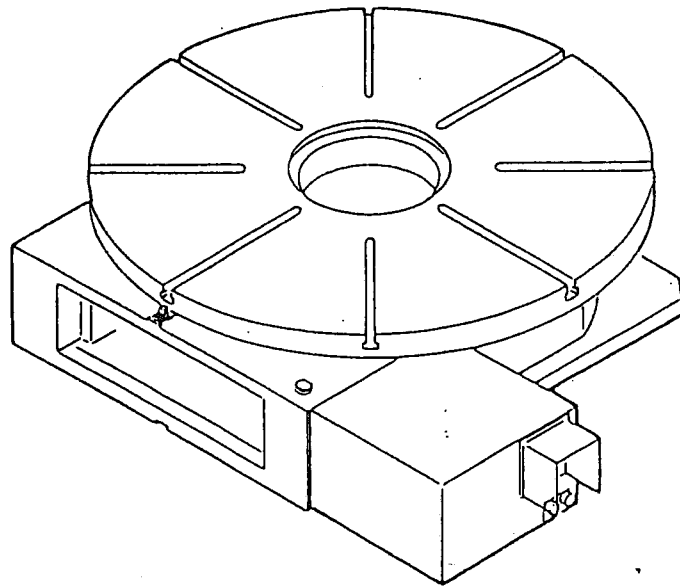


NIKKEN CNC ROTARY TABLE

CNC 1200

INSTRUCTION MANUAL



THE UNIVERSITY OF CHICAGO

1958

THE UNIVERSITY OF CHICAGO



CONTENTS

1. Preface

2. Mechanism & Adjustment

2-1. Mechanism

2-2. Measurement of Backlash

2-3. Adjustment of Backlash on Worm Gear

2-4. Adjustment of Backlash on Motor Gear

2-5. Brake Clamp / Unclamp Mechanism

2-6. Zero Point Return Mechanism and Dog Positioning

2-7. Hydranlic Supply for Brake

3. Reference Data

3-1. Relation between Workpiece Dia & Length for allowable Max Load

3-2. Relation between Workpiece Dia & Length for allowable work inertia

2. Mechanism & Adjustment

2-1. Mechanism

Lubrication Oil Amount for CNC-1200 : Approximately 18L
Please see CNC Table Common Instruction Manual for Grade
of oil to suit.

