JANOME DESKTOP ROBOT

JR3000 Series

Operation Manual

Specifications

Thank you for purchasing this Janome Robot.

- **Before using your robot, read this manual thoroughly and always make sure you use the robot correctly. In particular, be sure to thoroughly read "For Your Safety" as it contains important safety information.**

- **After reading this manual, store in a safe place that can be easily accessed at any time by the operator.**

Original Instructions

JANOME

PREFACE

This manual covers the JR3200, JR3300, JR3400, JR3500, and the JR3600 Series.

There are several manuals pertaining to these robots.

Manual	Details	JR3000	JC-3	JS3
Read This First	• For Your Safety Be sure to thoroughly read “For Your Safety” as it contains important safety information. • Package Contents (JS3 Series only) Check the items included with your robot. • CD-ROM Contents Explains the CD-ROM contents.	✓	✓	✓
Setup (JR3000 / JC-3) Installation (JS3)	Explains how to set up the robot. ■ Make sure you read this manual when installing the robot ■ NOTE: This manual is designed for people who have received safety and installation training regarding the robot.	✓	✓	✓
Maintenance	Explains maintenance procedures for the robot. ■ Make sure you read this manual when performing maintenance ■ NOTE: This manual is designed for people who have received safety and maintenance training regarding the robot.	✓	✓	✓
Basic Instructions	Provides part names, data configurations, and the basic knowledge necessary to operate the robot.	✓ (Common)		✓
Quick Start	Explains the actual operation of the robot by creating and running simple programs.	✓ (Common)		✓
Teaching Pendant Operation	Explains how to operate the robot via the teaching pendant.	✓ (Common)		✓
Functions I	Explains point teaching.	✓ (Common)		
Functions II	Explains commands, variables, and functions.	✓ (Common)		
Functions III	Explains functions such as All Program Common Settings and PLC programs.	✓ (Common)		
Functions IV	Explains Customizing Functions.	✓ (Common)		
External Control	Explains I/O and Fieldbus. Refer to this manual if you are using Fieldbus.	✓	✓	✓
Communication Control	Explains COM 1 – 3 and LAN communication control.	✓ (Common)		
Camera & Sensor Functions	Explains the functions of the attachable camera and Z position sensor.	✓ (Common)		

Manual	Details	JR3000	JC-3	JS3
Specifications	Outlines general specifications such as the robot's operating range, mass, etc.	✓	✓	—
Auxiliary Axis Functions	Explains the auxiliary axis functions.	✓ (Common)		
Application Specifications	Explains the specialized functions of the various application specifications.	Standard model: - Application model: ✓		

⚠ Warning

Do not handle or operate the robot in ways not covered in the manuals listed here.
Contact Janome (listed on the back of this manual) for repairs.
Failure to do so can cause electric shock or injury.

⚠ Caution

To make full use of the machine's functions and capabilities, make sure that you use the robot according to the correct handling/operation procedures that are written in the manuals pertaining to this robot.

If you turn OFF the power after making changes to robot's settings or data without saving, these changes are lost and the robot will revert to its original settings. Make sure that you save any changes to data and/or settings.

Before using this robot for the first time, make sure you back up robot data and save the individual configuration information. Individual configuration information is needed when replacing internal circuit boards. For details on how to back up robot data, refer to "3. BACKING UP AND RESTORING ROBOT DATA" in the operation manual *Setup*.

- The descriptions within this manual are based on standard specifications. The menu item names etc. may vary depending on the model type.
- For information regarding optional additions for this robot, refer to "24. SPECIFICATIONS."
  The notation "optional" is not used in the main text of this manual except for diagrams.
- Machine specifications may be modified without prior notice to improve quality.

Remarks:

- The operation methods described in this manual are indicated as follows:

  TP Operation via the teaching pendant

  PC Operation via PC (JR C-Points II)

- Click text that appears blue and is underlined to jump to that section.

  Example: Refer to “1. LINEUP.”

CONTENTS

FOR YOUR SAFETY

The safety notes outlined below are provided in order to ensure safe and correct usage of the product in addition to preventing injury to the operator, other people and damage to property as well.

・・・・・Be sure to follow the safety guidelines detailed here・・・・・

Symbols are also listed alongside the safety note explanations. Refer to the list below for an explanation of these symbols.

■ Symbols that indicate the level of danger and/or damage.
The level of danger or damage that could occur as a result of ignoring these safety guidelines and misusing the robot are classified by the following symbols.

Danger	This symbol indicates an imminent risk of serious injury or death.
Warning	This symbol indicates a risk of serious injury or death.
Caution	This symbol indicates the possibility of serious injury or damage to property.

■ The following symbols indicate the nature of the danger and any necessary safety precautions to be taken.

	Indicates caution must be taken
	Take Caution (General Precaution)
	Indicates a forbidden action
	Never do this (General Prohibition)
	Do not disassemble, modify or repair
	Do not touch (Contact Prohibition)
	Indicates a required action
	Be sure to follow instructions (General Requirement)
	Be sure to unplug the power supply cord
	Make sure the machine is grounded

FOR YOUR SAFETY

If using auxiliary axis functions to operate a motor, such as a servo motor, that produces feedback and/or a motor with high output etc., or when using auxiliary axes in the robot setup etc., we ask that you perform a risk assessment on your side and take any necessary safety measures.

If Using Auxiliary Axis Functions in a Way that Require Safety Measures

⚠ Danger

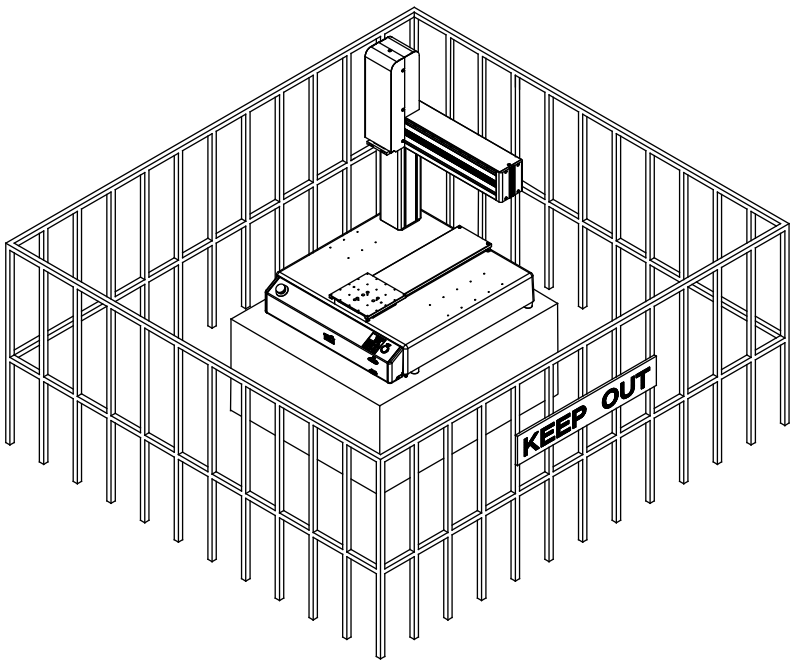
Always set up safety guards around the robot or the auxiliary axes so the moveable parts cannot be touched.

Anyone within the maximum reach of the robot and the auxiliary axes being controlled by the robot may be injured. Set up an **emergency stop interlock device that cuts OFF the motor power to the auxiliary axes when the entrance to the safety guard is opened** and make sure this entrance is the only way to access the machine.

NOTE: A stop made via a device connected to the I/O-S connector is a stop category 2. Make sure to perform a separate risk assessment of the interlock device.

Furthermore, put up a **"Keep Out"** or **"Do Not Operate"** warning sign in a clearly visible place.

Example:



FOR YOUR SAFETY

If Using Auxiliary Axis Functions in a Way that Require Safety Measures

⚠ Danger

When power to the robot is ON, never enter the safety guard or put your head, hands, or any part of your body inside.
Entering the safety guard could result in injury.

When entering the safety guard due to something wrong with the robot or a peripheral device, or to inspect or lubricate the machine etc., **with both the power supply breaker and the robot switched OFF, make sure to lockout and tagout and confirm there is no electricity flowing to the robot.**
Failure to do so can cause electric shock or injury.

⚠ Warning

When creating a robot system using auxiliary axis functions, if the system can be categorized as an industrial robot, make sure to use the robot in accordance with the laws and guidelines of the country where it is used.

Before performing a run or operation, always check the following:

- **Obstacles** : Make sure there are no obstacles or people within the safety guard.
- **Installation** : Make sure the robot is installed properly, that there are no abnormalities with the robot and the surrounding devices, and that the teaching pendant and tools are in the appropriate places.
- **Emergency Stop Switch** : Make sure the I/O-S circuit (interlock) and emergency stop switch(es) are functioning properly.

It is potentially dangerous to operate the robot without making these checks first.

FOR YOUR SAFETY

If Using Auxiliary Axis Functions in a Way that Require Safety Measures

⚠ Warning	
	**Construct safety guards that are strong enough to protect the operator against such dangers as the tool or workpiece splintering, etc.** When working within the safety guard, use protective gear such as a helmet, protective gloves, protective goggles, and safety shoes. Failure to follow these safety measures can result in injury.
	If objects that the robot grasps have a risk of falling or being projected, **take into account the size, mass, and chemical composition of the objects for the required safety precautions.** Failure to do so can result in injury or unit breakdown.
	**When working within the safety guard, make sure not to come within the maximum range of the robot.** Failure to do so can cause injury.
	When starting a run, first confirm there are **no people inside of the safety guard and there are no obstacles that could interfere with the run.** Failure to do so can cause injury or unit breakdown.

FOR YOUR SAFETY

⚠ Danger

Do not use where flammable or corrosive gas is present.
Leaked gas accumulating around the unit causes explosions or fire.

⚠ Warning

Use protective gear such as a helmet, protective gloves, protective goggles, and safety shoes when installing the robot and performing maintenance.
Failure to do so can cause injury.

Make sure that you securely install the unit in a place that can fully withstand both the unit's weight and its usage. Install the robot on a workbench 600 mm or higher above floor level, in the center of the workbench.
In addition, **for units with a cooling fan on the back, allow for 300 mm or more clearance between the back of the unit and the wall.**
Install the switchbox 600 mm or more above floor level in an easily accessible place.
If installation is inadequate, the unit can drop or fall over causing injury and unit breakdown. Also, inadequate installation causes overheating or fire.

Make sure to power the unit within its rated current range.
Failure to do so causes electric shock, fire, or unit breakdown.

Plug the power cord into the power outlet firmly.
Failure to do so causes the plug to heat up resulting in fire.

Be sure to use the unit within its indicated voltage range.
Failure to do so causes unit breakdown, fire, or electric shock.

When replacing fuses, or inspecting or lubricating the unit, unplug the power cord from the power outlet, then remove the cord from the main unit and make sure there is no electrical current. Also, do not touch any of the power inlet pins within 5 seconds of removing the power cords. Failure to follow these steps causes electric shock or injury.

FOR YOUR SAFETY

⚠ Warning	
	Always **make sure the machine is grounded through the power cord.** **Do not use the machine when it is not grounded.** Improper grounding causes electric shock, fire, malfunction, or unit breakdown.
	**Wipe the power plug with a clean, dry cloth periodically to eliminate dust.** Dust accumulation deteriorates the electrical insulation or causes fire.
	**Be sure to unplug the power cord from the power outlet when the unit is not in use for long periods of time.** Dust accumulation causes fire.
	**Be sure to turn OFF the unit before inserting or removing cords and cables such as the teaching pendant cable or LAN cable.** Failure to do so causes electric shock, data loss, unit breakdown, or malfunction.
	**If disassembling this machine, follow the instructions in the operation manual *Maintenance*, and do not disassemble in any other way other than those specified.** Do not modify the machine in any way. Inappropriate disassembly or modification causes electric shock or unit breakdown.
	**Do not allow water or oil to come in contact with the unit, control box or the power cord.** Contact with water or oil causes electric shock, fire, or unit breakdown. IP Protection Rating: IP20.
	**If anything unusual occurs, such as a burning smell or unusual sound, stop operation and unplug the power cord immediately. Contact Janome (details on the back of this manual) or a Janome dealer.** Continuing to use the robot without addressing the problem causes electric shock, fire, or unit breakdown.

FOR YOUR SAFETY

⚠ Caution
Do not drop or jar the unit during transport and/or installation. This can cause injury or damage the unit.
Before performing any operation, ensure there is no imminent danger to any of the operators. Failure to do so causes injury.
Use the unit in an environment between 0 and 40 °C, with a humidity level of 20 to 90 %, and without condensation. Use outside of these conditions can cause unit breakdown or malfunction.
Use the unit in an environment where no electrical noise is present. Failure to do so causes unit malfunction or breakdown.
For models with I/O-S circuits*, when installing the unit, take safety measures such as setting up area sensors and safety guards. If there are no safety measures in place and someone enters the area of operation when the robot is running, they may be injured.
Keep the emergency stop switch within reach of the operator when running or operating the robot. If the robot is operated when the emergency switch is not within reach, it may not be possible to stop the robot immediately and safely. This is potentially dangerous.
Make sure that you regularly perform a function check of the emergency stop switch(es). Also, for models with I/O-S circuits*, regularly perform an I/O-S circuit function check. If the robot is operated without making these checks, it may not be possible to stop the robot immediately and safely in an emergency. This is potentially dangerous.

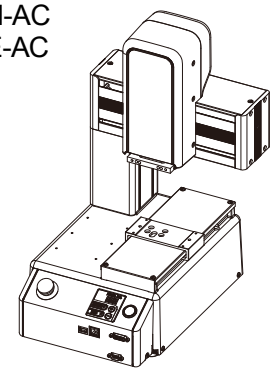
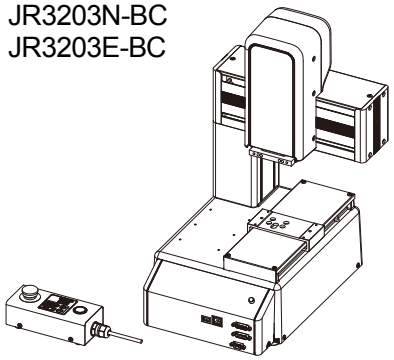
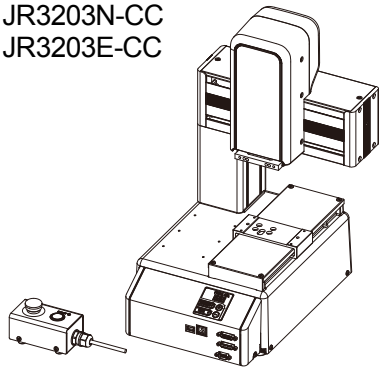
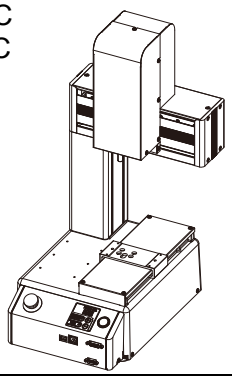
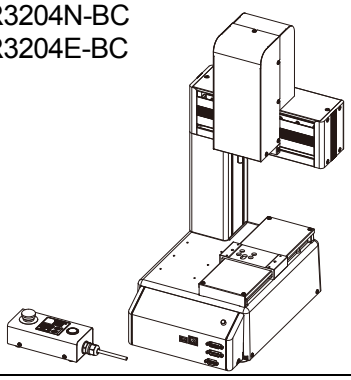
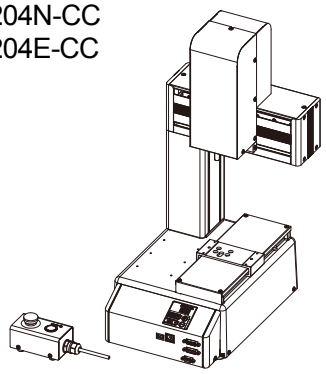
* A stop made via a device connected to the I/O-S connector is a stop category 2. Make sure to perform a separate risk assessment of the interlock device.

FOR YOUR SAFETY

⚠ Caution	
	**When attaching tools, a USB camera, or any other device, make sure they are securely fitted before running the robot.** Failure to do so causes injury or breakdown.
	**When using the machine for extended periods of time, check and make sure none of the main unit's mounting screws are loose, and perform a routine inspection every 3 months or after every 750 hours of operation.** Failure to do so causes injury or breakdown.
	**Be sure to check the connections of the cords and cables to the main unit.** Improper connection causes unit malfunction or breakdown.
	**When lifting or transporting the robot, do so in accordance with the following:** • **Secure the movable parts of the unit (the Z/ZR mechanism) before transportation.** • **Lift and transport the JR3200 Series with 2 or more people.** • **Lift and transport the JR3300 – JR3600 Series with 2 or more people or use a lifter.** • **Hold the bottom of the base and keep the robot horizontal.** • **Do not hold the robot by the column or Y body.** Failure to adhere to this can cause injury or damage the robot.
	**Use the unit in an environment that is not exposed to direct sunlight.** Direct sunlight causes unit malfunction or breakdown.
	Individual Configuration Information varies for each individual unit even if they are the same model. **Do not use backup data with a different robot. The robot cannot function normally with backup data from a different robot.**

1. LINEUP

JR3200 Series

JR3203N-AC JR3203E-AC 	JR3203N-BC JR3203E-BC 	JR3203N-CC JR3203E-CC 
JR3204N-AC JR3204E-AC 	JR3204N-BC JR3204E-BC 	JR3204N-CC JR3204E-CC 

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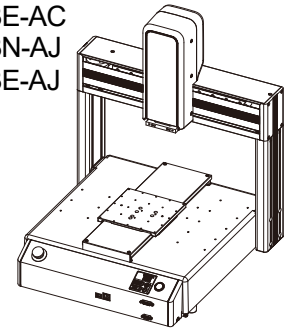
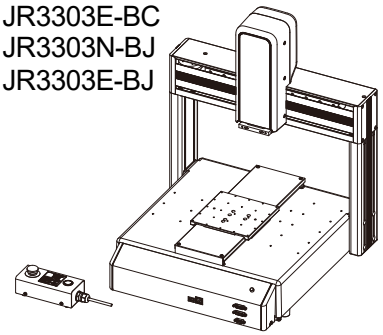
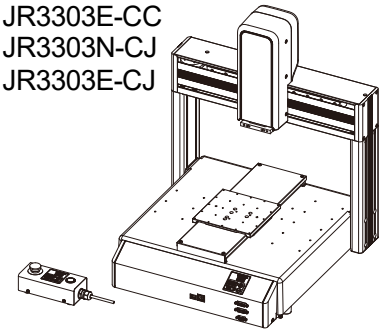
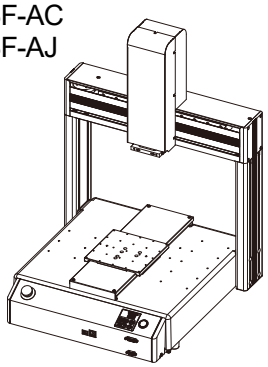
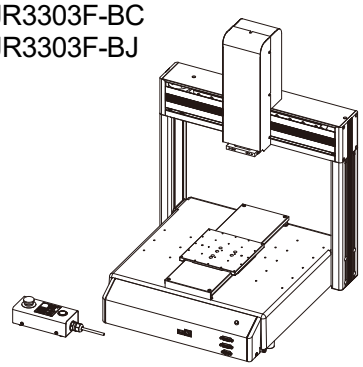
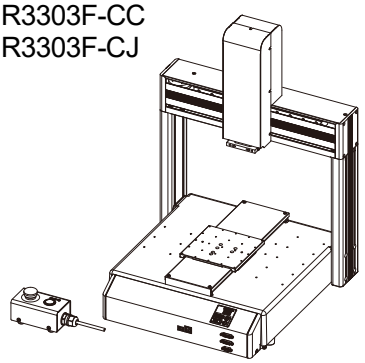
JR3303N-AC JR3303E-AC JR3303N-AJ JR3303E-AJ 	JR3303N-BC JR3303E-BC JR3303N-BJ JR3303E-BJ 	JR3303N-CC JR3303E-CC JR3303N-CJ JR3303E-CJ 
JR3303F-AC JR3303F-AJ 	JR3303F-BC JR3303F-BJ 	JR3303F-CC JR3303F-CJ 

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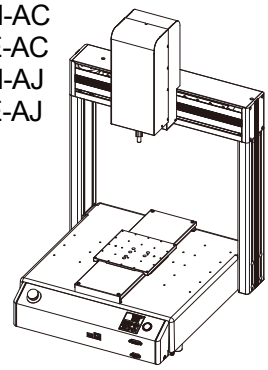
JR3304E-AJ



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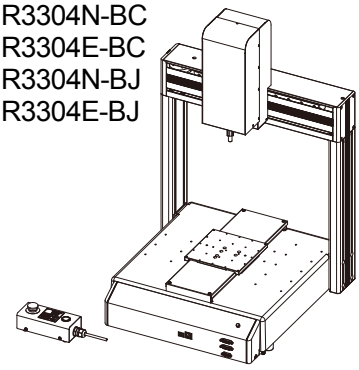

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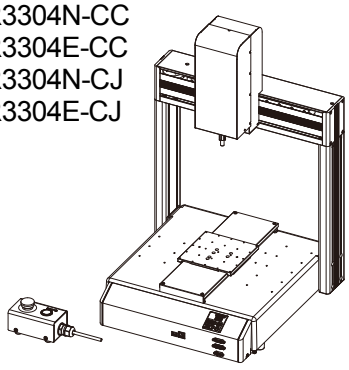

JR3400 Series

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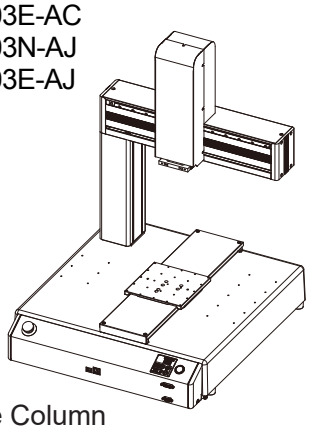
JR3403E-AJ



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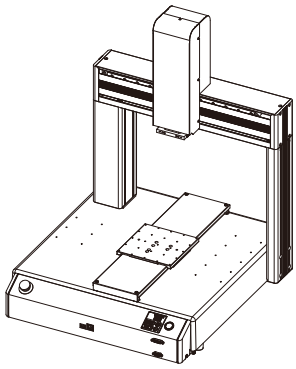

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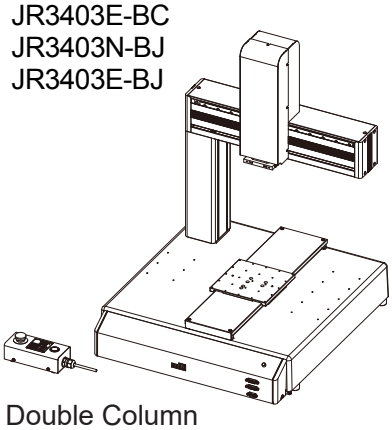

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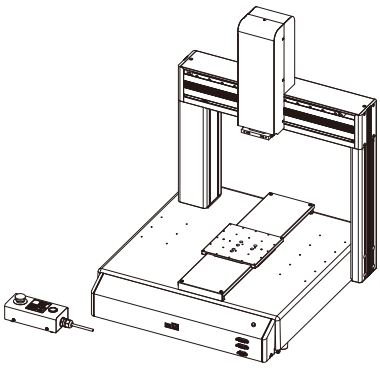

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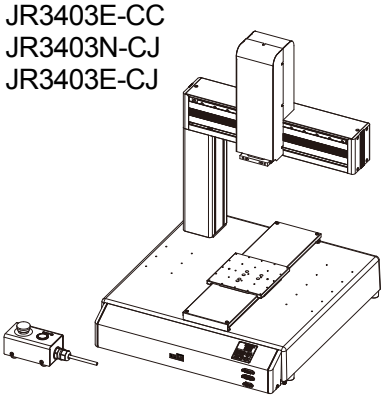

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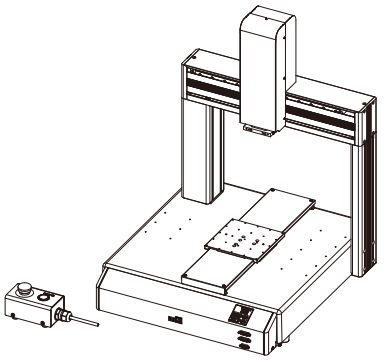

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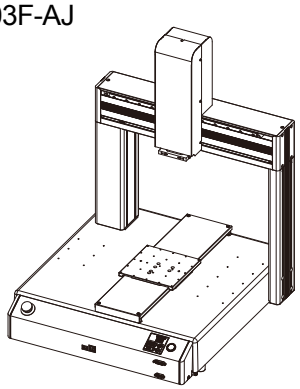

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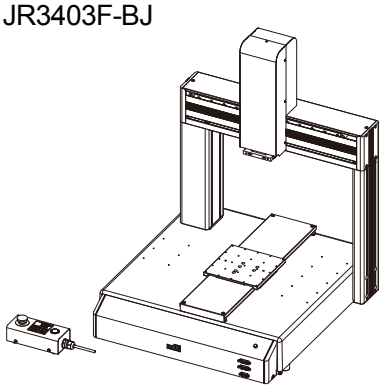

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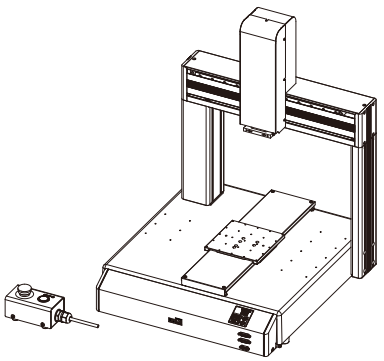

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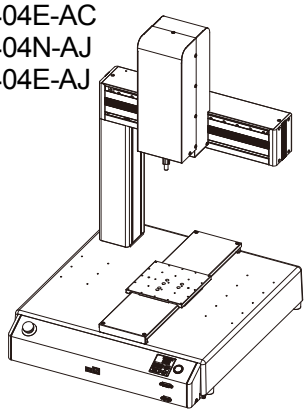	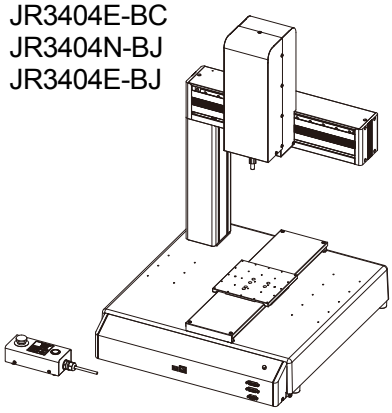	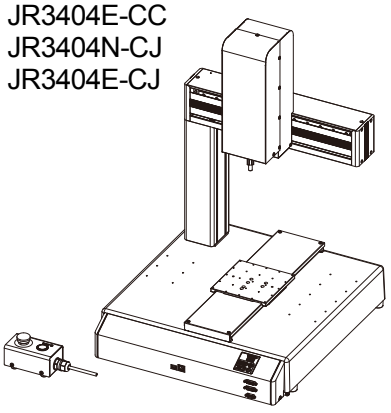
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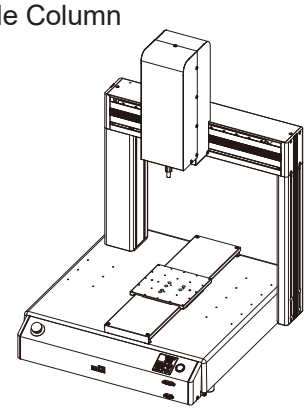
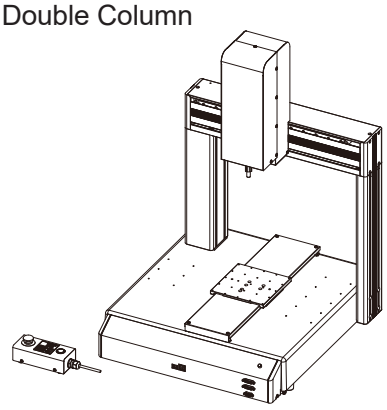
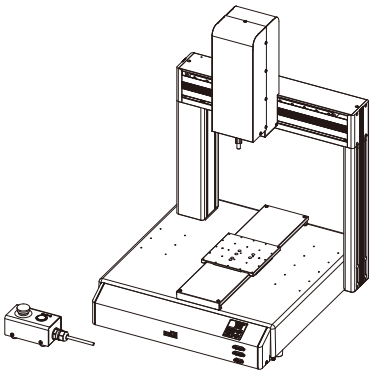
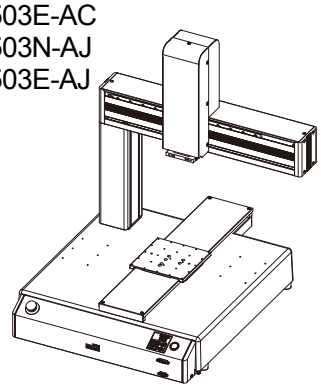
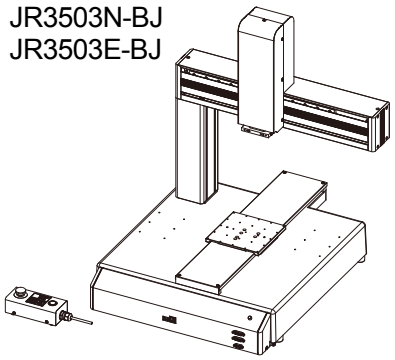
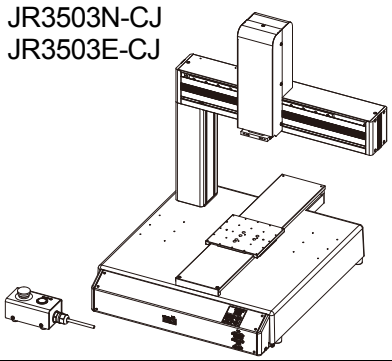
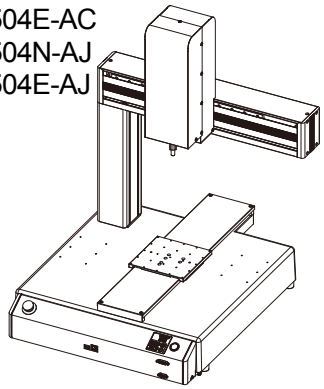
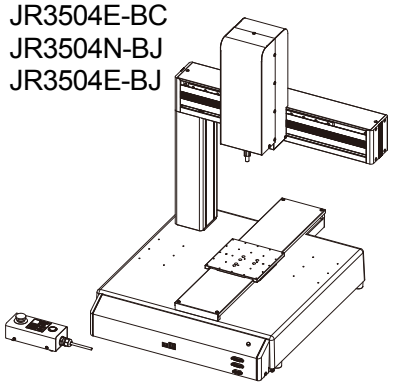
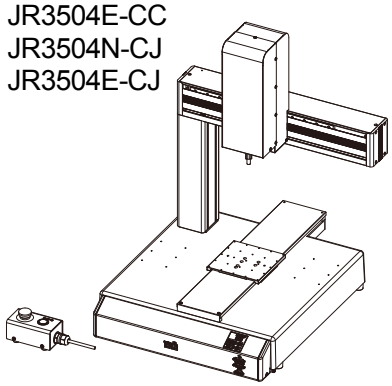
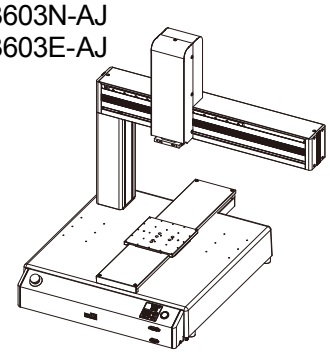
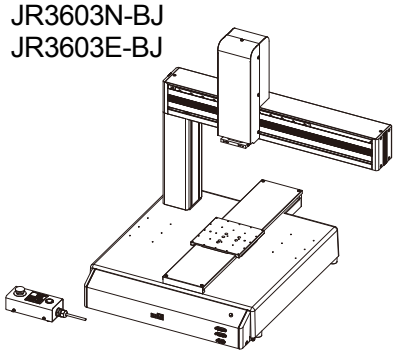
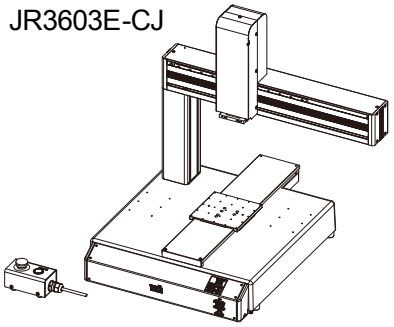
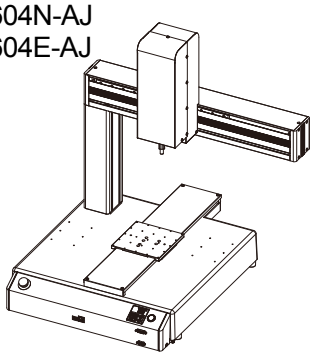
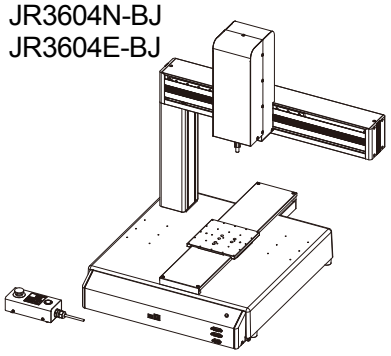
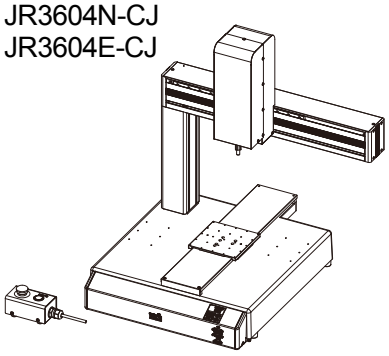
		

JR3500 Series

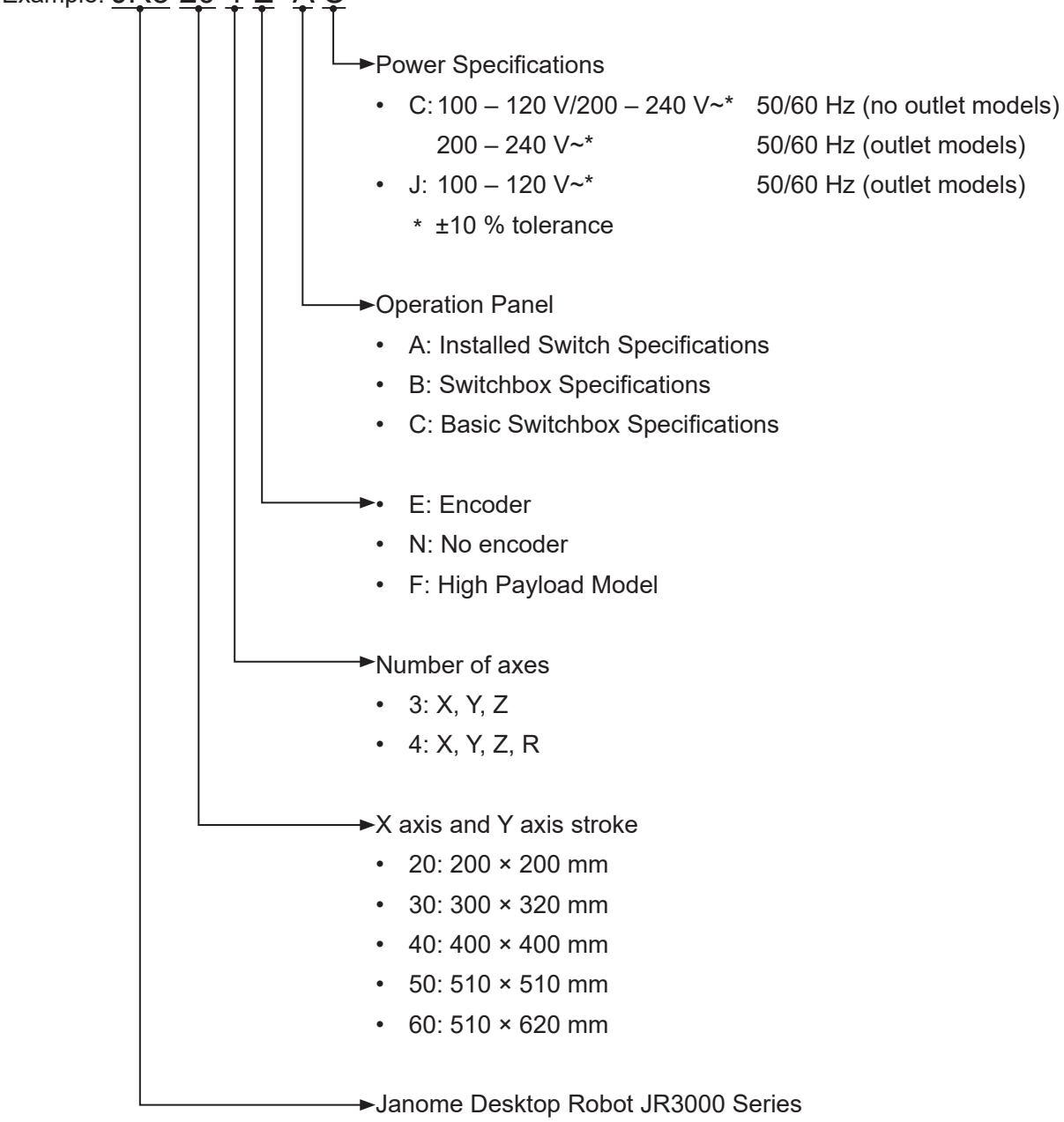
JR3503N-AC JR3503E-AC JR3503N-AJ JR3503E-AJ	JR3503N-BC JR3503E-BC JR3503N-BJ JR3503E-BJ	JR3503N-CC JR3503E-CC JR3503N-CJ JR3503E-CJ
		
JR3504N-AC JR3504E-AC JR3504N-AJ JR3504E-AJ	JR3504N-BC JR3504E-BC JR3504N-BJ JR3504E-BJ	JR3504N-CC JR3504E-CC JR3504N-CJ JR3504E-CJ
		

JR3600 Series

JR3603N-AC JR3603E-AC JR3603N-AJ JR3603E-AJ 	JR3603N-BC JR3603E-BC JR3603N-BJ JR3603E-BJ 	JR3603N-CC JR3603E-CC JR3603N-CJ JR3603E-CJ 
JR3604N-AC JR3604E-AC JR3604N-AJ JR3604E-AJ 	JR3604N-BC JR3604E-BC JR3604N-BJ JR3604E-BJ 	JR3604N-CC JR3604E-CC JR3604N-CJ JR3604E-CJ 

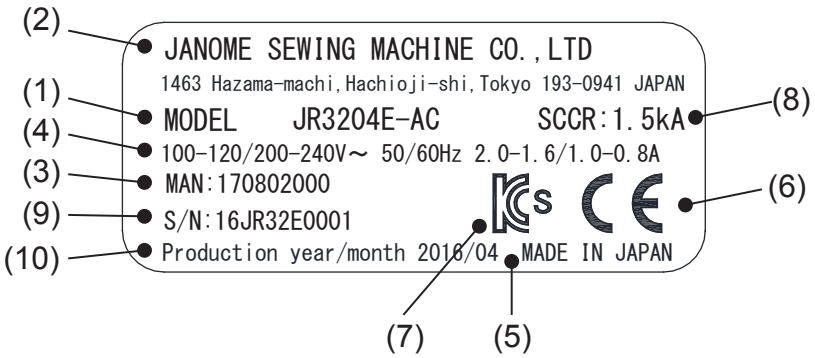
1.1 Understanding the Model Name

Example: JR3 20 4 E–A C



2. RATED IDENTIFICATION PLATE

2.1 Reading the Rated Identification Plate



Example of the Rated Identification Plate

(1) Model name
Refer to “1.1 Understanding the Model Name.”

(2) Manufacturer

(3) Part number of “Read This First”

(4) Power supply specifications
Refer to “1.1 Understanding the Model Name.”

(5) Country of manufacture

(6) CE marking

(7) KCs marking

(8) Breaker maximum electrical current cutoff for the power source input

(9) Serial number

Example: 16 JR32E 0001

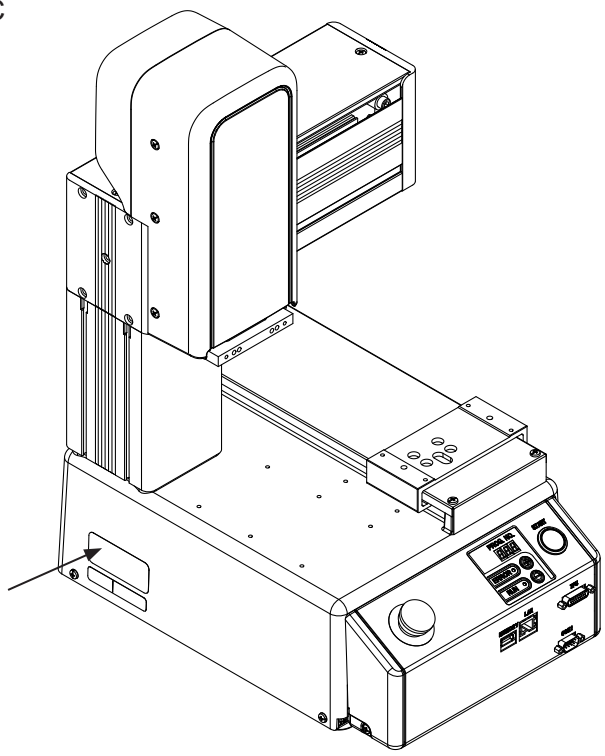
- 0001 → Identification number
- JR32E → Model abbreviation
- 16 → Production year (Last two digits of the year)

(10) Date of Production (year 4 digits/month 2 digits)

2.2 Rated Identification Plate Locations

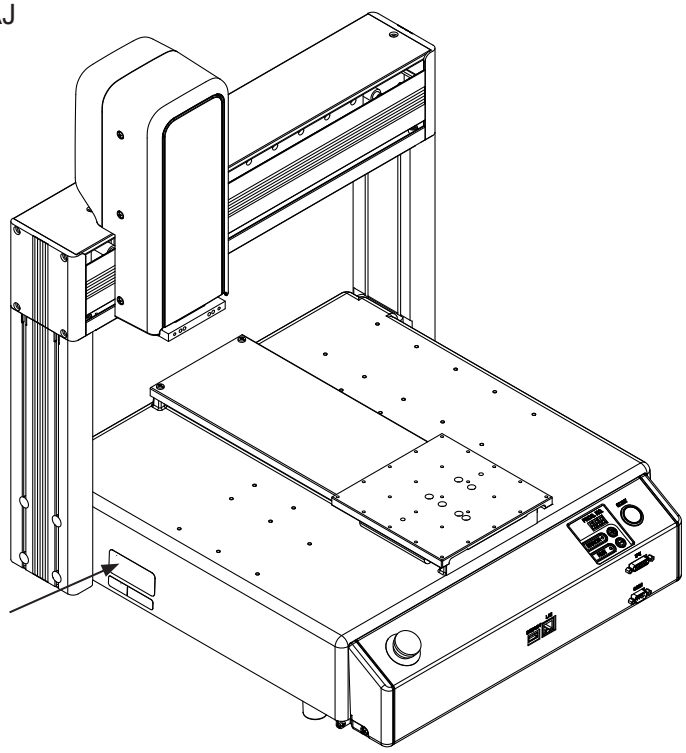
JR3200 Series

Example: JR3203N-AC



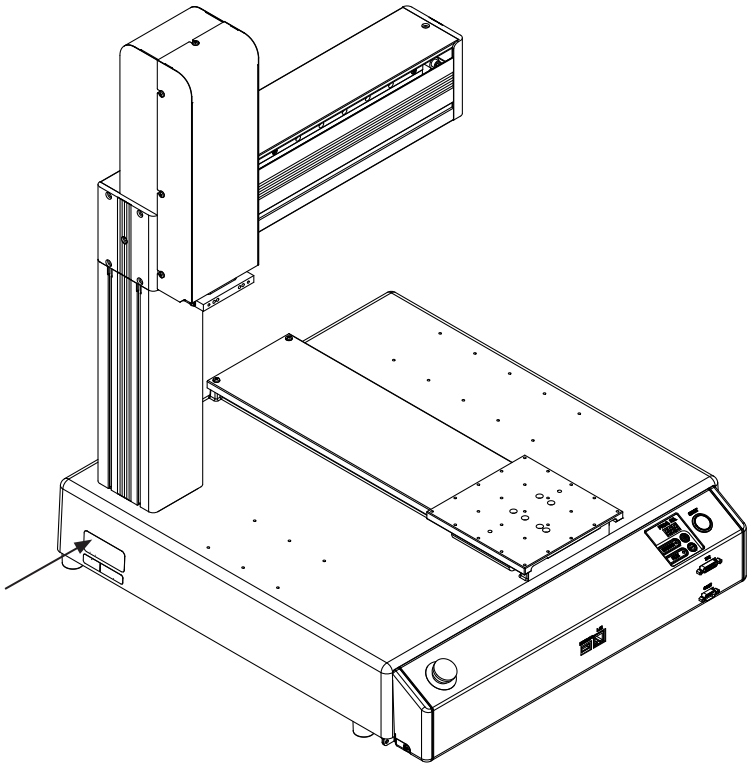
JR3300 Series

Example: JR3303N-AJ



JR3400 − JR3600 Series

Example: JR3403N-AJ



3. I/O POLARITY

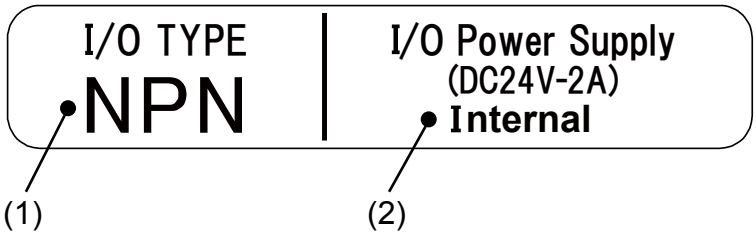
There are two types of I/O polarity: NPN specifications and PNP specifications. After confirming your robot's polarity specifications, always connect tools, etc., which are compatible with these specifications.

3.1 I/O Polarity

■ I/O Polarity

If you are connecting external devices, make sure they are compatible with your robot's I/O polarity.

The I/O polarity can be confirmed by checking the I/O nameplate affixed to the left side face of the robot.



(1) I/O Polarity

- NPN (sink type)
- PNP (source type)

(2) I/O Power Supply Indication

- External
  The power supply (DC 24 V) for a device connected to the I/O-SYS is externally supplied. Prepare a separate I/O power supply.
- Internal
  The power supply (DC 24 V) for a device connected to the I/O-SYS is output from the I/O-SYS connector.

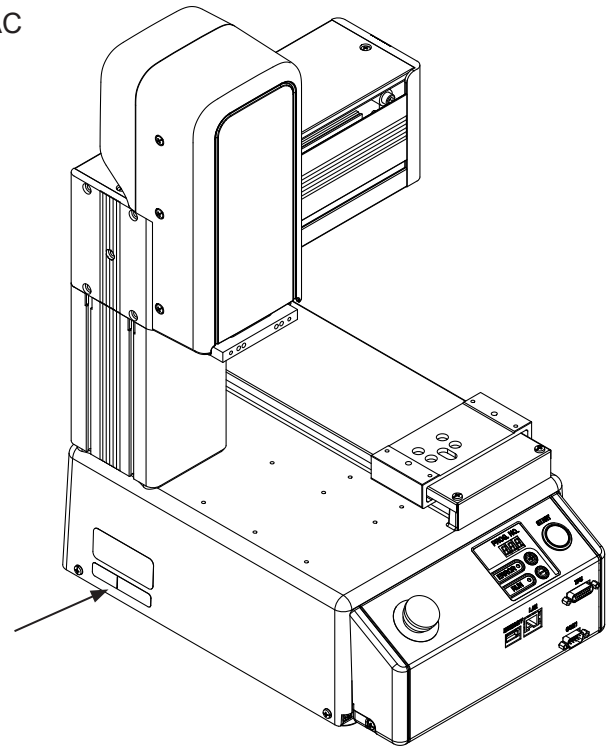
NOTE: I/O power supply type (External/Internal) is selected when you purchase the robot and cannot be changed after doing so.

For further information regarding wiring, refer to the operation manual *External Control*.

I/O nameplates are affixed in the following areas:

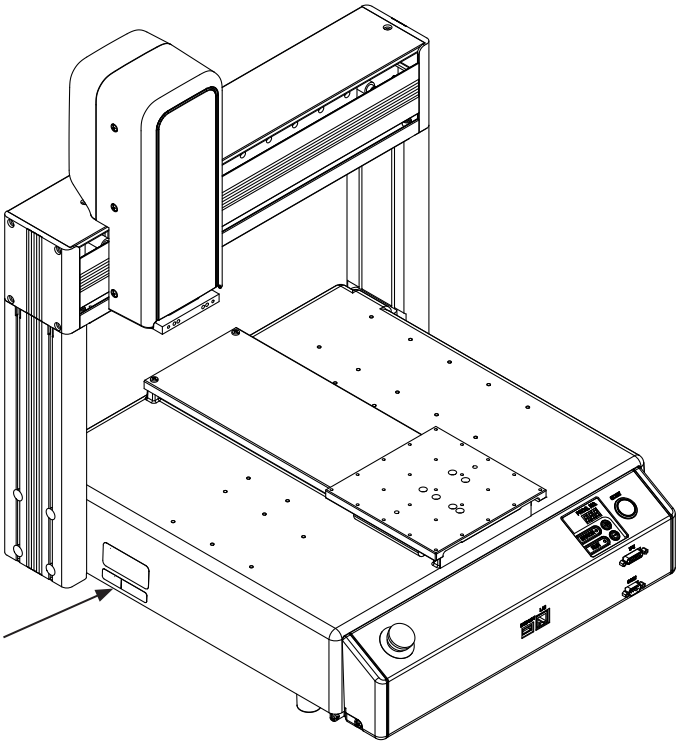
JR3200 Series

Example: JR3203N-AC



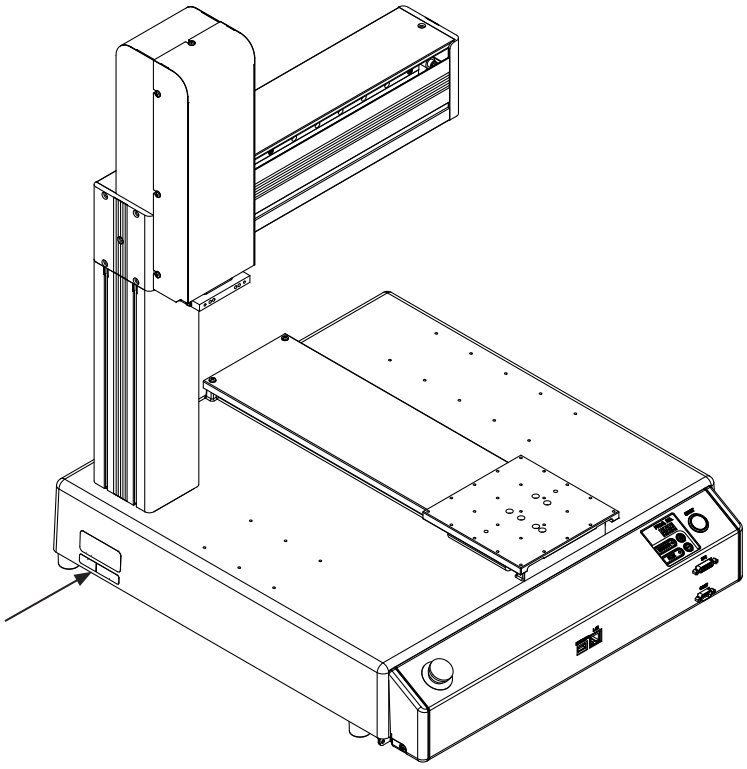
JR3300 Series

Example: JR3303N-AJ



JR3400 − JR3600 Series

Example: JR3403N-AJ



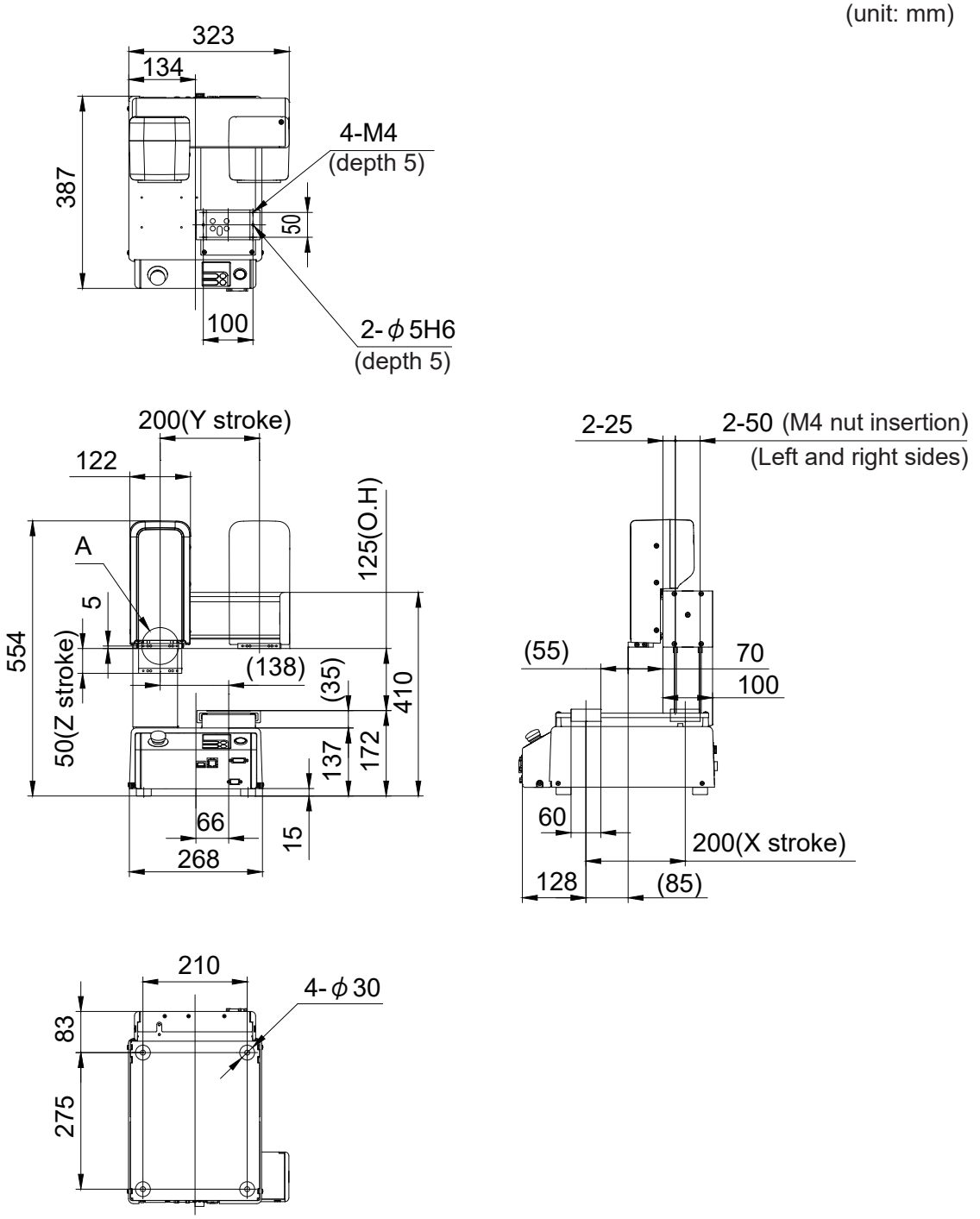
4. EXTERNAL DIMENSIONS

4.1 Unit External Dimensions

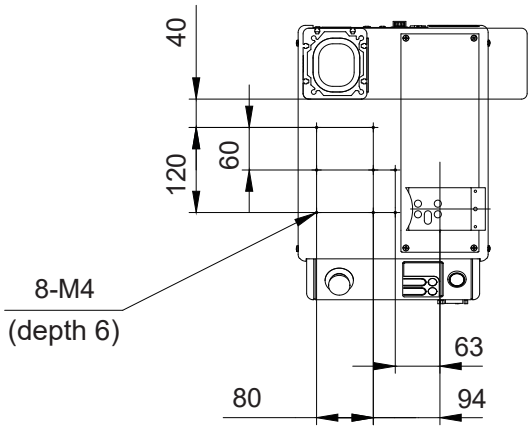
4.1.1 JR3203

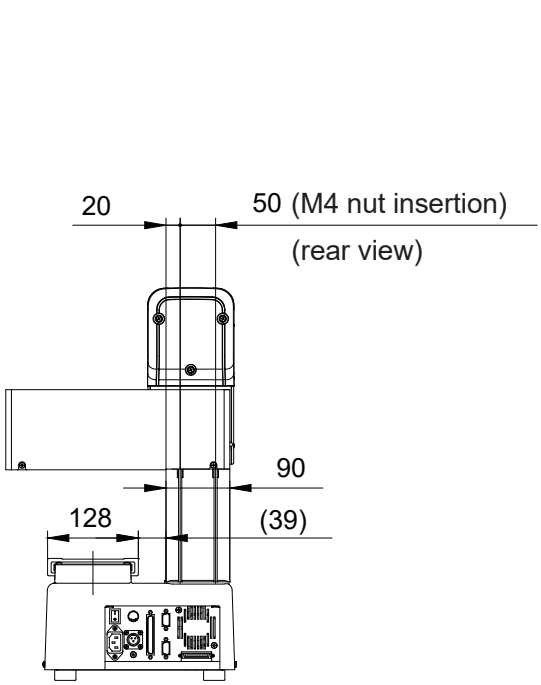
External dimensions of JR3203 using the JR3203N-AC model as an example.

