MELSEC QnA Series

Programmable Logic Controller

User's Manual
(Hardware)

AJ72QLP25
AJ72QLR25
AJ72QBR15

MELSECNET/10 Remote I/O Module

01 11 2002
SH(NA)-080074
Version B

● SAFETY PRECAUTIONS ●

(Read these precautions before using.)

When using Mitsubishi equipment, thoroughly read this manual and the associated manuals introduced in this manual. Also pay careful attention to safety and handle the module properly.
These precautions apply only to Mitsubishi equipment. Refer to the CPU module user's manual for a description of the PC system safety precautions.
These ●SAFETY PRECAUTIONS● classify the safety precautions into two categories: "DANGER" and "CAUTION".

⚠DANGER	Procedures which may lead to a dangerous condition and cause death or serious injury if not carried out properly.
⚠CAUTION	Procedures which may lead to a dangerous condition and cause superficial to medium injury, or physical damage only, if not carried out properly.

Depending on circumstances, procedures indicated by **⚠CAUTION** may also be linked to serious results.
In any case, it is important to follow the directions for usage.
Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

[INSTALLATION PRECAUTIONS]

⚠CAUTION

- Use the PC in an environment that meets the general specificaitons contained in this manual. Using this PC 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.
- Do not touch the printed circuit board of the module.
  It may cause damage or erroneous operation.
- Install so that the pegs on the bottom of the module fit securely into the base unit peg holes.
  Not installing the module correctly or tightening the screws to the terminal base could result in erroneous operation, damage, or pieces of the product falling.

[WIRING PRECAUTIONS]

⚠DANGER

- Completely turn off the external power when installing or placing wiring. Not completely turning off all power could result in electric shock or damage to the product.

⚠CAUTION

- When wiring in the PC, be sure that it is done correctly by checking the product's rated voltage and the terminal layout. Connecting a power supply that is different from the rating or incorrectly wiring the product could result in fire or damage.
- 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.
- Solder the coaxial cable connector properly. Incomplete soldering may cause a malfunction.
- Tighten terminal screws to the specified torque.
  If a terminal screw is not tightened to the specified torque, it the module may fall out, short circuit, or malfunction.
  If a terminal screw is tightened excessively, exceeding the specified torque, the module may fall out, short circuit, or malfunction due to breakage of the screw or the module.
- Be sure to fix communication cables or power cables leading from the module by placing them in the duct or clamping them.
  Cables not placed in the duct or without clamping 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)

Correspondence to EMC DIRECTIVE

For instructions to make the PLC compatible with EMC standards, refer to "EMC AND LOW-VOLTAGE DIRECTIVE" in PLC CPU User's Manual (Hardware).

* When the PLC CPU user's manual (Hardware) does not include Chapter 2 "EMC AND LOW-VOLTAGE DIRECTIVE", refer to QnA Series CPU Compatible High-Speed Accessing Basic Base Unit-Additional Explanation for Product Conforming to EMC Standards (IB-66837) (optional).

1. Overview

This manual gives the specifications and nomenclature of the AJ72QLP25, AJ72QLR25, AJ72QBR15 type network module (abberviated as Remote I/O Modules) to be used in a MELSEC-QnA series MELSECNET/10 network system.

(1) The following table shows the applications, applicable cable and installation position of the Remote I/O Modules.

Type	Application	Applicable cable		Module installation position
		Optical fiber cable	Coaxial cable	
AJ72QLP25	For remote I/O station of MELSECNET/10	○	-	CPU slot of main base unit
AJ72QLR25		-	○	
AJ72QBR15				

(2) Please confirm that the following parts have been supplied on unpacking the package:

(a) AJ72QLP25

Part name	Quantity
AJ72QLP25 network module	1

(b) AJ72QLR25

Part name	Quantity
AJ72QLR25 network module	1

(c) AJ72QBR15

Part name	Quantity
AJ72QBR15 network module	1
F type connector (A6RCON-F)	1

(3) When configuring a coaxial bus system a terminal resistor (A6RCON-R75) must be installed at both ends. The terminal resistors are not contained in the package and you must be obtained at your own expense.

2. Performance Specifications

The following table shows the performance specifications of the Remote I/O Modules.

