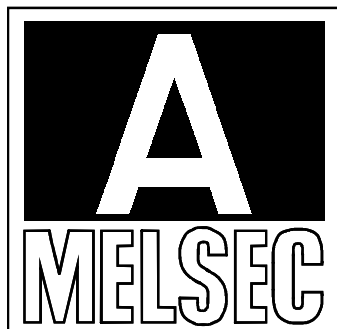# MITSUBISHI

PROFIBUS-DP
Slave Module

User's Manual

(Hardware)

A1SJ71PB93D

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	A1SJ71PB93D-U-H
MODEL CODE	13JT73
IB(NA)-0800205-A(0109)MEE	

A **MELSEC**

• SAFETY PRECAUTIONS •
(Read these precautions before using.)

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 given in this manual are concerned with this product. For the safety instructions of the programmable controller system, please read the CPU module user's manual.
In this manual, the safety instructions are ranked as "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.

Note that the ⚠ CAUTION level may lead to a serious consequence according to the circumstances.
Always follow the instructions of both levels because they are important to personal safety.
Please save this manual to make it accessible when required and always forward it to the end user.

[INSTALLATION PRECAUTIONS]

⚠ CAUTION
• Use the PLC in an environment that meets the general specifications contained in the CPU 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 securely inserting the module fixing hook at the bottom of the module into the fixing hole of the base unit. Always screw the module to the base unit to the specified torque. • 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 ding 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.

Revisions

∗ The manual number is given on the bottom left of the back cover.

Print Date	∗Manual Number	Revision
Sep., 2001	IB(NA)-0800205-A	First printing

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CONTENTS

About the 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)
A1SJ71PB93D type PROFIBUS-DP Slave Module User's Manual	SH-080195 (13JR47)

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 manual explains how to handle the PROFIBUS-DP Slave module, model numbers A1SJ71PB93D (hereinafter referred to as A1SJ71PB93D).
After unpacking A1SJ71PB93D, confirm that the following products are enclosed.

Model number	Description	Quantity
A1SJ71PB93D	Model A1SJ71PB93D PROFIBUS-DP Slave module	1

2. PERFORMANCE SPECIFICATIONS

The performance specifications of the A1SJ71PB93D are indicated below.

Item		Specifications		
Model		A1SJ71PB93D		
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.)		

Item	Specifications
Flash ROM write count	Max. 10000 times
Number of occupied I/O	32 points (I/O assignment : 32 Special points)
5VDC Internal power consumption (A)	0.36
External dimensions (mm)	130(H) × 34.5(W) × 93.6(D)
Weight (kg)	0.18

*1 Transmission speed control within +/- 0.3% (EN50170Volume2 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)
For the general specifications, noise immunity, withstand voltage, insulation resistance and others in the PLC system using this module, refer to the used CPU module user's manual.

3. INSTALLATION

The following section explains the precautions when handling the A1SJ71PB93D, from the time they are unpacked until they are installed.
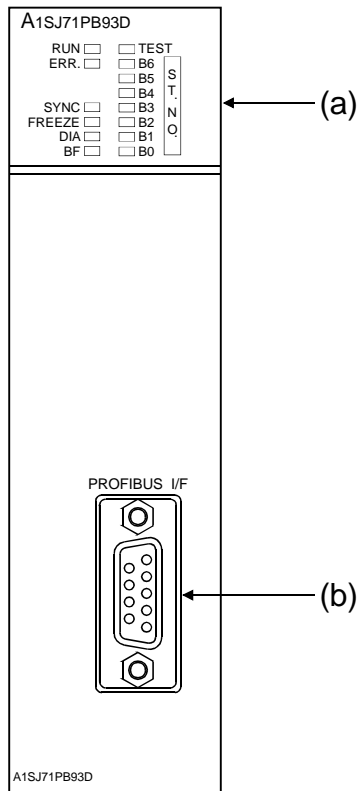For more details on the module installation, see the user's manual for the PLC CPU used.

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) Tighten the module mounting screws and connector mounting screws using torque within the following ranges.

