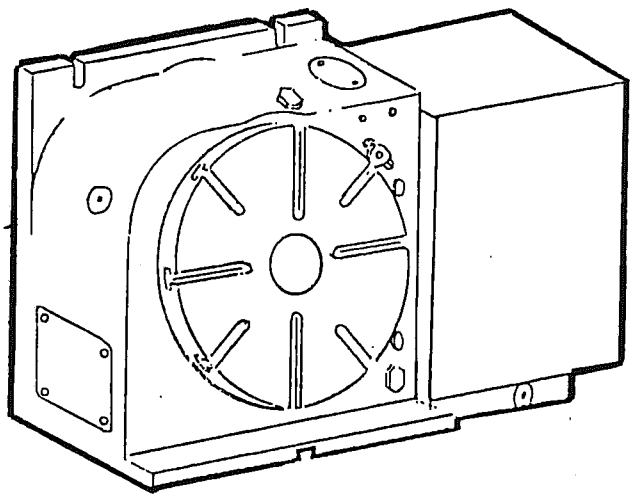
NIKKEN CNC ROTARY TABLE

CNC500V, 600V, 800V SERIES

INDIVIDUAL INSTRUCTION MANUAL

EIGHTH EDITION



CE

NIKKEN KOSAKUSHO WORKS, LTD.
6-53,1-Chome,Motomachi,
Higashiosaka-shi,Osaka-fu,Japan

Telephone: 0729-81-5861
Telefax: 0729-87-1338

This manual was produced using NIKKEN CNC rotary table CNC500V,600V,800V series. CNC500V,600V,800V series includes CNC500V,CNC500T,CNC600V,CNC600T, and CNC800V with any kind of motor.

It is essential that you read the instructions and safety regulations before you attempt to use CNC rotary table.

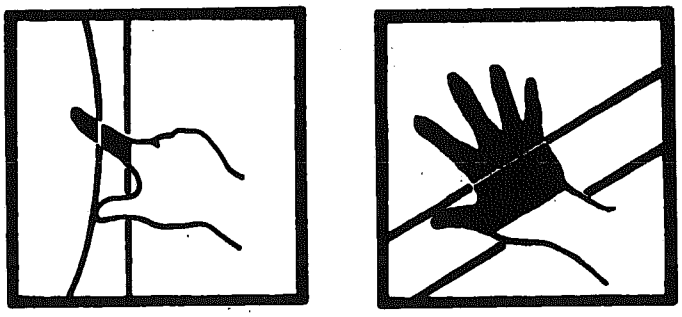
DANGER : This is the industry safety symbol. This symbol is used to bring you attention to items or operations that could cause danger to you or other persons using CNC rotary tables. Please read these messages and follow these instructions carefully.

NOTE : This is the industry safety symbol. This symbol is used to bring you attention to items or operations that could be potentially hazardous to you or other persons using CNC rotary tables. Please read these messages and follow these instructions carefully.

DANGER : Use CNC rotary table on the machine with safety door in combination with interlock system.

DANGER : Switch off main power of machine tool before setting, inspection or maintenance.

DANGER : Make sure your hand is out of the area marked as follows:



NOTE : Do not attempt to modify CNC rotary table.

NOTE : Never hammer CNC rotary table or workpiece.

NOTE : Never attempt to operate CNC rotary table while under the influence of alcohol or drugs.

NOTE : Gloves and ties should not be worn when operating CNC rotary table.

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APPENDIX

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

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

1 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.

1.1 Measurement of backlash

1) Unclamping the brake.
   Execute unclamp command.

2) Confirming the backlash

   Read a deflection of the dial guage Ⓖ by inserting the flat plate Ⓗ into a T-slot and manoeuvre the faceplate clockwise and anticlockwise through the plate by hand. A backlash of within 5 ~ 15 microns is normal when shipped (It means that at least 5 microns of backlash amount is required for CNC rotary table.), and the adjustment should be done in the event when a backlash of 50 microns or more is observed. The confirmation is to be done on eight spots of every 45° of table.

! NOTE Set dial guage Ⓖ 240 ~ 250mm apart from the table center for CNC600V and CNC800V.

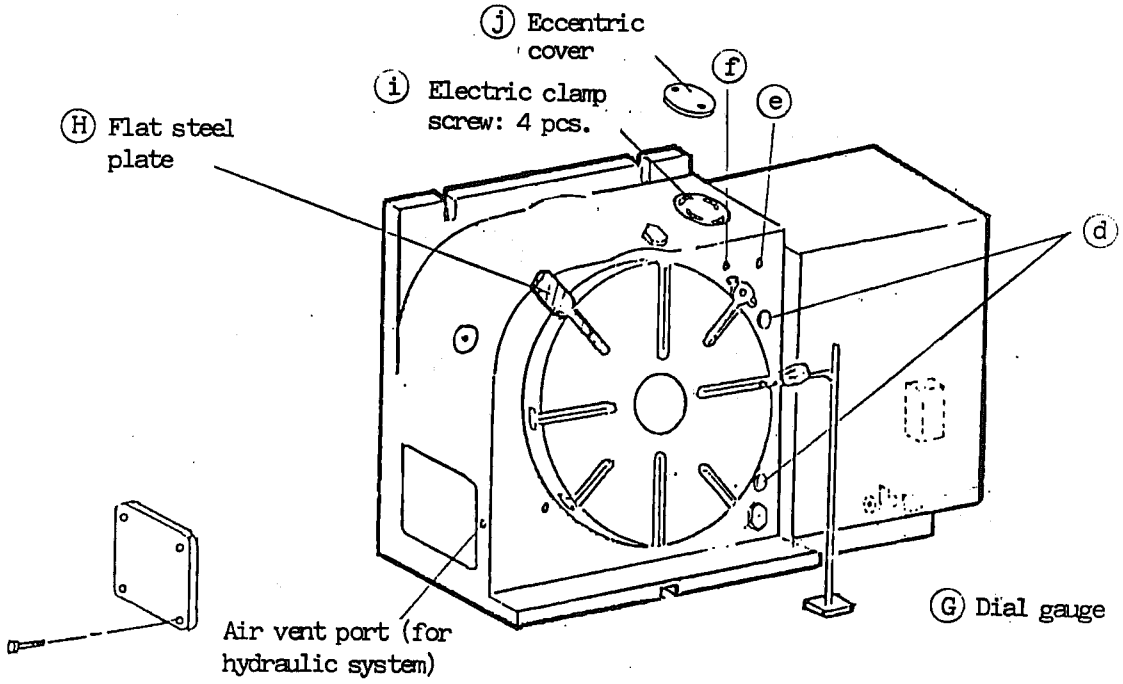


Fig. 1

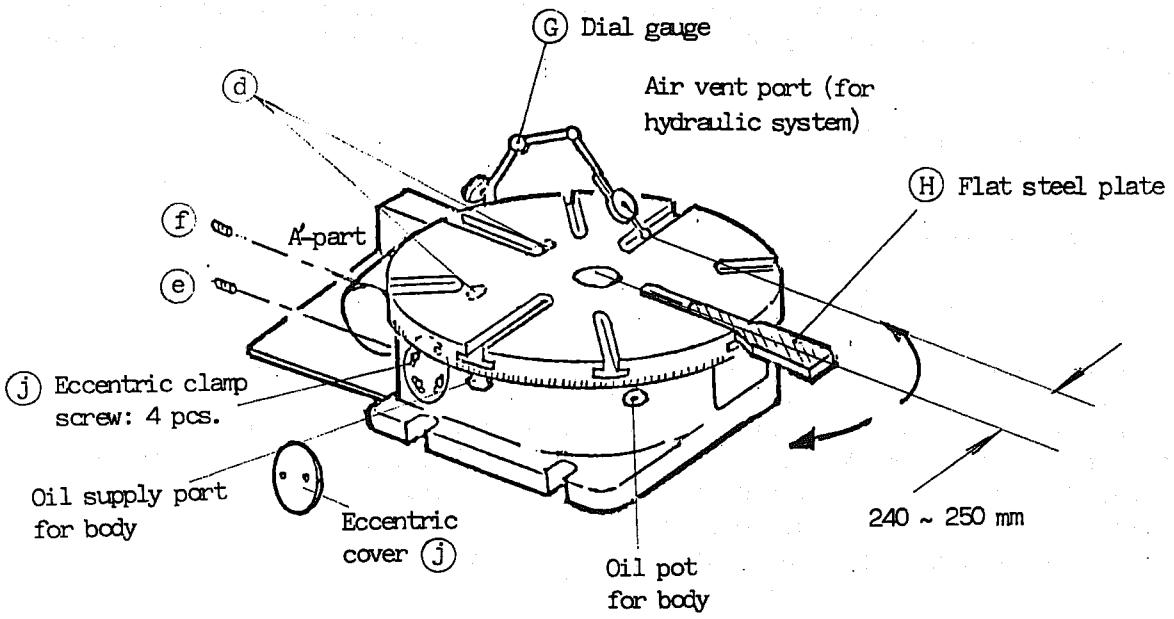


Fig. 1-1 (In case of CNC 600V,& 800V)

