NARVIK

Series X6230 Universal Rotary-Head Milling Machine OPERATION MANUAL

(Mechanical Part)

Width of Working Table: 250/300/320 mm

Length of Working Table: 1100 mm

Serial No.: 0582

971/2

Index

1. Model , Name & View of the machine..

1.1 Model, Name and features.（See Fig.1）

Table 1 Model & Name of this series of milling machine

No.	Model	Name	Feature
1	X6225 X6230 XQ6232	Universal Rotary-head Milling Machine	a) Working table can be swiveled a certain degree. b) 45° universal rotary head can rotate to any angle . And model /3, /5 belongs to new type ram speed change system and extension of rotary milling spindle c) Model /1, /5 indicate that lead screw on three directions (Longitudinal, transversal and vertical) are all ball screws
2	X6225/1 X6230/1 XQ6232/1		
3	X6230/3 X6230/5		

Remarks : Each types of milling machine can become relative digital display milling machine when equipped with digital display device.

1.2 Overview

See Fig. 1. Fig1a. Fig1b. & Fig1c for overview of the machine.

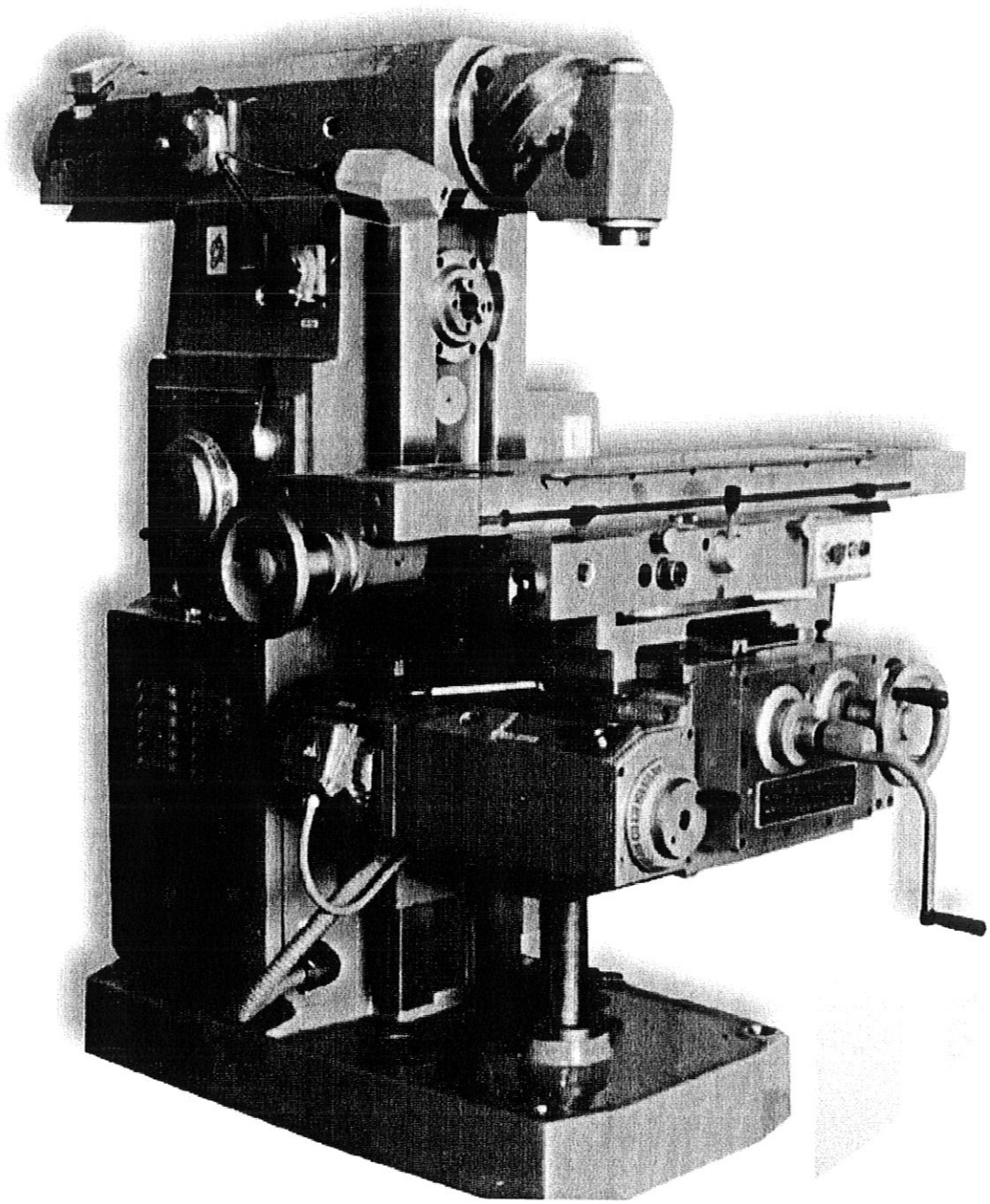


Fig.1 Overview of Series X6230 Universal Rotary Head Milling Machine

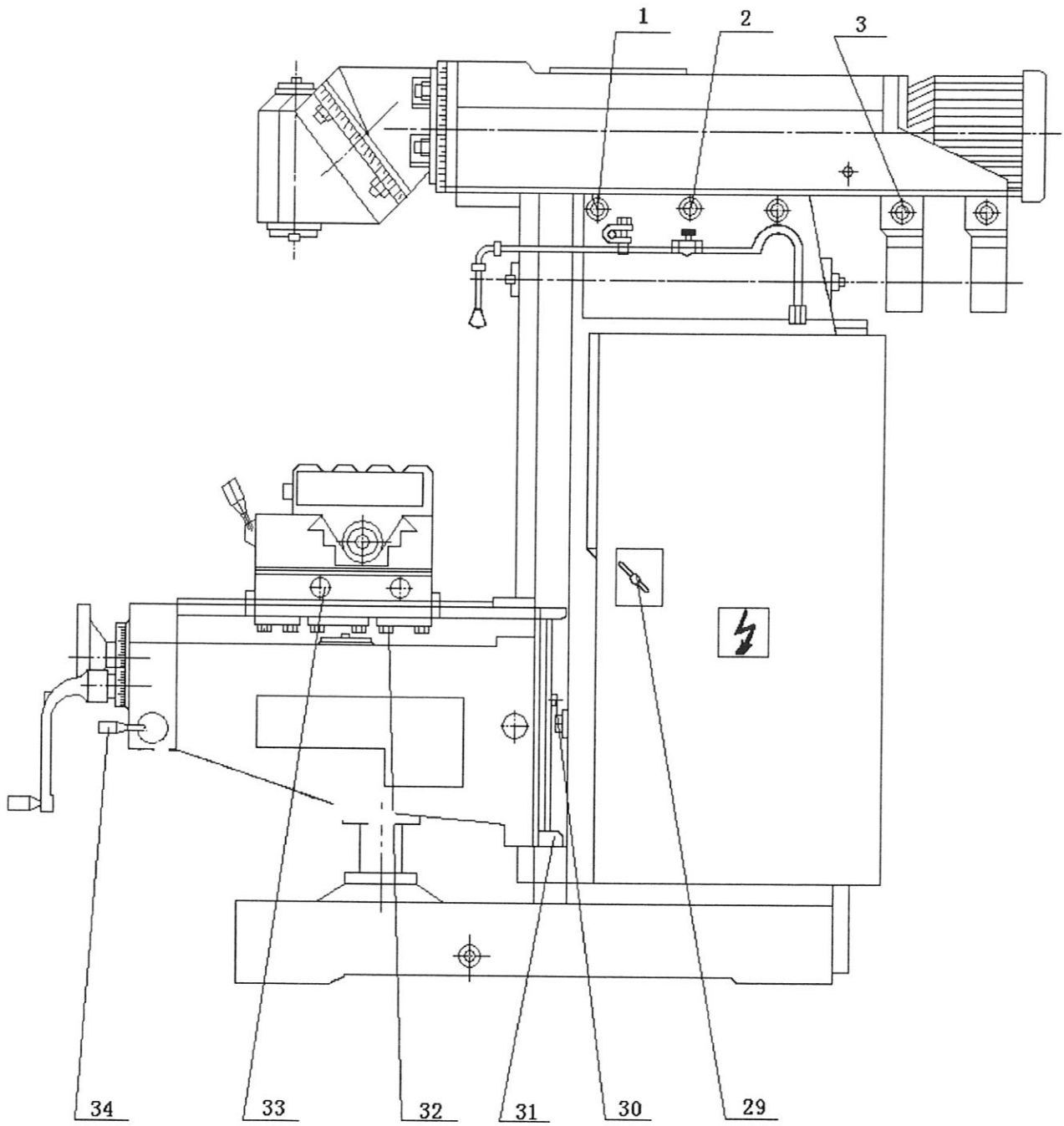


Fig.1a Right view of series X6230 Universal Rotary-Head Milling Machine

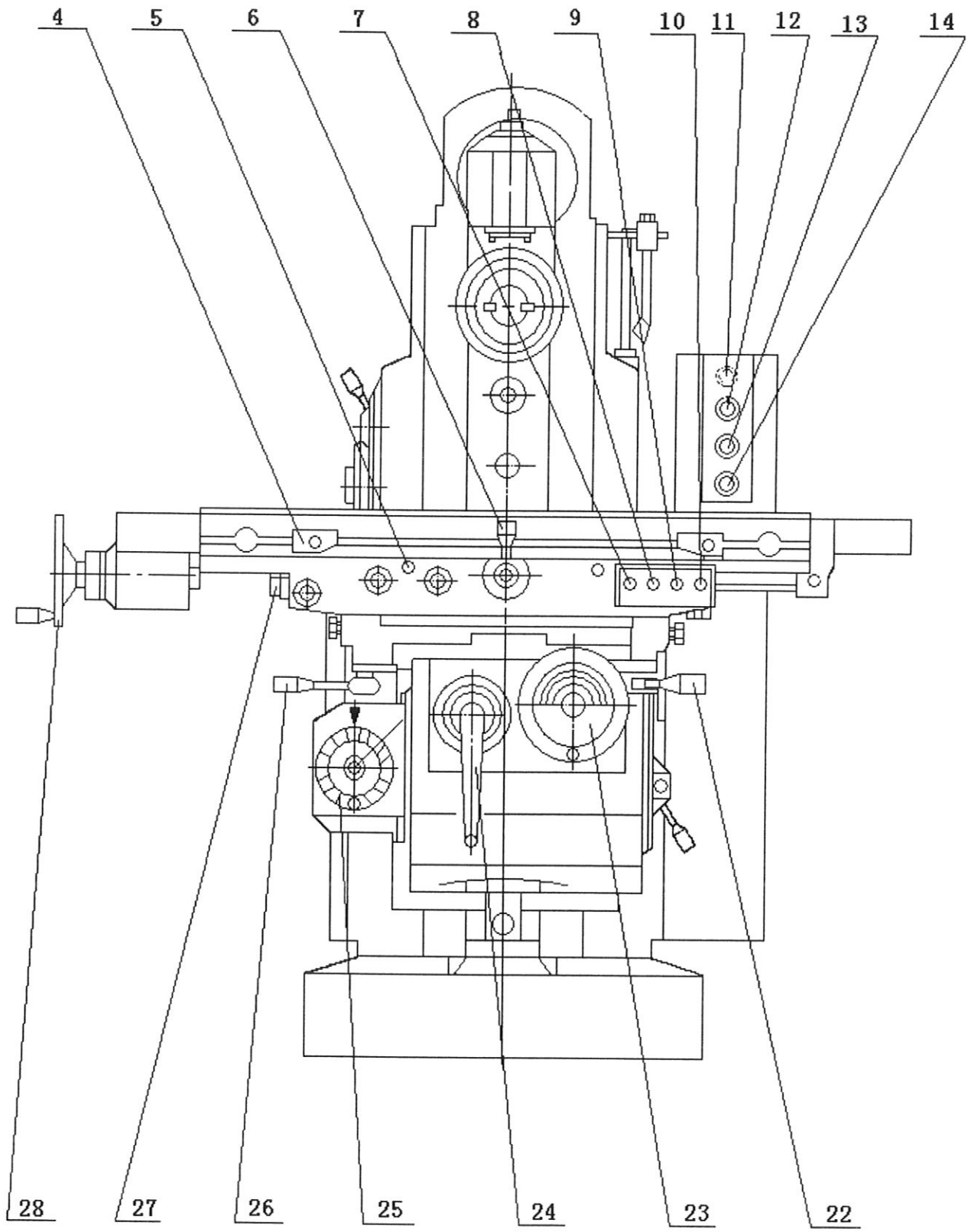


Fig.1b Main view of series X6230 Universal Rotary-Head Milling Machine

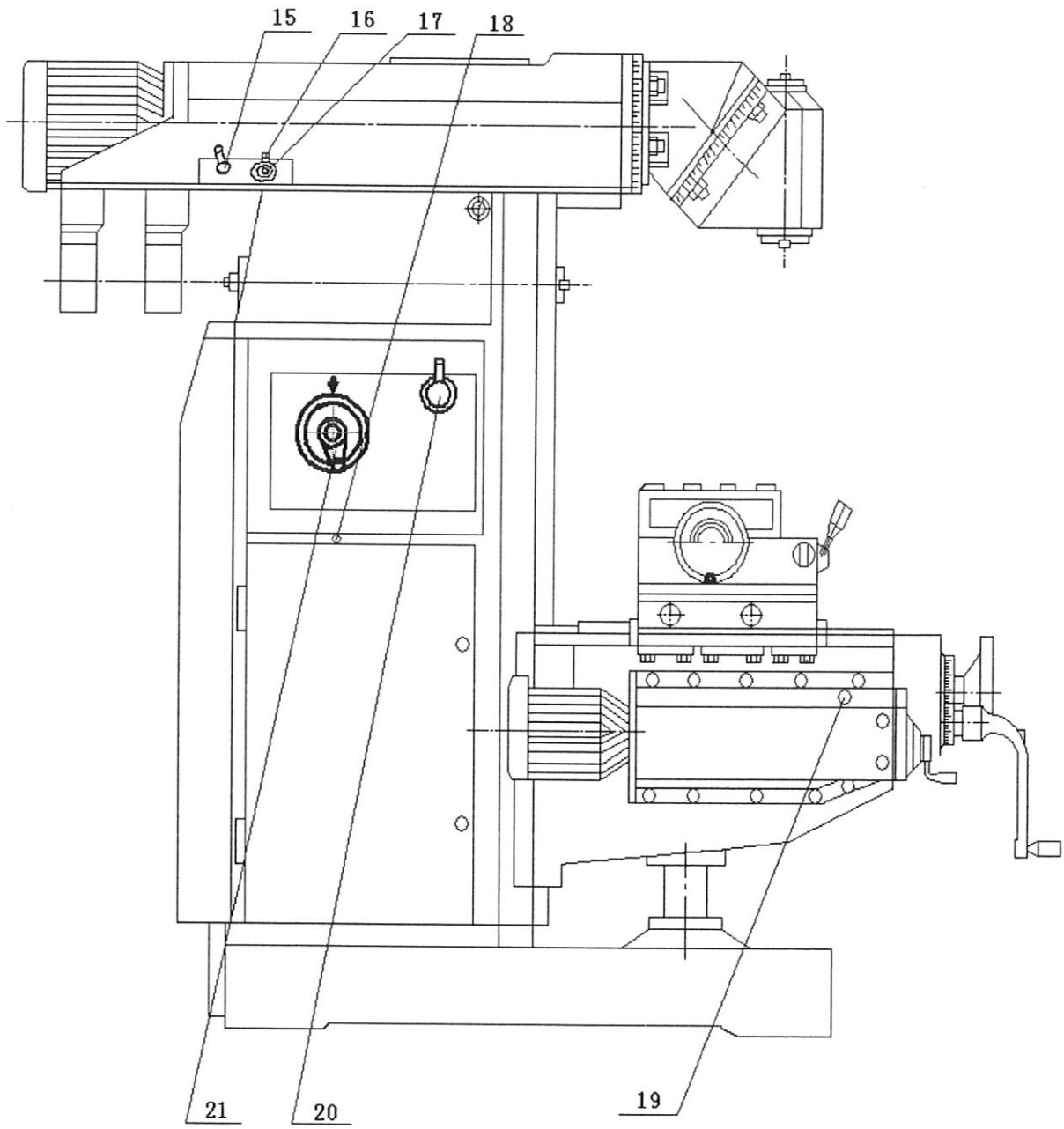


Fig.1c Left view of series X6230 Universal Rotary-Head Milling Machine

2. Application & technical specification of the machine

2.1Application of the machine

Series X6230 Universal Rotary-Head Milling Machine, is mainly suitable for workshops which products small batches of mechanical parts , various tools fields and as well as large and medium sized maintenance departments. It has features of easy operation, easy handle and universal. It can mill plane, terrace and grooves of black metal, ferrous & non-ferrous metal by using various kinds of millers such as cylindrical miller, end miller, angular miller and slice miller as well all kinds of special millers. When equipped with relative accessories, it can mill and cut circular face, spiral slot, gears, rack, its vertical milling head can rotate transversally 45° and in addition, its spindle quill can be fed by hand

Each types of milling machine can become relative digital display milling machine when equipped with digital display device.

2.2 Main specification of the machine(see Fig1)

Table 1

Name		Unit	Specification		
			X6225 X6225/1	X6230 X6230/1	XQ6232 XQ6232/1
Width of working table		mm	250	300	320
Length of working table		mm	1200		
T slot (Number./pitch)		/mm	3/63	3/80	3/80
With of T-slot of table		mm	14		
Longitudinal travel of table Manual/Automatic		mm	800/780		
Transversal travel of table Manual/Automatic		mm	280/260	270/250	260/240
Vertical travel of table Manual/Automatic	X6225 X6230 XQ6232	mm	400/390		
	X6225/1 X6230/1 XQ6232/1	mm	375/365		
Distance from Center of T-slot of working table to vertical guide-way of the bed. Min./Max.		mm	145/425	160/430	170/430
Rapid traverse of working table		mm/min.	Hor./tra.	2450	
		mm/min.	Vertical	820	

Table 1(continued)

Name		Unit	Specification		
			X6225 X6225/1	X6230 X6230/1	XQ6232 XQ6232/1
Distance from spindle central line to working table surface Min./Max.	X6225 X6230 XQ6232	mm	10/410		
	X6225/1 X6230/1 XQ6232/1	mm	15/390		
Spindle speed range	First main movement	r/min	32~1600		
	Second main movement	r/min	38~1800		
Max. swivel angle of working table		°	±45°		
Step-ness of spindle speed(both for first & second main movements)			18		
Spindle taper			7:24 ISO N0.40		
Feed speed working table	Longitudinal	mm/min	15~1200		
	Transversal	mm/min			
	Vertical	mm/min	5~400		
Step of working table feed speed			18		
Speed of spindle motor	First main movement	kW/r/min	4/1440		
	Second main movement	kW/r/min	2.2/1440		

Power & speed of feed motor		kW/r/min	1.1/1400
Power & speed of coolant pump motor		kW/r/min	40/2800
type/inner circle length/Number of T-belt			B/1250mm/3
Overall dimension(L×W×H)		mm	2225×1670×1697
Weight	X6125 X6125/1	2200	2025
	X6130 X6130/1	2250	2050
	XQ6132 XQ6132/1	2280	2070

Note: After equipping digital display device, the machine with a working table width of 250mm will have the following relative change: distance from transversal travel and central T-slot to vertical guide-way of the bed will change to 270/250mm and 160/430mm, and the specification of other types of digital display machines will be the same as the basic machine.

3. Main structure & features of the machine.

3.1Components of the machine:

This machine is composed of the following main parts:

1) Part 10 the bed

2) Part 20 rotary-head

3) Part 21 sliding ram

4) Part 31 Main drive

5) Part 22 Feed box(second main movement)

6) Part 60 Knee

7) Part 32 main speed change

8) Part 33 operation of main speed change

9) Part 40 feed box

10) Part 70 working table

11) Part 71 ball screw

3.2 Sketch of driving system of the machine(see Fig.2)

3.3 Main structure & features of the machine

3.3.1 Dimensions related to T-slot of table, vertical guide-way and spindle end face(see Fig.3)

3.3.2 Driving system of horizontal spindle of the machine

3.3.2.1 Driving of the spindle

Main motor is located on the adjustable rest under the bed, w\hich uses the T-belt to drive power to the gear box. And then to the spindle by means of gears on each axis inside the gear box and the middle axis and as well as a pair of bevel gears and a pair of straight gears .this kind of designation can make the contour dimension of the machine smaller, and move the gravity of the bed downward in order to make the machine more stable. Meanwhile, the T-belt can also isolate the vibration of the motor. Because the belt functions as a flying wheel which increased the moment of the system.

3.3.2..2 Spindle speed & its structure(see Fig.4)

The spindle speed has 18 steps in all, in which the speed direction is very even, it adopts double public gear of step speed change, which uses a few numuber of gears in order to get a compact axial dimension.The spindle uses double supports which are located inside the movable quill. Both its front and rear bearings are equipped with D3182000&D46000 relatively. Such design can make the spindle get enough rigidity and accuracy. The spindle uses an energy-consumption brave with a simple structure, which can stop the spindle from rotating in a specified time.

3.3.2.3 Main drive gear box.

As showed in Fig.5, the operating device of the gear box uses interval structure which can be controlled easilly and give a reliable & simple structure.

3.3.3 45° universal rotary head (second main movement)

Rotary head in part 20 of series X6230 is linked by a motor of 2.2kW with a circle which has a speed of 18 steps. The principle is as follows:power is passed to two pairs

of spiral bevel gears inside the milling head by the gear box through a pair of gears , to have the spindle gain a speed of 18 steps(see Fig.6~7).

3.3.4 Feed gear box

As showed in Fig.8, feed gear box of this series of machines uses sliding gear's step gear-shiftand can get 18 steps of feed speed. The square case is directly connected to the feed motor through gears. Its outer side is linked to the left side of the knee. And while changing speed, its single hol e board will do a pre-select which will control the gear box rotatedly, doing this will give a short feed drive chain, a high driving efficiency and an easy maintanance & assemble.

High & low feed speed are controlled by twoDLM3 types of frictional electro-magnetic clutches, and its interlock is controlled by electric control unit.

3.3.5 Knee & Table(see Fig.9~14)

The drive of the knee of this series of milling machines is as follows: mount seperately three distributional axes amd passing gears inside a case, and fix it in front of the knee in order to locate the longitudinal axis in the middle. And rotary center of transversal lead-screw should be alligned to the semetrical center of transversal part. All these will reduce the operation force of transversal control.

Direction change of feed ,movement on three directions of the working table are controlled by 3directional handles, which are easily seen.

Vertical lead-screw of knee adopts reversely mounted bevel gear whose upper part can be floated. Doing this can enlarge travel, reduce noise of the gear and lighten the operation force of the handle.

The working table surface of this series of machines still used traditional structure of water groove and T-slot. But more reasonably locates 3 T-slots, which enlarge its assemly area.

When the feed screw in three directions are using ladder screws, there is an ajustable device which has both clovk-wise & anti-clockwise milling of lead-screw nut pair of clearance. This device uses double-interconnect adjustable device which can

cut & mill clockwisely & anti-clockwisely with a reliable structure.

4. Reference of lubricant.

4.1 Sketch of lubrication position(See Fig.13)

4.2 List of lubrication system

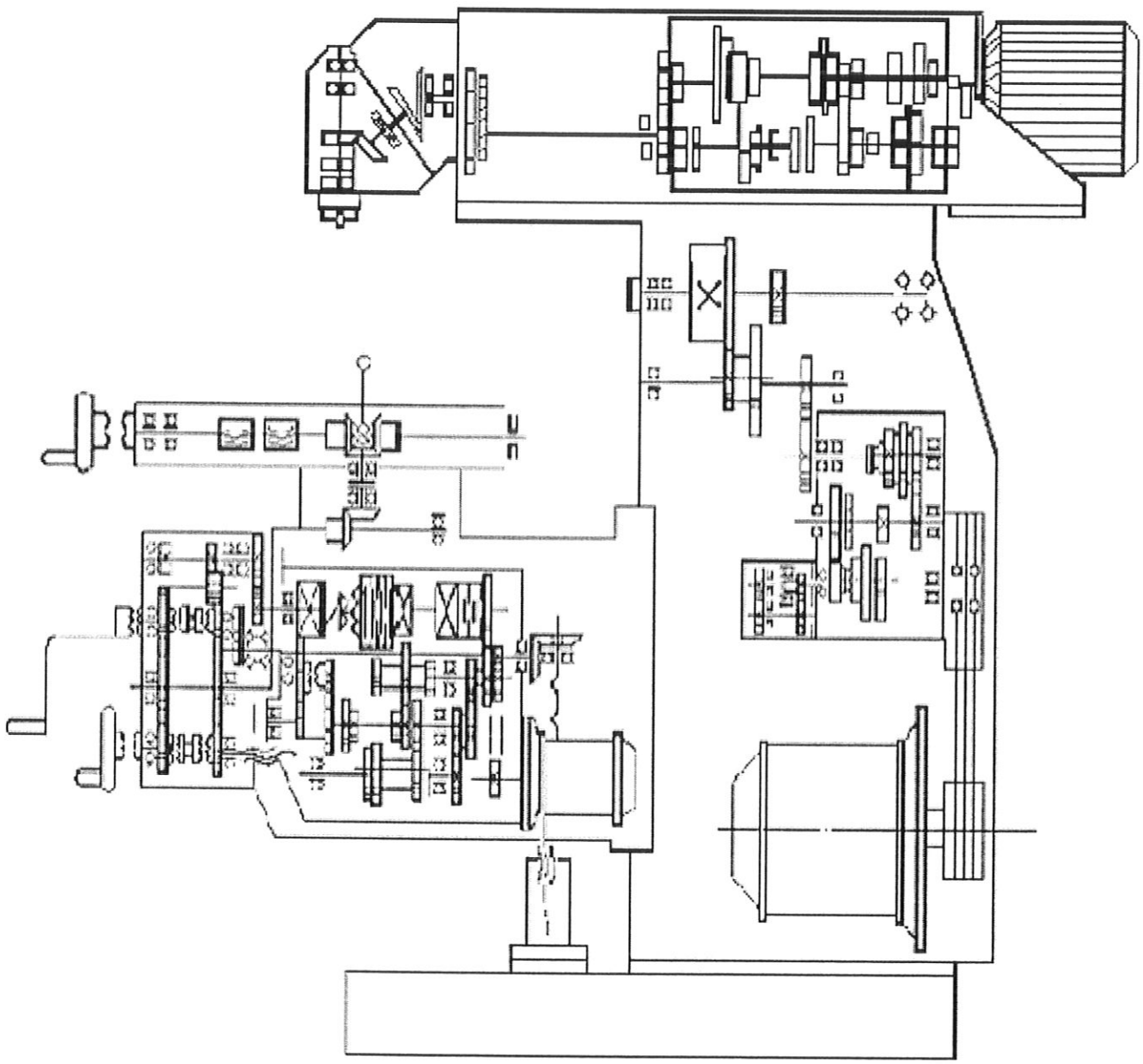


Fig.2 Driving system of Series X6230 Universal Rotary-head Milling Machine

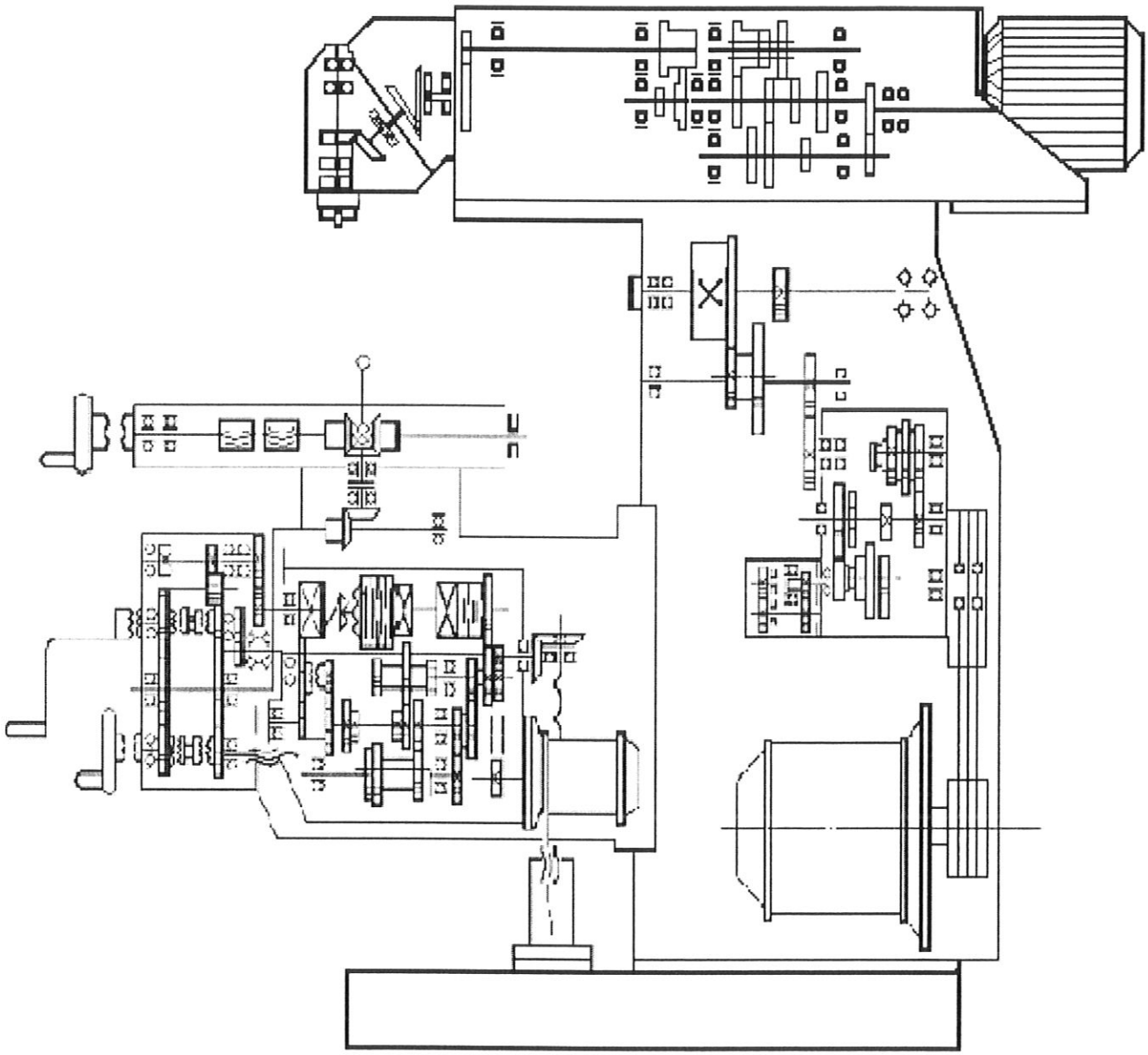
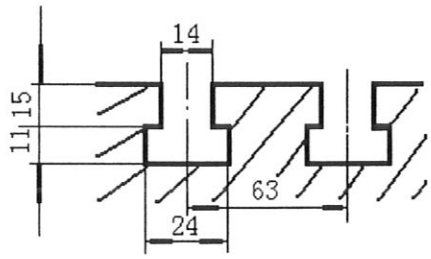
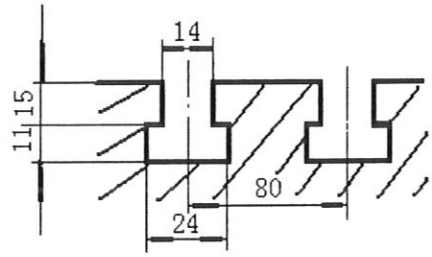


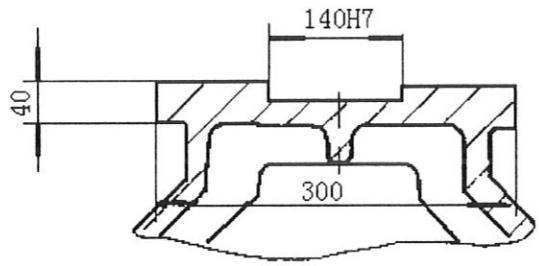
Fig.2a Driving system of Series X6230/3,X6230/5
Universal Rotary-head Milling Machine

