MITSUBISHI

MELSECNET/10 Network Module

User's Manual

(Hardware)

AJ71LP21GE

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	AJ71LP21GE-U-E
MODEL CODE	13J813
IB(NA)-66590-D(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 AJ71LP21GE model MELSECNET/10 network module (abbreviated as Network Modules) which are used with MELSECNET/10 network system of the MELSEC-A series.

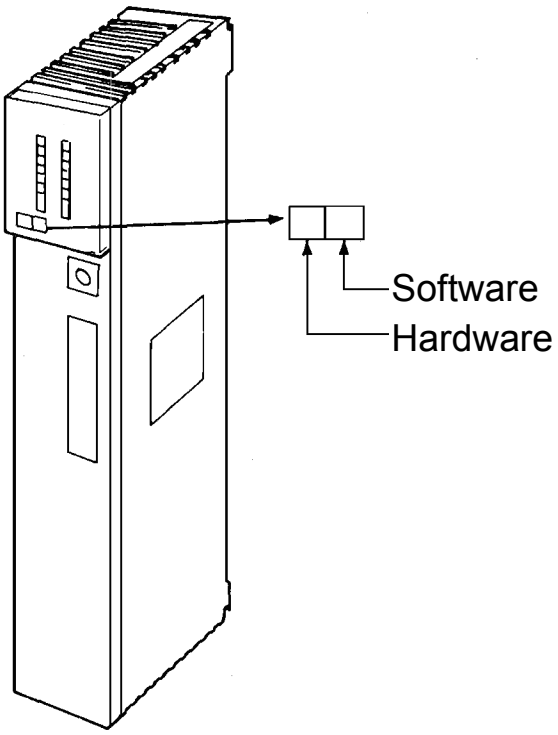
(1) The use, cable used and installation position of the Network Modules are indicated on the following chart.

	Application	Cable used		Position
		Optical fiber cable	Coaxial cable	
AJ71LP21GE	The control station, normal station and remote master station of MELSECNET/10	○ (GI-62.5/125 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
AJ71LP21GE	Model AJ71LP21GE 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

2.1 Performance specifications for the network module

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	• 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 (Station-to-station distance)		30km (2km)
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
Connection cable		GI-62.5/125 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 F 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.

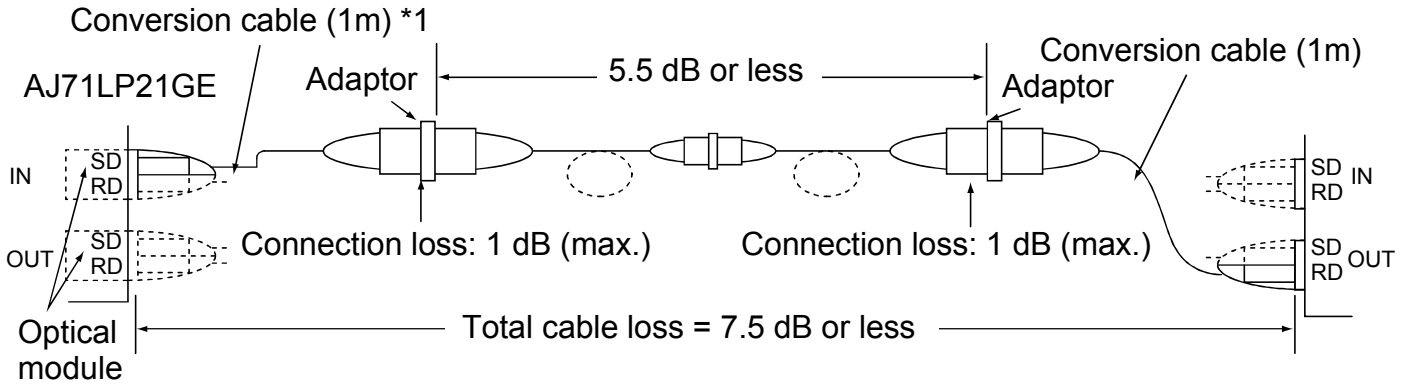
2.2 GI-62.5/125 optical fiber cable specifications

(1) Applicable cable specifications

- The specifications for the GI-62.5/125 cable are given below.
- If you prepare a GI-62.5/125 cable yourself, it must comply with the specifications indicated below.

