

73VR1100 / 73VR21x / 73VR3100 Modbus/TCP Reference Guide

MSYSTEM
M-SYSTEM CO., LTD.

5-2-55, Minamitsumori, Nishinari-ku, Osaka 557-0063 JAPAN

Tel: +81-6-6659-8201 Fax: +81-6-6659-8510

<http://www.m-system.co.jp/>

E-mail: info@m-system.co.jp

Contents

1. Introduction	3
1.1 General Features	3
1.2 Data Configurations	3
2. Network Specifications.....	4
3. Connecting the 73VR.....	5
4. Function Codes	7
4.1 Usable Function Codes	7
4.2 Read Coil Status (01)	7
4.3 Read Input Status (02)	8
4.4 Read Input Register (04).....	9
4.5 Force Single Coil (05)	10
4.6 Fetch Communication Event Counter (11)	11
4.7 Force Multiple Coils (15)	12
5. Data Address	13
5.1 73VR1100 Data Address	13
5.2 73VR21x Data Address.....	17
5.3 73VR3100 Data Address.....	19
6. Exception Responses.....	20

1. Introduction

Thank you for choosing M-System's Paperless Recorder Models 73VR1100, 73VR21x and 73VR3100 (referred herein as the 73VR). This reference guide explains about the open-protocol Modbus/TCP features specific for the 73VR.

The contents of this manual are applicable to the 73VR1100 Version 1.00 or higher and 73VR21x/73VR3100 Version 2.00 or higher.

1.1 General Features

Modbus/TCP is a type of the widely used Modbus protocol, extended for use with TCP/IP protocol. It uses Client-Server model communication style: in Modbus terminology, the Client is equivalent to the Master, and the Server to the Slave.

'Open Modbus/TCP Specification' is available on the internet for detailed information.

1.2 Data Configurations

Modbus/TCP data is configured as follows (values divided by bytes are converted into hexadecimal numeral.) Data in "[]" shows samples.

No.	0	1	2	3	4	5	6	7	8≤	
Contents	Transaction ID		Protocol ID		Byte Count		Unit ID	Function	Data	
Setting	Fixed on "0"		Fixed on "0"		Total byte count for ≥No. 6		Fixed on "1"			
Byte data	0	0	0	0	[0]	[4]	1	[1]	[0]	[4]
Hex data	00	00	00	00	[00]	[04]	01	[01]	[00]	[04]

(1) Transaction ID

Transaction ID is not checked by the 73VR.

Set "00", "00" by hexadecimal numeral.

(2) Protocol ID

Protocol ID is not checked by the 73VR.

Set "00", "00" by hexadecimal numeral.

(3) Byte Count

Set the total byte count for the 6th data byte and later numbers.

(4) Unit ID

Unit ID (node address) is not checked by the 73VR.

Set "01" by hexadecimal numeral.

(5) Function

Function codes are specified by Modbus for the type of input/output.

(6) Data

Transmitted data fields.

2. Network Specifications

Basic specifications

Standards: IEEE802 (10BASE-T), IEEE802.3 (100BASE-TX)
Transmission cable: 10BASE-T, 100BASE-TX
Protocol: Modbus/TCP

Communication specifications

IP address: 192.168.0.1 (factory setting)
Locally selectable on the unit
Subnet mask: 255.255.255.0 (factory setting)
Locally selectable on the unit
Default gateway: None (factory setting)
Locally selectable on the unit
Port No.: 502 (fixed)
Node address: 1 (fixed)
Number of Masters: Max. two connected at once.

3. Connecting the 73VR

(1) Setting IP address

Assign an IP address to the 73VR. Subnet mask is fixed on "255.255.255.0." Modbus/TCP Port number is "502".

Please refer to the 73VR1100 Users Manual (EM-7399-C), the 73VR21x Users Manual (EM-7395-B) or the 73VR3100 Users Manual (EM-7397-B).

