Manual Precision Lathe

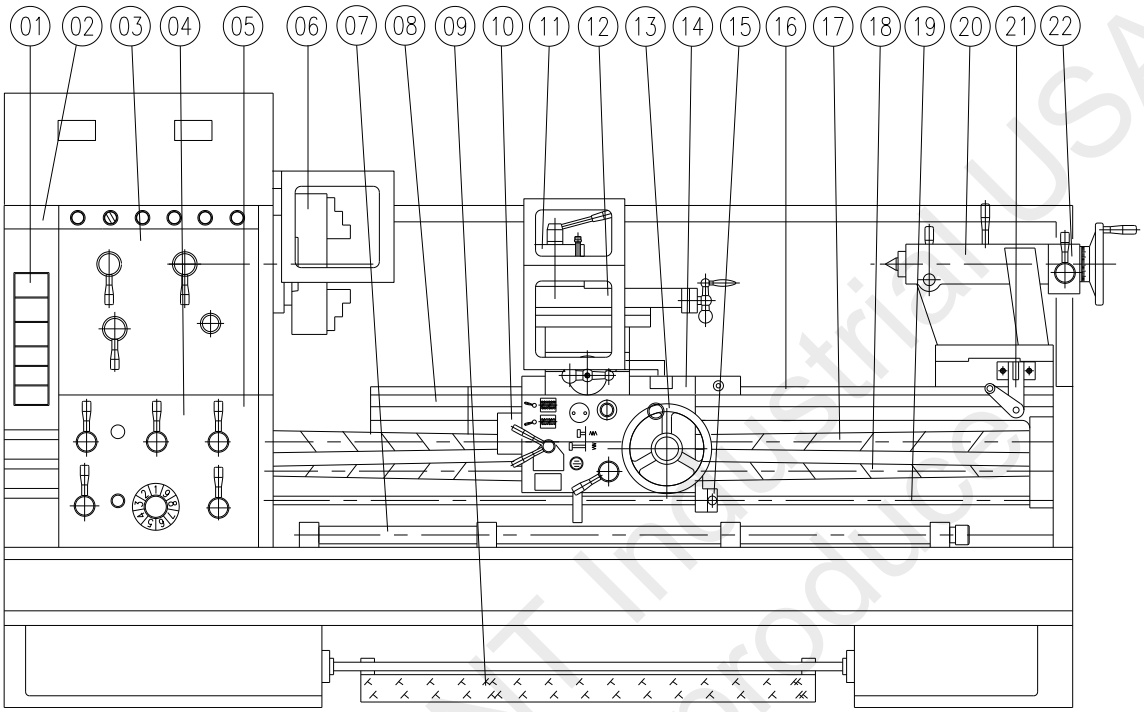
Operations Manual

HR-30 Series

(2025/4)

INDEX

GENERAL LAYOUT



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INSTALLATION

CLEANING

Protective layers of grease and corrosion-preventing paint have been liberally applied to all external parts of the machine to guard it against the elements during storage and shipping. Before installing the lathe in its final position, these protective coatings should be thoroughly removed.

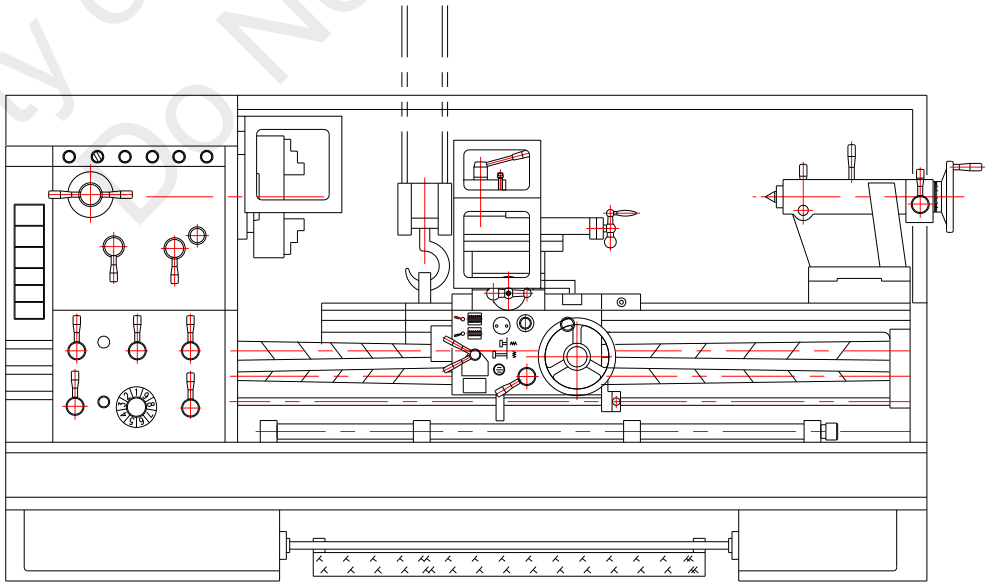
Cleaning should be done immediately after removing the machine from its packaging . Special care should be given to cleaning the slideways.

LIFTING

In order to have the machine properly balanced before hoisting, it is advisable to move Tailstock and Carriage to the extreme right hand position; clamp both assemblies firmly in place so they will not accidentally slide to the left when lifting.

Hemp rope should be used in lifting, which should be at least 1-3/8"(30 mm) in diameter, or steel cable of equivalent strength.

