

MITSUBISHI

High-Speed Counter Module

User's Manual
(Hardware)

AJ65BT-D62
AJ65BT-D62D
AJ65BT-D62D-S1

Thank you for buying the Mitsubishi general-purpose programmable logic controller MELSEC-A Series

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



MODEL	AJ65BT-D62-UW
MODEL CODE	13JL44
IB(NA)-66822-D(0609)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.

[DESIGN PRECAUTIONS]

DANGER

- If data link becomes faulty, the status of the faulty station changes as follows. Using the communication status information, construct an interlock circuit in the sequence program so that the system operates safely. There is a risk of an accident due to output error or malfunction.
 - (1) All general-use inputs from this module turn off.
 - (2) All general-use outputs from this module turn off.
- The inputs and outputs may be turned on or off when a failure occurs within the module. Provide a circuit that externally monitors the input and output signals that might lead to a serious accident.

CAUTION

- Do not have control cables and communication cables bundled with or placed near by the main circuit and/or power cables. Wire those cables at least 100mm (3.94 inch) away from the main circuit and/or power cables. Not doing so could result in noise that would cause erroneous operation.

[INSTALLATION PRECAUTIONS]

CAUTION

- Use each module in an environment as specified in the "general specification" in the detailed manual.
Usage of the module outside the general specification range may cause electric shock, fire, malfunction, product damage or deterioration.
- Tighten the module securely using DIN rail or installation screws within the specified torque range of the installation screws. Loose screws may cause falling or malfunction. Also, if the screws are too tight, it may cause falling or malfunction due to damage of the screws or module.
- Do not touch the conductive area of the module.
Doing so may cause module malfunction or breakdowns.

[WIRING PRECAUTIONS]

DANGER

- Perform installation and wiring after disconnecting the power supply at all phases externally.
If the power is not disconnected at all phases an electric shock, product damage or malfunction may result.
- When powering up or operating the module after performing installation or wiring work, always attach the terminal cover that came with the product.
It may cause an electric shock if the terminal cover is not attached.

CAUTION

- Be sure to ground the FG terminal to the class-3 or higher grounding.
Otherwise there will be a danger of malfunctions.
- Use applicable solderless terminals and tighten them with the specified torque. If any solderless spade terminal is used, it may be disconnected when the terminal screw comes loose, resulting in failure.
- Perform correct wiring for the module according to the product's rated voltage and terminal arrangement. Connecting to a power supply different from rating or mis-wiring may cause fire and/or product failure.
- Fix terminal screws securely within the specified torque range. Loose terminal screws may cause short circuit or malfunction.
If the terminal screws are too tight, it may cause short circuit or malfunction due to damage of the screws and module.
- Make sure foreign objects do not get inside the module, such as dirt and wire chips. It may cause fire, product failure or malfunction.
- Be sure to fix the wires or cables that are connected to the module in place, either by running them through a duct or by using clamps.
If the cables are not fixed in one of these ways, dispersion, movement, or careless pulling of the cables may cause damage to the module or malfunction due to cable contact faults.

[WIRING PRECAUTIONS]

CAUTION

- Do not install the control lines together with the communication cables, or bring them close to each other. Failure to do so may cause malfunctions due to noise.
- When disconnecting a communication or power supply cable from the module, do not pull on the cable itself.
Disconnect cables fitted with connectors by holding and pulling the cable connector. Disconnect cables not fitted with a connector by removing the screws from the part connected to the module.
Pulling on a cable that is connected to the module can cause damage to the module or cable, or malfunction due to cable connection faults.

[STARTING AND MAINTENANCE PRECAUTIONS]

DANGER

- Do not touch the terminals when the power is on. It may cause an electric shock or malfunction.
- Perform cleaning the module after turning off the all external power supply for sure. If you do not switch off the external power supply, it will cause electric shock.

CAUTION

- Never try to disassemble or modify module. It may cause product failure, malfunction, fire or cause injury.
- The module case is made of resin, do not drop it or subject it to strong shock. A module damage may result.
- Make sure to switch all phases of the external power supply off before installing or removing the module to/from the panel.
If you do not switch off the external power supply, it will cause failure or malfunction of the module.
- Always set the setting pins for pulse and external input voltage after externally shutting down all phases of the power supply.
Failure to shut down all phases of the power supply may cause a failure or malfunction of the module.
- Do not install/remove the terminal block more than 50 times after the first use of the product. (IEC 61131-2 compliant)

[DISPOSAL PRECAUTIONS]

CAUTION

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

Revisions

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

Print Date	*Manual Number	Revision
Oct., 1997	IB(NA)-66822-A	First printing
Nov., 1998	IB(NA)-66822-B	Full revision
Jul., 2005	IB(NA)-66822-C	Partial correction SAFETY PRECAUTIONS
Sep., 2006	IB(NA)-66822-D	Partial correction SAFETY PRECAUTIONS

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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)
AJ65BT-D62/AJ65BT-D62D/AJ65BT-D62D-S1 High-speed counter module	SH-3637 (13JM44)

Related Manuals

Manual name	Manual No. (Model code)
CC-Link System Master/Local Module User's Manual type AJ61BT11/A1SJ61BT11 Describes the system configuration, performance specifications, functions, handling, wiring and troubleshooting of the AJ61BT11 and A1SJ61BT11. (Optionally available)	IB-66721 (13J872)
CC-Link System Master/Local Module User's Manual type AJ61QBT11/A1SJ61QBT11 Describes the system configuration, performance specifications, functions, handling, wiring and troubleshooting of the AJ61QBT11 and A1SJ61QBT11. (Optionally available)	IB-66722 (13J873)
CC-Link System Master/Local Module User's Manual type QJ61BT11N Describes the system configuration, performance specifications, functions, handling, wiring and troubleshooting of the QJ61BT11N. (Optionally available)	SH-080394E (13JR64)

Conformation to the EMC Directive and Low Voltage Instruction

When complying with EMC Directives and Low-Voltage Directives by assembling a Mitsubishi PLC compatible with EMC Directive and Low-Voltage Directives into the user product, refer to Chapter 3 "EMC Directives and Low-Voltage Directives" in the User's Manual (Hardware) for the CPU module being used.

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.

To conform this product to the EMC Directive and Low Voltage Directive, refer to the Section of "CC-Link Modules" in Chapter 3 "EMC Directive and Low Voltage Directive" of the User's Manual (Hardware) of the CPU module used.

1. Overview

This manual explains the specifications, handling and wiring for the AJ65BT-D62 /AJ65BT-D62D/AJ65BT-D62D-S1 model high-speed counter module used in the CC-Link system.

After unpacking the product you purchased, check to see that the following equipment is included.

Product name	Quantity
High-speed counter module	1

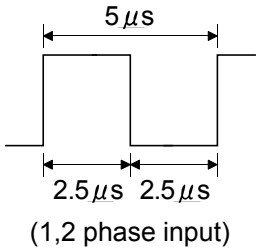
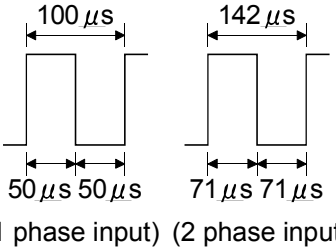
There are three types of high-speed counter module, as indicated below:

Item		AJ65BT-D62	AJ65BT-D62D	AJ65BT-D62D-S1
Type		DC input sink output type	Differential input sink output type	
External input	Preset	5/12/24VDC 2 to 5mA		Differential input
	Function start			5/12/24VDC 2 to 5mA
Maximum counting speed		Maximum 200kPPS	Maximum 400kPPS	
CC-Link station type		Remote device station		
Signal level		24-bit binary (0 to 16777215)		
Counting switching		200k/10k	Phase 1: 400k Phase 2: 300k /10k	

2. Specification

Specifications for the high-speed counter module are given below.
For general specifications, refer to the user's manual (details) for the master module used.

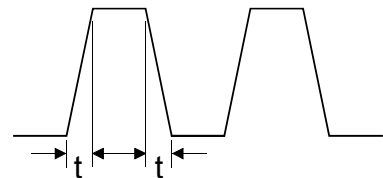
2.1 Performance Specifications for AJ65BT-D62

Item		Specification		
Setting switch for counting speed switching		HIGH side	LOW side	
Number of channels		2 channels		
Count input signal	Phase	1 phase input, 2 phase input		
	Signal level (ϕA , ϕB)	5VDC 12VDC 2 to 5mA 24VDC		
Counter	Counting speed (maximum)*	1 phase input	200kPPS	10kPPS
		2 phase input	200kPPS	7kPPS
	Signal level	24-bit binary 0 to 16777215		
	Model	UP/DOWN preset counter and ring counter functions		
	Smallest count pulse width (Set the time for rise and fall of input to 2 μs or less. Duty ratio: 50 %)	 (1,2 phase input)	 (1 phase input) (2 phase input)	
Coincidence output	Comparison range	24-bit binary		
	Comparison result	Set value < Count value Set value = Count value Set value > Count value		
External input	Preset	5/12/24VDC 2 to 5mA		
	Function start	OFF → ON: 0.5ms or less		
	Response time	ON → OFF: 3ms or less		
External output	Coincidence output	2A/common		
	Response time	0.1ms or less		
CC-Link station type		Remote device station		
Number of occupied stations		4 stations		
Number of maximum connected units		Maximum 16 units		

Item	Specification
Connection cable	Twisted shielded wire
Power voltage	18 to 28.8VDC
Current consumption (for 24V DC)	70mA
Noise durability	Based on a noise simulator with 500Vp-p noise voltage, 1 μ s noise width and 25-60Hz noise frequency
Dielectric withstand voltage	1 minute at 500V AC between batch of DC external terminals and ground
Insulation resistance	10M Ω or more on an insulation resistance tester at 500V DC between batch of DC external terminals and ground
Connected terminal block	27 terminal blocks (seven M3.5 screws)
Applicable wire size	0.75 to 2.00mm ²
Applicable crimp contact	RAV1.25-3, RAV2-3.5 (JIS C 2805 compliant)
Allowable momentary power failure period	1ms
Module installation screws	M4 \times 0.7mm(0.03in.) \times 16mm(0.63in.) or larger screws (tightening torque range 78 to 118N \cdot cm {8 to 12kgf \cdot cm}) Can also be mounted using a DIN rail
Applicable DIN rail	TH35-7.5Fe, TH35-7.5Al, TH35-15Fe (JIS C 2B12 compliant)
Weight	0.41kg

* Counting speed is affected by the duration of rise and fall periods. The speeds that can be counted are indicated in the table below. Take note that the count may become incorrect when a pulse with a large rise or fall period is counted.