(2) Setting node address

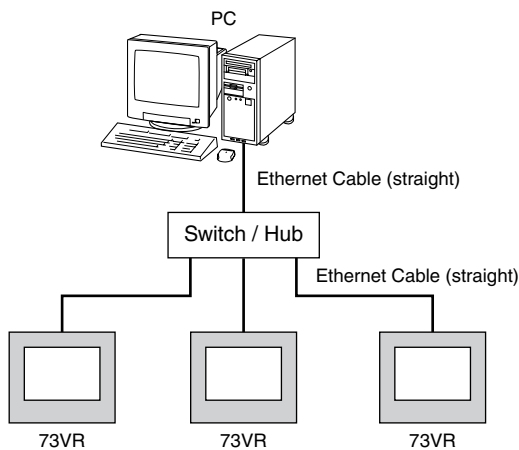
The node address (Unit ID) is transmitted together with data. Node address is fixed on "1."

(3) Hardware wiring

Connect the 73VR to a PC. Different types of cable are used depending upon network configurations.

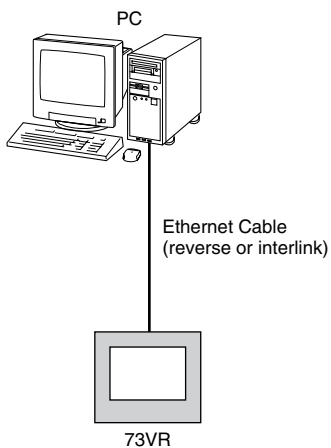
Via Ethernet switch/hub

Use straight type cables between the PC and the switch/hub, and between the switch/hub and the 73VR.



Direct connection

Use a cross (reverse or interlink) type cable between the PC and the 73VR.



- CAUTION - Cross cable

Cross cable connection may fail depending upon PC types. Using straight type cables via a switch/hub is recommended.

(4) Confirming connection of the 73VR

Confirm connection of the 73VR with the PC using 'ping command' on Windows MS-DOS.

How to start MS-DOS command prompt:

Choose "Start > Program > Accessories > Command prompt" on Windows.

How to confirm connection of the 73VR:

Enter the ping command as follows and press Enter key:

```
C:\WINDOWS > ping ***.***.***.***
(***.***.***.*** :Enter IP address in decimal.)

ping ***.***.***.*** with 32 bytes of data:
Reply from ***.***.***.***:bytes = 32 time < 10ms TTL = 64
Reply from ***.***.***.***:bytes = 32 time < 10ms TTL = 64
Reply from ***.***.***.***:bytes = 32 time < 10ms TTL = 64
Reply from ***.***.***.***:bytes = 32 time < 10ms TTL = 64

Ping statistics for ***.***.***.***
Packets:Sent = 4, Received = 4, Lost = 0(0% loss)
```

Replies in case of normal connection are as shown above. If a normal connection cannot be established due to e.g. wrong IP address, other replies such as "time over" will be received.

4. Function Codes

4.1 Usable Function Codes

The 73VR can use the following Function Codes:

FUNCTION CODE	NAME	FUNCTION
01 (0x01)	Read Coil Status	Reads discrete output signals
02 (0x02)	Read Input Status	Reads discrete input signals
04 (0x04)	Read Input Register	Reads analog input signals
05 (0x05)	Force Single Coil	Sets single discrete output signal (73VR3100 only)
11 (0x0B)	Fetch Communication Event Counter	Reads Status Word and Event Counter from Communication Event Counter
15 (0x0F)	Force Multiple Coils	Sets multiple discrete output signals (73VR3100 only)

4.2 Read Coil Status (01)

This Function Code is used to read ON/OFF status at the discrete outputs in the slave, i.e. the alarm output status of the 73VR.

Query

No.	0	1	2	3	4	5	6	7	8	9	10	11
Contents	Transaction ID		Protocol ID		Byte Count		Unit ID	Function	Starting Address		Number of Registers	
Byte data	0	0	0	0	0	6	1	1	0	0	0	1
Hex data	00	00	00	00	00	06	01	01	00	00	00	01

- (1) **Unit ID**
Specify the 73VR node address "1."
- (2) **Function**
Function Code: 01
- (3) **Starting Address**
Specify the Hi and Lo address in the DO's Starting Address. Begin at "0."
- (4) **Number of Registers**
Specify the number of data counted from the Starting Address.