Item	AJ72QLP25	AJ72QLR25	AJ72QBR15	
	Optical loop ssytem	Coaxial loop sytem	Coaxial bus sytem	
Maximum number of link points per network	X/Y: 8192 points B: 8192 points W: 8192 points			
Maximum number of link points per station	• Remote master station → Remote I/O station $\left[\frac{Y+B}{8}+(2\times W)\right]+(2\times W) \le 1600$ bytes • Remote I/O station → Remote master station $\left[\frac{X+B}{8}+(2\times W)\right]+(2\times W) \le 1600$ bytes • Remote master station → Remote sub-master station Remote sub-master station → Remote master station $\left[\frac{Y+B}{8}+(2\times W)\right]+(2\times W) \le 2000$ bytes			
Maximum number of I/O points per station	X+Y ≤ 2048 (main base plus 7 extension bases)			
Communication speed	10Mbps (20Mbps: multiple transmission)		10Mbps	
Communication method	Token-ring method		Token bus method	
Synchronization system	Frame synchronization			
Coding system	NRZI coding (Non Return to Zero Inverterd)		Manchester coding	
Transmission channel type	Duplex loop		Single bus	
Transmission format	Conforms to HDLC (frame format)			
Maximum number of networks	239			
Number of stations connectable per network	65 stations (Master station: 1; remote I/O stations: 64)		33 stations (Master station:1; remote I/O stations:32)	
Overall extension distance	30km SI optical cables: station-to-station distance 500m H-PCF optical cables: station-to-station distance 1km Broad-band H-PCF optical cables: station to station distance 1km	3C-2V 19.2km (inter station 300m)	3C-2V 300m (station-to-station distance 300m)	5C-2V 500m (station-to-station distance 500m)
		5C-2V 30km (inter station 500m)	Repeter unit Extension up to 2.5km possible by using A6BR10 or A6BR10DC	
Error control ststem	Retry by CRC ($X^{16}+X^{12}+X^5+1$) and overtime			
RAS function	• Loopback function in response to error detection and cable disconnection (AJ72QLP25, AJ72QLR25) • Diagnosis function for self-station link line check • Error detection using special relays and registers • Network monitor and other diagnosis functions			
Transient transmission	• Monitoring with peripheral device, program up/download			
Connection cable	Optical fiber cable (Arranged by user *1)	3C-2V, 5C-2V or equivalent		

Item	AJ72QLP25	AJ72QLR25	AJ72QBR15
	Optical loop ssytem	Coaxial loop sytem	Coaxial bus sytem
Applicable connector	2-core optical connettor plug (Arranged by user *1)	BNC connector compatible with 3C-2VC, 5C-2V cable	
5VDC current consumption (A)	0.8	1.3	0.9
Weight (kg)	0.53	0.6	0.6

*1: 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, refer to the user's manual for the PLC CPU used for the network system.

3. Handling

[INSTALLATION PRECAUTIONS]

⚠CAUTION
● Use the PC in an environment that meets the general specificaitons contained in this manual. Using this PC 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. ● Do not touch the printed circuit board of the module. It may cause damage or erroneous operation. ● Install so that the pegs on the bottom of the module fit securely into the base unit peg holes. Not installing the module correctly or tightening the screws to the terminal base could result in erroneous operation, damage, or pieces of the product falling.

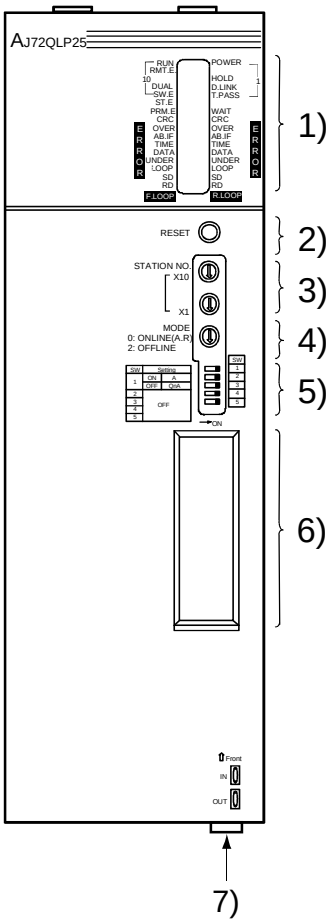
3.1 Cable length restrictions between stations.

