

# mitsubishi

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# MELSECNET/10

# Network Module

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User's Manual  
(Hardware)

## AJ71LP21G

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	AJ71LP21G-U(HW)-E
MODEL CODE	13J802
IB(NA)-66579-E(0706)MEE	

# ● SAFETY PRECAUTIONS ●

(Always read before starting use.)

Before using this product, please read this manual and the relevant manuals introduced in this manual carefully and pay full attention to safety to handle the product correctly.

The instructions given in this manual are concerned with this product. For the safety instructions of the programmable controller system, please read the CPU module user's manual.

In this manual, the safety instructions are ranked as "DANGER" and "CAUTION".



**DANGER**

Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.



**CAUTION**

Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage.

Note that the  **CAUTION** level may lead to a serious consequence according to the circumstances.

Always follow the instructions of both levels because they are important to personal safety.

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

## [INSTALLATION PRECAUTIONS]

### **CAUTION**

- Use the 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 projection on the bottom of the module into the hole in the base unit and press the module into position.  
Not installing the module correctly could result in malfunction, damage, or drop of some pieces of the product.  
If using the product in a vibratory environment, tighten the module with the screws.  
Always tighten the module fixing screws within the specified torque range. Loose tightening could result in drop of some pieces of the product, short-circuit, and malfunction.  
Tightening the screws too much could result in drop of some pieces of the product, short-circuit, or malfunction due to the breakage of a screw or the module.

## [INSTALLATION PRECAUTIONS]

### CAUTION

- 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]

### DANGER

- 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.
- Make sure to place the communication and power cables into a duct or fasten them using a clamp.  
Cables not placed in the duct or not clamped may hang or shift, allowing them to be accidentally pulled, which may cause a module malfunction and cable damage.
- When removing the communication cable or power cables from the module, do not pull the cable. When removing the cable with a connector, hold the connector on the side that is connected to the module.  
When removing the cable connected to the terminal block, first loosen the screws on the terminal block.  
Pulling the cable that is still connected to the module may cause malfunction or damage to the module or cable.

## About the Manuals

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

### Detailed Manual

Manual name	Manual No. (Model code)
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 the EMC Directive and the Low Voltage Directive

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

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

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

# 1. Overview

This manual explains the specifications and names of each part, etc., of the AJ71LP21G model MELSECNET/10 network module (abbreviated as Network Modules) which are used with MELSECNET/10 network system of the MELSEC-A series.

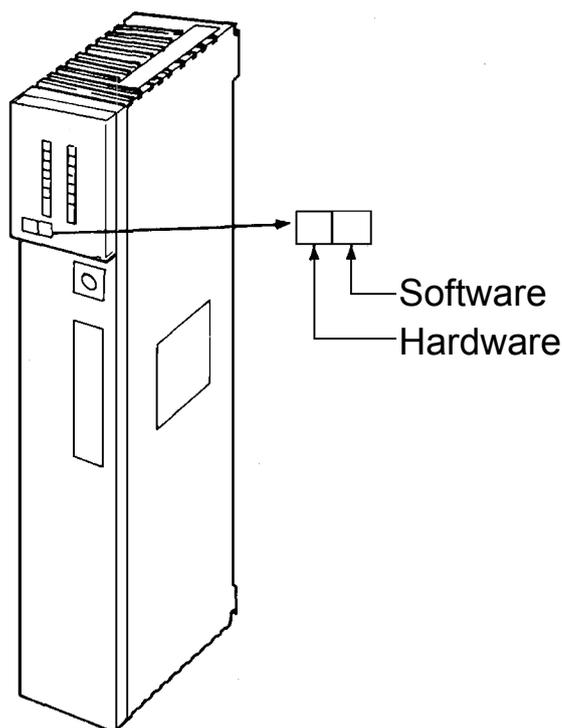
(1) The use, cable used and installation position of the Network Modules are indicated on the following chart.

	Application	Cable used		Position
		Optical fiber cable	Coaxial cable	
AJ71LP21G	The control station, normal station and remote master station of MELSECNET/10	○ (GI cables)	-	Main base, Extension base I/O slot

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

Model	Description	Quantity
AJ71LP21G	Model AJ71LP21G MELSECNET/10 network module (optical loop type)	1

(3) The remote I/O network is supported from the software version 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.

