

mitsubishi

MELSECNET/H
Network Module

User's Manual
(Hardware)

QJ71LP21-25, QJ71LP21G
QJ71BR11

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

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

MELSEC-Q

Mitsubishi Programmable
Logic Controller

● SAFETY PRECAUTIONS ●

(Always read these instructions before using this equipment.)

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.

Precautionary notes in this manual cover only the installation of this product. For precautions on designing and discarding this product, refer to "Safety Precautions" in the MELSECNET/H Reference Manual.

For safety precautions on the PLC system, refer to the CPU User's Manual.

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



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



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 save this manual to make it accessible when required and always forward it to the end user.

[INSTALLATION PRECAUTIONS]

CAUTION

- Use the PLC in an environment that meets the general specifications contained in CPU module user's manual.
Using this PLC in an environment outside the range of the general specifications may cause electric shock, fire, malfunction, and damage to or deterioration of the product.
- Insert the module's mounting latch into the base unit's mounting cutout while pressing the module's loading lever, which is located at the bottom of the module. Improper installation may result in a malfunction or breakdown, or may cause the module to fall off.
To install the module in a place subject to strong vibration or impact, secure it with mounting.
- Tighten the screw within the range of specified torque.
Loose screws may result in malfunctioning or cause the module to fall off. If the screws are too tight, it may damage the screws, and as a result the module may malfunction or fall off.
- Switch all phases of the external power supply off when mounting or removing the module.
Not doing so may cause damage of the product.
- Do not directly touch the conductive area or electronic components of the module.
Doing so may cause malfunction or failure in the module.

[WIRING PRECAUTIONS]

DANGER

- Switch all phases of the external power supply of the whole system off when installing or placing wiring.
Not doing so may cause electric shock or damage to the product.

CAUTION

- Solder the coaxial cable's connector properly.
Improper soldering may cause the module to malfunction.
- Be careful not to let foreign matters such as sawdust or wire chips get inside the module.
These may cause fires, failure or malfunction.
- The top surface of the module is covered with protective film to prevent foreign objects such as cable offcuts from entering the module when wiring.
Do not remove this film until the wiring is complete.
Before operating the system, be sure to remove the film to provide adequate heat ventilation.
- Be sure to fix communication cables or power cables leading from the module by placing them in the duct or clamping them.
Cables not placed in the duct or without clamping 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.

CONTENTS

1. Overview.....	1
2. Performance Specifications	2
3. Handling	4
3.1 Handling Precautions	4
4. Part Identification Names.....	5
5. Wiring	7
5.1 Precautions for Laying Optical Fiber Cables	8
5.2 Precautions when Installing the Coaxial Cables	9
5.3 Connecting the Connector for the Coaxial Cable.....	10
6. External Dimensions	12

About the Manuals

The following manuals are also related to this product.
In necessary, order them by quoting the details in the tables below.

Related Manuals

Manual name	Manual No. (Model code)
Q corresponding MELSECNET/H Network System Reference Manual (PLC to PLC network)	SH-080049 (13JF92)
Q corresponding MELSECNET/H Network System Reference Manual (Remote I/O network)	SH-080124 (13JF96)
Q/QnA/Q4AR corresponding MELSECNET/10 Network System Reference Manual	IB-66690 (13JF78)

Conformation to the EMC Directive and Low Voltage Instruction

For details on making Mitsubishi PLC conform to the EMC directive and low voltage instruction when installing it in your product, please refer to Chapter 3, "EMC Directive and Low Voltage Instruction" of the PLC CPU User's Manual(Hardware).

The CE logo is printed on the rating plate on the main body of the PLC that conforms to the EMC directive and low voltage instruction

1. Overview

This manual explains how to handle the MELSECNET/H network module, model numbers QJ71LP21-25 and QJ71BR11 (hereinafter referred to as the network module).

After unpacking the network module, confirm that the following products are enclosed.

Model number	Description	Quantity
QJ71LP21-25	Model QJ71LP21-25 MELSECNET/H network module (optical link type)	1
QJ71LP21G	Model QJ71LP21G MELSECNET/H network module (optical link type)	1
QJ71BR11	Model QJ71BR11 MELSECNET/H network module (coaxial bus type)	1
	F-type connector	1

Important

The coaxial bus-type network system requires terminal resistors at both terminal stations of the network. The user should arrange for terminal resistors, since the QJ71BR11 does not come with terminal resistors.

