MITSUBISHI

MELSECNET/H Interface Board

User's Manual

(Hardware)

Q80BD-J71LP21-25
Q81BD-J71LP21-25
Q80BD-J71LP21S-25
Q80BD-J71LP21G
Q80BD-J71LP21GE
Q80BD-J71BR11

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

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

MODEL	MNETH-B-SW0-H
MODEL CODE	13JT27
IB(NA)-0800154-N(0805)MEE	

● SAFETY PRECAUTIONS ●

(Be sure to read these instructions before using the product.)

Before using this product, read this manual and the relevant manuals introduced in this manual carefully and handle the product correctly with full attention to safety.
Note that these precautions apply only to this product. Refer to the user's manual of the CPU module for safety precautions on programmable controller systems.
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 serere injury.
⚠CAUTION	Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

Note that failure to observe the ⚠CAUTION level instructions may also lead to serious results depending on the circumstances.
Be sure to observe the instructions of both levels to ensure personal safety.
Please keep this manual in accessible place and be sure to forward it to the end user.

[INSTALLATION PRECAUTIONS]

⚠CAUTION

- Use the MELSECNET/H board in an environment as described in the general specifications listed in this operating manual.
  If the board is used in an environment outside the ranges described in the general specifications, it may result in an electric shock, fire, malfunctioning, damage to or deterioration of the product.
- Be sure to shut off all phases of the external power supply used by the system before installing or removing the MELSECNET/H board. If all power is not turned off, this will result in failure of the MELSECNET/H board or malfunctioning.
- Securely mount the MELSECNET/H board to the PCI bus slot of the mounting device. If the MELSECNET/H board is not mounted correctly, this may lead to malfunctioning, failure or cause the board to fall.
- When mounting the MELSECNET/H board, take care not to become injured by the components that are installed or surrounding materials.
- Always make sure to touch the grounded metal to discharge the electricity charged in the body, etc., before touching the MELSECNET/H board.
  Failure to do so may cause a failure or malfunctions of the MELSECNET/H board.

[WIRING PRECAUTIONS]

⚠DANGER

- Be sure to shut off all phases of the external power supply used by the system before performing work such as installing the MELSECNET/H board and wiring. If all power is not turned off, there is a risk of electric shock or damage to the product.
- When turning on the power and operating the module after having installed the MELSECNET/H board and doing the wiring, always attach the cover for the device module in which the MELSECNET/H board is installed. There is a risk of electric shock if the module cover is not attached.

⚠CAUTION

- Solder the coaxial cable properly.
  If the soldering is incomplete, it may cause the module malfunction.
- For the communication cable, specialized skills and tools are required to connect the plug and cable. The connector plug itself is a custom part. When purchasing, consult your local Mitsubishi representative.
  If the connection is incomplete, this can result in a short, fire or malfunction.
- Be sure to fix communication cables connecting to the MELSECNET/H board by placing them in the duct or clamping them.
  Cables not placed in the duct or without clamping may be hang freely and accidentally pulled, which may cause damage to the MELSECNET/H board or cable, or malfunction due to bad cable contacts.
- When removing the cable from the MELSECNET/H board, do not pull the cable.
  Pulling the cable that is still connected to the MELSECNET/H board may cause damage to the MELSECNET/H board or cable, or malfunction due to bad cable contacts.
- Prevent foreign matter such as chips or wiring debris from getting on the MELSECNET/H board.
  Failure to do so can result in fire, breakdowns or malfunction.
- Verify the rated voltage and pin assignment of the product and connect the external power supply cable properly.
  Connecting a power supply with a different voltage rating, imperfect cable crimping or faulty wiring may cause a fire or failure.
- Use a specified tool for crimping of the cable and contacting pin. Imperfect crimping may cause malfunction.
- Verify the pin assignment and fully insert the crimped contacting pin into the connector. Imperfect insertion may cause failure or malfunction.
- Insert the wired external power supply cable into the external power supply cable connector until a click is heard. Imperfect insertion may cause failure or malfunction.

⚠ CAUTION
● Keep the external power supply cable away from the main circuit cable, power cables and/or load cables connected to other than programmable controllers. Ensure a distance of 100mm (3.94 in.) between them. Failure to do so may result in malfunction due to noise, surge or induction. ● Always ground the personal computer. Failure to do so may cause malfunction.

[Disposal Instructions]

⚠ CAUTION
● When disposing of this product, treat it as industrial waste.

Revisions

*The manual number is noted at the lower right of the top cover.

Print Date	*Manual Number	Revision
Nov., 2000	IB(NA)-0800154-A	First edition
Mar., 2001	IB(NA)-0800154-B	Model addition Q80BD-J71LP21G Correction Section 8.1
Jun., 2001	IB(NA)-0800154-C	Correction Section 7.1, Section 8.1
Feb., 2002	IB(NA)-0800154-D	Correction Chapter 3, Chapter 5
Jul., 2002	IB(NA)-0800154-E	Correction Contact address (Back cover)
Dec., 2002	IB(NA)-0800154-F	Correction SAFETY PRECAUTIONS, Section 6.2, Section 7.1, Section 7.2, Section 8.1, Chapter 9
Mar., 2004	IB(NA)-0800154-G	Correction SAFETY PRECAUTIONS, Chapter 5, Chapter 9 Addition Chapter 3, Section 4.1, Section 6.2,
Dec., 2004	IB(NA)-0800154-H	Chapter 2 was changed to Chapter 5. Chapter 3 to 5 was changed to Chapter 2 to 4 respectively. Correction Chapter 2, Chapter 4
Jun., 2005	IB(NA)-0800154-I	Model addition Q80BD-J71LP21S-25 Correction SAFETY PRECAUTIONS, Chapter 1, Chapter 2, Chapter 4, Chapter 6, Section 7.1, Chapter 8, Chapter 9, Contact address (Back cover) Addition Section 6.3

*The manual number is noted at the lower right of the top cover.

Print Date	*Manual Number	Revision
Jul., 2005	IB(NA)-0800154-J	Correction Chapter 2, Chapter 9
Jun., 2007	IB(NA)-0800154-K	Correction Section 6.1, Section 6.2
Oct., 2007	IB(NA)-0800154-L	Correction Chapter 5, Chapter 9 was changed to Chapter 8. Deletion Chapter 8
Jan., 2008	IB(NA)-0800154-M	Correction Section 3.1
May, 2008	IB(NA)-0800154-N	Model addition Q81BD-J71LP21-25 Correction Chapter 1, Chapter 2, Chapter 4, Section 6.1, Section 7.1, Section 7.2, Chapter 8

CONTENTS

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)
MELSECNET/H Interface Board User's Manual (For SW0DNC-MNETH-B) The system configuration, software package installation, uninstallation and each utility's operation method, accessible range, devices and troubleshooting are explained. (Option)	SH-080128 (13JT25)
Q corresponding MELSECNET/H Network System Reference Manual (PLC to PLC network) The MELSECNET/H network system's system configuration, performance specifications, functions, handling, wiring and troubleshooting are explained. (Option)	SH-080049 (13JF92)
Q/QnA/Q4AR corresponding MELSECNET/10 Network System Reference Manual The MELSECNET/10 network system's system configuration, performance specifications, functions, handling, wiring and troubleshooting are explained. (Option)	IB-66690 (13JF78)
A70BDE-J71QLP23/A70BDE-J71QLP23GE/ A70BDE-J71QLR13/A70BDE-J71QLR23 MELSECNET/10 Interface Board User's Manual (For SW3DNF-MNET10) The MELSECNET/10 board's system configuration, performance specifications, functions, handling, wiring and troubleshooting are explained. (Option)	IB-0800035 (13JL93)

Remarks : MELSECNET/H Interface Board User's Manual (For SW0DNC-MNETH-B) is enclosed with the CD-ROM as a set with the software package.
A printed version of the manual is available as an option.
Indicate the manual No. (Model code) when placing an order for a printed version of the manual.

1. Outline

This manual explains the methods of handling the Q80BD-J71LP21-25/Q81BD-J71LP21-25/Q80BD-J71LP21S-25/Q80BD-J71LP21G/Q80BD-J71LP21GE/ Q80BD-J71BR11 MELSECNET/H interface board (hereinafter referred to as the MELSECNET/H board). (Special models are abbreviated as Q80BD-J71LP21-25, Q81BD-J71LP21-25, Q80BD-J71LP21S-25, Q80BD-J71LP21G, Q80BD-J71LP21GE or Q80BD-J71BR11.)
The MELSECNET/H board can be used as a control station or normal station in the MELSECNET/H network system (PLC to PLC network).
The MELSECNET/H board cannot be used in the remote I/O network.
Unpack the product and confirm that the following products are enclosed.

