

NIKKEN

NIKKEN CNC ROTARY TABLE CNC105 & CNCZ105 Series

Instruction Manual

First Edition

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1. Preface

Thank you for your purchasing of the Nikken CNC Rotary Table.

The Nikken CNC Rotary Table is designed and manufactured on basis of our spirit of "everyday research", which words are the origin of our company name, and customers intention is incorporated in the design to a Maximum practical extent.

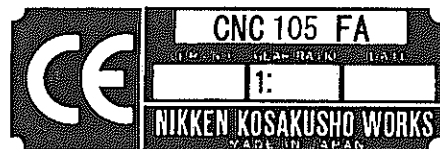
We are sure that this CNC Rotary Table will satisfy you for its high performance, high quality and easy operation.

Nikken CNC Rotary Table withstands long-term and full operation.

In order to ensure its proper handling and full utility for intend purpose, please read through the instruction manuals attached hereto.

Please keep "Inspection Certificate", "Common Instruction manual" and "Individual Instruction Manual" in your file.

If there should happen any trouble on the CNC Rotary Table, please inform us detail of trouble as well as all letters engraved on its name plate.



2. Dimensional drawings and specifications

Please see separate sheets in this file.

3. Preparation for Operation

The following preparations and test running are required before the CNC Table is fully running:

- 1) Unpacking, transfer and installation
- 2) Checking of lubrication oil level
- 3) Air supply for brake clamping
- 4) Electrical connection
- 5) Test Running
- 6) Setting grid shift amount for zero return

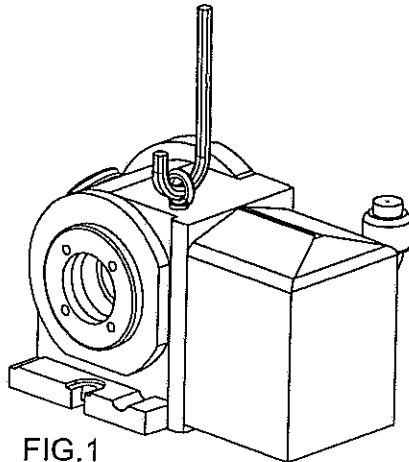
3-1. Unpacking, transfer and installation

- 1) Unpacking and transfer

Careful attention should be paid to the transfer of the CNC Rotary Table after it is unpacked.

Hook a wire through the eye bolts and carefully move the CNC Rotary Table while keeping the balance.

After the transfer please remove the eye bolt(s).



- 2) Wiping off rust-prevent oil

Carefully wipe off the rust-prevent oil applied on the whole surface of the CNC Rotary Table by using waste cloth.

Do not use benzene or gasoline which would produce rust.

- 3) Installation

Please make sure that the CNC Rotary Table is installed on the machine properly as per discussed in advance.



3-2. Lubrication

The entirely enclosed CNC Rotary Table body will not permit the ingress of cutting oil or permit lubrication oil to leak out. Check lubrication oil and the sight glass every day, and fill a proper amount of oil if it is insufficient.

Oil should be change at least once a year.

The proper amount of oil has been filled in the CNC Rotary Table when shipped.

