

INSTRUCTION MANUAL

GHD-50 **Geared Head Drill (415V)** **50mm Drilling Capacity with Automatic** **Feed & Tapping 4MT**



D178

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Dear end-user, Thank you very much for choosing our products. Please let us have the model of your machine, series number, as well as the name, address and correspondence method of your company in order to facilitate us to let you have a good service. Important notice: 1. Please immediately contact your dealer in case the machine, accessories or documents are not in conformity with those indicated in the packing list after the machine package is opened. 2. Please carefully read this Operation Manual particularly the electric part of this documents before installation, testing and running the machine. 3. Removing grease on the machine (particularly on the column) and checking lubrication oil in each place is well filled . Running the machine without lubrication oil is strictly forbidden. Lubrication of the machine as per the stipulation of this documents is required. 4. Ground wire of the machine shall be well connected. When test running, push jog button in slow spindle speed to check if direction of spindle revolution is correct. 5. Machine must be stopped if spindle speed or feed rate change is necessary. 6. Please check if cutting tool or work piece is well clamped before machining 7. The red mushroom push button located in front of the spindle box is an emergence push button for emergency purpose only. Familiar with its position and its use are necessary. 8. Professional electric service engineer is required for electric maintenance. 9. The machine must be stopped when you need removing away the cutting material around the drill. Moving the cutting material by hand or by hook is definitely forbidden. 10. Correct use and daily maintenance of the machine are required in order to keep machine accuracy and its lifetime in long time. 11. We will much appreciate if you could solve some problems of the machine. In order to facilitate us for the service, please let us know the details regarding the places and phenomenon of the troubles if you could not solve problems.	

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1. Main use and features of the machine:

GHD-50 series vertical drilling machines are our new products designed and developed by our-self based on our accumulated experience in so many years in this field. It is a light, column type, superior quality and high efficiency machine with milling function vertical drilling machine. It is really a multi-function universal machine which could be widely used for small and middle sizes of work pieces for drilling, spot facing, reaming, tapping and milling etc. Besides, some machine tool accessories could also be used on this machine. The machines are suitable for the machining workshop, maintenance workshop and production line etc.

Features:

- 1.1 Good in appearance, easy in operation, convenience in maintenance and well consideration in safety protection
- 1.2 Single speed motor is to be used for the main drive system with sufficient driving power but saving energy. Wide spindle speed range is adopted driven by gears.
- 1.3 Oil lubrication both for the main driving system and for the feed driving system could be supplied automatically by a new type of trochoid pump when it is working in forward and reverse revolution.
- 1.4 The spindle features good rigidity and good wear resisting and equipped with tool disassembly and balancing device.
- 1.5 The worktable could be turned round the column center line or worktable center line itself or horizontal shaft centerline by manual and could be moving up and down by manual or automatically.
- 1.6 A locking device for the spindle quill is available for the purpose of milling job. There is a screw hole located at the end of the main spindle for the clamping of different kinds of milling cutters.
- 1.7 Main operation levers and push buttons could be reached easily that makes you comfortable when you operate the machine.
- 1.8 Spindle feed both in mechanical and in electrical with micro feed structure is available in this series machines.
- 1.9 Besides the normal indication both for the spindle speed and for the cutting depth, the machine also has a digital display showing the above figures.

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1.10 Superior quality material with special treatment for the wear-resisting purpose has been used for transmission parts such as gears, worm and worm shaft, rack, lead screw etc as well as for some key parts like spindle and spindle quill. 1.11 An adjustable safety protection clutch in the spindle feed device is available in order to prevent the machine and tools from damage when overloaded. 1.12 A safety protection guard under the spindle box is available as it is not only prevent coolant splash while cutting but also could observe the machining status. The guard is interlocked with the spindle, so when the guard is opened, the spindle could not be running until the protection guard keeps his position.			
2. Main technical data:			
2.1 Main technical data			
No.	Name of the items	Unit	Data
1	Max. drilling diameter (steel)	mm	50
2	Max. tapping diameter (steel)	mm	M30
3	Max. milling cutter diameter	mm	80
4	Distance between spindle center line to the center line of column	mm	360
5	Max. distance between spindle end to the surface of the worktable (automatic)	mm	585(550)
6	Max. distance between spindle end to the worktable surface of the base	mm	1170
7	Max. stroke of the spindle	mm	240
8	Spindle taper	Morse	MT4
9	Number of speed steps of the spindle	Step	12
10	Spindle speed range	r/min	52~1400
11	Feed steps of the spindle	Step	4
12	Feed range of the spindle	mm/r	0.1-0.4
13	Max. stroke of worktable and its bracket	Mm	530(410)
14	Rotation degree of worktable and its bracket in cross direction	degree	$\pm 45^\circ$
15	Working area of the worktable (L x W)	mm	580 × 460
16	Working area of the worktable of the base (L x W)	mm	445 × 435
17	Numbers and width of the T slots both for worktable and worktable of base	mm	3-T14, 2-T14
18	Diameter of column	mm	$\phi 180$
20	Power and speed of the main motor	Kw, rpm	3/1440
21	Power and speed of the worktable up and down motor.	Kw, rpm	0.25/1440
22	Power and flow rate of the coolant pump motor	Kw, L/min	0.085/6
23	Machine dimension (L x W x H)	mm	950 × 680 × 2405
24	Weight of the machine (Net weight/Gross weight)	Kg	670/730

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2.2 For the machine appearance and its main technical data, see diagram 1.

3. Brief description of the driving system and its structure:

The machine consists of spindle box, column, machine base, worktable and its bracket, electric cabinet, coolant device and machine accessories, total seven component parts. Spindle revolution is main motion of the machine. During drilling and milling processing, spindle movement along with its axis is a feed motion, during milling operation, movement of worktable in longitudinal or cross directions or rotation of the worktable is also a feed motion. Worktable up and down movement and worktable turn round itself is an auxiliary motion. To those big or higher work piece that could be clamped on the worktable of the base. The worktable and its bracket should turn round the column to a proper area far away from the machining area.

Two separately vertical motors realize machine transmission. A special pump supplies coolant water.

Two operating levers in the front of spindle box could make changes for the spindle speed in 12 steps. Changing either lever position could drive a triple gear and a quadruple gear moving along with axis direction results the speed change. One of levers has an idle position that is for the spindle rotation by manual for loading and unloading of tool cutters as well as for the adjustment of work piece only. Adjustment of the feed rate could be realized by shifting a set of gears controlled by changing a lever position in the right corner of spindle box. It also has an idle position for disengaging power feed transmission of the spindle for the micro adjustment of the spindle by manual.

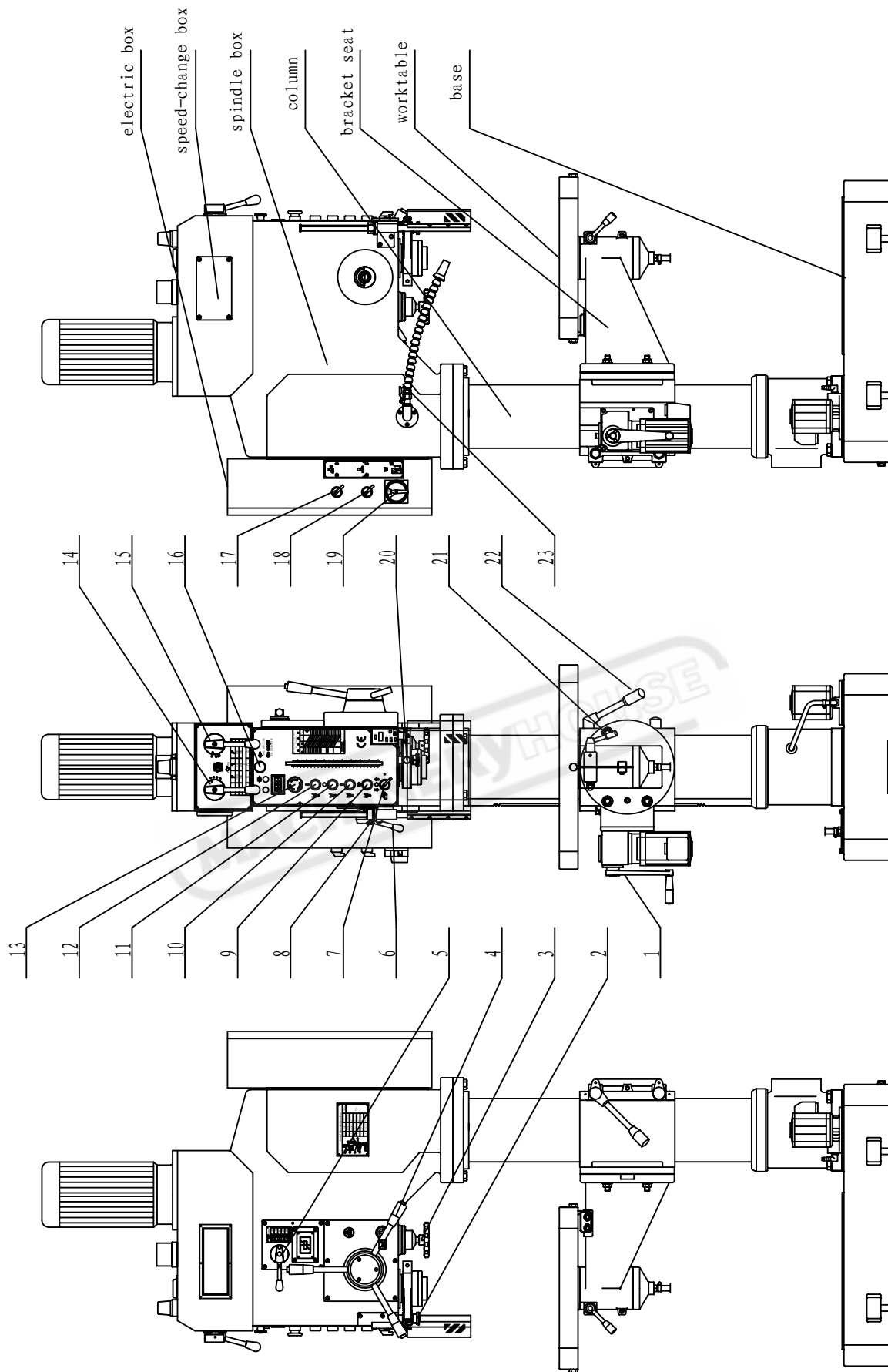
Up and down movement of the worktable and its bracket is completed by a vertical speed reduction motor. Of cause, little adjustment for the height of the worktable could also be made by manual.

Two kinds of lubrication, auto or manual, of the machine are available. Auto lubrication system consists of a filter (located inside of a tank under spindle box), a lubrication oil pump and an oil distributor (located on the top of spindle box), a visual window and an oil nozzle etc.

Please refer to the diagram 2 for the transmission system of the machine.

For the gear, worm and worm shaft, rack and pinion etc, please see table 1.

For the details of roller bears to be used on the machine, please refer to the diagram 3 and for a list of roller bears, please refer to the table 2.