Place wooden blocks between the hoisting cable and the body of the machine at points where damage would occur if excessive pressure resulted from lifting. Other parts of the machine should be protected by cloth to prevent scratching or other disfiguring marks. When hoist rope becomes taunt, check the position of the inserted blocks and the cable itself. As the lathe lifts from the ground, check the blocks and cables once more, and determine if the balance of the machine is proper. Again, just before lowering the machine into position, check all cable and blocks.



POSITIONING AND LEVELLING

The production accuracy of all precision machinery depends on the accuracy with which the machine is installed. Manufacturing tolerance of the machine can only be guaranteed if the machine is firmly and accurately installed. The foundation for all lathes should be of the highest quality concrete and at least 22-1/2" in depths. The foundation should support the entire weight bearing surfaces of the lathe base.

Once the machine is lowered on the prepared foundation, machinists levels should be used alternately on the cross slide and slideways of the lathe. Reading of the level should be taken on the extreme ends of the slideways as well as in the center. Minute adjustments of adjusting blots should be made until the machine is perfectly leveled.

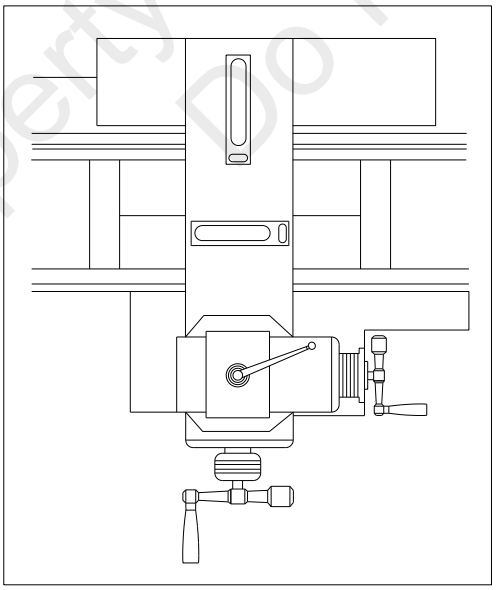
When the level of the lathe has been established, immediately grout the machine base to the foundation with the highest quality, shock-vibration-resistant mortar.

Care must be taken not to jar the machine or the foundation after grouting until the mortar is completely set; usually 48 hours are required. The anchoring bolts should be securely tightened after the grouting mortar is set; and spirit levels should again be used to assure absolute leveling of the lathe.

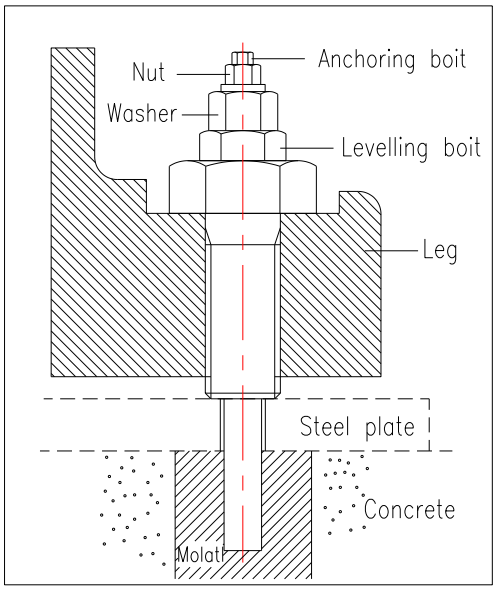
Positioning of Spirit levels.

Detailed view of foundation.

