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Admit between Center		
Bed Width		
Hight of Center		
Spindle Bore		
Machine No.	Year	Type

1. Do's & Don'ts

Do's

- Study the operation manual before put the machine in to the operation.
- Clean the machine properly
- Check the leveling and foundation
- Check the electrical system, connections, fusing system, other protection System, Earthing and ensure the direction of rotation on the motor
- Please check the lubrication system and ensure the level of the lubrications in the gear box
- Points of lubrication on the machine should be lubricated by recommended lubricants regularly.
- Declamp the slides which are required to move before any movements.
- Clamp all the slides which are need not to move.
- Ensure the clamping of cutter, fixtures and work piece before starting the machine
- Ensure the clamping of the supporting screw after each movements of the knee in vertical plan.
- Check the cleanliness of the machine.
- Follows the instructions from this manual during operation and maintainance.

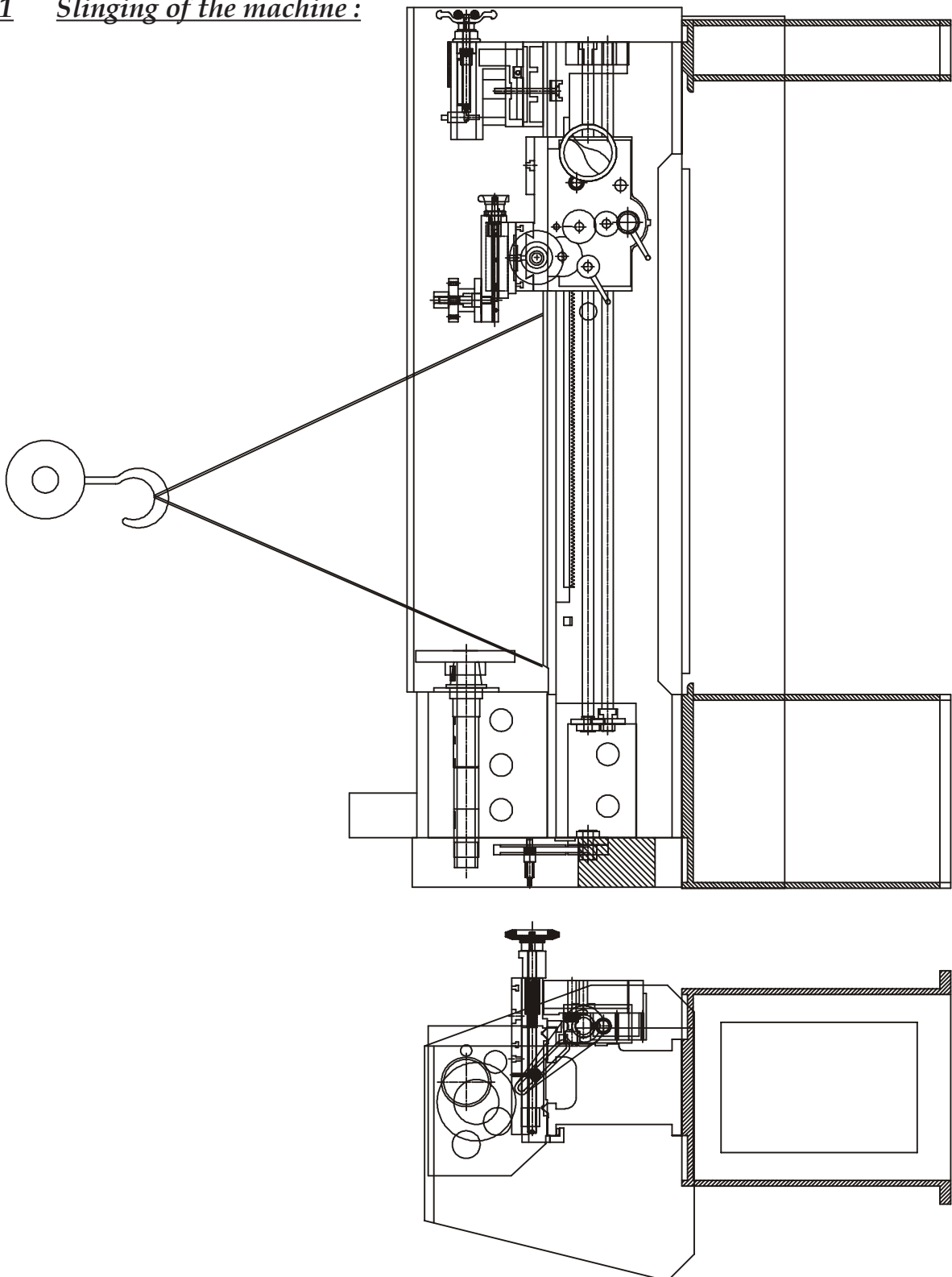
Dont's

- Do not shift the gears of the machine when it is in motion.
- Do not disturb the geometrical alignments and adjustments of the machine.
- Do not use improper quality and quantity of lubricants.
- Do not over load the machine.
- Do not remove fitting of the machine.

BRIEF SPECIFICATION OF LATHE MACHINE			
Specification	Model - 34	Model - 35	Model - 43
Center height	175 mm	175 mm	215 mm
Swing over bed	350 mm	350 mm	430 mm
Swing over cross slide	190 mm	200 mm	240 mm
Spindle nose	LOO Type	LOO Type	LO Type
Morse taper in spindle sleeve	M.T. 3	M.T. 3	M.T. 4
Spindle bore	38 mm	40 mm	53 mm
Power required	1 KW	2 HP	5 KW

3 Installation :

3.1 Slinging of the machine :



3.1 SLINGING OF THE MACHINE :

Figure 2 and 3 shows the lifting arrangement of LATHE MACHINE. To achieve balance tailstock and carriage should be moved to position shown and adjusted if required.

Item recommended lifting :

Hemp rope dia. 40mm x 16mm long. # Wooden blocks size: 100 x 100 x 200. # Quantity-1

3.2 CLEANING OF THE MACHINE :

Remove the anticorrosive coating from all side-ways, lead screw, rack & end train, etc, Using kerosene. Oil all bright machined surfaces immediately there after. Use heavy oil on the end gears. At the end of day work, clean machine carefully, do not use compressed air. Never use fluffy or cotton Waste. Though cleaning should be undertaken once a week after using very long production. Avoid uneven wear of the guide ways.

3.3 INSTALLATION :

The machine should be unstained at a place, which provides sufficient room for its operation and maintenance. (See figure on page 2) The lathes can be free standing on hard and stable shop floor. Depth of foundation Depends on quality of floor but should be 400mm (min).

Foundation bolts : Diameter 16 mm x length 400 mm

3.4 LEVELING :

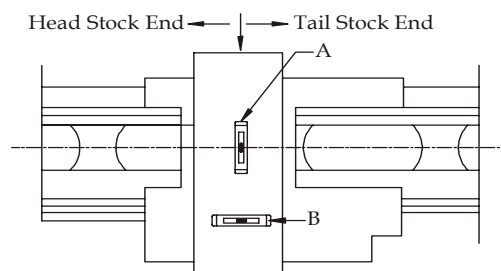
The machine should be geometrically leveled before it put in to the operation. Alignment taste and accurately to the values specified in the Taste chart of this machine, will shown after precision level. The foundation bolts are to be grouted and facilitate proper grouting. Between base plate and foundation. Foundation bolts should be tightened gently and uniformly without disturbing the level of the machine. Recheck bed level after tightening the foundation bolts. Periodically check bed level to ensure contained lathe accuracy.

Use spirit level accuracy of 0.05 mm/mt. (RSK Japan, Mitutoyo or Equivalent)

The machine must be leveled accurately to the values specified in the test chart (supplied along with the machine). Use precision level graduated to 0.02 mm per meter (SRK Japan make or equivalent). Follow the procedure given below for accurate leveling.

Transverse Level A :

- Keep the precision level on cross slide transverse position. (A)
- Take the carriage to head stock end, adjust the bubble in precision level approximately as per shown in centre by adjusting leveling bolts.
- Move the carriage to tailstock end, and adjust the bubble as per same reading shown near headstock end, by adjusting the leveling bolts.
- Make both the readings at headstock end and tailstock end to be identical and same. NO
- TWIST OF BED IS PERMITTED.



Longitudinal Level B :

- After setting the Transverse level as per (A) Do not adjust the leveling bolts
- Move the carriage to the centre of bed.
- Put the precision level on cross slide top on front 'V' of bed in longitudinal position (B).
- Ensure the bubble position approximately at the centre of the level. Use: Thin paper, if required for marking.
- Move the carriage near to headstock and then to tailstock side and ensure the variation.
- Recheck the transverse level.

After properly leveling the machine, run the machine for about 2 hours at various speed and check levels. Reset if required.

