MITSUBISHI

PROGRAMMABLE CONTROLLER

MELSEC-A

User's Manual

GI-62.5/125 Cable Correspondence Network Module type A1SJ71LP21GE (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.

Model	A1SJ71LP21GE-U-E
Part Number	13J886

🔶 **MITSUBISHI ELECTRIC**

IB (NA)66739 -A

Cautions on Safety

(Read these precautions before using)

When using a MELSEC-A series PC, you are requested to read the manuals supplied with each product and the related manuals cited in these manuals, and also pay due attention to safety and handle the product correctly. The cautions in this cautions on safety are classified into two ranks, "DANGER" and "CAUTION", according to their importance.
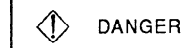
🔶 **DANGER** — A warnig given when improper operation could result in a dangerous situation causing death or serious injuries.
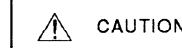
⚠ **CAUTION** — A caution given when improper operation could result in a dangerous situation causing moderate or injuries, and physical damage to the module, etc.

Even failure to observe a caution marked ! CAUTION may bring about a serious accident depending on the situation. Do not fail to follow the cautions.
Retain this manual for consultation whenever necessary, and provide a copy to the end user.

[Cautions on Design]

🔶 **DANGER**

● Provide safety circuits external to the PC to ensure that the system as a whole will function safely even in the event of an external power supply fault or PC failure. Otherwise there will be a danger of accidents due to erroneous outputs and malfunctions.

(1) Construct emergency stop circuits, protective circuits, interlock circuits for mutually exclusive operations such as forward/reverse rotation, interlock circuits to prevent mechanical damage at upper and lower stroke limits in positioning, etc., external to the PC.

(2) When the PC detects the following faults, it stops operation and turns all outputs OFF.
  ● Actuation of the overcurrent protection device or overvoltage protection device of a power supply module.
  ● Detection of a fault such as a WDT error by the PC CPU.
  In the event of faults that cannot be detected by the PC CPU, such as those in the input control section, all outputs may come ON. Configure the system with external failsafe circuits to ensure that the machine will operate safely if this happens.
  For an example of a failsafe circuit, refer to the CPU module User's Manual.

(3) Outputs may stay continuously ON or continuously OFF if the relays or transistors of an output module fail. Provide external circuits to monitor those output signals whose disruption could cause serious accidents.

● Configure the circuit so that the external power supply is switched on after the PC power supply.
If the external power supply is switched on first, there will be a danger of accidents due to erroneous outputs and malfunctions.

● When there is a communication fault in the data link system, the following happens at the faulty station. Using the communications status information, create an interlock circuit in the sequence program to ensure that the system will operate safely despite such faults.

(1) The data link data that existed before the fault is retained.

(2) All outputs of MELSECNET (II,/B,/10) remote I/O stations go OFF.

(3) At MELSECNET/MINI-S3 remote I/O stations, either output statuses are latched in accordance with the E.C. mode setting, or all outputs go OFF.

For details on the method for confirming the faulty station and the operating status when a communication fault occurs, see the manual for the relevant data link.

⚠ **CAUTION**

● Do not bundle the control wire and the communication cable with the main circuit or power line or keep them close to one another.
Keep the control wire and the communication cable at least 100 mm away from the main circuit or power line: otherwise, noise or malfunctions will occur.

[Cautions on Installation]

⚠ **CAUTION**

● Use the PC in the environment specified in the General Specifications section in this manual.
Using it in an environment which does not meet the general specifications could cause electric shock, fire or malfunctions, and damage or deterioration of the module.

● Connect extension cables with the base unit and module connectors securely. After making the connections, check them for looseness.
Loose contacts can cause erroneous inputs and outputs.

● Do not directly touch the electrically conductive areas and electronic parts. Direct touch can cause malfunctions and failure of the module.

● Install the module by securely inserting the module clamp hook under the module to the hole in the base unit, then tighten the module clamp screws at the specified torque.
If the module is not correctly installed and clamped securely with the screws, it could cause malfunctions, failure, and fall of the module.

[Cautions on Wiring]

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● Always switch off all power supply phases externally before attempting installation or wiring work.
If all power supply phases are not switched off, there will be a danger of electric shock or damage to the product.

● After completing installation or wiring work, be sure to fit the terminal cover provided as an accessory before supplying power or attempting operation.
If the terminal cover is not fitted there will be a danger of electric shock.

⚠

● Ground the FG and LG terminal using third class grounding or higher exclusively for the PC. If you do not, the PC will malfunction.

● Before connecting wires to the PC, check the rated voltage and the terminal arrangement. Connecting power of a different voltage or wiring incorrectly will result in fire or failure.

● Do not connect the outputs of multiple power supply modules in parallel. The power supply modules could overheat, catch fire, or fail.

● Tighten the terminal screws to the specified torque. Loose terminal screws will cause a short, fire or malfunctions.

