



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

Programmable Controller

## User's Manual

(Hardware)

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

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



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### ● 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 Electric 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: "⚠ WARNING" and "⚠ CAUTION".

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

	<b>WARNING</b> <ul style="list-style-type: none"><li>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.</li></ul>
	<b>CAUTION</b> <ul style="list-style-type: none"><li>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.</li></ul>

#### [Installation Precautions]

	<b>CAUTION</b> <ul style="list-style-type: none"><li>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.</li><li>For protection of the switches, do not remove the cushioning material before installation.</li><li>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.</li><li>Do not directly touch any conductive part of the module. Doing so can cause malfunction or failure of the module.</li></ul>
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#### [Wiring Precautions]

	<b>CAUTION</b> <ul style="list-style-type: none"><li>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.</li><li>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.</li><li>Ground the FG terminals to the protective ground conductor dedicated to the programmable controller. Failure to do so may result in malfunction.</li><li>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.</li><li>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.</li></ul>
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#### [Wiring Precautions]

	<b>CAUTION</b> <ul style="list-style-type: none"><li>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.</li><li>Prevent foreign matter such as dust or wire chips from entering the module. Such foreign matter can cause a fire, failure, or malfunction.</li><li>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.</li><li>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.</li><li>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.</li></ul>
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#### [Startup and Maintenance precautions]

	<b>CAUTION</b> <ul style="list-style-type: none"><li>Do not touch any terminal while power is on. Doing so may cause malfunction.</li><li>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.</li><li>Do not disassemble or modify the modules. Doing so may cause failure, malfunction, injury or a fire.</li><li>Do not drop or apply any strong shock to the module. Doing so may damage the module.</li><li>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.</li><li>Mounting/removing the terminal block is limited to 50 times after using a product. (IEC61131-2-compliant)</li><li>Do not remove or change the platinum temperature-measuring resistor designation pin while energizing the module. If a platinum temperature-measuring resistor designation pin is removed or changed while energizing, it may cause failure or malfunction.</li><li>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.</li></ul>
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#### [Disposal Precautions]

	<b>CAUTION</b> <ul style="list-style-type: none"><li>When disposing of this product, treat it as industrial waste.</li></ul>
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### ● 安全注意事项 ●

(使用之前请务必阅读)

在使用本产品之前，应仔细阅读本手册以及本手册中所介绍的相关手册，同时在充分注意安全的前提下正确操作。

本手册中的注意事项仅记载与本产品有关的内容。

关于使用本产品的系统方面的安全注意事项，请参阅所使用的CPU模块的用户手册。

在“安全注意事项”中，安全注意事项被分为“⚠警告”和“⚠注意”两个等级。

	<b>警告</b> 表示错误操作可能造成危险后果，导致死亡或重伤事故。
	<b>注意</b> 表示错误操作可能造成危险后果，导致中度伤害、轻伤或财产损失。

此外，根据情况不同，即使标注为“⚠注意”的事项也有可能引发严重后果。

这两个等级的注意事项记载的均为重要内容，请务必遵守。

请妥善保管本手册以备需要时取阅，并将本手册交给最终用户。

#### 【设计注意事项】

	<b>警告</b> <ul style="list-style-type: none"><li>数据链接出现通信异常时，将保持主站模块的数据。应使用通信状态信息，在顺控程序上配置互锁电路，以保证系统能安全运行。</li></ul>
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#### 【设计注意事项】

	<b>注意</b> <ul style="list-style-type: none"><li>请勿将控制线及通信电缆与主电路及动力线等捆扎在一起或相互靠得太近。应相距大约100mm以上距离。因为噪声有可能导致误动作。</li></ul>
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#### 【安装注意事项】

	<b>注意</b> <ul style="list-style-type: none"><li>应在详细手册记载的一般规格环境下使用模块。如果在一般规格范围以外的环境中使用模块，可能导致触电、火灾、误动作、产品损坏或性能劣化。</li><li>为保护开关，在安装前请勿拆除缓冲材料。</li><li>模块应通过DIN导轨或者安装螺栓切实地加以固定，安装螺栓应在规定的扭矩范围内切实地扭紧。如果螺栓拧得过松，有可能导致掉落、短路或误动作。如果螺栓拧得过紧，有可能造成螺栓及模块破损从而导致掉落、短路或误动作。</li><li>请勿直接触碰模块的导电部分。否则可能导致模块误动作、故障。</li></ul>
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#### 【配线注意事项】

