MITSUBISHI

MELSECNET/10 Network Module

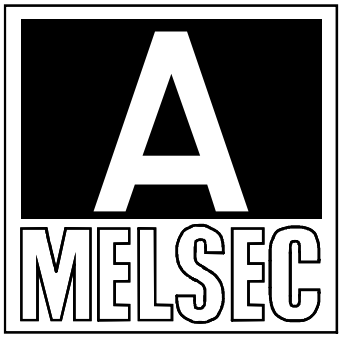
User's Manual

(Hardware)

AJ71LP21, AJ71LR21 AJ71BR11

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

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



MODEL	AJ71LP21/BR11-U-E
MODEL CODE	13JE32
IB(NA)-66444-E(1112)MEE	

● SAFETY PRECAUTIONS ●

(Read these precautions before using this product.)

Before using this product, please read this manual and the relevant manuals 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 precautions are classified into two levels: "⚠WARNING" and "⚠CAUTION".

⚠WARNING	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 minor or moderate injury or property damage.

Under some circumstances, failure to observe the precautions given under "⚠CAUTION" may lead to serious consequences.
Observe the precautions of both levels because they are important for personal and system safety.
Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

[DESIGN PRECAUTIONS]

⚠WARNING

- When there are communication problems with the data link, the communication ploblem station will enter the following condition. Build an interlock circuit into the sequence program that will make sure the system operates safety by using the communication state information.
  Not doing so could result in erroneous output or erroneous operation.
  (1) For the data link data, the deta prior to the communication error will be held.

⚠CAUTION

- Do not install the control lines or communication cables together with the main circuit lines or powercables. Keep a distance of 100mm (3.94 inches) or more between them. Failure to do so may result in malfunction due to noise.

[INSTALLATION PRECAUTIONS]

⚠CAUTION

- Use the programmable controller in an environment that meets the general specifications contained in CPU module user's manual. Using this programmable controller 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 protection 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.
- 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.
- 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.

[WIRING PRECAUTIONS]

⚠WARNING

- Before 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

- 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.
- 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.

[STARTUP AND MAINTENANCE PRECAUTIONS]

⚠WARNING

- Do not touch the terminals while power is on.
  Doing so may cause malfunctions.

⚠CAUTION

- Please read this manual thoroughly and confirm the safety before starting online operations (especially, program modifications, forced outputs, and operating status modifications), which are performed by connecting the GX Developer via the MELSECNET/1 0 network system to a running CPU module of other station. Performing incorrect online operations may damage the machinery or result in accidents
- Never disassemble or modify the module.
  Doing so may cause failure, malfunction, injury, or a fire.
- Use any radio communication device such as a cellular phone or PHS (Personal Handy-phoneSystem) more than 25cm (9.85 inches) away in all directions from the programmable controller.
  Failure to do so may cause malfunction.
- Shut off the external power supply (all phases) used in the system before mounting or removing the module.
  Failure to do so may cause the module to fail or malfunction.
- Before handling the module, touch a grounded metal object to discharge the static electricity from the human body.
  Failure to do so may cause the module to fail or malfunction.

[DISPOSAL PRECAUTIONS]

⚠WARNING

- When disposing of this product, treat it as industrial waste.

●安全注意事项●

（使用之前请务必阅读）

在使用本产品之前，应仔细阅读本手册以及本手册中所介绍的相关手册，同时在充分注意安全的前提下正确操作。
在“安全注意事项”中，安全注意事项被分为“⚠警告”和“⚠注意”两个等级。

⚠警告	表示错误操作可能造成危险后果，导致死亡或重伤事故。
⚠注意	表示错误操作可能造成危险后果，导致中度伤害、轻伤或财产损失。

此外，根据情况不同，即使标注为“⚠注意”的事项也有可能会引发严重后果。
这两个等级的注意事项记载的均为重要内容，请务必遵守。
请妥善保管本手册以备需要时取阅，并将本手册交给最终用户。

【设计注意事项】

⚠警告

- 数据链接出现通信异常时，通信异常站会变为以下状态。应使用通信状态信息，在顺控程序上配置互锁电路，以保证系统能安全运行。
  否则可能由于误输出、误动作而导致事故发生。
  (1) 保持通信异常前的数据。

⚠注意

- 请勿将控制线及通信电缆与主电路及动力线等捆扎在一起或相互靠得太近。应相距大约100㎜以上距离。
  因为噪声有可能导致误动作。

【安装注意事项】

⚠注意

- 应在所使用的CPU模块的用户手册记载的一般规格环境下使用可编程控制器。
  如果在一般规格范围以外的环境中使用可编程控制器，可能导致触电、火灾、误动作、产品损坏或性能劣化。

【安装注意事项】

⚠注意

- 应将模块下部的模块固定用凸起部切实插入基板的固定孔中，以模块固定孔为支点进行安装。
  如果模块未正确安装，有可能造成误动作、故障或掉落。
  在振动较多的环境下使用时，应使用螺栓固定模块。
  应在规定的扭矩范围内拧紧螺栓。
  如果螺栓拧得过松，有可能导致掉落、短路或误动作。
  如果螺栓拧得过紧，有可能造成螺栓及模块破损从而导致掉落、短路或误动作。
- 请勿直接触碰模块的基板、导电部分及电子部件。
  否则可能导致模块误动作、故障。
- 在触碰模块之前，必须先触碰已接地的金属等，释放掉人体等所携带的静电。
  如果不释放掉静电，有可能导致模块故障或误动作。
- 在拆装模块时，必须将系统使用的外部供应电源全部断开后再进行操作。
  如果未全部断开，有可能导致产品损坏。

【配线注意事项】

⚠警告

- 在配线作业等时，必须将系统使用的外部供应电源全部断开后再进行操作。
  如果未全部断开，有可能导致触电或产品损坏。

⚠注意

- 应注意防止切屑及配线头等异物掉入模块内。
  否则有可能导致火灾、故障或误动作。
- 同轴电缆用接口应正确焊接。
  如果焊接不牢固，有可能导致误动作。
- 与模块相连接的通信电缆必须收入套管中，或者用夹具进行固定处理。
  如果未将电缆收入套管或未用夹具进行固定处理，可能由于电缆的晃动及移动、不经意的拉拽等造成模块及电缆破损、电缆接触不良而导致误动作。
- 在拆卸与模块相连接的通信电缆时，请勿用手拉扯电缆部分。
  带接口的电缆应握住与模块相连接部分的接口进行拆卸。
  如果在与模块相连接的状态下拉扯电缆，可能导致模块及电缆破损、电缆接触不良而导致误动作。

【启动 / 维护注意事项】

⚠警告

- 在通电状态下请勿触摸接口。否则可能导致误动作。

【启动 / 维护注意事项】

⚠注意
● 通过经由MELSECNET/10的外围设备对其他站点在运行中的CPU模块进行在线操作（特别是程序更改、强制输出、运行状态的更改）前，应仔细阅读手册，在充分确认安全的基础上进行操作。 否则操作错误有可能导致机械破损或事故发生。 ● 请勿拆解或改造各模块。 否则可能导致故障、误动作、人身伤害或火灾。 ● 便携电话或PHS等无线通信设备应在距离可编程控制器本体（各个方向）25cm以上的地方使用。否则可能导致误动作。 ● 在拆装模块时，必须将系统使用的外部供应电源全部断开后再进行操作。 如果未全部断开，有可能导致模块故障或误动作。 ● 在触碰模块之前，必须先触碰已接地的金属等，释放掉人体等所携带的静电。 如果不释放掉静电，有可能导致模块故障或误动作。

【报废处理注意事项】

⚠注意
● 本产品报废时，应当作工业废物处理。

● CONDITIONS OF USE FOR THE PRODUCT ●

(1) Mitsubishi programmable controller ("the PRODUCT") shall be used in conditions;
i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and
ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.
MITSUBISHI SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI'S USER, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT.
("Prohibited Application")
Prohibited Applications include, but not limited to, the use of the PRODUCT in;
- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

Notwithstanding the above, restrictions Mitsubishi may in its sole discretion, authorize use of the PRODUCT in one or more of the Prohibited Applications, provided that the usage of the PRODUCT is limited only for the specific applications agreed to by Mitsubishi and provided further that no special quality assurance or fail-safe, redundant or other safety features which exceed the general specifications of the PRODUCTs are required. For details, please contact the Mitsubishi representative in your region.