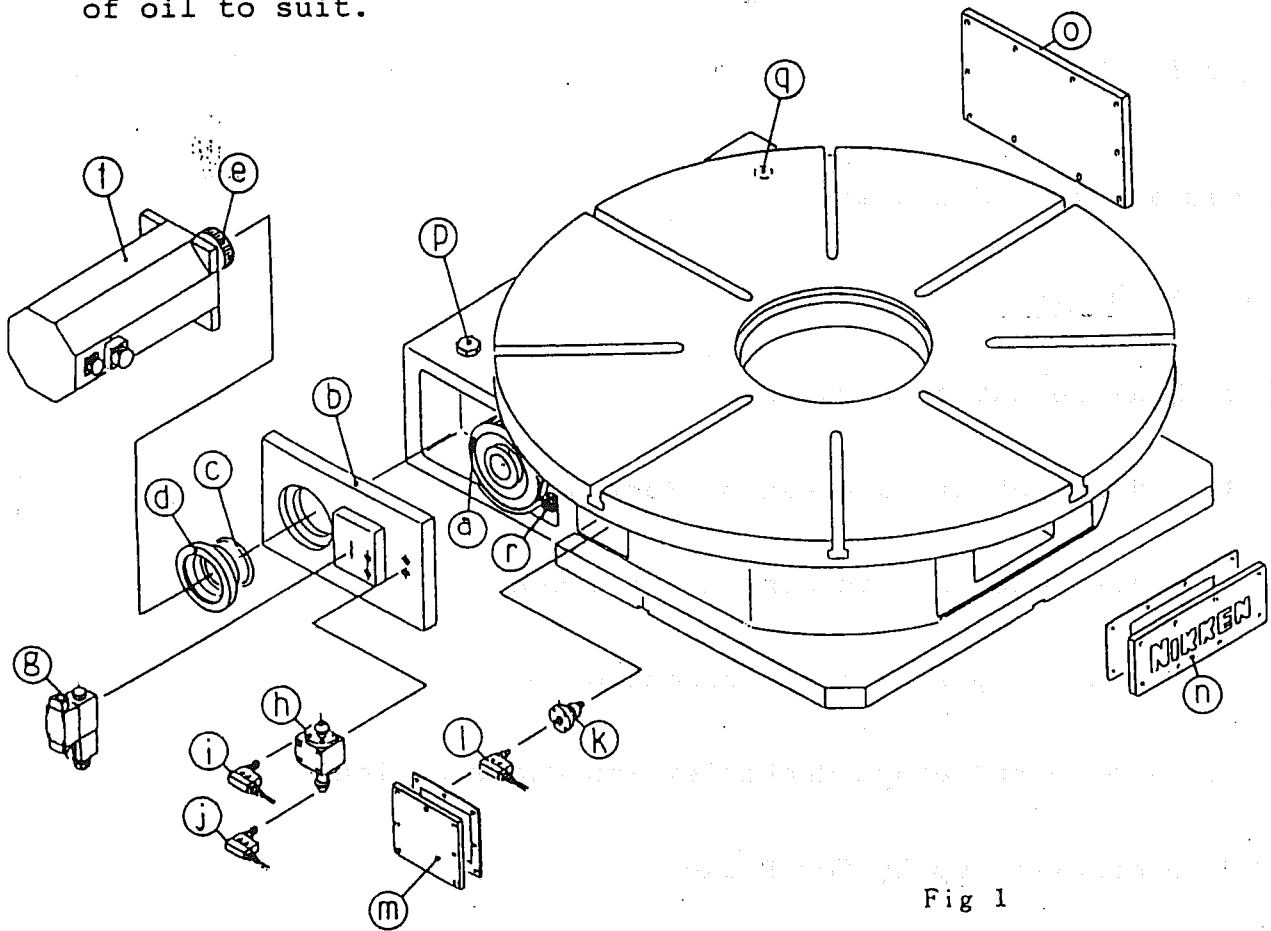


Fig 1

- a. Worm Gear
- b. Motor Fitting Plate
- c. O Ring
- d. Sealing
- e. Motor Gear
- f. Servo Motor
- g. Solenoid Valve
- h. Clamp / Unclamp Confirming Parts
- i. Unclamp Confirming Limit Switch

- j. Clamp Confirming Limit Switch
- k. Plunger for Zero Point Return
- l. Limit Switch for Zero Point Return
- m. Side Plate
- n. Top Cover
- o. Eccentric Side Cover
- p. Oil Port
- q. Eccentric Housing Fixing Screw
- r. Backlash Adjusting Screw

2-2. Adjustment of 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 wheel and the hardened worm screw, so that it is not necessary to adjust the backlash until four to five years have elapsed after the rotary table is put in service.

However, if necessary, the backlash can be adjusted according to the following procedures.

Measurement of Backlash

- 1) Unclamping the brake. Execute unclamp command.
- 2) Confirming the backlash.

Read a deflection of the dial guage (G) by inserting the flat Plate (H) into a T-slot and manoeuvre the face plate clockwise and anti-clockwise through the flat plate by hand.

A Backlash of within 10-15 microns is intial amount has been set at factory, and the adjustment should be done in the event when a backlash of 50 microns or more is observed.

the Measurement is to be done at eight spots of every 45° of table (Please see Fig 2 for (G) & (H)).

2-3. Backlash Adjustment on Worm Gear

- 1). Pull blank Plug ① on top of Eccentric Housing Fixing Screws ②
- 2). Loosen the Screws ③ by one to two turns tap.
- 3). Remove Eccentric Side Cover (Fig ④) and loosen four Eccentric Housing Clamp Screws ⑤.
- 4). Now you could see two Backlash Adjusting Screws will be provided there in (the Screws have hexagon Cap heads in order to be turned at inside casting.)
- 5). Reset the dial guage ⑥ as shown in Fig 2, and loosen the Screw ⑦ and tighten the Screw ⑧ toward clockwise, then the Eccentric Housing will turn in the direction of arrow, thus, the Backlash between the worm wheel and the worm screw will get near to Zero.
- 6). Insert the flat plate ⑨ into a T-slot of face plate, and manoeuvre the face plate clockwise and anticlockwise through the plate by hand, and adjust the Backlash to 10-15 microns by using the screw ⑩ & ⑪ watching the deflection of the dial guage ⑥.
- 7). After completion of avove adjustment, tighten the screw ⑩ & ⑪, then put blank plugs back onto original position.
- 8). Measure the Backlash again and confirm to that it has been adjusted to 10-15 microns.

- NOTE
1. Please make sure blankplag should be completely sealed with sealing tape.
 2. The Adjustment of Backlash is every delicate works, so be careful when executing it.

