



ZEF005953302

**ezABSO®**

**CC-Link**

**EZA-MACCL-01G**

**Specifications & Instruction Manual**

**CE**



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## INTRODUCTION

Thank you very much for purchasing our product.

Before operating this product, be sure to carefully read this manual so that you may fully understand the product, safety instructions and precautions.

- Please submit this manual to the operators actually involved in operation.
- Please keep this manual in a handy place.

# GENERAL SAFETY RULES



## ● Application Limitation

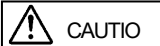
This product is not designed to be used under any situation affecting human life. When you are considering using this product for special purposes such as medical equipment, aerospace equipment, nuclear power control systems, traffic systems, and etc., please consult with NSD.

This product is designed to be used under the industrial environments categorized in Class A device. The supplier and user may be required to take appropriate measures.



## ● Signal Words

Safety precautions in this guide are classified into DANGER and CAUTION.





Symbol	Meaning
 DANGER	Incorrect handling may cause a hazardous situation that will result in death or serious injury.
 CAUTION	Incorrect handling may cause a hazardous situation that will result in moderate injury or physical damage.




Instructions accompanied by a symbol  may also result in serious damage or injury. Be sure to follow the all instructions accompanied by the symbol.

## ● Graphic Symbols



Symbol	Meaning
	Indicates prohibited items.
	Indicates items that must be performed to.

### 1. Handling Precautions




 DANGER	
	- Do not touch components inside of ezABSO; otherwise, it will cause electric shock.
	- Do not touch to ezABSO during operation; otherwise, it will cause injury. - Do not damage the cable by applying excessive load, placing heavy objects on it, or clamping; otherwise, it will cause electric shock or fire.
	- Turn the power supply OFF before wiring, transporting, and inspecting ezABSO; otherwise, it may cause electric shock. - Provide an external safety circuit so that the entire system functions safely even when ezABSO is faulty.

 CAUTION	
	- Do not use ezABSO in the following places; the atmosphere of the corrosion, the atmosphere of the flammable vapor, and the side of the combustibility. Doing so may result in fire or ezABSO may become faulty. -Do not use in areas where strong magnetic fields exist; otherwise, it will cause injury or malfunction.
	- Be sure to use ezABSO in the environment designated by the general specifications in the manual. Failure to do so may result in electric shock, fire, malfunction or ezABSO failure. - Be sure to use the specified combination of ezABSO and cable; otherwise, it may cause fire or ezABSO failure.




### 2. Transport

 CAUTION	
	- Do not hold the cable or shaft of ezABSO during transport; otherwise, it will cause injury or failure.



### 3. Storage

 CAUTION	
	- Do not store ezABSO in a place exposed to water, or toxic gas and liquid. - Do not to store in areas where strong magnetic fields exist.
	- Be sure to store ezABSO in designed temperature and humidity range, and do not exposed to direct sunlight. - Be sure to consult with NSD when ezABSO is stored for long periods.




### 4. Installation

 CAUTION	
	- Do not step on ezABSO or place heavy objects on ezABSO; otherwise, it will cause injury or malfunction. - Do not subject ezABSO to strong impact shocks; otherwise, it will cause ezABSO failure.
	- Be sure that ezABSO mounting adequately supports its weight. Failure to do so may result in ezABSO falling and possibly causing injury. -Mount ezABSO in the prescribed manner. Failure to do so may cause ezABSO to fall or malfunction, possible resulting in injury. -Be sure to use a coupling device to link shafts; otherwise, it will cause injury, malfunction, or ezABSO failure.



### 5. Wiring

 CAUTION	
	- Be sure to keep the cable at least 300 mm away from the power line; otherwise it may malfunction. - Be sure to connect all cables correctly; otherwise, it may cause malfunction or ezABSO failure.



### 6. Operation

 CAUTION	
	- Do not change the ezABSO's function switch settings during the operation; otherwise, it will cause injury. - Do not approach the machine after instantaneous power failure has been recovered. Doing so may result in injury if the machine starts abruptly.
	- Be sure to check that the power supply specifications are correct; otherwise, it may cause ezABSO failure. - Be sure to provide an external emergency stop circuit so that operation can be stopped with power supply terminated immediately. - Be sure to conduct independent trial runs for ezABSO before mounting ezABSO to the machine; otherwise, it may cause injury. - When an error occurs, be sure to eliminate the cause, ensure safety, and reset the error before restarting operation; otherwise, it may cause injury.

### 7. Maintenance and Inspection

 CAUTION	
	- Do not disassemble, remodel, or repair ezABSO; otherwise, it will cause electric shock, fire, and ezABSO failure.

### 8. Disposal

 CAUTION	
	- Be sure to handle ezABSO as industrial waste while disposing of it.

## REVISION HISTORY

The Document No. appears at the upper right of this manual's cover page.

Document No.	Date	Revision Description
ZEF005953300	5, Feb., 2021	1st Edition Japanese document: ZEF005953100
ZEF005953301	10, Mar., 2023	2nd Edition Japanese document: ZEF005953101
ZEF005953302	26, July, 2023	3rd Edition Japanese document: ZEF005953102

# 1. OVERVIEW

EZA-MACCL-01G (hereinafter referred to as EZA-MACCL) is a multi-turn type rotary encoder which adopts the electromagnetic induction method. A converter is incorporated in the sensor, and the machine positions can be detected by only a sensor unit.

The open field network "CC-Link" is used for communicating with the host controller.

## ●A difference between existing models and EZA-MACCL-01G

The cable gland shape is different between the following existing models and EZA-MACCL-01G.

- EZA-MACCL-01F

- EZA-MACCL-01T

Change to the cable gland supplied with this product when replacing the existing model.

## 1-1. Features

### (1) Long-life

No electrolytic capacitor, light-emitting element, light-receiving element, and variable resistor are used.

### (2) Superior durability

Withstands vibrations and impact shocks because the EZA-MACCL doesn't have a glass slit plate.

### (3) Position data

Detects maximum 8,778 turns of the position data.

The maximum divisions per turn are 262,144 divisions. (The value can be changed by the parameter.)

### (4) Connection with the CC-Link

The position, preset, monitor, and parameter data can be transmitted via "CC-Link".

### (5) Error detection function

Detects a power supply voltage, temperature, and usage status errors (alarm).

The use status such as a power supply voltage, temperature, and operation time can be monitored by CC-Link or ezSCOPE.

### (6) Preset function

The position data can be set to a desired value by the master device of the CC-Link.

### (7) Parameter

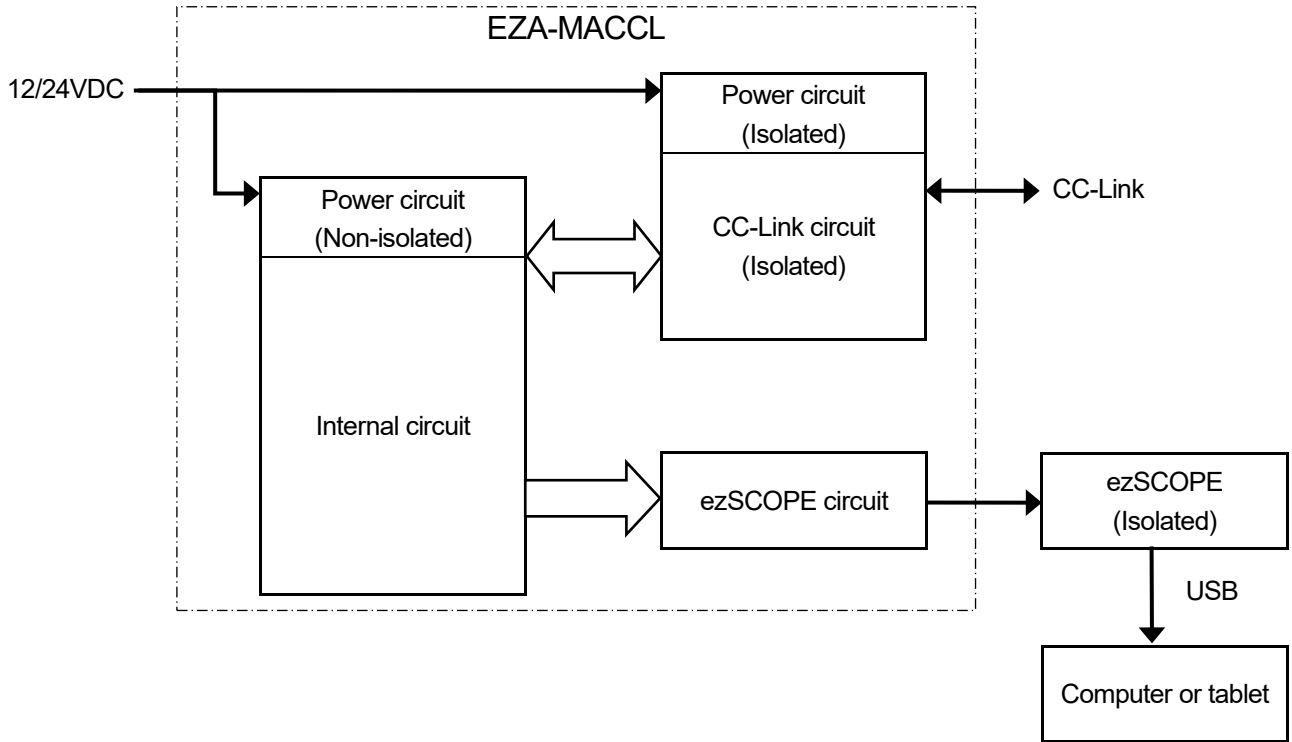
The operation (parameter data) can be changed by the configuration tool for CC-Link (software for CC-Link configuration) and CSP+ file.

### (8) ezSCOPE

With using the device (ezSCOPE) for monitoring, EZA-MACCL status can be checked by software for ezSCOPE of the computer or tablet.



## 1-2. Internal Block Diagram



## 2. MODEL SELECTION WHEN ORDERING

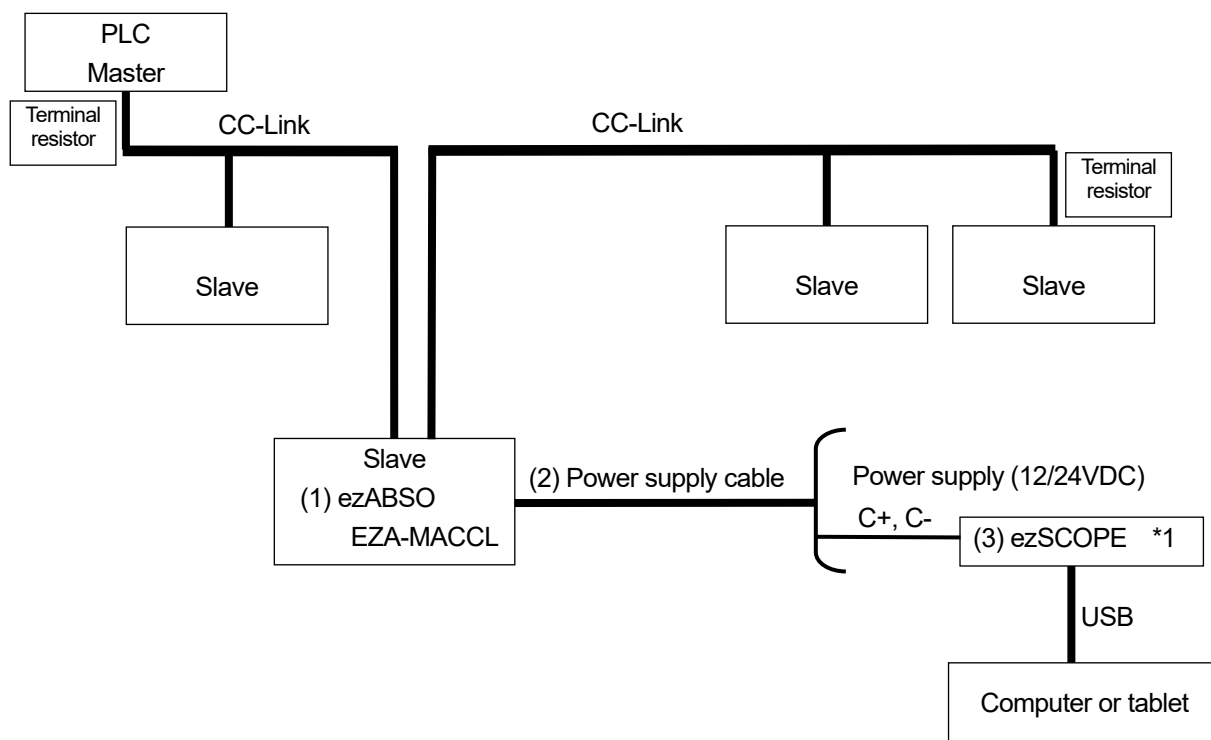
The following figure indicates the connection configuration of EZA-MACCL.