REVISIONS

*The manual number is given on the bottom right of the cover.

Print Date	*Manual Number	Revision
Oct., 1993	IB(NA)-66444-A	First printing
Oct., 2004	IB(NA)-66444-B	Manual size change A4 → A6 Correction Overall reexamination
May, 2006	IB(NA)-66444-C	Correction SAFETY PRECAUTIONS, Compliance with the EMC Directive and the Low Voltage Directive, Chapter 1, 2, 3, 4, 5, 6
Jun., 2007	IB(NA)-66444-D	Correction Section 5.1, 5.2.1, 5.2.2
Dec., 2011	IB(NA)-66444-E	Correction SAFETY PRECAUTIONS, COMPLIANCE WITH EMC AND LOW VOLTAGE DIRECTIVES, Chapter 3, 5, Section 5.2.3, 6.1, 6.2, 6.3 Addition SAFETY PRECAUTIONS(Chinese), CONDITIONS OF USE FOR THE PRODUCT

Japanese Manual Version IB-68388-K

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)
Type MELSECNET/10 Network System (PLC to PLC network) Reference Manual	IB-66440 (13JE33)
Type MELSECNET/10 Network System (Remote I/O network) Reference Manual	SH-3509 (13JE72)

Before use of this module, be sure to read the Type MELSECNET/10 Network System (PLC to PLC network) Reference Manual or the Type MELSECNET/10 Network System (Remote I/O network) Reference Manual.

COMPLIANCE WITH EMC AND LOW VOLTAGE DIRECTIVES

(1) Method of ensuring compliance
To ensure that Mitsubishi programmable controllers maintain EMC and Low Voltage Directives when incorporated into other machinery or equipment, certain measures may be necessary. Please refer to one of the following manuals.
• User's manual for the CPU module used
• User's manual (hardware) for the CPU module or base unit used
The CE mark on the side of the programmable controller indicates compliance with EMC and Low Voltage Directives.

(2) Additional measures
To ensure that this product maintains EMC and Low Voltage Directives, please refer to one of the manuals listed under (1).

1. Overview

This manual explains the specifications and names of each part, etc., of the AJ71LP21, AJ71LR21 and AJ71BR11 model MELSECNET/10 network module (abbreviated as Network Modules) which are used with MELSECNET/10 network system of the MELSEC-A series.

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

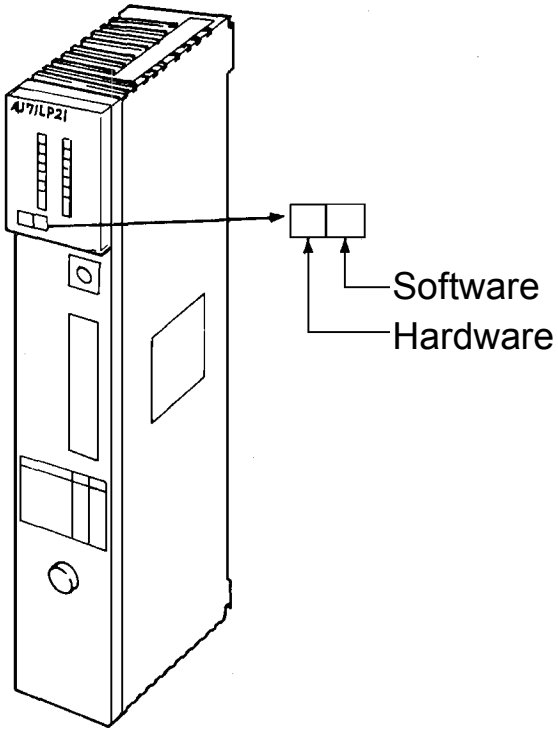
	Application	Cable used		Position
		Optical fiber cable	Coaxial cable	
AJ71LP21	The control station, normal station and remote master station of MELSECNET/10	○	—	Main base, Extension base I/O slot
AJ71LR21		—	○	
AJ71BR11				

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

Model	Description	Quantity
AJ71LP21	Model AJ71LP21 MELSECNET/10 network module (optical loop type)	1
AJ71LR21	Model AJ71LR21 MELSECNET/10 network module (coaxial loop type)	1
AJ71BR11	Model AJ71BR11 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 AJ71BR11 does not come with terminal resistors.

(4) The remote I/O network is supported from the software version J or later.
(For the AJ71LR21, the software version must be "A" or later.)



In addition, make sure to use the following software version for the CPU module applicable to the remote I/O network.

Model	Software version
A2UCPU(S1) A3UCPU A4UCPU	N or later
A2ASHCPU(S1)	D or later
A2USHCPU-S1	A or later

2. Performance Specifications

The performance specifications for Network Modules are indicated as follows.

(1) A1SJ71LP21

Item		Specifications
		AJ71LP21
Maximum link points per network	X/Y	8192 points
	B	8192 points
	W	8192 points
Maximum link points per station	PLC to PLC network	$\left\{\frac{Y+B}{8}+(2\times W)\right\} \leq$ 2000 bytes
	Remote I/O network	• Remote master station → remote I/O station $\left\{\frac{Y+B}{8}+(2\times W)\right\} \leq$ 1600 bytes • Remote I/O station → remote master station $\left\{\frac{X+B}{8}+(2\times W)\right\} \leq$ 1600 bytes
Communication speed		10Mbps (equivalent to 20Mbps for multiple transmission)
Communication method		Token ring
Synchronization method		Frame synchronization
Encoding method		NRZI encoding (Non Return to Zero Inverted)
Transmission route format		Duplex optical loop
Transmission format		Conform to HDLC (frame format)
Maximum number of networks		255 (The sum total of PLC to PLC network and remote I/O network)
Maximum number of groups		9 (Only for PLC to PLC network)
Number of stations for connection per network	PLC to PLC network	64 stations (Control station: 1 Normal stations: 63)
	Remote I/O network	65 stations (Remote master station: 1 Remote I/O stations: 64)
Overall distance		30km
Station-to-station distance *1		SI optical cable : 500m H-PCF optical cable : 1km Broad-band H-PCF optical cable : 1km QSI optical cable : 1km
Error control method		Retry by CRC ($X^{16}+X^{12}+X^5+1$) and overtime
RAS function		• Loop back function due to abnormality detection and cable disconnection • Diagnostic function for local link circuit check • Prevention of system down due to shifting to control station (Only for PLC to PLC networks) • Abnormality detection by link special relay, resistor • Network monitor, each type of diagnostic function
Transient transmission		• N: N communication (Monitor, program upload/download, etc.) • ZNRD/ZNWR instructions (N: N): AnUCPU dedicated instructions

Item	Specifications
	AJ71LP21
Connection cable	Optical fiber cable (Arranged by user *2)
Applicable connector	2-core optical connector plug (Arranged by user *2)
5VDC current consumption	0.65 A
Weight	0.31 kg *3
No. of occupied I/O points	32 points (I/O assignment: 32 points as special)

*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.

