

# MITSUBISHI

PROGRAMMABLE CONTROLLER

# MELSEC-A

User's Manual

## GI Cable Correspondence Network Module type AJ71LP21G (Hardware)

### INTRODUCTION

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



IB (NA) 66579 A

The United States	Mitsubishi Electronics America, Inc. (Industrial Automation Division) 800 Biermann Court, Mt Prospect IL 60058 Phone: (708)298 9223
Canada	Mitsubishi Electric Sales Canada, Inc. (Industrial Automation Division) 4299 14th Avenue, Markham Ontario L3R 0J2 Phone: (416)475 7728
United Kingdom	Mitsubishi Electric UK Ltd. (Industrial Sales Division) Travellers Lane, Hatfield Herts AL10 8XB Phone: (0707)276100
Germany	Mitsubishi Electric Europe GmbH (Industrial Automation Division) Gothaer Strasse 8, Postfach 1548 D 4030 Ratingen 1 Phone: (02102)4860
Taiwan	Setuwo Enterprise Co., Ltd. (106) 11th Fl, Chung Ling Bldg 363, Sec 2 Fu Hsing S Rd, Taipei, Taiwan R.O.C. Phone: (02)732 0161
Hongkong (& China)	Ryoden International Ltd. (Industrial & Electrical Controls Division) 10/F Manulife Tower 169 Electric Rd North Point Hong Kong Phone: 8878870
Singapore (& Malaysia)	MELCO Sales Shingapore Pte. Ltd. (Industrial Division) 307 Alexandra Rd #05 01/02 Mitsubishi Electric Bldg Singapore 0315 Phone: 4732308
Thailand	F A Tech Co. Ltd. 1138/33 34 Rama 3 Rd, Yannawa Bangkok 10120 Phone: (02)285 2861-4
Australia	Mitsubishi Electric Australia Pty Ltd (Industrial Controls Division) 348 Victoria Rd, Rydalmere N S W 2116 Phone: (02)684 7200
Republic of South Africa	M S A Manufacturing (Pty) Ltd (Factory Automation Division) P.O. Box 39733, Bramley Johannesburg 2018 Phone: (011)444 8080

**MITSUBISHI ELECTRIC CORPORATION**  
HEAD OFFICE: MITSUBISHI DENSO BLDG HARIKINGU-CHU TOKYO 100 JAPAN TEL: 22652 CABLE: MELCOR TOKYO  
NAOYA WORKS: 1-14, YADA-KAMATA 5, HIGASHI-KU NAGOYA JAPAN

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

IB (NA) 66579 A (9/86)MEE Printed in Japan

Specifications subject to change without notice

## 1. GENERAL DESCRIPTION

### 1 GENERAL DESCRIPTION

This manual describes the specifications and nomenclature of the AJ71LP21G type GI cable correspondence network module used for a MELSEC-A series MELSEC-NET/10 network system.

See the Reference Manual for the performance and functions of the module, except for the station-to-station distance requirement of 2 km.

#### 1.1 Rated Manual

- MELSECNET/10 Network system (PC to PC network) Reference Manual (IB-66440)
- MELSECNET/10 Network system (Remote I/O network) Reference Manual (SH-3509)

## 2. PERFORMANCE SPECIFICATIONS

### 2 PERFORMANCE SPECIFICATIONS

The following table shows the performance specifications of the AJ71LP21G.

