

# JET

**JMD-1667 DRO**

**Milling Machine**

Original:  
**GB**  
Operating Instructions



**EAC**

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# GB - ENGLISH

## Operating Instructions

Dear Customer,

Many thanks for the confidence you have shown in us with the purchase of your new JET-machine. This manual has been prepared for the owner and operators of a JET JMD-1667 DRO Milling Machine to promote safety during installation, operation and maintenance procedures. Please read and understand the information contained in these operating instructions and the accompanying documents. To obtain maximum life and efficiency from your machine, and to use the machine safely, read this manual thoroughly and follow instructions carefully.

### 1. Declaration of conformity

On our own responsibility we hereby declare that this product complies with the regulations\* listed on page 2. Designed in consideration with the standards\*\*.

### 2. Warranty

JPW Tool Group Hong Kong Limited guarantees that the supplied product(s) is/are free from material defects and manufacturing faults.

This warranty does not cover any defects which are caused, either directly or indirectly, by incorrect use, carelessness, damage due to accidents, repairs or inadequate maintenance or cleaning as well as normal wear and tear.

Further details on warranty (e.g. warranty period) can be found in the General Terms and Conditions (GTC) that are an integral part of the contract.

These GTC may be viewed on the website of your dealer or sent to you upon request.

JPW(Tool)AG reserves the right to make changes to the product and accessories at any time.

### 3. Safety

#### 3.1 Authorized use

This **Milling Machine** centre is designed for milling and machinable metal and plastic materials only. Machining of other materials is not permitted and may be carried out in specific cases only after consulting with the manufacturer.

#### **Never cut magnesium- high danger to fire!**

The proper use also includes compliance with the operating and maintenance instructions given in this manual.

The machine must be operated only by persons familiar with its operation and maintenance and who are familiar with its hazards.

The required minimum age must be observed.

The machine must only be used in a technically perfect condition.

When working on the machine, all safety mechanisms and covers must be mounted.

In addition to the safety requirements contained in these operating instructions and your country's applicable regulations, you should observe the generally recognized technical rules concerning the operation of metalworking machines.

Any other use exceeds authorization.

In the event of unauthorized use of the machine, the manufacturer renounces all liability and the responsibility is transferred exclusively to the operator.

#### 3.2 General safety notes

Metalworking machines can be dangerous if not used properly. Therefore the appropriate general technical rules as well as the following notes must be observed.

Read and understand the entire instruction manual before attempting assembly or operation.

Keep this operating instruction close by the machine, protected from dirt and humidity, and pass it over to the new owner if you part with the tool.

No changes to the machine may be made.

Daily inspect the function and existence of the safety appliances before you start the machine.

Do not attempt operation in this case, protect the machine by unplugging the power cord.

Remove all loose clothing and confine long hair.

Before operating the machine, remove tie, rings, watches, other jewellery, and roll up sleeves above the elbows.

Wear safety shoes; never wear leisure shoes or sandals.

Always wear the approved working outfit.

Do **not** wear gloves.

Wear goggles when working

Install the machine so that there is sufficient space for safe operation and work piece handling.

Keep work area well lighted.

The machine is designed to operate in closed rooms and must be bolted to the cabinet stand or a solid work bench.

Make sure that the power cord does not impede work and cause people to trip.

Keep the floor around the machine clean and free of scrap material, oil and grease.

Stay alert!

Give your work undivided attention. Use common sense. Do not operate the machine when you are tired.

Do not operate the machine under the influence of drugs, alcohol or any medication. Be aware that medication can change your behaviour.

Never reach into the machine while it is operating or running down.

Never leave a running machine unattended. Before you leave the workplace switch off the machine.

Keep children and visitors a safe distance from the work area.

Do not operate the electric tool near inflammable liquids or gases.

Observe the fire fighting and fire alert options, for example the fire extinguisher operation and place.

Do not use the machine in a damp environment and do not expose it to rain.

Work only with well sharpened tools.

Always close the chuck guard and pulley cover before you start the machine.

Remove the chuck key and wrenches before machine operation.

Specifications regarding the maximum or minimum size of the work piece must be observed.

Do not remove chips and work piece parts until the machine is at a standstill.

Do not stand on the machine.

Connection and repair work on the electrical installation may be carried out by a qualified electrician only.

Have a damaged or worn power cord replaced immediately.

Never place your fingers in a position where they could contact any rotating tool, chuck or cutting chips.

Secure work piece against rotation. Use fixtures, clamps or a vice to hold the work piece.

Never hold the work piece with your hands alone.

When using a vice, always fasten it to the table.

Never do any works "freehand" (hand-holding the work piece rather than supporting it).

Never move the head while the machine is running.

If a work piece overhangs the table such that it will fall or tip if not held, clamp it to the table or provide auxiliary support.

Check the save clamping of the work piece before starting the machine.

Remove cutting chips with the aid of an appropriate chip hook when the machine is at a standstill only.

Never stop the rotating chuck or tool with your hands.

Measurements and adjustments may be carried out when the machine is at a standstill only.

Setup work may only be carried out after the machine is protected against accidental starting by pressing the emergency stop button.

Maintenance and repair work may only be carried out after the machine is protected against accidental starting by pulling the mains plug.

Do not use wire wheels or grinding wheels on this machine.

To avoid injury from parts thrown by the spring, follow instructions exactly as given when adjusting the spring tension of the quill (see chapter 7.5)

### 3.3 Remaining hazards

When using the machine according to regulations some remaining hazards may still exist.

The rotating chuck, tool and cutting chips can cause injury.

Thrown and hot work pieces and cutting chips can lead to injury.

Chips, dust and noise can be health hazards. Be sure to wear personal protection gear such as safety goggles, dust mask and ear protection.

The use of incorrect mains supply or a damaged power cord can lead to injuries caused by electricity.

## 4. Machine Safety for JMD-1667 DRO

The JMD-1667 DRO series milling machines are universal machines that are capable of diverse machining, like drilling, reaming, milling and boring.

Flat, slant, vertical surfaces cutting and slotting can be done with formed cutter or face mill. With the spindle center line rotating at any angle in the first half hemisphere of the rotary head, it has a diverse cutting capacity.

The machines have a wide application for single-piece or small batch production in manufacturing, instruments, construction, maintenance and repair workshops and so like industries.

Featuring optimum structure, easy operation and less maintenance, the machine can also be equipped with DRO system for higher positioning and efficiency in batch production.

Marks / Tokens:

★: "**RISKY**" for a potentially instant risky status to be avoided. Fatal death or severe injury may occur.

☆: "**RISKY**" for a potentially risky.fatal death or severe inquiry may occur.

▲: "**WARNING**" for a potential risk. Injury to personnel or damage to machine may occur.

△: "**CAUTIONS**" for extra attention.

### 1. Installation

△ **CAUTIONS**: Understand fully of the requirement and procedures of machine installation listed in the *Operation Manual*.

△ **CAUTIONS**: Coordinate and cooperate with each other with clear communication.

▲ **WARNING**: Check slings,tools and make sure they are qualified as per safety criterions.

### 2. Power

△ **CAUTIONS**: Make sure the electric cabinet door is appropriately closed.

▲ **WARNING**: When machine stops suddenly due to cutoff of power, turn off the main power switch.

### 3. Idle Running



2. The high power and wide speed change range of machine can make full use efficiency of tool, and the machine can cut workpiece at high speed with carbide tool.

3. There are the same function pushbutton and control handle in front of the machine and on the left of machine, which enable operator to operate the machine conveniently.

4. All start and stop of spindle and rapid moving start up of table have visible pushbuttons. table feed is controlled by handles or pushbuttons, feed direction accords with the direction of turning control handle; speed of spindle is controlled by the speed change tray. The handwheel on the right of the headstock controls the feed of spindle.

5. Speed change mechanism of spindle and speed change mechanism of table all rig inching device, which makes speed change well.

6. The main transmission part is made of alloy steel, and wearing parts are made of antifriction material, which make sure working life of machine.

7. Mount adjusting device of eliminate backlash in wearing position to make sure machining accuracy and stable run.

8. The machine was equippted with safety device, mutual interlocking device, stopper in order to make sure safety of operator.

9. The main transmission adopts electromagnetic brake, so the machine will thoroughly stop when pressing STOP pushbutton after work or other reason.

10. The machine can down milling and up milling.

11. Table can rapid feed in cross, longitudinal, vertical directions, which can improve work efficiency.

12. Cross and vertical feed of table is controlled by only one handle.

13. Main drive parts and bearings are automatically lubricated by oil pump, an indicator is set to check the lubricant conveniently. Hand lubrications are set in obvious positions.

14. Main driving parts and spindle are mounted through rolling bearing, which can improve drive efficiency. Adjust the spindle bearing to make sure the precision of spindle.  
Three-direction travels of milling machine are driven

by lead screws, so transmission effieciency is high. Cross feed may be applicable for up milling. Do not choose roughing feed when adopting down milling, otherwise cause kick on the Y travel. Cross component

force will increase and kick on the cross travel happens when longitudinal cutting, therefore clamp handles (2), (28) to prevent cross kick, must loosen them after cutting, see Fig .2 .

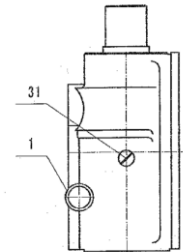


Fig 2

The kind of machine not only has the performance of general vertical knee-type milling machine, but also machining and measure workpiece at the same time when installing DRO device, so make sure the machining quality of workpiece, and reduce labour intensity and raise labour productivity.

Vertical knee-type milling machine may adopt DRO device, and please refer to the instruction of DRO .

## 6.MACHINE STRUCTURE

The machine is composed of base, column, vertical milling head, knee, table, spindle transmission, feed transmission and corresponding speed change control mechanism, coolant and electrical equipment and so on. (See Fig.1 )

1. Base and column parts: Column is fixed on the base with screws; column is box-type construction cast iron, inner reasonable dispose ribs enhance rigidity, so base and column are supporting parts of vertical and table; main motor is fixed at the back of the column; main transmission system is installed in the column; speed change box is fixed on the left of the column; electrical equipment is fixed on both sides of the inferior of the column. Cooling box is in the base, cooling pump is on the base.

2. Spindle transmission parts:  
Spindle transmission mechanism is installed in the column, one end of shaft I connects with main motor through elastic coupling, electromagnetic clutch is fixed on the other end of the shaft I to brake the spindle. Spiral bevel gear at the end of shaft V connects with vertical milling head. Check and

adjust the main transmission when taking off the cover on the right of column.

### 3. Vertical milling head part:

Vertical milling head is installed in front of the elbow of column, and vertical milling head can tilt 45° left and right in vertical plane through small gear drives arc gear ring, the small gear, gear ring is fixed on the turning head, small gear is fixed on the left of the elbow of column, turn the small gear to tilt the vertical milling head. Fasten vertical milling head with T-screws when tilting vertical milling head to target position. Accurately locate the vertical milling head with taper pin when it is in zero position in order to ensure squareness of spindle to table. Spindle is in vertical milling head, bevel gear on output shaft in main drive system meshes with bevel gear on the vertical milling head, then drive quill to turn through a pair of gears. Quill drive the spindle to turn through sliding key. Spindle can axially move in quill. Precision rolling bearing is fixed in the quill. Quill can axially move in the vertical milling head, and the stroke of quill is 70mm. Turn the handwheel on the left of vertical milling head to make the quill move vertically in order to mill different deep machining surface or drill. Clamp the quill when it is in any position.

### 4 . Spindle speed change control part

Spindle speed change control box is independent part, it is installed on the left of the column. (see Fig.3)

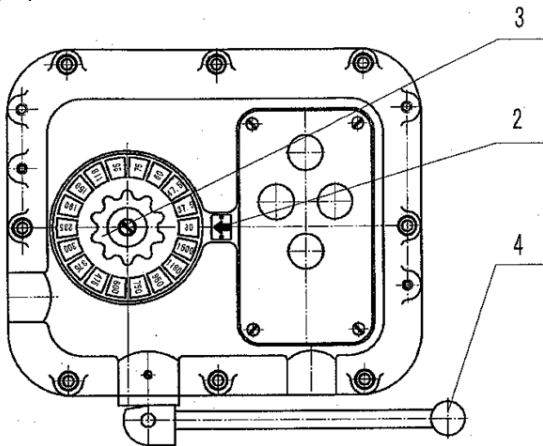


Fig 3

Porose disc, rack, shifting fork control position of each sliding gear.

Operating sequence as following:

4.1 Press the handle (4) down to make key of the handle slide out from groove, then turn left till keyblock fall into the first groove.

4.2 Turn dial scale (3) and make target speed aim at index (2), at the same time positioner automatically

fix position. Turn dial scale (3) clockwise or counterclockwise to save machining time.

4.3 Turn the handle (4) to original position, keyblock of handle must fall into groove. Sudden actuation of motor during rotation of handle can realize easy engagement of speed change gears . Connection time of power supply relates to movement speed of handle. Demand quick turning the handle (4) for avoiding over impact of gears, but reduce the moving speed of handle (3) when it approaches end point position in order to gears mesh well.

Stop rotation of the spindle before changing speed

### 5. Feed and speed change part

Speed change box is independent part, it controls feed and rapid movement of table.

Speed change box is installed on the left of knee, which includes five drive shafts. Different engagement of a set of gears and two sliding triple gears on drive shafts will get 18 steps speed.(see Fig.4).

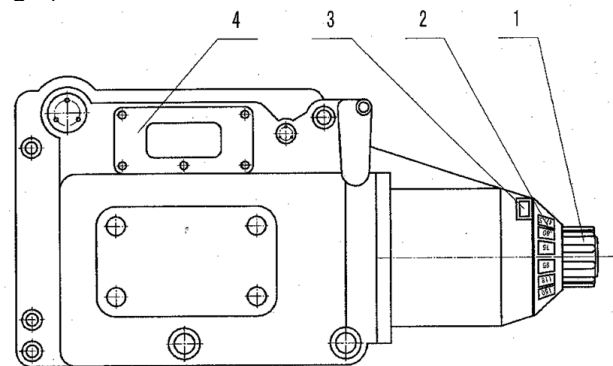


Fig 4

Operation sequence as following:

5.1 Pull handle (1) forward (don't touch limit position).

5.2 Turn the handle (1) to make target speed on dial scale (2) aim at index (3), the handle may turn clockwise or counterclockwise. the number of the dial scale (2) denotes longitudinal and cross feed speed, vertical feed speed is one third of the number of the dial scale (2).

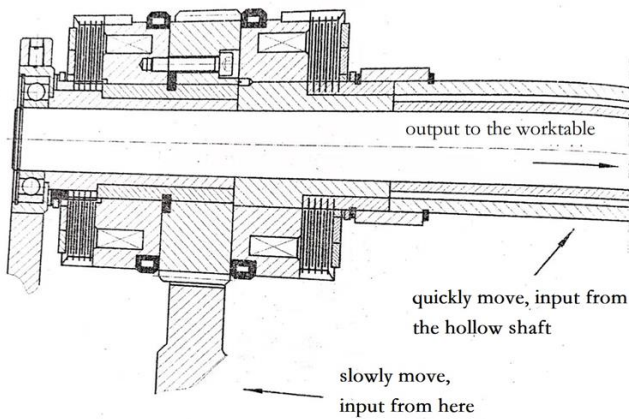


Fig 5

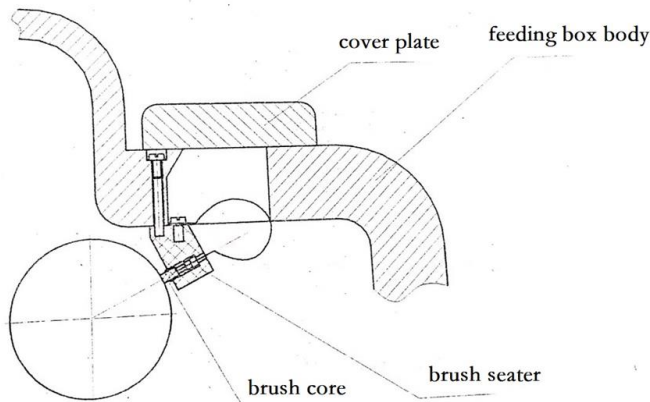


Fig 6

5.3 Pull the handle forward to limiting position to connect to power, then push back to original position. Operator can change speed during running of machine. Longitudinal, cross, vertical directions feed and rapid movement are controlled by two electromagnetic clutches on the shaft VI (see Fig.5), and the two electromagnetic clutches interlock. It is slow feed when electromagnetic clutch A attracts; it is rapid feed when electromagnetic clutch B attracts. Electromagnetic clutch is attrition flake type, and direct current produce suction, which passes 130 NM torque. Refer to Fig.6 about electromagnetic clutch brush construction, brush seat is fixed at the feed speed change box, remove cover (4) first (see Fig.4), then may disassemble or repair it. Note: Ensure brush core flexibly slide and slip ring of electromagnetic clutch contact well, Coil brush is made of wiring cloth only when replacing it, not use other material instead.

#### 6. Knee part

Knee is in front of column, and connect with column through dovetail way, adjust the backlash of knee to column with gib. Clamping handle is on the right of knee. Knee connect with table through rectangle ways.

Flanged type feed motor is in the front of knee, feed

speed change box is on the left of the knee, cross table feed handwheel and lifting control handle lever are in front of the knee. Handwheel and handle lever disengage drive shaft when table power feed or rapid feed due to interlocked construction, which ensures operation safety.

