JANOME DESKTOP ROBOT

JR2000N 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.**

- **This manual is written according to IEC 62079.**

JANOME

PREFACE

The Janome Desktop Robot JR2000N Series are new low-cost, high-performance robots. With these robots we succeeded in reducing the price while maintaining functionality. The combined use of stepping motors and specialized micro step driving circuits saves both energy and installation space. There are several manuals pertaining to these robots.

JR2000N Series

Setup	Explains how to set up the robot. ■ Make sure you read this manual ■ 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 ■ 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.
Quick Start	Explains the actual operation of the robot by creating and running simple programs.
Teaching Pendant Operation	Explains how to operate the robot via the teaching pendant.
PC Operation	Explains how to use the PC software, JR C-Points.
Functions I	Explains point teaching.
Functions II	Explains commands, variables, and functions.
Functions III	Explains functions such as Run Mode parameters and sequencer programs.
Functions IV	Explains functions in Customizing Mode.
External Control I (I/O-SYS)	Explains I/O-SYS communication control.
External Control II (COM Communication)	Explains COM1 – COM3 communication control.
Camera/Sensor	Explains the functions of the attachable camera and Z position sensor.
Specifications	Outlines general specifications such as the robot's operating range, weight, etc.
Application Specifications	Explains the specialized functions of the various application specifications.

Note: Product specifications are regularly updated; therefore the content of this manual may differ from the robot in your possession. Additionally, the menu items displayed on the TP and PC may vary from those listed in this manual.

The descriptions within this manual are based on standard specifications. The menu item names etc. may vary depending on the model type.

Attention

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 this manual. Do not handle or operate the robot in ways not covered in this manual.

Attention

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.

Warning

Make sure that the **machine is grounded and do not use the machine if it is not grounded**. Make sure that the **ground resistance of the robot power supply is 100Ω or less**.
Using the machine without sufficient grounding can cause electric shock, fire, accidental operation and machine breakdown.

Warning

Make sure that the machine power supply is OFF before connecting the power cord.
Failure to do so could cause electric shock and/or injury.

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

TP Operation via the teaching pendant

PC Operation via PC (JR C-Points)

RESPONSE TO EC/EU DIRECTIVES

This robot is a semi-finished product, and includes a declaration to the EC/EU directives.
Janome implements its conformity testing through a third certification authority for each of the EMC, LVD, MD directives.
The applicable requirements of the MD and EMC Directives vary depending on the machine settings and systems. We conduct general confirmation tests through a model setup. Conduct your own final confirmation tests and risk assessments of your machine and its setup and make sure that it conforms to the MD and EMC Directives.

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 list the nature of the danger and any necessary safety methods 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 cord
	Make sure the machine is grounded

FOR YOUR SAFETY

Danger	
	**Do not use where flammable or corrosive gas is present.** Leaked gas accumulating around the unit can cause fire or an explosion.

Warning	
	**Make sure that you securely install the unit in a place that can withstand both the mass of the machine and the usage conditions.** In addition, **for units with a cooling fan on the back, allow for 30cm or more clearance between the back of the unit and the wall.** If installation is inadequate, the unit may drop or fall over causing injury and/or unit breakdown.
	**Make sure to power the unit within its rated current range.** Failure to do so may cause electric shock, fire, or unit malfunction.
	**Plug the power cord into the power outlet firmly.** Failure to do so may cause the plug to heat up and may result in fire.
	**Be sure to use the unit within its indicated voltage range.** Failure to do so may cause fire or unit malfunction.
	**When 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 cord.** Failure to follow these steps causes electric shock or injury.

FOR YOUR SAFETY

Warning	
	Always **make sure the unit is grounded to avoid possible electrical shocks. Do not use when the unit is not grounded.** Improper grounding may cause electric shock or fire.
	**Wipe the power plug with a clean, dry cloth periodically to eliminate dust.** Dust accumulation may deteriorate the electrical insulation and cause 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 may cause fire.
	**Be sure to turn OFF the unit before inserting or removing cords and cables such as the teaching pendant cable.** Failure to do so may result in electric shock, fire, data loss, or unit malfunction.
	**Do not attempt to disassemble or modify the unit.** Disassembly or modification may cause electric shocks or unit malfunction.
	**Do not allow water or oil to come in contact with the unit, control box or the power cord.** Contact with water or oil may cause electric shock, fire, or unit malfunction. IP Protection Rating: IP30 (CE specifications : IP40)
	**If anything unusual occurs, such as a burning smell or unusual sound, stop operation and unplug the power cord immediately. Contact the dealer from whom you purchased the robot or the office listed on the last page of this manual.** Continuing to use the robot without addressing the problem may cause electric shock, fire, or unit breakdown.

FOR YOUR SAFETY

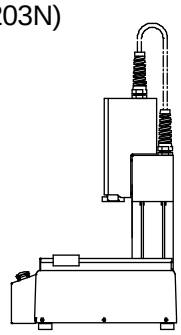
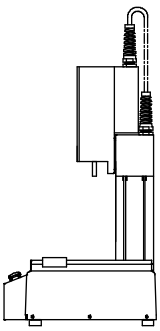
Caution
Do not drop or jar the unit during transport and/or installation. This could cause injuries or damage the unit.
Before performing any operation, ensure there is no imminent danger to any of the operators. Failure to do so may result in injury.
Use the unit in an environment between 0 and 40°C, with a humidity level of 20 – 90%, and without condensation. Use outside of these conditions may result in unit malfunction or breakdown. IP Protection Rating: IP30 (CE specifications: IP40)
Use the unit in an environment where no electrical noise is present. Failure to do so may result in 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 an enclosure. 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 for the emergency stop switch. Also, for models with I/O-S circuits, regularly perform an I/O-S circuit function check. If you perform work without making a circuit check, you or the operator will not be able to immediately and safely stop the robot in an emergency. This is potentially dangerous.

FOR YOUR SAFETY

Caution
When attaching tools 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. Failure to do so causes injury or breakdown.
Be sure to check the connections of the cords and cables to the main unit. Improper wiring may result in unit malfunction or breakdown.
Be sure to secure the movable parts of the unit before transportation. Failure to do so may result in injury or breakdown.
When lifting and transporting the robot, do so with 2 or more people. Failure to do so causes injury or breakdown.
Use the unit in an environment that is not exposed to direct sunlight. Direct sunlight may cause 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.**

LINEUP

JR2000N Series

Model	Axes No.	Series	External view (Operation manuals use the external views shown here)
JR2202N	2	JR2200N Series	(JR2203N)  (JR2204N) 
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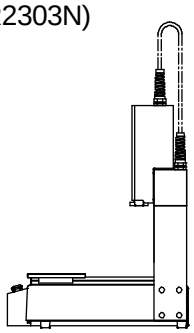
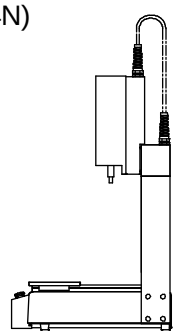
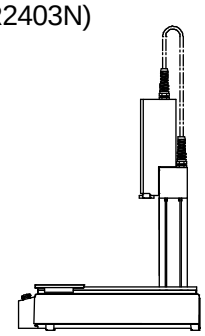
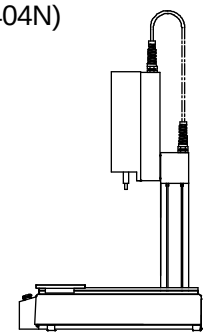
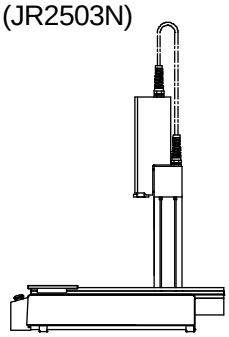
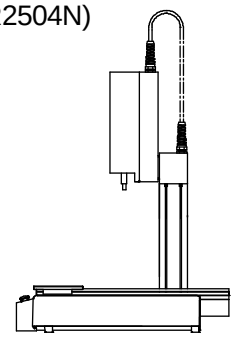
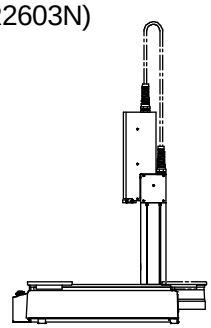
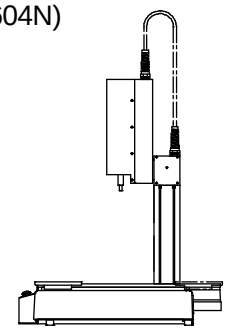
JR2203NE	3		
JR2204N	4		
JR2204NE	4		
JR2302N	2	JR2300N Series	(JR2303N)  (JR2304N) 
JR2303N	3		
JR2303NE	3		
JR2304N	4		
JR2304NE	4		
JR2402N	2	JR2400N Series	(JR2403N)  (JR2404N) 
JR2403N	3		
JR2403NE	3		
JR2404N	4		
JR2404NE	4		
JR2502N	2	JR2500N Series	(JR2503N)  (JR2504N) 
JR2503N	3		
JR2503NE	3		
JR2504N	4		
JR2504NE	4		

NOTE

2 axes: X,Y 3 axes: X,Y,Z 4 axes: X,Y,Z,R

JR2000N Series

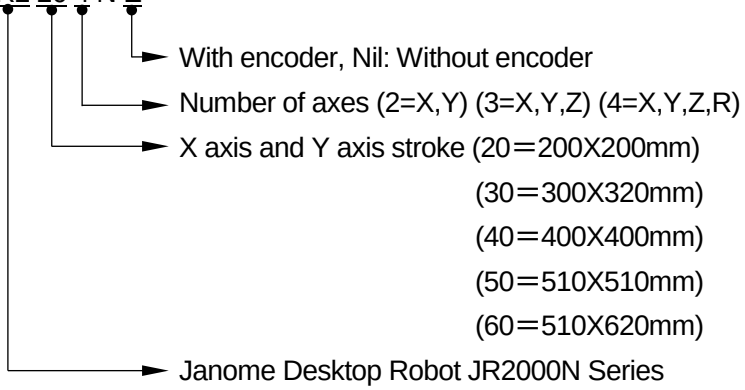
Model	Axes No.	Series	External View (Operation manuals use the external views as shown below)
JR2603N	3	JR2600N Series	(JR2603N)  (JR2604N) 
JR2604N	4		

NOTE

3 axes: X,Y,Z 4 axes: X,Y,Z,R

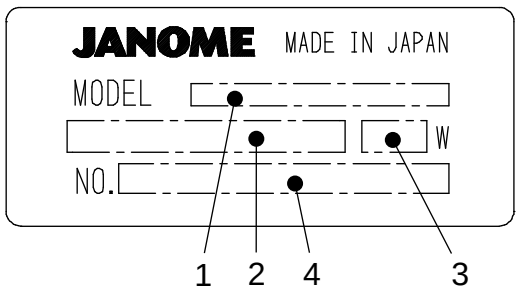
1.1 Reading the Identification Plate

Example: JR2 20 4 N E

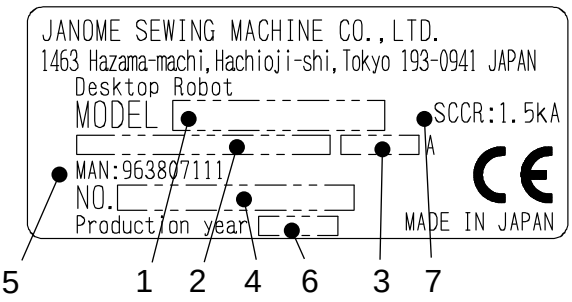


2. IDENTIFICATION PLATE

2.1 How to Check the Identification Plate



CE Specifications



1. Model Name
   For further details refer to “1.1 Reading the Identification Plate” on the previous page.

2. Rated Power Supply

3. Power Consumption, Current Consumption (CE models)

4. Identification Number

Example: 16 JRN2 0001

- 0001 → Serial number
- JRN2 → Model Abbreviation
- 16 → Year of manufacture (Last two digits of the year)

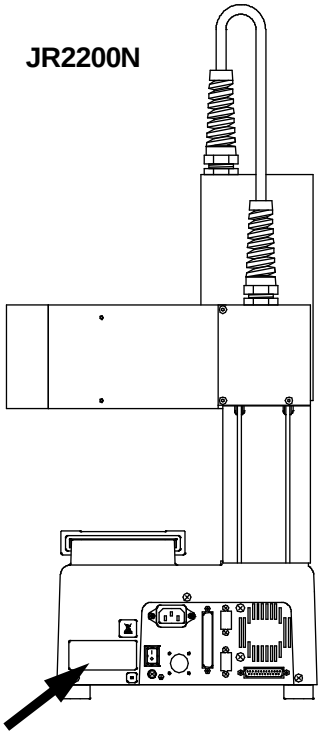
5. Operation manual serial number

6. Year of Manufacture (4 digits)

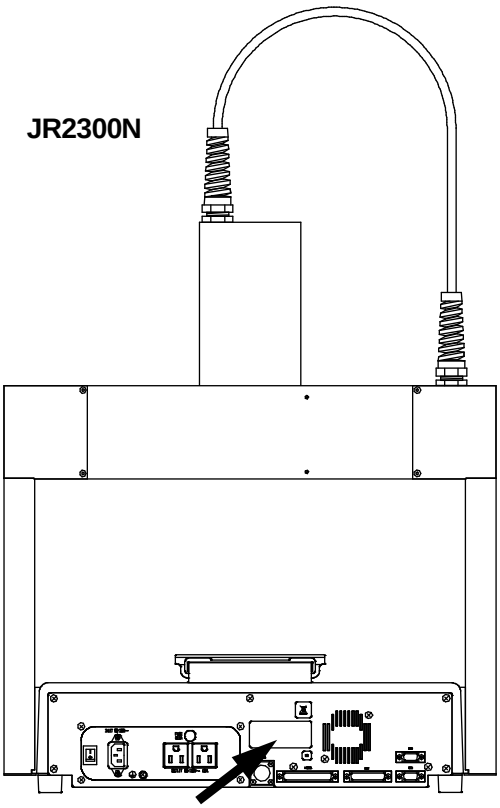
7. Maximum circuit breaker ampacity used for power input. SCCR:1.5kA

2.2 Identification Plate Locations

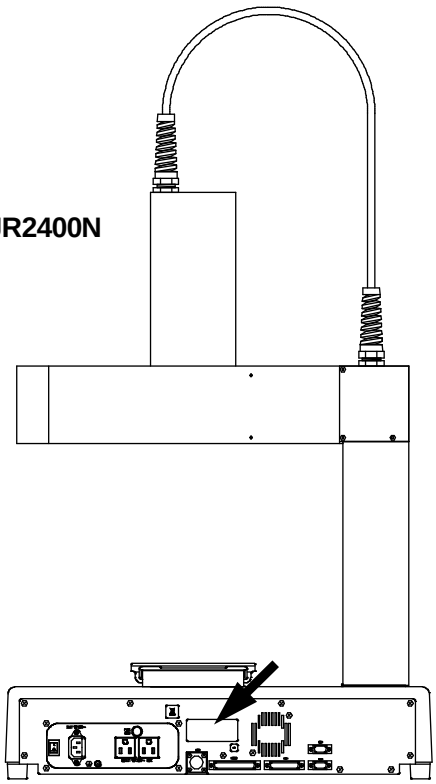
JR2200N



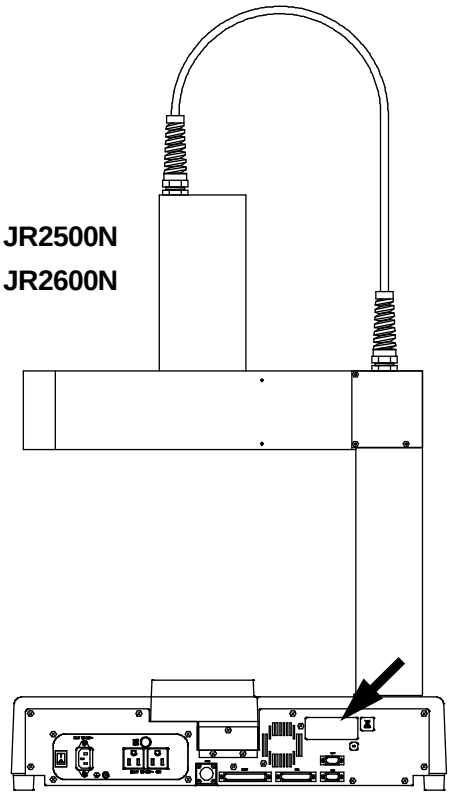
JR2300N



JR2400N



JR2500N
JR2600N



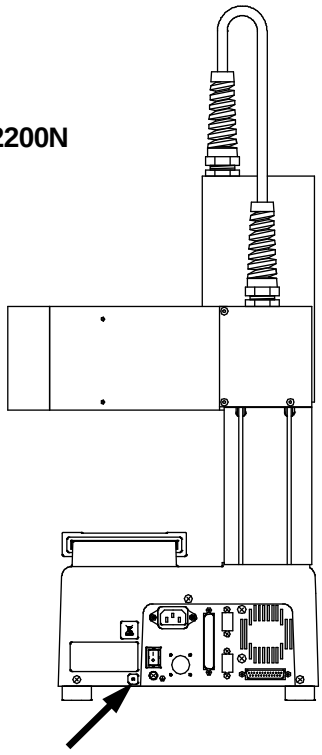
3. I/O Polarity

There are two types of I/O polarity: PNP specifications and NPN specifications. After confirming your robot's polarity specifications, always use tools (etc.) which are compatible with these specifications. The I/O polarity can be confirmed by checking the sticker affixed to the rear of the robot.

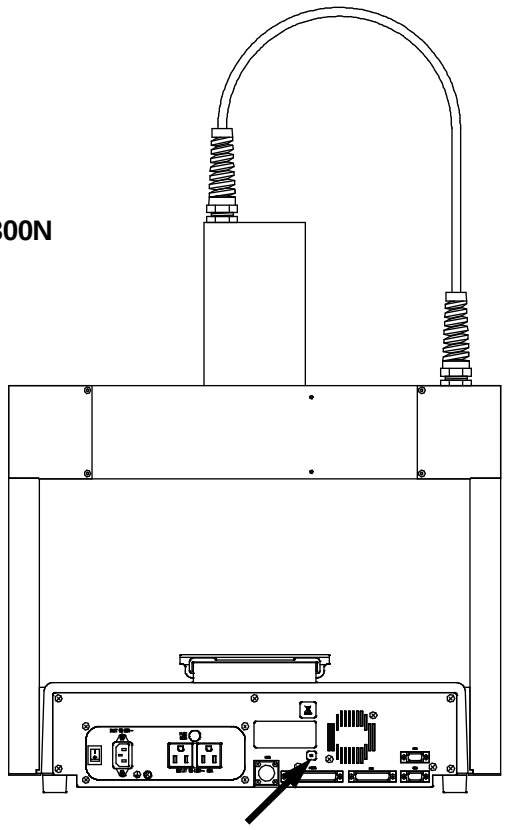
3.1 I/O Polarity Sticker

The I/O polarity sticker is affixed to your robot in the following places:

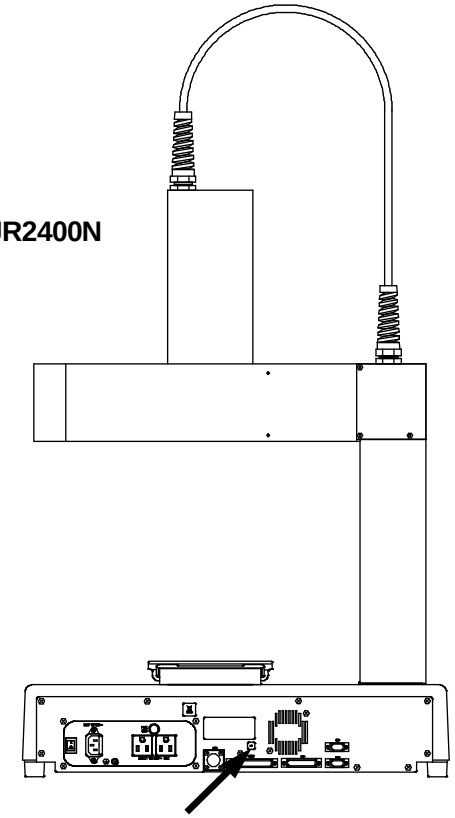
JR2200N



JR2300N

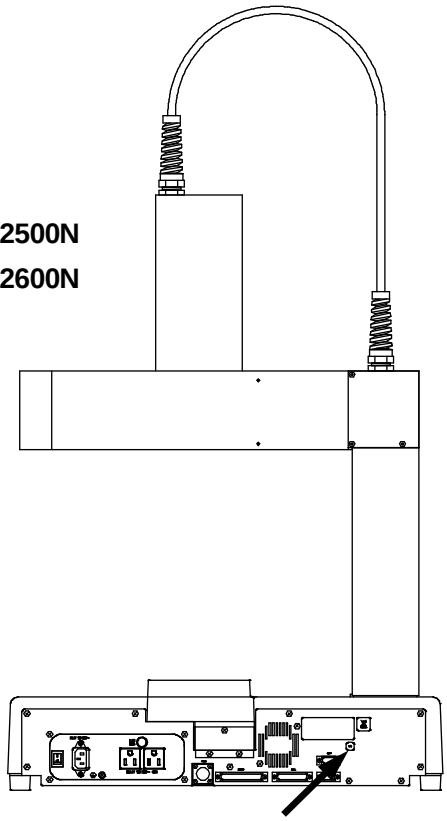


JR2400N



JR2500N

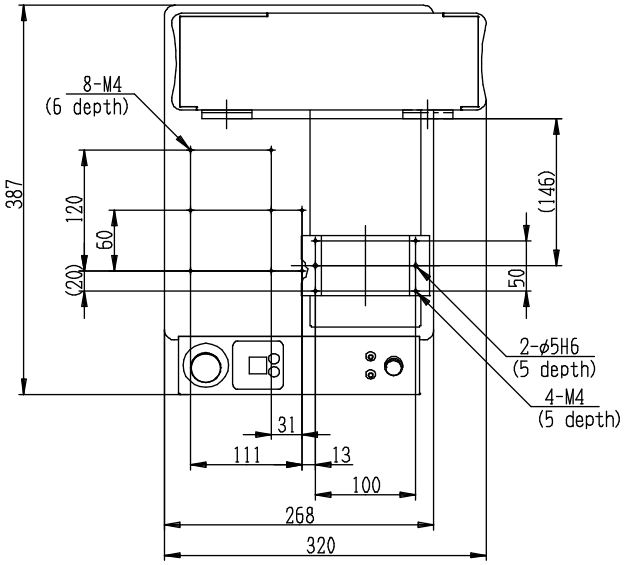
JR2600N



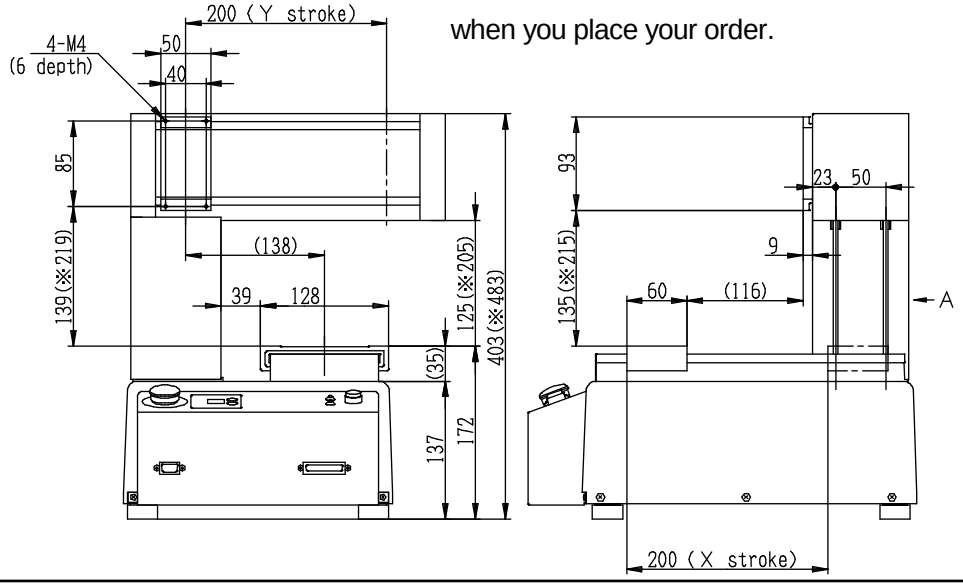
4. EXTERNAL DIMENSIONS

4.1 Unit External Dimensions

4.1.1 JR2202N



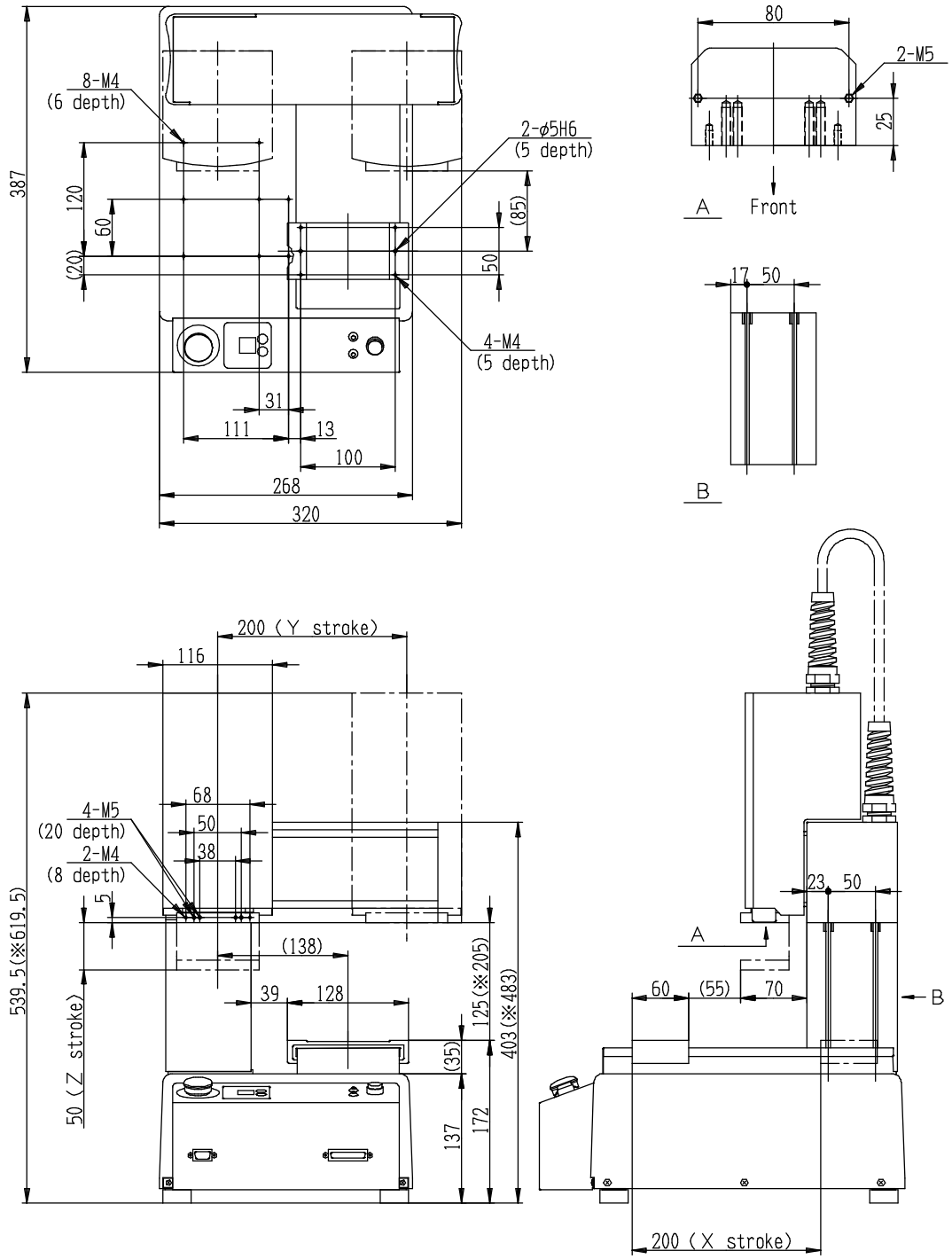
*These are optional heights that can be selected when you place your order.