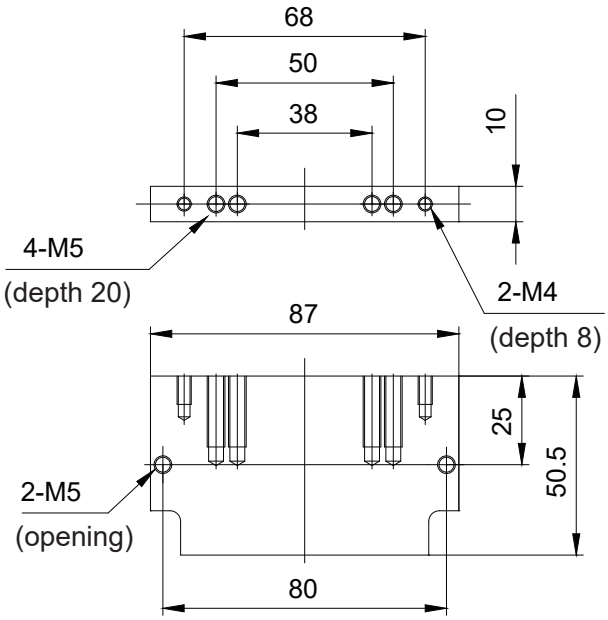
(unit: mm)



(unit: mm)







Detail Part A

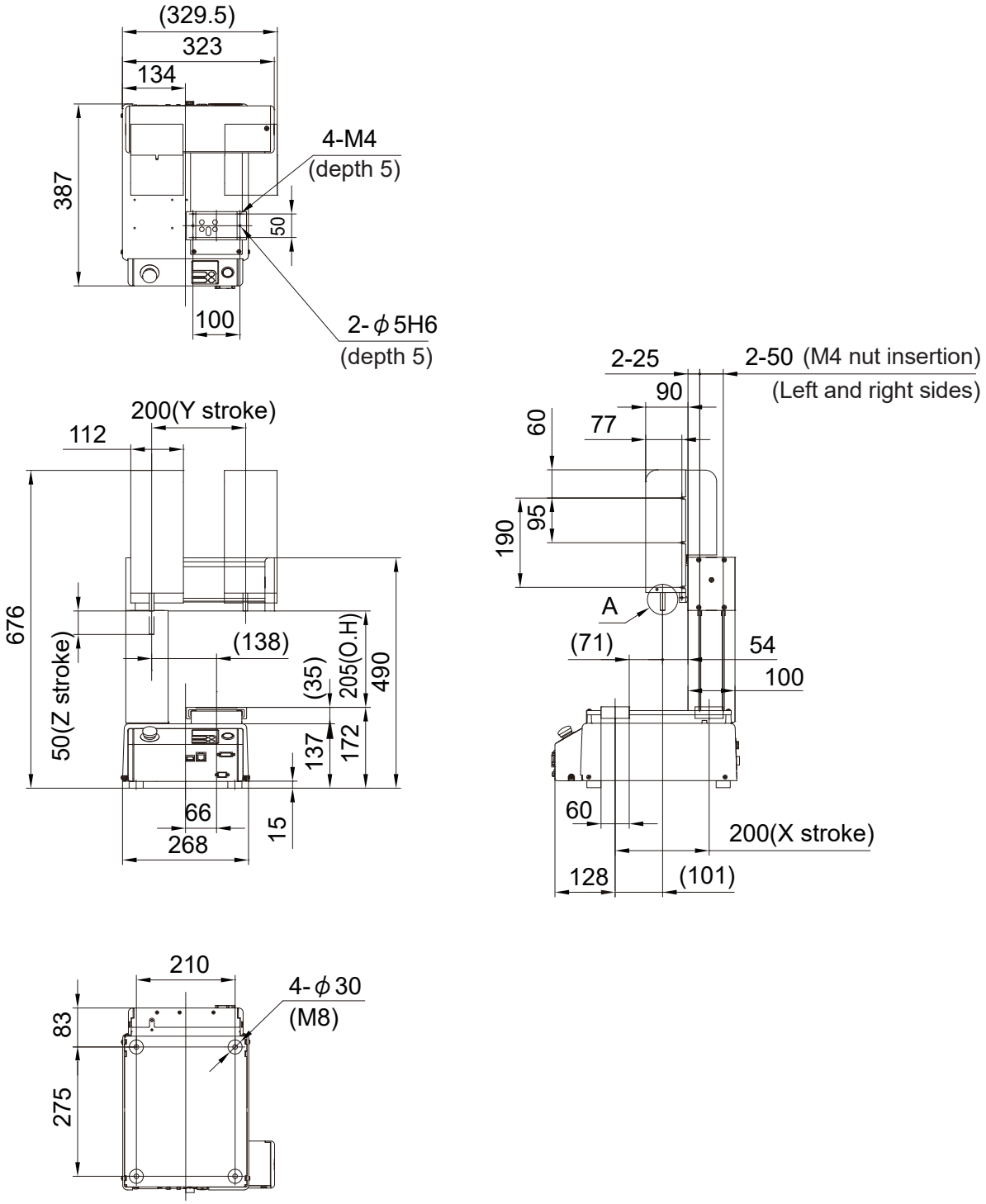
⚠ Warning

Be sure to leave a space of 300 mm or more between the rear of the robot and the wall or any other obstacle when you install the robot. If the robot is too close to the wall, etc. it will be hard to do maintenance, etc., and also due to the cooling fan on the rear of the unit, the robot may overheat or malfunction.

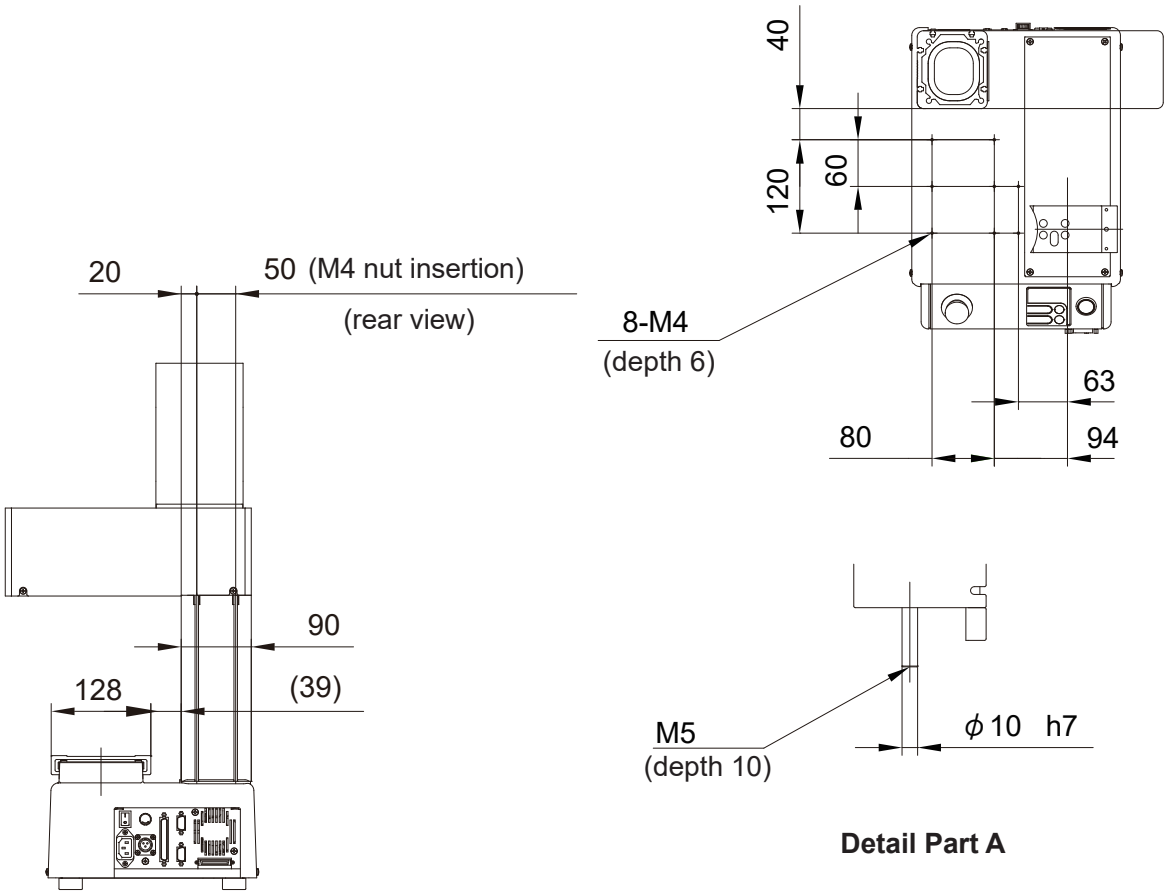
4.1.2 JR3204

External dimensions of JR3204 using the JR3204N-AC model as an example.

(unit: mm)



(unit: mm)



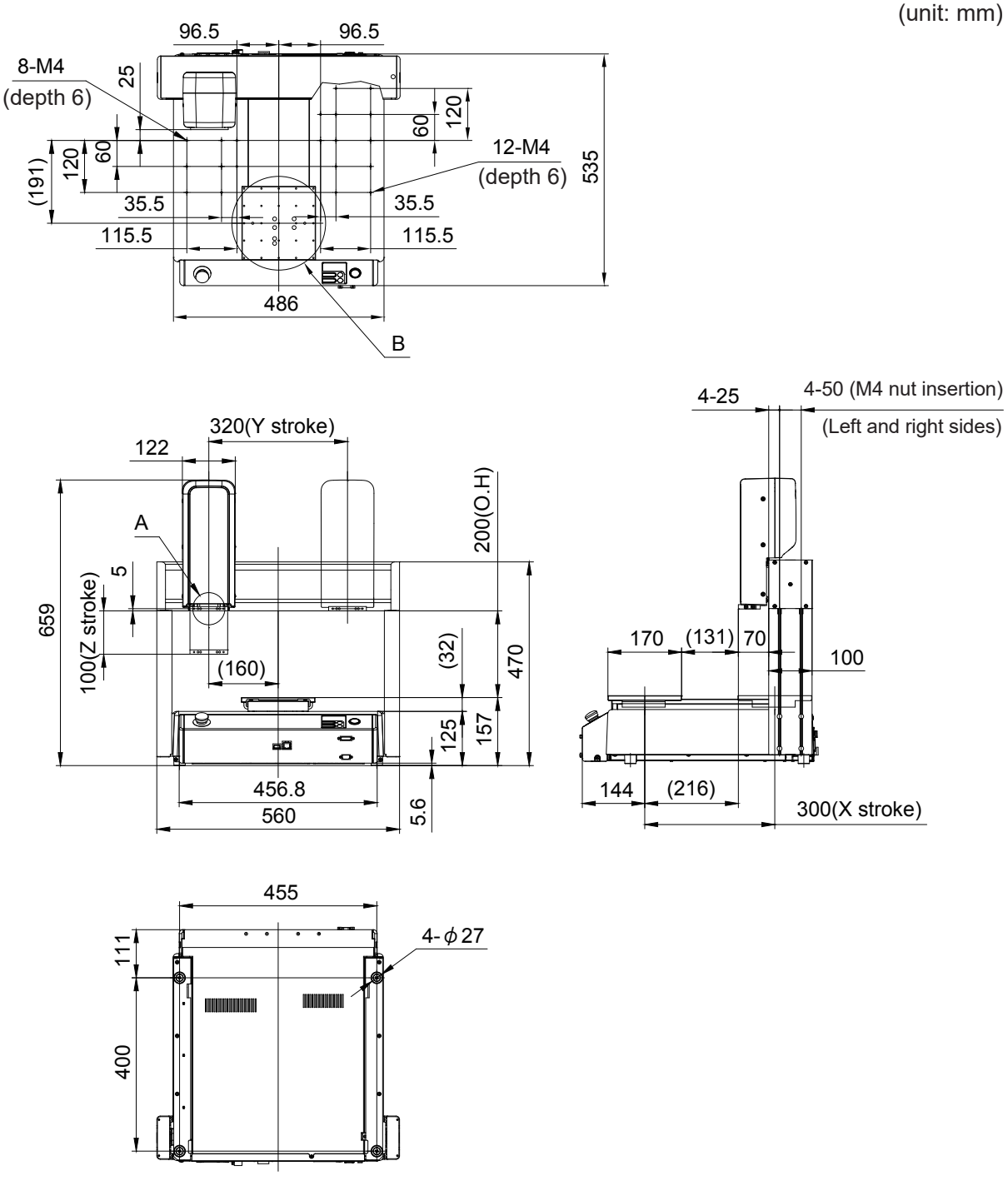
⚠ Warning

Be sure to leave a space of 300 mm or more between the rear of the robot and the wall or any other obstacle when you install the robot. If the robot is too close to the wall, etc. it will be hard to do maintenance, etc., and also due to the cooling fan on the rear of the unit, the robot may overheat or malfunction.

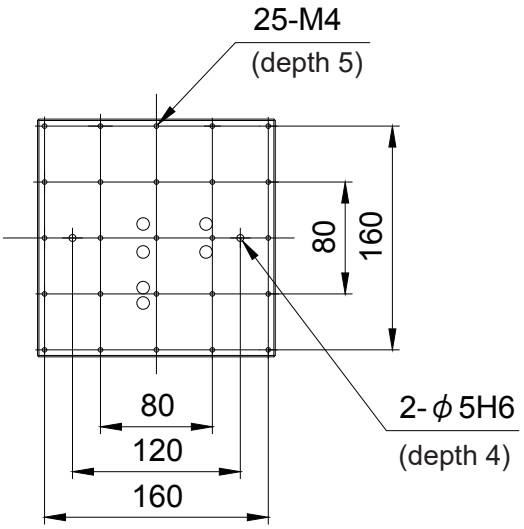
4.1.3 JR3303

External dimensions of JR3303 using the JR3303N-AC model as an example.

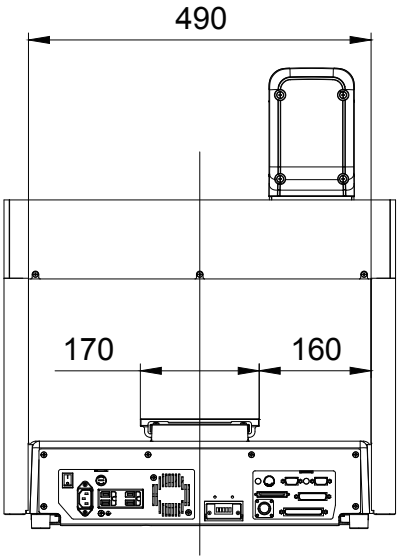
(unit: mm)

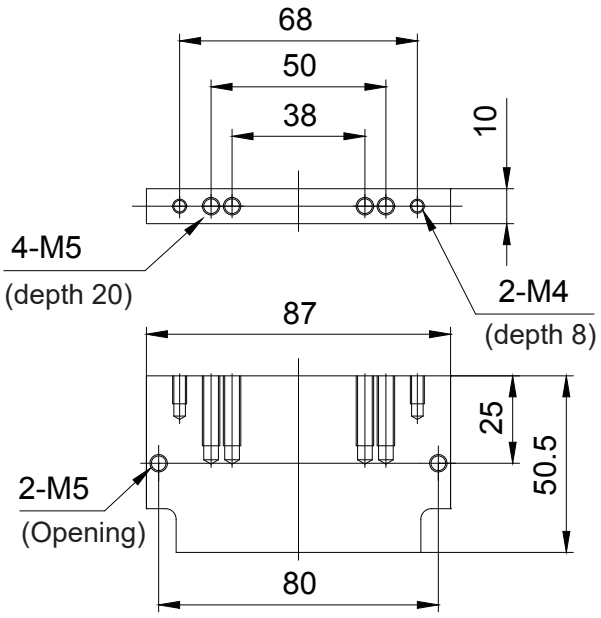


(unit: mm)



Detail Part B





Detail Part A

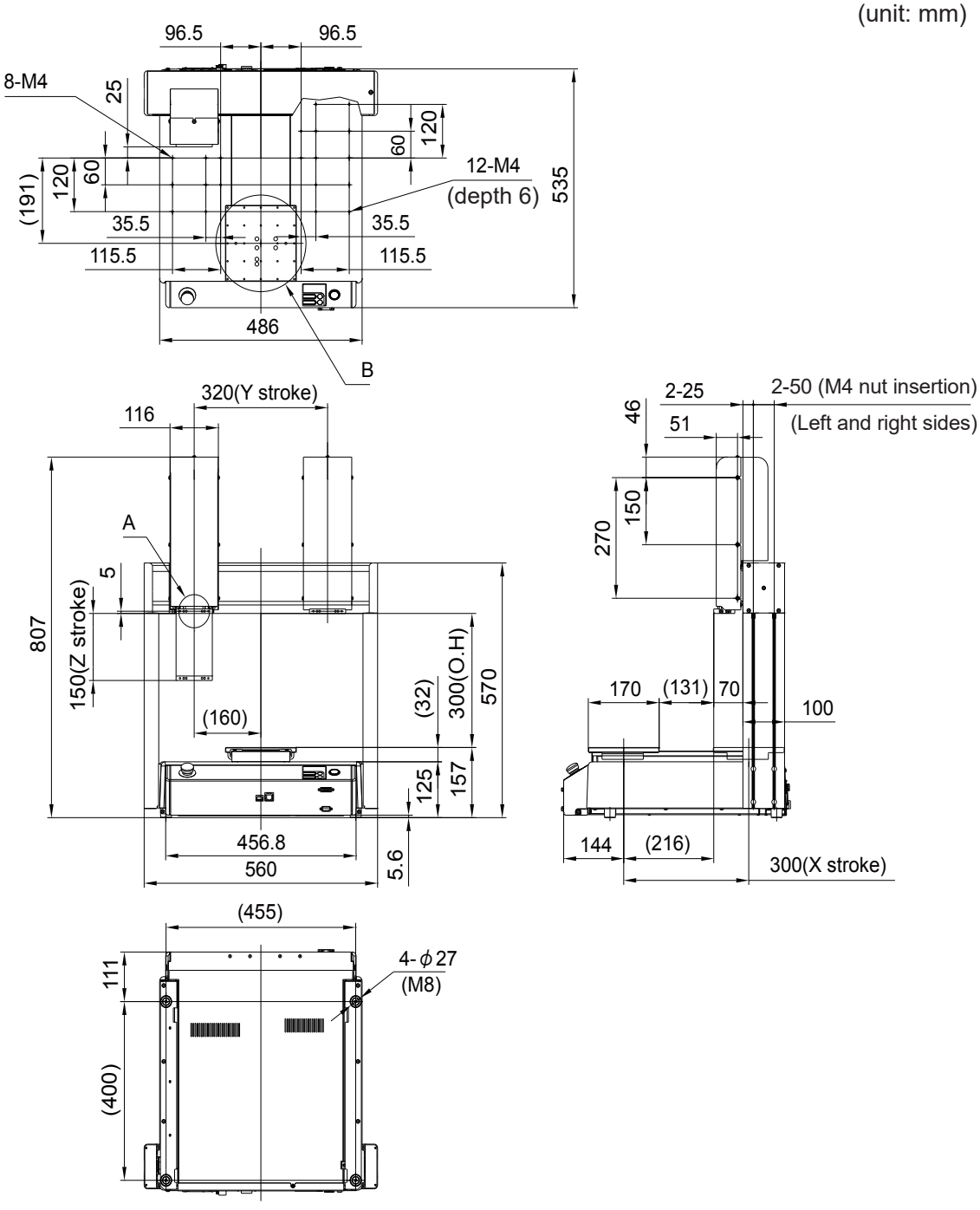
⚠ Warning

Be sure to leave a space of 300 mm or more between the rear of the robot and the wall or any other obstacle when you install the robot. If the robot is too close to the wall, etc. it will be hard to do maintenance, etc., and also due to the cooling fan on the rear of the unit, the robot may overheat or malfunction.

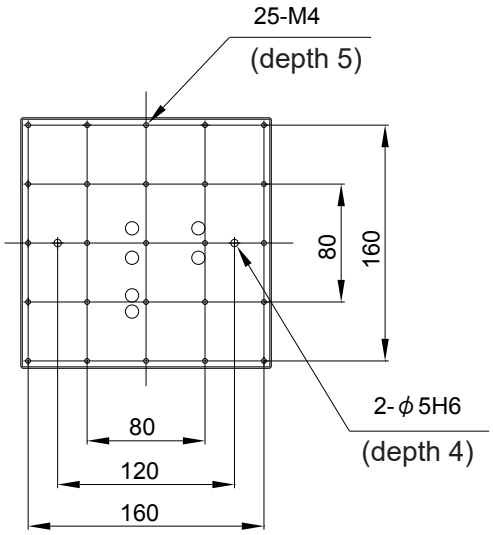
4.1.4 JR3303F

External dimensions of JR3303F using the JR3303F-AJ model as an example.

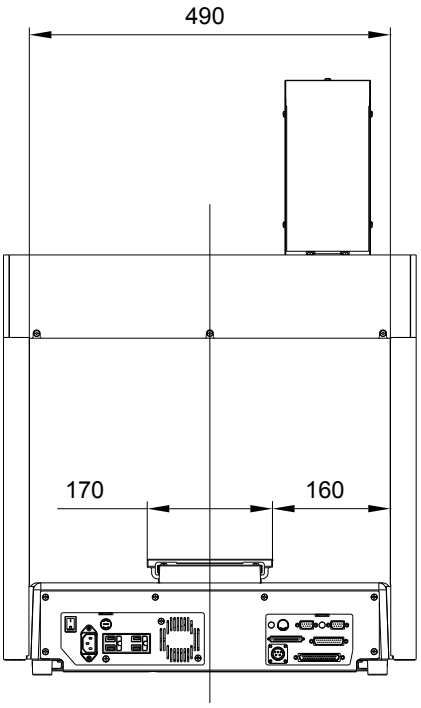
(unit: mm)

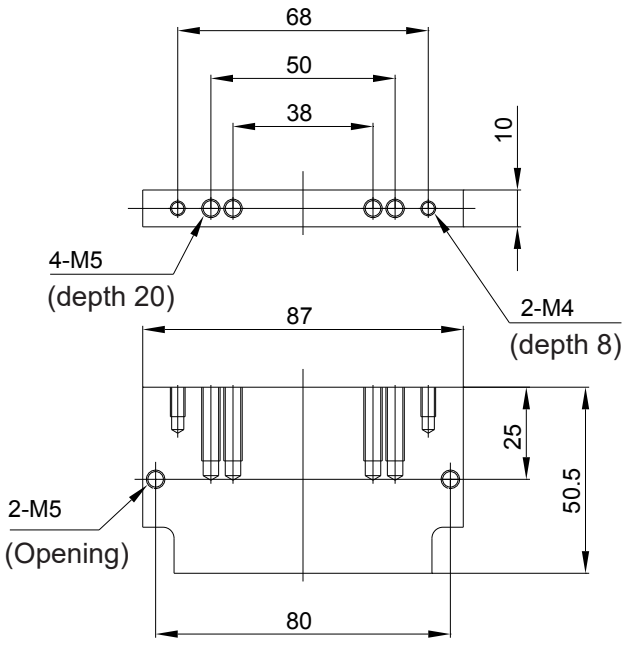


(unit: mm)



Detail Part B



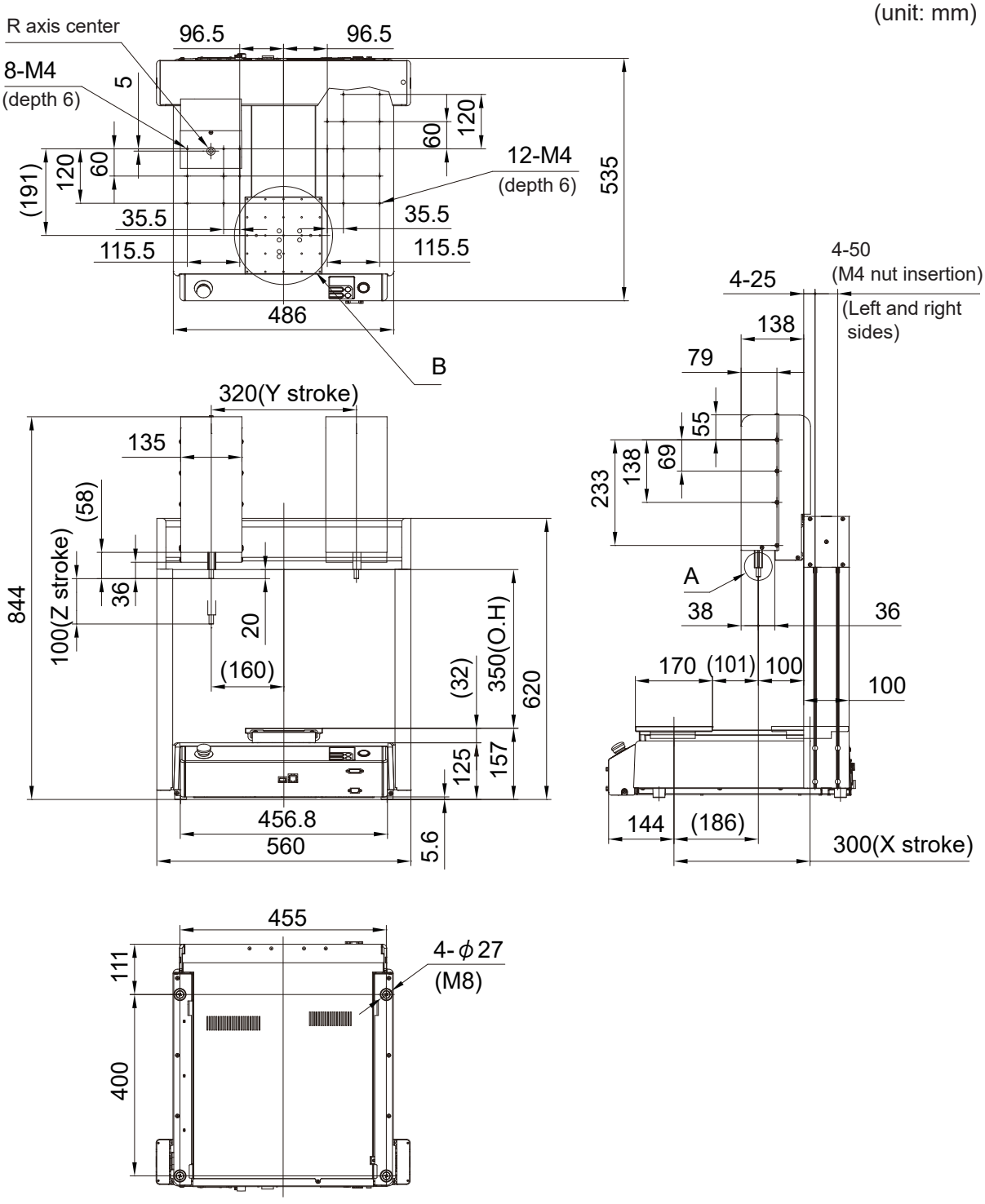


Detail Part A

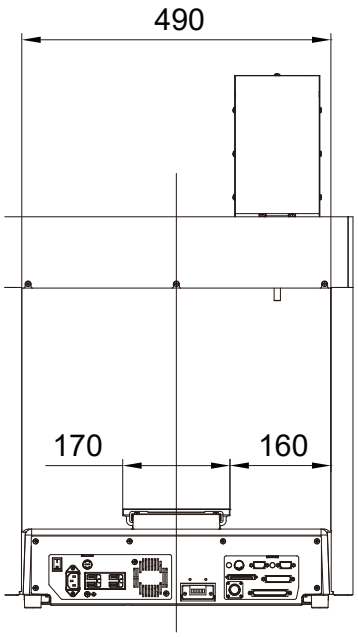
4.1.5 JR3304

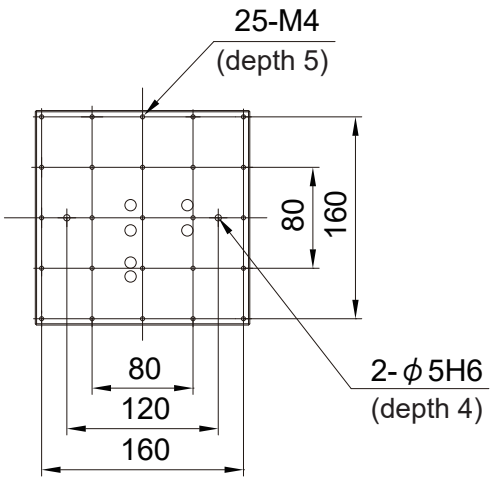
External dimensions of JR3304 using the JR3304N-AJ model as an example.

(unit: mm)

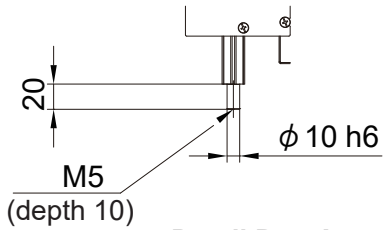


(unit: mm)





Detail Part B



Detail Part A

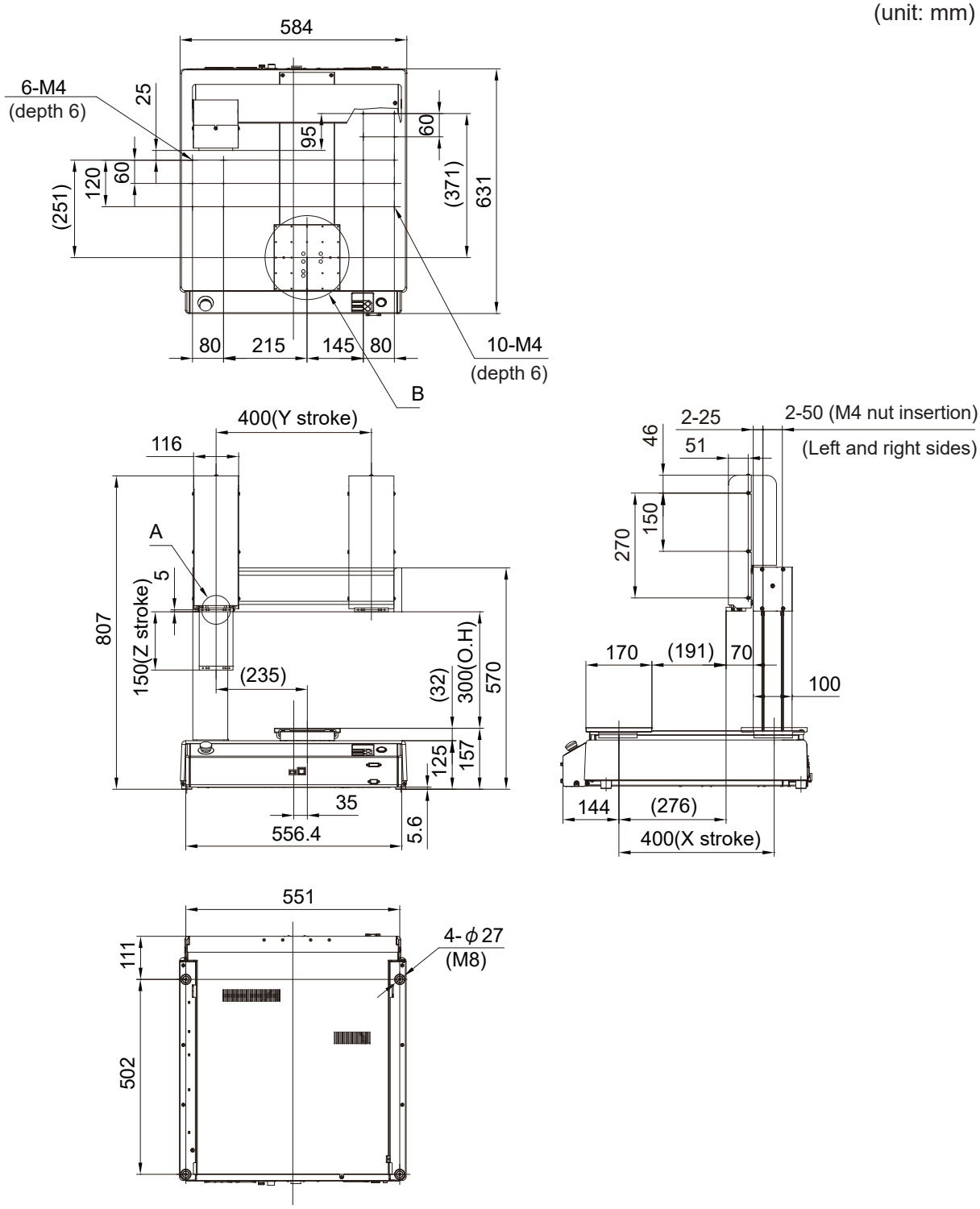
⚠ Warning

Be sure to leave a space of 300 mm or more between the rear of the robot and the wall or any other obstacle when you install the robot. If the robot is too close to the wall, etc. it will be hard to do maintenance, etc., and also due to the cooling fan on the rear of the unit, the robot may overheat or malfunction.

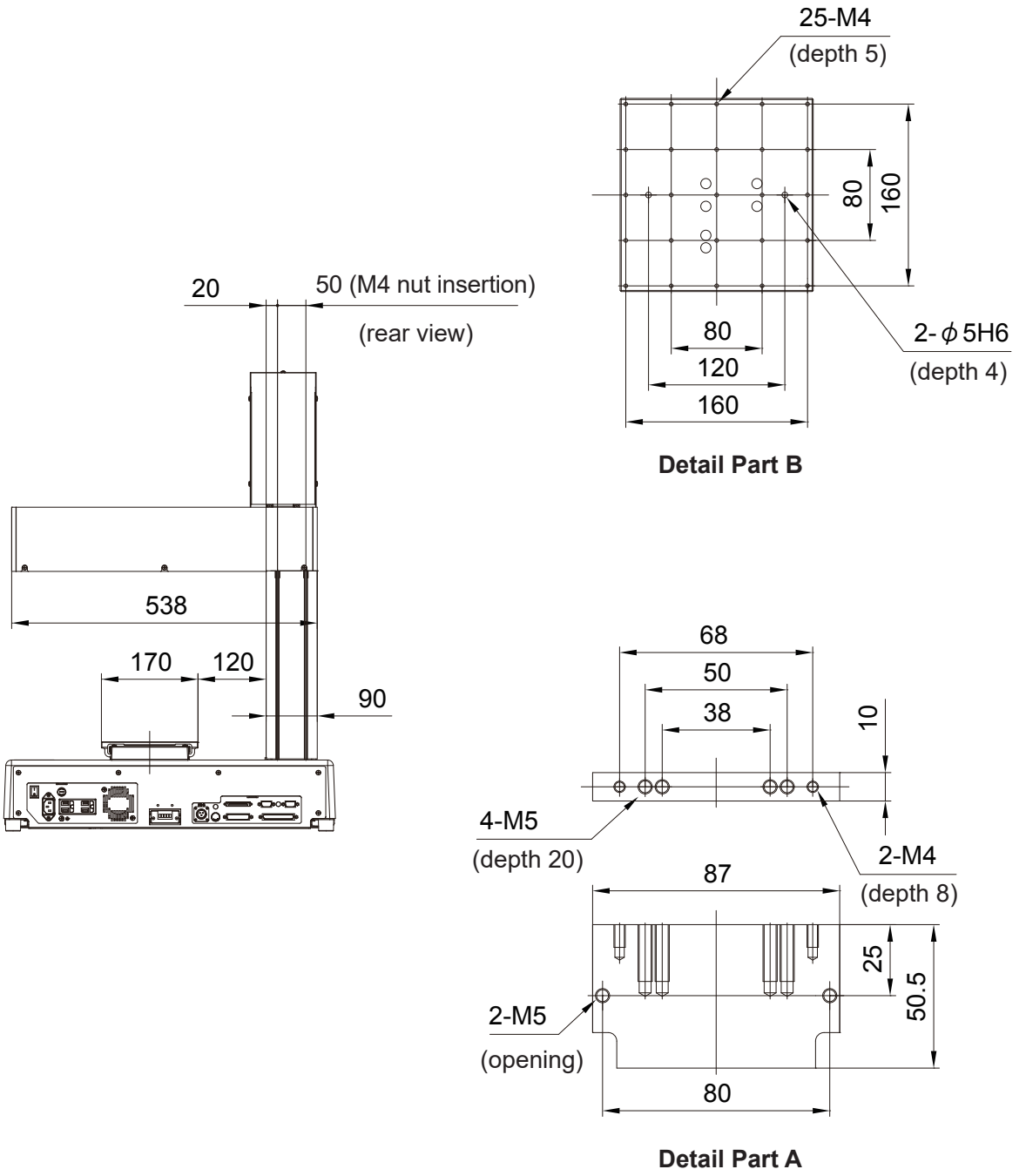
4.1.6 JR3403 Single Column (Standard)

External dimensions of the single column JR3403 using the JR3403N-AJ model as an example.

(unit: mm)



(unit: mm)



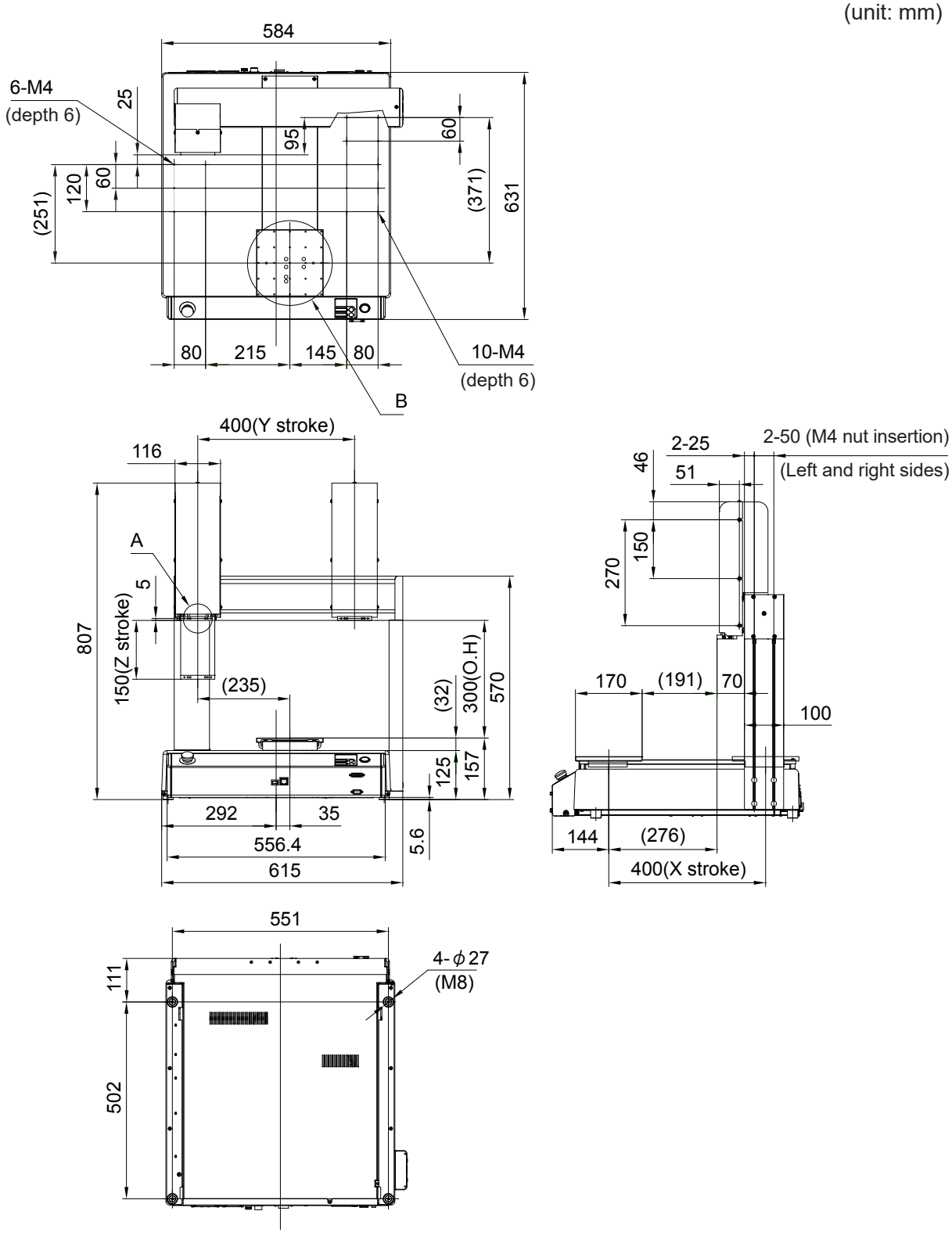
⚠ Warning

Be sure to leave a space of 300 mm or more between the rear of the robot and the wall or any other obstacle when you install the robot. If the robot is too close to the wall, etc. it will be hard to do maintenance, etc., and also due to the cooling fan on the rear of the unit, the robot may overheat or malfunction.

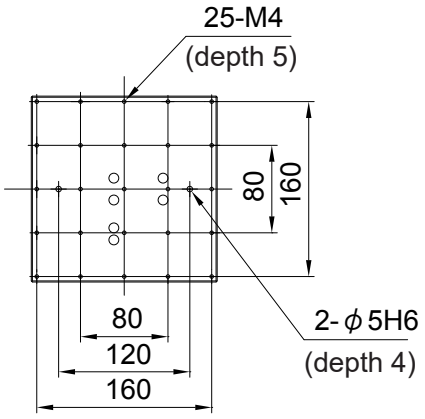
4.1.7 JR3403 Double Column, JR3403F

External dimensions of the double column JR3403 and JR3403F using the JR3403N(F)-AJ model as an example.

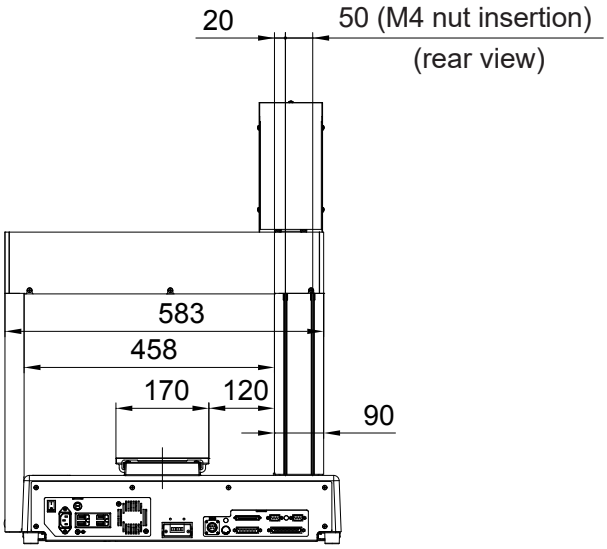
(unit: mm)

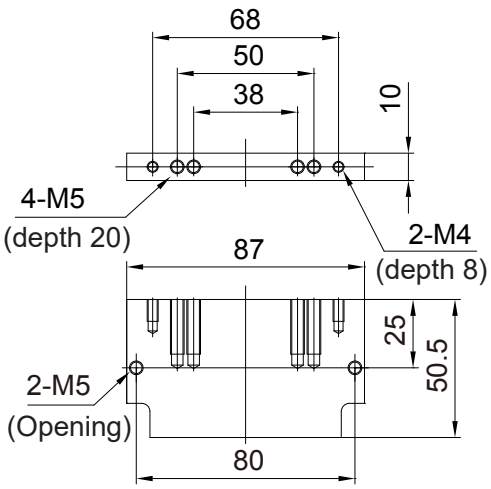


(unit: mm)



Detail Part B





Detail Part A

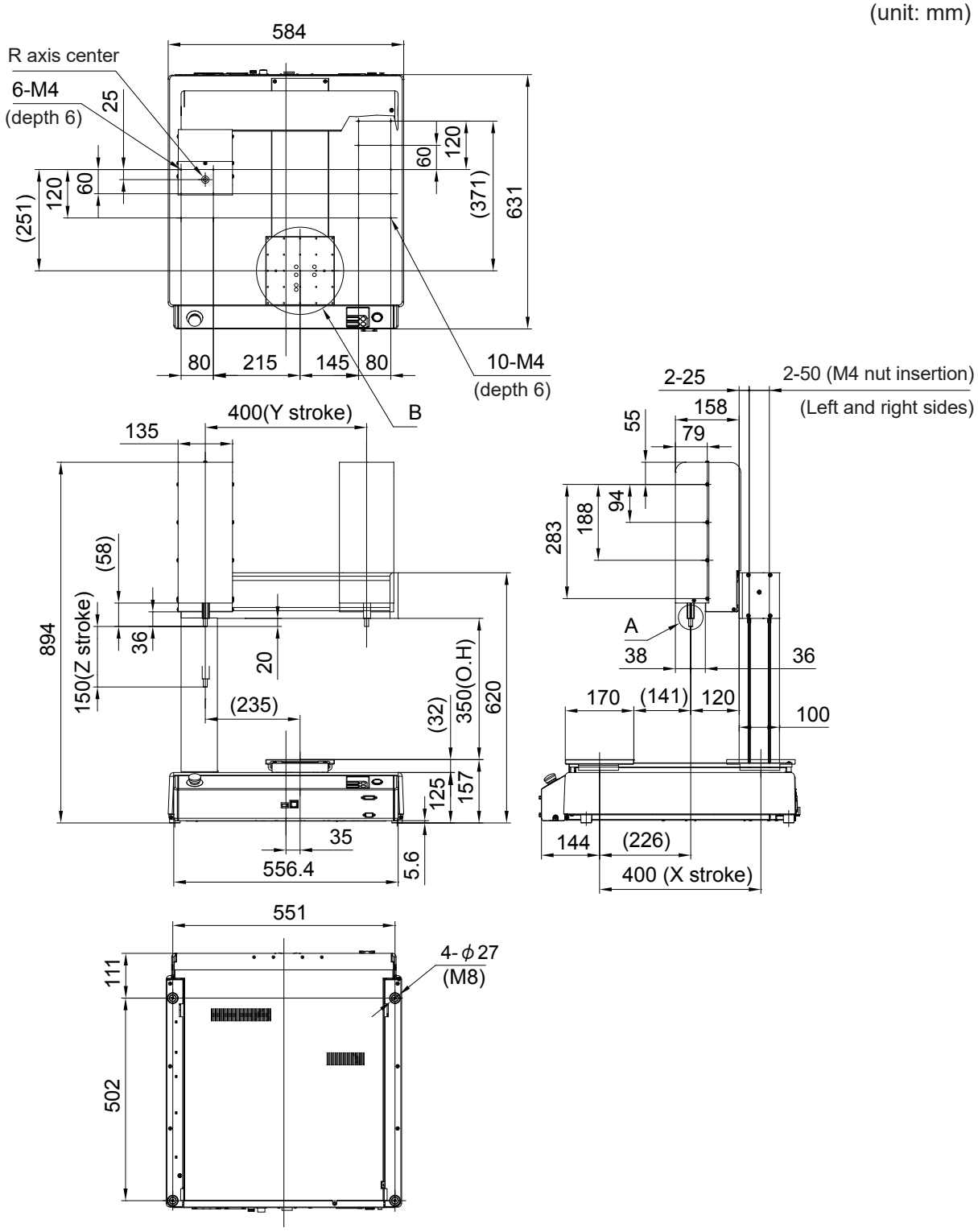
⚠ Warning

Be sure to leave a space of 300 mm or more between the rear of the robot and the wall or any other obstacle when you install the robot. If the robot is too close to the wall, etc. it will be hard to do maintenance, etc., and also due to the cooling fan on the rear of the unit, the robot may overheat or malfunction.

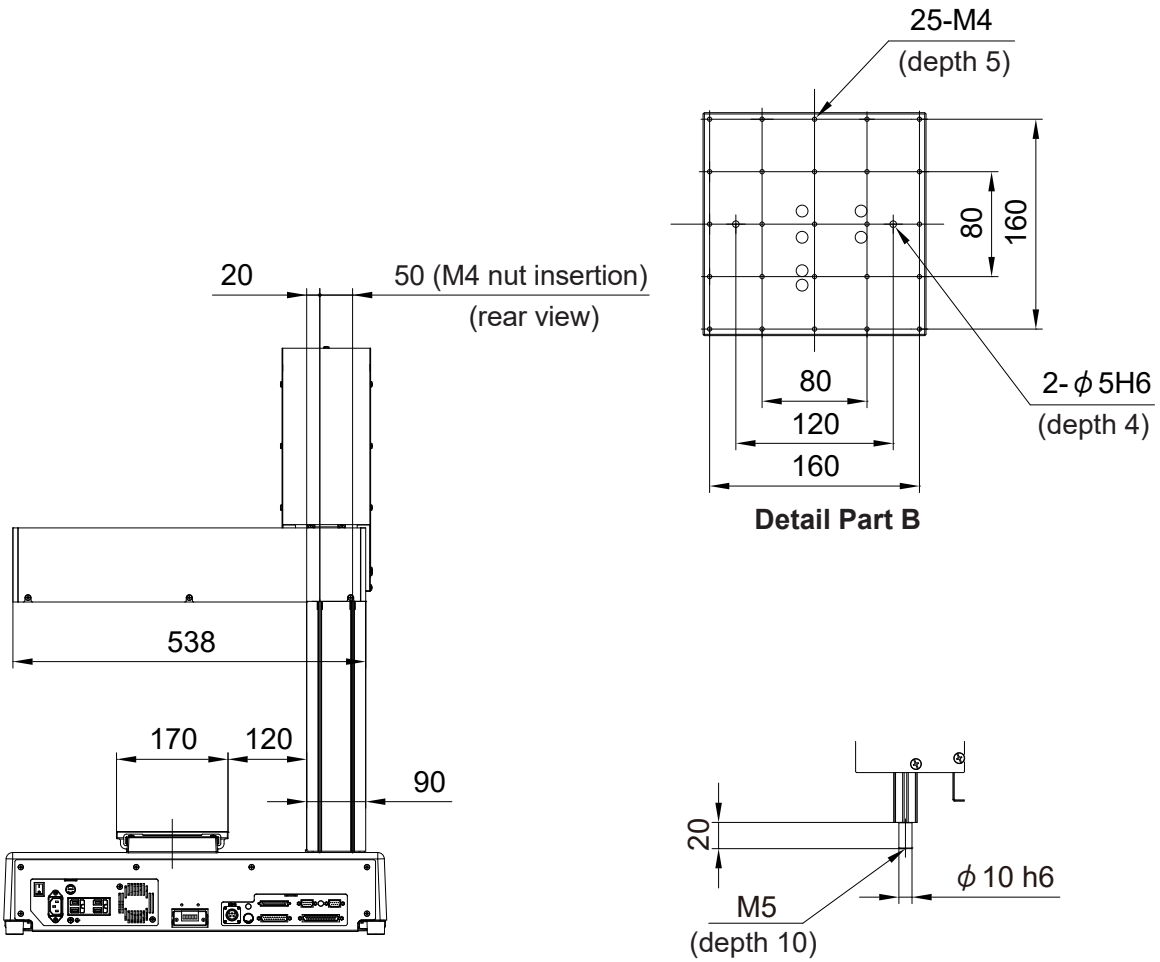
4.1.8 JR3404 Single Column (Standard)

External dimensions of the single column JR3404 using the JR3404N-AJ model as an example.

(unit: mm)



(unit: mm)



Detail Part B

Detail Part A

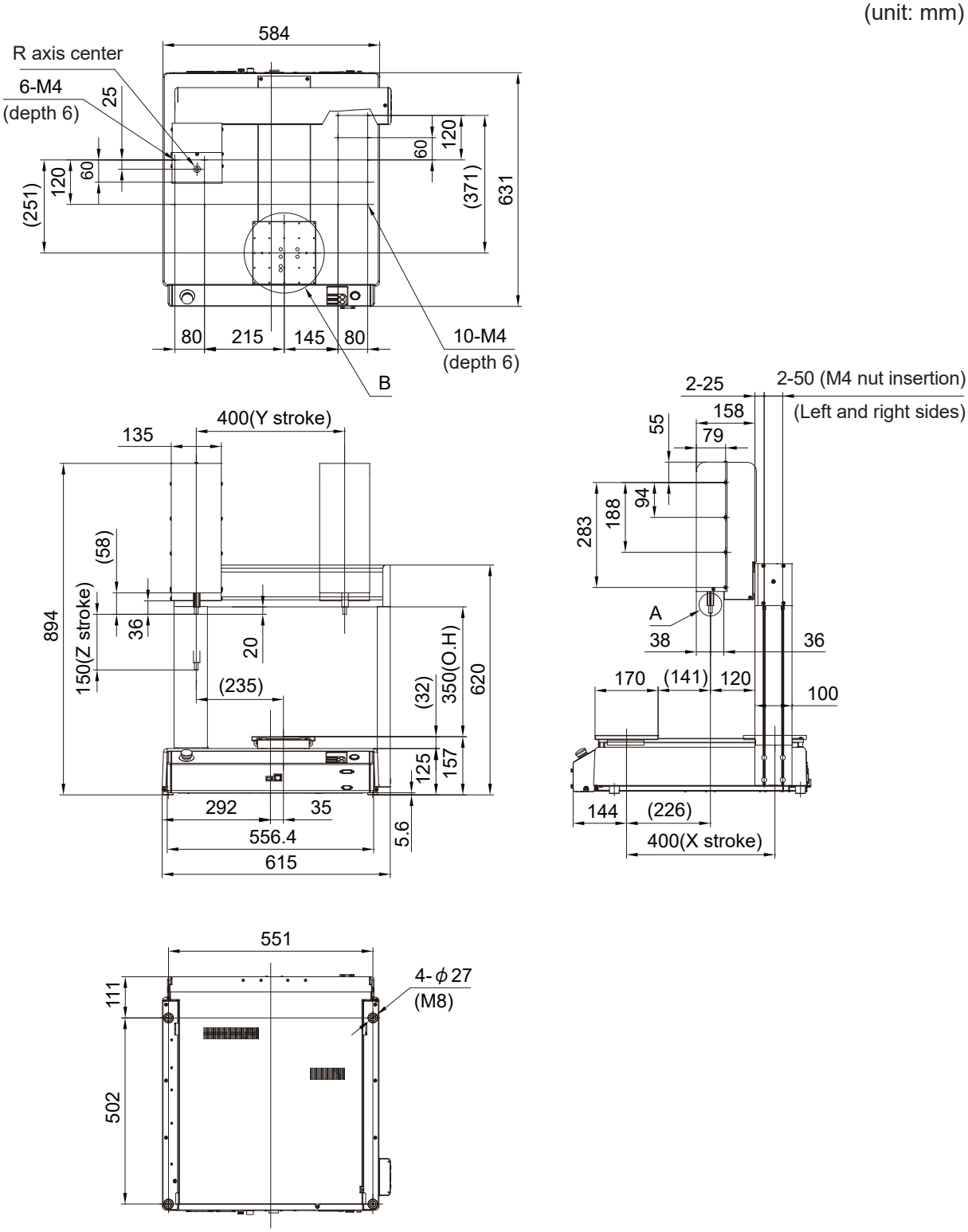
⚠ Warning

Be sure to leave a space of 300 mm or more between the rear of the robot and the wall or any other obstacle when you install the robot. If the robot is too close to the wall, etc. it will be hard to do maintenance, etc., and also due to the cooling fan on the rear of the unit, the robot may overheat or malfunction.

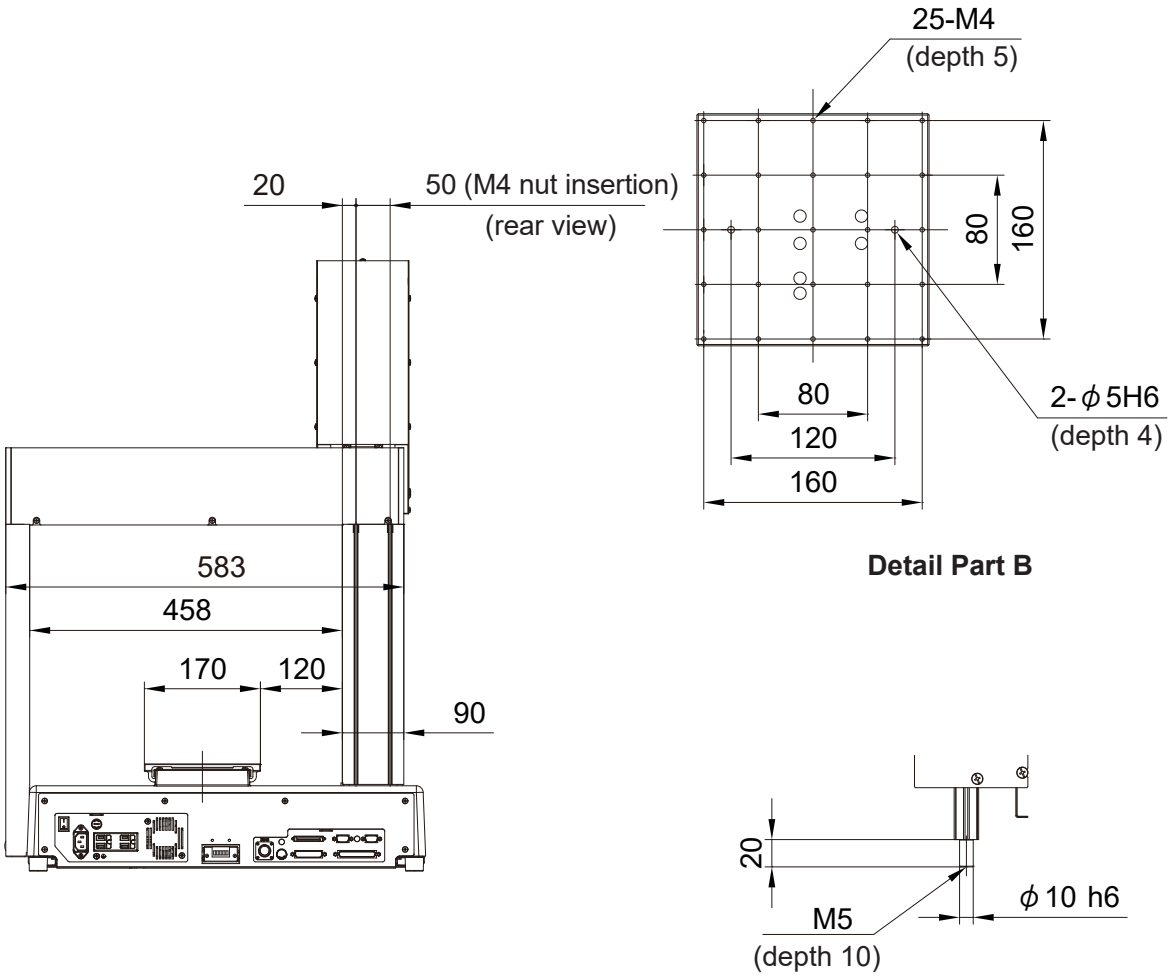
4.1.9 JR3404 Double Column

External dimensions of the double column JR3404 using the JR3404N-AJ model as an example.

(unit: mm)



(unit: mm)



Detail Part B

Detail Part A

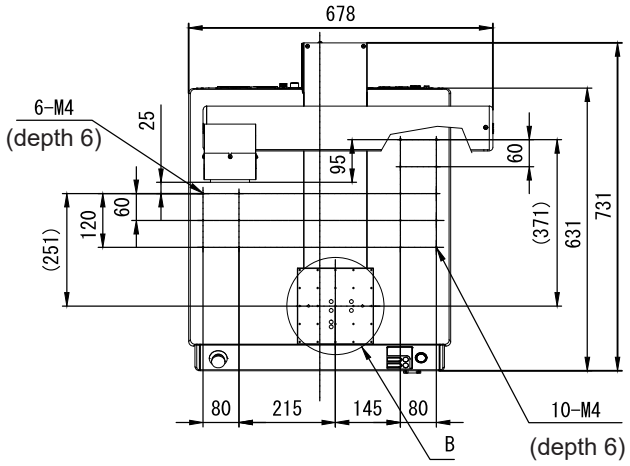
⚠ Warning

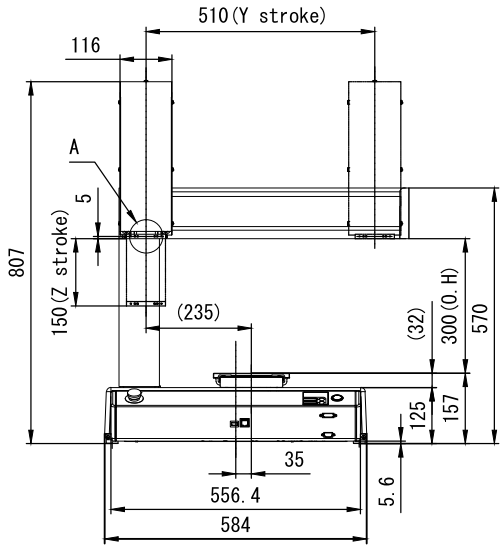
Be sure to leave a space of 300 mm or more between the rear of the robot and the wall or any other obstacle when you install the robot. If the robot is too close to the wall, etc. it will be hard to do maintenance, etc., and also due to the cooling fan on the rear of the unit, the robot may overheat or malfunction.

