ISO 9001 QM011

PANTHER

LATHE MACHINE

INSTRUCTION & SPARE PARTS MANUAL

MODEL: 3050/	MACHINE No. _____

GUJARAT LATHE MFG. CO. PVT. LTD.

NH-8B, OPP. FILD MARSHALL HIGH SCHOOL, SHAPAR-360024, (DIST. RAJKOT)

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ALL GEARED LATHE MACHINE

MODEL – 3050

INSTRUCTION & SPARE PARTS MANUAL

MANUFACTURED BY:
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PREFACE

This machine have been manufactured with a view to obtain the highest degree of working accuracy and it has been thoroughly tested for the performance to confirm IS 11118-1984, IS 1878(Part-1)-1971 and Dr. Schlesinger's code for "Testing Machine Tools"

This accuracy of the machine can be achieved and maintained only if the instructions contained in this manual are starkly followed. The users of the machine are therefore, requested to get themselves acquainted with contents of the manual, before installation, operation and maintenance of the machine. It is suggested that a copy of this manual be made available to the operation and maintenance staff on the shop floor, who will be directly handling this machine.

As the machine and accessories are constantly being improved this manual may differ in detail with the machine supplied.

At the time of ordering the spares, please mention the component number as indicated in this manual and serial number of the machine which is stamped on right hand corner of the lathe machine bed.

Please read Instruction Manual before starting the machine.

For easy reference and understanding, this manual is divided in to following five different sections.

Section 1 Introduction

Section 2 Installation

Section 3 Operation

Section 4 Settings, Maintenance and Trouble Shootings

Section 5 Assembly drawing and Spare-part list

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SECTION-1

INTRODUCTION

1.1 Machine specification:

Type of bed	Gap bed
Width of bed	375 mm
Height of center	330 mm
Swing over bed	630 mm
Swing over saddle	500 mm
Swing over cross slide	440 mm
Swing in gap	940 mm
Length of gap in front of faceplate	220 mm
Number of spindle speed	8
Spindle speed range	20 to 835 rpm
Tapper in spindle sleeve	MT-4
Spindle hollow	80 mm
Spindle nose detail	A2 size 8
Number of British threads	52
Range of British threads	2.5 to 44 TPI
Number of Metric threads	44
Range of Metric threads	0.469 to 15 mm pitch
Number of DP threads	52
Range of DP threads	5 to 88 DP
Number of Module threads	40
Range of Module threads	0.234 to 7 mod.
Number of feeds	52
Range of Longitudinal feeds	0.074 to 2.360 mm/rev.
Range of Transverse feeds	0.018 to 0.564 mm/rev.
Lead screw	Ø38.1 mm X 4TPI
Tail stock spindle diameter	Ø75 mm
Taper in Tail stock spindle	MT-5
Cross slide travel	330 mm
Compound slide travel	180 mm
Tail stock sleeve travel	200 mm
Tool shank size	32 X 32 mm

Model	Length of bed (mm)	Admit between center (mm)	Flore space (mm)	Approx weight (Kg)	Motor (H.P.)
3050/1	2130	900	3100 x 1450	1900	5
3050/2	2740	1500	3700 x 1450	2300	5
3050/3	3045	1800	4000 x 1450	2500	5
3050/4	3655	2400	4600 x 1450	2800	7.5
3050/5	4260	3000	5200 x 1450	3200	7.5
3050/6	4870	3600	5800 x 1450	3600	7.5
3050/7	5480	4200	6400 x 1450	4000	7.5
3050/8	6090	4800	7000 x 1450	4400	7.5

PACKING SLIP

Machine Model :	**Machine specification :**
Machine Sr. No. :	**Date :**

STANDARD ACCESSORIES			EXTRA ACCESSORIES		
1	Hardened guide ways	1No.	1	Face plate (Ø600 mm)	No.
2	Center adopter	1No.	2	Steady rest (I.D.230 mm)	No.
3	Dead center MT-4/MT-5	2No.	3	Follow rest	No.
4	Carrier plate	1No.	4	Coolant equipments with tank & fitting H.P.:____ ,RPM:_____ Make:_____ Sr. No.:_____	No.
5	Instruction manual	1No.			
6	Tool post key	1No.			
7	Norton gear box	1No.			
8	Change gear fitted with machine: 45-48-80-80-127	5No.	5	3 jaw self centering chuck with flange Ø_____	No.
9	Change gear packed in tool box: 65-70-75-88-90-95	6No.	6	4 jaw dog chuck with flange Ø_____	No.
10	Oil can	1No.	7	Extra chuck flange	No.
11	Screw driver	1No.	8	Taper turning attachment	No.
12	Allen keys: 4-5-6-8-10-14 mm	6No.	9	Machine lamp with C.T.	No.
13	Fixed spanner: 12x13, 16x17,18x19,1/2”x5/8”	4No.	10	rear tool post	No.
14	Long cross slide	1No.	11	Foot pedal/foot brake	No.
15	Electric motor: H.P.:____ ,RPM:_____ Make:_____ Sr. No.:_____	1No.	12	Rear splash guard	No.
			13	Revolving center MT-5	No.
			14	Quick change tool post with 5 tool holder	No.
16	V-Belt No.:B-_____	1No.	15	In./Ext./Combine tool post Grinder with /without electric motor: H.P.:____ ,RPM:_____ Make:_____ Sr. No.:_____	No.
17	Electric control panel	1No.			
18	Starting switch shaft	1No.			
			16	Key way cutting attachment	No.
			17	Anti vibration pads	No.

Any other accessories:

Mode of packing: _____

Name & Address: _____

_____

_____

Checked By: _____

[NOTE: If any discrepancy is found with regard to the above accessories. It should be immediately notified to us alone with machine no.**]**

1.3 List of Accessories:

1.3.1 Standard Accessories(to be supplied with machine):

- Harden guide ways of lathe bed
- Electric motor with V-belt
- Fwd.-Off-Rev. shaft
- A2 type size 8 spindle nose
- Norton gear box
- Long cross slide
- Carrier plate
- Centre adapter
- Dead centre MT-4 & MT-5 one each
- Instruction manual with test chart
- Tool post bolt key
- Change gear for inch/mm threading (for 4 TPI lead screw)
- Oil can
- Screw driver
- Allen keys – 6 Nos.
- Fixed spanner – 4 Nos.
- Control panel

1.3.2 Optional Accessories (to be order along with machine):

- 6mm pitch lead screw in lieu of 4 TPI lead screw
- Electrical coolant pump with tank & fittings
- Rear tool post with tool holder
- Taper turning attachment
- Rear splashguard
- Drift type tail stock spindle
- Rake operated centre
- Lever operated front lever collet attachment with collets

1.3.3 Optional Accessories (Retro fitting possible):

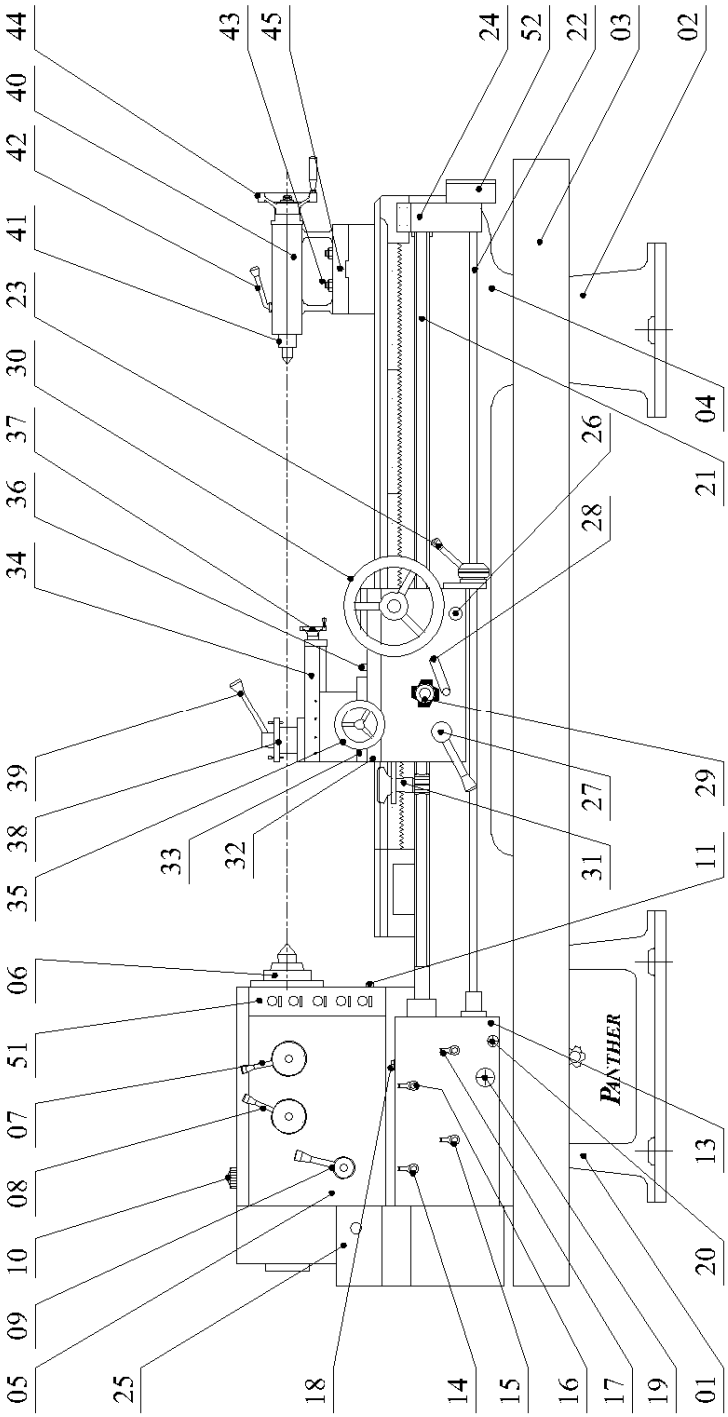
- Face plate
- Steady rest pad type
- Follow rest pad type
- Chuck flange
- Machine lamp
- Quick-change tool post with 5 tool holders
- Internal or external or combine tool post grinder with or without electric motor
- Keyway cutting attachment
- Revolving center MT-5
- 3-Jaw self-centering chuck or 4-Jaw dog chuck
- Change gears and chart for DP & Module threads

1.3.4 List of change gears (9 DP) required for

Machine having 4 TPI lead screw

(a) For British & Metric threads, 45-48-65-70-75-80-80-88-90-95-127 T
(b) For DP & Module threads, 44-56-99 T (Optional)

Legend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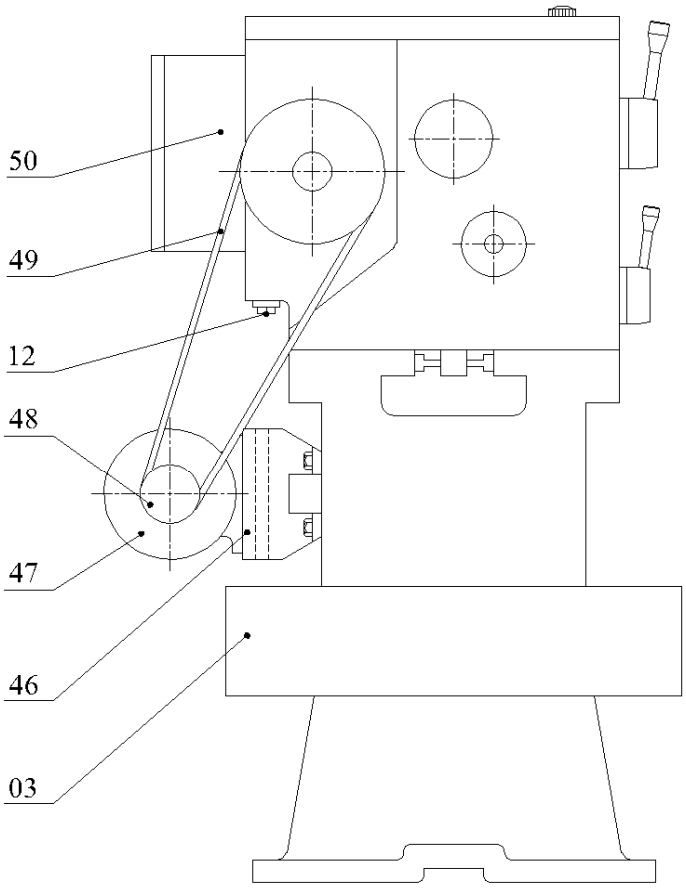
Legend



1.4 Legend

01. Pedestal (LH)
02. Pedestal (RH)
03. Chip & coolant tray
04. Bed
05. Head stock
06. Spindle A2 size 8
07. High/Low speed changing lever I,II
08. Speed changing lever A,B,C & D
09. Feed changing lever
10. Oil filling plug for head stock
11. Oil sight glass for head stock
12. Oil drain plug for head stock
13. Norton gear box
14. Feed selecting lever (A-B)
15. Feed selecting lever (R-S-T)
16. Feed selecting lever (C-D)
17. Feed selecting lever (X-Y-Z)
18. Oil filling plug for norton gear box
19. Oil sight glass for norton gear box
20. Oil drain plug for norton gear box
21. Lead screw
22. Switch shaft
23. Spindle Rev./Fwd. lever
24. Off-end bracket
25. End feed gear train cover
26. Apron
27. Half nut engaging lever
28. Feed engage-disengage knob
29. Feed selecting lever
30. Hand wheel for longitudinal travel
31. Thread dial indicator
32. Carriage
33. Cross slide
34. Compound slide
35. Hand wheel for surface slide

36. Carriage locking bolt
37. Hand wheel for compound slide
38. 4 way tool post
39. Handle for tool post
40. Tail stock
41. Tail stock quill
42. Tail stock quill locking handle
43. Tail stock clamping bolt
44. Hand wheel for tail stock quill
45. Tail stock side setting bolt
46. Motor mounting bracket
47. Electric motor
48. Motor pulley
49. V-Belts
50. Control panel
51. Push button plate
52. Limit switch

Note: - Middle pedestal is not applicable in machine model 3050/1 & 3050/2 but it is applicable in model 3050/3 and onwards.

SECTION-2

INSTALLATION

2.1 Unpacking and cleaning

Once machine is brought on shop floor, for unpacking of the machine, proper care should be taken. In case of machine with case packing, top directing is marked on wooden case. It is suggested that the packing case is opened soon after its receipt and verification is made for the standard and extra accessories mention in packing slip.

Prior to dispatch, all slides all unpainted parts, handles etc are coated with anti corrosive/rust-preventive. This should be carefully removed and wiped dry and then all bright machine parts should be oiled immediately.

2.1 Slinging the machine

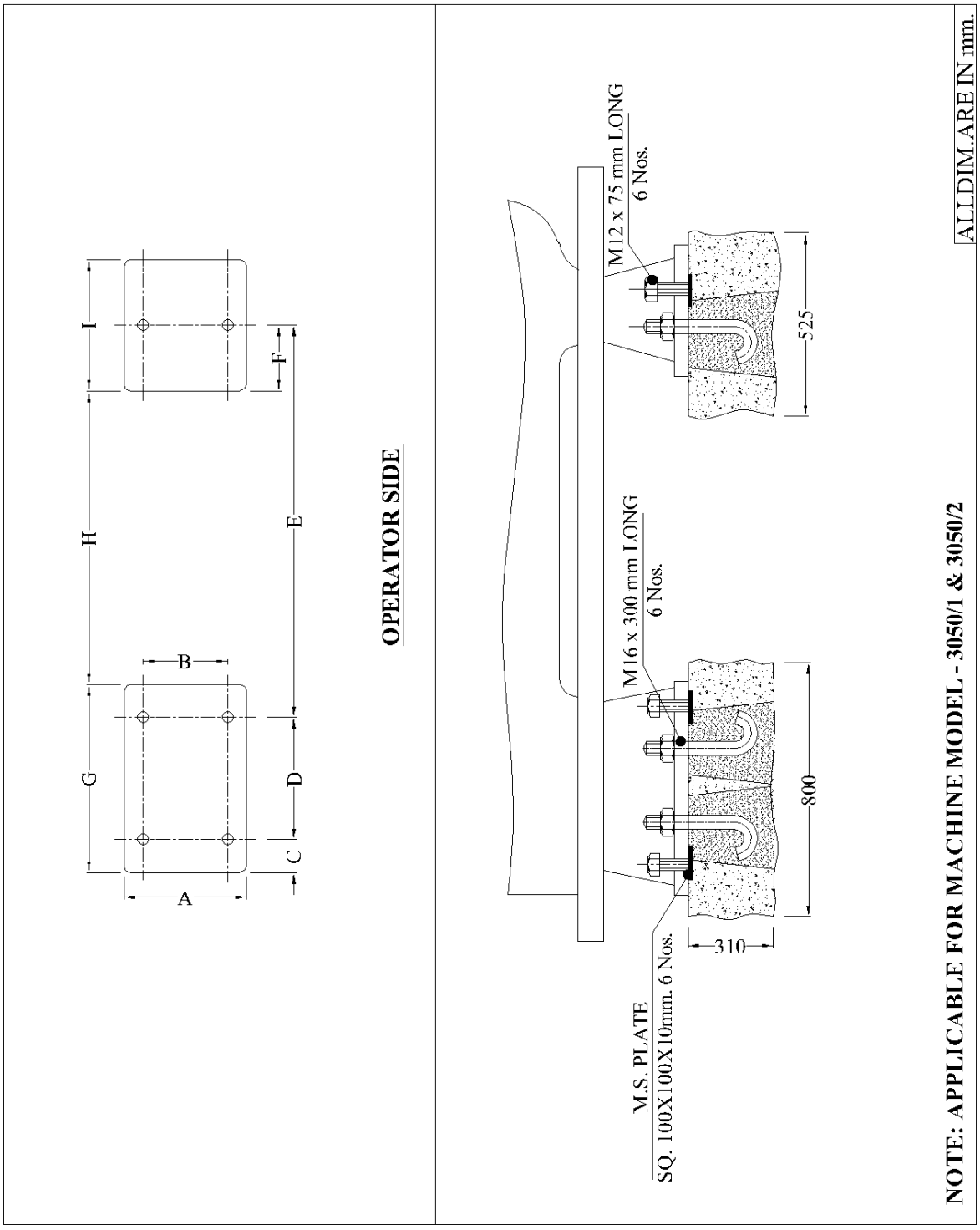
While lifting the machine by crane, proper care should be taken to prevent damage of machine paints, components and levers. Use suitable wooden block or felt packing, whenever chances of damage to machine part due to contact of rope or chain are possible. Suitable capacity ropes/chains should be used, while lifting the machine and it should be lift in balance position. For proper balancing of the machine, move tail stock and carriage at appropriate position and clamp on bed.