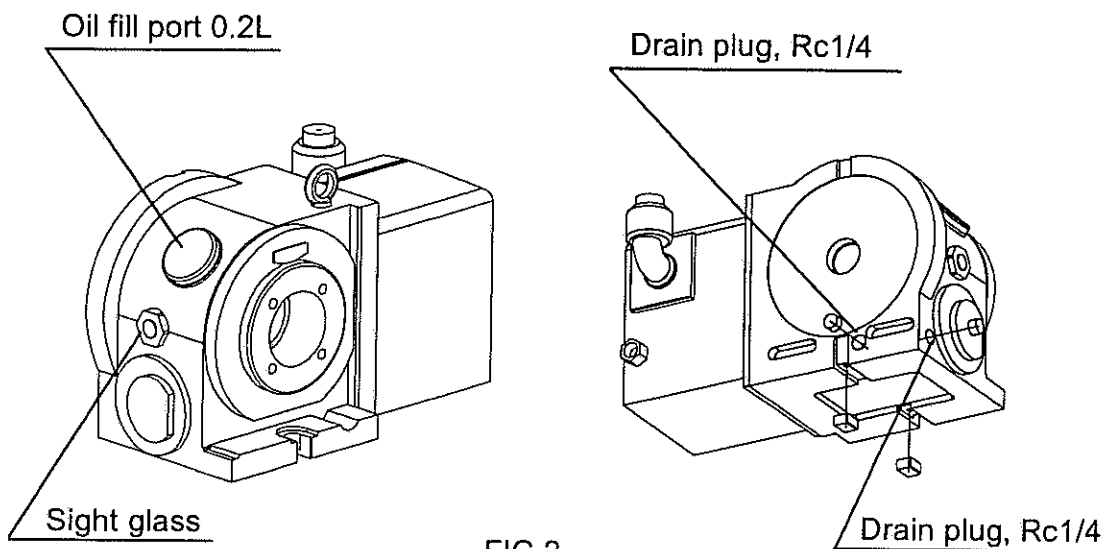


FIG. 2

List of recommended oil

MAKE	ORDER #
IDEMITSUSUPER	MULTI OIL 100
NISSEKI MITSUBISHI	SUPER Mulpas 100
COSMO	COSMO MIGHTY SUPER 100
JAPAN ENERGY	LATUS 100
SHOWA SHELL	SHELL TERRASE OIL C100
ESSO	TELESO 100
MOBIL	DTE OIL HEAVY
KIGNAS	UNIT OIL P100

3-3. Air supply for brake clamp

1. Air supply for brake clamp

The brake clamp on this table is activated by pneumatic pressure.

The solenoid valve and confirmation switches for clamp/unclamp are provided inside the motor cover. Please connect air hose to the specified port.

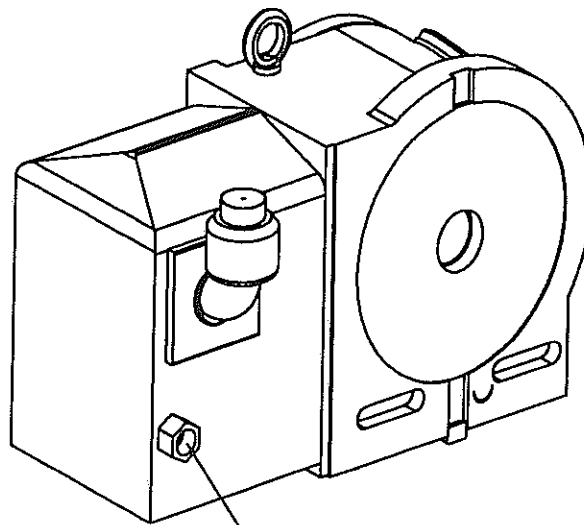
1) The fig. 3 shows the standard air connection port on the motor cover. The port has Rc1/4 female Tap hole for 8mm Dia. air tube.

(Please refer the attached drawings for details.)

2) Always make sure that the brake clamp requires 0.49MPa constant pneumatic pressure.

3) The applicable pneumatic pressure range is between 0.40MPa to 0.69MPa. However, if the pressure is below 0.49MPa, the sufficient brake torque in the specifications can not be obtained, and if the pressure is over 0.69MPa, it might damage the solenoid valve, switches for clamp/unclamp confirmation, and the air hose.

4) Always make sure that the pure clean air is supplied for brake clamp system.



Air hose connection for Brake system
Rc1/4 Tap (Female) with 8mm Dia. connector

FIG.3



3-4. Electrical connection

Always make sure that the electrical connection between the CNC Rotary Table and the machine controller is done according to the attached electrical circuit diagram. Starting the CNC Rotary Table with the brake clamped would damage the CNC Rotary Table.

Note 1) The cable connection and checking must be done while the main power of the machine tool is switched off.

Note 2) Ensure that the cables and the pneumatic /hydraulic hose are located safely without causing any interference against the movement of machine table.

3-5. Test Running

- 1) Make sure that the air hose is connected and the pressure is supplied correctly.
- 2) Do not load any component on the CNC Rotary Table.
- 3) Command the brake clamp (M10, M68 etc.) and unclamp (M11, M68 etc.) signals repeatedly from NC unit to check the brake works properly.

When the CNC Rotary Table is controlled by Nikken Alpha21 Controller, use G10 (Unclamp command) and G11 (Clamp command) instead of M signal.

```
N000          G10   G13   (Unclamp, Single Block Mode)
N001  J000   G11          (Clamp and then Jump to N000)
```

- 4) Rotate the CNC Rotary Table clockwise and counterclockwise about twice for brake in running at Low speed (F300) for the first time, and make sure that the CNC Rotary Table rotate smoothly, then gradually increase the speed up to the rapid speed.

3-6. Setting grid shift amount for machine zero return

(Only for additional axis control)

The machine zero point of the CNC Rotary Table is located at the position where the CNC Rotary Table reference pin hole is located at 90 deg (3 o'clock) position.

