

MITSUBISHI

MODBUS[®]/TCP

Interface Module

User's Manual
(Hardware)

QJ71MT91

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

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

MELSEC-Q
Mitsubishi Programmable
Controller

MODEL	QJ71MT91-U-HW-JE
MODEL CODE	13JP52
IB(NA)-0800280-C(0808)MEE	

● SAFETY PRECAUTIONS ●

(Always read these instructions before using this product.)

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.

The instructions provided here are limited to those for the installation of this product and wiring to the other devices only. 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".




DANGER

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



CAUTION

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.

[Design Precautions]

DANGER

- When connecting a peripheral device to the CPU module or connecting a personal computer or the like to the intelligent function module / special function module to exercise control (data change) on the running programmable controller, configure up an interlock circuit in the sequence program to ensure that the whole system will always operate safely. Also before exercising other control (program change, operating status change (status control)) on the running programmable controller, read the manual carefully and fully confirm safety. Especially for the above control on the remote programmable controller from an external device, an immediate action may not be taken for programmable controller trouble due to a data communication fault. In addition to configuring up the interlock circuit in the sequence program, corrective and other actions to be taken as a system for the occurrence of a data communication fault should be predetermined between the external device and programmable controller CPU.

[Design Precautions]

DANGER

- Do not write any data in the "system area (Use prohibited)" of the buffer memory of the intelligent function module. Also, do not output (turn on) the "use prohibited" signal, which is one of the output signals from the programmable controller CPU to the intelligent function module. If data is written to the "system area (Use prohibited)" or the "use prohibited" signal is output, there is a risk that the programmable controller system may malfunction.

CAUTION

- 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]

DANGER

- 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.
- 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.
- 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.

CAUTION

- 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.

[Wiring Precautions]

CAUTION

- Completely turn off the externally supplied power used in the system when placing wiring.
Not completely turning off all power could result in electric shock or damage to the product.
- External connections shall be crimped or pressure welded with the specified tools, or correctly soldered.
Imperfect connections could result in short circuit, fires, or erroneous operation.
- Securely connect the connector to the module.
- 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.
- Wire the module correctly after confirming the type of the connected interface. If the cable is connected to a different interface or wired incorrectly, it may cause a fire or breakdown.
- 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. If the cable is pulled while being connected to the module, it may damage the module and/or cable or make cable contact improper, causing a malfunction.
- 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.

Revisions

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

Print Date	*Manual Number	Revision
Jan., 2004	IB(NA)-0800280-A	First printing
Mar., 2004	IB(NA)-0800280-B	Partial correction Section 3.1
Aug., 2008	IB(NA)-0800280-C	Change of a term "PLC" was changed to "programmable controller" Partial correction SAFETY PRECAUTIONS, Conformation to the EMC Directive and Low Voltage Instruction, Chapter 2, Section 3.1, Chapter 5,6

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CONTENTS

1. Overview.....	1
2. Performance Specifications	1
3. Mounting and Installation	3
3.1 Handling Precautions	3
3.2 Installation Environment	3
4. Part Names.....	3
5. Connection to Ethernet	5
6. Setting from GX Developer	6
7. External Dimensions	8

About Manual

The following manual is also related to this product.
In necessary, order it by quoting the details in the table below.

Related Manual

Manual name	Manual No. (Model code)
MODBUS [®] /TCP Interface Module User's Manual	SH-080446ENG (13JR71)

Before using this module, be sure to read the MODBUS[®]/TCP Interface Module User's Manual.

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).

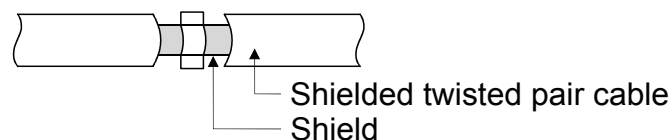
The CE mark, indicating compliance with the EMC and Low Voltage Directives, is printed on the rating plate of the programmable controller.

(2) For the product

Note the following when making this product to conform to the EMC and Low Voltage directives.

(a) Twisted pair cable

Use shielded twisted pair cables for connecting to the 10BASE-T/100BASE-TX connectors. For the shielded twisted pair cables, strip a part of the outer cover and ground the exposed shield section on the widest contact surface as shown below.