Response

No.	0	1	2	3	4	5	6	7	8	9
Contents	Transaction ID		Protocol ID		Byte Count		Unit ID	Function	Data Byte Count	Data
Byte data	0	0	0	0	0	4	1	1	1	0
Hex data	00	00	00	00	00	04	01	01	01	00

- (1) **Unit ID, Function**
Echo the Unit ID and Function Code in the Query.
- (2) **Data Byte Count**
Specify how many data packs (bytes) follow.
- (3) **Data**
1 byte (8 bits) data in two-digit hexadecimal numeral.

4.3 Read Input Status (02)

This Function Code is used to read ON/OFF status at the discrete inputs in the slave, i.e. the trigger input status of the 73VR.

Query

No.	0	1	2	3	4	5	6	7	8	9	10	11
Contents	Transaction ID		Protocol ID		Byte Count		Unit ID	Function	Starting Address		Number of Registers	
Byte data	0	0	0	0	0	6	1	2	0	0	0	1
Hex data	00	00	00	00	00	06	01	02	00	00	00	01

- (1) **Unit ID**
Specify the 73VR node address "1."
- (2) **Function**
Function Code: 02
- (3) **Starting Address**
Specify the Hi and Lo address in the DI's Starting Address. Begin at "0."
- (4) **Number of Registers**
Specify the number of data counted from the Starting Address.

Response

No.	0	1	2	3	4	5	6	7	8	9
Contents	Transaction ID		Protocol ID		Byte Count		Unit ID	Function	Data Byte Count	Data
Byte data	0	0	0	0	0	4	1	2	1	0
Hex data	00	00	00	00	00	04	01	02	01	00

- (1) **Unit ID, Function**
Echo the Unit ID and Function Code in the Query.
- (2) **Data Byte Count**
Specify how many data packs (bytes) follow.
- (3) **Data**
1 byte (8 bits) data in two-digit hexadecimal numeral.

4.4 Read Input Register (04)

This Function Code is used to read values at the analog inputs in the slave, i.e. the analog input values of the 73VR.

Query

No.	0	1	2	3	4	5	6	7	8	9	10	11
Contents	Transaction ID		Protocol ID		Byte Count		Unit ID	Function	Starting Address		Number of Registers	
Byte data	0	0	0	0	0	6	1	4	0	0	0	12
Hex data	00	00	00	00	00	06	01	04	00	00	00	0C

- (1) **Unit ID**
Specify the 73VR node address "1."
- (2) **Function**
Function Code: 04
- (3) **Starting Address**
Specify the Hi and Lo address in the AI's Starting Address. Begin at "0."
- (4) **Number of Registers**
Specify the number of data counted from the Starting Address.

Response

No.	0	1	2	3	4	5	6	7	8	9	10	11	12
Contents	Transaction ID		Protocol ID		Byte Count		Unit ID	Function	Data Byte Count	Data 1		Data 2	
Byte data	0	0	0	0	0	4	1	4	24	108	139	191	151
Hex data	00	00	00	00	00	04	01	04	18	6C	8B	BF	97

- (1) **Unit ID, Function**
Echo the Unit ID and Function Code in the Query.
- (2) **Data Byte Count**
Specify how many data packs (bytes) follow.
- (3) **Data 1**
1 word (16 bits) data in four-digit hexadecimal numeral.
- (4) **Data 2**
1 word (16 bits) data in four-digit hexadecimal numeral.

4.5 Force Single Coil (05)

This Function Code is used to write ON/OFF status at the single discrete output in the slave. (Usable with the 73VR3100 only)

Query

No.	0	1	2	3	4	5	6	7	8	9	10	11
Contents	Transaction ID		Protocol ID		Byte Count		Unit ID	Function	Starting Address		Forced Data	
Byte data	0	0	0	0	0	6	1	5	0	128	255	0
Hex data	00	00	00	00	00	06	01	05	00	80	FF	00

- (1) **Unit ID**
Specify the 73VR node address "1."
- (2) **Function**
Function Code: 05
- (3) **Starting Address**
Specify the Hi and Lo address in the DO's Starting Address. Begin at "0." "129" is specified in the above example.
- (4) **Forced Data**
0xFF, 0x00 for ON; 0x00, 0x00 for OFF.

