

9. Electric system of the machine

9.1 Characteristics of Power

- a) Main circuit: a. c. 3 phases. 50/60 Hz. 220/380 V
- b) Control circuit: a. c. 110 V
- c) Lighting circuit and Indicator: a. c. 24 V

9.2 Operation of the Machine

Tie the power cable and ground wire (the end of which is marked with PE) respectively as indicated in connecting diagram of electric apparatus. Close the door of electric cabinet. Turn on the master switch QF1 and the indicator HL will light.

Press the green start button SB4 or SB5 on the control board, contactors KM1 are electrified and the main motor M1 runs. Press the red emergency button SB1 or SB2, KM1 are de-electrified and the main motor M1 stops running. Turn SA1 to ON position, KM2 is electrified and the coolant pump works; Turn SA1 to OFF position, KM2 is de-electrified and the coolant pump stops. Press button SB3, KM3 is electrified and the rapid feed motor works.

In case an emergent condition occurs, just press the red mushroom like button SB1 or SB2, all contactors, relay coils are de-electrified and the spindle stops at once.

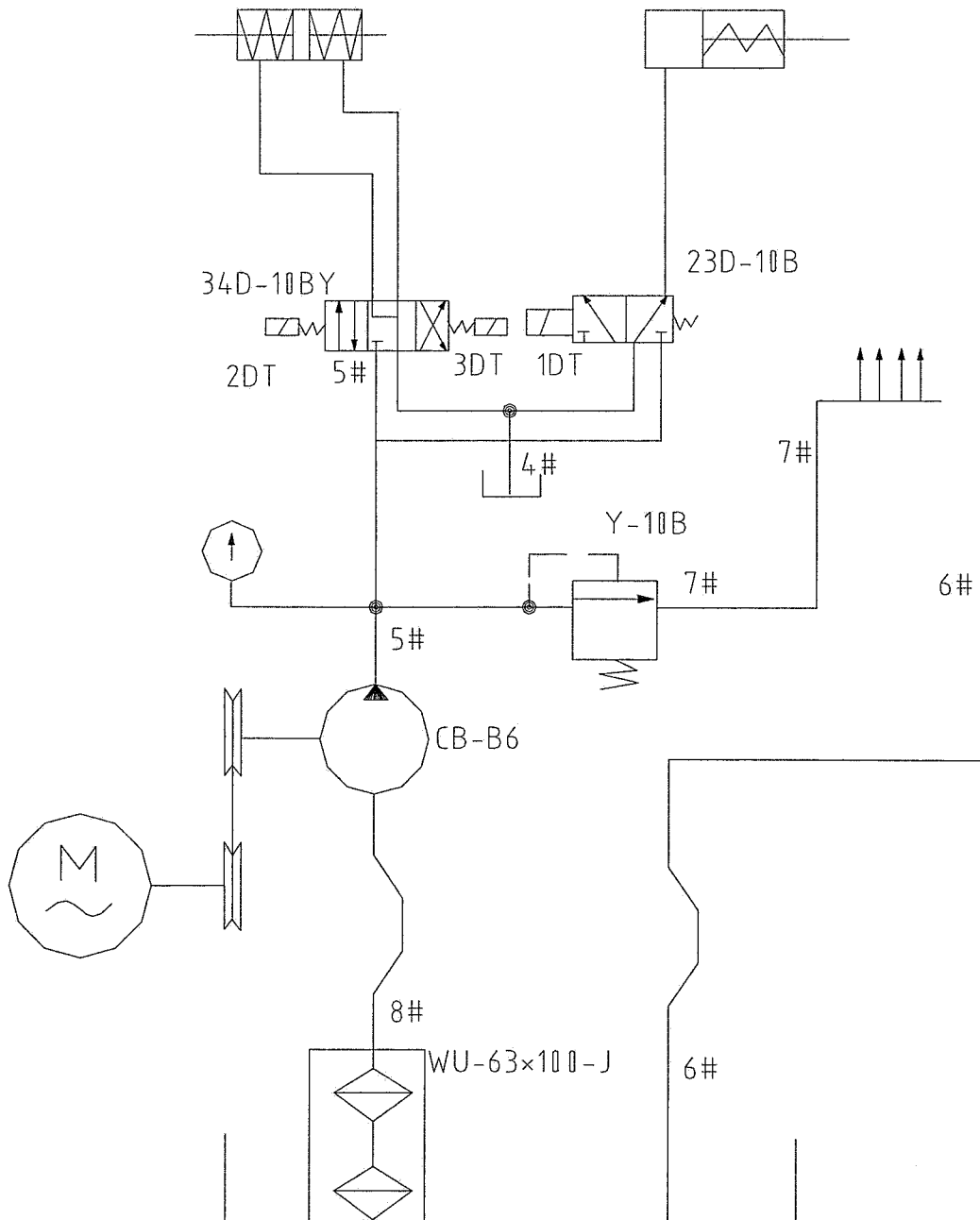
9.3 Maintenance of Electric Apparatus

Principle layout of electric apparatus, Connecting diagram of electric apparatus and List of electric elements may be referred to for the maintenance of the electric apparatus.