Counting speed setting switch	HIGH		LOW	
	1 phase input	2 phase input	1 phase input	2 phase input
Rise/fall period	1 phase input	2 phase input	1 phase input	2 phase input
t = 2 μ s or less	200kPPS	200kPPS	10kPPS	7kPPS
t = 25 μ s or less	10kPPS	10kPPS	1kPPS	700PPS
t = 500 μ s	—	—	500PPS	250PPS



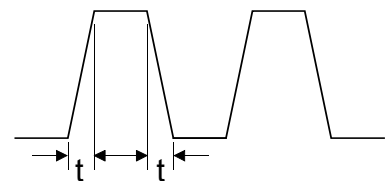
2.2 Performance Specifications for AJ65BT-D62D

Item		Specification		
Setting switch for counting speed switching		HIGH side		LOW side
Number of channels		2 channels		
Count input signal	Phase	1 phase input, 2 phase input		
	Signal level (ϕA , ϕB)	EIA Standard RS-422-A Differential line driver level (Am26LS31 (manufactured by Texas Instrument Japan) or equivalent)		
Counter	Counting speed (maximum)*	1 phase input	400kPPS	10kPPS
		2 phase input	300kPPS	7kPPS
	Signal level	24-bit binary 0 to 16777215		
	Model	UP/DOWN preset counter and ring counter function		
	Smallest count pulse width (Set the time for rise and fall of input to $0.1\mu s$ or less. Duty ratio: 50 %)			
Coincidence output	Comparison range	24-bit binary		
	Comparison result	Set value < Count value Set value = Count value Set value > Count value		
External input	Preset	5/12/24VDC 2 to 5mA		
	Function start			
	Response time	OFF → ON: 0.5ms or less ON → OFF: 3ms or less		
External output	Coincidence output	2A/common		
	Response time	0.1ms or less		
CC-Link station type		Remote device station		
Number of occupied stations		4 stations		
Transmission speed/maximum transmission distance		See the detailed manual		
Number of maximum connected units		Maximum: 16 units		
Connection cable		Twisted shielded wire		
Power voltage		18 to 28.8VDC		

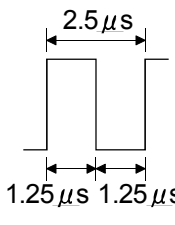
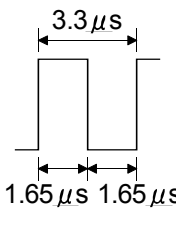
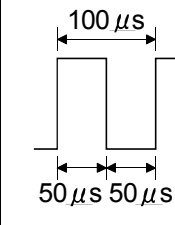
Item	Specification
Current consumption (for 24V DC)	100mA
Noise durability	Based on a noise simulator with 500Vp-p noise voltage, 1μs noise width and 25-60Hz noise frequency
Dielectric withstand voltage	1 minute at 500V AC between batch of DC external terminals and ground
Insulation resistance	10MΩ or more across all DC external terminals and grounding terminal using a 500VDC insulation resistance tester
Connected terminal block	27 terminal blocks (seven M3.5 screws)
Applicable wire size	0.75 to 2.00mm ²
Applicable crimp contact	RAV1.25-3, RAV2-3.5 (JIS C 2805 compliant)
Allowable momentary power failure period	1ms
Module installation screws	M4×0.7mm(0.03in.)×16mm(0.63in.) or larger screws (tightening torque range 78 to 118N·cm {8 to 12kgf·cm}) Can also be mounted using a DIN rail
Applicable DIN rail	TH35-7.5Fe, TH35-7.5Al, TH35-15Fe (JIS C 2B12 compliant)
Weight	0.42kg

* Counting speed is affected by duration of rise and fall periods.
The speeds that can be counted are indicated in the table below.
Take note that the count may become incorrect when a pulse with a large rise or fall period is counted.

Counting speed setting switch	HIGH		LOW	
	1 phase input	2 phase input	1 phase input	2 phase input
Rise/fall period				
t = 0.1μs or less	400kPPS	300kPPS	—	—
t = 1.25μs or less	200kPPS	200kPPS	10kPPS	7kPPS
t = 12.5μs or less	20kPPS	20kPPS	1kPPS	700PPS
t = 250μs	—	—	500PPS	250PPS



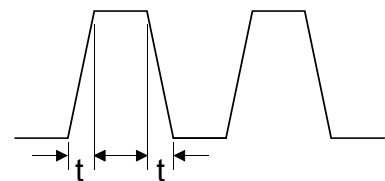
2.3 Performance Specifications for AJ65BT-D62D-S1

Item		Specification		
Setting switch for counting speed switching		HIGH side		LOW side
Number of channels		2 channels		
Count input signal	Phase	1 phase input, 2 phase input		
	Signal level (ϕA , ϕB)	EIA Standard RS-422-A Differential line driver level (Am26LS31 (manufactured by Texas Instruments Japan) or equivalent)		
Counter	Counting speed (maximum)*	1 phase input	400kPPS	10kPPS
		2 phase input	300kPPS	7kPPS
	Signal level	24-bit binary 0 to 16777215		
	Model	UP/DOWN preset counter and ring counter functions		
	Smallest count pulse width (Set the time for rise and fall of input to $0.1\mu s$ or less. Duty ratio: 50 %)	 $2.5\mu s$ $1.25\mu s$ $1.25\mu s$ (1 phase input)	 $3.3\mu s$ $1.65\mu s$ $1.65\mu s$ (2 phase input)	 $100\mu s$ $50\mu s$ $50\mu s$ (1 phase input)
Coincidence output	Comparison range	24-bit binary		
	Comparison result	Set value < Count value Set value = Count value Set value > Count value		
External input	Preset	EIA Standard RS-422-A Differential line driver level (Am26LS31 or equivalent)		
	Function start	5/12/24VDC 2 to 5mA		
	Response time	OFF → ON: 0.5ms or less ON → OFF: 3ms or less		
External output	Coincidence output	2A/common		
	Response time	0.1ms or less		
CC-Link station type		Remote device station		
Number of occupied stations		4 stations		
Transmission speed/maximum transmission distance		See the detailed manual		
Number of maximum connected units		Maximum 16 units		
Connection cable		Twisted shielded wire		
Power voltage		18 to 28.8VDC		

Item	Specification
Current consumption (for 24V DC)	120mA
Noise durability	Based on a noise simulator with 500Vp-p noise voltage, 1μs noise width and 25-60Hz noise frequency
Dielectric withstand voltage	1 minute at 500V AC between batch of DC external terminals and ground
Insulation resistance	10MΩ or more across all DC external terminals and grounding terminal using a 500VDC insulation resistance tester
Connected terminal block	27 terminal blocks (seven M3.5 screws)
Applicable wire size	0.75 to 2.00mm ²
Applicable crimp contact	RAV1.25-3, RAV2-3.5 (JIS C 2805 compliant)
Allowable momentary power failure period	1ms
Module installation screws	M4×0.7mm(0.03in.)×16mm(0.63in.) or larger screws (tightening torque range 78 to 118N·cm {8 to 12kgf·cm}) Can also be mounted using a DIN rail
Applicable DIN rail	TH35-7.5Fe, TH35-7.5Al, TH35-15Fe (JIS C 2B12 compliant)
Weight	0.42kg

* Counting speed is affected by duration of rise and fall periods.
The speeds that can be counted are indicated in the table below.
Take note that the count may become incorrect when a pulse with a large rise or fall period is counted.

Counting speed setting switch	HIGH		LOW	
	1 phase input	2 phase input	1 phase input	2 phase input
Rise/fall period				
t = 0.1μs or less	400kPPS	300kPPS	—	—
t = 1.25μs or less	200kPPS	200kPPS	10kPPS	7kPPS
t = 12.5μs or less	20kPPS	20kPPS	1kPPS	700PPS
t = 250μs	—	—	500PPS	250PPS



2.4 Interface Specifications for External Device Connections

The table below indicates the external device interfaces for the AJ65BT-D62, AJ65BT-D62D and AJ65BT-D62D-S1 high-speed counter modules.