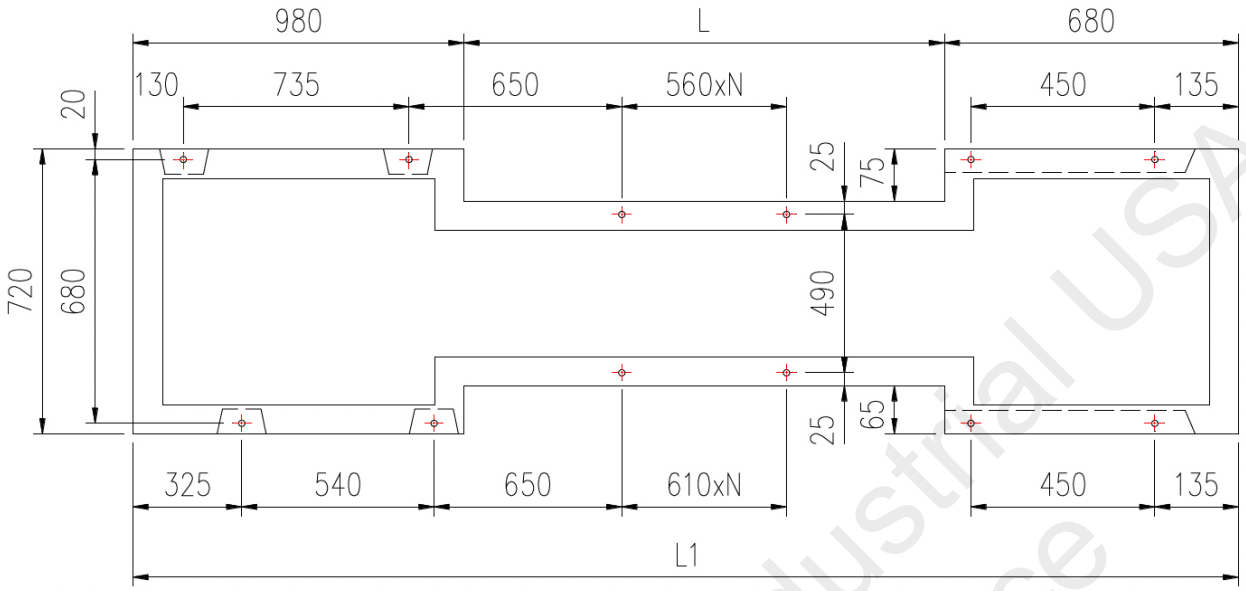
Positioning of Spirit Levels



Detailed view foundation



FOUNDATION PLAN



Model	HR-30160
L	4050
L1	5710
N	6

ELECTRICAL WIRING

This machine is equipped with 15HP main motor and 150W coolant pump. If an electric wire is used a cap-tired code, use size over AWG # 12. The use of extremely fine wires causes the fall of the voltage which often brings the trouble on a magnetic contactor.

In case the voltage is dropped down less than 70% of the required voltages, the magnetic contactor dose not work properly, so that the main motor may stop running, lowering the life of magnetic contactor.

Protect carefully the electric wires exposed to the outside, which will be liable to be damaged by chips. This will induce a layer-short accident and will lower efficiency to a considerable extent. The respective wirings should be connected with terminals R.S.T. at the control boss. In this instance check the revolving direction of main motor.

LUBRICATION

LUBRICATION AND LUBRICANT

The operator should be responsible for the proper lubrication of the lathe. The grade and quality of lubricants are given on the lubrication specification plate attached to the machine and also on the following chart of oil recommended. The instructions on this plate are essential to the proper oiling of the internal parts of

the lathe. Oil levels should be strictly observed, for the it is of primary importance for proper operation and long life that the oil baths for the internal parts of the lathe; Headstock, Feed Gear Box and Apron, Always be completely filled.

To keep the machine properly lubricated, follow the instructions given on the chart.

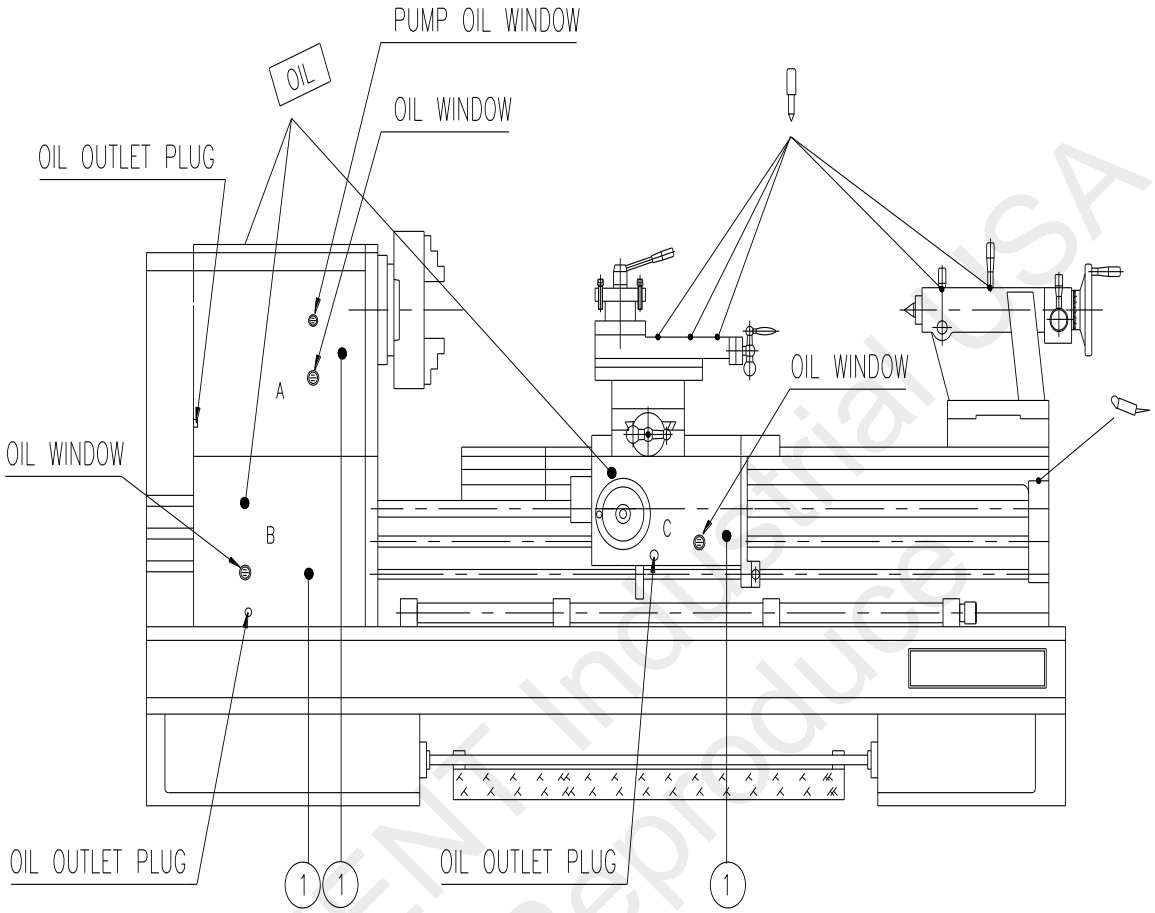
OIL LUBRICATION CHART

Lubricating Point	Oil exchange and/or replenishment	Quantity	Viscosity S.U.S 100°F
Headstock	Twice a year	12 liters	160
Feed Gear box	Twice a year	1.5 liters	160
Cross slide	Once a day		320
Apron & Carriage	Twice a month	6.5 liters	320
End bracket	Once a day		320
Tail stock	Once a day		320
Tool post slide	Twice a year		320
Other parts			

