MITSUBISHI

MELSECNET/10 Network Module

User's Manual

• Hardware •

AJ71QLP21,AJ71QLP21S AJ71QLR21,AJ71QBR11

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-M-U-E
MODEL CODE	13JR12
SH(NA)-080073-A(9912)MEE	

● 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.

Revisions

A-3

CONTENTS

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-68837) (optional).

1. Overview

This manual explains the specifications and names of each part, etc., of the AJ71QLP21(S), AJ71QLR21 and AJ71QBR11 model network module (abberviated as Network Modules) which are used with MELSECNET/10 network system of the MELSEC-QnA series.

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

Type	Use	Cable used		Application
		Optical fiber cable	Coaxial cable	
AJ71QLP21(S)	The control station, normal station and master station of MELSECNET/10	○	-	Main base, Extension base I/O slot
AJ71QLR21		-	○	
AJ71QBR11				

2) Please verify the existence of the following parts after opening the package.

   a) In the case of AJ71QLP21

Product name	Quantity
AJ71QLP21 Network module	1

   b) In the case of AJ71QLP21S

Product name	Quantity
AJ71QLP21S Network module	1

   c) In the case of AJ71QLR21

Product name	Quantity
AJ71QLR21 Network module	1

   d) In the case of AJ71QBR11

Product name	Quantity
AJ71QBR11 Network module	1
F form connector (A6RCON-F)	1

3) When constructing a coaxial bus system, a terminal resistor (A6RCON-R75) or a BNC-TMP-05 (75) manufactured by Hirose Electric Corp. is required for both system terminals. It is not included with the module and must be purchased separately.

4) Application CPU
   Q2ACPU(S1), Q3ACPU, Q4ACPU, Q4ARCPU
   Q2ASCPU(S1), Q2ASHCPU (S1)

2.Performance Specifications

The performance specifications for Network Modules are indicated as follows.

Topic		AJ71QLP21(S)		AJ71QLR21	AJ71QBR11
Maximum link points per 1 network	X/Y	8192 points			
	B	8192 points			
	W	8192 points			
Maximum link points per 1 station	When constructing a PC network	$\left\lceil \dfrac{B+Y}{8} + (2 \times W) \right\rceil + (2 \times W) \leq 2000$ bytes			
	When constructing a remote I/O network	• Remote master station → remote I/O station $$\left\lceil \frac{B+Y}{8} + (2 \times W) \right\rceil + (2 \times W) \leq 1600 \text{ bytes}$$ • Remote I/O station → remote master station $$\left\lceil \frac{B+X}{8} + (2 \times W) \right\rceil + (2 \times W) \leq 1600 \text{ bytes}$$ • Remote master station → remote sub master station Remote sub master station → remote master station $$\left\lceil \frac{Y+B}{8} + (2 \times W) \right\rceil + (2 \times W) \leq 2000 \text{ bytes}$$			
Communication speed		10Mbps (20Mbps: Multiplex transmission)			10Mbps
Communication method		Token ring mode			Token pass mode
Synchronous mode		Frame synchronous mode			
Transmission circuit format		Double loop (Optical fiber cable)		Double loop (Coaxial cable)	Single pass (Coaxial cable)
General extension distance (Inter station distance) *1		30km $\left[\begin{array}{l}\text{SI cable H type inter station 300m} \\ \text{SI cable L type inter station 500m} \\ \text{QSI cable inter station 1km}\end{array}\right]$		3C-2V 19.2km (inter station 300m)	3C-2V: 300m (inter station 300m) / 5C-2V: 500m (inter station 500m)
				5C-2V 30km (inter station 500m)	Repeater module (A6BR10, A6BR10-DC) Maximum expansion is 2.5km
Maximum number of networks		239			
Maximum number of groups		9 (Only in a PC network)			
Number of connection Stations in 1 network	When constructing a PC network	64 stations (Control station: 1 Normal stations: 63)			32 stations (Control station: 1 Normal stations: 31)
	When constructing a remote I/O network	65 stations Remote master station: 1 Remote I/O stations: 64			33 stations Remote master station:1 Remote I/O stations:32

2

Topic	AJ71QLP21(S)	AJ71QLR21	AJ71QBR11
Maximum number of installation modules per 1 CPU	QnACPU, Q2ASCPU(S1), Q2ASHCPU(S1): 4		
Coding mode	NRZ1 signal (Non Return to Zero Inverted)	Manchester signal	
Transmission format	HDLC performance (frame format)		
Error control format	Retry by CRC ($X^{16}+X^{12}+X^{5}+1$) and overtime		
RAS function	• Loop pack function due to abnormality detection and cable disconnection (AJ71QLP21(S), AJ71QLR21) • Diagnostic function for local link circuit check • Prevention of system down due to shifting to control station (Only for PC networks) • Abnormality detection by link special relay, resistor • Network monitor, each type of diagnostic function • Transient transmission possible even when there is PC CPU abnormality (cause of abnormality can be verified from other station) • Prevention of loopback due to supplying external power (AJ71QLP21S)		
Transient transmission	• N:N intercommunication (Monitor, program upload/download, etc.)		
Connection cable	Optical fiber cable SI-200/220,SI-200/250 QSI-185/230 (Arranged by user *2)	3C-2V, 5C-2V Equivalent goods	
Integration cable	2-core optical connettor plug DL-72ME•For SI-200/250• CA7003•CA7005 (For SI-200/220 and QSI-185/230)	BNC-P-3-Ni-CAU BNC-P-5-Ni-CAU Equivalent goods (manufactured by DDK Electronics., LTD.	
Cable transmission loss	12dB/km or less ¦5.5 dB/km or ¦less	In accordance with JIS C 3501	
5VDC Consumption current (A)	0.65	1.14	0.80
External supply power (AJ71QLP21S only)	Voltage	20.4 to 31.2VDC	
	Current	0.20A	-
	Applicable wire size	0.75 to 2mm^2	
	Tightening torque	41.1 N•cm	
Weight (kg)	0.45 (AJ71QLP21S: 0.55)		
Input output occupancy points	32 points		

*1: There are restrictions to the distance between stations, being determined according to the type of cable and number of stations. See sections 5.1, 5.2.1 and 5.2.2.