*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.

*3: The weight for the hardware version P or earlier is 0.45kg.

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

(2) AJ71LR21, AJ71BR11

Item		Specifications			
		AJ71LR21		AJ71BR11	
Maximum link points per network	X/Y	8192 points			
	B	8192 points			
	W	8192 points			
Maximum link points per station	PLC to PLC network	$\left\{\frac{Y+B}{8}+(2\times W)\right\} \leq$ 2000 bytes			
	Remote I/O network	• Remote master station → remote I/O station $\left\{\frac{Y+B}{8}+(2\times W)\right\} \leq$ 1600 bytes • Remote I/O station → remote master station $\left\{\frac{X+B}{8}+(2\times W)\right\} \leq$ 1600 bytes			
Communication speed		10Mbps (equivalent to 20Mbps for multiple transmission)		10Mbps	
Communication method		Token ring		Token bus	
Synchronization method		Frame synchronization			
Encoding method		Manchester encoding			
Transmission route format		Duplex coaxial loop		Single coaxial bus	
Transmission format		Conform to HDLC (frame format)			
Maximum number of networks		255 (The sum total of PLC to PLC network and remote I/O network)			
Maximum number of groups		9 (Only for PLC to PLC network)			
Number of stations for connection per network	PLC to PLC network	64 stations (Control station: 1 Normal stations: 63)		32 stations (Control station: 1 Normal stations: 31)	
	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)	
Overall distance (Station-to-station distance) *1		3C-2V	19.2km (300m)	3C-2V	300m (300m)
		5C-2V	30km (500m)	5C-2V	500m (500m)
		—		Can be extended to 2.5km when used with a repeater module (A6BR10, A6BR10-DC)	
Error control method		Retry by CRC ($X^{16}+X^{12}+X^5+1$) and overtime			
RAS function		• Loop back function due to abnormality detection and cable disconnection (AJ71LR21) • Diagnostic function for local link circuit check • Prevention of system down due to shifting to control station (Only for PLC to PLC networks) • Abnormality detection by link special relay, resistor • Network monitor, each type of diagnostic function			
Transient transmission		• N: N communication (Monitor, program upload/download, etc.) • ZNRD/ZNWR instructions (N: N): AnUCPU dedicated instructions			

Item	Specifications	
	AJ71LR21	AJ71BR11
Connection cable	Equivalent to 3C-2V, 5C-2V cables (Arranged by user)	
Applicable connector	Equivalent to BNC-P-3-NiCAu (For 3C-2V), BNC-P-5-NiCAu (For 5C-2V) (DDK) (Arranged by user)	
5VDC current consumption	1.20 A	0.80 A
Weight	0.45 kg	0.45 kg
No. of occupied I/O points	32 points (I/O assignment: 32 points as special)	

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

For general specifications of the network module, refer to the user's manual for the programmable controller 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.

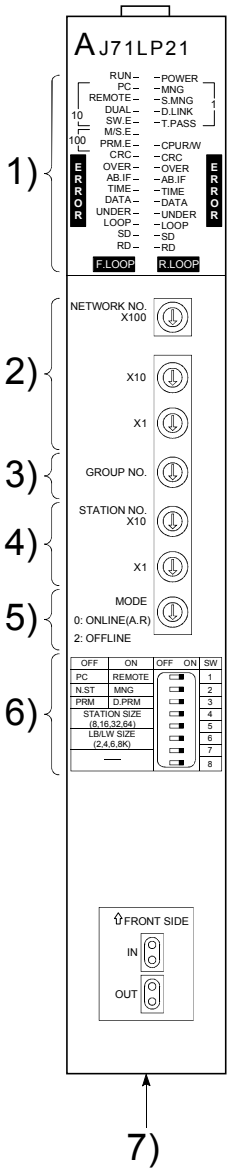
(4) The module installation screw should be kept within the following range.

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

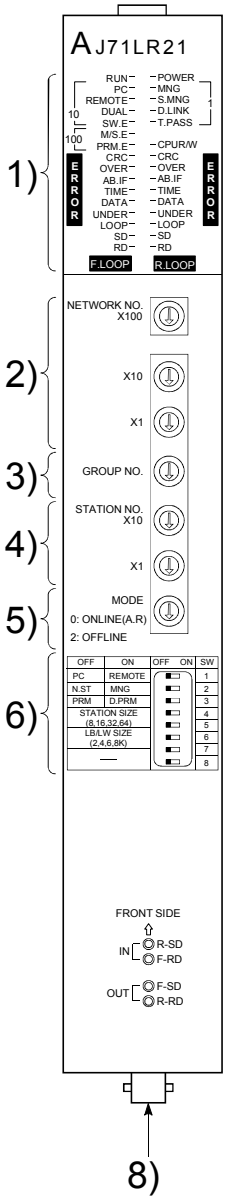
4. The Name and Setting of Each Part

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

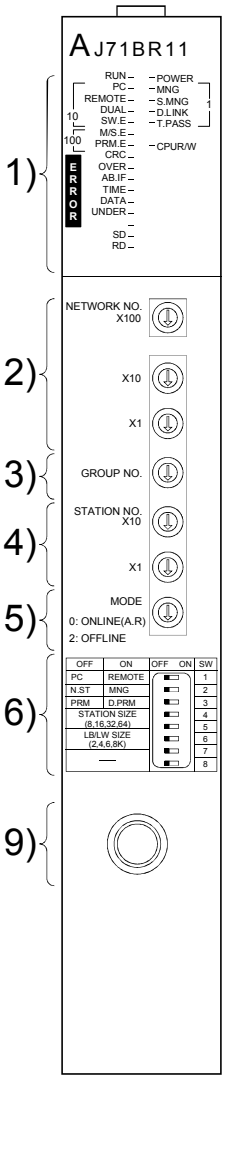
AJ71LP21

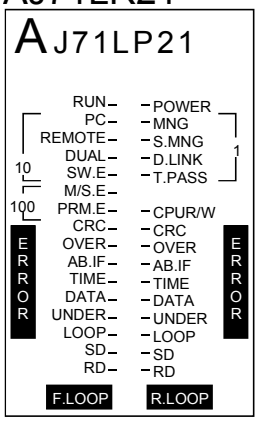
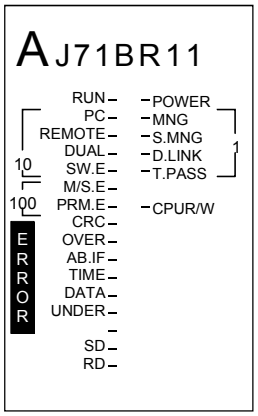


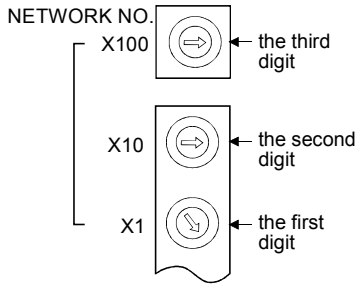
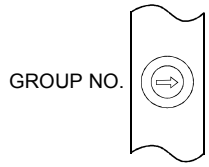
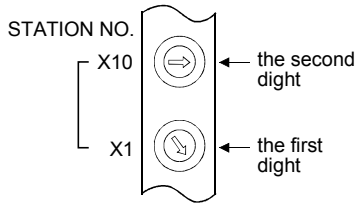
AJ71LR21