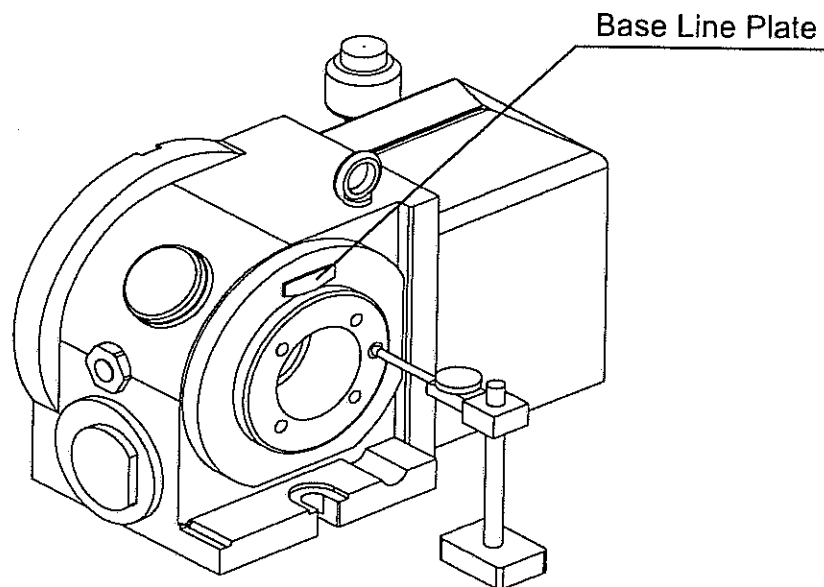


FIG.4

The grid shift amount is described at the individual parameter list. And regard this amount as the compensation amount.

- 1) Input the compensation amount at the grid shift amount.
- 2) Rotate the CNC Rotary Table a few degrees to the clockwise direction by JOG mode, then carry out the machine zero return.
- 3) Adjust the compensation amount with checking the CNC Rotary Table zero position by dial gauge reading. Repeat 1) to 3) operation to obtain the correct grid shift amount.

4. Mechanism and Maintenance information

4-1. Mechanism location for main parts.