9.4 List of electric elements is shown in the following table.

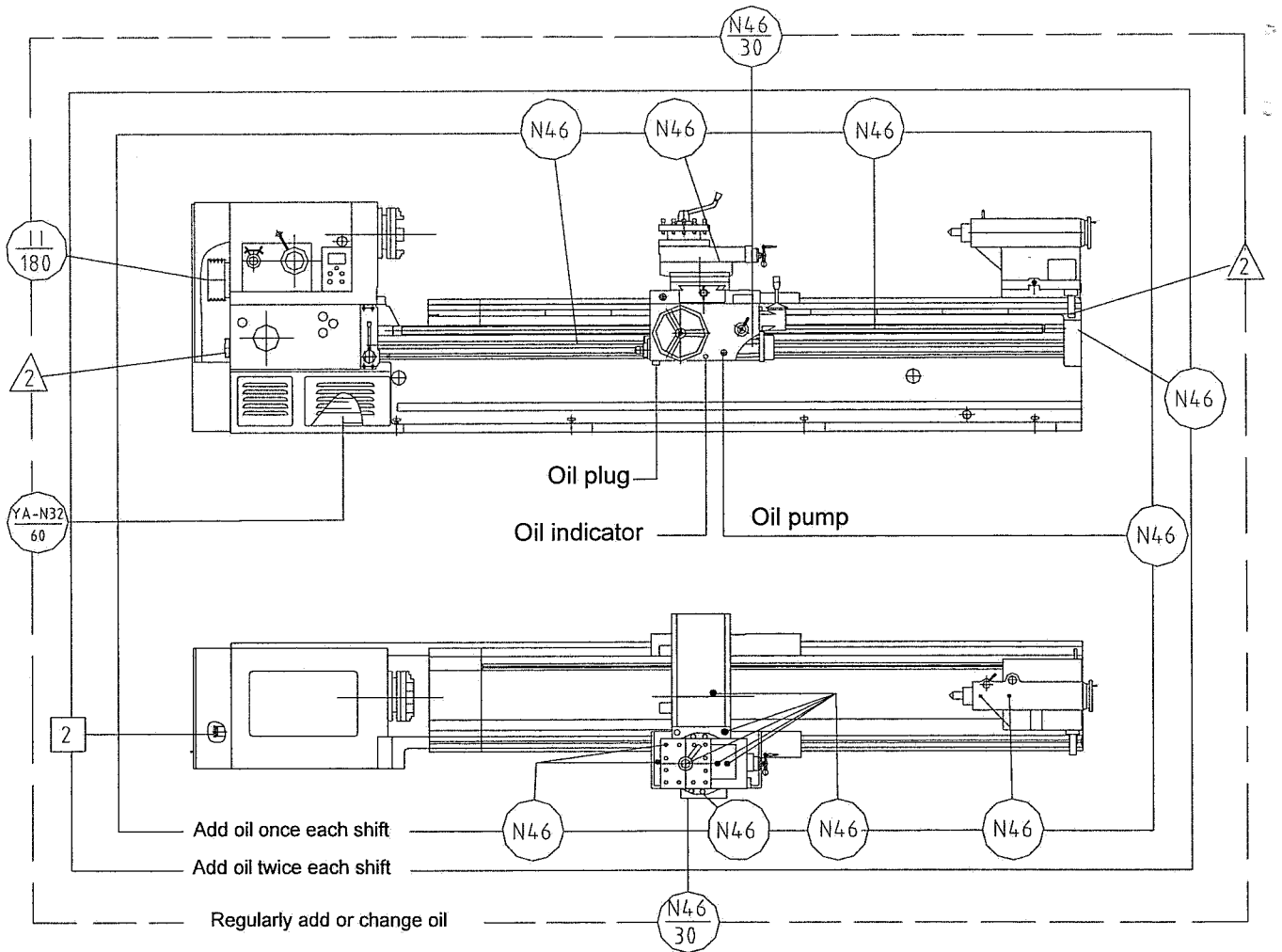
8.5 Pressure meter

The pressure meter is located at the inside of bed cavity beneath the headstock. It is covered by glass and can be seen from outside. The oil upper and lower limits can be observed by moving the ventilation window cover.8.6 Hydraulic principal layout (See Fig.9)



Hydraulic principal layout of 1500-3000mm size machine

lubricating period and method, etc. Details are shown in Fig. 8.





△	Lithium based grease; Change once every 3 years	Performed by oil service man
YA-N32	YA-N32 hydraulic oil	
N46	N46 engine oil	Performed by machine operator