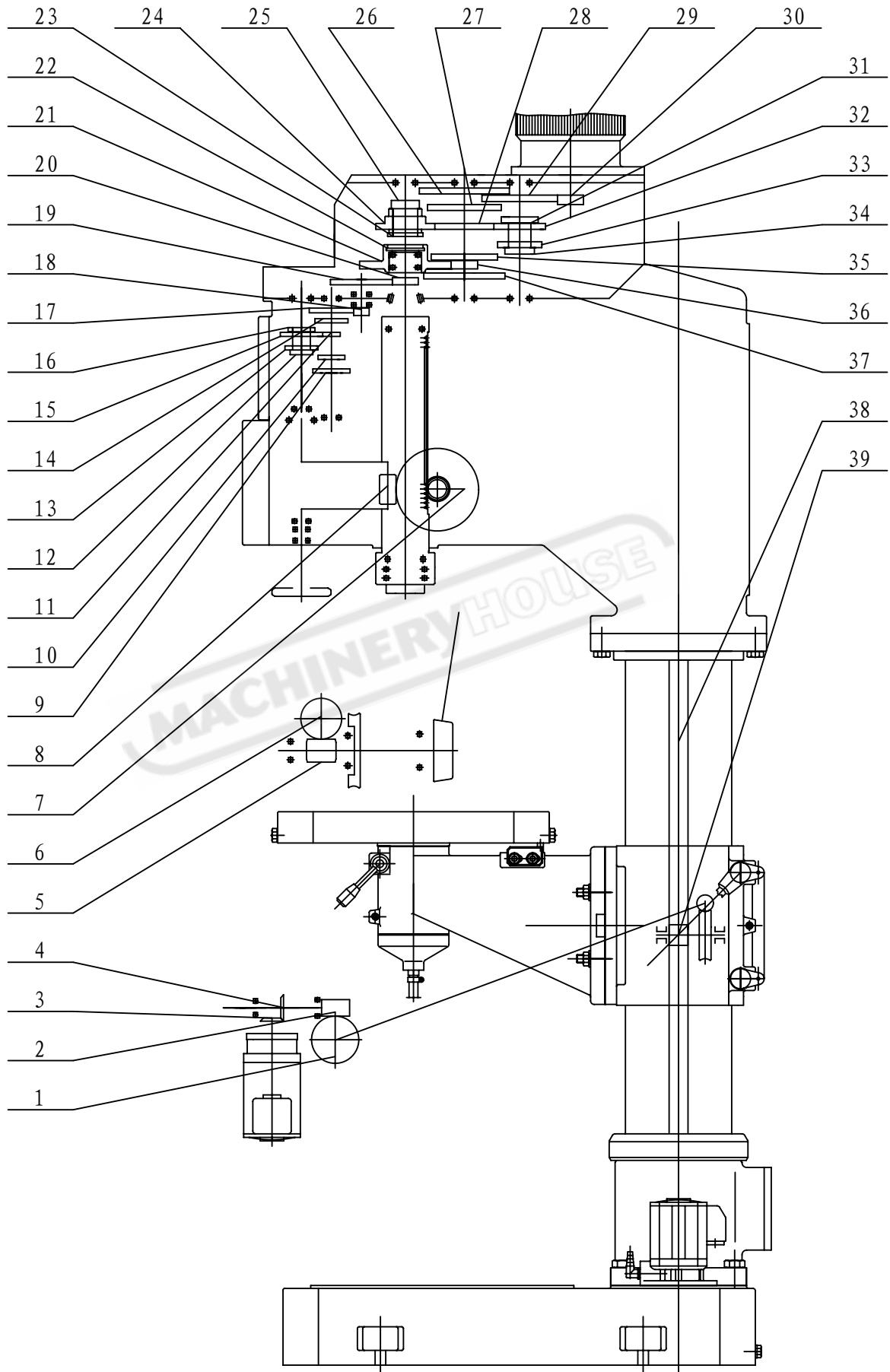


drawing (1) picture of appearance of machine

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drawing 2 picture of transmission

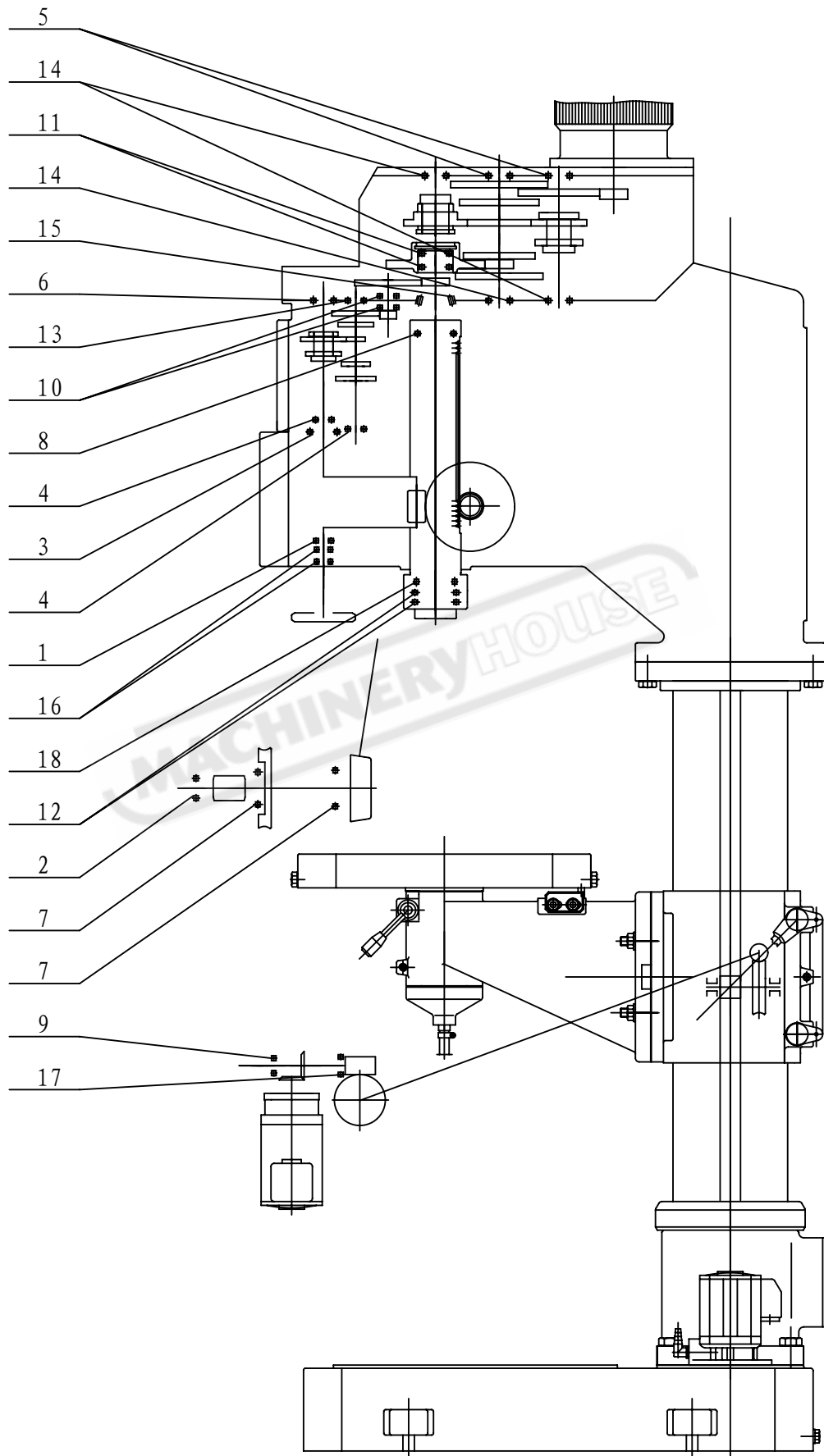
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4.1 list of gear, worm wheel, worm and rack										
table (1)										
Number on the drawing	21	22	23	24	25	26	27	28	29	30
Part drawing NO.	32049	32049	32009	32009	32010	32013	32014	32023	32016	32017
Number of teeth and starts	62	40	40	40	18	61	50	40	64	22
Module	2.5	1.5	1.5	2	2.5	2.5	2.5	2.5	2	2
Direction of helical angle										
Class of Accuracy	7-6-6	9	9	7-6-6	7-6-6	7-6-6	7-6-6	7-6-6	7-6-6	7-6-6
Material	40Cr	40Cr	40Cr	40Cr	40Cr	40Cr	40Cr	40Cr	40Cr	40Cr
Heat treatment and hardness	G42	G42	G42	G52	G52	G52	G52	G52	G52	G52
Number on the drawing	31	32	33	34	35	36	37	38	39	
Part drawing NO.	32018	32019	32020	32022	32025	32026	32027	12004	12015	
Number of teeth and starts	25	35	30	20	45	18	55	77	14	
Module	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
Direction of helical angle										
Class of Accuracy	7-6-6	7-6-6	7-6-6	7-6-6	7-6-6	7-6-6	7-6-6	9	9	
Material	40Cr	40Cr	40Cr	40Cr	40Cr	40Cr	40Cr	45	45	
Heat treatment and hardness	G52	G52	G52	G52	G52	G52	G52	T235	T235	

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drawing 3 picture of rolling bearing

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Roller bearing table					
Table (2)					
No.	Model	Name	Specification	Q'ty	Accuracy
1	GB276,102	Deep racing ball bearing	12×35×8	1	
2	GB276,104	Deep racing ball bearing	20×42×12	1	
3	GB276,106	Deep racing ball bearing	30×55×13	1	
4	GB276,202	Deep racing ball bearing	15×35×11	2	
5	GB276,204	Deep racing ball bearing	20×47×14	2	
6	GB276,303	Deep racing ball bearing	17×47×14	1	
7	GB276,1000909	Deep racing ball bearing	45×68×12	2	
8	GB276,D1000909	Deep racing ball bearing	45×68×12	1	D
9	GB276,7000102	Deep racing ball bearing	15×32×8	1	
10	GB276,7000103	Deep racing ball bearing	17×35×8	2	
11	GB276;7000106	Deep racing ball bearing	30×55×9	2	
12	GB276;D7000110	Deep racing ball bearing	50×80×10	2	D
13	GB277,50202	Deep racing ball bearing with stop moving racing outside	15×35×11	1	
14	GB277;50204	Deep racing ball bearing with stop moving racing outside	20×47×14	3	
15	GB297;2007107E	Roller bearing	35×62×18	1	
16	GB301,8102	Thrust bearing	15×28×9	2	
17	GB301,8104	Thrust bearing	20×35×10	1	
18	GB301,8110	Thrust bearing	50×70×14	1	

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4. Electrical system

4.1 Brief description

The machine with foreign advanced singlechip and superior quality electric element is controlled by electric system, the software system not only realize all kinds movement control ,but also has many protective function with catenation, the capability of this system is very good ,and the movement of this system is jarless and reliable.the move and stop of the main motor function are used by electric circuitry, and it improved the arrury of machine’s drilling.

4.2 Explanation of the circuit

When using the machine,breaker QF1,QF2,QF3 which positioned electric box B1(drawing 4) must be closed,it can be opened when examined and repaired. The two breakers separately protect short circuit、over loading and short phase of spindle motor and pump motor .when close the chief switch QS1, the system is entering working state and the single lamp HL1 ligh up ,when break the chief electric source, the lamp crush out and working stopped.

4.3 Tapping operation:

Electric Element for the tapping control mainly contactors KM1 and KM2, selection switch SX1 and limit switches SQ2 and SQ3 for tapping depth control.put the selection switch SX1 into the “1”(“0”is for hole drilling only),arrange the spindle revolution in clockwise direction KM1 engaged), put the spindle manual opration lever in down position until touches work piece, tapping job noe is starting. When requied depth is reached , the limit switch SQ3 works, the spindle immediately runs in counter clockwise direction (KM2 engaged), the tap returns out of the work piece, when spindle returns to the up highest position ,the limit switch SQ2 works, spindle runs in clockwise direction, now one tapping job is finished. If tapping stop is required, push the button (SB4) on the lever end , the spindle motor will immediately run in count clockwise direction, that’s all.

If the selection switch SX1 is in the “0”position, normal drilling work starts.