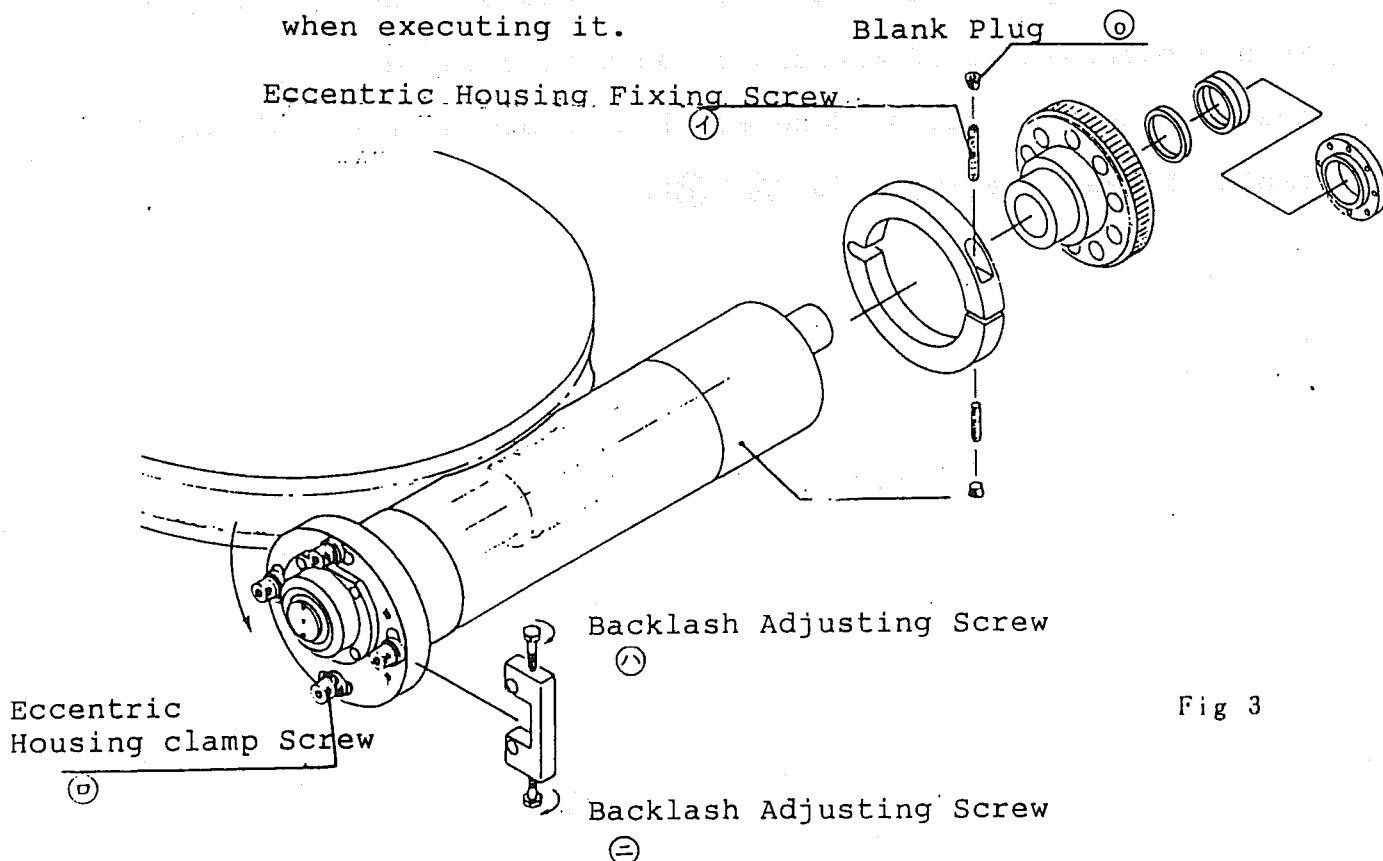


Fig 3

2-4. Adjustment of Backlash on Motor Gear

- 1) After completion of the backlash adjustment between worm wheel and worm screw. Confirm the motor load is correct.
- 2) Switch on the power supply, And rotate CNC Rotary Table on the jog mode to check the gear noise.
- 3) If any strange noise comes out, it means backlash adjustment on motor gear is required.

