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1 Safety Instructions

1.1 General Safety Rules

Operator must read the instructions carefully before operating the machine, and the manager of safety department should assure the operator knows the requirements well.

1) The operation, maintenance and repair of the machine must be done by qualified persons who have been trained the ability to forecast the potential risks. Only safety-conscious persons who are fully aware of the risks can operate the machine.

2) To those people who assemble, operate, or maintain the machine must be confirmed to have read and understood the operating instructions.

3) After stopping the machine, the chuck will still run for a period of time due to inertia, so you need to pay extremely attention to the chuck when you remove the chuck guard and fetch the workpiece.

4) Do not detach or modify any safety guard. Be sure that the machine is disconnected from the power when adjusting, maintenance and repair.

5) Do not dismantle any safety precaution sign attached to the machine. They should always be kept clean and legible.

WARNING! Never touch the tool or any other driving parts with hands when they are still turning.

6) Assign only special persons to operate, maintain and adjust the machine.

7) Operate the machine in accordance with technological process. Only qualified persons can completely repair the machine.

8) Use standard spanners and pliers for adjustment and repair.

9) Stop the machine immediately if an abnormality occurs. Ask for qualified persons to check and repair.

10) Dismantle and assembly the machine with the hoisting equipment which is of enough load capacity.

11) Observe all safety instructions and warnings attached to the machine; make sure they are always complete and perfectly legible.

12) Do safety inspection before operating. Be sure that limit switches for each axis, stop dogs and emergency stop button are all in good condition.

13) Reinstalled the removed guards and safety devices in place after maintaining.

14) Do maintenance or adjustment only after switch the machine off and remove the plug from the power source outlet, until all moving parts absolutely stop.

15) Always keep children away from the machine. Operating personal must be at least 18 years of age.

16) Do not wear loose clothing, gloves, neckties or jewelry (rings, watches, etc). Keep the sleeves and the edges of the work uniform tight. Always be sure to wear safety goggles and safety shoes during operation.

17) Those with long hair, no matter whether it is a man or woman, should wear safety hat and wrap the hair in

when operating.

18) The machine was inspected carefully before shipment from factory. Its noise emission is not higher than 81dB. Wear suitable personal protective equipment when necessary, for instance, wear hearing protection to reduce the risk of induced hearing loss.

19) Provide adequate light around the machine, and keep the perimeter around the machine dry, clean and in good order. In addition, do not place anything near the machine; otherwise it becomes an obstacle during operation.

20) Do not move away any guard during all working.

21) Isolate the machine from the power sources when leaving the machine.

22) Restart the machine only after the guards and safety devices are replaced to their position.

23) Do not place tools, work-pieces or other items on the machine, especially on the moving parts.

24) Do not start the spindle unless the workpiece is clamped completely in the chuck, and the key is taken away from the chuck and the chuck guard is closed.

25) When chucking an irregular-shaped workpiece, make some adjustments to center of its gravity so that the workpiece can rotate steadily.

26) Stop the machine before adjusting the position of the coolant nozzles.

27) Avoid as much as possible, using compressed air to remove dust and chips etc. deposited on the machine, switchboard, NC controller etc.

28) The fixtures to be set on the machine must have sufficient rigidity and proper steps should be taken so that the surface of the fixtures will be slip-free.

29) Both operators and the maintenance men should read with care the description on the caution plate attached to the machine. They should observe the precautions on this plate during their work. During operation and maintenance, care should be used so that this caution plate is not dirtied or damaged..

30) Memorize where the emergency stop push button is so that it can be depressed without delay in case of an emergency.

31) Follow the starting procedures given in this manual to start the machine.

32) Keep your hands away from the moving parts of the machine during operation.

33) Do not get direct access to the work light when it is on. That may cause being scalded.

34) Never remove chips from machine during operation. Especially do not handle chips with hands.

35) When removing chips caught around the turret or deposited on machine, take them out with a tool instead of hand, because your hand may be injured. Be sure to stop the machine when removing chips from it.

36) Prior to starting test operation, carefully read this manual so as to be completely familiar with this machine.

37) Contact this company if for some reason the manual should become unreadable.

38) When setting up a tool, stop the spindle and the feed in each axis.

1.2 Additional Safety Rules for machine

WARNING! Except the safety precautions the following points should always be followed to reduce the risk of fire, electrical shock and personal injury including the following:

Read all these instructions before attempting to operate this product and save these instructions.

1) Operating speed of spindle should not exceed permissible speed of chuck (See Operator's Manual of Chuck).

2) Do not use a turning tool that is damaged or deformed or unsharp.

3) Be sure that the machine is disconnected from the power when adjusting, maintenance and repair.

4) Be sure to switch off the machine when performing periodical maintenance or service.

5) Release the carriage by loosing the lock screws before moving it longitudinally.

6) Add oil or grease to every oil site including guideways, oil cups and 3 cases for ensuring safe and normal operation.

7) Use special tools to install turning tool.

8) Wear suitable personal protective equipment when necessary, this could include:

- Eye protection safety goggles
- .Safety hat or headgear for long hair
- Tight work uniform from head to foot
- Safety shoes
- Hearing protection

9) When turning a slender shaft work, recommend to fasten it with a follow rest, or steady rest or tailstock to prevent it from getting off.

10) Put the machine on a solid foundation.

11) Never machine flammable materials (like magnesium bar)

12) Always use in a well-ventilated area. Remove dust frequently. Clean out dust from the interior to prevent a potential hazard.

13) Store idle tools. When not in use, tools should be stored in a dry locked-up place, out of reach of children.

14) Keep the cord away from heat, oil and sharp edges.

15) Stay alert. Watch what you are doing, use common sense and do not operate the tool when you are tired.

16) Inspect the cords and extension cords periodically and if damaged have them repaired or replaced.

17) Have the machine repaired by a qualified person. Using of electric tools should comply with the relevant rules.

18) Repair of important parts should only be carried out by qualified persons using original spare parts; otherwise

this may result in considerable danger to the user.

19) When the machine is used outdoor, use only extension cords intended for outdoor use.

20) Recommend to use rust preventive coolant. Important: Coolant must be used in correct ways. Care not to spill it into eyes or onto skin. If do without intention, wash them with plenty of water and go to see a doctor at once.

21) Recommend to use refined petrolatum per ISO VG46 (GB/T3141 N46) lubricating the guideways, and to use refined petrolatum per ISO VG32 (GB/T3141 N32) lubricating every cases.

22) Hand tools are not allowed to use on the machine.

23) When repairing the chuck, please follow the requirements of manufacturer. Make sure that the rated speed of chuck should not be lower than the maximum speed of machine spindle.

24) The machine must be checked for balance and alignment after replacement of fixtures.

25) Be sure to clamp the workpiece completely and not to leave the wrench on the chuck before starting the machine.

26) When turning a long bar, user must protect the part of bar that stretches out of spindle back end using a guard. Remove the guard after completion of machining.

27) Irregular-shaped workpieces should be cut at a low speed and in balanced state.

28) The machine should be grounded to reduce risk of getting shocked.

29) Do not operate the machine in flammable, explosive and damp environment.

WARNING! FAILURE TO FOLLOW THESE RULES MAY RESULT IN SERIOUS PERSONAL INJURY.

WARNING! DO NOT EXPOSE THE MACHINE TO RAIN OR IN DAMP LOCATIONS.

Transport:

Move the machine to a location with lifting hooks or forklift truck. Observe the lifting marks painted on the case when lifting. Lifting can only be started after the case is opened or the skids are removed.

In order to keep balance, move the carriage and tailstock to the extremely right side, and lock them there.

Lift the machine according to Fig. 9-1. Insert a steel bar of 35mm diameter and of 760mm long, and stretch out at least 100mm away from every side of machine. When lifting, use wire ropes of 12mm (1/2") diameter. Prevent direct contact between ropes and machine by insertion of wood or used chipboards. Raise and lower the machine carefully, and take special care to prevent impact with any object at the time of lowering. During transporting, the machine should be fastened firmly. The parts easy to be collided should be packed with shock absorption material. The uncovered parts of the machine such as table should be smeared with anti-rust oil.

Installation:

Prepare sufficient space to put the machine and allow safe operation and normal service.

Requirements: Leave at least 600mm between machine back, tailstock and wall. Mount the machine on flat concrete ground and adjust the machine level with gradienter, then fasten it.

For training:

(1). The operator must be trained for safety and operation before using the machine.

(2). Be sure to disconnect power supply before making some adjustment and performing service..

(3). Always wear gloves when handling tools or cutters.

For work-piece guiding:

(1). The work-piece is possible to be made of the following materials:

- steel
- casting
- copper

(2). The work-piece is possible to take the following shapes:

- cylindrical
- disk
- pipe
- irregular shape

If the work-piece may affect the process due to unbalance it should be treated additionally. For example, an irregular shaped workpiece can be cut by adding a weight.

WARNING: FAILTURE TO FOLLOW THESE RULES MAY RESULT IN SERIOUS PERSONAL INJURY.

1.3 Limitations on ambient conditions

The machine is designed for operating on the site:

- The height above sea level doesn't exceed 1000m;
- The temperature range of air doesn't exceed 5℃~40℃
- The relative humidity doesn't exceed 50% or 90% at a maximum temperature of +40℃ or +20℃.
- Transportation and storage temperature range is -25℃~+55℃.

1.4 Notes on handling electrical unit

When operating the machine or performing check and maintenance, observe the following notes.

(1) Be careful not to touch and jolt the NC controller and the electric circuits.

(2) Be sure to use a wire or cable of proper length for connecting power supply to the machine. When the power wire or cable inevitably runs across the floor, take adequate measures to protect it against damage from chips etc.

(3) Do not change the value of current, which has been set with the thermal relay on the distribution board, or other values set previously to various volumes. Use breakers specified in the operation manual for

replacement.

(4) Before checking and maintaining the electrical apparatus, turn off the power switch of the control panel, and the main switch of the distribution board. In addition, turn off the power switch supplying power from the plant to the machine. Proceed with checks and maintenance only upon confirmation that the power has indeed been cut off. If possible, the power supply should be locked in the off-position during checks and maintenance, or else signs should be posted warning that the maintenance is being performed and no operation is permitted.

(5) Handle the electrical apparatus of machine with cautions and pay attention to their water proofness.

(6) An external power supply cable should be prepared by user, which must be larger in diameter than that specified by the manual. Use over voltage protects. Cable in bottom of cabinet should be fixed with cable connector.

(7) Rated input voltage with fluctuation: 220V/380V/400V/415V/420V/440V/500V/575V/600V/660V±10%

(8) Rated input frequency: 50Hz/60Hz±1 Hz

(9) Phase: 3-phase AC, grounding

(10) Ambient temperature and humidity should be controlled as steady as possible so that there is no violent change.

(11) Do not expose the machine as well as the electric unit to environment where corrosive gas or liquid exist such as acid, alkali and salt.

(12) Do not expose the machine as well as the electric unit to dusty environment. Avoid dust accumulating on any parts of machine.

(13) Do not expose the machine as well as the electric unit to magnetic or electrostatic environment.

Table of electric data

Rated voltage	Frequency	Phase	Total Current	IP grade
220V	50Hz/60Hz	3	63A	IP54
380V/400V	50Hz/60Hz	3	50A	IP54
415V~660V	50Hz/60Hz	3	40A	IP54

1.5 Safety precaution signs on machine

DANGER

Never touch the parts of machine attached with this sign.

WARNING AND CAUTION

Proper precautions should be taken.

External power cable should be correctly connected to terminals marked by this sign.

Do not operate during rotating of spindle.

2 Application of machine

2.1 This lathe in series can perform many operations, such as internal and external turning, taper turning, facing, threading of metric, module and DP threads, drilling, boring and groove broaching.

2.2 Gap-bed lathe, additionally, can machine all kinds of flat stocks and those in irregular shapes.

2.3 Machining accuracy: circularity deviation less than 0.01 mm, cylindricity deviation not more than 0.02 mm for a measured length of 200 mm, surface finish is excellent.

2.4 With ø 105mm thru-bore spindle, the lathe can hold bar stocks in larger diameter.

2.5 The lathe has a wide range of optional accessories for users to select.

3 Technical data

Table 3-1 Technical data

Item \ Model / Data	CS6150C	CS6250C	CS6166C	CS6266C
	CS20"C	CS20"GC	CS26"C	CS26"GC
Max. swing over bed	Φ500mm(20")		Φ660mm(26")	
Max. swing over slide	Φ300(12")		Φ420mm(17")	
Max. swing over gap		Φ710mm(28")		Φ870mm(34")
Effective length in gap		240mm(9")		240mm(9")
Max. workpiece length	750mm/1000mm/1500mm/2000mm/3000mm(30"/40"/60"/80"/118")			
Max. turning length	700mm/950mm/1450mm/1950mm/2950mm(28"/38"/58"/78"/116")			
Spindle thru-hole	Φ105mm(4")			
Dia. and taper of spindle bore	Φ113 1:20 (4 1/2". 1:20)			
Spindle nose	Cam lock type			
Spindle speeds	12 steps 36—1600r/min			
Number and range of long. feeds	65 sorts 0.063-2.52mm/r(0.0023-0.0937in/r)			
Number and range of cross feeds	65 sorts 0.027-1.07mm/r(0.0011-0.0404in/r)			
Number and range of threading				
Metric threads	1-14mm, 22 sorts			
Inch threads	28-2 tpi 25 sorts			
Module threads	0.5-7mm, 18 sorts			
D.P. threads	56-4DP, 24 sorts			
Longitudinal rapid traverse	4.5m/min(15ft/min)50Hz, 5.4m/min(18ft/min)60Hz			
Cross rapid traverse	1.9m/min(6.37ft/min)50Hz,2.3m/min(7.67ft/min)60Hz			
Pitch of leadscrew	12mm(2tpi)			
Height of spindle to bearing surface of tool	28mm($1\frac{3}{32}$")			
Tool section	25mm×25mm (1"×1")			
Swivel angle of fourway tool post	±90°			
Max. travel of compound rest	145mm (5 3/4")			
Max. travel of cross slide	320 (12 1/8")		310 (12 3/32")	
Tailstock quill diameter	75 (2 61/64")			
Taper of tailstock quill	MT No.5			
Max. travel of quill	150mm (5 29/32")			
Cross move of tailstock	±15mm (±19/32")			
Main motor type, power and speed	Y132M 7.5KW(10HP)1450r/min 50Hz(1750r/min 60Hz)			
Rapid traverse motor type, power and	2AOS 5634 250W(0.34HP)1360r/min 50Hz(1750r/min 60Hz)			

Item \ Data \ Model	CS6150C	CS6250C	CS6166C	CS6266C
	CS20"C	CS20"GC	CS26"C	CS26"GC
speed				
Coolant pump type, power and flow	AOB-25,60W(0.08HP),25L/min(5.5gal/min)			
V-belt	B2311 4 pieces		B2464 4 pieces	
Machine net weight				
750 (30")	2050kg (4520lb)		2150kg (4735lb)	
1000 (40")	2100kg (4630lb)		2200kg (4845lb)	
1500 (60")	2300kg (5070lb)		2400kg (5286lb)	
2000 (80")	2500kg (5510lb)		2600kg (5727lb)	
3000 (120")	2900kg (6390lb)		3000kg (6610lb)	
Machine dimensions(LxWxH)				
750 (30")	2382mmx975mmx1270mm (94"x38 3/8"x50")		2382mmx975mmx1450mm (94"x38 3/8"x55")	
1000 (40")	2632mmx975mmx1270mm (104"x38 3/8"x50")		2632mmx975mmx1450mm (104"x38 3/8"x55")	
1500 (60")	3132mmx975mmx1270mm (123"x38 3/8"x50")		3132mmx975mmx1450mm (123"x38 3/8"x55")	
2000 (80")	3632mmx975mmx1270mm (143"x38 3/8"x50")		3632mmx975mmx1450mm (143"x38 3/8"x55")	
3000 (120")	4632mmx975mmx1270mm (183"x38 3/8"x50")		4632mmx975mmx1450mm (183"x38 3/8"x55")	

4 Machine drive system

4.1 Tables and diagrams

Fig.4-1 shows the machine's drive system. Table 4-1 lists all the metric parts while Table 4-2 lists all the inch parts. Every bearing in drive system is listed in Table 4-3 and their positions are illustrated in Fig. 4-2.

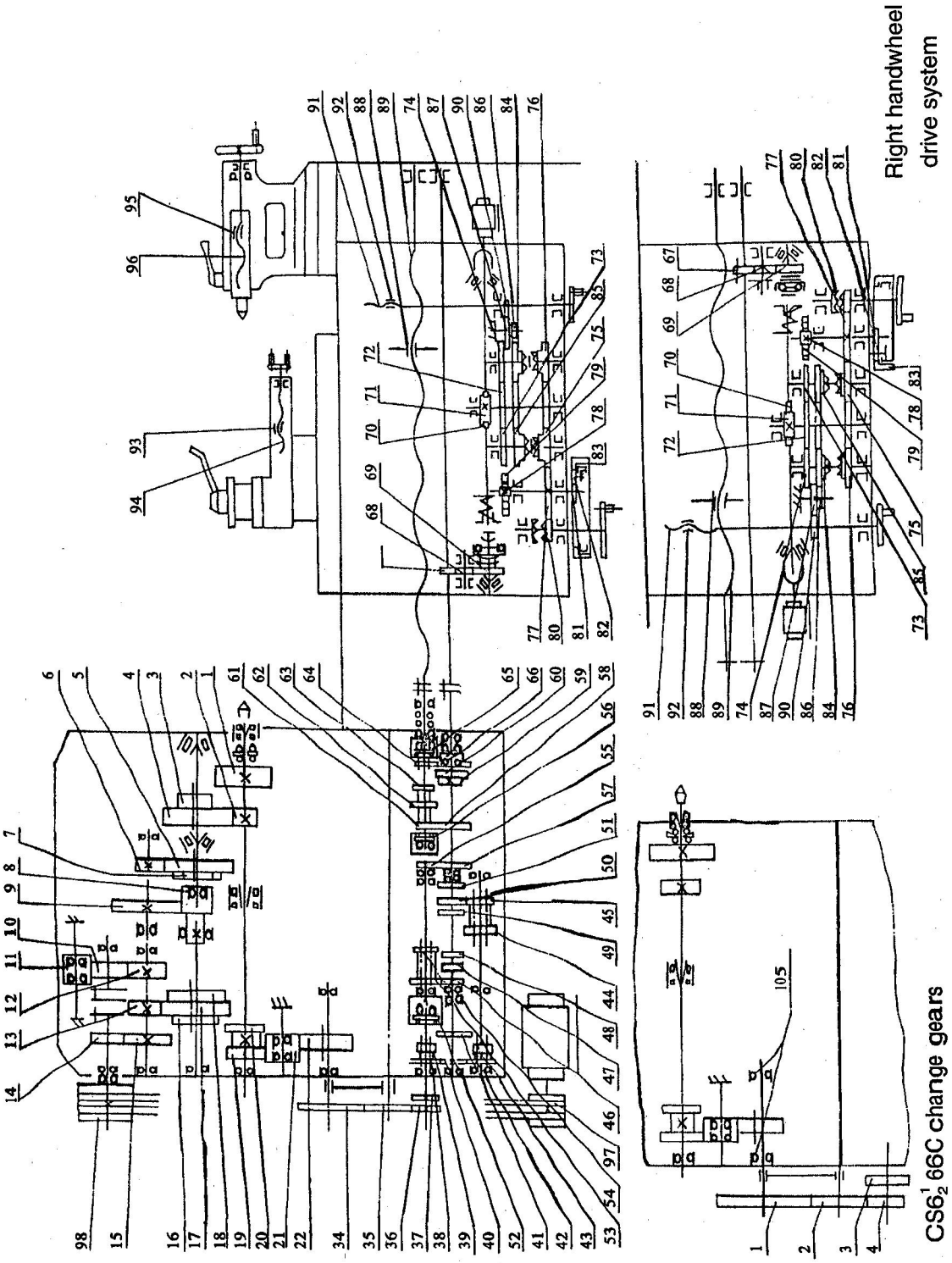


Fig. 4-1 Diagram of drive system

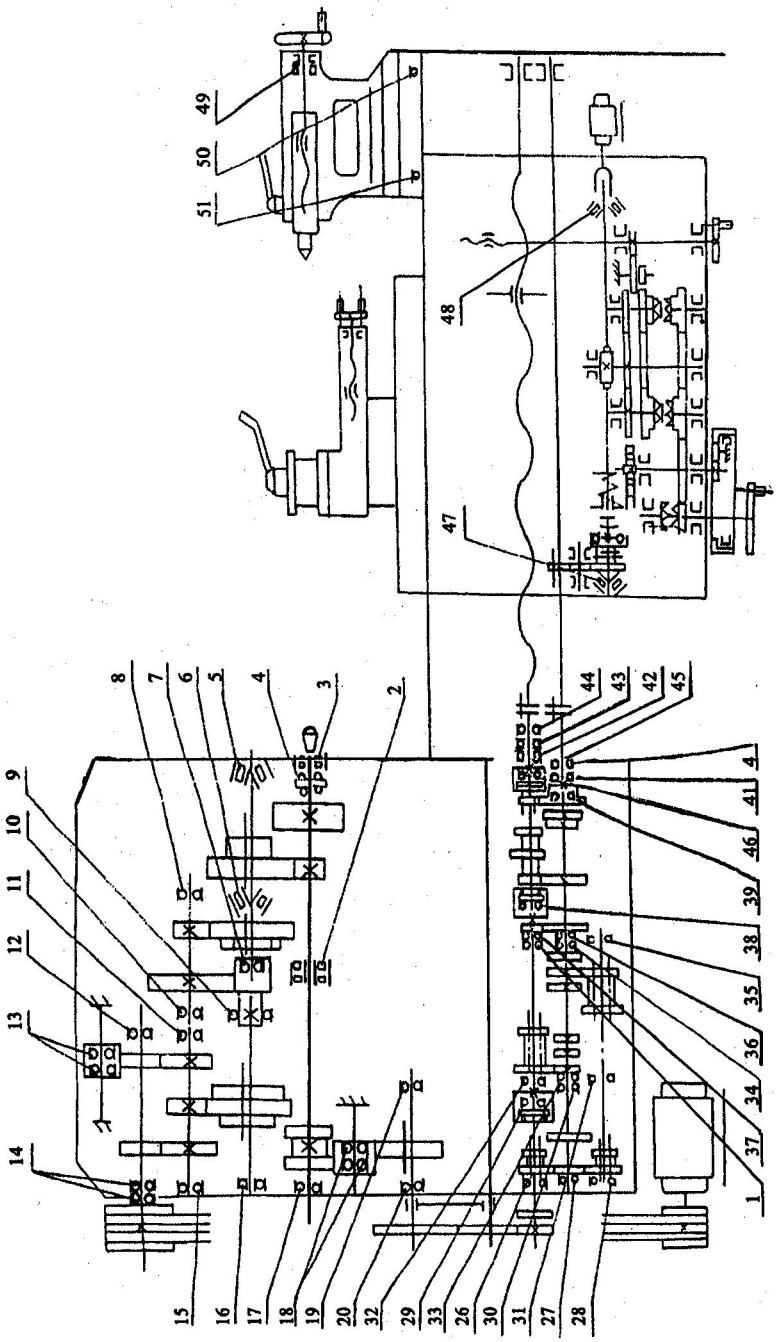


Fig. 4-2 Diagram of location of bearings

Table 4-1 List of metric drive parts

Name	No.	Part No.	No.of teeth or starts	Module or pitch	Position change ratio or start dir.	Helix / profile angle	Material	Heat treat-ment
Head-stock	1	02006	80	3.5	RH	20°/10"	40Cr	G48
	2	02009	51		LH			
	3	02062	36					G52
	4	02060	65		RH			
	5	02045	56	3	-0.5	20°		
	6	02055	20		+0.5		20Cr	So.8-G55
	7	02055	20				40Cr	G52
	8	02046	20		-0.5			
	9	02054	56					G50
	10	02051	45	2.5			45	G48
	11	02036	28					
	12	02050	45				40Cr	G52
	13	02049	38					
	14	02034	49				45	G48
	15	02048	53				40Cr	G52
	16	02025	38				45	G48
	17	02024	53					
	18	02023	46					
	19	02022	62				40Cr	G50
	20	02022	62					
	21	02016	30					G52
	22	02014	62				45	G48
Change gear	34	08042	60	2.25		20°	45	
	35	08043	69					
	36	08041	56					
	37	08044	57					

To be continued.

