MITSUBISHI

Pt 100 Temperature Input Module Type AJ65BT-64RD3/AJ65BT-64RD4

Mitsubishi General-Purpose Programmable Controller

User's Manual

(Hardware)

Thank you for purchasing the Mitsubishi general-purpose programmable controller MELSEC-A series.

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

Type	AJ65BT64RD-U-HW-E
Type Code	13JL50
IB (NA)-66831-E(0810) MEE	

● SAFETY PRECAUTIONS ●

(Read these precautions before using this product.)

Before using this product, please read this manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly.
These precautions apply only to Mitsubishi equipment. Refer to the CPU module user's manual for a description of the programmable controller system safety precautions.
In this manual, the safety precautions are classified into two levels: "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 minor or moderate injury or property damage.**

Under some circumstances, failure to observe the precautions given under "⚠CAUTION" may lead to serious consequences.
Observe the precautions of both levels because they are important for personal and system safety.
Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

[Design Precautions]

⚠DANGER

- In the case of a communication failure in the network, data in the master module are held.
  Check the communication status information (SB, SW) and configure an interlock circuit in the sequence program to ensure that the entire system will operate safely.

⚠CAUTION

- Do not install the control lines or communication cables together with the main circuit lines or power cables.
  Keep a distance of 100mm (3.94 inches) or more between them.
  Failure to do so may result in malfunction due to noise.

[Installation Precautions]

⚠CAUTION

- Use the module in an environment that meets the general specifications in this manual.
  Failure to do so may result in electric shock, fire, malfunction, or damage to or deterioration of the product.·
- For protection of the switches, do not remove the cushioning material before installation.
- Securely fix the module with a DIN rail or mounting screws. Tighten the screws within the specified torque range.
  Undertightening can cause drop of the screw, short circuit or malfunction.
  Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- Do not directly touch any conductive part of the module.
  Doing so can cause malfunction or failure of the module.

[Wiring Precautions]

⚠CAUTION

- Shut off the external power supply for the system in all phases before wiring.
  Failure to do so may result in damage to the product.
- After installation or wiring, attach the included terminal cover to the module before turning it on for operation.
  Undertightening can cause short circuit or malfunction.
- Ground the FG terminals to the protective ground conductor dedicated to the programmable controller.
  Failure to do so may result in malfunction.
- Use applicable solderless terminals and tighten them within the specified torque range. If any spade solderless terminal is used, it may be disconnected when the terminal screw comes loose, resulting in failure.
- Check the rated voltage and terminal layout before wiring to the module, and connect the cables correctly.
  Connecting a power supply with a different voltage rating or incorrect wiring may cause a fire or failure.
- Tighten the terminal screw within the specified torque range.
  Undertightening can cause short circuit or malfunction.
  Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- Prevent foreign matter such as dust or wire chips from entering the module.
  Such foreign matter can cause a fire, failure, or malfunction.
- Place the cables in a duct or clamp them.
  If not, dangling cable may swing or inadvertently be pulled, resulting in damage to the module or cables or malfunction due to poor contact.
- Do not install the control lines or communication cables together with the main circuit lines or power cables. Failure to do so may result in malfunction due to noise.
- When disconnecting the cable from the module, do not pull the cable by the cable part. Loosen the screws of connector before disconnecting the cable.
  Failure to do so may result in damage to the module or cable or malfunction due to poor contact.

[Startup and Maintenance precautions]

⚠CAUTION

- Do not touch any terminal while power is on.
  Doing so may cause malfunction.
- Shut off the external power supply for the system in all phases before cleaning the module or retightening the terminal screws.
  Failure to do so may cause the module to fail or malfunction.
  Undertightening the terminal screws can cause short circuit or malfunction.
  Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.
- Do not disassemble or modify the modules.
  Doing so may cause failure, malfunction, injury or a fire.
- Do not drop or apply any strong shock to the module.
  Doing so may damage the module.
- Shut off the external power supply for the system in all phases before mounting or removing the module to or from the panel.
  Failure to do so may cause the module to fail or malfunction.
- Mounting/removing the terminal block is limited to 50 times after using a product. (IEC61131-2-compliant)
- Before handling the module, touch a grounded metal object to discharge the static electricity from the human body.
  Failure to do so may cause the module to fail or malfunction.

[Disposal Precautions]

⚠CAUTION

- When disposing of this product, treat it as industrial waste.

About Manuals

The following product manuals are available.