Warning

Be sure to leave a space of 30cm 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 JR2203N(NE)

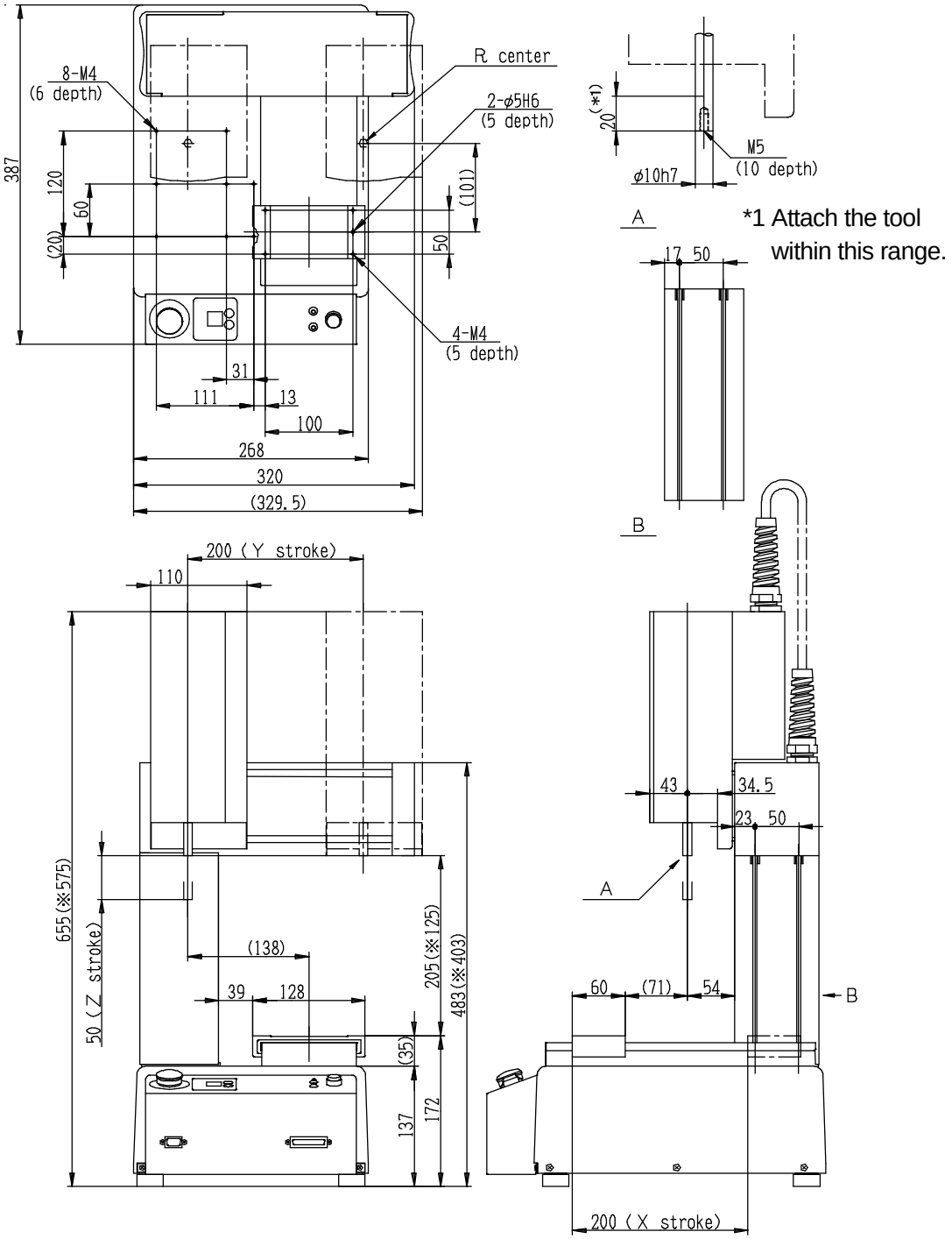


*These are optional heights that can be selected when you place your order.

Warning

Be sure to leave a space of 30cm 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 JR2204N(NE)

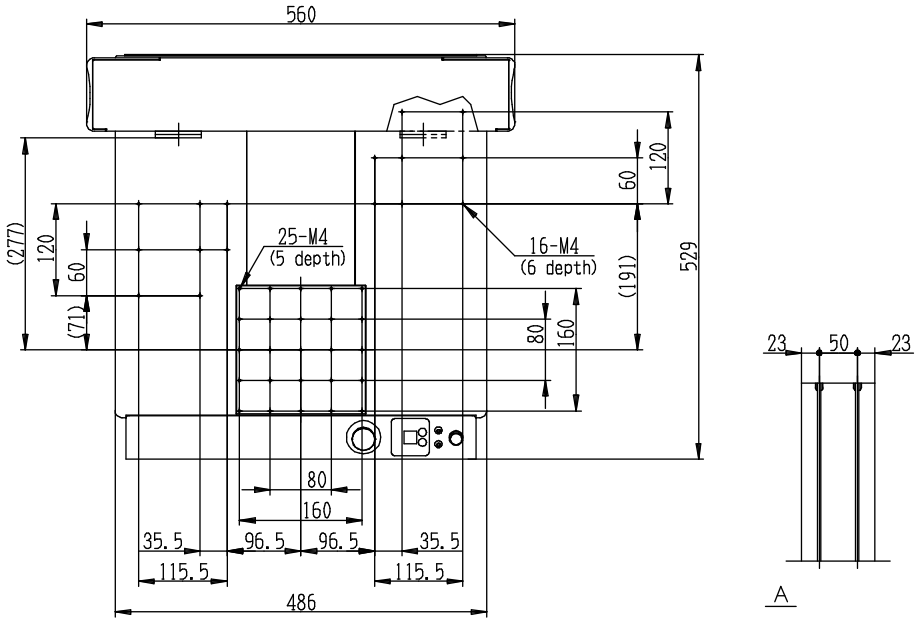


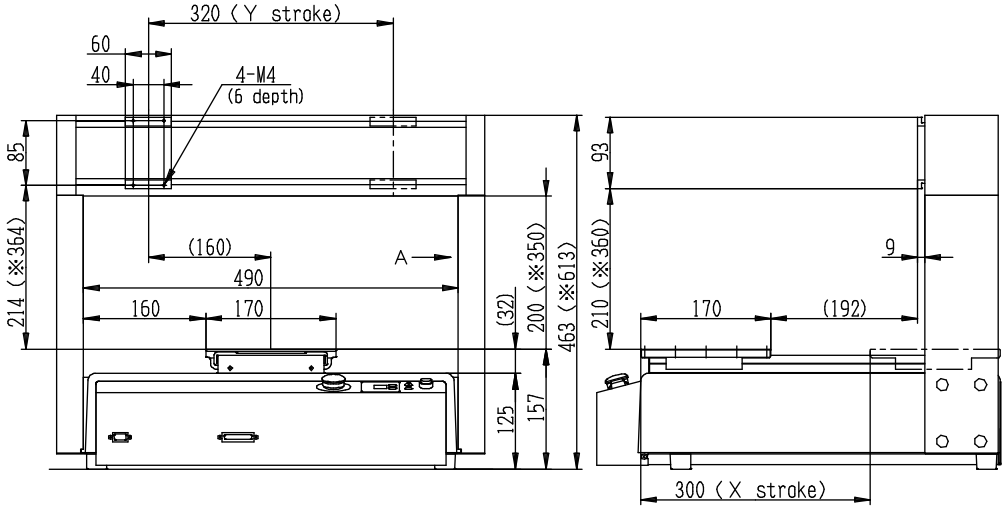
*These are optional heights that can be selected when you place your order.

Warning

Be sure to leave a space of 30cm 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 JR2302N(NE)



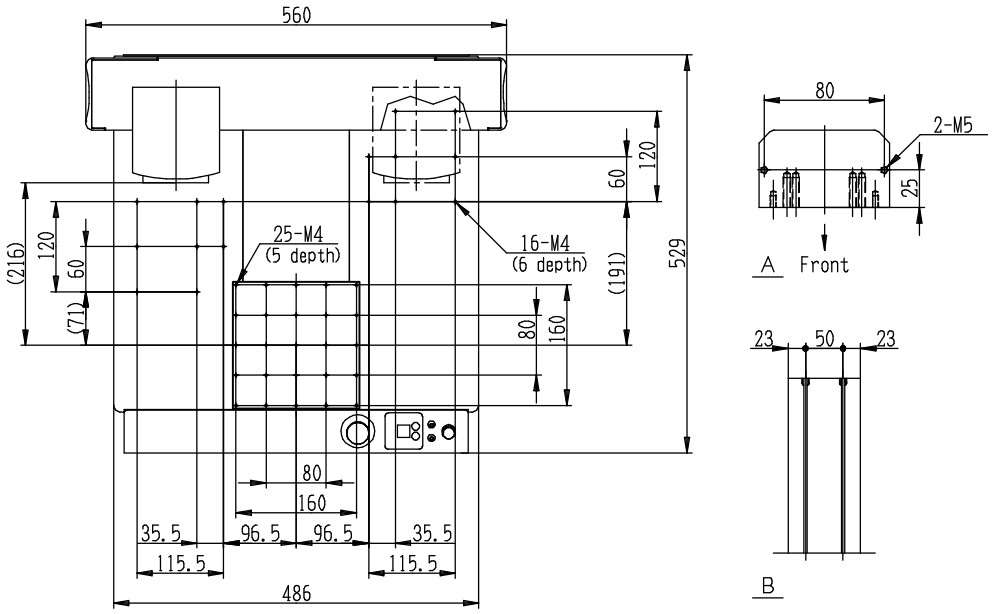


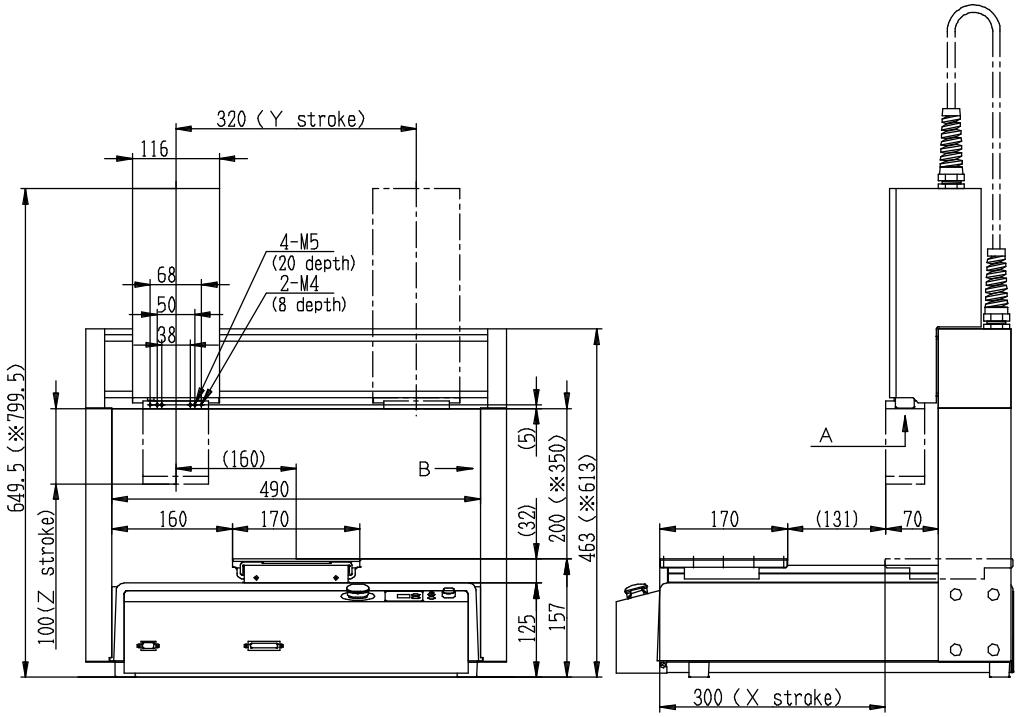
*These are optional heights that can be selected when you place your order.

Warning

Be sure to leave a space of 30cm 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.

4.1.5 JR2303N(NE)



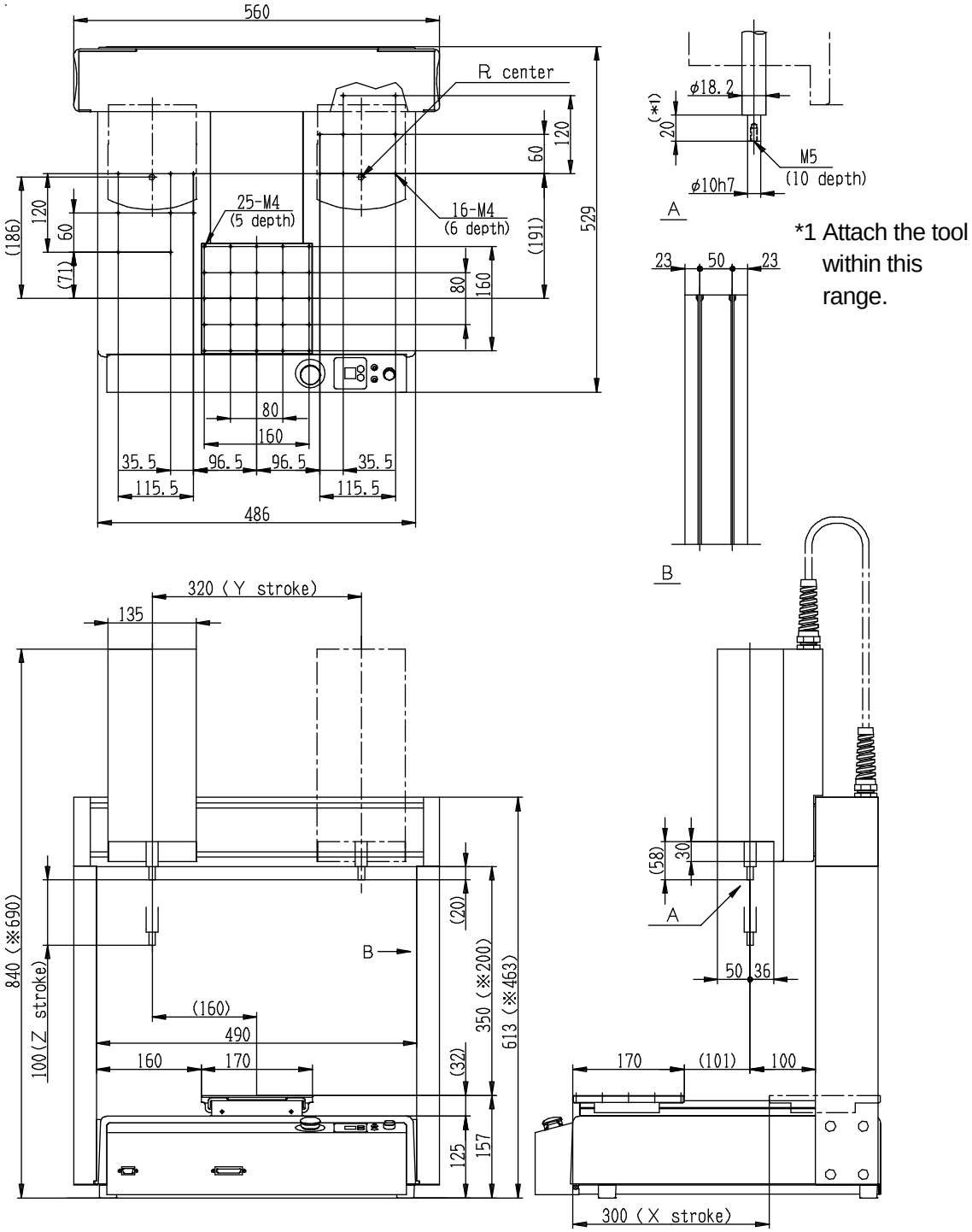


*These are optional heights that can be selected when you place your order.

Warning

Be sure to leave a space of 30cm 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 JR2304N(NE)



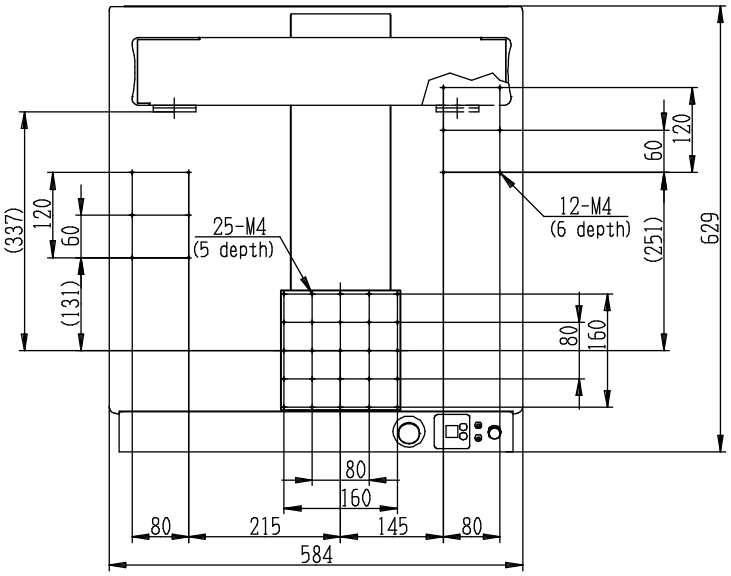
*1 Attach the tool within this range.

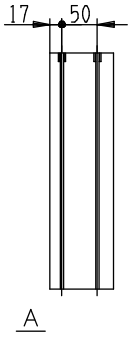
*These are optional heights that can be selected when you place your order.

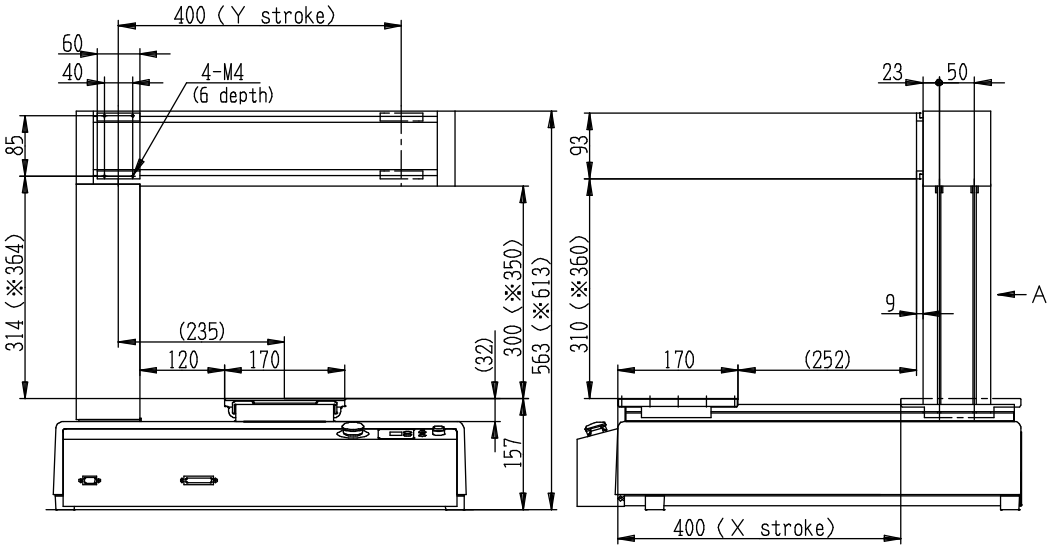
Warning

Be sure to leave a space of 30cm 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 JR2402N





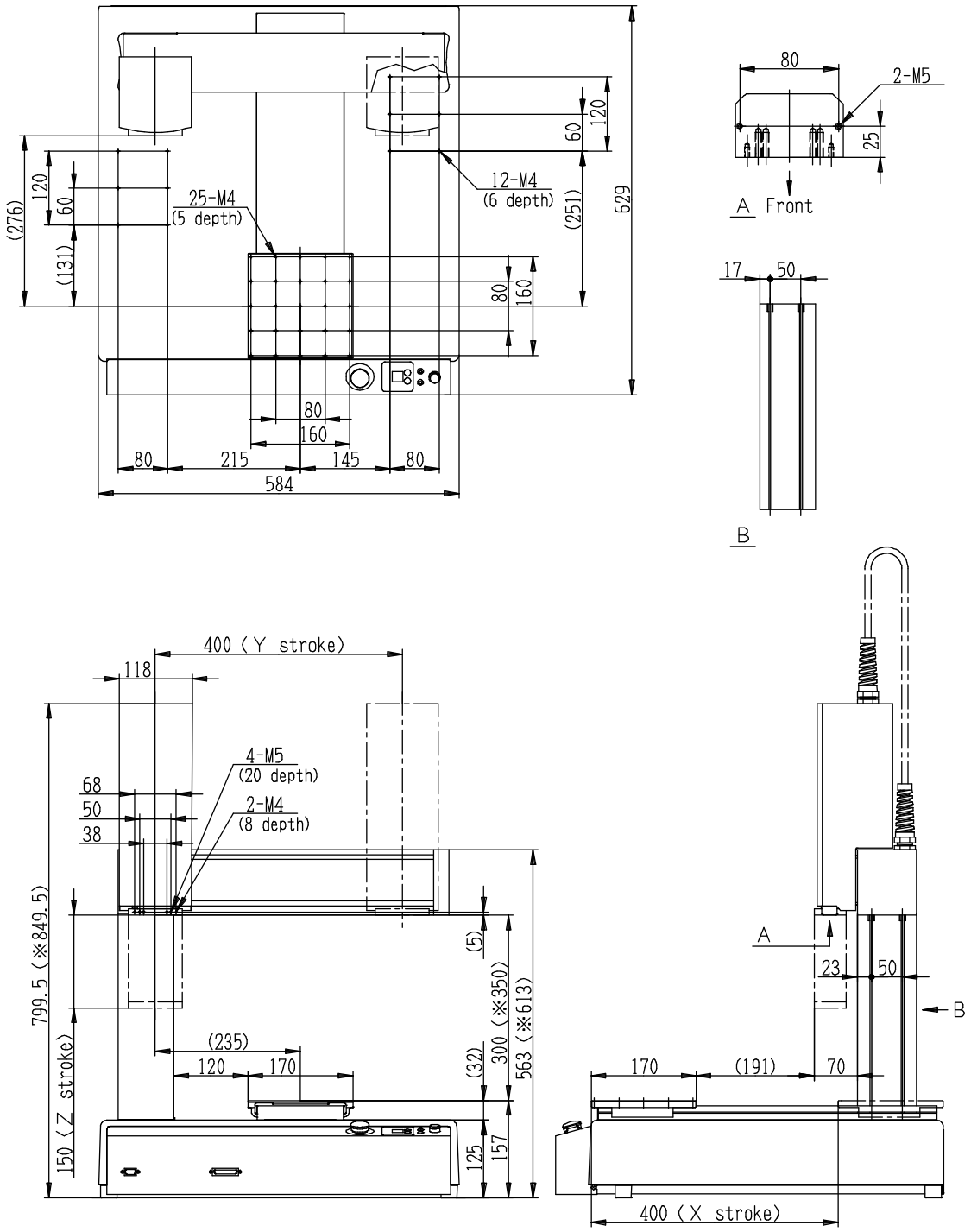


*These are optional heights that can be selected when you place your order.

Warning

Be sure to leave a space of 30cm 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 JR2403N(NE)

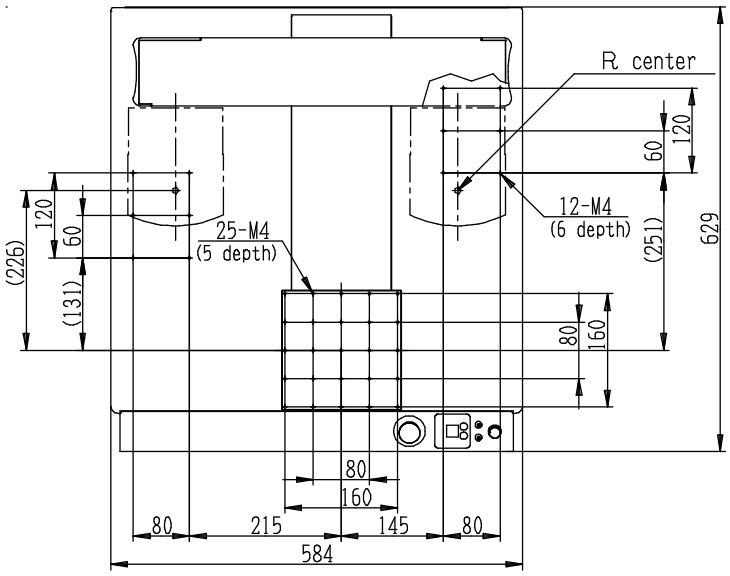


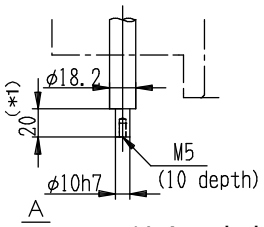
*These are optional heights that can be selected when you place your order.

Warning

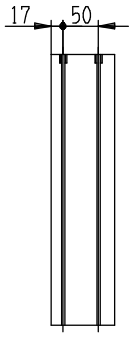
Be sure to leave a space of 30cm or more between the rear of the robot and the wall or any other obstacle when you install the robot. If the robot is too close to the wall, etc. it will be hard to do maintenance, etc., and also due to the cooling fan on the rear of the unit, the robot may overheat or malfunction.

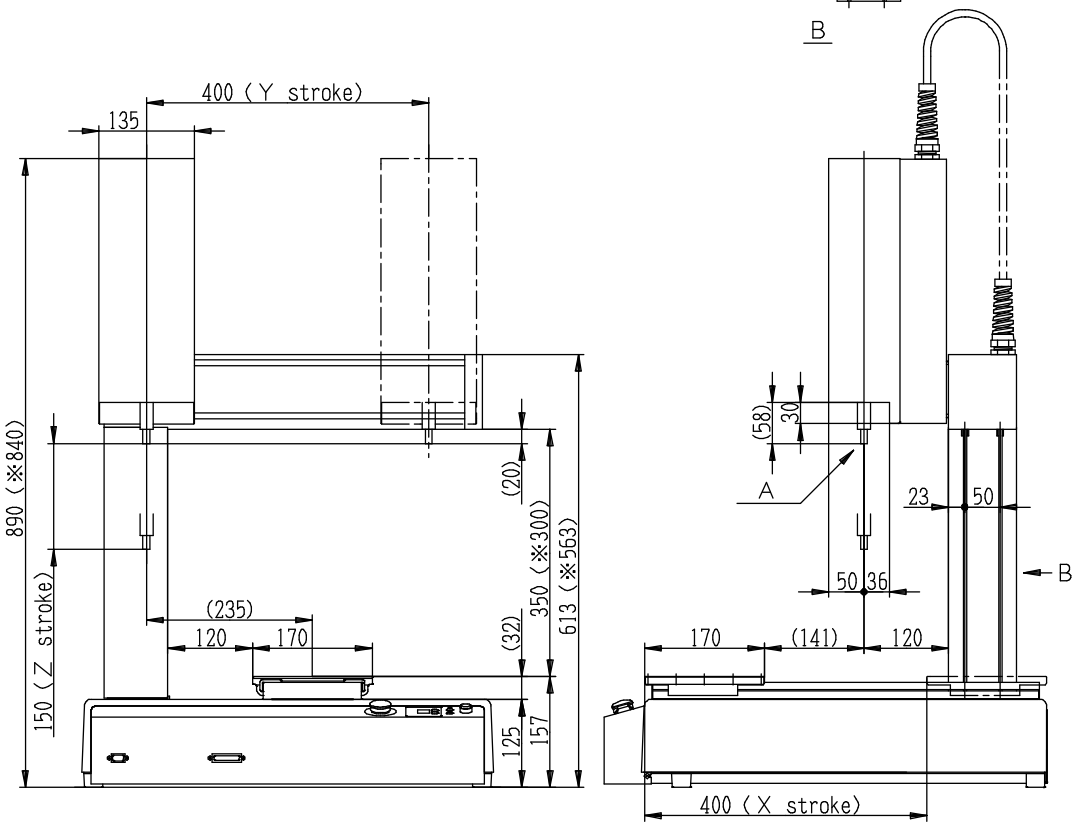
4.1.9 JR2404N(NE)





*1 Attach the tool within this range.