To continue from the above table

Name	No.	Part No.	No.of teeth or starts	Module or pitch	Position change ratio or start dir.	Helix / profile angle	Material	Heat treatment
	38	07061	28	2.25	+0.60			
	39	07061	30	1.75				
	40	07062	27	2.25	-0.1323			
	41	07063	41	1.75	+0.5254			
	42	07064	30	2.25	-0.3323			
	43	07064	29	1.75	+0.5731			
	44	07066	21	3	+0.50			
	45	07066	28	2	+0.30			
	46	07073	20		+0.04256			
	47	07072	18	3	+1.352			
	48	07071	21		-0.50		45	
	49	07069	36		-0.7687			
	50	07068	32	2	+1.444			
Feed-	51	07067	33		+0.8117			
ing	52	07065	30	1.75		20°		G42
case	53	07066	21	3	+0.50			
	54	07066	28	2	+0.30			
	55	07032	14		+0.40			
	56	07032	22					
	57	07076	42		-0.40			
	58	07077	33	2.25	+0.1323			
	59	07078	15		+0.5324		40Cr	
	60	07079	24					
	61	07074	22		+0.40			
	62	07074	40		+0.25			
	63	07074	32	2			45	
	64	07075	21					
	65	07034	21		+0.25			
	66	07038	42		-0.25			

To be continued.

To continue from the above table.

Name	No.	Part No.	No.of teeth or starts	Module or pitch	Position change ratio or start dir.	Helix / profile angle	Material	Heat treat-ment
Apron	67	06061	36	1.5	LH	20°	40Cr	G48
	68	06062	32				45	
	69	06063	56				GCr15	C60
	70	06057	2	2.5		6°20′25"	45	G48
	71	06021	26				ZQSn6-6-3	
	72	06064	32	1.75		20°	45	
	73	06065	36					
	74	06065	36					
	75	06066	45				40Cr	
	76	06066	45					
	77	06069	87				45	
	78	06052	12	2.5	+0.249			
	79	01024	rack					
	80	06071	18	1.75				
	81	06072	28	1.5				
	82	06073	20					
	83	06074	89					
	84	06066	45	1.75			40Cr	G48
	85	06066						
	86	06067	35				45	
	87	06068	58					
	88	06022	1	12			ZQSn6-6-3	
	89	01021					Y40Mn	
RH apron	79	01024A		2.5		20°	45	
	89	01021A		12			Y40Mn	
	70	06057A	2	2.5	LH	6°20′25"	45	G48
	78	06052A	12		+0.049	20°		
Tool post	90	05031	18	1.75			40Cr	
	91	05021	1	5	LH		Y40Mn	
	92	05011					ZQSn6-6-3	
	93	04011					HT200	
	94	04031					Y40Mn	
Tail-stock	95	03022						
	96	03005					HT150	
Pulley	97	15002	Φ115	B type			HT150	
		15002 /60Hz	Φ93					
	98	02003	Φ175					

Table 4-2 List of inch drive parts

Name	No.	Part No.	No.of teeth or starts	Module or pitch	Position change ratio or start dir.	Helix / profile angle	Material	Heat treat-ment
Change gear	34	08042Y	82	1.5		20°	45	
	35	08043Y	114					
	36	08041Y	81					
	37	08044Y	69					
Apron	81	06072Y	30	1.5		20°	45	
	82	06073Y	28					
	83	06074Y	97					
	88	06022Y	1	12.7			ZQSn6-6-3	
	89	01021Y					Y40Mn	
Tool post	91	05021Y	1	5.08			Y40Mn	
	92	05011Y					ZQSn6-6-3	
	93	04011Y		5.08			HT200	
	94	04031Y					Y40Mn	
Following parts are exclusively for CS6 $\frac{1}{2}$ 66C.								
Change gear	1	08042	60	2.75		20°	45	G42
	2	08043	69					
	3	08044	57					
	4	08041	56					
Change gear (inch)	1	CS6140 08044	57	2				
	2	08042Y	82					
	3	08045Y	95					
	4	08044Y	81					
	5	CS610 08043	69					

Table 4-3 Bearing location

Type	Specification	Qty.	Number on diagram
7000106	30X55X9	2	44,45
105	25X47X12	10	1,4,7,13,18,31,37,40
106	30X55X13	1	20
203	17X40X12	9	29,30,33,34,35,36,38
205	25X52X15	2	19,32
206	30X62X16	1	8
207	35X72X17	1	10
208	40X80X18	4	9,12,14
303	17X47X14	1	27
304	20X52X15	1	28
305	25X62X17	1	26
306	30X72X19	3	11,15,16
7205	25X52X16.5	2	47,48
7508	40X80X25	1	6
7608	40X90X35.5	1	5
D8106	30X47X11	2	42,43
D2268930	150X110X70	1	4
B205	25X47X15	1	49
17	7X19X6	4	50,51
D7000124	120X180X19	1	17
D3182126	130X200X52	1	2
D3182130K	150X225X56	1	3

5 Machine operation

5.1 Controls

Fig.5-1 shows the location and function of controls on machine.

5.2 Method

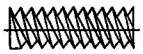
Different spindle speeds are available by setting spindle speed shifting levers (8) and (10).

12-step spindle speeds of clockwise or counter-clockwise are gotten if Lever (8) is set to one of its 4 positions and Lever (10) to a position with the same color as that of Lever (8). See Table 5-1.

5.3 Feed system

Setting the pitch and feed: Different pitches and feeds are available by setting lever (6) on headstock, control knob (7), (9) and (11) on feeding case.

a) Feed selector lever (6) is used to change pitch of threads and helix direction, or to change feeds. Because of a single-direction overrunning clutch fixed in the apron, feed motion is impossible unless lever (6) is set to RIGHT-HAND position.

 Right-hand thread with normal pitch. Feed is available.

 Left-hand thread with normal pitch. No feed.

b) Thread selector (7) is designed to select type of threads and also can be used to change feeds.

t	Metric thread
n	Inch thread
m	Module thread
DP	Diametral pitch thread
	Neutral

c) Pitch and feed control knob (9) is used to change pitch and feed.

d) Pitch and feed knob (11) is used to multiply the pitch and feed by means of lead screw and feed rod.

I , II , III, IV: Lead screw is engaged to cut a thread.

A, B, C, D: Feed rod is engaged to give a feed motion.

Ratio: I : II :III:IV=A:B: C: D=1:2:4:8

By setting the above levers and knobs accordingly different feeds listed in Table 5-2 are obtained. To ensure good operating of machine setting levers and knobs should be based upon the principle that a higher spindle speed matches a finer feed, and vice versa.

Threads excluded from Table 5-2 can also be cut . To do so, thread selector (7) must be set to NEUTRAL

position and pitch and feed knob (11) Ⅳ position. Change gears should be re-engaged as required.

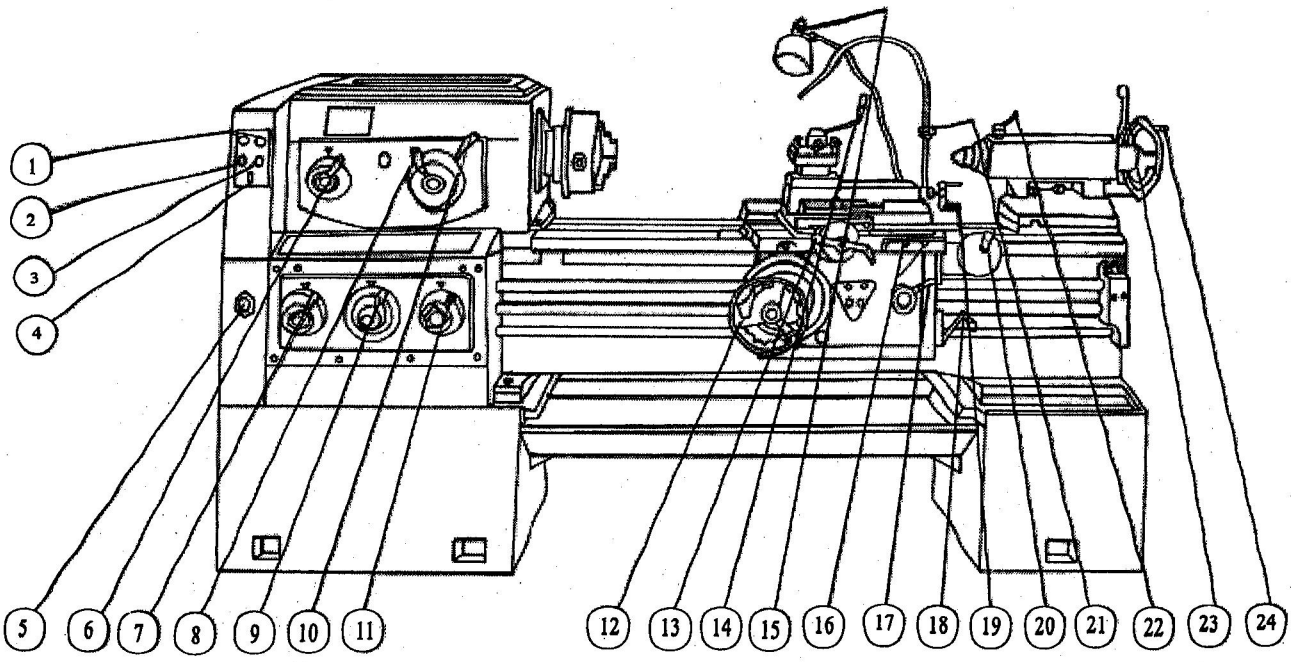
5.4 Carriage operation

a) Feed axis selector and rapid traverse button (20) is used to move the carriage or rapidly traverse it in the direction it is set. For CS6$\frac{1}{2}$66C lathes, button (21) is used. To rapidly traverse the carriage the button on head of the lever should be pressed and held till the carriage moves to the desired position.

b) Half nut lever (17) is used to move the carriage back and forth along the bed when cutting threads. For CS6$\frac{1}{2}$66C lathes, button (18) is used.

c) Apron hand-wheel (12), cross slide handle (13) and compound rest handle (19) are all manual controls. For CS6$\frac{1}{2}$66C lathes, Apron hand-wheel (13) , cross slide handle (14) and compound rest handle (20) are all manual controls. Each of them has a dial on its base to indicate distance moved.

5.5 Spindle control lever (18) is used to operate the spindle i.e. forward rotation, reversal rotation and stop. For CS6$\frac{1}{2}$66C lathes, spindle control lever (19) is used. For other controls, see Fig. 5-1 the operation diagram.



(1) Coolant supply ON/OFF button

(2) Emergency stop button

(3) Main motor start button

(4) Power switch

(5) End cover lever

(6) Feed selector lever

(7) Thread selector

(8) Spindle speed shifting lever

(9) Pitch and feed control knob

(10) Spindle speed shifting lever

(11) Pitch and feed knob

)n handwheel

(13) Cross slide handle

(14) Tool post lever

(15) Work lamp switch

(16) Main motor control button

(17) Half nut lever

(18) Spindle control lever

(19) Compound rest handle

(20) Feed axis selector and rapid traverse button

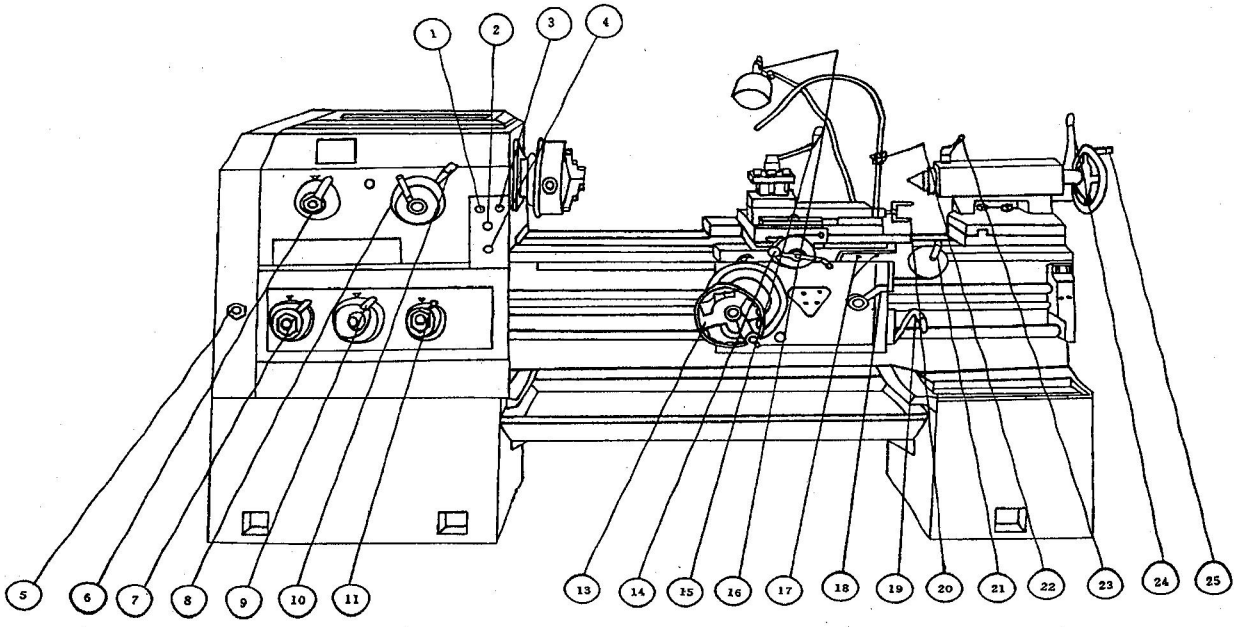
(21) Coolant flow faucet

(22) Tailstock quill lock lever

(23) Tailstock clamping lever

(24) Tailstock handwheel

Fig. 5-1a Location and function of controls on CS6 $\frac{1}{2}$50C



(1) Coolant supply ON/OFF button

(2) Emergency stop button

(3) Main motor start button

(4) Power switch

(5) End cover lever

(6) Feed selector lever

(7) Thread selector

(8) Spindle speed shifting lever

(9) Pitch and feed control knob

(10) Spindle speed shifting lever

(11) Pitch and feed knob

(13) Apron handwheel

(14) Cross slide handle

(15) Tool post lever

(16) Work lamp switch

(17) Main motor control button

(18) Half nut lever

(19) Spindle control lever

(20) Compound rest handle

(21) Feed axis selector and rapid traverse button

(22) Coolant flow faucet

(23) Tailstock quill lock lever

(24) Tailstock clamping lever

(25) Tailstock handwheel

Fig. 5-1b Location and function of controls on CS6 $\frac{1}{2}$ 66C

Table 5-1 Spindle speeds

No	Lever position		Spindle speed r/min	
	10	8	Normal	Calculated
1	White	White	36	36
2			50	50
3			70	71
4	Blue	Blue	100	103
5			140	141
6			200	201
7	Yellow	Yellow	280	286
8			400	390
9			560	556
10	Red	Red	800	810
11			1120	1105
12			1600	1575

Table 5-2a Feeds and pitches of CS6$\frac{1}{2}$ 50C lathe

Metric

n	t				m	n	t				m	60/69/56	P t				mπ m				DP DP				n/1" n				!	n/1" n	
A	A	B	C	D	D	A	A	B	C	D	D		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV		I	II
0.063	0.09	0.18	0.36	0.71		0.027	0.040	0.076	0.15	0.30		1	1	2	4	8	0.5	1	2	4									1		
0.071	0.10	0.20	0.40	0.80		0.030	0.043	0.085	0.17	0.34		2		2.25	4.5	9			2.25	4.5									2		
0.073		0.21	0.42	0.83		0.031		0.089	0.18	0.35		3																	3		
0.079	0.11	0.22	0.44	0.89		0.033	0.047	0.095	0.19	0.38		4	1.25	2.5	5	10		1.25	2.5	5									4		
0.081		0.23	0.46	0.92		0.034				0.39		5									56	28	14	7	28	14	7	31/2	5	60/69/57	60/59/69
0.084	0.12	0.24	0.48	0.95		0.036	0.050	0.101	0.20	0.40		6													27				6		
0.087		0.25	0.49	0.98		0.037	0.052	0.104	0.21	0.42		7		2.75	5.5	11			2.75	5.5									7		
	0.13	0.27	0.53	1.07	1.68		0.057	0.114	0.23	0.46	0.72	8	1.5	3	6	12	0.75	1.5	3	6	48	24	12	6	24	12	6	3	8		
	0.14	0.29	0.58	1.17	1.84		0.062	0.124	0.24	0.49	0.78	9																	9		
	0.15	0.30	0.60	1.21	1.89		0.064	0.128	0.25	0.51	0.80	10																	10		
		0.31	0.62	1.25	1.96		0.066	0.133	0.26	0.53	0.83	11	1.75	3.5	7	14		1.75	3.5	7									11		
	0.16	0.32	0.64	1.29	2.02		0.068	0.137	0.27	0.55	0.86	12									40	20	10	5	20	10	5	21/2	12		
	0.17	0.34	0.68	1.38	2.16		0.073	0.146	0.29	0.58	0.92	13																	13	19	11 1/2
				1.45	2.24					0.60	0.95	14									36	18	9	41/2	18	9	41/4	21/4	14		
0				1.61	2.52					0.68	1.07	15									32	16	8	4	16	8	4	2	15		

Inch

n	t				m	n	t				m	82/114	P t				mπ m				DP/1"π DP				n/1" n				!	n/1" n	
A	A	B	C	D	D	A	A	B	C	D	D		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV		I	II
0.023	0.033	0.067	0.134	0.264		0.010	0.015	0.029	0.057	0.113		1	1	2	4	8	0.5	1	2	4									1		
0.026	0.037	0.074	0.149	0.298		0.011	0.016	0.032	0.064	0.128		2		2.25	4.5	9			2.25	4.5									2		
0.027		0.078	0.156	0.309		0.012		0.034	0.068	0.132		3																	3		
0.029	0.011	0.082	0.164	0.331			0.018	0.036	0.072	0.143		4	1.25	2.5	5	10		1.25	2.5	5									4		
0.030		0.086	0.171	0.312		0.013				0.147		5									56	28	14	7	28	14	7	31/2	5		
0.031	0.045	0.089	0.179	0.33			0.019	0.038	0.076	0.151		6													27				6	19	11 1/2
0.032		0.093	0.183	0.365		0.014	0.020	0.039	0.079	0.159		7		2.75	5.5	11			2.75	5.5									7		
	0.048	0.100	0.197	0.398	0.625		0.022	0.043	0.087	0.174	0.272	8	1.5	3	6	12	0.75	1.5	3	6	48	24	12	6	24	12	6	3	8		
	0.052	0.108	0.215	0.435	0.684		0.023	0.047	0.091	0.185	0.295	9																	9		
	0.056	0.112	0.223	0.450	0.703		0.024	0.048	0.095	0.192	0.302	10																	10		
		0.115	0.230	0.465	0.729		0.025	0.050	0.098	0.200	0.314	11	1.75	3.5	7	14		1.75	3.5	7									11		
	0.060	0.119	0.238	0.480	0.751		0.026	0.052	0.102	0.208	0.325	12									40	20	10	5	20	10	5	21/2	12		
	0.063	0.126	0.252	0.513	0.804		0.028	0.055	0.109	0.219	0.348	13																	13		
				0.531	0.833					0.227	0.359	14									36	18	9	41/2	18	9	41/4	21/4	14		
0				0.599	0.937					0.257	0.404	15									32	16	8	4	16	8	4	2	15		

