



JHM-1667 DRO

Milling Machine

Original:

GB

Operating Instructions



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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 JHM-1253 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) AG 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 drilling 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 safe 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 JHM-1667

The JHM-1667 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.

Instruction:

★ : DANGER: Indicate an imminently hazardous situation which, if not avoided, will result in death or serious injury.

▲ : WARNING: Indicate a potentially hazardous situation which, if not avoided, could result in injury or machine damage.

△ : NOTICE: The item should specially be noticed and cared.

4.1 Installation of machine

△: Fully understand procedure and request of installation in the manual.

△: All relative persons must communicate with each other if necessary during installation.

▲: Sling and tool for installation must be pre-checked, and accord with relative safety standard request.

4.2 Power supply

△: Check whether electrical box's door is closed.

▲: Shut off power supply if the machine stops due to power cut.

4.3 Idle run

▲: The machine runs idle first for preheating before working.

▲ : When the machine runs idle, check whether each function of device is normal, check whether each control handle is flexible and reliable, whether each clamping device is loose, whether the each movement direction is normal, whether the each electrical operating part turns flexibly and is in normal position. Open the electrical door and check whether each electrical part (special binding screw) is loose during transportation or tighten them with special tool; check whether electrical parts are damaged. Close the electrical door after all the things are ready, turn the main switch control knob QS1 with key to interlock position, switch on the power supply and run idle after making sure there is not obstacle around the machine.

▲ : Check the push button switches on the operation panel first before operating then to avoid mistakenly pressing them.

★ : Stop the machine during loading or unloading work piece.

4.4. Device

▲ : Check all set value and state of moving parts.

★ : During lifting heavy objects, use hoisting machinery, crane or multi person cooperative operation;

▲ : The work lamp after lighting for a long time will be too hot to touch;

▲ : Be careful not to tumble on the ground due to coolant splashes down when the table moves to the extreme travel position.

★ : Do not touch moving parts when the machine runs.

▲ : Always unscrew the bolt slowly.

▲ : Clamp the tool and work piece firmly and safely.

▲ : Do not place the tool and apparatus on the table or other part of machine.

▲ : Be careful not to hit your head when operating the machine or going under the ram or other protruding parts.

4.5. Automatic run

★ : Do not touch switches with wet hands.

▲ : Don't lean against the machine when the machine runs.

★ : Take care not to press the wrong button, before operation, check the button switch on operation panel visually.

▲ : Be sure to close all the doors before run automatically.

▲ : Check whether all switches and moving parts are in the correct position before automatic run.

▲ : Do not touch any moving parts when machine runs.

▲ : Do not touch any switch when machine automatically runs.

4.6. Stop running

▲ : Press the ESP switch when malfunction happens.

▲ : Fully understand why the machine stops.

▲ : Check whether the machine thoroughly stops.

4.7. Switch off power supply when work is over.

▲ : Clean the machine.

▲ : Stop the machine in special position. (X, Y, Z axes)

▲ : Switch off the main switch immediately when work is over; turn control power supply knob in close down position and must take the key away.

4.8. Check, repair, maintenance

△ : Fully understand the malfunction of machine according to description of operator.

△ : Map out steps of check, maintenance and working range.

▲ : Place the sign plate with "under repair" around the machine when maintaining the machines.

★ : Place the sign plate with NO SWITCHING ON in the position of main switch to avoid switching on the power supply suddenly.

★ : Switch off the main power supply and must place the sign

plate with NO SWITCH ON in the position of main switch when repairing the machine.

★ : Do not touch the cable, electrical apparatus, and switches by damp hands

▲ : Use standard and special tool.

▲ : Do not place tool or clothes on the moving parts.

★ : When using lifting machinery, only qualified wire rope, hook and pulley are allowed to be use;

▲ : Replace with specified parts.

5. PERFORMANCE AND APPLICATION

5.1 Machine usage

(1) JHM-1667 Horizontal milling machine is suitable to volume production, individual production, machining department, tools and repairing department.

(2) The milling machine is used for cylindrical milling cutter, angular milling cutter, formed cutter and raised cutter to machine all kinds of plane, level, groove and gear. If using accessories, such as universal milling head, swivel table and dividing head, which can expand the range of machining.

(3) The table of JHM-1253 can swivel 45° left and right. When the table is rotated around its vertical center and installed a certain angle after dividing head, still capable of milling helical surface (such as a drill spiral groove, helical gear, drum, etc.).

5.2. The milling machine has the following characteristics:

(1) The machine structure itself has sufficient rigidity to withstand heavy cutting work load.

(2) The machine has enough power and a wide speed range, using carbide cutting tools can be used for high-speed cutting.

(3) In the front and left the machine, each of the same set of function buttons and joystick (i.e. duplex operating device) so that the table can choose the most convenient location to operate.

(4) Spindle start, stop, and fast travel have significant start button, table feed by the handle manipulation, and manipulation of its feeding direction consistent with the direction of the handle within the meaning of spindle speed and table feed speed with dial to select, all of which are manipulated so that the machine is simple, the workers operating the machine does not necessarily need to be skilled.

(5) An important tool transmission parts are made of alloy steel, and special treatment. Wear and tear parts are made of wear-resistant materials, Machine Tool anti crumbs devices, which are sufficient to ensure that the machine has long life.

(6) Wearable part has to eliminate the gap adjustment device to ensure accuracy and smooth machine.

(7) The machine has a good safety device, manual feed and feed motor has an interlocking mechanism, the feed excessive or overloaded due to a fault, the insurer zygot can be automatically disengaged, so that the machine parts will not be damaged, while ensuring the safety of the operator.

(8) The machine can be quickly and effectively braking, when the processing is completed or for other reasons have to stop the machine, simply click the stop button, the machine immediately stop all motion.

(9) The machine can be climb milling and work against the lock, the operator can be applied flexibly according to need.

(10) Table in three directions (longitudinal, lateral, vertical) can move quickly, reduce the auxiliary time and improve productivity.

(11) The table lateral movement and vertical concentration consists of a handle control, the operator can control the table with the handle in both directions of feeding and moving quickly.

(12) A sound machine lubrication system, important moving parts and bearings are lubricated by the motor oil pump automatically, required manual lubrication of parts, which are located in the refueling point obvious place.

(13) The important shafts and spindles are mounted on rolling bearings, to improve the transmission efficiency, tapered roller bearings on the spindle, can be adjusted to ensure precision spindle.

6. MACHINE STRUCTURE

6.1 The bed:

The bed is connected with basement by bolt. The over beam is on dovetail guideway, and on the bottom of left side is rack. When turn the hex head on left side of bed upper position by spanner, the rack will move by means of pinion. So the over beam will move forward and backward. There are two sets of clamping devices on upper left of bed. On extending part of over beam, there mount a cutter bar bracket. Each cutter bar bracket is equipped with wear-resistant bronze sleeve. The clearance between sleeve and cutter bar can be adjusted by nut. The coolant tank is in the base.

6.2. The drive system of spindle

Spindle drive part is in the bed; it is composed by five shafts. On both sides of bed, there is a window; Open cap of the right window, the drive parts can be seen, and inspection and adjustment should be done. On the left side of window, there is a variable speed control box. The motor is at the back of bed. Move triple or duplex sliding gear by shift fork. Different meshing conditions can be got to make spindle reach 18 kinds of speed.

6.3 Speed change of spindle

Gearbox is an independent component, which is installed at the left window of bed. It is close to sliding gear of transmission mechanism. It is controlled by a handle and a turntable (see Fig.1).

Fig 1

Operation steps are as follows:

(1) Press down handle 3, and make the key block slide out of groove. Then pull the handle to the front till the key block fall down into the second groove.

(2) Turn the turntable 2, which has 18 kinds of speed, making the required speed to the pointer 1. When it points to one speed, the locator will ring; put a little strength to turn to next speed. The turntable can turn clockwise or counter clockwise.

(3) Push handle 3 back to original position with rapid uniform speed. Be sure the key block falls into the groove.

In order to avoid collision between teeth, during shifting handle 3, the motor can get short impulse by means of variable speed control box to make sliding gear passing and meshing smoothly.

Do not change gear during spindle running.

6.4 Feed and speed change parts

Gearbox can not only changing feed speed, but make table rapid moving. Gearbox is an independent part, which is fixed on the left side of lifting table. It is driven by feed motor in the lifting table. The gearbox has five rotation shafts. By means of meshing condition of two triple gears and one set of back wheel, it can get 18 kinds of speed. The sliding gear position is controlled by feed speed changing control box. The control box is in front of the gearbox, and there is a turntable in front of the control box for feed selecting. There are 18 kinds of speed on the turntable; the mushroom handle is used for controlling. (see Fig.2)

Fig 2

Operation steps for feed speed changing:

(1)pull the mushroom handle 1 to forward;

(2)Turn the handle and turntable 2 is turning as well. Point the required speed to arrow 3. Attention must be paid that, the number on turntable is equal to the longitudinal or horizontal feed rate; but the vertical feed rate is only 1/3 of the number on the turntable.

(3)Pull the mushroom handle to forward limit position, and then push it back.

In order to guarantee variable speed smoothly, feed motor also has the impulse device. The mushroom handle axis movement will make motor has impulse. The feed speed can be changed under machine running.

6.5. Lifting table

Lifting table is in front of column, and connect with column through dovetail way, adjust the backlash of lifting table to column with gib. Clamping handle is on the right rear side of lifting table.

Rectangular guide is on the top of lifting table, being used for installing saddle. At the front lower part of lifting table, there is a 1.5 KW flange type motor.

There are control handwheel and handle at the front end of lifting table. Due to interlocking mechanism, when worktable working feed and rapid moving is carried out automatically, handle and hand wheel is out of contact with rotating shaft; they do not rotate along with the shaft so as to ensure the safety of operator.

The horizontal and vertical feed control handles are double entry, namely, two identical handles, which are installed at front and back of lifting table left side respectively. The handle has five positions:

- (1)Worktable upward or rapid upward;
- (2)Worktable downward or rapid downward;
- (3)Worktable forward or rapid forward;
- (4)Worktable backward or rapid backward.
- (5)Horizontal or vertical feed stop.

These five positions are interlock. The feed on each direction cannot be got at the same time. The bump plates at side of bed guide way and on table base can stop horizontal or vertical feed at the required position by means of leverage and rod.

6.6 The table part

Work table parts is installed on lifting table; By operating mechanism, the worktable can realize manual, motor and rapid moving on three directions of longitudinal, horizontal and vertical. There is feed interlock device on each axis.

The handle controlling longitudinal travel of worktable is installed on top center position of worktable base. The handle has three positions, namely "feed to the right ", "feed to the left" and "stop".

The longitudinal feed control handle of worktable also is double entry. The other identical handle is installed at the left lower position of table base.

There is a compensation device for adjusting the clearance between longitudinal leadscrew and nut.

Table longitudinal dovetail guide way and horizontal rectangular guide way clearance can be adjusted by wedge. On left and right side of worktable base has a clamping handle respectively for clamping the base on lifting table. When handle is clamped, the horizontal feed hand wheel can not be turned. Do not even move horizontal auto feed or rapid feed. The worktable is clamped on dovetail guide way by two screws at front end of table base.

JHM-1253 worktable has upper part and lower part; the upper part is rotary disc, and the lower part s saddle. Two parts combination is located by a ring fixed on saddle. The rotary disc can rotate with worktable together around the ring relative to saddle. The max. rotary angle is 45 °leftward/rightward. The rotary disc can be fixed on rotary angle you need by T-bolt.

6.7 Cooling section:

Coolant system installed in the machine base, turn the machine back cover you can see the coolant pump and motor, cooling pump coolant delivery along the tube to the nozzle, in order to make the liquid sprayed accurately cut parts, mobile systems have nozzles flexible enough to adjust it in any angle, but also to move along the cantilever rail. The amount of the cooling liquid is regulated through the delivery valve.