Item	Specification
Fiber type	GI (graded index) type multimode quartz glass
Core diameter	62.5μm
Clad diameter	125μm
Transmission loss	3dB/km or less
Wave length	0.85μm
Transmission band	300 MHz km or more

(2) Cable loss



*1: Conversion cable

Conversion Type	Cable
CA type ↔ FC type	AGE-1P-CA/FC1.5M-A
CA type ↔ ST type	AGE-1P-CA/ST1.5M-A
CA type ↔ SMA type	AGE-1P-CA/SMA1.5M-A

Purchased from: Mitsubishi Electric Europe GmbH

3. Handling

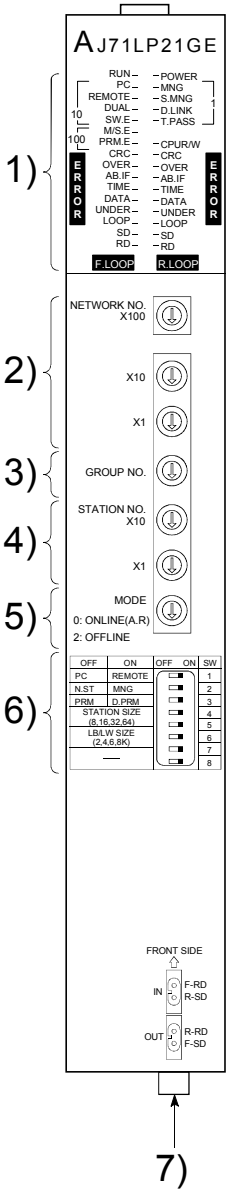
3.1 Cable length restrictions between stations

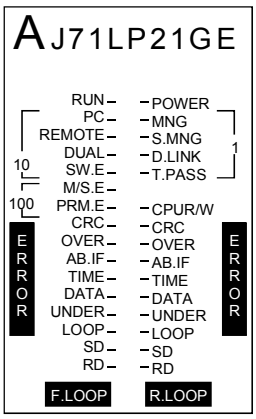
(1) The main modules case is made of plastic, so do not drop it or subject it to strong impacts.
(2) Do not dismount the printed wiring board from the case. It may damage the module.
(3) When wiring, be careful never to let foreign matter from the above module such as wiring scraps get inside the module.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

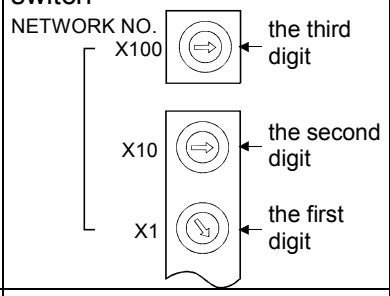
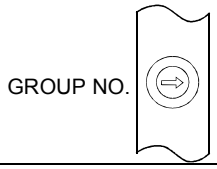
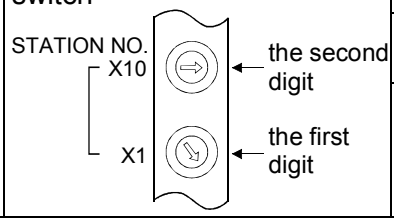
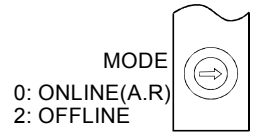
Screw Locations	Tightening Torque Range
Module installation screws (M4 screws)	78 to 118N•cm

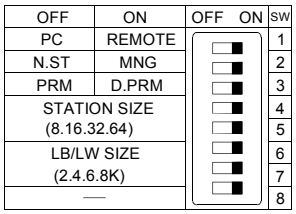
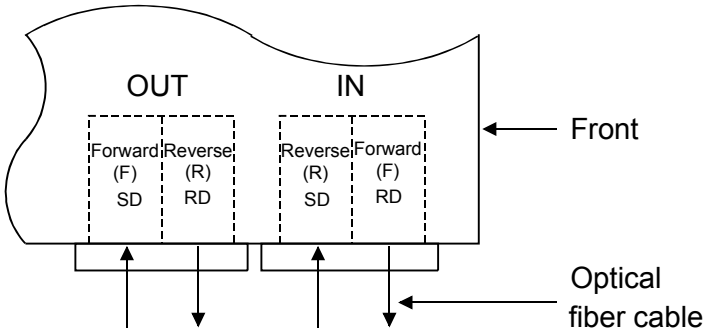
4. The Name and Setting of Each Part