Part name	Quantity					
	Q80BD-J71LP21-25	Q81BD-J71LP21-25	Q80BD-J71LP21S-25	Q80BD-J71LP21G	Q80BD-J71LP21GE	Q80BD-J71BR11
Type Q80BD-J71LP21-25 MELSECNET/H Interface Board	1	—	—	—	—	—
Type Q81BD-J71LP21-25 MELSECNET/H Interface Board	—	1	—	—	—	—
Type Q80BD-J71LP21S-25 MELSECNET/H Interface Board	—	—	1	—	—	—
Type Q80BD-J71LP21G MELSECNET/H Interface Board	—	—	—	1	—	—
Type Q80BD-J71LP21GE MELSECNET/H Interface Board	—	—	—	—	1	—
Type Q80BD-J71BR11 MELSECNET/H Interface Board	—	—	—	—	—	1
Connector Set (for External Power Supply Cable)	—	—	1	—	—	—
F-type Connector	—	—	—	—	—	1
MELSECNET/H Interface Board User's Manual (Hardware)	1	1	1	1	1	1
SW0DNC-MNETH-B MELSECNET/H Software Package (CD-ROM)	1	1	1	1	1	1
Software License Agreement	1	1	1	1	1	1
Software Registration Card	1	1	1	1	1	1

Important

A terminator is required at each end station of the network when using the coaxial bus type network system.
The terminator is not enclosed with the Q80BD-J71BR11, and must be prepared by the user.
Refer to section "6.2 Coaxial cable" for details on the terminator.

2. Performance Specifications

The performance specifications of the MELSECNET/H board are given below.

(1) Q80BD-J71LP21-25, Q81BD-J71LP21-25, Q80BD-J71LP21S-25, Q80BD-J71LP21G, Q80BD-J71LP21GE

Item		Specifications				
		Q80BD-J71LP21-25	Q81BD-J71LP21-25	Q80BD-J71LP21S-25	Q80BD-J71LP21G	Q80BD-J71LP21GE
Maximum links in 1 network	LX/LY	8192 Points				
	LB	16384 Points (When in the MELSECNET/10 Mode*1: 8192 Points)				
	LW	16384 Points (When in the MELSECNET/10 Mode*1: 8192 Points)				
Maximum links in 1 station		• MELSECNET/H mode, MELSECNET/10 mode*1 {(LY + LB) / 8 + (2 × LW)} ≦ 2000 bytes • MELSECNET/H Extended mode*1 {(LY + LB) / 8 + (2 × LW)} ≦ 35840 bytes				
Communications rate*1		25 Mbps / 10 Mbps			10 Mbps	
Number of stations Connected to 1 network		64 Stations (Control station: 1; Normal station: 63)				
Connection cable		Optical fiber cable				
Total extension cable length		30km (98430 ft.)				
Between stations length*2	25 Mbps	SI optical cable : 200m (656.2 ft.) H-PCF optical cable : 400m (1312.4 ft.) Broad-band H-PCF optical cable : 1km (3281 ft.) QSI optical cable : 1km (3281 ft.)			—	
	10 Mbps	SI optical cable : 500m (1640.5 ft.) H-PCF optical cable : 1km (3281 ft.) Broad-band H-PCF optical cable : 1km (3281 ft.) QSI optical cable : 1km (3281 ft.)			GI optical cable : 2km (6562 ft.)	62.5 GI opticall cable : 2km (6562 ft)
Maximum networks		239				
Maximum number of groups		32 (When in the MELSECNET/10 Mode: 9)				
Transmission channel format		Duplex loop				
Communications system		Token ring system				
Synchronization system		Frame synchronization system				
Encoding system		NRZI encoding (Non return to Zero inverted)				
Transfer format		HDLC Standard (Frame format)				
Error control system		CRC ($X^{16} + X^{12} + X^5 + 1$) and retry by overtime.				
RAS function		Automatic return function, loopback function, control station, shift of control station, etc.				
Transient transmission		N: N communications				
Special cyclic transmission		Low speed cyclic transmission				
Number of boards that can be installed		Maximum 4 boards*3				
Installation slot		PC PCI bus slot (half size)	PC PCI Express X1,X2,X4,X8,X16 Slot (half size)	PC PCI bus slot (half size)		
Exclusive slots		1 slot		2 slot	1 slot	
External power supply	Voltage	—		20.4 to 31.2 V DC	—	
	Current	—		0.16 A	—	
	Connector	—		Connector set (Accessory)	—	
	Suitable cable size	—		0.50 to 1.25 mm^2 [AWG20-16]	—	
5 V DC Internal current consumption		0.46 A	—	0.46 A	0.45 A	
3.3 V DC Internal current consumption		—	0.95A	—	—	
Weight		0.10 kg		0.20 kg	0.11 kg	

Refer to the next page for *1 to *3.

(2) Q80BD-J71BR11

Item		Specifications
		Q80BD-J71BR11
Maximum number of link points per network	LX/LY	8192 points
	LB	16384 points (During MELSECNET/10 mode[*1]: 8192 points)
	LW	16384 points (During MELSECNET/10 mode: 8192 points)
Maximum number of links per station		• MELSECNET/H mode, MELSECNET/10 mode {(LY + LB) / 8 + (2 × LW)} ≦ 2000 bytes • MELSECNET/H Extended mode {(LY + LB) / 8 + (2 × LW)} ≦ 35840 bytes
Communication speed		10Mbps/25Mbps[*2]
Number of stations connected per network		32 stations (one control stations, 31 normal stations)
Connection cable		Coaxial cable 5C-2V, 3C-2V or equivalen
Overall cable distance		500m (1640.5ft.) (5C-2V), 300m (984.3ft.) (3C-2V) The distance can be extended up to 2.5km (8202.5 ft.) by using a repeater module (A6BR10, A6BR10-DC).
Distance between stations [*2]		500m (1640.5ft.) (5C-2V), 300m (984.3ft.) (3C-2V)
Maximum number of networks		239
Maximum number of groups		32 (During MELSECNET/10 mode: 9)
Transmission path type		Single bus
Communication method		Token bus method
Synchronization method		Frame synchronization method
Coding method		NRZI coding (Non Return to Zero Inverted)
Transmission format		Manchester compliant
Error control method		CRC ($X^{16} + X^{12} + X^5 + 1$) and retry with overtime
RAS function		Automatic return function, compliant, control station shift function, etc.
Transient transmission		N:N communication
Special cyclic transmission		Low-speed cyclic transmission
Number of mountable boards		Maximum 4 boards [*3]
Mounting slot		PC PCI bus slot (half-size)
Occupied slot		1 slot
5VDC internal current consumption		0.67 A
Weight		0.11 kg

*1: The MELSECNET/H board communication speed and the mode are set with the MELSECNET/H utility.
Refer to the "MELSECNET/H Interface Board User's Manual (For SW0DNC-MNETH-B)" for details.

*2: There are some restrictions on the optical fiber cable distance between stations depending on the cable type.
For coaxial cables, some restrictions also apply depending on the cable type and the number of stations.
Refer to "6.1 Optical fiber cable" or "6.2 Coaxial cable".

*3: The number of mountable boards is the total of the MELSECNET/H boards and MELSECNET/10 boards(A70BDE-J71QLP23(GE)/A70BDE-J71QBR13/A70BDE-J71QLR23).
When using the Q80BD-J71LP21-25, Q81BD-J71LP21-25 or Q80BD-J71LP21S-25 at a communication speed of 25Mbps, errors may occur at all stations if multiple boards with the same network number are installed, or the operating systems are started up/shut down or the boards are reset simultaneously on the adjacent personal computers.
In this case, set the communication speed to 10Mbps.

3. Handling

This section explains precautions when handling the MELSECNET/H board and the installation environment.

3.1 Precautions when handling

The following are precautions to be noted when handling the MELSECNET/H board.

⚠DANGER

- While energizing, do not touch the connector. Doing so may result in electric shock or cause malfunctioning.

⚠CAUTION

- Fasten the MELSECNET/H board securely using the installation screws and tighten the installation screws securely within the specified torque range.
  If the screws are loose, this may cause malfunctioning.
  If the screws are tightened too much, this could cause damage to the screws or unit, leading to malfunctioning.
- Do not directly touch the conductive section of the MELSECNET/H board. Doing so could result in malfunctioning or breakdown of the MELSECNET/H board.
- Before handling the MELSECNET/H board, touch a grounded metal object to discharge the static electricity from the human body.
  Failure to do so may cause failure or malfunction of the MELSECNET/H board.
- Handle the MELSECNET/H board in a location where there is no static electricity.
  Static electricity could result in failure or malfunctioning.
- The MELSECNET/H board is packed in a bag for preventing static electricity. Always place the MELSECNET/H board in this bag when storing or transporting.
  Otherwise, failure or malfunctioning may result.
- Take care that foreign objects such as chips or wiring debris do not get into the PC.
  This could result in fire, breakdowns or malfunctioning.
- Do not dismantle or rebuild the MELSECNET/H board.
  This will result in failure, malfunctioning, injury or fire.
- Be sure to shut off all phases of the external power supply used by the system before installing or removing the MELSECNET/H board. If power is not turned off, there is a risk of electric shock or damage to the product.
- When disposing of the product, handle it as an industrial waste.
- Do not drop the MELSECNET/H board or subject it to strong impact.
  This will result in failure or malfunctioning of the board.