7.PARAMETERS

No.	Items	JHM-1667
1	Table size (WxL)	400x1700mm
2	Max. longitudinal travel of table	900mm
3	Max. cross travel of table	315 mm
4	Max. vertical travel of table	380mm
5	Max. table angle of rotation	±45°
6	No. of T-slot	3
7	T-slot width	18 mm
8	Distance of T-slot	90 mm
9	Spindle taper	ISO50 7: 24
10	Diameter of spindle bore	29mm
11	Diameter of tool arbor	32/50mm
12	Diameter of spindle front bearing	100mm
13	Distance of spindle axis to table surface	30-400mm
14	Distance of table center to vertical ways of column	255-570mm
15	Distance of spindle axis to ram	190mm
16	Spindle steps	18
17	Spindle speed range	30-1500 rev/min
18	Speed steps	18
19	Table feed range	
	Longitudinal	23.5-1180 mm /min
	Cross	23.5-1180 mm /min
	Vertical	8-394 mm /min
20	Table rapid moving speed	
	Longitudinal	2300 mm /min
	Cross	2300 mm /min
	Vertical	770 mm /min
21	Power supply total capacity	15 KVA
22	Main motor power	11 KW
23	Feed motor power	3 KW
24	Coolant pump power	1/8HP
25	Overall size (L×W×H)	2556×2159×1770 mm

26	Net weight	3850 KG
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8. UN-PACKING AND INSTALLATION

8.1 Machine transportation

Packaged machine tool is transported to the designated locations by crane or rolling bar. If crane is used, the wire rope must be able to load over 4 tons. When rolling on a tilting plate, slope of the plate should not be more than 10 degrees. When transport unpacking machine, set steel rope according to the positions shown on Hoisting Diagram (see fig.3) . Before lifting, move worktable near to bed. Do not make steel rope contact machine directly. To avoid damage oil paint, it is better to use wood pa

Fig 3

8.2. Unpacking

After unpacking, check all the accessories according to packing list. Check machine handle and prominent part of machine for damaging during transporting. If find any accessory loss, please inform immediately. Once the machine is used, manufacturer will not take any responsibility.

8.3 Installation of machine

In order to make the machine work smoothly and accurately, lay concrete foundation according to foundation plan (see fig.4). Pour foundation in solid soil. It is best to tamping beforehand. The foundation depth is decided by soil.

After placing machine tool on the foundation, and before pouring concrete, adjust by level ruler on vertical and horizontal directions. After fully dry, tighten the anchor bolts evenly. Check the machine level. The permissible error is 0.04/1000 on both directions.

Fig 4

8.4 Commissioning

Before commissioning, clean machine parts with kerosene. Do not use any metal material or other instrument enough to scratch parts surface to wipe. After cleaning, coat the exposed surfaces with a thin layer of machine oil. Fill up the lubrication unit and check each lubrication point before commissioning.

Check the motor direction after switching on the machine; and correct the machine wiring according to rotation direction indicated on the machine label.

Perform idle run at least for 30 minutes in the lowest speed. Then test all levels of operation with increasing the speed gradually. Also check if each direction feed control handle of worktable for is flexible and reliable. And check the lubricating oil pump working condition. It should be noted that during feeding, the worktable clamp handle on each direction should be loosened.

9. MACHINE TRANSMISSION SYSTEM

9.1. Drive system of spindle

Spindle is driven by 11 KW flange type motor. The motor is connected with I shaft through Elastic coupling (see fig.5). The spindle will obtain 18 kinds of speed by moving sliding gears (two triple gear and one duplex gear) of II/IV shaft; the speed range is of 30~1500rpm.

Fig.6 Spindle speed distribution diagram

Fig 6

Fig 5

Fig 7

9.2 Feed system (see Fig.5, Fig.6 and Fig. 7)

The feed system is driven by 1.5KW flange type motor (in lifting table) individually. The gear (18) is fixed directly on the shaft of motor, shaft V can get 9 steps speed through moving two triple gears on shaft III and shaft V. Push the gear (36) left to disconnect the clutch (35), gear (36) and (39) still mesh as the gear (39) is wide. The 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 (shown on the figure), gear (36) engage with clutch (35), so gear (39) can get 18 steps speed. When slow electromagnetic clutch attracts, gear 39 drives VI-shaft and also drives to shaft VII, VIII, IX and X through gear 42, 43, 44, 45, 46 and 47. Clutch 48、49、60 is

controlled by worktable control handle. Each position of the handle can connect one clutch. So the corresponding leadscrew turns and gets longitudinal, transverse and vertical feed movement. Three directions of the clutch is interlock, cannot be connected at the same time. The longitudinal and transverse feed range are all in 23.5mm/m to 1180mm/m; Due to lowering speed function of gear 56, 57, 58 and 59, vertical feed rate (namely 8-394 mm/m) is only equivalent to 1/3 of the vertical feed rate. When press down "Rapid" button, the worktable will move rapidly. When the electromagnetic clutch at the right side of VI-axis is connected, motor drives VI-axis through gear 18, 19, 20 and 21. So the worktable can move rapidly. The longitudinal and transverse rapid movement is of 2300 mm/m. The vertical movement is of 770mm/m. The figure 6 is the feed rate distribution chart. The speed is selected by variable speed turntable.

Please see Fig.8 about the site of rolling bearing.
 For machine gears and transmission parts list, see Table 1.
 For rolling bearing list, see Table 2.

Fig 8

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°	
6	triple gear	28	4	20°	
7	triple gear	37	4	20°	
8	triple gear	16	4	20°	
9	gear	39	4	20°	
10	triple gear	26	4	20°	
11	dual gear	18	4	20°	
12	triple gear	47	4	20°	
13	dual gear	33	4	20°	
14	gear	81	4	20°	
15	gear	39	3	20°	
16	gear	15	4	20°	
17	gear	57	4	20°	
18	gear	26	2	20°	
19	triple gear	44	2	20°	
20	gear	57	2	20°	
21	gear	43	2	20°	
22	triple gear	24	2	20°	
23	gear	64	2	20°	
24	triple gear	27	2.5	20°	
25	triple gear	27	2.5	20°	
26	triple gear	36	2.5	20°	
27	gear	18	2.5	20°	
28	triple gear	40	2.5	20°	
29	triple gear	18	2.5	20°	
30	triple gear	36	2.5	20°	
31	triple gear	21	2.5	20°	
32	triple gear	37	2.5	20°	
33	triple gear	24	2.5	20°	
34	triple gear	34	2.5	20°	
35	clutch	9			
36	gear	40	2.5	20°	
37	gear	13	2.5	20°	

Table 1: Gears and transmission parts list (see [Figure 5](#))

	shaft				
38	gear	18	2.5	20°	
39	gear	40	2.5	20°	
40	gear	45	2.5	20°	
42	gear	28	2.5	20°	
43	gear	35	2.5	20°	
44	gear	18	3	20°	
45	gear	33	3	20°	
46	gear	37	3	20°	
47	gear	33	3	20°	
48	clutch	9			
49	clutch	9			
50	bevel gear	18	4	20°	
51	bevel gear	16	4	20°	
52	spiral bevel gear	18	5.111	20°	40Cr
53	clutch gear	18	5.111	20°	20Cr
54	clutch gear	30	3	20°	20Cr
56	gear	22	3	20°	40Cr
57	gear	33	3	20°	45
58	bevel gear	22	3	20°	40Cr
59	bevel gear	44	3	20°	40Cr
60	clutch gear	7			20Cr
61	nut				outer bush 45 inner bush ZQSn6-6-3
62	lead screw	6			Y40Mn
63	nut	6			outer bush 45 inner bush ZQSn6-6-3
64	nut	6			outer bush 45 inner bush ZQSn6-6-3
65	lead screw	6			Y40Mn
66	nut	6			outer bush 45 inner bush ZQSn6-6-3
67	lead screw	6			Y40Mn
61a	vertic	6			unit

	al ball screw				
62a	longitudinal ball screw	6			unit
63a	cross ball screw	6			unit

Table 2. Rolling bearing list (see Fig. 8)

No.	Name	Model	Dimension	Qty	Accuracy grade
1	bearing	6411/p6	55 x140 x33	1	
2	bearing	6306/p6	30 x72 x19	1	
3	bearing	6307/P6	35 x80 x21	1	
4	bearing	6212/P6	60 x110 x22	1	
5	bearing	6407	35 x100 x25	1	
6	bearing	6309	45x100 x25	1	
7	bearing	6309	45x100 x25	1	
8	bearing b	6308	60 x130 x46	1	
9	bearing	6310/p6			
10	bearing	22312/P6	50 x110 x27	1	
11	bearing	6210	50x90x20	1	
12	bearing	6205	25x52x15	1	
13	bearing	6206	30x62x16	3	
14	needle roller		φ2.5 x16	391	
15	bearing	6306	30x72x19	1	
16	bearing	32216/P5	80x140x32.25	2	P5
17	bearing	32220/P5	100x180x49	1	P5
18	bearing	30206	30x62x16	1	
19	bearing	32208	40x80x25	1	
20	bearing	30306	30x72x20	1	
21	bearing	32209	45x85x25	1	
22	bearing	51306	30x60x21	1	
23	bearing	51112	60x85x17	1	
24	bearing	51206	30x52x16	1	
25	bearing	HK5024	50X58X24	2	
1	bearing	6411/p6	55 x140 x33	1	
2	bearing	6306/p6	30 x72 x19	1	
3	bearing	6307/P6	35 x80 x21	1	

10.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.

11. ELECTRIC SYSTEM

NOTE: The machine uses AC three-phase power supply of 400V, 50 Hz

11.1 The spindle motion electrical control (see Figure 9)

Fig 9

When starting the spindle, switch on the power switch SQ1 firstly, then turn the reversing switch SA1 to spindle required direction. Then pressing down start button SB2 or SB4 to connect contactor KM1, the spindle motor will be started.

When stop the spindle, press down button SB1 or SB2 to cut off the power supply circuit of contactor.

For easy meshing, the spindle motor should rotate instantaneously. When gear shift lever is back to original position (refer to Fig.1), press down travel switch SB12 to make contactor KM1 connecting instantaneously, so spindle motor will rotate instantaneously. Push gear shift lever back with continuous and rapid speed to avoid motor rotate is too fast to damage the gear.

Fig 1

11.2 Feed movement of electrical control

Lifting table up and down moving and worktable back and forth moving is controlled by operating handle. The handle linkage mechanism is connected with travel switch. The travel switch is at the left side of lifting table; SB8 is at the back of it, which controls worktable forward and downward moving; SB9 controls worktable backward and upward moving.

The leftward and rightward of worktable moving is also controlled by operating handle. The linkage mechanism controls travel switch SB6 and SB7 for worktable rightward and leftward movement. Start the feed motion only after spindle is started.

During shifting feed speed, push mushroom handle back (see Fig.2), but before reaching to the original position, push travel switch SB5 by means of linkage lever to make contactor KM3 connect instantaneously. So the feed motor instantaneous rotation makes the gears meshing easily.

Fig 2

11.3 Rapid travel and machine automatic control

After starting the spindle, pull the feed control handle to the desired location. The worktable will move as selected velocity to the pointed direction. Now, press down button SB10 or SB11, KA3 is engaged. The worktable moves rapidly according to its original direction. When releasing the rapid button, the rapid moving is stop, while it moves as original feed speed.

11.4 Cooling pump

Close switch SA3, connected C-L coil power supply circuit of contactor, the cooling pump motor start working.