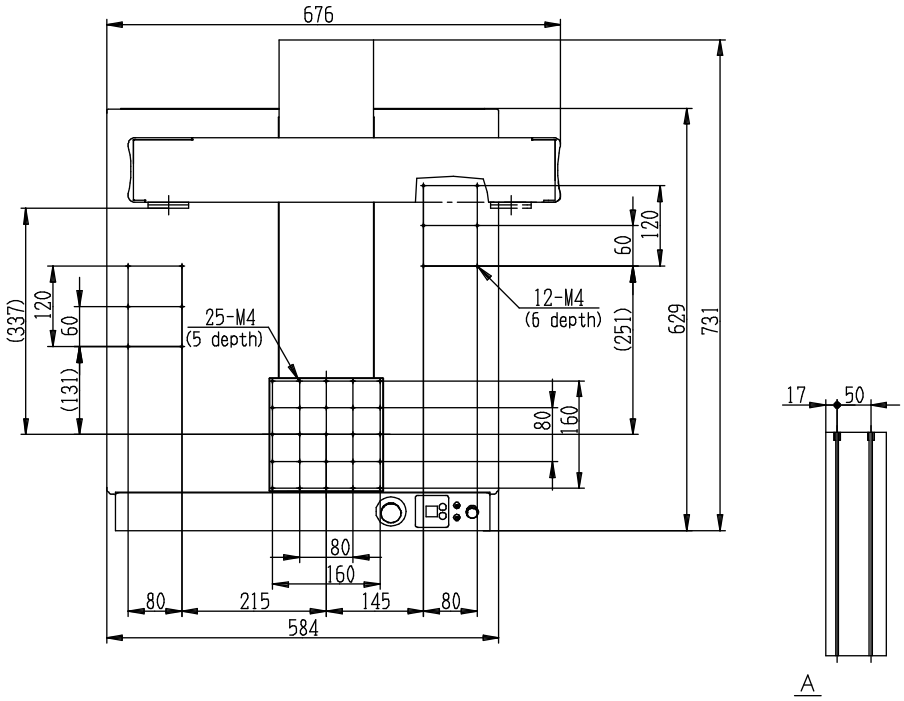


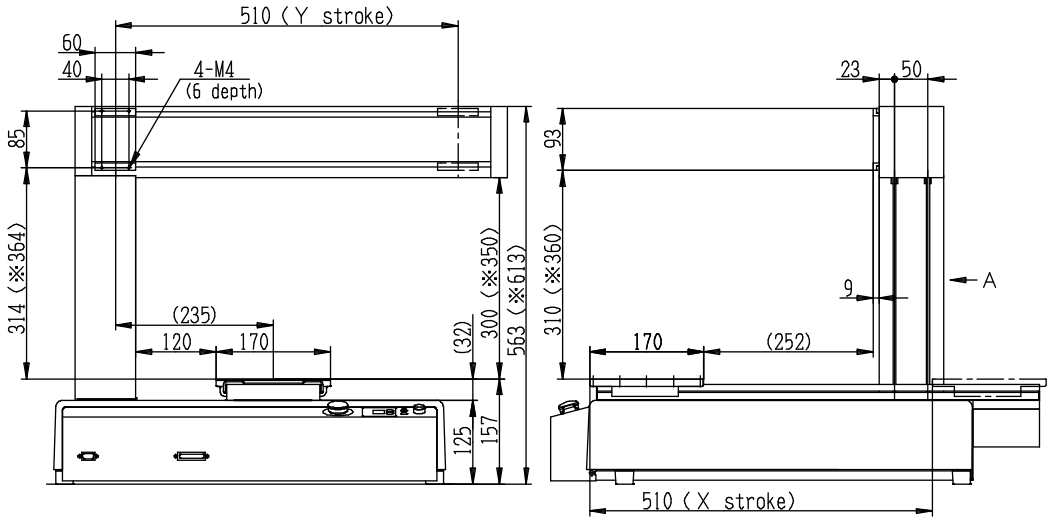
*These are optional heights that can be selected when you place your order.

Warning

Be sure to leave a space of 30cm 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 JR2502N



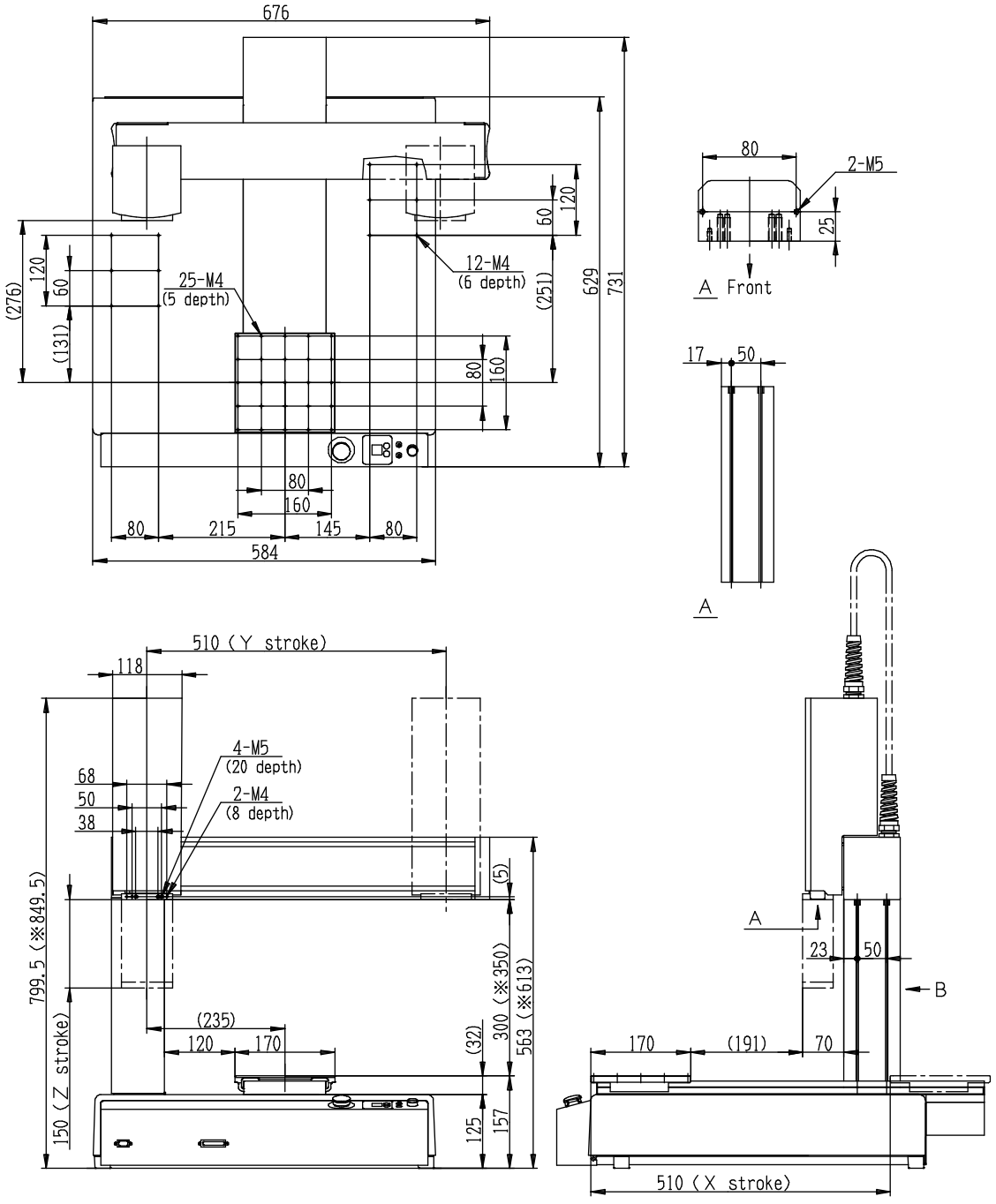


*These are optional heights that can be selected when you place your order.

Warning

Be sure to leave a space of 30cm 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 JR2503N(NE)

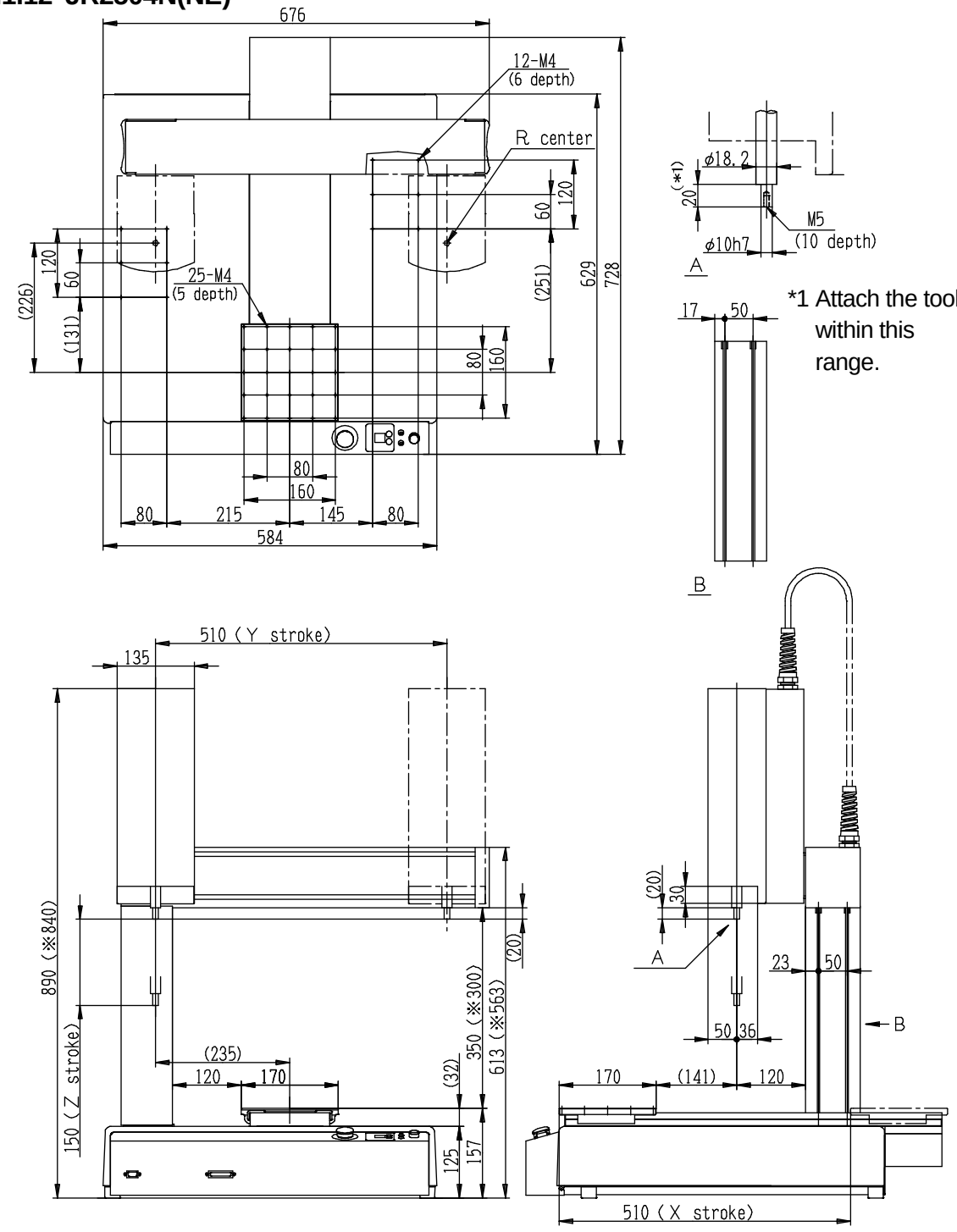


*These are optional heights that can be selected when you place your order.

Warning

Be sure to leave a space of 30cm 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 JR2504N(NE)

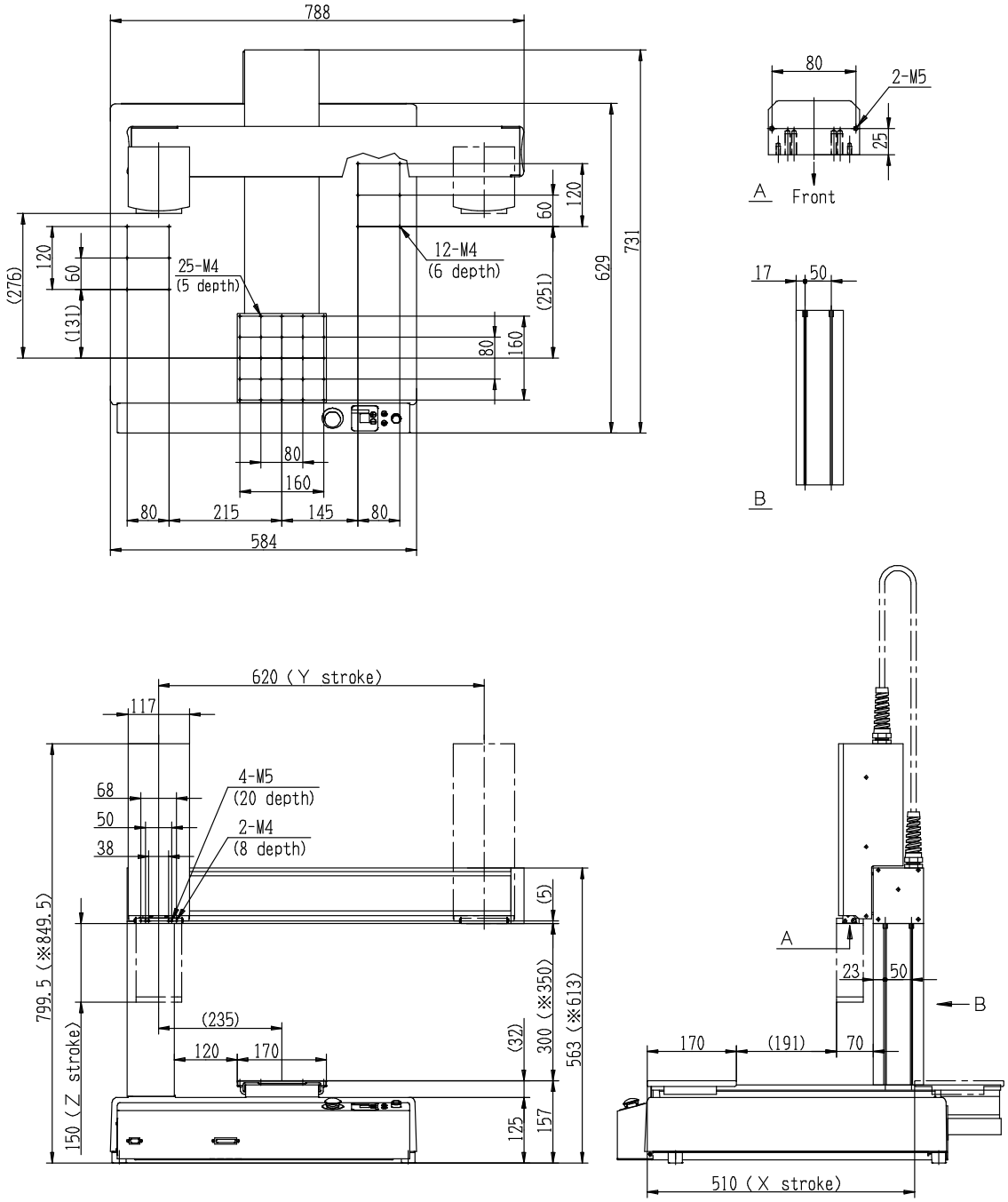


*These are optional heights that can be selected when you place your order.

Warning

Be sure to leave a space of 30cm 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 JR2603N

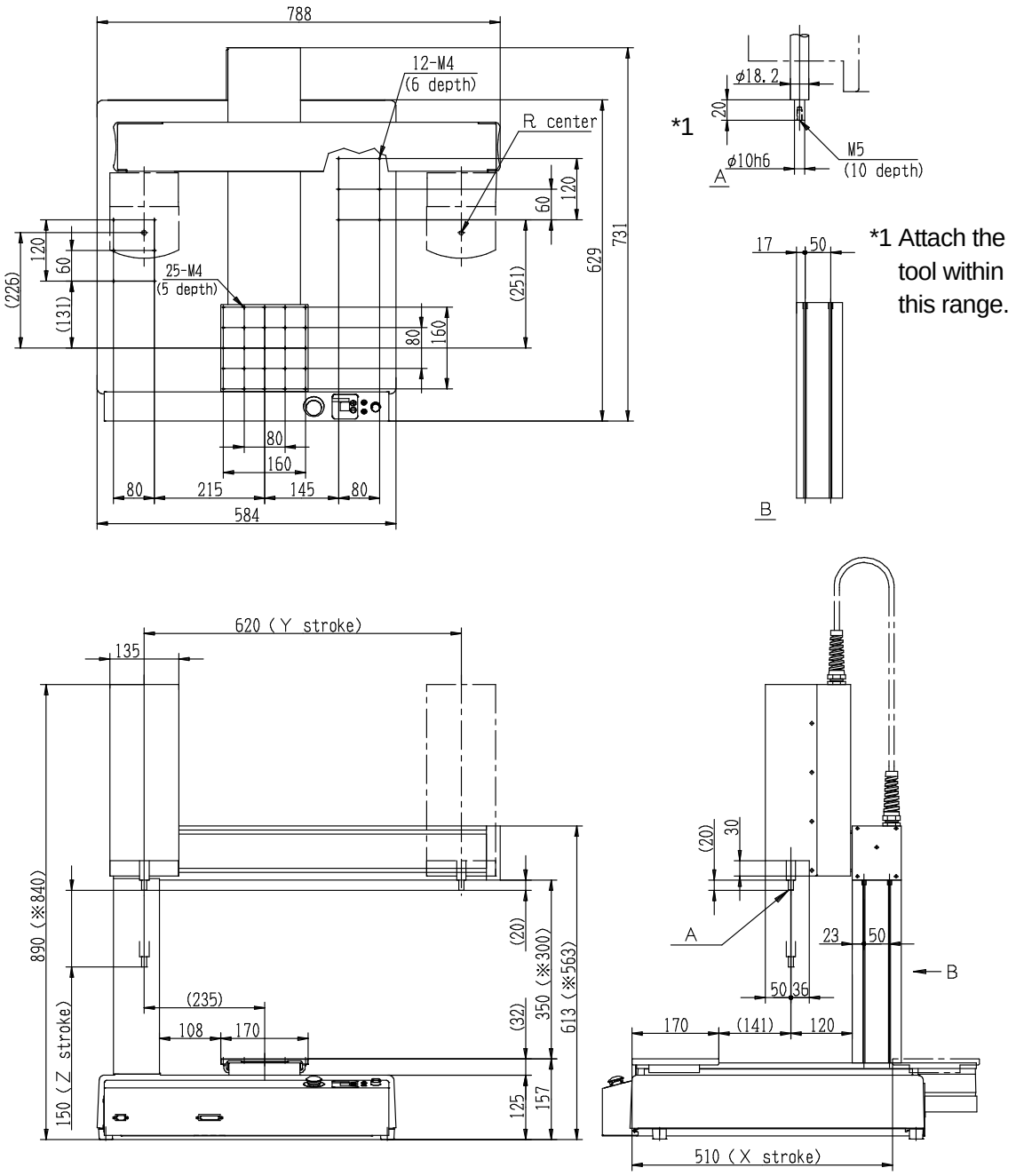


*These are optional heights that can be selected when you place your order.

Warning

Be sure to leave a space of 30cm 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.

4.1.14 JR2604N



*These are optional heights that can be selected when you place your order.

Warning

Be sure to leave a space of 30cm 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.

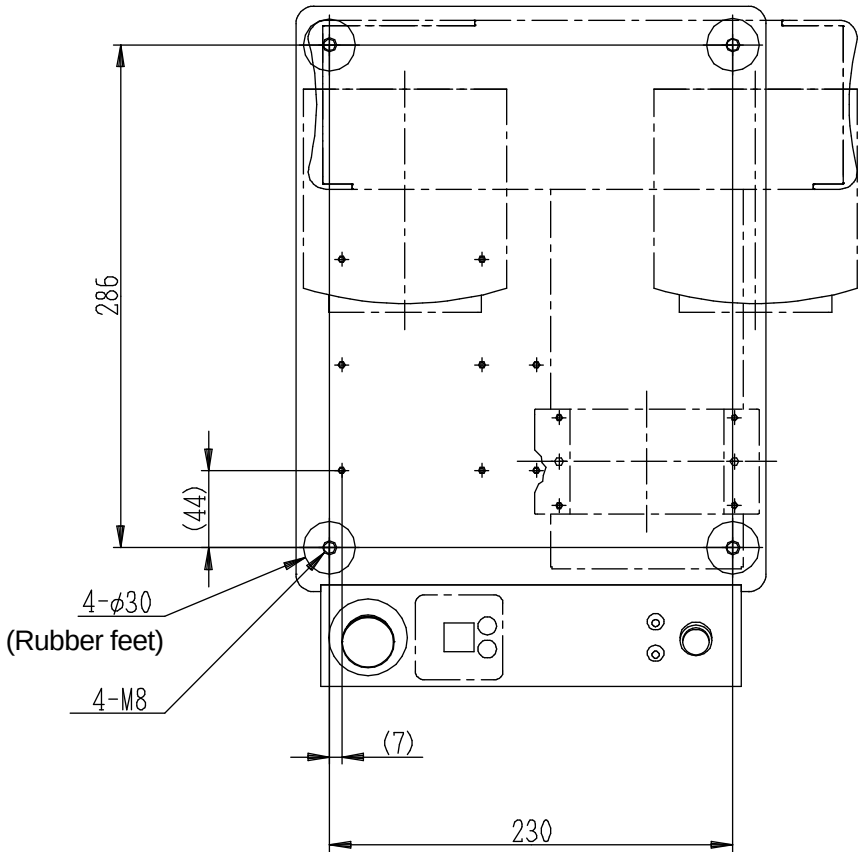
4.2 Unit Fixtures (4)

4.2.1 Common to the JR2200N(NE) Series

There are rubber feet attached (ϕ 30) in four places.

When securing the unit, use the M8 screws (the nuts are welded to the unit) in the four places where the rubber feet are attached.

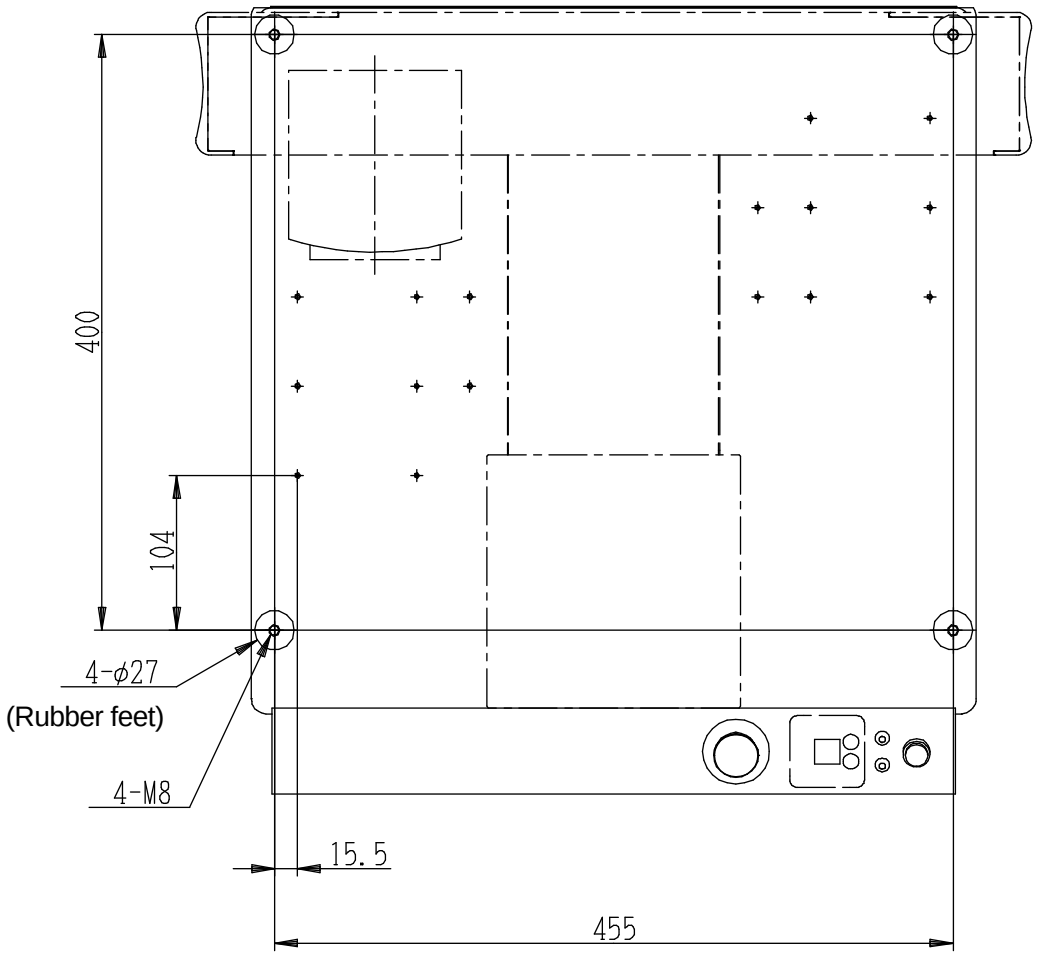
Note that dimensions within the brackets above are for reference only and may change depending upon unit assembly.



4.2.2 Common to the JR2300N(NE) Series

There are rubber feet attached (ϕ 30) in four places.