(1) External device interfaces for AJ65BT-D62

I/O classification	Internal Circuit	Terminal number *1	Signal Name	Operation	Input (guaranteed value)	Operating current (guaranteed value)	
Input		8 (15)	Phase A pulse input 24V	When ON	21.6 to 26.4 V	2 to 5mA	
				When OFF	5V or less	0.1mA or less	
			Phase A pulse input 12V	When ON	10.8 to 13.2V	2 to 5mA	
				When OFF	4V or less	0.1mA or less	
			Phase A pulse input 5V	When ON	4.5 to 5.5 V	2 to 5mA	
				When OFF	2V or less	0.1mA or less	
	9 (16)	Phase A pulse input COM					
		10 (17)	Phase B pulse input 24V	When ON	21.6 to 26.4 V	2 to 5mA	
				When OFF	5V or less	0.1mA or less	
			Phase B pulse input 12V	When ON	10.8 to 13.2 V	2 to 5mA	
				When OFF	4V or less	0.1mA or less	
			Phase B pulse input 5V	When ON	4.5 to 5.5 V	2 to 5mA	
When OFF				2V or less	0.1mA or less		
11 (18)	Phase B pulse input COM						
	12 (19)	Preset input 24V	When ON	21.6 to 26.4 V	2 to 5mA		
			When OFF	5V or less	0.1mA or less		
		Preset input 12V	When ON	10.8 to 13.2V	2 to 5mA		
			When OFF	4V or less	0.1mA or less		
		Preset input 5V	When ON	4.5 to 5.5 V	2 to 5mA		
			When OFF	2V or less	0.1mA or less		
13 (20)	COM	Response time	OFF→ON	0.5ms or less	ON→OFF	3ms or less	
	14 (21)	Function start input 24V	When ON	21.6 to 26.4 V	2 to 5mA		
			When OFF	5V or less	0.1mA or less		
		Function start input 12V	When ON	10.8 to 13.2 V	2 to 5mA		
			When OFF	4V or less	0.1mA or less		
		Function start input 5V	When ON	4.5 to 5.5 V	2 to 5mA		
			When OFF	2V or less	0.1mA or less		
		Response time	OFF→ON	0.5ms or less	ON→OFF	3ms or less	
Output		22 (24)	EQU1	Operating voltage:	10.2 to 30V		
				Rated current:	0.5 A/point		
				Maximum inrush current:	4A 10 ms		
				Maximum voltage drop at ON:	1.5V		
		23 (25)	EQU2	Response time: OFF→ON	0.1 ms or less		
				ON→OFF	0.1 ms or less		
		26	12/24V	Input voltage:	10.2 to 30 V		
		27	0V	Current consumption:	8mA (TYP 24VDC)		

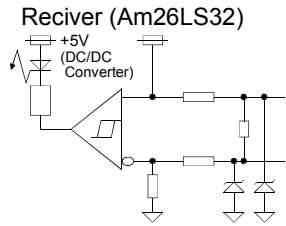
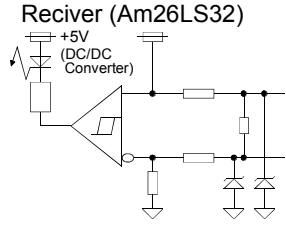
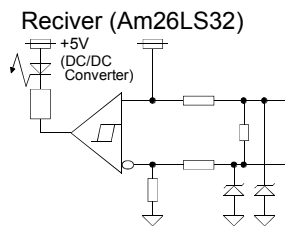
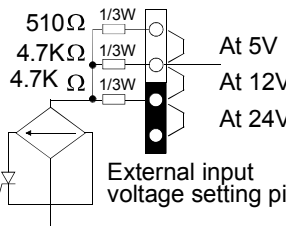
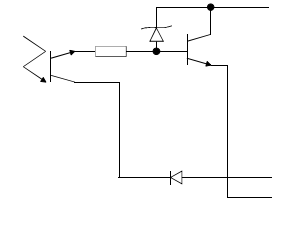
*1 Figure inside () indicates the terminal number of channel 2.

(2) External device interfaces for AJ65BT-D62D

I/O classification	Internal Circuit	Terminal number *1	Signal Name	Operation	Input (guaranteed value)	Operating current (guaranteed value)		
Input		8 (15)	Phase A pulse input	EIA Standard RS-422-A Line driver level (Am26LS31 (manufactured by Texas Instruments Japan) or equivalent) V _{th} hysteresis (V _{T+} -V _{T-}) 60 mV V _{IH(E)} "H" level enable input voltage: 2V or more V _{IL(E)} "L" level enable input voltage: 0.8V or more * Current type line driver cannot be used.				
		9 (16)	Phase \bar{A} pulse input					
		10 (17)	Phase B pulse input					
		11 (18)	Phase \bar{B} pulse input					
		12 (19)	Preset input 24V	When ON	21.6 to 26.4 V	2 to 5mA		
			Preset input 12V	When ON	10.8 to 13.2V	2 to 5mA		
			Preset input 5V	When ON	4.5 to 5.5 V	2 to 5mA		
		13 (20)	COM	Response time	OFF→ON	0.5ms or less	ON→OFF	3ms or less
			14 (21)	Function start input 24V	When ON	21.6 to 26.4 V	2 to 5mA	
				Function start input 12V	When ON	10.8 to 13.2 V	2 to 5mA	
Function start input 5V	When ON	4.5 to 5.5 V		2 to 5mA				
Output		22 (24)	EQU1	Operating voltage: 10.2 to 30V Rated current: 0.5 A/point Maximum inrush current: 4A 10 ms Maximum voltage drop at ON: 1.5V Response time: OFF→ON 0.1 ms or less ON→OFF 0.1 ms or less				
		23 (25)	EQU2					
		26	12/24V	Input voltage:	10.2 to 30 V			
		27	0V	Current consumption:	8mA (TYP 24VDC)			

*1 Figure inside () indicates the terminal number of channel 2.

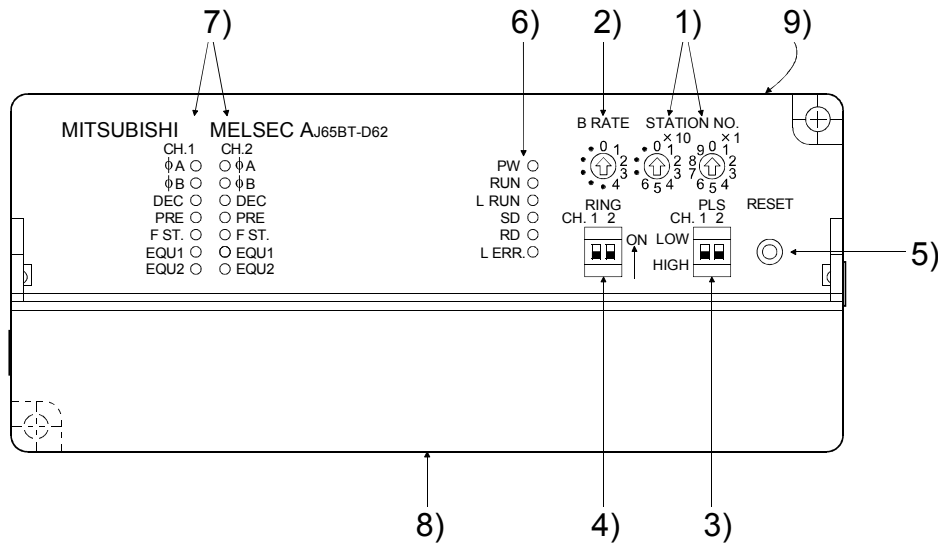
(3) External device interfaces for AJ65BT-D62D-S1

I/O classification	Internal Circuit	Terminal number *1	Signal Name	Operation	Input (guaranteed value)	Operating current (guaranteed value)			
Input		8 (16)	Phase A pulse input	EIA Standard RS-422-A Line driver level (Am26LS31 (manufactured by Texas Instruments Japan) or equivalent) V _{HY} hysteresis (V _{T+} -V _{T-}) 60 mV V _{IH(E)} "H" level enable input voltage: 2V or more V _{IL(E)} "L" level enable input voltage: 0.8V or more * Current type line driver cannot be used.					
		9 (17)	Phase \bar{A} pulse input						
		10 (18)	Phase B pulse input						
		11 (19)	Phase \bar{B} pulse input						
		12 (20)	Preset input						
		13 (21)	$\bar{\text{Preset}}$ input						
		14 (22)	Function start input 24V				When ON	21.6 to 26.4 V	2 to 5mA
			Function start input 12V				When OFF	5V or less	0.1mA or less
			Function start input 5V				When ON	10.8 to 13.2 V	2 to 5mA
		15 (23)	COM				When OFF	4V or less	0.1mA or less
When ON				4.5 to 5.5 V	2 to 5mA				
When OFF				2V or less	0.1mA or less				
Response time	OFF→ON	0.5ms or less	ON→OFF	3ms or less					
	Output		24 (25)	EQU1	Operating voltage: 10.2 to 30V Rated current: 0.5 A/point Maximum inrush current: 4A 10 ms Maximum voltage drop at ON: 1.5V Response time: OFF→ON 0.1 ms or less ON→OFF 0.1 ms or less				
			26	12/24V	Input voltage: 10.2 to 30 V				
27			0V	Current consumption: 8mA (TYP 24VDC)					

*1 Figure inside () indicates the terminal number of channel 2.