11.5 Electrical device list

NO.	Symbol	Model	Name	quantity
1	M1	Motor	Y132M-4-B5 7.5Kw 380V 50Hz	1
2	M2	Motor	Y90L-4-B5 1.5Kw 380V 50Hz	1
3	M3	Motor	AOB-25 90W 380V 50Hz 3PH	1
4	KM1			
5	KM2	Contactora	CJX1-32/22 coil voltage AC 24V 50Hz	2
6	KM3-KM5	Contactora	CJX1-9/22 coil voltage AC 24V 50Hz	3
7	KA1-KA2	Intermediate relay	HH54P coil voltage AC 24V 50Hz	2
8	KT1	Timing relay	JS-S8 coil voltage DC 24V	
9	timing delay 0.5-10 second 2NC			1
10	TC	Control		
11	transformer	JBK4-100 AC 380V /AC 110V 50Hz		
12	I: 0-380V O: 0-24V 100VA 0-27V 100VA			1
13	VC	Rectifier bridge	KBPC-10-10 10A	1
14	QF1	Main air switch	T0-100BA-3310 rated current 30A	
15	coil voltage 380V	1		
16	QF2	Breaker	DZ108-20/211 12.5-20A	1
17	QF3	Breaker	DZ108-20/211 0.25-0.4A	1
18	QF4	Breaker	DZ108-20/211 3.2-5A	1
19	QF5	Breaker	DZ47-63 2P 5A	1
20	QF6-QF7	Breaker	DZ47-63 1P 3A	2
21	QF8	Breaker	DZ47-63 1P 5A	1
22	SA1	Rotary switch	LA42X2-10/BS	1
23	SA2	Rotary switch	LA42X2-11/BS	1
24	SA3	Rotary switch	LA42X2-20/BS	1
25	SB1、SB2	Pushbutton	LA42P-21/RS	2
26	SB3、SB4	Pushbutton	LA42P-10/GS	2
27	SB5、SB6	Pushbutton	LA42P-10/WS	2
28	SB7、SB8	E-stop	LA42J-21/R	2
29	SQ1、SQ2	Travel switch	X2	2
30	SQ3、SQ4	Travel switch	LX2-131	2
31	SQ5	Travel switch	LXM1-23K	1
32	SQ6	Travel switch	LX3-11K	1
33	SQ7	Travel switch	X2N	1
34	EL	work light	LED AC 24V 40W	1
35	YC1	Spindle brake clutch	DLMOZ-5b DC 24V 24W	1
36	YC2	Feed clutch	DLMX-a DC 24V 7.4W	1
37	YC3	Rapid clutch	DLMX-b DC 24V 24W	1
38	XT1	Terminal board	TD206+TD1534	1
39	XT2	Terminal board	TD1530	1
40		lock	JDS-1	1
41	XB	Grounding、copper bar	6 (M4)	1

12. OPERATION

12.1 Manual operation

Variety handles of machine tool to manipulate, buttons, switches, etc. position and role, see machine manipulation (Figure 10) As can be seen from the figure, Longitudinal and transverse and lifting joystick and spindle start, stop, and fast travel button table, have two sets of so-called double-operating device, were installed in the machine front and left, the operator can manipulate the machine two positions. use the handle to control the three directions (vertical, horizontal and elevator) trip is intuitive and easy to remember, moving direction is the direction of the table move handle and unskilled workers are easy to grasp.

Hand shake table hand wheel or handle, are relying on tooth clutch drive shaft rotates together when shaking the hand wheel in either direction; we must first push the hand wheel to the clutch engagement. The feed motor, the lateral and lift the feed hand wheel is pushed interlocking mechanism, the clutch is disengaged, and the hand wheel will not rotate simultaneously, which is particularly important in the fast-moving. For the longitudinal manipulator hand wheel, when not in manual mode, the spring will be out at any time.

Button station is composed of the "Stop", "Start" and "Rapid" buttons. When depressed, "Stop" button, the machine will stop all motion, if vertical, horizontal and lift joystick not zero, then in the press "Start" button, the corresponding feed also will start, start After feeding, when as a result of the adjustment of the machine for automatic or other work to stop the spindle, the spindle must switch on the door handle to move the electrical box in the middle zero.

If the corresponding handle to move in the desired direction on the press under "Rapid" button, you can make the table as fast-moving, if the joystick in neutral (neutral position), then, though depressed "Rapid" button, do not produce rapid moving, "Rapid" button works only when depressed, fast moving immediately stop after release.

Other electrical switches of machine are concentrated in a small door on both sides and electrical boxes around on the bed.

12.2 Auto

No matter table in vertical, horizontal or vertical feeding, it can stop automatically by bump plate

13. ADJUSTMENT AND TEST RUNNING

13.1 The rotary table angle adjustment

On JHM-1667 Milling Machine, the table can each swivel around 45 degrees within the horizontal plane. Adjust machine tool accessories are available by the Allen wrench, "will manipulate the figure of 16 loosen the screw (see Fig.10), both before and after each of the screws can loosen after the rotary table, the rotation angle may be on the scale see, adjust to the desired angle, retighten the screws.

Fig 10

13.2. Longitudinal screw rotation adjustment gap

In order to adjust the cap should be removed (Fig.11), which

cover a portion located on the front bench, and then screw the flange 2 Loosen, then turn the small shaft 3, the use of the worm rotation tighten the nut 4, the rotation reduce the gap, the tightness of the nuts should be, when shaking the hand wheel by the method of inspection, the gap is no more than 1/40 turn the screw, while the full length may not have stuck phenomenon. After adjustment, tighten the screws, having a good cover Plate 1.

Fig 11

13.3 Longitudinal adjustment screw axial clearance

In order to climb milling, not only eliminate backlash between leadscrew and nut, but also minimize the gap between screw and table in the axial direction. **Figure 12** shows the structure of the table left screw bearing axial clearance adjustment, first remove the handwheel, tighten the nut 1 Remove the dial 2, the jammed nut washer 4 Release 3, then just slightly loosen the lock nut 3, the gap can be adjusted with a nut 5, the right to adjust, still the third locking nut, buckle On lap 4 washer, then dial, nut and hand wheels turn fitted.

Fig 12

13.4 drive system of spindle (see **Fig.13)**

Spindle drive mechanism is installed in the column, and is composed of five pieces of shafts. We can see the whole drive mechanism when removing the cover on the right of the column. Main motor is installed behind the column. The spindle can get 18 steps rotation speed when moving the two triple gears and dual gear in gear box with shifting fork.

The spindle front end is installed in the precision double row roller bearing, adjustment of the precision double row roller bearing backlash: Loosen the screw (1) first, turn nut (2), take off the washer (3) and repair it, tighten them according to the opposite sequence after proper adjusting them. Ensure temperature of bearing can not exceed 70°C when the motor run for 60 minutes at the speed of 1500 rev/min.

Brake of spindle adopts electromagnetic clutch, the

electromagnetic clutch is installed on the shaft I (see **Fig.14**). The electromagnetic clutch brakes smoothly and rapidly, and the braking time is not more than 0.5 second.

Fig 13

13.5 Feed movement and rapid moving clutch adjustment

The feed motion and rapid movement are relying on two electromagnetic clutch gear box in VI shaft. The **Figure 14**, **Figure 15** is a block diagram of VI, the left clutch pulls in, producing feed movement; the right clutch pulls in, the results in a rapid movement; and the two clutches are interlocked.

Fig 14

Fig 15

Friction plate with 3mm gap is appropriate; direct current through the brush to the electromagnetic clutch coil generates a magnetic field around the wire rings of magnetic friction plate pressed.

Brush structure shown in **Figure16**, the brush holder is fixed on the feeding transmission; open feed gearbox cover (**Figure 2**), load and unload brush seat through the window so as to replace the brush core. The brush core can move flexibly in brush seat, and it is pressed on guide ring of electromagnetic clutch by spring. To ensure good contact performance, the brush core is only allowed winded by copper wire cloth. No other material can be substitute.

Fig 16

Fig 2

14. MAINTENANCE

1. Cutting performance of machine tool:

1.1 Steel: carbon content of steel 0.45%; tensile strength limit 600 mega pascal; milling cutter diameter: 100mm; teeth number : 4; milling width :50mm; milling depth: 2.5 mm;rotation rate : 750 rev/min; feed speed : 750 mm/min.

1.2 Cast iron: milling cutter diameter:100mm; teeth number : 8; milling width :100mm;milling depth: 12mm; rotation rate: 47.5 rev/min; feed level: 118mm/min.

2 . Lubricate the machine according to the **Fig.15** periodically. Refer to Installation Guide about relative viscosity of lubricant.

Operator should add oil when the oil is lower than oil scale. Repair the lubricant system when the oil does not flow during work. Lubricate the lifting lead screw with supramoly grease once two months. Lubricate cross, longitudinal, vertical guide way with FUCHS Renep 68K or 40# hydraulic pressure guide way oil.

Notice: Pour 734# engine oil into headstock and gear box when the machine is used in high temperature areas.

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 17

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

Observation	Possible Reasons	Solution
Motor does not run when switching on the power supply.	1.Input power is wrong. 2.Connect is wrong. 3.Connection terminal is loose.	1.Input correct power. 2.Correct connection. 3.Tighten connection terminal.
Spindle works abnormally.	1.Gears disengage in main drive gear box. 2.Cutting overload. 3. Fault is in motor. 4. Mechanical part of spindle is damaged.	1. Check the spindle box. 2.Rightly operate the machine. 3.Check and repair the motor. 4. Check the spindle and repair it, and refer to the manual .
Spindle temperature exceed range.	1.Bearing is damaged. 2.Lock nut is tight.	1.Change bearing. 2. Adjust lock nut
Spindle accuracy exceed range.	1.Bearing is damaged or wrong adjustment. 2.Spindle inner hole wear and tear. 3.High temperature causes thermo deformation. 4.Lock nut is loose.	1. Adjust or change bearing. 2. Change spindle. 3. Adjust bearing. 4. Tighten lock nut.
Spindle does not start	Actuation connection of motor fails.	Check actuation circuit, adjust screw of actuation shaft end to realize actuation connection.
Noise of feed box is too big.	1.Drive gears is malposition or slack. 2.Motor has noise.	1.Check whether each gear slacks. 2.Check motor.
Feed box does not work.	1.Feed motor does not connect or is bad. 2.Feed clutch does not attracts.	Check circuit and equipments and obviate malfunction.
Sound of moving parts is abnormal.	1. Slump foreign matter 2. Juncture of screw and nut is loose.	1. Clean foreign matter. 2.Tighten the screw.
Moving parts slack.	1.Connection of screw and nut slacks. 2. Bearing seat of screw slacks. 3.Clearance of lead screw and nut is too big.	1.Tighten loose screw. 2.Tighten bearing seat. 3. Adjust clearance of lead screw and nut.
Moving parts crawl	(1) Lubrication of guide ways is poor. (2) Guide ways are not lubricated.	1.Check whether pipe jams or distribution is bad,or lubrication device is normal. 2.Oil the machine termly.
Motor is damaged.	Circuit happens short circuit.	(1) Contact manufacturer. (2) Change motor after obviating malfunction of circuit.
Noise of machine exceeds demand range.	(1) Drive gears slack. (2) Slump into foreign matter.	(1)Tighten loose gears. (2) Clean foreign matter.
Oil consumption of lubricative device is rapid.	(1) Oil pipe and distribution are damage.	(1) Change oil pipe and distribution.
Lubrication of lead screw is inadequate.	(1) Distributions are damaged (2) Oil pipe is damaged. (3) Lubricant is inadequate. (4) Nozzle is jammed.	(1) Change distribution. (2) Change oil pipe. (3) Add oil. (4) Repair nozzle.
Nozzle does not spray coolant.	(1) Coolant filter is jammed. (2) Coolant pipe leaks. (3) Nozzle is jammed.	(1)Clean filter, change coolant. (2) Change pipe. (3) Clean nozzle.
Malfunction of coolant pump happens.	1. Voltage is too high. 2. The motor is too hot due to clogging coolant pump. 3.Coolant pump is damaged. 4.Thermorelay is damaged. 5.Direction of motor rotation is	(1) Switch on thermal relay. (2) Clean pump, switch on thermal relay. (3) Change motor.

	wrong. 6. Coolant is poor.	(4) Change relay. (5) Exchange phase sequence of power. (6) Add coolant
Machine vibrates when cutting workpiece.	(1) Cutting parameter is unreasonable. (2) Bearings shafts in headstock slacks. (3) Backlash of gib is big. (4) Workpiece slacks.	(1) Adjust the cutting parameter. (2) Repair the headstock. (3) Adjust the gib. (4) Clamp workpiece.
Corrugation of processing surface is big, roughness exceeds range.	(1) Workpiece slacks. (2) Drive parts has backlash. (3) Cutting parameter is unreasonable.	(1) Clamp workpiece. (2) Adjust backlash of guideways. (3) Adjust the cutting parameter.