2	Calcium based grease; Turn 1/2 circle each shift	
II	Molybdenum disulphide 4#	Change half a year
 	Numerator indicates oil type and denominator indicates oil change term (days) under two shift working conditions.	

Fig. 8 Diagram of machine lubrication

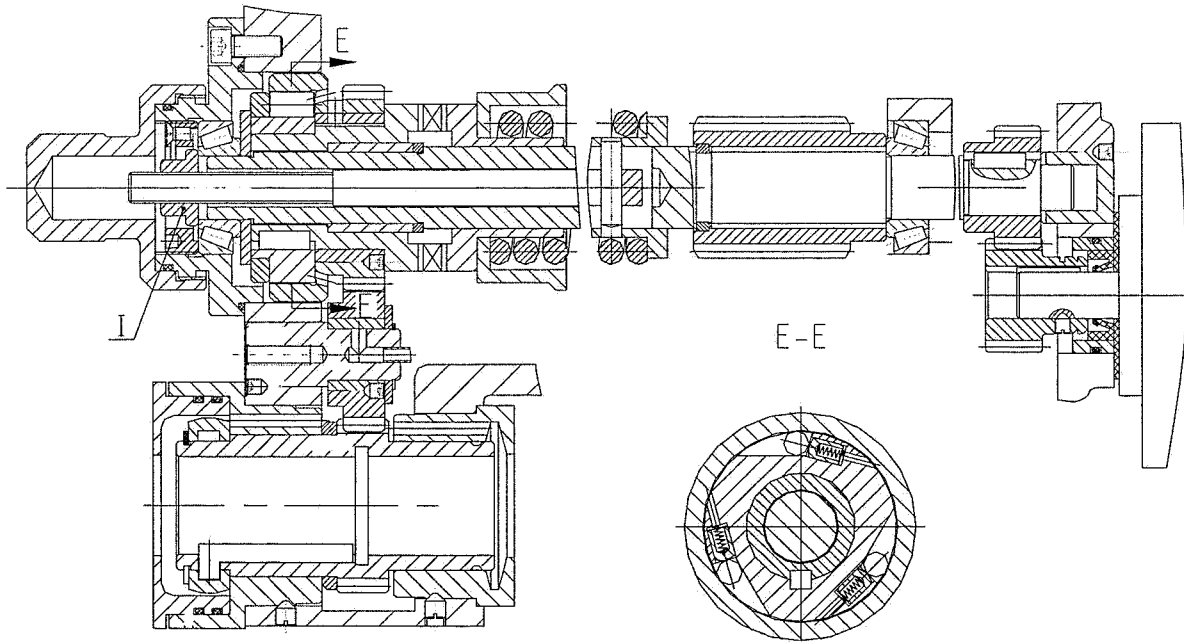


Fig. 6 Adjustment of apron safety device

6.3 Adjustment of clearance between tool post lead screw and nut

The bottom slide nut is split. If there is an axial slip of the lead screw against the nut because of the worn-out of the pair, just tighten the screw to pull the nut. The deformation of the nut maintains the suitable clearance between them (See Fig. 7).

