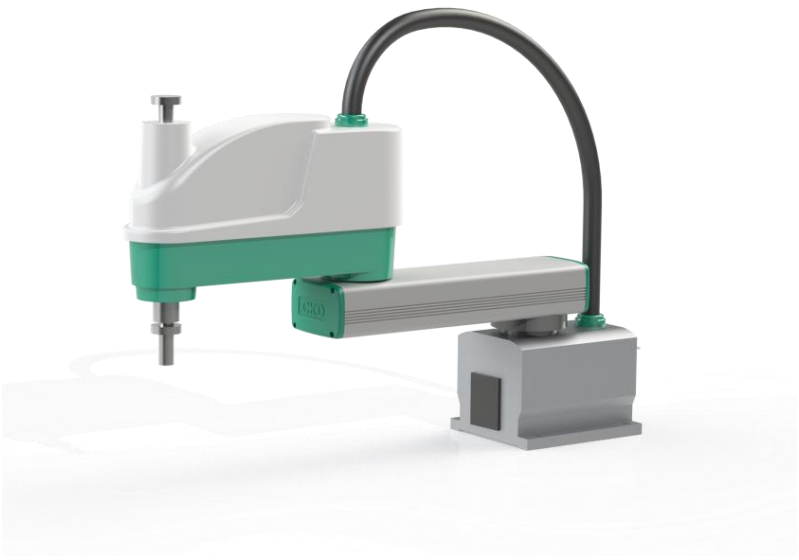
CKD

SCARA Robot

KHL Simple Clean Type
Industrial Robot Specifications

INSTRUCTION MANUAL

SM-A20064-A



- Read this Instruction Manual before using the product.
- Read the safety notes carefully.
- Keep this Instruction Manual in a safe and convenient place for future reference.

CKD Corporation

Preface

This manual describes the specifications of the KHL series simple clean type industrial robot. This manual is essential to keep the robot performance for a long time, to prevent failures and to assure safety. Be sure to look through this manual and set up a maintenance program before actually starting the robot.

Precautions on Safety

Important information on the robot and controller is noted in the instruction manual to prevent injury to the user and persons nearby, prevent damage to assets and to ensure correct use.
Make sure that the following details (indications and symbols) are well understood before reading this manual. Always observe the information that is noted.

[Explanation of indications]

Indication	Meaning of indication
! **DANGER**	This means that "incorrect handling will imminently lead to fatalities or major injuries".
! **WARNING**	This means that "incorrect handling may lead to fatalities or serious injuries."
! **CAUTION**	This means that "incorrect handling may lead to personal injuries *1) or physical damage *2)".

*1) Injuries refer to injuries, burns and electric shocks, etc., which do not require hospitalization or long term treatment.

*2) Physical damage refers to major damage due to destruction of assets or resources.

[Explanation of symbols]

Symbol	Meaning of symbol
	This means that the action is prohibited (must not be done). Details of the actions actually prohibited are indicated with pictures or words in or near the symbol.
	This means that the action is mandatory (must be done). Details of the actions that must be done are indicated with pictures or words in or near the symbol.
	This means danger and caution. Details of the actual danger and caution are indicated with pictures or words in or near the symbol.

[Maintenance and inspection]

Be sure to observe the following items to use this product safely.

 **DANGER**	
 Prohibited	• DO NOT incinerate, disassemble or charge the batteries. Otherwise, they may rupture.
 Mandatory	• Be sure to turn off the power switch of the controller before starting inspection or maintenance. • Batteries should be disposed of according to the user's in-house regulations.

! CAUTION	
 Disassembly prohibited	• The user must NEVER replace or modify parts other than those described in the instruction manual. Otherwise, the performance may deteriorate or faults or accidents will be caused.
 Mandatory	• Always use the CKD's designated spare parts when replacing the parts. • Maintenance and inspection should be performed regularly. Otherwise, the system may malfunction or accidents will be caused.

This manual is comprised of the following six (6) sections:

Section 1 Specifications
This section describes the basic specifications and names of respective parts of the clean type industrial robot.

Section 2 Transportation
This section describes how to remove the clean type robot from its box and how to transport it to the installation site.

Section 3 Installation
This section discusses the clean type robot installation environment, space requirements, and how to install the robot.

Section 4 Connection of System
This section describes the wiring connection between the robot and the controller and between the controller and the peripheral equipment.

Section 5 Tool Interface
This section discusses how to connect the cables and pipelines for the tool of the clean type robot.

Section 6 Maintenance
This section describes the structure of the clean type robot and all items required for the maintenance and inspection of the same robot.

Section 7 Replacement Parts for Maintenance
This section explains the replacement parts for the maintenance.

Table of Contents

1. Specifications

1.1 Name of Each Part

The names of respective parts of the clean type robot are shown in Fig. 1.1 to Fig. 1.3 below.

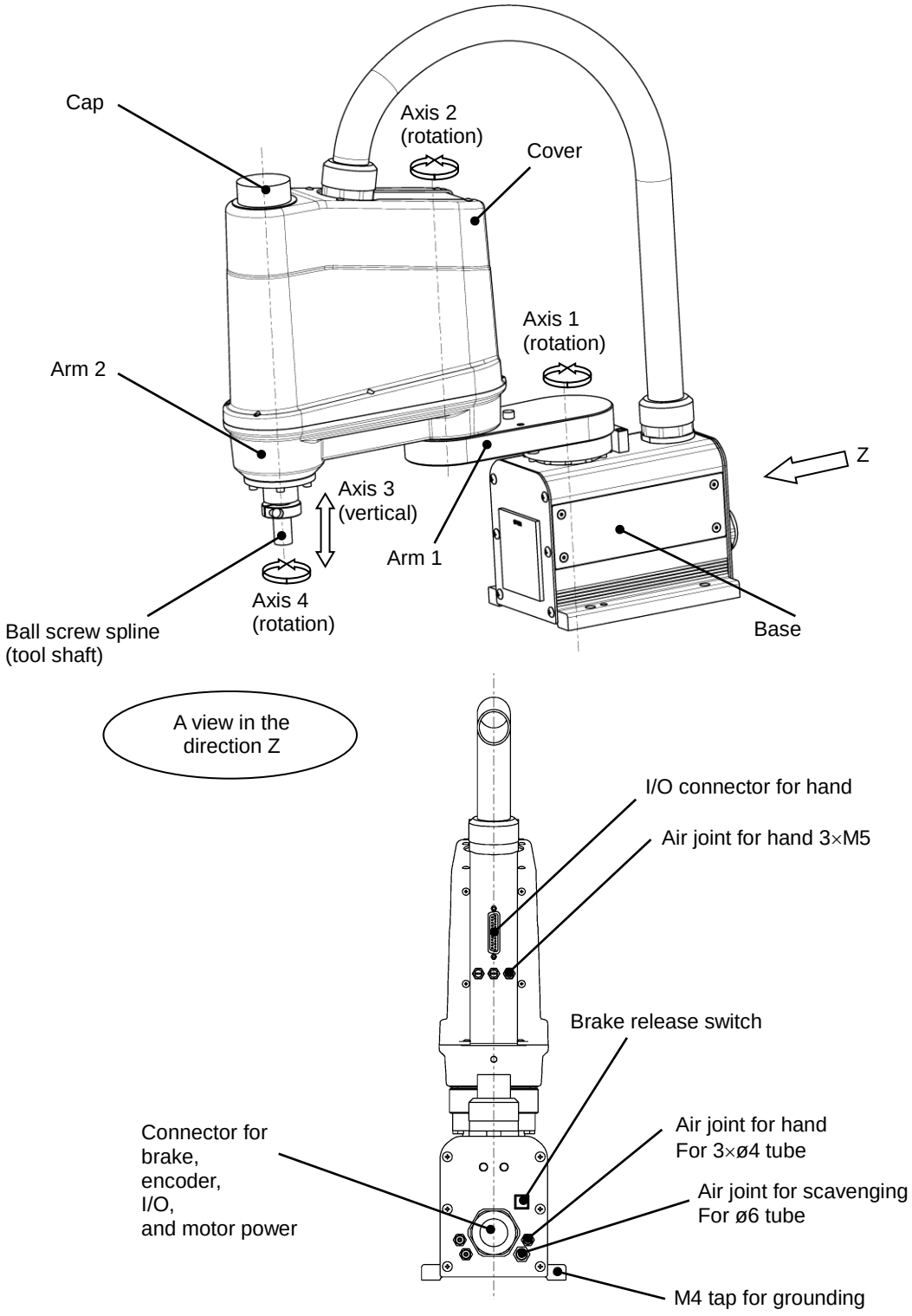
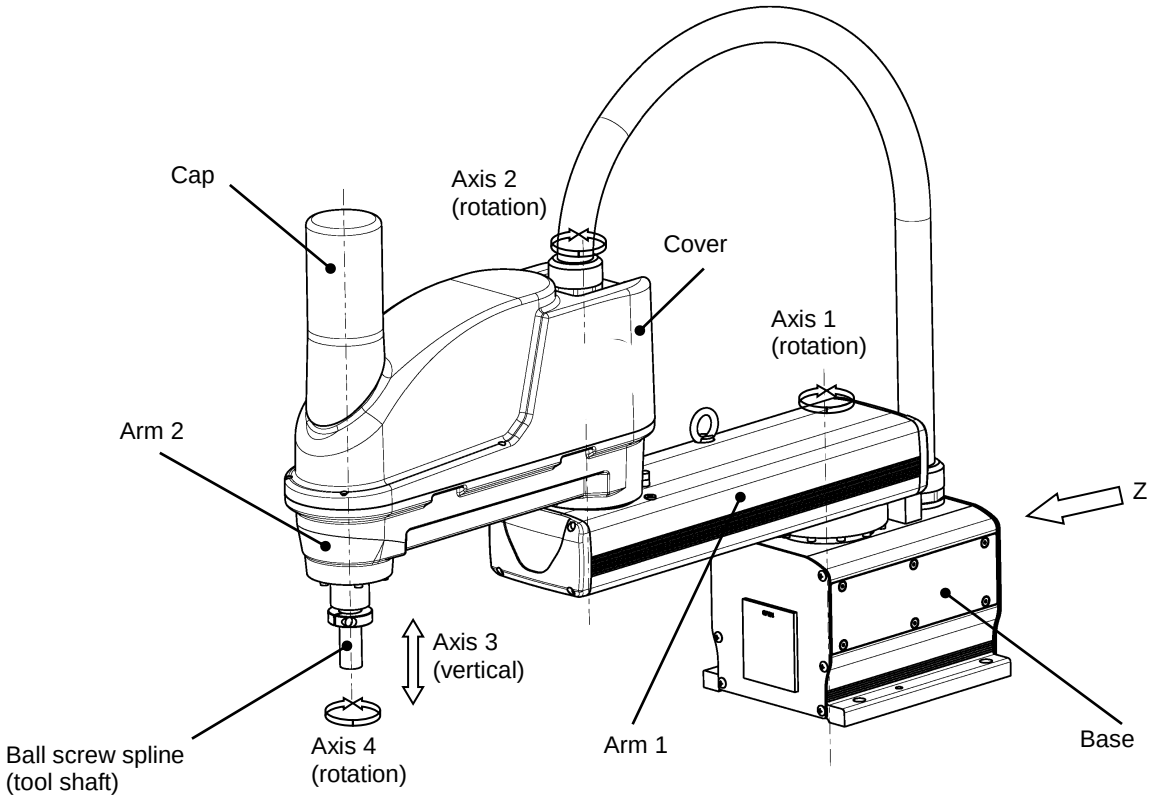


Fig. 1.1 Name of each part (KHL-300NSCN, KHL-400NSCN)



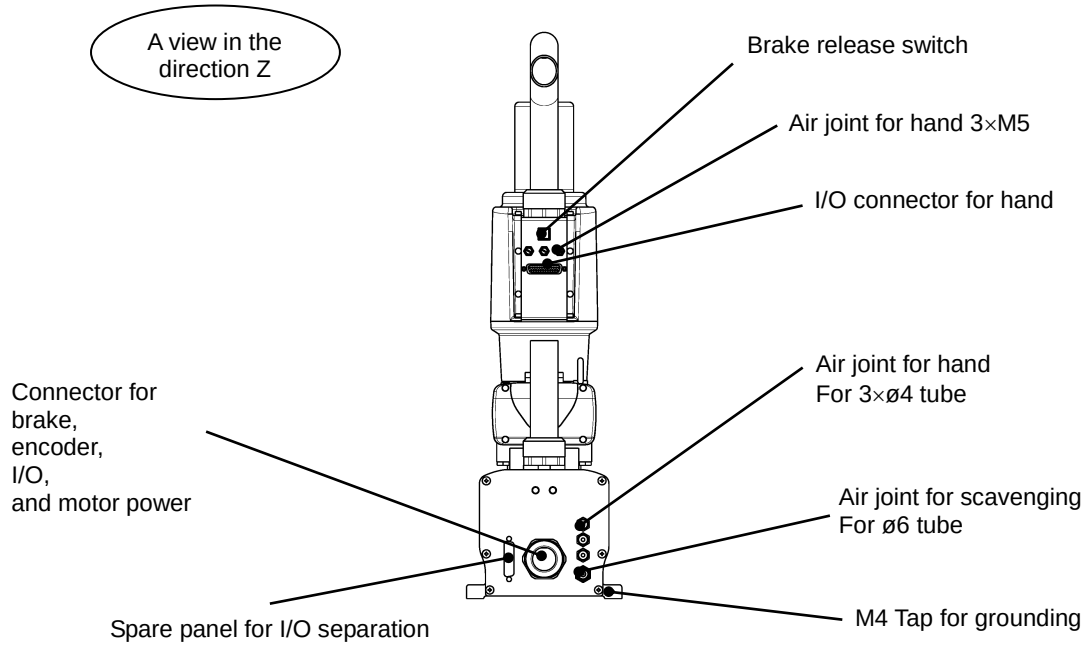


Fig. 1.2 Name of each part (KHL-500NSCN, KHL-600NSCN, KHL-700NSCN)

1.2 Outer Dimensions

Fig. 1.3 to Fig. 1.7 show the outer dimensions of the robot and Fig. 1.8 to Fig. 1.12 show the operating range of the robot.

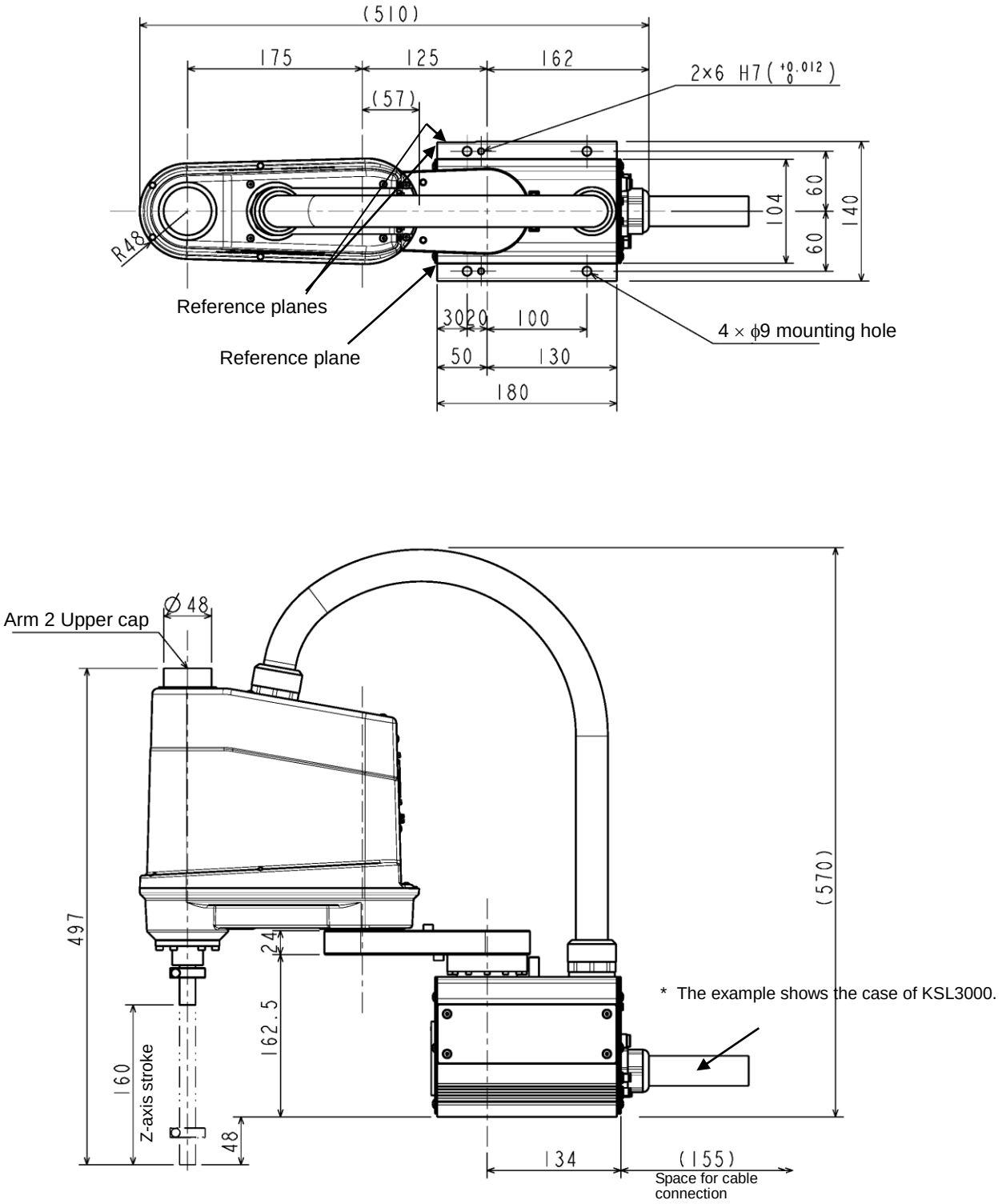


Fig. 1.3 Outer dimensions of the robot (KHL-300NSCN)

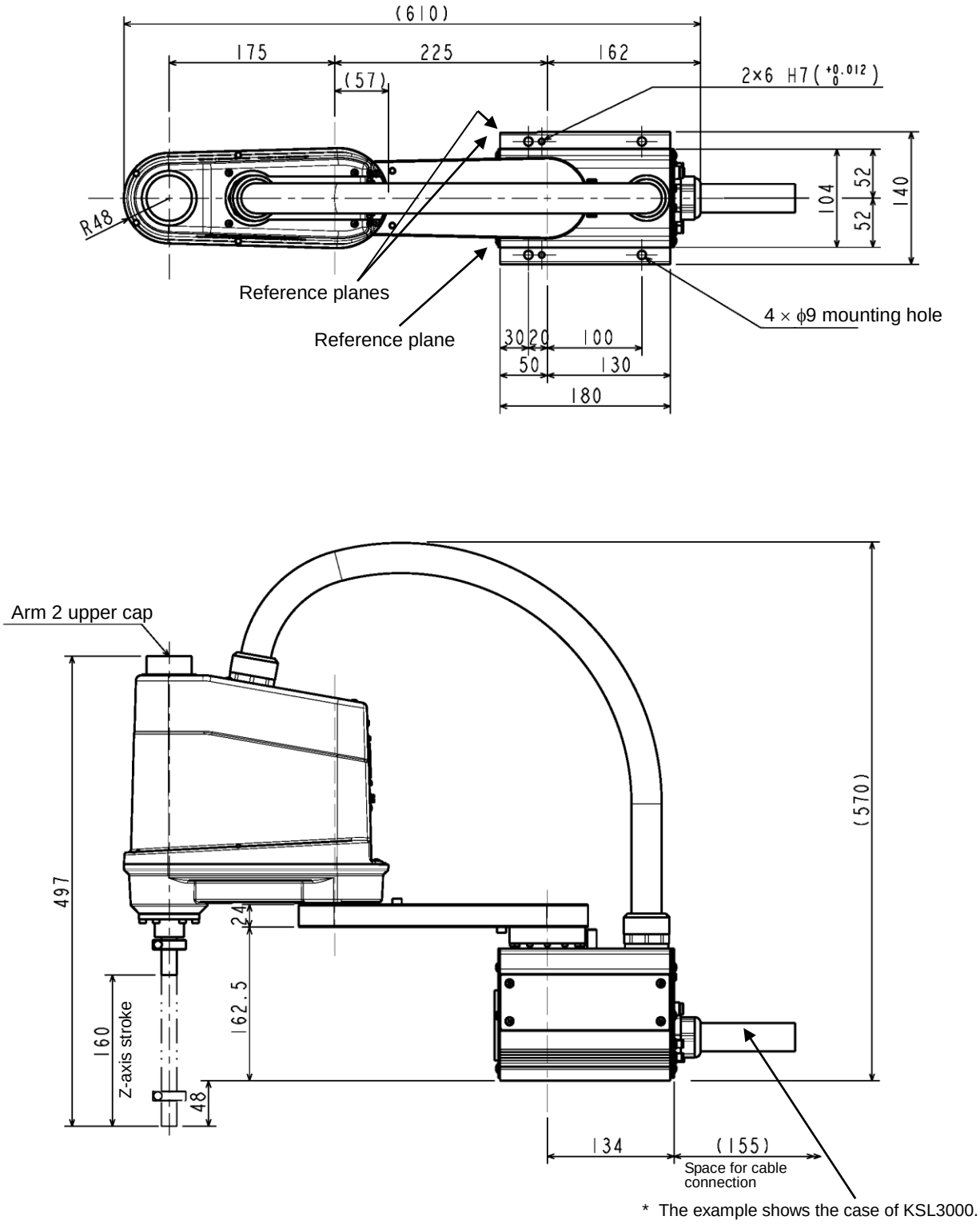


Fig. 1.4 Outer dimensions of the robot (KHL-400NSCN)