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



No.	Name	Contents		
1)	LED	Name	Status	Contents
		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.		• 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	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		• 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	Data being sent
		RD	ON	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)
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</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 : Setting error (The SW.E. LED turns ON)</td></tr>
</table></td></tr>
<tr><td>5)
*1</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>
</table>

<table>
<tr><th>No.</th><th>Name</th><th>Contents</th></tr>
<tr><td>6)
*1</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="2">OFF</th><th colspan="2">ON</th></tr>
<tr><td>1</td><td>Network type</td><td colspan="2">PLC to PLC network</td><td colspan="2">Remote I/O network</td></tr>
<tr><td>2</td><td>Station type</td><td colspan="2">Normal station</td><td colspan="2">Control station</td></tr>
<tr><td>3</td><td>Use parameters</td><td colspan="2">Parameters in common</td><td colspan="2">Default Parameters</td></tr>
<tr><td>4</td><td rowspan="2">Number of stations
[Valid when SW3 is ON]</td><td>OFF</td><td>8 stations</td><td>ON</td><td>16 stations</td></tr>
<tr><td>5</td><td>OFF</td><td>OFF</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>2k points</td><td>ON</td><td>4k points</td></tr>
<tr><td>7</td><td>OFF</td><td>OFF</td><td>ON</td></tr>
<tr><td>8</td><td colspan="5">Not used (always off)</td></tr>
</table>
<table>
<tr><th>SW</th><th>Contents</th><th colspan="2">OFF</th><th colspan="2">ON</th></tr>
<tr><td>4</td><td rowspan="2">Number of stations
[Valid when SW3 is ON]</td><td>OFF</td><td>32 stations</td><td>ON</td><td>64 stations</td></tr>
<tr><td>5</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>6k points</td><td>ON</td><td>8k points</td></tr>
<tr><td>7</td><td>OFF</td><td>ON</td><td>ON</td></tr>
</table>
*2</td></tr>
<tr><td>7)</td><td>Connector</td><td>Connect the optical fiber cable.
 
</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.)
Note that resetting the CPU module is not needed for mode "D" to "F".

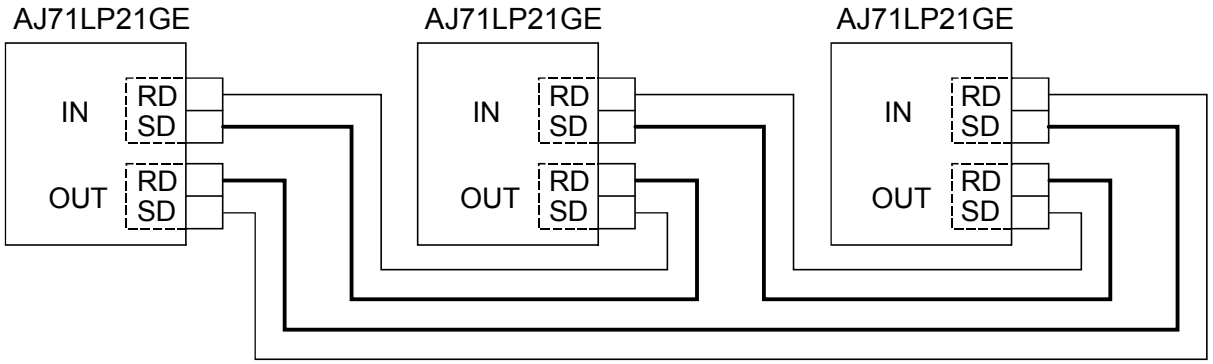
*2: The settings are enabled when the module is a control station in the PLC to PLC network.

