

Vertical Drilling Machine

Model: ZN5030B

Operation Manual

Max. Drilling Diameter: 30mm

Series Number:

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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, knurled handle of Feed handle must be pushed at locking handle's position , then the machine feed is manual Feed, otherwise the parts of machine will be destroyed if spindle rotate in mistake. Also push jog button in slow spindle speed to check if direction of spindle revolution is correct.(clockwise)
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 and stopped the machine stopped. Familiar with its position and its use are necessary.
8. Professional electric service engineer is required for electric maintenance.
9. When the machine working. The spindle box must be clamped otherwise. It will be hurt operator or the machine destroyed.
10. 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.
11. Correct use and daily maintenance of the machine are required in order to keep machine accuracy and its lifetime in long time.

12. 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.

1. **Main use and features of the machine:**

ZS 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 universal machine which could be widely used for small and middle sizes of work pieces for drilling, spot facing, reaming, tapping and 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 Two- 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 The spindle features good rigidity and good wear resisting and equipped with tool disassembly and balancing device.
- 1.4 The spindlebox could be turned round the column center line and could be moving up and down following the column.
- 1.5 The worktable could be turned round the column center line or the worktable center line or horizontal shaft centerline by manual and could be moving up and down following the column.
- 1.6 Main operation levers and push buttons could be reached easily that makes you comfortable when you operate the machine.
- 1.7 Spindle feed in mechanical and in manual two modes, there are available in this series machines.
- 1.8 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.

1.9 An adjustable safety protection clutch in the spindle feed device is available in order to prevent the machine and tools from damage when overloaded.

1.10 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	30
2	Max. tapping diameter (steel)	mm	M18
3	Distance between spindle center line to the center line of column	mm	260
4	Max. distance between spindle end to the surface of the worktable	mm	685
5	Max. distance between spindle end to the worktable surface of the base	mm	1165
6	Max. stroke of the spindle	mm	130
7	Spindle taper		MT3
8	Number of speed steps of the spindle	Step	12
9	Spindle speed range	r/min	125~3030
10	Feed steps of the spindle	Step	4
11	Feed range of the spindle	mm/r	0.1,0.2,0.3
12	Max. stroke of spindle box	mm	180
13	Max. stroke of worktable and its bracket	mm	500
14	Rotation degree of spindlebox in horizontal axes	degree	±45°
15	Working area of the worktable (L x W)	mm	420×350
16	Working area of the worktable of the base (L x W)	mm	335×340
17	Numbers and width of the T slots for worktable of base	mm	2-T14、2-T14
18	Diameter of column	mm	φ 110
19	Power and speed of the main motor	Kw, rpm	0.85/1.1 1440/2800
20	Power and flow rate of the coolant pump motor	Kw, L/min	0.085/6
21	Machine dimension (L x W x H)	mm	750×495×2080
22	Net weight of the machine (Net weight)	Kg	

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, bracket, electric cabinet, coolant device and machine accessories, total seven component parts. Spindle and revolution is main motion of the machine. During drilling and milling processing, spindle movement along with its axis is a feed motion. Worktable, its bracket and spindle box 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.

Vertical motor 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 double 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.

Up and down movement of the worktable, its bracket and spindle box is completed by manual, Adjustment for the required distance of cutter and work piece could also be made by manual.