* Terminal resistor (75 Ω)

- A6RCON-R75
- BNC-TMP-05 (75) (Manufactured by Hirose Electric Co., Ltd.)

2. Performance Specifications

The following table shows the performance specifications for the network module:

Item	Specifications		
	QJ71LP21-25		QJ71LP21G
Maximum number of link points per network		MELSECNET/H mode *1 (PLC to PLC network/ Remote I/O network)	MELSECNET/10 mode *1 (PLC to PLC network)
	LX/LY	8192 points	8192 points
	LB	19383 points	8192 points
	LW	19383 points	8192 points
Maximum number of link points per station	PLC to PLC network	$\{(LB + LY) / 2 + LW \times 2\} \leq 2000$ bytes	
	Remote I/O network	Remote master station to Remote I/O station Remote I/O station to Remote Master station $\{(LB + LY) / 2 + LW \times 2\} \leq 1600$ bytes	
Communication speed	10Mbps/25Mbps *4 (Switch changeing)		10Mbps
Communication method	Token ring		
Synchronous method	Frame synchronous method		
Transmission path format	Duplex loop		
Maximum number of networks	239		
Maximum number of groups	32		
Number of connected stations	PLC to PLC network	64 stations (control station: 1, normal station: 63)	
	Remote I/O network	65 stations (Remote master station: 1, Remote I/O station: 64)	
Overall distance	30 km (98430 ft.)		
Distance between stations *2	10Mbps	SI optical cable: 500 m (1640.5 ft.) SI type H-PCF optical cable :1 km (3281 ft.) GI type H-PCF optical cable :1 km (3281 ft.) QSI optical cable:1 km (3281 ft.)	GI optical cable: 2 km (36562 ft.)
	25Mbps	SI optical cable:200 m (656.2 ft.) SI type H-PCF optical cable :400m (1312.4 ft.) GI type H-PCF optical cable :1 km (3281 ft.) QSI optical cable:1 km (3281 ft.)	-
Connection cable	Optical fiber cable (Arranged by user *3)		
Applicable connector	2-core optical connector plug (Arranged by user *3)		
Number of I/O occupied points	32 points (I/O assignment: intelligent 32 points)		
5 VDC current consumption (A)	0.55		
External dimensions (mm (in.))	98 (3.86) (H) × 27.4 (1.08) (W) × 90 (3.54) (D)		
Weight (kg)	0.11		

*1: Mode selection is performed using network parameters.

*2: There are restrictions to the distance between stations, being determined according to the type of cable and number of stations. See sections 5.1 .

*3: 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.

*4: Only 25Mbps is MELSECNET/H mode.

Item		Specifications	
		QJ71BR11	
Maximum number of link points per network	PLC to PLC network	LX/LY	NET/10H mode: 8192 points, NET/10 mode: 8192 *1
		LB	NET/10H mode: 16383 points, NET/10 mode: 8192 *1
		LW	NET/10H mode: 16383 points, NET/10 mode: 8192 *1
	Remote I/O network	LX/LY	8192 points
		LB	16383 points
		LW	16383 points
Maximum number of link points per station	PLC to PLC network	$\{(LB + LY) / 2 + LW \times 2\} \leq 2000$ bytes	
	Remote I/O network	Remote master station to Remote I/O station Remote I/O station to Remote Master station $\{(LB + LY) / 2 + LW \times 2\} \leq 2000$ bytes	
Communication speed		10 Mbps	
Communication method		Token bus	
Synchronous method		Frame synchronous method	
Transmission path format		Single bus	
Maximum number of networks		239	
Maximum number of groups		32	
Number of connected stations		32 stations (control station: 1, normal station: 31)	
Overall distance		500 m (1640.5 ft.) (5C-2V) 300 m (984.3 ft.) (3C-2V) Can be extended to a maximum of 2.5 km (8202.5 ft.) using maximum 4 repeater modules (A6BR10, A6BR10-DC).	
Distance between stations *2		500 m (1640.5 ft.) (5C-2V) 300 m (984.3 ft.) (3C-2V)	
Connection cable		Coaxial cable Equivalent to 3C-2V, 5C-2V (Arranged by user)	
Applicable connector		BNC-P-3-Ni-CAU (For 3C-2V), BNC-P-5-Ni-CAU (For 5C-2V) Equivalent to (DDK)	
Number of I/O occupied points		32 points (I/O assignment: intelligent 32 points)	
5VDC current consumption (A)		0.75	
External dimensions (mm (in.))		98 (3.86) (H) × 27.4 (1.08) (W) × 90 (3.54) (D)	
Weight (kg)		0.11	

*1: Mode selection is performed using network parameters.

