MITSUBISHI

MELSECNET/10 Network Module

User's Manual

(Hardware)

AJ72QLP25,AJ72QLR25 AJ72QBR15

Thank you for buying the Mitsubishi general-purpose programmable logic controller MELSEC-QnA Series

Prior to use, please read both this manual and detailed manual thoroughly and familiarize yourself with the product.

MODEL	AQ-NET10-R-U-E
MODEL CODE	13JR13
SH(NA)-080074-C(0605)MEE	

● SAFETY PRECAUTIONS ●

(Always read before starting use.)

Before using this product, please read this manual and the relevant manuals introduced in this manual carefully and pay full attention to safety to handle the product correctly.
The instructions given in this manual are concerned with this product. For the safety instructions of the programmable controller system, please read the CPU module user's manual.
In this manual, the safety instructions are ranked as "DANGER" and "CAUTION".

⚠DANGER	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠CAUTION	Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage.

Note that the ⚠CAUTION level may lead to a serious consequence according to the circumstances.
Always follow the instructions of both levels because they are important to personal safety.

Please store this manual in a safe place and make it accessible when required. Always forward it to the end user.

[INSTALLATION PRECAUTIONS]

⚠CAUTION

- Use the PLC in an environment that meets the general specifications contained in CPU module user's manual. Using this PLC in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product.
- Fully insert the projection on the bottom of the module into the hole in the base unit and press the module into position.
  Not installing the module correctly could result in malfunction, damage, or drop of some pieces of the product.
  If using the product in a vibratory environment, tighten the module with the screws.
  Always tighten the module fixing screws within the specified torque range. Loose tightening could result in drop of some pieces of the product, short-circuit, and malfunction.
  Tightening the screws too much could result in drop of some pieces of the product, short-circuit, or malfunction due to the breakage of a screw or the module.

[INSTALLATION PRECAUTIONS]

⚠CAUTION

- Completely turn off the externally supplied power used in the system before mounting or removing the module.
  Not doing so could result in damage to the product.
- Do not directly touch the printed circuit board, the conducting parts and electronic parts of the module. It may cause damage or erroneous operation.
- Before handling the module, touch a grounded metal object to discharge the static electricity from the human body. Failure to do so may cause malfunction or failure of the module.

[WIRING PRECAUTIONS]

⚠DANGER

- Before installation or wiring, be sure to shut off all phases of the external power supply used by the system.
  Failure to do so may cause electric shocks or damage the product.

⚠CAUTION

- Solder the coaxial cable connector properly. Incomplete soldering may cause a malfunction.
- Be sure there are no foreign substances such as sawdust or wiring debris inside the module. Such debris could cause fires, damage, or erroneous operation.
- Make sure to place the communication and power cables into a duct or fasten them using a clamp.
  Cables not placed in the duct or not clamped may hang or shift, allowing them to be accidentally pulled, which may cause a module malfunction and cable damage.
- When removing the communication cable or power cables from the module, do not pull the cable. When removing the cable with a connector, hold the connector on the side that is connected to the module. When removing the cable connected to the terminal block, first loosen the screws on the terminal block. Pulling the cable that is still connected to the module may cause malfunction or damage to the module or cable.

About the Manuals

The following product manuals are available. Please use this table as a reference to request the appropriate manual as necessary.

Detailed Manual

Manual name	Manual No. (Model code)
For QnA/Q4AR MELSECNET/10 Network System Reference Manual	IB-66690 (13JF78)

Before use of this module, be sure to read the For QnA/Q4AR MELSECNET/10 Network System Reference Manual

Compliance with the EMC Directive and the Low Voltage Directive

When incorporating the Mitsubishi PLC into other industrial machinery or equipment and keeping compliance with the EMC and low voltage directives, refer to Chapter 3 "EMC Directive and Low Voltage Instruction" of the User's Manual (Hardware) for the CPU module used or the PLC CPU supplied with the base unit.

The CE logo is printed on the rating plate of the PLC, indicating compliance with the EMC and low voltage directives.

For making this product compliant with the EMC and low voltage directives, please refer to Section 3.1.3 "Cable" in Chapter 3 of the above-mentioned user's manual.

1. Overview

This manual explains the specifications and part names of the AJ72QLP25, AJ72QLR25, and AJ72QBR15 model MELSECNET/10 network modules (abbreviated as Network Modules) which are used to construct remote I/O systems on MELSEC-QnA series MELSECNET/10 network systems.

(1) The use, cable used and installation position of the Network Modules are indicated on the following chart.