Table 5-2b Feeds and pitches of CS6$\frac{1}{2}$66C lathe

Metric

n	t				m	n	t				m	60 / 69	P				mπ				DP				n/1"				!	n/1"	
													t				m				DP				n					n	
A	A	B	C	D	D	A	A	B	C	D	D		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV		I	II
0.063	0.09	0.18	0.36	0.71		0.027	0.040	0.076	0.15	0.30		1	1	2	4	8	0.5	1	2	4									1		
0.071	0.10	0.20	0.40	0.80		0.030	0.043	0.085	0.17	0.34		2		2.25	4.5	9			2.25	4.5									2		
0.073		0.21	0.42	0.83		0.031		0.089	0.18	0.35		3																	3		
0.079	0.11	0.22	0.44	0.89		0.033	0.047	0.095	0.19	0.38		4	1.25	2.5	5	10		1.25	2.5	5									4		
0.081		0.23	0.46	0.92		0.034				0.39		5									56	28	14	7	28	14	7	31/2	5	60 / 69	60 / 56 / 57 / 59
0.084	0.12	0.24	0.48	0.95		0.036	0.050	0.101	0.20	0.40		6													27				6		
0.087		0.25	0.49	0.98		0.037	0.052	0.104	0.21	0.42		7		2.75	5.5	11			2.75	5.5									7		
	0.13	0.27	0.53	1.07	1.68		0.057	0.114	0.23	0.46	0.72	8	1.5	3	6	12	0.75	1.5	3	6	48	24	12	6	24	12	6	3	8		
	0.14	0.29	0.58	1.17	1.84		0.062	0.124	0.24	0.49	0.78	9																	9		
	0.15	0.30	0.60	1.21	1.89		0.064	0.128	0.25	0.51	0.80	10																	10		
		0.31	0.62	1.25	1.96		0.066	0.133	0.26	0.53	0.83	11	1.75	3.5	7	14		1.75	3.5	7									11		
	0.16	0.32	0.64	1.29	2.02		0.068	0.137	0.27	0.55	0.86	12									40	20	10	5	20	10	5	21/2	12		
	0.17	0.34	0.68	1.38	2.16		0.073	0.146	0.29	0.58	0.92	13																	13	19	11t/2
				1.45	2.24					0.60	0.95	14									36	18	9	41/2	18	9	41/2	21/4	14		
				1.61	2.52					0.68	1.07	15									32	16	8	4	16	8	4	2	15		

Inch

n	t				m	n	t				m	82 / 95	P				mπ				DP/1"π				n/1"				!	n/1"	
													t				m				DP				n					n	
A	A	B	C	D	D	A	A	B	C	D	D		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV		I	II
0.023	0.033	0.067	0.134	0.264		0.010	0.015	0.029	0.057	0.113		1	1	2	4	8	0.5	1	2	4									1		
0.026	0.037	0.074	0.149	0.298		0.011	0.016	0.032	0.064	0.128		2		2.25	4.5	9			2.25	4.5									2		
0.027		0.078	0.156	0.309		0.012		0.034	0.068	0.132		3																	3		
0.029	0.011	0.082	0.164	0.331			0.018	0.036	0.072	0.143		4	1.25	2.5	5	10		1.25	2.5	5									4		
0.030		0.086	0.171	0.312		0.013				0.147		5									56	28	14	7	28	14	7	31/2	5		
0.031	0.045	0.089	0.179	0.33			0.019	0.038	0.076	0.151		6													27				6	19	11t/2
0.032		0.093	0.183	0.365		0.014	0.020	0.039	0.079	0.159		7		2.75	5.5	11			2.75	5.5									7		
	0.048	0.100	0.197	0.398	0.625		0.022	0.043	0.087	0.174	0.272	8	1.5	3	6	12	0.75	1.5	3	6	48	24	12	6	24	12	6	3	8		
	0.052	0.108	0.215	0.435	0.684		0.023	0.047	0.091	0.185	0.295	9																	9		
	0.056	0.112	0.223	0.450	0.703		0.024	0.048	0.095	0.192	0.302	10																	10		
		0.115	0.230	0.465	0.729		0.025	0.050	0.098	0.200	0.314	11	1.75	3.5	7	14		1.75	3.5	7									11		
	0.060	0.119	0.238	0.480	0.751		0.026	0.052	0.102	0.208	0.325	12									40	20	10	5	20	10	5	21/2	12		
	0.063	0.126	0.252	0.513	0.804		0.028	0.055	0.109	0.219	0.348	13																	13		
				0.531	0.833					0.227	0.359	14									36	18	9	41/2	18	9	41/2	21/4	14		
				0.599	0.937					0.257	0.404	15									32	16	8	4	16	8	4	2	15		

Table 5-2c Feeds and pitches

Applicable to CS6$_2^1$ 66C equipped with Inch lead screw and Metric cross slide and using metric feedrate

N	t				m	n	t				m		t				m				DP				n					n	
A	A	B	C	D	D	A	A	B	C	D	D		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV		I	II
0.058	0.084	0.17	0.34	0.67		0.025	0.038	0.072	0.14	0.28		1	1	2	4	8	0.5	1	2	4									1		
0.066	0.094	0.19	0.38	0.76		0.028	0.040	0.080	0.15	0.32		2		2.25	4.5	9			2.25	4.5									2		
0.068	0.099	0.20	0.40	0.78		0.030	0.043	0.085	0.17	0.33		3																	3		
0.074	0.104	0.21	0.42	0.84		0.032	0.045	0.090	0.18	0.36		4	1.25	2.5	5	10		1.25	2.5	5									4		
0.076	0.109	0.22	0.43	0.87		0.033	0.046	0.091		0.37		5									56	28	14	7	28	14	7	3 1/2	5		
0.079	0.114	0.23	0.45	0.90			0.048	0.095	0.19	0.38		6													27				6	19	11 1/2
0.084	0.119	0.24	0.46	0.93		0.035	0.050	0.098	0.20	0.40		7		2.75	5.5	11			2.75	5.5									7		
	0.122	0.25	0.50	1.02	1.59		0.055	0.108	0.22	0.44	0.68	8	1.5	3	6	12	0.75	1.5	3	6	48	24	12	6	24	12	6	3	8		
	0.132	0.27	0.54	1.10	1.74		0.058	0.118	0.23	0.46	0.74	9									44	22	11	5 1/2	22	11	5 1/2	2 3/4	9		
	0.142	0.28	0.57	1.14	1.79		0.060	0.120	0.24	0.48	0.76	10																	10		
	0.146	0.29	0.58	1.18	1.85		0.063	0.125	0.25	0.50	0.79	11	1.75	3.5	7	14		1.75	3.5	7									11		
	0.152	0.30	0.60	1.22	1.91		0.065	0.130		0.52	0.81	12									40	20	10	5	20	10	5	2 1/2	12		
	0.160	0.32	0.64	1.30	2.04		0.070	0.138	0.27	0.55	0.87	13																	13		
				1.35	2.11					0.57	0.90	14									36	18	9	4 1/2	18	9	4 1/2	2 1/2	14		
				1.52	2.38					0.64	1.01	15									32	10	8	4	16	8	4	2	15		

Applicable to CS6$_2^1$ 50C equipped with inch lead screw and metric cross slide and using metric feedrate

N	t				m	n	t				m		t				m				DP				n					n	
A	A	B	C	D	D	A	A	B	C	D	D		I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV		I	II
0.058	0.084	0.17	0.34	0.67		0.025	0.038	0.072	0.14	0.28		1	1	2	4	8	0.5	1	2	4									1		
0.066	0.094	0.19	0.38	0.76		0.028	0.040	0.080	0.15	0.32		2		2.25	4.5	9			2.25	4.5									2		
0.068	0.099	0.20	0.40	0.78		0.030	0.043	0.085	0.17	0.33		3																	3		
0.074	0.104	0.21	0.42	0.84		0.032	0.045	0.090	0.18	0.36		4	1.25	2.5	5	10		1.25	2.5	5									4		
0.076	0.109	0.22	0.43	0.87		0.033	0.046	0.091		0.37		5									56	28	14	7	28	14	7	3 1/2	5		
0.079	0.114	0.23	0.45	0.90			0.048	0.095	0.19	0.38		6													27				6	19	11 1/2
0.084	0.119	0.24	0.46	0.93		0.035	0.050	0.098	0.20	0.40		7		2.75	5.5	11			2.75	5.5									7		
	0.122	0.25	0.50	1.02	1.59		0.055	0.108	0.22	0.44	0.68	8	1.5	3	6	12	0.75	1.5	3	6	48	24	12	6	24	12	6	3	8		
	0.132	0.27	0.54	1.10	1.74		0.058	0.118	0.23	0.46	0.74	9									44	22	11	5 1/2	22	11	5 1/2	2 3/4	9		
	0.142	0.28	0.57	1.14	1.79		0.060	0.120	0.24	0.48	0.76	10																	10		
	0.146	0.29	0.58	1.18	1.85		0.063	0.125	0.25	0.50	0.79	11	1.75	3.5	7	14		1.75	3.5	7									11		
	0.152	0.30	0.60	1.22	1.91		0.065	0.130		0.52	0.81	12									40	20	10	5	20	10	5	2 1/2	12		
	0.160	0.32	0.64	1.30	2.04		0.070	0.138	0.27	0.55	0.87	13																	13		
				1.35	2.11					0.57	0.90	14									36	18	9	4 1/2	18	9	4 1/2	2 1/2	14		
				1.52	2.38					0.64	1.01	15									32	16	8	4	16	8	4	2	15		

6 Electrical part of the machine

6.1 Preparation before applying power source

After installation, following checks must be taken to guarantee safe operation.

1) Observation check. Open the door of cabinet and make sure that no element inside is damaged. Make sure that every connector and wires are connected firmly.

2) Be sure that no water has come into the cabinet and it is dry inside.

3) Measure the power supply with a multimeter and be sure it is the required specifications.

6.2 Operation and wire connection

Fig.6-1 is parts location diagram. Fig.6-2 is electric schematic diagram. Fig.6-3 is wire connection diagram. Table 6-1 lists all electrical parts.

The machine operates on power source of 3-phase AC 220V, 380V, 400V, 415V, 420V, 440V, 500V, 575V, 600V, 660V, and 50Hz/60Hz, There is no general fuse on the machine, so user should connect a desired fuse to the power source circuit. CS6266C lathe has power light and coolant light.

Connect the power line to the terminal board, which is installed in the front support of the machine and accessed through the window at rear side of the support. Connect and fasten the ground wire to the earth screw.

Supply electric power for machine by closing the power switch QS1. Lamp EL is lit up.

The motor starts to run when SB3 or SB4 is pushed and stops when SB2 or SB5 is pushed.

Coolant pump M2 is unable to be started unless the motor is running. Coolant pump is started using SB6 and stops as the motor stops.

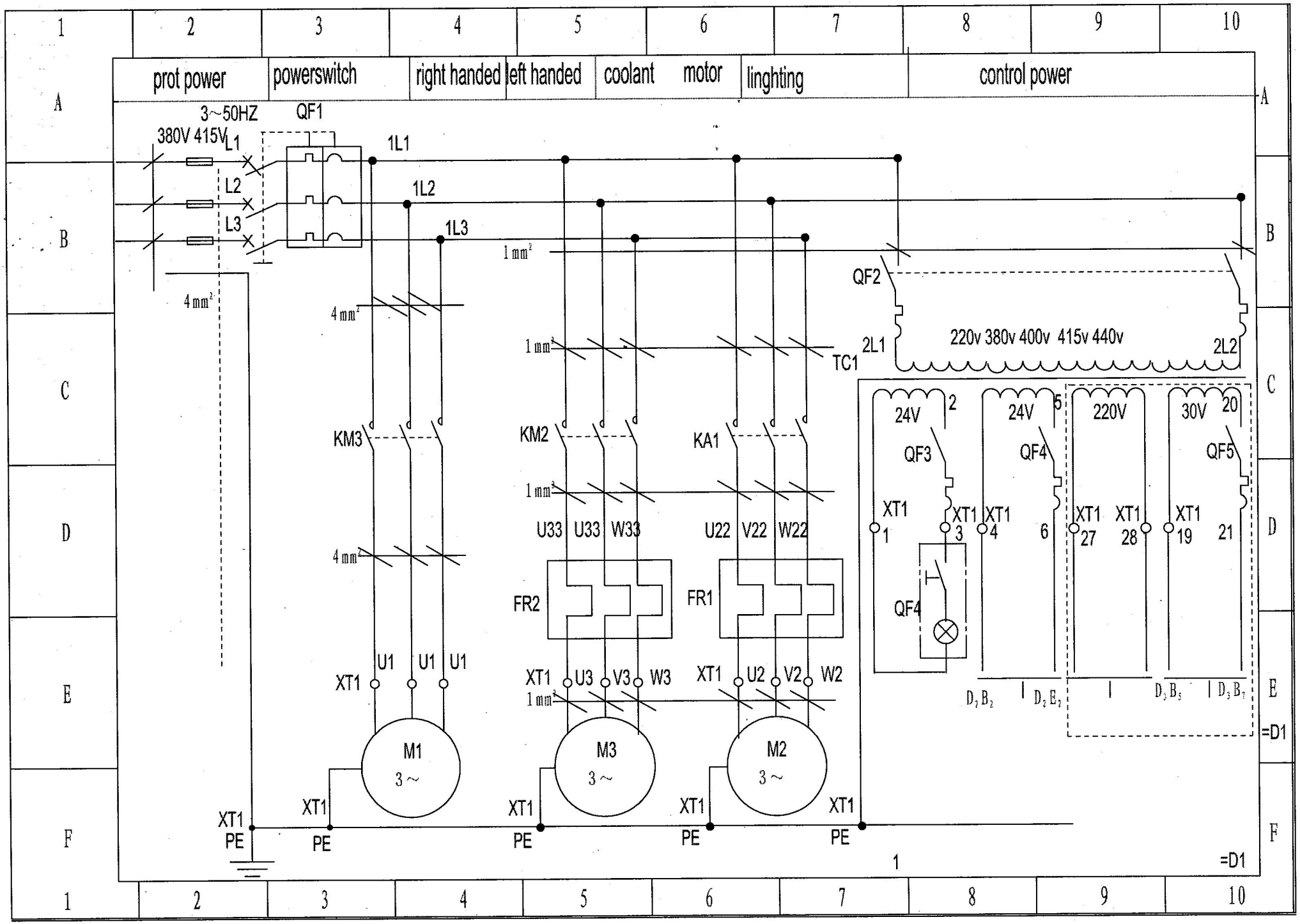
Work lamp EL is turned on and off with switch SA1 on condition that power switch QS1 is closed.

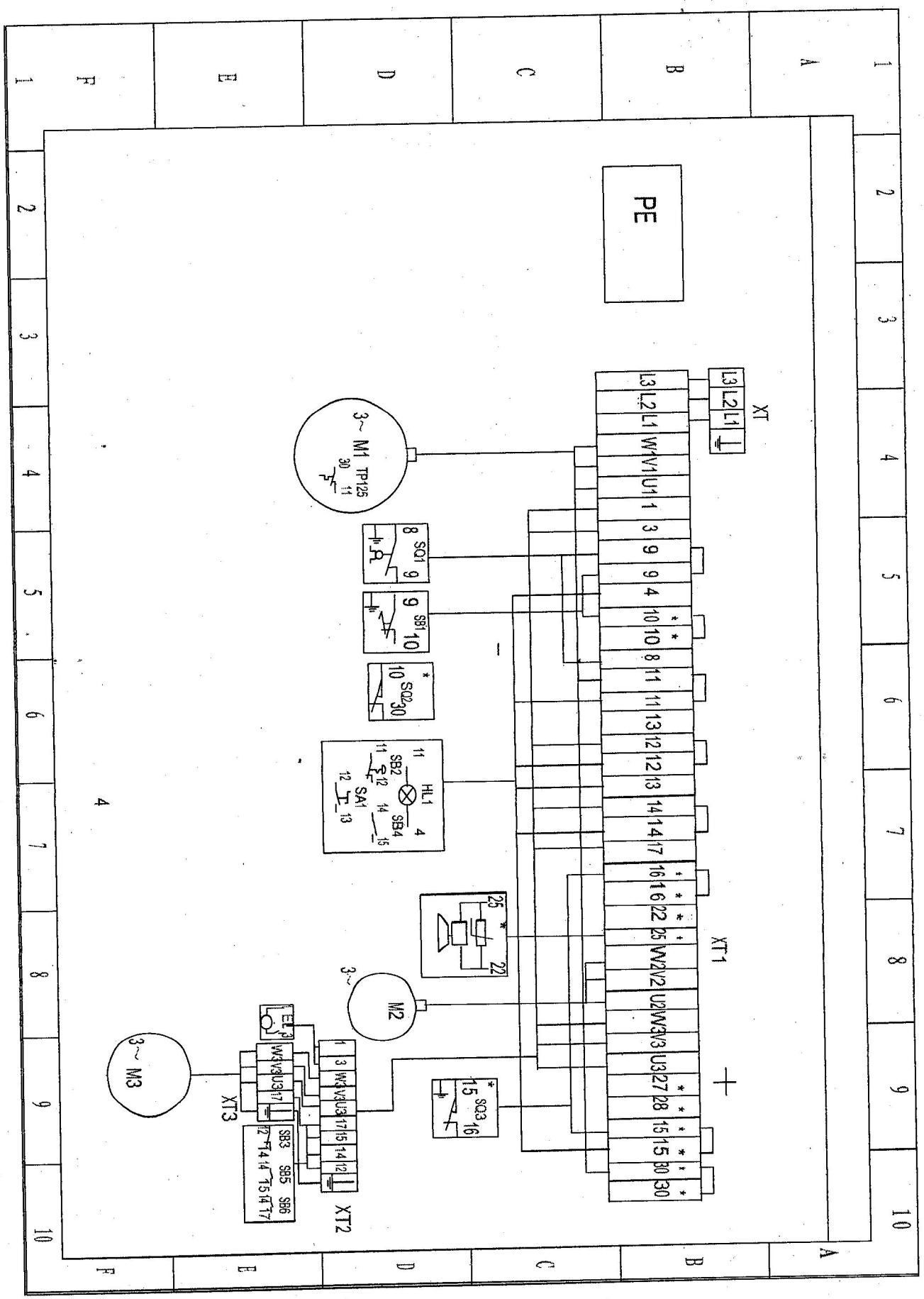
Limit switch SQ1 breaks the related contacts and cuts power from motor and from electric control unit to ensure safety of service man when the change gears cover is opened for maintenance and adjustment.

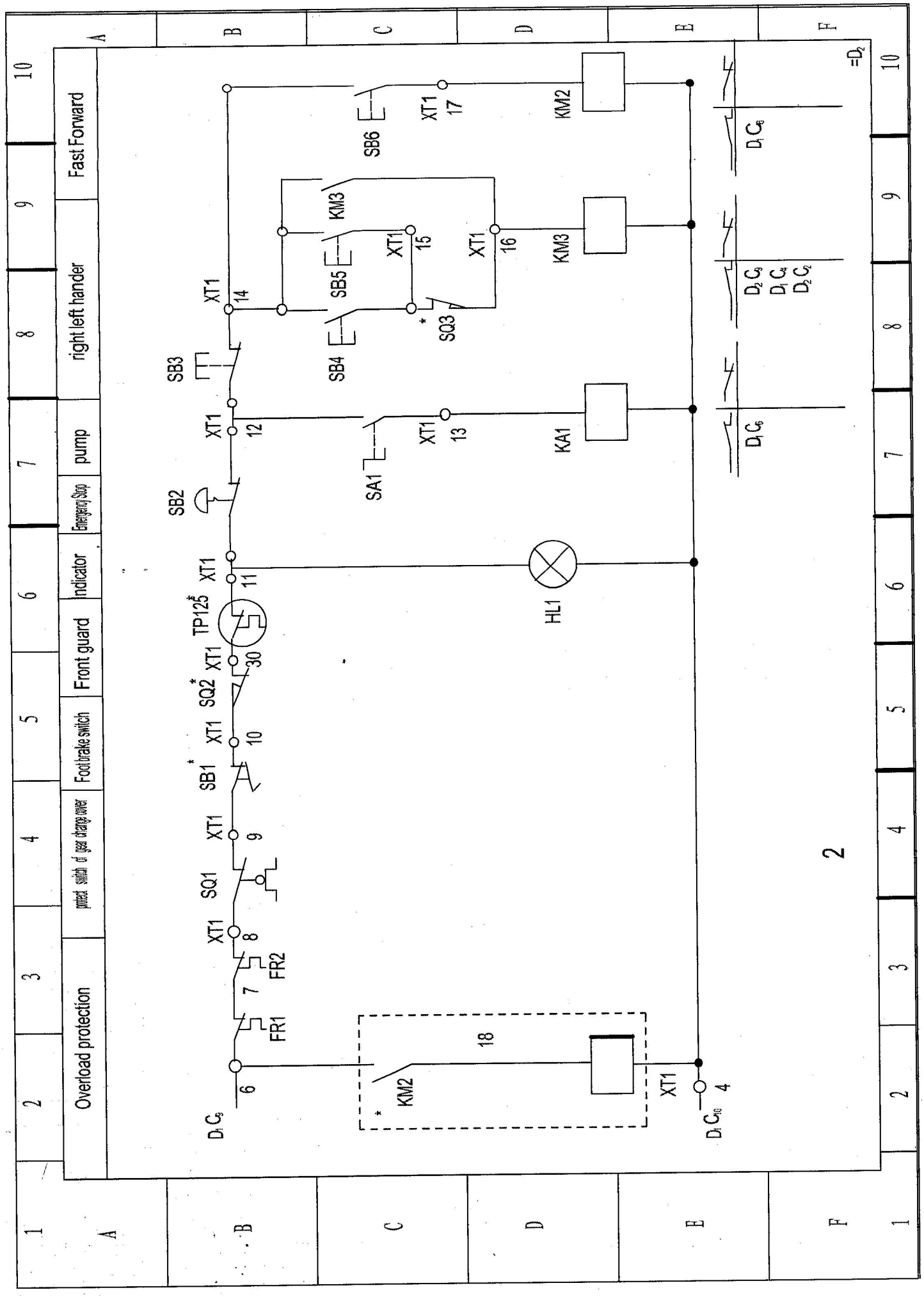
The electric parts can not be accessed unless the second protection door, which is installed to avoid accidental touch of electric parts, is removed. SQ5 is a door trip and is used to disconnect control circuit.