Item		Description
Maximum number of link points per network	LX/LY	8192 points
	LB	8192 points
	LW	8192 points
Maximum number of link points per station	In PC-to-PC network	$\left(\frac{LB+LY}{8} + (2 \times LW)\right) \leq 2000$ bytes
	In remote I/O network	<ul style="list-style-type: none"> <li>• Master station → Remote I/O station</li> <li><math>\left(\frac{LB+LY}{8} + (2 \times LW)\right) \leq 1600</math> bytes</li> <li>• Remote I/O station → Master station</li> <li><math>\left(\frac{LB+LX}{8} + (2 \times LW)\right) \leq 1600</math> bytes</li> </ul>
Communication speed	10 MBPS (20 MBPS multiple transmission)	
Communication method	Token ring method	
Synchronization system	Frame synchronization	
Transmission channel type	Duplex loop	
Overall extension distance	30 km	
Distance station to-station	2 km	
Maximum number of networks	255 (total number of PC-to-PC and remote I/O networks)	
Maximum number of groups	9 (PC-to PC networks only)	
Number of stations connectable per network	In PC-to-PC network	64 stations (control station 1 normal station: 63)
	In remote I/O network	65 stations (master station: 1; remote I/O station: 64)
Maximum number of modules installed per CPU	AnUCPU : 4 Other than AnUCPU : 1 (A0J2/A0J2HCPU cannot be installed)	
Coding system	NRZI coding (Non Return to Zero Inverted)	
Transmission format	Conforms to HDLC (frame format)	
Error control system	Retry by CRC ( $X^{15} + X^{12} + X^5 + 1$ ) and overtime	
RAS function	<ul style="list-style-type: none"> <li>• Loopback function in response to error detection and cable disconnection</li> <li>• Diagnosis function for self-station link line check</li> <li>• System down prevention by control station shift (PC to PC network only)</li> <li>• Error detection using special relays and registers</li> <li>• Network monitor and other diagnosis functions</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-50/125	
Applicable connector	CA9003S (for 2 core cable) CA9103S (for single-core cable)	
Cable transmission loss	3 dB/km or less	

Item	Description
Current consumption (5 VDC)	0.65 A
Weight kg (lb)	0.45 (0.99)
Number of occupied I/O points	32 points

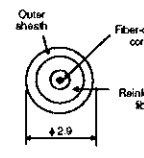
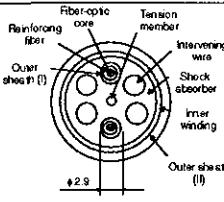
For general specifications, refer to the user's manual for the PC CPU used for the network system

### 3. GI TYPE FIBER-OPTIC CABLE SPECIFICATIONS

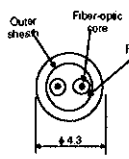
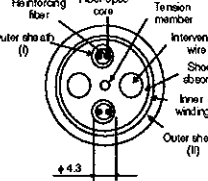
#### 3 GI TYPE FIBER-OPTIC CABLE SPECIFICATIONS

Each of the following table shows the specifications of the GI type fiber-optic cable used. Fiber-optic cables require specialized techniques and special tools for fitting the connector plugs to the cable. When purchasing connector plugs, make sure that they are compatible with the sockets.

##### (1) Single-core GI type fiber-optic cable

Item	Standard Cable for Indoor Use	Reinforced Cable for Outdoor Use
Construction		
Cable diameter	2.9 mm (0.12 in.)	13 mm (0.51 in.)
Transmission loss	Maximum 3 dB/km	
Transmission band	400 MHz/km or more	
Core diameter	50 μm GI type quartz fiber	
Clad diameter	125 μm GI type quartz fiber	
Number of cores	1 core	1 core x (1 to 4) pieces
Applicable connector	Single core fiber optic cable connector plug (CA9103S)	
Allowable bending radius	45 mm (1.77 in.) or more	130 mm (5.11 in.) or more
Allowable tensile load	20 kgf (44 lb) or less	100 kgf (200 lb) or less
Weight	8 kg/km	160 kg/km
Purchase order type	AGS-2P-[ ] M-A	AGS-2P-[ ] M [ ] D

##### (2) 2-core GI type fiber-optic cable

Item	Standard Cable for Indoor Use	Reinforced Cable for Outdoor Use
Construction		
Cable diameter	4.3 mm (0.17 in.)	14 mm (0.55 in.)
Transmission loss	Maximum 3 dB/km	
Transmission band	400 MHz/km or more	
Core diameter	50 μm GI type quartz fiber	
Clad diameter	125 μm GI type quartz fiber	
Number of cores	2 core	2 core x (1 to 4) pieces
Applicable connector	2 core fiber optic cable connector plug (CA9003S)	
Allowable bending radius	45 mm (1.77 in.) or more	140 mm (5.83 in.) or more
Allowable tensile load	20 kgf (44 lb) or less	150 kgf (300 lb) or less
Weight	15 kg/km	170 kg/km
Purchase order type	AG 2P [ ] M A	AG 2P-[ ] M-[ ] D

