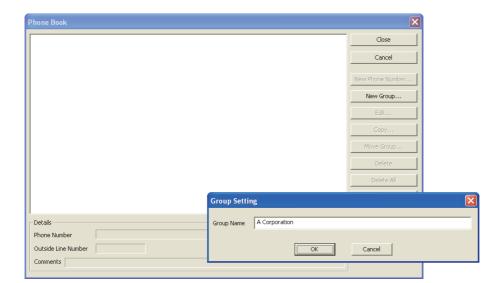
1 Displaying the telephone directory dialog box

Select [Tools] \rightarrow [Set TEL Data/Connect via Modem] \rightarrow [Phone Book] from the menu bar to display the following dialog box.



2 Creating the group name

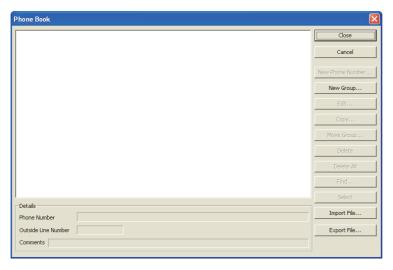
Click the [New Group] button to display the Group Setting dialog box. Input a group name (example: A Corporation) to which the telephone numbers belong, and click the [OK] button.



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3 Selecting a group name to which the counterpart telephone number will be registered

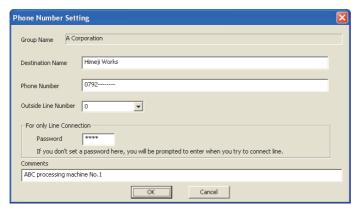
Click and select an already created group name (example: A Corporation). Click the [New Phone Number] button.



4 Inputting the name, telephone number, etc.

Input required items, and click [OK] button.

If there is another counterpart to be registered, repeat from step 2 above.



→ For details, refer to GX Works2 Version 1 Operating Manual (Common).

6.2 Setting Using FXGP/WIN

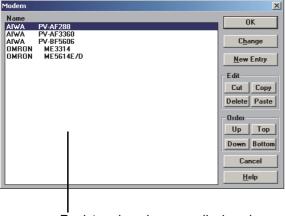
This section explains the line connection method using FXGP/WIN.

6.2.1 Registering AT command for connected modem

This subsection explains how to register the AT command for initializing a modem connected to the personal computer for remote access.

1 Setting the AT command

Select [Remote] \rightarrow [Environment] \rightarrow [Modem] from the toolbar to display the following dialog box.



Registered modems are displayed.

2 Registering the AT command for the connected modem

1. When the connected modem is shown in the list Select the modem model name, and click the [OK] button.

 \rightarrow Proceed to step 4.

2. When the connected modem is not shown in the list

It is necessary to create the AT command for the modem, and register it.

 \rightarrow Proceed to step 3.

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Communication
(RS/RS) Instruction

3 Newly creating the AT command for the modem

Click the [New Entry] button.

Input "Name" and "Initial Setup String", and then click the [OK] button.

- To "Name", input a name easy to understand such as the modem model name.
- To "Initial Setup String", input proper contents while referring to the description below.



Input the AT command while referring to the description below.

1. In the case of a modem whose operation is confirmed

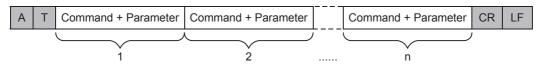
For a modem whose operation is confirmed, input the following AT command:

Modem manufacturer	Modem model name	AT command set value
AIWA CO., LTD.	PV-AF288	ATE0S0=2Q0V1&M4\J0\Q0
AIWA CO., LTD.	PV-AF3360	ATE0S0=2Q0V1S15=8&H0&R1
AIWA CO., LTD.	PV-BF5606	ATE0S0=2&K
OMRON Corporation	ME3314B	ATE0S0=2Q0V1S15=8&H0&R1
OMRON Corporation	ME5614E	ATE0S0=2&K0W0
OMRON Corporation	ME5614E2*1	ATE0S0=2&K0W0
OMRON Corporation	ME5614D	ATE0S0=2&K0W0

^{*1.} When used the FXGP/WIN, select the model "ME5614E".

2. AT command structure

For initializing a modem, use the AT command developed by Hayes. The Hayes AT command is generally expressed in the following format:



For details on the AT command, refer to the manual of the modem to be used.

3. Setting contents of the AT command

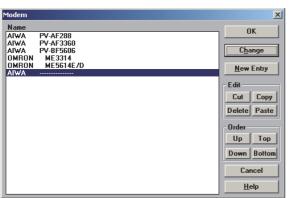
When the PLC power is turned ON, the PLC sends the AT command to the modem to initialize the modem. For reference, the table below shows the set items and setting contents of the AT commands for modems which are registered in advance in FXGP/WIN.