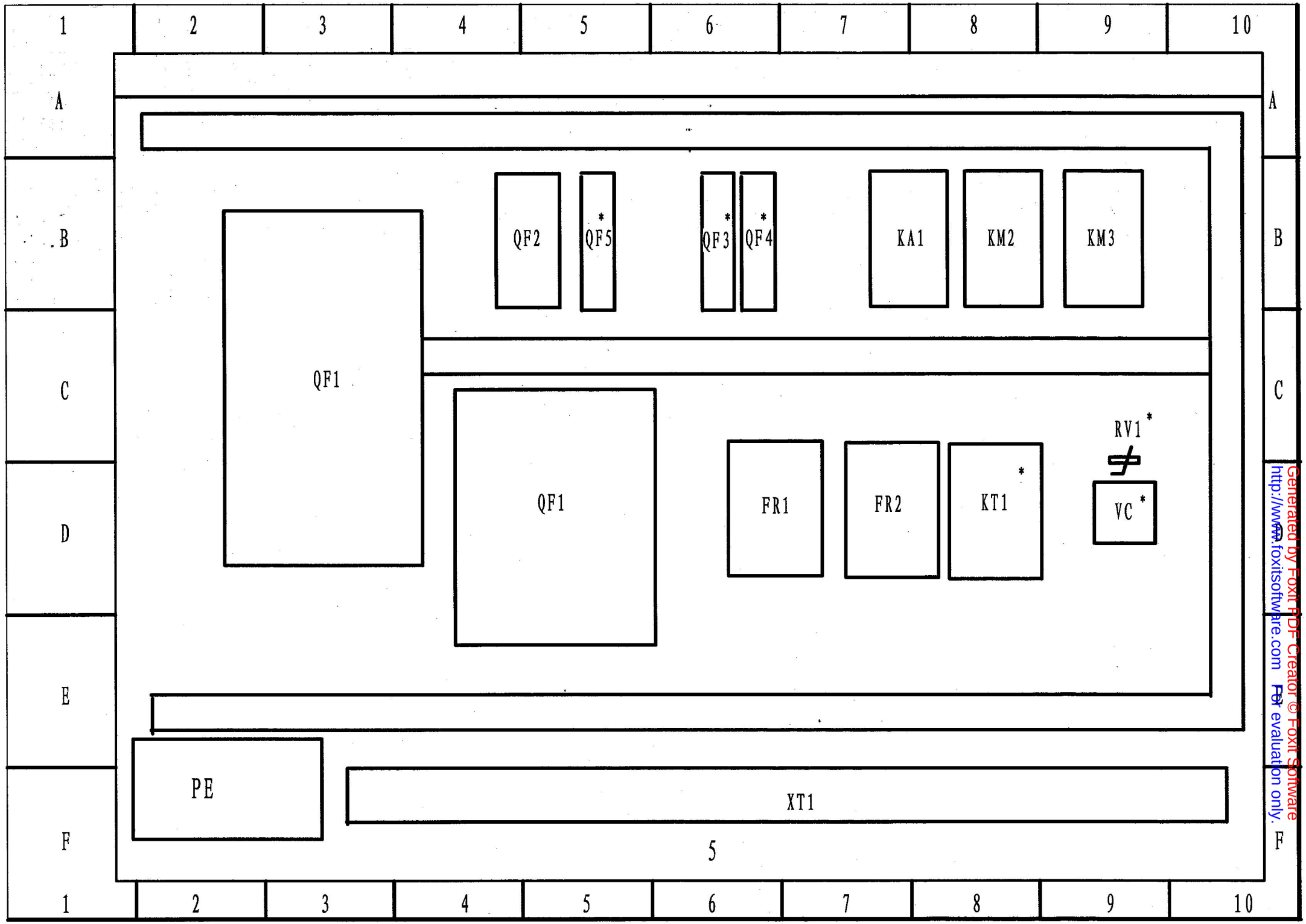
The right to change the data of this part for meeting customers' requirement is reserved.

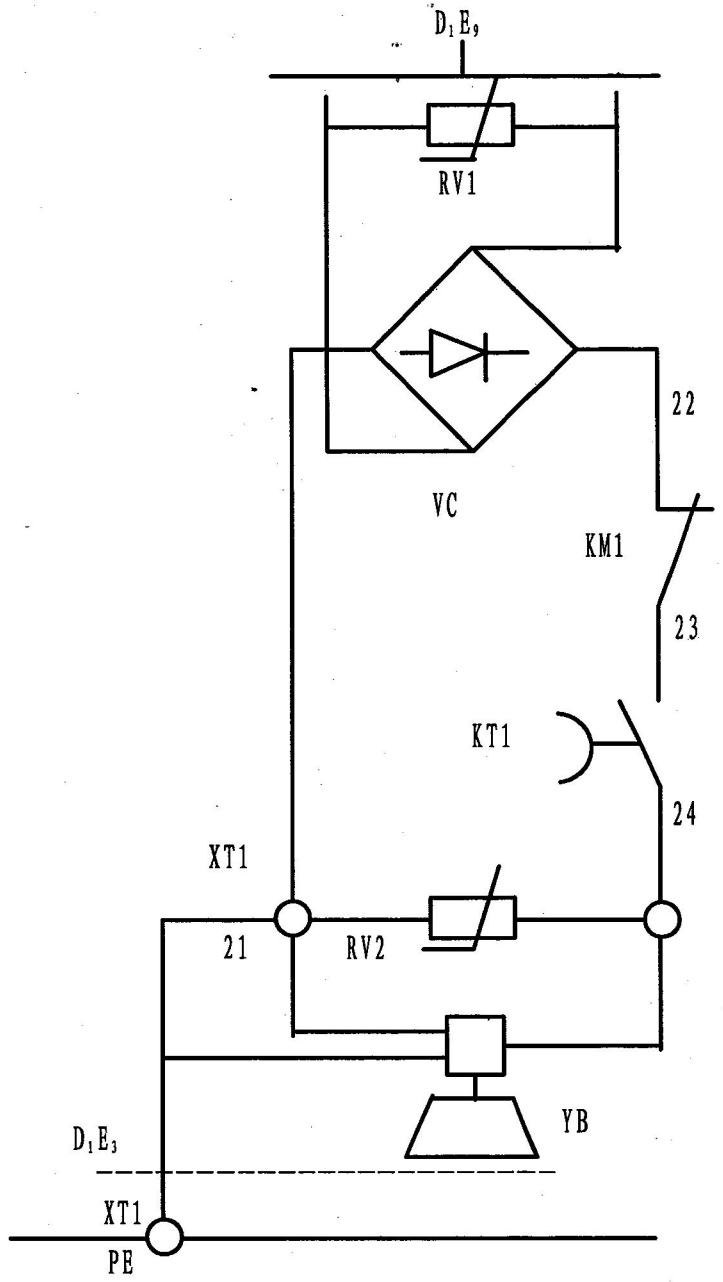
Elements codes	Name	Technical Date	QTY	Remarks
QS1	Power Switch	HZ5-S	1	
QF1	Breaker	DZ108 16-25A	1	
QF2	Breaker	DZ108 0.25-0.4A	1	
QF3	Breaker	DZ108 1.6-2.5A	1	
KM1	Contactor	3TB4317 24V	1	
KM2 KM3	Contactor	3TB4017 24V	2	
QF4	Breaker	DZ4763 2P 3A	1	
QF5 QF6	Breaker	DZ4763 1P 3A	2	
SQ1	Travelling Switch	JLXK-411	1	
SQ2 SQ3	Switch For Micromovement	LW5-11G	2	
SB6	Switch	LA38 Green	1	
SB5	Switch	LA19 Green	1	
SB3	Switch	LA19 Red	1	
SB4	Point Moving Key	LAY3-10 Black	1	
SB2	Emergency Stop Button	LAY3-01ZS/1 red yellow ring	1	
SA1	Turning Key	LAY3-10X Black	1	
HL1	Indication Lamp	XDJ1-22Y/B～380V	1	
TC1	Transformer	JBK5-150 380V 24V 50VA / 24V 50VA	1	Spotlight
EL	Light Lamp	JC38-B ～24V 50W	1	
M1	Motor	Y132M-4 3～380V 50HZ 7.5KW	1	
M2	Coolant Pump	AOB2-3～380V 50HZ	1	
M3	Rapid moving	YSS5634 3～380V 50HZ 300W	1	
		With Electromagnetic Brake (For Choice)	1	
KT1	Timer Relay	ST3PF-60 ～24V	1	
VC	Rectifier	QL5A 200V	1	
RV1 RV2	Verister	RMZ2 100V 100A	1	
YB	Brake	NB-10T DC 24V	1	











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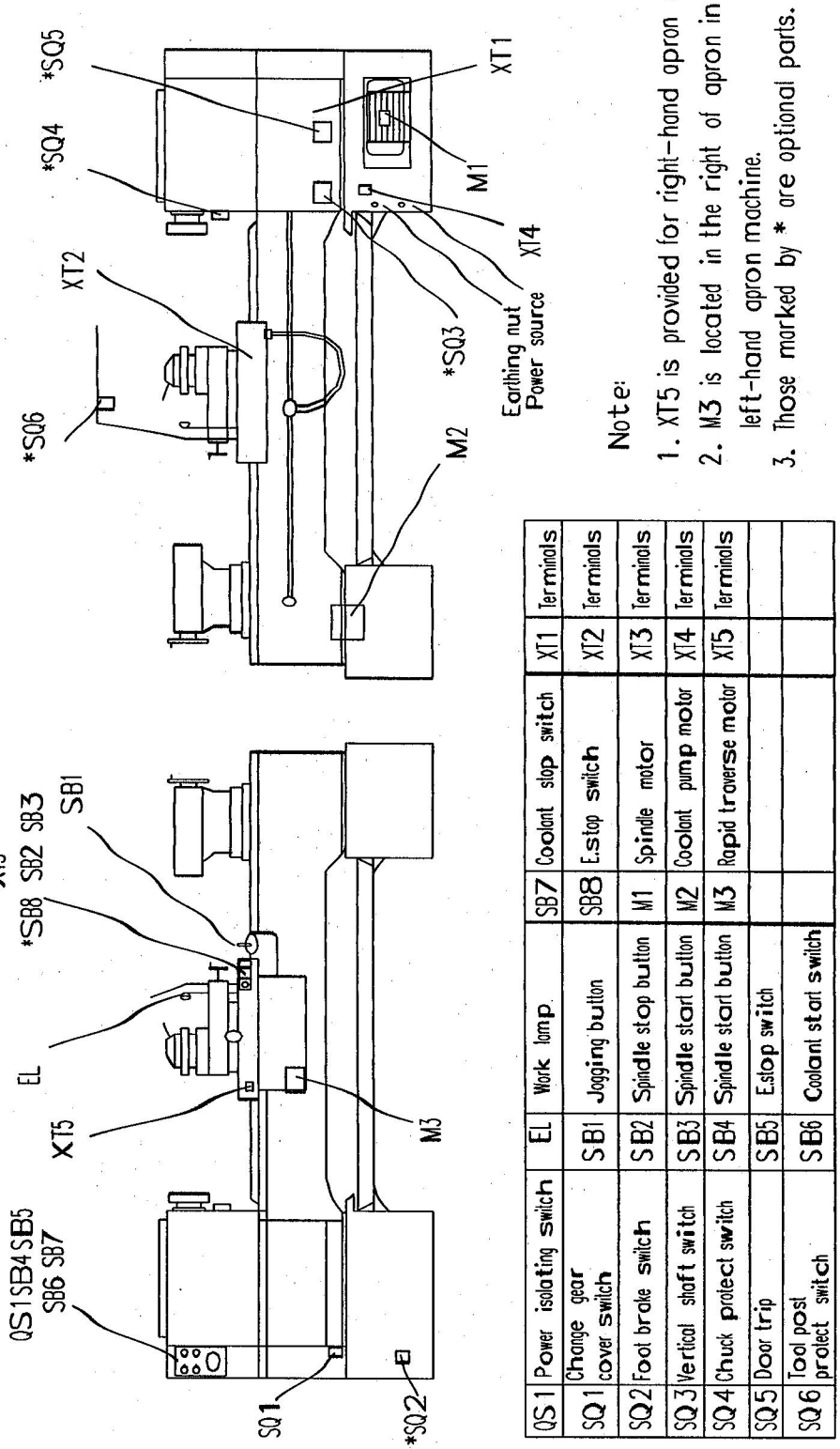
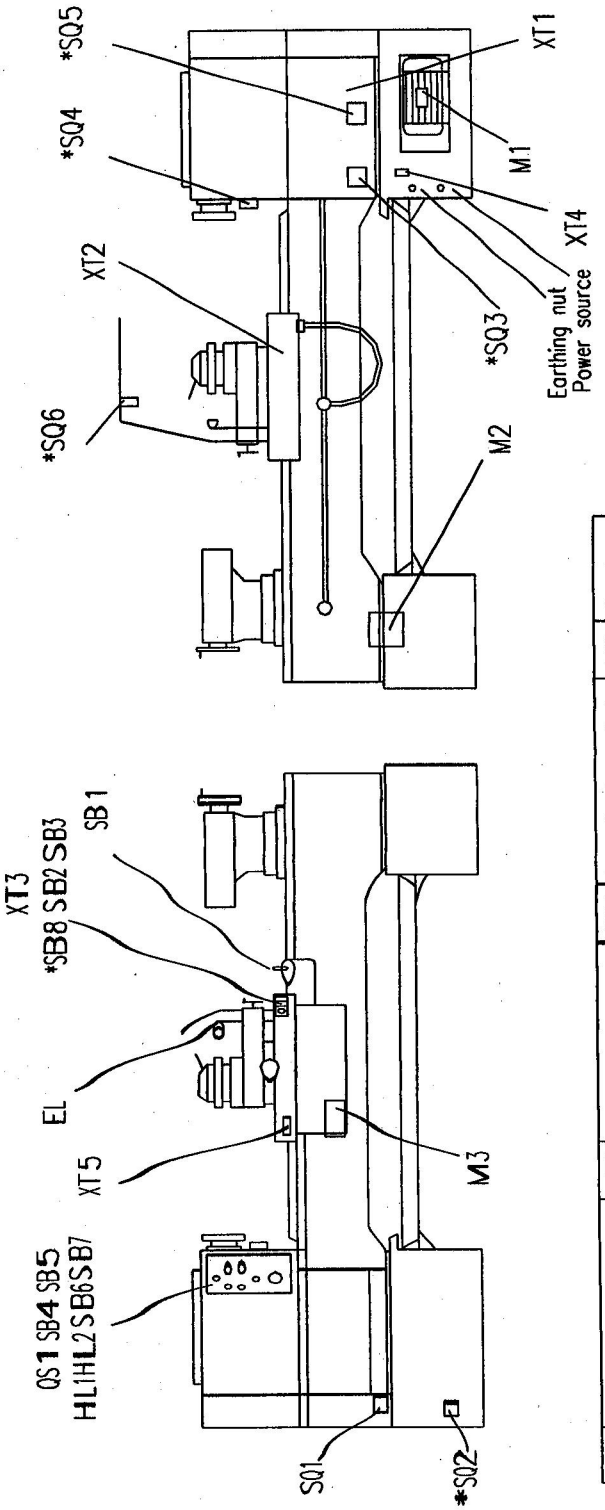


QS1	Power isolating switch	EL	Work lamp	SB7	Coolant stop switch	XT1	Terminals
SQ1	Change gear cover switch	SB1	Jogging button	SB8	E.stop switch	XT2	Terminals
SQ2	Foot brake switch	SB2	Spindle stop button	M1	Spindle motor	XT3	Terminals
SQ3	Vertical shaft switch	SB3	Spindle start button	M2	Coolant pump motor	XT4	Terminals
SQ4	Chuck protect switch	SB4	Spindle start button	M3	Rapid traverse motor	XT5	Terminals
SQ5	Door trip	SB5	E.stop switch				
SQ6	Tool post protect switch	SB6	Coolant start switch				

Note:

1. XT5 is provided for right-hand apron machine only.
2. M3 is located in the right of apron in case of a left-hand apron machine.
3. Those marked by * are optional parts.

Fig.6-1a Location of electrical parts



QS1	Power isolating switch	EL	Work lamp	SB7	Coolant stop switch	XT1	Terminals
SQ1	Change gear cover switch	SB1	Jogging button	SB8	E.stop switch	XT2	Terminals
SQ2	Foot brake switch	SB2	Spindle stop button	M1	Spindle motor	XT3	Terminals
SQ3	Vertical shaft switch	SB3	Spindle start button	M2	Coolant pump motor	XT4	Terminals
SQ4	Chuck protect switch	SB4	Spindle start button	M3	Rapid traverse motor	XT5	Terminals
SQ5	Door trip	SB5	E.stop switch	HL1	Power ON light		
SQ6	Tool post protect switch	SB6	Coolant start switch	HL2	Coolant ON light		

Note:

1. XT5 is provided for right-hand apron machine only.
2. M3 is located in the right of apron in case of a left-hand apron machine.
3. Those marked by * are optional parts.

Fig.6-1b Location of electrical parts of CS6266C

Table 6-1 List of electrical parts

Code	Name	Specification	Qty	Maker	Remark
QS1	Power switch	3-pole Ue=660V~ Ie=40A	1	Beijing Machine Tool Switchgear Co., Ltd.	
FU1	Fuse	Ue=380V~ 4A 6A	3 3	Suzhou Stone Electrical Appliance Factory	3~380V 3~220V
FU1		Ue=500V~ 4A	3		3~420V/660V
FU2 FU3 FU4		2A	1		
KM1	Contactor	3-pole Ue=380V~ Coil 1~50/60Hz 220V/24V/110V Ie=18A/AC3 3P+NO	1	Tianshui 213 Electrical Apparatus Co., Ltd.	3~380V
		3-pole Ue=220V~ Coil 1~50/60Hz 220V/24V/110V Ie=32A/AC3A 3P+NO			3~220V
		3-pole Ue=660V~ Coil 1~50/60Hz 220V/24V/110V Ie=18A/AC3 3P+NO			3~420V/660V
KM2 KM3		3-pole Ue=380V~ Coil 1~50/60Hz 220V/24V/110V Ie=9A/AC3 3P+NO	1		3~380V/220V
KM2 KM3		3-pole Ue=380V~ Coil 1~50/60Hz 220V/24V/110V Ie=9A/AC3 3P+NO	1		3~420V/600V
FR1	Thermal relay	Current/rated 23~32A 12~18A 10~13A	1 1 1	Tianshui 213 Electrical Apparatus Co., Ltd.	3~220V 3~380V/440V 3~500V /660V
FR2	Thermal relay	Current/rated 0.4~0.63A 0.25~0.4A 0.16~0.25A	1 1 1		3~220V 3~380V/420V 3~440V /660V

Code	Name	Specification	Qty	Maker	Remark
FR3	Thermal relay	Current/rated 2.5~4A 1~1.6A 0.63~1A	 1 1 1		250W motor 3~220V 3~380V/440V 3~500V /660V
FR3	Thermal relay	Current/rated 2.5~4A 1.6~2.5A 1~1.6A 0.63~1A	 1 1 1 1	Tianshui 213 Electrical Apparatus Co., Ltd.	300W motor 3~220V 3~380V/400V 3~415V /500V 3~575V /660V
FR3	Thermal relay	Current/rated 2.5~4A 1.6~2.5A 1~1.6A	 1 1 1		370W motor 3~220V 3~380V/440V 3~500V /660V
SB1	Rapid traverse button,	Ue=380V~ Ie=5A 1 No black 1 NC red	1	Changsha No.2 Machine Electrical Equipment Factory	
SB5	Emergency stop button		1	Xi'an Machine Electrical Equipment Factory	
HL1 HL2	Signal light	24V 1.2W	1 1	Handan Machine Electrical Equipment Factory	For CS6266C only.
 SB2 SB3 SB4 SB6 SB7	Button Spindle stop Spindle start Spindle start Coolant pump start Coolant pump stop	Ue=380V~ Ie=5A Φ25 NC+NO red NC+NO green NC+NO green NC+NO red	1	Tianshui 213 Electrical Apparatus Co., Ltd.	
SQ1 SQ2 SQ3	Limit switch	Ue=500V~ Ie=2A NC+NO	1	Wuxi Machine Tool Electrical Equipment Factory	
EL	Lamp	24V 40W	1	Shanghai Xinhua Luminaire Factory	
TC1	Transformer	1~50/60Hz 160VA Input 380V/420V/660V Output 220V/110V/24V	1	Wuxi Machine Tool Electrical Equipment Factory	Input voltage is supplied per user's power source.
M1 M2 M3	AC asynchronous motor, Coolant pump 3-phase micro motor	3~50/60Hz 220V/380V/420V/660V 7.5KW 4P 50L/min 300W/370W	1	Baoji Electric Machine Works Shenyang Micro-machine Factory	Supplied per user's power source

7 Lubrication

Fig. 7-1 is machine lubrication chart.

Machine oil No.30 with Engler viscosity of 3.81° ~4.59° E50 is used as lubricant.

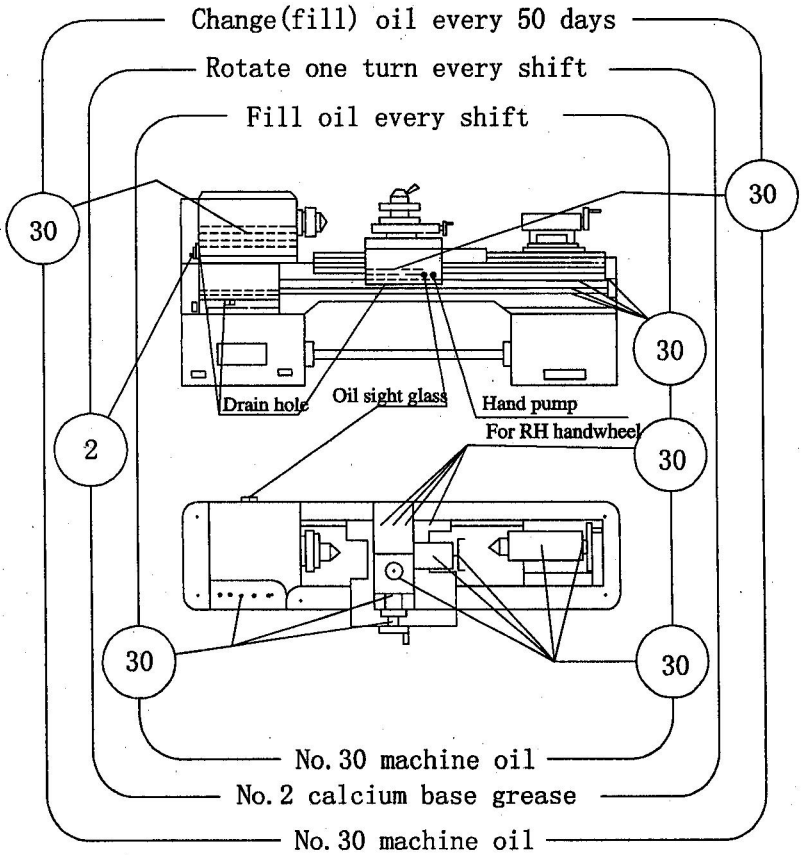


Fig. 7-1 Lubrication chart

7.1 Headstock lubrication

Oil is pumped by the trochoid pump driven by shaft Ⅰ. After being filtered oil is piped to the oil tray and path to lubricate gears, shafts, bearings and etc. in the headstock in a cycle (Fig.7-2).