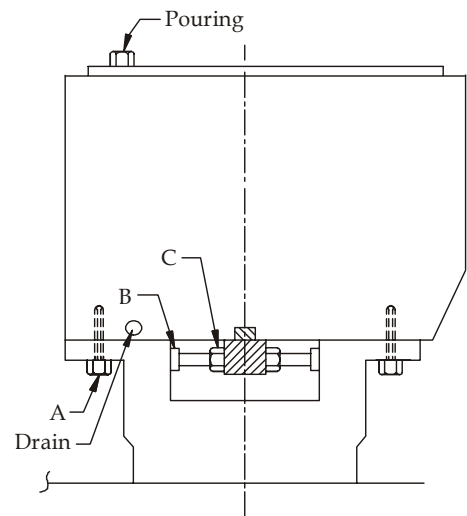
Then the foundation bolts are grouted in the large holes, with 1:3 cement and sand mixture. Sufficient time should be allowed for the concrete to cure (3-4 days). The foundation bolts are tightened gently. Periodically check up bed level to ensure continued lathe accuracy.

3.5 LUBRICATIONS IN LATHE MACHINE :

3.5.1 HEAD STOCK :

Head stock drive is splash lubricated, with oil stored inside head stock. The channel is connected to front and rear bore at the top for proper lubrication of spindle bearings. Oil shows up in level glass at the side of head stock.

Oil pouring is from top cover 1/2 bolt and drain points are at left side of head stock. Change oil every 8 months. Maintain the oil level and use always servo system 32 grade oil or equivalent. Use of incorrect grade of oil cause damage.

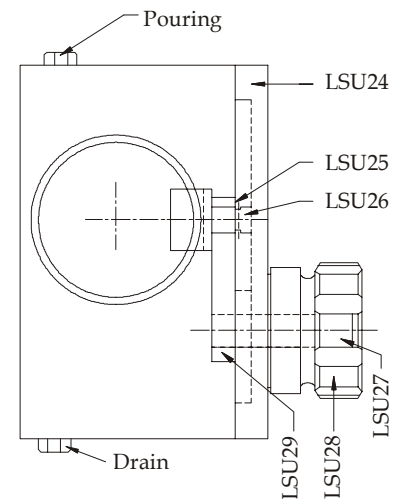


3.5.2 FEED GEAR BOX :

All drive elements in the feed gear box are splash lubricate. Oil pouring and drain points are at top and beneath to gear box. Oil silted glass is to maintain the level in feed gear box. Use servo gear oil H.P. 90 or equivalent.

3.5.3 APRON & CARRIAGE :

Carriage oil cup is given for saddle guide ways are lubrication an oil gun twice a day. An oil hole in apron at right hand to pour sufficient oil till the level. There is a drain plug in the beneath of apron. The dial indicator should be lubricated use servo gear oil H.P. 90 or equivalent. A daily Oil hole is also given in front of Apron face.



3.5.4 END GEAR TRAIN :

Pour oil on the end gear train everyday by an oil gun. Use servo gear oil H.P. 90 or equivalent. Following area's and item's are lubricate through oil nipple's everyday by oil gun.

- Cross slide ways.
- Cross and Compound slides screws, housing and bracket.
- Tail - stock quill, screw and bracket.
- End bearing bracket.
- Compound slide ways.
- Lead screw and feed rod.

Make	Oil Grades		
	Indian Oil Corporation Ltd.	Servo System 32	Servoway 68
Castrol	Hyspin VG 32	Magna BD/68	
H.P.C.L.	Enkol 32	Waylube 68	

3.6 **CHUCK & FACE PLATE :**

WARNING: GREY CAST IRON CHUCKS MUST NOT BE FITTED ON THIS HIGH SPEED LATHE. USE ONLY DUCTILE IRON CHUCK.

When fitting chucks or face plates. first ensure that spindle and chuck thread are scrupulously cleaned.

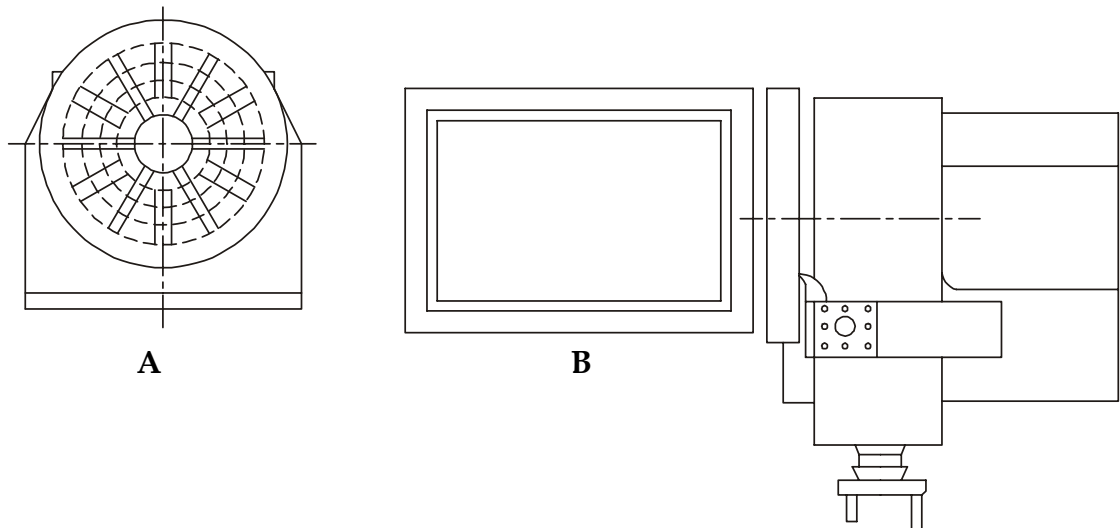
CONVENIENT CHUCK SIZE : # Self centering chuck 200 mm
 # Four Jaw independent chuck 305 mm

IMPORTANT :

Cast iron chuck plate should not be run at a surface speed more than 16 mt/sec.

EXAMPLE :

For a face plate of dia 30 mm limiting speed is $N = 16 \times 1000 \times 60 / 3.14 \times 430 = 711 \text{ RPM}$
INSTRUCTION FOR FINISH TURNING & FACE GROOVING OF FACE PLATE AT CUSTOMER END



A : FOR TURNING

1. The face plate on spindle nose and clamp if properly
2. Run the spindle with the suitable R.P.M.
3. Remove the out cut on O.D. and face
4. Take a finish cut on O D and face with 0.1 mm Depth of cut ensure vibration free finish
5. Chamfer O.D. and bore.

B : CIRCULAR GROOVING ON FACE FOR BETTER GRIPPING

1. Mount 60 degree "V" tool in tool post.
2. Put first groove at a distance of 15 mm
3. Put all equally spaced at a distance of 10 to 15 mm
4. Debar Slots.

4 OPERATION :

4.1 SPEED SECTION :

Main spindle R.P.M. is selected through three shift levers situated on the head stock. The various speeds obtained for different lever positions are tabulated on front of the head stock.

Sudden reversal at speeds above 100 rpm is not recommended

DO NOT MOVE SPEED CHANGE LEVERS WHILEST THE SPINDLE IS IN MOTION.

4.2 THREAD & FEED SELECTION :

All threads and feeds directly available from Feed gear box are given on the name plate fitted at the end cover. With the settings of control lever and change gears.

4.3 THREAD DIAL INDICATOR :

4 TPI Lead Screw

CHASING	DIAL	USED	INCHES
(A)	ENGAGE AT ANY	WHERE	4 - 8 - 12 - 16 - 24 - 32 - 48 - 60
(B)	ENGAGE AT ANY	LINE	6 - 10 - 14 - 18 - 22 - 26 - 30 - 54
(C)	ENGAG EAT ANY	NUMBER	3 - 5 - 7 - 9 - 11 - 13 - 19 - 23 - 27
(D)	ENGAG EAT OO	ONUMBER	4.5 - 5.5 - 6.5 - 7.5 - 9.5 - 11.5
(E)	DIAL CANNO TBE	USEO	2.25-2.75-3.25 & m.m. PITCH
MOTOR REVERSE - FORWARD			

6 mm Lead Screw

CHASING DIAL USED FOR MM PITCH	
Gear	Pitch in MM
14	7 - 3.5 - 1.75 - 1.4 - 0.7 - 0.35
16	8 - 6 - 4 - 6 - 1.5 - 0.8 - 0.75 - 0.5
18	9 - 4.5 - 2.25 - 0.9 - 0.45 - 0.225
20	10 - 5 - 2.5 - 1.25 - 1 - 0.5 - 0.025
22	11 - 5.5 - 2.75 - 1.375 - 0.55 - 0.11
ENGAGE AT ANY WHERE ONLINE ANY NUMBER & ODD NUMBER	
DIAL CAN NOT TO BE USED INCH MODULE DP THREAD	