Width of working table : 250mm



Width of working table:300mm, 320mm





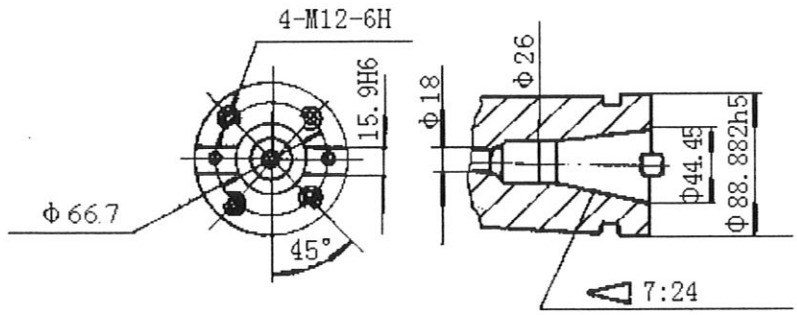


Fig.3 Sketch of T-slot, Vertical guide-way, Spindle end

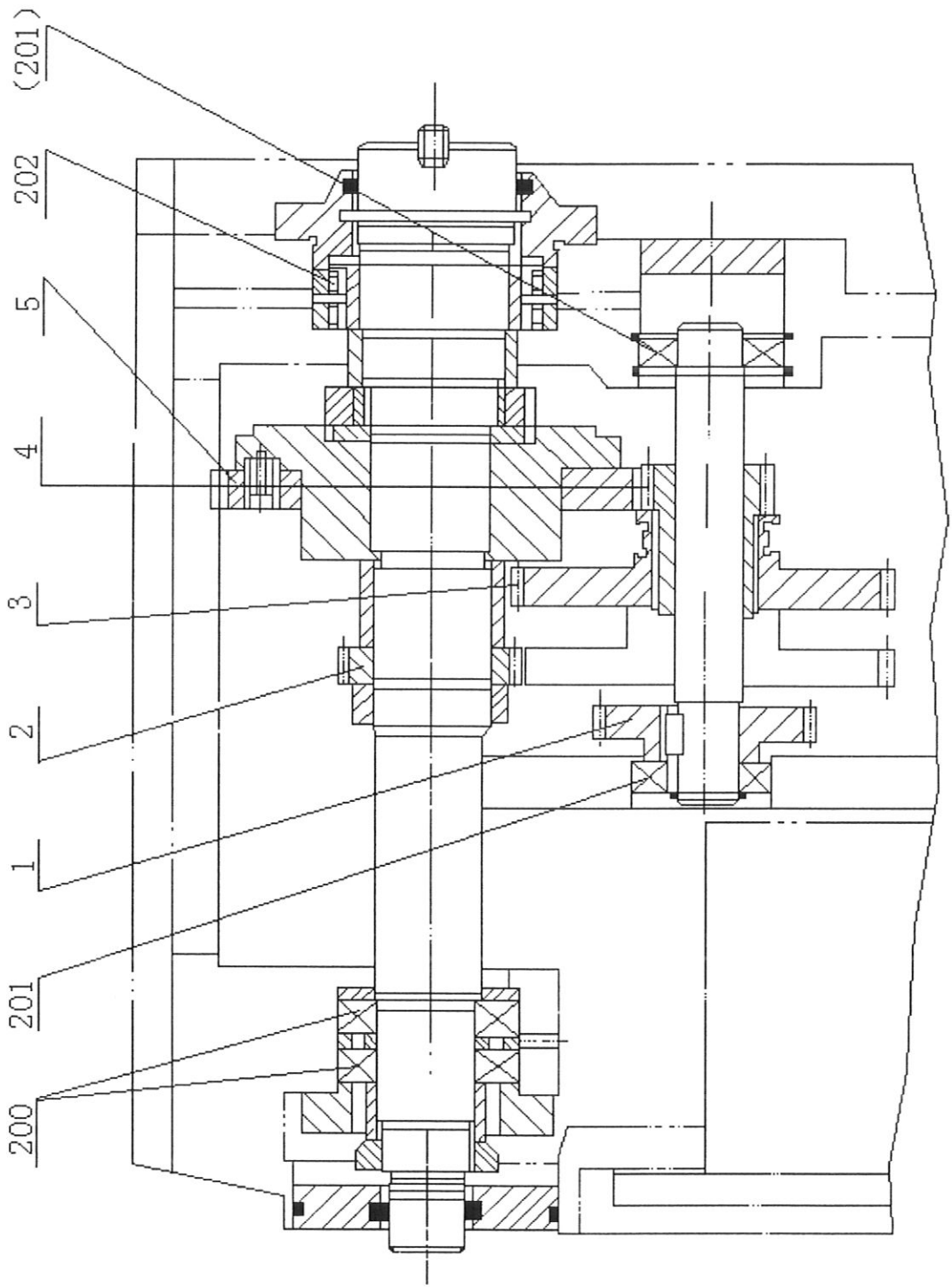


Fig.4 Structure of main drive gear-box

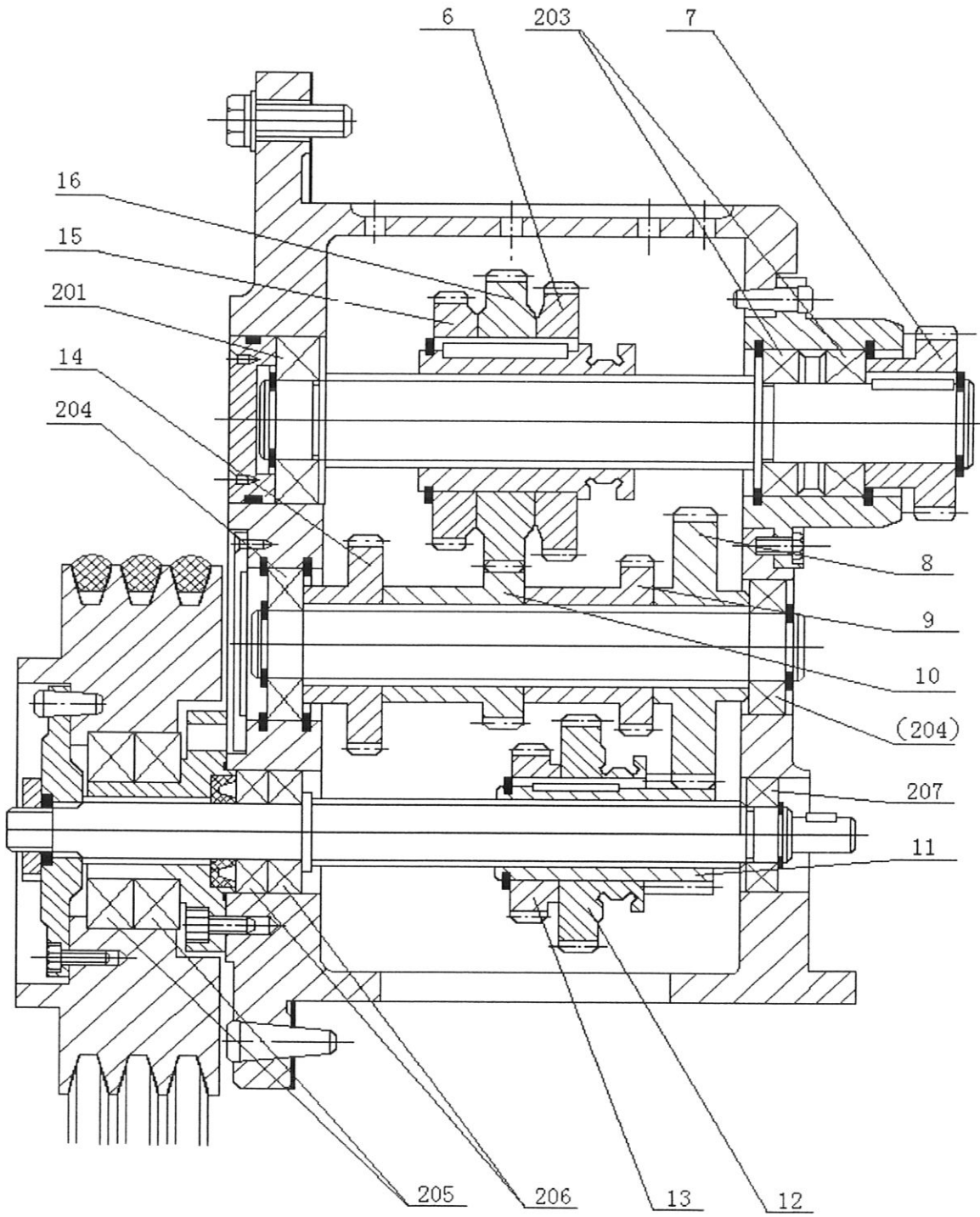


Fig.5 Structure of main drive gear-box

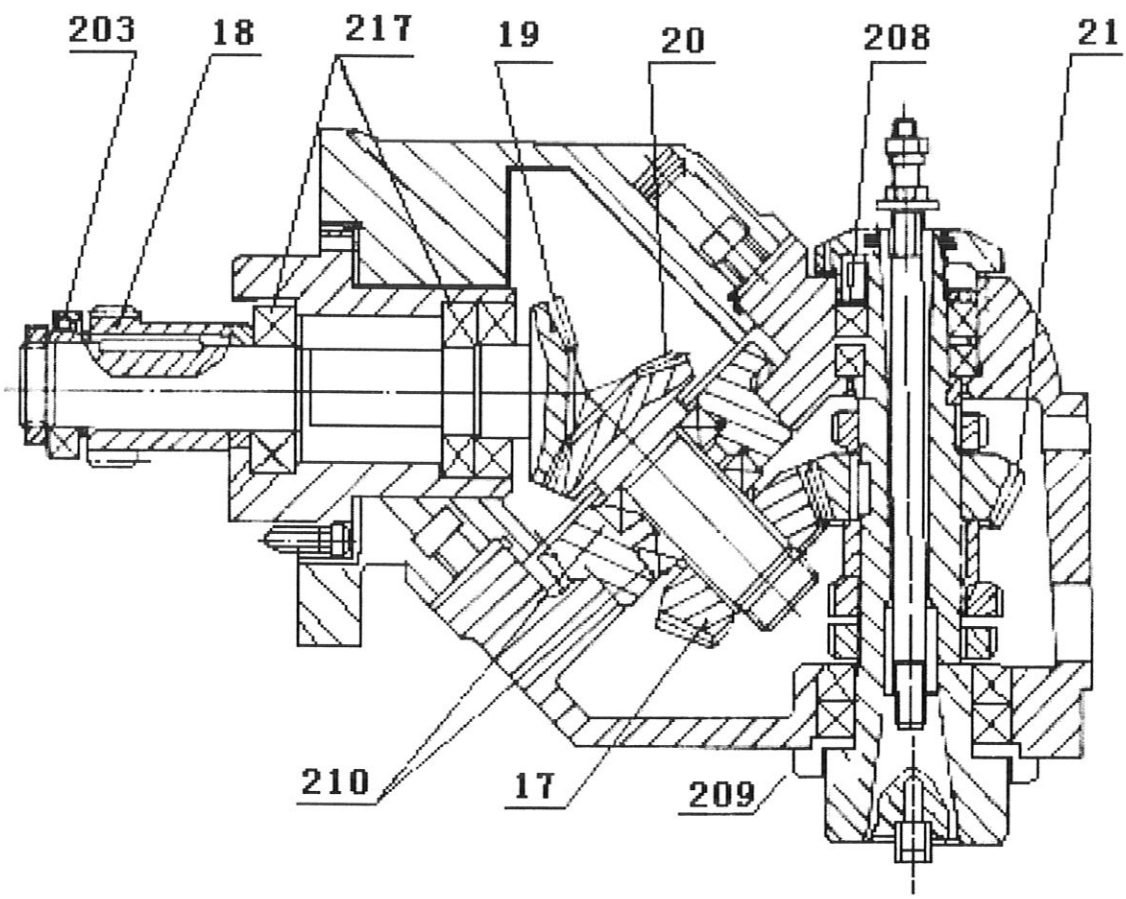


Fig.6 Driving system of 45° Universal rotary-head

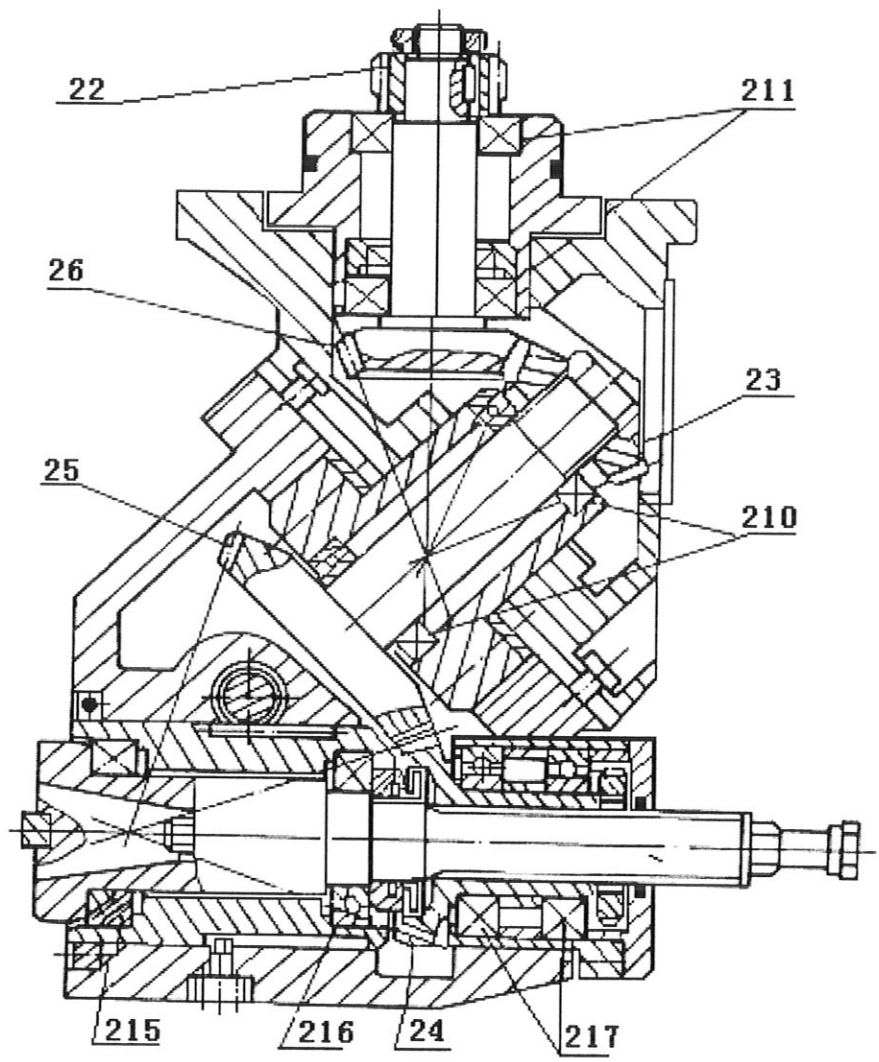


Fig.6a Driving system of milling head of 45° Universal rotary-head of Series X6230/3 & X6230/5

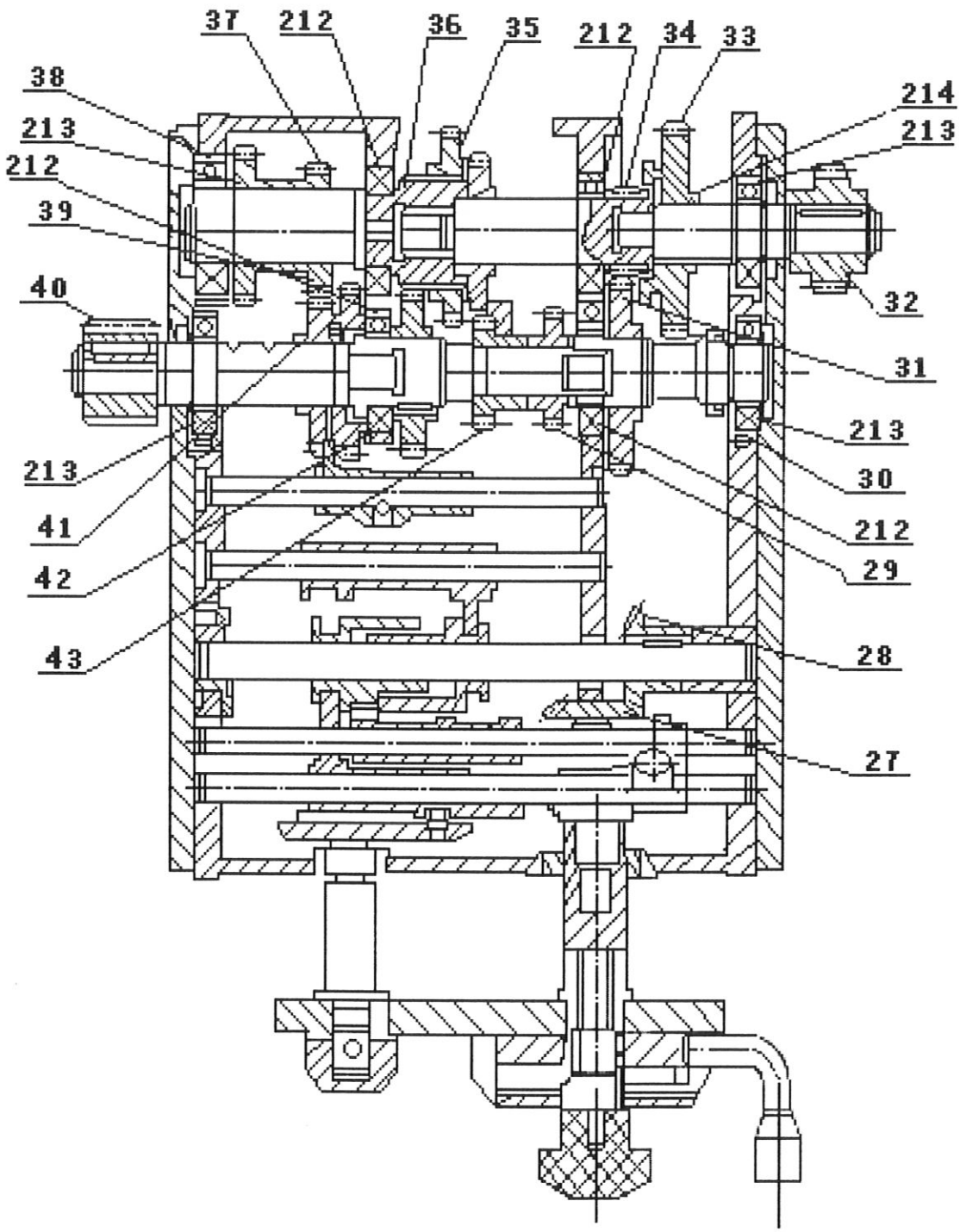


Fig.7 Structure of gear box of milling head of 45°
Universal rotary-head of Series X6230

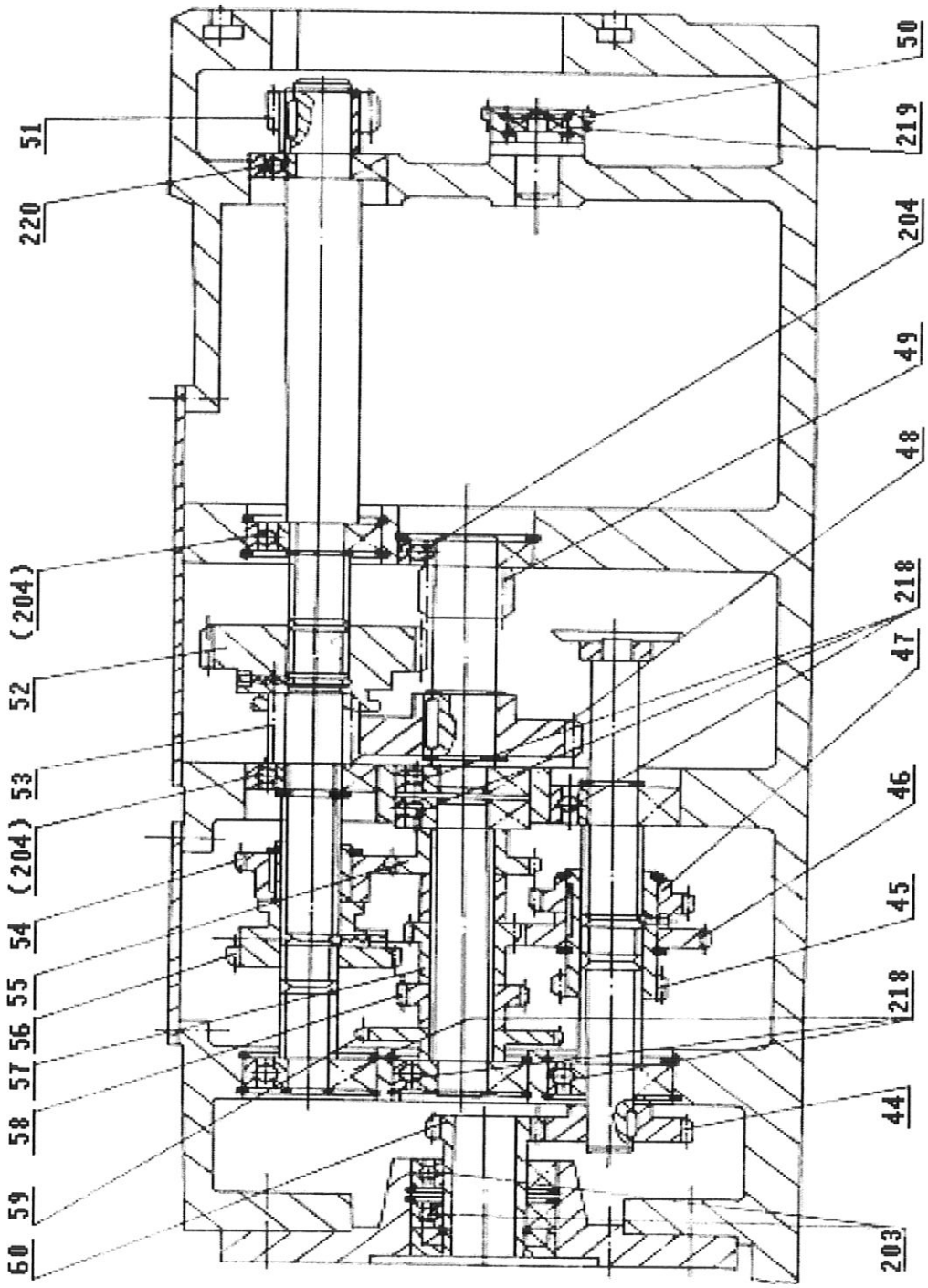


Fig.7a.Structure of gear box of series X6230
(second main movement)

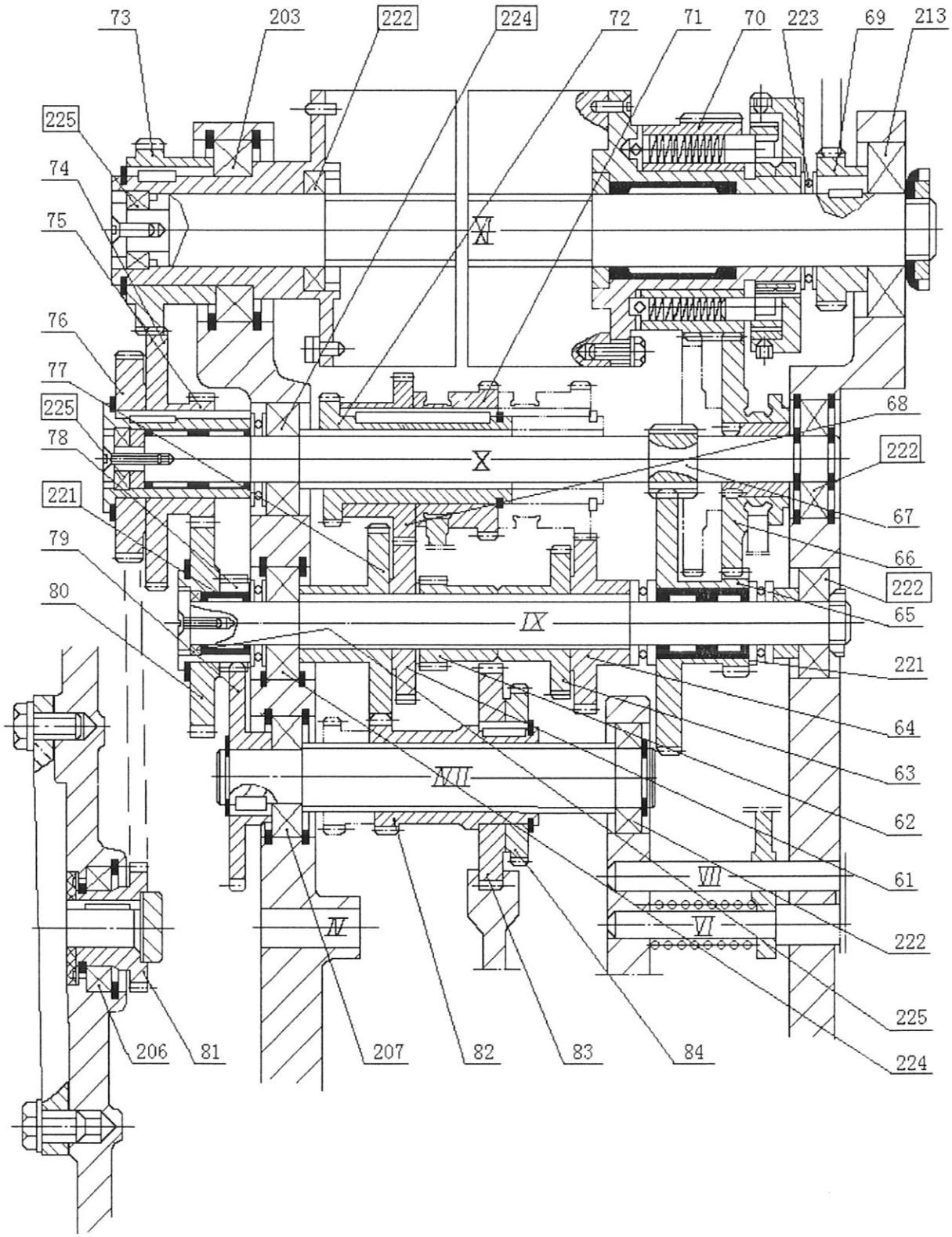


Fig.8 . Structure of gear box of series X6230

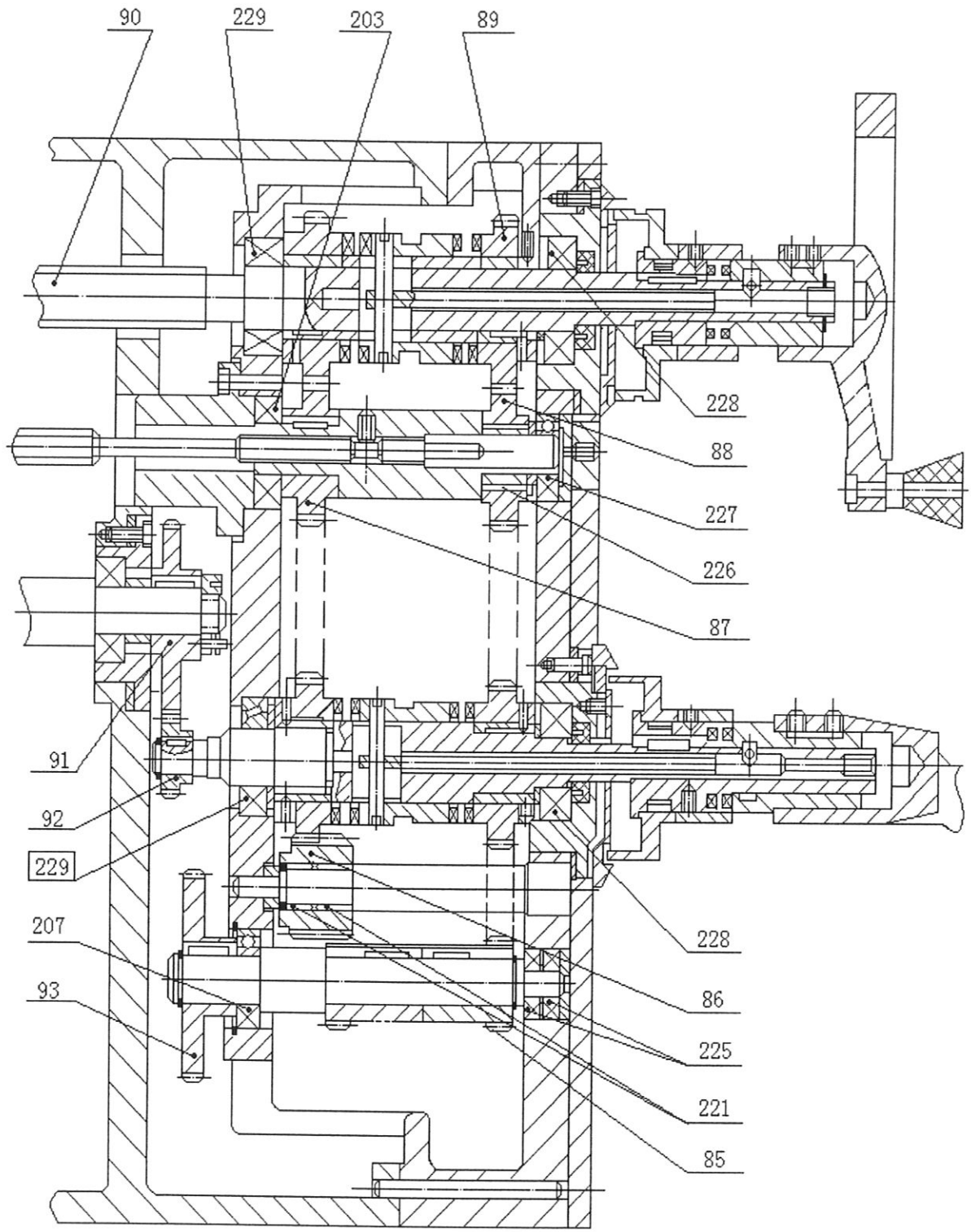


Fig.9 Structure of vertical lead-crew of the knee (ladder type lead-screw)

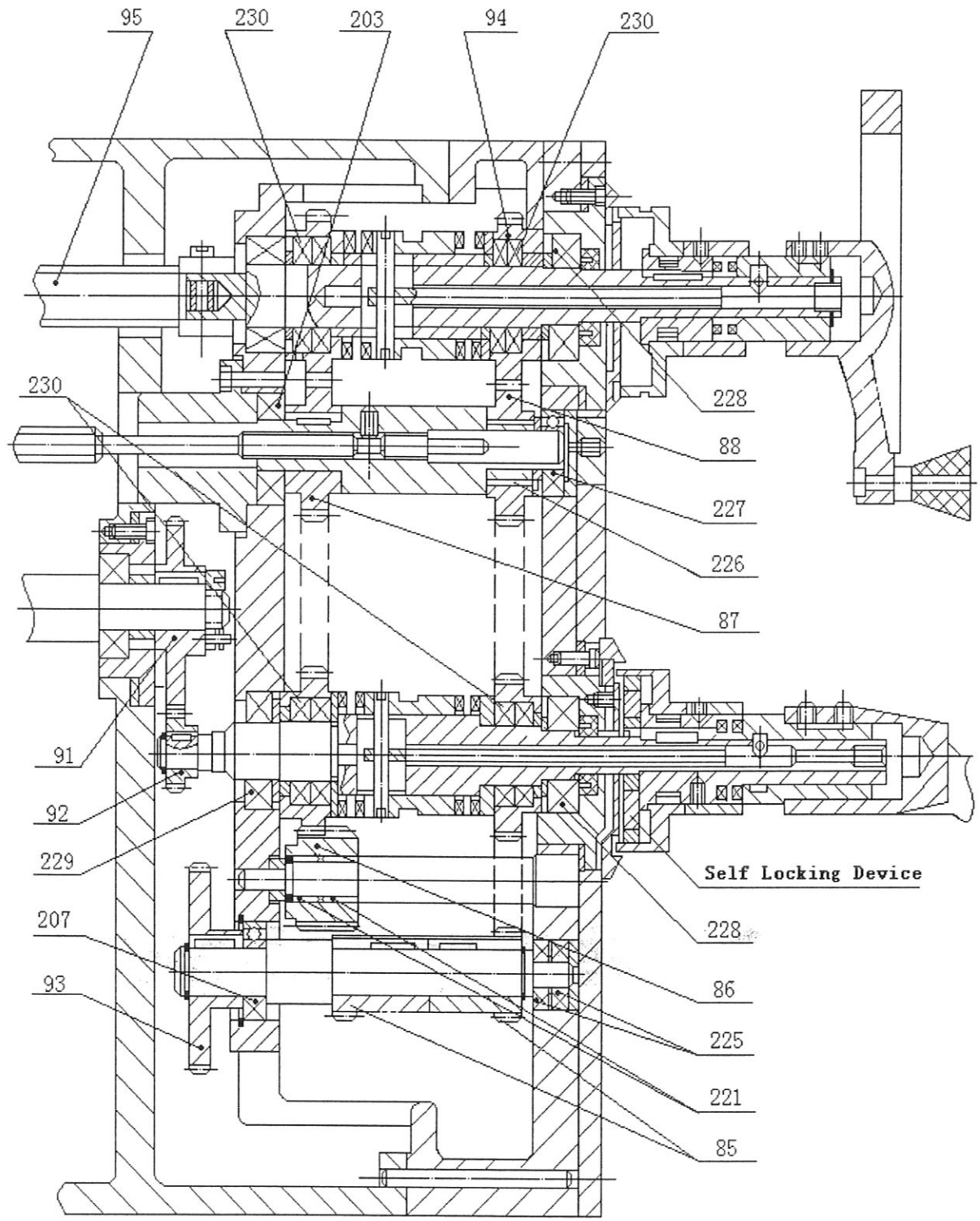


Fig.10 Structure of vertical lead-crew of the knee(ball screw)

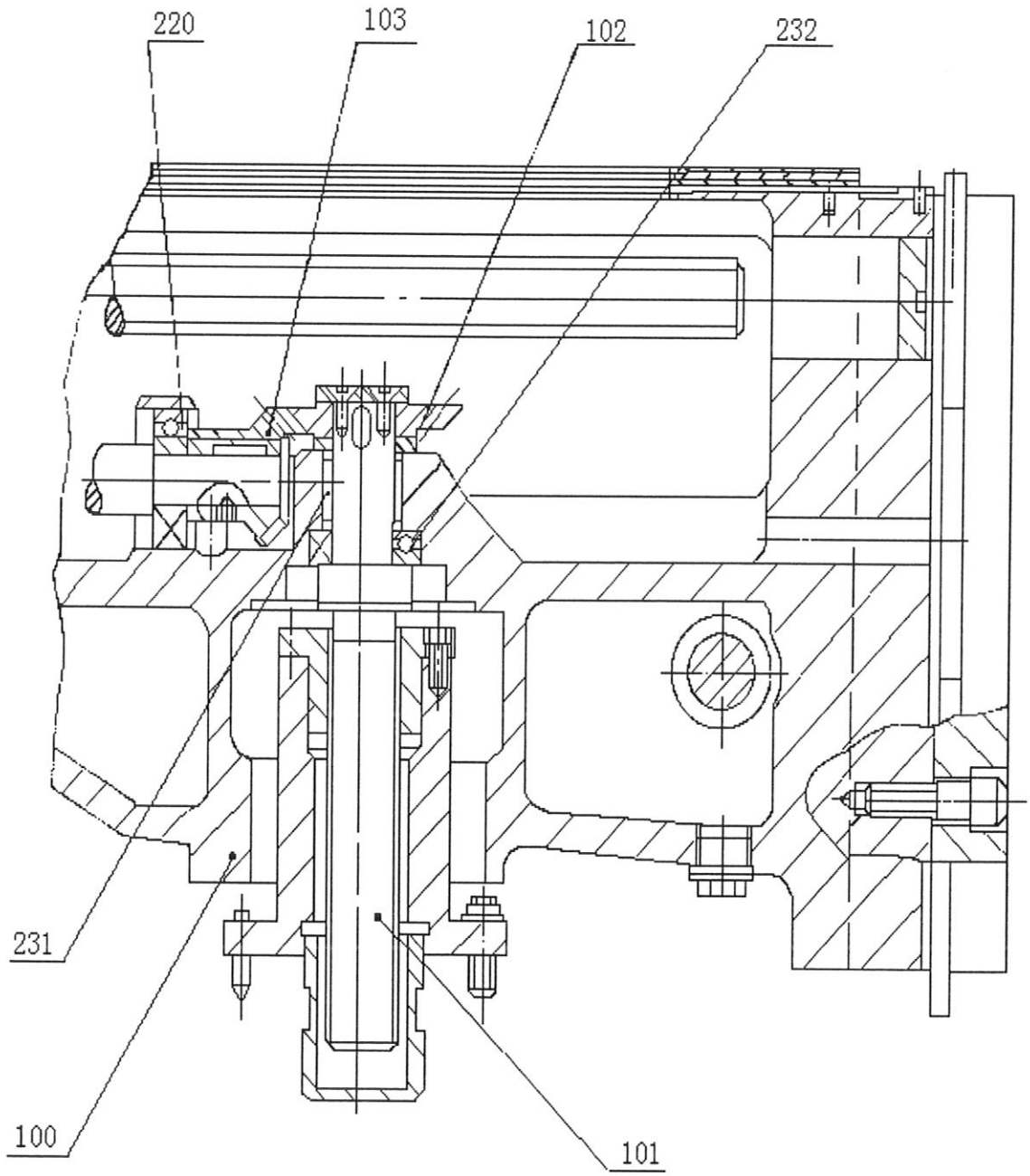


Fig.11 Structure of working table driving system(ladder type lead-screw)

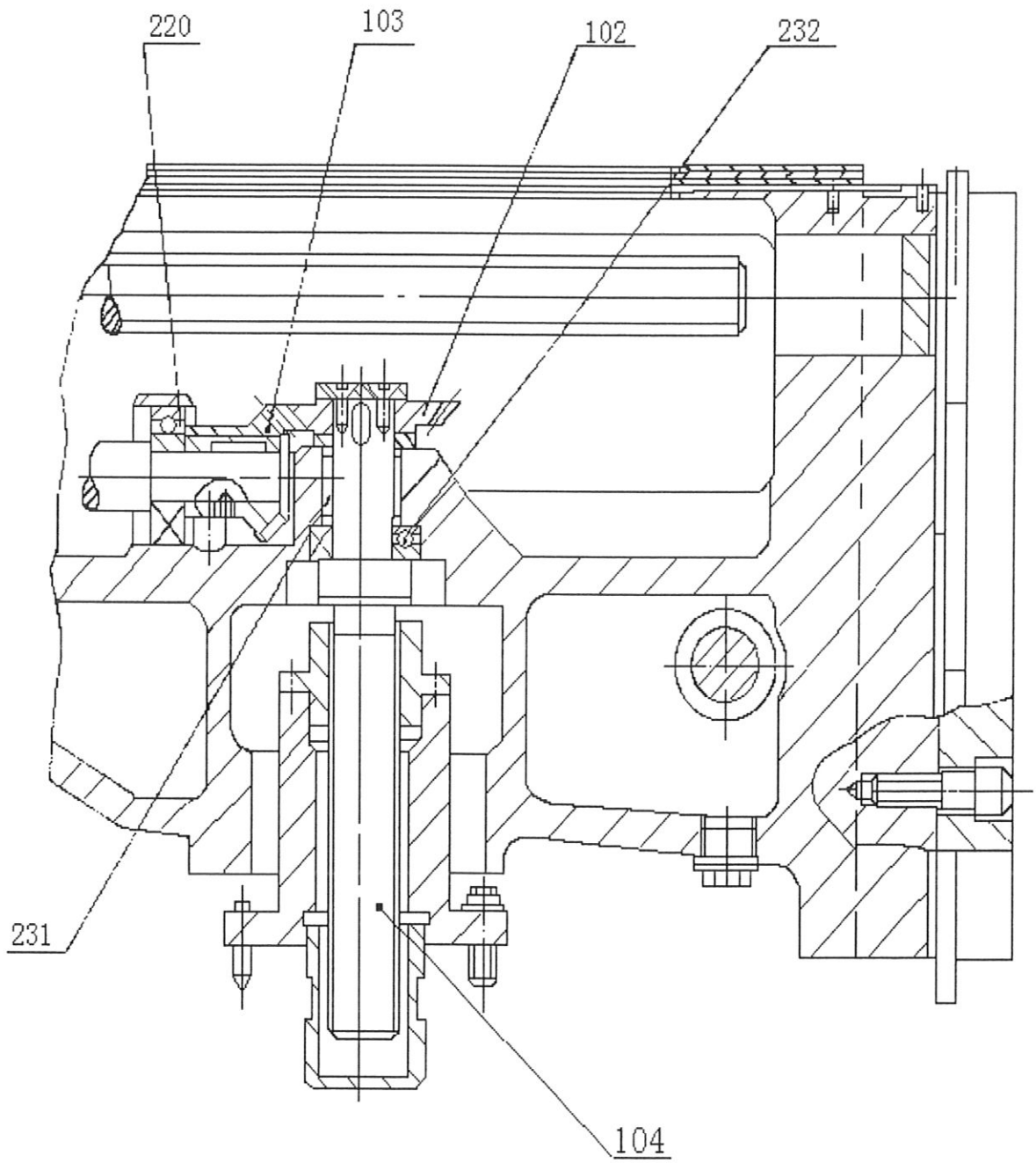


Fig.12 Structure of driving system of working table (ball screw)

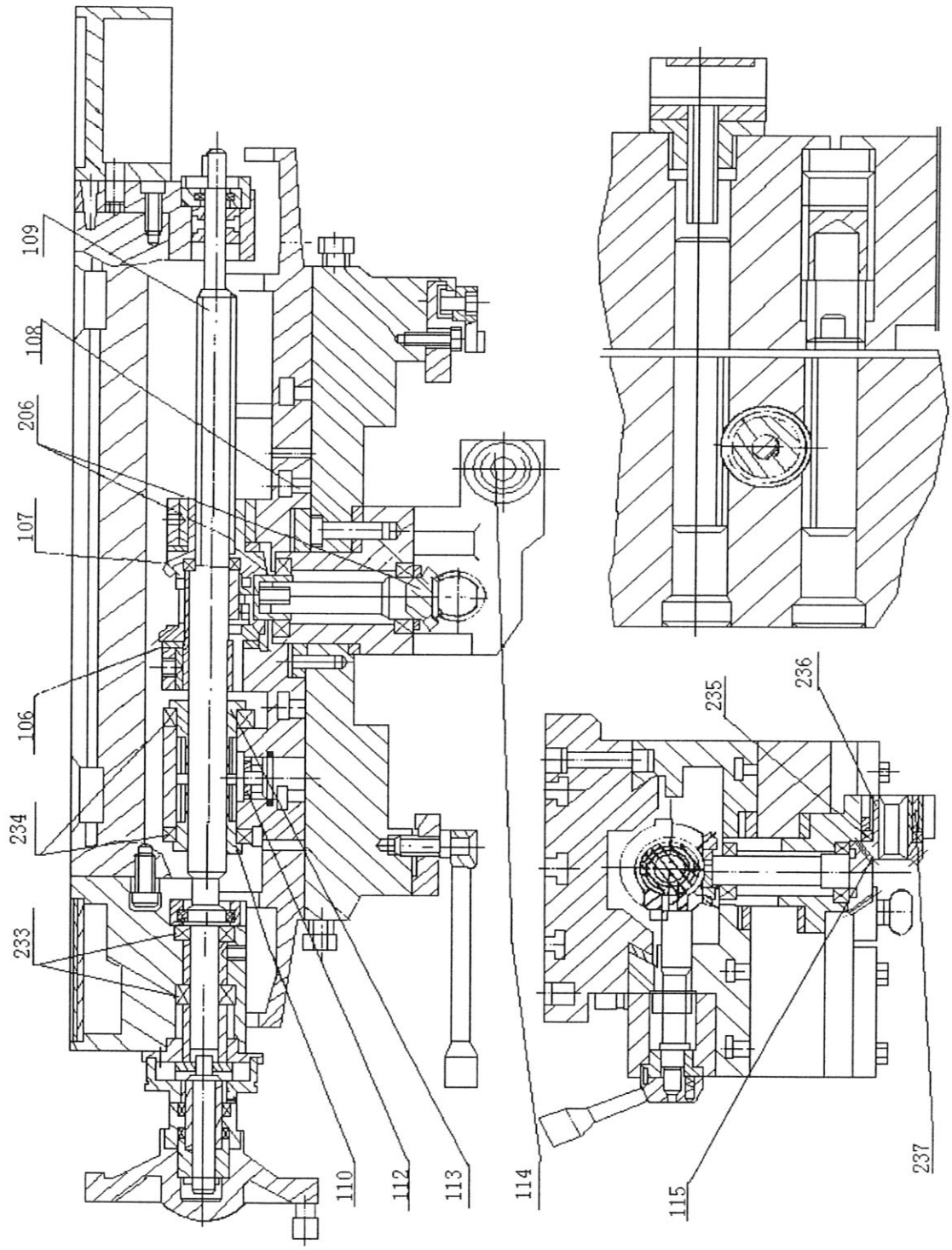


Fig.13 Structure of driving system of working table (ladder type lead-screw)