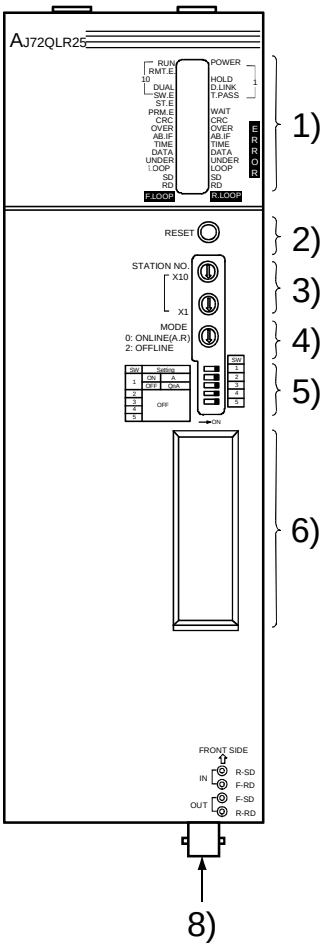
(1) The main modules case is made of plastic, so do not drop it or subject it to strong impacts.
(2) Do not dismount the printed wiring board from the case. It may damage the module.
(3) When wiring, be careful never to let foreign matter from the above module such as wiring scraps get inside the module. If something goes in, get rid of it.
(4) The module installation screw should be kept within the following range.

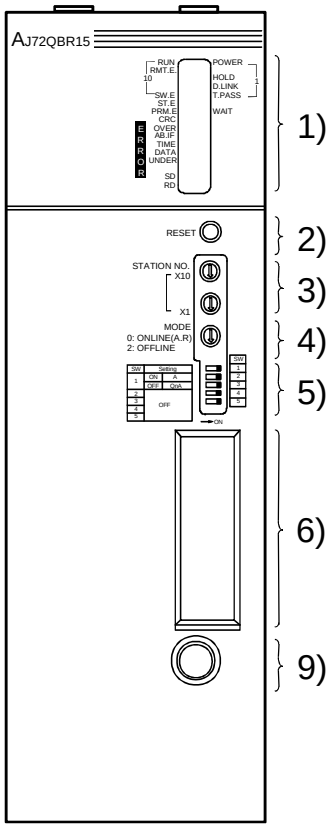
Screw Locations	Tightening Torque Range
Module installation screws (M4 screws)	78 to 118N•cm

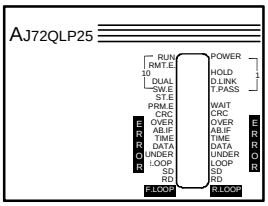
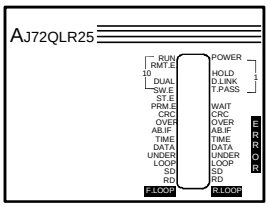
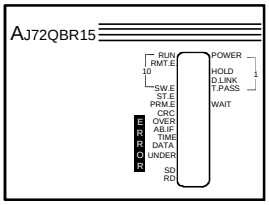
4. The Name and Setting of Each Part

This section gives the names of each part of the Remote I/O Modules and explains their settings.



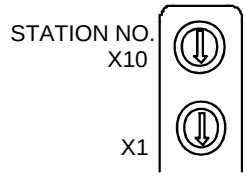
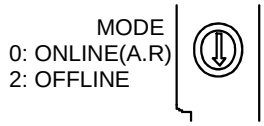