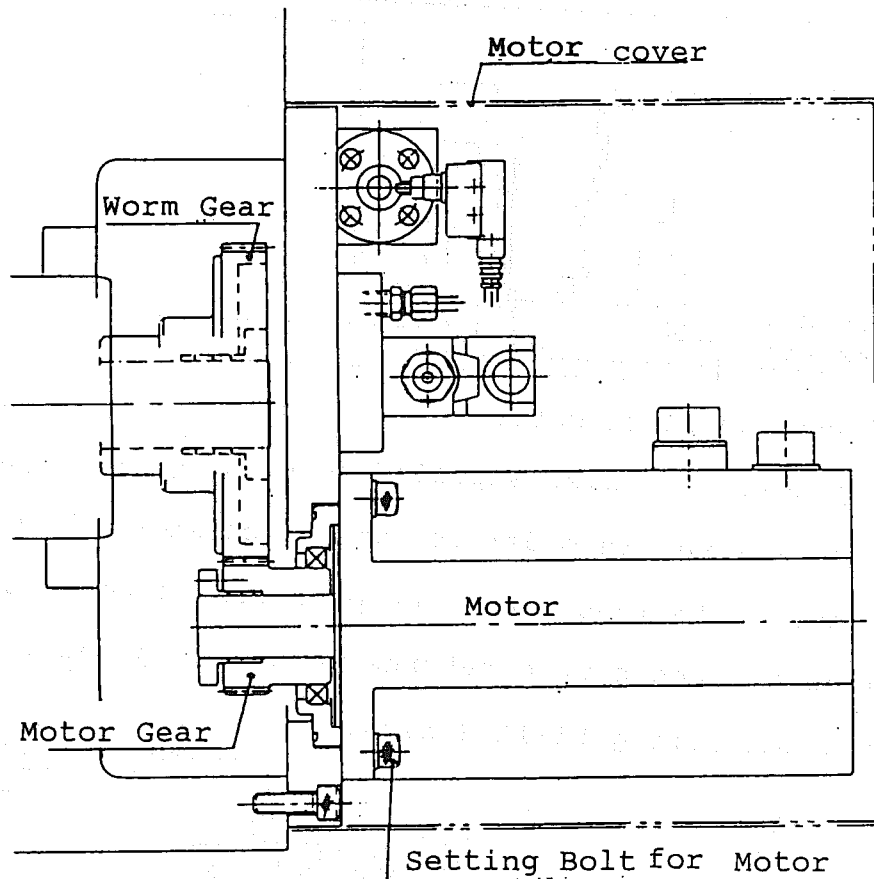


Fig 4

How to adjust the backlash.

- a) Remove the motor guard off the table.
- b) The backlash can be adjusted by shifting the Motor Location Slightly right or Left.
- c) Loosen four motor mounting screws, and push the motor fully up toward worm shaft gear.
- d) On the other hand, tap the motor by soft hammer gently toward the opposite direction of pushing up, and Listen the noise differences.
- e) When the noise becomes normal, the motor must be located properly.
Now tighten the four screws to complete.

2-5. Brake Clamp / Unclamp Mechanism

2-5-1 Brake Mechanism

When clamp command is supplied with hydraulic pressure, the thin wall portion on clamp sleeve expands toward the table internal bore surface. thus the brake becomes clamping.

when the hydraulic pressure is released, clamp sleeve gets back original shape. For its metal elasticity, and this is unclamp position.

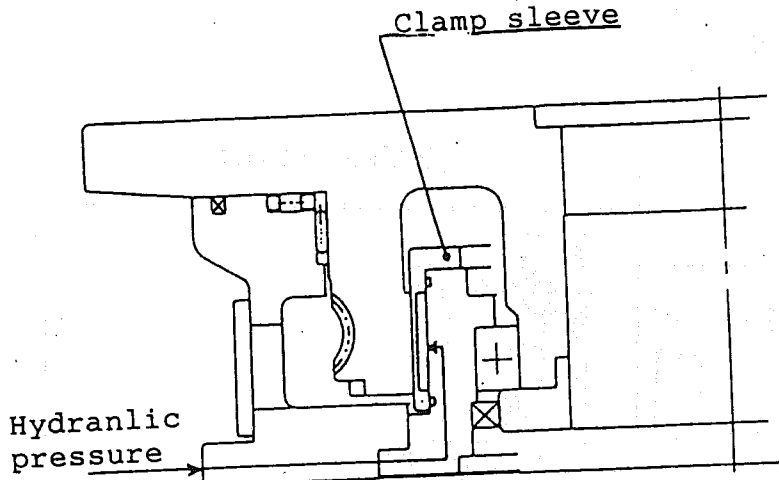


Fig 5

2-5-2 Clamp / Unclamp Confirmation

The Hydraulic pressure is also supplied to clamp Confirming mechanism As well as clamp sleeve, in order to actuate clamp confirming Limit switch by pushing plunge as follows. When the pressure is released (which means it becomes unclamping), the plunge returns to its original position and actuate unclamp confirming Limit Switch.

