

1614009

M7163D × 1250

**HORIZONTAL SHAFT AND RECTANGULAR
TABLE SURFACE GRINDER**

OPERATION MANUAL

QUALIFIED CERTIFICATE

Ex-factory record: JB/T3382.2-2000 and GB / T4022-1983 standard

Name : Horizontal Shaft & Rectangular Table Surface Grinder

Model : M7163D×1250

Table width: 630mm

Table length: 1250mm

The machine has been inspected and up to the standard, then approved for ex-factory.

Chief inspector: _____

Inspector: J32 _____

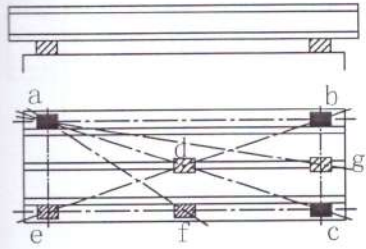
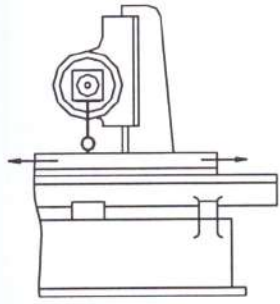
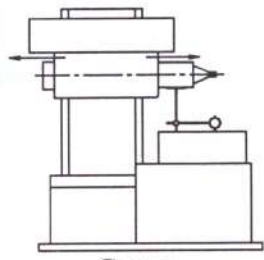
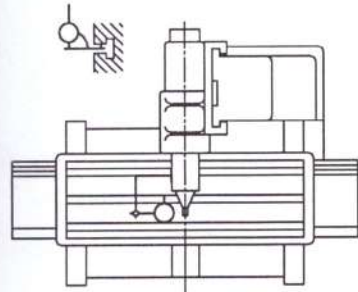
Date of inspection: 2016/11/11

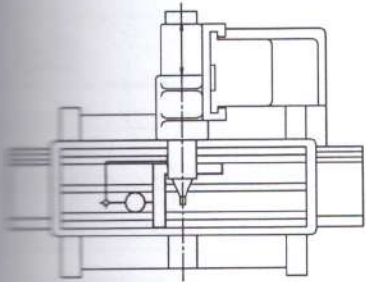
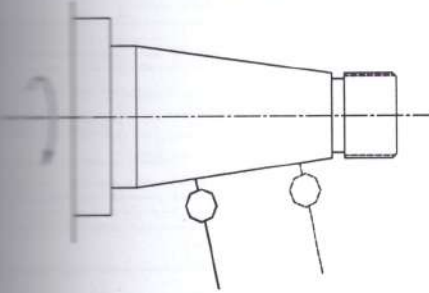
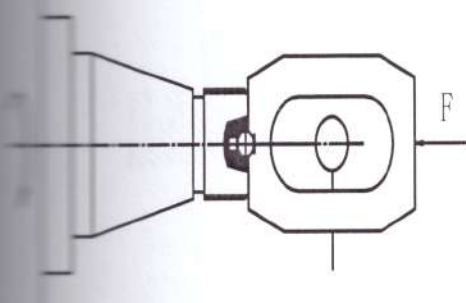
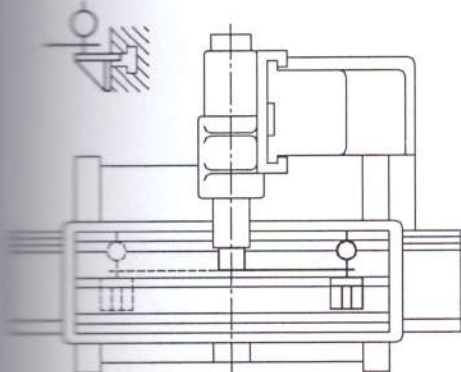
Before check the accuracy, please leveling the machine at first.

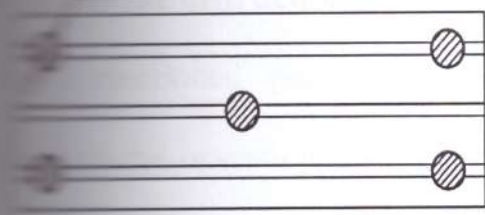
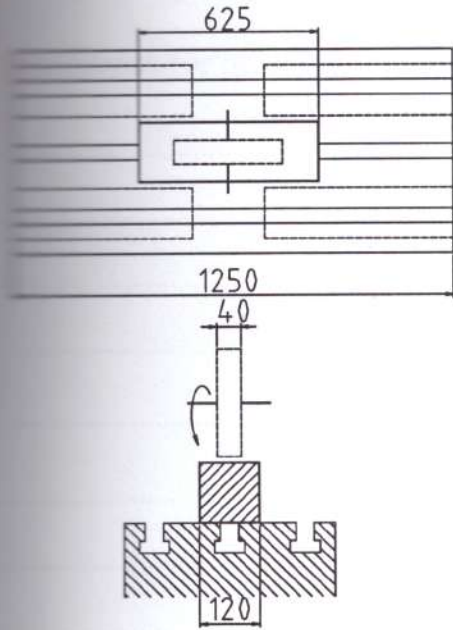
Longitudinal: 0.04/1000

Cross: 0.04/1000

B. Geometric accuracy

	Sketch map	Item	Permissible deviation	Actual deviation
E	 <p>Marble plate and gauge block</p>	Flatness of the table surface	0.0125/1250 0.005/300	0.01 0.005
A	 <p>gauge</p>	Parallelism of the table surface to its longitudinal movement	0.0175/1250 0.008/300	0.012 0.006
B	 <p>Gauge</p>	Parallelism of the table surface to its transverse movement	Full length: 0.010 (the user should not carry out thermal detection until the machine had run for a while)	0.008
G	 <p>Gauge</p>	Parallelism of the median slot to the longitudinal movement	0.0175/ full Length 0.008/300 (exclude about 25mm length on both side of slot)	0.012 0.006

Sketch map	Item	Permissible deviation	Actual deviation
 <p data-bbox="518 645 608 685">Gauge</p>	<p data-bbox="826 409 1070 595">Verticality of the wheel head transverse movement to the longitudinal movement</p>	<p data-bbox="1134 483 1238 517">0.03/300</p>	<p data-bbox="1313 477 1406 517">0.025</p>
 <p data-bbox="523 1088 608 1128">Gauge</p>	<p data-bbox="826 864 1070 1021">Verticality and straightness of the wheel head up and down to the table surface</p>	<p data-bbox="1161 920 1214 954">0.01</p>	<p data-bbox="1329 931 1390 987">0.03</p>
 <p data-bbox="523 1503 608 1543">Gauge</p>	<p data-bbox="826 1312 1070 1379">Radial run out of spindle tape</p>	<p data-bbox="1161 1323 1214 1357">0.01</p>	<p data-bbox="1321 1301 1382 1346">0.03</p>
 <p data-bbox="456 1995 679 2036">Gauge and square</p>	<p data-bbox="826 1783 1070 1850">Axial run out of the spindle nose</p>	<p data-bbox="1110 1727 1278 1895">0.015/300 (300mm is distance between both contact points)</p>	<p data-bbox="1334 1783 1414 1827">0.012</p>

Sketch map	Item	Permissible deviation	Actual deviation
 <p data-bbox="502 649 590 683">Gauge</p>	<p data-bbox="813 459 1061 582">Grind five column testing blocks (test block is steel #45)</p>	<p data-bbox="1093 347 1260 683">Tolerance in thickness 0.005/300 (the user should not carry out thermal detection until the machine had run for a while)</p>	<p data-bbox="1300 481 1380 526">0.005</p>
 <p data-bbox="502 1400 590 1433">Gauge</p>	<p data-bbox="813 1019 1061 1142">Grind complete test block surface (test block is steel #45)</p>	<p data-bbox="1093 940 1260 1232">0.005/300 (the user should not carry out thermal detection until the machine had run for a while)</p>	<p data-bbox="1300 963 1380 1008">0.005</p>

DISTRIBUTOR

Do not transport the machine and start operation before reading the safety directions and the instruction manual.

The below mentioned persons herewith confirm that they have read and comprehended the operation instructions before transport and appropriate use of the machine for their security and of third persons and the safety of the machine.

For achieving best grinding results it is in the user's own interest to follow the technical directions for grinding.

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(Signature)

SAFETY DIRECTIONS

To guarantee an optimal, trouble-free operation at lowest possible endangering this machine should only be operated, maintained and repaired by persons familiar with it and list operation.

For these reasons the instruction directions must be read and be followed exactly before transport and start of operation.

Especially important safety directions are marked with symbols in front of them.

Comments on indicative symbols



= Safety directions must be followed exactly.
Not noting them causes danger for the operator



= Caution advices must be remembered exactly
Not noting them may entail operation trouble or
damage of the machine



= Important directions should be noted in order to
reach good working results.

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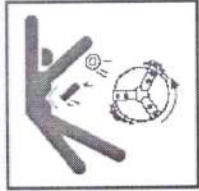
PACKING LIST

Prolegomena

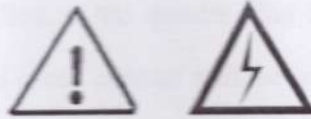
- 1 When you receive the machine, please transport, save, load, adjusting according to the rules in the Manual. As soon as you get the machine, please check it according to the packing list, in case of shortage, damage or other error, please contact with the seller from whom the machine is purchased at once.
- 2 the machine should be running and testing on a condition without strong shake, and an equable temperature.
- 3 the machine should be assembled and working strictly abidance by the rules in the Manual.
- 4 The operator must comply the safety rules and boundary of the machine



clean up the liquid over followed at once for the liquid such as coolant and oil are very smooth which could bring danger.



While working, not clamping the working by right way will cause the work piece flying out then make damage to operator or other human.



1.1 General safety instruction

- 1) The user should choose the operator who is trained and has passed.
- 2) The user should educate the operator according to Law on Industrial Safety and Hygiene.
- 3) The user should warn operator when there is unsafe.
- 4) Read the **Operation Manual** before using the machine, and note danger mark & content stuck on the machine.
- 5) The operator whose hair is too long must wear hat before operating and maintain machine.
- 6) The operator must wear glasses protecting eyes, mask and safe industrial shoes at operating machine.
- 7) Keep machine clean and among, avoid ground wet, slippery, and clean unnecessary hang-up.
- 8) Retain 600mm space out of machine's limit of size, prevention of compression between operator and machine, in order to forbid personnel to enter, point out the range with yellow covering material.
- 9) Always shut down all the electricity door and protector unless maintain the unit.
- 10) Shut down the power before maintain the machine.
- 11) The man who wears cloth with long sleeve, tie, gloves, is forbidden, is forbidden

- 27) The wheel of spindle is forbidden to cut material as rotary sander.
- 28) It's forbidden to alter usefulness & capacity of the design of machine and to use the wheel out of stipulation or overweight work-piece , overlarge work-piece.
- 29) It is forbidden that clamping these very small or with complex frame or with instability center of gravity parts directly by magnetic chuck.
- 30) While work, laying anything besides work piece on the work table is forbidden.
- 31) While the grinding wheel spindle rotating, it is forbidden to adjusting the coolant nozzle.
- 32) It is forbidden to stop the grinding wheel by hand or other tools while the spindle motor power is shut off.
- 33) Changing or moving the work piece is forbidden while the table or grinding wheel keep in running.
- 34) Leaning the chip on or around the work piece is forbidden while the grinding wheel keeps in rotating.
- 35) Only dismantle the grinding wheel by special extractor. Knock on the flange and wheel for dismantle the grinding wheel is forbidden.
- 36) Don't change circuit at will before authorized by manufactory, lest danger should occur.
- 37) Don't change interlocked circuit into by-pass circuit.
- 38) Don't touch the part of the machine where there is best lightning mark.
- 39) Should avoid touching electricity case and circuit when body and hands are wet.
- 40) Should avoid wearing metal garish lest receiving electric shock when inspecting electricity part, and hang up warning mark lest operator make mistaken of driving.
- 41) Pay attention to these Warning Mark note and abide by these note before chick or maintenance on electro circuit or apparatus.
- 42) It is necessary that wear insulating gloves, shoes and other insulating protectors before maintenance electro apparatus.

- 43) Make sure all earth circuits are well connected according to diagram.
- 44) Make sure the power is shut off by suitable gauge before checking and maintenance electro apparatus.
- 45) Don't open the electricity case and inspect electricity parts at will when there is fault in electricity part, must be inspected and maintained by certified operator.

1.2 Safety operating rules



We supply some safety operating rules for the operator in order to avoid some accidents.

1 Before power on

- a Make sure that there are no sundries on the machine
- b Make sure the door of cabinet is closed
- c Make sure the control levers and emergency switch are well condition
- d Make sure there is enough lubricating oil in the lubricator
- e Make sure the machine have been will earthed

2 Correct steps of power on / power off

- a Power on: switch on the total power switch of cabinet, turn the emergency switch clockwise, push down the power on switch located on control panel, then the machine is power on.
- b Power off: push down the emergency switch, then shut off the total power switch.



shout off the total power switch immediately if the power supply is not correct

3 Make sure no any alarm raise before operating the machine

- 4 As soon as accidents happened, push down the emergency switch at once then

the machine is power off.

5 Follow correct operating rules

- a The operator must pay attention to his clothing (shoes, cap, protect glass, etc.) before operating on the machine
- b Must use correct oil and lubricant according to the indicating on the Manual or Note mark
- c Make sure the work piece have been correctly clamped on the table before running the machine
- d Must not remove these chips or work piece while machining, must not close to the rotating area, if necessary, please stop the machine at first.
- e Must not touch the switches on the control panel by wet hand
- f Cleaning and maintenance the machine termly
- g Keep the machine far away from EDM machine and High voltage apparatus.
- h Must not use the fuse, rely, breaker which is over than the stand noted on the Manual
- i Shut off the power before change the fuse or breaker
- j The machine must be inspected and maintained by certified operator.



must use special earth wire (green-yellow, $\geq 10\text{mm}^2$) for machine bed earthed according to electrical circuit diagram.



1.3 Responsibility for an enterprise manager on the user's side

- 1) The operator should be trained, and he should not go to his post until qualified.

- 2) Provide clean and safe working areas for operation, maintenance around the machine.
- 3) Explain the safety warning to the operation, maintenance personnel, comply with the safety requirements and provisions of the Manual, and suggest that they can not ignore the security rules and signs.
- 4) Make sure that all machine moving parts should be in safe status while the machine is on work periodically according to the using situation.
- 5) The protective devices that in compliance with the safety requirements should be provided while processing different work pieces (especially when processing non-metallic work piece).

1.4 Responsibility of the operator



- 1) Do operation according to the safe using requests and operation manual; avoid any danger caused by wrong operation.
- 2) Once unsafe case appear, cut off the main power supply immediately and report to the leader, do not operate against regulations or accept wrong order.
- 3) Assemble safety guard in accordance with the regulations listed on the operation manual
- 4) The operator should not change, disassemble or damage any protection cover or safety guard without the allowance of related department in the enterprise.
- 5) The operator should keep a clean and safe working environment, pay special attention that the tools or parts that can move, fall or roll away and cause danger should be stored in safe place.