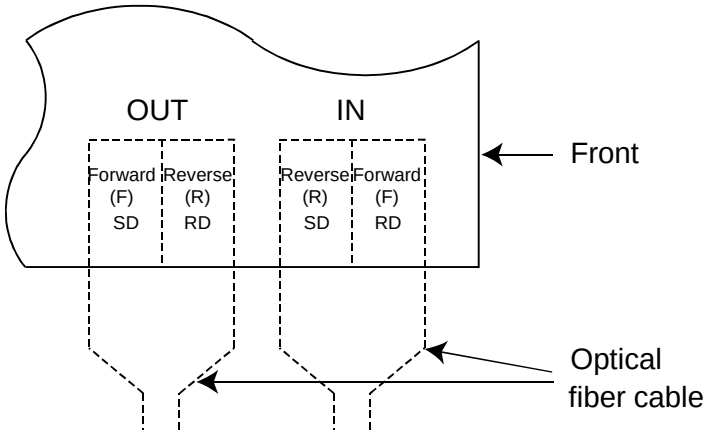
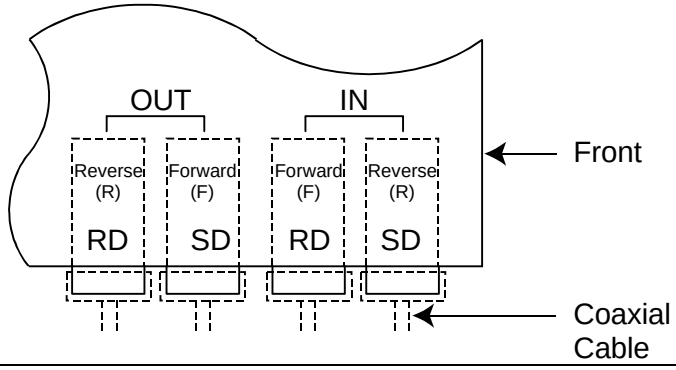
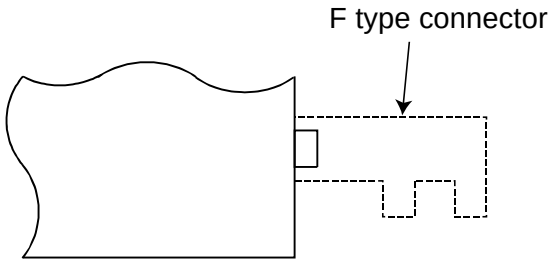


No.	Name	Contents		
1)	LED AJ72QLP25  AJ72QLR25  AJ72QBR15  	Name	State	Description
		RUN	ON	When the module is normal.
			OFF	When a WDT error occurs.
		PRM.E.	ON	When a blown fuse or I/O check error occurs.(Host station)
		DUAL		During duplex transmission. (Off: when duplex transmission not executed)
		SW.E		When settings of switches (3) to (4) are incorrect.
		ST.E.		When two or more stations have the same number exist in the same network.
		PRM.E.		• When I/O allocation is abnormal. • When the number of LB/LW points is insufficient. • When the parameters received from the remote master station are abnormal.
		POWER		When power is supplied. (Off: when power is not 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		During data link (Off: when data link stopped)
		T.PASS		When taking part in baton passing. (during transient transmission)
		WAIT		When waiting for communication with special-function module.
		CRC		When there is a code check error in the received data. <Cause> Timing when the station that is sending data to a specific station is set off-line, hardware fault, cable fault, noise, etc.
		OVER		When an error occurs due to delay in processing of received data. <Cause> Hardware fault, cable fault, noise, etc.
		AB.IF		• When the number of "1"s received in succession exceeds the specified number. • When an error occurs due to short data length of received data. <Causes> Timing when the station that is sending data to a specific station is set off-line, WDT setting too short, cable fault, noise, etc.
		TIME		When an error occurs when the data link monitoring timer operates. <Causes> Short WDT time, cable fault, noise, etc.
		DATA		When an error occurs due to receipt of more than 2 Kbytes of data. <Cause> cable fault, noise, etc.
		UNDER		When an error occurs due to internal processing of sent data at irregular intervals. <Cause> Hardware fault
		LOOP		When an error occurs due to abnorma forward or reverse loop. (F.LOOP)/ (R.LOOP) <Cause> Power OFF at adjacent station, cable disconnection, connection not made, etc.
		SD	Dimly lit	Using data transmission.
		RD		During data reception.