	<b>注意</b> <ul style="list-style-type: none"><li>在配线作业等时，必须将系统使用的外部供应电源全部断开后再进行操作。如果未全部断开，有可能导致产品损坏。</li><li>安装、配线作业等之后进行通电、运行时，必须安装产品附带的端子盖。如果未安装端子盖，有可能导致短路或故障。</li><li>必须将FG端子与可编程控制器的专用接地线连接。否则有可能导致误动作。</li><li>应使用合适的压装端子，并按规定扭矩拧紧。如果使用Y型压装端子，端子螺栓松动时可能导致脱落或故障。</li><li>进行模块配线作业时，应在确认产品的额定电压及端子排列的基础上正确进行操作。如果连接了与额定值不符的电源或配线错误，可能导致火灾或故障。</li><li>应在规定的扭矩范围内拧紧端子螺栓。如果端子螺栓拧得过松，有可能导致短路或误动作。如果端子螺栓拧得过紧，有可能造成螺栓及模块破损从而导致掉落、短路或误动作。</li><li>应注意防止切屑及配线头等异物掉入模块内。否则有可能导致火灾、故障或误动作。</li><li>与模块相连接的电线及电缆必须收入套管中，或者用夹具进行固定处理。如果未将电缆收入套管或用夹具进行固定处理，可能由于电缆的晃动及移动、不经意的拉拽等造成模块及电缆破损、电缆接触不良而导致误动作。</li><li>请勿将控制线及通信电缆与主电路及动力线等捆扎在一起或相互靠得太近。因为噪声有可能导致误动作。</li></ul>
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#### 【配线注意事项】

	<b>注意</b> <ul style="list-style-type: none"><li>在拆卸与模块相连接的电缆时，请勿用手拉扯电缆部分。请在松开与模块连接的部分的螺栓后再拆卸电缆。如果在与模块连接的状态下拉扯电缆，可能导致模块及电缆破损、电缆接触不良而导致误动作。</li></ul>
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#### 【启动 / 维护注意事项】

	<b>注意</b> <ul style="list-style-type: none"><li>在通电状态下请勿触摸端子。否则可能导致误动作。</li><li>在清洁模块或重新紧固端子螺栓时，必须将系统使用的外部供应电源全部断开后再进行操作。如果未全部断开，有可能导致模块故障或误动作。如果螺栓拧得过松，有可能导致掉落、短路或误动作。如果螺栓拧得过紧，有可能造成螺栓及模块破损从而导致掉落、短路或误动作。</li><li>请勿拆解或改造模块。否则可能导致故障、误动作、人身伤害或火灾。</li><li>请勿使模块掉落或受到强烈撞击。否则可能导致模块破损。</li><li>产品投入使用后，端子排的拆装次数不应超过50次。（根据IEC61131-2规范）</li><li>在控制盘内拆装模块时，必须将系统使用的外部供应电源全部断开后再进行操作。如果未全部断开，有可能导致模块故障或误动作。</li><li>在模块的通电状态下请勿进行铂金测温电阻体指定针脚的拆卸、更改。如果在通电状态下进行铂金测温电阻体指定针脚的拆卸、更改，有可能导致故障、误动作。</li><li>在触碰模块之前，必须先触碰已接地的金属等，释放掉人体等所携带的静电。如果不释放掉静电，有可能导致模块故障或误动作。</li></ul>
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#### 【报废处理注意事项】

	<b>注意</b> <ul style="list-style-type: none"><li>本产品报废时，应当作工业废物处理。</li></ul>
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### ● CONDITIONS OF USE FOR THE PRODUCT ●

- Mitsubishi programmable controller ("the PRODUCT") shall be used in conditions; i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.
- The PRODUCT has been designed and manufactured for the purpose of being used in general industries.

MITSUBISHI SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY THE PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI'S USER, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR THE PRODUCT.

("Prohibited Application")

Prohibited Applications include, but not limited to, the use of the PRODUCT in;

- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

Notwithstanding the above, restrictions Mitsubishi may in its sole discretion, authorize use of the PRODUCT in one or more of the Prohibited Applications, provided that the usage of the PRODUCT is limited only for the specific applications agreed to by Mitsubishi and provided further that no special quality assurance or fail-safe, redundant or other safety features which exceed the general specifications of the PRODUCTS are required. For details, please contact the Mitsubishi representative in your region.