OIL RECOMMEND

	HEAD STOCK 12 liters	FEED BOX 1.5 liters	APRON 6.5 liters
SHELL	TELLUS 27	TELLUS 27	TONNA 33
ESSO	TERESSO 43	TERESSO 43	TERSSO 52
CALTEX	REGAL AR & O	REGAL AR & O	WAYLUBRICA
MOBIL	D.T.E. LIGHT	D.T.E. LIGHT	VACTORA NO.2

LUBRICATION CHART

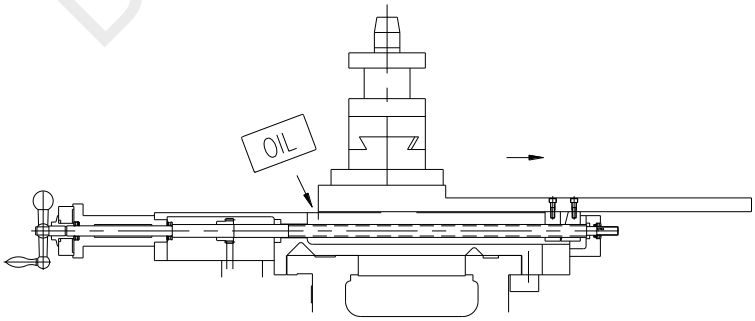


1. OIL GAUGE

A. HEAD STOCK

B. GEAR BOX

C. APRON



LUBRICATION OF HEADSTOCK AND FEED GEAR BOX

Oil windows are provided to check the proper functioning of the lubrication system.

The lubrication of headstock and feed gear box is forcedly provided by trochoid pumps(discharge quantity 2.4 L/min, pressure 2Kgs/cm2 per 1000 r.p.m. through filters from oil tank incorporated into the machine leg.

Lubrication of end bar support is done by a pump fitted into the support itself and this pump should be oiled periodically on a regular scheduled basis.

Particular attention and study has been done into manufacturing of lubrication system in all C.H lathes. In most instances, trochoid pumps are fitted into Feed Gear Box and Headstock, and provides forced lubrication to Spindle bearings and spray oiling of all other running parts. The inlet side of all pumps are fitted with fine filters to offer further protection.

Remove the cover of headstock and next pour the recommended oil into the headstock, and oil is stocked in the tank through the feed box. After long term use, dirt and spoiled oil should be replenished with fresh lubrication oil.

The oil tank can be easily dismantled from the machine by loosening the bolts tightened to the machine.

Cleaned oil by the filter flows regularly to the said points.

Oil filter should be cleaned at regular intervals and wire screws should be kept clean.

LUBRICATION FOR CARRING & APRON

All gears, shafts, bearings and all other running parts are automatically lubricated by a plunger pump.

Push the manual plunger pump several times which located on the left side of the apron when start to operate the machine or the machine stop running for a long time.

Particular attention should be given to the lubrication of the slideways during mechanical traversing.

Although the slideways are oiled automatically, during heavy duty work, close visual checks are strongly recommended.

LUBRICATION OF LEADSCREW AND FEED ROD

Lead screws and feed rod should be lubricated at least once or twice a day by an oil gun.

Be sure that the grade of oil should be used according to the recommended oil chart attached. Likewise lubricate to the starting rod.

LUBRICATION OF TAILSTOCK

The oil inlets are equipped at the slideways of tailstock spindle, supporting part for lead screw and feed rod, and gear wheel. The daily lubrication should be done before operating the machine every morning.

OPERATION AND USE

STARTING AND STOPPING

Before starting up machine, make sure if the proper lubrication to all running parts has been done as per lubrication chart on page. And switch on after ensuring the starting lever at apron, which should be placed in the neutral position.

Upon switching on, the pilot lamp is on. The starting-up of main spindle is accomplished by the starting lever which incorporates a safety device, which prevents an abrupt accident from operators. Move this starting lever horizontally to disengage a safety pin. When this lever is moved. Thermal overload relay protects motor from overheating or excessive voltage coming in with the stop of motor drive. In the case of motor stop with reason, please reset the thermal relay by the pushing the button to reset. The main spindle gets a reverse revolution, and when the lever is moved downwards, the main spindle gets a forward revolution.

When this lever comes back to the neutral position, it engages a safety pin, and the main spindle stops revolving.

Main spindle is supported by bearing in three places. Taper roller bearing is placed both at front and middle respectively to avoid the rise of temperature, and ball bearing is placed at the rear end to eliminate the expansion of main spindle. In addition to this, taper roller bearing at the middle is pressed by a saucer spring, due to which the adjustment of bearings is not needed at the position of lower speed range and higher speed range.