● Take all possible measures to prevent chips or wire scraps from entering the module. Entry of foreign material will cause fire, failure of malfunctions.

● Crimp, pressure weld, or correctly solder connectors for external connections, using the correct tools.
For details on crimping and pressure welding tools, refer to the User's Manual for the I/O module.
An imperfect connection could cause short circuiting, fire, or malfunction.

[Cautions on Start-Up and Maintenance]

🔶 **DANGER**

● Do not touch the terminals while they are live. This will cause malfunctions.

● Switch the power off before cleaning the module or retightening the terminal screws. If the power is left on, the module will break down or malfunction.
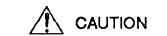
⚠ **CAUTION**

● Read the manual carefully and confirm safety before attempting operations such as program changes, forced output, RUN, STOP, PAUSE, etc., during operation. Incorrect procedure could damage the machine or cause accidents.

● Do not disassemble or tamper with the module. This will cause failure, malfunctions, injuries or fire.

● Switch the power off before installing or removing the module. If the power is left on, the module will break down or malfunction.

[Cautions on Disposal]

⚠ **CAUTION**

Dispose of the module as industrial waste.

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1. GENERAL DESCRIPTION

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This manual describes the specifications and nomenclature of the A1SJ71LP21GE type GI-62.5/125 cable correspondence network module used for a MELSEC-A series MELSECNET/10 network system.
See the Reference Manual for the performance and functions of the module, except for the station-to-station distance requirement of 1.5 km.

1.1 Related 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)

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2. PERFORMANCE SPECIFICATIONS

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The following table shows the performance specifications of the A1SJ71LP21GE.

Item		A1SJ71LP21GE	
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	$\left(\dfrac{LB+LY}{8}+(2 \times LW)\right) \leq 2000$ bytes	
	In remote I/O network	● Master station → Remote I/O station $\left(\dfrac{LB+LY}{8}+(2 \times LW)\right) \leq 1600$ bytes ● Remote I/O station → Master station $\left(\dfrac{LB+LY}{8}+(2 \times LW)\right) \leq 1600$ bytes	
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	
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		A2ASCPU(S1): 4 Other than A2ASCPU(S1): 1	
Coding system		NRZI coding (Non Return to Zero Inverted)	
Transmission format		Conforms to HDLC (frame format)	
Error control system		Retry by CRC ($X^{16} + X^{12} + X^5 + 1$) and overtime	
RAS function		● Loopback function in response to error detection and cable disconnection ● Diagnosis function for self-station link line check ● System down prevention by control station shift (PC-to-PC network only) ● Error detection using special relays and registers ● Network monitor and other diagnosis functions	
Transient transmission		● N: N communication (monitor, program upload/download, etc.) ● ZNRD/ZNWR instructions (N:N): AnUCPU dedicated instructions	
Connection cable		GI-62.5/125	
Applicable connector		CA9003S (for 2-core cable) CA9103S (for single-core cable)	
Cable transmission loss		3 dB/km or less	
Current consumption (5 VDC)		0.65 A	
Weight kg (lb)		0.33 (0.73)	
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

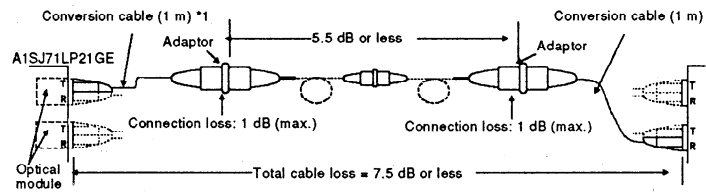## 3. GI TYPE FIBER-OPTIC CABLE SPECIFICATIONS

3.1 plicable Cable Specifications

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

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

3.2 Cable Loss

Conversion cable (1 m) *1
A1SJ71LP21GE
Adaptor — 5.5 dB or less — Adaptor
Conversion cable (1 m)
Connection loss: 1 dB (max.) Connection loss: 1 dB (max.)
Optical module
Total cable loss = 7.5 dB or less
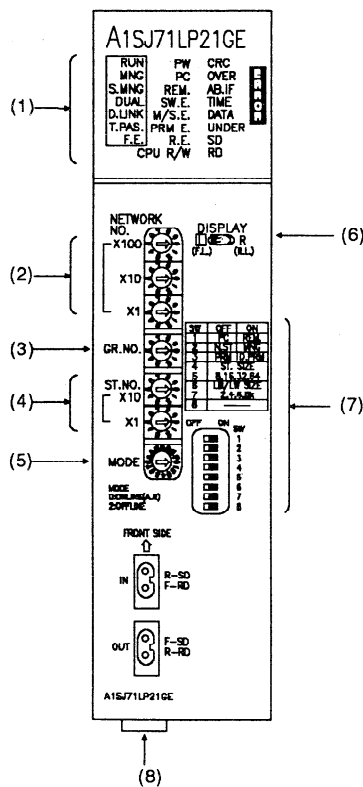
*1 Conversion cable