5. Wiring

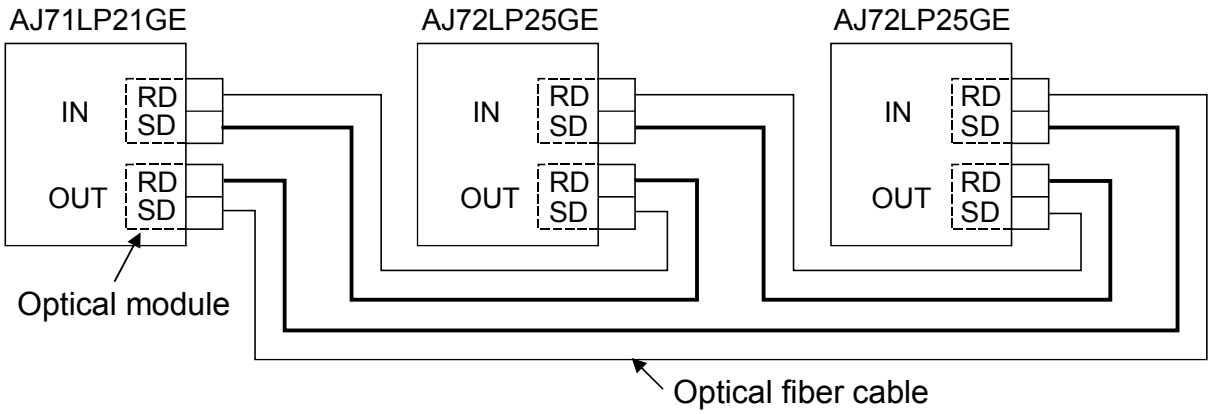
5.1 Precautions for Laying Optical Fiber Cables

(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.
(a) AJ71LP21GE-AJ71LP21GE



(b) AJ71LP21GE-AJ72LP25GE



(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.

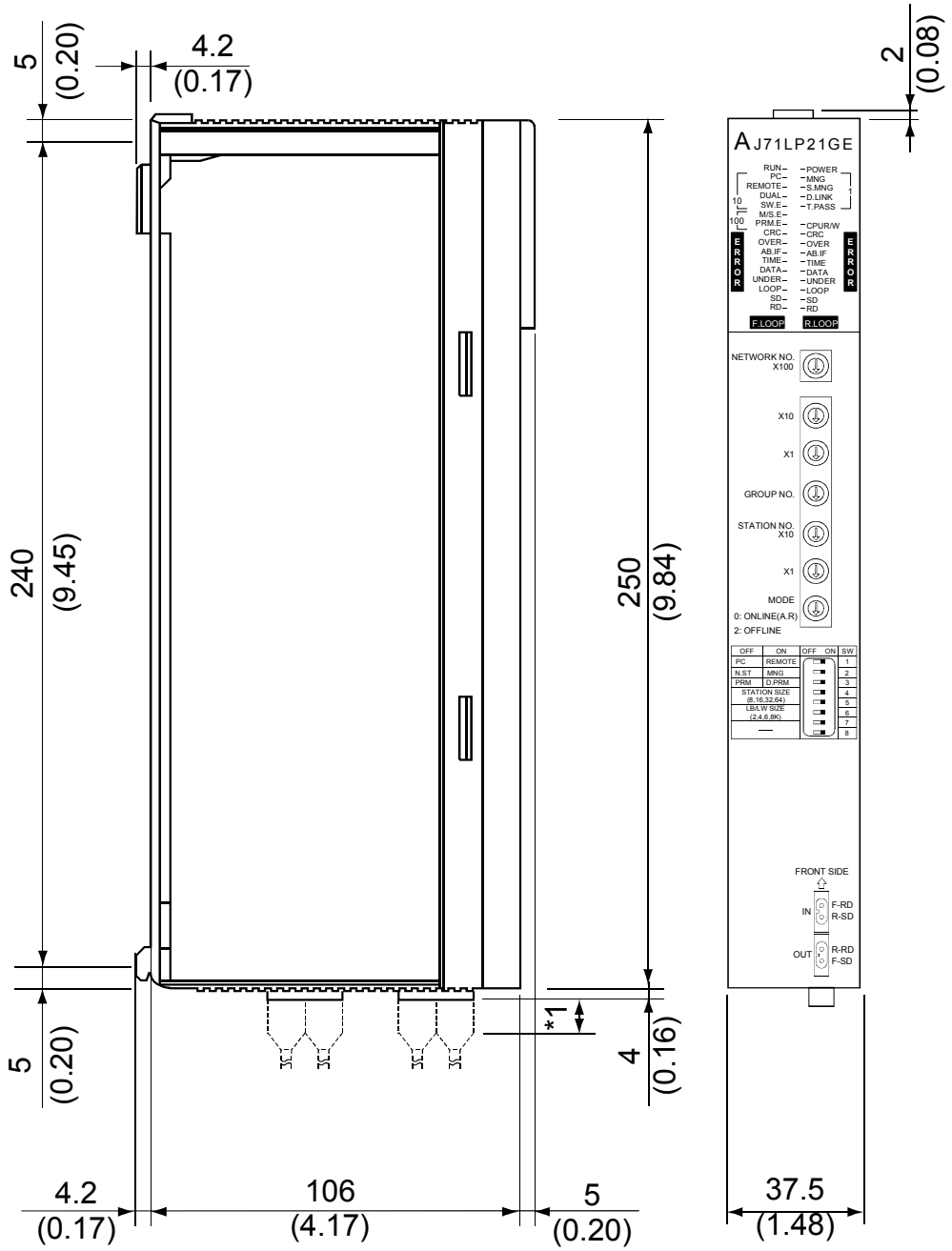
(4) When attaching or detaching the optical fiber cable to/from the module, hold the cable connector securely with the hands.