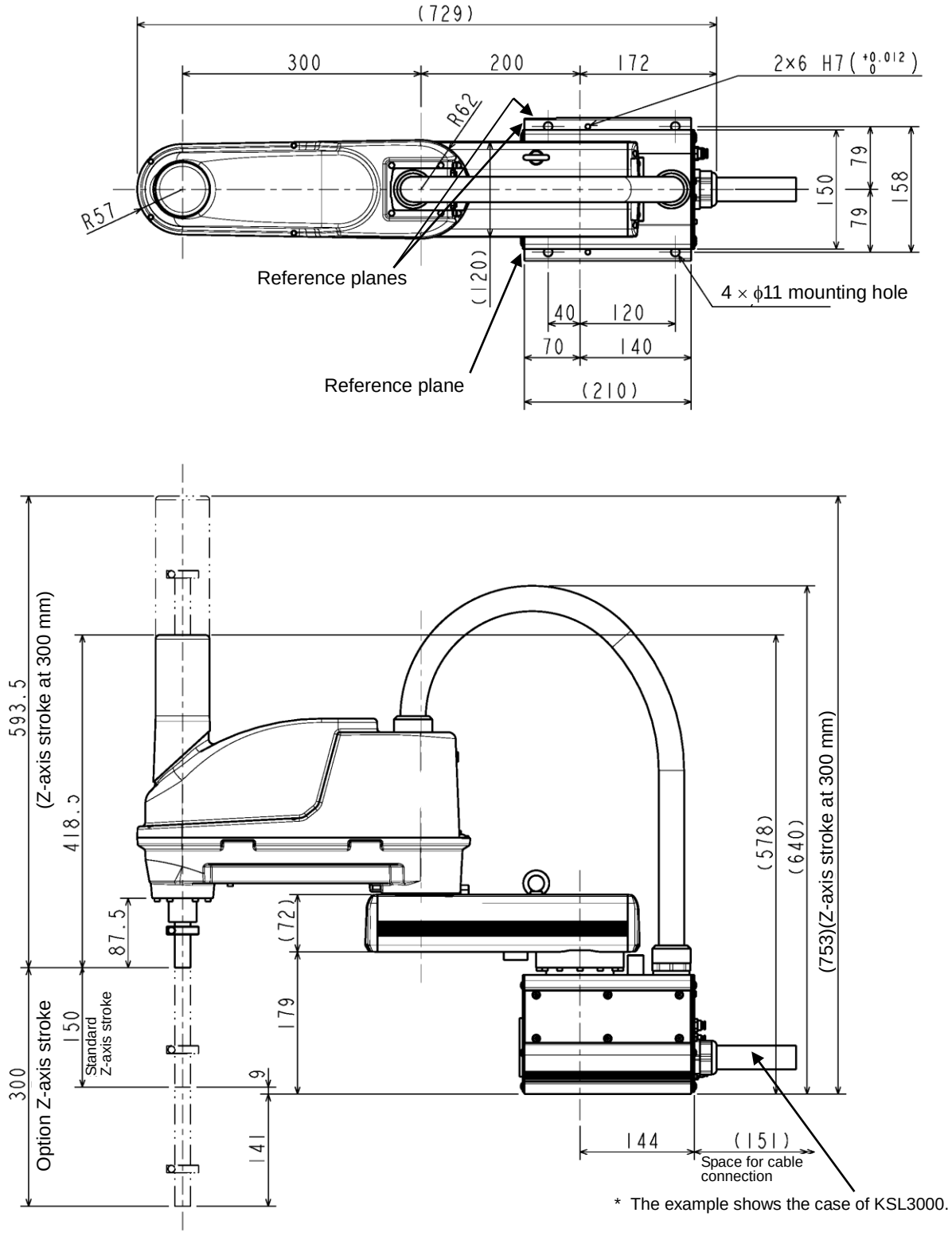


Fig. 1.5 Outer dimensions of the robot (KHL-500NSCN)

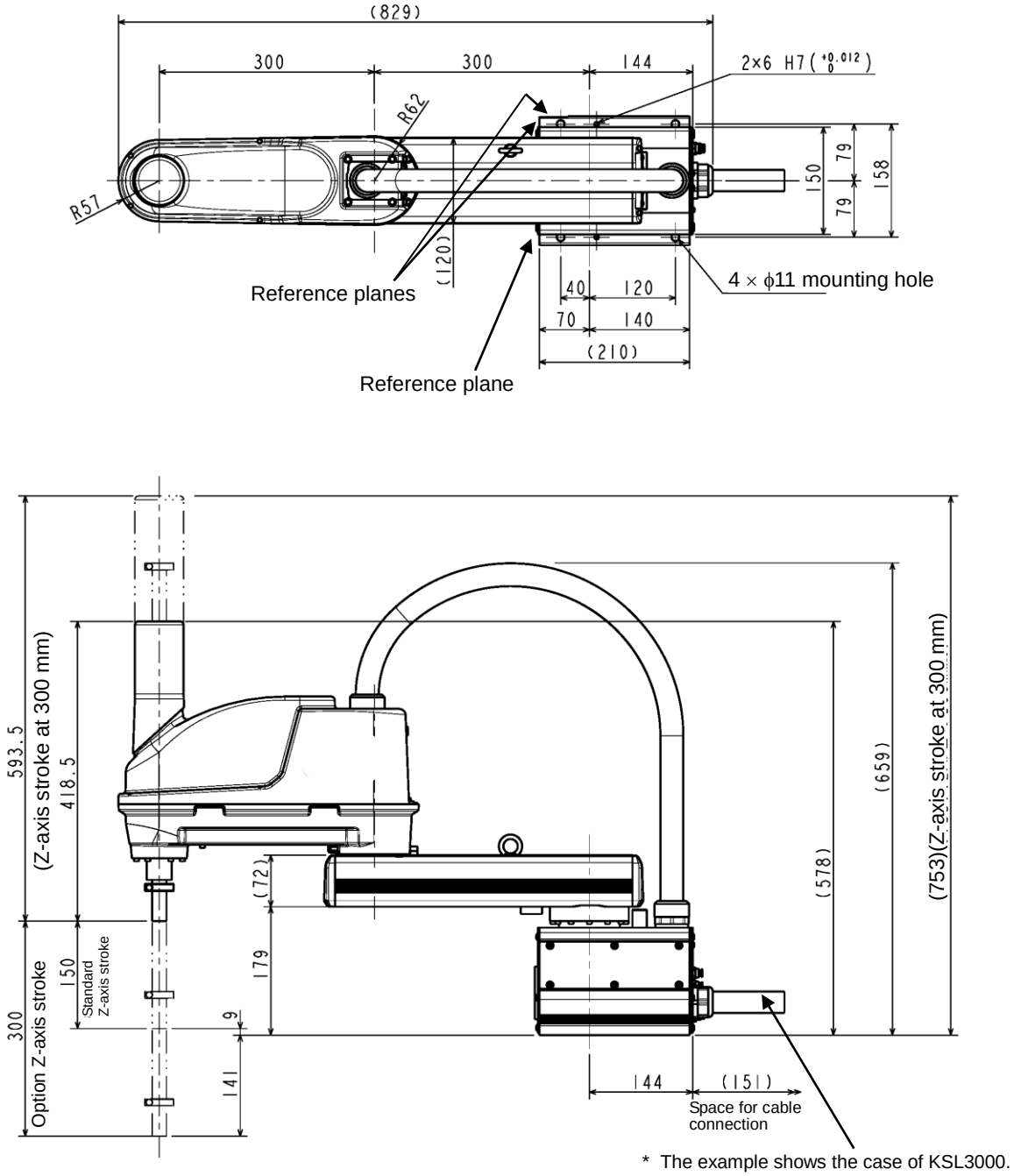


Fig. 1.6 Outer dimensions of the robot (KHL-600NSCN)

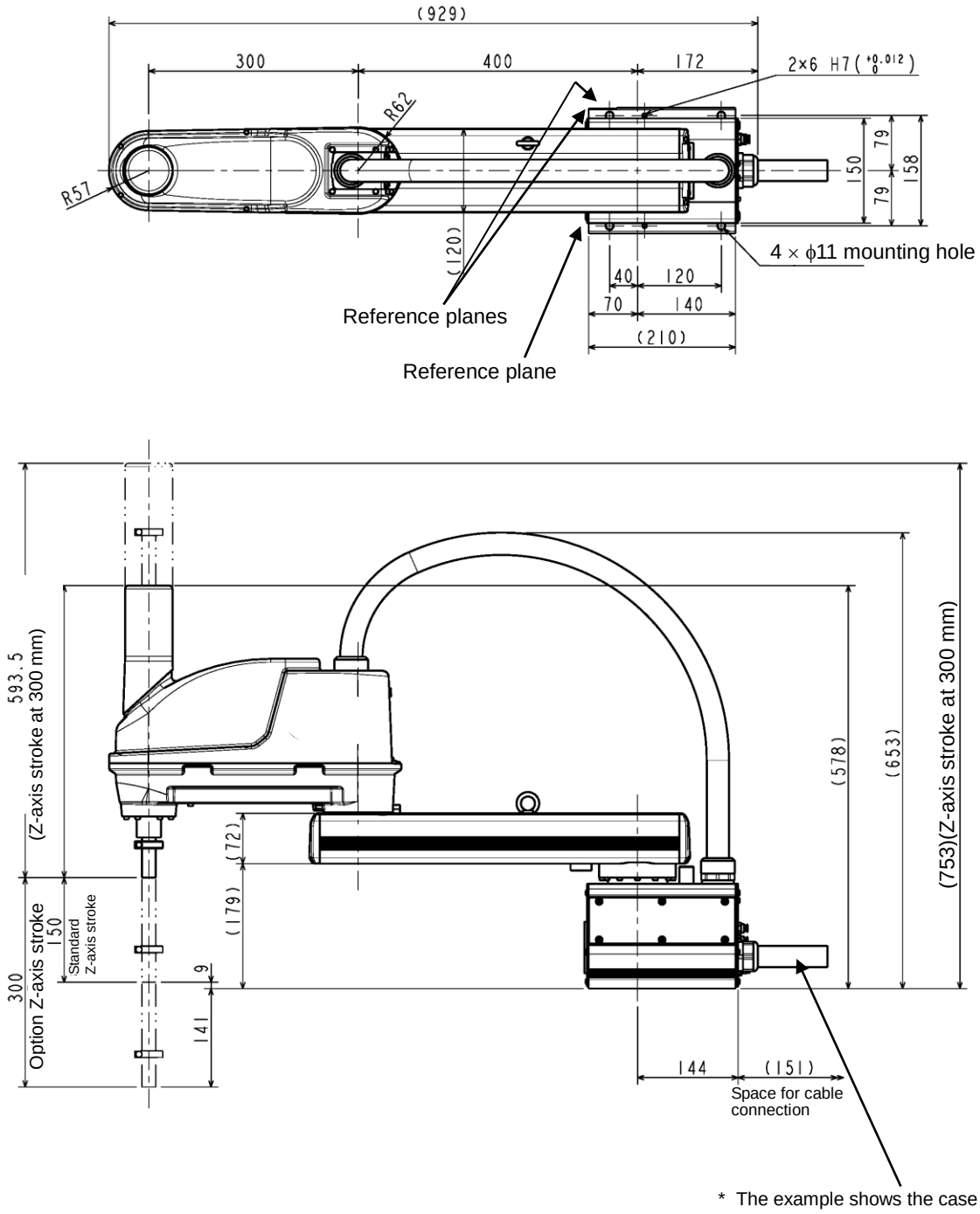


Fig. 1.7 Outer dimensions of the robot (KHL-700NSCN)

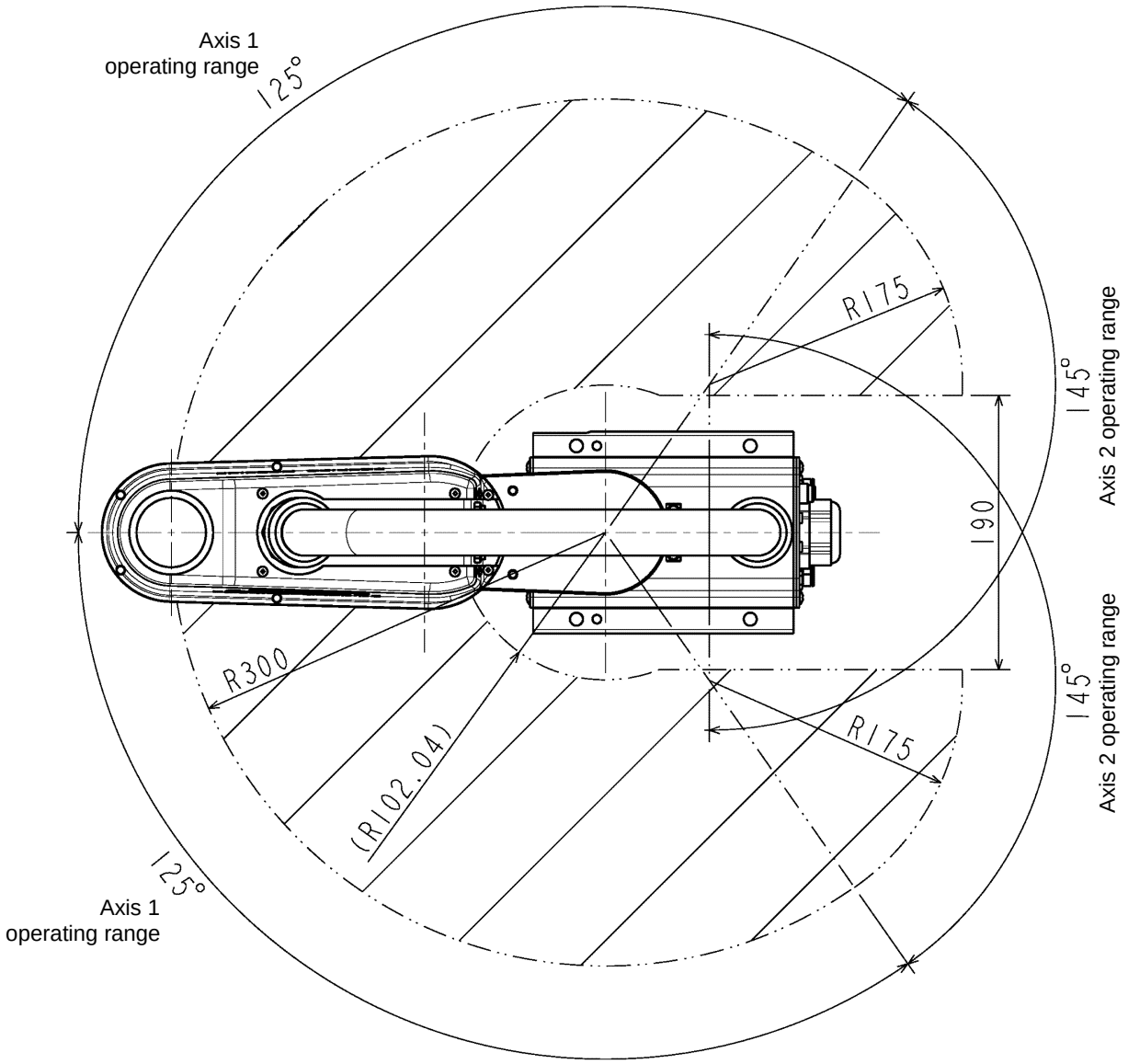


Fig. 1.8 Operating range of the robot (KHL-300NSCN)

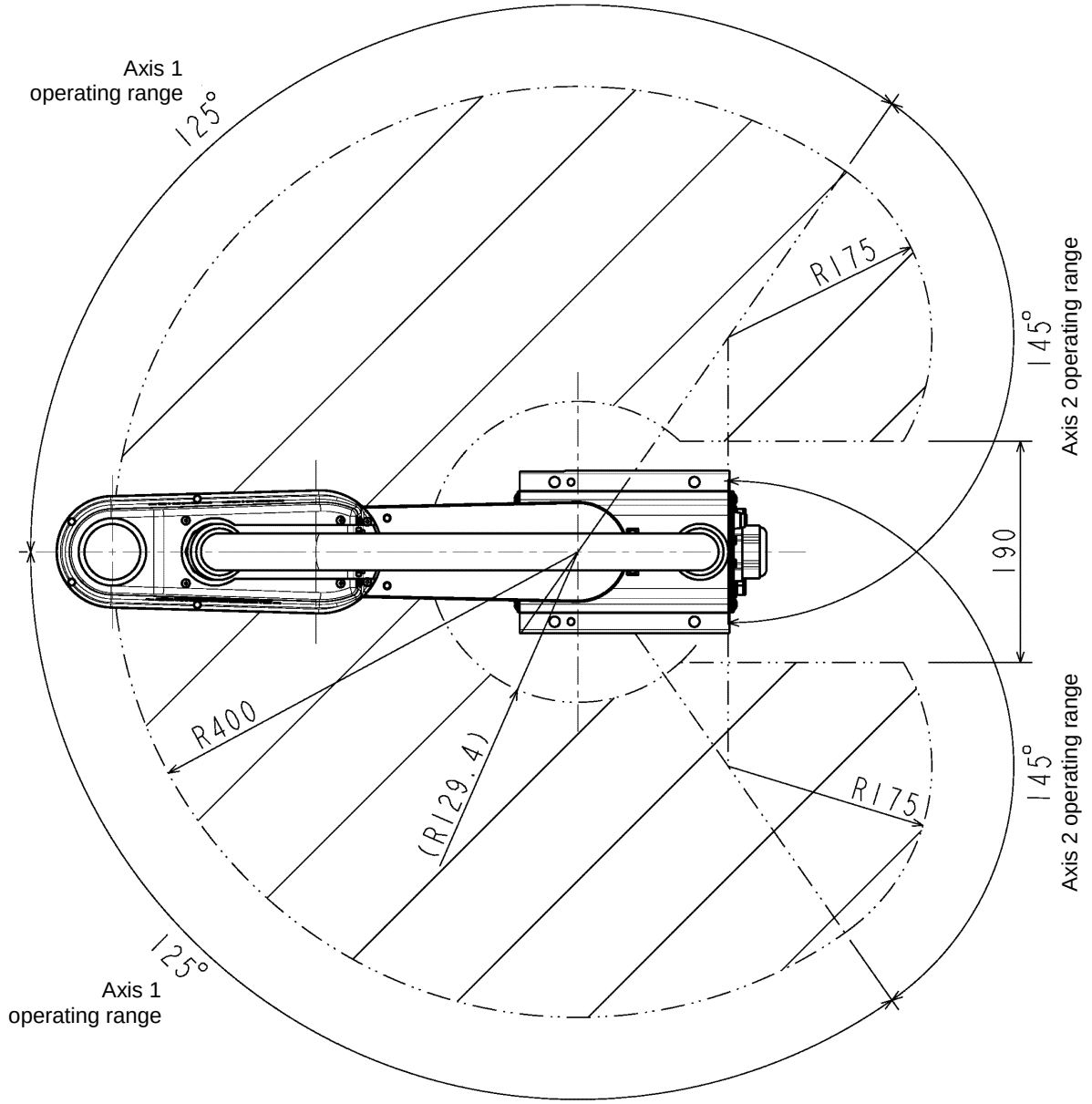


Fig. 1.9 Operating range of the robot (KHL-400NSCN)

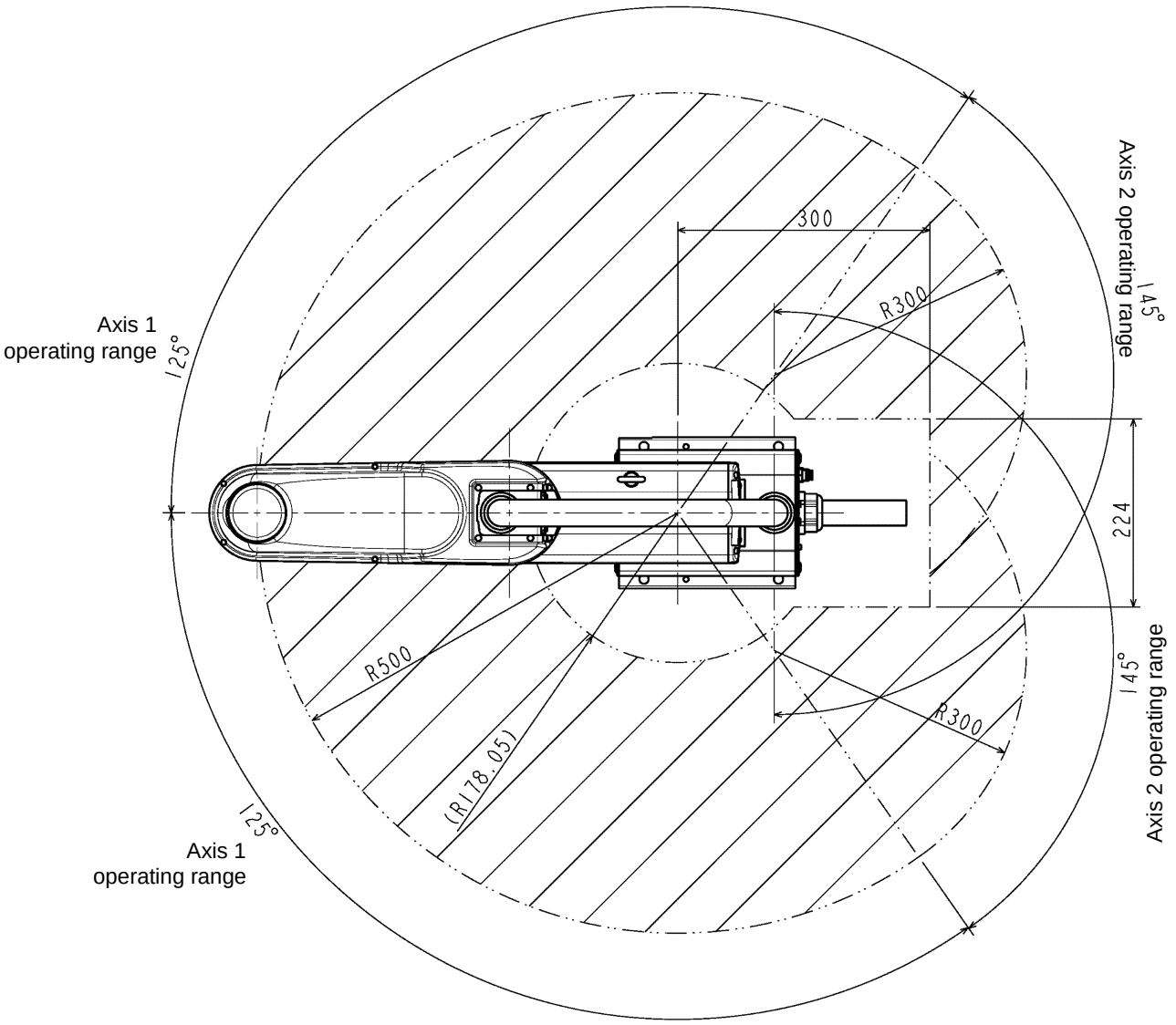


Fig. 1.10 Operating range of the robot (KHL-500NSCN)