#### 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)
CC-Link System Master/Local Module Type AJ61BT11/A1SJ61BT11 User's Manual	IB-66721 (13J872)
CC-Link System Master/Local Module Type AJ61QBT11/A1SJ61QBT11 User's Manual	IB-66722 (13J873)
CC-Link System Master/Local Module User's Manual type QJ61BT11N	SH-080394E (13JR64)
Type AnSHCPU/AnACPU/AnUCPU/QCPU-A (A Mode) Programming Manual (Dedicated Instructions)	IB-66251 (13J742)
MELSEC-L CC-Link System Master/Local Module User's Manual	SH-080895ENG (13JZ41)

## 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

- Method of ensuring compliance
  - To ensure that Mitsubishi Electric programmable controllers maintain EMC and Low Voltage Directives when incorporated into other machinery or equipment, certain measures may be necessary. Please refer to one of the following manuals.
    - User's manual for the CPU module or head module used
    - Safety Guidelines (This manual is included with the CPU module, base unit, or head module)
  - The CE mark on the side of the programmable controller indicates compliance with EMC and Low Voltage Directives.
- Additional measures
  - To ensure that this product maintains EMC and Low Voltage Directives, please refer to one of the manuals listed under (1).

## 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.

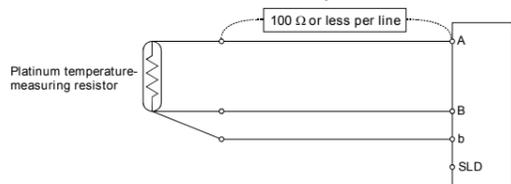
Item	AJ65BT-64RD3	AJ65BT-64RD4
Measurement method	3-wire	4-wire
Connectable platinum temperature-measuring resistor	Pt 100, JPt 100	
Output current for detecting temperature	1 mA	
Temperature input range	-180 to 600°C	
Temperature detection value	16-bit signed binary : -1800 to 6000 (value to one decimal 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 <sup>1</sup>	
Temperature input point	4-channel/module	
CC-Link station type	Remote device station	
Occupied points	4-station : RX/RV 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	
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 communication system and batch temperature input	
Noise durability	Between batch temperature input and ground	
	500 V AC, 1 minute	
Noise durability	Noise voltage 500 Vp-p, Noise width 1 μs by noise simulator of the noise frequency 25 to 60 Hz	
	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 <sup>2</sup>	
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.)	

<sup>1</sup> 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

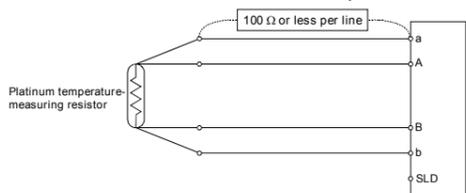
### 3.2 Specifications when Connecting to a Platinum Temperature-Measuring Resistor

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

- 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 m Ω.
  - The lead resistance value between platinum temperature measuring resistor and AJ65BT-64RD3 should be 100 Ω or less per line.



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



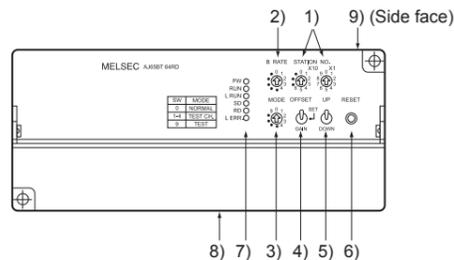
### 3.3 Applicable Systems

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, A1S1J61QBT11), 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.

### 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

- Because it is made of resin, do not drop or given a strong shock to the module case and the terminal block.
- Do not take the printed circuit board of the module out of the case. It may result in a failure.
- 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.
- Tighten the module mounting screws within the following torque range.