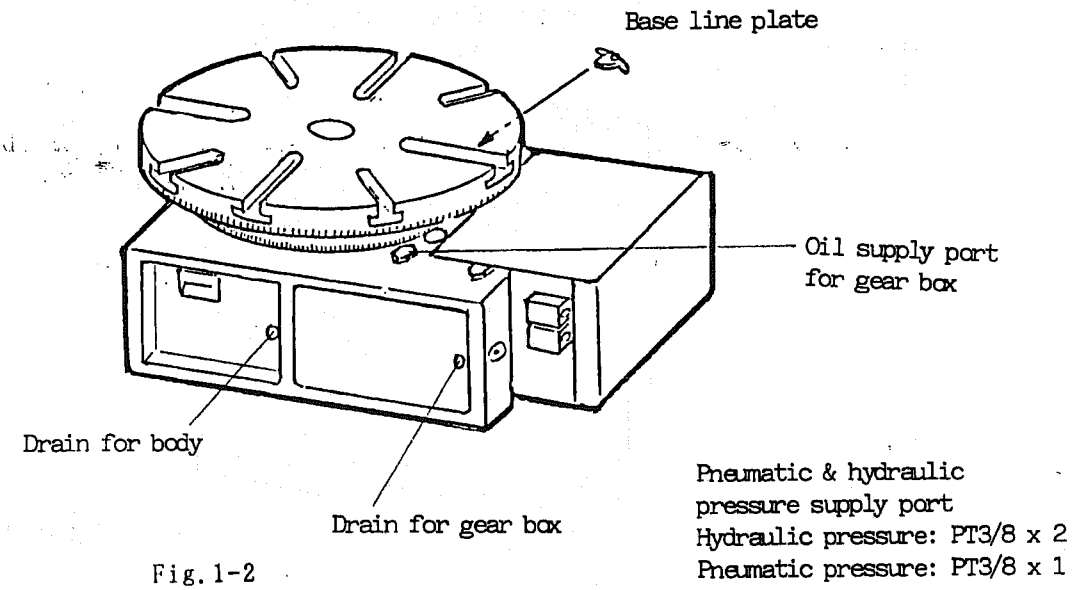


Fig. 1-2

(In case of CNC 600V,& 800V)

1.2 Adustment of backlash

DANGER

1) Switch off main power of machine tool.

2) Remove the cover Ⓒ by utilizing two threaded holes.

3) Slightly loosen four bolts which tighten the eccentric shaft Ⓔ

4) Take out two (upper and lower) blank plugs ⓓ

5) Loosen two (upper and lower) bolts ⓑ which tighten the eccentric shaft by three to four turns tap at heads thereof as shown in Fig.2. Thus, the wedged sleeve ⓒ which holds the eccentric shaft will be loosen by a shock of tapping, eccentric shaft clamping force will be released and the shaft will be freed to enable the adjustment of backlash.

6) Take out tapered screw plugs ⓔ and ⓕ and the backlash adjusting bolts ⓖ and ⓗ will be provided therein.

7) Here, reset the dial guage Ⓖ as shown in Fig.1, loosen the bolt ⓗ and tighten the bolt ⓖ clockwise, then the eccentric shaft will turn in the direction of arrow. Thus, the backlash between the worm wheel and the worm screw will get near to 0(zero). Adjust the backlash to 10～15 microns by using the bolts ⓗ and ⓖ watching the deflection of the dial guage Ⓖ while shaking the outer periphery of CNC rotary table, then securely lock them again.

8) After completion of above adjustment, put and tighten the bolts ⓑ, and blank plugs ⓓ, the tapered screw plugs ⓔ and ⓕ and four bolts for the eccentric shaft in respective original positions.

9) Measure the backlash again and confirm to that it has been adjusted to 5～15 microns.

10) After completion of the adjustment of backlash, make sure of the motor load. Switch on the power supply, let CNC rotary table rotate on the jog mode to check the gear noise.

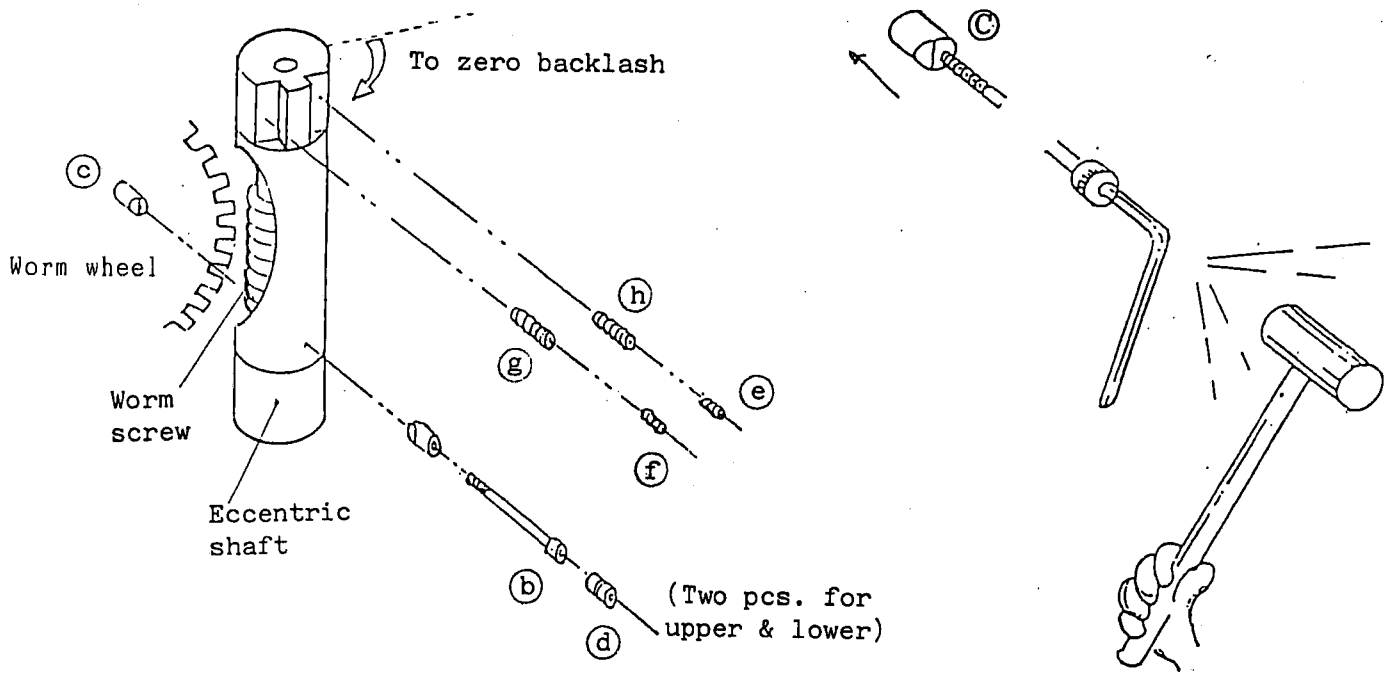


Fig.2

! NOTE Differing from the case of CNC500V, the backlash adjusting mechanism (tapered screw plugs ⓔ and ⓕ etc.) is arranged as shown in Fig. 1-1 in case of CNC600V and CNC800V.

! NOTE The adjustment of backlash is a very delicate work, so be careful when executing it.

! NOTE Be sure to seal the tapered screw plugs ⓔ and ⓕ using a seal tape.

! NOTE Be sure to apply each sealing agent (shown in Fig. 1) to its corresponding part assembling the worm screw, so that no ingress of coolant etc. is permitted.

! NOTE By no means turn the table at the rapid speed immediately after the adjustment. Be sure to turn it at the low speed (2 r.p.m) for trial running first, then turn it at the rapid speed.

1.3 Backlash adjustment of gears in gear box

After completion of backlash adjustment between worm wheel and worm screw, carry out the backlash adjustment of gears in gear box according to the following procedures.

DANGER

1) Switch off main power of machine tool.

2) Drain oil from the gear box.

3) Remove the gear box cover.

4) Adjustment of backlash between gears Z1 and Z2
(Optimum backlash:0.02～0.03mm)

Loosen six tightening bolts for eccentric shaft to which the Z2 gear is fixed. Measure the backlash by applying the dial guage on the tooth surface of Z2 gear. After confirming the backlash has been adjusted to within 0.02～0.03mm, tighten the six tightening bolts.

5) Adjustment of backlash between gears Z2 and Z3.
(Optimum backlash:0.02～0.03mm)

Loosen four tightening bolts for the drive motor. The backlash can be adjusted by depressing the motor toward the Z2 gear. Measure the backlash by applying the dial guage on the tooth surface of Z3 gear. After confirming, the backlash has been adjusted to within 0.02～0.03mm, tighten the four tightening bolts.

NOTE Be sure to adjust the backlash from the table side in sequence as Z1, Z2 to Z3 gears.

NOTE Be sure to refill the gear box with lubrication oil.