Attention: As the spindle motor works frequently during tapping,the motor will be hot quickly ,so the tapping job could not be down for a long time, eight times of tapping per minutes maximum is recommended as the motor needs cool when it is hot otherwise it will be burned.

4.4 Auto feed operation:

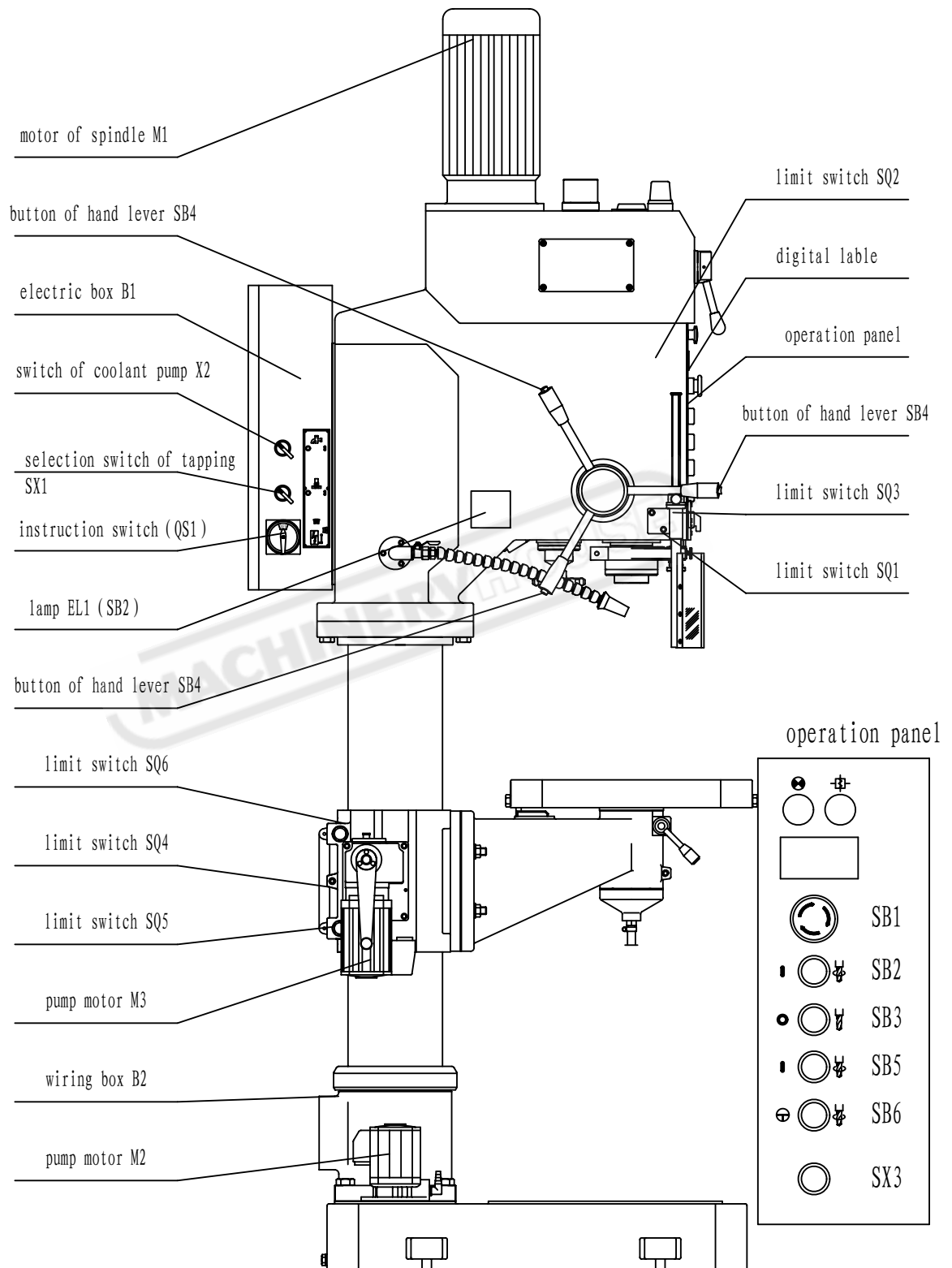
When auto feed , moving spindle down 5-6mm, press a push button at the end of either one of the three levers, now feed clutch is engaged and indicator HL2 on the panel is lighted auto feed job is started.

When required drilling depth is reached ,the limited switch will be pressed, then spindle returns automatically. Press the push button of the lever once angin, auto feed will be stopped and the spindle will return back to the original place.

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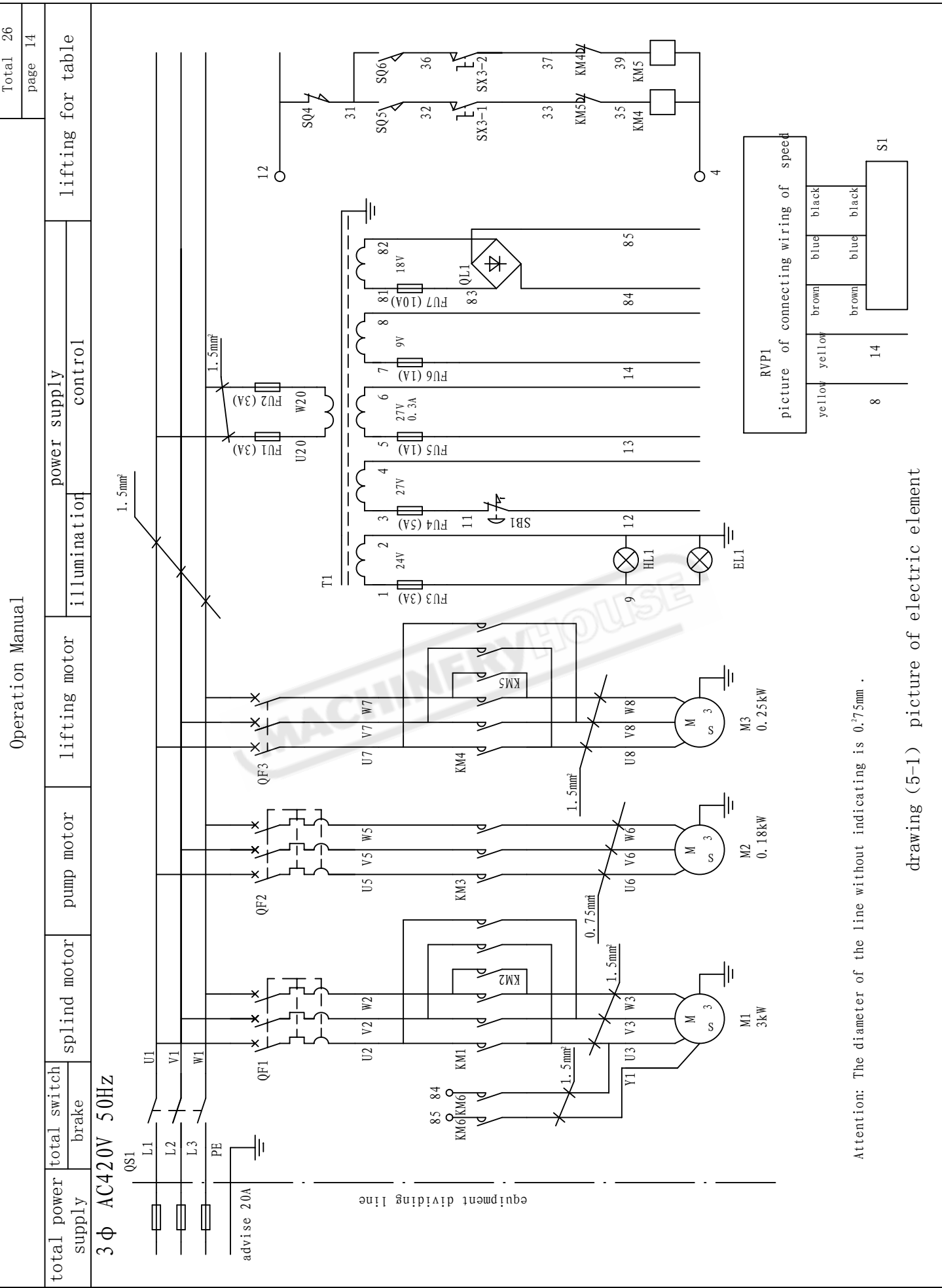
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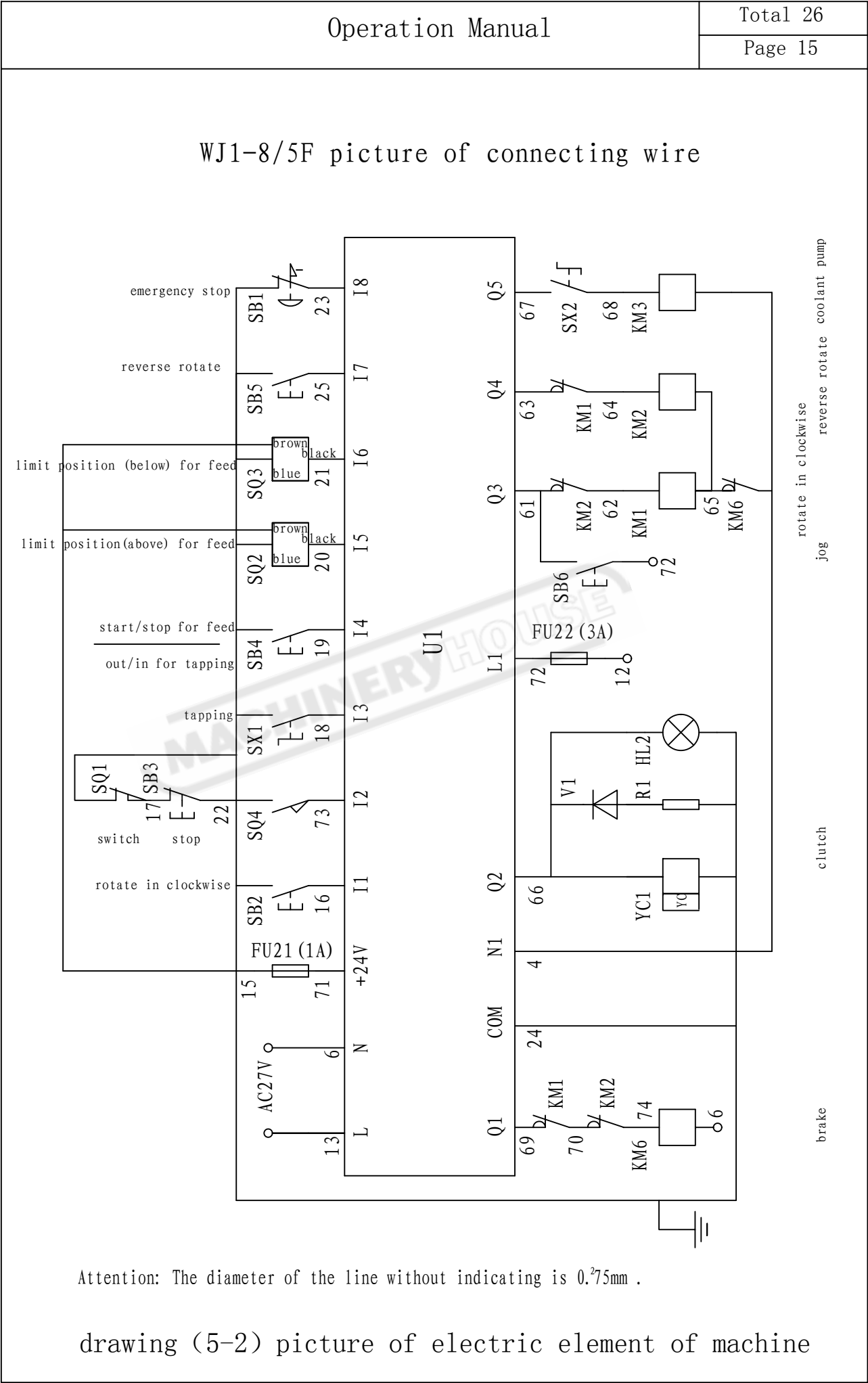
drawing (4) picture of electrical element of machine