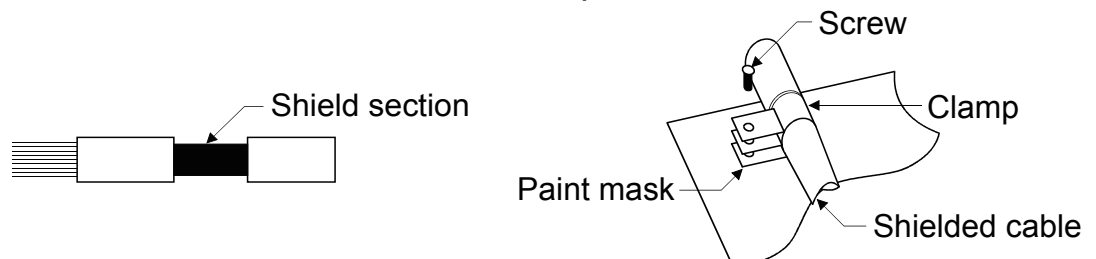


Refer to (b) for grounding of the shield.

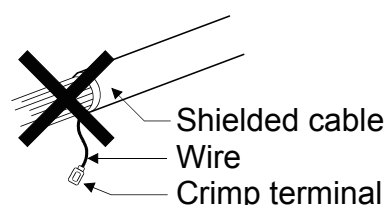
(b) Grounding of shield of shielded cable

(1) Ground the shield of the shielded cable as close to the module as possible to avoid the electromagnetic induction from ungrounded cables.

(2) Take an appropriate measure so that the stripped shield section can be grounded to the control panel in the largest area as possible. A clamp may be used as shown below. In this case, however, mask the contact part when painting the inner surface of the control panel to allow it to contact with the clamp.



Note) 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.



1. Overview

This manual explains how to install the QJ71MT91 MODBUS®/TCP Interface Module (hereinafter referred to as QJ71MT91) and how to wire it to other devices. MODBUS is a registered trademark of Schneider Electric SA.

(Product Configuration)

Model	Item name	Quantity
QJ71MT91	QJ71MT91 MODBUS®/TCP interface module	1

2. Performance Specifications

The following describes the performance specifications of the QJ71MT91. For the general specifications of the QJ71MT91, refer to the user's manual of the CPU module used.

Item		Specifications		
		10BASE-T	100BASE-TX	
Transmission specifications	Data transmission rate	10Mbps	100Mbps	
	Transmission method	Base band		
	Maximum node-to-node distance	200m (656.16ft.)		
	Maximum segment length*1	100m (328.08ft.)		
	Number of cascade connection stages	Max. 4 stages	Max. 2 stages	
	Maximum number of connections*2	64 connections		
	Number of routers that can be set	1 default router + any 8 routers		
	Cable	Cable compliant with the IEEE802.3 10BASE-T Standard (unshielded twisted pair cable (UTP cable), Category 3 (4, 5))	Cable compliant with the IEEE802.3 100BASE-TX Standard (shielded twisted pair cable (STP cable), Category 5)	
Connector applicable for external wiring		RJ45		
Master function	Automatic communication function	Number of slaves *3	64 slaves	
		Function (for send)	7 functions	
		Input area size	4k words	
		Output area size	4k words	
	Dedicated instruction	Number of instructions that can be executed concurrently *4	Up to 8 instructions	
		Function (for send)	MBRW instruction: 9 functions MBREQ instruction: 19 functions	
		Input area size	Max. 253 bytes per instruction	
		Output area size	Max. 253 bytes per instruction	

*1: Length between a hub and a node.

*2: Indicates the number of TCP connections that can be established simultaneously.

*3: Indicates the maximum number of slaves that can be communication targets.

*4: Indicates the maximum number of dedicated instructions that can be started simultaneously from a sequence program.

Item		Specifications	
		10BASE-T	100BASE-TX
Slave function	Automatic response function	Function (for receive)	12 functions
	MODBUS [®] device size	Coil	64k points
		Input	64k points
		Input register	64k points
		Holding register	64k points
		Extended file register	Max. 4086k points
No. of simultaneously acceptable request messages		64	
GX Developer connection function	Number of simultaneously connectable GX Developers		Max. 8 GX Developers
Number of occupied I/O points		32 points	
5VDC internal current consumption		0.52A	
External dimensions		98 (3.86 in.)(H) × 27.4 (1.08 in.)(W) × 90 (3.54 in.)(D) [mm]	
Weight		0.11kg	

3. Mounting and Installation

3.1 Handling Precautions

- (1) Since the case of the QJ71MT91 is made of resin, do not drop or give it hard impact.
- (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
Module fixing screw (normally not required) (M3 screw) (*1)	0.36 to 0.48N · m