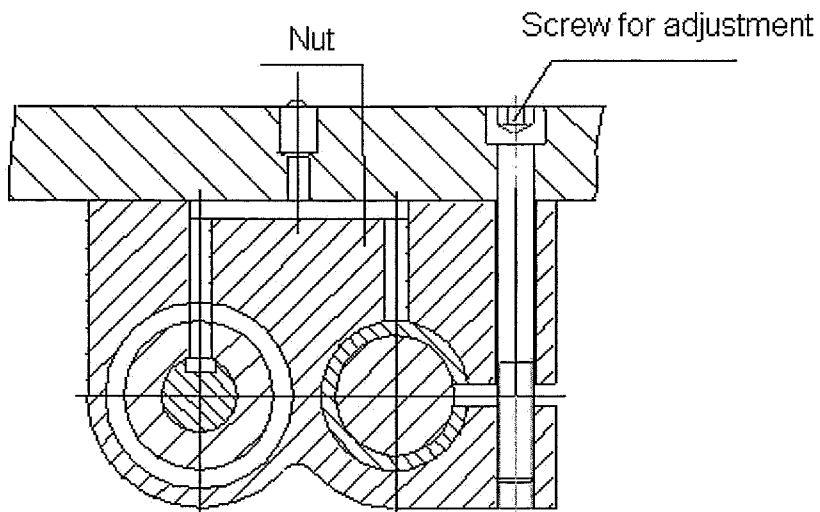
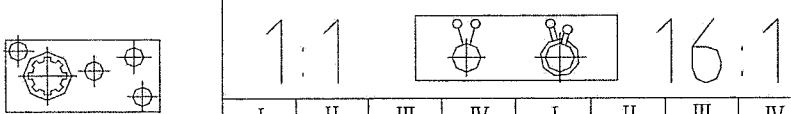


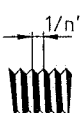





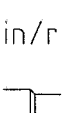



Fig. 7 Adjustment of tool post lead screw

Inch

		1:1				16:1				
		I	II	III	IV	I	II	III	IV	
		1	1	2	4	8	16	32	64	128
		2			4.5	9	18	36	72	144
		3	1.25	2.5	5	10	20	40	80	160
		4			5.5	11	22	44	88	176
		5	1.5	3	6	12	24	48	96	192
		6								
		7	1.75	3.5	7	14	28	56	112	224
		8			7.5	15	30	60	120	240
		1	8	4	2	1				
		2	9	4 1/2	2 1/4	1 1/8				
		3	10	5	2 1/2	1 1/4				
		4	11	5 1/2	2 3/4	1 3/8				
		5	12	6	3	1 1/2				
		6			3 1/4	1 5/8				
		7	14	7	3 1/2	1 3/4				
		8								
		1	0.5	1	2	4	8	16	32	64
		2			2.25	4.5	9	18	36	72
		3		1.25	2.5	5	10	20	40	80
		4			2.75	5.5	11	22	44	88
		5		1.5	3	6	12	24	48	96
		6			3.25	6.5	13	26	52	104
		7		1.75	3.5	7	14	28	56	112
		8			3.75	7.5	15	30	60	120
		1	16	8	4	2	1			
		2	18	9	4 1/2	2 1/4				
		3	20	10	5	2 1/2	1 1/4			
		4								
		5	24	12	6	3	1 1/2			
		6								
		7	28	14	7	3 1/2	1 3/4			
		8								
		1	0.00375	0.075	0.015	0.03	0.06	0.12	0.24	0.48
		2	0.00425	0.0085	0.017	0.034	0.068	0.136	0.272	0.544
		3	0.00475	0.0095	0.019	0.038	0.076	0.152	0.304	0.608
		4	0.00525	0.0105	0.021	0.042	0.084	0.168	0.336	0.672
		5	0.00575	0.0115	0.023	0.046	0.092	0.184	0.368	0.736
		6	0.00625	0.0125	0.025	0.05	0.1	0.2	0.4	0.8
		7	0.00675	0.0135	0.027	0.054	0.108	0.216	0.432	0.864
		8	0.00725	0.0145	0.029	0.058	0.116	0.232	0.464	0.928