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

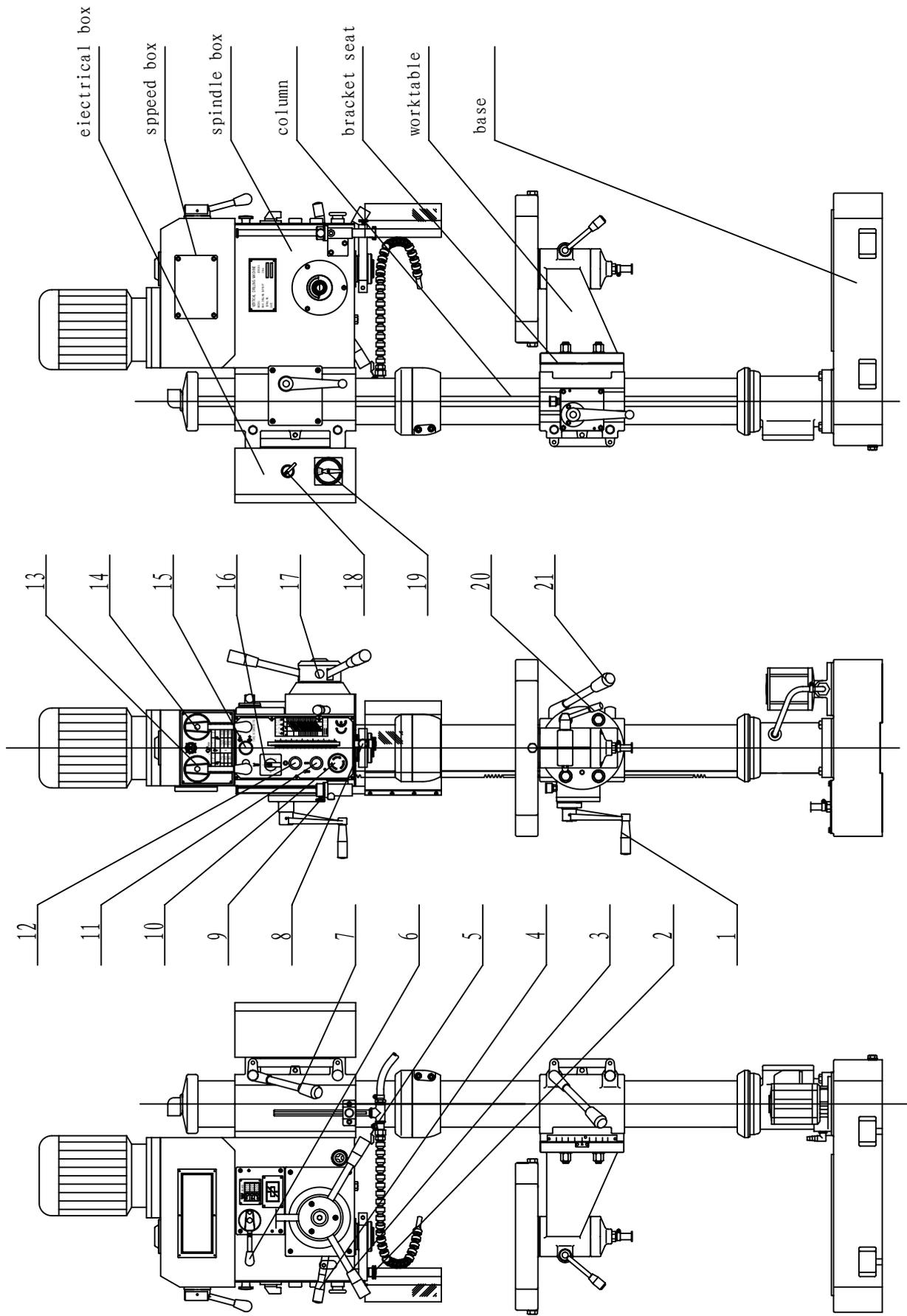
For the gear, worm and worm shaft, rack and pinion etc, please see table 1.

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.