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4.5 Emergency stop operation: If emergency stop is necessary during operation, press emergency push button SB1 that makes the loss of electric power of the contactor KM1,so the machine is completely stopped .After eliminating the breakdown ,release the lock of the push button then restart the machine. 4.6 Coolant pump Revolving the switch of coolant pump right, then the coolant pump is moving and working with the spindle. When the spindle stopped, the coolant pump stopped too. 4.7 Lifting motor The clamping handle 22 must be opened when the worktable lifting, turn the push button SX3 at required position. 4.8 Installation of the main motor: Insert the key of the main motor into the solt position of the spline shaft then fixed by 4-M10 ×35 hex screw bolts. Connect three phases and one ground wires to the power supply as per the electrical Diagram(5) of the machine.(please note the direction of main revolving). 4.9 Sheet metal guard: The sheet metal guard of this machine has a safety protection function, when it is opened The spindle can't working, until it is closed when the spindle is working now, it immediately stopped if The sheet metal guard is opened . 4.10 Maintenance of the electric equipment: Turn off the electric power before maintenance of the electric equipment starts.The electric equipment must keep on clean condition. Therefore, regularly cleaning is necessary. However .liquid such as kerosene, gasoline and detergent etc.is not be allowed for the cleaning. Wave of power supply shall not be over $\pm 10\%$ required by the electric motor. Maintenance of electric equipment is absolutely important inorder to keep machine works well.	



Attention: The diameter of the line without indicating is 0.75mm .

drawing (5-1) picture of electric element



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Electric components list:				
Table (3)				
Code of elements	Name	Specification	Q'ty	Remark
QF1	Breaker	DZ108-6.3/10A	1	
QF2	Breaker	DZ108-0.4/0.63A	1	
QF3	Breaker	DZ47-63(D) 3P 3A	1	
QS1	Instruction switch	JCH13-20	1	
SX1,2	Selection switch	C2SS2-10B-10	2	
SB1	Emergency stop button	MPMT3-10R	1	
		MCBH-00	1	
		MCB-01	2	
SB2,5	Push button	CP1-10G-10	2	
SB6	Push button	CP1-10B-10	1	
SB3	Push button	CP1-10R-01	1	
SB4	Push button	Homedade	1	
SX3	Selection push button	C3SS2-10B-20	1	
SQ1,SQ5,SQ6	Micro switch	E62-10A	3	
SQ2,SQ3	Adjacent switch	TL-Q5MC1	2	
SQ4	Micro switch	SND4112-SP-C1	1	
KM1–KM2	Contactor	AS12-30-01-20(AC24V),CA3-01	Each 2	
KM3	Contactor	HH54P ,AC24V(match seat)	1	
KM4-KM6	Contactor	AS12-30-01-20(AC24V)	3	
HL1,HL2	Single lamp	AD17-16 AC24V	2	
EL1	Illuminating light	AC24 V,25W	1	
T1	Transformer	JBK5-250TH, 420/24,27,27,9,18	1	
R1	Resistor	RT 2W62 Ω	1	
V1	Diode	IN5404	1	
U1	Control panel	WJ1-8/5F	1	
QL1	Bridge wiring	QL 10A 200V	1	
RVP1	Tachometer	RSD-22	1	

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5. Lubrication and coolant system:

Lubrication system:

Parts and bearings inside of the spindle box are all automatically lubricated. Oil level shall be a little bit higher than the centerline of the oil window when you fill lubrication oil. Too much oil filling will cause overflowing. Oil release plug and a filter device are in the same unit located at left side down of the spindle box. Please pay attention that when fastening your oil release plug, don't forget to put the oil absorption pipe inside of the filter, otherwise no filtered oil will be available. The filter needs to be washed once every two weeks.

For lubrication places and its requirements by manual. Please refer to the diagram 6.

Coolant system:

A special pump will supply coolant both for tool cutter and for work piece during machining. Coolant liquid is stored in a compartment located at the backside of the machine base. Flow rate of the coolant could be adjusted by a ball valve. Regularly washing for the coolant system is necessary and coolant water shall be exchanged as per actual condition.

6. Hoisting and installation:

Hoisting:

The machine is strongly fixed inside of the crate. When hoisting the machine, please pay close attention to the sign outside of the crate (where the wire cable shall be placed and where the gravity center is).

The crate must not be reversed or inclined and must not be strongly stroked when lift up the machine.

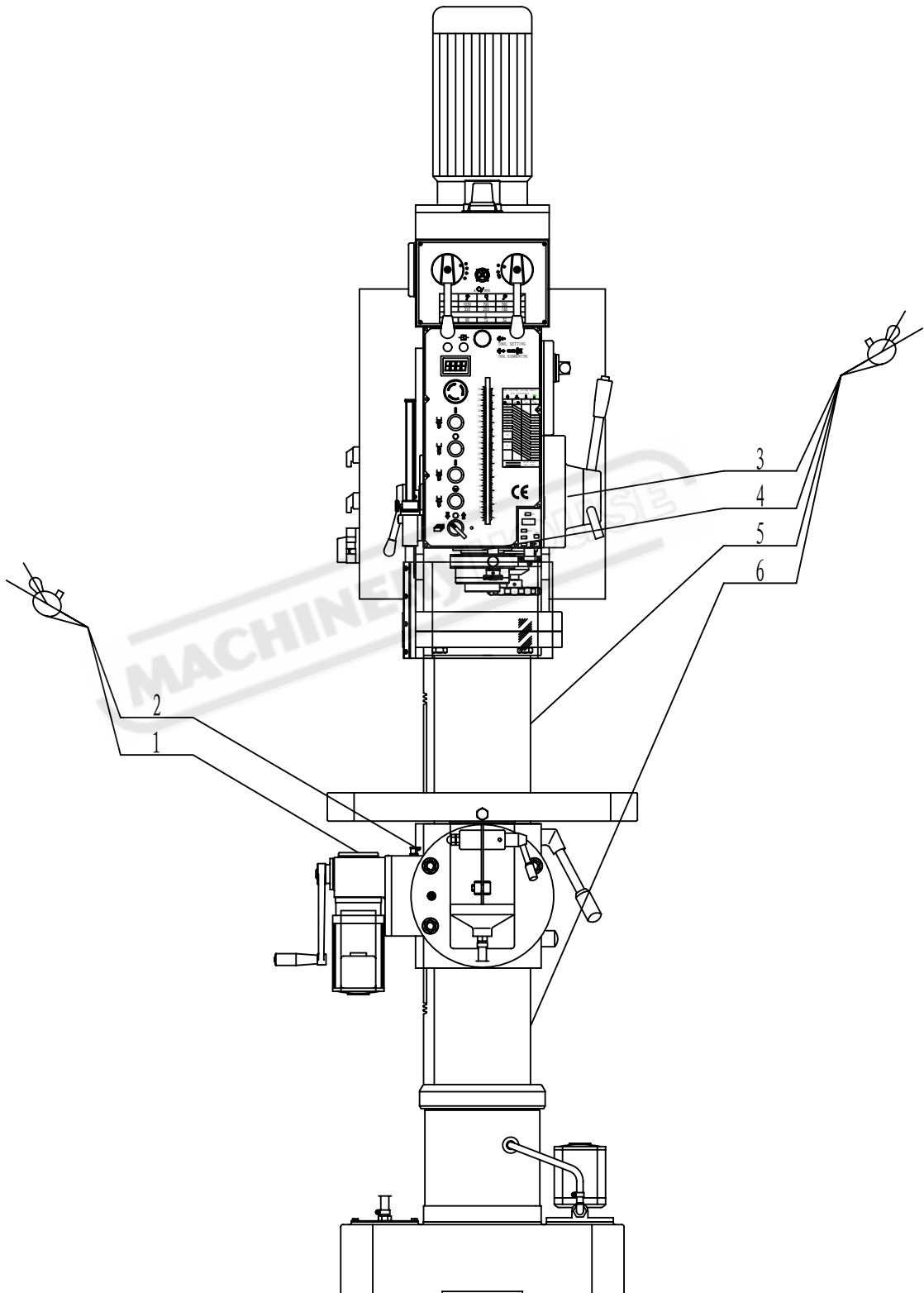
Considering small size of the bottom and higher size of the height of the machine package, therefore, moving the machine by roller is forbidden. Lifting by a crane or by forklift is recommended.

Please refer to the diagram 7 for the machine lifting. A soft pad between machine and wire cable is necessary in order to avoid paint damage of the machine. Lifting must be slow at beginning to see if the gravity center is correct.

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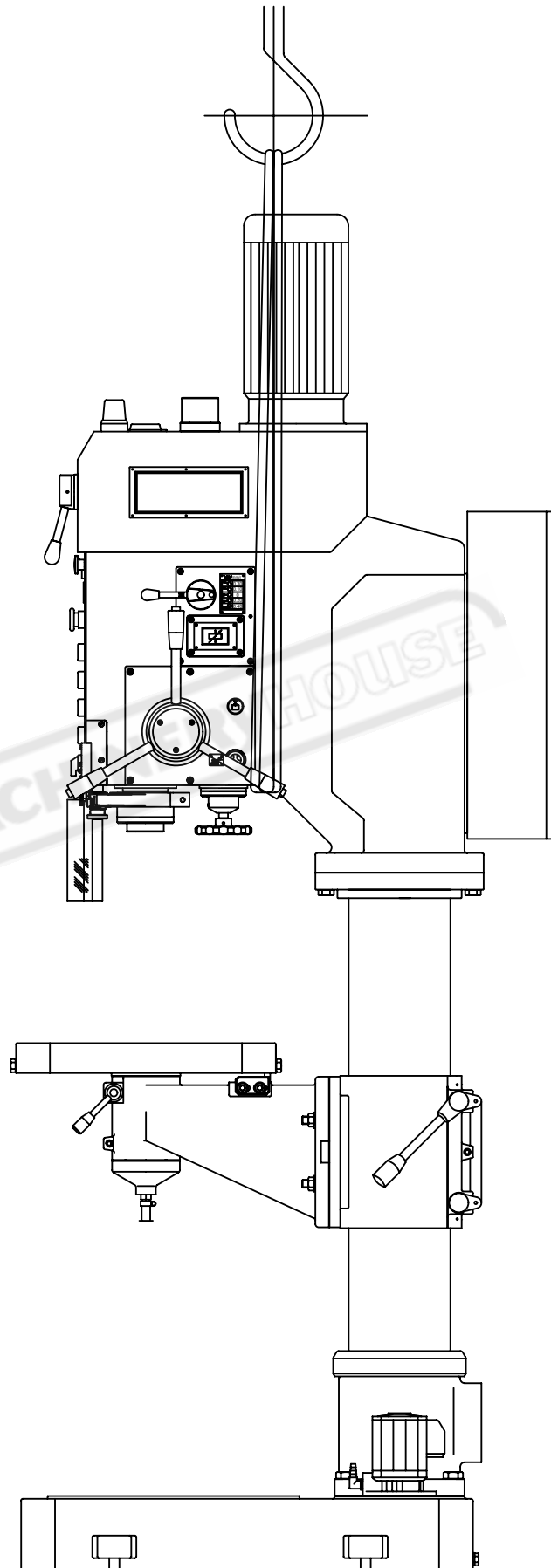


drawing 6 picture of lubrication

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drawing 7. picture of hoisting

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Installation:

Working area of the machine shall be the size when the worktable rounds its column in one cycle. Its diameter is about Ø2000mm. Further more, space for the work pieces, toolbox, and machine accessories as well as operating and maintenance space must be considered.