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 colspan="3">Contents</th></tr>
<tr><td>2)</td><td>Reset switch
  </td><td colspan="3">Resets the host station hardware.</td></tr>
<tr><td>3)
*1</td><td>Station number setting switch
  </td><td colspan="3">Station number setting (setting on delivery: 1)
<Setting range>
1 to 64
Any number outside the range will result in an error (the SW.E LED will come on).</td></tr>
<tr><td>4)
*1</td><td>Mode setting switch
  </td><td colspan="3">Mode setting (setting on delivery: 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">Unusable</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 line of the entire data link system.</td></tr><tr><td>4</td><td>Reverse loop test</td><td>Checks the reverse loop line of the entire data link 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>-</td><td>Unusable</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 colspan="3">Operation condition setting (setting at delivery: 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">Unusable (leave OFF at all times)</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 colspan="3">Connects the peripheral device</td></tr>
</table>

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

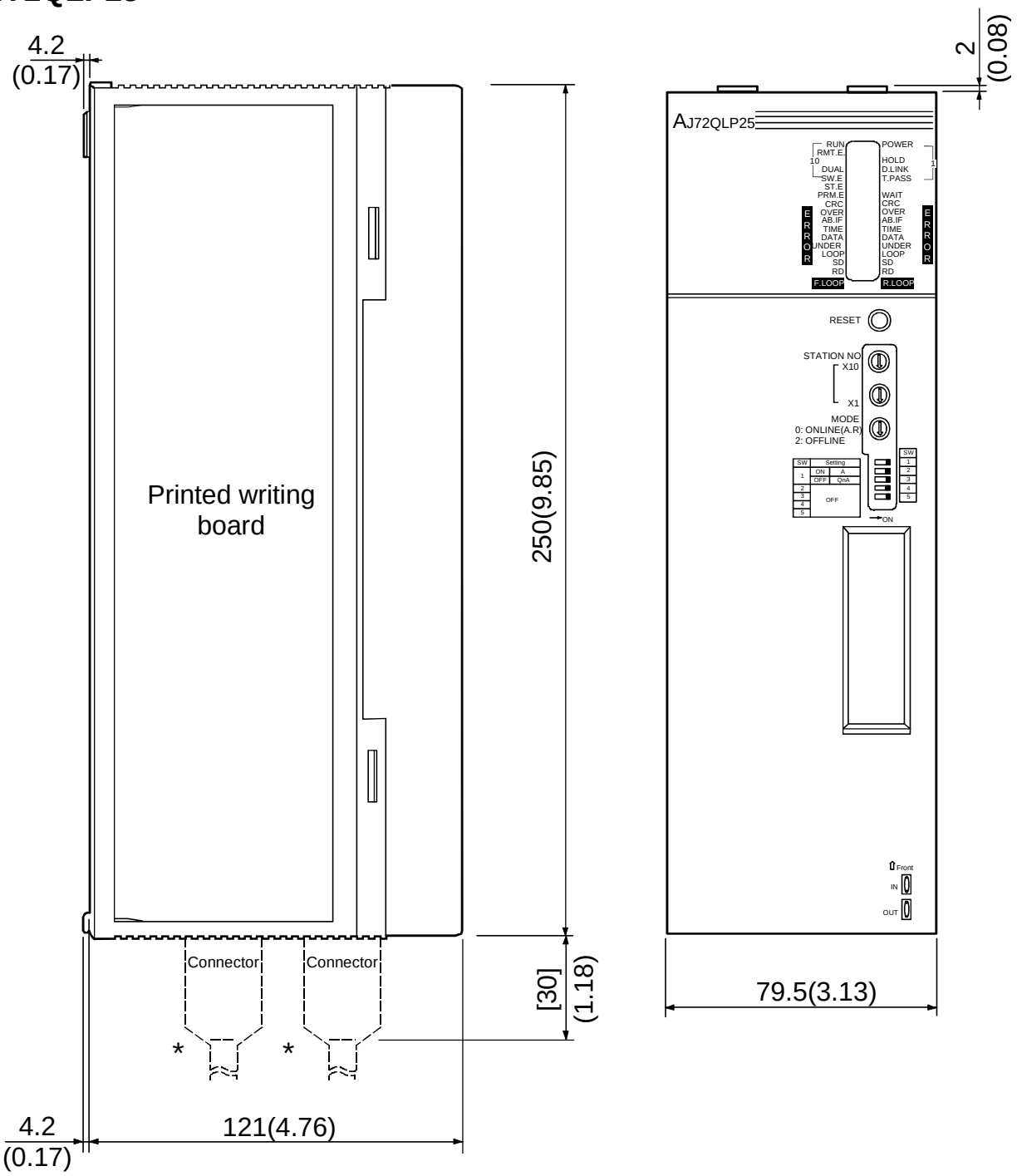
*1: After changing a setting while the power supply is ON, reset using the reset switch (2). However, when the mode setting switch (4) is set to "F", resetting is not necessary.