3. Part Identification Nomenclature and Settings

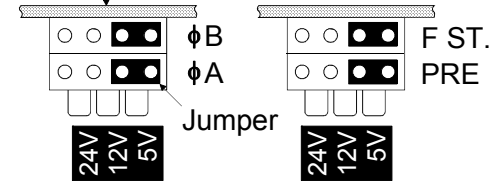
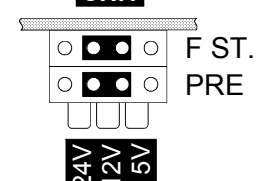
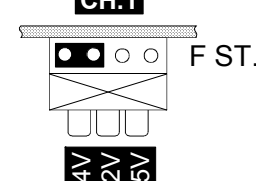
This section shows the name of each part within the high-speed counter module and explains how to set each switch. (The illustration below indicates the AJ65BT-D62).



No.	Name	Description														
1)	Station number setting switch	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> $\uparrow \times 10$ $\uparrow \times 1$ </div> <div> Set the number for the AJ65BT-D62/D62D/D62D-S1 station number within the range of 1 to 61. (When shipped from the factory: 00) </div> </div>														
2)	Transmission baud rate setting switch	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Setting number</th> <th>Transmission baud rate</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>156kBPS (factory set value)</td> </tr> <tr> <td>1</td> <td>625kBPS</td> </tr> <tr> <td>2</td> <td>2.5MBPS</td> </tr> <tr> <td>3</td> <td>5MBPS</td> </tr> <tr> <td>4</td> <td>10MBPS</td> </tr> <tr> <td>Other than 0 to 4</td> <td>Not used (When a number other than 0 to 4 is used, the L ERR. LED lights up and a communication error is generated.)</td> </tr> </tbody> </table>	Setting number	Transmission baud rate	0	156kBPS (factory set value)	1	625kBPS	2	2.5MBPS	3	5MBPS	4	10MBPS	Other than 0 to 4	Not used (When a number other than 0 to 4 is used, the L ERR. LED lights up and a communication error is generated.)
		Setting number	Transmission baud rate													
		0	156kBPS (factory set value)													
		1	625kBPS													
		2	2.5MBPS													
		3	5MBPS													
4	10MBPS															
Other than 0 to 4	Not used (When a number other than 0 to 4 is used, the L ERR. LED lights up and a communication error is generated.)															
3)	Counting speed setting switch	LOW side: With Phase 1 input, up to 10kPPS and with Phase 2, up to 7kPPS can be counted. HIGH side: With Phase 1 input, up to 400(200)kPPS and with Phase 2, up to 300(200)kPPS can be counted. The figures in () are for the AJ65BT-D62. (When shipped from the factory: set at HIGH side)														
4)	Ring counter setting switch	Set whether the ring counter function can be used. When ring counter used: ON side When ring counter not used: OFF side (When shipped from the factory: set at OFF side)														
5)	Reset switch	Hardware reset Initializes the remote register for the high-speed counter module. By turning the switch on, the initial data processing request flag turns on.														

No.	Name	Description																																																																		
6)	LED display	PW Lit: power is on Unlit: power is off																																																																		
		RUN Lit: operating normally Unlit: 24V DC power supply is disconnected or WDT error																																																																		
		L RUN Lit: communication is normal Unlit: communication is disconnected (time over error)																																																																		
		SD SD: lit when data is being transmitted																																																																		
		RD RD: lit when data is being transmitted																																																																		
		L ERR. Lit: communication data error (CRC error) Flashing: setting error in the station number or baud rate switch Unlit: communication is normal																																																																		
7)	LED display	ϕA Lights up when voltage is being applied to the Phase A pulse input terminal.																																																																		
		ϕB Lights up when voltage is being applied to the Phase B pulse input terminal.																																																																		
		DEC Lights up during subtraction.																																																																		
		PRE Lights up stays lit when voltage is being applied to the RESET terminal. Turns off when the external preset detection reset command rises.																																																																		
		F ST. Lights up when voltage is being applied to the F.START terminal.																																																																		
		EQU1 Lights up when coincidence output set value No.1 = counter value.																																																																		
		EQU2 Lights up when coincidence output set value No.2 = counter value. (This does not exist in the AJ65BT-D62D-S1 model.)																																																																		
8)	Terminal block	<p>For AJ65BT-D62</p> <table border="1"> <thead> <tr> <th>Pin Number</th> <th>Signal name</th> <th>Pin Number</th> <th>Signal name</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>DA</td> <td>15</td> <td rowspan="7">CH2</td> </tr> <tr> <td>2</td> <td>DB</td> <td>16</td> <td>ϕA</td> </tr> <tr> <td>3</td> <td>DG</td> <td>17</td> <td rowspan="2">ϕB</td> </tr> <tr> <td>4</td> <td>SLD</td> <td>18</td> </tr> <tr> <td>5</td> <td>24V</td> <td>19</td> <td>PRESET</td> </tr> <tr> <td>6</td> <td>F.G.</td> <td>20</td> <td>COM</td> </tr> <tr> <td>7</td> <td>24G</td> <td>21</td> <td>F.START</td> </tr> <tr> <td>8</td> <td rowspan="2">CH1</td> <td>ϕA</td> <td>22</td> <td rowspan="2">CH1</td> <td>EQU1</td> </tr> <tr> <td>9</td> <td></td> <td>23</td> <td>EQU2</td> </tr> <tr> <td>10</td> <td rowspan="3">CH1</td> <td rowspan="2">ϕB</td> <td>24</td> <td rowspan="2">CH2</td> <td>EQU1</td> </tr> <tr> <td>11</td> <td></td> <td>25</td> <td>EQU2</td> </tr> <tr> <td>12</td> <td>PRESET</td> <td>26</td> <td colspan="2">12/24V</td> </tr> <tr> <td>13</td> <td>COM</td> <td>27</td> <td colspan="2">COM</td> </tr> <tr> <td>14</td> <td>F.START</td> <td></td> <td colspan="2"></td> </tr> </tbody> </table>	Pin Number	Signal name	Pin Number	Signal name	1	DA	15	CH2	2	DB	16	ϕA	3	DG	17	ϕB	4	SLD	18	5	24V	19	PRESET	6	F.G.	20	COM	7	24G	21	F.START	8	CH1	ϕA	22	CH1	EQU1	9		23	EQU2	10	CH1	ϕB	24	CH2	EQU1	11		25	EQU2	12	PRESET	26	12/24V		13	COM	27	COM		14	F.START			
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No.	Name	Description
9)	Pulse/external input voltage setting pin	<p>This is the same for CH2.</p> <p>AJ65BT-D62</p> <p>Circuit board CH.1</p>  <p>(When a jumper is connected to 5V)</p> <p>AJ65BT-D62D</p> <p>CH.1</p>  <p>(When a jumper is connected to 12V)</p> <p>AJ65BT-D62D-S1</p> <p>CH.1</p>  <p>(When a jumper is connected to 24V)</p>

4. Loading and Installation

4.1 Handling Precautions

- (1) The module case is made of plastic. Be sure not to drop it or subject it to strong vibration.
- (2) Do not remove the module printed circuit board from the case. This will cause a breakdown.
- (3) Be careful not to let foreign matters such as fillings or wire chips get inside the module. If these do get inside, remove them.
- (4) Tighten the module installation screws within the following tightening torque range.

Screw	Tightening Torque Range
Module installation screws (M4 screw)	78 to 118N·cm
Terminal block terminal screws (M3.5 screw)	59 to 88N·cm
Terminal block installation screws (M3.5 screw)	98 to 137N·cm

- (5) When using a DIN rail adapter, take note of the following points when mounting the DIN rail.
 - (a) Applicable DIN rail type (JIS C 2B12 compliant)
 - TH-35-7.5Fe
 - TH-35-7.5Al
 - TH-35-15Fe
 - (b) Screw spacing when mounting the DIN rail
When mounting the DIN rail, tighten the screws at a pitch of 200mm (7.84in.) or less.

4.2 Installation Environment

Do not install the A series PLC in the following environment.