See the instruction manual provided with the Personal computer for the clamping torque of the MELSECNET/H board mounting screws.

3.2 Installation environment

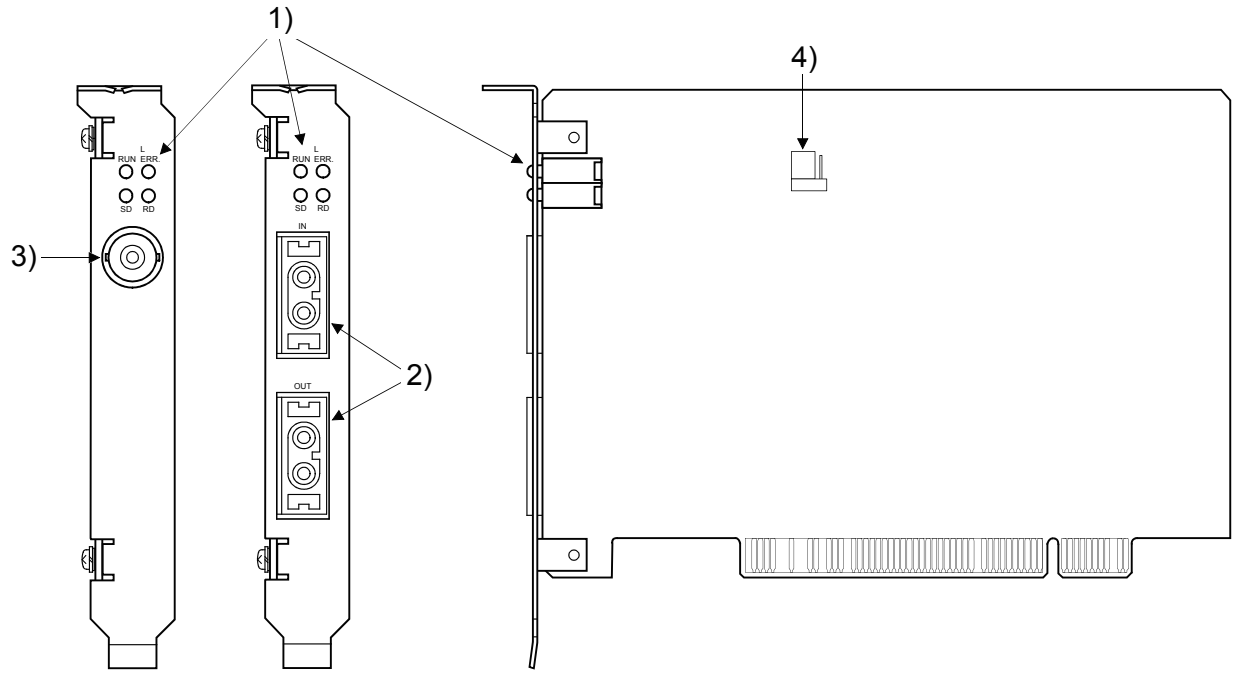
See the instruction manual accompanying the PC unit regarding installation of the PC unit in which the MELSECNET/H board is mounted.

⚠ **CAUTION**	● Always ground the PC unit using grounding type D (Class 3 grounding). Otherwise, there is the risk of malfunctioning.

4. Names of Each Part

The names of each MELSECNET/H board part are explained in this section.

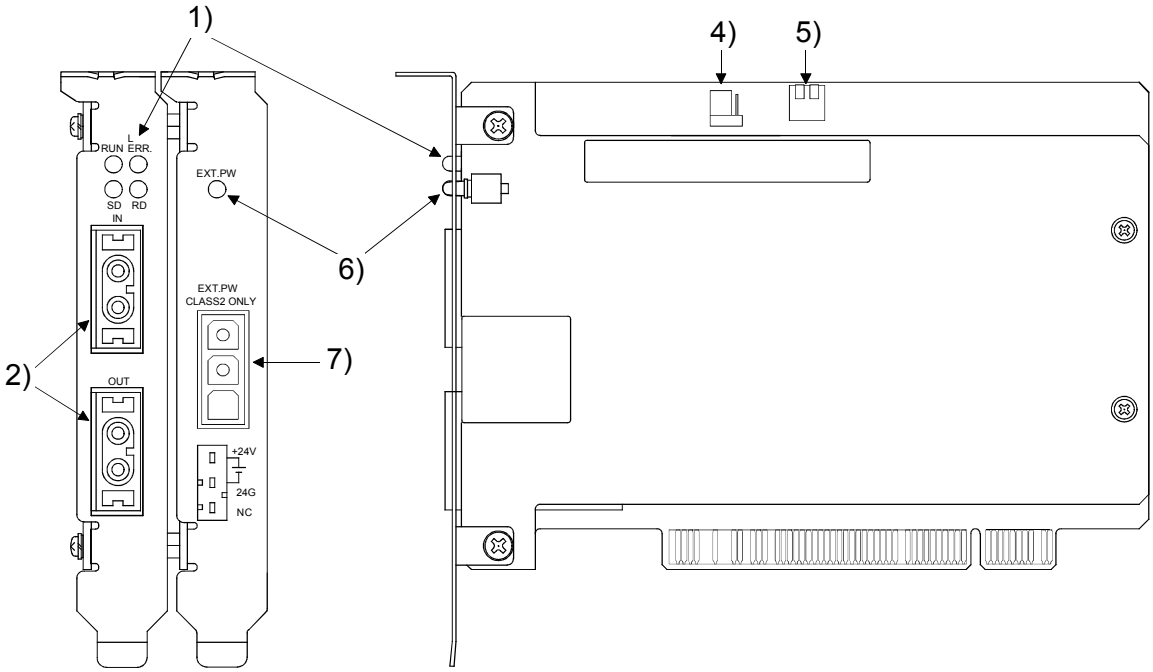
(1) Q80BD-J71LP21-25, Q81BD-J71LP21-25, Q80BD-J71LP21G, Q80BD-J71LP21GE, Q80BD-J71BR11

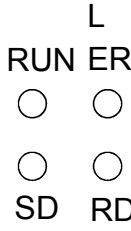


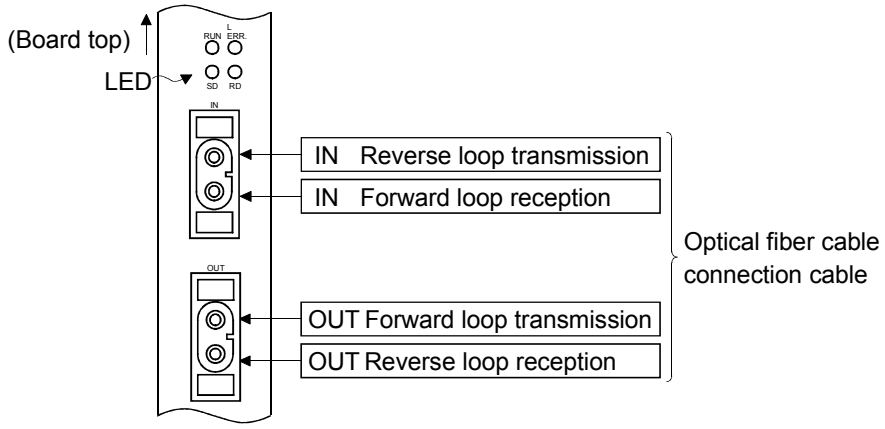
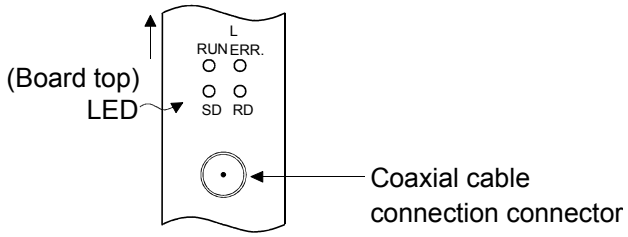
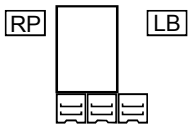
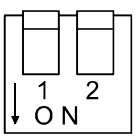
Q80BD-J71BR11

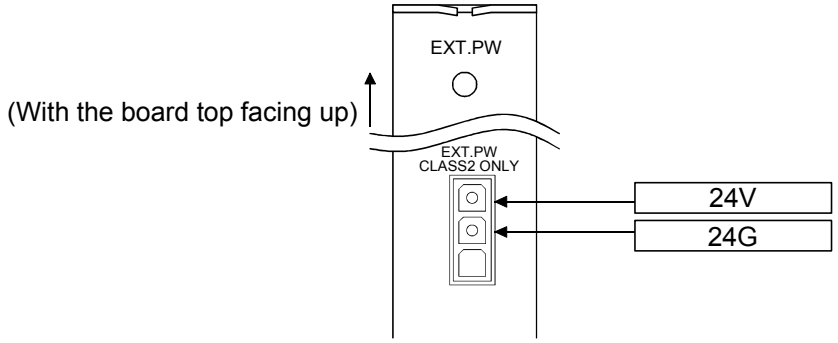
Q80BD-J71LP21-25
Q81BD-J71LP21-25
Q80BD-J71LP21G
Q80BD-J71LP21GE