*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
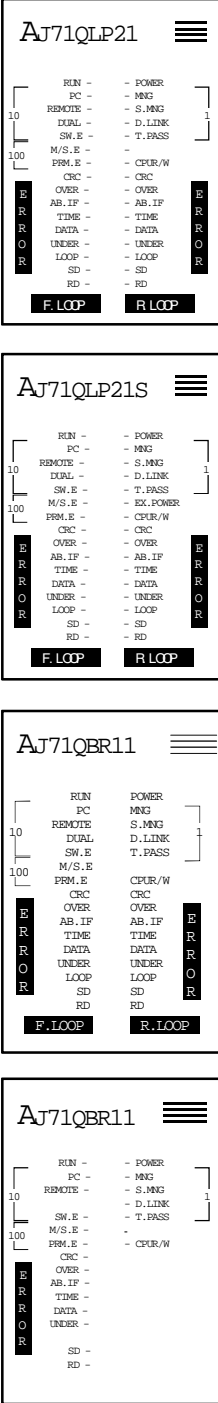
[INSTALLATION PRECAUTIONS]

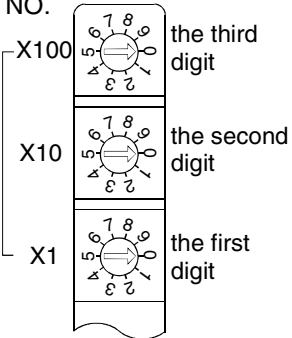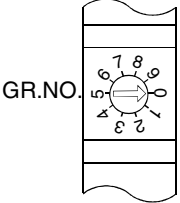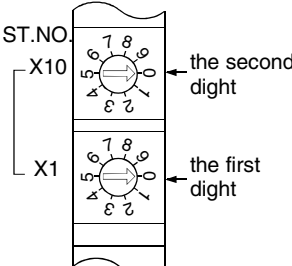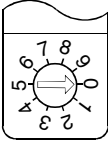| ⚠CAUTION |
|---|
| ● Use the PC in an environment that meets the general specificaitons contained in this manual. Using this PC in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product.
● 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.
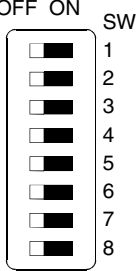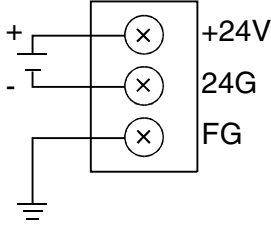
Screw Locations	Tightening Torque Range
Module installation screws (M4 screws)	78 to 118N•cm

4. The Name and Setting of Each Part
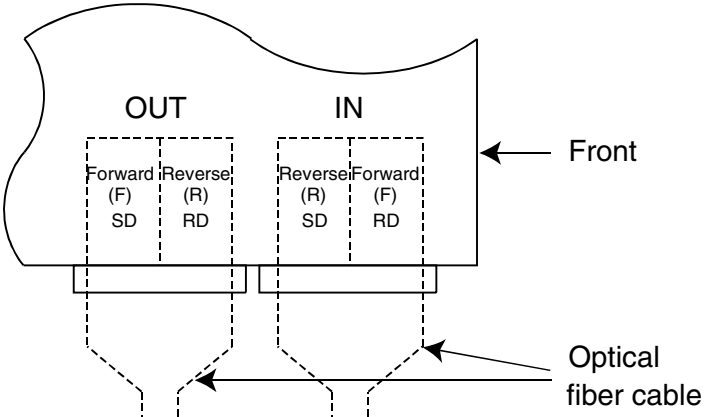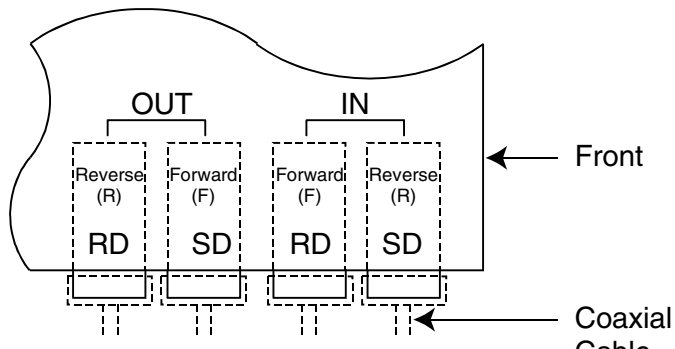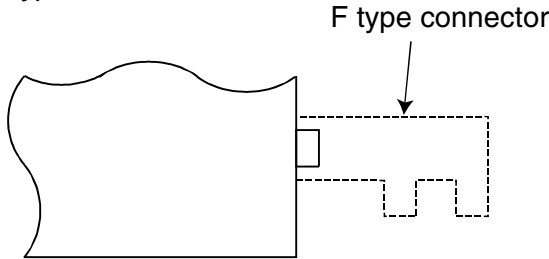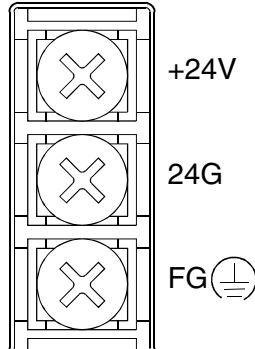
Indicates the name and setting of each part of Network Modules.