The set items and setting contents may vary depending on each modem. For actual setting contents, refer to the manual of the modem to be used.

Set item	PV-AF288 (AIWA)	PV-AF3360 (AIWA)	ME3314B (OMRON)	
	ATE0S0=2Q0V1&M4\J0\Q0	ATE0S0=2Q0V1&M4\J0\Q0	ATE0S0=2Q0V1S15=8&H0&R1	
Command echo	E0 (not provided)	E0 (not provided)	E0 (not provided)	
Number of times of calling in automatic receiving	S0 = 2 (twice)	S0 = 2 (twice)	S0 = 2 (twice)	
Result code display	Q0 (provided)	Q0 (provided)	Q0 (provided)	
Result code format	V1 (character, word)	V1 (character, word)	V1 (character, word)	
Communication mode	&M4 (MNP automatic)	&M4 (MNP automatic)	S15 = 8 (V. 42 bis)	
Terminal speed fixing mode	\J0 (fixed)	\J0 (fixed)	_	
Send data flow control	_	_	&H0 (not provided)	
Terminal flow control method	\Q0 (not provided)	\Q0 (not provided)	&R1 (not provided)	
Initialization to values set in factory before delivery	&F (FXGP/WIN sends "AT&F", and then sends the AT command above.)			

4 Displaying the selected modem

Verify that the desired modem is set, and click the [OK] button.



On this window, a newly registered modem is selected.

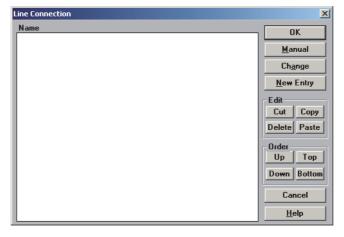
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6.2.2 Registering line connection destination

This subsection explains how to register the telephone number of the line connection destination (line connected to the modem of the desired PLC).

Displaying the line connection dialog box

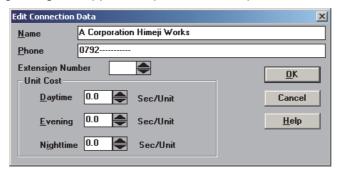
Select [Remote] \rightarrow [Connect] \rightarrow [to PLC] from the toolbar to display the following dialog box.



2 Inputting the telephone number of the line connection destination

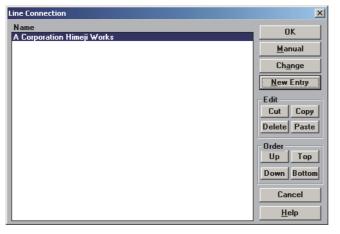
Click the [New Entry] button.

When the following dialog box appears, input the counterpart "Name" and "Phone".



3 Registering the line connection destination

After inputting the telephone number, click the [OK] button to register it.



→ For details on set items, refer to the manual of FXGP/WIN.

7. Connecting Line

This chapter explains the line connection procedure for remote maintenance.

7.1 Preparing for Connection of PLC

For remote maintenance, it is necessary to properly establish the modem-to-PLC connection. Set the PLC using the following procedure.

1 Setting initialization for the modem on the PLC side

Set the AT command for the modem to be connected to the PLC.

→ For details, refer to Chapter 6.

2 Turning OFF the PLC power

After inputting the AT command to the PLC, turn OFF the PLC power.

3 Connecting the modem

Connect the communication equipment of the PLC to the modem.

→ For details, refer to Chapter 4.

4 Turning ON the modem power

Turn ON the modem power connected to the PLC.

5 Turning ON the PLC power

After turning ON the power to the modem, turn ON the PLC power.

When the PLC power is turned ON, the TXD (SD) and RXD (RD) LEDs light instantaneously in the optional communication equipment operating in accordance with RS-232C, and the AT command is sent to the modem.

→ If these LEDs do not light, refer "Chapter 8. Troubleshooting".

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7.2 **Line Connection Procedure**

This section explains the procedure to connect a personal computer to a PLC using a telephone line. The connection procedure varies depending on the software used. Connect a telephone line suitable to the software used.

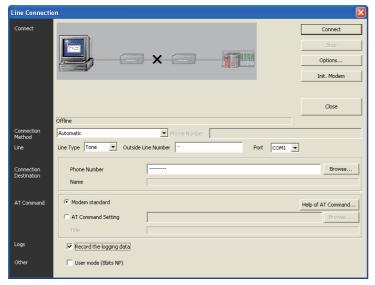
→ For details on GX Developer operating procedure, refer to GX Developer Operating Manual.

7.2.1 For GX Works2

This subsection explains the line connection procedure using GX Works2. Prepare for connection of the PLC, connect a modem to the communication port in the personal computer, and start up GX Works2.

Setting the line connection

Select [Tools] → [Set TEL Data/Connect via Modem] → [Line Connection] from the menu bar to display the following dialog box.