(2) Q80BD-J71LP21S-25



<table>
<tr><th>Number</th><th>Name</th><th>Details</th></tr>
<tr><td>1)</td><td>Display LED
 
</td><td>This indicates the MELSECNET/H board operation status.
The LED lighting status include the normal mode and error mode.
(1) Normal mode
If a communication error, etc., occurs in the normal mode, judge the error by reading the status of the LED on the MELSECNET/H Utility's "Board Information" screen.
Refer to the "MELSECNET/H Interface Board User's Manual (For SW0DNC-MNETH-B)" for details on the " Board Information" scene's LED statuses.
<table>
<tr><th>LED name</th><th>Status</th><th>Details</th></tr>
<tr><td rowspan="2">RUN</td><td>OFF</td><td>A WDT error has occurred, or the board is being reset.</td></tr>
<tr><td>ON</td><td>The board is operating normally.</td></tr>
<tr><td rowspan="2">L ERR.</td><td>OFF</td><td>A communication error has not occurred.</td></tr>
<tr><td>ON</td><td>A communication error has occurred.</td></tr>
<tr><td rowspan="2">SD</td><td>OFF</td><td>Data has not been received.</td></tr>
<tr><td>ON</td><td>Data is being transmitted.</td></tr>
<tr><td rowspan="2">RD</td><td>OFF</td><td>Data has not been received.</td></tr>
<tr><td>ON</td><td>Data is being transmitted.</td></tr>
</table>
(2) Error mode
When the RUN LED is flickering, the LED display will change to the error mode.
If an error occurs in the error mode, check the details of the error with the Error Viewer or Event Viewer.
Refer to the "MELSECNET/H Interface Board User's Manual (For SW0DNC-MNETH-B)" for details.
<table>
<tr><th>LED name</th><th>Status</th><th>Details</th></tr>
<tr><td rowspan="2">RUN</td><td>Flicker</td><td>The error mode has been entered.</td></tr>
<tr><td>ON
OFF</td><td>No error</td></tr>
<tr><td rowspan="2">L ERR.</td><td>OFF</td><td>OS starting error has not occurred.</td></tr>
<tr><td>ON</td><td>OS starting error has occurred.</td></tr>
<tr><td rowspan="2">SD</td><td>OFF</td><td>Driver response error has not occurred.</td></tr>
<tr><td>ON</td><td>Driver response error has occurred.</td></tr>
<tr><td rowspan="2">RD</td><td>OFF</td><td>PCI bus error has not occurred.</td></tr>
<tr><td>ON</td><td>PCI bus error has occurred.</td></tr>
</table></td></tr>
</table>

Number	Name	Details
2)	Optical fiber cable connection connector	This connector is used to connect the optical fiber cable. (1) The cable terminal has the following type of configuration.  (2) Refer to the "MELSECNET/H Interface Board User's Manual (For SW0DNC-MNETH-B)" for details on wiring the optical fiber cable.
3)	Coaxial cable connection connector	This connector is used to connect the coaxial cable. (1) The cable terminal has the following type of configuration.  (2) Refer to the "MELSECNET/H Interface Board User's Manual (For SW0DNC-MNETH-B)" for details on wiring the coaxial cable.
4)	Jumper [*1]  	Use prohibited (Fixed to RP side)
5)	DIP switch  	Use prohibited (Fixed to OFF)

<table>
<tr><th>Number</th><th>Name</th><th>Details</th></tr>
<tr><td>6)</td><td>External power supply indicator LED</td><td>The external power supply status is indicated.
<table>
<tr><th>LED name</th><th>Status</th><th>Description</th></tr>
<tr><td rowspan="2">EXT.PW</td><td>Unlit</td><td>No external power supplied</td></tr>
<tr><td>Lit</td><td>External power supplied</td></tr>
</table></td></tr>
<tr><td>7)</td><td>External power supply cable connector</td><td>Connector for connecting external power supply cable
The cable terminal assignment is as shown below.
 
</td></tr>
</table>

*1: The jumper is provided for all of the Q80BD-J71LP21S-25, Q81BD-J71LP21-25, and the Q80BD-J71LP21-25 and Q80BD-J71LP21G of the following serial No.

Q80BD-J71LP21-25:

The sixth digit (from the left) of the serial No. is 7 or higher.

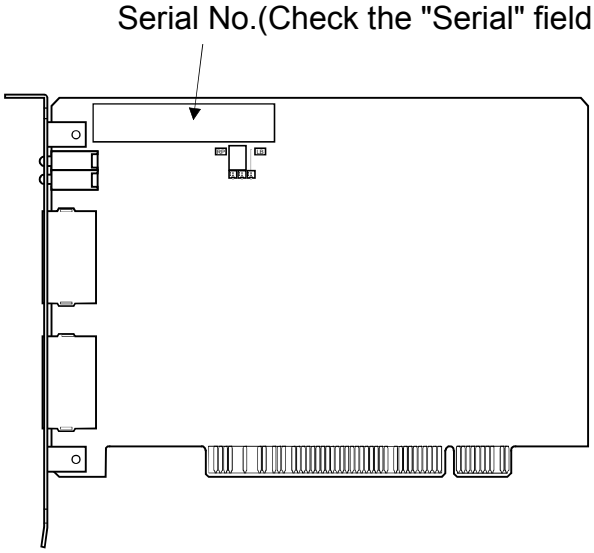
＊＊＊＊＊ 7 ＊＊＊＊＊＊＊＊＊-＊

Q80BD-J71LP21G, Q80BD-J71LP21GE:

The sixth digit (from the left) of the serial No. is 4 or higher.

＊＊＊＊＊ 4 ＊＊＊＊＊＊＊＊＊-＊

The serial No. of the board can be verified at the part shown in the illustration.



5. EMC and Low Voltage Directive

For the products sold in European countries, the conformance to the EMC Directive, which is one of the European Directives, has been a legal obligation since 1996. Also, conformance to the Low Voltage Directive, another European Directive, has been a legal obligation since 1997.
Manufacturers who recognize their products must conform to the EMC and Low Voltage Directives are required to declare that their products conform to these Directives and put a "CE mark" on their products.

5.1 Requirements for conformance to EMC Directive

The EMC Directive specifies that products placed on the market must "be so constructed that they do not cause excessive electromagnetic interference (emissions) and are not unduly affected by electromagnetic interference (immunity)". The applicable products are requested to meet these requirements.
The sections 5.1.1 through 5.1.5 summarize the precautions on conformance to the EMC Directive of the machinery constructed using the MELSECNET/H board.
The details of these precautions has been prepared based on the control requirements and the applicable standards. However, we will not assure that the overall machinery manufactured according to these details conforms to the above-mentioned directives.
The final decision on the method for the EMC Directive conformance and the application must be made by the manufacturer of the machinery.

5.1.1 Standards applicable to the EMC Directive

The standards applicable to the EMC Directive are listed below.
All test items were tested by installing each device on a personal computer bearing a CE certification logo.

Specification	Test item	Test details	Standard value
EN50081-2: 1995	EN55011 Radiated noise	Electromagnetic emissions from the product are measured.	30M-230MHz QP: 30dB μ V/m (30 m in measurement range) *1 230M-1000MHz QP: 37 dB μ V/m (30 m in measurement range)
	EN55011 Conducted noise	Electromagnetic emissions from the product to the power line is measured.	150k-500kHz QP: 79 dB, Mean: 66 dB *1 500k-30MHz QP: 73 dB, Mean: 60 dB
EN61131-2: 1996	EN61000-4-2 Electrostatic immunity	Immunity test in which static electricity is applied to the cabinet of the equipment.	15kV Aerial discharge
	EN61000-4-4 Fast transient burst noise	Immunity test in which burst noise is applied to the power line and signal lines.	Power line: 2kV Digital I/O (24V or higher): 1kV (Digital I/O (24V or less)) > 250V (Analog I/O, signal lines) > 250V
	EN61000-4-3 Radiated field AM modulation	Immunity test in which field is irradiated to the product.	10V/m, 26-1000MHz, 80%AM modulation@1kHz
	EN61000-4-12 Damped oscillatory wave immunity	Immunity test in which a damped oscillatory wave is superimposed on the power line.	Power line: 1kV Digital I/O (24V or higher): 1kV

*1: QP: Quasi-peak value, Mean: Mean value

5.1.2 Installing devices in the control panel

Installing devices in the control panel has a considerable effect, not only securing safety but also shielding the noise generated from the personal computer in the control panel. *

*: Also, each network remote station needs to be installed inside the control panel.
However, the waterproof type remote station can be installed outside the control panel.