	Application	Cable used		Position
		Optical fiber cable	Coaxial cable	
AJ72QLP25	For remote I/O station of MELSECNET/10	○	-	Main base CPU slot
AJ72QLR25		-	○	
AJ72QBR15				

(2) After unpacking the Network Modules, confirm that any of the following products is enclosed.

Model	Description	Quantity
AJ72QLP25	Model AJ72QLP25 MELSECNET/10 network module (optical loop type)	1
AJ72QLR25	Model AJ72QLR25 MELSECNET/10 network module (coaxial loop type)	1
AJ72QBR15	Model AJ72QBR15 MELSECNET/10 network module (coaxial bus type)	1
	F-type connector (A6RCON-F)	1

(3) The coaxial bus-type network system requires terminal resistors (A6RCON-R75: 75Ω) at both terminal stations of the network. The user should arrange for terminal resistors, since the AJ72QBR15 does not come with terminal resistors.

2. Performance Specifications

The performance specifications for Network Modules are indicated as follows.

<table>
<tr><th colspan="2" rowspan="2">Item</th><th colspan="6">Specifications</th></tr>
<tr><th colspan="2">AJ72QLP25</th><th colspan="2">AJ72QLR25</th><th colspan="2">AJ72QBR15</th></tr>
<tr><td rowspan="3">Maximum link points per network</td><td>X/Y</td><td colspan="6">8192 points</td></tr>
<tr><td>B</td><td colspan="6">8192 points</td></tr>
<tr><td>W</td><td colspan="6">8192 points</td></tr>
<tr><td colspan="2">Maximum link points per station</td><td colspan="6">• Remote master station → Remote I/O station
$\left\{\frac{Y+B}{8}+(2\times W)\right\} \le 1600$ bytes
• Remote I/O station → Remote master station
$\left\{\frac{X+B}{8}+(2\times W)\right\} \le 1600$ bytes
• Remote master station → Remote sub-master station
Remote sub-master station → Remote master station
$\left\{\frac{Y+B}{8}+(2\times W)\right\} \le 2000$ bytes</td></tr>
<tr><td colspan="2">Maximum number of I/O points per remote I/O station</td><td colspan="6">X+Y ≤ 2048 (main base unit + 7 extension base units)
When X and Y overlap, either of them becomes effective.</td></tr>
<tr><td colspan="2">Communication speed</td><td colspan="3">10Mbps
(equivalent to 20Mbps for multiple transmission)</td><td colspan="2">10Mbps</td></tr>
<tr><td colspan="2">Communication method</td><td colspan="3">Token ring</td><td colspan="2">Token bus</td></tr>
<tr><td colspan="2">Synchronization method</td><td colspan="6">Frame synchronization</td></tr>
<tr><td colspan="2">Encoding method</td><td colspan="2">NRZI encoding
(Non Return to Zero Inverterd)</td><td colspan="4">Manchester encoding</td></tr>
<tr><td colspan="2">Transmission route format</td><td colspan="2">Duplex optical loop</td><td colspan="2">Duplex coaxial loop</td><td colspan="2">Single coaxial bus</td></tr>
<tr><td colspan="2">Transmission format</td><td colspan="6">Conform to HDLC (frame format)</td></tr>
<tr><td colspan="2">Maximum number of networks</td><td colspan="6">239</td></tr>
<tr><td colspan="2">Number of stations for connection per network</td><td colspan="3">65 stations (Remote master station: 1; Remote I/O stations: 64)</td><td colspan="2">33 stations (Remote master station: 1; Remote I/O stations: 32)</td></tr>
<tr><td colspan="2" rowspan="3">Overall distance (station-to-station distance)*1</td><td colspan="2" rowspan="3">30km
(SI optical cable : 500m
H-PCF optical cable : 1km
Broad-band H-PCF optical cable : 1km
QSI optical cable : 1km)</td><td>3C-2V</td><td>19.2km (300m)</td><td>3C-2V</td><td>300m (300m)</td></tr>
<tr><td>5C-2V</td><td>30km (500m)</td><td>5C-2V</td><td>500m (500m)</td></tr>
<tr><td colspan="2">—</td><td colspan="2">Can be extended to 2.5km when used with a repeater module (A6BR10, A6BR10-DC)</td></tr>
<tr><td colspan="2">Error control method</td><td colspan="6">Retry by CRC ($X^{16}+X^{12}+X^5+1$) and overtime</td></tr>
<tr><td colspan="2">RAS function</td><td colspan="6">• Loop back function due to abnormality detection and cable disconnection (AJ72QLP25, AJ72QLR25)
• Diagnostic function for local link circuit check
• Abnormality detection by link special relay, resistor
• Network monitor, each type of diagnostic function</td></tr>
<tr><td colspan="2">Transient transmission</td><td colspan="6">Monitoring with peripheral device, program up/download</td></tr>
<tr><td colspan="2">Connection cable</td><td colspan="2">Optical fiber cable
(Arranged by user *2)</td><td colspan="4">Equivalent to 3C-2V, 5C-2V cables
(Arranged by user)</td></tr>
</table>