*2: There are restrictions to the distance between stations, being determined according to the type of cable and number of stations. See sections 5.2.

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

3. Handling

CAUTION

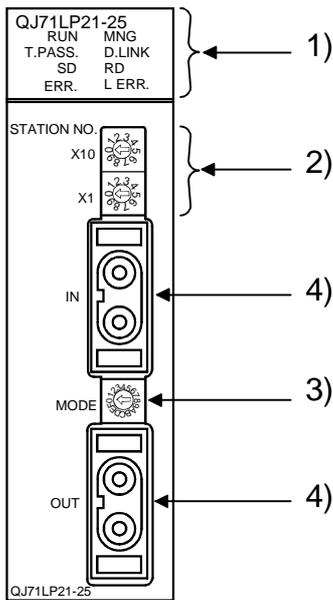
- Use the PLC in an environment that meets the general specifications contained in CPU module user's manual.
Using this PLC in an environment outside the range of the general specifications may cause electric shock, fire, malfunction, and damage to or deterioration of the product.
- Insert the module's mounting latch into the base unit's mounting cutout while pressing the module's loading lever, which is located at the bottom of the module. Improper installation may result in a malfunction or breakdown, or may cause the module to fall off. To install the module in a place subject to strong vibration or impact, secure it with mounting screws using the specified clamping torque. Loose screws may result in malfunctioning or cause the module to fall off. If the screws are too tight, it may damage the screws, and as a result the module may malfunction or fall off.
- Switch all phases of the external power supply off when mounting or removing the module.
Not doing so may cause damage of the product.
- Do not directly touch the conductive area or electronic components of the module.
Doing so may cause malfunction or failure in the module.

3.1 Handling Precautions

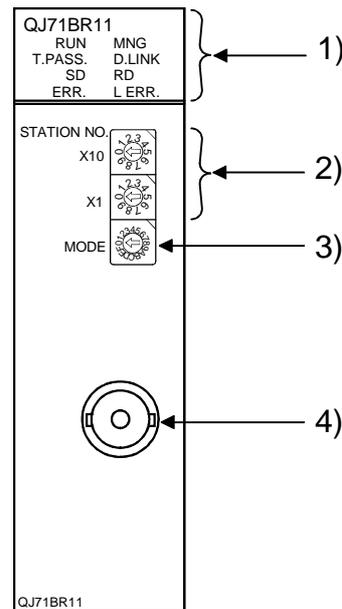
- (1) Since the module case is made of resin, do not drop it or subject it to strong impact.
- (2) The module can easily be secured to the base unit using the hooks located at the top of the module. However, if the module is to be placed in an area that is subject to strong vibration or impact, we recommend that it be secured with module mounting screws (provided by the user). In that case, tighten the module mounting screws within the following range.
Module mounting screws (M3 × 12): The range of clamping torque is 36 to 48 N·cm .

4. Part Identification Names

(a) QJ71LP21-25, QJ71LP21G



(b) QJ71BR11



Number	Name
1)	Display LED
2)	Station number setting switches

Number	Name
3)	Mode setting switch
4)	Connector

(1) Display contents for LEDs

QJ71LP21-25	
RUN <input type="checkbox"/>	<input type="checkbox"/> MNG
T.PASS <input type="checkbox"/>	<input type="checkbox"/> D.LINK
SD <input type="checkbox"/>	<input type="checkbox"/> RD
ERR. <input type="checkbox"/>	<input type="checkbox"/> L.ERR.