(1) Control panel

(a) Use a conductive control panel.

(b) When attaching the control panel's top plate or base plate, mask painting and weld so that good surface contact can be made between the panel and plate.

(c) To ensure good electrical contact with the control panel, mask the paint on the installation bolts of the inner plate in the control panel so that contact between surfaces can be ensured over the widest possible area.

(d) Ground the control panel with a thick wire so that a low impedance connection to ground can be ensured even at high frequencies.

(e) Holes made in the control panel must be 10 cm (3.94 in.) diameter or less. If the holes are 10 cm (3.94 in.) or larger, radio frequency noise may be emitted.
In addition, because radio waves leak through a clearance between the control panel door and the main unit, reduce the clearance as much as practicable. The leakage of radio waves can be suppressed by the direct application of an EMI gasket on the paint surface.

Maker name	Series type
KITAGAWA INDUSTRIES CO., LTD.	US series
ZIPPERTUBING (JAPAN) LTD.	71TS series
SEIWA ELECTRIC MFG CO., LTD.	E02S□□□A

Our tests have been carried out on a panel having the damping characteristics of 37 dB max. and 30 dB mean (measured by 3 m method with 30 to 300MHz).

(2) Connection of power and ground cable
The power supply cable and ground cable for a personal computer should be laid out as follows:

(a) Provide a grounding point near the power supply of personal computer. Ground the FG (frame ground) terminal of the personal computer and the SLD (shield) terminal of the MELSECNET/H board with the thickest and shortest grounding wire (wire for grounding) possible (about 30 cm (11.81 in.) or less in length). Since the FG and SLD terminals function to ground the noise generated in the personal computer, it is necessary to ensure the lowest possible impedance.
As the wires are used to relieve the noise, the wire itself contains a large amount of noise and thus short wiring prevents from functioning as an antenna.

(b) Twist the ground cable leading to the ground point with the power supply cable. By twisting it with the ground cable, the noise leaking from the power supply cable may be grounded at a higher rate. However, twisting the power supply cable with the ground cable may not be necessary if a noise filter is installed on the power supply cable.

5.1.3 Cables

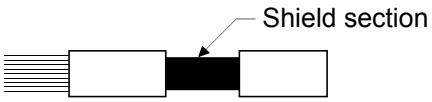
The cables extracted from the control panel contain a high frequency noise component. On the outside of the control panel, therefore, they serve as antennas to emit noise. Use shielded cable for the to be extracted to the outside of the control panel.

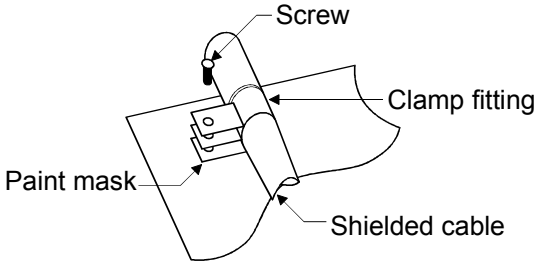
The use of a shielded cable also increases noise resistance.

(1) Grounding of shielded of shield cable

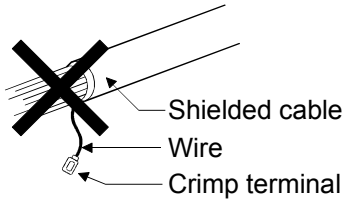
(a) Ground the shield of the shield cable as near the exit as possible from the control panel.
If the ground point is not near the outlet, the cables after the ground point will cause electromagnetic induction, and will generate a higher harmonic noise.

(b) Peel part of the shielded cable's sheath, and ground a wide section of the exposed shielded section against the control panel.
Clamp fittings can be used as shown below. Note that the painting on the inner side of the control panel, against which the clamp fitting is contacted, must be masked.



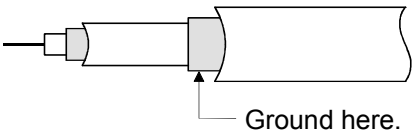


Note) The method of grounding by soldering a wire onto the shield section of the shielded cable as shown below is not recommended. The high frequency impedance will increase and the shield will be ineffective.



(2) Treatment of the coaxial cable ground

(a) Always use a double-shielded coaxial cable (MITSUBISHI CABLE: 5C-2V-CCY) for the coaxial cables Q80BD-J71BR11. Radiated noise in the range of 30MHz or higher can be suppressed by use of the double-shielded coaxial cables. Ground the double-shielded coaxial cable by connecting its outer shield to the ground.



(b) Attach a ferrite core to the double-shielded coaxial cable connected to the Q80BD-J71BR11.
The ferrite core should be attached on each cable near the outlet of the control panel.
Refer to section "5.1.4 Ferrite core" for details.

5.1.4 Ferrite core

A ferrite core has the effect of reducing radiated noise in the 30MHz to 100MHz band.

It is not required to fit ferrite cores to cables, but it is recommended to fit ferrite cores if shield cables pulled out of the enclosure do not provide sufficient shielding effects.

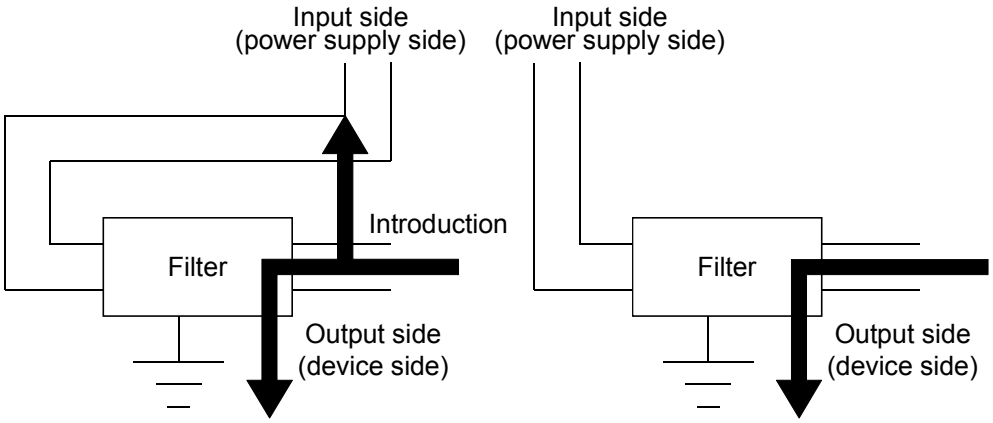
It should be noted that the ferrite cores should be fitted to the cables in the position immediately before they are pulled out of the enclosure. If the fitting position is improper, the ferrite will not produce any effect.

- Ferrite core
  Type: ZCAT3035-1330 (TDK ferrite core)

5.1.5 Noise filter (power supply line filter)

A noise filter is a component which has an effect on conducted noise.
It is not required to fit the noise filter to the power supply line, but fitting it can further suppress noise.
(The noise filter has the effect of reducing conducted noise of 10MHz or less.)
The precautions required when installing a noise filter are described below.

(1) Do not bundle the wires on the input side and output side of the noise filter. When they are bundled, the output side noise will induct into the input side wires.



(a) The noise will induct into input side when the input and output wires are bundled.

(b) Separate the input and output wires.

(2) Ground the ground terminal of the noise filter to the control panel using as short wiring as possible (about 10 cm (3.94 in.)).

Remarks

Reference noise filters are shown below.

Noise filter type	Maker name	Rated current	Rated voltage
FN343-3/01	SCHAFFNER	3A	250V
FN660-6-06		6A	
ZHC2203-11	TDK	3A	

5.2 Requirements for conformance to Low Voltage Directive

The MELSECNET/H board is out of the requirement for conformance to the Low Voltage Directive, since it does not use the power supply in the range of 50 to 1000V AC and 75 to 1500V DC.

6. Wiring

The precautions for connecting the cable to the MELSECNET/H board are given below.

(1) Precautions on general wiring

⚠DANGER

- Be sure to shut off all phases of the external power supply used by the system before performing work such as installing the MELSECNET/H board and wiring.
  If all power is not turned off, there is a risk of electric shock or damage to the product.
- When turning on the power and operating the module after having installed the MELSECNET/H board and doing the wiring, always attach the cover for the device module in which the MELSECNET/H board is installed.
  There is a risk of electric shock if the module cover is not attached.

⚠CAUTION

- When removing the cable from the MELSECNET/H board, do not pull the cable.
  Pulling the cable that is still connected to the MELSECNET /H board may cause damage to the MELSECNET/H board or cable, or malfunction due to bad cable contacts.
- Prevent foreign matter such as chips or wiring debris from getting on the MELSECNET/H board.
  Failure to do so can result in fire, breakdowns or malfunction.