The machine should be placed on a solid ground. No foundation construction is required if ground of workshop is solid enough. However, we suggest that you'd better to make a foundation as per the attached drawing 8 and shall consider some space for foundation screw bolts use.

When the foundation is completely dry, the machine could be laid down on the adjustable pad. Concrete could be filled when screw bolts are placed. Fastening screw bolts after concrete is completely dry. Leveling the machine first, required tolerance should not be over 0.04/1000mm both in horizontal and cross plane. Checking all items of the accuracy as per the table sheet of the certificate. Accuracy value for each checked item must not be over the required value.

Preparation before machine running:

A strict checking, testing and try cutting of the machine have been made before machine delivery. No adjustment of the machine itself is necessary. Before machine running, clean all surfaces of the machine first by using cloth with kerosene or gasoline, checking all lubrication points then turn the main switch of the machine to the "on" position, running the machine with middle or slow speed and checking all revolution direction is correct, operating levers are in a correct position, checking machine noise and working temperature are all ok. The machine should be running for a certain period of time, then it could be used if no any un-normal condition happened.

7. Use and operation of the machine:

For the operating levers, handles, electric switches and buttons, please refer to the diagram 1 and diagram 4.

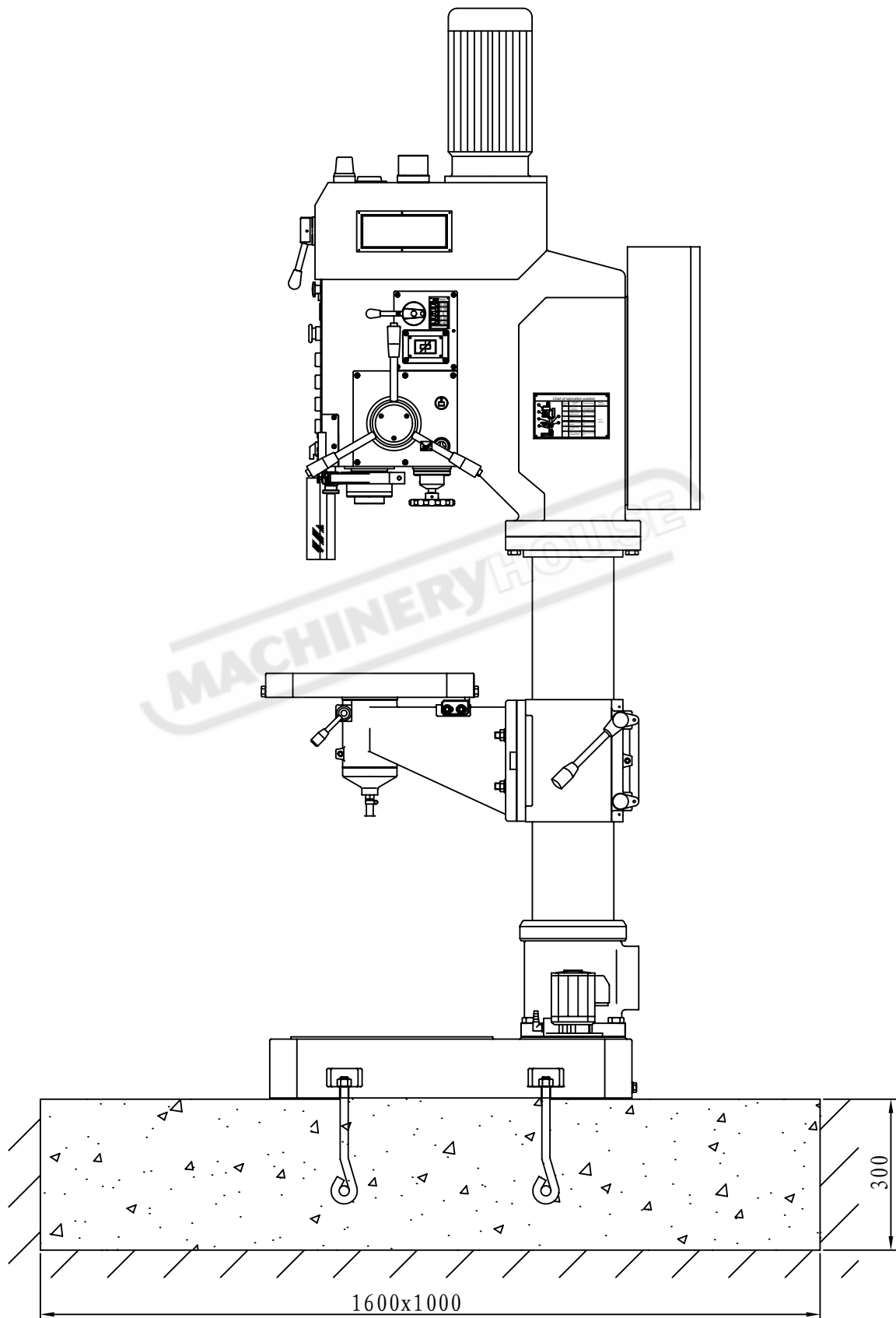
Mounting and dismounting of tool cutters:

The machine equipped with a tool dismounting device to be controlled by a nob (16). Push forward the nob (16) to the spindle box direction when tool mounting is required. As for dismounting tool cutters, pull out the nob (16), hold the tool cutter by left hand, meanwhile, turn the feed lever (4) by right hand, then the spindle quill goes up rapidly, the tool cutter will fall down until tool taper shank strokes the shaft of spindle.

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drawing 8 picture of installation of machine

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In case too tight mesh between tool shank and spindle taper and the tool cutter could not fall down after several strokes, then you have to use the normal way by using a taper wedge to dismounting the tool cutter.

If milling cutter is used, be sure to take away the screw on the tool holder screwed on the end of the spindle, the milling cutter then could be easily dismounted.

Warning: The nob (16) must not be pulled out while tool mounting or machine Running, otherwise, the spindle will goes up quickly which results tool cutter falls down. It is really dangerous.

7.3 Changes for the spindle speed and feed rate:

Spindle speed change could be made by moving the two levers (14) and (15) located in the front of the spindle box. Relations between spindle speed revolution and levers position is indicated at the speed change label. Meanwhile, the digital meter indicates the actual spindle revolution.

As mounting or dismounting tool cutter or adjustment of work piece needs spindle rotation by manual, therefore, the lever in the right side position shall be in the “idle” position, so spindle rotation could be easily obtained.

Changes of the feed rate could be realized by using the lever (5) in the upper right side position of the spindle box. As micro manual feed needs disengagement of the auto feed, therefore, the lever shall also be in the “idle” position.

7.4 Selection and operation of the spindle feed:

There are three types of spindle feed selections for your choice as per the requirement of your machining:

Manual feed: Simply moving the feed lever(4) at the right side of the spindle box, the spindle will move down if turned the lever in counter clockwise and the spindle will move up if turned the lever in clockwise.

Auto feed: There are three levers(4), at the end of each lever equipped with a push button. Push one of any three buttons(SB4), auto feed could be realized as per your required pre-set feed rate. Push one of any three buttons(SB4) once again, the auto feed will be stopped immediately.

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Manual micro feed: Spindle micro feed needs two steps. First, put the feed rate lever(5)in the “idle” position. Secondly, push button (SB4), then push up the micro feed hand wheel(3) and make sure that the clutch is engaged, now the micro feed hand wheel could be turned and micro feed of the spindle works.

7.5 Cutting depth control:

For the batch production, you need control cutting depth. A scale in front of spindle box could meet your requirements. Loosening knurled screw (20) by turning nob (2), moving the scale to the required depth, then fastening the knurled screw(20). Now the machining depth could be controlled.

7.6 Application of the digital scale:

A small round battery is fixed on the right side position of the spindle box for digital readout. With this scale, moving distance of the spindle could be easily readout. Except the battery switch, a “reset” push button and an “English or Metric” converter push button are available. Cutting depth could be readout at any time and cutting depth could also be set in advance. This function will be helpful for small batch or single work piece machining.

7.7 Tapping:

Put the “Selection Switch”(18) on the tapping position first, turn the feed lever(4) and let the tap approaches the work piece, a proper manpower force (based on the size of screw) shall be exerted in order to let the tap comes into the hole. The spindle will be rotated in reverse when the screw depth is reached, and the tap comes out.

Suppose, tapping job needs stop, push button (SB4) of the hand lever(4) then spindle will have reverse revolution. and tap returns back.

7.8 Milling

Choosing milling cutters and accessories as per the machining requirements and shape of the work piece. Milling cutters could be fixed on the spindle via tool holder or drill check. Put accessories on the worktable and fasten it, turn the worktable and let its pin in the bottom approaches right side position of round column and let lock block clamps the pin and fastens it by screw, be sure to clamp it in force by clamping levers(6) and (22) .

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For the milling operation, manual feed or auto feed using lever(4) is not permitted. The best way is to use micro feed hand wheel(3). Lock spindle by turning a clamping rod(6) if required cutting depth is reached. Now milling operation could be started.

Warning: The clamping rod (6) is to be used only for clamping the spindle while Milling. Therefore, for the job of drilling or tapping, the clamping rod shall be released. Otherwise, the spindle quill could not be moved and quill surface will be destroyed.

7.9 Adjustment of worktable position:

Symbols multi-use and convenience of the machine also reflects multi function of its worktable. Except its normal manual and auto up and down function, it can also be turned around the table itself, around the column and tilt in $\pm 45^\circ$ in horizontal position.

Operation method for the table tilting

Using a special tool to take out the taper pin and loosening four screw nuts on the bracket and manually turn the worktable to the required position then fastening the four screw nuts, now the work piece can be machined as per your tilting angle.

When the job is finished, keep the worktable in the original position by using the same way mentioned on the above. Be sure do not forget to push the pin in its position.

8. Machine adjustment:

8.1 Spindle balance force adjustment:

Balance of spindle is realized through a springiness from a coil spring device located at the left side of the spindle box. Balance force shall be adjusted to the point that the spindle together with its tool shall not go down itself when spindle stops. (go up a little bit shall be much better).

Over springiness or less needs adjustment. Simply loosening the screw on the cover of spring box, turn the spring box cover, the spring could be either fastening or loosening. Fastening screw on the cover if the balance force is ok

8.2 Adjustment for the feed safety clutch:

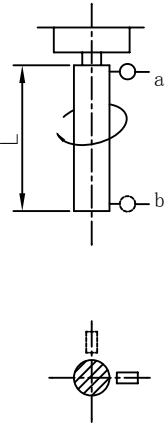
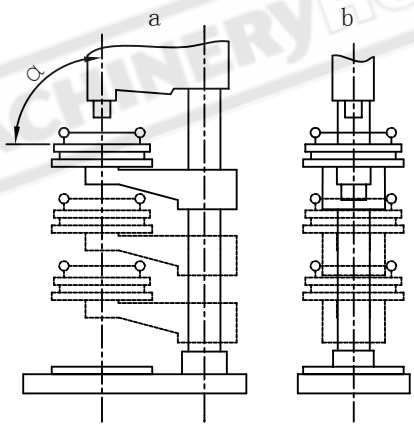
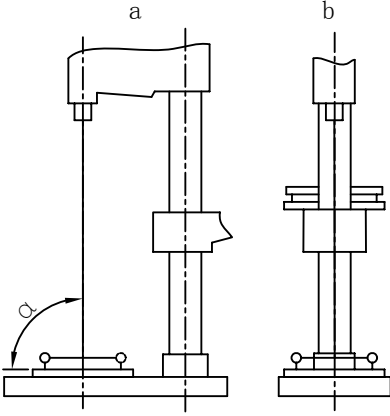
Feed safety clutch is mounted on upper side of the worm shaft. If too much feed resisting force is occurred, the feed safety clutch will be automatically slipped (sound “Ka” will be heard) in order to protect machine driving system not to be damaged. Clutch appearance could be seen when opening the cover below the feed change label.

