brother

W1000Xd1 Series

COMPACT MACHINING CENTER SPEEDIO

ROTARY TABLE
T-200Ad
INSTALLATION MANUAL
(For Installers & Machine Setup Specialists)

Only trained or qualified maintenance workers can install this product.

Please carefully read the following manuals before starting operation.
- SPEEDIO Operation Manual I – Safety Manual
- SPEEDIO Installation Manual – Safety Manual
- This manual

Be careful not to lose this manual and always make sure that it is available and on hand.

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ROTARY TABLE
T-200Ad
INSTALLATION MANUAL

Read this manual before performing work.

brother

Introduction

Thank you for purchasing the SPEEDIO (hereafter referred to as “machine”) and the rotary table T-200Ad (hereafter referred to as “product”) made by Brother.
Always be sure to read this manual and the machine manual carefully first, in order to use the machine functions properly and safely.

In addition, even if this product is purchased separately after the Brother machine is delivered, always be sure to refer to the Operation Manual and Installation Manual included with the machine at the time of purchase before using this product.

Brother is not responsible or liable for accidents that occur during special machine use or handling that does not follow the general safety usage guidelines.

This machine manual is divided into the following sections.

- Operation Manual
  This manual describes the operation procedure for the machine.
- Installation Manual
  This manual describes the machine’s installation procedure and inspections.
- Programming Manual
  This manual provides a program description.

Keep this manual for future reference.
Attach this manual to the product if it is resold.
Contact the nearest Brother sales office or Brother approved service dealer if this manual or the safety labels are damaged, lost or missing. (Charges apply)

The re-exportation and resale of this machine is regulated by Japan’s exportation laws and regulations in accordance with international export management.
When exporting, permission from the exporting country’s government and/or from the Japanese government may be required.
Contact a Brother Industries dealer in advance before retransferring, reselling or re-exporting any Brother product.

This manual is divided into the following sections.

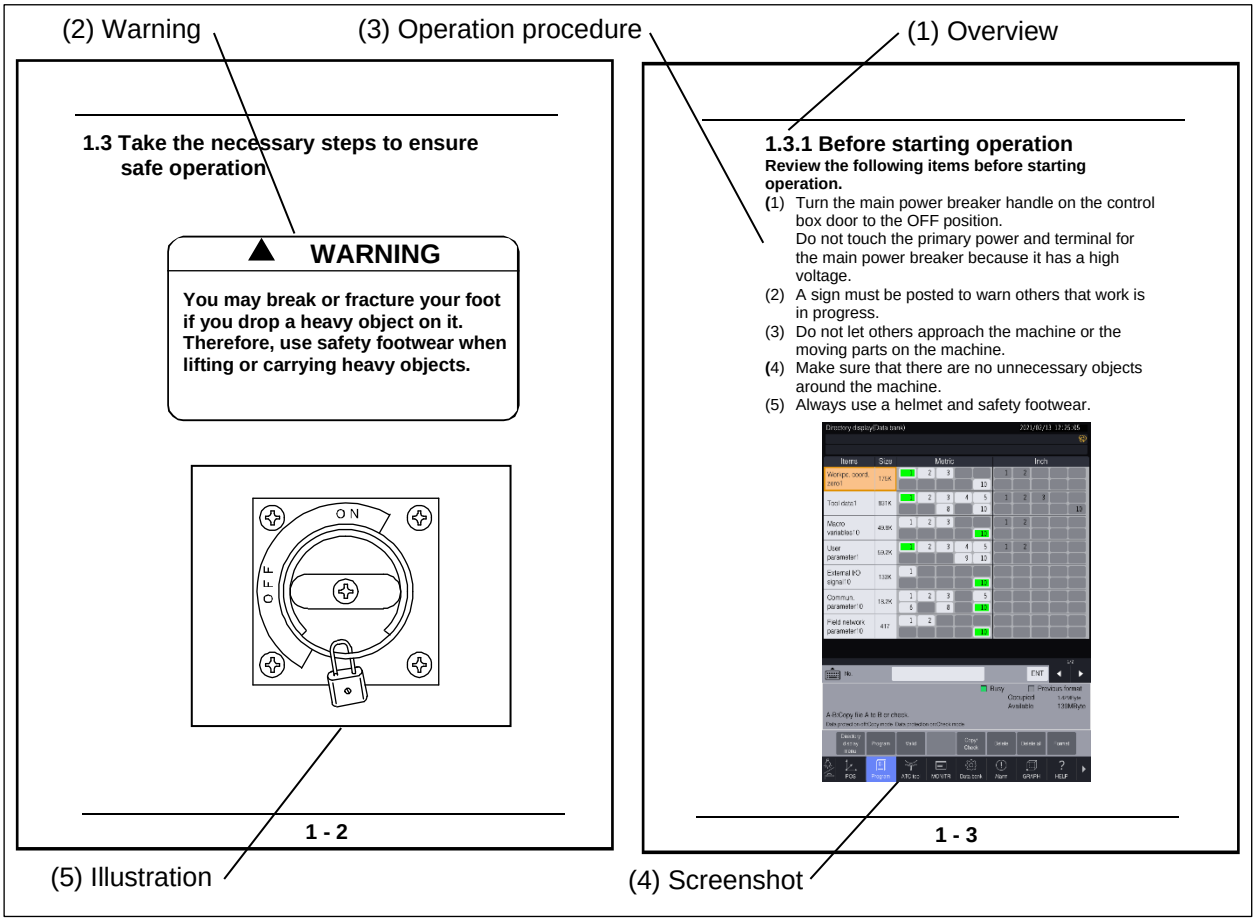
(1) Overview ------ A summary of the content is provided for the corresponding section.

(2) Warning-------- A warning is provided for any hazards that could potentially cause serious bodily injury, death or damage to the machine.
The hazards are described in the following order.
- (2-1) Hazard level
- (2-2) Type of hazard
- (2-3) Potential damage
- (2-4) Safety directions to avoid danger

(3) Operation procedure --- The procedure describes how to operate each function.

(4) Screenshot ---A screenshot is inserted into places to highlight certain points in the operation procedure. The screenshot messages are shown at an approximate position and may differ slightly from the actual position of the line or column. The same applies to the font.

(5) Illustration ---- Illustrations, such as explanatory drawings, diagrams that show the dimensions, positioning, ranges, figures or configurations, are used in certain places where a written explanation alone may be hard to understand.



In this manual, the following symbols are used to differentiate between keys, switches, text displayed on screens and alarm messages.

[ ]	: Keys
[ ]	: Switches
< >	: Text displayed on screens
<< >>	: Alarm messages

Striving for a Better, Richer Environment

Request for Your Cooperation

First, we would like to thank you for using Brother products.
Brother Industries established an environmental policy based on “Manufacturing products using an environmentally-friendly process from product development to product disposal,” in order to ensure the planet stays lush and green. As a responsible corporate member of society that can coexist with the local community and environment, we hope to contribute as much as we can in environmental conservation activities.

We hope that you can support this approach and ask for your understanding particularly with production activities in order to help in our environmental conservation efforts.

- Please ask a salvage or recycling business to process unnecessary packaging materials and chips/shavings in order to support recycling when possible.

- The outflow and spillage of coolant, waste oil and other pollutants can lead to polluting the environment. Make provisions in the event that there is a spill and/or outflow of coolant and waste oil, and consider installing those provisions onto the machine.

- Coolant, waste oil, electrical parts, replacement parts and other items must be properly disposed of in accordance with all national laws and local government regulations.

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CHAPTER 1

OVERVIEW

1.1 Handling Precautions

The rotary table is an index system that is mounted on the Brother SPEEDIO model, and is used to rotate, for example, iron or steel aluminum materials.
Do not use this system for any other application.

Ask a Brother Industries authorized dealer to install the rotary table.
This manual is written for personnel who set up and install the rotary table.

To ensure safety, the rotary table must be correctly installed inside the SPEEDIO's machine cover with the SPEEDIO's safety device operating properly.

Please be sure to carefully read the SPEEDIO Operation Manual I and "Chapter 1 Handling Precautions" from the SPEEDIO Installation Manual, in order to ensure you fully understand the potential dangers and the corresponding safety instructions.

⚠ WARNING

If an air blower or similar equipment is used to remove chips or shavings, they may shoot out and get into your eyes.

[SAFETY INSTRUCTIONS]

Chips or shavings should not be blown off the machine using an air blower or similar equipment.

⚠ WARNING

High-voltage components are present inside the control box. There is risk of electric shock if you touch these components by mistake.

[SAFETY INSTRUCTIONS]

Maintenance and inspection of electrical components must only be carried out by a qualified electrician who is trained in electrical safety and who has thorough knowledge of the electronic circuits in this machine.
Turn OFF the main power breaker, and then wait at least 20 minutes before carrying out work.
Attach a padlock to the main power breaker so that the power cannot be turned ON.
A sign or notice should be placed near the operation panel to warn others that work is in progress.
If leaving the machine unattended, close the control box and secure it with screws.

⚠ WARNING

If the power supply is not grounded, there is risk of electric shock because the leakage current breaker will not operate.

[SAFETY INSTRUCTIONS]

Connect the ground according to the specified method.
The PE line for the power line is longer than the other lines (L1, L2 and L3), and therefore, all of the slack should be taken up when the line is connected.

⚠ WARNING

If the control box or operation panel is touched accidentally with wet hands while performing installation or maintenance, an electric shock or short-circuit may cause a fire.

[SAFETY INSTRUCTIONS]

Do not touch the control box and the operation panel with wet hands.

The cover to the control box must be closed while the machine is operating.

The control box and the operation panel must be kept free of coolant, water, chips and shavings.

⚠ WARNING

If terminal connections on the PCBs or terminal block screws become loose, poor contacts may cause overheating or a fire.

[SAFETY INSTRUCTIONS]

There should be no loose screws when connecting the wiring.

Do not replace fuses and electrical parts that have been soldered to the inside of the unit.

⚠ WARNING

If you touch cables which have been crushed or damaged by heavy objects, there is risk of electric shock.

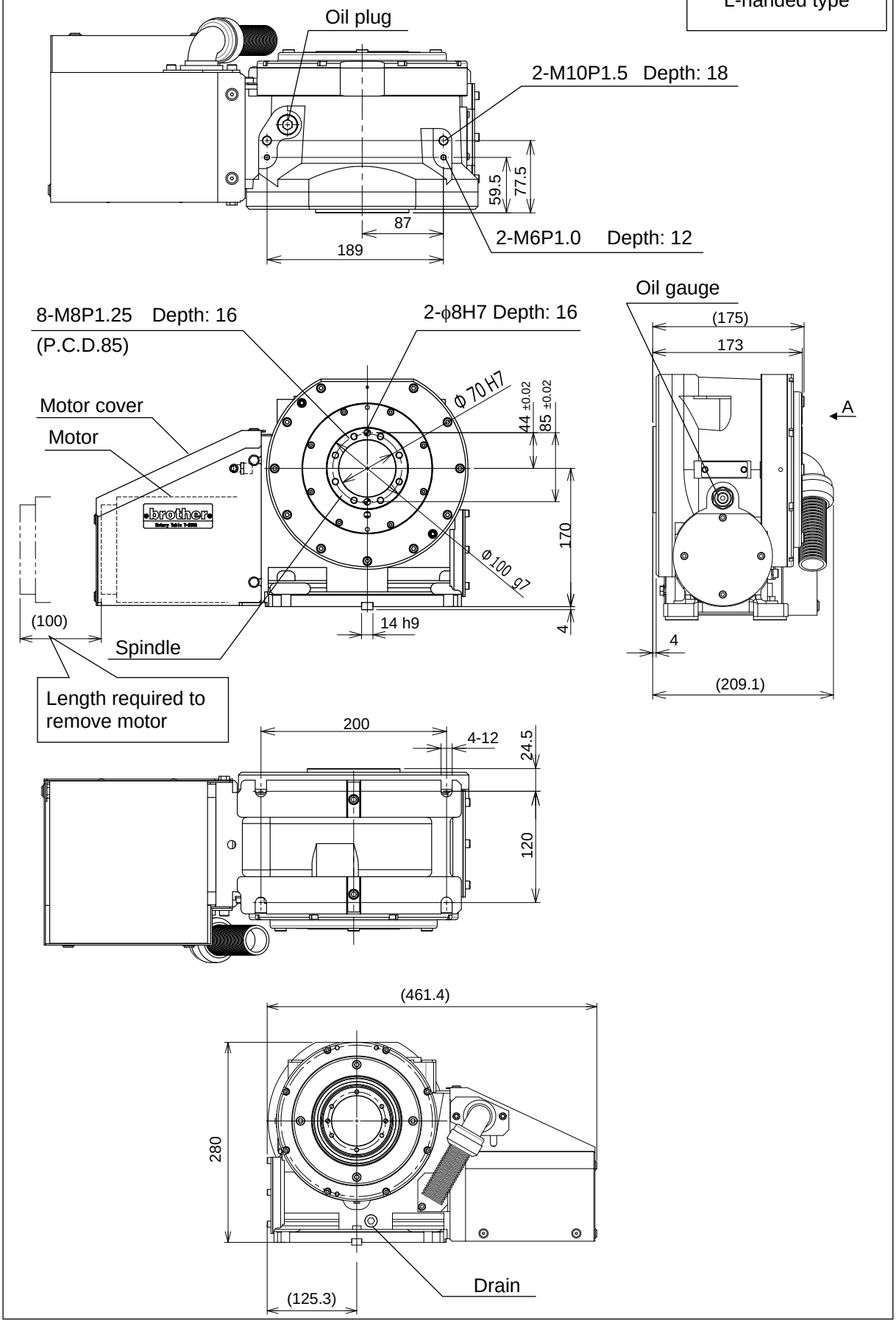
In addition, short-circuits may occur if cables are crushed or damaged by heavy objects.

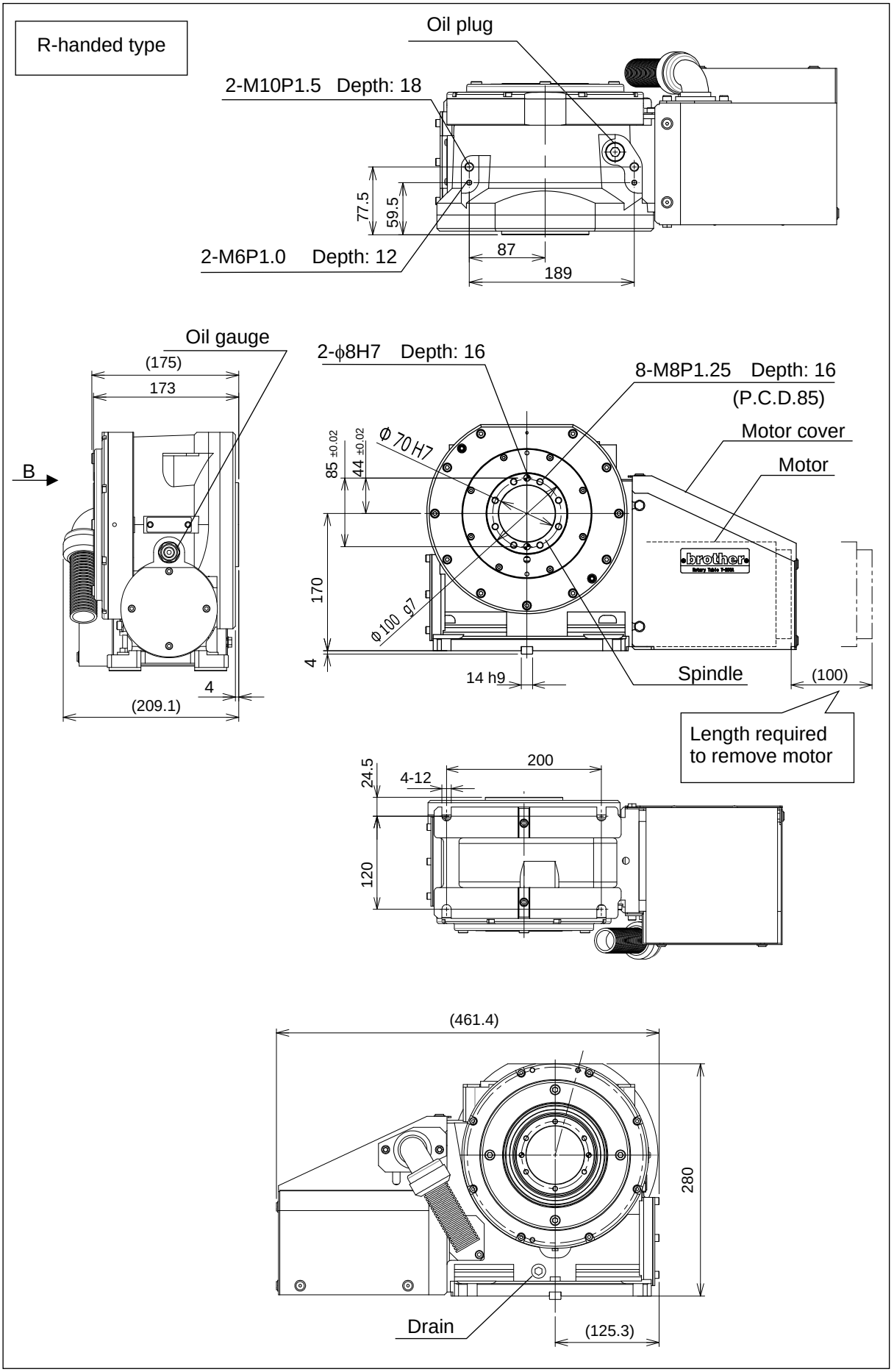
[SAFETY INSTRUCTIONS]

Cables should be gathered up or arranged to prevent them from being crushed. If a cable has become damaged, it must be replaced with a new one.

1.2 External View and Main Dimensions

L-handed type




R-handed type
Oil plug
2-M10P1.5 Depth: 18
77.5
59.5
87
189
2-M6P1.0 Depth: 12
Oil gauge
(175)
173
B
4
(209.1)
2-ϕ8H7 Depth: 16
8-M8P1.25 Depth: 16
(P.C.D.85)
Motor cover
Motor
85 ±0.02
44 ±0.02
Φ 70 H7
170
4
ϕ100 g7
14 h9
Spindle
(100)
Length required
to remove motor
24.5
4-12
200
120
(461.4)
280
Drain
(125.3)

1.3 List of Specifications

		Unit	Specifications
Clamp system			Pneumatic
Operating air pressure		MPa	0.4 to 0.6
Clamp torque		N·m	280 (when 0.5 MPa)
Maximum holding torque		N·m	720 (when 0.5 MPa) *1
Allowable load weight		kg	100: Single side support 200: Double side support
Allowable moment of inertia		$kg \cdot m^2$	1 (4: High inertia mode) *2
Allowable unbalanced load		kg·m	5
Lubrication system			Oil bath (Exxon Mobil SHC629: 600 cc)
Deceleration ratio			1/20
Maximum speed		min^{-1}	100 (50: High inertia mode) *2
Cutting feedrate		º / min	0.01 to 5724 (0.01 to 2844: High inertia mode) *2
Index accuracy (ISO230-2)	Bidirectional accuracy	Seconds	Less than 20 *3
	Bidirectional repeatability	Seconds	Less than 10 *3
Index accuracy *4		Seconds	Less than 10
Repeatable accuracy *4		Seconds	Less than 4
Product weight		kg	61
Drive system			AC servo motor
Continuously applied torque		N·m	200
Torque applied for 1 minute		N·m	300
Maximum momentary torque applied		N·m	440

*1 Value is the clamp torque plus the servo.
*2 High inertia mode is a mode that changes the parameter to a set value that can support the high load, the same as the rotary table.
*3 When there is no unbalanced load and during pitch error compensation
*4 Based on Brother measurement standard.

CHAPTER 2

INSTALLATION

2.1 Installation, Non-Panel Wiring and Air Piping

2.1.1 Removing and connecting cables

When the cables are attached, it is difficult to install onto the machine, therefore remove the cables first and then perform the installation.

Procedure to remove cables

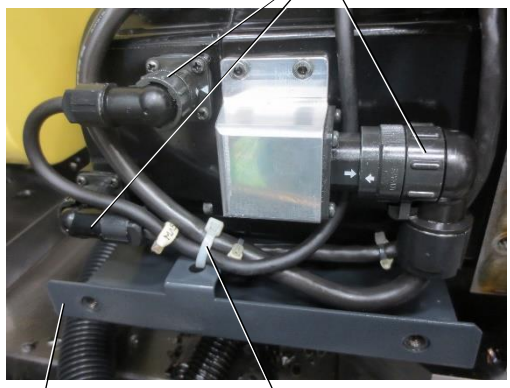
1. Remove the plate that secures the flexible hose. (Socket bolt M6 × Qty.2)
2. Remove the motor cover. (Low head bolt M6× Qty.6, flat washers × Qty. 6)
3. Remove the Cannon connectors (Qty.3).
4. Use nippers to cut the tie that secures the cable and flexible hose.

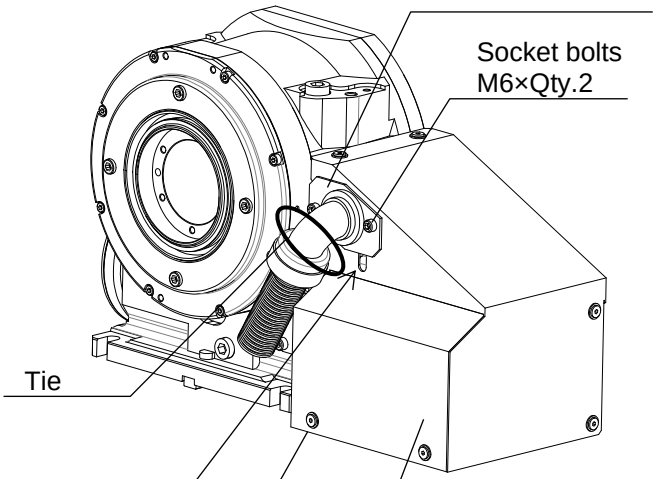
Procedure to connect cables

Perform the removal procedure in reverse order.
Use a tie to secure the motor cables (Qty.3) to the bottom of the motor cover.
Pass the air tubing so that the tie attached to the air tubing is on the inside of the notch on the motor cover.
The piping inside the motor cover varies depending on whether there is a support table with a clamp or not. Check the pictures on the next page for the positioning of the piping and the ties.

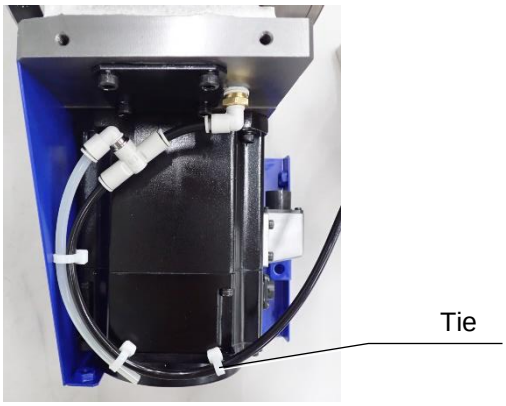
* Refer to “4.3 Installation” for the air piping layout.