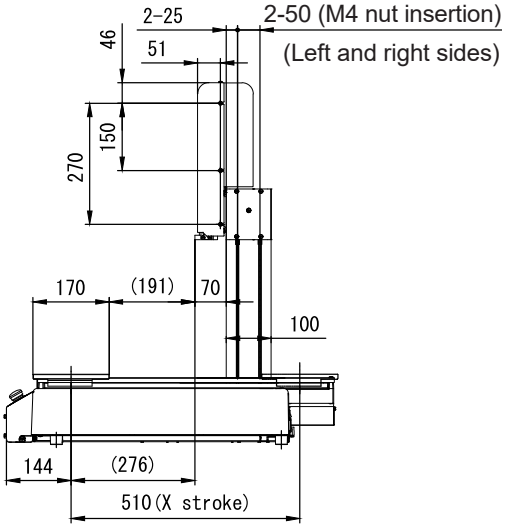
4.1.10 JR3503

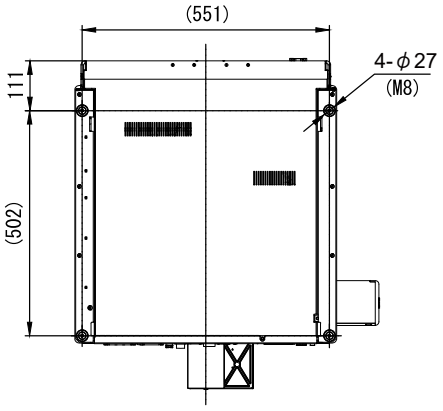
External dimensions of JR3503 using the JR3503N-AJ model as an example.

(unit: mm)

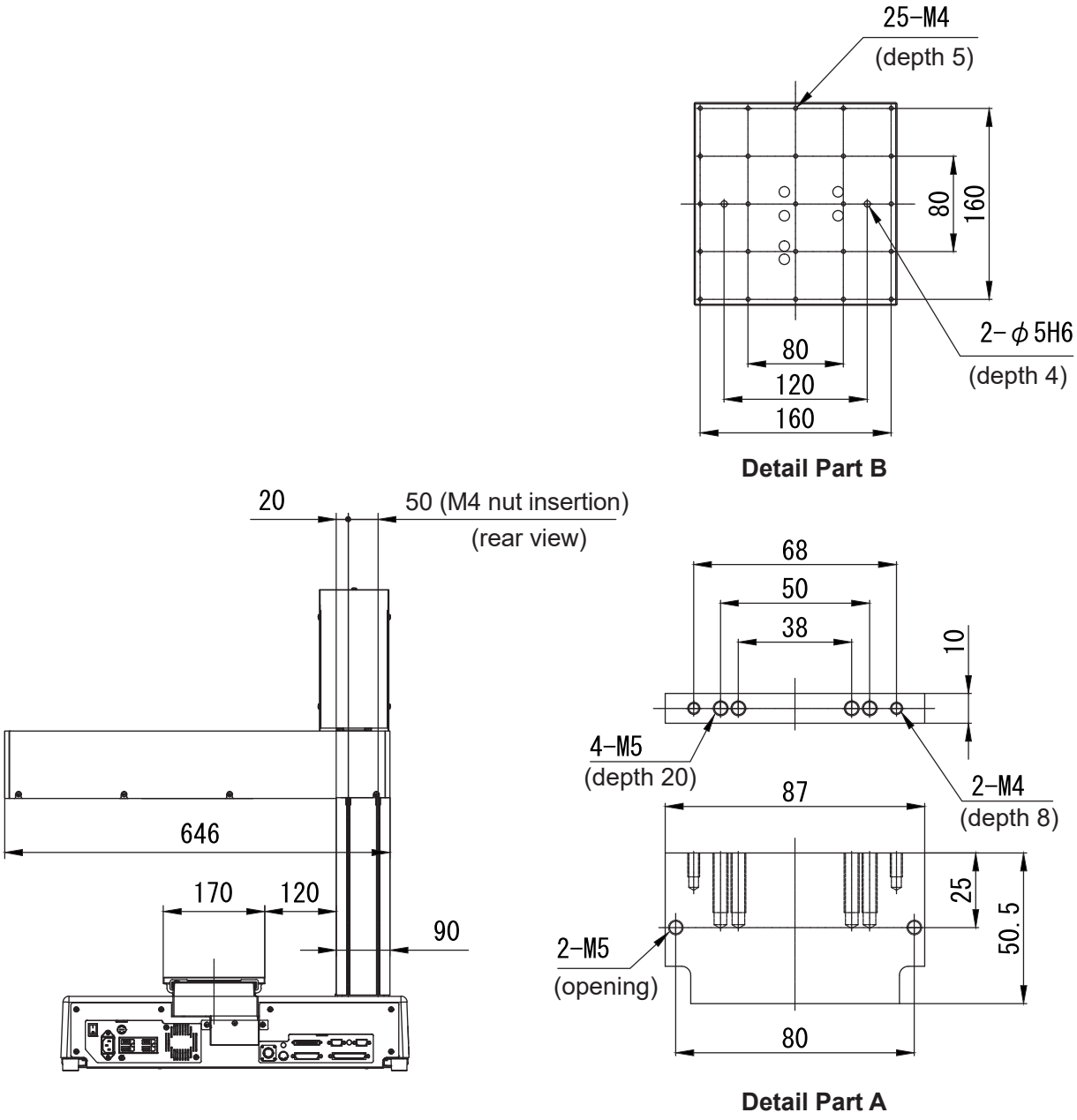








(unit: mm)



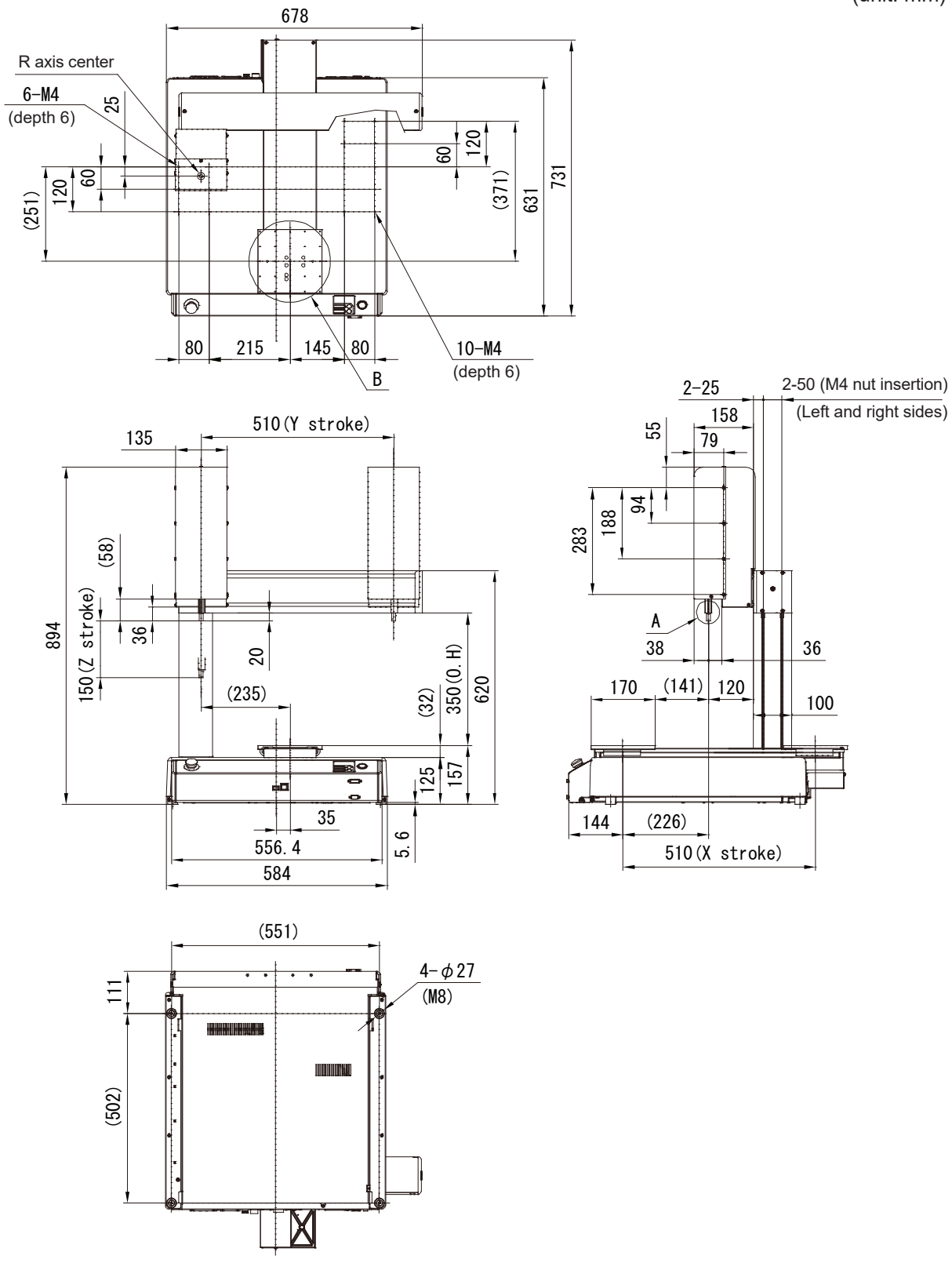
⚠ Warning

Be sure to leave a space of 300 mm or more between the rear of the robot and the wall or any other obstacle when you install the robot. If the robot is too close to the wall, etc. it will be hard to do maintenance, etc., and also due to the cooling fan on the rear of the unit, the robot may overheat or malfunction.

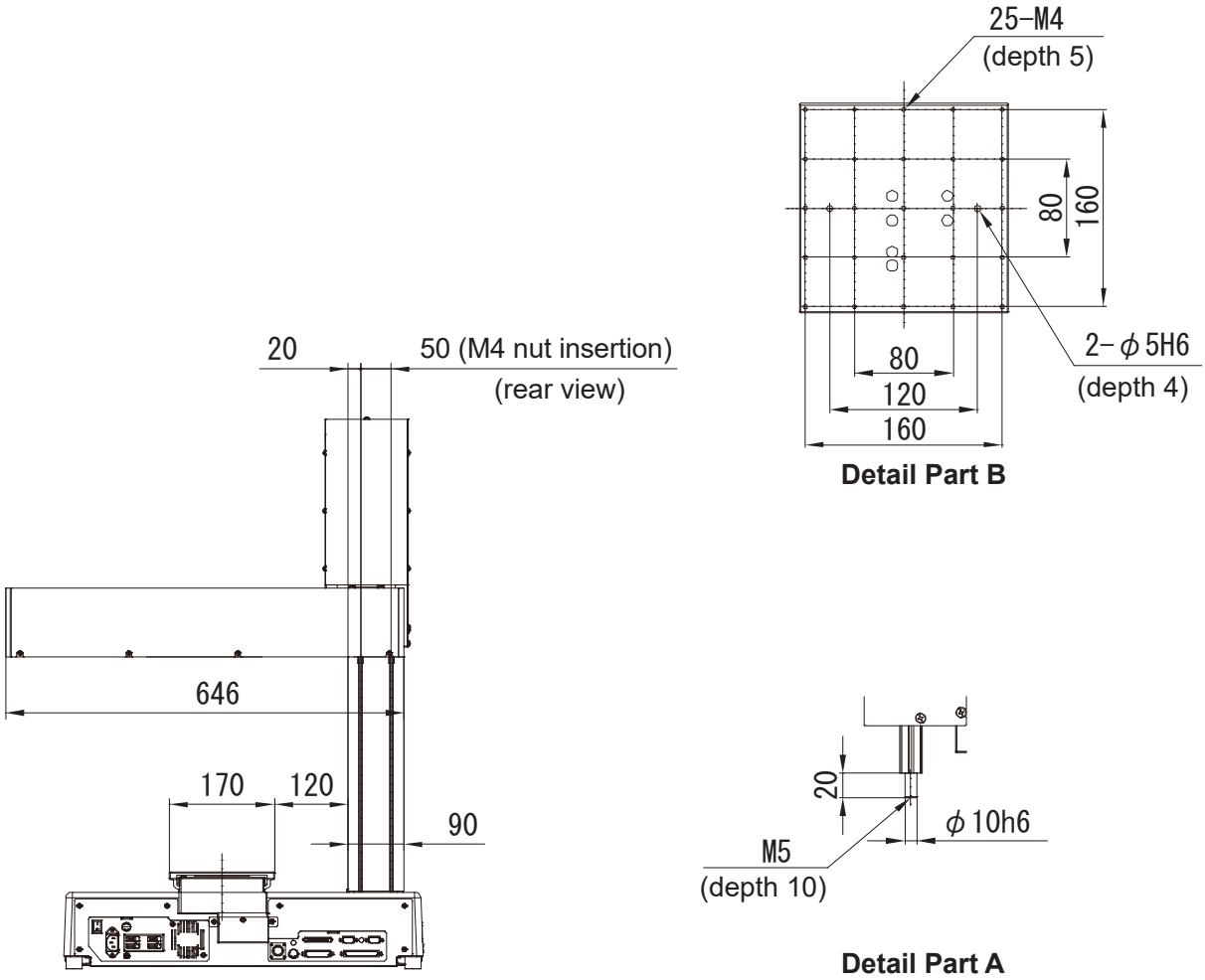
4.1.11 JR3504

External dimensions of JR3504 using the JR3504N-AJ model as an example.

(unit: mm)



(unit: mm)



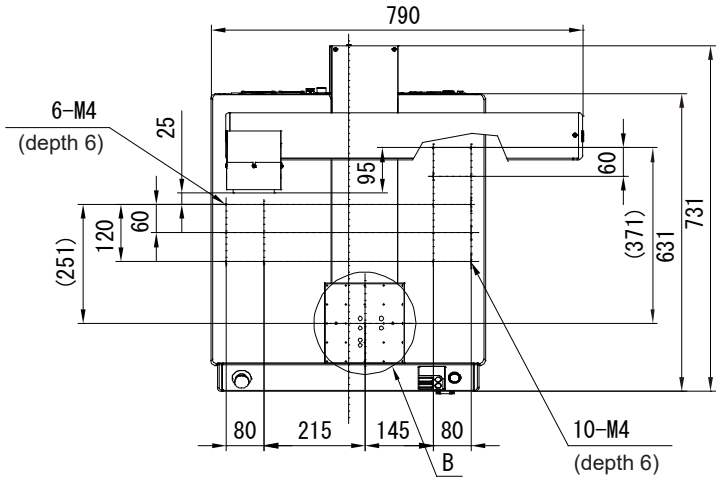
⚠ Warning

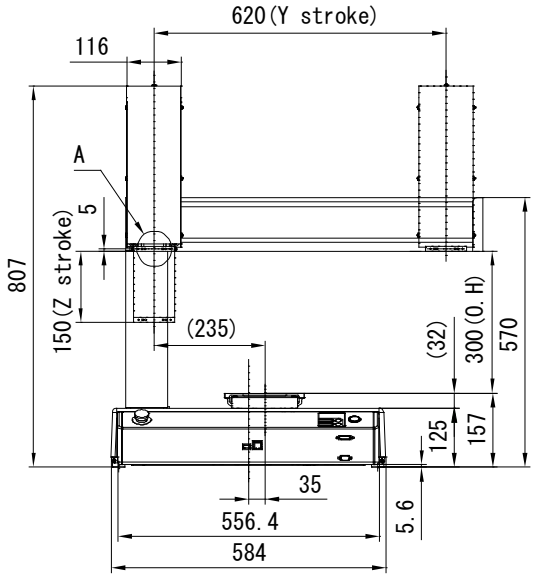
Be sure to leave a space of 300 mm or more between the rear of the robot and the wall or any other obstacle when you install the robot. If the robot is too close to the wall, etc. it will be hard to do maintenance, etc., and also due to the cooling fan on the rear of the unit, the robot may overheat or malfunction.

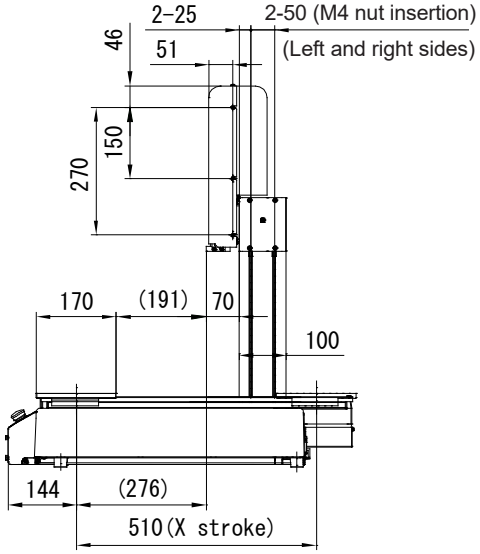
4.1.12 JR3603

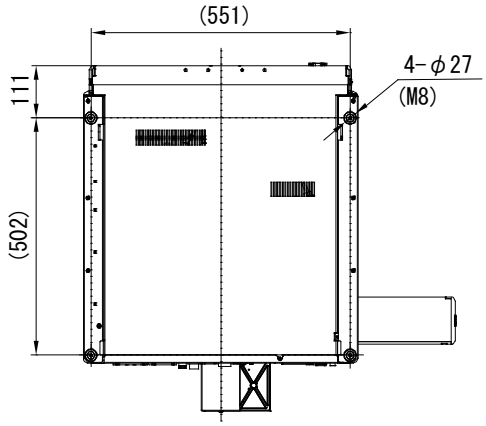
External dimensions of JR3603 using the JR3603N-AJ model as an example.

(unit: mm)

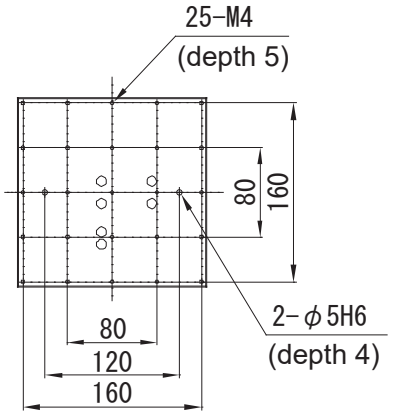




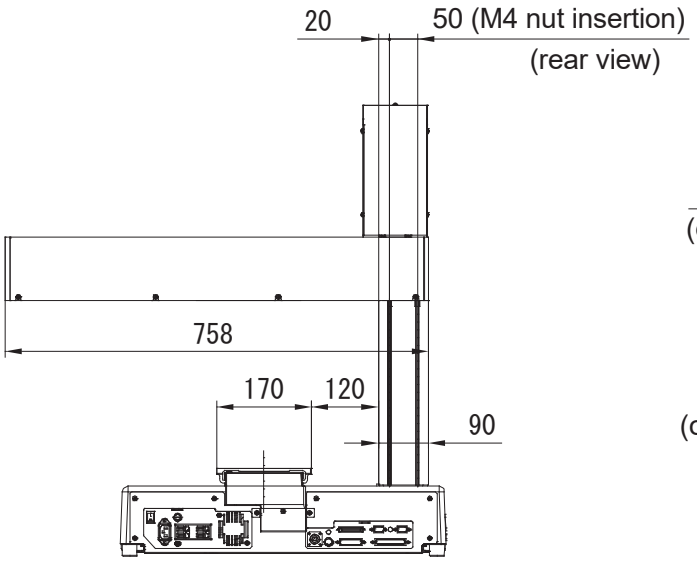


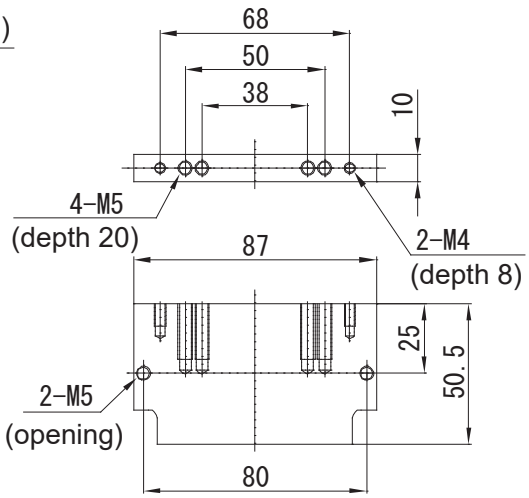


(unit: mm)



Detail Part B





Detail Part A

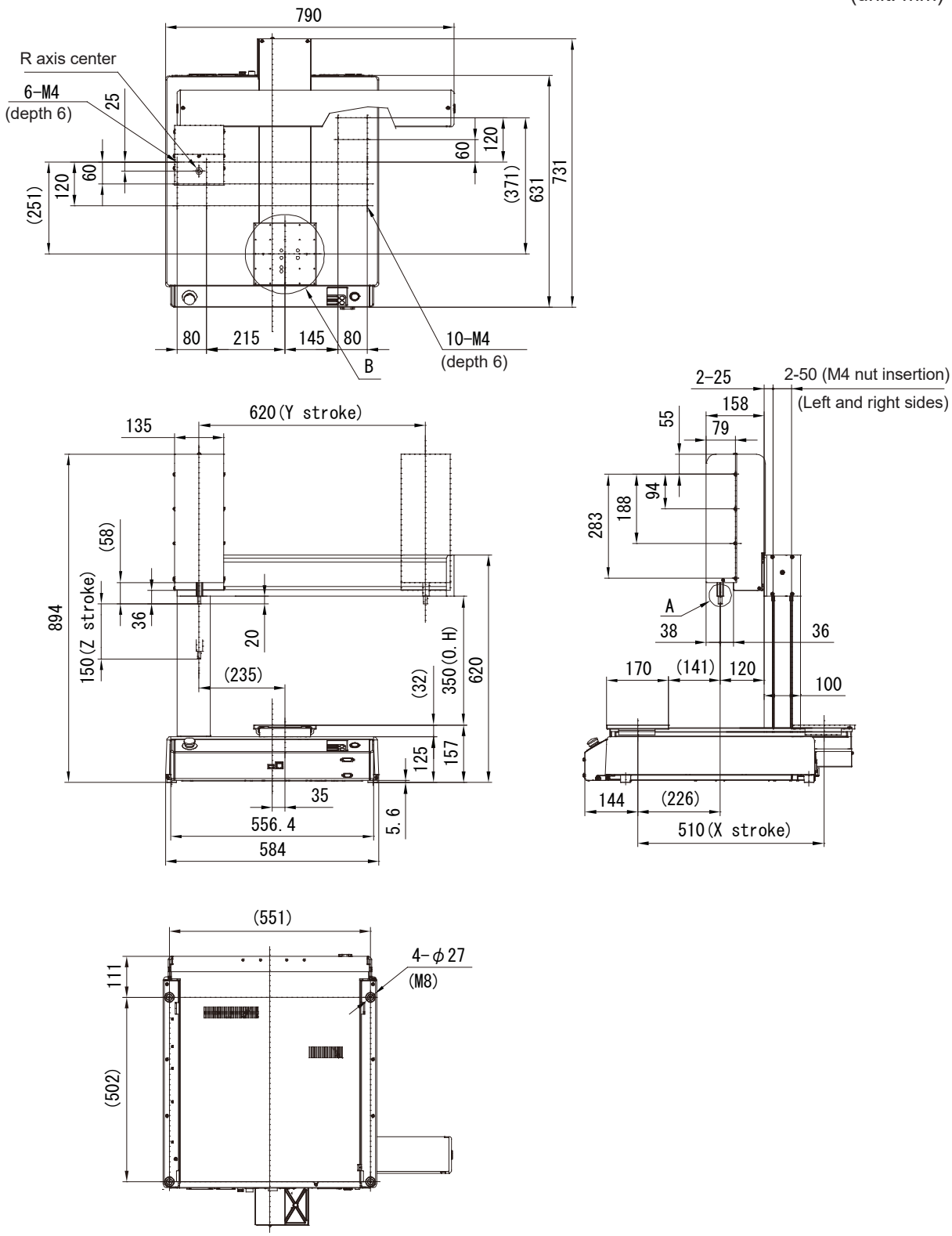
⚠ Warning

Be sure to leave a space of 300 mm or more between the rear of the robot and the wall or any other obstacle when you install the robot. If the robot is too close to the wall, etc. it will be hard to do maintenance, etc., and also due to the cooling fan on the rear of the unit, the robot may overheat or malfunction.

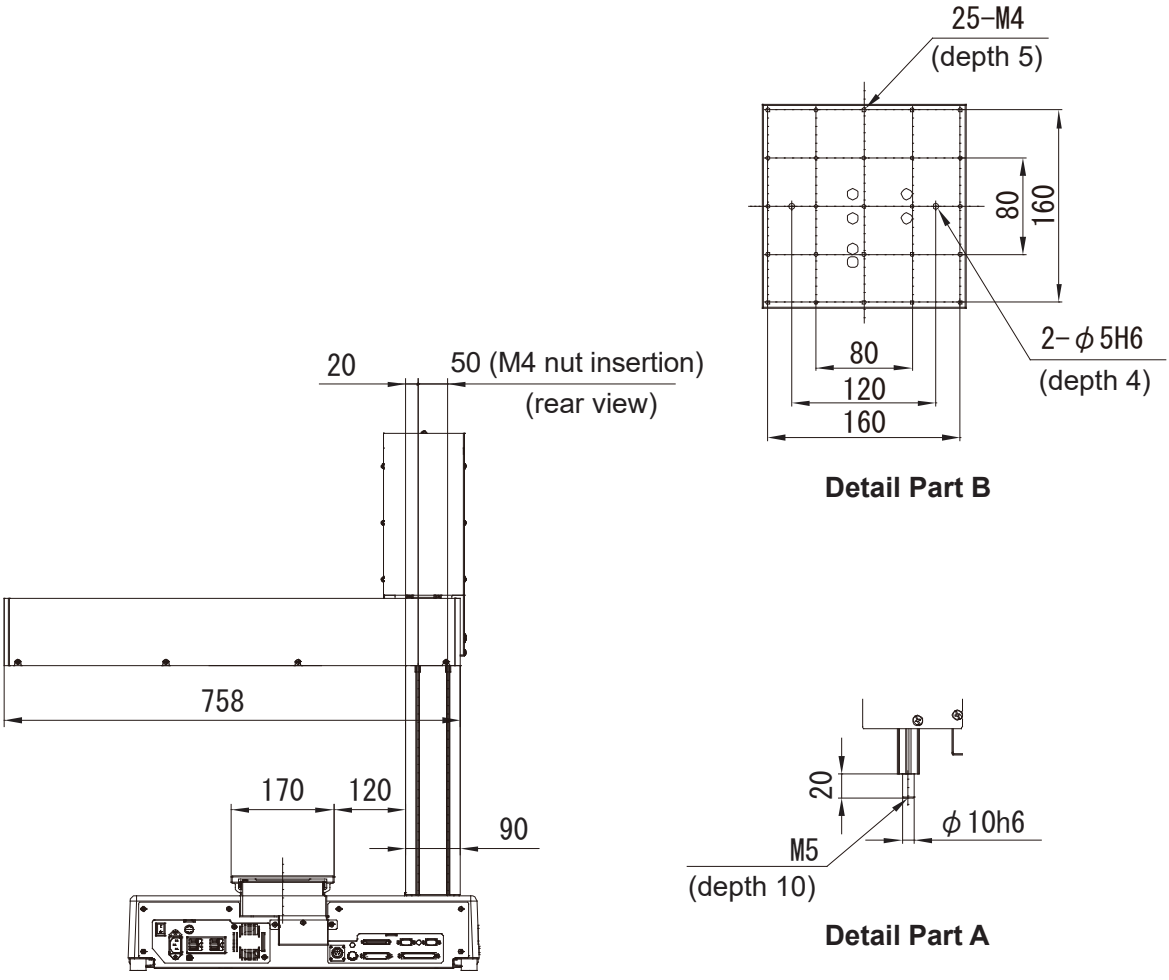
4.1.13 JR3604

External dimensions of JR3604 using the JR3604N-AJ model as an example.

(unit: mm)



(unit: mm)



Detail Part B

Detail Part A

⚠ Warning

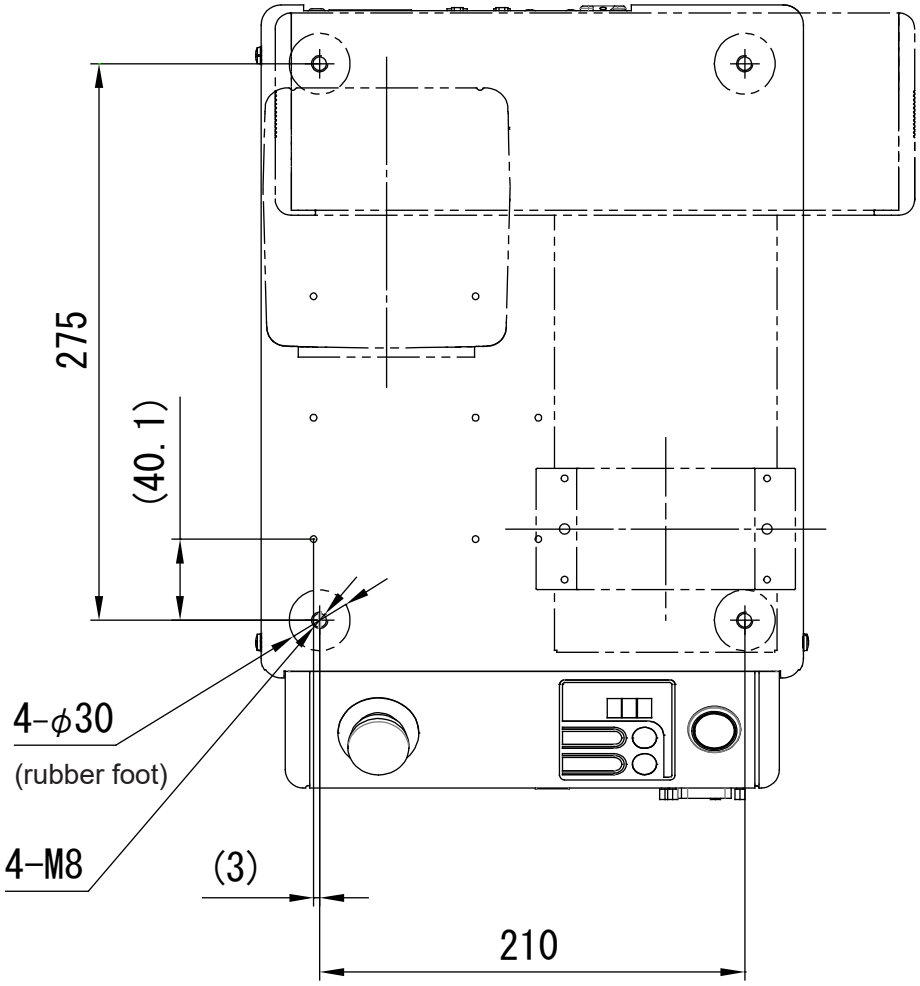
Be sure to leave a space of 300 mm or more between the rear of the robot and the wall or any other obstacle when you install the robot. If the robot is too close to the wall, etc. it will be hard to do maintenance, etc., and also due to the cooling fan on the rear of the unit, the robot may overheat or malfunction.

4.2 Unit Fixtures (4 Locations)

4.2.1 Common to the JR3200 Series

There are rubber feet (ø 30) attached in four places.
To secure the unit, use the M8 screws in the four places where the rubber feet are attached.
Note that dimensions in parentheses are for reference only and may change depending upon unit assembly.

Example: JR3203N-AC



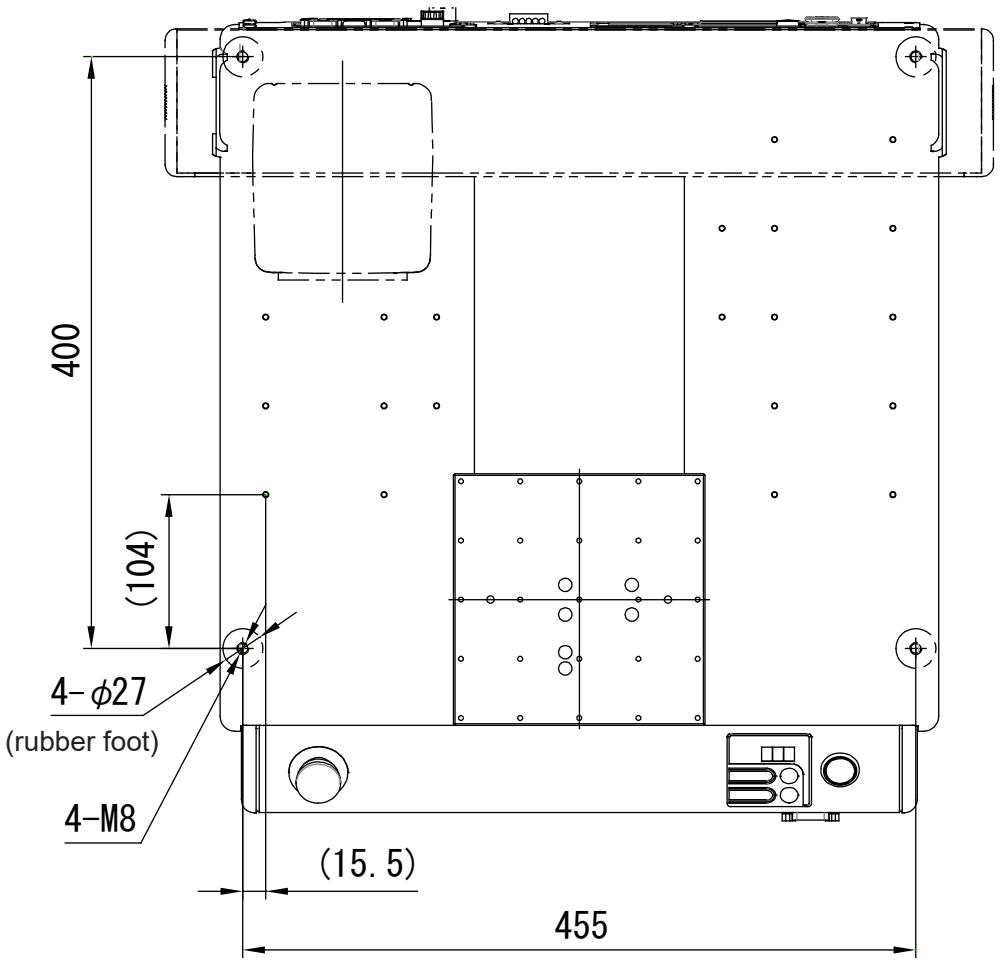
(unit: mm)

4.2.2 Common to the JR3300 Series

There are rubber feet (ø 27) attached in four places.
To secure the unit, use the M8 screws in the four areas where the rubber feet are attached, and be sure to use spacers with a height of 20 mm or more (as clearance for any protrusions).

Example: JR3303N-AJ

(unit: mm)

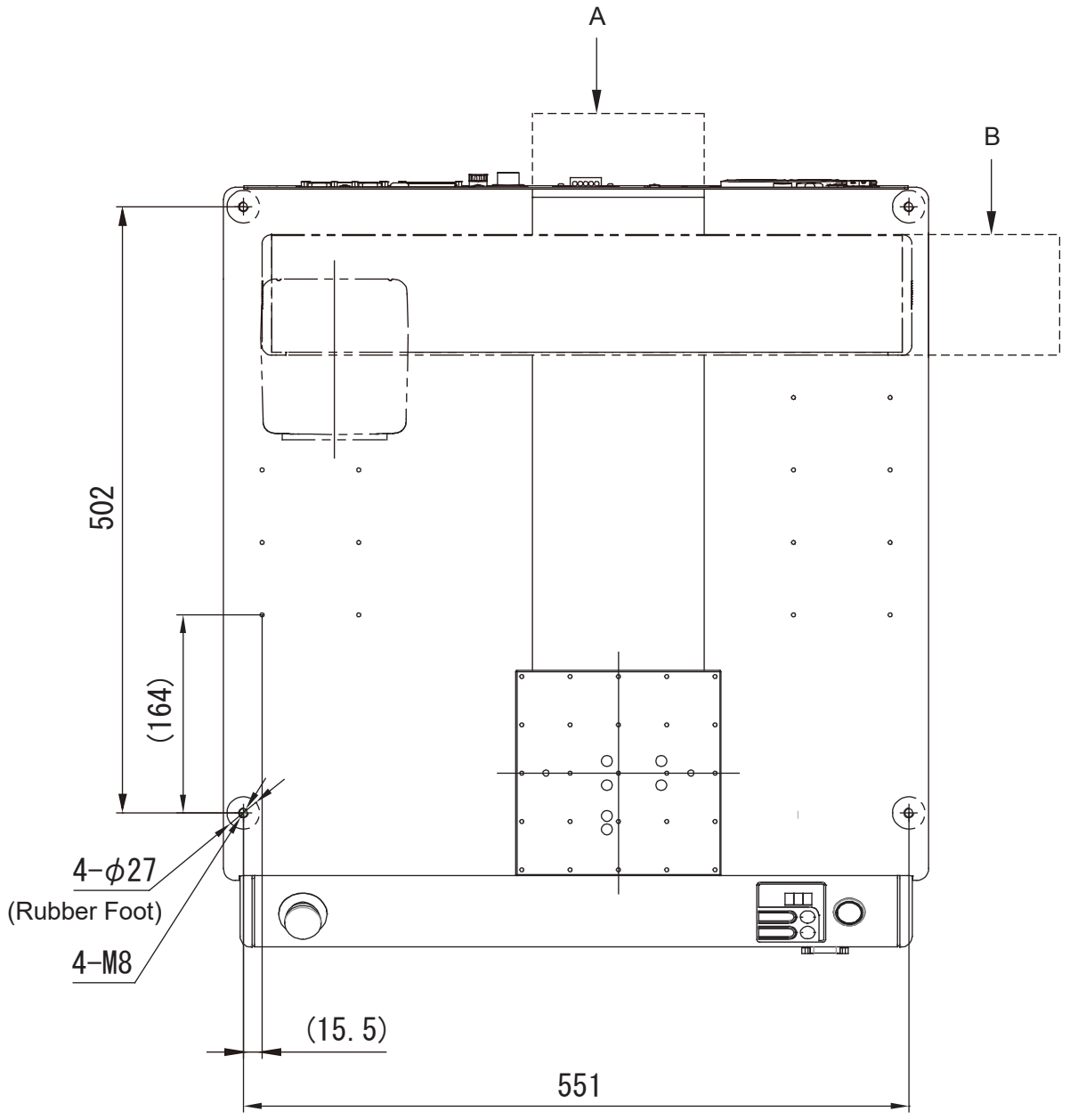


4.2.3 Common to the JR3400 – JR3600 Series

There are rubber feet (ø 27) attached in four places.
To secure the unit, use the M8 screws in the four areas where the rubber feet are attached, and be sure to use spacers with a height of 20 mm or more (as clearance for any protrusions).

Example: JR3403N-AJ

(unit: mm)

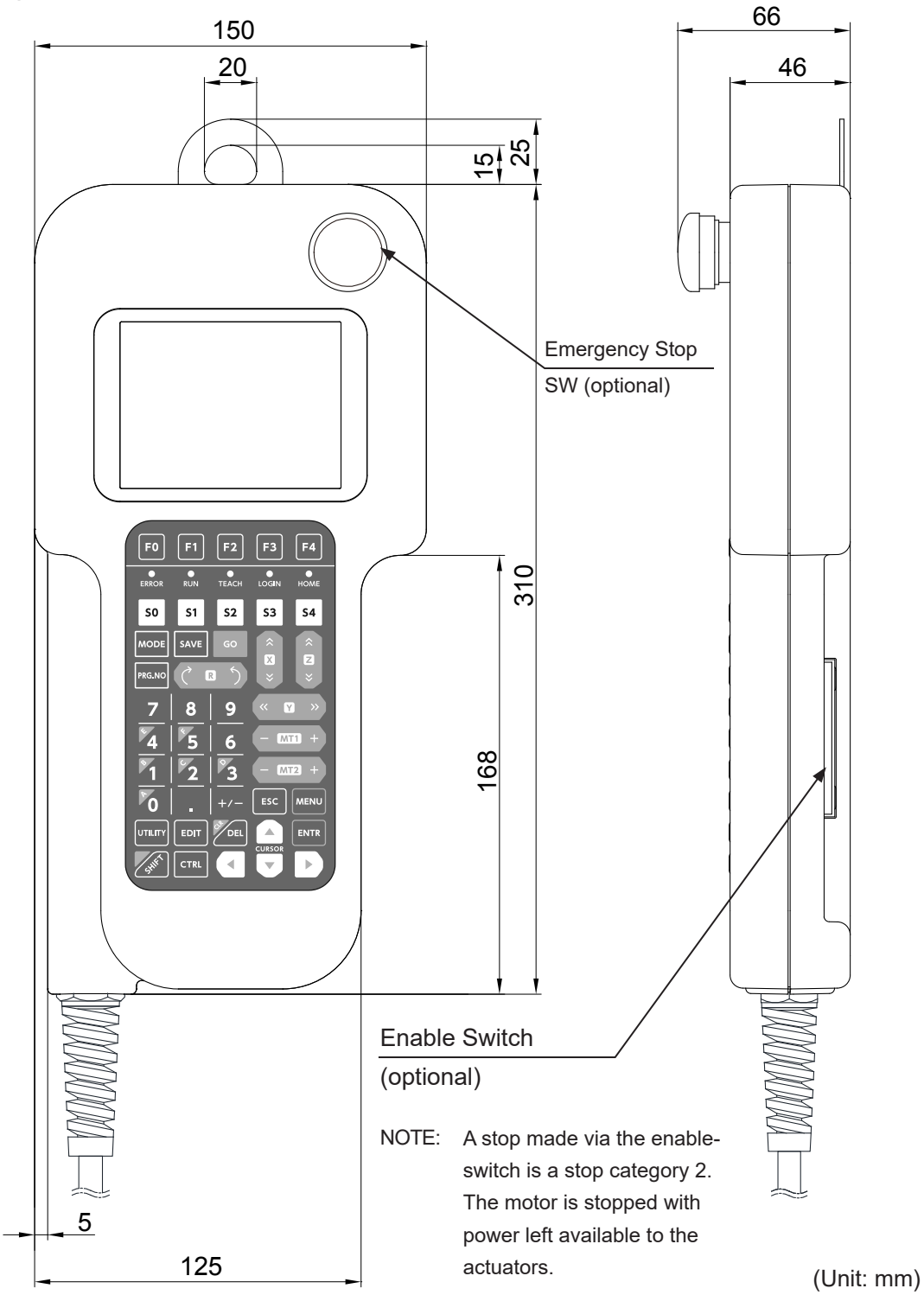


NOTE: With the JR3500, JR3600 series, the lengths of A and B in the diagram above vary.

4.3 Teaching Pendant

If you are using the teaching pendant as a monitor in Run Mode, install it 600 mm or higher above floor level for easy operation.

Teaching Pendant II (New Model)

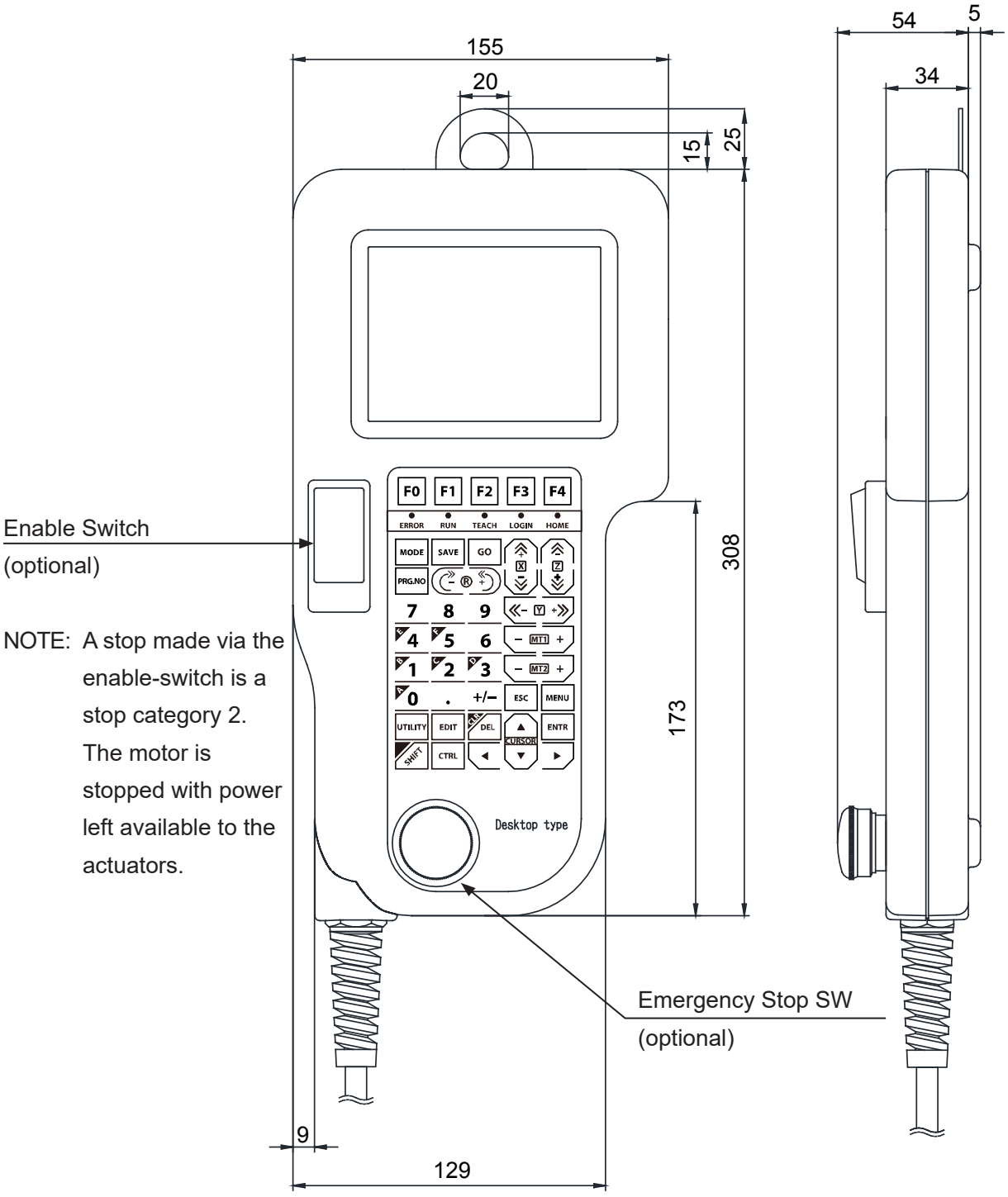


NOTE: A stop made via the enable-switch is a stop category 2. The motor is stopped with power left available to the actuators.

(Unit: mm)

NOTE: The teaching pendant is optional.

Teaching Pendant (Conventional Model)



(unit: mm)

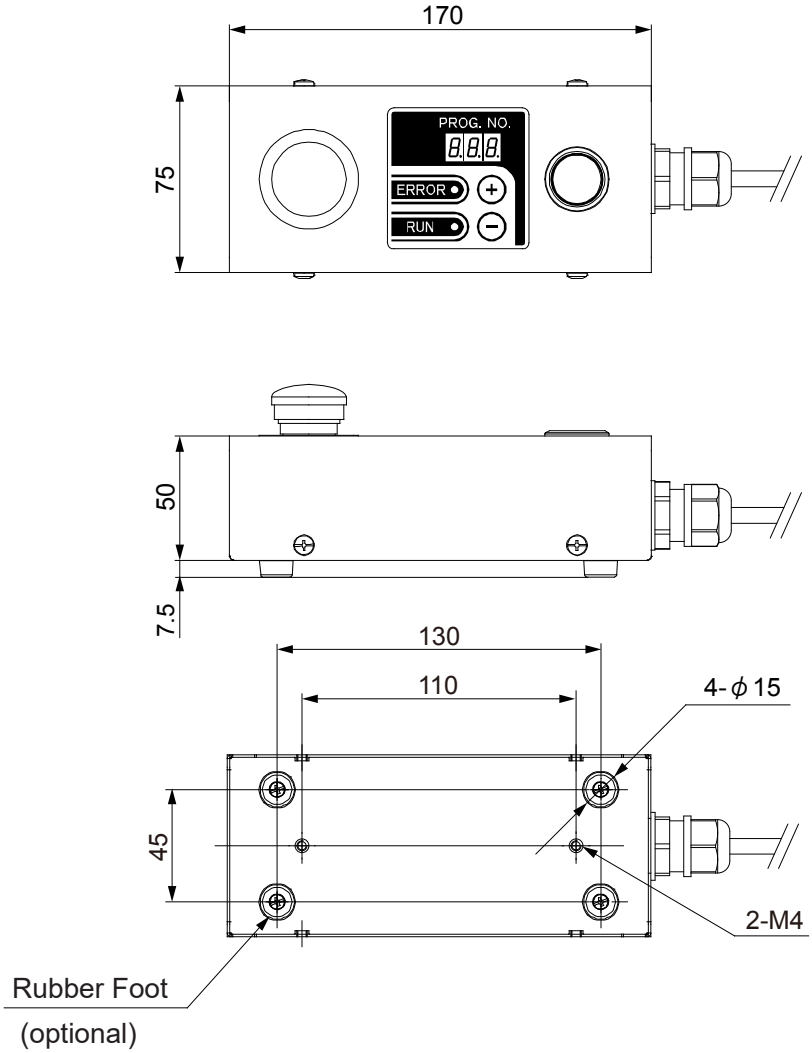
NOTE: The teaching pendant is optional.

4.4 Switchbox

Install the switchbox 600 mm or higher above floor level for easy operation.

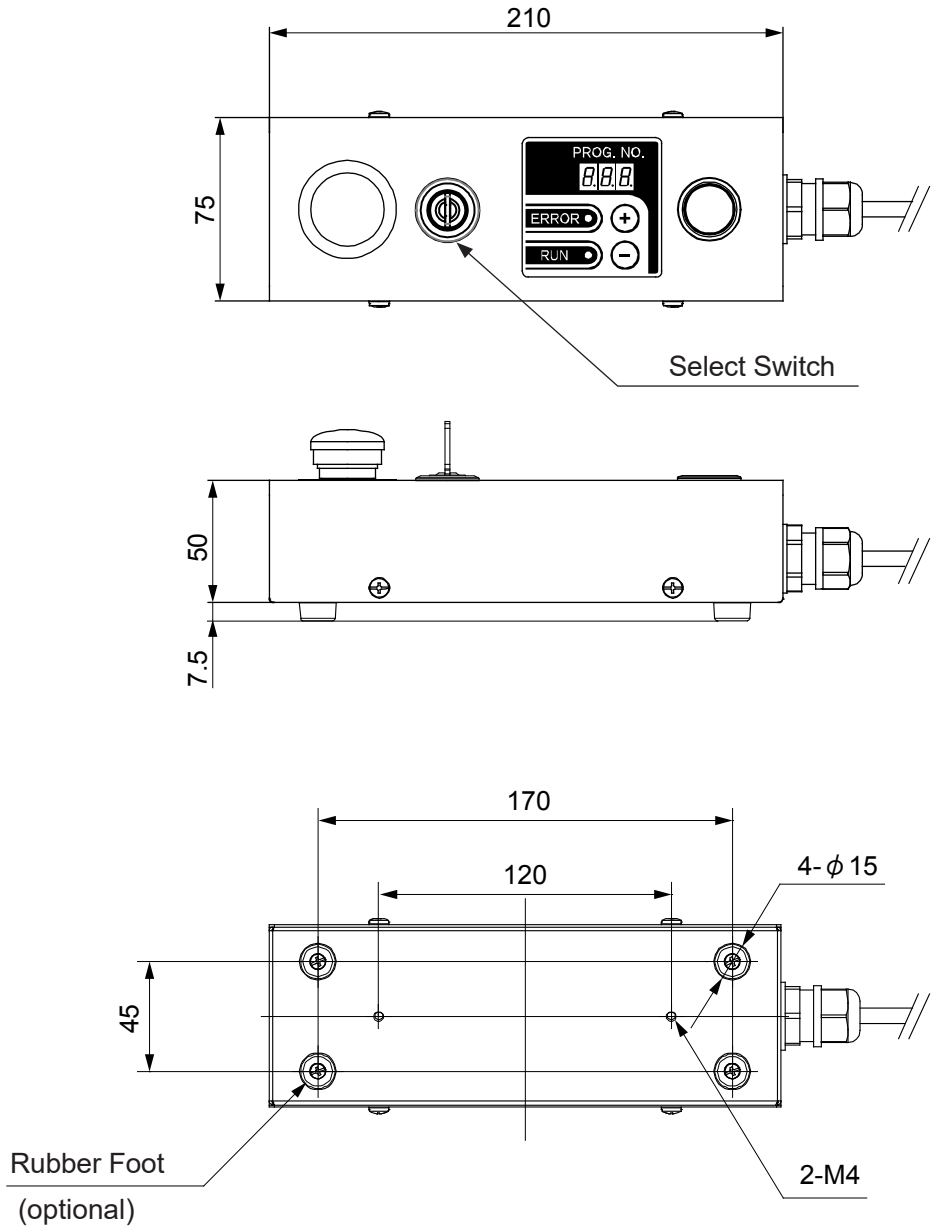
■ Standard Specifications

(unit: mm)



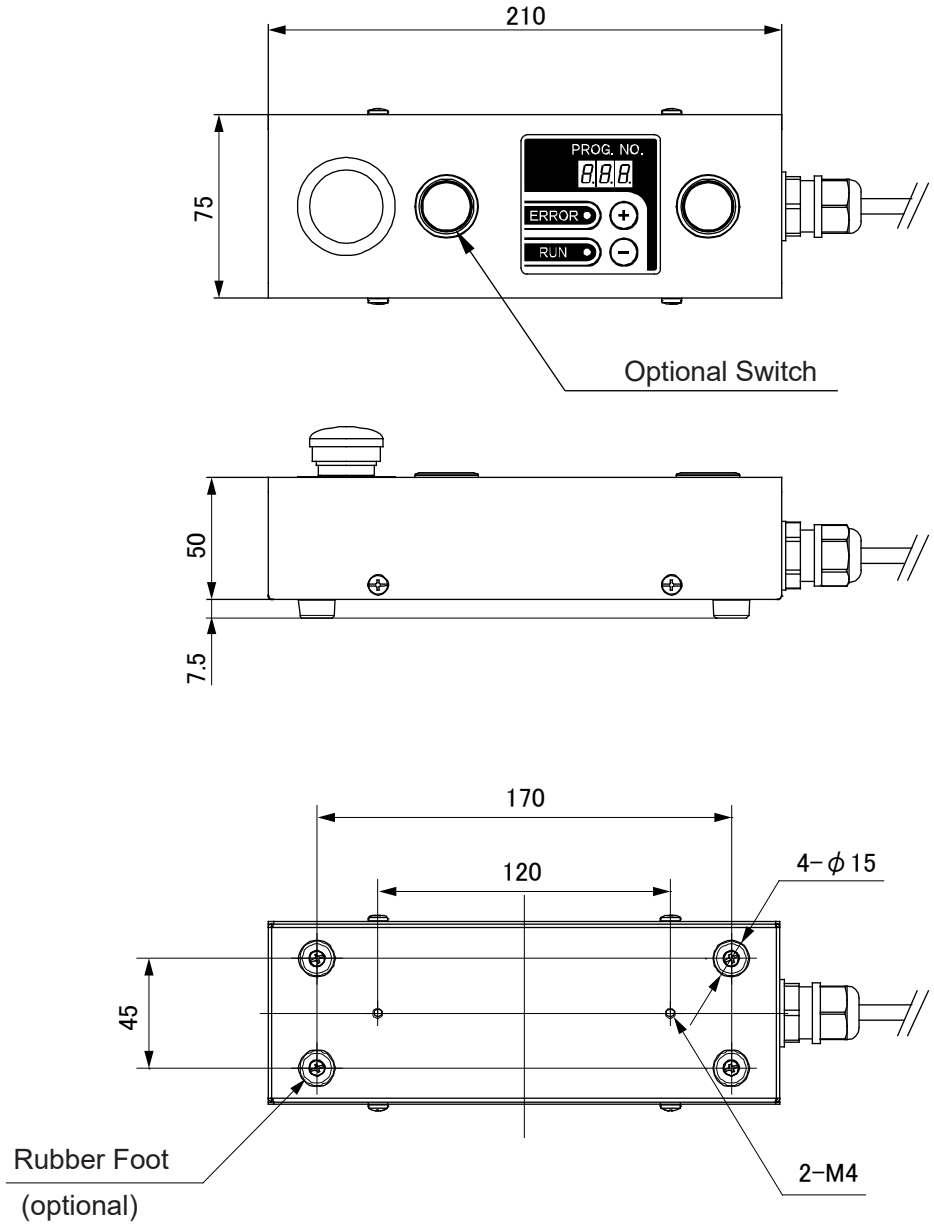
■ Standard Specifications with Select Switch

(unit: mm)



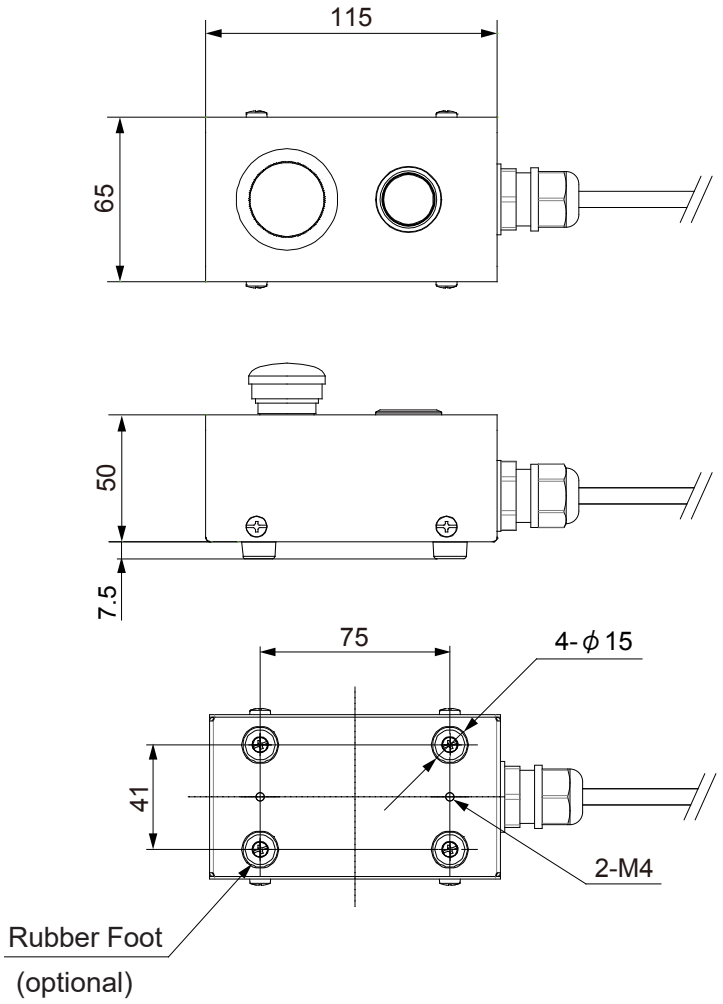
■ Standard Specifications with Optional Switch

(unit: mm)