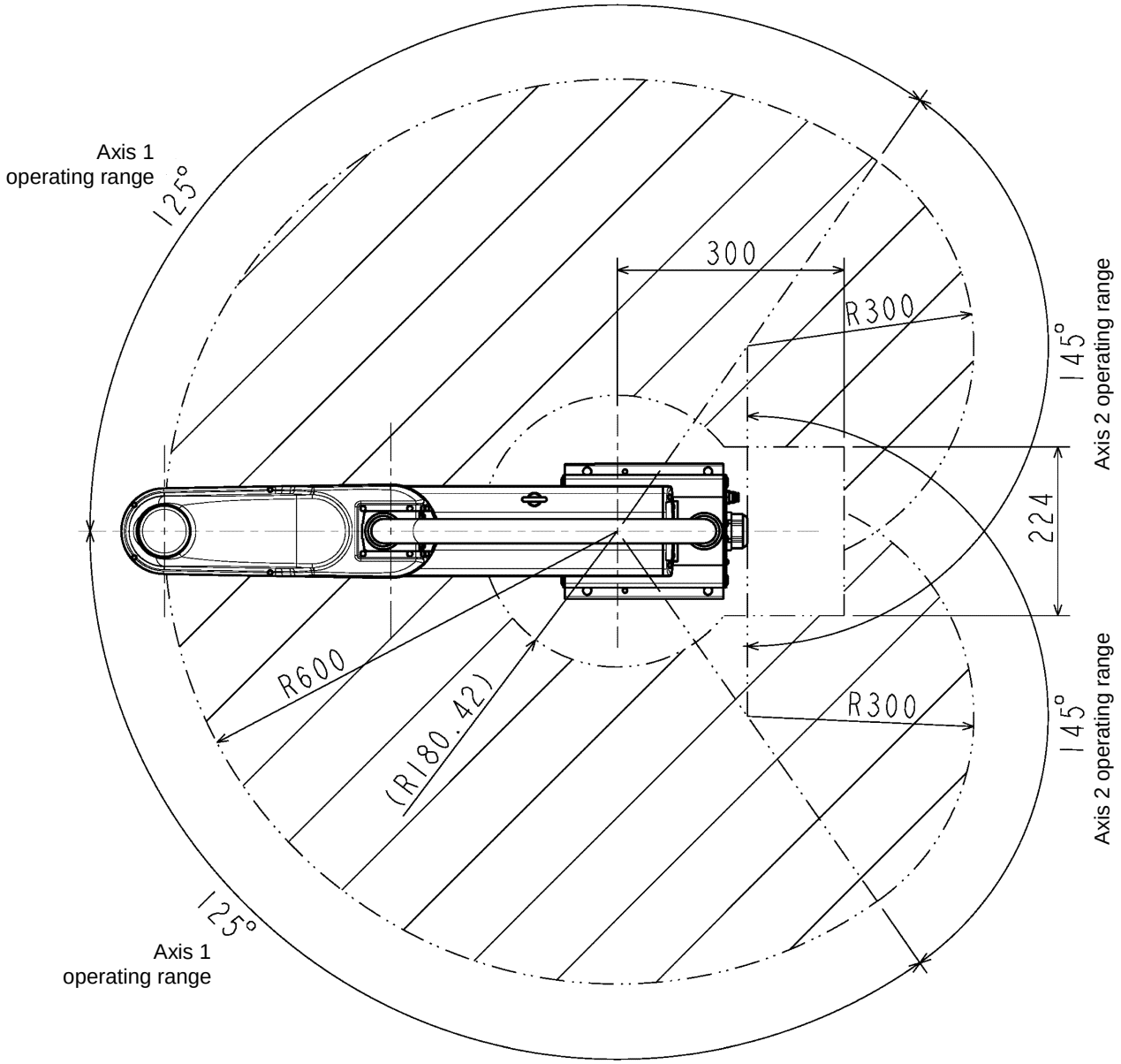


Fig. 1.11 Operating range of the robot (KHL-600NSCN)

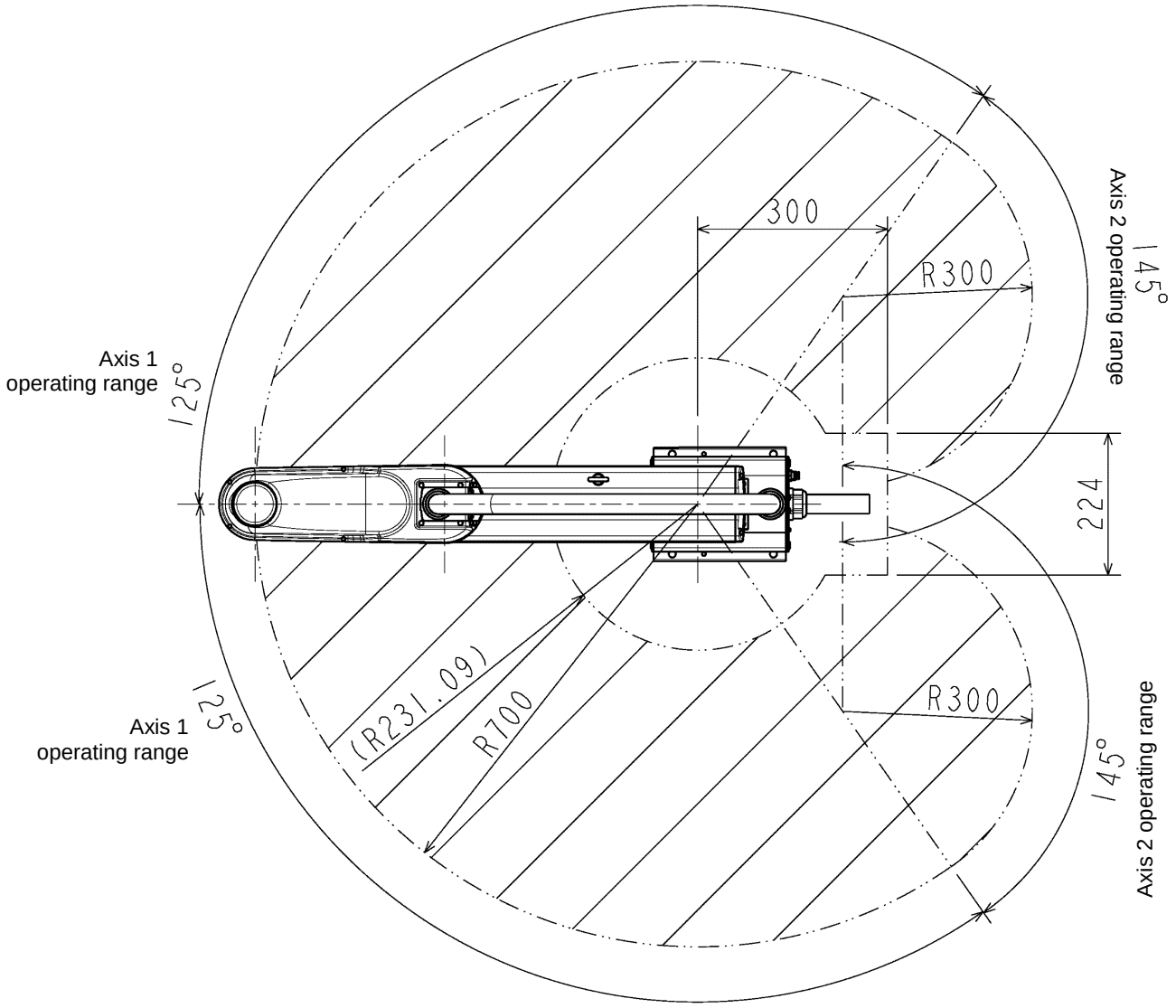


Fig. 1.12 Operating range of the robot (KHL-700NSCN)

1.3 Specifications Table

[KHL-300NSCN/KHL-400NSCN]

Item		Specifications	
Structure		Horizontal multi-joint type SCARA robot	
Model		KHL-300NSCN	KHL-400NSCN
Applicable controller		KSL3000 (*1)	
Mass of robot body		12 kg	13 kg
No. of controlled axes		Four (4)	
Arm length		300 mm (125+175)	400 mm (225+175)
Motor capacity	Axis 1	200 W	
	Axis 2	100 W	
	Axis 3	100 W	
	Axis 4	100 W	
Operating range	Axis 1	±125 deg	
	Axis 2	±145 deg	
	Axis 3	0 to 160 mm	
	Axis 4	±360 deg	
Maximum speed (*2)	Axis 1	660 deg/s	
	Axis 2	660 deg/s	
	Axis 3	1120 mm/s	
	Axis 4	1500 deg/s	
	Composite speed of axes 1 and 2	5.1 m/s	6.3 m/s
Rated payload mass		2 kg	
Maximum payload mass		5 kg	
Permissible load inertia (*2)		0.05 kg·m^2	
Repeatability (*3)	X, Y	±0.01 mm	
	Z	±0.015 mm	
	C	±0.005 deg	
Cycle time (*4) (When payload mass is 2 kg)		0.48 s	
Drive system		By means of AC servo motors	
Position detection method		Absolute	
Cleanness level (*5)		100,000 or less dust particles of 0.1 μm or over in diameter, which exist in 1 cft (28,317 cm^3) of a sample area. Equivalent to clean class 5 defined by ISO	
Air suction volume		60 normal liters/min	

*1: The structure of the robot controller is not of a clean type.

*2: There are restrictions on speed and acceleration speed depending on the operation pattern, load, and offset amount.

*3: This is unidirectional position repeatability when the ambient temperature is constant at 20°C. It is not absolute positioning accuracy.

*4: The standard cycle operation pattern cannot achieve continuous operation exceeding the effective load rate. With horizontal direction 300 mm, vertical direction 25 mm round trip, and rough positioning.

*5: When the air suction volume is 60 normal liters/min, down flowrate in the clean room is 0.4 m/s or over.

[KHL-500NSCN/KHL-600NSCN/KHL-700NSCN]

Item		Specifications		
Structure		Horizontal multi-joint type SCARA robot		
Model		KHL-500NSCN	KHL-600NSCN	KHL-700NSCN
Applicable controller		KSL3000 (*1)		
Mass of robot body		22 kg	23 kg	24 kg
No. of controlled axes		4		
Arm length		500 mm (200+300)	600 mm (300+300)	700 mm (400+300)
Motor capacity	Axis 1	400 W		
	Axis 2	200 W		
	Axis 3	200 W		
	Axis 4	200 W		
Operating range	Axis 1	±125 deg		
	Axis 2	±145 deg		
	Axis 3	0 to 150 mm [Option: 0 to 300 mm]		
	Axis 4	±360 deg		
Maximum speed (*2)	Axis 1	450 deg/s		
	Axis 2	450 deg/s		
	Axis 3	2000 mm/s		
	Axis 4	1700 deg/s		
	Composite speed of axes 1 and 2	6.3 m/s	7.1 m/s	7.9 m/s
Rated payload mass		2 kg		
Maximum payload mass		10 kg		
Permissible load inertia (*2)		0.2 kg•m^2		
Repeatability (*3)	X, Y	±0.01 mm		
	Z	±0.015 mm		
	C	±0.007 deg		
Cycle time (*4) (When payload mass is 2 kg)		0.45 s		
Drive system		By means of AC servo motors		
Position detection method		Absolute		
Cleanness level (*5)		100,000 or less dust particles of 0.1 μm or over in diameter, which exist in 1 cft (28,317 cm^3) of a sample area. Equivalent to clean class 5 defined by ISO		
Air suction volume		60 normal liters/min		

*1: The structure of the robot controller is not of a clean type.

*2: There are restrictions on speed and acceleration speed depending on the operation pattern, load, and offset amount.

*3: This is unidirectional position repeatability when the ambient temperature is constant at 20°C. It is not absolute positioning accuracy.

*4: The standard cycle operation pattern cannot achieve continuous operation exceeding the effective load rate. With horizontal direction 300 mm, vertical direction 25 mm round trip, and rough positioning.

*5: When the air suction volume is 60 normal liters/min, down flowrate in the clean room is 0.4 m/s or over.

2. Transportation

2.1 Unpacking and Transport

The robot and controller are shipped either in wooden crates or cardboard boxes.

Open the packages in a location easily accessible, where the equipment is to be installed. Take careful precautions not to damage the robot and controller.

After opening the packages, make sure that all the accessories are present and that no part has been damaged during transport.

The package posture and contents of the wooden crates and cardboard boxes are the same as in the standard robot. For details, see the INSTRUCTION MANUAL - KHL Series Transportation and Installation Manual.

2.2 Mass and Outer Dimensions

The mass and outer dimensions of the robot at the time of transport are shown in Fig. 2.1 to Fig. 2.8.

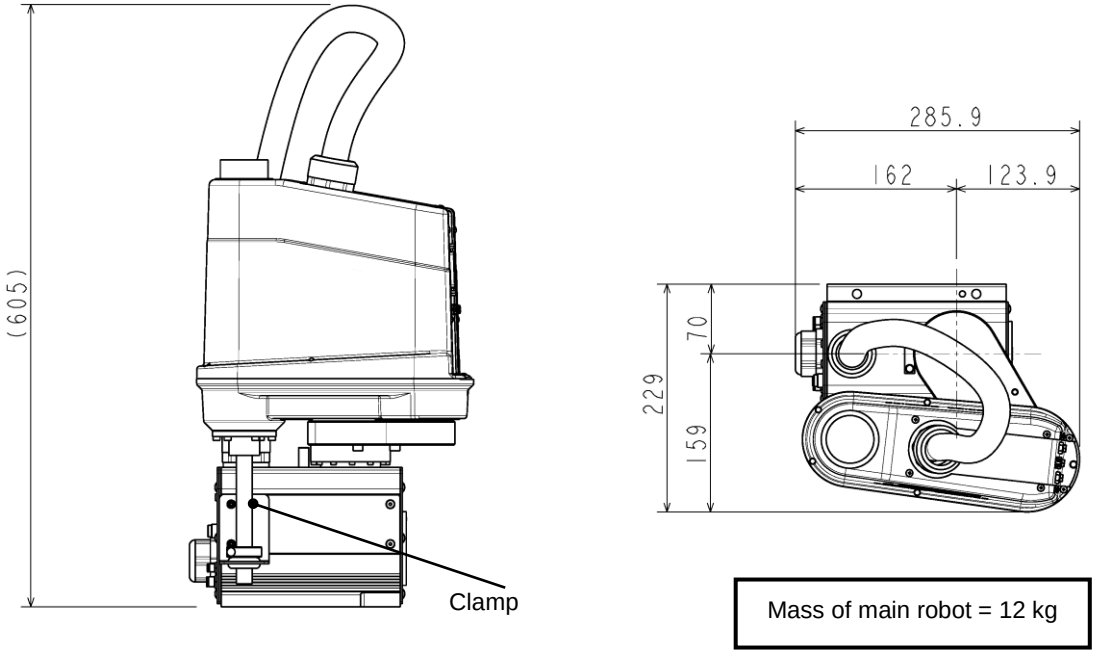


Fig. 2.1 Outer dimensions at transport (KHL-300NSCN)

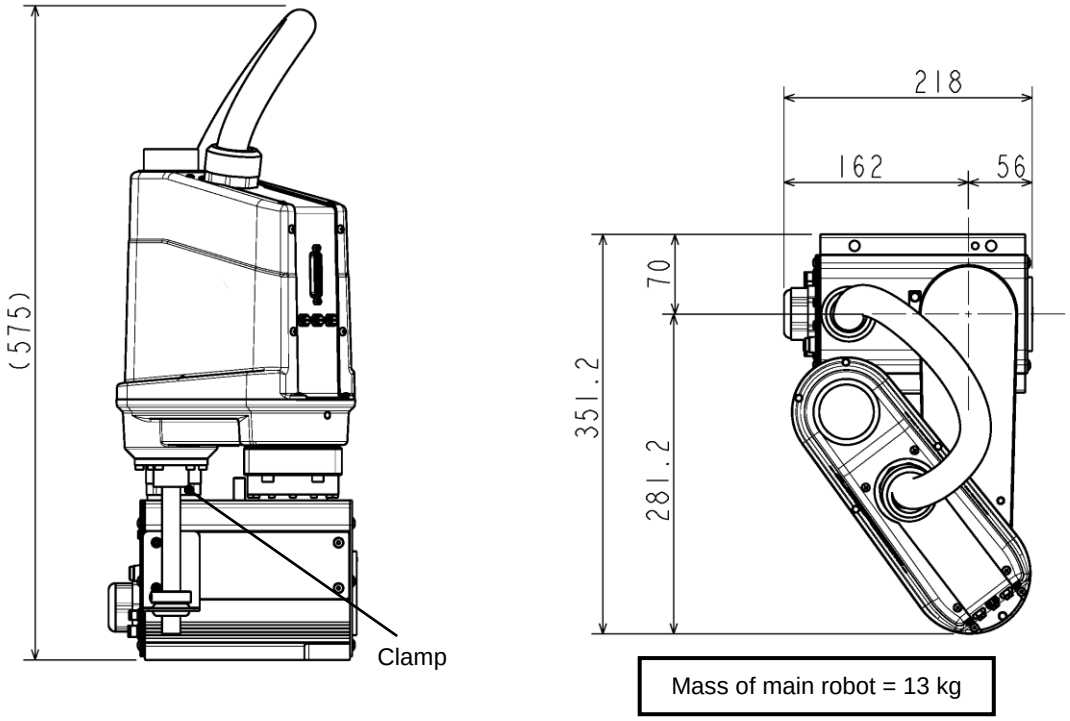


Fig. 2.2 Outer dimensions at transport (KHL-400NSCN)

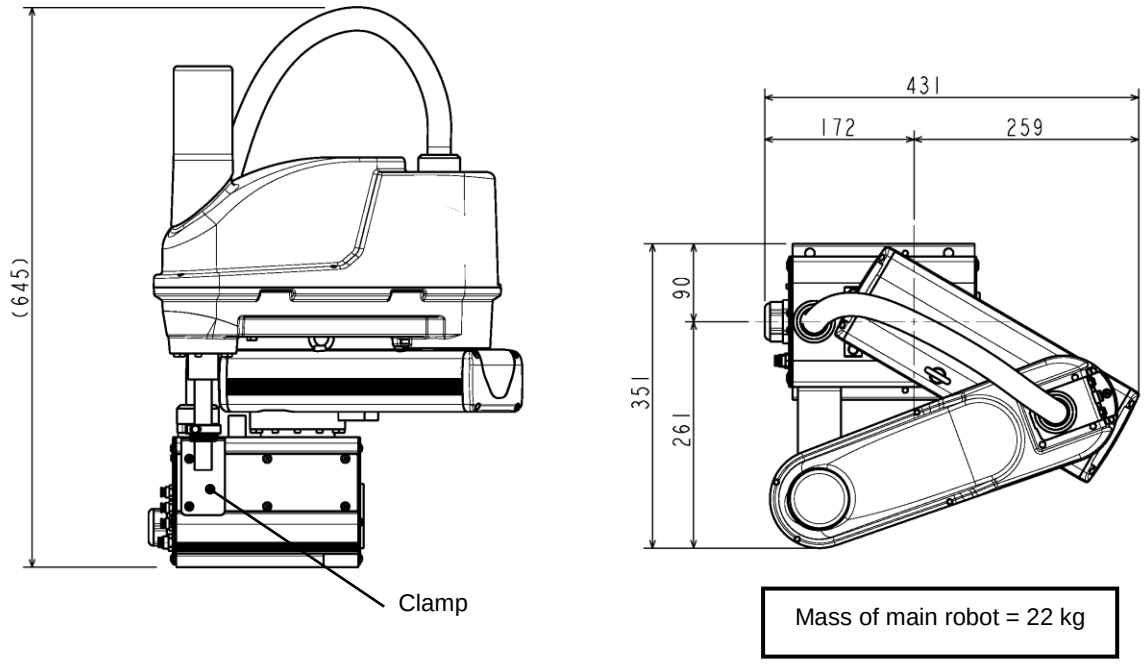


Fig. 2.3 Outer dimensions at transport (KHL-500NSCN)

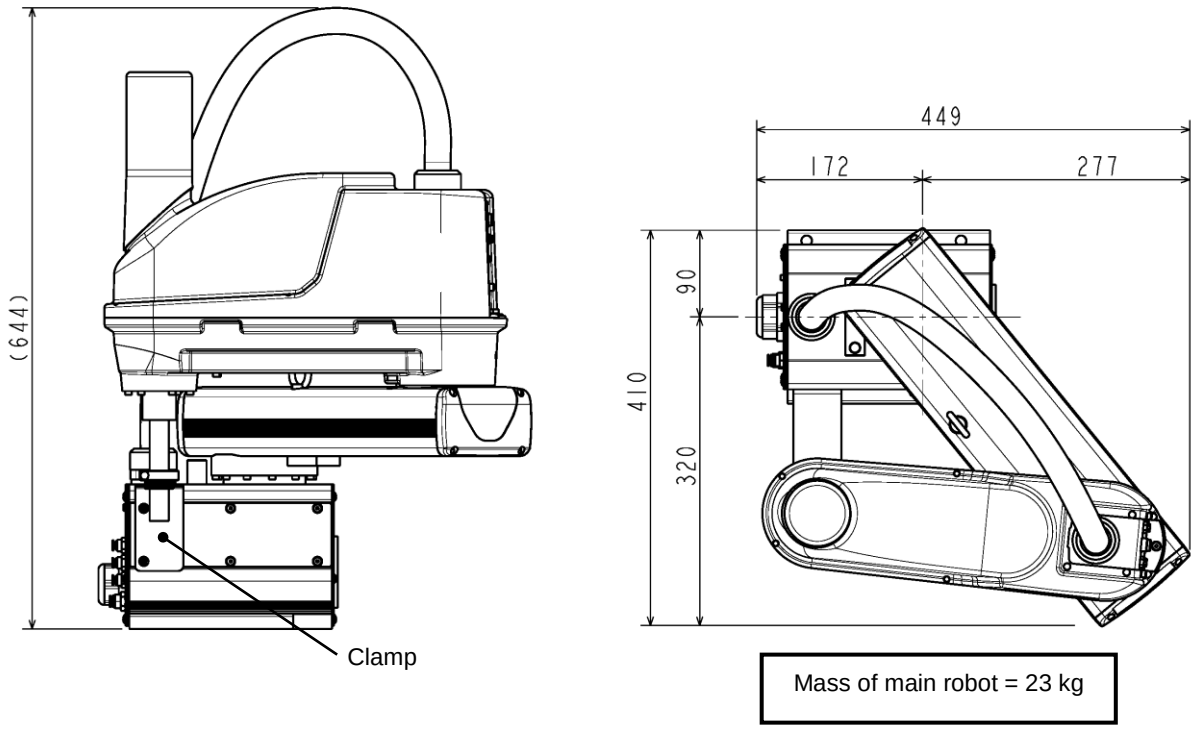


Fig. 2.4 Outer dimensions at transport (KHL-600NSCN)

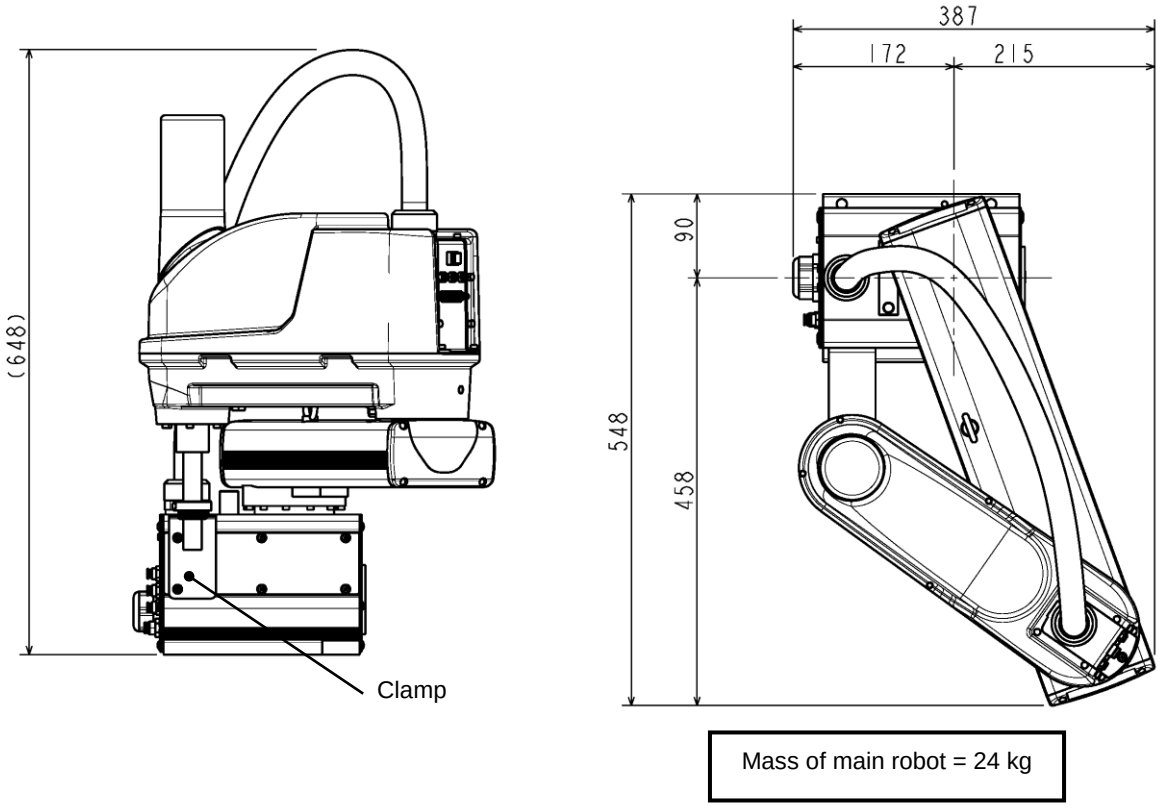


Fig. 2.5 Outer dimensions at transport (KHL-700NSCN)

2.3 Cautions on Transporting the Robot

The precautions to be taken at transport are stated below. The precautions other than the below are the same as in the standard robot. For details, see the INSTRUCTION MANUAL - KHL Series Transportation and Installation Manual.