15. Environmental protection

Protect the environment.

Your appliance contains valuable materials which can be recovered or recycled. Please leave it at a specialized institution.

This symbol indicates separate collection for electrical and electronic equipment required under the WEEE Directive (Directive 2012/19/EC) and is effective only within the European Union.

16. Available accessories

Refer to the JET-Price-list

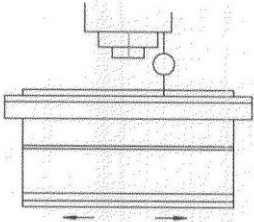
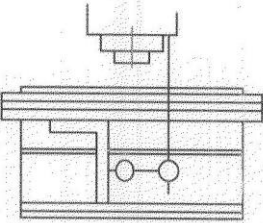


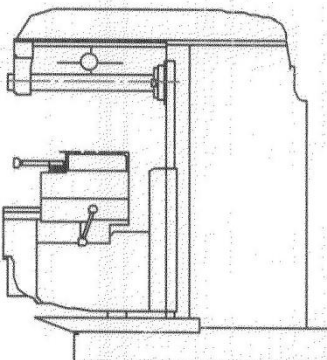
INSPECTING
ACCURACY TEST LIST

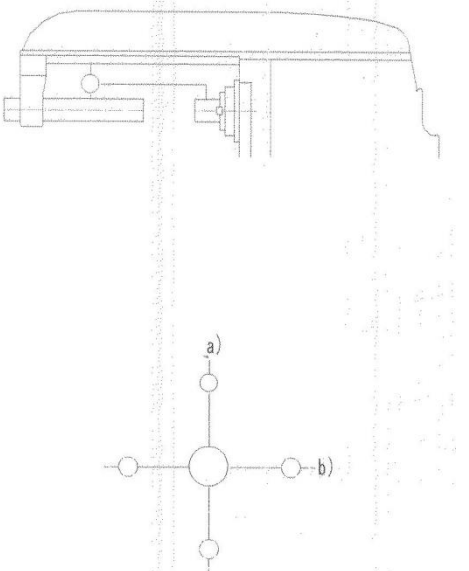
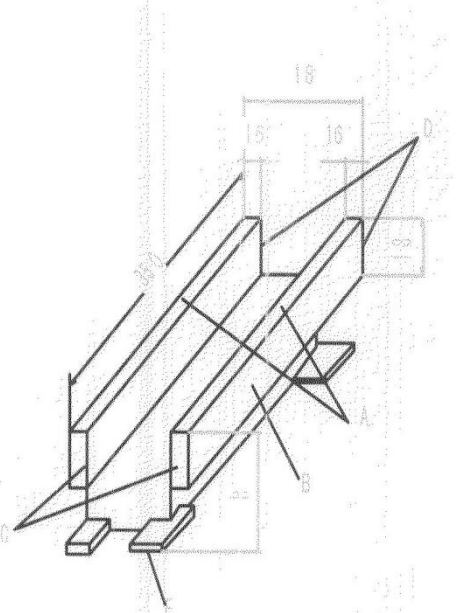
No.	Item		Geometrical Accuracy (mm)	
			Tolerance	Measurement
G1	Linearity of vertical movement of knee a) In cross vertical plane b) In longitudinal vertical plane		a) 0.025/300 b) 0.025/300	
G2	Squareness of table surface to guideway of column a) In cross vertical plane b) In longitudinal vertical plane		a) 0.025/300 α <90° b) 0.025/300	

G3	Planeness of table surface		Part: 0.04 0.02/300	
G4	Parallelism of table surface to table movement a) Cross b) Longitudinal		a) 0.025/300 b) 0.025/300 Max: 0.050	
G5	Runout of spindle end a) Runout of spindle outer face b) Kick of spindle axial direction c) Kink of spindle nose face		a) 0.01 b) 0.01 c) 0.02	

G6	Runout of spindle bore axis a) At the vicinity of the spindle nose b) 300mm to the spindle nose		a) 0.01 b) 0.02	
G7	Parallelism of spindle axis to table surface		0.025/300	
G8	Parallelism of spindle axis to table cross movement a) In vertical plane b) In horizontal plane		a) 0.025/300 b) 0.025/300	

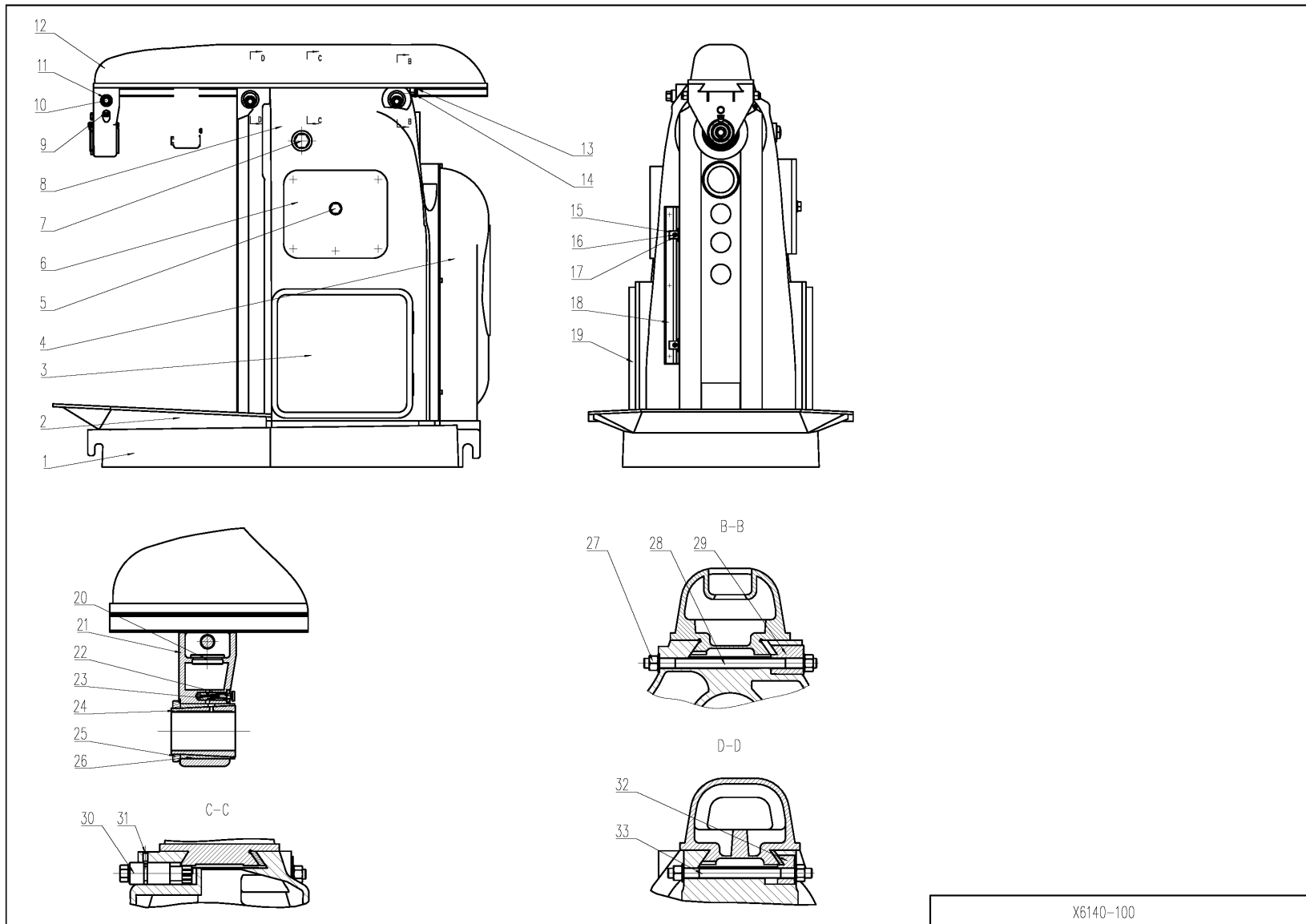
G9	Linearity of datum T-slot		0.01/500 Max: 0.03	
G10	Squareness of spindle axis to datum T-slot		0.02/300 (distance between two bend plates is 300mm)	
G11	Parallelism of datum T-slot to table longitudinal movement		a) 0.015/300 Max: 0.04	

<p>G12</p>	<p>Squareness of cross travel to longitudinal travel of table</p>	<p>a)</p>  <p>b)</p> 	<p>0.02/300</p>	
<p>G13</p>	<p>Parallelism of ram guide way to spindle axis a) In vertical plane b) In horizontal plane</p>	<p>a)</p>  <p>b)</p>  	<p>a) 0.02/300 b) 0.02/300</p>	

<p>G14</p>	<p>Coaxiality of cutter holder hole to spindle axis a) In vertical plane b) In horizontal plane</p>		<p>a) 0.03 (hole of cutter holder is lower than spindle axis) b) 0.03</p>	
<p>P1</p>	<p>a) B side of every test piece should be flat b) Height of test piece should be accordant c) C side and A side, D side and A side should be mutually perpendicular, and C,A,D side are all perpendicular to B side</p>		<p>a) 0.02 b) 0.03 c) 0.02/100</p>	

17. Exploded View & Part List

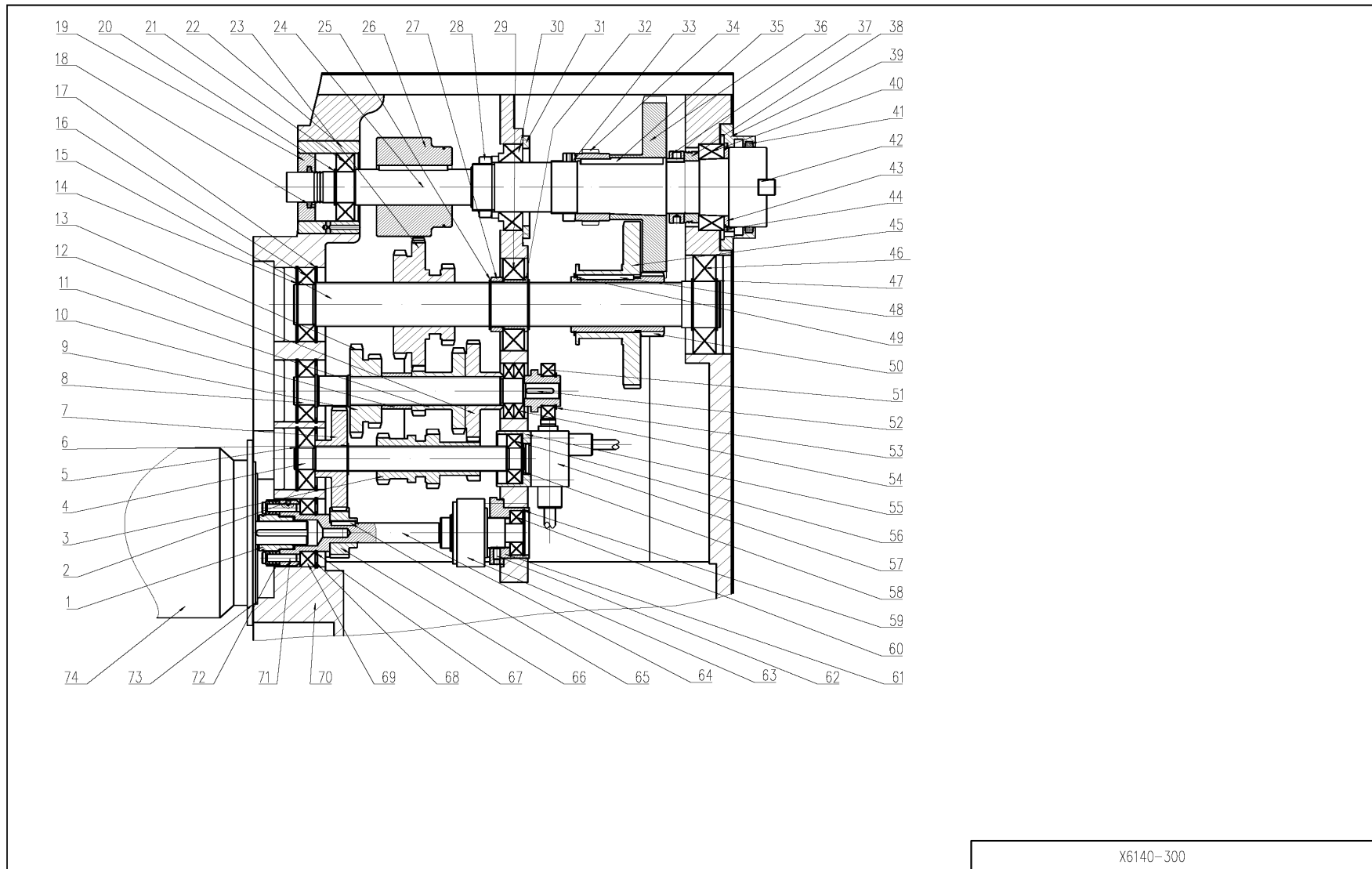
Exploded View for JHM-1667 MILLING MACHINE - OVERVIEW - 01