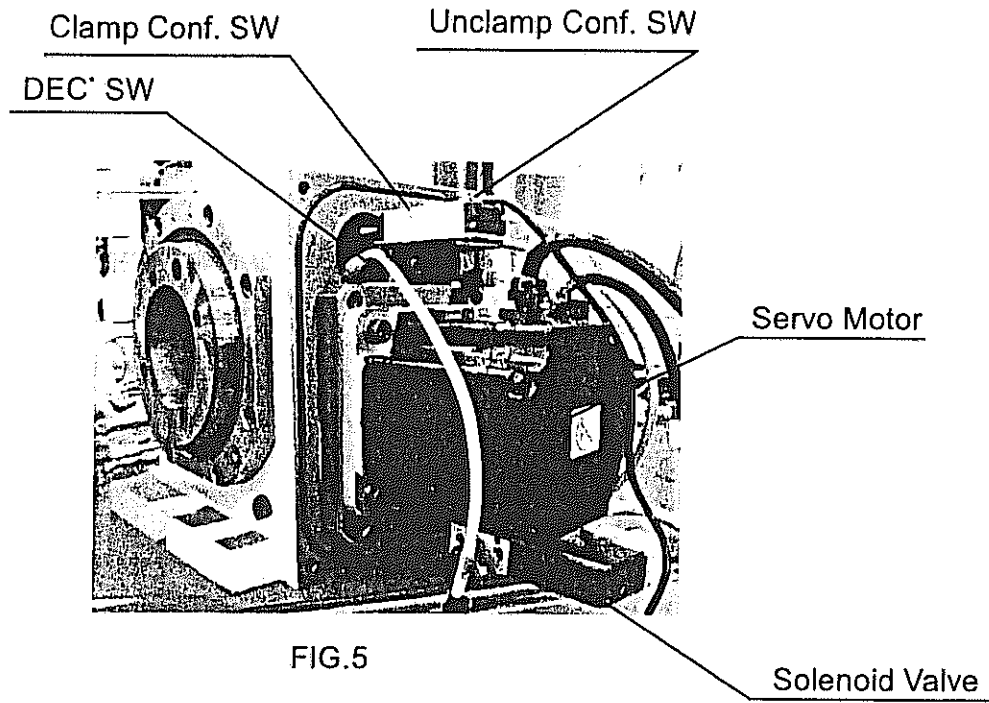


FIG.5

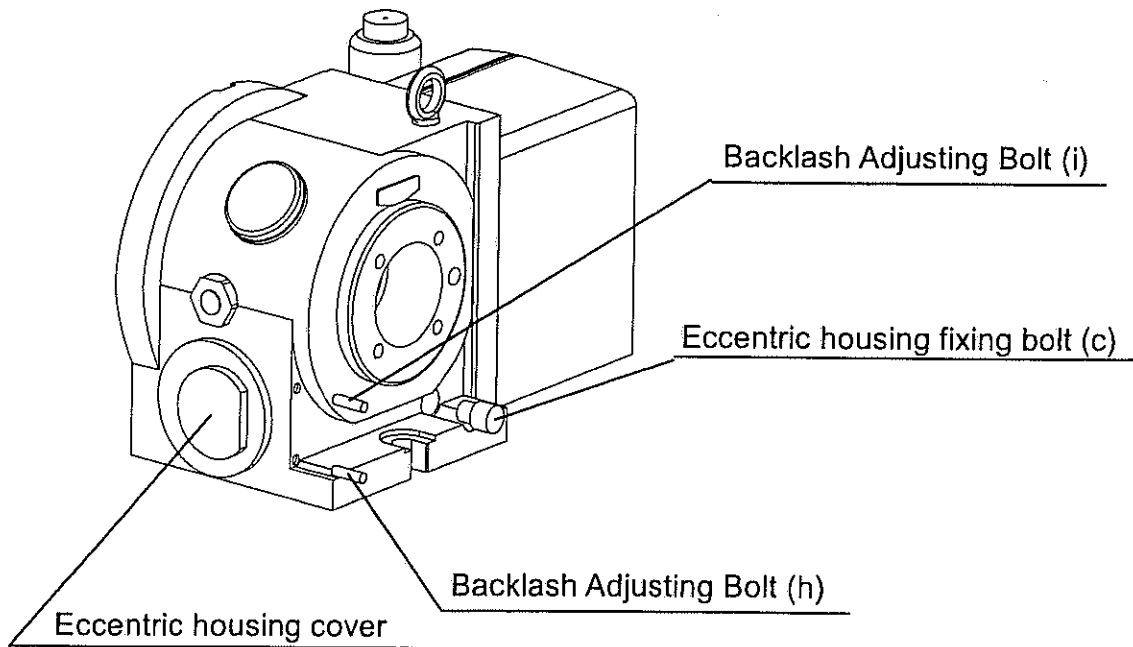


FIG.6

4-2. Backlash adjustment

[Check of the backlash]

The worm screw rotates in the totally-enclosed oil bath and the reduction mechanism is composed of a combination of the special ion-nitrided worm gear and the hardened worm screw, so that it is not necessary to adjust the backlash until 4 to 5 years have elapsed after the rotary table is put in service. However, if it's necessary, the backlash can be simply adjusted according to the following procedures.

- 1) Unclamp the brake
- 2) Confirming the backlash

Set the dial gauge (a) probe at the Reference pin hole as fig. 8.

Shake the Table CW and CCW by hands using 2 bolts (9.8Nm through 14.7Nm) and read the dial gauge (a).

A backlash of within 0.005mm to 0.010mm is normal, and the adjustment should be done in the event when a backlash of 0.050mm or more is observed.

The confirmation is to be done on 8 spots of every 45 deg of Table position.

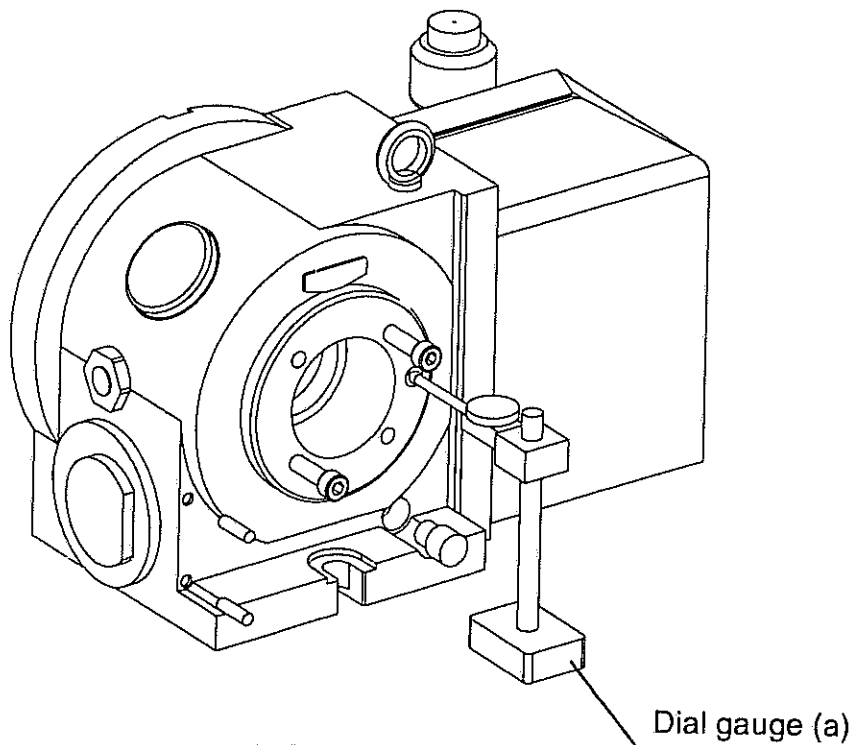


FIG.8

3) Backlash adjustment at worm gear

[1] Remove the eccentric housing cover.

[2] Slightly loosen 3 bolts (b) [M6] which is fixing the flange of eccentric housing.

[3] Slightly loosen 1 bolt (c) which is fixing the eccentric housing.

