

mitsubishi

PROFIBUS-DP Slave Module

User's Manual
(Installation)

QJ71PB93D

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

MODEL	QJ71PB93D-U-H-JE
MODEL CODE	13JT96
IB(NA)-0800230-A(0204)MEE	

● SAFETY PRECAUTIONS ●

(Always read before starting use)

When using this equipment, thoroughly read this manual. Also pay careful attention to safety and handle the module properly.

These precautions apply only to this equipment.

Refer to the user's manual of the CPU module to use for a description of the PLC system safety precautions.

These "Safety Precautions" classify the safety precautions into two categories: "DANGER" and "CAUTION".




DANGER

Procedures which may lead to a dangerous condition and cause death or serious injury, if not carried out properly.



CAUTION

Procedures which may lead to a dangerous condition and cause superficial to medium injury, or physical damage only, if not carried out properly.

Depending on circumstances, procedures indicated by  **CAUTION** may also be linked to serious results.

In any case, it is important to follow the directions for usage.

Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

[INSTALLATION PRECAUTIONS]

CAUTION

- Use the PLC in the environment defined in the general specifications given in the 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.
- Load the module by holding down the module loading lever at the bottom of the module and securely inserting the module fixing hook into the fixing hole of the base unit.
Incorrect loading of the module can cause a malfunction, failure or drop.
Screw the module when using it in an environment of frequent vibration.
- Tighten the screws within the range of specified torque.
If the screws are loose, it may cause the module to fallout, short circuits, or malfunction.
If the screws are tightened too much, it may cause damage to the screw and/or the module, resulting in fallout, short circuits or malfunction.
- Switch all phases of the external power supply off when mounting or removing the module.
Not doing so may cause electric shock or damage to the module.
- Do not touch the conductive area or electric parts of the module.
Doing so may cause module malfunctioning or breakdowns.

[WIRING PRECAUTIONS]

CAUTION

- Switch all phases of the external power supply of the PLC system off before connecting the PROFIBUS cable. If you not switch off the external power supply, it will cause failure or malfunction of the module.
- Be careful not to let foreign matter such as filings or wire chips get inside the module. These can cause fire, breakdowns and malfunctioning.
- The PROFIBUS cable which is connected to the module must be protected with a duct or secured in position with clamps.
Unless the cable is thus protected or secured, the module or the cable could be damaged when the cable swings, moves or it is strained with careless pulls, or it could cause malfunction when the cable contacts with any undesirable objects.
- When disconnecting the PROFIBUS cable from the module, do not pull by holding the cable section. To disconnect the cable, make sure to hold the connector which is coupled with the module. Do not attempt to pull the cable to disconnect it from the module. It could damage the module or the cable, or cause malfunction due to a poor contact of the cable.
- An ingress prevention label is applied to the module top to prevent the ingress of foreign matter, such as wire-offcuts, into the module during wiring.
Do not peel off this label during wiring.
Before starting system operation, always peel off this label since heat will be dissipated.

Revisions

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

Print Date	*Manual Number	Revision
Apr.2002	IB(NA)-0800230-A	First printing

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CONTENTS

- 1. Overview 1
- 2. Performance Specifications..... 2
- 3. Installation..... 3
 - 3.1 Handling precautions 3
 - 3.2 Installation environment..... 3
- 4. Part Names and Settings 4
- 5. Wiring..... 5
 - 5.1 Precautions against wiring..... 5
 - 5.2 PROFIBUS cable wiring 6
- 6. Outline Drawings..... 7

About the Manuals

The following product are available for this equipment.
Refer to the table given below to choose suitable manuals.

Detailed Manual

Manual name	Manual No. (Model code)
PROFIBUS-DP Slave Module User's Manual	SH-080318E (13JR57)

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 User's Manual (Hardware) for the CPU module to use.

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 is the user's manual for the QJ71PB93D PROFIBUS-DP slave module (hereafter abbreviated as "QJ71PB93D"), which is used to connect a MELSEC-Q series programmable controller to a PROFIBUS-DP network.

The QJ71PB93D operates as a slave station in the PROFIBUS-DP network. After unpacking QJ71PB93D, verify that the following parts are contained.

Model name	Product name	No. of items
QJ71PB93D	QJ71PB93D type PROFIBUS-DP slave module	1

2. Performance Specifications

The performance specifications of the QJ71PB93D are indicated below.
For the general specifications of the QJ71PB93D, refer to the user's manual of the used CPU module.