AJ71QLP21

```
RUN -        - POWER
PC -         - MNG
REMOTE -     - S.MNG
DUAL -       - D.LINK
SW.E -       - T.PASS
M/S.E -
PRM.E -      - CRTR/W
CRC -        - CRC
OVER -       - OVER
AB.IF -      - AB.IF
TIME -       - TIME
DATA -       - DATA
UNDER -      - UNDER
LOOP -       - LOOP
SD -         - SD
RD -         - RD
F.LOOP       R.LOOP
```

1)

NETWORK NO. — X100 / X10 / X1
2)

GROUP NO.
3)

STATION NO. — X10 / X1
4)

MODE
0: ONLINE(A.R)
2: OFFLINE
5)

	OFF	ON	OFF	ON	SW
PC		REMOTE			1
N.ST		MNG			2
PRM		D.PRM			3
STATION SIZE (8,16,32,64)					4
LB/LW SIZE (2,4,6,8K)					5 6 7
—					8

6)

FRONT SIDE
IN
OUT

7)

AJ71QLP21S

```
RUN -        - POWER
PC -         - MNG
REMOTE -     - S.MNG
DUAL -       - D.LINK
SW.E -       - T.PASS
M/S.E -      - EX.POWER
PRM.E -      - CRTR/W
CRC -        - CRC
OVER -       - OVER
AB.IF -      - AB.IF
TIME -       - TIME
DATA -       - DATA
UNDER -      - UNDER
LOOP -       - LOOP
SD -         - SD
RD -         - RD
F.LOOP       R.LOOP
```

1)

NETWORK NO. — X100 / X10 / X1
2)

GROUP NO.
3)

STATION NO. — X10 / X1
4)

MODE
0: ONLINE(A.R)
2: OFFLINE
5)

	OFF	ON	OFF	ON	SW
PC		REMOTE			1
N.ST		MNG			2
PRM		D.PRM			3
STATION SIZE (8,16,32,64)					4
LB/LW SIZE (2,4,6,8K)					5 6 7
—					8

6)

24V
24G
FG
10)

FRONT SIDE
IN
OUT

7)

AJ71QLR21

```
RUN          POWER
PC           MNG
REMOTE       S.MNG
DUAL         D.LINK
SW.E         T.PASS
M/S.E
PRM.E        CRTR/W
CRC          CRC
OVER         OVER
AB.IF        AB.IF
TIME         TIME
DATA         DATA
UNDER        UNDER
LOOP         LOOP
SD           SD
RD           RD
F.LOOP       R.LOOP
```

1)

NETWORK NO. — X100 / X10 / X1
2)

GROUP NO.
3)

STATION NO. — X10 / X1
4)

MODE
0: ONLINE(A.R)
2: OFFLINE
5)

	OFF	ON	OFF	ON	SW
PC		REMOTE			1
N.ST,O.S.MNG	D.S.M				2
PRM		D.PRM			3
STATION SIZE (8,16,32,64)					4
LB/LW SIZE (2,4,6,8K)					5 6 7 8

6)

FRONT SIDE
IN — R-SD / F-RD
OUT — F-SD / R-RD

8)

AJ71QBR11

```
RUN -        - POWER
PC -         - MNG
REMOTE -     - S.MNG
SW.E -       - D.LINK
M/S.E -      - T.PASS
PRM.E -      - CRTR/W
CRC -
OVER -
AB.IF -
TIME -
DATA -
UNDER -
SD -
RD -
```

1)

NETWORK NO. — X100 / X10 / X1
2)

GROUP NO.
3)

STATION NO. — X10 / X1
4)

MODE
0: ONLINE(A.R)
2: OFFLINE
5)

	OFF	ON	OFF	ON	SW
PC		REMOTE			1
N.ST		MNG			2
PRM		D.PRM			3
STATION SIZE (8,16,32,64)					4
LB/LW SIZE (2,4,6,8K)					5 6
—					6

6)

9)