Item		Specifications
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	<ul style="list-style-type: none"> <li>• Remote master station → remote I/O station  <math>\left\{ \frac{Y+B}{8} + (2 \times W) \right\} \leq 1600</math> bytes</li> <li>• Remote I/O station → remote master station  <math>\left\{ \frac{X+B}{8} + (2 \times W) \right\} \leq 1600</math> bytes</li> </ul>
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 (Station-to-station distance)		30km (2km)
Error control method		Retry by CRC ( $X^{16}+X^{12}+X^5+1$ ) and overtime
RAS function		<ul style="list-style-type: none"> <li>• Loop back function due to abnormality detection and cable disconnection</li> <li>• Diagnostic function for local link circuit check</li> <li>• Prevention of system down due to shifting to control station (Only for PLC to PLC networks)</li> <li>• Abnormality detection by link special relay, resistor</li> <li>• Network monitor, each type of diagnostic function</li> </ul>
Transient transmission		<ul style="list-style-type: none"> <li>• N:N communication (Monitor, program upload/download, etc.)</li> <li>• ZNRD/ZNWR instructions (N:N) : AnUCPU dedicated instructions</li> </ul>
Connection cable		GI optical fiber cable (Arranged by user *1)
Applicable connector		1-core optical connector plug (Arranged by user *1)
5VDC current consumption		0.65A
Weight		0.31kg *2
No. of occupied I/O points		32 points (I/O assignment: 32 points as special)

\*1: Specialised training and specific tools are required to connect the connector to the optical fiber cable; the connector itself is a custom product. Please contact your nearest Mitsubishi Electric System Service Corporation when purchasing these items.

\*2: The weight for the hardware version K 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.

## 3. Handling

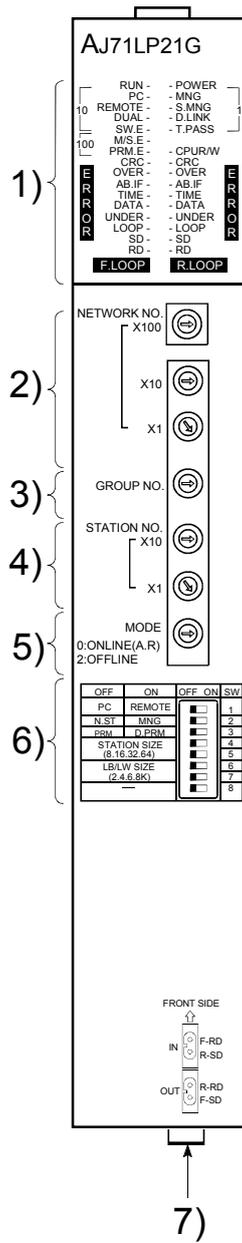
### 3.1 Cable length restrictions between stations

- (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.

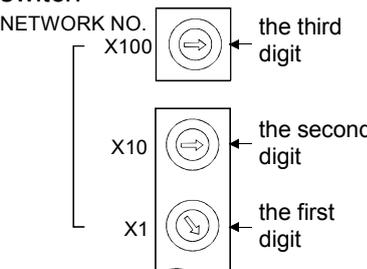
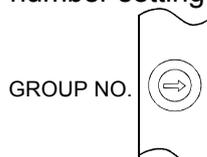
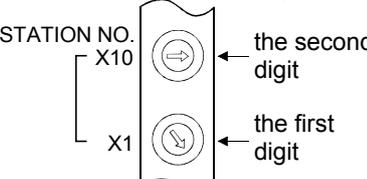
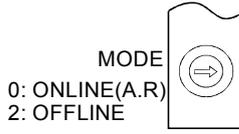
Screw Locations	Tightening Torque Range
Module installation screws (M4 screws)	78 to 118N•cm