Use a tie to secure the air tube to the motor’s flexible elbow (fixed).
Tightening torque for socket bolt M6: 11.6 Nm (118 kgf·cm)
for low head bolt M6: 3.33 Nm (34 kgf·cm)

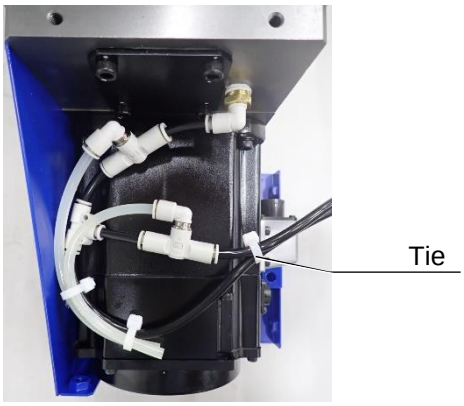




Pass the air tubing through the notch s that the tie is on the inside of the notch on the motor cover.



- When there is no support table with a clamp



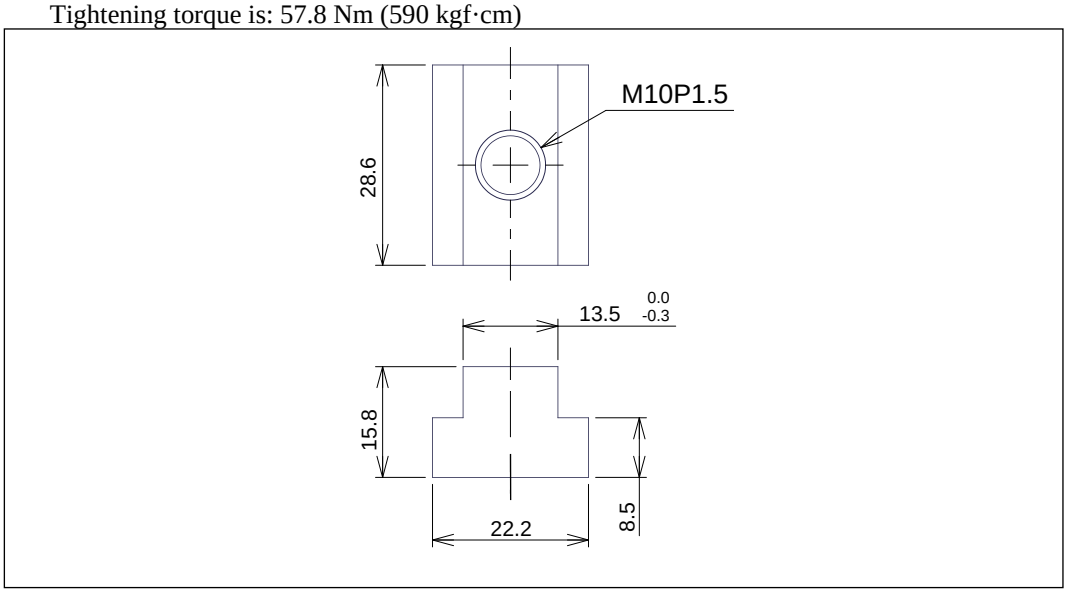
- When there is a support table with a clamp

2.1.2 Installation and non-panel wiring

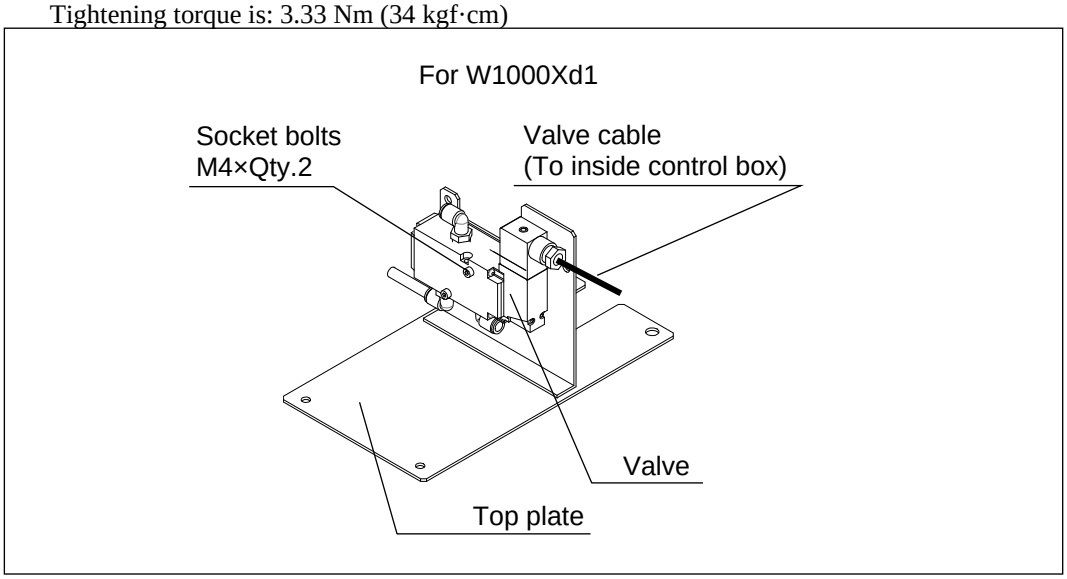
2.1.2.1 Installation on W1000Xd1

Installation procedure

1. Install the rotary table onto the machine's table surface or jig (provided by the customer) and secure it using bolts and T-slot nuts (provided by customer).
   Make sure that there are no contaminants or burrs on the table's mounting side when installing.
   When installing directly on the W1000Xd1, install the special table mount (OP) onto the machine's table surface, and secure the rotary table on top of that.
   Tightening torque is: 57.8 Nm (590 kgf·cm)

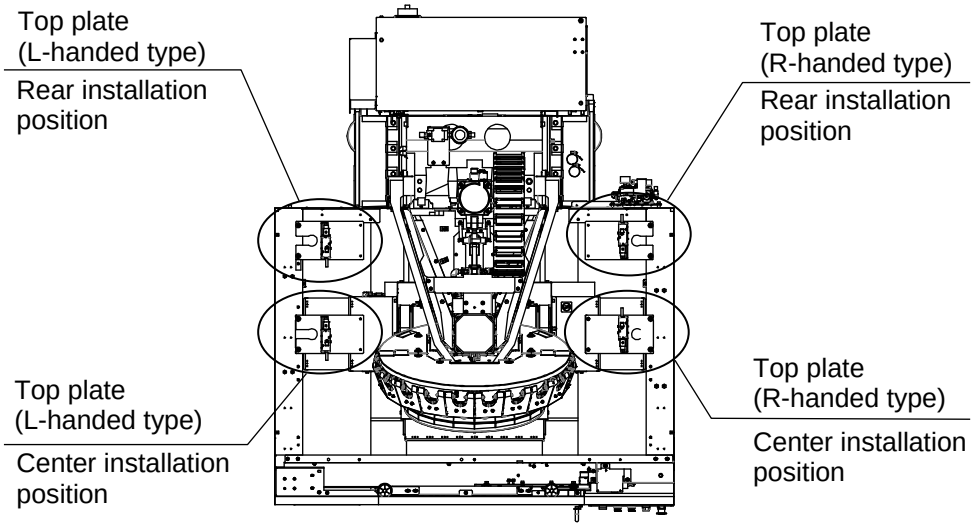


2. Install the valve provided onto the top plate. (Socket bolt M4×Qty.2)
   Tightening torque is: 3.33 Nm (34 kgf·cm)

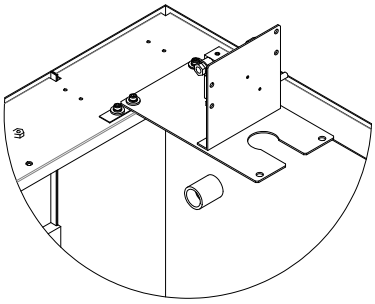


(NOTE) Refer to "2.1.3 Air piping" for further details on valve piping.

3. When looking from the front of the machine, install the top plate onto the top-left (top-right for R-handed type).
   When the installation at a rear position and the wiring is difficult, or when there is an excessive load or pull on the flexible hose, install at a center position.
   The top plate has a specific direction which varies depending on the machine model. Therefore, be sure to install it correctly following the figure below as a reference.
   W1000Xd1: Through-hole for flexible hose is on inside

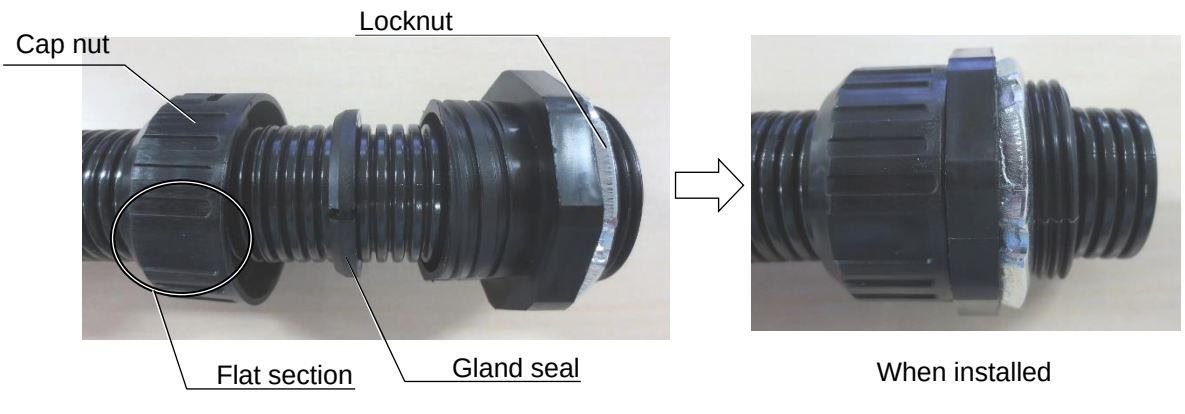


For W1000Xd1



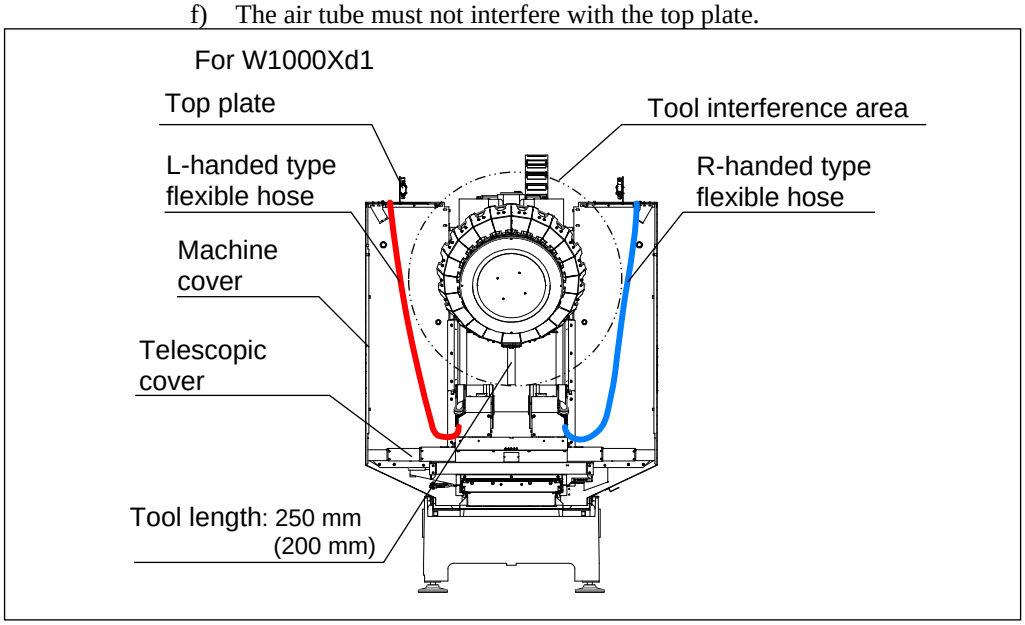
Flexible hose adjustment procedure

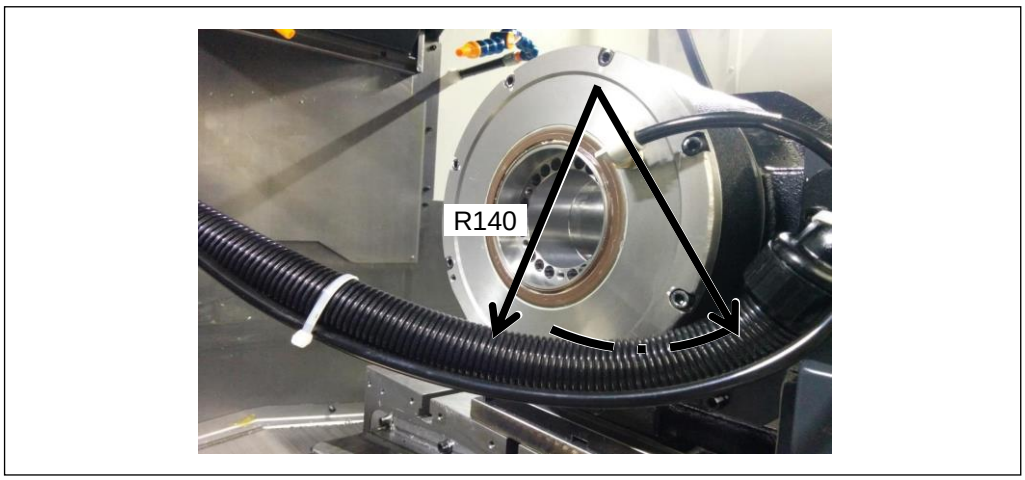
(1) Loosen the locknut on the adjustable connector, and remove it from the top plate.
(2) Use your index finger and thumb to hold and squeeze the flat section (at two places) on the cap nut, and then turn the cap nut to loosen. After the cap nut stops (approximately one half turn), turn the cap nut again (approximately one half turn) to remove it.
(3) After adjusting the position of the gland seal on the flexible hose to the desired length, tighten the domed nut.
(4) Insert the connector into the attachment hole for the flexible hose on the top plate, and then tighten the locknut to install it onto the top plate.

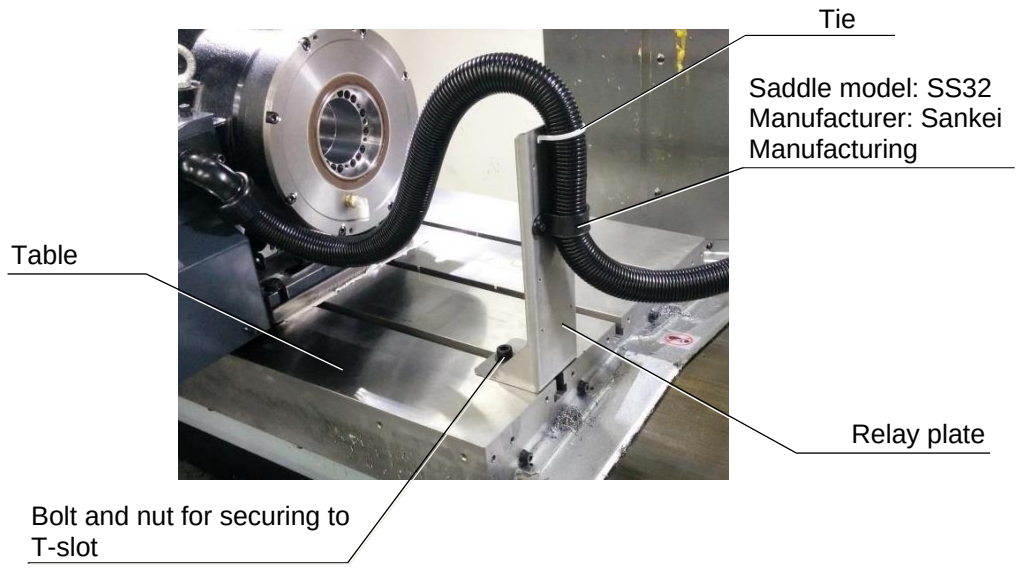


4. Install the flexible hose that comes out from the rotary table onto the top plate, and pull it through to the outside of the machine. At this time, pay attention to the following points. Follow the previously mentioned flexible hose adjustment procedure to adjust the flexible hose length.
   Use a tie to secure the air tube and the flexible elbow at the fixed position. (Refer to “2.1.1 Removing and connecting cables” for further details.)
   Use a relay plate when directly wiring to the top plate is more difficult than the installation position for the rotary table unit. (Option, part code: 6C3332001)

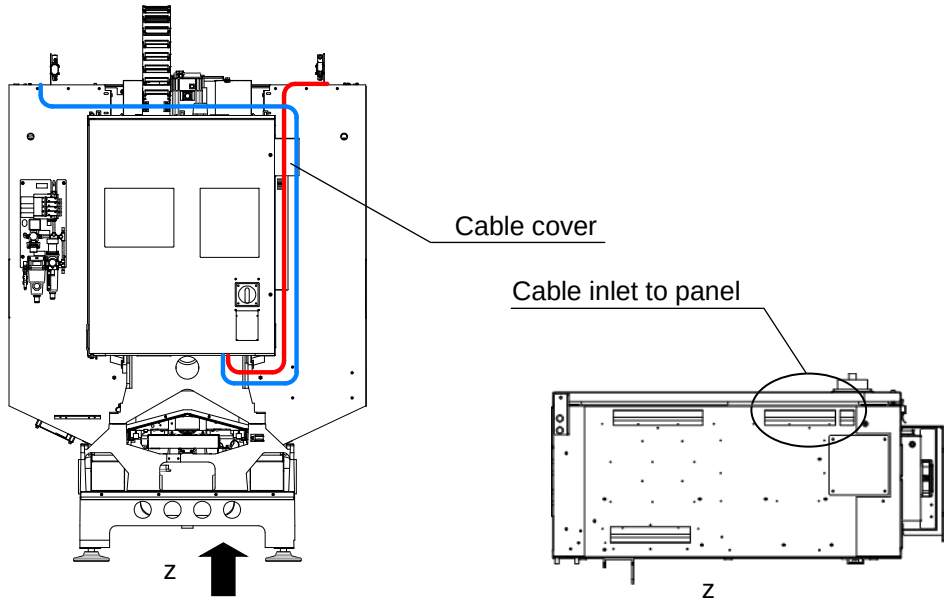
   (NOTICE) Move the full stroke to check and adjust for the following.
   If no check is conducted, the flexible hose, connectors and cables may become damaged.
   a) Flexible hose bending R (Flexible hose center R) must be a minimum of R140 mm.
   b) There must be no kinks in the air tube.
   c) The flexible hose and air tube must not interfere with the tool in the magazine.
   d) The flexible hose and air tube must not come into contact with the telescopic cover.
   e) The flexible hose must not twist so that it hits the machine cover with force.
   f) The air tube must not interfere with the top plate.







5. Use a tie to bundle the outside cable and valve cable together, and follow the figure below when setting up the non-panel wiring. Set up the wiring so that the cable cover can be removed. Use a tie to bundle and secure the extra cable at the bottom of the control box.

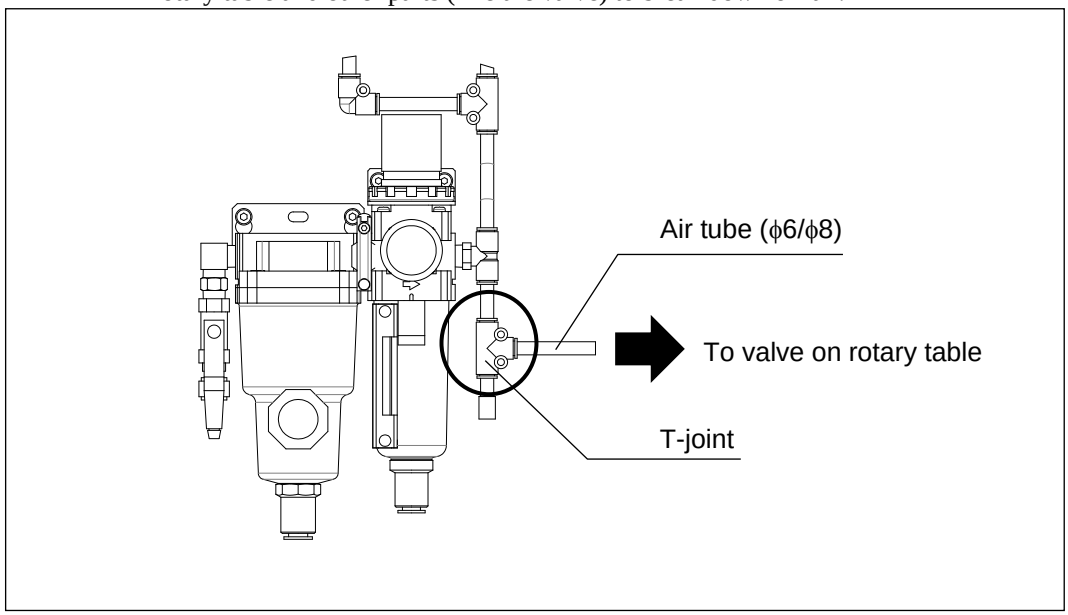


2.1.3 Air piping

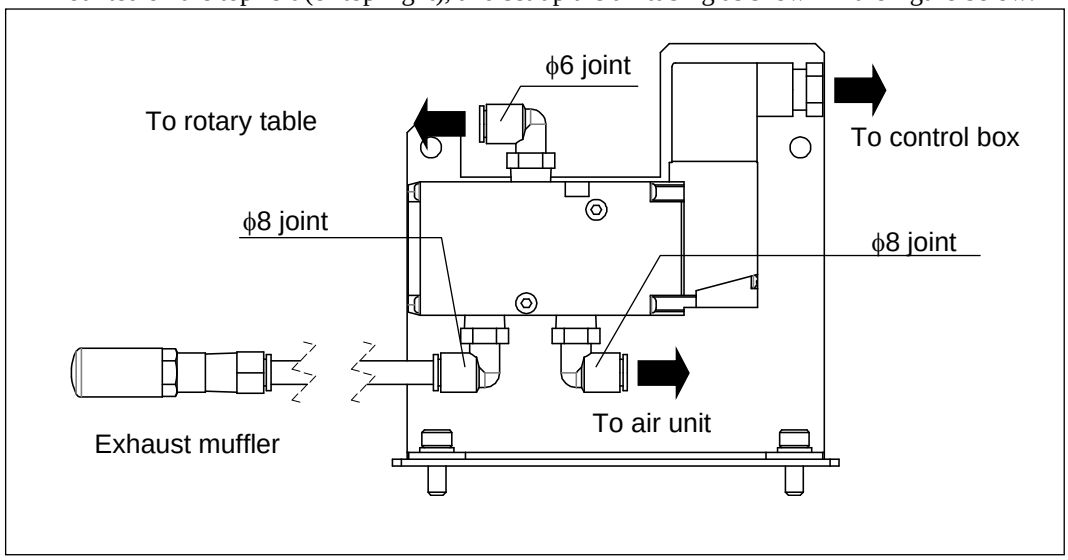
Setup procedure

1. Disconnect the pipe from the pressure source and purge the remaining air inside the piping.
2. Attach the T-joint (provided) at the location indicated in the figure below for the air unit, and connect the air tubing (ϕ6/ϕ8).