Before ordering, refer to the connection configuration and model list. Please prepare by customer except (1) and (3) in the connection configuration.

For the PLC, select the model which can set the parameter by using CSP + file.

Refer to "8-4. Parameter Setting" for the parameter setting.

### 2-1. Connection configuration



\*1: ezSCOPE isn't needed for the normal operation.

ezSCOPE is a monitoring device for EZA-MACCL. Use it for monitoring the sensor system normality or operation status.

ezSCOPE is connected to EZA-MACCL and computer with two signals (C+ and C-) of power supply cable and USB cable. EZA-MACCL data is sent to the computer or tablet by the software for ezSCOPE.

The signal line between EZA-MACCL and ezSCOPE is isolated, thus the sensor operation isn't affected from the disturbance.

### 2-2. Model List

No.	Models	Descriptions
(1)	EZA-MACCL-01G	ezABSO - Multi-turn type - CC-Link - Cable connection method: Cable gland
(2)	KVC-36SBT 4(2P) x 0.5mm <sup>2</sup>	ezABSO power supply cable (recommended product)
(3)	EZSCP-01	ezSCOPE
	EZSCP-TXMDL-01	Infrared transmission module (Option)

### 3. SPECIFICATIONS

#### 3-1. EZA-MACCL Specifications

##### 3-1-1. General specification

Items	Specifications
Power supply voltage	10.8 to 28.8 DCV (including ripple)
Current consumption	240mA or less (at 12DCV) 120mA or less (at 24DCV)
Insulation resistance	10 M-Ohms or more between DC power terminals and case (by 500 VDC insulation resistance tester)
Withstand voltage	500 VAC, 60Hz for 1 minute between DC power terminals and case
Vibration resistance	200m/s <sup>2</sup> 55 to 2,000Hz (JIS C 60068-2-6)
Shock resistance	2,000m/s <sup>2</sup> (6ms, JIS C 60068-2-27)
Ambient operating temperature *1	-20 to +80°C (No condensation)
Ambient storage temperature	-20 to +90°C (No condensation)
Outside dimension (mm)	[Refer to dimensions for details.]
Mass	Approx. 0.5kg

\*1: The ambient operation temperature indicates the surface temperature of EZA-MACCL's case side.  
Pay attention to EZA-MACCL mounting part because it might be high temperature even though the ambient temperature is low.

##### 3-1-2. Mechanical specification

Items	Specifications
Position detection format	Electromagnetic induction method
Shaft diameter	10mm
Protection rating	IP66 Shaft seal part: IP64 (during the shaft rotation)
Permissible shaft load	Radial: 40N Thrust: 20N
Permissible mechanical speed	6,000r/min (continuous operation)
Linearity error	0.03° (±0.015° )
Moment of inertia	1 x 10 <sup>-6</sup> kg·m <sup>2</sup>
Starting torque	0.02N·m

### 3-1-3. Function specification

Items	Specifications
Total number of turns	8,778
Total number of divisions	Max. 2,301,100,032 divisions (8,778 turns x 262,144 per turn) *1 Factory setting: 575,275,008 divisions (8,778 turns x 65,536 per turn)
Output code	Binary code
Internal updating cycle	0.4ms (Position data, Speed data)
Error detection	Power supply voltage alarm, Internal temperature alarm, Rotation speed alarm, Setting alarm Sensor error, Memory error, Hardware error, Switch setting error
Monitor function	EZA-MACCL can be connected to ezSCOPE.
Monitor LED	READY: System ready ERROR: Error occurred L RUN: Connection to CC-Link master
Switch setting	Station No. setting switch for CC-Link Baud rate setting for CC-Link
Function, parameter setting	Position data increase direction Current position preset function selection Scaling function selection Scaling data Sensor low-pass filter Sensor median filter

\*1: The number of divisions can be changed by the parameter setting (scaling data).  
262,144 and 65,536 are number of divisions per turn.

### 3-1-4. CC-Link specification

Items	Specifications
Communication Specification	CC-Link Ver.1.10
Number of occupied station	1 station
CC-Link station type	Remote device station
Number of remote points	Remote input (RX): 32 points Remote output (RY): 32 points Remote register (RWw): 4 words Remote register (RWr): 4 words
Communication speed	10M / 5M / 2.5M / 625k / 156kbps

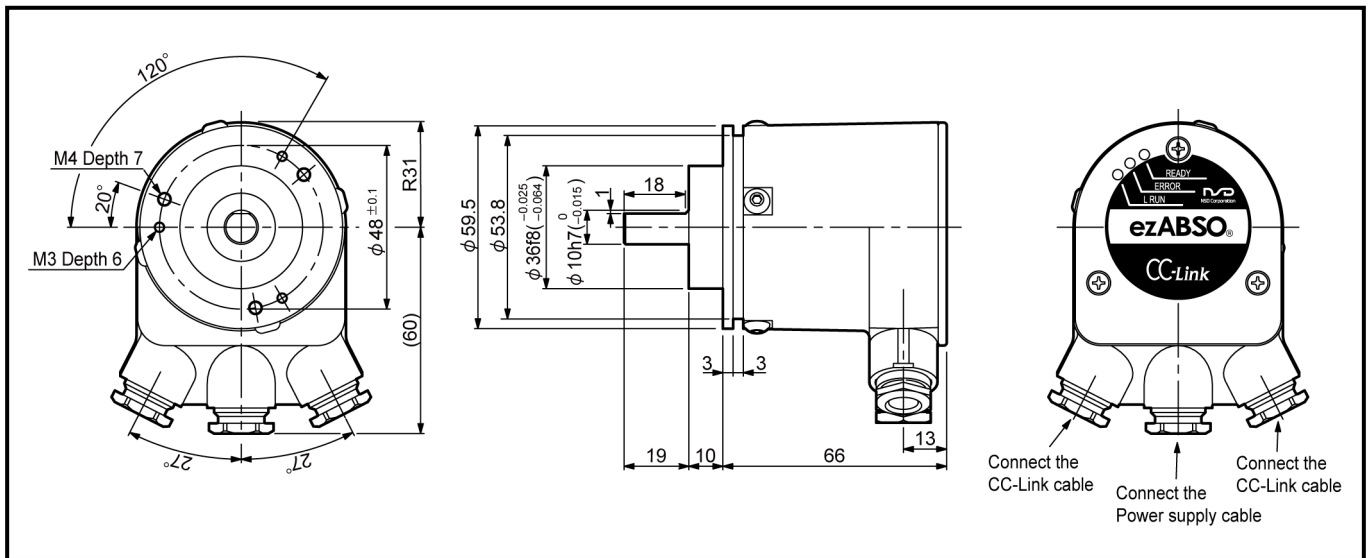
### 3-1-5. Terminal block for internal wiring specification

Items		Specifications	Remarks
Terminal block model		SPTA 1/12-3,5  (Manufactured by PHOENIX CONTACT GmbH & Co. KG)	—
Pin spacing		3.5mm	—
Pin spacing		8mm	—
Wire size	Solid wire	0.2mm <sup>2</sup> to 1.5mm <sup>2</sup>	—
	Flexible wire	0.2mm <sup>2</sup> to 1mm <sup>2</sup> (AWG24 to AWG16)	—
Ferrule (Rod terminal)		0.25mm <sup>2</sup> to 0.75mm <sup>2</sup>	Cover the rod terminals with the tubes in order to prevent contacting the rod terminals when using them.

\*: Insert the wire by pressing the orange part on the terminal block if it is inserted to the terminal block directly.  
Remove the wire by pressing the orange part of the terminal block when removing the wiring.

## 4. DIMENSIONS

Units: mm

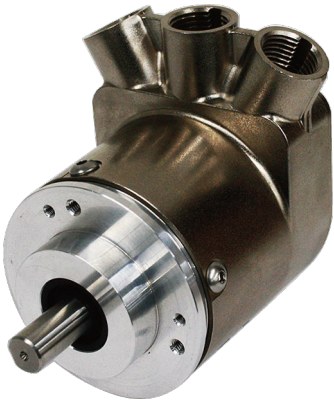








## 5. CHECKING THE CONTENTS OF THE SHIPPING CASE

Open the packing case, and verify that all items are present.

### Packing list

①(EZA-MACCL-01G) is shipped with ② (sealing plug) and ③(cable gland) which are mounted on it.

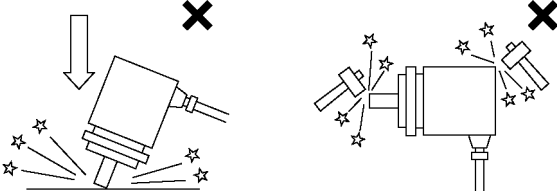
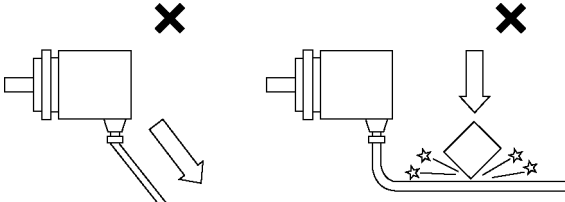
No.	①	②	③	
Shape		 <p>*: Insert this product if the cable isn't inserted in the cable gland.</p>	Push nut	Spacer
				
			Rubber bush	Contact sleeve
				
			Double ring	
				
Model	EZA-MACCL-01G	Sealing plug	Cable gland	
Quantity	1 unit	1 piece	3 pieces	

## 6. INSTALLATION

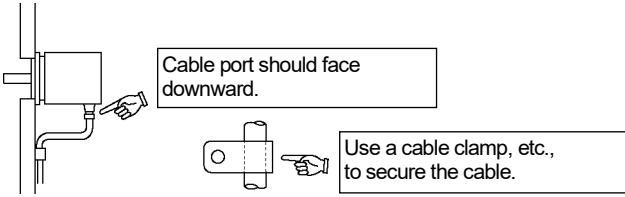
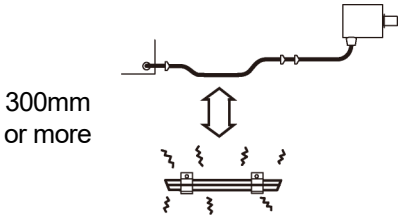
### 6-1. EZA-MACCL Installation Condition and Precaution

The installation conditions and precautions for EZA-MACCL are described in this section.

#### ● Handling of EZA-MACCL

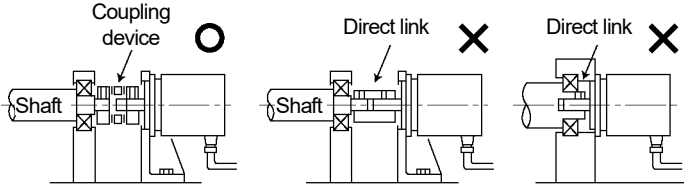
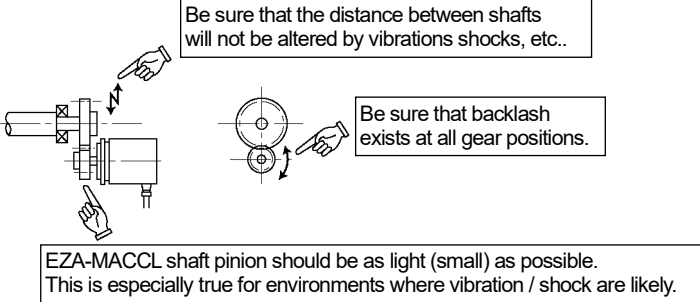
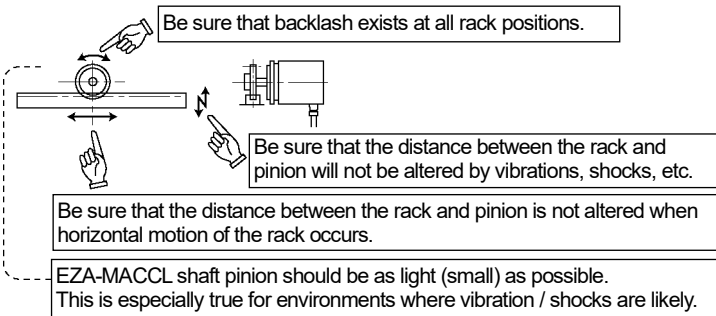
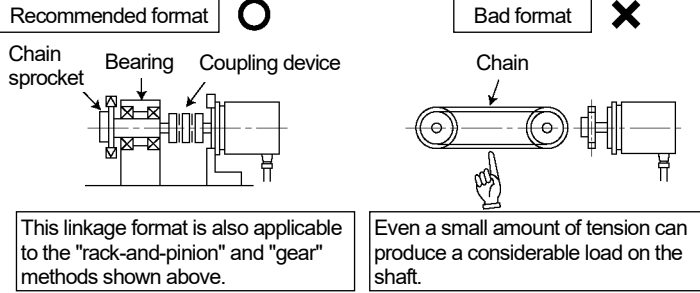
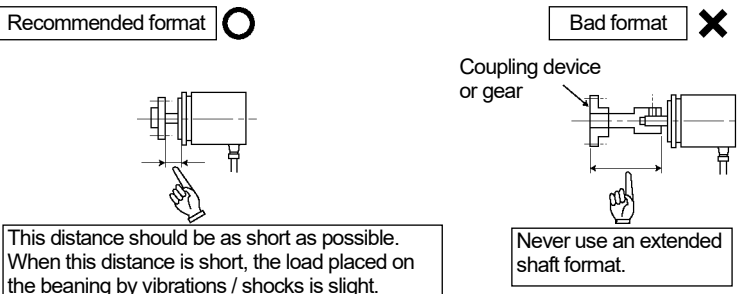
Item	Explanation	Precaution
(1) Main unit	Do not loose a screw or nut except the rear lid. Do not disassemble or remodel EZA-MACCL. Secure tightly with screws on the rear lid before the operation.	—
(2) Main unit	Never drop EZA-MACCL, or subject it to excessive forces or shocks.  	—
(3) Main unit	Do not allow any foreign object (e.g. cutting chips, wire strips) to get into EZA-MACCL.	—
(4) Main unit	Never directly touch this EZA-MACCL's conductive areas.	—
(5) Cable	Avoid stepping on, or applying excessive stress to the cable.  	—