LED name	Display contents
RUN	On: Operating normally Off: WDT error occurred
T. PASS	On: Executing baton pass Flicker: Executing test Off: Baton pass not yet executed (host is disconnecting)
SD	On: Data being transmitted Off: Data not yet transmitting
ERR.	On: Setting error occurred Flicker: Error detected by a test Off: No setting error
MNG	On: Operating as a control station or sub control station Off: Operating as a normal station
D. LINK	On: Data link being executed Off: Data link not yet executed
RD	On: Data being received Off: Data not yet received
L. ERR.	On: Communication error occurred Off: No communication error

(2) Setting contents for each switch

(a) Station number setting switches

STATION NO.
10s unit → X10 
1s unit → X1 

Switch name	Setting content	Type	Setting range	Setting at time of shipment
Station number setting switches	Sets the station number	PLC to PLC network	QJ71LP21-25, QJ71LP21G: 1 to 64 QJ71BR11: 1 to 32 Setting error for other than the above	1
		Remote I/O network	All module 0: Remote master station Setting error for other than the above	

(b) Mode setting switch

1) QJ71LP21G, QJ71BR11

MODE 

Switch name	Setting content	Type	Setting range	Setting at time of shipment
Mode setting switch	Sets the operating mode	PLC to PLC network • Remote I/O network	0: On-line 1: Self-loopback test 2: Internal self-loopback test 3: Hardware test 4 to F: Use prohibited	0

2) QJ71LP21-25

Switch name	Setting content	Type	Setting range	Setting at time of shipment
Mode setting switch *1	Sets the operating mode	PLC to PLC network • Remote I/O network	0: On-line 1: Self-loopback test 2: Internal self-loopback test 3: Hardware test	10Mbps used
			4: On-line 5: Self-loopback test 6: Internal self-loopback test 7: Hardware test 8 to F: Use prohibited	

*1: Control station, normal station of PLC to PLC network or remote I/O network when making to online with Mode setting switch remote master station and remote I/O station is made the switch the same set.

5. External Wiring

DANGER

- Switch all phases of the external power supply of the whole system off when installing or placing wiring.
Not doing so may cause electric shock or damage to the product.

CAUTION

- Solder the coaxial cable's connector properly.
Improper soldering may cause the module to malfunction.
- Be careful not to let foreign matters such as sawdust or wire chips get inside the module.
These may cause fires, failure or malfunction.
- The top surface of the module is covered with protective film to prevent foreign objects such as cable offcuts from entering the module when wiring.
Do not remove this film until the wiring is complete.
Before operating the system, be sure to remove the film to provide adequate heat ventilation.
- Be sure to fix communication cables or power cables leading from the module by placing them in the duct or clamping them.
Cables not placed in the duct or without clamping 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.

5.1 Precautions for Laying Optical Fiber Cables

(1) The distance between stations varies depending on the type of optical fiber cable used.

(a) QJ71LP21-25

Type		Distance between stations (m)	
		10Mbps used	25Mbps used
SI optical fiber cable (Old type: A-2P-□)	L type	500 (1640.5 ft.)	200 (656.2 ft.)
	H type	300 (984.3 ft.)	100(328.1 ft.)
SI optical fiber cable		500 (1640.5 ft.)	200 (656.2 ft.)
SI type H-PCF optical fiber cable		1000 (3281 ft.)	400 (1312.4 ft.)
GI type H-PCF optical fiber cable		1000 (3281 ft.)	1000 (3281 ft.)
QSI optical fiber cable		1000 (3281 ft.)	1000 (3281 ft.)

(b) QJ71LP21G

Type	Distance between stations (m)
GI optical fiber cable	2000 (6562 ft.)

(2) When connecting an optical fiber cable, the following restrictions on the bending radius must be observed. Please confirm bending radius of the cable with the cable used.

(3) Please maintain the optical fiber cable permissible bending radius with a checking tool.

Enquiries for the checking tool for optical fiber cable bending radius maintenance are handled by Mitsubishi Electric System Service Corporation. Please contact your nearest Mitsubishi Electric System Service Corporation for detail.

(4) When laying the optical-fiber cable, do not touch the fiber core of the cable connector or module connector, or let dirt or dust collect on it.

If oil from the hands, dirt or dust should adhere to the core, the transmission loss will increase, causing a malfunction in the data link.

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

(6) Connect the cable connector and module connector securely until you hear a "click" sound.

5.2 Precautions when Installing the Coaxial Cables

(1) Between stations, use the cable length indicated in the table below according to the number of stations connected.

There is the possibility of communication errors if the cable length other than the table listed below is used.