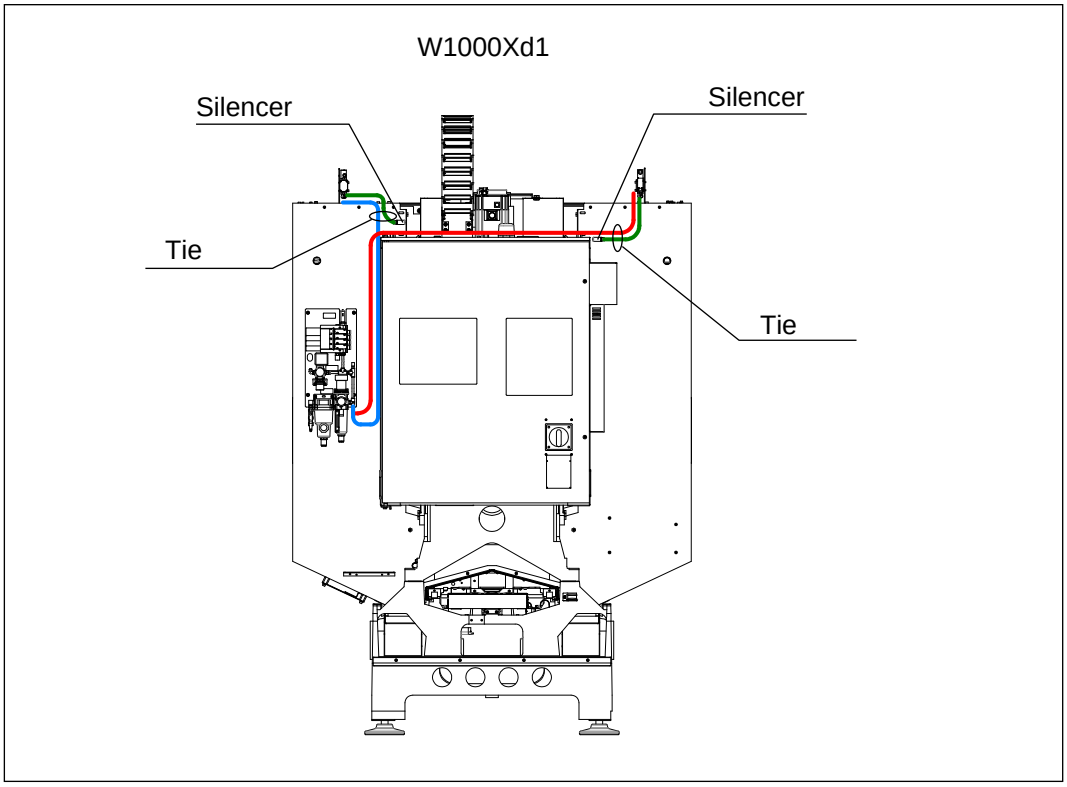
(NOTICE) Always connect the air tubing at the location indicated in the figure. If the air tubing is connected at another location, it may lead to oil, water moisture or other contaminants getting inside the rotary table, causing the clamp mechanism on the rotary table and other parts (like the valve) to break down or fail.



3. When looking from the front of the machine, install the valve onto the top plate, which is mounted on the top-left (or top-right), and set up the air tubing as shown in the figure below.



4. Set up the air tube as shown in the figure below.
   Extend the silencer toward the rear of the machine and use ties to secure it to other piping and cables.



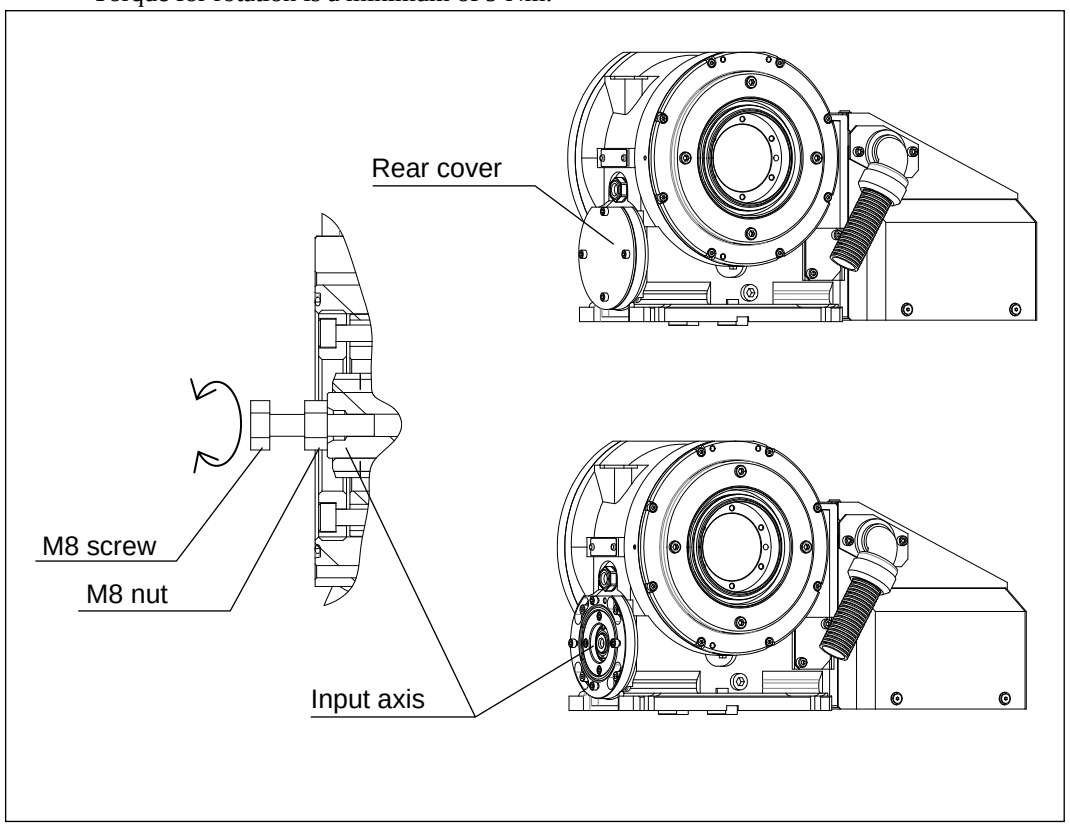
5. Run the air tubing from the valve to the rotary table. Run it the same way as the flexible hose from the previous section.

2.1.4 Manual rotation before power ON

To move the rotation axis before turning ON the power, follow the procedure below.

- Remove the rear cover. (M5×4)
- Attach an M8 (Length: 16 or longer) screw and nut to the end of the input axis, and use the screw to rotate the input axis.

* Torque for rotation is a minimum of 9 Nm.



When fine adjustment is required, there is a unit (RT1 BRAKE RELEASE JIG ASSY: 6C3334001) for releasing the motor's brake. Contact Brother or an authorized dealer for details.

(NOTICE) Using the unit with an unbalanced load can cause an unexpected movement to occur when the output axis rotates. Therefore, take the necessary precautions.

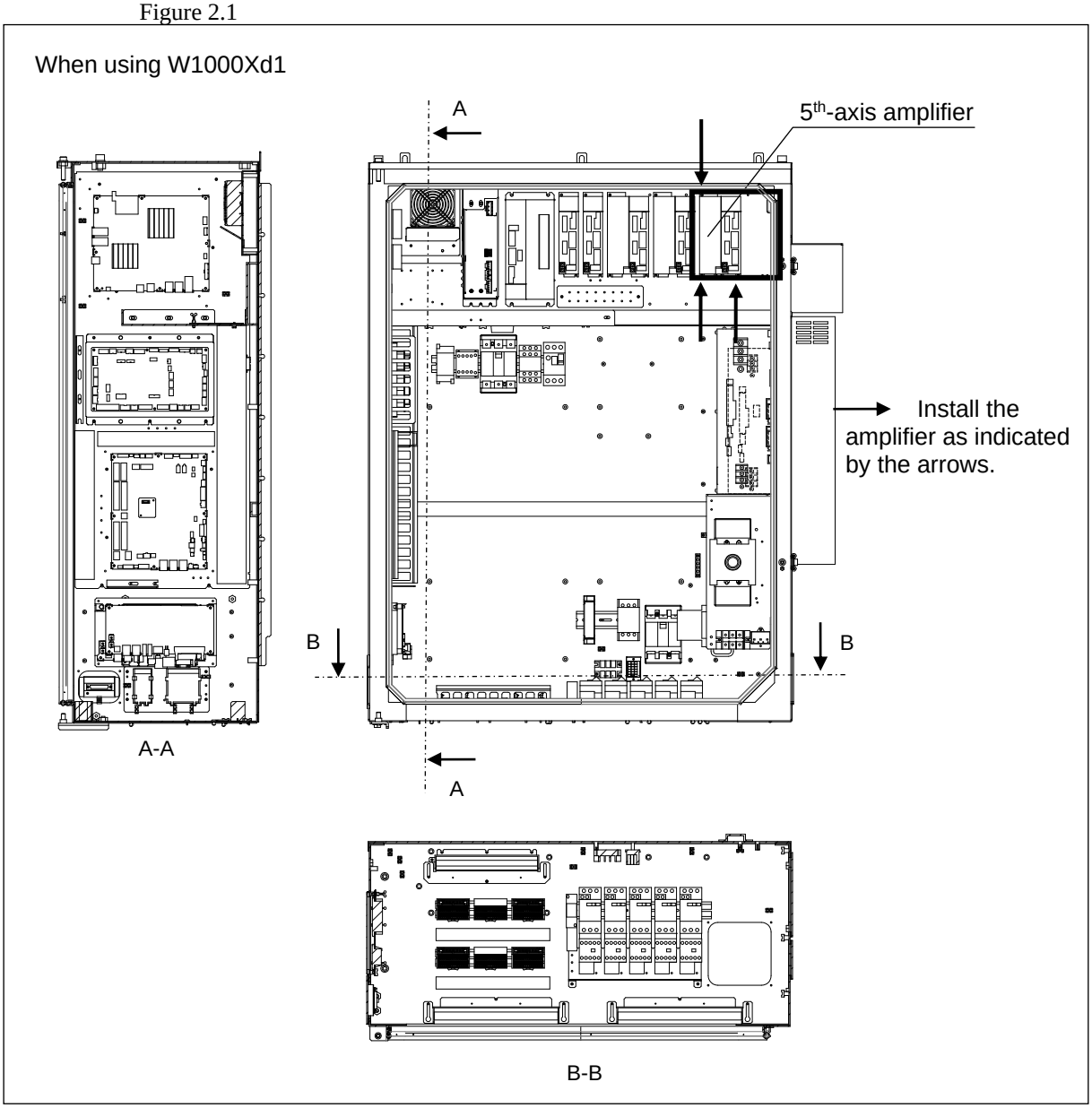
2.2 Panel Wiring

First, turn OFF the main power breaker, and then begin installation of the amplifier and cable wiring.

2.2.1 Install servo amplifier

1. Install the servo amplifier for the rotary table at the location specified in Figure 2.1 (M4×Qty.3).

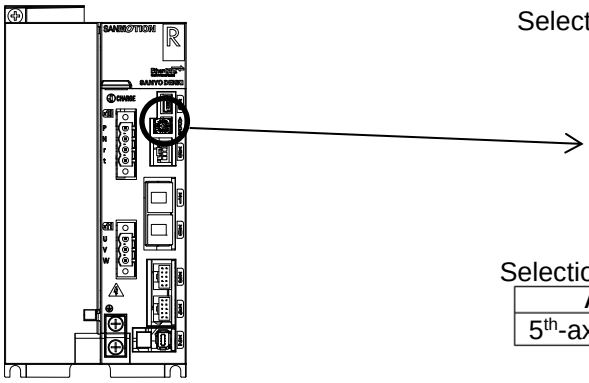
Figure 2.1



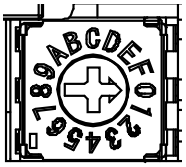
2. Set the selection switch for each axis. Refer to the figure below for the setting method.

Selection switch location

5th-axis amplifie



Selection switch (ADDR)



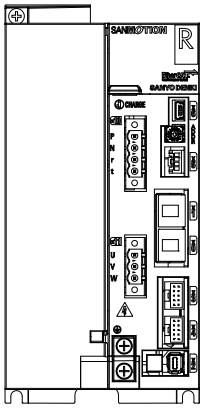
Selection switch (ADDR) setting

Amplifier	Set value
5th-axis amplifie	5

2.2.2 Wiring diagram

Follow the instructions below to wire the cables provided.
Refer to the parts list at the end of this manual for the cable descriptions.
Refer to the diagram below for the connector layout of the amplifier.

Amplifier connector layout



Main circuit power and control power ⇨ X10

Motor cord ⇦ X11

X5 ⇨ Brake IN cord

X1 ⇔ EtherCAT cord

X0 ⇔ EtherCAT cord

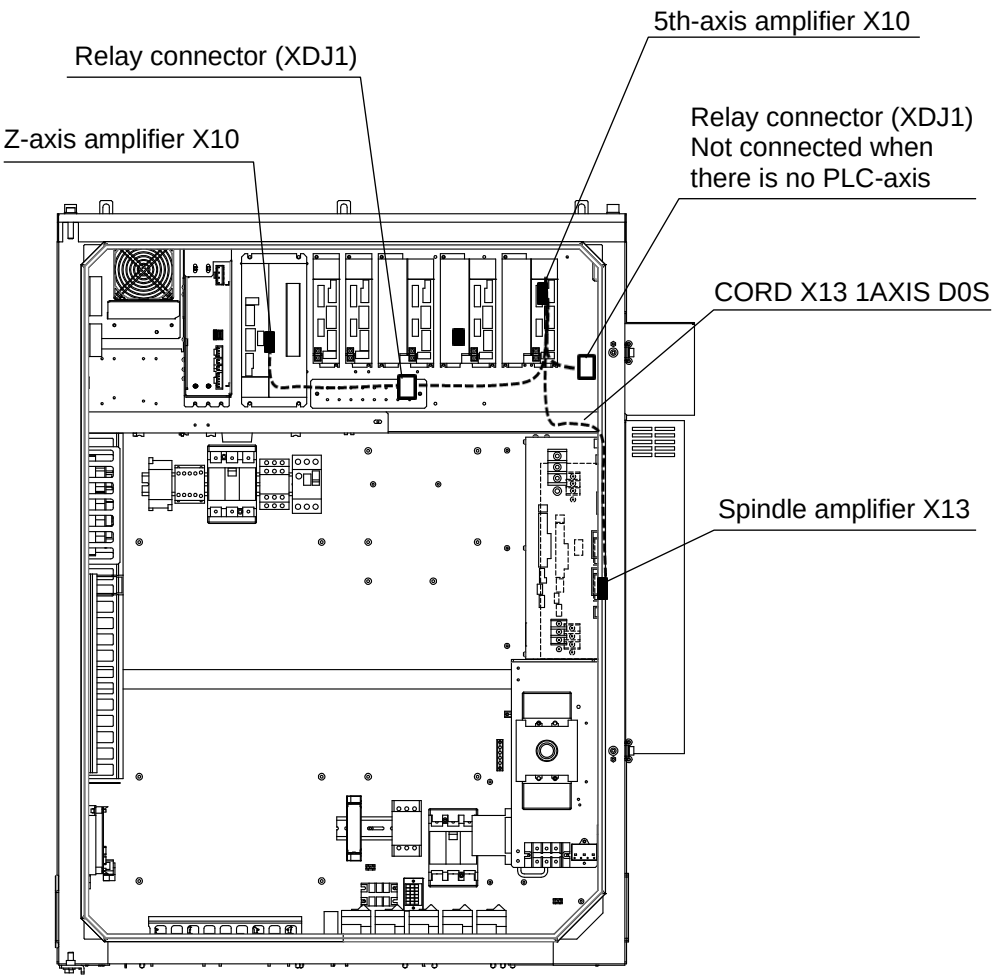
X3 ⇦ STO cord

X4 ⇨ STO cord

X2 ⇦ Encoder cord

When using a W1000Xd1

1. Cable wiring in control box
   Power cord connection
   (1) Connect the CORD X13 1AXIS DOS to X13 for the spindle amplifier and X10 for the 5th-axis amplifier.
   (2) Connect X10 for the Z-axis amplifier from X10 for the 5th-axis amplifier via the relay connector (XDJ1).
   (3) Use a screwdriver to tighten the screw for the power connector (X10). (0.25 N • m)

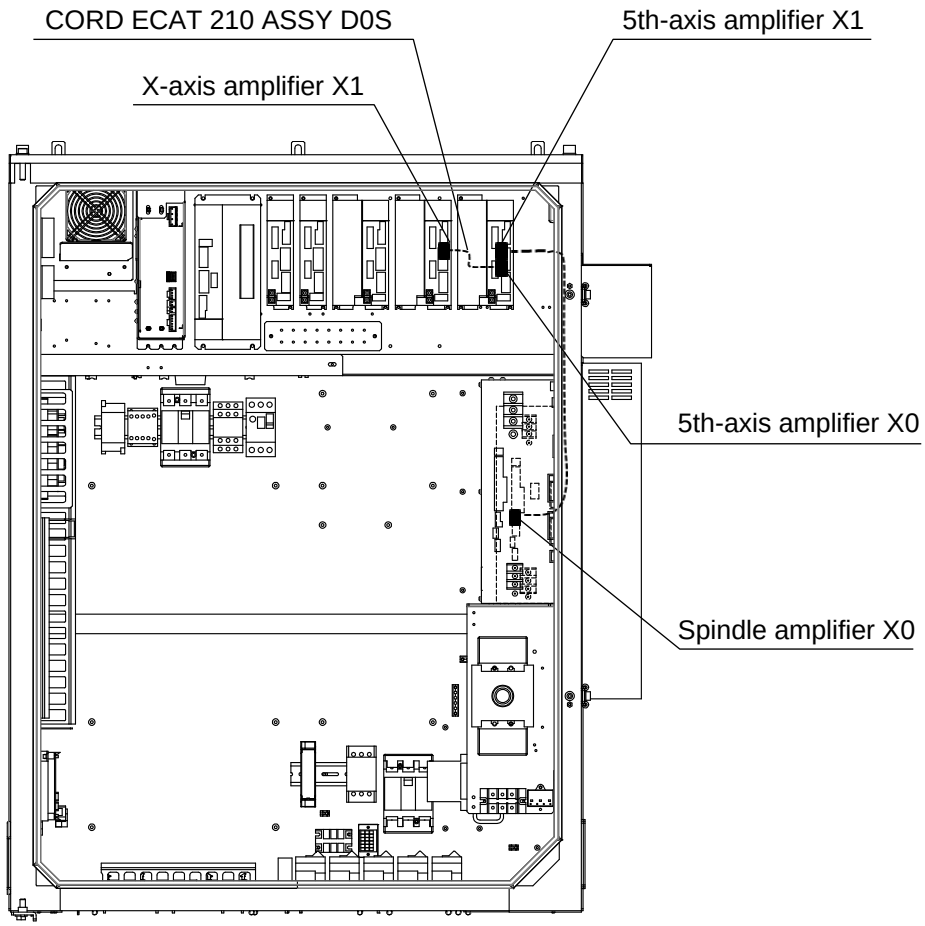


Control box front

Wiring for EtherCAT cord

(1) Change the connection for the cable that is connected to X1 for the X-axis amplifier to X1 for the 5th-axis amplifier.

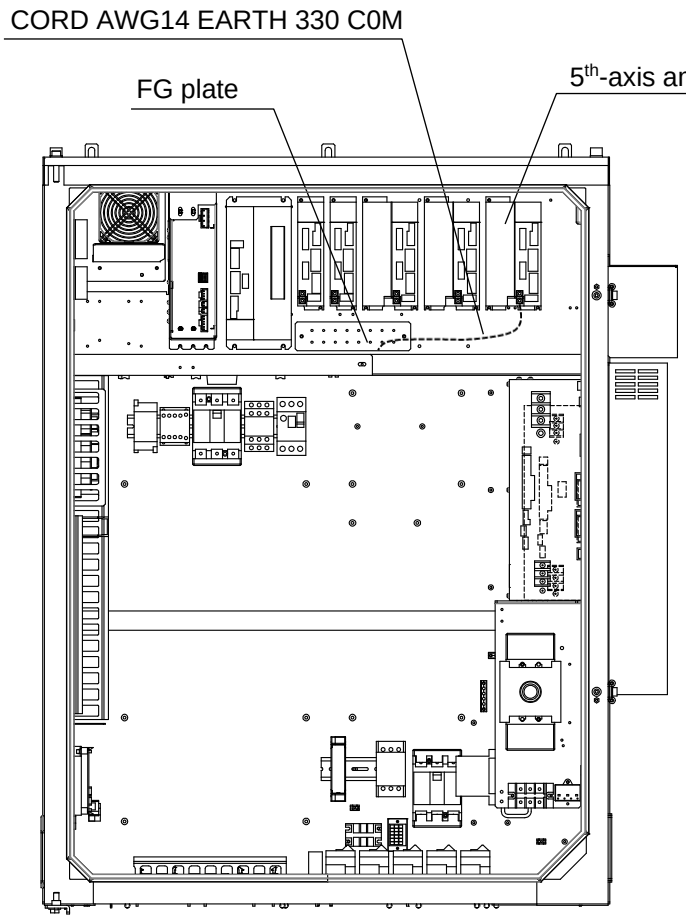
(2) Connect the CORD ECAT 210 ASSY D0S to X1 for the X-axis amplifier and X0 for the 5th-axis amplifier.



Control box front

Ground cord connection

(1) Connect the CORD AWG14 EARTH 330 COM to the ground terminal for the 5th-axis amplifier and FG plate.