(2) Precautions on communication cable wiring

⚠CAUTION

- Solder the coaxial cable properly.
  If the soldering is incomplete, it may cause the module malfunction.
- For the communication cable, specialized skills and tools are required to connect the plug and cable. The connector plug itself is a custom part.
  When purchasing, consult your local Mitsubishi representative.
  If the connection is incomplete, this can result in a short, fire or malfunction.
- Be sure to fix communication cables connecting to the MELSECNET/H board by placing them in the duct or clamping them.
  Cables not placed in the duct or without clamping may be hang freely and accidentally pulled, which may cause damage to the MELSECNET/H board or cable, or malfunction due to bad cable contacts.

(3) Precautions on external power supply cable wiring

⚠CAUTION

- Verify the rated voltage and pin assignment of the product and connect the external power supply cable properly. Connecting a power supply with a different voltage rating, imperfect cable crimping or faulty wiring may cause a fire or failure.
- Use a specified tool for crimping of the cable and contacting pin. Imperfect crimping may cause malfunction.
- Verify the pin assignment and fully insert the crimped contacting pin into the connector. Imperfect insertion may cause failure or malfunction.
- Insert the wired external power supply cable into the external power supply cable connector until a click is heard. Imperfect insertion may cause failure or malfunction.
- Keep the external power supply cable away from the main circuit cable, power cables and/or load cables connected to other than programmable controllers. Ensure a distance of 100mm between them. Failure to do so may result in malfunction due to noise, surge or induction.

Remarks

(1) Refer to the "Q corresponding MELSECNET/H reference manual (PLC to PLC network) for details of each communication cable.

(2) Refer to the "MELSECNET/H Interface Board User's Manual (For SW0DNC-MNETH-B)" for details on the wiring method.

6.1 Optical fiber cable

The precautions for connecting the optical fiber cable with Q80BD-J71LP21-25, Q81BD-J71LP21-25, Q80BD-J71LP21S-25, Q80BD-J71LP21G and Q80BD-J71LP21GE in an optical loop system are given below.

(1) Precautions for connections

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

Type		Distance between stations (m)			
		Q80BD-J71LP21-25, Q81BD-J71LP21-25, Q80BD-J71LP21S-25		Q80BD-J71LP21G 10Mbps (fixed)	Q80BD-J71LP21GE 10Mbps (fixed)
		10Mbps	25Mbps		
SI type optical fiber cable (Old type: A-2P-□)	L type	500 (1640.5 ft.)	200 (656.2 ft.)	Not allowed	Not allowed
	H type	300 (984.3 ft.)	100 (328.1 ft.)		
SI optical fiber cable		500 (1640.5 ft.)	200 (656.2 ft.)		
H-PCF optical fiber cable		1000 (3281 ft.)	400 (1312.4 ft.)		
Broad-band H-PCF optical fiber cable		1000 (3281 ft.)	1000 (3281 ft.)		
QSI optical fiber cable		1000 (3281 ft.)	1000 (3281 ft.)		
GI optical fiber cable		Not allowed	Not allowed	2000 (6562 ft.)	
62.5 GI optical fiber cable				Not allowed	2000 (6562 ft.)

(b) 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.

(c) 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 Mitsubishi Electric System Service Corporation for detail.

(d) When laying the opticalfiber 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.
Do not detach the cover until the cable is attached.

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

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

(g) When attaching or detaching the optical fiber cable to/from the module, make sure to power off the personal computer and external power supply.

6.2 Coaxial cable

The precautions for connecting the coaxial cable with Q80BD-J71BR11 in a coaxial bus system are given below.

(1) Precautions for connections

(a) Limits to station-to-station cable length

1) The cable used to connect networks must have the following lengths according to the number of connected stations.
When using a cable length other than that shown below, a communication error may occur.

Number of connected stations / Station-to-station cable length	2 to 9 stations		10 to 33 stations	
Cable type	3C-2V	5C-2V	3C-2V	5C-2V
0 to 1m (0 to 3.28ft.)	× (A cable less than 1m long cannot be used.)			
1 to 5m (3.28 to 16.41ft.)	○	○	○	○
5 to 13m (16.41 to 42.65ft.)	○	○	×	×
13 to 17m (42.65 to 55.78ft.)	○	○	○	○
17 to 25m (55.78 to 82.03ft.)	○	○	×	×
25 to 300m (82.03 to 984.3ft.)	○	○	○	○
300 to 500m (82.03 to 1640.5ft.)	×	○	×	○

○: Usable ×: Not usable

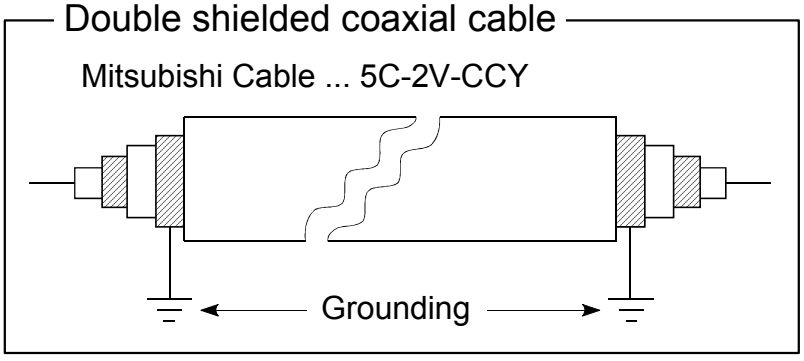
2) If the number of stations may increase when the system is expanded, etc., lay the wires beforehand taking precaution 1) above into consideration.

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.

(b) Precautions for laying cables

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

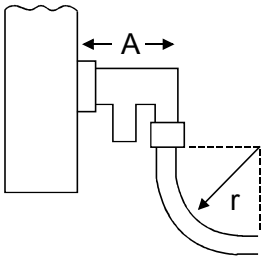
2) Consider wiring using double-shielded coaxial cable in places that are subject to large amounts of noise.



The 5C-2V connector plug is applicable to double-shielded coaxial cable.
Contact the 5C-2V connector plug to the coaxial cable inside a double-shielded coaxial cable. Ground the shielded part outside a double-shielded coaxial cable as shown in the above figure.

(c) 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)	



(d) Do not pull any of the connected coaxial cables.
This will cause a faulty contact, cable disconnection, or damage to the module.

(e) Make sure to connect a terminal resistor to both terminal stations of the coaxial bus type network system.

(f) There are integral type and separate type F-shaped connectors.
In the case of the separate type F-shaped connector, tighten the ring of the connector until the ring is tight before connecting the connector to the network module.
If the ring is loose, a communication error may occur.
After connecting the F-shaped connector to the network module, retighten its ring periodically.
Retighten it with both hands.

(g) The F-type connector may deposit white oxides depending on the working environment. This will not form at the fitting section, and thus poses no functional problems.

(h) When attaching or detaching the coaxial cable to/from the module, make sure to power off the personal computer.

(2) Terminal resistor
The coaxial bus-type network system requires terminal resistors (A6RCON-R75) at both terminal stations of the network. The user should arrange for terminal resistors, since the Q80BD-J71BR11 does not come with terminal resistors.

6.3 External power supply cable

This section explains how to connect the external power supply cable to the Q80BD-J71LP21S-25.

(1) Parts and tool required for making an external power supply cable

To make an external power supply cable, the following parts and a tool are required.

(a) Connector set (Accessory)

Check that the following parts are contained in the connector set supplied with the product.

Parts	Model	Applicable cable size	Quantity
Connector	1-178288-3	—	1
Contacting pin	175218-2	AWG#20-16	3 (1 spare)

(b) Cable

Use an external power supply cable with heat-resistant vinyl sheath of 0.50 to 1.25mm^2 [AWG 20 to 16].

(c) Tool

Be sure to use the following specified tool.

Model	Applicable cable size	Inquiry
91558-1	AWG#20-16	Tyco Electronics

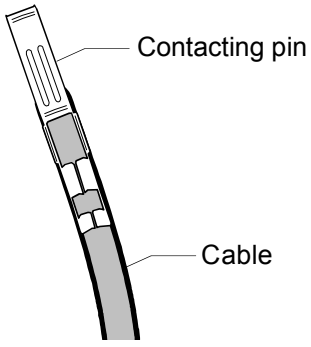
(2) Making external power supply cable

(a) Crimping to the contacting pin

Using a crimping tool, crimp the cable and contacting pin.
Set the contacting pin and cable in the grooves of the crimping tool and squeeze the handle tightly.
For details, refer to the instructions of the crimping tool.

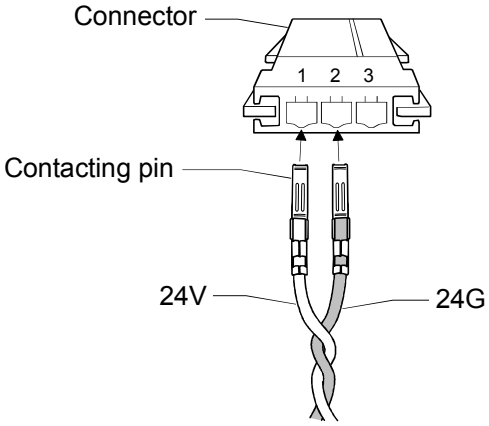
(b) Check the crimped condition

Check if the cable (including a part of the sheath) is evenly crimped to the contacting pin.
If only wire part is crimped and not the sheath part, or if the cable is stuck out, the cable can be cut off or malfunction may occur.