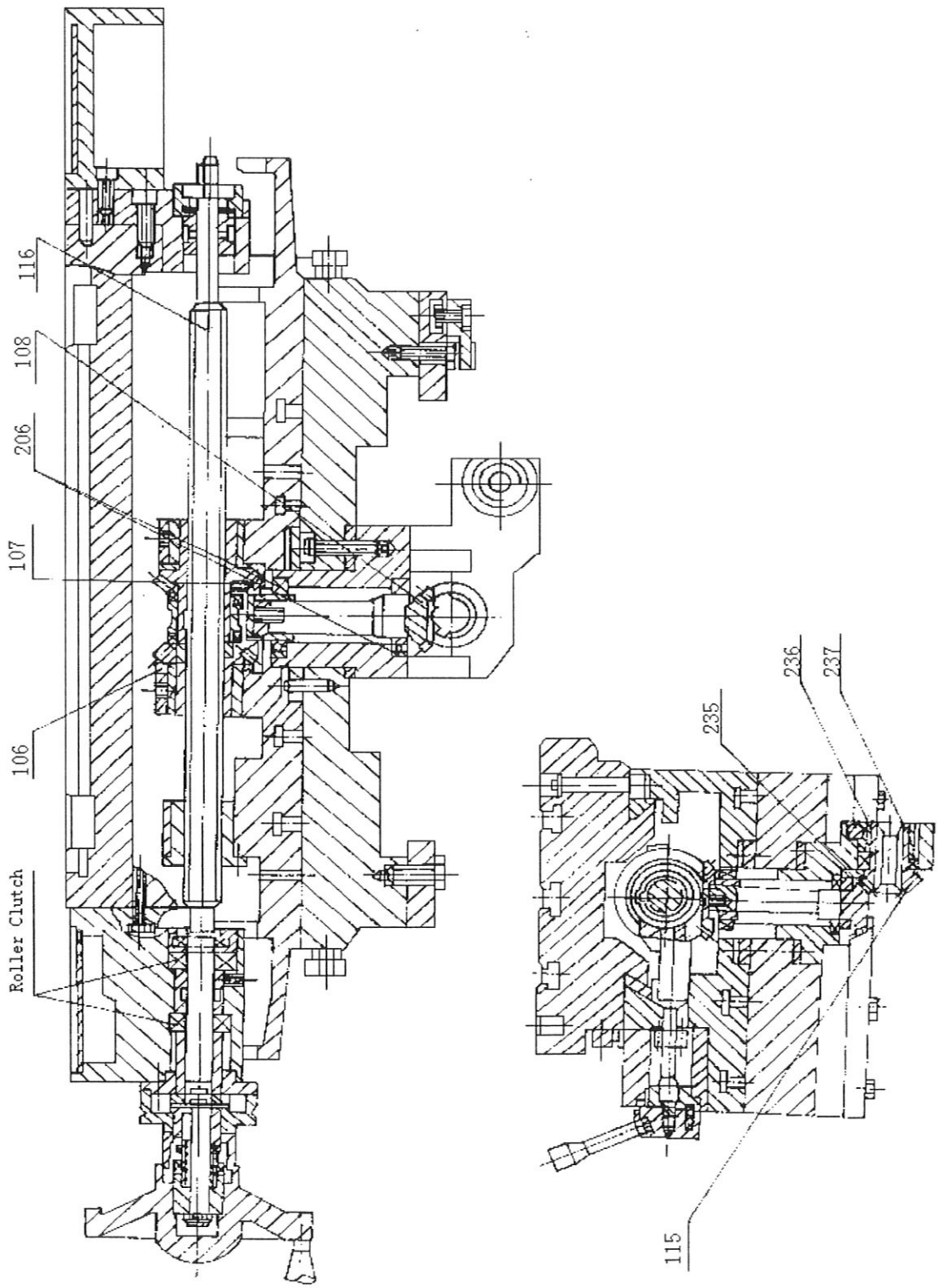


Fig.14 Structure of driving system of working table (ball screw)

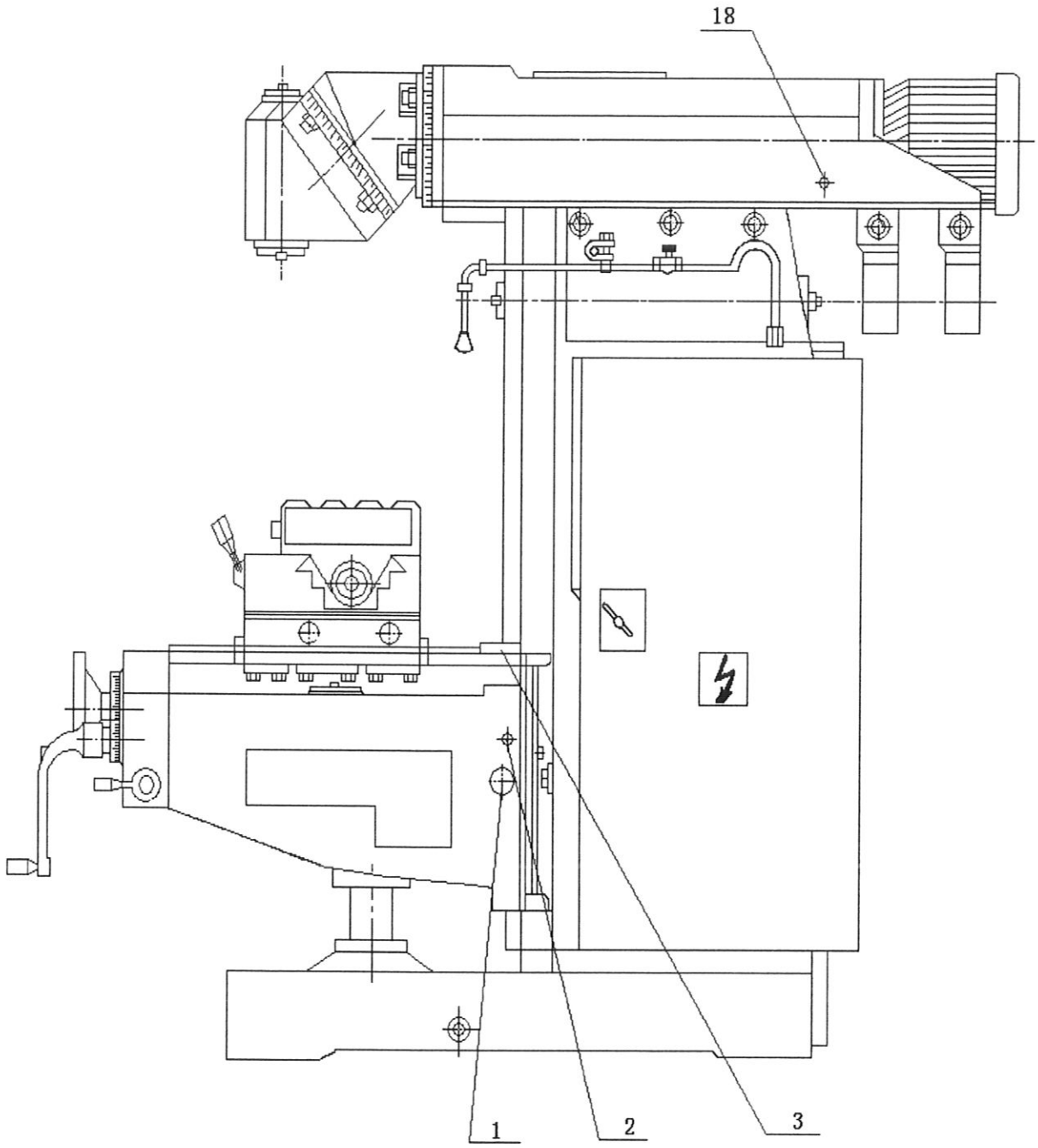


Fig. 15a Right view of lubrication position of Universal rotary-head milling machine

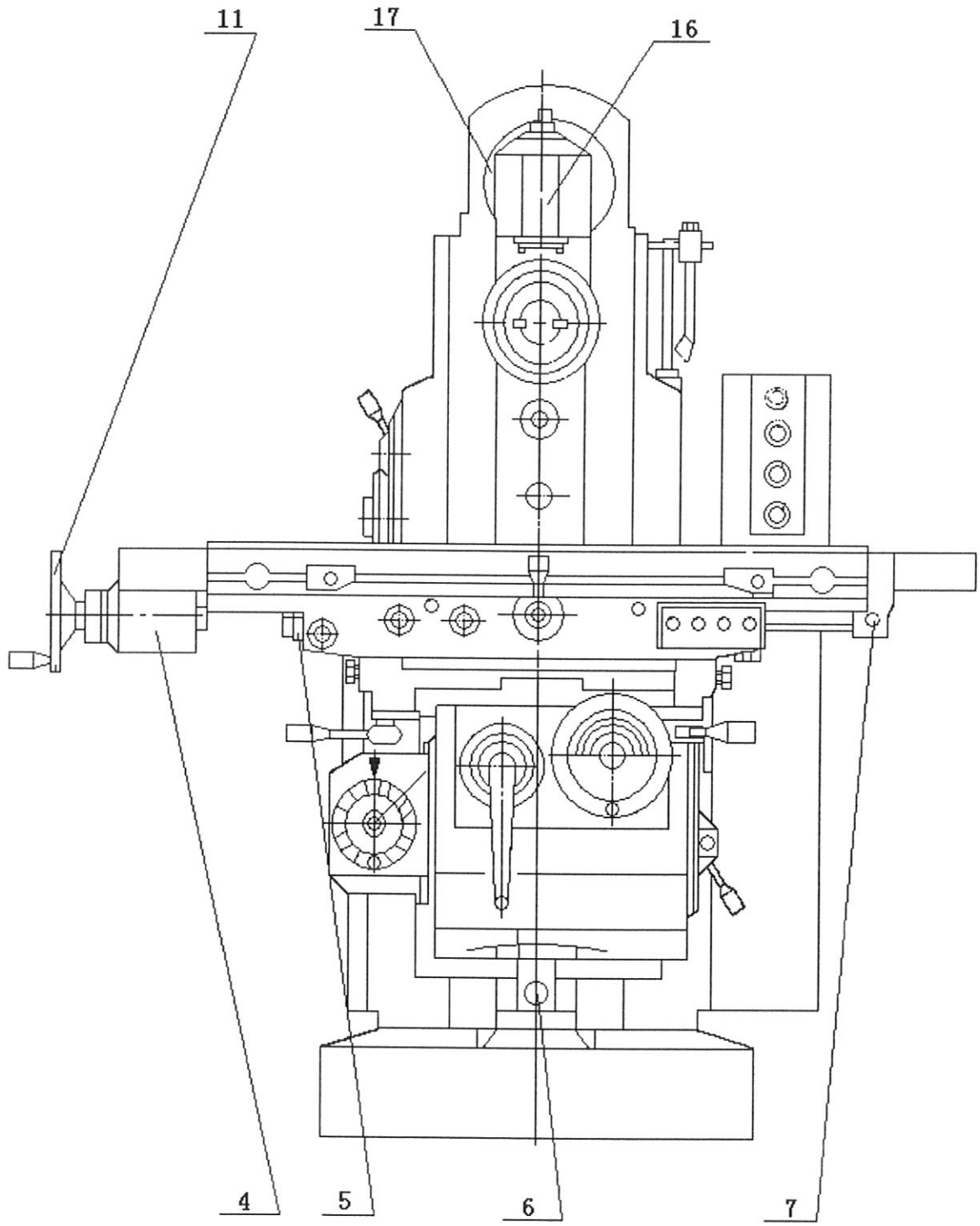


Fig. 15b Main view of lubrication position of Universal rotary-head milling machine

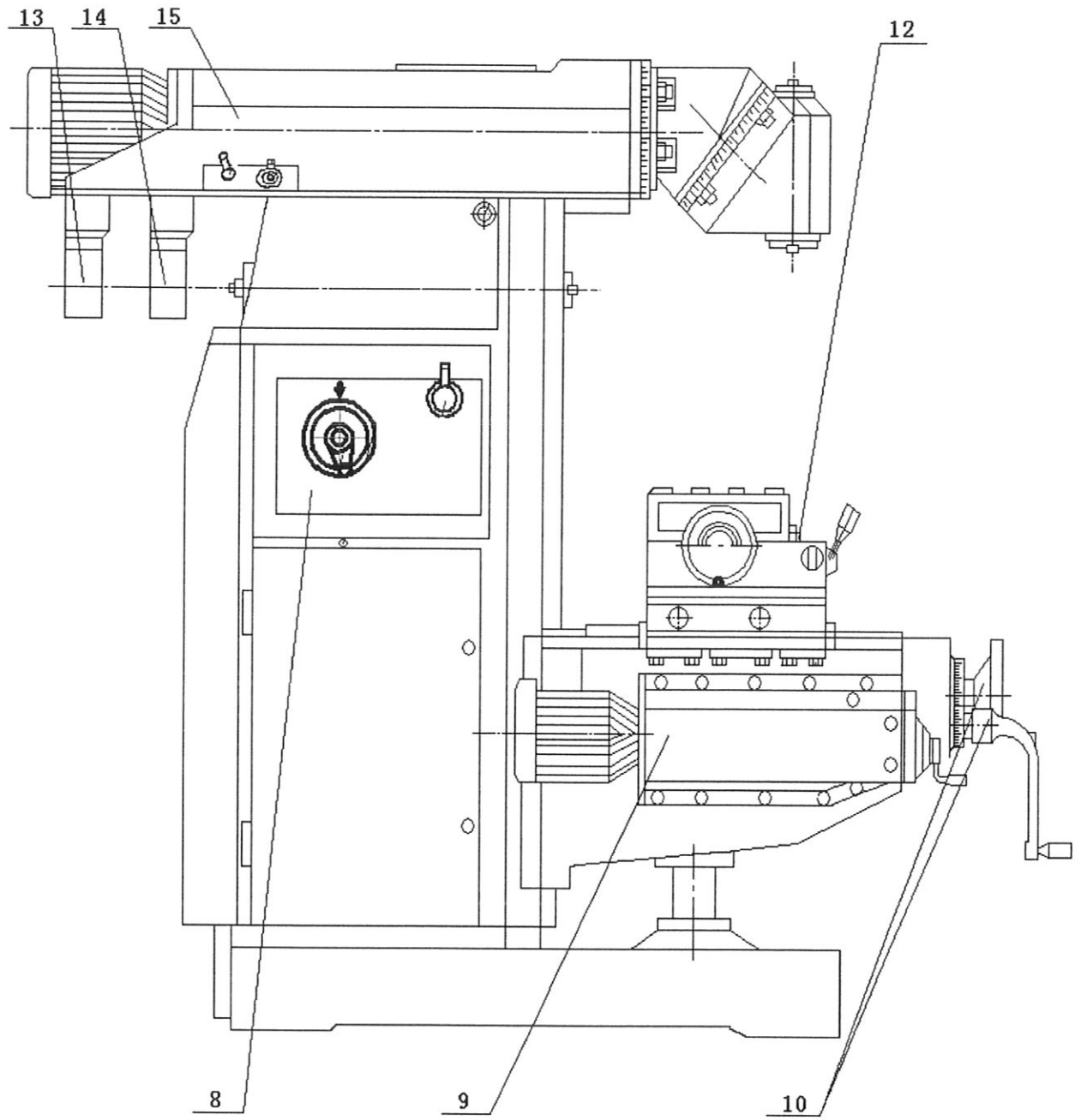


Fig. 15c Left view of lubrication position of Universal rotary-head milling machine

Table 2 List of Lubrication system

No.	Lubrication part	Point	Method	Material	Oiling period	Rmks.
1	Oil indicator	1				
2	Clamping system of the knee	2	fill by hand	#20mechanical oil	2times/shift	
3	Vertical guide-way of the knee	8	fill by hand	#20mechanical oil	Depends on consumption	90# Guide-way oil is ok
4	Rolling bearing of working table lead-screw	1	fill by hand	#20mechanical oil	2times/shift	
5	Bevel of working table lead-screw nut Transversal guide-way of rotary table	6	lubrication pump	#20mechanical oil	Depends on consumption	
6	Vertical lead-screw nut of the knee	1	Oil tank	MuS2 grease	Oil once for small repair, replace for big maintenance	
7	Rolling bearing of working table lead-screw	1	fill by hand	#20mechanical oil	Depends on consumption	
8	Gear bearing inside the spindle gear box	4	Gear pump	#20mechanical oil		
9	Knee & gear bearing inside the	11	Gear pump	#20mechanical oil		

	spindle gear box					
10	Hand-wheel & handle	1	fill by hand	#20mechanical oil	2times/shift	
11	Longitudinal hand-wheel of the working table	2	fill by hand	#20mechanical oil	2times/shift	
12	Gear& rack of working table direction change system	1	fill by hand	#20mechanical oil	2times/shift	
13	Bearing of tool-holder head	1	Oil gun	Lithium grease	1 time/3months	
14	Bearing of tool-holder head	1	Oil gun	Lithium grease	1 time/3months	
15	Gear bearing of gear box inside the ram	5	Gear pump	#20mechanical oil		
16	Gear bearing of milling head inside the spindle	Each gear shaft	Oil tank	Lithum high speed grease	Once/6 months	
17	Gear bearing of milling head inside the rotary body	Each gear shaft	Oil tank	Lithium high speed grease	Once/6 months	
18	Oil indicator of ram body			#20mechanical oil		

5. Operation device & application

5.1 Name of operation device & their application(see Fig.1 for the machine's overview drawing) You must read carefully this Chapter before operating this machine in order to avoid damaging of the machine or arise of any risks.

See table 3 for the name of the operation device.

Table 3 Name list of the operation device

1	Locking bolt of sliding ram	18	"jog" button of spindle
2	Operation handle of sliding ram	19	"jog"button of feed motor
3	Locking blot of tool holder	20	Select handle of high & low speed of spindle
4	Auto stop block of longitudinal Feed of working table	21	Operation handle of spindle speed change
5	Longitudinal locking screw Of working table	22	Transversal locking handle of working table
6	Operation handle of longitudinal feed of working table	23	Longitudinal hand-wheel
7	"full stop" button	24	Vertical handle
8	"stop" button(breakage of circuit)	25	Operation handle of feed speed
9	"start" button of spindle feed motor	26	Transversal locking handle of working table
10	Rapid movement button of table & knee	27	Oil pump handle of working table
11	Signal lamp of power supply	28	Longitudinal hand-wheel
12	Direction change switch of spindle	29	Power supply switch
13	Select switches of first & second movement of the spindle	30	Vertical locking bolt of the knee
14	"start" button of coolant pump	31	Auto stop block of vertical feed
15	Spindle speed or operation	32	Auto stop block of horizontal feed

	selection switch		
16	Select handle of high & low speed of spindle of rotary milling head	33	Transversal locking handle of working table
17	Select handle of speed of spindle of rotary milling head	34	Operation handle of vertical feed of the knee

5.2 Gear-shift of the machine (see Fig.1 for number & location of handle)

5.2.1 Horizontal & vertical spindle gear-shift of universal rotary-head milling machine

While changing speed, firstly move select handle 20 to high (red mark) or low speed(blue mark), if can't, jog the spindle jog button18, and then turn the speed change handle 21 clock-wisely or anti-clock-wisely until to required position(the spacing line which is used to indicate the high & low speed must point to the triangle mark upper the disk, see Fig.16) and handle 16 must be in the lowest position, in this way, the gear-shift is finished.

As showed in Fig.16, when the handle 20 is in the blue position, the spindle speed will be32r/min on the blue board, when it is on the red position, the spindle speed will be 255r/min on the red board.

Table 4 spindle speed

Board color & position of handle 16	Spindle speed								
Blue	32	40	50	63	80	100	125	160	200
Red	255	320	400	500	630	800	1000	1250	1600

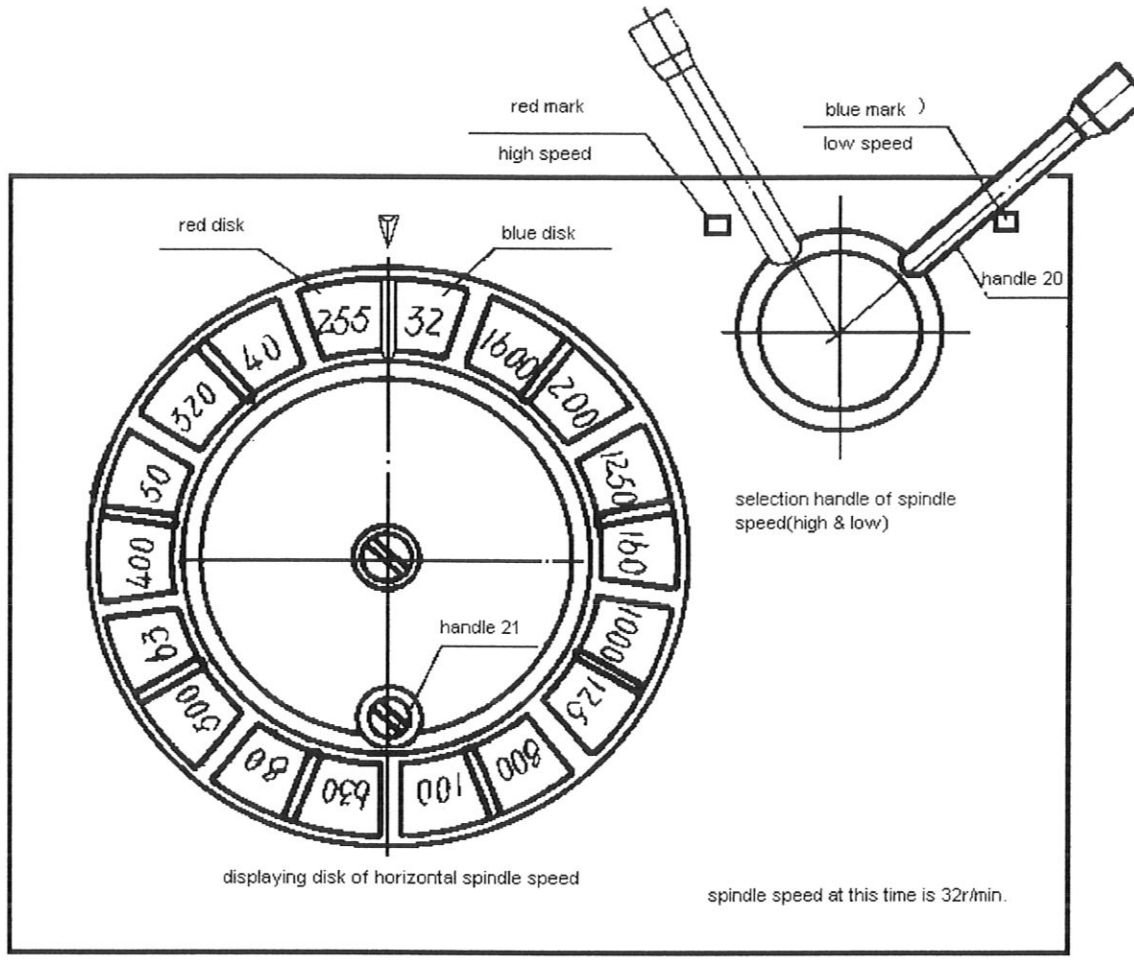
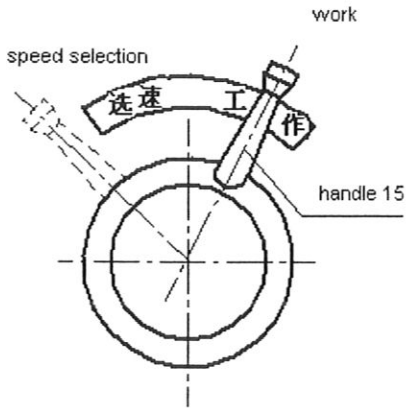


Fig.16 Horizontal Spindle speed

5.2.1.2 Speed change of spindle of universal rotary milling head

5.2.1.2.1 Speed change of 45° universal rotary milling head of series X6225. X6230. XQ6232. X6225/1. X6230/1. XQ6230/1 machines is as follows: firstly move select handle 15 to high (red mark) or low speed(blue mark), if can't, jog the spindle jog button18, and then turn the speed change handle 17 clock-wisely or anti-clock-wisely until to required position(the spacing line which is used to indicate the high & low speed must point to the triangle mark upper the disk, see Fig.18) and handle 16 must be in the lowest position, in this way, the gear-shift is finished.

As showed in Fig.18 and Fig.19, when the handle 15 is in working position, when it is on the red position, the spindle speed will be 290r/min on the red board.



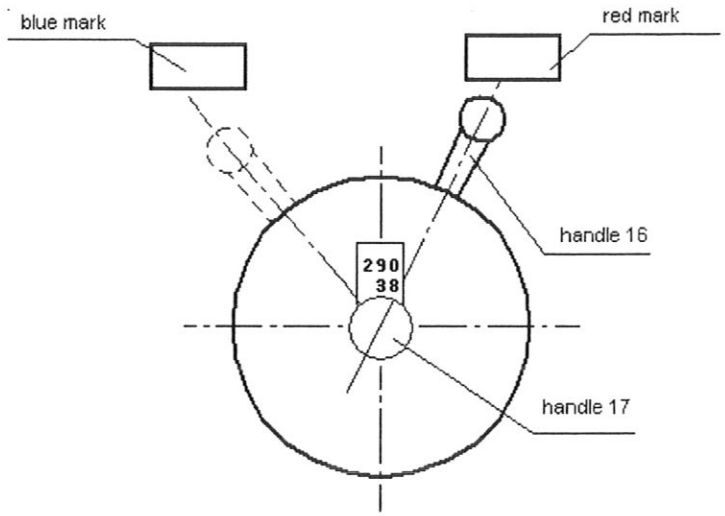


Fig.18 Spindle speed & working selection Fig.19 High & low spindle speed selection

See table 5 for comparision between speed handle position and spindle speed

Table 5 Spindle speed of universal rotary milling head

Number color and location of handle 16	Spindle speed								
Blue	38	47	60	75	95	120	150	190	240
Red	290	360	450	580	735	920	1150	1450	1800

5.2.2 Feed gear shift

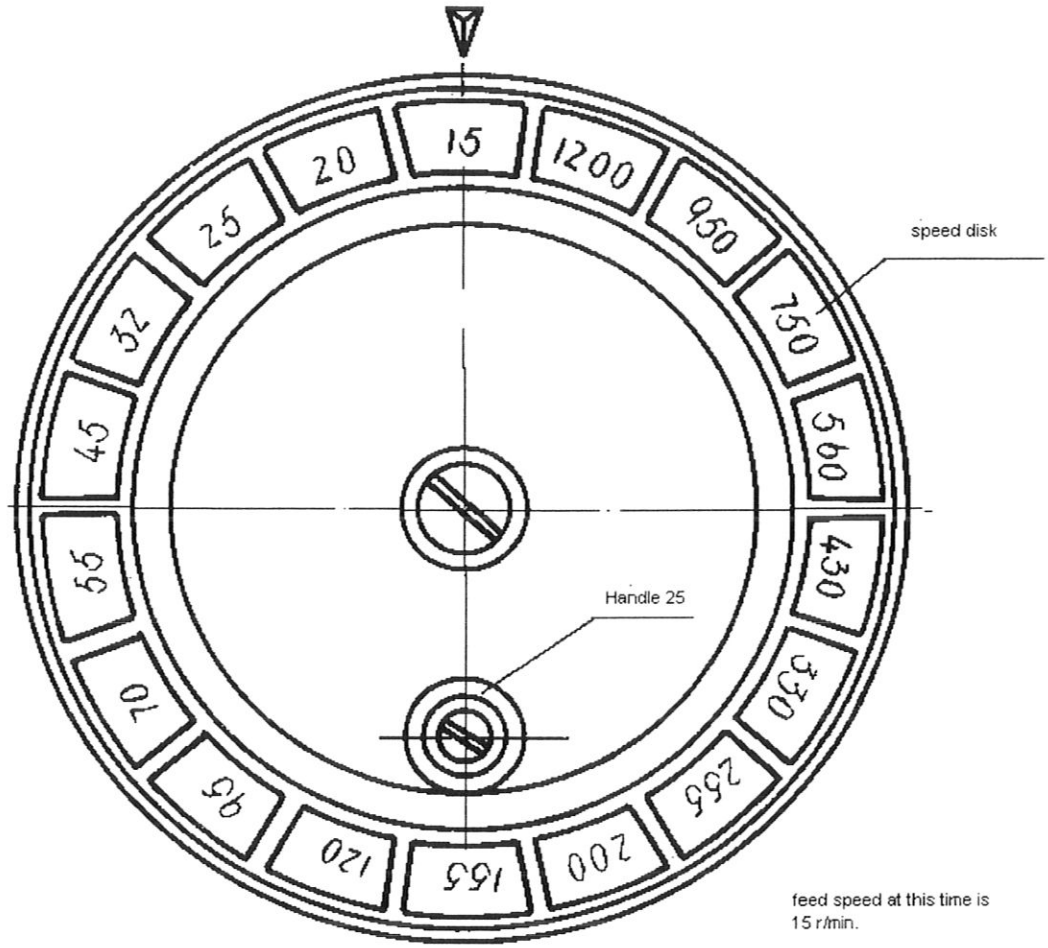


Fig.15 Feed speed

The selecting procedure of feed speed in three directions of table (transversal, longitudinal and vertical directions) is as follows:

First step: Reset: operation handle 25 should be rotated clock-wisely to the position, at this time, you can hear the first "click" sound. Its about one circle.

Second step: Choose speed: rotate anti-clock-wisely the speed disk, each "click" indicates one speed revolution. Align required speed to the red triangle mark.

Third step: Location: Rotate handle 25 anti-clock-wisely to the required position, there will be a "click" sound, and the speed on the disk is corresponded to feed speed of working table both in transversal & longitudinal direction. And refer to table 6 for feed speed change. That is, when the transversal feed speed on the disk is 15r/min, then the vertical feed speed will be 5r/min.

If handle 25 can't be in position, please use the jog switch 14 on the feed box.

Rotate after jog. Then the handle 25 be in position, and the speed disk can only rotate clock-wisely while selecting the speed. If it is over required speed at the first time, you must continue rotation clock-wisely until to the required position.

For example: as showed in Fig.15, when transversal & longitudinal feed speed of working table is 15r/min. then the vertical feed speed will be r5r/min. min。

Table 6 Feed gear-shift

Direction	Feed speed								
Vertical	5	6	8	11	15	18	24	32	40
Transversal longitudinal	15	20	25	32	45	55	70	95	120
Vertical	52	68	85	110	144	186	260	315	400
Transversal	155	200	255	330	430	560	760	960	1200

5.2.3 Direction changing operation of feed movement(see Fig.1)

The operation handle 6 of longitudinal feed &direction changing operation of working table is located at the front central part of working table. It can swivel 30° (left & right)in the vertical plane.

There are some steel ball on left, middle and right positions, they are used for positioning. And its moving direction is the same as rotating direction of the handle 6.

Note : Handle 6 must be in position.

The operation handle 22 of transversal feed &direction changing operation of working table is located in the right front side of the knee. It can swivel 30° (back & forth) in the horizontal plane.

There are some steel balls on left, middle and right positions, they are used for positioning. and their moving direction is against to that of handle22.

Note : Handle 22 must be in position.

The operation handle 34 of vertical feed &direction changing operation ofworking table is located at the front right lower part of the knee. It can swivel 30° (back &

forth)in the vertical plane.

There are some steel ball son left, middle and right positions, they are used for positioning. And its moving direction is the same as rotating direction of the handle34.

Note: Handle 34 must be in position.

If the three handles above mentioned can't be in position, please use the jog switch 19 to rotate to the position you required. If the three handles above mentioned aren't in the middle position, teeth pair on the hand-wheel can not be geared. So you must make the three handles in the middle position.

6. Hanging -on , installation and Trial on of the machine.

6.1 Hanging- on of the machine.

While hanging, you must follow Fig.20, Fig.21, to use steel rope and inclination, big violation is forbidden when transporting for the sake of the machine's safety.

Note: hanging- on of machines with vertical digital display device should need you to dismantle the vertical digital display device. And re-install it to the original correct position after finishing hanging -on by using encoder, digital display scale and as well the operation manual.

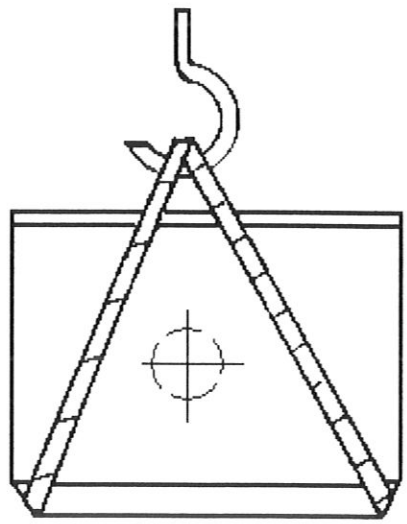


Fig. 20 Hanging-on with packing box

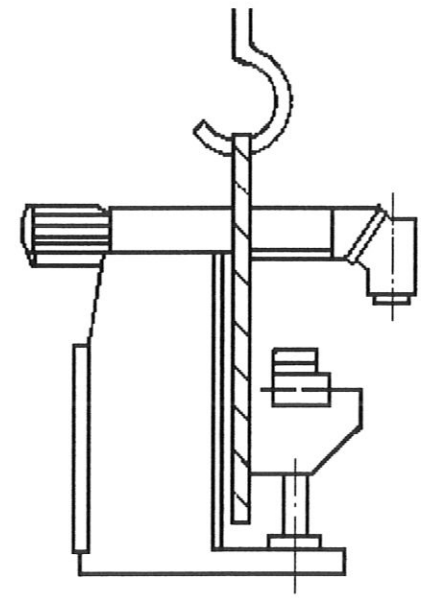


Fig. 21 Hanging- on without package

6.2 Installation of the machine

Refer to Fig.22 for the drawing plan of the machine's foundation.

Lay the machine on the foundation together with the wedges. and then and then put the gauge on the working table surface to adjust leveling. Readings of the lever both in longitudinal & transversal plane shouldn't be larger than 0.04/1000mm, after finishing the level adjustment, mount & tighten the archor stud bolt of the machine.

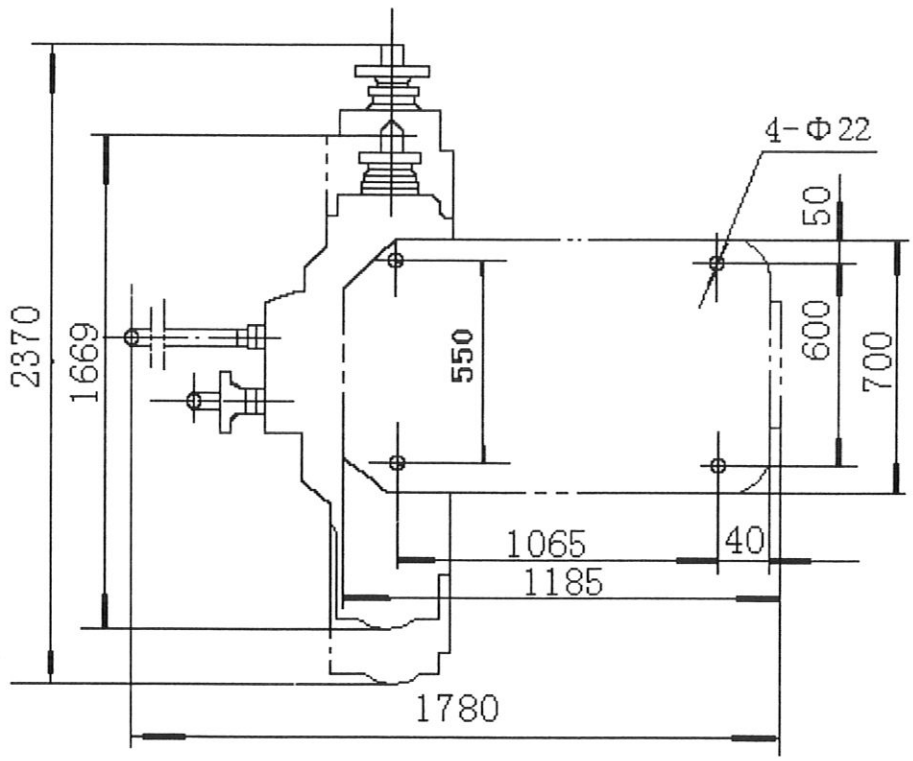


Fig.22 Plan drawing of foundation

6.3 Trial-on of the machine

6.3.1 Before trial-on, you must read the machine's mechanical & electric operation manuals carefully, and do the following after a correct connection of the machine:

Trial-on can be carried out after cleaning & lubrication of the machine according to the operation manual. During trial-on, both main movement and feed movement will run from low speed to high speed in turn. And you must check running situation of the machine and its oil pump as well as temperature rise of the spindle..