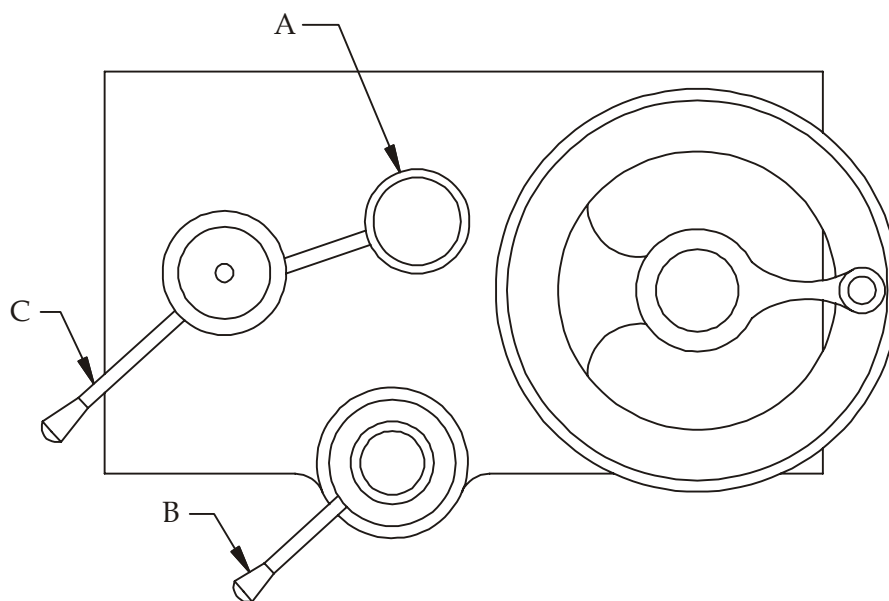
While cutting lengthy screws, the half nuts required to be disengaged at the end of each cut to bring the carriage quickly to the starting position for subsequent cut. This indicator is useful to engage the half nuts at correct time, while cutting screws during beginning of each cut. So that the tool will follow original helix that is formed during previous cuts.

The recommended graduations on the dial in the column 3 coincide with the fixed point on the bracket. This dial indicator is not useful for cutting other pitches Metric, Module and DP thread. While cutting these threads the tool should be with drawn without disengaging the half nuts ant the end of each cut and spindle rotation should be reversed to bring the carriage (tool) to the starting position for subsequent cuts.

4.4 APRON CONTROLS :

In addition to hand wheel operation, the saddle can be power operated through controls on front to apron (see fig. 4) "Plunger" knob "A" selected power sliding. Surfacing feeds or neutral condition. Lever "B" is moved upward for power feed engagement and downward for manual operation. Lever "C" is moved upward to engage the lead screw half nut for screw cutting lever "A" & "C" are interlock against simultaneous engagement. Lever on head stock should be used for right or left hand thread cutting.

A safety clutch is built in the apron which disengaged power feed on excessive over loads or moving against bed stop. The setting of the clutch is done at our works and should not normally disturbed.

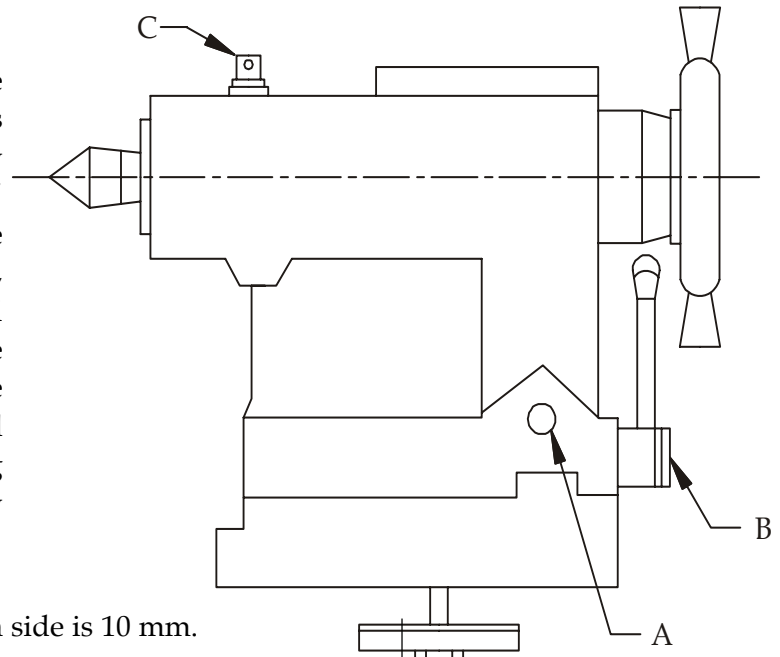


4.5 COMPOUND SLIDE :

Compound slide is fixed stud type and is more rigid type of design where stud is integral with the compound slide. Compound slide be tilted to any angle for short taper turning.

4.6 TAIL STICK :

Tail stock can be set over the production of shallow tapers or for realignment by adjustment of the screw "A" (see fig. 5). At both side of the base. Before adjustment, release the clamping bolts and loosen screw "B" beneath the tail stock which hold the base to main casting. The quill locked by lever "C". a tang slot in quill permits heavy drilling from tail stock .

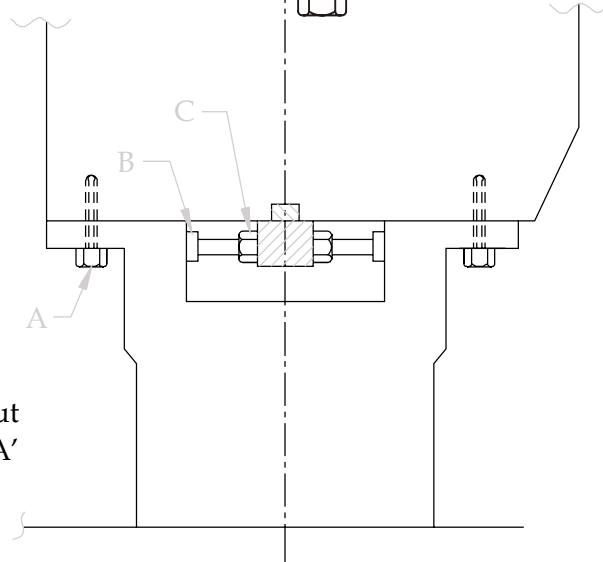


Note : Maximum off setting on each side is 10 mm.

5 SERVICING MAINTANANCE :

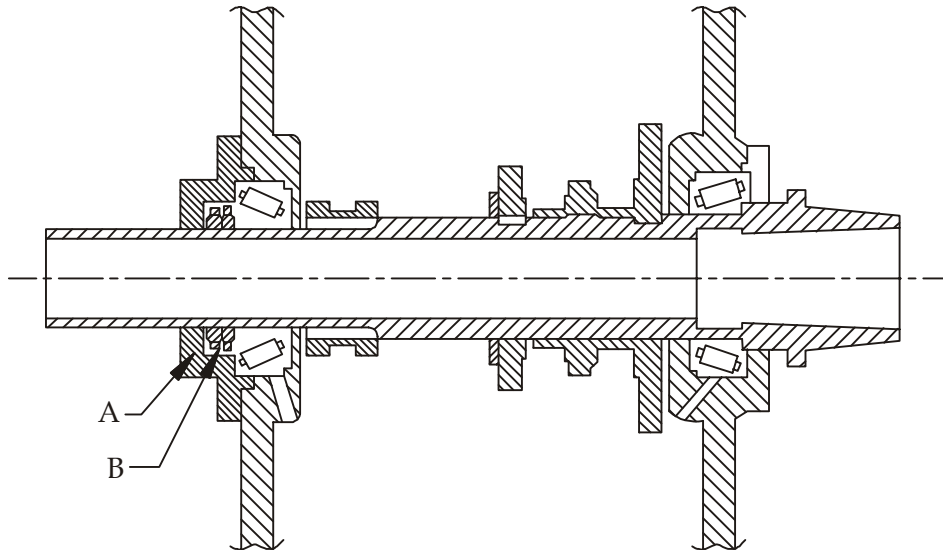
5.1 HEAD STOCK ALIGMENT :

Loosen the four fixing screws 'A' and nut 'C' adjust hex bolts 'B'. Tight screw 'A' and nut 'C' after adjustment.