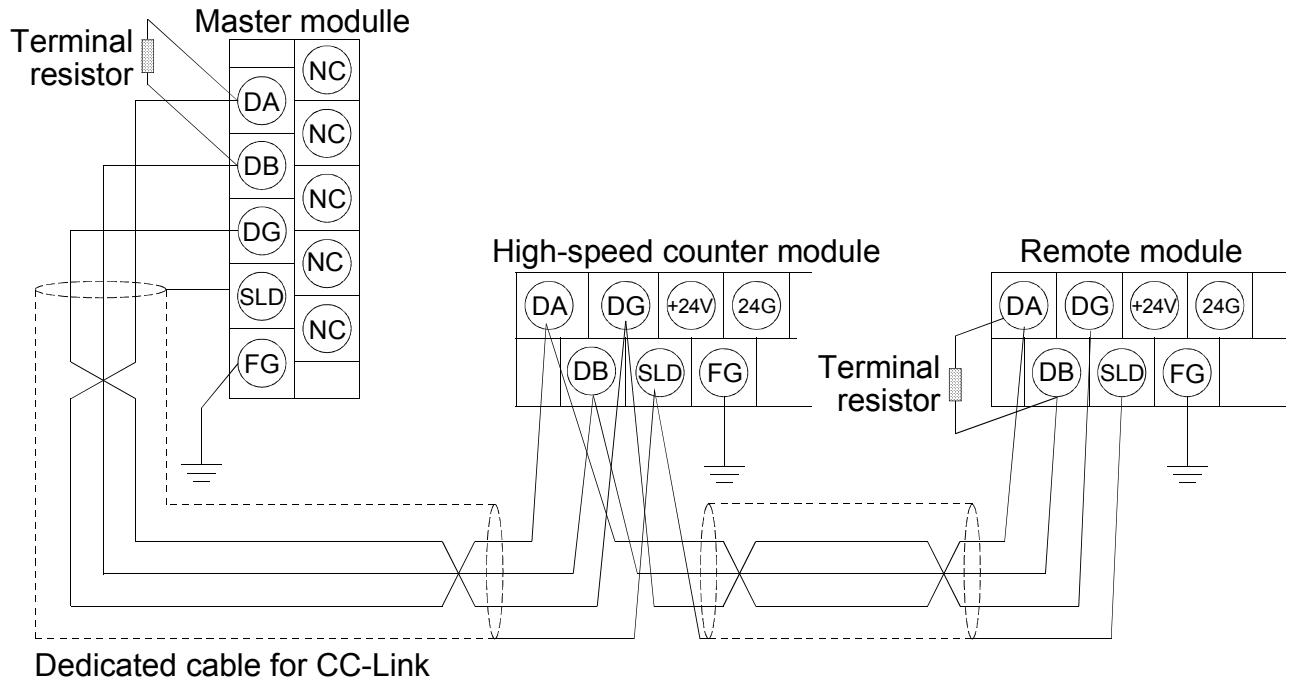
- (1) Where the ambient temperature exceeds the 0 to 55°C range.
- (2) Where the ambient humidity exceeds the 10 to 90% RH range.
- (3) Where condensation is produced by sudden temperature changes.
- (4) Where corrosive or combustible gas is present.
- (5) Where dust, iron powder and other conductive powder, oil mist, salt, or organic solvents are prevalent.
- (6) In direct sunlight.
- (7) Where a strong electric or magnetic field is generated.
- (8) Where vibration and shock may be transmitted directly to the module.

5. Wiring

This section explains the wiring for the high-speed counter module.

5.1 Wiring Method to Each Module

The following diagram shows the wiring of the master module, remote module and high-speed counter module with dedicated cable for CC-Link.

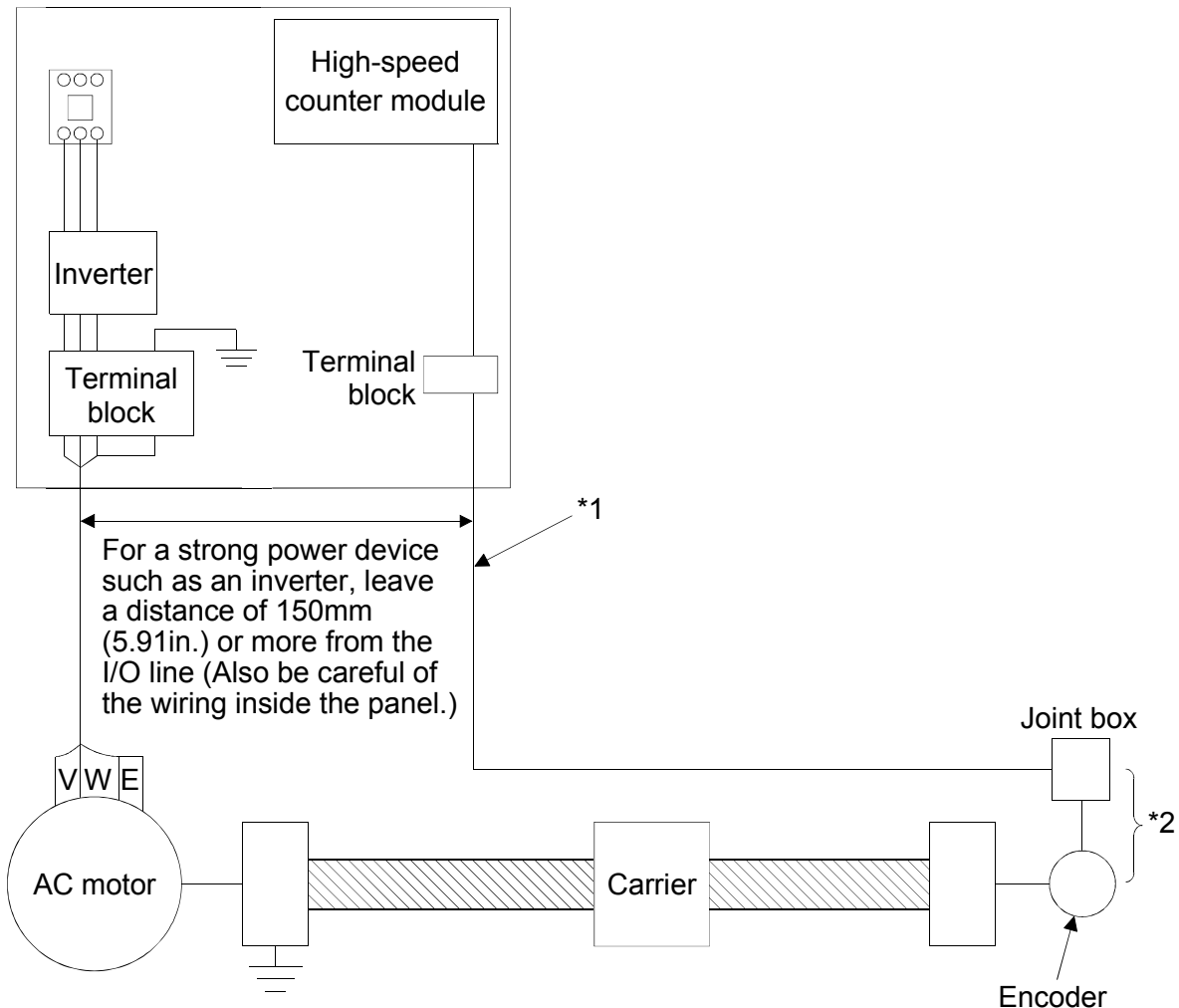


Point

Always connect the "terminal resistors" provided with the master module to the modules at both ends of data link.
(Connect between DA and DB)

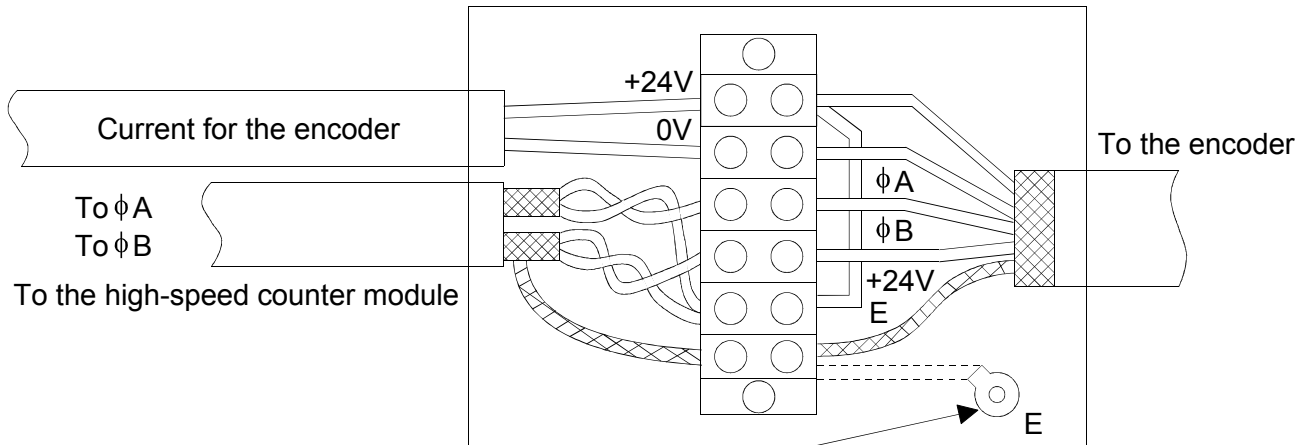
5.2 Precautions When Wiring to the Pulse Generator

- (1) Implement the following types of noise measures for high-speed pulse input.
 - (a) Always use a twisted shielded wire and perform class 3 grounding.
 - (b) Do not run the twisted wire parallel to the power cord or I/O line with a lot of noise. Secure a distance of 150mm(5.91in.) or more and run the cable for the shortest distance possible.
- (2) In the case of Phase 1 input, always wire to the Phase A side.
- (3) The high-speed counter module counts up when a pulse-state noise is input, resulting in a count error.
- (4) Wiring for noise measure is indicated below.



- *1 When using metal piping, avoid intermingling solenoid valves and inductive loads in the same piping. Also, if an isolation distance from a strong power line such as duct wiring cannot be secured, use a CVVS or other shielded cable for the strong power line.

- *2 Make the distance from the encoder to the joint box short. When there is long distance from the high-speed counter module to the encoder, voltage drops will occur. Therefore, use a measuring device such as a tester on the joint box terminal block to check whether the voltage while the encoder is operating and at a standstill is within the rated voltage for the encoder. If the drop in voltage is large, make the cable size thicker or use a 24V DC type encoder with small current consumption.
- Grounding for the twisted, shielded cable is done on the encoder side (in the joint box). (The following is an example of a connection for a 24V sink load.)