Screw location	Tightening torque range
Module mounting screws (M4 screws)	78.4 to 117.6 N・cm
PROFIBUS cable connector mounting screws (#4 - 40UCN)	20 to 28 N・cm

4. PART NAMES AND SETTINGS

Following is an explanation of the A1SJ71PB93D part names and settings.

```
┌─────────────────────────┐
│ A1SJ71PB93D             │
│  RUN☐  ☐TEST            │
│  ERR.☐ ☐B6    ┌─┐       │
│        ☐B5    │S│       │
│        ☐B4    │T│              (a)
│  SYNC☐ ☐B3    │N│  ◄──────────
│ FREEZE☐☐B2    │O│       │
│   DIA☐ ☐B1    └─┘       │
│    BF☐ ☐B0              │
├─────────────────────────┤
│                         │
│                         │
│                         │
│                         │
│      PROFIBUS I/F       │
│        ┌─────┐          │
│        │ ◎   │          │
│        │ ○   │          │
│        │ ○   │                 (b)
│        │ ○   │  ◄──────────
│        │ ○   │          │
│        │ ◎   │          │
│        └─────┘          │
│                         │
│                         │
│                         │
│ A1SJ71PB93D             │
└─────────────────────────┘
```

3

| No.	Name	Description		Remark
(a)	LED	Displays the A1SJ71PB93D status.		
		Name	Display description	
		RUN	Displays the A1SJ71PB93D operation status. On: Normal Off: Module WDT 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: During extended fault notification processing	
		BF	On: Before data communication or communication error detected Off: During data communication	
		TEST	On: During execution of self-diagnostics	
		B6 to B0	Indicate the station number of the host in binary. Example: Station No. 85 (55H) ■ B6 □ B5 ■ B4 □ B3 ■ B2 □ B1 ■ B0	
(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 5.2.)
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 A1SJ71PB93D'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 A1SJ71PB93D is described below.

(1) Do not route the wire of A1SJ71PB93D 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.
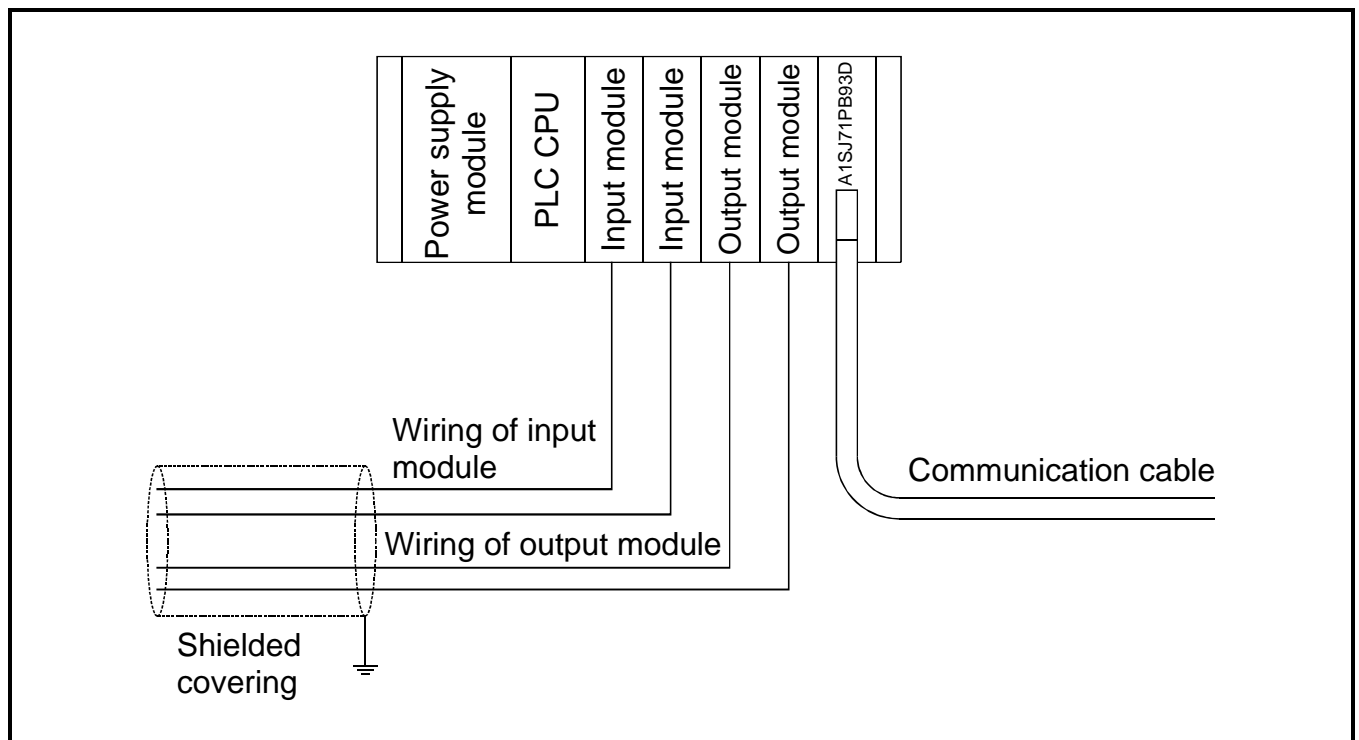
(3) Grounding