The line connection status is displayed.

Setting the connection method

Select "Auto".

Setting the line

Set each item as follows:

1. Line type

Set the type of line connected to the modem.

- In the case of general telephone, select the contracted line type (tone, pulse or ISDN).
- In the case of cellular phone, select "Tone".

2. Outside line

Set this item if necessary for making phone calls to outside lines.

3. Port

Select the communication port number in the personal computer connected to the modem.

4 Setting the connection destination

Set the telephone number of the counterpart (line number of the modem connected to the desired PLC).

When a telephone number has been set in advance in the telephone directory, it can be set using the [Browse] button.

→ For details on the telephone directory, refer to Subsection 6.1.2.

5 Setting the AT command

Set the AT command for the modem connected to the personal computer. When the AT command has been registered in advance, it can be set using the [Browse] button.

→ For details on the AT command registration, refer to Subsection 6.1.1.

6 Placing a check mark (✓) next to "Record the logging data"

Put a check mark here when storing the log at the line connection to a file. The log at the line connection is recorded in the following log file:

1. For GX Works2

- · Storage destination
 - For Windows® 2000 and Windows® XP
 User folder\Application Data\MITSUBISHI\MELSOFT\TEL\Log
 - For Windows Vista®, Windows® 7, Windows® 8, Windows® 8.1 and Windows® 10 User folder\AppData\Roaming\MITSUBISHI\MELSOFT\TEL\Log
- Log file name: year, month, day.dat (example: 130206.dat)

2. For GX Developer

- Storage destination: GX Developer installation destination\log (default: Melsec\Gppw\log)
- Log file name: Date.log (example: 130206.log)

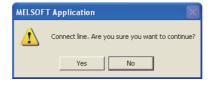
7 Setting others

When "PP Modem Mode (CH1)" or "PP Modem Mode (CH2)" is selected in "Init modem", place a check mark (\checkmark) next to "User mode (8bits NP)".

8 Connecting the line

Click the [Connect] button to display the following dialog box.

Click the [Yes] button to execute line connection and make a call from the modem connected to the personal computer.



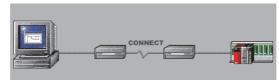
7.2 Line Connection Procedure

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9 Checking the line connection status

1. When the line is connected

When the line is connected, the connection status shown below is displayed on the Line Connection dialog box.



When connection is completed, the following dialog box appears to indicate the telephone number of the connection destination and the communication speed.



Confirm the contents, and click the [OK] button to close the dialog box.

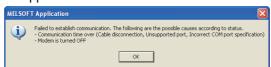
 \rightarrow Proceed to step 10.

2. When the line cannot be connected

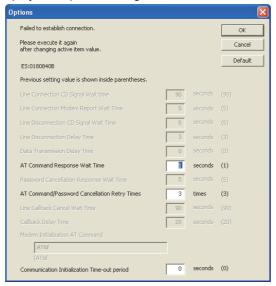
When the line cannot be connected, the following figure is displayed on the Line Connection dialog box. (Example: When no response is given by the modem connected to the personal computer)



And the following dialog box appears.



Click the [OK] button to display the Options dialog box.



Change the waiting time and number of retries, and then click the [OK] button to close the dialog box. Check the telephone number and AT command, and then execute connection again.

→ If line connection is disabled, refer to "Chapter 8. Troubleshooting".

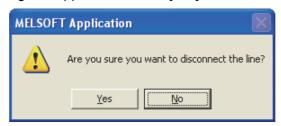
10 Executing remote maintenance

Read and write sequence programs, and monitor devices.

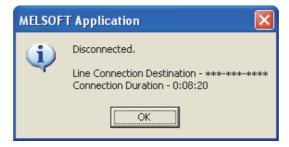
11 Disconnecting the line

To disconnect the line, select [Tools] \rightarrow [Set TEL Data/Connect via Modem] \rightarrow [Line Disconnection] from the menu bar.

When the following dialog box appears, click the [Yes] button to disconnect the line.



When line disconnection is finished, the following dialog box appears to indicate the connection destination telephone number and line use time.



Click the [OK] button to close the dialog box.

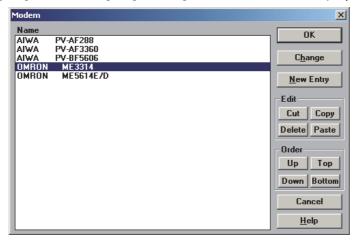
D

7.2.2 For FXGP/WIN

This subsection explains the line connection procedure using FXGP/WIN. Prepare for connection of the PLC, connect a modem to the communication port in the personal computer, and then start up FXGP/WIN.

1 Setting the modem to be used

Select [Remote] \rightarrow [Environment] \rightarrow [Modem] from the toolbar to display the following dialog box.