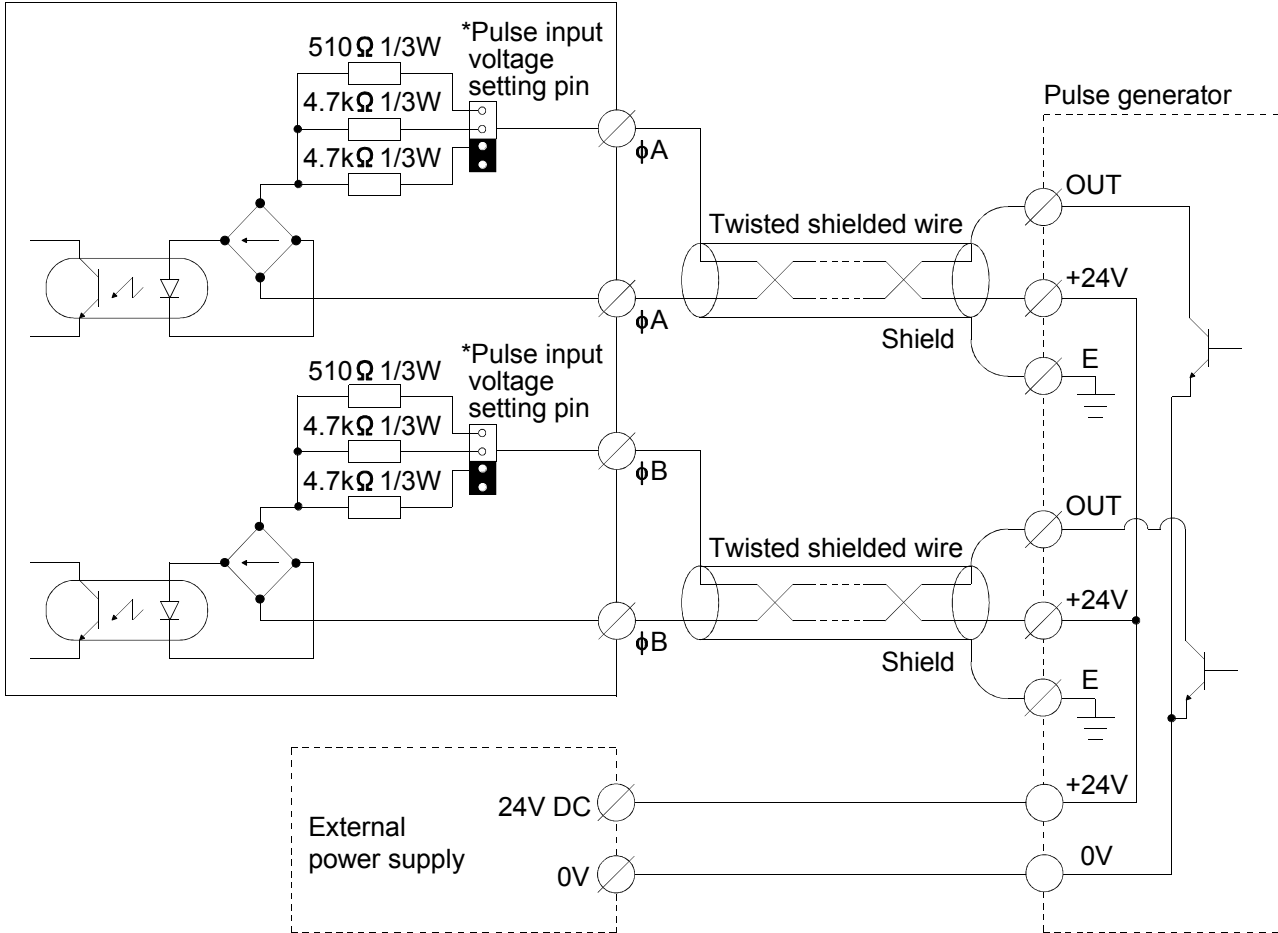


The shielded cable for the encoder and that for the twisted cable are connected inside the joint box. If the shielded cable for the encoder is not grounded inside the encoder, then perform grounding inside the joint box as shown by the dotted line.

5.3 Example of Wiring for the Pulse Generator

(1) Example of wiring to an open collector output type pulse generator (24V DC)

AJ65BT-D62

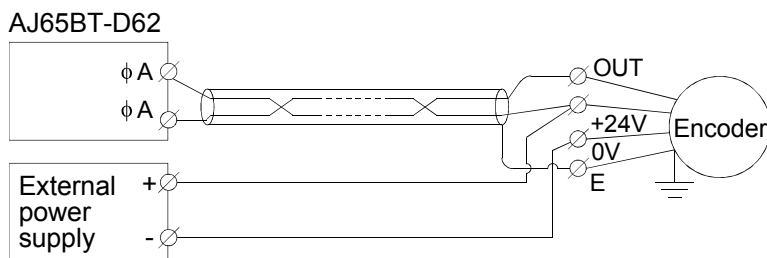


* Set the pulse input voltage setting pin to the  side.

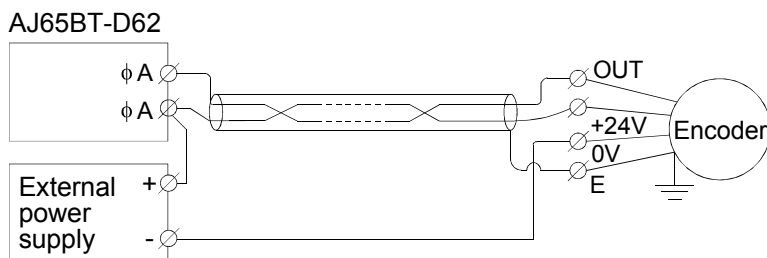
Point

The wiring between the AJ65BT-D62 and the encoder should be separate from the power supply line and signal line.

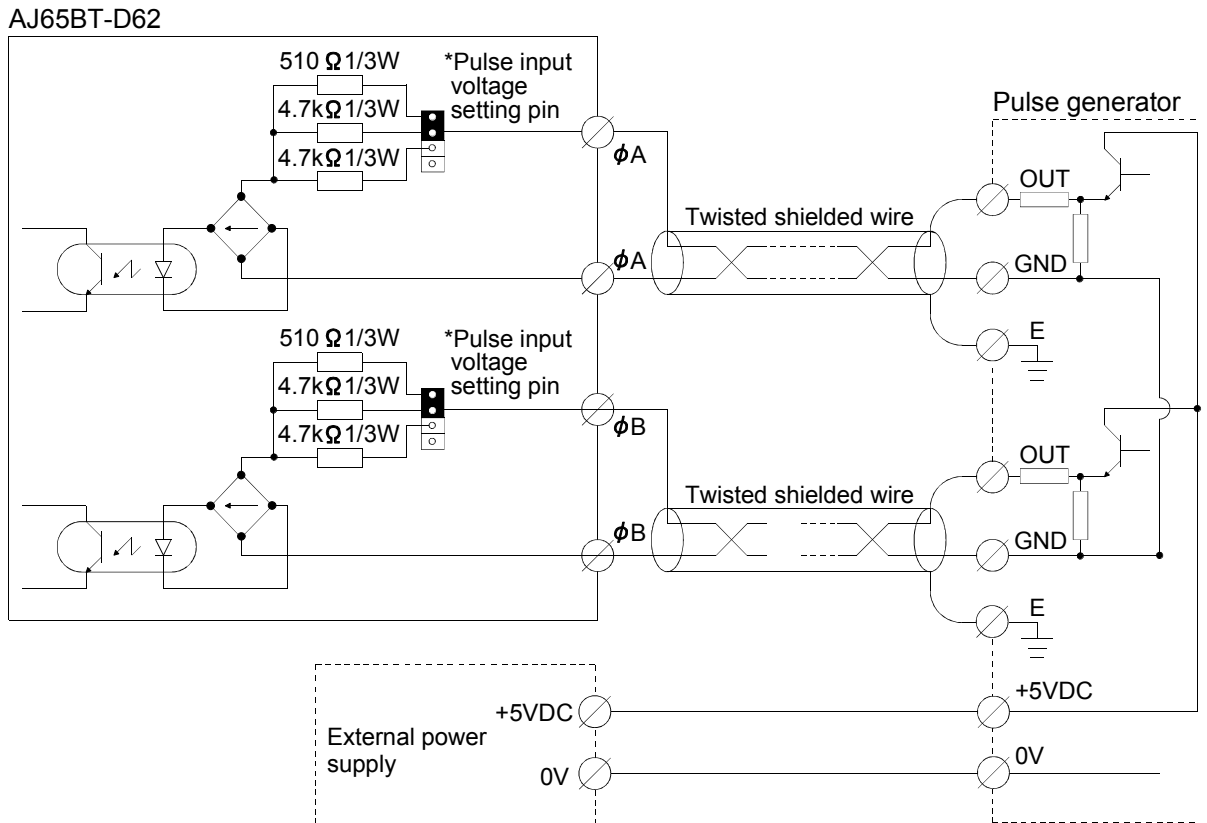
An example is shown below.



An example of wiring to be avoided.