Chapter 2: Main character and application

2.1 machine application

This surface grinder is used to grind the flat surface work piece, it uses mainly the wheel periphery for surface grind, but the wheel end surfaces can also be used for grinding the vertical surface of the work pieces. When working, the work pieces can be placed on the magnetic chuck or fixed directly on the table or with other fixtures according to various work pieces. The machine can be used for grinding steel, casting iron or non-ferrous metal. Since grinding with the wheel periphery can produce higher manufacturing precision, so this type surface grinder is suitable for grinding very high accuracy surface

2.2 machine character

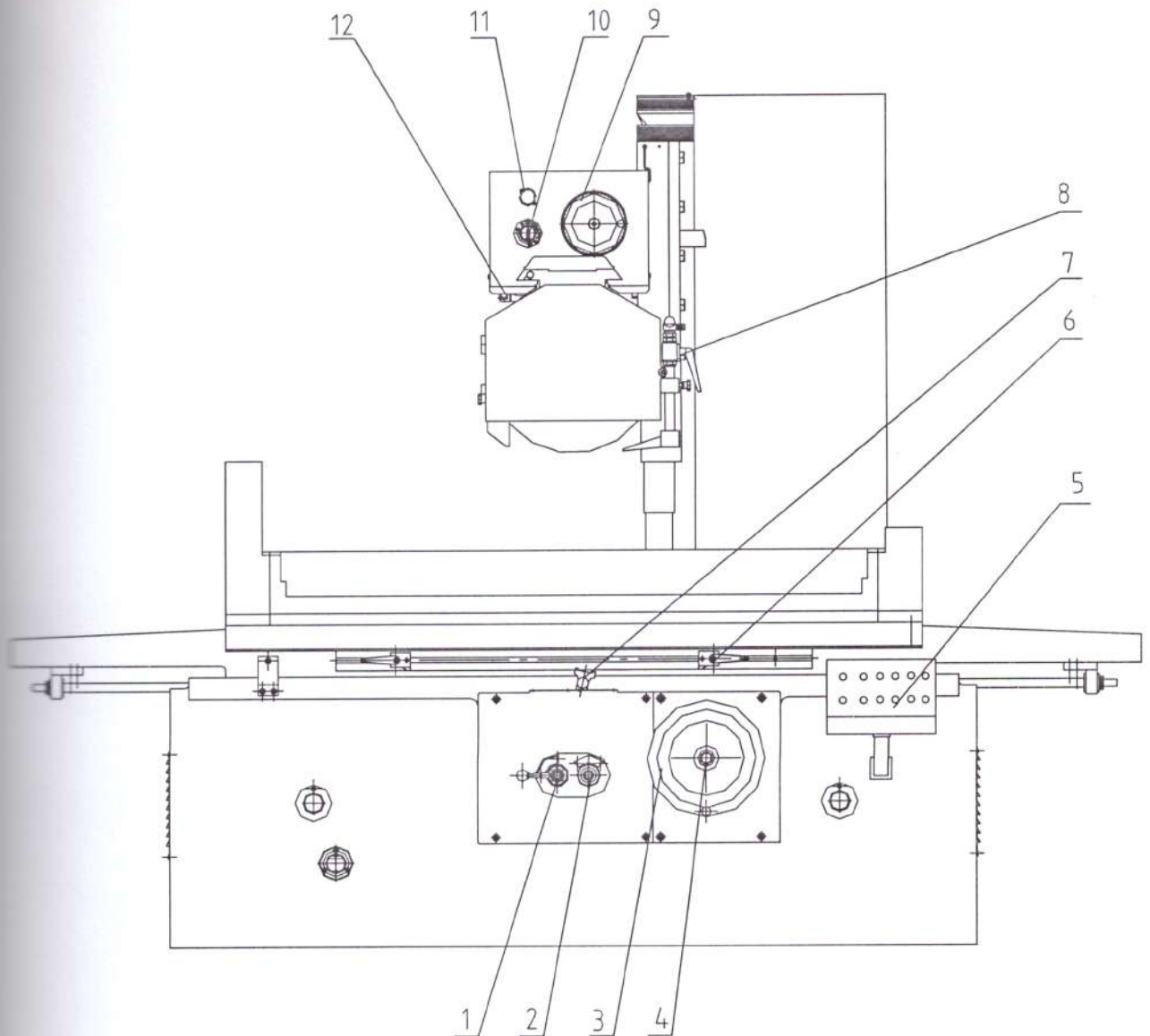
Special designed bed, column, table wheel head, slide block, the structure with high rigidity, ensure high accuracy and efficiency.

The table longitudinally movement drove by hydraulic, wheel head transverse on the slide block, it can be drove by manual or hydraulic. The slide block together with wheel head move up and down along the column guide way, with manual and rapid movement. All operating levers, hand wheels, knobs and buttons are concentrated on the front of bed and saddle, so the machine is very convenient to operate.

Chapter 3: Main Specifications

Item		Unit	Specification
Max. size of work piece (L × W × H)		mm	250×120×50
Table area (W×L)		mm	250×120
Longitudinal travel of table		mm	200-1250
Number of T slots of on table		mm	24/2
Speed of the table (stepless)		mm/min	3-17
Max. distance from table surface to spindle assembly		mm	70
Max. travel of wheel head cross movement		mm	190
Wheel head vertical movement	Rapid speed	mm/min	40
	Manual feed	mm/min	0.05
Wheel head transverse movement	Continuous feed	mm/min	0.5-4.5
	Auto intermittent feed	mm/min	3-30
	Manual feed	mm/min	0.01
Grinding wheel size		mm	400×40×203
Spindle motor	Speed	rpm	50HZ: 1440 60HZ: 1720
	power	kW	7.5
Hydraulic pump motor	Power	kW	5.5
	speed	rpm	960
Hydraulic pump	flux	l/min	125
	Speed	rpm	960
Vertical elevating motor	Power	kW	1
			4.7N/M
Coolant pump	Power	kW	0.2
	Speed	rpm	1450
Machine size (L×W×H)		mm	390×220×242
Machine weight (approx.)		kg	7400

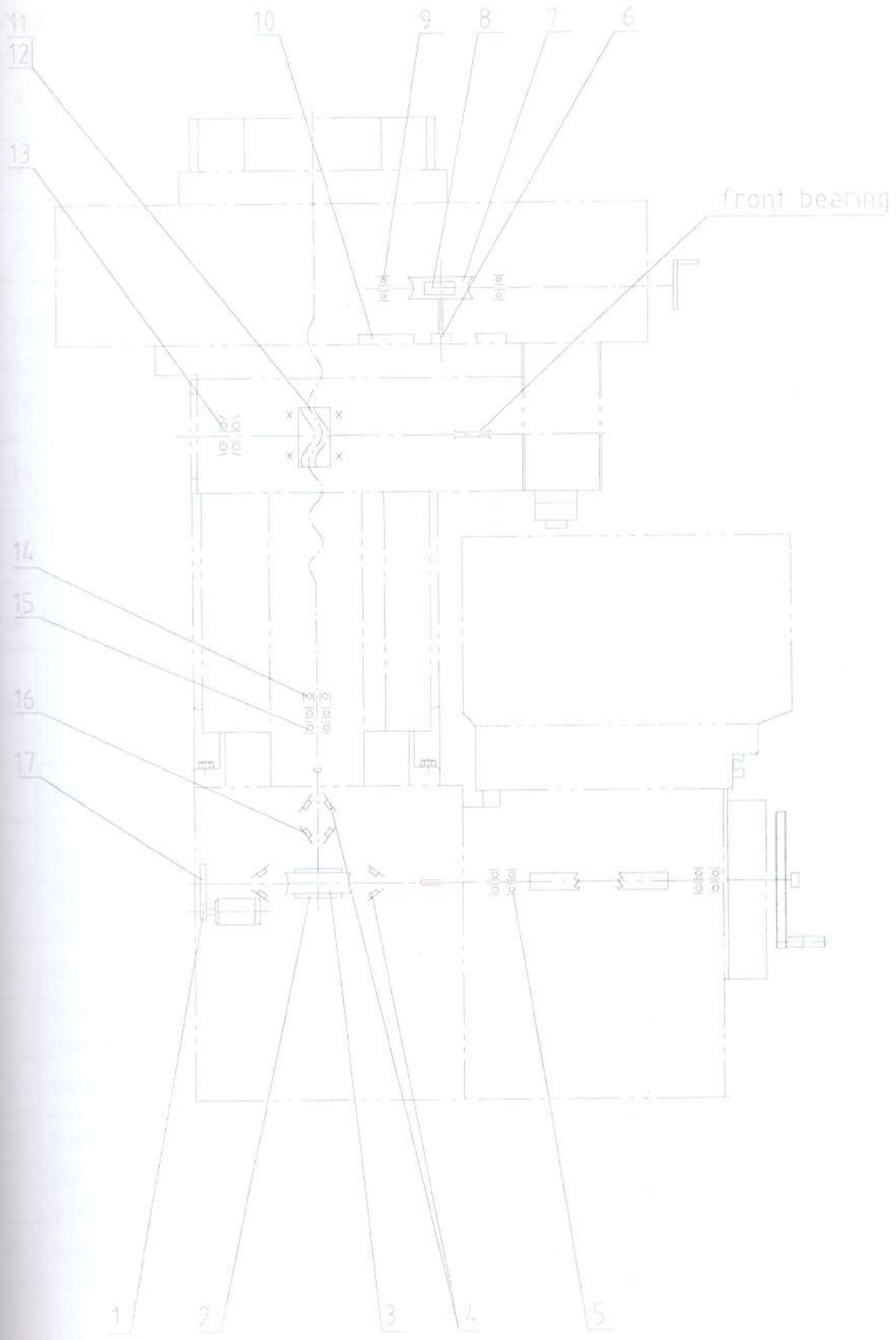
Chapter 4: Operating Levers Instruction



No .	Name and Purpose
1	Hydraulic power on/off and table speed controller lever.
2	Wheel head cross transverse movement continuous feed/ intermittent auto
3	Wheel head up/down manual feed hand wheel
4	Wheel head rapid down feed control lever
5	Electro cabinet
6	Table transverse movement stop block
7	Table transverse movement direction control lever
8	Coolant pump on/off switch
9	Wheel head cross movement hand wheel
10	Wheel head cross transverse movement direction manual control lever
11	Column slide way, lifting screw lubricating control push button
12	Wheel head transverse movement stop block

Chapter 5: Mechanical drive system

5.1

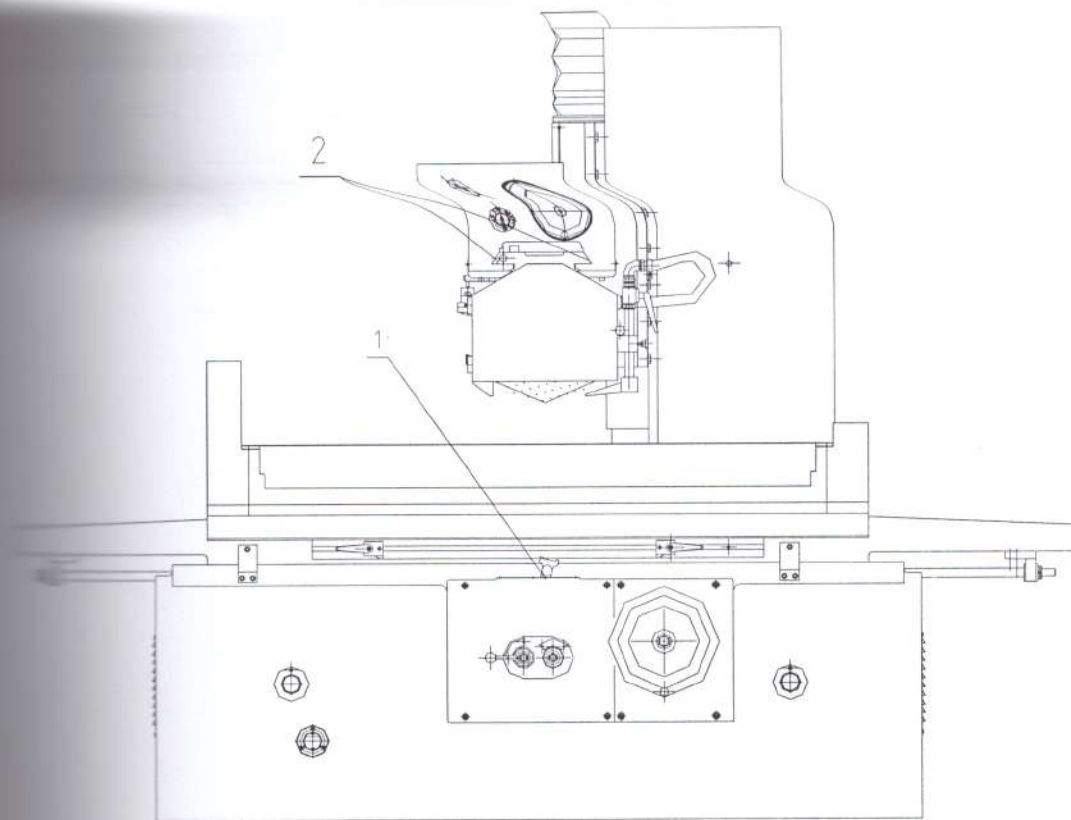


5.1 List for rolling bearing

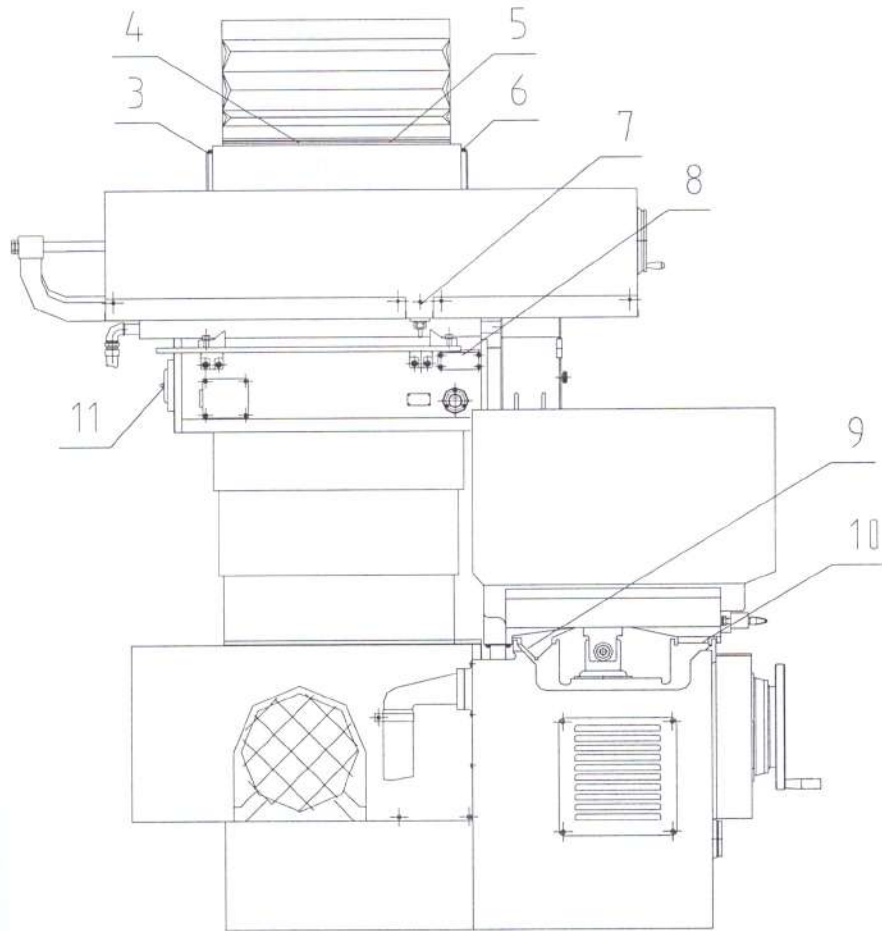
No.	Bearing type	Assembly position	Qty.	Dimension	Code
4	Single row taper roller bearing	Vertical feed reducer	3	$\phi 35 \times \phi 72 \times 18$	7207
5	Single-row annular ball bearing	Vertical feed	4	$\phi 40 \times \phi 68 \times 15$	6008
9		Cross feed	2	$\phi 25 \times \phi 52 \times 15$	6205-Z
13	Double-row angular-contact ball bearing	Wheel head	2	$\phi 50 \times \phi 90 \times 20$	7210C
14	Single-row annular ball bearing	Column	1	$\phi 45 \times \phi 85 \times 19$	6209
15	Ball thrust bearing	Column	2	$\phi 45 \times \phi 73 \times \phi 78 \times 24$	53209U
16	Single-row taper roller bearing	Vertical feed reducer	1	$\phi 30 \times \phi 62 \times 17$	7206