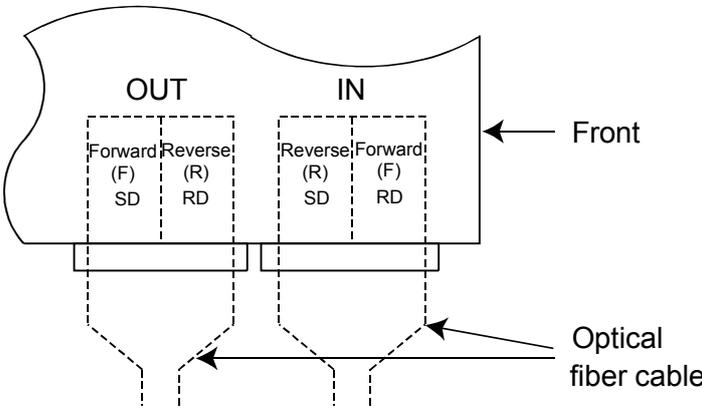
# 4. The Name and Setting of Each Part

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



No.	Name	Contents																																							
1)	<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center; margin: 0;"><b>AJ71LP21G</b></p> <table style="width: 100%; border-collapse: collapse; font-size: 8px;"> <tr> <td style="width: 50px;">RUN -</td> <td>- POWER</td> <td rowspan="10" style="border-left: 1px solid black; border-right: 1px solid black; text-align: center; vertical-align: middle;">ERROR</td> </tr> <tr> <td>PC -</td> <td>- MNG</td> </tr> <tr> <td>REMOTE -</td> <td>- S.MNG</td> </tr> <tr> <td>DUAL -</td> <td>- D.LINK</td> </tr> <tr> <td>SW.E -</td> <td>- T.PASS</td> </tr> <tr> <td>M/S.E -</td> <td></td> </tr> <tr> <td>PRM.E -</td> <td>- CPU R/W</td> </tr> <tr> <td>CRC -</td> <td>- CRC</td> </tr> <tr> <td>OVER -</td> <td>- OVER</td> </tr> <tr> <td>AB.IF -</td> <td>- AB.IF</td> </tr> <tr> <td>TIME -</td> <td>- TIME</td> </tr> <tr> <td>DATA -</td> <td>- DATA</td> <td rowspan="10" style="border-left: 1px solid black; border-right: 1px solid black; text-align: center; vertical-align: middle;">ERROR</td> </tr> <tr> <td>UNDER -</td> <td>- UNDER</td> </tr> <tr> <td>LOOP -</td> <td>- LOOP</td> </tr> <tr> <td>SD -</td> <td>- SD</td> </tr> <tr> <td>RD -</td> <td>- RD</td> </tr> <tr> <td colspan="2" style="text-align: center;">F.LOOP</td> <td style="text-align: center;">R.LOOP</td> </tr> </table> </div>	RUN -	- POWER	ERROR	PC -	- MNG	REMOTE -	- S.MNG	DUAL -	- D.LINK	SW.E -	- T.PASS	M/S.E -		PRM.E -	- CPU R/W	CRC -	- CRC	OVER -	- OVER	AB.IF -	- AB.IF	TIME -	- TIME	DATA -	- DATA	ERROR	UNDER -	- UNDER	LOOP -	- LOOP	SD -	- SD	RD -	- RD	F.LOOP		R.LOOP	Name	Status	Contents
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		F.LOOP			R.LOOP																																				
		RUN	ON		Normal state																																				
			OFF		WDT error, SP.UNIT ERROR																																				
		PC			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.		<ul style="list-style-type: none"> <li>• Duplication of network refreshes parameters when multiple modules are mounted.</li> <li>• Inconsistency between the common and station specific parameters</li> <li>• Difference between parameter received from sub-control station and the one of the host (received from control station).</li> </ul>																																					
		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	ON	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		<ul style="list-style-type: none"> <li>• Consecutive 1s exceeding the specified number were received.</li> <li>• Length of received data is too short.</li> </ul> <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	Data being sent																																							
RD	ON	Data being received																																							