Item	Specifications		
	AJ72QLP25	AJ72QLR25	AJ72QBR15
Applicable connector	2-core optical connector plug (Arranged by user *2)	Equivalent to BNC-P-3-NiCAu (For 3C-2V), BNC-P-5-NiCAu (For 5C-2V) (DDK) (Arranged by user)	
5VDC current consumption	0.80A	1.3A	0.90A
Weight	0.53kg	0.60kg	0.60kg

*1: The distance between stations is restricted in accordance with the type of cable and number of stations. Refer to Reference Manual of master module in use for details.

*2: Specialised training and specific tools are required to connect the connector to the optical-fiber cable; the connector itself is a custom product. Please contact your nearest Mitsubishi Electric System Service Corporation when purchasing these items.

For general specifications of the network module, refer to the user's manual for the PLC CPU that is to be used.

3. Handling

3.1 Cable length restrictions between stations

(1) The main modules case is made of plastic, so do not drop it or subject it to strong impacts.

(2) Do not dismount the printed wiring board from the case. It may damage the module.

(3) When wiring, be careful never to let foreign matter from the above module such as wiring scraps get inside the module. If something goes in, get rid of it.

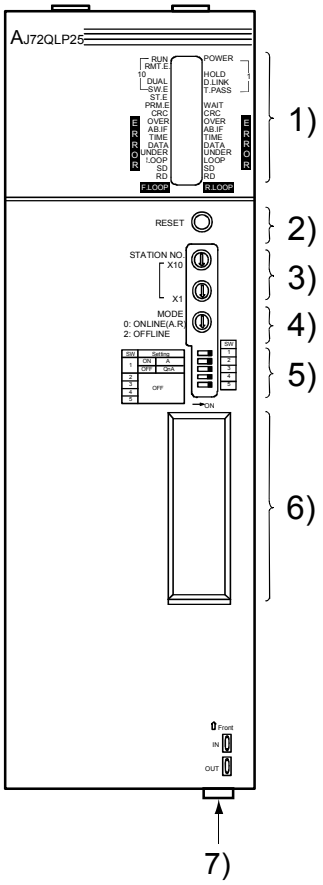
(4) The module installation screw should be kept within the following range.

Screw Locations	Tightening Torque Range
Module installation screws (M4 screws)	78 to 118N•cm

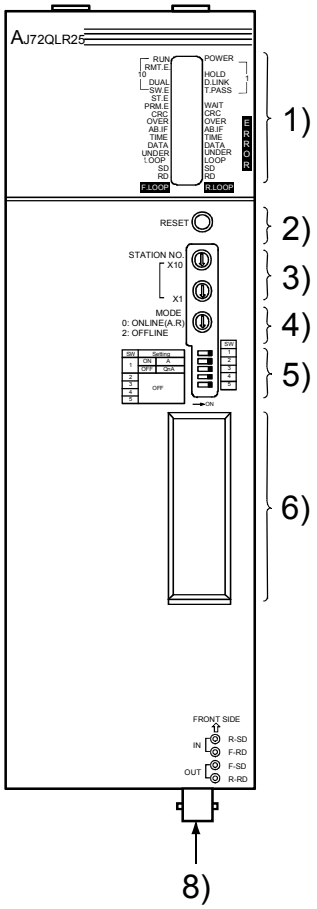
4. The Name and Setting of Each Part

Indicates the name and setting of each part of Network Modules.