Response

No.	0	1	2	3	4	5	6	7	8	9	10	11
Contents	Transaction ID		Protocol ID		Byte Count		Unit ID	Function	Starting Address		Forced Data	
Byte data	0	0	0	0	0	6	1	5	0	128	255	0
Hex data	00	00	00	00	00	06	01	05	00	80	FF	00

- (1) **Unit ID, Function**
Echo the Unit ID and Function Code in the Query.
- (2) **Starting Address**
Echo the Starting Address in the Query.
- (3) **Forced Data**
Data forced by the Query.

4.6 Fetch Communication Event Counter (11)

This Function Code is used to read a status word and a event count from the Communication Event Counter of the 73VR.

The event counter is incremented once for each successful message completion. By fetching the current count before and after a series of messages, the master can determine whether the messages were handled normally by the 73VR.

Query

No.	0	1	2	3	4	5	6	7
Contents	Transaction ID		Protocol ID		Byte Count		Unit ID	Function
Byte data	0	0	0	0	0	2	1	11
Hex data	00	00	00	00	00	02	01	0B

(1) Unit ID

Specify the 73VR node address "1."

(2) Function

Function Code: 11

Response

No.	0	1	2	3	4	5	6	7	8	9	10	11
Contents	Transaction ID		Protocol ID		Byte Count		Unit ID	Function	Status		Event Count	
Byte data	0	0	0	0	0	7	1	11	0	0	0	10
Hex data	00	00	00	00	00	07	01	0B	00	00	00	0A

(1) Unit ID, Function

Echo the Unit ID and Function Code in the Query.

(2) Status

Always "0."

(3) Event Count

Number of successful message completions including error responses. The count is reset to 0 with an overflow.

With two masters connected to the 73VR, total counts for the first and second masters are used.

4.7 Force Multiple Coils (15)

This Function Code is used to write ON/OFF status at the multiple discrete outputs in the slave. (Usable with the 73VR3100 only)

Query

No.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Contents	Transaction ID		Protocol ID		Byte Count		Unit ID	Function	Starting Address		Number of Registers		Data Byte Count	Forced Data	
Byte data	0	0	0	0	0	9	1	15	0	128	0	16	2	209	5
Hex data	00	00	00	00	00	09	01	0F	00	80	0	10	02	D1	05

(1) Unit ID

Specify the 73VR node address "1."

(2) Function

Function Code: 0F

(3) Starting Address

Specify the Hi and Lo address in the DO's Starting Address. Begin at "0." "129" is specified in the above example.

(4) Number of Registers

Specify the number of data counted from the Starting Address. "16" is specified in the above example.

(5) Data Byte Count

Specify how many data packs (bytes) follow. "2" bytes specified in the above example.

(6) Forced Data

0xFF, 0x00 for ON; 0x00, 0x00 for OFF.

The above shows an example of setting ON/OFF at the Address 129 through 144 as indicated below:

```
Address  136 135 134 133 132 131 130 129 / 144 143 142 141 140 139 138 137
Bit      1  1  0  1  0  0  0  1 / 0  0  0  0  0  0  1  0  1
(1 : ON, 0 : OFF)
```

Response

No.	0	1	2	3	4	5	6	7	8	9	10	11
Contents	Transaction ID		Protocol ID		Byte Count		Unit ID	Function	Starting Address		Number of Registers	
Byte data	0	0	0	0	0	6	1	15	0	128	0	16
Hex data	00	00	00	00	00	06	01	0F	00	80	00	10

(1) Unit ID, Function

Echo the Unit ID and Function Code in the Query.

(2) Starting Address

Echo the Starting Address in the Query.

(3) Number of Registers

Echo the Number of Registers in the Query.

5. Data Address

5.1 73VR1100 Data Address

Data address assignments for the 73VR1100 depend upon Function channel setting. Refer to the following tables. For detailed information about the Function channels, refer to the 73VR1100 Users Manual (EM-7399-C).