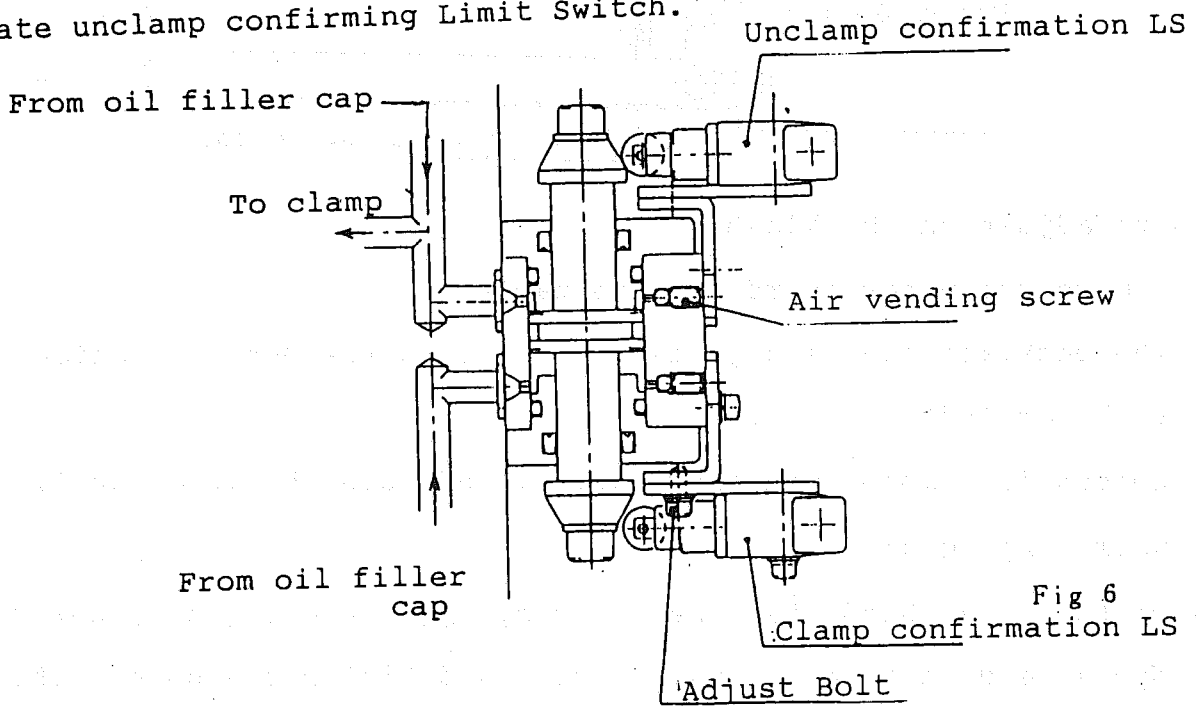


Fig 6

2-6. Zero Point Return Mechanism and Dog position

2-6-1 Zero Point Return Mechanism (See Fig 1)

The dog actuates the limit switch through plunger to have it deliver the deceleration signal.

- 1) Zero Point Return direction is Clock-wise as standard in view of front.
- 2) Remove side plate and the plunger fixing screws. then the whole portion of Zero Point Return Mechanism can be detached.
- 3) The location of Limit Switch is adjustable with loosening its fixing screws.