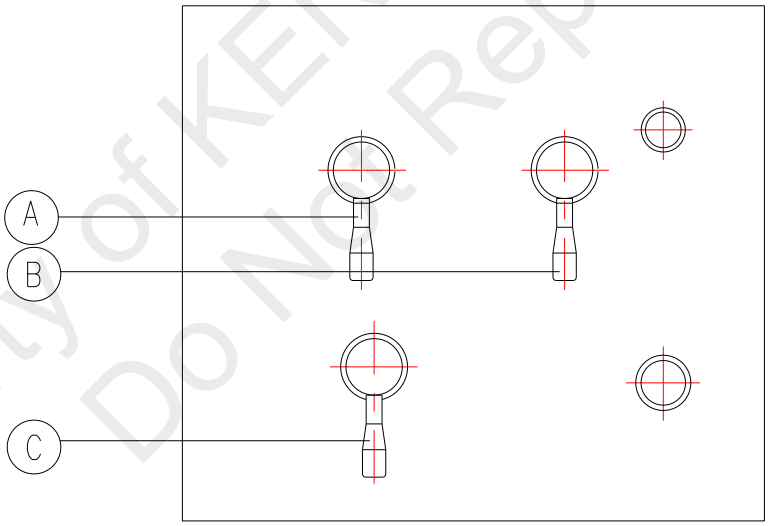
Note: Torque constant range is up to 52 r.p.m.

Operation

Range of spindle speeds: 25-1000, r.p.m./24-800 r.p.m

Lever(B)selects(H) or(L).

Knob(C) carries out the change of the forward and reverse revolution for feeds and threads. Check out the oil sight gage to make sure of the proper lubrication.



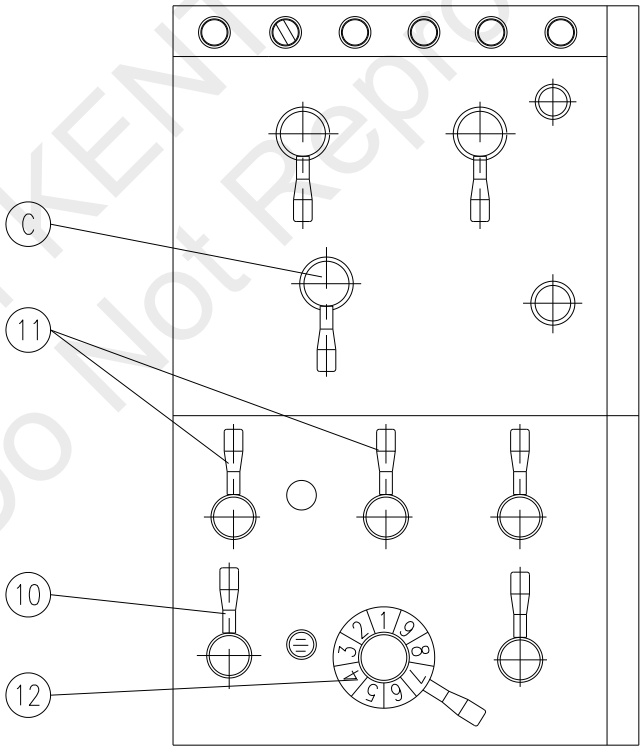
FEEDS:

First, turn the lever(10) to Feed, and turn a dial selector(12) to get feeds table plate at the upper side. Check out the desired feed according to the feeds table plate and turn the lever(11) up to the position where the indicated figure comes to the upper side.

Turn the clamping lever(C) anti-clockwise and the engaged gears of Norton system disengages. Turn the lever(11) up to the position of arrow which indicates the desired feed, and then the desired operation of feed is ready by turning the clamping lever(C) clockwise.

THREADS:

First, select change gears to meet the desired threads according to the threads according to the threads chart. Turn the lever(10) to threads side and then a dial selector to get a threads table plate at the upper side. The further preparatory procedure is exactly same as in feed selection.



FEEDS AND THREADS TABLE

1 in									
	1	2	3	4	5	6	7	8	9
ADWF	2	2 1/4	2 3/8	2 1/2	2 3/4	2 7/8	3	3 1/4	3 1/2
BDWF	4	4 1/2	4 3/4	5	5 1/2	5 3/4	6	6 1/2	7
ACWF	8	9	9 1/2	10	11	11 1/2	12	13	14
BCWF	16	18	19	20	22	23	24	26	28
mm									
	1	2	3	4	5	6	7	8	9
ACME	8	9	9.5	10	11	11.5	12	13	14
BCME	4	4.5	4.75	5	5.5	5.75	6	6.5	7
ADME	2	2.25		2.5	2.75		3	3.25	3.5
BDME	1			1.25			1.5		1.75
ACMH	6.4	7.2	7.6	8	8.8	9.2	9.6	10.4	11.2
BCMH	3.2	3.6	3.8	4	4.4	4.6	4.8	5.2	5.6
ADMH	1.6	1.8	1.9	2	2.2	2.3	2.4	2.6	2.8
BDMH	0.8	0.9	0.95	1	1.1	1.15	1.2	1.3	1.1
DP									
	1	2	3	4	5	6	7	8	9
ADWF	4	4 1/2	4 3/4	5	5 1/2	5 3/4	6	6 1/2	7
BDWF	8	9	9 1/2	10	11	11 1/2	12	13	14
ACWF	16	18	19	20	22	23	24	26	28
BCWF	32	36	38	40	44	46	48	52	56
MP									
	1	2	3	4	5	6	7	8	9
ACME	4	4.5	4.75	5	5.5	5.75	6	6.5	7
BCME	2	2.25		2.5	2.75		3	3.25	3.5
ADME	1			1.25			1.5		1.75
BDME	0.5						0.75		
MM (= 1/2)									
	1	2	3	4	5	6	7	8	9
ACMG	0.40	0.44	0.46	0.48	0.52	0.56	0.60	0.62	0.70
BCMG	0.20	0.22	0.23	0.24	0.26	0.28	0.30	0.31	0.35
ADMG	0.10	0.11	0.11	0.12	0.13	0.14	0.15	0.16	0.17
BDMG	0.05	0.05	0.05	0.06	0.06	0.07	0.07	0.08	0.09