AJ71BR11



No.	Name	Contents		
1)	LED AJ71LP21 AJ71LR21  AJ71BR11  	Name	Status	Contents
		RUN	ON	Normal state
			OFF	WDT error, SP.UNIT ERROR
		PC	ON	Set as PLC to PLC network (SW1 turned OFF)
		REMOTE		Set as remote I/O network (SW1 turned ON)
		DUAL		Multiplex transfer in execution (OFF: Multiplex transfer not executed)
		SW.E.		Incorrect setting of switches 2) to 6)
		M/S.E.		Station number or control/remote master station status is duplicated on the same network.
		PRM.E.		• Duplication of network refreshes parameters when multiple modules are mounted. • Inconsistency between the common and station specific parameters • Difference between parameter received from sub-control station and the one of the host (received from control station).
		POWER		Power being supplied (OFF: No power being supplied)
		MNG		Operating as control station or remote master station (OFF: Normal station)
		S.MNG		Operating as sub-control station
		D.LINK		Data link being performed (OFF: Data link stopped)
		T.PASS.		Participating in token passing (Transient transmission is available.)
		CPU R/W		Communicating with CPU
		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		Data link WDT times out. <Cause> Monitoring time too short, cable fault, noise, etc.
		DATA		Abnormal data larger than 2 kbytes are 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

<table>
<tr><th>No.</th><th>Name</th><th>Contents</th></tr>
<tr><td>2)
*1</td><td>Network number setting switch
 
</td><td>Network number setting (factory setting at time of shipping: 1)
<Setting range>
1 to 255 : Network number
Other than 1 to 255 : Setting error (The SW.E. LED turns ON)
Becomes off-line condition</td></tr>
<tr><td>3)
*1</td><td>Group number setting Switch
 
</td><td>Group number setting (factory setting at time of shipping: 0)
<Setting range>
0 : No specified group
1 to 9 : Group number
] Enabled for PLC to PLC network</td></tr>
<tr><td>4)
*1</td><td>Station number setting switch
 
</td><td>Station number setting (factory setting at time of shipping: 1)
<table>
<tr><th>Type</th><th>Setting</th></tr>
<tr><td>PLC to PLC network *2</td><td>1 to 64 : Station number
Other than 1 to 64 : Setting error
(The SW.E. LED turns ON)</td></tr>
<tr><td>Remote I/O network</td><td>0 : Remote master station
Other than 0 to 64 : Setting error
(The SW.E. LED turns ON)</td></tr>
</table></td></tr>
</table>

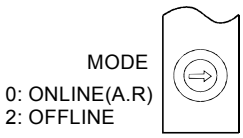
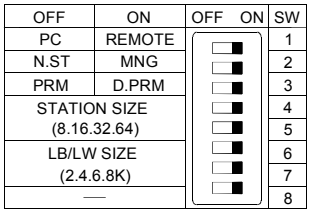
*1: When the setting has been changed with the CPU module powered ON, reset the CPU module (Shift the RUN/STOP key switch from RESET to any other than RESET.)

*2: The setting range for the AJ71BR11 is shown below.

<Setting range>

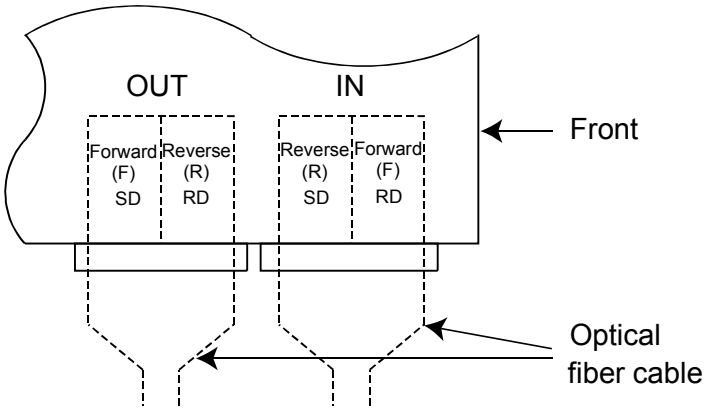
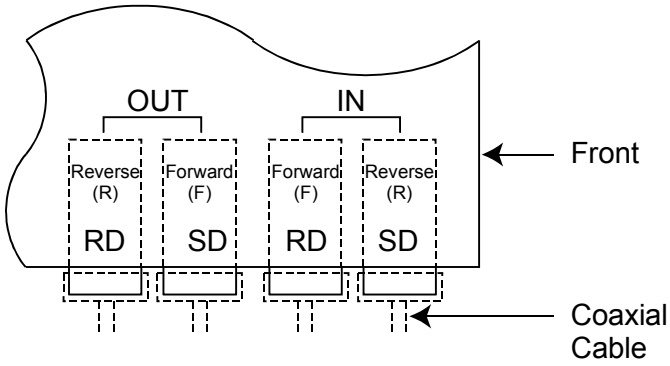
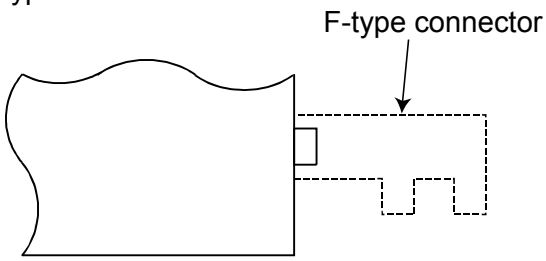
1 to 32 : Station number

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.)

<table>
<tr><th>No.</th><th>Name</th><th>Contents</th></tr>
<tr><td>5)
*3</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 C</td><td>Not used</td><td>(Do not set the mode.)</td></tr>
<tr><td>D</td><td>Test mode 8</td><td>Network No. check (LED display)</td></tr>
<tr><td>E</td><td>Test mode 9</td><td>Group No. check (LED display)</td></tr>
<tr><td>F</td><td>Test mode 10</td><td>Station No. check (LED display)</td></tr>
</table>
</td></tr>
<tr><td>6)
*3</td><td>Conditions setting switch
 
</td><td>
Operation condition setting
(factory setting at the time of shipping: all off)
<table>
<tr><th>SW</th><th>Contents</th><th colspan="4">OFF</th><th colspan="4">ON</th></tr>
<tr><td>1</td><td>Network type</td><td colspan="4">PLC to PLC network</td><td colspan="4">Remote I/O network</td></tr>
<tr><td>2</td><td>Station type</td><td colspan="4">Normal station</td><td colspan="4">Control station</td></tr>
<tr><td>3</td><td>Use parameters</td><td colspan="4">Parameters in common</td><td colspan="4">Default Parameters</td></tr>
<tr><td>4</td><td rowspan="2">Number of stations
〔Valid when SW3 is ON〕</td><td>OFF</td><td rowspan="2">8 stations</td><td>ON</td><td rowspan="2">16 stations</td><td>OFF</td><td rowspan="2">32 stations</td><td>ON</td><td rowspan="2">64 stations</td></tr>
<tr><td>5</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td></tr>
<tr><td>6</td><td rowspan="2">B/W number of general point
〔Valid when SW3 is ON〕</td><td>OFF</td><td rowspan="2">2k points</td><td>ON</td><td rowspan="2">4k points</td><td>OFF</td><td rowspan="2">6k points</td><td>ON</td><td rowspan="2">8k points</td></tr>
<tr><td>7</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td></tr>
<tr><td>8</td><td colspan="9">Not used (always off)</td></tr>
</table>
*4
</td></tr>
</table>

*3: When the setting has been changed with the CPU module powered ON, reset the CPU module (Shift the RUN/STOP key switch from RESET to any other than RESET.)
Note that resetting the CPU module is not needed for mode "D" to "F".

*4: The settings are enabled when the module is a control station in the PLC to PLC network.