5.2 List for gears, worms, worm wheels and lead-screws

No.	Name	Assembly position	Number of teeth or number of thread	Modulus or pitch	Worm screw angle	Material	Heat treatment
1	Teeth belt	Vertical rapid moving	Z=22	8m	-	Q235	-
2	Worm	Vertical feed reducer	Z=2	m=2.75	R	S 45	T260
3	Worm wheel	Vertical feed reducer	Z=31	m=2.75	R	HT200	-
6	Gear shift	Cross feed	Z=17	M=2	-	S 45	Teeth C42
7	Worm wheel	Cross feed	Z=40	M=2	R	QT45.5	
8	Worm	Vertical feed reducer	Z=1	M=2	R	S 45	T250-
10	Rack	Wheel head	Z=123	M=2	-	S 45	-
11	elevating screw	column	-	S = 8	R	S 45	-
17	Pulley	Vertical rapid feed	Z=48	8m	-	HT200	-



Lubricating point	Lubricating method	Lubricant	Lubricating interval
Shaft for table reversing longitudinal moving	Feed in from oil hole of bed slide way	N32G# hydraulic oil	Auto
Wheel head side guide way	Oil feeder	N32G# hydraulic oil	Once a shift

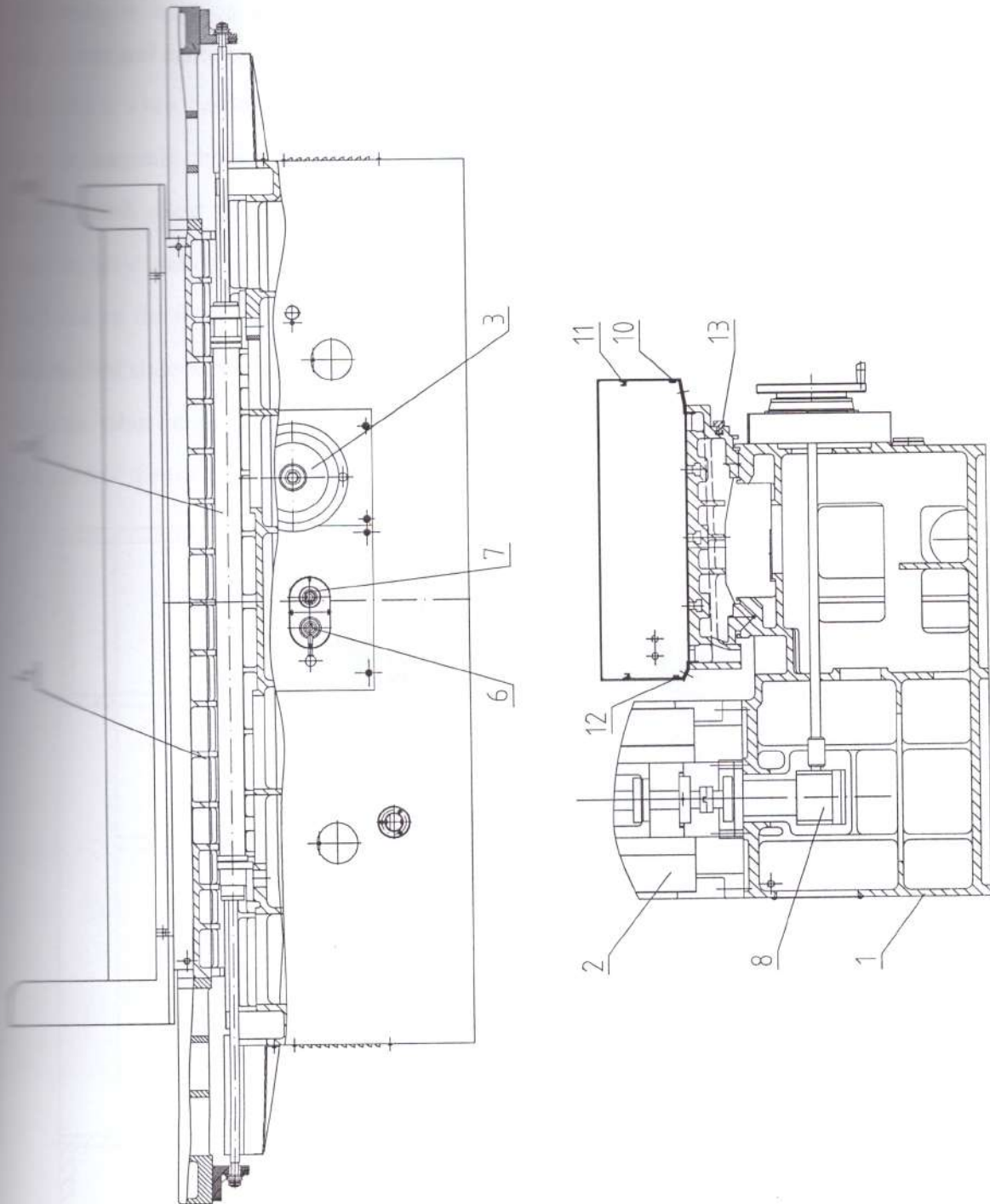


No.	Lubricating point	Lubricating method	Lubricant	Lubricating interval
3	Column back guide way	Oil feeder	N32G# hydraulic oil	Once a shift
4	Lifting screw and nut	Oil feeder	N32G# hydraulic oil	Once a shift
5	Column gib	Oil feeder	N32G# hydraulic oil	Once a shift
6	Column front guide way	Oil feeder	N32G# hydraulic oil	Once a shift
7	Wheel head transverse movement shift	Oil cup	2# lithium grease 5YB1715-59	Once a shift
8	Spindle front bearing	Circulating lubrication	7# engine oil	Once a shift
9	Bed V-slide way	Force-feed lubrication	N32G# hydraulic oil	Auto.
10	Bed flat slide way	Force-feed lubrication	N32G# hydraulic oil	Auto.
11	Spindle back bearing	Oil cap	2# lithium grease 5YB1715-59	Once three months

Hydraulic oil recommended:

Brand	China petro	MOBIL	BP	CASTROL	ESSO	GULF	SHELL	TOTAL
Model	N32G	DTE13 NO.2	Energol SHF 32	Hyspin AWH 32	Univis N 32	Hydrasil Multi	Tellus T 32	Equival ZS 32

Chapter 7: Construction of Machine

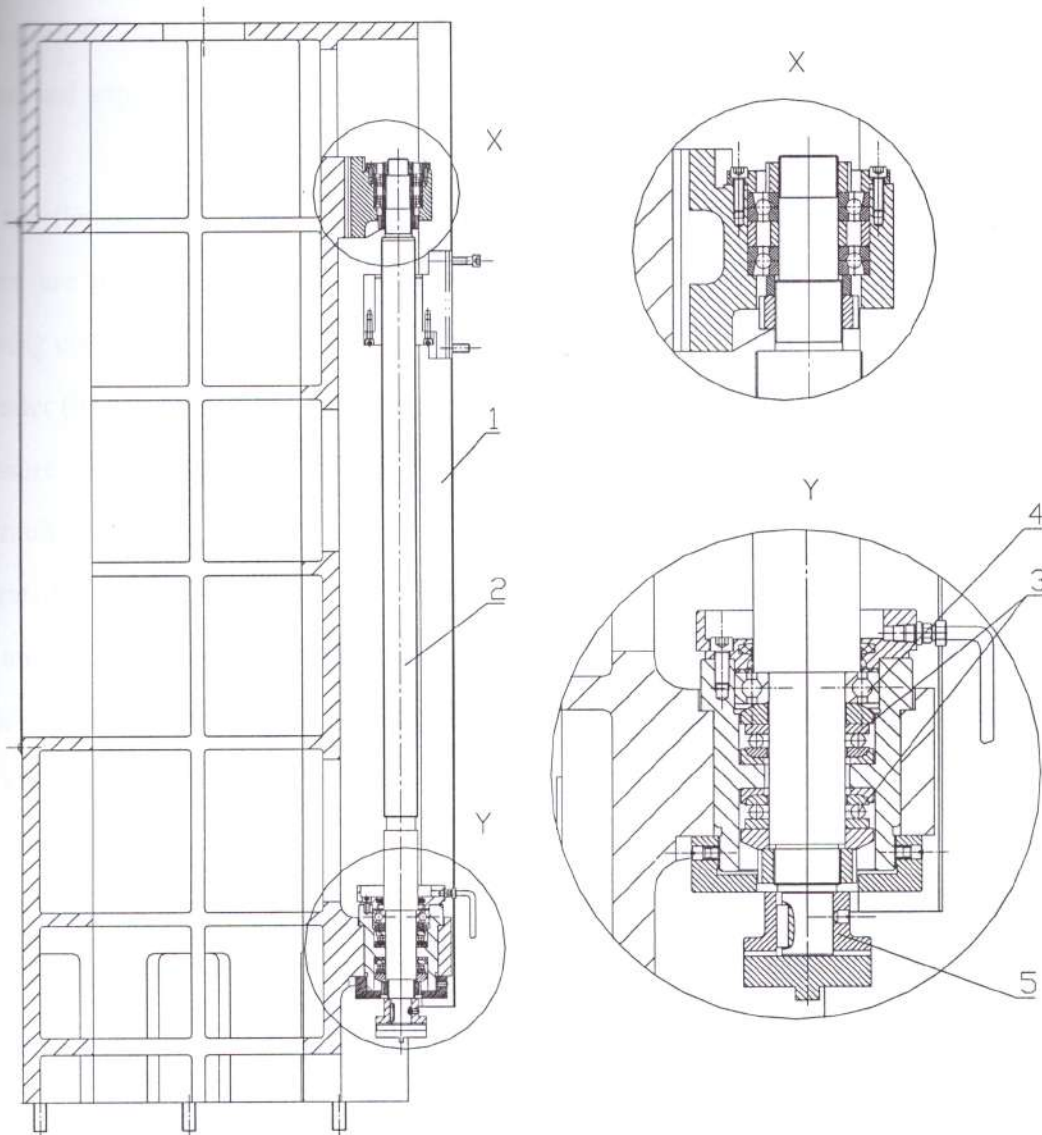


7.1 Bed and table

The machine bed (1) is of box type design, oil tank for the hydraulic system is integral with the bed. Column (2) is mounted on the bed. A speed reduction mechanism (8) for the vertical movement of wheel head is fixed between the column slide ways. Table (4) traverses on V-flat ways on the bed. Table cylinder (5) is attached to the bed between bed slide ways, which provides a reciprocating motion to the table. On the front of the machine

There is a mechanism (3) for vertical movement of wheel head and control panel with (6) reversing or stopping the table and for adjusting table speed and knob (7) for adjusting consistent and continuous cross feed rate.

The table is a box casting piece, there are 3 T-slots on the table surface, used to fix work piece or magnetic chuck. The table has three T-slots for fixing the work pieces or magnetic chuck. Splash guard (9) (10) (11) around prevent coolant from splashing out. Coolant flows from the table guards to the drain pipe into water tank. Table reversing dog (12) is fixed on the T-slot on the front of the table. The table with flat way and V slide way, which contact with the bed slide way, the hydraulic cylinder is located under the table through two blocks, allow the table longitudinal moving. On the front of the table located transverse stop block (13), control the travel and position.



7.2 Column

The column (1) with two flat slide ways, the lifting screw (2) is located in the middle of these two slide ways, by which bring the cross slide plate vertical moving. One set of thrust ball bearing and one set angular ball bearing are assembled on the rear of screw. The vertical feed reducer joins with lifting screw by a clutch located on the end of screw. The column slide way is covered with safe guard for protecting the guide way and screw. Rapid up/down limit stop switch is located on the back of column.

There are bellow guard on the column for protecting slide way and elevating screw.

The wheel head vertical travel limit switch is located on the rear of column

7.3 Cross slide plate

The cross sliding plate (1) has two guide ways system. One can slide on the vertical column ways, and supports the wheel head. Another is horizontal dovetail way for moving wheel head .

On the flat way is mounted lifting roller nut mechanism for vertical feed of lead-screw. There are mounted cylinder (9) for moving wheel head (2) and wheel head reversing moving control box (7). The control box (7) can supply oil to the left or right cavity of the cylinder (9) alternatively.

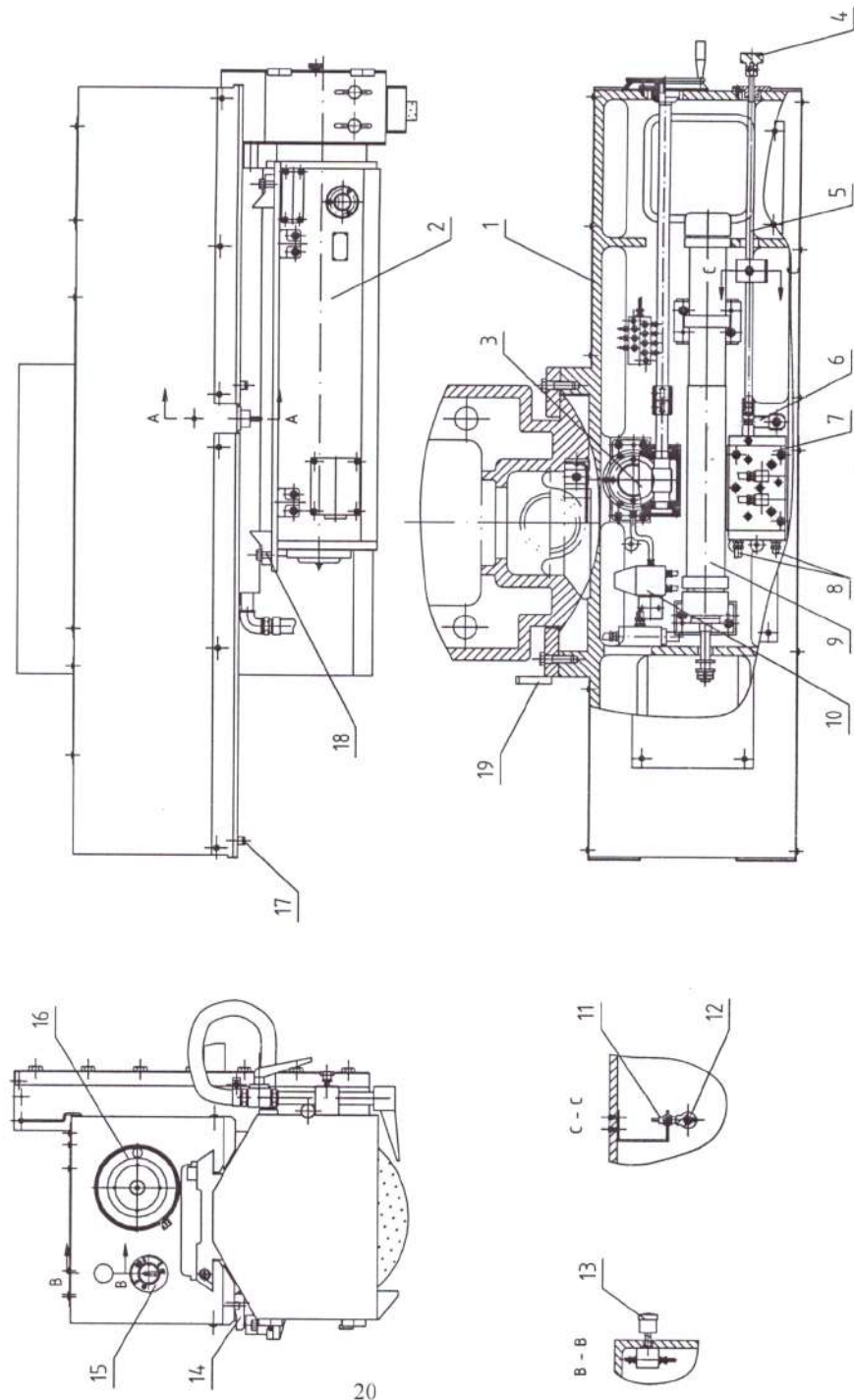
Pressure oil from the feed control valve is admitted through telescopic pipe (8) to the hydraulic reversing control box (7) of wheel head. Wheel head cross reversing can be operated either manually or automatically. Hand-operating is manipulated through pull rod (5) and "cross auto feed / manual feed control knob" (4). While turn the Knob (4), the non-contact switch (11) approach or away form the sensor (12) which is located on the pull rod (5), the sensor (12) will transfer the signal to control system for selecting Auto feed or Manual feed). Automatic reversing travel is actuated by dog (18).