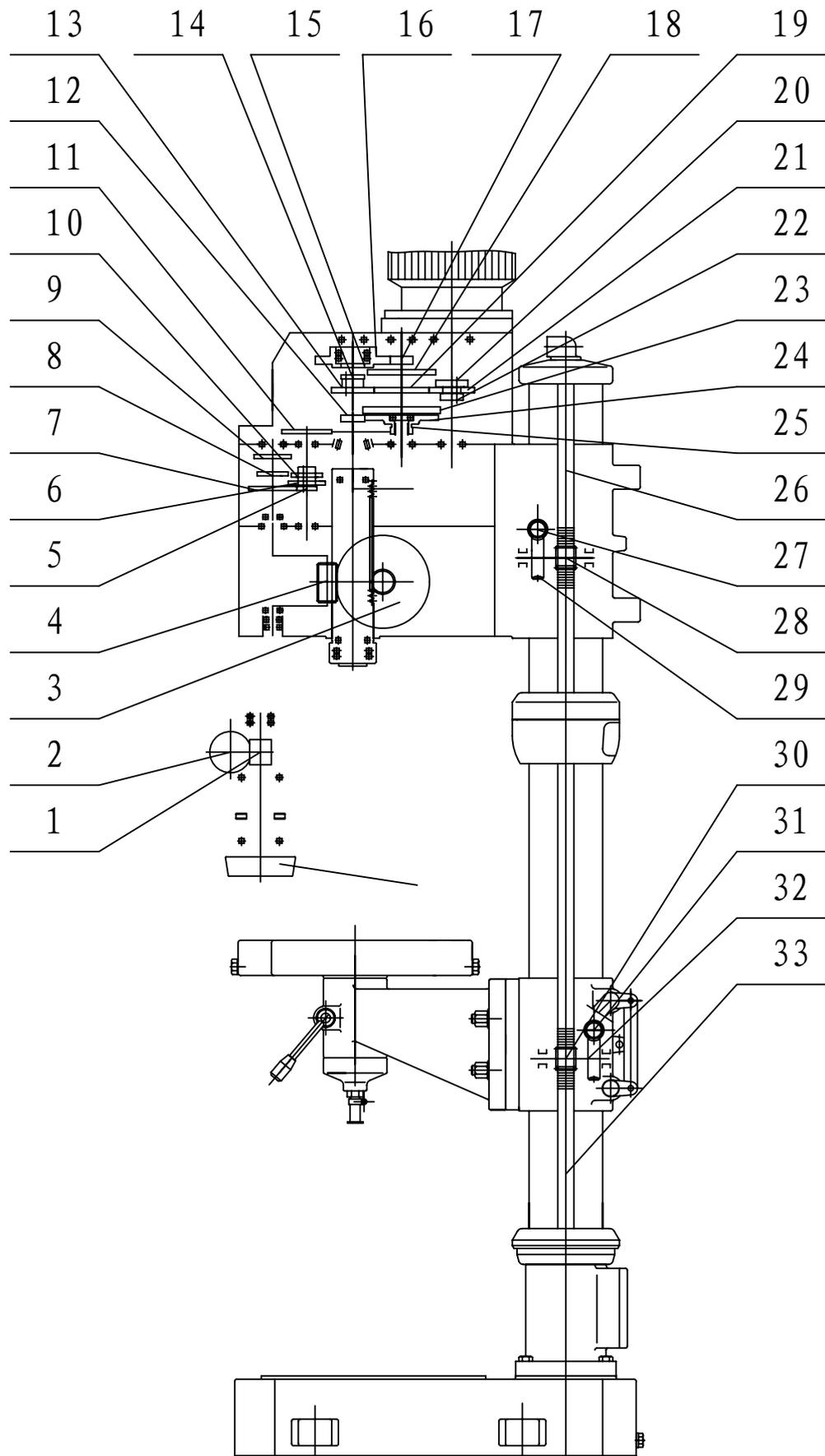
4. Electrical system

4.1 Brief description

The machine is suitable for the power supply for 400V/50HZ 3 phase. Special voltage with 60HZ could also be available as per the requirements of the end user.