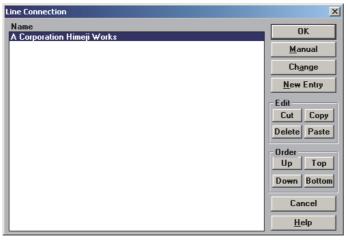
Select the modem to be used, and click the [OK] button.

If the modem to be used is not displayed, click the [New Entry] button, and register the AT command for the modem.

 \rightarrow For details on AT command registration, refer to Subsection 6.2.1.

2 Connecting the connection destination

Select [Remote] \rightarrow [Connect] \rightarrow [to PLC] from the toolbar to display the following dialog box.



Select the connection destination, and click the [OK] button.

If the connection destination is not displayed, click the [New Entry] button, and register the connection destination.

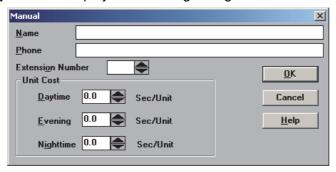
→ For details on connection destination registration, refer to Subsection 6.2.2.
→ Proceed to step 4.

When directly setting a telephone number, click the [Manual] button.

 \rightarrow Proceed to the next step.

3 Executing manual connection

Click the [Manual] button to display the following dialog box.



Set "Name" and "Phone", and click the [OK] button.

4 Checking the line connection status

When the [OK] button is clicked, the following dialog box appears.



Click the [Yes] button to display the message box "Executing!" and make a call from the modem connected to the personal computer.

5 Checking the line connection status

1. When the line is connected

When connection is completed, the message box "Executing!" is closed, and the line connection time is displayed on the title bar as shown below:



 \rightarrow Proceed to step 6.

2. When the line cannot be connected

When the line cannot be connected, the message box "Executing!" is closed, and the following dialog box appears.



Click the [OK] button to close the dialog box.

Check the telephone number and AT command, and then execute connection again.

ightarrow If line connection is disabled, refer to "Chapter 8. Troubleshooting".

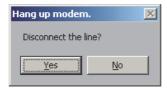
D

6 Executing remote maintenance

Read and write sequence programs, and monitor devices.

7 Disconnecting the line

To disconnect the line, select [Remote] \rightarrow [Disconnect] from the toolbar. When the following dialog box appears, click the [Yes] button to disconnect the line.



When the line is disconnected, the line connection time on the title bar disappears.



8. Troubleshooting

This chapter explains troubleshooting.

8.1 Checking FX PLC Applicability

Verify that the FX PLC main unit version is applicable to remote maintenance.

 \rightarrow For the version applicability check, refer to Section 1.3.

8.2 Checking Programming Tool Applicability

Verify that the programming tool version is applicable to remote maintenance.

→ For the version applicability check, refer to Section 1.4.

The remote maintenance function cannot be used when FXGP/WIN is used in the following versions of Windows:

- Windows NT® 4.0
- Windows® 2000
- Windows® XP

8.3 Checking Communication Status Based on LED Indication

Check the status of the "RXD (RD)" and "TXD (SD)" indicator LEDs provided in the optional equipment

LED status		Operation status	
RXD (RD)	TXD (SD)	- Operation status	
Flashing	Flashing	Data is being sent or received.	
Flashing	Off	Data is received, but is not sent.	
Off	Flashing	Data is sent, but is not received	
Off	Off	Data is not sent nor received.	

When the power is turned ON, the FX PLC transfers the AT command to the connected modem. At this time, the "RXD (RD)" and "TXD (SD)" indicator LEDs in the communication equipment light instantaneously. If modem initialization is not set in parameters in the FX PLC, however, these LEDs do not light. If the wiring and/or modem specifications are different, these LEDs flash several times, but the FX PLC does not transfer the AT command.

8.4 Checking Installation

1. Mounting status

If the communication equipment is not securely connected to the PLC, communication is not possible.

ightarrow For the mounting method, refer to the respective communication equipment manual.

8.5 Checking Modem Specifications

In a modem in which the following communication specifications are not applicable, remote maintenance can be used.

Check the modem specifications.

1. In the case of user registration mode

Item	Contents
Communication method	Half-duplex, asynchronous system
Baud rate	9600 bps
Start bit	1-bit
Data bit	7-bit
Parity bit	Even
Stop bit	1-bit
Control line	Not provided

2. PP modem mode (ch1) and PP modem mode (ch2)

Item	Contents
Communication method	Half-duplex, asynchronous system
Baud rate	9600 bps
Start bit	1-bit
Data bit	8-bit
Parity bit	Not provided
Stop bit	1-bit
Control line	Not provided

8.6 Checking Setting in PLC

Check the parameters, AT command and sequence programs in the PLC.

After changing any parameters, make sure to turn OFF the PLC power, and then turn it ON again.