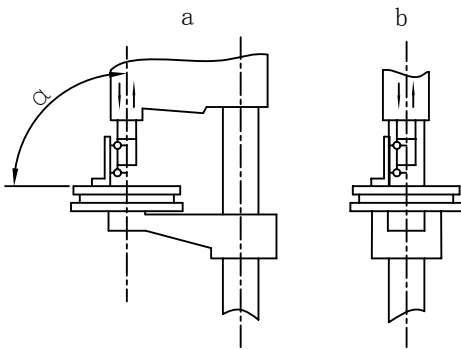
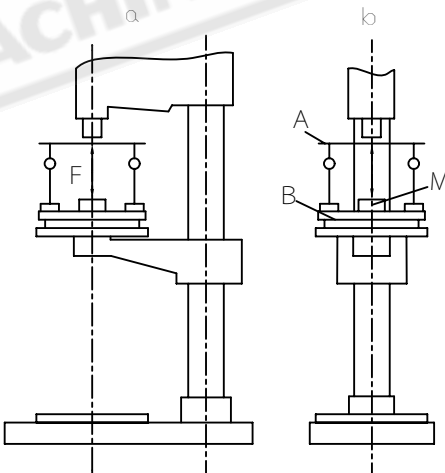
Using a tool to turn a slotted nut in clockwise, this will increase the feed resisting force, meanwhile, the counter clockwise will reduce the feed resisting force. The max. feed resisting force of this machine is 10000N, Over feed resisting force will cause un-safety, be sure to lock it by screw bolt or nut after adjustment.

Operation Manual	Total 26
	page 25
9 Machine use and maintenance: 9.1 Before running the machine, carefully read the Operation Manual first, fully understand the structure of the machine and its performance and needs to familiar with locations for all levers and buttons. 9.2 Lubrication of the machine is very important. Daily lubrication work as per the requirements of the operation manual is necessary. Filter should be cleaned once every two weeks otherwise pump, transmission parts and bearings will be damaged. 9.3 Max. spindle torque of this machine is 160Nm. Max. feed resisting force in the driving system is 10000N. Over permitted cutting feed range is not allowed. High spindle speed with big cutting feed is not good to the machine. 9.4 As standard drill with 118 degree angle features big cutting force but quick wear-out, so diameter and roughness of holes is not so ideal after drilling, therefore, regrinding its edges particularly for the big diameter drills is necessary. It is better to use two different angles for the machining of cast iron material (Second angle could be 70°). 9.5 Spot facer with three edges is proffered for the spot facing machining, using a normal drill for spot facing job will cause vibration. However, it will have a better result for the spot facing machining if reducing the rear angle of the normal drill with two different angles and going down the cutting speed and feed rate. 9.6 Temperature of motor will be increased so quickly when tapping due to frequently Motor direction be changed. Therefore, rapid and continuous tapping shall be avoided. Max. eight times per minutes of tapping is recommended. The machine shall be stopped for cooling if the motor is too hot. 9.7 A proper cutting force is required when milling. As this is not a milling machine although it has a milling function. Too big milling force will cause worktable moving round the column, therefore, clamping the worktable strongly is required when milling and a reasonable cutting feed rate for milling job is necessary. 9.8 Please turn off the coolant valve when mounting and dismounting tools, clamping or adjusting work piece or measuring work piece, as coolant is not necessary during this period. Stop coolant pump if these job takes more than ten minutes. 9.9 As gears are to be used for spindle and feed system, so it is not allowed to change spindle speed or change cutting feed rate when machine running, otherwise it will damage gears, shafts or relevant parts.	

Operation Manual				Total	26
				page	26
9.10 Do not extend spindle quill too much, instead, a proper working table height is suggested. Clean the spindle taper hole and tool taper shank first before tool mounting. Unqualified or rusted or damaged taper shank is forbidden to use. 9.11 Dry agent inside of the electric box and regularly removing dustiness are necessary. It is forbidden to use gasoline or kerosene or diesel oil to clean electric components. We suggest to use those no erosion and not be easily burned liquid such as carbon tetrachloride etc. 11. Machine accessories:					
No.	Description	Specification/standard	Q'ty	Remark	
1	Drill check with spanner	1-13/G86087	1		
2	Adapter for drill check		1		
3	Adaptor	4-3/JB3477	1		
4	Adaptor	4-2/JB3477	1		
5	Adaptor	3-1/JB3477	1		
6	Taper wedge for flat shape quill	Wedge 1/JB3482	1		
7	Taper wedge for flat shape quill	Wedge 3/JB3482	1		
8	Wrench	21×24/GB4388	1		
9	Battery	SR44	1		
10	Fuse	φ 5×25 3A/1A/10A	2 for each		
11	Fuse	φ 5×25 5A	2		
12	Cross work table	640×205	1	Special attachment	
13	Cross work table	555×195	1	Special attachment	
14	End cutter	φ 80×27/GB5342	1	Special attachment	
15	Milling shank		1	Special attachment	
16	adaptor for spring collet		1	Special attachment	
17	Nut for T-slot	M12	4	Special attachment	
18	Inner hexagon bolt	M12×40	4	Special attachment	
19	Spring collet	6,8,10,12,15,16	1	Special attachment	

Certificate of Inspection			Total 3	
			Page 1	
Precision Inspection Record				
Geometrical Precision Test:				
No.	Item	Brief Drawing	Precision	
			Allowance (mm)	Actual Test
G1	Parallelism of the base surface		0.06 at any tested Length of 300 (flat or concave)	
G2	Parallelism of the work table surface		0.04 at any tested Length of 300 (flat or concave)	
G3	surface runout of worktable		D=300 0.04	

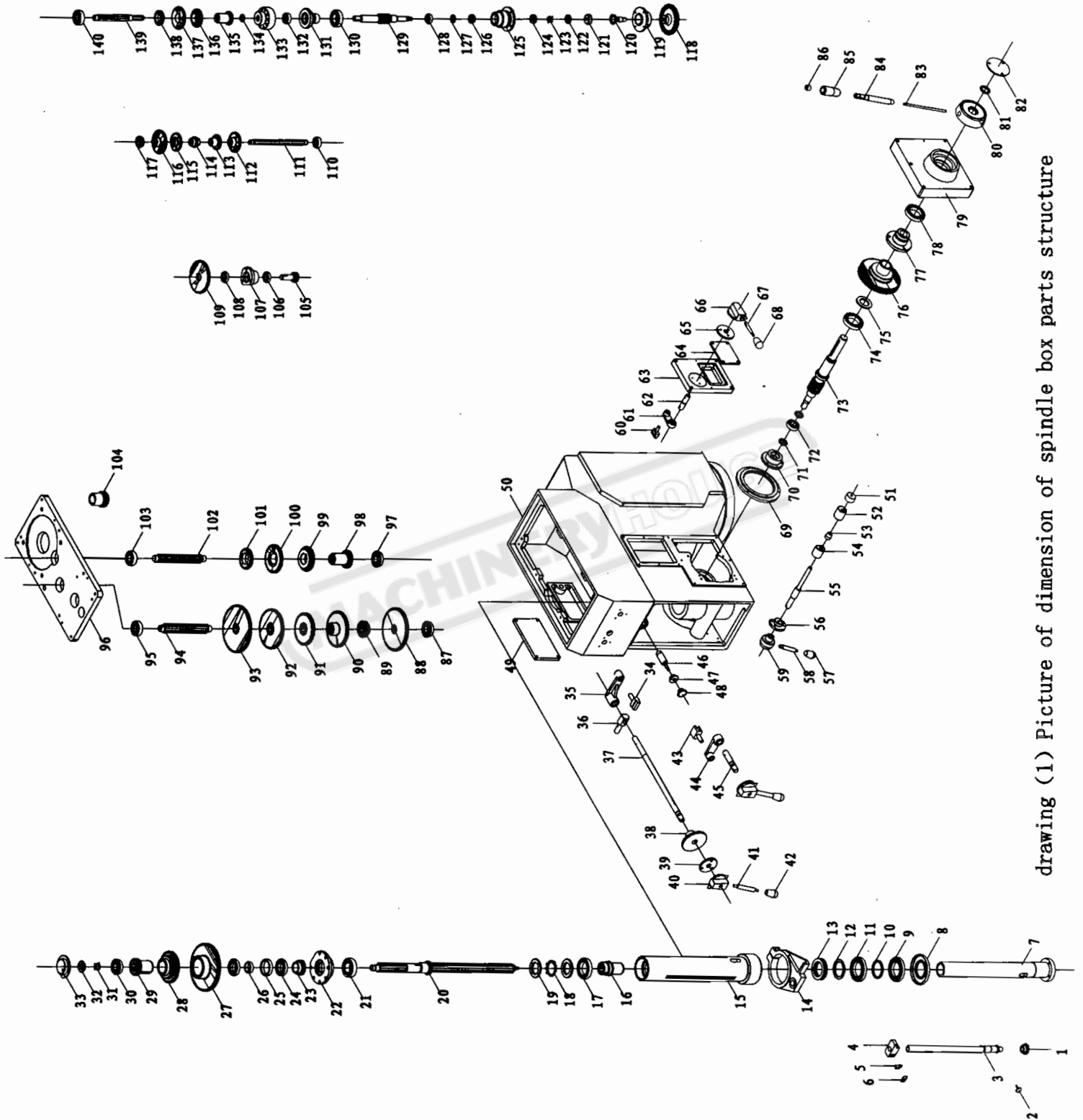
Certificate of Inspection			Total 3	
			Page 2	
Precision Inspection Record				
Germetrical Precision Test:				
No.	Item	Brief Drawing	Precision	
			Allowance (mm)	Actual Test
G4	Spindle bore axis runout a) Close to spindle surface b) at a distance of L to spindle surface		L=200 a) 0.02 b) 0.035	
G5	Perpendicularity of the spindle axis to work table surface		a) 0.1/300* ($\alpha \leq 90^\circ$) b) 0.06/300*	
G6	Perpendicularity of the spindle axis to Base plate table surface		a) 0.10/300* ($\alpha \leq 90^\circ$) b) 0.10/300*	
Distance between two contacts of indicator probe				

Certificate of Inspection			Total 3	
			Page 3	
Precision Inspection Record				
Germetrical Precision Test:				
No.	Item	Brief Drawing	Precision	
			Allowance (mm)	Actual Test
G7	Perpendicularity of the vertical movement of spindle sleeve to work table surface		a.0.1/300 (a≤90°) b.0.1/300	
Work Acuracy:				
P1	The change of Perpendicularity of spindle axis to work table surface under the axial force.		F=5000N 2/1000	

