ＮＣ円テーブル
NC ROTARY TABLE

取扱説明書
INSTRUCTION MANUAL

Model　MR250LAE02

重要	IMPORTANT
取扱説明書本文に記載してある危険・警告事項の部分は、製品を使用する前に注意深く読み、理解すること。	Please read and understand DANGER / WARNING items in this manual before operating your NC Rotary Table.
将来いつでも使用できるように大切に保管すること。	Please keep this manual by your side for answers to any questions you may have and to check.

KITAGAWA IRON WORKS CO., LTD.

Thank you for choosing the Kitagawa NC Rotary Table.
Kitagawa, a world-renowned precision equipment manufacturer, has developed the finest quality NC Rotary Table with emphasis in high precision and rigidity as its basic principals in design.

This NC Rotary Table has been designed to provide years of high precision performance. To ensure optimum and trouble-free performance, please read this operation manual carefully before using the unit and retain this copy for your future reference.

Please pay close attention to the procedures with the following warning marks(!)to avoid severe injury and/or accident.

SAFETY ALERT SYMBOL

This is the industry " Safety Alert Symbol ". This symbol is used to call your attention to items or operations that could be dangerous to you or other persons using this equipment.
Please read these massages and follow these instructions carefully.
It is essential that you read the instructions and safety regulations before you attempt to assemble or use this unit.

WARNING

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentialty hazardous situation which, if not avoided, may result in minor or moderate injury.

IMPORTANT

IMPORTANT

Instructions for table performance and avoiding errors or mistakes.

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1. For Your Safety

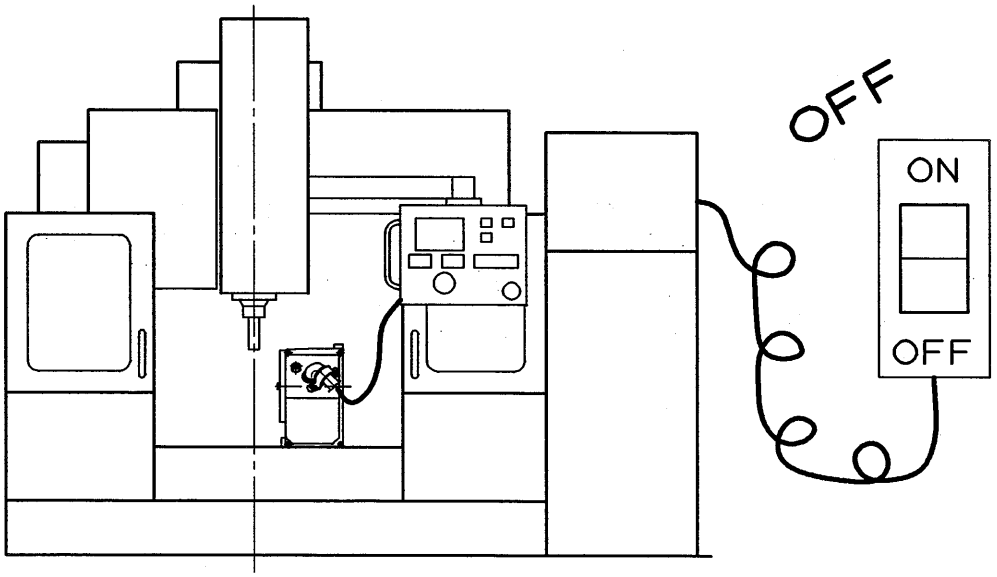
Basic Safety Tips

Please read this manual and follow instructions carefully.

We cannot assume responsibility for damage or accidents caused by misuse of the NC Rotary indexing tables, through non-compliance with the safety instructions.

DANGER

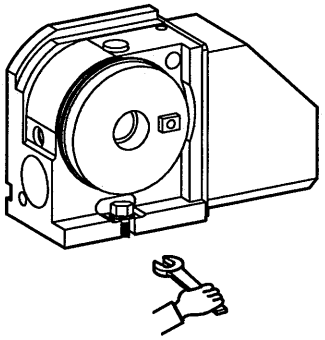
Turn off the main power of the machine prior to maintenance, check, or repair of the unit. Failure to do so may cause severe injury and/or accident.



WARNING

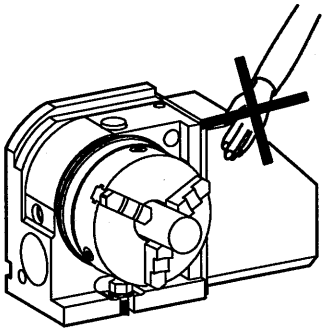
Tighten the bolts securely when mounting the unit on the machine table.

Please refer to the chart below for the recommended tightening torque of the bolts.

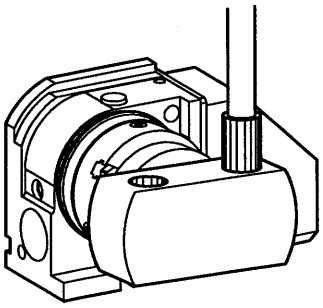


Hex. Bolt Size	Torque N·m
M10	33.8
M12	58.9
M16	146.3
M20	294.3

Make sure the working area is clear of any foreign object and/or hand when the unit is in operation to avoid any serious accident and/or injury.

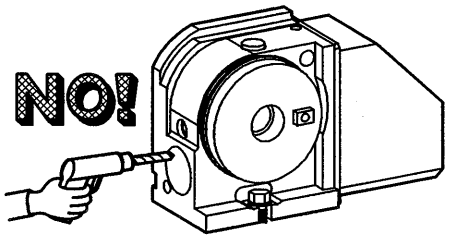


Do not apply cutting force which exceeds the specification in this manual. Failure to do so may cause severe injury and/or damage to the unit.

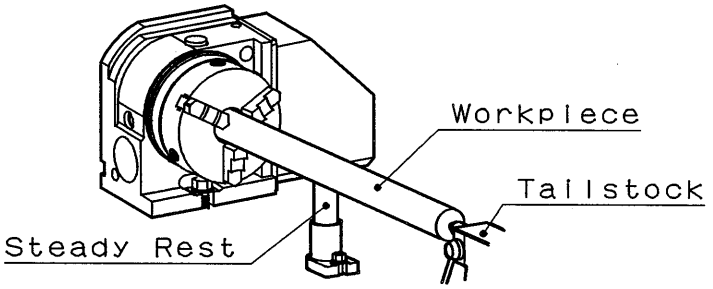


⚠ WARNING

Please consult your local distributor before attempting any modification of the unit.



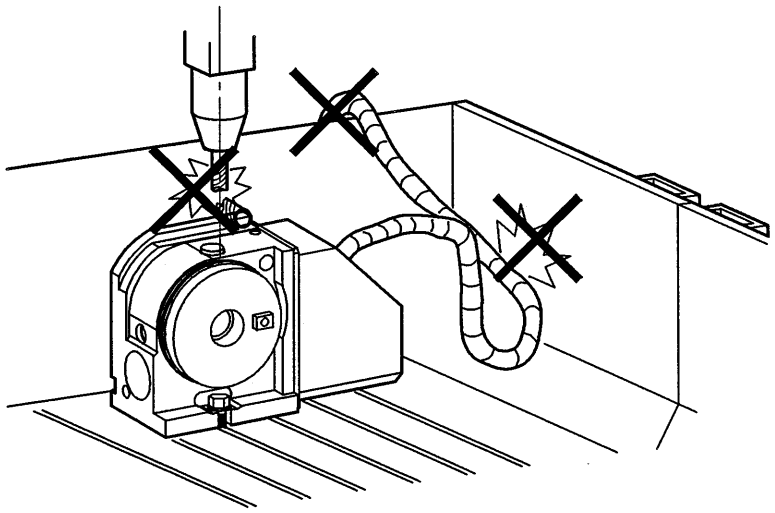
Use a support, steady rest, or tailstock for heavy or long workpieces to prevent any injury and/or accident. **(See P.7)**



CAUTION

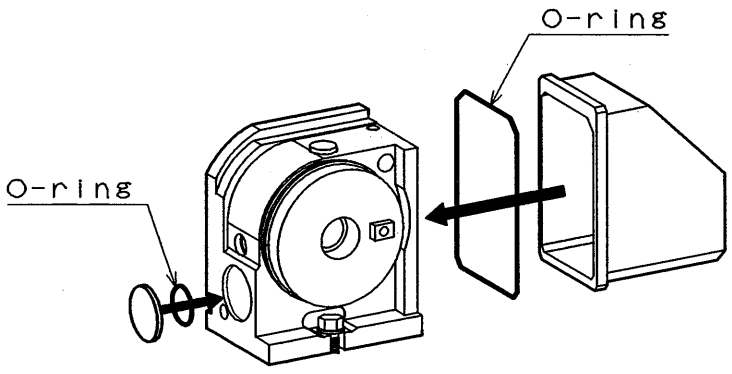
Maintain adequate clearance between the unit and any part of the machine.

Avoid bending the external cables and air tube of the unit.



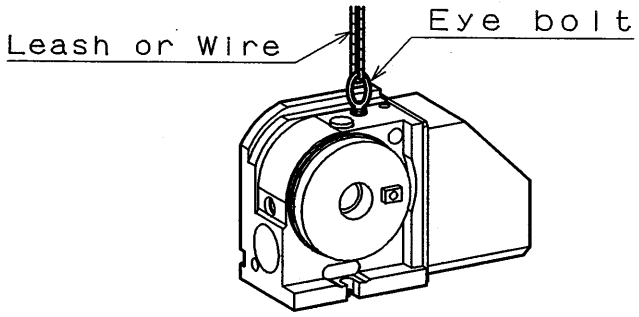
CAUTION

Mount all covers attached with O-rings.
(No damages on O-rings)

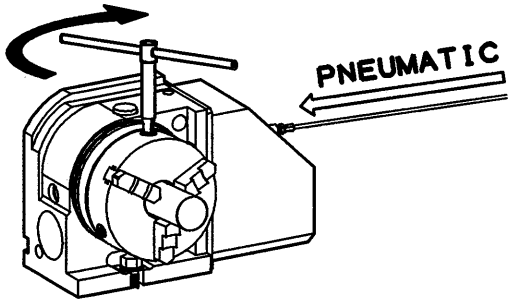


CAUTION

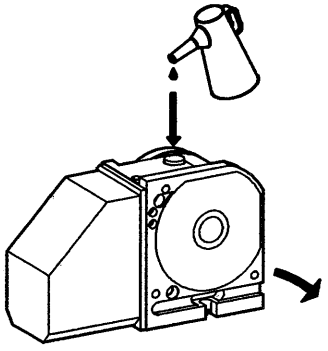
When transporting the unit. make sure to use eye bolts and a sufficient leash or wire.



Mount or dismount the workpiece to or from the unit while the unit is clamped to avoid damage to the internal mechanism and diminished indexing accuracy of the unit.