Always check the pump for good condition by observing through the oil sight glass in front side of headstock. Make sure level of oil is up to the centered line of the oil gauge.

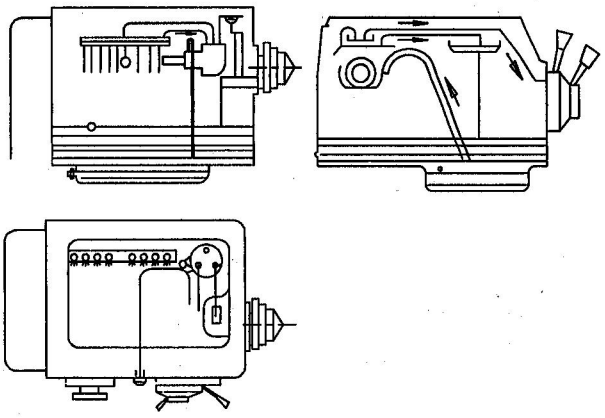


Fig. 7-2 Lubrication chart of headstock

7.2 Feeding case lubrication

Parts in feeding case are drop lubricated via some strings of wool soaked with oil stored in oil path in the feeding case (Fig.7-3). Waste oil must be drained off the case according to the indicated mark of the oil sight glass after a period of time.

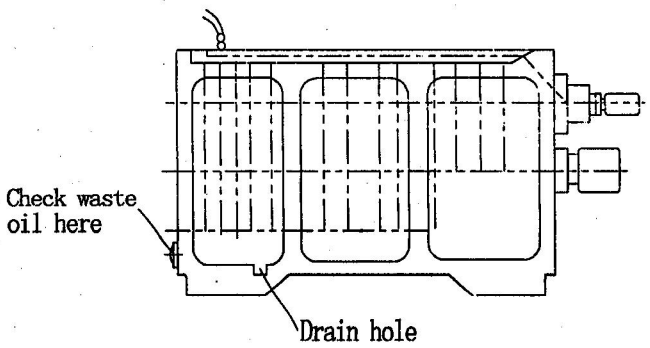


Fig. 7-3 Feeding case lubrication chart

7.3 Apron lubrication

Oil is reserved in the path of apron. During rapid traverse of apron, all running parts are splash lubricated with oil churned up by the churning fins. Bearings in apron are lubricated either through the cup on carriage into which oil is pressed from an oil gun, or drop lubricated via some strings of wool soaked with oil splashed into the upper groove by churning fins. See Fig. 7-4. Bearings of a right-hand apron are lubricated with oil from the upper groove into which oil is piped by a hand pump. The handle of the pump should be pulled five times before starting to work. See Fig. 7-5.

Observe the level of oil in the oil gauge and make sure it is up to the centered line of the gauge.

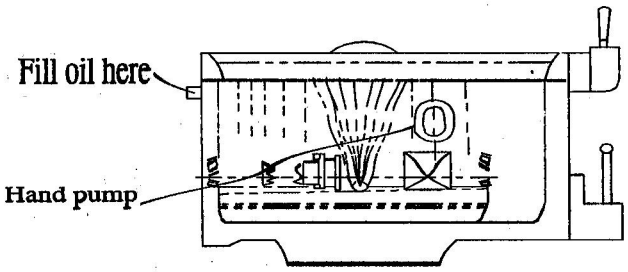


Fig.7-4 Apron lubrication chart

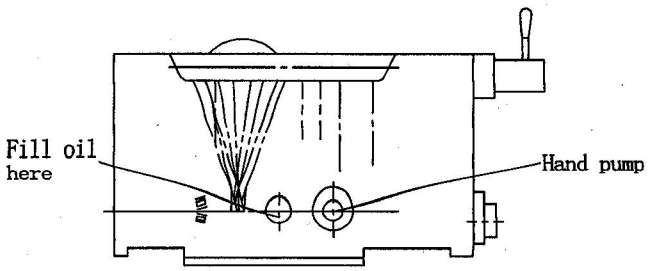


Fig. 7-5 Right-hand apron lubrication chart

7.4 Guide ways lubrication

Lower rails of carriage are lubricated by the oil from two cups. The oil is filtered by the fine felt.

Upper rails of carriage, cross screw, screw of top slide, tool rest, tailstock quill and screw are all lubricated with oil gun.

7.5 Other oil sites

Lead screw, rod and neck of operating rod are drop lubricated by some strings of wool. Oil is stored in the basin of the rear bracket.

The shaft and sleeve of idle pulley in change gear box are greased with No.2 calcium base grease that is pressed into by the plug screw.

8 Coolant unit

Coolant stored somewhere inside machine or in middle support of machine is pumped up by a three-phase pump AOB-25. Flow of the coolant is regulated with a faucet on the coolant pipe.

9 Lifting, installation and test operation

9.1 Hoisting

When hoisting a crated machine, tie and pass wire ropes per symbols painted on crate. Handle the machine carefully to avoid any bumps or shocks. Keep it up-right and not tilting. Avoid placing the machine over sharp objects.

When hoisting a machine after unpacking, tie and pass wire ropes according to the diagram below (Fig.9-1). Move the carriage back and forth for balance. Place soft substances between the ropes and machine to prevent damage to machine.

9.2 Unpacking

After unpacking, check the machine for good appearance immediately. Check the accessories and tool for correct quantities per PACKING LIST.

9.3 Installation

Though the machine was inspected and tested prior to shipment from the factory it must be installed correctly in order to maintain the accuracy and service life of the machine.

The machine is located by means of several groups of iron wedges on a concrete foundation that is prepared in advance. See Fig. 9-1 foundation plan. Level the machine using precision levels to within the accuracy of 0.06/1000 in lengthwise direction and 0.03/1000 in width-wise direction by adjusting the jack bolts. After primary adjustments are finished, pour mortar into holes for anchor bolts. Minute adjustments are to be done only after the mortar is hardened completely. When the machine is leveled to the required accuracy give every bolt nut an even screw, pour mortar to iron wedges and on the machine base leaving a smooth face of foundation.

9.4 Cleaning

The anti-rust agent applied on machine must be thoroughly removed with kerosene. Inside of headstock should be cleaned with warm kerosene. All strings of wool must be cleaned also. After completion of cleaning, fill sufficient oil to machine according to the lubrication chart.

9.5 Test operation

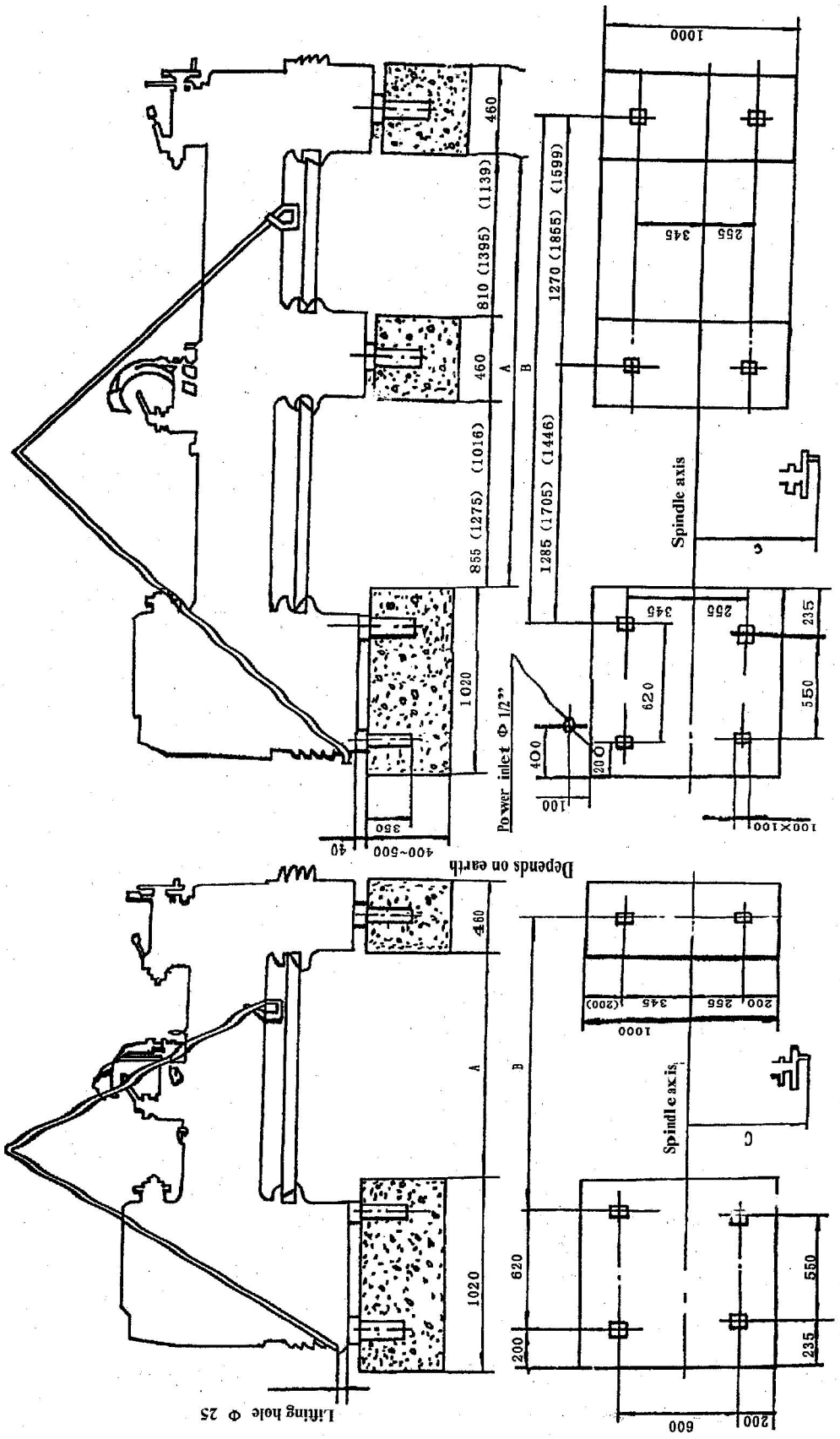
Before test operation carefully read the OPERATOR'S MANUAL to lean the function and use of every control and be sure the machine is properly lubricated.

Operate every operating part by hand for good condition.

Before turning on the electric power of machine, make sure the electrical unit is in good condition and the motor doesn't suffer from damp. After turning on the electric power, check that the motor is rotating clockwise. Otherwise wiring of phase lines must be rectified.

Dry run is performed only after all the above procedures are completed. Operate the machine first at the minimum speed for a period of time and gradually increase the speed. Carefully observe working condition of the lubrication unit, operation unit, electrical unit, cooling unit and other functioning unit during dry run.

Do not start to work unless the machine is operatable, properly lubricated and braked freely with a normal functioning of controls.



Max.work length	750	1000	1500	2000	2500	3000
A	875	1125	1625	855+460+810	1016+460+1139	1275+460+1395
B	1305	1555	2055	1285+1270	1446+4599	1705+1855
C	590					

Fig .9-1 Lifting and foundation plan

10 Maintenance and care

10.1 Lubrication

In order to keep good operation and reduce wear, all running and sliding parts on the machine must be properly lubricated periodically. So pay special attention to the following points.

a) Fill clean oil at regular intervals according to the lubrication chart.

b) Each of headstock, apron and feeding case should be filled with oil up to the centered line of their oil gauges. Take care that oil level should not be higher than the upper line of each gauge. Oil will overflow in that case. So it is important to check oil level from time to time and keep it in correct position.

c) Because of serous wear on a new machine first change of oil both in headstock and apron should occur ten days after using of machine and second change twenty days after, thereafter it is replaced every two or three months in order to keep the headstock and apron clean all the time. After the waste is drained out the headstock and apron must be washed with kerosene.

d) The filter in headstock and strings of wool in other places of machine must be cleaned every month. Dustproof felts at ends of rails beneath the carriage and that at left side of tailstock's bottom must be cleaned every week with kerosene. Replace the felts when they are worn.

e) The front bearing of spindle is lubricated from pipe line. It is also added with lithium complex grease whose service life is up to three years. Refill the front bearing with 300 gram grease when it is in poor lubrication or the spindle is in poor working condition. Before refilling grease the spindle and bearing should be cleaned and the spindle must be run in after refilling till a steady temperature rise is reached.

10.2 Operation

Pay attention to the following points when operating the machine.

a) After the main motor is started, the spindle is started only when the lube pump is confirmed in good condition and sufficient oil is confirmed in the headstock.

b) Never change speed while the spindle is running at a high speed. Change it only when the spindle is stopped. Feed rate is changed either when the spindle is stopped or running at a lower speed.

c) Before starting the spindle, make sure that every gear-shifting lever is in a correct position to ensure good engagement between gears.

d) When the brake fails to work repair it immediately. Never use the reversing friction clutch as a brake.

e) When operating any of the spindle control levers, be sure to place it downward or upward completely. Uncompleted operation is not allowed for decreasing the speed during cutting.

10.3 Maintenance

In order to maintain the accuracy and service life of every part on the machine, take note of the following points.

a) Check and adjust the tension of V-belts periodically to maintain its service life.

b) Clean any dirt or waste coolant deposited between the four-way tool post and its slide to keep repeatability of the slide.

c) If the tailstock is used to support the workpiece for cutting, a Morse Taper No. 5 tang must be applied and horizontally inserted into the hole of tailstock quill so that it engages with the stop dog, which can prevent the tang from rotating and maintain the accuracy of the taper hole.

d) The lead screw is designed for cutting threads not for longitudinal feeding of work piece. Feeding might affect the service life and accuracy of lead screw. Since the apron is driven directly by the lead screw when threading the safety clutch in apron become useless. Take care to choose a proper depth of cut and a proper cutting

force Px.

e) Long and slender shaft-type work should be turned using a steady rest or follow rest. Lubricate the bearing face of work before starting.

f) Be sure to stop the main motor prior to workpiece loading/unloading or before the operator leaves.

11 Adjustment and structure

11.1 Machine bed

The main motor is located in front leg of machine. The coolant pump is located in back or middle leg. Electric switchboard is located in the window at rear side of the machine. The tension of drive belts must be properly adjusted with the adjusting nuts. See Fig. 11-1.

High grade hardened cast bed ways ensure high rigidity and maintenance of accuracy in a long time.

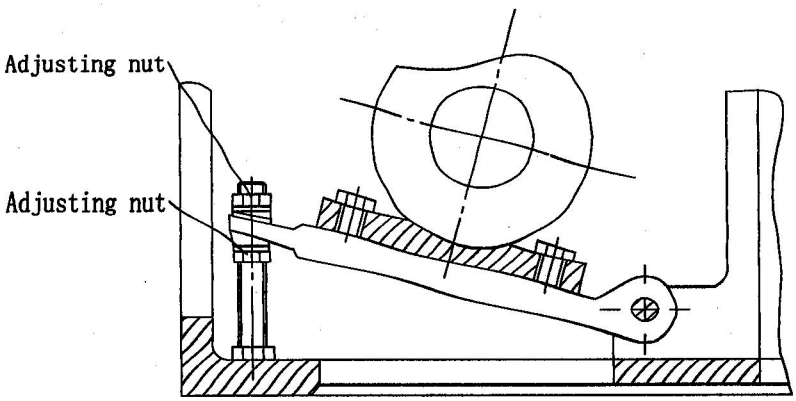


Fig. 11-1 Drive belt adjustment diagram

11.2 Headstock

This is an all-geared centralized drive headstock. Power from the main motor is transmitted through V-belts to shaft Ⅰ which drives the spindle by means of multiple-plate friction clutch and several steps of gears. Direction of spindle rotation is determined by the friction clutch. In order to ensure smooth running of spindle the friction clutch must be properly adjusted. It is not allowed to be too tight or too loose. Being too loose may cause not only ineffectiveness and non-sufficient output of spindle power but also frequent slip and heat that will result in serious wear. Being too tight may make it difficult to operate thus losing function of protection. See Fig. 11-2.

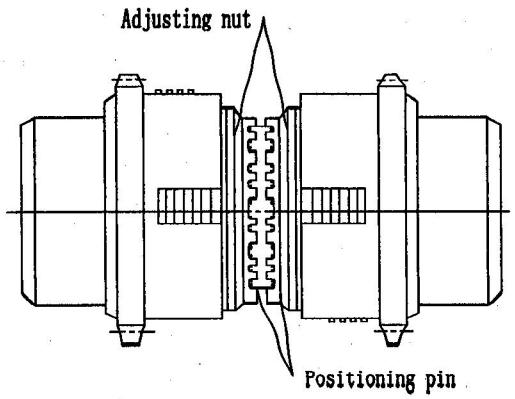


Fig. 11-2 Multiple plate friction clutch adjustment diagram

The brake is used to control the spindle rotation instead of the clutch when clutch is out of engagement. If the spindle fails to come to a dead stop the brake band needs to be tightened with the adjusting nuts. Care not to twist the band. See Fig. 11-3.

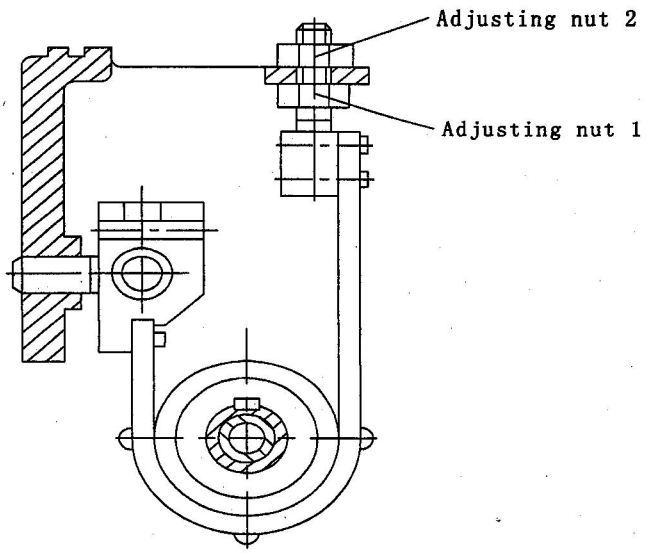


Fig. 11-3 Brake band adjustment diagram

The spindle is supported on three bearings of which the front and middle bearings offer main support and rear bearing offers assistant support.

In order to ensure the machining accuracy and cutting ability of the machine, play of spindle must be adjusted carefully till radial run-out and axial slip are exactly as the machine requires (See Fig.11-4).

When it is necessary to adjust the spindle bearings, loosen nut (1) and nut (2). Be sure to remove the stop washer prior to loosening nut (2). Adjust the spindle front bearing with nut (3) and middle bearing with nut (4) till a proper play is reached. Finally tighten every nut again.

After completion of the above procedure, dry run of over one hour must be performed for the spindle. The temperature of spindle in steady state should be no more than 70℃, otherwise readjustment must be made.

In order to keep balance and avoid vibration at non-load, a balancer is fixed to gear (5) of spindle. Every machine undergoes a balance check prior to shipment from the factory. If it is balanced no balancer is fixed.

Torque from gear-shifting mechanical is transferred with a chain. The chain may stretch after a long use and cause the speed plate to give an improper or wrong value. So it must be adjusted to tension by means of the adjusting screws. See Fig. 11-5.

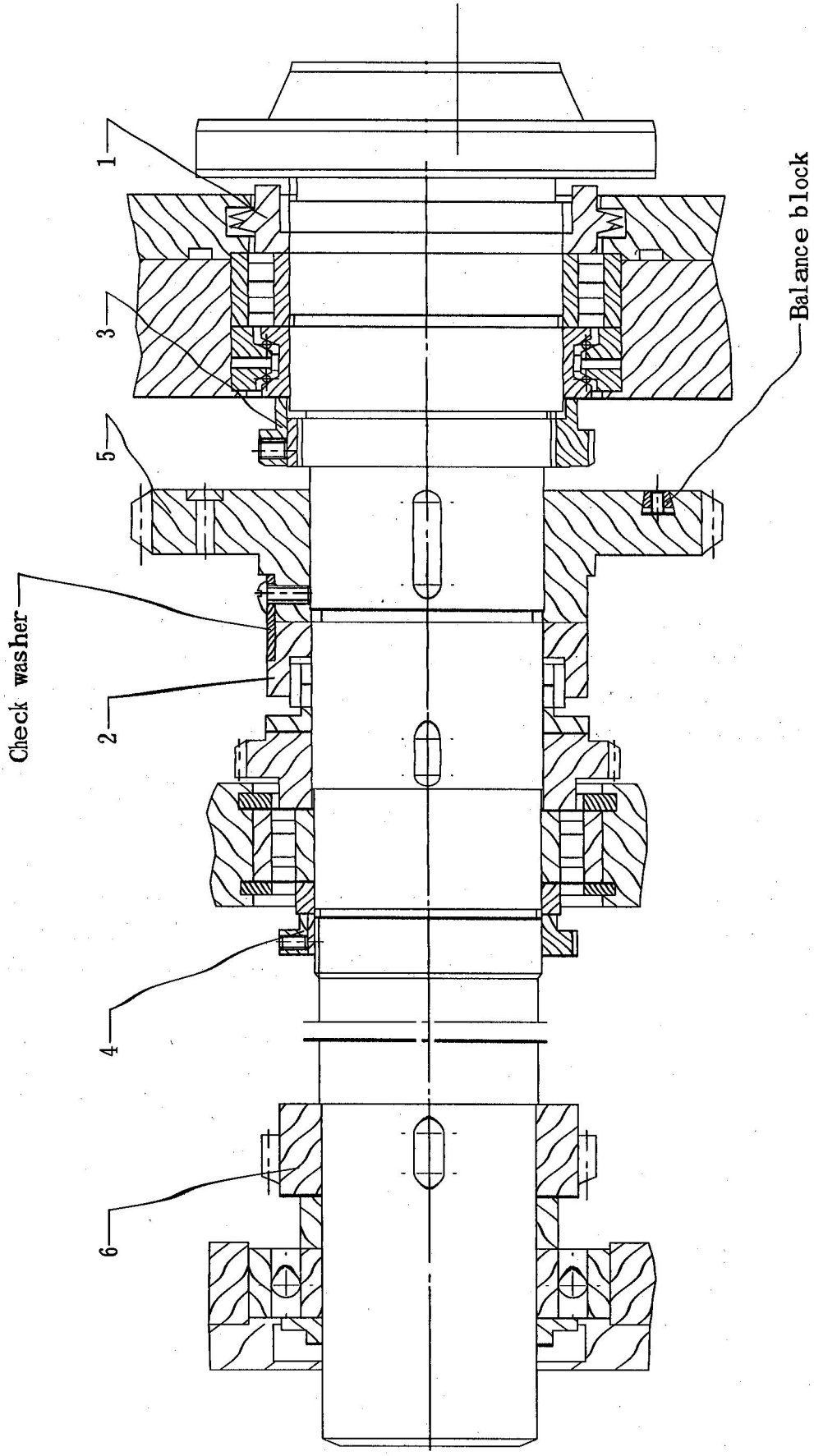


Fig.11-4 Spindle bearing adjustmen

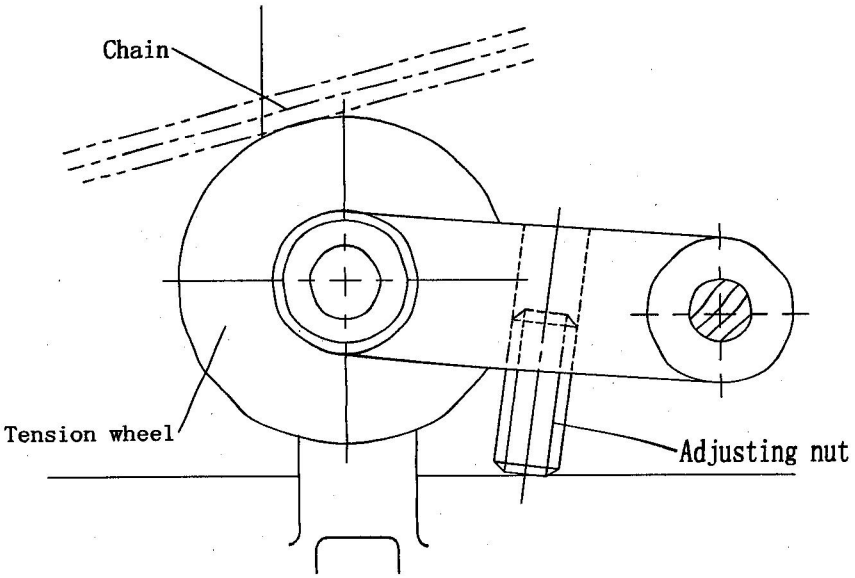


Fig. 11-5 Chain tension adjustment diagram

11.3 Tailstock

A stop dog (6) fixed in the taper hole of the tailstock is to prevent the tool held from rotating. The tailstock can move crosswise on the single-direction ways. Cross adjustment is performed with screw (1). Before adjusting be sure to unclamp the tailstock and loosen the screw (2). After completion of adjustment tighten screw (2) again. When resetting the tailstock, make sure that flanges (8) are in alignment. See Fig. 11-6.