6.3.2 Fill coolant liquid into the coolant tank on the base of the machine, and check working condition of coolant pump and the coolant system.

7. Technology adjustment of the machine.

7.1 Belt adjustment of the machine's main movement.(see Fig.23)

Dismount the back cover of the machine, and lightly loosen screw 2(or 4), then adjust the two screws on bolt 1 to move the bracket up and down together with the motor, finally, re-tighten screws 2(or 4) after tensioning the belt.

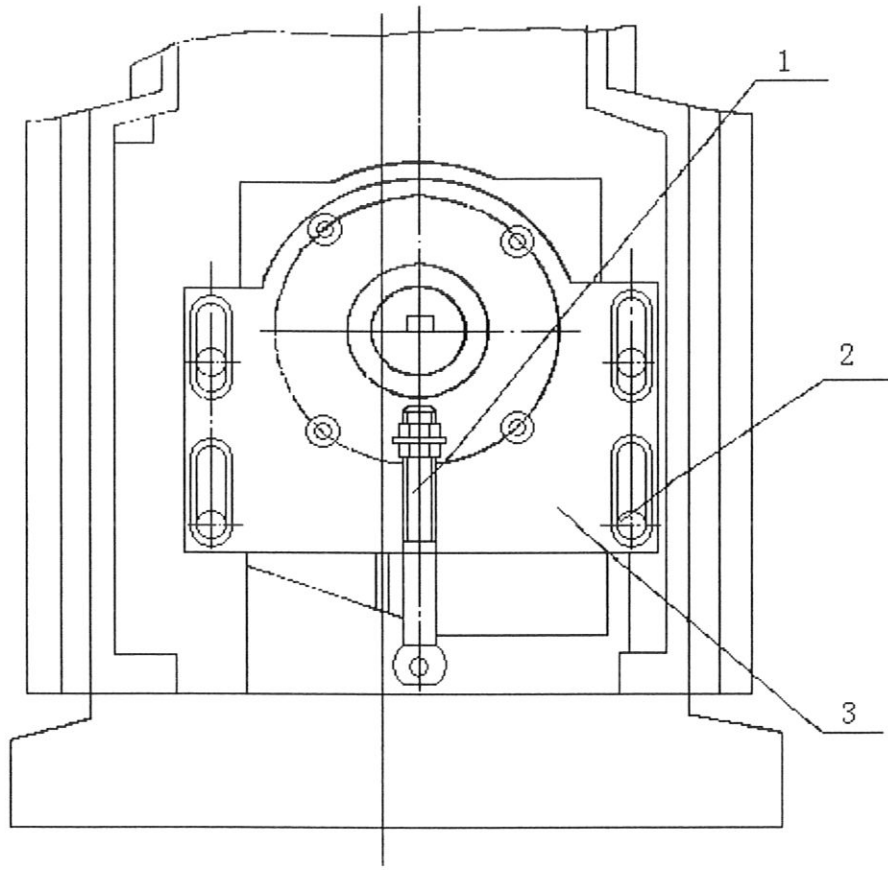


Fig.23 Adjustment of T-belt of main motor

7.2Adjustment of the spindle(Fig.24)

when the spindle central line swings an extreme angle due to the wear of the spindle bearing, you must re-adjust the spindle .

Before adjustment, you must dismount cover and take away the sliding ram firstly, and then loosen and take off screw 5 (altogether 4). When dismount the fastening screw 4 and its cotter pin, it will be pulled or go out itself.

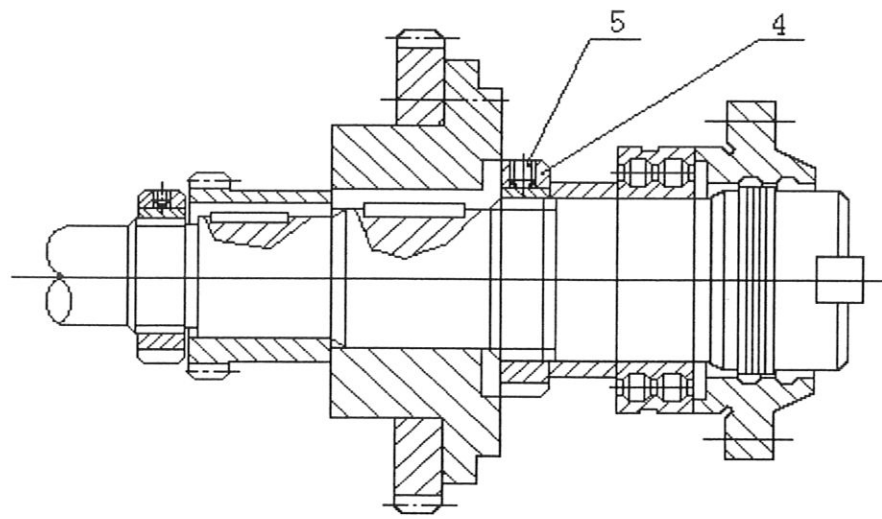


Fig.24 Adjustment of horizontal spindle

7.3 Adjustment of self-locker's damper of vertical ball-screw pair.

When the machine' vertical lead-screw belongs to ball-screw, sink of working table can be prevented by means of adjusting self-locker. Because self-locker's damper of vertical ball-screw pair has an elastic light& adjustable damper" self-locking device as Fig. 21 showed.

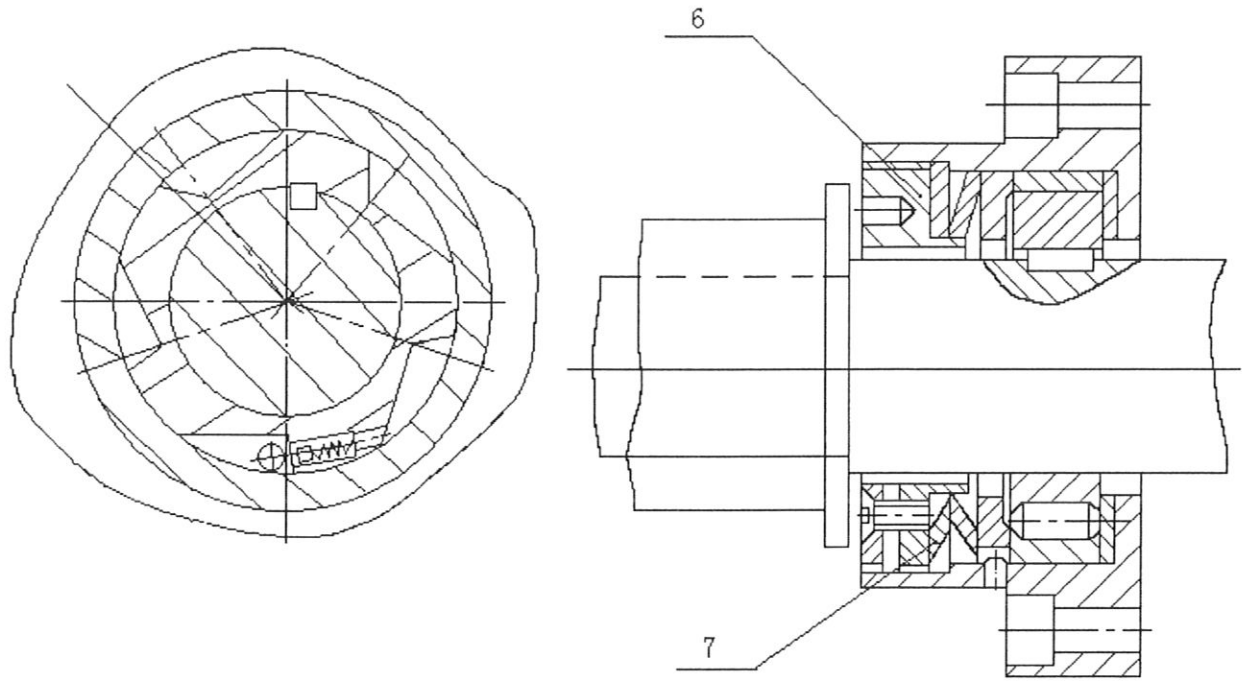


Fig. 25 Sketch of self-locker

This self-locker is mounted at the shake handle in front of the knee, and when the shake-handle rotates anti-clock-wisely, the knee will fall(descending), if operation force of the shake-handle at this time is less than 50N, you should do a suitable adjustment to the self-lock for the purpose of a safe operation.

While adjusting the self-locker, First, you should dismount such parts as shake-handle , scale disc and as well as clutch and spring in front of the self-locker, and then loosen locking screw M5 on the locking nut 6 , and rotate locking nut 6 clock-wisely to press castle spring 7, wait until the operation force of shake-handle reach your requirement, tighten locking screw M5 and adjust the locking force of the self-locker. At this time, how large of the damper force can be judged by the evenness of the operation force when rotating the shake-handle to make the knee move. After finishing the adjustment, mount all parts dismounted again according to the regulation.

7.4 Clearance adjustment of longitudinal lead-screw & screw nut.(see Fig.26)

When the longitudinal lead-screw belongs to ladder type one, there is a system in the left front part of the working table which can adjust the clearance of lead-screw pairs. While milling clock-wisely or anti-clock-wisely, loosen the nut under the knurled

screw 8 first, and then rotate the knurled screw 8 clockwisely and anti-clockwisely to adjust the clearance. The way of judging whether the adjustment is correct or not is: you will feel very ease while rotate the lead-screw with the hand-wheel, and the working table won't move when the lead-screw is rotating in a stroke range of 18° .

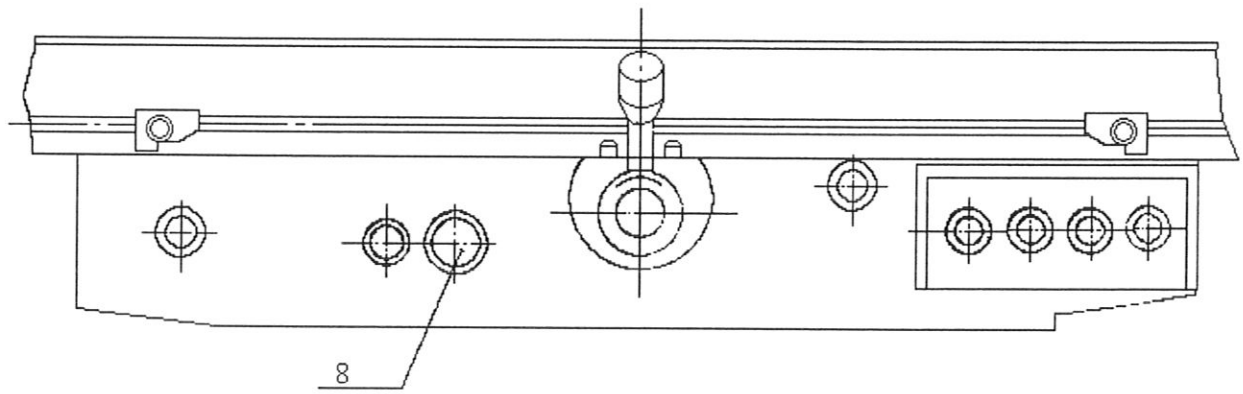


Fig. 26 Clearance adjustment between lead-screw and nut

7.6 Installation of wheel-bracket of indexing-head.

While using the wheel, you can take off the bracket 9 at the right end of the working table, and mount the gear of wheel-bracket of indexing-head on lead-screw 10, see Fig. 27.

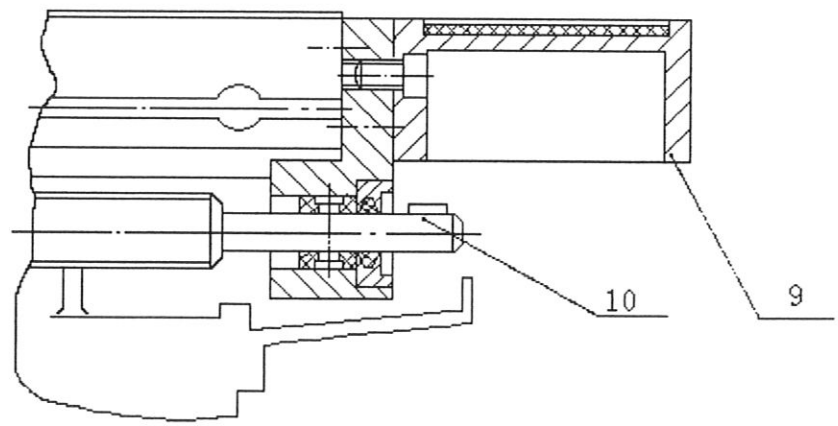


Fig. 27 Installation of wheel-bracket of indexing head

7.7 Clearance adjustment between working table and slide guide-way(see Fig.28)

Due to the wear of gib12, clearance between the working table and the slide guide-way will increase gradually, this will affect the working quality of the machine. Thus, you should firstly loosen screw 13, and then rotate screw 11 to maintain a normal clearance between working table guide-way and the gib. Finally, tighten screw 13 (Note: the force on it shouldn't be large in case of the gib becoming bend), Screw 11 located in the left front part while screw 13 is in the right front part of the working table

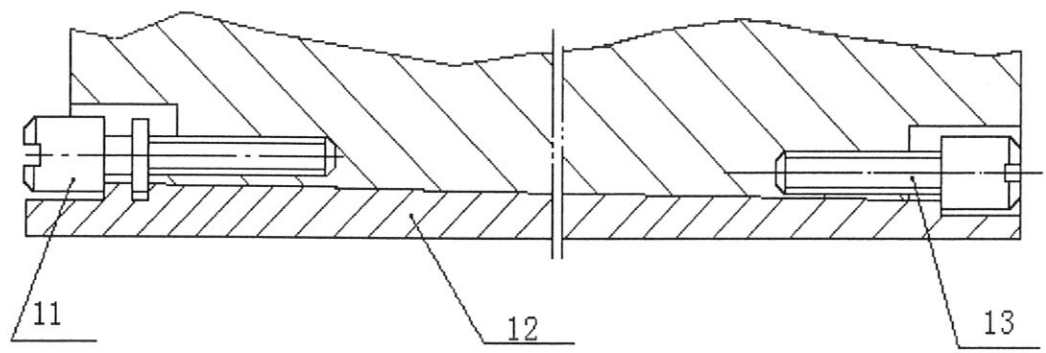


Fig. 28 Clearance adjustment between working table and slide guide-way

7.8 Clearance adjustment between slide and knee guide(see Fig.29)

Due to the wear of gib15, clearance between the slide and the knee guide-way will increase gradually, this will affect the working quality of the machine. Thus, you should firstly loosen screw 14, and then tighten screw 16 to maintain a normal clearance . Finally, tighten screw 14 .

Screw 14 locates at the left back side of the slide while screw 16 is at the right front part of the slide.

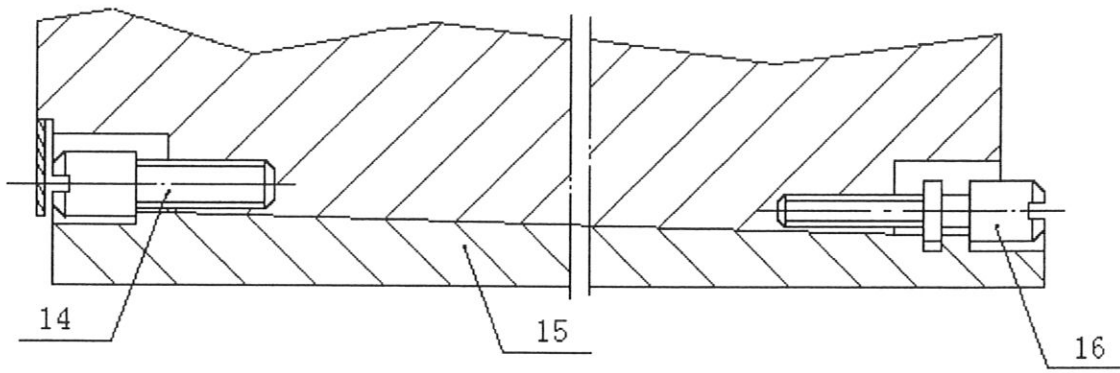


Fig.29 Clearance adjustment between slide and knee guide

7.9 Clearance adjustment of knee and bed guide-way(see Fig.30)

The wear-ness of gib 18 and gib 19 & because of the looseness of tightening screw will cause a large clearance between the vertical guide-way and bed guide, which will lead to an obvious trembling of the knee during its movement. This will affect the machine's accuracy. So , you must adjust by means of tightening screw 17 and screw 20.

Screw 17 and screw 20 is located at the inner upper part & lower part of vertical guide-way of knee respectively.

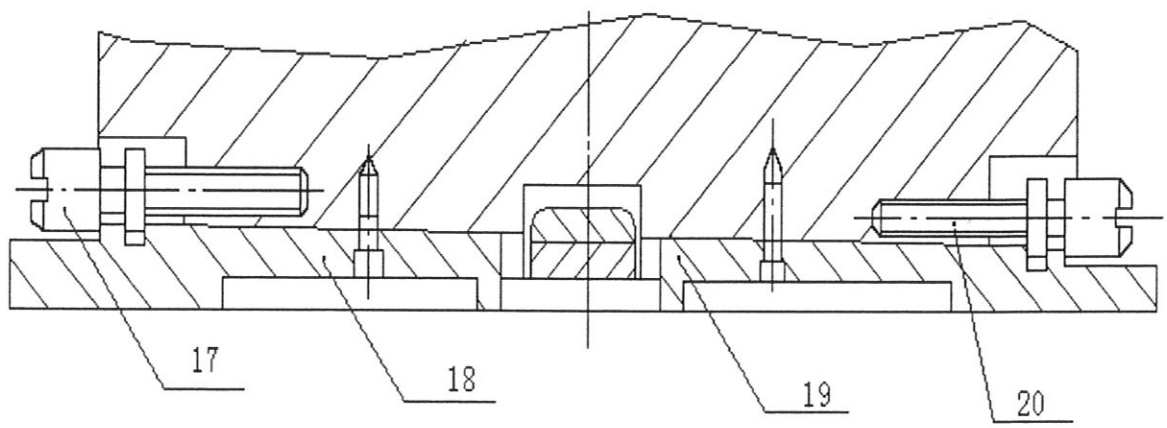


Fig. 30 Clearance adjustment of knee and bed guide-way

8. List of gear, lead-screw and screw-nut. (table 6)

Location	No	Name	Tooth	Module (mm)	Material	Heat-treatment	Direction of spiral angle
Spindle (Fig4)	1	Gear	39	3	40Cr	Tooth part G52	
	2		31		20Cr	Tooth part S0.8-G59	
	3		69		20Cr	Tooth part& 12C11slot S0.8-G59	
	4		22		40Cr	Tooth part G52	
	5		78		40CR	Tooth part G52	
Spindle driving gear box	6		49	2.5	20Cr	12H12 Tooth part &slot partS0.8-G59	
	7		29	3	40Cr	Tooth part G52	
	8		48	2.5	40Cr	Tooth part G52	
	9		31		20Cr	Tooth part S0.8-G59	
	10		26		20Cr	Tooth part S0.8-G59	
	11		19		40Cr	Tooth part G52	
	12		41		20Cr	Tooth part S0.8-G59	
	13		29		40Cr	Tooth part G52	
	14		36		20Cr	Tooth part S0.8-G59	
	15		45		20Cr	Tooth part S0.8-G59	
	16		54		20Cr	Tooth part S0.8-G59	
Feed speed box (Fig.6)	61	Gear	34	2	40Cr	Tooth part G52	
	62		19				
	63		31				
	64		38				
	65	Conical gear	56 21				
	66	Gear	49 13				
	67	Gear shaft	13			T235 Tooth part G52	
	68	gear	35			Tooth part G52	
	69		25	2.5		Tooth part G52	
	70	Joint body	49	2		Tooth part& left end face of 8-Φ18H8 G52	
	71	gear	30			Tooth part G52	

Table 6(continued)

location	No	Name	Tooth	Module (mm)	Material	Heat-treatment	Direction of spiral angle
Feed gear box (Fig.6)	72	Gear	26	2	40Cr	Tooth partG52	
	73		40				
	74		58				
	75		20				
	76		44				
	77		43				
	78		20				
	79		47				
	80		49				
	81		20				
	82		23				
	83		48				
	84		36				
Driving box of the knee Fig.7	85	Gear	19	2.5	40Cr	Tooth part G48	
	86		19				
	87		29				
	88		29				

	89		35		20Cr	Tooth & Gear part S0.9-G59	
	90	Transversal lead screw			45	Soft nitric gas	Tr30×6left
	91	Gear	30	2.5	40Cr	Tooth part G48	
	92		20				
	93		30				
Driving box of knee (Fig.8)	94	Gear	35	2.5	40Cr	Driving box of the knee Fig.8 Fig.9G52	
	95	Transversal lead screw			60CrMo	C48	GQ30×6 left-F
Vertical lead-screw of knee (Fig.9, Fig.10)	100	Nut			HT200	Soft nitric gas	Tr40×6left
	101	Vertical lead-screw			45	Soft nitric gas	Tr40×6left
	102	Bear gear	34	3	40Cr	Tooth partG48	

	103	Bear gear	17	3	40Cr	Tooth partG48	
	104	Vertical lead-screw pair			60CrMo	C48	GQ40×6leftF
Table (Fig.11, Fig.12)	106	Conical gear	20	4	20Cr	S0.9-G59	
	107		18	4	40Cr	Tooth partG52	
	108	Axial taper gear	20	3	40Cr	Tooth partG52	
	109	Longitudinal lead screw			45	Soft nitric gas	Tr32×6
	110	Nut			HT200	Soft nitric gas	Tr32×6
	112	Gear	12	2.5	45	Tooth partG42	
	113	Nut			HT200	Soft nitric gas	Tr32×6
	114	Nut			HT200	Soft nitric gas	Tr30×6left
	115	Conical gear	18	3	40Cr	Tooth partG52	
	116	Longitudinal lead screw pair			60CrMo	C48	GQ32×6-F

9 List of main bearings of the machine(table7)

Table 7

No.	Name	type	Size	number	Rmks.
201	Single direction radial ball bearing	208	40×80×18	3	
203		108	40×68×15	4	Repeat 1 for Fig.8 & Fig.9
204		206	30×62×16	2	
205		210	50×90×20	2	
206		107	35×62×14	5	Repeat 2 for Fig.8 & Fig.139
207		205	25×52×15	2	Repeat 1 for Fig.8 & Fig.9
213		105	25×47×12	1	
220		106	30×55×13	1	Repeat 1 for Fig.11 & Fig.12
221	Needle bearing	942/20	20×26×20	4	Repeat 2 for Fig.8 & Fig.9
222	Single direction radial ball bearing	104	25×42×12	4	
223	Single direction thrust ball bearing	8105	25×42×11	1	
224	Single direction radial ball bearing	204	20×47×14	2	
225		1000903	17×30×7	5	Repeat 2 for Fig.8 & Fig.9
226	Needle without ring but has holding pole	9243/40	40×45×17	1	Repeat for Fig.8 & Fig.9
227	Single direction radial ball bearing	1000907	35×55×10	1	Repeat for Fig.8 & Fig.9
228	Single direction conical rolling bearing	7206	30×62×17	2	Repeat for Fig.8 & Fig.9
229		2007106	30×55×17	2	Repeat for Fig.8 & Fig.9
230	Single direction radial ball bearing	1000906	30×47×9	8	

231	Needle bearing	943/30	30×38×32	1	Repeat for Fig.10 & Fig.11
232	Single direction thrust ball bearing	8106	30×47×11	1	Repeat for Fig.10 & Fig.11
233		8205	25×47×15	2	
234		8110	50×70×14	2	
235		8107	30×52×12	1	Repeat for Fig.10 & Fig.11
236	Needle bearing	941/35	35×43×16	1	Repeat for Fig.12 & Fig.13
237		942/35	35×43×25	1	Repeat for Fig.12 & Fig.13

10. Application of rotary milling head.

A skillful use of the rotary milling head of this series of machine can largely enlarge the application range of this kind of machine. Processing of the work-piece with an optimum and easy angle require a thorough understanding about the rotary milling head. And while processing spiral types of work-pieces or holes by using millers or boring cutter, you can suppose the position that the spindle center line perpendicular to the working table surface will be 0° (see fig.31)

10.1 Milling & cutting of spiral lines:

while milling the spiral lines, you must move the front case for180° in order to make the spindle of milling head at the lowest level.

For example, suppose the spiral angle of the work-piece is $\theta_{H,}$, then the moving angle of both front and rear casings of the milling head will separately be $\theta_{1,}$ θ_{2}, and the relationship between $\theta_{H,}$ $\theta_{1,}$ θ_{2} are showed in table 9.

10.1.1 While milling the work-piece in right swivel direction(i.e the top part of the spindle is on the left side, see fig.32), the angle of both front and rear casings of the milling head will be:

direction of front casing movement: CCW(the operator is facing to the machine)

direction of rear casing movement: CW(the operator is facing to the machine)

10.1.2 While milling the work-piece in left swivel direction(i.e the top part of the spindle is on the right side, see fig.33), the angle of both front and rear casings of the milling head will be:

direction of front casing movement: CW

direction of rear casing movement: CCW

10.2 Bevel surface that has an angle with the working table of the work-piece can be milled by using bar miller.(see fig.34)

10.2.1 When there is a ϕ angle between the bevel surface and the working table: a direct movement of the rear casing according to the ϕ angle required is enough.

10.2.2 When there is an angle between the bevel surface and the transversal working table, the movement of both front and rear casings depends on the bevel surface of the work-piece and the position of the spindle, and the angle should be moved are showed in table 10.

10.2.2.1 When the front part of the spindle is lower than its rear end face(see fig.35): Rotation direction of front and rear casings are CW and CCW respectively while the spindle line lies on the left side of the bed.

10.2.2.2 Case while the front end face of the spindle is crossed with its rear end face(see fig.36):

Firstly, move the rear casing about 180° ,then move front and rear casings according to the following procedure: when the spindle line lies on the right side of the bed, rotation direction of front and rear casings are CW and CCW respectively , and rotation direction of front and rear casings are CCW and CW respectively while the spindle line lies on the left side of the bed.

10.3 If the work-piece that is going to be milled is in a high position, you can adjust the milling head to the position showed in fig.37, and use a short tool holder

that is mated with the spindle taper of the machine to mill it horizontally. Doing this will enlarge the vertical loading space of the machine.

10.4 For working of some holes, a certain degree of swivel of this rotary milling head in both vertical and longitudinal directions can finish processing of holes which is parallels to the feeding direction in a single assembling.

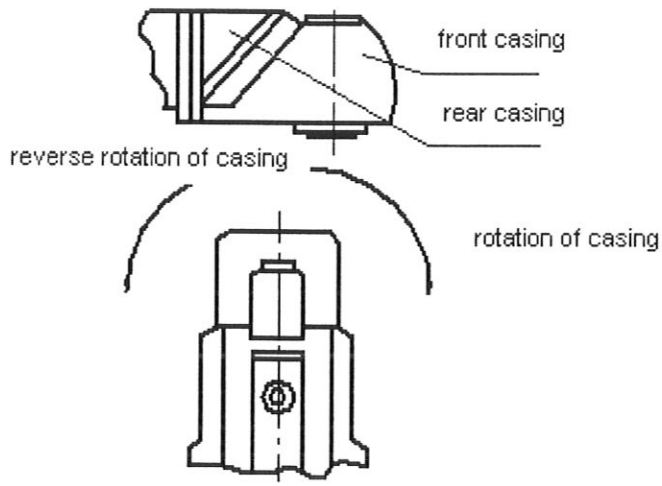


Fig.31

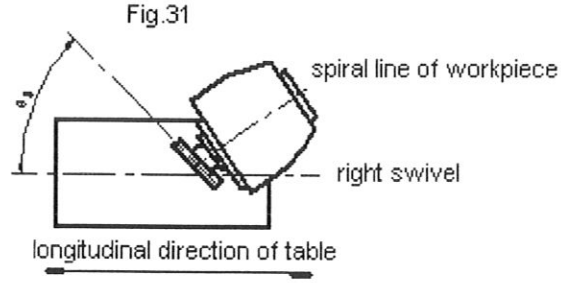


Fig.32

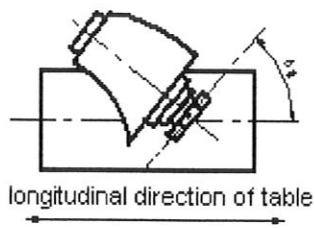


Fig.33

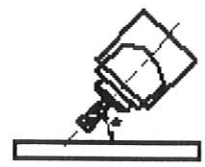


Fig 34

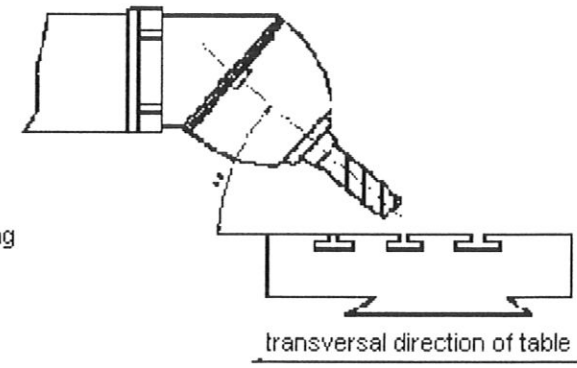


Fig.35

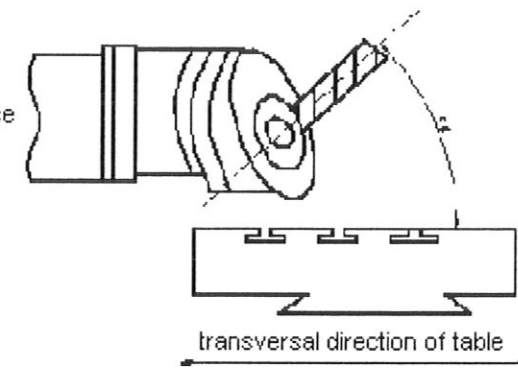


Fig.36

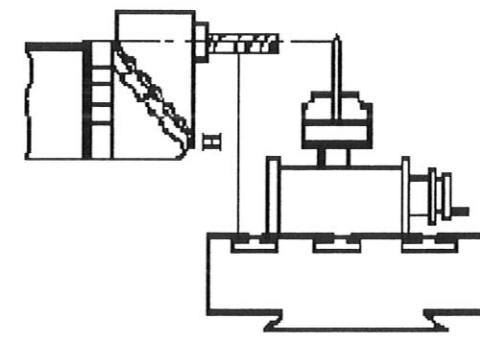


Fig.37

Table 9 Relationship between moving angle of milling head and spiral angle

θ_H°	θ_1°	θ_2°	θ_H°	θ_1°	θ_2°	θ_H°	θ_1°	θ_2°
1	1.4	0.5	21.5	30.6	10.9	42	60.9	22.6
1.5	2.1	0.8	22	31.3	11.2	42.5	61.7	22.9
2	2.8	1.0	22.5	32	11.5	43	62.4	23.2
2.5	3.5	1.3	23	32.7	11.7	43.5	63.2	23.5
3	4.7	1.5	23.5	33.5	12	44	64	23.8
3.5	4.9	1.8	24	34.2	12.3	44.5	64.7	24.2
4	5.7	2.0	24.5	34.9	12.5	45	65.5	24.5
4.5	6.4	2.3	25	35.6	12.8	45.5	66.3	24.8
5	7.1	2.5	25.5	36.4	13.1	46	67.1	25.1
5.5	7.8	2.8	26	37.1	13.4	46.5	67.9	25.5
6	8.5	3.0	26.5	37.8	13.6	47	68.6	25.8
6.5	9.2	3.3	27	38.5	13.9	48	70.2	26.4
7	9.9	3.5	27.5	39.5	14.2	49	71.8	27.1
7.5	10.6	3.8	28	40	14.4	50	73.4	27.8
8	11.3	4.0	28.5	40.7	14.7	51	75	28.5
8.5	12	4.3	29	41.5	15	52	76.6	29.2
9	12.7	4.5	29.5	42.2	15.3	53	78.2	29.9
9.5	13.4	4.8	30	42.9	15.5	54	79.9	30.6
10	14.2	5.0	30.5	43.7	15.8	55	81.5	31.4
10.5	14.9	5.3	31	44.4	16.1	56	83.2	32.1
11	15.6	5.5	31.5	45.1	16.4	57	84.9	32.9
11.5	16.3	5.8	32	45.9	16.7	58	86.6	33.7
12	17	6.0	32.5	46.6	17.0	59	88.3	34.5
12.5	17.7	6.3	33	47.4	17.2	60	90	36.3

13	18.4	6.5	33.5	48.1	17.5	61	91.7	36.1
13.5	19.1	6.8	34	48.8	17.8	62	93.5	36.9
14	19.8	7.1	34.5	49.6	18.1	63	95.3	37.8
14.5	20.6	7.3	35	50.3	18.4	64	97.1	38.7
15	21.3	7.6	35.5	51.1	18.7	65	98.9	39.6
15.5	22	7.8	36	51.9	19.0	66	100.7	40.5
16	22.7	8.1	36.5	52.6	19.3	67	102.6	41.4
16.5	23.4	8.3	37	53.3	19.8	68	104.5	42.4
17	24.1	8.6	37.5	54.1	20.1	69	106.5	43.4
17.5	25	8.9	38	54.8	20.4	70	108.4	44.4
18	25.6	9.1	38.5	55.6	20.7	75	118.8	50.1
18.5	26.3	9.4	39	56.3	21	80	130.7	57
19	27	9.6	39.5	57.1	21.3	85	145.7	66.4
19.5	27.7	9.9	40	57.8	21.7	90	180	70
20	28.4	10.2	40.5	58.6	22			
20.5	29.1	10.4	41	54.4	22.3			
21	29.9	10.7	41.5	60.1	22.6			

Table 10 moving angle of milling head when there is an angle between axial line and working table

θ_H°	θ_1°	θ_2°	θ_H°	θ_1°	θ_2°	θ_H°	θ_1°	θ_2°
1	15.183	10.674	31	91.723	55.544	61	138.525	75.012
2	21.534	15.052	32	93.431	56.337	62	139.987	75.562
3	26.449	18.384	33	95.122	57.115	63	141.445	76.109
4	30.629	21.17	34	96.799	57.879	64	142.9	76.652
5	34.342	23.606	35	98.462	58.63	65	144.352	77.191
6	37.726	25.789	36	100.112	59.368	66	145.801	77.728
7	40.864	27.782	37	100.749	60.094	67	147.247	78.261
8	48.809	29.624	38	103.375	60.808	68	148.69	78.791
9	46.597	31.342	39	104.989	61.512	69	150.13	79.319
10	49.254	32.955	40	106.593	62.205	70	151.568	79.844
11	51.802	34.479	41	108.187	62.888	71	153.003	80.367
12	54.256	35.925	42	109.771	63.562	72	154.437	80.887
13	56.626	37.304	43	111.346	64.227	73	155.869	81.405
14	58.925	38.622	44	112.912	64.883	74	157.298	81.921
15	61.16	39.886	45	114.47	65.53	75	158.725	82.435
16	63.338	41.101	46	116.02	66.17	76	160.151	82.947
17	65.465	42.272	47	117.562	66.802	77	161.575	83.458
18	67.544	43.403	48	119.097	67.427	78	162.998	83.961
19	69.582	44.497	49	120.625	68.045	79	164.42	84.474
20	71.581	45.556	50	122.147	68.656	80	165.84	84.981
21	73.545	46.585	51	123.662	69.261	81	167.259	85.486
22	75.476	47.584	52	125.174	69.859	82	168.677	85.99
23	77.377	48.556	53	126.675	70.452	83	170.094	86.493

Table 10(continued)

$\theta_H°$	$\theta_1°$	$\theta_2°$	$\theta_H°$	$\theta_1°$	$\theta_2°$	$\theta_H°$	$\theta_1°$	$\theta_2°$
24	79.25	49.503	54	128.173	71.039	84	171.511	86.996
25	81.097	50.426	55	129.665	71.621	85	172.927	87.498
26	82.92	51.327	56	131.153	72.198	86	174.342	87.999
27	84.72	52.208	57	132.636	72.77	87	175.757	88.499
28	86.5	53.068	58	134.115	73.337	88	177.171	89
29	88.259	53.91	59	135.589	73.899	89	178.586	89.5
30	90	54.736	60	137.059	74.458	90	180	90

Calculation formular of angle between spindle line and working table :