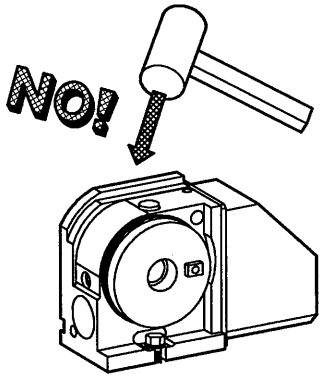


Replace lubricating oil every 6 months. (See P.9)



CAUTION

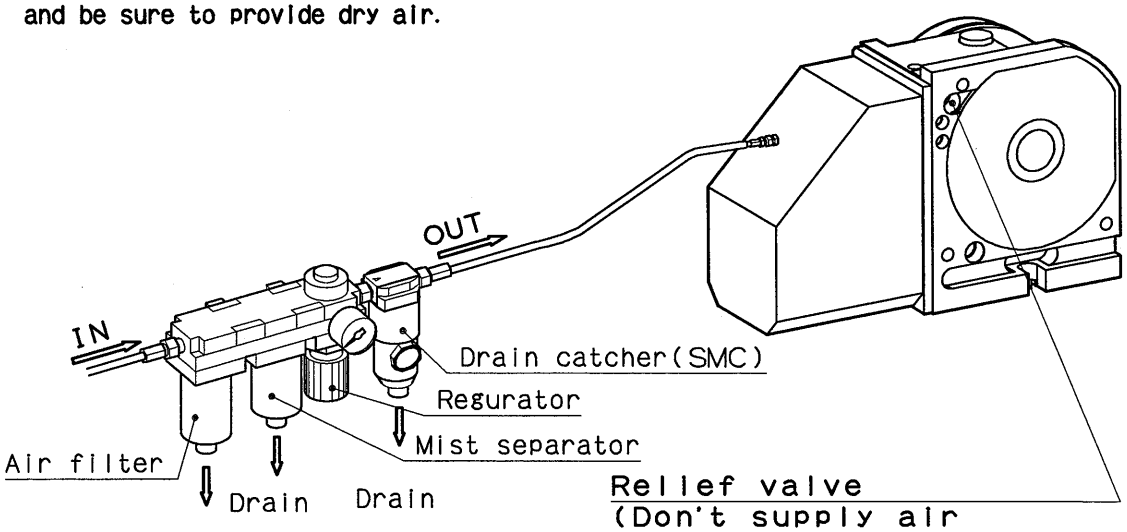
Avoid sudden impact to any part of the unit which may cause damage to the internal mechanism.



Supply air through Air combination (Air filter. Mist separator. regulator) + Drain catcher. (The air supply port is on the motor case.) **(See P.10)**

Apply air purge inside the motor case

and be sure to provide dry air.



2. Specifications

NC Rotary Table is dividing unit for the workpiece. usually operating machines. [Machining Center.(NC) milling machine. (NC)drilling machine. etc.]

Specifications are as belows.

	ITEM \ MODEL		MR120	MR160	MR200	MR250	MR320
1	Table Diameter mm		φ128	φ165	φ202	φ250	φ320
2	Table Height in Horizontal mm		136	145	173	180	210
3	Center Height in Vertical mm		120	140	140	180	225
4	Center Hole Diameter mm		φ50	φ50	φ65	φ100	φ130
5	Thru. Hole Diameter mm		φ32	φ40	φ45	φ70	φ106
6	Guide Block Width mm		10h7	14h7	14h7	14h7	14h7
7	Clamping Torque [Pneumatics 0.5MPa (5.1kgf/cm²)] N·m(kgf·m)		150(15.3)	310(31.6)	350(35.7)	600(61.2)	1200(122.4)
8	Allowable Workpiece Dia. mm		φ128	φ165	φ200	φ250	φ320
9	Allowable Mass of Workpiece (kg)	Horizontal	120	160	200	250	350
		Vertical	60	80	100	125	180
10	Allowable Work Inertia Kg·m²(kgf·cm·sec²)		0.22(2.2)	0.51(5.2)	1.00(10.2)	1.95(19.9)	4.49(45.7)
11	Total Reduction Ratio		1/60	1/72	1/90	1/90	1/120
12	Max. Rotation Speed min^{-1}		50	41.6	33.3	33.3	16.6
13	Mass of Rotary Table kg		28	40	49	85	130

IMPORTANT The above-mentioned list shows the value in standard specification. Please refer to the outside view for details.

IMPORTANT Table clamping torque is measured at 0.5MPa(5.1kgf/cm²) pneumatic pressure. Max. Rotation Speed is at 3000min^{-1}(rpm) of the motor rotation.

CAUTION Although the mass of the workpiece is within Allowable Mass of the workpiece. Allowable Work Inertia must stay within the specification.

CAUTION A tailstock may be required depending upon the weight and shape of the workpiece or the cutting conditions.

CAUTION The cutting conditions are to be within the specifications above.

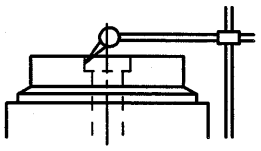
3. Accuracies

GUARANTEED ACCURACIES

(Unit : mm)

	DESCRIPTION OF INSPECTION		GUARANTEED ACCURACY
1	Run-out of center hole		0.01
2	Run-out of table surface		0.02
3	Parallelism of table surface and reference plane for horizontal installation	per 150mm	0.02
4	Parallelism of rotating axis center line and reference plane for vertical installation	per 150mm	0.02
5	Parallelism of rotating axis center line and guide block center	per 150mm	0.02
6	Indexing accuracy	cumulative	20sec
7	Repeatability		±2sec

1



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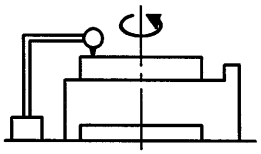

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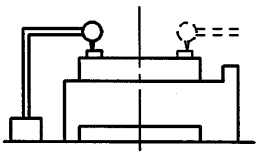

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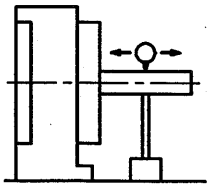

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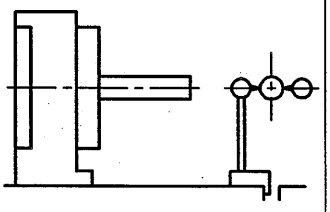


6.7 Index accuracy is measured with the optical device.

4. Preparation

Unpack the unit and remove the packing material.

4-1 Installation

1) When lifting the unit, securely screw in the eye bolts provided. Use wire loop which provided sufficient strength to lift the unit.
2) Clean the unit throughly with an adequate clean agent. When installing the unit on the machine table, make sure there is no foreign material nor damage such as nicks and burrs on the mating faces. Use an oil stone for correction if necessary.
3) Locate and set the unit at the most suitable location for the operation. In case of vertical installation, the guide blocks will fit into the slotted groove on the machine. If there is any play between the guide block and the T-slot, place the unit against one side of the T-slot to eliminate the gap.
4) Firmly clamp down the unit to the machine with the furnished clamping fixtures.

⚠ CAUTION When the unit is installed on the machine, ensure to avoid any interferences with any part of the machine. Especially when the machine has a capability of X-Y-Z axis movement of the spindle head or the machine bed, the interference must be checked carefully before starting the operation.

⚠ WARNING Apply the clamping fixtures to the step of the unit provided, and clamp the bolts with the specified torque. (See P.2)

4-2 Lubrication

⚠ CAUTION Change the lubricating oil every 6 months. Be sure to drain all oil from the unit first. When pouring oil into the unit, make sure to clean the area around the lubrication port so that no foreign material will enter the system. It may cause severe damage to the internal mechanism. Use recommended oil shown 4-4.

4-3 Required Oil Quantity

MODEL	MR120	MR160	MR200	MR250	MR320
QTY.(l) at Horizontal installation	0.2	0.6	0.6	0.8	1.0
QTY.(l) at Vertical installation	0.2	0.4	0.4	0.6	1.0

Dafunimultiway 32MT (Idemitsu) is provided in the unit before shipping.

4-4 Recommended Lubricating Oil

Maker	Oil Name	Maker	Oil Name
Mobil	Vactra Oil No.1	Cosmo	Dynaway 32
Nippon Oil Corporation	Uniway 32	Idemitsu	Daphne Multiway 32MT
Jomo	Slidus HS32	Esso	Unipower MP32
Shell	Shell Tonna Oil S32		

・Grade of Viscosity : ISO VG32

4-5 Inlet Pressure for Table Clamp

1) Use an appropriate filtration system. (Air Filter. Mist separator.Regulator. Drain catcher set)
2) Connect the air hose to the slot. The air inlet (the slot is Rc 1/4) is located on the motor case. Be sure to refer to the outside view for air hose installation.
3) The air supply pressure should be range from 0.5 to 0.6 MPa (5.1 to 6.1 kgf/cm²).
4) Where the tailspindle is additionally used. supply air to the tailspindle via the NC Rotary Table by using either of the tailspindle slot (Rc 1/4) provided on the reverse or top surfaces of the base. (Refer to the outside view.)

4-6 Air purge

⚠ WARNING

According to the circumstance of use. the dew may be occurred in the motor case.
Air is exhausted from the portion of the air exhaust so that it causes the obstacle of electric parts or each part.
The air purge is performed by air branched inside of NC table that uses air for clamp.
Be sure to use the clean air (passing through air filter. mist separator. regulator and drain catcher) passing through the filter. If the air contains water content (moisture). oil content. etc..
it is entered in the motor cover. thus causing in equipment damage. The air inside of motor case is exhausted from the air exhaust port.
In case that the portion of the air closed. motor case or motor etc. may be damaged so that the dew cannot be exhausted and that air pressure is kept in the motor case. Therefore the portion of exhaust should not be closed.
When exhausting. though exhaust sound occurs. there is no trouble.

5. Table Clamp and Unclamp

5-1 General Instruction

⚠ CAUTION

When the table is positioned. activate the table clamp. When the table is in motion. inactivate the table clamp.
Improper procedures in table clamp and/or unclamp may cause severe damage to the internal mechanism. This unit is supplied with two pressure switches for table clamp and unclamp for added safety.

⚠ CAUTION

Make sure that your cutting operation on the unit does not exceed the table clamping force specified on the specification sheet. This may cause damage to the internal mechanism.