Cross and power lifting feed handles are fixed respectively at two ends of the left of knee, which takes the same effect, the five kinds of positions of the handle.

- (1) up vertical table feed or vertical rapid feed up
- (2) down vertical table feed or vertical rapid feed down
- (3) forward table feed or rapid feed forward
- (4) backward table feed or rapid feed backward
- (5) neutral stop

All the directions do not feed at the same time due to the five kinds of positions interlock. dogs are fixed on the column and table to limit travel of knee and table.

**Notice: Must make the handle (10) be in the neutral position first before adjusting the handle (10) up or down, forward or backward during the power feed of the table.**

7. Table part: Table is installed on the knee, table connects with saddle through dovetail way, adjust the backlash of table to saddle with gib.

Two longitudinal feed handwheels are respectively fixed on the left of table and in front of saddle. Two longitudinal feed handle levers are respectively fixed in front of the table and under the left of saddle, control handle position: left, right, stop.

**Notice: Must make the handle (26) be in the neutral position first before adjusting the handle (26) left or right during the power feed of the table.**

First check whether control handle direction accords with actual movement direction, change phase sequence of power supply if their directions disaccord.

Two clamping screws that locates in front of saddle to clamp the table, and cross table feed clamping handlebars locate at both sides of saddle to clamp the saddle.

#### 8. Cooling part

Coolant is in the base of the machine, remove the rear cover and see coolant pump. Coolant is transmitted to nozzle, the flux of coolant is controlled by valve.

### 7.PARAMETERS

No.	Items	JMD-1667 DRO
1	Table size	400x1700mm

2	Max. longitudinal travel of table	900
3	Max. cross travel of table	315mm
4	Max. vertical travel of table	385mm
5	Y axis travel (cross)	700 mm
6	Z axis travel (vertical)	500 mm
7	Distance of T-slot	90 mm
8	Spindle taper	ISO50 7: 24
9	Diameter of spindle bore	29 mm
10	Diameter of spindle front bearing	100mm
11	Moving distance of spindle axial direction	85mm
12	Max. revolving angle of vertical milling head	$\pm 45^\circ$
13	Distance of spindle nose to table surface	30-500 mm
14	Distance of spindle center to vertical ways of column	450 mm
15	Speed steps	18
16	Spindle speed range	30-1500 rev/min
17	Table feed range	
	Longitudinal	23.5-1180mm/min
	Cross	15-786 mm/min
	Vertical	8-394 mm/min
18	Table rapid moving speed	
	Longitudinal	2300 /min
	Cross	1540 mm/min
	Vertical	770 mm/min
19	main motor	11KW
20	Feed motor	3KW
21	Coolant pump	1/8HP
22	Overall size (L×W×H)	2556×2156×2258mm
23	Net Weight	4250 KG
24	Max. load	500 KG

## 8. UN-PACKING AND INSTALLATION

### 1. Transportation of machine

The machine tool is conveyed to destination by crane, forklift or round roller, and the load of steel wire is over 5 tons if convey the machine tool with crane. Obliquity of board is less than  $10^\circ$  when conveying on the board.

### 2. Un-packing

Remove the package and inner stanchions carefully, and do not damage any parts of the machine. Take crank, accessories box and other parts out of packing box first.

Take the information out of the accessories box, check whether the all accessories according to packing list, and check whether handles and protrudent parts are damaged during the transportation. Inform dealer or manufacturer if anything wrong exists, otherwise we are not responsible for it if the machine has been used.

### 3. Conveying of machine

Set the tightwire according to the position on the fig.7 when conveying the machine. Move the table close to the column

before conveying the machine, and tightwire must not touch the handle levers and cooling pipes, electric wire and other exposed parts to avoid damaging them, set soft material (wood pad) between the tightwire and machine surface to avoid scratching the paint on the machine surface.

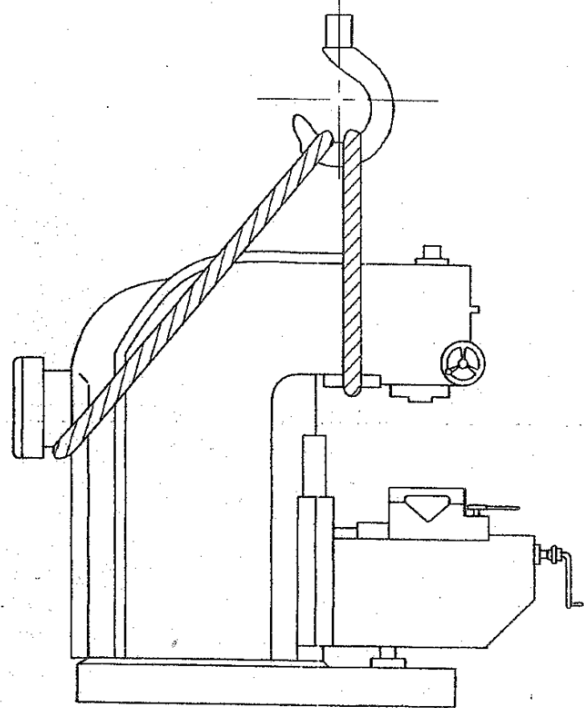


Fig 7

### 4. Installation of machine

Building the concrete foundation according to the foundation fig.8 is to make sure the machine run steadily and machining accurately. The foundation should be built on the solid soil, and had better beforehand tamp the soil. The depth of the foundation according to property of soil  $H \geq 700\text{mm}$ . Install machine after the concrete foundation is dry.



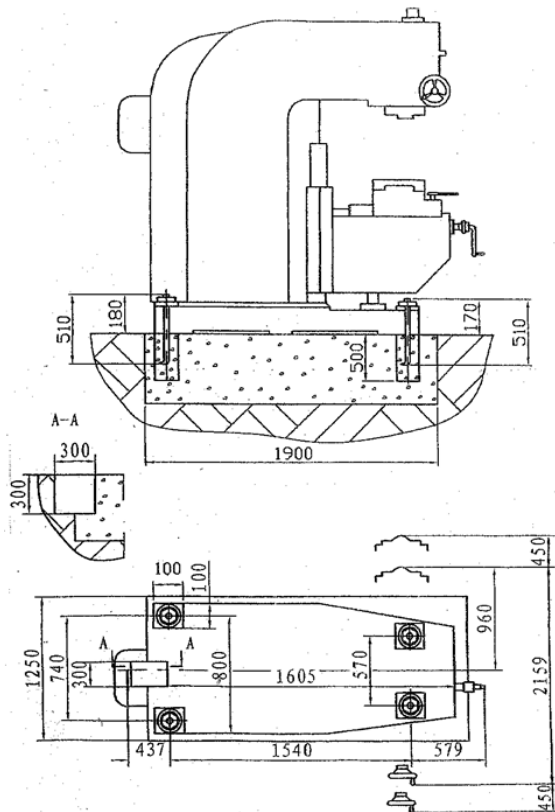


Fig 8

Put the 4 foundation bolts M20×500 into the bolt holes, the upper end of bolts should be approximately 180mm over the ground.

Put 6 pieces of the sizing blocks in proper position on the foundation, then convey the machine to the foundation, adjust the cross and longitudinal level with levelmeter before pouring the mortar into bolt holes. Tighten the bolts when the concrete foundation is dry, then check cross and longitudinal level with levelmeter, and the tolerance is under 0.04/1000.

#### 5. Trial run

Clean the antirust oil on each part carefully before trial run, but do not use the metal tool or instruments that can scratch surface of metal surface, then coat a thin layer of engine oil on exposed surface of machine.

Check whether voltage of outer power supply accords with working voltage, and check whether direction of rotation accords with the demand, check whether movement direction of handle is the same as the table movement direction, or adjust the phase sequence.

First run idle for more than 30 minutes at the lowest speed during testing run, then increase the speed step and step, and test each step run and mechanism of gear change, at the same time check whether each control handle of worktable is flexible and reliable, and check the working situation of lubrication pump.

### 9. MACHINE TRANSMISSION SYSTEM

#### 1. Drive system of spindle (see Fig.9) :

Main motor connects with shaft I through elastic coupling, pass power through seven piece of shafts and its upper gears to spindle. There are two sliding triple gears and a dual gear on the shaft II and shaft IV, speed change

mechanism is controlled by shifting fork, and get 18 steps speed, range of speed is 30-1500 rev/min(see Fig.10). Actual speed has little difference than the speed on the chart.

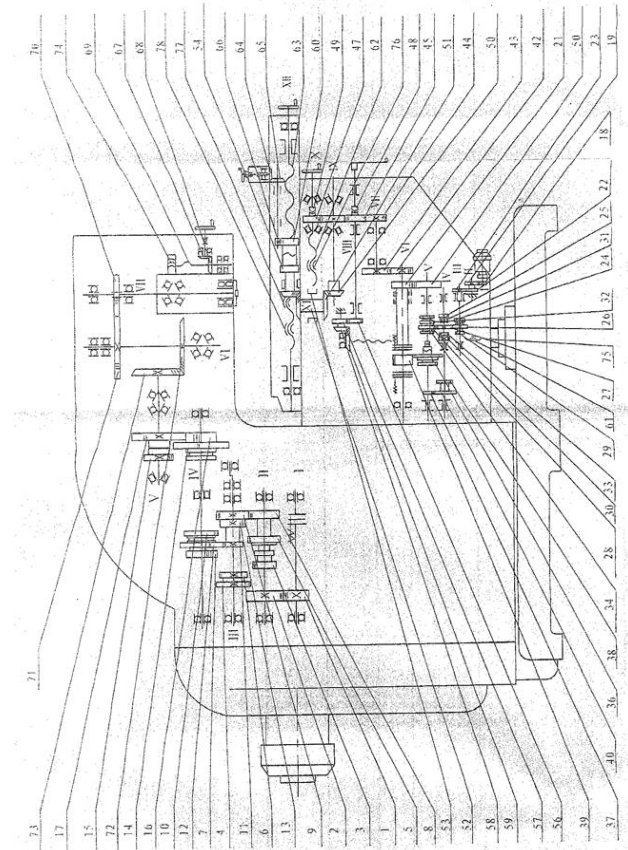


Fig 9

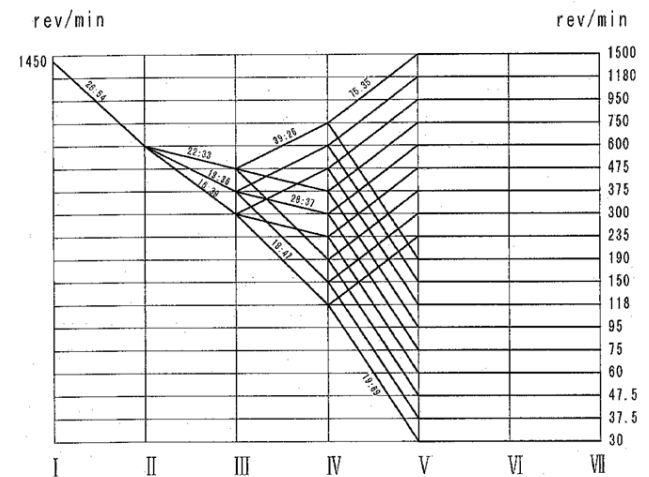


Fig 10

#### 2. Feed drive system (see Fig.9) :

Feed system is driven by 1.5kW motor, the motor is installed in the knee, gear (18) is fixed directly on the shaft of motor, shaft VI can get 9 steps through moving two triple gears on shaft III and shaft V. Push the gear (36) left to disengage the clutch (35), gear (36) and (39) still mesh as the gear (39) is wide, drive route: shaft V—37—40—38—36—39; shaft V drives shaft VI through gear (36), (39) when gear (36) is on the right (See Fig.9), gear (36) engage with clutch (35), so gear (39) can get 18 steps speed. Gear (39) drives shaft VI through gears (42), (43), (44), (45), (46), (47) to drive shafts

VII、VIII、XI、X when left electromagnetic clutch attracts.  
 Table operating handle controls different position of clutches (48), (49), (60), only one of clutches (48), (49), (60) attracts to drive the corresponding lead screw to turn, then get X, Y, Z three-direction feed movement, and the X, Y, Z three-direction feed movements interlocks. Feed range of longitudinal and cross are all 23.5-1180 mm/min. Vertical feed range (8-394mm/min) is equivalent to one third of longitudinal feed as speed down of gears (56), (57), (58), (59).

Press the RAPID SPEED pushbutton when table moves. Table can get the rapid speed 2300 mm/min in longitudinal and cross directions, vertical speed is 770 mm/min when electromagnetic clutch on the right of shaft VI meshing, at the same time motor drives directly shaft through gears (8), (19), (20), (21) to make table rapid move. The every speed in the Fig.11 is controlled by the speed change tray.

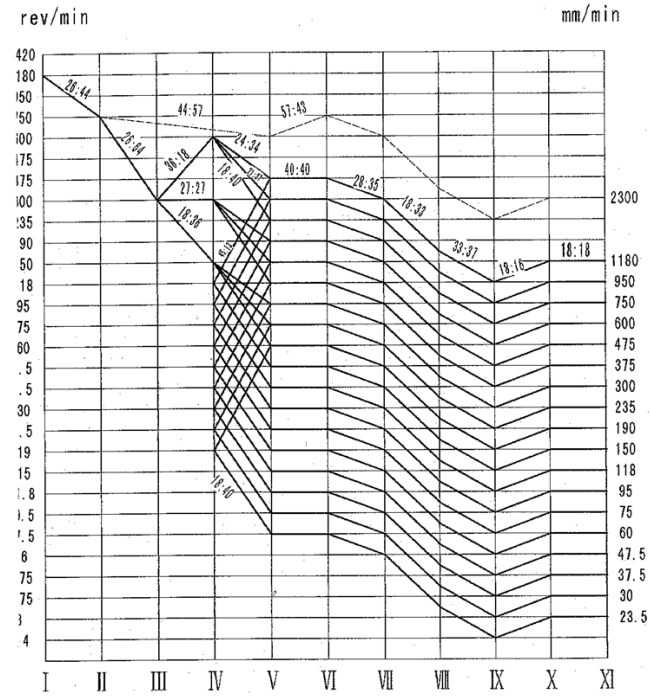


Fig 11

Rolling bearing position of the machine is on the Fig.12.  
 Rolling bearing list of the machine, gears and transmission parts.(see list 1,2).

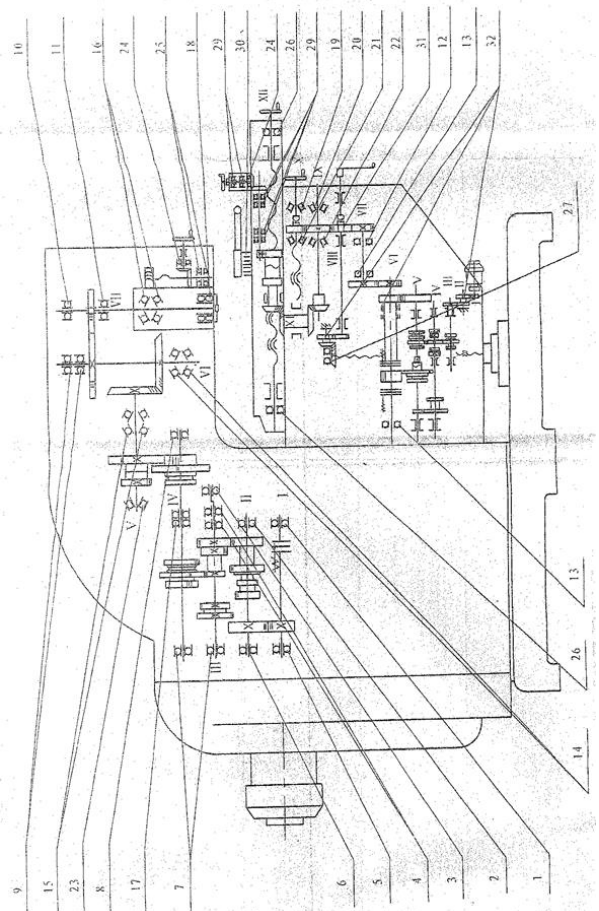


Fig 12

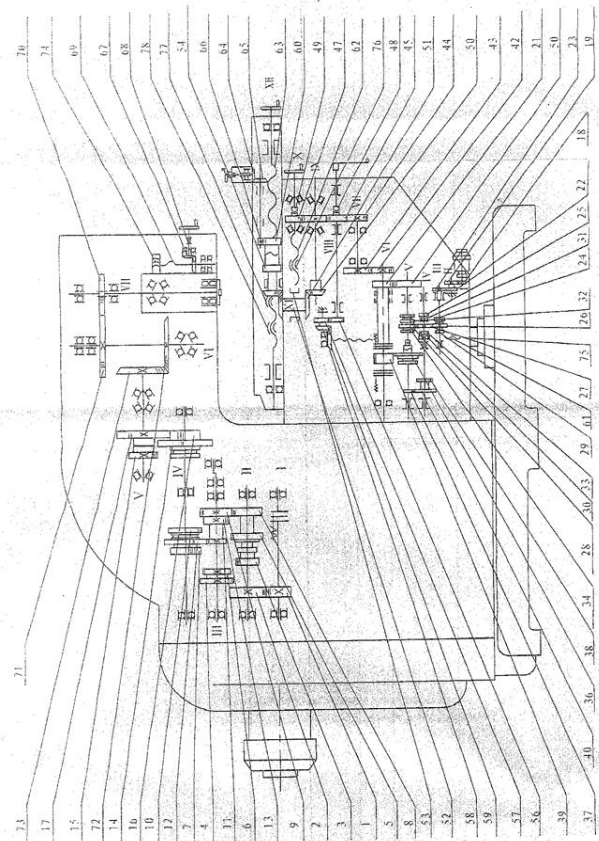


Fig 9

**BEARING LIST ( See Fig.12 )**

No.	Name	Model	Dimension	Qty	Accuracy grade
1	bearing	306	30x72x19	1	
2	bearing	307	35x80x21	1	
3	bearing	210	50x90x20	1	
4	bearing	308	40x90x23	2	
5	bearing	212	60x110x22	1	
6	bearing	407	35x100x25	1	
7	bearing	309	45x100x25	2	
8	bearing	409	45x120x29	1	
9	bearing	212	60x110x22	2	
10	bearing	224	120x215x40	1	
11	bearing	222	110x200x38	1	
12	bearing	206	30x62x16	1	
13	bearing	205	25x52x15	2	
14	bearing	46212	60x110x22	2	
15	bearing	46216	80x140x26	2	
16	bearing	46120	100x150x24	2	E
17	bearing	3612	60x130x46	1	
18	bearing	3182120	100x150x37	1	D
19	bearing	7206	30x72x21	1	
20	bearing	7509	45x85x25	1	
21	bearing	7206	30x62x17.5	1	
22	bearing	7508	40x80x25	1	
23	bearing	7312	60x130x34	1	
24	bearing	8105	25x42x11	2	
25	bearing	8104	20x35x10	2	
26	bearing	8209	45x73x20	2	
27	bearing	8112	60x85x17	1	
28	bearing	943/25	25x32x25	6	
29	bearing	942/20	20x26x20	1	
30	Needle roller		3x24	49	
31	Needle roller		2.5x16	57	
32					