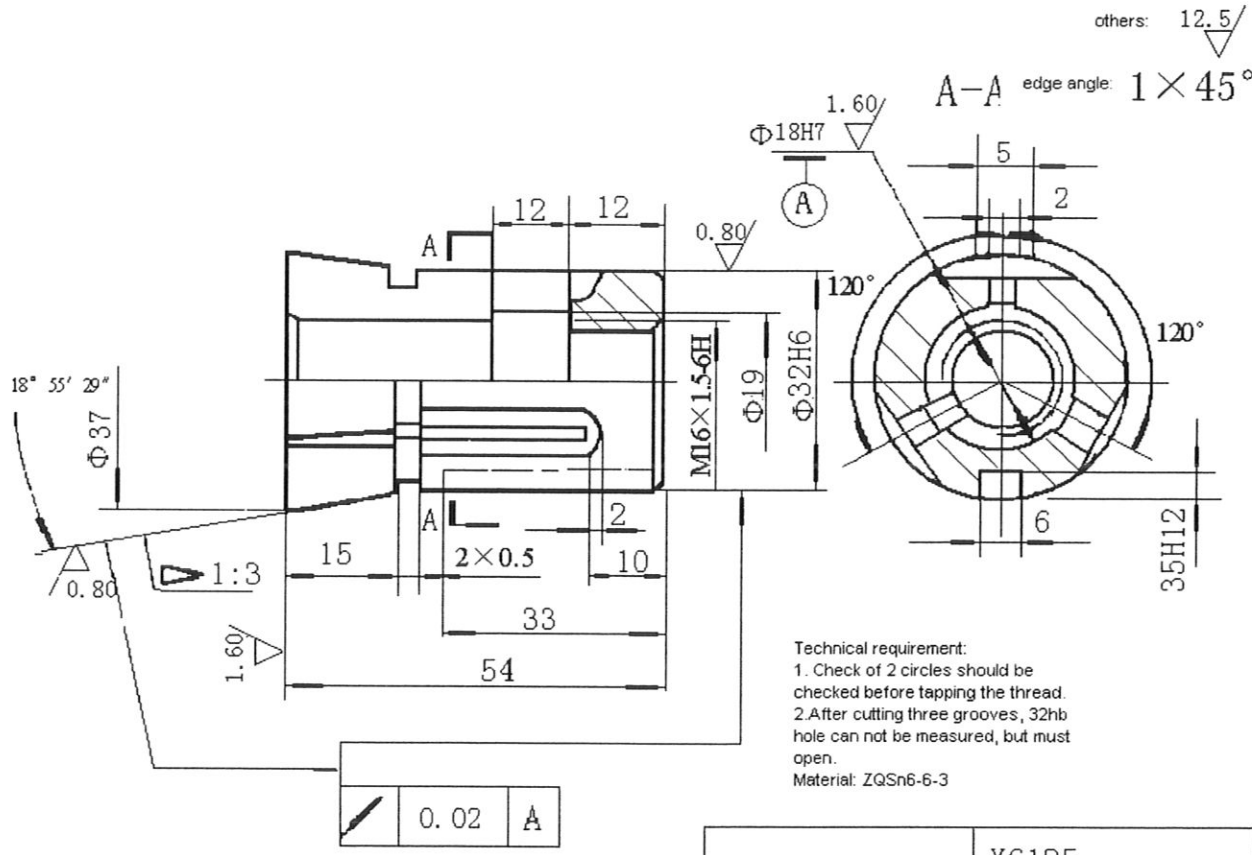
$\theta_1 = \cos^{-1}(1-2\sin\Phi)$

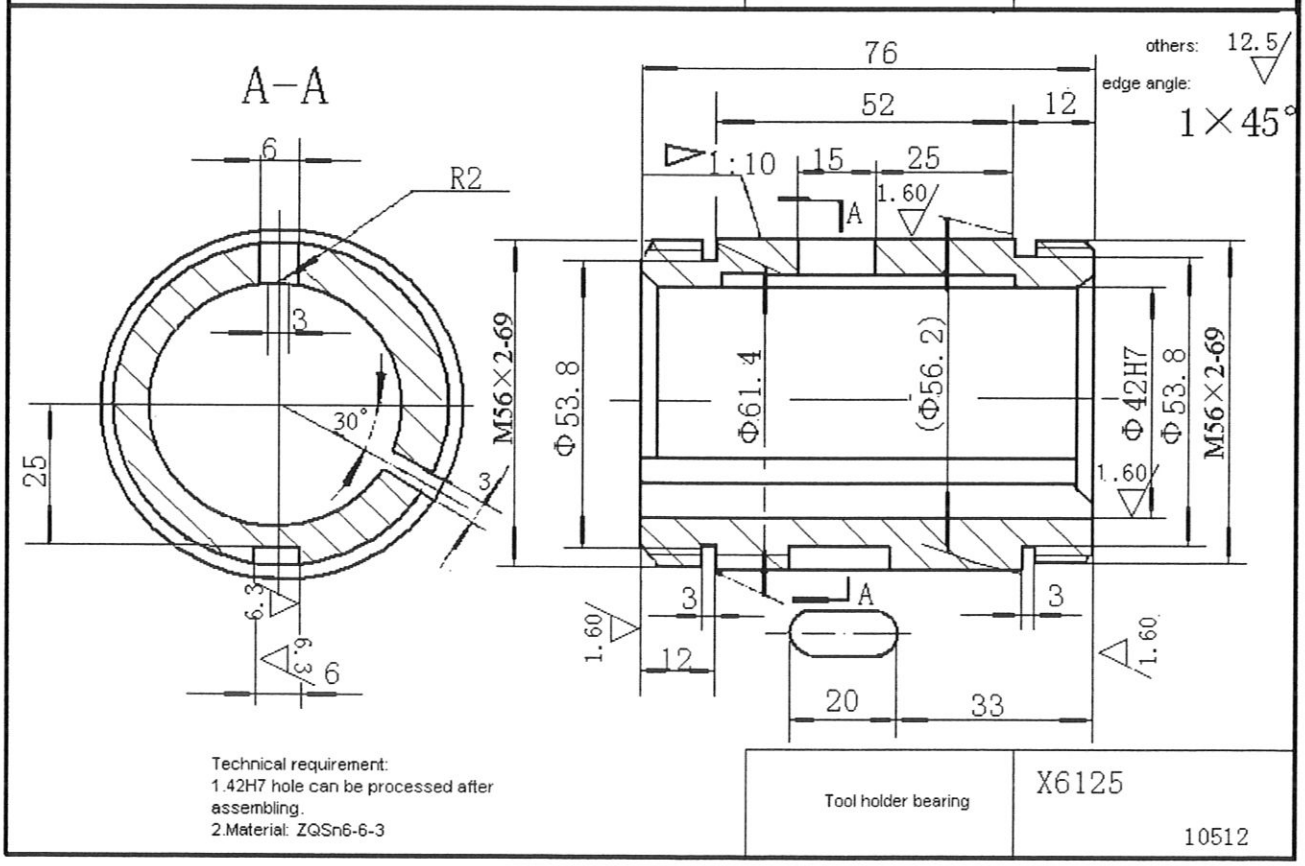
$\theta_2 = \cos^{-1}\left(\frac{1-\sin\Phi}{\cos\Phi}\right)$

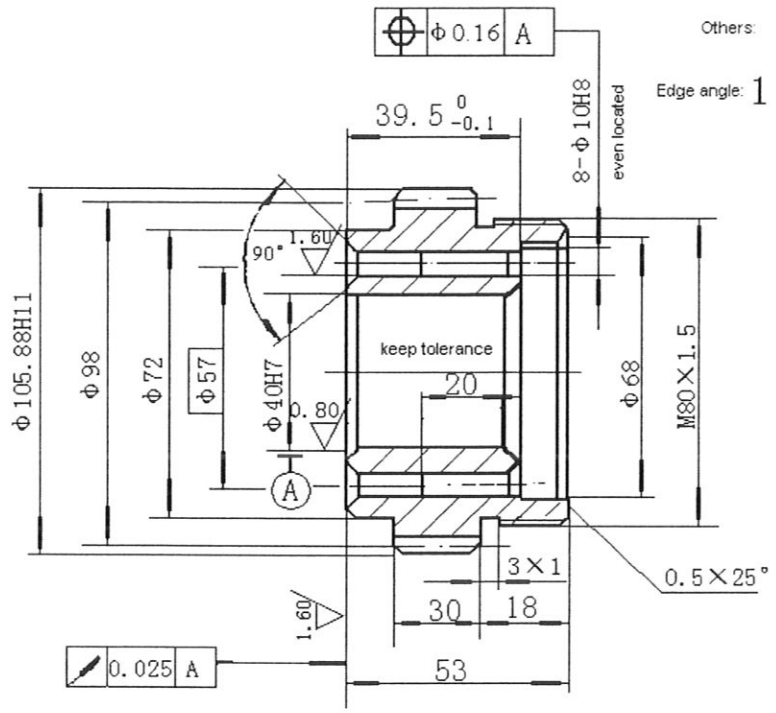
among which: Φ-indicates the angle that the center of miller's shaft projected on the YZ plane.

θ_1-indicates the front casing angle θ_2-indicates the rear casing angle

11.Easy-worn spare parts of the machine


others: 12.5
A–A
edge angle: 1×45°
1.60
Φ18H7
A
12
12
0.80
120°
5
2
120°
18° 55′ 29″
Φ37
M16×1.5-6H
Φ19
Φ32H6
A
2
6
35H12
15
2×0.5
10
1:3
0.80
33
1.60
54
0.02
A
Technical requirement:
1. Check of 2 circles should be checked before tapping the thread.
2.After cutting three grooves, 32hb hole can not be measured, but must open.
Material: ZQSn6-6-3
Tool holder bearing
X6125
10511

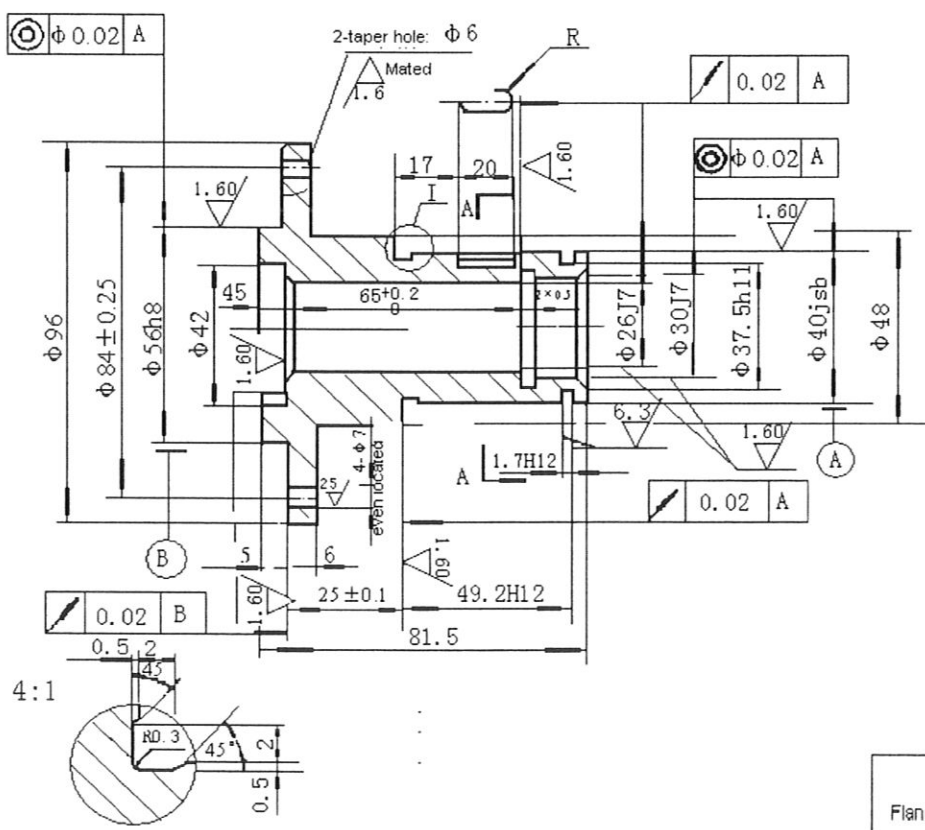

A–A
others: 12.5
edge angle: 1×45°
76
52
12
1:10
15
25
1.60
A
6
R2
3
30°
25
6.3
6.3
6
M56×2-69
Φ53.8
Φ61.4
(Φ56.2)
Φ42H7
Φ53.8
M56×2-69
1.60
3
A
3
1.60
12
1.60
20
33
Technical requirement:
1.42H7 hole can be processed after assembling.
2.Material: ZQSn6-6-3
Tool holder bearing
X6125
10512



module	2
tooth no.	49°
press angle	20°
pos. change	0.47154
accuracy grade	776
geared tooth part	40297
geared tool no.	49

Heat treatment:
Tooth part of T235 and left end face G52 of 8-10H8 hole.
Material:40Cr.

Joint body	x6125 40273S

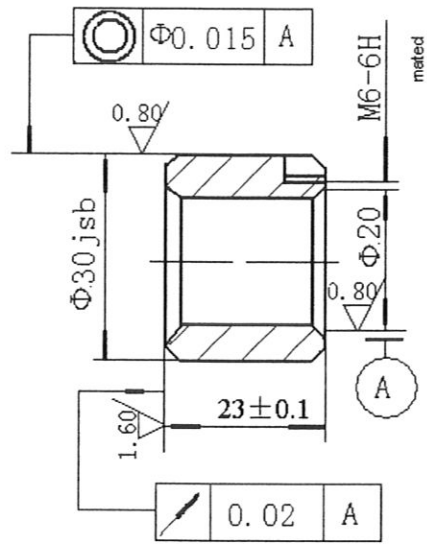


Heat treatment: T235
Material:40Cr

Flange sleeve	x6125 40319B

Others: 25

Edge angle: 1×45°

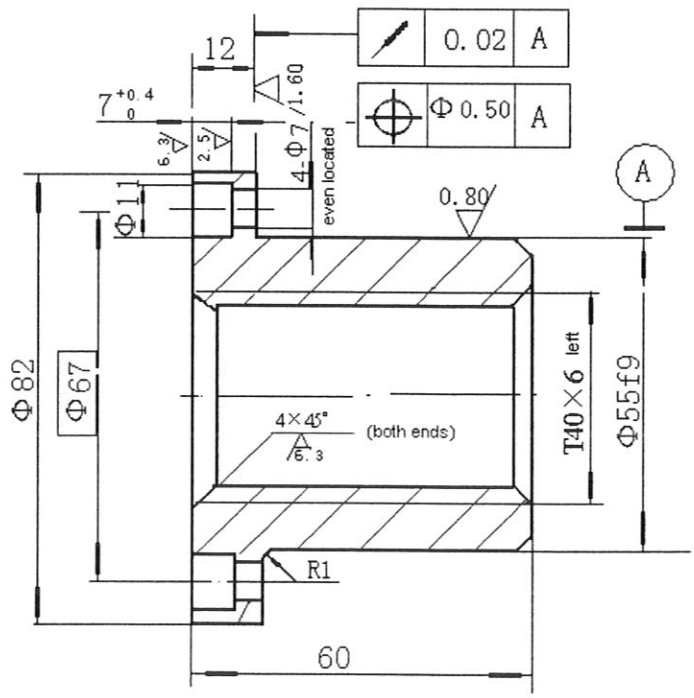


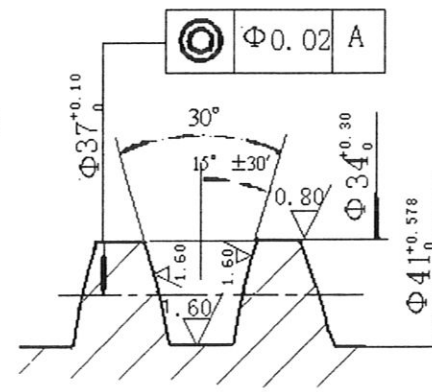
Material: ZQSn6-6-3

Sleeve	X6125
	40501

Others: 25

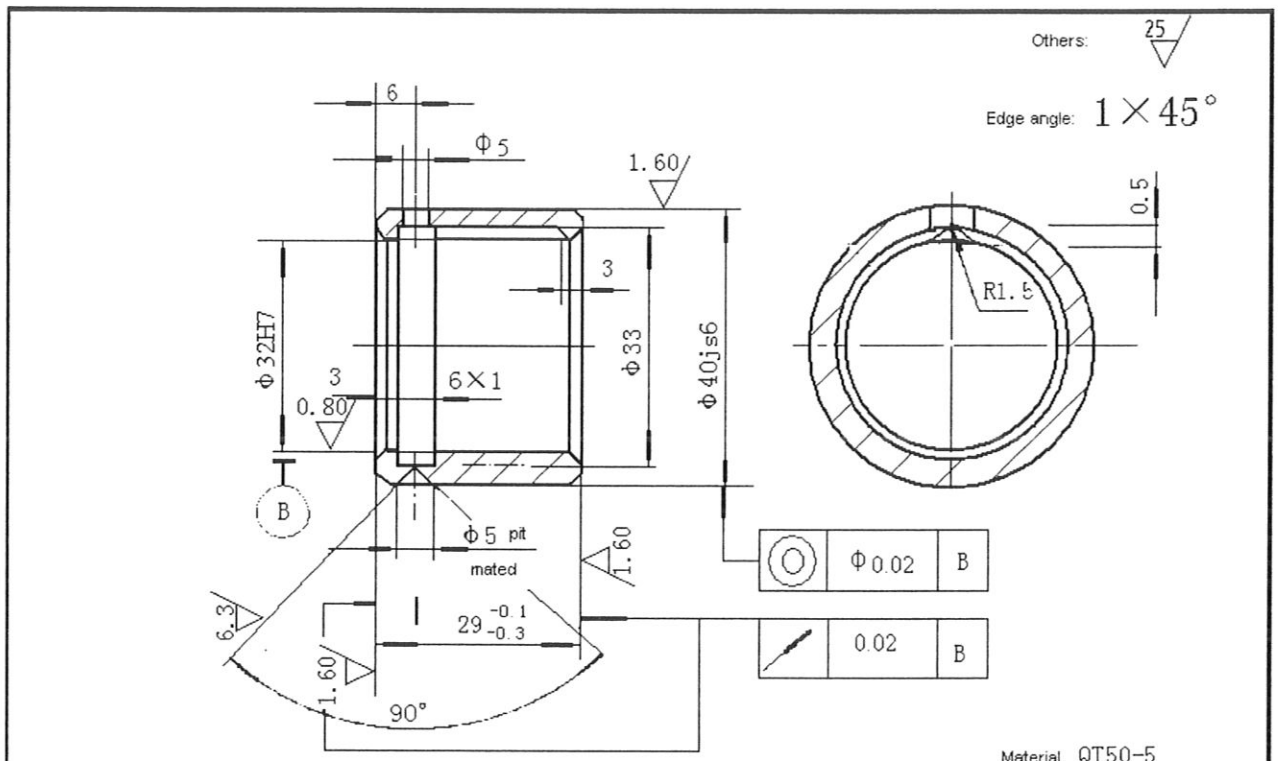
edge angle: 1×45°

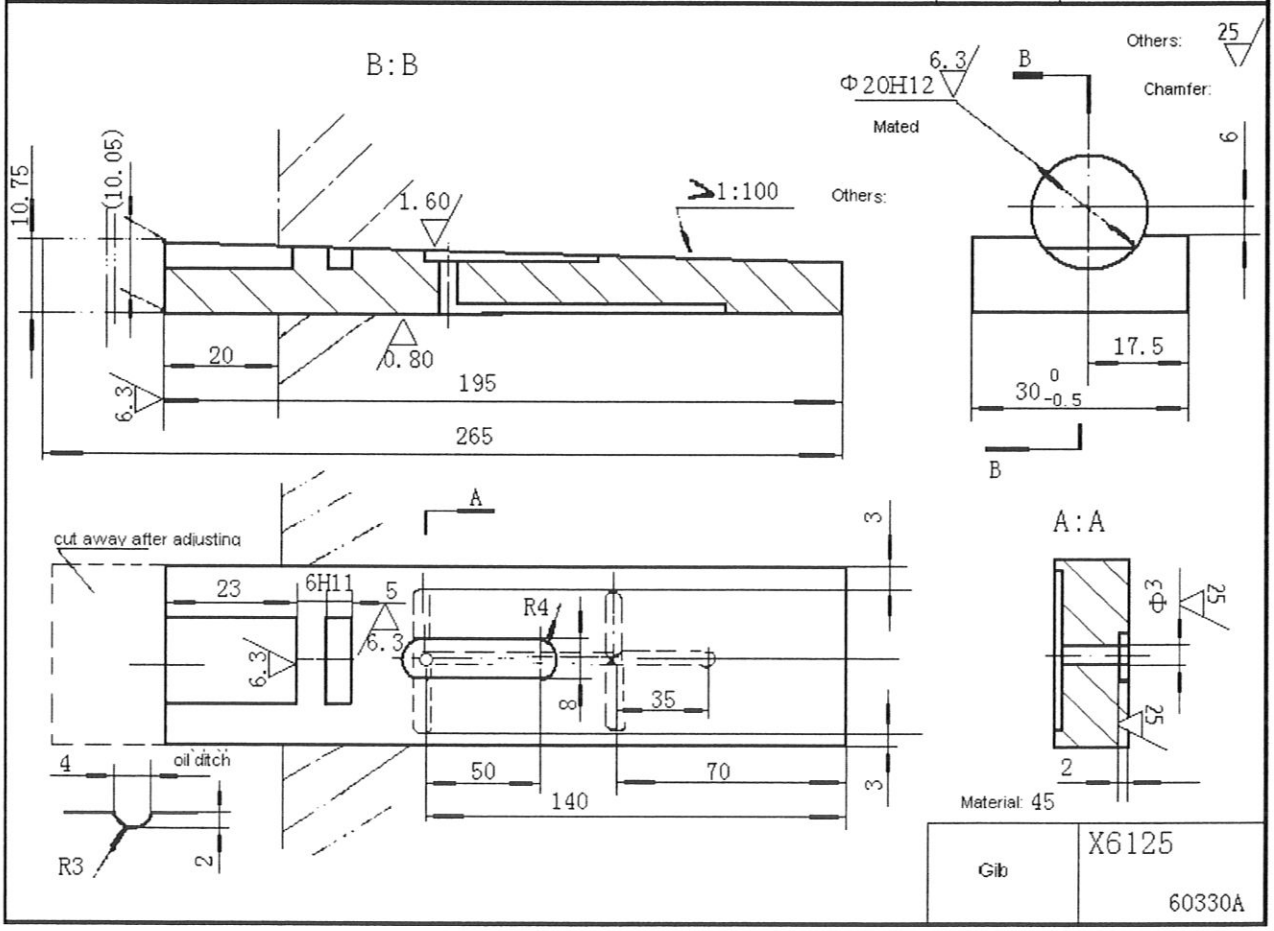


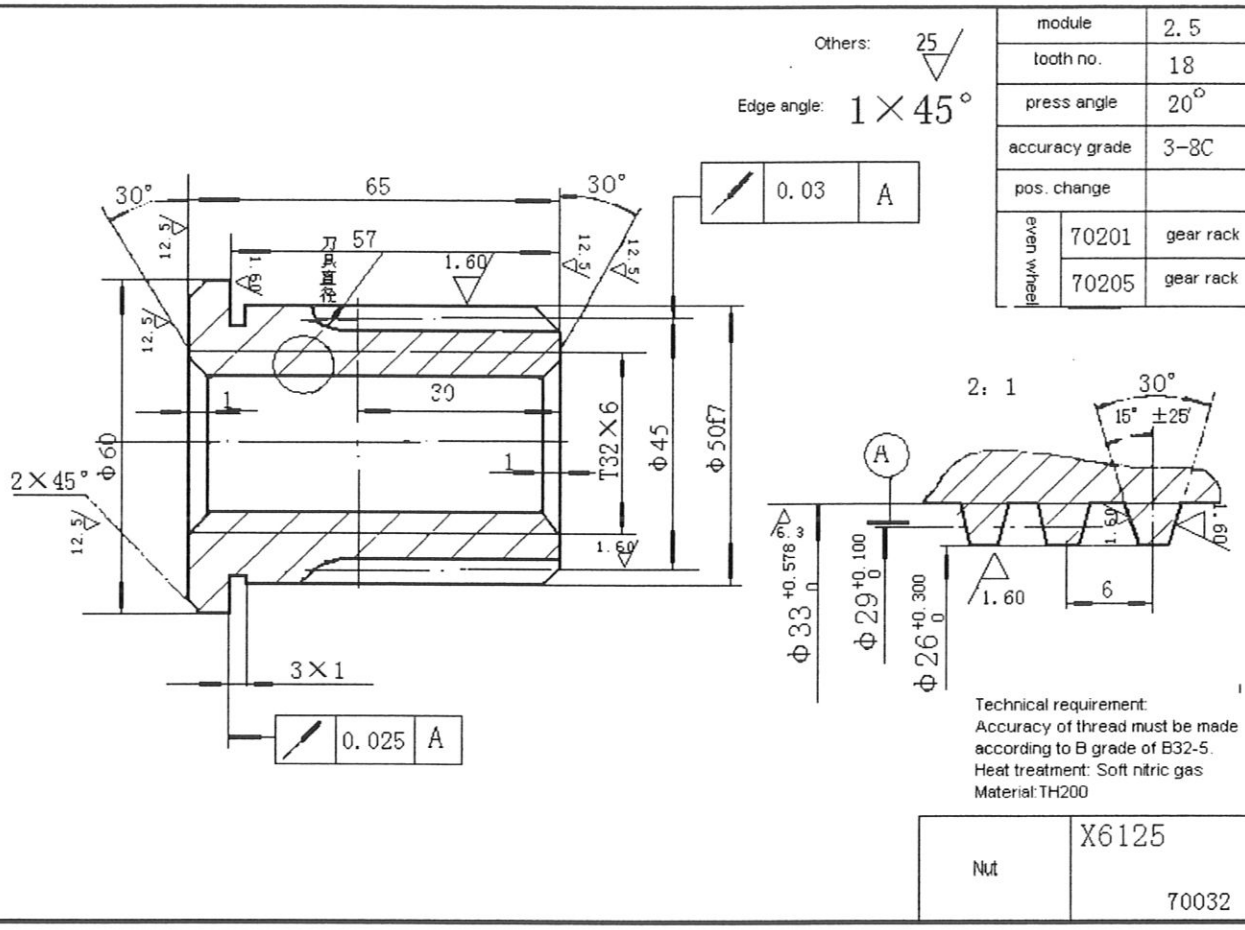


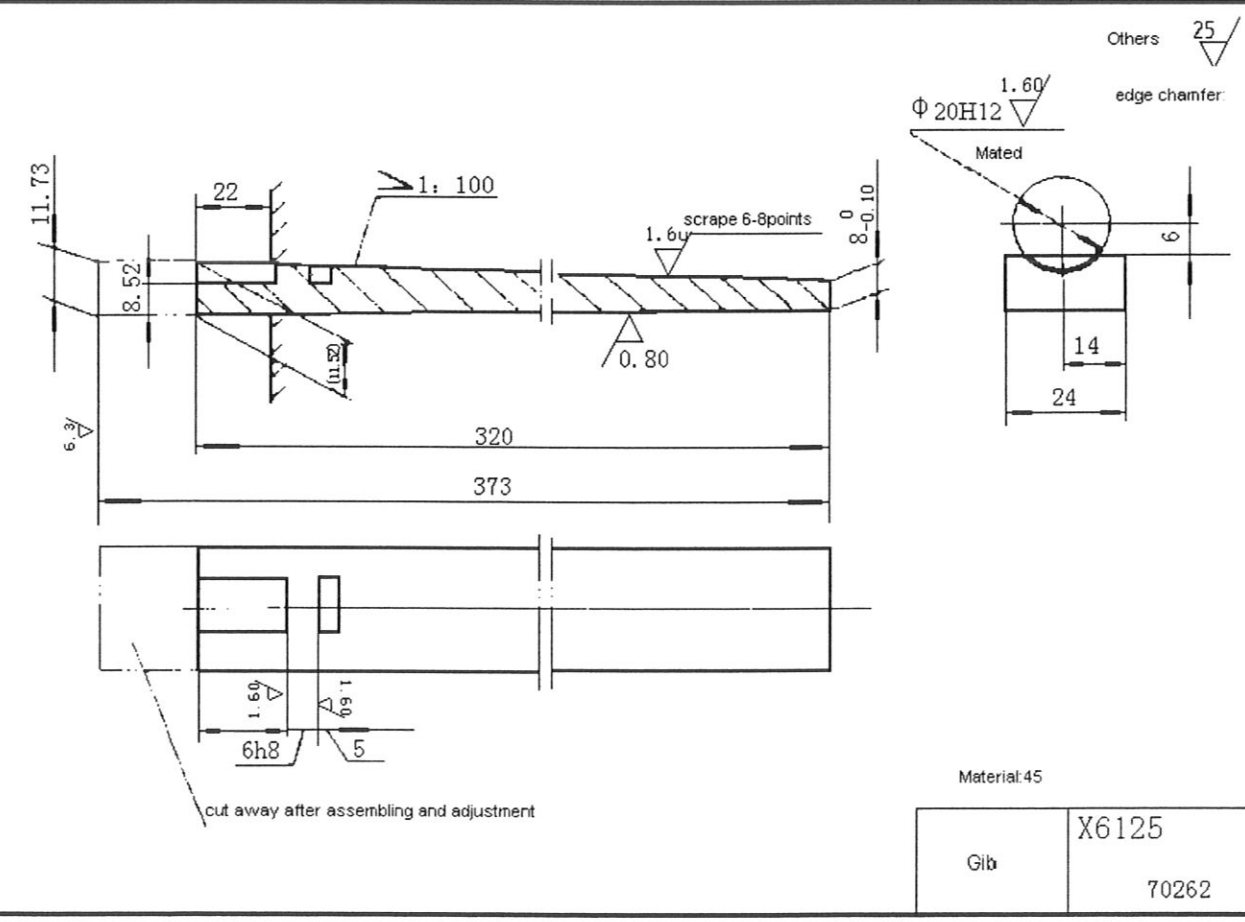
Technical requirement:
1.Thread must be made according to grade 8 of B32-5.
2. Heat treatment: soft nitric gas.
3. Material: HT200

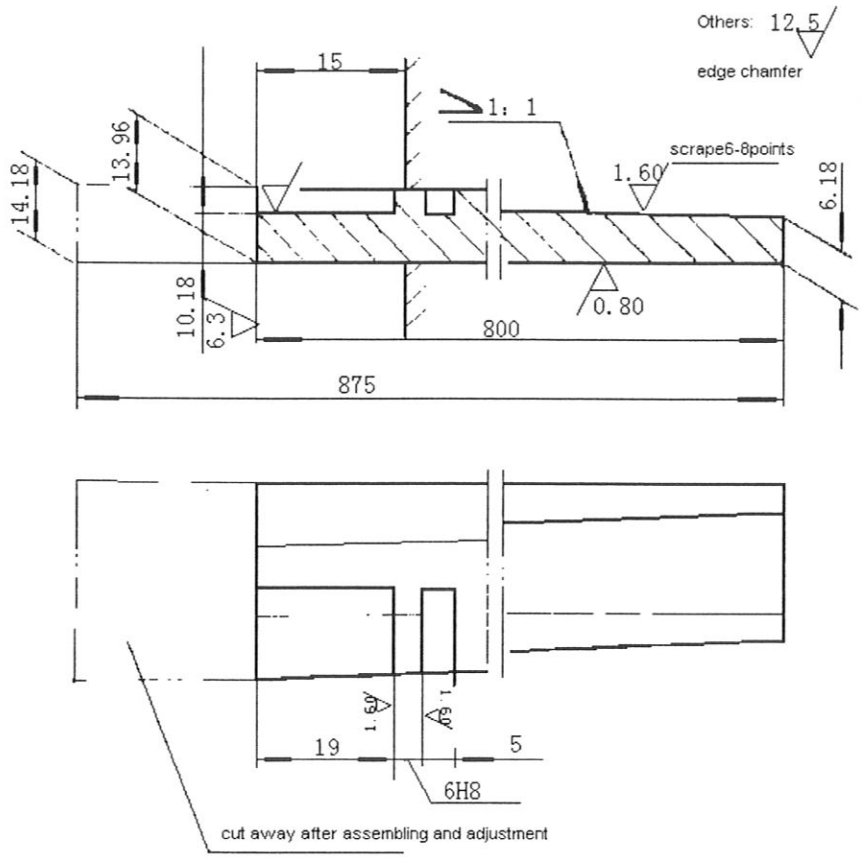
Nut	X6125
	60024


Others: 25
Edge angle: 1×45°
6
Φ5
1.60
3
Φ32H7
Φ33
Φ40js6
3
0.80
6×1
B
Φ5 pit
mated
1.60
6.3
29 -0.1 -0.3
1.60
90°
Φ0.02 B
0.02 B
R1.5
0.5
Material QT50-5
Sleeve
x6125
60042


B:B
10.75
(10.05)
1.60
1:100
Others:
20
0.80
6.3
195
265
Φ20H12
6.3
B
Mated
Others:
25
Chamfer:
6
17.5
30 0 -0.5
B
A
cut away after adjusting
23
6H11
5
6.3
6.3
R4
8
35
3
3
4
oil ditch
50
70
140
R3
2
A:A
Φ3
25
25
2
Material: 45
Gib
X6125
60330A

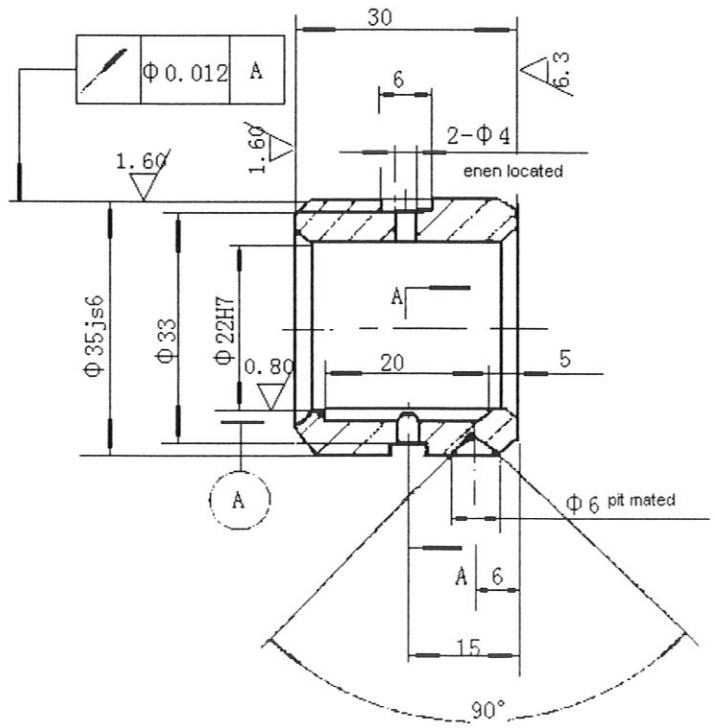

Others: 25
Edge angle: 1×45°
module 2.5
tooth no. 18
press angle 20°
accuracy grade 3-8C
pos. change
even wheel 70201 gear rack
70205 gear rack
30°
65
30°
57
1.60
12.5
0.03 A
30
T32×6
Φ45
Φ50f7
Φ60
2×45°
3×1
0.025 A
2:1
15° ±25'
Φ33 +0.578 0
Φ29 +0.100 0
Φ26 +0.300 0
1.60
6
Technical requirement:
Accuracy of thread must be made according to B grade of B32-5.
Heat treatment: Soft nitric gas
Material:TH200
Nut
X6125
70032


Others 25
edge chamfer
Φ20H12 1.60
Mated
11.73
22
1:100
scrape 6-8points
8-0.10
8.52
1.60
0.80
320
373
6.3
14
24
6
6h8
5
cut away after assembling and adjustment
Material:45
Gib
X6125
70262



Material:45

Gib	X6125 70266A

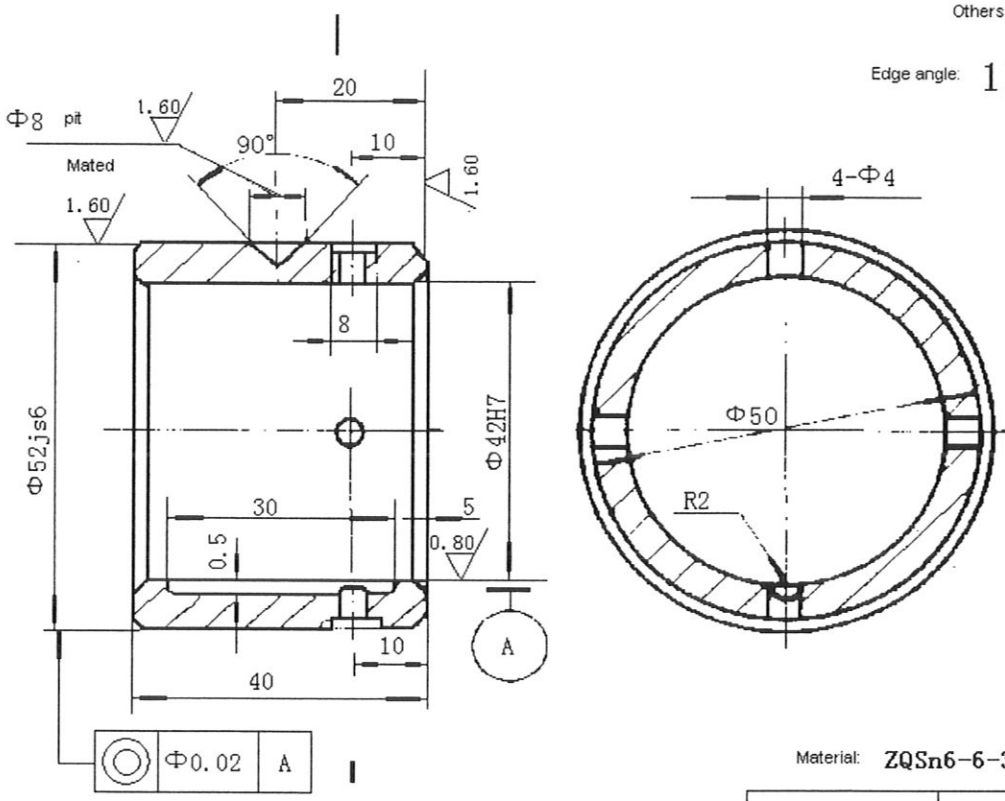


Material ZQSn6-6-3

Supporting sleeve	X6125 70511

Others: 12.5

Edge angle: 1×45°

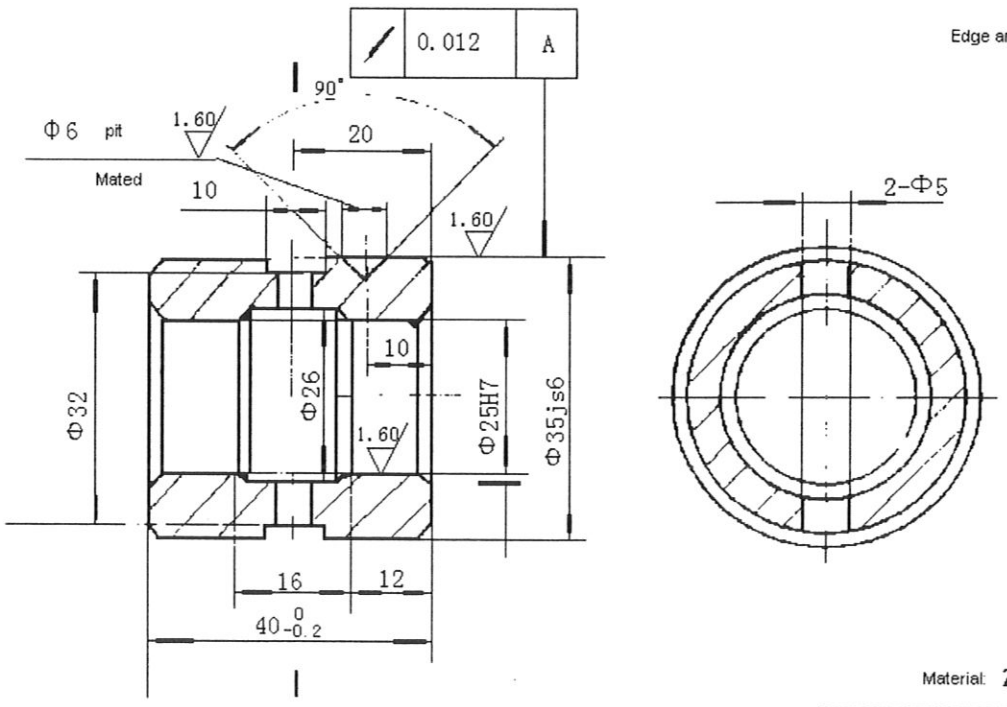


Material: ZQSn6-6-3

Supporting sleeve	X6125 70512

Others: 12.5

Edge angle 1×45°



Material: ZQSn6-6-3

Supporting sleeve	X6125 70513

Series X6230 Universal Rotary-Head Milling Machine CERTIFICATE

Width of Working Table:	**250/300/320 mm**
Length of Working Table:	**1100 mm**
Serial No.:	0582

This machine has been tested in pursuance of receiving conditions and ascertained satisfaction to be delivered.