Detailed Manual

Manual Name	Manual No. (Model Code)
Pt 100 Temperature Input Module Type AJ65BT-64RD3/AJ65BT-64RD4 User's Manual	SH-4001 (13JL54)

Related Manual

Manual Name	Manual No. (Model Code)
AJ61BT11/A1SJ61BT11 CC-Link System Master · Local Module User's Manual	IB-66721 (13J872)
AJ61QBT11/A1SJ61QBT11 CC-Link System Master · Local Module User's Manual	IB-66722 (13J873)
CC-Link System Master/Local Module User's Manual type QJ61BT11N	SH-080394E (13JR64)

1. Overview

This user's manual explains the specifications, part identification and wiring for the products listed below, which are used as remote device stations for the CC-Link system:

- AJ65BT-64RD3 Platinum Temperature-Measuring Resistor Pt 100 Temperature Input Module
  (abbreviated as AJ65BT-64RD3 from here on)
- AJ65BT-64RD4 Platinum Temperature-Measuring Resistor Pt 100 Temperature Input Module
  (abbreviated as AJ65BT-64RD4 from here on)

The AJ65BT-64RD3 is a 3-wire system connecting module for the platinum temperature-measuring resistor.
The AJ65BT-64RD4 is a 4-wire system connecting module for the platinum temperature-measuring resistor.
(Hereinafter, the AJ65BT-64RD3 and AJ65BT-64RD4 will be collectively referred to as AJ65BT-64RD.)

The AJ65BT-64RD converts temperature data input from platinum temperature-measuring resistor Pt 100 (abbreviated as Pt 100 from here on) or platinum temperature-measuring resistor JPt 100 (abbreviated as JPt 100 from here on) to 16-bit signed BIN data (up to the first decimal place), or 32-bit signed BIN data (up to the third decimal place).

2. EMC and Low-Voltage Commands

(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 the "EMC AND LOW VOLTAGE DIRECTIVES" chapter of the User's Manual for the CPU module used.
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 the "CC-Link module" section in the "EMC AND LOW VOLTAGE DIRECTIVES" chapter of the User's Manual for the CPU module used.

3. Specification

3.1 Performance Specification

The performance specification of the AJ65BT-64RD is shown below.
And, refer to master module user's manual which is used about the general specification.

Item		AJ65BT-64RD3	AJ65BT-64RD4
Measurement method		3-wire	4-wire
Connectable platinum temperature-measuring resistor		Pt 100, JPt 100	
Output current for detecting temperature		1 mA	
Temperature input range		–180 to 600°C	
Temperature detection value		16-bit signed binary : –1800 to 6000 (value to one decimal place × 10)	
		32-bit signed binary : –180000 to 600000 (value to three decimal places × 1000)	
Overall accuracy	Operating ambient temperature (25 ± 5 °C)	± 0.1 % (accuracy for maximum value)	
	Operating ambient temperature (less than 20 °C, more than 30 °C)	± 0.25 % (accuracy for maximum value)	
Resolution		0.025°C	
Conversion speed (Sampling time)		40 ms/channel*1	
Temperature input point		4-channel/module	

Item	AJ65BT-64RD3	AJ65BT-64RD4
CC-Link station type	Remote device station	
Occupied points	4-station : RX/RY 128 points each RWw/RWr 16 points each	
Connection cable	CC-Link dedicated cable	
Dielectric withstand voltage	Between batch power supply system and ground Between batch power supply system and batch communication system Between batch communication system and batch temperature input Between batch temperature input and ground 500 V AC, 1 minute	
Insulation method	Between the platinum temperature-measuring resistor input and CC-Link transmission : photocoupler insulation Between the platinum temperature-measuring resistor input and channel : no insulation	
Insulation resistor	Between batch power supply system and ground Between batch power supply system and batch communication system Between batch communication system and batch temperature input Between batch temperature input and ground 500 V DC, more than 10 MΩ by the insulation resistance taster	
Noise durability	Noise voltage 500 Vp-p, Noise width 1 μs by noise simulator of the noise frequency 25 to 60 Hz	
Connection terminal block	27 points terminal block (M 3.5 × 7 screws)	
Supported cable size	0.75 to 2.00 mm^2	
Supported solderless terminal	RAV 1.25-3.5, RAV 2-3.5 (Conforms to JIS C2805)	
Module mounting screw	M4 × 0.7 mm (0.03 in.) × 16 mm (0.63 in.) Installation in the rail is possible, too.	
Applicable DIN rail	TH35-7.5Fe, TH35-7.5Al, TH35-15Fe (conform to JIS C 2812)	
External power supply	24 V DC (18 to 30 V DC)	
Allowable momentary power failure period	1 ms	
Weight	0.38 (0.84) kg (lb.)	