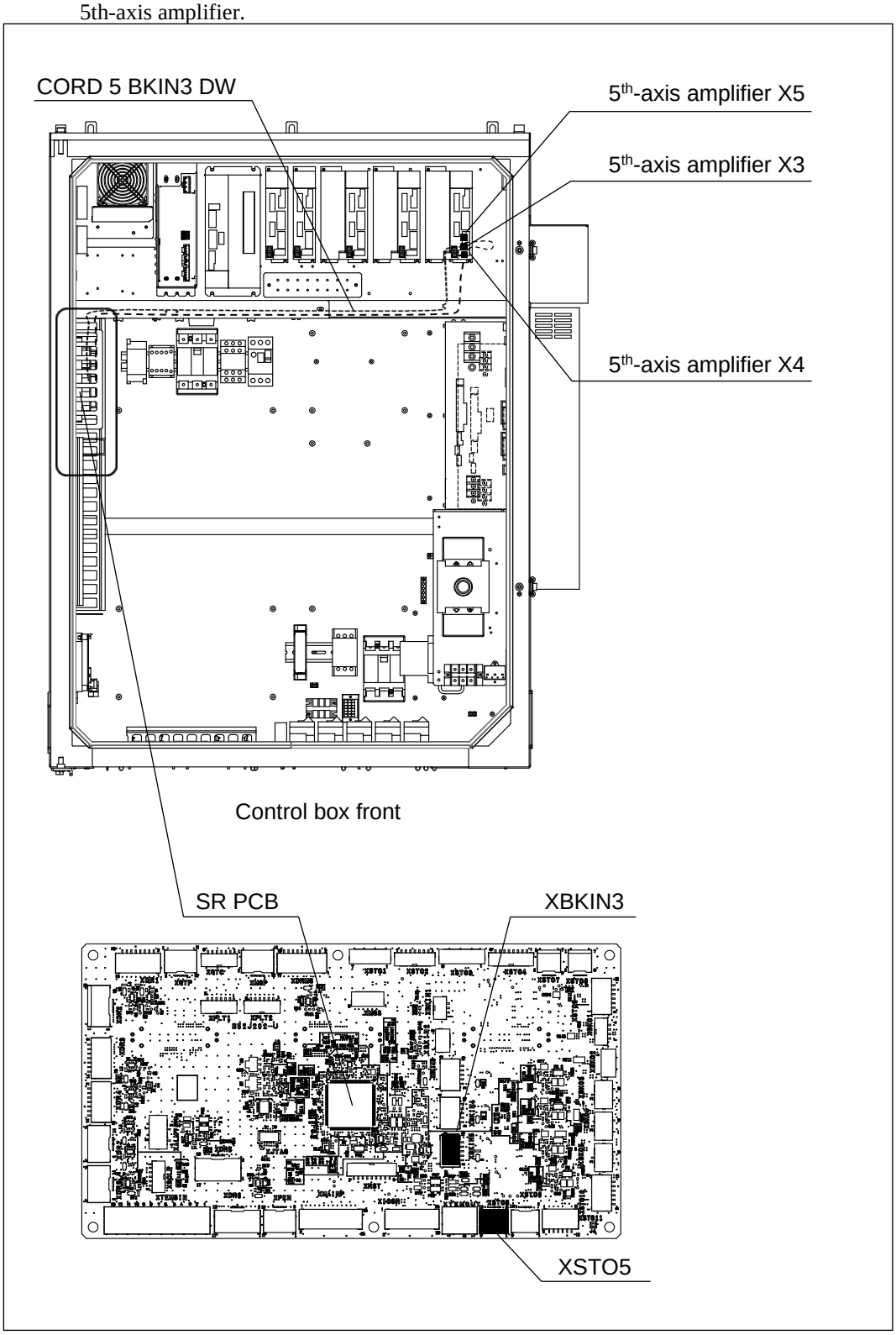


Control box front

Wiring for STO cord and brake IN cable

(1) Connect the CORD 5 BKIN3 DW to XSTO5 on the SR PCB and to X3 for the 5th-axis amplifier.

(2) Connect the CORD 5 BKIN3 DW to XBKIN3 on the SR PCB and to X5 for the 5th-axis amplifier.
At this time, connect the short cord provided with CORD 5 BKIN3 DW to the X4 for the 5th-axis amplifier.



2. Wiring for motor cable, etc
   (1) Remove screw (1) that secures A in Figure (b) to the control box, and tighten screw (2). (M4×Qty.2)
   (2) Slide up A (status shown in Figure (c)).
   (3) Run CORD 5 MOTOR CF L(R) through the opening and re-attach A. (M4×Qty.2)

Figure (a)

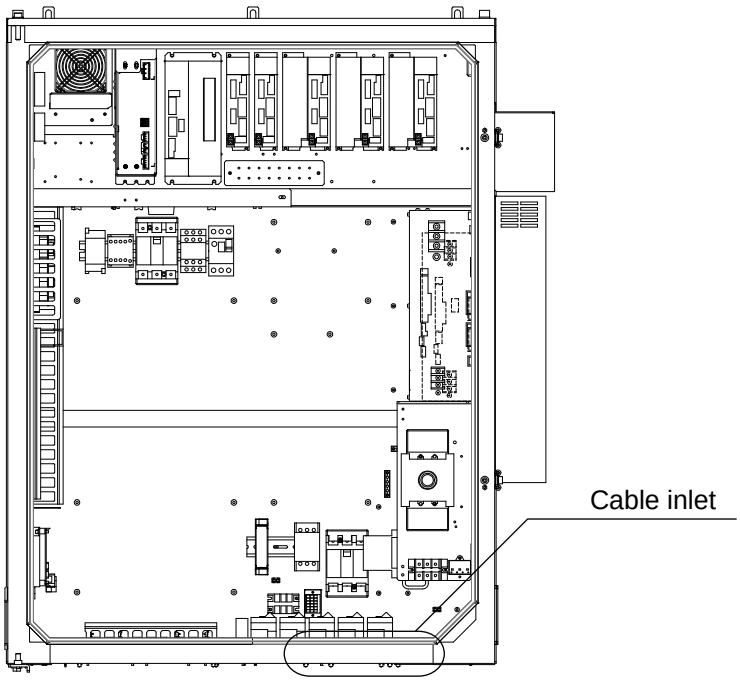


Figure (b)

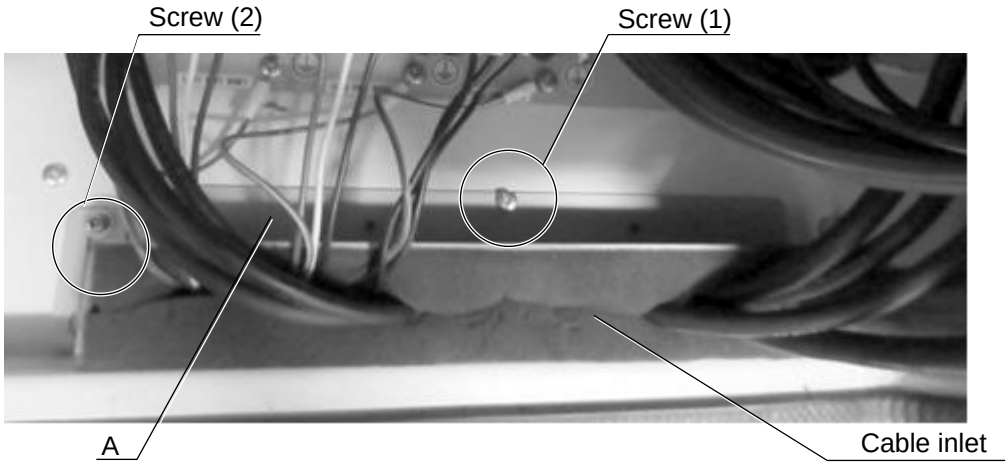
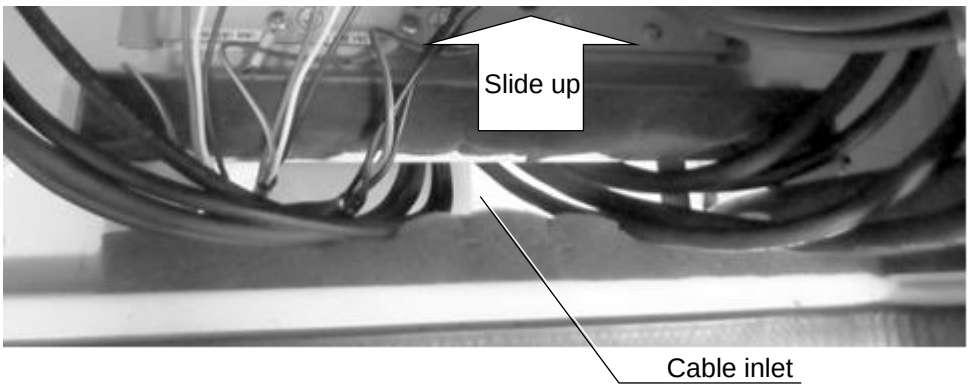
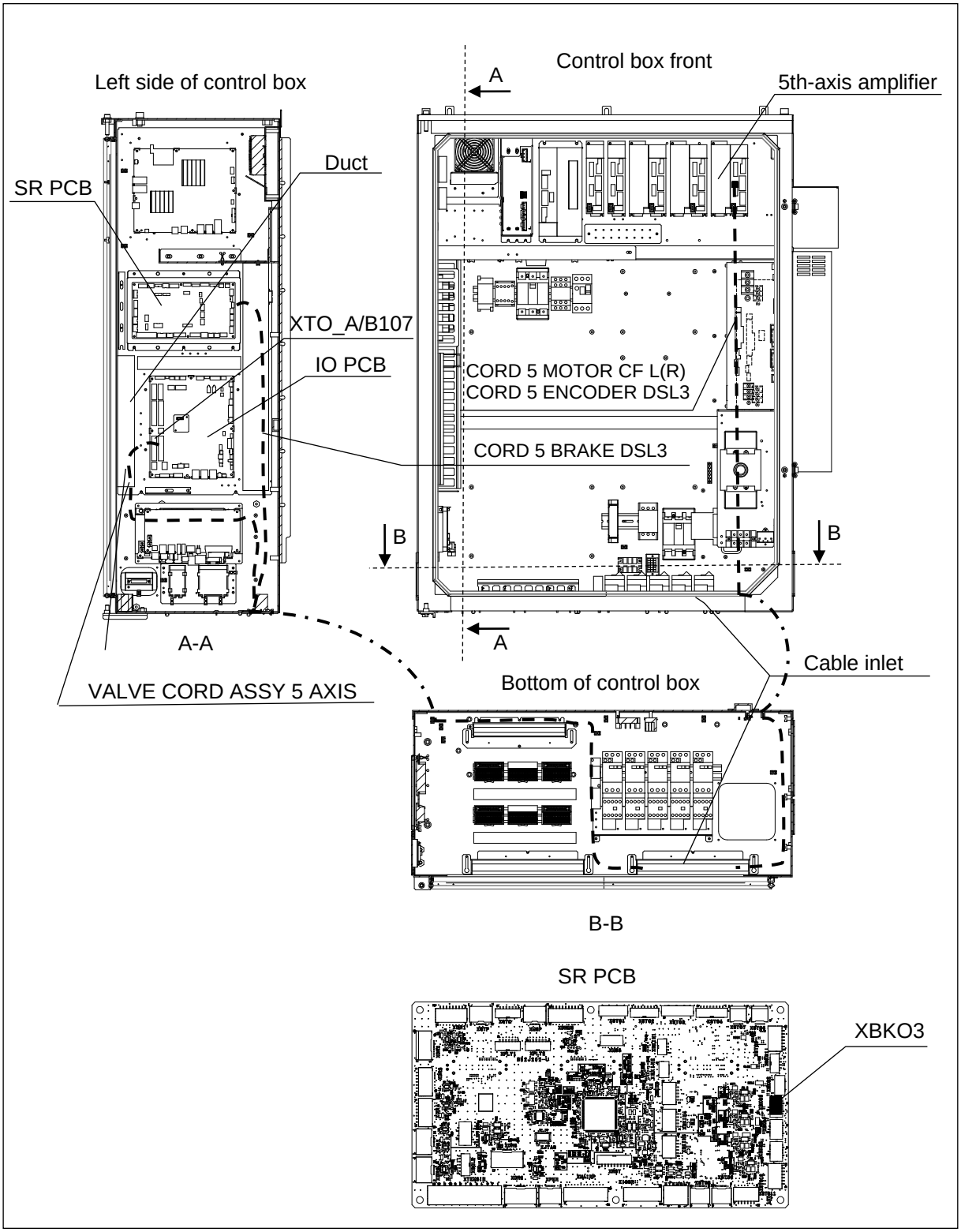


Figure (c)

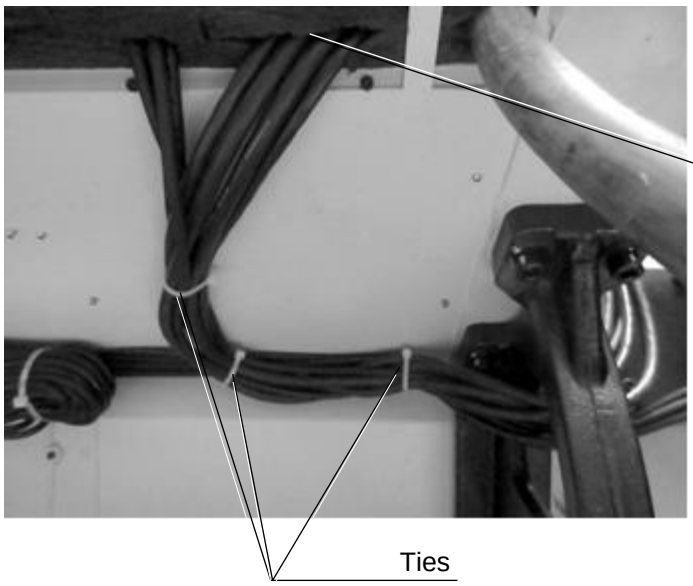


(4) Follow the instructions below and connect the motor cable, etc., to the control box.
  (i) Connect CORD 5 MOTOR CF L(R) to X11 for the 5th-axis amplifier.
  (ii) Use a screwdriver to tighten the screw on the connector (X11) for CORD 5 MOTOR CF L(R). (0.25 Nm)
  (iii) Connect CORD 5 ENCODER DSL3 to X2 for the 5th-axis amplifier.
  (iv) Connect CORD 5 BRAKE DSL3 to XBKO3 on the SR PCB.
  (v) Connect VALVE CORD ASSY 5 AXIS to the IO PCB.
  Refer to the table below for the connections on the IO PCB.

			5th-axis
Output	Unclamp output	PNP output	XTO_107
		IOG	XTIOG


Left side of control box
Control box front
A
5th-axis amplifier
SR PCB
Duct
XTO_A/B107
IO PCB
CORD 5 MOTOR CF L(R)
CORD 5 ENCODER DSL3
CORD 5 BRAKE DSL3
B
B
A-A
A
VALVE CORD ASSY 5 AXIS
Cable inlet
Bottom of control box
B-B
SR PCB
XBKO3

(5) Refer to the picture below and use ties to secure the loose cables on the bottom of the control box. (Recommended setup)



(NOTICE 1) CORD 5 MOTOR CF L(R) emits extremely powerful noise. Therefore, if bundled together with VALVE CORD ASSY 5 AXIS and CORD 5 BRAKE DSL3 in the cable setup, it will cause malfunction. Therefore, do not bundle them together.

(NOTICE 2) Bundling CORD 5 MOTOR CF L(R) and CORD 5 ENCODER DSL3 together with the power cord for the main power breaker causes noise. Therefore, do not bundle them together.

(NOTE) If the connections on the peripheral equipment are already being used, refer to “Chapter 5 External I/O signals” in the SPEEDIO Installation Manual and “Chapter 1 Data bank” in the Data Bank & Alarm Manual.

2.3 Parameter Setting

Set the parameters required for using and operating the rotary table.
There are two sets of parameters that need to be set: machine and user parameters.

2.3.1 Machine parameter

The machine parameters must be set to the appropriate values, otherwise the machine may become damaged.
Use the table below to set them to the recommended values. Be careful when setting the parameters because the recommended values are different for standard specifications and high inertia mode. (Refer to "1.3 List of Specifications" for further details.)
There are parameters for four axes: 5th-, 6th-, 7th- and 8th-axes. Set the parameter to the axis with the same number as the amplifier selection switch. The parameters are grouped together, and the phrase <*axis> refers to a parameter that applies to all four axes.

(NOTICE) The recommended values for "Pause after *-axis unclamp" are noted below.
- T-200Ad : 440

Please be careful when entering the values, because if the wrong value is entered, the clamp mechanism may become damaged.

Refer to "Chapter 7 Machine Parameter" in the SPEEDIO Installation Manual for further details on the parameter content and editing procedures.

Axis option and axis setting position

When using W1000Xd1

(System 1: common)

No.	Item name	Default value	Recommended value
118	EDM5 check time	0	500

(System 2: additional axis)

No.	Item name	Default value	Recommended value
1	Optional axis (5th-axis)	0	-
1	Optional axis (6th-axis)	0	-
1	Optional axis (7th-axis)	0	-
1	Optional axis (8th-axis)	0	-
2	Installation position (5th-axis)	0	0
2	Installation position (6th-axis)	0	0
2	Installation position (7th-axis)	0	0
2	Installation position (8th-axis)	0	0

(System 2: common)

No.	Item name	Default value	Recommended value
1	Additional axis stroke 2	0	0
2	Additional axis stroke 2 (-)	0	0
3	Additional axis stroke 2 (+)	0	0
4	Additional axis stroke 3	0	0
5	Additional axis stroke 3 (-)	0	0
6	Additional axis stroke 3 (+)	0	0
7	Additional axis stroke 4	0	0
8	Additional axis stroke 4 (-)	0	0
9	Additional axis stroke 4 (+)	0	0
10	Additional axis stroke 5	0	0
11	Additional axis stroke 5 (-)	0	0
12	Additional axis stroke 5 (+)	0	0
13	Additional axis stroke 6	0	0
14	Additional axis stroke 6 (-)	0	0
15	Additional axis stroke 6 (+)	0	0
16	Additional axis stroke 7	0	0
17	Additional axis stroke 7 (-)	0	0
18	Additional axis stroke 7 (+)	0	0
19	Additional axis stroke 8	0	0

No.	Item name	Default value	Recommended value
20	Additional axis stroke 8 (-)	0	0
21	Additional axis stroke 8 (+)	0	0
22	Additional axis stroke 9	0	0
23	Additional axis stroke 9 (-)	0	0
24	Additional axis stroke 9 (+)	0	0
25	Additional axis stroke 10	0	0
26	Additional axis stroke 10(-)	0	0
27	Additional axis stroke 10(+)	0	0

(System 2: additional axis)

No.	Item name	Default value	Recommended value	
			Standard	High inertia
3	Address	<5th-, 6th-axes: 0> <7th-, 8th-axes: 1>	<0:A, 1:B, 2:C> Set the value depending on the address being used.	
4	Machine zero return order	2	2	
5	Gear ratio	90	20	
6	Absolute encoder rotation direction	0	1*1	
9	Backlash compensation	0	Follow the parameter sheet to set the backlash compensation.	
10	Clamp mechanism	1	2	
11	Unclamp check input signal	0	2	
12	Clamp check input signal	0	0	
13	Unclamp output signal	1	0	
14	Unclamp check time	200	380	
15	Clamp check time	50	200	
16	Unclamp time during servo ON	0	0	
22	In-position width	800	2000	
23	In-position check time	0	0	
24	In-position timeout period	5000	5000	
25	Positioning end check angle	0.3	0.3	
26	Positioning check time	0	0	
27	Position check pulse	16000	6672	
28	Position check pulse (when cutting)	0	0	
29	Time for changing position check pulse	0	0	
30	Rapid feedrate	33.3	100.0	50.0
31	Manual speed	33.3	33.3	
32~34	Manual time constant 1/2/3	0	0	
35	Rapid feedrate (door open)	8.0	1.5	
36	Rapid feedrate (Outer pallet)	0.1	20.9	10.4
37~39	Rapid feed time constant 1A/2A/3A	200/50/0	150/60/0	150/30/0
40~42	Rapid feed time constant 1B/2B/3B			
43~45	Rapid feed time constant 1C/2C/3C			
46~47	Time constant change distance A/B	0.000	0.000	
48	Lower limit time constant	20	20	
49	Maximum cutting rotation speed	33.3	15.9	7.9
50	Brake	0	3	
51	Brake load test*2	0	1	
52	Load torque for brake load test	70	36	
59	Marked position for adjustment		0.000	
60	Wait time before applying brake in brake load test	1000	700	
62~64	Door open time constant 1/2/3	30/15/0	30/15/0	30/15/0
65	Adjustment mark	0	1	

*1 Change the rotation direction as necessary.

*2 When the brake load test is set to <1: Test> on axes where <Brake> (5th- to 8th-axis) is set to <0: None>, the alarm <<Machine param. setting error (SYS 2)>> (Stop level 4, cancel level 2) is triggered.

(NOTE) When changing the set value, refer to the inspection report and change the value for the pitch error compensation as well.

Pitch error compensation

No.	Item name	Default value	Recommended value
-	*-axis(1 to 400)	0	Follow the parameter sheet to set the pitch error compensation.
	Divisions for *axis pitch error correction interval	24	72

Servo (*-axis)

No.	Default value	Recommended value	
		Standard	High inertia
0*001	40	54	
0*002	40	54	
0*003	40	54	
0*004	40	54	
0*005	30	54	
0*006	30	54	
0*007	40	54	
0*008	-	54	
0*009	-	54	
0*011	100	320	
0*012	100	320	
0*013	100	320	
0*014	100	320	
0*015	50	320	
0*016	50	320	
0*017	100	320	
0*021	200	35	55
0*022	200	35	55
0*023	200	35	55
0*024	200	20	35
0*025	200	35	55
0*026	200	35	55
0*027	200	35	55
0*028	200	35	55
0*031	50	0	
0*032	100	0	
0*041	5000	5000	
0*042	5000	5000	
0*043	5000	5000	
0*044	5000	5000	
0*101	9	9	
0*102	2	2	
0*103	0	0	
0*104	5	5	
0*111	5	5	
0*112	0	0	
0*113	4000	4000	
0*114	0	100	
0*115	0	0	
0*116	0	100	
0*117	1500	800	
0*118	600	1600	

No.	Default value	Recommended value	
		Standard	High inertia
0*119	5000	5000	
0*120	4000	2800	
0*121	4000	700	
0*122	4000	900	
0*123	4000	1200	
0*124	4000	150	
0*125	4000	320	
0*126	4000	370	
0*127	0	0	
0*128	4000	4000	
0*129	4000	4000	
0*130	100	100	
0*131	300	300	
0*132	50	50	
0*133	30	30	
0*134	4000	4000	
0*135	800	800	
0*136	800	800	
0*137	3000	3000	
0*138	500	500	
0*139	50	50	
0*140	50	50	
0*141	1000	1000	
0*142	5	5	
0*143	2	2	
0*144	0	0	
0*145	0	300	
0*146	0	25	
0*147	1000	300	
0*148	250	250	
0*149	2147483647	2147483647	
0*150	90	90	
0*151	150	150	
0*152	2	2	
0*153	0	0	
0*154	0	2	
0*155	0	12	
0*156	0	14	
0*157	0	12	
0*158	0	15	
0*159	0	14	
0*160	0	14	
0*161	0	0	
0*162	20	20	
0*163	0	0	
0*164	500	500	
0*165	0	0	
0*166	4000	4000	
0*167	4000	480	
0*168	0	60	
0*169	50	50	
0*170	64	64	
0*171	0	0	
0*172	0	0	
0*173	0	0	
0*174	1	1	

No.	Default value	Recommended value	
		Standard	High inertia
0*175	2000	2000	
0*176	90	90	
0*177	80	80	
0*178	30	30	
0*179	500	500	
0*180	200	200	
0*181	8670	8670	
0*182	10110	10110	
0*183	11000	11000	
0*184	13500	13500	
0*185	11500	11500	
0*186	14500	14500	
0*187	20	20	
0*188	90	90	
0*189	120	120	
0*190	200	200	
0*191	200	200	
0*192	4000	250	
0*193	0	100	
0*194	9	9	
0*195	0	0	
0*198	4000	1800	
0*199	0	100	
0*200	4000	125	
0*201	0	15	
0*202	0	0	
0*203	0	0	
0*204	0	0	
0*205	0	0	
0*206	0	0	
0*207	0	0	
0*208	-	4	
0*210	0	0	
0*211	0	0	
0*212	0	0	
0*213	1	1	
0*214	0	0	
0*215	0	0	
0*216	1	1	
0*217	0	0	
0*218	1	1	
0*219	0	0	
0*220	2	2	
0*221	0	0	
0*222	0	0	
0*223	1	1	
0*224	1	1	
0*225	0	0	
0*226	0	0	
0*227	32768	32768	
0*228	32768	32768	
0*229	32768	32768	
0*230	17037	17037	
0*231	7	7	
0*232	3	3	
0*233	-4	-4	