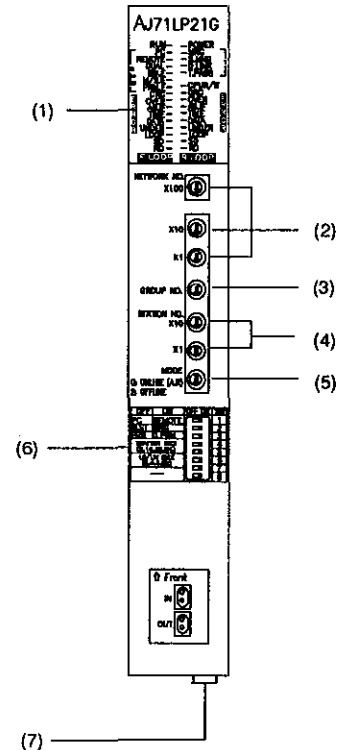
\* Enter the following value in [ ] of the purchase order type

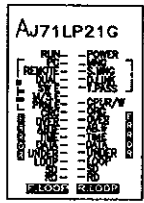
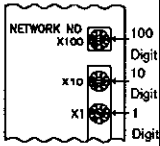
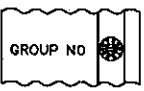
- Standard cable for indoor use Specify the cable length (unit m)
- Reinforced cable for outdoor use Specify the cable length (unit m) and the number of single- or 2-core cords  
Example Two 30-m-long (98.43 ft) 2-core cords : AG-2P-30M-2D

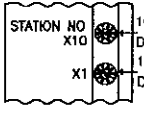
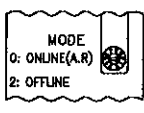
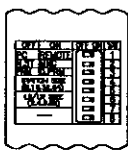
### 4. NOMENCLATURE AND SETTING

#### 4 NOMENCLATURE AND SETTING

This section gives the names of each part of the AJ71LP21G and explains their settings.