The wheel head Manual cross feed:

Turn the "cross auto feed / manual feed control knob" (4) to " Manual " position, then make the manual feed apparatus engaged, rotate the manual hand wheel (16) realize the wheel head manual cross moving.

The wheel head auto intermittent cross feed:

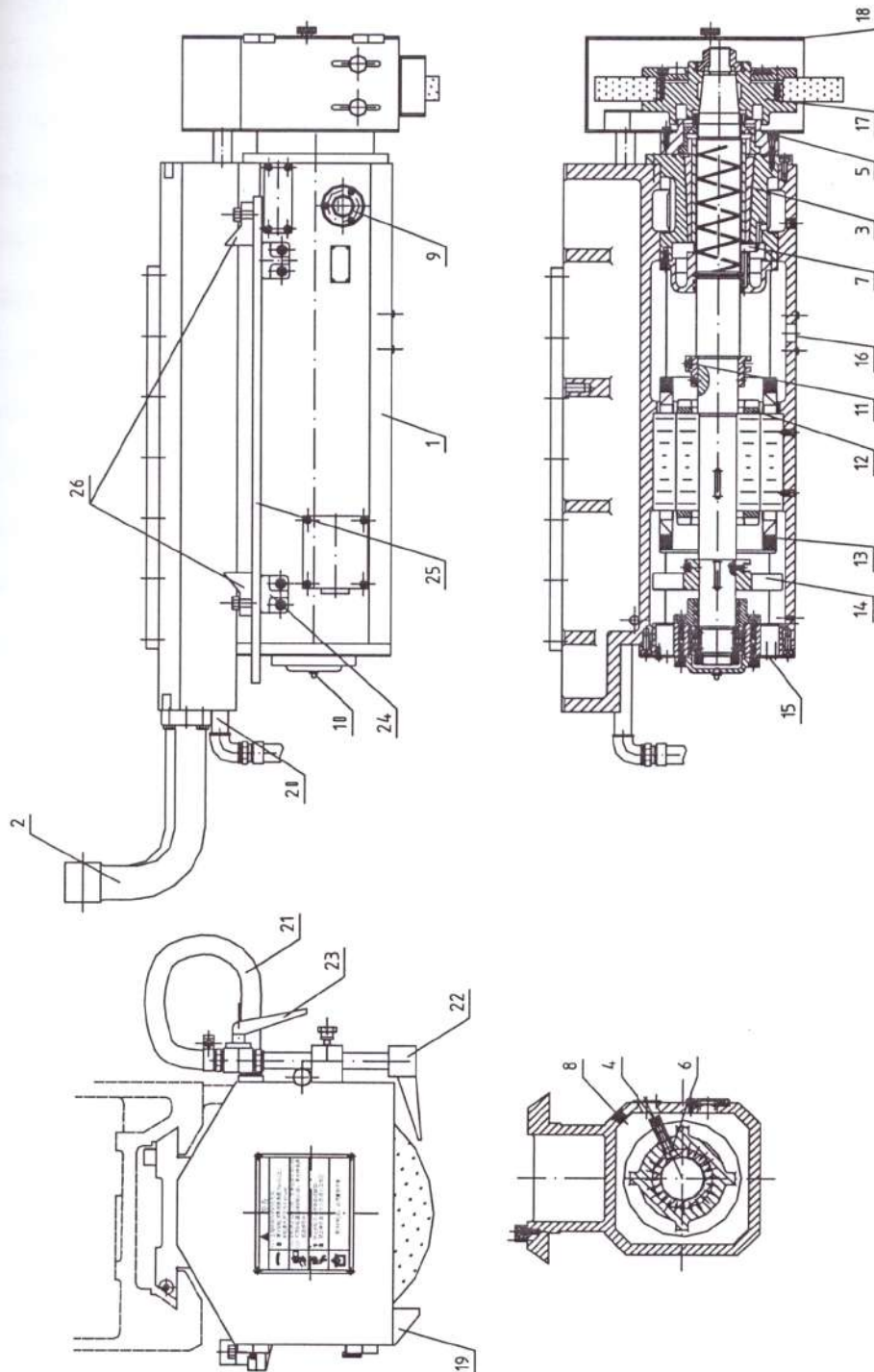
Turn the “cross auto feed / manual feed control knob” (4) to “ Auto” position, turn the “ continuous feed and speed / intermittent feed and speed control knob” to “ Intermittent” position, then the wheel head make cross intermittent auto feed. The reversing movement is control by limit dogs (18) and control knob (14) and vertical shaft (6). Also the operator could control reversing movement by manual: push knob (4) in, the wheel head will go backward, pull the knob (4) out, the wheel head will go forward.



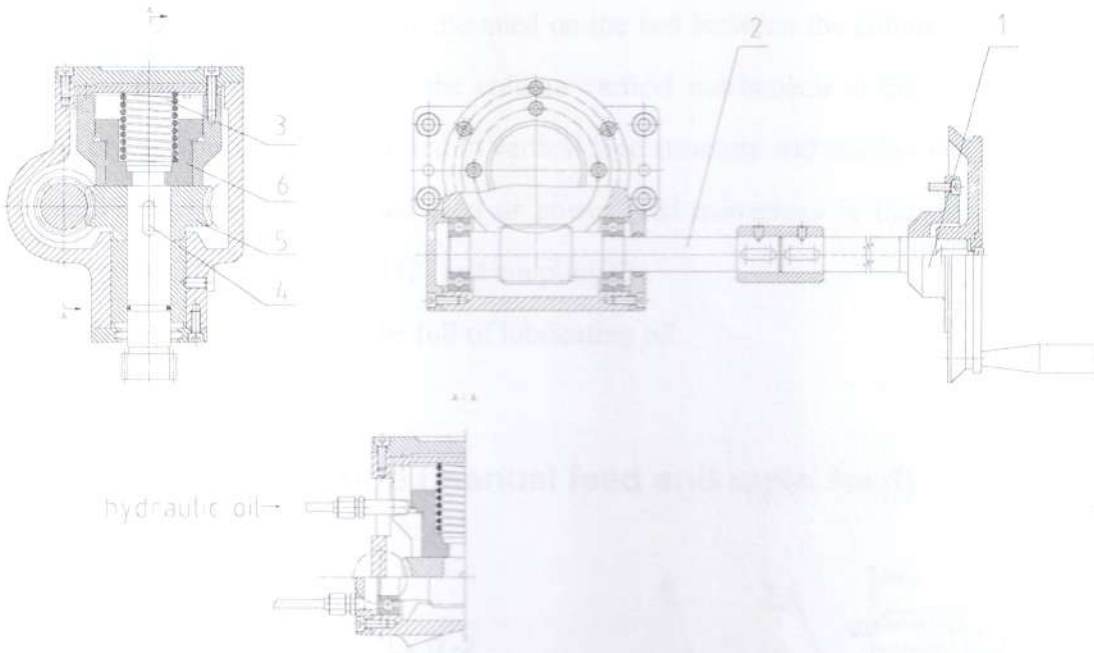
The wheel head auto continuous cross feed:

While the grinding wheel needs dressing, the wheel head should make continuous cross feed. Turn the "cross auto feed / manual feed control knob" (4) to "Auto" position, turn the "continuous feed and speed / intermittent feed and speed control knob" to "Continuous" position, then the wheel head make cross continuous auto feed, also the wheel head could be changed the moving direction by push or pull the Knob (4).

2.4 Grinding wheel head

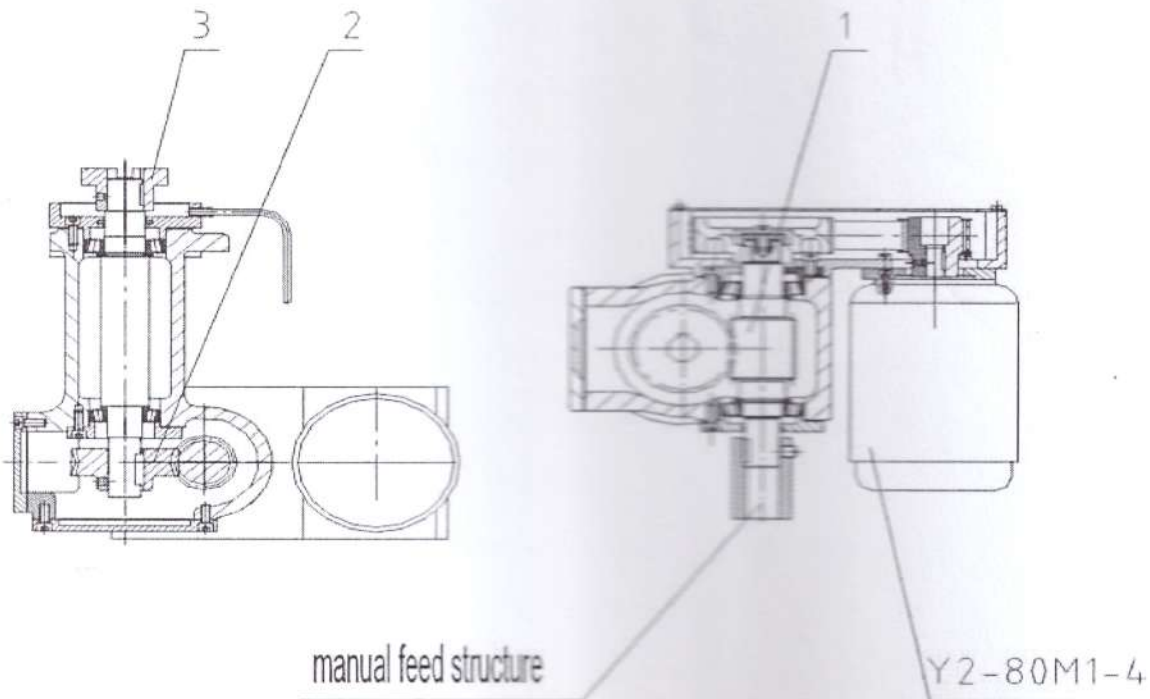


7.5 Transverse feed structure



Manual cross feed: gear shaft (4) engaged with rack fixed on wheel head by the force of spring (3), the worm wheel (5) connect with gear shaft (4) via Key, turning hand wheel (1) motion is transmitted through worm (2) and worm wheel (5) to gear shaft (4) which is engaged with rack fixed on the wheel spindle housing, then drive the wheel head moving.

Hydraulic auto feed: the piston compress spring (3), the gear shaft disengaged with rack.

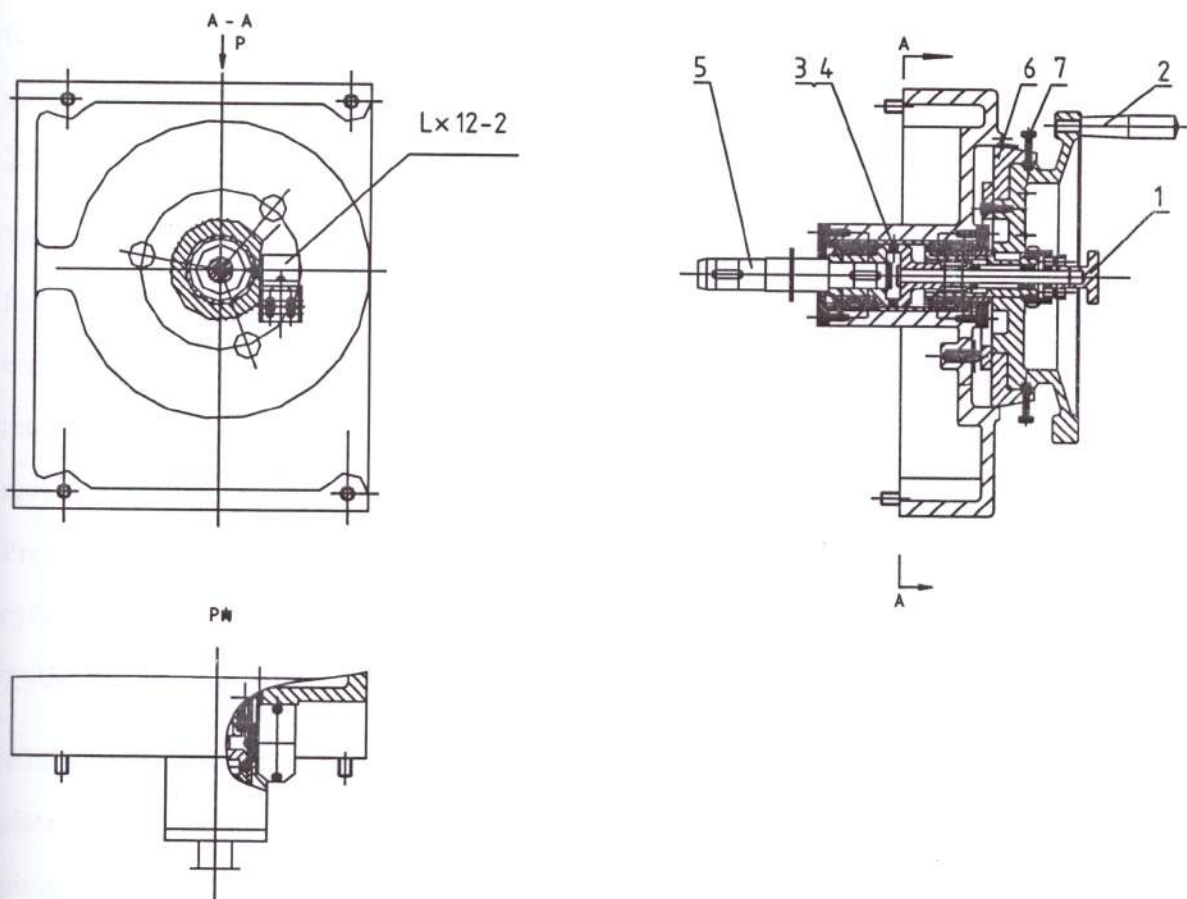


7.6 Vertical feed reducer

Vertical feed reducer mechanism is mounted on the bed between the column guide ways. It reduces the transmission speed of the column vertical mechanism to the elevating screw. One end of the worm (1) is connected to vertical feed structure and another end is connected with rapid feed structure. Manual feed or power feed movement is transfer to elevating screw via worm (1), worm wheel (2) and coupling (3).

Inside of he reducer box should be full of lubricating oil.

7.7 Vertical feed structure (manual feed and rapid feed)



Housing of the wheel vertical feed mechanism is located at front of machine bed, beside hand feed but the interlock mechanism while the wheel head moving up and down rapidly. For manual feed, push in the **knob** (1), turning the **hand wheel** (2), the motion is transmitted to the **worm** of the **vertical feed reducer** through the clutch (3), (4) and shaft (5), then the saddle and wheel head is driven to feed vertically by the screw-nut mechanism.

For rapid moving, draw out the knob (1) to disengage the clutch (3), (4), at the same time the taper of the clutch (3) compress the limit switch L×12-2 to make the elevation motor to be at preparing station, this time push the UP OR DOWN switch (on the panel), the elevation motor would rotate the worm rapidly through a pair of gears to drive the saddle and wheel head to move upward or downward through the screw-nut mechanism. The dial (6) is mounted on **hand wheel** (2). Loosen the **screw** (7) to adjust the dial position. Each graduation of hand wheel will feed vertically by 0.005mm.

7.8 Table hydraulic cylinder

The table cylinder is accommodated on the stand in bed between bed ways. One side is fixed and another side is free. The double-piston rod is fastened by nut to a bracket fitted at end of the table. The piston rod is connected with the piston by hexagonal nut with slot and retainer pin. In the left bracket the bronze sleeve and polyurethane packing is fixed for reducing the friction and leakage.