(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.

Country/Region	Sales office/Tel
U.S.A	Mitsubishi Electric Automation Inc. 500 Corporate Woods Parkway Vernon Hills, IL 60061, U.S.A. Tel : +1-847-478-2100
Brazil	MELCO-TEC Rep. Com.e Assessoria Tecnica Ltda. Rua Correia Dias, 184, Edificio Paraiso Trade Center-8 andar Paraiso, Sao Paulo, SP Brazil Tel : +55-11-5908-8331
Germany	Mitsubishi Electric Europe B.V. German Branch Gothaer Strasse 8 D-40880 Ratingen, GERMANY Tel : +49-2102-486-0
U.K	Mitsubishi Electric Europe B.V. UK Branch Travellers Lane, Hatfield, Hertfordshire., AL10 8XB, U.K. Tel : +44-1707-276100
Italy	Mitsubishi Electric Europe B.V. Italian Branch Centro Dir. Colleoni, Pal. Perseo-Ingr.2 Via Paracelso 12, I-20041 Agrate Brianza., Milano, Italy Tel : +39-039-60531
Spain	Mitsubishi Electric Europe B.V. Spanish Branch Carretera de Rubi 76-80, E-08190 Sant Cugat del Valles, Barcelona, Spain Tel : +34-93-565-3131
France	Mitsubishi Electric Europe B.V. French Branch 25, Boulevard des Bouvets, F-92741 Nanterre Cedex, France TEL: +33-1-5568-5568
South Africa	Circuit Breaker Industries Ltd. Private Bag 2016, ZA-1600 Isando, South Africa Tel : +27-11-928-2000

Country/Region	Sales office/Tel
Hong Kong	Mitsubishi Electric Automation (Hong Kong) Ltd. 10th Floor, Manulife Tower, 169 Electric Road, North Point, Hong Kong Tel : +852-2887-8870
China	Mitsubishi Electric Automation (Shanghai) Ltd. 4/F Zhi Fu Plazz, No.80 Xin Chang Road, Shanghai 200003, China Tel : +86-21-6120-0808
Taiwan	Setsuyo Enterprise Co., Ltd. 6F No.105 Wu-Kung 3rd.Rd, Wu-Ku Hsiang, Taipei Hsine, Taiwan Tel : +886-2-2299-2499
Korea	Mitsubishi Electric Automation Korea Co., Ltd. 1480-6, Gayang-dong, Gangseo-ku Seoul 157-200, Korea Tel : +82-2-3660-9552
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