No.	Name	Contents
7)	Connector (AJ71LP21)	Connect the optical fiber cable. 
8)	Connector (AJ71LR21)	Connect the coaxial type cable. 
9)	Connector (AJ71BR11)	Connect the F-type connector. 

5. Wiring

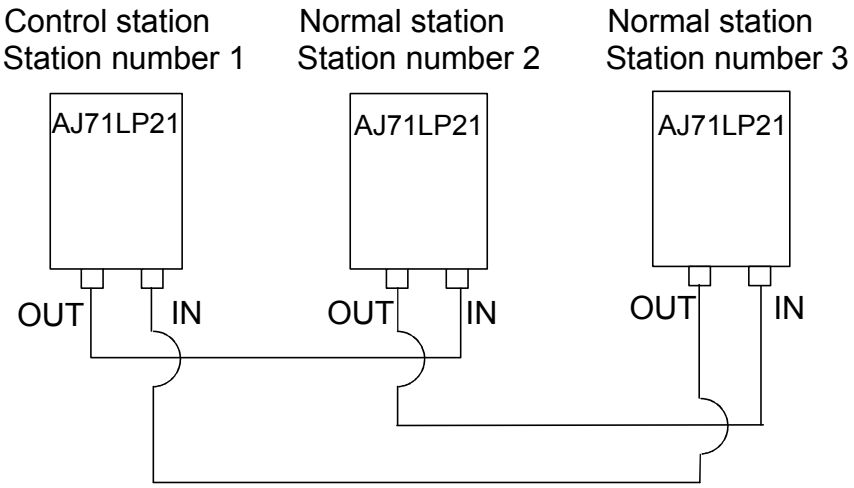
5.1 Precautions for Laying Optical Fiber Cables

(1) The optical fiber cable type that can be used differs depending on the station to station distance.

Type	Distance between stations
SI optical fiber cable	500 m (1640.5 ft.)
H-PCF optical fiber cable	1000 m (3281 ft.)
Broad-band H-PCF optical fiber cable	1000 m (3281 ft.)
QSI optical fiber cable	1000 m (3281 ft.)

(2) When connecting an optical fiber cable, the following restrictions on the bending radius must be observed.
Make sure of the specifications of the cable to be used.

(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.



(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.
Also, do not remove the cover from the module connector until an optical fiber cable is connected.

(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 loopback of an arbitrary bureau do the row again even by the reclosing of the power supply.

(8) Completely turn off the externally supplied power used in the system when connecting or disconnecting the cable.

5.2 Precautions when Installing the Coaxial Cables

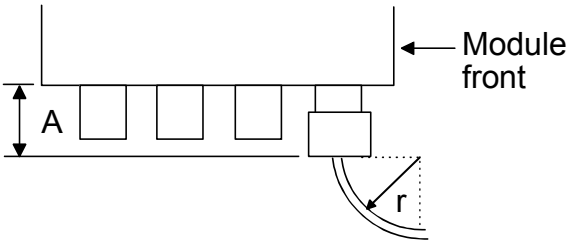
5.2.1 For the Coaxial Loop Type

(1) For connection between network modules, use the cable length given in the following table depending on the cable type.

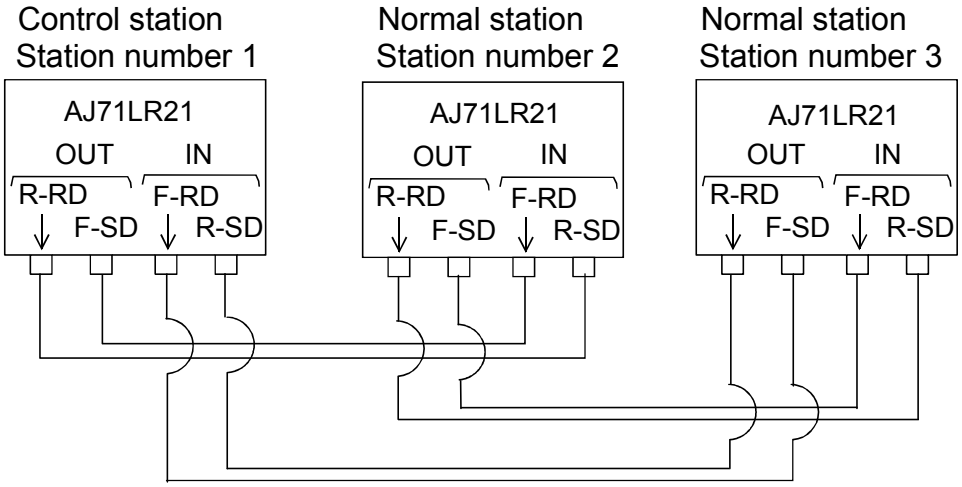
Cable type	Interstation cable length	Overall distance
3C-2V	300 m (984.3 ft.)	19.2 km (62995.2ft.)
5C-2V	500 m (1640.5 ft.)	30 km (98430 ft.)

(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)	

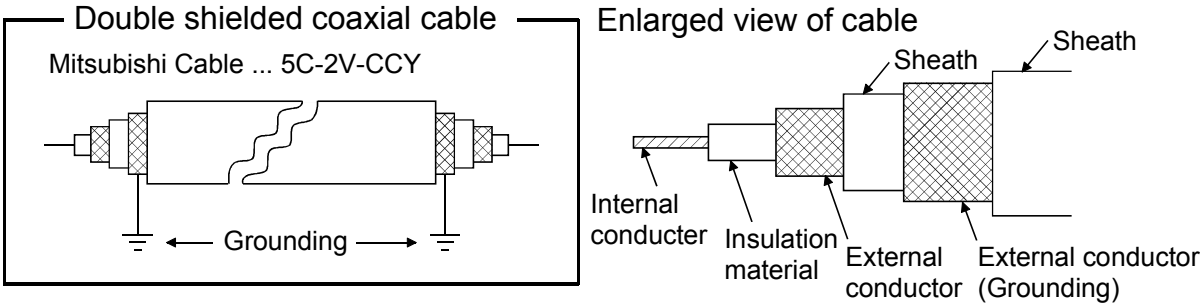


(3) The Coaxial cable is wired in the following manner.
There is no problem even if not wiring in order of the station number.
There is no problem even if station how many become control station.



(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.



The 5C-2V connector plug is applicable to double-shielded coaxial cable. Connect the 5C-2V connector plug to the coaxial cable inside a double-shielded coaxial cable. Ground the shielded part outside a double-shielded coaxial cable as shown in the above figure.

(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 loopback of an arbitrary bureau do the row again even by the reclosing of the power supply.

(8) Completely turn off the externally supplied power used in the system when connecting or disconnecting the cable.

5.2.2 For the Coaxial Bus Type

(1) The cable to connect between network modules must be the following according to the number of stations connected.
When a cable length other than those specified in the table below is used, a communication error may result.

Number of stations connected / Station-to-station cable length	2 to 9 stations		10 to 33 stations	
Cable type	3C - 2V	5C - 2V	3C - 2V	5C - 2V
0 to 1 m (3.28 ft.)	× (cable less than 1m (3.28 ft.) in length cannot be used.)			
1 (3.28 ft.) to 5 m (16.41 ft.)	○	○	○	○
5 (16.41 ft.) to 13 m (42.65 ft.)	○	○	×	×
13 (42.65 ft.) to 17 m (55.78 ft.)	○	○	○	○
17 (55.78 ft.) to 25 m (82.03 ft.)	○	○	×	×
25 (82.03 ft.) to 300 m (984.3 ft.)	○	○	○	○
300 (984.3 ft.) to 500 m (1640.5 ft.)	×	○	×	○

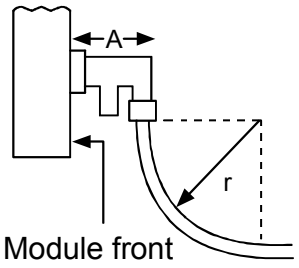
○: Allowed ×: Not allowed

(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.

