# MITSUBISHI Ethernet Interface Module

# User's Manual (Hardware)

# QJ71E71-100 QJ71E71-B5 QJ71E71-B2

Thank you for purchasing the Mitsubishi programmable controller MELSEC-Q Series.

Prior to use, please read both this and relevant manual thoroughly to fully understand the product.



Mitsubishi Programmable Controller

MODEL	QJ71E71-U-HW-JE		
MODEL	12 1025		
CODE	13JQ35		
IB(NA)-0800009-H(0809)MEE			

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## 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. For the safety instructions of the programmable controller system, please read the user's manual of the CPU module to use.

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



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.

#### [Design Precautions]

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 Do not bunch the control wires or communication cables with the main circuit or power wires, or install them close to each other.
 They should be installed 100 mm (3.94 inch) or more from each other.
 Not doing so could result in noise that would cause erroneous operation.

#### [Installation Precautions]

|--|--|

• Use the programmable controller in the operating environment that meets the general specifications described in the user's manual of the CPU Module to use.

Using this programmable controller in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product.

#### [Installation Precautions]

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- While pressing the installation lever located at the bottom of module, insert the module fixing tab into the fixing hole in the base unit until it stops. Then, securely mount the module with the fixing hole as a supporting point. Incorrect loading of the module can cause a malfunction, failure or drop. When using the programmable controller in the environment of much vibration, tighten the module with a screw.
- Tighten the screw in the specified torque range. Undertightening can cause a drop, short circuit or malfunction. Overtightening can cause a drop, short circuit or malfunction due to damage to the screw or module.
- Completely turn off the externally supplied power used in the system before mounting or removing the module. Not doing so could result in damage to the product.
- Do not directly touch the module's conductive parts or electronic components.

Touching the conductive parts could cause an operation failure or give damage to the module.

#### [Wiring Instructions]

## 

• Use crimp-contact, pressure-displacement or soldering to wire the connectors for external connections properly using the manufacturer-specified tools.

Imperfect connections could result in short circuit, fires, or erroneous operation.

- Connect the connectors to the module securely.
- Make sure to place the communication and power cables to be connected to the module in a duct or fasten them using a clamp.
   If the cables are not placed in a duct or fastened with a clamp, their positions may be unstable or moved, and they may be pulled inadvertently. This may damage the module and the cables or cause the module to malfunction because of faulty cable connections.
- Tighten the terminal screws with the specified torque. If the terminal screws are loose, it could result in short circuits, fire, or erroneous operation.

Tightening the terminal screws too far may cause damages to the screws and/or the module, resulting in fallout, short circuits, or malfunction.

### [Wiring Instructions]

## 

- When disconnecting the communication and power cables from the module, do not pull the cables by hand. When disconnecting a cable with a connector, hold the connector to the module by hand and pull it out to remove the cable. When disconnecting a cable connected to a terminalblock, loosen the screws on the terminal block first before removing the cable. If a cable is pulled while being connected to the module, it may cause the module to malfunction or damage the module and the cable.
  Be sure there are no foreign substances such as sawdust or wiring debris inside the module. Such debris could cause fires, damage, or erroneous operation.
  The module has an ingress prevention label on its top to prevent foreign matter, such as wire offcuts, from entering the module during wiring. Do not peel this label during wiring.
  Before starting system operation, be sure to peel this label because of heat dissipation.
- Solder the coaxial cable connectors properly. Incomplete soldering may result in malfunctions.

#### Revisions

		al number is given on the bottom right of the cover.
Print Date	*Manual Number	Revision
Sep., 1999	IB(NA)-0800009-A	First printing
Dec., 1999	IB(NA)-0800009-B	Addition
		"Compliance with the EMC Directive and the Low Voltage
		Directive"
		Correction
		Chapter 2, Section 5.2 POINT
Sep., 2000	IB(NA)-0800009-C	Put Windows <sup>®</sup> base software products together from Mitsubishi Programmable Logic Controller MELSEC
		series to Mitsubishi integrated FA software MELSOFT
		series.
		Standardize the name from software package (GPP
		function) to Product name (GX Developer.)
		Correction
		"SAFETY PRECAUTIONS", "Manuals", "Compliance with
		the EMC Directive and the Low Voltage Directive",
		Chapter 1, Chapter 2, Chapter 6, Chapter 7.
May, 2001	IB(NA)-0800009-D	Additional model QJ71E71-100
Sep., 2001	IB(NA)-0800009-E	Correction
		Chapter 2, Chapter 3, Chapter 4,
		Section 5.1 POINT, Section 5.2 POINT, Chapter 6
Apr., 2003	IB(NA)-0800009-F	Additional model QJ71E71-B5
		Deleted model QJ71E71
Mar., 2006	IB(NA)-0800009-G	Correction
		"SAFETY PRECAUTIONS", "Compliance with the EMC
		and Low Voltage Directives", Section 3.1, Chapter 7
Sep., 2008	IB(NA)-0800009-H	Correction
		"SAFETY PRECAUTIONS", "Compliance with the EMC
		and Low Voltage Directives", Section 3.1, Chapter 4,
		Section 5.2, Chapter 7