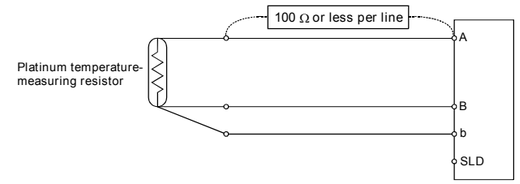
*1 : Conversion speed is the time until it is converted to the corresponding digital value after the temperature has been input, and then stored in the remote register.
When the multiple channels are used, the conversion speed is "40 ms × number of the conversion enable channels"

3.2 Specifications when Connecting to a Platinum Temperature-Measuring Resistor

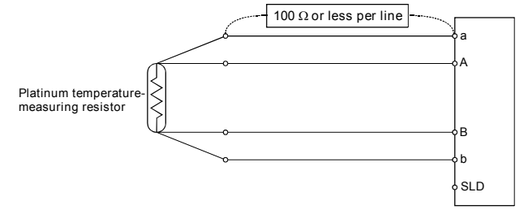
The following explains the specifications when connecting the AJ65BT-64RD and a platinum temperature-measuring resistor.

(1) AJ65BT-64RD3

- The effect on the measured resistance by the discrepancy in the lead resistance value connected to A, b is approximately 0.025 °C/10 mΩ.
- The lead resistance value between platinum temperature measuring resistor and AJ65BT-64RD3 should be 100 Ω or less per line.



(2) AJ65BT-64RD4
The lead resistance value between between platinum temperature-measuring resistor and AJ65BT-64RD4 should be 100 Ω or less per line.



3.3 Applicable Systems

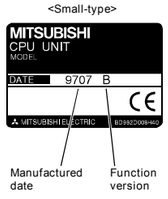
The CC-Link system master modules that the AJ65BT-64RD can use are explained below.

- There are no restrictions when using the Q series master modules (QJ61BT11N, QJ61BT11).
- When using the Q series master modules (AJ61QBT11, A1SJ61QBT11), use one where the symbol shown below (9707 B or later) is recorded in the DATE column on the rating name plate.

The master modules that do not have "9707 B" recorded on the DATE column cannot be used.

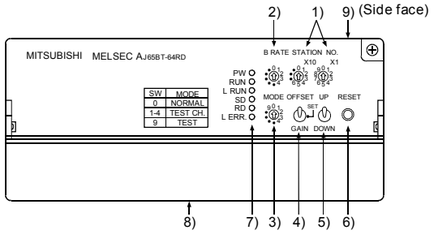
<Large-type>

<Small-type>



4. Name of Each Part

The name of each part in the AJ65BT-64RD is described.



Number	Name	
1)	Station setting switch	
2)	Transmission baud rate setting switch	
3)	MODE switch	
4)	OFFSET/GAIN (Offset/gain) setting switch	
5)	UP/DOWN switch	
6)	RESET switch	
7)	LED for operation status display	PW
		RUN
		L RUN
		SD
		RD
		L ERR.
8)	Terminal block	
9)	Platinum temperature-measuring resistor type specification pin	

5. Handling

5.1 Handling Precautions

(1) Because it is made of resin, do not drop or given a strong shock to the module case and the terminal block.

(2) Do not take the printed circuit board of the module out of the case. It may result in a failure.

(3) Be careful not to let foreign matter such as filings or wire chips get inside the module while wiring. Remove all foreign matters if any get inside.

(4) Tighten the module mounting screws within the following torque range.

Screw area	Tightening torque range
Module mounting screws (M4 screw)	78 to 118 N · cm
Terminal block terminal screws (M3.5 screw)	59 to 88 N · cm
Terminal block mounting screws (M3.5 screw)	98 to 137 N · cm

(5) When using a DIN rail adapter, install the DIN rail considering the precautions described below.

(a) Applicable DIN rail types (conform to JIS C 2812)

TH 35-7.5 Fe
TH 35-7.5 Al
TH 35-15 Fe

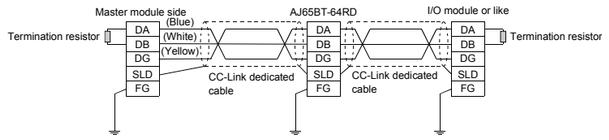
(b) Space between DIN rail mounting screws

When installing a DIN rail, tighten the screws with a space of less than 200 mm (7.9 in.).

6. Wiring

6.1 Wiring Example with CC-Link Module

The twisted cable connections between the AJ65BT-64RD and master module are as follows:



Point

For the modules at both ends of the data link, make sure to connect the "terminal resistor" that is attached to a master module (Connect between DA and DB).

6.2 Precautions when Wiring

To obtain maximum performance from the functions of AJ65BT-64RD and improve the system reliability, a wiring with high durability against noise is required.