⚠ CAUTION

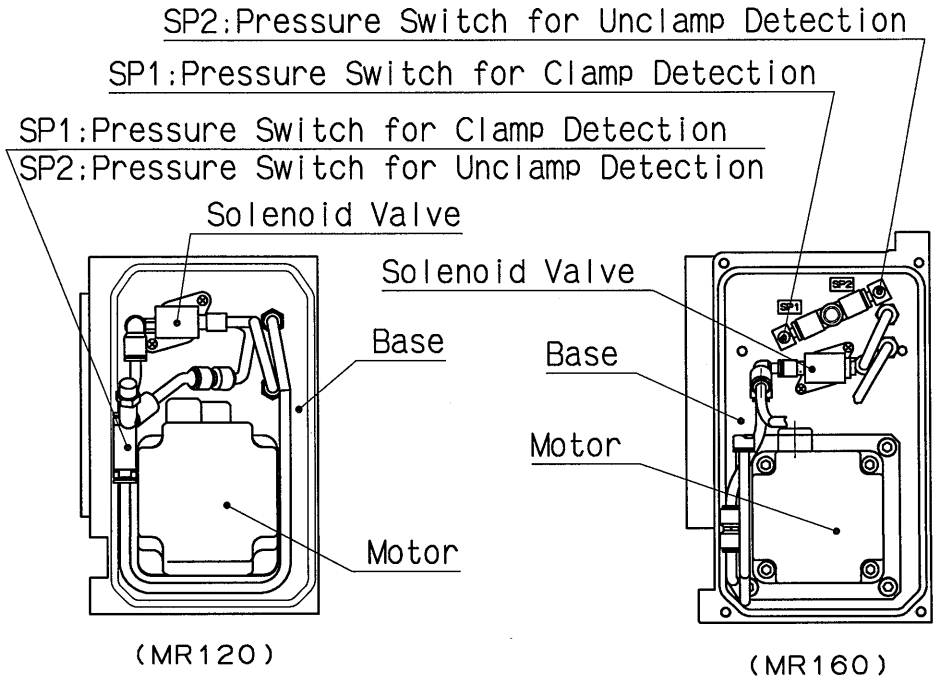
If some excessive pressures remain when it is unclamped. the unit is operating under a half-clamp situation. This may cause severe damage to the internal mechanism.

5-2 Confirmation of Clamp and Unclamp

The unit is equipped with two built-in pressure switches for clamp/unclamp detection as shown in Fig. 1.
The set up pressure of each switch for pneumatic systems is as follows:

Signal	Clamp Signal (SP1)	Unclamp Signal (SP2)
Pneumatic	0.25 MPa (2.55 kgf/cm²) PS1000-R06L-Q-X140	0.055 MPa (0.56 kgf/cm²) PS1100-R06L-Q-X141

The pressure switches SMC CORP made are used.



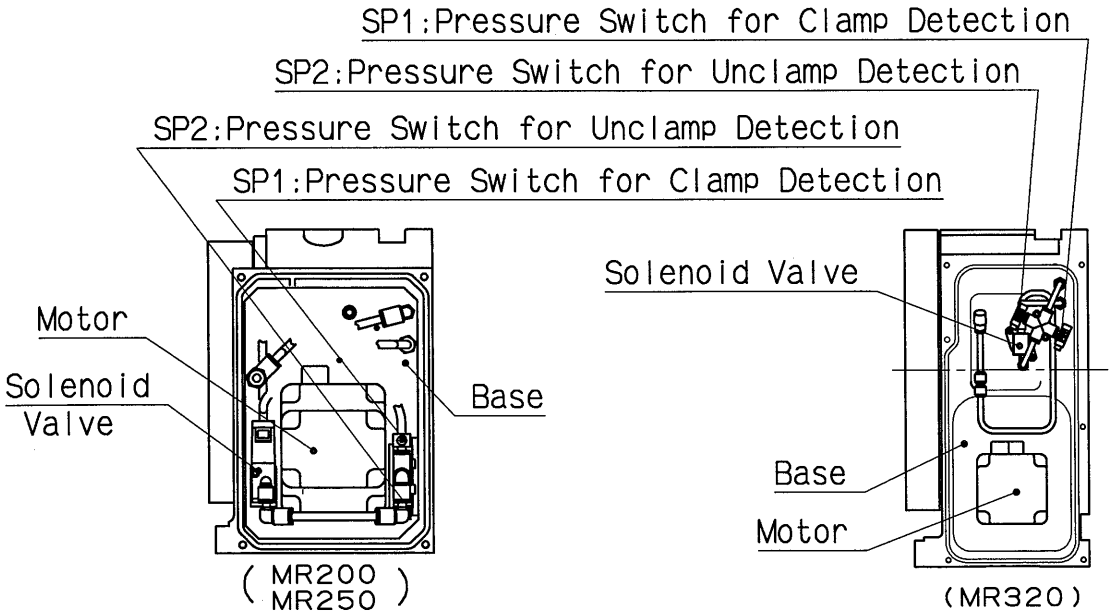


Fig. 1

5-3 Solenoid Valve for Clamp and Unclamp

For Pneumatic Clamping. a solenoid valve is equipped inside.
The piping is arranged as follows as a standard set up.
Be sure to arrange electrical wiring accordingly.

Solenoid ON ——— Unclamp
Solenoid OFF ——— Clamp

⚠ CAUTION Since there is polarity in the pressure switch by SMC CORP..a proximity switch. and a soreoid valve. please refer to the wiring diagram.

6. Inspection

Daily inspection

1) Confirm that the NC rotary tables (including jigs. if attached) are securely fixed.
2) Confirm that the electric connection cables and hoses are not damaged and the penumatic pressure is appropriate.
3) Confirm that the machine-zero operation and indexing operation and position.
4) Confirm that there is no abnormal vibration or noise. (eq. Body and motor)
5) Confirm that there is no abnormal heating. (eq. Body and motor)

Periodic inspection (Inspect the following items every six months.)

1) Confirm that muddiness of the lubricating oil.
2) Confirm that the connectors are securely attached and there is no damage on the cables.
3) Confirm that corrosion and breaking of the wiring in the motor case.

7. Mounting the Workpiece

⚠ WARNING Securely mount the workpiece to the unit. If this is not done properly. it may cause severe injury and/or accident as well as poor indexing accuracy.

⚠ CAUTION Avoid mounting a workpiece which has poor flatness or perpendicularity directly to a table face. This may strain the table and prevent smooth rotation. which may result in very poor indexing accuracy. Shimming may be required to prevent this problem.

⚠ CAUTION Clamp the work in equipartition on the rotary table as much as possible.

8. Adjustment of Backlash between Worm Wheel and Worm Gear

The amount of backlash has been adjusted to the appropriate range at time of the shipment from the factory. However, if it becomes necessary, excessive backlash between the precisely machined double-lead worm and worm wheel can be eliminated easily with two slightly different inclined leads provided on the worm gear. Appropriate amount of backlash between the worm and worm wheel is shown below.
The figures apply only when the unit is cold. The amount of backlash will be affected by thermal expansion when the unit warms up during operation.

⚠ CAUTION If the amount of backlash is too small, it may cause a heat seisure of the worm and worm wheel.

O Optimum values of backlash

MODEL	MR120	MR160	MR200	MR250	MR320
Backlash in Circular Length of Table O.D.(μm)	12～37	13～39	13～38	13～41	14～41
Backlash in seconds	39～118	33～98	26～78	22～68	18～53

If it is necessary to adjust the amount of backlash, measure the backlash using the following procedure:

8-1 Measuring the Backlash of the Worm Gear (See Fig.2.)

1) Set a dial gauge on the side face of the guide block on the top surface of the table.
2) Turn the table slowly by using the tap on the surface of the table as shown in fig.2. And read the value of the dial gauge when tooth of the worm wheel makes contact with a worm shaft. At this time, the rotating torque added to the table is as follows. Then, rotate the table on the same conditions to the opposite direction. The difference of these measurements is the amount of backlash.

MODEL	MR120	MR160	MR200	MR250	MR320
Torque added to table T(N·m)	11	15	17	26	30

3) The above measurements should be conducted at four different points by rotating the table 90 degrees at a time. Compare the readings with the correct amount of backlash shown above. If the reading is out of the range specified, take the following procedures to adjust the backlash so that the minimum reading is within the correct range specified above.

$T = F \times L$ T:Torque(N·m)

F:Effort force(N)

L:Distance from table center to point to add power F(m)

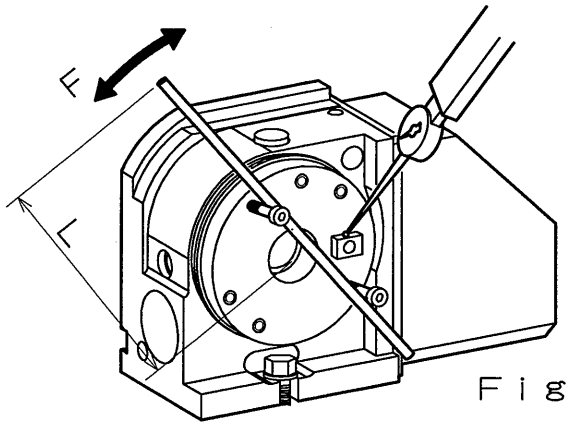


Fig. 2

8-2 Adjusting the Backlash of the Worm Gear (See Fig.3.)

DANGER Before proceeding to the backlash adjustment, you must turn off the power to the control unit and set the NC Rotary Table in the "unclamp" mode. If this caution is ignored, your hands or clothes may be caught in the gear while the gear is rotating resulting in serious injury.

1) For the backlash adjustment , you must discharge the lubricating oil throuht the drain (you do not have to do this for model MR200).
2) For vertical installation, remove the hexagon socket headless tapered pipe plug (3/8) ① located on the reference plane for vertical installation, and for horizontal installation, remove the same pipe plug (model MR160,MR320:3/8 OR MR120,MR200,MR250:1/4) ② located on the reference plane for vertical installation.
3) You will see the coupling ⑤ through the hole after removing the screw plug in the previous step. Rotate the worm shaft to a position where you can see the hexagon socket head cap screw ③ , which fixes the coupling ⑤ and the worm shaft ⑦ .
4) Loosen the hexagon socket head cap screw ③ , which is fixed on the coupling ⑤ .
5) Then, remove the cover ⑨ , which is located on the opposite side on the motor case ⑥ , and slightly loosen all four hexagon socket head cap screws (Only MR320 is six) ⑩ which fix the bearing case ⑫ . Then, slightly loosen the four adjustment screws (Only MR320 is six) ⑪ the same amount. Now, re-fastening the four hexagon socket head cap screws (Only MR320 is six) ⑩ will move the bearing case ⑫ ahead, which makes the backlash of the worm shaft ⑦ small.

IMPORTANT Since the pitch of the adjustment screw ⑪ is set to 1.0 mm. loosening the screw by one rotation will makes the backlash smaller as shown in the following table.

MODEL	MR120	MR160	MR200	MR250	MR320
Amount of face plate O.D.(μm)	44	36	36	32	45

After adjusting. reassemble the worm gears by the reverse procedure of the above and securely tighten the bolts. After reassembling. measure the backlash again at outside periphery of the table and at the same position. Check that the backlash is proper. If the backlash is inadequate. adjust it again by the above method.