No.	Name	Contents																																															
2) *1	<b>Network number setting switch</b> 	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																																															
3) *1	<b>Group number setting Switch</b> 	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																																															
4) *1	<b>Station number setting switch</b> 	<table border="1"> <thead> <tr> <th data-bbox="555 694 718 728">Type</th> <th data-bbox="718 694 1525 728">Setting</th> </tr> </thead> <tbody> <tr> <td data-bbox="555 728 718 795">PLC to PLC network</td> <td data-bbox="718 728 1525 795">1 to 64 : Station number Other than 1 to 64 : Setting error (The SW.E. LED turns ON)</td> </tr> <tr> <td data-bbox="555 795 718 873">Remote I/O network</td> <td data-bbox="718 795 1525 873">0 : Remote master station Other than 0 : Setting error (The SW.E. LED turns ON)</td> </tr> </tbody> </table>	Type	Setting	PLC to PLC network	1 to 64 : Station number Other than 1 to 64 : Setting error (The SW.E. LED turns ON)	Remote I/O network	0 : Remote master station Other than 0 : Setting error (The SW.E. LED turns ON)																																									
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5) *1	<b>Mode setting switch</b> 	<table border="1"> <thead> <tr> <th colspan="3" data-bbox="555 907 1525 929">Mode setting (factory setting at time of shipping: 0)</th> </tr> <tr> <th data-bbox="555 929 638 963">Mode</th> <th data-bbox="638 929 949 963">Name</th> <th data-bbox="949 929 1525 963">Contents</th> </tr> </thead> <tbody> <tr> <td data-bbox="555 963 638 1030">0</td> <td data-bbox="638 963 949 1030">Online (automatic online return effective)</td> <td data-bbox="949 963 1525 1030">Data link with automatic online return effective</td> </tr> <tr> <td data-bbox="555 1030 638 1064">1</td> <td data-bbox="638 1030 949 1064">Not used (Setting to this turns on the SW.E. LED.)</td> <td data-bbox="949 1030 1525 1064"></td> </tr> <tr> <td data-bbox="555 1064 638 1097">2</td> <td data-bbox="638 1064 949 1097">Offline</td> <td data-bbox="949 1064 1525 1097">Disconnects the host station.</td> </tr> <tr> <td data-bbox="555 1097 638 1176">3</td> <td data-bbox="638 1097 949 1176">Forward loop test</td> <td data-bbox="949 1097 1525 1176">Checks the forward loop of the whole network system.</td> </tr> <tr> <td data-bbox="555 1176 638 1243">4</td> <td data-bbox="638 1176 949 1243">Reverse loop test</td> <td data-bbox="949 1176 1525 1243">Checks the reverse loop of the whole network system.</td> </tr> <tr> <td data-bbox="555 1243 638 1310">5</td> <td data-bbox="638 1243 949 1310">Station-to-station test (master station)</td> <td data-bbox="949 1243 1525 1400" 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 data-bbox="555 1310 638 1400">6</td> <td data-bbox="638 1310 949 1400">Station-to-station test (slave station)</td> </tr> <tr> <td data-bbox="555 1400 638 1500">7</td> <td data-bbox="638 1400 949 1500">Self-loopback test</td> <td data-bbox="949 1400 1525 1500">Check the hardware of a module in isolation, including the communication circuit and cables of the transmission system.</td> </tr> <tr> <td data-bbox="555 1500 638 1601">8</td> <td data-bbox="638 1500 949 1601">Internal self-loopback test</td> <td data-bbox="949 1500 1525 1601">Check the hardware of a module in isolation, including the communication circuit of the transmission system.</td> </tr> <tr> <td data-bbox="555 1601 638 1668">9</td> <td data-bbox="638 1601 949 1668">Hardware test</td> <td data-bbox="949 1601 1525 1668">Check the hardware inside the network module.</td> </tr> <tr> <td data-bbox="555 1668 638 1702">A to C</td> <td data-bbox="638 1668 949 1702">Not used</td> <td data-bbox="949 1668 1525 1702">(Do not set the mode.)</td> </tr> <tr> <td data-bbox="555 1702 638 1736">D</td> <td data-bbox="638 1702 949 1736">Test mode 8</td> <td data-bbox="949 1702 1525 1736">Network No. check (LED display)</td> </tr> <tr> <td data-bbox="555 1736 638 1769">E</td> <td data-bbox="638 1736 949 1769">Test mode 9</td> <td data-bbox="949 1736 1525 1769">Group No. check (LED display)</td> </tr> <tr> <td data-bbox="555 1769 638 1809">F</td> <td data-bbox="638 1769 949 1809">Test mode 10</td> <td data-bbox="949 1769 1525 1809">Station No. check (LED display)</td> </tr> </tbody> </table>	Mode setting (factory setting at time of shipping: 0)			Mode	Name	Contents	0	Online (automatic online return effective)	Data link with automatic online return effective	1	Not used (Setting to this turns on the SW.E. LED.)		2	Offline	Disconnects the host station.	3	Forward loop test	Checks the forward loop of the whole network system.	4	Reverse loop test	Checks the reverse loop of the whole network 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	Check the hardware of a module in isolation, including the communication circuit and cables of the transmission system.	8	Internal self-loopback test	Check the hardware of a module in isolation, including the communication circuit of the transmission system.	9	Hardware test	Check the hardware inside the network module.	A to C	Not used	(Do not set the mode.)	D	Test mode 8	Network No. check (LED display)	E	Test mode 9	Group No. check (LED display)	F	Test mode 10	Station No. check (LED display)
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		OFF	ON	OFF	ON	SW																																									
		PC	REMOTE	<input type="checkbox"/>	<input type="checkbox"/>	1																																									
		N.ST	MNG	<input type="checkbox"/>	<input type="checkbox"/>	2																																									
		PRM	D.PRM	<input type="checkbox"/>	<input type="checkbox"/>	3																																									
		STATION SIZE (8.16.32.64)		<input type="checkbox"/>	<input type="checkbox"/>	4																																									
		LB/LW SIZE (2.4.6.8K)		<input type="checkbox"/>	<input type="checkbox"/>	5																																									
		—		<input type="checkbox"/>	<input type="checkbox"/>	6																																									
		—		<input type="checkbox"/>	<input type="checkbox"/>	7																																									
		—		<input type="checkbox"/>	<input type="checkbox"/>	8																																									
SW	Contents	OFF	ON																																												
1	Network type	PLC to PLC network	Remote I/O network																																												
2	Station type	Normal station	Control station																																												
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	8 stations	OFF	16 stations	ON	32 stations	ON	64 stations																																						
6	B/W number of general point	OFF	2k points	ON	4k points	OFF	6k points	ON	8k points																																						
7	[ Valid when SW3 is ON ]	OFF	2k points	OFF	4k points	ON	6k points	ON	8k points																																						
8	Not used (always off)																																														
7)	Connector	Connect the optical fiber cable.  																																													