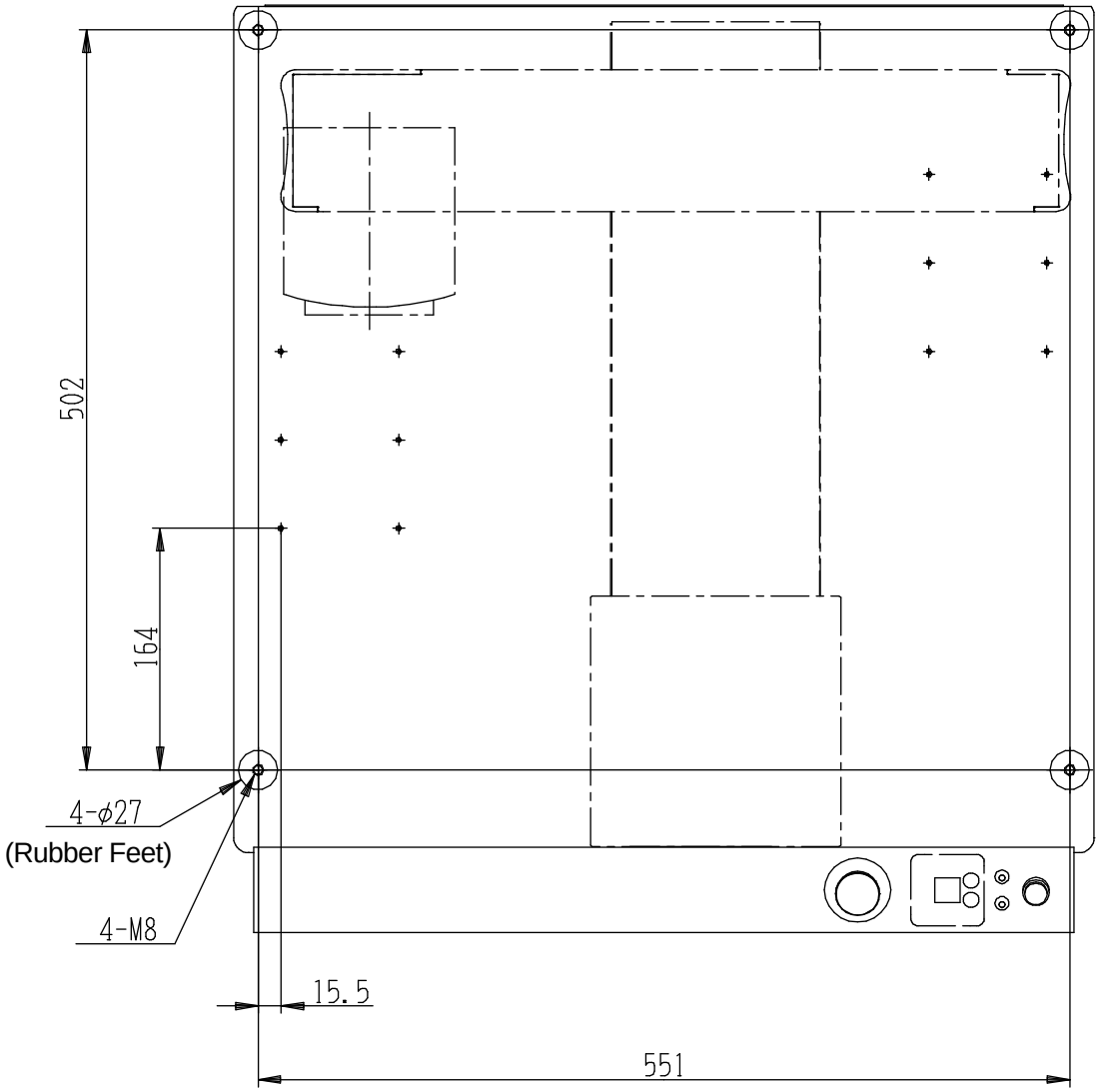
When securing the unit, use the M8 screws (the nuts are welded to the unit) in the four areas where the rubber feet are attached, and ensure to use spacers with a height of 20mm or more (as clearance for any protrusions).



4.2.3 Common to the JR2400N(NE) Series

There are rubber feet attached (ϕ 30) in four places.

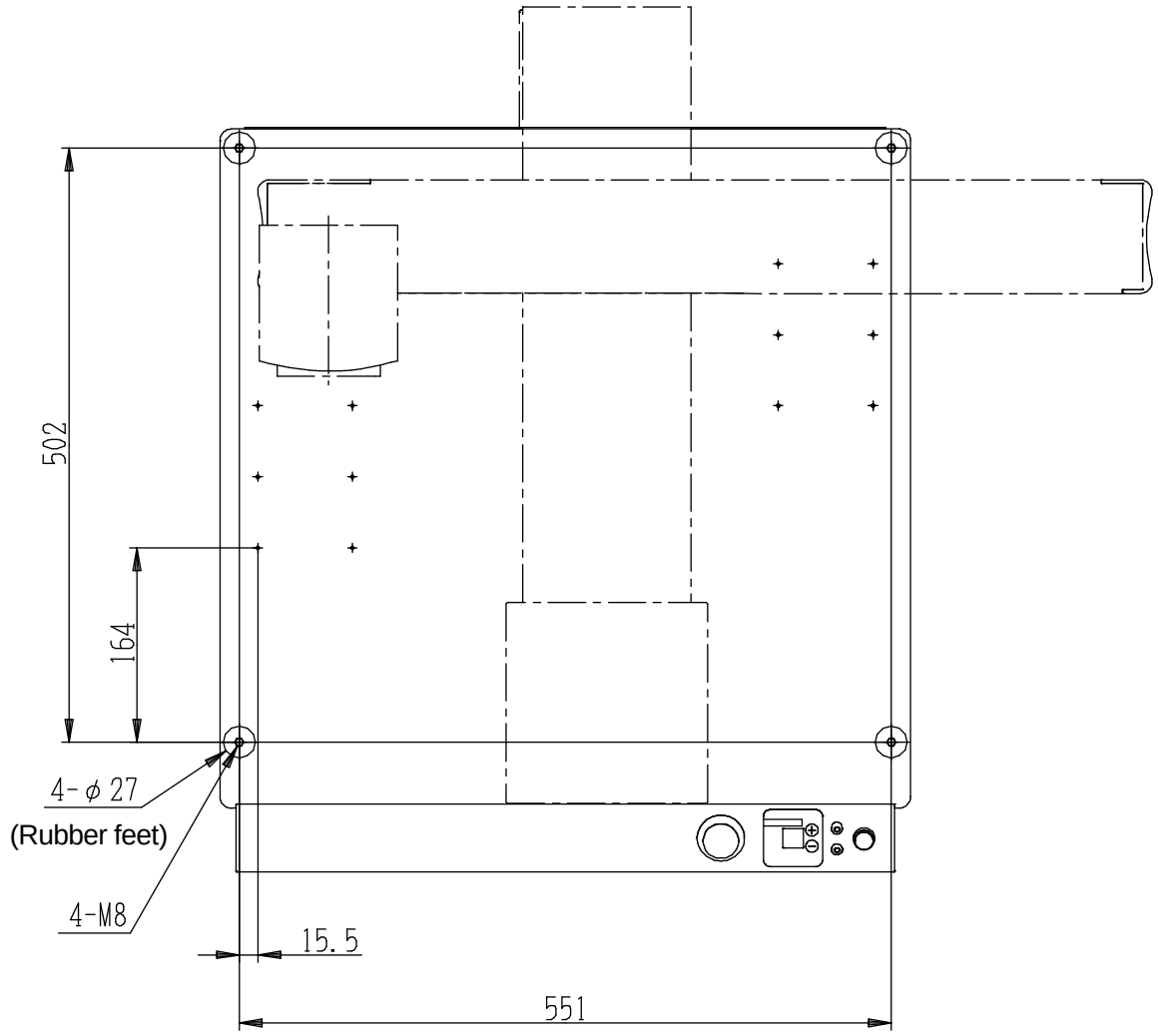
When securing the unit, use the M8 screws (the nuts are welded to the unit) in the four areas where the rubber feet are attached, and ensure to use spacers with a height of 20mm or more (as clearance for any protrusions).



4.2.4 Common to the JR2500N(NE) – JR2600N Series

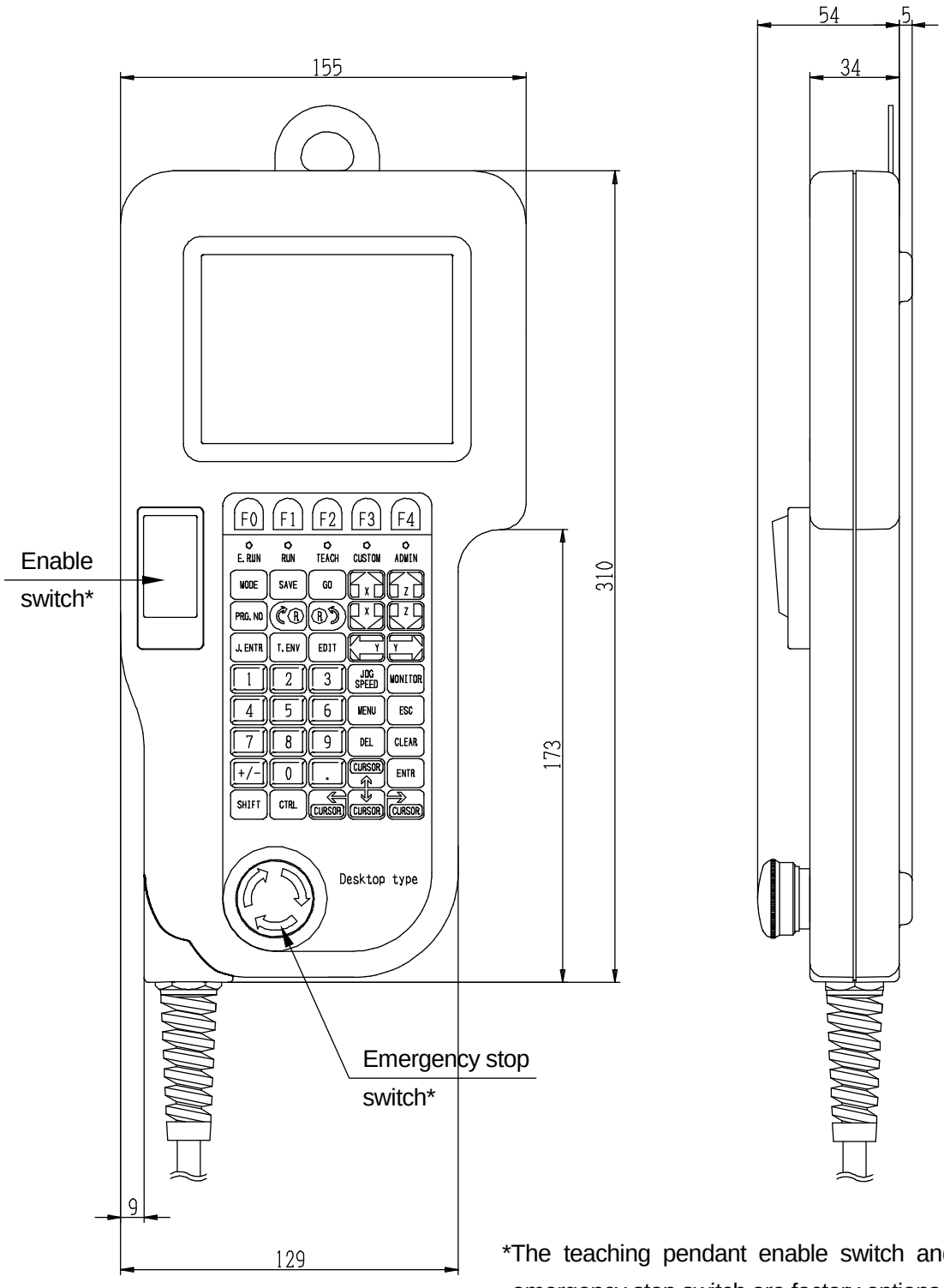
There are rubber feet attached (ϕ 30) in four places.

When securing the unit, use the M8 screws (the nuts are welded to the unit) in the four areas where the rubber feet are attached, and ensure to use spacers with a height of 20mm or more (as clearance for any protrusions).



4.3 Teaching Pendant

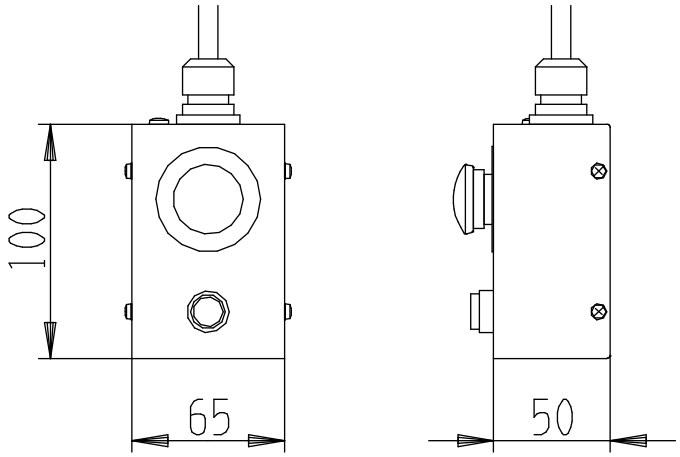
If using the teaching pendant as a monitor in the Run Modes, install it at a height of 60cm or above for easy operation.



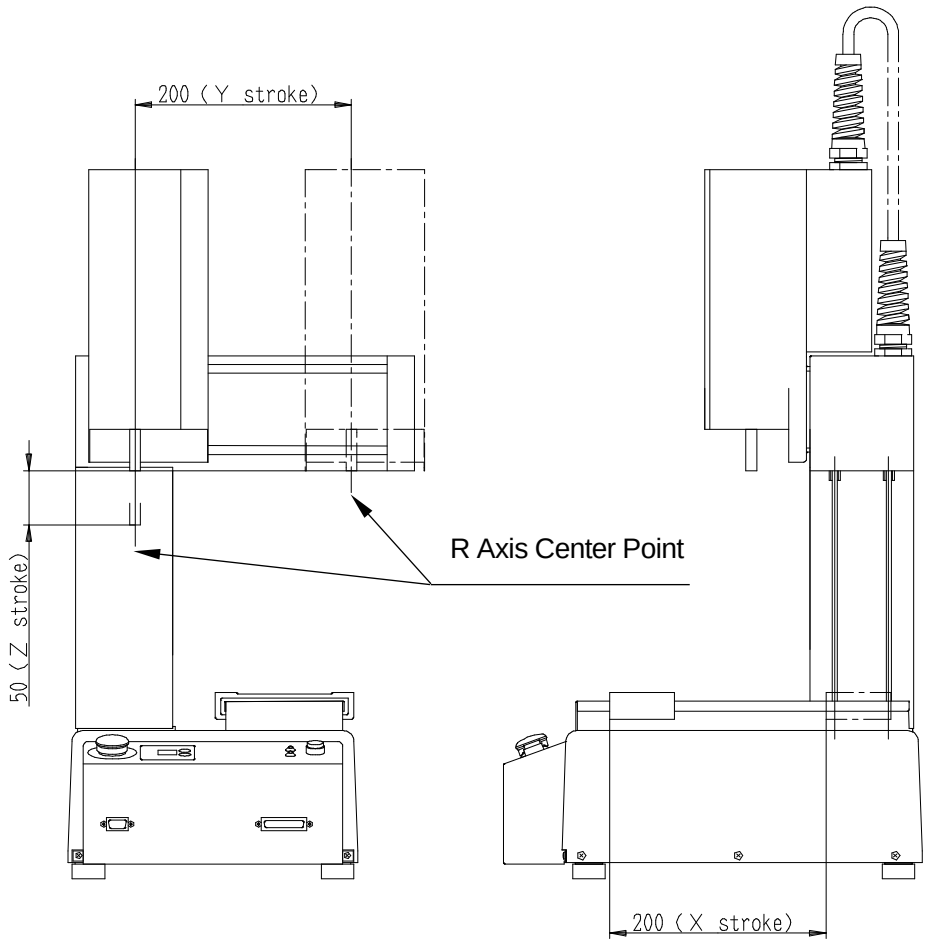
*The teaching pendant enable switch and emergency stop switch are factory options.

4.4 Switchbox (CE Specifications)

Install the switchbox at a height of 60cm or above for easy operation.



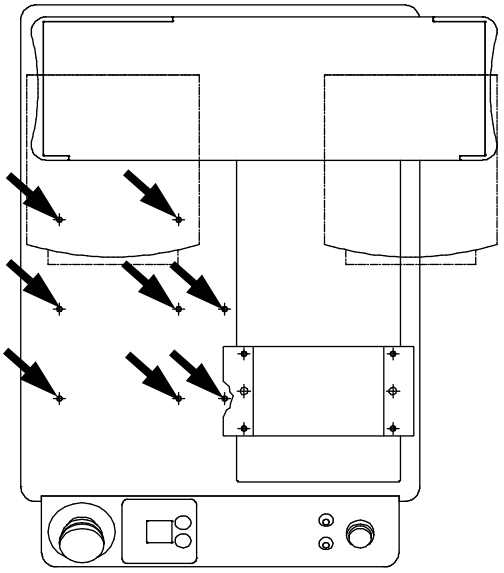
5. RANGE OF MOVEMENT



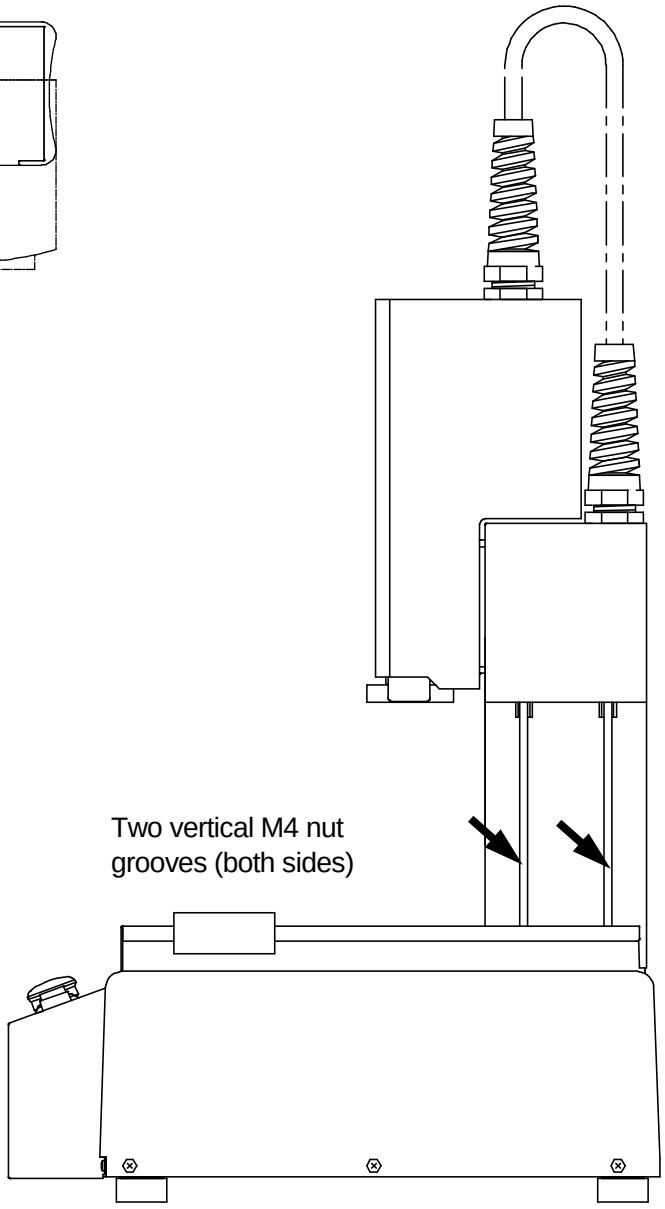
Axis / Robot	X	Y	Z	R
JR2202N	200	200	—	—
JR2203N(NE)	200	200	50	—
JR2204N(NE)	200	200	50	±360
JR2302N	300	320	—	—
JR2303N(NE)	300	320	100	—
JR2304N(NE)	300	320	100	±360
JR2402N	400	400	—	—
JR2403N(NE)	400	400	150	—
JR2404N(NE)	400	400	150	±360
JR2502N	510	510	—	—
JR2503N(NE)	510	510	150	—
JR2504N(NE)	510	510	150	±360
JR2603N	510	620	150	—
JR2604N	510	620	150	±360

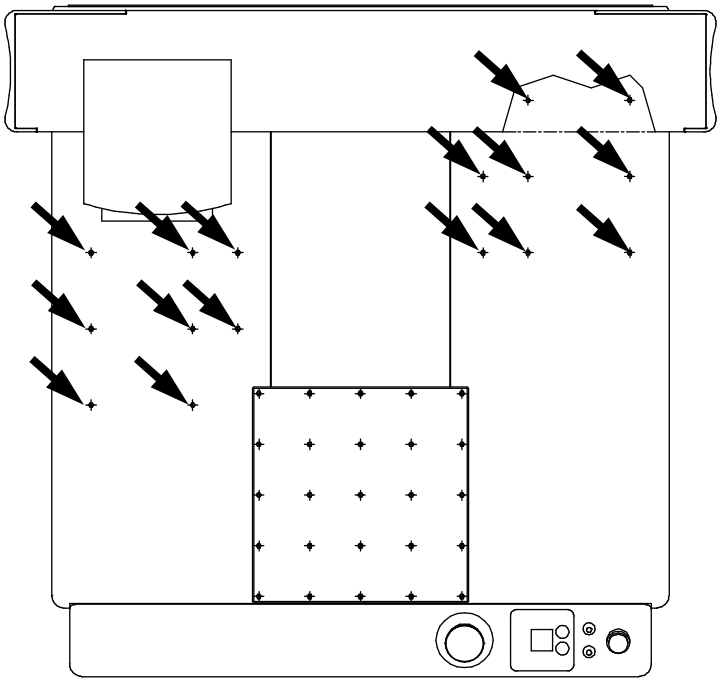
6. ATTACHING EQUIPMENT

When you want to attach a feeder, tool controller or jig to your robot, there are two vertical M4 nut grooves on both sides of the column, and M4 screws (JR2200N: 8, JR2300N: 16, JR2400N,JR2500N, JR2600N: 12 screws) on the base which you can use, as shown in the illustrations below.
Refer to “4.1 Unit External Dimensions” for attaching dimensions.



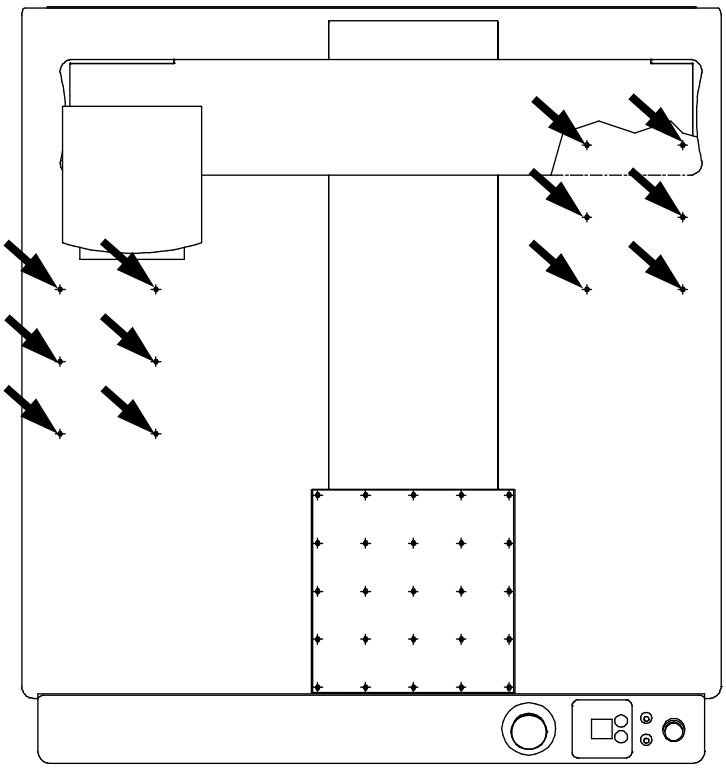
JR2200N(NE) Series
M4 Screws (Eight)





JR2300N(NE) Series
(Sixteen) M4 Screws

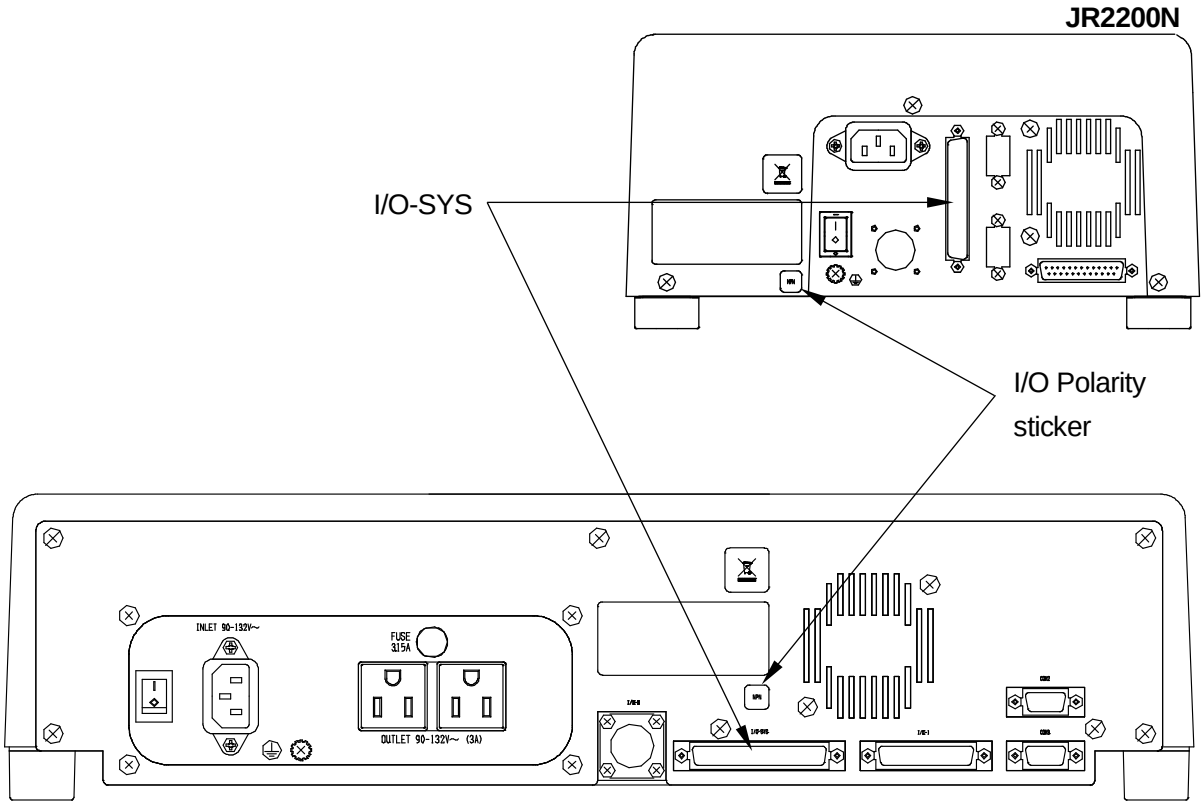
JR2400N(NE) Series and
JR2500N(NE) Series
JR2600N Series
M4 Screws (Twelve)



7. I/O-SYS

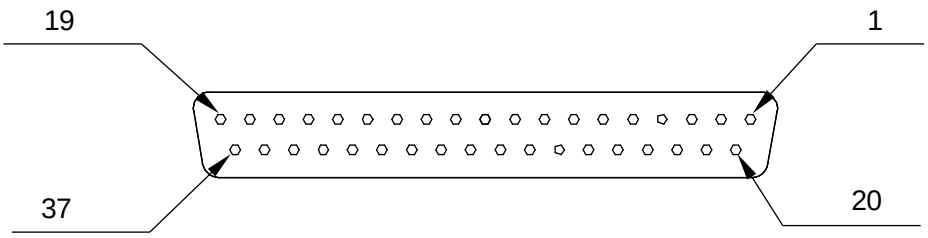
There are system functions assigned to I/O-SYS. Refer to an application specifications operation manual (*Dispensing* etc.) for information regarding these assigned functions.

7.1 Connector



JR2300N, JR2400N, JR2500N, JR2600N

7.2 Pin Nos.



Connector on the robot

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 by checking the I/O polarity sticker.

7.3 Output Capacity

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

JR2200N Series

Use voltage ratings equal to or less than the ones listed below.