8.6.1 Checking parameters in PLC

1. Checking the communication setting

Verify that non-protocol communication, computer link communication, etc. are not set in the parameters of the FX PLC. If such communication is already set, remote maintenance cannot be used.

2. Checking the modem initialization setting

Verify that the modem initialization is selected correctly in parameters in the FX PLC. If the modem initialization is not set correctly, normal communication is not possible.

→ For the parameter settings of the PLC, refer to Chapter 5.

8.6.2 Checking AT command setting

The AT command is required when "user registration mode", "PP modem mode (ch 1)" or "PP modem mode (ch 2)" is selected in the modem initialization setting. When such a mode is set, check the following contents.

1. Checking data registers

The head device number and device range of data registers used for setting the AT command vary depending on the FX Series.

Check the data register numbers in which the AT command is set.

PLC	Device range
FX1N, FX1NC, FX2N, FX2NC, FX3G, FX3GC, FX3U and FX3UC PLC	D1000 to D1059
FX1s and FX3s PLC	D200 to D255

Use consecutive data registers from the head device number. If a numeric value is not set in a data register, the data registers after it are not transferred.

2. Checking the contents of the AT command

If the contents of the AT command are not correct, remote maintenance cannot be used.

Verify that the setting contents are correct.

As reference, the table below shows the set items and their contents of the AT commands already registered in PLCs.

Set item	PV-AF288 (AIWA) ATE0S0 = 2Q1&D0&M5\Q0\J0&W	ME3314B (OMRON) ATE0S0 = 2Q1&D0&H0&R1S15=8&W		
Command echo	E0 (not provided)	E0 (not provided)		
Number of times of calling in automatic receiving	S0 = 2 (twice)	S0 = 2 (twice)		
Result code display	Q1 (not provided)	Q1 (not provided)		
DTR control	&D (normally ON)	&D (normally ON)		
Communication mode	&M5 (V. 42 bis)	S15 = 8 (V. 42 bis)		
Terminal flow control method	\Q0 (not provided)	&R1 (not provided)		
Send data flow control	_	&H0 (not provided)		
Terminal speed fixing mode	\J0 (fixed)	_		
Writing to nonvolatile memory	&W	&W		

3. Checking "CR (H0D)" and "LF (H0A)"

Make sure to input "CR (H0D)" and "LF (H0A)" at the end of the AT command. If they are not input, the AT command cannot be transferred.

 \rightarrow For the AT command setting for the PLC, refer to Chapter 5.

D

8.6.3 Checking sequence program

1. Checking the contents of the communication setting

Verify that no communication format (D8120, D8400, D8420), N:N Network: D8176 to D8180, and Parallel Link: M8070 and M8071) is being used in the sequence program.

If any communication format is being used in the sequence program, communication will not function correctly.

2. Ethernet port setting (in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the same channel is not used in the Ethernet port setting. Do not set the channel used in remote maintenance.

After changing the setting, make sure to reboot the PLC's power.

3. Presence of VRRD and VRSC instructions

1) Except FX3G, FX3U and FX3UC PLCs

Verify that the VRRD and VRSC instructions are not used in the program.

If these instructions are used, delete them, turn OFF the PLC power, and then turn the power ON again.

- 2) In FX3G PLC
 - In the case of the 14 points and 24-point type

Verify that the VRRD and VRSC instructions are not used in the program.

If these instructions are used, delete them, turn OFF the PLC power, and then turn the power ON again.

- In the case of the 40 points and 60-point type
 - Verify that the VRRD and VRSC instructions are not used in the program.

If these instructions are used in the program, the communication function is not available in ch2. Use ch1. or delete these instructions.

After deleting these instructions, turn OFF the PLC power, and then turn the power ON again.

3) In FX3U and FX3UC PLCs

Verify that the VRRD and VRSC instructions are not used in the program.

If these instructions are used in the program, the communication function is not available in ch1. Use ch2. or delete these instructions.

Use cn2, or delete these instructions.

After deleting these instructions, reboot the PLC's power.

4. Presence of RS instruction (except FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the RS instruction is not used in the program.

If this instruction is used, delete it, turn OFF the PLC power, and then turn the power ON again.

5. Presence of RS and RS2 instructions (in FX3s, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the RS and RS2 instructions are not being used for the same channel.

If these instructions are used for the same channel, revise them, turn OFF the PLC power, and then turn the power ON again.

6. Presence of EXTR instruction (in FX2N and FX2NC PLCs)

Verify that the EXTR instruction is not used in the program.

If this instruction is used, delete it, turn OFF the PLC power, and then turn the power ON again.

7. Presence of IVCK, IVDR, IVRD, IVWR, IVBWR^{*1}, and IVMC instructions (in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the IVCK, IVDR, IVRD, IVWR, IVBWR and IVMC instructions are not being used for the same channel.