\*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.)

Note that resetting the CPU module is not needed for mode "D" to "F".

\*2: The settings are enabled when the module is a control station in the PLC to PLC network.

## 5. Wiring

### 5.1 Precautions for Laying Optical Fiber Cables

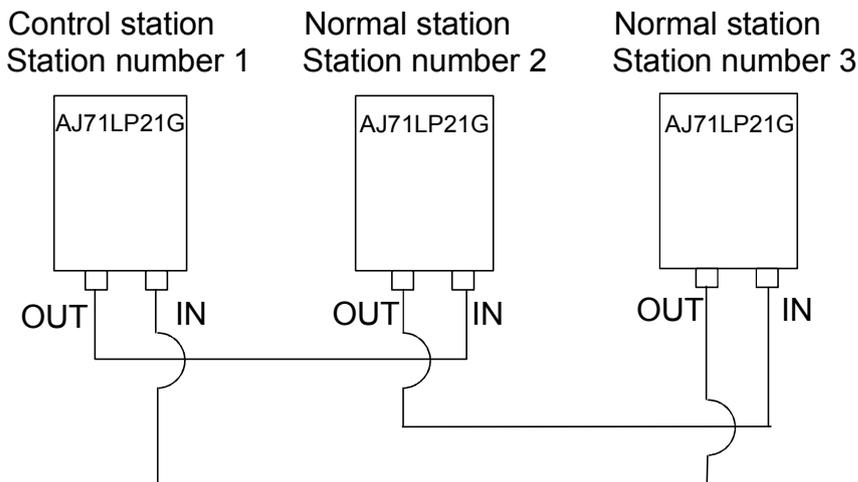
- (1) When connecting an optical fiber cable, the following restrictions on the bending radius must be observed.

Make sure of the specifications of the cable to be used.

- (2) The optical fiber cable is wired in the following manner.