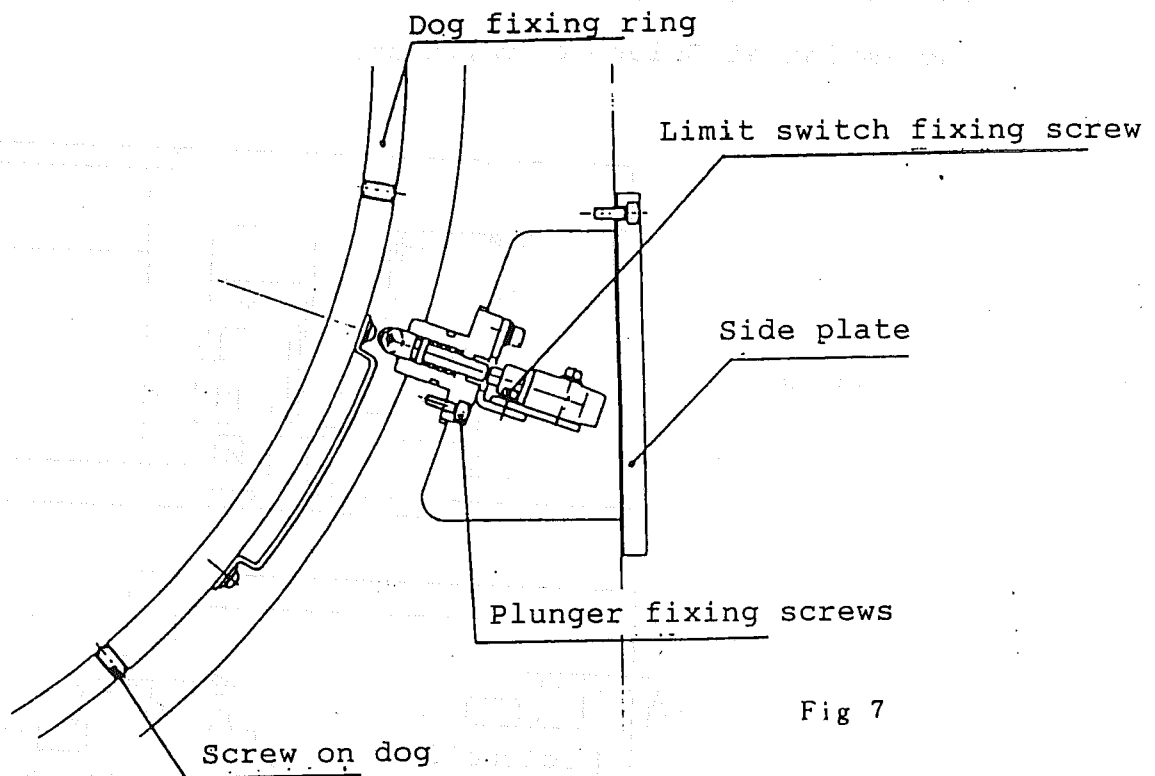


Fig 7

2-6-2 Adjustment of Dog Location

- 1) Drain the oil from the table
- 2) Remove Top Cover (n) (See Fig-1)
- 3) At the table Zero Point Position, the dog is attached with ring at the bottom of worm wheel, therefore rotate the table until the dog comes up to the top port.
- 4) Loosen the screws on dog set Ring and Locate the ring to proper position.

2-7. Hydraulic Supply

1) Please see Fig-2 (Page 3) for Hydraulic Connection Ports.

Pipe fitting are PT 3/8 male threads as standard.

2) Hydraulic Supply pressure should be between 28-35 kgf/cm²

Please use reducing valve, if the pressure is more than 35kgf/cm²

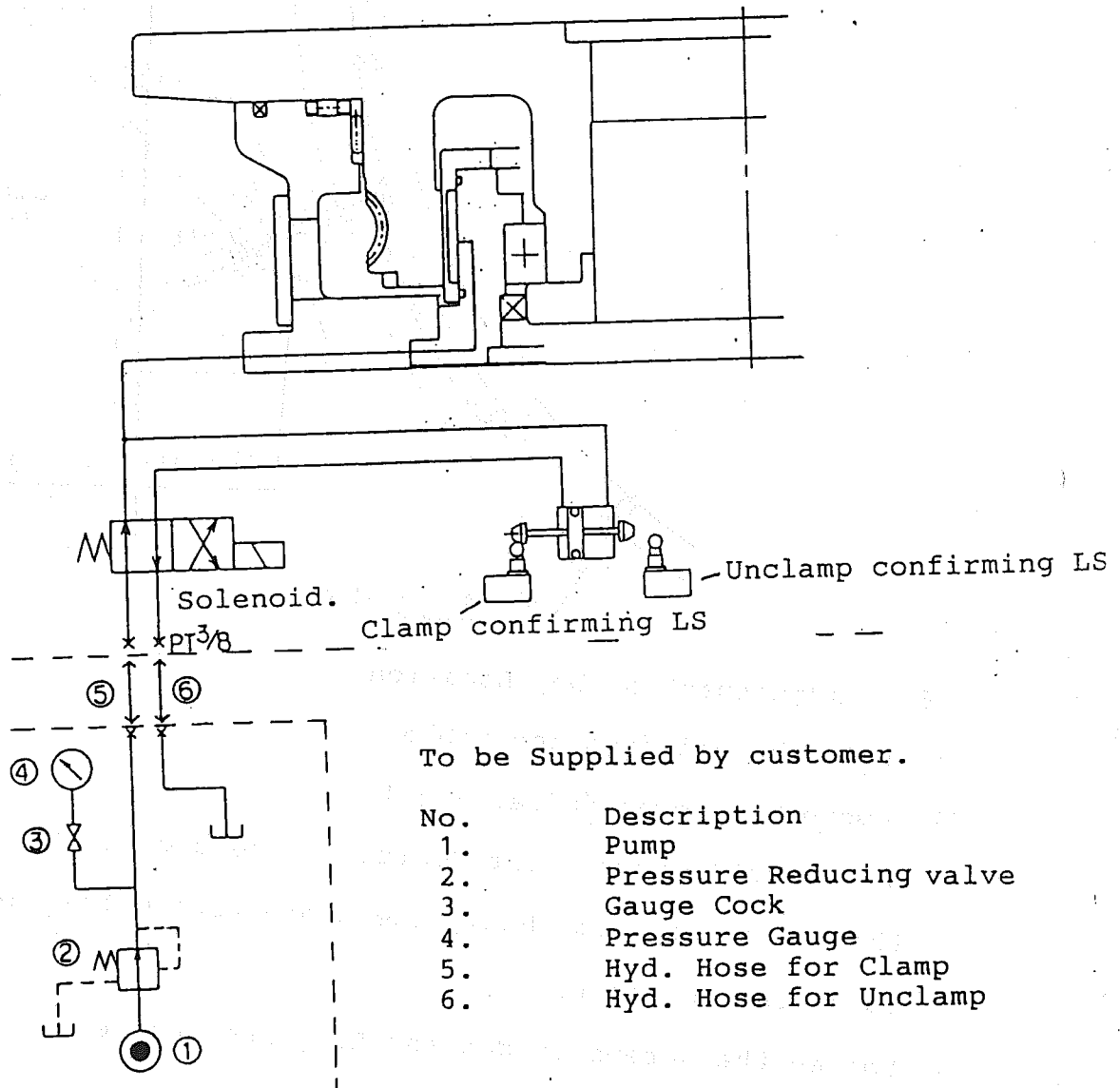
3) Use a Hydraulic pump have its delivery of more than 10L/min.