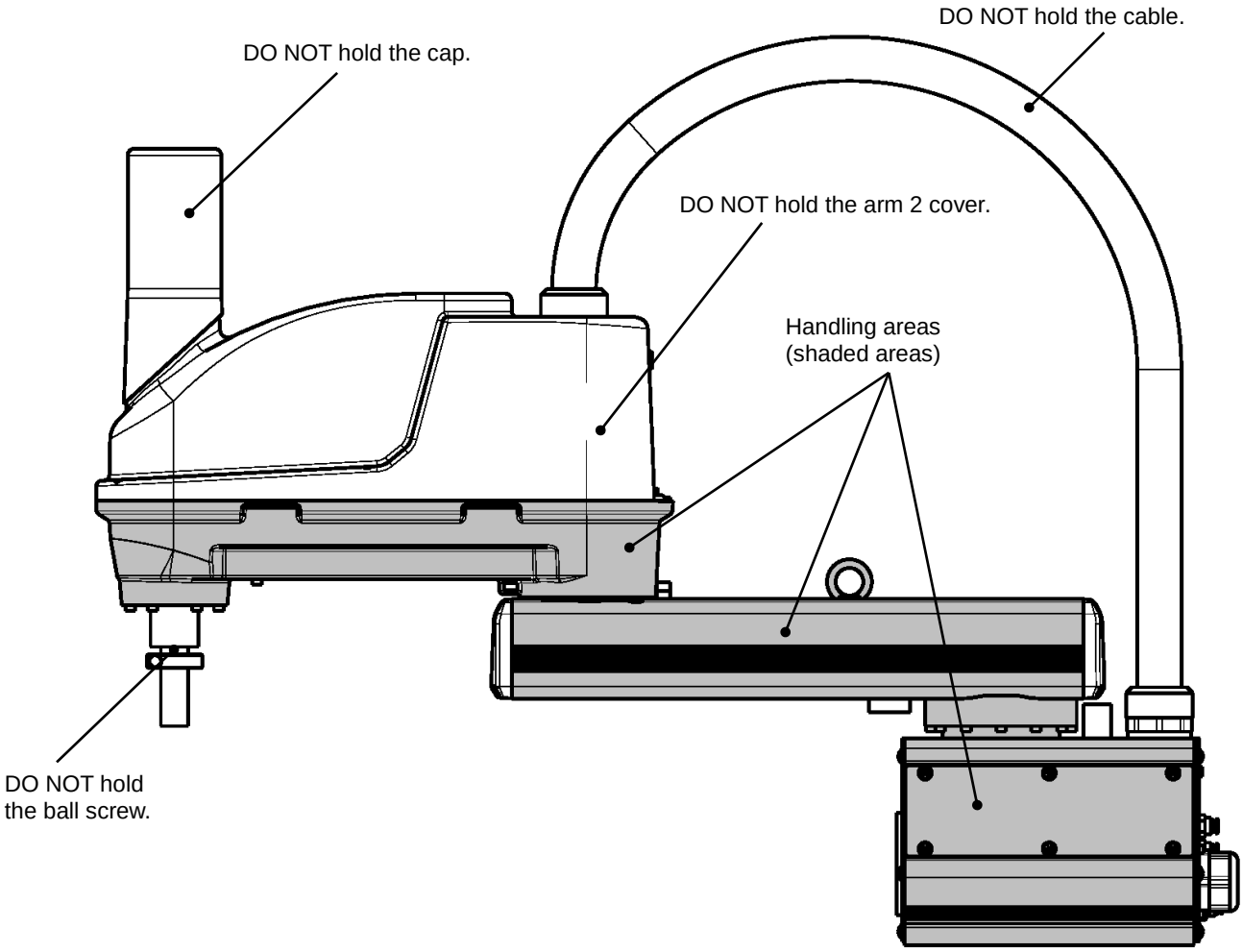


Fig. 2.6 Robot handling prohibited areas

After the installation, remove the clamp and eyebolt used for transport. No eyebolt is used for the KHL-300NSCN and KHL-400NSCN.

! CAUTION

- When lifting up the robot by workers, hold the shaded locations by hands, as shown in Fig. 2.6. If the ball screw spline shaft is held by hands, an unusually large force is exerted, resulting in a malfunction.
- Holding the cap applies excessive force that may cause a damage to the robot.
- When carrying the robot by workers, take careful precautions to prevent their hand or leg from being caught in the robot.
- The work should always be performed by two (2) or more workers.
- Do not lay the machine for transportation. Doing so can cause a grease leakage in the reduction gears.

3. Installation

3.1 Installation Environment

Table 3.1 shows the environmental conditions for the location in which the robot and controller are to be installed.

Table 3.1 Environmental conditions for robot and controller

Item	Specifications
Temperature	In operation: 0 to 40°C In storage: −10 to +50°C
Humidity	20 to 80% (Non-condensing) DO NOT install the robot and controller in a place where they are exposed to water or other liquid.
Altitude	1000 m or less
Vibration	In operation：0.98 m/s^2 or less
Dust	No inductive dust should exist. When using the robot and controller in a dusty environment, consult with us beforehand.
Gas	No corrosive or combustible gas should exist.
Degree of protection	IEC60529 IP40 (Robot side) IP20 (Controller side)
Overvoltage category	IEC60664-1 Class III (Controller side)
Protection against electric shock	IEC61140 Class I (Controller side)
Pollution degree	IEC60664-1 Pollution degree 3 (Controller side)
Cleanness level	Equivalent to ISO class 5 *1)
Sunlight	The robot and controller should not be exposed to direct sunlight.
Power noise	A heavy noise source should not exist nearby.
Magnetic field	A heavy magnetic field source should not exist nearby.
Other ambient environment	No existence of iron powder, oil, saline matter, or organic solvent. No exposure to water. Do not lay the machine when stored.

* 1: Clean room down flow wind speed is 0.4 m/s or more at the suction rate of 60 normal liters/min.

! DANGER

- Do not place the robot or controller near combustible. Doing so could lead to fires if it ignites due to a fault, etc.

3.2 Outline Drawing and Operating Range

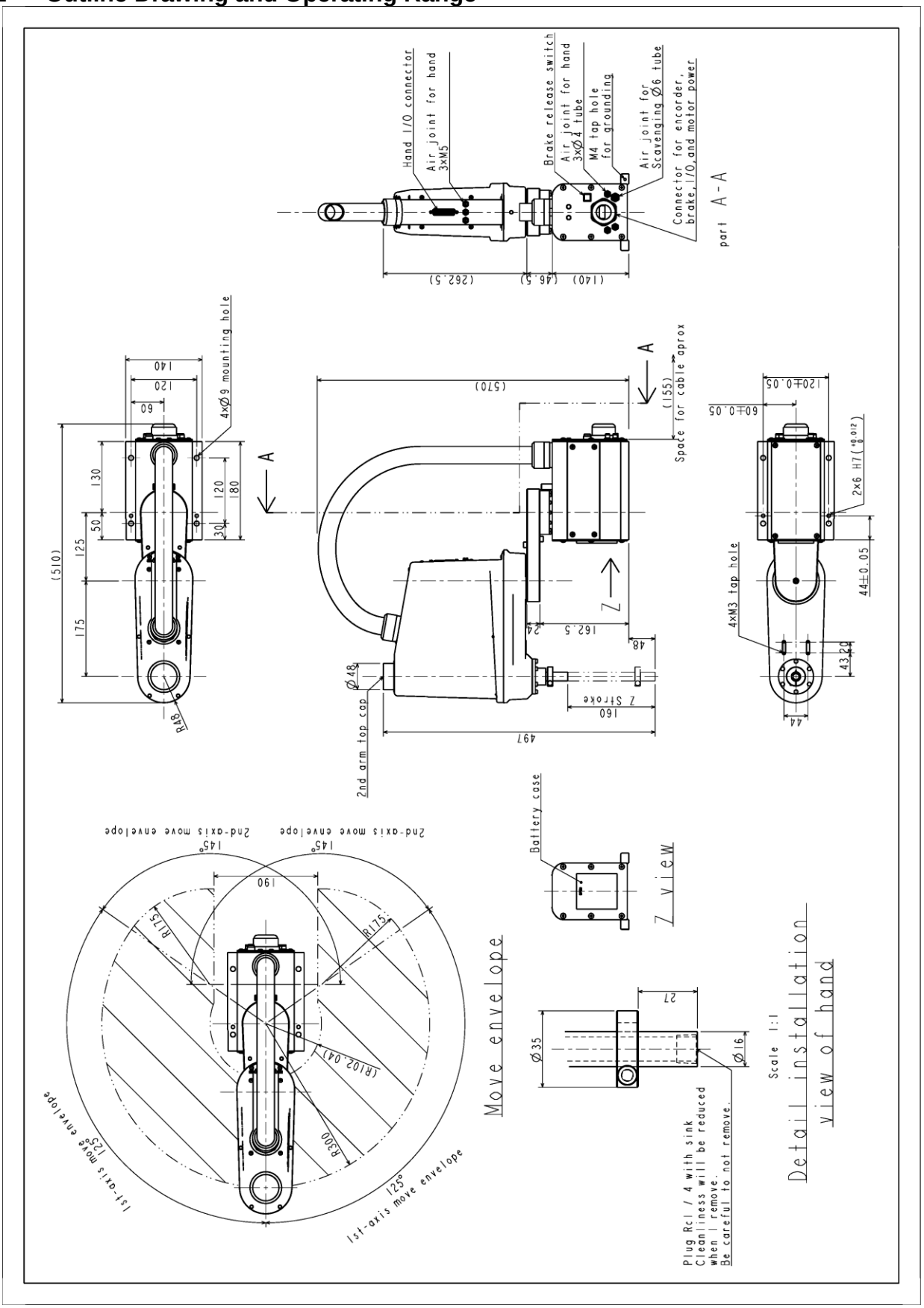


Fig. 3.1 Outline drawing and operating range (KHL-300NSCN)

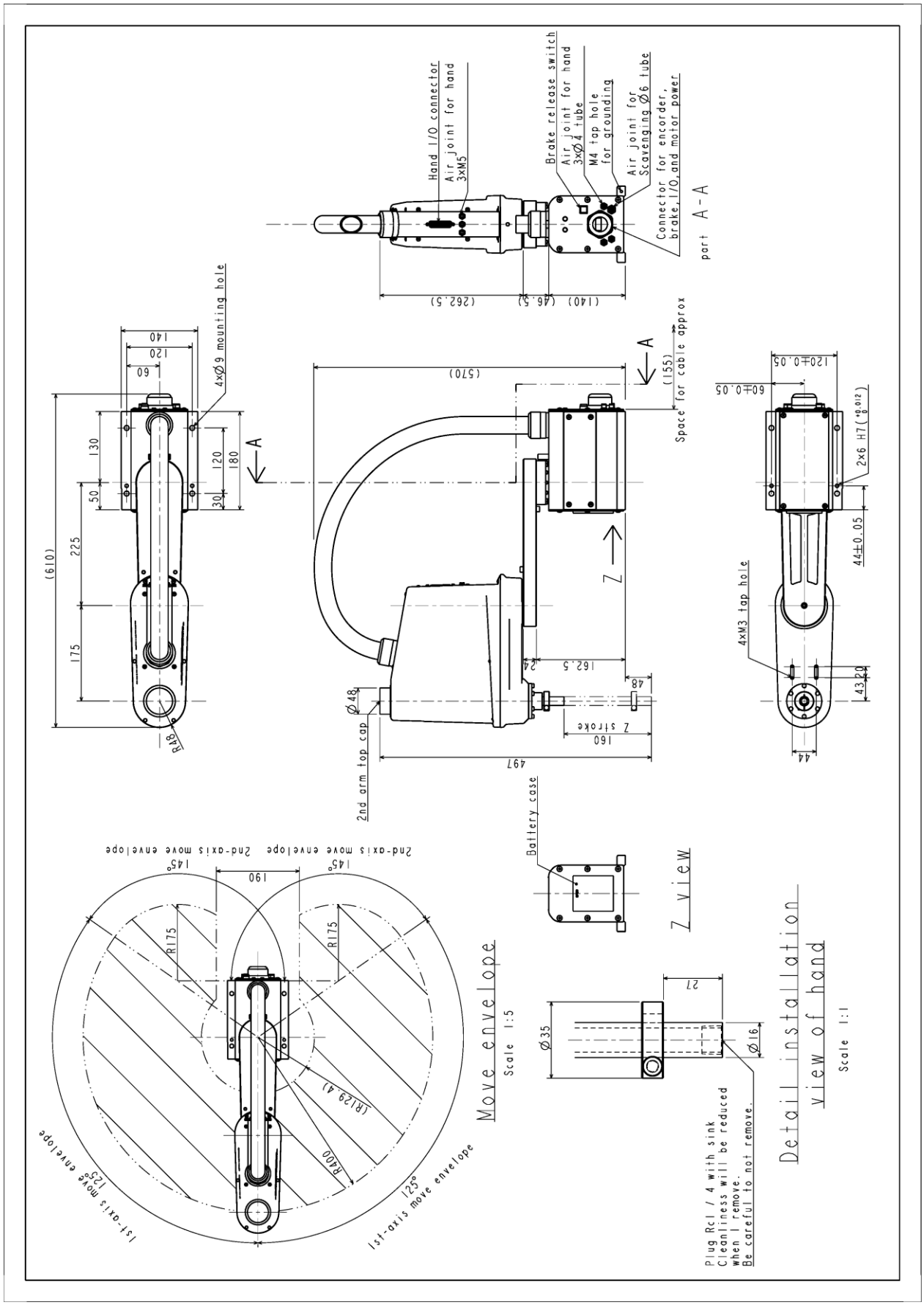


Fig. 3.2 Outline drawing and operating range (KHL-400NSCN)

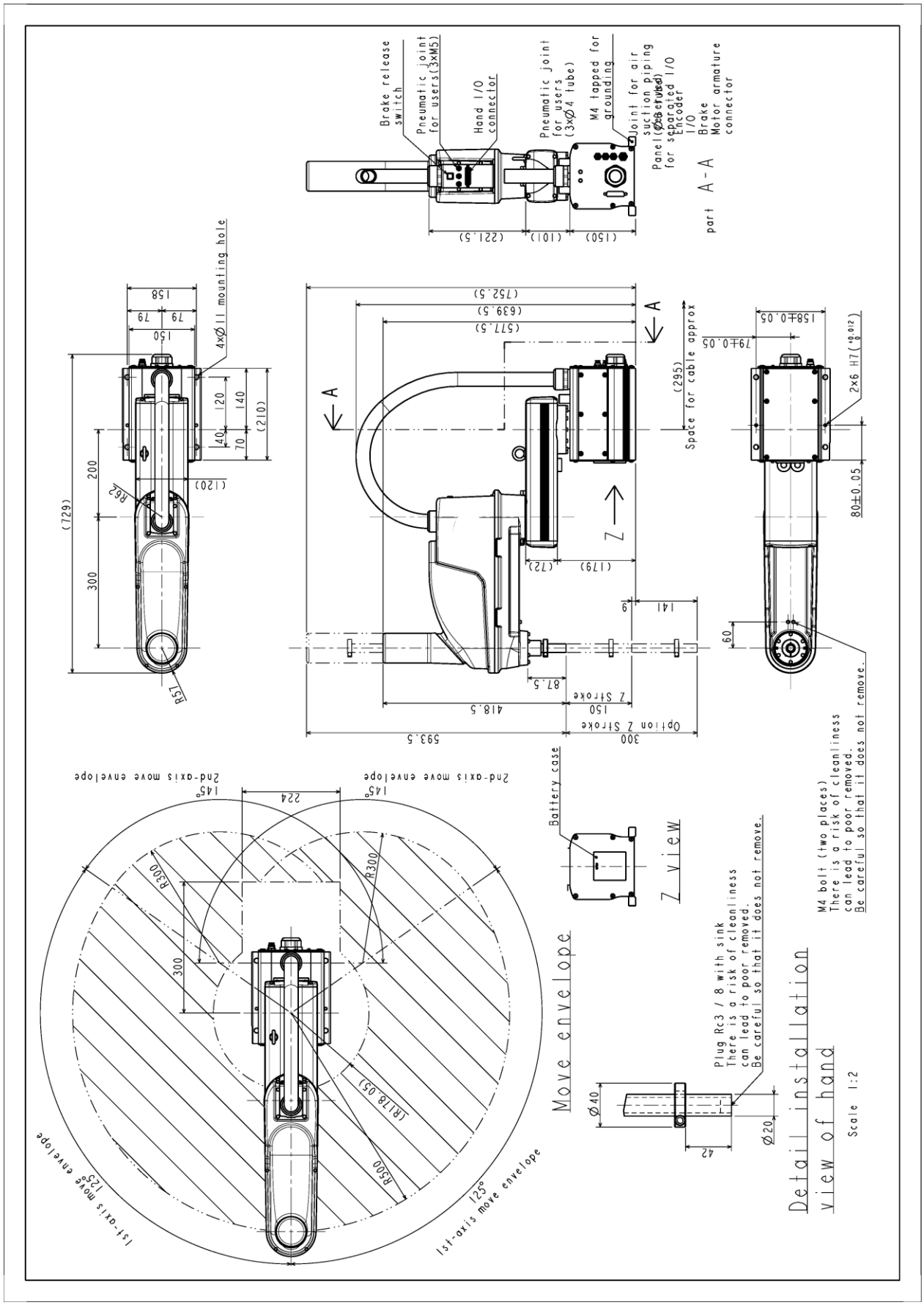


Fig. 3.3 Outline drawing and operating range (KHL-500NSCN)

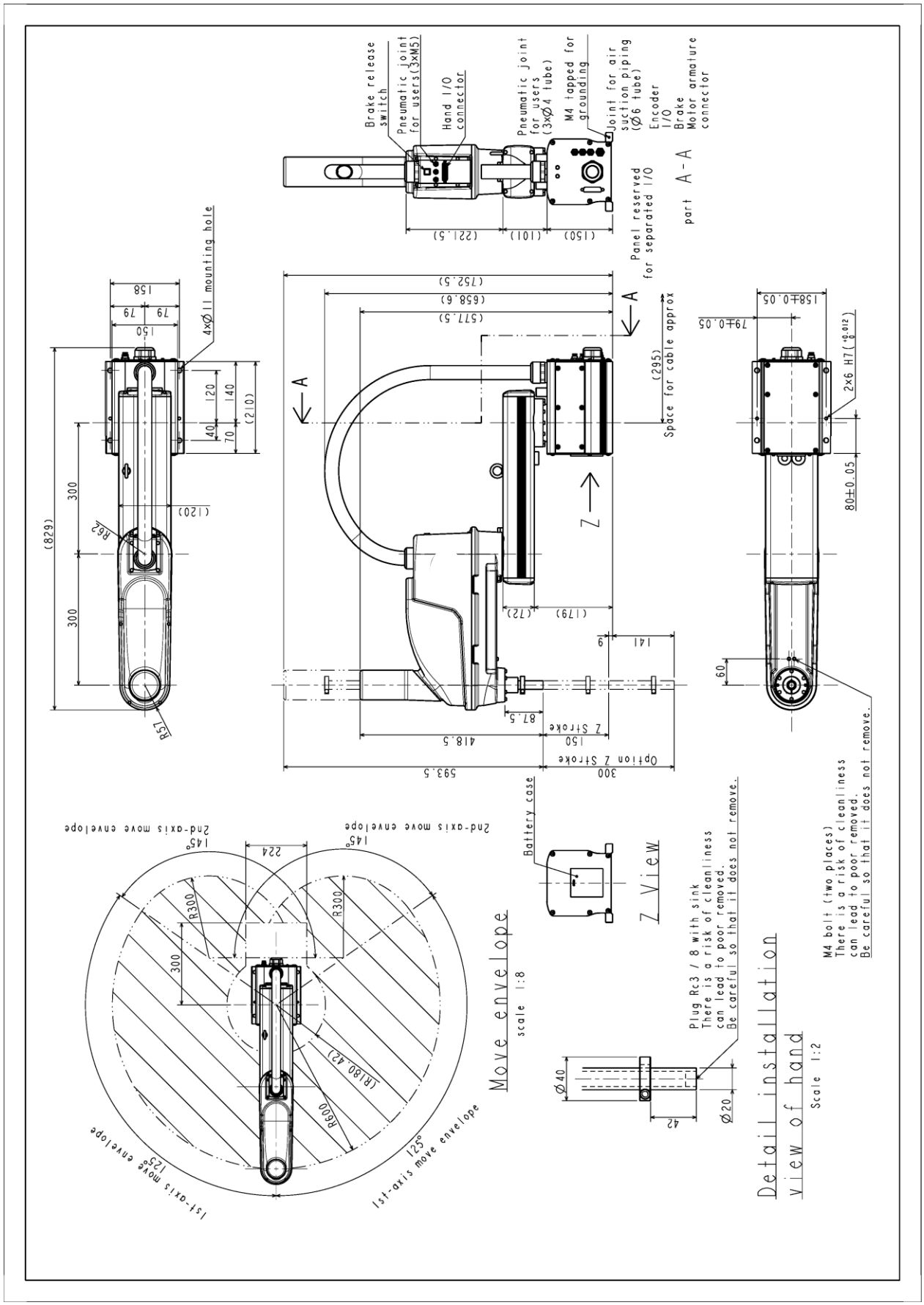


Fig. 3.4 Outline drawing and operating range (KHL-600NSCN)