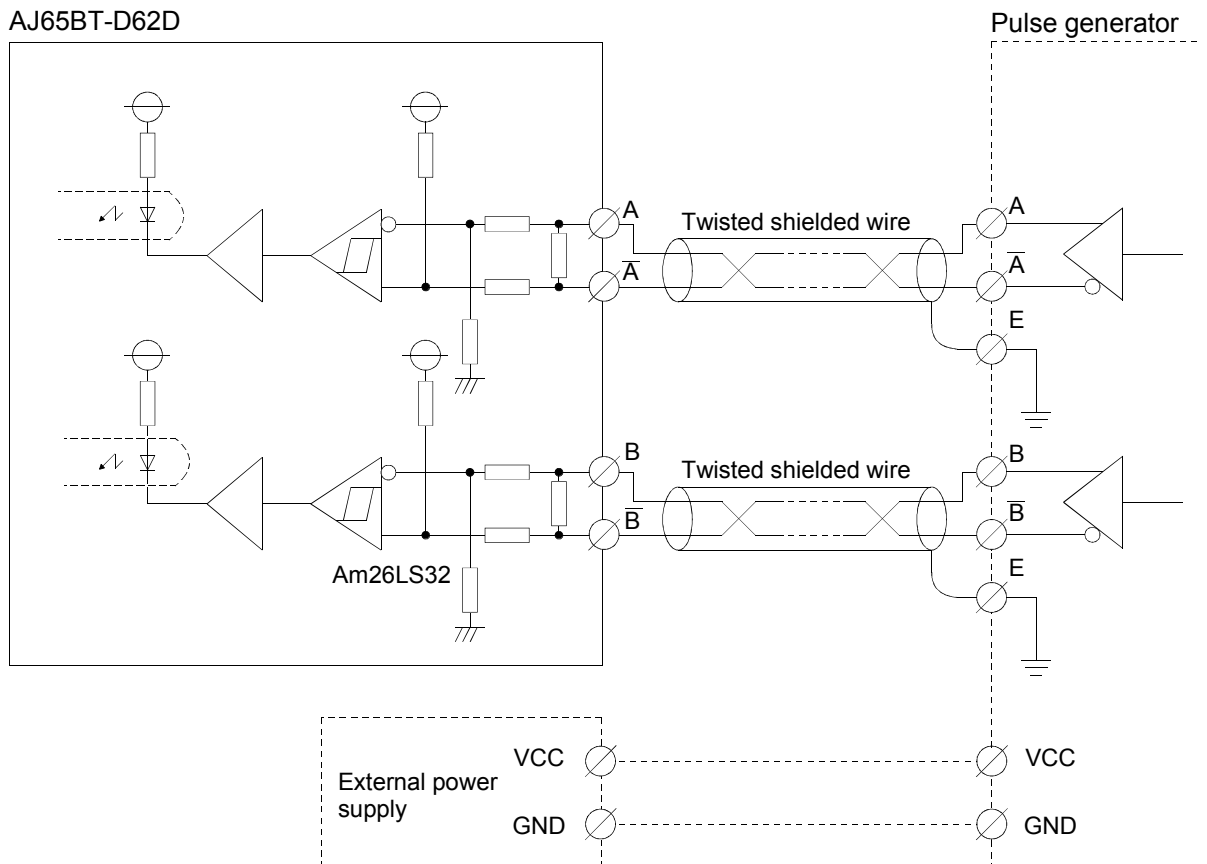


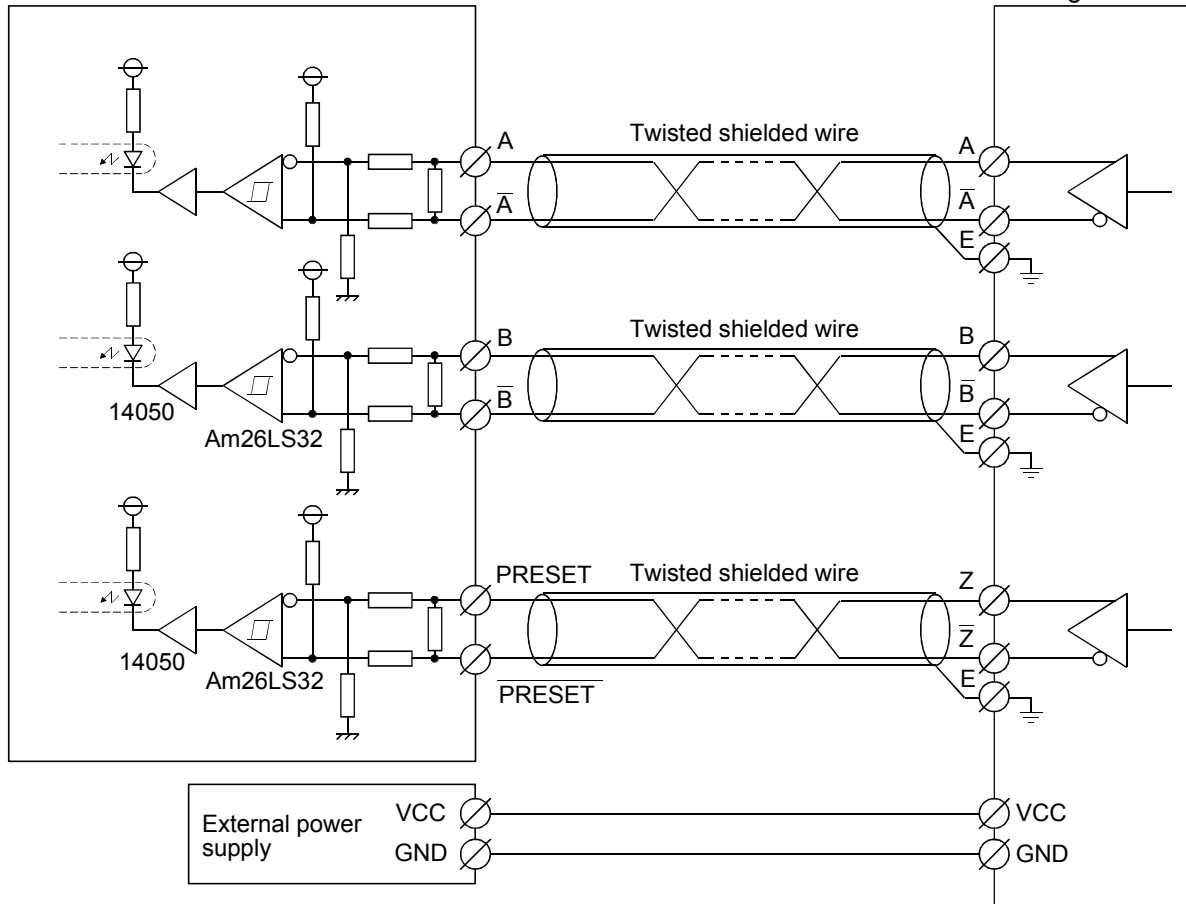
(2) Example of wiring to a voltage output type pulse generator (5V DC)



* Set the pulse input voltage setting pin to the  side.

(3) Example of wiring to the pulse generator for a line driver (Am26LS31 or equivalent)

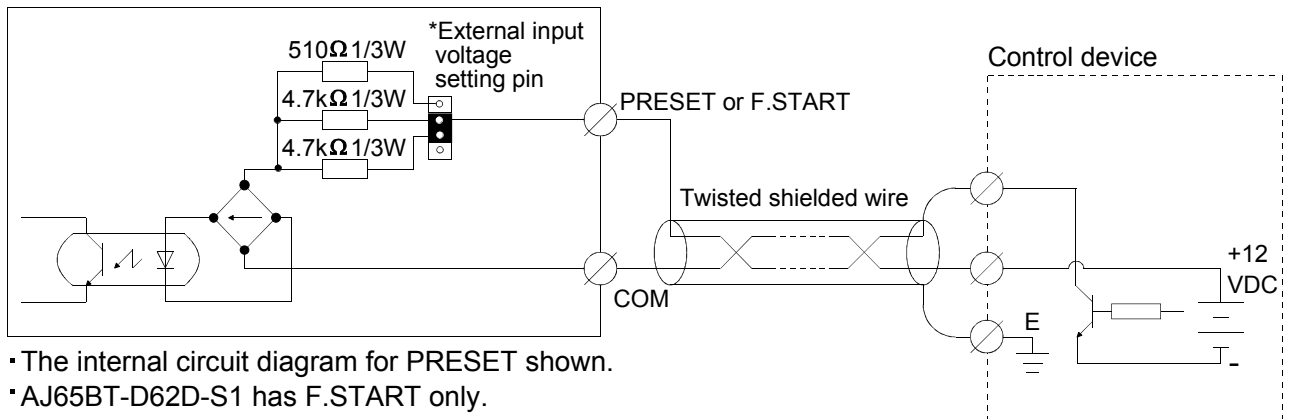




5.4 Example of Wiring Between a Control Device and External Input Terminals (PRESET, F.START)

(1) When the control device (sink load type) is 12V

AJ65BT-D62,AJ65BT-D62D,AJ65BT-D62D-S1

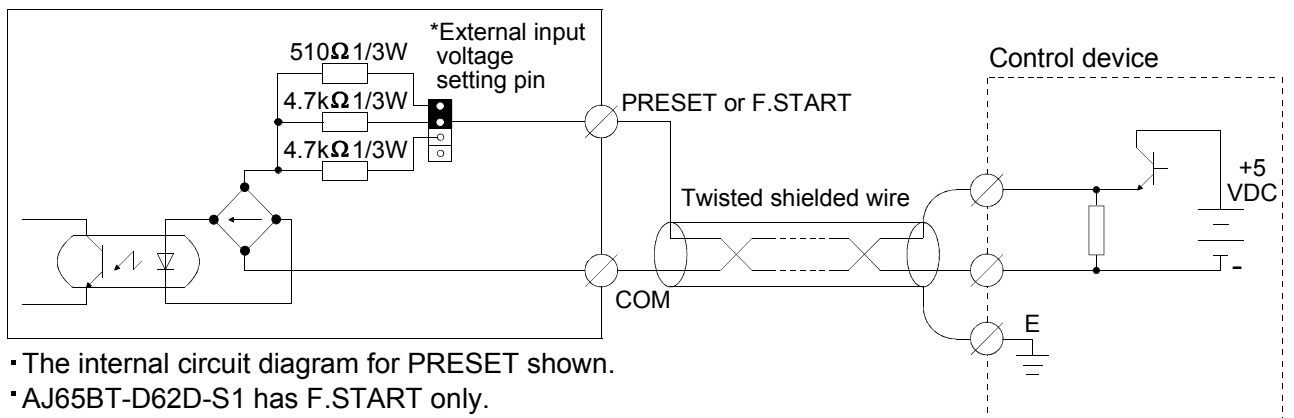


- The internal circuit diagram for PRESET shown.
- AJ65BT-D62D-S1 has F.START only.