No.	Name	Contents	
1)	LED	RUN	Module at the normal time: lamp is lit When a WDT error is generated: lamp is not lit
	AʒJ71QLP21	PC	When setting a PC network: the lamp is lit (SW1 is off)
	AʒJ71QLP21S	REMOTE	When setting a remote I/O: lamp is lit (turns on the SW1)
	AʒJ71QBR11	DUAL	During execution of multiplex transmission: lamp is lit
	AʒJ71QBR11	SW.E	When there is an abnormality with a switch between 2 and 6: lamp is lit
		M/S.E	On the same network, at the time of station or control station duplication: lamp is lit
		PRM.E	When there is a conformity error with a common parameter and station existent parameter and when the parameter received from a sub-management station and the local station parameter received from the management station are different: lamp is lit
		POWER	When the power supply is supplied: lamp is lit
		MNG	Control station, master station setting time: lamp is lit Normal station setting time: lamp is not lit
		S.MNG	When it is sub-management station: lamp is lit
		D.LINK	During data link: lamp is lit
		T.PASS	At the time of baton pass (transient transmission): lamp is lit
		EX. POWER	When the external power supply (24VDC) is being supplied to A: lamp is lit
		CPU R/W	During CPU communication exchange: lamp is lit
		CRC	When there is a code check error of receiving data: lamp is lit <Primary cause> The timing of a station in parallel condition sending data to corresponding station, H/W abnormality, cable abnormality, noise, etc.
		OVER	When there is an error due to delayed processing of receiving data: the lamp is lit <Primary cause> H/W abnormality, cable abnormality, noise, etc.
		AB.IF	Errors when successively receiving communication which is "1" above the regulations and or when the length of the receiving data is short: lamp is lit <Primary causes> The timing of a station in parallel condition sending data to the corresponding station, monitoring time is short, cable is abnormal, noise, etc.
		TIME	An error at the time that the data link timer is working: lamp is lit <Primary causes> Monitoring time is short, cable abnormality, noise, etc.
		DATA	Error when receiving abnormal data which is 2K bytes or over: lamp is lit. <Primary causes> Cable abnormality, noise, etc.
		UNDER	An error when the internal processing of the sending transmission data is not in constant intervals: lamp is lit <Primary causes> H/W abnormality
		LOOP	If there is an error when the Forward (F. Loop)/Reverse (R.LOOP) loop is abnormal: lamp is lit <Primary cause> The power supply of the adjacent station is off, the cable is cut or not connected, etc.
		SD	During data sending: lamp is lit
		RD	During data receiving: lamp is lit

No.	Name	Contents
2) *2	Network number setting switch NETWORK NO. X100 — the third digit X10 — the second digit X1 — the first digit	Network number setting (factory setting at time of shipping: 1) <Setting range> 1 to 239 :Network number Other than 1 to 239 :Setting error (SW.E LED lamp is lit) Becomes off-line condition
3) *2	Group number setting Switch GR.NO.	Network number setting (factory setting at time of shipping: 1) <Setting range> 1 to 239 : Network number Other than 1 to 239 : Setting error (SW.E LED lamp is lit) Becomes off-line condition
4) *2	Station number setting switch ST.NO. X10 — the second dight X1 — the first dight	Station number setting (factory setting at time of shipping: 1)

Station number setting (factory setting at time of shipping: 1)

Type	Setting	
PC network	1 to 64	:station number
	Other than 1 to 64	:setting error (SW.E led light is lit)
Remote I/O network	0	:remote master station
	1 to 64	:remote sub master station
	Other than 1 to 64	:setting error (SW.E LED light is lit)

No.	Name	Contents		
5) *2	Mode setting switch MODE 0:FOML TIME(A,R) 2:FOFFLINE	Mode setting (factory setting at time of shipping: 0)		
		Mode	Name	Contents
		0	On-line (automatic double line existent)	Data link (automatic double line existent)
		1	Use not possible	-
		2	Off-line	Placing local station in parallel condition
		3	Forward loop	Data link system Check of all forward loop side circuits is executed.
		4	Reverse loop	Data link system Check of all reverse loop side circuits is executed.
		5	Test between stations (master stations)	By the mode which checks circuits between 2 stations, execute the check of the one which has a smaller number as the master station and the other as the sub master station.
		6	Test between stations (sub master stations)	
		7	Self back to back test	By the module simplex, check the hardware including the sending and receiving communication circuit of the transmission system and the cable.
		8	Internal self back to back test	By the unit simplex, check the hardware including the sending and receiving communication circuit of the transmission system.
		9	Hardware test	Check the internal hardware of the network module.
		A to F	Use prohibited	(Do not set the mode.)

No.	Name	Contents		
6) *2	Conditions setting switch	Operation condition setting (factory setting at the time of shipping: all off)		
		SW	Contents	OFF	ON

SW	Contents	OFF	ON
1	Network type	PC Network	Remote I/O network
2	Station type	Normal station/ Multiple sub master	Control station/ parallel sub masters
3	Use parameters	Parameters in common	Default Parameters
4	Number of stations	OFF 8 stations / ON 16 stations / OFF 32 stations / ON 64 stations	
5	[Valid when SW3 is ON]	OFF / OFF / ON / ON	
6	B/W number of general point	OFF 2k points / ON 4k stations / OFF 6k points / ON 8k stations	
7	[Valid when SW3 is ON]	OFF / OFF / ON / ON	
8	Use prohibited (always off)		

*3 *4

8

No.	Name	Contents
7)	Connector (AJ71QLP21(S))	Connect the optical fiber cable. OUT IN Forward (F) SD Reverse (R) RD Reverse (R) SD Forward (F) RD ← Front ← Optical fiber cable
8)	Connector (AJ71QLR21)	Connect the coaxial type cable. OUT IN Reverse (R) RD Forward (F) SD Forward (F) RD Reverse (R) SD ← Front ← Coaxial Cable
9)	Connector (AJ71QBR11)	Connect the F type connector. F type connector
10)	External power source supply terminal EXT.PW +24V 24G FG ⏚	When preventing loop pack by turning OFF the power source of the PLC CPU, supply an external power source. + ⊗ +24V - ⊗ 24G ⊗ FG

*1: EXT.PW LED light by the power supply for the network generated with an external power supply(24VDC). There fore, please note that an external power supply might be input when LED is turned off.