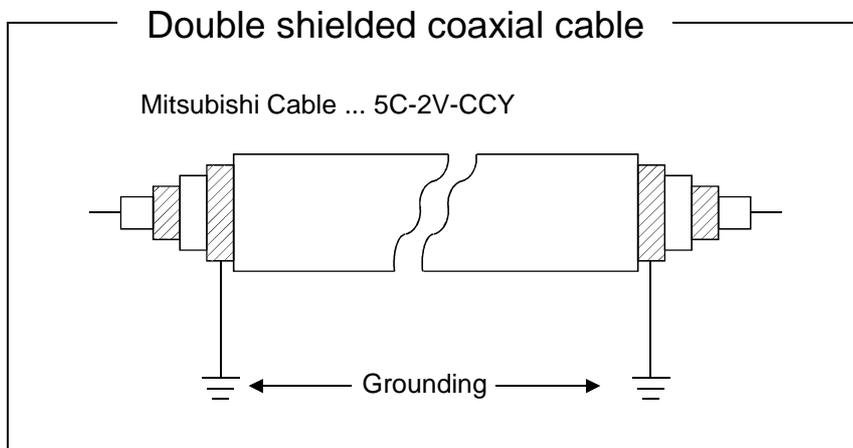
Number of stations connected	Cable length between stations	Total extension distance
2 to 9 stations	1 to 300 m (3C-2V) (3.28 to 984.3 ft.) 1 to 500 m (5C-2V) (3.28 to 1640.5 ft.)	300 m (984.3 ft.) (3C-2V)
10 to 33 stations	1 to 5 m (3C-2V, 5C-2V) (3.28 to 16.41 ft.) 13 to 17 m (3C-2V, 5C-2V) (42.65 to 55.78 ft.) 25 to 300 m (3C-2V) (82.03 to 984.3 ft.) 25 to 500 m (5C-2V) (82.03 to 164.5 ft.)	500 m (1640.5 ft.) (5C-2V)

(2) If there is the possibility of an increase in the number of stations due to system expansion, install the cables with advance consideration of the restrictions.

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

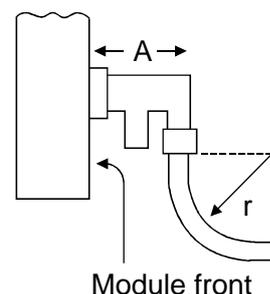
(4) Install the coaxial cables at least 100 mm (3.94 ft.) away from other power cables and control cables.

(5) Consider wiring using double-shielded coaxial cable in places that are subject to large amounts of noise.



(6) When connecting a coaxial cable, the following restrictions on the bending radius must be observed.

Cable type	Allowable bending radius r [mm (in.)]	Connector A [mm (in.)]
3C-2V	23 (0.91)	55 (2.17)
5C-2V	30 (1.18)	



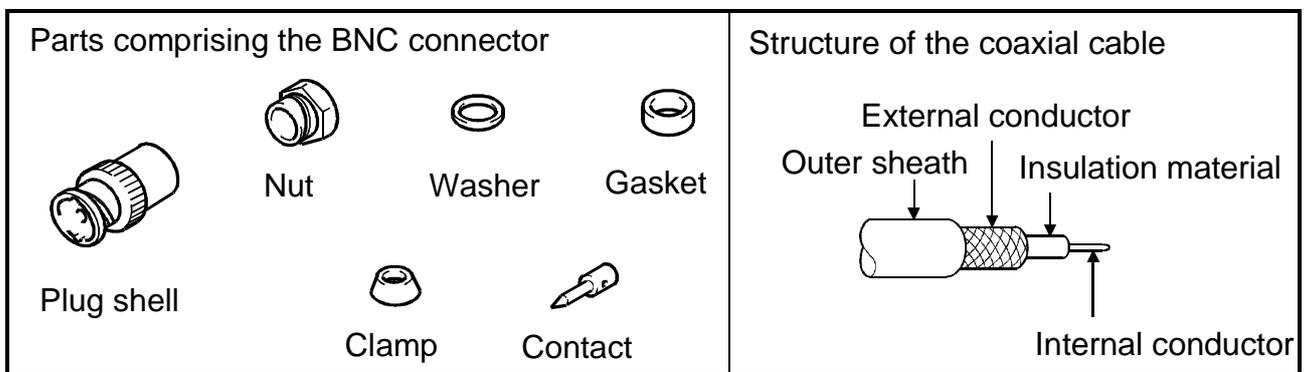
- (7) Do not pull any of the connected coaxial cables.
This will cause a faulty contact, cable disconnection, or damage to the module.
- (8) Make sure to connect a terminal resistor to both terminal stations of the coaxial bus type network system.
- (9) Depending on the usage environment, some white oxidation deposits may be seen on the F type connector. However, oxidation will not occur on the connection area, so there will be no problems with the function of the unit.