**Gear and transmission parts list ( See Fig.9 )**

No.	Name	Number of teeth	Modulus	Pressure angle	Material
1	gear	26	3	20°	20Cr
2	gear	54	3	20°	40Cr
3	triple gear	19	4	20°	40Cr
4	triple gear	36	4	20°	40Cr
5	triple gear	22	4	20°	40Cr
6	triple gear	28	4	20°	40Cr
7	triple gear	37	4	20°	40Cr
8	triple gear	16	4	20°	40Cr
9	gear	39	4	20°	40Cr
10	triple gear	26	4	20°	20Cr
11	dual gear	18	4	20°	20Cr

12	triple gear	47	4	20°	40Cr
13	dual gear	33	4	20°	40Cr
14	gear	75	4	20°	40Cr
15	gear	35	4	20°	40Cr
16	gear	19	5	20°	40Cr
17	gear	69	5	20°	40Cr
18	gear	26	2	20°	20Cr
19	triple gear	44	2	20°	20Cr
20	gear	57	2	20°	40Cr
21	gear	43	2	20°	20Cr
22	triple gear	24	2	20°	20Cr
23	gear	64	2	20°	40Cr
24	triple gear	27	2.5	20°	40Cr
25	triple gear	27	2.5	20°	40Cr
26	triple gear	36	2.5	20°	40Cr
27	gear	18	2.5	20°	40Cr
28	triple gear	40	2.5	20°	40Cr
29	triple gear	18	2.5	20°	40Cr
30	triple gear	36	2.5	20°	40Cr
31	triple gear	21	2.5	20°	40Cr
32	triple gear	37	2.5	20°	40Cr
33	triple gear	24	2.5	20°	40Cr
34	triple gear	34	2.5	20°	40Cr
35	clutch	9			20Cr
36	gear	40	2.5	20°	20Cr
37	gear shaft	13	2.5	20°	40Cr
38	gear	18	2.5	20°	40Cr
39	gear	40	2.5	20°	40Cr
40	gear	45	2.5	20°	40Cr
41	gear	28	2.5	20°	40Cr
42	gear	35	2.5	20°	40Cr
43	gear	18	3	20°	40Cr
44	gear	33	3	20°	20Cr
45	gear	37	3	20°	45
46	gear	33	3	20°	40Cr
47	clutch	9			20Cr
48	clutch	9			20Cr

49	bevel gear	18	4	20°	20Cr
50	bevel gear	16	4	20°	40Cr
51	spiral bevel gear	18	5.111	20°	40Cr
52	clutch gear	18	5.111	20°	20Cr
53	clutch gear	30	3	20°	20Cr
54	gear	22	3	20°	40Cr
55	gear	33	3	20°	45
56	bevel gear	22	3	20°	40CR
57	bevel gear	44	3	20°	40CR
58	clutch gear	48	2	20°	40CR
59	nut				ZQSn6-6-3
60	lead screw				Y40MN
61	Lead screw	55	4		Y40MN
62	bevel gear	25	2	20°	45
63	bevel gear	25	2	20°	45
64	gear	32	2	20°	45
65	clutch gear	25	2	20°	45
66	bevel gear	25	2	20°	45
67	lead screw		4		45
68	gear	6			40CR
69	gear	6			40CR
70	gear	4			40CR
71	gear	4			40CR
72	nut	6			ZQSn6-6-3
73	lead screw	6			Y40MN
74	nut	6			ZQSn6-6-3
75	nut		2	20°	ZQSn6-6-3
76	nut	6			ZQSn6-6-3

## 10. LUBRICATION SYSTEM

Scientific lubrication of machine is important for useful life of machine, and selection of lubricant directly affects the lubricating effect.

Select the corresponding the lubricant according to the practical situation.

### warning:

Comply with advice of safety and health of all luricant

manufacturers.

### Recommended lubricant:

oil site	oil model		lubricant reserves
	supplier	model	
guide way	FUCHS	Renep 68K	4 (inpouring quantity of lubricant
main transmission gear box	FUCHS	RENOLIN B15	approximate is 2/3 of the oil scale)

### Volume of cooling box: 50 liters

#### Notice:

1. Select the corresponding the coolant according to the machining material.
2. 50 liter is dilute volume.

### Recommended coolant:

Supplier	Model	Application range	Performance and application technology
FUCHS	JIDAC-22 RATAK EM5	cast iron, steel	Good antirust performance, good biologic stability, free of silicon, nitrite and phenol and so on. It is applicable to all machining and grinding machining technology.
FUCHS	ECOCO OLALU- CF ECO COOLAL/ M	steel, aluminium, cast iron	Good extreme pressure performance, good Emulsification stability, strong antimicrobials performance, good antirust performance, free of nitrite and other harmful biology. It is applicable to all kinds of single machine and integrated supply liquid system.
FUCHS	JM-3 ECOCO OL 68CF2	steel, copper, copper alloy	Good antirust performance, good biologic stability, cleanout, good cooling performance. It is applicable to multifarious material technology.

### Recommended cutting liquid

Supplier	Model	Application range	Performance and application technology
FUCHS	ECOCUT LE series	mild/medium steel, alloy steel, cast iron, aluminium, non ferrous metal	Good lubricating property, free of chlorin. It is mainly used for saw, turning, milling, drill, gear machining, grinding, honing machining, thread machining and so on.
FUCHS	BREAK MSN series	medium steel, stainless steel, high-carbon steel cast iron alloy	Oil for extreme pressure type metal machining. It is mainly used for depth drill, gear, thread, broaching, reaming, high pressure, extreme pressure molding and grinding machining and so on.

## 11.COOLANT SYSTEM

General emulsified coolant mixture can be used for cooling of the cutting tools. Different coolant can be used for different material. The coolant pump is installed and is compatible with

different coolant for different cutting tools. Coolant is stored in the machine base reservoir and pumped to the nozzle via hose. The nozzle can be adjusted to different angle as per needs. Coolant flows back to the reservoir through T slots on the table, hose and filter net.

A switch is installed on the operation panel. Turn it on and the pump will work. To change the coolant, pull the plug on the machine base and drain the coolant. Feed new coolant through the filter net.

## 12. ELECTRIC SYSTEM

1、Electrical equipment list (power supply 3P, 50Hz, 400V )

Code	Name	Specification	Qty
M1	motor	Y132M-4-B5 11Kw 380V 50Hz	1
M2	motor	Y90L-4-B5 3Kw 380V 50Hz	1
M3	motor	AOB-25 125W 380V 50Hz 3PH	1
KM1、KM2	contactor	CJX1-32/22 coil voltage AC 24V 50Hz	2
KM3-KM5	contactor	CJX1-9/22 coil voltage AC 24V 50Hz	3
KA1、KA2	intermediate relay	HH54P coil voltage AC 24V 50Hz	2
KT1	timing relay	JS-S8 coil voltage DC 24V time delay 0.5-10 second 2NC	1
TC	control transformer	JBK4-100 AC 380V /AC 110V 50Hz I: 0-380V O: 0-24V 100VA 0-27V 100VA	1
VC	rectifier bridge	KBPC-10-10 10A	1
QF1	main switch	T0-100BA-3310 rated current 30A coil voltage 380V	1
QF2	breaker	DZ108-20/211 12.5-20A	1
QF3	breaker	DZ108-20/211 0.25-0.4A	1
QF4	breaker	DZ108-20/211 3.2-5A	1
QF5	breaker	DZ47-63 2P 5A	1
QF6、QF7	breaker	DZ47-63 1P 3A	2
QF8	breaker	DZ47-63 1P 5A	1
SA1	rotary switch	LA42X2-10/BS	1
SA2	rotary switch	LA42X2-11/BS	1
SA3	rotary switch	LA42X2-20/BS	1
SB1、SB2	pushbutton	LA42P-21/RS	2
SB3、SB4	pushbutton	LA42P-10/GS	2
SB5、SB6	pushbutton	LA42P-10/WS	2
SB7、SB8	E-stop	LA42J-21/R	2
SQ1、SQ2	travel switch	X2	2
SQ3、	travel switch	LX2-131	2

SQ4			
SQ5	travel switch	LXM1-23K	1
SQ6	travel switch	LX3-11K	1
SQ7	travel switch	X2N	1
SQ10、SQ11	Travel switch	JW2A-11HL	2
EL	lamp	JC15	1
	lamp globe	AC 24V 40W	1
YC1	spindle brake clutch	DLM0Z-5b DC 24V 24W	1
YC2	feed clutch	DLMX-a DC 24V 7.4W	1
YC3	rapid clutch	DLMX-b DC 24V 24W	1
XT1	terminal board	TD206+TD1534	1
XT2	terminal board	TD1530	1
	lock	JDS-1	1
XB	grounding terminal copper bar	6 (M4)	1

### 2. Electrical layout general situation

Control coolant switch (SA1), spindle tight/loose changeover switch (SA2), table rapid moving pushbutton (SB5), E-stop pushbutton (SB7), spindle speed change switch (SQ5), spindle stop pushbutton (SB1), spindle changeover switch(SA3) all locate on the left of column. Table longitudinal movement control switch is in front of the table. Spindle stop pushbutton (SB2), spindle start pushbutton (SB3), table rapid feed pushbutton (SB6),

E-stop pushbutton (SB8) are on the saddle panel.

The vertical feed of knee and cross feed of saddle are controlled by the handle lever that is on the left & front of knee. Feed speed change switch is in front & left of table. Upward and backward feed of table is controlled by SQ4, downward and forward feed is controlled by the SQ4 too. Press E-stop pushbutton when malfunction happens, then reset the E-stop after eliminating malfunction.

Wiring diagram (see Fig.13)

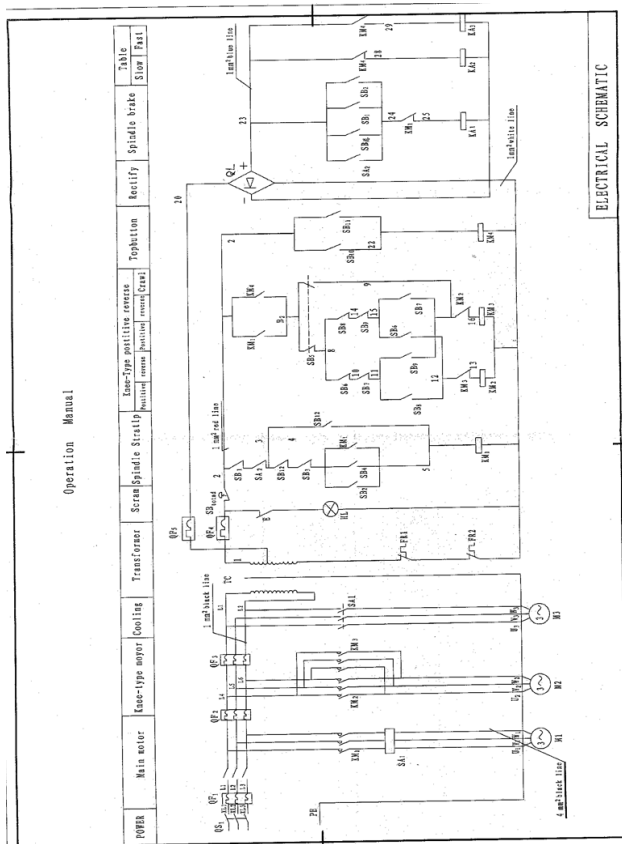


Fig 13

### 3. Electric control movement of machine

3.1 Main switch QF1: First switch on the switch that connects with lock before starting the machine.

#### 3.2 Spindle movement

3.2.1 Start or stop of spindle: Changeover switch SA3 controls direction of rotation. KM1, KM2 contactors control clockwise and counterclockwise turn of spindle. Spindle will turn when pressing SB3, SB4 start pushbutton. Spindle will stop immediately when pressing one of SB1, SB2 stop pushbuttons.

3.2.2 Speed change of spindle: Travel switch SQ5 realize instantaneous movement of motor in order to easily mesh well. Press the travel switch SQ5 when pulling it out from the positioning groove or push it back to positioning groove. The travel switch SQ5 must be turned quickly in order to protect gears.

Notice: Spindle does not turn when switch SA2 locates in zero position.

#### 3.3 Table feed movement:

Vertical, cross, longitudinal table feed is controlled by mechanism control handle.

3.3.1 Longitudinal feed (see Fig. 14)

### OPERATION MANUAL

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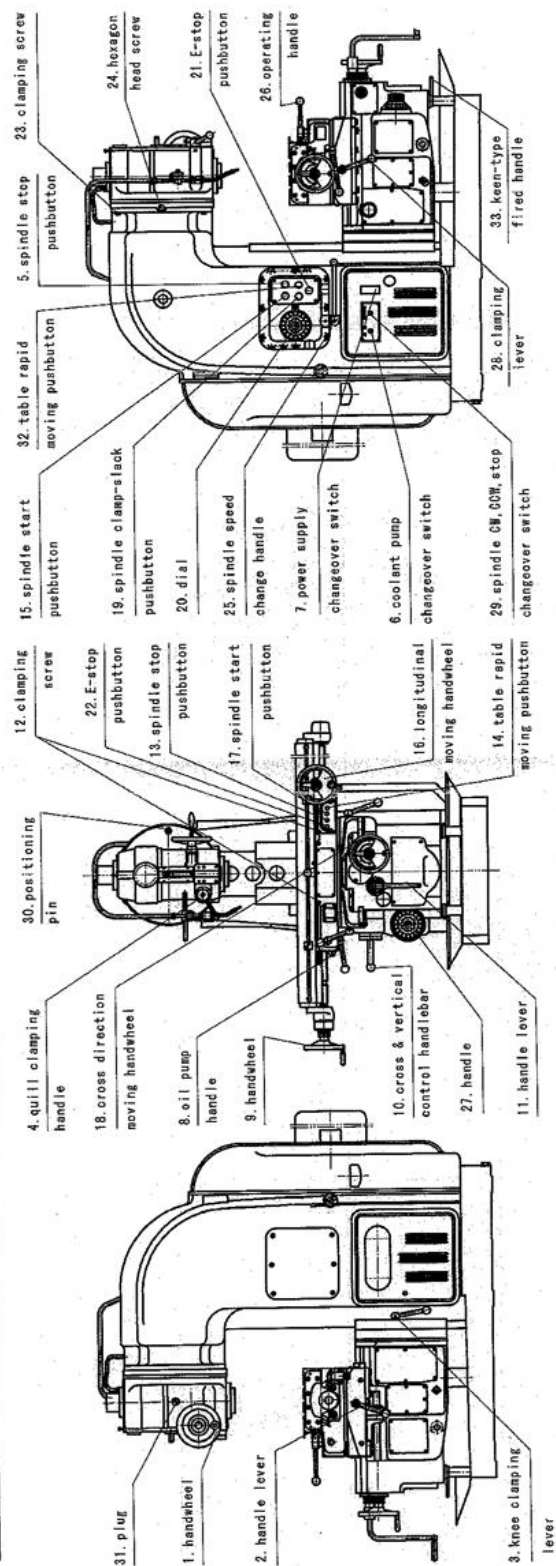


Fig 14

Turn handle (26) left, linkage mechanism presses travel switch SQ2 to make contactor KM5 attract; turn handle (26) right, linkage mechanism presses travel switch SQ1 to make contactor KM4 attract. Actual movement direction should accord with indicatory direction, change phase sequence of power supply if actual movement direction does not accord with indicatory direction.