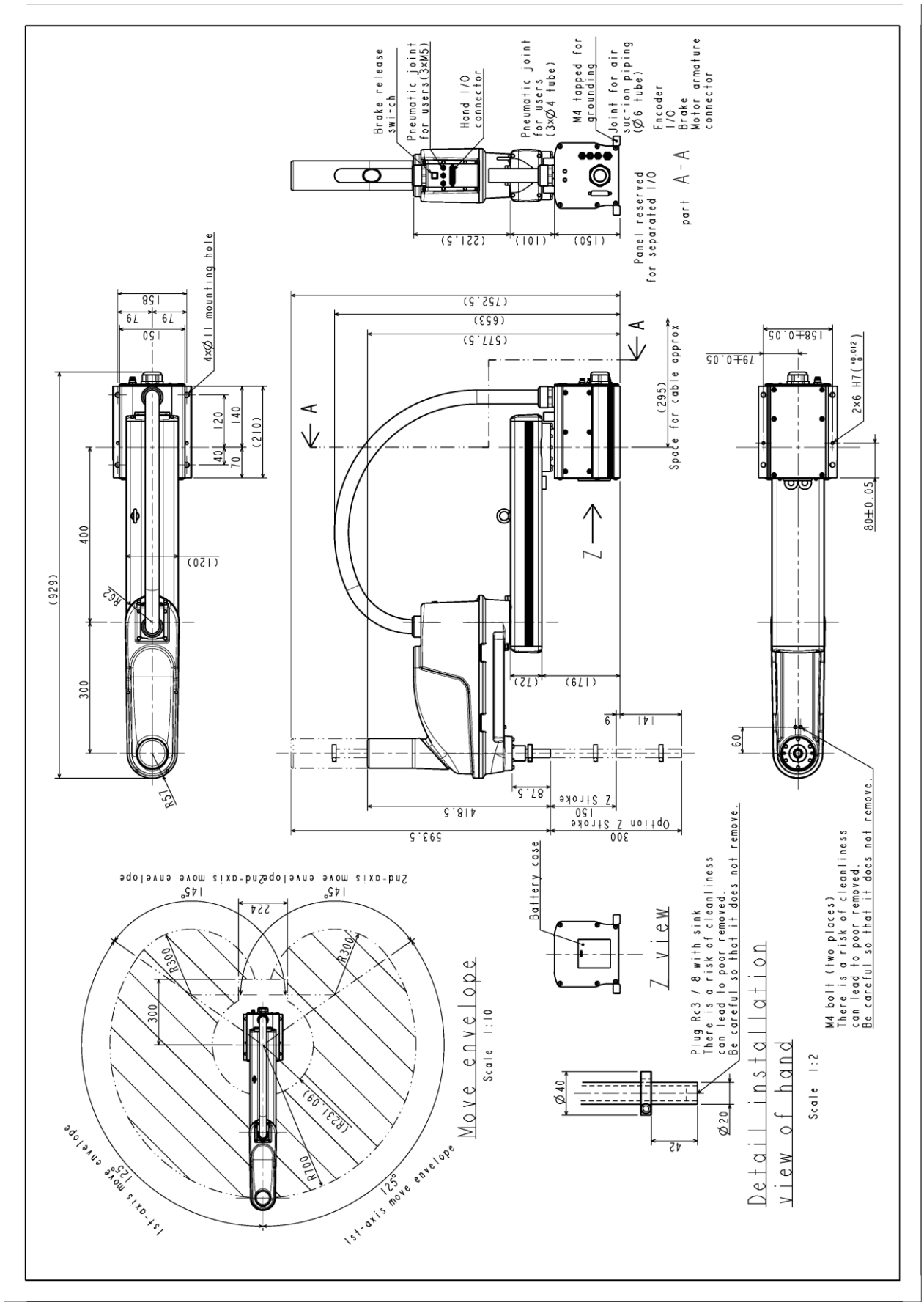


Fig. 3.5 Outline drawing and operating range (KHL-700NSCN)

3.3 Change of Operating Range

How to change the operating range is the same as the standard robot. For details, see the INSTRUCTION MANUAL - KHL Series Transportation and Installation Manual.

3.4 Air Suction Volume

It is possible to maintain the equivalent to clean class 5 defined by ISO by sucking a specified volume of air from the quick-operated joint for air suction attached to the base rear cover.

The air suction unit and suction air tube (6 mm- or 8 mm-dia.) should be provided by the customer.

Air suction volume	60 normal liters/min
Equivalent to clean class 5 defined by ISO	• The number of particles of 0.1 μm or larger shall be 100,000 or less in a cubic meter of air. • The number of particles of 0.1 μm or larger shall be 2,857 or less in a cubic foot of air.

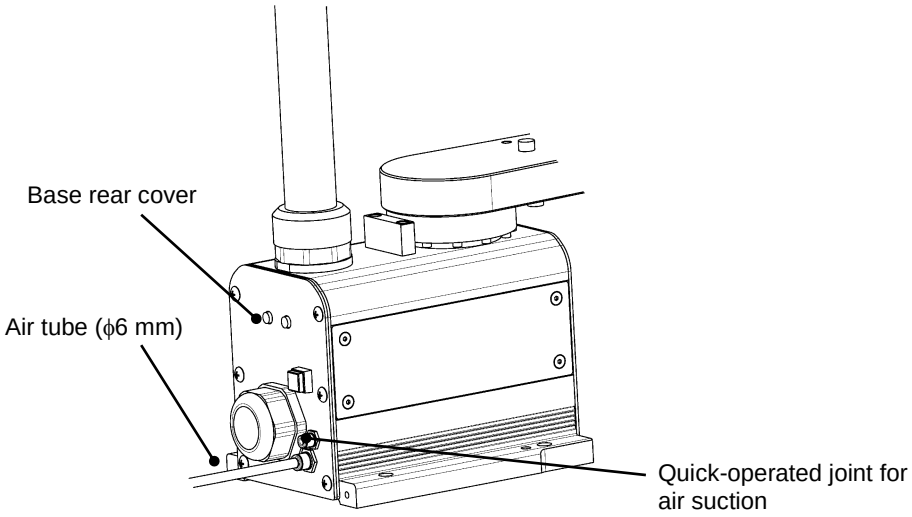


Fig. 3.6 Air suction volume (KHL-300NSCN, KHL-400NSCN)

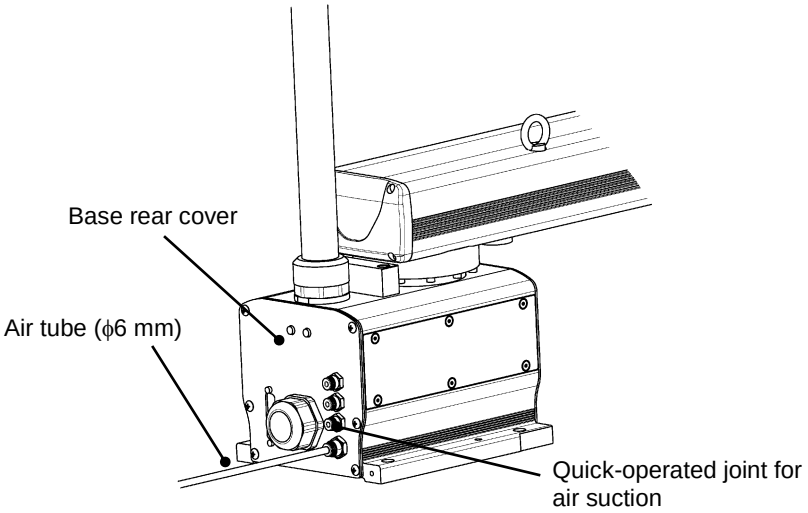


Fig. 3.7 Air suction volume (KHL-500NSCN, KHL-600NSCN, KHL-700NSCN)

CAUTION

- In the clean room, the down flowrate should be 0.4 m/s or over.
- Unless air suction is executed, dust will generate.
- The structure of the robot controller is not of a clean type.

3.5 Coordinate System

The robot's joint angle origin (0° or 0 mm position) is factory-calibrated according to the base reference planes. Figs. 3.8 to 3.19 show the base coordinate system (XB, YB, ZB) and origin of each axis joint angle.

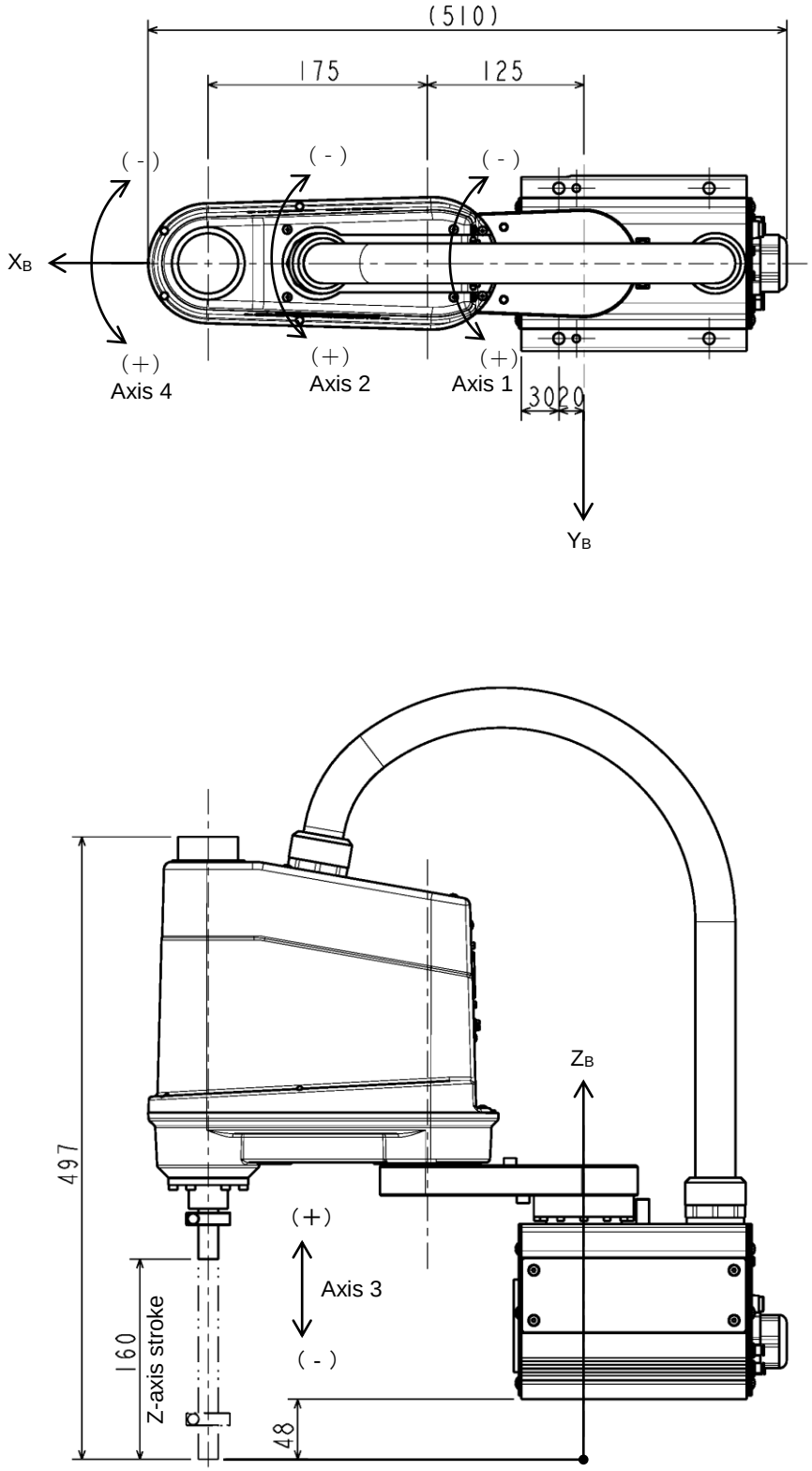
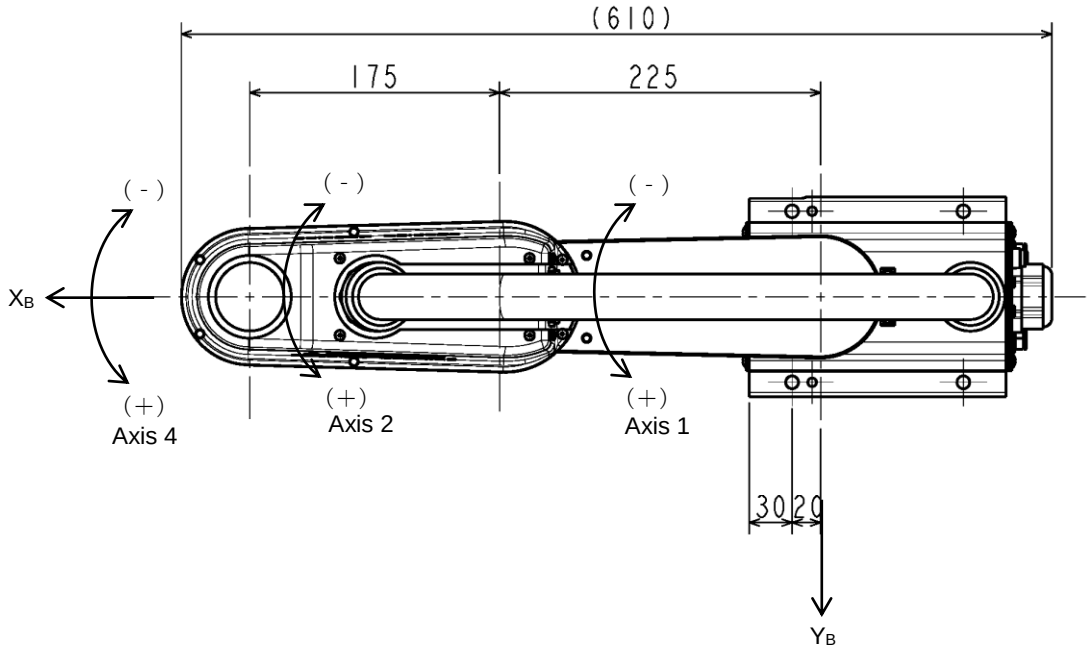


Fig. 3.8 Base coordinate system and joint angle origin (KHL-300NSCN)



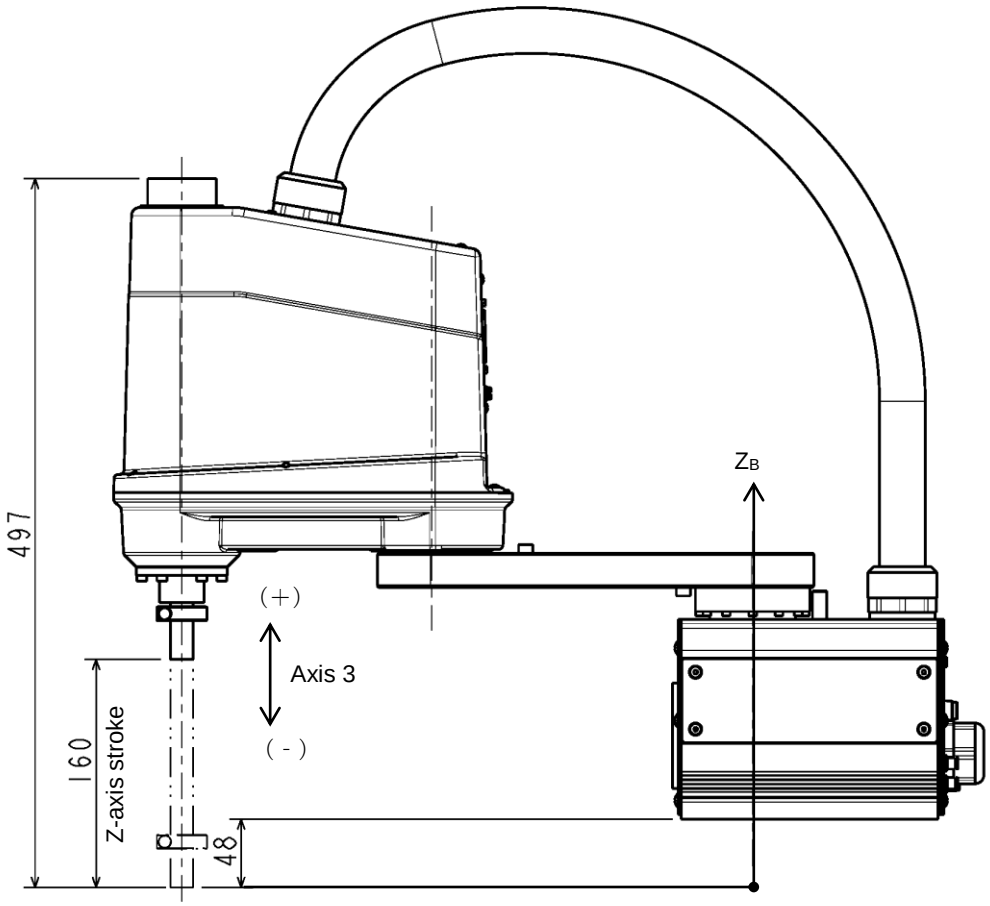


Fig. 3.9 Base coordinate system and joint angle origin (KHL-400NSCN)

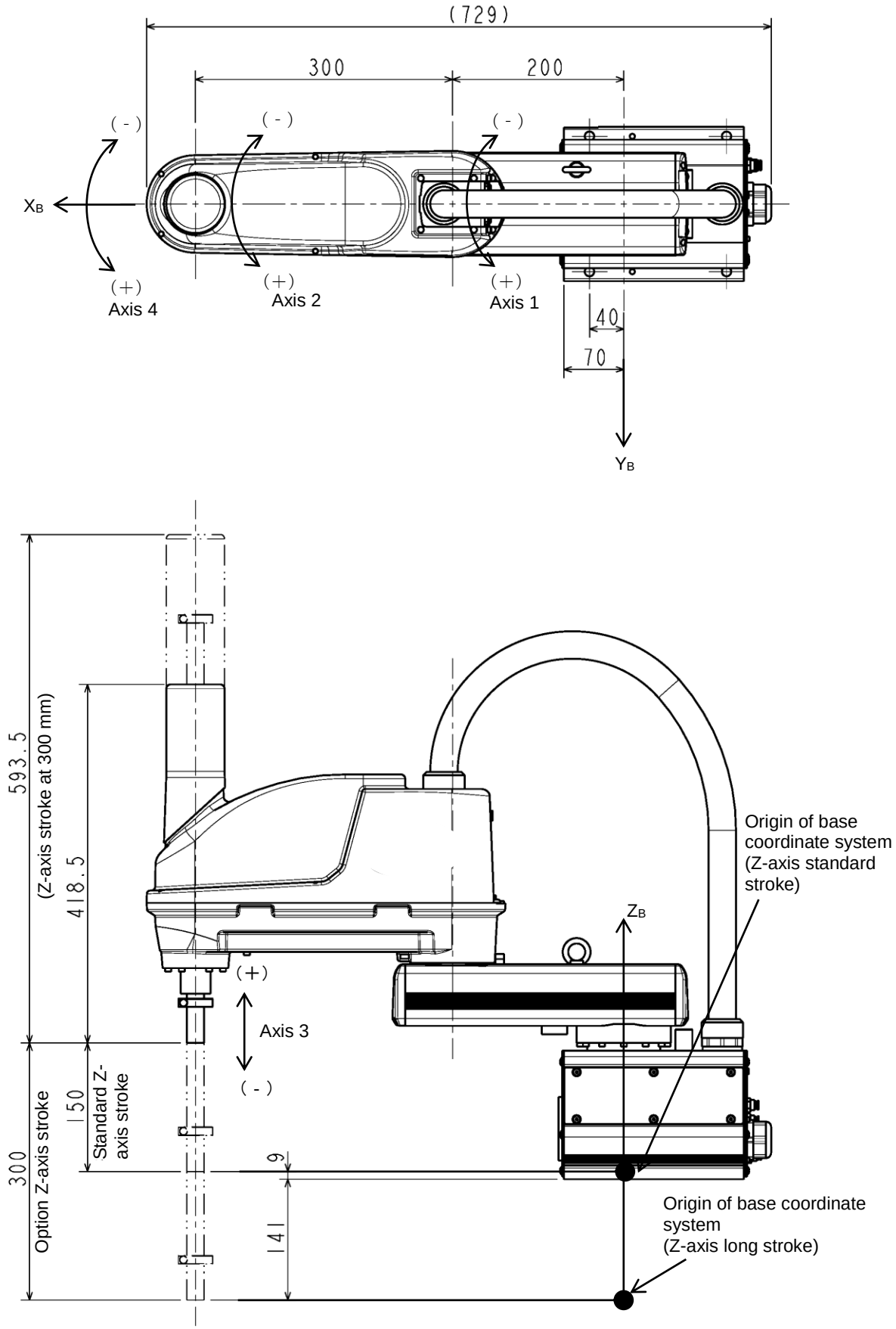


Fig. 3.10 Base coordinate system and joint angle origin (KHL-500NSCN)