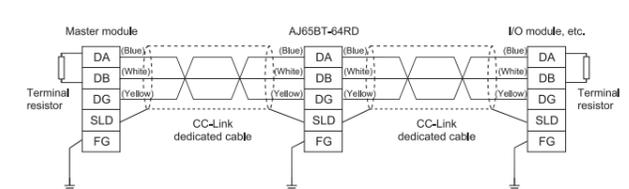
Screw area	Tightening torque range
Module mounting screws (M4 screw)	0.78 to 1.18 N · m
Terminal block terminal screws (M3.5 screw)	0.59 to 0.88 N · m
Terminal block mounting screws (M3.5 screw)	0.98 to 1.37 N · m

- When using a DIN rail adapter, install the DIN rail considering the precautions described below.
  - Applicable DIN rail types (conform to JIS C 2812)  
TH 35-7.5 Fe  
TH 35-7.5 Al  
TH 35-15 Fe
  - 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

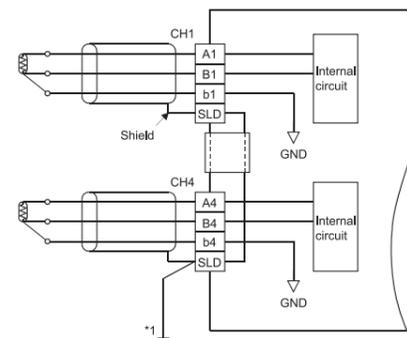
To obtain maximum performance from the functions of AJ65BT-64RD and improve the system reliability, a wiring with high durability against noise is required.

The following describes the external wiring precautions.

- 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.
- 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.

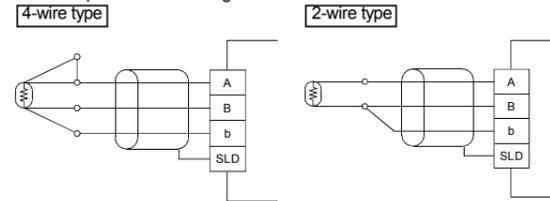
### 6.3 Connecting to the AJ65BT-64RD3

- 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.



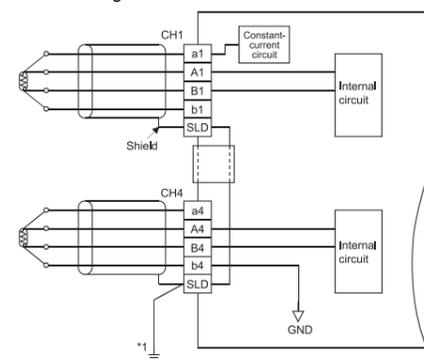
\*1 May be better to connect depending on the operating environment.

- 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.



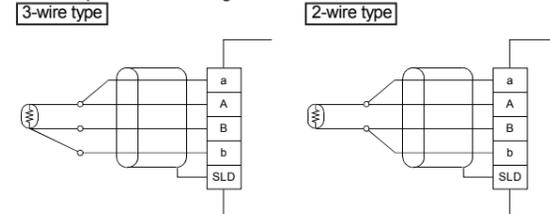
### 6.4 Connecting to the AJ65BT-64RD4

- 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.

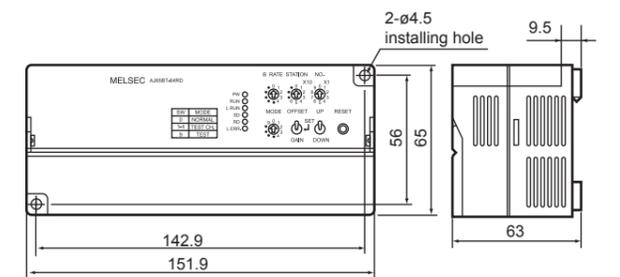


\*1 May be better to connect depending on the operating environment.

- 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.



## 7. External Dimensions Diagram



Unit: mm

## 8. Marking and Information Disclosure for the Restriction on Use of Hazardous Substances in Electrical and Electronic Products Required by the New China RoHS

「电器电子产品有害物质限制使用标识要求」的表示方式



Note: This symbol mark is for China only.

含有有害6物质的名称, 含有量, 含有部品

本产品中所含有的有害6物质的名称, 含有量, 含有部品如下表所示。

产品中有害物质的名称及含量

部件名称	有害物质					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷基板	×	○	○	○	○	○
外壳	○	○	○	○	○	○

本表格依据SJ/T 11364 的规定编制。

○:表示该有害物质在该部件所有均质材料中的含量均在GB/T 26572 规定的限量要求以下。  
×:表示该有害物质至少在该部件的某一均质材料中的含量超出GB/T 26572 规定的限量要求。

### WARRANTY

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Specifications subject to change without notice.