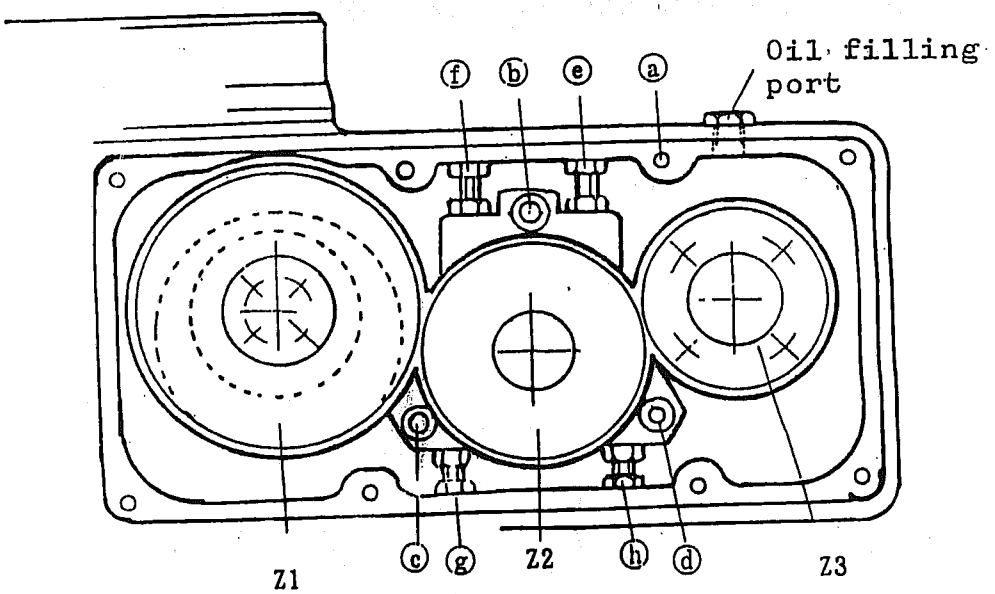


Fig. 3

2 Brake mechanism

There are three type of brake system as follows;

1) Pneumatic system (clamp by pneumatic pressure)

   Solenoid valve is provided inside the motor cover.

2) Hydraulic 1 port system (clamp by hydraulic pressure)

   Solenoid valve is not provided in CNC rotary table.

3) Hydraulic 2 ports system (clamp and unclamp by hydraulic pressure)

   Solenoid valve is not provided in CNC rotary table.

Since the specification of brake system will differ to some extent depending on demand, reference should be made to the attached "External Dimension" or "Hydraulic Circuit Diagram"

! NOTE Since this brake mechanism requires a fine adjustment, by no means disassemble it indiscriminately.

Remove the side cover of the table, clamp and unclamp confirmation limit switches are provided. In the event when the position of the dog is incorrect with no trouble in air/hydraulic supply and the brake mechanism, loosen the dog locking screw and adjust the dog position correctly.

! NOTE In case of the pneumatic system, a slight air noise will be emitted from the cylinder for actuating the limit switches. This is not abnormal but due to a constructional reason.

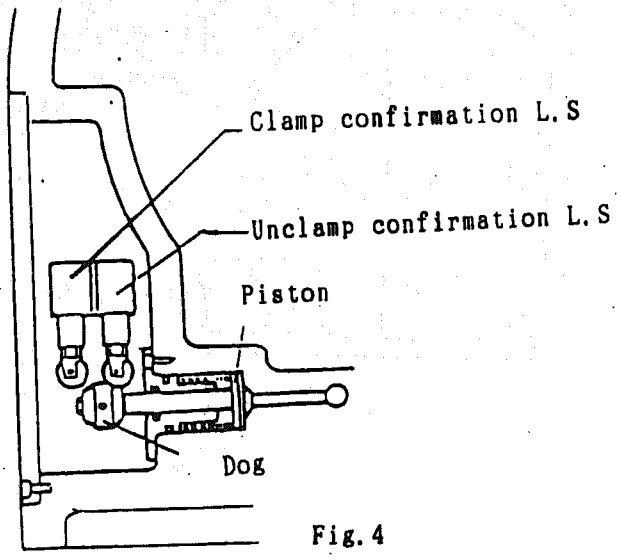
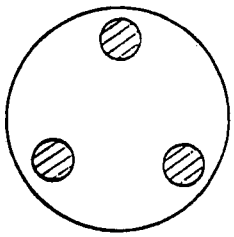
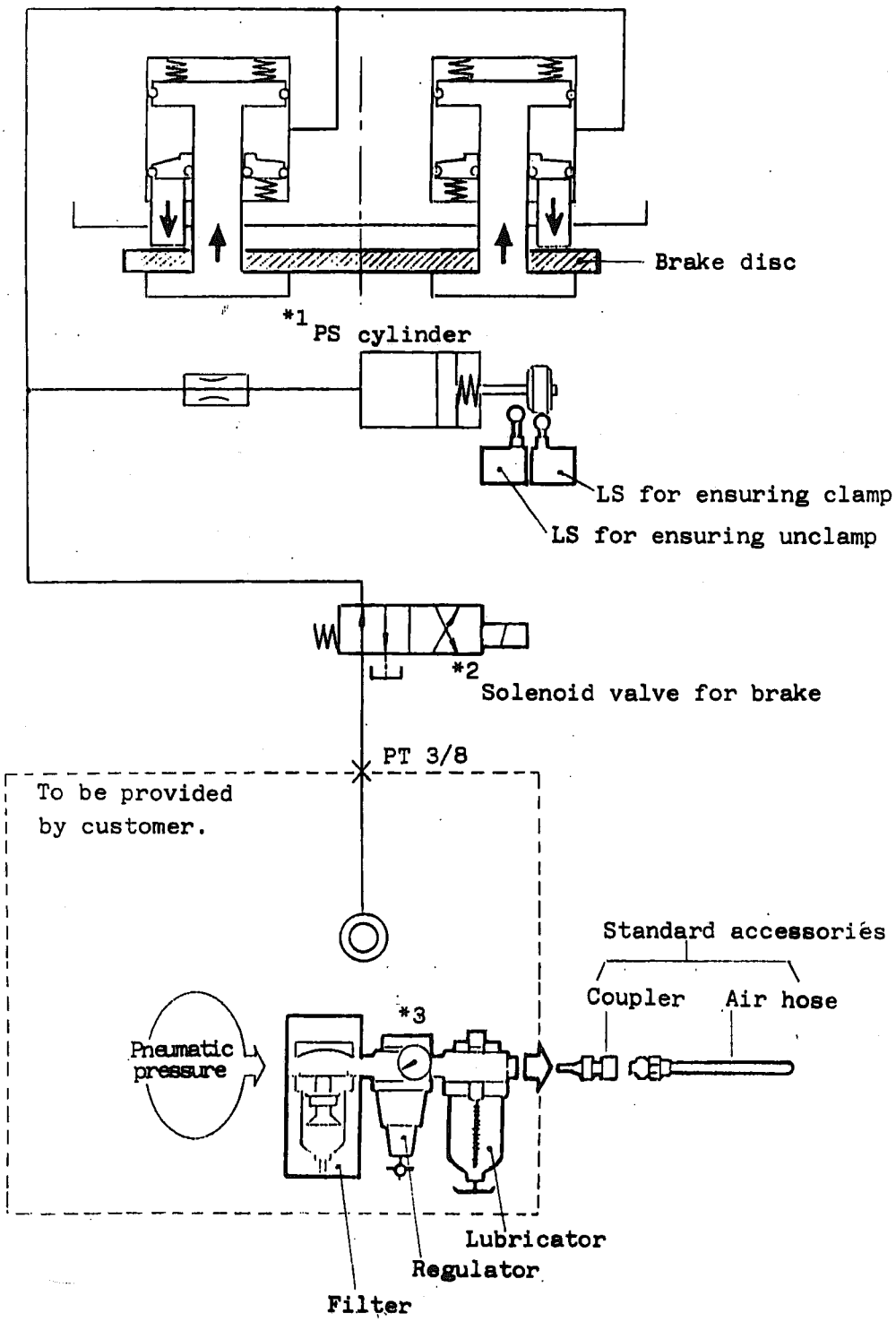


Fig. 4

2.1 Pneumatic system

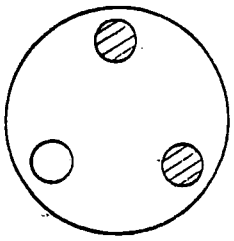
Three disc brakes are provided on the backside of rotary table as shown below.