3.3.2 Vertical and cross feed of table: Pull upward and

backward SQ4, then KM5 will attract, Pull down and forward SQ3, then KM4 will attract. Actual movement direction should accord with indicated direction, change phase sequence of power supply if actual movement direction does not accord with indicated direction.(see Fig.14)

3.3.3 Speed change of table feed (see Fig.14): Switch on travel switch SQ6 instantaneously during pulling handle (27) out quickly, choose target speed, then switch on travel switch SQ6 instantaneously during pushing back handle (27) quickly, connect KM4 to make motor M3 has actuation in order to easily mesh with gears.

3.3.4 Table rapid feed: Press SB4 or SB5 to attract KA2 to switch on YC3 when table is feeding, and rapid feed clutch can realize rapid feed.

3.4 Brake spindle when installing cutter: Turn changeover switch SA2 in clamping position when changing tool. Turn changeover switch SA2 in loose position after changing tool.

3.5 Changeover switch SA1 controls coolant pump. Turn changeover switch SA1 in connecting position after spindle starts, contactor KM3 attracts, motor M2 runs, coolant flows.Control transformer controls working lamp.

3.6. DRO device may be installed on VERTICAL KNEE-TYPE MILLING MACHINE . Read the instruction of DRO carefully .

### 13. OPERATION

Refer to Fig.14 about the position and function of each handle, pushbutton, switch. The operation construction of machine is convenient for operator.

Longitudinal, cross, vertical directions feed of table is controlled by handles, and control handle direction is moving direction of table.

First push the handwheel to engage before turning any handwheel. START and STOP pushbuttons only control start and stop of the whole machine, only spindle will turns when pressing START pushbutton and other feed handle lever is in neutral position. Table will rapidly feed when pressing "rapid speed feed pushbutton" during normal feed. Table will resume normal feed when loosening the rapid speed feed pushbutton. Table can not rapidly feed when table does not normally feed.

Turn the spindle changeover switch to neutral position first, table will feed when pressing START pushbutton. Table will rapidly feed when pressing rapid speed feed pushbutton after adjusting operating handle (26) to target direction.

### 14. ADJUSTMENT AND TEST RUNNING

1. Adjustment of vertical milling head angle of rotation. (see Fig.14)

Loosen the lock nut (23) on the operation position figure, pull the position pin (30) out, then turn the handle (24) with wrench to drive the vertical milling head to target position, tighten the tight nut (23) finally. Insert the positioning pin (30) if turn vertical milling head from tilted position to vertical position, tighten the tight nut (23) finally.

2. Spindle lubrication (see Fig.14)

Spindle upper bearing lubrication: First remove the plug (31), turn the handwheel (1) to make the hole of spindle aim at the taphole, add 2# precision spindle bearing lubricative grease through the taphole.

Spindle inferior bearing lubrication: Move the quill down till show the screw on quill side, remove the screw, add 2# precision spindle bearing lubricative grease through the hole.

8.3 Adjustment of backlash between longitudinal lead screw and nut

Adjustment of longitudinal table lead screw and nut backlash. .(see Fig.2, Fig.15)

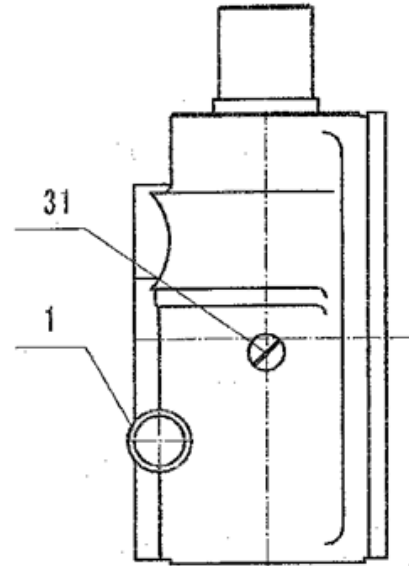


Fig 2

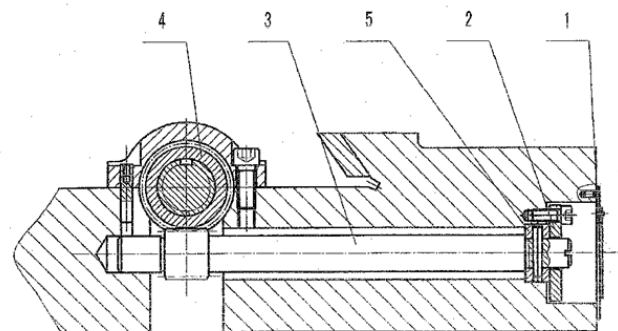


Fig 15

First remove cover (1) which is in front of table, then loosen the screws on the flange, turn shaft (3), tighten nut (4) with worm to reduce the drive backlash. Test method:

Backlash of lead screw is not more than 1/20 of revolution, Standstill should not appear during the longitudinal table feed. Press out ring (5) with flange (2), worm is fixed in required position.

8.4 Adjustment of longitudinal lead screw axial backlash (see Fig.16)

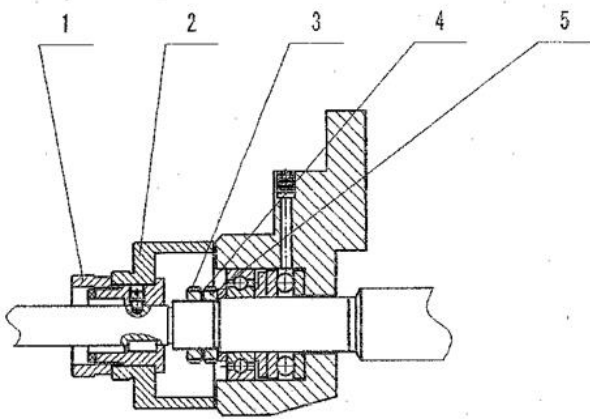


Fig 16

Not only eliminate the drive backlash of lead screw and nut, adjust the backlash of axial lead screw and table to the least for down milling.

Dismount the handwheel, remove the nut (1), take dial (2) away, prize the check washer (4) off the round nut (3), loosen the round nut (3) a little, then properly adjust the backlash with nut (5). Tighten round nut (5) with round nut (3) and fasten check washer, assemble the parts according to opposite order of disassembly.

8.5 Spindle bearing adjustment (see Fig.17)

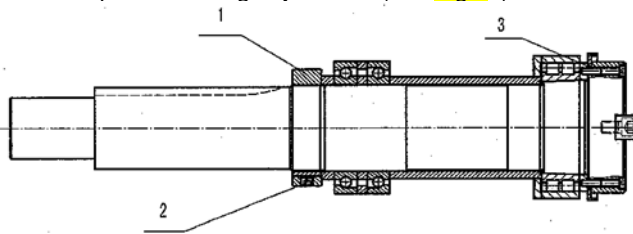


Fig 17

Spindle front end is installed in precision double row cylindrical roller bearing, the bearing has taper holes. Radial backlash of bearing is adjusted with washer (3) and nut (1).

The washer (3) is rubbed 0.12mm away if eliminate 0.01mm radial backlash due to taper of spindle neck is 1:12. Remove the plug (31) on the vertical milling head side (see Fig.2) in order to tighten nut (1), loosen the screw (2) with inner hexagon spanner through the taphole, at the same time turn the spindle with other wrench, so nut (1) will move axially.

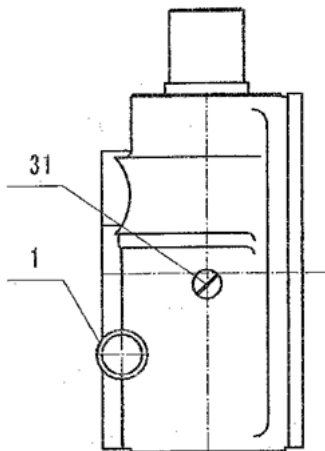


Fig 2

Tighten the screw (2) after proper adjustment. Move the spindle down a little when trimming washer (3) first, remove the screw on the flange, then take the washer (3) out from two sides due to washer (3) is made of two half round rings.

When the machine normally works, ensure temperature of bearing can not exceed 70°C when the motor run for 30~60 minutes at the speed of 1500 rev/min. Temperature rising range can not exceed 40°C.

8.6 Adjustment of electromagnetic clutch (see Fig.18)

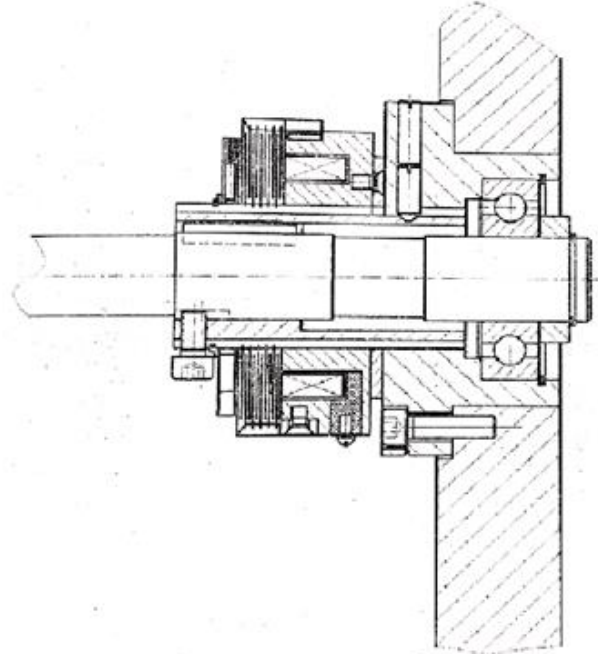


Fig 18

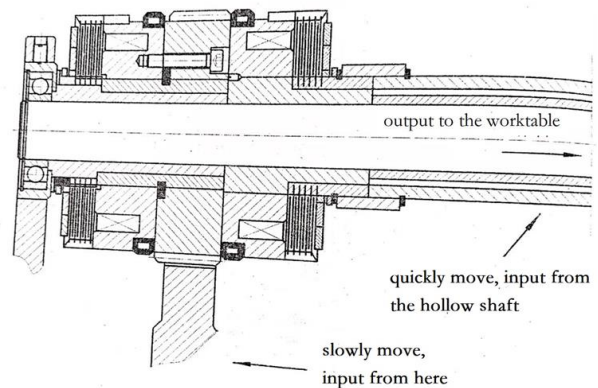


Fig 5

Electromagnetic clutch brake is adopted a in main drive system; Slow and rapid feed adopt two electromagnetic clutches (see Fig.5). Electromagnetic clutch has been adjusted well before the machine leaves the factory. Long time use of machine may cause natural abrasion of wearing piece. Must adjust washer for ensuring general backlash range of wearing piece is 2.5~3mm.

**15. MAINTENANCE**

1. Do not exceed maximum cutting range when cutting cast iron or steel at high speed with end face milling cutter.



item number material	cast iron HB=143~229	carbon content 0.45%, tensile strength limit 600N/mm2
millingl cutter dia.	200 (mm)	100 (mm)
number of teeth	10	4
speed of spindle	60 (rev/min)	750 (rev/min)
feed	300 (mm/min)	750 (mm/min)
cutting width	150 (mm/min)	50 (mm/min)
cutting depth	5~6 (mm)	3 (mm)
power	5~7 (kW)	10~11 (kW)

2. We advise operator to make use of the whole length of table as easy abrasion of working section of longitudinal lead screw; operator should often change machining position if the required travel of workpiece is short.

3. Ensure longitudinal, cross, vertical travel of table do not exceed limit, and stopper is reliable and firm.

4. Clean the inside of base, knee, oil bath lubrication in saddle regularly; clean the oil filter screen with gas once three months at the beginning, once half a year later.

5. Lubricate the machine with clean engine oil according to lubricative figure regularly. (see Fig.19).

6. Add oil in time when oil is lower than oil scale. FUCHS RENOLIN B15 or 30 engine lubricating oil are recommended; lifting lead screw is lubricated with supramoly grease; spindle bearings are lubricated with 2# precision spindle bearings grease; longitudinal, vertical, cross guide ways are advised to adopt FUCHS Renep 68K or 40# machine hydraulic lubricating oil.

7. Often check the oil pump in column and knee, oil windows of pressure lubrication are installed on the upper right and outside of feed speed change box on the left of knee, repair them when oil windows do not show oil during running of the machine.

8. Close the valve of nozzle when coolant is not used in a short time, but close the changeover switch when coolant is not used for a long time.

9. Max. machining workpiece weight is approximate 500kg.

10. Check whether contact point of rapid speed control relay (KA1) disconnects when table continue to rapidly feed under the circumstance of loosening rapid feed pushbutton.

11.743# engine oil is adopted in headstock and feed box when the machine is used in high temperature areas.

NOTICE: Times of spindle start and stop can not exceed 3 times /min.

**Caution: First check whether there is lubricant oil in column before starting the machine for the first time, and must pour lubricant oil into the oil pocket in column if there is not lubricant oil in oil pocket.**

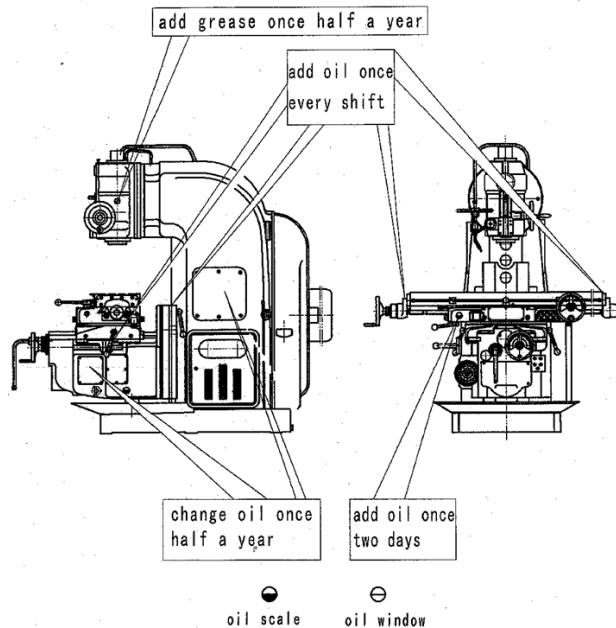


Fig 19

Trouble shooting: Refer to the following procedures for general troubles:

Observation	Possible Reasons	Solution
Abnormal of spindle brake	Worn-out of braking disc	Replace the disc
Abnormal rotation of the spindle	1. Switch is broken 2. Loose V-belt 3. Motor is broken	1. Check the switch 2. Adjust or replace 3. Repair or replace
Wrong rotation direction	Wrong lever position	Put the lever in the correct position
Big run-out of horizontal spindle	Worn-out of bearing or loose locking nut	Tighten the nut, and adjust the clearance of the bearing
Abnormal feed of three axes	1. Gib strip is too tight 2. Clearance in the bolt and nut is not proper 3. Lack of lubrication oil	1. Replace the gib strip 2. Adjust the clearance 3. Add more oil
Vibration of the machine	1. Foundation is not solid enough 2. Abnormal cutting conditions	1. Tighten the grouting bolts 2. Use proper setting of cutting rates, material and cutting tools.
Motor not running after power on	1. Incorrect power source 2. Incorrect connection Wire 3. Terminal block loose	1. Input correct power 2. Check correct connection 3. Tighten the terminal block
Failure of spindle running	1. Main transmission speed change gear grade shift not in the position 2. Cutting overload 3. Motor broken 4. Spindle mechanical part damage	1. Check main transmission speed change box 2. Use the machine according to the cutting rule 3. Check the motor 4. Check the mechanical part manual
High temperature of spindle	1. Bearing damage 2. Lock nut too tight	1. Change bearing 2. Adjust lock nut
Spindle accuracy not good	1. bearing damage or adjusting not so well 2. spindle inner hole wear 3. spindle temperature too high cause heat deformation 4. lock nut get loose	1. change bearing or adjusting 2. change spindle 3. adjusting bearing 4. tighten lock nut
No gear change for spindle speed change	Spindle motor impulse line contact failure	Check electrical wire, adjusting impulse shaft tail end bolts, reach the impulse contact.
Feed box high noise	1, Transmission gear not in the position or loose 2. Motor noise	1. Check every transmission gear 2. Check motor
Feed box no feed movement	1. Feed motor not connecting with power or damage 2. Feed electrical clutch does not function	Check electrical part wire connection and electrical unit failure and exclude
Abnormal movement part sound	1. Articles fall inside 2. Screw and nut connecting part loose	1. Clean the foreign matter 2. Tighten the bolts
Axial movement of moving parts	1. Screw and nut connection loose 2. Screw bearing bracket loose. 3. Screw and nut space too large.	1. Tighten the loosen bolts 2. Tighten bearing bracket 3. Adjusting the screw and nut space.
Crawl movement of moving parts	1. Guideway not be fully lubricated 2. No lubrication	1. Check the pipe jam or not, oil distributor damage, lubrication system abnormal 2. Lubricate the machine as operation manual.
Motor broken	1. Water or oil into the electrical wire, circuit gets short-circuit. 2. Wire damage cause short circuit.	1. Contact with manufacture. 2. Eliminate the problem and change the motor.
Abnormal noise	1. Transmission gear loose 2. Foreign matter fall into the machine	1. Retighten the loosen gear 2. Clean foreign matter
Quick consumption of lubrication oil	1. Oil pipe damage 2. Oil distributor damage	1. Change oil pipe 2. Change oil distributor
Insufficient lubrication or no lubrication of guide ways and leadscrews	1. Oil distributor damage or oil is not enough, 2. Lubrication break off or pipe block 3. No lubrication 4. Machine oil outlet block up	1. Change the lubrication pipe joint. 2. Change oil pipe. 3. Fill up the lubrication oil. 4. Repair the ou-let hole.
No coolant supply	1. Coolant liquid is too dirty coolant filter filter mesh block, 2. Coolant pipe leak or fold 3. Nozzle get block	1. Clean filter mesh and change clean coolant liquid 2. Change pipe 3. Clean nozzle.
Coolant pump fault	1. Longtime work, voltage too high 2. Coolant pump block up, motor too hot. 3. Coolant pump damage.	1. Pull on thermal relay 2. Clean coolant pump, pull on thermal relay. 3. Change coolant pump motor.