Thus, the eccentric housing will be free and now it's ready to adjust the backlash.

(If the eccentric housing will not be free, gently tap the head of clamp piece (f) which is located back of eccentric housing clamp bolt (c) by soft hammer. Refer fig. 10 & 11.

[4] Set the dial gauge (a) again and loosen bolt (h) and tighten bolt (i), then the eccentric housing will turn and the backlash between the worm screw and worm wheel will get close to 0 (zero). Adjust the backlash to 0.005 mm to 0.010 mm by watching the dial gauge (a) reading while shaking the Table by hands.

[5] After completion of above adjustment, tighten the clamp bolt (c) & fixing bolts (b). And put eccentric housing cover back as it was.

[6] Measure the backlash again and confirm to that it has been adjusted to 0.005 mm to 0.010 mm.

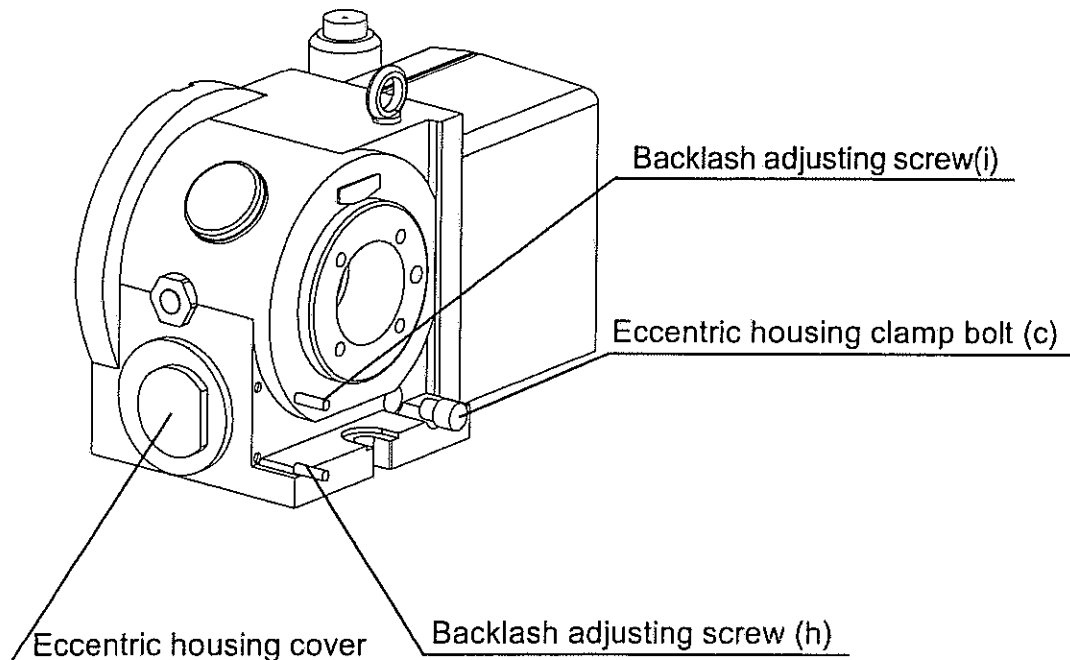


FIG.9

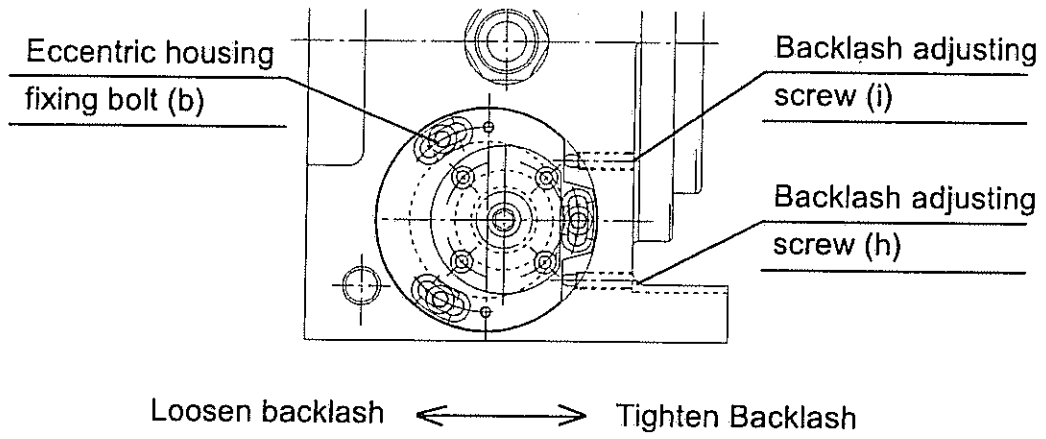


FIG.10

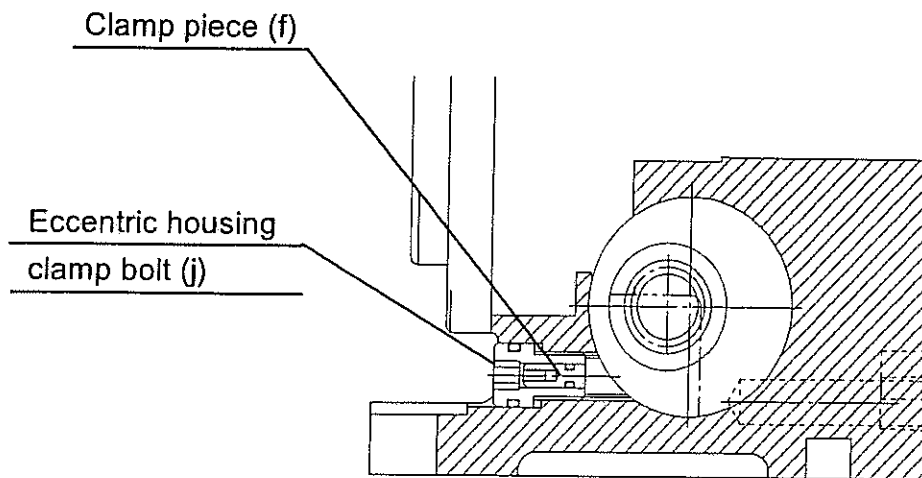


FIG.11

4) Backlash adjustment between worm shaft gear and motor shaft gear

- [1] Slightly loosen four (4) motor fixing bolts.
- [2] Slightly push the motor toward the worm shaft gear.