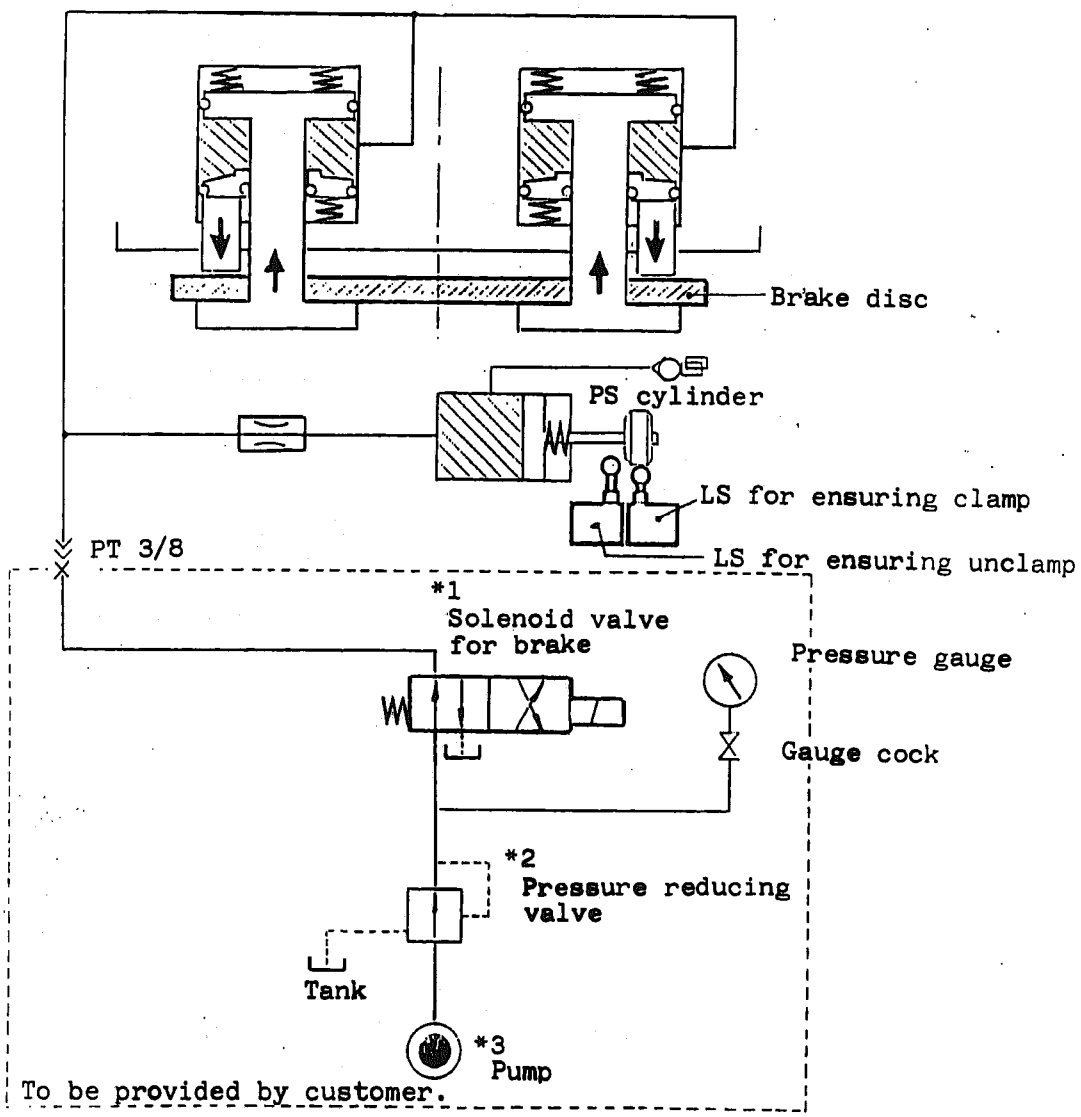




2.2 Hydraulic 1 port system

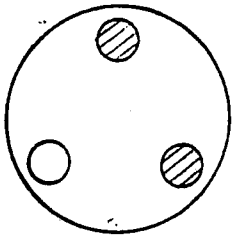
Two disc brakes are provided on the backside of rotary table as shown below.

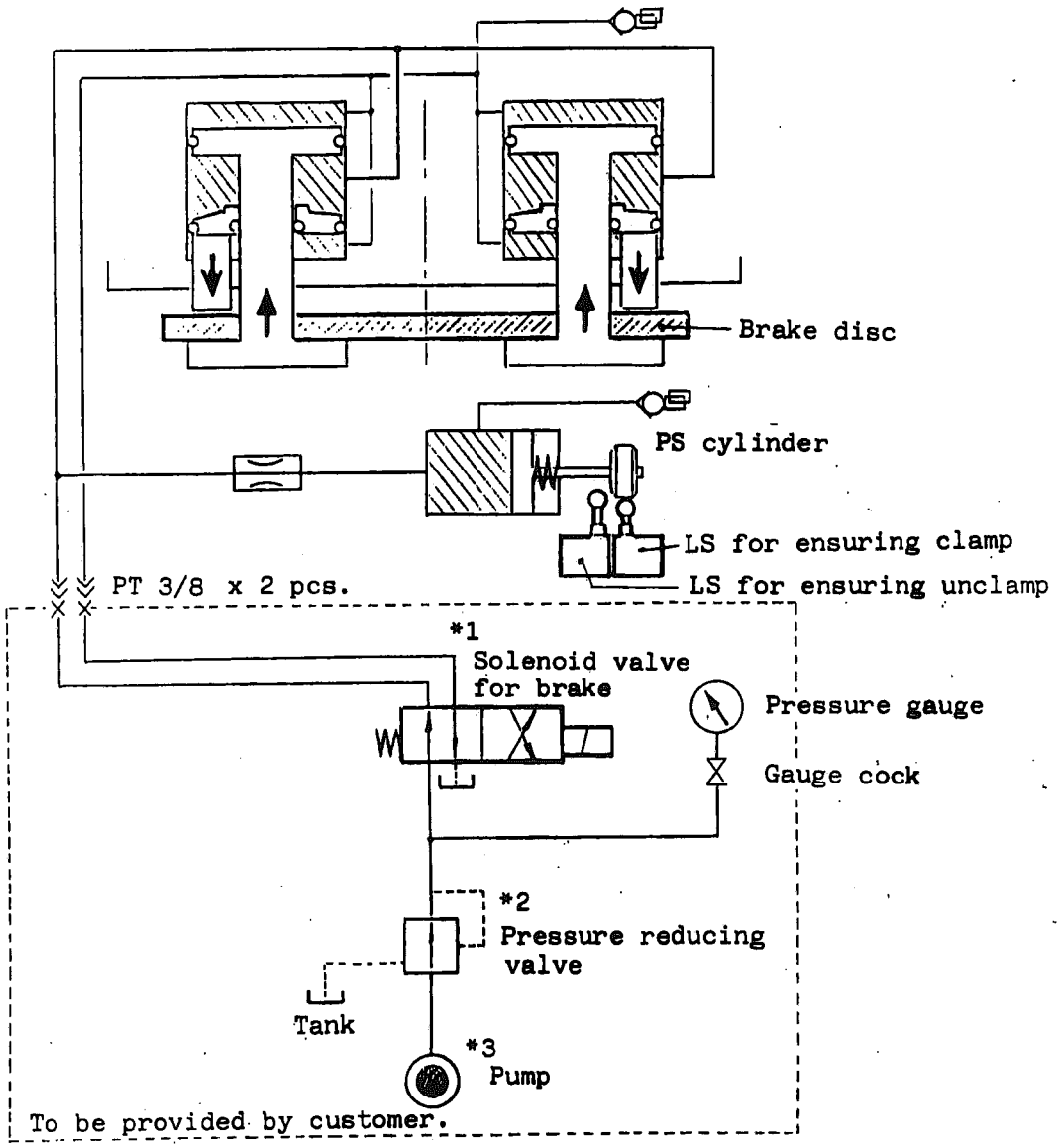




2.3 Hydraulic 2 port system

Two disc brakes are provided on the backside of rotary table as shown below.





3. Zero-point return mechanism

Remove the side cover of the table, the zero-point return mechanism will be found. The dog ring for deceleration (DEC*) for zero-point return is fastened by two set screws. In case when the correct machine zero-point can not be obtained even if the grid shift amount is varied, adjust the dog ring.

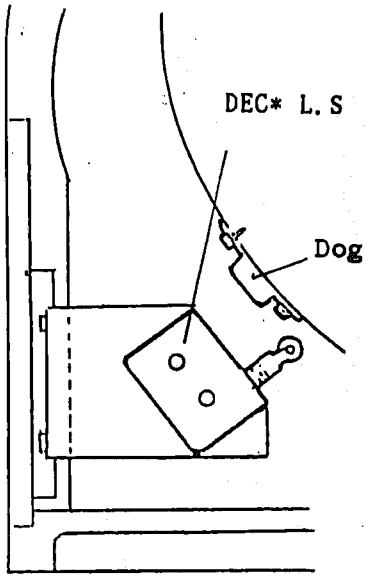
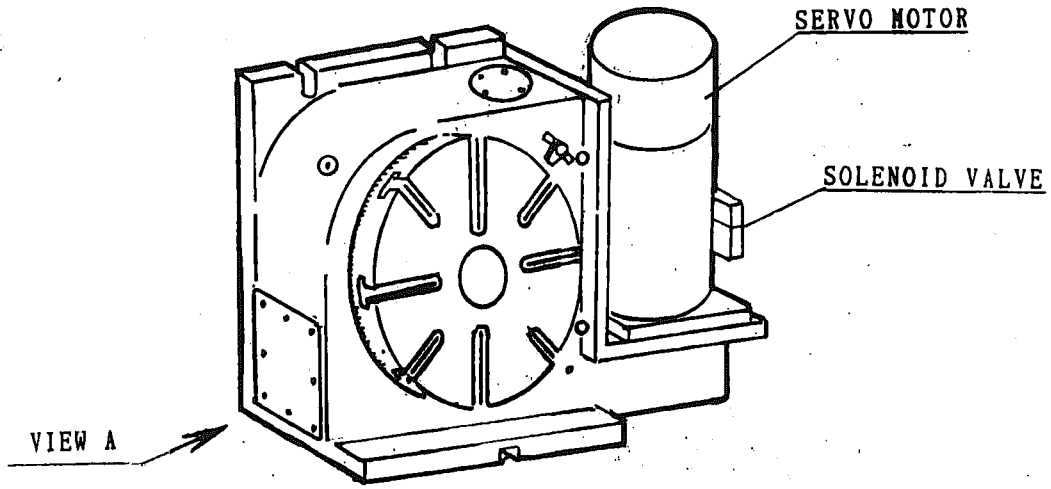
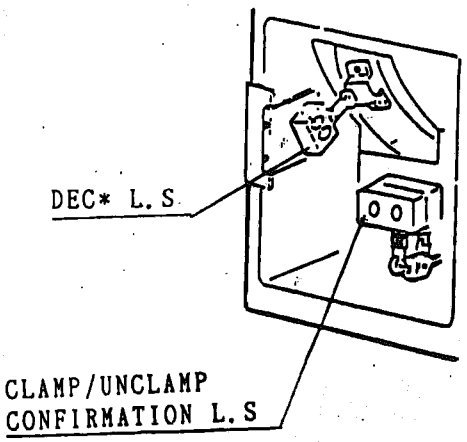