	<ul style="list-style-type: none"> <li>4. Thermal relay burn out</li> <li>5. Wrong motor rotation direction.</li> <li>6. No coolant liquid</li> </ul>	<ul style="list-style-type: none"> <li>4. Change thermal relay.</li> <li>5. reconnection</li> <li>6. Fill up the coolant liquid</li> </ul>
Vibration when cutting	<ul style="list-style-type: none"> <li>1. Cutting parameter is unreasonable</li> <li>2. Spindle bearing loose.</li> <li>3. Worn of gibs and big guide ways clearance</li> <li>4. Workpiece is not be clamped tighten or unreasonable clamping method</li> </ul>	<ul style="list-style-type: none"> <li>1. Adjusting the cutting parameter</li> <li>2. Repair the spindle box</li> <li>3. Repair the gibs</li> <li>4. Tighten the workpiece</li> </ul>
Poor cutting finish	<ul style="list-style-type: none"> <li>1. Workpiece is not be tighten clamped.</li> <li>2. Transmission part have space or preload is insufficient</li> <li>3. Cutting feed is not correct.</li> </ul>	<ul style="list-style-type: none"> <li>1. Tighten the workpiece</li> <li>2. Adjust the guideway space</li> <li>3. Change the cutting parameter.</li> </ul>

## PACKING LIST

1. Parts, Accessory, Tool

2. Wearing parts of following the machine

No.	Name	Specification	Qty	Remark
1	Draw bar		1 set	
2	ISO50 Mill chuck		1 set	8 pieces/set
3	ISO50 Milling arbor	ISO50-φ40	1 piece	
4	7: 24 Taper	7: 24 ISO50/MS4	1 piece	
5	Oil gun		1 piece	
6	Inner hexagon spanner	6	1 piece	
7	Double head wrench	17×19	1 piece	
8	Double head wrench	22×24	1 piece	
9	Double head wrench	27×30	1 piece	
10	Double head wrench	32×36	1 piece	
11	Single head spanner	14	1 piece	may replace with 11×14
12	Single head spanner	50	1 piece	may replace with 50×55
13	Inner hexagon spanner	5	1 piece	
14	Inner hexagon spanner	8	1 piece	
15	Inner hexagon spanner	10	1 piece	

3. Technical document of following the machine

No.	Name	Qty		Remark
		Ought to load	Actual load	
1	Operation manual	1	1	Operation manual
2	Test list	1	2	Test list
3	Packing llist	1	3	Packing llist
4	Installation guide	1	4	Installation guide
5	Instruction of grating DRO system	1	5	Instruction of grating DRO system

4. Spare parts (extra payment)

No.	Piece No.	Name	Specifi- cation	Qty	Remark
1	B1DL-II-355	friction lining	65Mn	15	
2	B1DL-II-356	friction lining	65Mn	15	
3	B1DL-I-200	coil	QZ enamel covered wire	3	
4	62W4290	brush core	40copper wire cloth0.5x0.5 soft wire	2	
5	62W6101bM/b	nut	ZQSn6-6-3	1	
6	62W6195A	melt	45	1	
7	62W6288	saddle	40Cr	2	
8	52K713	nut	ZQSn6-6-3	1	
9	62W7101	nut	ZQSn6-6-3	1	
10	62W7102	nut	ZQSn6-6-3	1	
11	62W7158	key	45	1	
12	63W763	guide plate	45	1	

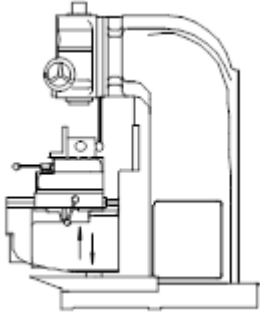
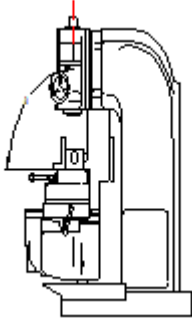
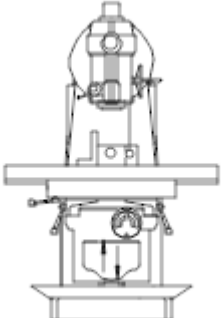
5.Special accessories (extra payment)

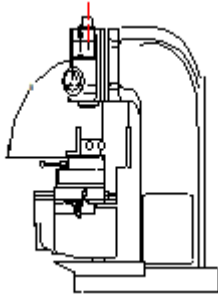
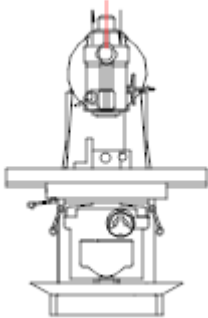
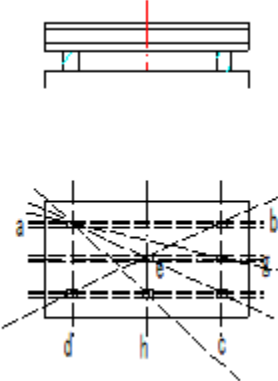
1	Universal dividing head			include three-jaw chuck
2	Swivel table	φ320		automatic / manual
3	Indexable carbide mill tool	φ63		
4	Indexable carbide mill tool	φ100		
5	Indexable carbide mill tool	φ160		
6	Sizing block	240×120		6 pieces / set

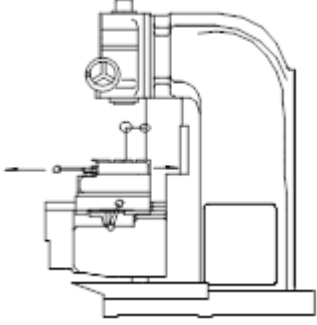
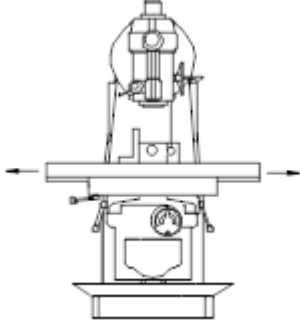
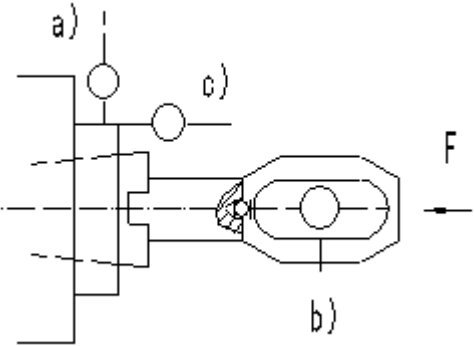
Notice: Fill in "Actual load" column according to contract or prescriptive item of technical agreement.

# ACCURACY TEST LIST

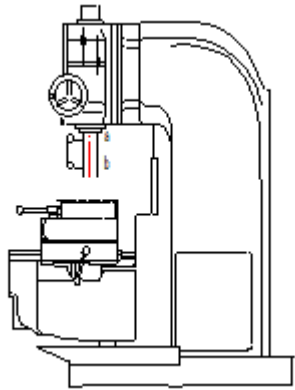
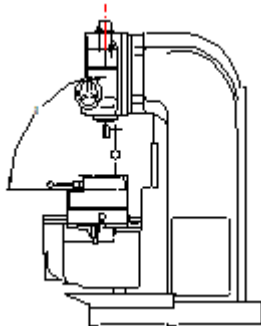
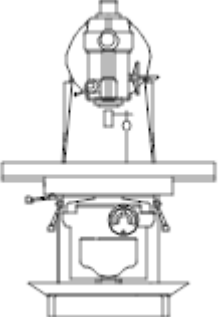
## 1. Geometrical accuracy

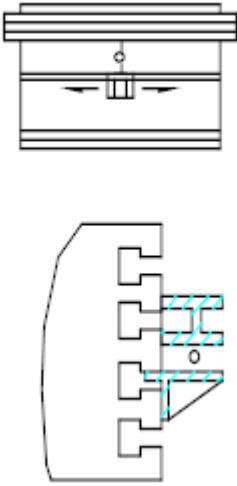
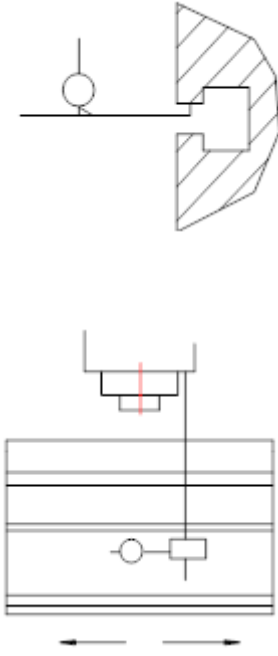
No.	Item	Illustration	Accuracy (mm)	
			Tolerance	Measurement
G1	Linearity of vertical movement of knee	a)	a. 0.025/300 b. 0.025/300	
	a) In cross vertical plane			
	b) In longitudinal vertical plane	b)		
G2	Squareness of table surface to guideway of column.	a)	a. 0.025/300 $\alpha < 90^\circ$ b. 0.025/300	
	a) In cross vertical plane			
	b) In longitudinal vertical plane	b)		
				

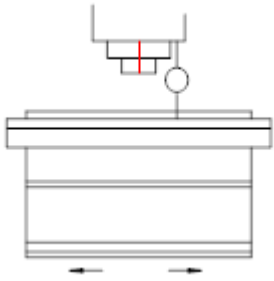
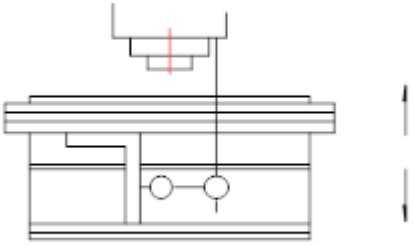
No.	Item	Illustration	Accuracy (mm)	
			Tolerance	Measure
G3	Squareness of quill vertical movement to table surface	<p>a)</p>  <p>b)</p> 	a. 0.015/100 $\alpha < 90^\circ$	
	a) In cross vertical plane b) In longitudinal vertical plane		b. 0.015/100	
G4	Planeness of table surface		part : 0.04 0.02/300	

No.	Item	Illustration	Accuracy (mm)	
			Tolerance	Measure
G5	<p>Parallelism of table surface to table movement</p> <p>a) cross</p> <p>b) longitudinal</p>	<p>a)</p>  <p>b)</p> 	<p>a. 0.025/300</p> <p>b. 0.025/300</p> <p>max. : 0.050</p>	
G6	<p>Runout of spindle end</p> <p>a) Runout of spindle outer face.</p> <p>b) Kick of spindle axial direction .</p> <p>c) Kick of spindle nose face.</p>		<p>a. 0.01</p> <p>b. 0.01</p> <p>c. 0.02</p>	



<p>Runout of spindle nose inner face</p> <p>a) At the vicinity of the spindle nose</p> <p>b) At 300mm below the spindle nose</p>		<p>a. 0.01</p> <p>b. 0.02</p>	
<p>Squareness of spindle centerline to table surface</p> <p>a) In cross vertical plane</p> <p>b) In longitudinal vertical plane</p>	<p>a)</p>  <p>b)</p> 	<p>a. 0.025/300 <math>\alpha &lt; 90^\circ</math></p> <p>b. 0.025/300</p>	

<p>G11</p>	<p>Linearity of datum T-slot</p>		<p>0.01/500 Max.: 0.03</p>	
<p>G13</p>	<p>Parallelism of datum T-slot to table longitudinal movement</p>		<p>0.015/300 Max.: 0.04</p>	

	<p>Squareness of cross travel to longitudinal travel of table</p>	<p>a)</p>  <p>b)</p> 	<p>0.02/300</p>	
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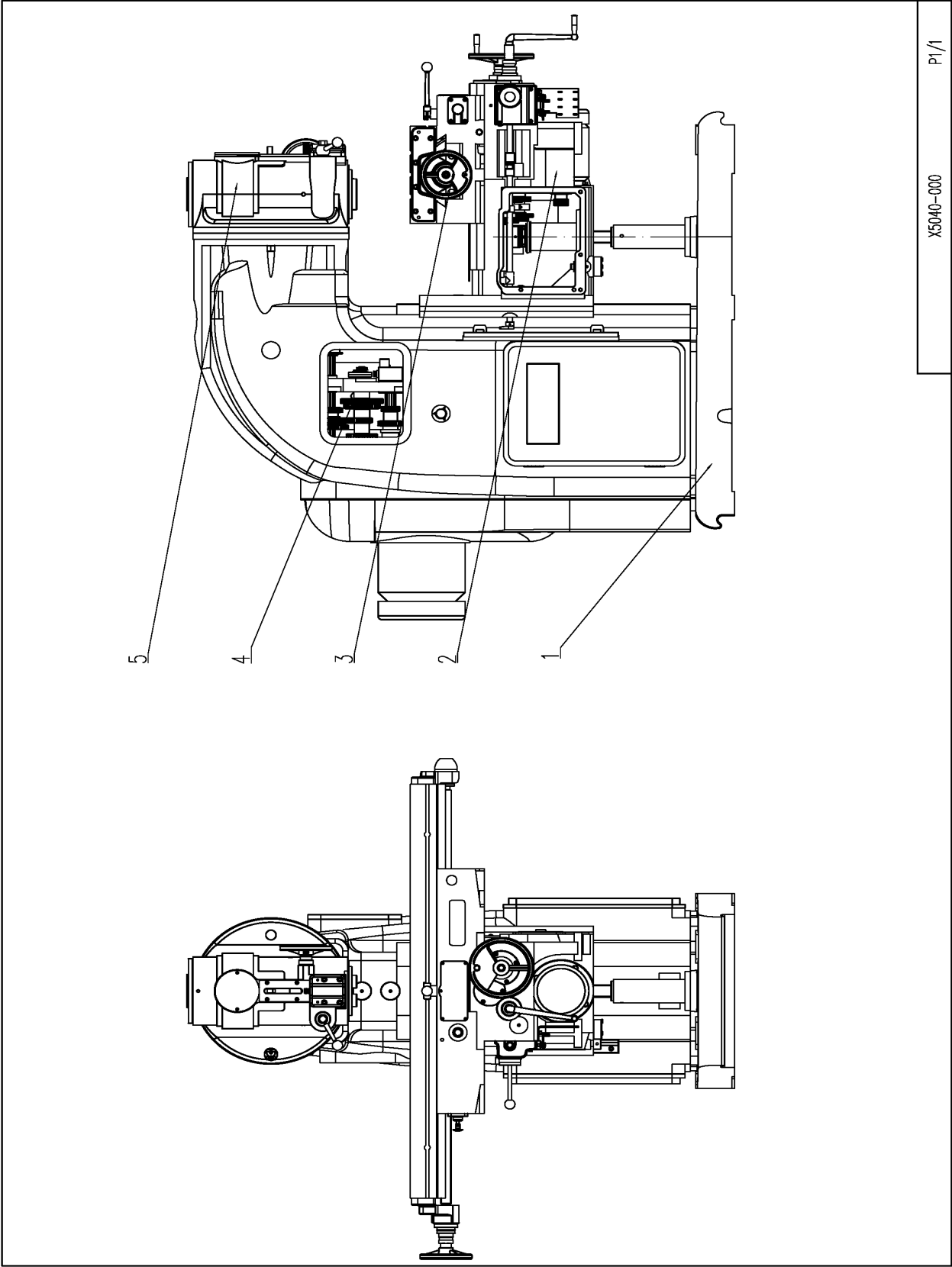
## 2. Working accuracy

No.	Item	Illustration	Accuracy (mm)	
			Tolerance	Measure
P1	<p>a) A side of each test piece should be flat.</p> <p>b) Height of test piece should be equal.</p> <p>c) C and B sides, D and B sides should be mutually square, and be square to A side.</p>		<p>a) 0.02</p> <p>b) 0.03</p> <p>c) 0.02/100</p>	