Power Supply	Internal	External
Voltage	DC24V	DC24V
1 Pin (when using DC 24C)	100mA	100mA
Total of I/O-SYS and I/O-1	1.6A or less	—

JR2300N, JR2400N, JR2500N and JR2600N Series

Use voltage ratings equal to or less than the ones listed below.

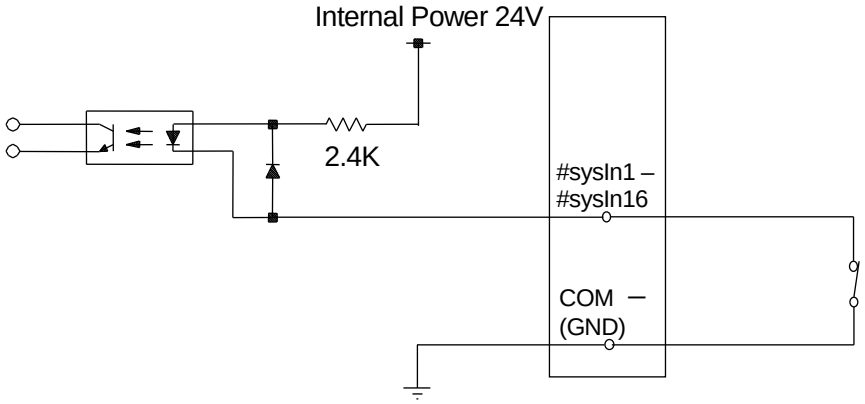
Power Supply	Internal	External
Voltage	DC24V	DC24V
1 Pin (when using DC 24C)	100mA	100mA
Total of I/O-SYS and I/O-1	2A or less	—

7.4 Input Signal (NPN)

■ When using the internal power supply

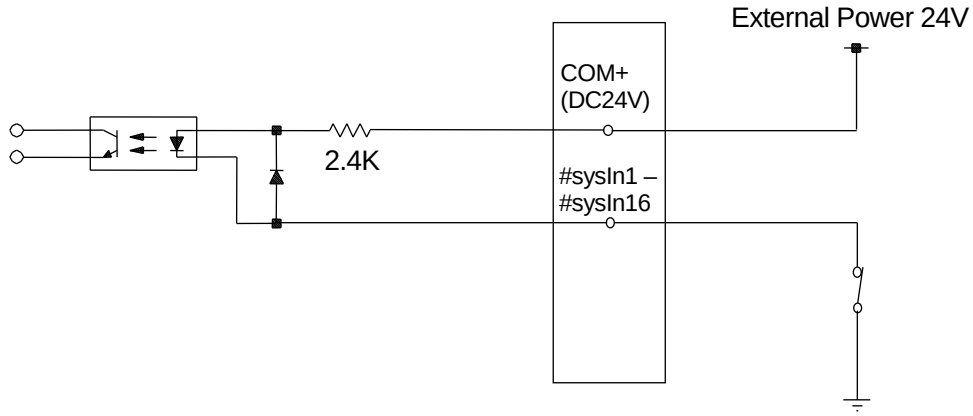
Input signals are active when the photocoupler is ON.

Using an internal power supply means that the input pin and the COM- pin are shorted.



■ When using an external power supply

Using an external power supply means that the input pin and the ground of the external power supply are ON.

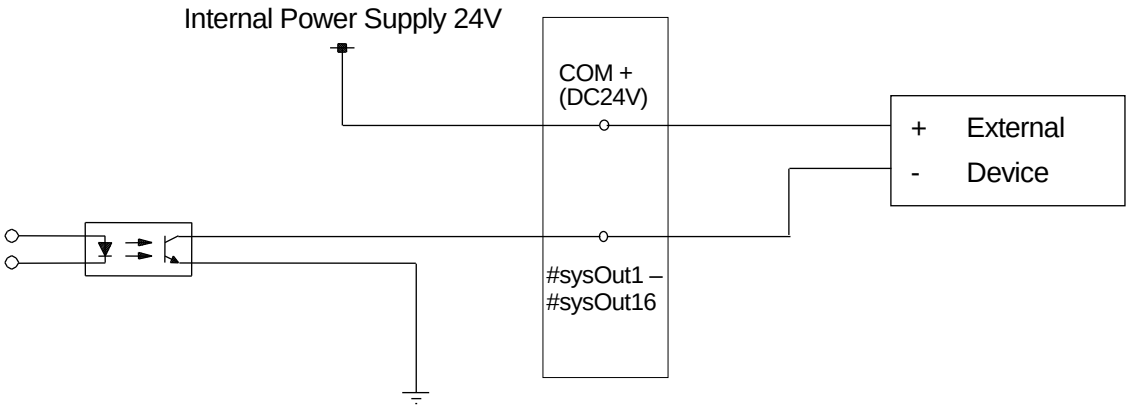


If connecting a two-wire external device, such as a sensor, use one which has a leakage current of no more than 0.3mA. If you use a device with a leakage current of more than 0.3mA, it may not turn OFF.

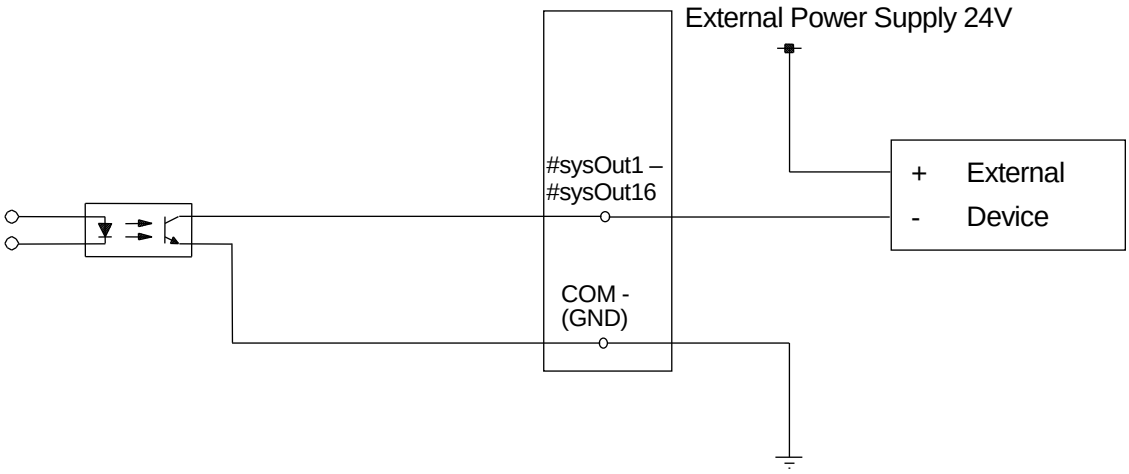
Do not assign wiring other than the wiring specified above.
Assigning the wrong wiring can damage the internal circuits.

7.5 Output Signal (NPN)

■ When using the internal power supply

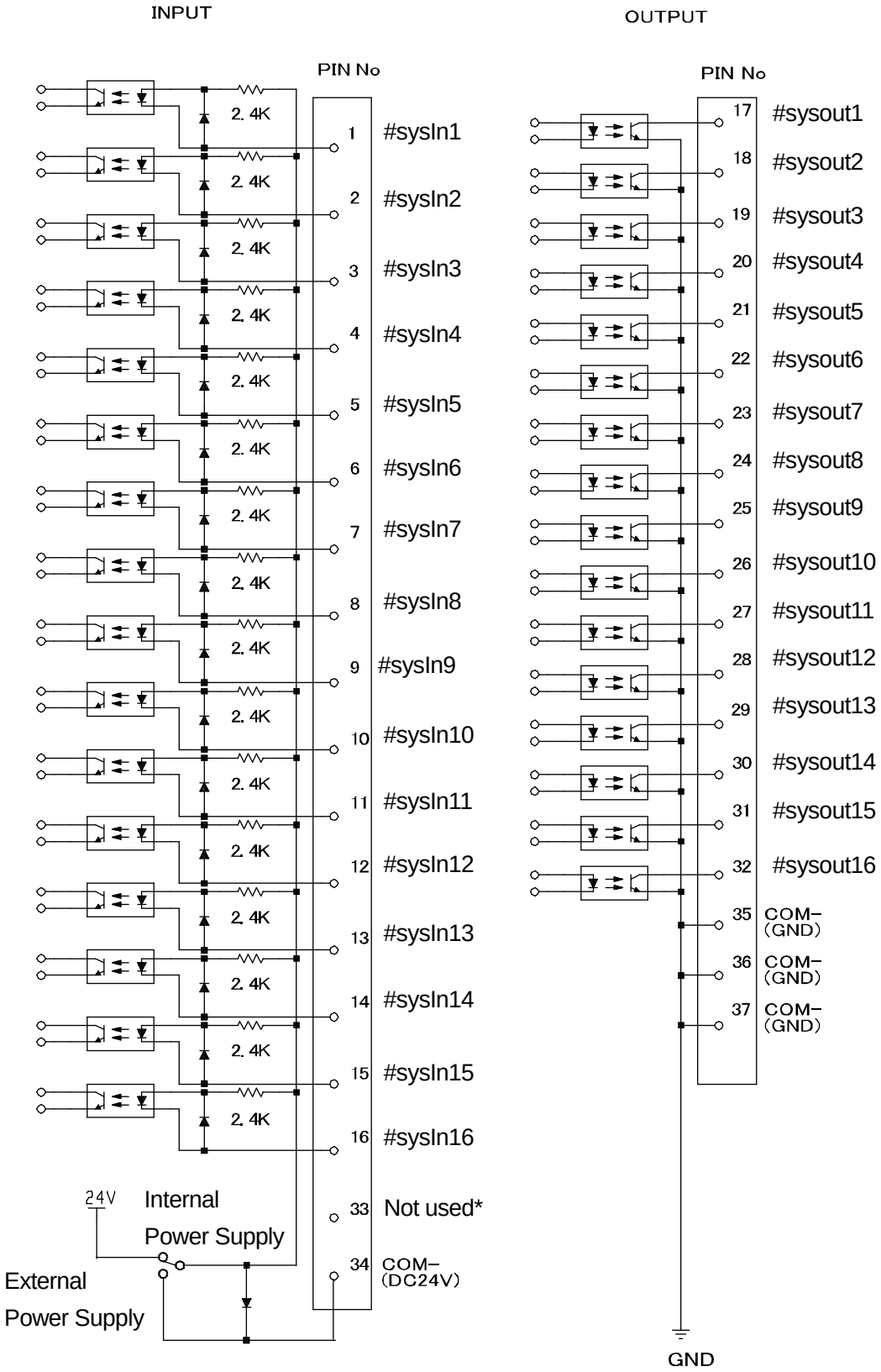


■ When using an external power supply



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

7.6 Circuit Diagram (NPN)



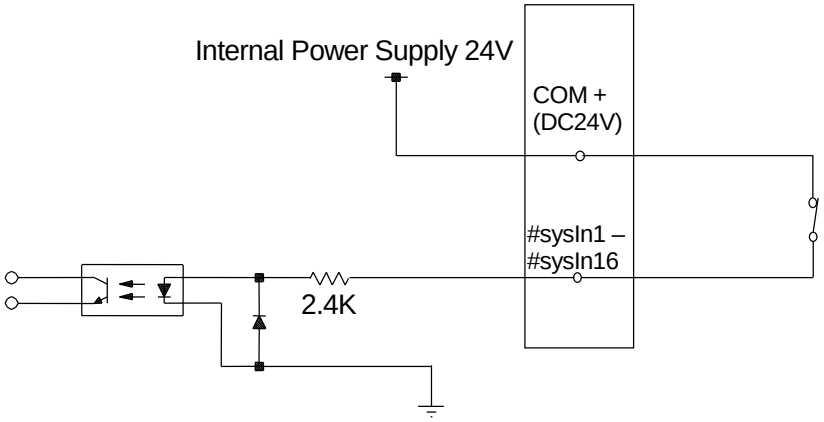
* Do not connect any wiring to this pin number.

7.7 Input Signal (PNP)

■ When using the internal power supply

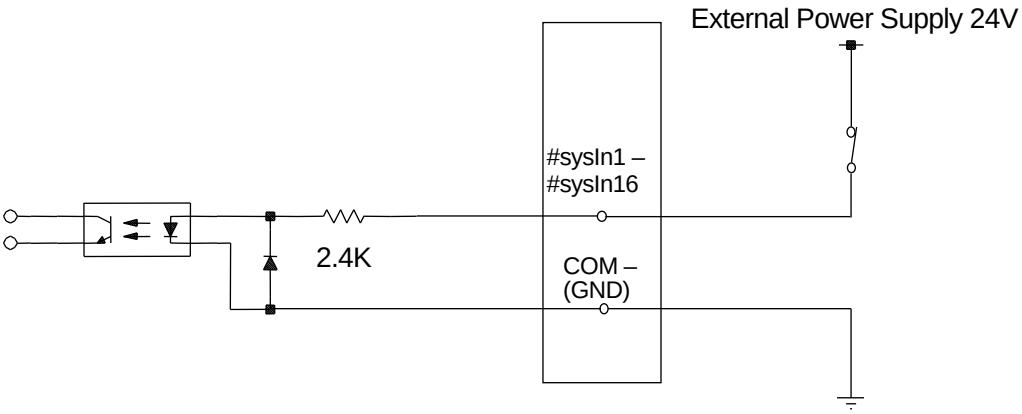
Input signals are activate when the photocoupler is ON.

When using the internal power supply, it means the input pins and COM- pin are ON as shown below.



■ When using an external power supply

When using the external power supply, it means the input pins and the external power source are ON as shown below.

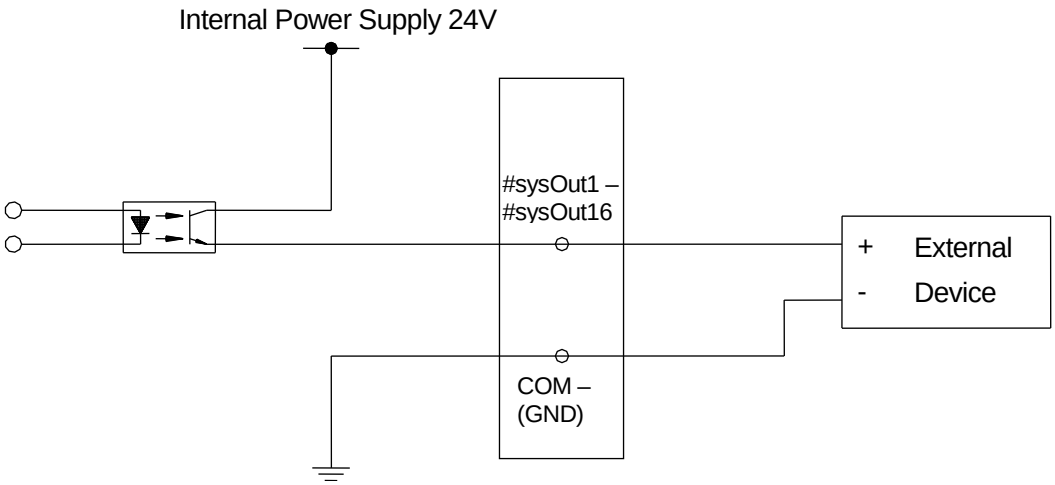


If connecting a two-wire external device, such as a sensor, use one which has a leakage current of no more than 0.3mA. If you use a device with a leakage current of more than 0.3mA, it may not turn OFF.

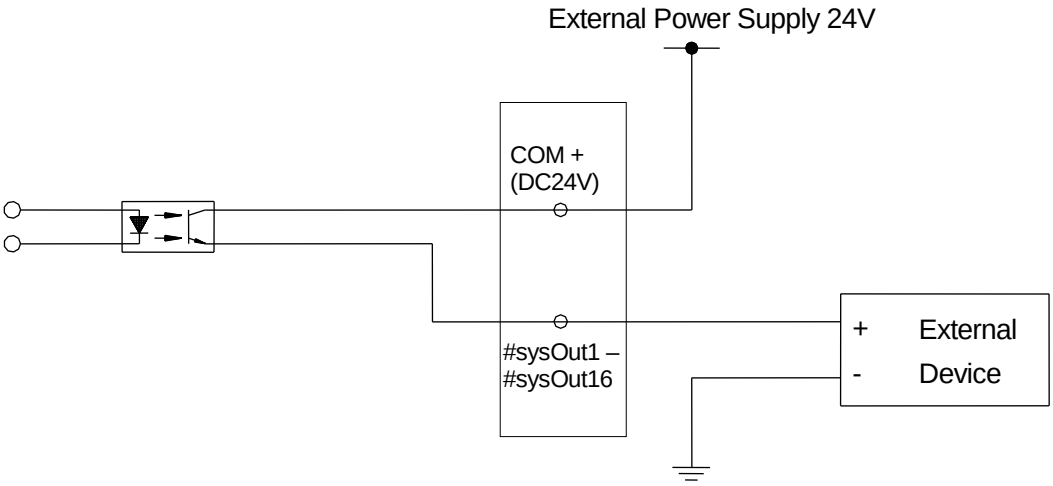
Do not assign wiring other than the wiring specified above.
Assigning the wrong wiring can damage the internal circuits.

7.8 Output Signal (PNP)

■ When using the internal power supply

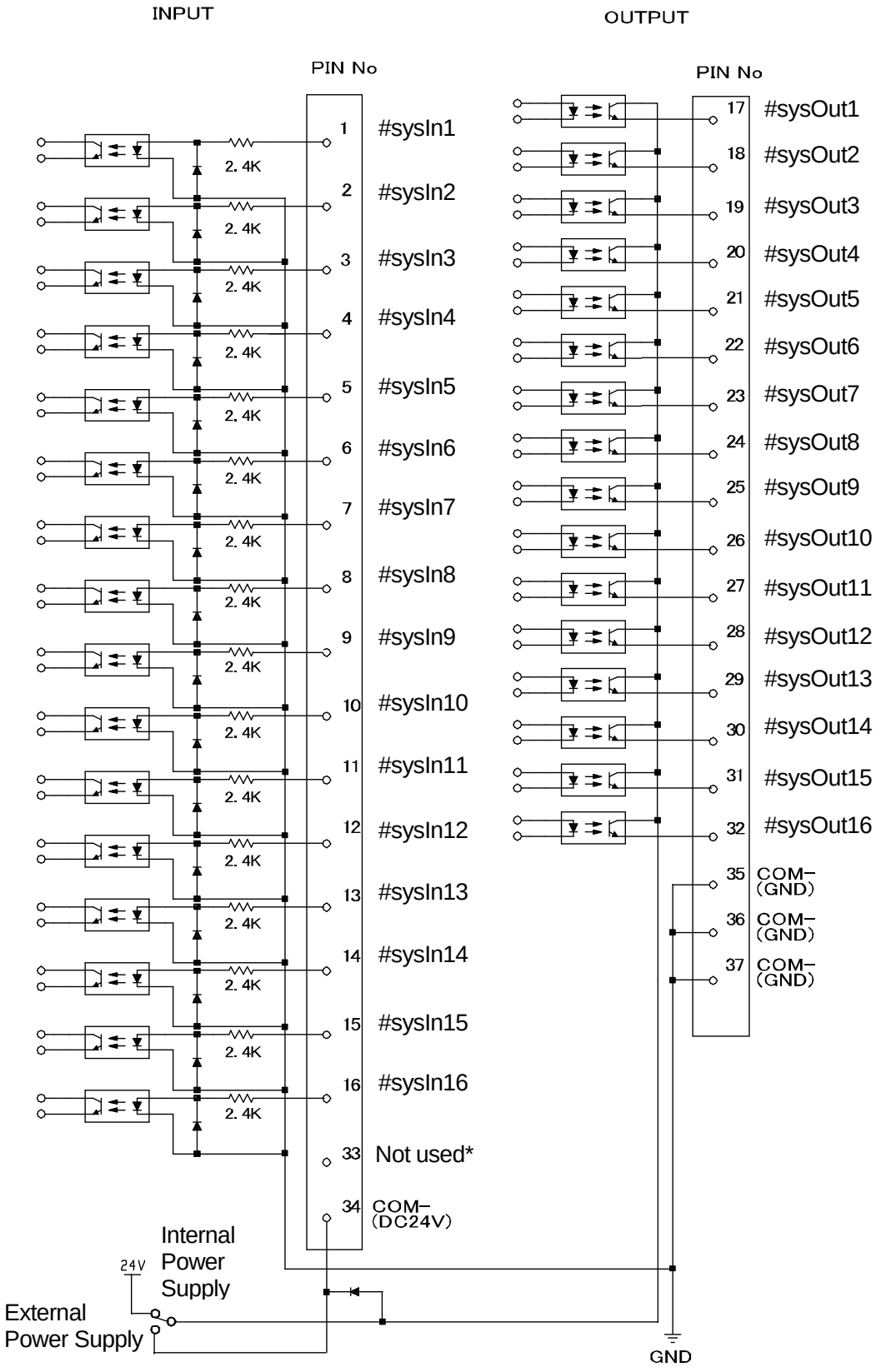


■ When using an external power supply



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

7.9 Circuit Diagram (PNP)



* Do not connect any wiring to this pin number.

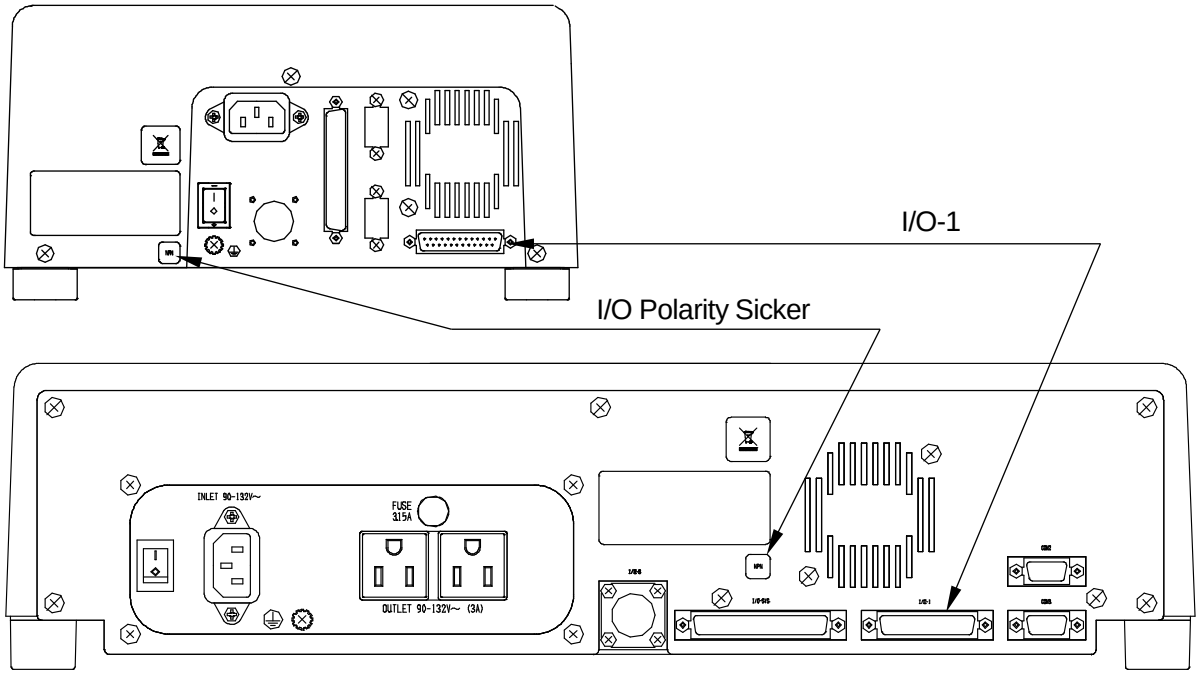
8. I/O-1 (Optional)

I/O-1 is controlled by point jobs/sequencer.

8.1 Connector

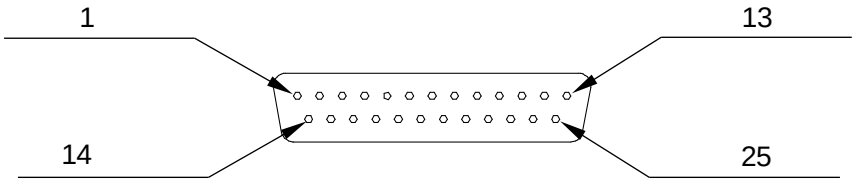
Back of the Robot

JR2200N(NE)



JR2300N(NE), JR2400N(NE), and JR2500N(NE), JR2600N

8.2 Pin Nos.



Connector on the robot

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 by checking the I/O polarity sticker.

8.3 Function Assignment List

	Name	Function	Pin Nos.
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+	24V Power Supply	21
	COM+	24V Power Supply	22
	COM–	GND	23
	COM–	GND	24

8.4 Cable Connection

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	Green	White	2

8.5 Output Capacity

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 sources:

		Type	Output/Input Rated Value
Output Pins	I/O-1(genOut1 - genOut4)	Relay	DC30V, 1A/pin
	I/O-1(genOut5 - genOut8)	Photocoupler	DC24V, 100mA/pin
Input Pins		Photocoupler	DC24V, 10mA/pin

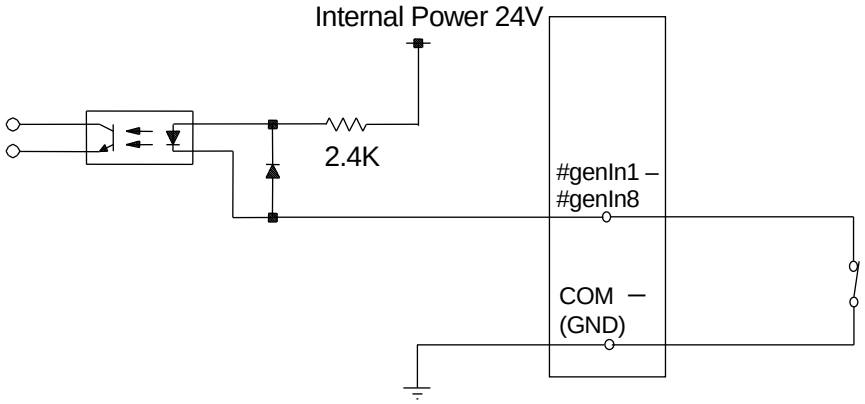
- I/O-1 signals genOut1 – genOut4 are relay outputs (no-voltage contact output).
- If using an external power supply (DC24V), thismust be prepared on the user's end.
- If using the internal power supply, use a power capacity no higher than the following:
  DC24V, 1.6A (JR2200N Series: I/O-SYS+I/O-1 composite total)
  DC24V, 2A (JR2300N, JR2400N, JR2500N, JR2600N Series: I/O-SYS+I/O-1 composite total)

8.6 Input Signal (NPN)

■ When using the internal power supply

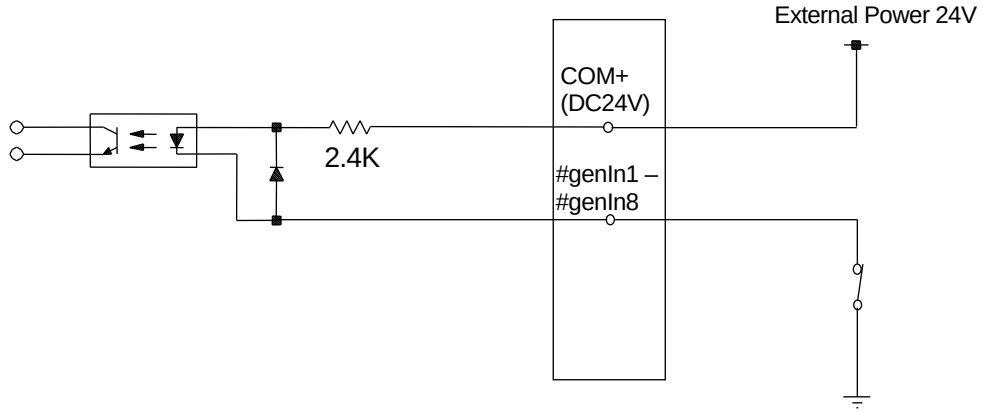
Input signals are active when the photocoupler is ON.