● Mounting of EZA-MACCL

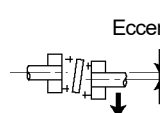
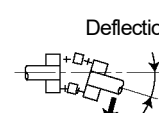
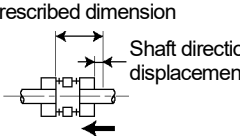

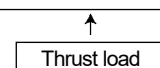
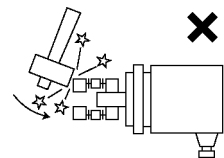
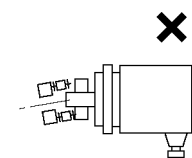
Item	Explanation	Precaution
(1) Mounting	Install EZA-MACCL by referring to “4. DIMENSIONS”.	—
(2) Cable port	<p>Cable port should face downward.</p>  <p>The diagram illustrates the correct installation of the cable port. On the left, a hand points to the cable port of the EZA-MACCL unit, which is mounted on a wall. A callout box indicates that the cable port should face downward. On the right, a hand points to a cable clamp being used to secure the cable to the wall. A callout box indicates that a cable clamp, etc., should be used to secure the cable.</p>	—
(3) Cable	Use a flexible cable if a cable moves.	—
(4) Wiring	<p>The cable should be located at least 300mm away from power lines and other lines which generate a high level of electrical noise.</p>  <p>The diagram shows a cable running horizontally. Below it, a power line is shown with electrical noise symbols (zig-zags) around it. A double-headed vertical arrow indicates a distance of 300mm or more between the cable and the power line.</p>	—
(5) Wiring	<p>EZA-MACCL has electrical parts inside. Never subject it to excessive shocks by tools.</p>	<p>The performance of EZA-MACCL might decline or EZA-MACCL might have a malfunction.</p>
(6) Wiring	Be sure to shut off all power before executing wiring, installing, or uninstalling.	—



● Mounting of EZA-MACCL

Item	Explanation	Precaution
(1) Coupling of machine shaft and EZA-MACCL shaft	<p>Be sure to use a coupling device to link the 2 shafts.</p> 	A "direct-link" installation will result in shaft fatigue and / or breakage after using long periods.
(2) For gear-type linkage	<p>If a gear linkage is used, be sure that some backlash exists.</p> 	Incorrect gear mounting can result in shaft bending or breakage.
(3) For rack and pinion type linkage	<p>Be sure that backlash exists at all rack positions.</p> 	Incorrect rack and pinion mounting can result in shaft bending or breakage.
(4) Chain or timing belt linkage	<p>When a chain or timing belt linkage format is used, there is an inherent risk of the shaft's load being increased by the resulting tension. Therefore, a bearing should be used, with the shafts being linked by a coupling device immediately behind the bearing.</p> 	-
(5) Shaft mounting position	<p>The coupling device or gear should be attached to the shaft at a point which is as near to the EZA-MACCL body as possible.</p> 	-

●Coupling for EZA-MACCL

Item	Explanation	Precaution
<p>(1) Coupling device selection precaution</p>	<p>1. Selection of the coupling device should be based on the following factors;</p> <ul style="list-style-type: none"> <li>- Amount of a mounting error caused by machine design.</li> <li>- Permissible error of coupling device.</li> <li>- Reaction force of coupling device.</li> <li>- Permissible shaft load of EZA-MACCL.</li> </ul> <div style="display: flex; justify-content: space-around; align-items: center; margin: 10px 0;"> <div style="border: 1px solid black; padding: 5px; font-size: small;">Amount of a mounting error caused by machine design.</div> <div style="font-size: 2em;">&lt;</div> <div style="border: 1px solid black; padding: 5px; font-size: small;">Permissible error of coupling device.</div> <div style="font-size: 2em;">&lt;</div> <div style="border: 1px solid black; padding: 5px; font-size: small;">Reaction force of coupling device.</div> <div style="font-size: 2em;">&lt;</div> <div style="border: 1px solid black; padding: 5px; font-size: small;">Permissible shaft load of EZA-MACCL.</div> </div> <p><b>Mounting error</b></p> <div style="display: flex; justify-content: space-around; align-items: center; margin: 10px 0;"> <div style="text-align: center;">  <p>Eccentricity</p> <div style="border: 1px solid black; padding: 2px; font-size: x-small;">Load generated by the eccentricity.</div> </div> <div style="text-align: center;">  <p>Deflection</p> <div style="border: 1px solid black; padding: 2px; font-size: x-small;">Load generated by the deflection.</div> </div> <div style="text-align: center;">  <p>Prescribed dimension Shaft direction displacement</p> <div style="border: 1px solid black; padding: 2px; font-size: x-small;">Load generated by the shaft direction displacement.</div> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;">  <p>Radial load</p> </div> <div style="text-align: center;">  <p>Thrust load</p> </div> </div> <p>2. Be sure to select a coupling device with an adequate transmission torque surplus relative to the EZA-MACCL shaft's torque.</p>	<p>If the selected coupling device is larger than necessary (When used in high vibration/shock environments), the load which is applied to the shaft by the vibrations/shocks will be increased by the weight of the coupling device.</p> <p>Excessive force applied to the shaft might deform the coupling and reduce durability.</p>
<p>(2) Coupling device installation precaution</p>	<p>Avoid bending or damaging the coupling.</p> <div style="display: flex; justify-content: center; align-items: center; margin-top: 20px;">  <div style="margin: 0 20px; font-size: 2em;">×</div>  </div>	
<p>(3) Recommended coupling</p>	<p>Micro-coupling (Manufactured by Daido Precision Industries Ltd.)</p> <p>If there is a possibility of electric corrosion on the bearing, an insulated micro coupling is recommended.</p>	—

## 6-2. Cable Connection

### 6-2-1. Wiring precautions for the cables

- (1) Do not bind or close the cable which is connected to EZA-MACCL with the main circuit cable and the power supply cable. If location near the above cables is unavoidable, the cable ducts should be separated with individual wiring conduits being provided.
- (2) When wiring conduits are used, they should be securely grounded.
- (3) Use all cable gland parts, and tighten the cable gland securely.  
Tighten the push nut of cable gland securely.  
It will cause the connection failure, deterioration of waterproof, damage of the internal board if the cable gland isn't tightened. Refer to "6-2-4. Precaution for the cable gland".
- (4) Use the robotic cables for movable parts.
- (5) The shield wire should be grounded at the spacious area for preventing noises.

### 6-2-2. Wiring precautions for the power supply cable

- (1) Use the twist pair cable with shield.
- (2) Twist the wires for the power supply (24VDC and 0V) and ezSCOPE (C+ and C-) individually in order to prevent noises, and use combinations of the twist.
- (3) The cable length should be decided with considering the voltage drops. (Refer to \*1)
- (4) Use the cable whose finished outer diameter must be 7 to 8mm.  
It might cause the connection failure, deterioration of waterproof, and damage of the internal board.

Recommended cable

Cable	Model	Manufacturer
Power supply cable	KVC-36SBT 4(2P) x 0.5mm <sup>2</sup> *1	Kuramo Electric Co., LTD.

\*1: The maximum cable length will be calculated by following formulas if the supply voltage is 24V±10%.  
(Refer to "ezSCOPE specifications and instruction manual" for cable models and maximum cable lengths between EZA-MACCL and ezSCOPE.)









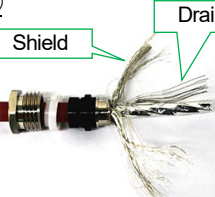
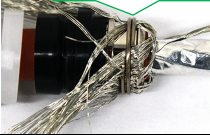

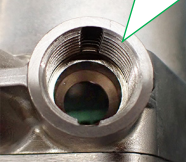

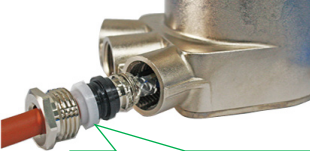
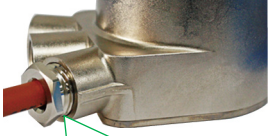
Conductor resistance of KVC-36SBT 4(2P) x 0.5mm<sup>2</sup>: 34.3Ω/km [20°C or less] (loop resistance 68.6Ω/km)  
Current consumption of EZA-MACCL: 0.24A (at 12VDC of power supply voltage)  
Allowable voltage difference of cable: (24V x 0.9) - 10.8V = 10.8V  
Allowable resistance value of cable: 10.8V / 0.24A = 45Ω  
Maximum cable length: 45Ω / 68.6Ω = 0.655km → 655m

### 6-2-3. Wiring precautions for the CC-Link cable

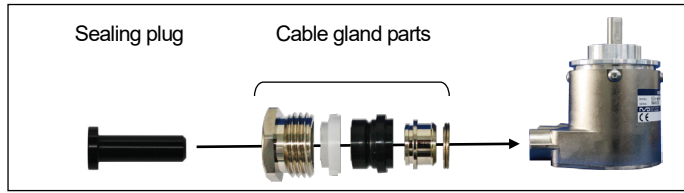
- (1) Use the cable for CC-Link whose finished outer diameter must be 7 to 8mm.  
It might cause the connection failure, deterioration of waterproof, and damage of the internal board
- (2) For CC-Link wiring, refer to the following;  
- CC-Link Cable Wiring Manual (Download the manual from CC-Link web site.)
- (3) Numbers of the connection units and relay connecting parts have a limitation when the CC-Link cable is connected to a terminal block or connector.  
For preventing the communication error, use CC-Link repeater unit if numbers exceed.  
 $64 \geq \text{number of master or slave units} + \text{number of relay connecting parts}$

## 6-2-4. Precaution for the cable gland

- (1) Process the shield of CC-Link cable and power supply cable on the EZA-MACCL side by referring to the following photos for preventing noises.

Cable Gland Parts		Push nut	Spacer	Rubber bush	Contact sleeve	Double ring
						
①		②		<p>① Check that there is no foreign object adhering to the rubber bush. If adhering, remove it.</p> <p>② Insert the contact sleeve to the rubber bush. (Insert the contact sleeve in correct direction.)</p>		
③	<p>Insert the spacer in correct direction.</p>  <p>Be careful not to catch any foreign object between the cable and the rubber bush.</p>	④	<p>③ Insert the cable to the push nut, spacer, and parts assembled in step ②. At this time, be careful not to catch any foreign object between the cable and the rubber bush.</p> <p><b>NOTE</b> Foreign objects caught between the cable and the rubber bush may cause the deterioration of waterproof.</p> <p>④ Strip the sheath of the cable approximately 40mm.</p>			
⑤	<p>Shield</p> <p>Drain wire</p> 	⑥	<p>⑤ Separate the shield from the drain wire.</p> <p>⑥ Fold all shields back, and cover the contact sleeve. Connect the drain wire to the SLD of the terminal block for internal wiring. (Connect portion of shield to the SLD if there is no drain wire.)</p>			
⑦	<p>Put the double ring on the contact sleeve covered with the shield.</p> 	⑧	<p>⑦ Put the double ring on the contact sleeve covered with the shield.</p> <p>⑧ Cut the shield at the dashed line to avoiding the rubber bush being covered with the shield.</p>			
⑨	<p>Insulation tube</p> 	⑩	<p>⑨ The drain wire (portion of the shield) connected to the SLD of the terminal block for the internal wiring should be covered with the insulation tube.</p> <p>⑩ Strip the cover for each wire. (Stripping length: 8mm)</p>			
⑪	<p>Cable gland inserting part</p> 		<p>Sealing part</p> 	<p>⑪ Check that there is no foreign object adhering to the cable gland inserting part of the case and the rubber bush of the cable gland. If adhering, remove it. Be especially careful as the contact sleeve side becomes the sealing part of the rubber bush.</p> <p><b>NOTE</b> Foreign objects caught between the case and the rubber bush may cause the deterioration of waterproof.</p>		
⑫	 <p>Fit the projection of the spacer into the groove position.</p>	⑬	<p>⑫ Insert to EZA-MACCL in order to prevent the shield slipping off from the contact sleeve.</p> <p>⑬ Tighten the push nut by wrench. (Tightening torque: 3N·m)</p>			
			 <p>Tighten the push nut by designated torque.</p>			

- (2) Process following methods on the power supply and master sides for preventing noises.
  - Ground the shield section of the power supply cable at the spacious area on the power supply side.
  - Ground the shield section of CC-Link cable at the spacious area on the master side.
- (3) Insert the sealing plug to the cable insertion hole for preventing water and dusts if a cable isn't inserted to the hole.