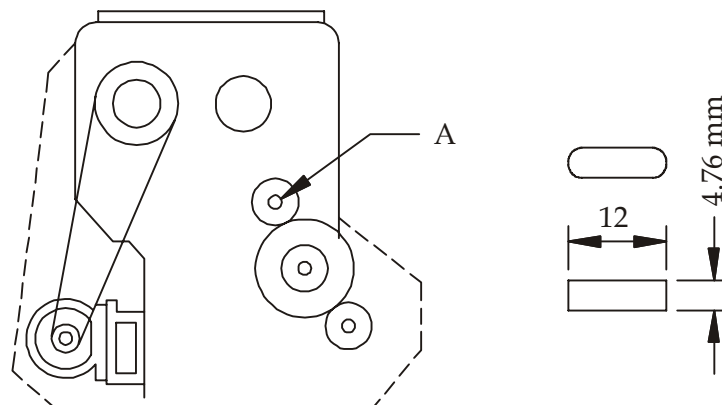
5.2 MAIN SPINDLE BEARING :

Main spindle is mount on two opposed taper roller bearing to adjust the spindle bearing remove cap "A" (see figure) and tighter ring nut "B" such that spindle rotates by hand with a light drag.



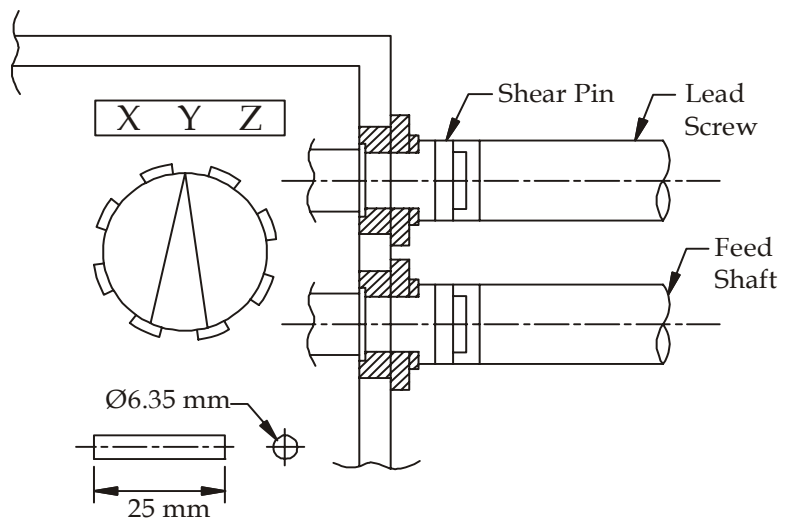
5.3 END GEAR TRAIN :

Gear 'A' in Fig.8 is drive through an aluminum safety key Which should cut of in case of excessive lead of any accident of feed gear or end train drive. The sheared key should be replaced by new key of aluminum alloy of dimension as given in below figure.



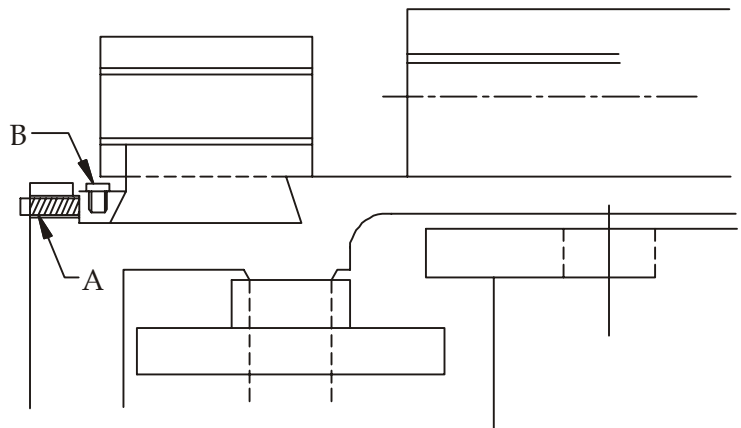
5.4 LEAD SCREW & FEED SHAFT SHEAR PIN :

It shear pin given way because of excessive load on lead screw and feed shaft, slide away the broken shear pin. Align the holes of lead screw and feed shaft to insert new shear pin. Dimensions and material specification of shear pin are given in figure.



5.5 APRON :

The half nut guide way play is reduced by adjusting the screw 'A' after loosening the screw 'B' see figure.



5.6 GEAR NOISE :

In spite of the monumental research work done the subject given noise (as well as measures for it's reduction) is one of the least understood areas of gear technology. Even if all the relevant machining instructions, tolerances, and other factors are observed faithfully, these is no guarantee that a noiseless gear set will result. Generally speaking, the noise level at the work place should be as possible. In case of various gear drives, certain guiding values for intensity of sound can be given which have been measured at a distance of 500 mm. And which are usually encountered in industries. Rigid standards for permissible gear noise have not been made, but the "American Gear Manufacturers Association" (AGMA) has given the following provisional noise limit for high speed helical and herringbone gear-sets.

- (1) 107 db between 20 and 75 Hz
- (2) 99 db between 75 and 150 Hz
- (3) 94 between 150 and 300 Hz

(Here db (decibel) is the unit of sound level and Hz (hertz) for the frequency.)

5.7 POSSIBLE OPERATIONAL DIFFICULTIES AND REMEDIES :**CAUSE OF INACCURATE TURNING :**

Almost always the cause of inaccurate turning is faulty alignment of lathe. The importance of accurate alignment and proper grouting cannot there for be over looked if, in spite of this, inaccurate turning occurs after some time, it is possible that the gibbs of the slides or the nut of the cross slide screw require adjustment, provided always that the cutting tool is properly clamping and does not vibrate. Chattering on lathes especially when turning overhang, can be avoided by changing the speed and feed as the possible that in this case the critical speeds of machine and work piece ate the same. If a change if feed or speed does not step the chattering, it may be due to any of the following reasons.

- To employ proper speed and feed.
- Improper leveling of the lathe.
- The work-piece is over hanging too far; a steady rest should be used.
- Slender components being machined without proper supports by steady rest.
- The legs are not properly grouted.
- Back plate of chuck not fitted properly.
- The gibes of the slide need adjustment.
- Dirt between spindle nose taper and center-holder.
- The cutting tool overhanging too far.
- The cutting tool is not clamped firmly.
- Un-balanced fixture of work-piece cause vibrations especially at high speed.
- Check the cooling and the coolant.

SPINDLE RUNS TOO TIGHTLY AND BEARINGS BE COME TOO HOT IN THE HEAD STOCK.

1. Check the bearing lubrication portion and see whether it needs to be or not. Use recommended grade of oil.
2. Loosen the check nuts of spindle and adjust the bearing.

5.8 LOCATION AND SPECIFICATION OF BEARINGS IN LATHE MACHINE :

No.	Type Of Bearing	Code No.	Size	No. Of Bearing		
				HS	AP	B
01	Ball Bearing	6202	15x35x11	00	01	00
02	Ball Bearing	6003	17x35x10	02	00	00
03	Ball Bearing	6205	25x52x15	01	00	00
04	Ball Bearing	6206	30x62x16	04	00	00
05	Taper Roller Bearing	32212/30215	50x110x29.75	01	00	00
06	Taper Roller Bearing	32211/30213	55x100x26.75	01	00	00
07	Thrust Bearing	51204	20x40x14	00	00	02