\*The manual number is given on the bottom right of the cover.

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#### **About Manuals**

The following table lists manuals regarding this product. Use this table to order necessary manuals respective to the functions used.

Related Manuals

Manual name	Manual No. (Model code)
Q Corresponding Ethernet Interface Module User's manual (Basic)	SH-080009 (13JL88)
Q Corresponding Ethernet Interface Module User's manual (Application)	SH-080010 (13JL89)
Q Corresponding Ethernet Interface Module User's manual (Web function)	SH-080180 (13JR40)
Q Corresponding MELSEC Communication Protocol Reference Manual	SH-080008 (13JF89)

Please read the Q Corresponding Ethernet Interface Module User's Manual (Basic) before using this module.

#### Compliance with the EMC and Low Voltage Directives

(1) For programmable controller system

To configure a system meeting the requirements of the EMC and Low Voltage Directives when incorporating the Mitsubishi programmable controller (EMC and Low Voltage Directives compliant) into other machinery or equipment, refer to Chapter 9 "EMC AND LOW VOLTAGE DIRECTIVES" of the QCPU User's Manual (Hardware Design, Maintenance and Inspection).

The CE mark, indicating compliance with the EMC and Low Voltage Directives, is printed on the rating plate of the programmable controller.

#### (2) For the product

For the compliance of this product with the EMC and Low Voltage Directives, refer to Section 9.1.3 "Cables" in Chapter 9 "EMC AND LOW VOLTAGE DIRECTIVES" of the QCPU User's Manual (Hardware Design, Maintenance and Inspection).

## 1. Overview

This manual describes how to install the QJ71E71-100/QJ71E71-B5/QJ71E71-B2 Ethernet interface modules (hereinafter referred to as Ethernet modules) and how to wire them with external devices.

(Product Configuration)

Model	Item name	Quantity
QJ71E71-100	QJ71E71-100 Ethernet interface module	1
QJ71E71-B5	QJ71E71-B5 Ethernet interface module	1
QJ71E71-B2	QJ71E71-B2 Ethernet interface module	1

## 2. Performance Specifications

The following describes the performance specifications of the Ethernet module. For the general specifications of the Ethernet module, refer to the user's manual for the CPU module used.

Item			Specification	
			QJ71E71-100	
			100BASE-TX	10BASE-T
	Data transmission speed		100 Mbps (Full-duplex/Half-duplex)	10 Mbps (Half-duplex)
	Transm method		Base band	
Trans- mission specifi-	Maximu node-to distance	-node		
cations	length	m segment	100 m (328.0	08 ft.) (*1)
		m number of connection	Cascade connection Maximum 2 stages	Cascade connection Maximum 4 stages
	Interval between the minimum nodes		—	
Trans-	connections allowed		16 connections (Connections usable by the sequence program)	
mission data	Fixed bu	uffer	1 k words $ imes$ 16	
storage memory	brage Random access		6 k words $ imes$ 1	
memory	E-mail	Attached file	6 k words $ imes$ 1 (*2)	
	Main text		960 words $ imes$ 1 (*2)	
Number of I/O points occupied			32 points/1 slot (I/O assignments: intelligent)	
5 V DC internal current		rent	0.50 A	
	consumption		0.00 A	
12 V DC external power supply capacity (Transceiver)			—	
External d		/	98 (3.86 in.) (H) $ imes$ 27.4 (1.08 in.) (W) $ imes$ 90 (3.54 in.) (D) [mm]	
Weight			0.11 kg (0.24 lb.)	