- (4) Tighten the push nut of cable gland to the designated tightening torque.  
(Tightening torque: 3N·m)

### 6-3. Ground

EZA-MACCL case must be securely grounded (ground resistance of 100 ohm or less) to prevent electrical shocks and noises

### 6-4. Internal Wiring

The rear lid can be taken off when removing screws (3-piece) which is on the opposite side of the shaft. Wire and set the switches.

For the switch setting, refer to "7-2. Switch Setting".

For the wire specifications, refer to "3-1-5. Terminal block for internal wiring specification".

ezSCOPE wiring

Power supply

Cable gland for CC-Link cable

Cable gland for Power supply cable

Cable gland for CC-Link cable

**Wiring for the CC-Link cable**

Panel display	Wire color
DA	Blue
DB	White
DG	Yellow
SLD	Drain wire Shield wire

CC-Link cable can be connected to ether terminal for the internal wiring.

**Wiring for the power supply cable**

\*: Wire color when using KVC-36SBT 4(2P)×0.5mm<sup>2</sup>

Panel display	Wire color	
DC24V	V+	Red
	V-	Red / White
ezSCOPE	C+	Black
	C-	Black / White

For power supply (24VDC)

For ezSCOPE

\*: Press the orange part on the terminal block with the flat-blade screwdriver when inserting or extracting the wire.



## NOTE

- The terminal resistor and CC-Link cable should be connected to separate wiring parts when installing the terminal resistor in EZA-MACCL. The metal part of the terminal resistor should be covered with the tube in order to avoid contacting the case.  
Fix the terminal resistor with a tape when using it in a place with vibration.
- Insert the sealing plug to the cable gland when a cable isn't inserted, and tighten the push nut.  
(Use all cable gland parts.)
- Check the wire connecting to the terminal block securely.
- Electrical components are used inside of EZA-MACCL. Do not give impact shocks to them by tools. It may cause failure.
- Do not allow any cutting chips and wire strips to get into EZA-MACCL.
- After wiring internal cables and setting the switches, mount the rear lid securely without a wire being caught in it.
- Cover the rod terminals with the tubes in order to prevent contacting the rod terminals or the rear lid when using them.
- Don't insert two or more wires or rod terminals in one terminal.
- Refer to "3-1-5. Terminal block for internal wiring specification" for specifications of wires connected to the terminal block and rod terminals. Do not apply excessive force to wires and rod terminals after connecting the terminal block.

## 6-5. External Connecting Devices

### 6-5-1. Power supply

- (1) The power supply capacity should be more than twice the current consumption of EZA-MACCL.  
Refer to "3-1-1. General specification" for the current consumption of EZA-MACCL.  
Consider the voltage drop of the cable.
- (2) The power supply must have an over current protector.
- (3) Use the power supply which should be isolated from the commercial one.

### 6-5-2. ezSCOPE

- (1) Refer to "ezSCOPE specifications and instruction manual" for maximum cable lengths between EZA-MACCL and ezSCOPE.
- (2) The following cables are recommended to extend the length.
  - ① KPEV-SB (Instrumentation cable with the shield), 0.5mm<sup>2</sup> or more
  - ② LAN cable (with the shield) \* No category specified
- (3) Open the signal for ezSCOPE when not using ezSCOPE.

# 7. NOMENCLATURE

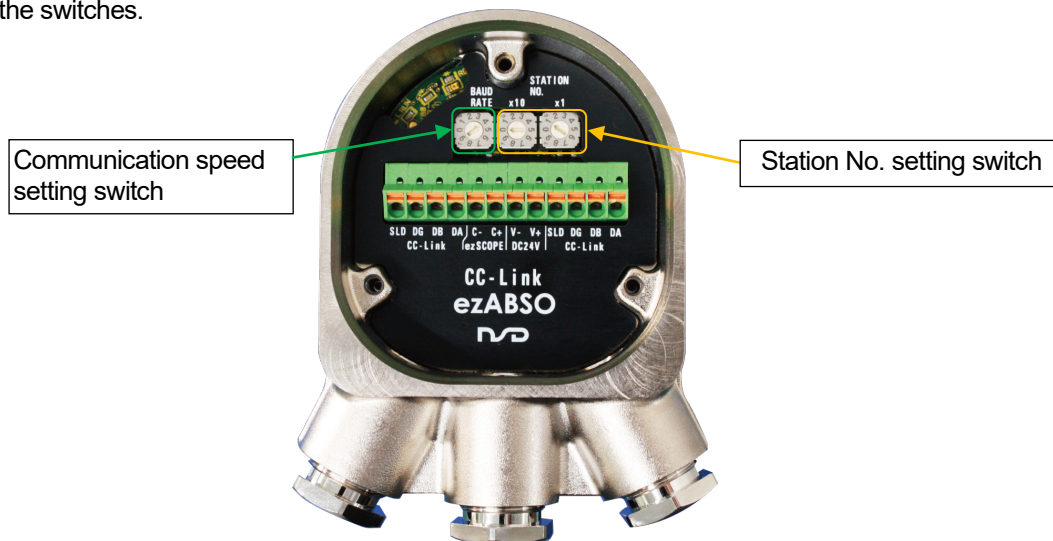
## 7-1. Display Contents of the Monitor LEDs

The opposite side of the shaft has the monitor LED.

Display Monitor LED	Contents
READY	LED turns ON when EZA-MACCL operates normally. At the same time, the remote input "RX1B (READY)" is changed to "1". It blinks when the parameter has been writing or reading out. (For details of lighting condition, refer to "8-5-1. Error contents".)
ERROR	LED turns ON when EZA-MACCL has an error. At the same time, the remote input "RX1A (ERROR)" is changed to "1". (For details of lighting condition, refer to "8-5-1. Error contents".)
L RUN	LED turns ON when data can be updated by CC-Link. Communication should be established between EZA-MACCL and the master unit by using CC-Link configuration tool (CC-Link configuration software). If not, the LED doesn't turn ON.

## 7-2. Switch Setting

The rear lid can be taken off when removing screws (3-piece) which is on the opposite side of the shaft. Set the switches.



### 7-2-1. Station No. setting switch (STATION No.)

Sets station No. for CC-Link communication.  
Setting range: 01 to 64 (Factory setting: 00)

### 7-2-2. Communication speed setting switch (BAUD RATE)

Sets the baud rate for CC-Link communication. (Factory setting: 0)

Setting value	Baud rate
0	156kbps
1	625kbps
2	2.5Mbps
3	5Mbps
4	10Mbps

## 8. CC-Link COMMUNICATION

Master: PLC etc.  
Slave: EZA-MACCL

\*EZA-MACCL will operate with the factory setting value (initial value) if the parameter and preset setting value aren't designated. For setting the parameter, the CSP+ file for EZA-MACCL is needed.

The parameter cannot be changed if the CC-Link configuration tool (CC-Link configuration software) or PLC which isn't able to set the parameter by using a CSP+ file is used. The PLC which is connected to the EZA-MACCL must stop the operation when setting parameters.

\*: It isn't necessary to set the parameter every time when turning ON the power supply because the designated parameter is stored at the non-volatile memories in EZA-MACCL.

※ Download CSP+ file for EZA-MACCL from NSD web site.

(Note: The parameter initial value may be different depending on CSP+ version.)

### 8-1. Input Signal (Slave to Master)

#### 8-1-1. Remote input (RX00 ~ 1F)

	RXx7/F	RXx6/E	RXx5/D	RXx4/C	RXx3/B	RXx2/A	RXx1/9	RXx0/8	
RX00~07	Answer back for monitor selection code								
RX08~0F	0	0	0	0	0	0	0	PRESET ANSWER	
RX10~17	System Area								
RX18~1F	System Area				READY	ERROR	System Area		

Signal name	Name	Information	Description
ERROR	Error	0	No error has occurred on EZA-MACCL.
		1	One of following errors has occurred; Sensor error, memory error, hardware error, power supply voltage alarm, internal temperature alarm, rotation speed alarm, setting alarm (For the details of errors, refer to "8-5-1. Error contents".)
READY	Remote station READY	0	One of following errors has occurred; *1 Sensor error, memory error, hardware error (For more error details, refer to "8-5-1. Error contents".)
		1	EZA-MACCL operates normally.
Answer back for monitor selection code		This is a confirmation data of the monitor selection code. Monitor data indicated by the monitor selection code answerback can be read from RWr2, 3 (Monitor data). (Refer to "8-3. Monitor".)	
PRESET ANSWER	Preset answer back	This is an operation checking signal of PRESET. (Refer to "8-2-3. Preset timing".)	
System Area	System	This is an area for the system operation.	

\*1: When the parameter of EZA-MACCL is read out or written by using CC-Link configuration tool (CC-Link configuration software) registered the CSP+ of EZA-MACCL, "READY" turns ON and OFF repeatedly.



## 8-1-2. Remote register (RWr0 ~ 3)

	7/F	6/E	5/D	4/C	3/B	2/A	1/9	0/8	Remarks
RWr0(L)	D7	D6	D5	D4	D3	D2	D1	D0 (LSB)	Position data
RWr0(H)	D15	D14	D13	D12	D11	D10	D9	D8	
RWr1(L)	D23	D22	D21	D20	D19	D18	D17	D16	
RWr1(H)	D31 (MSB)	D30	D29	D28	D27	D26	D25	D24	
RWr2(L)								(LSB)	Monitor Contents
RWr2(H)	Monitor data								
RWr3(L)									
RWr3(H)	(MSB)								

Signal name	Name	Description
D0-31	Position data	Reads out the position by binary data.
	Monitor data	This is the internal status data of EZA-MACCL designated by the monitor selection code (Refer to "8-3. Monitor".)

### ● Setting of position data division number

The division number of the position data per turn can be changed by the scaling data setting. Set "8,778 turns (Total number of turns) × division number of data per turn" when changing it.

For the scaling data setting, refer to "8-4. Parameter Setting".

For the following example ① and ②, the scaling data setting value is designated to "8778 x 2<sup>n</sup>" (2<sup>n</sup> = division number of data per turn).

In this case, the specific bit range can read out as the single-turn data or multi-turn data.

For the following example ③, the scaling data setting value is designated to a value except "8778 x 2<sup>n</sup>" (2<sup>n</sup> = division number of data per turn).

In this case, specific bit range cannot readout as the single-turn data or multi-turn data.

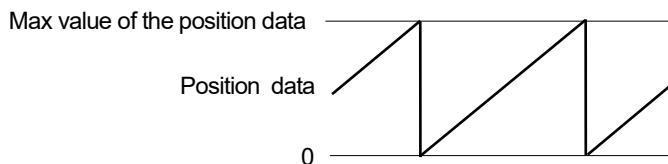
Ex.	Scaling data setting value	Position data (32bit)																			
		D31	D30	D29	.....				D18	D17	D16	D15	.....		D0						
①	<b>(Factory setting)</b> 575,275,008 =8,778 turns x 65,536 / turn	0	0	Multi-turn data						Single-turn data: 16bit											
				H 0 ~ H 2249 : 0 ~ 8,777						H 0 ~ H FFFF : 0 ~ 65,535											
												Position data range: H 0 ~ H 2249 FFFF : 0 ~ 575,275,007									
②	(Maximum value of the total division number) When scaling is invalid, 2,301,100,032 =8,778 turns x 262,144 / turn	Multi-turn data						Single-turn data : 18bit													
		H 0 ~ H 2249 : 0 ~ 8,777						H 0 ~ H 3 FFFF : 0 ~ 262,143													
												Position data range: H 0 ~ H 8927 FFFF : 0 ~ 2,301,100,031									
③	2 <sup>n</sup> setting example 2,147,483,648 (=2 <sup>31</sup> )	0	Multi-turn data (8778) x Single-turn data (244,643.8423 divisions)																		
			Position data range: H 0 ~ H 7FFF FFFF : 0 ~ 2,147,483,647																		



## NOTE

If the position data exceeds the maximum value, the data will return to "0". (If the data exceeds "0", it will become maximum value.)