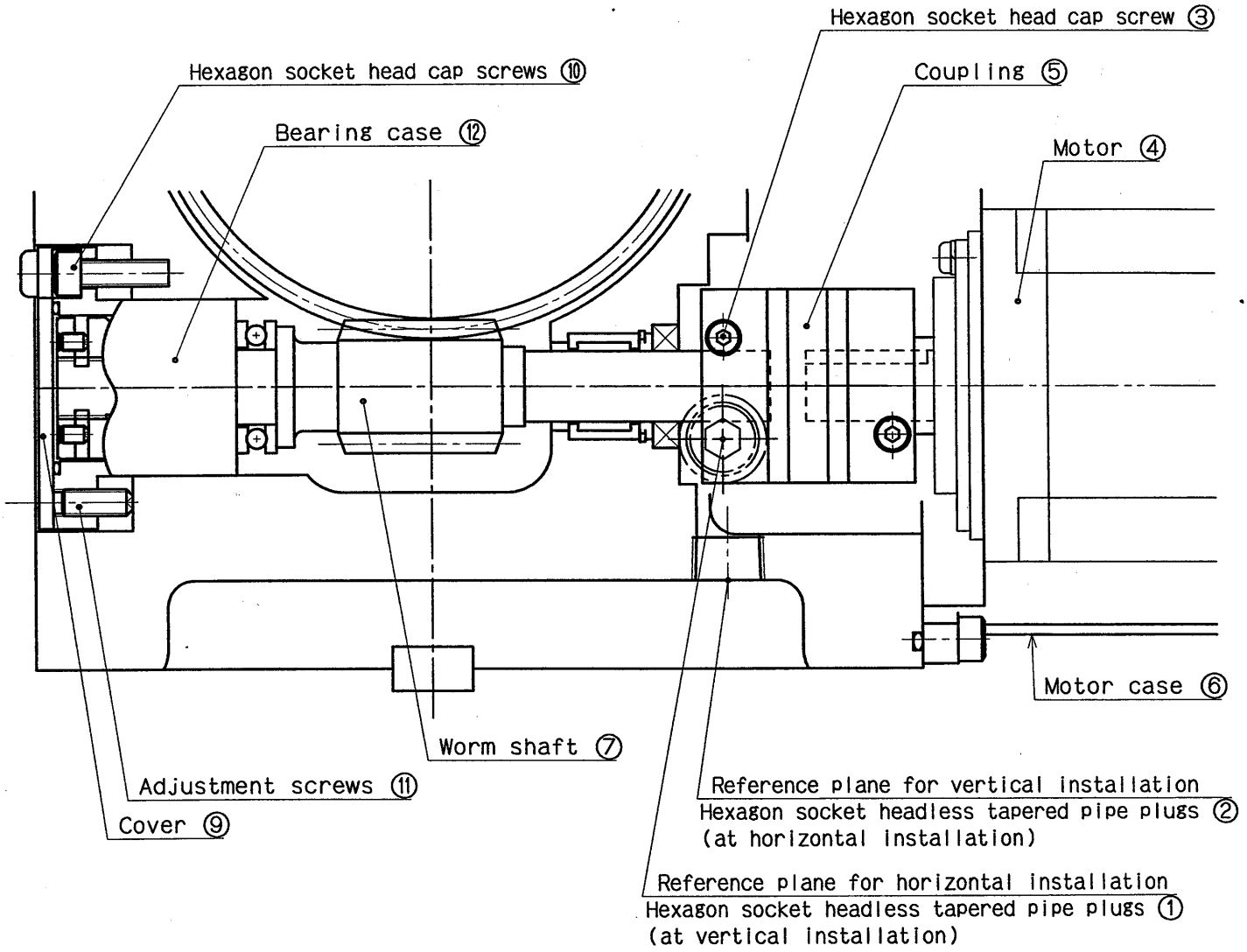


Fig. 3

9. ZRN device

9-1 ZRN device on table

The ZRN device rotates clockwise (CW) on the standard specification.
The table datum groove comes to position at a right angle to the motor when connected to the NC unit. The dog, which activates the table speed reduction, is located inside the unit. The ZRN deceleration dog is mounted in the table and it can be mounted on the optional position of outer periphery. When shipping a product, the flank of the guide block fitted on the table has been positioned parallel to the reference plane for vertical installation. Fine adjustment of the ZRN position may be required at the customer at the time of interface with the NC controller of the machine.

9-2 ZRN device Adjustment (See Fig.4)

When the zero position is changed or when the rotation direstion for return is changed to counterclockwise, adjust the ZRN position through the following procedures.

1) Remove the flange plug ① located on the top surface of the NC Rotary Table.
2) Rotate the table and, thorough the hole made by removing the hexagon socket flange head screw plug ① , loosen the hexagon socket headless set screw M3 ② that fixes the dog ③ to the main shaft of the Rotary Table.
3) Move the dog ③ to an appropriate position.
4) Upon the completion of the position adjustment, securely fasten the hexagon socket headless set screw ② . Also, securely fasten the hexagon socket headless set screw ① .

9-3 Sensor Mechanism

1) Proximity Switch (See Fig. 4)
   The gap between the dog ③ and the proximity switch ④ should be adjusted to approximately 0.75mm by the 1.00mm pitch thread provided on the proximity switch ④.

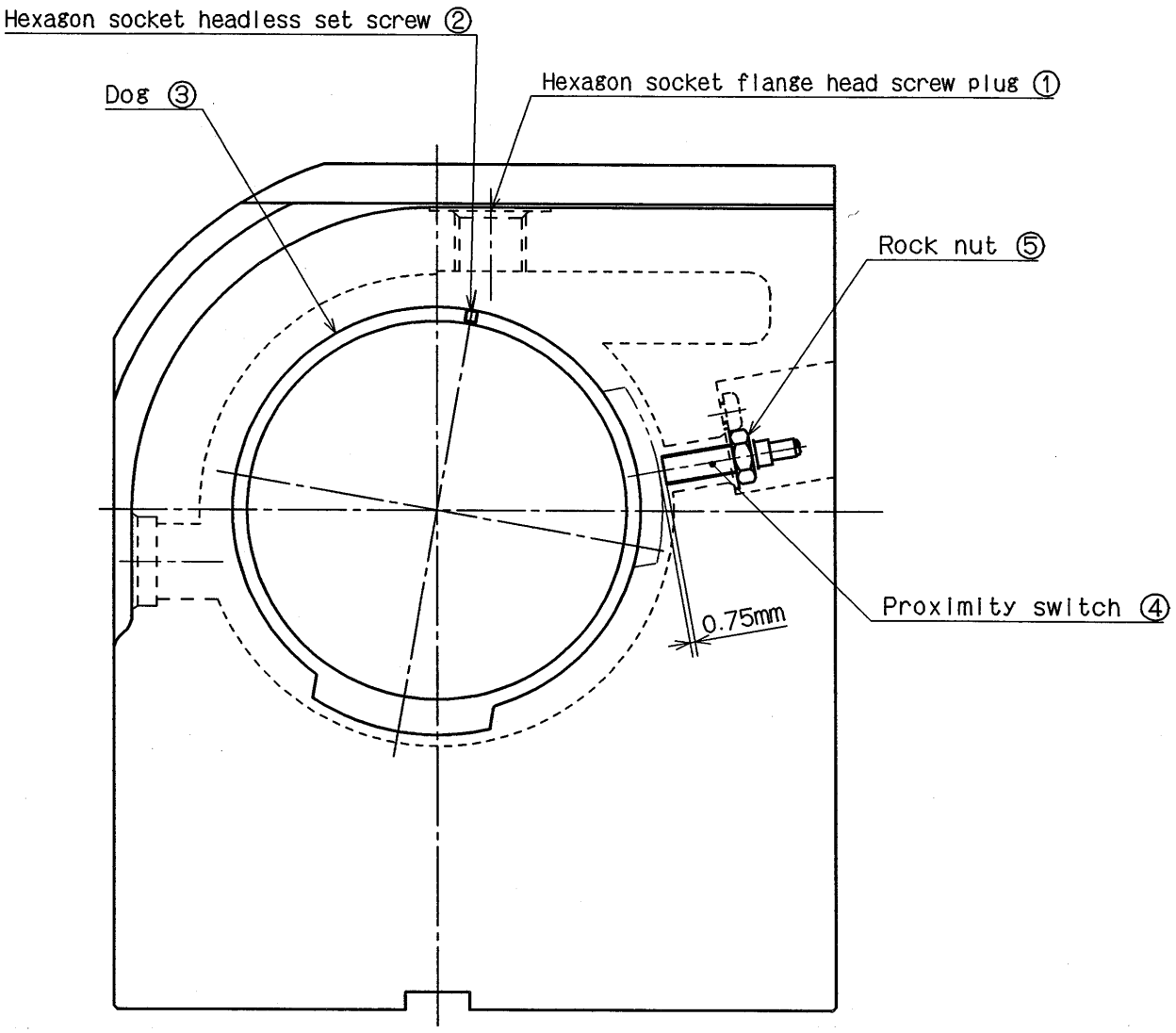

Hexagon socket headless set screw ②
Dog ③
Hexagon socket flange head screw plug ①
Rock nut ⑤
Proximity switch ④
0.75mm

Fig.4

10. Motor Cover

10-1 Dismount

Please follow the procedure below for removing the motor cover. (See Fig.5)

1) Remove the cover of the motor case ① and remove wiring and air hose from the canon connector of the motor ② and from the NC Rotary Table side of the terminal block.
2) Loosen the hexagon socket head cap screws ⑪ , which sets the motor case ① in the base ⑩ and carefully detach the motor case ① by lifting the case upward.

10-2 Waterproofing

In order to prevent the entering of coolant from the outside, O-ring ④ is used at the portion of commection beteen motor case ① and the body.

CAUTION For detaching the motor, remove either of the hexagon socket headless tapered pipe plug, ⑤ or ⑥ , and loosen the hexagon socket head cap screw ⑦ on the coupling ⑧ which connects the worm shaft ⑨ and the motor ② .
Then, remove the four hexagon socket head cap screws ③ which secure the motor ② in order to detach the motor. When re-installing the motor ② , be sure to securely tighten the bolts and plugs.

CAUTION When the motor case ①is re-installed, be carefull not to damage the O-ring. The damaged O-ring may allow the cutting water to enter the motor case.