Item		Specifications			
Model		QJ71PB93D			
PROFIBUS-DP station type		Slave station			
Transmission specifications	Electrical standards and characteristics	Complies with EIA-RS485			
	Medium	Shielded twisted cable (Type A)			
	Network configuration	Bus (however, tree type when a repeater is used)			
	Data link method	Polling method			
	Transmission encoding method	NRZ			
	Transmission speed/maximum transmission distance ^{*1 *2}	Transmission speed	Transmission distance [m/segment]	Maximum transmission distance when 3 repeaters are used [m/network]	
		9.6 [kbps]	1200	4800	
		19.2 [kbps]			
		45.45 [kbps]			
		93.75 [kbps]			
		187.5 [kbps]	1000	4000	
		500 [kbps]	400	1600	
		1500 [kbps]	200	800	
		3 [Mbps]	100	400	
	6 [Mbps]				
12 [Mbps]					
Maximum number of repeaters/network	3 units ^{*2}				
Maximum number of stations/segment	32 stations (including repeaters)				
Number of connection nodes/segments	32				
Station numbers that may be set	0 to 125 ^{*3}				
Max. number of data that may be communicated	Number of I/O data is 192 words in total. (Number of input or output data is up to 122 words.)				
Number of occupied I/O	32 points (I/O assignment : 32 intelligent points)				
5VDC Internal power consumption	0.44 [A]				
External dimensions	105(H) × 27.4(W) × 97.5(D) [mm]				
Weight	0.11 [kg]				

*1: Transmission speed control within +/- 0.3% (EN50170 Volume 2 compliant)

*2: Distance that the transmission distance can be expanded by (m/network) using repeaters
Transmission distance (m/network) = (number of repeaters + 1) × transmission distance (m/segment)

*3: Factory-set to "126" (EN50170 Volume 2 compliant)

For the noise immunity, withstand voltage, insulation resistance and others in the PLC system using this module, refer to the power supply module specifications given in the used CPU module user's manual.

3. Installation

The following section explains the precautions when handling the QJ71PB93D, from the time they are unpacked until they are installed.

For more details on the module installation, see the user's manual for the CPU module used.

3.1 Handling precautions

- (1) Do not drop the module case or subject it to heavy impact since it is made of resin.
- (2) Do not remove the PCB of each module from its case. This may cause a failure in the module.
- (3) Be careful not to let foreign objects such as wire burrs enter the module during wiring. In the event any foreign object enters, remove it immediately.
- (4) The top surface of the module is covered with a protective film to prevent foreign objects such as wire burrs from entering the module during 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.
- (5) Tighten the module mounting screws and connector mounting screws using torque within the following ranges.

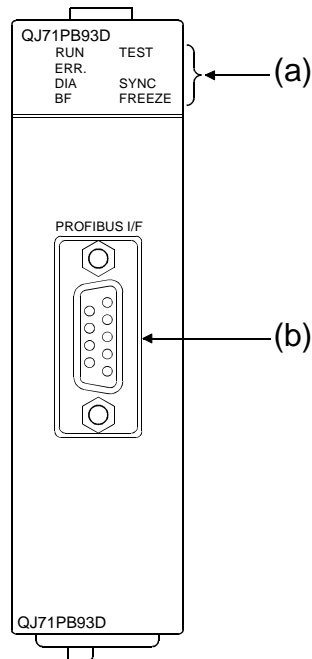
Screw location	Tightening torque range
Module mounting screws (M3 screws)	36 to 48 N · cm
PROFIBUS cable connector mounting screws (#4 - 40UCN)	20 to 28 N · cm

3.2 Installation environment

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

4. Part Names and Settings

Following is an explanation of the QJ71PB93D part names and settings.



No.	Name	Description	Remark	
(a)	LED	Displays the QJ71PB93D status.		
		Name	Display description	
		RUN	Displays the A1SJ71PB93D operation status. On: Normal Off: Watch dog timer error occurrence	
		ERR.	On: Parameter setting error or module error occurrence Off: Normal	
		SYNC	On: During SYNC mode	
		FREEZE	On: During FREEZE mode	
		DIA	On: Extended fault information present Off: Extended fault information absent (Related item: Section 3.4.2 (9))	
		BF	On: Before data communication or communication error detected Off: During data communication	
		TEST	On: During execution of self-diagnostics	
(b)	PROFIBUS interface connector	Connector for connecting the table for the PROFIBUS-DP network.	*1	

*1: For the connector type, use a male D-Sub 9 pin. The PROFIBUS cable must be created by the user. (for information regarding the cable wiring, refer to Item 5.5.)