The tailstock can move on the bed ways and be clamped and locked in position with the eccentric shaft. The clamping force is adjusted with nut (3) and (4). When tailstock is heavily loaded nut (5) is used to clamp it as well as the eccentric shaft.

When the clamping lever is released the tailstock is supported on four rolling bearings with spring seats, about 0.05-0.15mm clear of bed ways. That makes it an ease for the tailstock to move along the bed ways. The clearance between tailstock and bed ways is adjusted with screw (7). Before adjusting the tailstock should be locked to ensure proper contact between tailstock and bed ways and prevent bearings from being broken.

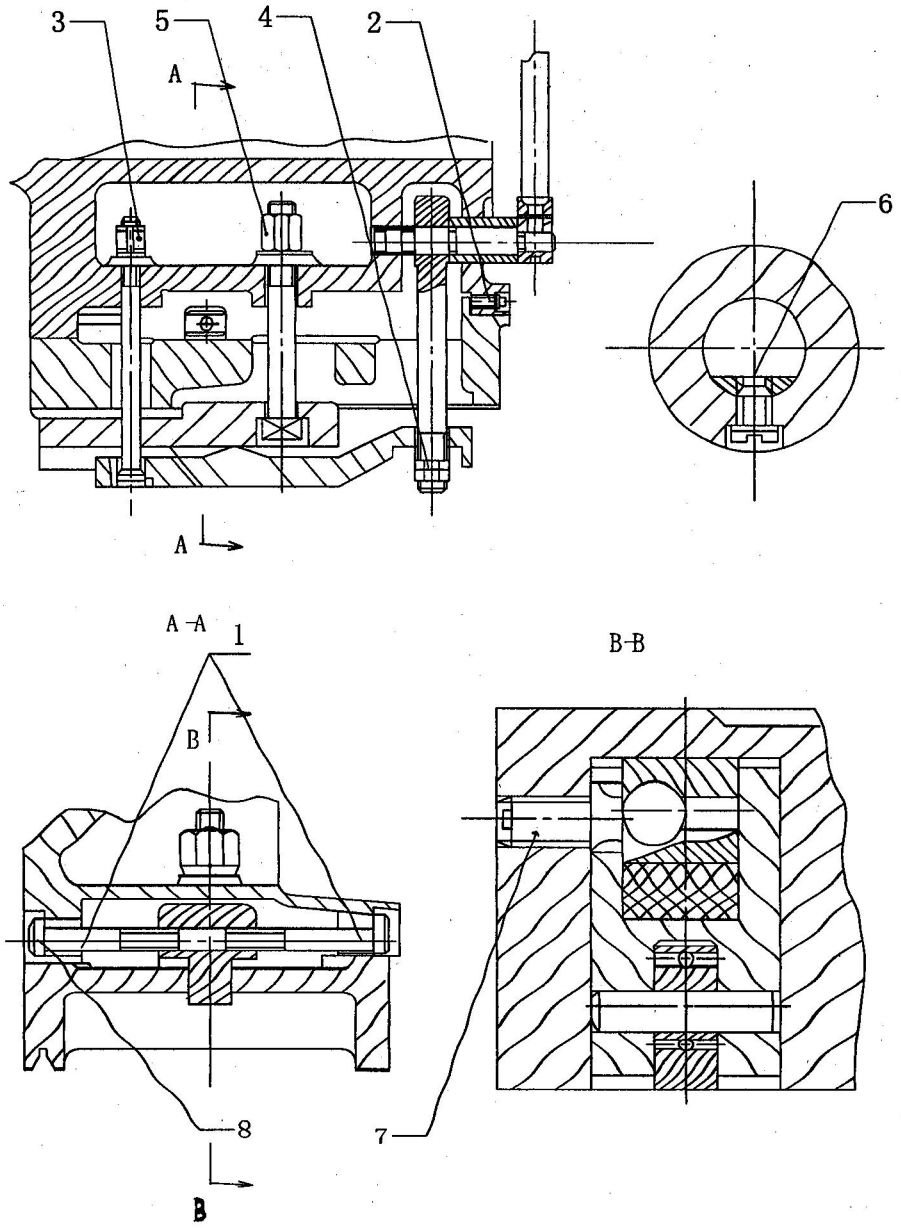


Fig. 11-6 Tailstock adjustment diagram

11.4 Carriage

The cross slide is driven by the split nut which moves with rotation of lead screw and is used to eliminates transmission clearance by adjusting the pith diameter fit. When adjusting loosen the stop screw (1) first and then adjust screw (2) till the clearance is removed. After completion tighten screw (1) again and cover the dust lid (3). See Fig.11-7.

If the sliding ways of cross slide and compound rest have too large clearance or they are hard to move, adjust the clearance with the adjusting screws at ends of the rack strip.

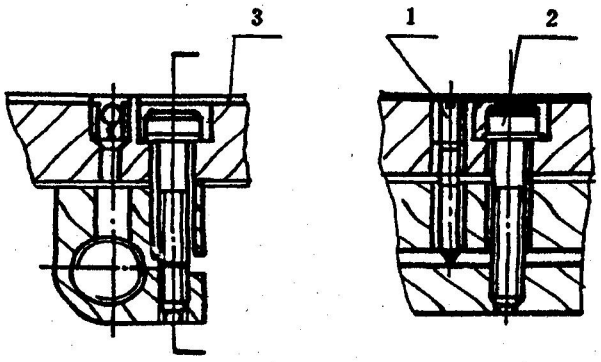


Fig.11-7 Cross slide screw nut adjustment diagram

11.5 Apron

The apron controls feeding movements of carriage. Drive from the rod is transmitted to the apron, which in turn drives the carriage to move longitudinally or crosswise by means of safety clutch, worm and transmission gears.

In order to make it possible for the carriage to perform rapid traverse at any time the worm is fixed with a one-way overrunning clutch that overpasses the drive from the rod when the rapid traverse motor is driving the worm in a selected direction.

When the carriage is moving in rapid traverse mode or auto feeding mode the apron handwheel is disengaged for safety and it is engaged again after the carriage stops.

If the cutting force is always below the maximum permissible cutting force of the machine, the safety clutch needs to be adjusted with screw (2). Before adjusting, be sure to remove the cover (1). See Fig. 11-8. Care not to over tighten the clutch. An over tight clutch may lose the function of protection and cause damage to machine parts.

To prevent simultaneous engagement of rod and lead screw an interlock mechanism is fixed between the split nut and the operating shaft.

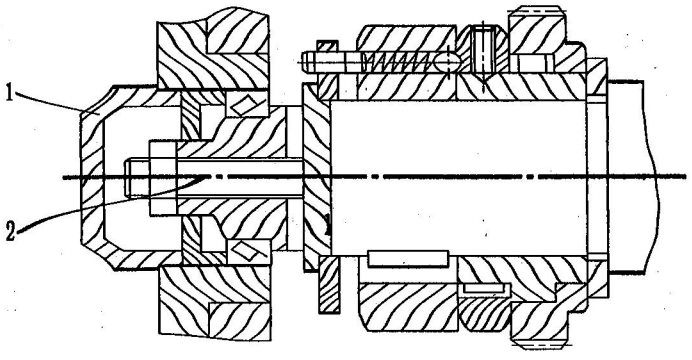


Fig.11-8 Safety clutch adjustment diagram

11.6 Feeding case

In the feeding case there are sliding gears mounted on three shafts, thread selecting mechanism and multiplying mechanism, so normal threads are cut without changing gears.

In order to cut high accuracy threads and eliminate the axial slip of lead screw the anti-thrust bearing (2 and 3)

must be adjusted with nut (1). See Fig. 11-9.

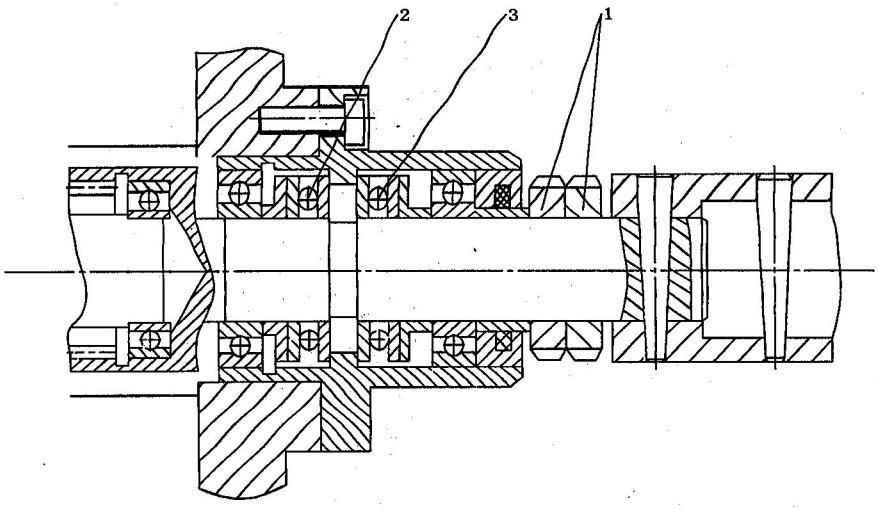
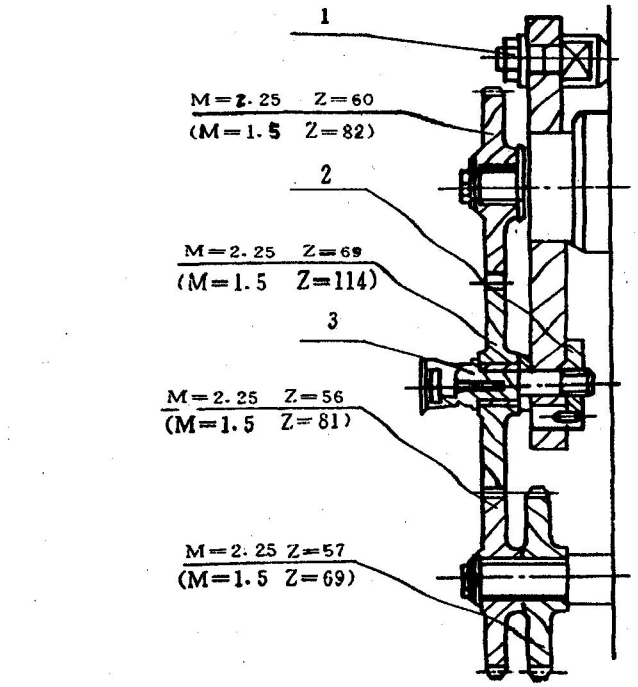
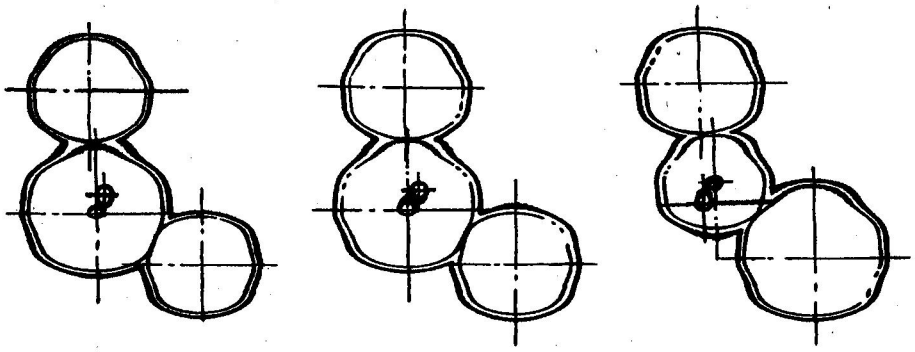


Fig.11-9 Screw shaft anti-thrust bearing adjustment diagram

11.7 Change gearbox

See Fig. 11-10.





60/69X69/56
(82/114X114/81)

60/69X69/57
(82/81X81/114)

19 tpi

60/56X56/69
(82/114X114/69)

11 1/2 tpi

Fig. 11-10a Engagement of change gears of CS6$\frac{1}{2}$50C

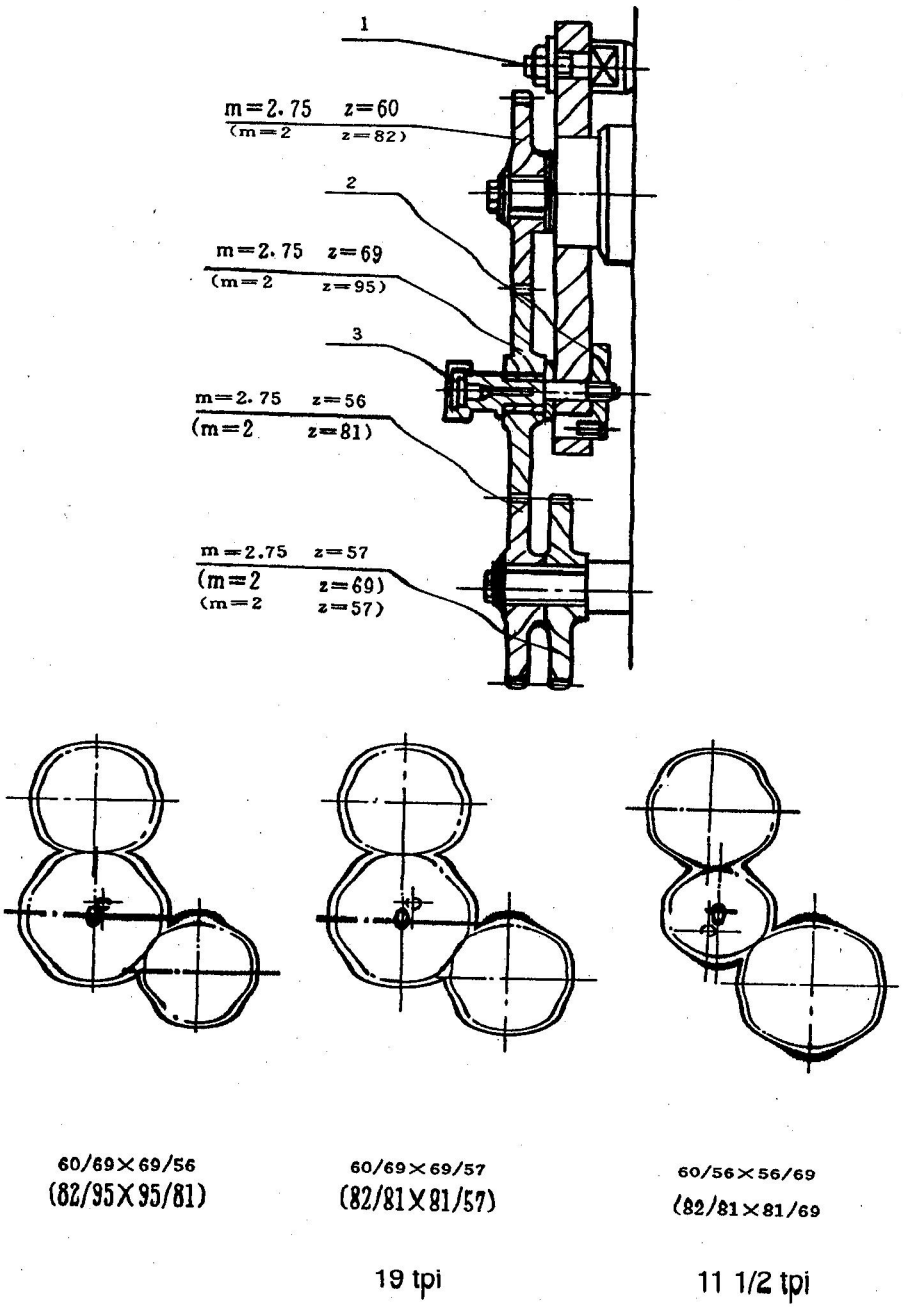


Fig. 11-10b Engagement of change gears of CS6$\frac{1}{2}$66C

11.8 Chuck, Driving plate and Spindle nose

Chuck or driving plate is mounted and connected onto the spindle by a short taper cam lock.

When mounting, align reference line 2 on cam (4) with reference line 1 on spindle nose; align reference line 3 on studs of chuck or driving plate with left face of chuck or driving plate; tighten them with screw (6). Insert six studs of chuck or driving plate into six holes in spindle nose and turn the six cams with the square key supplied till they are locked. See Fig.11-11.

When removing the chuck or driving plate from the spindle nose, loosen the six cams with a key aligning reference line 1 with reference line 2. A face plate is mounted onto or removed from the spindle nose in the same

way as the chuck or driving plate.

See Fig. 11-12 for structure of spindle nose.

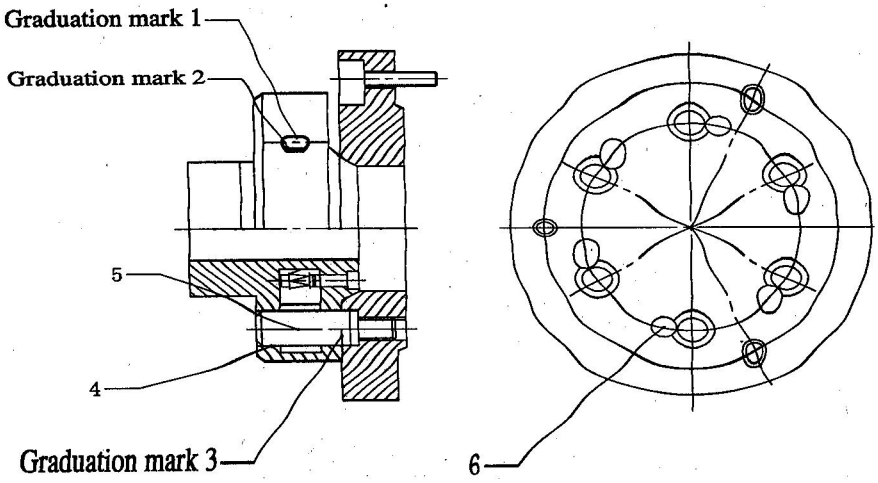


Fig. 11-11 Mounting of chuck or driving plate onto spindle

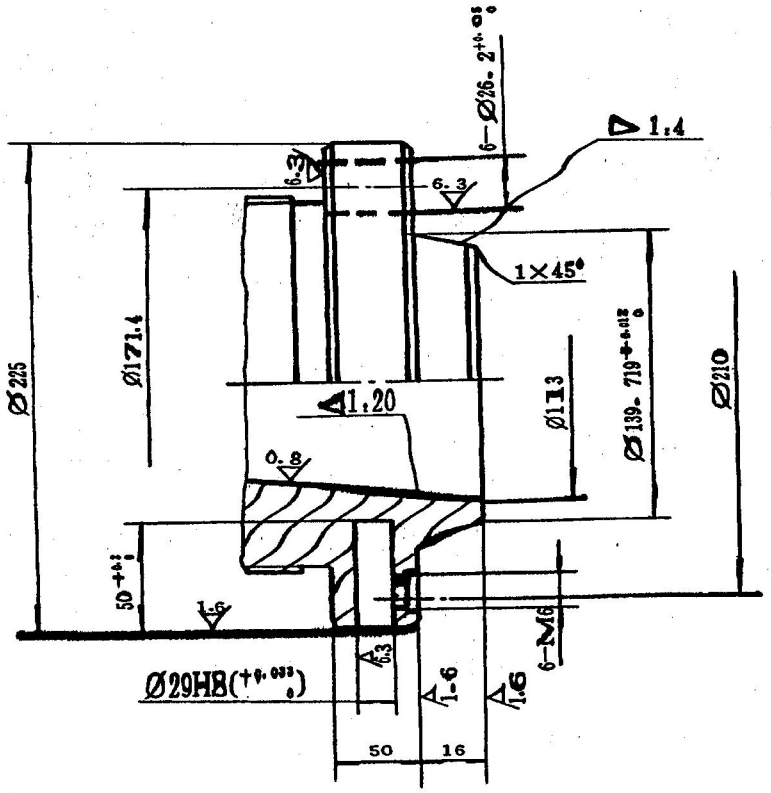
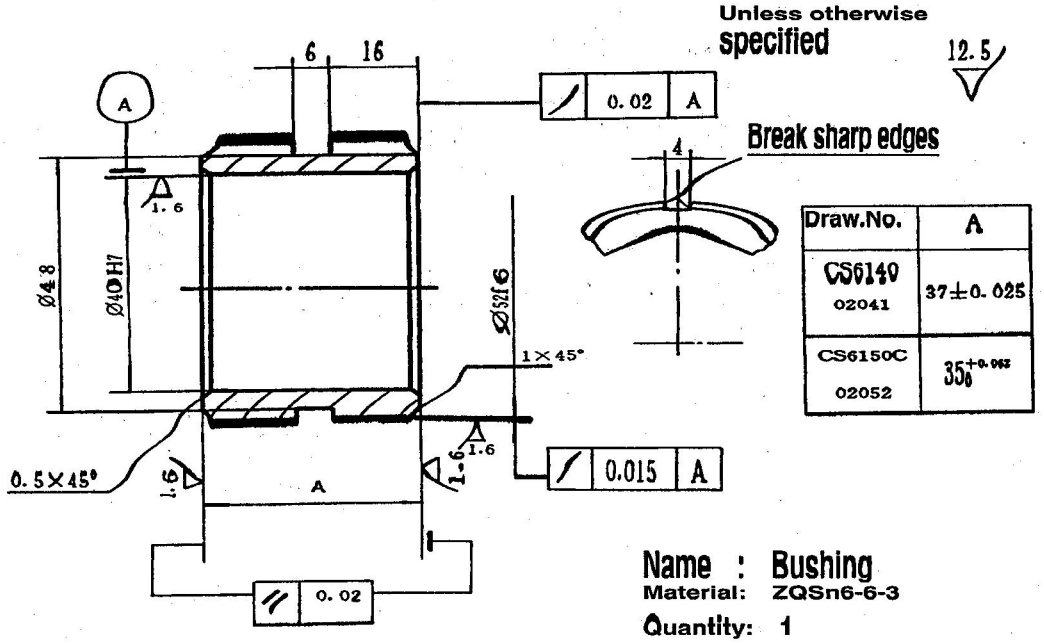