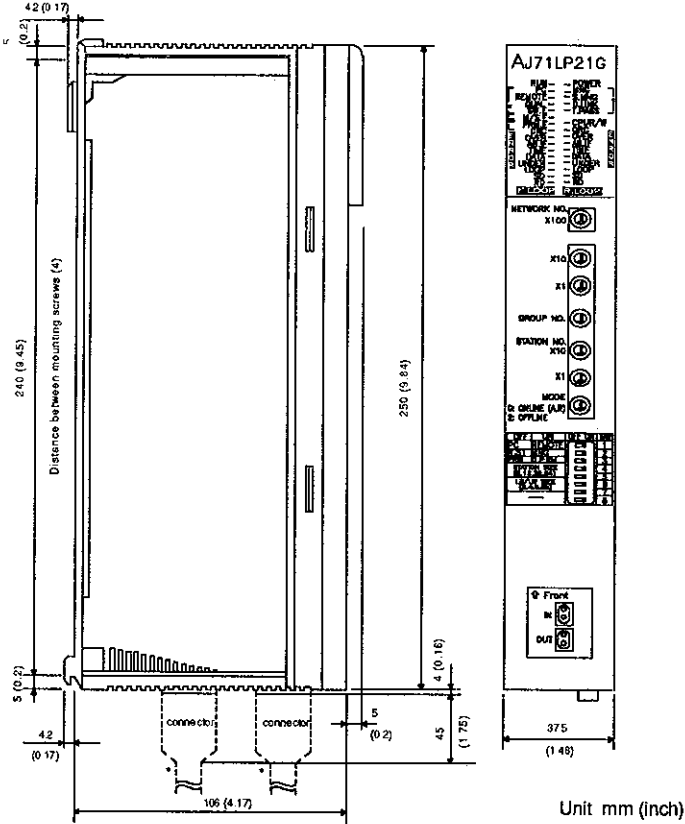
No	Name	Description
(1)	<b>LED</b> 	<b>RUN</b> When the module is normal On When a WDT error, SP, and UNIT ERROR occurs: Off
		<b>PC</b> When PC to-PC network is set On (SW1 off)
		<b>REMOTE</b> When remote I/O network is set: On (SW1 on)
		<b>DUAL</b> During duplex transmission: On
		<b>SW E</b> When settings of switches (2) to (6) are incorrect On
		<b>M/S E</b> When two or more stations have the same number or two or more control stations exist in the same network On
		<b>PRM E</b> On occurrence of a common parameter/station specific parameter matching error, and when parameters received from a sub control station do not match self-station parameters: On
		<b>POWER</b> When power is supplied: On
		<b>MNG</b> When a control or master station is set: On When normal stations are set: Off
		<b>S MNG</b> After shift to a sub control station: On
		<b>D LINK</b> During data link On
		<b>T PASS</b> When taking part in baton passing (during transient transmission): On
		<b>CPU R/W</b> During CPU communication: On
		<b>CRC</b> When there is a code check error in the received data: On <Cause> Timing when the station that is sending data to a specific station is set off line, hardware fault, cable fault, noise etc
		<b>OVER</b> When an error occurs due to delay in processing of received data On <Cause> Hardware fault, cable fault, noise etc
		<b>AB IF</b> When the number of "1"s received in succession exceeds the specified number, or when an error occurs due to short data length of received data On <Cause> Timing when the station that is sending data to a specific station is set off line, WDT setting too short, cable fault, noise, etc
		<b>TIME</b> When an error occurs when the data link monitoring timer operates: On <Cause> Short WDT time, cable fault, noise, etc
		<b>DATA</b> When an error occurs due to receipt of more than 2 Kbytes of data: On <Cause> Cable fault noise etc
		<b>UNDER</b> When an error occurs due to internal processing of sent data at irregular intervals: On <Cause> Hardware fault
		<b>LOOP</b> Lights on occurrence of a forward/reverse loop error <Cause> Power OFF at adjacement station, cable break cable not connected, etc
<b>SD</b> During data transmission: On		
<b>RD</b> During data reception: On		
(2) *1	<b>Network number setting switch</b> 	<b>Network number setting (setting on delivery 1)</b> <Setting range> 1 to 255 Any number out of the range will result in an error (the SW E LED comes on)
(3) *1	<b>Group number setting switch</b> 	<b>Group number setting (setting on delivery 0)</b> <Setting range> 0 to 9 The number "0" means that no group is specified (This setting is not required for a remote I/O network)