### 15. Available accessories

Refer to the **JET**-Price-list

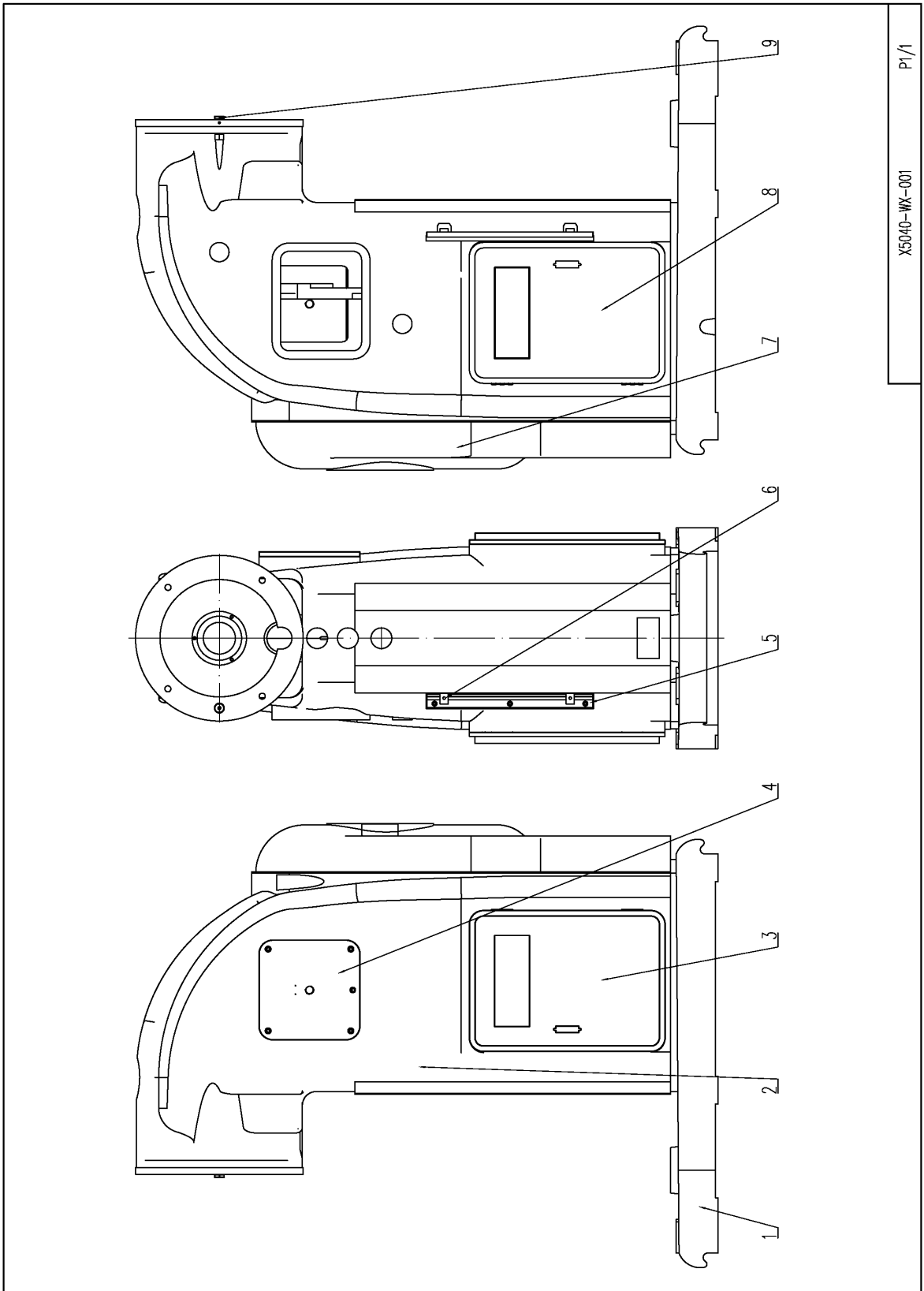
Exploded View for JMD-1667 DRO MILLING MACHINE - OVERVIEW - A



**Part List for JMD-1667 DRO MILLING MACHINE - OVERVIEW - A**

<b>Index No.</b>	<b>Part No.</b>	<b>Description</b>	<b>Size</b>	<b>Qty</b>
1	JMD1667-A-1	Base		
2	JMD1667-A-2	Lifting part		1
3	JMD1667-A-3	Worktable		1
4	JMD1667-A-4	Transmission		1
5	JMD1667-A-5	Header		1

Exploded View for JMD-1667 DRO MILLING MACHINE - OVERVIEW - B

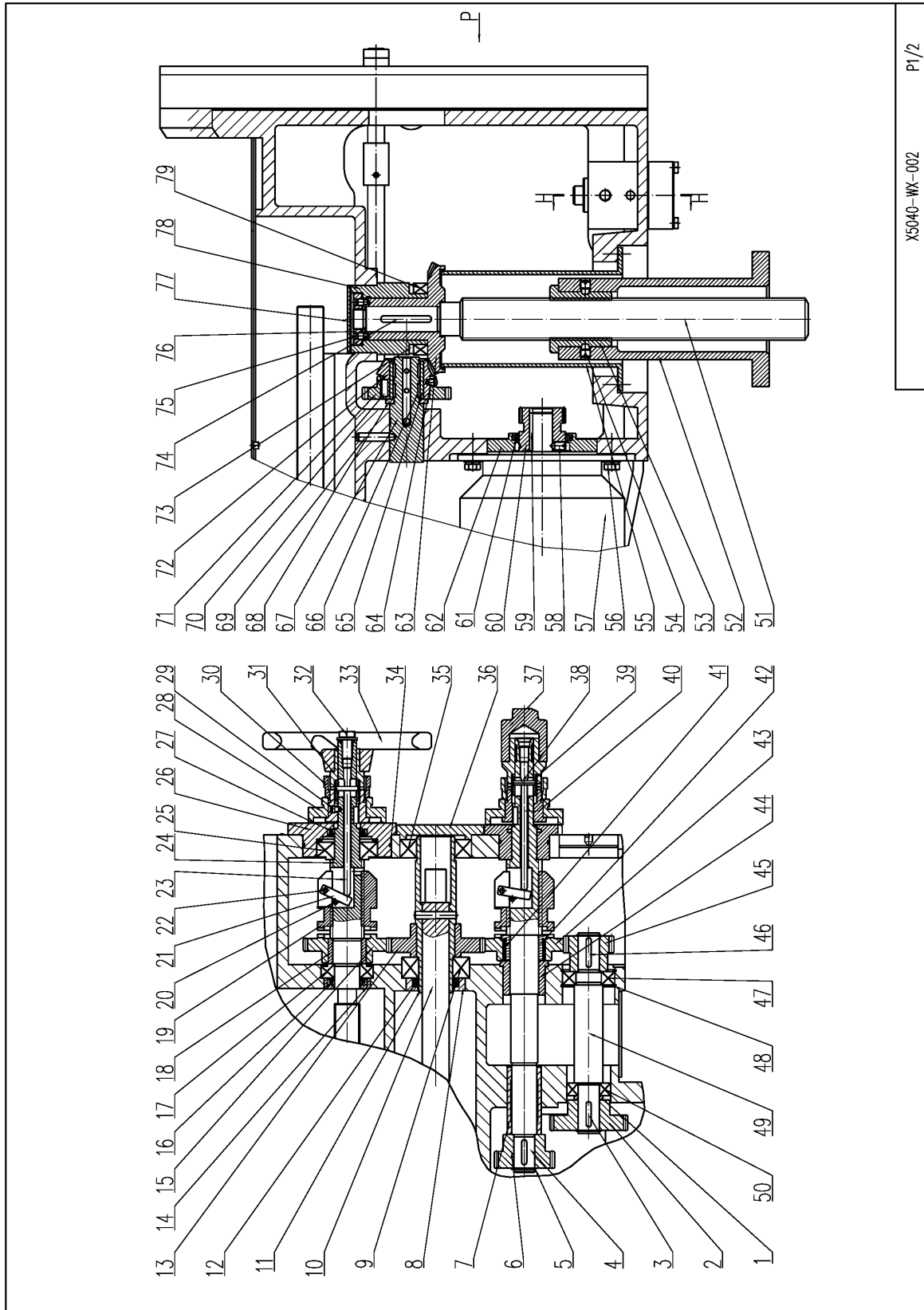


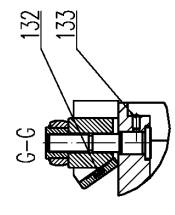
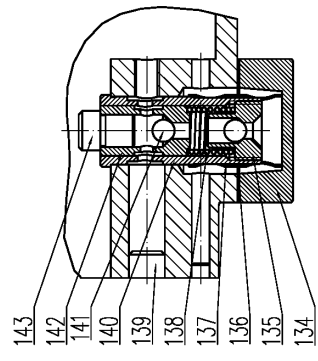
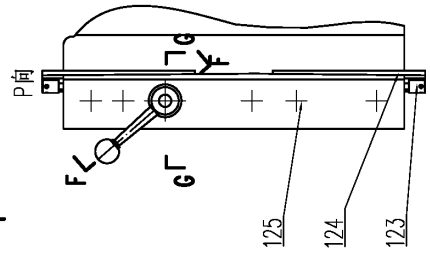
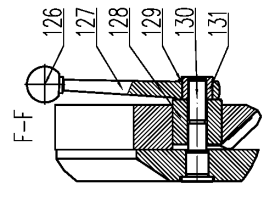
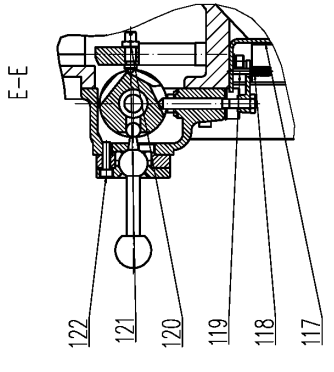
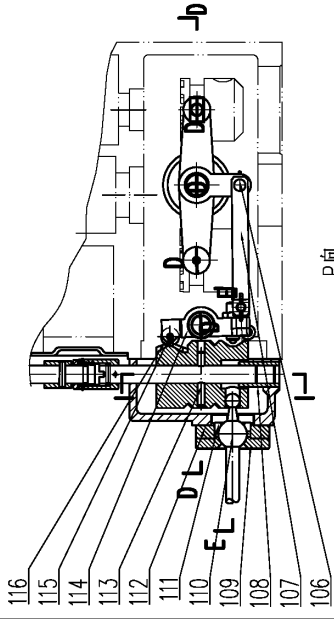
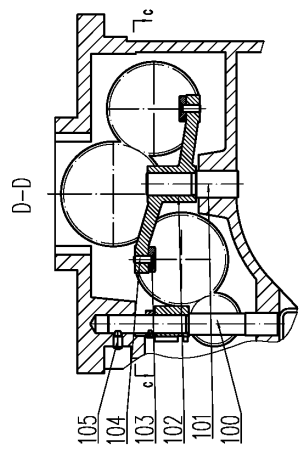
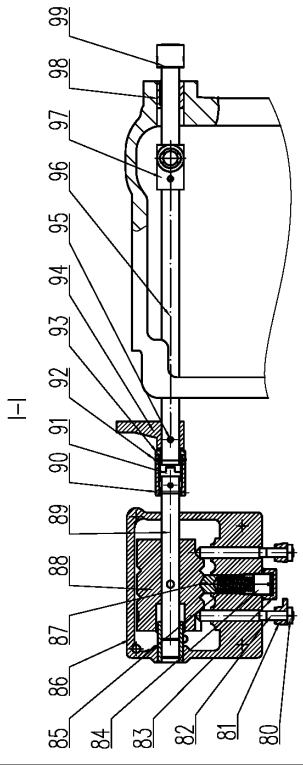
### Part List for JMD-1667 DRO MILLING MACHINE – OVERVIEW – B

Index No.	Part No.	Description	Size	Qty
1	JMD1667-B-1	Base		1
2	JMD1667-B-2	Bed		1
3	JMD1667-B-3	Right door		1
4	JMD1667-B-4	Cover		1
5	JMD1667-B-5	Trough plate		1
6	JMD1667-B-6	Bump block		2
7	JMD1667-B-7	Rear cover		1
8	JMD1667-B-8	Left door		1
9	JMD1667-B-9	Gear		1



# Exploded View for JMD-1667 DRO MILLING MACHINE - OVERVIEW - C





### Part List for JMD-1667 DRO MILLING MACHINE – OVERVIEW – C

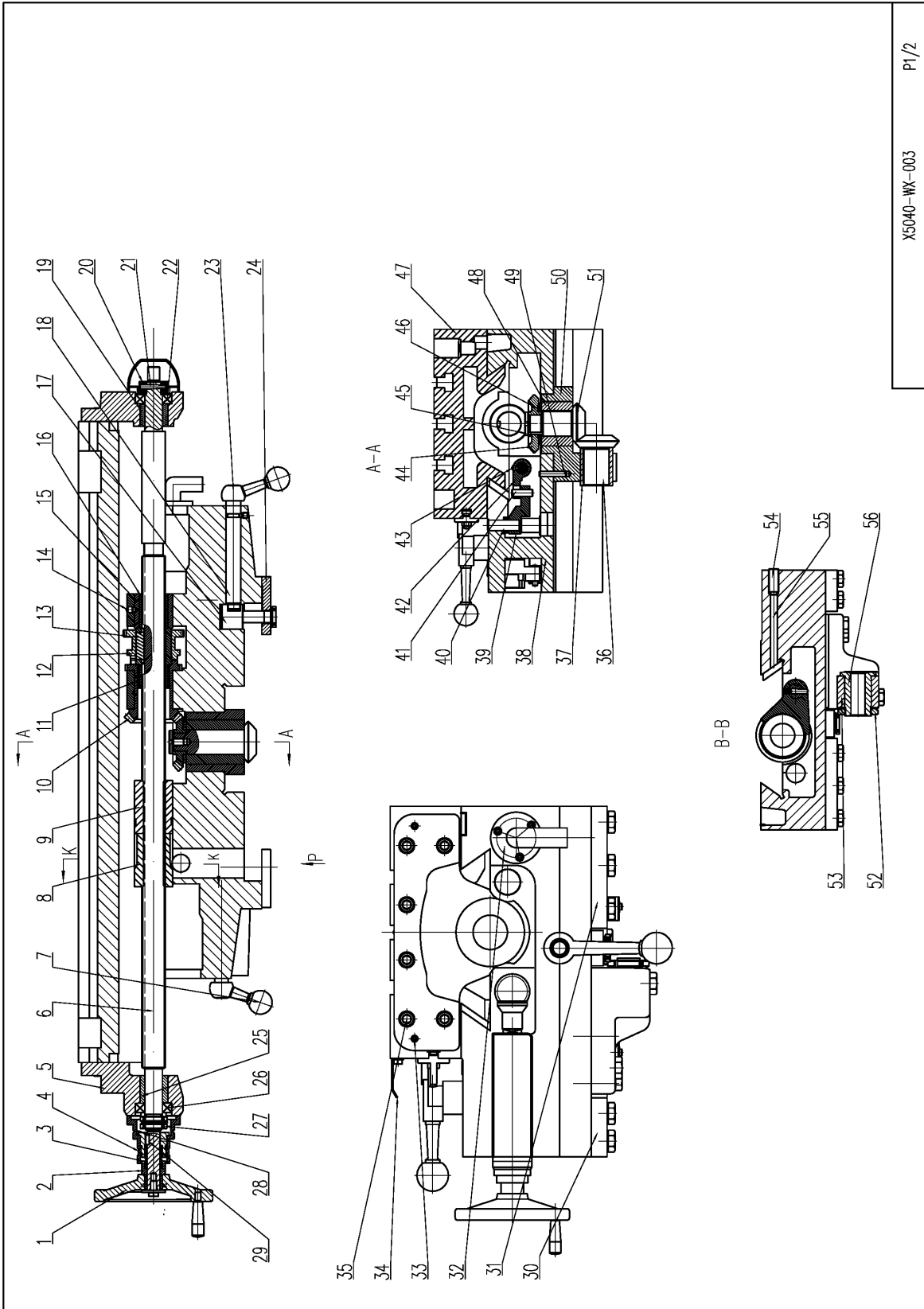
Index No.	Part No.	Description	Size	Qty
1	JMD1667-C-1	Sleeve		1
2	JMD1667-C-2	Gear		1
3	JMD1667-C-3	Key	6x30	1
4	JMD1667-C-4	Shaft		1
5	JMD1667-C-5	Shaft ring	25	3
6	JMD1667-C-6	Gear		1
7	JMD1667-C-7	Shaft sleeve		1
8	JMD1667-C-8	Ring		1
9	JMD1667-C-9	Bearing	32208	1
10	JMD1667-C-10	Shaft		1
11	JMD1667-C-11	Shaft sleeve		1
12	JMD1667-C-12	Seal ring		1
13	JMD1667-C-13	Gear		1
14	JMD1667-C-14	Ring		1
15	JMD1667-C-15	Gear		1
16	JMD1667-C-16	Seal ring		1
17	JMD1667-C-17	Bearing	30206	1
18	JMD1667-C-18	Sleeve		1
19	JMD1667-C-19	clutch		2
20	JMD1667-C-20	Pin	5x20	2
21	JMD1667-C-21	Gate		2
22	JMD1667-C-22	Pin	5x30	2
23	JMD1667-C-23	Rod		2
24	JMD1667-C-24	Lead screw		1
25	JMD1667-C-25	Bearing	7306E	1
26	JMD1667-C-26	Flange		1
27	JMD1667-C-27	Seal ring		1
28	JMD1667-C-28	Dial		2
29	JMD1667-C-29	Screw	M8x10	2
30	JMD1667-C-30	Scale sleeve		2
31	JMD1667-C-31	Clutch sleeve		1
32	JMD1667-C-32	Screw		1
33	JMD1667-C-33	Handwheel		1
34	JMD1667-C-34	Seal ring		1
35	JMD1667-C-35	Bearing	32209	1
36	JMD1667-C-36	Flange		1
37	JMD1667-C-37	Lifting handle		1
38	JMD1667-C-38	Fixed round pin		2
39	JMD1667-C-39	Ring		2
40	JMD1667-C-40	Clutch shaft sleeve		2
41	JMD1667-C-41	Needle roller	3x24	49