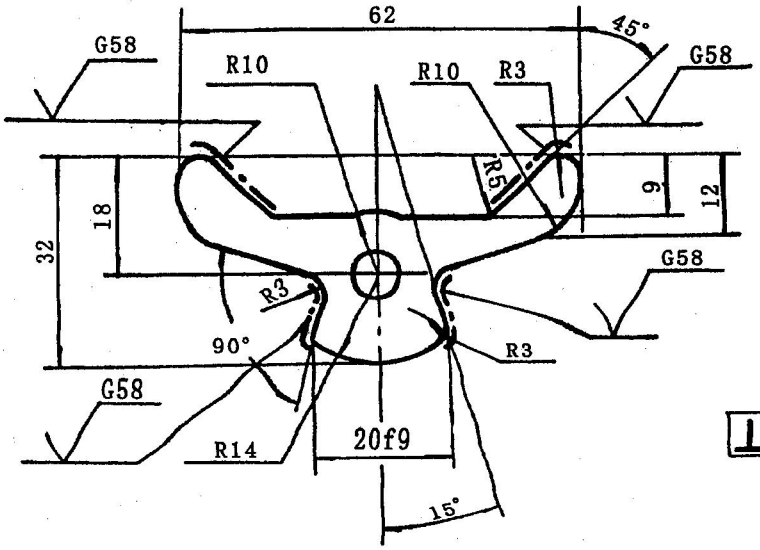
Fig. 11-12 Structure of spindle nose

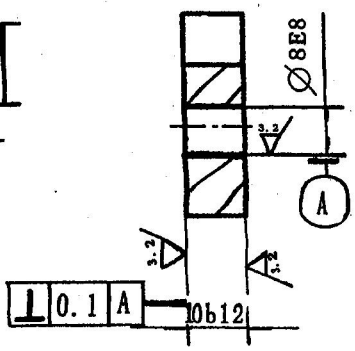
12 Wear parts of the machine and their machining diagrams

Table 12-1 List of Wear Parts

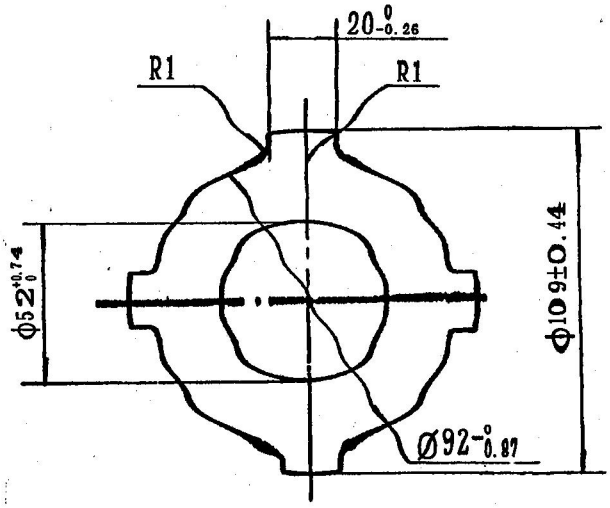
Part No.	Name	Material	Heat treatment	Qty	Remark
02052/CS6$\frac{1}{2}$50C	Bushing	ZQSn 6-6-3		1	
02041/CS6140	Bushing	ZQSn 6-6-3		1	
02136/CS6140	Lever	45	Local G48	1	
02192/CS6140	Friction plate	15	S0.5-C60	13	
02193/CS6140	Friction plate	15	S0.5-C60	9	
02089/CS6$\frac{1}{2}$50C	Brake band	65Mn		1	
02211/CS6140	Outer roller of trochoid pump	Iron base powder		1	
02212/CS6140	Inner roller of trochoid pump	Iron base powder		1	
02088/CS6$\frac{1}{2}$50C	Brake friction plate	Iron sand canvas		1	
05011/CS6140	Nut	ZQSn 6-6-3		1	05011Y（Inch parts）
06021/CS6140	Worm	ZQSn 6-6-3		1	
06022/CS6140	Half nut	ZQSn 6-6-3		1	06022Y（Inch parts）
08011/CS6140	Spline collar	ZQSn 6-6-3		1	
GB83-85	Screw M16x40	35		8	
	Center 5#	T8	C58	2	

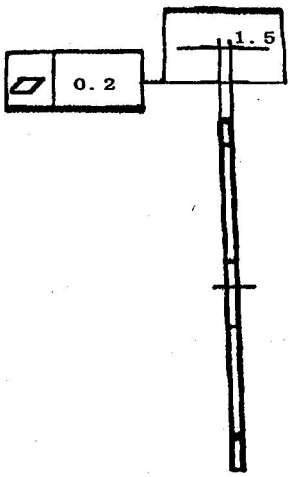






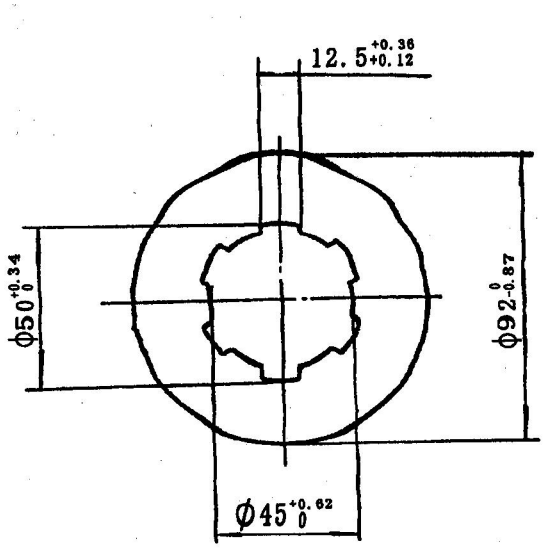
Part No.: 02136 Name: Lever Material: 45 Quantity: 1

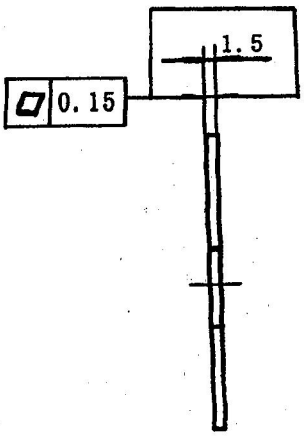




Sand blast S0.5-C60

Part No.: 02192
Name : Friction plate
Material: 15
Quantity: 9

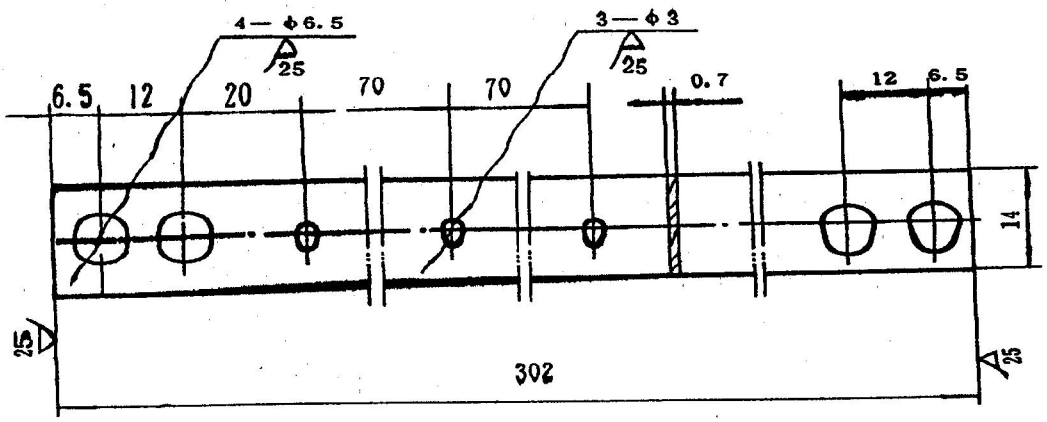




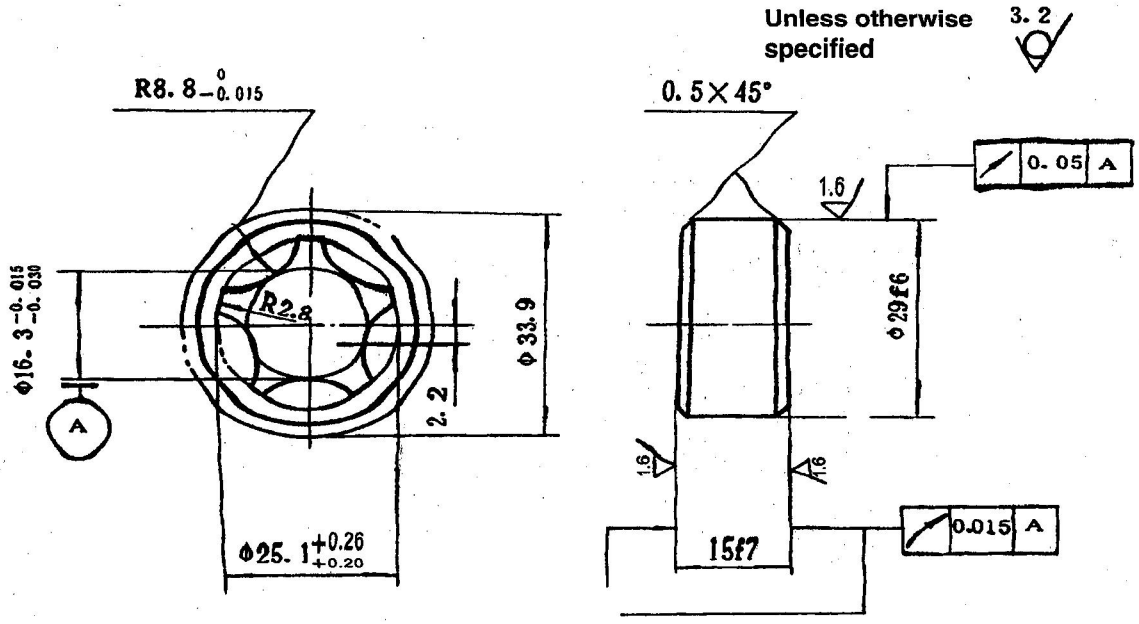
Sand blast S0.5-C60

Part No. : 02193
Name : Friction plate
Material : 15
Quantity: 11

Unless otherwise specified

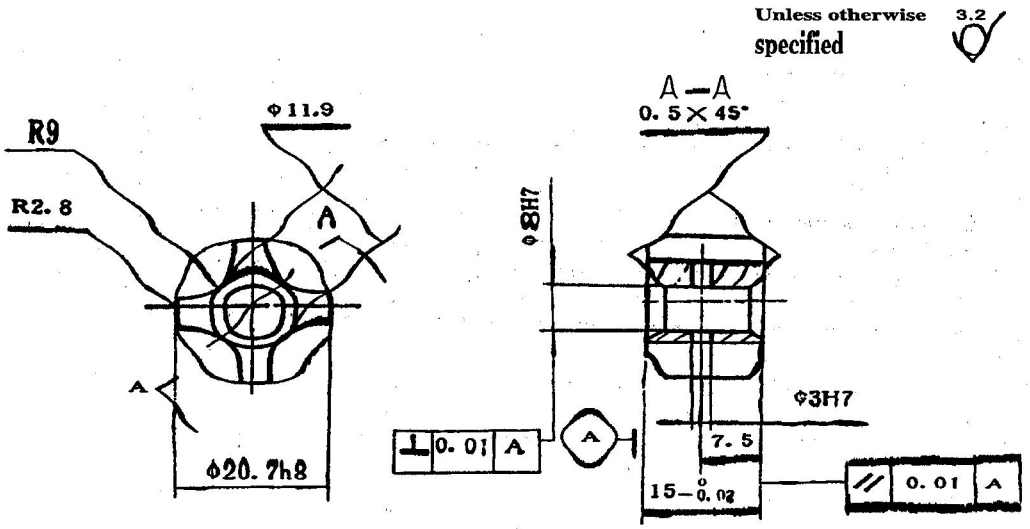


Part No.: 02089
Name : Brake band
Material: 65Mn
Quantity: 1



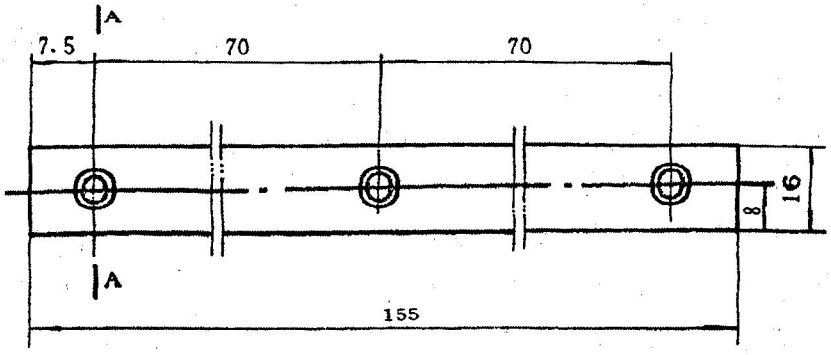
Gernerated radius = 16. 95

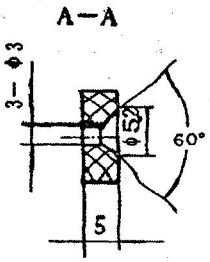
Part No.: 02211
Name : Outer rotor of trochoid pump
Material: Power metallurgy
Quantity: 1



Gernerated radius = 16. 95

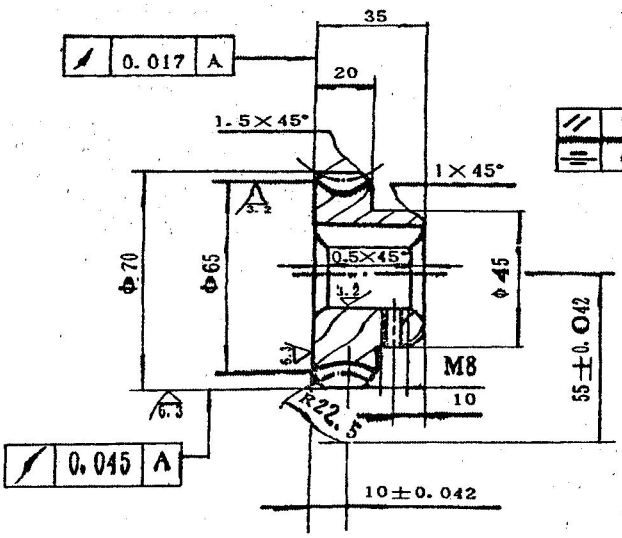
Part No.: 02212
Name : Inner rotor of trochoid pump
Material: Power metallurgy
Quantity: 1



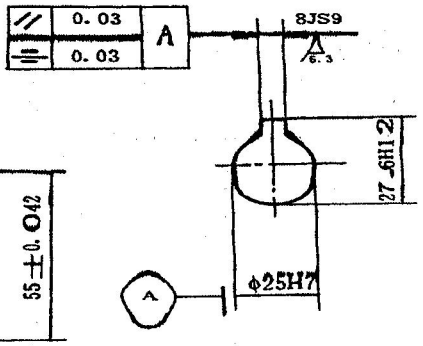


Cut and leave a straight smooth edge

Part No.: 02088
Name : Brake friction plate
Material: Iron sand cancas
Quantity: 1

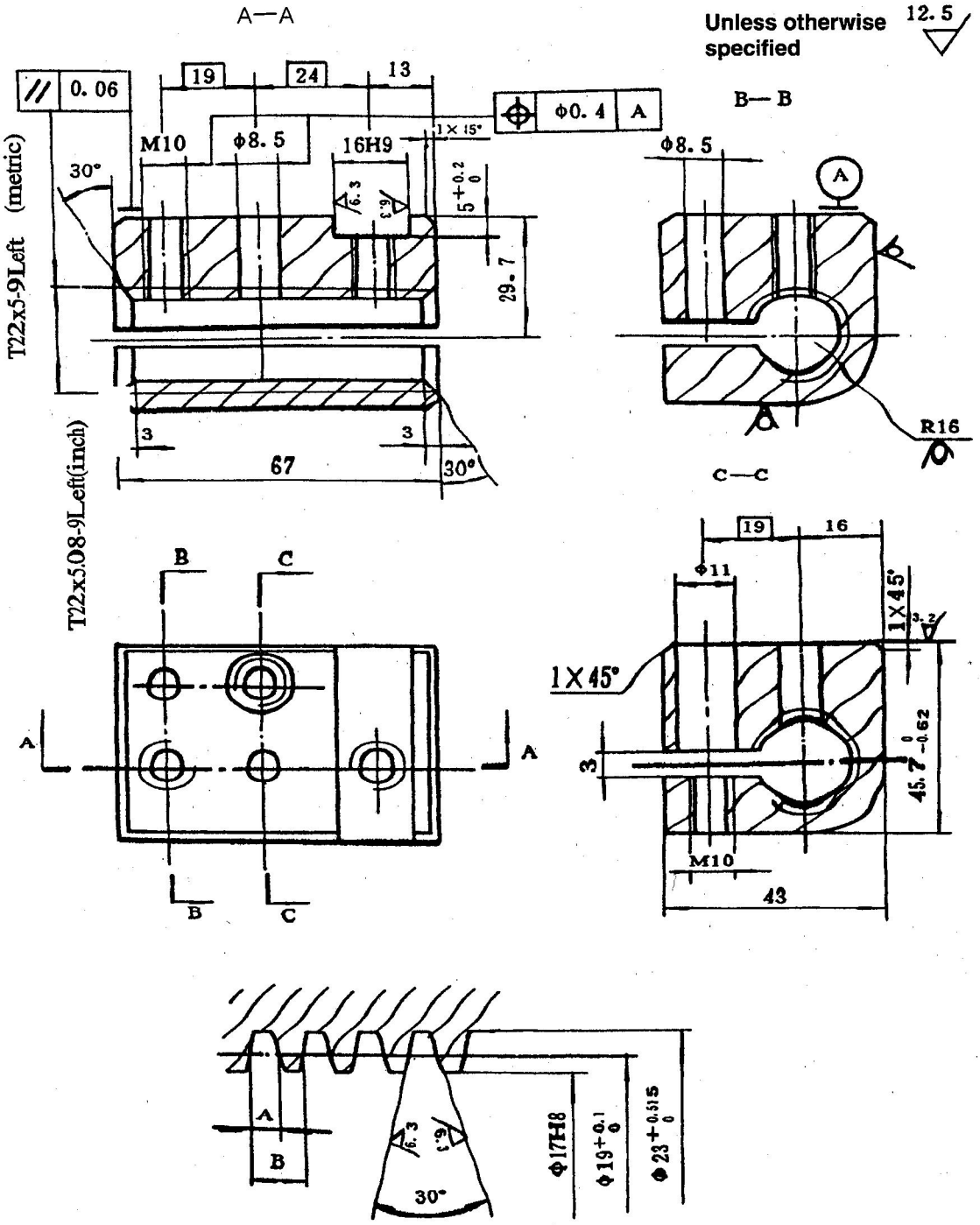


Unless otherwise specified 12.5



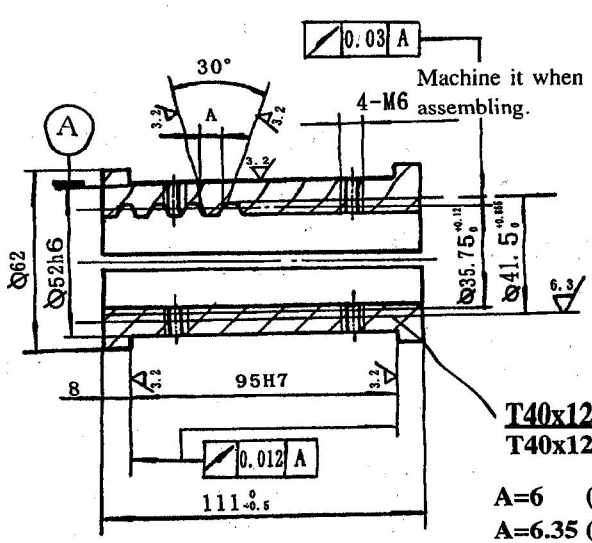
Part No.: 06021
Name : Worm wheel
Material: ZQSn6-6-3
Quantity: 1