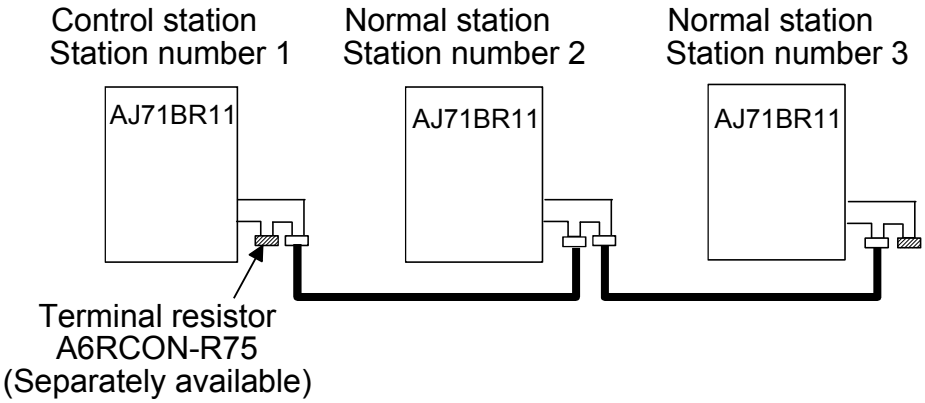
(3) When using a repeater module (models A6BR10 or A6BR10-DC), use the station-to-station cable length indicated by "10 to 33" stations, regardless of the number of stations connected or the number of repeater modules.

(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)	

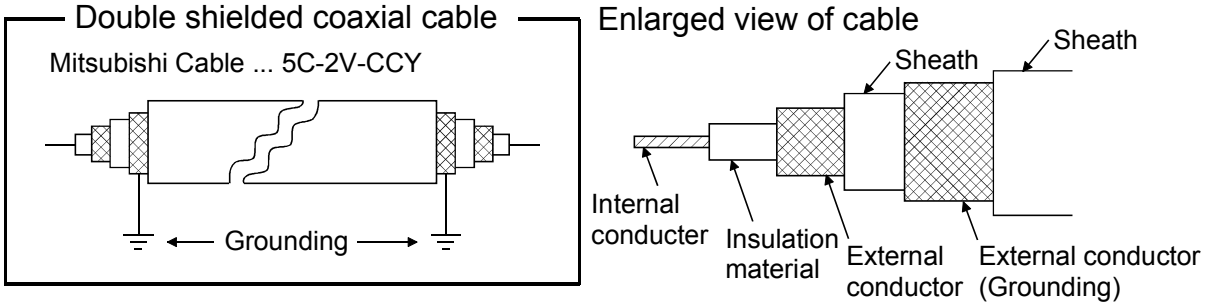


(5) The coaxial cable is wired in the following manner.
There is no program even if not wiring in order of the station number.
There is no program even if station how many become control station.



(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.



The 5C-2V connector plug is applicable to double-shielded coaxial cable. Connect the 5C-2V connector plug to the coaxial cable inside a double-shielded coaxial cable. Ground the shielded part outside a double-shielded coaxial cable as shown in the above figure.

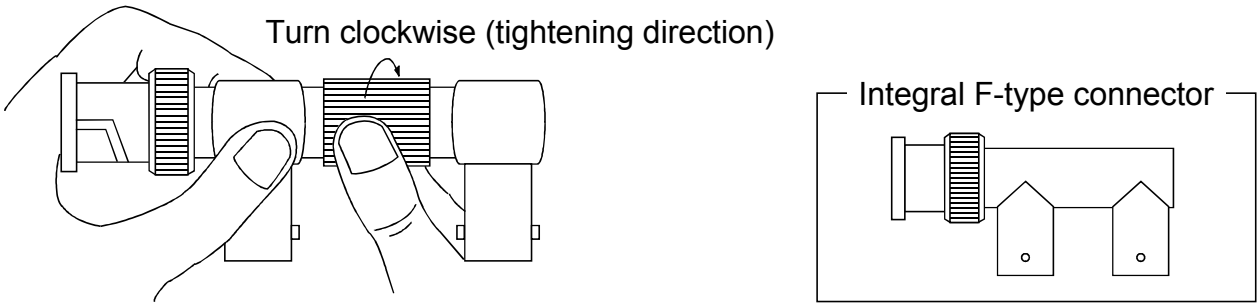
(8) Do not pull any of the connected coaxial cables.
This will cause a faulty contact, cable disconnection, or damage to the module.

(9) Make sure to connect a terminal resistor to both terminal stations of the coaxial bus type network system.

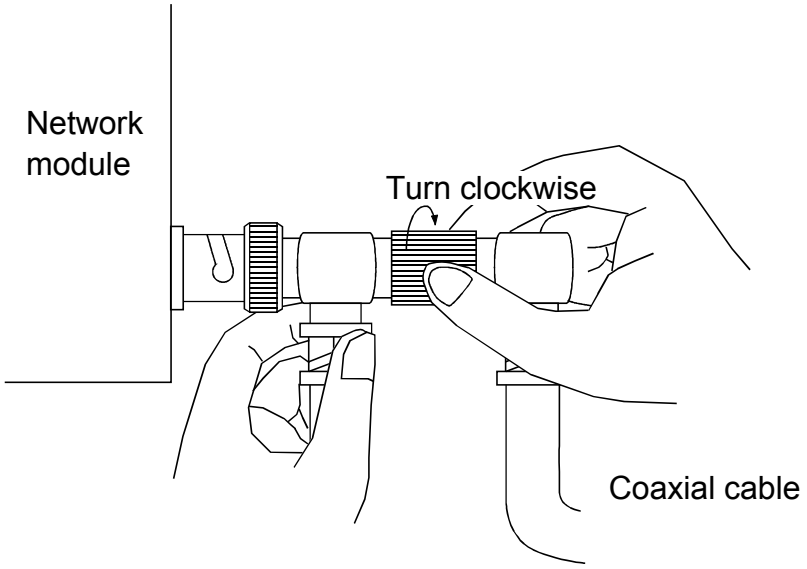
(10) A white oxide, which may be deposited on the F-type connector depending on the operating environment, is not producted in the fitting portion, posing no functional problems.

(11) Completely turn off the externally supplied power used in the system when connecting or disconnecting the cable.

(12)There are integral type and separate F-type connectors. In the case of the separate F-type connector, tighten the ring of the connector until the ring is tight before connecting the connector to the network module.
If the ring is loose, a communication error may occur.



After connecting the F-type connector to the network module, retighten its ring periodically.
Retighten it with both hands as shown below.