(c) Connecting to the connector

According to the following pin assignment, fully insert the crimped cable to the connector until a click is heard.



Pin No.	Description
1	24V
2	24G
3	Open

(3) Connecting external power supply cable to board

Properly insert the completed external power supply cable to the external power supply cable connector of the Q80BD-J71LP21S-25 until a click is heard.

Keep the external power supply cable away from the main circuit cable, power cables and/or load cables connected to other than programmable controllers. (Ensure a distance of 100mm (3.94 in.) between them.)

Point
Be sure to twist the external power supply cable.

7. Installing Software Packages

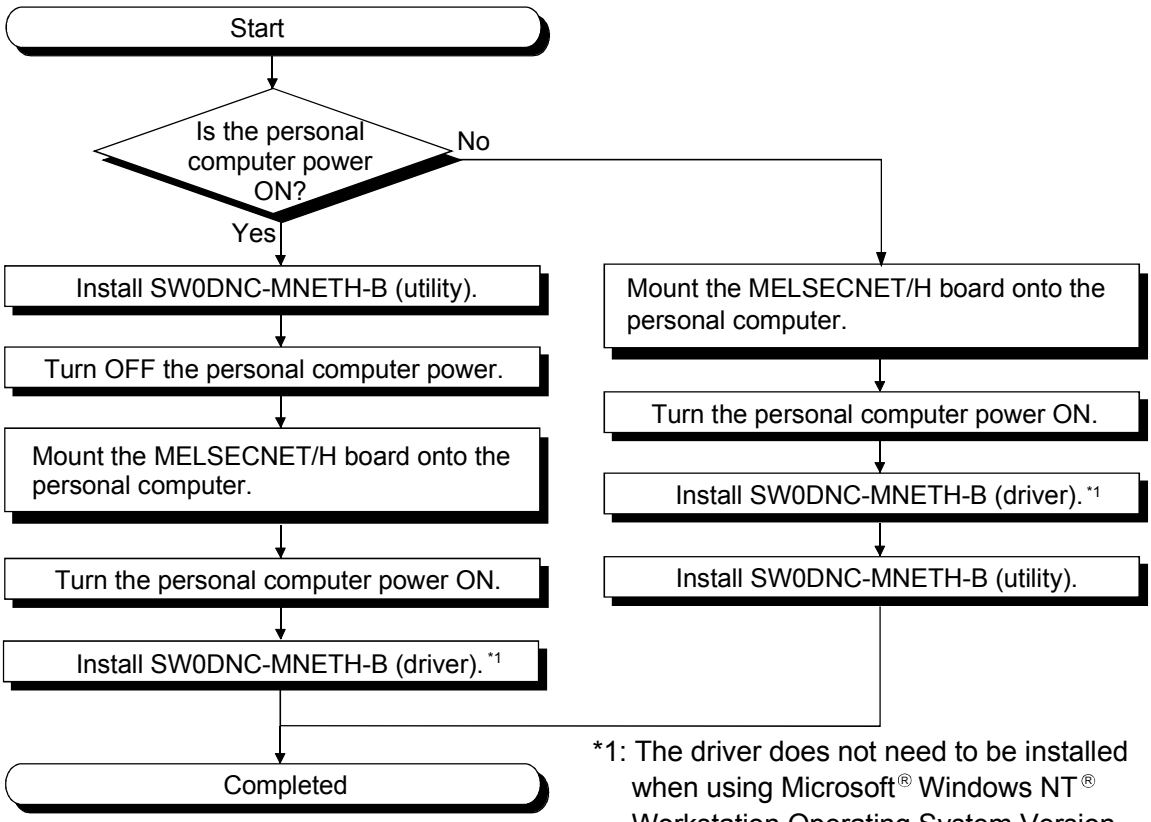
The methods of installing the software package and the registered icons are explained in this section.
Refer to the "MELSECNET/H Interface Board User's Manual (For SW0DNC-MNETH-B)" for details on uninstalling the software and on installing by copying onto an FD.

7.1 Installation procedures

Refer to the "MELSECNET/H Interface Board User's Manual (For SW0DNC-MNETH-B)" for detailed installation procedures.

Point

(1) A multi-processor compatible personal computer cannot be used as the drivers are not compatible.
Refer to the "MELSECNET/H Interface Board User's Manual (For SW0DNC-MNETH-B)" for details on the working environment.
(2) Log on as the user who has the Administrator attributes, when any of the following OSs is used.
Microsoft® Windows NT® Workstation Operating System Version 4.0
Microsoft® Windows® 2000 Professional Operating System
Microsoft® Windows® XP Professional Operating System
Microsoft® Windows Server® 2003 R2 Operating System
Microsoft® Windows Vista® Home Basic Operating System
Microsoft® Windows Vista® Home Premium Operating System
Microsoft® Windows Vista® Business Operating System
Microsoft® Windows Vista® Ultimate Operating System
Microsoft® Windows Vista® Enterprise Operating System
(3) Make sure to close other applications running on Windows® (including resident software such as antivirus software) before installation.
(4) Remove all applications that are included in the Start up menu, then restart PC before installing.
(5) When the installation fails to complete successfully, and if software packages can be uninstalled, execute uninstall.
(6) If you want to reinstall the software package, turn off the personal computer after uninstalling the software package, them turn the personal computer back on and reinstall the software package.
(7) When the utility has been installed on Windows® 95 and if the utility is not displayed properly, reboot the personal computer and reinstall the utility.



*1: The driver does not need to be installed when using Microsoft® Windows NT® Workstation Operating System Version 4.0 as the operating system.

7.2 Icons to be registered

Installing the software packages will register the icons shown below.
The icons shown below are registered in [Start] - [Program] - [MELSEC].

Remarks

When Windows® XP Professional, Windows Server® 2003 R2 or Windows Vista® *2 is used, the icons are registered to [Start] - [All Programs] - [MELSEC].

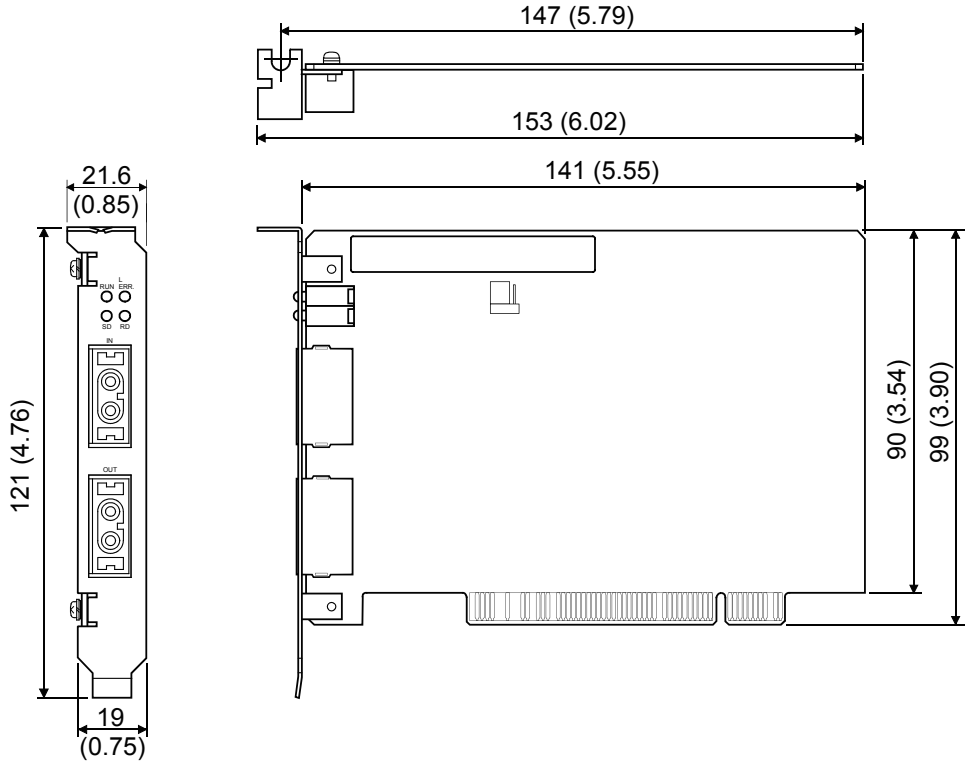
Icon	Utility name	Details
	MELSECNET/H Utility	The MNETH Utility starts when this icon is clicked.
	Error Viewer *3	The Error Viewer opens when this icon is clicked.
	Device Monitor Utility	The Device Monitor Utility starts when this icon is clicked.
	MELSEC Communication Function HELP	The Communication function HELP opens when this icon is clicked.