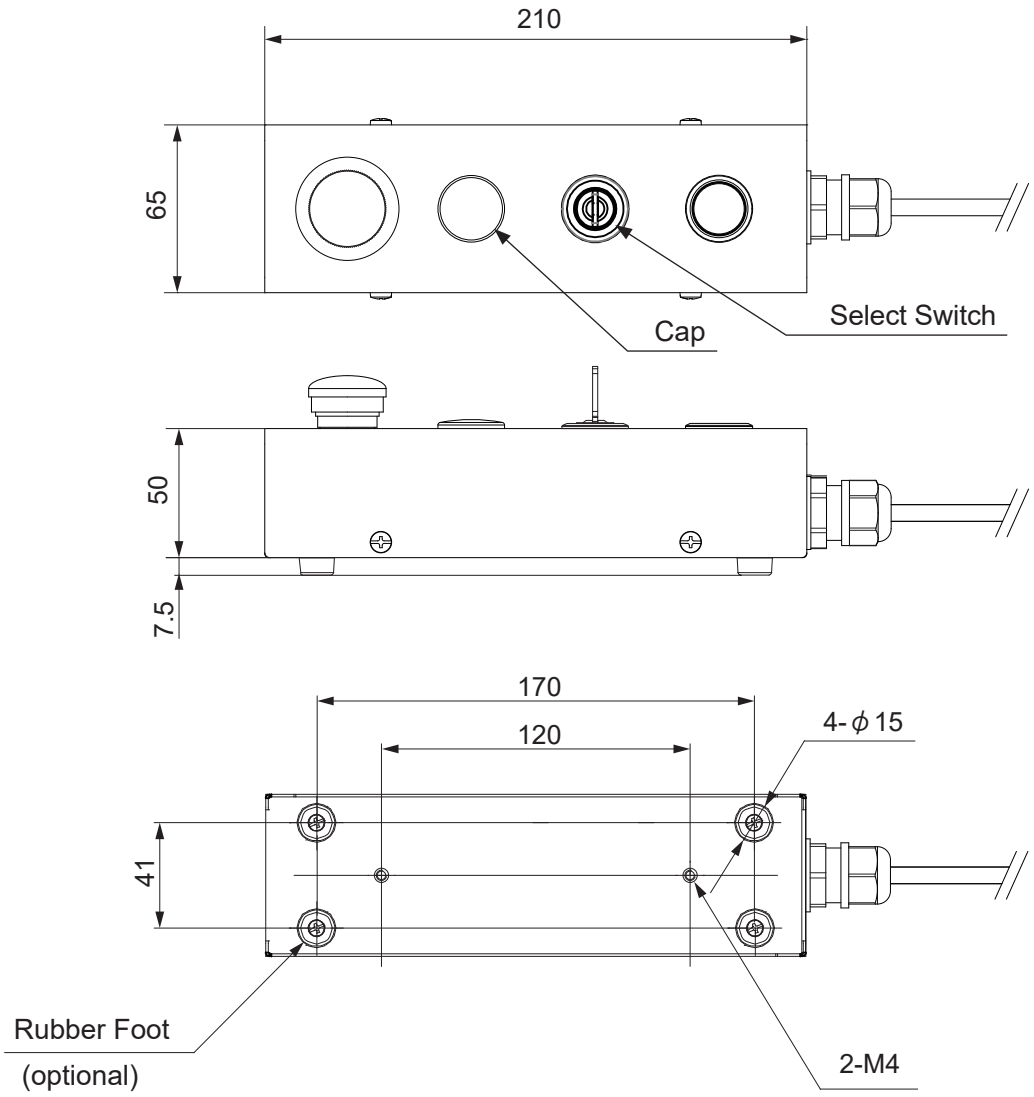
■ Basic Specifications

(unit: mm)



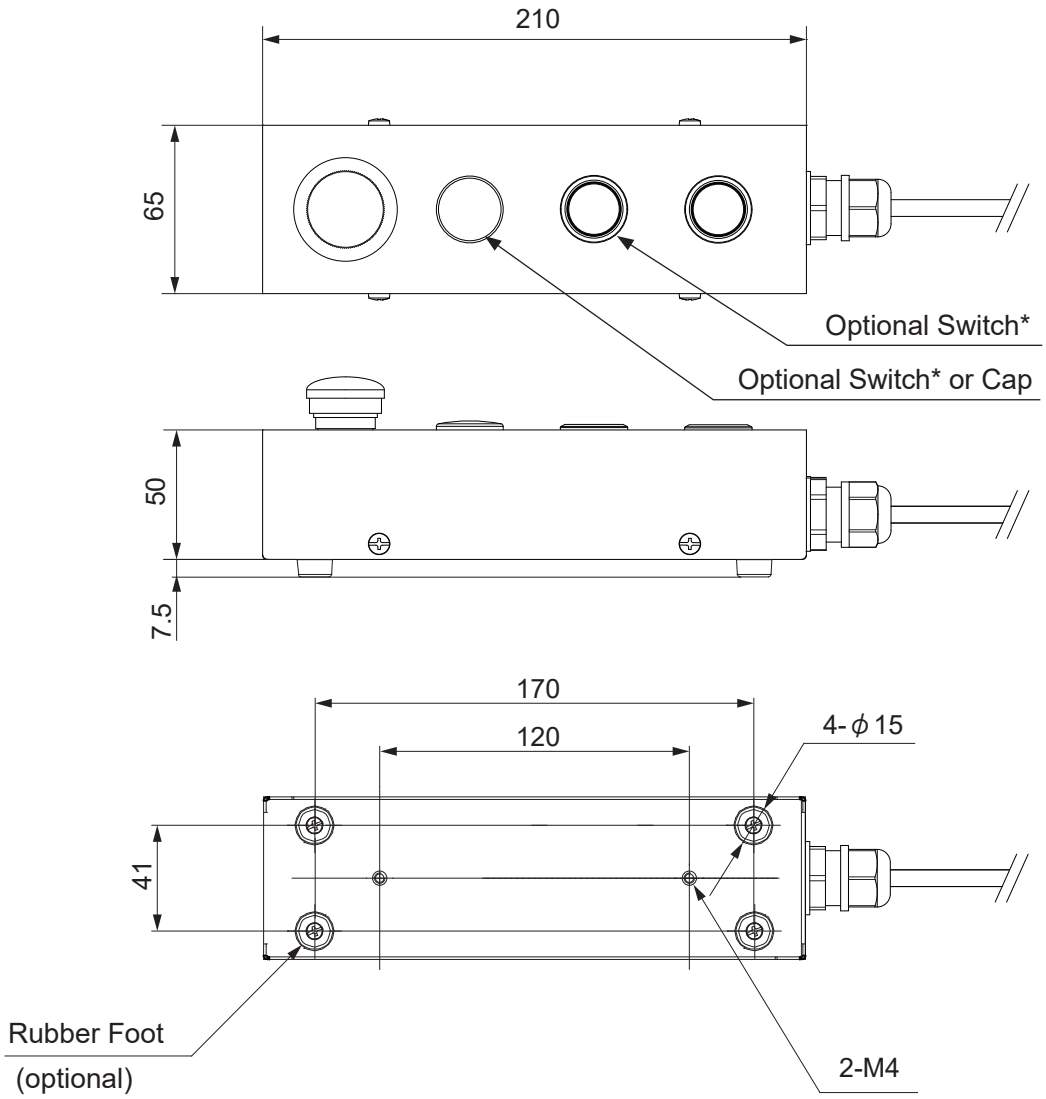
■ Basic Specifications with Select Switch

(unit: mm)



■ Basic Specifications with Optional Switch

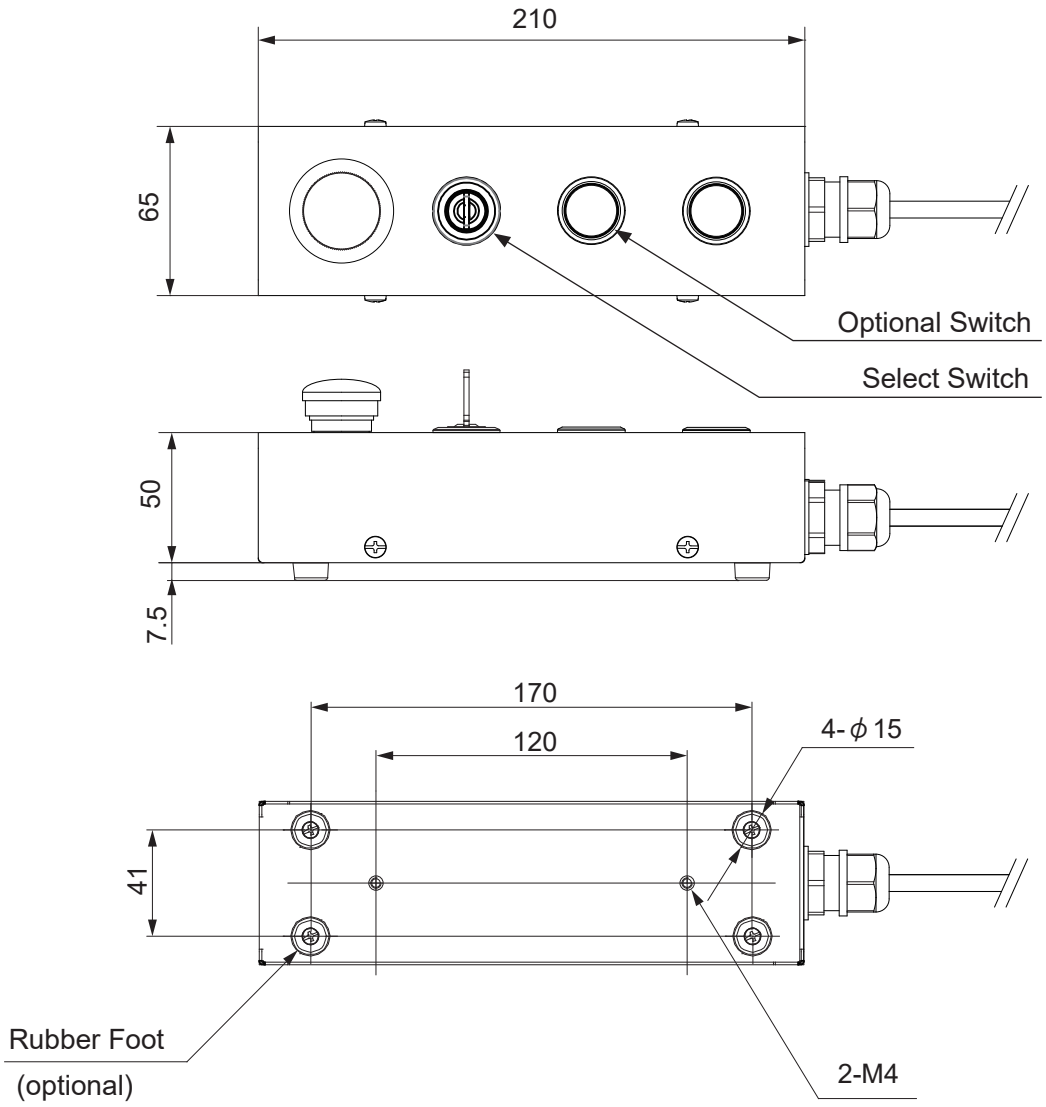
(unit: mm)



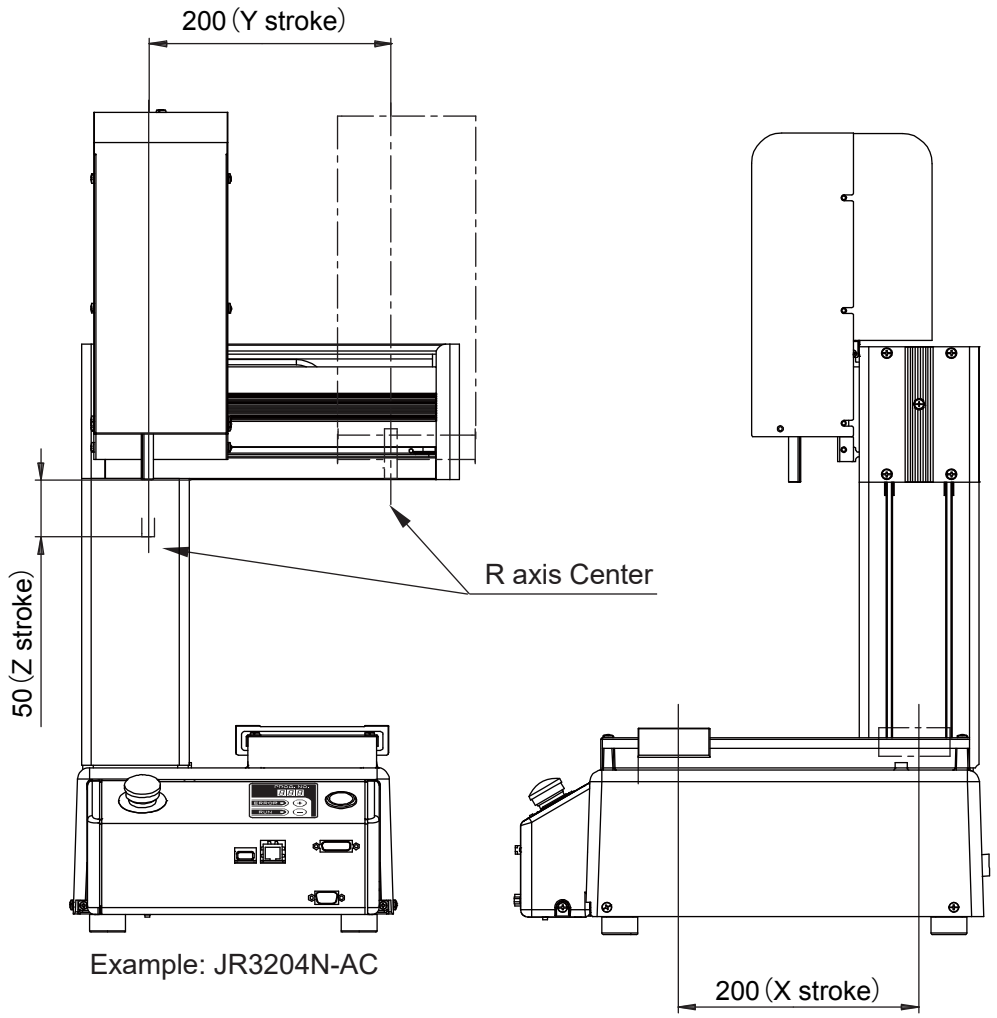
* If you have 1 optional switch equipped, the left most switch is a cap.
If you have 2 optional switches equipped , they are equipped in the order of optional switch 1 to optional switch 2 from the left.

■ Basic Specifications with Optional Switch and Select Switch

(unit: mm)



5. RANGE OF MOVEMENT



Example: JR3204N-AC

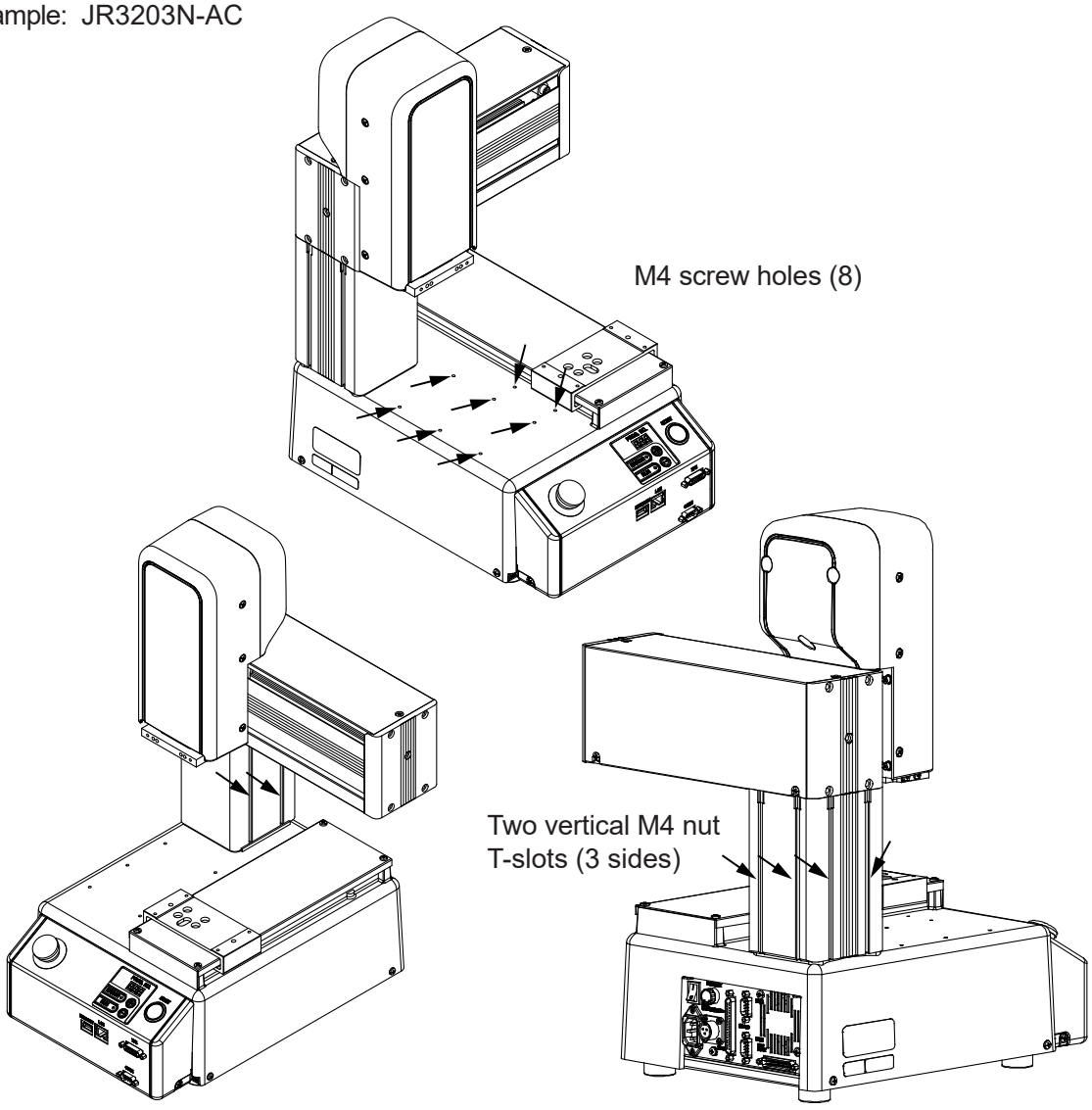
Axis / Model	X [mm]	Y [mm]	Z [mm]	R [deg]
JR3203	200	200	50	–
JR3204				±360
JR3303	300	320	100	–
JR3304				±360
JR3303F	300	320	150	–
JR3403	400	400	150	–
JR3403F				
JR3404				±360
JR3503	510	510	150	–
JR3504				±360
JR3603	510	620	150	–
JR3604				±360

6. ATTACHING EQUIPMENT

When you want to attach a feeder, tool controller or fixture to your robot, there are M4 nut T-slots on the column, and M4 screw holes (JR3200: 8, JR3300: 20, JR3400 – JR3600: 16 screws) on the base which you can use, as shown in the illustrations below.
Refer to “4. EXTERNAL DIMENSIONS” for attaching dimensions.

JR3200 Series

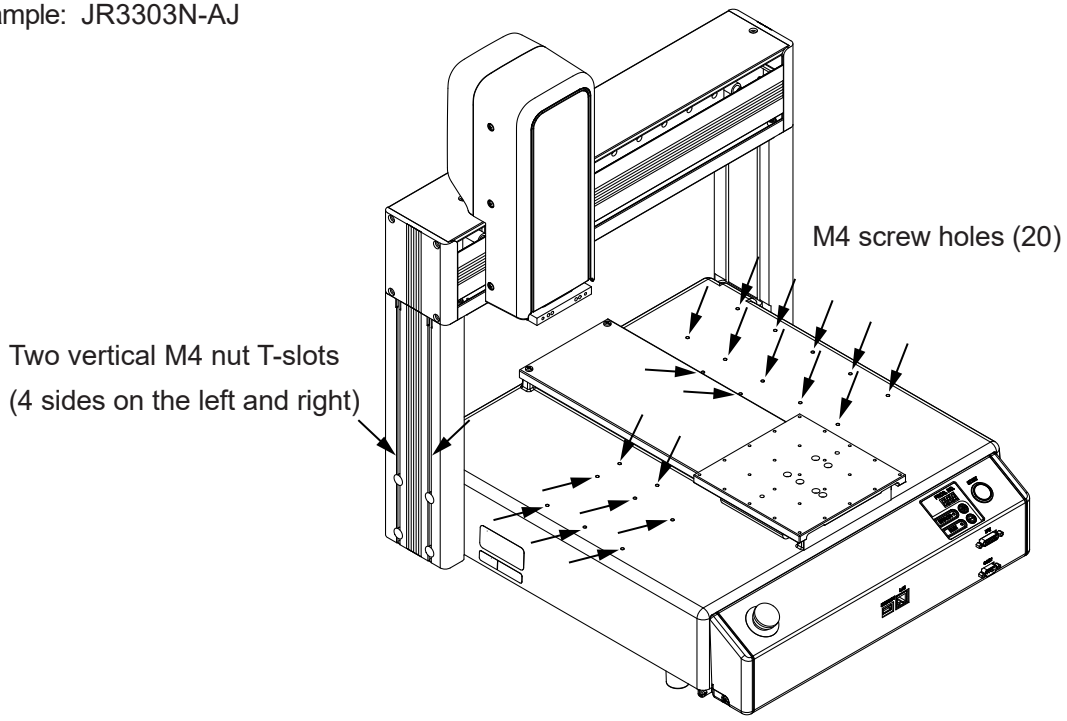
Example: JR3203N-AC



NOTE: Refer to “4. EXTERNAL DIMENSIONS” for the dimensions of the M4 screw holes and the M4 nut T-slots.

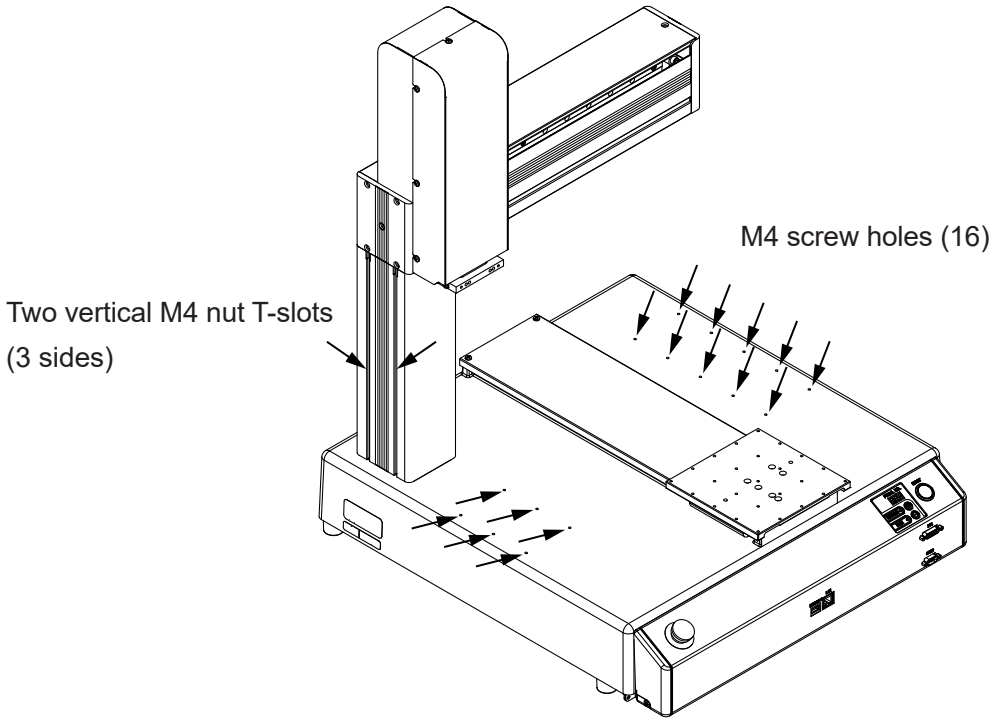
JR3300 Series

Example: JR3303N-AJ



JR3400 – JR3600 Series

Example: JR3403N-AJ



NOTE: Refer to “4. EXTERNAL DIMENSIONS” for the dimensions of the M4 screw holes and the M4 nut T-slots.

7. I/O-SYS

There are system functions assigned to I/O-SYS. For information regarding the assigned functions, refer to “8. I/O-SYS FUNCTION ASSIGNMENT.”

7.1 Connectors

There are two types of I/O polarity: NPN specifications and PNP specifications. After confirming your robot’s polarity specifications, always connect tools, etc., which are compatible with these specifications.

■ I/O Polarity

If you are connecting external devices, make sure they are compatible with your robot’s I/O polarity. The robot’s I/O polarity can be confirmed on the I/O nameplate. Refer to “3.1 I/O Polarity.”

■ I/O Power Supply Indication

- External

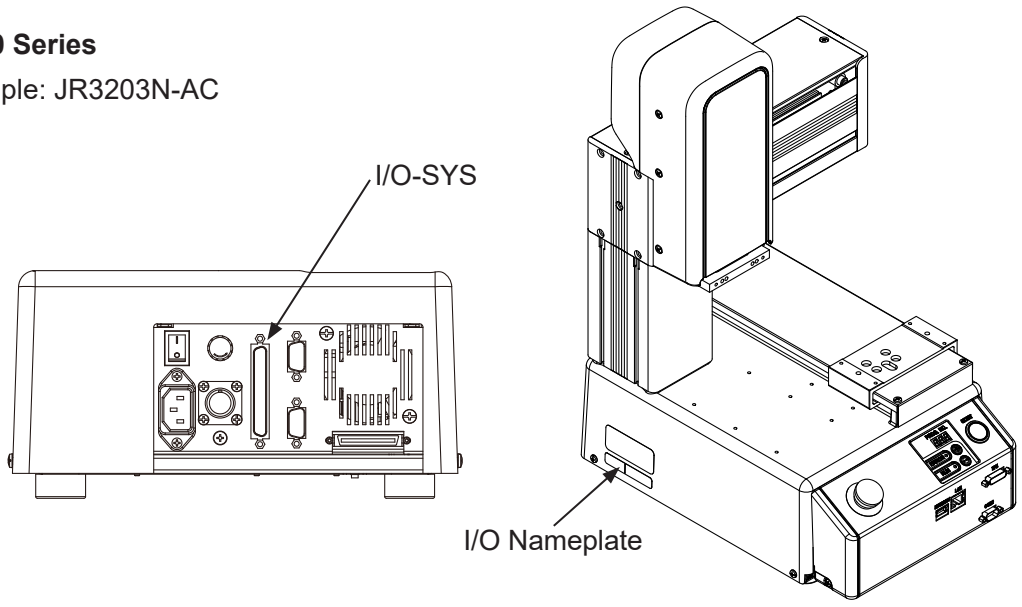
  The power supply (DC 24 V) for a device connected to the I/O-SYS is supplied externally. Prepare a separate I/O power supply.
- Internal

  The power supply (DC 24 V) for a device connected to the I/O-SYS is output from the I/O-SYS connector.

NOTE: I/O power supply type (External/Internal) is selected when you purchase the robot and cannot be changed after doing so.

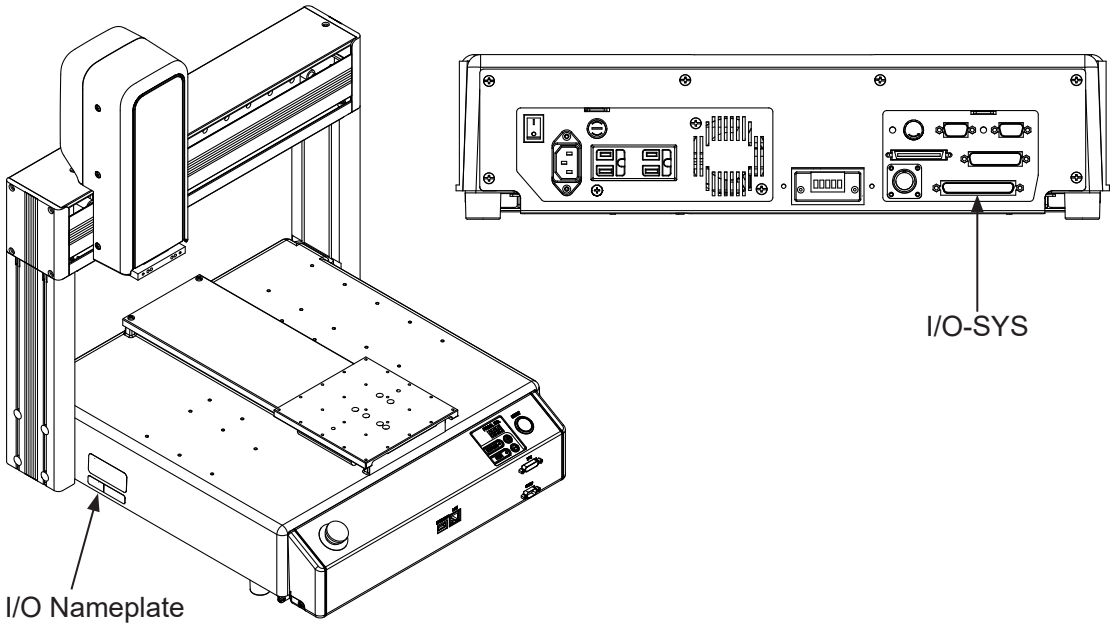
JR3200 Series

Example: JR3203N-AC



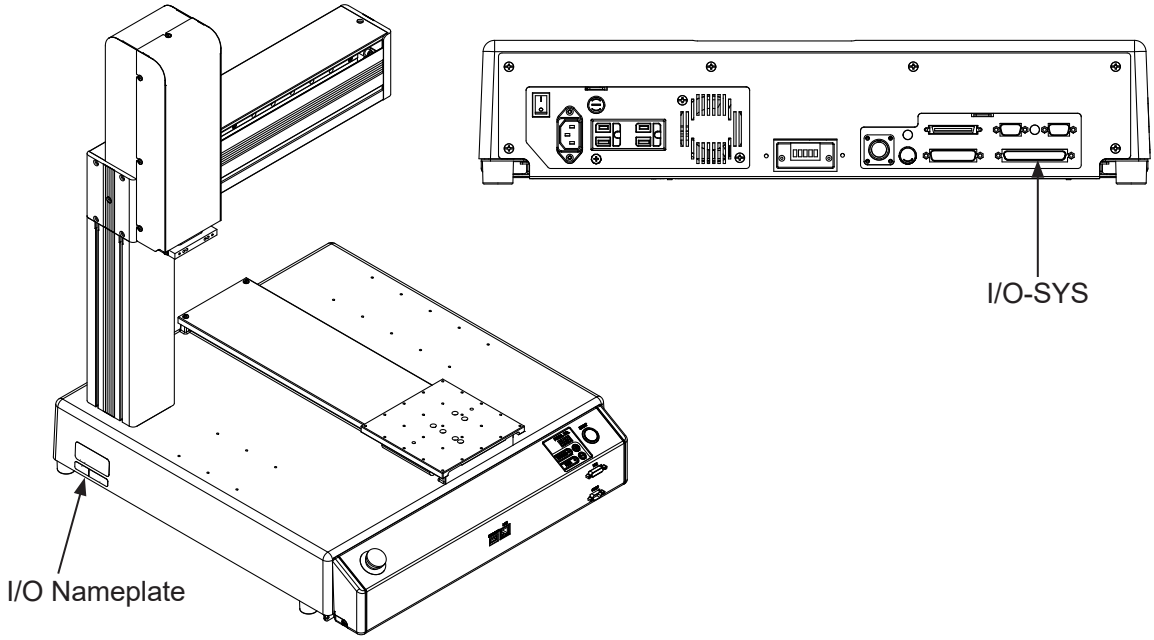
JR3300 Series

Example: JR3303N-AJ

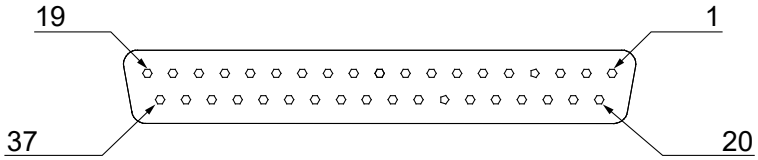


JR3400 – JR3600 Series

Example: JR3403N-AJ



7.2 Pin No. (Robot Side)



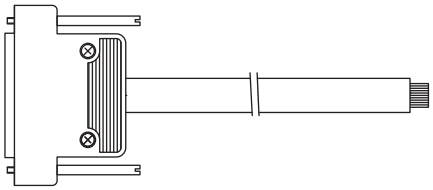
NOTE: When connecting an external device, make sure it is compatible with the robot's I/O polarity. The robot's I/O polarity can be confirmed on the I/O nameplate. Refer to "3.1 I/O Polarity."

7.3 I/O Cable (Unit)

■ I/O Cable (Unit) (optional)

NOTE: The part number varies according to the cable length.

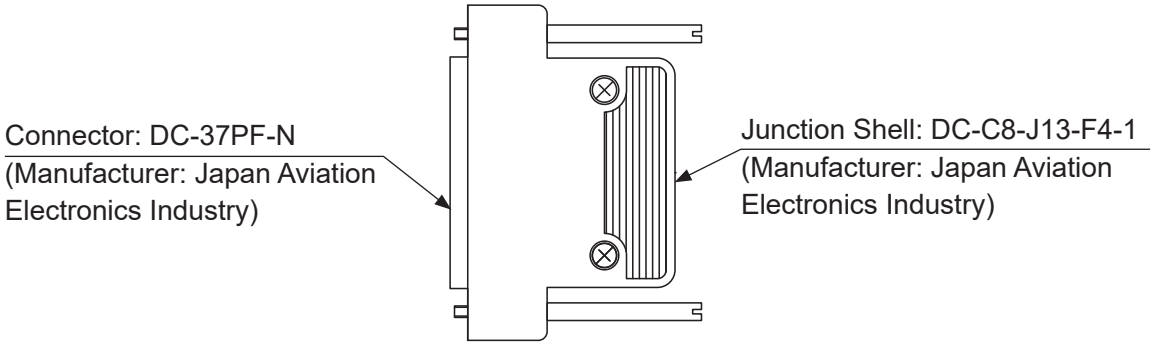
Cable Length [m]	Janome Part No.
2	984937002
3	984937105
5	984937208



Cable Wiring

Pin No.	Insulator Color	Spiral Marking	Pin No.	Insulator Color	Spiral Marking
1	Black		21	Red	White
2	White		22	Red	Black
3	Red		23	Red	Green
4	Green		24	Red	Blue
5	Yellow		25	Green	White
6	Brown		26	Green	Black
7	Blue		27	Green	Red
8	Gray		28	Green	Blue
9	Orange		29	Yellow	White
10	Pink		30	Yellow	Black
11	Light Blue		31	Yellow	Red
12	Purple		32	Yellow	Green
13	White	Black	33	Yellow	Blue
14	White	Red	34	Brown	White
15	White	Green	35	Brown	Black
16	White	Blue	36	Brown	Red
17	Black	White	37	Brown	Green
18	Black	Red		Brown	Blue
19	Black	Green		Blue	White
20	Black	Blue		Blue	Black

■ Connector (Unit) (I/O1) (optional)
Janome part No.: 960537004



7.4 Power Supply Capacity

⚠ Caution

Adhere to the rated amperage outlined in the table below. If you exceed the values listed below, the internal circuits may be damaged.

Use the press within the capacity listed below.

Power Supply	Internal	External
Voltage	DC 24 V	DC 24 V
Amperage per pin (when using DC 24 V)	100 mA	100 mA
Total amperage (I/O-SYS + I/O-1)	1.6 A or less	-

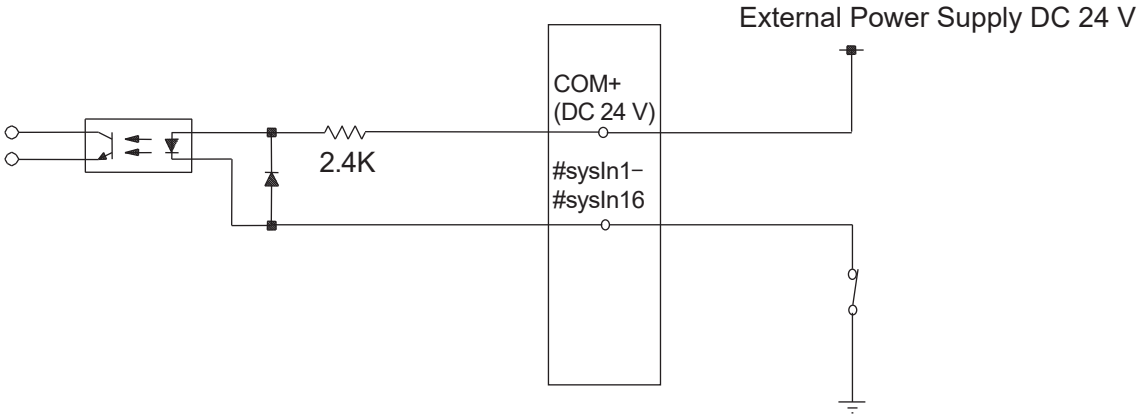
NOTE: Use an IEC/EN 62368-1 certified power supply unit (DC 24 V) for the external power supply.

7.5 Input Signal (NPN)

■ When using an external power supply

Input signals are treated as active when the photocoupler is ON.

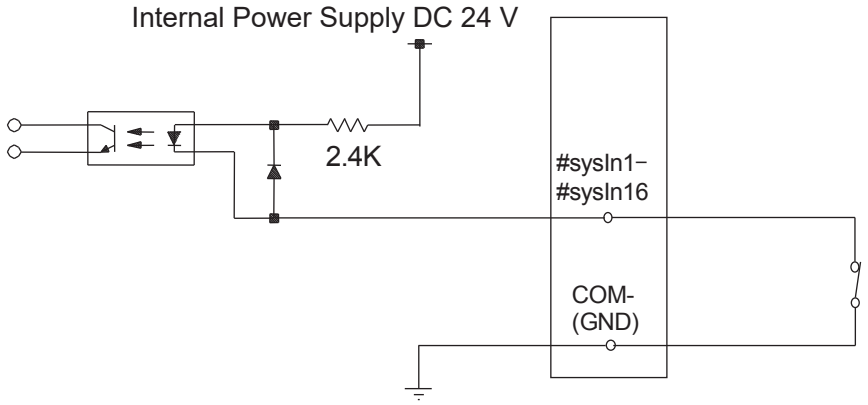
When using an external power supply, the input signals become active when the input pin and the external power supply ground are ON.



■ When using an internal power supply (optional)

Input signals are treated as active when the photocoupler is ON.

When using an internal power supply, the input signals become active when the input pin and the COM- pin are shorted.



If connecting a two-wire external device, such as a sensor, use one which has a leakage current of no more than 0.3 mA. If you use a device with a leakage current of more than 0.3 mA, it may not turn OFF.

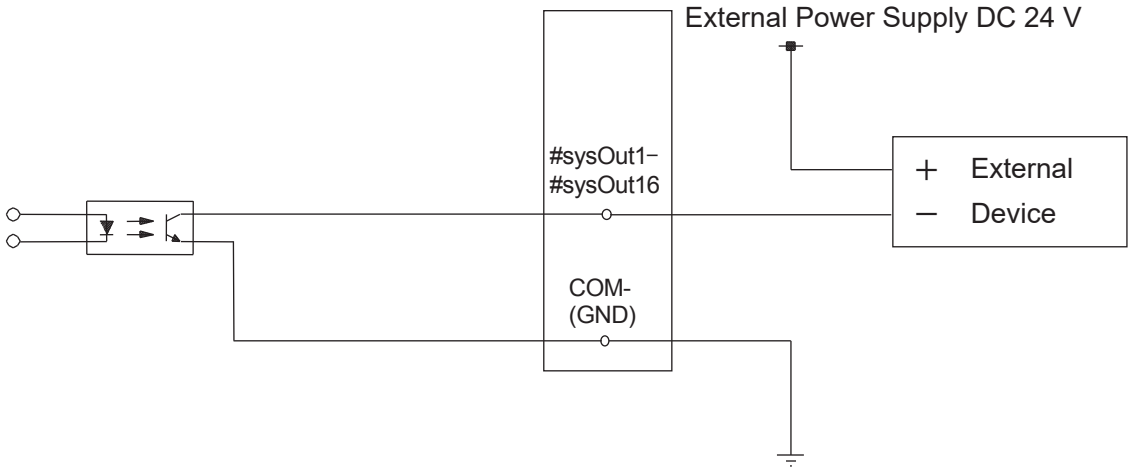
⚠ Caution

Do not assign wiring other than the wiring specified above.

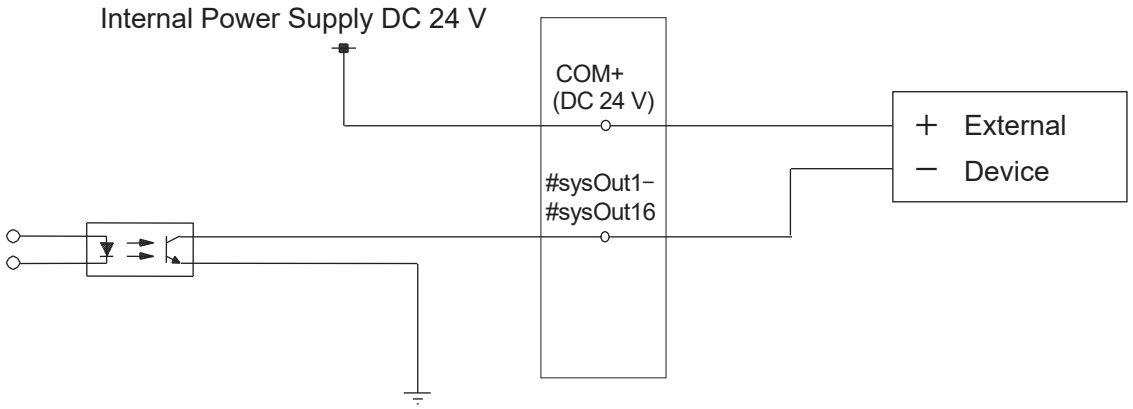
Assigning the wrong wiring can damage the internal circuits.

7.6 Output Signal (NPN)

■ When using an external power supply



■ When using an internal power supply (optional)

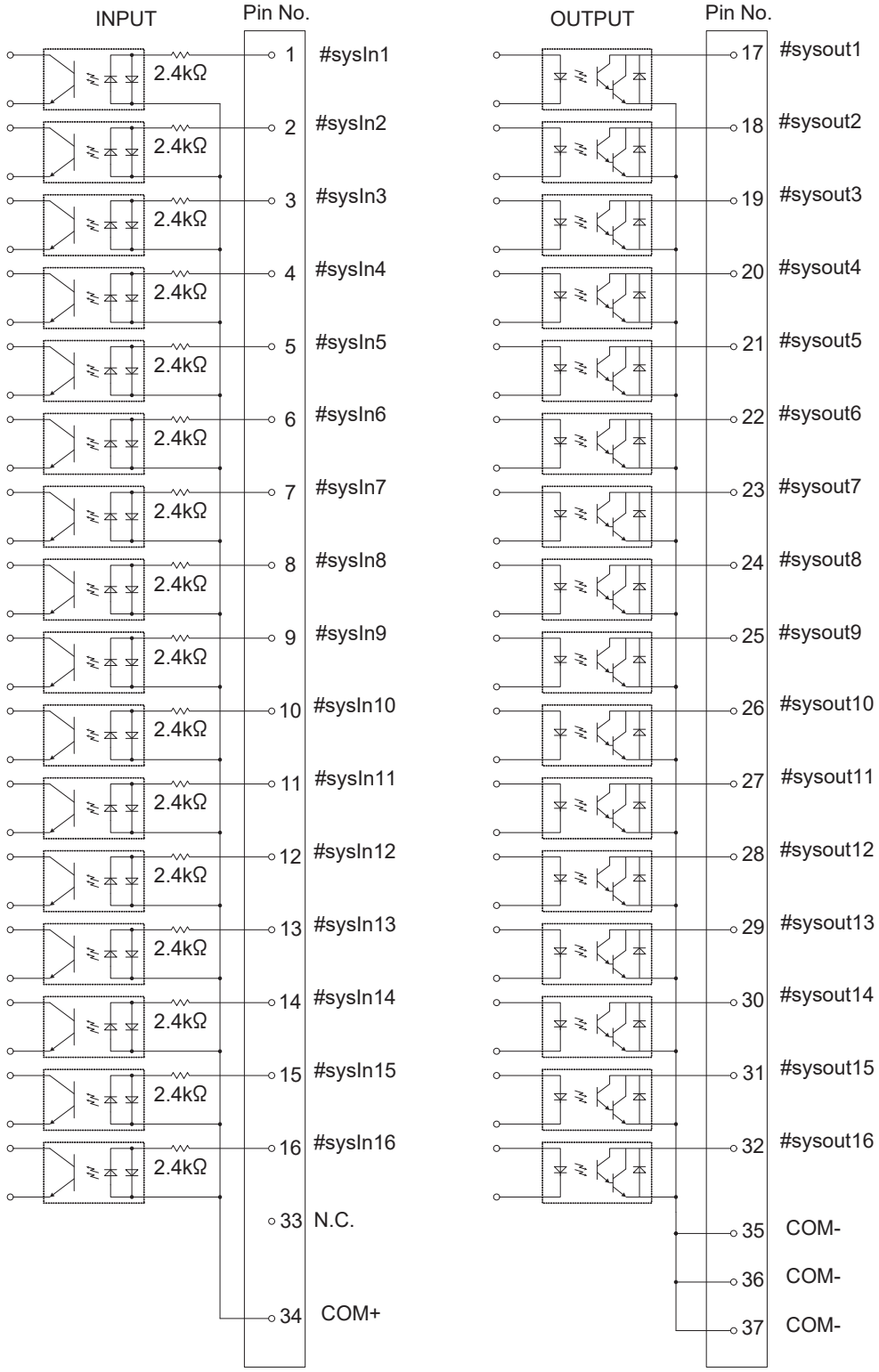


⚠ Caution

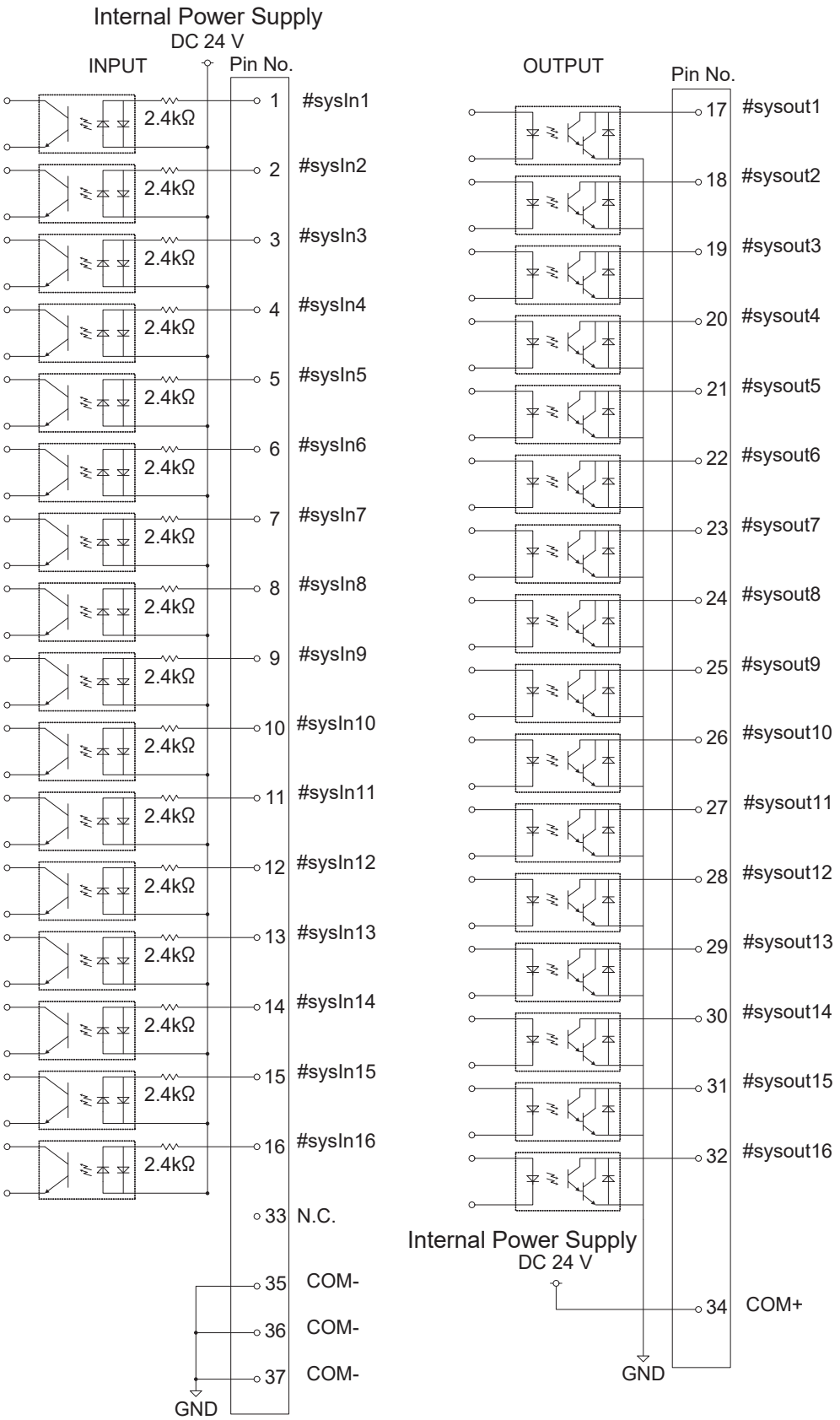
Do not assign wiring other than the wiring specified above.
Assigning the wrong wiring can damage the internal circuits.

7.7 Circuit Diagram (NPN)

■ External Power Supply Specifications



■ Internal Power Supply Specifications (optional)

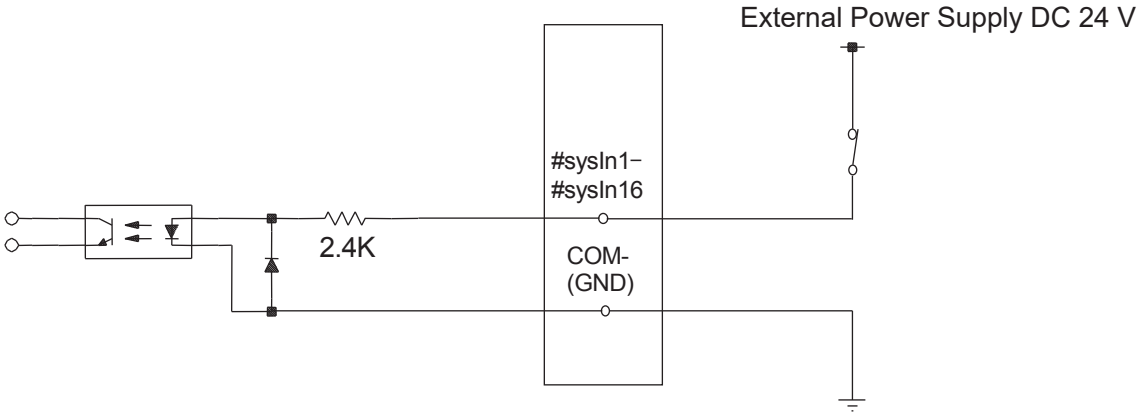


7.8 Input Signal (PNP)

■ When using an external power supply

Input signals are treated as active when the photocoupler is ON.

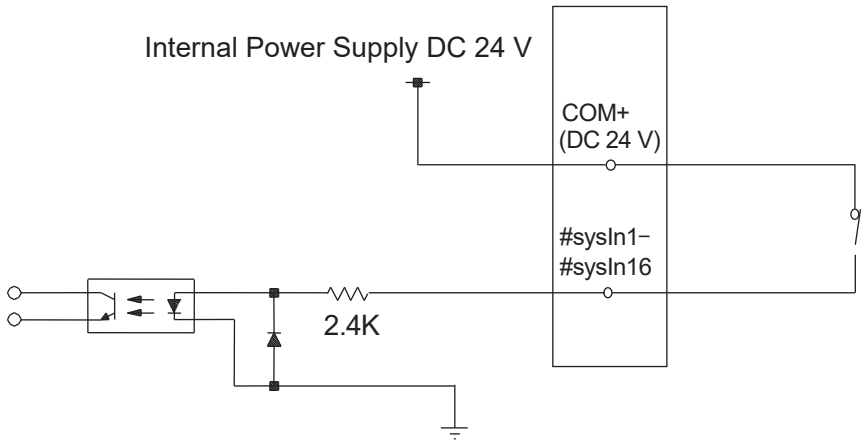
When using an external power supply, the input signals become active when the input pin and the external power supply ground are ON.



■ When using an internal power supply (optional)

Input signals are treated as activate when the photocoupler is ON.

When using an internal power supply, the input signals become active when the input pin and COM+ pin are ON.



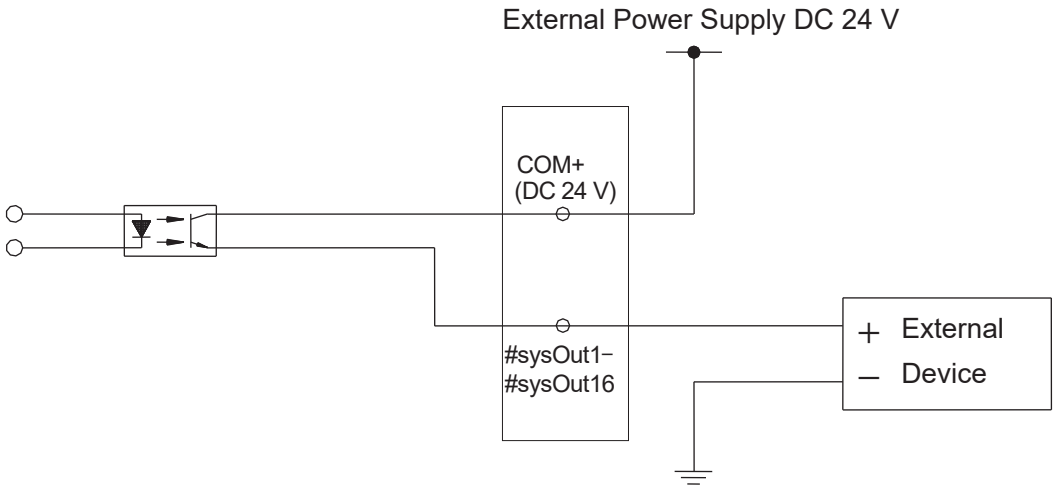
If connecting a two-wire external device, such as a sensor, use one which has a leakage current of no more than 0.3 mA. If you use a device with a leakage current of more than 0.3 mA, it may not turn OFF.

⚠ Caution

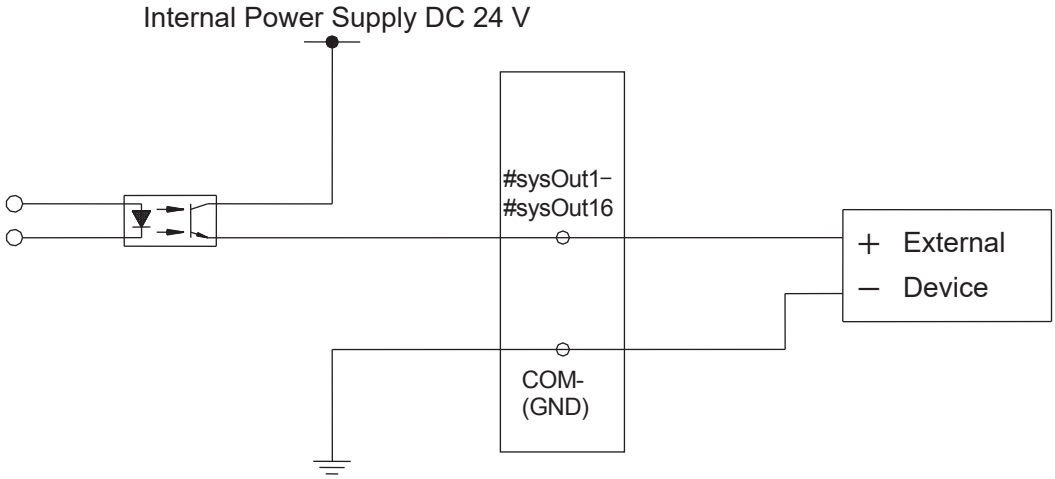
Do not assign wiring other than the wiring specified above.
Assigning the wrong wiring can damage the internal circuits.