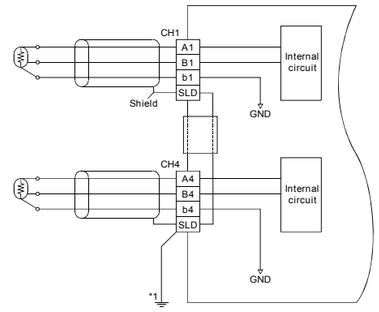
The following describes the external wiring precautions.

(1) Use separate cables for the AC and the external input signals of the AJ65BT-64RD, in order not to be affected by the AC side surge or conductivity.

(2) Always place a platinum temperature-measuring resistor at least 10 cm (3.9 in.) apart from the main circuit line and AC control circuit line. Place a platinum temperature-measuring resistor sufficiently apart from circuits with high frequency, such as high-voltage lines and inverter load main circuits. If they are placed close to each other, the platinum temperature-measuring resistor is influenced more easily by the noise, surge, or conductivity.

6.3 Connecting to the AJ65BT-64RD3

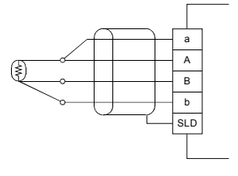
(1) The highest accuracy can be obtained if a 3-wire type platinum temperature-measuring resistor is used for AJ65BT-64RD3.
The following shows a connection example of a 3-wire type platinum temperature-measuring resistor.



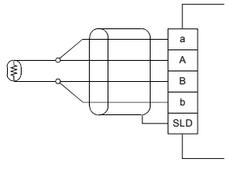
*1 May be better to connect depending on the operating environment.

(2) A 4-wire type or 2-wire type platinum temperature-measuring resistor can also be used for AJ65BT-64RD3.
Connect as shown in the diagrams below when using a 4-wire type or 2-wire type platinum temperature-measuring resistor.

4-wire type

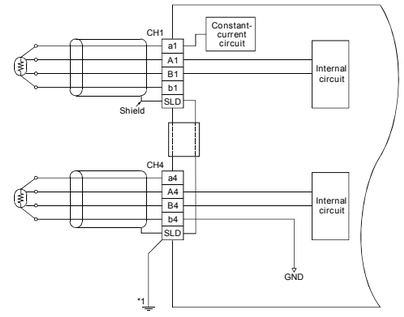


2-wire type



6.4 Connecting to the AJ65BT-64RD4

(1) The highest accuracy can be obtained when if a 4-wire type platinum temperature-measuring resistor is used for AJ65BT-64RD4. The following shows a connection example of a connecting the 4-wire type platinum temperature-measuring resistor.



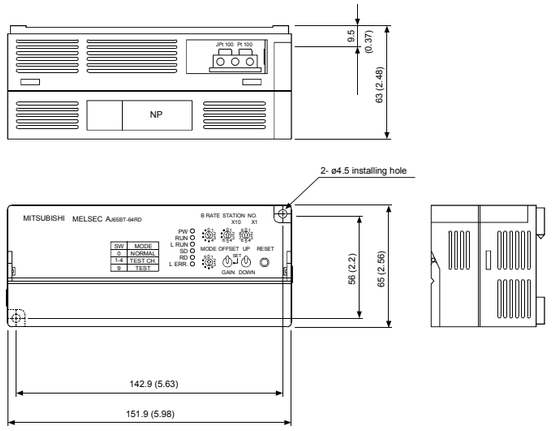
*1 May be better to connect depending on the operating environment.

(2) A 4-wire type or 3-wire type platinum temperature-measuring resistor can also be used for AJ65BT-64RD4.
Connect as shown in the diagrams below when using a 3-wire type or 2-wire type platinum temperature-measuring resistor.

3-wire type

2-wire type

7. External Dimensions Diagram



Unit: mm (in.)

Warranty

Mitsubishi Electric shall not be liable for any loss caused by reasons for which Mitsubishi is not held accountable, lost business opportunities or unrealized gain on the customer's side resulting from failure of the product, or any other damage, secondary disaster, accident, damage to equipment other than the product or disruption of other business operations arising out of special circumstances which may or may not have been predicted at Mitsubishi.

⚠ For safe use of the product

- This product is manufactured as a general-purpose product intended for general industrial use only. It is not designed nor manufactured for use in an equipment or system affecting human lives.
- If you are considering to use this product in equipment or systems for nuclear power generation, power generation, aerospace, medical or passenger transport applications, consult our sales representatives.
- This product is manufactured under our strict quality control system. However, if the product is used in the intended facility in such a way that a failure of the product may lead to serious accident or loss, incorporate backup or fail-safe functions into the system design.

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