*2: When it is desired to change the setting while the PLC CPU's power supply is ON, reset the PLC CPU (move the RUN/STOP key switch away from RESET to a position other than RESET).

*3: When using by the remote I/O network, it becomes valid for station numbers 1 to 64.

*4: Valid in the case of PC network management station.

5. Wired

◇**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.

## 5.1 Precautions for Laying Optical Fiber Cables

1) The distance between stations varies depending on the type of optical fiber cable used.

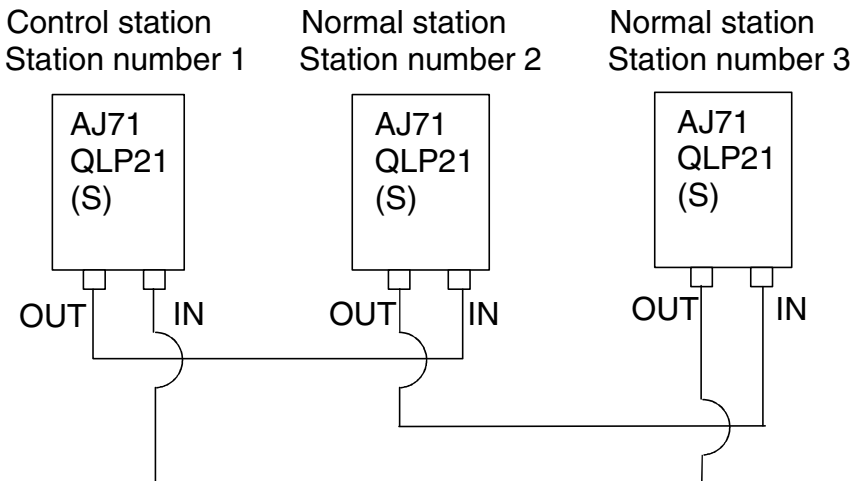| Type		Distance between stations (m)
SI type optical fiber cable (Old type: A-2P-□)	L type	500 (1640.5 ft.)
	H type	300 (984.3 ft.)
SI type optical fiber cable		500 (1640.5 ft.)
SI (H-PGF) type optical fiber cable		1000 (3281 ft.)
QSI type optical fiber cable		1000 (3281 ft.)

2) When connecting an optical fiber cable, the following restrictions on the bending radius must be observed.

Cable type		Allowable bending radius		Connector A [mm (in.)]			
	Type	φ 2.8mm area	[mm (in.)]	CA9003	CA7003	CA7005	DL-72ME
SI (old)	A	—	50 (1.97)	45 (1.77)	—	—	—
	B		85 (3.35)				
	C	50	85 (3.35)				
	D		140 (5.51)				
SI	A	—	50 (1.97)	—	30 (1.18)	—	—
	B		60 (2.36)				
	C	50	60 (2.36)				
	D		110 (4.33)				
SI (H-PCF)	A	—	45 (1.77)	—	—	—	35 (1.38)
	B	45	100 (3.94)				
	D	50	100 (3.94)				
QSI	A	—	50 (1.97)	—	30 (1.18)	30 (1.18)	—
	B		60 (2.36)				
	C	50	60 (2.36)				
	D		140 (5.51)				

(Type) A: Indoor use standard   B: Indoor use reinforced
C: Outdoor use standard   D: Outdoor use reinforced
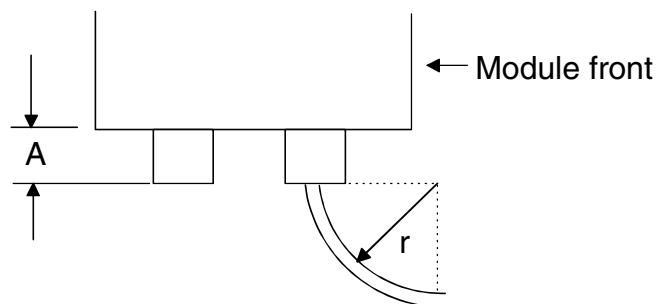
3) The optical fiber cable is wired in the following manner.
   There is no problem even if not wiring in order of the station number.
   There is no problem even if station how many become control station.

Control station   Normal station   Normal station
Station number 1   Station number 2   Station number 3

| AJ71 QLP21 (S) | AJ71 QLP21 (S) | AJ71 QLP21 (S) |

OUT   IN   OUT   IN   OUT   IN

4) When laying the optical fiber cable, do not touch the fiber core of the cable connector or module connector, or let dirt or dust collect on it.
   If oil from the hands, dirt or dust should adhere to the core, the transmission loss will increase, causing a malfunction in the data link.
5) When attaching or detaching the optical-fiber cable to/from the module, hold the cable connector securely with the hands.
6) Connect the cable connector and module connector securely until you hear a "click" sound.
7) Please wire IN/OUT 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 loop back of an arbitrary bureau do the row again even by the reclosing of the power supply.

## 5.2 Precautions when Installing the Coaxial Cables

5.2.1 For the Coaxial Loop Type

1) The distance between station is different depending on the kind of the coaxial cable used.

Type	Distance between stations (m)	Total extension distance (km)
3C-2V	300 (984.3ft.)	19.2 (62995.2ft.)
5C-2V	500 (1640.5ft.)	30 (98430ft.)