Part List for JHM-1667 MILLING MACHINE - OVERVIEW - 01

Index No.	Part No.	Description	Size	Qty
1	JHM1667-01-1	Base	X63WX107C	1
2	JHM1667-01-2	Drip tray	X63WX203	1
3	JHM1667-01-3	Right door	X63WX132	1
4	JHM1667-01-4	Rear cover	X63WX179A	1
5	JHM1667-01-5	Plug screw	JB/ZQ4450	1
6	JHM1667-01-6	Cap	X63WX114B	1
7	JHM1667-01-7	Oil mark	JB/T7941.2	1
8	JHM1667-01-8	Bed	X63WX106A	1
9	JHM1667-01-9	Plug screw	JB/ZQ4450	2
10	JHM1667-01-10	Pull rod	X63WX148B	2
11	JHM1667-01-11	Nut	GB/T6170	2
12	JHM1667-01-12	Over beam	X63WX109B	1
13	JHM1667-01-13	Wedge iron	X63WX181	1
14	JHM1667-01-14	Adjusting screw	X63WX1201	1
15	JHM1667-01-15	Bump lock	X63WX146A	2
16	JHM1667-01-16	Bolt	GB/T37	2
17	JHM1667-01-17	Nut	GB/T6170	2
18	JHM1667-01-18	Through plate	X63WX133A	1
19	JHM1667-01-19	Left door	X63WX131	1
20	JHM1667-01-20	Screw cap	X63WX171	2
21	JHM1667-01-21	Spindle bracket	X63WX112B	1
22	JHM1667-01-22	Needle valve	X63WX160	2
23	JHM1667-01-23	Sleeve	X63WX158	2
24	JHM1667-01-24	Large hanger cover	X63WX201	1
25	JHM1667-01-25	Nut	GB/T810	1
26	JHM1667-01-26	Large hanger cover	X63WX125-1	1
27	JHM1667-01-27	Nut	GB/T6170	4
28	JHM1667-01-28	Draw bar	X63WX149B	1
29	JHM1667-01-29	Tension sleeve	X63WX147	1
30	JHM1667-01-30	Gear shaft	X63WX140T	1
31	JHM1667-01-31	Screw	GB/T72	1
32	JHM1667-01-32	Tension sleeve	X63WX145	1
33	JHM1667-01-33	Draw bar	X63WX148B	1

Exploded View for JHM-1667 MILLING MACHINE - OVERVIEW - 02



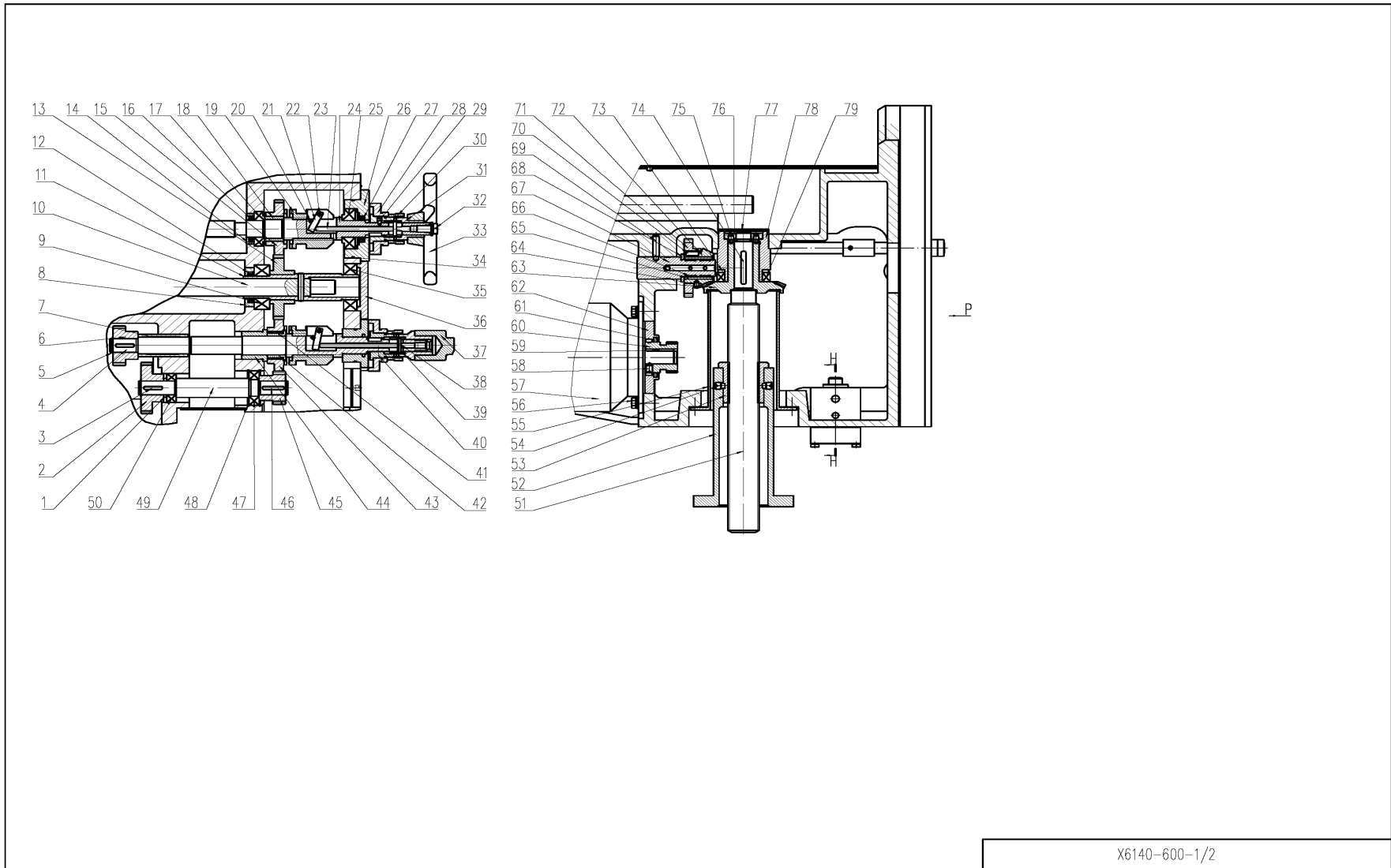
Part List for JHM-1667 MILLING MACHINE – OVERVIEW – 02

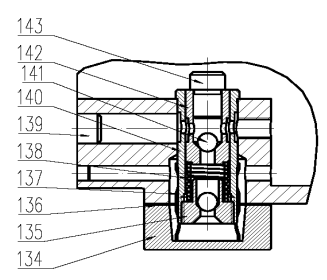
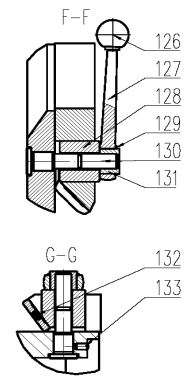
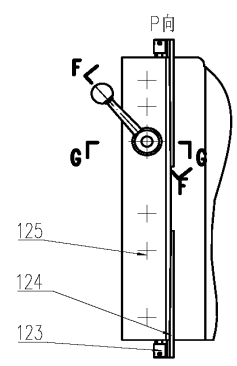
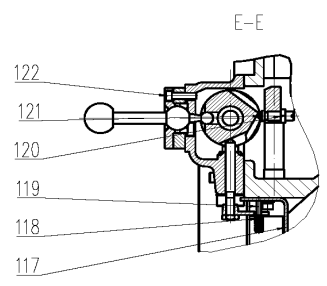
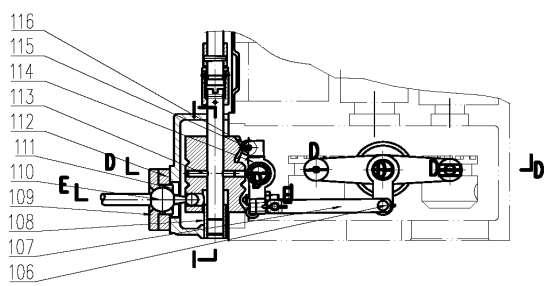
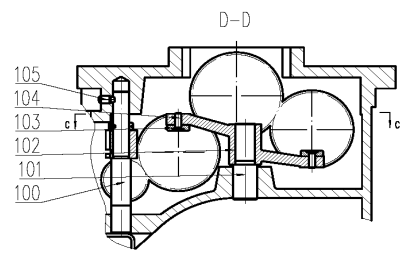
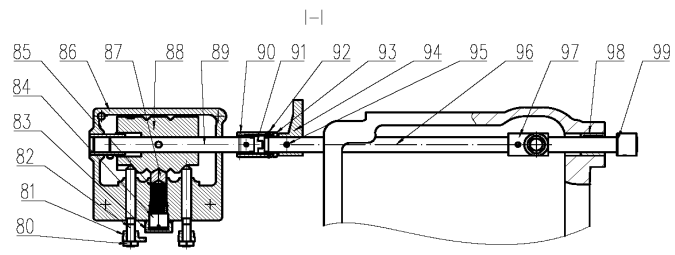
Index No.	Part No.	Description	Size	Qty
1	JHM1667-02-1	Sleeve	X63WX347B	1
2	JHM1667-02-2	Screw	GB/T71	6
3	JHM1667-02-3	Gear	X63WX370A	1
4	JHM1667-02-4	Shaft	X63WX343E	1
5	JHM1667-02-5	Shaft ring	GB/T894.1	1
6	JHM1667-02-6	Shaft ring	GB/T894.1	1
7	JHM1667-02-7	Gear	X63WX339B	1
8	JHM1667-02-8	Shaft	X63WX342E	1
9	JHM1667-02-9	Gear	X63WX371A	1
10	JHM1667-02-10	Ring	X63WX375A	1
11	JHM1667-02-11	Gear	X63WX372A	1
12	JHM1667-02-12	Gear	X63WX373A	1
13	JHM1667-02-13	Gear	X63WX371A	1
14	JHM1667-02-14	Shaft ring	GB/T894.1	2
15	JHM1667-02-15	Shaft	X63WX341B	1
16	JHM1667-02-16	Bearing	GB/T276	2
17	JHM1667-02-17	Hole ring	GB/T893.1	6
18	JHM1667-02-18	Felt lining	X63WX389	1
19	JHM1667-02-19	Ring	X63WX359A	1
20	JHM1667-02-20	Shaft ring	GB/T894.1	1
21	JHM1667-02-21	Bearing	GB/T276	1
22	JHM1667-02-22	Sleeve	X63WX342	1
23	JHM1667-02-23	Gear	X63WX374	1
24	JHM1667-02-24	Spindle	X6140-28353A	1
25	JHM1667-02-25	Shaft ring	GB/T894.1	2
26	JHM1667-02-26	Flywheel	X63WX306A	1
27	JHM1667-02-27	Ring	X63WX355	1
28	JHM1667-02-28	Nut	X63WX345	1
29	JHM1667-02-29	Bearing	GB/T281	1
30	JHM1667-02-30	Bearing	GB/T297	1
31	JHM1667-02-31	Flange	X63WX341	2
32	JHM1667-02-32	Sleeve	X63WX354A	1
33	JHM1667-02-33	Nut		1
34	JHM1667-02-34	Gear	X63WX328A	1
35	JHM1667-02-35	Flat key	X63WX340	1
36	JHM1667-02-36	Gear	X63WX327	1
37	JHM1667-02-37	Nut	X63WX346	1