4) the Hydraulic back pressure should be as small as possible.

(less than 3kgf/cm²)

5) The following diagram shows 2 ports-type Hydraulic system with unclamping at Solenoid valve-on.

Fig 8



3. APPENDIX

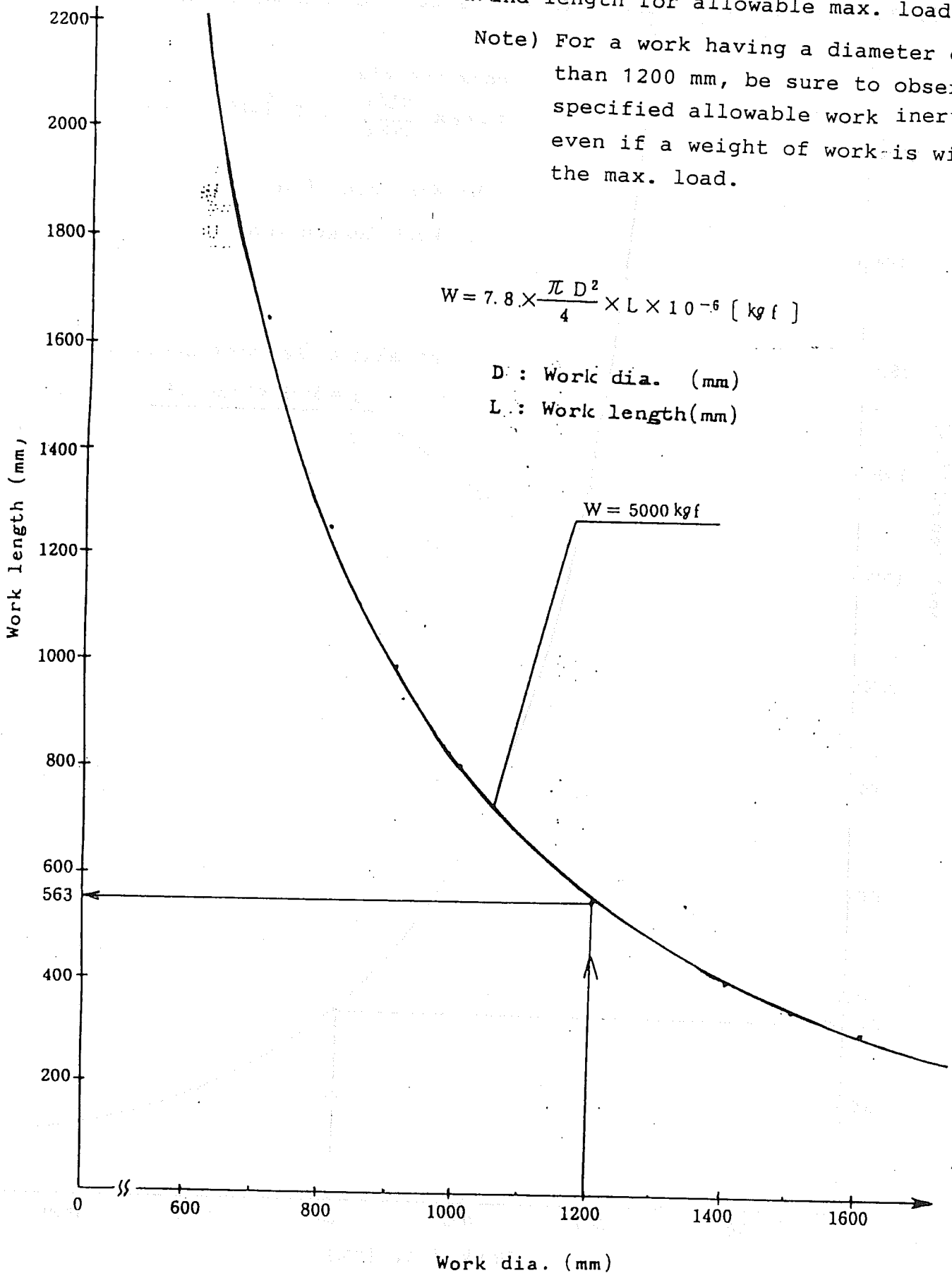
3-1. Relation between work dia. and length for allowable max. load