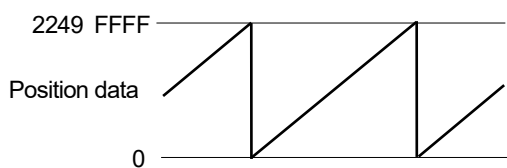
In the factory setting, if the multi-turn data exceeds 8777 (maximum value), it will return to "0".



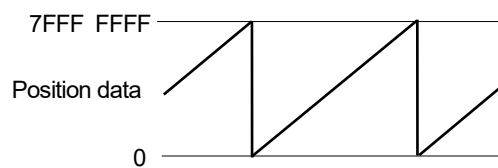
When the position data exceeds maximum value and return to 0, it might be difficult to calculate correct position data if positions of the device which rotates continuously like a roll are detected.

In this case, set the scaling data to "2<sup>n</sup>" (example ③ in the previous page)".

(Example ① in previous page)



(Example ③ in previous page)



H 7FFFFFFF (maximum value data) is easier to calculate than H 2249FFFF when calculating the position changing amount which is over 0.

### 8-1-3. Program for position data readout

A program example for the position data readout is given below.

1) Set CC-Link parameters in network parameter as follows.

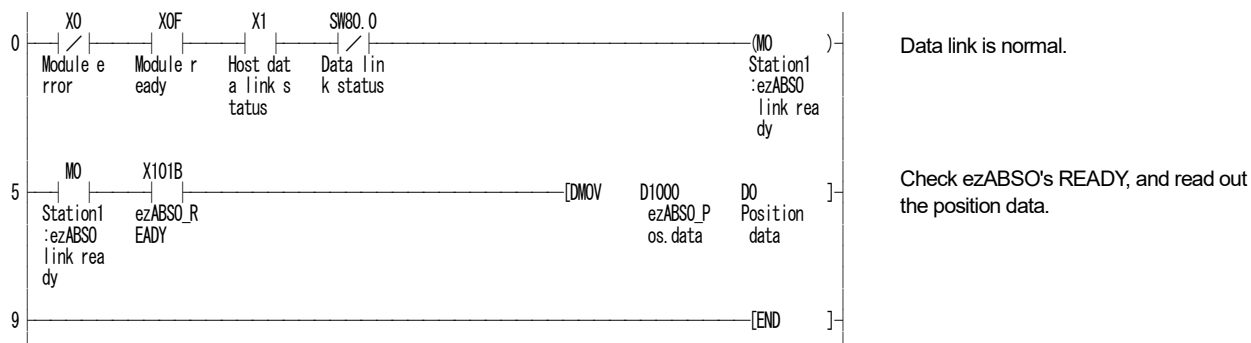
Head I/O No.	0000
Remote input (RX)	X1000
Remote output (RY)	Y1000
Remote register (RW <sub>r</sub> )	D1000
Remote register (RW <sub>w</sub> )	D1500
Link special relay (SB)	SB0
Link special register (SW)	SW0
Station Information Setting	Station No. 1: EZA-MACCL

2) The following devices are used in the program example.

Position data storage register (double word): D0, D1

Station 1 link ready: M0

[Program example]



## 8-2. Output Signal (Master to Slave)

### 8-2-1. Remote output (RY00 ~ 1F)

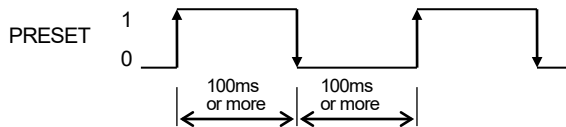
	RYx7/F	RYx6/E	RYx5/D	RYx4/C	RYx3/B	RYx2/A	RYx1/9	RYx0/8
RY00~07	Monitor selection code							
RY08~0F	System Area				0	0	0	PRESET
RY10~17	System Area							
RY18~1F	System Area					CLR	System Area	

Signal name	Name	Description
Monitor selection code		Designates the selection code for reading out the internal status of EZA-MACCL. (Refer to "8-3. Monitor").
PRESET	Preset signal	The position data can change to the arbitrary value (PRESET Data: PRD0-31) by designating PRESET to "1". *1, *2
CLR	Error clear	Designating CLR to "1" can clear an error. *3 (For details of the error, refer to "8-5-1. Error contents".) -After CLR is designated to "1", ERROR becomes "0". -After CLR is designated to "0", READY becomes "1".
System Area	System	This area is for the system operation. Do not write other than "0" in this area.

\*1: The position data is changed when the PRESET signal changes from "0" to "1"

(When PRESET signal is changed to 1 by the PLC pulse instruction, "1" of the PRESET signal might not be sent because of the relation between PLC scan time and Output Signal update time of the CC-Link communication.)

\*2: EZA-MACCL needs a period of 100ms or more until accepting the PRESET signal change from "0 to 1" or "1 to 0".



\*3: The error cannot be cleared without removing an error cause.

### 8-2-2. Remote register (RWw0 ~ 3)

	7/F	6/E	5/D	4/C	3/B	2/A	1/9	0/8	Remarks
RWw0(L)	PRD7	PRD6	PRD5	PRD4	PRD3	PRD2	PRD1	PRD0 (LSB)	Preset data
RWw0(H)	PRD15	PRD14	PRD13	PRD12	PRD11	PRD10	PRD9	PRD8	
RWw1(L)	PRD23	PRD22	PRD21	PRD20	PRD19	PRD18	PRD17	PRD16	
RWw1(H)	PRD31 (MSB)	PRD30	PRD29	PRD28	PRD27	PRD26	PRD25	PRD24	
RWw2(L)	System Area								System
RWw2(H)									
RWw3(L)									
RWw3(H)									

Signal name	Name	Description
PRD0-31	Preset data	The position data can be changed to any desired value (Preset data: PRD0-31) by setting PRESET to "1". (Setting range: $0 \leq \text{preset data} \leq (\text{scaling data} - 1)$ )
System Area	System	This area is for the system operation. Do not write other than "0" in this area.

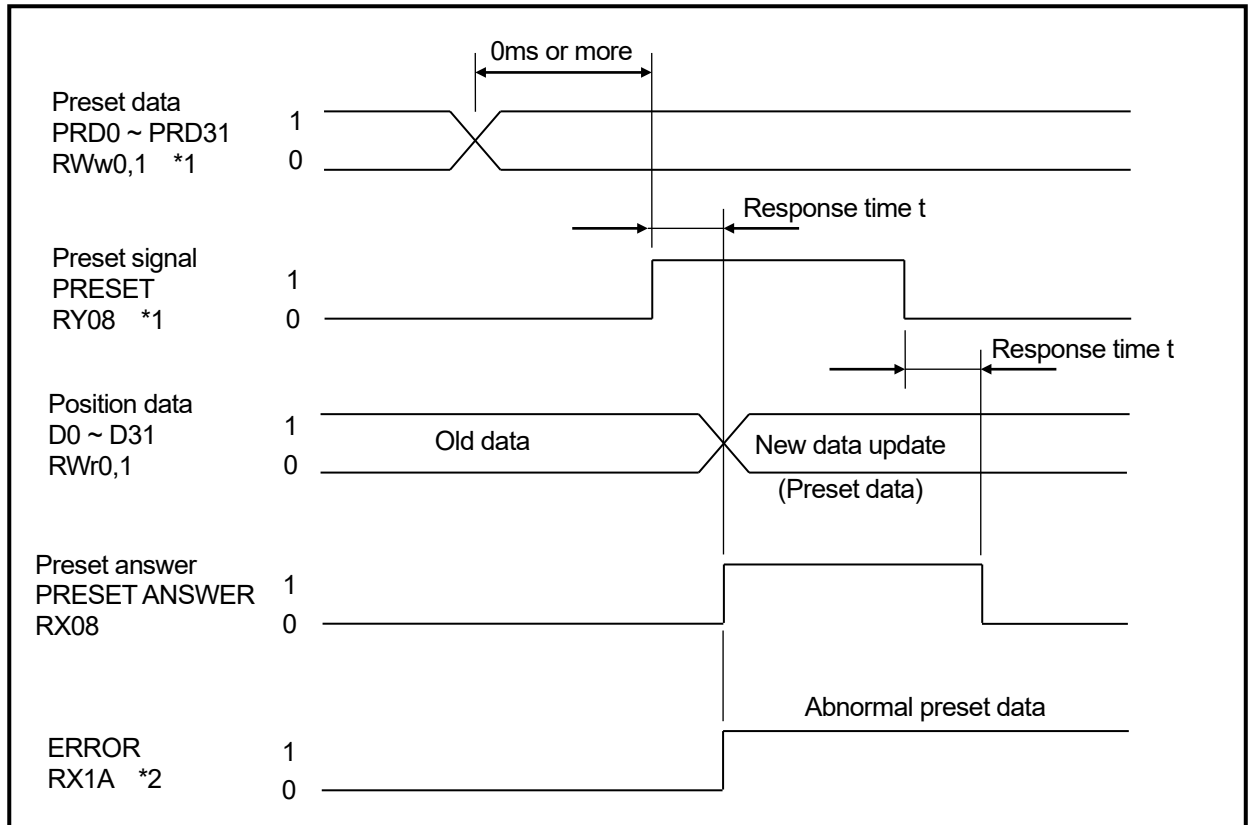
### 8-2-3. Preset timing

The position data is changed by the preset data (PRD0-31) and PRESET signal (1 bit) which are written from the master.

The response time from the point when the PRESET signal changes from "0" to "1", until the preset setting occurs, is shown below.

Response time can be calculated by the following calculation expression.

Response time  $t$  = PLC scan time + CC-Link update time + EZA-MACCL internal process time (Max. 10ms)



\*1: The PRESET signal should be changed from "0" to "1", after the Preset data are written. (0ms or more)

\*2: When PRESET is executed with writing an out-of-range value of the preset data (preset data  $\geq$  scaling data), the setting alarm is detected and PRESET ANSWER (RX08) and ERROR (RX1A) changes "1".

The setting alarm is cleared and ERROR (RX1A) is changed to "0" by designating the preset data in the setting range and executing the preset again.



#### NOTE

"PRESET (RY08)" and "Preset data (PRD0-31)" may not be synchronized according to the system. "Preset data" is divided into old and new data per 2-word unit due to the auto refresh timing when using CC-Link. Therefore, the position data may not be changed properly even if "PRESET signal" is changed from 0 to 1 after writing "Preset data".

#### <Countermeasure 1>

Set the PLC's scanning time enough by CC-Link update cycle.

#### <Countermeasure 2>

Set "valid" for the following CC-Link parameter.

[Operation setting]→[Block Data Assurance per Station] (using MELSEC-Q series)

The integrity of cycle data (RX, RY, RWr, RWw) for each station is assured.



## NOTE

In the following cases, PRESET cannot be done.

And PRESET ANSWER cannot be changed to "1" even though PRESET is changed to "1".

- "Invalid" is designated for the current position preset function of the parameter.
- READY is 0 (OFF). An error (sensor error, hardware error, or memory error) is occurred.

## 8-2-4. Program for preset setting

A program example which changes the position data by presetting is indicated below.

1) Set CC-Link parameters in network parameter as follows.

Head I/O No.	0000
Remote input (RX)	X1000
Remote output (RY)	Y1000
Remote register (RWr)	D1000
Remote register (RWw)	D1500
Link special relay (SB)	SB0
Link special register (SW)	SW0
Station Information Setting	Station No. 1: EZA-MACCL

2) The following devices are used in the program example.