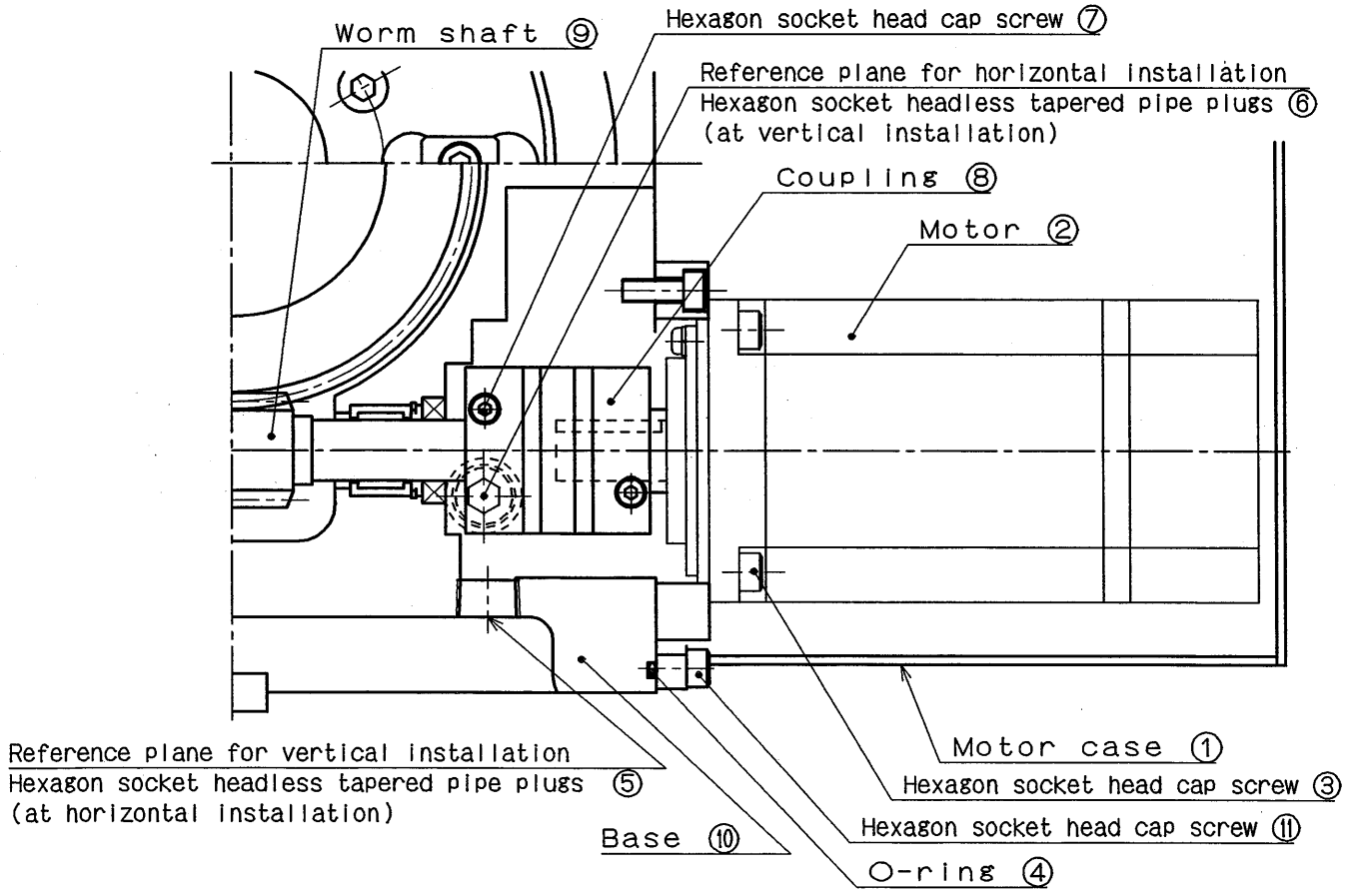


Fig. 5

11. Storage

CAUTION When removing the unit from the machine table, apply oil to prevent rust and store it on a stable wooden stand or in the original crate with the appropriate cover to protect it from dust and maintain its accuracy.

Note: Some raw wood is chemically unstable and may cause rust on the unit.

12. Indexing Accuracy and Pitch Error

IMPORTANT " What is the linear length at the table circumference with 30 seconds cumlative indexing accuracy ?"

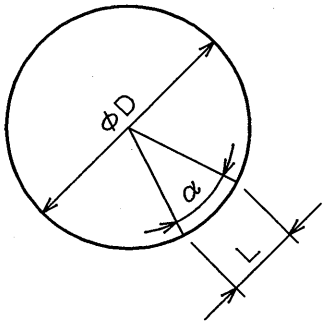
" What is the angle with a cumlative pitch error of 0.05mm ?"

To answer these questions, use the following formula representing the relationship between the angle and linear length at the table circumference.

D: Diameter of Workpiece (mm)

α: Angle (seconds)

L: Linear length at the table circumference (mm)



$$\frac{L}{\pi \times D} = \frac{\alpha}{360^\circ \times 60' \times 60''} \quad \text{----------(1)}$$

$$\alpha = \frac{360 \times 60 \times 60 \times L}{\pi \times D} = \frac{L \times 4.125 \times 10^5}{D} \quad \text{----------(2)}$$

$$L = \frac{\alpha \times \pi \times D}{360 \times 60 \times 60} = 2.424 \times 10^{-6} \times \alpha \times D \quad \text{----------(3)}$$

(Examples)

Assuming the diameter of the workpiece is 100mm, and by using formula (3), the cumulative indexing accuracy of 30 seconds as linear length at table circumference will be:

$L = 2.424 \times 30 \times 100 \times 10^{-6} = 0.007272\text{mm} \fallingdotseq 0.0073\text{mm}$

Therefore, the length is approximately 0.0073mm.

And converting the cumulative pitch error of 0.05mm to an angle, use formula (2):

$$\alpha = \frac{4.125 \times 0.05 \times 10^5}{100} = 206.25''$$

Therefore, the angle is approximately 206.25 seconds equal to 3 minites 26 seconds.

Thus, by using the formula (2) and (3), the indexing precision and pitch error can be converted in terms of linear length and angle.

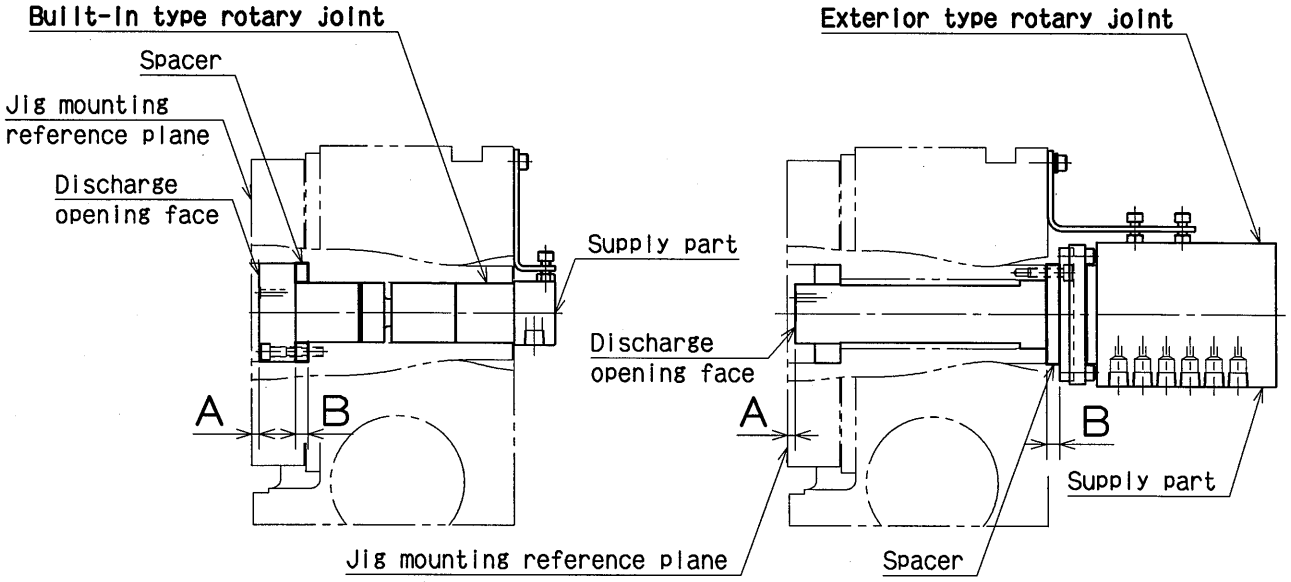
13. Mounting Rotary Joint (Option)

13-1 Alignment of discharge opening face

To mount the rotary joint. the rotary joint discharge opening face must be aligned with the jig mounting reference plane so that hydraulic oil does not leak to the jig (A-size in the following figure).

To align the position of the rotary joint discharge opening face. the thickness of the spacer attached to the rotary joint must be adjusted (B-size in the following figure).

When the rotary joint is mounted additionally or a set of rotary joint parts is replaced. check the product type and manufacturing number. and contact Kitagawa branch or your agent.