Packing list				Total	1
				page	1
Case No.: 1/1 Dimension (L × W × H): 110 × 67 × 225 CM Gross weight: 730kg Net weight: 670kg					
No.	Name	Specification and marks	Q'ty	Remark	
1	Machine		1 piece		
2	Drill check with lever	1-13: GB6087	1 piece		
3	Drill check adaptor		1 piece		
4	Tool shank adaptor	4-3: JB3477	1 piece		
		4-2: JB3477	1 piece		
		3-1: JB3477	1 piece		
5	Taper wedge for shank	Wedge 1: JB3482	1 piece		
		Wedge 3: JB3482	1 piece		
6	Wrench	21 × 24/GB4388	1		
7	Battery	SR44	1		
8	Fuse	φ 5 × 25 3A/1A/5A/10A	2 for each		
9	Cross work table	640 × 205	1	Special attachment	
10	Cross work table	555 × 195	1	Special attachment	
11	End cutter	φ 80 × 27/GB5342	1	Special attachment	
12	Milling shank		1	Special attachment	
13	adaptor for spring collet		1	Special attachment	
14	Nut for T-slot	M12	4	Special attachment	
15	Inner hexagon bolt	M12 × 40	4	Special attachment	
16	Spring collet	6,8,10,12,15,16	1	Special attachment	
17	Operation manual		1 piece		
	Quality certificate		1 piece		
	Packing list		1 piece		
Inspector of the packing: Date:					

Ancillary Page Of Operation Manual

Page 1



drawing (1) Picture of dimension of spindle box parts structure

Ancillary page of Operation Manual				page 2
Contrast for the parts number of GHD-50 spindle box and its three dimensions sketch.				
No.	Parts number	Name of the parts	Q'ty	Remarks
1	32004/ZY5050	Knurled knob	1	
2	32005/ZY5050	Knurled screw bolt	1	
3	32004/ZY5050A	Scaled screw	1	
4	31003/ZY5050A	Scaled nut	1	
5	32004/ZS5030	Support for the vernier	1	
6	35001/ZS5030	Scaled indicator sheet	1	
7	32035/ZY5050	Main spindle	1	
8	32003/ZY5050	Bearing cover	1	
9	D7000110; GB276	Bearing	1	
10	32001/ZY5050	Washer	1	
11	D7000110; GB276	Bearing	1	
12	32002/ZY5050	Washer	1	
13	8110; GB301	Bearing	1	
14	31002/ZY5050	Scale clamper	1	
15	32036/ZY5050	Spindle quill	1	
16	32006/ZY5050	Spline quill	1	
17	D000909; GB276	Bearing	1	
18	32029/ZY5050	Washer	1	
19	32007/ZY5050	Round nut	2	
20	32037/ZY5050	Transmission shaft	1	
21	2007107E; GB297	Bearing	1	
22	32008/ZY5050	Bearing cover	1	
23	32048/ZY5050	Feed gear	1	
24	7000106; GB276	Bearing	2	
25	32051/ZY5050	Bushing	1	
26	32050/ZY5050	Bearing	1	
27	32049/ZY5050	Gear	1	
28	32009/ZY5050	Gear	1	
29	32010/ZY5050	Gear	1	
30	50204; GB277	Bearing	1	
31	18; GB858	Washer	1	
32	32011/ZY5050	Round nut	1	
33	32012/ZY5050	Cover	1	
34	34011/ZY5050	Lever block	1	
35	31014/ZY5050	Fork lever	1	
36	32086/ZY5050	Support for block	1	

Ancillary page of Operation Manual				page 3
Contrast for the parts number of GHD-50 spindle box and its three dimensions sketch.				
No.	Parts number	Name of the parts	Q'ty	Remarks
37	32087/ZY5050	Lever shaft	1	
38	32088/ZY5050	Positioning twist	1	
39	32028/ZS5030	Washer	2	
40	32031/ZS5030	Handle seat	2	
41	32032/ZS5030	Handle	2	
42	1.222/40-M8/21101	Oval knob	2	
43	34010/ZY5050	Lever block	1	
44	31013/ZY5050	Fork lever	1	
45	32090/ZY5050	Lever shaft	1	
46	32047/ZY5050	Positioning shaft	1	
47	32045/ZS5030	Bushing	1	
48	BM8×32; GB4141.27	Knurled handle	1	
49	31012/ZY5050	Cover	1	
50	31001/ZY5050	Spindle box	1	
51	32085/ZY5050	Stop ring	1	
52	32070/ZY5050	Lock sleeve(II)	1	
53	32071/ZY5050	Sleeve	1	
54	32072/ZY5050	Lock sleeve(I)	1	
55	32073/ZY5050	Locked screw	1	
56	32077/ZY5050	Eccentric cover	1	
57	1.222/30-M8/21001	Oval knob	1	
58	32075/ZY5050	Handle	1	
59	32076/ZY5050	Handle seat	1	
60	34019/ZY5050	Lever block	1	
61	31015/ZY5050	Fork lever	1	
62	32094/ZY5050	Small shaft	1	
63	31016/ZY5050	Side cover	1	
64	31006/ZY5050	Cover	1	
65	32095/ZY5050	Positioning board	1	
66	32093/ZY5050	Handle seat	1	
67	32038/ZS5030A	Handle lever	1	
68	1.222/30-M8/21001	Oval knob	1	
69	31008/ZY5050	Cover	1	
70	32027/ZS5030	Bearing cover	1	
71	32024/ZS5030	Washer	2	
72	104;GB276	Bearing	1	

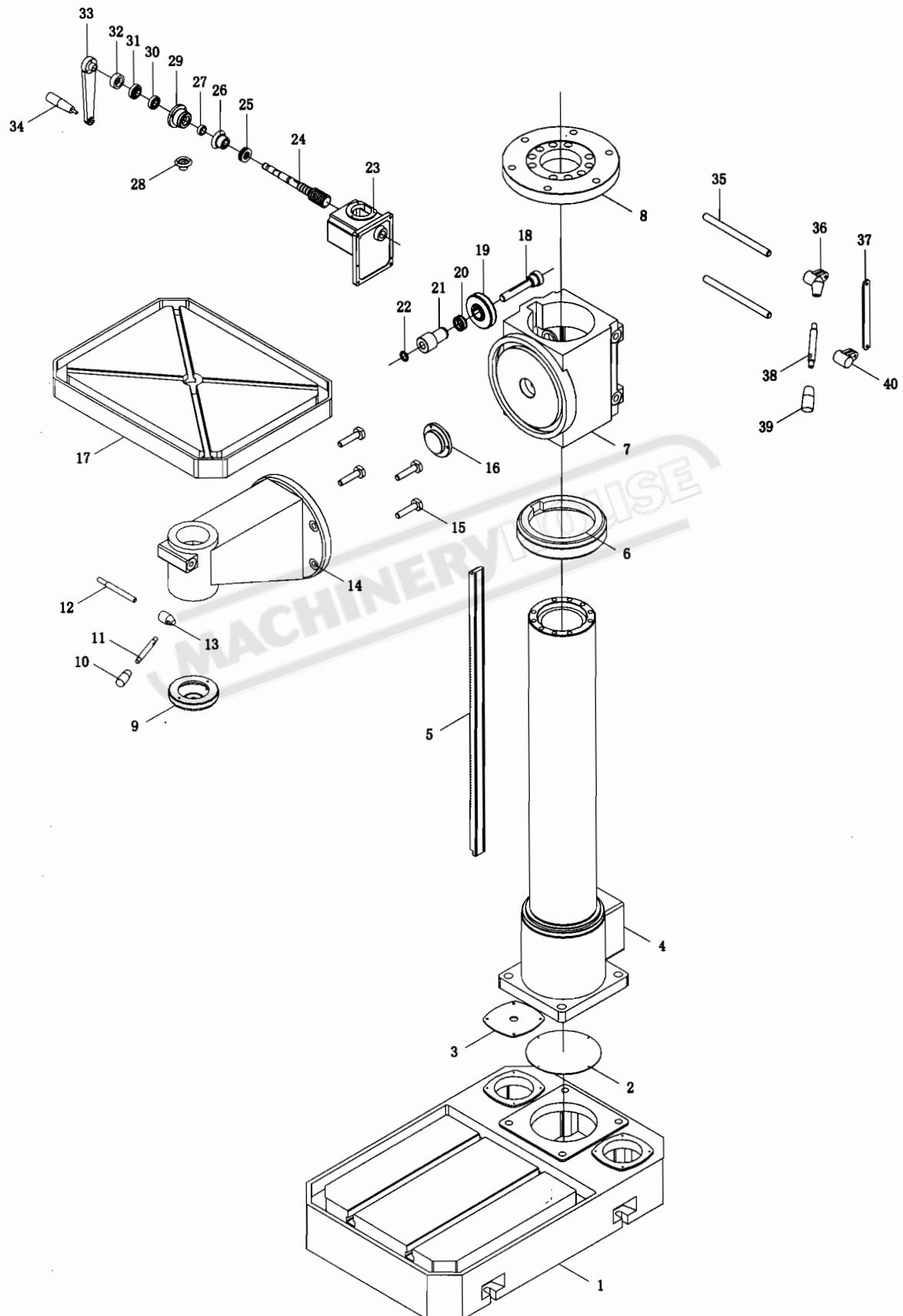
Ancillary page of Operation Manual				page 4
Contrast for the parts number of GHD-50 spindle box and its three dimensions sketch.				
No.	Parts number	Name of the parts	Q'ty	Remarks
73	32001/ZY5050A	Horizontal spindle	1	
74	1000909;GB276	Bearing	1	
75	32002/ZY5050A	Washer	1	
76	31001/ ZY5050A	Worm wheel	1	
77	32003/ZY5050A	Sleeve	1	
78	1000909;GB276	Bearing	1	
79	31002/ZY5050A	Side cover for feed	1	
80	32029/ZS5030A	Handle seat	1	
81	32030/ZS5030A	Washer for adjusting	1	
82	32031/ZS5030A	Pressing cover	1	
83	32033/ZS5030A	Lever	3	
84	32032/ZS5030A	Handle lever	3	
85	35002/ZS5030A	Nip	3	
86	35001/ZS5030A	Core lever	3	
87	50204;GB277	Bearing	1	
88	32027/ZY5050	Gear	1	
89	32026/ZY5050	Gear	1	
90	32025/ZY5050	Gear	1	
91	32023/ZY5050	Gear	1	
92	32014/ZY5050	Gear	1	
93	32013/ZY5050	Gear	1	
94	35024/ZY5050	Spline (II)	1	
95	204;GB276	Bearing	1	
96	31005/ZY5050	Spindle box cover	1	
97	50204;GB277	Bearing	1	
98	32022/ZY5050	Gear	1	
99	32020/ZY5050	Gear	1	
100	32019/ZY5050	Gear	1	
101	32018/ZY5050	Gear	1	
102	32021/ZY5050	Spline shaft (I)	1	
103	204;GB276	Bearing	1	
104	32017/ZY5050	Electric gear	1	
105	32046/ZY5050	Feed gear	1	
106	7000103;GB276	Bearing	1	
107	32053/ZY5050	Bearing seat	1	
108	7000103;GB276	Bearing	1	