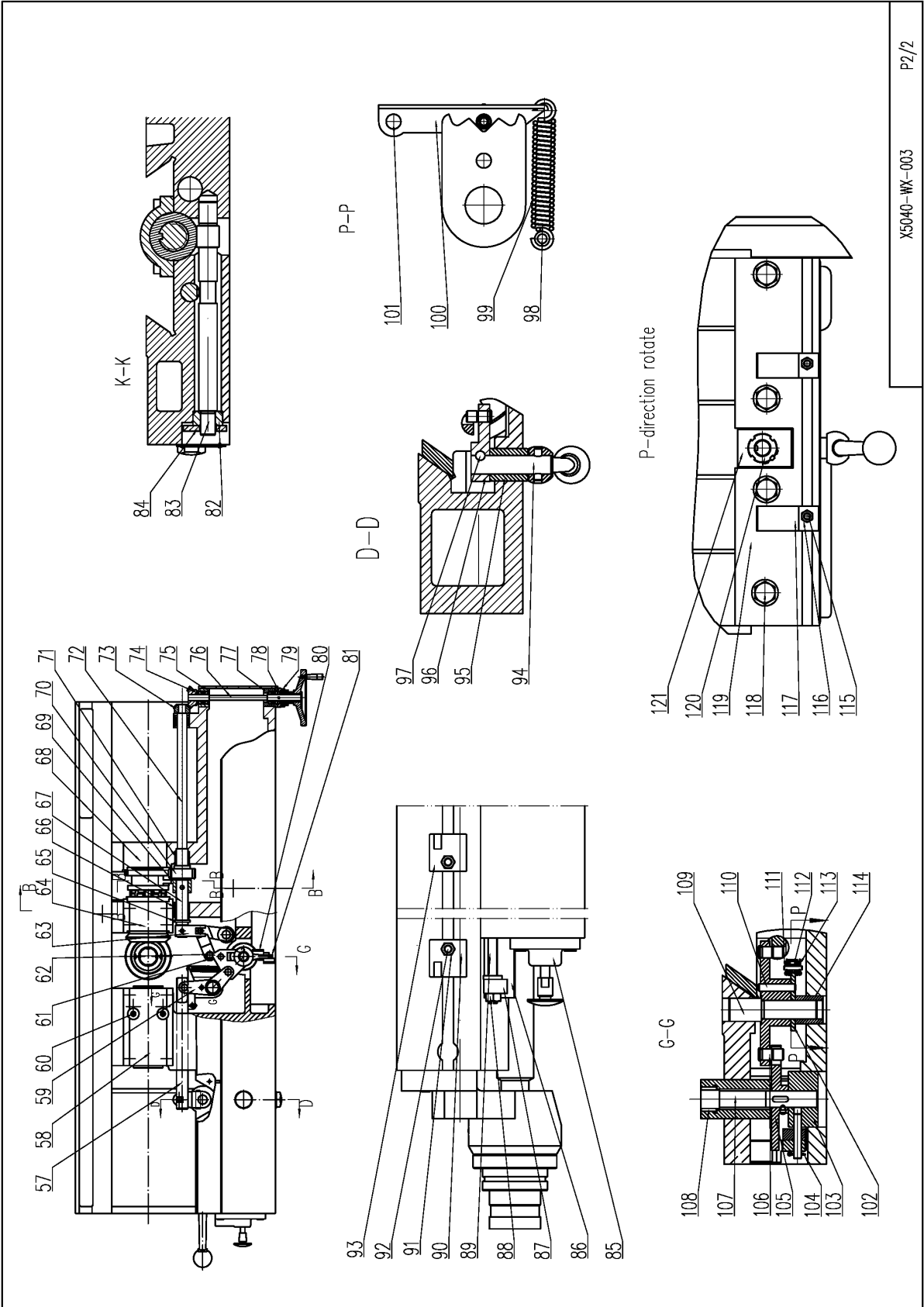
Index No.	Part No.	Description	Size	Qty
42	JMD1667-C-42	Shaft sleeve		1
43	JMD1667-C-43	Gear		1
44	JMD1667-C-44	Sleeve		2
45	JMD1667-C-45	Gear		1
46	JMD1667-C-46	Key	6x35	1
47	JMD1667-C-47	Bearing	6206	1
48	JMD1667-C-48	Hole ring	62	2
49	JMD1667-C-49	Shaft		1
50	JMD1667-C-50	Bearing	6205	1
51	JMD1667-C-51	Leadscrew		1
52	JMD1667-C-52	Socket		1
53	JMD1667-C-53	Shaft sleeve		1
54	JMD1667-C-54	Screw		2
55	JMD1667-C-55	Cover		1
56	JMD1667-C-56	Bolt		1
57	JMD1667-C-57	Motor	M10x30	1
58	JMD1667-C-58	Screw		1
59	JMD1667-C-59	key	M10x16	1
60	JMD1667-C-60	Motor gear	8x45	1
61	JMD1667-C-61	Felt ring		1
62	JMD1667-C-62	Sleeve		1
63	JMD1667-C-63	Bevel gear		1
64	JMD1667-C-64	Screw		1
65	JMD1667-C-65	Sleeve	M10x10	1
66	JMD1667-C-66	Needle roller		72
67	JMD1667-C-67	Small shaft	2.5x16	1
68	JMD1667-C-68	Pad		1
69	JMD1667-C-69	Screw		1
70	JMD1667-C-70	Key		1
71	JMD1667-C-71	Gear		1
72	JMD1667-C-72	Bevel gear		1
73	JMD1667-C-73	Adjusting washer		1
74	JMD1667-C-74	Key		1
75	JMD1667-C-75	Screw		1
76	JMD1667-C-76	Nut		1
77	JMD1667-C-77	Cap		1
78	JMD1667-C-78	Flange		1
79	JMD1667-C-79	Key		1
80	JMD1667-C-80	Nut		1
81	JMD1667-C-81	Small lever		1
82	JMD1667-C-82	Pin	6x30	1
83	JMD1667-C-83	Nut		1

Index No.	Part No.	Description	Size	Qty
84	JMD1667-C-84	Plug screw	25	3
85	JMD1667-C-85	Spring		1
86	JMD1667-C-86	Gear box		1
87	JMD1667-C-87	Pin		1
88	JMD1667-C-88	Drum wheel	32208	1
89	JMD1667-C-89	Shaft		1
90	JMD1667-C-90	Sleeve		1
91	JMD1667-C-91	Adjusting plug		1
92	JMD1667-C-92	Ring spring		1
93	JMD1667-C-93	Nut		1
94	JMD1667-C-94	Lever		1
95	JMD1667-C-95	Pin		1
96	JMD1667-C-96	Shaft	30206	1
97	JMD1667-C-97	Shaft sleeve		1
98	JMD1667-C-98	Sleeve		2
99	JMD1667-C-99	Lever	5x20	2
100	JMD1667-C-100	Shaft		2
101	JMD1667-C-101	Pin	5x30	2
102	JMD1667-C-102	Connecting rod		2
103	JMD1667-C-103	Slider		1
104	JMD1667-C-104	Pin	7306E	1
105	JMD1667-C-105	Screw		1
106	JMD1667-C-106	Pin		1
107	JMD1667-C-107	Small plate		2
108	JMD1667-C-108	Shaft sleeve	M8x10	2
109	JMD1667-C-109	Cap		2
110	JMD1667-C-110	Handle		1
111	JMD1667-C-111	Ring		1
112	JMD1667-C-112	Flange		1
113	JMD1667-C-113	Pin		1
114	JMD1667-C-114	Plate	32209	1
115	JMD1667-C-115	Pin		1
116	JMD1667-C-116	Small roller		1
117	JMD1667-C-117	Angle iron		2
118	JMD1667-C-118	Spring		2
119	JMD1667-C-119	Small pin		2
120	JMD1667-C-120	Nut	3x24	49
121	JMD1667-C-121	Pin		1
122	JMD1667-C-122	Screw		1
123	JMD1667-C-123	Screw		2
124	JMD1667-C-124	Wedge iron		1
125	JMD1667-C-125	Guide plate	6x35	1

<b>Index No.</b>	<b>Part No.</b>	<b>Description</b>	<b>Size</b>	<b>Qty</b>
126	JMD1667-C-126	Handle ball	6206	1
127	JMD1667-C-127	Handle	62	2
128	JMD1667-C-128	Tension sleeve		1
129	JMD1667-C-129	Shaft ring	6205	1
130	JMD1667-C-130	Screw		1
131	JMD1667-C-131	Nut		1
132	JMD1667-C-132	Screw pin		1
133	JMD1667-C-133	Key		2
134	JMD1667-C-134	Flange		1
135	JMD1667-C-135	Plug		1
136	JMD1667-C-136	Base plate	M10x30	1
137	JMD1667-C-137	Net		1
138	JMD1667-C-138	Spring	M10x16	1
139	JMD1667-C-139	Plug	8x45	1
140	JMD1667-C-140	Sleeve body		1
141	JMD1667-C-141	Steel ball		1
142	JMD1667-C-142	piston		1
143	JMD1667-C-143	Short shaft		1

# Exploded View for JMD-1667 DRO MILLING MACHINE - OVERVIEW - D







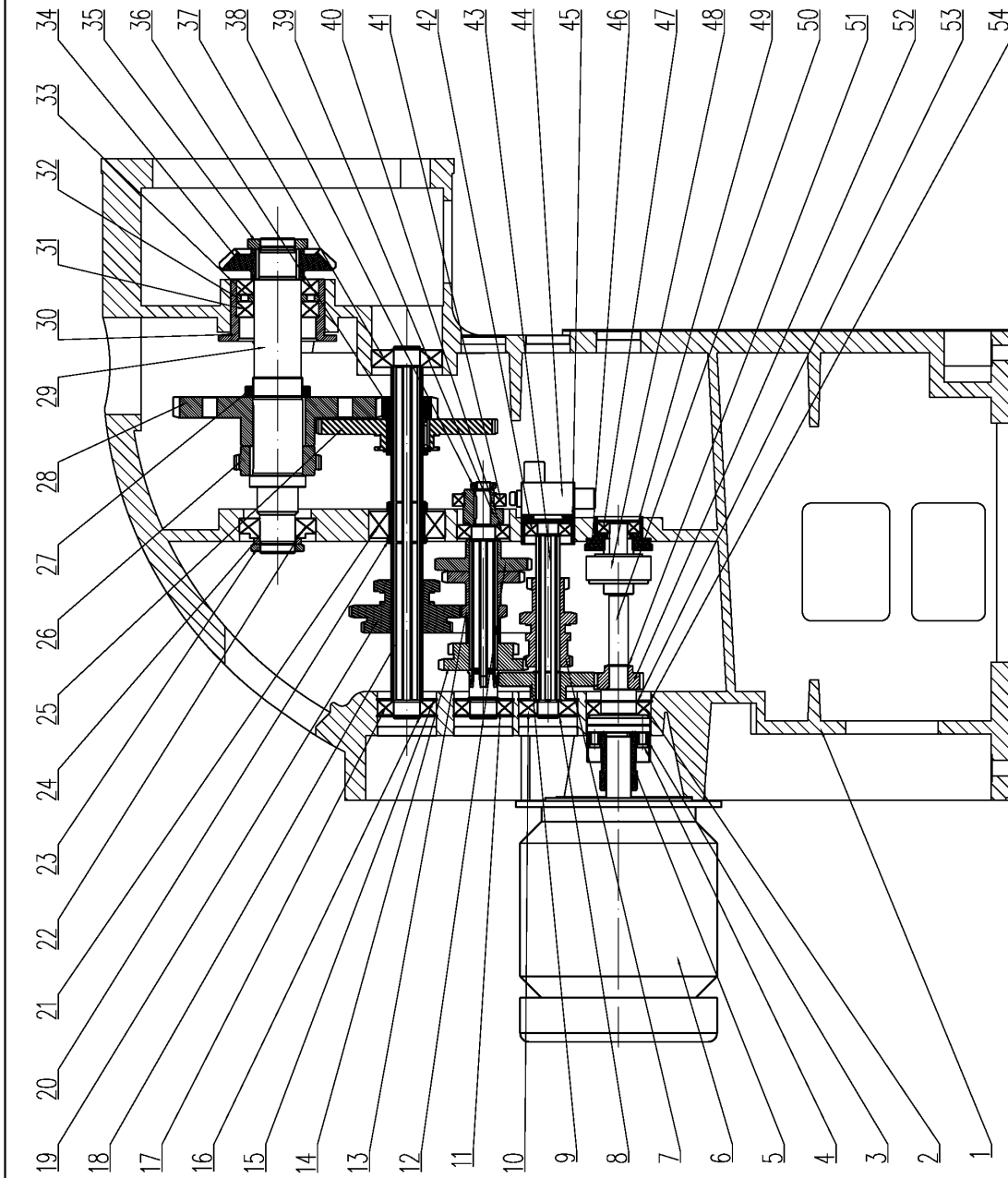
**Part List for JMD-1667 DRO MILLING MACHINE - OVERVIEW - D**

<b>Index No.</b>	<b>Part No.</b>	<b>Description</b>	<b>Size</b>	<b>Qty</b>
1	JMD1667-D-1	Large handwheel		2
2	JMD1667-D-2	Clutch sleeve		2
3	JMD1667-D-3	spring		2
4	JMD1667-D-4	Scale sleeve		2
5	JMD1667-D-5	Left shaft bracket		1
6	JMD1667-D-6	Leadscrew		1
7	JMD1667-D-7	Handle ball		4
8	JMD1667-D-8	Sleeve nut		1
9	JMD1667-D-9	Sleeve nut		1
10	JMD1667-D-10	Clutch gear		1
11	JMD1667-D-11	Sleeve		1
12	JMD1667-D-12	Clutch		1
13	JMD1667-D-13	Key		1
14	JMD1667-D-14	Screw		1
15	JMD1667-D-15	Sleeve		1
16	JMD1667-D-16	Socket		1
17	JMD1667-D-17	Screw		2
18	JMD1667-D-18	Eccentric shaft		2
19	JMD1667-D-19	Sleeve		1
20	JMD1667-D-20	Round nut		1
21	JMD1667-D-21	Pin		1
22	JMD1667-D-22	Bearing	51209	1
23	JMD1667-D-23	Handle		2
24	JMD1667-D-24	Pressure plate		2
25	JMD1667-D-25	Sleeve		1
26	JMD1667-D-26	Bearing	51209	1
27	JMD1667-D-27	Round nut and washer		2
28	JMD1667-D-28	Dial		1
29	JMD1667-D-29	Key		1
30	JMD1667-D-30	Pressure plate		1
31	JMD1667-D-31	Pressure plate		1
32	JMD1667-D-32	Pipe connector		1
33	JMD1667-D-33	Pin		2
34	JMD1667-D-34	Protective plate		1
35	JMD1667-D-35	Screw		6
36	JMD1667-D-36	Bevel gear		1
37	JMD1667-D-37	Insert sleeve		1
38	JMD1667-D-38	Saddle		1
39	JMD1667-D-39	Swing arm		1
40	JMD1667-D-40	Pin		1
41	JMD1667-D-41	Pin		1
42	JMD1667-D-42	Swing arm		1

Index No.	Part No.	Description	Size	Qty
43	JMD1667-D-43	Screw		1
44	JMD1667-D-44	Bevel gear		1
45	JMD1667-D-45	Fixed screw		1
46	JMD1667-D-46	Adjusting ring		1
47	JMD1667-D-47	Worktable		1
48	JMD1667-D-48	Sleeve		1
49	JMD1667-D-49	Pin		1
50	JMD1667-D-50	Bracket		1
51	JMD1667-D-51	Bevel gear		1
52	JMD1667-D-52	Round nut and washer		1
53	JMD1667-D-53	Bracket		1
54	JMD1667-D-54	Screw		2
55	JMD1667-D-55	Bolt		2
56	JMD1667-D-56	Sleeve nut		1
57	JMD1667-D-57	Connecting rod		1
58	JMD1667-D-58	Bearing cover		1
59	JMD1667-D-59	Swing arm		1
60	JMD1667-D-60	Pin		2
61	JMD1667-D-61	Small roller		1
62	JMD1667-D-62	Bolt		1
63	JMD1667-D-63	Swing arm		1
64	JMD1667-D-64	Bearing cover		1
65	JMD1667-D-65	Sleeve		1
66	JMD1667-D-66	Spring		1
67	JMD1667-D-67	Small shaft		1
68	JMD1667-D-68	Gland		1
69	JMD1667-D-69	Fork		1
70	JMD1667-D-70	Gear		1
71	JMD1667-D-71	Bearing	HK2524	4
72	JMD1667-D-72	Shaft		1
73	JMD1667-D-73	Bevel gear		2
74	JMD1667-D-74	Bearing	51105	1
75	JMD1667-D-75	Sleeve		1
76	JMD1667-D-76	Shaft		1
77	JMD1667-D-77	Sleeve		1
78	JMD1667-D-78	Clutch sleeve		1
79	JMD1667-D-79	Dial		1
80	JMD1667-D-80	Swing arm		2
81	JMD1667-D-81	Short shaft		1
82	JMD1667-D-82	Ring		1
83	JMD1667-D-83	Worm		1
84	JMD1667-D-84	Flange		1