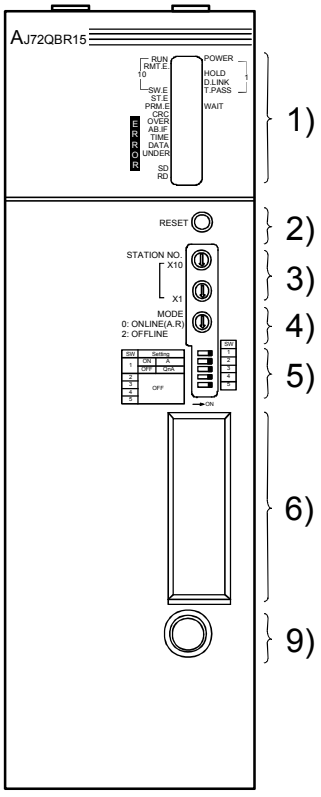
AJ72QLP25

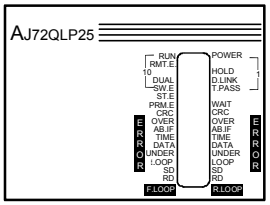
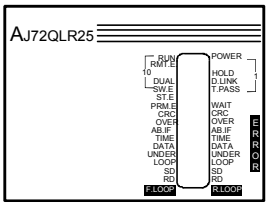
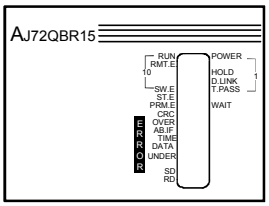


AJ72QLR25



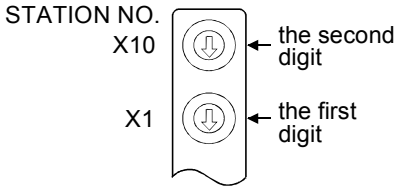
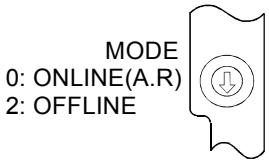
AJ72QBR15



No.	Name	Contents		
1)	LED AJ72QLP25  AJ72QLR25  AJ72QBR15  	Name	Status	Contents
		RUN	ON	Normally operating.
			OFF	WDT error occurred (hardware failure)
		RMT.E.	ON	When a blown fuse or I/O check error occurs. (Host station)
		DUAL		Multiplex transfer in execution (OFF: Multiplex transfer not executed)
		SW.E.		Incorrect setting of switches 3) to 4)
		ST.E.		Station number or remote master station status is duplicated on the same network.
		PRM.E.		• When I/O allocation is abnormal. • When the number of LB/LW points is insufficient. (special-function module) • When the parameters received from the remote master station are abnormal.
		POWER		Power being supplied (OFF: No power being supplied)
		HOLD		Output status is held when communication is abnormal. Standard network ···· Q4ARCPU output hold/reset setting switch is set to "Hold". Duplex network ····· A6RAF is set to "Hold" at "HOLD/RESET MODE" section.
		D.LINK		Data link being performed (OFF: Data link stopped)
		T.PASS		Participating in token passing (Transient transmission is available.)
		WAIT		When waiting for communication with special-function module.
		CRC		Error detected in code check of receive data <Cause> Timing at which station sending data to target station is disconnected from network, hardware failure, cable fault, noise, etc.
		OVER		Error occurred when receive data processing is delayed <Cause> Hardware failure, cable fault, noise, etc.
		AB.IF		• Consecutive 1s exceeding the specified number were received. • Length of received data is too short. <Cause> Timing at which station sending data to target station is disconnected from network, too short monitoring time, cable fault, noise, etc.
		TIME		Token has not reached host within monitoring time. <Cause> Monitoring time too short, cable fault, noise, etc.
		DATA		Data with erroneous code was received. <Cause> Cable fault, noise, etc.
		UNDER		Internal send data processing is not done at fixed intervals. <Cause> Hardware failure
		LOOP		Forward/reverse loop (F.LOOP/R.LOOP) is faulty. <Cause> Power-off of adjacent station, cable disconnection, no connection, etc.
		SD	Dimly ON	Data being sent
		RD		Data being received