2.3 Foundation

The lathe machine can give satisfactory performance only if it is put on proper foundation and proper leveling is done. Foundation should be prepared as per foundation drawing and sufficient time should be allowed for concrete slab to be fully cured and dried. The depth of the foundation slab given in foundation drawing is only recommended and it should be directly decided by the users, depending upon the soil condition and surrounding atmosphere. The load bearing capacity of the soil should be taken in account for preparing foundation.

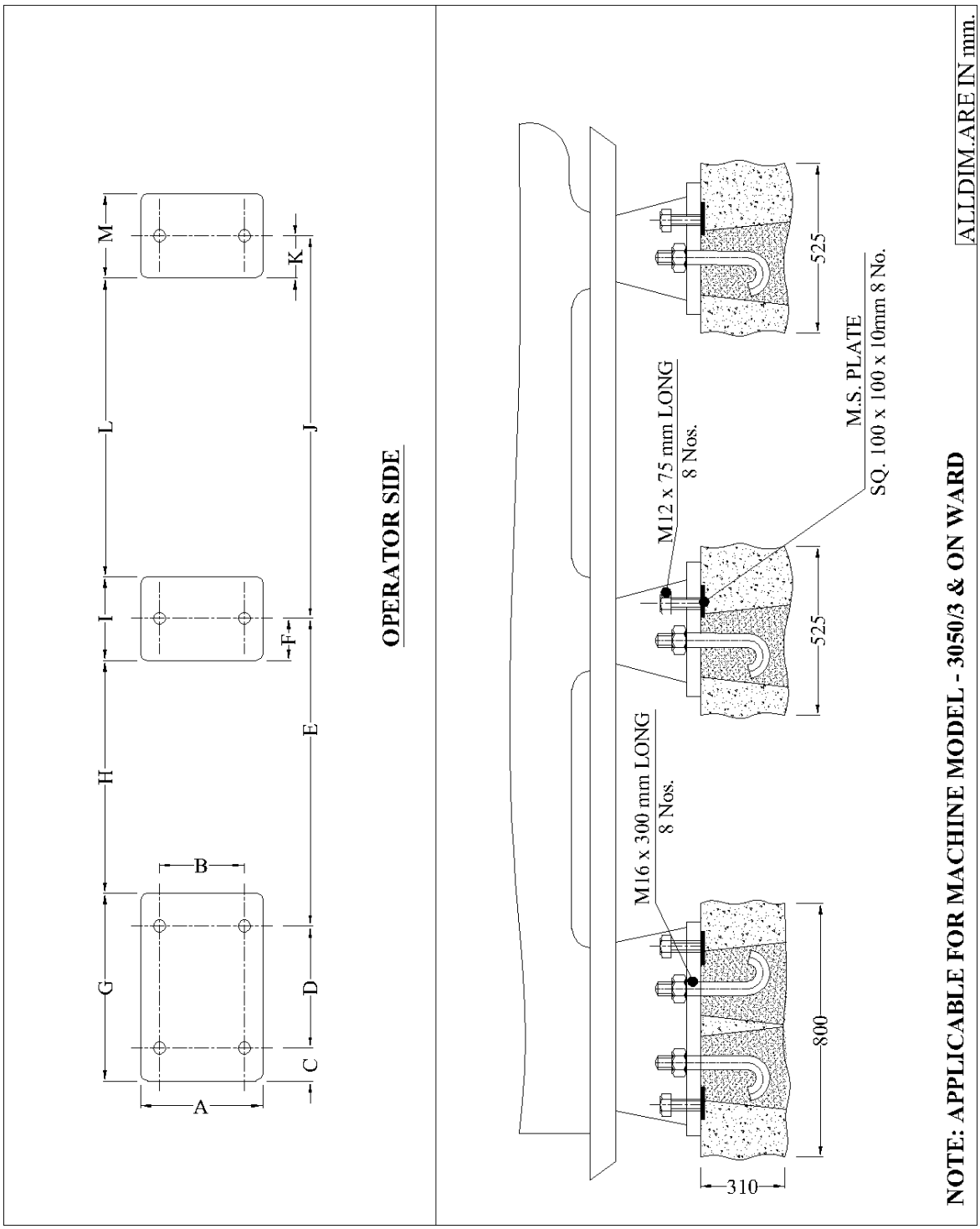
[**Working Area**: while selecting space and location for setting up the machine, leave enough space for convenient operation and easy accessibility of all parts for maintenance.]

FOUNDATION DRAWING



A =	B =	C =	D =	E =
F =	G =	H =	I =	

FOUNDATION DRAWING



A =	B =	C =	D =	E =
F =	G =	H =	I =	J =
K =	L =	M =		

2.4 Leveling

Leveling is very important and should be carried out with proper care. The accuracy of sprit level, which recommended is 0.050 mm/meter. For leveling follow the procedure given below.

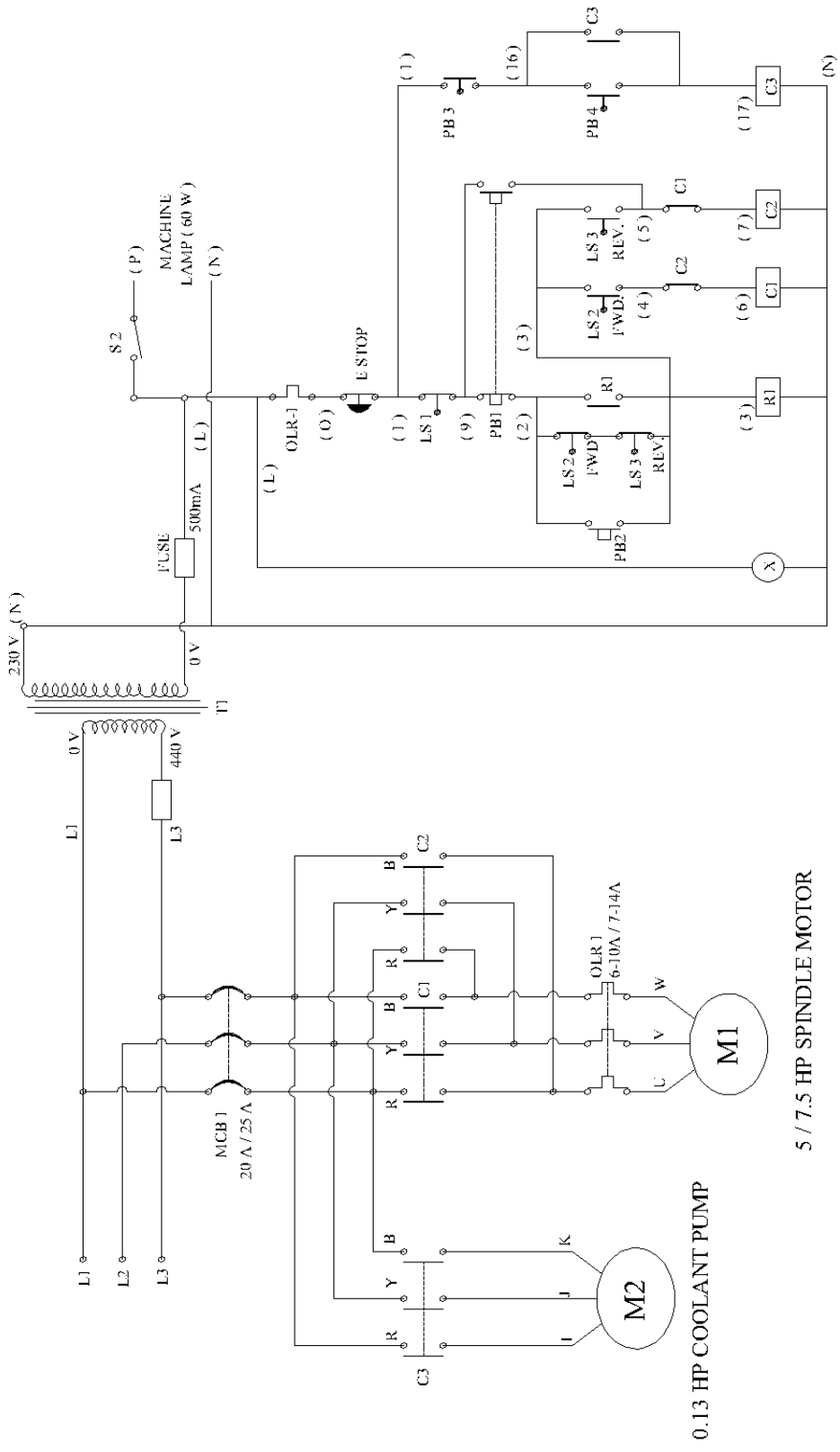
- Keep the precision lever on cross slide top face at centre in transverse position.
- Adjust the leveling bolt to make the position of level bubble in centre.
- Move carriage slide without disturbing level towards head stock side and adjust the bubble in level at centre position by adjusting level bolt.
- Move carriage slide toward tail stock side and repeat the procedure.
- Make both the readings at head stock side and tail stock side to be identical
- After setting transverse level, move the carriage to the centre of bed.
- Keep precision level on surface slide top near V-guide ways of bed in longitudinal position
- Ensure the bubble position at centre of level by using thin paper if required
- Move carriage towards head stock slide and then tail stock side and ensure the variation and adjust level if required.
- Recheck the transverse level.

After proper leveling of machine, run the machine for about 2 hours at various speed and feed and recheck levels and reset the level if required.

Then the foundation bolts are grouted in larger holes with 1:3 cement and sand mixture. Sufficient time should be allowed for concrete to cure. The foundation bolts are then tightened without undue force. Periodically check up bed level to ensure continued level accuracy.

Wiring Diagram:

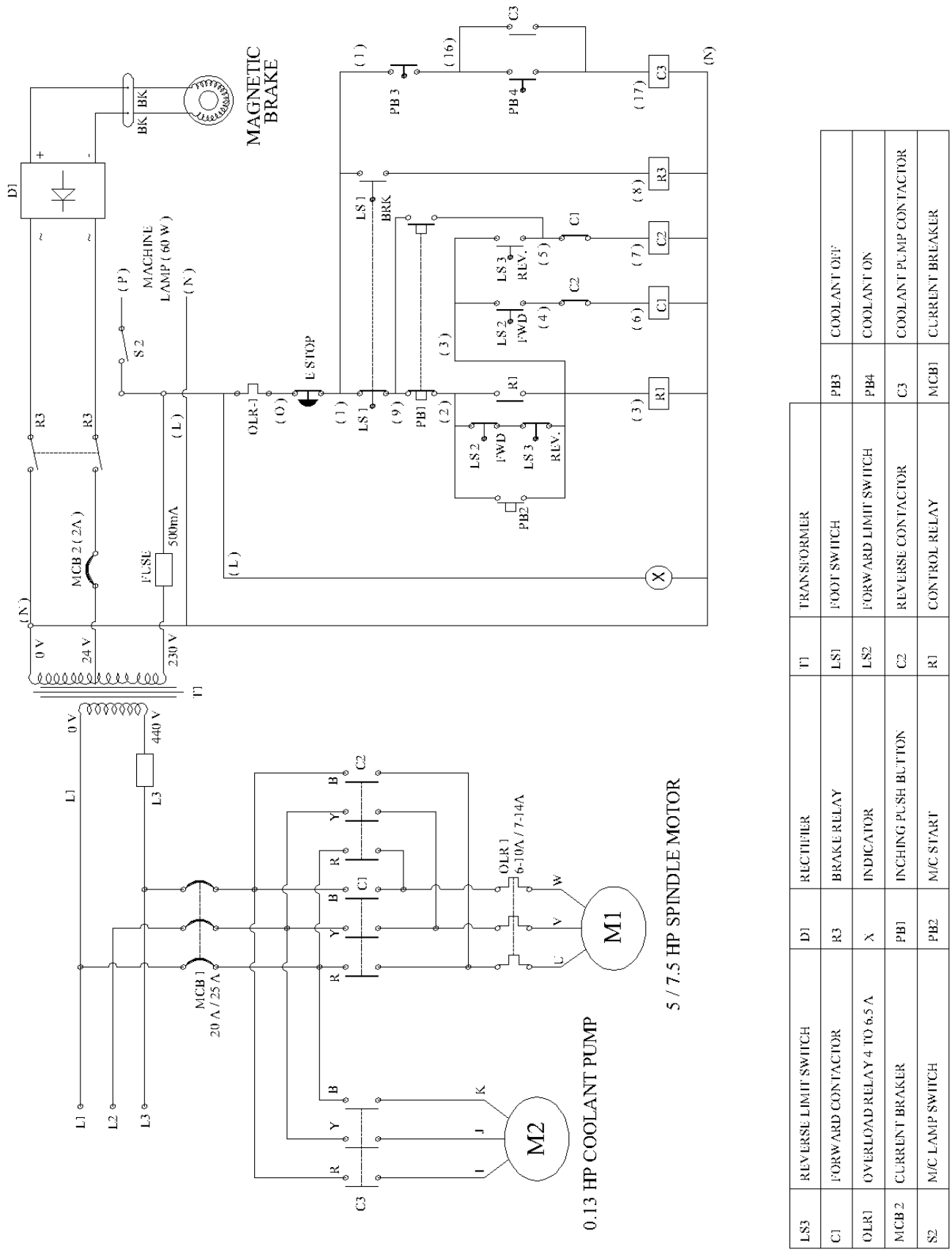
(Starting shaft with coolant & m/c lamp power & control)



LS3	REVERSE LIMIT SWITCH	X	INDICATOR	LS1	FOOT SWITCH	PB3	COOLANT OFF		
C1	FORWARD CONTACTOR	PB1	INCHING PUSH BUTTON	LS2	FORWARD LIMIT SWITCH	PB4	COOLANT ON		
OLR1	OVERLOAD RELAY	PB2	M/C START	C2	REVERSE CONTACTOR	T1	TRANSFORMER		
C3	COOLANT PUMP CONTACTOR	S2	M/C LAMP SWITCH	R1	CONTROL RELAY	MCB1	CURRENT BREAKER		

Wiring Diagram:

(Starting shaft with foot brake, coolant & m/c lamp power & control)



LS3	REVERSE LIMIT SWITCH	D1	RECTIFIER	T1	TRANSFORMER	PB3	COOLANT OFF		
C1	FORWARD CONTACTOR	R3	BRAKE RELAY	LS1	FOOT SWITCH	PB4	COOLANT ON		
OLR1	OVERLOAD RELAY 4 TO 6.5 A	X	INDICATOR	LS2	FORWARD LIMIT SWITCH	C3	COOLANT PUMP CONTACTOR		
MCB 2	CURRENT BRAKER	PB1	INCHING PUSH BUTTON	C2	REVERSE CONTACTOR	MCB1	CURRENT BREAKER		
S2	M/C LAMP SWITCH	PB2	M/C START	R1	CONTROL RELAY				

2.5 Electric connection

Machine supplied with electric panel

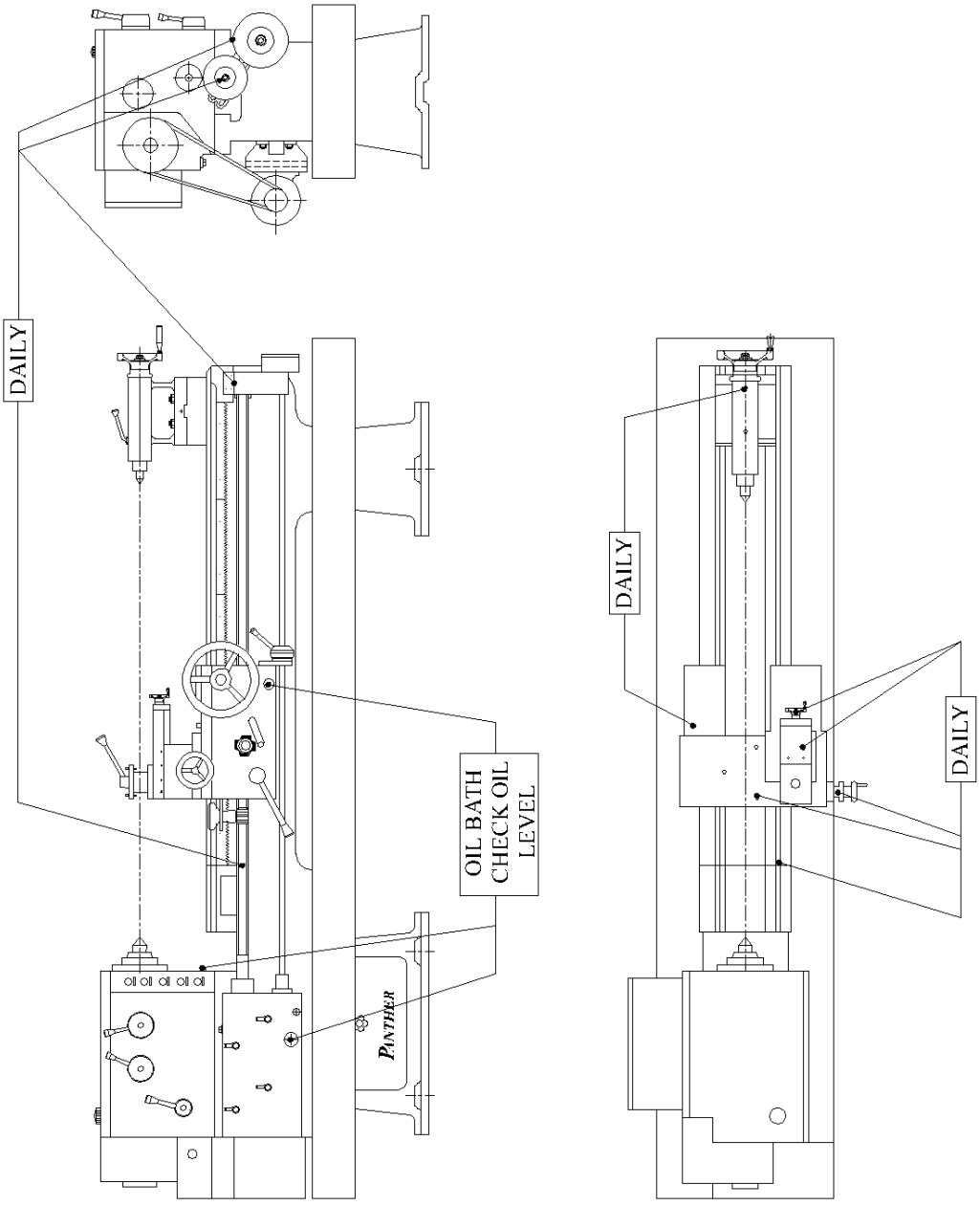
If machine is supplied with electric panel than internal electric wiring of electric motor and controls is done with wiring panel kept in electric cabinet. Wiring diagram is also given in this manual. Give electric power supply of three phase and proper earthing to machine. **Please check machine body with tester for leakage of power supply for safety**. Switch on machine by rev. /fwd. start handle given at apron box check machine spindle rotation, it should be matched with position of ref. /fwd. start handle. If position is not matched than interchange any one pair of leads from main electric supply. During connection of power, main power supply should be kept off.