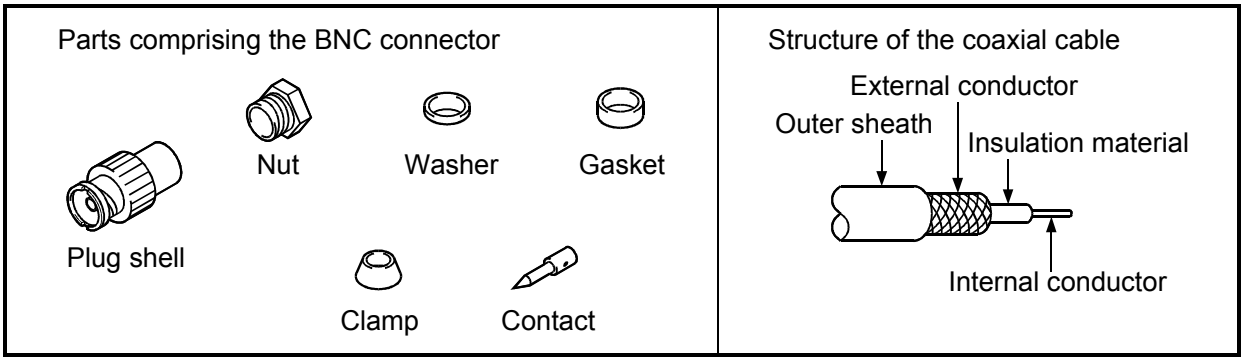


5.2.3 Connecting the Connector for the Coaxial Cables

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

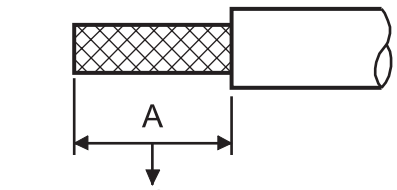
(1) Structure of the BNC connector and coaxial cable

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

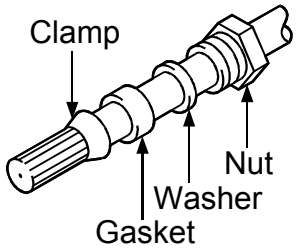
(a) Cut off the outer sheath of the coaxial cable to the length shown in the diagram below.



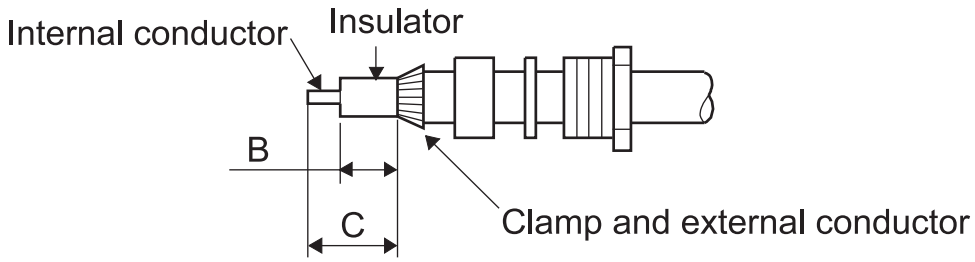
Measures for removing external sheath

Applicable cable	A
3C-2V	15mm (0.59 in.)
5C-2V, 5C-2V-CCY	10mm (0.4 in.)

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

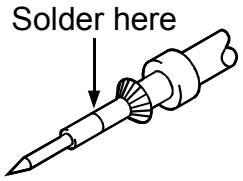


(c) Cut the external conductor, insulation material and internal conductor to the dimensions shown below. However, cut the external conductor to the same dimension as the tapered section of the clamp and smooth it down to the clamp.

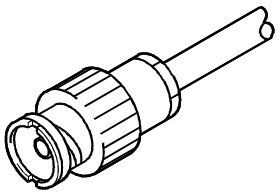


Applicable cable	B	C
3C-2V	3mm (0.12 in.)	6mm (0.24 in.)
5C-2V, 5C-2V-CCY	5mm (0.2 in.)	7mm (0.28 in.)

(d) Solder the contact to the internal conductor.



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



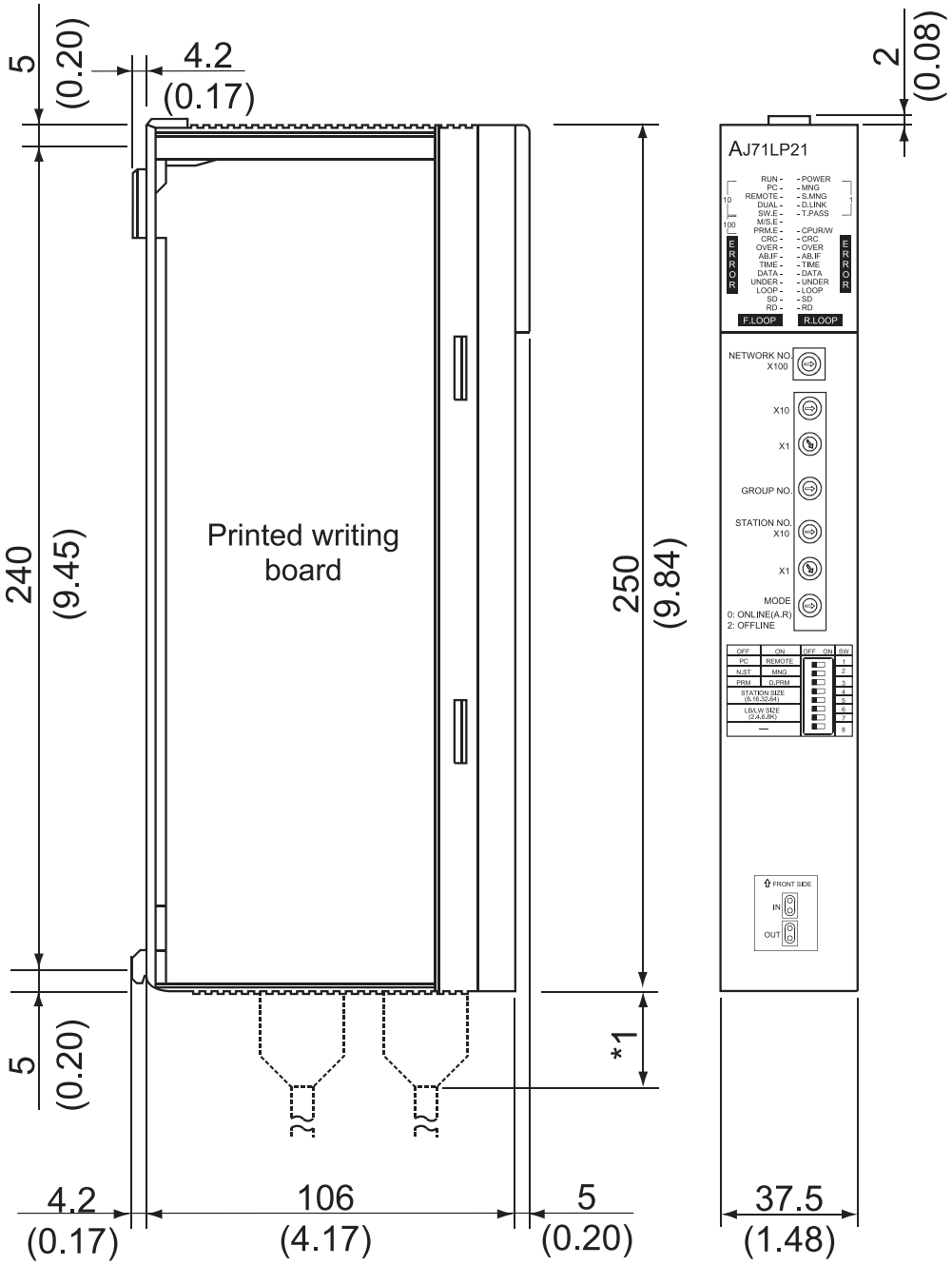
Important

(1) 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.

(2) Before connecting or disconnecting the coaxial connector, touch a grounded metal object to discharge the static electricity from the human body. Failure to do so may result in a module malfunction.