* Set the external input voltage setting pin to the  side.

(2) When the control device (source load type) is 5V

AJ65BT-D62,AJ65BT-D62D,AJ65BT-D62D-S1

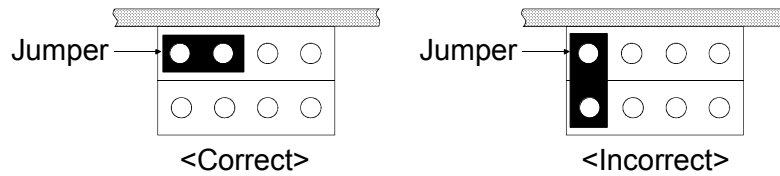


- The internal circuit diagram for PRESET shown.
- AJ65BT-D62D-S1 has F.START only.

* Set the external input voltage setting pin to the  side.

⚠ CAUTION

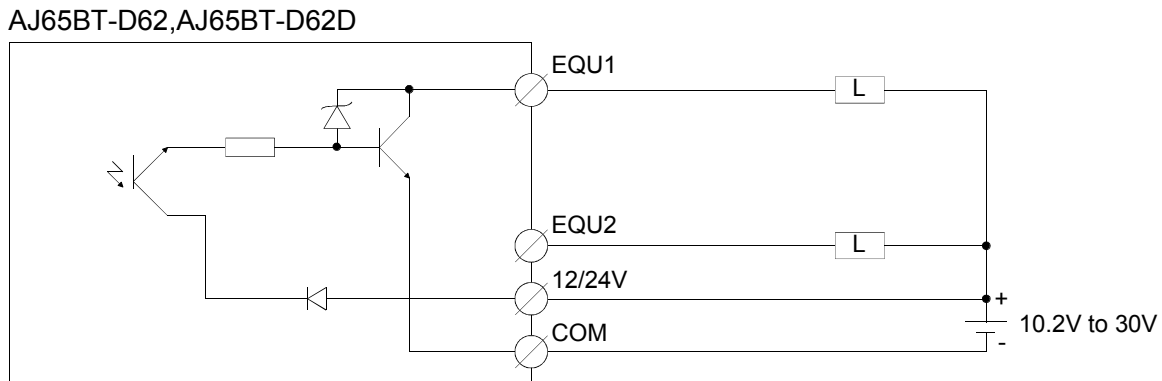
- Set the pulse/external input voltage setting pin correctly after confirming the rated voltage for the external power supply. If there is a fault in the wiring (setting mistake), fire or breakdown can be caused.
- Always set the pulse/external input voltage setting pin after shutting down all phases of the power supply externally. If all phases are not shut down, this will cause a breakdown of the module or an error in operation.
- Make sure the insertion direction of the jumper for the pulse/external-input voltage setting pin is correct. Incorrect insertion direction may cause the module to breakdown.



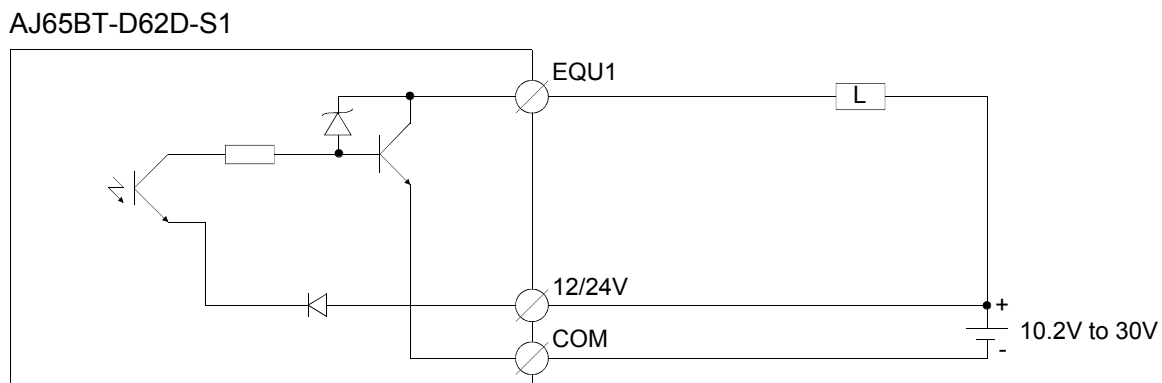
5.5 Example of Wiring to the External Output Terminals (EQU1 to EQU2)

When using an EQU terminal, an external power supply in the range of 10.2V DC to 30V DC is needed to operate the internal photocoupler. Run the wires as shown below.

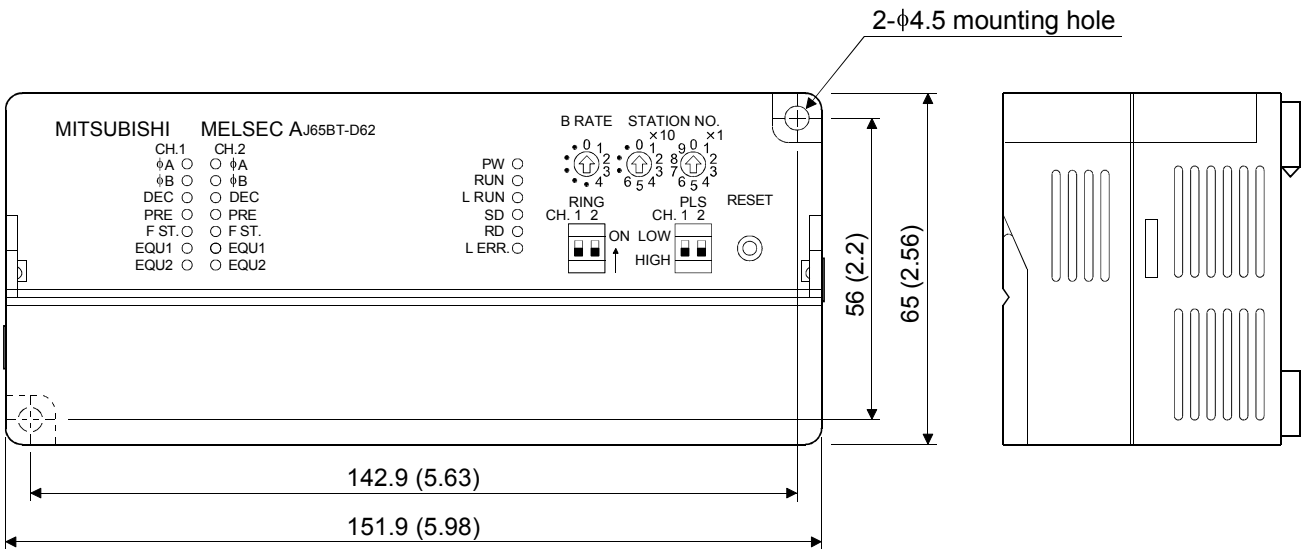
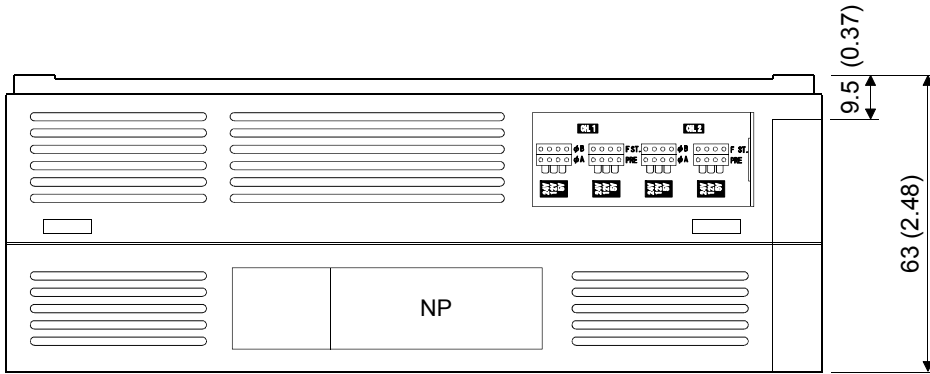
(1) AJ65BT-D62, AJ65BT-D62D



(2) AJ65BT-D62D-S1



6. External Dimensions



(Unit: mm (in.))

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.

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- 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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