    (a) When the A1SJ71PB93D is used, the FG and LG terminals of the power supply module of the PLC should basically be grounded.

    (b) If communication cannot be performed after grounding because of abnormal voltage applied to the FG terminal, the module may be used without grounding.

5.2 PROFIBUS Cable Wiring

This section explains the wiring to PROFIBUS connector for the A1SJ71PB93D

(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.
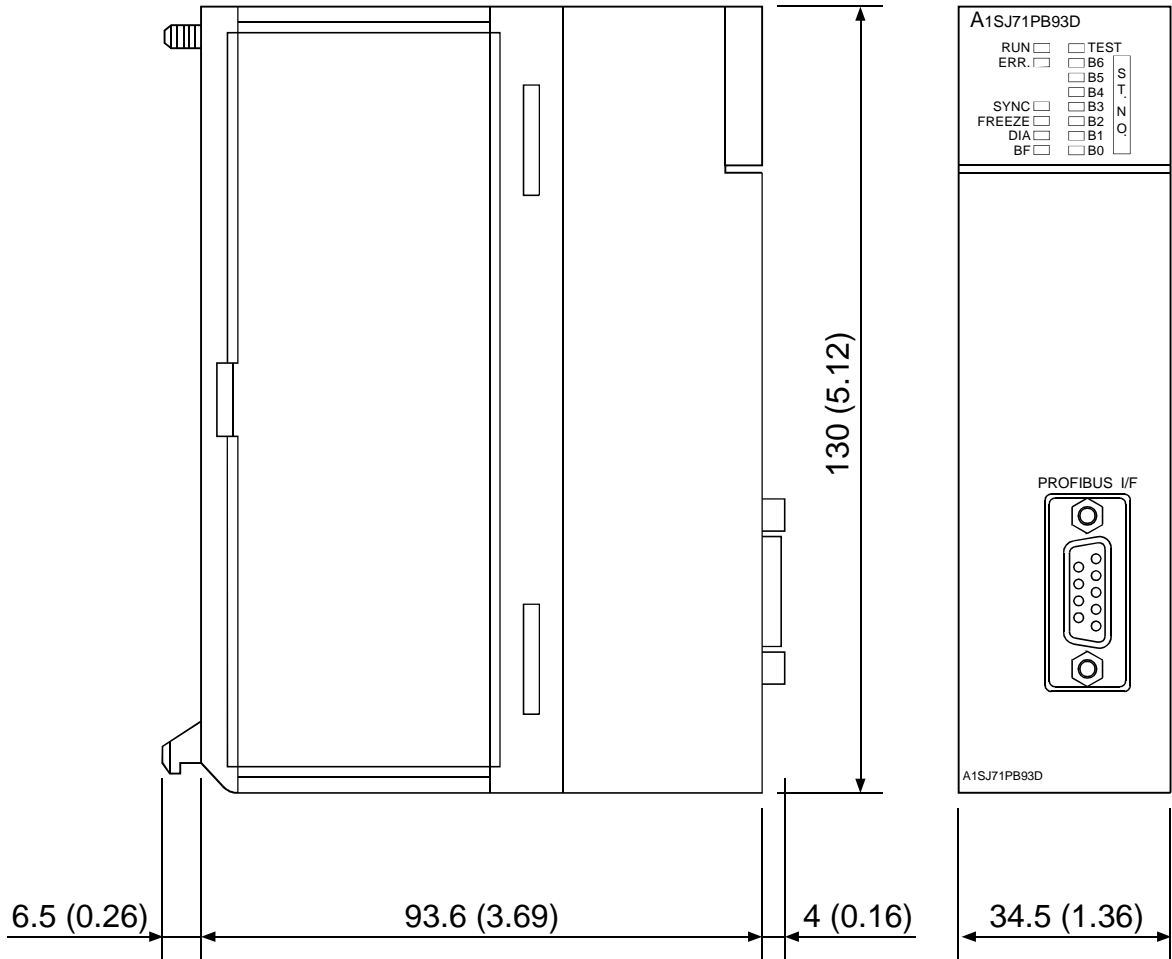
(2) Wiring