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

4. NOMENCLATURE AND SETTINGS

4. NOMENCLATURE AND SETTINGS

This section gives the names of each part of the A1SJ71LP21GE and explains their settings.

| No.	Name	Description	
(1)	LED	RUN	When the module is normal: On / When a WDT error occurs: Off
		MNG	When a control or master station is set: On / When normal stations are set: Off
		S.MNG	After shift to a sub-control station: On
		DUAL	During duplex transmission: On
		D.LINK	During data link: On
		T.PAS.	When taking part in baton passing (during transient transmission): On
		F.E / R.E.	When an error occurs while forward (F.E.)/reverse (R.E.) loop is faulty: On / <Cause> Power off of adjacent station, disconnected or unconnected cable, etc.
		PW	When power is supplied: On
		PC	When PC-to-PC network is set: On (SW1 off)
		REM.	When remote I/O network is set: On (SW1 on)
		SW.E.	When settings of switches (2) to (5) are incorrect: On
		M/S.E.	When two or more stations have the same number or two or more control stations exist in the same network: On
		PRM.E.	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
		CPU R/W	During CPU communication: On
		CRC	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.
		OVER	When an error occurs due to delay in processing of received data: On / <Cause> Hardware fault, cable fault, noise, etc.
		AB.IF	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.
		TIME	When an error occurs when the data link monitoring timer operates: On / <Cause> Short WDT time, cable fault, noise, etc.
		DATA	When an error occurs due to receipt of more than 2 Kbytes of data: On / <Cause> Cable fault, noise, etc.
		UNDER	When an error occurs due to internal processing of sent data at irregular intervals: On / <Cause> Hardware fault
		SD	During data transmission: On
		RD	During data reception: On
(2) *1	Network number setting switch	Network number setting (setting on delivery: 1) <Setting range> 1 to 255 Any number out of the range will result in an error (the SW.E LED comes on).
(3) *1	Group number setting switch	Group number setting (setting on delivery: 0) <Setting range> 1 to 9: Group No. The number "0" means that no group is specified. (This setting is not required for a remote I/O network.)
(4) *1	Station number setting switch	Station number setting (setting on delivery: 1) <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).

No.	Name	Description			
(5) *1	Mode setting switch	Mode setting (setting on delivery: 0)			
		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 to F	Unusable	—	
(6)	LED display selector switch	Switches the LED display.			
(7) *1	Condition setting switch	Operation condition setting (setting at delivery: all OFF)			

Condition setting switch:

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 OFF (8 stations) / ON OFF (16 stations)	OFF ON (32 stations) / ON ON (64 stations)
5			
6	Total number of B/W points (valid with SW3 on)	OFF OFF (2 K points) / ON OFF (4 K points)	OFF ON (6 K points) / ON ON (8 K points)
7			
8	Not used (always OFF)		

No.	Name	Description
(8)	Connector	An optical fiber cable is connected. Viewing the module from the front, the connectors are arranged in the following order from the front to the rear. IN R-SD (reverse loop send), IN F-RD (forward loop receive), OUT F-SD (forward loop send), OUT R-RD (reverse loop receive) Connect IN R-SD to OUT R-RD of preceding station Connect IN F-RD to OUT F-SD of preceding station Connect OUT F-SD to IN F-RD of preceding station Connect OUT R-RD to IN R-SD of preceding station

*1: Reset the ACPU after changing the settings of (2), (3), (4), (5) and (7) with the ACPU power on.

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

5. OUTSIDE DIMENSIONS

5. A1SJ71LP21GE

130 (5.12)
40 (1.54)
4.5 (0.18)
6.5 (0.26)
93.6 (3.69)
34.5 (1.36)

Connector   Connector
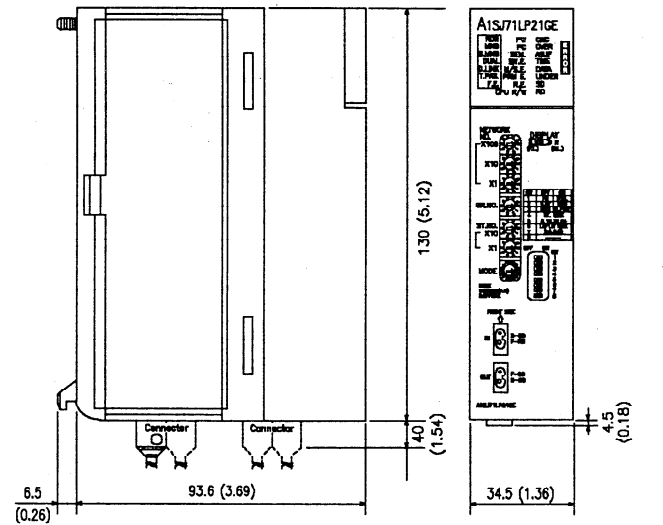
* Take account of the bending radius of the cable. (Refer to the Reference Manual.)