Director:

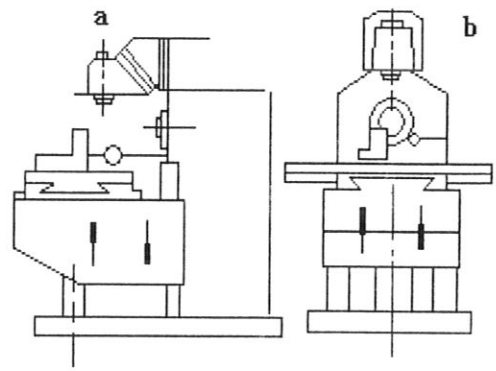
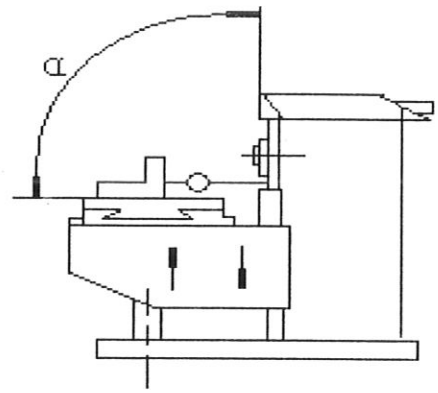
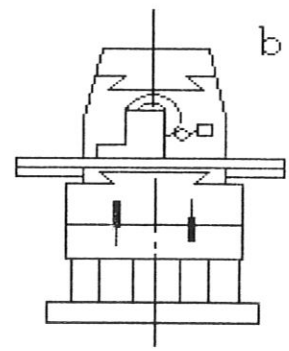
Director of Inspection:

Inspector:

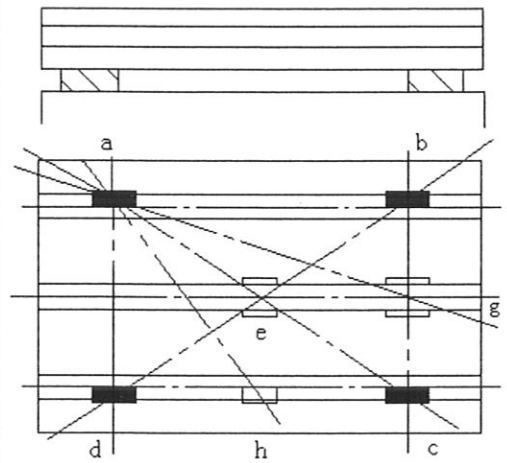
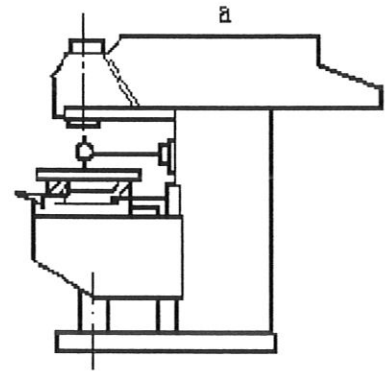
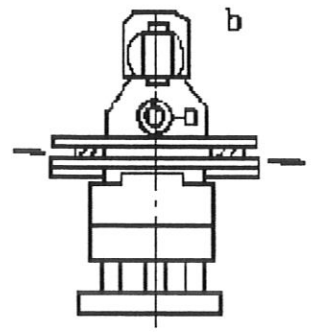
Series X6230	CERTIFICATE	PP12 P.1

Test Specification

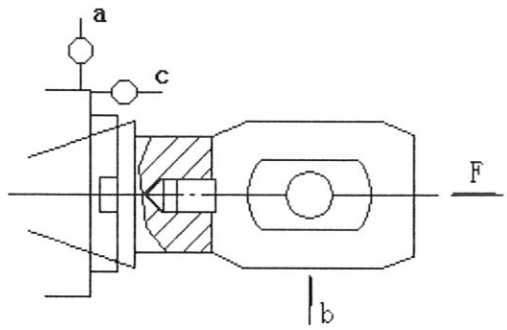
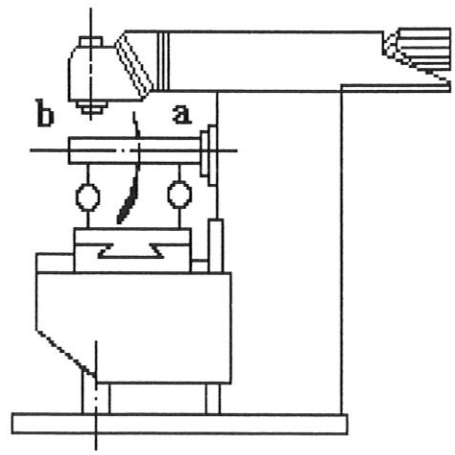
I .Inspection of Geometric Accuracy

No.	Item	Sketch	Accuracy mm	
			Permissible	measured
G1	Straightness of the Knee moving vertically: In the transversal & vertical plane; b. In the longitudinal & vertical plane;		a. The length measured on 300 is	
			0.025	0.01
			b. The length measured on 300 is	
			0.025	0.012
G2	Perpendicularity of working table surface to vertical guide-way of the bed: a. On transversal & vertical plane; b. On longitudinal & vertical plane;	 	a. 0.025/300 $\alpha \leqslant 90°$	a. 0.015 /300 $\alpha \leqslant 90°$
			b. 0.025/300	0.013 /300

Series X6230	CERTIFICATE	PP12 P.2

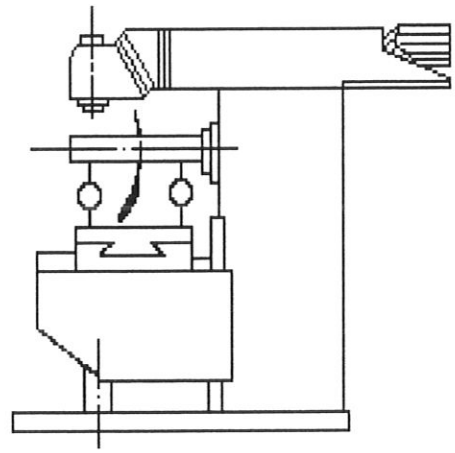
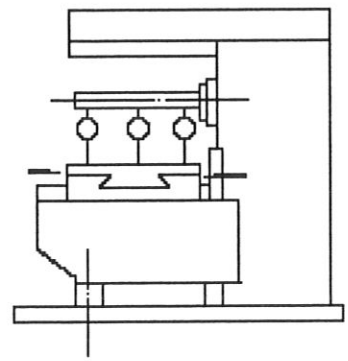
No.	Item	Sketch	Accuracy mm	
			Tolerance	Measured
G4	Plane-ness of Working table surface		0.040 on a length of 1000 permissible value will increase by 0.005 when working table increase 1000. Max. is 0.050	In a length of 1100 0.012
			The local tolerance on any measured length of 300 is :	
			0.020	0.007
G5	Parallelism of working table surface to working table: a.Transversal; b.Longitudinal	 	a. The length measured on any 300 is 0.025	a. The length measured on any 300 is 0.013
			b. The length measured on any 300 is	
			0.025	0.016
			Maximum tolerance:	
			0.050	0.012

Series X6230	CERTIFICATE	PP12 P.3

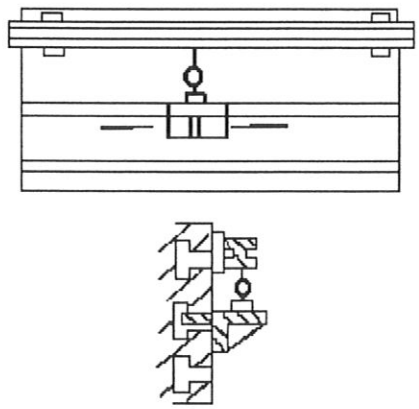
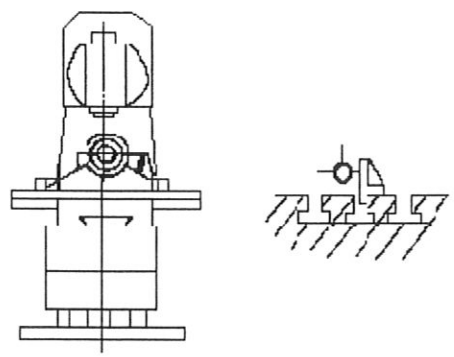
No.	Item	Sketch	Accuracy mm	
			Tolerance	Measured
G6	Face run-out of the spindle a. Radial run-out of spindle neck; b. Axial run-out of the spindle; c. Run-out of spindle shoulder supporting face		a. 0.010	0.005
			b. 0.010	0.005
			c. 0.020	0.01
G7	Radial run-out of spindle taper hole: a. Near the spindle end face b. At 300mm from spindle end face.		a. 0.010	0.005
			b. 0.020	0.015

Series X6230	CERTIFICATE	PP12 P.4

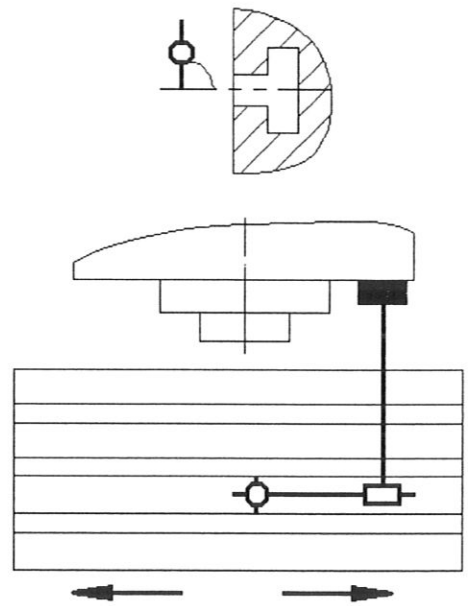
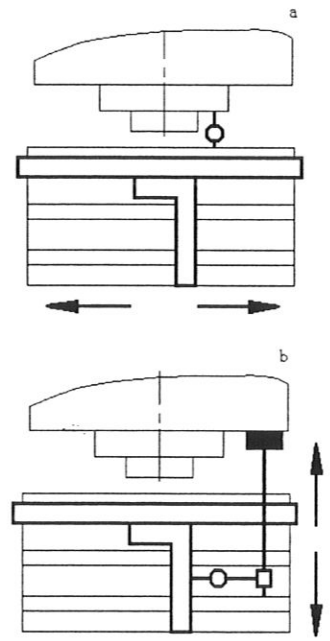
Inspection of working accuracy

No.	Item	Sketch	Accuracy mm	
			Tolerance	Measured
G8	Parallelism of the rotational axis of the spindle to working table surface:		The length measured on any 300 is 0.025 Extension of testing bar should only be downward	The length measure d on length of 300 is 0.015 Extensio n of testing bar should only be down-wa rded
G10	Parallelism of the rotational axis of the transversal movement of working table a. On vertical plane b. On longitudin al plane		a. On measured length of 300	
			0.025 Extension of testing bar should only be downward	0.016
			b. On measured length of 300	
			0.025	0.014

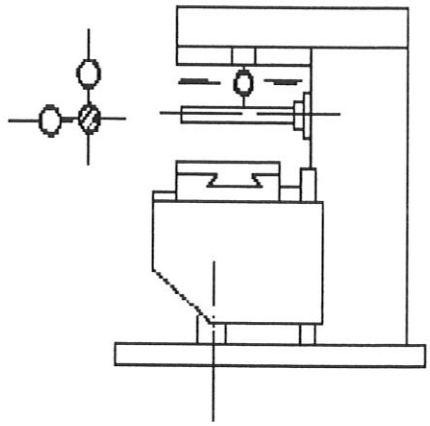
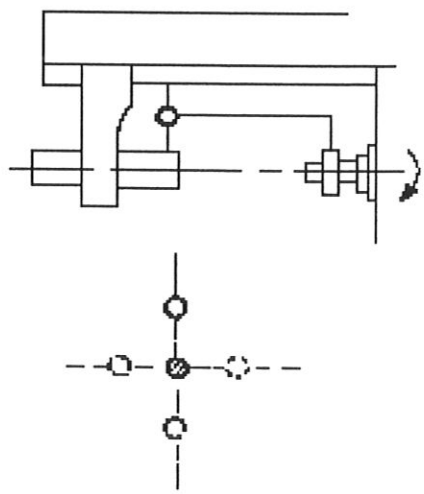
Series X6230	CERTIFICATE	PP12 P.5

No.	Item	Sketch	Accuracy mm	
			Tolerance	Measured
G11	Straightness of the central T-slot of working table		The length measured on any 500 is	
			0.010	0.006
			Max. permissible value is	
			0.030	0.012
G12	Perpendicularity of spindle swivel line to T-slot of working table		0.020/300 （300refers to distance between two measuring points of indicator）	0.015 /300

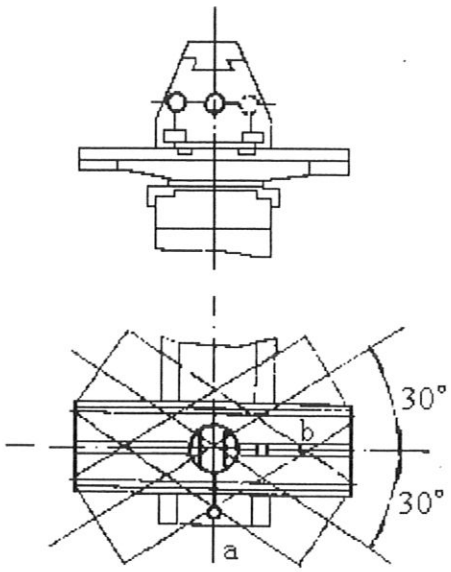
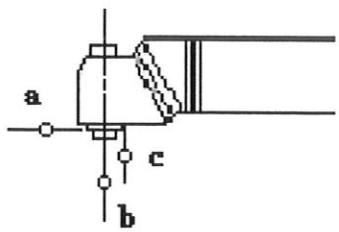
Series X6230	CERTIFICATE	PP12 P.6

No.	Item	Sketch	Accuracy mm Tolerance	 Measured
G13	Parallelism of the central T-slot of working table to vertical working table		Value measured on any length of 300	
			0.015	0.01
			Max. permissible value is	
			0.040	0.018
G14	Perpendicularity of transversal working table to longitudinal working table		0.020/300	0.015 /300

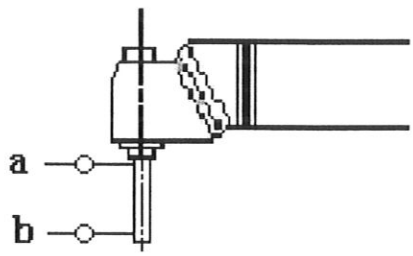
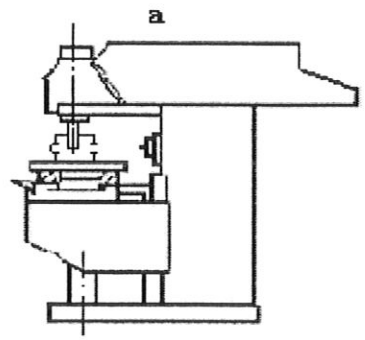
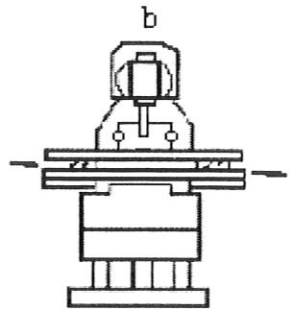
Series X6230	CERTIFICATE	PP12 P.7

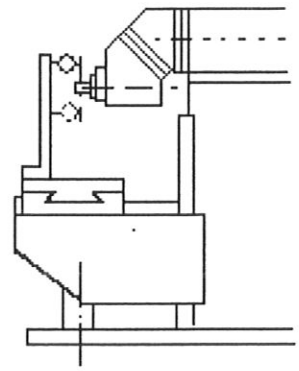
No.	Item	Sketch	Accuracy mm Tolerance	 Measured
G15	Parallelism of over beam guide to spindle swivel line a. On vertical plane b. On longitudinal plane		a. value on measured length of 300 is:	
			0.020 （Extended end of beam can only be downward）	0.015
			b. Value on measured length of 300	
			0.020	0.015
G16	Cohesion of tool holder axial line to spindle swivel line In vertical plane In longitudinal plane		a.0.030 （line of tool holder should be lower than spindle swivel line）	0.02
			b. 0.030	0.02

Series X6230	CERTIFICATE	PP12 P.8

No.	Item	Sketch	Accuracy mm Tolerance	 Measured
G17	Shift of working table swivel center to spindle swivel line and T-slot of working table: a. Shift of spindle swivel line; b. Shift of working table swivel center to T-slot.		a. 0.050	0.03
			b. 0.080	0.06
G18	Run-out of rotary head at spindle end: a. Radial Run-out of spindle neck; b. Axial run-out of the spindle; c. Run-out of spindle shoulder supporting face		a. 0.010	0.005
			b. 0.010	0.005
			c. 0. 020	0.01

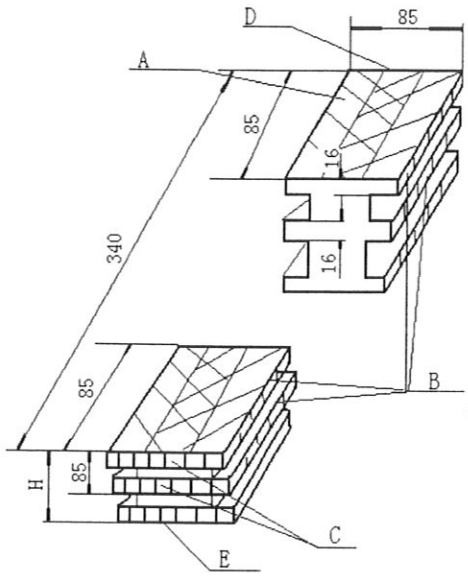
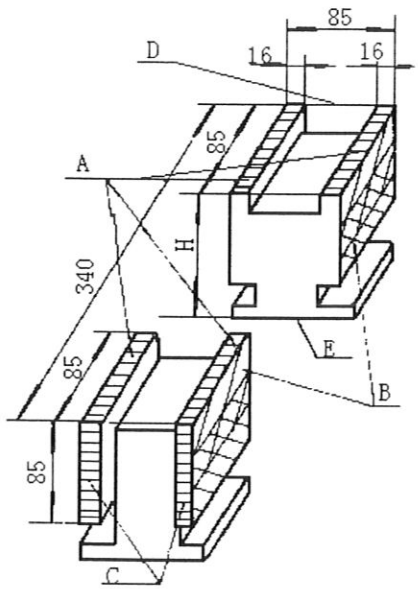
Series X6230	CERTIFICATE	PP12 P.9

No.	Item	Sketch	Accuracy mm	
			Tolerance	Measured
G19	Radial run-out of rotary head spindle taper hole: a. Near the spindle end face b. At 200mm from spindle end face		a. 0.010	0.005
			b. 0.018	0.012
G20	Perpendicularity of swivel line to working table surface: a. On transversal vertical plane; b. On longitudinal vertical plane.	 	a. 0.020/200	0.015
			b. 0.020/200	0.015

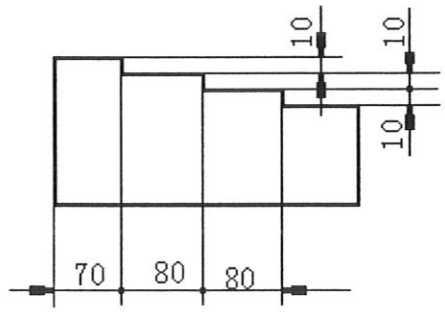
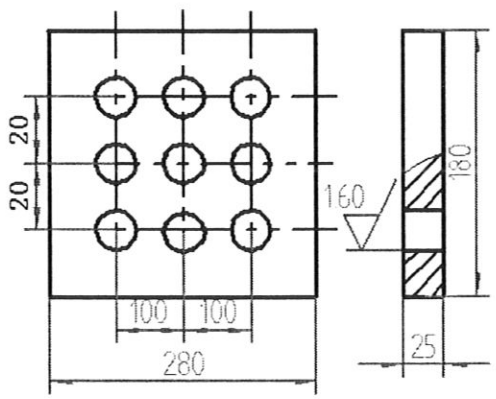
No.	Item	Sketch	Accuracy mm	
No.			Tolerance	Measured
G21			Value on measured length of 200mm is	
			0.020	0.016

II . Inspection of Working Accuracy

Series X6230	CERTIFICATE	PP12 P.11

NO.	Item	Sketch	Accuracy mm	
			Tolerance	Measured
P1	a. Straightness of A side of the test pieces; b. Height difference between the test pieces		a.0.020	0.018
			b.0.030	0.02
			c.0.020/100	0.015 /85
P2	Plane accuracy of horizontal milling machine: a. B plane of each test piece should be flat b. The height of test part H should be equal; c. C&A.A&D should perpendicular to each and they all should perpendicular to B plane		a. 0.020	0.016
			b. 0.030	0.02
			c. 0.020/100	0.014 /85

Series X6230	CERTIFICATE	PP12 P.12

No.	Item	Sketch	Accuracy mm Tolerance	 Measured
P3	Dimension accuracy of digital display milling machine's plane: a. Accuracy on dimension of 10: b. Accuracy on dimension of 80:		a. ±0.020 b. ±0.020	
P4	Pitch accuracy of boring hole:		Value on dimension of 70 and 100 is 0.020	

Material:HT200

Remarks :

1) The working accuracy P3 is only used on digital display milling machine.

2) This certificate is subjected toGB3933-83" Accuracy of Knee-Type Milling Machine" (G1~G17 P1~2) and industry standard QB/QH$_1$11-8 " Supplement of Accuracy of Universal Rotary Head Milling Machine"

3) P3 and P4 are determined by our factory.

Series X6230 Universal Rotary-Head Milling Machine PACKING LIST

Width of Working Table: **250/300/320 mm**

Length of Working Table: **1100 mm**

Serial No.:

Series X6230	PACKING LIST	PP.2 P.1

1 box in total: Box No.1

Size of wooden package: (L×W×H) 207×194×201(cm)

Size of magnesium package: (L×W×H) 212×190×230(cm)

Net weight:

X6225 2200 k

X6230 2350 kg

Gross Weight: (Wooden package) +800 kg

(Magnesium package) +1650 kg

List of package				
No.	Name	Specification	Quantity	Remarks
1	Main machine		1 set	
2	End miller holder spanner	10	1piece	F63-1
3	End miller holder spanner	12	1piece	F63-1
4	End miller handle	22	1 set	F13-1
5	End miller handle	27	1 set	F13-1
6	Archer bolt	M20×500	1 set	J23-8 (includes nut & washer)
7	Vertical handle		1 piece	X6125 60032
8	Longitudinal handle		1 piece	X6125 60029
9	B type belt	B-1245	3 pieces	
10	Cover		3 pieces	X6125 10239
11	Flat miller bar	22×250	1set	F11-2
12	Flat miller bar	27×315	1set	F11-2
13	Tension screw	40×650	1pie.	J20-2A
14	Tension screw		1set	Rotary milling head
15	Operation Manual		1copy	
16	Certificate		1copy	
17	Packing List		1copy	

Table 2 List of special accessories ordered

Choose or not?	No.	Name	Specification	Q'ty	Remarks
	1	Flat cutting pliers	QH160	1	Separate casket
	2	Universal indexing head	100	1	Separate casket
	3	Rotary table	ϕ 250	1	Separate casket
	4	Mid sleeve	3	1	F15-1
	5	Mid sleeve	1	1	F15-2
	6	Mid sleeve	2	1piece	F15-2
	7	Mid sleeve	3	1piece	F15-2
	8	Mid sleeve	4	1piece	F15-2
	9	Moor 2# aiguille shank	2#	1piece	F15-10
	10	Spring collet		1piece	

Remark: Special accessories listed in this table should be paid by the customers separately. And please mark with " √ "if you choose.

Packer : 马银林

Inspector :

Date: 08.11

Index

1 General introduction

This series of machines include the following products:

X6225、X6225/1、X6225/3、X6225/5

X6230、X6230/1、X6230/3、X6230/5、XQ6232

Digital display device can be equipped with all these machines if customers reuired,and power capacity is11KWA。

1.1 Electric control of the machine

1.1.1 General introduction of the machine's electric control elementary

The machine's electrical control system provides power supply according to the voltage class and frequency related. by closing the main power switch=D01-QF10,the machine's electrical system will attain power and the indicating light =D01-HL20 will be on .and by means of control transformer =D01-TC10,its secondary side will gain ～110V voltage needed by the control circuit;～6V,～24V voltage needs by signal light and working light;～27V voltage needs by electro-magnetic clutch, and as well as～56V voltage needed by braking circuit of spindle electromotor.

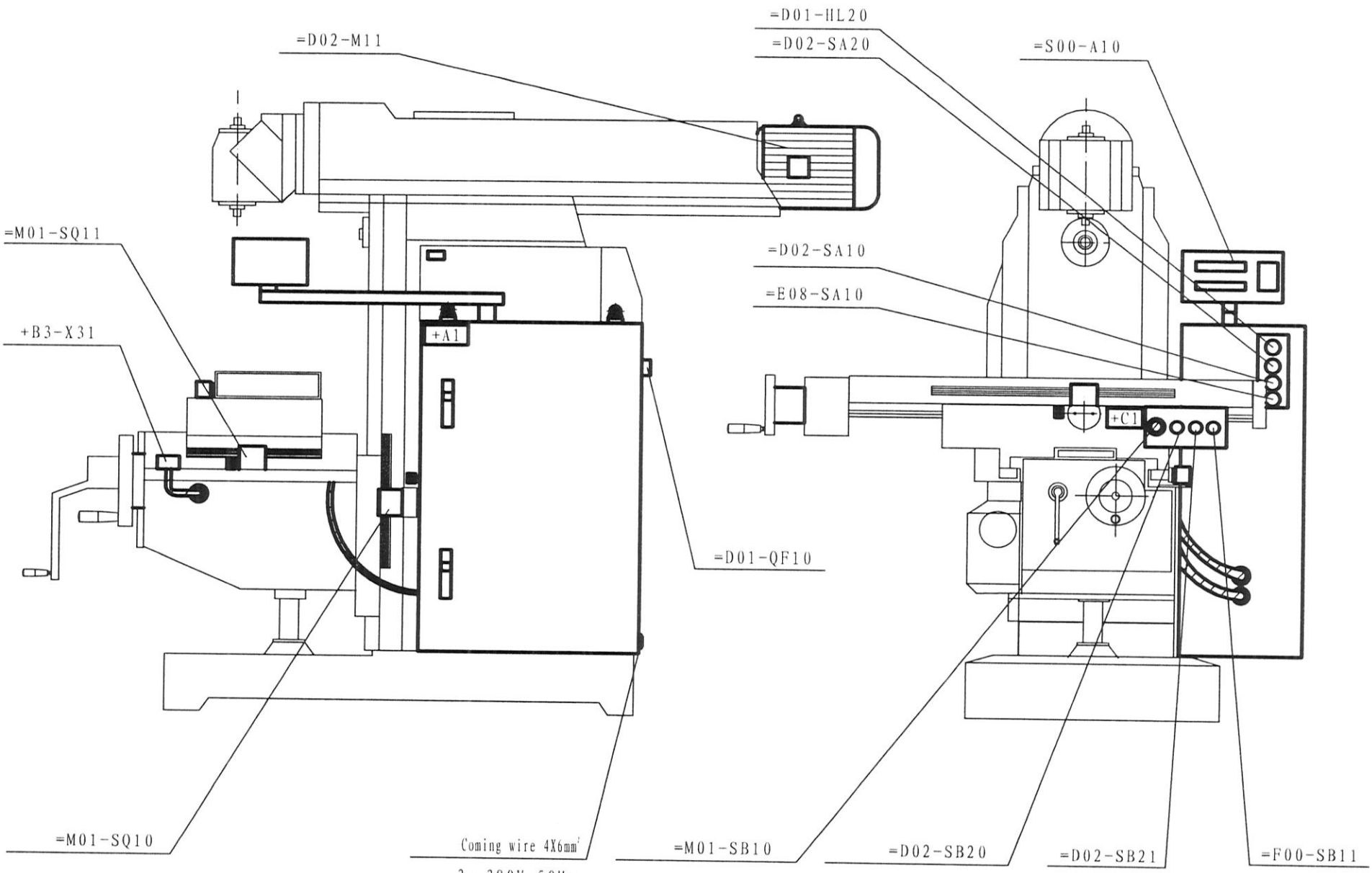
1.1.2 Spindle start

The spindle of this series of machine is driven by =D02-M10 . the working status of the spindle is selected by spindle motor's CW rotation-Stop-CCW rotation. And the spindle speed is selected by manipulator, and after finishing all selections above mentioned, press button =D02-SB21, the spindle will start immediately.

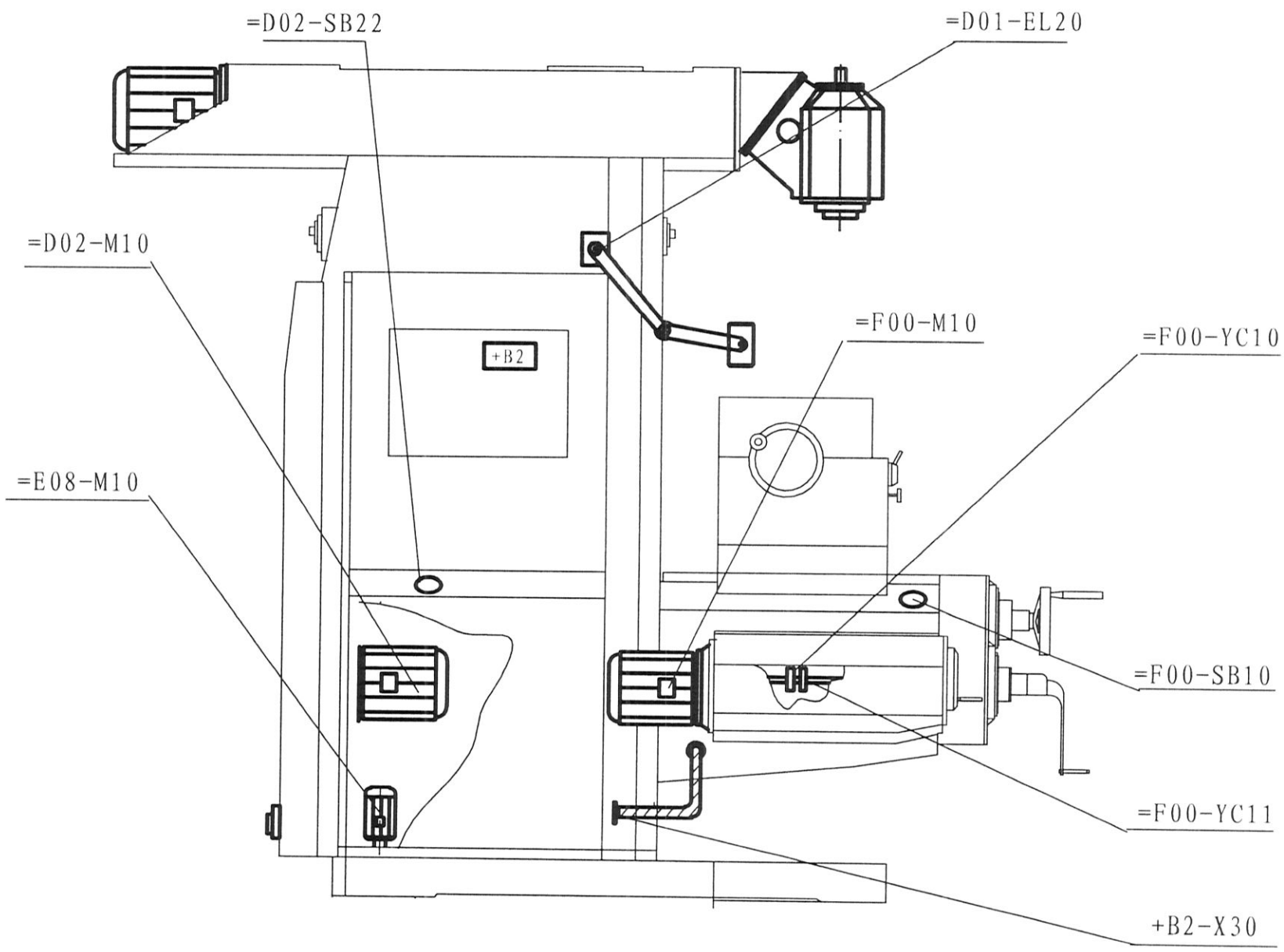
1.1.3 Feed start

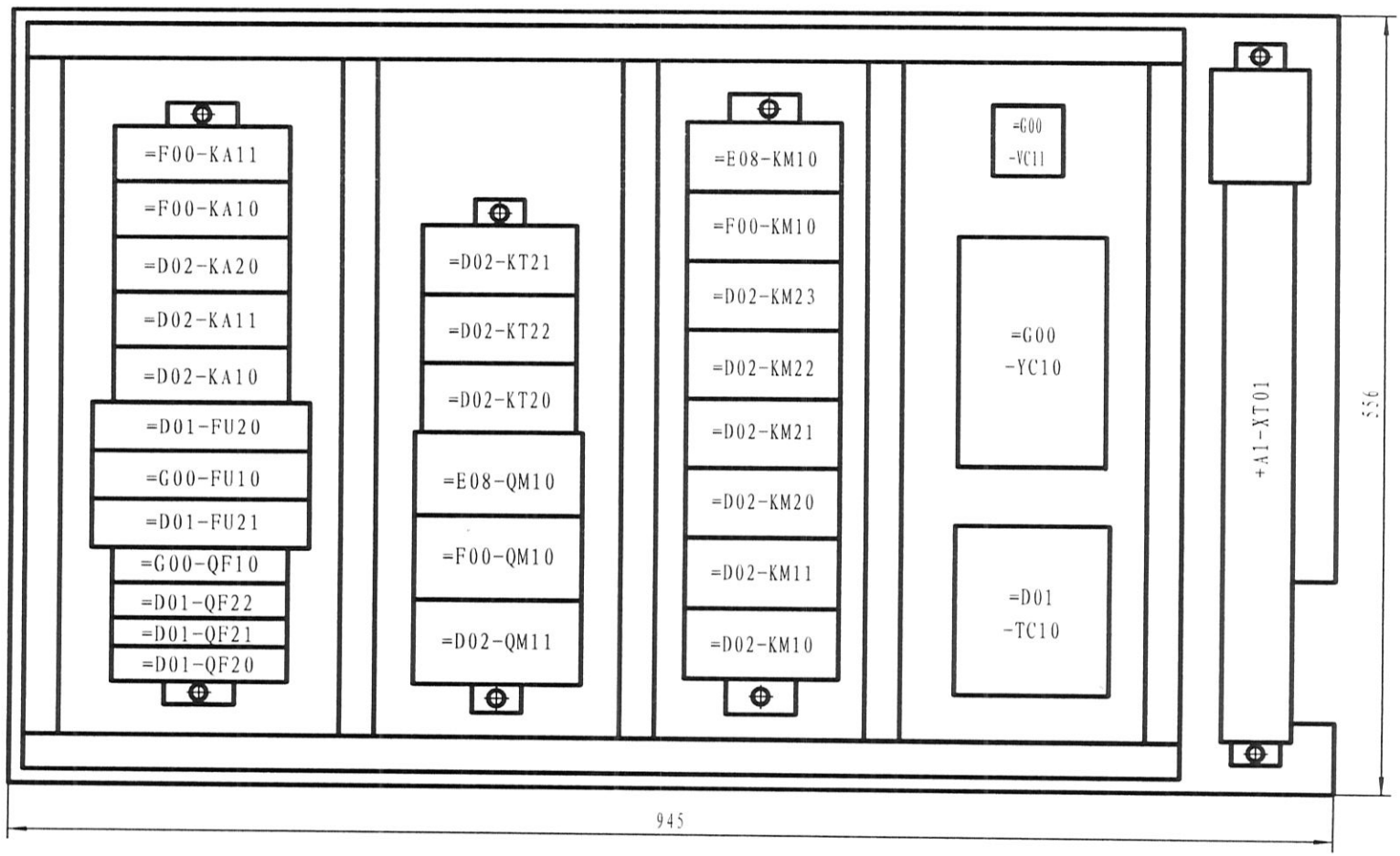
Pressing the button=D02-SB21, the spindle will start first, and after a period of delay, the feed will start, and the feed direction of working table and the knee are controlled by the handle of the manipulator. Continuous feed or rapid feed is controlled by the electro-magnetic clutch. =F00-YC10、=F00-YC11.