73VR1100 Data Address, Storing rate 100 msec., Function channel: None

	ADDRESS	DATA TYPE	DATA
Coil (0X)	1		DO (discrete output, Input pen 1, Relay 1)
	2		DO (discrete output, Input pen 1, Relay 2)
	3		DO (discrete output, Input pen 1, Relay 3) Not used for discrete alarm
	4		DO (discrete output, Input pen 1, Relay 4) Not used for discrete alarm
	:		:
	255		DO (discrete output, Input pen 64, Relay 3) Not used for discrete alarm
	256		DO (discrete output, Input pen 64, Relay 4) Not used for discrete alarm
	257		DO (discrete output, alarm output terminal)
Input Status (1X)	1 to 64		Measured data (discrete)
Input Register (3X)	1 to 128	Short/Long int or Float	Measured data (analog)

73VR1100 Data Address, Storing rate 100 msec., Function channel: 32

	ADDRESS	DATA TYPE	DATA
Coil (0X)	1		DO (discrete output, Input pen 1, Relay 1)
	2		DO (discrete output, Input pen 1, Relay 2)
	3		DO (discrete output, Input pen 1, Relay 3) Not used for discrete alarm
	4		DO (discrete output, Input pen 1, Relay 4) Not used for discrete alarm
	:		:
	127		DO (discrete output, Input pen 32, Relay 3) Not used for discrete alarm
	128		DO (discrete output, Input pen 32, Relay 4) Not used for discrete alarm
	129		DO (discrete output, Function pen 1, Relay 1)
	130		DO (discrete output, Function pen 1, Relay 2)
	:		:
	255		DO (discrete output, Function pen 32, Relay 3) Not used for discrete alarm
	256		DO (discrete output, Function pen 32, Relay 4) Not used for discrete alarm
257		DO (discrete output, alarm output terminal)	
Input Status (1X)	1 to 32		Measured data (discrete)
	33 to 64		Function data (discrete)
Input Register (3X)	1 to 64	Short/Long int or Float	Measured data (analog)
	65 to 128	Float	Function data (analog)

73VR1100 Data Address, Storing rate \geq 500 msec., Function channel: None

	ADDRESS	DATA TYPE	DATA
Coil (0X)	1		DO (discrete output, Input pen 1, Relay 1)
	2		DO (discrete output, Input pen 1, Relay 2)
	3		DO (discrete output, Input pen 1, Relay 3) Not used for discrete alarm
	4		DO (discrete output, Input pen 1, Relay 4) Not used for discrete alarm
	:		:
	511		DO (discrete output, Input pen 128, Relay 3) Not used for discrete alarm
	512		DO (discrete output, Input pen 128, Relay 4) Not used for discrete alarm
	513		DO (discrete output, alarm output terminal)
Input Status (1X)	1 to 128		Measured data (discrete)
Input Register (3X)	1 to 256	Short/Long int or Float	Measured data (analog)

73VR1100 Data Address, Storing rate \geq 500 msec., Function channel: 32

	ADDRESS	DATA TYPE	DATA
Coil (0X)	1		DO (discrete output, Input pen 1, Relay 1)
	2		DO (discrete output, Input pen 1, Relay 2)
	3		DO (discrete output, Input pen 1, Relay 3) Not used for discrete alarm
	4		DO (discrete output, Input pen 1, Relay 4) Not used for discrete alarm
	:		:
	383		DO (discrete output, Input pen 96, Relay 3) Not used for discrete alarm
	384		DO (discrete output, Input pen 96, Relay 4) Not used for discrete alarm
	385		DO (discrete output, Function pen 1, Relay 1)
	386		DO (discrete output, Function pen 1, Relay 2)
	:		:
	511		DO (discrete output, Function pen 32, Relay 3) Not used for discrete alarm
	512		DO (discrete output, Function pen 32, Relay 4) Not used for discrete alarm
	513		DO (discrete output, alarm output terminal)
	Input Status (1X)	1 to 96		Measured data (discrete)
97 to 128			Function data (discrete)
Input Register (3X)	1 to 192	Short/Long int or Float	Measured data (analog)
	193 to 256	Float	Function data (analog)