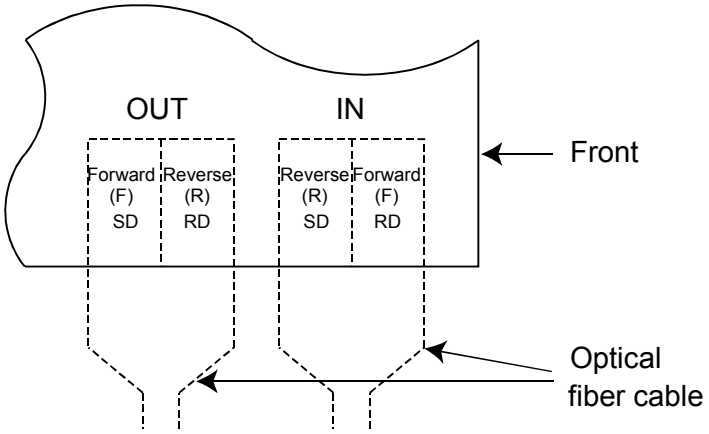
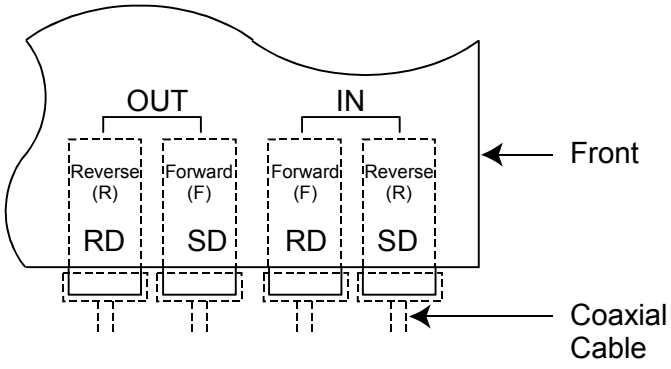
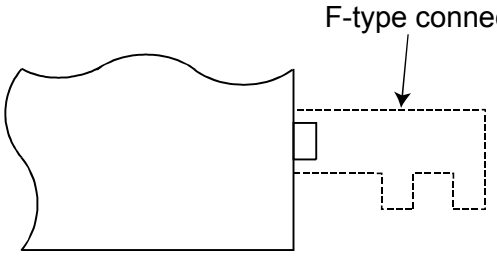
Caution

Do not change the setting of the DIP switch on the printed circuit board at the side face of the module.

<table>
<tr><th>No.</th><th>Name</th><th>Contents</th></tr>
<tr><td>2)</td><td>Reset switch
  </td><td>Resets the host station hardware.</td></tr>
<tr><td>3)
*1</td><td>Station number setting switch
  </td><td>Station number setting (factory setting at time of shipping: 1) *2
<Setting range>
1 to 64 : Station number
Other than 1 to 64 : Setting error (The SW.E. LED turns ON)</td></tr>
<tr><td>4)
*1</td><td>Mode setting switch
  </td><td>Mode setting (factory setting at time of shipping: 0)
<table>
<tr><th>Mode</th><th>Name</th><th>Contents</th></tr>
<tr><td>0</td><td>Online (automatic online return effective)</td><td>Data link with automatic online return effective</td></tr>
<tr><td>1</td><td colspan="2">Not used (Setting to this turns on the SW.E. LED.)</td></tr>
<tr><td>2</td><td>Offline</td><td>Disconnects the host station.</td></tr>
<tr><td>3</td><td>Forward loop test</td><td>Checks the forward loop of the whole network system.</td></tr>
<tr><td>4</td><td>Reverse loop test</td><td>Checks the reverse loop of the whole network system.</td></tr>
<tr><td>5</td><td>Station-to-station test (master station)</td><td rowspan="2">The mode for a line check between two stations, in which the station with the smaller number is regarded as the master station and the other is considered the slave station.</td></tr>
<tr><td>6</td><td>Station-to-station test (slave station)</td></tr>
<tr><td>7</td><td>Self-loopback test</td><td>Check the hardware of a module in isolation, including the communication circuit and cables of the transmission system.</td></tr>
<tr><td>8</td><td>Internal self-loopback test</td><td>Check the hardware of a module in isolation, including the communication circuit of the transmission system.</td></tr>
<tr><td>9</td><td>Hardware test</td><td>Check the hardware inside the network module.</td></tr>
<tr><td>A to E</td><td>Not used</td><td>(Do not set the mode.)</td></tr>
<tr><td>F</td><td>Station number check</td><td>Checks the number using LEDs</td></tr>
</table></td></tr>
<tr><td>5)
*1</td><td>Conditions setting switch</td><td>Operation condition setting (factory setting at time of shipping: all OFF)
<table>
<tr><th>SW</th><th>OFF</th><th>ON</th></tr>
<tr><td>1</td><td>Peripheral device for QnA series connected</td><td>Peripheral device for A series connected</td></tr>
<tr><td>2</td><td colspan="2" rowspan="4">Not used (always off)</td></tr>
<tr><td>3</td></tr>
<tr><td>4</td></tr>
<tr><td>5</td></tr>
</table></td></tr>
<tr><td>6)</td><td>RS-422 interface</td><td>Connects the peripheral device</td></tr>
</table>

*1: When the setting is changed while the power supply is ON, reset using the reset switch in 2).
When the mode setting switch in 4) is set "F", reset is unnecessary.