Pressure oil from the control box is admitted through the piston passage ways in both cylinder heads to either end of the piston pushing table to the right or left

7.9 Wheel head hydraulic cylinder.

Wheel head cylinder is used for cross feed of the wheel. The cylinder is mounted in slide plate. Cross feed of the wheel head is operated through piston and piston rod . Free end of piston rod is fastened to bracket fixed on the wheel head housing. The polyurethane ring packing is fitted in the left bracket, to prevent from leakage because of moving of the piston rod the bronze bushing is fitted in the left bracket.

Pressure oil from the reversing mechanism, is admitted into either ends of the cylinder and push the piston and piston rod to operate the cross feed of wheel head

Chapter 8: Hydraulic system instruction

8.1 Hydraulic system instruction

The hydraulic system adopts a vane type hydraulic pump having a capacity of 0.125L per rev., through suction filter the pump drive pressure oil to different parts of the hydraulic system. Relief valve provides overload protection in the hydraulic system. For lubricating guide ways, the oil passes through a filter to ensure cleanness of lubricant. The flow of lubricant adjusted separately by adjusting screws.

Functions of the hydraulic system are:

1. Reciprocating table movement.
2. Cross continuous and intermittent feed of wheel head.
3. Force lubrication on guide ways.

8.2 Table movement

Hydraulic pump draws oil from the oil tank through suction strainer and delivers it through line 1 to table control box. The oil flows through section VI of start, stop and speed control valve G (operated through Knob "14", diagram of control lever) to line 2. The oil entering line 2 is for actuating the piston of the table cylinder. The oil also flows through line 1 and section II of table movement control valve I (lever "5" in diagram of control) to line 13. This oil controls the admission of oil into the right or left end of the table cylinder. Oil in line 13 is forced through throttle valve E and check valve F into the right end of feed valve D so as to move D to left as shown in the fig.10. As the valve D moves to left, the oil from line 13 flows through the circular groove of valve D, line 14, check valve C and line 15 into the right end of directional control valve A so as to move the latter to left as shown in the diagram. Line 2 is thus connected to line, enabling the oil to flow through these lines into the right end of the table cylinder and to move the piston together with the table to left. At the end of table stroke, the trip dog fixed on the table shifts the control lever towards the left, thus turning control valve I clockwise for 60° to reverse the oil circuit, where by the table will travel in the opposite direction.

When table moves to the left, the low pressure oil in the left side of the table cylinder returns to the oil tank, flowing through line 4 & 5, throttle port V and section IV of valve G, and line 6.

Control valve I may be operated not only by trip dogs automatically, but also by hand through the control lever.

Throttle valve serves to regulate the speed of which reversing valve A acts, thus controlling the stability when the table reverses its travel.

Valve G can be set in three different positions:

- Position 1 gives maximum speed of table travel. The oil circuit as shown in the diagram is based in this valve position.
- When the plunger is set at position 2, ports 2 & 5 are shut and table will remain at a standstill. The pressure oil is, however, still retained in the system, and the wheel head can be operated for wheel truing.
- When the plunger is in position 3, line 1 & 6 are connected to each other, then the pressure oil will return to the oil tank, the hydraulic system thus rendered out of function.

When valve G is set at intermediate positions between positions 1 & 2, an infinite variation of the table speed within a range of 3~27m/min, may be readily obtained.

Should line 1 be obstructed, building up of pressure would occur in the system. When the oil pressure reaches a value in excess of the pre-set load of the relieve valve, it will force the valve open, through which oil will flow into the tank through line 6, thereby ensuring safety operation of the hydraulic system.

8.3 Wheel head cross feed

The hydraulic cross feed of the wheel head is effected through feed valve D and feed control valve H (operated through knob 15, diagram of controls) in the table hydraulic control unit, as well as through the wheel head hydraulic control unit, which consists of reversing valve K and reversing control valve J.

Part of the oil that is pumping into the table hydraulic control unit goes through section VIII of valve H for the operation of reversing valve K and the piston attached to the wheel head. As indicated in the diagram, the oil coming in from line 1 is led into valve H, and, through its section VII and VIII and line 8 is admitted into valve J. At the valve positions of J & K, as shown in the diagram, the oil will pass through line 9, valve K, and line 11 and enter into the left end of wheel head housing actuating cylinder, pushing towards the right, the piston and the wheel head housing attached there on to make the continuous cross feed. Depending on the position of the valve K, whether it remains in the left or right position, the oil will enter into the right or left end of the cylinder to produce cross feed in the forward or backward direction.

The oil at the right side of the piston will return into the oil tank through line 10, 12, back

pressure valve, and line 6.

The position of valve K is controlled by valve J. In the valve position as shown in the diagram, oil coming from line 8 will partly go out from valve J through 18 and enter into the left end of valve K, pushing the plunger towards the right. The right oil at the right end of valve K will return into the oil tank through line 12, back pressure valve, and line 6. At the end of the wheel head stroke, valve J is brought to its left position through the trip dog and lever, whereby the oil come out of valve J and enter into right end of valve K through line 19, instead of 18 as in the previous case. The connection between 12 and 19 is now cut off, but that between 8 and 19 is open. The pressure oil from the left end of valve K will return to the tank through 19. As the plunger of valve K advances towards left, it gradually closes down the connection between 9 & 11 and opens up that between 9 & 10. This will produce a braking effect on the wheel head first and then reverse its direction of feed.

Apart from being trip through dog, valve J may be also operated by hand through knob 11, (diagram of controls). Valve H may be set at three positions through spring loaded balls.

1) When the valve H is set at position 1, continuous cross feed is carried out. The direction of oil flow is shown as in the fig..

2) At position 2, line 1 is cut off from line 8. The oil will stop entering into the reverse unit and cross feed be brought to a stop.

3) At position 3, line 8 is cut off from line 1, but connected to line 7 through section IX so as to carry out intermittent feed. Within the range of 3~30 mm/stroke

The movement of valve plunger D is controlled by pilot valve I. When valve H is positioned for intermittent cross feed, the plunger of valve D will move from one end to the other while pilot valve I changes its position. Every time the plunger reaches its middle position, lines 1 & 7 are connected and the oil from line 7 will flow passing section IX and line 8 of section VIII into valve J of the cylinder through lines 8, 9 and 11. The wheel head may be intermittently fed once, every time the table reverses its direction of travel. The feed amount is regulated by pilot valve H.

Valve H may be set at any intermediate position between position 2 & 1 so as to obtain an infinite variation in the rate of continuous feed within the range of 0.5~4.5m/min.

Valve J may be set either for hydraulic feed or for hand feed. When valve J is turn 90° from its hydraulic feed position, as shown in the diagram, hand feed may be applied. Note that, for hand feed, valve H must set at stop position 1.

8.4 Slide way lubricating

The pressure oil is delivered by pump through line 1 and filter into the oil stabilizer. The oil

flows through throttle valve M & N and passing lines 22 and 23 to the V and flat ways respectively. The required quantity of oil flow is adjusted through the throttle valves M & N. Regulating valve P is provided for the regulation of the lubricating oil pressure.

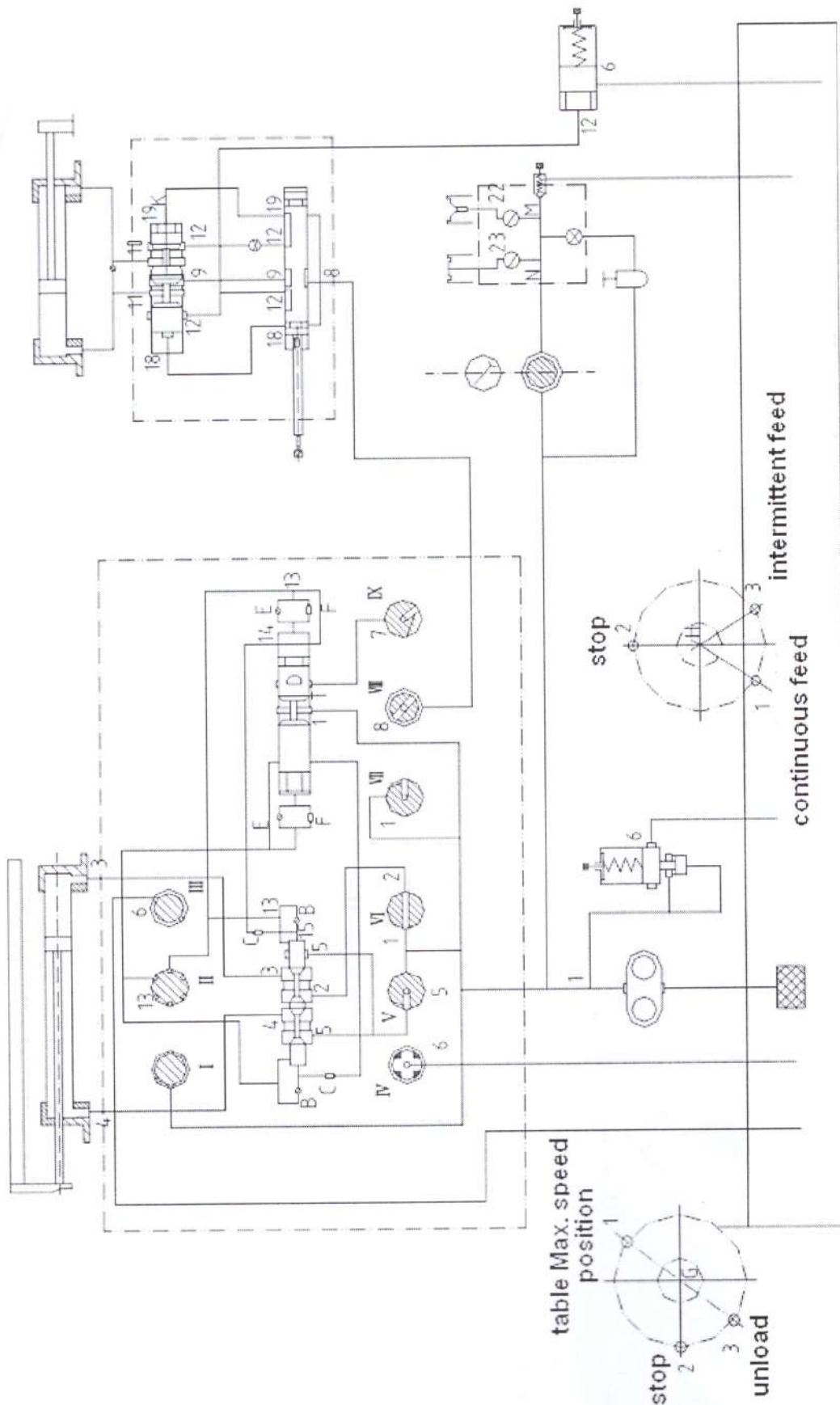
8.5 Other lubricating

Oil feeder S: oil flow into oil distributor Q, lubricating the wheel head slide way and elevating screw, the oil value can be adjusted by set screw on the distributor Q.

8.6 Pressure gauge base

Turn the pressure gauge at the position "3" to test the main oil circuit pressure. Set the relief valve at $10\sim 12\text{ kg/cm}^2$, the table speed control lever G should be set at the "stop" position in the whole testing procedure. After testing turn the pressure gauge at position 0.

To test the lubricating oil pressure turn the pressure gauge at position "2", set the lubricating oil pressure at $2\sim 3\text{ kg/cm}^2$.



(Diagram 10)

8.7 Adjusting hydraulic system

The hydraulic system has been properly adjusted before dispatch from manufacturing factory. Introduction given here in merely serves as a reference for making adjustments after repair of machine.

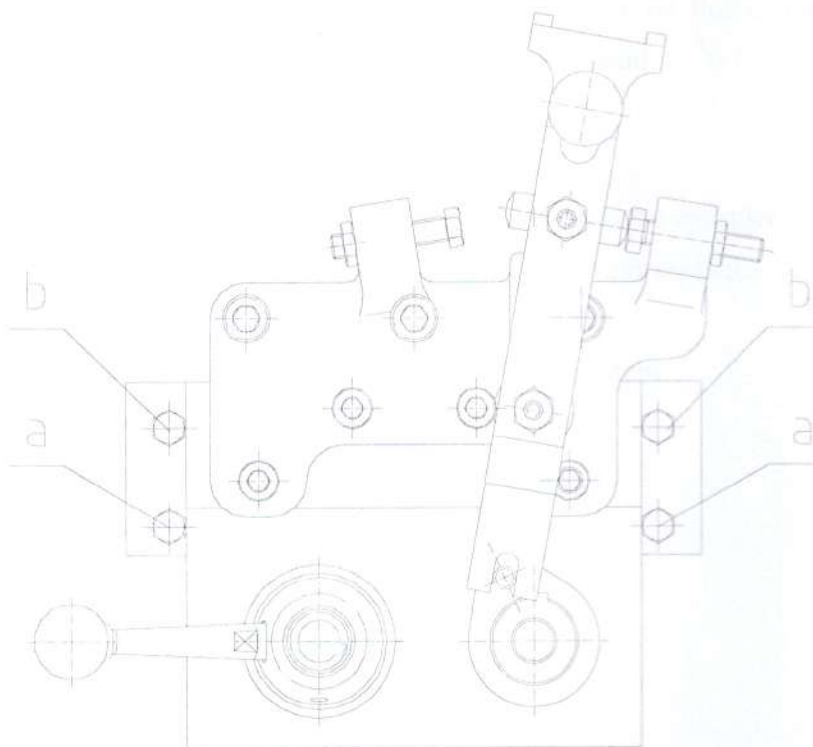
1) The adjustment of table reciprocating mechanism

When mounting the reversing lever, see that the angles included between the vertical line and the lever at extreme left and right positions, are equal. The examination whether corners of reversing lever are actuated by reversing dogs on the table.

The table speed has to be adjusted to about 3m/min. Make sure that the table can be reversed automatically, otherwise, set screw out throttle valves "a" of reversing valve until the table can be reversed automatically.

Thereafter, adjust the speed control valve to give maximum table speed and turn throttle valves "a" until the table makes reversal without shock, then tighten throttle valves "a" by their nuts.

Always remember as throttle valves "a" are screwed-out that the time of dwell at end of each stroke would be shorted but the table reversal would be more sudden causing a hammering action to the hydraulic system. If the throttle valves "a" are screwed-in, the result is opposite.



2) Adjustment of feed control mechanism

To secure uniform intermittent cross feed of wheel head, adjust by means of throttle valves "b". Set the speed at about 20m/min, and control lever for feed control valve at position for max. intermittent cross feed. Turn throttle valves "b" until the maximum intermittent cross feed of about 30mm is reached. Then tighten throttle valves "b" by their nuts. The throttle valves "a" and "b" have been properly adjusted before dispatch of machine from works, so that the operator need not make any adjustment. When the machine are found of traversed in jerky manner after running for a period, so that it is necessary to adjust. Note that the opening should not be too large, otherwise the traverse force of the wheel head will be reduced.

8.8 The possible trouble of the hydraulic system

- Table or wheel head traverse in jerky manner:

Owing prolonged idleness, when starting machine, there might be hindrances in the operation of table or wheel head.

Cause: Occurrence of air in the hydraulic system.

Remedies:

- 1) Examine oil level in the tank. If oil level is lower than marking line, fill oil up to the line.
- 2) Examine whether the suction pipe and oil return pipe are submerged in oil.
- 3) For a certain period, traverse the table over its full course at high speed, or operate the continuous cross feed of wheel head.

Other causes:

- 1) Pressure of hydraulic system too low.
- 2) Heavy leakage of oil in stuffing boxes of traverse cylinder.
- 3) Insufficient quantity of lubricant for guide ways on bed.

Remedies:

- 1) Examine and adjust pressure of hydraulic system.
- 2) Tighten packing in stuffing boxes.
- 3) Adjust lubrication of guide ways.

- Oil pump runs noisily:

Cause:

- 1) Suction strainer clogged up.
- 2) Oil tank not clean.
- 3) Joints of oil pipes worked loose.