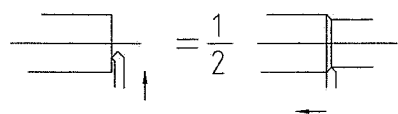


Fig. 4 Feed and thread label

turn the handle for adjusting pitch or feed rate and lead screw or feed rod connector to select suitable metric, inch, module or diametral pitch.

- Use the longitudinal/cross feed and rapid feed lever to move the tool post to the thread cutting position, then put the lever in the middle of the cross slots.
- Press the main motor start button. Turn the spindle operating lever to forward position to run the spindle.
- Manually control the saddle longitudinal feed hand wheel and bottom slide hand wheel to set the distance between the tool and the workpiece. Move the tool a certain distance away and select suitable cutting depth.
- Engage the half nuts operating lever and either of the above mentioned thread cutting method can be performed.

Note: If manual braking is adopted for threading, do not turn the spindle operating lever directly from forward to reverse position. Turn it to the middle braking position and stay for about 2 seconds before turn it to the reverse position. This will prolong the machine service life.

5.7 Spindle stop operation

During working process, the spindle may need stopping its turning for machine adjustment, part change, shift over and so on. The operation process should be as follows:

Manually brake the machine: Turn the spindle operating lever to the middle position and the spindle stops.

If the spindle need to be restarted, the spindle operating lever must be turned to the middle position first before make it run forward or reverse.

5.8 Machine stop operation

- Use the longitudinal/cross feed lever move the tool post near the tailstock. In cross direction move it near the bottom slide hand wheel.
- Turn the spindle operating lever to the middle position.
- Press the motor stop button to stop the motor.
- Turn the coolant pump switch to "0" position, if any.
- Turn the master power switch to "OFF" position.

workpiece should not be too great. As a rule, the projection of the jaws should not exceed the circumference for 1/3 length. Otherwise, the force to the jaws may crash the face threads on it. Try best to use reverse jaws for chucking large diameter parts.

- When use long rod materials, never extend it over the back end of the spindle.
- When a part of irregular shape is chucked, its gravity center may be eccentric to produce imbalance in turning. In this case, additional weight block should be preferably adopted to make it in balance. If it is hard to attach, the spindle speed has to be reduced for safety.

5.3 The cutting tool requirement

Tool size: The tool size should be suitable to mount on the tool post. The distance from spindle center line to tool resting surface is 33mm. Therefore, the tool shank section should be 32mm×32mm. In addition, the height of the tool tip should be the same as the spindle center line.