Fig. 5

4 Layout of electric parts



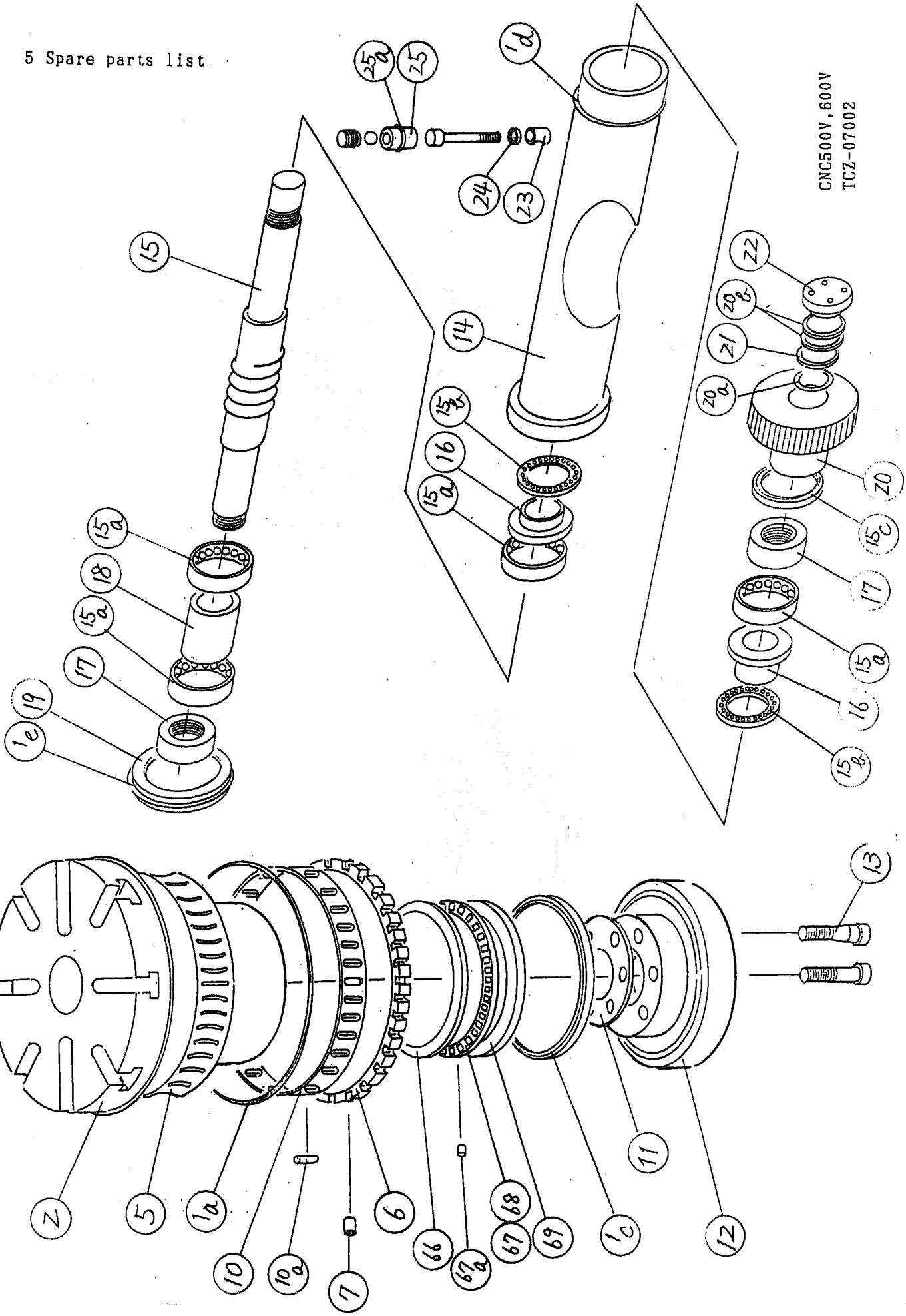


VIEW A

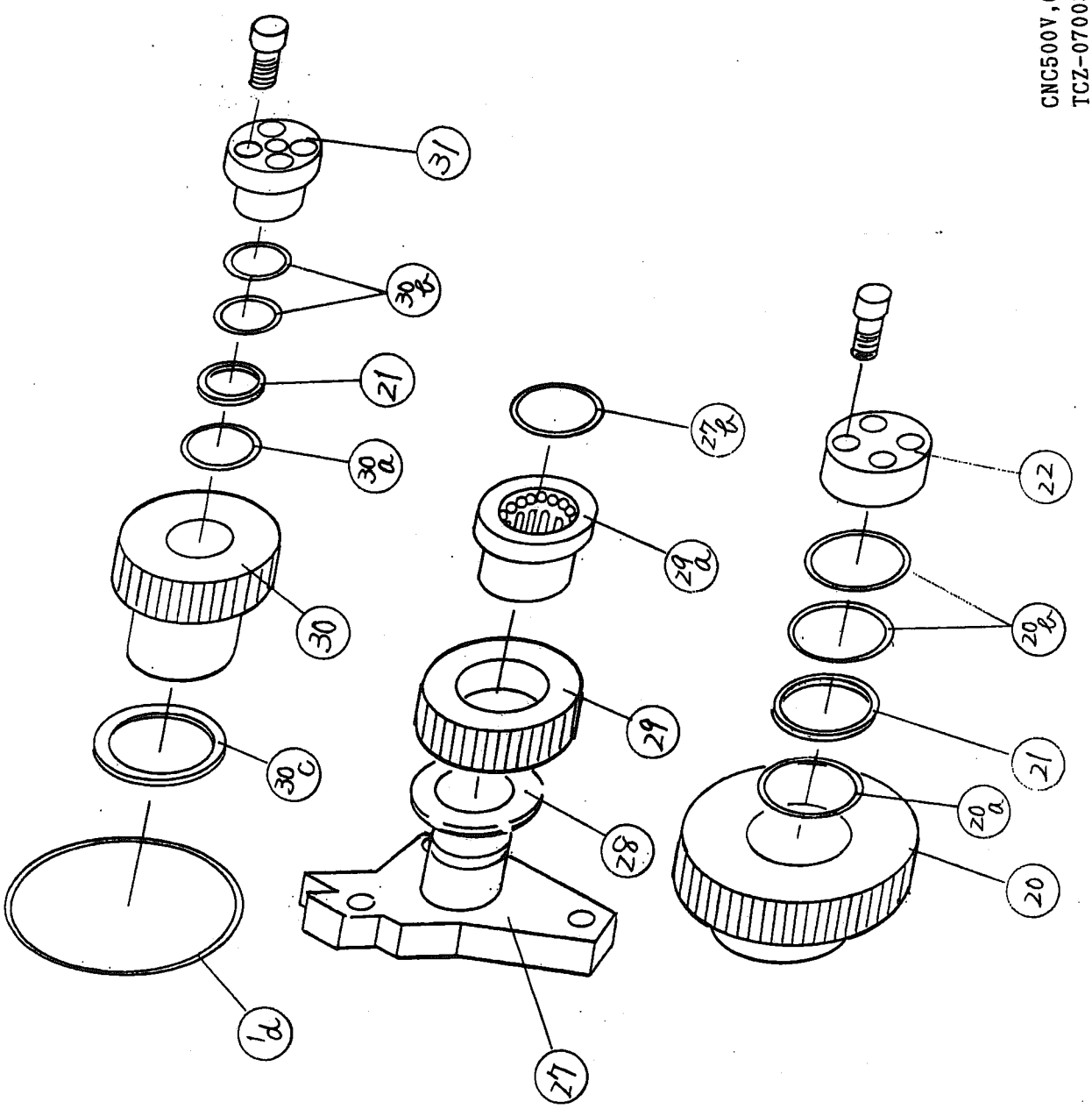
CNC500V,600V LAYOUT OF
ELECTRIC PARTS
TCZ-07001