Using an internal power supply means that the input pin and the COM- pin are shorted.



■ When using an external power supply

Using an external power supply means that the input pin and the ground of the external power supply are ON.

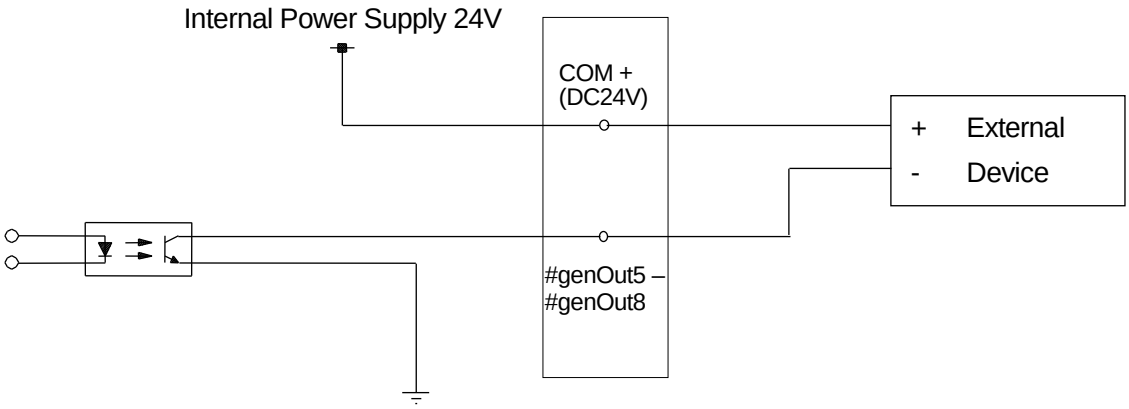


If connecting a two-wire external device, such as a sensor, use one which has a leakage current of no more than 0.3mA. If you use a device with a leakage current of more than 0.3mA, it may not turn OFF.

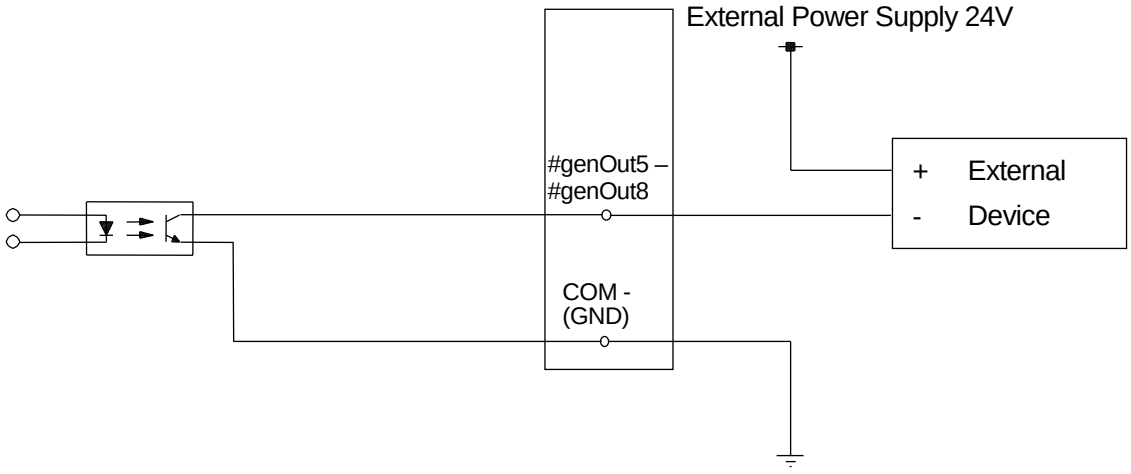
Do not assign wiring other than the wiring specified above.
Assigning the wrong wiring can damage the internal circuits.

8.7 Output Signal (NPN)

■ When using the internal power supply

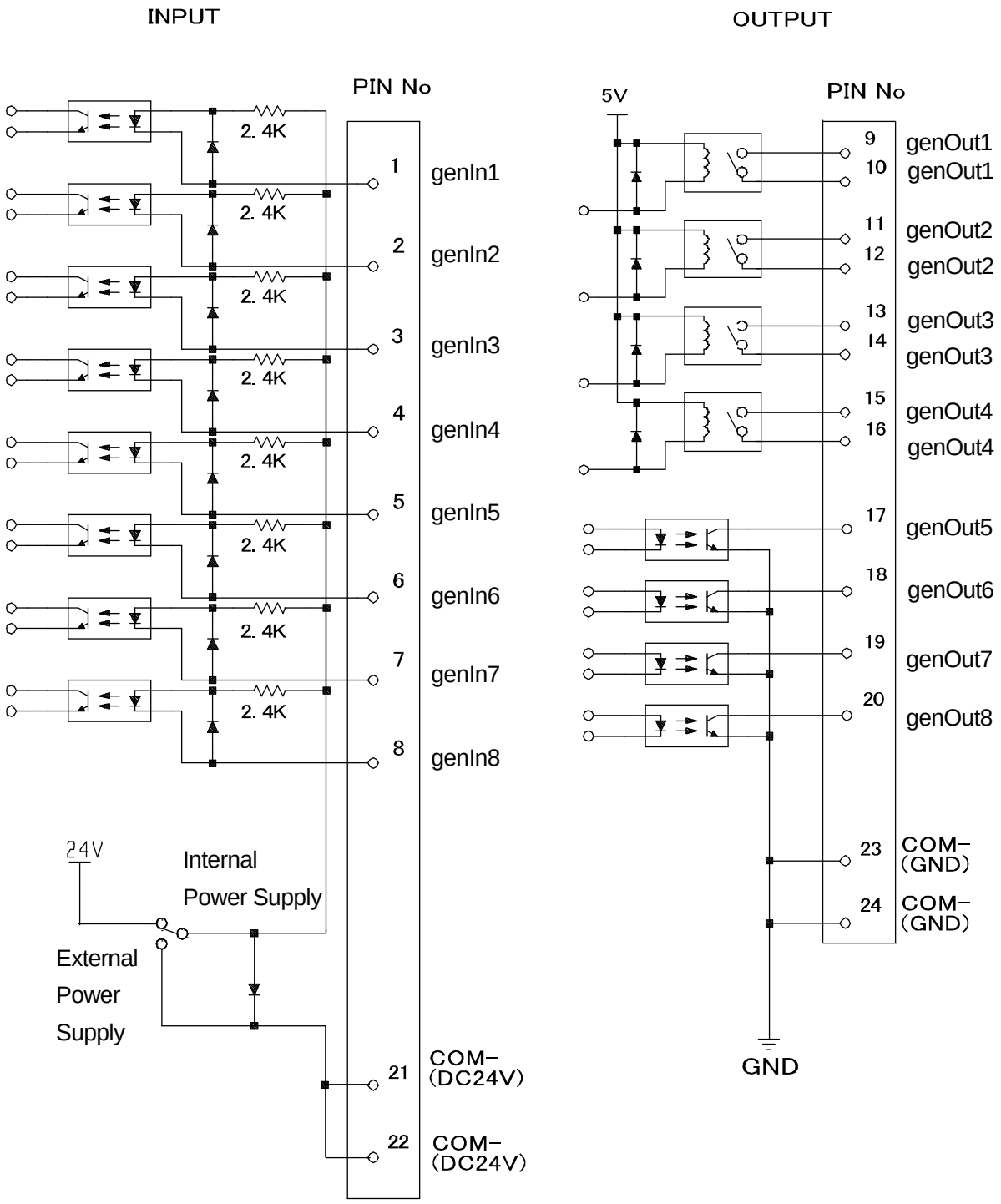


■ When using an external power supply



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

8.8 Circuit Diagram (NPN)

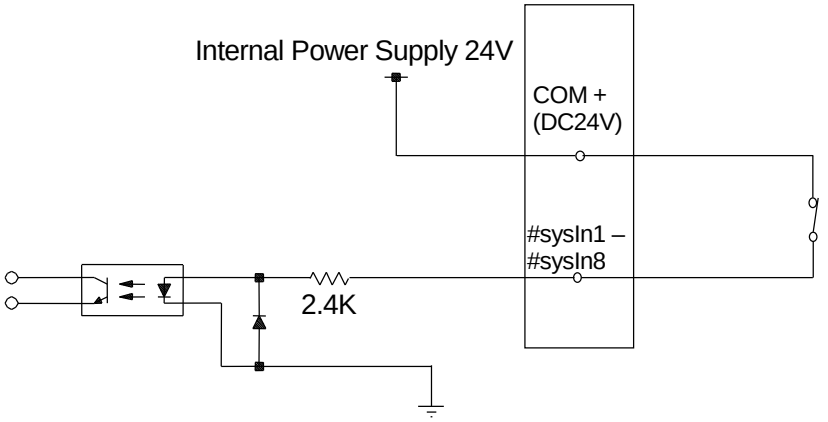


8.9 Input Signal (PNP)

■ When using the internal power supply

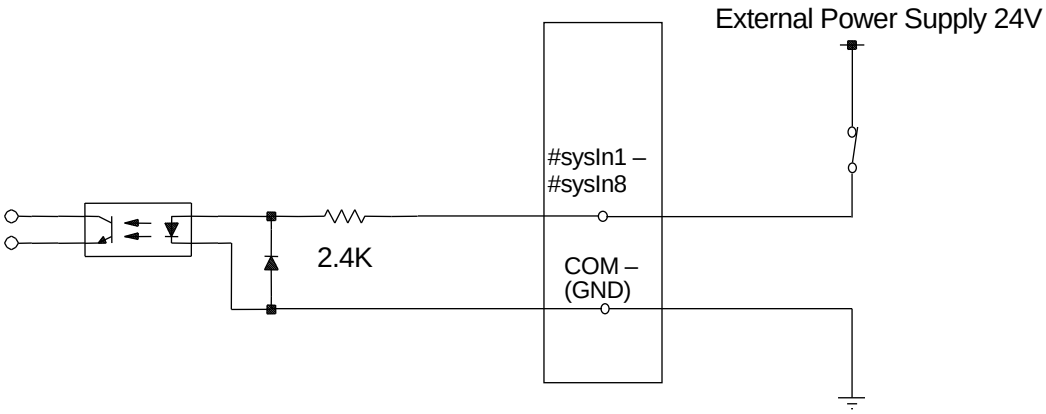
Input signals are activate when the photocoupler is ON.

When using the internal power supply, it means the input pins and COM- pin are ON as shown below.



■ When using an external power supply

When using the external power supply, it means the input pins and the external power source are ON as shown below.

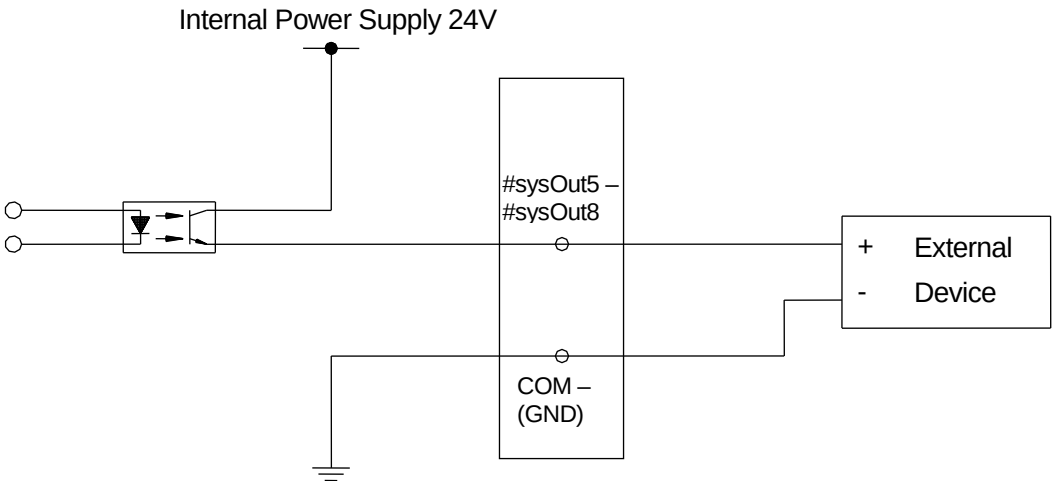


If connecting a two-wire external device, such as a sensor, use one which has a leakage current of no more than 0.3mA. If you use a device with a leakage current of more than 0.3mA, it may not turn OFF.

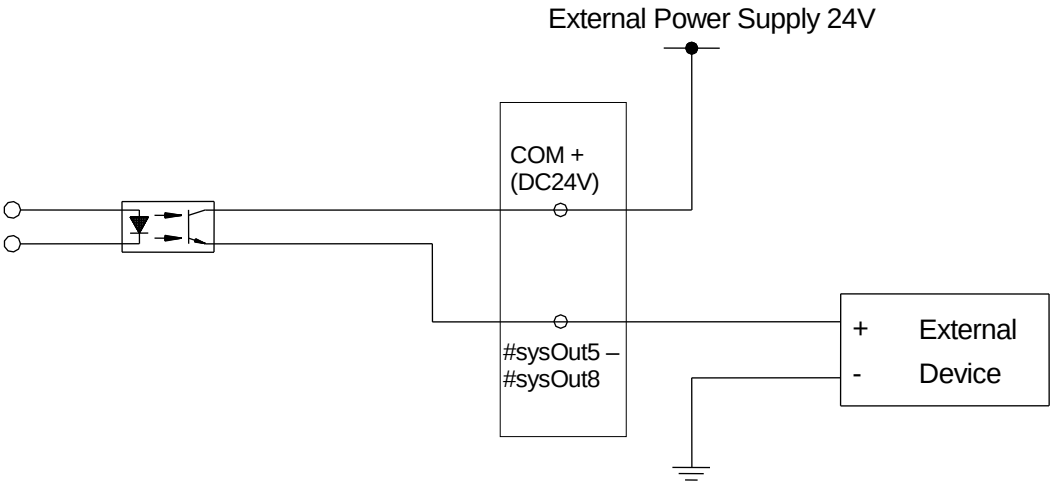
Do not assign wiring other than the wiring specified above.
Assigning the wrong wiring can damage the internal circuits.

8.10 Output Signal (PNP)

- When using the internal power supply

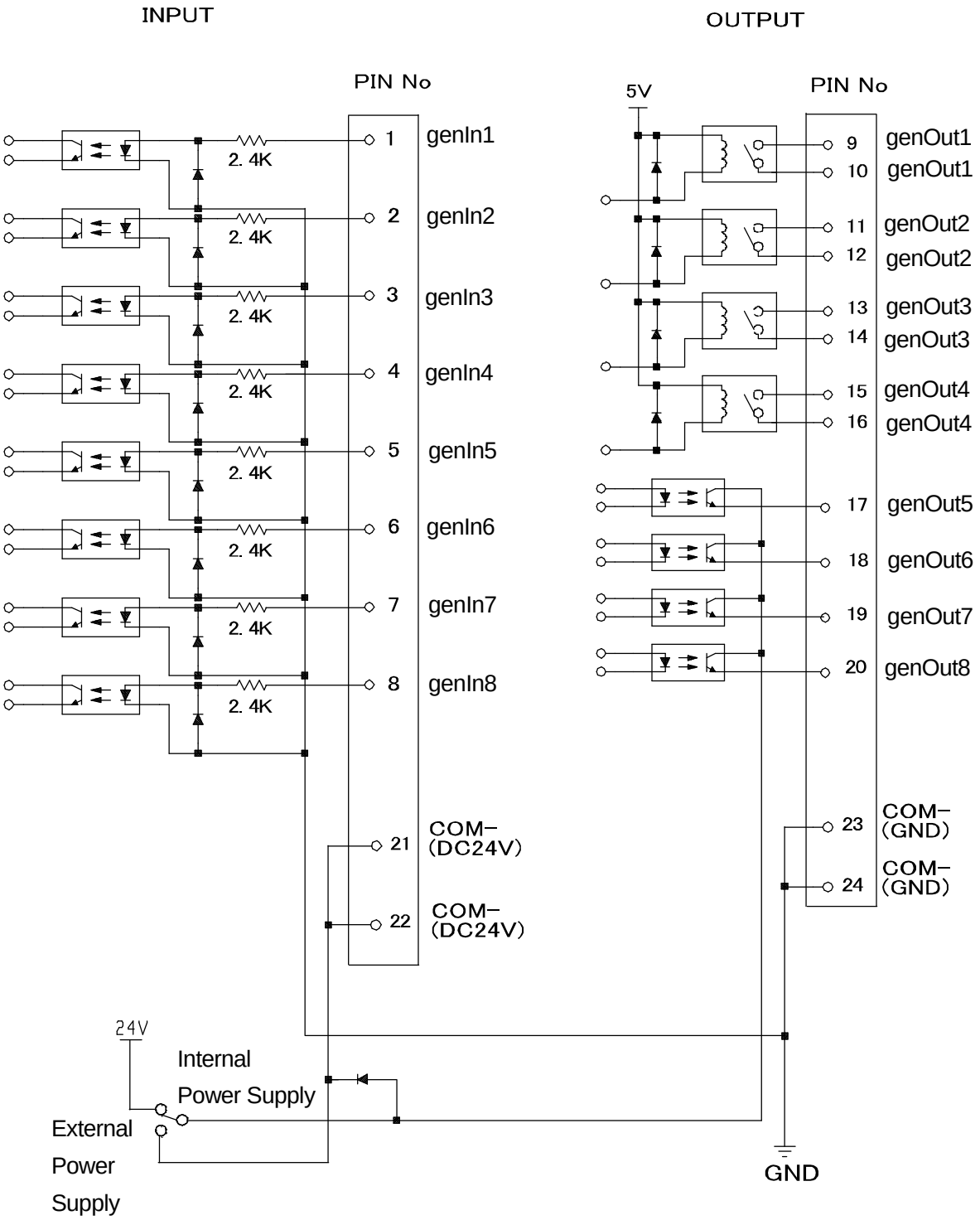


- When using an external power supply



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

8.11 Circuit Diagram (PNP)

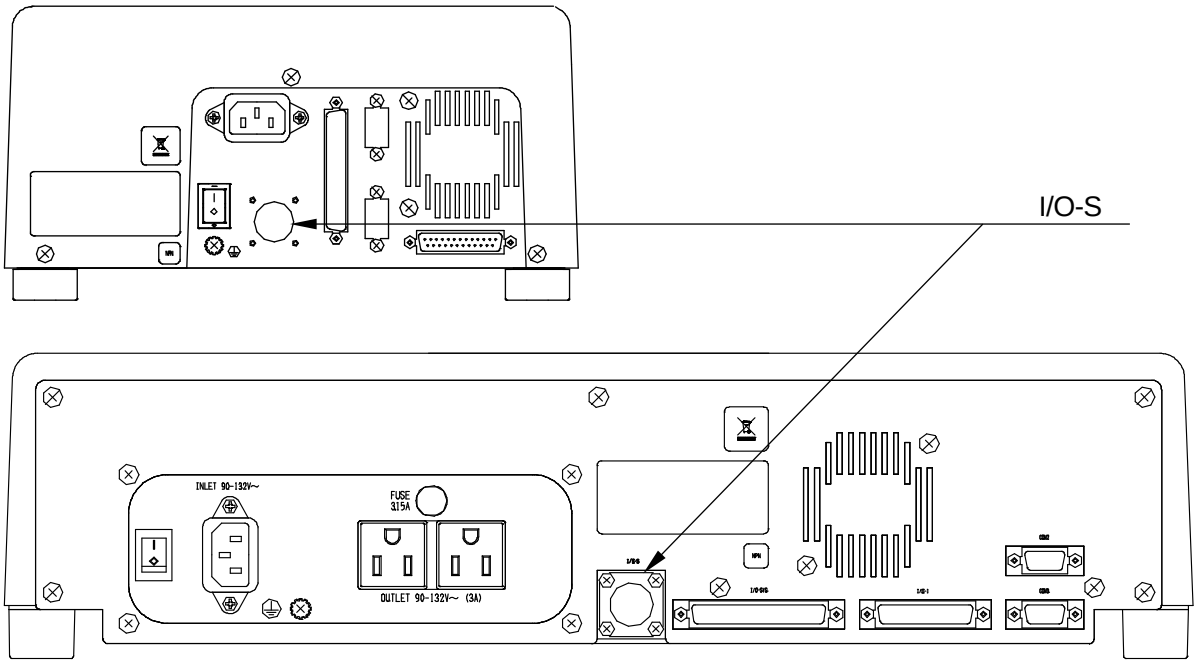


9. I/O-S (CE Specifications)

9.1 Connector

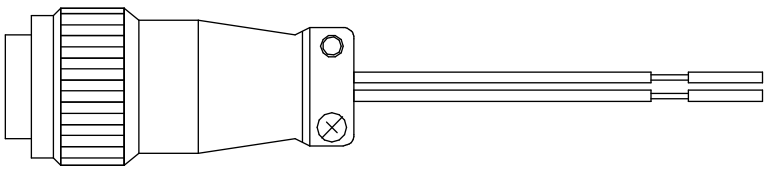
Back of the Robot

JR2200N(NE)



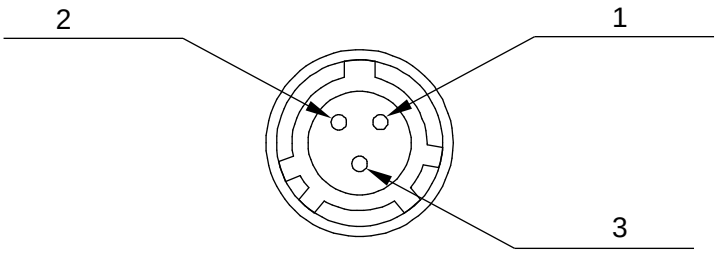
JR2300N(NE), JR2400N(NE), JR2500N(NE) and JR2600N

The I/O-S connector is an attachment included for the safe operation of the robot.
To ensure safety when operating the robot, refer to “9.3 I/O-S Safety Circuit” and always use the I/O-S connector correctly.



Connector type: SRCN6A13-3P (Manufactured by Japan Aviation Electronics Industry, Ltd.)

9.2 Pin Nos.



Connector on the robot

Pin No.	Cable Color
1	White
3	White

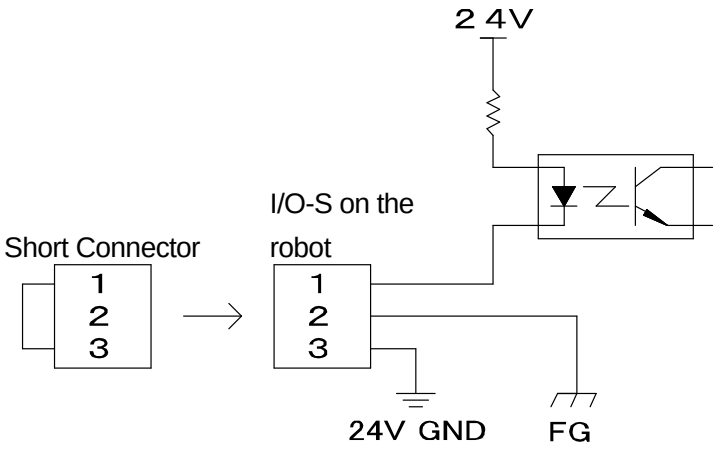
Caution

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

9.3 I/O-S Safety Circuit

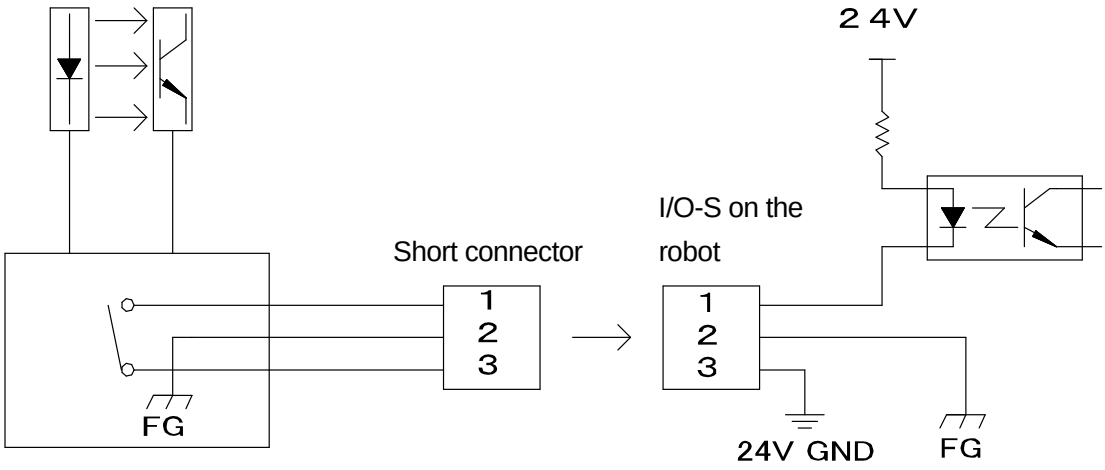
I/O-S is an interface for connecting a door switch or area sensor.

■ When an Operation Check Device is not Connected



Connector type: SRCN6A13-3P (Manufactured by Japan Aviation Electronics Industry, Ltd.)

■ When an Operation Confirmation Device (e.g. Area Sensor) is Connected

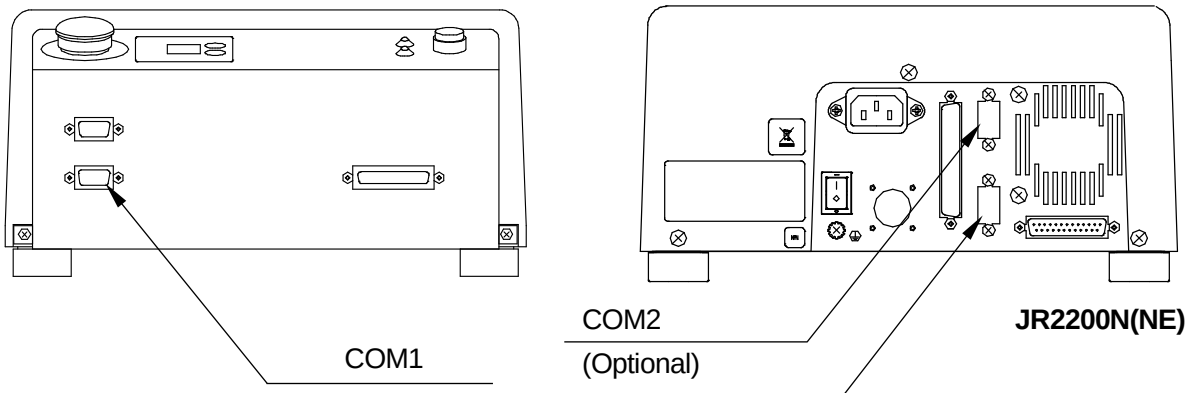


Connector type: SRCN6A13-3P (manufactured by Japan Aviation Electronics Industry, Ltd.)