If these instructions are used for the same channel, revise them, turn OFF the PLC power, and then turn the power ON again.

*1. Only available for FX3U and FX3UC PLCs.

8. Presence of ADPRW instructions (in FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs)

Verify that the ADPRW instructions are not being used for the same channel.

If these instructions are used for the same channel, delete them, and reboot the PLC's power.

9. Presence of FLCRT, FLDEL, FLWR, FLRD, FLCMD, and FLSTRD instructions (in FX3U and FX3UC PLCs)

Verify that the FLCRT, FLDEL, FLWR, FLRD, FLCMD and FLSTRD instructions are not being used for the same channel.

If these instructions are used for the same channel, delete them, reboot the PLC's power.

8.7 Checking Programming Tool Setting

Verify that the setting contents in the programming tool are correct.

1. Checking the telephone number

Verify that the telephone number of the connection destination is set correctly.

2. Checking the AT command setting

Verify that the AT command is set correctly for the registered modem.

3. Checking the communication port

Verify that the communication port connected to the modem is set correctly.

→ For the programming tool setting, refer to Chapter 6.

8.8 Checking Absence/Presence of Errors

In FX3S, FX3G, FX3GC, FX3U and FX3UC PLCs, an error occurs when modem initialization is not possible. Verify that an error has not occurred.

1. Checking M8063

When a communication error occurs, M8063 turns ON and D8063 stores the corresponding error code.

2. Checking the error code

D8063 stores one of the following error codes:

	Error code	Contents of error
	6301	Parity error, overrun error or framing error
	6302	Defective communication character
	6303	Communication data sum mismatch
	6304	Defective data format
	6305	Defective command
	6306	Monitoring timeout
	6307	Modem initialization error
D8063	6308	N:N Network parameter error
D0003	6309	N:N Network setting error
	6312	Parallel link character error
	6313	Parallel link sum error
	6314	Parallel link format error
	6320	Inverter communication error
	6321	MODBUS communication error
	6330	Memory access error
	6340	Special adapter connection error

When modem initialization is disabled, D8063 stores the error code 6307. If D8063 stores any error code shown above, check the following items:

- Wiring
- · Modem specifications

8.9 Operation mode display [D8419 and D8439] (FX3S, FX3G, FX3GC, FX3U, FX3UC)

These devices store the communication type being used.

1. Detailed contents

These devices store the code of the communication type currently being used in the communication port. When communication port ch1 is used, D8419 stores the communication type.

When communication port ch2 is used, D8439 stores the communication type.

The table below shows the contents of the communication type codes.

Code	Description	
0	Programming communication	
1	PP modem mode	
2	Protocol dedicated to computer link	
3	N:N Network	
4	RS instruction	
5	RS2 instruction	
6	Parallel link	
7	Inverter instruction	
8	Variable analog potentiometer expansion board is used.	
9	MODBUS communication	
10	CF-ADP	
11	ENET-ADP	
12	Input/output expansion board is used.	

9. Related Information

9.1 ASCII Code Table

1. ASCII code table (7-bit code expressed in hexadecimal)

Hexadecimal	0	1	2	3	4	5	6	7
0		DLE	SP	0	@	Р	`	р
1	SOH	DC1	!	1	Α	Q	а	q
2	STX	DC2	"	2	В	R	b	r
3	ETX	DC3	#	3	С	S	С	s
4	EOT	DC4	\$	4	D	T	d	t
5	ENQ	NAK	%	5	Е	U	е	u
6	ACK	SYN	&	6	F	V	f	V
7	BEL	ETB	,	7	G	W	g	W
8	BS	CAN	(8	Н	Х	h	Х
9	HT	EM)	9	I	Υ	i	У
Α	LF	SUB	*	:	J	Z	j	Z
В	VT	ESC	+	;	K	[k	{
С	FF	FS	,	<	L	*1	I	
D	CR	GS	_	=	М]	m	}
E	SO	RS		>	N	^	n	~
F	SI	US	/	?	0	_	0	DEL

^{*1. \ (}ASCII CODE:5C) symbol is displayed as " " in Japanese.

2. Examples of ASCII codes

Decimal	ASCII		
Boomia	(hexadecimal)		
0	30		
1	31		
2	32		
3	33		
4	34		
5	35		
6	36		
7	37		
8	38		
9	39		

Alphabet	ASCII (hexadecimal)	Alphabet	ASCII (hexadecimal)
А	41	N	4E
В	42	0	4F
С	43	Р	50
D	44	Q	51
Е	45	R	52
F	46	S	53
G	47	Т	54
Н	48	U	55
	49	V	56
J	4A	W	57
K	4B	K	58
L	4C	Y	59
М	4D	Z	5A

Code	ASCII
Code	(hexadecimal)
STX	02
ETX	03
LF	0A
CR	0D

Symbol	ASCII (hexadecimal)
#	23
&	26
=	3D
*1	5C

^{*1. \ (}ASCII CODE:5C) symbol is displayed as " " in Japanese.