			Specification	
ltem			QJ71E71-B5	QJ71E71-B2
			10BASE5	10BASE2
	Data transmission speed		10 Mbps (Half-duplex)	
	Transm method	ission	Base band	
Trans- mission specifi-	Maximu node-to distance	-node	2500 m (8202.10 ft.)	925 m (3034.77 ft.)
cations	Maximu length	m segment	500 m (1640.42 ft.)	185 m (606.96 ft.)
	Maximum number of nodes/connection		100 units/ segment	30 units/ segment
	Interval between the minimum nodes		2.5 m (8.20 ft.)	0.5 m (1.64 ft.)
Trans-	CONNECTIONS Allowed		16 connections (Connections usable by the sequence program)	
mission data	Fixed b	uffer	1 k words $ imes$ 16	
storage	numer		6 k words $ imes$ 1	
memory	E-mail	Attached file	6 k words $ imes$ 1 (*2)	
	Main text		960 words $ imes$ 1 (*2)	
Number of I/O points occupied		•	32 points/1 slot (I/O assignments: intelligent)	
5 V DC internal current		rent	0.50 A	0.60 A (*4)
consumption				
	12 V DC external power supply capacity (Transceiver)		(*3)	—
External d	imension	IS	98 (3.86 in.) (H) $ imes$ 27.4 (1.08 in.) (W) $ imes$ 90 (3.54 in.) (D) [mm]	
Weight			0.12 kg (0.26 lb.)	0.13 kg (0.29 lb.) (*4)

\*1: Length between the Hub and node.

- \*2: Regarding the specifications of the e-mail transmission and reception function, refer to the Ethernet module Users Manual (Basic) or the Users Manual (Application).
- \*3: It is necessary to apply a transceiver, or a device that meets AUI cable specifications.
- \*4: The product with first 5 digits of serial number "05049" or earlier is different as follows:
  - 5V DC internal current consumption: 0.70A
  - Weight: 0.14kg (0.31lb.)

## 3. Loading and Installation

#### 3.1 Handling Precautions

- (1) Do not drop or apply severe shock to the module case since it is made of resin.
- (2) Always make sure to touch the grounded metal to discharge the electricity charged in the body, etc., before touching the module.

Failure to do so may cause a failure or malfunctions of the module.

(3) Tighten the screws such as module fixing screws within the following range.

Screw location	Tightening torque range
External power supply terminal screw (M2.5 screw) (*1)	0.40 N•m
Module fixing screw (usually not required) (M3 screw) (*2)	0.36 to 0.48 N•m

- \*1: This terminal is used as an external power input terminal for supplying power to the transceiver when being connected to a 10BASE5.
- \*2: The module can be easily fixed onto the base unit using the hook at the top of the module. However, it is recommended to secure the module with the module fixing screw if the module is subject to significant vibration.

#### 3.2 Installation Environment

For further details, refer to the user's manual for the CPU module to use.

### 4. Part Names

1)

2)

3)

4)



\*1: The LED on the connector does not light up.
 For connectors with first 5 digits of serial No. "05059" or earlier, the orientation of the connectors has been rotated by 180 degrees.

\*2: Indicates the serial No. of the Ethernet module.

#### (1) LED display contents

	LED display	Display contents: (◯:Off ● : On)
QJ71E71-100 RUN	RUN	<ul> <li>Normal operation</li> <li>Abnormal operation</li> </ul>
	INIT.	<ul> <li>Initial processing normal completion</li> <li>Initial processing not performed</li> </ul>
QJ71E71-B5	OPEN	<ul> <li>Normally opened connection available (*1)</li> <li>Normally opened connection not available</li> </ul>
RUN ERR. INIT COM.ERR. OPEN SD RD	SD	<ul> <li>Data being sent</li> <li>Data is not sent</li> </ul>
	ERR.	<ul> <li>Setting abnormal display (*2)</li> <li>Normal setting display</li> </ul>
QJ71E71-B2	COM.ERR.	<ul> <li>Communication abnormal display</li> <li>Normal communication display</li> </ul>
RUN ERR. INIT COM.ERR. OPEN	100 M	<ul> <li>: 100 M bps</li> <li>: 10 M bps/When not connected</li> </ul>
SD C RD	RD	<ul> <li>Data being received</li> <li>Data not received</li> </ul>

- \*1: The [OPEN] LED turns on/off depending on the open states of user connections 1 to 16.
- \*2: The [ERR.] LED turns on in the following cases:
  - When setting values in GX Developer (mode, station number, and/or network number) are incorrect.
  - When an error has occurred in the Ethernet module or programmable controller CPU and the operation is disabled due to the error.