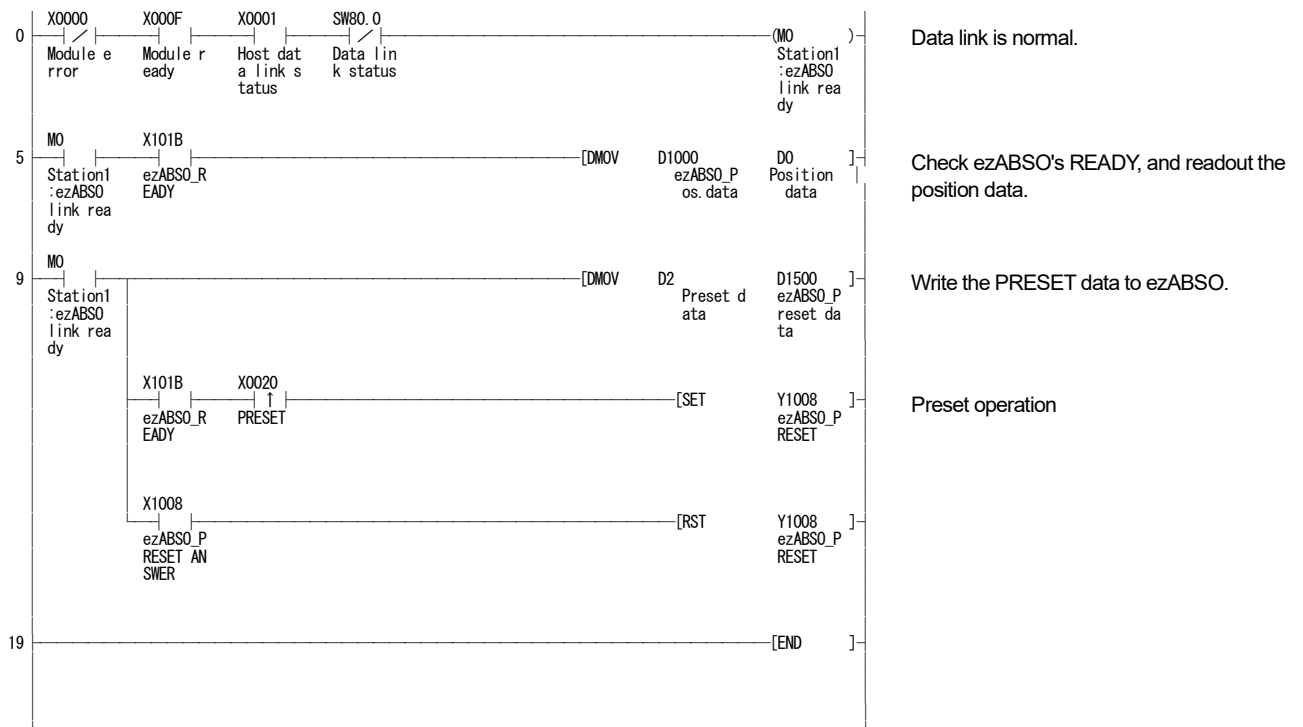
Position data storage register (double word): D0, D1

Preset data storage register (double word): D2, D3

Station 1 link ready: M0

Preset instruction input: X20

[Program example]



### 8-3. Monitor

The internal status of EZA-MACCL selected by the monitor selection code (RY00 to RY07) can be read out.

#### 8-3-1. Monitor data lists

Monitor selection code	bit31~8	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0	Remarks
H00	0	0	Setting alarm	Rotation speed alarm	Internal temperature alarm	Power supply voltage alarm	Hardware error	Memory error	Sensor error	Error information
H01	Speed data									Operation information
H02	0	0	0	0	0	0	0	0	0	
H03	Power supply voltage									Condition information
H04	Internal temperature									
H05	Operating time									
H06	Serial number									
H07	Divisions/Turn									Product information
H08	Total number of turns									
H09	Current position preset function selection									Parameter information
H0A	Position data increase direction									
H0B	Scaling function selection									
H0C	Scaling data									
H0D	Sensor low-pass filter									
H0E	Sensor median filter									


## 8-3-2. Monitor data contents

### (1) Error information

EZA-MACCL detects errors. For more details of the error, refer to 8-5. Error Detection".


### (2) Operation information

Code	Name	Unit	Description
H01	Speed data	0.1r/min	The speed can be read out by a binary code. (Unit: 0.1 r/min) Positive numeric value: H 0 ~ H 1 5F90 (0 ~ 90,000) The shaft of EZA-MACCL turns in clockwise direction. Negative numeric value: H FFFF FFFF ~ H FFFE A070 (-1 ~ -90,000) The shaft of EZA-MACCL turns in counterclockwise direction.

	<b>NOTE</b>
<p>The positive and negative of the speed data cannot reverse even though the position data increase direction is changed.</p> <p>When the shaft rotates in 9000r/min or more, the speed data might be unstable.</p>	

### (3) Condition information

Code	Name	Unit	Description
H03	Power supply voltage	0.1V	The power supply voltage which is supplied to EZA-MACCL is read out. Ex.) 24.0V: 240(HF0)
H04	Internal temperature	°C	The internal temperature is read out. Ex.) 25°C: 25 (H 19) -10°C:-10 (H FFFF FFF6)
H05	Operating time	hour (hr.)	Operation time (Power supply ON time) is read out. Ex.) After 80,000 hour is passing: 80,000 ( H 1 3880)

	<b>NOTE</b>
<p>The internal temperature is approximately 17°C higher than the surface (sides of the case) temperature of the EZA-MACCL. (Internal temperature is increase about 17°C)</p>	
<p>The operation time is measured at internal EZA-MACCL every 1/8 hours (7.5 minutes), and the monitor data reads out. (The data which is 1 hour or less is omitted.) The operation time isn't increased when the power supply turns ON less than 7.5 minutes.</p>	
<p>* The memory error doesn't occur when the operation time memory is malfunction. The readout data is -1 (H FFFF FFFF).</p>	

(4) Product information

Code	Name	Unit	Description
H06	Serial number	—	The serial number is read out. ( Fixed data "8-bit" + binary "24-bit") * The fixed number of the products whose serial codes start from K is "00".
H07	Divisions/Turn	bit	The maximum division number for 1-turn is read out by bit unit. Fixed at 18 (H 12)
H08	Total number of turns	turns	The total number of turns is read out. Fixed at 8,778 (H 224A)

(5) Parameter information

The parameter data are set to EZA-MACCL.

Refer to "8-4. Parameter Setting ".



### 8-3-3. Monitor selection timing

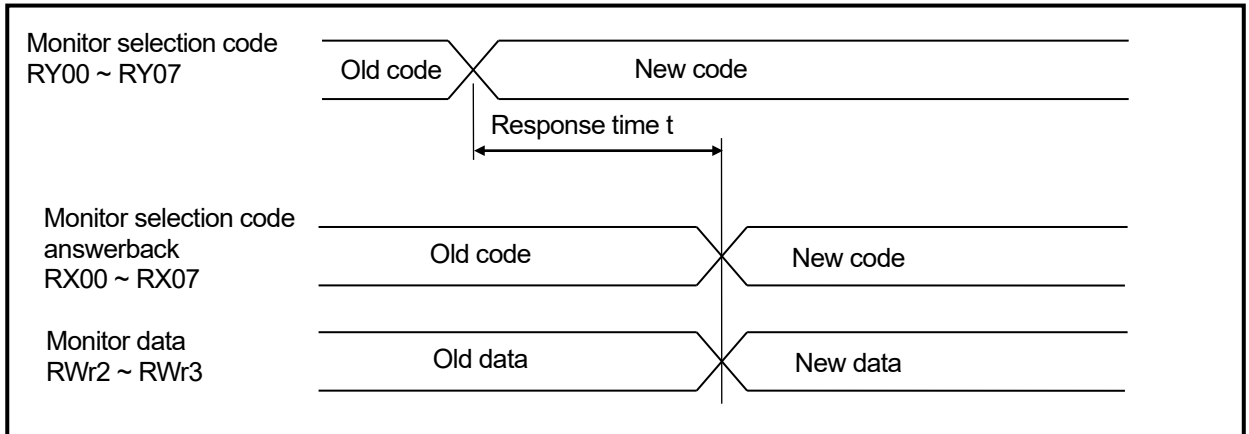
The monitor selection code answerback and monitor contents are changed by writing the monitor selection code (RY00 ~ RY07) from the master.

Read out the data after checking the monitor selection code answerback value.

The response time from when the monitor selection code is finished to write until the monitor data starts to change is indicated.

The response time can calculate by the following expression.

Response time  $t = \text{PLC scan time} + \text{CC-Link update time} + \text{EZA-MACCL internal process time (Max.0.4ms)}$



The monitor data is updated by the following interval.

Monitor selection code	EZA-MACCL monitor data internal update cycle
H01 (Speed data)	0.4ms
H00 (Error information) H03 (Power supply voltage) H04 (Internal temperature)	10ms or less
H05 (Operating time)	1 hour

**NOTE**

"Monitor selection code answerback" and "monitor data" may not be synchronized according to the system. "Monitor data" is divided into old and new data per 2-word unit due to the auto refresh timing when using CC-Link. Therefore, "monitor data" may not be read properly.

**<Countermeasure 1>**  
Set the PLC's scanning time enough by CC-Link update cycle.

**<Countermeasure 2>**  
Set "valid" for the following CC-Link parameter.  
[Operation setting]→[Block Data Assurance per Station] (using MELSEC-Q series)  
The integrity of cycle data (RX, RY, RWr, RWw) for each station is assured.

**NOTE**

When the monitor selection code is designated undefined number (H0For more), the monitor data is changed as indicated below.

- The monitor selection code answerback changes to new code (undefined number).
- The monitor data changes to the monitor selection code H00 (error information).

### 8-3-4. Program for monitor selection

The program example which is read out the EZA-MACCL status is indicated below.

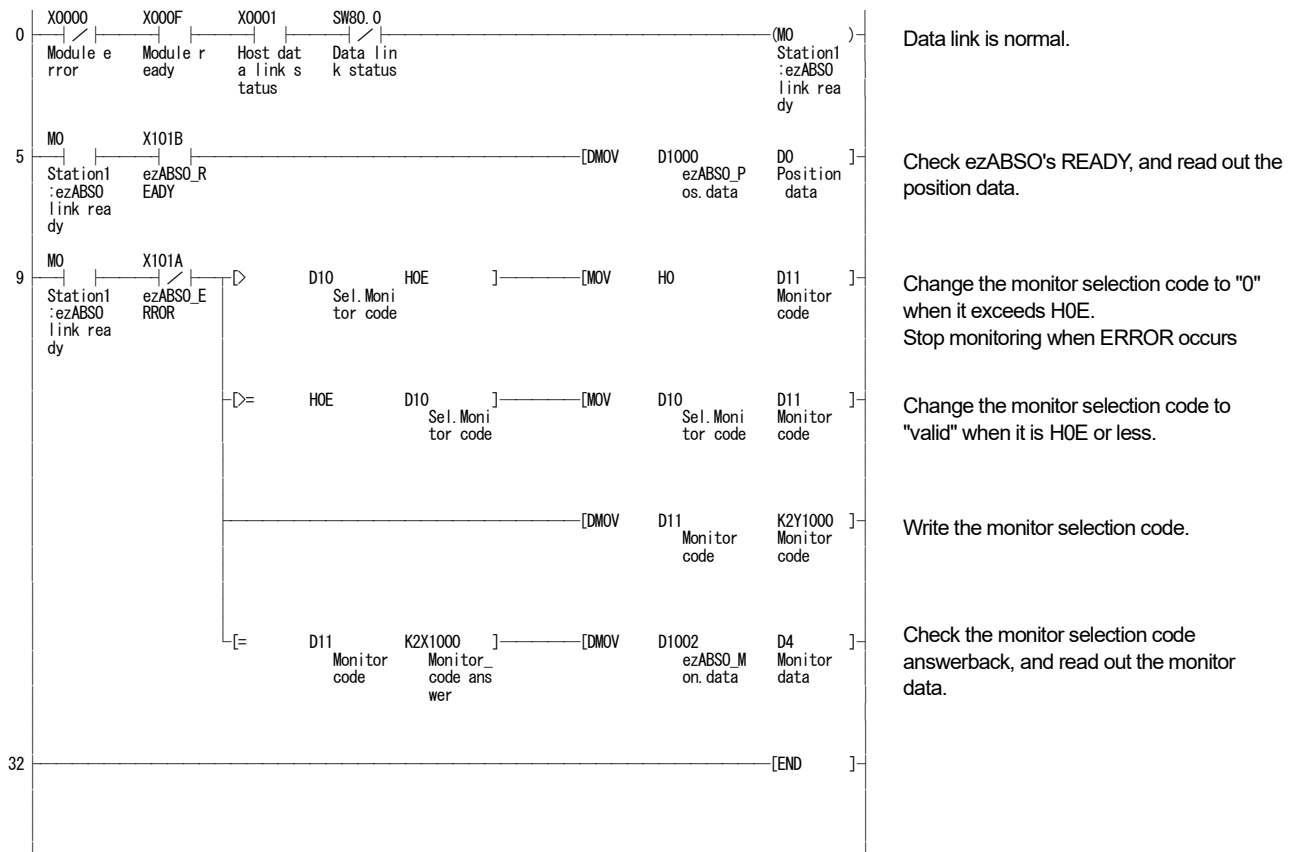
1) Set CC-Link parameters in network parameter as follows.

Head I/O No.	0000
Remote input (RX)	X1000
Remote output (RY)	Y1000
Remote register (RWr)	D1000
Remote register (RWw)	D1500
Link special relay (SB)	SB0
Link special register (SW)	SW0
Station Information Setting	Station No. 1: EZA-MACCL

2) The following devices are used in the program example.

- Position data storage register (double word): D0, D1
- Monitor data storage register (double word): D4, D5
- Station 1 link ready: M0
- Monitor selection code designation (word): D10
- Monitor selection code output data (word): D11

[Program example]



## 8-4. Parameter Setting

### 8-4-1. Parameter List

The parameter is set by registering EZA-MACCL's CSP+ file to CC-Link configuration tool (CC-Link configuration software)

The parameter cannot be changed if the CC-Link configuration tool (CC-Link configuration software) or PLC which isn't able to set the parameter by using a CSP+ file is used.