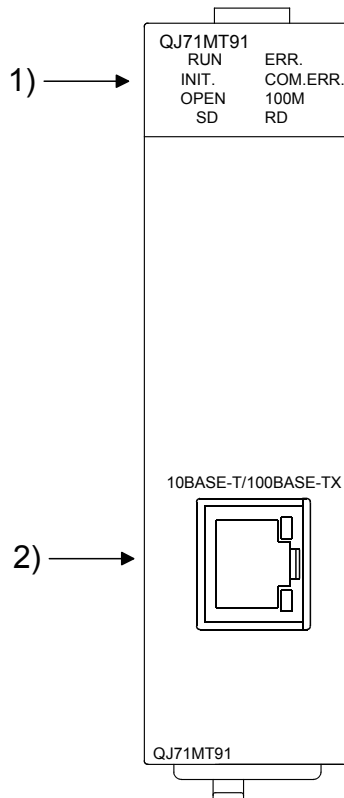
*1: The module can be easily fixed onto the base unit using the hook at the top of the module. However, it is recommended to secure the module with the module fixing screw if the module is subject to significant vibration.

3.2 Installation Environment

Refer to the user's manual of the CPU module used.

4. Part Names

This section indicates the names of the QJ71MT91 parts.



	Name	Description
1)	Indicator LEDs	Refer to the following section, (1) Indications of indicator LEDs.
2)	10BASE-T/100BASE-TX connector (RJ45) *1	Connector for connection of the QJ71MT91 to 10BASE-T/100BASE-TX. (The QJ71MT91 detects whether 10BASE-T or 100BASE-TX is used according to the hub.)

*1: The LED on the connector is not lit.

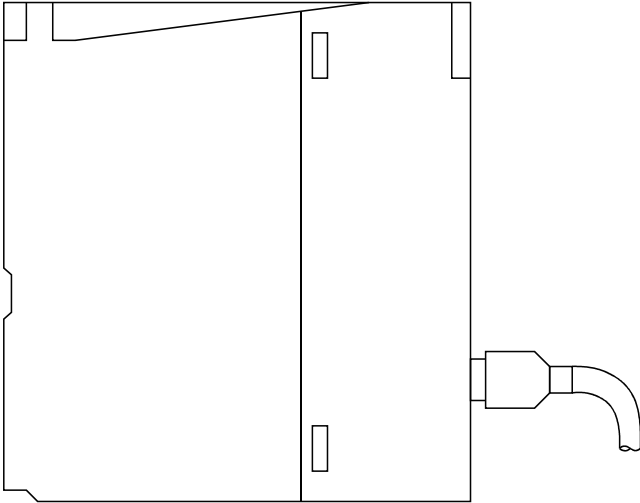
(1) Indications of indicator LEDs

QJ71MT91	
RUN	<input type="checkbox"/> <input type="checkbox"/> ERR.
INIT.	<input type="checkbox"/> <input type="checkbox"/> COM.ERR.
OPEN	<input type="checkbox"/> <input type="checkbox"/> 100M
SD	<input type="checkbox"/> <input type="checkbox"/> RD

LED Name	Indication	ON	OFF
RUN	Operation status	Normal	Error
INIT.	Initial processing status	Normal completion of basic parameter setting	Basic parameter setting in progress or nonexistent
OPEN	TCP connection open status	Presence of open TCP connection	Absence of open TCP connection
SD	Send status	Data send in progress	Data not yet sent
ERR.	Setting error status	Error	Normal setting
COM.ERR.	Communication error status	Communication error occurrence	Normal communication in progress
100M	Transmission speed	100Mbps	10Mbps or not connected
RD	Receive status	Data receive in progress	Data not yet received

5. Connection to Ethernet

This section explains how to connect the QJ71MT91 to 100BASE-TX or 10BASE-T network.



<Operation procedures>

- 1) Connect the twisted pair cable to the hub.
- 2) Connect the twisted pair cable to the QJ71MT91.

POINT

- (1) Sufficient safety measures must be taken for 100BASE-TX or 10BASE-T installation work.
Consult a specialist when connecting cable terminals or installing trunk line cables, etc.
- (2) The QJ71MT91 detects whether 10BASE-T or 100BASE-TX, and the full or half duplex communication mode is used according to the hub.
For connection with the hub that does not support the auto negotiation function, set the half duplex communication mode on the hub side.

6. Setting from GX Developer

In order to use the QJ71MT91, make the intelligent function module switch setting from GX Developer.