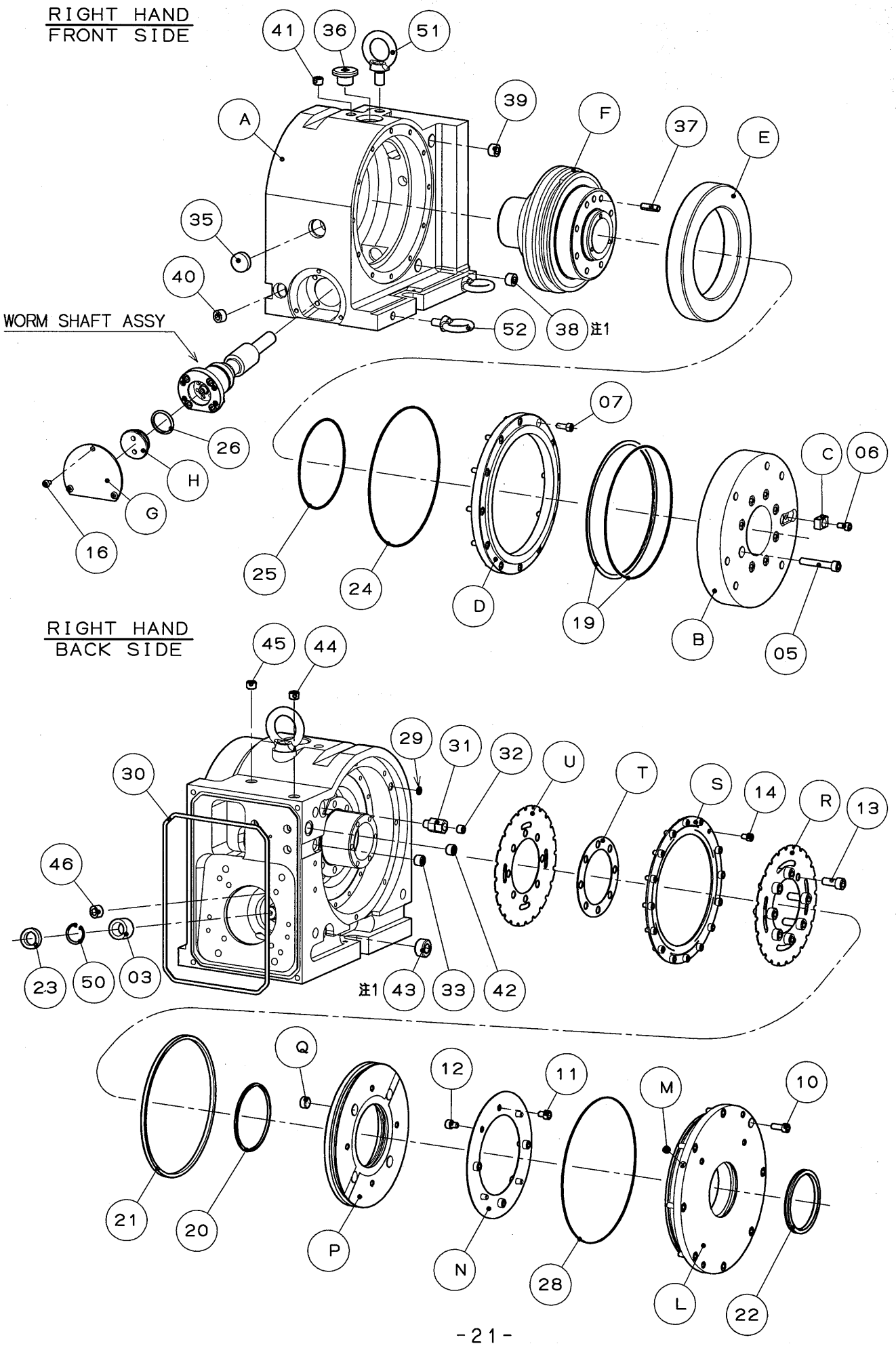


13-2 Pining to supply part

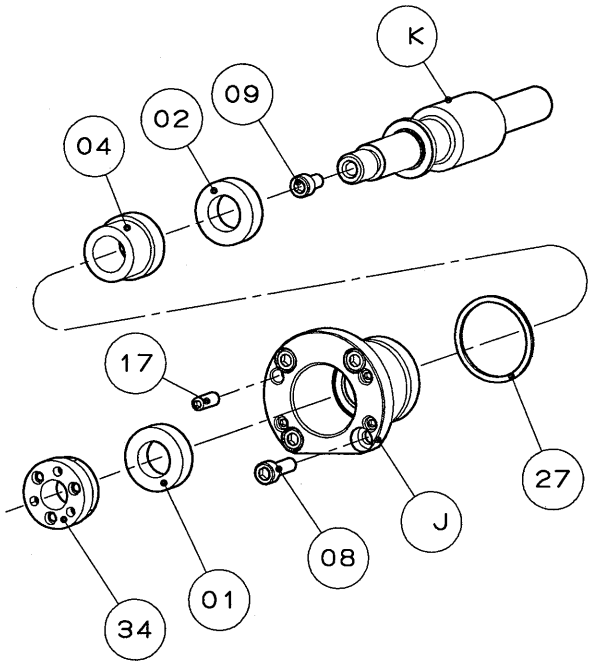
To route the pipe to the supply part of the rotary joint. determine a hose length so that the hose will not be moved by the movement of a table for a mounted machine.

Moreover. when turning a joint screw. use the tightening tool carefully so that unreasonable force will not be applied to the supply part.

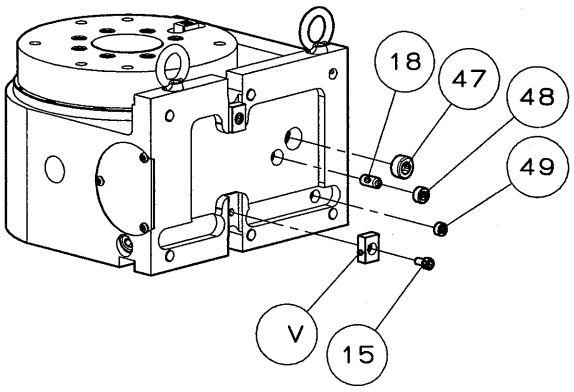
14. Parts List



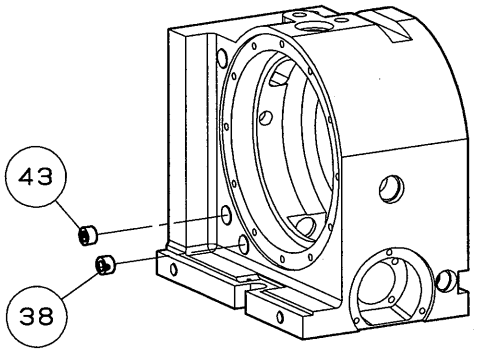
WORM SHAFT ASSY



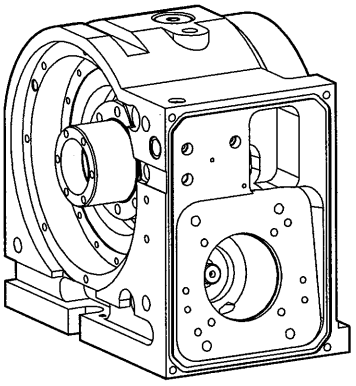
BOTTOM SIDE



NOTE 1 LEFT HAND



FRONT SIDE



BACK SIDE

MARK	NAME・SIZE	Q'ty
A	BASE	1
B	TABLE	1
C	GUIDE BLOCK	1
D	BEARING PUSH PLATE	1
E	CROSS-ROLLER BEARING	1
F	TABLE SPINDLE ASSY	1
G	COVER A	1
H	COVER B	MR120 MR160 MR200 MR250 MR320 - - 1 - -
J	BEARING CASE	1
K	WORM SHAFT	1
L	CYLINDER	1
M	PLUG C	MR120 MR160 MR200 MR250 MR320 2 1 2 2 2
N	CLAMP PLATE B	1
P	PISTON	1
Q	PLUG	MR120 MR160 MR200 MR250 MR320 4 4 4 4 6
R	CLAMP PLATE D	1
S	CLAMP PLATE C	1
T	FLANGE	1
U	CLAMP PLATE A	1
V	GUIDE BLOCK	1

MARK	NAME		MR120	MR160	MR200	MR250	MR320
01	BEARING	SIZE	51102	51103	51103	51206	51106
		Q'ty	1	1	1	1	1
02			51103	—	—	51107	51107
			1			1	1
03			RNA4901R	NK16/16R	NK16/16R	NK20/20R	NK20/20R
			1	1	1	1	1
04			RNA4901R	NKX17T2	NKX17T2	NK30/20R	NK30/20R
			1	1	1	1	1
05	HEX.SOCKET HEAD CAP SCREW		M6x35	M8x40	M8x50	M12x50	M12x55
			10	8	8	8	8
06			M4x10	M6x10	M6x10	M6x10	M6x10
			1	1	1	1	1
07			M5x16	M5x16	M6x16	M6x20	M8x25
			10	12	12	12	12
08			M6x20	M6x20	M6x20	M6x25	M6x20
			4	4	4	4	6
09			—	—	M6x12	M6x10	M6x10
					1	1	1
10			M6x16	M6x12	M6x12	M6x12	M8x20
			8	8	8	12	10
11			M6x8	M6x8	M6x8	M6x8	M6x8
			4	4	4	4	6
12			M6x8	M6x8	M6x8	M6x8	M6x8
			4	4	4	4	6
13			M6x12	M6x12	M8x20	M6x12	M8x16
			10	12	8	20	20
14			M4x6	M5x8	M5x8	M5x8	M6x10
			16	16	16	24	20
15			M6x10	M6x12	M6x12	M6x12	M6x12
			2	2	2	2	2
16	CROSS-RECESSED HEAD SCREW		M4x8	M4x8	M5x8	M6x10	M5x10
			4	4	3	3	3
17	HEX.SOCKET SET SCREW (FLAT POINT)		M6x12	M6x16	M6x16	M6x20	M6x16
			4	4	4	4	6
18	HEX.SOCKET BALL PLUNGER		BSR6x10	—	—	—	—
			1				
19	FACE SEAL		φ94	φ122	φ170	φ190	φ290
			1	1	1	1	1
20	QUAD RING		4227-366Y	4231-366Y	4234-366Y	4243-366Y	4258-366Y
			1	1	1	1	1
21			4249-366Y	4258-366Y	4362-366Y	4367-366Y	4377-366Y
			1	1	1	1	1
22			—	—	4334-366Y	4344-366Y	4434-366Y
					1	1	1
	OIL SEAL		D50 65 9	D60 75 9	—	—	—
			1	1			
23			AC0684E1	AC0684E1	AC0684E1	AE0995E0	AE0995E0
			1	1	1	1	1
24	O-RING		S120	S140	S180	GS210	AS568-277
			1	1	1	1	1
25			S75	S95	S115	S145	S195
			1	1	1	1	1
26			S35.5	S35.5	P26	S90	S53
			1	1	1	1	1
27			G35	G35	G35	—	G55
			1	1	1		1
28			S130	S160	S170	S200	S265
			1	1	1	1	1
29			P6	P6	P6	P6	P10
			2	1	2	2	2
30			GS180	GS195	GS210	GS245	GS290
			1	1	1	1	1

MARK	NAME		MR120	MR160	MR200	MR250	MR320
31	CHECK VALVE	SIZE	CVR01-A	CVR01-A	CVR01-A	CVR01-A	CVR01-A
		Q'ty	1	1	1	1	1
32	PLUG SILENCER		PSA101	PSA101	PSA101	PSA101	PSA101
			1	1	1	1	1
33			PSA102	PSA102	PSA102	PSA102	PSA102
			1	1	1	1	1
34	LOCK NUT		MSR14x1.5	MSR14x1.5	MSR14x1.5	MSR28x1.5	MSR28x1.5
			1	1	1	1	1
35	OIL GAUGE		257	257	257	257	257
			1	1	1	1	1
36	FLANGE HEAD PLUG		GFO M20x1.5	GFO M20x1.5	GFO M20x1.5	GFO M20x1.5	GFO M20x1.5
			1	1	1	1	1
37	SPRING PIN		6x16	—	8x25	8x25	8x25
			1		1	1	1
38	HEX.SOCKET HEADLESS TAPERED PIPE PLUG		1/4	—	—	1/2	1/2
			1			1	1
39			—	1/2	3/8	—	—
				1	1		
40			—	3/8	3/8	—	3/8
				1	1		1
41			1/4	—	—	1/2	
			1			1	
42			1/4	1/4	1/4	1/4	1/4
			1	1	1	1	1
43			1/4	3/8	1/2	1/2	1/2
			1	1	1	1	1
44			1/4	1/4	1/4	1/4	1/4
			1	1	1	1	1
45			NPTF1/16	—	—	—	—
			1				
46			—	1/4	—	3/8	1/4
				1		1	1
47			1/4	3/8	3/8	1/2	1/2
			1	1	1	1	1
48			1/8	—	—	—	—
			1				
49			NPTF1/16	—	—	—	—
			1				
50	RETAINING RING-C		—	H24	H24	H28	H28
				1	1	1	1
51	EYE BOLT		M8	M10	M12	M12	M12
			1	1	1	1	1
52			M8	M10	M10	M10	M12
			2	2	2	2	2

CUSTOMER		
MDF.NO.	DATE	REASON OF REVISION
1	04.07.30	ADJUSTMENT
2	06.03.28	ADJUSTMENT（△3ヶ所）
3	08.04.21	ADJUSTMENT

エアパージ AIR PURGE
テーブルクランプ TABLE CLAMP
モータケース MOTOR CASE
クランプ確認 CLAMP DETECTION 0.25MPa ~~0.29MPa~~ ③
アンクランプ確認 UNCLAMP DETECTION 0.055MPa ~~0.05MPa~~ ③
② ~~VK332-5GS-M5-F~~
エア排出 AIR EXHAUST
ソレノイドバルブ SOLENOID VALVE VK332-5DS-M5-F-Q(DC24V)
ドレンキャッチ(オートドレン付) DRAIN CATCHER with AUTO DRAIN AMG150-02BC (SMC)
NOTICE 要注意
許容最大空圧力 0.7MPa MAXIMUM PNEUMATIC PRESS 0.7MPa
エアコンビネーション (オートドレン付) AIR COMBINATION with AUTO DRAIN AC25C-02CG (SMC)
客先にて手配願います CUSTOMER MUST PREPARE