No.	Default value	Recommended value	
		Standard	High inertia
0*234	-1	-1	
0*235	5000000	424000	216000
0*236	20	20	
0*237	50	50	
0*238	50	50	
0*239	0	0	
0*240	224	224	
0*241	-1	-1	
0*242	-1	-1	
0*243	-1	-1	
0*244	5000	5000	
0*245	5000	5000	
0*246	0	0	
0*247	0	0	
0*321	0	12	
0*322	0	0	
0*323	0	0	
0*324	0	1000	
0*325	0	1000	
0*326	0	0	
0*327	0	0	
0*328	0	2500	3500
0*329	0	0	
0*330	0	0	
0*331	0	0	
0*332	0	0	
0*341	0	1000000	
0*342	0	500	
0*343	0	250000	500000
0*344	0	0	
0*345	0	0	
0*346	0	0	
0*347	0	0	
0*351	0	1000000	
0*352	0	750	500
0*353	0	200000	250000
0*354	0	0	
0*355	0	0	
0*356	0	0	
0*357	0	0	
0*361	0	3	
0*362	0	0	
0*363	0	0	
0*364	0	0	
0*365	0	0	
0*366	0	1000	
0*367	0	4000	
0*368	0	18358	
0*369	0	0	
0*370	0	21347	
0*371	0	450	
0*372	0	0	
0*373	0	0	
0*374	0	0	
0*375	0	0	
0*376	0	800000	

No.	Default value	Recommended value	
		Standard	High inertia
0*377	0	9320	
0*401	0	0	
0*402	0	0	
0*403	0	0	
0*404	0	0	
0*405	0	0	
0*406	0	0	
0*407	0	0	
0*408	0	0	
0*409	0	0	
0*410	0	0	
0*411	0	0	
0*412	0	0	
0*441	0	0	
0*442	0	0	
0*443	0	0	
0*444	0	0	
0*445	0	0	
0*586	0	0	
0*587	210000	210000	
0*588	0	0	
0*592	0	0	
0*593	1000	1000	
0*594	0	0	
0*595	0	0	
0*596	0	0	
0*597	0	0	
0*598	0	0	
0*599	0	0	
0*600	0	0	

(High accuracy: common)

	Item name	Default value	Recommended value
9	High accuracy B additional axes	0	1

(High accuracy: additional axis)

	Item name	Default value	Recommended value	
			Standard	High inertia
1	Current check time	0.0	0.0	
2	Current tolerance	0	0	
3	Max. feedrate B	33.3	15.9	7.9
4	Speed to control acceleration/deceleration B	7293.0	3482.0	1730.0
5	Upper limit for corner acceleration B	30.0	1700.0	800.0
6	Speed difference B(min.)	0.1	1.0	
7	Speed difference B(max.)	0.1	1.0	
8	Speed difference command speed B (min.)	0.0	0.0	
9	Speed difference command speed B (max.)	33.3	15.9	7.9

2.3.2 User parameter

Set the parameters related to operating the rotary table. Change the default values as necessary. Be extremely careful when changing the settings because this data is important for machine operation. There are parameters for four axes: 5th-, 6th-, 7th- and 8th-axes. Set the parameter to the axis with the same number as the amplifier selection switch. The parameters are grouped together, and the phrase <*axis> refers to a parameter that applies to all four axes.

Refer to "1.5 User parameter" in the SPEEDIO Data Bank & Alarm Manual for further details on the parameter content and editing procedures.

(Switch 2: stroke)

No	Item name	Default value
1~4	*-axis stroke control	0
6~12	*-axis stroke (-) / (+)	0.000
13~26	Stroke limit 1 for *-axis (-) / (+)	0.000

(Switch 2: override)

No	Item name	Default value
509, 513, 517, 521	*-axis override rotation speed 1	0.0
510, 514, 518, 522	*-axis override rotation speed 2	0.5
511, 515, 519, 523	*-axis override rotation speed 3	5.0
512, 516, 520, 524	*-axis override rotation speed 4	10.0

(Switch 2: position signal output)

No	Item name	Default value
1009~1016	*-axis position signal output range(-) (+)	0.000

(Switch 2: single direction positioning)

No	Item name	Default value
1504~1507	*-axis single direction positioning excess travel amount (NC language only)	0.000

(Switch 2: external index)

No	Item name	Default value
2001	External index 1 switch address switching (NC language only)	0
2002	External index 1 axis indexing amount (+)	180.000
2003	External index 1 axis indexing amount (-)	-180.000
2004	External index 2 switch address switching (NC language only)	0
2005	External index 2 axis indexing amount (+)	180.000
2006	External index 2 axis indexing amount (-)	-180.000

2.3.3 External I/O signal setting (Example)

When using W1000Xd1

External output signals

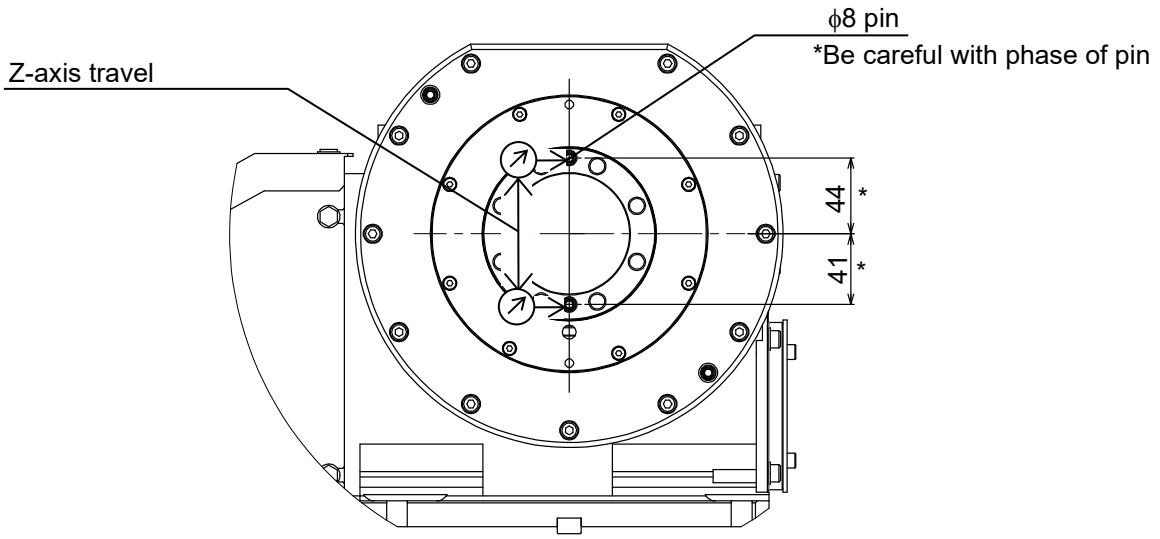
NO.107 UNCLP5 (107) Unclamp output (5^{th}-axis)

* Refer to "Chapter 5 External I/O signals" in the SPEEDIO Installation Manual and "Chapter 1 Data bank" in the SPEEDIO Data Bank & Alarm Manual for further details on the above setting procedure.

2.4 Procedure to Adjust Zero Point on Rotary Table

Adjust so that the ϕ8 pin holes (2 locations) on the table run parallel to the Z-axis.
Insert the ϕ8 pins into the pin holes, and check using Z-axis travel.
Be careful with the phase of the pins at this time.

1. Press the **[I/O]** key, enter "-9999" and press the **[ENT]** key.
2. Press **[Reset abso. ENC counter]** key to display the absolute reset screen.
3. Move the cursor, enter "1" for the "Operation item" on the axis to be adjusted, and press the **[ENT]** key.
4. Press the **[RST]** key.
5. Press the **[I/O]** key, enter "-9999" and press the **[ENT]** key.
6. Press **[Reset abso. ENC counter]** key to display the absolute reset screen.
7. Enter "2" for the "Operation item" on the axis to be adjusted, and press the **[ENT]** key.
8. Press the **[RST]** key.



0° position (machine coordinate) for additional axis

2.5 Inspection & Check

Periodic inspection check list

Period	Inspection item
Every day	Make sure that the oil level is at or above the indicated mark on the oil gauge.
Every month	Make sure that there is no abnormal noise or vibrations when rotating the rotation axis. Make sure that there is no abnormal wear on the air tube or flexible cable.
Every year	Replace the gear oil.

2.5.1 Startup inspection for rotary table

Gear oil level inspection
Check the gear oil level as shown in the figure below.

(NOTICE) When the oil level is below the center, refer to the next section on refilling the gear oil accordingly.

2.5.2 Refill and replace gear oil

When replacing or refilling the gear oil with the appropriate amount, open the oil plug and refill with the appropriate amount.
When discharging the gear oil, remove the plug for discharging.
When inserting the plug, re-apply new thread sealing tape.

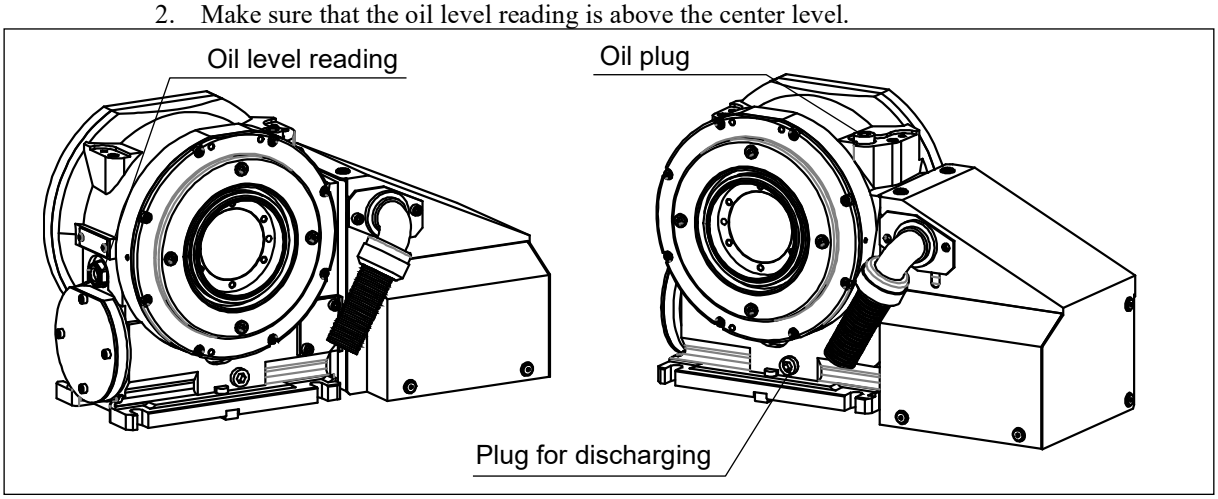
Recommended oil : Mobil SHC629 (Exxon Mobil)
Amount of oil : 600 cc (when replacing)

(NOTICE 1) Be sure to completely remove all chips, shavings and oil residue around the oil fill port before proceeding. This is to prevent chips, shavings or other contaminants from entering inside.
(NOTICE 2) The machine is lubricated with the recommended oil at the factory before shipment. When replacing or refilling the oil, do not use another type.
(NOTICE 3) Gear oil helps reduce consumption on the gear parts caused by friction. Gear oil helps extend the life and accuracy of rotary table.

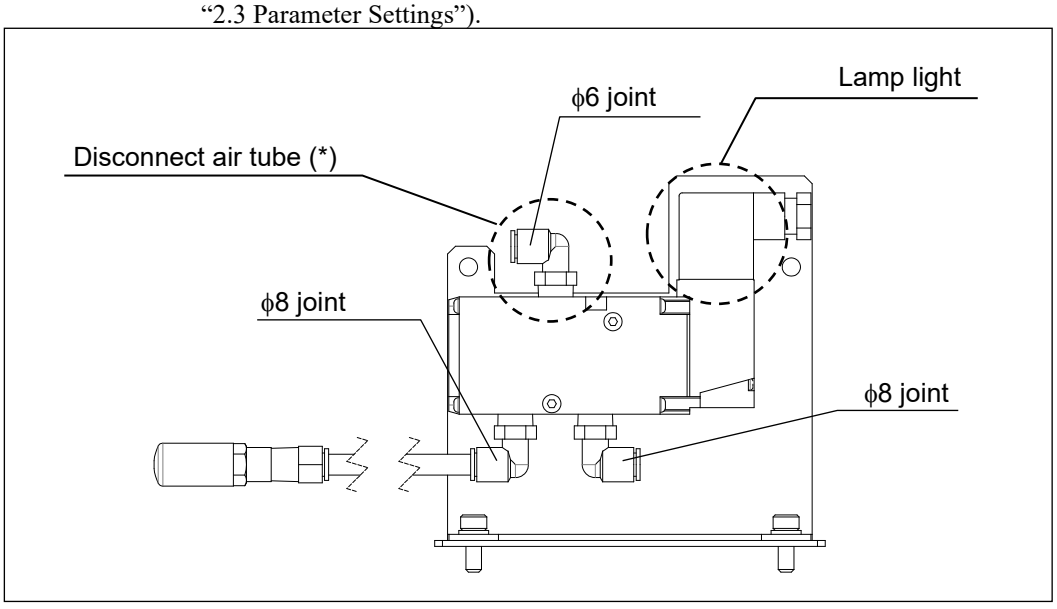
(NOTE) Do no flush gear oil down the sewer or drain. Ask a waste disposal company or contractor to properly dispose of the gear oil.

2.5.3 Installation and setup check

1. Make sure that there is no interference before rotating the rotary table.
2. Make sure that the oil level reading is above the center level.



3. After connecting the piping and valve that is provided with T-200Ad, check the following 3 points.
   (1) Check the lamp light for the solenoid valve.
      (i) Press the **[MDI]** key, enter the M code for the clamp command (refer to the table below for the M code), and press the start switch.
      (ii) Make sure that the valve lamp turns red.
      (iii) Press the **[MDI]** key, enter the M code for the unclamp command, and press the start switch.
      (iv) Make sure that the valve lamp turns off.
      If the valve lamp does not turn off, check the following points.
      - Check the wiring to the IO PCB for the valve cord (Refer to "2.2 Panel Wiring").
      - Check the settings for the machine parameter and external I/O signals (Refer to "2.3 Parameter Settings").



	Unclamp	Clamp
A-axis	M442	M443
B-axis	M440	M441
C-axis	M444	M445

(2) Check the sound of the air exhaust.
  (i) Press the **[MDI]** key, enter the M code for the unclamp command, and press the **[START]** switch.
  (ii) Make sure there is a sound coming from the silencer for the air exhaust at the back of the machine (column side). (The moment that the switch is pressed, there is a sound of air escaping in a single burst.)

(3) Check the clamp air.
  (i) Press the **[MDI]** key, enter the M code for the unclamp command, and press the **[START]** switch.
  (ii) Remove the air tube connected to the T-200Ad unit side from the valve. (Refer to the asterisk* in the figure above to confirm the removal location.)
  (iii) Press the **[MDI]** key, enter the M code for the clamp command, and press the **[START]** switch.
  (iv) Make sure that the air exhaust is making a sound from the valve.
  (v) Press the **[MDI]**key, enter the M code for the unclamp command, and press the **[START]** switch.
  (vi) Re-connect the air tube that was removed from the valve. Make sure that the air tube is inserted all the way inside the joint, and then pull on it to ensure it does not come off.

  (NOTICE) After the clamp command execution, the air with an approximate pressure of 0.5 MPa discharges from the air tube. Wear glasses to make sure that dust or other contaminants that shoot out from the air do not get into your eyes.

4. Rotate the rotary table, and make sure that there is no abnormal noise or vibrations.

  (NOTE) Make sure that the opening speed is slow when in machine setup mode and when the front door and the side door (option) are closed. When the door is opened in machine setup mode, the axes will not move unless enable is pressed.

CHAPTER 3

MEMORY OPERATION

3.1 Memory Operation

3.1 Memory Operation

The rotary table can be rotated in memory operation using positioning or the cutting feed.
Refer to the SPEEDIO Programming Manual (NC) for further details.

The rotary table is equipped with a clamp mechanism. It unclamps before travel, and clamps once travel is complete. The unclamp and clamp operations are carried out automatically, and as a result, there is no need to issue a command in the program.

If performing light cutting, machining is possible while unclamped.
When an M code unclamp command below is issued, it unclamps, and thereafter, the unclamp/clamp operation is automatically carried out. Use the M codes to perform light cutting and reduce the cycle time.

	Unclamp	Clamp
A-axis	M442	M443
B-axis	M440	M441
C-axis	M444	M445

After performing one of the following operations, it clamps and returns to the setting that carries out the unclamp and clamp operations automatically.

- Issue an M code clamp command
- Issue (an M30) command to end memory operation
- Press reset key

Program example:
When the following program is executed, the unclamp or clamp operation is not carried out during A-axis travel for N1.
During A-axis travel for N2, it unclamps before travel and clamps after travel is complete.

```
G90 G54;
G0 X0.000 Y0.000 A0.000;

M442;

N1 G0 A90.000;
G1 X-10.000 F500;
G1 Y-10.000;

M443;

N2 G0 A180.000;
G1 X-20.000 F500;
G1 Y-20.000;

M30:
```

CHAPTER 4

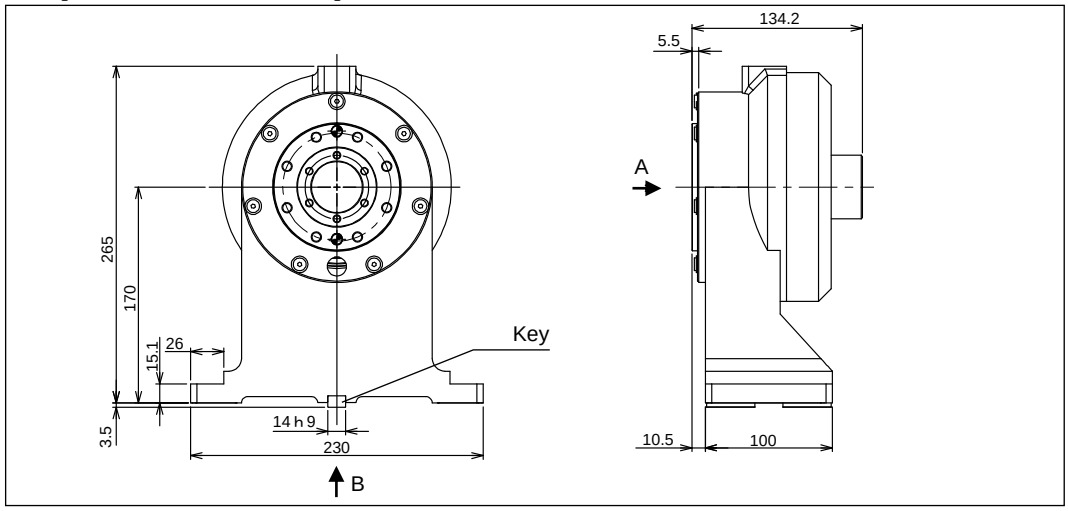
SUPPORT TABLE

4.1 List of Specifications

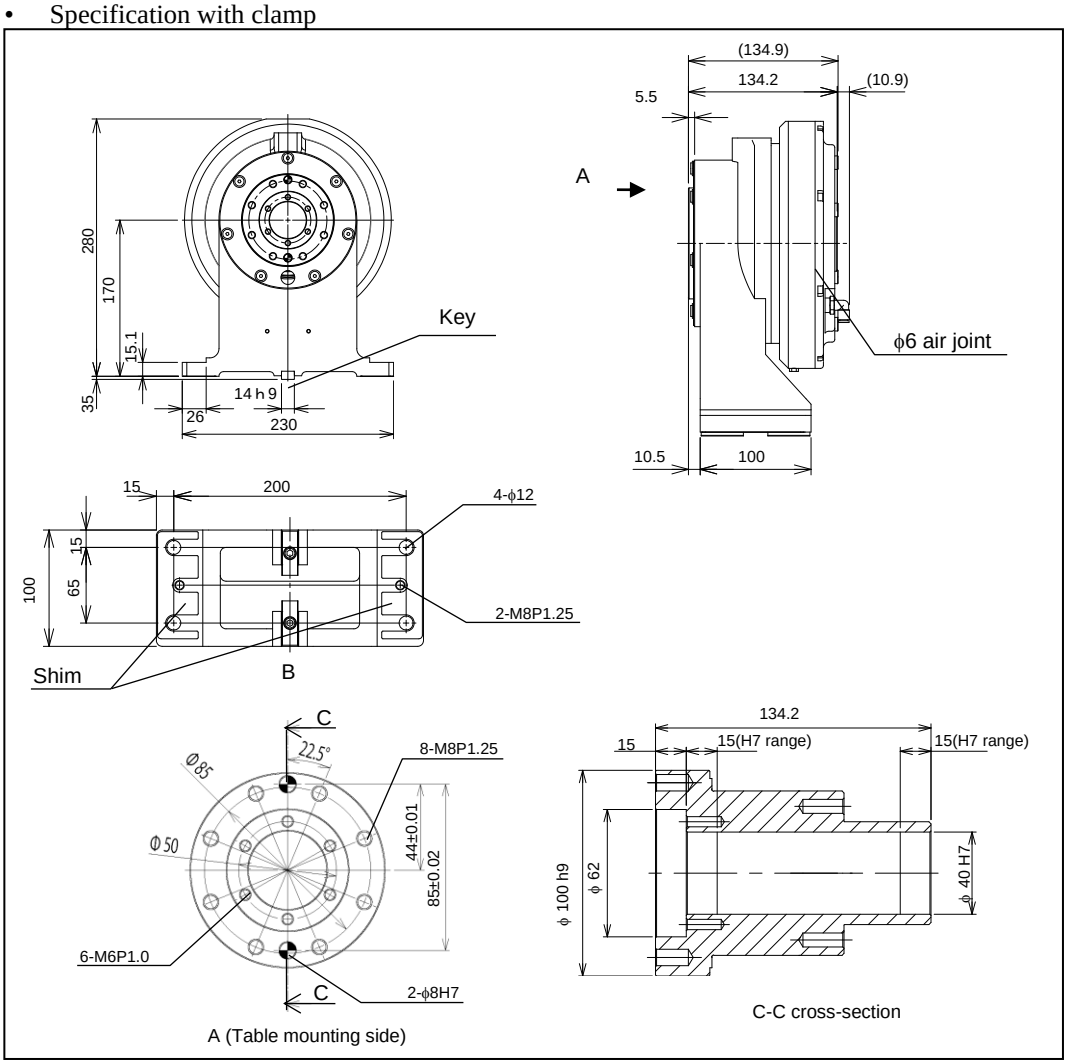
	Specification without clamp	Specification with clamp
Clamp system	-	Pneumatic
Clamp torque	-	330 Nm (When 0.5 MPa)
Unit weight	21 kg	28 kg