2.6 Idle running of the machine

At the time of machine dispatch, speed and feed levers are set for lowest value. You are requested to ensure that these positions are maintained at the time of starting the machine to avoid any accidental switching on at high speed and feed, which may damage the machine.

Machine saddle, tail stock spindle etc are kept locked at the time of machine dispatch. Do not try to move them until they are properly cleaned, lubricated and unlocked.

LUBRICATION POINTS



2.7 Lubrication

Proper lubrication of lathe machine plays vital role to retain accuracy and gives satisfactory service. If lubrication is neglected the bearing surface may be damage, impairing the accuracy and sorting the life of machine.

Lubrication in head stock, apron and norton gear box are done by splash lubrication. Oil level indicator is provided in head stock, apron and norton gear box. Check oil level through oil level indicator regular, if oil level seems down then pour oil through oil filling plug.

In initial period, or first time running oil should be changed after first 300 hours running and then after 500 running hours.

Latter on oil can be used up to 1000 to 1500 running hours. Before filling new oil, the headstock should be washed with kerosene and thoroughly dried. Quantity of oil and type of oil to be used in head stock, apron and norton gear box is show in lubrication chart. Lubrication of cross slide, lead screw and tail stock are done by oil can. Various oil holes are provided for lubrication.

All the oil holes, oil cups, oil nipple of the lathe machine should be inspected and filled at least once in day or more often, if machine is operate day and night shifts or high speed and feed value is engaged. Dirt chip should be brushed away before oiling or greasing to prevent them to enter in to holes.

2.7.1 Lubrication through various oil holes

Oil holes are provided at various places for oiling

(01) Arm plate stud, (02) Thread dial indicator

Apply oil daily in these holes by oil can.

2.7.2 Lubrication through various nipples

Various oil nipples are provided for oiling

(01) Carriage screw, (02) Carriage screw nut,

(03) Compound screw, (04) Compound screw nut,

(05) Cross slide, (06) Compound slide,

(07) Tail stock body bore

Apply oil daily in these holes by oil can.

2.7.3 Lubrication through oil cups

Small oil cups are provided for lubrication
(01) Carriage, (02) Lead screw bracket
Apply oil daily to oil cups by oil can.

2.7.4 Apron

One oil level indicator is given in front face of apron box. Pour oil through oil pouring holes given on top face of carriage slide up to level marked in oil level indicator if required. One oil drain plug is given at the bottom face of apron body to remove oil from apron box.

2.7.5 List of recommended lubrication

Sr. No.	Company	Head stock Feed box Apron	Guide ways Lead screw Tail stock
1	HPCL	PARTHAN EP 220	WAYLUB 220
2	BPCL	MAK AMOCAM	WAYLUB 220
3	ISO GRADE	320	220
4	CASTRO OIL	GEAR OIL 320	MAGNA 220
5	MOBIL OIL	GEAR OIL 632	VACTRA 4
6	SHELL OIL	OMALA 320	TONNA 220

SECTION-3

OPERATION

3.1 Safety

(01) Protect your eyes wearing safety glasses.
(02) Wear shoes with oil resistance soles.
(03) If you have long hair, tie it back properly.
(04) Do not wear long sleeved cloths or loose clothing.
(05) Make sure that your work area should be free from chips, coolant, electric wire, air-hoses, oil or anything that can be get in your way and cause you to fall.
(06) Make sure that work holding are firm.
(07) Make sure that tool holding are firm.
(08) Ensure proper belt tension.
(09) Refit covers and guards before the machine is put again into operation after opening of any cover or guards.
(10) Do not file work piece, when they are being rotate under power. This is extremely hazardous.
(11) Do not touch machine part immediately after machining it may have sharp edges and considerable amount of heat.
(12) Wear rubber sole shoes while working on electrical cabinet.
(13) All maintenance work should be done with power off condition.
(14) Electrical shock can cause serious injury or loss of life. All service and maintenance work within the electrical cabinet should be performed by qualified electricians in power off condition.
(15) When replacing fuse always replace them with the same type and rating. Do not substitute fuses for higher current or different voltage.
(16) While working on the machine parts like brake unit, transformer etc. it may be extremely hot. Take sufficient care when handling such parts.
(17) Do not shift gear in running condition of head stock & norton gear box.

3.2 Do, Do Not & Checks

Do

- Check and maintain oil level in head stock, norton & apron.
- Amplified pitches. Do follow guide line given for amplified pitches.
- The following table gives guideline for selection of maximum spindle speed while cutting high range pitch threading/amplified pitches.
- Clean machine at the end of every shift.

Metric Pitch	English Thread	Spindle Speed
2	12	265
3	8	160
4	6	105
5	5	105
6	4	75

Do Not

- Do not shift gears in motion.
- Do not open head stock covers or end feed gear covers while machine is running.
- Do not exceed speeds of chuck or face plate beyond the specified limit.
- Do not exceed more than 30 reversals of the motor switches per hour.
- Do not remove chucks from threaded spindle by rotation spindle in reversed direction(optional)

Checks

- Job weight limitation. Do not load jobs weighting more than 200 kg. without steady rest or centre support.
- Do not start the machine at high speed with heavy jobs.
- Sudden reversal of spindle at speed 145 & above rpm is not recommended
- It is recommended that cast iron chucks should not be run at surface speed more than 16 meter/sec. accordingly 360 mm diameter chuck should not run at more than 835 rpm.

3.3 Head stock

Head stock pulley is directly driven by electric motor through three V-belts. Power transmission inside the head stock to main spindle is through gear arrangement. Total 8 nos. different spindle speed is available.

Main spindle rpm is selected by two levers, High/Low speed changing lever (07) and speed changing lever (08). Lever (07) has three different position one is high-speed position second is neutral and third position is low speed range. A lever (08) has four different positions A, B, C & D. By selecting any one position of both levers spindle speed can be change.

Feed selecting lever (09) has three different positions Reverse, Neutral & Forward feed.

Oil sight glass (11) is provided for checking oil level in head stock. Lubrication of main bearing, gears, shifters and shafts are done by splash lubrication system. It is necessary to keep always proper oil level in head stock to give lubrication of head stock parts. Oil filling plug (10) is given on top face of Head stock cover and oil drain plug (12) is given at backside of head stock bottom face.

Caution: do not shift gear in running condition.

Spindle Speed in rpm				
Lever position	A	B	C	D
I	105	265	390	835
II	20	50	75	160

3.4 Norton gear box

Norton gear box provides selection of various feeds and threads. Total 52 types of British threads and 44 types of metric threads can be cut by selecting different levers positions. Total 4 different knobs are given in norton gear box. Knob (14) has two different positions A & B, knob (15) has three different positions R, S & T. Knob (16) has two different positions C & D. Knob (17) has three different positions X, Y & Z.

Oil filling plug (18) and oil sight glass (19) is given for checking oil level in Norton gear box. It is necessary to maintain proper oil level in norton gear box. Lubrication of norton gear box is done by splash lubrication system.

Caution: do not shift gear in running condition.

3.5 End feed gears

At the rear end of the head stock, change gear train is fitted to give longitudinal feed, transverse feed and threading operation. To change the direction of rotation of gear train, feed changing lever (09) is given is head stock.

One arm plate with arm stud and gunmetal bush is fitted with norton gear box. Change gears are connected in this arm plate to give drive from head stock output gear to norton gear box.

3.5.1 Thread chart For machine having 4 TPI lead screw

BRITISH THREAD

GEAR TRAIN	LEVER	BC	BD	AC	AD
48/80	RX	20	10	5	2.5
	TZ	24	12	6	3
	SZ	30	15	7.5	3.75
	TX	32	16	8	4
	SX	40	20	10	5
48/90	TZ	27	13.5	6.75	3.375
	TX	36	18	9	4.5
48/95	TX	38	19	9.5	4.75
48/70	TZ	21	10.5	5.25	2.625
	TX	28	14	7	3.5
48/65	TX	26	13	6.5	3.25
48/88	RX	22	11	5.5	2.75
	SX	44	22	11	5.5

METRIC THREAD

GEAR TRAIN	LEVER	BC	BD	AC	AD
45/80 X 80/127	TX	0.469	0.938	1.875	3.75
	SZ	0.5	1	2	4
	TZ	0.625	1.25	2.5	5
	RX	0.75	1.5	3	6
	RZ	1	2	4	8
	TY	1.094	2.187	4.375	8.75
	RY	1.75	3.5	7	14
45/80 X 90/127	RX	0.844	1.688	3.375	6.75
	RZ	1.125	2.25	4.5	9
45/70 X 75/127	RY	1.857	3.75	7.5	15
45/80 X 88/127	TZ	0.687	1.375	2.75	5.5

3.5.2 Thread chart For machine having 4 TPI lead screw – (Optional)

DP THREAD

GEAR TRAIN	LEVER	BC	BD	AC	AD
48/80 X 88/56	RX	40	20	10	5
	TZ	48	24	12	6
	SZ	60	30	15	7.5
	TX	64	32	16	8
	SX	80	40	20	10
48/90 X 88/56	TZ	54	27	13.5	6.75
	TX	72	36	18	9
48/95 X 88/56	TX	76	38	19	9.5
48/70 X 88/56	TZ	42	21	10.5	5.25
	TX	56	28	14	7
48/65 X 88/56	TX	52	26	13	6.5
48/80 X 80/56	RX	44	22	11	5.5
	SX	88	44	22	11

MODULE THREAD

GEAR TRAIN	LEVER	BC	BD	AC	AD
45/56 X 88/127	TX	0.234	0.469	0.938	1.875
	SZ	0.25	0.5	1	2
	TZ	0.312	0.625	1.25	2.5
	RX	0.375	0.75	1.5	3
	RZ	0.5	1	2	4
	TY	0.547	1.094	2.187	4.375
	RY	0.875	1.75	3.5	7
45/56 X 99/127	RX	0.422	0.844	1.688	3.375
	RZ	0.562	1.125	2.25	4.5
44/56 X 99/127	TZ	0.343	0.687	1.375	2.75

3.6 Thread dial indicator

Thread dial indicator is used during threading operation. By using thread dial indicator half nut with lead screw can engage at correct position during successive threading cuts, so that tool will follow the original cuts and it will eliminates the necessity of reversing the lathe spindle.

For British threading

For all odd and even threads in each inch, close half nuts at any no. on dial (for example at no. 4, 5, 6 etc.)

For all threads involving half threads in each size, close half nuts at any alternative no. on dial. (For example 2, 4, 6 or 1, 3, 5)

For Metric threading

During Metric threading thread dial indicator will not be used and spindle has to run in reverse direction without disengaging half nuts in second and subsequent cuts till threading operation is completed.

3.6.1 Special threading not indicating in thread chart

British threads

$$\text{Gear train for required TPI} = \text{Gear train of selecting TPI} \times \frac{\text{Selected TPI}}{\text{Required TPI}}$$

For example 17 TPI threads required. Then select nearest 16 TPI threads and set levers position as per 16 TPI of norton gear box that will be TX-BD

$$= \frac{48}{80} \times \frac{16}{17}$$

$$= \frac{48}{85}$$

Metric threads

Gear train for required pitch =Gear train of selecting pitch X Required pitch / Selected pitch

For example pitch required is 10 mm, then select nearest pitch of 9 mm and set levers as per 9 mm pitch that will be RZ-AD

$$= \frac{45}{80} \times \frac{90}{127} \times \frac{10}{9}$$

$$= \frac{48}{80} \times \frac{100}{127}$$

3.6.2 Feed calculations

Longitudinal feed (in mm/rev.) = $\frac{3.995}{TPI}$ **OR** 0.1573 X Pitch

Transverse feed (in mm/rev.) = $\frac{0.9549}{TPI}$ **OR** 0.0376 X Pitch

- For example if machine change gears set as per 10 TPI then

Longitudinal feed will be $\frac{3.995}{10}$ = 0.3995 mm/rev.

Transverse feed will be $\frac{0.9549}{10}$ = 0.09549 mm/rev.

- For example if machine change gears set as per 2.5 mm pitch then

Longitudinal feed will be 0.1573 X 2.5 = 00.39325 mm/rev.

Transverse feed will be 0.0376 X 2.5 = 0.094 mm/rev.

TRANSVERS FEED mm/rev.

WITH TPI THREAD SETTING

GEAR TRAIN	LEVER	BC	BD	AC	AD
48/80	RX	0.048	0.095	0.191	0.382
	TZ	0.040	0.079	0.159	0.318
	SZ	0.032	0.064	0.127	0.255
	TX	0.030	0.060	0.119	0.239
	SX	0.024	0.048	0.095	0.191
48/90	TZ	0.035	0.071	0.141	0.283
	TX	0.026	0.053	0.106	0.212
48/95	TX	0.025	0.050	0.100	0.201
48/70	TZ	0.045	0.091	0.182	0.364
	TX	0.034	0.068	0.136	0.273
48/65	TX	0.037	0.073	0.147	0.294
48/88	RX	0.043	0.087	0.174	0.347
	SX	0.022	0.043	0.087	0.174

WITH METRIC THREAD SETTING

GEAR TRAIN	LEVER	BC	BD	AC	AD
45/80 X 80/127	TX	0.018	0.035	0.070	0.141
	SZ	0.019	0.038	0.075	0.150
	TZ	0.023	0.047	0.094	0.188
	RX	0.028	0.056	0.113	0.226
	RZ	0.038	0.075	0.150	0.301
	TY	0.041	0.082	0.164	0.329
	RY	0.066	0.132	0.263	0.526
45/80 X 90/127	RX	0.032	0.063	0.127	0.254
	RZ	0.042	0.085	0.169	0.338
45/70 X 75/127	RY	0.070	0.141	0.282	0.564
45/80 X 88/127	TZ	0.026	0.052	0.103	0.207

LONGITUDINAL FEED mm/rev.

WITH TPI THREAD SETTING

GEAR TRAIN	LEVER	BC	BD	AC	AD
48/80	RX	0.200	0.399	0.799	1.598
	TZ	0.166	0.333	0.666	1.332
	SZ	0.133	0.266	0.533	1.065
	TX	0.125	0.250	0.499	0.999
	SX	0.100	0.200	0.399	0.799
48/90	TZ	0.148	0.296	0.592	1.184
	TX	0.111	0.222	0.444	0.888
48/95	TX	0.105	0.210	0.420	0.841
48/70	TZ	0.190	0.380	0.761	1.522
	TX	0.143	0.285	0.571	1.141
48/65	TX	0.154	0.307	0.615	1.230
48/88	RX	0.181	0.363	0.276	1.452
	SX	0.091	0.181	0.363	0.276

WITH METRIC THREAD SETTING

GEAR TRAIN	LEVER	BC	BD	AC	AD
45/80 X 80/127	TX	0.074	0.148	0.295	0.590
	SZ	0.079	0.157	0.315	0.629
	TZ	0.098	0.197	0.393	0.786
	RX	0.118	0.236	0.472	0.944
	RZ	0.157	0.315	0.629	1.258
	TY	0.172	0.344	0.688	1.376
	RY	0.275	0.550	1.101	2.202
45/80 X 90/127	RX	0.133	0.265	0.531	1.062
	RZ	0.177	0.354	0.708	1.416
45/70 X 75/127	RY	0.292	0.590	1.180	2.360
45/80 X 88/127	TZ	0.108	0.216	0.432	0.865

3.7 Carriage

Carriage slide is fitted on bed top face by two kipper plate and one lock piece in front side and setting wedge type keeper plate at rear side. On the top face of carriage, cross slide fitted on dovetail guide ways with setting wedge. On the side edge of carriage two tapped holes are given to clamp follow rest guide. Aluminum chip guards with felt are given at all four corners of carriage to prevent to enter dust and chips inside the sliding surface. Two oil cups with cap are provided on top face of carriage slide for lubrication of sliding surface. One lock bolt is provided on carriage surface to lock carriage movement if required.

Cross slide is fitted on carriage dowtails. On the front face of carriage one screw boss fitted to guide surface screw and nut. Cross screw and gear is fitted in carriage and cross slide screw gun metal nut is fitted on bottom face of cross slide. One hand wheel with micro ring is fitted on cross slide screw to give manual hand feed to cross slide. On the top face of cross slide one circular T-slot is given and angular marking of 180 degree (90 degree on either side.) is done to set compound slide at any desire angular position.

Compound slide assembly is located in center of cross slide and clamped with cross slide through two nos. T-bolts. One 4 way tool post is fitted on top face of compound slide to hold tools.

3.8 Apron box

Construction of apron gear box is rigid, oil bath and box type. Apron gear box is fitted at bottom face of carriage. Lead screw is passed through apron gear box worm to give drive to apron box. One thread cutting lever is fitted on left side of apron gearbox. This lever operates engage/disengages of half nut on lead screw during threading operation. Thread dial indicator is fitted on left hand slid of apron gear box.

Feed selecting lever with spring-loaded plunger is provided on apron gear box. This lever has 3 positions Reverse, Neutral & Forward feed. Thread cutting lever and feed selecting lever are interlocked with each other to prevent operating of both levers simultaneously. During thread cutting operation feed selecting lever should in neutral position, otherwise thread cutting lever will not work. Similarly

during turning operation thread cutting lever should be in disengage condition with lead screw, otherwise feed selecting lever will not work.

One star knob type wheel is given on apron gear box to engage or disengage feed. By tightening this star knob wheel feed will engage through taper washer.

One hand wheel is provided to move carriage slide on lathe bed by manual operation.

3.9 Tail stock

Tail stock body with tail stock base is fitted on lathe bed to provide support during turning operation or to perform drilling, boring, taper turning etc. operation. Tail stock assembly is clamped on lathe bed by one tail stock clamping pad and bolt. After setting tail stock at desire position on bed. It should be clamped with bed by clamping bolt. Two setting bolts are provided on either side of tail stock base to set alignment of tail stock spindle with lathe spindle.

Tail stock spindle guide in tail stock body and moves axially by hand wheel and screw nut assembly fitted with hand wheel. One clamping handle is given to clamp tail stock spindle movements if required.

Least count of hand wheels

Longitudinal movements by apron hand wheel	0.240 mm/div.
Transverse movements by cross slide hand wheel	0.050 mm/div.
Compound slide hand wheel	0.050 mm/div.
Tail stock spindle movement by hand wheel	0.050 mm/div.

SECTION-4

SETTINGS MAINTENANCE & TROUBLE SHOOTINGS

Proper care and maintenance of the machine is most important factor to increase life and reliability of machine performance. Following are the few important settings, which needed attention.

4.1 Head stock

4.1.1 Taper setting

Headstock is mounted on bed by six bolts. To set head stock alignment, first loose bolts slightly and then insert test mandrel of 300 mm length in spindle nose and aligned axis of taper mandrel with longitudinal movements and clamped bolt.

4.1.2 Spindle

Main spindle runs in two taper roller & one needle roller bearing. To adjust radial or axial clearance or spindle tightens check nuts so that the spindle can be rotate by hand with light drag.