73VR1100 Data Address, Storing rate ≥ 500 msec., Function channel: 64

	ADDRESS	DATA TYPE	DATA
Coil (0X)	1		DO (discrete output, Input pen 1, Relay 1)
	2		DO (discrete output, Input pen 1, Relay 2)
	3		DO (discrete output, Input pen 1, Relay 3) Not used for discrete alarm
	4		DO (discrete output, Input pen 1, Relay 4) Not used for discrete alarm
	:		:
	255		DO (discrete output, Input pen 64, Relay 3) Not used for discrete alarm
	256		DO (discrete output, Input pen 64, Relay 4) Not used for discrete alarm
	257		DO (discrete output, Function pen 1, Relay 1)
	258		DO (discrete output, Function pen 1, Relay 2)
	:		:
	511		DO (discrete output, Function pen 64, Relay 3) Not used for discrete alarm
	512		DO (discrete output, Function pen 64, Relay 4) Not used for discrete alarm
	513		DO (discrete output, alarm output terminal)
Input Status (1X)	1 to 64		Measured data (discrete)
	65 to 128		Function data (discrete)
Input Register (3X)	1 to 128	Short/Long int or Float	Measured data (analog)
	129 to 256	Float	Function data (analog)

Coil

Alarm ON/OFF status for the input signals of the 73VR1100

Input Status

(1) Measured data (discrete)

ON/OFF status of the discrete input signals at the 73VR1100

(2) Function data (discrete)

Results of logic function operations (AND, OR, NOT, XOR)

Input Register

(1) Measured data (analog)

Values of analog input signals stored at the 73VR1100.

Data format depends upon signal types. Two consecutive input register addresses are used for one data. Some types of data use only 1 register (Lo word). '0' is sent for Hi word.

Data allocation (e.g. No function data)

```

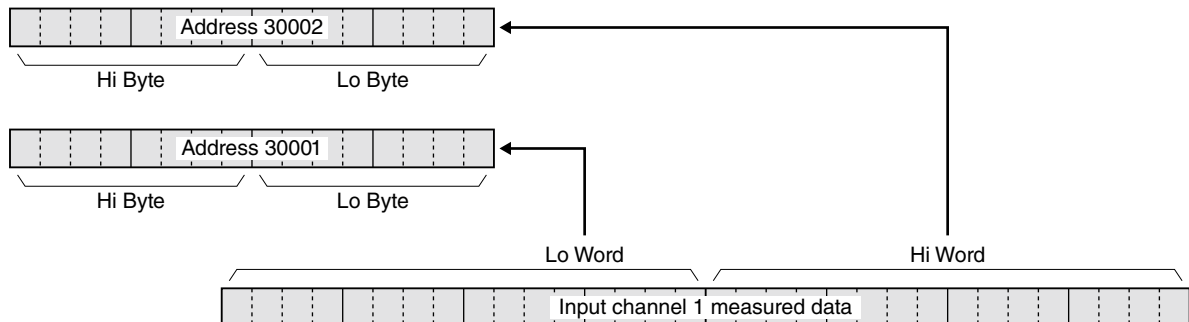
Address 30001 ..... Input channel 1 data
        30002 ..... Input channel 1 data
        :
        :
        30255 ..... Input channel 128 data
        30256 ..... Input channel 128 data
    
```