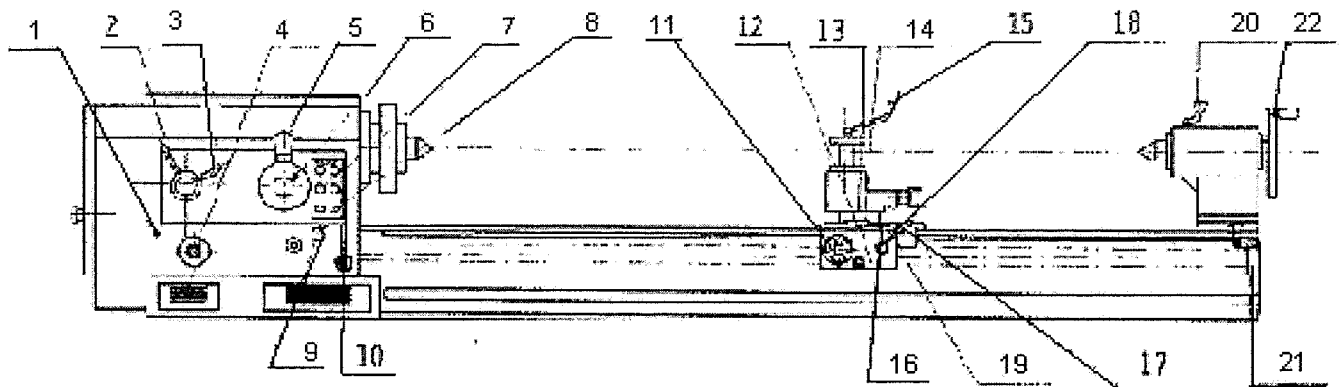
Tool material: Tool material should be suitable for the material to be cut. As a rule, tungsten and cobalt alloy is suitable for cutting of fragile materials such as cast iron and some nonferrous metals. Tungsten, titanium and cobalt alloy is suitable for cutting of plastic material such as steel. High speed steel tool is good for machining irregularly shaped part which may produce shocking during cutting. It can also be used as a fine cutting tool such as wide turning tip tool, thread fine cutting tool and from shaping tool.

The geometrical parameters of a cutting tool should be suitable for the machining requirement.

5.4 Manual feed

- Press main motor start button. Turn the spindle forward/reverse operating lever (4000mm size machine is a button) to forward. The spindle starts to run.
- Turn the longitudinal/cross feed lever to cross slot center. Manually control the saddle longitudinal feed hand wheel and the bottom slide hand wheel. Turn the hand wheel and lever to realize forward or reverse feed.
- Manually control the top slide handle. According to the different swivel angle of the top slide, turn the handle to make longitudinal, cross or slant feed.
- Move the tailstock to machining position. Manually control the tailstock quill feed hand

5. Operation system of the machine



Note: Never change running speed or direction at high speed

Fig. 3 Operation system of the machine

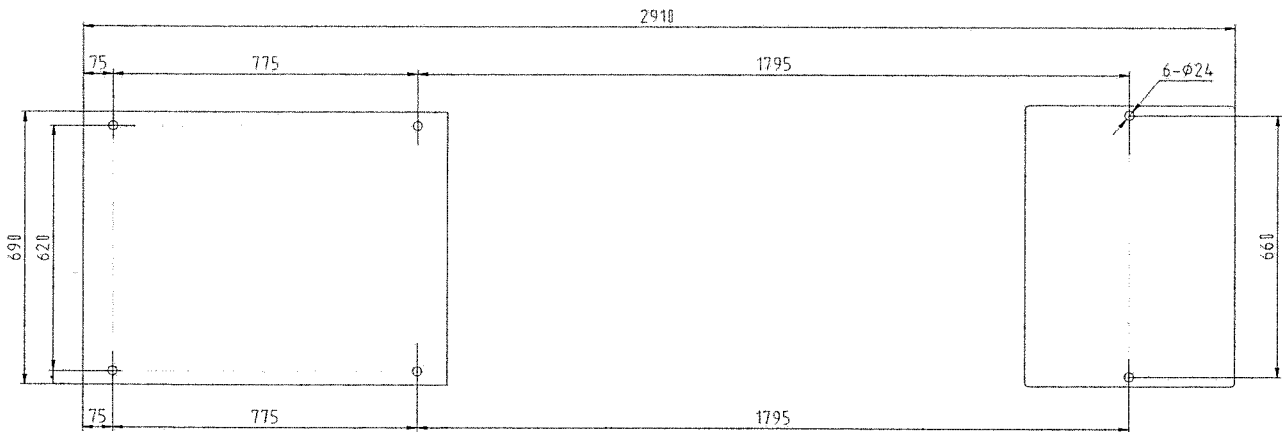
1	Handle for selecting metric or inch thread
2	Lever for selecting right hand or left hand thread
3	Lever for enlarging pitch
4	Handle for adjusting pitch or feed rate
5	Spindle H/L speed change lever
6	Spindle speed change lever
7	Main motor button
8	Coolant pump button
9	Lead screw or feed rod connector
10	Spindle operating lever
11	Saddle longitudinal feed hand wheel
12	Bottom slide hand wheel
13	Top slide auto/manual change lever
14	Top and bottom slide auto feed change lever
15	Tool post swivel and fastening lever
16	Main motor button
17	Spindle operating lever
18	Longitudinal/cross feed and rapid feed lever
19	Half nuts operating lever
20	Tailstock quill clamping lever
21	Tailstock quill feed hand wheel