*2: The setting range for the AJ72QBR15 is shown below.
<Setting range>
1 to 32 : Station number
Other than 1 to 32 : Setting error (The SW.E. LED turns ON. Note that it does not turn ON when set to any of 33 to 64.)

No.	Name	Contents
7)	Connector (AJ72QLP25)	Connect the optical fiber cable. 
8)	Connector (AJ72QLR25)	Connect the coaxial type cable. 
9)	Connector (AJ72QBR15)	Connect the F-type connector. 

5. Wiring

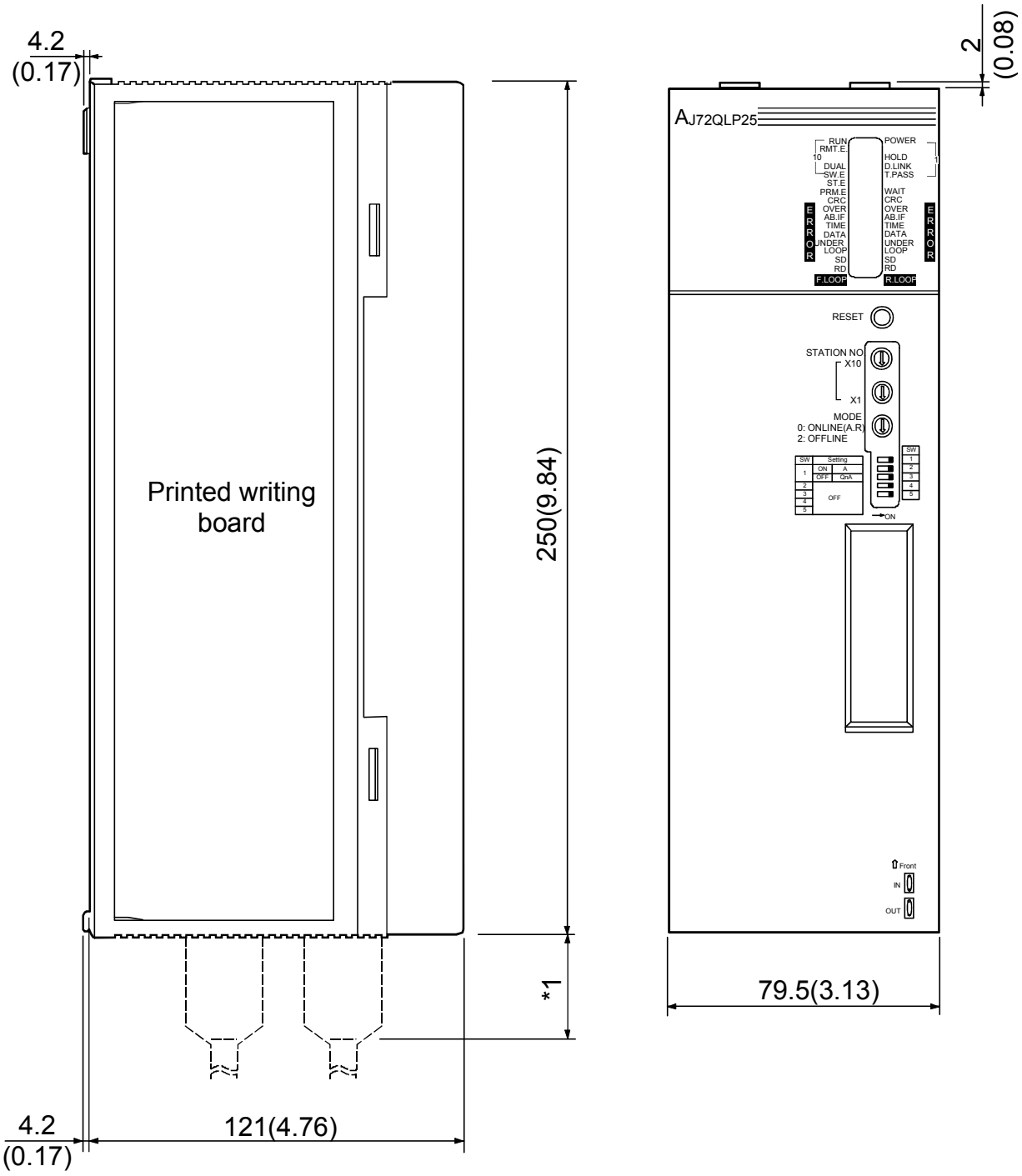
Please refer to the reference manual of used master module for the wiring for network system.