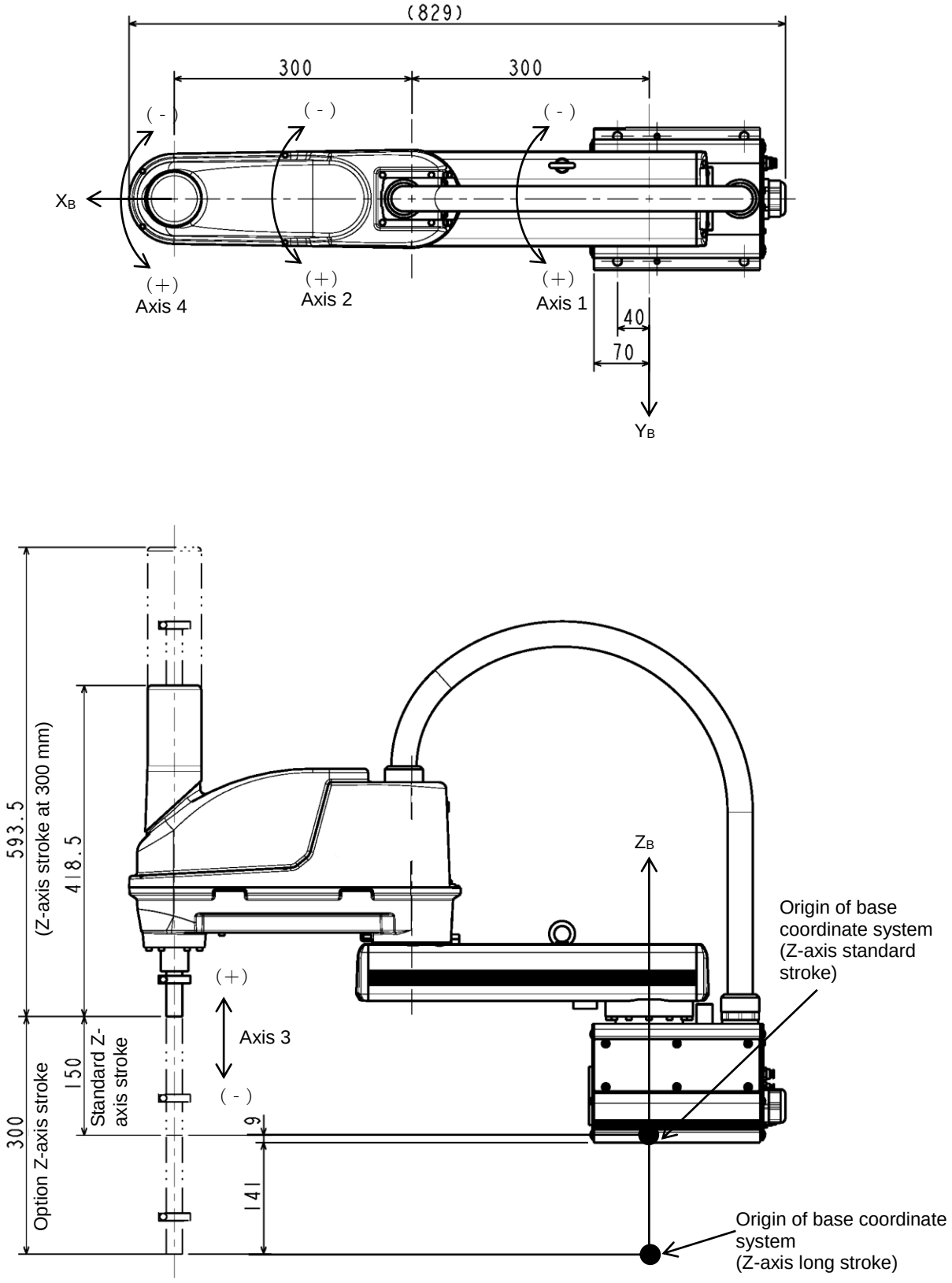


Fig. 3.11 Base coordinate system and joint angle origin (KHL-600NSCN)

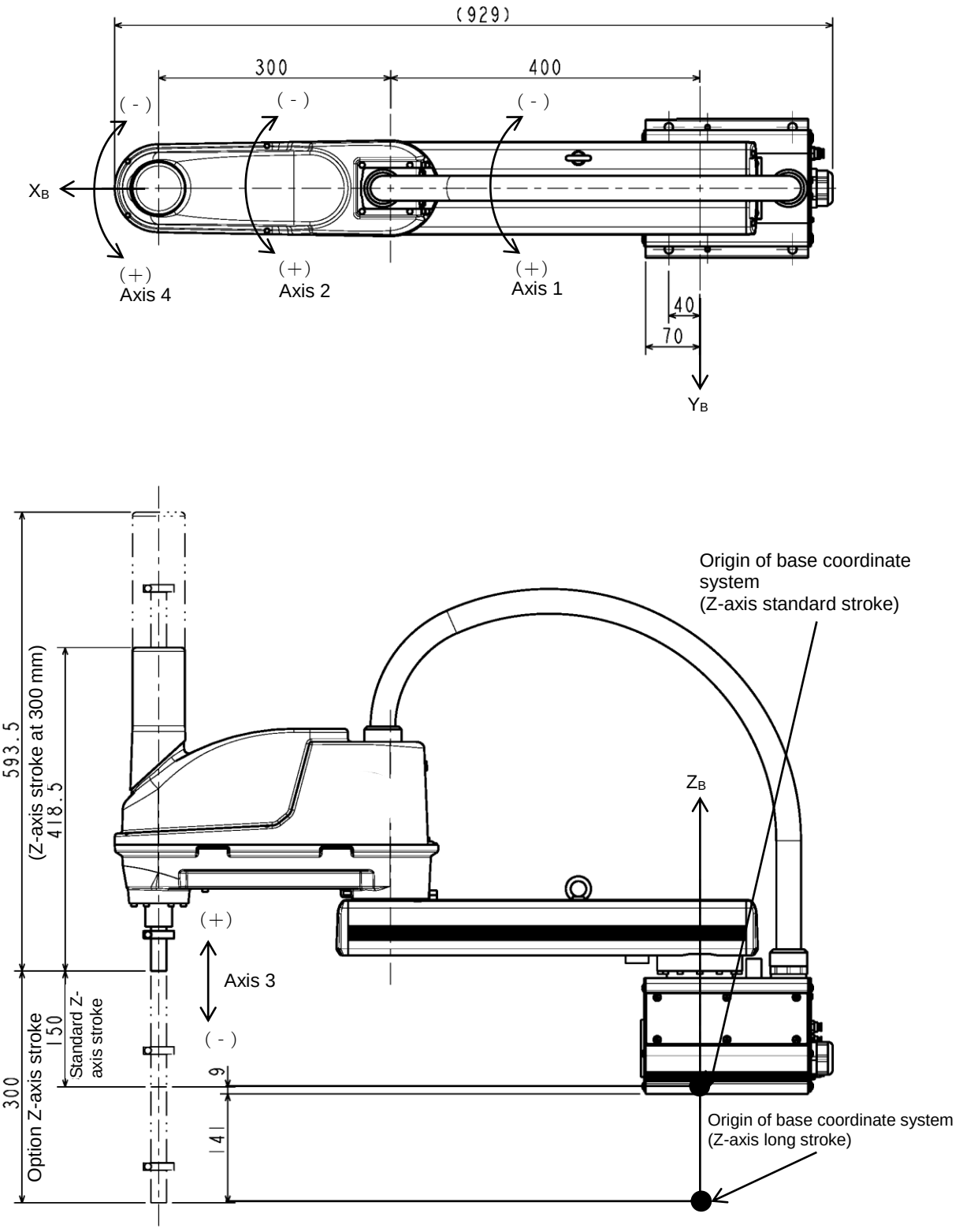


Fig. 3.12 Base coordinate system and joint angle origin (KHL-700NSCN)

3.6 Installation of Robot

How to install the robot is the same as the standard robot. For details, see the INSTRUCTION MANUAL - KHL Series Transportation and Installation Manual. However, use stainless steel bolts for installation.

3.7 Installation of Controller

How to install the controller is the same as the standard robot. For details, see the INSTRUCTION MANUAL - KHL Series Transportation and Installation Manual.

4. Connection of System

How to connect the system is the same as the standard robot. For details, see the INSTRUCTION MANUAL - KHL Series Transportation and Installation Manual.

5. Tool Interface

Mounting of a tool and tool signals are the same as in the standard robot. For details, see the INSTRUCTION MANUAL - KHL Series Transportation and Installation Manual.

5.1 Tool Air Piping

Three (3) lines are provided as air piping for the tools. The outside diameter of the air pipes is ϕ4 mm or ϕ6 mm. The air tube is identified by the number and color. At piping, make sure that each tube is connected properly, referring to the below-mentioned.

1 : Red 2 : White 3 : Blue 4 : Yellow

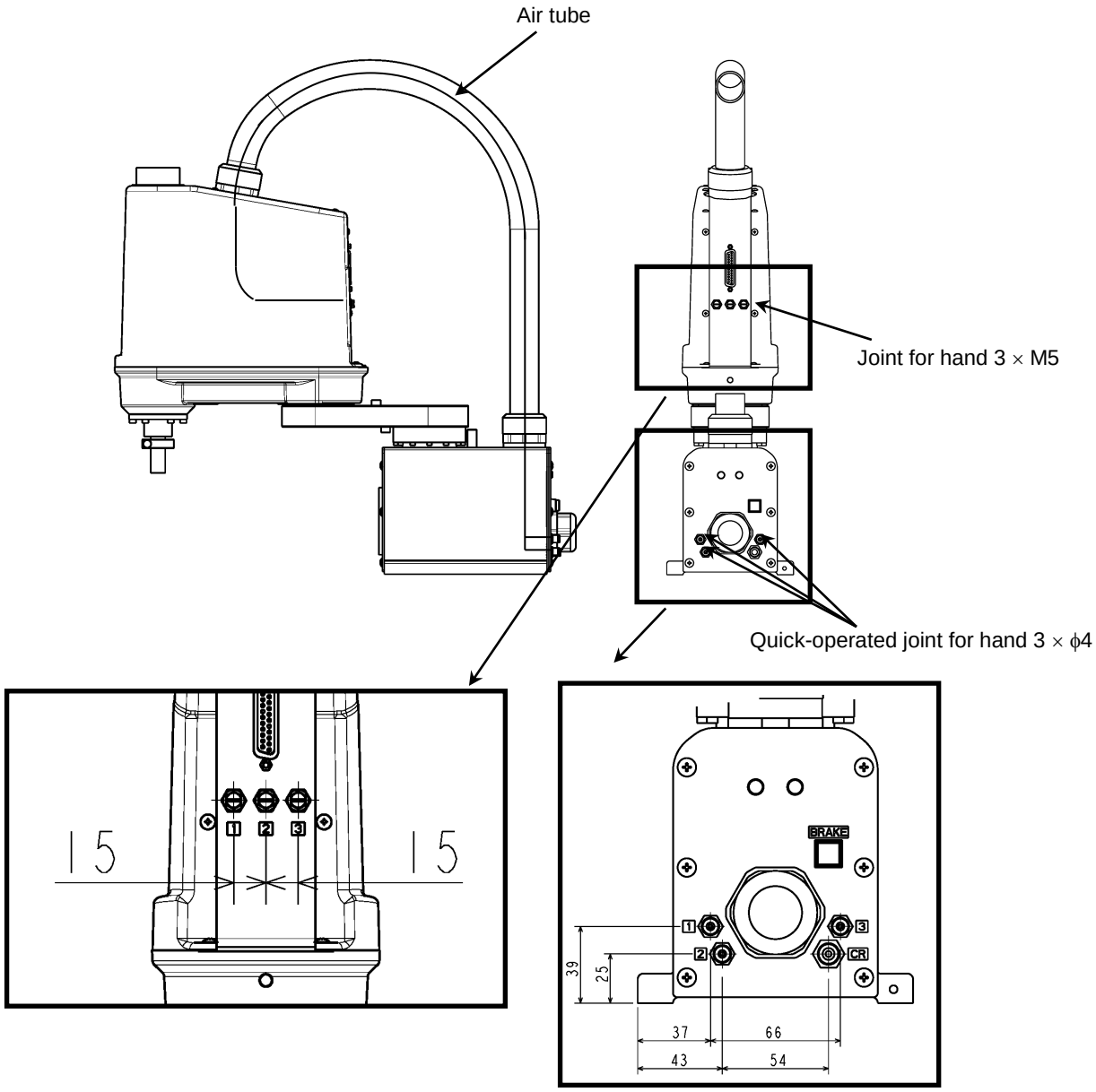


Fig. 5.1 Tool air piping (KHL-300NSCN, KHL-400NSCN)

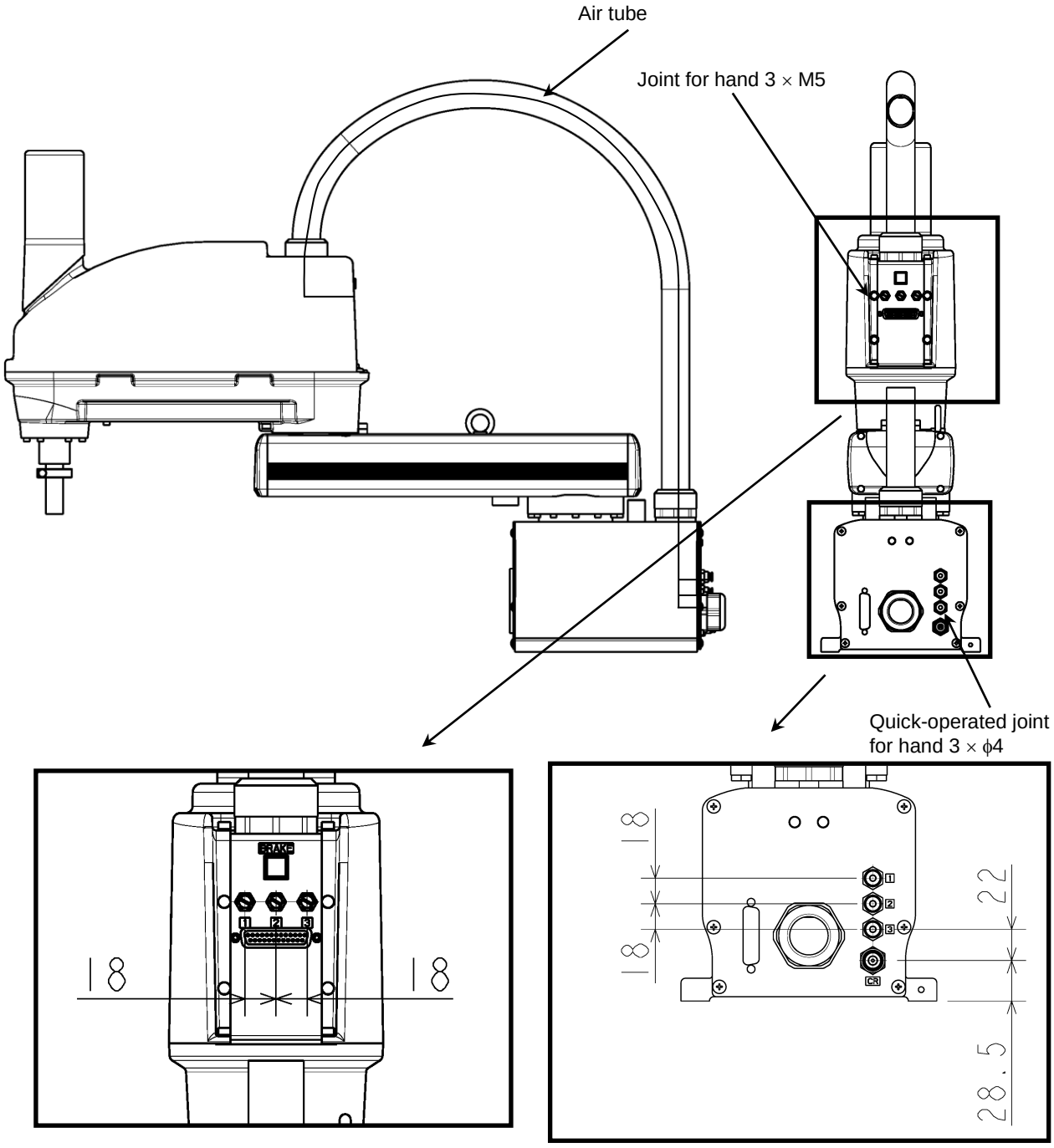


Fig. 5.2 Tool air piping (KHL-500NSCN, KHL-600NSCN, KHL-700NSCN)

As for the air piping between the joint for the hand of the Arm 2 and the hand, refer to the piping examples in Fig. 5.3 to Fig. 5.4. Fix the air tube to the Arm 2 cover by using binding bands and binding band holding fixtures.

In the KHL series simple clean type robot specifications, a cap is provided on the upper part of the Arm 2 and a plug is inserted in the bottom surface of the ball screw spline. Therefore, an air tube cannot be passed through the ball screw spline. Note that the cleanness level will be impaired if a hole is opened through the upper cap of the Arm 2 and the air tube is passed through the vacant hole of the ball screw spline.

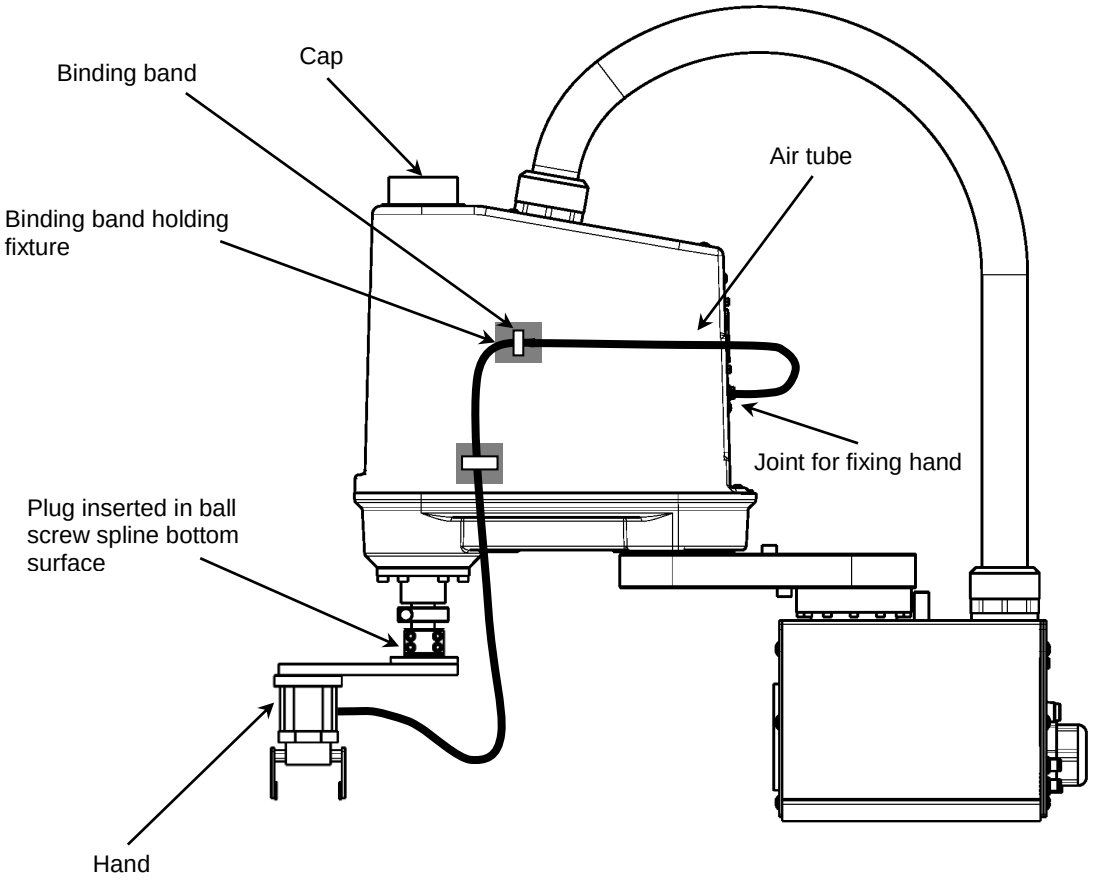


Fig. 5.3 Air piping example (KHL-300NSCN, KHL-400NSCN)

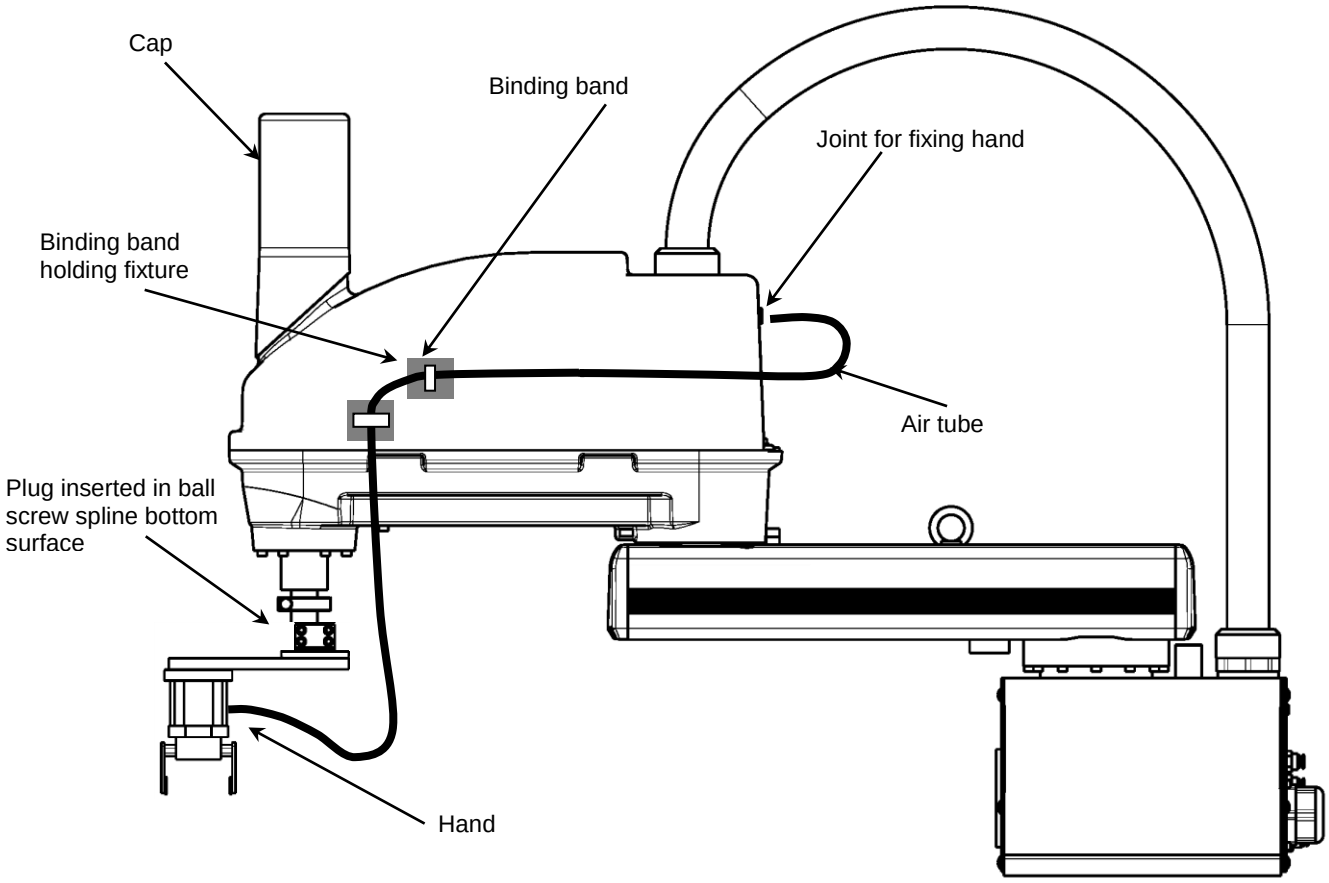


Fig. 5.4 Air piping example (KHL-500NSCN, KHL-600NSCN, KHL-700NSCN)

⚠ CAUTION

- The customer is to install the air piping. Please be understanding of this matter.
- In installing the air piping, attention must be paid to the dragging of the air tube during the descending of the Axis 3 and the entwining of the air tube during the rotation of the Axis 4.