5.1 Preparation steps

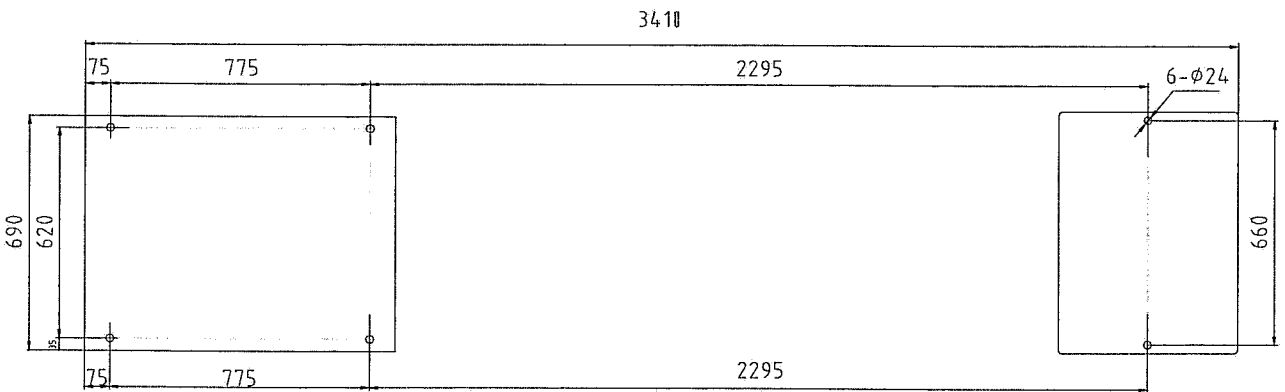
- Turn on the power master switch to light the machine lamp.

directions about the machine construction, control levers and lubrication system, and check the working conditions of each part manually. Proceed with trial running without load.. Only when the machine runs smoothly with full lubrication and reliable control and braking, can the machine be put into production.

To check the running direction of the rapid feed motor, it is necessary to disengage the feed rod from the feedbox so as to avoid parts damage.



Foundation diagram for 1000mm size machine



Foundation diagram for 1500mm size machine

Range of spindle speeds	7.5~1000r/min
8) Number of longitudinal feeds	64 kinds
Range (1: 1)	0.1~1.52mm/r
Range (16: 1)	1.6~24.32mm/r
Range (Using change gears)	0.06~0.912mm/r
9) Number of cross feeds	64 kinds
Range	0.03-0.456mm/r
10) Rapid feed: Longitudinal	4000mm/ min
Cross	2000mm/ min
11) Thread cutting	
Metric: 50 kinds	1 ~ 240mm
Inch: 26 kinds	14 ~ 1 TPI
Module: 53 kinds	0.5 ~ 120mm
D.P.: 24 kinds	28 ~ 1 DP
12) Longitudinal lead screw pitch	12mm
13) Distance from spindle center line to tool resting surface	33mm
14) Section of tool shank	32×32mm
15) Max. cross slide travel	440mm
16) Max. swivel of middle slide	±90°
17) Max. travel of top slide	200mm
18) Tailstock:	
Taper hole	Morse No.6
Max. travel	230mm
Outside diameter	100mm
19) Main motor power	11 KW
20) Rapid feed motor power	1.1 KW
21) Coolant pump power	90W
22) Overall dimensions (L)	3275/3725/4225/5225mm
(W)	1393mm
(H)	1537mm

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Advice to Users

This machine is suitable for two shift operation with each shift being 8 hours. The continuous working time should not exceed 16 hours. Operation regulations should be strictly observed.