4.2 External View and Main Dimensions

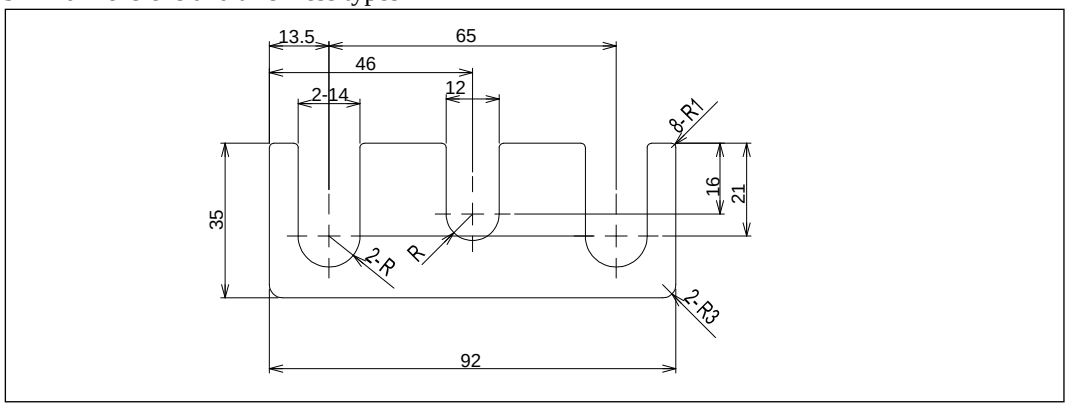
- Specification without clamp



- Specification with clamp



Shim dimensions and thickness types



4.3 Installation

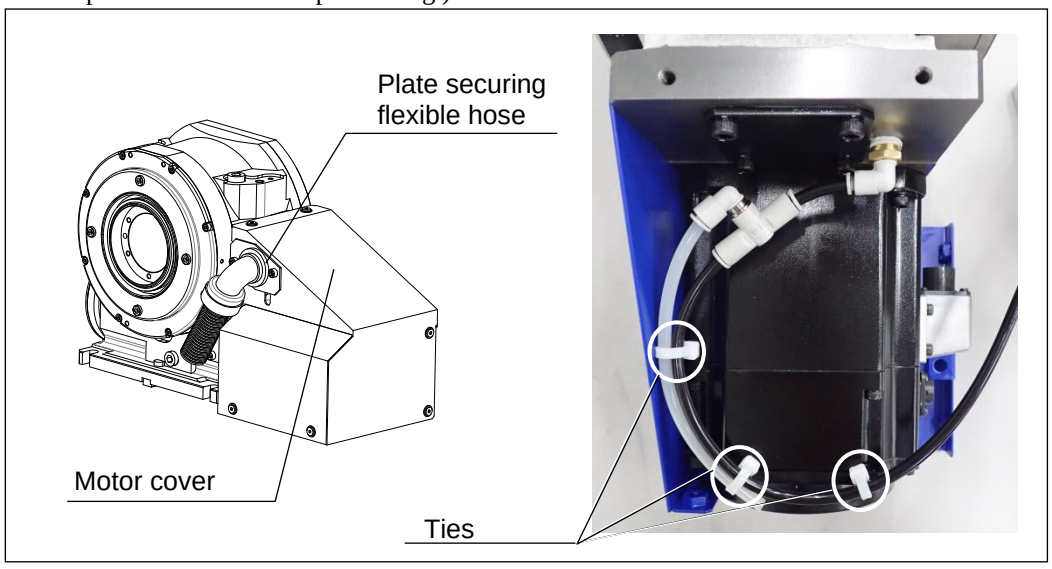
When using a specification without support clamp

1. Press the **[EMERGENCY]** switch.
2. Put the support table onto the table or onto the jig (provided by the customer) and secure it. Tightening torque is: 57.8 Nm (590 kgf·cm)
   - Make sure that there are no contaminants or burrs on the mounting side when installing.
   - A shim, adjusted to the rotary table unit and height, is provided for the support table. Set it below the support table and secure.
3. There is a difference between the rotation center position for the rotary table unit and the rotation center position on the support table. Adjust that difference so it is within 10 μm in the forward-backward direction and in the height. Measure the position from the surface on the circumference of the output axis.

When using a specification with support clamp

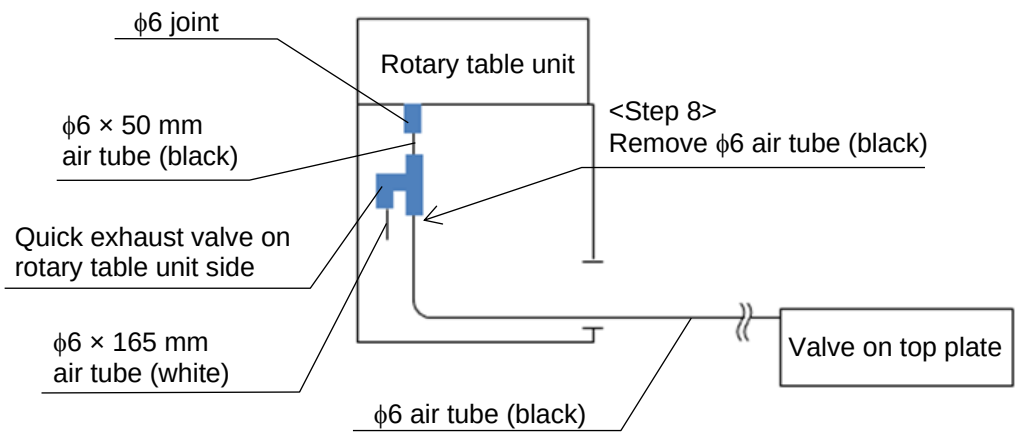
* Use the same procedure as in the specification without support clamp for steps 1 through 3.

4. Stop the air on the machine.
5. Remove the plate that secures the flexible hose on the rotary table unit side. (Socket bolt M6×Qty.2)
6. Remove the motor cover on the rotary table unit side. (Low head bolt M6×Qty.6, flat washers × Qty. 6)
7. Cut the ties at the three places that secure the air tubing on the rotary table unit side. (Refer to the picture below for the positioning.)

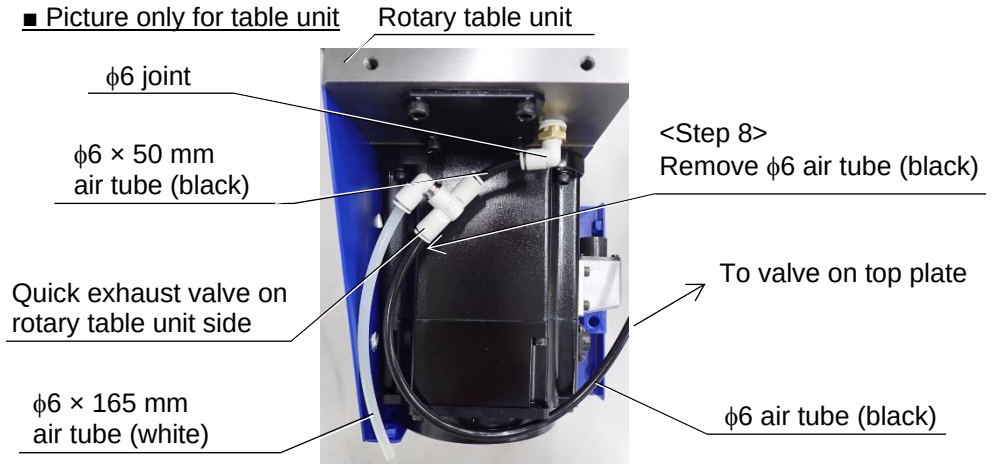


8. Remove the ϕ6 air tube (black) on the valve side for the top plate, which is connected to the quick exhaust valve on the rotary table unit.

■ Layout only for table unit



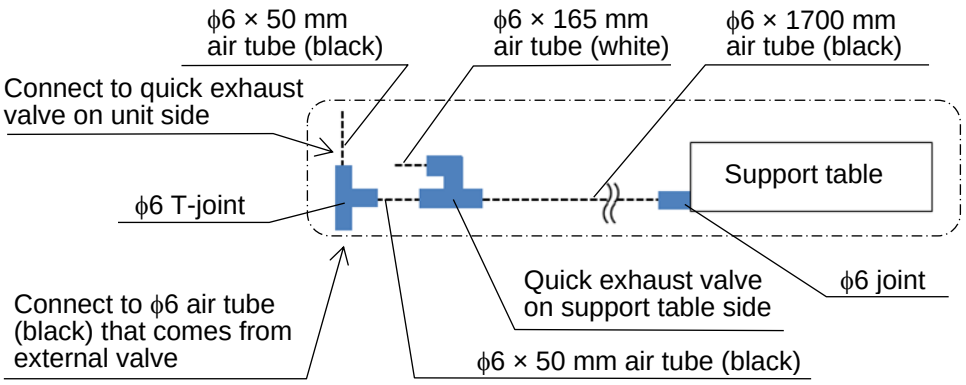
■ Picture only for table unit



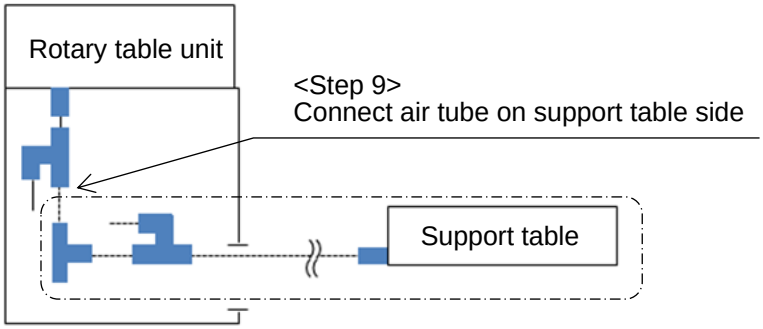
4

9. Connect the ϕ6 air tube (black) on the joint side of the support table to the quick exhaust valve on the rotary table unit.

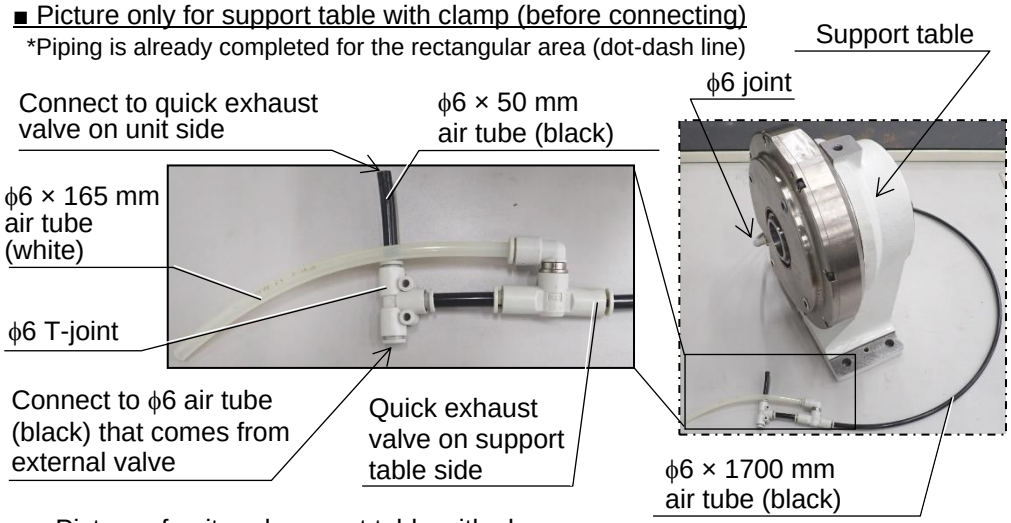
■ Layout only for support table with a clamp (before connecting)
*Piping is already completed for the rectangular area (dot-dash line)



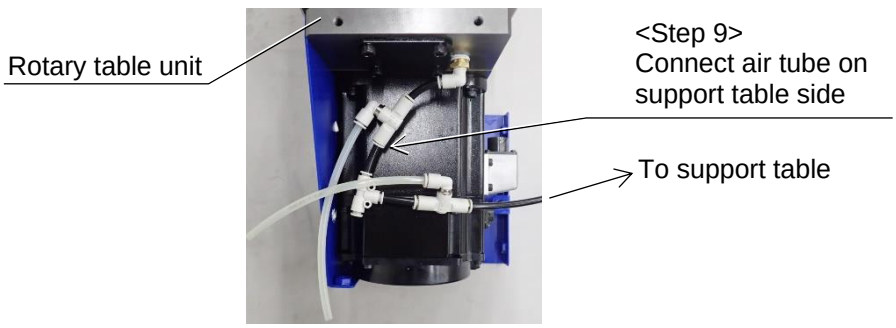
■ Layout of unit and support table with a clamp



■ Picture only for support table with clamp (before connecting)
*Piping is already completed for the rectangular area (dot-dash line)

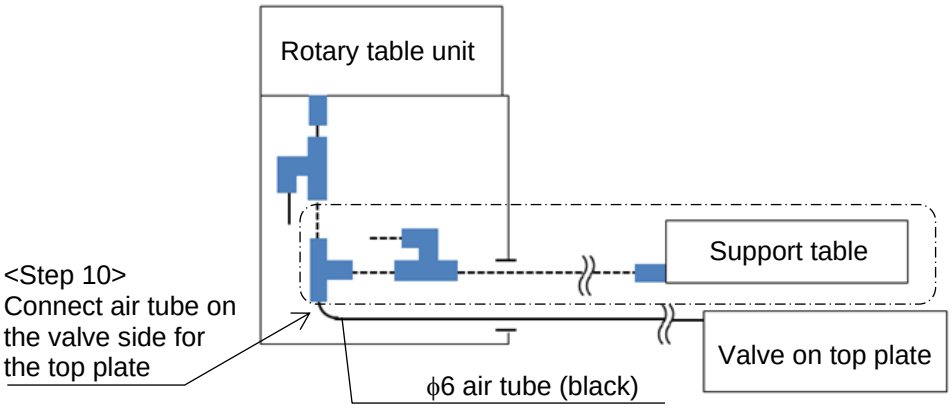


■ Picture of unit and support table with clamp

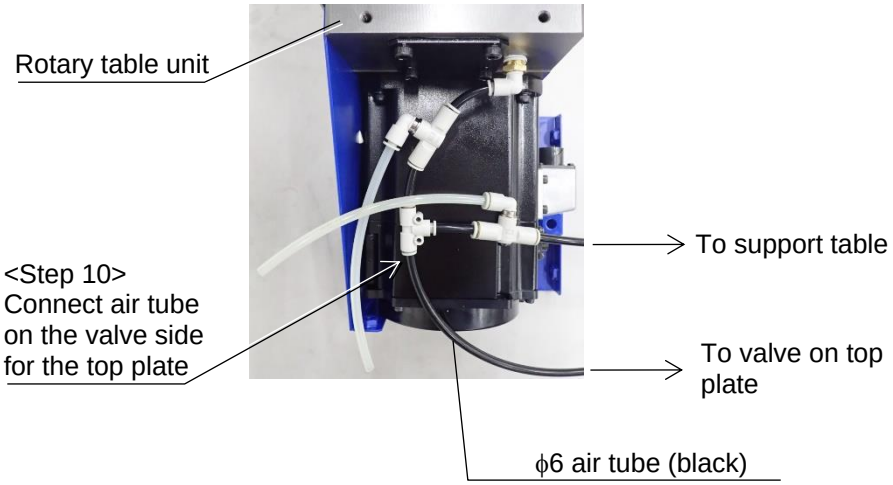


10. Connect ϕ6 air tube (coming from top plate valve) to the joint on the support table.

■ Layout of unit and support table with a clamp (after connecting)

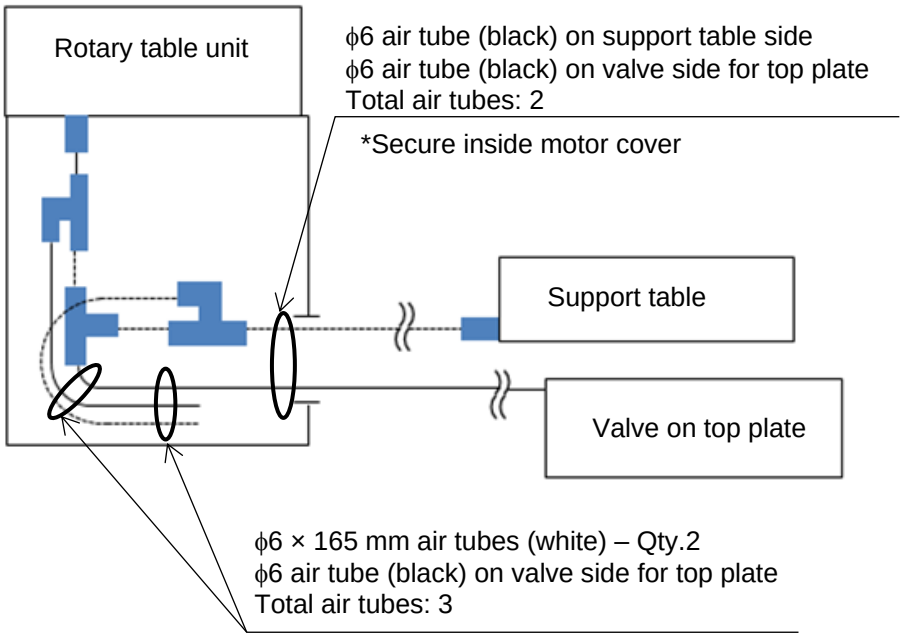


■ Picture of unit and support table with clamp (after connecting)

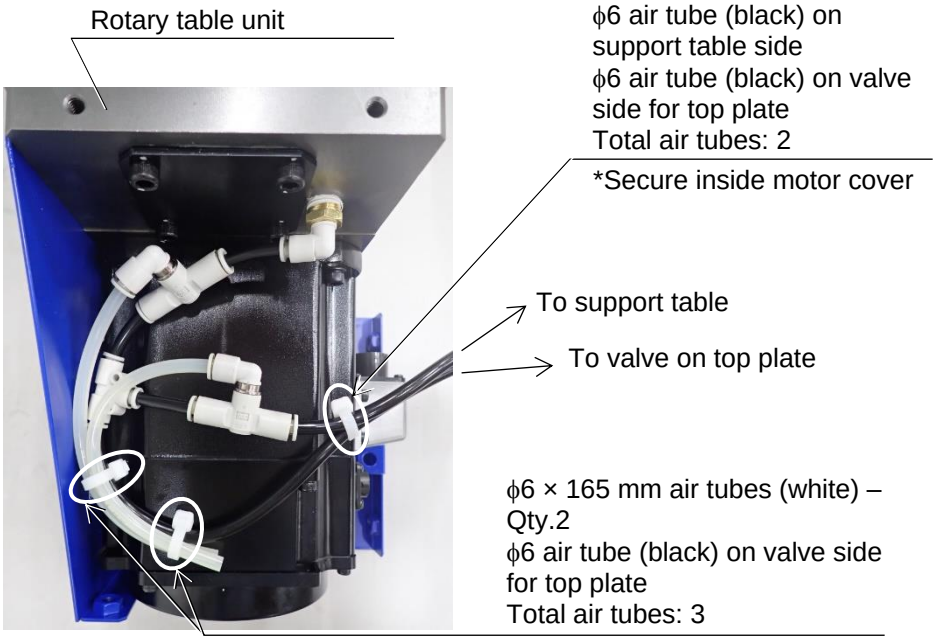


11. Use the ties to secure the ϕ6 air tubing at 3 places as shown in the figure.

■ Securing the air tubing with ties

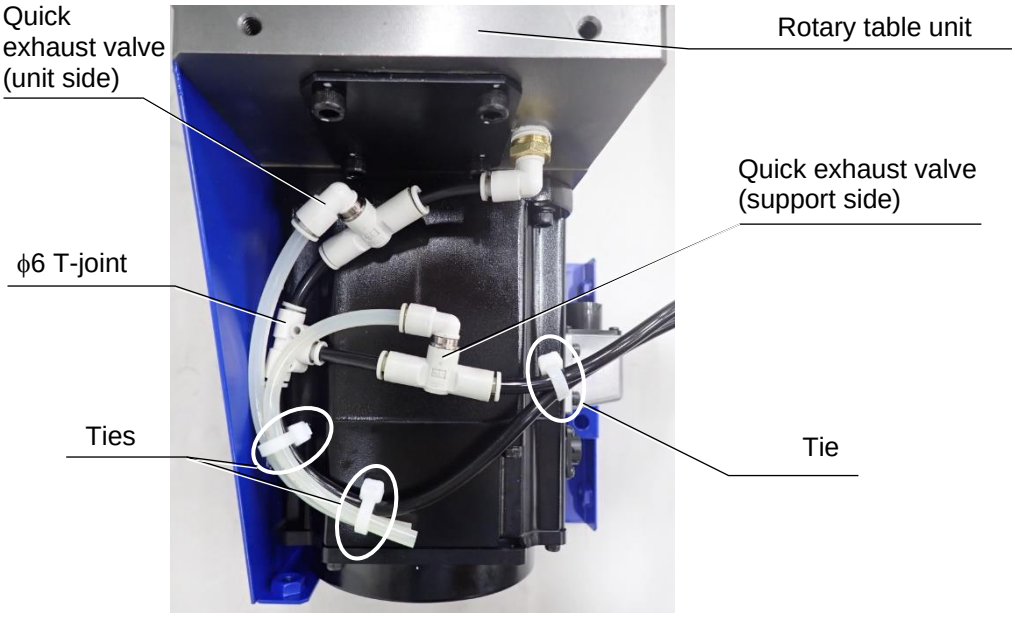


■ Securing the air tubing with ties (picture)

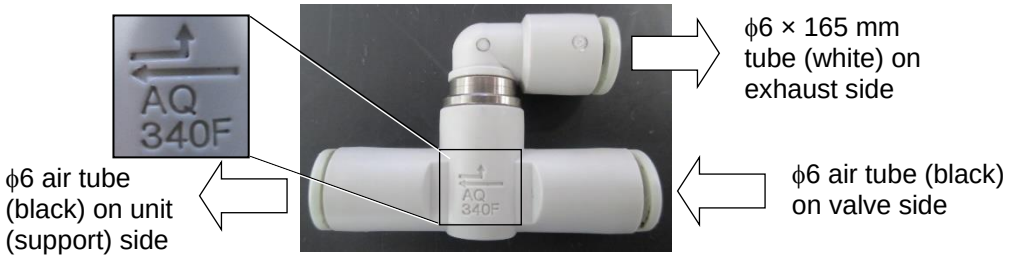


12. Make sure that piping is installed appropriately based on the figure below and the pneumatic circuit diagram.

■ Checking piping for unit and support table with a clamp

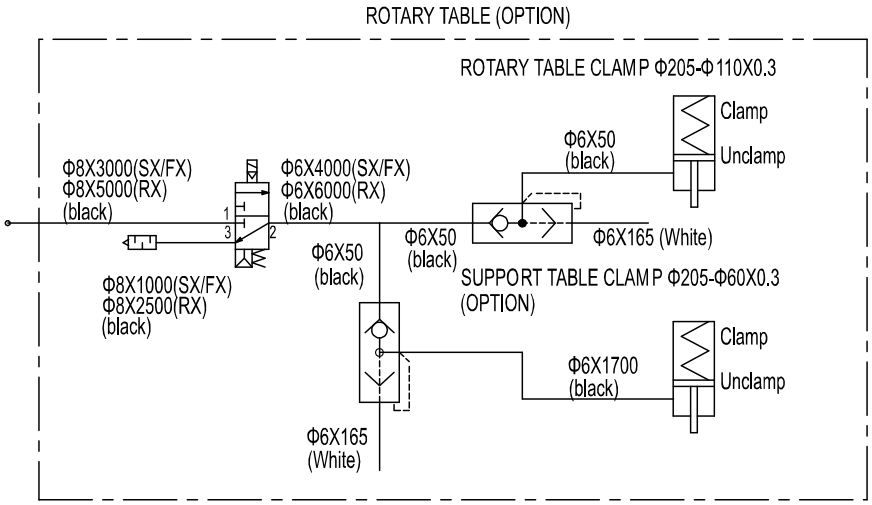


■ Checking orientation of quick exhaust valve

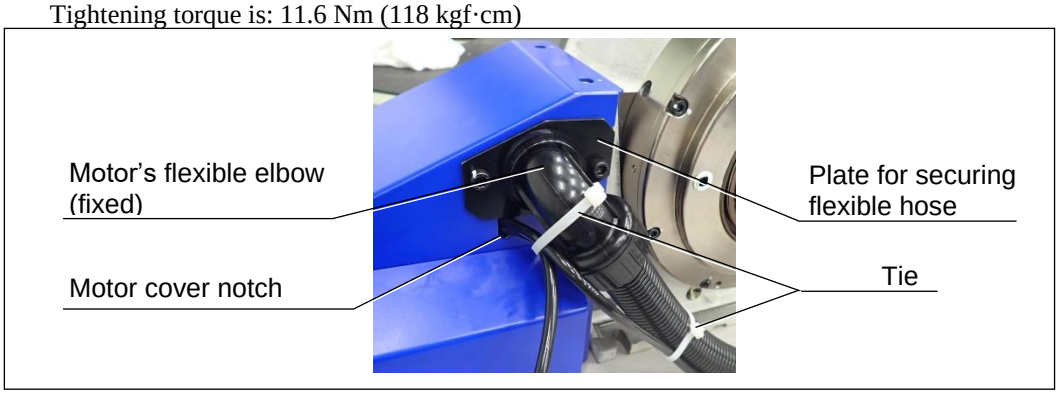


* Make sure that the quick exhaust valve is installed so the unit (support) is piped in the direction of the arrow and the valve side is piped on the opposite side.