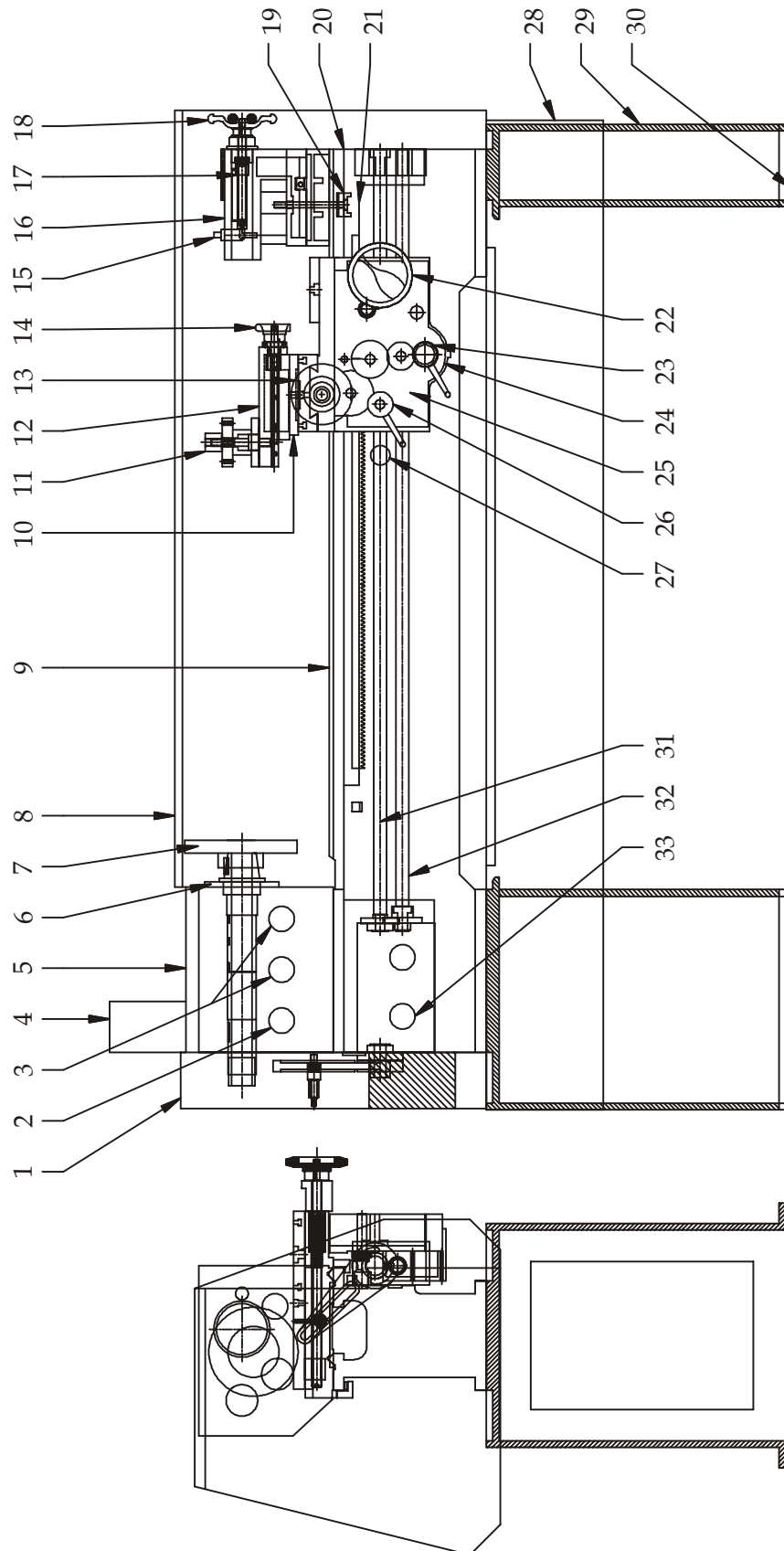
HS : Head Stock # AP : Apron # B : Bed

6. PART SECTION :**Important when ordering spares parts :**

1. Machine No. This is clamped on the bed at extreme position of Tail stock
2. Year of manufacture.
3. Part No. / Description.
4. Quantity required.

No.	Assembly	Sr. No.
01	Center Lathe	15
02	Head Stock	17
03	Feed Gear Box	19
04	End Feed Train	20
05	Carriage	20
06	Apron	21
07	Thread Dial Indicator	22
08	Compound Slide & Tool Post	22
09	Steady Rest	22
10	Tail Stock	23
11	Follower Rest	24
12	Coolant Pump	24

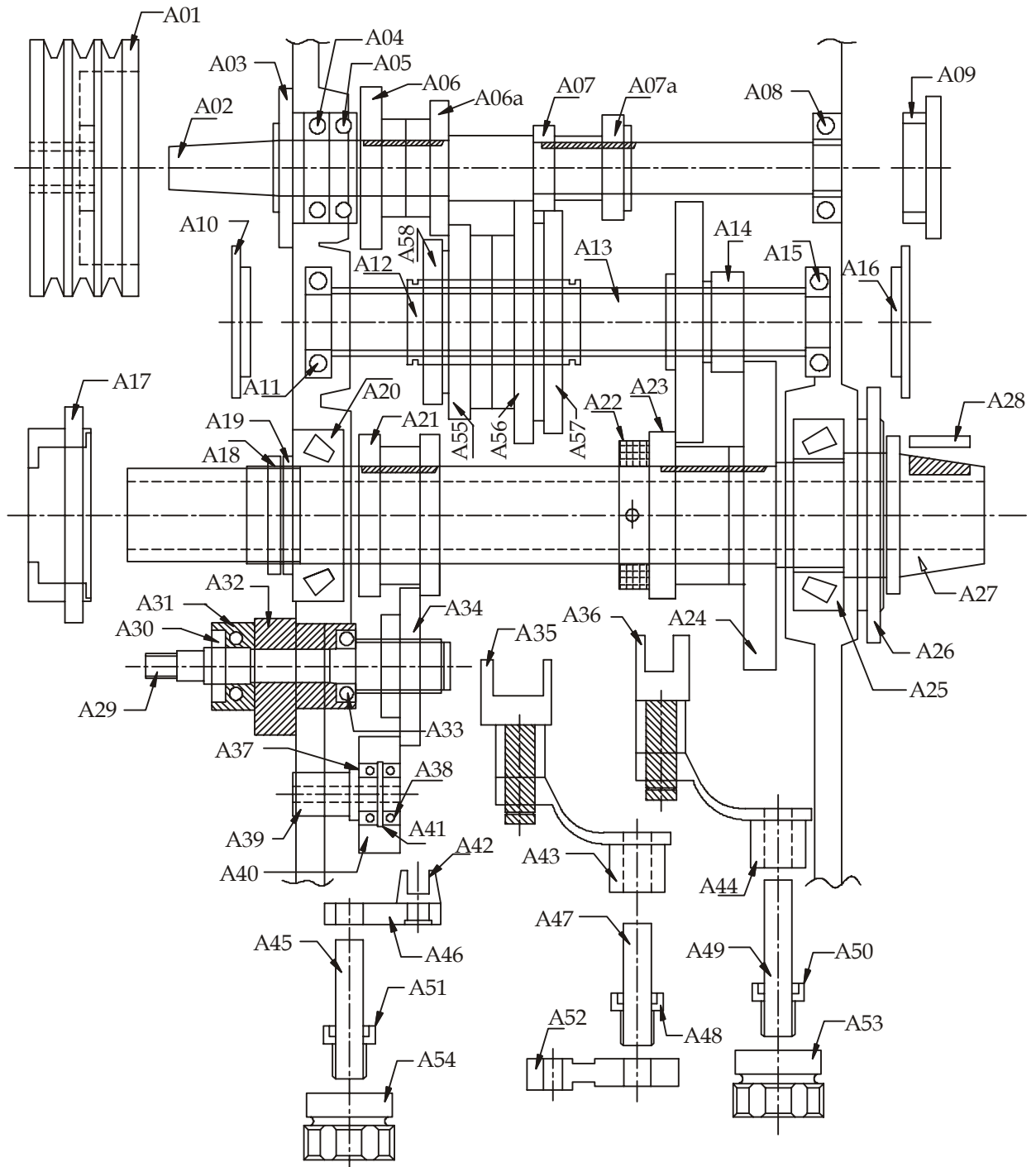
6.1 Center Lahte :



Center Lahte Machine

NO	PART NAME	NO	PART NAME
01	SIDE COVER	17	TAIL STOCK HAND WHEEL
02	FORWARD REVERSE LEVER	18	TAIL STOCK PLATE
03	SPEED CHANGE LEVER	19	TAIL STOCK CLAMPING LEVER
04	SWITCH BOARD	20	END BEARING BRACKET
05	HEAD STOCK COVER	21	RECK
06	MAIN SPINDLE	22	APRON HAND WHEEL
07	CHUCK PLATE	23	SURFACING SLIDING LEVER
08	REAR SPLASH GUARD	24	AUTOMATIC FEED ENGAGE LEVER
09	BED	25	APRON
10	CROSS SLIDE	26	LEAD SCREW ENGAGE LEVER
11	TOOL POST	27	THREAD DIAL INDICATOR
12	COMPOUND SLIDE	28	FRONT COVER
13	CROSS SLIDE HAND WHEEL	29	CHIP TROLLY
14	COMPOUND SLIDE HAND WHEEL	30	LEG
		31	LEAD SCREW
15	QUILL CLAMPING LEVER	32	FEED SHAFT
16	TAIL STOCK LEVER	33	FEED SELECTING LEVER