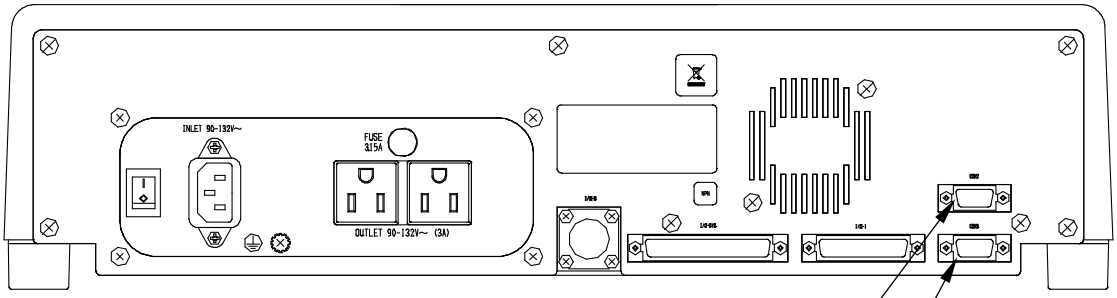
10. COM 1 – 3

10.1 Connector

Back of the Robot



JR2200N(NE)

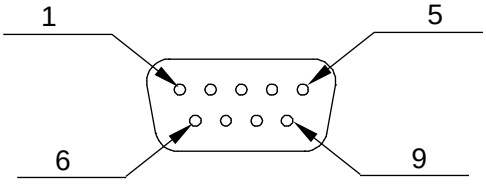


JR2300N(NE), JR2400N(NE), JR2500N(NE) and JR2600N

COM2
(Optional)

COM3
(Optional)

10.2 Pin Nos.



Connector on the robot

NOTE

The pin assignments for COMs 1 – 3 are all the same.

COM Connector Pin Connection

- Host side in this example: D-Sub 9 Connector

COM1: RS232C 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
8	RTS	Request to Send	→	8	CTS	Clear to Send
7	CTS	Clear to Send	←	7	RTS	Request to Send
5	GND	Ground	—	5	GND	Ground
Connector: D-Sub 9 Pin				Connector: D-Sub 9 Pin		

COM2 (Optional): RS232C 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
8	RTS	Request to Send	→	8	CTS	Clear to Send
7	CTS	Clear to Send	←	7	RTS	Request to Send
5	GND	Ground	—	5	GND	Ground
Connector: D-Sub 9 Pin				Connector: D-Sub 9 Pin		

COM3 (Optional): RS232C 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 in this example: DB-25 Connector

COM1: RS232C 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
8	RTS	Request to Send	→	5	CTS	Clear to Send
7	CTS	Clear to Send	←	4	RTS	Request to Send
5	GND	Ground	—	7	GND	Ground
Connector: D-Sub 9 Pin				Connector: DB-25 Pin		

COM2 (Optional): RS232C Port

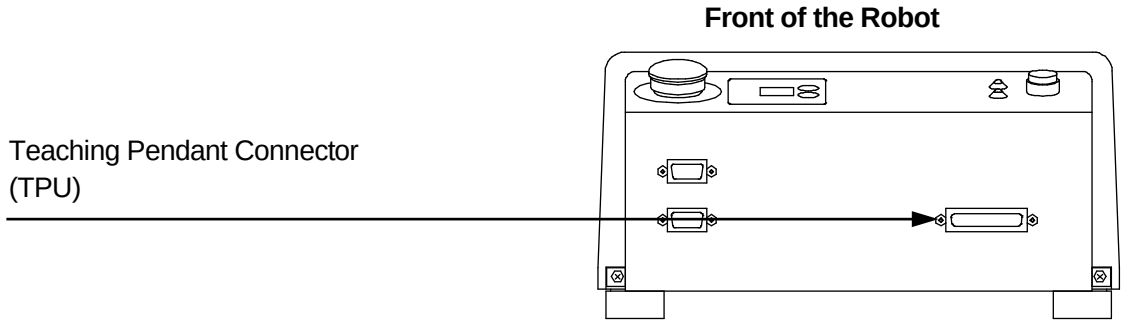
Robot				Host (PC)		
Pin No.	Terminal	Function		Pin No.	Terminal	Function
3	RxD	Receive Data	←	2	TxD	Transmit Data
2	TxD	Transmit Data	→	3	RxD	Receive Data
8	RTS	Request to Send	→	5	CTS	Clear to Send
7	CTS	Clear to Send	←	4	RTS	Request to Send
5	GND	Ground	—	7	GND	Ground
Connector: D-Sub 9 Pin				Connector: DB-25 Pin		

COM3 (Optional): RS232C Port

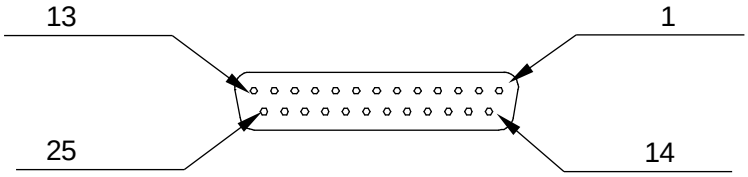
Robot				Host (PC)		
Pin No.	Terminal	Function		Pin No.	Terminal	Function
3	RxD	Receive Data	←	2	TxD	Transmit Data
2	TxD	Transmit Data	→	3	RxD	Receive Data
5	GND	Ground	—	7	GND	Ground
Connector: D-Sub 9 Pin				Connector: DB-25 Pin		

11. TPU

11.1 Connector



11.2 Pin Nos.



Connector on the robot

11.3 TPU (Teaching Pendant Connector)

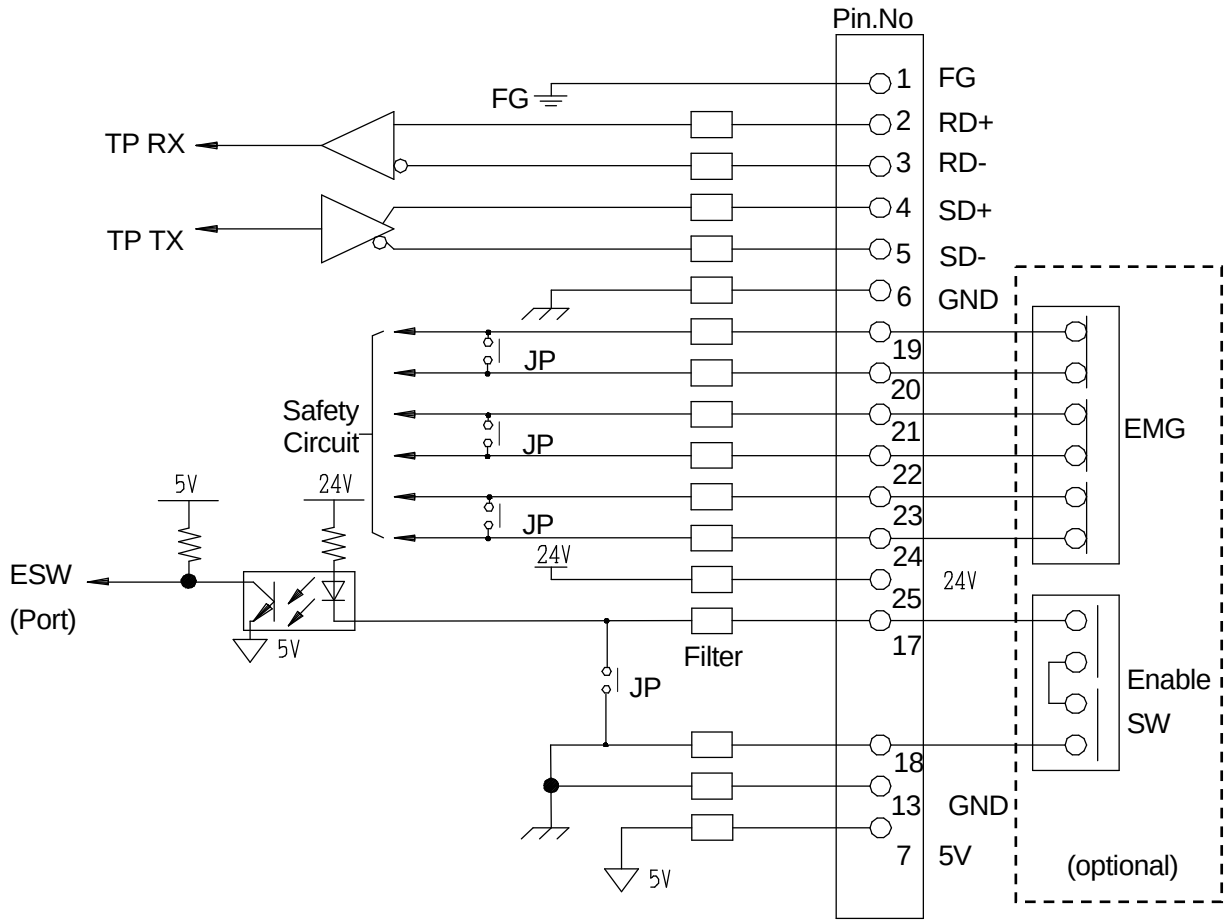
RS422 Interface

Pin No.	Terminal Name	Function
1	FG	Frame Ground
2	RD (+)	Receive Data (+)
3	RD (–)	Receive Data(-)
4	SD (+)	Send Data (+)
5	SD (–)	Send Data (-)
6	GND	Communication Signal Ground
7	5V	DC5V
13	GND	DC24V Ground
17	ENSW11	Enable Switch Terminal 1*
18	ENSW12	Enable Switch Terminal 2*
19	EMGSW11	Emergency Stop Switch Contact Port 1 Terminal 1*
20	EMGSW12	Emergency Stop Switch Contact Port 1 Terminal 2*
21	EMGSW21	Emergency Stop Switch Contact Port 2 Terminal 1*
22	EMGSW22	Emergency Stop Switch Contact Port 2 Terminal 2*
23	EMGSW31	Emergency Stop Switch Contact Port 3 Terminal 1*
24	EMGSW32	Emergency Stop Switch Contact Port 3 Terminal 2*
25	24V	DC24V

*Pin Nos. 17 and 18 are shorted internally for teaching pendants that do not have an enable switch. Therefore, operation is possible even if Pin Nos. 17 and 18 are open.

Pin Nos. 19 – 24 are internally shorted for teaching pendants that do not have an emergency stop switch (optional). Therefore, an emergency stop is not made even if Pin Nos. 19 – 24 are open.

11.4 TPU (Teaching Pendant Connector) Circuit Diagram



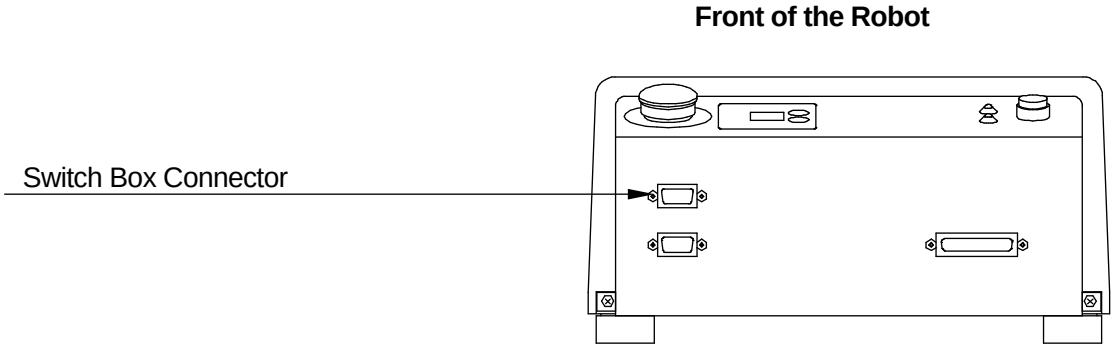
Make sure to connect pins 19 – 24 in this manner: 19 – 20, 21 – 22, 23 – 24.
Connecting them any other way can damage the emergency stop circuit.

12. SWITCH BOX CONNECTOR (CE SPECIFICATIONS)

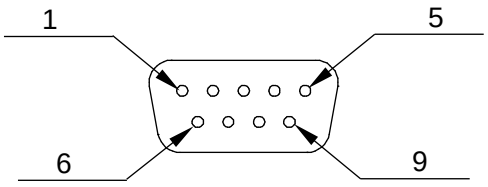
12.1 Connector

NOTE

The switch box connector is available with CE specification models only.

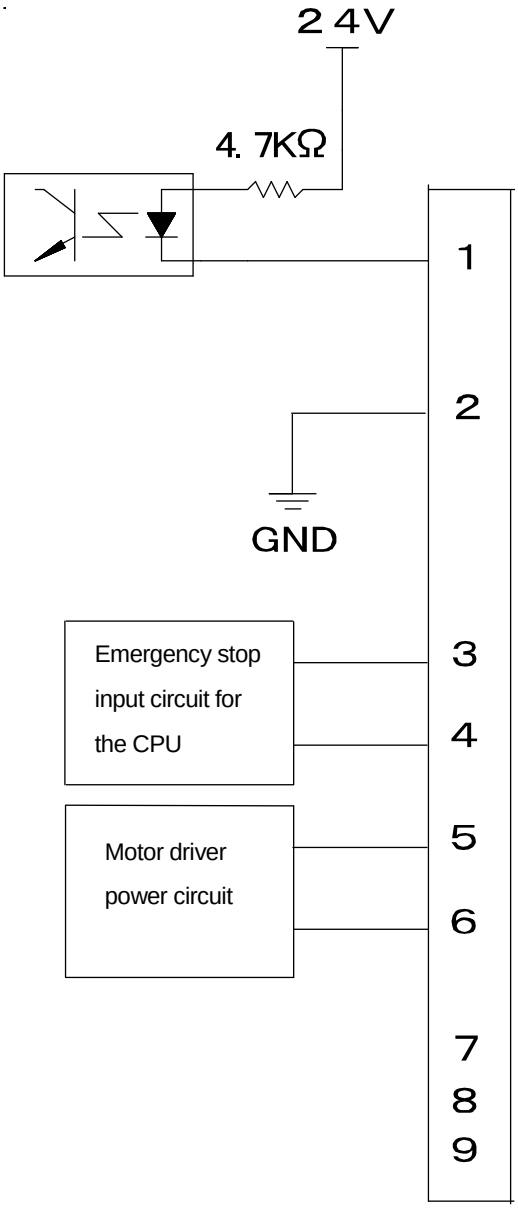


12.2 Pin Nos.



Connector on the robot

12.3 Switch Box Connector Circuit Diagram



Pin No.	Function
1	Start input
2	
3	Emergency stop input to CPU
4	
5	Input to the power supply relay of the motor driver
6	

To connect the emergency stop switch, connect it between pins 3 – 4 and 5 – 6. Use a normal close switch as the connection point.

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

The output current of the photocoupler is not more than 100mA.
Pin Nos. 8 – 9 are not connected.

13. COMMAND LIST

NOTE

If you assign any point job data containing commands that are grayed out ( ) to CP passing points or CP arc points, the commands are ignored.

Point Job Data

Category	Command	Required Parameter	Description
ON/OFF Output Control	set	Output destination	Output ON.
	reset	Output destination	Output OFF.
	pulse	Output destination, pulse width	ON pulse output for the specified width.
	invPulse	Output destination, pulse width	OFF pulse output for the specified width.
	delaySet	Output destination, Delay time	ON output after the specified delay time.
	delayReset	Output destination, Delay time	OFF output after the specified delay time.
	onoffBZ	ON time, OFF time	Intermittently sound the buzzer
	onoffGLED	ON time, OFF time	Blink the green LED on the front of the robot.
	onoffRLED	ON time, OFF time	Blink the red LED on the front of the robot.
	dataOut	Output value, destination, and output width	Numeric data, or tag code registered to a point, output to the I/O.
	dataOutBCD	Output value, destination, and output width	Numeric data, or a tag code assigned to a point, output BCD to the I/O.
if Branch, Wait Condition	if	–	Conditional branching
	then	–	Perform if true.
	else	–	Perform if false.
	endIf	–	End of conditional branching
	waitCondTime	Time-out period	Wait for conditions for a specified 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 connection of blocks
	orb	–	Parallel connection of blocks
Delay	delay	Wait time	Stop for a specified time.
	dataIn	Assignment destination, read out source, and read out width	Read out numeric data from the I/O.
	dataInBCD	Assignment destination, read out source, and read out width	Read out numeric data in BCD from the I/O.
	waitStart	–	Wait for a start instruction.
	waitStartBZ	–	Wait for a start instruction with the buzzer sounding.
Pallet	loopPallet	Pallet number, destination number	Pallet loop
	resPallet	Pallet number	Reset the pallet counter.
	incPallet	Pallet number	Increase the pallet counter number. (+1)
Execute Flow Control	callBase	–	Call a base point job which is defined by its point type, from a point job number registered to a user-defined point type.
	callJob	Point job number	Call a specified number's point job data by subroutine.
	callPoints	Point string identifier	Perform a specified point string (defined in Customizing Mode).
	returnJob	–	End of point job
	returnFunc	Expression	Terminate the function by assigning a return value to the specified expression's value. (This command is valid in functions only.)
	callProg	Program number	Call a specified number's program by subroutine.
	endProg	–	End of program
	goPoint	Drive condition number, point number	Jump to a specified point.
	goRPoint	Drive condition number, relative point number	Jump to a relatively-specified point.
	goCRPoint	Drive condition number, destination point selection	Jump to a selected destination point while running in the CP drive.
	jump	Destination point number, label number	Jump to a specified label.
	Label	Label number	Label

Category	Command	Required Parameter	Description
Repeat	for	Control variable, initial value, end value, and step value	Repeats commands between *for* and *next* until the specified variable changes from the initial value to the end value.
	next	–	
	exitFor	–	Break from *for* loop.
	do	–	Repeat commands between *do* and *loop*.
	loop	–	
	exitDo	–	Break from *do* loop.
Drive Control	upZ	Shifting distance and speed	Z Up
	downZ	Shifting distance and speed	Z Down
	movetoZ	Shifting distance and speed	Z Move
	lineMove	Moving (rotation) speed and distance of each axis	Make the robot move a specified distance (relative distance) at a specified speed in the CP line drive. (Relative move command) Entering this command displays the specified speed and distance of each direction as follows: e.g. lineMoveSpeed 20 lineMoveX 10 lineMoveY 20 lineMoveZ 0 lineMoveR 0
	lineMoveStopIf	–	Terminate the movement made by *lineMove* if the conditions are met.
	endLineMove	–	End of *lineMoveStopIf* condition statements.
	initMec	Specify an Axis	Perform a mechanical initialization for the specified axis.
	checkPos	–	Detect a position error.
LCD, 7 Segment	clrLCD	–	Clear the LCD display.
	clrLineLCD	Row (1 – 13)	Clear a specified line on the LCD display.
	outLCD	Row (1 – 13), column (1 – 40), and string	Display strings on the LCD display.
	eoutLCD	Row (1 – 13), Column (1 – 40), and string expression	Display the result of the string expression on the LCD display.
	sys7SLED	–	Return the LED display to the 7 segment LED changed by out7SLED.
	out7SLED	Display type and value	7 segment LED output

Category	Command	Required Parameter	Description
COM Input/Output	outCOM	Port, string	Output the string from COM.
	eoutCOM	Port, string expression	Output the result of the string expression from COM.
	setWTCOM	Port, wait time	Set [Wait Time] (time-out period) for receiving data from COM.
	inCOM	Variable name, port, wait time	Assign received data from COM to the specified variable.
	cmpCOM	Port, string	Compare the receive data and string. The result is entered into the system flags (sysFlag(1) – sysFlag(20)).
	ecmpCOM	Port, string expression	Compare the receive data and string expression. Results are entered into system flags (sysFlag(1) – sysFlag(20)).
	clrCOM	Port	Clear the COM receive buffer.
	shiftCOM	Port, shift number	Shift data received from COM. Deletes the amount of byte data shifted from the top.
	stopPC	–	Stops PC communication with COM1.
	startPC	–	Starts PC communication with COM1.
Variable, Comment, System Control	declare	Type, identifier	Local variable declaration
	let	Assignment expression string	Assign the calculation result of the left side expression to the right side variable. Can use the symbols: +, -, ∗, /, =, (,), &
	rem	String	One line comment
	crem		
	setProgNum	Program number	Change the program number. NOTE: Do not carry out this command while the robot is running. Use the command *callProg* during a run if you want to run a different program.
	setSeqNum	Sequencer number	Change the sequencer program number in the system data.
Camera, Z Sensor	cameraWadj	Work adjustment number	Take an image with the camera and calculate the offset from the data gained according to the [Workpiece Adjustment] setting.
	wCameraWadj	Work adjustment number, shot number	Use this command when calculating the offset from two camera images according to the [Workpiece Adjustment].
	cameraTool	Tool number	Take an image with the camera and calculate [TCP-X] and [TCP-Y] from the data gained according to the [Point Tool Data Settings].
	cameraPallet	Pallet routine number	Take an image with the camera and use the gained number of marks and coordinates as the number of times and coordinates for the execution of the [Pallet Routine].
	takeZWadj	Work adjustment number	Calculate the Z offset from the data gained by the distance or touch-sensitive sensor according to the [Workpiece Adjustment] settings.

Execute Condition

Category	Command	Required 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 connection of blocks.
	orb	–	Parallel connection of blocks.

Sequencer

Category	Command	Required Parameter	Description
Calculate	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 drive.
	set	Output destination	Coil drive hold command output.
	reset	Output destination	Coil drive hold command cancel.
	pls	Output destination	Output the rising edge of pulse.
	plf	Output destination	Output the falling edge of pulse.
Connection	anb	–	Serial connection of parallel circuit block
	orb	–	Parallel connection of serial circuit block
	Mps	–	Store data in process of calculation.
	Mrd	–	Read out data in process of calculation.
	Mpp	–	Read out and reset data in process of calculation.
Others	Nop	–	No operation

14. VARIABLE LIST

With this robot you can use both built-in variables, which are built into the robot as a function, and user-defined variables, which are freely defined by the user.
Excluding local variables (variables defined by the declare command which are only valid in defined point job data), user-defined variables are defined in Customizing Mode. (Refer to the operation manual *Functions IV* for details about Customizing Mode.)

Boolean type (boo): 1-bit variable which holds only 1 (true) or 0 (false)
Numeric type (num): 8-byte real type (double type) variable
String type (str): 255-byte variable

Category	Type	Identifier	Description
Free Variable	boo	#mv (1 – 99)	Boolean variable
	boo	#mkv (1 – 99)	Boolean variable (Keeping variable)*
	num	#nv (1 – 99)	Numerical variable
	num	#nkv (1 – 99)	Numerical variable (Keeping variable)*
	str	#sv (1 – 99)	String variable
	str	#skv (1 – 99)	String variable (Keeping variable)*
Input Variable	boo	#sysIn1 – 16	I/O-SYS
	boo	#genIn1 – 8	I/O-1
	boo	#handIn1 – 4	I/O-H (JS Series only)
Output Variable	boo	#sysOut1 – 16	I/O-SYS
	boo	#genOut1 – 8	I/O-1
	boo	#handOut1 – 4	I/O-H (JS Series only)
System Flag	boo	#sysFlag(1) – #sysFlag(999)	Refer to “16. System Flag List.”
Buzzer	boo	#FBZ	set #FBZ : Sound the buzzer. reset #FBZ : Stop the buzzer. (onoffBZ : Intermittently sound the buzzer.

*A keeping variable refers to a variable which maintains its values even if the robot is turned OFF.

Variables

Category	Type	Identifier	Description
Special Variable	num	#downTimer1 – 10	Enter a substitute value and it decreases automatically (by msec).
	num	#jobStartHight	Start a point job from a position in the substituted values which is higher than the registered point Z coordinates. (Invalid in the CP drive)
	num	#jobStartX	Start a point job from a position in the substituted values which is farther than the registered point X coordinates. (Invalid in the CP drive)
	num	#jobStartY	Start a point job from a position in the substituted values which is farther than the registered point Y coordinates. (Invalid in the CP drive)
	num	#jobStartR	Start a point job from a position in the substituted values which is farther than the registered point R-coordinates. (Invalid in the CP drive)
Pallet Routine	boo	#palletFlag (1 – 100)	Pallet flag (Corresponds to Pallet Routine Nos. 1 – 100.)
	num	#palletCount (1 – 100)	Pallet counter (Corresponds to Pallet Routine Nos. 1 – 100.)
Workpiece Adjustment	num	#workAdj_X (1 – 100) #workAdj_Y (1 – 100) #workAdj_Z (1 – 100) #workAdj_R (1 – 100) #workAdj_Rotation (1 – 100)	Amount of adjustment of each axis for the workpiece adjustment (Corresponds to work adjustment Nos. 1 – 100.)
Tool Data	num	#tool_X (1 – 100) #tool_Y (1 – 100) #tool_Z (1 – 100) #tool_R (1 – 100)	TCP value of each axis for the new tool. (Corresponds to Tool Nos. 1 – 100.)
PTP Condition	num	#priorityPTPCondNum	PTP condition number The PTP condition number set using this variable has top priority over other PTP condition numbers in the PTP drive (even at points where additional function data [PTP Condition] is set).
Sequencer Program	boo	#seqT (1 – 99)	Becomes 1 when #seqTCount reaches the specified value or greater.
	num	#seqTCount (1 – 50): Integrating timer #seqTCount (51 – 99): non-integrating timer	One timer can count 0.001 – 2,147,483.647 seconds (in units of 0.001 seconds).
	boo	#seqC (1 – 99)	Becomes 1 when #seqCCount reaches the specified value or greater.
	num	#seqCCount (1 – 99)	One counter can count 1 – 2,147,483,647.

Variables

Category	Type	Identifier	Description
Current Point Coordinates	num	#point_X	X-coordinate value of the point being performed
	num	#point_Y	Y-coordinate value of the point being performed
	num	#point_Z	Z-coordinate value of the point being performed
	num	#point_R	R-coordinate value of the point being performed
	num	#point_TagCode	Tag code value of the point being performed
Specified Point Coordinates	num	#P_X (1 – last point number)	X-coordinate value of the specified point
	num	#P_Y (1 – last point number)	Y-coordinate value of the specified point
	num	#P_Z (1 – last point number)	Z-coordinate value of the specified point
	num	#P_R (1 – last point number)	R-coordinate value of the specified point
	num	#P_TagCode (1 – last point number)	Tag code value of the specified point
Specified Program, Specified Point Coordinates	num	#prog_P_X (1 – 255, 1 – last point number)	X-coordinate value of the specified point in the specified program
	num	#prog_P_Y (1 – 255, 1 – last point number)	Y-coordinate value of the specified point in the specified program
	num	#prog_P_Z (1 – 255, 1 – last point number)	Z-coordinate value of the specified point in the specified program
	num	#prog_P_R (1 – 255, 1 – last point number)	R-coordinate value of the specified point in the specified program
	num	#prog_P_TagCode (1 – 255, 1 – last point number)	Tag code value of the specified point in the specified program
Condition Number	num	#point_CondNum	The condition setting variable number registered to the point being performed
	num	#P_CondNum (1 – last point number)	The condition setting variable number registered to the specified point
	num	#prog_P_CondNum (1 – 255, 1 – last point number)	The condition setting variable number registered to the specified point in the specified program

15. FUNCTION LIST

With this robot, you can use both the built-in functions, which are built into the robot as operational functions, and the user-defined functions, which are freely defined by the user.
The user-defined functions are defined in Customizing Mode.

x, y: Numerical value or numerical variable

n, m: Numeric value becomes larger by a digit by rounding up or truncation

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	numCOM (COM port number)	Data byte count of COM receiving port
	num	isConditionData (n)	Display whether the specified condition data number is available (1) or not (0).
	str	strCenterLCD (a)	Adjust the strings on the teaching pendant LCD (centering).
	str	strRightLCD (a)	Adjust 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 drive [sec]
	num	getSystemPTPrestTime ()	Valid only for job while moving. Time left before the current PTP drive ends (reaching to the destination) [sec]
	num	Pause (x)	Temporary stop. The robot, however, cannot pause in the middle of a movement. The argument (x) in the brackets is the *pause* number for when executing Reference Value.