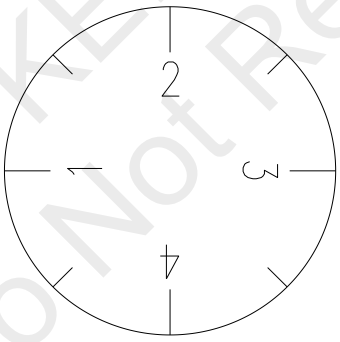
Thread outing indicator is installed on the left side of APRON, it is used for cutting inch thread.

To cut threads of an even number per inch, close the half nut as any line on the dial passe datum mark.

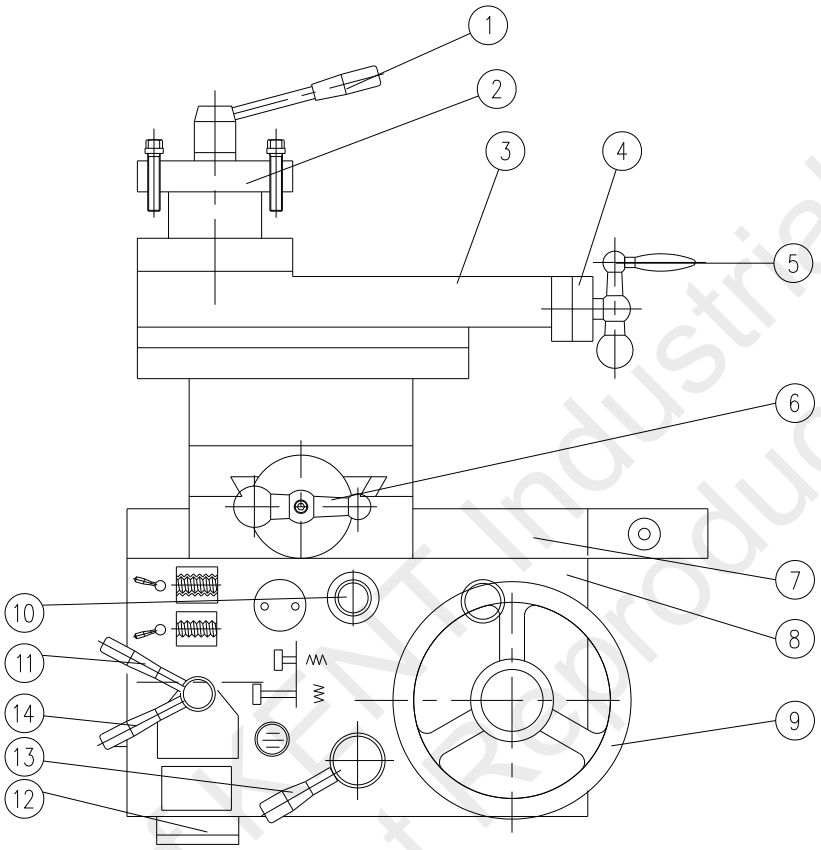
To out threads of odd numbers per inch close the half nut as any one long number on the dial passes datum mark.

Fractional threads of 1/2 or 3/4 T.P.I may be by closing the half nut at the same line on each pass of the tool.

This dial indicator can't be used with an inch lead screw to cut metric threads, D.P. module pitches. For that will cut the metric threads, the half nut of APRON must be kept closed, can only be cut by the spindle reverse-For ward rotation lever in PRON and carriage return is driven by half nut and lead screw.



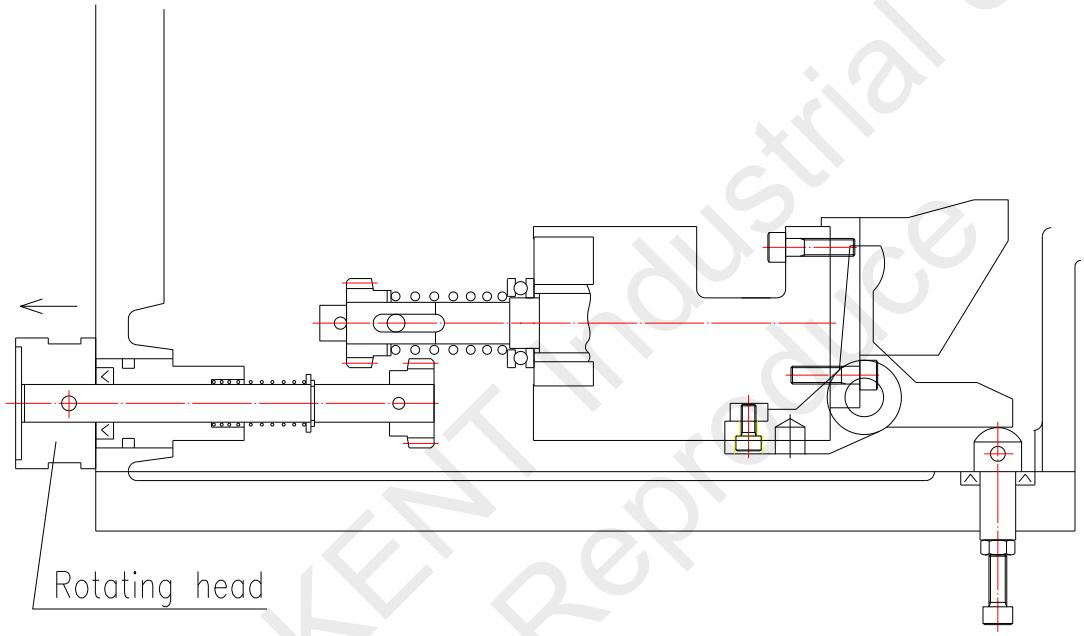
The engaging and disengaging of longitudinal and cross feeds is accomplished by lever (10) drop worm; system). The interlocking device is equipped so that the longitudinal feeds and the half-nut engagement or disengagement can not work together. There is an overload safety device by means of cone clutch.