Worm type	Archimedes	Axial profile angle of worm α_s	20°
Axial modulus of worm m_s	2.5	Teeth number of wormwheel Z_2	26
Number of starts of worm	2	Position change ratio of wormwheel ξ	0
Helix angle and rotary direction of worm λ	Left-hand 6°20′ 25″	Machining accuracy	8DC



Type	Size	
	A	B
Metric	2.5	5
Inch	2.54	5.08

Part No.: 0011(metric)
05011Y(inch)
Name : Nut
Material: ZQSn6-6-3
Quantity: 1



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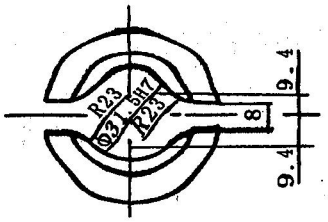
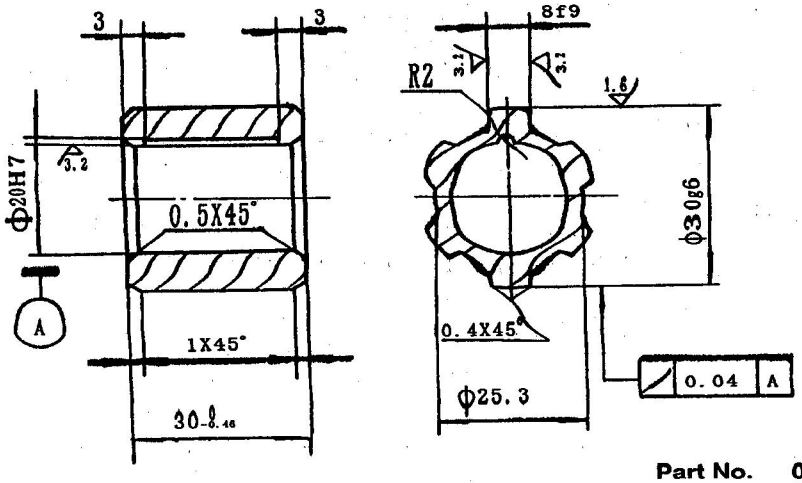
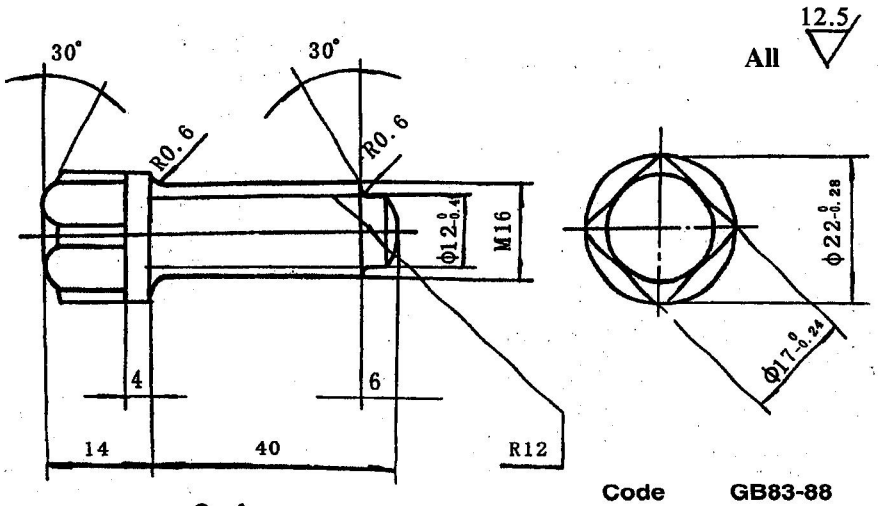


Part No.	06022(metric) 06022Y(inch)
Name	Split nut
Material	ZQSn6-6-3
Qty.	1

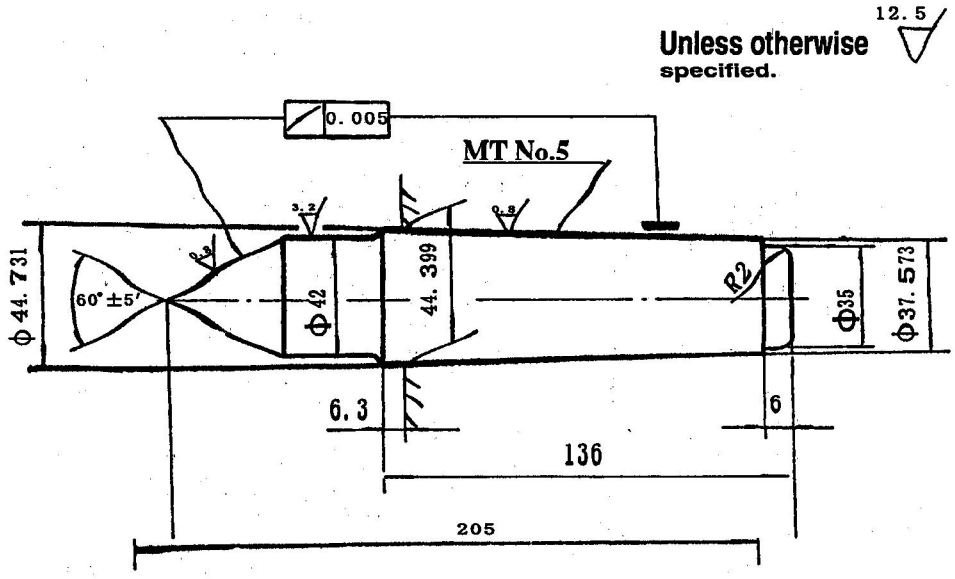
Unless otherwise specified. 12.5



Part No.	08011
Name	Splined bush
Material	ZQSn6-6-3
Qty.	1



Code	GB83-88
Speci.	M16x40
Name	Screw
Material	35
Qty.	8



Heat treatment C58

Speci.	MT No.5
Name	Center
Material	T8
Qty.	2

13 Standard accessories, tools and optional accessories

Table.13-1 Standard accessories

Part No.	Name	Specification	Qty.	Remarks
09100	3-jaw chuck and adapter	Φ315	1 set	
	Center	Morse taper 5	1 set	
	Center	Morse taper 6	1 set	
CS6$\frac{1}{2}$ 50C 02104	Center sleeve	Φ113 1:20/Morse taper 6	1 set	

Table.13-2 Tools

Part No.	Name	Specification	Qty.	Remarks
S92-3	Square socket wrench	17	1 set	For setting the cutters.
12001	Allen key	12	1 set	For setting cams of spindle
S93-1	Hook spanner	45-48	1	For setting lead screw
	Hook spanner	165-170	1	For setting spindle bearings
	Hook spanner	180-200	1	For setting spindle bearings
GB1165-74	Oil gun	100 cm^3	1	

Table 13-3 Optional accessories

Part No.	Name	Specification	Qty.	Remarks
09200A	Drive plate	Φ250	1 set	
09400A	Face plate	Φ630	1 set	
09300B	4-jaw and adapter	Φ400	1 set	
10100	Steady rest	Φ20-Φ125	1 set	
10200	Following rest	Φ20-Φ80	1 set	
10300	Super-giant steady rest	Φ120-Φ260	1 set	
12002	Pin remover	M12	1 set	For gap-bed lathes
01035	Full-length splash guard	750/1000/1500/2000	1 set	
	T-shaped tool post		1 set	
09900	Thread chasing dial	12	1 set	
10300A	Big steady rest (with roller wheel)	Φ120-Φ260	1 set	
09500	Face plate	Φ710	1 set	
223000	Chuck cover		1 set	
224000	Tool post cover		1 set	
13000	Taper turning attachment	±10°	1 set	

	Double-speed tailstock		1 set	For CS6$_2^1$ 66C lathe.
	Long. feed auto stop		1 set	
	Digital readout		1 set	Crosswise coordinate
09700	Long. 1-position stopper		1 set	
09600	Long. 4-position stopper		1 set	

14 Foot brake

14.1 Application and function

This brake is designed for stopping the high running main motor and other transmission units of CS6140 series lathes only. It is simply constructed, efficient, independent and easy to service.

14.2 Structure and working principle

Fig.14-1 shows the structure of the foot brake. It consists of pedal, connection rod, support, seat, cam, strain arm, pulley, steel band, braking assembly and electrical unit. As soon as the pedal (7) is trodden, cam (15) will disconnected the over-travel limit switch (16) with the help of strain arm (14), cut off the power to main motor. The motor is thus stopped under the combined action of strain arm (14) and steel band (11).

The spindle is unable to re-start unless the starting lever (10) is set to NEUTRAL position.

14.3 Electric unit

Fig. 6-2a is electric schematic diagram of CS6$\frac{1}{2}$50C series lathes equipped with foot brake and Fig. 6-3a is electric connection diagram. Fig. 6-2b is electric schematic diagram of CS6$\frac{1}{2}$66C and Fig. 6-3b is electric connection diagram of CS6$\frac{1}{2}$66C.

14.3.1 For electrical unit of foot brake, please refer to relevant section of operator's manual of the machine.

The main motor of machine can't be started unless the starting lever is set to NEUTRAL position. See Fig.14-1.

When the starting lever (10) is set to NEUTRAL position, dog (17) operates and close SQ3 of limit switch (18). In this case the contactor is closed when SB3 or SB4 (KM1) is depressed, and the main motor is operatable.

When it is necessary to stop the rotating spindle, step on pedal (7) and the limit switch (16) is switched off, meanwhile the main motor is disconnected to a stop. The main motor can also be stopped by depressing SB2 or SB5 and it can not be restarted unless the starting lever is set to NEUTRAL position.

During turning operation the control circuit can be disconnected by depressing SB5 in a case of emergency.

14.3.2 Adjustment

When starting lever is set to NEUTRAL position, dog (17) should be adjusted so that SQ3 of limit switch (18) is in a compressed state. Some adjustment should be made so that limit switch (16) is in released state when no pedal is stepped and in compressed state when pedal is stepped.

14.4 Set up

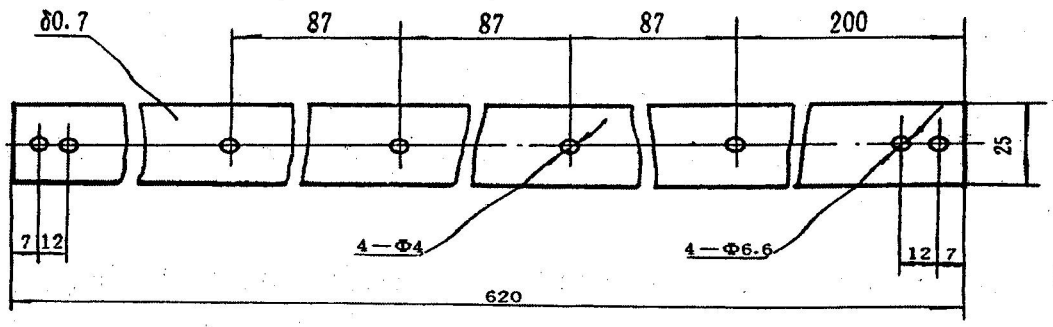
The swivel angle of pedal (7) is changed by adjusting the length of steel band (11) using the nut of tightening screw rod (12). The height of pedal (7) is changed after loosing the pressure rod (8). The pedal must be locked again after adjustment. Cam (15) is adjusted so that the machine brakes to a steady stop when limit switch (16) is switched off. Limit switch (18) should be adjusted so that it is closed prior to starting of spindle.

14.5 Easily-worn patrs

See the following table. It is a diagram of machining the easily-worn parts.

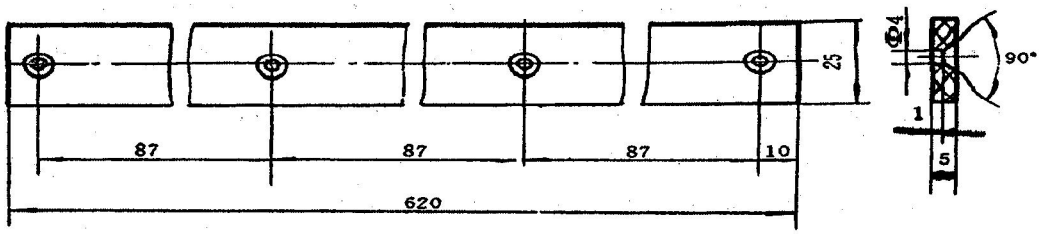
List of easily-worn parts

Draw No.	Name	Material	Heat treatment	Qty.	Remark
B16008	Steel band	65Mn	C42	1	
B16010	Braking band	Wire asbestos band		1	

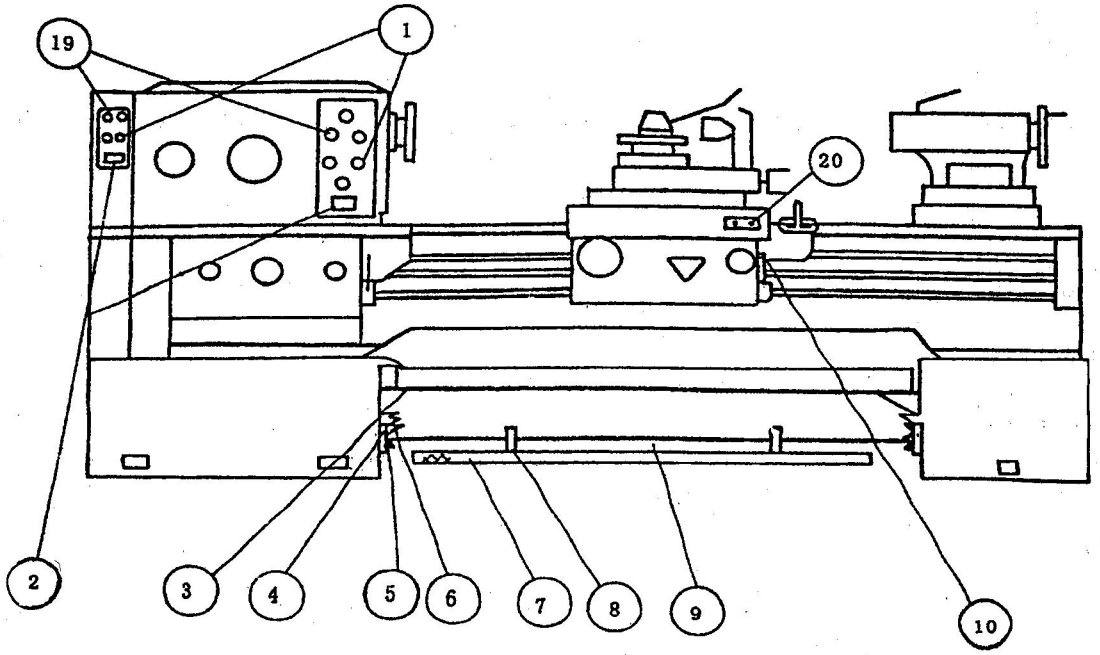


C42

B16008



B16010



Note: Operator's panel of CS6266C series lathe is located on headstock.

Open in K direction.

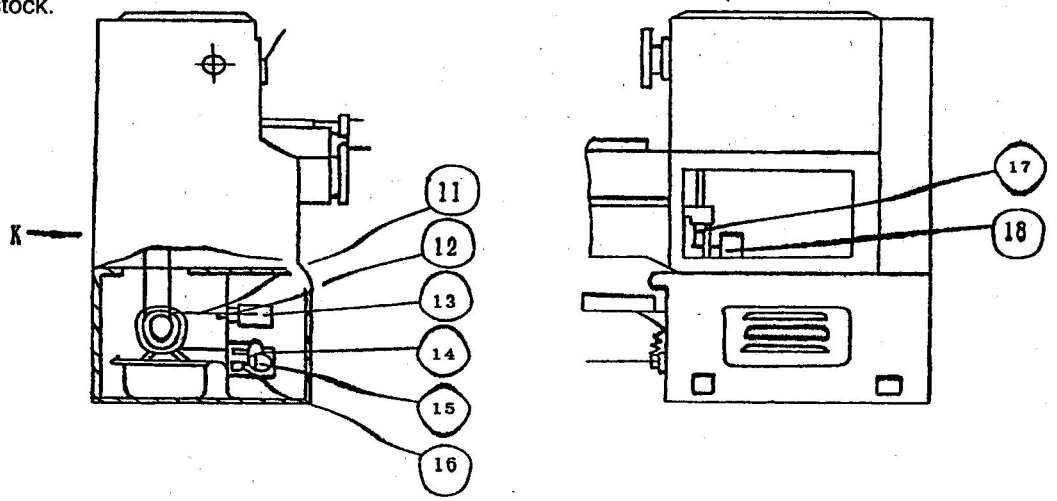


Fig.14-1 Structure of foot brake

1 Emergency stop, spindle start button
2 Power switch
3 Pin
4 Left support
5 Tension spring arm
6 Tension spring
7 Pedal
8 Pressure rod
9 Connection rod
10 Starting lever
11 Steel band
12 Tightening screw rod
13 Upper seat
14 Strain arm
15 Cam
16 Limit switch
17 Dog
18 Limit switch
19 Coolant pump start/stop button
20 Spindle start/ stop button

15 Taper turning attachment

15.1 Application

This attachment is designed for taper turning and taper pipe threading. It is a special accessory of $CS6_2^1$ 50C series lathe produced in our factory.

15.2 Main specifications

Max. taper turning length：220mm

Swivel angle：±10°

Max. travel：20mm

15.3 Structure

See Fig.15-1.

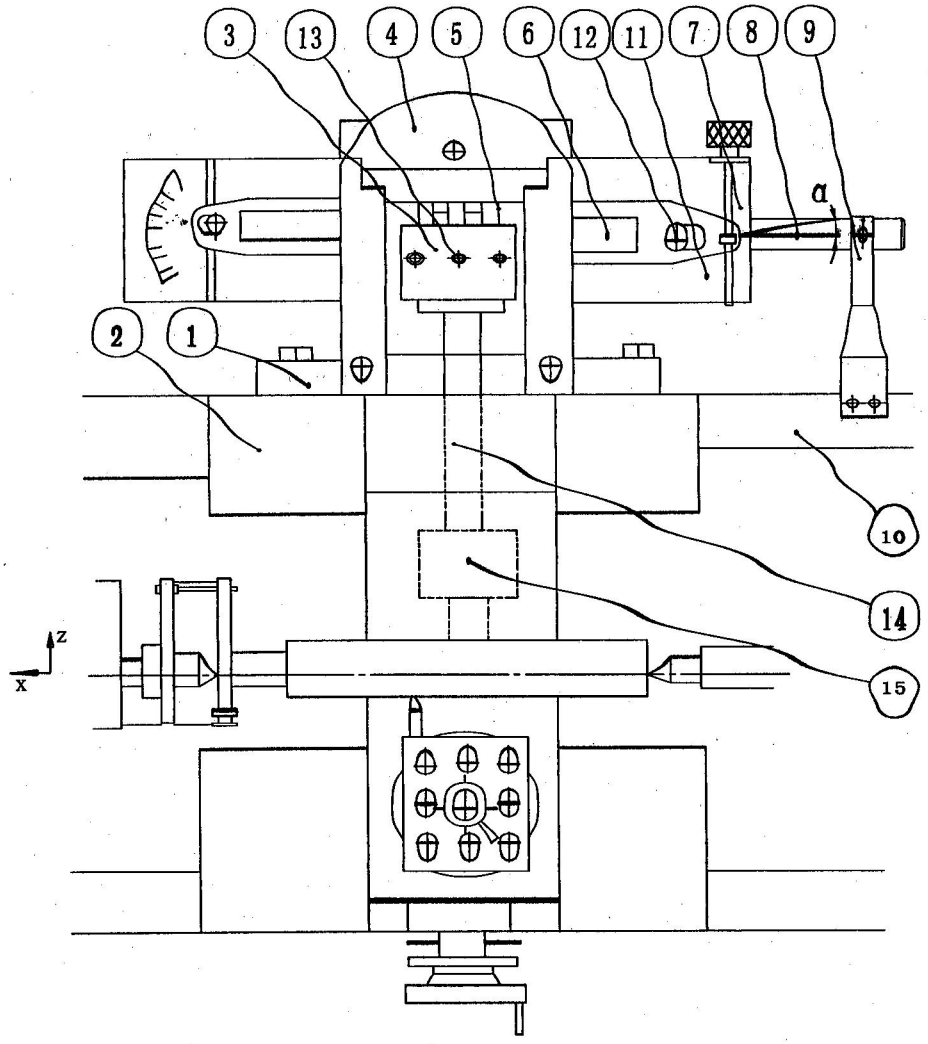


Fig. 15-1 Structure of taper turning attachment

Support (1) is fastened to rear face of machine saddle (2) with 2-M6 screws and 2-10 taper pins. Bracket (9) is

fastened to machine bed (10) with taper pins. When operating, I-shaped sliding block (3) moves along plate (4) and sliding slot (5) moves along scale (6) that is connected with graduation plate (7) with taper pins.

15.4 Setting up

Before using, the scale, which swings back and forth in the graduation plate around the shaft pin, must be properly adjusted so that it points to correct graduation mark as required by the work piece to be turned. Rotate the adjusting screw arbor till the scale is pointed in position, and fasten it to the graduation plate with two T-slot screws. During operation the tool will move a taper path, thus a taper is turned. During taper turning some length of cylindrical surface is always cut due to mechanical backlash. So it is necessary to take a test operation to find the length (it varies with different taper work pieces). After setting up the tool, true turning cannot be taken unless the said length is eliminated by moving the carriage a same distance to the right using the apron handwheel.

15.5 Caution

When the taper turning attachment is not to be used, bracket (8) must be removed. Some adjustment should be made so that the scale is pointed to zero. Fasten T-slot screws (12) and lock I-shaped sliding block (3) using two pointless set screws (13) to stop the drive screw from sliding back and forth.

When it is necessary to check the terminal block for trouble removing, take off the taper turning attachment first.

Every running parts of the attachment should be lubricated with an oil gun every shift of work to reduce wear and guarantee operation.

16 Mechanical Feed Stop

The machine is designed with a mechanical feed stop, which automatically stops the longitudinal and crosswise feed motion of carriage at a desired position.

During feeding, the carriage stops at the position where a dog is pre-set. That is, the lever located in apron, once come into contact with the dog will disengage the jaw clutch mounted on worm shaft in apron. The jaw clutch in turn will stop the carriage.

Six adjustable dogs, mounted on the positioning rod that is fixed with machine bed, are used to stop the longitudinal feed.

Note: The mechanical feed stop is ineffective during rapid traverse motion of carriage.

This manual is subject to change without notice due to continuous improvement of products.