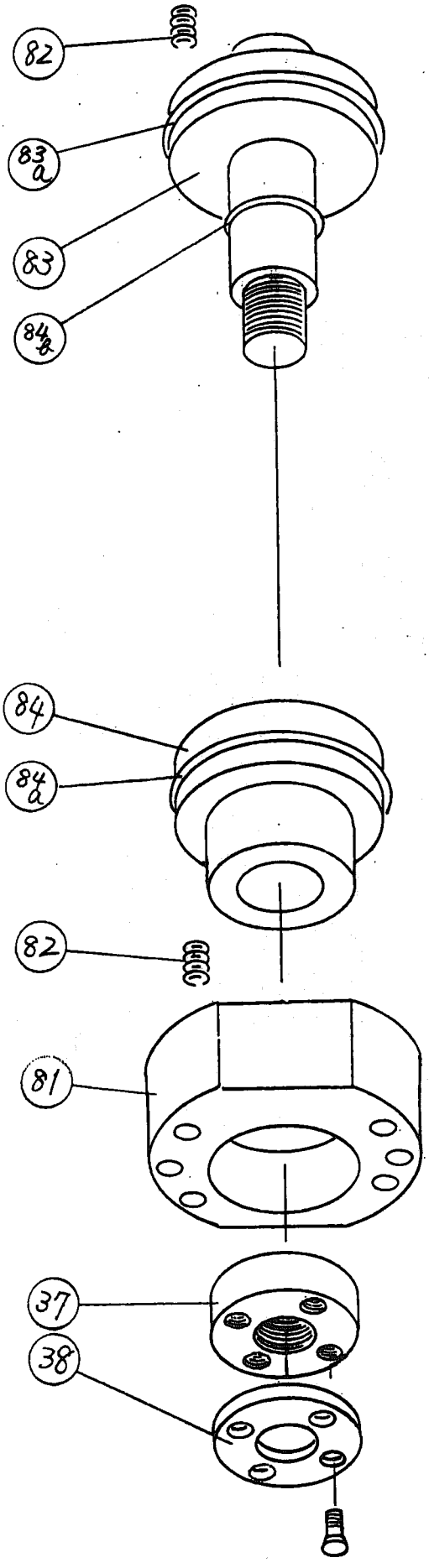
5 Spare parts list

CNC500V,600V
TCZ-07002

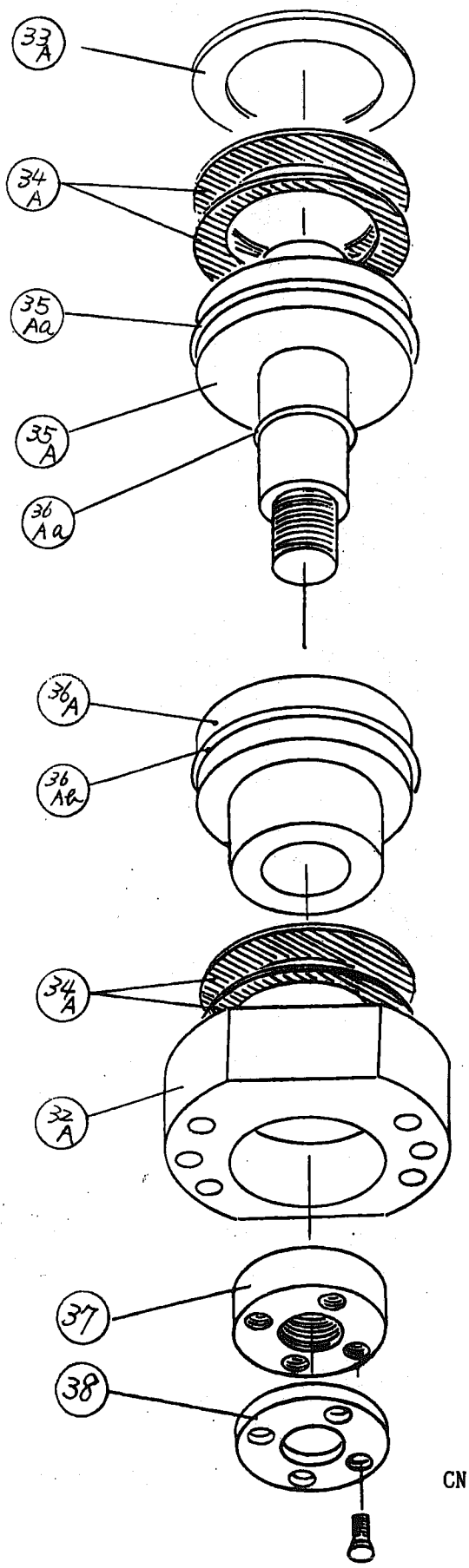


CNG500V,600V GEAR BOX
TCZ-07003

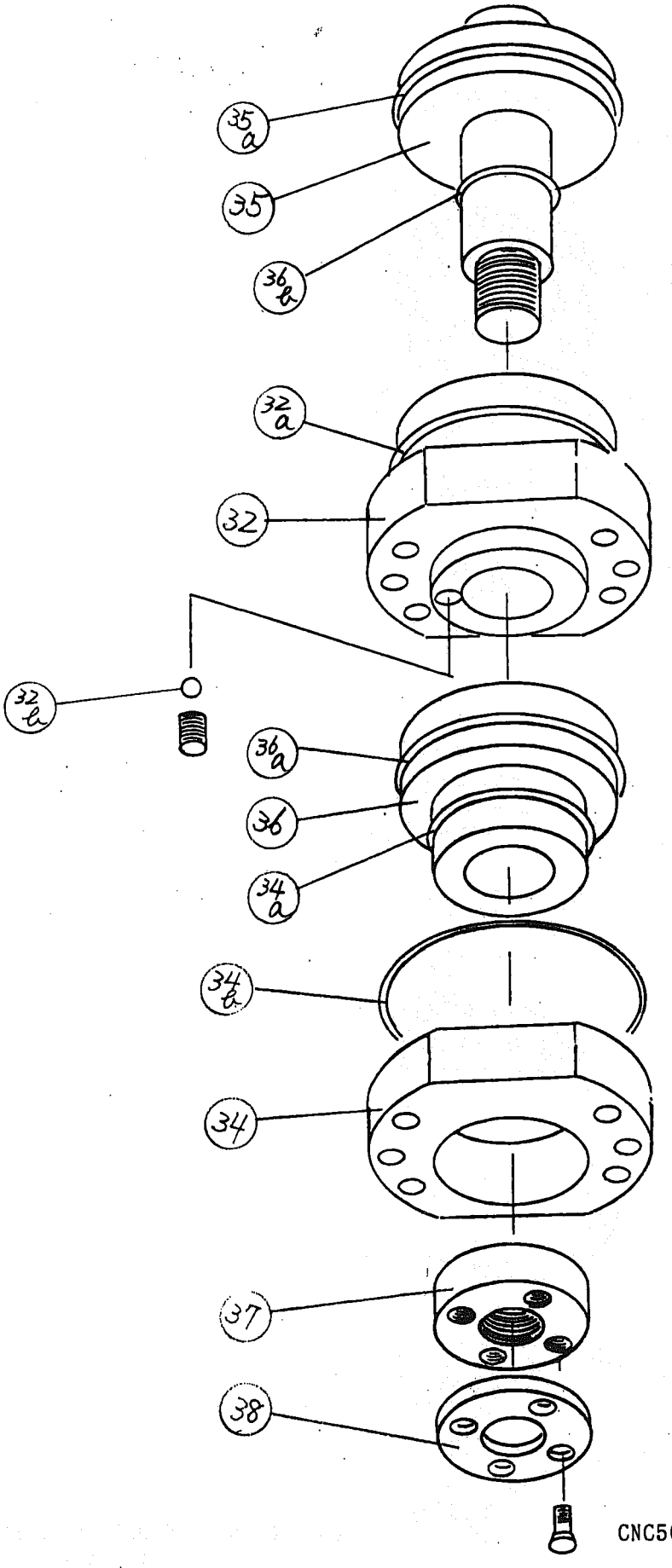




CNC500V,600V PNEUMATIC SYSTEM
TCZ-07004

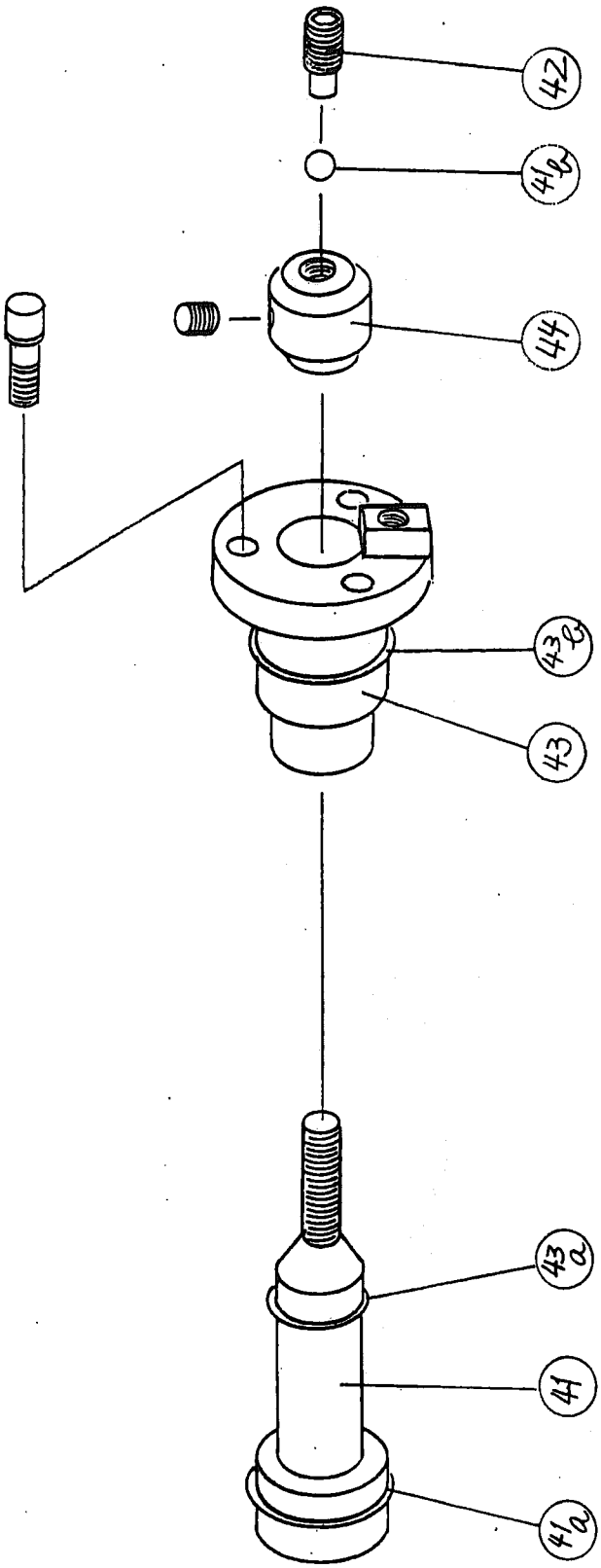


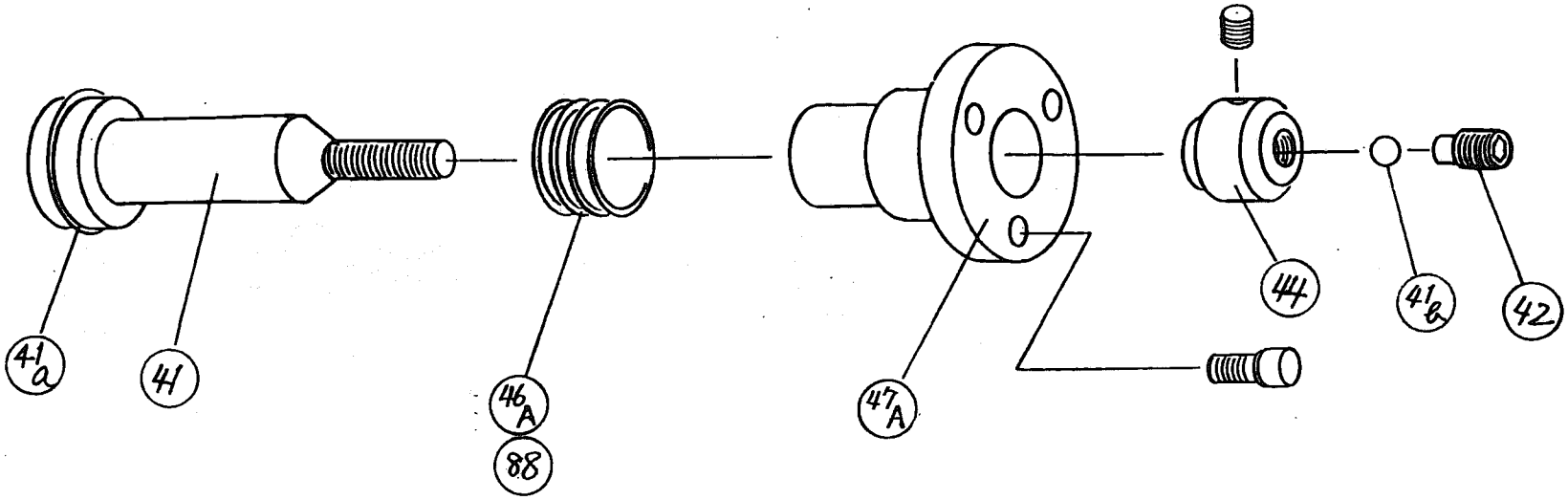
CNC500V,600V HYDRAULIC 1 PORT SYSTEM
TCZ-07005



CNC500V,600V HYDRAULIC 2 PORTS SYSTEM
TCZ-07006

CNC500V,600V CLAMP/UNCLAMP CONFIRMATION
TCZ-07008





CNC500V,600V CLAMP/UNCLAMP CONFIRMATION
TCZ-07007

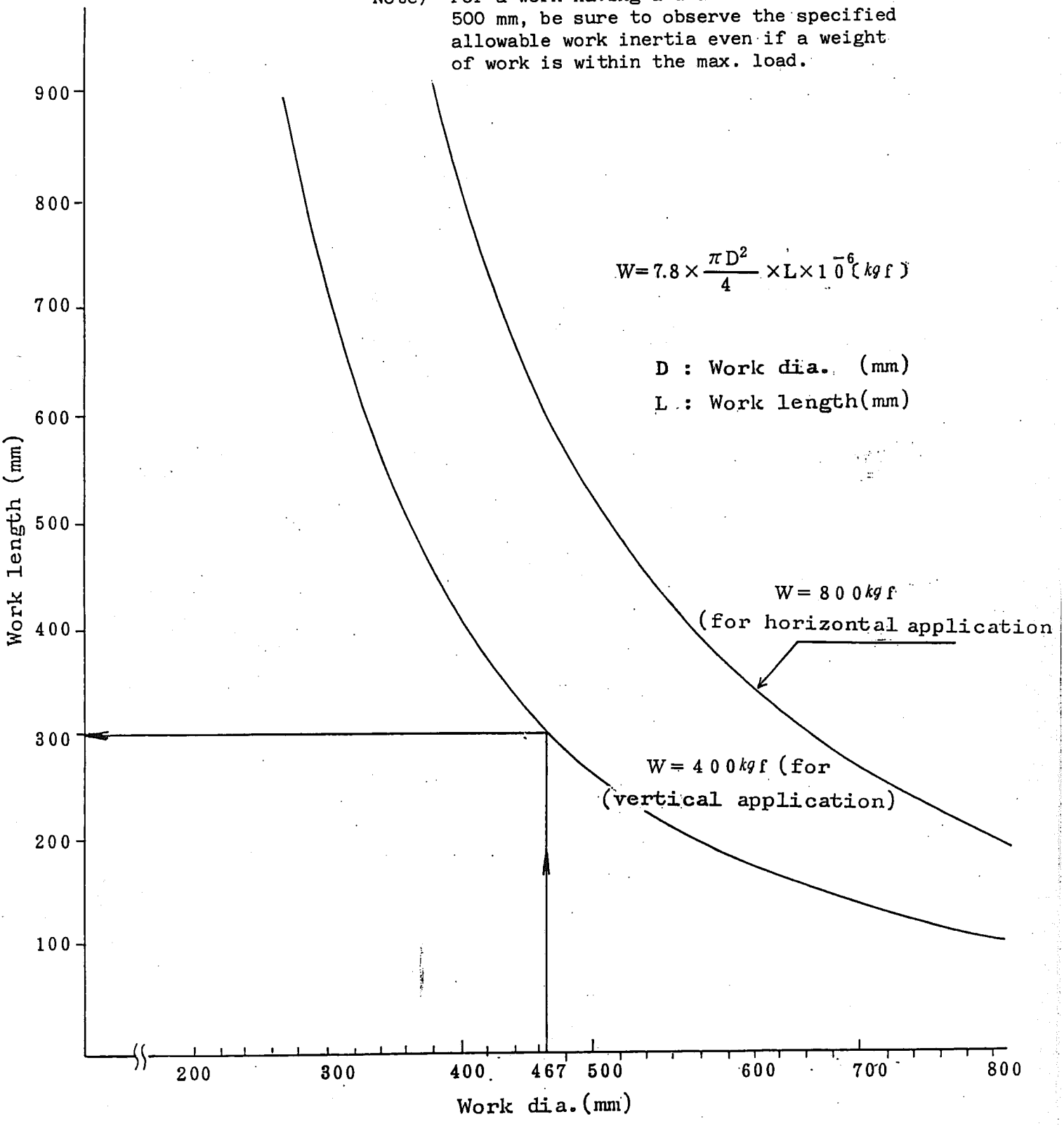
No.	REFERENCE	ITEM	PIECES	REMARKS
2	TCZ-07002	CIRCULAR TABLE	1	
5	TCZ-07002	WORM WHEEL	1	
6	TCZ-07002	RETAINER FOR #7	1	
7	TCZ-07002	TUBULAR ROLLER	72	ϕ10 * 15L
10	TCZ-07002	RETAINER FOR #10a	1	
11	TCZ-07002	SETTING RING	1	
12	TCZ-07002	BRAKE DISC	1	
13	TCZ-07002	TAPER BOLT	4	
14	TCZ-07002	ECCENTRIC HAUSING	1	
15	TCZ-07002	WORM SHAFT	1	
16	TCZ-07002	THRUST RING	1	
17	TCZ-07002	NUT	1	M40 PITCH=1.5
18	TCZ-07002	THRUST COLLAR	1	
19	TCZ-07002	COVER FOR ECCENTRIC HAUSING	1	
20	TCZ-07002	MAIN GEAR	1	