6.2 Head Stock :

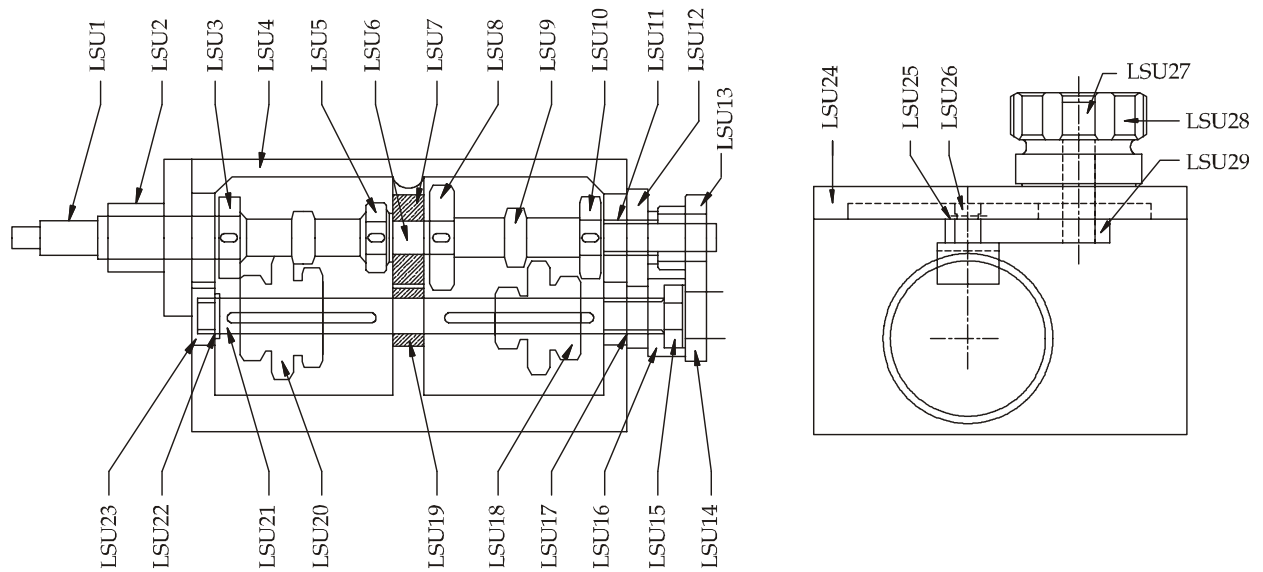


Head Stock

Part No.	Description
A01	Pully
A02	Main Shaft
A03	Bearing Cover
A04	Bearing
A05	Bearing
A06	Spur Gear
A06 a	Spur Gear
A07	Spur Gear
A07 a	Spur Gear
A08	Bearing
A09	Bearing Cover
A10	Bearing Cover
A11	Bearing
A12	Spur Gear
A13	Main Spline
A14	Spur Gear
A15	Bearing
A16	Bearing Cover
A17	Bearing Cover
A18	Check Nut
A19	Check Nut
A20	Taper Roller Bearing
A21	Spur Gear
A22	Stopper
A23	Spur Gear
A24	Spur Gear
A25	Taper Roller Bearing
A26	Bearing Cover
A27	Spindle
A28	Key

Part No.	Description
A29	Panjo spline
A30	Circlip
A31	Bearing
A32	Housing
A33	Bearing
A34	Spur Gear
A35	Gear Clip
A36	Gear Clip
A37	Bearing
A38	Bearing
A39	Shaft
A40	Spur Gear
A41	Circlip
A42	Gear Clip
A43	Gear Strip
A44	Gear Strip
A45	Lever Shaft
A46	Gear Strip
A47	Lever Shaft
A48	Sleeve with Oil Seal
A49	Lever Shaft
A50	Sleeve with Oil Seal
A51	Sleeve with Oil Seal
A52	Lever
A53	Lever
A54	Lever
A55	Spur Gear
A56	Spur Gear
A57	Spur Gear
A58	Spur Gear

6.3 FEED GEAR BOX



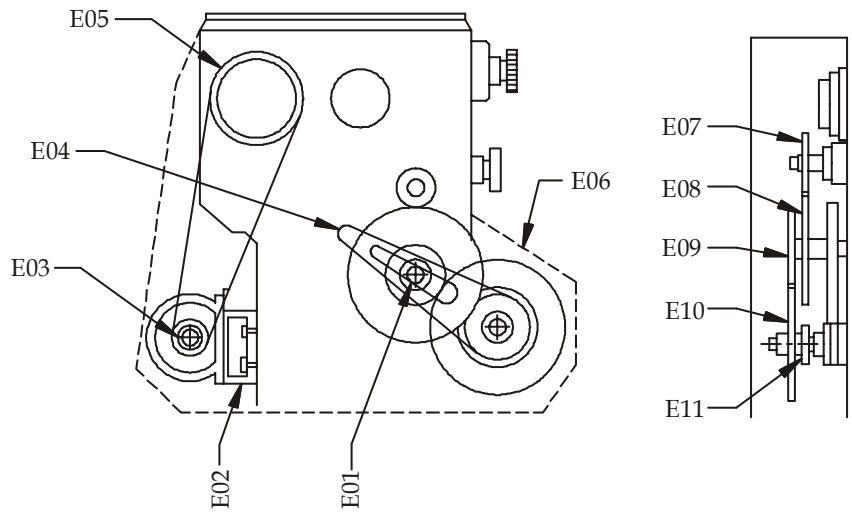
Part No.	Description
LUS 01	Shaft with Gear
LUS 02	Housing 1
LUS 03	Spur Gear
LUS 04	Gear Box Body
LUS 05	Spur Gear
LUS 06	Gun Metal Bush
LUS 07	Bush
LUS 08	Spur Gear
LUS 09	Shift with gear
LUS 10	Spur Gear

Part No.	Description
LUS 11	Gun Metal Bush
LUS 12	Housing 2
LUS 13	Spur Gear
LUS 14	Spur Gear
LUS 15	Bearing 6202
LUS 16	Housing 3
LUS 17	Gun Metal Bush
LUS 18	Spur Gear
LUS 19	Bush
LUS 20	Spur Gear

Part No.	Description
LUS 21	Shaft
LUS 22	Gun Metal Bush
LUS 23	Bush
LUS 24	Gear Box Body
LUS 25	Circlip
LUS 26	Gear Clip
LUS 27	Lever Pin
LUS 28	Lever
LUS 29	Gear Strip

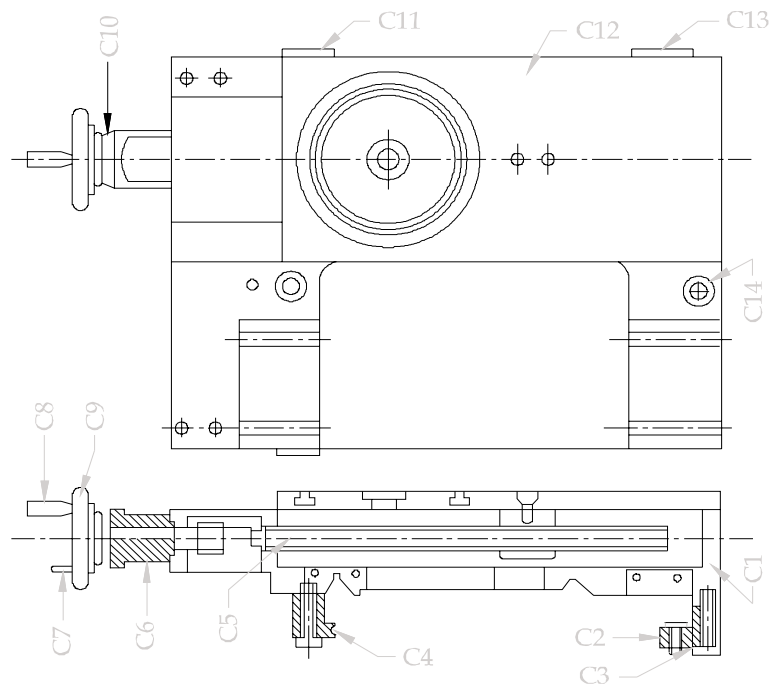
6.4 END FEED TRAIN

Part No.	Description
E 01	Arm Stud
E 02	Motor Bench
E 03	Motor Pulley
E 04	Arm
E 05	Main Pulley
E 06	Side Cover
E 07	Spur Gear
E 08	Spur Gear
E 09	Spur Gear
E 10	Spur Gear
E 11	Spur Gear