■ Pneumatic circuit diagram (unit & support with clamp specification)



13. Pass the two air tubes through the notch on the motor cover.
14. Pass the motor cord through the cover hole so it does not get smashed and cover with the motor cover.
15. Secure the motor cover with bolts. (Low head bolt M6×Qty.6, flat washers × Qty. 6)
    Tightening torque is: 3.33 Nm (34 kgf·cm)
16. Secure the flexible hose plate. (Socket bolt M6×Qty.2)
    Tightening torque is: 11.6 Nm (118 kgf·cm)



17. Use a tie to secure the two air tubes to the motor's flexible elbow (fixed).
18. Use a saddle or similar item to secure the air tube, which connects to the clamp on the support table side. (Customer makes arrangements)
19. Adjust the air tube setup. Make sure that the air tube is set up so that it does not interfere with the jig or workpiece. It is dangerous to leave the tube setup unadjusted, because the air tube may get caught on a rotating part and damage or cut the air tube.
20. Turn on the air on the machine. When the orientation of the quick exhaust valve is reversed, it constantly makes a sound that air is leaking on the exhaust side. If this occurs, re-install the quick exhaust valve so that it is fitted in the proper direction.
21. Check the air exhaust. Refer to item in section 2.5.3 3.(2), and after entering the M code, press the **[START]** switch. Make sure that there is a sound coming from the silencer for the air exhaust at the back of the machine and from inside the motor cover.

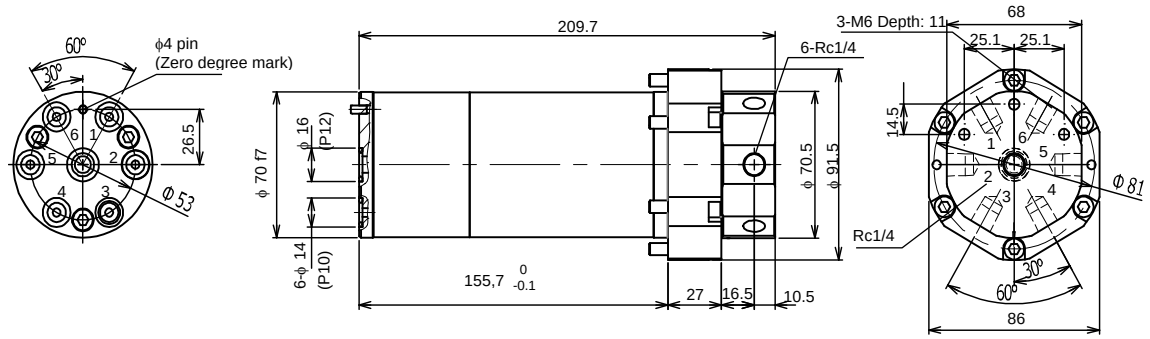
CHAPTER 5

ROTARY JOINT

5.1 List of Specifications

Maximum operating pressure	Oil	7.0 MPa
	Air	1.0 MPa
	Coolant	0.3 MPa
Speed	100 min^{-1}	
Operating temperature	0 to 40°C	
Minimum access area	Ports (1) to (6)	12.6 mm^2
	Center port	50.3 mm^2
Fluids used	Ports (1) to (6)	General hydraulic fluid or air
	Center port	Coolant
Weight	6.2 kg	

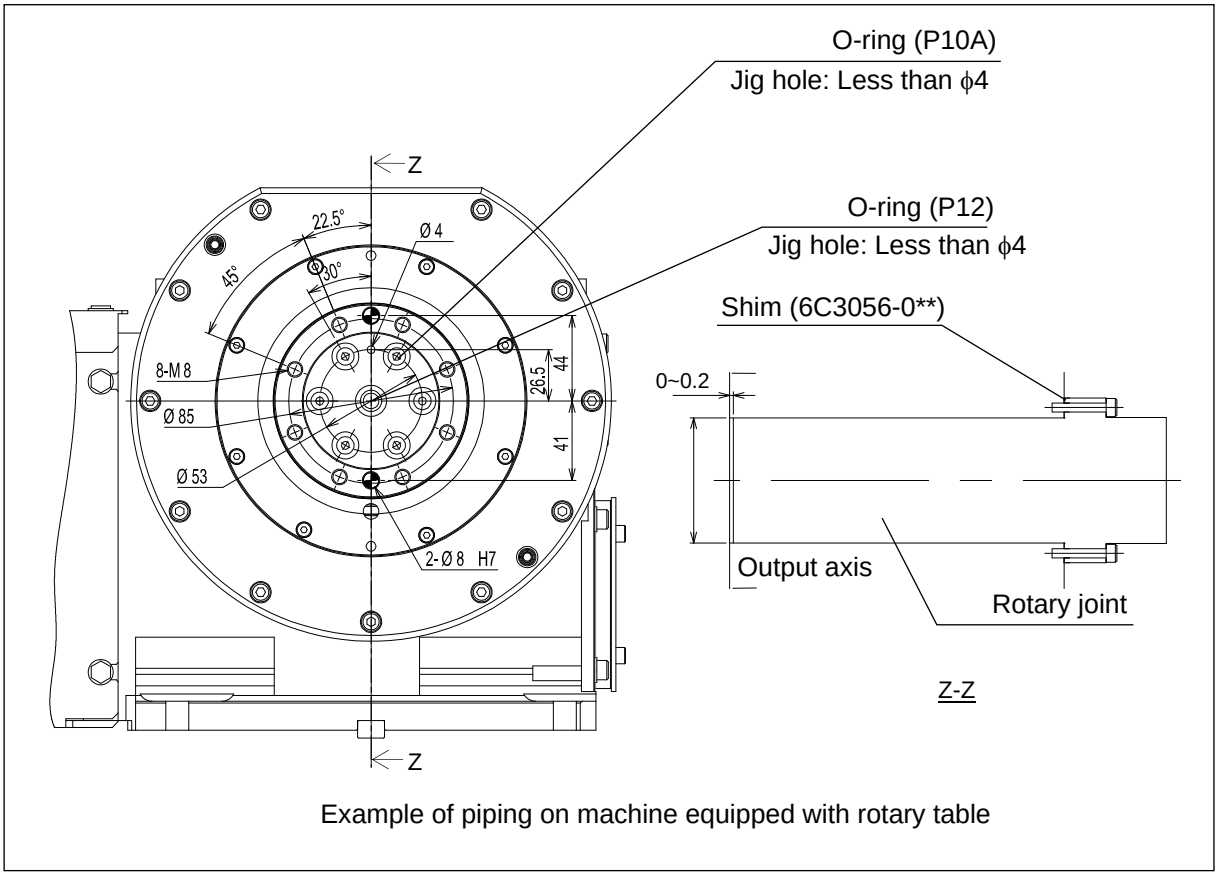
5.2 External View and Main Dimensions



External view of rotary joint

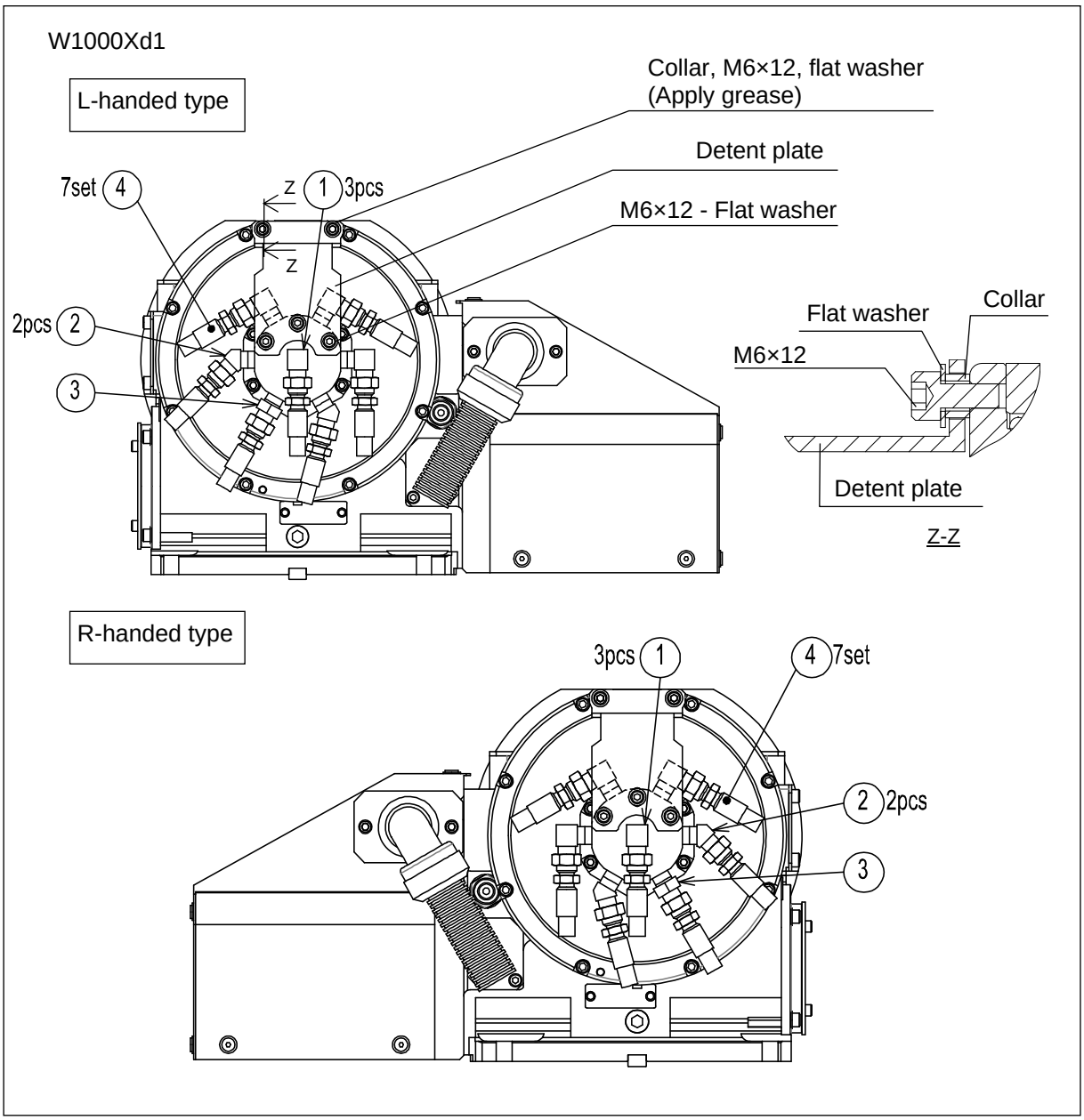
5.3 Installation

1. Align the phase of the ϕ4 holes on the jig plate side and the rotary joint side, and then insert into the center hole for the rotary table and secure the rotary joint to the unit. (M6×30…Qty.6)
   Tightening torque is: 11.6 Nm (118 kgf·cm)
   * A shim for adjusting the height difference on the rotary joint end is not required for the T-200Ad.
2. Attach the O-rings (Qty.7) to the rotary joint.
3. Attach the piping to each port. (Customer must make arrangements for piping.)
   * Use a plug to cover the unused ports.
4. Use the collar to attach the detent plate to the unit. (M6×12…Qty.2, flat washer M6…Qty.2, collar…Qty.2)
   Tightening torque is: 11.6 Nm (118 kgf·cm)
   At this time, apply grease to the collar.
5. Attach the detent plate to the rotary joint. (M6×8…Qty.3)
   Tightening torque is: 11.6 Nm (118 kgf·cm)
6. Rotate the unit's axis, and make sure that there is no abnormal noise.
   Make sure that there is no oil or air leak.



Example of piping on machine equipped with rotary table

	Part description	Manufacturer	Model	Max. working pressure	Min. burst pressure	Min. bending R
1	Screw-in type adapter (Elbow)	Ihara Science	SHL201-02×02	-	-	-
2	Screw-in type adapter (45° elbow)	Ihara Science	SHL211-02×02	-	-	-
3	Screw-in type adapter (Straight)	Ihara Science	SHA201-02×02	-	-	-
4	High-pressure hose	Sumitomo Riko	Hose: SIB210-6 Mouthpiece: No.4	20.5MPa	102.5MPa	50mm


W1000Xd1
L-handed type
Collar, M6×12, flat washer
(Apply grease)
Detent plate
M6×12 - Flat washer
7set
4
Z
1
3pcs
Z
2pcs
2
3
Flat washer
Collar
M6×12
Detent plate
Z-Z
R-handed type
3pcs
1
4
7set
2
2pcs
3

ロータリーテーブル
ROTARY TABLE
T-200Ad

パーツリスト
PARTS LIST

ブラザー工業株式会社
BROTHER INDUSTRIES, LTD.

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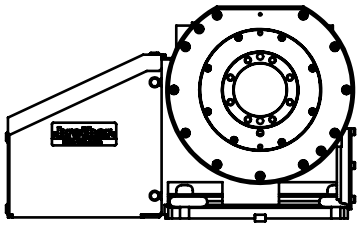
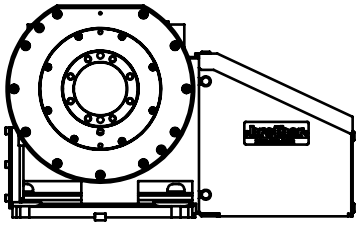
ロータリーテーブル T-200Ad パーツリスト
ROTARY TABLE T-200Ad PARTS LIST

目次 (CONTENTS)