Please wire IN/OUT or SD/RD of the connector for the cable correctly.

Please do loopback test, the set confirmation test, and the bureau order confirmation test after wiring. It might be generated that a baton abnormal passing cannot be generated when miswiring and the downed bureau which cannot do the loopback of an arbitrary bureau do the row again even by the reclosing of the power supply.

6. External Dimensions

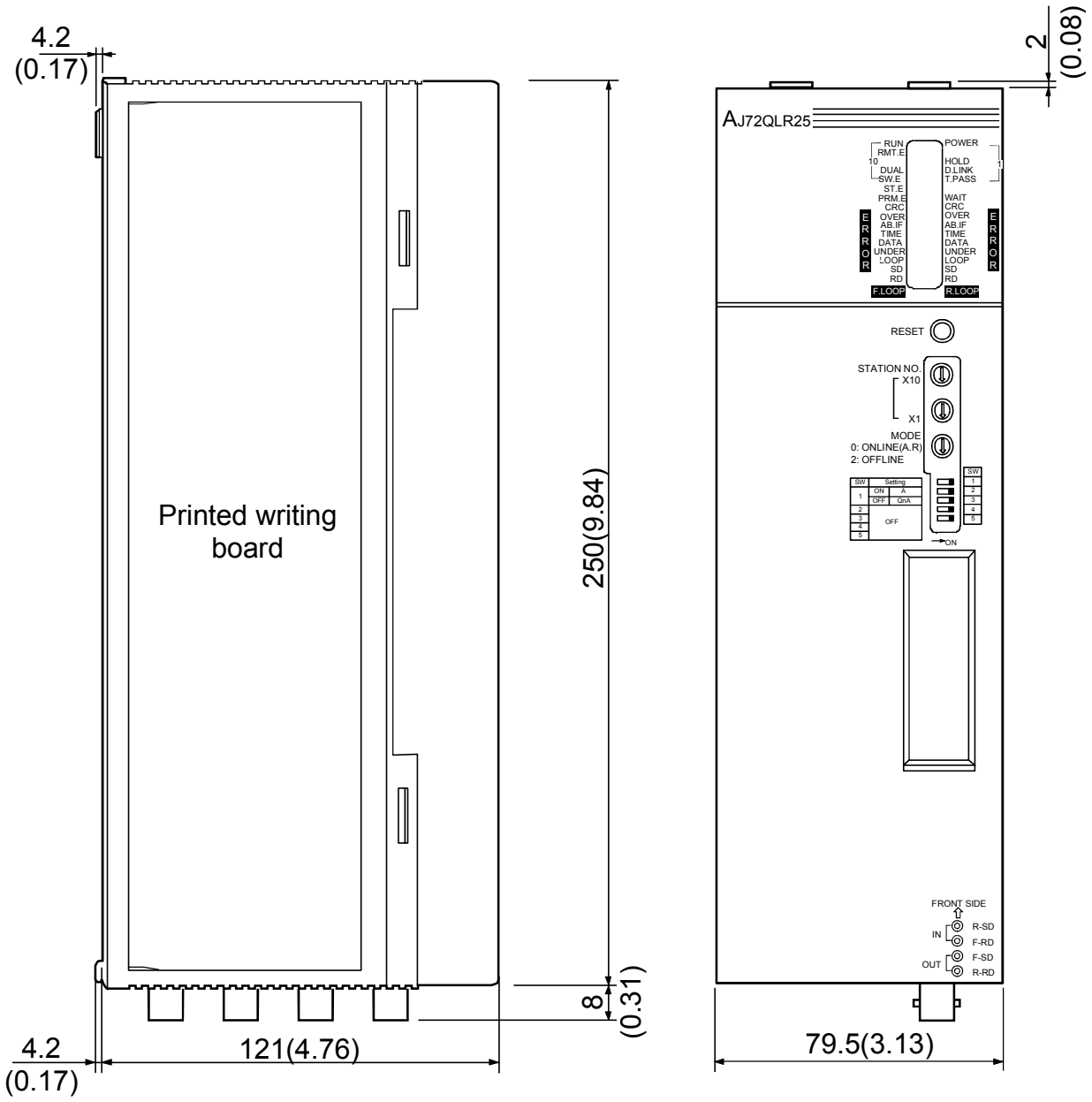
6.1 AJ72QLP25



Unit: mm (in.)