Ancillary page of Operation Manual				page 5
Contrast for the parts number of GHD-50 spindle box and its three dimensions sketch.				
No.	Parts number	Name of the parts	Q'ty	Remarks
109	32052/ZY5050	Feed gear	1	
110	202;GB276	Bearing	1	
111	32040/ZY5050	Spline shaft (III)	1	
112	32041/ZY5050	Feed gear	1	
113	32042/ZY5050	Feed gear	1	
114	32043/ZY5050	Feed gear	1	
115	32044/ZY5050	Feed gear	1	
116	32045/ZY5050	Feed gear	1	
117	50202;GB277	Bearing	1	
118	B-12×100;GB4141.2	Waved hand wheel	1	
119	32067/ZY5050	Worm cover	1	
120	32068/ZY5050	Inching shaft	1	
121	32069/ZY5050	Inching clutch	1	
122	M14×1.5;GB812	Round nut	1	
123	14;GB858	Washer	1	
124	8102;GB301	Bearing	1	
125	31007/ZY5050	Bearing seat	1	
126	8102; GB301	Bearing	1	
127	32066/ZY5050	Washer	1	
128	102;GB276	Bearing	1	
129	32064/ZY5050	Worm shaft	1	
130	106; GB276	Bearing	1	
131	32063/ZY5050	Clutch seat (below)	1	
132	202; GB276	Bearing	1	
133	32062/ZY5050	Overload protection sleeve	1	
134	32060/ZY5050	Washer for adjusting	1	
135	32059/ZY5050	Feed gear	1	
136	32058/ZY5050	Feed gear	1	
137	32057/ZY5050	Feed gear	1	
138	32056/ZY5050	Feed gear	1	
139	32061/ZY5050	Spline shaft (IV)	1	
140	303;GB276	Ball bearing	1	

Ancillary Page Of Operation Manual

Page 6

Drawing (2) Picture of dimensions sketch of column
and bracket parts structure



Ancillary page of Operation Manual				page 7
Contrast for the parts number of GHD-50 column and its bracket and its three dimension sketch.				
No.	Parts number	Name of the parts	Q'ty	Remarks
1	11003/ZY5050	Base	1	
2	12003/ZY5050	Cover	1	
3	12008/ZS5030	Cover broad	1	
4	11008/ZY5050	Column	1	
5	12004/ZY5050	Rack	1	
6	11010/ZY5050	Stop ring	1	
7	11006/ZY5050	Up and down device of bracket	1	
8	11009/ZY5050	Up connection seat	1	
9	11001/ZY5050	Crust	1	
10	M10×50; GB4141.14	Long lever quill	1	
11	M10×80; GB4141.15	Hand lever	1	
12	12005/ZY5050	Double end bolt	1	
13	M12×30;GB4141.16	Hand lever seat	1	
14	11007/ZY5050	Bracket seat	1	
15	12005/ZS5030	T type screw bolt	1	
16	12010/ZS5030	Positioning shaft	1	
17	11002/ZY5050	Worktable	1	
18	12016/ZY5050	Small shaft	1	
19	12017/ZY5050	Worm shaft	1	
20	11015/ZY5050	Sleeve	1	
21	12015/ZY5050	Gear	1	
22	12014/ZY5050	Washer	1	
23	11014/ZY5050	Side cover for lifting	1	
24	12012/ZY5050	Warm shaft for lifting	1	
25	8104; GB301	Ball bearing	1	
26	12011/ZY5050	Taper gear	1	
27	11013/ZY5050	Washer for adjusting	1	
28	12013/ZY5050	Taper gear	1	
29	12007/ZY5050	Bearing seat	1	
30	7000102;GB276	Ball bearing of depth chimb	1	
31	12010/ZY5050	Connecting end	1	
32	12008/ZY5050	Connecting end	1	
33	11011/ZY5050	Lever for lifting	1	
34	M10×80; GB4141.5	Lever for turning	1	
35	12006/ZY5050	Double end bolt	2	
36	11005/ZY5050	Main nut for clamping board	1	

[illegible]



WARNING

General Machinery Safety Instructions

Machinery House
requires you to read this entire Manual before using this machine.

- 1. Read the entire Manual before starting machinery.** Machinery may cause serious injury if not correctly used.
- 2. Always use correct hearing protection when operating machinery.** Machinery noise may cause permanent hearing damage.
- 3. Machinery must never be used when tired, or under the influence of drugs or alcohol.** When running machinery you must be alert at all times.
- 4. Wear correct Clothing.** At all times remove all loose clothing, necklaces, rings, jewelry, etc. Long hair must be contained in a hair net. Non-slip protective footwear must be worn.
- 5. Always wear correct respirators around fumes or dust when operating machinery.** Machinery fumes & dust can cause serious respiratory illness. Dust extractors must be used where applicable.
- 6. Always wear correct safety glasses.** When machining you must use the correct eye protection to prevent injuring your eyes.
- 7. Keep work clean and make sure you have good lighting.** Cluttered and dark shadows may cause accidents.
- 8. Personnel must be properly trained or well supervised when operating machinery.** Make sure you have clear and safe understanding of the machine you are operating.
- 9. Keep children and visitors away.** Make sure children and visitors are at a safe distance for you work area.
- 10. Keep your workshop childproof.** Use padlocks, Turn off master power switches and remove start switch keys.
- 11. Never leave machine unattended.** Turn power off and wait till machine has come to a complete stop before leaving the machine unattended.
- 12. Make a safe working environment.** Do not use machine in a damp, wet area, or where flammable or noxious fumes may exist.
- 13. Disconnect main power before service machine.** Make sure power switch is in the off position before re-connecting.
- 14. Use correct amperage extension cords.** Undersized extension cords overheat and lose power. Replace extension cords if they become damaged.
- 15. Keep machine well maintained.** Keep blades sharp and clean for best and safest performance. Follow instructions when lubricating and changing accessories.
- 16. Keep machine well guarded.** Make sure guards on machine are in place and are all working correctly.
- 17. Do not overreach.** Keep proper footing and balance at all times.
- 18. Secure workpiece.** Use clamps or a vice to hold the workpiece where practical. Keeping the workpiece secure will free up your hand to operate the machine and will protect hand from injury.
- 19. Check machine over before operating.** Check machine for damaged parts, loose bolts, Keys and wrenches left on machine and any other conditions that may effect the machines operation. Repair and replace damaged parts.
- 20. Use recommended accessories.** Refer to instruction manual or ask correct service officer when using accessories. The use of improper accessories may cause the risk of injury.
- 21. Do not force machinery.** Work at the speed and capacity at which the machine or accessory was designed.
- 22. Use correct lifting practice.** Always use the correct lifting methods when using machinery. Incorrect lifting methods can cause serious injury.
- 23. Lock mobile bases.** Make sure any mobile bases are locked before using machine.
- 24. Allergic reactions.** Certain metal shavings and cutting fluids may cause an allergic reaction in people and animals, especially when cutting as the fumes can be inhaled. Make sure you know what type of metal and cutting fluid you will be exposed to and how to avoid contamination.
- 25. Call for help.** If at any time you experience difficulties, stop the machine and call you nearest branch service department for help.

WARNING

Drilling Machine Safety Instructions

Machinery House
requires you to read this entire Manual before using this machine.

- 1. Maintenance.** Make sure the Drill is turned off and disconnect from the main power supply and make sure all moving parts have come to a complete stop before any inspection, adjustment or maintenance is carried out.
- 2. Drill Condition.** Drill must be maintained for a proper working condition. Never operate a Drill that has damaged or worn parts. Scheduled routine maintenance should be performed on a scheduled basis.
- 3. Leaving a Drill Unattended.** Always turn the Drill off and make sure all moving parts have come to a complete stop before leaving the Drill. Do not leave Drill running unattended for any reason.
- 4. Avoiding Entanglement.** Remove loose clothing, belts, or jewelry items. Never wear gloves while machine is in operation. Tie up long hair and use the correct hair nets to avoid any entanglement with the Drill spindle or moving parts.
- 5. Chuck key & wrench safety.** Always remove chuck keys, wrenches and any service tools immediately after use. Chuck keys left in the chuck can cause serious injury.
- 6. Understand the machines controls.** Make sure you understand the use and operation of all controls.
- 7. Drill bit selection.** Always use the correct Drill bit for the job you are Drilling. Make sure you use the correct shank drill bit for your drilling machine.
- 8. Secure the Drill Bit.** Properly tighten and securely lock the drill bit in the chuck.
- 9. Cutting Tool inspection.** Inspect Drill for sharpness, chips, or cracks before use. Replace any cutting tools immediately if dull, chipped or cracked. Handle new cutting tools with care. Cutting edges are very sharp and can cause lacerations.
- 10. Reversing the spindle.** Make sure the spindle has come to a complete stop before changing the direction of the spindle.
- 11. Stopping the spindle.** Do not slow or stop the spindle by using your hand.
- 12. Speed selection.** Select the appropriate speed for the type of work, material, and tool bit. Allow the Drill to reach full speed before beginning a cut.
- 13. Changing Belts for speed selection.** Always allow the machine to come to a complete stop and turn power off before changing belts. Not turning power off when changing belts can cause serious injury.
- 14. Clearing chips.** Always use a brush to clear chips. Never clear chips when the drill is running.
- 15. Power outage.** In the event of a power failure during use of the drill, turn off all switches to avoid possible sudden start up once power is restored.
- 16. Clean work area.** Keep the area around the drill clean from oil, tools, chips.
- 17. Surface/workpiece area.** Before turning the drill on, make sure the table is clear of any objects (tools, scraps, off-cuts etc.) Do not drill material that does not have a flat surface unless a suitable support is used.
- 18. Table Lock.** Make sure the table is tightened before starting the drill.
- 19. For - Radial Drill Arm Lock.** Make sure the arm is locked before leaving or starting a radial arm drill. An unlocked radial drill arm can swing and cause serious injury.
- 20. Drilling Sheet metal.** All sheet metal should be clamped to the table before drilling.
- 21. Mounting workpieces.** Use clamps or vices to secure workpiece before drilling. Position work so you avoid drilling into table.
- 22. Guarding.** Do not operate the drill when chuck guard is removed.
- 23. Eye and hand protection.** A face shield with safety glasses is recommended. Always keep hands and fingers away from the drill bit. Never hold a workpiece in your hand while drilling. Do not wear gloves while operating the drill.
- 24. Drill operation.** Never start the drill with the drill bit pressed against the workpiece. Feed the drill evenly into the workpiece. Back the drill out of deep holes. Turn the machine off and clear chips and scrap pieces with a brush. Turn power off, remove drill bit, and clean the table before leaving the machine.
- 25. Call for help.** If at any time you experience difficulties, stop the machine and call your nearest branch service department for help.

PLANT SAFETY PROGRAM
NEW MACHINERY HAZARD IDENTIFICATION, ASSESSMENT & CONTROL

Drilling Machine

Developed in Co-operation Between A.W.I.S.A and Australia Chamber of Manufactures
This program is based upon the Australian Worksafe Standard for Plant(NOHSC:1010-1994)

Item No.	Hazard Identification	Hazard Assessment	Risk Control Strategies (Recommended for Purchase / Buyer / User)
A	ENTANGLEMENT	HIGH	Eliminate, avoid loose clothing / Long hair etc.
B	CRUSHING	LOW	Secure & support work material on drill table.
C	CUTTING, STABBING, PUNCTURING.	MEDIUM	Isolate power to machine prior to any checks or maintenance being carried out. Do not adjust or clean until the machine has fully stopped.
D	SHEARING	MEDIUM	Isolate power to machine when changing speeds or maintenance is being carried out. Make sure all guards are secured shut when machine is on.
F	STRIKING	MEDIUM	Ensure workpieces are tightly secured on machine. Wear safety glasses. For Radial Arm Drills ensure that arm is locked before drilling. Ensure correct spindle direction when drilling..
H	ELECTRICAL	MEDIUM	All electrical enclosures should only be opened with a tool that is not to be kept with the machine. Never clean or dust machine when power is on. Machine should be installed & checked by a Licensed Electrician.
M	HIGH TEMPERATURE	LOW	Wear appropriate protective clothing to prevent hot swarf.
O	OTHER HAZARDS, NOISE.	LOW	Wear hearing protection as required.
Plant Safety Program to be read in conjunction with manufactures instructions			



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Authorised and signed by:
Safety officer:

Manager:




Revised Date: Aug-08