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MITSUBISHI

MELSEC QnA Series

User's Manual

MELSECNET/10 remote I/O module type AJ72QLP25/AJ72QBR15 (Hardware)

INTRODUCTION

Thank you for choosing the Mitsubishi MELSEC QnA Series of General Purpose Programmable Controllers. Please read this manual carefully so that the equipment is used to its optimum. A copy of this manual should be forwarded to the end user.

PROGRAMMABLE CONTROLLER

IB (NA) 66621-A

Cautions on Safety

(Please read before using the module)

Please carefully read this manual and related ones mentioned herein to ensure safety and operate this module properly.

The following cautions are applicable only to the module. For the cautions on safety relating to the PC CPU system, see the PC CPU User's Manual. The cautions in this cautions on safety are classified into two ranks, "DANGER" and "CAUTION", according to their importance.



DANGER

A warning given when improper operation could result in a dangerous situation causing death or serious injuries.



CAUTION

A caution given when improper operation could result in a dangerous situation causing moderate or injuries, and physical damage to the module, etc.

Even failure to observe a caution marked ! CAUTION may bring about a serious accident depending on the situation. Do not fail to follow the cautions. Retain this manual for consultation whenever necessary, and provide a copy to the end user.


Cautions on Design

 DANGER

- When there is a communication fault in the data link system, the following happens at the faulty station. Using the communications status information, create an interlock circuit in the sequence program to ensure that the system will operate safely despite such faults.


- (1) The data link data that existed before the fault is retained.
- (2) All outputs of remote I/O stations go OFF.

For details on the method for confirming the faulty station and the operating status when a communication fault occurs, see the manual for the relevant data link.

 CAUTION

- Do not bundle the control wire and the communication cable with the main circuit or power line or keep them close to one another. Keep the control wire and the communication cable at least 100 mm away from the main circuit or power line; otherwise, noise or malfunctions will occur.

Cautions on Installation


 CAUTION

- Use the PC in the environment specified in the General Specifications section in this manual. Using it in an environment which does not meet the general specifications could cause electric shock, fire or malfunctions, and damage or deterioration of the module.
- Install the module by engaging the module mounting projections on the lower part of the module in the mounting holes of the base unit. Incorrect installation could result in malfunctions, failure of detachment.

Cautions on Wiring


 DANGER

- Always switch off all power supply phases externally before attempting installation or wiring work. If all power supply phases are not switched off, there will be a danger of electric shock or damage to the product.

 CAUTION

- Take all possible measures to prevent chips or wire scraps from entering the module. Entry of foreign material will cause fire, failure of malfunctions.
- Crimp, pressure weld, or correctly solder connectors for external connections, using the correct tools. An imperfect connection could cause short circuiting, fire, or malfunction.

Cautions on Start-Up and Maintenance

 DANGER

- Do not touch the terminals while they are live. This will cause malfunctions.
- Switch the power off before cleaning the module or retightening the terminal screws. If the power is left on, the module will break down or malfunction.

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When a product from Japan, this manual does not require a application to the Ministry of International Trade and Industry for service transaction permission.

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Specifications subject to change without notice

CAUTION

- Read the manual carefully and confirm safety before attempting operations such as program changes, forced output, RUN, STOP, PAUSE, etc., during operation. Incorrect procedure could damage the machine or cause accidents.
- Do not disassemble or tamper with the module. This will cause failure, malfunctions, injuries or fire.
- Switch the power off before installing or removing the module. If the power is left on, the module will break down or malfunction.

Cautions on Disposal

CAUTION

- Dispose of the module as industrial waste.

1. GENERAL DESCRIPTION

This manual gives the specifications and nomenclature of the AJ72QLP25/AJ72QBR15 type network 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 AJ72QLP25 and AJ72QBR15.

	Application	Applicable Cable		Module Installation Position
		Optical Fiber Cable	Coaxial Cable	
AJ72QLP25	For remote I/O stations of MELSECNET/10	O	—	CPU slot of main base unit
AJ72QBR15		—	O	

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

(a) AJ72QLP25

Part Name	Quantity
AJ72QLP25 network module	1

(b) 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.