PLC connected to EZA-MACCL must stop the operation when setting the parameter (reading or writing) from the CC-link configuration tool.

\* Designated parameter is stored at the non-volatile memories in EZA-MACCL.

"READY" turns ON and OFF repeatedly during the parameter is read out or written.

※ Download CSP+ file for EZA-MACCL from NSD web site.

(Note: The parameter initial value may be different depending on CSP+ version.)

The setting value of the parameter can be checked by the monitor.

For the checking method, refer to "8-3. Monitor".

Monitor Selection Code	Setting Description
H09	Current position preset function selection
H0A	Position data increase direction
H0B	Scaling function selection
H0C	Scaling data
H0D	Sensor low-pass filter
H0E	Sensor median filter

## 8-4-2. Parameter setting contents

### (1) Current position preset function selections

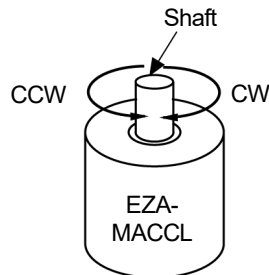
Select whether "Valid" or "Invalid" to the current position preset function.

Monitor Selection Code	Data	Selection Content	Description
H09	0	Invalid	The position data cannot be changed by PRESET.
	1	Valid <b>(Factory setting)</b>	The position data can be changed by PRESET.

### (2) Position data increase direction settings

This setting determines rotation direction in which the position data value increases.

Monitor Selection Code	Data	Selection Content	Description
H0A	0	CW <b>(Factory setting)</b>	The position data value will increase when the shaft of EZA-MACCL turns in the clockwise direction as viewed from the shaft end.
	1	CCW	The position data value will increase when the shaft of EZA-MACCL turns in the counterclockwise direction as viewed from the shaft end.



#### NOTE

Even though the position data increase direction of the parameter is changed, the speed data's positive and negative isn't reversed.

### (3) Scaling function selection and scaling data setting

The scaling setting can be changed the division number of the position data per turn.

Set the total number of divisions when changing it.

For the position data, refer to "8-1-2. Remote register".

#### Scaling function selection

Monitor Selection Code	Data	Selection Content	Description
H0B	0	Invalid	The scaling is invalid. The total division number of the position data is as follows; 8,778 turns x 262,144/turn = 2,301,100,032
	1	Valid <b>(Factory setting)</b>	The scaling is valid.

#### Scaling data

Monitor Selection Code	Setting range	Description
H0C	2 ~ 2,301,100,032 <b>(Factory setting=575,275,008)</b>	The total division number of the position data is designated. Total number of divisions = "total number of turns (8,778 turns)" x "division number of data per turn"

### (4) Sensor low-pass filter

The low-pass filter's cutoff frequency of the EZA-MACCL's internal sensor circuit is designated.

The position data's flicker can be inhibited more when the cut-off frequency is set low. However, the response time might be delayed.

Designate this function when you need to reduce influences such as random noises (white noise) or mechanical oscillations.

Monitor Selection Code	Data	Selection Content	Description
H0D	0	1kHz	Cutoff frequency = 1kHz
	1	500Hz	Cutoff frequency = 500Hz
	2	250Hz <b>(Factory setting)</b>	Cutoff frequency = 250Hz
	3	125Hz	Cutoff frequency = 125Hz
	4	62Hz	Cutoff frequency = 62Hz

### (5) Sensor median filter

Designates the sensor median filter which is installed on EZA-MACCL's internal sensor circuit either "valid" or "invalid". The position data will be a median value of data which is extracted within a certain amount of time if the filter is valid.

This filter is effective when using an inverter that generates instantaneous noises.

With using sensor median filter, the data might have a certain period delay.

This filter and low-pass filter can be used together.

Monitor Selection Code	Data	Selection Content	Description
H0E	0	Invalid <b>(Factory setting)</b>	Median filter is invalid.
	1	valid	Median filter is valid.

## 8-5. Error Detection


### 8-5-1. Error contents

Error Name	Description	When Detected	Remote input or Monitor LED		Status	Clear Method	Probable cause
			ERROR (RX1A)	READY (RX1B)			
Sensor error	EZA-MACCL has failure	Always	1	0	The position and speed data are unstable.	-CLR -Restart	EZA-MACCL has failure
Memory error	An error has occurred at the non-volatile memory inside EZA - MACCL.	At power ON	1	0	The position and speed data are unstable. (EZA-MACCL operates with factory settings.)	-CLR	EZA-MACCL has failure
Hardware error	EZA-MACCL has failure	Always	1	0	The position and speed data are unstable.	-CLR -Restart	EZA-MACCL has failure
Power supply voltage alarm	The power voltage supplied to EZA-MACCL is outside of the range between 10.8 and 28.8V.	Always	1	1	The position and speed data output normally.	Automatic recovery	The power voltage supplied to EZA-MACCL is outside of the specification range. Or, EZA-MACCL has failure.
Internal temperature alarm	The EZA-MACCL's ambient temperature is out of the range between -20 and 80°C.	Always	1	1	The position and speed data output normally, but we cannot guarantee the accuracy.	Automatic recovery	The EZA-MACCL's temperature is out of the specification range. Or, EZA-MACCL has failure.
Rotation speed alarm	The EZA-MACCL's rotation speed is more than 6100r/min.	Always	1	1	The position and speed data are unstable.	Automatic recovery	The EZA-MACCL's rotation speed is out of the specification range. Or EZA-MACCL has failure.
Setting alarm	The parameter or preset data is out of the range.	Always	1	1	EZA-MACCL operates with data before the preset.	Reset the parameter or preset.	The parameter or preset setting has error.
Switch setting error	The station No. setting switch is out of the setting range. The baud rate is out of the setting range.	At power ON	1	0	CC-link communication is unavailable.	Turn ON the power supply again after changing the switch setting.	The station No. setting switch is designated "0" or "65 or more". The baud rate setting is designated "5" or more. Or, EZA-MACCL has failure.

\*1: EZA-MACCL might be damaged when the internal temperature alarm occurs.

Lower the ambient temperature quickly.

Or, the installation place should move to a place which is within a permissible temperature range.

 NOTE
<ul style="list-style-type: none"> <li>- EZA-MACCL will operate with the factory setting values of the parameter and position data if a memory error occurs. The memory error is cleared when CLR (error clear) setting is designated to "1", but parameter settings and position data doesn't change.</li> <li>- The memory error isn't generated when the memory of operation time is broken. However, the operation time's data become -1(FFFF FFFF H).</li> <li>- CC-Link communication is not available when a switch setting error is occurred. Check the data by monitor LED or ezSCOPE because ERROR and READY cannot be checked by the remote input.</li> <li>- "READY" turns ON and OFF repeatedly during the parameter is read out or written.</li> </ul>

## 8-5-2. Program for error detection

A program example that the error information reads out is indicated below.

1) Set CC-Link parameters in network parameter as follows.

Head I/O No.	0000
Remote input (RX)	X1000
Remote output (RY)	Y1000
Remote register (RWr)	D1000
Remote register (RWw)	D1500
Link special relay (SB)	SB0
Link special register (SW)	SW0
Station Information Setting	Station No. 1: EZA-MACCL

2) The following devices are used in the program example.

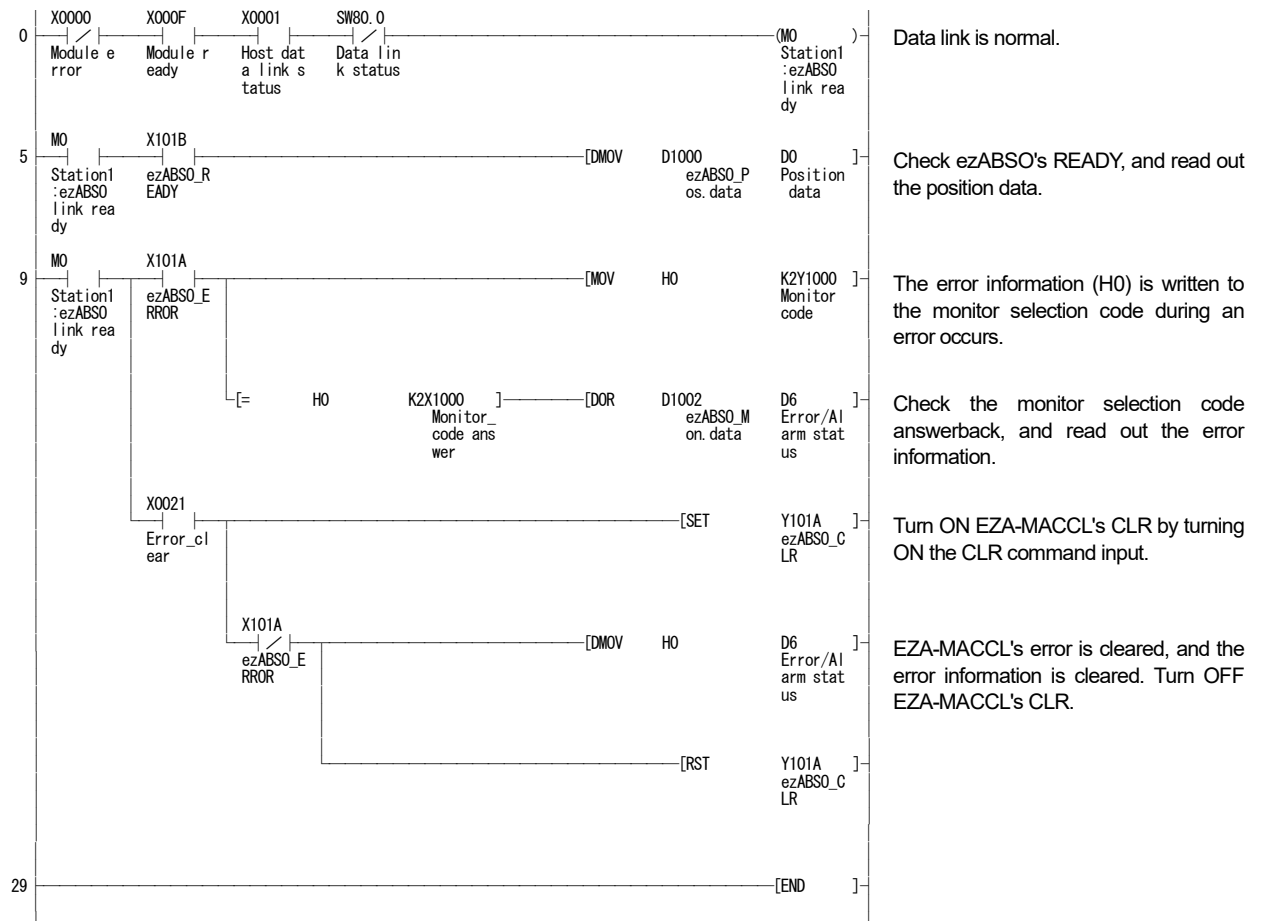
Position data storage register (double word): D0, D1

Error information register (word): D6

Station 1 link ready: M0

CLR (error clear) command input: X21

[Program example]



### NOTE

- In the above program example, The monitor selection code is changed to the error information (H00) when an error occurs.
- If monitoring other except the error information, the monitor selection must be stopped when an error occurs.

## 9. INSPECTION

The inspection should be conducted once every 6 months to a year.