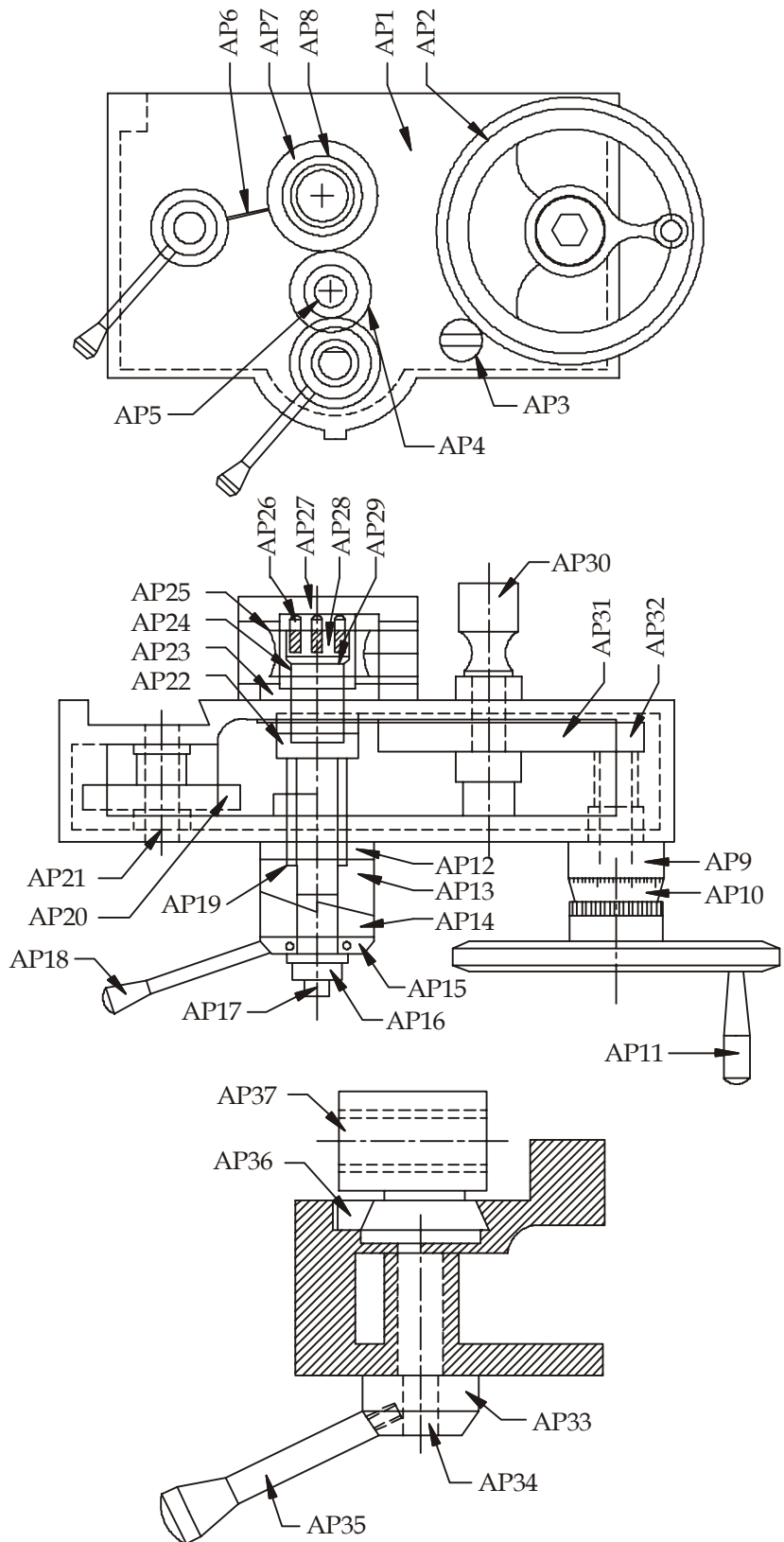
6.5 CARRIAGE

Part No.	Description
C 01	Saddle
C 02	Wedge
C 03	Locking Slide
C 04	Lock Piece
C 05	Carriage Screw Nut
C 06	Carriage Screw Nut
C 07	Small Handle
C 08	Handle with Screw & Grip
C 09	Cross Slide Hand Wheel
C 10	Graduated Dial Wheel
C 11	"Vee" Wiper
C 12	Cross Slide
C 13	Flat Wiper
C 14	Oil Cap



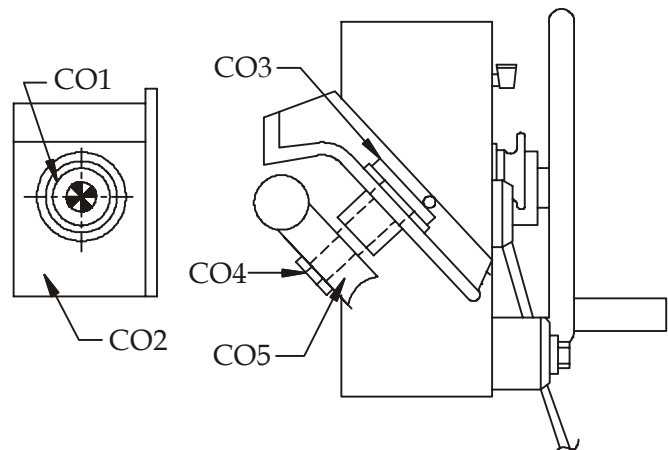
6.6 APRON

Part No.	Description
AP 01	Apron Body
AP 02	Hand Wheel
AP 03	Oil Level
AP 04	Spur Gear
AP 05	Gear Shaft
AP 06	Pin
AP 07	Spur Gear
AP 08	Trip Rod
AP 09	Housing
AP 10	Graduated dial Collar
AP 11	Handle
AP 12	Self Housing 1
AP 13	Self Housing 2
AP 14	Self Housing 3
AP 15	Bearing 6202
AP 16	Nut
AP 17	Self Shaft
AP 18	Feed Engagement Lever
AP 19	Nut
AP 20	Spur Gear
AP 21	Gear Shaft
AP 22	Worm Gear Shaft
AP 23	Support Bracket
AP 24	Worm Gear
AP 25	Worm
AP 26	Spring
AP 27	Worm Cover
AP 28	Degree Washer
AP 29	Washer
AP 30	Rack Pinion Gear
AP 31	Spur Gear
AP 32	Wheel Pinion Gear
AP 33	Half Nut Knob
AP 34	Half Nut Eccentric Shaft
AP 35	Knob Handle
AP 36	Half Nut Wedge
AP 37	Half Nut



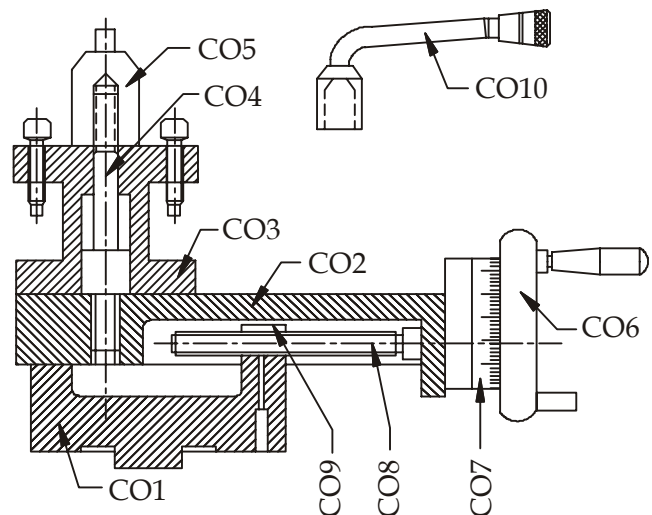
6.7 THREAD DIAL INDICATOR

Part No.	Description
D 01	Dial Plate
D 02	Guard (Indicator Body)
D 03	Dial Strip
D 04	Grip Nut
D 05	Dial Gear (T 16)



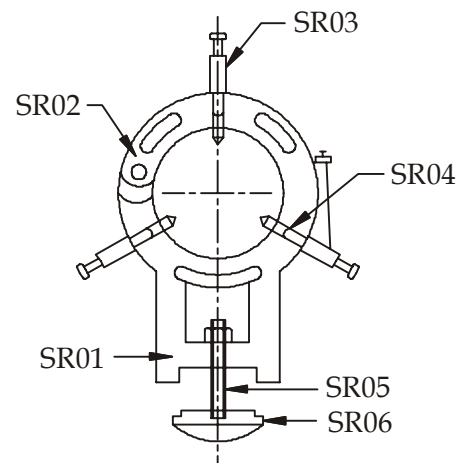
6.8 COMPOUND SLIDE & TOOL POST

Part No.	Description
CO 01	Compound Lower
CO 02	Compound Upper
CO 03	Tool Post
CO 04	Tool Post Stud
CO 05	Stud Cap
CO 06	Hand Wheel
CO 07	Graduated Dial Collar
CO 08	Screw
CO 09	Screw Nut
CO 10	Key