1.1 Rated Manual

QnA MELSECNET/10 Reference Manual (IB-66620)

2. PERFORMANCE SPECIFICATIONS

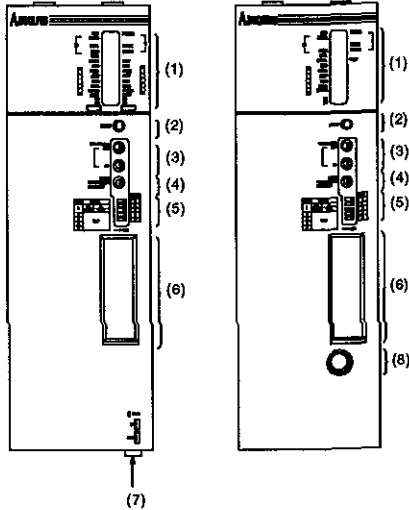
The following table shows the performance specifications of the AJ72QLP25 and AJ72QBR15.

Item	AJ72QLP25		AJ72QBR15		
	Optical Loop System		Coaxial Bus System		
Maximum number of link points per network	X/Y	8192 points			
	B	8192 points			
	W	8192 points			
Maximum number of link points per station	<ul style="list-style-type: none"> • Remote master station → Remote I/O station $\left(\frac{Y+B}{8} + (2 \times W)\right) \leq 1600 \text{ bytes}$ <ul style="list-style-type: none"> • Remote I/O station → Remote master station $\left(\frac{X+B}{8} + (2 \times W)\right) \leq 1600 \text{ bytes}$ <ul style="list-style-type: none"> • Remote master station → Remote sub-master station Remote sub-master station → Remote master station $\left(\frac{Y+B}{8} + (2 \times W)\right) \leq 2000 \text{ bytes}$				
	Max number of I/O points per station	X+Y ≤ 2048 (main base plus 7 extension bases)			
	Communication speed	10 MBPS (20 MBPS: multiple transmission)		10 MBPS	
Communication method	Token-ring method		Token bus method		
Synchronization system	Frame synchronization				
Coding system	NRZI coding (Non Return to Zero Inverted)		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 station: 64)		33 stations (master station: 1; remote I/O station: 32)		
Overall extension distance	30 km		3C-2V	5C-2V	
	<ul style="list-style-type: none"> SI cable H type: station-to-station distance 300 m SI cable L type: station-to-station distance 500 m QSI cable: station-to-station distance 1 km 		300 m (station-to-station distance 300 m)	500 m (station-to-station distance 500 m)	
	Repeater unit Extension up to 2.5 km possible by using A6BR10 or A6BR10DC				
Error control system	Retry by CRC (X ¹⁶ + X ¹² + X ⁵ + 1) and overtime				
RAS function	<ul style="list-style-type: none"> • Loopback function in response to error detection and cable disconnection (Optical loop system only) • 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	SI 200/250	QSI-185/230	3C-2V, 5C-2V or equivalent		
Applicable connector	2-core optical fiber cable connector plug CA7003		BNC connector compatible with 3C-2V, 5C-2V cable		
Cable transmission loss	12 dB/km or less	5.5 dB/km or less	Conforms to JIS C 3501		
Current consumption (5 VDC)	0.8 A		0.9 A		
Weight (kg) (lb)	0.53 (1.17)		0.6 (1.32)		

For general specifications, refer to the user's manual for the PC CPU used for the network system.

3. NOMENCLATURE AND SETTINGS

This section gives the names of each part of the AJ72QLP25 and AJ72QBR15 and explains their settings

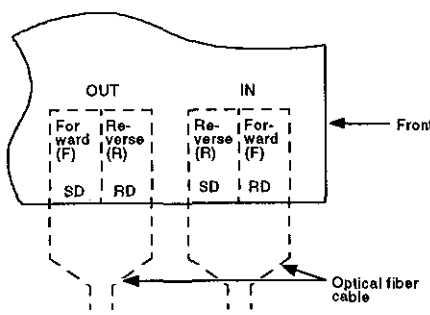
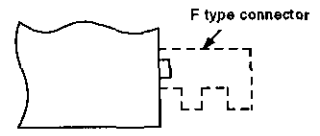