4.1.3 V-Belts

Main electric motor is mounted on motor mounting bracket on backside of lathe bed. Three nos. V-Belts are fitted between motor pulley and head stock pulley. To adjust belt tension, unclamps four bolts of electric motor and readjust the position of motor on motor mounting bracket and clamp bolts.

4.2 Lead screw

Lead screw is coupled with output shaft of norton gear box by dowel pin.

4.3 Carriage

Carriage is fitted on bed with on V guide and one flat surface. Carriage is set on bed guide ways with two keeper blocks on operator side and one keeper late with parallel wedge is rear side.

4.4 Cross slide and Compound slide

Cross slide and compound slide is scraped and matched with guide ways by one wedge & setting bolts are given to set slide wedge clearance.

4.5 Tail stock

Taper turning of long job can be done by offsetting of tail stock with respect to head stock center line. In tail stock base two setting bolts are given on either side. By loosen one setting bolt and tighten other setting bolt tail stock body can be set offset.

4.6 Tool post

After long use the tool post clamping handle may extend beyond the convenient zone of clamping. To get back proper angle of tool post clamping handle, cut the bottom surface of spacer by required amount.

4.7 Half nut

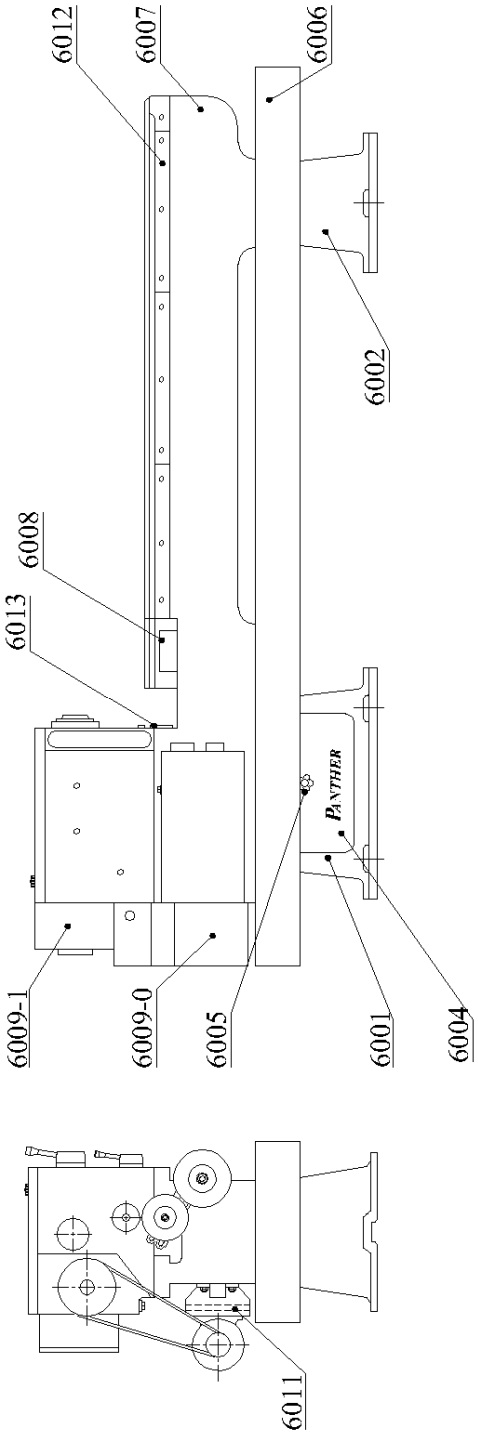
Half nut is guided in prismatic guide ways of apron body. Clearance of guide ways can be set by setting bolts given on left hand side of apron body. First loosen slightly two hex bolts given on prismatic guide ways and complete settings, after completing settings, clamping bolts should be tighten.

4.8 Trouble shooting and remedy

Sr.	Trouble	Cause	Remedies
1.	Machine vibrates while running	Improper leveling	Level machine properly and tighten on foundation
		Job not balanced	Balance job by adding counter weight and reduce spindle speed and feed
2.	Machine vibrates while machining and chatter mark on job	Improper tension of V-belt	Adjust V-belt tension
		Excessive tool over hang	Reduce overhang of tool and clamp tool rigidly
		Wrong tool	Check proper tool material and tool
		Improper tool center	Adjust correct tool center
		Work holding not rigid.	Check job holding
		Clearance between carriage, surface or compound slide	Adjust proper clearance between all wedges.
		Slender components machine without support	Put proper support on job

Sr.	Trouble	Cause	Remedies
		Back plate of chuck is lose	Check back plate of chuck
		Pre loading of main spindle is not correct	Adjust pre loading of spindle
3.	Spindle runs too tight or loose.	Preloading of spindle is not proper	Adjust check nuts given at rear end of head stock such that spindle should rotate by hand with light drag
4.	Machine cuts taper on job	Alignment of head stock is not proper	Align head stock axis with carriage movement
5.	Machine cuts taper on job held between centers	Alignment of tail stock not proper	Aligned tail stock axis
		Improper machine level	Level machine properly
		Tool worn out	Regrind or replace tool
6.	Gear train in end feed gear train make sound during running	Back lash of change gear is not proper	Adjust backlash of change gears
		Fixing nut bolts not proper tight	Tighten fixing nut and bolts
		Some damage mark on gear teeth	Inspect and remove damage mark from gear
		Lubrication is not sufficient	Provide sufficient lubrication
7.	Machine is not able to take heavy cuts	Belt tension is not proper	Adjust proper belt tension
8.	Threading over lapse	Excessive axial play of lead screw	Set axial play of lead screw
		Excessive play in half nut	Set play of half nuts
		Gear train or Norton lever position is not proper	Set proper gear train or proper lever position of norton gear box
		Engagement of half nut is not proper	Engage half nut as per instruction given in thread dial indicator.
9.	Noise in head stock	Lubricant is not sufficient	Check oil level and maintain proper oil level
		Gear damage	Replace damage gear
		Bearing damage	Replace damage bearing

STRUCTURE ASSEMBLY



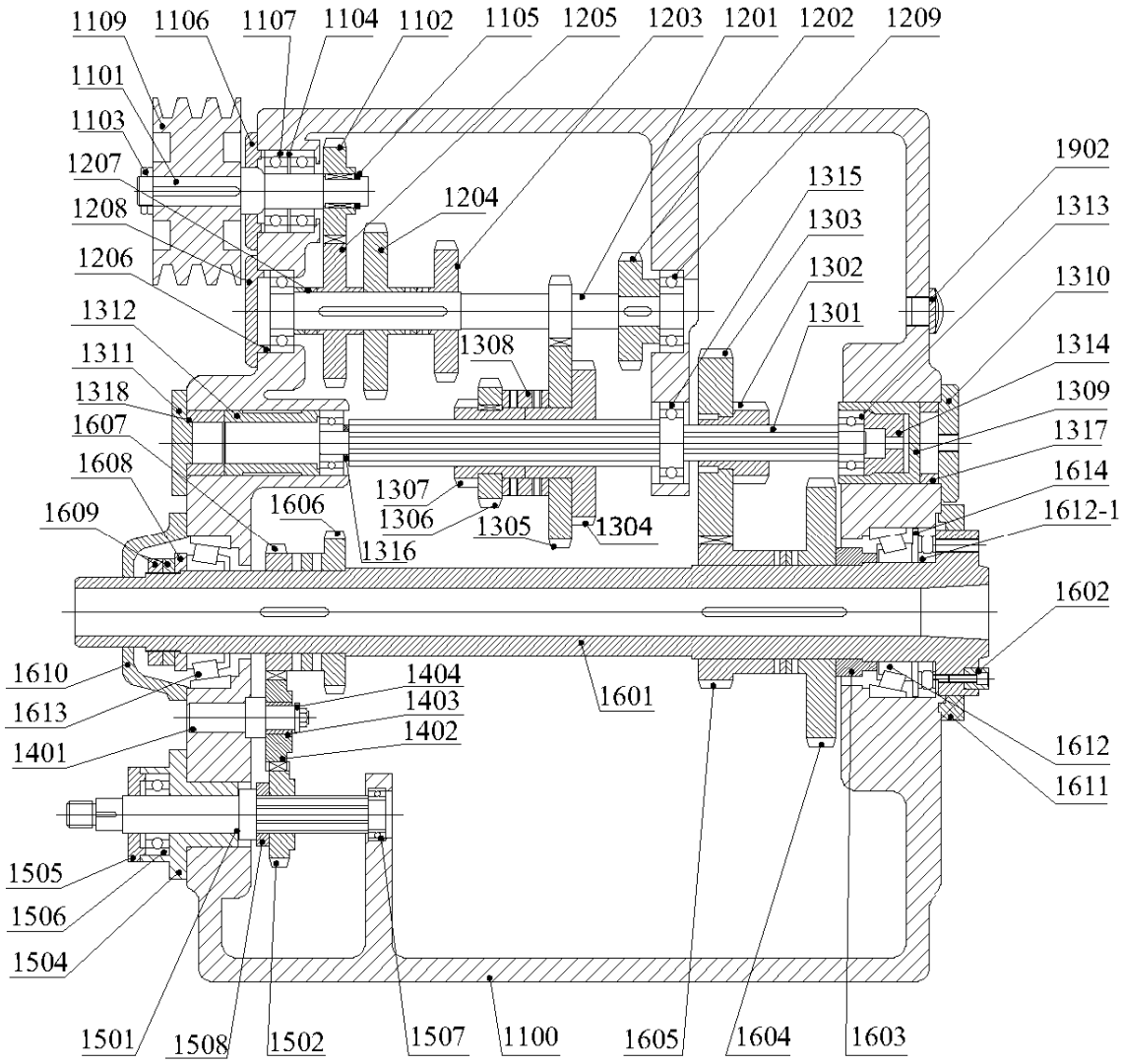
SECTION-5

ASSEMBLY DRAWING AND SPARE PART LIST

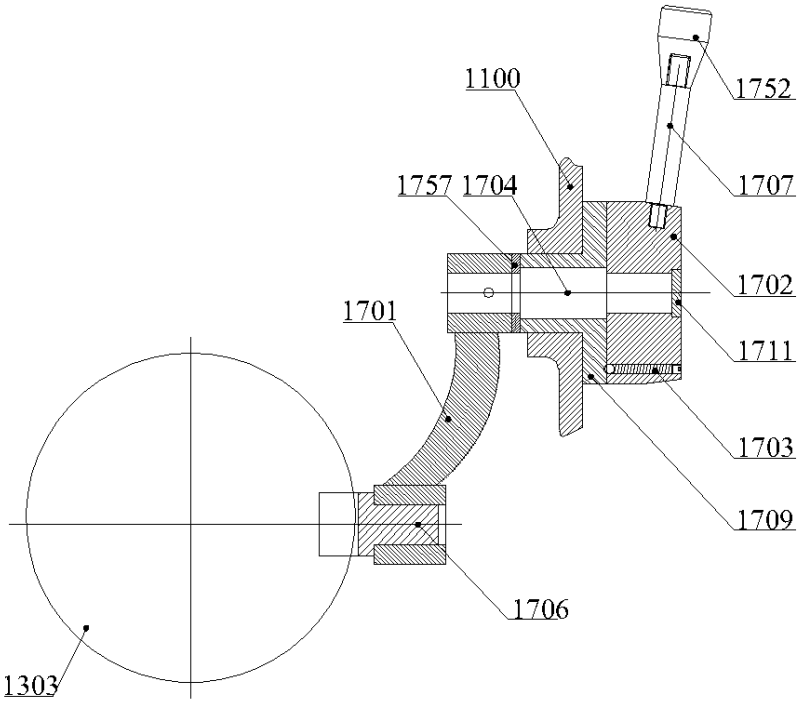
5.1 Structure assembly

Drg. No.	Part Name	Qty.
6001	Pedestal (LH)	1
6002	Pedestal (RH)	1
6003	Pedestal (Middle – for 3050/3 and onwards)	1
6004	Pedestal window	1
6005	Knob with stud for pedestal window	1
6006	Chip & coolant tray	1
6007	Lathe bed	1
6008	Gap for lathe bed	1
6009-0	End feed gear train cover	1
6009-1	Driving pulley cover	1
6010	V-Belt guard	1
6011	Motor mounting bracket	1
6012	Rake (Quantity as per machine size)	-
6013	Head stock window	1

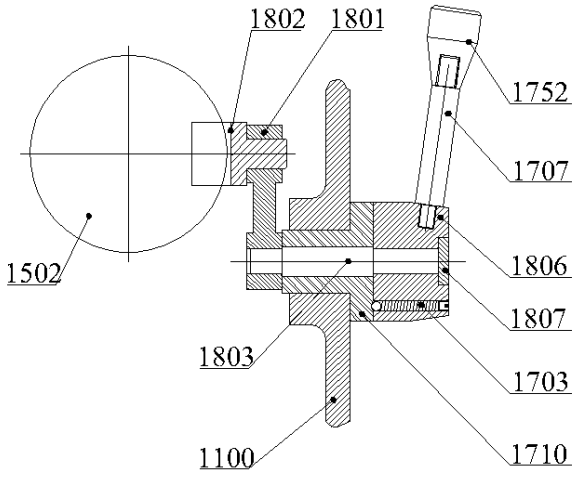
HEAD STOCK ASSEMBLY



HEAD STOCK SHIFTER ASSEMBLY

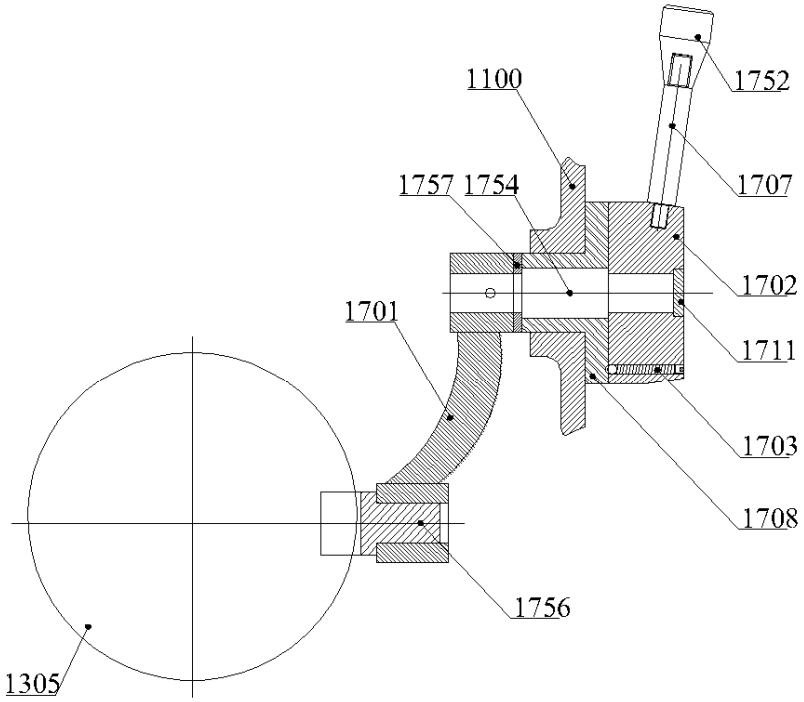


(Lever assembly for I - II position)



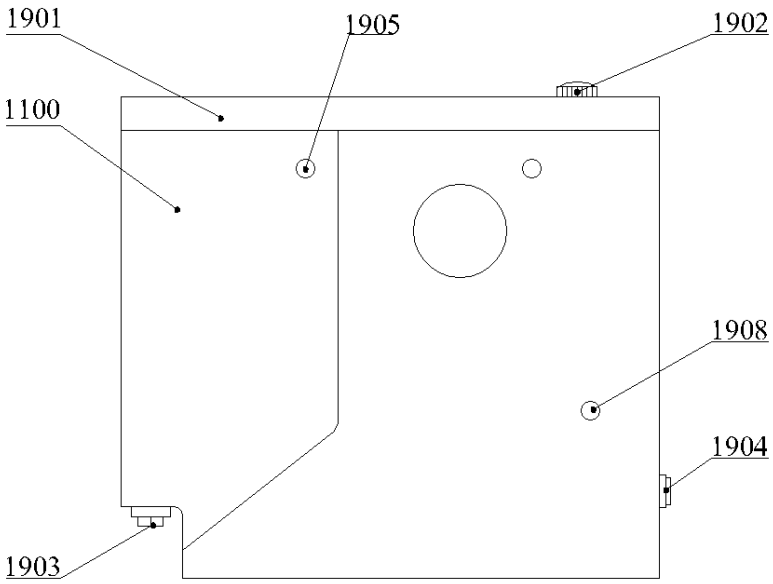
(Lever assembly for Fwd. - Rev. position)

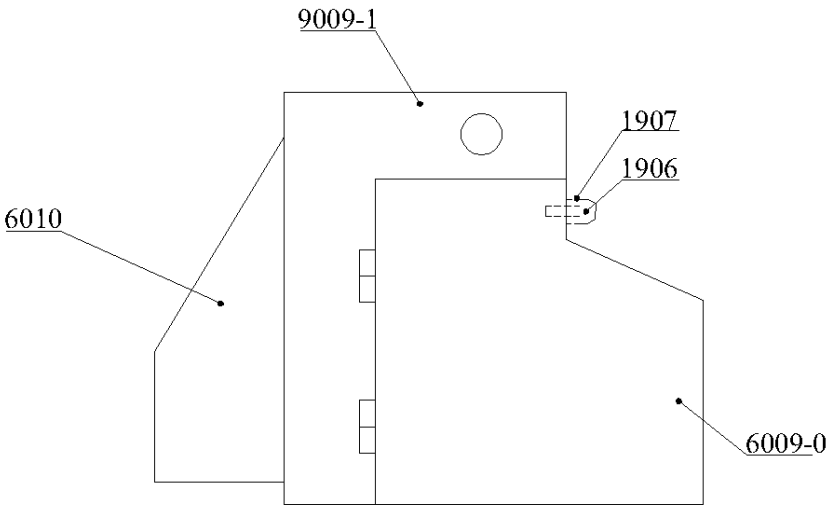
HEAD STOCK SHIFTER ASSEMBLY



(Lever assembly for A-B-C-D position)