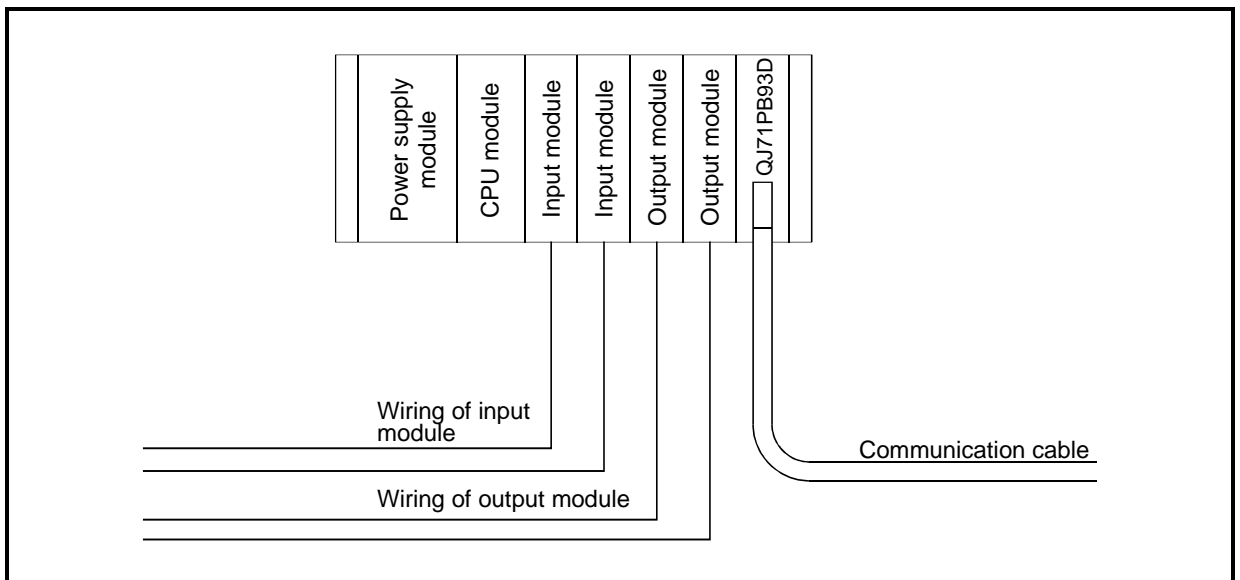
The size of the screw which can be used for the connector is #4-40 UNC.

5. Wiring

5.1 Precautions against wiring

As one of the requirements to give full play to QJ71PB93D's functions and make up the system with high reliability, it is necessary to have an external wiring unsusceptible to an influence of noise. Precautions against external wiring of QJ71PB93D is described below.

- (1) Do not route the wire of QJ71PB93D close to or bundle it together with the main circuit and high-tension lines, or the load-carrying lines from other than the PLC. Otherwise, the module may be susceptible to an influence of noise and surge induction.
- (2) The wires from the input/output modules of the PLC should be away from the communication cable as far as possible as shown in the figure below.



- (3) Grounding
 - (a) When using the QJ71PB93D, basically ground the FG and LG terminals of the power supply module of the PLC.
 - (b) Grounding the module and other device with the same FG terminal may apply noise through the FG terminal and result in a communication error. If this error occurs, disconnect the FG terminal from the module.