No	Name	Description		
		Name	State	Description
(1)	AJ72QLP25 AJ72QBR15 	RUN	ON	When the module is normal
		RUN	OFF	When a WDT error occurs
		RMT E	ON	When a blown fuse or I/O check error occurs (Host station)
		DUAL		During duplex transmission (Off: when duplex transmission not executed)
		SW E		When 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		<ul style="list-style-type: none"> When I/O allocations are 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)
		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		<ul style="list-style-type: none"> 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 <Cause> 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 <Cause> 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

Caution

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

No	Name	Description		
(1)	LED	NDER	ON	When an error occurs due to internal processing of sent data at irregular intervals <Cause> Hardware fault
			LOOP	When error occurs due to abnormal forward or reverse loop (F LOOP/R LOOP) <Cause> Power OFF at adjacent station, cable disconnection, connection not made, etc
		SD	During data transmission	
		RD	During data reception	
(2)	Reset switch RESET	• Resets the host station hardware		
(3)	Station number setting switch *1 	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)		
(4)	Mode setting switch *1 	Mode setting (setting on delivery: 0)		
		Mode	Name	Description
		0	Online (automatic online return effective)	Data link with automatic online return effective
		1	Unusable	
		2	Offline	Disconnects the host station
		3	Forward loop test	Checks the forward loop line of the entire data link system
		4	Reverse loop test	Checks the reverse loop line of the entire data link system
		5	Station-to-station test (master station)	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
		6	Station-to-station test (slave station)	
		7	Self-loopback test	Checks the hardware of a module in isolation, including the communication circuit and cables of the transmission system
		8	Internal self-loopback test	Checks the hardware of a module in isolation, including the communication circuit of the transmission system
9	Hardware test	Checks the hardware inside the network module		
A to E		Unusable		
F	Station number check	Checks the number using LEDs		
(5)	Condition setting switch *1	Operation condition setting (setting at delivery: all OFF)		
		SW	OFF	ON
		1	Peripheral device for QnA series connected	Peripheral device for A series connected
		2	Unusable (leave OFF at all times)	
		3		
		4		
5				
(6)	RS-422 interface	Connects the peripheral device		

No	Name	Description
(7)	Connector	An optical fiber cable is connected 
(8)	Connector	An F type connector is connected 

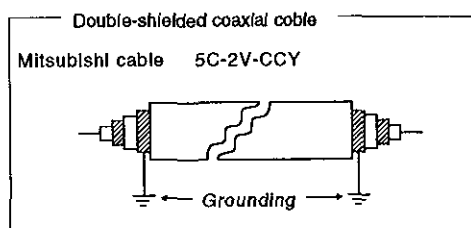
*1 After changing a setting while the power supply is ON, reset using the reset switch (2)
However, when the mode setting switch (4) is set to "F", resetting is not necessary

4. CAUTIONS ON COAXIAL BUS SYSTEM CONFIGURATION

- (1) Restrictions on the station-to-station cable length
Use a station-to-station coaxial cable of an appropriate length for the total number of stations according to the table to the right
Using a cable of a length other than that specified in this table may cause communication errors
The overall extension length is 500 m (1640 ft), irrespective of the total number of stations

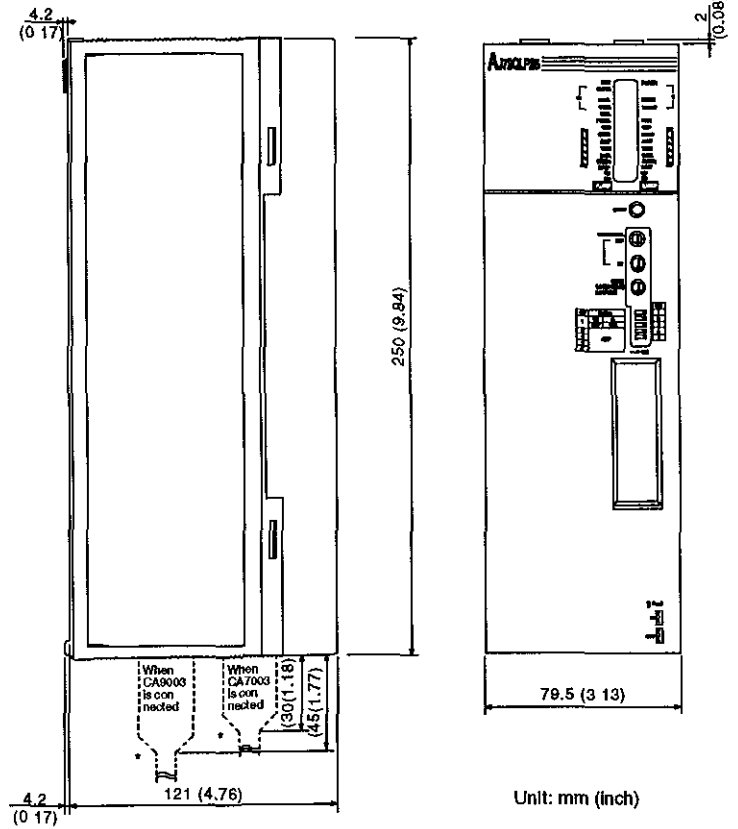
Total Number of Stations	Station-to-Station Cable Length
2 to 9 stations	1 to 500 m (3 28 to 1640 ft)
10 to 33 stations	1 to 5 m (3 28 to 16 4 ft) 13 to 17 m (42 65 to 55 77 ft) 25 to 500 m (82 02 to 1640 ft)