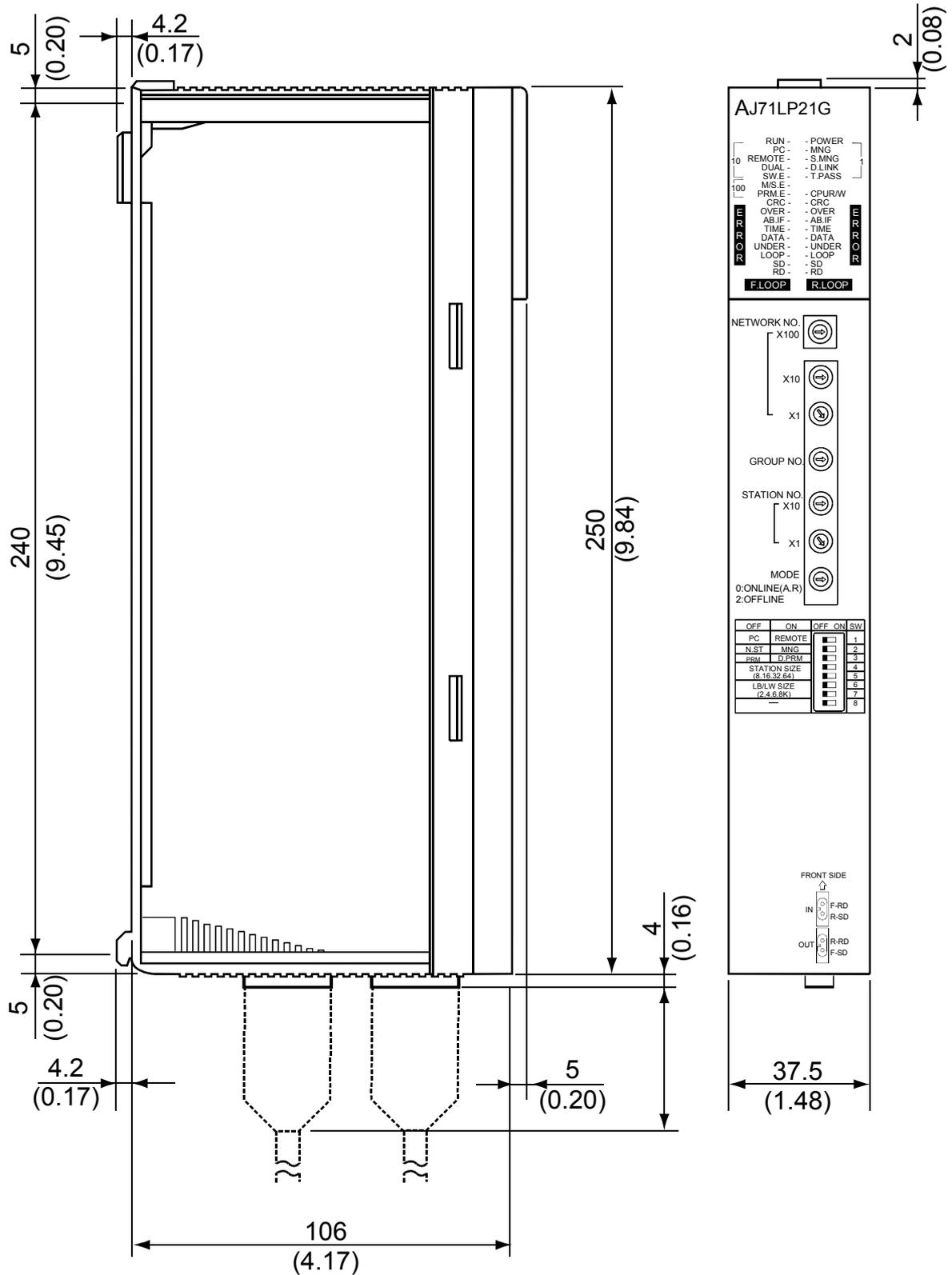
There is no problem even if not wiring in order of the station number.

There is no problem even if station how many become control station.



- (3) 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.
- (4) When attaching or detaching the optical fiber cable to/from the module, hold the cable connector securely with the hands.
- (5) Connect the cable connector and module connector securely until you hear a "click" sound.
- (6) 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.
- (7) Completely turn off the externally supplied power used in the system when connecting or disconnecting the cable.

## 6. External Dimensions



Unit: mm (in.)

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





## Warranty

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

### For safe use

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult with Mitsubishi.
- This product has been manufactured under strict quality control. However, when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.

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