5.2 PROFIBUS cable wiring

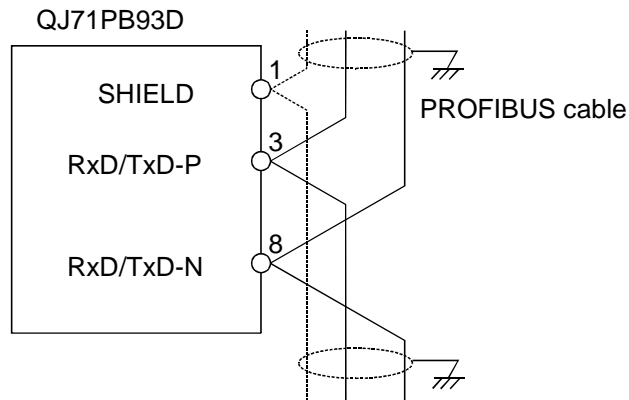
This section explains the wiring to PROFIBUS connector for the QJ71PB93D

(1) Pin assignments for the connector

Pin No.	Name	Application
1	SHIELD	Shield, Protective Ground
2	Vacancy	—
3	RxD/TxD-P	Receive/Transmit Data-P
4	Vacancy	—
5	DGND ^{*1}	Data Ground
6	VP ^{*1}	Voltage-Plus
7	Vacancy	—
8	RxD/TxD-N	Receive/Transmit Data-N
9	Vacancy	—

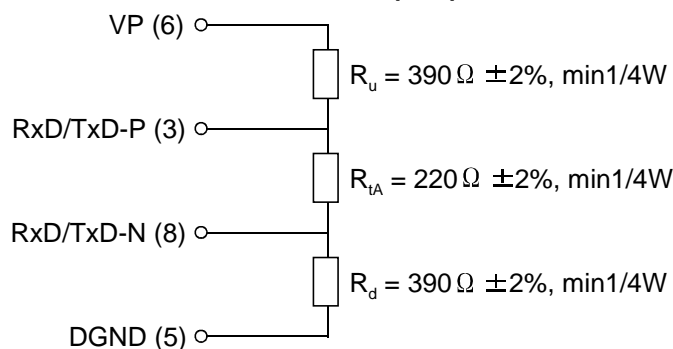
*1: The signals are used when termination resistors are connected.

(2) Wiring



(3) Termination resistor

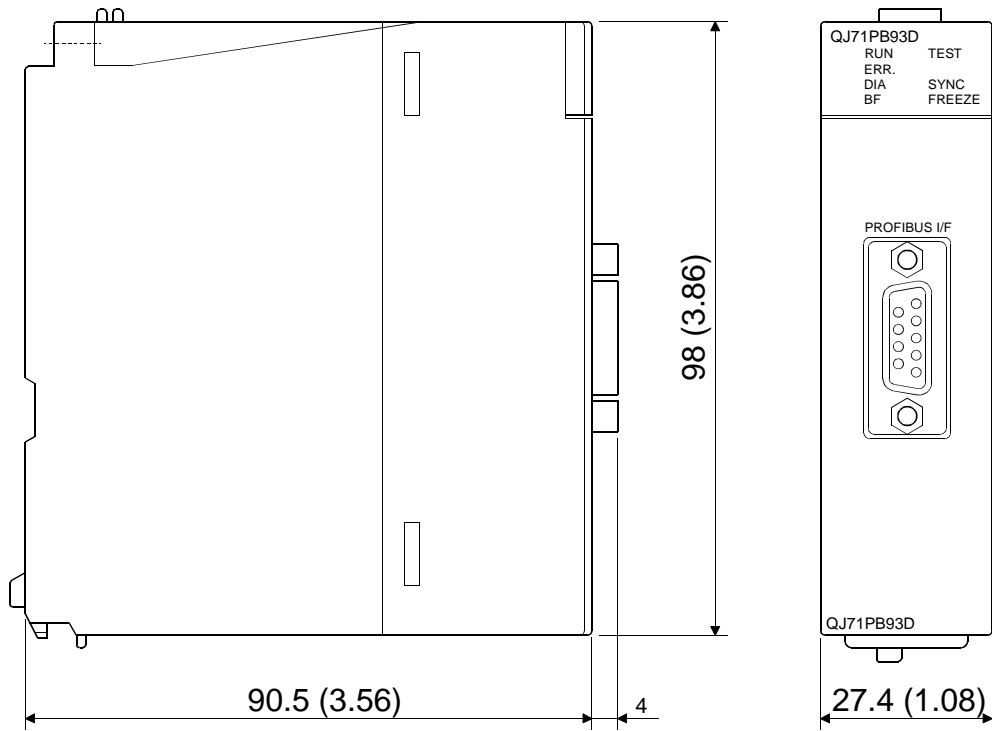
The termination resistor is to be user-prepared.



REMARK

- Please use the PROFIBUS cable (Type A) with braided shield.

6. Outline Drawings



Unit: mm (inch)

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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