5.2 Wiring for Tool

Note that the tool wiring is different from that of the standard robot.

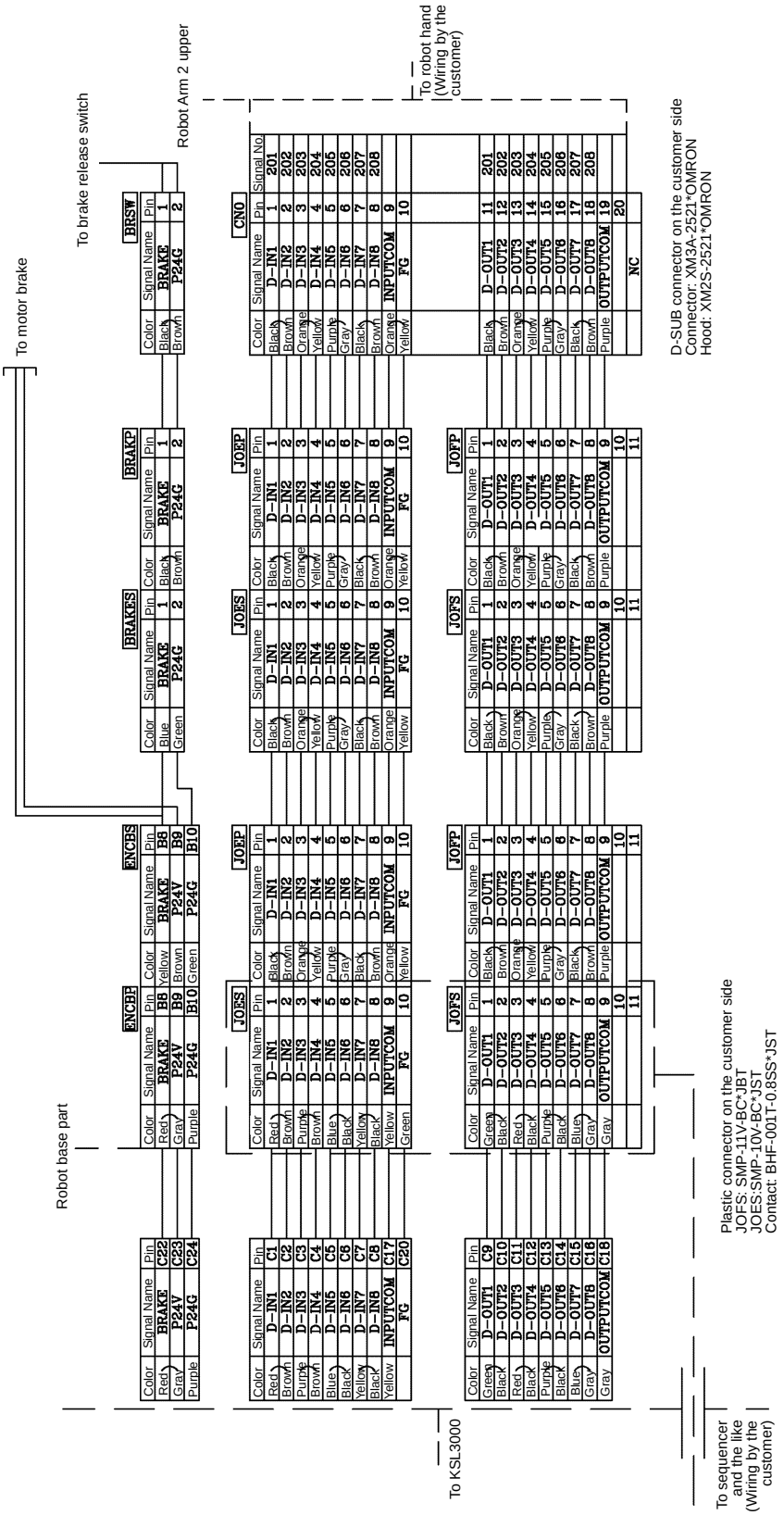


Fig. 5.7 Tool wiring drawing for the simple clean specifications

6. Maintenance

6.1 Items for Maintenance and Inspection

The maintenance schedule and maintenance procedures for the simple clean type robot are shown in Table 6.1 below.

The basic structure of the simple clean type robot is the same as that of the standard robot. For the maintenance schedule, maintenance procedures, contents of inspection, etc., see the "KHL Series Maintenance of Instruction Manual".

Table 6.1 Maintenance items for the simple clean type robot specifications

Check position	Description	Daily inspection	Quarterly inspection	Semi-annual inspection	Annual inspection	Refer to
Filling grease to ball screw spline unit	Grease to the ball screw spline.		○	○	○	Para. 6.1.1

DANGER

- Be sure to turn off the power switch of the controller before approaching the robot for maintenance and inspection.

6.1.1 Filling Grease to Ball Screw Spline Unit

CAUTION

- When vertically moving the ball screw by hand, take care not to have your hand or finger caught.
- There is a possibility that grease will drop during grease-up work, so cover the peripheral equipment.
- When grease has run short, cut or scratch can occur on the slide unit or other part, resulting in performance deterioration. So be careful of shortage of grease.
- Be sure to use grease designated by CKD.
- Apply grease when it is dried up. If grease is not applied, rust will be generated on the ball screw spline unit.
- NEVER touch the ball screw spline unit with bare hands. Failure to observe this will lead to earlier rusting. So be sure to wear gloves when handling the ball screw spline unit.

- The ball screw spline of the simple clean type robot is rustproof specifications. Therefore, please do not apply anticorrosive to a part shown in Fig.6.1. Otherwise the anticorrosive may scatter and compromise the cleanliness level.

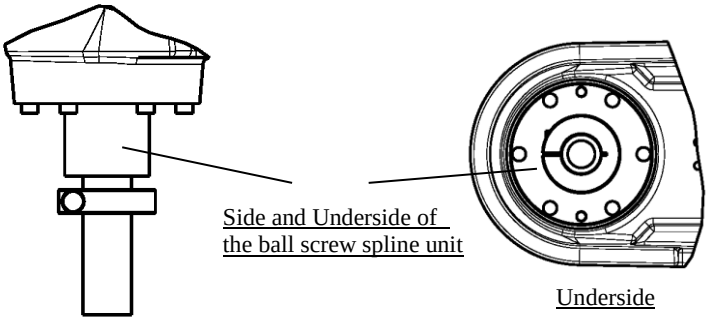


Fig. 6.1 The port of the ball screw spline unit not to apply anticorrosive

Basically, fill the grease to the ball screw spline unit every three (3) months. If a grease shortage is found out, be sure to apply grease.

At daily inspection also, make sure that the ball screw spline unit is filled with a sufficient volume of grease. Please be noted that the grease used in the simple clean type robot specifications is different from that used in the standard robot specifications.

Table 6.2 Recommended grease in the simple clean type robot specifications

Recommended grease	Maker
AFE-CA grease	THK

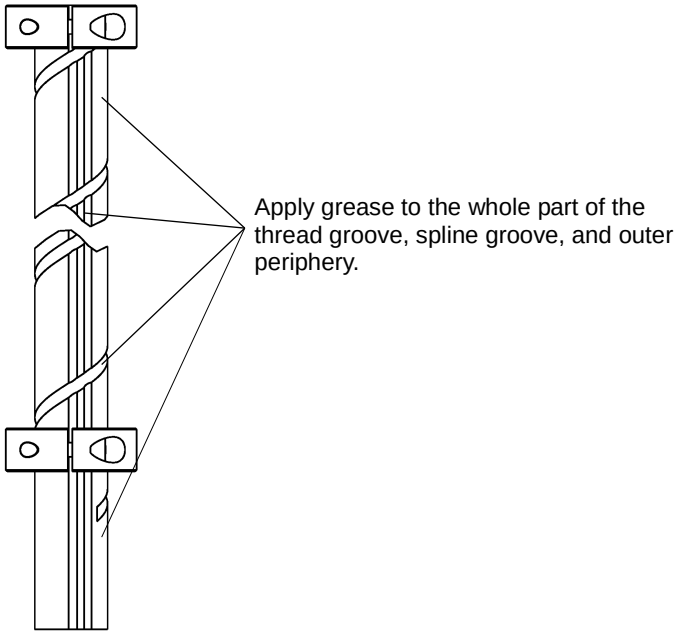


Fig. 6.2 Grease application part on the ball screw spline unit

1) Turn on the controller power supply and turn off the servo system.
2) Manually move the arm to the position where Axis 3 can be moved over the full stroke.
3) Remove the Arm 2 cover (see "6.3 Mounting and Dismounting Covers").
4) Push down the ball screw spline shaft to the lower limit while holding down the Axis 3 brake release switch.
5) Apply grease to the exposed part of the shaft by a brush or the like. Apply the grease to such an extent that the shaft groove can be filled with grease. See Fig. 6.1 for the grease application part.

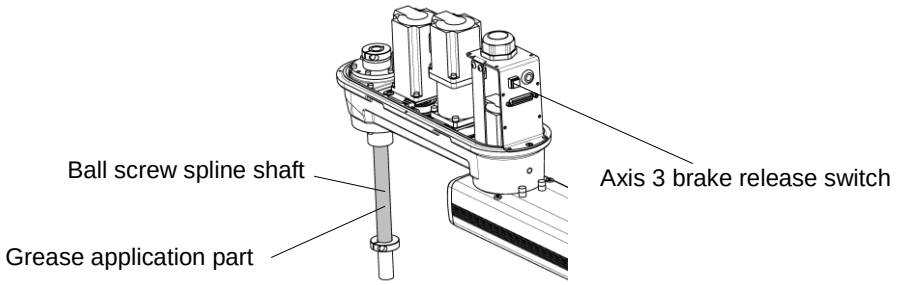


Fig. 6.3 Greasing up the ball screw spline unit (lower side)

6) Push up the shaft up to the upper limit while holding down the Axis 3 brake release switch.
7) Apply grease by a brush or the like to the part of the shaft sticking up from the cover. Apply grease to such an extent that the shaft groove can be filled with grease. See Fig. 6.1 for the grease application part.

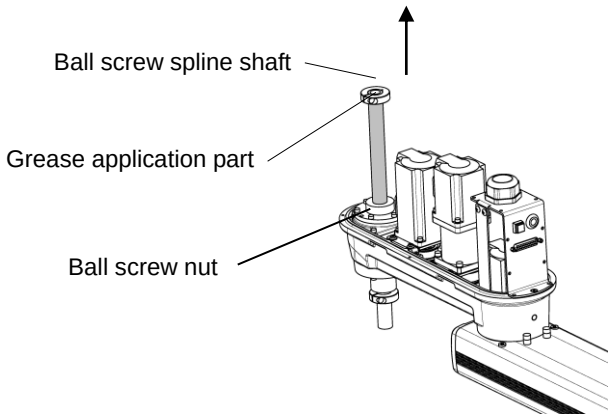


Fig. 6.4 Greasing up the ball screw spline unit (upper side)

8) Move the shaft up and down several times while holding down the Axis 3 brake release switch and fill the grease uniformly. Wipe out the surplus grease. This completes the grease-up work. As for the area to wipe out, see Fig. 6.4.

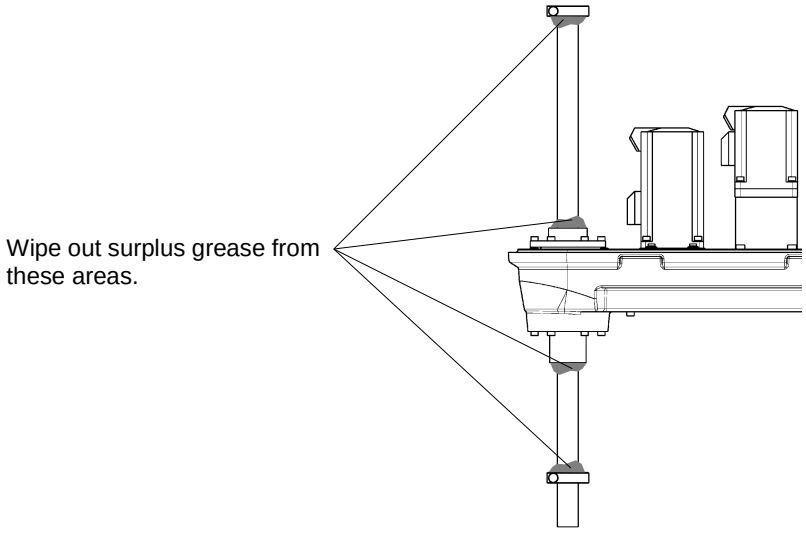


Fig. 6.5 Surplus grease wiping out area

⚠ CAUTION

- Surplus grease, unless being wiped out, will be dispersed, so that the cleanness level will be impaired. Be sure to wipe out surplus grease.

6.2 Layout of Robot Components

The layout of the robot mechanical components is shown in Fig. 6.6 to Fig. 6.7.

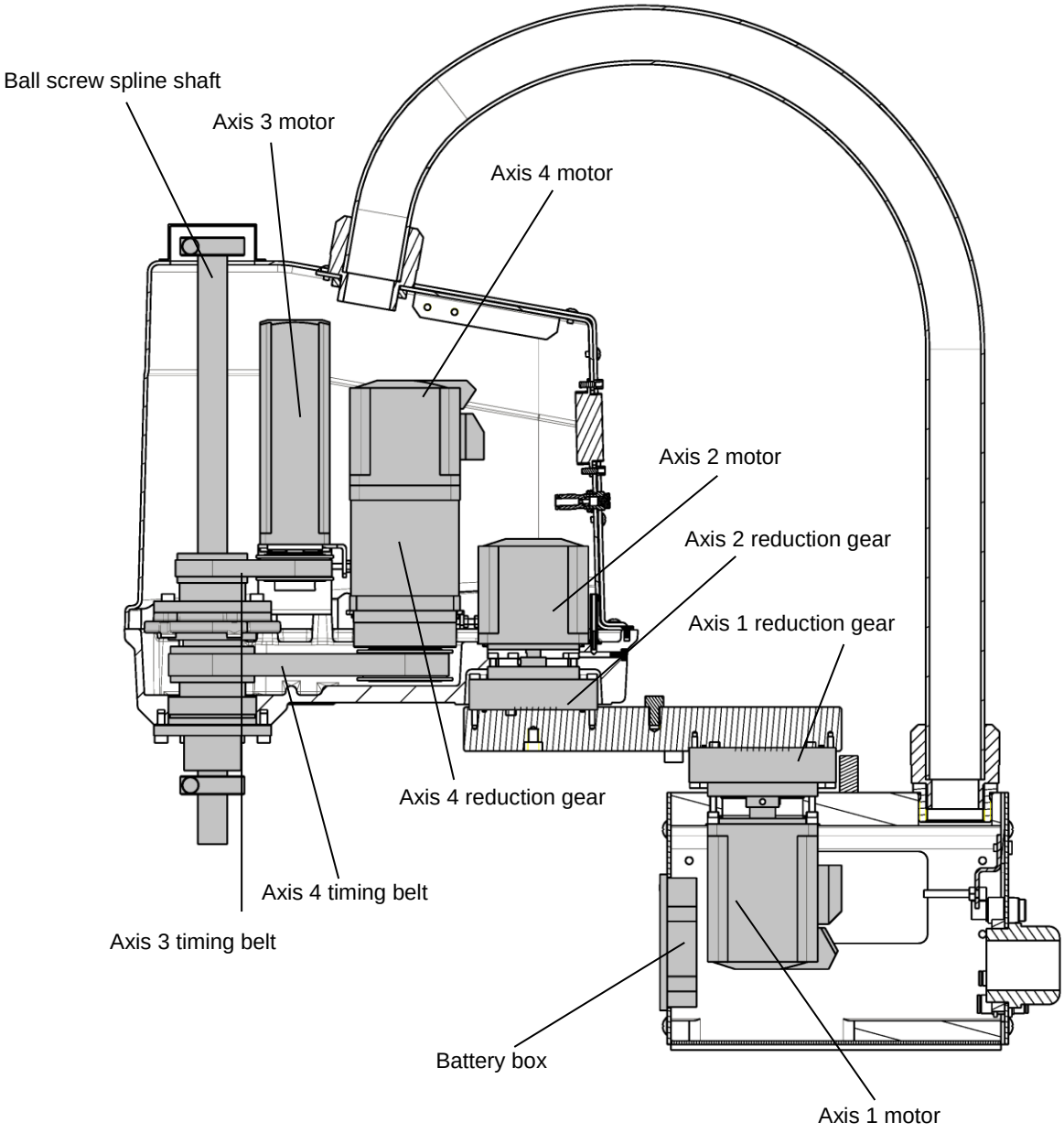


Fig. 6.6 Layout of robot mechanical components (KHL-300NSCN/KHL-400NSCN)

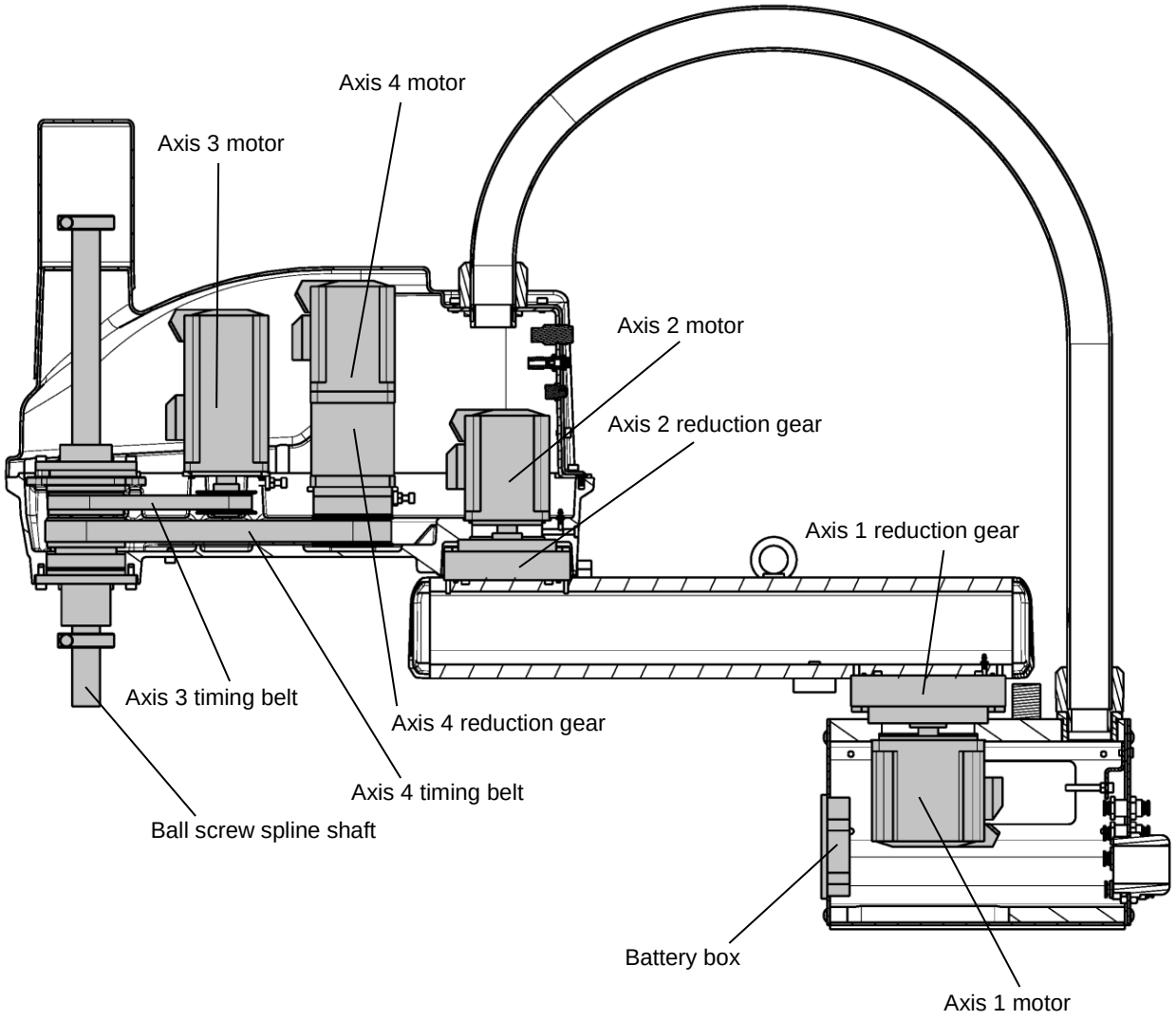


Fig. 6.7 Layout of robot mechanical components
(KHL-500NSCN/KHL-600NSCN/KHL-700NSCN)

6.3 Mounting and Dismounting Covers

The base rear cover of the robot with the simple clean type specifications is different from that of the standard robot.
Strictly observe the following procedures to mount and dismount each cover.

DANGER

- Before mounting and dismounting each cover, be sure to turn off the power switch.
- When opening each cover, make sure that water or contaminant will not enter the robot. If the power is supplied while water or contaminant is left in the robot, you may get an electric shock or the robot may be damaged, which is very dangerous.

6.3.1 Arm 2 Cover (KHL-300NSCN, KHL-400NSCN)

The Arm 2 cover is secured to Arm 2 and the harness guide with 4 hexagon socket head cap screws (M3×16) and 10 cross truss head screws (M3×10×2 pcs, M3×6×8 pcs). (It is not necessary to apply Loctite when installing.)