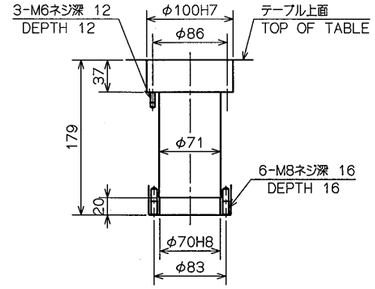
エア回路図 AIR DIAGRAM

仕様 SPECIFICATIONS

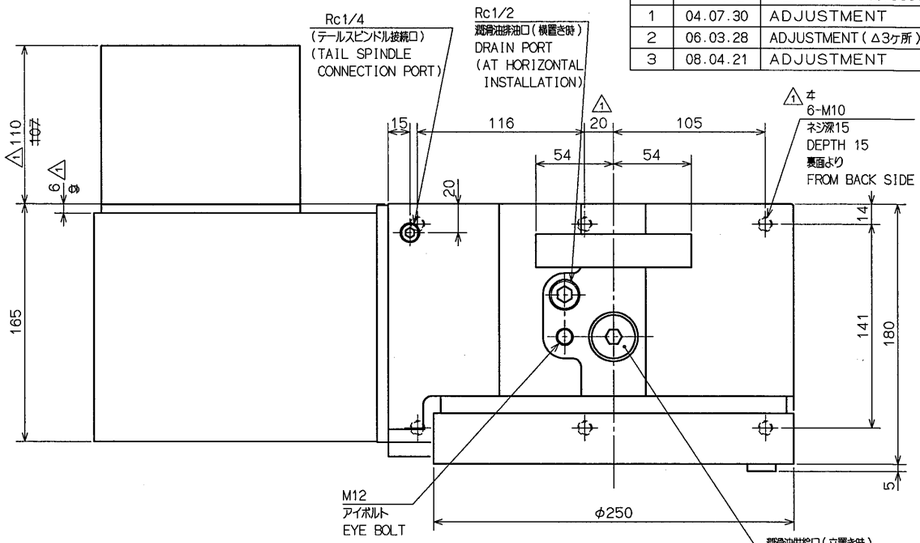
割出精度 INDEXING ACCURACY	20 sec以内	許容積載質量 ALLOWABLE MASS OF WORK	横 HORZ 250 kg 立 VERT 125 kg
再現精度 REPEATABILITY	4 sec以内	許容積載ワーク径 ALLOWABLE WORK DIA.	φ250 mm
テーブル最高回転速度 MAXIMUM ROTATION SPEED	22.2 min⁻¹ [モータ MOTOR 2000 min⁻¹]	総減速比 TOTAL REDUCTION RATIO	1/90
クランプトルク CLAMPING TORQUE	600N·m [空圧 PNEUMATICS 0.5MPa]	製品質量 MASS OF ROTARY TABLE	85 kg
許容最大空圧力 MAXIMUM PNEUMATIC PRESS	0.7 MPa	慣性モータ軸換算イナーシャ MACHINE INERTIA (REDUCED TO MOTOR SHAFT)	0.000308kgm²

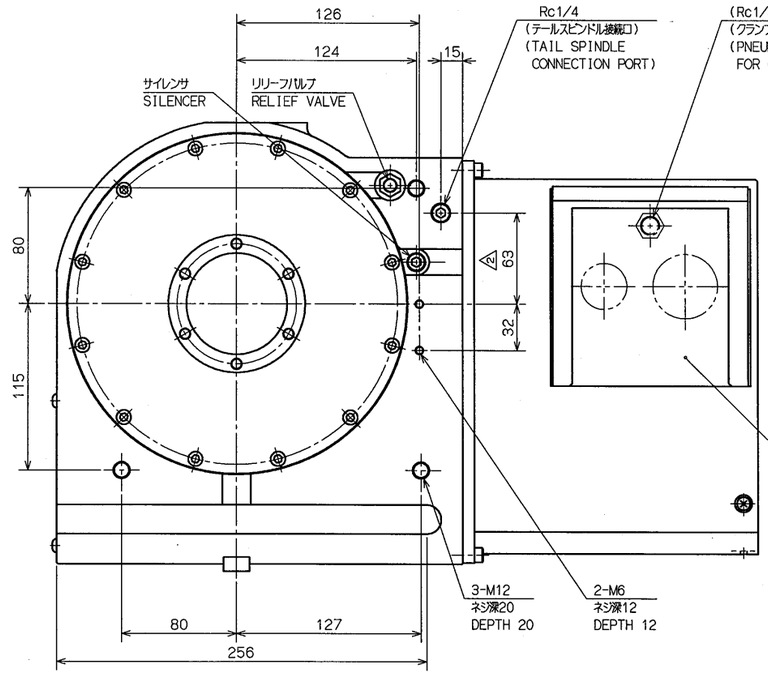
注記 NOTE

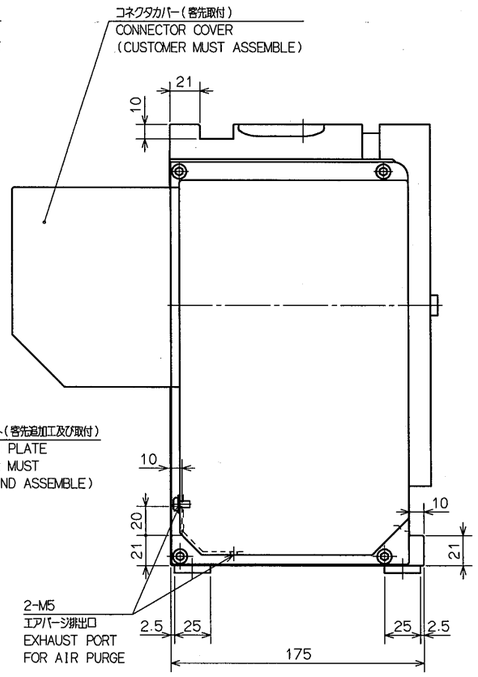
1）ACサーボモータ：客先にて手配及び取付願います。
WITHOUT MOTOR (SETTING WORKS OF MOTOR AT KEL OR USER.)
取付可能モータ: MITSUBISHI HCH102T-A47
MOUNTING POSSIBLE MOTOR: MITSUBISHI HCH102T-A47
2）図中に記載のない精度規格は、カタログ記載の値とします。
ACCURACY STANDARDS EXCEPT STATED IN THIS DRAWING SHOULD BE APPEALED TO THAT IN CATALOGUE.
3）原点復帰速度は 22.2min⁻¹ 以下、同クリープ速度は 0.6min⁻¹ 以下に設定して下さい。
SPEED OF ZERO RETURN SHOULD BE SET LESS THAN 22.2min⁻¹. AND ITS CREEP SPEED SHOULD BE SET LESS THAN 0.6min⁻¹.
4）本機はエアパージ仕様ですので空圧供給口からクリーンエアを供給して下さい。
THIS ROTARY TABLE IS DESIGNED UNDER THE CONDITION OF AIR PURGE. ACCORDINGLY CLEAN AIR FROM PNEUMATIC PORT HAVE TO BE SUPPLIED.
5）このNC円テーブルはモータ支給されていませんので動作確認をしておりません。
御手数をお掛けしますがお客様でご確認お願いします。
MOVEMENT CONFIRMATION IS NOT DONE. BECAUSE A MOTOR WITH THIS NC ROTARY TABLE IS NOT SUPPLIED.
THE CUSTOMER MUST CONFIRM THE MOVEMENT AFTER YOU MOUNT THE MOTOR.
6）本機は立取付専用です。
VERTICAL USE ONLY.
7）本機を機械に設置する場合には、周辺との干渉を防止する為に、外形寸法より10mm以上の余裕を確保下さい。
WHEN YOU INSTALL A ROTARY TABLE ON A MACHINE,PLEASE KEEP A CLEARANCE OF MORE THAN 10 mm BETWEEN THE ROTARY TABLE AND THE MACHINE SPLASHGUARD IN ORDER TO PREVENT THE INTERFERENCE.

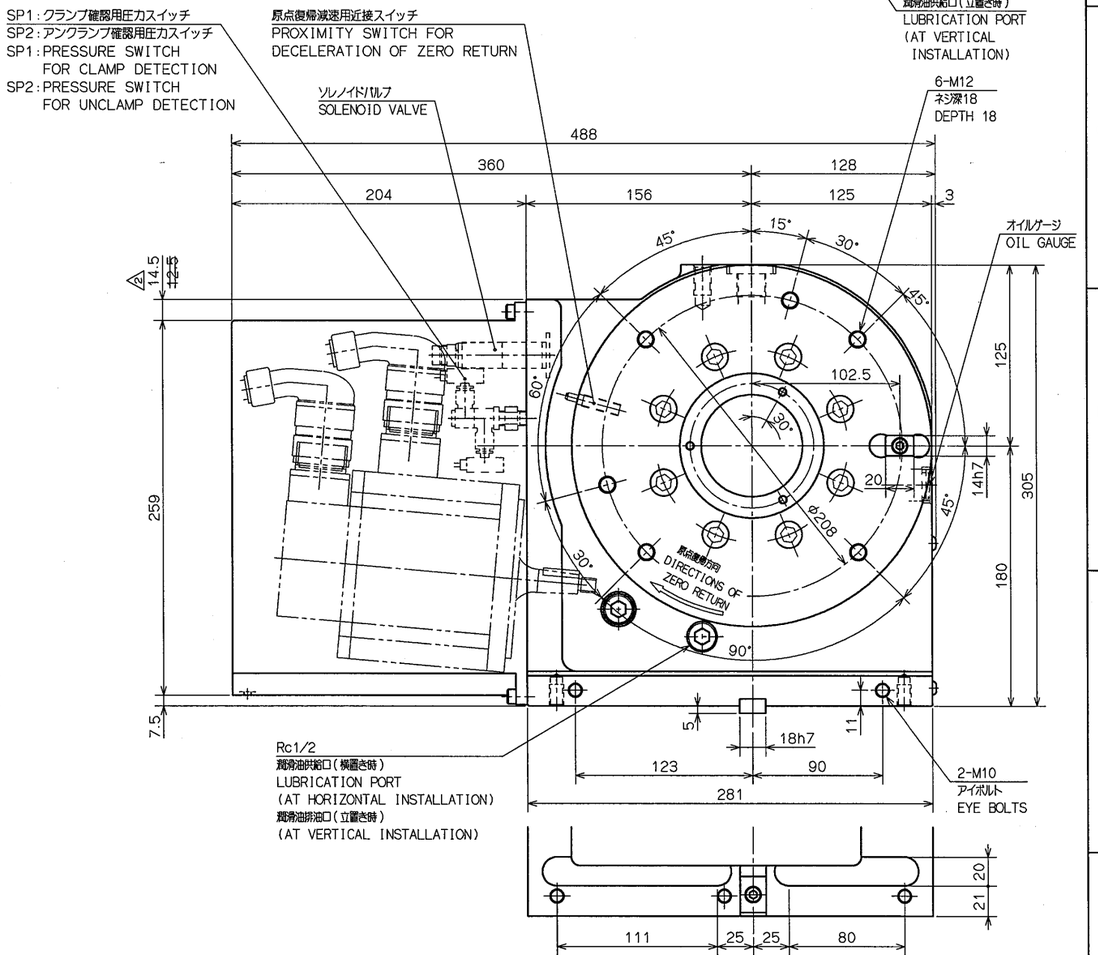


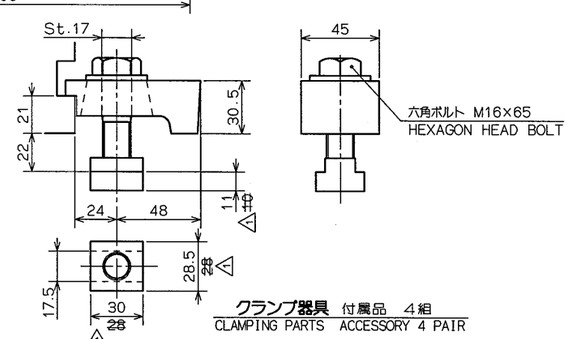
スピンドル穴 SPINDLE THRU-HOLE (S=1:5)