1.1.4 Spindle feed & jogging button
Spindle jogging button is =D02-SB22 (the spindle will stop freely after spindle jogging) , Feed jogging button is =F00-SB10, and rapid movement button being =F00-SB 11.
1.1.5 Stop of the machine
After pressing button =D02-SB20, both the coolant and feed system will stop working, the spindle will conduct an energy consumption braking after a period of delay, and its braking time will be regulated by the time relay =D02-KT20, while pressing the emergency stop button =M 01-SB10, all actions of the machine will be cut off (the spindle will stop automatically).
1.1.6 Start-up of the coolant system
The coolant pump motor =E08-M10 is controlled by the knob =E08-SA10.
before cleaning the dust.



Note: =S00-A10 is only available for machine with digital display device.


=D02-SB22
=D01-EL20
=D02-M10
=F00-M10
=F00-YC10
+B2
=E08-M10
=F00-SB10
=F00-YC11
+B2-X30


=F00-KA11
=F00-KA10
=D02-KA20
=D02-KA11
=D02-KA10
=D01-FU20
=G00-FU10
=D01-FU21
=G00-QF10
=D01-QF22
=D01-QF21
=D01-QF20
=D02-KT21
=D02-KT22
=D02-KT20
=E08-QM10
=F00-QM10
=D02-QM11
=E08-KM10
=F00-KM10
=D02-KM23
=D02-KM22
=D02-KM21
=D02-KM20
=D02-KM11
=D02-KM10
=G00
-VC11
=G00
-YC10
=D01
-TC10
+A1-XT01
556
945

4 Explaination on the operation symbols

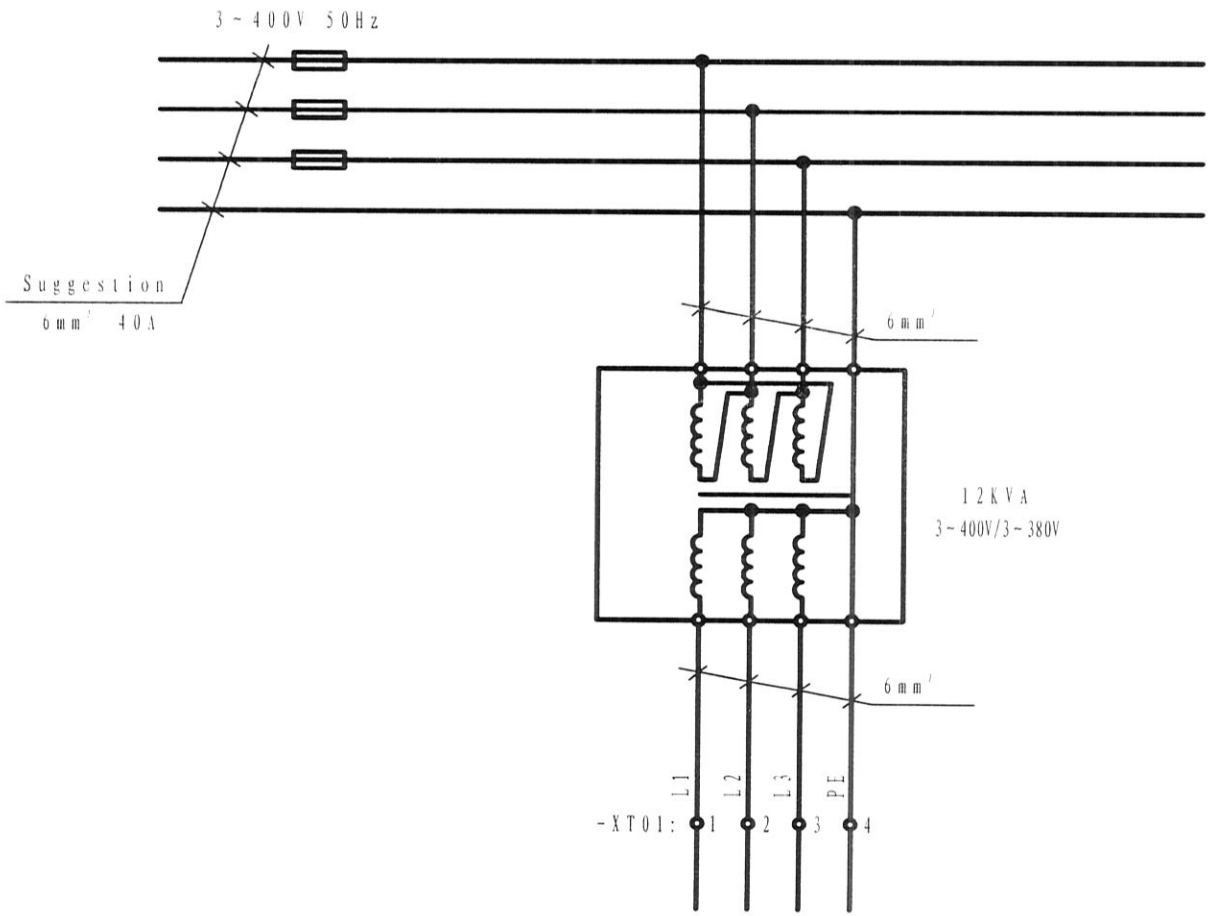
No.	Symbol	Explaination	Code
1		Spindle jogging	=D02-SB22
1		Feed jogging	=F00-SB10
1		Stop	=D02-SB20
1		Start	=D02-SB21
1		Rapid movement	=F00-SB11
1		Indicator light of the power	=D01-HL20
1		Direction of spindle motor Stop CW rotation CCW rotation	=D02-SA20
1		Coolant pump Stop Start	=E08-SA10

No.	Part No.	Model	Name	Specification	Q'ty	Manufacturer
1	=D01-TC10	JBK5-800	Control transformer	Primary side: ~380V, 50Hz, 800VA Secondary side: ~6V/12VA; ~24V/48VA; ~27V/120VA; ~36V/350VA; ~110V/120VA; ~220V/150VA	1	Wuxi Fuji Electrical Apparatus Co., Ltd.
2	=D01-QF10	JFD11-63/300011	Load breaker	63A, class3, Panel mounting with iron enclosure, and protection class is IP40	1	JUCHE Electrical Apparatus Co., Ltd.
3	=D02-M10	Y122M-4-B5	AC Electromotor	3~380V, 50Hz, 4KW, 8.8A, 1440r/min	1	Nantong Yuandong Weite Motor Factory
4	=D02-M11	Y100L1-4-B5	AC Electromotor	3~380V, 50Hz, 2.2KW, 5A, 1420r/min	1	Nantong Yuandong Weite Motor Factory
5	=F00-M10	Y90S-4-B5	AC Electromotor	3~380V, 50Hz, 1.1KW, 2.8A, 1400r/min	1	Nantong Yuandong Weite Motor Factory
6	=E08-M10	AB-12	Coolant pump motor	3~380V, 50Hz, 40W, 0.24A, 2800r/min	1	Nantong Yuandong Weite Motor Factory
7	=D02-SB20	LA39-11/K-22	Button	Round, 1 open, 1 close, Black ϕ22 openning	1	Shanghai Ergong (APT) Machine Tool Electrical Apparatus Factory
8	=D02-SB22	LA19-11	Button	Round, 1 open, 1 close, Black ϕ22 openning	1	Tianshui 213 Machine Tool Electrical Apparatus Plant
9	=F00-SB10	LA19-11	Button	Round, 1 open, 1 close, Black ϕ22 openning	1	Tianshui 213 Machine Tool Electrical Apparatus Plant
10	=F00-SB11	LA39-11/K-22	Button	Round, 1 open, 1 close, Black ϕ22 openning	1	Shanghai Ergong (APT) Machine Tool Electrical Apparatus Factory
11	=D02-SB21	LA39-22/W-22	Button	Round, 1 open, 1 close, Black ϕ22 openning	1	Shanghai Ergong (APT) Machine Tool Electrical Apparatus Factory
12	=M01-SB10	LA39-11Z/R-22	Emergency stop buttom	ϕ40 Red mushroom head, with self-lock, and ϕ22 openning	1	Shanghai Ergong (APT) Machine Tool Electrical Apparatus Factory
13	=D01-EL20	JC10-1	Working light	~24V, 40W	1	Shanghai Xinhua Laterns Factory
14	=F00-YC10	DLM3-5	Electro-magnetic clutch	~24V, 5Kg, 1.34A	1	Tianjin Machine Tool Electrical Apparatus Plant
15	=F00-YC11	DLM3-2.5	Electro-magnetic clutch	~24V, 2.5Kg, 0.67A	1	Tianjin Machine Tool Electrical Apparatus Plant
16	=M01-SQ10	LXW2-11	Jiggle switch	1 open, 1 close	1	Beijing No.1 Machine Tool Electrical Apparatus Plant
17	=M01-SQ11	LXW2-11	Jiggle switch	1 open, 1 close	1	Beijing No.1 Machine Tool Electrical Apparatus Plant
18	=E08-SA10	LA39-22X/K-22	Knob	2 position knob, ϕ22openning hole, black	1	Shanghai Ergong (APT) Machine Tool Electrical Apparatus Factory
19	=D02-SA10	LA39-22X/K-22	Knob	3 position knob, ϕ22 openning hole, black	1	Shanghai Ergong (APT) Machine Tool Electrical Apparatus Factory
20	=D02-SA20	LA39-22X/K-22	Knob	3 position knob, ϕ22 openning hole, black	1	Shanghai Ergong (APT) Machine Tool Electrical Apparatus Factory

No.	Piece No.	Model	Name	Specification	Quantity	Manuafacturer
21	=D01-HL20	XD12	Signal light	Ivory ~6V	1	Shanghai Lixin Electrical Apparatus Plant
22	=D02-QM10	GHM611-4204	AC electromotor protection switch	6.3-10A	1	Suzhou Electro Equipment Plant
23	=F00-QM10	GHM611-3304	AC electromotor protection switch	2.5-4A	1	Suzhou Electro Equipment Plant
24	=E08-QM10	GHM611-1304	AC electromotor protection switch	0.25-0.4A	1	Suzhou Electro Equipment Plant
25	=D02-QM11	GHM611-4204	AC electromotor protection switch	4-6.3A	1	Suzhou Electro Equipment Plant
26	=D01-QF20	DZ47-63	Breaker	Double poles 5A	1	JUCHE Electrical Apparatus Co., Ltd.
27	=D01-QF21	DZ47-63	Breaker	Single pole 3A	1	JUCHE Electrical Apparatus Co., Ltd.
28	=D01-QF22	DZ47-63	Breaker	Single pole 15A	1	JUCHE Electrical Apparatus Co., Ltd.
29	=G00-QF10	DZ47-63	Breaker	Single pole 30A	1	JUCHE Electrical Apparatus Co., Ltd.
30	=D02-KM20	CJX1-12/22	AC contactor	Coil voltage: ~110V, 9A, 2 open, 2 close	1	JUCHE Electrical Apparatus Co., Ltd.
31	=D02-KM21	CJX1-12/22	AC contactor	Coil voltage: ~110V, 9A, 2 open, 2 close	1	JUCHE Electrical Apparatus Co., Ltd.
32	=D02-KM22	CJX1-12/22	AC contactor	Coil voltage: ~110V, 9A, 2 open, 2 close	1	JUCHE Electrical Apparatus Co., Ltd.
33	=D02-KM23	CJX1-12/22	AC contactor	Coil voltage: ~110V, 9A, 2 open, 2 close	1	JUCHE Electrical Apparatus Co., Ltd.
34	=F00-KM10	CJX1-12/22	AC contactor	Coil voltage: ~110V, 9A, 2 open, 2 close	1	JUCHE Electrical Apparatus Co., Ltd.
35	=E08-KM10	CJX1-9/22	AC contactor	Coil voltage: ~110V, 9A, 2 open, 2 close	1	JUCHE Electrical Apparatus Co., Ltd.
36	=D02-KM10	CJX1-22/22	AC contactor	Coil voltage: ~110V, 12A, 2 open, 2 close	1	JUCHE Electrical Apparatus Co., Ltd.
37	=D02-KM11	CJX1-22/22	AC contactor	Coil voltage: ~110V, 12A, 2 open, 2 close	1	JUCHE Electrical Apparatus Co., Ltd.
38	=D02-KA10	JZC1-44	Mid relay	Coil: ~110V, 1 open, 3 close	1	JUCHE Electrical Apparatus Co., Ltd.
39	=D02-KA11	JZC1-44	Mid relay	Coil: ~110V, 1 open, 3 close	1	JUCHE Electrical Apparatus Co., Ltd.
40	=D02-KT21	JK4-222d	Time delay relay	~110V, Electrify delay 0.1-30S	1	Tianshui 213 Machine Tool Electrical Apparatus Plant

No.	Part No.	Model	Name	Specification	Q'ty	Manufacturer
41	=D02-KA20	JZC1-44	Mid relay	Coil: ~110V, 9A, 2 open,2 close	1	JUCHE Electrical Apparatus Co.,Ltd.
42	=F00-KA10	JCZ1-44	Mid relay	Coil: ~110V, 9A, 2 open,2 close	1	JUCHE Electrical Apparatus Co.,Ltd.
43	=F00-KA11	JZC1-44	Mid relay	Coil: ~110V, 9A, 2 open,2 close	1	JUCHE Electrical Apparatus Co.,Ltd.
44	=D02-KT20	JK4-322d	Time delay relay	~110V, Electrify delay 0.1-30S	1	Tianshui 213 Machine Tool Electrical Apparatus Plant
45	=D02-KT22	JK4-322d	Time delay relay	~110V, Electrify delay 0.1-30S	1	Tianshui 213 Machine Tool Electrical Apparatus Plant
46	=G00-VC10	QL250C	Bridge type Commutator	40A,400V Square	1	Hengyang Semi-Conductor Factory
47	=G00-VC11	ICQ-6B	Bridge type Commutator	5A,100V Square	1	Hengyang Semi-Conductor Factory
48	=D01-FU20	RT18-32X/4	Fuse	4A	1	Beijing Machine Tool Electrical Apparatus Plant
49	=D01-FU21	RT18-32X/2	Fuse	2A	1	Beijing Machine Tool Electrical Apparatus Plant
50	=G00-FU10	RT18-32X/2	Fuse	2A	1	Beijing Machine Tool Electrical Apparatus Plant
51	=S00-A10	GSJ25B	Digital display device		1	Yunnan Electro Equipment Plant
52	+A1-XT01	JH6-B-2.5/4,2.5G-2.5JD/10, -2.5/14-2.5L/3,-2.5/2-2.5L/6,-2.5L/6,-2.5/9-2.5/2,-2.5/1-2.5L/2,-2.5-2.5L/2,2.5G	Calipers	Model G32standard calipers with a length of 410MM	1	Chengdu Low Voltage Electrical Apparatus Plant

No.	Piece No.	Model	Specification	Manufacturer
1	Button	LA39-11/K	Round, 1 open, 1 close, black ϕ22 openning hole	Shanghai APT Machine Tool Electrical Apparatus Plant
2	Button	LA19-11	Round, 1 open, 1 close, black ϕ22 openning hole	Tianshui 213 Machine Tool Electrical Apparatus Plant
3	Button	LA39-22/W-22	Round, 1 open, 1 close, black ϕ22 openning hole	Tianshui 213 Machine Tool Electrical Apparatus Plant
4	Emergency stop button	LA39-11Z/R-22	ϕ40 Red mushroom head with self-lock ϕ22 openning hole	Tianshui 213 Machine Tool Electrical Apparatus Plant
5	Working light	Suitable for JC10-1 Latern seat	~24V, 40W	Shanghai Xinhua Laterns Apparatus Plant
6	Knob	LA39-22X/K-22	2 position knob, ϕ22 openning hole, black	Shanghai APT Machine Tool Electrical Apparatus Plant
7	Knob	LA39-22XS/K-22	3 position knob, ϕ22 openning hole, black	Shanghai APT Machine Tool Electrical Apparatus Plant
8	Signal light	XD12	Ivory ~6V	Tianshui 213 Machine Tool Electrical Apparatus Plant
9	Fuse core	Suitable for RT18-32/2	2A	Beijing Machine Tool Electrical Apparatus Plant
10	Fuse core	Suitable for RT18-32/4	4A	Beijing Machine Tool Electrical Apparatus Plant
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				


3~400V 50Hz
Suggestion
6mm² 40A
6mm²
12KVA
3~400V/3~380V
6mm²
L1
L2
L3
PE
-XT01: 1 2 3 4

SERIES X6225 UNIVERSAL ROTARY- HEAD .MILLING MACHINE

ELECTRIC ELEMENTARY CHART

2008.09

Drawing No. 90000/1

Func. code

No.	Code	Name	Page No.	No.	Code	Name	Page No.
1	=A01	Code index of electric equipment	1	10	=B08	List of electric equipment	3
2	=A03	Electric mounting position drawing of the machine	2	11	=B09	List of easy-worn & spare parts	1
3	=A03.1	Mounting Position of digital display device of the bed.	2	12	=D01	Circuir dragram of AC power supply	2
4	=A03.2	Mounting Position of digital display device	1	13	=D02	Circuit diagram of AC main driving system	2
5	=A04	Electricity mounting position of electric cabinet	2	14	=E08	Circuit diagram of coolant driving system	1
6	=A05	Electricity mounting position of power distribution panel	1	15	=F00	Circuit diagram of AC feed drive sytem	1
7	=B00	Electric inter-connection diagram	2	16	=G00	Circuit diagram of commutating device	1
8	=B04	Chart of lead & cable	1	17	=M01	Circuit diagram of emergency stop& monitoring protection	1
9	=B05	Wiring list	3	18	=S00	Circuit diagram of digital display device	1

Position code

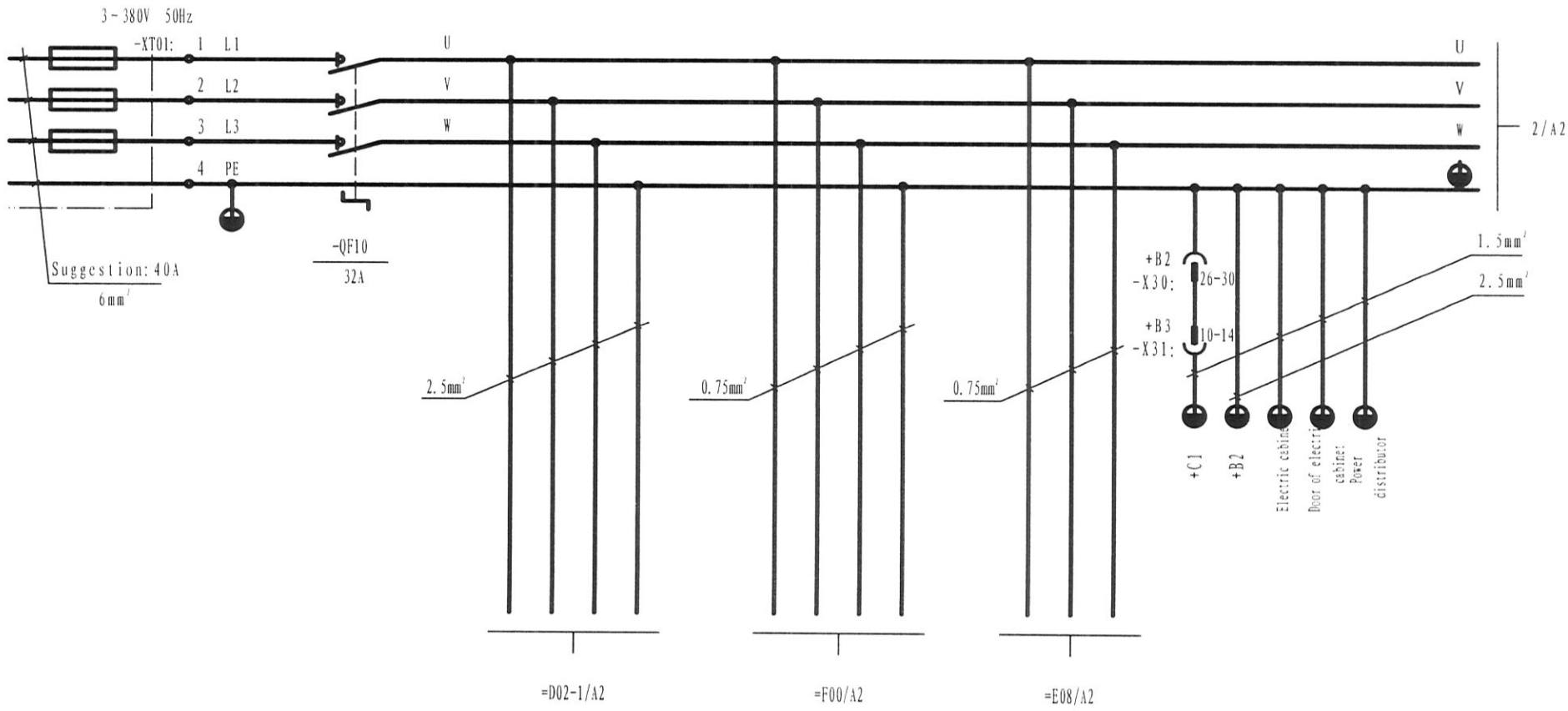
No.	Code	Part name	Rmks.
1	+A1	Electric cabinet	
2	+B2	Base, Bed	
3	+B3	Table, Knee, Slide	
4	+B5	Spindle box(Slide)	
5	+C1	Operation panel, Console, Hanging set	

Mark	Locate No.	Change document No.	Signiture	Date	Mark	Locate No.	Change document No.	Signiture	Date

Designer		Code index of electric equipment	=A01	Technology consultant	
Checker				Criterion consultant	
Designer in charge		SERIES X6225UNIVERSAL ROTARY-HEAD MILLING MACHINE		Scale	
Design leader				PP. 1	P. 1
Director				90000/1	
Mark					

Drawing No. 90000/2

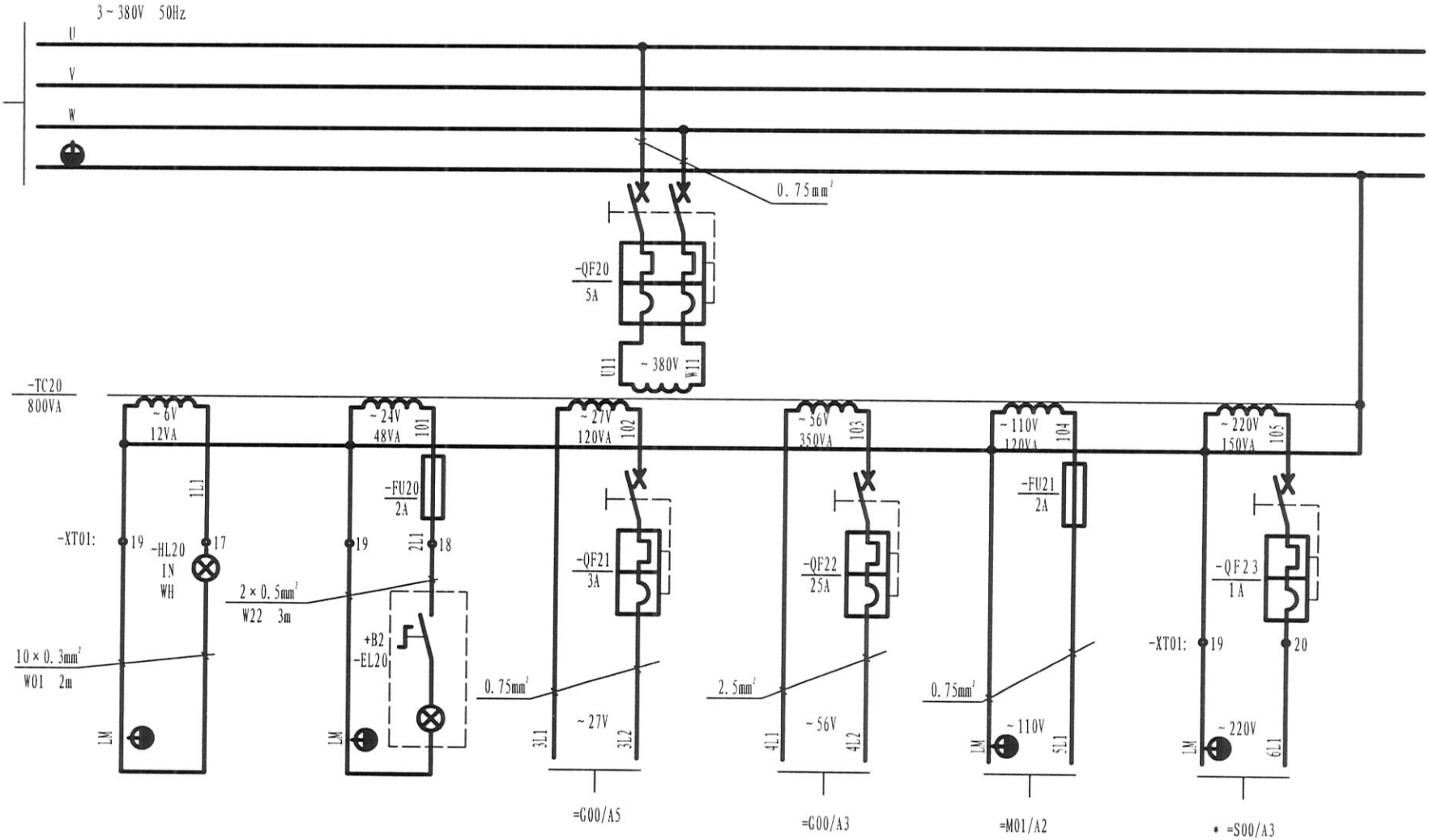
Power on Users' side	Switch of main power supply	Spindle power supply	Feed power supply	Coolant power	Protection grounding



Mark	Locate No.	Change document No.	Signiture	Date	Mark	Locate No.	Change document No.	Signiture	Date	

Designer		Circuit Diagram of AC Power	=D01	Technology consultant:
Checker			+A1	Criterion consultant:
Designer in charge		SERIES X6225UNIVERSAL ROTARY-HEAD MILLING MACHINE		Scale
Design leader				PP. 2 P. 1
Director				90000/2
Mark				

Drawing No. 90000/2	transistor power supply	Machine's light	Power of clutch	Power of spindle feed brake	Power of control circuit	Power of digital display device



Others: 0.5mm²

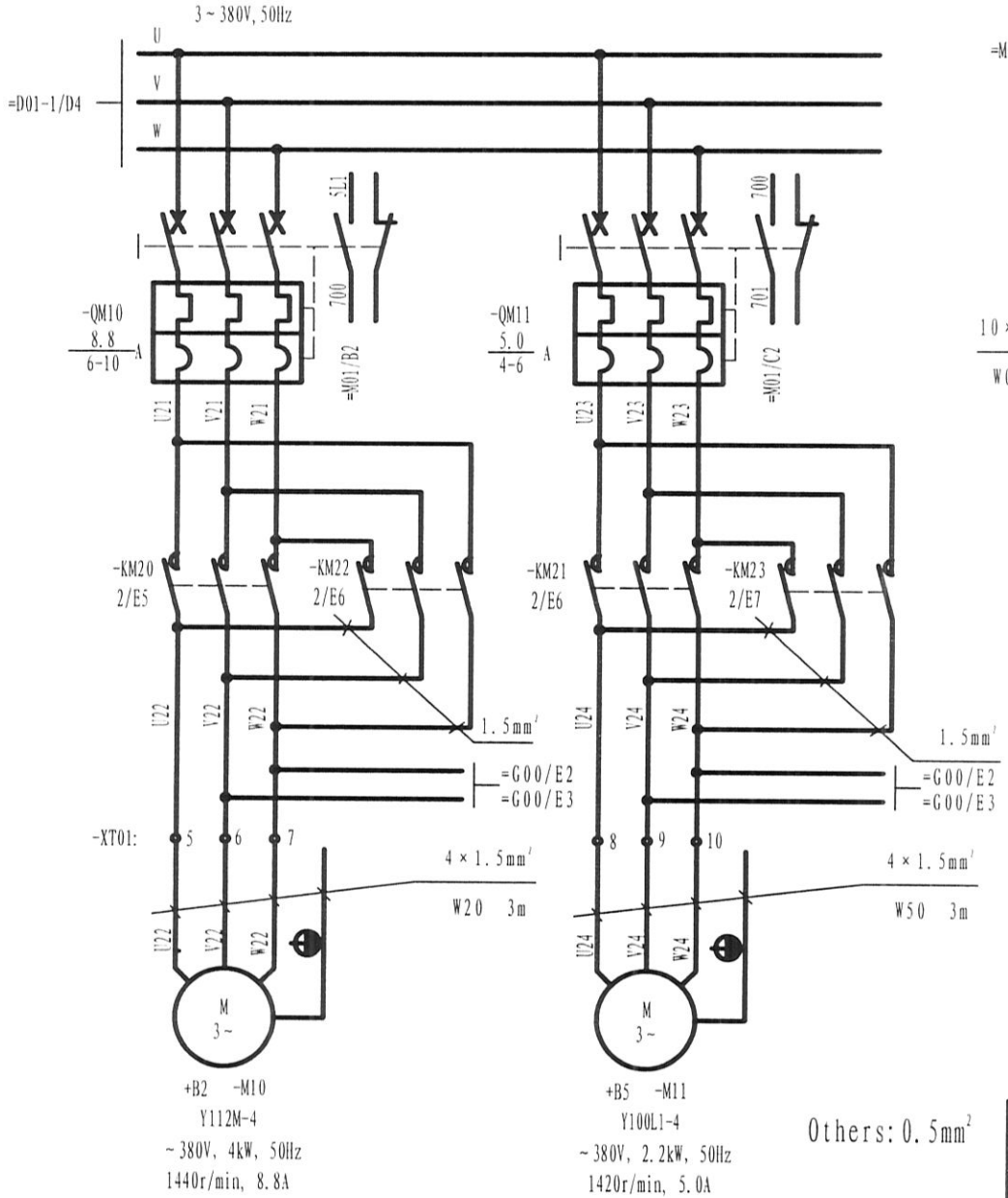
Note: * is equipped while required by the user.

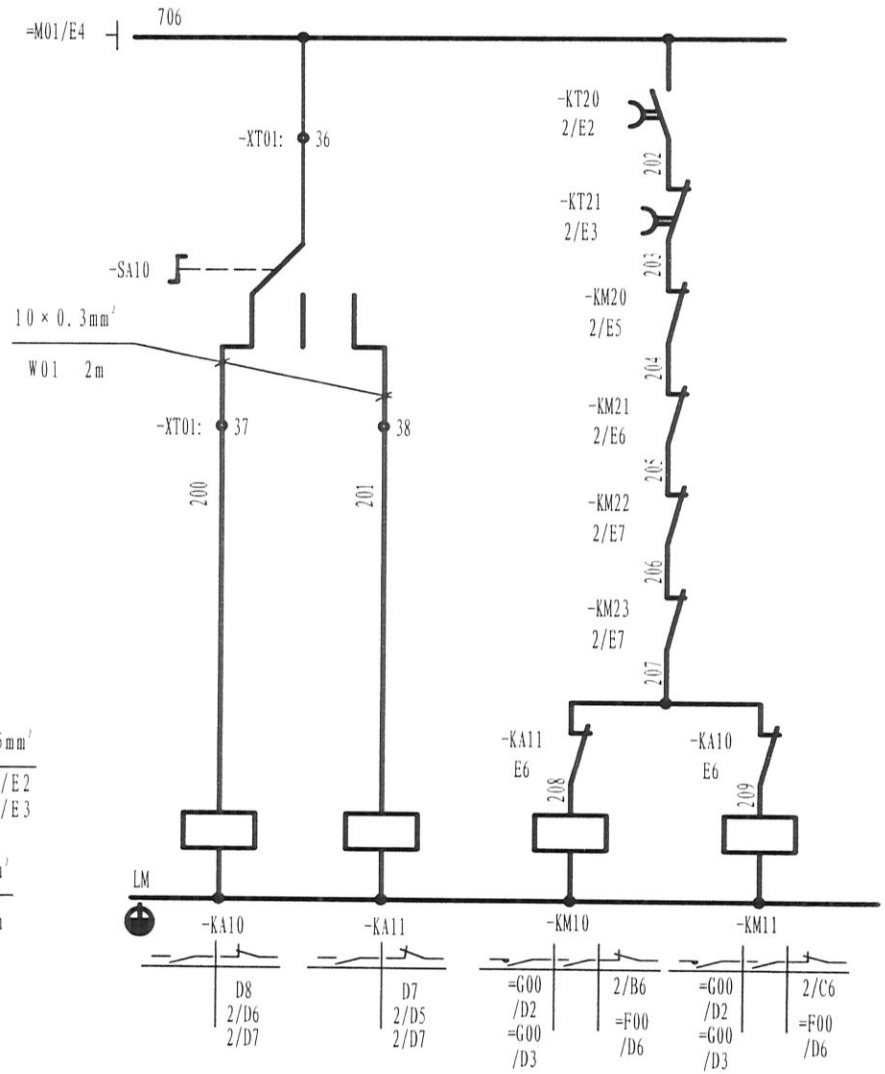
Designer		Circuit Diagram of AC Power	=D01	Technology consultant	
Checker			+A1	Criterion consultant	
Designer in charge		SERIES X6225UNIVERSAL ROTARY-HEAD MILLING MACHINE		Scale	
Design leader				PP. 2	P. 2
Director				90000/2	
Mark					

Mark	Locate No.	Change document No.	Signiture	Date	Mark	Locate No.	Change document No.	Signiture	Date

Drawing No. 90000/3

Spindle motor of horizontal milling machine		Spindle motor of vertical milling machine		Selection of spindle motor			Spindle motor braking	
CW rotation	CCW rotation	CW rotation	CCW rotation	horizontal	vertical horizontal	vertical	horizontal	vertical



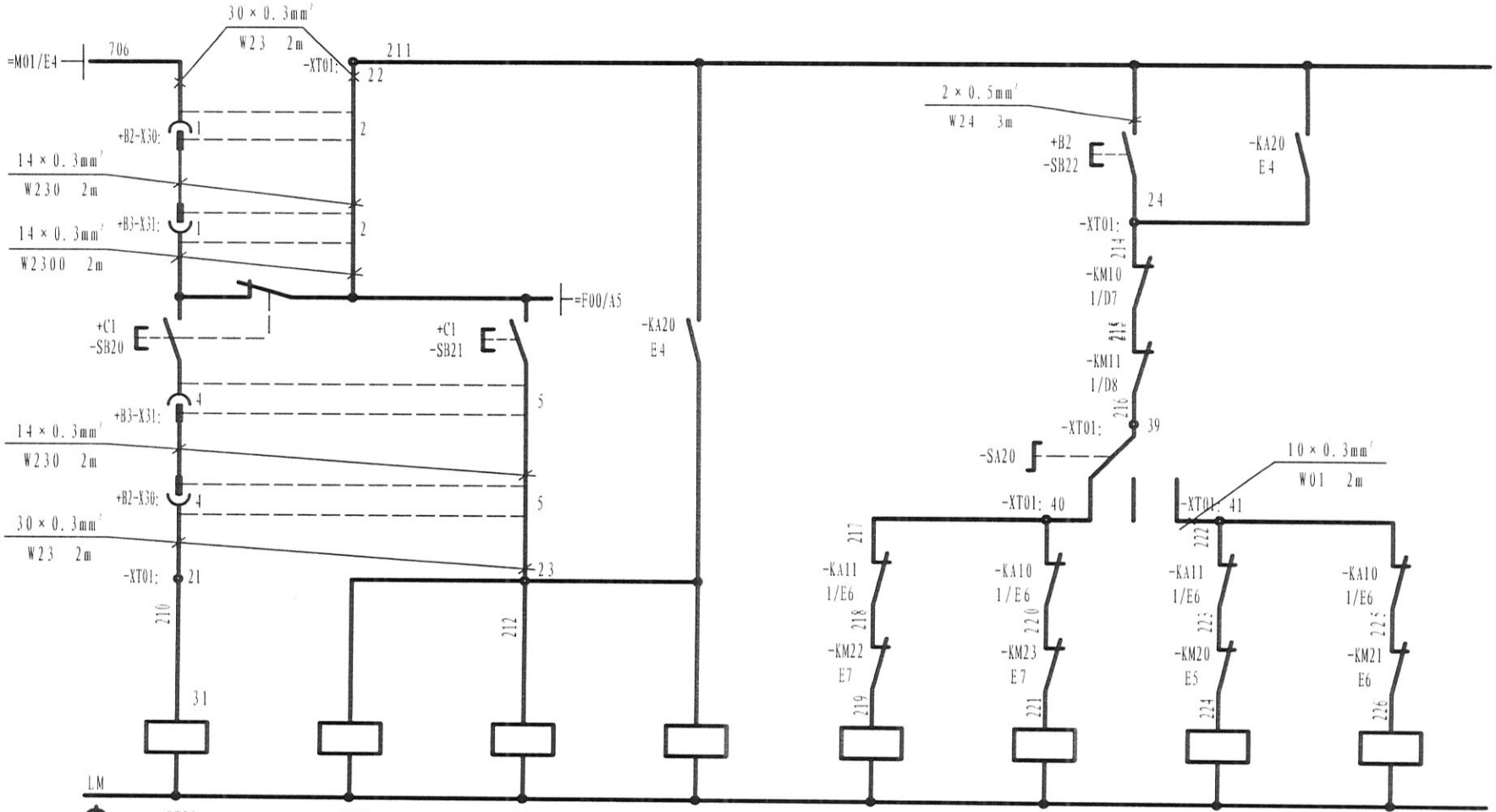


Others: 0.5mm²

Mark	Locate No.	Change document No.	Signiture	Date	Mark	Locate No.	Change document No.	Signiture	Date	

Designer		Circuit Diagram of AC Main Drive	=D02	Technology standard
Checker			+A1	Criterion candidate
Designer in charge		SERIES X6225UNIVERSAL ROTARY-HEAD MILLING MACHINE		Scale
Design leader				PP.2 P.1
Director				90000/3
Mark				

Drawing No. 90000/3	Time delay of the spindle motor braking		Spindle start		CW rotation		Jogging	CCW rotation	
	Time delay 1	Time delay 2	Start	Time delay	horizontal	vertical		horizontal	vertical



00.4S~60S
Power off delay: 3S
Adjustment of this time depends on the spindle speed