- (2) For an A6BR10 or A6BR10-DC type repeater unit, use a station-to-station cable whose length corresponds to one of the lengths specified for "10 to 33 stations"
- (3) Cautions on wiring
- Keep coaxial cables more than 100 mm (3 94 in) away from other power cables and control cables
 - It is advisable to connect double-shielded coaxial cable in locations susceptible to noise



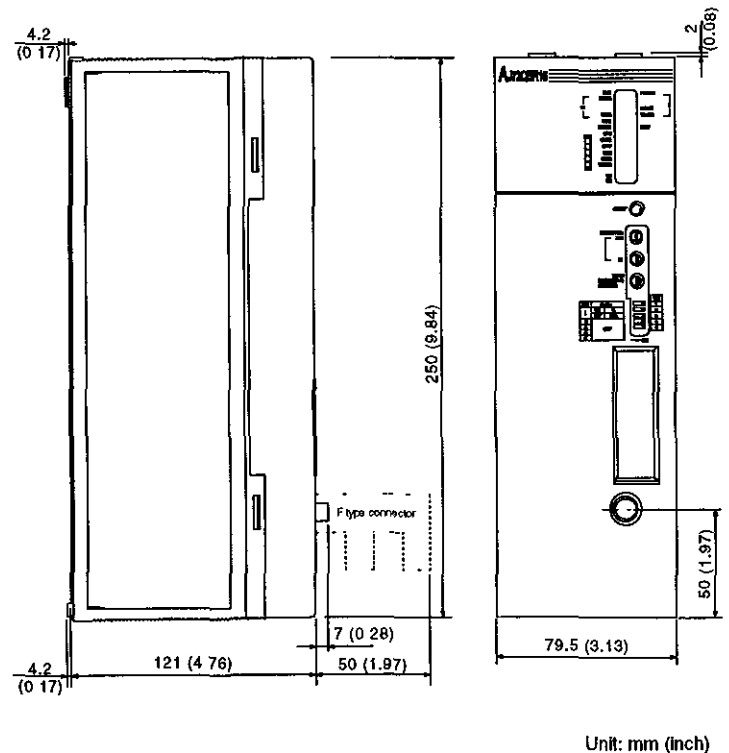
5. OUTSIDE DIMENSIONS

5.1 AJ72QLP25



* Take account of the bending radius of the cable (Refer to the Reference Manual)

5.2 A1SJ71BR11



Unit: mm (inch)

REVISIONS

A	
Mar., 1996	

IMPORTANT

- (1) Design the configuration of a system to provide an external protective or safety interlocking circuit for the PCs
- (2) The components on the printed circuit boards will be damaged by static electricity, so avoid handling them directly. If it is necessary to handle them take the following precautions
 - (a) Ground human body and work bench
 - (b) Do not touch the conductive areas of the printed circuit board and its electrical parts with and non-grounded tools etc

Under no circumstances will Mitsubishi Electric be liable or responsible for any consequential damage that may arise as a result of the installation or use of this equipment

All examples and diagrams shown in this manual are intended only as an aid to understanding the text, not to guarantee operation. Mitsubishi Electric will accept no responsibility for actual use of the product based on these illustrative examples.

Owing to the very great variety in possible applications of this equipment, you must satisfy yourself as to its suitability for your specific application.