1. CLAMPING LEVER
2. SQUARE TURRET TOOL POST/AMERICAN TOOL POST
3. TOP SLIDE
4. MICRO METER COLLAR
5. TOP SLIDE HANDLE FOR CROSS FEEDS
6. OPERATING HANDLE FOR CROSS FEEDS
7. CARRIAGE
8. APRON
9. HAND WHEEL FOR LONGITUDINAL
10. CHANG LEVER FOR AUTOMATIC LONGITUDINAL AND CROSS FEEDS
11. HALF-NUT LEVER
12. MOTOR
13. FEEDS STARTING LEVER
14. RAPID FEED LEVER

SAFETY DEVICE

The safety device installed in the lateral side of APRON, when the overload happens in operating of auto-feed, the taper-clutch was divided, and the auto-feed of APRON will stop transmission to attain the purpose of safety. According to the over-load or lower-lead will must adjust the rotating head. Pull up the rotating head, the over-load is clock wise and the lower-load is counter clockwise.

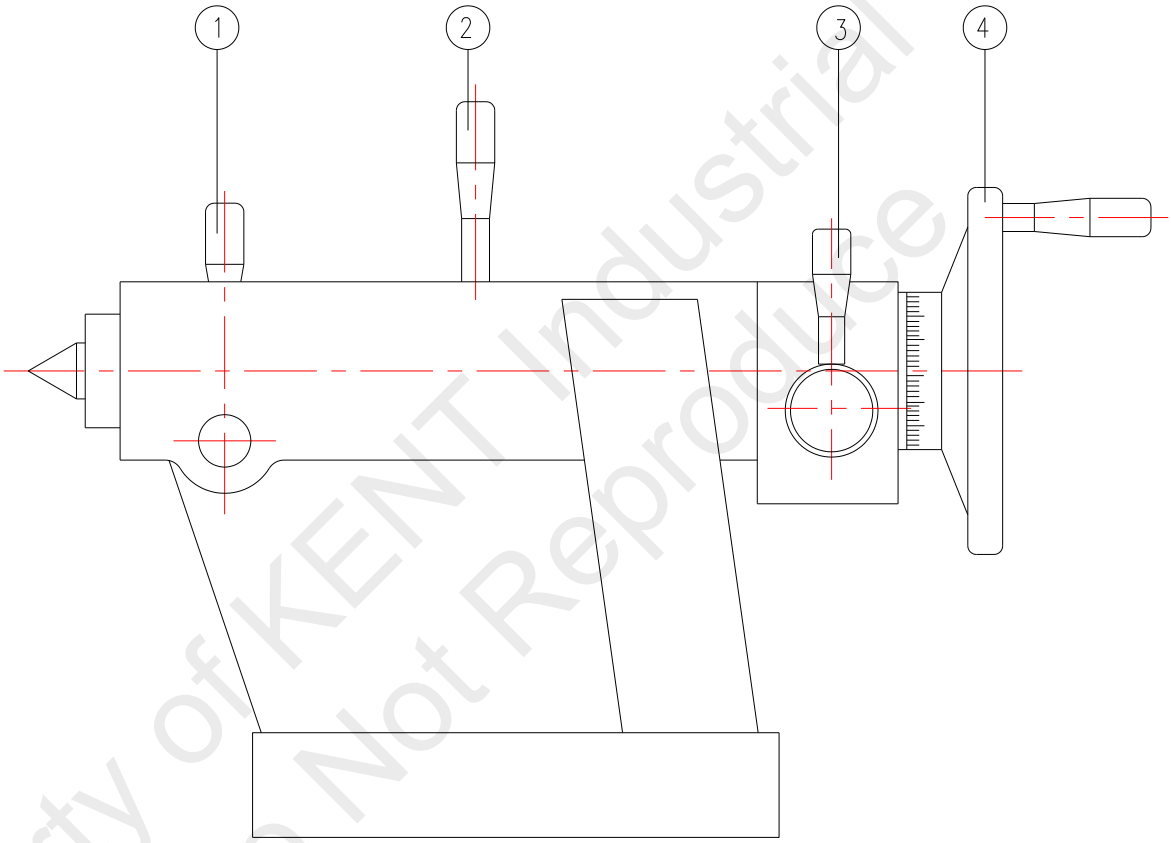


Tow step of spindle speed:

A 1 to 1/4 reduction gives a fast range quick positioning and slow one principally for drilling operation .(Special order)

Normal speed 5mm/rev.

Reduction speed 1.25 mm/rev.