0.4S~60S
Power off delay: 0.5S

0.4S~60S
Power on delay: 2S

Others: 0.5mm²

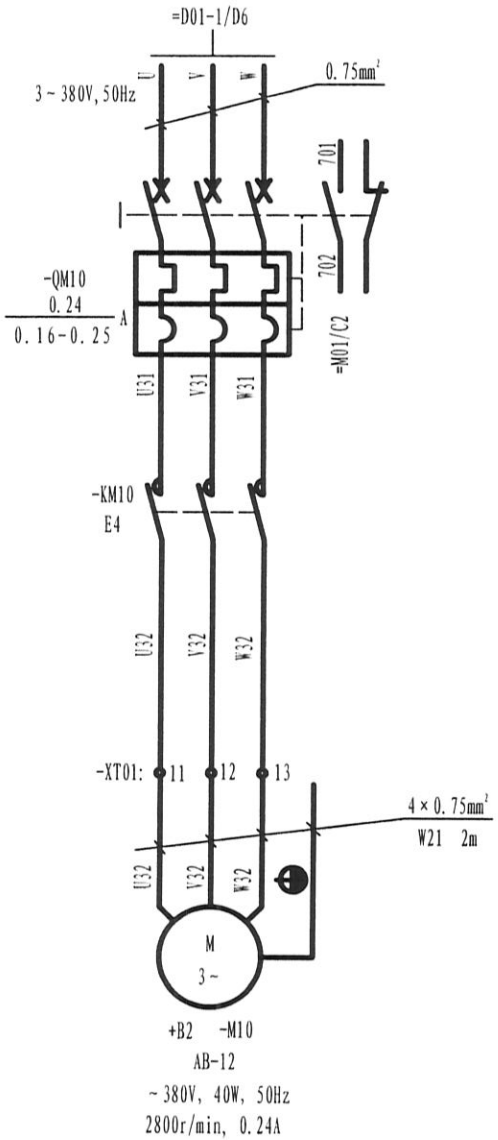
Designer		Circuit Diagram of AC Main Drive	=D02	Technology consultant	
Checker			+A1	Criterion consultant	
Designer in charge		SERIES X6225UNIVERSAL ROTARY-HEAD MILLING MACHINE		Scale	
Design leader				PP. 2	P. 2
Director				90000/3	
Mark					

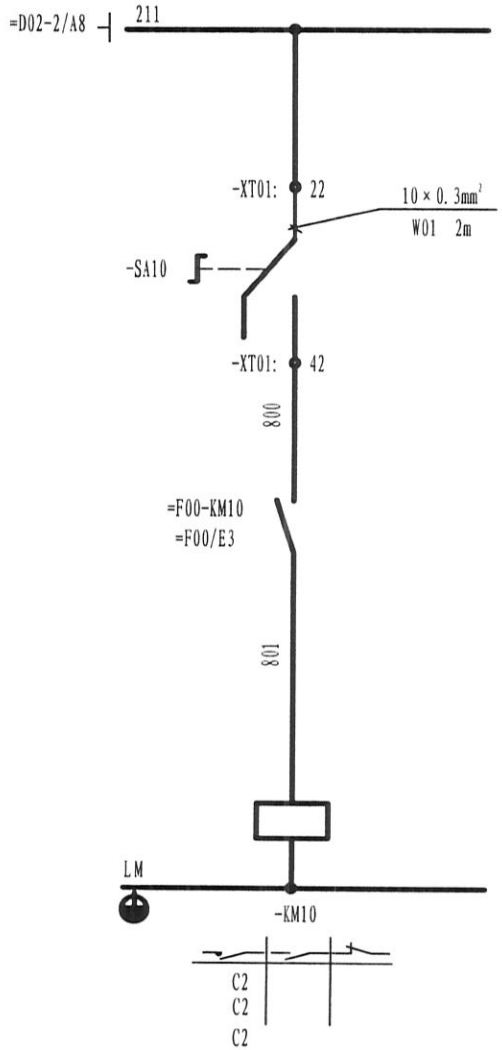
Mark	Locate No.	Change document No.	Signiture	Date	Mark	Locate No.	Change document No.	Signiture	Date

Drawing No. 90000/4

Coolant pump motor

Coolant control switch





Others: 0.5mm²

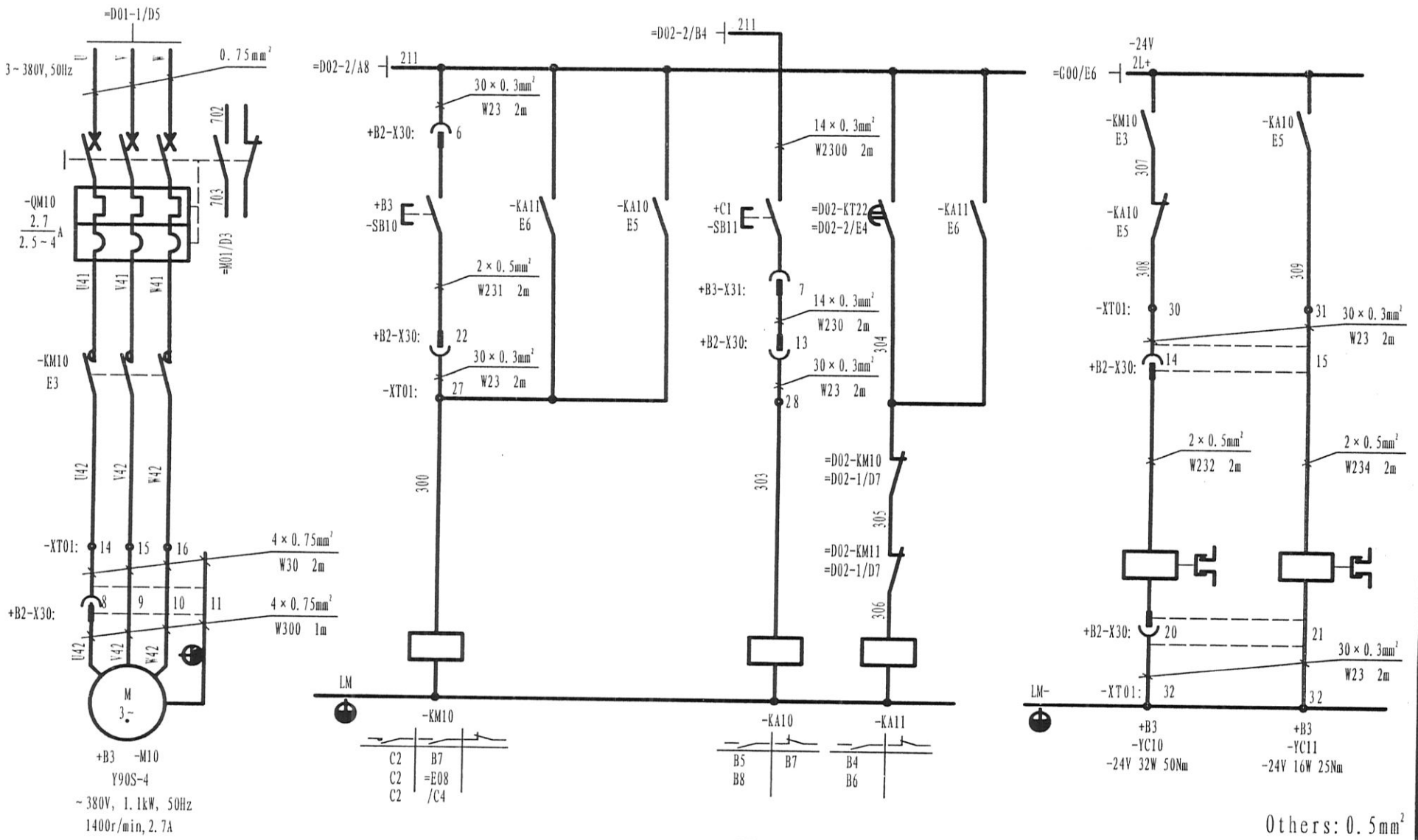
Mark	Locate No.	Change document No.	Signiture	Date	Mark	Locate No.	Change document No.	Signiture	Date	

Designer		Circuit diagram of coolant device driving	=E08	Technology consultant	
Checker			+A1	Criterion consultant	
Designer in charge		SERIES X6225UNIVERSAL ROTARY-HEAD MILLING MACHINE		Scale	
Design leader				PP.1	P.1
Director				90000/4	
Mark					

底图编号

Drawing No. 90000/5

Feed motor	Feed jogging	Rapid movement	Feed start	Continuous feed	Rapid



Mark	Locate No.	Change document No.	Signiture	Date	Mark	Locate No.	Change document No.	Signiture	Date	

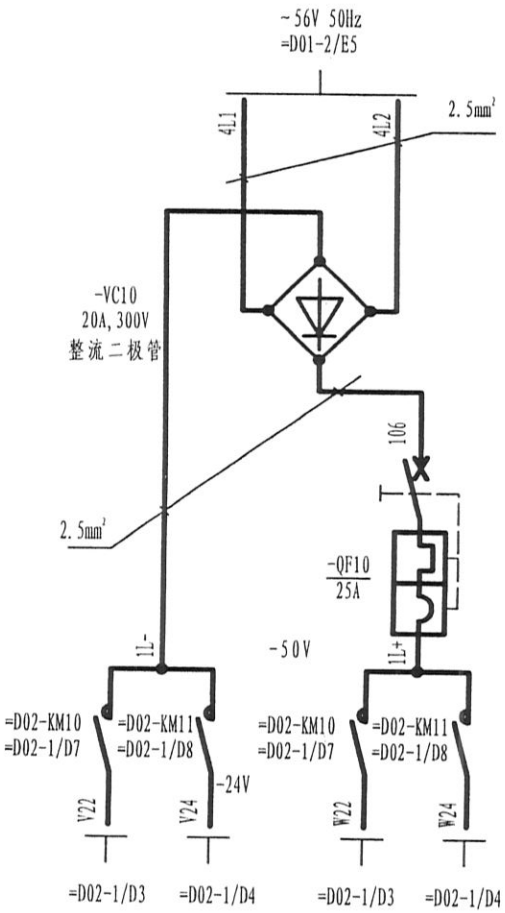
Designer		Circuit diagram of coolant device driving	=F00	Technology consultant	
Checker			+A1	Criterion consultant	
Designer in charge		SERIES X6225UNIVERSAL ROTARY-HEAD MILLING MACHINE		Scale	
Design leader				PP.1	P.1
Director				90000/5	
Mark					

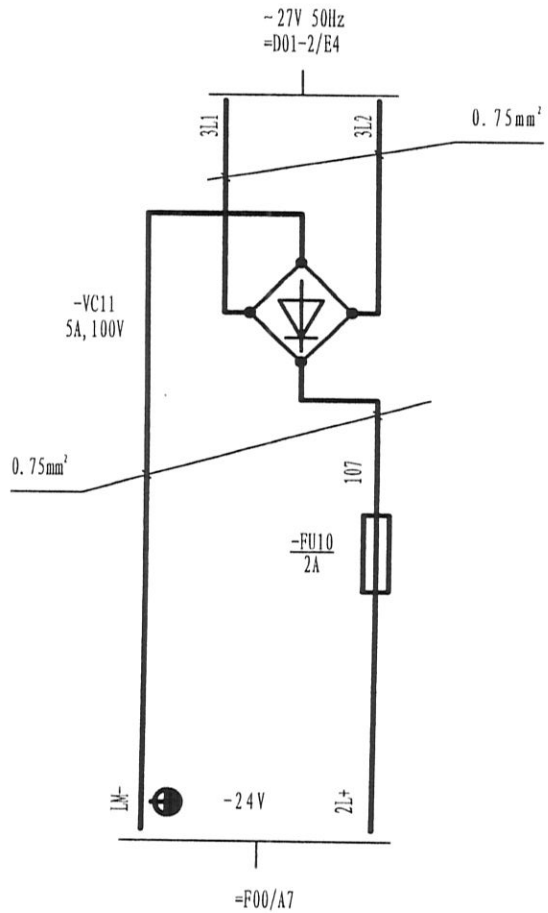
底图编号

Drawing No. 90000/6

Energy consumption braking power of spindle motor

Power of electro-magnetic clutch





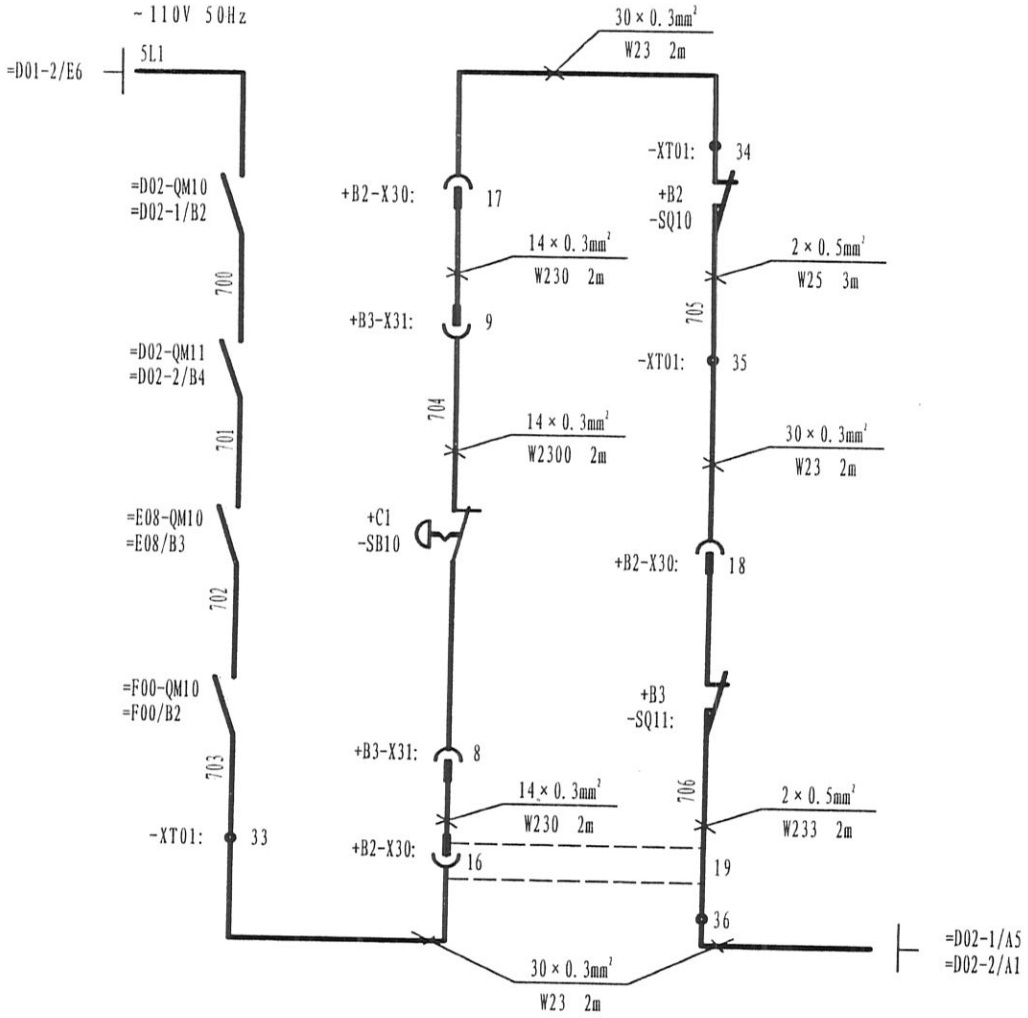
Others: 1.5mm²

Mark	Locate No.	Change document No.	Signiture	Date	Mark	Locate No.	Change document No.	Signiture	Date	

Designer		Circuit Diagram of Commutating Device	=G00	Technology consultant
Checker			+A1	Technology consultant
Designer in charge		SERIES X6225UNIVERSAL ROTARY-HEAD MILLING MACHINE	Scale	
Design leader			PP.1	P.1
Director			90000/6	
Mark				

Drawing No. 90000/7

Over heating protection	Emergency stop	Limit switch protection



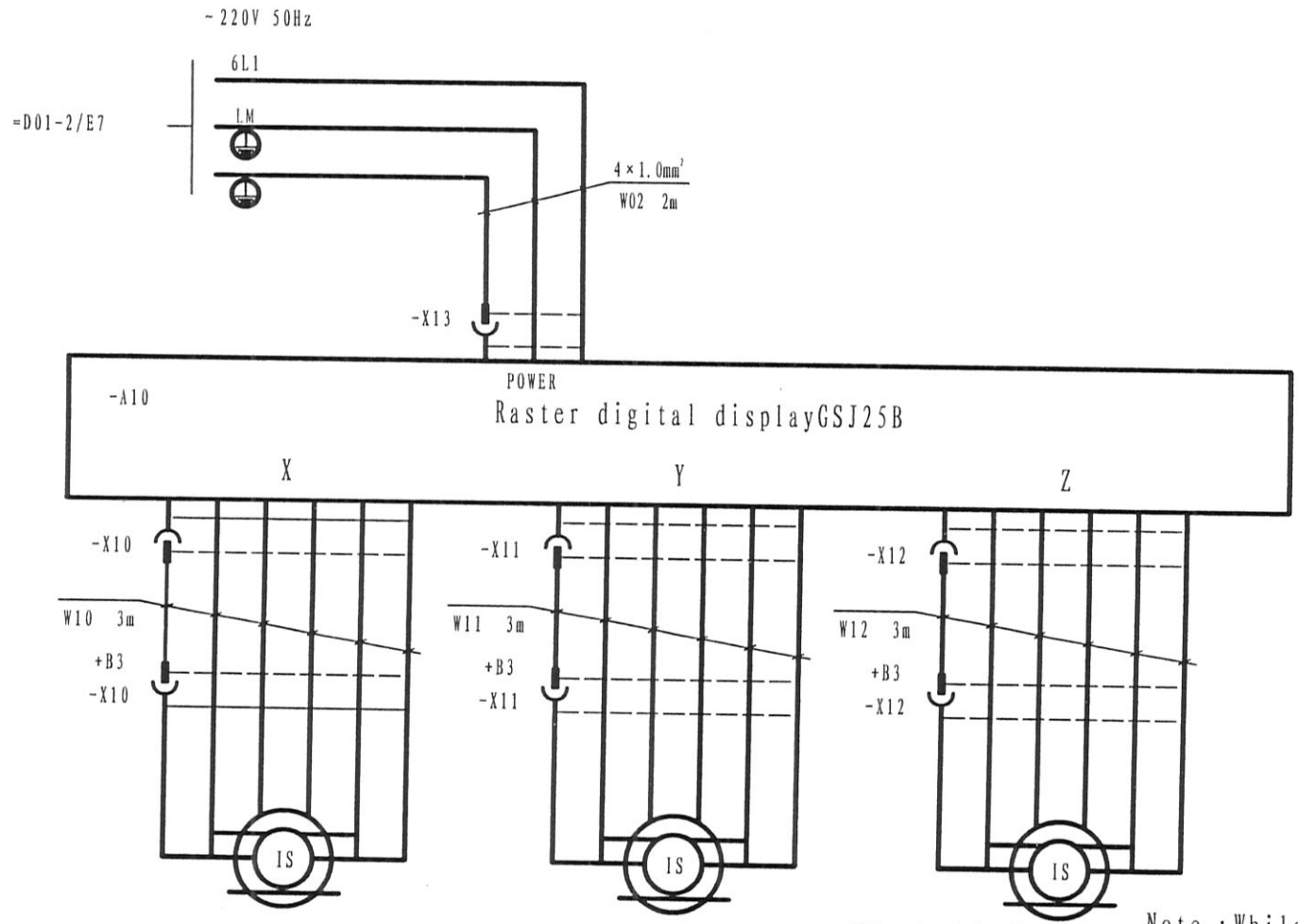
others: 0.5mm²

Mark	Locate No.	Change document No.	Signiture	Date	Mark	Locate No.	Change document No.	Signiture	Date	

Designer		Circuit diagram of emergency stop & monitoring protection	=M01	Technology consultant	
Checker			+A1	Criterion consultant	
Designer in charge		SERIES X6225UNIVERSAL ROTARY-HEAD MILLING MACHINE		Scale	
Design leader				PP.1	P.1
Director				90000/7	
Mark					

Digital Display Device

Table (longitudinal)	Table (Transversal)	Table (vertical)



+B3 (Dynamic ruler、Static ruler)
-BQ10
GX-6-750
L=750

+B3 (Dynamic ruler、Static ruler)
-BQ11
GX-6-300
L=300

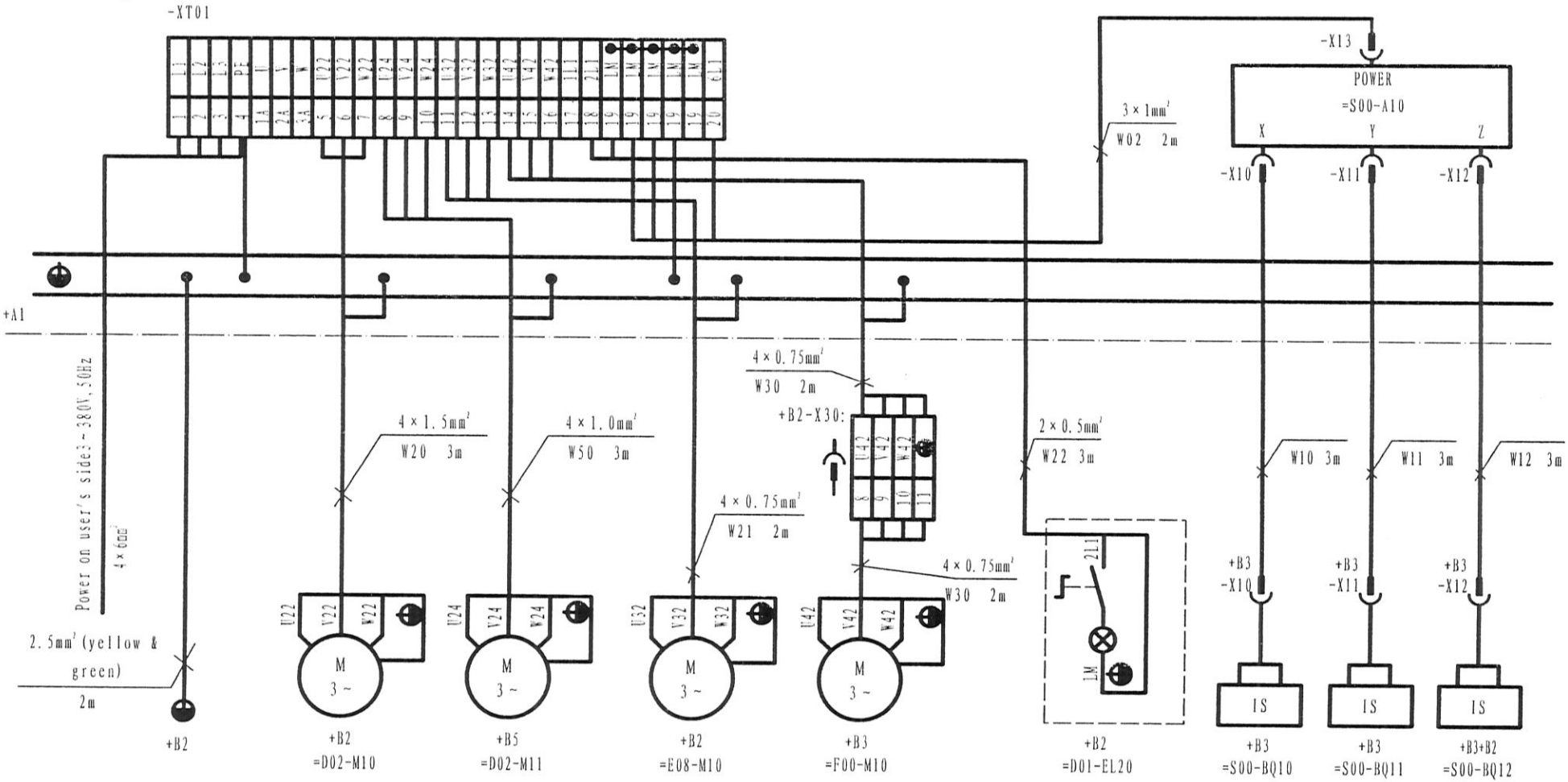
+B3 (Dynamic ruler) +B2 (Static ruler)
-BQ12
GX-6-400
L=400

Note : While using the grating digital display device , this page is valid.

Designer		Circuit Diagram of Digital Display Device	= S 0 0	Technology consultant	
Checker			+ A 1	Criterion consultant	
Designer in charge		SERIES X6225UNIVERSAL ROTARY-HEAD MILLING MACHINE		Scale	
Design leader				PP. 1	P. 1
Director				90000/8	
Mark					

Mark	Locate No.	Change document No.	Signiture	Date	Mark	Locate No.	Change document No.	Signiture	Date

Drawing No. 90000/9

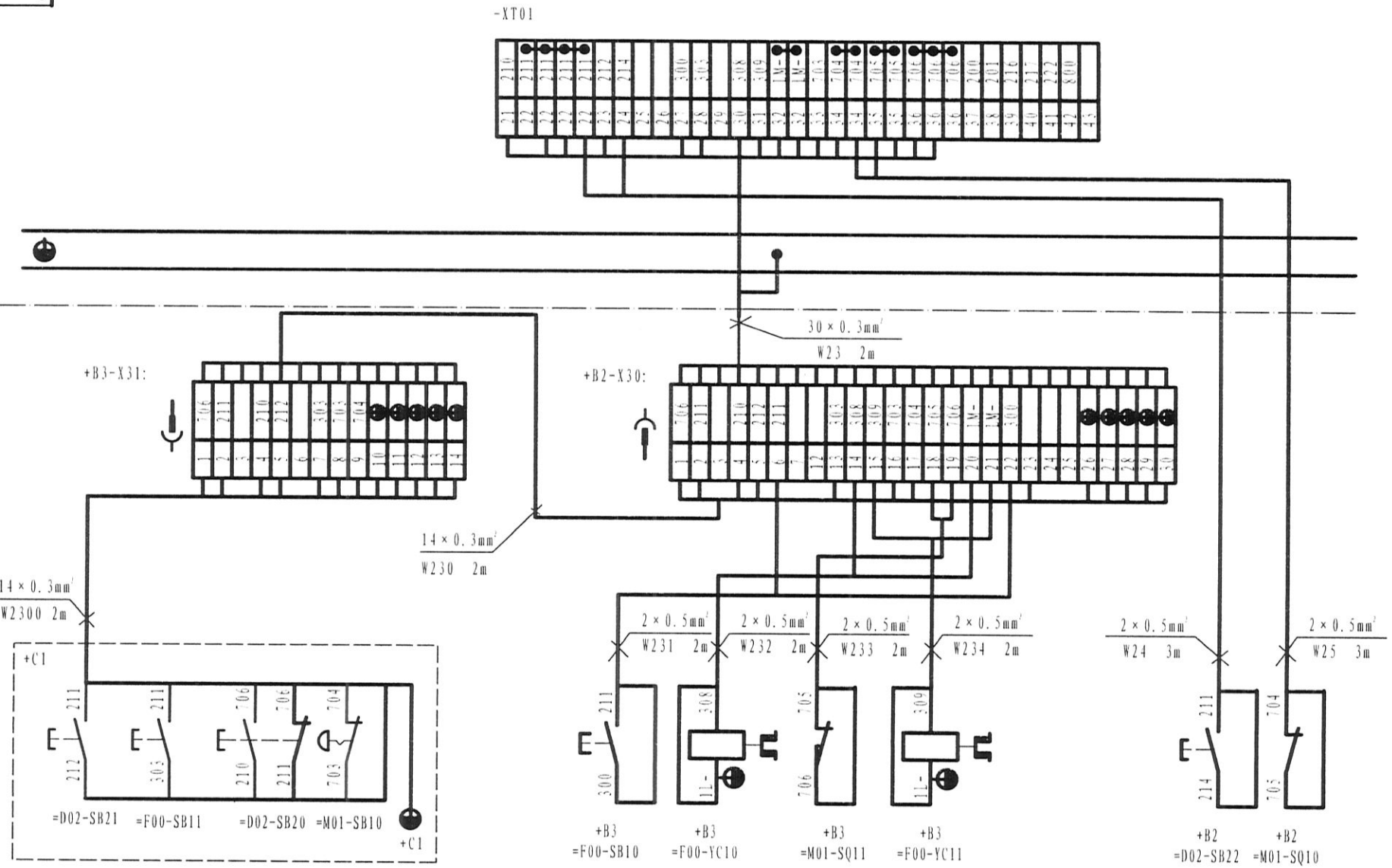


Note: =S00-A01、=S00-BQ10、=S00-BQ11、=S00BQ12、W02、W10、W11、W12 are only used while selecting digital display device.

											Designer		Electric Inter-connection Diagram	=B00
											Checker			+A1
											Designer in charge		SERIES X6225UNIVERSAL ROTARY-HEAD MILLING MACHINE	
											Design leader			
											Director			
Mark	Locate No.	Change document No.	Signiture	Date	Mark	Locate No.	Change document No.	Signiture	Date		Mark			

Technology consultant	
Criterion consultant	
Scale	
PP. 2	P. 1
90000/9	

Drawing No. 90000/9



Designer		Interlock Diagram of Electricity	= B 0 0	Technology consultant	
Checker			+ A 1	Criterion consultant	
Designer in charge		SERIES X6225UNIVERSAL ROTARY-HEAD MILLING MACHINE		Scale	
Design leader				PP. 2	P. 2
Director				90000/9	
Mark					

Mark	Locate No.	Change document No.	Signature	Date	Mark	Locate No.	Change document No.	Signature	Date

Drawing No. 90000/10

No.	No. of cable	Connecting part	Core × Section	Length	Specification	Manufacturer	Remarks
1	W01	+A1-XT01-=D01-HL20 etc.	10 × 0.3mm²	2m	RVV	Self-made	
2	*W02	+A1-XT01-=S00-A10	4 × 1.0mm²	2m	RVV	Self-made	
3	*W10	=S00-A10-=S00-BQ10		3m		Build-in	
4	*W11	=S00-A10-=S00-BQ11		3m		Build-in	
5	**W12	=S00-A10-=S00-BQ12		3m		Build-in	
6	W20	+A1-XT01-=D02-M10	4 × 1.5mm²	3m	RVV	Self-made	
7	W21	+A1-XT01-=E08-M10	4 × 0.75mm²	2m	RVV	Self-made	
8	W22	+A1-XT01-=D01-EL20	2 × 0.5mm²	3m	RVV	Self-made	
9	W23	+A1-XT01-+B2-X30	30 × 0.3mm²	2m	RVV	Self-made	
10	W230	+B2-X30-+B3-X31	14 × 0.3mm²	2m	RVV	Self-made	
11	W2300	+B3-X31-+C1	14 × 0.3mm²	2m	RVV	Self-made	
12	W231	+B2-X30-=F00-SB10	2 × 0.5mm²	2m	RVV	Self-made	
13	W232	+B2-X30-=F00-YC10	2 × 0.5mm²	2m	RVV	Self-made	
14	W233	+B2-X30-=M01-SQ11	2 × 0.5mm²	2m	RVV	Self-made	
15	W234	+B2-X30-=F00-YC11	2 × 0.5mm²	2m	RVV	Self-made	
16	W24	+A1-XT01-=D02-SB22	2 × 0.5mm²	3m	RVV	Self-made	
17	W25	+A1-XT01-=M01-SQ10	2 × 0.5mm²	3m	RVV	Self-made	
18	W30	+A1-XT01-+B2-X30	4 × 0.75mm²	2m	RVV	Self-made	
19	W300	+B2-X30-=F00-M10	4 × 0.75mm²	1m	RVV	Self-made	
20	W50	+A1-XT01-=D02-M11	4 × 1.5mm²	3m	RVV	Self-made	

Note: "*" are useful while selecting digital display device, and "**" are useful while selecting three-coordination digital display device.

Mark	Locate No.	Change document No.	Signiture	Date	Mark	Locate No.	Change document No.	Signiture	Date

Designer		CHART OF LEAD & CABLE	=B04	Technology consultant
Checker				Criterion consultant
Designer in charge		SERIES X6225UNIVERSAL ROTARY-HEAD MILLING MACHINE		Scale
Design leader				PP.1 PP.1
Director				90000/10
Mark				

Drawing No. 90000/11

+A1-XT01

Terminal No.	Wire No.	Coming direction	Going direction	Terminal No.	Wire No.	Coming direction	Going direction	Terminal No.	Wire No.	Coming direction	Going direction
1	L1	User's side	=D01-QF10	18	2L1	=D01-FU20	=D01-EL20	31	309	=F00-KA10	+B2-X30: 15
2	L2	User's side	=D01-QF10	19	LM	=D01-HL20	⏚	32	LM-	=G00-VC11	+B2-X30: 20
3	L3	User's side	=D01-QF10	19	LM	=D01-EL20	⏚	32	LM-		+B2-X30: 21
4	PE	User's side	Protection ground	19	LM	=S00-A10	⏚	33	703	=F00-QM10	+B2-X30: 16
1A	U	=D01-QF10	=D02-QM10 etc.	19	LM	=D01-TC20	⏚	34	704	+B2-X30: 17	
2A	V	=D01-QF10	=D02-QM10 etc.	19	LM	=D01-TC20	⏚	34	704		=M01-SQ10
3A	W	=D01-QF10	=D02-QM10 etc.	20*	6L1	=D01-QF23	=S00-A10	35	705	=M01-SQ10	
5	U22	=D02-KM20	=D02-M10	21	210	=D02-KT20	+B2-X30: 4	35	705		+B2-X30: 18
6	V22	=D02-KM20	=D02-M10	22	211	=D02-KA20	+B2-X30: 2	36	706	+B2-X30: 19	=D02-KT20
7	W22	=D02-KM20	=D02-M10	22	211		+B2-X30: 6	36	706		+A1-XT01: 36
8	U24	=D02-KM21	=D02-M11	22	211			36	706		+B2-X30: 1
9	V24	=D02-KM21	=D02-M11	22	211		=D02-SB22	37	200	=D02-KA10	=D02-SA10
10	W24	=D02-KM21	=D02-M11	23	212	=D02-KT21	+B2-X30: 5	38	201	=D02-KA11	=D02-SA10
11	U32	=E08-KM10	=E08-M10	24	214	=D02-KM10	=D02-SB22	39	216	=D02-KM11	=D02-SA20
12	V32	=E08-KM10	=E08-M10	25				40	217	=D02-KA10	=D02-SA20
13	W32	=E08-KM10	=E08-M10	26				41	222	=D02-KA11	=D02-SA20
14	U42	=F00-KM10	+B2-X30: 8	27	300	=F00-KM10	+B2-X30: 22	42	800	=F00-KM10	=E08-SA10
15	V42	=F00-KM10	+B2-X30: 9	28	303	=F00-KA10	+B2-X30: 13	43			
16	W42	=F00-KM10	+B2-X30: 10	29							
17	1L1	=D01-TC20	=D01-HL20	30	308	=F00-KA10	+B2-X30: 14				

Mark	Locate No	Change document No.	Signiture	Date	Mark	Locate No.	Change document No.	Signiture	Date

Designer		Wiring list	=B05	Technologe consultant	
Checker				Criterion consultant	
Designer in charge		SERIES X6225UNIVERSAL ROTARY-HEAD MILLING MACHINE		Scale	
Design leader				PP. 3	PP. 1
Director				90000/11	
Mark					

Drawing No. 90000/11

+B2-X30

1	706	+A1-XT01:36	+B3-X31:1	20	LM-	+A1-XT01:32	=F00-YC10				
2	211	+A1-XT01:22	+B3-X31:2	21	LM-	+A1-XT01:32	=F00-YC11				
3				22	300	+A1-XT01:27	=F00-SB10				
4	210	+A1-XT01:21	+B3-X31:4	23							
5	212	+A1-XT01:23	+B3-X31:5	24							
6	211	+A1-XT01:22	=F00-SB10	25							
7				26	⏚	⏚	+B3-X31:10				
8	U42	+A1-XT01:14	=F00-M10	27	⏚	⏚	+B3-X31:11				
9	V42	+A1-XT01:15	=F00-M10	28	⏚	⏚	+B3-X31:12				
10	W42	+A1-XT01:16	=F00-M10	29	⏚	⏚	+B3-X31:13				
11	⏚	⏚	=F00-M10	30	⏚	⏚	+B3-X31:14				
12											
13	303	+A1-XT01:28	+B3-X31:7								
14	308	+A1-XT01:30	=F00-YC10								
15	309	+A1-XT01:31	=F00-YC11								
16	703	+A1-XT01:33	+B3-X31:8								
17	704	+A1-XT01:34	+B3-X31:9								
18	705	+A1-XT01:35	=M01-SQ11								
19	706	+A1-XT01:36	=M01-SQ11								

Mark	Locate No.	Change document No.	Signiture	Date	Mark	Locate No.	Change document No.	Signiture	Date

Designer		Wiring list	=B05	Technology consultant	
Checker				Criterion consultant	
Designer in charge		SERIES X6225UNIVERSAL ROTARY-HEAD MILLING MACHINE		Scale	
Design leader				PP. 3	PP. 2
Director				90000/11	
Mark					

Drawing No. 90000/11

+B3-X31

Terminal No.	Wire No.	Coming direction	Going direction
1	706	+B2-X30:1	=D02-SB20
2	211	+B2-X30:2	=D02-SB20等
3			
4	210	+B2-X30:4	=D02-SB20
5	212	+B2-X30:5	=D02-SB21
6			
7	303	+B2-X30:13	=F00-SB11
8	703	+B2-X30:16	=M01-SB10
9	704	+B2-X30:17	=M01-SB10
10	⏚	+B2-X30:26	⏚
11	⏚	+B2-X30:27	⏚
12	⏚	+B2-X30:28	⏚
13	⏚	+B2-X30:29	⏚
14	⏚	+B2-X30:30	⏚

Mark	Locate No.	Change document No.	Signiture	Date	Mark	Locate No.	Change document No.	Signiture	Date

Designer		Wiring list	=B05	Technology consultant	
Checker				Criterion consultant	
Designer in charge		SERIES X6225UNIVERSAL ROTARY-HEAD MILLING MACHINE		Scale	
Design leader				PP. 3	PP. 3
Director				90000/11	
Mark					