NOTE: It is expected that [Pause] will be used with the PC software JR C-Points (optional). Changing [Pause] from valid to invalid and vice versa, or cancelling a pause, cannot be done through the Teaching Pendant.

x, y: Numerical value or numerical variable

n, m: Numeric value becomes larger by a digit by rounding up or truncation

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
	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)	Return a string (1 character) with the given character code.
	num	ord (a)	Return the top character code. Other codes are ignored.
	num	len (a)	Return the string length (non-multibyte).
	num	strPos (a, b)	Return the first part string position in a matching b.
	str	strMid (a, n, m)	Return the string from *n* to the amount of *m* counted from the start of string *a*.
	str	str (x)	Convert a numeric value to a decimal digit string.
	str	strBin (n, m)	Convert a numeric value to a binary string. m: Number of binary string digits
	str	strHex (n, m)	Convert a numeric value to a hexadecimal string. m: Number of hexadecimal string digits
	str	str1SI (x)	Round a numeric value to a 1-byte signed integer to convert it to a 1-byte string. (1-byte Signed Integer)
	str	str2SIBE (x)	Round 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)	Round 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)	Round 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)	Round 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)

x, y: Numerical value or numerical variable

n, m: Numeric value becomes larger by a digit by rounding up or truncation

a, b: String or string variable

Category	Type	Identifier	Description
String System	str	chr (x)	Return a string (1 character) with the given character code.
	num	ord (a)	Return the top character code. Other codes are ignored.
	num	len (a)	Return the string length (non-multibyte).
	num	strPos (a, b)	Return the first part string position in a matching b.
	str	strMid (a, n, m)	Return the string from *n* to the amount of *m* counted from the start of string *a*.
	str	str (x)	Convert a numeric value to a decimal digit string.
	str	strBin (n, m)	Convert a numeric value to a binary string. m: Number of binary string digits
	str	strHex (n, m)	Convert a numeric value to a hexadecimal string. m: Number of hexadecimal string digits
	str	str1SI (x)	Round a numeric value to a 1-byte signed integer to convert it to a 1-byte string. (1-byte Signed Integer)
	str	str2SIBE (x)	Round 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)	Round 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)	Round 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)	Round 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)	Regard a numeric value as a float to convert it to a 4-byte string using the Big Endian byte order. (4-byte Signed Float Big Endian)
	str	str4FLE (x)	Regard a numeric value as a float to convert it to a 4-byte string using the Little Endian byte order. (4-byte Signed Float Little Endian)
	str	str8DBE (x)	Regard a numeric value as a float to convert it to an 8-byte string using the Big Endian byte order. (8-byte Signed Float Big Endian)
	str	str8DLE (x)	Regard a numeric value as a float to convert it to an 8-byte string using the Little Endian byte order. (8-byte Signed Float Little Endian)
	num	val (a)	Regard a 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)	Regard a string as a binary string (sequence of “0”, “1”) to convert it to a numeric value.
	num	valHex (a)	Regard a string as a hexadecimal string (sequence of “0” – “9”, “A” – “F”, or “a” – “f”) to convert it to a numeric value.
	num	val1SI (a)	Convert the top character to a 1-byte signed integer. (1-byte Signed Integer)

x, y: Numerical value or numerical variable

n, m: Numeric value becomes larger by a digit by rounding up or truncation

a, b: String or string variable

Category	Type	Identifier	Description
String System	num	val2SIBE (a)	Convert 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)	Convert 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)	Convert 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)	Convert 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)	Convert the top 4 characters to a float using the Big Endian byte order. (4-byte Float Big Endian)
	num	val4FLE (a)	Convert the top 4 characters to a float using the Little Endian byte order. (4-byte Float Little Endian)
	num	val8DBE (a)	Convert the top 8 characters to a double-precision float using the Big Endian byte order. (8-byte Double Big Endian)
	num	val8DLE (a)	Convert the top 8 characters to a double-precision float using the Little Endian byte order. (8-byte Double Little Endian)
	num	valSum (a)	Return 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

16. SYSTEM FLAG LIST

With this robot, you can use the system flags as Boolean valuables. If system flag conditions are met, “1” (true) is automatically assigned. 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	COM1 receive data exists Y/N	Yes
02	#FltCOM1	Result of COM1 receive data compare command (cmpCOM)	Constant > Receive data
03	#FeqCOM1	Result of COM1 receive data compare command (cmpCOM)	Constant = Receive data
04	#FgtCOM1	Result of COM1 receive data compare command (cmpCOM)	Constant < Receive data
05	#FtimeOutCOM1	COM1 receive data compare command (cmpCOM) timeout	Timeout
06	#FisCOM2	COM2 receive data exists Y/N	Yes
07	#FltCOM2	Result of COM2 receive data compare command (cmpCOM)	Constant > Receive data
08	#FeqCOM2	Result of COM2 receive data compare command (cmpCOM)	Constant = Receive data
09	#FgtCOM2	Result of COM2 receive data compare command (cmpCOM)	Constant < Receive data
10	#FtimeOutCOM2	COM2 receive data compare command (cmpCOM) timeout	Timeout
11	#FisCOM3	COM3 receive data exists Y/N	Yes
12	#FltCOM3	Result of COM3 receive data compare command (cmpCOM)	Constant > Receive data
13	#FeqCOM3	Result of COM3 receive data compare command (cmpCOM)	Constant = Receive data
14	#FgtCOM3	Result of COM3 receive data compare command (cmpCOM)	Constant < Receive data
15	#FtimeOutCOM3	COM3 receive data compare command (cmpCOM) timeout	Timeout
16	#FisCOM4	COM4 receive data exists Y/N	Yes
17	#FltCOM4	Result of COM4 receive data compare command (cmpCOM)	Constant > Receive data
18	#FeqCOM4	Result of COM4 receive data compare command (cmpCOM)	Constant = Receive data
19	#FgtCOM4	Result of COM4 receive data compare command (cmpCOM)	Constant < Receive data
20	#FtimeOutCOM4	COM4 receive data compare command (cmpCOM) timeout	Timeout
30	#FinitMecError	Mechanical initialization command error status	Mechanical initialization error
31	#FcameraError	Camera data error status	Error
32	#FtakeZError	Z height data (takeZWadj) error status	Error
33	#FlMoveOutRange	Relative move command range	Out of range

No.	Identifier	Description	Condition “1” (True)
34	#FlMoveStop	Relative move command condition stop status	Stopped by the stop condition
35	#FcheckPosError	Position error detect command result	Position error
36	#FdataInBCDError	dataInBCD command error status	Error
60	#FstartSW	Start 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	Initial X position sensor	ON
72	#Fsensor2	Initial Y position sensor	ON
73	#Fsensor3	Initial Z position sensor	ON
74	#Fsensor4	Initial R position sensor	ON
76	#Fdrvoz1	X driver 0-phase	Close
77	#Fdrvoz2	Y driver 0-phase	Close
78	#Fdrvoz3	Z driver 0-phase	Close
79	#Fdrvoz4	R driver 0-phase	Close
91	#FenableSW	Enable switch	ON (Pressed)
92	#FspmodeSW	Special mode switch	ON
93	#FspareSW	Spare switch	ON
94	#FmotorPower	Motor power status	ON

17. ERROR MESSAGE LIST

When an error occurs, the program number display on the front of the operation panel alternately shows the Er sign and the error number (excluding error numbers of 100 or larger).

TP The error number and error message is also displayed on the teaching pendant LCD. If the teaching pendant is not connected, turn the power OFF and connect the teaching pendant to the robot. Turn the power ON again and the error number and error message is displayed on the teaching pendant LCD.

PC If the robot is connected to a PC, select [System Error Information] or [Run Error Information] from the [Robot] pull-down menu in JR C-Points. All robot error information is displayed.
If the robot is not connected to a PC, turn the power to the robot OFF. (If the PC is ON, turn it OFF also.) Connect the robot to the PC, start up the PC, and load the error information.

Error No.	Message	Countermeasure
001	Program is Empty	Enter the number of a registered program.
006	Point Type Error	A CP passing point following a PTP point causes a point type error. Check and reenter the point type.
007	Position is out of range	"Out of range" means the tool tip cannot move to the area specified due to the move area limit. This error occurs when a point position or a CP arc movement, etc., goes out of the move area. Check and reenter the teaching position coordinates. Also check and reenter the move area limit and the tool data TCP (tool center point).
008	Error on Point Job	All errors which are not as distinct as errors 009 – 013, 016, 042 – 053 are classified as a 008 error. -When *anb* or *orb* do not have their corresponding *ld* or *ldi* condition commands. -There are 30 or more *then*, *else* or *timeUp* nests in a single point job routine. -A *then*, *else* or *endIf* command does not have a corresponding *if* command. -A *timeUp* or *endWait* command does not have a corresponding *waitCondTime* or *waitCond* command. Check and reenter the point job content.

Error No.	Message	Countermeasure
009	then/else for if doesn't exist	This error includes the following cases in the point command: -When *if* does not have the corresponding *then* or *else*. -When after *if* there are wrong condition commands before *then* or *else*, etc. Check and reenter the point job command.
010	endIf for if doesn't exist	Check and reenter the point job command.
011	endWait for waitCond doesn't exist	Check and reenter the point job command.
012	Label for jump doesn't exist	Check and reenter the point job command.
013	Point for goPoint doesn't exist	This error occurs when the jump point number of the point job command, *goPoint*, *goRPoint*, or *palletLoop* is larger than the largest point number in a program or when it is a negative number. Check and reenter the point job command.
016	Error on Pallet Routine Data	This error occurs when the pallet number specified by a point job command does not exist. Check and reenter the point job command or the designated pallet routine in the additional function.
022	CP Speed Over	Reduce the CP (line) speed.
029	Saving Data Error	- If the TP is not connected and you are in Run Mode, this error number is displayed by LED and the robot cannot proceed. - If the TP is not connected and you are not in Run Mode, the robot initializes the work data (data in the RAM) and starts up. When this happens, you cannot change the saved data at this time. - If the TP is connected, the error message is displayed, a confirmation to delete all data [Y] appears, and the robot will then initialize with the saved data included.
030	Flash ROM Erase Error	All C & T data from FLROM is automatically deleted before saving. If deletion is not possible, this error occurs. It is possible that circuit board A is damaged. Circuit board A will need replacing. Please contact the dealer from whom you purchased this robot.
031	Flash ROM Write Error	A write error when saving C & T data. It is possible that circuit board A is damaged. Circuit board A will need replacing. Please contact the dealer from whom you purchased this robot.
035	Teaching Data SUM Error	When the power to the robot is turned ON, the stored C & T data is loaded. If the data sums do not match, this error occurs. Delete the C & T data. This error also occurs if the power to the robot is turned OFF while saving C & T data.
037	Motor Power Supply Error	This message appears when power to the motor is not supplied. Check the motor power supply. If the power supply connector or one of the thermal protectors is defective, check the connection If the power source is defective, replace the power source unit.

Error No.	Message	Countermeasure
042	Job for callJob doesn't exist	Check and reenter the point job command.
043	callJob Nesting Error	This error occurs when there are more than 30 *callJob* or *callBase* nests in a single point job routine. Check and reenter the point job command.
044	Program for callProg doesn't exist	Check and reenter the point job command.
045	callProg Nesting Error	This error occurs when there are more than 30 *callProg* or *callPoints* nests in a program (point string). Check and reenter the point job command.
046	for, do Nesting Error	This error occurs when there are more than 30 *for* or *do* nests in a repetitive command. Check and reenter the point job command.
047	Points for callPoints doesn't exist	Check and reenter the point job command.
048	for-next, do-loop Error	This error occurs when *next* corresponding to *for*, or *loop* corresponding to *do*, do not exist. It also occurs when *next* or *loop* appear even though *for* or *do* do not exist. Check and reenter the point job command.
049	Creating Local Variable Error	This error occurs if identifiers are overlapped or if the variable range is impossible when generating a local variable in a declare command. Check and reenter the point job command.
050	Evaluate Expression Error	This error occurs if the following errors are detected during expression evaluation: -No variable or function is included in the expression: -It is probable that the variable identifier or function identifier is wrong and the variable or the function may not have been defined. -Parentheses are not correct -Incorrect use of operators (e.g. +, -, ∗, /) -Wrong argument counts or types (including the numbers of array element successor functions) during a function call operation. Check and reenter the point job command.
051	I/O Alias Error	This error occurs if the specified I/O alias is not there. It is probable that the identifier is wrong or there is no definition. Check and reenter the point job command.
052	COM Alias Error	This error occurs if the specified COM alias is not there. It is probable that the identifier is wrong or there is no definition. Check and reenter the point job command.
053	Parameter value is out of range	This error occurs if the expression evaluation value exceeds the range. Check and reenter the point job command.

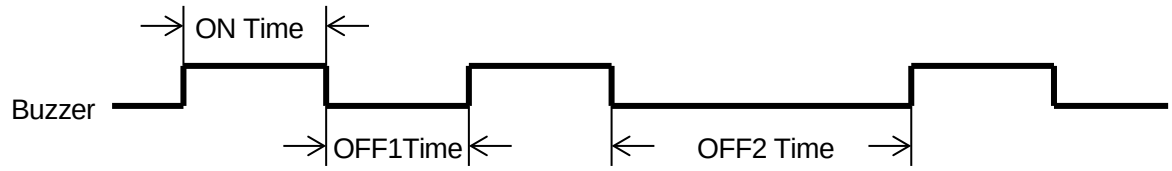
Error No.	Message	Countermeasure
082	Emergency Stop	This error occurs when the emergency stop switch has been pressed or when the emergency stop function I/O-S (CE specs only) has been activated. Release the emergency stop and perform mechanical initialization using the start signal.
083	Stop with Over Load (JR2000NE 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 the test run, press the start switch or a teaching pendant key. 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 sysIn11 function is set to [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]. I/O-B: The robot stands by for run when the sysIn13 (Error Reset) signal is turned ON.
085	Incorrect Use	This error occurs if the respective application specifcations of system programs and C&T data are different. For example, if you write a “Standard” system program to a robot that has a “Dispensing” program registered, an error will occur when the power is turned ON. Either delete the C&T data or make a system program that is appropriate for the work you want to perform. If the teaching pendant is connected, “OK to delete all teaching pendant data?” will appear and if you select [YES], the C&T data is deleted.
086	Incorrect Data Version	This error occurs when the data version number of the system program is lower than the data version number of the teaching data. This means that the new teaching data that is registered in the unit is not compatible with this system program. 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?” will be displayed. Selecting [YES] deletes the C&T data.
087	Incorrect Data Sub Version	This error occurs when the system program data subversions number is different from the teaching data subversion number. This means that there is new teaching data registered in the main unit that cannot run on this system program. Delete all teaching data or update the system program to the new version. If the teaching pendant is connected, “OK to Delete All Teaching Data?” will appear and if you select [YES], the C&T data is deleted.

Error No.	Message	Countermeasure
089	Z Sensor/Motor Error	This error occurs when the sensor does not open or close even when a preset pulse is output during mechanical initialization. If the Z axis motor is working it is a sensor error. If the Z axis motor is not working it is a motor error. (Mechanical Initialization Error)
090	Z Driver 0-Phase Error	This error occurs when the Z-phase signal is not output or is constantly output after the preset pulse is output at mechanical initialization. (Mechanical Initialization Error)
092	X Sensor/Motor Error	This error occurs when the sensor doesn't open or close even when the preset pulse is output at mechanical initialization. If the X Axis motor is working it is a sensor error If the X Axis motor is not working it is a motor error (Mechanical Initialization Error)
093	X Driver 0-Phase Error	This error occurs when the Z-Phase signal is not output or is constantly output after the preset pulse is output at mechanical initialization. (Mechanical Initialization Error)
095	Y Sensor/Motor Error	This error occurs when the sensor doesn't open or close after the preset pulse is output at mechanical initialization. If the Y axis motor is working it is a sensor error. If the Y axis motor is not working it is a motor error. (Mechanical Initialization Error)
096	Y Driver 0-Phase Error	This error occurs when the Z-Phase signal is not output or is constantly output when the preset pulse is output at mechanical initialization. (Mechanical Initialization Error)
098	R Sensor/Motor Error	This error occurs when the sensor doesn't open or close after the preset pulse is output at mechanical initialization. If the R axis motor is working it is a sensor error. If the R axis motor is not working it is a motor error. (Mechanical initialization error)
099	R Driver 0-Phase Error	This error occurs when the Z-Phase signal is not output or is constantly output when the preset pulse is output at mechanical initialization. (Mechanical Initialization Error)
100	Logical Error XXXXXX	The logical error is not displayed in the program number display. Turn the power OFF and back ON again. If the error continues to appear, please contact your local dealer from whom you purchased the robot with the "XXXXXX" display information.
101	Trap Error	When a trap error occurs, it is not shown on the display. A short beep will sound twice and when the power is turned ON again the error and error number will display on the teaching pendant LCD. It is likely to be caused by an A circuit board malfunction and so it is necessary to replace the A circuit board. Please contact the dealer from whom you purchased the robot for assistance.

17.1 Power-On Errors

The errors below are not displayed on the screen. Identify the error type from the following buzzer sounds:

Buzzer	Contents
One long beep	This indicates a write mode program error. When switching to Write Mode and turning the power ON, this error occurs when there is no write mode program or when it is corrupted (judged using SUM check). Printed circuit board A needs replacing. Please contact the dealer from whom you purchased the robot for assistance.
Two long beeps	This indicates a system program error. This error occurs when there is no system program or it is corrupted (determined using SUM check). The system program may be restored by switching to Write Mode and re-downloading the system program. Please contact the dealer from whom you purchased the robot for assistance.
Two short beeps	This indicates a trap error. It is a likely a malfunction with printed circuit board A. Printed circuit board A needs replacing. Please contact the dealer from whom you purchased the robot for assistance.
A two second beep	This indicates a flash ROM write error. This error occurs when writing is not executed properly in the Write Mode program. Printed circuit board A needs replacing. Please contact the dealer from whom you purchased the robot for assistance.



	ON Time	OFF1 Time	OFF2 Time
Long	0.6[sec]	0.6[sec]	1.2[sec]
Short	0.2 [sec]	0.2[sec]	1.2[sec]

Example: One long beep

ON	OFF	ON	OFF	ON	OFF	...
0.6	1.2	0.6	1.2	0.6	1.2	[sec]

Example: Two long beeps

ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	...
0.6	0.6	0.6	1.2	0.6	0.6	0.6	1.2	0.6	0.6	[sec]

Example: Two short Beeps

ON	OFF	ON	OFF	ON	OFF	ON	OFF	ON	OFF	...
0.2	0.2	0.2	1.2	0.2	0.2	0.2	1.2	0.2	0.2	[sec]

18. SPECIFICATIONS

Universal for JR2200N(NE), JR2300N(NE), JR2400N(NE), JR2500N(NE), and JR2600N Series		
Position Error Detection*		Each axis motor is equipped with a built-in position detection sensor. The robot stops on a [Stop with Over Load] error.
Encoder*		Incremental encoder (Two-Phase) Resolution: 125P/R Detection accuracy: 1mm (X- and Y- Axes), 0.5mm (Z-Axis), 1.8° (R-Axis)
Teaching Method		Remote teaching (JOG) and manual data input (MDI)
Teaching System		JR C-Points: A multipurpose and simple teaching system. Simple: Easy teaching simply by inputting necessary items, such as positions and parameters. Optional system programs for standard operations and other various applications are available. Multipurpose: You can create original programs, such as I/O control using point job commands.
Teaching Pattern		Direct teaching using the teaching pendant (optional) Off-line teaching using the PC (optional)
Program Capacity		255 programs
Data Memory Capacity		Maximum 30,000 points
Drive Method		5-phase stepping motor drive
Control Method		Point to Point (PTP) drive, Continuous Path (CP) drive
Interpolating Function		3-Dimensional linear and arc interpolation
External Interface		RS-422 1ch For teaching pendant 1ch RS-232C 3 ch For PC (COM1) : 1ch For external device (COM2) : 1ch (Optional) For external device (COM3) : 1ch (Optional)
External Input/Output		I/O-SYS: 16 inputs and 16 outputs I/O-1 (optional): 8 inputs and 8 outputs (including 4 relay outputs)
Simple PLC Function		100 programs, 1,000 steps/1 program
Resolution	X- and Y-Axes	0.005mm
	Z-Axis	0.0025mm
	R-Axis	0.009deg
Power Source		AC 90 – 132 V (single phase) 50/60 Hz AC 180 – 250V (single phase) 50/60 Hz
Power Consumption		200W
Operating Ambient Temperature		0 – 40°C
Relative Humidity		20 – 90% (no condensation)
Storage Temperature		-10 – +50°C
Airborne Noise		Not more than 70dB

*Only JR2200NE, JR2300NE, JR2400NE, and JR2500NE Series are equipped with these functions.

JR2200N(NE) Series			
Specifications \ Model		2203N(NE)	2204N(NE)
Axis Type*1		3 (synchronous control)	4 (synchronous control)
Operating Range	X-Axis	200mm	
	Y-Axis	200mm	
	Z-Axis	50mm	
	R-Axis	–	±360°
Portable Weight*2	Workpiece	7kg	
	Tool	3.5kg	
Acceptable Moment of Intertia		–	65kg·cm^2
Maximum Speed*3 (PTP Drive)	X- and Y-Axes	700mm/sec (7 – 700mm/sec)*4	
	Z-Axis	250mm/sec (2.5 – 250mm/sec)*4	
	R-Axis	–	600°/sec (6 – 600°/sec) *4
Maximum Speed*3 (CP Drive)	X-, Y-, and Z-Axes (Combined)	500mm/sec (0.1 – 500mm/sec)*4	
Repeatability	X- and Y-Axes	±0.006mm	±0.01mm
	Z-Axis	±0.006mm	±0.01mm
	R-Axis	–	±0.008°
External Dimensions (excluding cables and protrusions)	W x D x H (mm)	320 x 387 x 539.5	320 x 387 x 655
Unit weight		18kg	

*1: A two axes model (JR2202N) is also available. Two axes unit weight is 15kg.

*2: Maximum portable weight for the two axes model is 6.5kg for the tool and 7.0kg for the workpiece.

*3: There may be limitations depending on the drive conditions.

*4: Settable speed range

CE specification models are also available.

JR2300N(NE) Series			
Specifications \ Model		2303N(NE)	2304N(NE)
Axis Type*1		3 (synchronous control)	4 (synchronous control)
Operating Range	X-Axis	300mm	
	Y-Axis	320mm	
	Z-Axis	100mm	
	R-Axis	–	±360°
Portable Weight*2	Workpiece	11kg	
	Tool	6kg	
Acceptable Moment of Inertia		–	90kg·cm^2
Maximum Speed*3 (PTP Drive)	X- and Y-Axes	800mm/sec (8 – 800mm/sec)*4	
	Z-Axis	320mm/sec (3.2 – 320mm/sec)*4	
	R-Axis	–	800°/sec (8 – 800°/sec)*4
Maximum Speed*3 (CP Drive)	X-, Y-, and Z-Axes (Combined)	800mm/sec (0.1 – 800mm/sec)*4	
Repeatability	X- and Y-Axes	±0.007mm	±0.01mm
	Z-Axis	±0.007mm	±0.01mm
	R-Axis	–	±0.008deg
External Dimensions (excluding cables and protrusions)	W x D x H (mm)	560 x 529 x 649.5	560 x 529 x 840
Weight (Robot)		35kg	

*1: A two axes model (JR2302N) is also available. Two axes unit weight is 31kg.

*2: Maximum portable weight for the two axes model is 7kg for the tool and 11kg for the workpiece.

*3: There may be limitations depending on the drive conditions.

*4: Settable speed range

CE specification models are also available.

JR2400N(NE) Series			
Specifications \ Model		2403N(NE)	2404N(NE)
Axis Type*1		3 (synchronous control)	4 (synchronous control)
Operating Range	X-Axis	400mm	
	Y-Axis	400mm	
	Z-Axis	150mm	
	R-Axis	–	±360°
Portable Weight*2	Workpiece	11kg	
	Tool	6kg	
Acceptable Moment of Inertia		–	90kg·cm^2
Maximum Speed*3 (PTP Drive)	X- and Y-Axes	800mm/sec (8 – 800mm/sec)*4	
	Z-Axis	320mm/sec (3.2 – 320mm/sec)*4	
	R-Axis	–	800°/sec (8 – 800°/sec)*4
Maximum Speed*3 (CP Drive)	X-, Y-, and Z-Axes (Combined)	800mm/sec (0.1 – 800mm/sec)*4	
Repeatability	X- and Y-Axes	±0.007mm	±0.01mm
	Z-Axis	±0.007mm	±0.01mm
	R-Axis	–	±0.008°
External Dimensions (excluding cables and protrusions)	W x D x H (mm)	584 x 629 x 799.5	584 x 629 x 890
Weight (Robot)		42kg	

*1: A two axes model (JR2402N) is also available. Two axes unit weight is 38kg.

*2: Maximum portable weight for the two axes model is 10kg for the tool and 11kg for the workpiece.

*3: There may be limitations depending on the drive conditions.

*4: Settable speed range

CE specification models are also available.

JR2500N(NE) Series			
Specifications \ Model		2503N(NE)	2504N(NE)
Axis Type*1		3 (synchronous control)	4 (synchronous control)
Operating Range	X-Axis	510mm	
	Y-Axis	510mm	
	Z-Axis	150mm	
	R-Axis	–	±360°
Portable Weight*2	Workpiece	11kg	
	Tool	6kg	
Acceptable Moment of Inertia		–	90kg·cm^2
Maximum Speed*3 (PTP Drive)	X- and Y-Axes	800mm/sec (8 – 800mm/sec)*4	
	Z-Axis	320mm/sec (3.2 – 320mm/sec)*4	
	R-Axis	–	800°/sec (8 – 800°/sec)*4
Maximum Speed*3 (CP Drive)	X-, Y-, and Z-Axes (Combined)	800mm/sec (0.1 – 800mm/sec)*4	
Repeatability	X- and Y-Axes	±0.008mm	±0.01mm
	Z-Axis	±0.008mm	±0.01mm
	R-Axis	–	±0.008°
External Dimensions (excluding cables and protrusions)	W x D x H (mm)	676 x 731 x 799.5	676 x 731 x 890
Weight (Robot)		45kg	

*1: A two axes model (JR2502N) is also available. Two axes unit weight is 42kg.

*2: Maximum portable weight for the two axes model is 10kg for the tool and 11kg for the workpiece.

*3: There may be limitations depending on the drive conditions.

*4: Settable speed range

CE specification models are also available.

JR2600N Series			
Specifications \ Model		2603N	2604N
Axis Type		3 (synchronous control)	4 (synchronous control)
Operating Range	X-Axis	510mm	
	Y-Axis	620mm	
	Z-Axis	150mm	
	R-Axis	–	±360°
Portable Weight	Workpiece	11kg	
	Tool	6kg	
Acceptable Moment of Inertia		–	90kg·cm^2
Maximum Speed*1 (PTP Drive)	X- and Y-Axes	800mm/sec (8 – 800mm/sec)*2	
	Z-Axis	320mm/sec (3.2 – 320mm/sec)*2	
	R-Axis	–	800°/sec (8 – 800°/sec)
Maximum Speed*1 (CP Drive)	X-, Y-, and Z-Axes (Combined)	800mm/sec (0.1 – 800mm/sec)*2	
Repeatability	X-Axis	±0.008mm	±0.01mm
	Y-Axis	±0.01mm	±0.01mm
	Z-Axis	±0.008mm	±0.01mm
	R-Axis	–	±0.008°
External Dimensions (excluding cables and protrusions)	W x D x H (mm)	788 x 731 x 799.5	788 x 731 x 890
Weight (Robot)		48kg	

*1: There may be limitations depending on the drive conditions.

*2: Settable speed range

CE specification models are also available.

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