21	TCZ-07002	SLEEVE	1	
22	TCZ-07002	FLANGE	1	
66	TCZ-07002	THRUST RING	1	#66,#67,#67a,#68 AND #69 ARE SET.
67	TCZ-07002	RETAINER FOR #67a	1	
68	TCZ-07002	HOLDER FOR RETAINER	1	
69	TCZ-07002	THRUST RING	1	
27	TCZ-07003	SHAFT FOR IDLE GEAR	1	
28	TCZ-07003	SPACER	1	
29	TCZ-07003	IDLE GEAR	1	
30	TCZ-07003	MOTOR GEAR	1	
31	TCZ-07003	FLANGE	1	
1a	TCZ-07002	FACE SEAL	1	ϕ472 WITH O-RING
1c	TCZ-07002	OIL SEAL	1	AB5140A0
1d	TCZ-07002	O-RING	1	G-110
1e	TCZ-07002	O-RING	1	G-140
10a	TCZ-07002	NEEDLE ROLLER	90	ϕ5 * 19.8L
15a	TCZ-07002	BEARING	1	#6008
15b	TCZ-07002	BEARING	1	#51109
15c	TCZ-07002	OIL SEAL	1	AC2864K0 OR SC507212
20a	TCZ-07002	O-RING	1	G-35
20b	TCZ-07002	SPAN RING	2	Rfn8006 ϕ35 * 40L
67a	TCZ-07002	ROLLER	18	ϕ15 * 15L
23	TCZ-07002	CLAMP PIECE	1	
24	TCZ-07002	COLLER	1	
25	TCZ-07002	PLAG	1	
25a	TCZ-07002	O-RING	1	P-24
27b	TCZ-07003	SNAP RING	1	
29a	TCZ-07003	BEARING	1	NKX-35
30a	TCZ-07003	O-RING	1	G-35
30b	TCZ-07003	SPAN RING	2	Rfn8006 ϕ35 * 40L
30c	TCZ-07003	OIL SEAL	1	AC3400A0 OR SC658812
			1	
			1	
			1	
			1	
			1	
			1	
			1	
			1	
			1	
			1	