Remedies:

- 1) The suction strainer should be frequently washed to prevent clogging up of its

Chapter 9: Transportation and installation

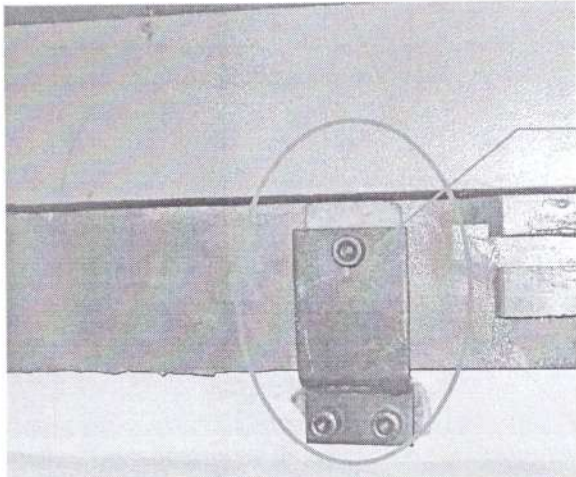
9.1 Transportation and installation the machine

The machine is delivered to the customer packed in wooden case. When opening case, take care not to damage the parts. If lifted with a crane, convey the machine packed in the case to final location as shown in diagram. Make sure that the steel slings are of sufficient strength and of proper length in order to have the machine raised in level position. Where the slings come in contact with bed castings, place strong wooden blocks to protect the machine. For precaution, first raise the machine 100~200mm above floor and test whether the slings are properly fixed in place and slipping. After the machine has been conveyed to final location and is ready for installation, remove the antirust on the bright parts with kerosene and apply a thin layer of machine oil. The machine should be set on a solid concrete foundation as shown in diagram, place wedges around the machine between bed and foundation as shown in diagram. Level the machine properly, the read-out of the spirit level should be with 0.04/1000 and 0.04/1000 longitudinally and traverse. Then grout the foundation with cement. The concrete would be solidity after 72 hours. After settling-up of the cement tighten the foundation bolts. If there is any equipment which causes serious vibration, it would have harmful influence in the machine Especially do not install the machines near equipments causing serious vibration or machines having heavy reciprocating part like double housing planer of heavy construction. Because of to avoid any movement of the table during transport so that clamping plates and screws at the both end of the bed flat guide way are provided. Take away the clamping plates and screws before starting the machine.

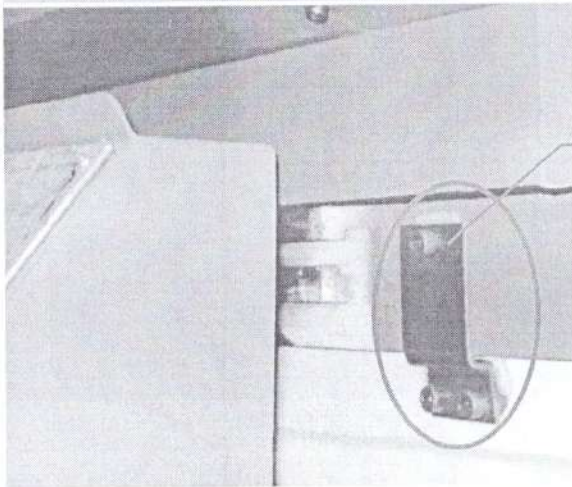
BEFORE RUNNING THE MACHINE

Before running the machine, please do the following at first:

- 1) Read the OPTIONAL MANUAL carefully.
- 2) Remove the protective plastic coating
- 3) remove the lock block (three lock points)



Remove left lock block for tighten the table



Remove right lock block for tighten the table

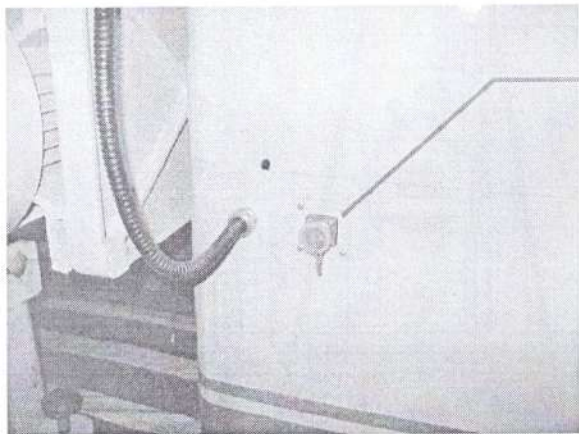


The travel limit blocks have been moved together for lock the head. Before operating, please loosen the blocks and move to suitable position

4) Remove the protective paper coating around the plunger

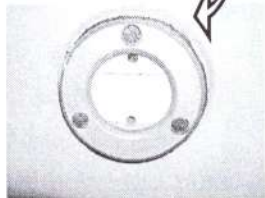
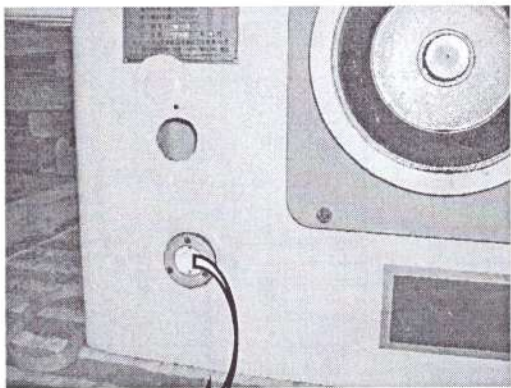


Protective paper around plunger



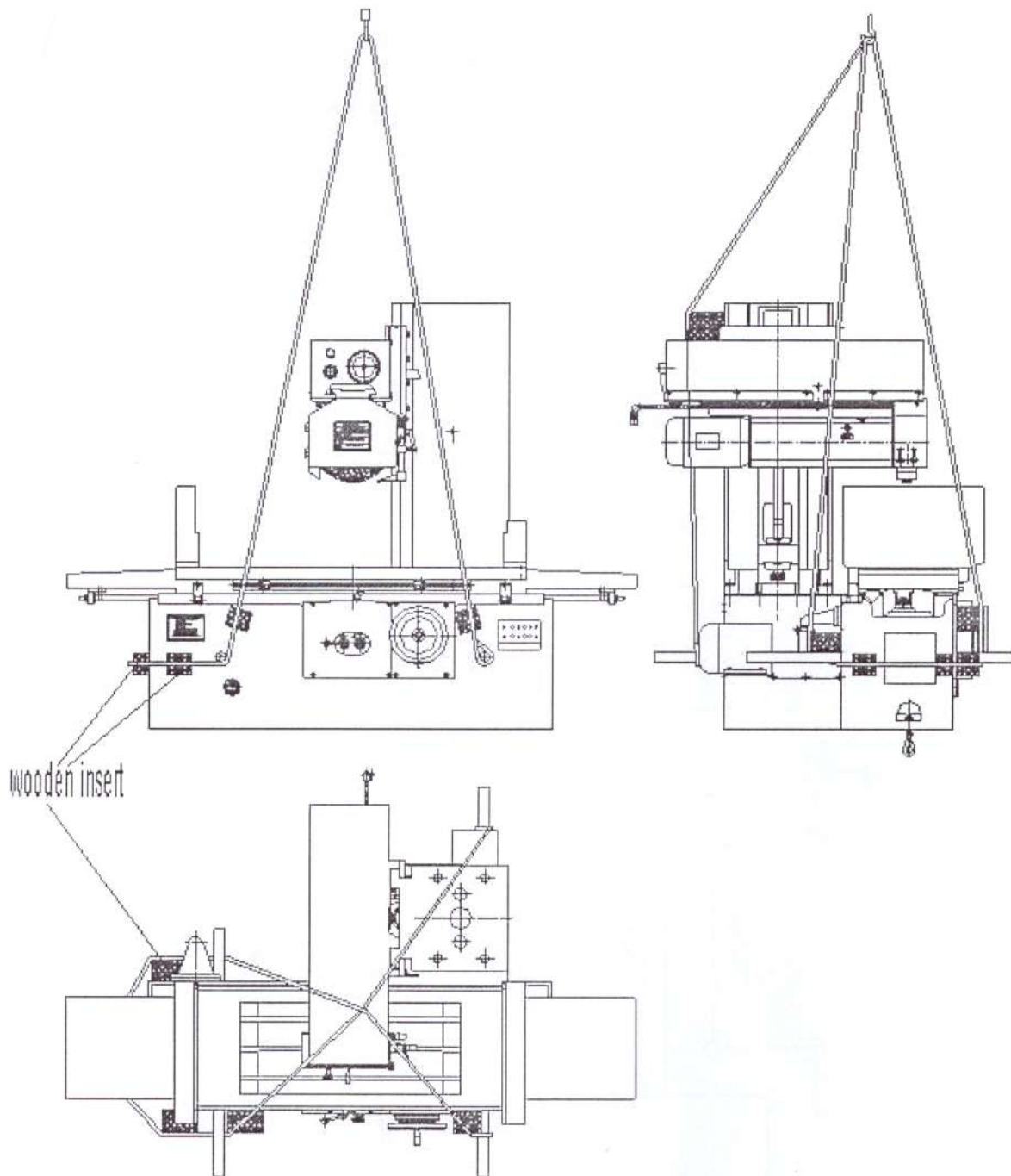
Connecting to the cooling pump

5) fill in hydraulic oil



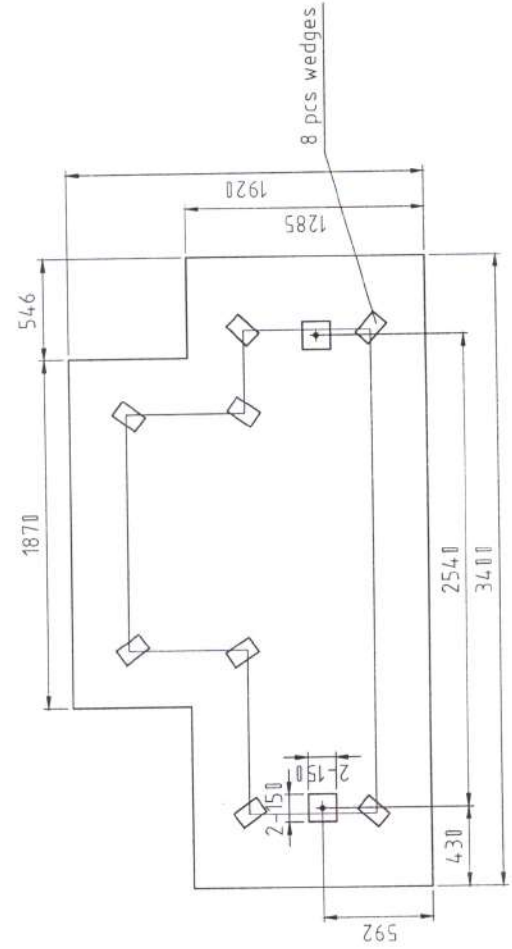
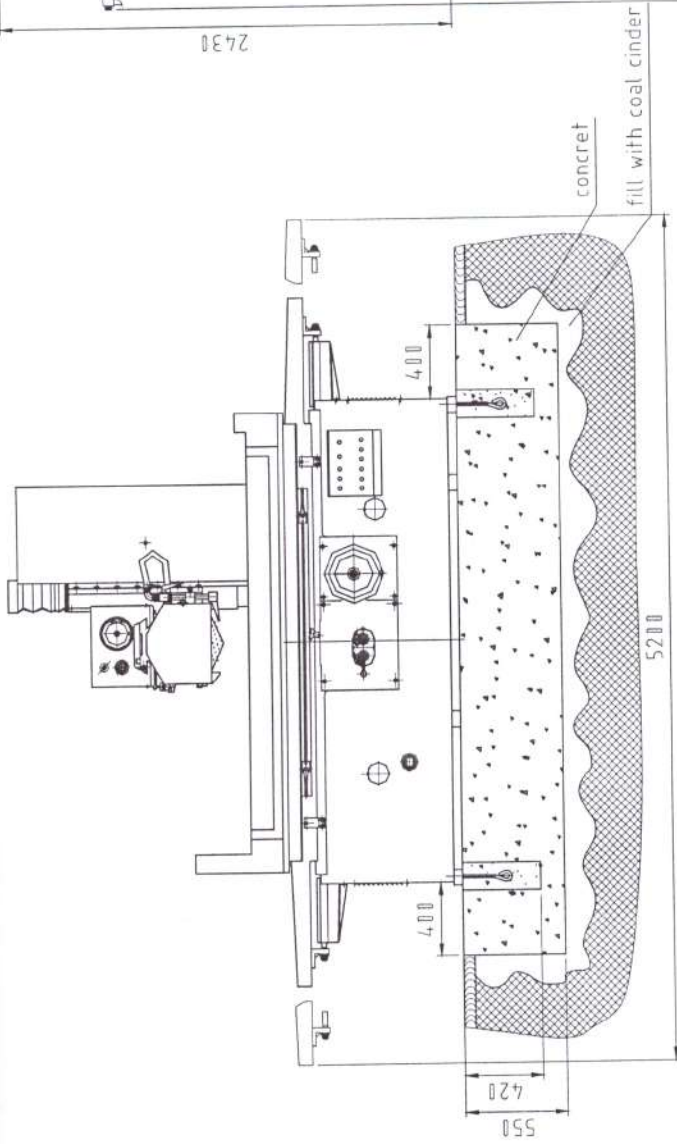
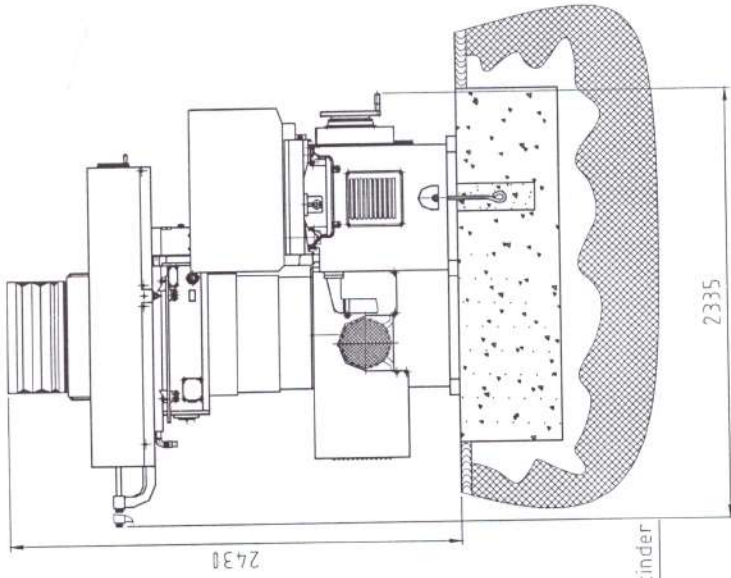
get off the cover locate oh the left side of the body, and fill suitable oil into the body, observe the oil mirror, up the line is OK

9.2 Machine lifting drawing



Note:
Remove the table splashing safe guard
before lifting the machine

9.3 Machine ground drawing



Chapter 10: Preparation before trial running

10.1 Lubricating

Before operating the machine, carefully lubricate the machine parts according to lubrication chart. According to the requirement of the hydraulic system, fill up oil to the level of the oil glass levels. Oil for hydraulic system and lubrication should be filtered before using.

For the hydraulic system, use N32G special hydraulic oil having viscosity of Engler 28.8~35.2 at 40°C. Fill No.7 engine oil into the front bearing of the wheel head

Attention: keep running the machine about 5 minutes and make the slide way well lubricated, this could avoid the slide way damage caused by low lubricant oil.

10.2 Coolant

The coolant used should be 7~10% soluble oil mixing with soft water thoroughly.

10.3 Grinding table surface

After having installed the machine in foundation, level it by means of spirit level and check whether all preparatory works mentioned above have been carried out. Grind the bright surfaces of the magnetic chuck by the machine itself so as to ensure the grinding accuracy.

This completes the preparatory work of the machine installation.