- [3] Slightly tighten four motor fixing bolts.
- [4] Set the dial gauge at the motor flange as fig. 12.
- [5] Push the motor away from the worm shaft gear approx. 0.03mm.
- [6] Tighten four motor fixing bolts properly.
- [7] Make sure that it's not making any unusual noise by driving the motor.
- [8] If so, adjust the position of the motor as per the procedure [5] to suit.

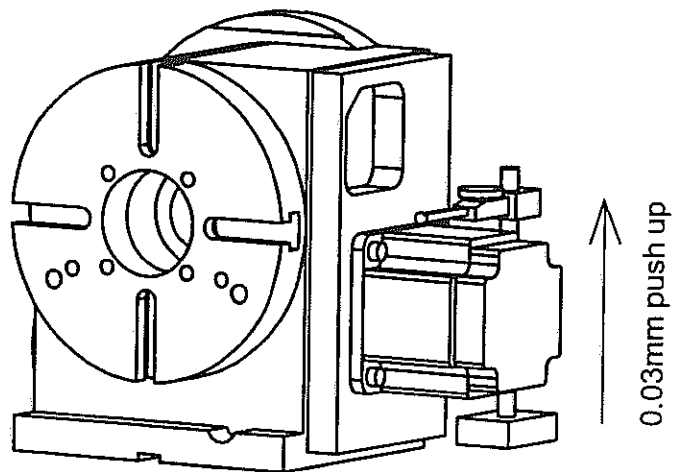


FIG.12

4-3. Brake Mechanism

1) When the pneumatic pressure is provided into the brake cylinder by clamp command, the wedged piston which has small tapered front end strokes and creates the double clamp force due to the mechanism to clamp the table by pushing the brake shoe, connected on the table spindle, at its all round the diameter of the inside table casting.

2) When the pneumatic pressure for clamping is released by unclamp command, the piston is pushed back to the original position by the return spring to make it unclamp. At the same time, the pneumatic pressure at the brake confirmation mechanism also, pushes the piston to the original position and activates the reed switch for unclamp confirmation to send the signal.