Switch No.	Description	Initial value	Reference
Switch 1	Operation mode setting	0000H	(1) in this section
Switch 2	Communication condition setting	0000H	(2) in this section
Switch 3	IP address setting (high order)	C001H	(3) in this section
Switch 4	IP address setting (low order)	00FEH	
Switch 5	No setting (blank).	-	-

(1) Operation mode setting (Switch 1)

Set the operation mode of the QJ71MT91, such as the online or offline mode.

Set value *	Item	Description
0000H	Online	Normal operation mode. Communicates with the target device.
0001H	Offline	Disconnects the local station from the network. In the offline mode, parameter setting cannot be executed. Communication with the other station is not available, either.
000DH	Hardware test	Tests the RAM and ROM of the QJ71MT91.
000EH	Self-loopback test	Checks the hardware including the send/receive circuits of the QJ71MT91

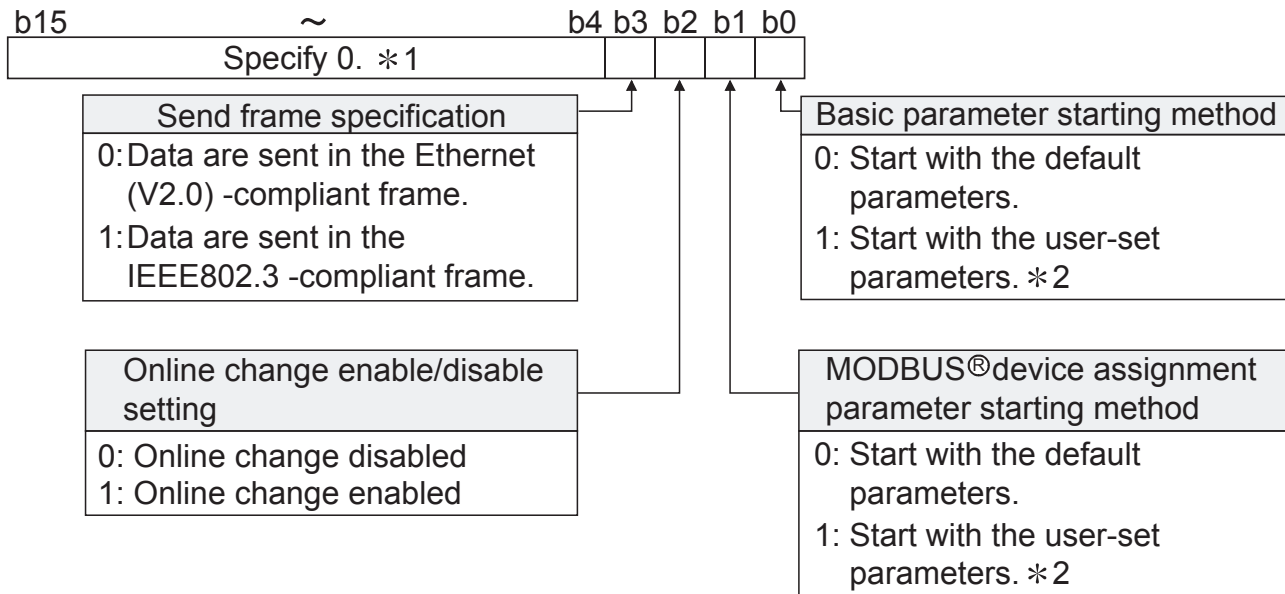
*: A switch 1 error (error code: 7301H) will occur if the set value is other than the value indicated in the table.

If the switch error has occurred, correct the switch setting and then switch the power OFF and ON or reset the programmable controller CPU.

(2) Communication condition setting (Switch 2)

Specify the starting methods, the send frame, and the online change enable/disable setting.

<Switch 2>



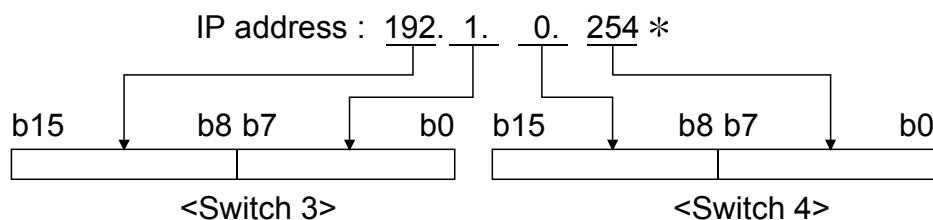
*1 : The information in this area is ignored.

However, if the setting in this area is other than 0, a switch 2 error (error code: 7302H) occurs. If the switch error has occurred, correct the switch setting and then switch the power OFF then ON or reset the programmable controller CPU.