*2: Generic term of Microsoft® Windows Vista® Home Basic Operating System, Microsoft® Windows Vista® Home Premium Operating System, Microsoft® Windows Vista® Business Operating System, Microsoft® Windows Vista® Ultimate Operating System and Microsoft® Windows Vista® Enterprise Operating System.

*3: This utility is compatible only with the Microsoft® Windows® 95 Operating System and Microsoft® Windows® 98 Operating System.

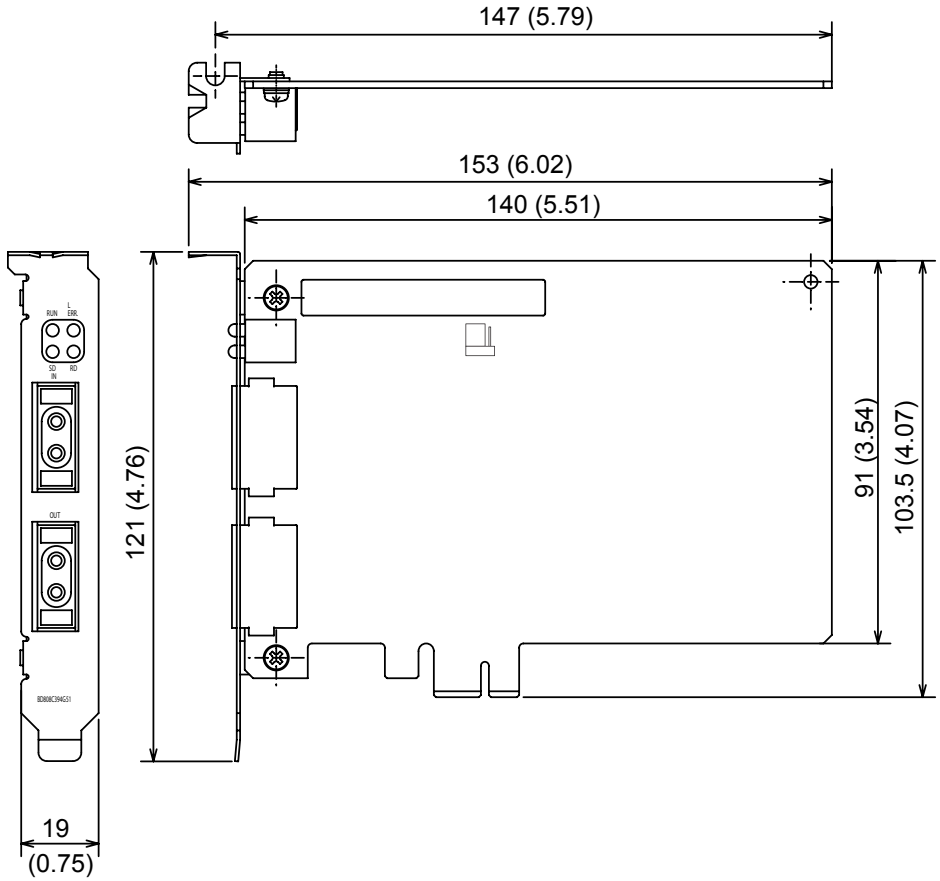
8. External Dimensions

(1) Q80BD-J71LP21-25, Q80BD-J71LP21G, Q80BD-J71LP21GE



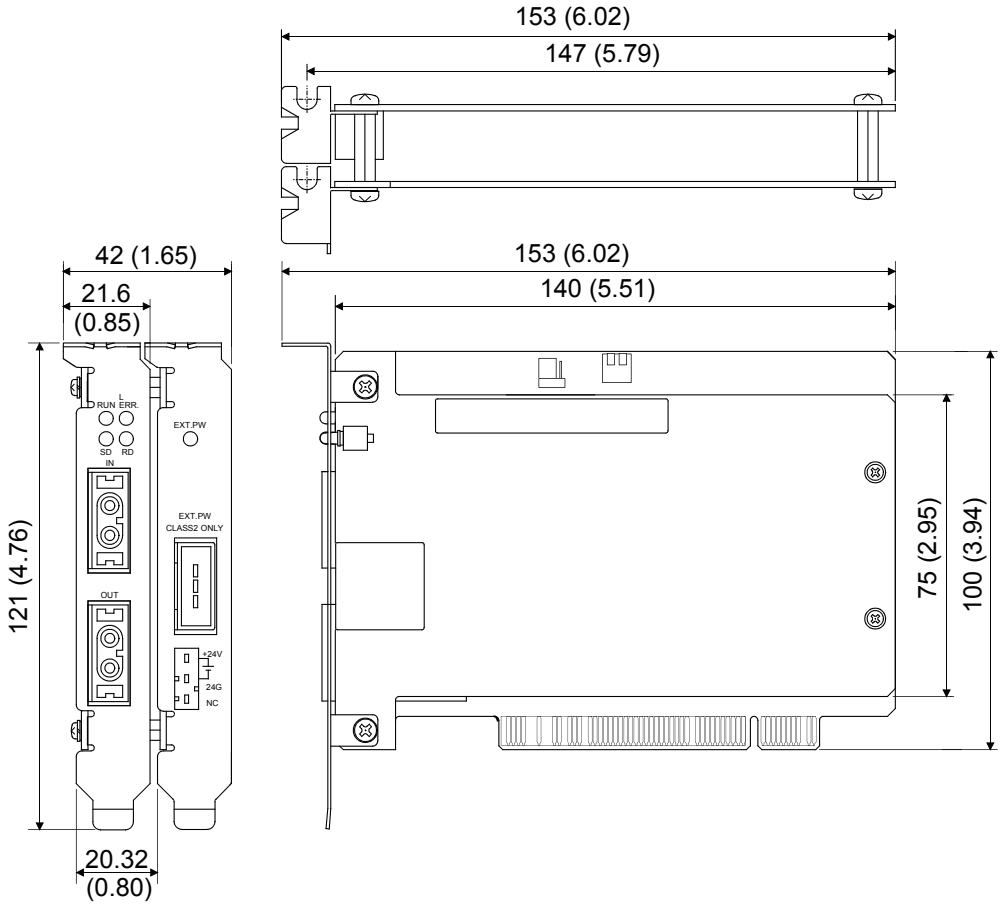
Unit: mm (in.)

(2) Q81BD-J71LP21-25



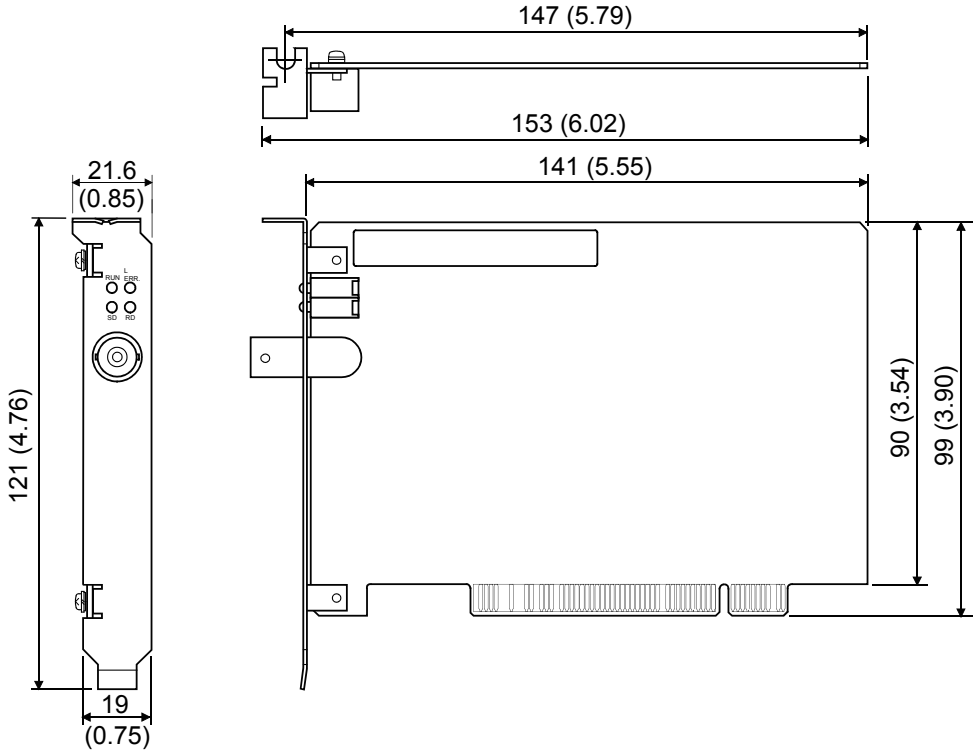
Unit: mm (in.)

(3) Q80BD-J71LP21S-25



Unit: mm (in.)

(4) Q80BD-J71BR11



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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