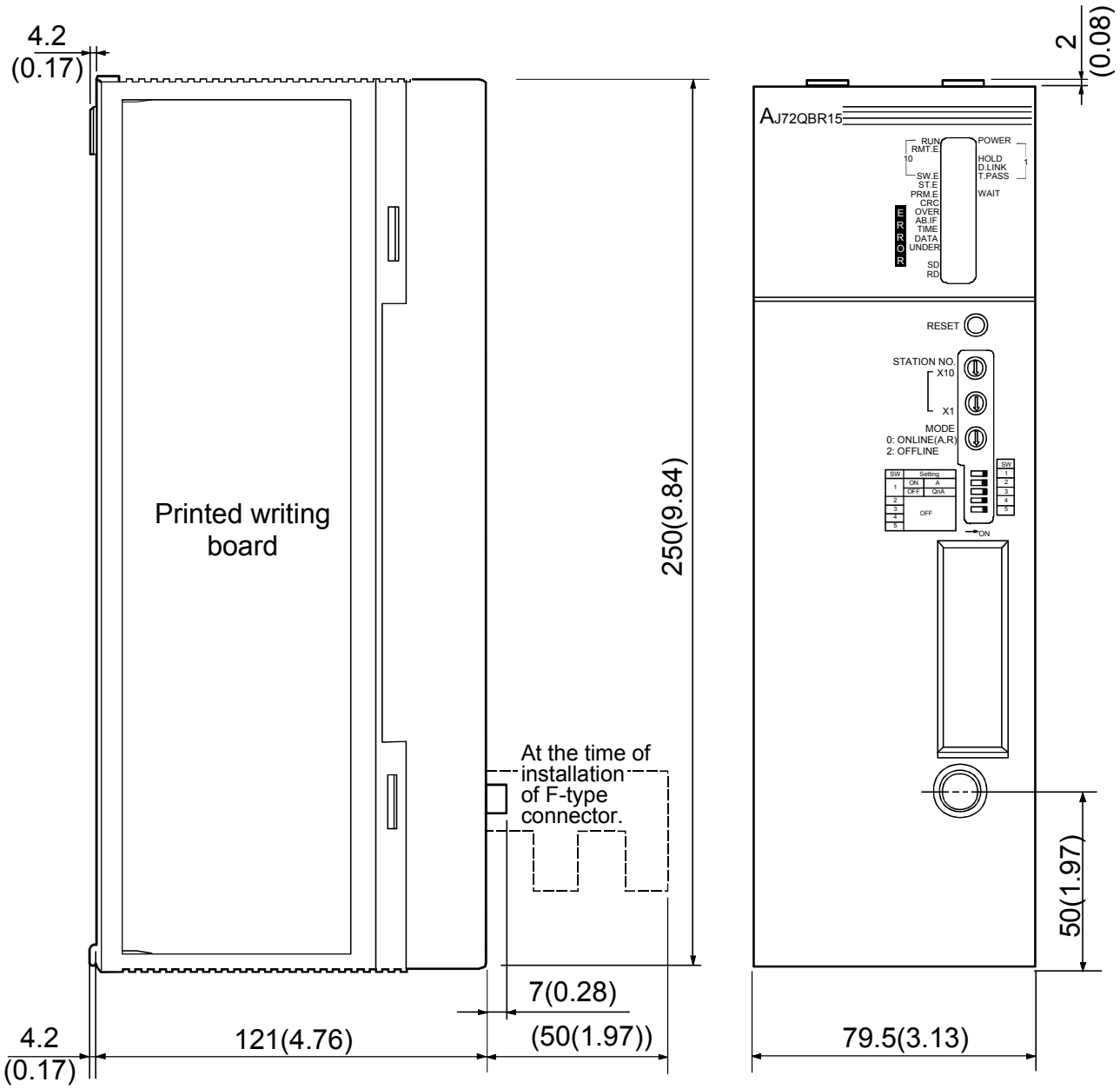
*1: Please confirm details to Mitsubishi Electric System Service Corporation.

6.2 AJ72QLR25



Unit: mm (in.)

6.3 AJ72QBR15



Unit: mm (in.)

Warranty

Mitsubishi will not be held liable for damage caused by factors found not to be the cause of Mitsubishi; machine damage or lost profits caused by faults in the Mitsubishi products; damage, secondary damage, accident compensation caused by special factors unpredictable by Mitsubishi; damages to products other than Mitsubishi products; and to other duties.

⚠For safe use

- 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.
- 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 in the system.

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