7.9 Output Signal (PNP)

■ When using an external power supply



■ When using the internal power supply (optional)

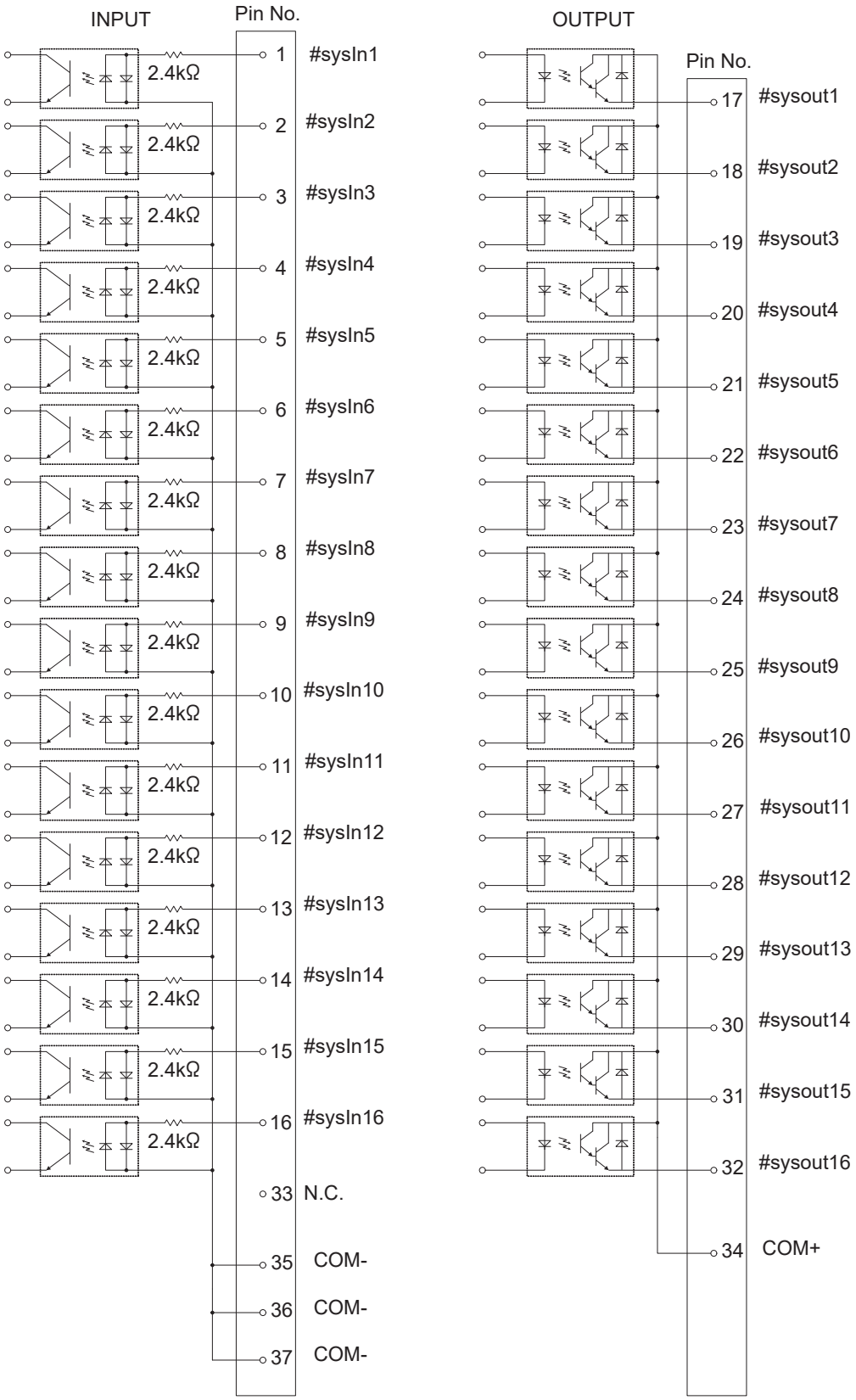


⚠ Caution

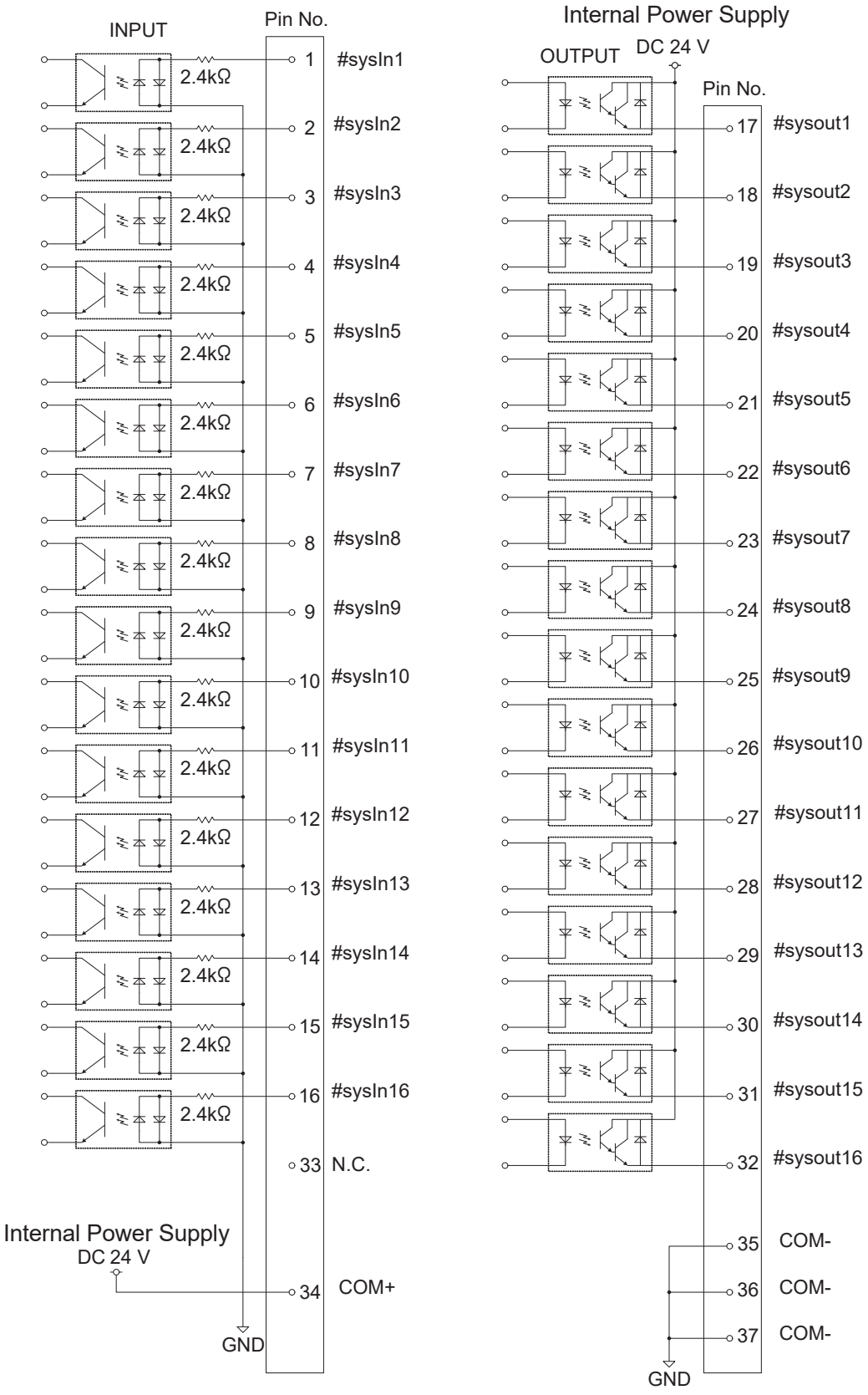
Do not assign wiring other than the wiring specified above.
Assigning the wrong wiring can damage the internal circuits.

7.10 Circuit Diagram (PNP)

■ External Power Supply Specifications



■ Internal Power Supply Specifications (optional)



8. I/O-SYS FUNCTION ASSIGNMENT

The following functions are assigned to I/O-SYS in advance:

		Name	Function	Pin No.
Input	Ext	#sysIn1	Start / Free	1
		#sysIn2	Free / (B) Start Inhibition / (B) Stop-Start Inhibition / (B) Software Interlock/(B) Urgent Stop/(A) Start Inhibition / (A) Stop-Start Inhibition / (A) Software Interlock / (A) Urgent Stop	2
		#sysIn3	Program Number Load / Free	3
		#sysIn4	Program Number 1 / Free	4
		#sysIn5	Program Number 2 / Free	5
		#sysIn6	Program Number 4 / Free	6
		#sysIn7	Program Number 8 / Free	7
		#sysIn8	Program Number 16 / Free	8
		#sysIn9	Program Number 32 / Free	9
		#sysIn10	Program Number 64 / Free	10
		#sysIn11	Last Work / Program Number 128 / Error Reset / Initialize / Free	11
		#sysIn12	Temporary Stop / Temporary Stop - Single Point Run / Program Number 256 / Free	12
		#sysIn13	Free / Program Number 512	13
		#sysIn14	Free / (A) Start Inhibition / (A) Stop-Start Inhibition / (A) Software Interlock / (A) Urgent Stop / (B) Start Inhibition / (B) Stop-Start Inhibition / (B) Software Interlock / (B) Urgent Stop	14
		#sysIn15	Free / Last Work / Error Reset	15
		#sysIn16	Free / Temporary Stop	16
Output		#sysOut1	Ready for Start / Free	17
		#sysOut2	Robot Stopped / Free	18
		#sysOut3	Program Number ACK / Free	19
		#sysOut4	Program Number Error / Free	20
		#sysOut5	Running / Free	21
		#sysOut6	Error / Free	22
		#sysOut7	Emergency Stop / Free	23
		#sysOut8	Position Error / Free	24
		#sysOut9	Free	25
		#sysOut10	Free	26
		#sysOut11	Free	27
		#sysOut12	Free / Finish Initialize	28
		#sysOut13	Free	29
		#sysOut14	Free	30
		#sysOut15	Free	31
		#sysOut16	Free	32
		N.C.	Not in use	33
Other		COM +	DC 24 V	34
		COM -	GND	35
		COM -	GND	36
		COM -	GND	37

Ext: Activated only in External Run Mode.

NOTE: A type signals use positive logic and B type signals use negative logic.

9. FIELDBUS FUNCTION ASSIGNMENT

The following input/output functions are assigned to Fieldbus in advance:

	Name		Relay Number	Function
Input	Ext	fbIn1000	1000	Start / Free
		fbIn1001	1001	Free / Start Inhibition / Stop-Start Inhibition / Software Interlock / Urgent Stop
		fbIn1002	1002	Program Number Load / Free
		fbIn1003	1003	Free
		fbIn1004	1004	Free
		fbIn1005	1005	Free
		fbIn1006	1006	Free
		fbIn1007	1007	Free
		fbIn1008	1008	Free
		fbIn1009	1009	Free
		fbIn100A	100A	Last Work / Error Reset/Initialize / Free
		fbIn100B	100B	Temporary Stop/ Temporary Stop - Single Point Run/Free
		fbIn100C	100C	Free
		fbIn100D	100D	Free / Start Inhibition / Stop-Start Inhibition / Software Interlock / Urgent Stop
		fbIn100E	100E	Free
		fbIn100F	100F	Free
		fbIn101	1010-101F	Program Number (word) / Free
Output		fbOut1800	1800	Ready For Start / Free
		fbOut1801	1801	Robot Stopped / Free
		fbOut1802	1802	Program Number ACK / Free
		fbOut1803	1803	Program Number Error / Free
		fbOut1804	1804	Running / Free
		fbOut1805	1805	Error / Free
		fbOut1806	1806	Emergency Stop / Free
		fbOut1807	1807	Position Error / Free
		fbOut1808	1808	Free
		fbOut1809	1809	Free
		fbOut180A	180A	Free
		fbOut180B	180B	Free / Finish Initialize
		fbOut180C	180C	Free
		fbOut180D	180D	Free
		fbOut180E	180E	Free
		fbOut180F	180F	Free

Ext: Activated only in External Run Mode.

10. I/O-1

I/O-1 is controlled by point jobs/PLC programs.

10.1 Connector

There are two types of I/O polarity: NPN specifications and PNP specifications. After confirming your robot's polarity specifications, always connect tools, etc., which are compatible with these specifications.

■ I/O Polarity

If you are connecting external devices, make sure they are compatible with your robot's I/O polarity. The robot's I/O polarity can be confirmed on the I/O nameplate. Refer to "3.1 I/O Polarity."

■ I/O Power Supply Indication

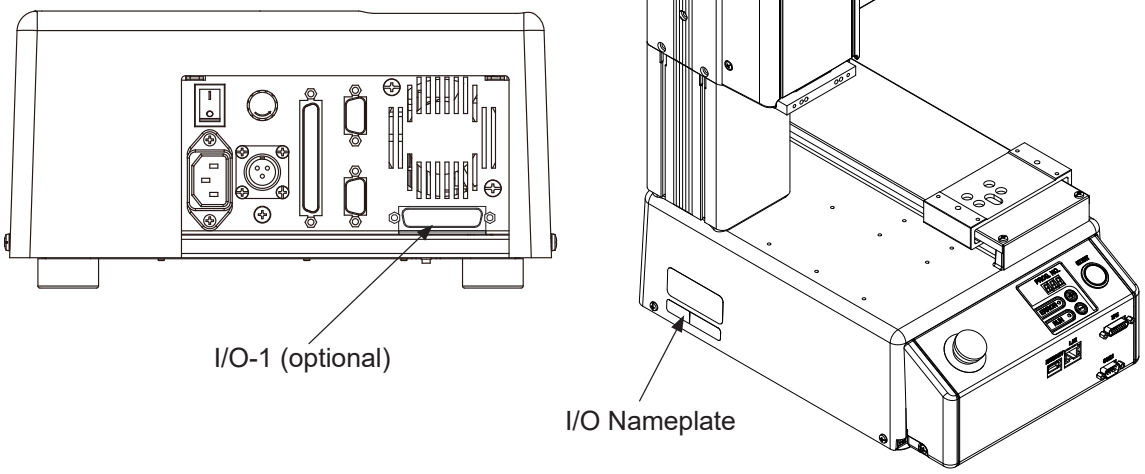
- External
  The power supply (DC 24 V) for a device connected to the I/O-1 is supplied externally. Prepare a separate I/O power supply.
- Internal
  The power supply (DC 24 V) for a device connected to the I/O-1 is output from the I/O-1 connector.

NOTE:

- I/O power supply type (External/Internal) is selected when you purchase the robot and cannot be changed after doing so.
- If you are using the JR3200 equipped with I/O-MT, you cannot use I/O-1.

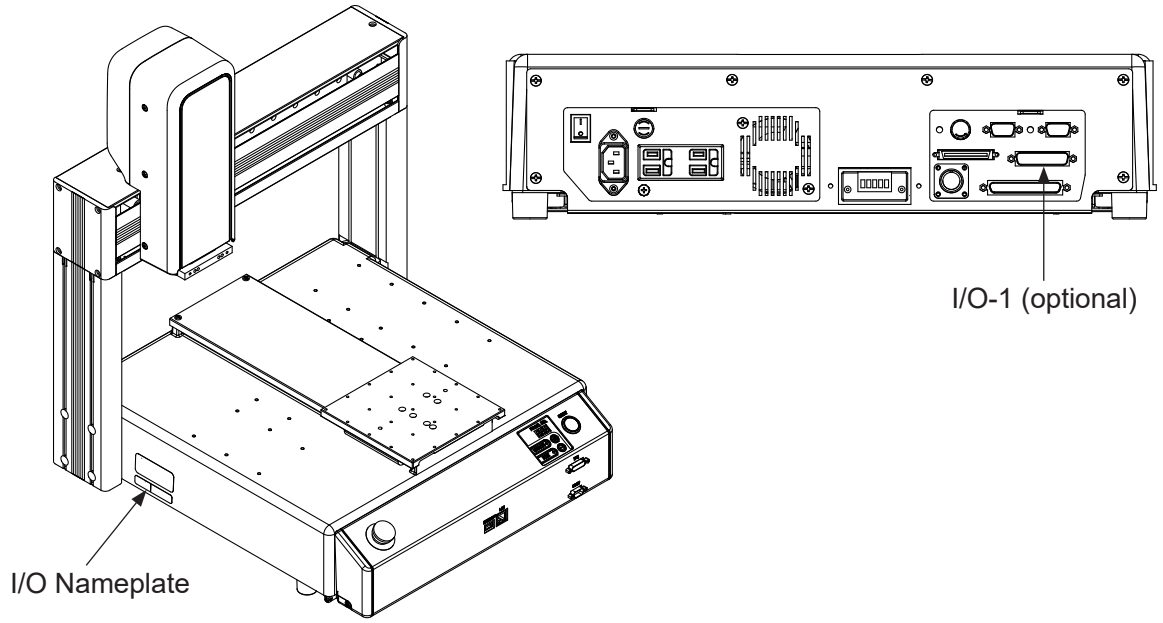
JR3200 Series

Example: JR3203N-AC



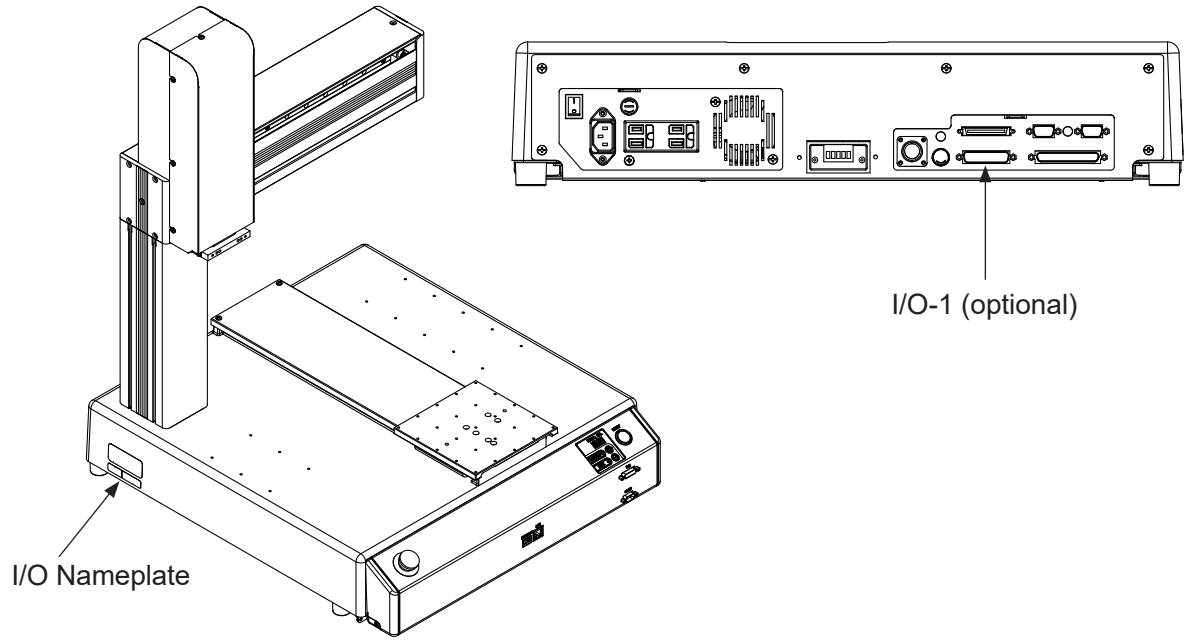
JR3300 Series

Example: JR3303N-AJ

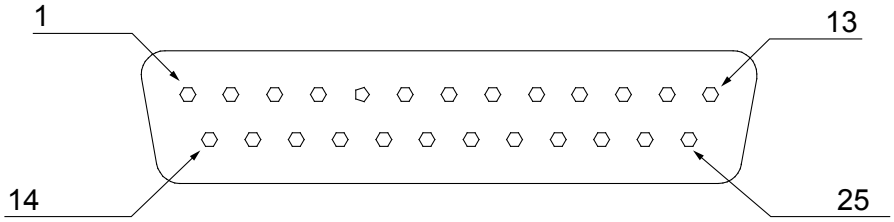


JR3400 – JR3600 Series

Example: JR3403N-AJ



10.2 Pin No. (Robot Side)



NOTE: When connecting an external device, make sure it is compatible with the robot's I/O polarity. The robot's I/O polarity can be confirmed on the I/O nameplate. Refer to "3.1 I/O Polarity."

10.3 Function Assignment List

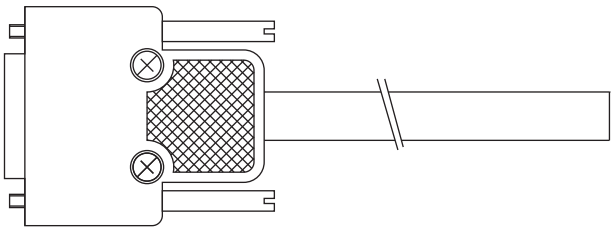
	Name	Function	Pin No.
Input	#genIn1	Free	1
	#genIn2	Free	2
	#genIn3	Free	3
	#genIn4	Free	4
	#genIn5	Free	5
	#genIn6	Free	6
	#genIn7	Free	7
	#genIn8	Free	8
Output	#genOut1	Free	9, 10
	#genOut2	Free	11, 12
	#genOut3	Free	13, 14
	#genOut4	Free	15, 16
	#genOut5	Free	17
	#genOut6	Free	18
	#genOut7	Free	19
	#genOut8	Free	20
Others	COM+	DC 24 V Power Supply	21
	COM+	DC 24 V Power Supply	22
	COM-	GND	23
	COM-	GND	24

10.4 I/O2 Cord (Unit)

■ I/O2 Cord (Unit) (optional)

NOTE: The part number varies according to the cable length.

Cable Length [m]	Janome Part No.
2	982544013
3	982544312
5	982544415



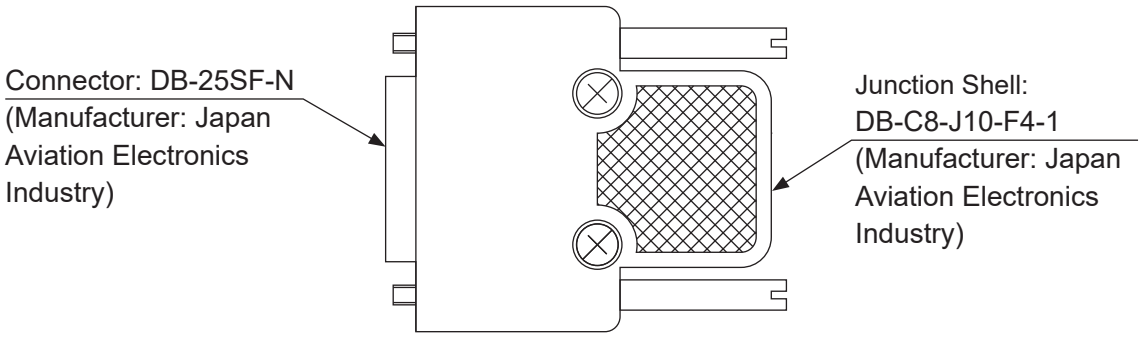
Cable Wiring

Pin No.	Insulator Color	Mark Color	Number of Marks
1	Blue		
2	Orange		
3	Green		
4	Brown		
5	Gray		
6	Red		
7	Black		
8	Yellow		
9	Pink		
10	Purple		
11	White		
12	Blue	Red	1
13	Orange	White	1

Pin No.	Insulator Color	Mark Color	Number of Marks
14	Green	White	1
15	Brown	White	1
16	Gray	White	1
17	Red	White	1
18	Black	White	1
19	Yellow	Black	1
20	Pink	Black	1
21	Purple	White	1
22	White	Blue	1
23	Blue	Red	2
24	Orange	White	2
25	No connection		

■ Connector (Unit) (I/O2) (optional)

Janome part No.: 961513007



10.5 Power Supply Capacity

⚠ Caution

Adhere to the rated amperage outlined in the table below. If you exceed the values listed below, the internal circuits may be damaged.

Use the following capacities for both the internal and external power supplies:

		Type	Output/Input Rated Value
Output Pins	I/O-1 (#genOut1 − #genOut4)	Relay	DC 30 V, 1 A/pin
	I/O-1(#genOut5 − #genOut8)	Photocoupler	DC 24 V, 100 mA/pin
Input Pins		Photocoupler	DC 24 V, 10 mA/pin

I/O-1 (#genOut1 – #genOut4) are relay outputs (no-voltage contact output).
If using an external power supply (DC 24 V), prepare on the user's end.
If using an internal power supply, use a power capacity no higher than the following:
DC 24 V, 1.6 A (I/O-SYS + I/O-1 composite total)

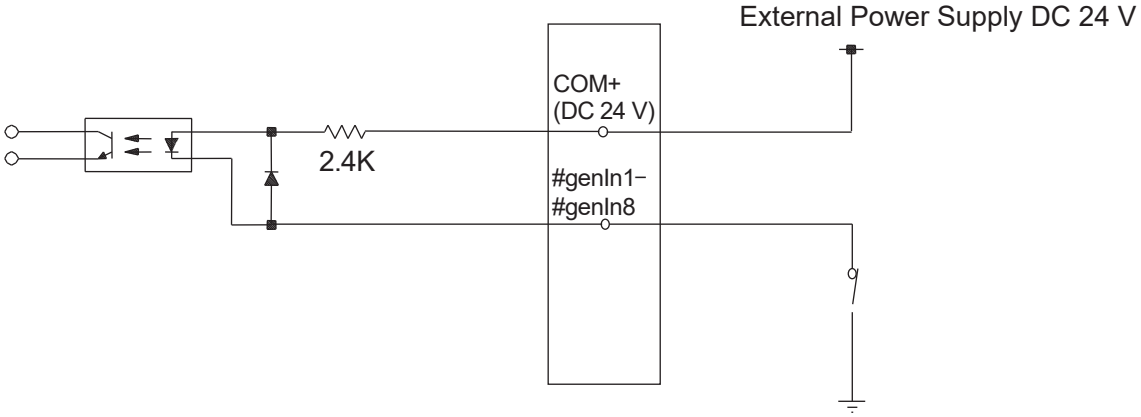
NOTE: The capacity of the internal power supply fuses is 1.6 A. If you use and exceed 1.6 A, the fuses will blow. If a fuse blows, refer to "5. REPLACING FUSES" in the operation manual *Maintenance*.

10.6 Input Signal (NPN)

■ When using an external power supply

Input signals are treated as active when the photocoupler is ON.

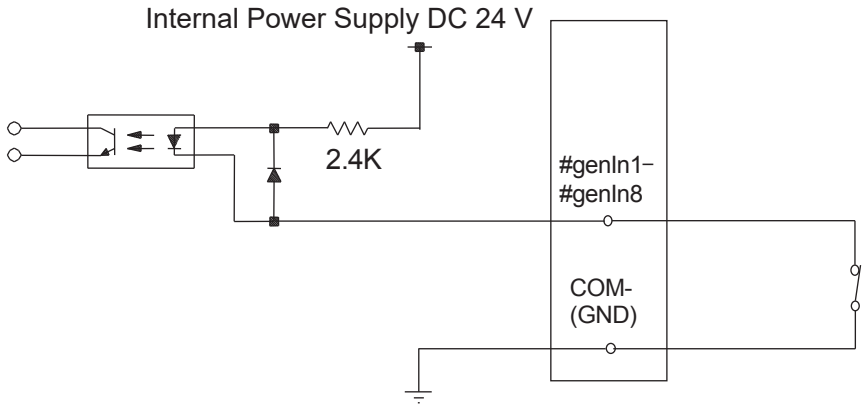
When using an external power supply, the input signals become active when the input pin and the external power supply ground are ON.



■ When using an internal power supply (optional)

Input signals are treated as active when the photocoupler is ON.

Using an internal power supply, the input signals become active when the input pin and the COM- pin are shorted.



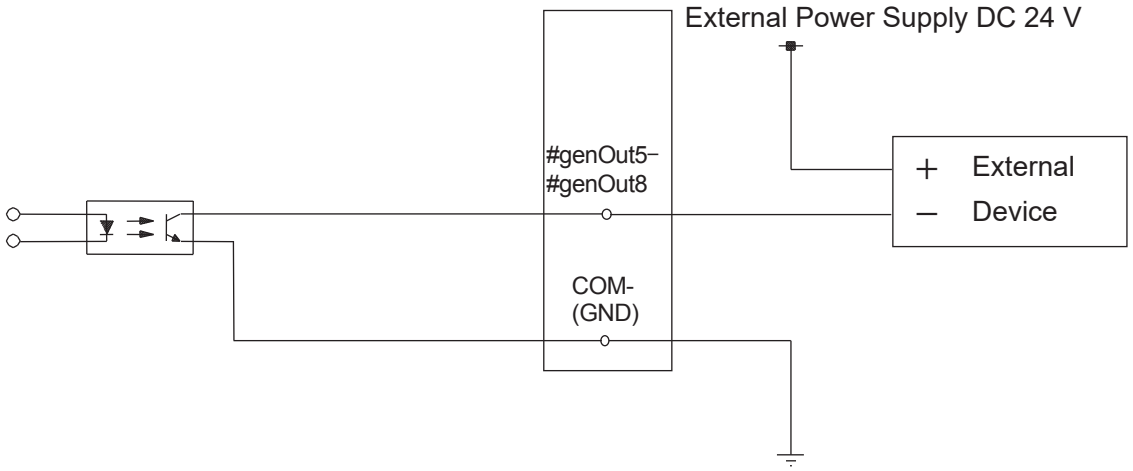
If connecting a two-wire external device, such as a sensor, use one which has a leakage current of no more than 0.3 mA. If you use a device with a leakage current of more than 0.3 mA, it may not turn OFF.

⚠ Caution

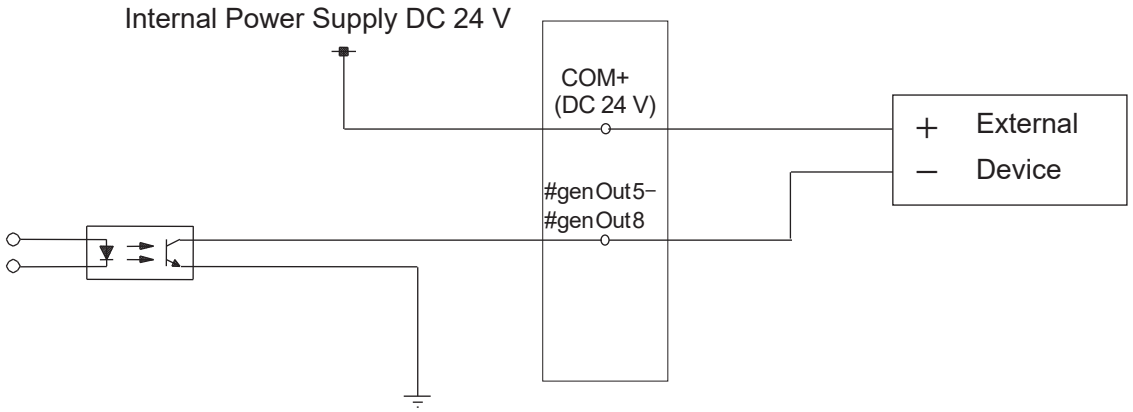
Do not assign wiring other than the wiring specified above.
Assigning the wrong wiring can damage the internal circuits.

10.7 Output Signal (NPN)

■ When using an external power supply



■ When using an internal power supply (optional)

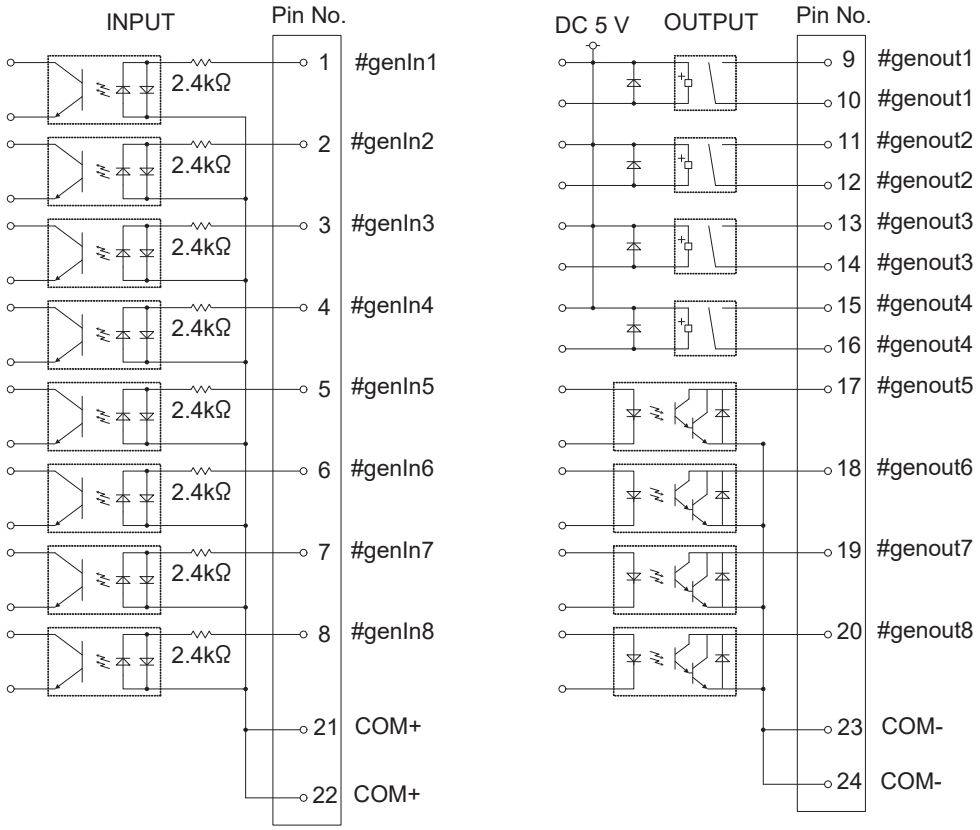


⚠ Caution

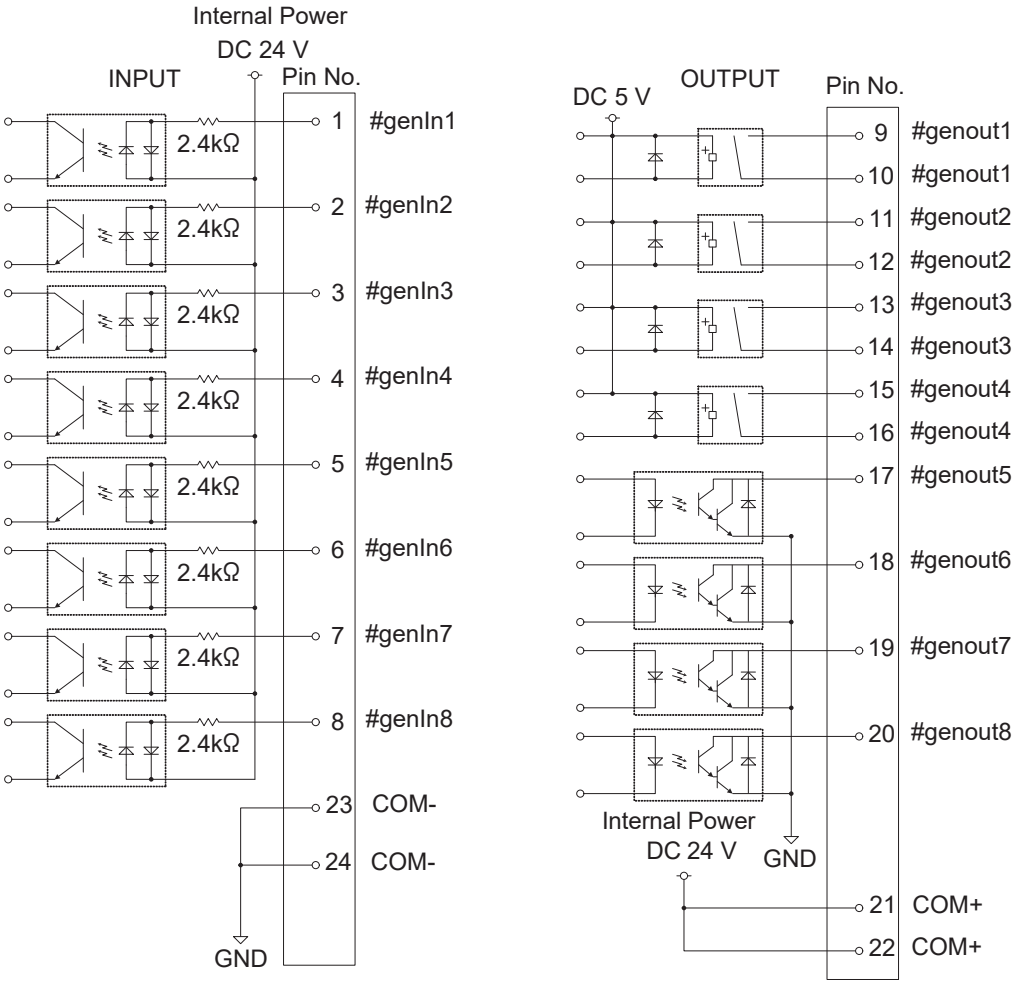
Do not assign wiring other than the wiring specified above.
Assigning the wrong wiring can damage the internal circuits.

10.8 Circuit Diagram (NPN)

■ External Power Supply Specifications



■ Internal Power Supply Specifications (optional)

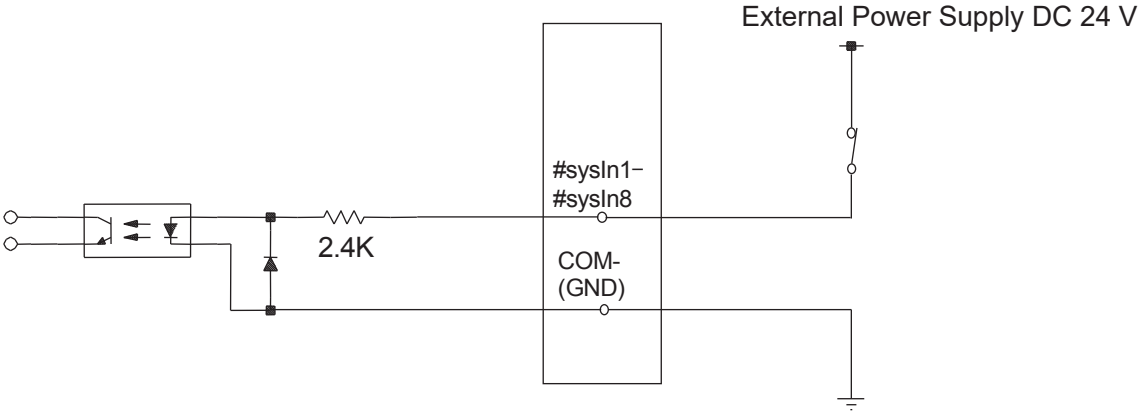


10.9 Input Signal (PNP)

■ When using an external power supply

Input signals are treated as active when the photocoupler is ON.

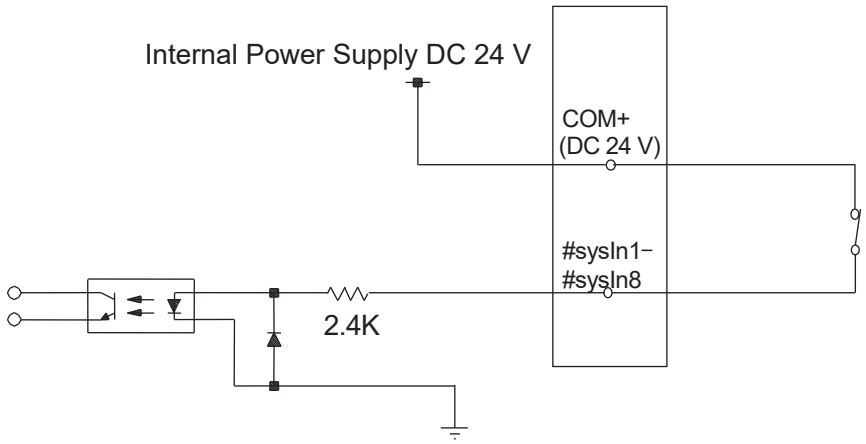
When using an external power supply, the input signals become active when the input pin and the external power supply are ON.



■ When using an internal power supply (optional)

Input signals are treated as active when the photocoupler is ON.

When using an internal power supply, the input signals become active when the input pin and the COM+ come ON.



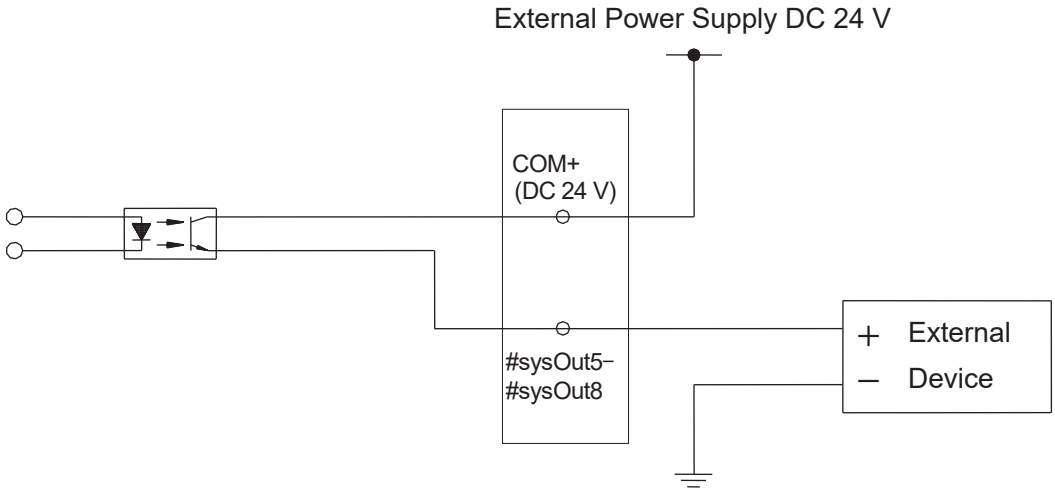
If connecting a two-wire external device, such as a sensor, use one which has a leakage current of no more than 0.3 mA. If you use a device with a leakage current of more than 0.3 mA, it may not turn OFF.

⚠ Caution

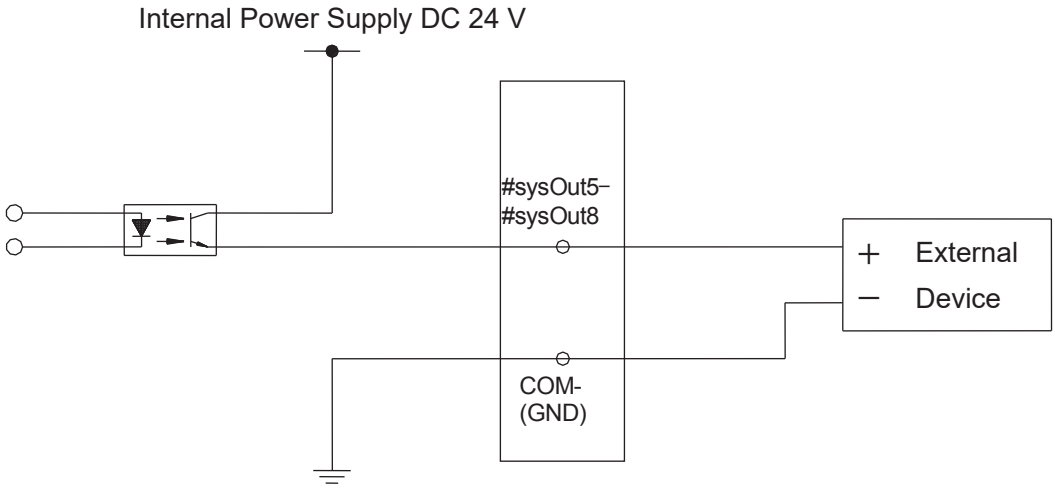
Do not assign wiring other than the wiring specified above.
Assigning the wrong wiring can damage the internal circuits.

10.10 Output Signal (PNP)

■ When using an external power supply



■ When using the internal power supply (optional)

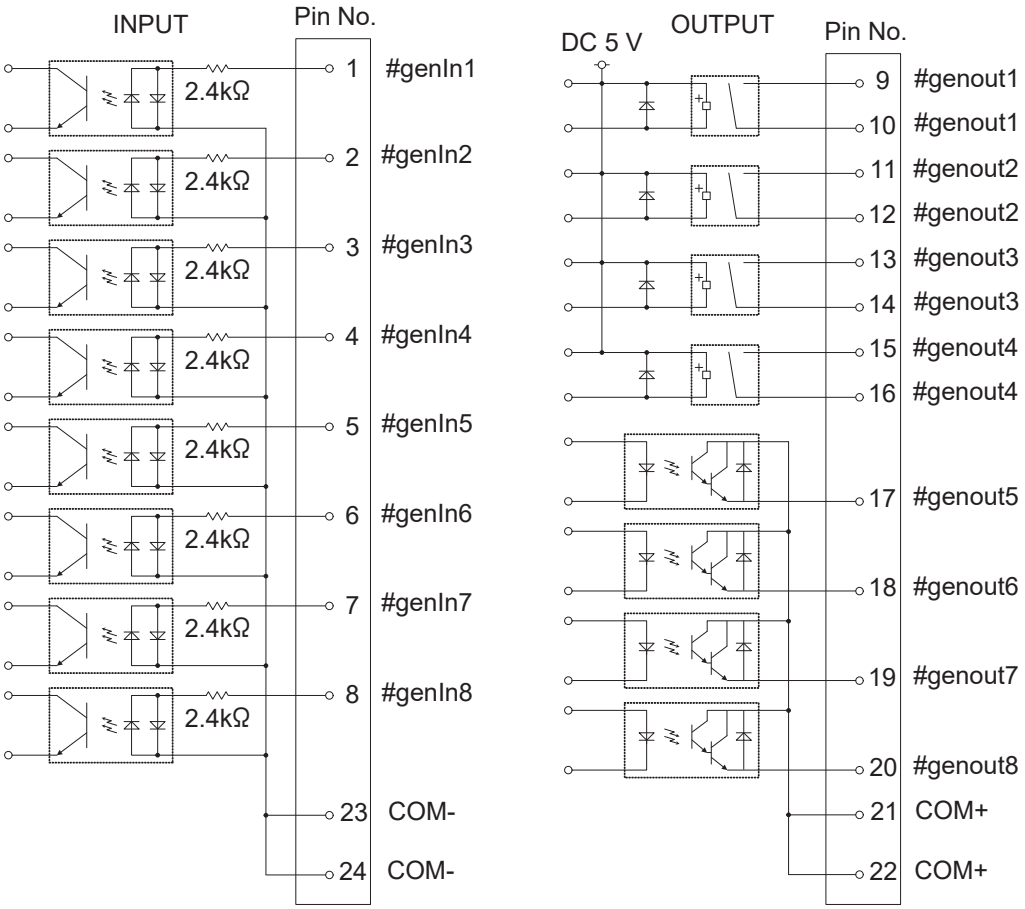


⚠ Caution

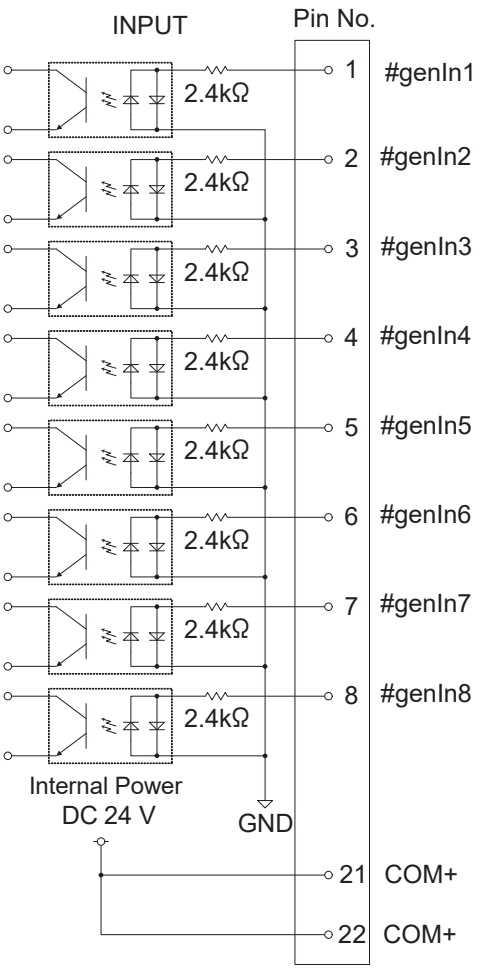
Do not assign wiring other than the wiring specified above.
Assigning the wrong wiring can damage the internal circuits.

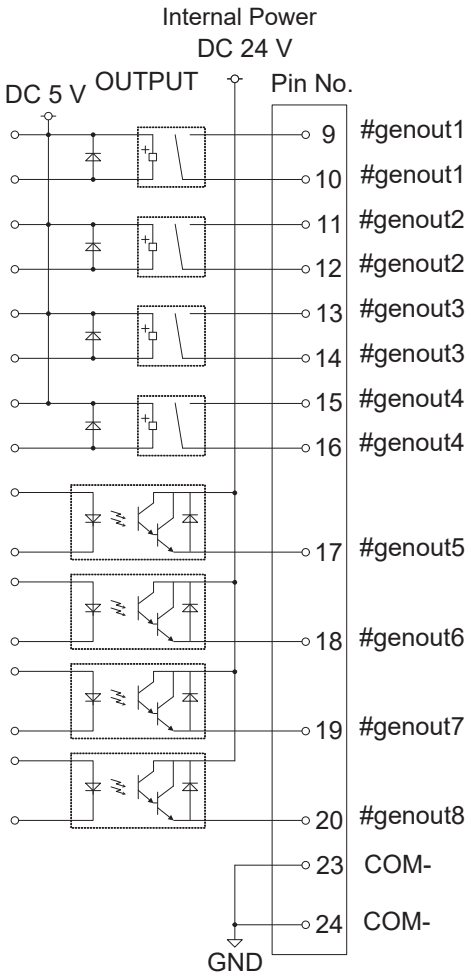
10.11 Circuit Diagram (PNP)

■ External Power Supply Specifications



■ Internal Power Supply Specifications (optional)



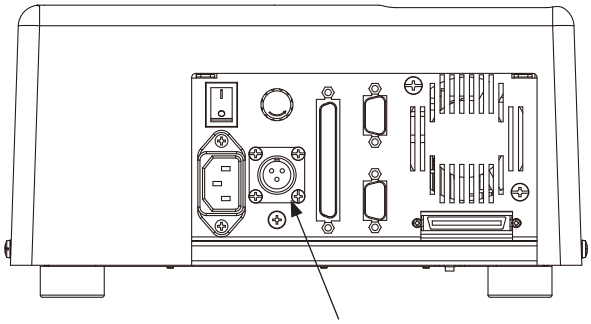


11. I/O-S

11.1 Connector

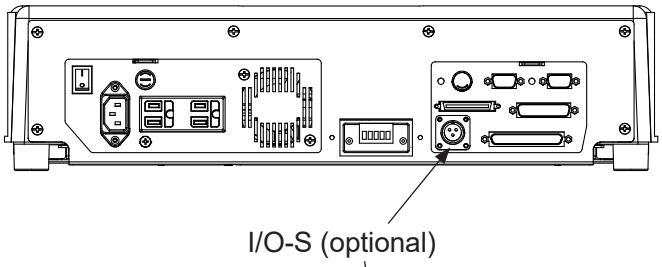
JR3200 Series

Example: JR3203N-AC/BC/CC



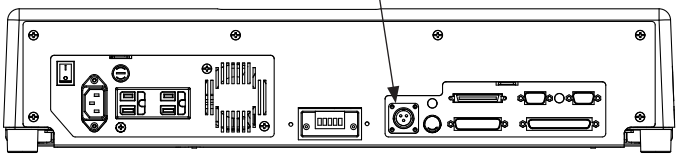
JR3300 Series

Example: JR3303N-AJ/BJ/CJ

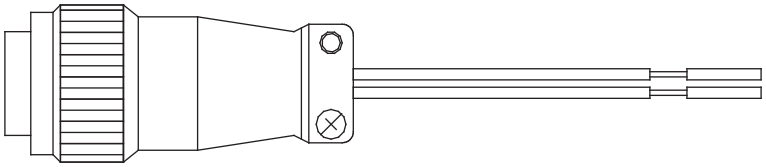


JR3400 – JR3600 Series

Example: JR3403N-AJ/BJ/CJ



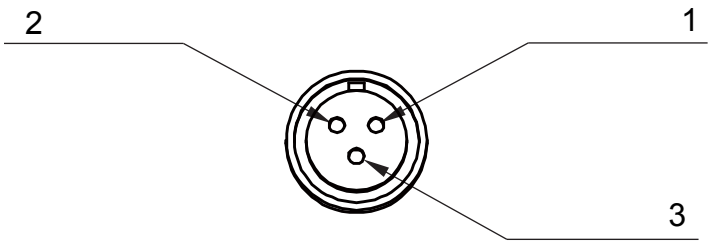
The I/O-S connector attachment is for connecting a safety device, such as an area sensor, to the robot. Correctly connect the lead wires from the safety device to the I/O-S connector.
For further information, refer to “11.3 Safety Device” and the safety device’s instruction manual.



Connector type: SRCN6A13-3P (Manufacturer: Japan Aviation Electronics Industry)

NOTE: If you are not connecting a safety device, connect the I/O-S connector with the two lead wires short-circuited.

11.2 Pin No. (Robot Side)



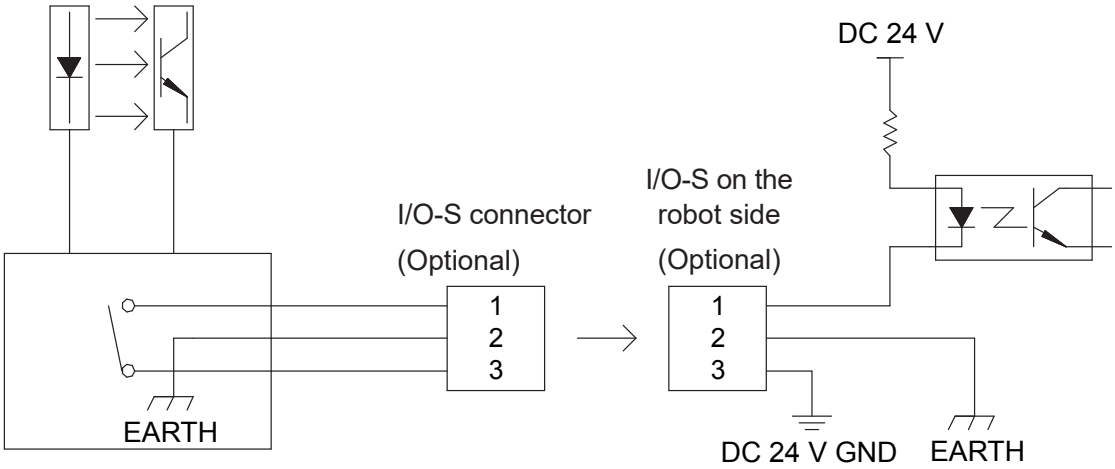
⚠ Caution

A person entering the operating range of the robot may be injured.
If necessary, install an area sensor, etc., interlock using the I/O-S connector and maintain safety precautions at all times.

11.3 Safety Device

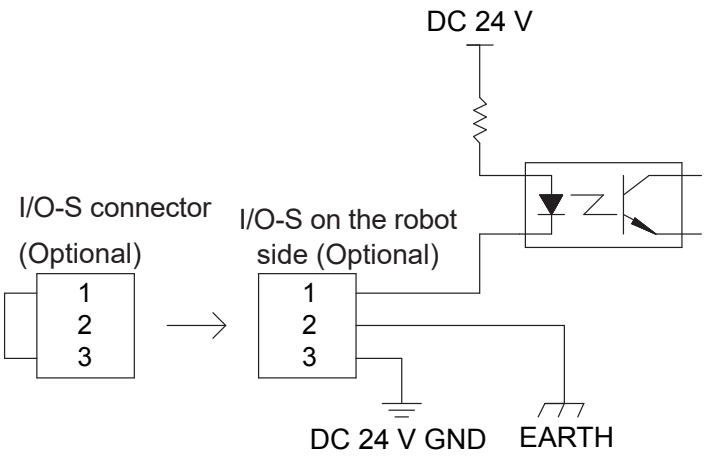
With this desktop robot the end user can connect a safety device such as an area sensor or door switch, etc., when there is a risk of danger due to some part of the body entering the robot's work area.
I/O-S is an interface for connecting such a safety device. If you want to connect a safety device, do so as shown in the diagram below, and perform the risk assessment on your side. A stop performed via a safety device connected to the robot is classified as an emergency stop category 2.

■ When setting up a safety device (Example: Area Sensor)
Connect the safety device to the robot with the I/O-S connector by attaching the lead wires properly to the corresponding terminals of the I/O-S connector. For further information, refer to "11.2 Pin No. (Robot Side)" and the safety device's instruction manual.



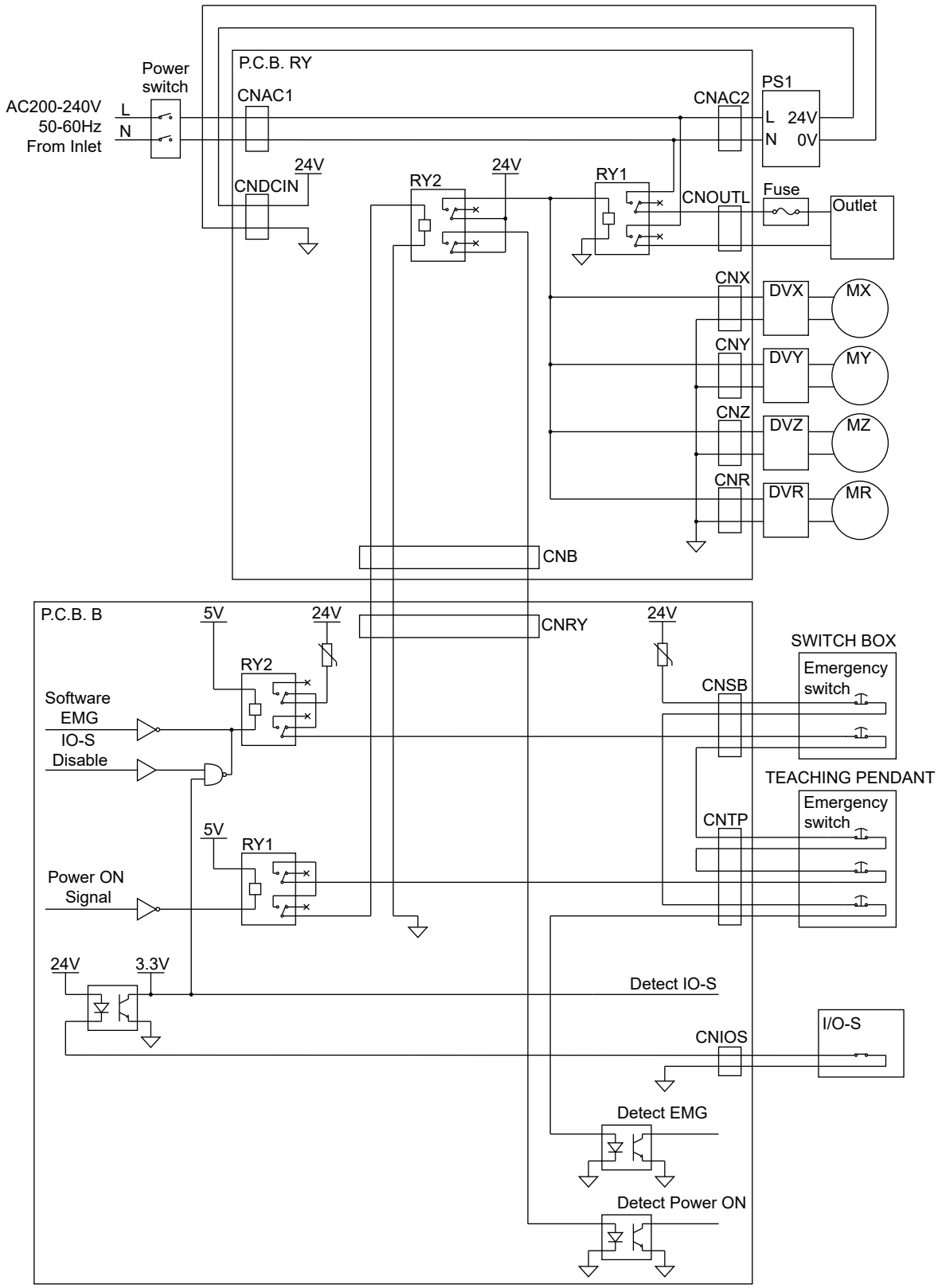
Connector type
SRCN6A13-3P (Manufacturer: Japan Aviation Electronics Industry)
NOTE: For the configuration of the internal safety circuit, refer to "Safety Circuit" on the next page.

■ When not connecting a safety device
Connect the I/O-S connector with the two lead wires short-circuited.



Connector type:
SRCN6A13-3P (Manufacturer: Japan Aviation Electronics Industry)

■ Safety Circuit



12. FIELDBUS

Fieldbus is an optional function for the JR3000 Series. (Not compatible with JR3000F models) The compatible Fieldbus module types are DeviceNet, PROFIBUS, CC-Link, CANopen, PROFINET, and EtherNet/IP. Make sure you make the Fieldbus settings correctly because the connector shape and settable items differ according to the Fieldbus module type.

⚠ Danger

Before connecting a Fieldbus, make sure safety can be maintained at all times when the robot is run. If signals such as a start signal etc., are assigned to the Fieldbus, the Fieldbus may standby waiting to send signals and cause the robot to start running directly after it is connected. Improper countermeasures for this can cause injury or unit breakdown.

⚠ Caution

When you want to communicate using the Fieldbus, turn ON the power to the PLC you are pairing with before turning ON the power to the robot. If power to the robot is turned ON first, internal processing of the communication module cannot be made and communication cannot commence.

If using DeviceNet or CC-Link, attach the included FB cover with the two M4 screws included to prevent damage from static electricity. For further information, refer to “2.6 Cable Connection” in the operation manual *Setup*.