HEAD STOCK ASSEMBLY





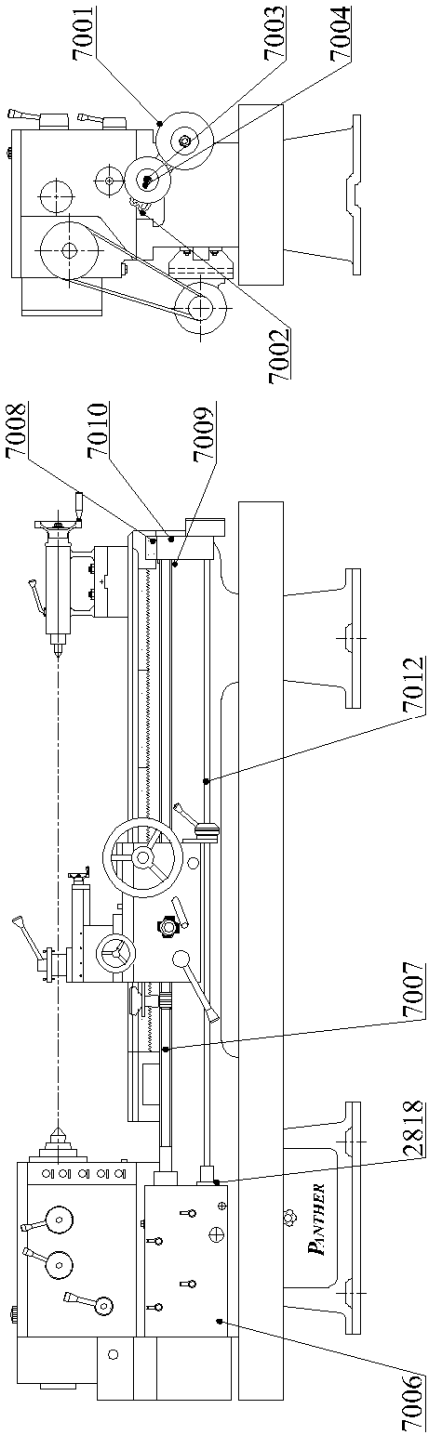
5.2 Head stock assembly

Drg. No.	Part Name	Qty.
1100	Head stock body	1
1101	Driving shaft	1
1102	Driving shaft gear (25-T)	1
1103	Check nut	2
1104	Bearing spacer	2
1105	Circlip	1
1106	Driving shaft outside cover	1
1107	Ball bearing 6206	2
1108	Motor pulley	1
1109	Driving pulley	1
1201	Middle shaft with gear (16-T)	1
1202	Gear (30-T)	1
1203	Gear (37-T)	1
1204	Gear (50-T)	1
1205	Gear (40-T)	1
1206	Spacer for bearing	1
1207	Spacer	1
1208	Middle shaft outside cover	1
1209	Ball bearing 6206	2
1301	Spline shaft	1
1302	Gear (22-T)	1
1303	Gear (62-T)	1
1304	Gear (42-T)	1
1305	Gear (56-T)	1
1306	Gear (35-T)	1
1307	Gear (22-T)	1
1308	Coupling for spline shaft gear	1
1309	Spline shaft bearing housing	1
1310	Spline shaft front cover	1
1311	Spline shaft rear cover	1
1312	Bearing spacer for splineshaft	1
1313	Ball bearings 6304	2
1314	Puller bush	1
1315	Ball bearing LS12	1
1316	Bearing spacer	1
1317	Spacer	1
1318	Spacer	1

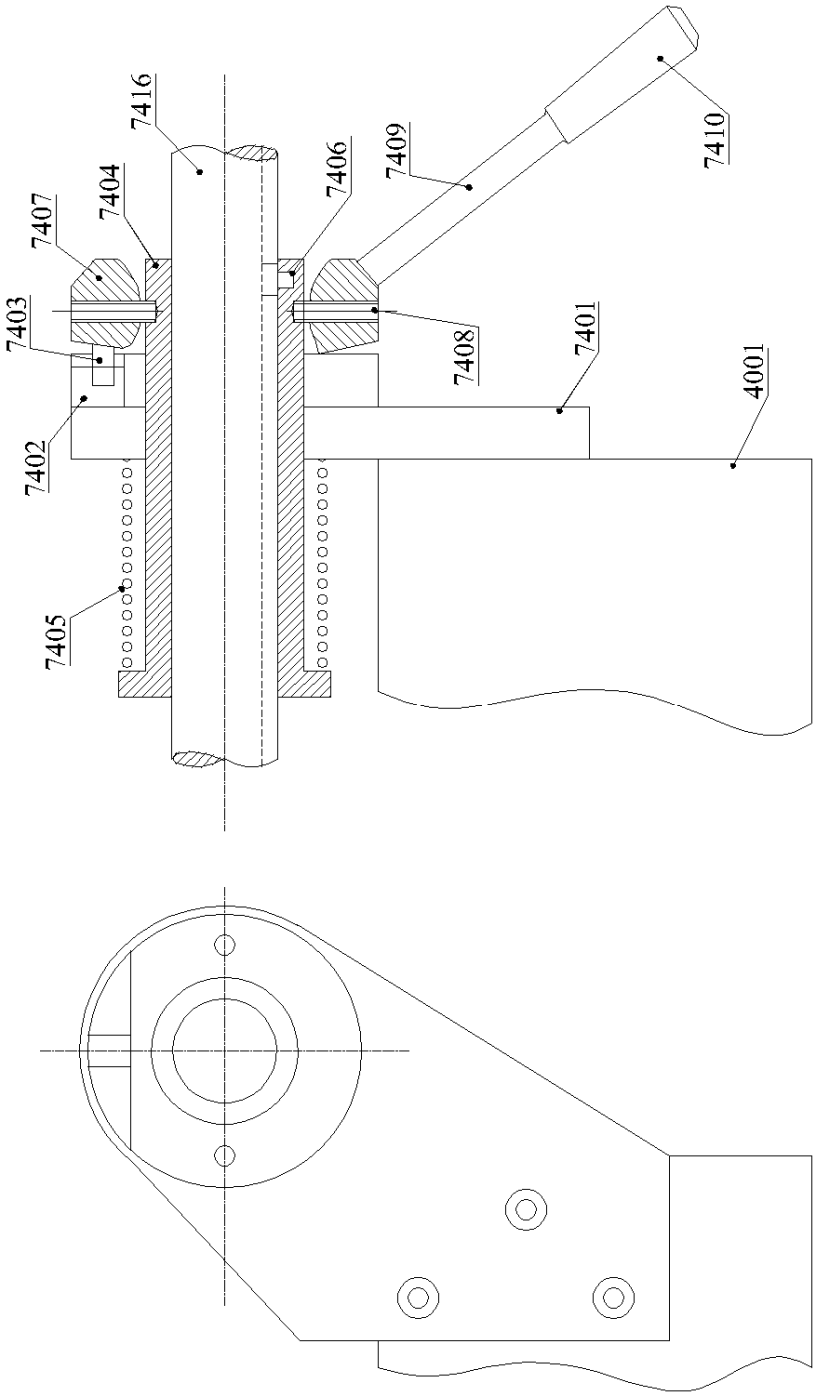
Drg. No.	Part Name	Qty.
1401	Idler shaft	1
1402	Idler shaft gear (28-T)	1
1403	G.M. Bush for idler gear	1
1404	Washer	1
1501	Change gear spline shaft	1
1502	Bottom gear (48-T)	1
1504	Change gear shaft housing	1
1505	Outside cover for bearing housing	1
1506	Ball bearing 6006	1
1507	Ball bearing 6204	1
1508	Spacer	1
1601	Spindle	1
1602	Driving button	1
1603	Inner spacer	1
1604	Spindle gear (86-T)	1
1605	Spindle gear (46-T)	1
1606	Feed drive gear (64-T)	1
1608	Rear bearing spacer	1
1609	Spindle check nuts	2
1610	Rear bearing cover	1
1611	Front bearing cover	1
1612	Taper roller bearing 32222	1
1612-1	Needle roller bearing N-222	1
1613	Taper roller bearing 32220	1
1614	Bearing spacer	1
1701	Gear shifter lever	3
1702	Lever	2
1703	Spring with steel ball	1
1704	Shifter lever pin	1
1706	Fork	1
1707	Stud	1
1708	Bush	1
1709	Bush	1
1710	Bush	1
1711	Washer	1
1752	Knob	1
1754	Shifter lever pin	1
1756	Fork	1
1757	Spacer	2

Drg. No.	Part Name	Qty.
1801	Feed reversing lever	1
1802	Fork	1
1803	Shifter lever pin	1
1806	Lever	1
1807	Washer	1
1901	Top cover	1
1902	Oil filling plug	1
1903	Oil drain plug	1
1904	Oil level indicator	1
1905	Side cover stud	2
1906	Side cover knob	1
1907	Side cover knob collar	1
1908	Side cover knob stud	1

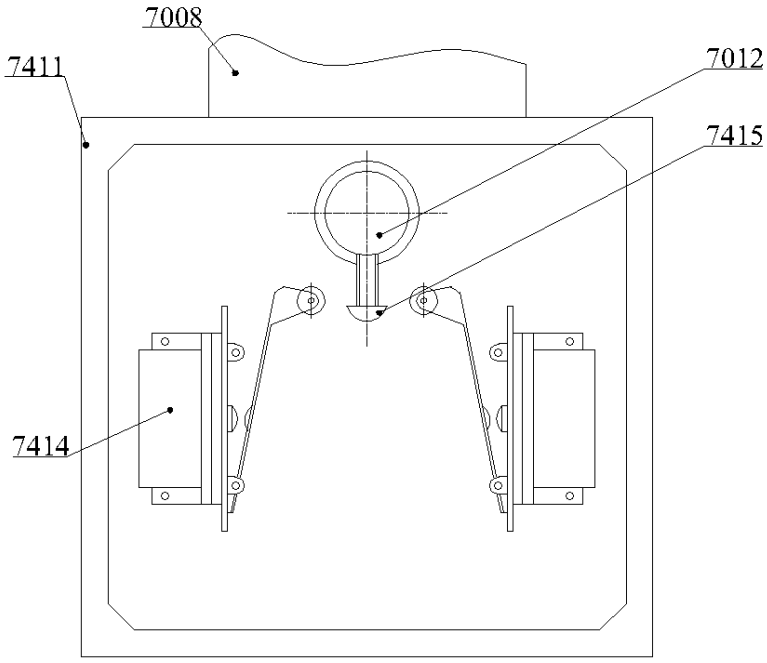
END FEED ASSEMBLY



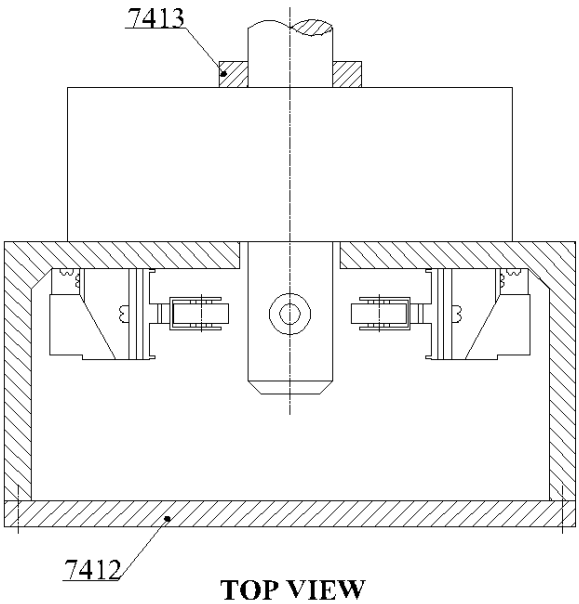
REVERS & FORWARD HANDLE ASSEMBLY



SWITCH SHAFT & LIMIT SWITCH ASSEMBLY



SIDE VIEW



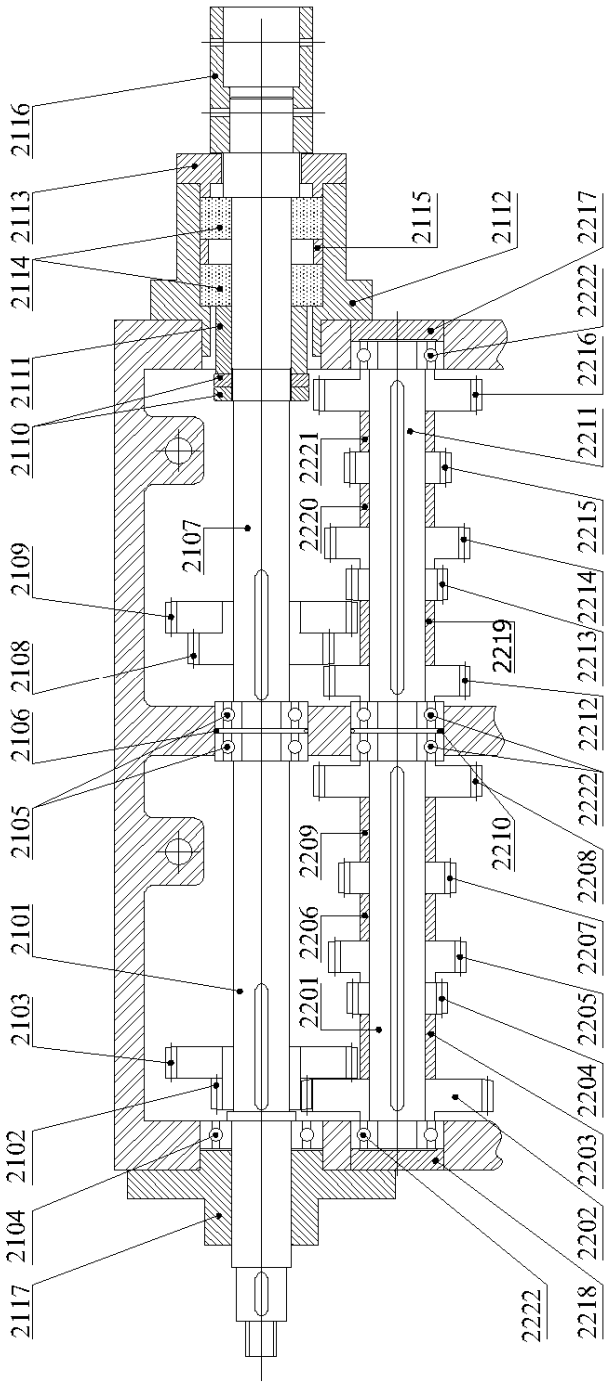
TOP VIEW

5.3 End feed assembly

Drg. No.	Part Name	Qty.
7001	Change gears (As per packing slip)	-
7002	Arm plate	1
7003	Arm plate stud	1
7004	G.M. Bush of arm plate stud	1
7005	Clamping stud of arm plate	2
7006	Norton gear box	1
7007	Lead screw	1
7008	Lead screw bracket (RH)	1
7009	Thrust bearing 09	1
7010	Gun metal bushes for lead screw brackets	2
7012	Switch shaft	1
7401	Guide plate	1
7402	Lock ring	1
7403	Lock pin	1
7404	Guide bush	1
7405	Spring	1
7406	Guide bush key	1
7407	Handle ring	1
7408	Hinge bolt	2
7409	Handle	1
7410	Plastic grip	1
7411	Limit switch box	1
7412	Limit switch box cover	1
7413	Limit switch collar	2
7414	Limit switch No. BPS22 RL (RH/LH)	2
7415	Operating dog bolt	1

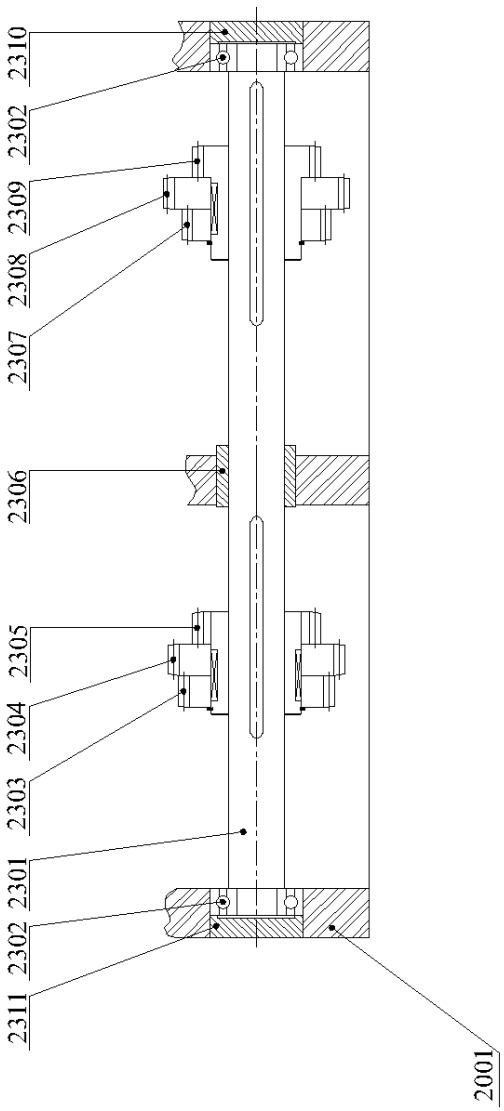
NORTON GEARBOX ASSEMBLY

(Top shaft & Middle shaft)

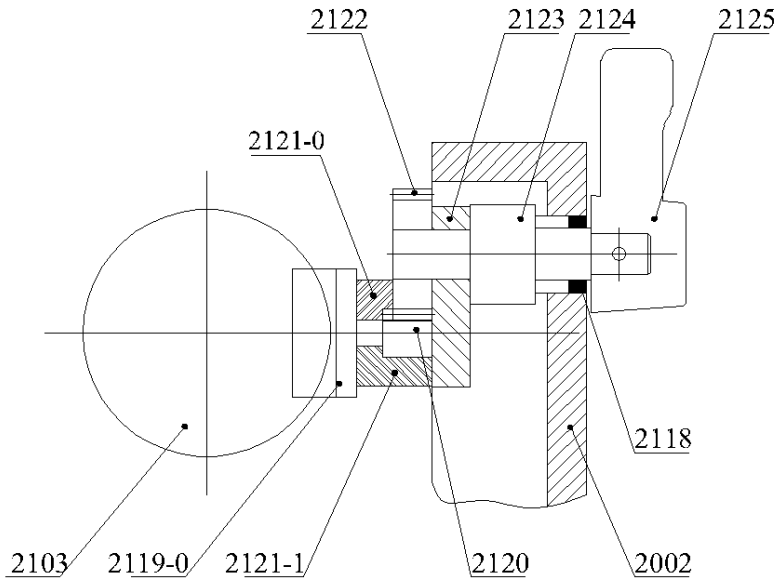


NORTON GEARBOX ASSEMBLY

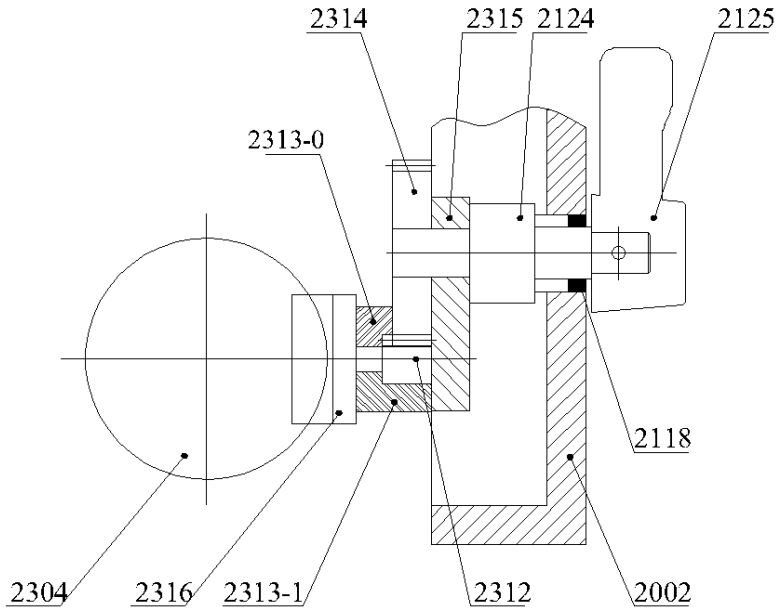
(Bottom shaft)