Note) For a work having a diameter of more than 1200 mm, be sure to observe the specified allowable work inertia even if a weight of work is within the max. load.

$$W = 7.8 \times \frac{\pi D^2}{4} \times L \times 10^{-6} \text{ [kgf]}$$

D : Work dia. (mm)

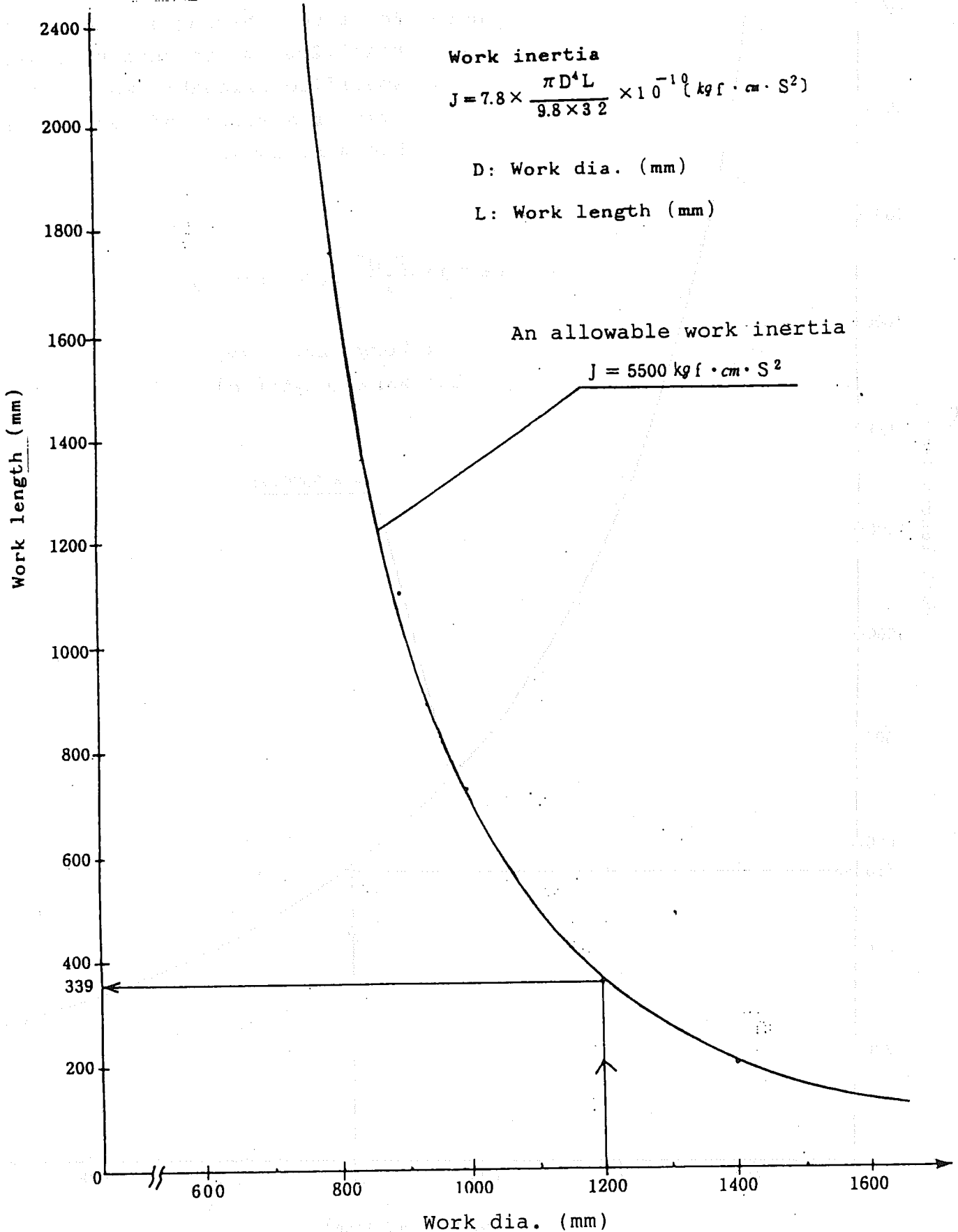
L : Work length (mm)



Utilizing method of above figure

A work, having ϕ 1200 mm dia. and a length of within 563 mm, will have an allowable max. load of within 5000kgf.

3-2. Relation between work dia. and length for allowable work inertia.



Utilizing method of above figure

A work, having ϕ 1200 dia. and a length of within 339 mm, will have an allowable work inertia of within 5500 kg.f.cm.S.