A1SJ71PB93D

SHIELD 1

RxD/TxD-P 3

RxD/TxD-N 8
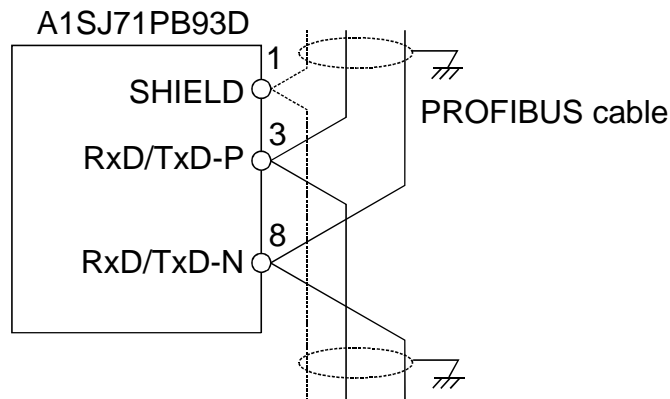
PROFIBUS cable

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

(3) Termination resistor

VP (6)

$R_u = 390\Omega \pm 2\%$, min1/4W

RxD/TxD-P (3)

$R_{tA} = 220\Omega \pm 2\%$, min1/4W

RxD/TxD-N (8)

$R_d = 390\Omega \pm 2\%$, min1/4W

DGND (5)

6. OUTLINE DRAWINGS

130 (5.12)

6.5 (0.26)   93.6 (3.69)   4 (0.16)   34.5 (1.36)

A1SJ71PB93D

RUN ☐   ☐ TEST
ERR. ☐   ☐ B6
         ☐ B5
         ☐ B4
SYNC ☐   ☐ B3
FREEZE ☐ ☐ B2
DIA ☐   ☐ B1
BF ☐   ☐ B0

S
T
N
O

PROFIBUS I/F

A1SJ71PB93D
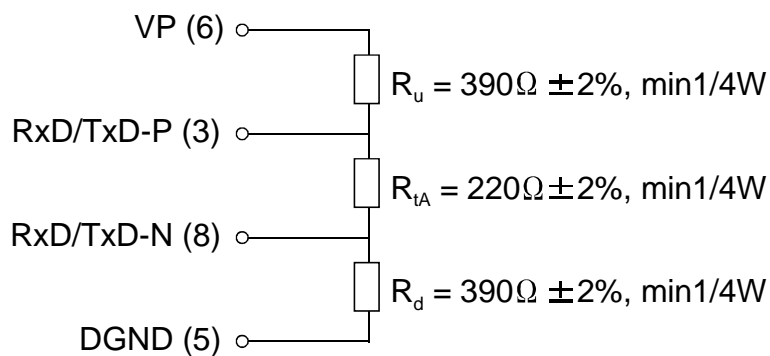
Unit : mm (inch)

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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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