Chapter 11: Using and maintenance of machine

11.1 Trial running

- a) **Before the machine using, the operator must check following case:**
- Check if the fore of Magnetic chuck is Ok
 - Check if the direction of the wheel turning is Ok
 - Check if the coolant is enough
 - Start the hydraulic system, check if all the parts is Ok
 - Moving the table, from low speed change to high speed, on the same time, transverse the wheel head cross feed, check if all is Ok
 - Check the wheel head vertical feed
- b) **Before operating the machine, the worker must be trained and know well of all the lever and switch function, read the **Operation Manual** carefully**
- c) **For maintenance should frequently check the parts of machine and clean all dirt.** Once every 3~4 months, drain oil from oil tank, clean it, then fill up with clean and filtered oil. The sieves on suction strainer should be cleaned and washed frequently. The coolant pump should be cleaned with kerosene after about 2000 hours. Wash the coolant tank at least once a month. Frequently clean the oil tray of the table, coolant drain and oil collector on guide ways.

11.2 Choice of grinding wheel

The effect of grinding has a great deal to do with if the selecting of grinding wheel is correct.

Carborundum grinding wheel possess very high productivity while grinding casting iron, white iron, brass, bronze, aluminum, copper and other same kind materials. While grinding carbon steel, high speed steel, alloy steel and other same kind materials ,the grinding wheel made of corundum is of highest productivity.

Selecting the granularity, should consider that to use grinding wheel of big abrasive grit while grinding material which is soft and sticky. The grinding wheel of big abrasive grit is also suitable for the case of big grinding allowance.

When grinding the surface of big size , should use grinding wheel of big abrasive grit

When grinding hard and brittleness material and the workpiece must have fine surface finish and high precision, using grinding wheel of fine abrasive grain would get nice effect. Also

note its cellularity. Fenestral grinding wheel should be used to grind hard and brittleness material and used in the finishing process, big hole grinding wheel should be used to grind flexible material.

The grinding wheel should be of flexibility to make it suitable for the requirement of self-grinding. Using too hard wheel would reduce the effect because of becoming pointless causing by clogged of oil dirty. Although the worn of wheel reduces, but not economy. Self-grinding make wheel very sharp to raise the productivity and the quality of workpieces and thoroughly eliminate the phenomenon of wheel being worn.

The suitable wheel will bring good working surface, so the operator should pay more attention to select correct wheel suit different material

List for selecting grinding wheel

Material to be ground	wheel	Bond	Grit size	Hardness
Unhardened steel	Aluminum oxide	Ceramic	24-36	ZR ₂ -R ₂
Hardened steel			36-46	R ₃ -R
High speed steel			36-46	R ₃ -R
Nickel chrome steel	Mo oxide		36-46	ZR ₁ -R ₁
Cast iron	Carborundum		24-46	ZR ₁ -R ₂

11.3 Maintenance

Only correctly and carefully maintain the machine to ensure the machine work in good condition for long time, the introduction of the practice of using machine as follow would give a great deal of help to how to use the machine correctly.

a) The finished surface with waves.

The work piece is of undulance because of various different causes as follow:

- 1) The spindle produces vibration because the worn of the bearing, or the clearance of bearing is to big, to adjust the bearing too tighten to create heat, the temperature of bearing should not above 60°C.
- 2) The spindle produces vibration because of imbalance of the flange with the grinding wheel fitted on. To clear up this kind of imbalance the balancing blocks must be moved to the proper position, the flange with the wheel on must be done static

balance on the balancing stand.

- 3) Because that the selecting of grinding wheel and grinding value is not correct. To require fine surface, to raise the depth of grinding and reduce the amount of traverse feed.
- 4) Because of not finely truing the wheel. If the spark weaken and the surface appear the brightness like the mirror surface while grinding, it shows that the grinding wheel became worn, in this case the grinding must be trued.

b) Burnable mark

The burnable mark produce, it is mainly because the grinding wheel is too hard, select softer grinding wheel to avoid producing burnable mark.

c) Wheel head traverse in jerky manner

Wheel head traverse in jerky manner because the gib of wheel head guide ways is adjusted too tighten or bad lubrication of the guide ways. In this case, loosen the gib a little space, adjust the adjusting screws of the oil distributor to lubricate the guide ways.

Chapter 12: Electrical system instruction

12.1 General requirement

- 1) The crane (sling etc.) can not be contacted with the electrical part of machine (electric engine, button panel, metal tube etc.)
- 2) Note before starting the machine:
 - a. The machine which is installed just or not used for a long time need to be processed dryness to dislodge humidity in the engine coil and the insulator of the wire to raise the insulating intensity of the coil and electric wire.
 - b. Examine if all joints join nice, eliminate the dust and dirty, tighten the loosened screws and nuts.
 - c. Test if the moving part of conductor is flexible, and if the contacts contact nice.

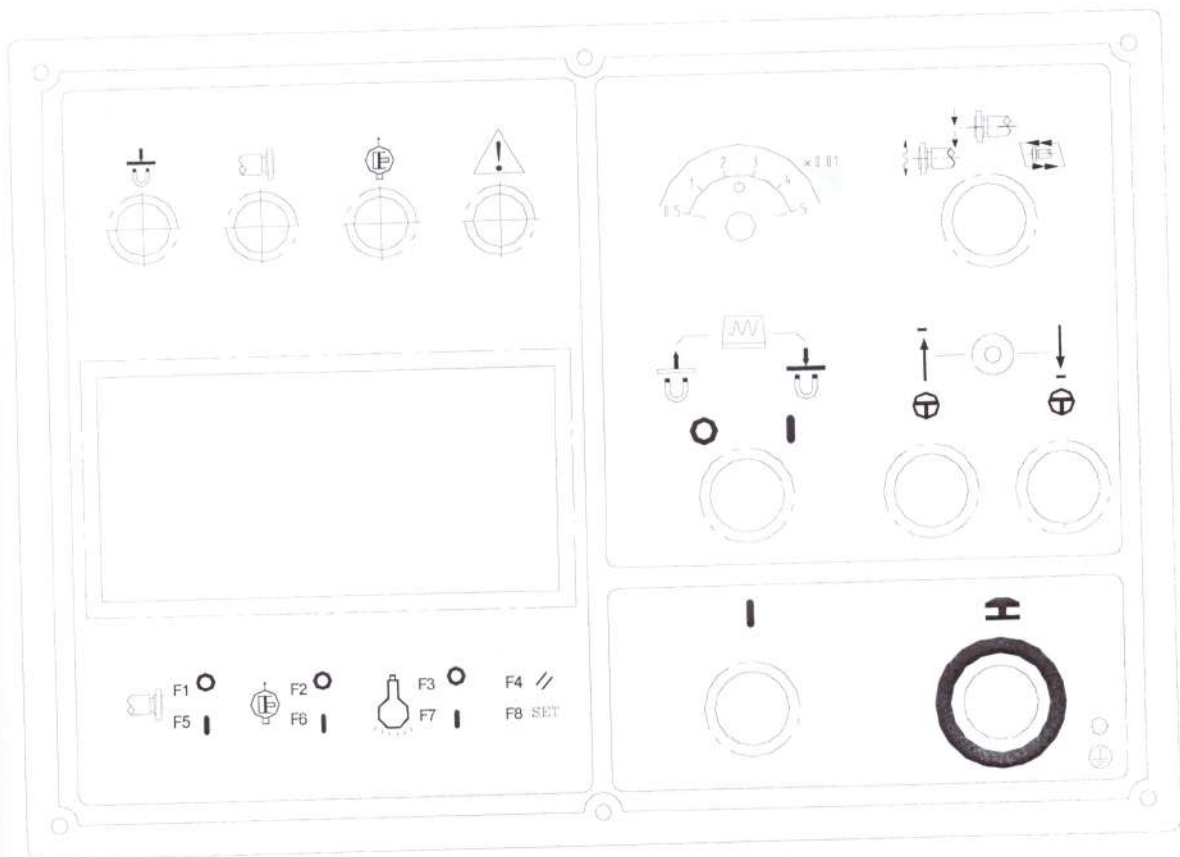
12.2 Electrical equipment

The machine needs three electrical driving devices:

- 1) Wheel driving device: 7.5KW, 4P inbuilt type asynchronous electric motor.
- 2) Hydraulic pump driving device: 5.5KW/6P/ Y series AC motor
- 3) Coolant pump: driven by 0.2KW AC motor.
- 4) Elevating driving device: driven by 0.55KW/4P AC motor.

All electrical controlling equipment (power switch, controller for magnetizing and demagnetizing, heat relay, fuse) is set in the electrical box. To separate the coolant from the machine, power is supplied to the coolant pump with outlet, the magnetic chuck have outlet to separate itself from the machine.

12.3 Electrical operating system instruction



- 1) The left above side of control panel is status indicators ,including magnetizing, grinding head, hydraulic running, warning status indicators.
- 2) In the middle of left side is TXT human machine interface(instruction as below)
- 3) The right of the upper part of the first choose for feed volume down button. SA2 for vertical axis servo motor selection button from left to right in turn for continuous, inching and automatic. SB1, SB2 vertically up and down buttons respectively. SA1 for control of magnetization and demagnetization of sucker magnetic chuck knob. The lower button for the control of power supply and take the mushroom head, easy to prevent accidents in the case of an emergency stop button.



There have nine buttons in the communication menu TD400, button F1-F8 are double function user-button, SHIFT is exchanging button, ESC is canceling button, ENTER is confirming button, in addition, there have two up and down turning page button (setting parameter as reduce and increase value function)

Button F1-F4 is double function button, If press this button directly, word underside function of button is valid. If at the same time press button shift, word upside function of button is valid. For example, there are two functions F5 and F1 at first button. Press this button directly; F1 is selected, if press SHIFT at first, and then press F1, F5 function is valid.

Button Function distribution in communication menu:

F1—grinding head stop	F5 —grinding head start
F2—oil pump stop	F6 —oil pump start
F3—light on	F7 —light off
F4—fault reset	F8 —set feed and zero feed times



NOTE: If press button SHIFT, flashing S will appear at the right-down of menu, if want to cancel SHIFT function, please press ESC button.

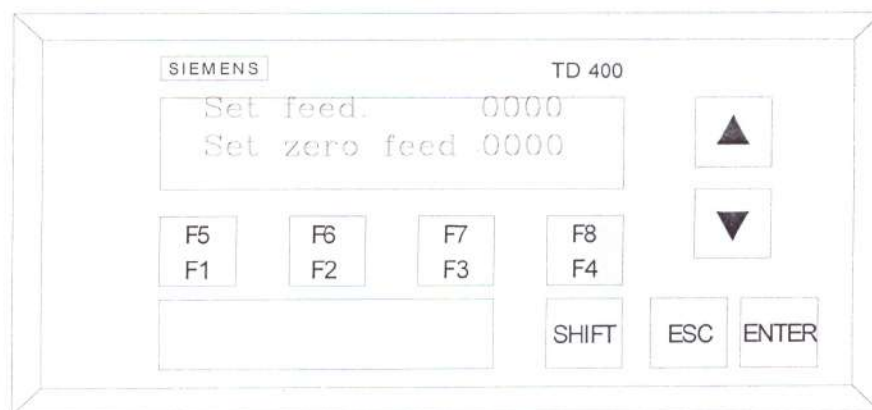
Operation Procedure

After press Power on and turn on the control system, communication menu screen will light, at first , will starting system and then going to processing interface

Processing interface



Setting interface



Without alarm, pressing button F8 will come setting interface. The first parameter will flash, press button \uparrow , \downarrow to reduce and increase times. After up to setting times, press button "ENTER" to confirm the inputting times, moreover automatically move to next parameter, after setting the second parameter, press button "ENTER" to confirm and exit this Menu. Press button "ESC" to cancel flash cursor when parameter is on flash status. Press button "ENTER" to move cursor to next parameter, if there is no setting need for parameter, can press button "ENTER" to move cursor to second parameter, press button "ENTER" to confirm after changing.



NOTE: can not press button “ESC” two times in this menu.

Other Operation

there will appear two menu in default menu after pressing button “ESC”, which is divide into operation menu and diagnose menu.

In operation menu, only time can be set, other parameter only can be look up. The clear button is used for: when cleaning communication menu, for the sake of avoiding error operation, in 30 second after pressing this button, you can clear menu safely.

Some important parameters is included in diagnose menu, especially TD 400 setting, please not change parameter at will, otherwise, will lead the interrupt between communication menu and PLC. In “information looking up” the alarming kinds and content is included.

TD 400 WORKS PARAMETER IS AS FOLLOW:

TD 400 Add:	1
PLC Add:	2
Parameter Add:	0
Baud rate:	19.6K

Remark: in case operator change TD400 parameters uncarefully to cause communication interrupt, please reset the parameter according works parameter.

In addition, the bus cable and connector (plug) must be reliable connection, connection according to the principle diagram

12.4 Machine operation

- 1) please strictly abide by the following instructions before operation, after ready, you can "start" machine.
- 2) Installation calibration mechanical level.

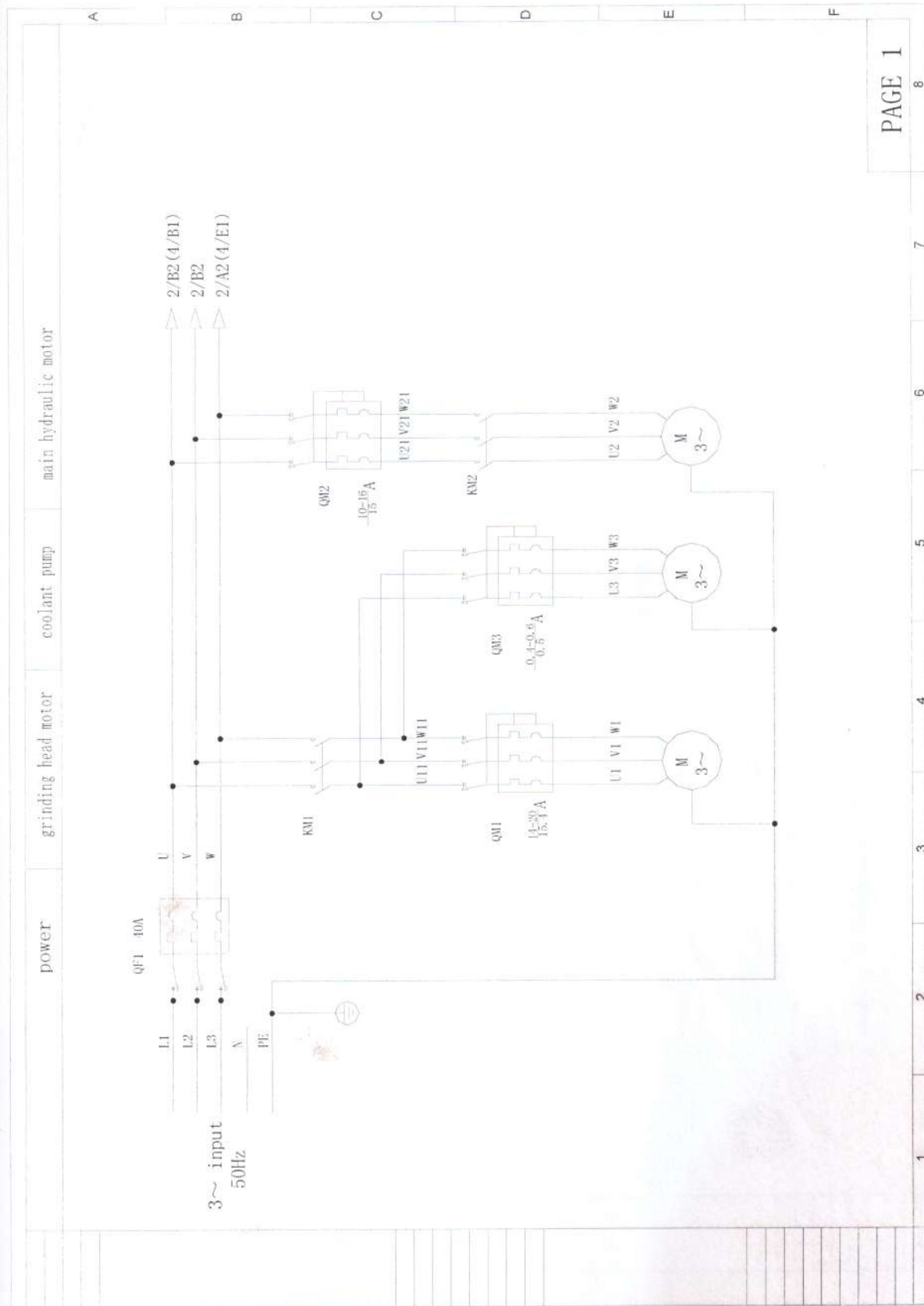
3) According to the lubrication, lubrication machine.