5.3 Connecting the Connector for the Coaxial Cable

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

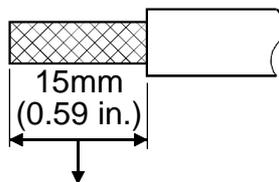
(1) Structure of the BNC connector and coaxial cable

The structure of the BNC connector and coaxial cable are shown in the figure below.



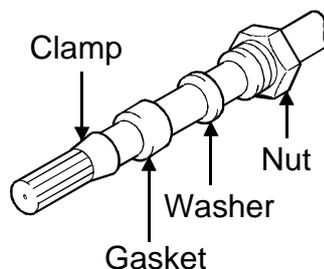
(2) How to connect the BNC connector and the coaxial cable

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

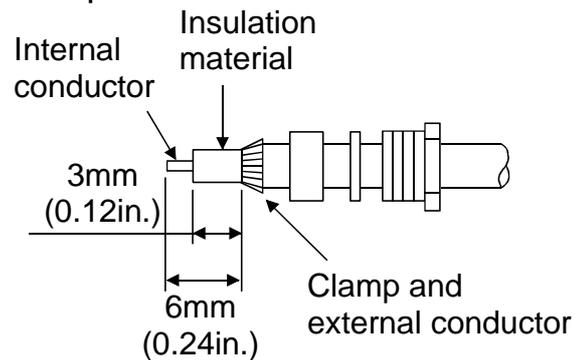


↓
Cut this portion of the outer sheath

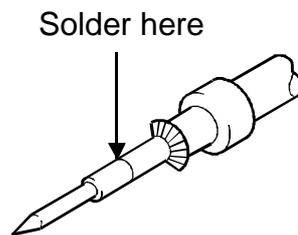
(b) Feed the nut, washer, gasket and clamp on the coaxial cable through, as shown below, then unfasten the external conductor.



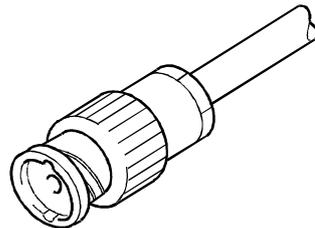
- (c) Cut the external conductor, insulation material and internal conductor to the dimensions shown below. However, cut the external conductor to the same dimension as the tapered section of the clamp and smooth it down to the clamp.



- (d) Solder the contact to the internal conductor.