Appendix A: Discontinued models

The table below shows discontinued models of MELSEC-F Series PLCs and programming tools described in this manual.

Discontinued model	Production stop date	Repair acceptance period	
FX1	June 30, 2002	Until June 30, 2009	
FX2(FX)	June 30, 2002	Until June 30, 2009	
FX2C	June 30, 2002	Until June 30, 2009	
FX0	June 30, 2002	Until June 30, 2009	
FX0S	January 31, 2006	Until January 31, 2013	
FX0N	January 31, 2006	Until January 31, 2013	
FX2N	September 30, 2012	Until September 30, 2019	
FX2NC	September 30, 2012	Until September 30, 2019	
FX1s	December 31, 2015	Until December 31, 2022	
FX1N	December 31, 2015	Until December 31, 2022	
FX1NC	December 31, 2015	Until December 31, 2022	
FX1N-CNV-BD	December 31, 2015	Until December 31, 2022	
FX1N-232-BD	December 31, 2015	Until December 31, 2022	
FX1N-422-BD	December 31, 2015	Until December 31, 2022	
FX1N-485-BD	December 31, 2015	Until December 31, 2022	
FX2N-CNV-BD	December 31, 2015	Until December 31, 2022	
FX2N-232-BD	December 31, 2015	Until December 31, 2022	
FX2N-422-BD	December 31, 2015	Until December 31, 2022	
FX2N-485-BD	December 31, 2015	Until December 31, 2022	
FX-232ADP	June 30, 2002	Until June 30, 2009	
FX-485ADP	June 30, 2002	Until June 30, 2009	
FX2-40AW	June 30, 2002	Until June 30, 2009	
FX2-40AP	June 30, 2002	Until June 30, 2009	
FX0N-485ADP	January 31, 2006	Until January 31, 2013	
FX0N-232ADP	January 31, 2006	Until January 31, 2013	
FX2NC-232ADP	December 31, 2015	Until December 31, 2022	
FX2NC-485ADP	December 31, 2015	Until December 31, 2022	
FX-232AW	September 30, 2004	Until September 30, 2011	
FX-232AWC	June 30, 2004	Until June 30, 2011	
FX-422AW0	March 31, 2019	_	
FX-232DOPA	April 30, 2006	Until April 30, 2013	
FX3U-232ADP	September 30, 2013	Until September 30, 2020	
FX3U-485ADP	September 30, 2013	Until September 30, 2020	
FX2N-32ASI-M	June 30, 2010	Until June 30, 2017	
FX2N-16LNK-M	September 30, 2012	Until September 30, 2019	
FX2N-16CCL-M	September 30, 2012	Until September 30, 2019	
FX-10DM(-E)	September 30, 2017	Until September 30, 2024	
FX-2PIF	June 30, 2008	Until June 30, 2015	
FX-PCS/WIN(-E)	March 31, 2013	_	
FX-10P-E	June 30, 2008	Until June 30, 2015	
FX-10P-SET0	June 30, 2008	Until June 30, 2015	
FX-20P(-E)-SET0	December 31, 2012	Until December 31, 2019	
FX2N-ROM-E1	March 31, 2017	2000	

Discontinued model	Production stop date	Repair acceptance period
FX2NC-ROM-CE1	March 31, 2017	_
FX-10DU(-E)	December 31, 2012	Until December 31, 2019
FX-20DU(-E)	June 30, 2008	Until June 30, 2015
FX-20DU-CAB0	June 30, 2008	Until June 30, 2015
FX-25DU	September 30, 2002	Until September 30, 2009
FX-30DU(-B)	September 30, 2002	Until September 30, 2009
FX-40DU(-B)	September 30, 2002	Until September 30, 2009
FX-40DU-TK(B)	September 30, 2002	Until September 30, 2009
FX-50DU-TK(S)	September 30, 2002	Until September 30, 2009

MEMO

Warranty

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range
If any faults or defects (hereinafter "Failure") found to be the
responsibility of Mitsubishi occurs during use of the product
within the gratis warranty term, the product shall be repaired
at no cost via the sales representative or Mitsubishi Service
Company. However, if repairs are required onsite at
domestic or overseas location, expenses to send an
engineer will be solely at the customer's discretion.
Mitsubishi shall not be held responsible for any
re-commissioning, maintenance, or testing on-site that
involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place. Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

- (1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.
- (2) Even within the gratis warranty term, repairs shall be charged for in the following cases.
 - Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
 - 2. Failure caused by unapproved modifications, etc., to the product by the user.
 - When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
 - Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
 - Relay failure or output contact failure caused by usage beyond the specified Life of contact (cycles).
 - Failure caused by external irresistible forces such as fires or abnormal voltages, and failure caused by force majeure such as earthquakes, lightning, wind and water damage.
 - Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
 - Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

- Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued.
 - Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.
- (2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to:

- Damages caused by any cause found not to be the responsibility of Mitsubishi.
- (2) Loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products.
- (3) Special damages and secondary damages whether foreseeable or not, compensation for accidents, and compensation for damages to products other than Mitsubishi products.
- (4) Replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

6. Product application

- (1) In using the Mitsubishi MELSEC programmable logic controller, the usage conditions shall be that the application will not lead to a major accident even if any problem or fault should occur in the programmable logic controller device, and that backup and fail-safe functions are systematically provided outside of the device for any problem or fault.
- (2) The Mitsubishi programmable logic controller has been designed and manufactured for applications in general industries, etc. Thus, applications in which the public could be affected such as in nuclear power plants and other power plants operated by respective power companies, and applications in which a special quality assurance system is required, such as for Railway companies or Public service purposes shall be excluded from the programmable logic controller applications.
 - In addition, applications in which human life or property that could be greatly affected, such as in aircraft, medical applications, incineration and fuel devices, manned transportation, equipment for recreation and amusement, and safety devices, shall also be excluded from the programmable logic controller range of applications.
 - However, in certain cases, some applications may be possible, providing the user consults their local Mitsubishi representative outlining the special requirements of the project, and providing that all parties concerned agree to the special circumstances, solely at the users discretion.
- (3) Mitsubishi shall have no responsibility or liability for any problems involving programmable controller trouble and system trouble caused by DoS attacks, unauthorized access, computer viruses, and other cyberattacks.

Revised History

Date	Revision	Description		
7/2005	Α	First Edition		
2/2006	В	 The status of the DR (DSR) signal is made checkable when RS2 (serial data transfer 2) is in operation. Parameters in A700 Series are added. Clerical error is modified 		
11/2007	С	 FX3UC(D,DSS) Series are added. FX3U-232ADP-MB, FX3U-485ADP-MB are added. Inverter E700 Series are added. (FX3U, FX3UC Series corresponding) Discontinued models are added. (Appendix A) The addition and the change of other coverage. Clerical error is modified. 		
11/2008	D	 FX3G Series are added. Inverter E700 Series option FR-E7TR are added. Inverter D700 Series are added. (FX3G, FX3U, FX3UC Series corresponding) Discontinued models are added. (Appendix A) Clerical error is modified. 		
6/2009	Е	 FX-30P are added. Caution on using CF card special adapter is added. Explanation corrections for manufacture's serial number. The addition and the change of other coverage. Clerical error is modified. 		
11/2009	F	 The baud rate of the RS instruction/RS2 instruction/inverter communication/computer link of the FX3U and FX3UC Series corresponds to "38400bps". The addition and the change of other coverage. Clerical error is modified. 		
8/2010	G	 Inverter multi command (FNC275 IVMC) are added. FX3UC(DS) Series are added. Caution on using VRRD and VRSC command is added. (FX3U, FX3UC Series corresponding) GX Works2 are added. Explanation corrections for manufacturer's serial number and lot number. The addition and the change of other coverage. Clerical error is modified. 		
7/2011	Н	 FX3G Series supports the IVMC instruction. Cautions on setting up the N:N Network added. The addition and the change of other coverage. Clerical error is modified. 		
2/2012	J	 FX3GC Series are added. FX3U-16CCL-M is added to system configurations. The addition and the change of other coverage. Clerical error is modified. 		
5/2013	К	 FX3s Series are added. FX3U-ENET-ADP is added to system configurations. Description of the programming tool is changed accompanied by change of the programming tool from GX Developer to GX Works2. Discontinued models are added. The addition and the change of other coverage. Clerical error is modified. 		

Date	Revision	Description		
9/2013	L	FX3G-485-BD-RJ is added to system configurations.		
		Discontinued models are added. The addition and the change of other severage.		
		 The addition and the change of other coverage. Clerical error is modified. 		
4/2015	M	A part of the cover design is changed.		
7/2016	N	Inverter F800, A800 Series are added.		
772010	.,	(FX3S, FX3G, FX3GC, FX3U, FX3UC Series corresponding)		
		FX ₃ U-128ASL-M is added to system configurations.		
		Discontinued models are added.The change of warranty coverage.		
		Clerical error is modified.		
11/2017	Р	The change of time at which the communication settings of RS/RS2 instruction		
		become valid.		
		Discontinued models are added.		
5/2019	Q	Discontinued models are added.Clerical error is modified.		
8/2020	R	Precautions for product security are added.		
	1	recautions for product security are added.		

FX SERIES PROGRAMMABLE CONTROLLERS

USER'S MANUAL

Data Communication Edition

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE: TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN

MODEL	FX-U-COMMU-E
MODEL CODE	09R715