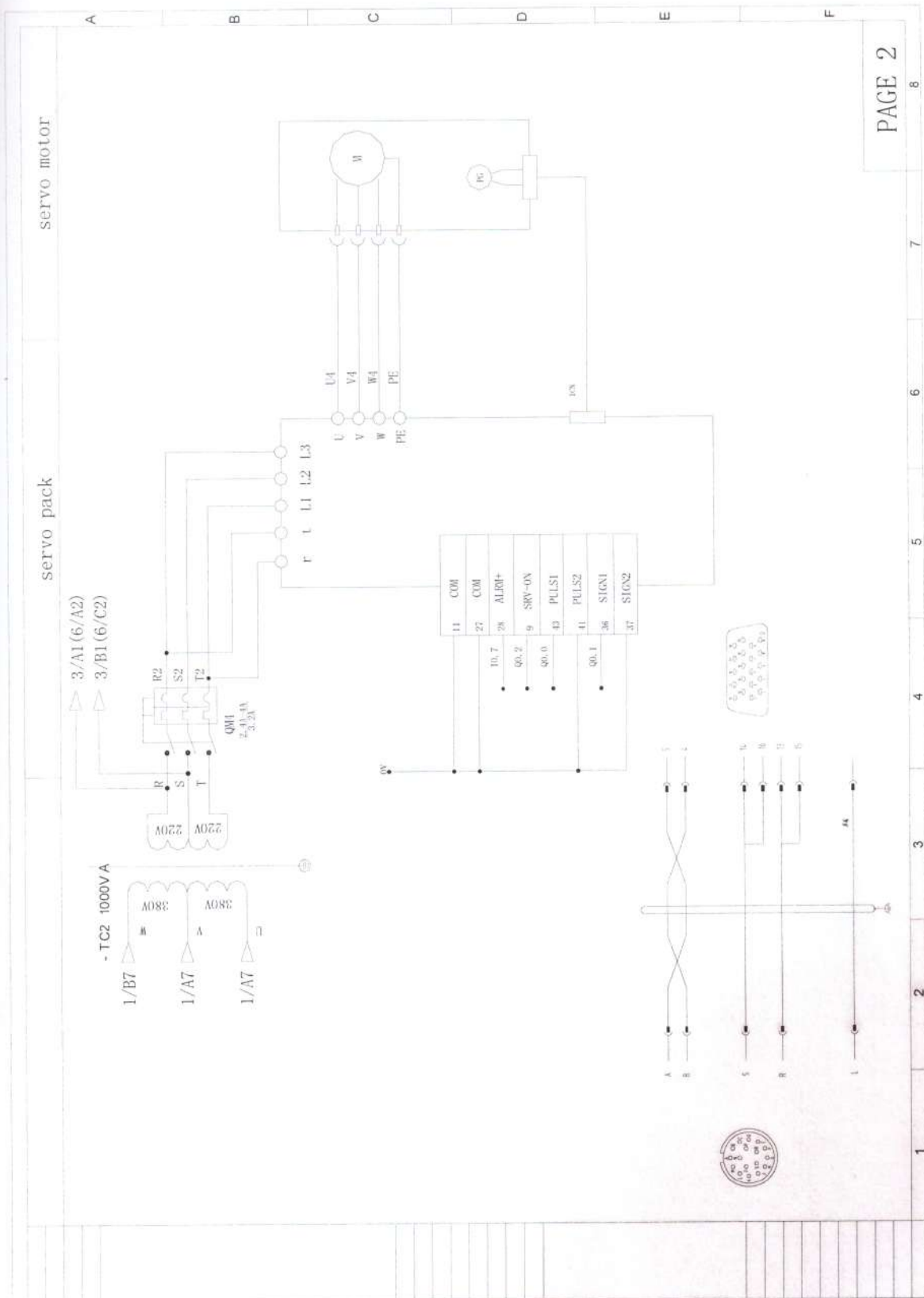
4) Check the direction of rotation of the spindle, must be clockwise. Because before start the spindle must remove the grinding wheel, spindle if is counterclockwise, easy to produce risk.

5) Confirm oil box put enough hydraulic oil.

6) Control worktable movement speed regulation valve stem, must at" stop "position.

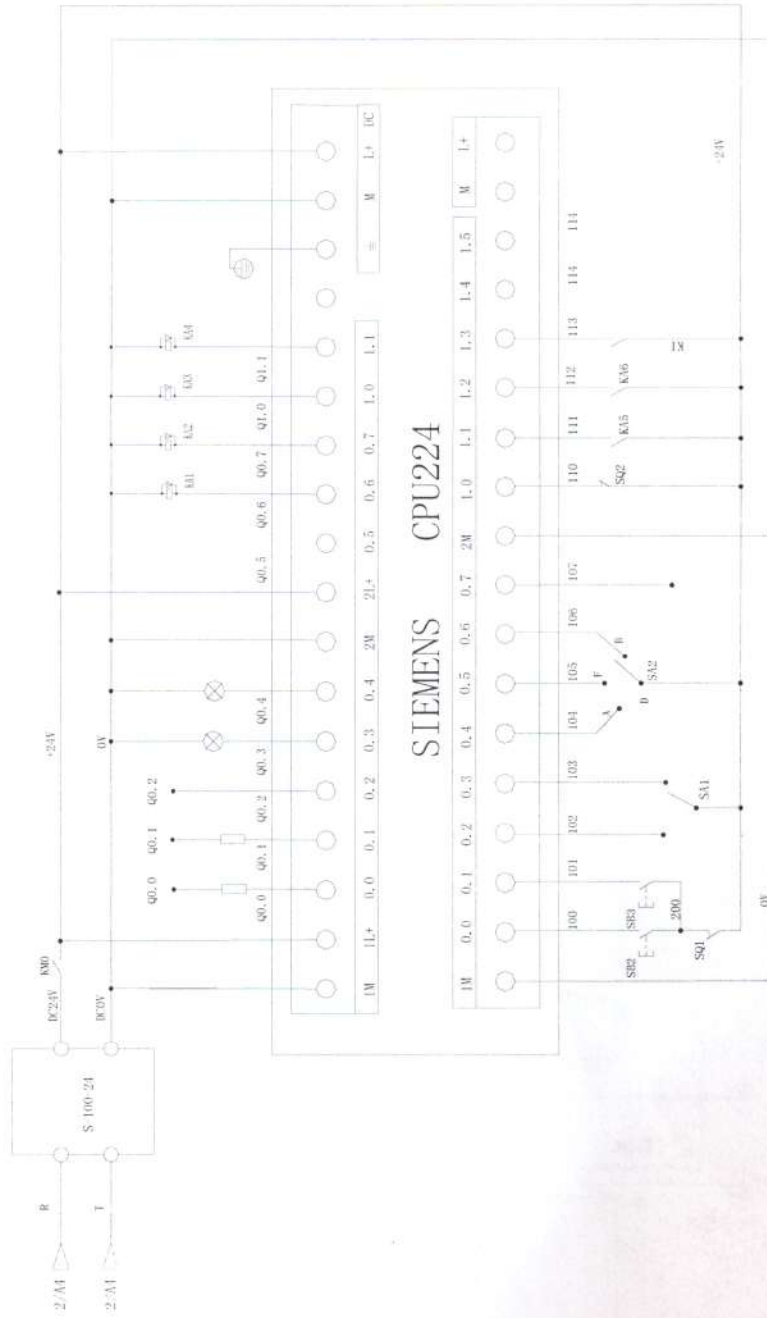
Electrical schematic diagram



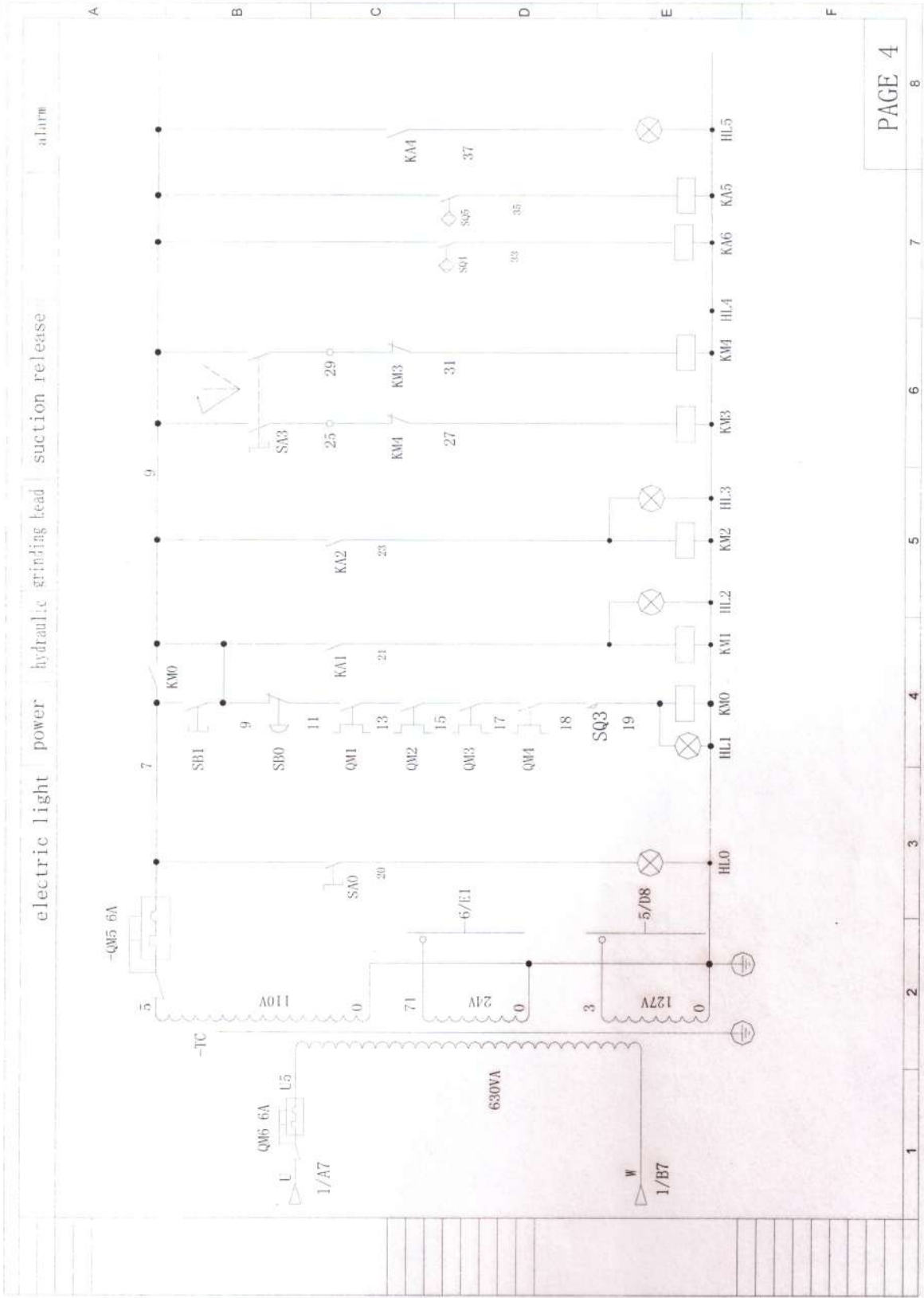


PLC224

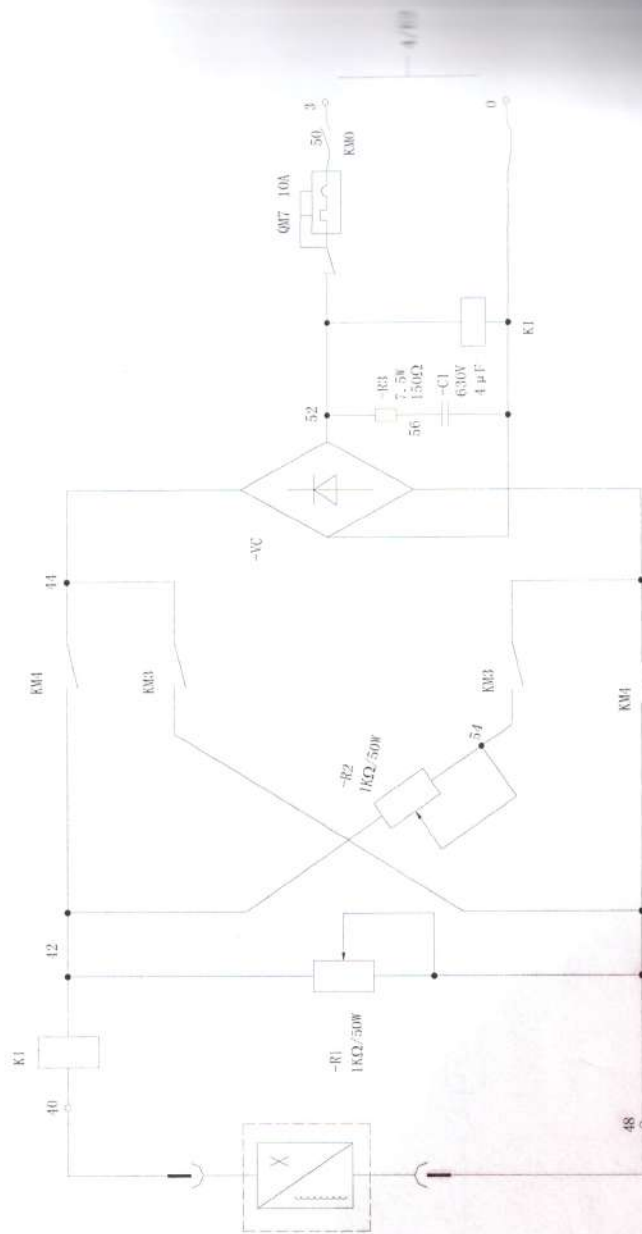
Matching Power Supply



SIEMENS CPU224



adsorptive bedplate





名称	
CAD	
会签	
校对	
审核	
日期	
比例	

PACKING LIST

Serial No.: 1614009

Machine

Name	Model	Quantity
Surface grinder	M7163D×1250	1 set

Technical documents

Name	Quantity
Operation manual / Packing list	1 copy

Accessories

Name	Specifications	Quantity	Notes
Balancing shaft	M7130-8013	1 piece	
Nut	M7130-8014	1 piece	
Socket spanner	M7130-8011	1 piece	
Rusher	M7130A-8001	1 piece	
Sleeve nut	M7130-8017A	1 piece	
Handle	M7130-8016	1 piece	
Wheel dresser	M7130-8005	1 piece	Without diamond
Electromagnetic chuck	630×1250 mm	1 piece	On the machine
Wheel flange	M7150A-50C-109A	1 piece	On the Grinding wheel
Wheel flange cover	M7150A-50C-321	1 piece	On the Grinding wheel
Balancing block	HJX37-80-101	4piece	On the Grinding wheel
Locking screw	M8×10	4piece	On the Grinding wheel
Grinding wheel	P400×40× 203WA46L10V35	1 piece	On the Wheel flange
Washer	20/J51-1B	2 pieces	
Adjusting wedge	HJX81-1	8 pieces	
Foundation bolt	M20×400/J23-1B	2 pieces	
Nut	M20/J11-1B	2 pieces	

Optional Accessories

Name	Specifications	Quantity

Inspector: J32

Date: 2016.11