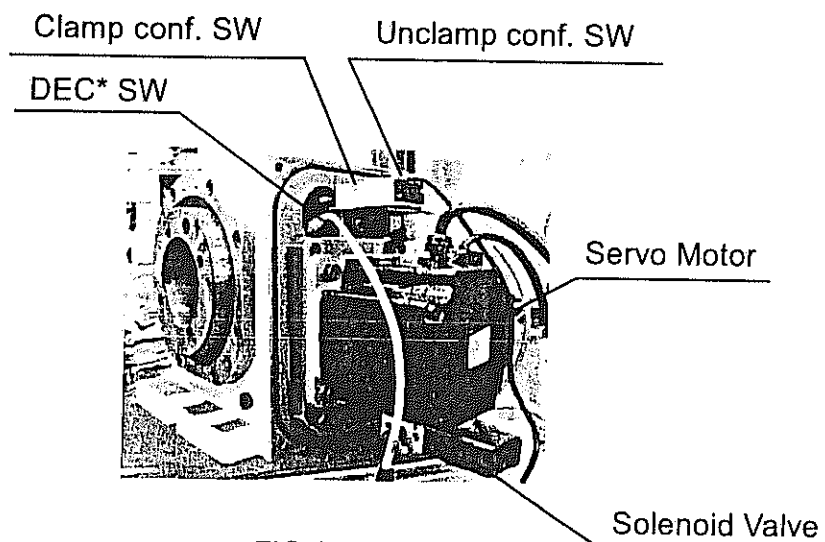
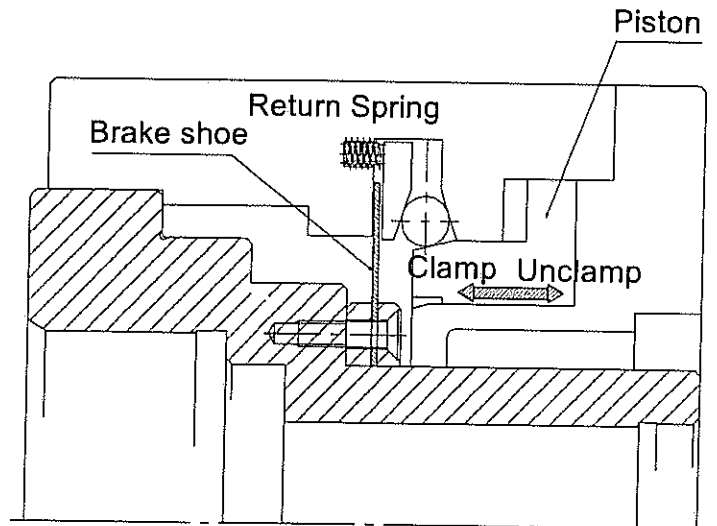


FIG.14

4-4. Zero point return mechanism

There is a proximity switch for zero point return as per fig. 15.

If the Machine zero position on the CNC Rotary Table is out of position by shift amount per one rotation of the motor (4 deg or 8 deg) or more, adjustment of dog location is required.

If the above out of position is less than shift amount per one rotation of the motor, please adjust the grid shift amount.

Table Model	deg/motor 1 rev	Position of DEC* release (for FANUC Controller)
CNC105	4 deg	358.0 deg
CNCZ105	8 deg	356.0 deg

Note 1) When changing the proximity switch, located the switch to get the length of 14.5 mm from flange to the front end as fig. 15.

(If the adjustment is not made, it might cause the interference against the dog ring or the zero positioning might not be done properly.)

Note 2) For the installation on the special purpose machine (for special application), the proximity switch for zero point return might not be installed on the CNC Rotary Table due to the machine specifications. Please refer to the attached CNC Table specifications with CNC Rotary Table.

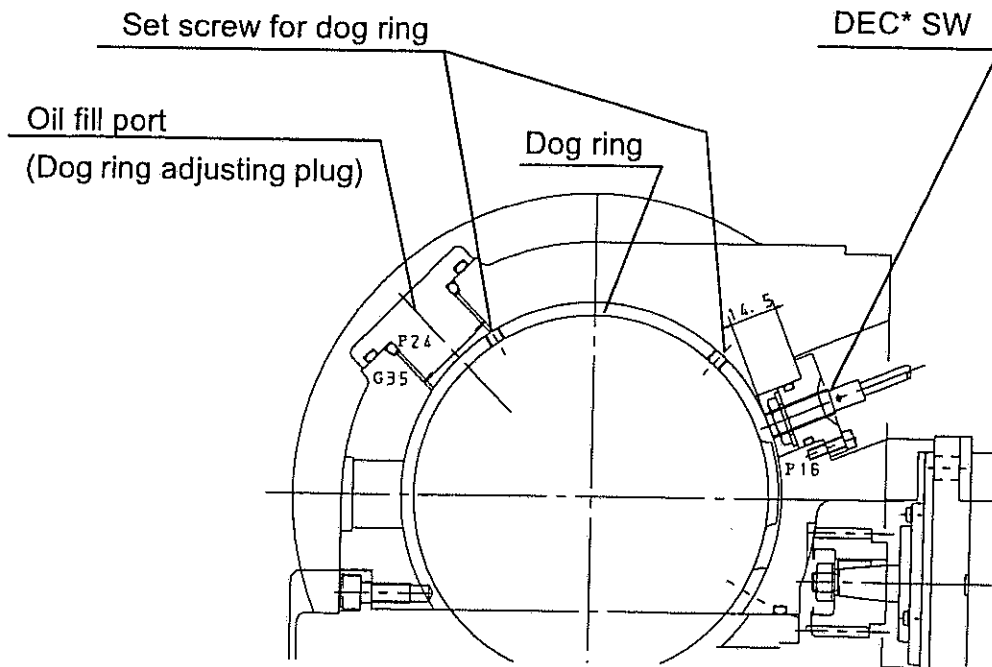
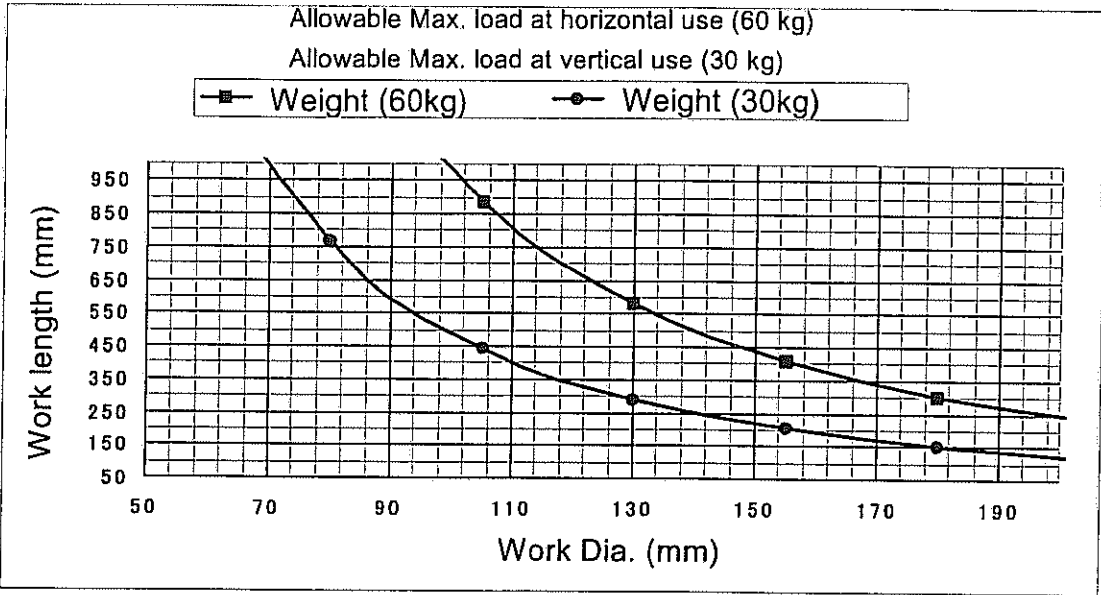