2) When connecting a coaxial cable, the following restrictions on the bending radius must be observed.

| Cable type	Allowable bending radius r[mm(in.)]	Connector A[mm(in.)]
3C-2V	23 (0.91)	35 (1.38)
5C-2V	30 (1.18)	
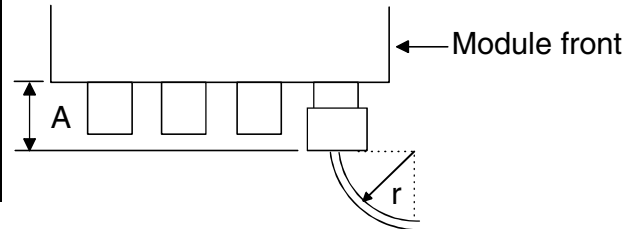
3) The Coaxial cable is wired in the following manner.
   There is no problem even if not wiring in order of the station number.
   There is no problem even if station how many become control station.
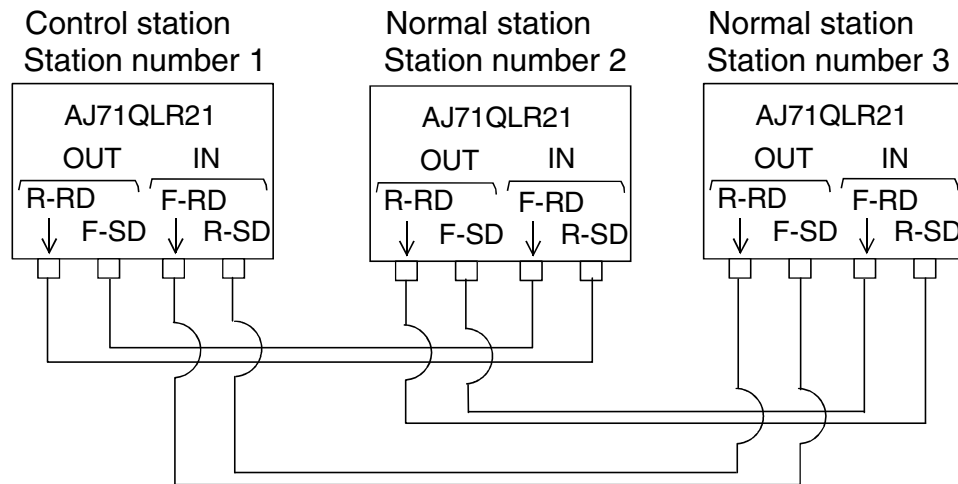
4) Install the coaxial cables at least 100 mm (3.94 in.) away from other power cables and control cables.

5) Consider wiring using double-shielded coaxial cable in places that are subject to large amounts of noise.

Double shielded coaxial cable
Mitsubishi Cable...5C-2V-CCY

Grounding
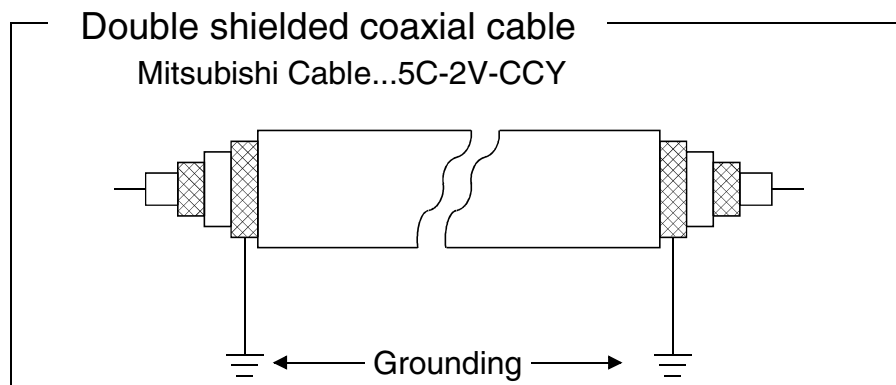
6) Do not pull any of the connected cables.
   This will cause a faulty contact, cable disconnection, or damage to the module.
7) Please wire SD/RD of the connector for the cable correctly.
   Please do loopback test, the set confirmation test, and the bureau order confirmation test after wiring.
   It might be generated that a baton abnormal passing cannot be generated when miswiring and the downed bureau which cannot do the loop back of an arbitrary bureau do the row again even by the reclosing of the power supply.

5.2.2 For the Coaxial Bus Type

1) Between stations, use the cable length indicated in the table below according to the number of stations connected.
   There is the possibility of communication errors if the cable length other than the table listed below is used.

Number of stations connected	Cable length between stations	Total extension distance
2 to 9 stations	1 to 300 m (3C-2V) (3.28 to 984.3 ft.) 1 to 500 m (5C-2V) (3.28 to 1640.5 ft.)	300 m (984.3 ft.) (3C-2V) 500 m (1640.5 ft.) (5C-2V)
10 to 33 stations	1 to 5 m (3C-2V, 5C-2V) (3.28 to 16.41 ft.) 13 to 17 m (3C-2V, 5C-2V) (42.65 to 55.78 ft.) 25 to 300 m (3C-2V) (82.03 to 984.3 ft.) 25 to 500 m (5C-2V) (82.03 to 164.5 ft.)	