NORTON GEARBOX ASSMBLY

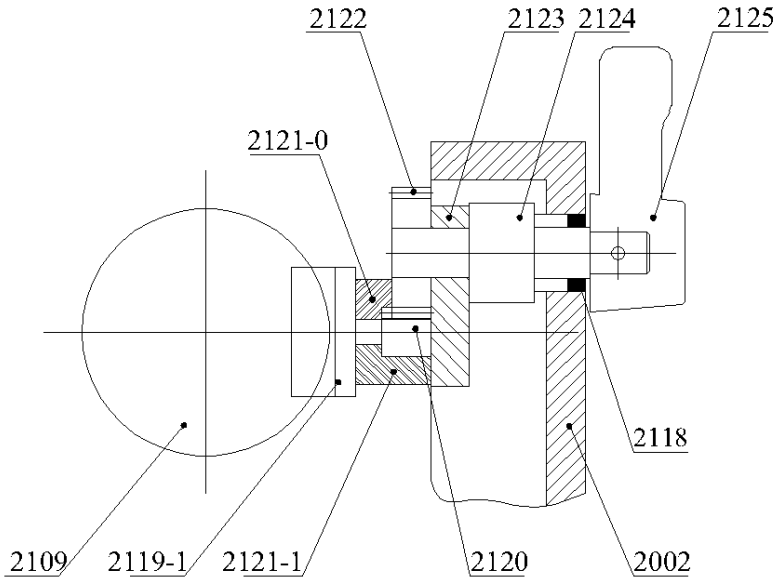


(Lever assembly for A-B position)

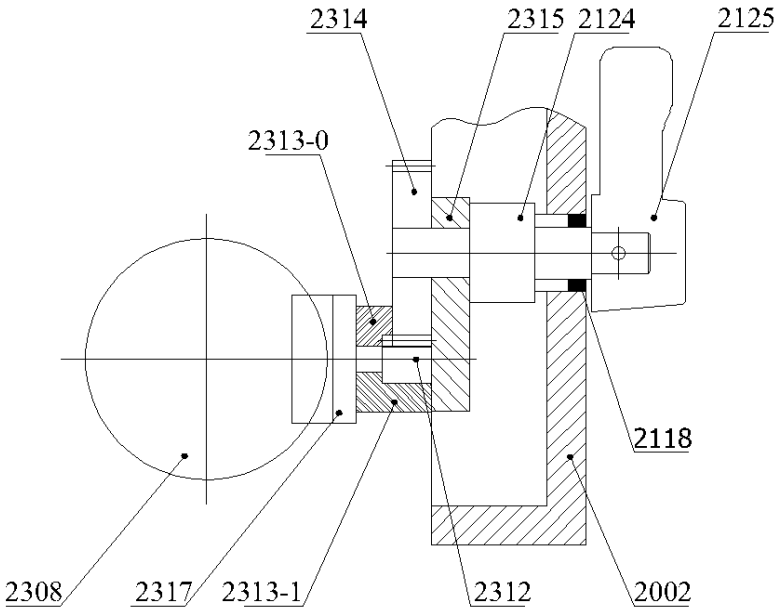


(Lever assembly for R-S-T position)

NORTON GEARBOX ASSEMBLY



(Lever assembly for C-D position)



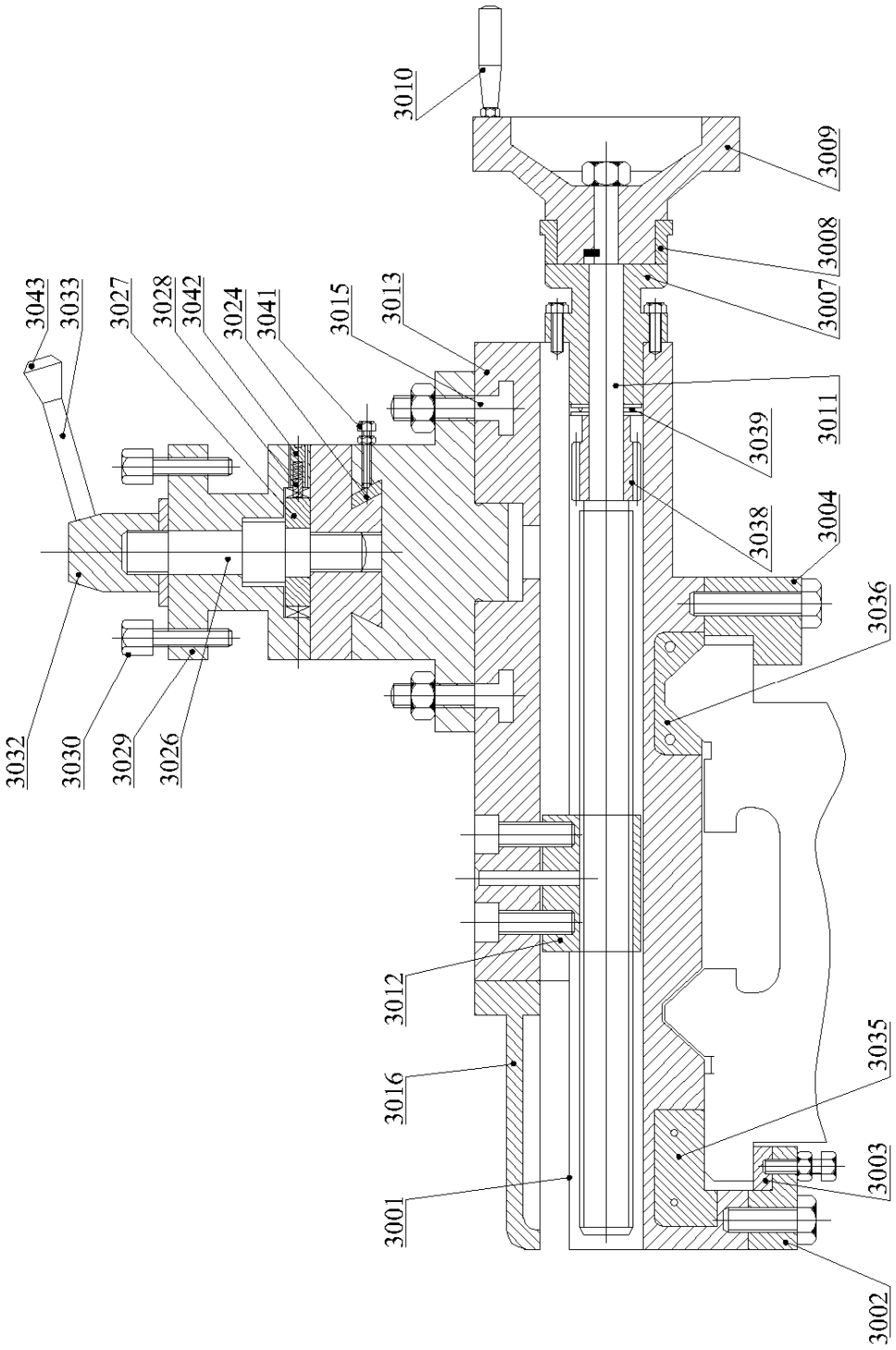
(Lever assembly for X-Y-Z position)

5.4 Norton gearbox assembly

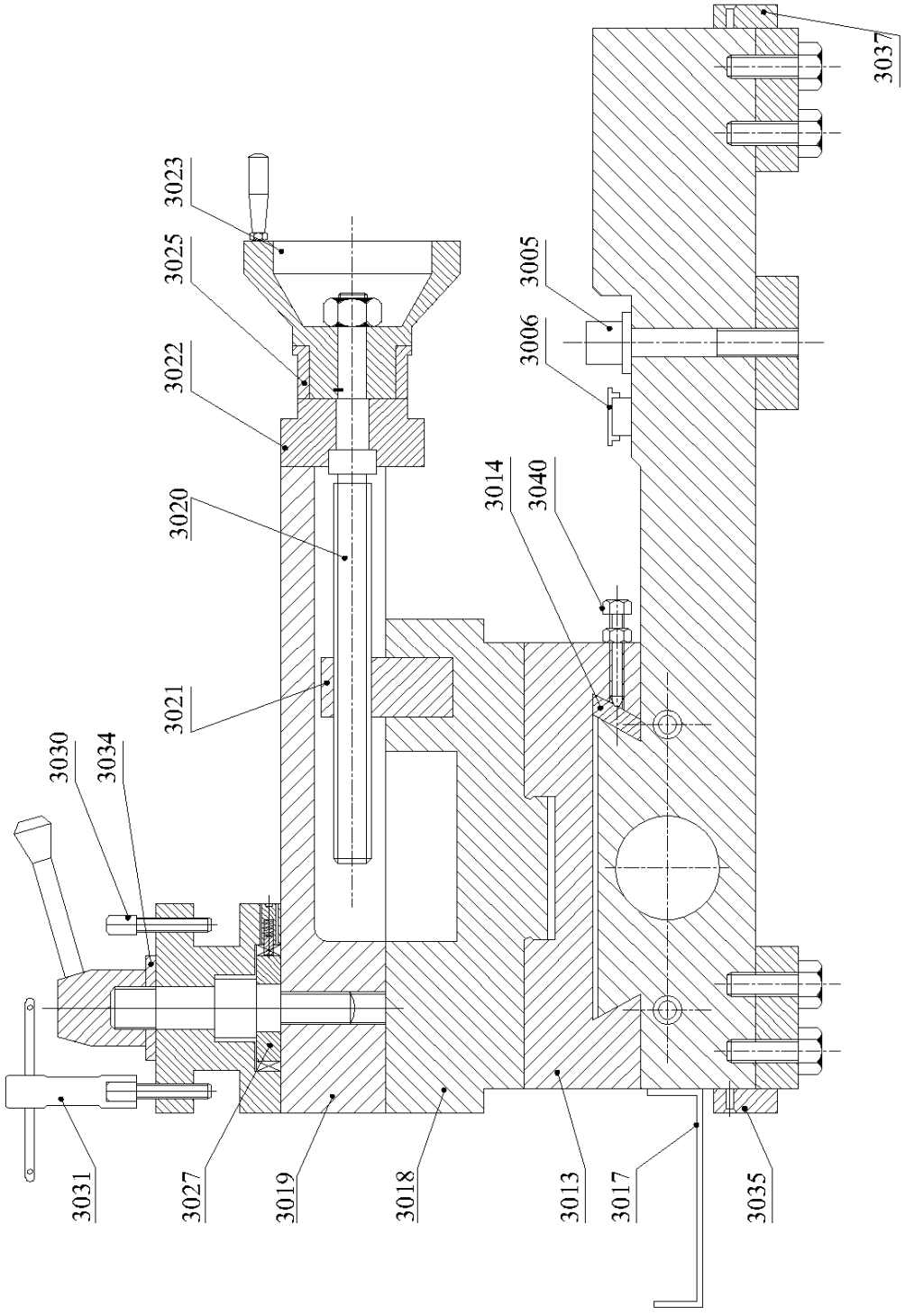
Drg. No.	Part Name	Qty.
2001	Norton gear box body	1
2002	Norton gearbox body cover	1
2101	Top shaft (LH)	1
2102	Gear (18-T,10-DP)	1
2103	Gear (36-T,10-DP)	1
2104	Ball bearing 6206	1
2105	Ball bearing 6204	2
2106	Bearing spacer	1
2107	Top shaft (RH)	1
2108	Gear (27-T,10-DP)	1
2109	Gear (36-T,10-DP)	1
2110	Check nut (KM-6)	2
2111	Spacer	1
2112	Lead screw housing	1
2113	Lead screw housing cover	1
2114	Tapper roller bearing 32206	1
2115	Bearing spacer	1
2116	Output shaft coupler	1
2117	Input shaft housing	1
2118	Oil seal (20-30-7)	4
2119-0	Fork	1
2119-1	Fork	1
2120	Rake (12-DP)	2
2121-0	Rake support	2
2121-1	Rake support	2
2122	Gear for shifting (22-T,12-DP)	2
2123	Guide plate	1
2124	Pin for shifter lever	4
2125	Shifter lever	4
2201	Middle shaft (LH)	1
2202	Gear (36-T,10-DP)	1
2203	Spacer	1
2204	Gear (18-T,10-DP)	1
2205	Gear (25-T,10-DP)	1
2206	Spacer	1

Drg. No.	Part Name	Qty.
2207	Gear (25-T,10-DP)	1
2208	Gear (32-T, 2.5-Mod.)	1
2209	Spacer	1
2210	Bearing spacer	1
2211	Middle shaft (RH)	1
2212	Gear (27-T,10-DP)	1
2213	Gear (18-T,10-DP)	1
2214	Gear (28-T, 2.5-Mod.)	1
2215	Gear (20-T,10-DP)	1
2216	Gear (32-T,2.5-Mod)	1
2217	Plug	1
2218	Plug	1
2219	Spacer	1
2220	Spacer	1
2221	Spacer	1
2222	Ball bearing 6204	4
2301	Bottom shaft	1
2302	Ball bearing 6204	2
2303	Gear (30-T,10-DP)	1
2304	Gear (33-T,10-DP)	1
2305	Gear (24-T,10-DP)	1
2306	G.M. Bush	1
2307	Gear (28-T,2.5-Mod.)	1
2308	Gear (35-T,10-DP)	1
2309	Gear (24-T,2.5-Mod.)	1
2310	Plug	1
2311	Plug	1
2312	Rake (12-DP)	2
2313-0	Rake support	2
2313-1	Rake support	2
2314	Gear (32-T,12-DP)	2
2315	Guide plat	1
2316	Fork	1
2317	Fork	1