Input device & data format

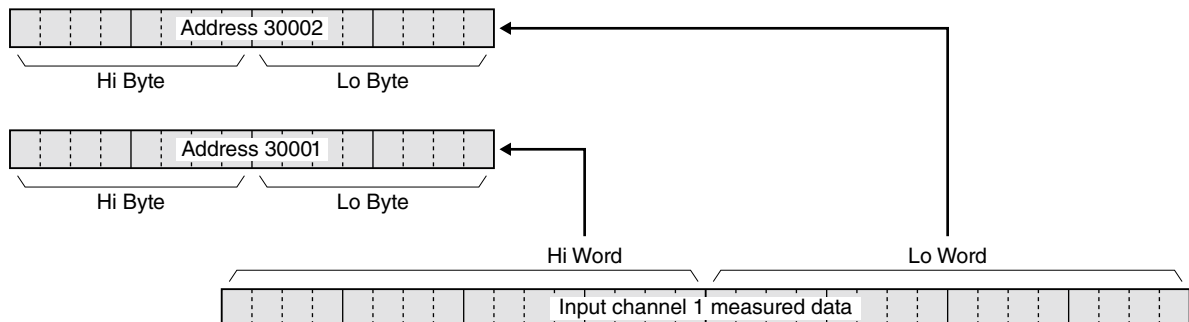
INPUT DEVICE	DATA TYPE	DATA FORMAT	REGISTER
R1M-GH2	Voltage, Thermocouple	Float	2
R1M-J3	RTD, Potentiometer	Float	2
R1M-P4	Totalized pulse count	Long int	2
	Momentary pulse rate	Short int	1
R1M-A1	Totalized pulse count	Long int	2
R1MS-GH3	Voltage, Thermocouple	Float	2
RZMS-U9	Voltage, Thermocouple, RTD, Potentiometer	Float	2
R2M-2H3	Thermocouple	Float	2
R2M-2G3	Voltage	Float	2
R3	0 to 100 percent	Short int	1
	Temperature	Short int	1
	COUNT16	Short int	1
	COUNT32	Long int	2
R5	0 to 100 percent	Short int	1
	Temperature	Short int	1
R7M	0 to 100 percent	Short int	1
	Temperature	Short int	1
53U	32 bits	Long int	2
	16 bits	Short int	1

Register format

Example: Channel 1 for input devices except the R1M-P4 (totalized pulse count type)



Example: Channel 1 for the R1M-P4 (totalized pulse count type)



(2) Function data (analog)

Results of analog function operations: Results x 100.

Analog data are in 32-bit long format, using two consecutive input register addresses for one data.

Data allocation (e.g. 32 function data)

Address 30193Function channel 1 data, Lo word
 30194Function channel 1 data, Hi word
 :
 :
 30255Function channel 32 data, Lo word
 30256Function channel 32 data, Hi word

Register format

Identical to that for measured data (analog) for the input devices except the R1M-P4.

5.2 73VR21x Data Address

Refer to the following tables for data address assignments for the 73VR21x V2 and V3 (or higher) respectively.

73VR21x V2 Data Address

	ADDRESS	DATA TYPE	DATA
Coil (0X)	1		DO (discrete output)
Input Status (1X)	1		DI (trigger input)
	3		DI (contact input, 73VR2102)
	5		DI (contact input, 73VR2104)
	7		DI (contact input, 73VR2106)
	13 to 24		Function data (discrete)
Input Register (3X)	1 to 12	Float	Measured data (analog)
	25 to 48	Float	Function data (analog)

73VR21x V3 (or higher versions) Data Address

	ADDRESS	DATA TYPE	DATA
Coil (0X)	1		DO (discrete output)
Input Status (1X)	1		DI (trigger input)
	3		DI (contact input, 73VR2102)
	5		DI (contact input, 73VR2104)
	7		DI (contact input, 73VR2106)
	9		DI (contact input, 73VR2108)
	11		DI (contact input, 73VR2110)
	13		DI (contact input, 73VR2112)
	14 to 25		Function data (discrete)
Input Register (3X)	1 to 24	Float	Measured data (analog)
	25 to 48	Float	Function data (analog)

Coil

ON/OFF status at the alarm output terminals of the 73VR21x

Input Status

(1) Trigger input

ON/OFF status at the trigger input terminals of the 73VR21x

(2) Contact input

ON/OFF status at the contact input terminals of the 73VR21x

(3) Function data (discrete)

Results of logic function operations (AND, OR, NOT, XOR)

Input Register

(1) Measured data (analog)

Analog values before scaling measured at the input terminals of the 73VR21x.