## 5. Connecting to the Network

The following describes how to connect the Ethernet module to the 100BASE-TX, 10BASE-T, 10BASE5 and 10BASE2.

#### POINT

Sufficient safety precautions are required when installing the 100BASE-TX, 10BASE-T, 10BASE5 and 10BASE2 networks. Consult a specialist when connecting cable terminals or installing trunk line cables, etc.

#### 5.1 Connecting to the 10BASE-T/100BASE-TX



<Connection procedure>

- 1) Connect the twisted pair cable to the hub.
- 2) Connect the twisted pair cable to the Ethernet module.

POINT

During the high-speed communication (100 M bps) via 100BASE-TX connection, a communication error may occur due to the effect of high frequency noise from devices other than programmable controller in a given installation environment.

The following describes countermeasures on the QJ71E71-100 side to prevent the effect of high frequency noise for construction of network system. (1) Wiring connection

- Do not bundle the twisted pair cables with the main circuit and the power wires, and do not install them close to each other.
- Make sure to place the twisted pair cables in a duct.
- (2) Communication method
  - Data communication with an external device is performed using TCP/IP communication.
  - Increase the number of communication retries as necessary.
- (3) 10 M bps communication
  - Communication is performed at a data transmission rate of 10 M bps by changing the connection hub for the QJ71E71-100 to a hub capable of handling 10 M bps.

#### 5.2 Connecting to the 10BASE5

(1) Connecting an AUI cable



<Connection procedure> (\*1)

- 1) Slide the retainer toward the direction B as shown in the figure.
- 2) Push in the AUI cable connector all the way.
- 3) Slide the retainer toward the direction A as shown in the figure.
- 4) Confirm that the AUI cable is locked.
- \*1: Do not connect the AUI cable while the power to the module installed station is on.
- (2) Wiring to the external power supply terminal (DC power supply for transceiver (\*1))

The following explains how to connect a cable to the external power supply terminal (DC power supply for transceiver).

1) Strip the cable jacket back 13mm. (\*2)

The applicable cable size is 0.13mm<sup>2</sup> (AWG26) to 2.5mm<sup>2</sup> (AWG14).



- 2) Loosen the terminal screw and insert the cable into the terminal.
- 3) Tighten the terminal screw within the torque range shown in Section 3.1.

\*1:Use a transceiver with a function that is generally called SQE TEST or heart beat (a transceiver function that emits signals to notify whether the transceiver is operating normally at the end of communication).

\*2:If the wire strip length is too long, the conductive part is exposed and it may increase the risk of electric shock or short circuit between the adjacent terminals. If the wire strip length is too short, it may result in poor contact.



#### 5.3 Connecting to the 10BASE2



<Connection procedure>

- 1) Push in the connector by aligning the groove [1] and tab [2] as shown in the figure.
- 2) While pushing in the connector, rotate it clockwise by a 1/4 turn.
- 3) Turn until the connector locks.
- 4) Check that the connector is locked.

## 6. Setting from GX Developer

Using GX Developer, please make parameter setting for "Network Parameters Setting the number of Ethernet/CC IE/MELSECNET cards" (\*1) and "Ethernet Operations".

Item	Contents
Network parameters setting the number of Ethernet/CC IE/MELSECNET cards	Sets "Staring I/O No.", "Network No." and "Station No." to use Ethernet module as Network module.
Ethernet operations	Sets "Communication data code", "IP address" and "Initial timing" to perform initial processing of Ethernet module.

Remarks

It is not necessary to set the "Intelligent function module switch settings" with GX Developer's I/O assignment.

Each type of setting corresponding to the switch settings is performed in the above mentioned "Operational settings," "Initial settings," and "Open settings."

## 7. External Dimensions

(1) QJ71E71-100



<sup>(</sup>Units : mm (in.))

- \*1: When connecting the twisted pair cable, set the bending radius near the connector (reference value: R1) as four times the cable's outside diameter or larger.
- (2) QJ71E71-B5



(Units : mm (in.))

\*1: When connecting the AUI cable, set the bending radius near the connector (reference value: R2) as four times the cable's outside diameter or larger.



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#### ▲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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