*2 When setting parameters by GX Configurator-MB, set 1 to both b0 and b1.

(3) IP address setting (Switch 3, Switch 4)

Set the IP address of the QJ71MT91 on the local station.

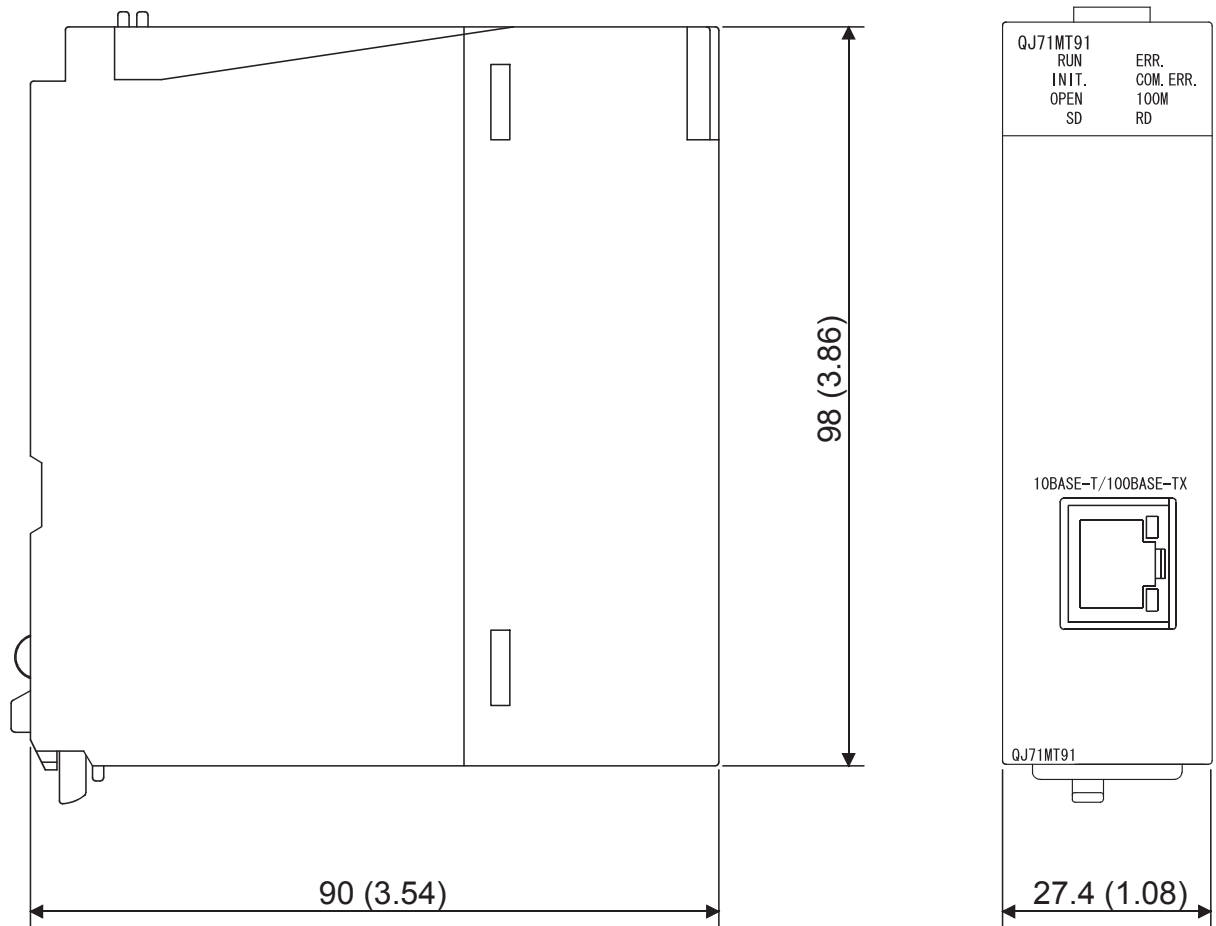


*: Set the value that satisfies the following conditions.

- Condition 1: The IP address class is any of A, B and C.
- Condition 2: All the host address bits are not "0" or "1".

If the conditions are not satisfied, a switch 3.4 error (7303H) will occur. In such a case, correct the switch setting and then switch the power OFF then ON or reset the programmable controller CPU.

7. External Dimensions



(Unit: mm (in.))

Ethernet is a trademark of Xerox Corporation.
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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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