Index No.	Part No.	Description	Size	Qty
38	JHM1667-02-38	Sleeve	X63WX397	1

39	JHM1667-02-39	Flange	X63WX395A	1
40	JHM1667-02-40	Bearing	GB/T297	1
41	JHM1667-02-41	Felt lining	X63WX390	1
42	JHM1667-02-42	End key	A50 GB3837.1	2
43	JHM1667-02-43	Adjusting ring	X63WX3143A	1
44	JHM1667-02-44	Adjusting pad	X63WX396	1
45	JHM1667-02-45	Gear	X63WX331	1
46	JHM1667-02-46	Bearing	GB/T276	1
47	JHM1667-02-47	Shaft ring	GB/T894.1	2
48	JHM1667-02-48	Flat key	GB/T1096	1
49	JHM1667-02-49	Shaft ring	GB/T894.1	1
50	JHM1667-02-50	Gear	X63WX330B	1
51	JHM1667-02-51	Bearing	GB/T276	1
52	JHM1667-02-52	Flat key	GB/T1096	1
53	JHM1667-02-53	Shaft ring	GB/T894.1	1
54	JHM1667-02-54	Bearing	GB/T276	2
55	JHM1667-02-55	Sleeve	X63WX363B	1
56	JHM1667-02-56	Bearing	GB/T276	1
57	JHM1667-02-57	Oil pump	X63WX1202	1
58	JHM1667-02-58	Shaft ring	GB/T894.1	1
59	JHM1667-02-59	Hole ring	GB/T893.1	1
60	JHM1667-02-60	Bearing	GB/T276	1
61	JHM1667-02-61	Sleeve	X63WX377	1
62	JHM1667-02-62	Screw	GB/T70.1	3
63	JHM1667-02-63	Clutch	DLMX-5C	1
64	JHM1667-02-64	Shaft	X63WX344C	1
65	JHM1667-02-65	Flat key	GB/T1096	1
66	JHM1667-02-66	Gear	X63WX340B	1
67	JHM1667-02-67	Shaft ring	GB/T894.1	1
68	JHM1667-02-68	Hole ring	GB/T893.1	1
69	JHM1667-02-69	Bearing	GB/T276	1
70	JHM1667-02-70	Bed	X63WX106A	1
71	JHM1667-02-71	Small shaft	X63WX348	6
72	JHM1667-02-72	Ring	X63WX386	24
73	JHM1667-02-73	Felt ring	X603206401	1
74	JHM1667-02-74	Motor	11 KW	1

Exploded View for JHM-1667 MILLING MACHINE - OVERVIEW - 03





Part List for JHM-1667 MILLING MACHINE – OVERVIEW – 03

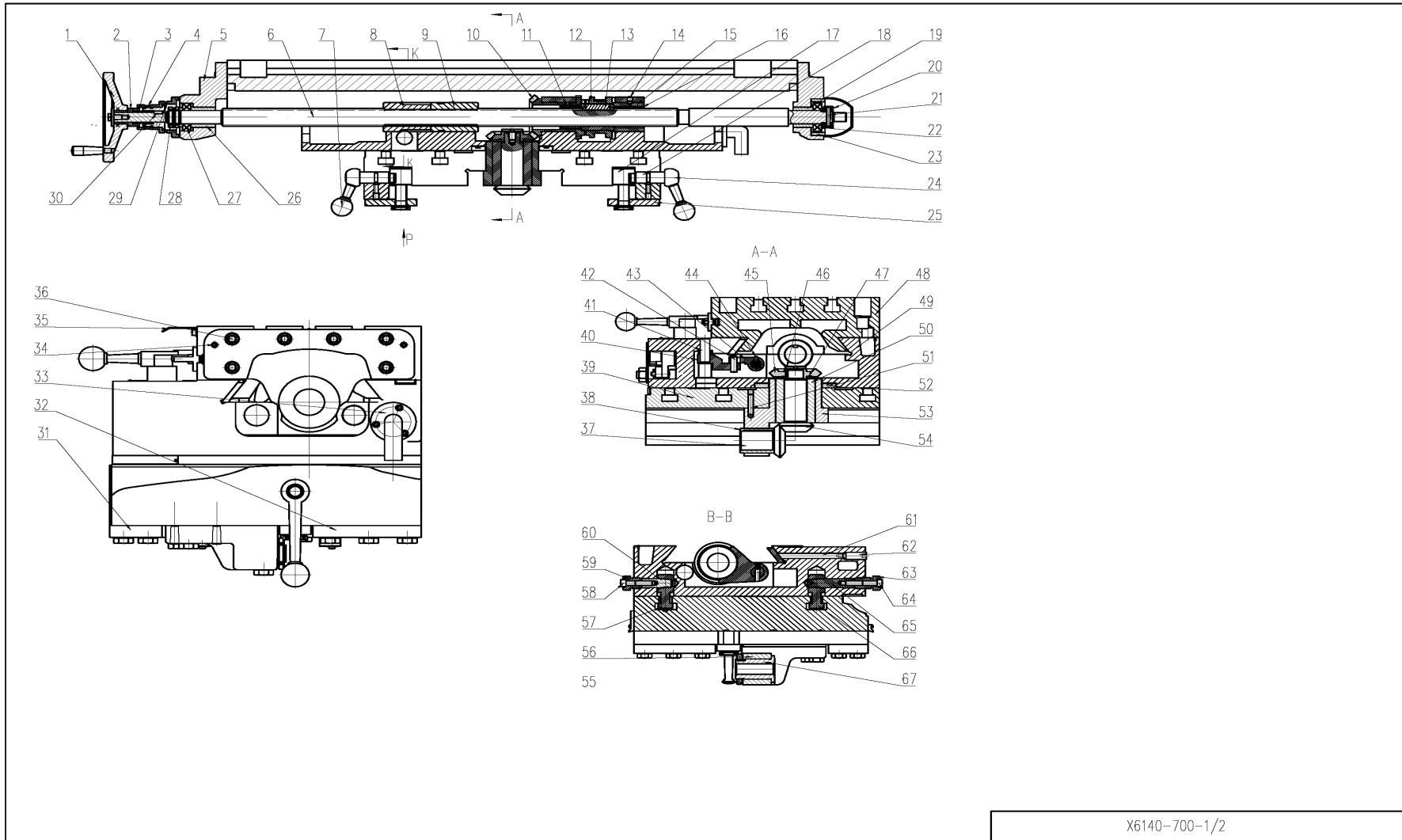
Index No.	Part No.	Description	Size	Qty
1	JHM1667-03-1	Sleeve	X63WX6210A-1	1
2	JHM1667-03-2	Gear	X63WX6208	1
3	JHM1667-03-3	Key	GB/T1096	1
4	JHM1667-03-4	Shaft	X63WX6188A	1
5	JHM1667-03-5	Shaft ring	GB/T894.1	3
6	JHM1667-03-6	Gear	X63WX6190	1
7	JHM1667-03-7	Shaft sleeve	X63WX6103BM	1
8	JHM1667-03-8	Ring	X63WX6184A	1
9	JHM1667-03-9	Bearing	GB/T297	1
10	JHM1667-03-10	Shaft	X63WX6181B	1
11	JHM1667-03-11	Shaft sleeve	X63WX6189B	1
12	JHM1667-03-12	Seal ring	GB/T13871	1
13	JHM1667-03-13	Gear	X63WX6183	1
14	JHM1667-03-14	Ring	X63WX6172A	1
15	JHM1667-03-15	Gear	X63WX6171	1
16	JHM1667-03-16	Seal ring	GB/T13871	1
17	JHM1667-03-17	Bearing	GB/T297	1
18	JHM1667-03-18	Sleeve	X63WX6534	1
19	JHM1667-03-19	Clutch	X63WX6173A	2
20	JHM1667-03-20	Pin	GB/T119	2
21	JHM1667-03-21	Gate	X63WX6174	2
22	JHM1667-03-22	Pin	GB/T119	2
23	JHM1667-03-23	Rod	X63WX6176A	2
24	JHM1667-03-24	Leadscrew	X63WX6170A	1
25	JHM1667-03-25	Bearing	GB/T297	1
26	JHM1667-03-26	Flange	X63WX6175B	1
27	JHM1667-03-27	Seal ring	GB/T13871	1
28	JHM1667-03-28	Dial	X63WX6278	2
29	JHM1667-03-29	Screw	GB/T72	2
30	JHM1667-03-30	Scale sleeve	X603203207	2
31	JHM1667-03-31	Clutch sleeve	X603203208	1
32	JHM1667-03-32	Screw	GB/T5783	1
33	JHM1667-03-33	Handwheel	X63WX7512	1
34	JHM1667-03-34	Seal ring	GB/T3452.1	1
35	JHM1667-03-35	Bearing	GB/T297	1
36	JHM1667-03-36	Flange	X63WX6182	1
37	JHM1667-03-37	Lifting handle	X63WX6220B	1
38	JHM1667-03-38	Fixed round pin	X63WX6177	2
39	JHM1667-03-39	Ring	X63WX6178	2
40	JHM1667-03-40	Clutch shaft sleeve	X63WX6179	2
41	JHM1667-03-41	Needle roller	GB/T309	49