1. CLAMPING LEVER FOR QUILL
2. CLAMPING LEVER FOR TAILSTOCK BODY
3. TAILSTOCK TRAVEL REDUCTION LEVER
4. HANDWHEEL FOR TAILSTOCK QUILL MOVEMENT

BED AND LEVELLING

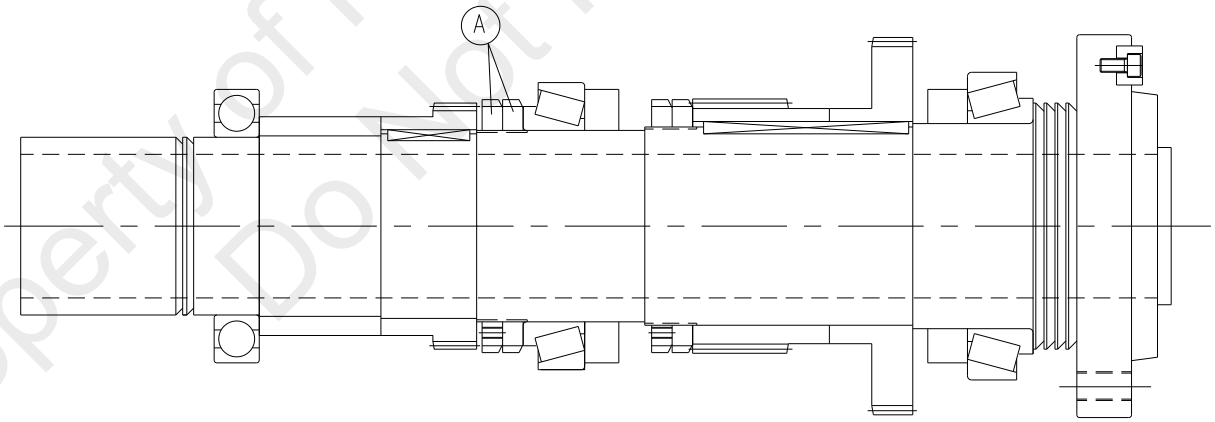
Leveling of machine itself is very important so that cutting accuracy can be maintained. So occasional leveling check is required very carefully. And for leveling adjustment, please refer to the leveling instruction shown in page No.5 and chart of accuracy.

SPINDLE BEARING ADJUSTMENT

Spindle bearings are already adjusted correctly at our plant before delivery. So please avoid the unnecessary adjustment except the particular case. When adjustment is needed by the reason of chattering or bearing noise or over temperature etc, adjust only front and middle bearings by loosing or tightening the nut(A)properly, not too tight.

Rear bearing is specially combined and free from adjustment.

It is recommended that when main spindle is rotated slowly, continuously, to ensure the bearings are not over tight. Do not over adjust flat spring as this is a guard against over-heating of bearings.



ADJUSTMENT OF TAPER GIB

There is a taper gib on the cross slide and tool slide respectively. Adjust a taper gib in a successive order as follows:

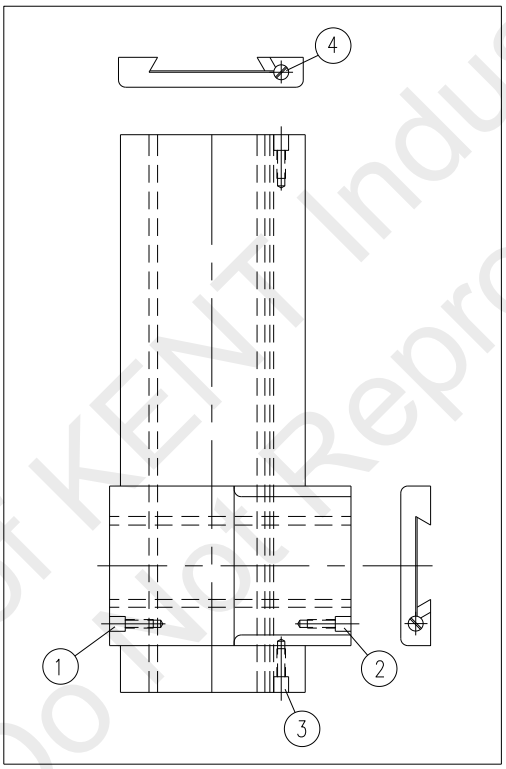
Adjustment of a tool slide gib.

1) Loosen an adjusting screw (1) at the rear and tighten an adjusting screw(2) at the front.

2) Turn a tool slide handle and make sure whether a taper gib has been adjusted. If it is well adjusted, then tighten an adjusting screw (1).

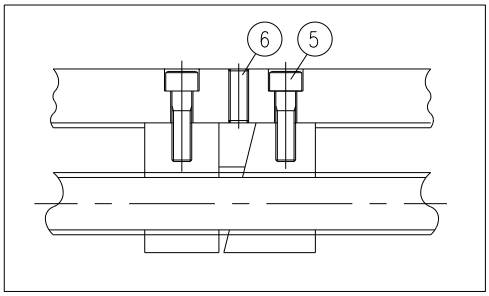
Adjustment of a cross slide gib.

Remove a felt cover at the front and loosen an adjusting screw(3) at the front and then tighten an adjusting screw (4) at the rear. The following procedure is same as for tool slide gib.



FEMALE SCREW OF CROSS SLIDE

A female screw can be adjusted to minimize a backlash for a cross slide screw. Loosen Bolt (5) to some extent and tighten Screw(6) by a driver. Then the slid backlash can be minimized.



ELECTRICAL CIRCUIT DIAGRAM