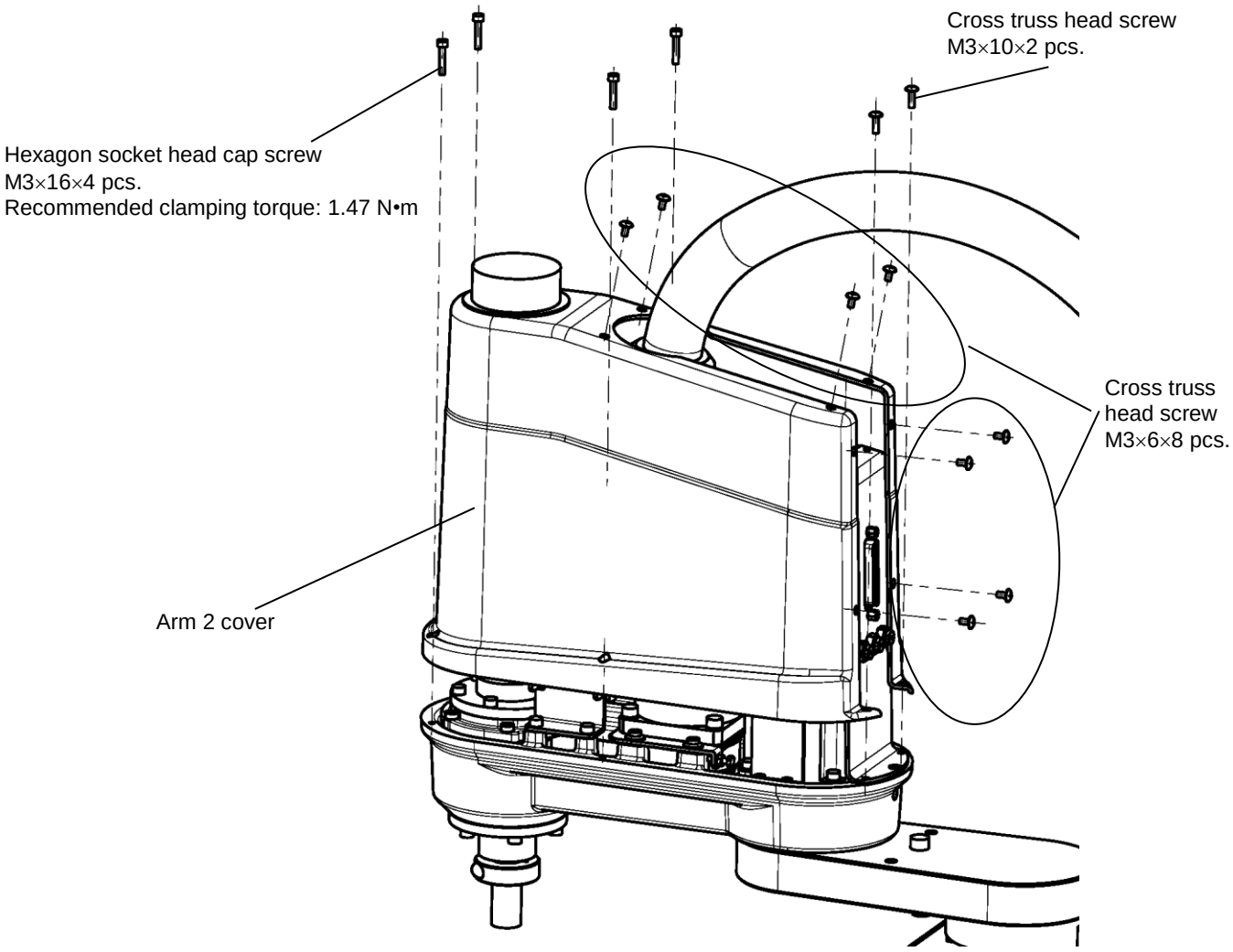


Fig. 6.8 Arm 2 cover (KHL-300NSCN, KHL-400NSCN)

After the cover is mounted, manually move up and down the ball screw spline shaft while holding down the brake release switch, and make sure that the ball screw will not interfere with the Arm 2 cover.

⚠ CAUTION

- NEVER touch the ball screw spline unit with bare hands. Failure to observe this will lead to earlier rusting. So be sure to wear gloves when handling the ball screw spline unit.

6.3.2 Base Covers(KHL-300NSCN, KHL-400NSCN)

There are four (4) types of base covers: base front cover, base rear cover, base side cover and base cover. (It is not necessary to apply Loctite to all the covers when installing.)

The base front cover is secured to the base with six (6) cross truss head screws (M4 × 8). They can be dismounted from the base when these fastening screws are removed, but do not pull them with force as they are connected with the connectors inside. The base rear cover is composed of two types of base covers, the base rear cover 1 and the base rear cover 2, tightened together by six (6) cross truss head screws (M4 × 8). A cable connected to the Arm 2 is fixed to the base rear cover 1, and another cable is connected inside the base rear cover 2, so be sure not to jerk any of them with force. For the cable fixed to the base rear cover 1, pull out the pins after removing the binding bands. We recommend taking photos at this stage so that the binding bands can be restored to the original state.

Each of the left and right base side covers is secured to the base with six (6) hex countersunk screws (M4 × 12).

The base cover is secured to the base with four (4) hex countersunk screws (M4 × 8).

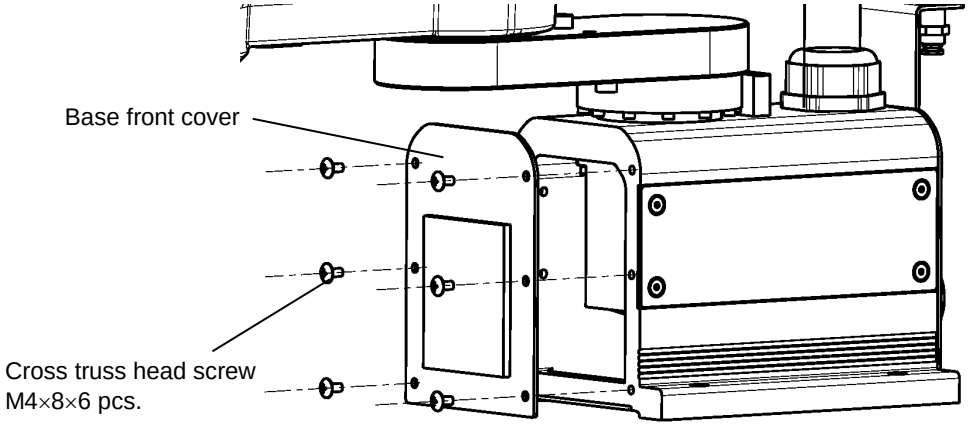


Fig. 6.9 Base front cover (KHL-300NSCN, KHL-400NSCN)

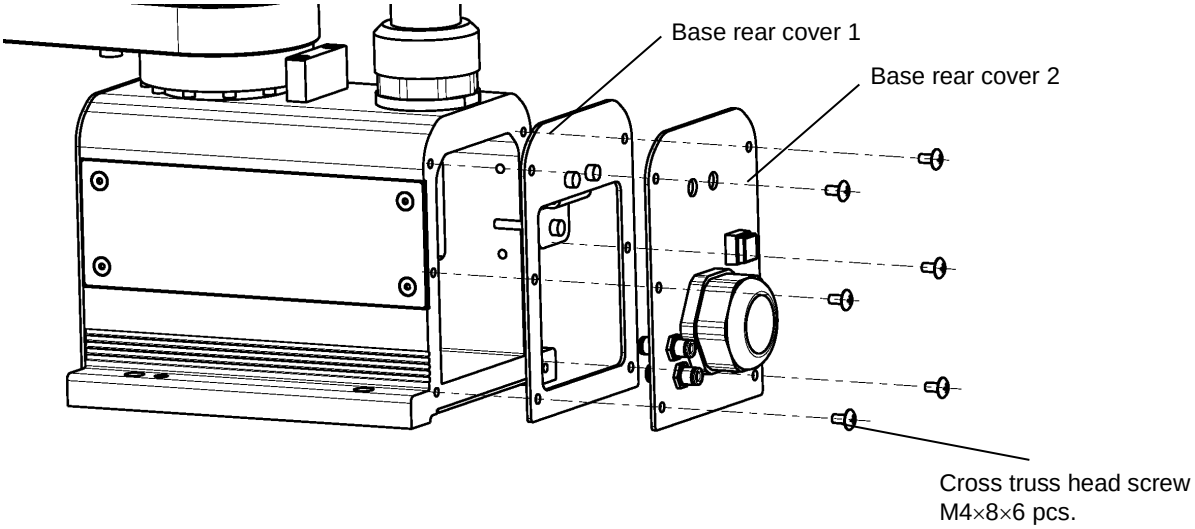


Fig. 6.10 Base rear covers (KHL-300NSCN, KHL-400NSCN)

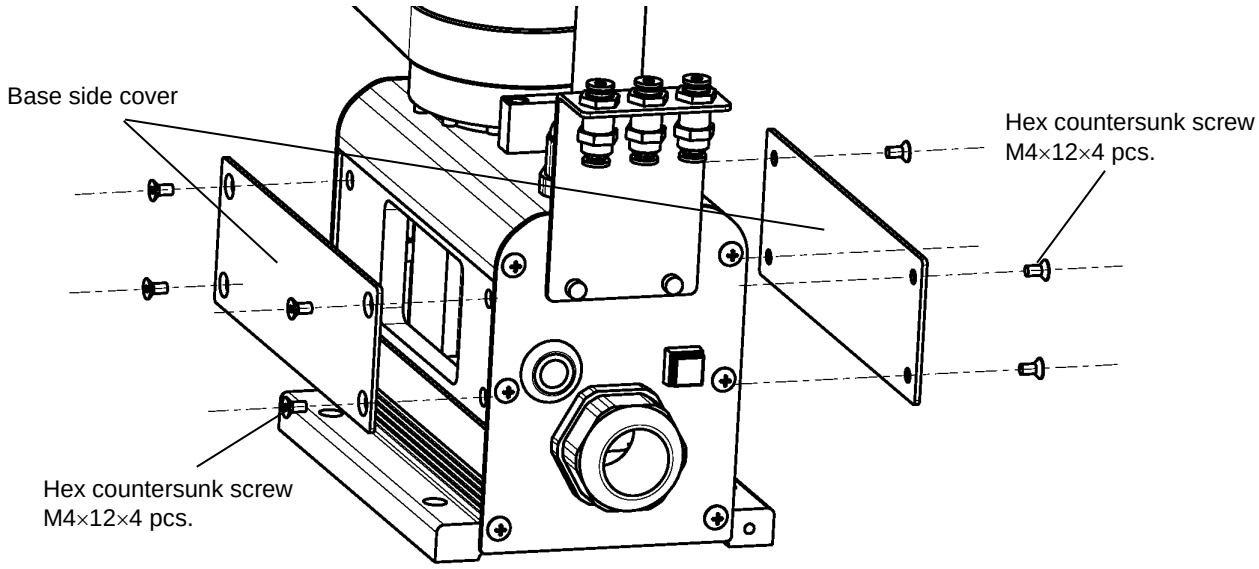


Fig. 6.11 Base side covers (KHL-300NSCN, KHL-400NSCN)

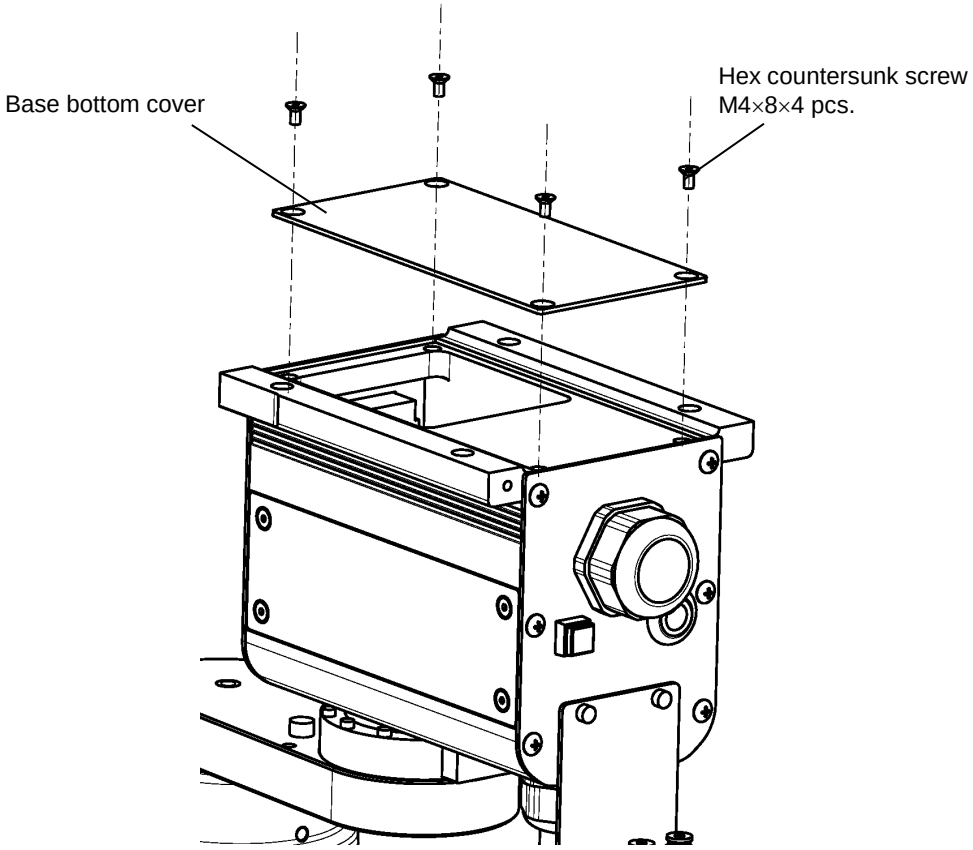


Fig. 6.12 Base bottom cover (KHL-300NSCN, KHL-400NSCN)

6.3.3 Arm 2 Cover (KHL-500NSCN, KHL-600NSCN, KHL-700NSCN)

The Arm 2 cover is secured to Arm 2 and the harness guide with 14 hexagon socket head cap screws (M3 × 16 × 4 pcs., M4 × 6 × 8 pcs., M4 × 10 × 2 pcs.) and nylon washers. (It is not necessary to apply Loctite when installing.)

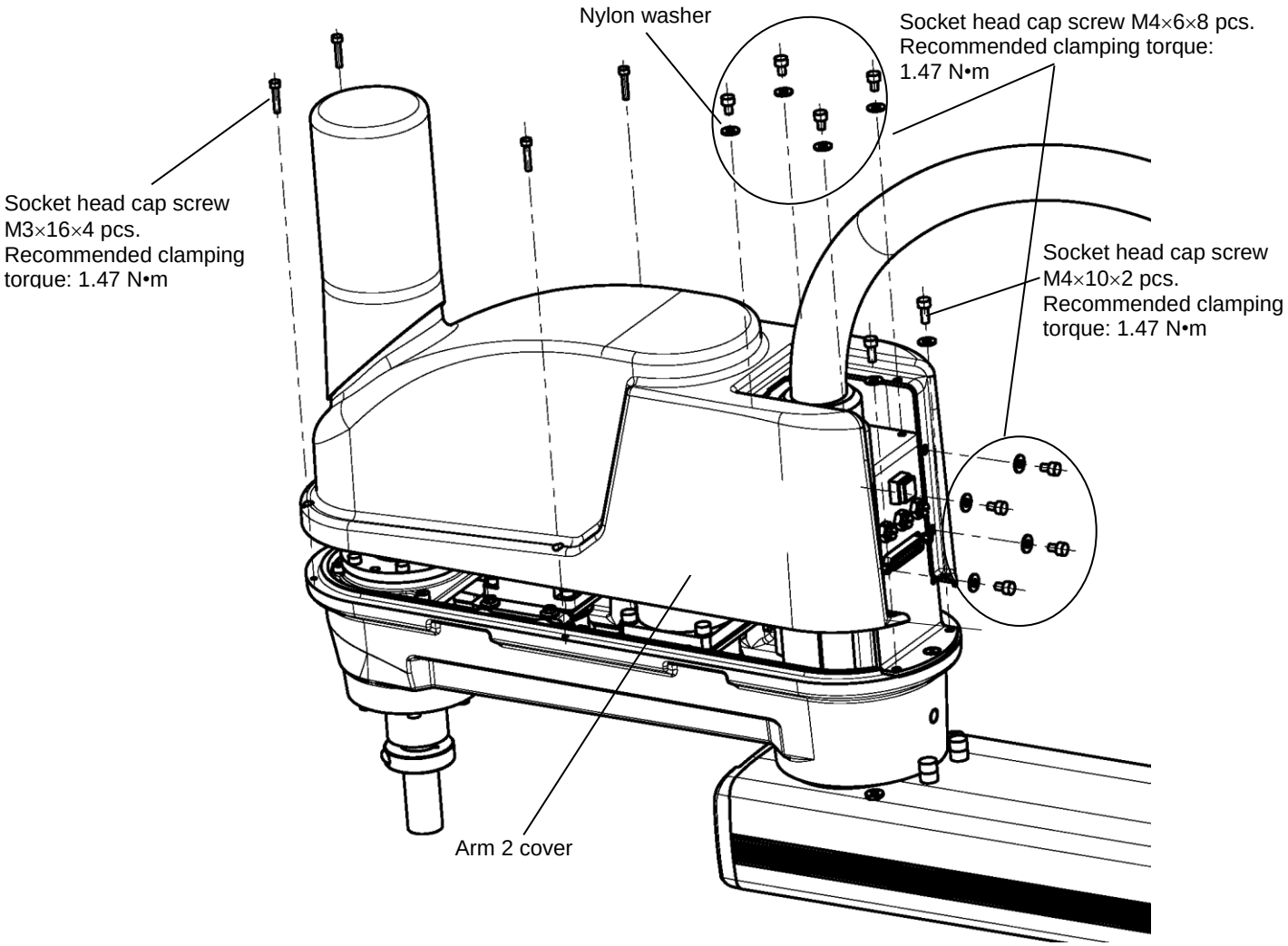


Fig. 6.13 Arm 2 cover (KHL-500NSCN, KHL-600NSCN, KHL-700NSCN)

After the cover is mounted, manually move up and down the ball screw spline shaft while holding down the brake release switch, and make sure that the ball screw will not interfere with the Arm 2 cover.

⚠ CAUTION

- NEVER touch the ball screw spline unit with bare hands. Failure to observe this will lead to earlier rusting. So be sure to wear gloves when handling the ball screw spline unit.

7. Replacement Parts for Maintenance

7.1 List of Replacement Parts for Maintenance

No.	Part name	Our drawing No.	Unit code	Manufacturer	Q'ty	Remarks
1	Ball screw spline unit	H862917	Y610A3TZ0	SHIBAURA MACHINE	1	For KHL-300NSCN/ KHL-400NSCN
2		H862890	Y610A3TV0		1	For KHL-500NSCN/ KHL-600NSCN/KHL-700N SCN 150-mm stroke
3		H862891	Y610A3TW0		1	For KHL-500NSCN/ KHL-600NSCN//KHL-700N SCN 300-mm stroke
4	Harness for robot body	F113116	Y610A3TL0		1	For KHL-300NSCN
5		F113104	Y610A3TM0		1	For KHL-400NSCN
6		F113105	Y610A3TN0		1	For KHL-500NSCN
7		F113106	Y610A3TP0		1	For KHL-600NSCN
8		F113094	Y610A3TQ0		1	For KHL-700NSCN
9	AFE–CA grease			THK		For ball screws

The replacement parts for maintenance except the above are the same as the standard robot.
For details, see the "KHL Series Maintenance of Instruction Manual".

- When you wish to purchase the replacement parts for maintenance, make sure of the serial number of the main robot and contact us. The serial No. is described on the nameplate as shown below.
  Also, as for the attached positions of the nameplate, see Fig. 7.2 to Fig. 7.3.

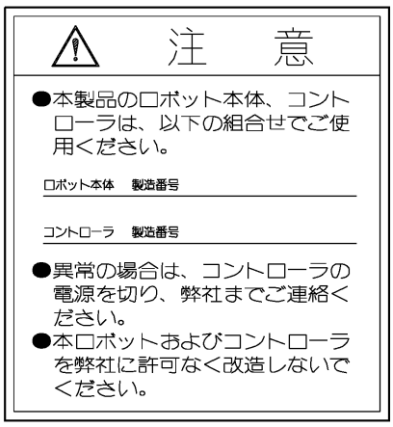


Fig. 7.1　Combination nameplate

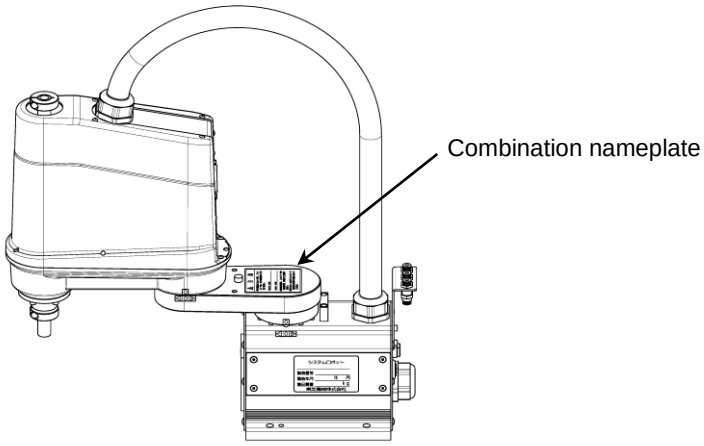


Fig. 7.2 Combination nameplate attached position (KHL-300NSCN, KHL-400NSCN)

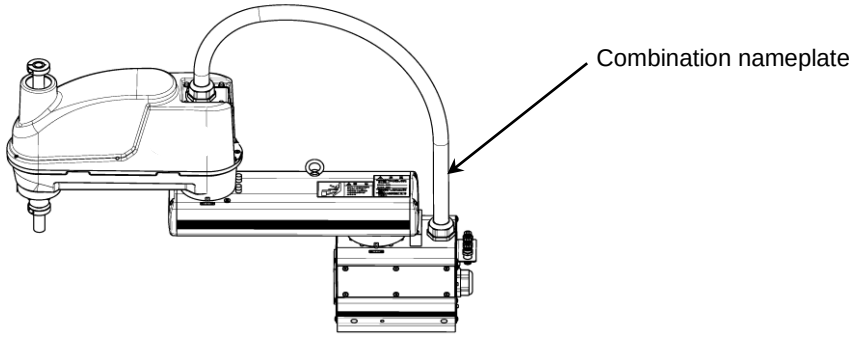


Fig. 7.3 Combination nameplate attached position (KHL-500NSCN, KHL-600NSCN, KHL-700NSCN)

⚠ CAUTION

- All the items in the List of Replacement Parts for Maintenance are parts with special specifications, so be sure to contact us for your purchase or order of them.
- The replacement parts for maintenance are to be replaced by our service engineer. If they are replaced by the customer, we will not guarantee any consequential trouble or accident.