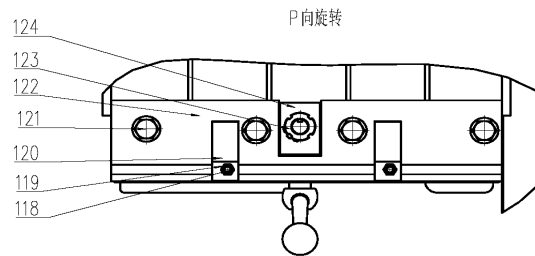
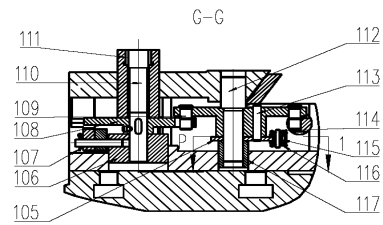
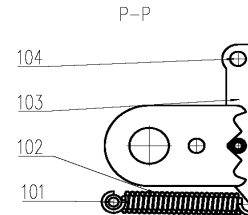
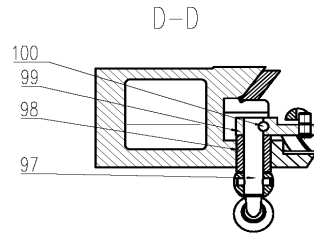
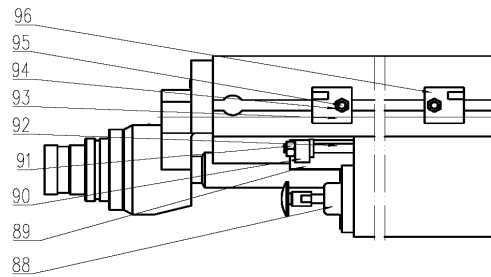
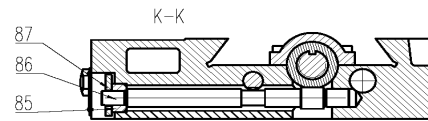
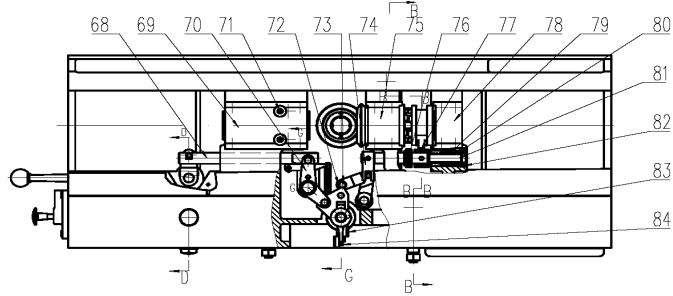
Index No.	Part No.	Description	Size	Qty
42	JHM1667-03-42	Shaft sleeve	X63WX6186	1
43	JHM1667-03-43	Gear	X63WX6187	1
44	JHM1667-03-44	Sleeve	X63WX6106BM-A	2
45	JHM1667-03-45	Gear	X63WX6213	1
46	JHM1667-03-46	Key	GB/T1096	1
47	JHM1667-03-47	Bearing	GB/T276	1
48	JHM1667-03-48	Hole ring	GB/T893.1	2
49	JHM1667-03-49	Shaft	X63WX6210A	1
50	JHM1667-03-50	Bearing	GB/T276	1
51	JHM1667-03-51	Leadscrew	X63WX6160B/X626160	1
52	JHM1667-03-52	Socket	X63WX6024B/X63WX62-6024	1
53	JHM1667-03-53	Shaft sleeve	X63WX6101BM-B	1
54	JHM1667-03-54	Screw	GB/T72	2
55	JHM1667-03-55	Cover	X63WX6159	1
56	JHM1667-03-56	Bolt	GB/T5783	1
57	JHM1667-03-57	Motor	1.5KW	1
58	JHM1667-03-58	Screw	GB/T71	1
59	JHM1667-03-59	Key	GB/T1096	1
60	JHM1667-03-60	Motor gear	X63WX6164	1
61	JHM1667-03-61	Felt ring	X63WX6401	1
62	JHM1667-03-62	Sleeve	X63WX6312A	1
63	JHM1667-03-63	Bevel gear	X63WX6157	1
64	JHM1667-03-64	Screw	GB/T72	1
65	JHM1667-03-65	Sleeve	X63WX6314	1
66	JHM1667-03-66	Needle roller	GB/T309	72
67	JHM1667-03-67	Small shaft	X63WX6154A	1
68	JHM1667-03-68	Pad	X63WX6315	1
69	JHM1667-03-69	Screw	GB/T72	1
70	JHM1667-03-70	Key	GB/T1096	1
71	JHM1667-03-71	Gear	X63WX6153A	1
72	JHM1667-03-72	Bevel gear	X63WX6151	1
73	JHM1667-03-73	Adjusting washer	X63WX6158	1
74	JHM1667-03-74	Key	GB/T1096	1
75	JHM1667-03-75	Screw	GB/T72	1
76	JHM1667-03-76	Nut	X63WX6156	1
77	JHM1667-03-77	Cap	X63WX6155	1
78	JHM1667-03-78	Flange	X63WX6026	1
79	JHM1667-03-79	Bearing	GB/T301	1
80	JHM1667-03-80	Nut	M12	2
81	JHM1667-03-81	Nut	GB/T6172.1	2
82	JHM1667-03-82	Small lever	X63WX6225	2

Index No.	Part No.	Description	Size	Qty
83	JHM1667-03-83	Pin	X63WX6216A	2
84	JHM1667-03-84	Nut	X63WX6223-1	1
85	JHM1667-03-85	Plug screw	X63WX6223B	1
86	JHM1667-03-86	Spring	GB/T2089	1
87	JHM1667-03-87	Gear box	X63WX6022A	1
88	JHM1667-03-88	Pin	X63WX6229A	1
89	JHM1667-03-89	Drum wheel	X63WX6230A	1
90	JHM1667-03-90	Shaft	X63WX6236-1	1
91	JHM1667-03-91	Sleeve	X63WX6240	1
92	JHM1667-03-92	Adjusting plug	X63WX6238-1	1
93	JHM1667-03-93	Ring spring	X63WX6241	1
94	JHM1667-03-94	Nut	X63WX6239	1
95	JHM1667-03-95	Lever	X63WX6291	1
96	JHM1667-03-96	Pin	GB/T117	1
97	JHM1667-03-97	Shaft	X63WX6224	1
98	JHM1667-03-98	Shaft sleeve	X63WX6152	1
99	JHM1667-03-99	Sleeve	X63WX6531	1
100	JHM1667-03-100	Lever	X63WX6248	1
101	JHM1667-03-101	Shaft	X63WX6249A	1
102	JHM1667-03-102	Pin	X63WX66233	1
103	JHM1667-03-103	Connecting rod	X63WX6029	1
104	JHM1667-03-104	Slider	X63WX6228	2
105	JHM1667-03-105	Pin	X63WX6231	2
106	JHM1667-03-106	Screw	GB/T72	1
107	JHM1667-03-107	Pin	X63WX6204	2
108	JHM1667-03-108	Small plate	X63WX6197	1
109	JHM1667-03-109	Shaft sleeve	X63WX6031	1
110	JHM1667-03-110	Cap	X63WX6222	1
111	JHM1667-03-111	Handle	X63WX6226	1
112	JHM1667-03-112	Ring	X63WX6212	1
113	JHM1667-03-113	Flange	X63WX6221	1
114	JHM1667-03-114	Plate	X63WX6283A	1
115	JHM1667-03-115	Pin	GB/T117	1
116	JHM1667-03-116	Small roller	X63WX6290	1
117	JHM1667-03-117	Angle iron	X63WX6243E	1
118	JHM1667-03-118	Spring	GB/T2089	2
119	JHM1667-03-119	Small pin	X63WX6286B	2
120	JHM1667-03-120	Nut	GB/T6170	1
121	JHM1667-03-121	Pin	X63WX6195A	1
122	JHM1667-03-122	Screw	GB/T70.1	3
123	JHM1667-03-123	Screw	X63WX6254	2
124	JHM1667-03-124	Wedge iron	X63WX6253	2

Index No.	Part No.	Description	Size	Qty
125	JHM1667-03-125	Guide plate	X63WX6025A	1
126	JHM1667-03-126	Handle ball	GB/T7271.1	1
127	JHM1667-03-127	Handle	X63WX6264B	1
128	JHM1667-03-128	Tension sleeve	X63WX6263	1
129	JHM1667-03-129	Shaft ring	GB/T894.1	1
130	JHM1667-03-130	Screw	X63WX6266A	1
131	JHM1667-03-131	Nut	X63WX6297A	1
132	JHM1667-03-132	Screw pin	X63WX6304	2
133	JHM1667-03-133	Key	GB/T72	1
134	JHM1667-03-134	Flange	X63WX6251A	1
135	JHM1667-03-135	Plug	X63WX6268B	1
136	JHM1667-03-136	Base plate	X63WX6508	1
137	JHM1667-03-137	Net	X63WX6501	1
138	JHM1667-03-138	Spring	X63WX6271	1
139	JHM1667-03-139	plug	X63WXQ56-2	1
140	JHM1667-03-140	Sleeve body	X63WX6272A	1
141	JHM1667-03-141	Steel ball		2
142	JHM1667-03-142	piston	X63WX6270	1
143	JHM1667-03-143	Short shaft	X63WX6269	1

Exploded View for JHM-1667 MILLING MACHINE - OVERVIEW - 04





Part List for JHM-1667 MILLING MACHINE – OVERVIEW – 04

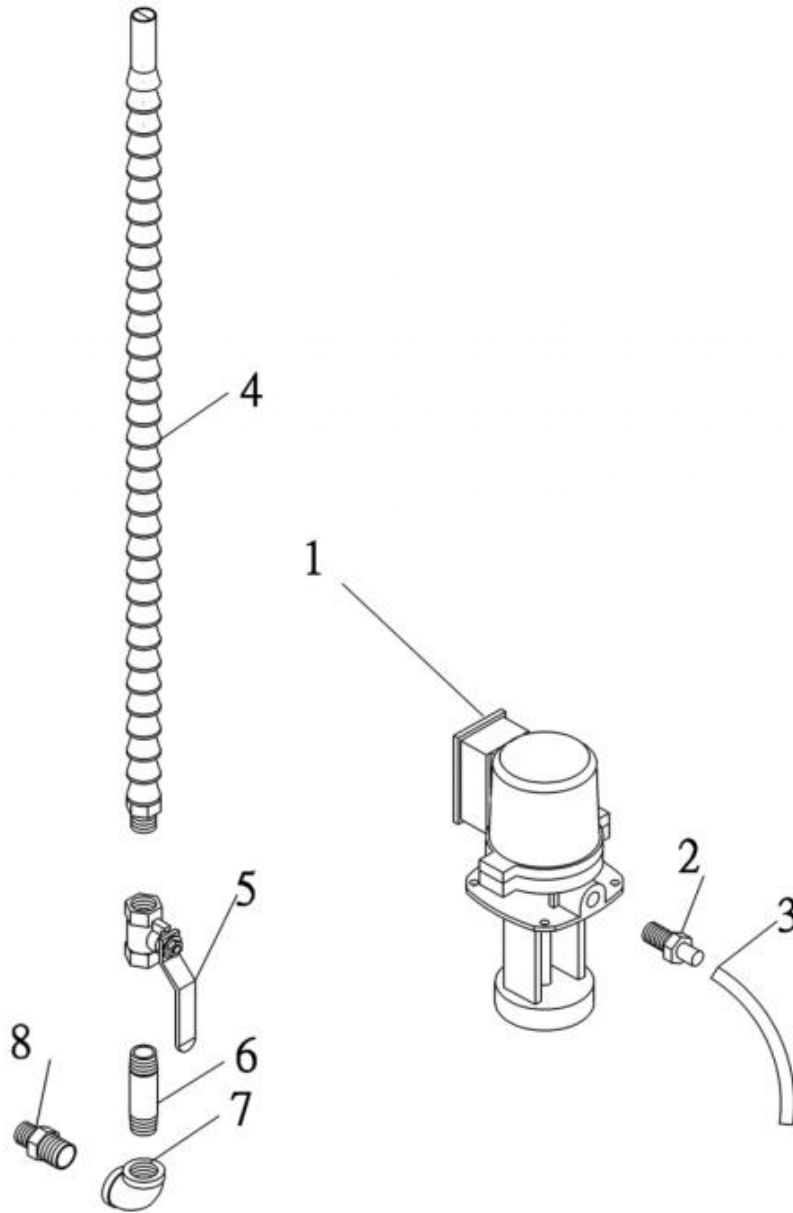
Index No.	Part No.	Description	Size	Qty
1	JHM1667-04-1	Large handwheel	X63WX7512	1
2	JHM1667-04-2	Clutch sleeve	X603203208	1
3	JHM1667-04-3	Spring	GB/T2089	1
4	JHM1667-04-4	Scale sleeve	X603203207	1
5	JHM1667-04-5	Left shaft bracket	X63WX7024C	1
6	JHM1667-04-6	Leadscrew	X63WX7152	1
7	JHM1667-04-7	Handle ball	JB/T7271.1	4
8	JHM1667-04-8	Sleeve nut	X63WX7101	1
9	JHM1667-04-9	Sleeve nut	X63WX7102	1
10	JHM1667-04-10	Clutch gear	X63WX7157A	1
11	JHM1667-04-11	Sleeve	X63WX7028	1
12	JHM1667-04-12	Clutch	X63WX7159B	1
13	JHM1667-04-13	Key	X63WX7158	1
14	JHM1667-04-14	Screw	GB/T72	1
15	JHM1667-04-15	Sleeve	X63WX7030A	1
16	JHM1667-04-16	Socket	X63WX7161B	1
17	JHM1667-04-17	Screw	X63WX7171A	2
18	JHM1667-04-18	Eccentric shaft	X63WX7173B	1
19	JHM1667-04-19	Sleeve	X63WX718A	1
20	JHM1667-04-20	Round nut	X63WX7167B	1
21	JHM1667-04-21	Pin	GB/T117	1
22	JHM1667-04-22	Bearing	GB/T301	1
23	JHM1667-04-23	Sleeve	X63WX716B	1
24	JHM1667-04-24	Handle lever	X63WX7170	2
25	JHM1667-04-25	Pressure plate	X63WX7172	2
26	JHM1667-04-26	Sleeve	X63WX719A	1
27	JHM1667-04-27	Bearing	GB/T301	1
28	JHM1667-04-28	Round nut and washer	GB/T812	2
29	JHM1667-04-29	Dial	X63WX7273	1
30	JHM1667-04-30	Key	GB/T1096	1
31	JHM1667-04-31	Pressure plate	X63WX7178	1
32	JHM1667-04-32	Pressure plate	X63WX7179	1
33	JHM1667-04-33	Pipe connector	X63WX7358B	1
34	JHM1667-04-34	Pin	GB/T118	2
35	JHM1667-04-35	Protective plate	X63WX7181A	1
36	JHM1667-04-36	Screw	GB/T70.1	6
37	JHM1667-04-37	Bevel gear	X63WX7182B	1