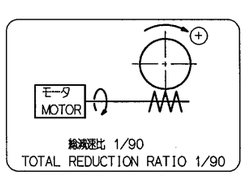








クランプ器具 付属品 4組
CLAMPING PARTS ACCESSORY 4 PAIR



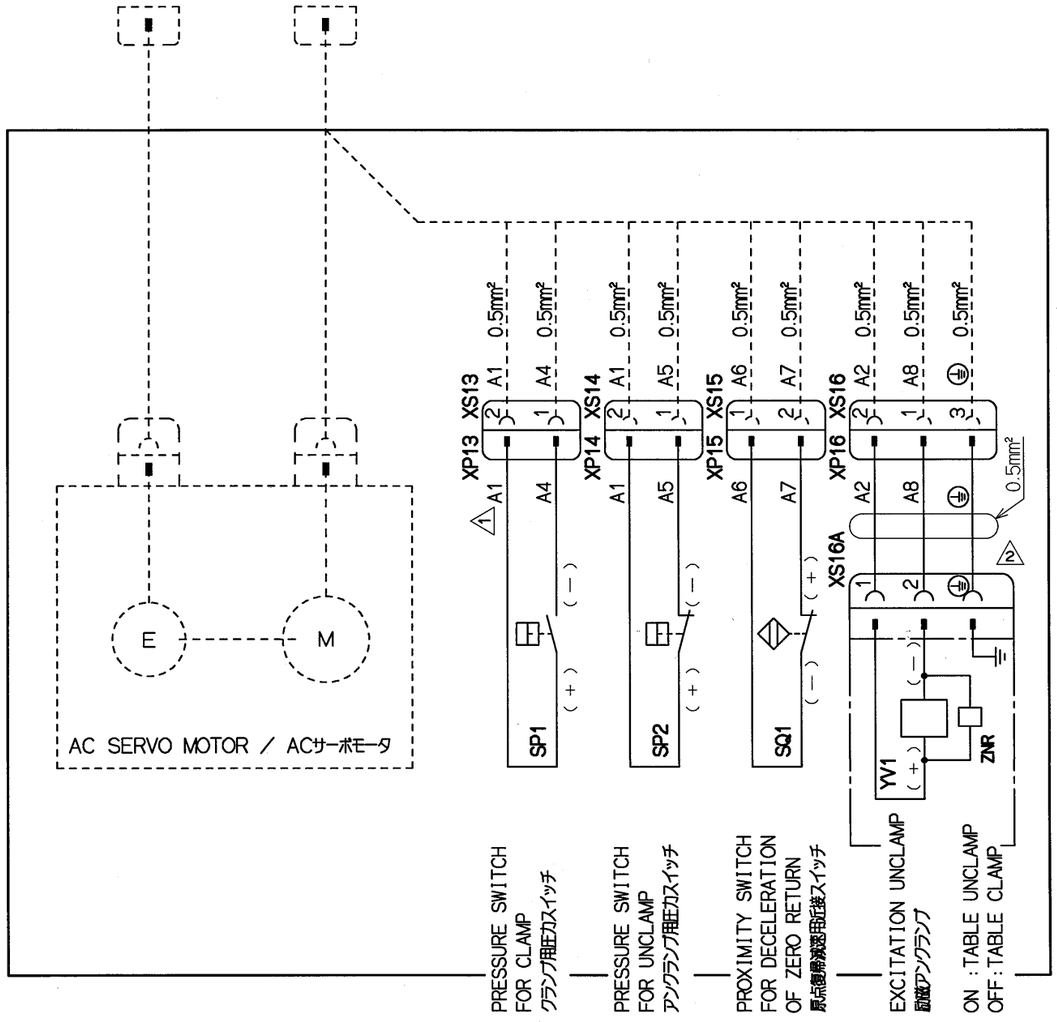
駆動系スケルトン SKELTON DRAWING OF DRIVE SYSTEM

注記 NOTE

モータ回転方向が、出力軸側から見てCCWのときテーブル回転方向は、CW
WHEN DIRECTION OF MOTOR SHAFT REVOLUTION IS CCW.THAT OF TABLE REVOLUTION IS CW.

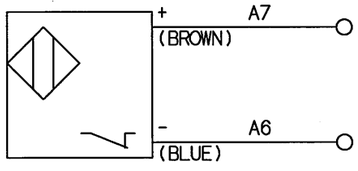
CAREER			SCALE	TYPE MR250LAE02	WEIGHT kg
W.D. 61E366368			1:3	NAME NCテーブル NC ROTARY TABLE	
MANAGER	CHIEF	DRAWN BY K.Okunaka	3RD ANGLE	MR250LAE02 ガイケイ OUTSIDE VIEW	
KITAGAWA IRON WORKS CO..LTD.		DATE 03.12.25		DRW NO. 61E 24 6730 3	

CUSTOMER		
MDF.NO.	D A T E	REASON OF RIVISION
1	04.08.06	CHANGE NAME' S
2	06.03.22	ADJUSTMENT(Δ5PLACES)
3	07.04.10	ADJUSTMENT(Δ1PLACE)
4	07.07.30	ADJUSTMENT(Δ3PLACES)



MARK 記号	NAME 品名	MAKER メーカー	TYPE 型式	Q'ty 個数	REMARKS 備考
△4△2 SP1	PRESSURE SWITCH プレッシャスイッチ	SMC ~~PS1000-R06L~~	~~PS1000-R06L-Q~~ PS1000-R06L-Q-X140	1	0.25 MPa 1a ~~0.29 MPa~~
△4△2 SP2	PRESSURE SWITCH プレッシャスイッチ	SMC ~~PS1100-R06L~~	~~PS1100-R06L-Q~~ PS1100-R06L-Q-X141	1	0.055 MPa 1b ~~0.05 MPa~~
SQ1	PROXIMITY SWITCH 近接スイッチ	YAMATAKE	FL7M-2K6H	1	DC10~30V
△2 YV1	SOLENOID VALVE ソレノイドバルブ	SMC	~~VK332-5DS-M5-F-Q~~ VK332-5DS-M5-F-Q	1	DC24V
XP13	PLUG HOUSING プラグハウジング	MOLEX	52116-0240	1	
XP14	PLUG HOUSING プラグハウジング	MOLEX	52116-0241	1	
XP15	PLUG HOUSING プラグハウジング	MOLEX	52116-0242	1	
XP16	PLUG HOUSING プラグハウジング	MOLEX	52116-0341	1	△3
XS13	RECE HOUSING リセハウジング	MOLEX	52117-0240	1	~~CUSTOMER MUST PREPARE 客先にて手配お願いします~~
XS14	RECE HOUSING リセハウジング	MOLEX	52117-0241	1	~~CUSTOMER MUST PREPARE 客先にて手配お願いします~~
XS15	RECE HOUSING リセハウジング	MOLEX	52117-0242	1	~~CUSTOMER MUST PREPARE 客先にて手配お願いします~~
XS16	RECE HOUSING リセハウジング	MOLEX	52117-0341	1	~~CUSTOMER MUST PREPARE 客先にて手配お願いします~~
△2 XS16A	CONNECTOR コネクタ	SMC	VK300-82-1	1	SOLENOID VALVE ACCESSORIES ソレノイドバルブ付属

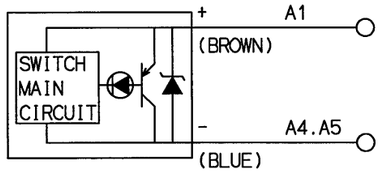
近接スイッチ接続要領
CONNECTION OF PROXIMITY SWITCH



近接スイッチ仕様
SPECIFICATIONS

電源電圧	POWER SUPPLY	DC10~30V
負荷容量	LOAD CURRENT	3~100 mA
漏れ電流	LEAK CURRENT	max.0.55 mA
残留電圧	RESIDUAL VOLTAGE	max.3.0 V
出力機能	OUT PUT TYPE	NC

プレッシャスイッチ接続要領
CONNECTION OF PRESSURE SWITCH



プレッシャスイッチ仕様
SPECIFICATIONS

負荷電圧	POWER SUPPLY	DC12~24V	
負荷容量	LOAD CURRENT	5~40 mA	
漏れ電流	LEAK CURRENT	max.1.0 mA	
内部降下電圧	RESIDUAL VOLTAGE	max.5 V	
出力機能	OUT PUT TYPE	NO(PS1000-R06L-Q-X140)	△4 ~~PS1000-R06L-Q~~
		NC(PS1100-R06L-Q-X141)	~~PS1100-R06L-Q~~

NOTE 注意

1) '⏚' IS EARTH.
'⏚' はアース.
2) THE COMMON LINE OF A PRESSURE SWITCH IS (+) COMMON.
プレッシャスイッチの共通ラインは+コモンです.

ソレノイドバルブ 仕様
SOLENOID VALVE SPECIFICATIONS

定格電源電圧 RATED SUPPLY VOLTAGE	DC24V
消費電力 POWER CONSUMPTION	4W

CAREER			SCALE	TYPE	MR250RAE03	WEIGHT kg
				NAME	NCテーブル NC ROTARY TABLE	
MANAGER	CHIEF	DRAWN BY E.KUROTOBI	3RD ANGLE		テンキシヨウ WIRING DIAGRAM	
KITAGAWA IRON WORKS CO..LTD.		DATE 02.12.12		DRW NO.	61E 36 6368 △4	

KITAGAWA
Machine Tool Accessories

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