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



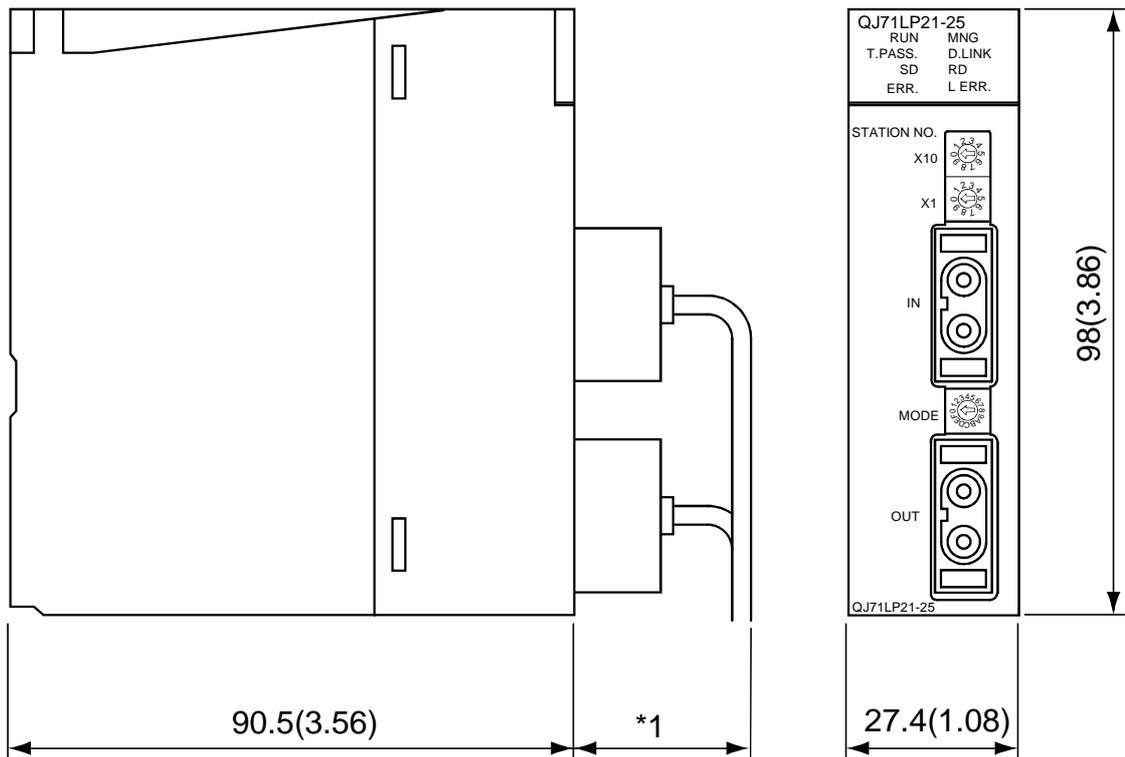
Important

Note the following precautions when soldering the internal conductor and contact.

- Make sure that the solder does not bead up at the soldered section.
- Make sure there are no gaps between the connector and cable insulator or they do not cut into each other.
- Perform soldering quickly so the insulation material does not become deformed.

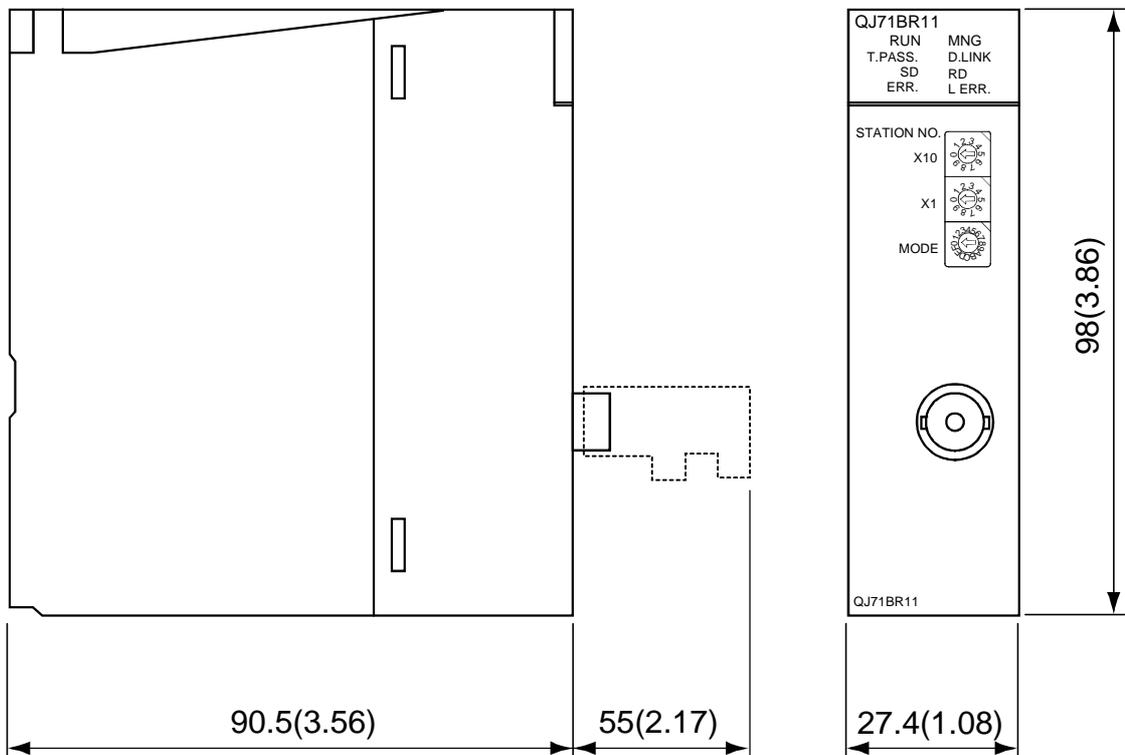
6. External Dimensions Diagram

(1) QJ71LP21-25, QJ71LP21G



*1: Please contact your nearest Mitsubishi Electric System Service Corporation for detail.
 Unit: mm (in.)

(2) QJ71BR11



Unit: mm (in.)

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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MITSUBISHI ELECTRIC CORPORATION

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