6. External Dimensions

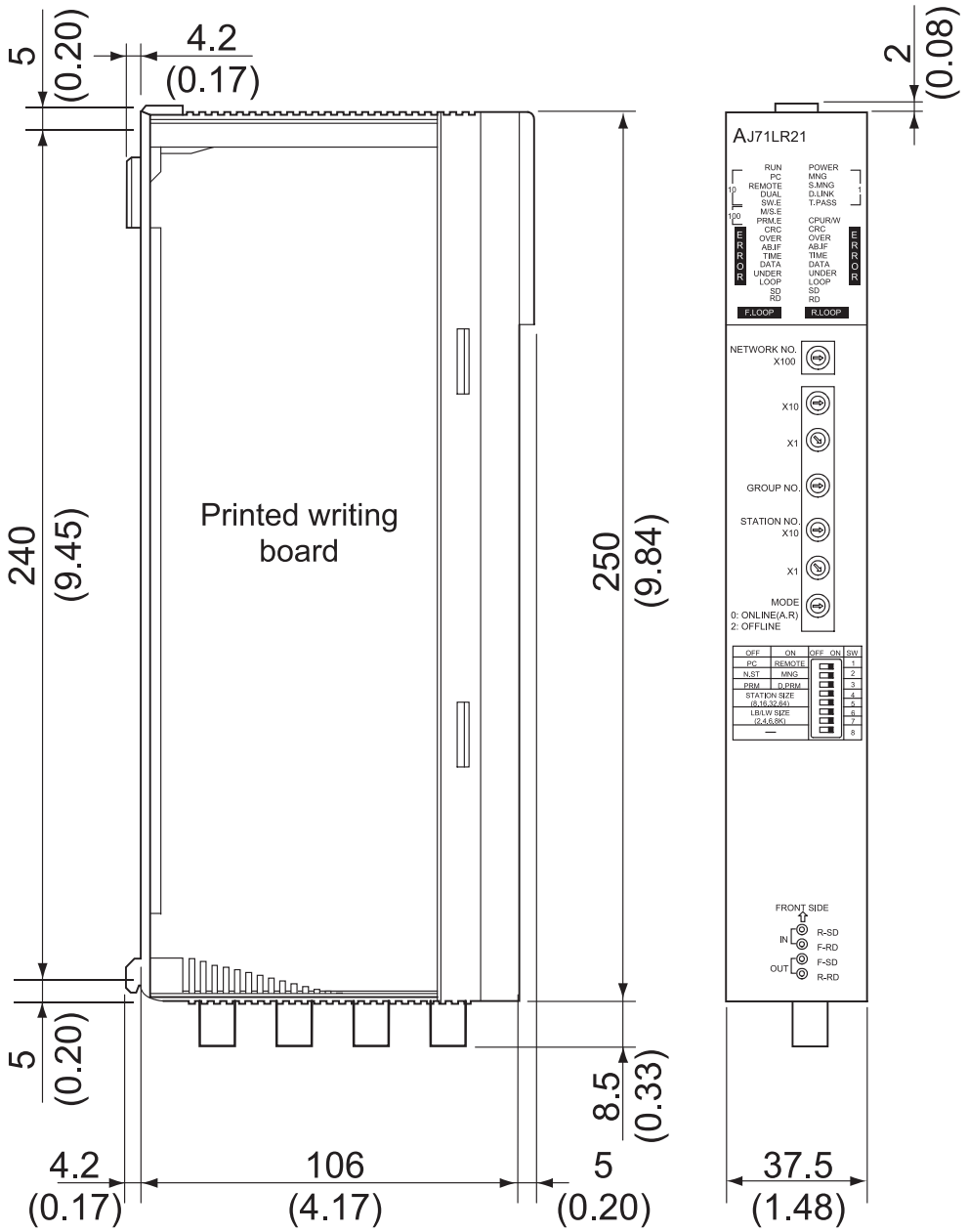
6.1 AJ71LP21



Unit: mm (in.)

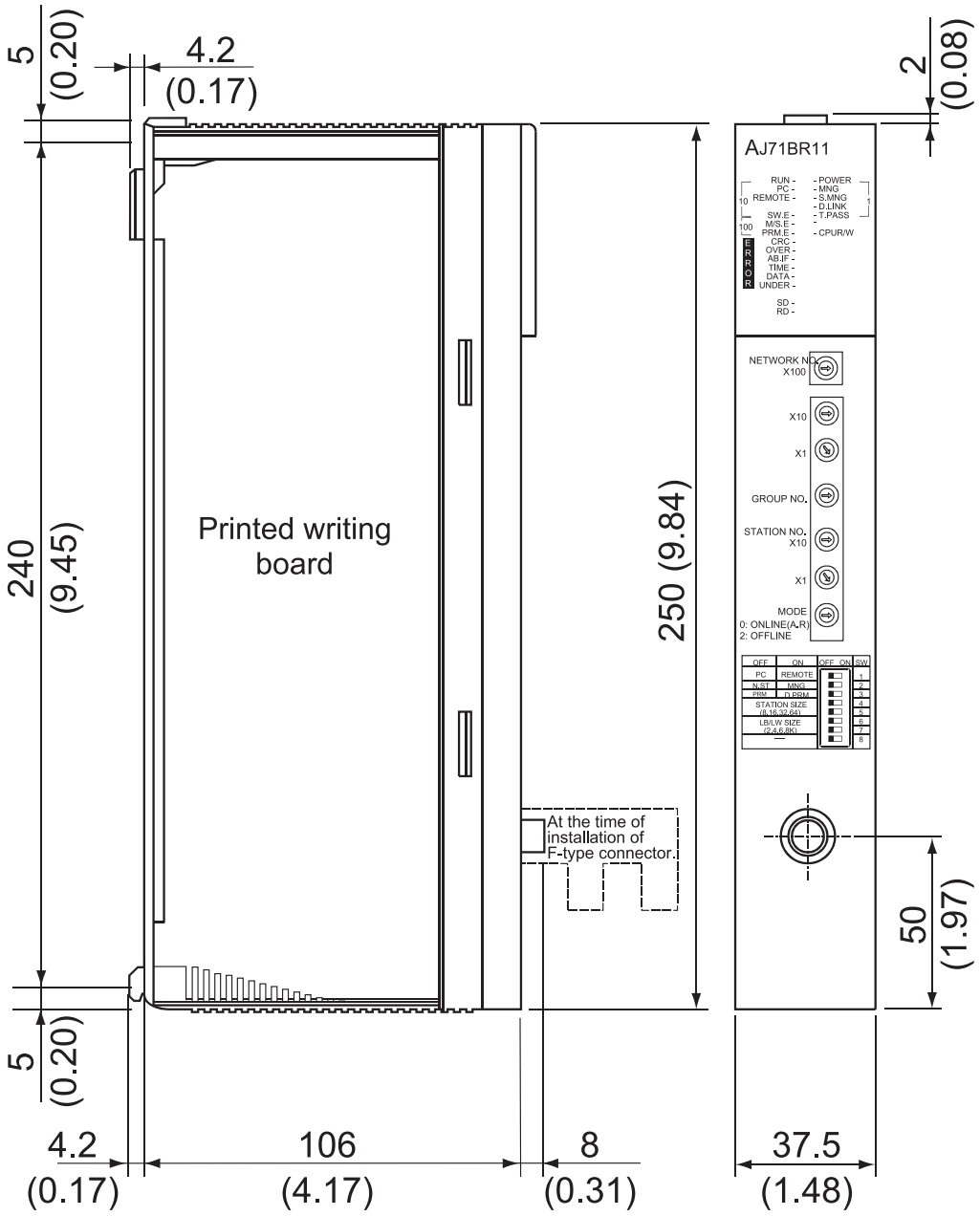
*1: Please confirm details to Mitsubishi Electric System Service Corporation.

6.2 AJ71LR21



Unit: mm (in.)

6.3 AJ71BR11



Unit: mm (in.)

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