No.	REFERENCE	ITEM	PIECES	REMARKS
37	TCZ-07004	BRAKE NUT	1	
38	TCZ-07004	BRAKE LOCK NUT	1	
81	TCZ-07004	BRAKE CYLINDER	1	
82	TCZ-07004	SPRING	1	
83	TCZ-07004	PISTON ROD	1	
84	TCZ-07004	PISTON RING	1	
83a	TCZ-07004	PACKIN	1	GLY-80
84a	TCZ-07004	PACKIN	1	GLY-80
84b	TCZ-07004	PACKIN	1	GLY-25
37	TCZ-07005	BRAKE NUT	1	
38	TCZ-07005	BRAKE LOCK NUT	1	
32A	TCZ-07005	BRAKE CYLINDER	1	
33A	TCZ-07005	FLANGE	1	
34A	TCZ-07005	SPRING	4	
35A	TCZ-07005	PISTON ROD	1	
36A	TCZ-07005	PISTON RING	1	
35Aa	TCZ-07005	PACKIN	1	SKY-75
36Aa	TCZ-07005	PACKIN	1	SKY-25
36Ab	TCZ-07005	PACKIN	1	SKY-75
32	TCZ-07006	BRAKE CYLINDER	1	
34	TCZ-07006	CYLINDER FLANGE	1	
35	TCZ-07006	PISTON ROD	1	
36	TCZ-07006	PISTON RING	1	
37	TCZ-07006	BRAKE NUT	1	
38	TCZ-07006	BRAKE LOCL NUT	1	
32a	TCZ-07006	O-RING	1	G-95
32b	TCZ-07006	3/16" BALL	1	3/16"
34a	TCZ-07006	O-RING	1	P-50
34b	TCZ-07006	O-RING	1	N-90
35a	TCZ-07006	O-RING	1	P-65
36a	TCZ-07006	O-RING	1	P-65
36b	TCZ-07006	PACKIN	1	SKY-25
41	TCZ-07007	PISTON ROD	1	
47A	TCZ-07007	CYLINDER FLANGE	1	
44	TCZ-07007	DOG	1	
46A	TCZ-07007	SPRING	1	FOR HYDRAULIC 1 PORT SYSTEM
88	TCZ-07007	SPRING	1	FOR PNEUMATIC SYSTEM
41a	TCZ-07007	O-RING	1	P-22
41b	TCZ-07007	1/8" BALL	1	1/8"
42	TCZ-07007	BOLT	1	
41	TCZ-07008	PISTON ROD	1	
42	TCZ-07008	BOLT	1	
43	TCZ-07008	CYLINDER FLANGE	1	
44	TCZ-07008	DOG	1	
41a	TCZ-07008	O-RING	1	P-22
41b	TCZ-07008	1/8" BALL	1	1/8"
43a	TCZ-07008	O-RING	1	P-12
43b	TCZ-07008	O-RING	1	P-22

APPENDIX

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

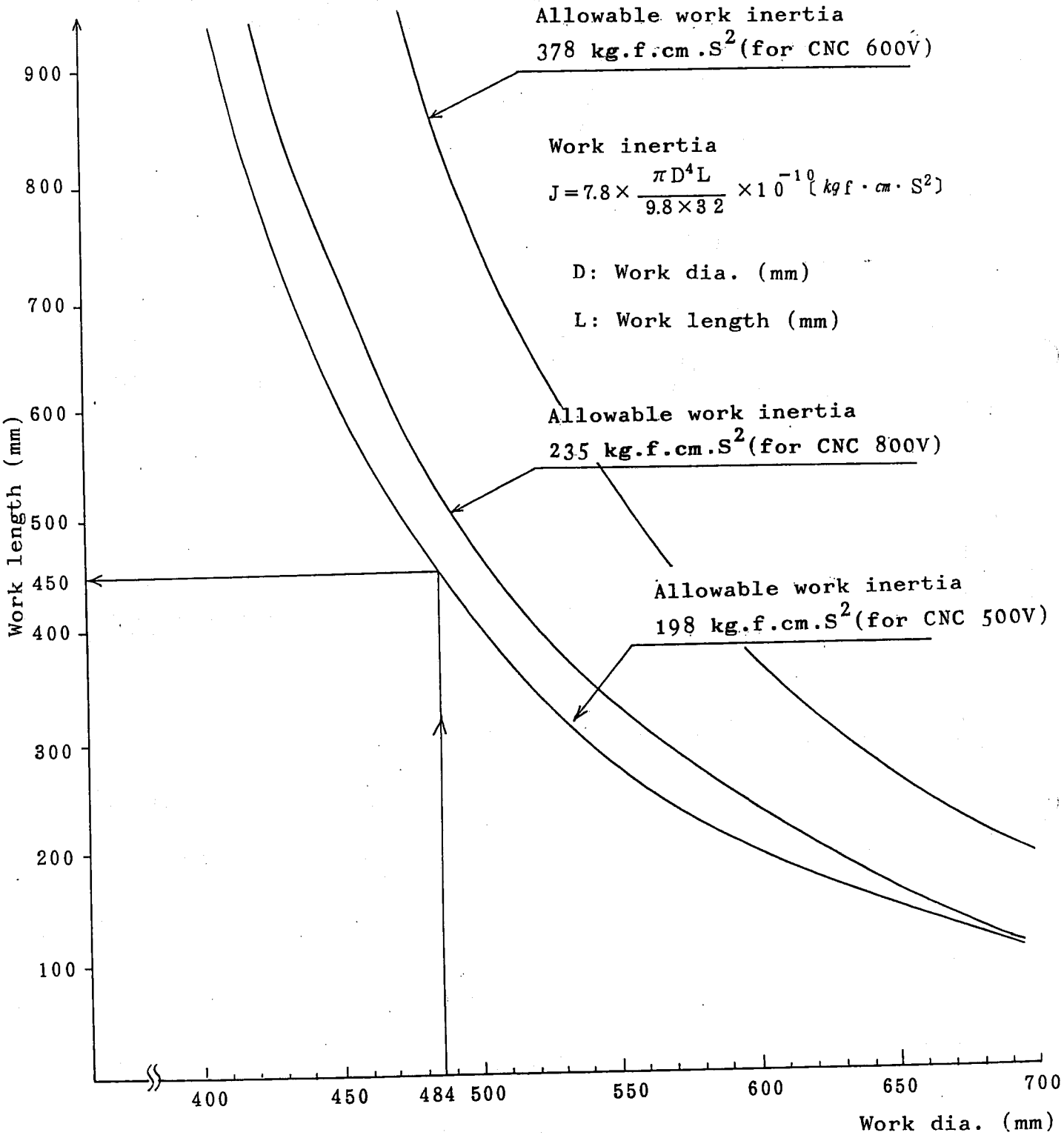
Note) For a work having a diameter of more than 500 mm, be sure to observe the specified allowable work inertia even if a weight of work is within the max. load.



Utilizing method of above figure

A work, having ϕ 467mm dia. and a length of within 300mm, will have an allowable max. load of within 400kgf.

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



Utilizing method of above figure

A work, having Ø 400 dia. and a length of within 450 mm, will have an allowable work inertia of within 198 kg.f.cm.S^2.