5. Wired

Please refer to the user's manual of connected master module for the wiring for network system.

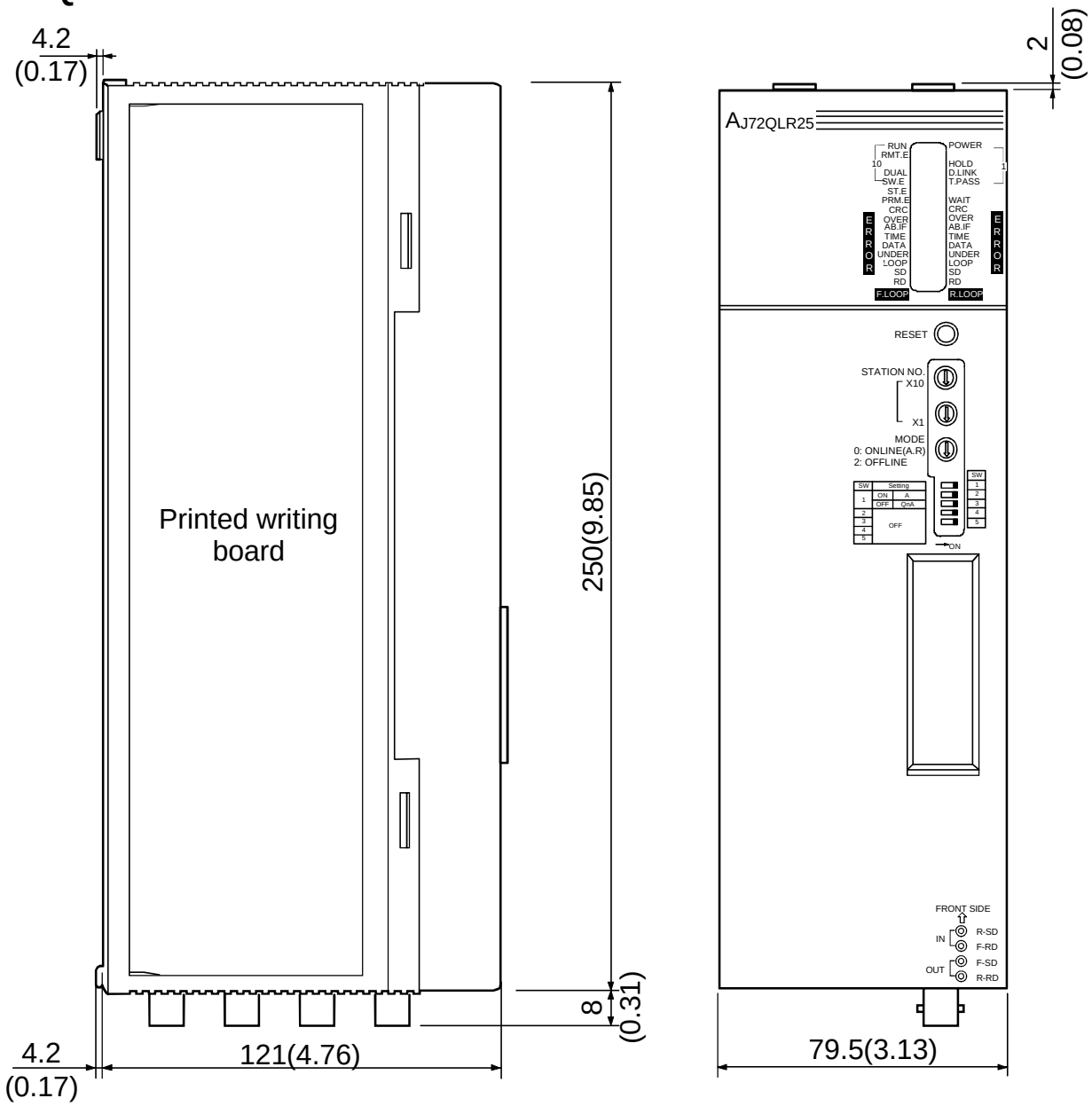
6. External Dimensions

6.1 AJ72QLP25

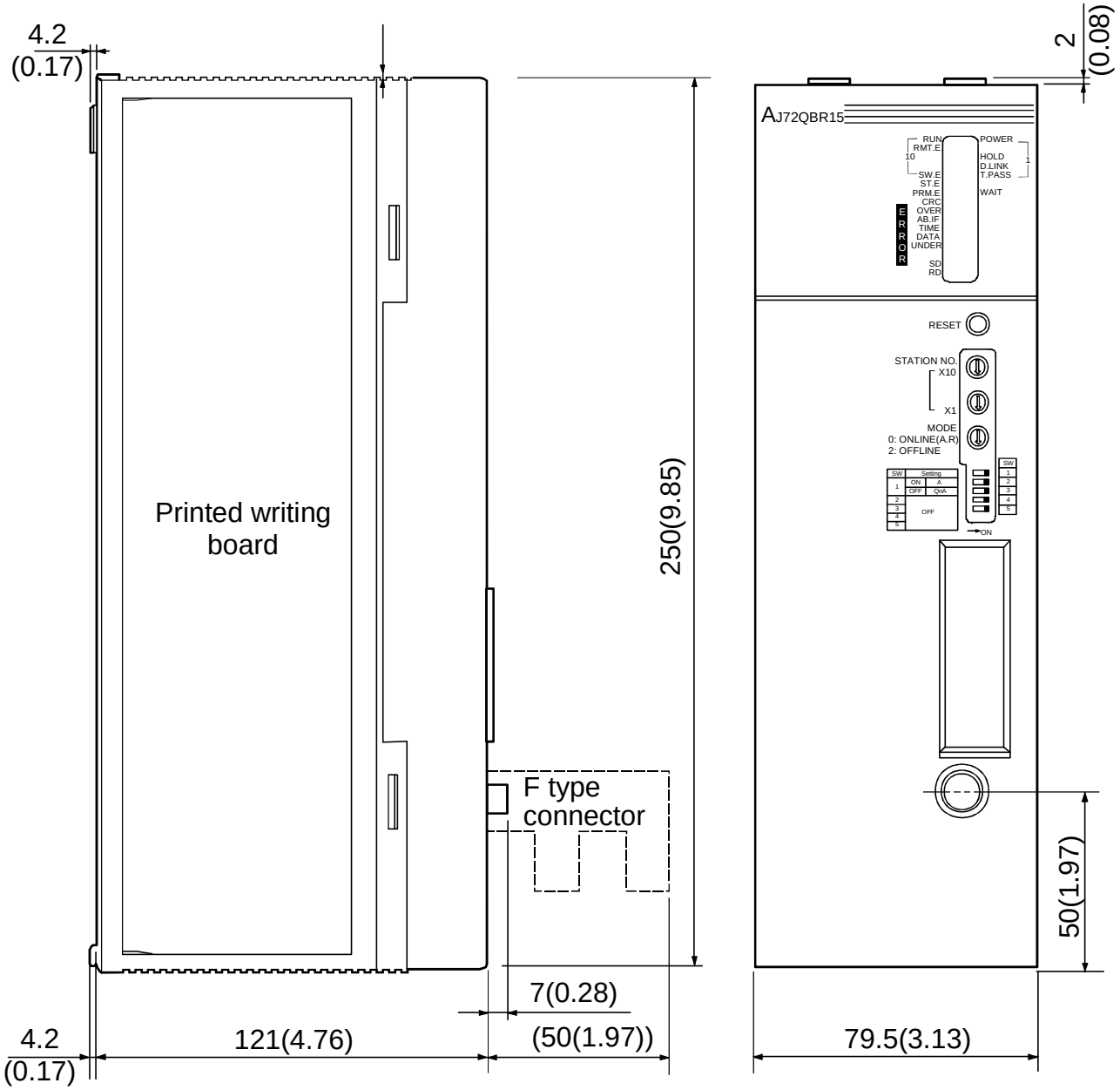


* Take account of the bending radius of the cable. (Refer to the Reference Manual.)
Please contact your local Mitsubishi Electric System Service Corporation for detail.

6.2 AJ72QLR25



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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Specifications subject to change without notice.
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