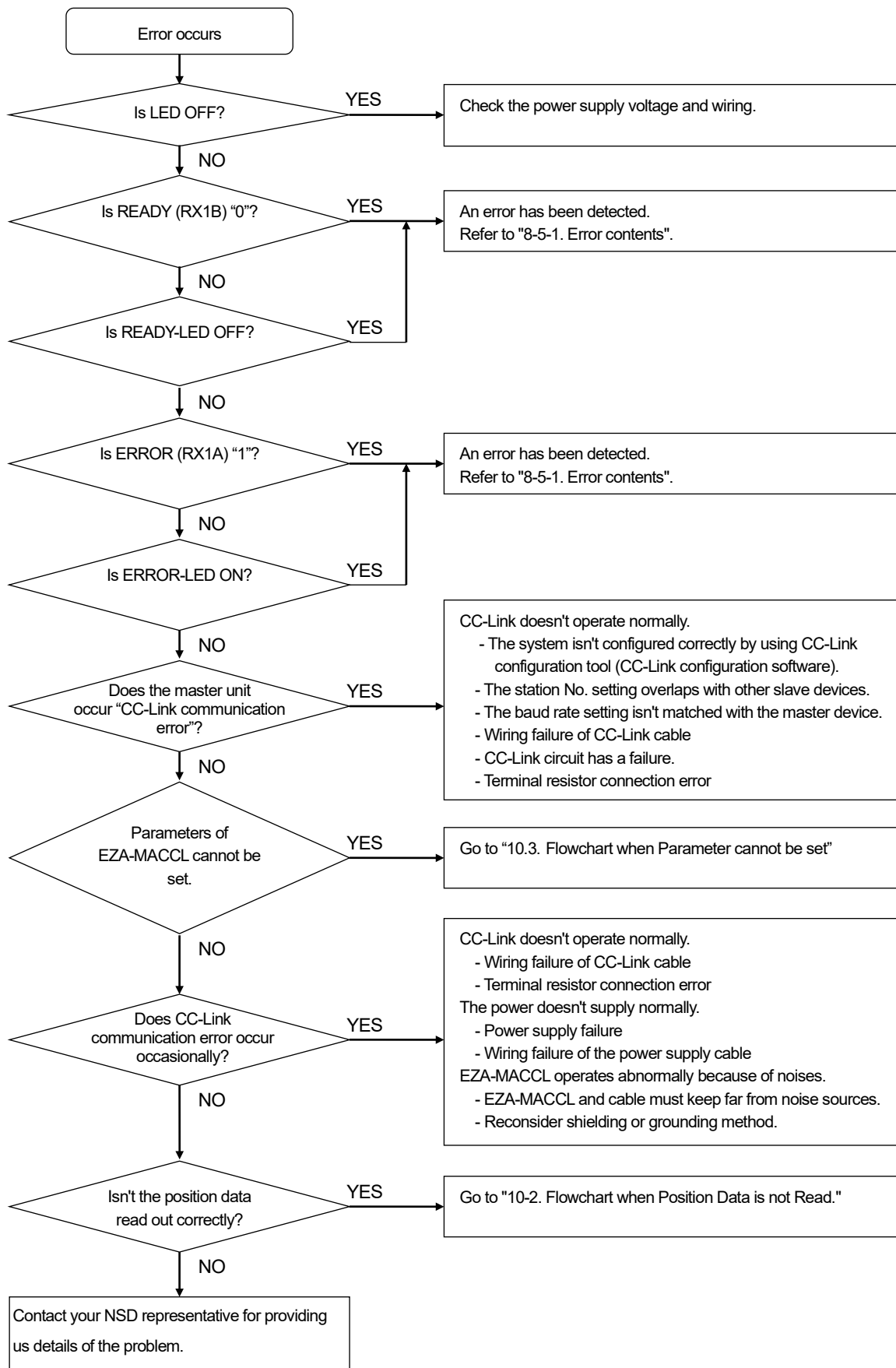
Any inspected items which do not satisfy the criteria shown below should be repaired

Inspection item	Inspection Description	Criteria	Remark
Power supply	Measure the voltage fluctuation at the power supply terminal block.	Within 10.8V to 28.8VDC range	Tester
Ambient Conditions	Check the ambient temperature.	-20 to +80°C	Thermometer
	There should be no accumulation of dust.	None	Visual Inspection
Mount Conditions	Verify that EZA-MACCL is securely mounted.	There should be no looseness.	
	Verify that the shaft of EZA-MACCL is securely coupled to the machine shaft.	There should be no looseness.	
	Check for severed cables.	Cable should appear normal.	
	Check the screws of the relay terminal are securely tightened.	There should be no looseness.	
	Check the wires are securely connected to the terminal block for internal wiring.	Cable should be connected.	

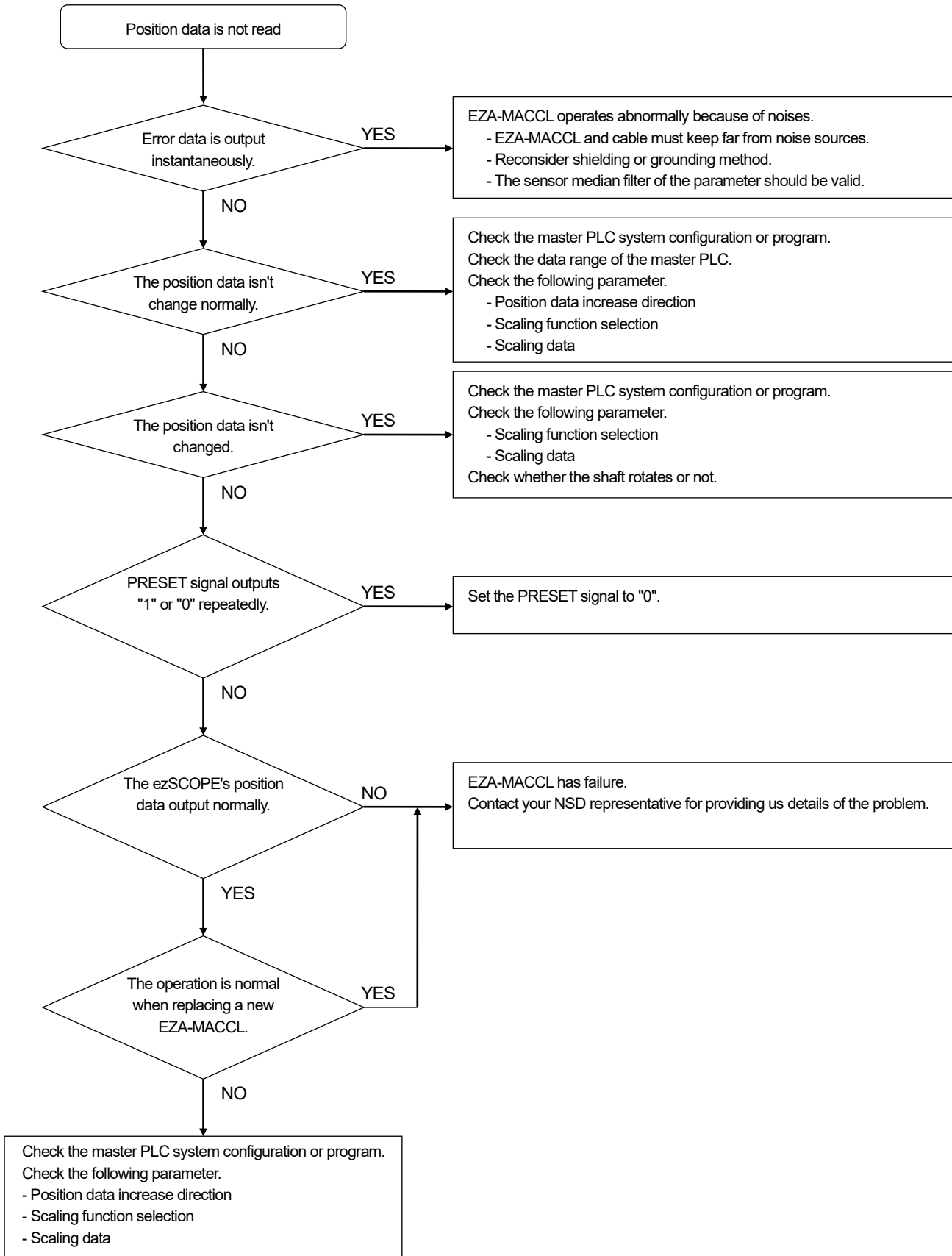


# 10. TROUBLE SHOOTING

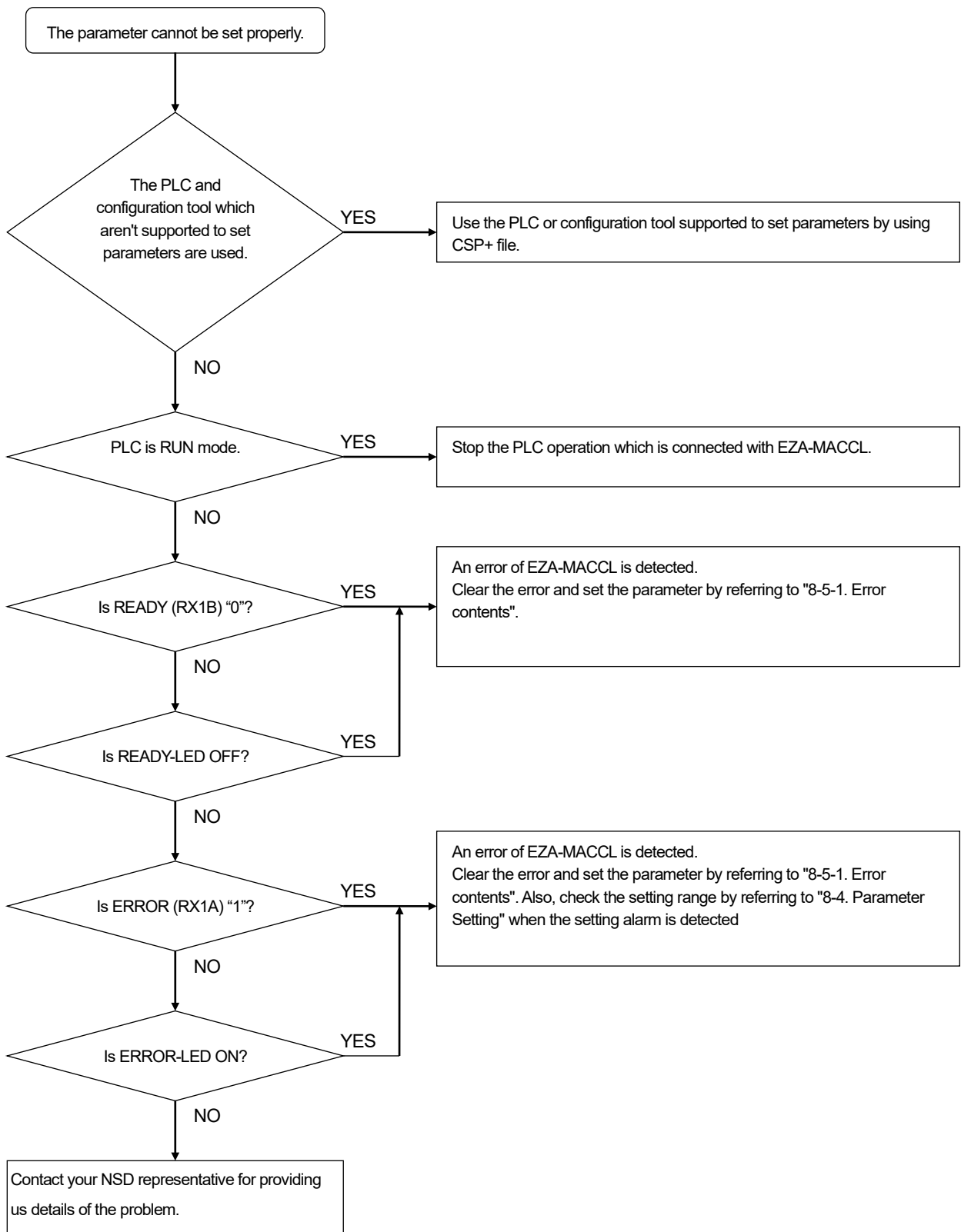
## 10-1. Trouble Shooting Flowchart



## 10-2. Flowchart when Position Data is not Read



### 10-3. Flowchart when Parameter cannot be Set



## APPENDIX 1. CE MARKING

EZA-MACCL conforms to EMC directive.

The low voltage directive is out of the range because EZA-MACCL is activated by 24VDC power supply.

### APPENDIX 1-1. EMC Directives

It is necessary to do CE marking in the customer's responsibility in the state of a final product.

Confirm EMC compliance of the machine and the entire device by customer because EMC changes configuration of the control panel, wiring, and layout.

### APPENDIX 1-2. EMC Directive and Standards

EMC Directive consists of immunity and emission items.

EMC standards and Testing item is indicated in the following table.

EMC Standard and Testing

Class	Standard No.	Name
EMI (Emission)	EN61000-6-4	Generic standards. Emission standard for industrial environments
EMS (Immunity)	EN61000-6-2	Generic standards. Immunity standard for industrial environments
	EN61000-4-2	Electrostatic Discharge
	EN61000-4-3	Radiated, Radio frequency, Electromagnetic Field
	EN61000-4-4	Electrical Fast Transient / Burst
	EN61000-4-5	Surge Immunity
	EN61000-4-6	Conducted Disturbances, Induced by Radio-Frequency Fields
	EN61000-4-8	Power Frequency Magnetic Field

#### Reference

It might be improved when the clamp filter is installed to the power supply cable or the CC-Link cable when it operates faultily by the influence from the peripheral devices.

Recommendation clamp filter

Mounting location	Clamp filter model	Manufacturer
- Power supply cable - CC-Link cable	ZCAT2032-0930 (inner dimensions: $\phi 9$ )	TDK Corporation





NSD Group

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**Manufacturer**

**NSD Corporation** 3-31-28, OSU, NAKA-KU, NAGOYA, JAPAN 460-8302

**Distributor**

**NSD Trading Corporation** 3-31-23, OSU, NAKA-KU, NAGOYA, JAPAN 460-8302

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