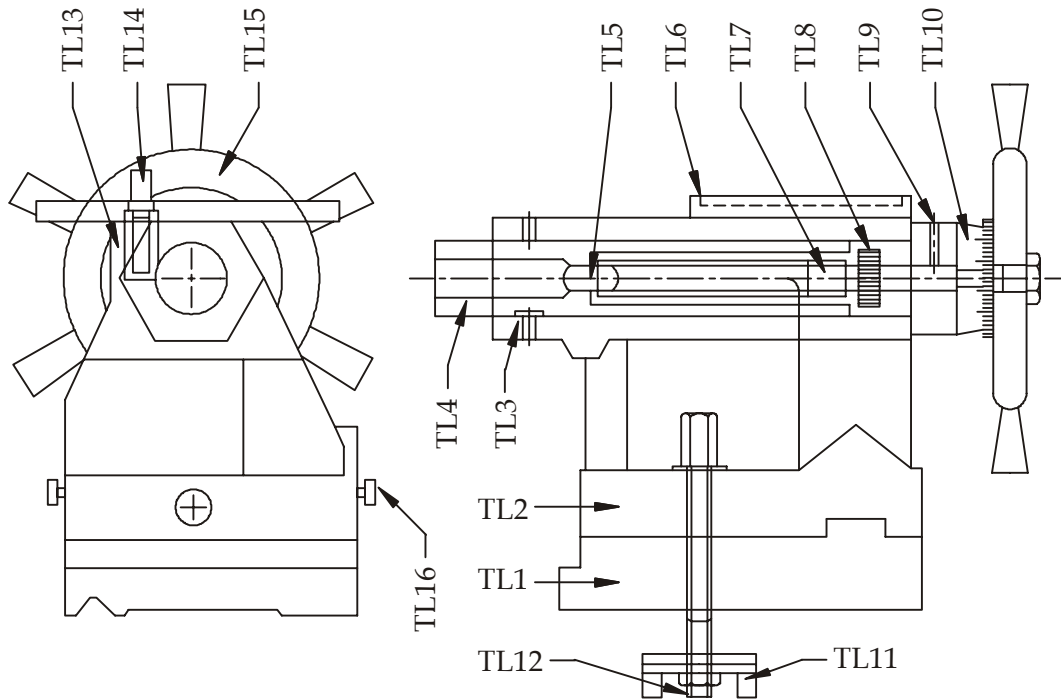


6.9 STEADY REST

Part No.	Description
SR 01	Lower Body
SR 02	Upper Body
SR 03	Setting Screw
SR 04	Casting Pin
SR 05	Stud
SR 06	Grip Plate



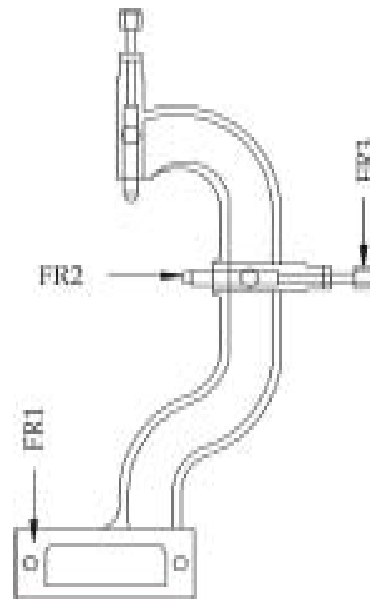
6.10 TAIL STOCK



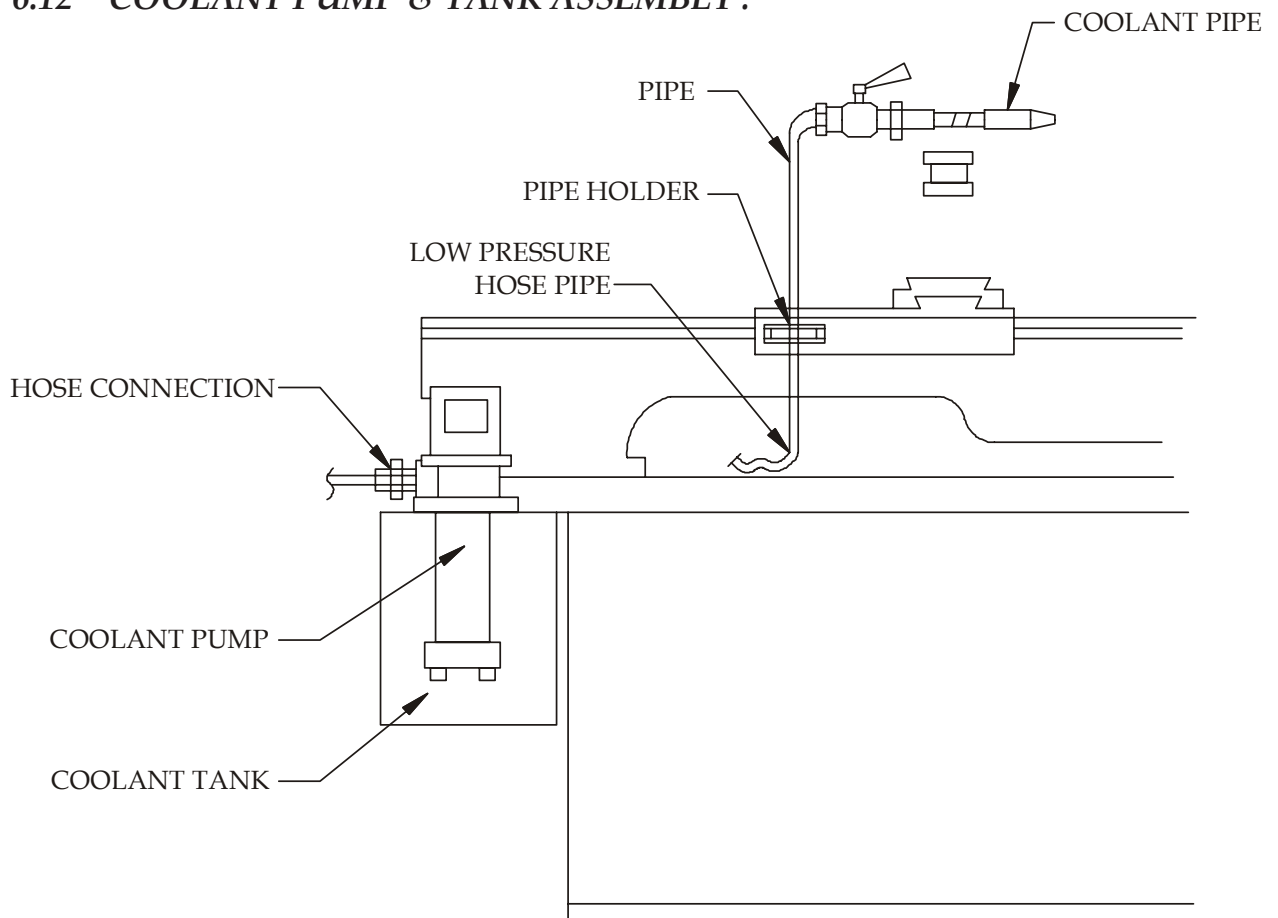
Part No.	Description	Part No.	Description	Part No.	Description
TL 01	Base	TL 07	Nut (metric)	TL 13	Spindle Lock Key
TL 02	Body	TL 08	Bearing	TL 14	Square Head Bolt
TL 03	Key	TL 09	Screw Bracket	TL 15	Hand Wheel
TL 04	Tail Stock Spindle	TL 10	Graduated Dial Collar	TL 16	Adjusting Bolt
TL 05	Screw (metric)	TL 11	Grip Plate		
TL 06	Tail Stock Try	TL 12	Lock Stud		

6.11 FOLLOWER REST

Part No.	Description
FR 01	Frame
FR 02	Casting Pin
FR 03	Setting Screw



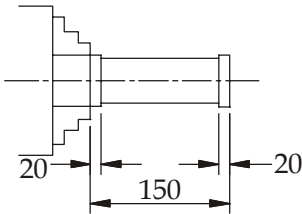
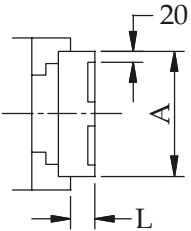
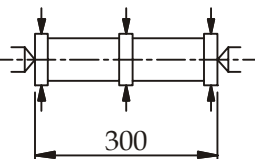
6.12 COOLANT PUMP & TANK ASSEMBLY :



**7. TEST CHART FOR GENERAL PURPOSE PARALLEL LATHES
WITH SWING OVER BED UP TO 800 MM**

As per IS : 1878 (PART 1) 1971

**PRACTICAL TESTS
(All Dimenstions are in Millimeters)**

Sr. No.	Test	Test	Measuring Instruments	Actual Error
01	Cylindrical Turning with work piece mounted in chuck $D, \text{Dia of Job} > D_a \div 8$ ($D_a = \text{Swing Dia}$)		Precision Dia, Measuring instrument	Round with 0.01 mm Taper near Head Stock 0.02 mm
02	Facing with Work piece mounted in chuck $D > D_a \div 2 =$ $L < D_a \div 8 =$		Straight edge, Slip gauges or Dial Indicator	0.02 mm for 300 mm dia. concave only
03	Cylindrical turning of workpiece hold between centers		Dial Indicator or Micrometer	0.02 / 300 mm

Hardness of Bed - BHN

Note : The specification concerning local tolerance are given only to eliminate in case of liner sideways, the possibility of too large deviations in straightness concentrated on a small length. (2.3.2.2 (d) of IS : 2063-1962 code for - testing machine tools)

However, in the case of slide ways with a regular convex which is approximately symmetrical with respect to the middle of their length, the specifications for local tolerance are too respective at the extremities of the slideway. In such cases the specifications for local tolerance may be doubled for the outer quarters of the slideway.

INSPECTED DATE : _____

INSPECTED BY : _____

CHIEF INSPECTOR : _____