CROSS SLIDE ASSEMBLY



COMPOUND SLIDE ASSEMBLY

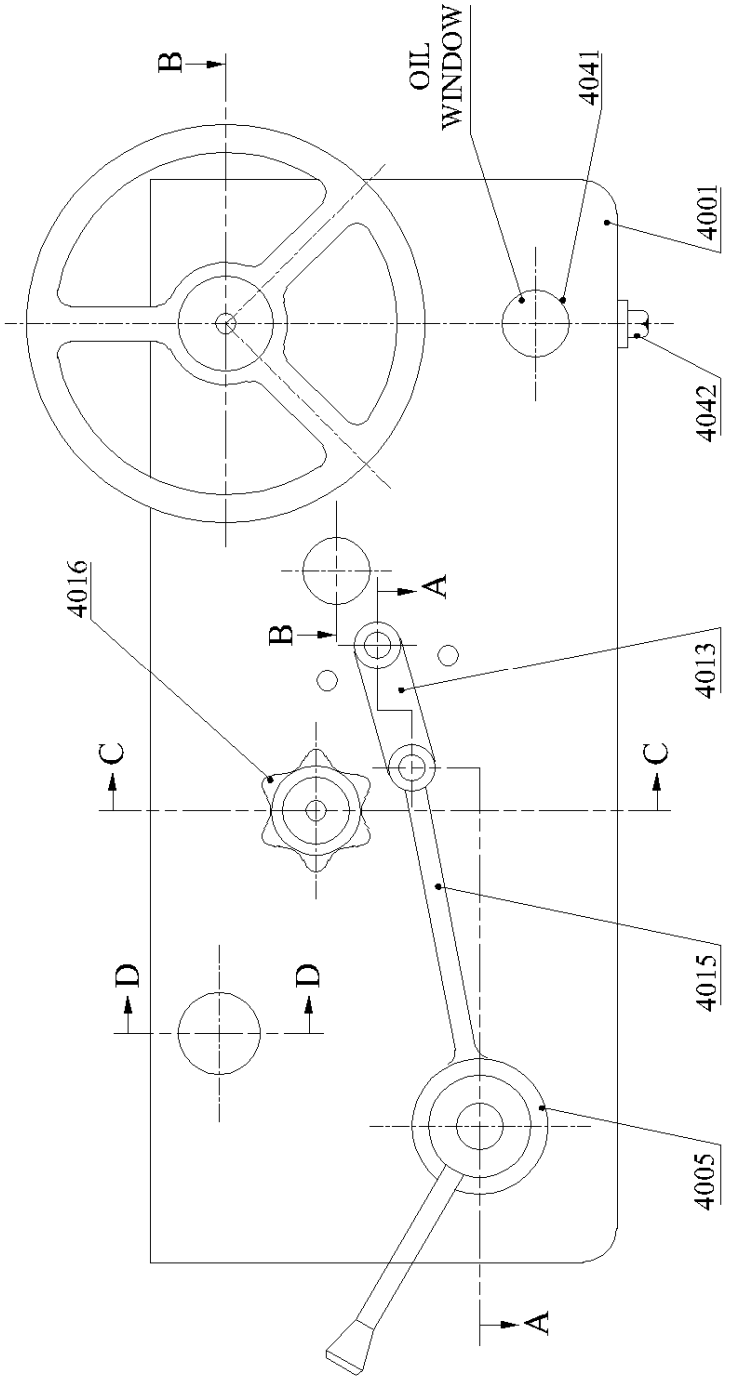


5.5 Carriage, Cross slide and Compound slide assembly

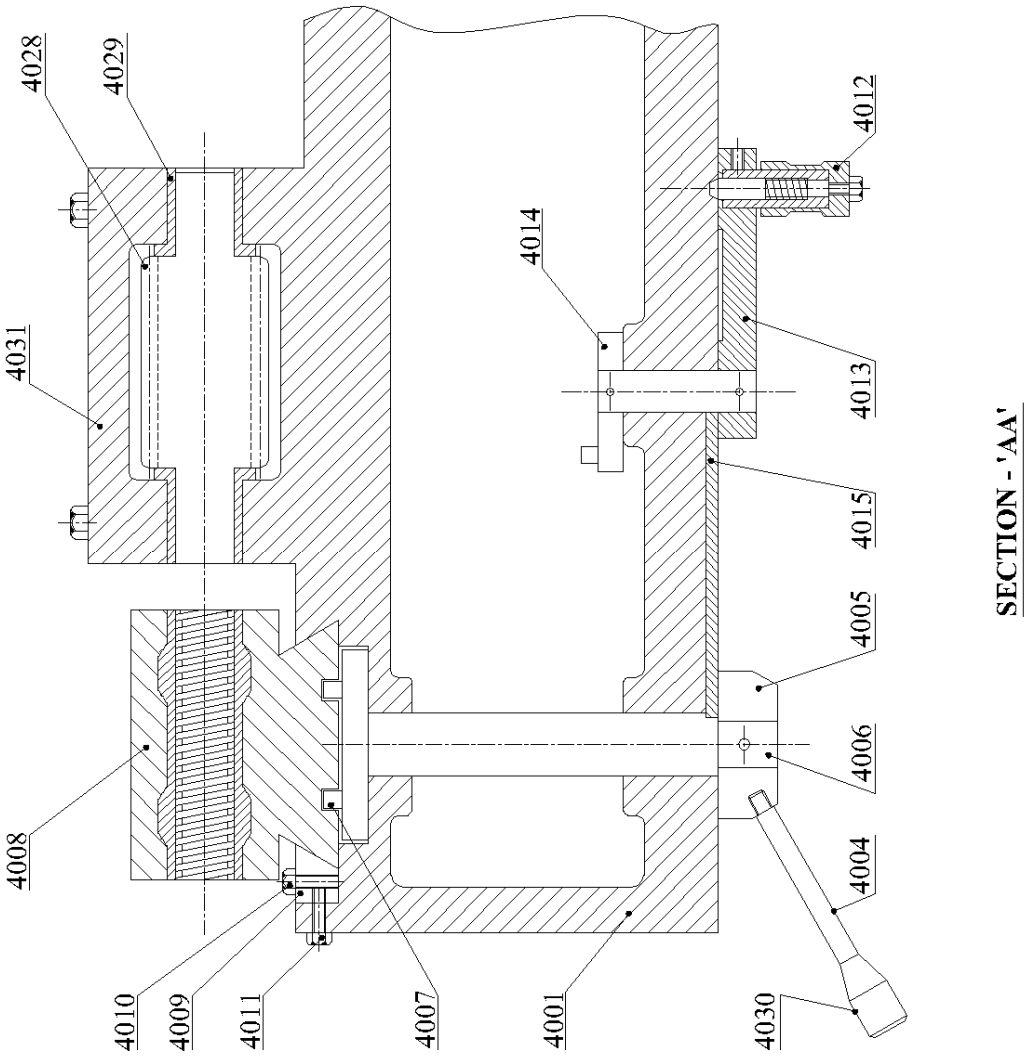
Drg. No.	Part Name	Qty.
3001	Carriage	1
3002	Rear keeper plate	1
3003	Setting wedge	1
3004	Front keeper blocks	2
3005	Clamping bolt	1
3006	Oil cup	2
3007	Cross slide boss	1
3008	Micro ring	1
3009	Cross slide hand wheel	1
3010	Plastic handle grip with stud	11
3011	Cross slide screw	1
3012	Cross slide screw G.M. nut	1
3013	Cross slide	1
3014	Cross slide wedge	1
3015	T-bolt	2
3016	Cross slide cover	1
3017	Chip tray	1
3018	Compound slide base	1
3019	Compound slide	1
3020	Compound screw	1
3021	Compound screw nut	1
3022	Compound screw boss	1
3023	Compound slide handle	1
3024	Compound slide wedge	1
3025	Compound slide micro ring	1
3026	Tool post stud	1
3027	Index ring	1
3028	Lock pin with spring	1
3029	Tool post	1
3030	Tool clamping bolts	8
3031	Tool post bolts key	1
3032	Tool post clamping boos	1
3033	Tool post clamping handle with plastic grip	1
3034	Washer	1
3035	Wiper LH flat	1
3036	Wiper LH & RH ‘V’	2

Drg. No.	Part Name	Qty.
3037	Wiper RH flat	1
3038	Cross slide screw gear (13-T)	1
3039	Thrust bearing	1
3040	Cross slide setting bolt	5
3041	Compound setting bolt	4
3042	Bolt for lock pin	1
3043	Bakelite knob	1

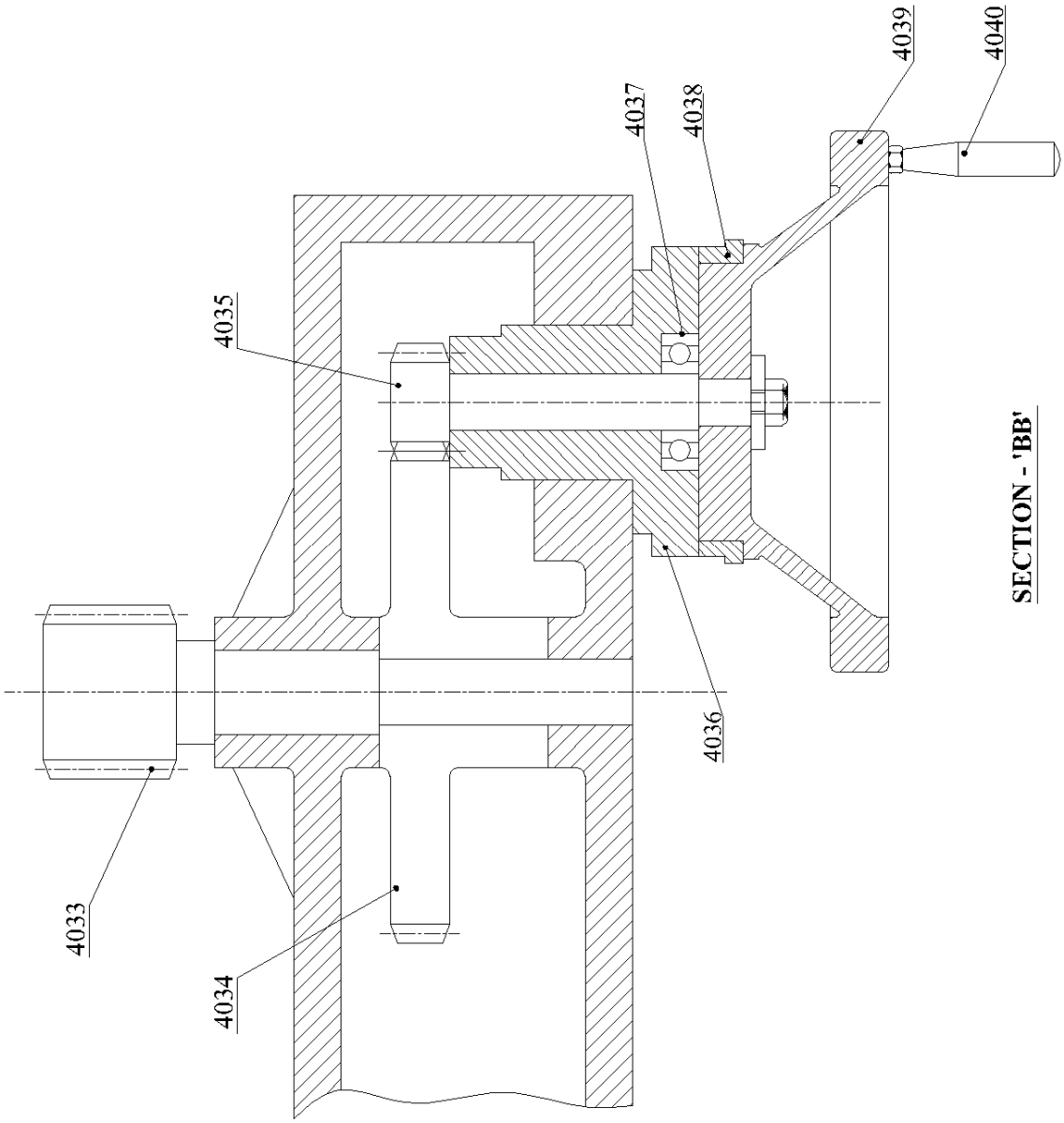
APRON



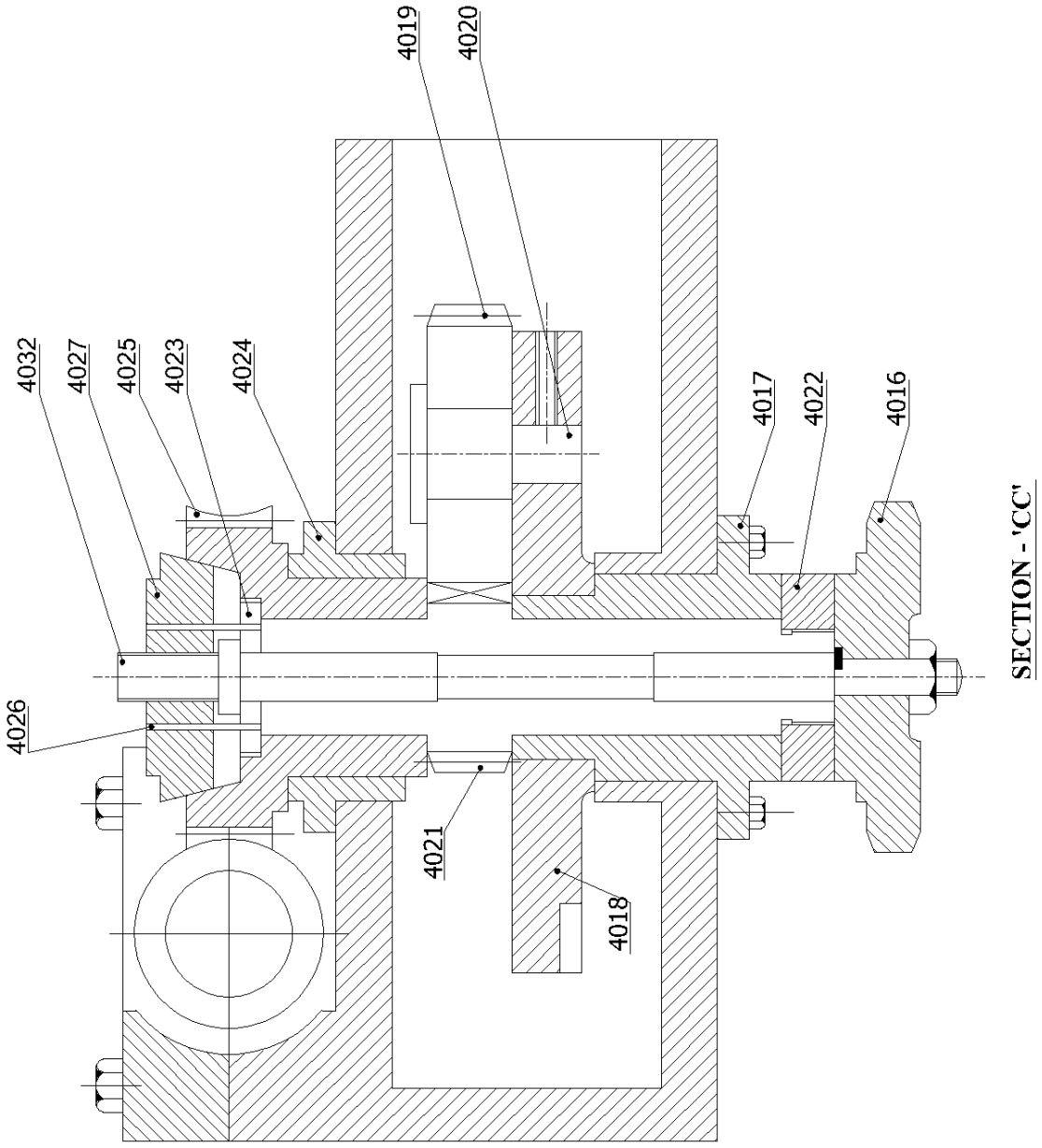
APRON ASSEMBLY



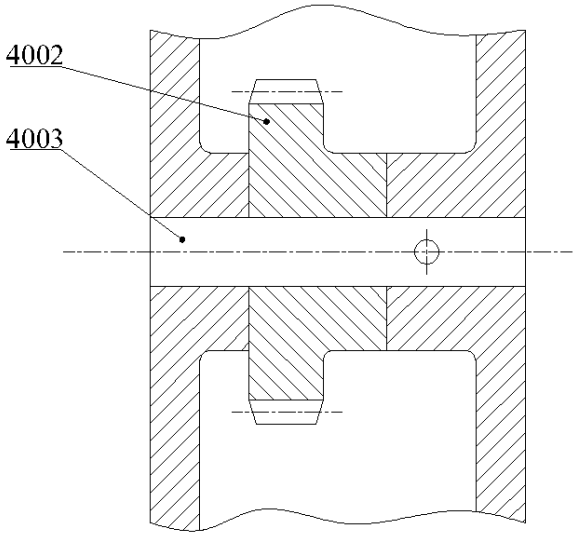
APRON ASSEMBLY



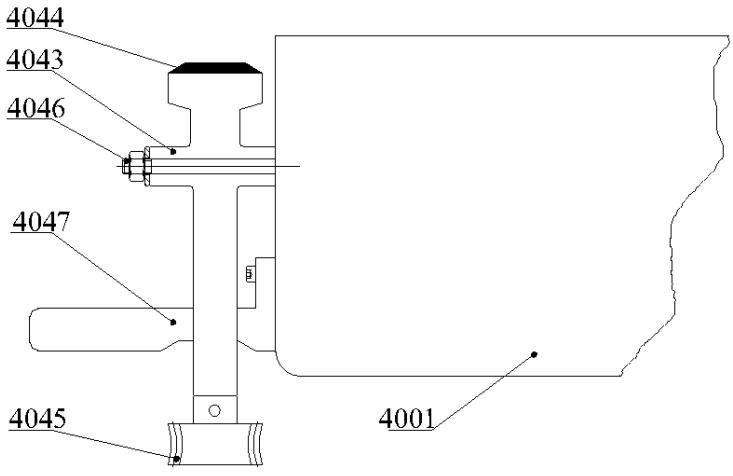
APRON ASSEMBLY



APRON ASSEMBLY



SECTION ='DD'