Index No.	Part No.	Description	Size	Qty
38	JHM1667-04-38	Insert sleeve	X63WX7104	1
39	JHM1667-04-39	Saddle	X63WX7023A	1

40	JHM1667-04-40	Swing arm	X63WX7039A	1
41	JHM1667-04-41	Pin	X63WX7246B	1
42	JHM1667-04-42	Pin	X63WX7247	1
43	JHM1667-04-43	Swing arm	X63WX7237	1
44	JHM1667-04-44	Screw	GB/T72	1
45	JHM1667-04-45	Bevel gear	X63WX7153A	1
46	JHM1667-04-46	Fixed screw	X63WX7155	1
47	JHM1667-04-47	Adjusting ring	X63WX7156	1
48	JHM1667-04-48	Worktable	X63WX7021B	1
49	JHM1667-04-49	Rotary disc	X63WX7022A	1
50	JHM1667-04-50	Sleeve	X63WX7033A	1
51	JHM1667-04-51	Pin	GB/T118	1
52	JHM1667-04-52	Ring	X63WX7219	1
53	JHM1667-04-53	Bracket	X63WX7034	1
54	JHM1667-04-54	Bevel gear	X63WX7183	1
55	JHM1667-04-55	Round nut and washer	GB/T812	1
56	JHM1667-04-56	Bracket	X63WX7037A	1
57	JHM1667-04-57	Bolt	X63WX7200	2
58	JHM1667-04-58	Screw	GB/T70.1	2
59	JHM1667-04-59	Screw	X63WX7269	2
60	JHM1667-04-60	Bolt rod	X63WX7199A	2
61	JHM1667-04-61	Bolt	X63WX7201	2
62	JHM1667-04-62	Screw	GB/T78	2
63	JHM1667-04-63	Screw	X63WX7270	2
64	JHM1667-04-64	Screw	GB/T70.1	2
65	JHM1667-04-65	Bolt rod	X63WX7202A	2
66	JHM1667-04-66	Tight bolt	X63WX7200	2
67	JHM1667-04-67	Sleeve nut	X63WX7103	1
68	JHM1667-04-68	Connecting rod	X63WX7215A	1
69	JHM1667-04-69	Bearing cover	X63WX7026A	1
70	JHM1667-04-70	Swing arm	X63WX7035	1
71	JHM1667-04-71	Pin	GB/T118	2
72	JHM1667-04-72	Small roller	X63WX7226	1
73	JHM1667-04-73	Bolt	X63WX7227	1
74	JHM1667-04-74	Swing arm	X63WX7237	1
75	JHM1667-04-75	Bearing cover	X63WX7027	1
76	JHM1667-04-76	Ring	X63WX7238	1
77	JHM1667-04-77	Fork	X63WX7038A	1
78	JHM1667-04-78	Gland	X63WX7029A	1
79	JHM1667-04-79	Spring	X63WX7214	1
80	JHM1667-04-80	Sleeve	X63WX7211	1
81	JHM1667-04-81	Connecting rod	X63WX7213	1
82	JHM1667-04-82	Nut	X63WX7212	1
83	JHM1667-04-83	Swing arm	X63WX7264	2
84	JHM1667-04-84	Shot shaft	X63WX7265	1

Index No.	Part No.	Description	Size	Qty
85	JHM1667-04-85	Ring	X63WX7207A	1
86	JHM1667-04-86	Worm	X63WX7205A	1
87	JHM1667-04-87	Flange	X63WX7208B	1
88	JHM1667-04-88	Oil pump		1
89	JHM1667-04-89	Wedge iron	X63WX7165A	1
90	JHM1667-04-90	Ear pin	X63WX7164	1
91	JHM1667-04-91	Nut	GB/T6170	1
92	JHM1667-04-92	Screw	X63WX7166	1
93	JHM1667-04-93	Bump plate	X63WX7044A	1
94	JHM1667-04-94	Nut	GB/T6170	2
95	JHM1667-04-95	Bolt	GB/T37	2
96	JHM1667-04-96	Bump plate	X63WX7043A	1
97	JHM1667-04-97	Short shaft	X63WX7193A	1
98	JHM1667-04-98	Sleeve	X63WX7036	1
99	JHM1667-04-99	Swing arm	X63WX7221B	1
100	JHM1667-04-100	Taper pin	GB/T117	1
101	JHM1667-04-101	Small shaft	X63WX7176A	1
102	JHM1667-04-102	Spring	X63WX7266A	1
103	JHM1667-04-103	Swing arm	X63WX7223A	1
104	JHM1667-04-104	Short shaft	X63WX7222A	1
105	JHM1667-04-105	Positioning plate	X63WX7239A	1
106	JHM1667-04-106	Sleeve	X63WX7041A	1
107	JHM1667-04-107	Cotter pin	JB/T791	1
108	JHM1667-04-108	Swing arm	X63WX7240B	1
109	JHM1667-04-109	Short shaft	X63WX7192A	3
110	JHM1667-04-110	Handle components	X63WX7250	1
111	JHM1667-04-111	Bearing	JB/T7918	1
112	JHM1667-04-112	Short shaft	X63WX7228	1
113	JHM1667-04-113	Pin	GB/T119	1
114	JHM1667-04-114	Short shaft	X63WX7225B	1
115	JHM1667-04-115	Small roller	X63WX7224	1
116	JHM1667-04-116	Cotter pin	JB/T791	2
117	JHM1667-04-117	Sleeve	X63WX7601	1
118	JHM1667-04-118	Bolt	GB/T37	2
119	JHM1667-04-119	Nut	GB/T6170	2
120	JHM1667-04-120	Stop	X63WX7175	2
121	JHM1667-04-121	Bolt	GB/T5783	4
122	JHM1667-04-122	Pressure plate	X63WX7174	1
123	JHM1667-04-123	Nut and pad	GB/T812	2

Part List for JHM-1667 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 JHM-1667 MILLING MACHINE – Electrical diagram

POWER	Spindle motor	Kee-TYPE motor/coolingpump	transformer	sudden stop	Spindle	Keentype-CW/CCW			rapid button	Relitfier	Spindle trig		Table
						CW	CCW	CCW			Low	High	

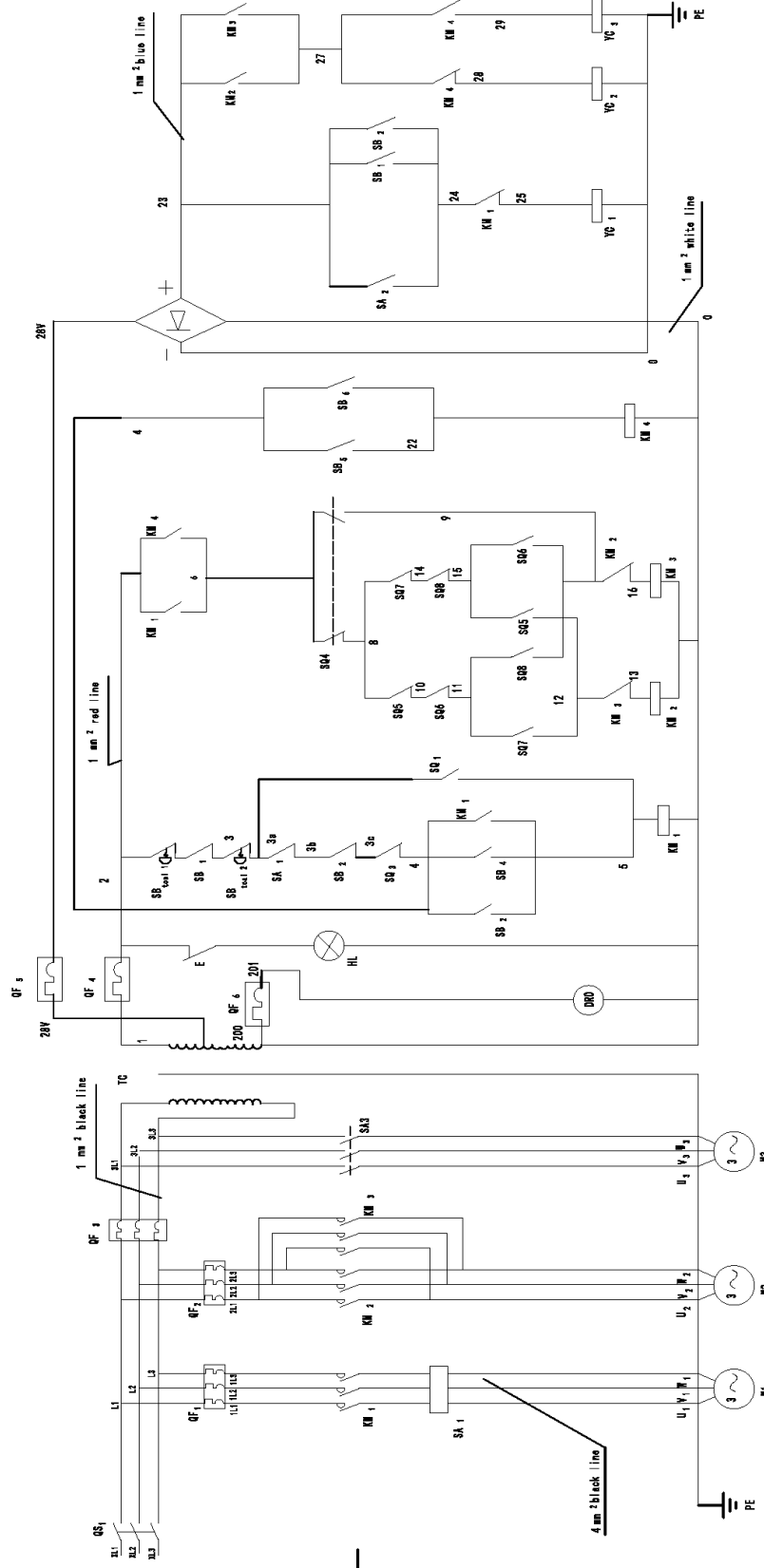


Fig 16

Part List for JHM-1667 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

Packing List --Main machine, Accessories and tools

No.	Name	Specification	Qty	Remark
1	Milling arbor	φ 32	1 set	
2	Milling arbor	φ 50	1 set	
3	Drawbar		1 set	
4				
5	ISO50 Milling arbor	ISO50- φ 40	1 piece	
6	7: 24 Taper	7: 24 ISO50/MS4	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 hend spanner	14	1 piece	may replace with 11×14
12	Inner hexagon spanner	5	1 piece	
13	Inner hexagon spanner	8	1 piece	
14	Inner hexagon spanner	10	1 piece	

Rapid wear parts list (according to packing list)

No.	Part No.	Name	Specification	Qty	Remark
1	DLMX-5d	Brush		1 set	

Spare parts list (extra charge)

No.	Part No.	Name	Specification	Qty	Remark
1	X6132-01201	Supporting bush		1 piece	
2	X6132-17211	Nut		1 piece	
3	X62W-7158	Key		1 piece	
4	X62W-7239A	Positioning plate		1 piece	
5	X62W-7156	Adjusting ring		1 piece	
6	X6132-17718	Nut		1 piece	
7	X62W-6226	Pin		1 piece	
8	X62W-6228	Sliding block		2 pieces	