No	Name	Description																																																		
(4) *1	<b>Station number setting switch</b> 	<b>Station number setting (setting on delivery: 1)</b> <Setting range> For PC-to PC network 1 to 64 Any number outside the range will result in an error (the SW E LED will come on) For remote I/O network 0 (master station) Any number other than 0 will result in an error (the SW E LED will come on)																																																		
(5) *1	<b>Mode setting switch</b> 	<b>Mode setting (setting on delivery 0)</b>																																																		
		<table border="1"> <thead> <tr> <th>Mode</th> <th>Name</th> <th>Description</th> </tr> </thead> <tbody> <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>Unusable</td> <td>-----</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 line of the entire data link system</td> </tr> <tr> <td>4</td> <td>Reverse loop test</td> <td>Checks the reverse loop line of the entire data link 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>Checks 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>Checks 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>Checks the hardware inside the network module</td> </tr> <tr> <td>A</td> <td>Unusable</td> <td>-----</td> </tr> <tr> <td>B</td> <td>Unusable</td> <td>-----</td> </tr> <tr> <td>C</td> <td>Unusable</td> <td>-----</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> </tbody> </table>	Mode	Name	Description	0	Online (automatic online return effective)	Data link with automatic online return effective	1	Unusable	-----	2	Offline	Disconnects the host station	3	Forward loop test	Checks the forward loop line of the entire data link system	4	Reverse loop test	Checks the reverse loop line of the entire data link system	5	Station-to-station test (master station)	The mode for a line check between two stations, in which the station with the smaller number is regarded as the master station and the other is considered the slave station	6	Station to station test (slave station)	7	Self loopback test	Checks the hardware of a module in isolation, including the communication circuit and cables of the transmission system	8	Internal self-loopback test	Checks the hardware of a module in isolation, including the communication circuit of the transmission system	9	Hardware test	Checks the hardware inside the network module	A	Unusable	-----	B	Unusable	-----	C	Unusable	-----	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)
		Mode	Name	Description																																																
		0	Online (automatic online return effective)	Data link with automatic online return effective																																																
		1	Unusable	-----																																																
		2	Offline	Disconnects the host station																																																
		3	Forward loop test	Checks the forward loop line of the entire data link system																																																
		4	Reverse loop test	Checks the reverse loop line of the entire data link system																																																
		5	Station-to-station test (master station)	The mode for a line check between two stations, in which the station with the smaller number is regarded as the master station and the other is considered the slave station																																																
		6	Station to station test (slave station)																																																	
		7	Self loopback test	Checks the hardware of a module in isolation, including the communication circuit and cables of the transmission system																																																
		8	Internal self-loopback test	Checks the hardware of a module in isolation, including the communication circuit of the transmission system																																																
		9	Hardware test	Checks the hardware inside the network module																																																
		A	Unusable	-----																																																
		B	Unusable	-----																																																
C	Unusable	-----																																																		
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)																																																		
(6) *1	<b>Condition setting switch</b> 	<b>Operation condition setting (setting at delivery: all OFF)</b>																																																		
		<table border="1"> <thead> <tr> <th>SW</th> <th>Description</th> <th>OFF</th> <th>ON</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Network type</td> <td>PC to PC network</td> <td>Remote I/O network</td> </tr> <tr> <td>2</td> <td>Station type</td> <td>Normal station</td> <td>Control station</td> </tr> <tr> <td>3</td> <td>Used parameter</td> <td>Common parameters</td> <td>Default parameters</td> </tr> <tr> <td>4</td> <td rowspan="2">Number of stations (valid with SW3 on)</td> <td>OFF</td> <td>ON</td> </tr> <tr> <td>5</td> <td>OFF</td> <td>ON</td> </tr> <tr> <td>6</td> <td rowspan="2">Total number of B/W points (valid with SW3 on)</td> <td>OFF</td> <td>ON</td> </tr> <tr> <td>7</td> <td>OFF</td> <td>ON</td> </tr> <tr> <td>8</td> <td colspan="3">Not used (always OFF)</td> </tr> </tbody> </table>	SW	Description	OFF	ON	1	Network type	PC to PC network	Remote I/O network	2	Station type	Normal station	Control station	3	Used parameter	Common parameters	Default parameters	4	Number of stations (valid with SW3 on)	OFF	ON	5	OFF	ON	6	Total number of B/W points (valid with SW3 on)	OFF	ON	7	OFF	ON	8	Not used (always OFF)																		
SW	Description	OFF	ON																																																	
1	Network type	PC to PC network	Remote I/O network																																																	
2	Station type	Normal station	Control station																																																	
3	Used parameter	Common parameters	Default parameters																																																	
4	Number of stations (valid with SW3 on)	OFF	ON																																																	
5		OFF	ON																																																	
6	Total number of B/W points (valid with SW3 on)	OFF	ON																																																	
7		OFF	ON																																																	
8	Not used (always OFF)																																																			
(7)	<b>Connector</b>	An optical fiber cable is connected When viewed from the front of the module the closer connector is IN connector and the farther one is OUT																																																		

\*1 Reset the ACPU after changing the settings of (2), (3), (4) (5) and (7) with the ACPU power on  
However, if the mode setting switch (5) is set to one of the modes "D" through "F", it is not necessary to reset the ACPU

\*2 The switches need not be set when a remote I/O network is configured (SW1 on)

## 5. OUTSIDE DIMENSIONS



Unit mm (inch)

\*Take the bending radius of the cable into account

### REVISIONS

A	
Jul., 1995	

### IMPORTANT

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

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

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

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