<b>Index No.</b>	<b>Part No.</b>	<b>Description</b>	<b>Size</b>	<b>Qty</b>
85	JMD1667-D-85	Oil pump		1
86	JMD1667-D-86	Wedge iron		1
87	JMD1667-D-87	Ear pin		1
88	JMD1667-D-88	Nut		1
89	JMD1667-D-89	Screw		1
90	JMD1667-D-90	Bump plate		1
91	JMD1667-D-91	Nut		2
92	JMD1667-D-92	Bolt		2
93	JMD1667-D-93	Bump plate		1
94	JMD1667-D-94	Short shaft		1
95	JMD1667-D-95	Sleeve		1
96	JMD1667-D-96	Swing arm		1
97	JMD1667-D-97	Taper pin		1
98	JMD1667-D-98	Taper pin		1
99	JMD1667-D-99	Small shaft		1
100	JMD1667-D-100	Spring		1
101	JMD1667-D-101	Swing arm		1
102	JMD1667-D-102	Short shaft		1
103	JMD1667-D-103	Positioning plate		1
104	JMD1667-D-104	Sleeve		1
105	JMD1667-D-105	Cotter pin		1
106	JMD1667-D-106	Short shaft		1
107	JMD1667-D-107	Swing arm		1
108	JMD1667-D-108	Bearing	K20x26x17	1
109	JMD1667-D-109	Short shaft		1
110	JMD1667-D-110	Pin		1
111	JMD1667-D-111	Short shaft		1
112	JMD1667-D-112	Small roller		1
113	JMD1667-D-113	Cotter pin		2
114	JMD1667-D-114	Sleeve		1
115	JMD1667-D-115	Bolt		2
116	JMD1667-D-116	Nut		2
117	JMD1667-D-117	Stop iron		2
118	JMD1667-D-118	Bolt		4
119	JMD1667-D-119	Pressure plate		1
120	JMD1667-D-120	Nut and pad		2
121	JMD1667-D-121	Pressure plate		1

# Exploded View for JMD-1667 DRO MILLING MACHINE - OVERVIEW - E

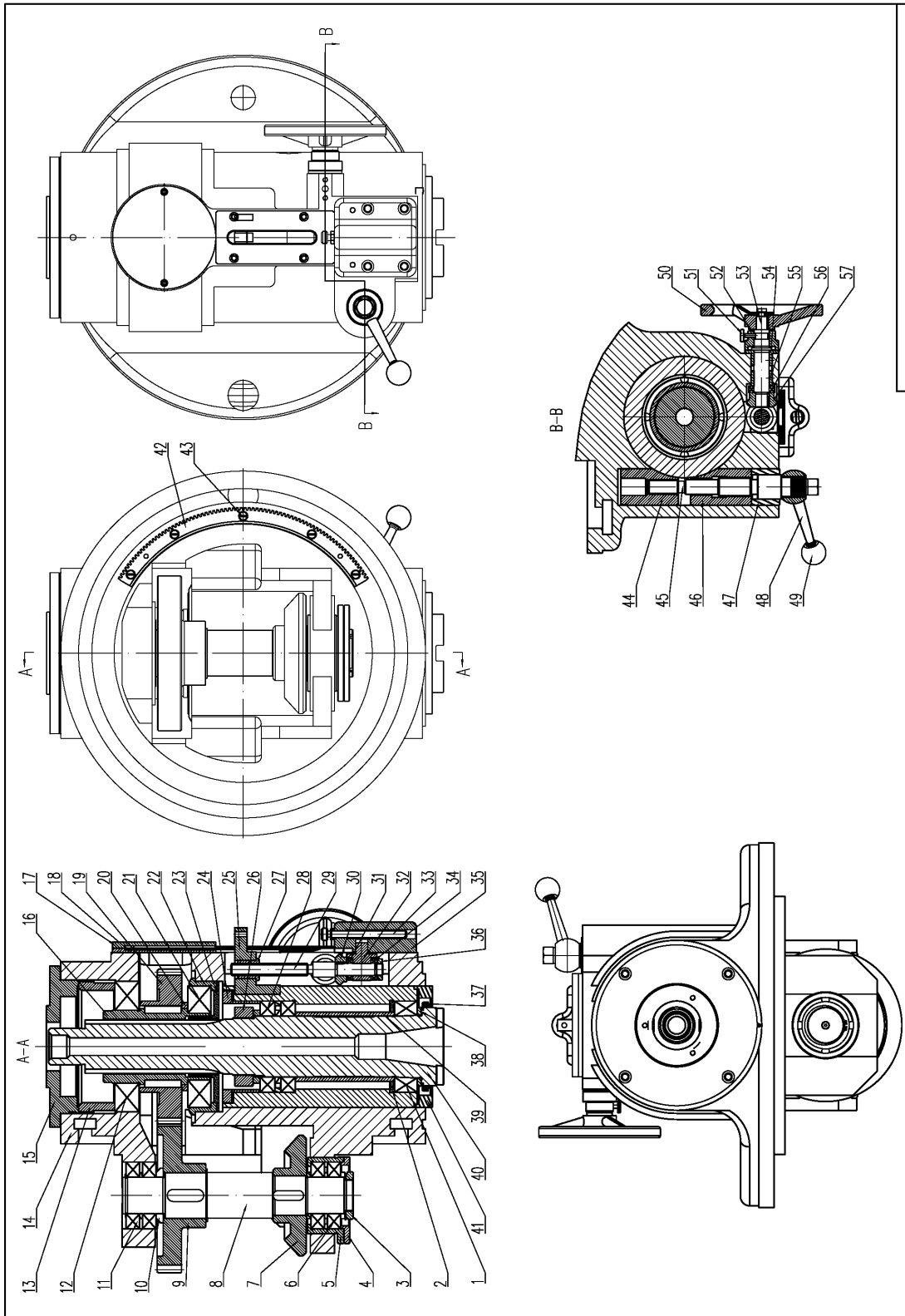


**Part List for JMD-1667 DRO MILLING MACHINE - OVERVIEW - E**

<b>Index No.</b>	<b>Part No.</b>	<b>Description</b>	<b>Size</b>	<b>Qty</b>
1	JMD1667-E-1	Body		1
2	JMD1667-E-2	Bearing	6212	1
3	JMD1667-E-3	Sleeve		24
4	JMD1667-E-4	Shaft		6
5	JMD1667-E-5	Sleeve		1
6	JMD1667-E-6	Main motor		1
7	JMD1667-E-7	Gear		1
8	JMD1667-E-8	Shaft ring	GB/T894.1 35	1
9	JMD1667-E-9	Gear		1
10	JMD1667-E-10	Bearing	6407	1
11	JMD1667-E-11	Bearing	6309	1
12	JMD1667-E-12	Gear		1
13	JMD1667-E-13	Gear		1
14	JMD1667-E-14	Gear		1
15	JMD1667-E-15	Hole ring	GB/T893.1 100	6
16	JMD1667-E-16	Shaft ring	GB/T894.1 45	2
17	JMD1667-E-17	Bearing	6309	1
18	JMD1667-E-18	Shaft		1
19	JMD1667-E-19	Gear		1
20	JMD1667-E-20	Sleeve		1
21	JMD1667-E-21	Bearing	2312	1
22	JMD1667-E-22	Bearing	30312	1
23	JMD1667-E-23	Nut		1
24	JMD1667-E-24	Sleeve		1
25	JMD1667-E-25	Gear		1
26	JMD1667-E-26	Gear		1
27	JMD1667-E-27	Sleeve		1
28	JMD1667-E-28	Gear		1
29	JMD1667-E-29	Shaft		1
30	JMD1667-E-30	Sleeve		1
31	JMD1667-E-31	Bearing	7216AC	2
32	JMD1667-E-32	Sleeve		1
33	JMD1667-E-33	Sleeve		1
34	JMD1667-E-34	Gear		1
35	JMD1667-E-35	Nut		1
36	JMD1667-E-36	Gear		1
37	JMD1667-E-37	Bearing	6409	1
38	JMD1667-E-38	Nut		1
39	JMD1667-E-39	Sleeve		1
40	JMD1667-E-40	Bearing	6308	1
41	JMD1667-E-41	Bearing	6210	1
42	JMD1667-E-42	Bearing	6307	1

<b>Index No.</b>	<b>Part No.</b>	<b>Description</b>	<b>Size</b>	<b>Qty</b>
43	JMD1667-E-42	Shaft		1
44	JMD1667-E-44	Pump		1
45	JMD1667-E-45	Sleeve		1
46	JMD1667-E-46	Sleeve		1
47	JMD1667-E-47	Bearing	6306	1
48	JMD1667-E-48	Clutch		1
49	JMD1667-E-49	Hole ring	GB/T894.1 72	1
50	JMD1667-E-50	Shaft		1
51	JMD1667-E-51	Shaft ring	GB/T894.1 32	1
52	JMD1667-E-52	Gear		1
53	JMD1667-E-53	Shaft ring	GB/T894.1 60	1
54	JMD1667-E-54	Hole ring	GB/T893.1 110	1

# Exploded View for JMD-1667 DRO MILLING MACHINE - OVERVIEW - F



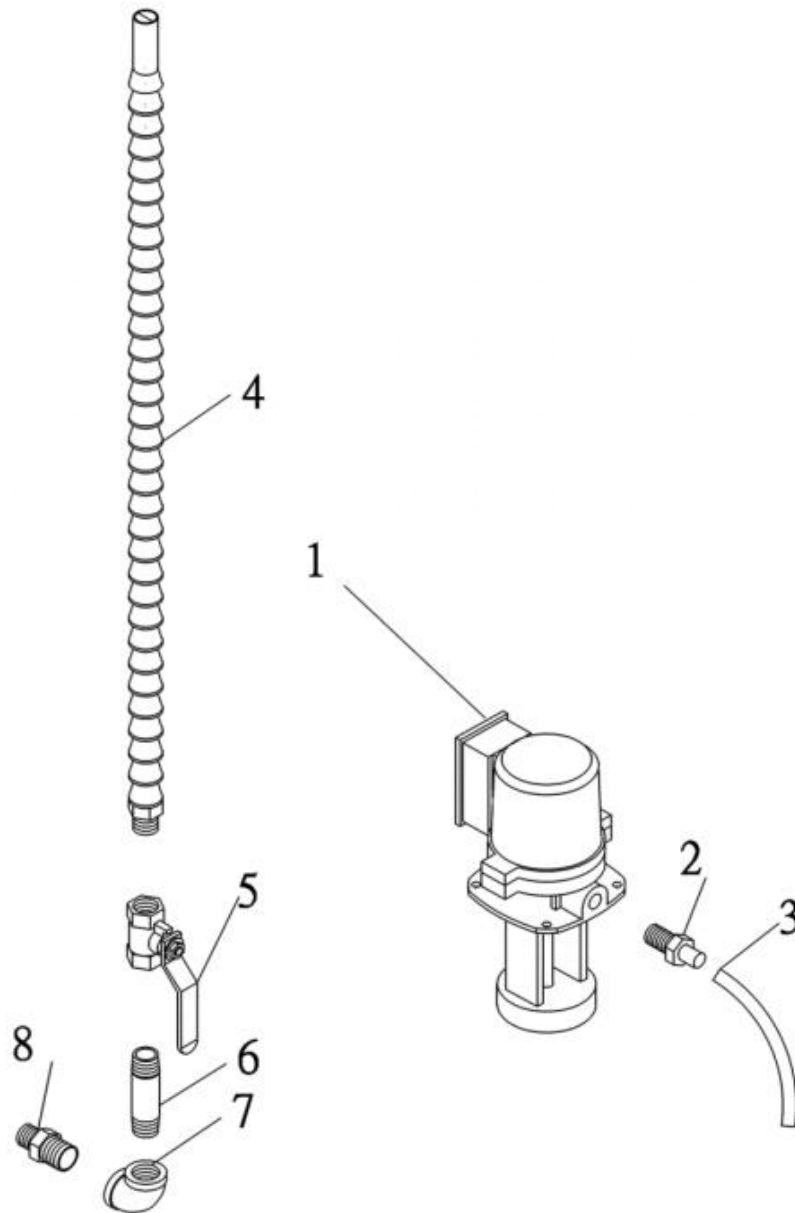
**Part List for JMD-1667 DRO MILLING MACHINE - OVERVIEW - F**

<b>Index No.</b>	<b>Part No.</b>	<b>Description</b>	<b>Size</b>	<b>Qty</b>
1	JMD1667-F-1	Bearing	NN3020K	1
2	JMD1667-F-2	Pad		1
3	JMD1667-F-3	Nut		1
4	JMD1667-F-4	Cover		1
5	JMD1667-F-5	Sleeve		1
6	JMD1667-F-6	Bearing	7020AC	2
7	JMD1667-F-7	Gear		1
8	JMD1667-F-8	Shaft		1
9	JMD1667-F-9	Gear		1
10	JMD1667-F-10	Cover		1
11	JMD1667-F-11	Bearing	6212	2
12	JMD1667-F-12	Bearing	6224	1
13	JMD1667-F-13	Cover		1
14	JMD1667-F-14	Shell		1
15	JMD1667-F-15	Cover		1
16	JMD1667-F-16	Sleeve		1
17	JMD1667-F-17	Cover		1
18	JMD1667-F-18	Cover		1
19	JMD1667-F-19	Gear		1
20	JMD1667-F-20	Sleeve		1
21	JMD1667-F-21	Bearing	6222	1
22	JMD1667-F-22	Sleeve		1
23	JMD1667-F-23	Sleeve		1
24	JMD1667-F-24	Sleeve		1
25	JMD1667-F-25	Block		1
26	JMD1667-F-26	Nut		1
27	JMD1667-F-27	Sleeve		1
28	JMD1667-F-28	Bearing	7020AC	1
29	JMD1667-F-29	Leadscrew		1
30	JMD1667-F-30	Gear		1
31	JMD1667-F-31	Bearing	51104	1
32	JMD1667-F-32	Shaft		1
33	JMD1667-F-33	Leadscrew		1
34	JMD1667-F-34	Bearing	51104	1
35	JMD1667-F-35	Base		1
36	JMD1667-F-36	Nut		1
37	JMD1667-F-37	Pad		1
38	JMD1667-F-38	Pad		1
39	JMD1667-F-39	Sleeve		1
40	JMD1667-F-40	Spindle		1
41	JMD1667-F-41	Flange		1
42	JMD1667-F-42	Gear		1



43	JMD1667-F-43	Screw		5
44	JMD1667-F-44	Sleeve		1
45	JMD1667-F-45	Clamp shaft		1
46	JMD1667-F-46	Sleeve		1
47	JMD1667-F-47	Sleeve		1
48	JMD1667-F-48	Handle		1
49	JMD1667-F-49	Handle ball		1
50	JMD1667-F-50	Handwheel		1
51	JMD1667-F-51	Screw		1
52	JMD1667-F-52	Sleeve		1
53	JMD1667-F-53	Shaft		1
54	JMD1667-F-54	Sleeve		1
55	JMD1667-F-55	Sleeve		1
56	JMD1667-F-56	Bearing	51104	1
57	JMD1667-F-57	Gear		1

**Part List for JMD-1667 DRO MILLING MACHINE–Coolant Pump Assembly G**



Index No.	Part No.	Description	Size	Qty.
01	JM125-F-001	Coolant pump	400V-50HZ-90W	1
02	JM125-F-002	Connect Elbow		1
03	JM125-F-001	Hose		1
04	JM125-F-004	Nozzle		1
05	JM125-F-005	Valve		1
06	JM125-F-006	Extend Elbow		2
07	JM125-F-007	90° Joint		2
08	JM125-F-008	Connect Elbow		1

**Exploded View for JMD-1667 DRO MILLING MACHINE – Electrical diagram**



Part code	Part name		Qty
3040160	voltage transformer	LBK5-250VA 380V/400V/415V- 220V50VA/28V100VA/24V100VA	1
3040091	Schneider motor thermal magnetic circuit breaker	GV2-ME32C 24-32A	1
3040082	Schneider motor thermal magnetic circuit breaker	GV2-ME05C 0.63-1A	1
3040087	Schneider motor thermal magnetic circuit breaker	GV2-ME14C 6-10A	1
3040064	Schneider circuit breaker	OMSC32N1D3 1PD3A	1
3040065	Schneider circuit breaker	OMSC32N1D6 1PD6A	1
3040097	Schneider AC contactor	LC1-D50B7C	1
3040092	Schneider AC contactor	LC1-D09B7C	3
304343	rectifier bridge	KBPC5010	1
3040144	grounding copper bar	JDM4*6	1
3040139	terminal block	TB10I	6
3040138	terminal block	TB2.5BI	60
3040141	ground terminal	TB10B-PEI	3
3040140	ground terminal	TB2.5B-PEI	3
3040169	combination switch	HZ5B-10/2	1
3040170	power cut off switch	HZ12D-40/2	1
3040172	CAM switch	LW5D-16/B 16A	1
3040173	travel limit switch	BYDX1-11DSC3	2
3040171	travel limit switch	BYDX7-131LA	2
3040174	travel limit switch	LX3-11K	2
3040179	auxiliary contact module	LAD11C	3
3040127	Schneider red emergency stop button	ZB2-BS54C	2
3040113	Schneider red button	ZB2-BA4C	2
3040112	Schneider green button	ZB2-BA3C	2
3040111	Schneider black button	ZB2-BA2C	2
3040128	Schneider black two position knob	ZB2-BD2C	1
3040462	work lamp	LED50F-4 (9 heads)	1
3230795	bracket	XZ6328103	1
3040122	Schneider button seat	ZB2-BZ105C	9