2) If there is the possibility of an increase in the number of stations due to system expansion, install the cables with advance consideration of the restrictions.
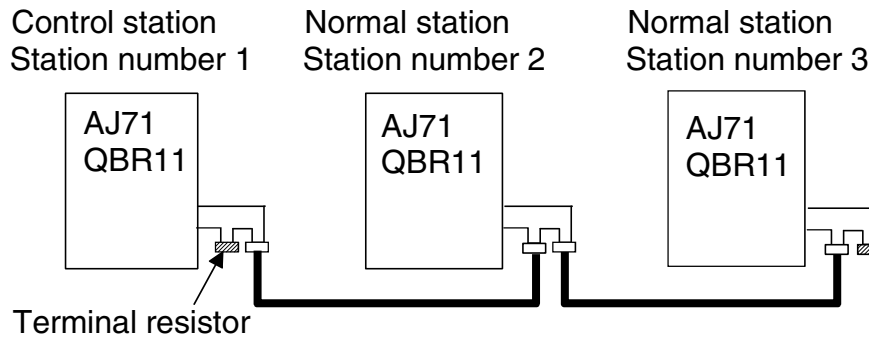3) When using a repeater module (models A6BR10 or A6BR10-DC), use the station-to-station cable length indicated by "10 to 33" stations, regardless of the number of stations connected or the number of repeater modules.
4) When connecting a coaxial cable, the following restrictions on the bending radius must be observed.

Cable type	Allowable bending radius r [mm (in.)]	Connector A [mm (in.)]
3C-2V	23 (0.91)	50 (1.97)
5C-2V	30 (1.18)	

Module front
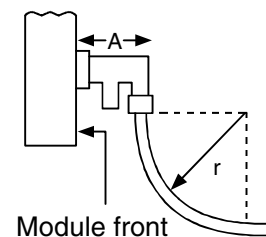
5) The coaxial cable is wired in the following manner.
   There is no program even if not wiring in order of the station number.
   There is no program even if station how many become control station.

Control station	Normal station	Normal station
Station number 1	Station number 2	Station number 3
AJ71 QBR11	AJ71 QBR11	AJ71 QBR11

Terminal resistor

6) Install the coaxial cables at least 100 mm (3.94 in.) away from other power cables and control cables.
7) Consider wiring using double-shielded coaxial cable in places that are subject to large amounts of noise.

Double shielded coaxial cable

Mitsubishi Cable...5C-2V-CCY

← Grounding →
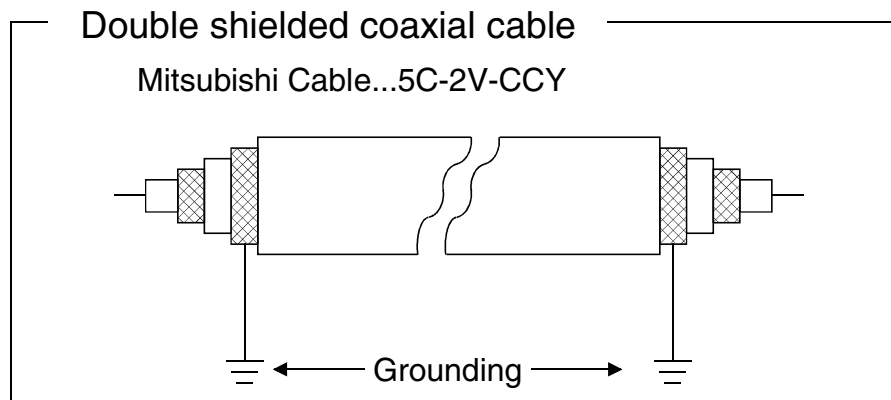
8) Do not pull any of the connected coaxial cables.
   This will cause a faulty contact, cable disconnection, or damage to the module.
9) Make sure to connect a terminal resistor to both terminal stations of the coaxial bus type network system.
10) The F type connector has the possibility to extract a white oxide according to the use enviroment.
    However, there is no problem on the function because the oxide is not generated in connected part.

5.2.3 Connecting the Connector for the Coaxial Cable

The following section explains how to connect the BNC connector (connector plug for the coaxial cable) to the cable.
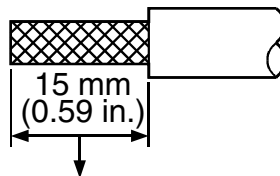
1) Structure of the BNC connector and coaxial cable

The structure of the BNC connector and coaxial cable are shown in the figure below.
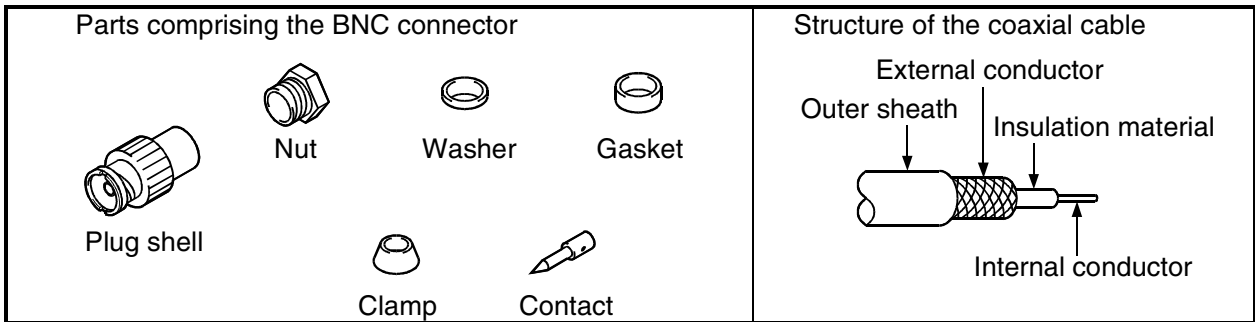
2) How to connect the BNC connector and the coaxial cable

a) Cut off the outer sheath of the coaxial cable to the length shown in the diagram below.