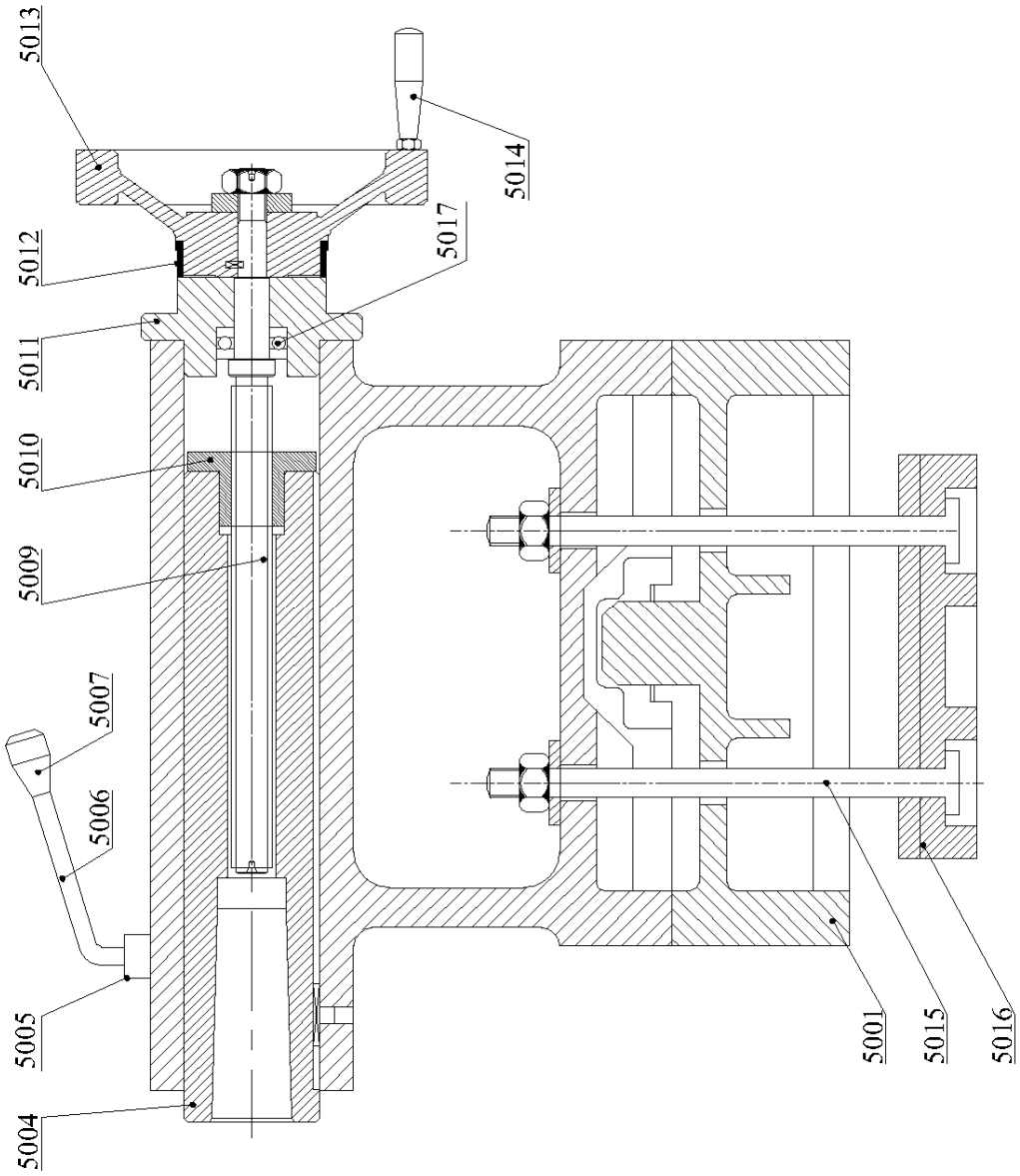
THREAD DIAL INDICATOR ASSEMBLY

5.6 Apron assembly

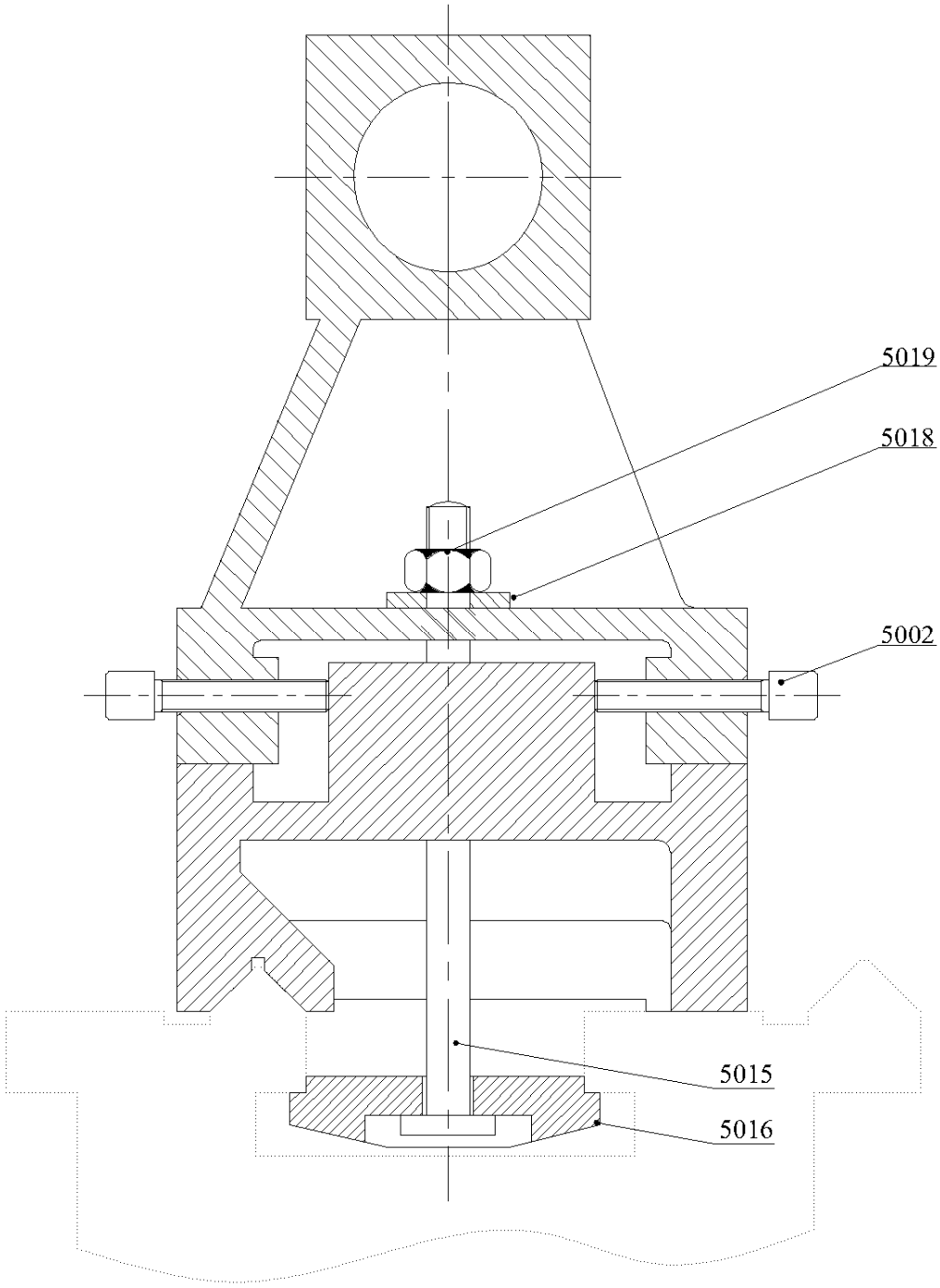
Drg. No.	Part Name	Qty.
4001	Apron body	1
4002	Surface feed gear (35-T)	1
4003	Surface gear pin	1
4004	Half nut engaging handle with plastic grip	1
4005	Half nut haft cap	1
4006	Half nut shaft	1
4007	Half nut operating cap with studs	1
4008	Half nut	1
4009	Half nut setting wedge	1
4010	Setting wedge clamping bolts	2
4011	Setting bolts for wedge	3
4012	Feed selecting handle with pin and spring	1
4013	Feed selecting lever	1
4014	Eccentric pin of feed selecting lever	1
4015	Inter locking key	1
4016	Feed engaging knob	1
4017	Feed engage shaft boss	1
4018	Connecting arm	1
4019	Connecting arm gear (25-T)	1
4020	Connecting arm gear pin	1
4021	Boss gear (18-T)	1
4022	Chuck nut for boss gear	1
4023	Washer	1
4024	Worm wheel support	1
4025	Worm wheel (29-T)	1
4026	Driving washer	1
4027	Taper washer	1
4028	Worm single start	1
4029	G.M. worm guide bushes	2
4030	Worm spacer	2
4031	Worm unit cover	1
4032	Feed engaging stud	1
4033	Rake pinion shaft (12-T)	1
4034	Gear (85-T)	1
4035	Hand wheel gear shaft (15-T)	1
4036	Gear shaft boss	1

Drg. No.	Part Name	Qty.
4037	Hand wheel shaft bearing 6204	1
4038	Micro ring	1
4039	Hand wheel	1
4040	Plastic grip with handle shaft	1
4041	Oil level indicator	1
4042	Oil drain plug	1
4043	Thread dial indicator body	1
4044	Thread dial indicator pin	1
4045	Thread dial indicator gear	1
4046	Thread dial indicator clamping stud	1
4047	Spacer	1
4048	Lead screw cover	1

TAIL STOCK ASSEMBLY



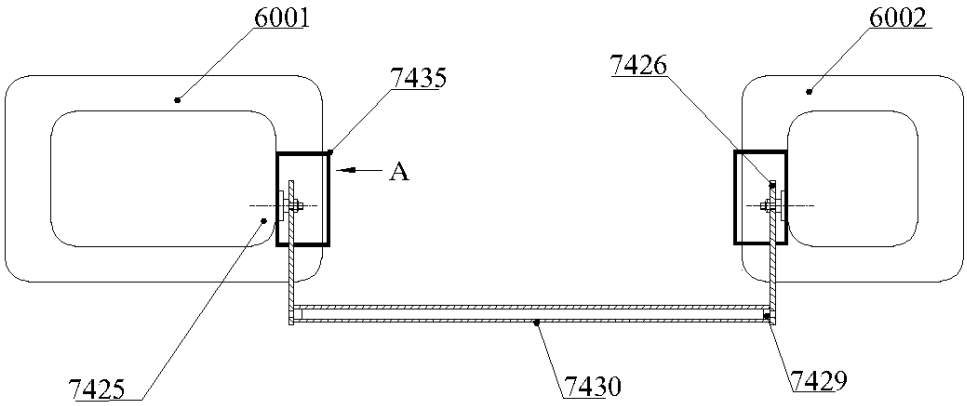
TAIL STOCK ASSEMBLY

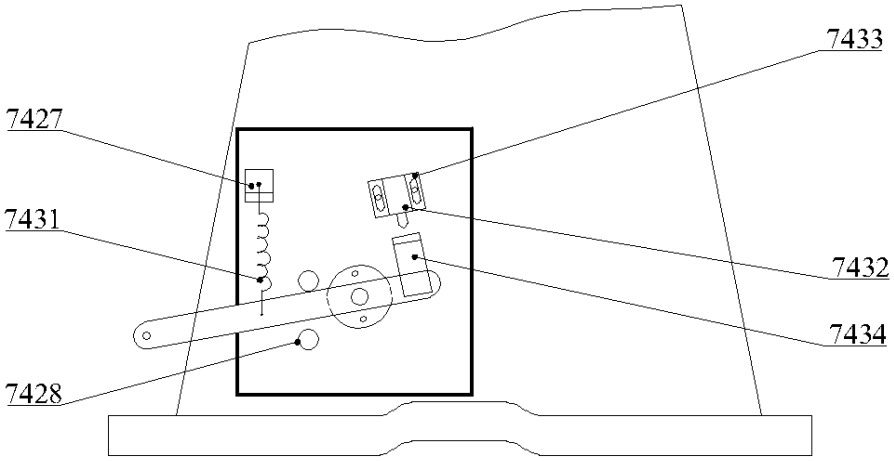


5.7 Tail stock assembly

Drg. No.	Part Name	Qty.
5001	Tail stock base	1
5002	Tail stock setting bolts	2
5003	Tail stock body	1
5004	Tail stock quill	1
5005	G.M. pad for tail stock quill clamping	1
5006	Tail stock quill clamping stud	1
5007	Plastic grip for handle	1
5008	Quill key	1
5009	Tail stock screw	1
5010	Tail stock screw G.M. nut	1
5011	Tail stock screw boss	1
5012	Micro ring	1
5013	Hand wheel	1
5014	Plastic grip for hand wheel with stud	1
5015	Tail stock clamping stud	2
5016	Tail stock clamping plate	1
5017	Thrust bearing 06	1
5018	Tail stock clamping stud washer	2
5019	Tail stock clamping stud nut	2

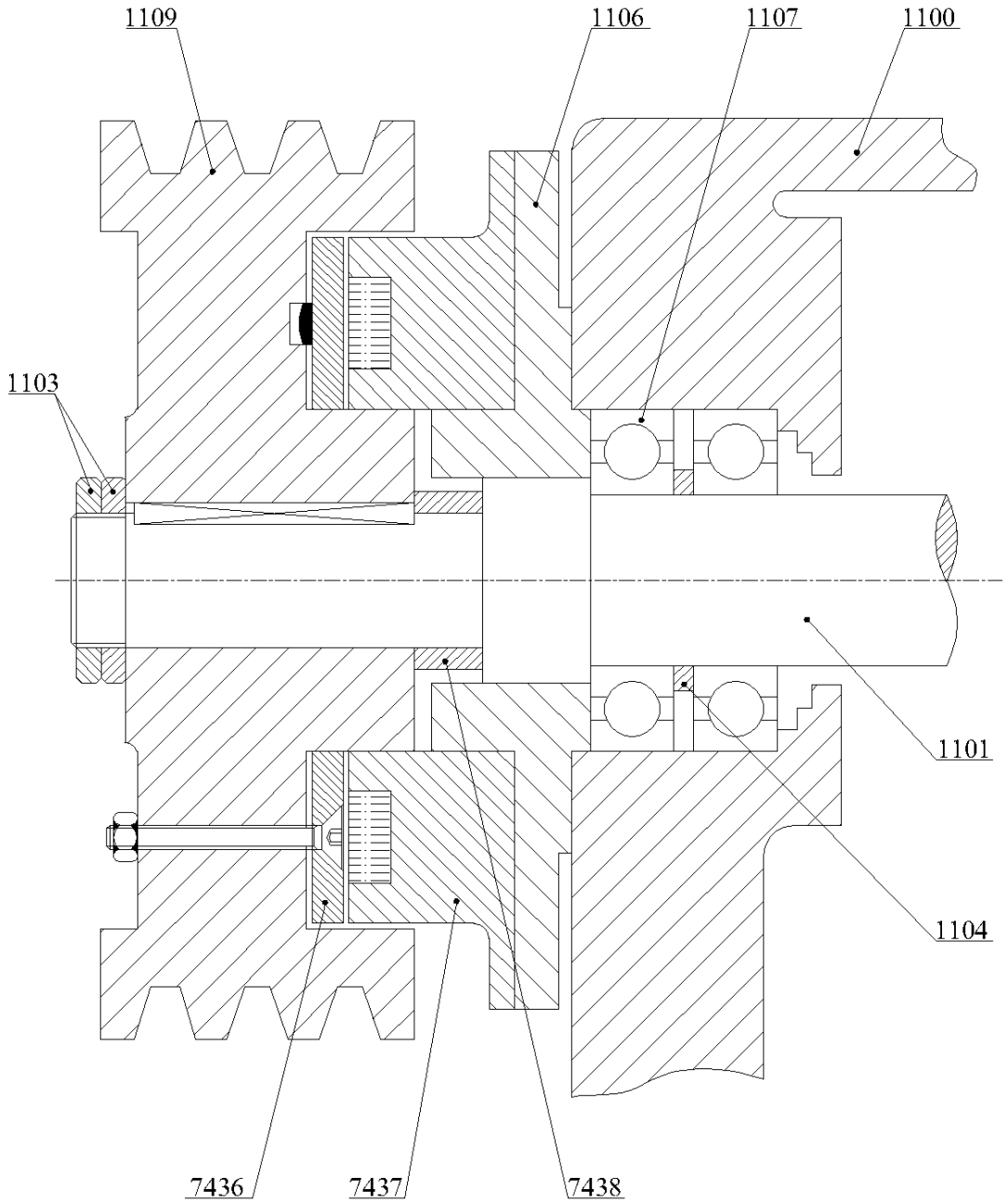
FOOT PADDLE ASSEMBLY





VIEW -A

ELECTRO MEGNETIC BRAKE ASSEMBLY



5.8 Foot peddle & brake assembly

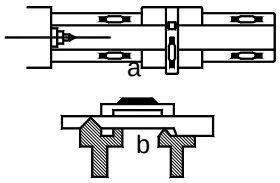
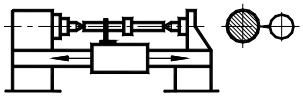
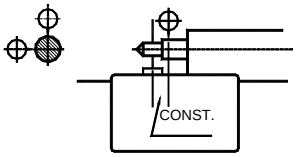
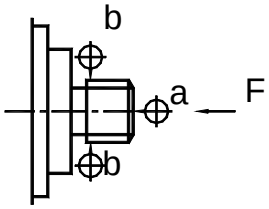
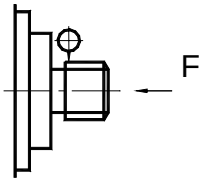
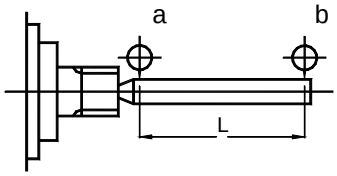
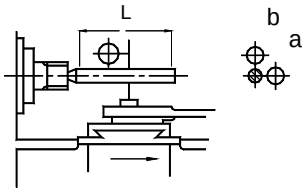
Drg. No.	Part Name	Qty.
7425	Pivot plug	2
7426	Strip	2
7427	Angle bracket	7
7428	Stopper bolt with nut	4
7429	Plug for pipe	2
7430	Pipe	1
7431	Spring	2
7432	Limit switch No. LSOS-C	1
7433	Limit switch setting plate	1
7434	Limit switch setting angel	1
7435	Foot pedal cover	2
7436	Electromagnetic brake disc	1
7437	Electromagnetic brake	1
7438	Spacer	1

5.9 Extra accessories

Drg. No.	Part Name
X001	Face plate
X002	Steady rest
X003	Steady rest body
X004	Steady rest clamp
X005	Follow rest
X006	Coolant pump with on/off switch
X007	Coolant tank
X008	Spout assembly
X009	Machine lamp
X010	Chuck flange
X011	Self centering chuck
X012	Dog chuck
X013	Rear splash guard
X014	Rear tool post with tool holders
X015	Revolving center
X016	Internal/External/Combine tool post grinder
X017	Electric motor for tool post grinder with switch
X018	Quick change tool post with 5 tool holders
X019	Key way cutting attachment
X020	Taper turning attachment

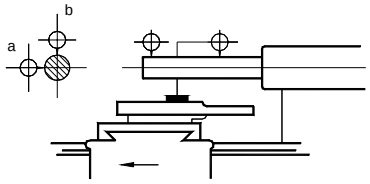
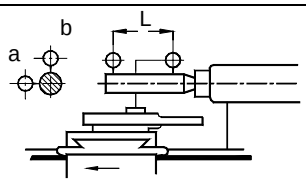
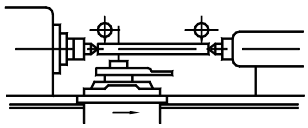
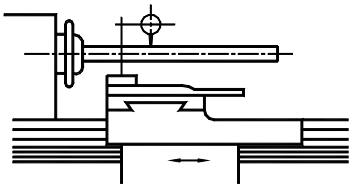
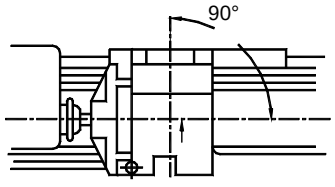
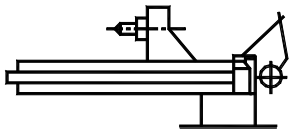
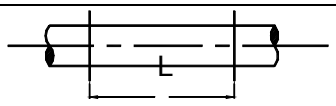
TEST CHART – GEOMETRICAL TEST

MODEL:	MACHINE No.:

Sr. No.	FIGURE	OBJECTS	PERMISSIBLE DEVIATIONS	Actual Error
01		Straightness of carriage slide ways (a) In longitudinal direction (b) In transverse direction.	(a) 0.03 mm (Convex) (b) 0.04	
02		Straightness of carriage movement in horizontal plane.	0.02mm	
03		Parallelism of tailstock movement to carriage movement (a) In horizontal plane (b) In vertical plane	(a) 0.03 mm (b) 0.03 mm	
04		(a) Periodic axial slip (b) Coming of the face plate mounting surface	(a) 0.01mm (b) 0.02 mm	
05		Run out or spindle nose	0.01 mm	
06		True running of taper bore of spindle (a) Near to the spindle (b) At a list. 300 mm	(a) 0.01 mm (b) 0.02 mm	
07		Parallelism of spindle axis to the carriage movement (a) In horizontal plane (b) In vertical plane	(a) 0.015/300 (towards tool only) (b) 0.02/300 (upwards only)	

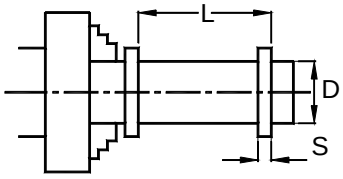
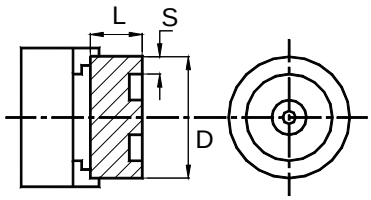
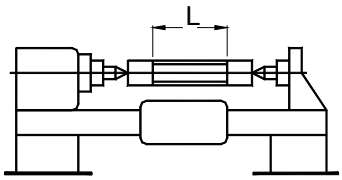
TEST CHART – GEOMETRICAL TEST

MODEL:	MACHINE No.:

Sr. No.	FIGURE	OBJECTS	PERMISSIBLE DEVIATIONS	Actual Error
08		Parallelism of external surface of tailstock sleeve to carriage movement (a) In horizontal plane (b) In vertical plane	(a) 0.015/100 (towards tool only) (b) 0.02/100 (upwards only)	
09		Parallelism of taper bore of tailstock sleeve to carriage movement (a) In horizontal plane (b) In vertical plane	(a) 0.03/300 (towards tool only) (b) 0.03/300 (upwards only)	
10		Difference in height between headstock and tailstock centre	0.04 mm (Tailstock centre higher than head stock centre)	
11		Parallelism of the longitudinal movement of the tool slide to the spindle axis	0.04/300 upwards only	
12		Squareness of the transverse movement of the cross slide to spindle axis	0.02/300 mm	
13		Axial slip	0.015 mm	
14		Accuracy of the pitch generated by the lead screw	(a) 0.04/300 (b) 0.015/50	

TEST CHART – PRACTICAL TEST

MODEL:	MACHINE No.:

Sr. No.	FIGURE	OBJECTS	PERMISSIBLE DEVIATIONS	Actual Error
01		Turning of cylindrical test piece held in chuck (a) Roundness (b) Cylindricity	(a) 0.01 (b) 0.04/300	
02		Facing of cylindrical test piece held in chuck (Flat or Concave only.)	0.025/300 dia.	
03		Thread cutting a cylindrical test piece (a) Deviation over length or 300 (b) Deviation over length of 50	(a) 0.04 mm (b) 0.015 mm	
04		Hardness of lathe bed (a) Standard bed (b) Flame harden bed	(a) 180 BHN min. (b) 300 BHN min.	

- **THE MACHINE CONFIRMS TO GRADE – 1 STANDARD OF ACCURACY AS PRESCRIBED BY D.O. (TOOLS)**
- **THE TEST CHART USED IS TO "IS:1878 (PART-1)-1971"**

TESTED BY : _____

INSPECTION DEPT.:_____

For,

Gujarat Lathe Mfg. Co. Pvt. Ltd.

Shapar (Dist. Rajkot)