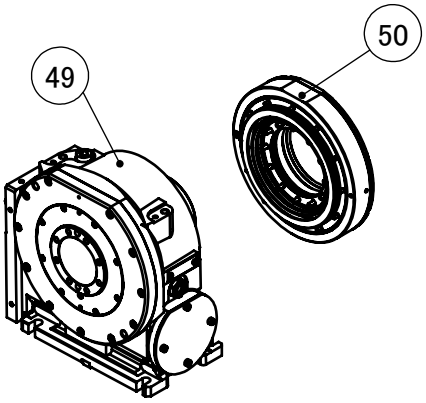
1.ロータリーテーブル
ROTARY TABLE

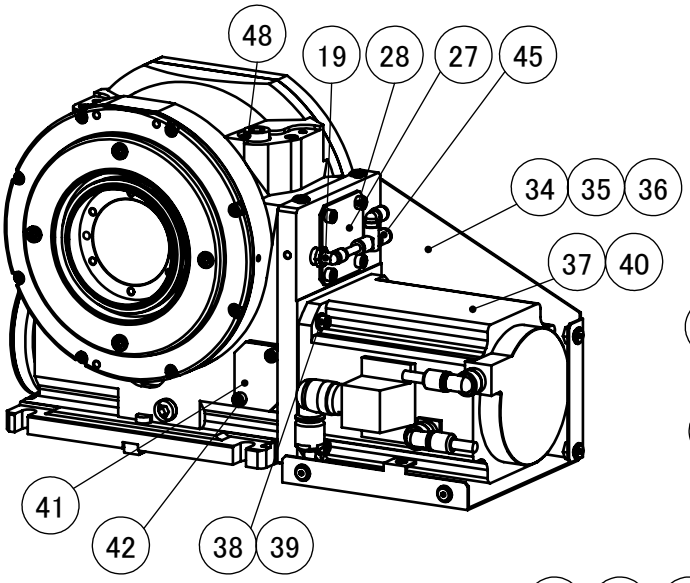


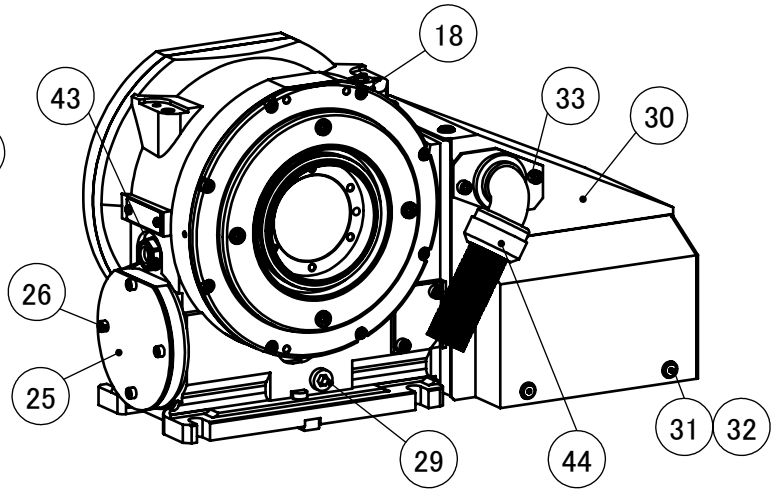
L勝手　L handed type

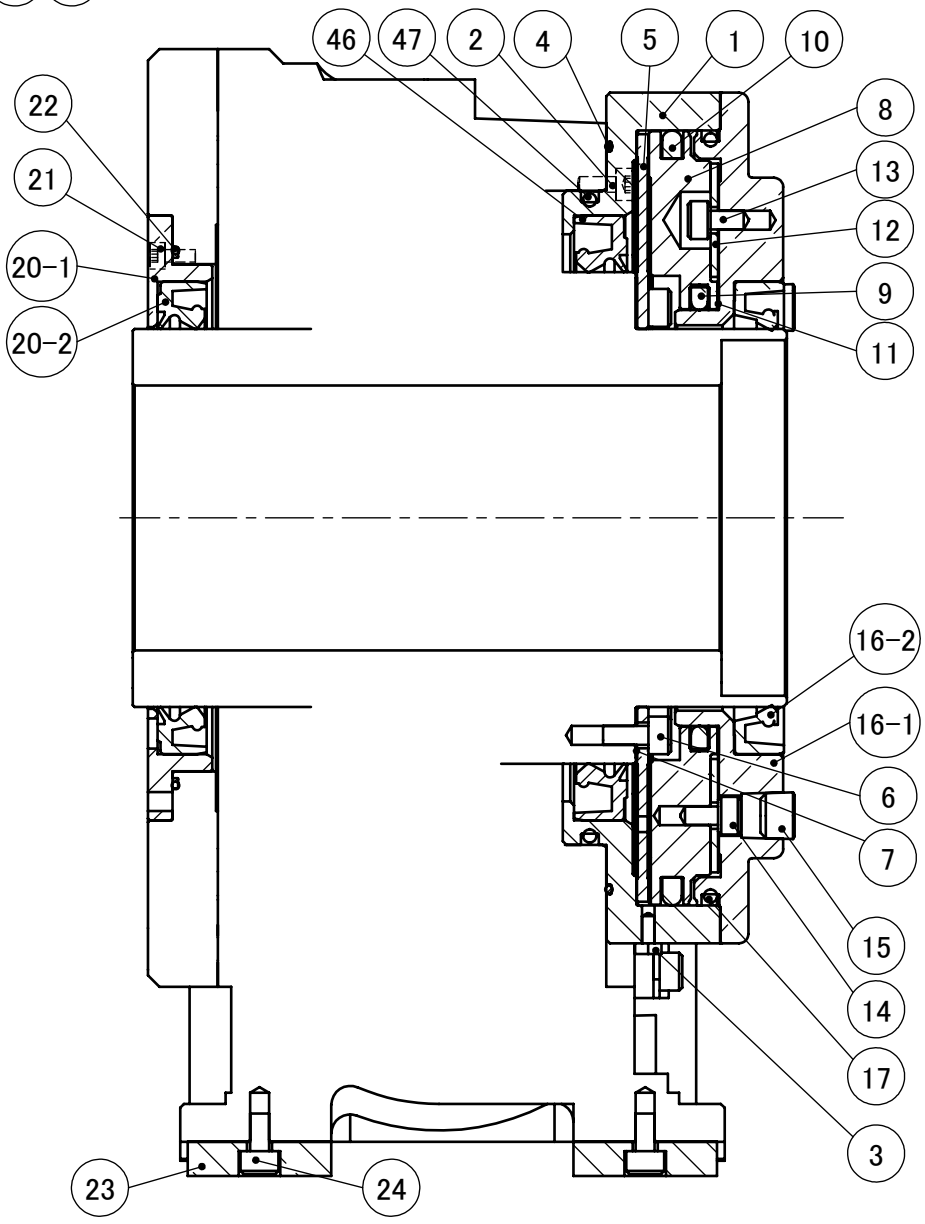


R勝手　R handed type









参照No. Ref. No.	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark	分類 Classification
1	6C3436001	1	ブレーキハウジングRT2	HOUSING BRAKING RT2		
2	018501031	11	アナボルト5X10	BOLT SOCKET M5X10		
3	017400802	1	ボルト4X8	BOLT M4X8		
4	6C3437001	1	OリングS195	O RING S195		
5	6C3043001	1	ブレーキディスク RT1	BRAKE DISK RT1		
6	018061231	12	アナボルト6X12	BOLT SOCKET M6X12		
7	6C304900*	1	ディスクスペーサ RT1	SPACER DISK RT1	t0.1 ～ t0.5	
8	6C3439001	1	ブレーキピストンRT2	BRAKE PISTON RT2		
9	6C3044001	1	DリングDRI110	D RING DRI110		
10	6C3031001	1	DリングDRO200	D RING DRO200		
11	6C304800*	1	ピストンスペーサ RT1	SPACER PISTON RT1	t0.1 ～ t0.5	
12	6C3045001	1	イタバネ RT1	PLATE SPRING RT1		
13	018061031	4	アナボルト6X10	BOLT SOCKET M6X10		
14	018061031	4	アナボルト6X10	BOLT SOCKET M6X10		
15	647454000	4	プラグ 1/4	PLUG, 1/4		
16-1	6C3440001	1	ブレーキエンドキャップRT2	BRAKE END CAP RT2		
16-2	6C3438001	1	オイルシールAC100-125	OIL SEAL AC100-125-13		
17	6C3441001	1	Oリング AS568-265A	O RING AS568-265A		
18	018501231	8	アナボルト5X12	BOLT SOCKET M5X12		
19	6C3457001	1	エルボKQ2L06-02AS	ELBOW UNION KQ2L06-02AS		
20-1	6C3017001	1	シールブラケットRT1	SHIELD BRACKET RT1		
20-2	6C3231001	1	オイルシールUE100-125	OIL SEAL UE100-125-13		
21	018400831	8	アナボルト4X8	BOLT SOCKET M4X8		
22	081140870	1	OリングS140	O RING S140		
23	6C3029001	2	キー14X9X38	KEY 14X9X38		
24	018061031	2	アナボルト6X10	BOLT SOCKET M6X10		
25	6C3435001	1	Aジクウシロカバー RT2	COVER REAR A AXIS RT2		
26	018501031	4	アナボルト5X10	BOLT SOCKET M5X10		
27	6B7215001	1	Aジクウシロカバ-2	COVER REAR A AXIS 2		
28	018060831	4	アナボルト6X8	BOLT SOCKET M6X8		
29	605458001	1	アナプラグPT3/8	PLUG SCREW PT3/8		
30	6C3430001	1	モータカバーウエL RT2	COVER UPPER MOTOR L RT2	L-handed type	
	6C3428001	1	モータカバーウエR RT2	COVER UPPER MOTOR R RT2	R-handed type	
31	651289001	6	テイトウボルト6X12	FLAT HEAD BOLT 6X12		
32	025060232	6	ヒラザガネチュウ6	WASHER PLAIN M 6		
33	018061231	2	アナボルト6X12	BOLT SOCKET M6X12		
34	6C3429001	1	モータカバーシタL RT2	COVER UNDER MOTOR L RT2	L-handed type	
	6C3427001	1	モータカバーシタR RT2	COVER UNDER MOTOR R RT2	R-handed type	
35	017061202	2	ボルト6X12	BOLT M6X12		
36	025060232	2	ヒラザガネチュウ6	WASHER PLAIN M 6		
37	6D0185001	1	モータ RT2 D0S	MOTOR RT2 D0S		C
38	018062031	4	アナボルト6X20	BOLT SOCKET M6X20		
39	025060232	4	ヒラザガネチュウ6	WASHER PLAIN M 6		
40	6C2026001	1	カップリング18-22 MX2	COUPLING 18-22 MX2		
41	6C3018001	1	カップリングカバー RT1	COUPLING COVER RT1		
42	018060831	2	アナボルト6X8	BOLT SOCKET M6X8		
43	6B7213001	1	オイルマドKMH-3	OIL GAUGE KMH-3		
44	6D0529001	1	5フレキクミDSL3 L	CORD 5 TUBE ASSY DSL3 L	L-handed type	C
	6D0534001	1	5フレキクミDSL3 R	CORD 5 TUBE ASSY DSL3 R	R-handed type	C
45	6C2850001	1	クイックエギゾーストバルブ	QEV AQ340F-06-06		
46	6C3426001	1	オイルシールUE130-160	OIL SEAL UE130-160-14		
47	6C3425001	1	Oリング AS568-260A	O RING AS568-260A		
48	626373000	1	アナプラグ PT1/2	PLUG PT1/2		
49	6C3473001	1	RT2Lホキュウクミ シムツキ	RT2 L SUPPLY ASSY SPACER	L-handed type	
	6C3474001	1	RT2Rホキュウクミ シムツキ	RT2 R SUPPLY ASSY SPACER	R-handed type	
50	6C3475001	1	RT2クランプホキュウクミ	RT2 CLUMP SUPPLY ASSY		

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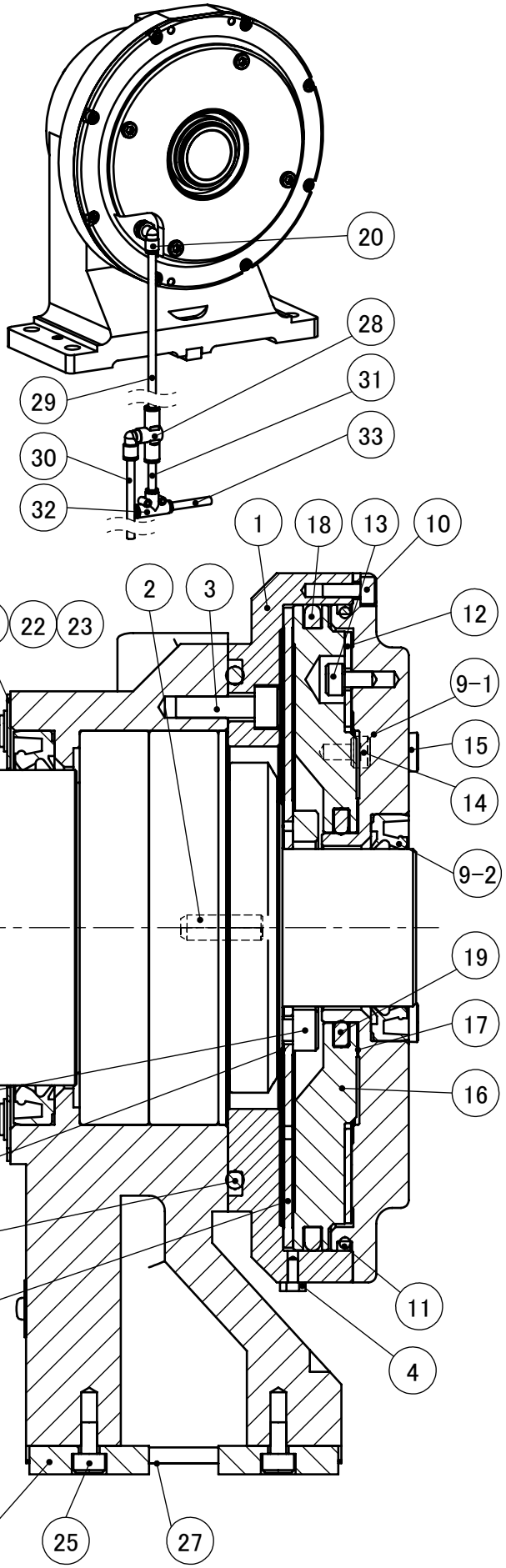
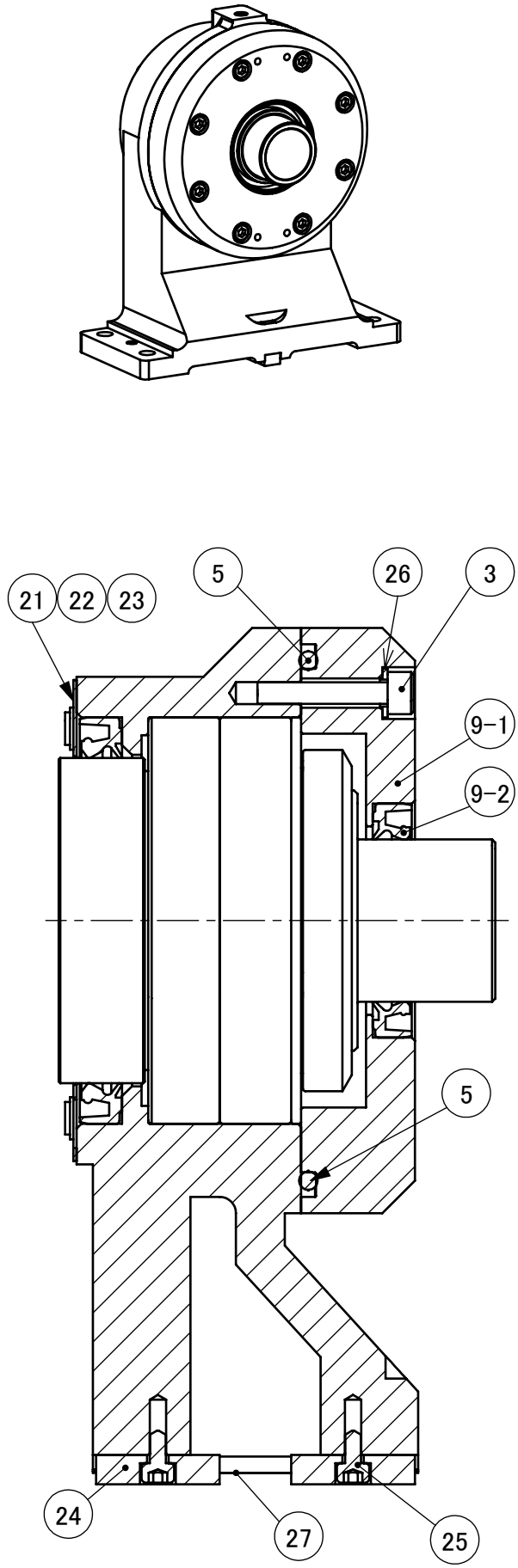
2.サポートテーブル
SUPPORT TABLE

34 (クランプ有) (With clump)



35 (クランプ無) (Without clump)



2.サポートテーブル
SUPPORT TABLE

参照No. Ref. No.	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark	分類 Classification
1	6C3444001	1	ブレーキハウジング S RT2	HOUSING BRAKING SUPPORT RT2		
2	620067002	2	ストレートピン8X26XM5	STRAIGHT PIN 8X26XM5		
3	018082531	8	アナボルト8X25	BOLT SOCKET M8X25		
	018084031	8	アナボルト8X40	BOLT SOCKET M8X40		
4	017400802	1	ボルト4X8	BOLT M4X8		
5	081155770	1	OリングG155	O RING G155		
6	6C3034001	1	ブレーキディスク S RT1	BRAKE DISK SUPPORT RT1		
7	6C303600*	1	ディスクスペーサS RT1	SPACER DISK SUPPORT RT1	t0.05 ～ t0.5	
8	018081631	12	アナボルト8X16	BOLT SOCKET M8X16		
9-1	6C3446001	1	BエンドキャップS RT2	BRAKE END CAP SUPPORT RT2		
	6C3051001	1	エンドキャップS RT1	COVER END CAP SUPPORT RT1		
9-2	6C3040001	1	オイルシール50-72-12	OIL SEAL UD50-72-12		
10	018501231	8	アナボルト5X12	BOLT SOCKET M5X12		
11	6C3441001	1	Oリング AS568-265A	O RING AS568-265A		
12	6C3045001	1	イタバネ RT1	PLATE SPRING RT1		
13	018061031	4	アナボルト6X10	BOLT SOCKET M6X10		
14	018061031	4	アナボルト6X10	BOLT SOCKET M6X10		
15	647454000	4	プラグ 1/4	PLUG, 1/4		
16	6C3445001	1	ブレーキピストンS RT2	BRAKE PISTON SUPPORT RT2		
17	6C303500*	1	ピストンスペーサS RT1	SPACER PISTON SUPPORT RT1	t0.1 ～ t0.5	
18	6C3031001	1	DリングDRO200	D RING DRO200		
19	6C3032001	1	DリングDRI60	D RING DRI60		
20	6C3457001	1	エルボKQ2L06-02AS	ELBOW UNION KQ2L06-02AS		
21	6C3067001	1	Fシールカバー S RT1	FRONT SHIELD COVER SUPPORT RT1		
22	651289001	7	テイトウボルト6X12	FLAT HEAD BOLT 6X12		
23	025060232	7	ヒラザガネチュウ6	WASHER PLAIN M 6		
24	6C3029001	2	キー14X9X38	KEY 14X9X38		
25	018061031	2	アナボルト6X10	BOLT SOCKET M6X10		
26	6C3050001	8	シールワッシャ M8	SEAL WASHER M8		
27	6C301600*	2	サポートスペーサ RT1	SPACER SUPPORT RT1	t0.02 ～ t0.35	
28	6C2850001	1	クイックエギゾーストバルブ	QEV AQ340F-06-06		
29	6C3447001	1	チユーブ6X1700	TUBE 6X1700		
30	6A9129002	1	エアチューブ6X165	AIR TUBE 6X165		
31	6C5445002	1	チューブ 6X50	TUBE 6X50		
32	6C2810001	1	チーズKQ2T06-00A	TEE KQ2T06-00A		
33	6C5445002	1	チューブ 6X50	TUBE 6X50		
34	6C3456001	1	RT2サポートホキュウクミC	RT2 SUPPORT CLUMP SUPPLY ASSY		
35	6C3372002	1	RT1サポートホキュウクミ	RT1 SUPPORT SUPPLY ASSY		

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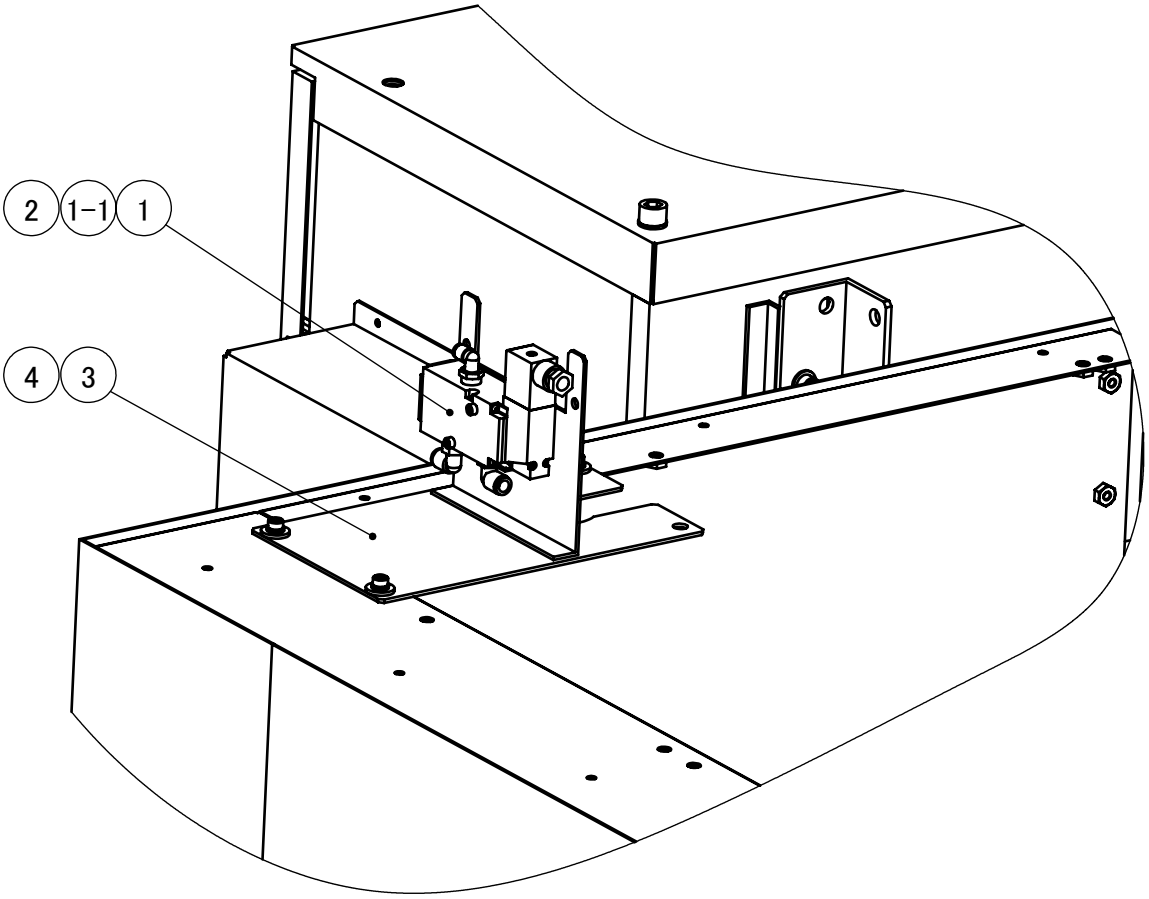
3. クランプバルブ
CLUMP VALVE



3.クランプバルブ
CLUMP VALVE 2-2

参照No. Ref. No.	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark	分類 Classification
1	6C3507001	1	VP542バルブクミ5 RT2	VALVE VP542 ASSY 5 AXIS RT2	W1000Xd1 L-handed type , R-handed type	
1-1	6C3062001	1	バルブコードクミ5ジク	VALVE CORD ASSY 5 AXIS	W1000Xd1 L-handed type , R-handed type	
2	018404031	2	アナボルト4X40	BOLT SOCKET M4X40	W1000Xd1 L-handed type , R-handed type	
3	6C3058001	1	テンジョウプレートSX1	CEILING PLATE SX1	W1000Xd1 L-handed type , R-handed type	
4	614220001	2	アナボルト6X16X19SW	SOCKET HEAD BOLT 6X16X19SW		

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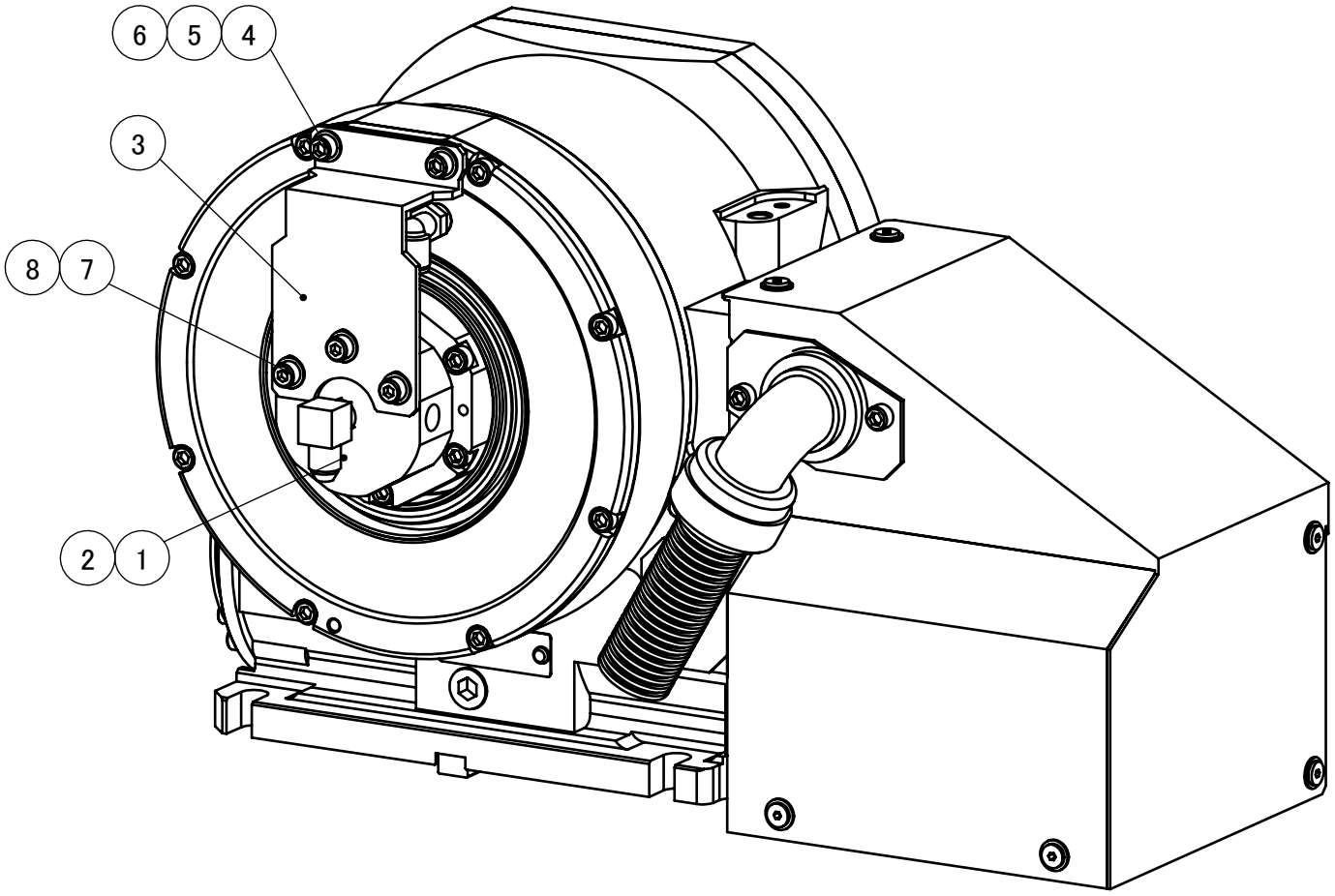
4.ロータリージョイント
ROTARY JOINT



4.ロータリージョイント
ROTARY JOINT

参照No. Ref. No.	部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark	分類 Classification
1	6C3469001	1	RJ JRX0610-026	ROTARY JOINT ASSY JRX0610-026		
1-1	6C3569001	1	Oリング P12	O RING P12		
2	018063031	6	アナボルト6X30	BOLT SOCKET M6X30		
3	6C3470001	1	RJコテイカナグ RT2	ROTARY JOINT FIXING PLATE RT2		
4	655808001	2	カラ-6.2X5	COLLAR, 6.2X5		
5	018061231	2	アナボルト6X12	BOLT SOCKET M6X12		
6	025060232	2	ヒラザガネチュウ6	WASHER PLAIN M 6		
7	018060831	3	アナボルト6X8	BOLT SOCKET M6X8		
8	025060232	3	ヒラザガネチュウ6	WASHER PLAIN M 6		

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5.アンプ・ケーブル
AMPLIFIER・CABLE

部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark	分類 Classification
6D0721001	1	AMPLIFIER RT3W05	アンプRT3W05	5 AXIS	C
6D0521101	1	CORD 5 BKIN3 DW	5BKIN3コードDW	For 5 AXIS	C

6D0532001 RT2 CORD ASSY DSL3

部品ｺｰﾄﾞ Part Code	個数 Q'ty	品名 Part Name		備考 Remark	分類 Classification
6D0935001	1	CORD X13 1AXIS D0S	X13コードﾞ1AXIS D0S		C
6D0465001	1	CORD ECAT 210 ASSY D0S	ECATコードﾞ210クミ D0S		C
6B7373001	1	CORD AWG14 EARTH 330 C0M	AWG14アースコードﾞ330		C

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