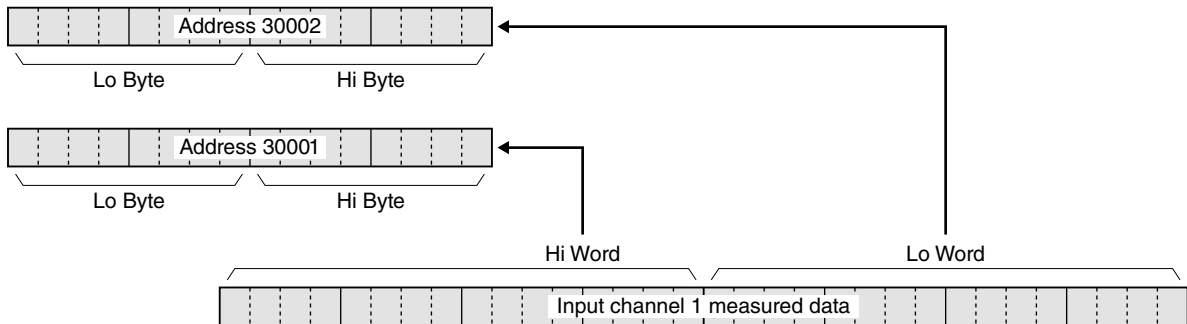
Analog data are in 32-bit long format, using two consecutive input register addresses for one data.

Data allocation

Address	30001	.....	Input channel 1 data, Hi word
	30002	.....	Input channel 1 data, Lo word
	:		:
	30023	.....	Input channel 12 data, Hi word
	30024	.....	Input channel 12 data, Lo word

Register format

Example: Channel 1



(2) Function data (analog)

Results of analog function operations: Results x 100.

Analog data are in 32-bit long format, using two consecutive input register addresses for one data.

Data allocation

Address	30025	.....	Function channel 1 data, Hi word
	30026	.....	Function channel 1 data, Lo word
	:		:
	30047	.....	Function channel 12 data, Hi word
	30048	.....	Function channel 12 data, Lo word

Register format

Identical to that for measured data (analog)

5.3 73VR3100 Data Address

The following functions are available for the 73VR3100 V2 or higher versions.

73VR3100 Data Address

	ADDRESS	DATA TYPE	DATA
Coil (0X)	1 to 256		DO (alarm output, discrete output)
Input Status (1X)	1 to 256		DI (trigger input, discrete input)
	257 to 319		Function data (discrete)
Input Register (3X)	1 to 64	Short int	Measured data (analog, 2 bytes)
	≥ 257	Long int or Float	Measured data (analog, 4 bytes)
	≥ 385	Float	Function data (analog, 4 bytes)

Coil

ON/OFF status of the alarm/discrete output signals at the 73VR3100.

Coil output forced via Modbus is processed in OR logic at the alarm output address.

Input Status

(1) Trigger and measured data (discrete)

ON/OFF status of the trigger/discrete input signals at the 73VR3100

(2) Function data (discrete)

Results of logic function operations (AND, OR, NOT, XOR)

Input Register

(1) Measured data (analog)

Values of analog input signals stored at the 73VR3100.

2-byte long data are in 16-bit long format.

4-byte long data are in 32-bit long format, using two consecutive input register addresses for one data.

COUNT32 type data are in 32-bit long format.

Raw data (no scaling) measured at the I/O modules are sent. "0 to 100 percent" type data values are multiplied by 100, and °C temperature data values are multiplied by 10.

(2) Function data (analog)

Results of analog function operations: Results x 100.

Data are in 32-bit long format, using two consecutive input register addresses for one data.

6. Exception Responses

When receiving an abnormal or unacceptable data, the 73VR responds with an exception code.

EXCEPTION CODE	NAME	FUNCTION
01	Illegal Function	Function code is not allowable for the slave.
02	Illegal Data Address	Address is not available within the slave.

Exception Response

No.	0	1	2	3	4	5	6	7	9
Contents	Transaction ID		Protocol ID		Byte Count		Unit ID	Function	Exception code
Byte data	0	0	0	0	0	3	1	131	2
Hex data	00	00	00	00	00	03	01	83	02

(1) Unit ID

Echo the Unit ID in the Query.

(2) Function

Set the most-significant bit of the Function Code to "1."

For example, when Function Code is "03", that in the exception response will be "83."

(2) Exception code

One of the codes in the above table.