The Fieldbus I/O memory address is as follows:

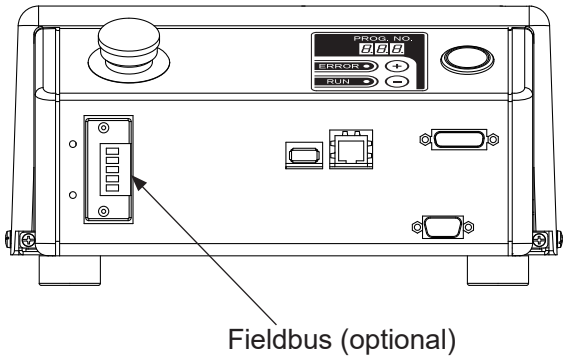
Name	No. of I/O	Relay No. (hex)	Register No. (hex)	Details
Fieldbus (Input)	2048	1000 – 17FF	100 – 17F	Domain for Fieldbus input
Fieldbus (Output)	2048	1800 – 17FF	180 – 1FF	Domain for Fieldbus output

NOTE:

- Fieldbus (input): external device writes (PLC) / robot reads
- Fieldbus (output): external device reads (PLC) / robot writes

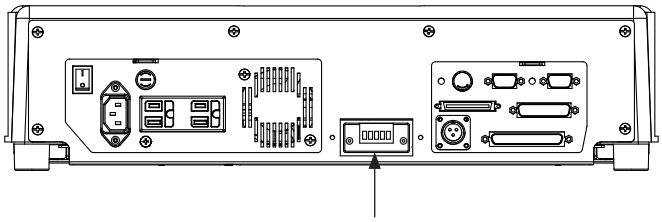
JR3200 Series

Example: JR3203N-AC



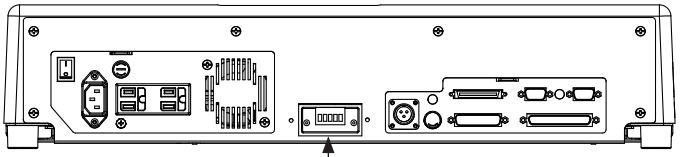
JR3300 Series

Example: JR3303N-AJ/BJ/CJ



JR3400 – JR3600 Series

Example: JR3403N-AJ/BJ/CJ



12.1 Fieldbus Settings

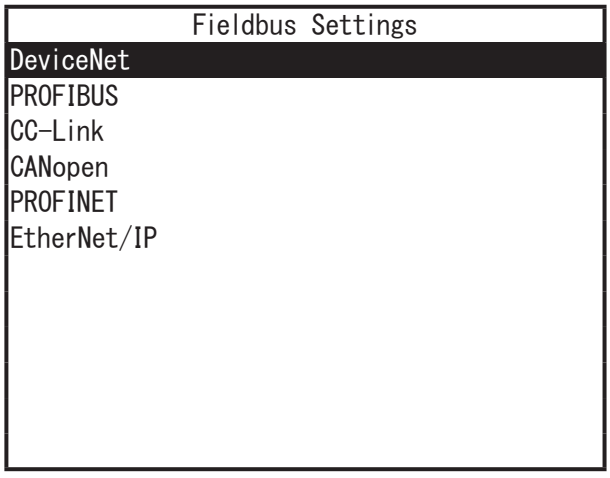
⚠ Danger

Before connecting a Fieldbus, make sure safety can be maintained at all times when the robot is run. If signals such as a start signal etc., are assigned to the Fieldbus, the Fieldbus may standby waiting to send signals and cause the robot to start running directly after it is connected. Improper countermeasures for this can cause injury or unit breakdown.

To set up the Fieldbus module type, use the teaching pendant to perform the procedure below, and select the module you want to set up.
Refer to the module's methods of setup for further details regarding each of the items for setup for the Fieldbus module. You can set up the Fieldbus module you want to use without attaching it to the robot; however, it will not function properly so do not set it up when it is not attached.

TP MODE [Administration]
[Administration Settings]
[Fieldbus Settings]

PC [Robot] → [Administration] → [Administration Settings] → [Fieldbus Settings]

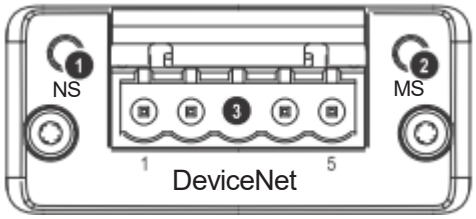


12.2 DeviceNet

12.2.1 Connector Diagram

This module has two status LEDs and one DeviceNet connector.

#	Name
1	Network Status (NS) (LED)
2	Module Status (MS) (LED)
3	DeviceNet Connector



12.2.2 Network Status

Status	Details
OFF	Offline or not supplied with power
Green LED	Online, communication connection complete
Green LED blinking (1Hz)	Online, communication connection incomplete
Red LED	Not able to communicate
Red LED blinking (1Hz)	Communication timeout
Red and green LEDs alternating	Self-test

12.2.3 Module Status

Status	Details
OFF	Not supplied with power
Green LED	Communicating normally
Green LED blinking (1Hz)	Settings are incorrect
Red LED	Fatal malfunction
RED LED blinking (1Hz)	Malfunction; restoration possible. May be possible to restore with re-setup.
Red and green LEDs alternating	Self-test

12.2.4 Connector Pin Assignment

Pin No.	Name	Function
1	V-	Bus power ground
2	CAN_L	Communication data Low (CAN busline L)
3	SHIELD	Shield ground
4	CAN_H	Communication data High (CAN busline H)
5	V+	Bus power (DC 24 V)

• Connector

Manufacturer: Phoenix Contact

Model Name: TMSTBP 2.5/5-ST5.08

NOTE: Connector is included. Prepare the cable yourself.

■ EDS File

EDS files include the device characteristics and configuration options. Download the EDS file to the master unit as required.

Download the latest EDS file from the website of HMS Industrial Networks (Anybus CompactCom manufacturer).

The EDS file identification number for this module is as follows:

Name	File Name
DeviceNet Setting File	ABCC_DEC_V_2_3_JMxxxxxx.EDS

NOTE: The numbers are entered in the “x” of the file name.

12.2.5 Settings

Settable Items	Setting/Selection Range	Function
Read Domain Word Count	0 – 127	Word number input is the amount of data input (external PLC writes/sends, robot reads/receives). Set the necessary amount of data in words (1 word is 2 bytes). For DeviceNet, you can set up to 127 words. As the amount of data increases, so does the amount of time to transfer data, worsening the responsiveness.
Write Domain Word Count	0 – 127	Word number output is the amount of data output (robot writes/sends, external PLC reads/receives). Set the necessary amount of data in words (1 word is 2 bytes). You can set a maximum up to 127 words. As the amount of data increases, so does the amount of time to transfer data, worsening the responsiveness.
Station Number	0 – 63	You can set station numbers 0 – 63. The DeviceNet slave is distinguished by its station number. If you are connecting multiple slaves, choose and set available station numbers.
Transmission Speed	Auto/125/250/500 kbps	You can select and set the transmission from 4 settings: Auto/125kbps/250kbps/500kbps. Set the transmission speed to match the speed used by the network. If you select Auto, the transmission speed is automatically set to match the transmission speed of the mask.

NOTE:

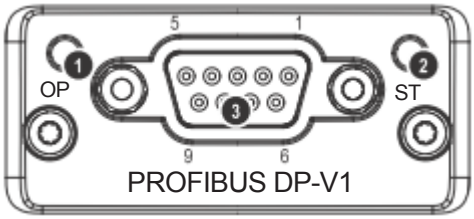
- The communication format is DeviceNet slave.
- The number of possible connections generated is 1.
- The type of possible connection generated is polling.

12.3 PROFIBUS

12.3.1 Connector Diagram

This module has two status LEDs and one PROFIBUS connector.

#	Name
1	Operation Mode (OP) (LED)
2	Status (ST) (LED)
3	PROFIBUS Connector



PROFIBUS DP-V1

12.3.2 Operation Mode (OP) / Status (ST)

By looking at the Operation Mode (OP) and Status (ST) LED combinations you can confirm the following statuses:

Data exchange	Status	PROFIBUS Module Front LED	
		OP	ST
Yes	Normal	ON (green)	ON (green)
No	Station number disagreement	OFF	ON (green)
No	Master/Slave address duplication	OFF	ON (green)
No	Input/output word number disagreement	Blinking (red)	ON (green)

12.3.3 Connector Pin Assignment

Pin No.	Name	Function
1	NC	Not connected
2	NC	Not connected
3	B Line	RS485 RxD/TxD (+)
4	RTS	Transmission request
5	GND Bus	Bus ground
6	5 V Bus Output	5 V bus power output
7	NC	Not connected
8	A Line	RS485 RxD/TxD (-)
9	NC	Not connected
Housing	Cable Shield	Shield ground

NOTE: When setting a PROFIBUS unit, you need to make settings according to the specified format otherwise you cannot establish a connection. Enter the data in order of Output-Input for the connection data range settings and assign the data in one word units.

⚠ Danger

Before connecting a Fieldbus, make sure safety can be maintained at all times when the robot is run. If signals such as a start signal etc., are assigned to the Fieldbus, the Fieldbus may standby waiting to send signals and cause the robot to start running directly after it is connected. Improper countermeasures for this can cause injury or unit breakdown.

■ GSD File

GSD files are files which include the device characteristics and configuration options.

Download the GSD file to the master unit as required.

Download the latest GSD file from the website of HMS Industrial Networks (Anybus CompactCom manufacturer).

The GSD file identification number for this module is as follows:

Name	File Name
PROFIBUS Setting File	xxxxxx.gsd

NOTE: The numbers are entered in the “x” of the file name.

12.3.4 Settings

Settable Items	Setting/Selection Range	Function
Read Domain Word Count	Matchup input and output 0 – 64	Word number input is the amount of data input (external PLC writes/sends, robot reads/receives). Set the necessary amount of data in words (1 word is 2 bytes). For PROFIBUS, you can set up to 64 words. As the amount of data increases, so does the amount of time to transfer data, worsening the responsiveness.
Write Domain Word Count	Matchup input and output 0 – 64	Word number output is the amount of data output (robot writes/sends, external PLC reads/receives). Set the necessary amount of data in words (1 word is 2 bytes). For PROFIBUS, you can set a maximum up to 64 words. As the amount of data increases, so does the amount of time to transfer data, worsening the responsiveness.
Station Number	0 – 125	You can set station numbers 0 – 125. The PROFIBUS slave is distinguished by its station number. If you are connecting multiple slaves, choose and set available station numbers.

NOTE:

- The communication format is PROFIBUS-DP slave.
- The number of occupied nodes is 1.
- The connection speed is set automatically from the master.

12.3.5 PROFIBUS Master (PLC) Settings

When setting up the slave (robot) configuration for the PROFIBUS master (PLC), fulfill the following conditions:

1. Set the input and output in “1 word” units.
2. Set the data in the sequence, output → input.

■ Example of settings on the master side:

1 word unit

Output 1 - 1 word
Output 2 - 1 word
...
Output 32 - 1 word

} Set the output first

Input 1 - 1 word
Input 2 - 1 word
...
Input 32 - 1 word

} Set the input afterwards

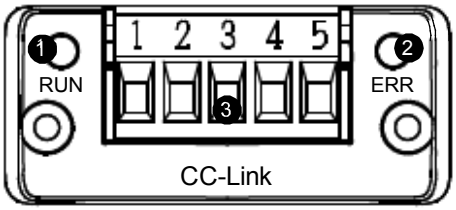
NOTE: Any other conditions will cause a configuration error and data conversion will not function.

12.4 CC-Link

12.4.1 Connector Diagram

This module has two status LEDs and one CC-Link connector.

#	Name
1	Run (RUN) (LED)
2	Error (ERR) (LED)
3	CC-Link Connector



12.4.2 Run (RUN) / Error (ERR)

By looking at the Run (RUN) and Error (ERR) LED combinations you can confirm the following statuses:

	Configuration Settings (Master/Slave Value Settings)		CC-Link Module Front LED	
Data exchange	Stations Occupied	Expansion Cyclic Setting	RUN	ERR
Yes	Agreement	Agreement	ON	OFF
No	Agreement	Disagreement	ON	OFF
No	Disagreement	Agreement	OFF	OFF
No	Disagreement	Disagreement	OFF	OFF

12.4.3 Connector Pin Assignment

Pin No.	Name	Function
1	DA	RS485 RxD/TxD (+)
2	DB	RS485 RxD/TxD (-)
3	DG	Signal ground
4	SLD	Shield ground
5	FG	Frame ground

NOTE:

- CC-Link is a remote device station.
- The last word of the output word area is used by the system area and therefore use is prohibited.
- Before connecting to CC-Link, always make sure that the highest controller (master unit) is useable.

⚠ Danger

Before connecting a Fieldbus, make sure safety can be maintained at all times when the robot is run. If signals such as a start signal etc., are assigned to the Fieldbus, the Fieldbus may standby waiting to send signals and cause the robot to start running directly after it is connected. Improper countermeasures for this can cause injury or unit breakdown.

■ CSP File

CSP files are files which include the device characteristics and configuration options.

Download the CSP file to the master unit as required.

Download the latest CSP file from the website of HMS Industrial Networks (Anybus CompactCom manufacturer).

The CSP file identification number for this module is as follows:

Name	File Name
CC-Link Setting File	HMS-ABCC_CCL_(n)_JMxxxxxx.csp

NOTE:

- The numbers are entered in the “x” of the file name.
- (n): The numbers (1 – 4) are entered.

There is a CSP file for each of the stations (1 – 4) used

- Setting Example

  When the occupied station number is set to 4:

  Slave (JR3000) side: occupied station number setting = **4**

  Match the occupied station

  CSP file downloaded to master unit: HMS-ABCC-CCL**4**.csp

12.4.4 Settings

Settable Items	Setting/Selection Range	Function
Station Number	1 − 64	You can set station numbers 1 – 64. The CC-Link remote device station is distinguished by its station number. If you are connecting multiple slaves, choose and set available station numbers.
Transmission Speed Specification	156 kbps 625 kbps 2.5 Mbps 5 Mbps 10 Mbps	If you increase the transmission speed, the transfer distance is shortened. 156 kbps 1200 m 625 kbps 900 m 2.5 Mbps 400 m 5 Mbps 160 m 10 Mbps 100 m
Version Number	1 2	Compatible with two CC-Link versions: Ver.1 and Ver.2.
Stations Occupied/Expansion Cyclic Settings	1 Station Occupied / Expansion Cyclic Setting x1 2 Stations Occupied / Expansion Cyclic Setting x1 3 Stations Occupied / Expansion Cyclic Setting x1 4 Stations Occupied / Expansion Cyclic Setting x1 1 Station Occupied / Expansion Cyclic Setting x2 2 Stations Occupied / Expansion Cyclic Setting x2 1 Station Occupied / Expansion Cyclic Setting x4 1 Station Occupied / Expansion Cyclic Setting x8	Word number input and word number output are decided the same as the tables below depending on the settings for the occupied stations and the expansion cyclic settings. Expansion cyclic settings 2, 4, 8 are only compatible with Ver. 2.

1 Station Occupied/Expansion Cyclic Setting x1

	Number	Register Number	Relay Number
Data Input	4	100 – 103	−
I/O Input	16	−	1400 – 140F
Data Output	3	180 – 182	−
I/O Output	16	−	1C00 – 1C0F

2 Stations Occupied/Expansion Cyclic Setting x1

	Number	Register Number	Relay Number
Data Input	8	100 – 107	–
I/O Input	32	–	1400 – 141F
Data Output	7	180 – 186	–
I/O Output	32	–	1C00 – 1C1F

3 Stations Occupied/Expansion Cyclic Setting x1

	Number	Register Number	Relay Number
Data Input	12	100 – 10B	–
I/O Input	48	–	1400 – 142F
Data Output	11	180 – 18A	–
I/O Output	48	–	1C00 – 1C2F

4 Stations Occupied/Expansion Cyclic Setting x1

	Number	Register Number	Relay Number
Data Input	16	100 – 10F	–
I/O Input	64	–	1400 – 143F
Data Output	15	180 – 18E	–
I/O Output	64	–	1C00 – 1C3F

1 Station Occupied/Expansion Cyclic Setting x2

	Number	Register Number	Relay Number
Data Input	8	100 – 107	–
I/O Input	16	–	1400 – 140F
Data Output	7	180 – 186	–
I/O Output	16	–	1C00 – 1C0F

2 Stations Occupied/Expansion Cyclic Setting x2

	Number	Register Number	Relay Number
Data Input	16	100 – 10F	–
I/O Input	48	–	1400 – 142F
Data Output	15	180 – 18E	–
I/O Output	48	–	1C00 – 1C2F

1 Station Occupied/Expansion Cyclic Setting x4

	Number	Register Number	Relay Number
Data Input	16	100 – 10F	–
I/O Input	32	–	1400 – 141F
Data Output	15	180 – 18E	–
I/O Output	32	–	1C00 – 1C1F

1 Station Occupied/Expansion Cyclic Setting x8

	Number	Register Number	Relay Number
Data Input	32	100 – 11F	–
I/O Input	64	–	1400 – 143F
Data Output	31	180 – 19E	–
I/O Output	64	–	1C00 – 1C3F

NOTE:

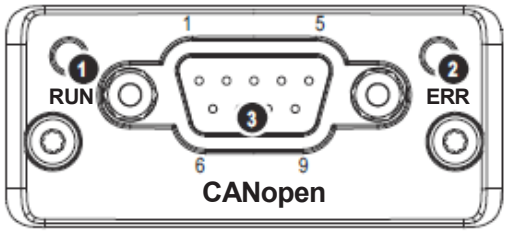
- The station type is a remote device station.
- The last 1 word of the output word area is used by the system area and therefore its use is prohibited.
- Before connecting to CC-Link, always make sure that the highest controller (master unit) is useable.

12.5 CANopen

12.5.1 Connector Diagram

This module has two status LEDs and one CANopen connector.

#	Name
1	RUN Status (RUN) (LED)
2	ERROR Status (ERR) (LED)
3	CANopen Connector



12.5.2 RUN Status

Status	Details
OFF	Not supplied with power
Green	Online, communication connection complete
Green blinking (1Hz)	Waiting for communication connection
Green flash (x1)	Stopped
Green blinking (fast)	Automatically detecting baud rate
Red	Not able to communicate

12.5.3 ERROR Status

Status	Details
OFF	Not supplied with power or the bus is functioning properly
Red blinking (fast)	LSS
Red flash (x1)	Multiple communication errors
Red flash (x2)	Event notification received from the network
Red	Number of communication errors exceeded the stipulated amount

12.5.4 CANopen Connector Pin Assignment

Pin No.	Name	Details
1, 4, 6, 8, 9	N.C.	
2	CAN_L	Communication data: Low (CAN bus line L)
3	CAN_GND	Communication data: GND
5	SHIELD	Shielded grounding
7	CAN_H	Communication data: High (CAN bus line H)
Housing	SHIELD	Shielded grounding

⚠ Danger

Before connecting a Fieldbus, make sure safety can be maintained at all times when the robot is run. If signals such as a start signal etc., are assigned to the Fieldbus, the Fieldbus may standby waiting to send signals and cause the robot to start running directly after it is connected. Improper countermeasures for this can cause injury or unit breakdown.

■ EDS File

The EDS file is a text file that includes the device characteristics and configuration options.

Download the EDS file to the master unit and configuration tool as required.

The EDS file is included on the operation manual CD-ROM.

Use the correct EDS file according to the CANopen input/output domains.

EDS File	Setting Range/Selection
EDS_ABCC_COP_JANOME_OUT16_IN16.eds	Fieldbus Input: 256 points (16 Words) Fieldbus Output: 256 points (16 Words)
EDS_ABCC_COP_JANOME_OUT20_IN12.eds	Fieldbus Input: 192 points (12 Words) Fieldbus Output: 320 points (20 Words)
EDS_ABCC_COP_JANOME_OUT24_IN8.eds	Fieldbus Input: 128 points (8 Words) Fieldbus Output: 384 points (24 Words)

12.5.5 Settings

Settable Items	Setting/Selection Range	Function
Node Addr. Selection Method	Enter Value Specify LSS	Select the method of specifying the node address. The node address is automatically assigned on the CANopen network with [Specify LSS]. Specify the node address when using [Enter Value].
Node Address	1 to 127	You can set the node address between 1 and 127. This cannot be modified when set to [Specify LSS]. Set this to a value which does not conflict with any other device.
Baudrate	10 kbps 20 kbps 50 kbps 100 kbps 125 kbps 250 kbps 500 kbps 800 kbps 1 Mbps AutoBaud Specify LSS	Specify the baud rate. Set this to the same value as your other devices.

NOTE: You can only use LSS (Layer Setting Service) with a 1-to-1 connection. When using this, the node address and baud rate are automatically set according to the master device.

12.5.6 CANopen Assignment

Select and assign the appropriate relays/registers from the Fieldbus domain of the I/O memory. Use the correct EDS file according to the CANopen environment. Also make sure to assign the relays/registers using your master device (PLC, etc.) configuration tool.

The diagram below is an example of when using the following EDS file:
EDS_ABCC_COP_JANOME_OUT16_IN16.eds.
By reading the EDS file supplied by us on the robot, the relays and registers named on CANopen are displayed on the configuration tool.

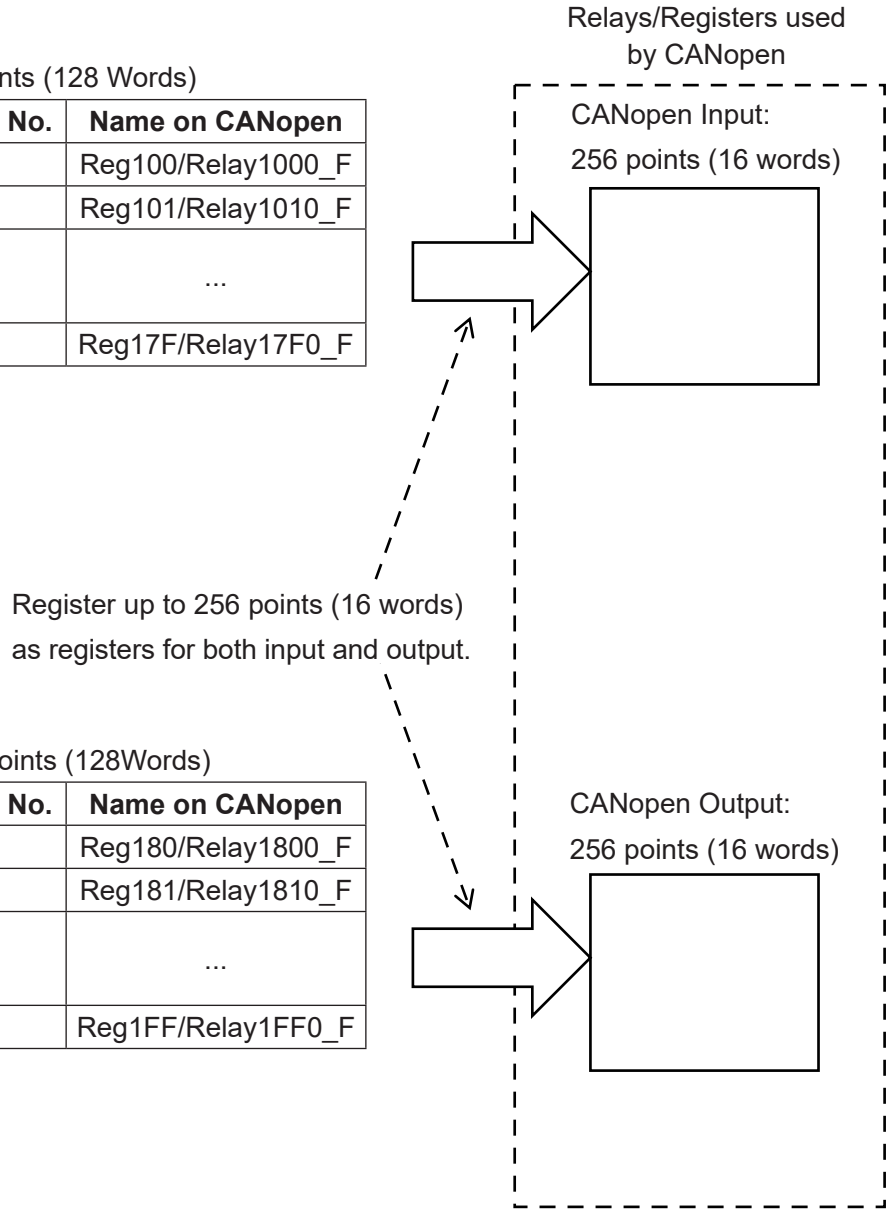
For example, if you want to use relay numbers 1000 and register numbers 180, 181, you need to assign the following relays/registers using the configuration tool.

Reg100/Relay1000_F
Reg180/Relay1800_F
Reg181/Relay1810_F

You can make assignments in 16 bit (1 word) units.

Fieldbus Input: 2048 Points (128 Words)

Relay No.	Register No.	Name on CANopen
1000–100F	100	Reg100/Relay1000_F
1010–101F	101	Reg101/Relay1010_F
...	...	...
17F0–17FF	17F	Reg17F/Relay17F0_F



Fieldbus Output: 2048 Points (128Words)

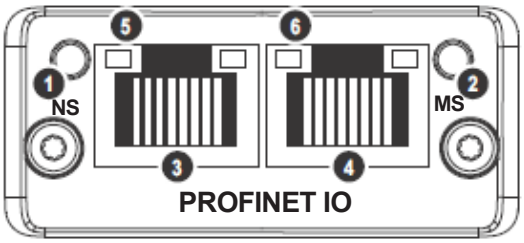
Relay No.	Register No.	Name on CANopen
1800–180F	180	Reg180/Relay1800_F
1810–181F	181	Reg181/Relay1810_F
...	...	...
1FF0–1FFF	1FF	Reg1FF/Relay1FF0_F

12.6 PROFINET

12.6.1 Connector Diagram

This module has two status LEDs and two Ethernet connectors.

#	Name
1	Network Status (NS) (LED)
2	Module Status (MS) (LED)
3	Ethernet Connector (Port 1)
4	Ethernet Connector (Port 2)
5, 6	Link/Activity (LED)



12.6.2 Network Status

Status	Details
OFF	Not supplied with power
Green	Online (RUN)
Green blinking	Online (STOP)

12.6.3 Module Status

Status	Details
OFF	Module is initializing or not supplied with power
Green	Communicating normally
Green 1 flash	Diagnostic event(s)
Green blinking (1Hz)	Access from engineering tool
Red	Stopped due to a fatal error
Red 1 flash	Configuration error
Red 2 flash	IP address is not set
Red 3 flash	Station name is not set
Red 4 flash	Internal error

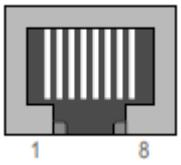
12.6.4 Link/Activity

Status	Details
OFF	Network cable is not connected
Green	Link is established but with no communication
Green blinking	Link and communication are established

NOTE: This is the same for both port 1 and port 2.

12.6.5 Ethernet Connectors

Pin No.	Signal	Details
1	TD+	+ transfer data line
2	TD-	- transfer data line
3	RD+	+ receive data line
4, 5, 7, 8	N.C.	
6	RD-	- receive data line
Housing	SHILD	Shielded ground



NOTE: This is the same for both port 1 and port 2.

⚠ Danger

Before connecting a Fieldbus, make sure safety can be maintained at all times when the robot is run. If signals such as a start signal etc., are assigned to the Fieldbus, the Fieldbus may standby waiting to send signals and cause the robot to start running directly after it is connected. Improper countermeasures for this can cause injury or unit breakdown.

■ GSD File

The GSD file is a text file that includes the device characteristics and configuration options. The GSD files are included on the operation manual CD-ROM. Use the correct GSD file according to the PROFINET input and output domains.

GSD File	Application
GSDML-2.3V-JANOME-RW8- xxxxxxxx.xml	Fieldbus Input: 128 points (8 Words) Fieldbus Output: 128 points (8 Words)
GSDML-2.3V-JANOME-RW16- xxxxxxxx.xml	Fieldbus Input: 256 points (16 Words) Fieldbus Output: 256 points (16 Words)
GSDML-2.3V-JANOME-RW32- xxxxxxxx.xml	Fieldbus Input: 512 points (32 Words) Fieldbus Output: 512 points (32 Words)
GSDML-2.3V-JANOME-RW64- xxxxxxxx.xml	Fieldbus Input: 1024 points (64 Words) Fieldbus Output: 1024 points (64 Words)
GSDML-2.3V-JANOME-RW127- xxxxxxxx.xml	Fieldbus Input: 2032 points (127 Words) Fieldbus Output: 2032 points (127 Words)

NOTE: The numbers are entered in the “x” of the file name, except for extension.

12.6.6 Settings

Settable Items	Setting Range / Selection	Function
Word Count for Read/Write Domain	8 16 32 64 127	Select the number of words to use in the Fieldbus read/write domain. The read/write domain makes the same number of words available.
Toggle DAP2 Support	Invalid Valid	Specify whether or not your module supports DAP protocol version 2. Set this according to the controller.

NOTE:

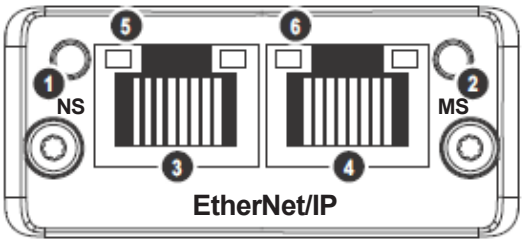
- Make sure the word count for the read/write domain matches that of the GDS file. If these do not match, the PROFINET module cannot function.
- A PROFINET interface can only be operated with 100 Mbps full-duplex.

12.7 EtherNet/IP

12.7.1 Connector Diagram

This module has two status LEDs and two Ethernet connectors.

#	Name
1	Network Status (NS) (LED)
2	Module Status (MS) (LED)
3	Ethernet Connector (Port 1)
4	Ethernet Connector (Port 2)
5, 6	Link/Activity (LED)



12.7.2 Network Status

Status	Details
OFF	IP address not set or module is not supplied with power
Green	Online and connection established
Green blinking	Online and waiting for connection
Red	Duplicate of the IP address
Red blinking	Connection timeout

12.7.3 Module Status

Status	Details
OFF	Not supplied with power
Green	Communicating normally
Green blinking	Idle status
Red	Fatal error
Red blinking	Configuration error

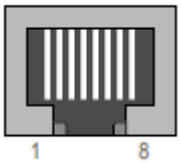
12.7.4 Link/Activity

Status	Details
OFF	Network cable is not connected
Green	Link is established at 100 Mbps but with no communication
Green blinking	Link and communication are established at 100 Mbps
Yellow	Link is established at 10 Mbps but with no communication
Yellow blinking	Link and communication are established at 10 Mbps

NOTE: This is the same for both port 1 and port 2.

12.7.5 Ethernet Connector

Pin No.	Signal	Details
1	TD+	+ transfer data line
2	TD-	- transfer data line
3	RD+	+ receive data line
4, 5, 7, 8	N.C.	
6	RD-	- receive data line
Housing	SHILD	Shielded ground



NOTE: This is the same for both port 1 and port 2.

⚠ Danger

Before connecting a Fieldbus, make sure safety can be maintained at all times when the robot is run. If signals such as a start signal etc., are assigned to the Fieldbus, the Fieldbus may standby waiting to send signals and cause the robot to start running directly after it is connected. Improper countermeasures for this can cause injury or unit breakdown.

■ EDS File

The EDS file is a text file that includes the device characteristics and configuration options.
Download the EDS file to the master unit and configuration tool as required.
The EDS file is included on the operation manual CD-ROM.

EDS File	Application
005A0000002E0100_ JMxxxxxxxx.eds	EDS file for EtherNet/IP

NOTE: The numbers are entered in the “x” of the file name.

12.7.6 Settings

Settable Items	Setting/Selection Range	Function
Read Domain Word Count	0 – 128	Word number input is the amount of data input (external PLC writes/sends, robot reads/receives). Set the necessary amount of data in words (1 word is 2 bytes). As the amount of data increases, so does the amount of time to transfer data, reducing the responsiveness.
Write Domain Word Count	0 – 128	Word number output is the amount of data output (robot writes/sends, external PLC reads/receives). Set the necessary amount of data in words (1 word is 2 bytes). As the amount of data increases, so does the amount of time to transfer data, reducing the responsiveness.
IP Address		Specify the IP address.
Subnet Mask		Specify the subnet mask.
Default Gateway		Specify the default gateway. NOTE: This is normally specified as “0.0.0.0”.

NOTE: The configuration tool needs to be set with the same read and write domain word counts specified in these settings.

13. I/O-MT

I/O-MT is a connector that connects and controls externally attached devices such as a motor driver for the motor etc. You can set up I/O functions and resolution etc. according to the devices you have. For further details, refer to the operation manual *Auxiliary Axis Functions*.

13.1 Connector

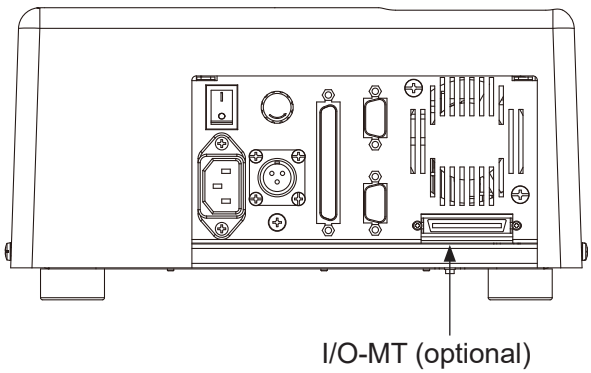
There are two types of I/O polarity: NPN specifications and PNP specifications. After confirming your robot's polarity specifications, always connect tools, etc., which are compatible with these specifications.

■ I/O Polarity
If you are connecting external devices, make sure they are compatible with your robot's I/O polarity. The robot's I/O polarity can be confirmed on the I/O nameplate. Refer to "3.1 I/O Polarity."

■ I/O Power Supply
The power supply (DC 24 V) for an external device connected to the I/O-MT is supplied externally. Prepare a separate I/O power supply.

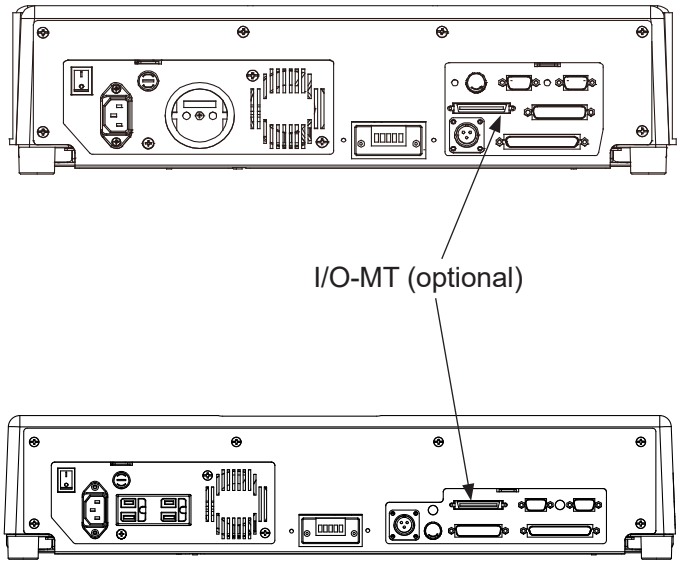
NOTE: If you are using a JR3200 equipped with I/O-MT, you cannot use I/O-1.

JR3200 Series
Example: JR3203N-AC/BC/CC



JR3300 Series

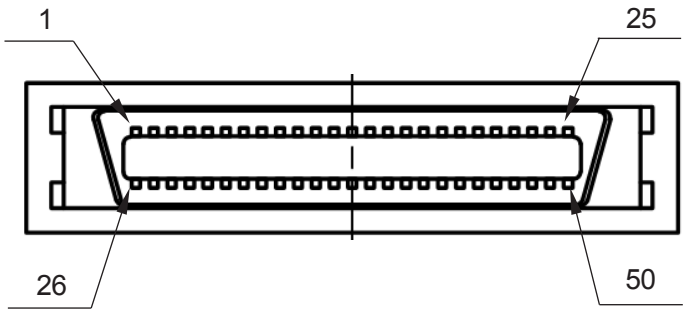
Example: JR3303N-AJ/BJ/CJ



JR3400 – JR3600 Series

Example: JR3403N-AJ/BJ/CJ

13.2 Pin No. (Robot Side)



Connector Model Number: PCR-E50PMC (Manufacturer: Honda Tsushin Kogyo)

13.3 Function Assignment (NPN)

		Name	Function	Pin No.
MT1	Input	MT1 Input 1	Refer to the operation manual *Auxiliary Axis Functions*.	13
		MT1 Input 2		12
		MT1 Input 3		11
		MT1 Input 4		10
		MT1 Input 5		9
		MT1 Input 6		8
		MT1 Input 7		7
		MT1 Input 8		6
		MT1 Input COM+		20
	Sensor Input	MT1 Sensor Input 2		4
		MT1 Sensor Input 1		22
		MT1 Sensor COM-		23
		MT1 Sensor COM+		25
	Output	MT1 Output 1		14
		MT1 Output 2		15
		MT1 Output 3		16
		MT1 Output 4		17
		MT1 Output 5		18
		MT1 Output 6		19
		MT1 Output COM-		21
	Pulse Output	MT1 Pulse Output 1		1
		MT1 Pulse Output 2		2
		MT1 Pulse Output COM-		3
		MT1 Pulse Output COM+		24
	Other	GND	GND	5

		Name	Function	Pin No.
MT2	Input	MT2 Input 1	Refer to the operation manual *Auxiliary Axis Functions*.	38
		MT2 Input 2		37
		MT2 Input 3		36
		MT2 Input 4		35
		MT2 Input 5		34
		MT2 Input 6		33
		MT2 Input 7		32
		MT2 Input 8		31
		MT2 Input COM+		45
	Sensor Input	MT2 Sensor Input 2		29
		MT2 Sensor Input 1		47
		MT2 Sensor COM-		48
		MT2 Sensor COM+		50
	Output	MT2 Output 1		39
		MT2 Output 2		40
		MT2 Output 3		41
		MT2 Output 4		42
		MT2 Output 5		43
		MT1 Output 6		44
		MT1 Output COM-		46
	Pulse Output	MT2 Pulse Output 1		26
		MT2 Pulse Output 2		27
		MT2 Pulse Output COM-		28
		MT2 Pulse Output COM+		49
	Other	GND	GND	30

13.4 Function Assignment (PNP)

		Name	Function	Pin No.
MT1	Input	MT1 Input 1	Refer to the operation manual *Auxiliary Axis Functions*.	13
		MT1 Input 2		12
		MT1 Input 3		11
		MT1 Input 4		10
		MT1 Input 5		9
		MT1 Input 6		8
		MT1 Input 7		7
		MT1 Input 8		6
		MT1 Input COM-		20
	Sensor Input	MT1 Sensor Input 2		4
		MT1 Sensor Input 1		22
		MT1 Sensor COM-		23
		MT1 Sensor COM+		25
	Output	MT1 Output 1		14
		MT1 Output 2		15
		MT1 Output 3		16
		MT1 Output 4		17
		MT1 Output 5		18
		MT1 Output 6		19
		MT1 Output COM+		21
	Pulse Output	MT1 Pulse Output 1		1
		MT1 Pulse Output 2		2
		MT1 Pulse Output COM-		3
		MT1 Pulse Output COM+		24
	Other	GND	GND	5

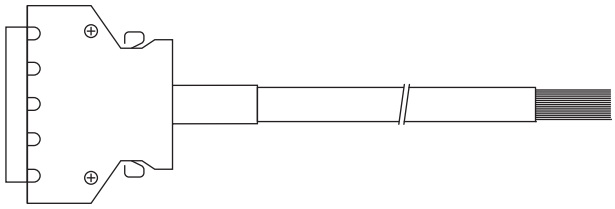
		Name	Function	Pin No.
MT2	Input	MT2 Input 1	Refer to the operation manual *Auxiliary Axis Functions*.	38
		MT2 Input 2		37
		MT2 Input 3		36
		MT2 Input 4		35
		MT2 Input 5		34
		MT2 Input 6		33
		MT2 Input 7		32
		MT2 Input 8		31
		MT2 Input COM-		45
	Sensor Input	MT2 Sensor Input 2		29
		MT2 Sensor Input 1		47
		MT2 Sensor COM-		48
		MT2 Sensor COM+		50
	Output	MT2 Output 1		39
		MT2 Output 2		40
		MT2 Output 3		41
		MT2 Output 4		42
		MT2 Output 5		43
		MT1 Output 6		44
		MT2 Output COM+		46
	Pulse Output	MT2 Pulse Output 1		26
		MT2 Pulse Output 2		27
		MT2 Pulse Output COM-		28
		MT2 Pulse Output COM+		49
	Other	GND	GND	30

13.5 I/O-MT Option Cord (Unit)

■ I/O-MT Option Cord (Unit) (optional)

NOTE: The part number varies according to the cable length.

Cable Length [m]	Janome Part No.
0.5	170551104
1	170551207
3	170551001
5	170551300

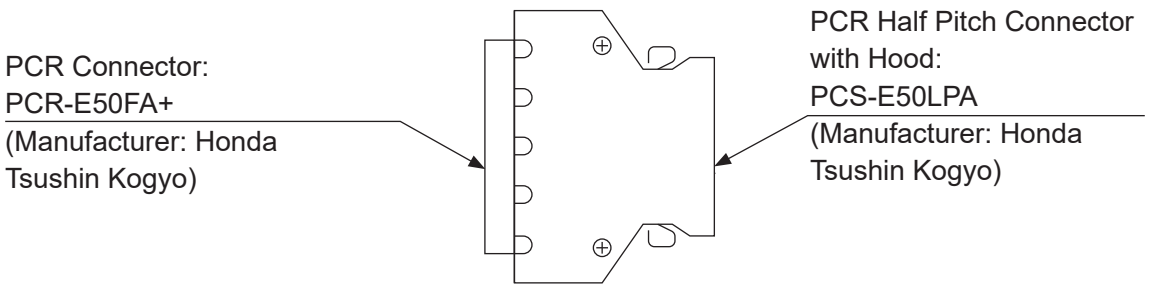


Cable Wiring

Pin No.	Cord Color (Dot)	Pin No.	Cord Color (Dot)	Pin No.	Cord Color (Dot)
1	Orange (Black 1)	18	Yellow (Red 2)	35	White (Black 4)
2	Orange (Red 1)	19	Pink (Black 2)	36	White (Red 4)
3	Gray (Black 1)	20	Pink (Red 2)	37	Yellow (Black 4)
4	Gray (Red 1)	21	Orange (Black 3)	38	Yellow (Red 4)
5	White (Black 1)	22	Orange (Red 3)	39	Pink (Black 4)
6	White (Red 1)	23	Gray (Black 3)	40	Pink (Red 4)
7	Yellow (Black 1)	24	Gray (Red 3)	41	Orange (Black line)
8	Yellow (Red 1)	25	White (Black 3)	42	Orange (Red line)
9	Pink (Black 1)	26	White (Red 3)	43	Gray (Black line)
10	Pink (Red 1)	27	Yellow (Black 3)	44	Gray (Red line)
11	Orange (Black 2)	28	Yellow (Red 3)	45	White (Black line)
12	Orange (Red 2)	29	Pink (Black 3)	46	White (Red line)
13	Gray (Black 2)	30	Pink (Red 3)	47	Yellow (Black line)
14	Gray (Red 2)	31	Orange (Black 4)	48	Yellow (Red line)
15	White (Black 2)	32	Orange (Red 4)	49	Pink (Black line)
16	White (Red 2)	33	Gray (Black 4)	50	Pink (Red line)
17	Yellow (Black 2)	34	Gray (Red 4)		

■ I/O-MT Connector (Unit) (optional)

Janome part No.: 170554004



13.6 Power Supply Capacity

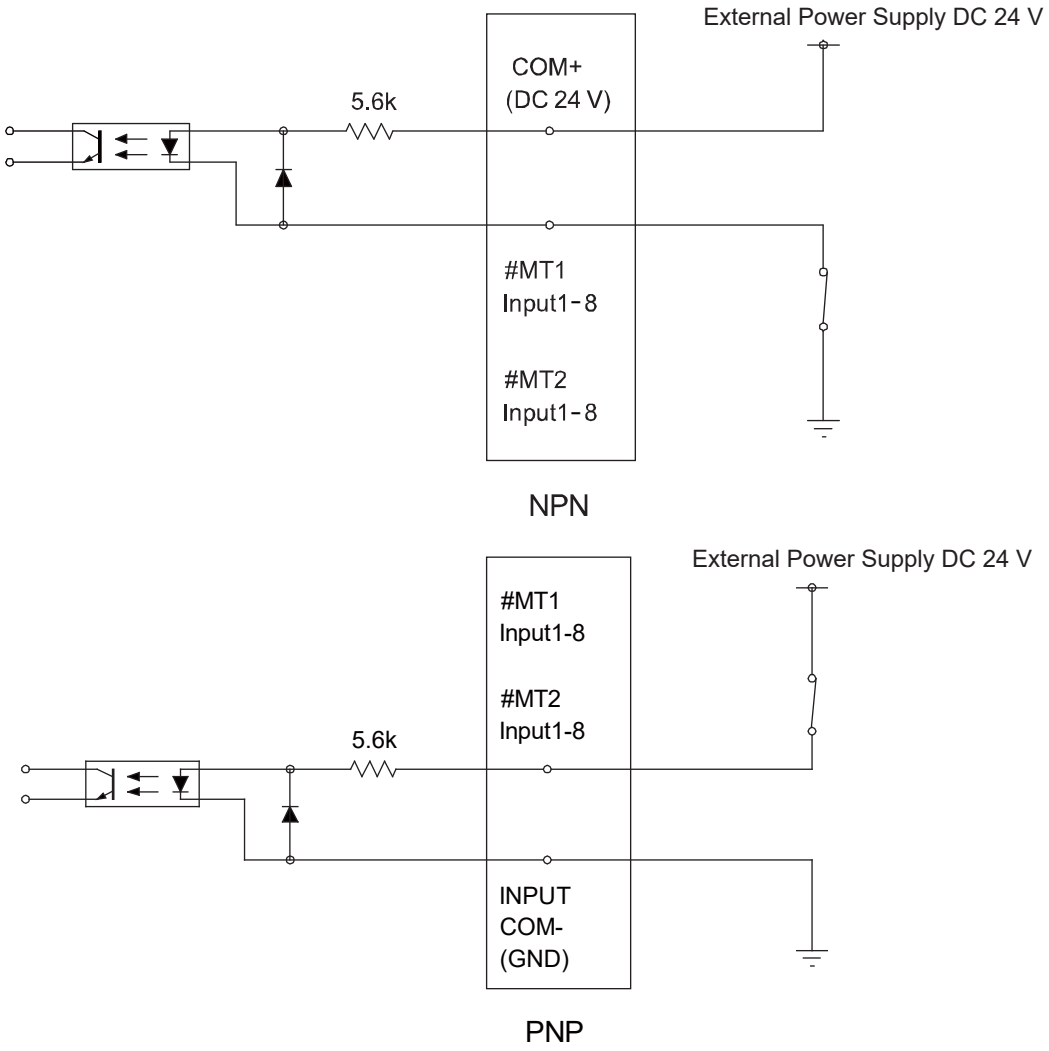
⚠ Danger

Adhere to the voltage capacities outlined in the table below. If you exceed the values listed below, the internal circuits may be damaged.

		Type	Rated Output/Input
Output Pin	MT1 Output 1 – 6	Photocoupler	DC 24 V, 100 mA/pin
	MT1 Output COM+	Photocoupler	DC 24 V, 600 mA/pin
	MT1 Pulse Output 1 – 2	FET	DC 24 V, 30 mA/pin
	MT1 Pulse Output COM+	FET	DC 24 V, 100 mA/pin
	MT2 Output 1 – 6	Photocoupler	DC 24 V, 100 mA/pin
	MT2 Output COM+	Photocoupler	DC 24 V, 600 mA/pin
	MT2 Pulse Output 1 – 2	FET	DC 24 V, 30 mA/pin
	MT2 Pulse Output COM+	FET	DC 24 V, 100 mA/pin
Input Pin	MT1 Input 1 – 8	Photocoupler	DC 24 V, 100 mA/pin
	MT1 Sensor Input 1 – 2	Photocoupler	DC 5 V, 50 mA/pin
	MT2 Input 1 – 8	Photocoupler	DC 24 V, 100 mA/pin
	MT2 Sensor Input 1 – 2	Photocoupler	DC 5 V, 50 mA/pin

For the external power supply, prepare a power supply (DC 24 V) on your side.

13.7 Input Signals

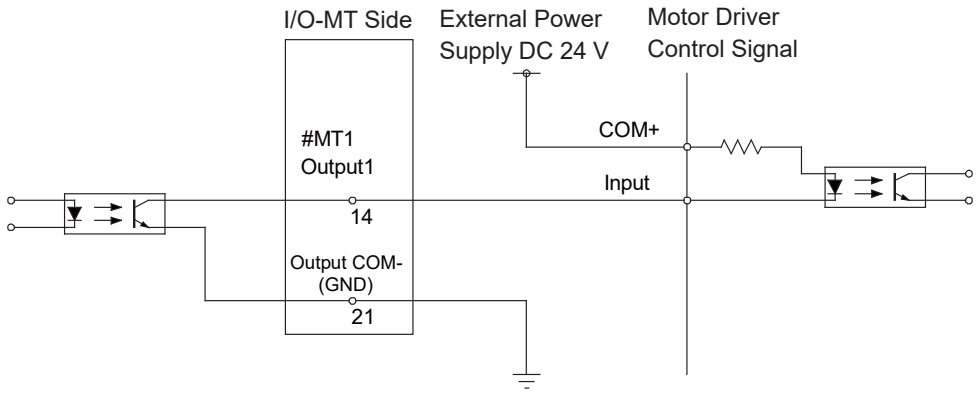


If connecting a two-wire external device, such as a sensor, use one which has a leakage current of no more than 0.3 mA. If you use a device with a leakage current of more than 0.3 mA, it may not turn OFF.

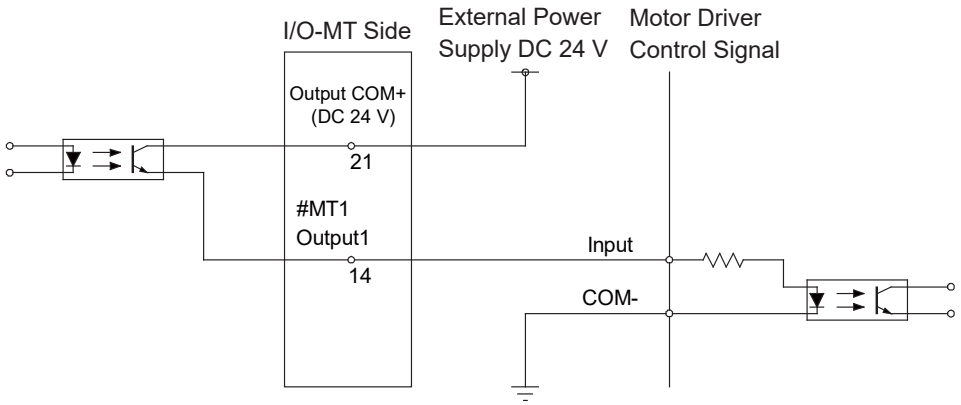
⚠ Caution

Do not assign wiring other than the wiring specified above.
Assigning the wrong wiring can damage the internal circuits.

13.8 Output Signals



NPN

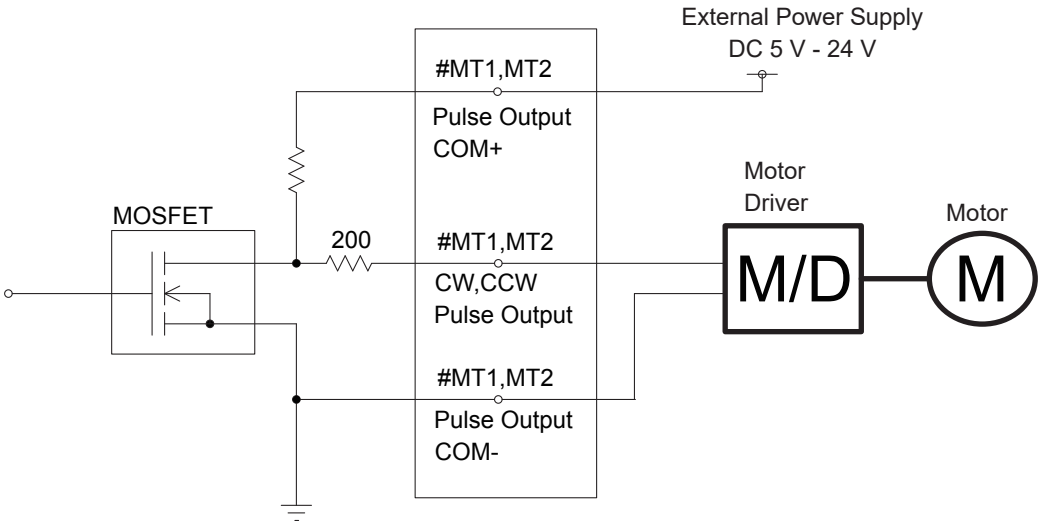


PNP

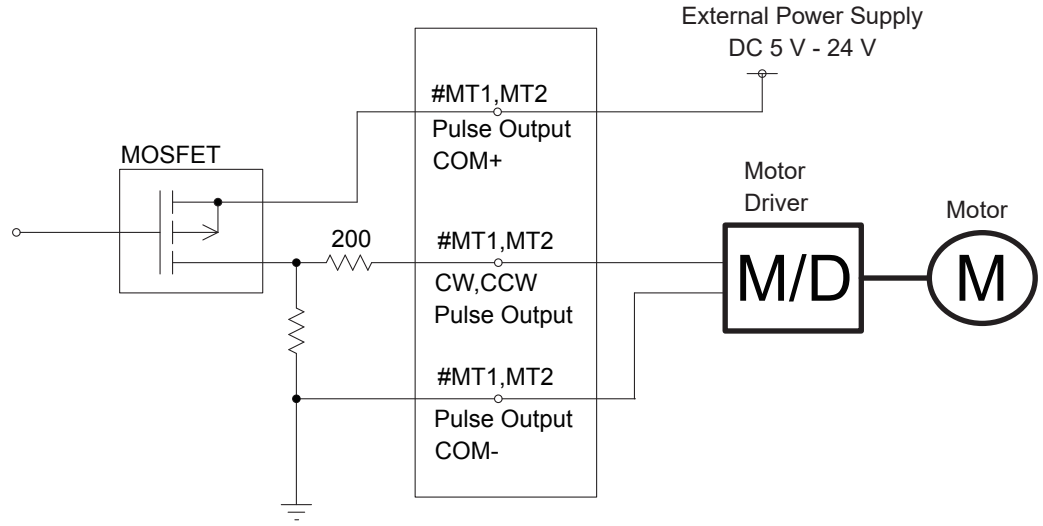
⚠ Caution

Do not assign wiring other than the wiring specified above.
Assigning the wrong wiring can damage the internal circuits.

13.9 Pulse Output Signals



NPN



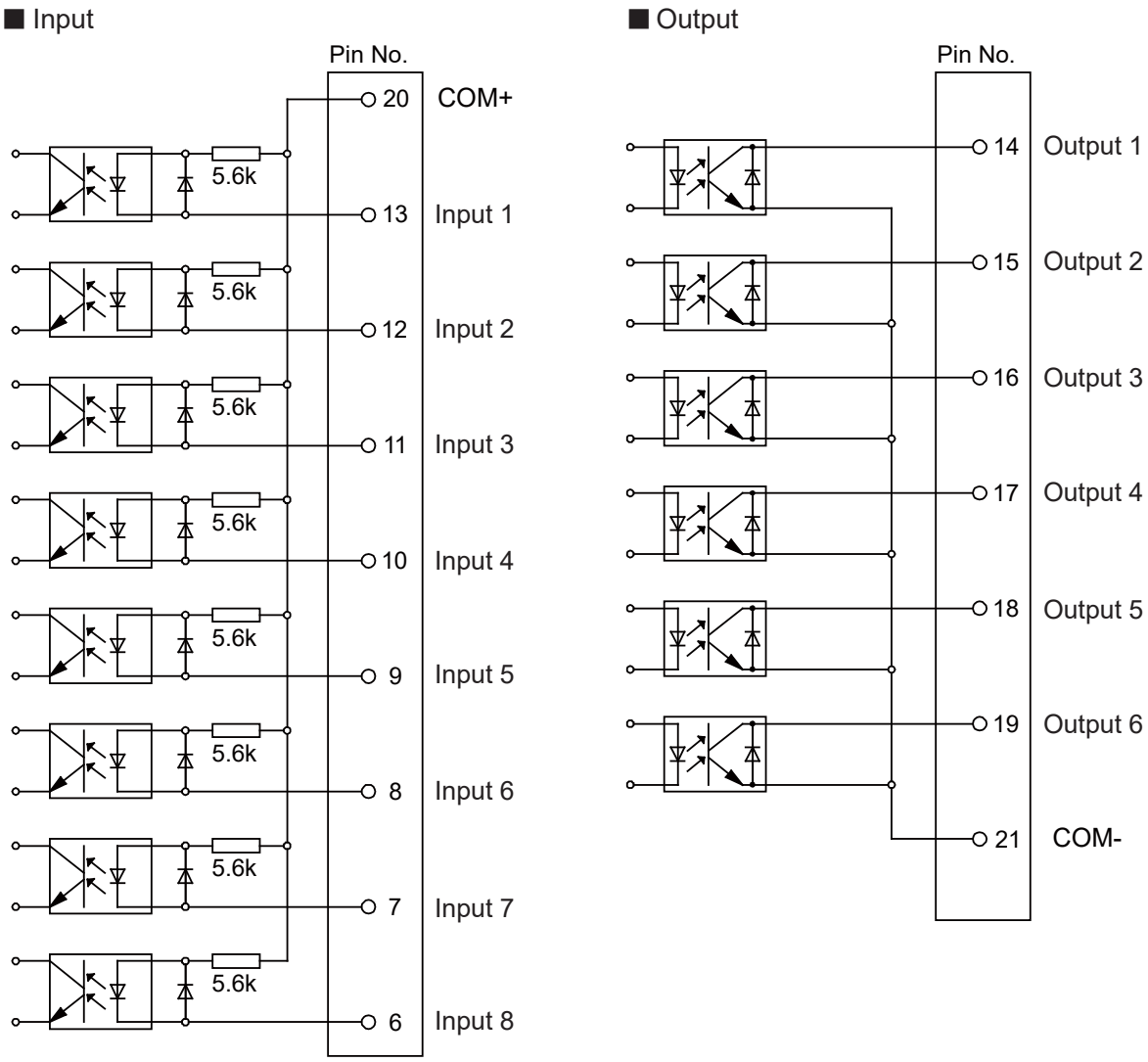
PNP

NOTE: This is a representation of the internal circuits.

MT1 and MT2 each have pulse output signal channel; one for CW and one for CCW (a total of 2).
With an NPN circuit, connect the pulse output COM- terminal to the motor driver ground terminal.
With a PNP circuit, connect the pulse output COM- terminal to the motor driver ground terminal.
MT1 and MT2 are both equipped with an individual pulse output COM+ terminal. Make sure to wire the MT1/MT2 pulse output COM+ terminals separate from each other.
Connect external current limiting resistors to the output terminals (CW, CCW) as necessary to ensure the electric current does not exceed 30 mA.
Make sure the external power supply connected to the pulse output COM+ terminal uses a voltage appropriate for the pulse input voltage of the external device.