FIG.15

5. Appendix

5-1. Relation between work diameter and length for allowable Max. load (for steel)

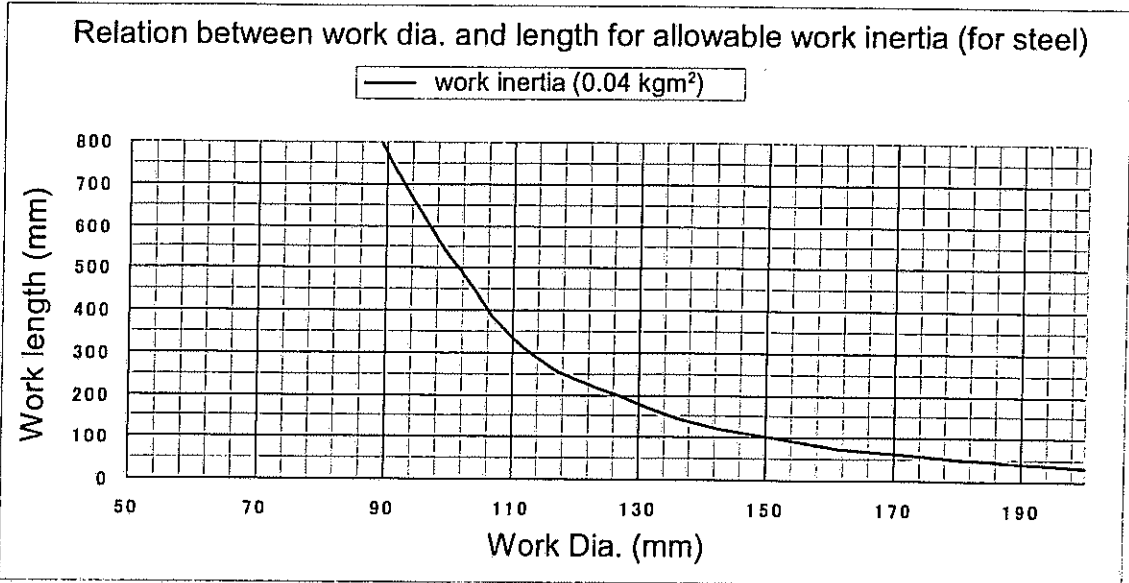


How to use above chart

A Work piece of 100mm dia. and its length of less than 450mm is within the allowable load of 30 kg from above chart.

Caution) In case of the work piece dia. of more than 100 mm, please make sure that its work inertia is within the specification, even if the work piece weight is within the allowable load.

5-2. Relation between work dia. and length for allowable work inertia.



How to use above chart

A work piece of 100mm dia. and its length of less than 500mm is within the allowable work inertia of 0.04kgm².