15 mm
(0.59 in.)

Cut this portion of the outer sheath

b) Feed the nut, washer, gasket and clamp on the coaxial cable through, as shown below, then unfasten the external conductor.


Clamp

Nut

Washer

Gasket
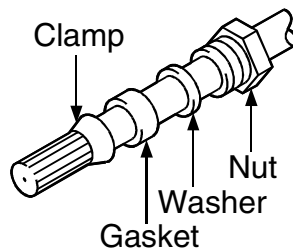
c) Cut the external conductor, insulation material and internal conductor to the dimensions shown below. However, cut the external conductor to the same dimension as the tapered section of the clamp and smooth it down to the clamp.

Internal
conductor
Insulation
material

3 mm
(0.12 in.)

6 mm
(0.24 in.)

Clamp and
external conductor
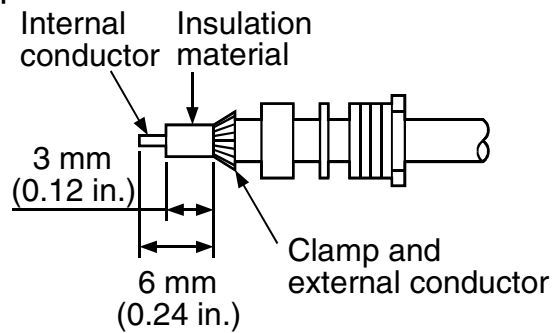
d) Solder the contact to the internal conductor.

Solder here
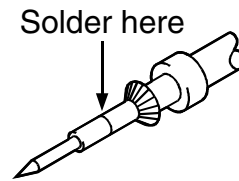
e) Insert the connector assembly in (d) into the plug shell and screw the nut into the plug shell.
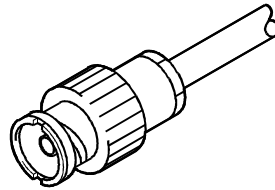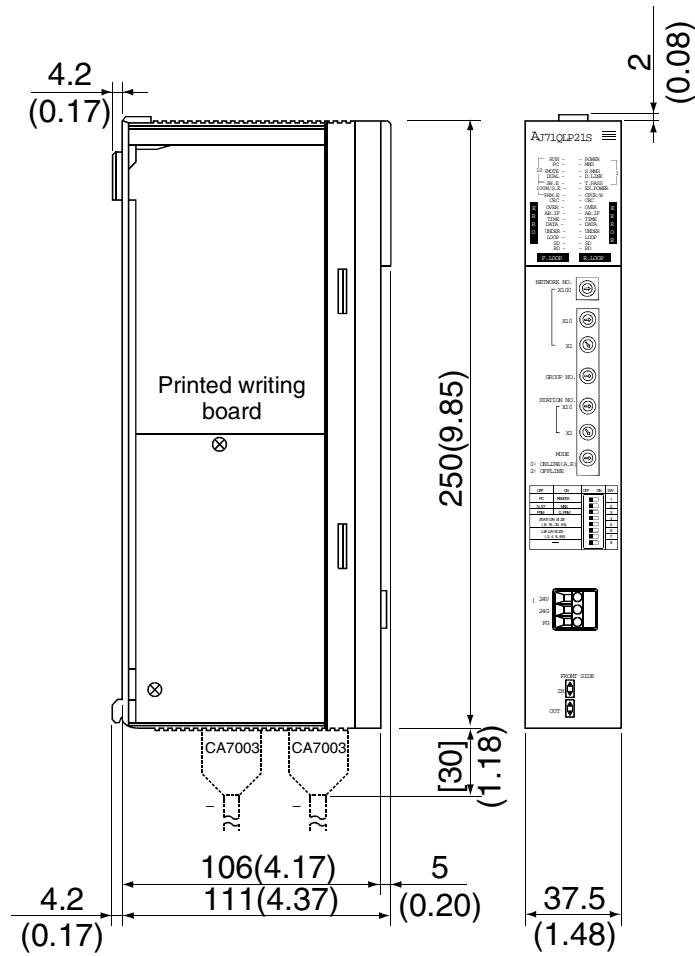
Important

Note the following precautions when soldering the internal conductor and contact.
•Make sure that the solder does not bead up at the soldered section.
•Make sure there are no gaps between the connector and cable insulator or they do not cut into each other.
•Perform soldering quickly so the insulation material does not become deformed.

6. External Dimensions

6.1 AJ71QLP21

4.2
(0.17)

2
(0.08)

Printed writing
board

250(9.85)

CA7003   CA7003

[30]
(1.18)

106(4.17)
111(4.37)

5
(0.20)

37.5
(1.48)

4.2
(0.17)

* Consider the radius of the bend in the cable.

6.2 AJ71QLR21

Printed writing board

4.2 (0.17)

4.2 (0.17)

106(4.17)

250(9.85)

5 (0.20)

12 (0.47)

2 (0.08)

37.5 (1.48)

6.3 AJ71QBR11

4.2
(0.17)

2
(0.08)

250(9.85)

Printed writing
board

AJ71QBR11

At the time of
installation of
F type connector.

106(4.17)

111(4.37)

7
(0.28)

37.5
(1.48)

4.2
(0.17)

50
(1.97)

Unit: mm (in.)

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•Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult with Mitsubishi.

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