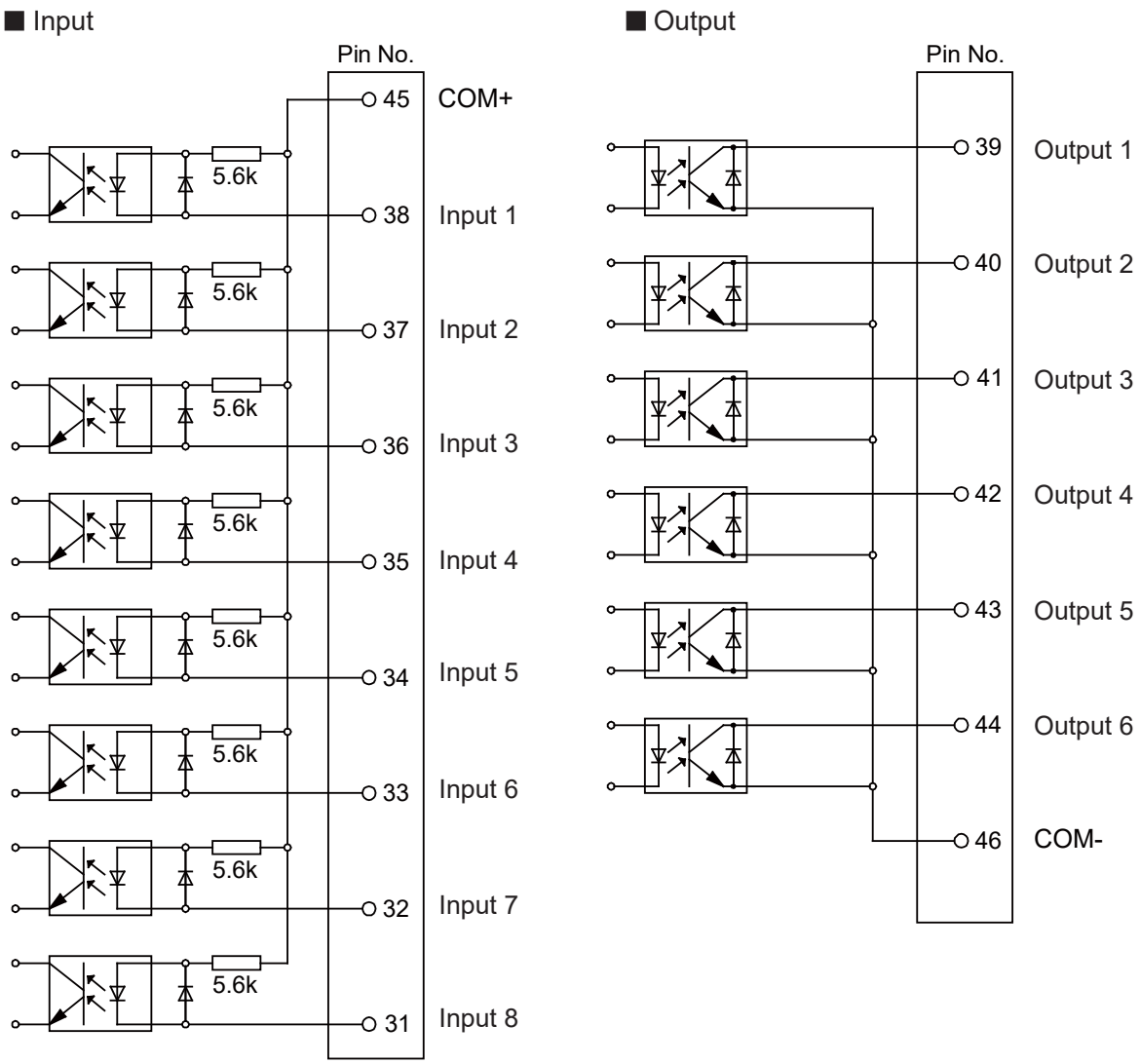
13.10 Circuit Diagram (NPN)

MT1 Circuit Diagram NPN



NPN

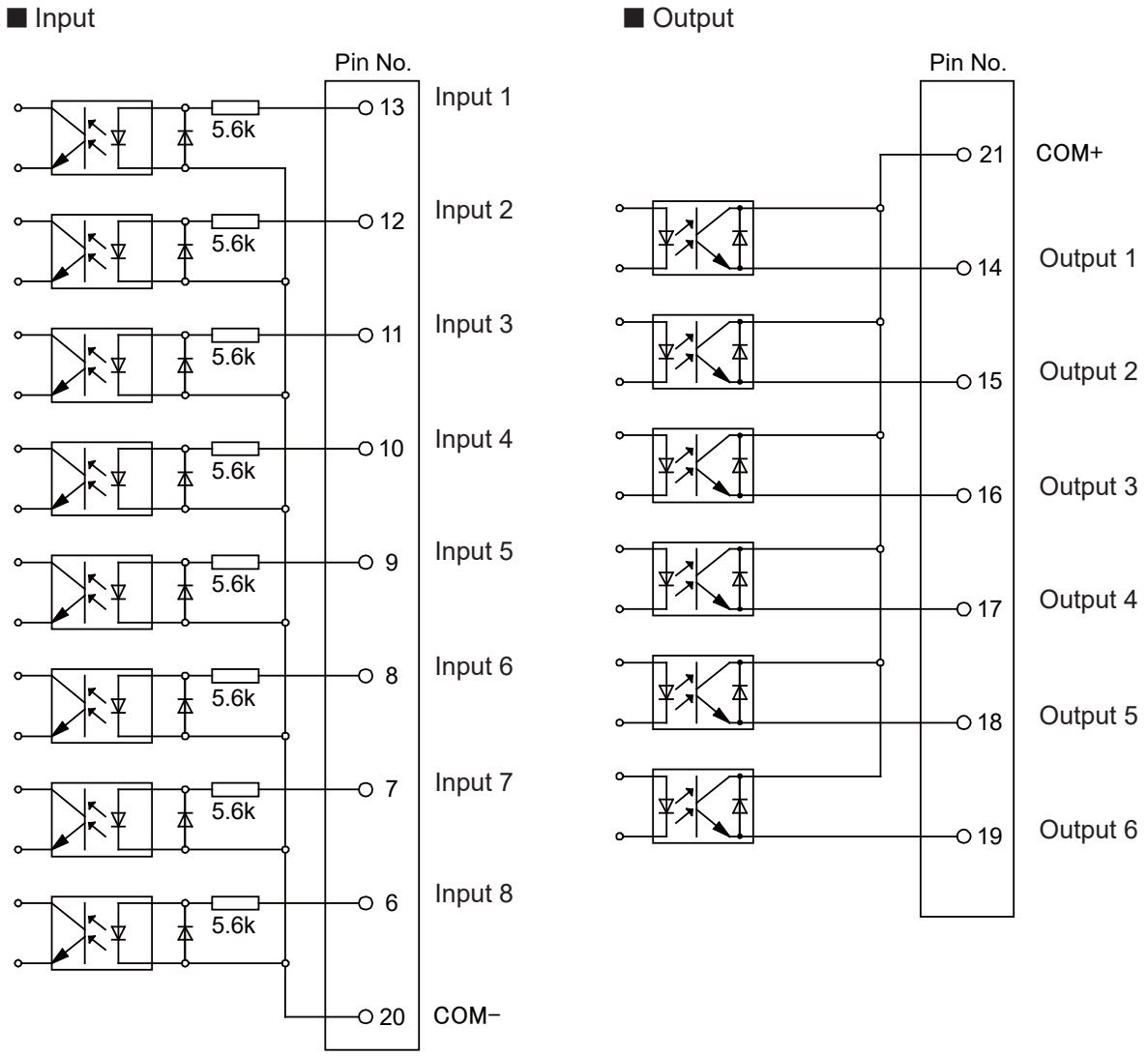
MT2 Circuit Diagram NPN



NPN

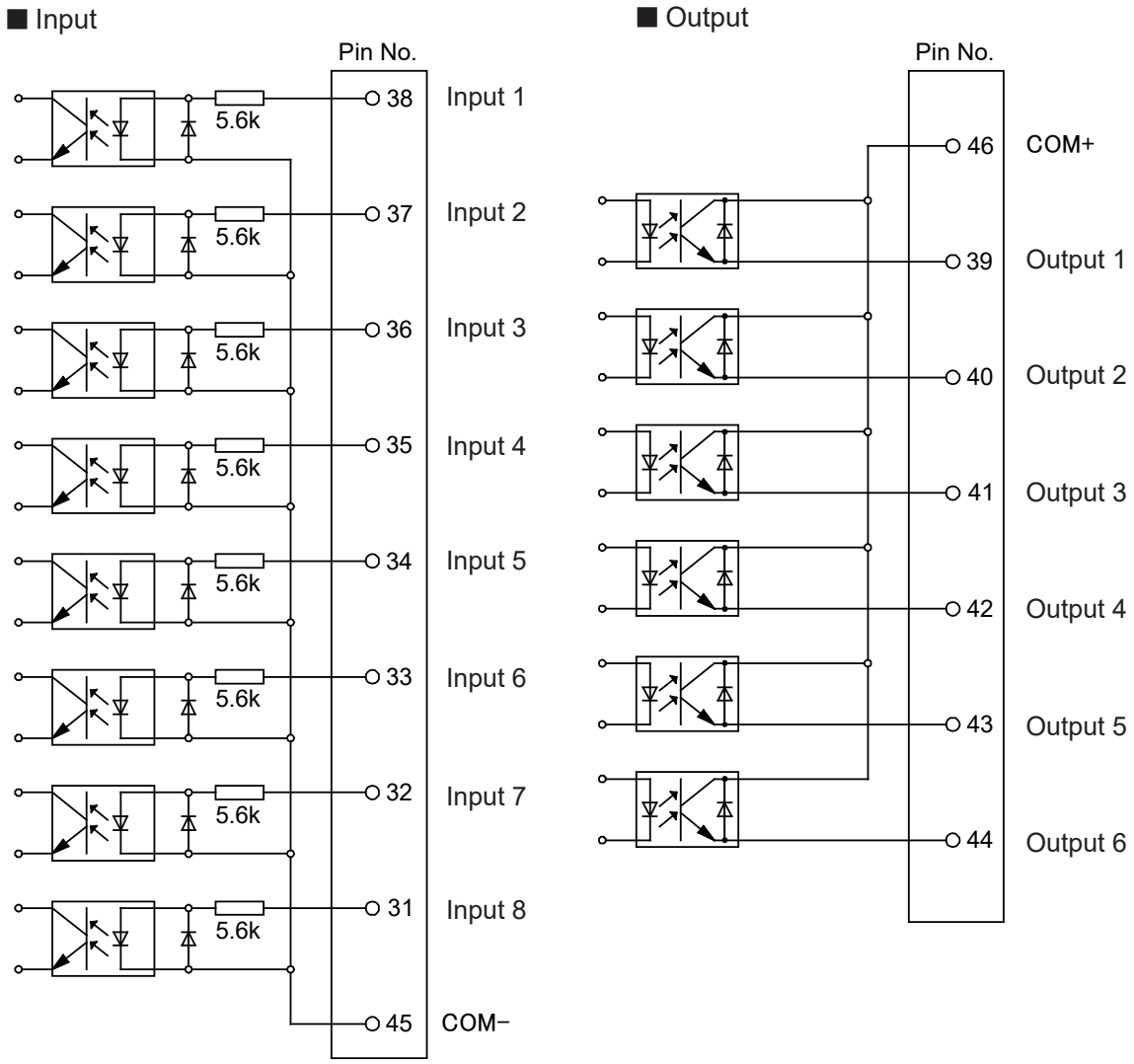
13.11 Circuit Diagram (PNP)

MT1 Circuit Diagram PNP



PNP

MT2 Circuit Diagram PNP



PNP

14. MEMORY PORT

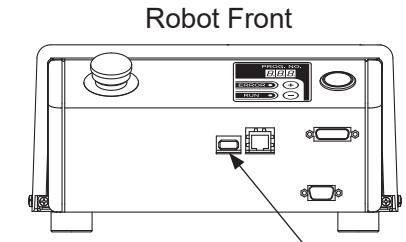
By inserting a commercially sold USB memory (Ver. 2.0) into the Memory Port, you can record robot data.

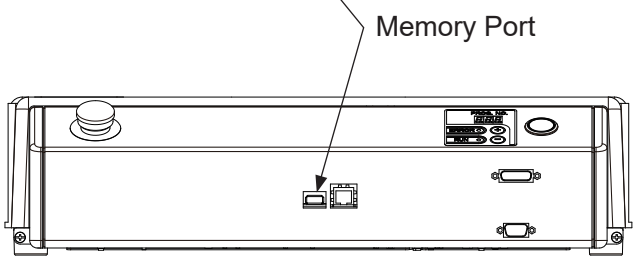
14.1 USB Memory Usage Precautions

- The USB memory device needs to be in FAT format.
- The robot may not recognize some USB memory devices depending on the manufacturer. However, the robot may recognize the USB memory device if you format it.
- The lifespan and number of times you can write files to the device may vary depending on the device.

14.2 Connector

JR3200 Series
Example: JR3203N-AC





JR3300 – JR3600 Series
Example: JR3303N-AJ

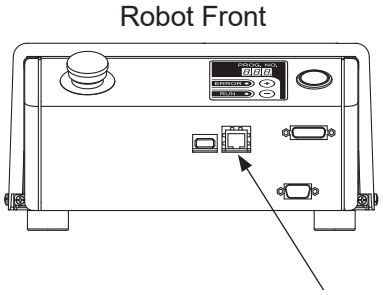
15. LAN PORT

15.1 Connector

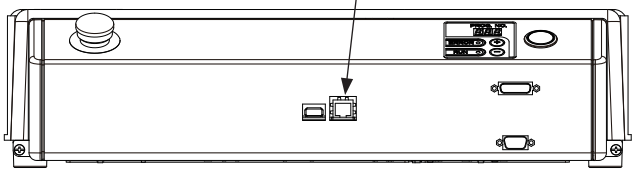
The robot is fitted with an Ethernet connector (10BASE-T/100BASE-TX) by standard.
The LAN port is on the front of the robot.
By using Ethernet to transmit commands and data from a PC, you can use functions such as the ones below:

1. Send and receive C&T data
2. Overwrite the system program
3. Online teaching such as JOG and GO movements etc.
4. Monitor functions such as external I/O and Fieldbus I/O display etc.
5. Setup online settings such as administration settings and teaching environment settings etc.
6. Display robot information such as system information and error history etc.

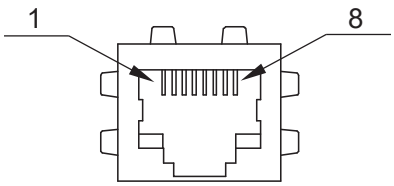
JR3200 Series
Example: JR3203N-AC



JR3300 – JR3600 Series
Example: JR3303N-AC



15.2 Pin No. (Robot Side)



LAN Port Pin Assignment

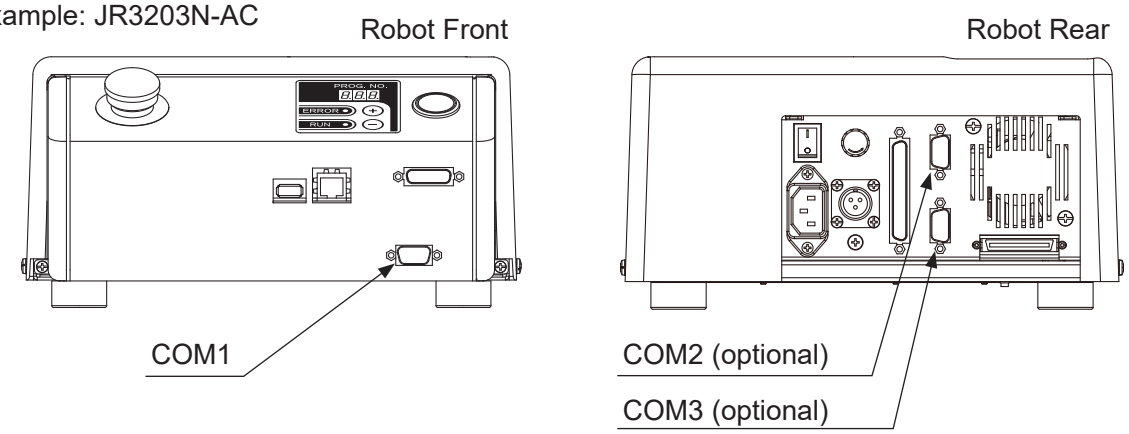
Pin No.	Name	Function
1	TD+	Transmit signal+
2	TD-	Transmit signal-
3	RD+	Receive signal+
4	NC	Not connected
5	NC	Not connected
6	RD-	Receive signal-
7	NC	Not connected
8	NC	Not connected

16. COM1−3

16.1 Connector

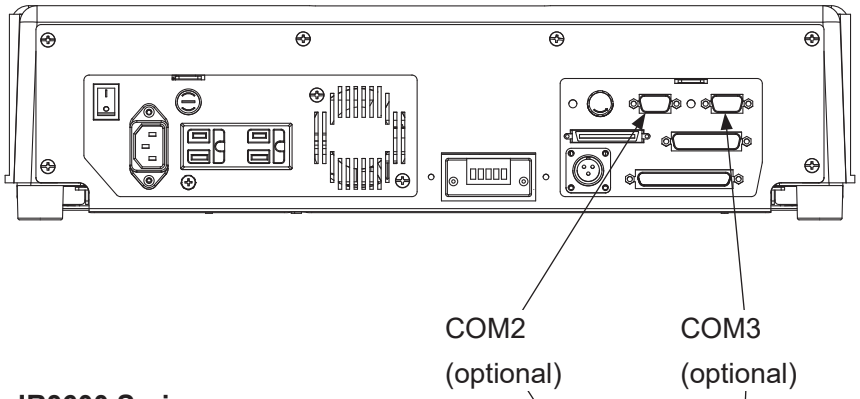
JR3200 Series

Example: JR3203N-AC



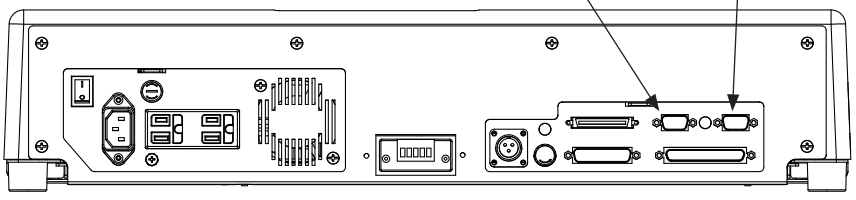
JR3300 Series

Example: JR3303N-AC/BC/CC



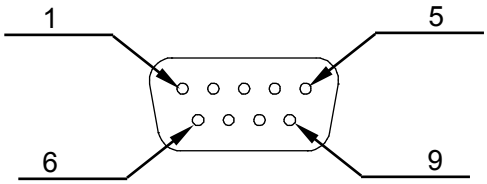
JR3400 – JR3600 Series

Example: JR3403N-AC/BC/CC



NOTE: The pin locations for COM 1 – 3 are all the same.

16.2 Pin No. (Robot Side)



16.3 COM Connector Pin Connection

■ Host side: D-Sub 9 pin Connector

COM1: RS-232C Port

	Robot			Host (PC)	
Pin No.	**Terminal**	**Function**		**Pin No.**	**Terminal**	**Function**
3	RxD	Receive Data	←	3	TxD	Transmit Data
2	TxD	Transmit Data	→	2	RxD	Receive Data
5	GND	Ground	—	5	GND	Ground
Connector: D-SUB 9 Pin				Connector: D-SUB 9 Pin		

COM2 : RS-232C Port

	Robot			Host (PC)	
Pin No.	**Terminal**	**Function**		**Pin No.**	**Terminal**	**Function**
3	RxD	Receive Data	←	3	TxD	Transmit Data
2	TxD	Transmit Data	→	2	RxD	Receive Data
5	GND	Ground	—	5	GND	Ground
Connector: D-SUB 9 Pin				Connector: D-SUB 9 Pin		

COM3 : RS-232C Port

	Robot			Host (PC)	
Pin No.	**Terminal**	**Function**		**Pin No.**	**Terminal**	**Function**
3	RxD	Receive Data	←	3	TxD	Transmit Data
2	TxD	Transmit Data	→	2	RxD	Receive Data
5	GND	Ground	—	5	GND	Ground
Connector: D-SUB 9 Pin				Connector: D-SUB 9 Pin		

■ Host side: D-Sub 25 pin Connector

COM1 : RS-232C Port

Robot				Host (PC)		
Pin No.	**Terminal**	**Function**		**Pin No.**	**Terminal**	**Function**
3	RxD	Receive Data	←	2	TxD	Transmit Data
2	TxD	Transmit Data	→	3	RxD	Receive Data
5	GND	Ground	—	7	GND	Ground
Connector: D-SUB 9 Pin				Connector: D-SUB 25 Pin		

COM2 : RS-232C Port

Robot				Host (PC)		
Pin No.	**Terminal**	**Function**		**Pin No.**	**Terminal**	**Function**
3	RxD	Receive Data	←	2	TxD	Transmit Data
2	TxD	Transmit Data	→	3	RxD	Receive Data
5	GND	Ground	—	7	GND	Ground
Connector: D-SUB 9 Pin				Connector: D-SUB 25 Pin		

COM3 : RS-232C Port

Robot				Host (PC)		
Pin No.	**Terminal**	**Function**		**Pin No.**	**Terminal**	**Function**
3	RxD	Receive Data	←	2	TxD	Transmit Data
2	TxD	Transmit Data	→	3	RxD	Receive Data
5	GND	Ground	—	7	GND	Ground
Connector: D-SUB 9 Pin				Connector: D-SUB 25 Pin		

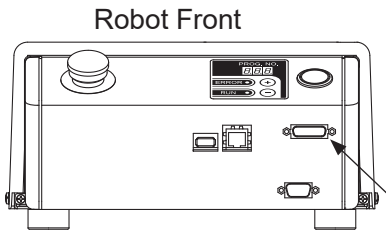
17. TPU (TEACHING PENDANT CONNECTOR)

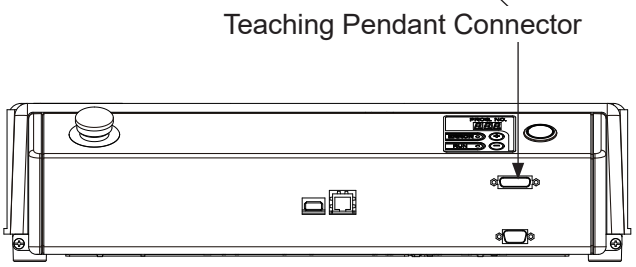
17.1 Teaching Pendant II (New Model)

17.1.1 Connector

JR3200 Series

Example: JR3203N-AC

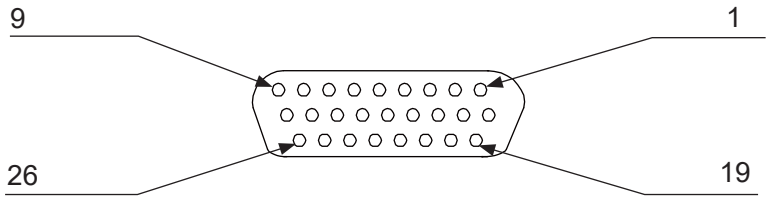




JR3300 – JR3600 Series

Example: JR3303N-AJ

17.1.2 Pin No. (Robot Side)



17.1.3 Pin Connections

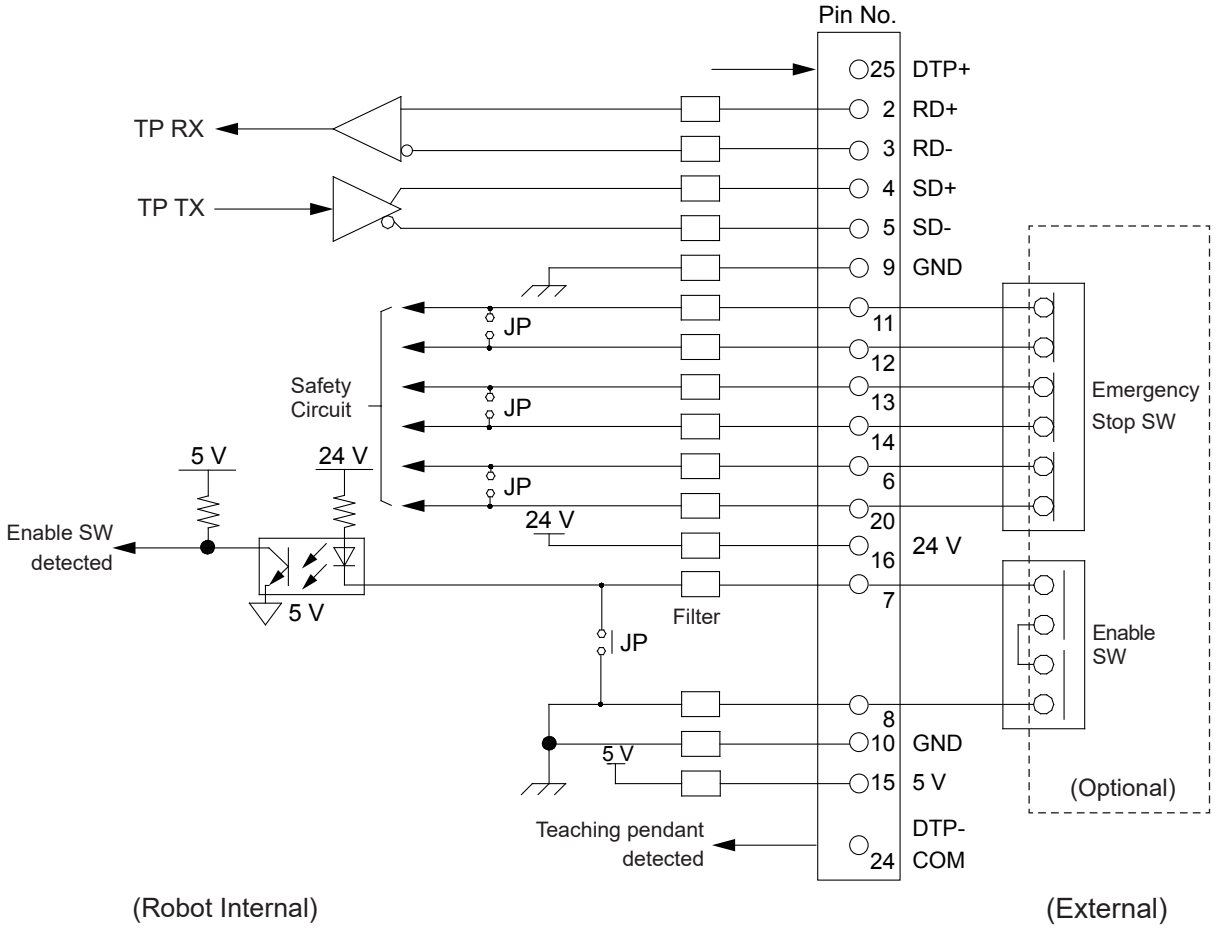
RS-422 Interface

Pin No.	Name	Function
1	N.C.	
2	RD(+)	Receive data (+)
3	RD(-)	Receive data (-)
4	SD(+)	Send data (+)
5	SD(-)	Send data (-)
6	EMGSW31	Emergency stop switch contact 3 terminal 1
7	ENSW11	Enable switch contact 1 terminal 1
8	ENSW12	Enable switch contact 1 terminal 2
9	GND	
10	GND	
11	EMGSW11	Emergency stop switch contact 1 terminal 1
12	EMGSW12	Emergency stop switch contact 1 terminal 2
13	EMGSW21	Emergency stop switch contact 2 terminal 1
14	EMGSW22	Emergency stop switch contact 2 terminal 2
15	5 V	DC 5 V
16	24 V	DC 24 V
17	N.C.	
18	N.C.	
19	N.C.	
20	EMGSW32	Emergency stop switch contact 3 terminal 2
21	N.C.	
22	N.C.	
23	N.C.	
24	COM	
25	DTP	Detect connection signal
26	N.C.	

NOTE: Pin No. 11 and 12 are shorted internally for teaching pendants that do not have an enable switch. Therefore, the teaching pendant cannot detect the enable switch even if the switch is connected.

Pin No. 11 – 12, 13 – 14, and 6 – 20 are internally shorted for teaching pendants that do not have an emergency stop switch. Therefore, an emergency stop is not made even if Pin No. 11 – 12, 13 – 14, and 6 – 20 are open.

17.1.4 Circuit Diagram



⚠ Caution

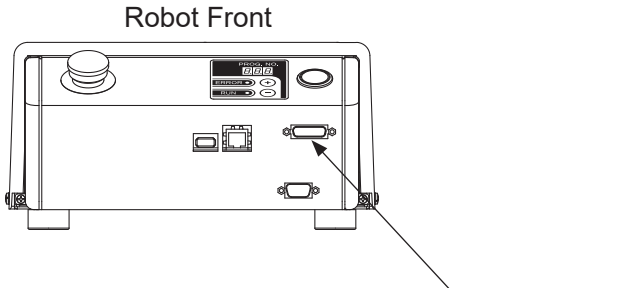
If using a teaching pendant equipped with an emergency stop switch, make sure to connect the following pins in pairs: 11 – 12, 13 – 14, 6 – 20.
Connecting them any other way damages the emergency stop circuit.

17.2 Teaching Pendant (Conventional Model)

17.2.1 Connection

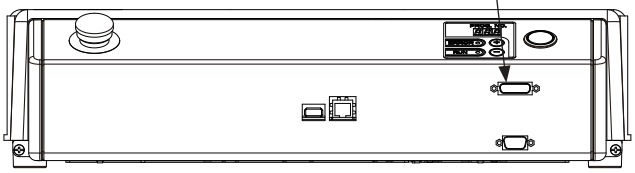
JR3200 Series

Example: JR3203N-AC

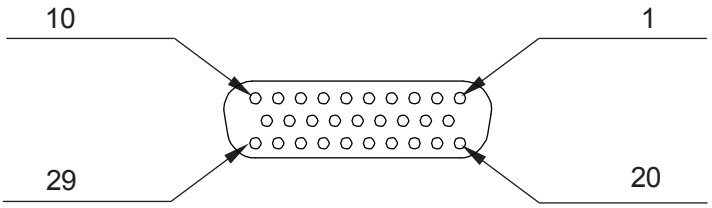


JR3300 – JR3600 Series

Example: JR3303N-AJ



17.2.2 Pin No. (Robot Side)



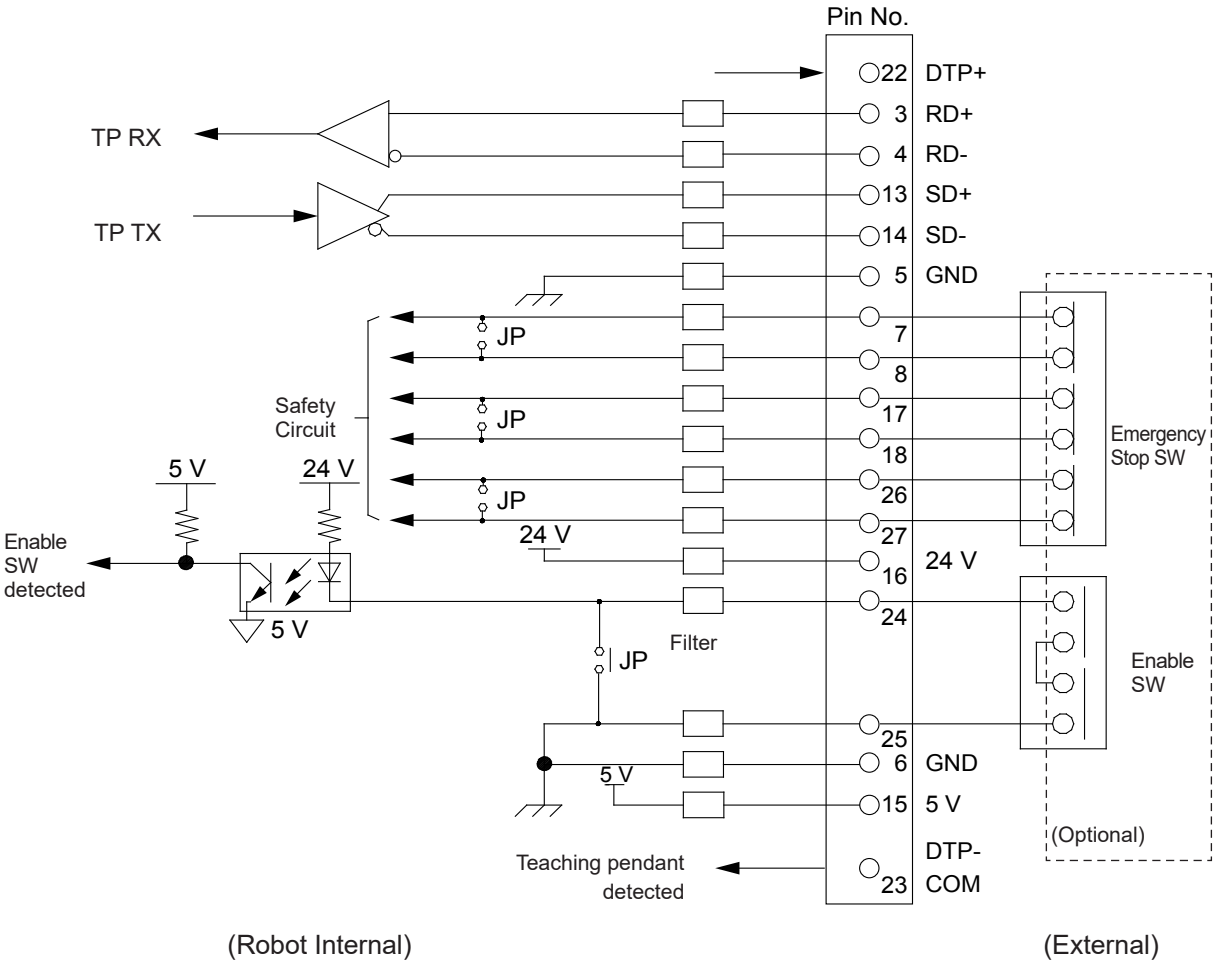
17.2.3 Pin Connections

RS-422 Interface

Pin No.	Name	Function
1	N.C.	
2	N.C.	
3	RD （+）	Receive data (+)
4	RD （-）	Receive data (-)
5	GND	Communication signal ground
6	GND	Communication signal ground
7	EMGSW11	Emergency stop switch contact 1 terminal 1
8	EMGSW12	Emergency stop switch contact 1 terminal 2
9	N.C.	
10	N.C.	
11	N.C.	
12	N.C.	
13	SD （+）	Send data (+)
14	SD （-）	Send data (-)
15	5 V	DC 5 V
16	24 V	DC 24 V
17	EMGSW21	Emergency stop switch contact 2 terminal 1
18	EMGSW22	Emergency stop switch contact 2 terminal 2
19	N.C.	
20	N.C.	
21	N.C.	
22	DTP	Detect connection signal
23	COM	
24	ENSW11	Enable switch contact terminal 1
25	ENSW12	Enable switch contact terminal 2
26	EMGSW31	Emergency stop switch contact 3 terminal 1
27	EMGSW32	Emergency stop switch contact 3 terminal 2
28	N.C.	
29	N.C.	

NOTE: Pin No. 24 and 25 are shorted internally for teaching pendants that do not have an enable switch.
Accordingly, even if a pendant with an enable switch is connected, these pins are not detectable. Pin No. 7 – 8, 17 – 18, and 26 – 27 are internally shorted for teaching pendants that do not have an emergency stop switch. Therefore, the emergency stop (switch) function is disabled even when Pin No. 7 – 8, 17 – 18, and 26 – 27 are open.

17.2.4 Circuit Diagram



⚠ Caution

If using a teaching pendant equipped with an emergency stop switch, make sure to connect the following pins in pairs: 7 – 8, 17 – 18, 26 – 27.
Connecting them any other way damages the emergency stop circuit.

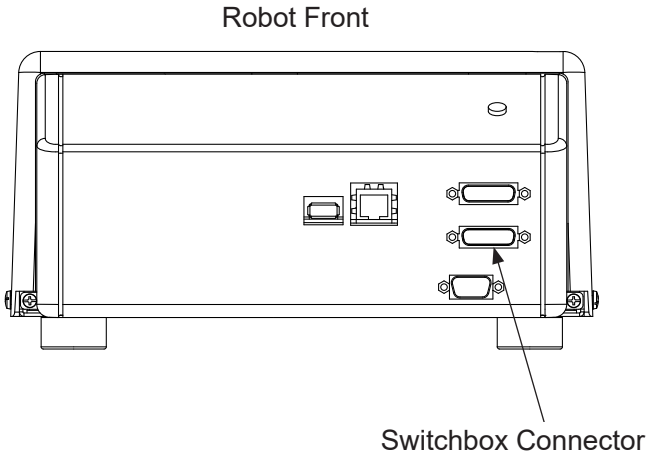
18. SWITCHBOX CONNECTOR

18.1 Switchbox Specifications

18.1.1 Connector

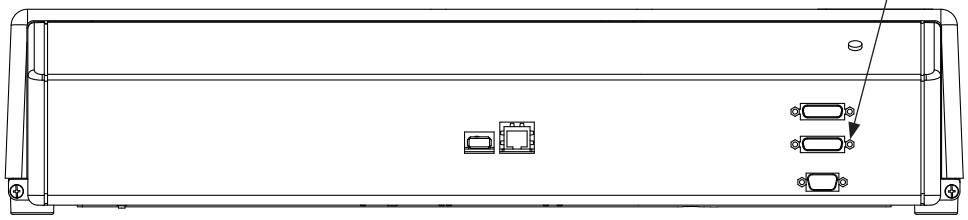
JR3200 Series

Example: JR3203N-BC

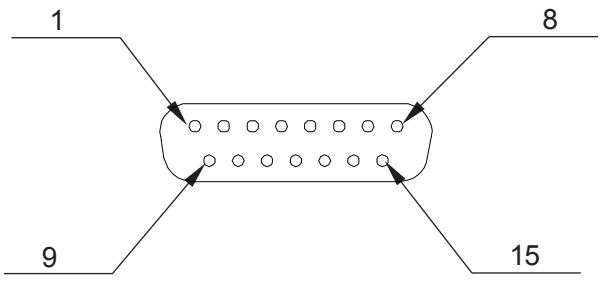


JR3300 – JR3600 Series

Example: JR3303N-BC

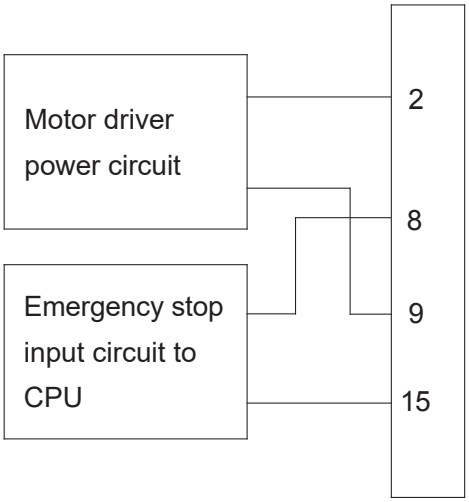


18.1.2 Pin No. (Robot Side)



18.1.3 Circuit Diagram

Pin No.	Function
2	Motor driver power supply relay input
9	
8	Emergency stop input to CPU (a signal so the robot can recognize whether or not the emergency stop switch is pressed).
15	



To connect the emergency stop switch, connect it between pins 2 – 9 and 8 – 15. Use a normally closed switch as the connection point.

⚠ Caution

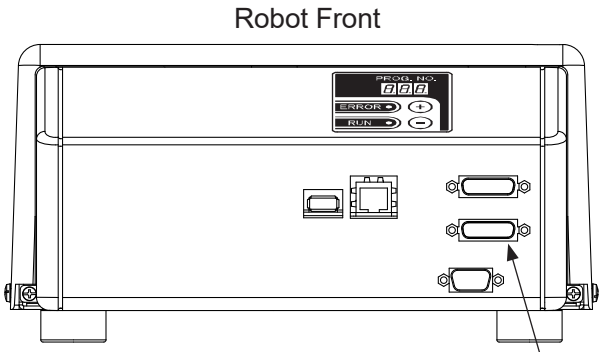
Do not assign wiring other than the wiring specified above.
Assigning the wrong wiring can damage the safety circuit.

18.2 Basic Switchbox Specifications

18.2.1 Connector

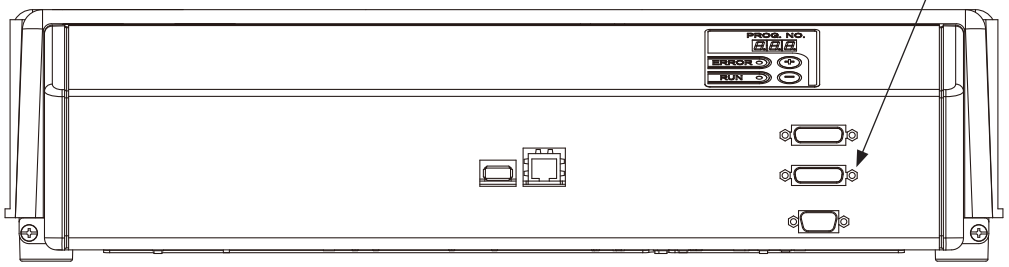
JR3200 Series

Example: JR3203N-CC

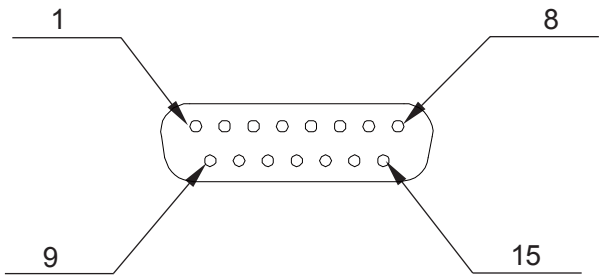


JR3300 – JR3600 Series

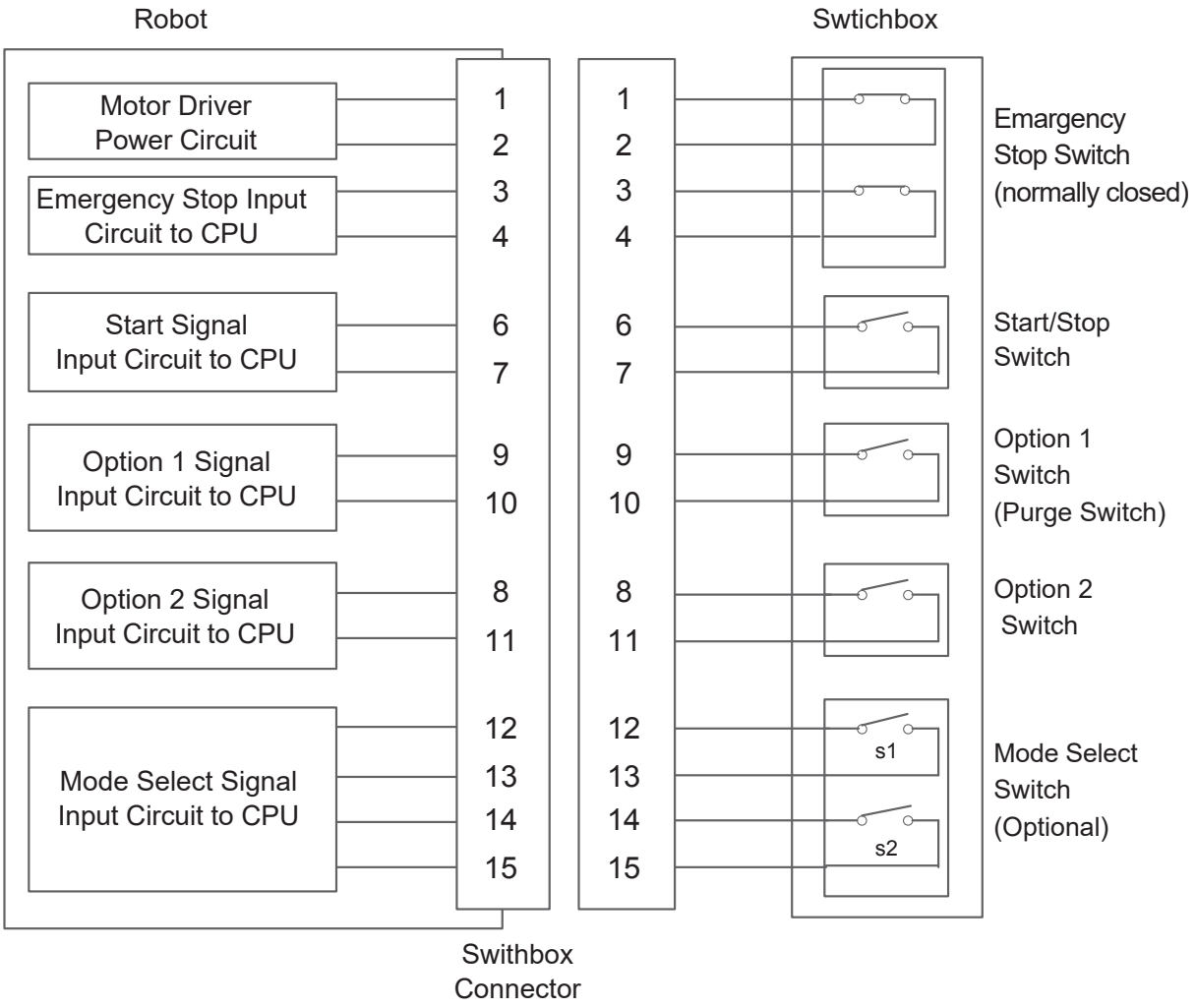
Example: JR3303N-CJ



18.2.2 Pin No. (Robot Side)



18.2.3 Circuit Diagram



⚠ Caution

Do not assign wiring other than the wiring specified above.
Assigning the wrong wiring can damage the safety circuit.

Pin No.	Function	System Flags*
1	Relay input for the motor driver power supply relay input	–
2		
3	Emergency stop input to the CPU (a signal so the robot can recognize whether or not the emergency stop switch is pressed)	#systemFlag(63) (#FemgSW)
4		
5	(No connection)	–
6	Start signal input to the CPU (a signal so the robot can recognize whether or not the start/stop switch is pressed)	#systemFlag(60) (#FstartSW)
7		
9	Option 1 signal input to the CPU (a signal so the robot can recognize whether or not the option 1 switch is pressed)	#systemFlag(111) (#FoptionSW1) NOTE: the following system flag is also used for dispensing specification robots: #systemFlag(80) (#FpurgeSW)
10		
8	Option 2 signal input to the CPU (a signal so the robot can recognize whether or not the option 2 switch is pressed)	#systemFlag(112) (#FoptionSW2)
11		
12	Mode select switch signal input to the CPU (a signal so the robot can recognize the status of the mode select switch)	–
13		
14		–
15		

* For further details on system flags, refer to “22. SYSTEM FLAG LIST.”

18.2.4 Creating a Basic Switchbox According to Your Specifications

When connecting each switch, refer to “18.2.3 Circuit Diagram” for wiring.

- Emergency Stop Switch
  Type: normally closed switch
  Recommended part: A165E-S02 (Manufacturer: OMRON)

- Start/Stop Switch, Option 1 and Option 2 Switches
  Type: momentary switch
  Recommended part: LBW6MB-M1T1L (Manufacturer: IDEC)

- Mode Select Switch
  Type: alternate action switch
  Recommended part: LBW6MK-3ST2D (Manufacturer: IDEC)
  The modes are defined according to the settings for the 2 contacts (s1 and s2) as follows:

		Contact s1	
		ON	**OFF**
Contact s2	ON	-	External Run Mode
	OFF	Teaching Mode	Switch Run Mode

- Switchbox Connection Cord
  Type: Shielded cable (breakdown voltage DC 30 V and above, AWG24) connected to both a metal connector and the switchbox metal casing to meet EMC standards.(Electromagnetic compatibility)

- Connection Cord Connector
  Type: D-SUB15 pin socket. Metal connector to meet EMC standards.(Electromagnetic compatibility)
  Recommended parts:
  Connector: DA-15SF-N (Manufacturer: Japan Aviation Electronics Industry)
  Junction Seal: DA-C8-J10-F5-1R (Manufacturer: Japan Aviation Electronics Industry)
  Long screw type #4-40 inch screw

- Switchbox Casing
  Type: Made from metal to meet EMC standards.(Electromagnetic compatibility)

19. COMMAND LIST

NOTE: If you assign point job data that contain any of the highlighted ( ) commands to a CP passing point, the commands are ignored.

19.1 Point Job Data

Category	Command	Necessary Parameter	Description
ON/OFF Output Control	set	Output Destination	Output ON.
	reset	Output Destination	Output OFF.
	pulse	Output Destination, Pulse Width	Output ON pulses of predetermined length.
	invPulse	Output Destination, Pulse Width	Output OFF pulses of predetermined length.
	delaySet	Output Destination, Delay Time	Output ON after the predetermined delay time.
	delayReset	Output Destination, Delay Time	Output OFF after the predetermined delay time.
	onoffBZ	ON Time, OFF Time	Sound the buzzer intermittently.
	onoffGLED	ON Time, OFF Time	Green LED blinks on robot front or on switchbox.
	onoffRLED	ON Time, OFF Time	Red LED blinks on robot front or on switchbox.
	dataOut	Output Value, Output Dest., Output Width	Output numeric data or a tag code assigned to a point to the I/O.
	dataOutBCD	Output Value, Output Dest., Output Width	Output numeric data or a tag code assigned to a point to the I/O in BCD (binary-coded decimal).
if Branch, Wait Condition	if	–	Conditional branching
	then	–	Perform if true.
	else	–	Perform if false.
	endIf	–	End of conditional branching
	waitCondTime	Wait Time	Wait for conditions for a designated period.
	timeUp	–	Perform when time is up.
	endWait	–	End of wait condition
	waitCond	–	Wait for conditions.

Category	Command	Necessary Parameter	Description
Condition	ld	Boolean variable or Expression	Input ON.
	ldi	Boolean variable or Expression	Input OFF.
	and	Boolean variable or Expression	Serial input ON.
	ani	Boolean variable or Expression	Serial input OFF.
	or	Boolean variable or Expression	Parallel input ON.
	ori	Boolean variable or Expression	Parallel input OFF.
	anb	–	Serial block connection
	orb	–	Parallel block connection
Delay	delay	Delay Time	Stop for the exact specified time.
	dataIn	Numeric Variable Name, Input Bit Number, Input Source	Read numeric data from the I/O.
	dataInBCD	Numeric Variable Name, Input Bit Number, Input Source	Read numeric data in BCD from the I/O.
	waitStart	–	Wait for a start instruction.
	waitStartBZ	–	Wait for a start instruction while sounding the buzzer.
Pallet	loopPallet	Pallet Routine Number, go Point Number	Pallet loop
	resPallet	Pallet Routine Number	Reset the pallet counter.
	incPallet	Pallet Routine Number	Increase the pallet counter number. (+1)

Category	Command	Necessary Parameter	Description
Execute Flow Control	callBase	–	At a user-defined point with a point job number set to it, call the point job defined by that point type.
	callJob	Point Job Number	Subroutine call point job data specified by number.
	callPoints	Variable Name (Identifier)	Perform a specified point string (defined in Customizing Mode).
	returnJob	–	End of point job
	returnFunc	Return Value (Expression)	Terminate the function by assigning the value of the specified expression as a return value. (This command is valid with functions only.)
	callProg	Program Number	Subroutine call a program specified by number.
	endProg	–	End of program
	goPoint	Condition Number, go Point Number	Jump to a specified point.
	goRPoint	Condition Number, Relative go Point Number	Jump to a relatively-specified point.
	goCRPoint	PTP Condition Number, Relative go Point Number	Jump to a selected destination during a CP movement.
	jump	Jump destination, Label Number	Jump to a specified label.
	Label	Label Number	Label
For, do-loop	for	Variable Name, Initial Value, End Value, Step Value	Repeat commands between *for* and *next* until the specified variable changes from the initial value to the end value.
	next	–	
	exitFor	–	Break from the *for* loop.
	do	–	Repeat commands between do and loop.
	loop	–	
	exitDo	–	Break from the *do* loop.

Category	Command	Necessary Parameter	Description
Move	upZ	Speed, Distance	Raise Z
	downZ	Speed, Distance	Descend Z
	movetoZ	Speed, Z movement pos.	Move Z
	lineMove	Speed, Movement/Rotation Distance of Each Axis	Make an axis move a specified distance (relative distance) at a specified speed in a CP line movement (relative move command). Entering this command displays the specified speeds, directions and distances of each axis as follows: Example: lineMoveSpeed 20 lineMoveX 10 lineMoveY 20 lineMoveZ 0 lineMoveR 0
	lineMoveStopIf	–	Terminate an axis movement made by *lineMove* mid-movement if the conditions are met.
	endLineMove	–	End of *lineMoveStopIf* condition statements.
	initMec	Specified Axis	Initialize the specified axis.
	checkPos	–	Detect a position error.
	monoMove	Specified Axis	Makes movement for 1 specified axis. You can specify the axis from among the X, Y, Z, R and the auxiliary MT1 and MT2 axes.
	mMoveDistance	Distance	This specifies the distance for movement using the monoMove command. The unit parameter varies depending on the axis specified.
	mMoveSpeed	Speed	Specifies the speed for movement using the monoMove command. The unit parameter varies depending on the axis specified.

Category	Command	Necessary Parameter	Description
Move	mMoveAccelRate	Acceleration rate (%)	These specify the acceleration for movement using the monoMove command. Specify either the mMoveAccelRate or mMoveAccelTime command. With the mMoveAccelRate command, acceleration is specified as a percentage (%) of the default acceleration. With the mMoveAccelTime command, acceleration is specified as the time (msec) it takes to reach the speed specified for the mMoveSpeed command.
	mMoveAccelTime	Acceleration time (msec)	
	monoMoveStopIf	−	This ends the movement made by the monoMove command when the conditions are met. You only need to input this command when using conditions to stop the movement.
	endMonoMove	−	This indicates the end of the movement for the monoMove command.
LCD, 7SLED	clrLCD	−	Clear the LCD display.
	clrLineLCD	Clear Line (1 – 13)	Clear a specified line on the LCD display.
	outLCD	Display Line (1 – 13), Display Column (1 – 40), Character String	Display strings on the LCD display.
	eoutLCD	Display Line (1 – 13), Display Column (1 – 40), Character String	Display the expression result on the LCD display.
	sys7SLED	−	Return the 7 segment LED display changed by out7SLED.
	out7SLED	Type, Output Value	7 segment LED output.

Category	Command	Necessary Parameter	Description
COM/Ethernet I/O	outCOM	Port, Character String	Character string output from COM and Ethernet.
	eoutCOM	Port, Character String Expression	Equation result output from COM and Ethernet.
	setWTCOM	Port, Wait Time	Set a COM and Ethernet wait time (time-out period) for receiving data.
	inCOM	Variable Name, Port, Character Length	Assign the received data from COM and Ethernet to a specified variable.
	cmpCOM	Port, Character String	Compare the received data from COM and Ethernet and the string. The result is entered into the system flags (sysFlag(1) – sysFlag(15)).
	ecmpCOM	Port, Character String Expression	Compare the received data from COM and Ethernet and string expression. The result is entered into the system flags (sysFlag(1) – sysFlag(15)).
	clrCOM	Port	Clear the COM and Ethernet receive buffer.
	shiftCOM	Port, Shift Number	Shift data received from COM and Ethernet. Delete the amount of byte data shifted, from the top.
	stopPC	–	Stop COM1 and Ethernet communication. Communication is not made until the power is cycled or the startPC command is received.
	startPC	–	Start COM1 and Ethernet communication. Communication is made possible when the power is turned ON so this command is not needed.
	connect	Port, numerical value	Connect to the communication destination. (Refer to “21.1.2 Connection Process” in *Functions II.*)
	disconnect	Port, numerical value	Disconnect from the communication destination. (Refer to “21.1.2 Connection Process” in *Functions II.*)

Category	Command	Necessary Parameter	Description
Variable, Comment, System Control	declare	Variable Type, Variable Name	Local variable declaration
	let	Expression	Assign the right side sum results of the expression to the left side variables. The symbols +, -, *, /, =, (,), & can be used.
	rem	Character String	One line comment
	crem		End of line comment (only displayed when decompiled)
	setProgNum	Program Number	Change the program number. Do not carry out this command while the robot is running. Use the command *callProg* if you want to change programs during a run.
	setSeqNum	PLC Program Number	Change the PLC program number in “system data”.
Camera, Z Sensor	cameraWadj	Work Adjustment Number	Acquire an image with the camera and calculate the offset values according to the [Workpiece Adjustment] settings.
	wCameraWadj	Work Adjustment Number, Shot Number	Use this command when calculating [Workpiece Adjustment] offset values from two camera images.
	multiCamWadj	−	Execute camera with counter adjustment
	incMultiCamWadj	−	Increment the camera with counter adjustment sub-counter values.
	clrMultiCamWadj	−	Clear the sub-values of the camera with counter adjustment.
	cameraTool	Tool Number	Acquire an image with a camera and calculate [TCP-X] and [TCP-Y] from the data gained according to [Point Tool Data Settings].
	cameraPallet	Pallet Routine Number	Acquire an image with the camera and set the number of marks and coordinates acquired as the routine number and coordinates for the [Pallet Routine].
	takeZWadj	Work Adjustment Number	Calculate the Z offset from the data gained from the distance/touch sensor according to the [Workpiece Adjustment] settings.
	multiTakeZWadj	Work Adjustment Number	Executes the content set in the Z adjustment menu of the CCD camera adjustment with counter settings. The adjustment amount is recorded in the workpiece adjustment counter each time this is executed.

NOTE: When the start channel is set to anything other than COM1, COM1 communication operations are handled differently depending on the system software version.

- System Software Versions 6 or Lower
  All communication command functions for COM1 are disabled when the start channel is set to anything other than [COM1].
- System Software Versions 6 or Higher
  Communication commands not related to movements are enabled even if the start channel is set to anything other than [COM1]. If you want to process arbitrary communication with COM1 using commands such as *inCOM* and *outCOM*, use *stopPC* in advance to stop other communication functions. If you do not use *stopPC* to stop other communication functions, you cannot communicate properly with the robot and you will receive an error response from the input of character strings arbitrarily defined by you.

NOTE: For [Camera, Z Adjustment] commands, refer to the operation manual *Camera & Sensor Functions*.
For information regarding the Mono Movement commands, refer to the operation manual *Auxiliary Axis Functions*. The Mono Movement commands are only valid when using a robot equipped with the I/O-MT connector. (The I/O-MT connector is optional for all models. Select between the I/O-1 connector or I/O-MT connector with a JR3200 Series model).

19.2 Execute Conditions

Category	Command	Necessary Parameter	Description
Condition	ld	Boolean variable or expression	Input ON.
	ldi	Boolean variable or expression	Input OFF.
	and	Boolean variable or expression	Serial input ON.
	ani	Boolean variable or expression	Serial input OFF.
	or	Boolean variable or expression	Parallel input ON.
	ori	Boolean variable or expression	Parallel input OFF.
	anb	–	Serial block connection
	orb	–	Parallel block connection

19.3 PLC Programs

Category	Command	Necessary Parameter	Description
Contact Point	ld	Boolean variable	Input ON.
	ldi	Boolean variable	Input OFF.
	and	Boolean variable	Serial input ON.
	ani	Boolean variable	Serial input OFF.
	or	Boolean variable	Parallel input ON.
	ori	Boolean variable	Parallel input OFF.
Coil	out	Output Destination	Coil movement
	set	Output Destination	Hold operation output.
	reset	Output Destination	Hold operation release
	pls	Output Destination	Rising pulse output.
	plf	Output Destination	Falling pulse output.
Connection	anb	–	Parallel circuit serial block connection
	orb	–	Serial circuit parallel block connection
	mps	–	Mid-calculation result storage
	mrd	–	Mid-calculation result readout
	mpp	–	Mid-calculation result readout and reset
Others	nop	–	No operation

20. VARIABLE LIST

With this robot you can use built-in variables (which are built into the robot as functions), and user-defined variables (which can be freely defined by the user).

■ User-defined Variables

Except for local variables (variables valid only in defined point job data which are defined by the declare command), user variables are defined in the Customizing Mode.

■ Built-in Variables

In the character and expression entry screen, when [BVar] is displayed at the very bottom of the LCD (above the F3 key), press the F3 key to view a list of the built-in variables.

The built-in variables are listed in the following tables.

“Type” refers to the type of variable.

- boo Boolean type, 1 bit variable that holds only 1 (true) and 0 (false).
- num Numeric type, 8 byte real type variable.
- str Character string type. Maximum of 255 bytes.

“Access” refers to the read/write access.

- R Read only type variable.
- W Write only type variable.
- R/W Read and write type variable.

• Free Variable

Type	Identifier	Description	Access	Remarks
boo	#mv (1 to 99)	Boolean variable	R/W	
boo	#mkv (1 to 99)	Boolean variable (keeping variable)	R/W	*1
num	#nv (1 to 99)	Numerical variable	R/W	
num	#nkv (1 to 99)	Numerical variable (keeping variable)	R/W	*1
str	#sv (1 to 99)	Character string variable	R/W	
str	#skv (1 to 99)	Character string variable (keeping variable)	R/W	*1

• Input Variable

Type	Identifier	Description	Access	Remarks
boo	#sysIn1 to #sysIn16	I/O-SYS input	R	
boo	#genIn1 to #genIn16	I/O-1 input	R	

num	#fbIn (a, b)
	a=I/O address (0x1000 to 0x17FF)
	b=bit width (1 to 32)
		Fieldbus I/O input	R	*2

- Output Variable

Type	Identifier	Description	Access	Remarks
boo	#sysOut1 to #sysOut16	I/O-SYS output	W	
boo	#genOut1 to #genOut16	I/O-1 output	W	

num	#fbOut (a, b)
	a=I/O address (0x1800 to 0x1FFF)
	b=bit width (1 to 32)
		Fieldbus I/O output	W	*2

- System Flag

Type	Identifier	Description	Access	Remarks
boo	#sysFlag(1 to 999)	System flag. Refer to “22. SYSTEM FLAG LIST.”	R	

- Hardware

Type	Identifier	Description	Access	Remarks
boo	#optionLED (1 to 3)	Option LEDs	R/W	

- Specialized Variable

Type	Identifier	Description	Access	Remarks
num	#downTimer1 to #downTimer10	A countdown timer (ms unit).	R/W	
num	#jobStartHight	The job start height after moving (mm unit)	R/W	
num	#jobStartX	The job start X axis position after moving (mm unit)	R/W	
num	#jobStartY	The job start Y axis position after moving (mm unit)	R/W	
num	#jobStartR	The job R axis position after moving (deg unit)	R/W	
num	#priorityPTPCondNum	Prioritized PTP condition number	R/W	

- Pallet Routine

Type	Identifier	Description	Access	Remarks
boo	#palletFlag (1 to 100)	Pallet flag	R	
num	#palletCount (1 to 100)	Pallet counter	R/W	

• PLC Program

Type	Identifier	Description	Access	Remarks
boo	#seqT (1 to 99)	PLC timer. Returns 1 (true) when the timer reaches a value greater than the count specified in #seqTCount.	R/W	
num	#seqTCount (1 to 99) 1 to 50: incremental timer 51 to 99: decremental timer	Pallet counter value	R/W	
boo	#seqC (1 to 99)	PLC counter. Returns 1 (true) when the timer reaches a value greater than the count specified in #seqCCount.	R/W	
num	#seqCCount (1 to 99)	PLC counter value	R/W	

• Workpiece Adjustment (additional function data)

Type	Identifier	Description	Access	Remarks
num	#workAdj_X (1 to 3000)	X adjustment amount (mm unit)	R/W	
num	#workAdj_Y (1 to 3000)	Y adjustment amount (mm unit)	R/W	
num	#workAdj_Z (1 to 3000)	Z adjustment amount (mm unit)	R/W	
num	#workAdj_R (1 to 3000)	R adjustment amount (deg unit)	R/W	
num	#workAdj_Rotation (1 to 3000)	Rotation adjust. amount (deg unit)	R/W	

• CCD Camera Workpiece Adjustment with Counter

Type	Identifier	Description	Access	Remarks
num	#mulWorkAdj_Wrt_Cam	Write counter for camera adjustment amount.	R	
num	#mulWorkAdj_Wrt_Zadj	Write counter for Z adjustment amount.	R	
num	#mulWorkAdj_Read	Read counter for adjustment value.	R/W	
num	#mulWorkAdj_Num	Counter for workpiece adjustment number.	R/W	
num	#mulWorkAdj_Result	Counter for data result 0=fail, 1=success	R/W	

- Point During Execution of Current Program

Type	Identifier	Description	Access	Remarks
num	#point_X	X axis coordinates (mm unit)	R/W	
num	#point_Y	Y axis coordinates (mm unit)	R/W	
num	#point_Z	Z axis coordinates (mm unit)	R/W	
num	#point_R	R axis coordinates (deg unit)	R/W	
num	#point_MT1	MT1 axis coordinates (arbitrary unit)	R/W	*3
num	#point_MT2	MT2 axis coordinates (arbitrary unit)	R/W	*3
num	#point_LineSpeed	Line speed (mm/s unit)	R/W	
num	#point_CondNum	Condition number	R/W	
num	#point_MoveBeforeNum	Job Before Moving number	R/W	
num	#point_MovingNum	Job While Moving number	R/W	
num	#point_MoveAfterNum	Job After Moving number	R/W	
num	#point_CPWorkNum	Job while CP Moving number	R/W	
num	#point_PTPCondNum	PTP condition number	R/W	
num	#point_CPCondNum	CP condition number	R/W	
num	#point_ToolNum	Tool data number	R/W	
num	#point_PalletNum	Pallet routine number	R/W	
num	#point_WorkAdjNum	Workpiece adjustment number	R/W	
num	#point_RunCondNum	Execution condition number	R/W	
num	#point_TagCode	Tag code	R/W	

- Arbitrary Point in Current Program

Type	Identifier	Description	Access	Remarks
num	#P_X (1 to last point no)	X axis coordinates (mm unit)	R/W	
num	#P_Y (1 to last point no)	Y axis coordinates (mm unit)	R/W	
num	#P_Z (1 to last point no)	Z axis coordinates (mm unit)	R/W	
num	#P_R (1 to last point no)	R axis coordinates (deg unit)	R/W	
num	#P_MT1 (1 to last point no)	MT1 axis coordinates (arbitrary unit)	R/W	*3
num	#P_MT2 (1 to last point no)	MT2 axis coordinates (arbitrary unit)	R/W	*3
num	#P_LineSpeed (1 to last point no)	Line speed (mm/s unit)	R/W	
num	#P_CondNum (1 to last point no)	Condition number	R/W	
num	#P_MoveBeforeNum (1 to last point no)	Job Before Moving number	R/W	
num	#P_MovingNum (1 to last point no)	Job While Moving number	R/W	
num	#P_MoveAfterNum (1 to last point no)	Job After Moving number	R/W	
num	#P_CPWorkNum (1 to last point no)	Job while CP Moving number	R/W	

Type	Identifier	Description	Access	Remarks
num	#P_PTPCondNum (1 to last point no)	PTP condition number	R/W	
num	#P_CPCondNum (1 to last point no)	CP condition number	R/W	
num	#P_ToolNum (1 to last point no)	Tool data number	R/W	
num	#P_PalletNum (1 to last point no)	Pallet routine number	R/W	
num	#P_WorkAdjNum (1 to last point no)	Workpiece adjustment number	R/W	
num	#P_RunCondNum (1 to last point no)	Execution condition number	R/W	
num	#P_TagCode (1 to last point no)	Tag code	R/W	

- Arbitrary Point in Arbitrary Program Number (a = 1 to 999, b = 1 to last point no)

Type	Identifier	Description	Access	Remarks
num	#prog_P_X (a, b)	X axis coordinates (mm unit)	R/W	
num	#prog_P_Y (a, b)	Y axis coordinates (mm unit)	R/W	
num	#prog_P_Z (a, b)	Z axis coordinates (mm unit)	R/W	
num	#prog_P_R (a, b)	R axis coordinates (deg unit)	R/W	
num	#prog_P_MT1 (a, b)	MT1 axis coordinates (arbitrary unit)	R/W	*3
num	#prog_P_MT2 (a, b)	MT2 axis coordinates (arbitrary unit)	R/W	*3
num	#prog_P_LineSpeed (a, b)	Line speed (mm/s unit)	R/W	
num	#prog_P_CondNum (a, b)	Condition number	R/W	
num	#prog_P_MoveBeforeNum (a, b)	Job Before Moving number	R/W	
num	#prog_P_MovingNum (a, b)	Job While Moving number	R/W	
num	#prog_P_MoveAfterNum (a, b)	Job After Moving number	R/W	
num	#prog_P_CPWorkNum (a, b)	Job while CP Moving number	R/W	
num	#prog_P_PTPCondNum (a, b)	PTP condition number	R/W	
num	#prog_P_CPCondNum (a, b)	CP condition number	R/W	
num	#prog_P_ToolNum (a, b)	Tool data number	R/W	
num	#prog_P_PalletNum (a, b)	Pallet routine number	R/W	
num	#prog_P_WorkAdjNum (a, b)	Workpiece adjustment number	R/W	
num	#prog_P_RunCondNum (a, b)	Execution condition number	R/W	
num	#prog_P_TagCode (a, b)	Tag code	R/W	

- Tool Data for All Program Common Settings

Type	Identifier	Description	Access	Remarks
num	#comm_ToolData_Mass	Tool mass (select tool mass no.)	R/W	*4
num	#comm_ToolData_X	TCP-X (mm unit)	R/W	
num	#comm_ToolData_Y	TCP-Y (mm unit)	R/W	
num	#comm_ToolData_DeltaZ	TCP-deltaZ (mm unit)	R/W	

• PTP Condition for All Program Common Settings

Type	Identifier	Description	Access	Remarks
num	#comm_PTPData_Speed	PTP speed (% unit)	R/W	
num	#comm_PTPData_R_Speed	R axis rotate speed (% unit)	R/W	
num	#comm_PTPData_R_Acc	R axis rotate acceleration (% unit)	R/W	
num	#comm_PTPData_Archmotion	Arch motion 0 = Z movement relative distance specification. 1 = Z movement absolute position specification.	R/W	
num	#comm_PTPData_Z_Height	Z movement height (mm unit)	R/W	
num	#comm_PTPData_Z_Up_Dis	Z axis up distance (mm unit)	R/W	
num	#comm_PTPData_Z_Down_Dis	Z axis down distance (mm unit)	R/W	
num	#comm_PTPData_Move_Dis_Pos	Horizontal movement pos. (mm unit)	R/W	
num	#comm_PTPData_Move_Start_Pos	Horizontal movement starting pos. (mm unit)	R/W	
num	#comm_PTPData_Down_Start_Pos	Down starting pos. (mm unit)	R/W	

• CP Conditions for All Program Common Settings

Type	Identifier	Description	Access	Remarks
num	#comm_CPData_Acc	CP acceleration (% unit)	R/W	
num	#comm_CPData_R_Speed	R axis rotation speed (% unit)	R/W	
num	#comm_CPData_R_Acc	R axis rotation acceleration (% unit)	R/W	

• Tool Data for Individual Program Settings

Type	Identifier	Description	Access	Remarks
num	#prog_ToolData_EachCommon (1 to 999)	Common/individual selection 0 = common, 1 = individual	R/W	
num	#prog_ToolData_Mass (1 to 999)	Tool mass (select tool mass no.)	R/W	*4
num	#prog_ToolData_X (1 to 999)	TCP-X (mm unit)	R/W	
num	#prog_ToolData_Y (1 to 999)	TCP-Y (mm unit)	R/W	
num	#prog_ToolData_DeltaZ (1 to 999)	TCP-deltaZ (mm unit)	R/W	

• PTP Condition for Individual Program Settings

Type	Identifier	Description	Access	Remarks
num	#prog_PTPData_EachCommon (1 to 999)	Common/individual selection 0 = common, 1 = individual	R/W	
num	#prog_PTPData_Speed (1 to 999)	PTP speed (% unit)	R/W	
num	#prog_PTPData_R_Speed (1 to 999)	R axis rotate speed (% unit)	R/W	
num	#prog_PTPData_R_Acc (1 to 999)	R axis rotate acceleration (% unit)	R/W	
num	#prog_PTPData_Archmotion (1 to 999)	Arch motion 0 = Z movement relative distance specification. 1 = Z movement absolute position specification.	R/W	
num	#prog_PTPData_Z_Height (1 to 999)	Z movement height (mm unit)	R/W	
num	#prog_PTPData_Z_Up_Dis (1 to 999)	Z axis up distance (mm unit)	R/W	
num	#prog_PTPData_Z_Down_Dis (1 to 999)	Z axis down distance (mm unit)	R/W	
num	#prog_PTPData_Move_Dis_Pos (1 to 999)	Horizontal movement pos. (mm unit)	R/W	
num	#prog_PTPData_Move_Start_Pos (1 to 999)	Horizontal movement starting pos. (mm unit)	R/W	
num	#prog_PTPData_Down_Start_Pos (1 to 999)	Down starting pos. (mm unit)	R/W	

• CP Condition for Individual Program Settings

Type	Identifier	Description	Access	Remarks
num	#prog_CPData_EachCommon (1 to 999)	Common/individual selection 0 = common, 1 = individual	R/W	
num	#prog_CPData_Acc (1 to 999)	CP acceleration (% unit)	R/W	
num	#prog_CPData_R_Speed (1 to 999)	R axis rotate speed (% unit)	R/W	
num	#prog_CPData_R_Acc (1 to 999)	R axis rotate acceleration (% unit)	R/W	

• Tool Data for Point Additional Function

Type	Identifier	Description	Access	Remarks
num	#tool_Mass (1 to 100)	Tool mass (select tool mass no.)	R/W	*4
num	#tool_X (1 to 100)	TCP-X (mm unit)	R/W	
num	#tool_Y (1 to 100)	TCP-Y (mm unit)	R/W	
num	#tool_Z (1 to 100)	TCP-deltaZ (mm unit)	R/W	
num	#tool_R(1 to 100)	R axis rotate amount (deg unit) (when using [Set TCP by Camera])	R/W	

• PTP Condition for Point Additional Function

Type	Identifier	Description	Access	Remarks
num	#ptp_Speed (1 to 100)	PTP speed (% unit)	R/W	
num	#ptp_R_Speed (1 to 100)	R axis rotate speed (% unit)	R/W	
num	#ptp_R_Acc (1 to 100)	R axis rotate acceleration (% unit)	R/W	
num	#ptp_Archmotion (1 to 100)	Arch motion 0 = Z movement relative distance specification. 1 = Z movement absolute position specification.	R/W	
num	#ptp_Z_Height (1 to 100)	Z movement height (mm unit)	R/W	
num	#ptp_Z_Up_Dis (1 to 100)	Z axis up distance (mm unit)	R/W	
num	#ptp_Z_Down_Dis (1 to 100)	Z axis down distance (mm unit)	R/W	
num	#ptp_Move_Dis_Pos (1 to 100)	Horizontal movement pos. (mm unit)	R/W	
num	#ptp_Move_Start_Pos (1 to 100)	Horizontal movement starting pos. (mm unit)	R/W	
num	#ptp_Down_Start_Pos (1 to 100)	Down starting pos. (mm unit)	R/W	

• CP Condition for Point Additional Function

Type	Identifier	Description	Access	Remarks
num	#cp_Acc (1 to 100)	CP acceleration (% unit)	R/W	
num	#cp_R_Speed (1 to 100)	R axis rotate speed (% unit)	R/W	
num	#cp_R_Acc (1 to 100)	R axis rotate acceleration (% unit)	R/W	

• Model Information, etc.

Type	Identifier	Description	Access	Remarks
num	#Model_Series	Series information. “3” is always returned.	R	
num	#Model_AxisNum	Number of mechanical axes: 2 = 2 axis model (X, Y) 3 = 3 axis model (X, Y, Z) 4 = 4 axis model (X, Y, Z, R)	R	
num	#Model_Info	Model information: 0 = Desktop Robot JR3000 2 = Cartesian Robot JC-3	R	
num	#Model_AuxAxis	Auxiliary axis (I/O-MT) existence: 0 = no 1 = yes	R	

Type	Identifier	Description	Access	Remarks
num	#Model_Language	Current language setting: 0 = English, 1 = Japanese, 2 = German, 3 = Italian, 4 = Spanish, 5 = French, 6 = Korean, 7 = Simplified Chinese, 8 = Czech, 9 = Vietnamese 10 = Traditional Chinese	R	

*1: Variables which hold their values even if the robot is turned OFF are keeping variables.

*2: Fieldbus I/O variables:

- Variables accessed with a bit width of 1 are Boolean variables. Variables accessed with a bit width of 2 or more are Numerical variables.
- Specify the I/O address as 4 hexadecimal digits continuing on from 0x.
- You can specify a bit width of 1 to 32 and up to 2 words (4 bytes) maximum. However, if the address specified exceeds the output area due to the Fieldbus settings, the exceeded bits are not included.

*3: The unit type used for MT1 and MT2 position coordinates is the unit type set separately in auxiliary axis configuration settings.

*4: The tool mass numbers and kg mass unit varies depending on the model you are using, as shown below:

	JR3200	JR3300 − JR3600
0	1 kg	1 kg
1	3.5 kg	4 kg
2	-	7 kg
3	-	-

21. FUNCTION LIST

With this robot, you can use built-in functions (which are built into the robot as an operational function) and user-defined functions.

User-defined Functions: These are defined in Customizing Mode. (Refer to the operation manual *Functions IV* for details about Customizing Mode.)

Built-in Functions: In the character and expression entry screen, when [BFunc] is displayed at the very bottom of the LCD screen (above the F2 key), press the F2 key to view a list of the built-in functions.

x, y: Numerical value or numerical variable

n, m: Round the numeric value up or off to the specified digit(s)

a, b: String or string variable

Category	Type	Identifier	Description
Robot System	num	currentMainProgNumber ()	Currently performed main program number
	num	currentSubProgNumber ()	Currently performed sub program number
	num	currentPointNumber ()	Currently performed point number
	num	currentArmX ()	Current X coordinate [mm]
	num	currentArmY ()	Current Y coordinate [mm]
	num	currentArmZ ()	Current Z coordinate [mm]
	num	currentArmR ()	Current R coordinate [deg]
	num	currentCmdArmX ()	Current command X coordinate [mm]
	num	currentCmdArmY ()	Current command Y coordinate [mm]
	num	currentCmdArmZ ()	Current command Z coordinate [mm]
	num	currentCmdArmR ()	Current command R coordinate [deg]
	num	currentArmH ()	Current coordinate system (1:righty -1: lefty) NOTE: This is fixed as 1:righty for desktop robots
	num	numCOM (COM port number)	Data byte count of COM receiving port
	num	moveAPTP (num a, num b, num X, num Y, num Z, num R)	Function of PTP movement to a designated absolute position. The robot moves by a PTP movement to a specified position.
	num	moveRPTP (num a, num b, num X, num Y, num Z, num R)	Function of PTP movement to a designated relative position. The robot makes a PTP movement from the current position to a remote position by exactly the specified distance.
	num	isConditionData (n)	Displays whether the specified condition data number is available (1) or not (0).
	str	strCenterLCD (a)	Adjusts the strings on the teaching pendant LCD (centering).

x, y: Numerical value or numerical variable

n, m: Round the numeric value up or off to the specified digit(s)

a, b: String or string variable

Category	Type	Identifier	Description
Robot System	str	strRightLCD (a)	Adjusts the strings on the teaching pendant LCD (right justification).
	str	strPlusRLCD (a, b)	Teaching pendant LCD: Right priority; items on the right are displayed in full if there is an overlap.
	str	strPlusLLCD (a, b)	Teaching pendant LCD: Left priority; Items on the left are displayed in full if there is an overlap.
	num	getSystemPTPmoveTime ()	Valid only for [Job while Moving]. Time required for the current PTP movement [sec]
	num	getSystemPTPrestTime ()	Valid only for [Job while Moving]. Time left before the current PTP movement ends (reaching the destination) [sec]
	num	Pause (X)	Pause cannot be performed halfway through a movement. The argument (x) in the brackets is the pause number for when executing Reference Value.
	str	getUserMessage (x)	Acquire the message character string defined by number and specified by x.
	num	addPointSkip ()	Register a specified point to skip.
	num	delPointSkip ()	Clear the skip operation for a specified point.
	num	clearPointSkip ()	Clear all skip operations for the specified points.
	num	addPalletSkip ()	Register a specified pallet routine to skip.
	num	delPalletSkip ()	Clear the skip operation for a specified pallet routine.
	num	clearPalletSkip ()	Clear all skip operations for the specified pallet routines.
	num	qCameraWadj (num X, num Y)	Calculate the workpiece adjustment using 4 camera points.

x, y: Numerical value or numerical variable

n, m: Round the numeric value up or off to the specified digit(s)

a, b: String or string variable

Category	Type	Identifier	Description
Arithmetic System	num	abs (x)	Absolute value
	num	max (x, y)	Maximum value
	num	min (x, y)	Minimum value
	num	degrad (x)	Conversion from degree to radian (x*π/180)
	num	raddeg (x)	Conversion from radian to degree (x*180/π)
	num	sqrt (x)	Square root
	num	sin (x)	Sine
	num	cos (x)	Cosine
	num	tan (x)	Tangent
	num	atan (x)	Arctangent
	num	atan2 (x, y)	Arctangent of the value of y divided by x (y/x)
	num	int (x)	Maximum integer that does not exceed x. e.g. int (1.3) → 1, int (-1.3) → -2
	num	ip (x)	Integer part of x: sgn (x)*int (abs(x)) (If x is a negative number, sgn (x) becomes -1. If x is a positive number, sgn (x) becomes +1.) e.g. ip (1.3) → 1, ip (-1.3) → -1
	num	fp (x)	Decimal part of x: x-ip (x) e.g. fp (1.3) → 0.3, fp (-1.3) → -0.3
	num	mod (x, y)	Value of x modulo y: x-y*int (x/y)
	num	remainder (x, y)	Remainder of dividing x by y: x-y*ip (x/y)
	num	pow (x, y)	x to the power of y
String System	str	chr (x)	Returns a string (1 character) with the given character code.
	num	ord (a)	Returns the top character code. Other codes are ignored. Returns 0 when the number of characters for the string set to a is 0.
	num	len (a)	Returns the string length (byte length). Not compatible with multi-bytes.
	num	strPos (a, b)	Returns the first part of the string position in a that matches b.
	str	strMid (a, n, m)	Returns the string from n to the amount of m counted from the start of string a.
	str	str (x)	Converts a numeric value to a decimal digit string.
	str	strBin (n, m)	Converts a numeric value to a binary string. m: Number of binary string digits

x, y: Numerical value or numerical variable

n, m: Round the numeric value up or off to the specified digit(s)

a, b: String or string variable

Category	Type	Identifier	Description
String System	str	strHex (n, m)	Converts a numeric value to a hexadecimal string. m: Number of hexadecimal string digits
	str	str1SI (x)	Rounds a numeric value to a 1-byte signed integer to convert it to a 1-byte string. (1-byte Signed Integer)
	str	str2SIBE (x)	Rounds a numeric value to a 2-byte signed integer to convert it to a 2-byte string using the Big Endian byte order. (2-byte Signed Integer Big Endian)
	str	str2SILE (x)	Rounds a numeric value to a 2-byte signed integer to convert it to a 2-byte string using the Little Endian byte order. (2-byte Signed Integer Little Endian)
	str	str4SIBE (x)	Rounds a numeric value to a 4-byte signed integer to convert it to a 4-byte string using the Big Endian byte order. (4-byte Signed Integer Big Endian)
	str	str4SILE (x)	Rounds a numeric value to a 4-byte signed integer to convert it to a 4-byte string using the Little Endian byte order. (4-byte Signed Integer Little Endian)
	str	str4FBE (x)	Regards a numeric value as a decimal float to convert it to a 4-byte string using the Big Endian byte order. (4-byte Float Big Endian)
	str	str4FLE (x)	Regards a numeric value as a decimal float to convert it to a 4-byte string using the Little Endian byte order. (4-byte Float Little Endian)
	str	str8DBE (x)	Regards a numeric value as a decimal float to convert it to an 8-byte string using the Big Endian byte order. (8-byte Double Float Big Endian)
	str	str8DLE (x)	Regards a numeric value as a decimal float to convert it to an 8-byte string using the Little Endian byte order. (8-byte Double Float Little Endian)
	num	val (a)	Regards a character string as a decimal digit string to convert it to a numeric value (integer type with no symbol). Returns 0 if the head of the character string is a minus sign.
	num	valBin (a)	Regards a character string as a binary string (sequence of “0”, “1”) to convert it to a numeric value.
	num	valHex (a)	Regards a character string as a hexadecimal string (sequence of “0” – “9”, “A” – “F”, or “a” – “f”) to convert it to a numeric value.

x, y: Numerical value or numerical variable

n, m: Round the numeric value up or off to the specified digit(s)

a, b: String or string variable

Category	Type	Identifier	Description
String System	num	val1SI (a)	Converts the top character to a 1-byte signed integer. (1-byte Signed Integer)
	num	val2SIBE (a)	Converts the top 2 characters to a 2-byte signed integer using the Big Endian byte order. (2-byte Signed Integer Big Endian)
	num	val2SILE (a)	Converts the top 2 characters to a 2-byte signed integer using the Little Endian byte order. (2-byte Signed Integer Little Endian)
	num	val4SIBE (a)	Converts the top 4 characters to a 4-byte signed integer using the Big Endian byte order. (4-byte Signed Integer Big Endian)
	num	val4SILE (a)	Converts the top 4 characters to a 4-byte signed integer using the Little Endian byte order. (4-byte Signed Integer Little Endian)
	num	val4FBE (a)	Converts the top 4 characters to a decimal float using the Big Endian byte order. (4-byte Float Big Endian)
	num	val4FLE (a)	Converts the top 4 characters to a decimal float using the Little Endian byte order. (4-byte Float Little Endian)
	num	val8DBE (a)	Converts the top 8 characters to a double-precision decimal float using the Big Endian byte order. (8-byte Double Big Endian)
	num	val8DLE (a)	Converts the top 8 characters to a double-precision decimal float using the Little Endian byte order. (8-byte Double Little Endian)
	num	valSum (a)	Returns the sum of a string code from top to bottom.
	num	valCRC (a)	Remainder of dividing a string (bit string) by a generator polynomial X16+X12+X5+1
	str	bitNot (a)	Bit invert
	str	bitAnd (a, b)	Bit logical conjunction
	str	bitOr (a, b)	Bit logical add
	str	bitXor (a, b)	Bit exclusive disjunction

22. SYSTEM FLAG LIST

You can use the system flags as Boolean valuables. If conditions are met, “1” (true) is automatically assigned to a system flag. If conditions are not met, “0” (false) is assigned. You can refer to the assigned values whenever necessary.

No	Identifier	Description	Condition “1” (True)
01	#FisCOM1	Existence of COM1 received data	Exists
02	#FltCOM1	Comparison command (cmpCOM) result of COM1 received data	Constant > Receive data
03	#FeqCOM1	Comparison command (cmpCOM) result of COM1 received data	Constant = Receive data
04	#FgtCOM1	Comparison command (cmpCOM) result of COM1 received data	Constant < Receive data
05	#FtimeOutCOM1	Comparison command (cmpCOM) timeout of COM1 received data	Timeout
06	#FisCOM2	Existence of COM2 received data	Exists
07	#FltCOM2	Comparison command (cmpCOM) result of COM2 received data	Constant > Receive data
08	#FeqCOM2	Comparison command (cmpCOM) result of COM2 received data	Constant = Receive data
09	#FgtCOM2	Comparison command (cmpCOM) result of COM2 received data	Constant < Receive data
10	#FtimeOutCOM2	Comparison command (cmpCOM) timeout of COM2 received data	Timeout
11	#FisCOM3	Existence of COM3 received data	Exists
12	#FltCOM3	Comparison command (cmpCOM) result of COM3 received data	Constant > Receive data
13	#FeqCOM3	Comparison command (cmpCOM) result of COM3 received data	Constant = Receive data
14	#FgtCOM3	Comparison command (cmpCOM) result of COM3 received data	Constant < Receive data
15	#FtimeOutCOM3	Comparison command (cmpCOM) timeout of COM3 received data	Timeout
30	#FinitMecError	Mechanical initialization command error status	Mechanical initialization error
31	#FcameraError	Camera data acquisition error status	Error
32	#FtakeZError	Z height adjustment (takeZWadj) acquisition error status	Error
33	#FlMoveOutRange	Range status of relative move command	Out of range
34	#FlMoveStop	Conditional stop status of relative move command	Stopped by the stop condition
35	#FcheckPosError	Result of the position discrepancy detection command	Position discrepancy error
36	#FdataInBCDError	Error status of dataInBCD command	Error
37	#FmultiWadjVal Error	Shows whether there was an error or not when obtaining the workpiece adjustment amount with the readout counter.	Error

No	Identifier	Description	Condition “1” (True)
60	#FstartSW	Start/Stop switch	ON (pressed)
61	#FincSW	Program number selection key (+)	ON (pressed)
62	#FdecSW	Program number selection key (–)	ON (pressed)
63	#FemgSW	EMG direct input	ON (the emergency stop switch is pressed.)
64	#Fios	I/O-S direct input	Circuit open (disconnected)
71	#Fsensor1	X initialization position detection sensor	ON (Blocked)
72	#Fsensor2	Y initialization position detection sensor	ON (Blocked)
73	#Fsensor3	Z initialization position detection sensor	ON (Blocked)
74	#Fsensor4	R initialization position detection sensor	ON (Blocked)
76	#Fdrvoz1	X driver 0-phase	ON
77	#Fdrvoz2	Y driver 0-phase	ON
78	#Fdrvoz3	Z driver 0-phase	ON
79	#Fdrvoz4	R driver 0-phase	ON
80	#FpurgeSW	Purge switch	ON (pressed)
81	#FdspRunning	The robot is dispensing	The robot is dispensing
82	#FdspDevRespError	Error status of dispenser response signal	Error
91	#FenableSW	Enable switch	ON (pressed)
94	#FmotorPower	Motor power status	ON
95	#Finitialize1	X axis mechanical initialization status	Complete
96	#Finitialize2	Y axis mechanical initialization status	Complete
97	#Finitialize3	Z axis mechanical initialization status	Complete
98	#Finitialize4	R axis mechanical initialization status	Complete
111	#FoptionSW1	Optional switch 1	ON (pressed)
112	#FoptionSW2	Optional switch 2	ON (pressed)
113	#FoptionSW3	Optional switch 3	ON (pressed)
300	#FisEther1	Existence of Ether1 received data	Data exists
301	#FltEther1	Ether1 Receive data comparative results	Constant > Receive data
302	#FeqEther1	Ether1 Receive data comparative results	Constant = Receive data
303	#FgtEther1	Ether1 Receive data comparative results	Constant < Receive data
304	#FtimeOutEther1	Ether1 Receive data comparative results	Timeout
305	#FconnectEther1	Ether1 Connection state	Connected
306	#FisEther2	Existence of Ether2 received data	Data exists
307	#FltEther2	Ether2 Receive data comparative results	Constant > Receive data
308	#FeqEther2	Ether2 Receive data comparative results	Constant = Receive data
309	#FgtEther2	Ether2 Receive data comparative results	Constant < Receive data
310	#FtimeOutEther2	Ether2 Receive data comparative results	Timeout
311	#FconnectEther2	Ether2 Connection state	Connected
312	#FisEther3	Existence of Ether3 received data	Data exists
313	#FltEther3	Ether3 Receive data comparative results	Constant > Receive data
314	#FeqEther3	Ether3 Receive data comparative results	Constant = Receive data
315	#FgtEther3	Ether3 Receive data comparative results	Constant < Receive data
316	#FtimeOutEther3	Ether3 Receive data comparative results	Timeout
317	#FconnectEther3	Ether3 Connection state	Connected

For further information, refer to the operation manual *Functions II*.

23. ERROR MESSAGE LIST

When an error occurs, the program number display on the front of the main unit alternately displays "Er" and the error number.
Also, you can confirm the time and date the error occurred and the error number from [Error History].

TP The error number and the error content also appear on the teaching pendant LCD.
If the teaching pendant is not connected, turn OFF the power once and connect the teaching pendant. When you turn ON the power again, the error and error number appear on the teaching pendant LCD.
Run Mode → MENU → [Error History]
Teaching Mode → UTILITY → [Error History]
Administration Mode → [Error History]
In addition, error history can be deleted from Administration Mode → [Administration Settings Mode] → [Clear Error History].

PC When connected to a PC, select [Error History] from the [Robot] pull-down menu in JR C-Points II. Every error of the connected robot is loaded and displayed.
If the PC is not connected, turn OFF the robot's power (if the PC is running, also turn OFF the PC's power) and after connecting the PC, startup both the robot and the PC and load the error information.

There are 2 types of errors.

- Run Errors: a situational error which can be restored or an error during Run Mode.
- System Errors: a robot system error or an error caused by something faulty.

However, error number082 (Emergency Stop) is an independent error; not classified as either of the above.

Error No.	Teaching Pendant Message	Countermeasure	Error Category
001	Program is Empty	Enter the number of a registered program.	Run error
006	Point Type Error	A Point type error in which a PTP point is succeeded by a CP passing point. Check and reenter the point type.	Run error

Error No.	Teaching Pendant Message	Countermeasure	Error Category
007	Position is out of range	The point position itself is out of range or the axes have gone out of range at a CP arc point, etc. Out of range means that the tool tip is unable to move in the range designated by the robot's move area limit. Check and reenter teaching positions. Also, check and reenter the move area limit and TCP (tool center point) in the tool data.	Run error
008	Error on Point Job	Any point job errors that are not as defined as errors 009 to 013, 016, and 042 to 053 are all 008 errors. • There is no *ld* and *ldi* for *anb* and *orb* in the condition operation command. • When *then/else/timeUp* nest reaches 30 or more. • *then/else/endIf* appear even though if doesn't exist. • *timeUp/endWait* appears even though *waitCondTime* and *waitCond* do not exist. Check and reenter the point job contents.	Run error
009	then/else for if doesn't exist	If in the point job command: • There is no *then/else* for *if.* • If there is something other than a condition operation command mistakenly written before *then/else* and after *if* etc. Check and reenter the point job command.	Run error
010	endIf for if doesn't exist	Check and reenter the point job command.	Run error
011	endWait for waitCond doesn't exist	Check and reenter the point job command.	Run error
012	Label for jump doesn't exist	Check and reenter the point job command.	Run error
013	Point for goPoint doesn't exist	If the pallet loop jump point number of the point job command goPoint, goRPoint is larger than the program's biggest point number, or it is a negative number, this error occurs. Check and reenter the point job command.	Run error
016	Error on pallet Routine data	If the pallet number designated by a point job command doesn't exist, this error occurs. Check and reenter the pallet for the point job command and/or additional function.	Run error
022	CP Speed Over	Reduce the CP line speed.	Run error

Error No.	Teaching Pendant Message	Countermeasure	Error Category
029	Saving Data Error	The C&T data is no longer compatible due to a system software downgrade. You need to either revert the system software to the version prior to the downgrade or format the C&T data. • If the teaching pendant is not connected, clear all C&T data using JR C-Points II. Robot → Administration Settings → General → Clear All Data in Robot Wait for all of the C&T data to clear. Power cycle the robot after the operation is complete. • If the teaching is connected, a message should display on the teaching pendant. Press the ENTR key to clear all C&T data. Wait for all of the C&T data to clear. Power cycle the robot after the operation is complete.	System error
030	Flash ROM Erase Error	When saving C&T data, all data is first deleted and then saved anew. If the data cannot be deleted, this error occurs. Printed circuit board A is most likely damaged and needs replacing. Contact Janome or a Janome dealer.	System error
031	Flash ROM Write Error	This is a writing error which occurs when saving C&T data. Printed circuit board A needs replacing. Contact Janome or a Janome dealer.	System error
034	System Model Incompatibility Error	This error occurs when the model settings and robot system software are not compatible with each other. This is likely caused by transferring the incorrect model settings data and/or system software, etc., to the robot after replacing printed circuit board A. Check the error message on the teaching pendant and transfer the appropriate system program and/or model settings file to the robot.	System error
035	Teaching data SUM error	When the robot's power is turned ON, stored C&T data is loaded. If the data sum doesn't match, this error occurs. Delete the C&T data. If the power is turned OFF in the middle of saving C&T data, this error occurs.	System error

Error No.	Teaching Pendant Message	Countermeasure	Error Category
037	Motor Power Supply Error	This error occurs when there is no power supplied to the motor. Check the motor power. • Damage to the power supply connector → Check the connection etc. • Damage to the power supply itself → Replace the power supply unit.	System error
042	Job for callJob doesn't exist	Check and reenter the point job commands.	Run error
043	callJob Nesting Error	This error occurs when the number of *callJob*, *callBase* nest reaches 30 or more in a point command sequence call up. Check and reenter the point job commands.	Run error
044	Program for callProg doesn't exist	Check and reenter the point job commands.	Run error
045	callProg Nesting Error	This error occurs when the number of *callProg*, *callPoints* commands in a nest reaches 30 or more. Check and reenter the point job commands.	Run error
046	for, do Nesting Error	This error occurs when the number of for, do reaches 30 or more. Check and reenter the point job commands.	Run error
047	Points for callPoints doesn't exist	Check and reenter the point job commands.	Run error
048	for-next, do-loop Error	This error occurs when *next* for *for*, and *loop* for *do*, do not exist; or when *for* and *next* do not exist but *next* or *loop* appear. Check and reenter the point job commands.	Run error
049	Creating Local Variable Error	This error occurs when the identifier is doubled up or the variable domain cannot be acquired when you try to generate a local variable with the declare command. Check and reenter the point job commands.	Run error

Error No.	Teaching Pendant Message	Countermeasure	Error Category
050	Expression Evaluation Error	This error occurs if the evaluation of the formula fails. • There are no variables or functions in the expression; the identifier of the variable or function is wrong, or the definition for the variable or function is missing. • The use of parentheses is incorrect. • Use of operators is incorrect (+-*/etc.). • In the calling up of functions, the form or number of arguments (including sequence elements) is incorrect. Check and reenter the point job commands.	Run error
051	I/O Alias Error	This error occurs if there is no I/O alias specified. It is likely that the identifier is wrong or there is no definition. Check and reenter the point job commands.	Run error
052	COM Alias Error	This error occurs if there is no COM alias specified. It is likely that the identifier is wrong or the definition is missing. Check and reenter the point job commands.	Run error
053	Parameter value is out of range	This error occurs when the expression judgment value exceeds the range. Check and reenter the point job commands.	Run error
056	Measurement of Needle Error	This error occurs when the measurement of Needle Adjuster 2 could not be taken correctly at the measuring point.	Run error

Error No.	Teaching Pendant Message	Countermeasure	Error Category
071	Motor Driver Error	This error occurs when a motor driver error is detected at the start or during a movement, or when there is a Z axis brake failure or cable breakage. Power cycle the robot. If this does not resolve the error, check the following: • The tool mass and workpiece mass settings. If the setting value is smaller than the actual mass, this error may occur. Refer to the operation manual *Functions I* for details regarding the tool mass and workpiece mass settings. • The error occurs during the mechanical initialization. Check and modify the mechanical initialization speed settings as needed. Refer to the operation manual *Functions III* for details regarding mechanical initialization speed settings. • The error occurs during a movement or when the robot is stopped. Make sure there is no excessive load or external force applied to the axes. If this error occurs even after checking the above, the motor driver, the motor, or a related component has likely failed. Contact Janome (details on the back of this manual) or a Janome dealer.	System Error
074	Motor Driver Not Ready (Z) (JR3000F Series Only)	This error occurs when a motor driver error is detected at the start of a movement or when there is a Z axis brake failure or cable breakage. Power cycle the robot. If this error continues to occur, the motor driver, the motor, or a related component has likely failed. Contact Janome (details on the back of this manual) or a Janome dealer.	System Error
082	Emergency Stop	This error occurs when the emergency stop switch is pressed or the I/O-S emergency stop function is activated. NOTE: Release the emergency stop switch then send a start instruction to perform mechanical initialization.	−

Error No.	Teaching Pendant Message	Countermeasure	Error Category
083	Stop with Over Load (JR3000E Series Only)	• This error occurs if a position error is detected. **Teaching Mode** The robot returns to normal two seconds after the error message is displayed. However, if this error occurs during a test run, press the start switch or a teaching pendant key. **Switch Run Mode** Press the start switch or a teaching pendant key to put the robot into standby for run. **Ext. Run Mode** I/O-A: The robot stands by for run when the sysIn11 (Error Reset) signal is turned ON. Note that the default assignment for sysIn11 is [Last Work]. If you wish to use the signal as an error reset signal, change the sysIn11 function to [Error Reset] in [I/O-SYS Function Assignment]. • This is likely a component malfunction. Search for the malfunction area with the motor diagnostics, and encoder diagnostics. (Refer to “7.3 Fault Diagnostic” in the operation manual *Maintenance*.) If the motor does not operate correctly, this may be a malfunction with the driver (unit), motor, or cables*. The malfunctioning component needs to be replaced. If the motor is operating correctly but the encoder is not, there may be malfunction with printed circuit board B (unit), the motor, or cables*. The malfunctioning component needs to be replaced. * For replacement of cables, contact Janome (details on the back of this manual) or a Janome dealer.	Run error

Error No.	Teaching Pendant Message	Countermeasure	Error Category
085	Incorrect Use	This error occurs if the system program application and the C&T data application are different. For example, if you load a “Standard” system program onto a robot that has “Dispensing” programs registered, this error occurs when the power is turned ON. Either delete the C&T data or make a system program that is appropriate for your robot’s application. If the teaching pendant is connected, “OK to delete all teaching pendant data?” appears. Select [YES] to delete the C&T data.	System error
086	Incorrect Data Version	This error occurs when the data version number of the system program is smaller than the data version number of the teaching data. This means that the system program cannot run the new version of teaching data registered onto the robot. Either delete all the teaching data or upgrade the system program. If the teaching pendant is connected, a message stating “OK to Delete All Teaching Data?” appears. Select [YES] to delete the C&T data.	System error
087	Incorrect Data Sub Version	This error occurs when the system program data subversion number is different from the teaching data subversion number. This means that there is new teaching data registered in the main unit that the system program cannot run. Delete all teaching data or update the system program to a newer version. If the teaching pendant is connected, “OK to Delete All Teaching Data?” appears. Select [YES] to delete the C&T data.	System error
088	Z Motor or Encoder Error	If the Z motor is running, this is an encoder error (JR3000E models). If the Z motor is not running, this is a motor error. Confirm operation in Diagnostic Mode. (Mechanical initialization error)	System error

Error No.	Teaching Pendant Message	Countermeasure	Error Category
089	Z Sensor/Motor Error	This error occurs if the sensor does not go ON (blocked)/OFF after running the motor according to the number of preset pulses during mechanical initialization. If the Z motor is running, this is a sensor error. If the Z motor is not running, this is a motor error. (Mechanical initialization error)	System error
090	Z Driver 0-Phase Error	This error occurs when the driver Z-Phase signal is not output or is constantly output after running the motor according to the number of preset pulses during mechanical initialization. (Mechanical initialization error)	System error
091	X Motor or Encoder Error	If the X motor is running, this is an encoder error (JR3000E models). If the X motor is not running, this is a motor error. Confirm operation in Diagnostic Mode. (Mechanical initialization error)	System error
092	X Sensor/Motor Error	This error occurs if the X sensor does not go ON (blocked)/OFF after rotating the X motor according to the number of preset pulses during mechanical initialization. If the X motor is rotating, the error has been caused by a sensor malfunction. If the X motor is not rotating, it has been caused by a motor malfunction. (Mechanical initialization error)	System error
093	X Driver 0-Phase Error	This error occurs when the driver Z-phase signal is not output or if it is constantly output after running the motor according to the number of preset pulses during mechanical initialization. (Mechanical initialization error)	System error
094	Y Motor or Encoder Error	If the Y motor is running, this is an encoder error (JR3000E models). If the Y motor is not running, this is a motor error. Confirm operation in Diagnostic Mode. (Mechanical initialization error)	System error

Error No.	Teaching Pendant Message	Countermeasure	Error Category
095	Y Sensor/Motor Error	This error occurs if the sensor does not go ON (blocked)/OFF after running the motor according to the number of preset pulses during mechanical initialization. If the Y motor is running, this is a sensor error. If the Y motor is not running, this is a motor error. (Mechanical initialization error)	System error
096	Y Driver 0-Phase Error	This error occurs when the driver Z-phase signal is not output or if it is constantly output after running the Y motor according to the number of preset pulses during mechanical initialization. (Mechanical initialization error)	System error
097	R Motor or Encoder Error	If the R motor is running, this is an encoder error (JR3000E models). If the R motor is not running, this is a motor error. Confirm operation in Diagnostic Mode. (Mechanical initialization error)	System error
098	R Sensor/Motor Error	This error occurs if the sensor does not go ON (blocked)/OFF after running the R motor according to the number of preset pulses during mechanical initialization. If the R motor is running, this is a sensor error. If the R motor is not running, this is a motor error. (Mechanical initialization error)	System error
099	R Driver 0-Phase Error	This error occurs when the driver Z-phase signal is not output or if it constantly output after running the R motor according to the number of preset pulses during mechanical initialization. (Mechanical initialization error)	System error
100	Logical Error XXXXXX	This error number is not displayed in the program number display. Turn the power OFF and ON again. If the error persists, contact Janome or a Janome dealer with the “XXXXXX” display information.	System error

Error No.	Teaching Pendant Message	Countermeasure	Error Category
101	Trap Error	When a trap error occurs, it is not shown on the display. A short buzzer sounds twice. Turn the power OFF and then ON again and the error and error number are displayed on the teaching pendant LCD. This is likely a printed circuit board A malfunction. Printed circuit board A needs replacing. Contact Janome or a Janome dealer for assistance.	System error

If an error occurs with the data held by the robot, “CA” and the error number appear alternately on the 7 seg LED program number display after the power is turned back ON.
Do not turn the power OFF while the CA number is displayed as the robot is processing the restoration data etc. Once the robot has finished processing the data, the CA number disappears and the robot starts up normally.

CA No.	Details
CA28	C&T data is being automatically restored due to an error with one of the copies of the recorded C&T data. Do not turn the power OFF while CA28 is displayed as the robot is automatically processing the restoration data.
CA50	Battery backup data has been erased due to low battery voltage or the removal of the battery. All of the battery backup data is cleared and replaced with the default values.

24. SPECIFICATIONS

NOTE: Specifications may vary depending on the application model. Refer to the operation manual for your application model if it includes dedicated specification information.

Common to JR3000 Series		
Movement Method	5-phase stepping motor movement	
Control Method	PTP (Point to Point) control, CP (Continuous Path) control	
Interpolating Function	3-Dimensional linear and arc interpolation	
Resolution	X and Y axes	0.005 mm/Step
	Z axis	0.0025 mm/Step
	R axis	0.009 deg/Step
Position Discrepancy Detection Function	• Position discrepancy detection at the run start and run end via initialization sensors. • Step out detection during runs via encoder (optional).	
Encoder (Optional)	• Two-phase incremental encoder • Detection accuracy X and Y axes: 1 mm, Z axis: 0.5 mm, R axis: 1.8 deg	
Teaching System	JR C-Points II: A multipurpose and simple teaching system. • Simple A teaching system centered around points (positions and types). By simply setting a point order, you can teach the movement operation for each axis. Each application specification is equipped with specialized point types, allowing you to easily teach specialized operations. • Multipurpose By setting a point job and the various parameters, you can set tool control and operations according to the workpiece. If you use the customizing functions, you can define point types for individual users.	
Teaching Configuration	• Direct teaching using the teaching pendant (optional) • Off-line teaching using the PC software JR-C Points II (optional). It is possible to use graphics created by CAD etc. (DXF, Gerber, JPEG).	
Position Instruction System	• Remote Teaching (JOG) • Manual Data Input (MDI)	
Program Capacity	Maximum 999 programs	
Point Capacity	Maximum 32,000 points *1	
Point Job Capacity	Maximum 1000 jobs, maximum 50,000 commands per job	

Common to JR3000 Series		
Work Adjustment Capacity	Maximum 3000 Of which, workpiece adjustment numbers 2999 and 3000 are reserved for internal system use.	
Additional Function Tool Number	Maximum 100 Of which, the additional function tool numbers 60, 61, 62, 63, and 64 are reserved for internal system use.	
Simple PLC Function	Maximum 100 programs, maximum 1000 steps per program	
External Input/Output	I/O-SYS	16 inputs/16 outputs *2
	I/O-1 (optional)	8 inputs/8 outputs (including 4 relay outputs) *2
	I/O-S (optional)	For connecting an interlock device such as an area sensor etc.
	I/O-MT (optional)	External motor control. 2 axis control possible.
	Fieldbus (optional) (JR3000F not compatible)	DeviceNet, Profibus, CC-Link, CANopen, PROFINET, EtherNet/IP
	COM1	RS-232C. External device control.
	COM2 (optional)	RS-232C. External device control.
	COM3 (optional)	RS-232C. External device control.
	MEMORY	Connects USB memory. • Read C & T data • Save C & T data • Update the system software version • Update the model setting data
	LAN	Dedicated for communicating with the PC software JR C-Points II (optional). • Send and receive C & T data • Control the robot with control commands • Update the system software version
	TPU	Teaching pendant (optional) dedicated connector.
	SWITCHBOX (Switchbox/ basic switchbox specifications only)	• Switchbox dedicated connector. • If this is a switchbox with a switch for changing modes (optional), you can change modes via the key switch. • If this is a switchbox with an optional switch attached, you can set an operation (dispenser tip purging etc.) to the optional switch.

Common to JR3000 Series	
Power Source	1. 100 – 120/200 – 240 V (± 10 % tolerance), 50/60Hz no outlet models 2. 200 – 240 V (± 10 % tolerance), 50/60Hz outlet models 3. 100 – 120 V (± 10 % tolerance), 50/60Hz outlet models
Rated Current	1. 2.0 − 1.6 / 1.0 − 0.8 A 2. 1.0 − 0.8 A 3. 2.0 − 1.6 A
Pollution Degree	2
Altitude	Not exceeding 1000 m above sea level
Power Consumption	200 W
Operating Ambient Temperature	0 – 40 ℃
Relative Humidity	20 – 90 % (no condensation)
Storage Temperature	-10 – +50 ℃ and not exceeding 95 % humidity
Airborne Noise	Not exceeding 70 dB
Standard Accessories	• Operation manuals (CD-ROM)/booklet (*Setup*) • Read This First • Timing belt tension adjustment screws (hex socket bolts M4x14): 2 • Cable tie fixings (adhesive is included on the robot rear): 4 • Cable ties: 5 • Robot cable grease: 10 g • Printed circuit board FB cover: 1 (Fieldbus spec. robots) • Lockscrews (± binding head screw M4x6): 2 (Fieldbus spec. robots)

*1: Point data shares its memory domain with job data, additional function data, PLC program data etc., and therefore as this data increases, you may not be able to create the maximum number of points.

*2: To use an internal power supply, an I/O internal power supply (optional) is required.

JR3000F Series			
Specifications \ Model		JR3303F	JR3403F
Axis Type		3 (synchronous control)	
Operating Range	X axis	300 mm	400 mm
	Y axis	320 mm	400 mm
	Z axis	150 mm	150 mm
Portable Mass	Workpiece	20 kg	
	Tool	15 kg	
Maximum Speed*1 (PTP Movement)	X and Y axes	1000 mm/sec (5 – 1000 mm/sec) *2	
	Z axis	400 mm/sec (4 – 400 mm/sec) *2	
Maximum Speed*1 (CP Movement)	X, Y, Z axes (Combined)	850 mm/sec (0.1 − 850 mm/sec) *2	
Repeatability	X and Y axes	±0.01 mm	
	Z axis	±0.01 mm	
External Dimensions (excluding cables and protrusions)	W x D x H	560×535×807 mm	615×631×807 mm
Mass (Robot)		36 kg	45 kg

*1: There are limitations depending on movement conditions.

*2: Settable speed range.

JR3200 Series			
Specifications \ Model		JR3203 (E)	JR3204 (E)
Axis Type		3 (synchronous control)	4 (synchronous control)
Operating Range	X axis	200 mm	
	Y axis	200 mm	
	Z axis	50 mm	
	R axis	—	±360 deg
Portable Mass	Workpiece	7 kg	
	Tool	3.5 kg	
Acceptable Moment of Inertia		−	65 kg/cm^2
Maximum Speed*1 (PTP Movement)	X and Y axes	700 mm/sec (7 − 700 mm/sec)*2	
	Z axis	250 mm/sec(2.5 − 250 mm/sec)*2	
	R axis	−	600 deg/sec (6 − 600 deg/sec)*2
Maximum Speed*1 (CP Movement)	X, Y, Z axes (Combined)	600 mm/sec (0.1 − 600 mm/sec)*2	
Repeatability	X and Y axes	±0.006 mm	±0.01 mm
	Z axis	±0.006 mm	±0.01 mm
	R axis	−	±0.008 deg
External Dimensions (excluding cables and protrusions)	W x D x H	323×387×554 mm	323×387×676 mm
Mass (Robot)		20 kg	22 kg

*1: There are limitations depending on movement conditions.

*2: Settable speed range.

JR3300 Series			
Specifications \ Model		JR3303 (E)	JR3304 (E)
Axis Type		3 (synchronous control)	4 (synchronous control)
Operating Range	X axis	300 mm	
	Y axis	320 mm	
	Z axis	100 mm	
	R axis	−	±360 deg
Portable Mass	Workpiece	15 kg	
	Tool	7 kg	
Acceptable Moment of Inertia		−	90 kg/cm^2
Maximum Speed*1 (PTP Movement)	X and Y axes	900 mm/sec (9 − 900 mm/sec)*2	
	Z axis	400 mm/sec (4 − 400 mm/sec)*2	
	R axis	−	900 deg/sec (9 − 900 deg/sec)
Maximum Speed*1 (CP Movement)	X, Y, Z axes (Combined)	850 mm/sec (0.1 − 850 mm/sec)*2	
Repeatability	X and Y axes	±0.007 mm	±0.01 mm
	Z axis	±0.007 mm	±0.01 mm
	R axis	−	±0.008 deg
External Dimensions (excluding cables and protrusions)	W x D x H	560×535×659 mm	560×535×844 mm
Mass (Robot)		35 kg	38 kg

*1: There are limitations depending on movement conditions.

*2: Settable speed range.

JR3400 Series			
Specifications \ Model		JR3403 (E)	JR3404 (E)
Axis Type		3 (synchronous control)	4 (synchronous control)
Operating Range	X axis	400 mm	
	Y axis	400 mm	
	Z axis	150 mm	
	R axis	−	±360 deg
Portable Mass	Workpiece	15 kg	
	Tool	7 kg	
Acceptable Moment of Inertia		−	90 kg/cm^2
Maximum Speed*1 (PTP Movement)	X and Y axes	900 mm/sec(9 − 900 mm/sec)*2	
	Z axis	400 mm/sec(4 − 400 mm/sec)*2	
	R axis	−	900 deg/sec (9 − 900 deg/sec)
Maximum Speed*1 (CP Movement)	X, Y, Z axes (Combined)	850 mm/sec(0.1 − 850 mm/sec)*2	
Repeatability	X and Y axes	±0.007 mm	±0.01 mm
	Z axis	±0.007 mm	±0.01 mm
	R axis	−	±0.008 deg
External Dimensions (excluding cables and protrusions)	W x D x H	Single Column: 584×631×807 mm Double Column: 615×631×807 mm	Single Column: 584×631×894 mm Double Column: 615×631×894 mm
Mass (Robot)		Single Column: 42 kg Double Column: 45 kg	Single Column: 46 kg Double Column: 49 kg

*1: There are limitations depending on movement conditions.

*2: Settable speed range.

JR3500 Series			
Specifications \ Model		JR3503 (E)	JR3504 (E)
Axis Type		3 (synchronous control)	4 (synchronous control)
Operating Range	X axis	510 mm	
	Y axis	510 mm	
	Z axis	150 mm	
	R axis	−	±360 deg
Portable Mass	Workpiece	15 kg	
	Tool	7 kg	
Acceptable Moment of Inertia		−	90 kg/cm^2
Maximum Speed*1 (PTP Movement)	X and Y axes	900 mm/sec (9 − 900 mm/sec)*2	
	Z axis	400 mm/sec (4 − 400 mm/sec)*2	
	R axis	−	900 deg/sec (9 − 900 deg/sec)
Maximum Speed*1 (CP Movement)	X, Y, Z axes (Combined)	850 mm/sec (0.1 − 850 mm/sec)*2	
Repeatability	X and Y axes	±0.008 mm	±0.01 mm
	Z axis	±0.008 mm	±0.01 mm
	R axis	−	±0.008 deg
External Dimensions (excluding cables and protrusions)	W x D x H	678×731×807 mm	678×731×894 mm
Mass (Robot)		44 kg	47 kg

*1: There are limitations depending on movement conditions.

*2: Settable speed range.

JR3600 Series			
Specifications \ Model		JR3603 (E)	JR3604 (E)
Axis Type		3 (synchronous control)	4 (synchronous control)
Operating Range	X axis	510 mm	
	Y axis	620 mm	
	Z axis	150 mm	
	R axis	−	±360 deg
Portable Mass	Workpiece	15 kg	
	Tool	7 kg	
Acceptable Moment of Inertia		−	90kg/cm^2
Maximum Speed*1 (PTP Movement)	X and Y axes	900 mm/sec (9 − 900 mm/sec)*2	
	Z axis	400 mm/sec (4 − 400 mm/sec)*2	
	R axis	−	900 deg/sec (9 − 900 deg/sec)
Maximum Speed*1 (CP Movement)	X, Y, Z axes (Combined)	850 mm/sec (0.1 − 850 mm/sec)*2	
Repeatability	X axis	±0.008 mm	±0.01 mm
	Y axis	±0.01 mm	
	Z axis	±0.008 mm	
	R axis	−	±0.008 deg
External Dimensions (excluding cables and protrusions)	W x D x H	790×731×807 mm	790×731×894 mm
Mass (Robot)		45 kg	48 kg

*1: There are limitations depending on movement conditions.

*2: Settable speed range.

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