drawing 1. picture of appearance of machine



drawing 2 .picture of transmission

4.1 list of gear, worm wheel, worm and rack

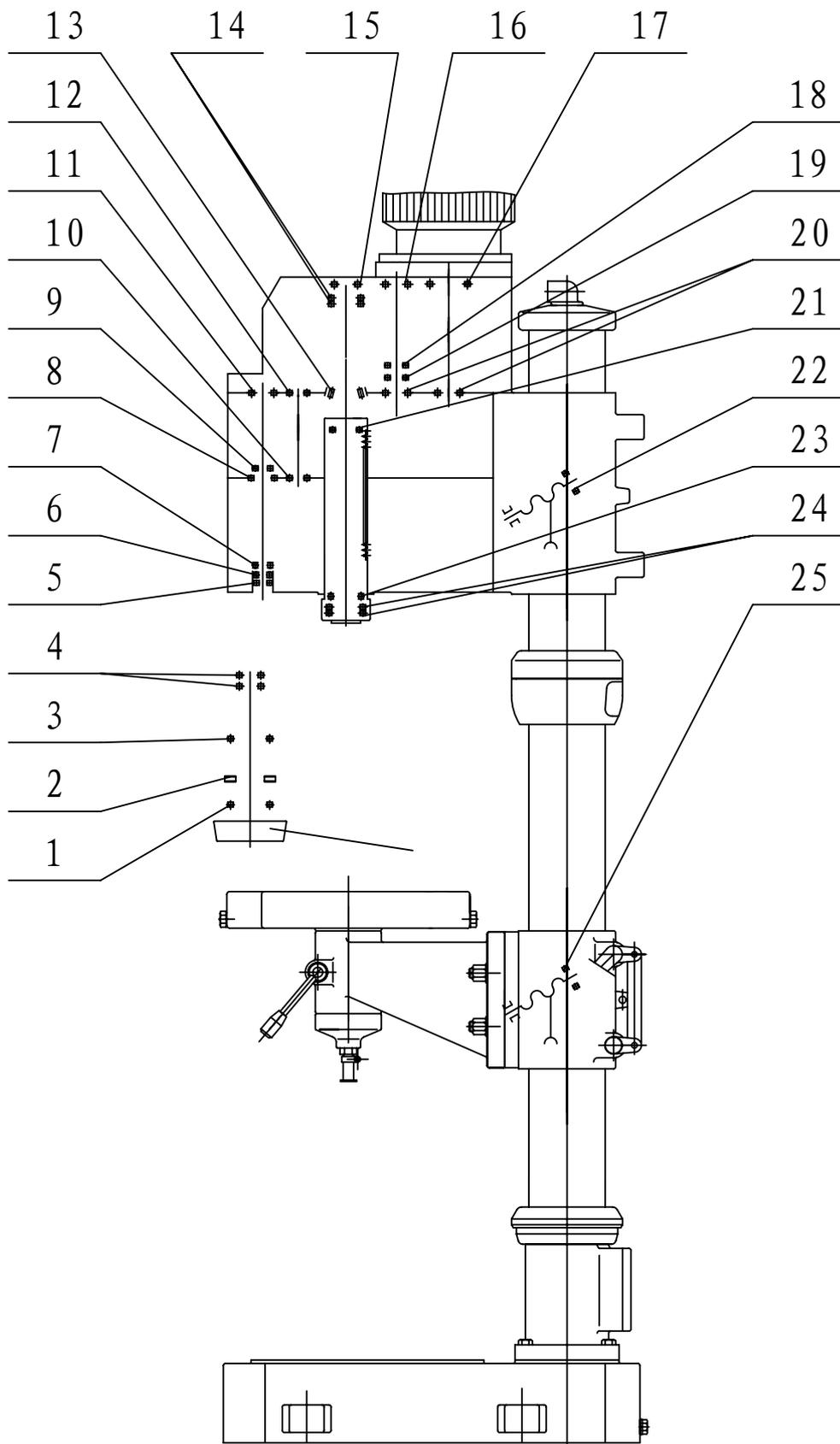
table (1)

Number on the drawing	1	2	3	4	5	6	7	8
Part drawing NO.	32007/Z S5030B	32003/Z S5025A	31003/Z S5030B	32023/Z S5030A	32004/Z S5030A	32010/Z S5030A	32016/Z S5030A	32015/Z S5030A
Number of teeth and starts	13	22	60	1	20	37	48	31
Module	2.5	2.5	2	2	1.5	1.5	1.5	1.5
Direction of helical angle			Left	Left				
Class of Accuracy	8-7-7	8	8	9	8	8	8	8
Material	40Cr	40Cr	QT400	45	45	45	45	45
Heat treatment and hardness	G42	HV500		T235	G42	G42	G42	G42
Number on the drawing	9	10	11	12	13	14	15	16
Part drawing NO.	32014/Z S5030A	32009/Z S5030A	32008/Z S5030A	32005/Z S5030A	32006 /ZS5030	32006 /ZS5030	32008 /ZS5030	32008 /ZS5030
Number of teeth and starts	37	31	50	18	32	35	35	56
Module	1.5	1.5	1.5	2	2	1	1	2
Direction of helical angle								
Class of Accuracy	8	8	8	8	7-6-6	9	9	7-6-6
Material	45	45	45	45	40Cr	40Cr	40Cr	40Cr
Heat treatment and hardness	G42	G42	G42	G52	G52	G52	G42	G52

4.1 list of gear, worm wheel, worm and rack

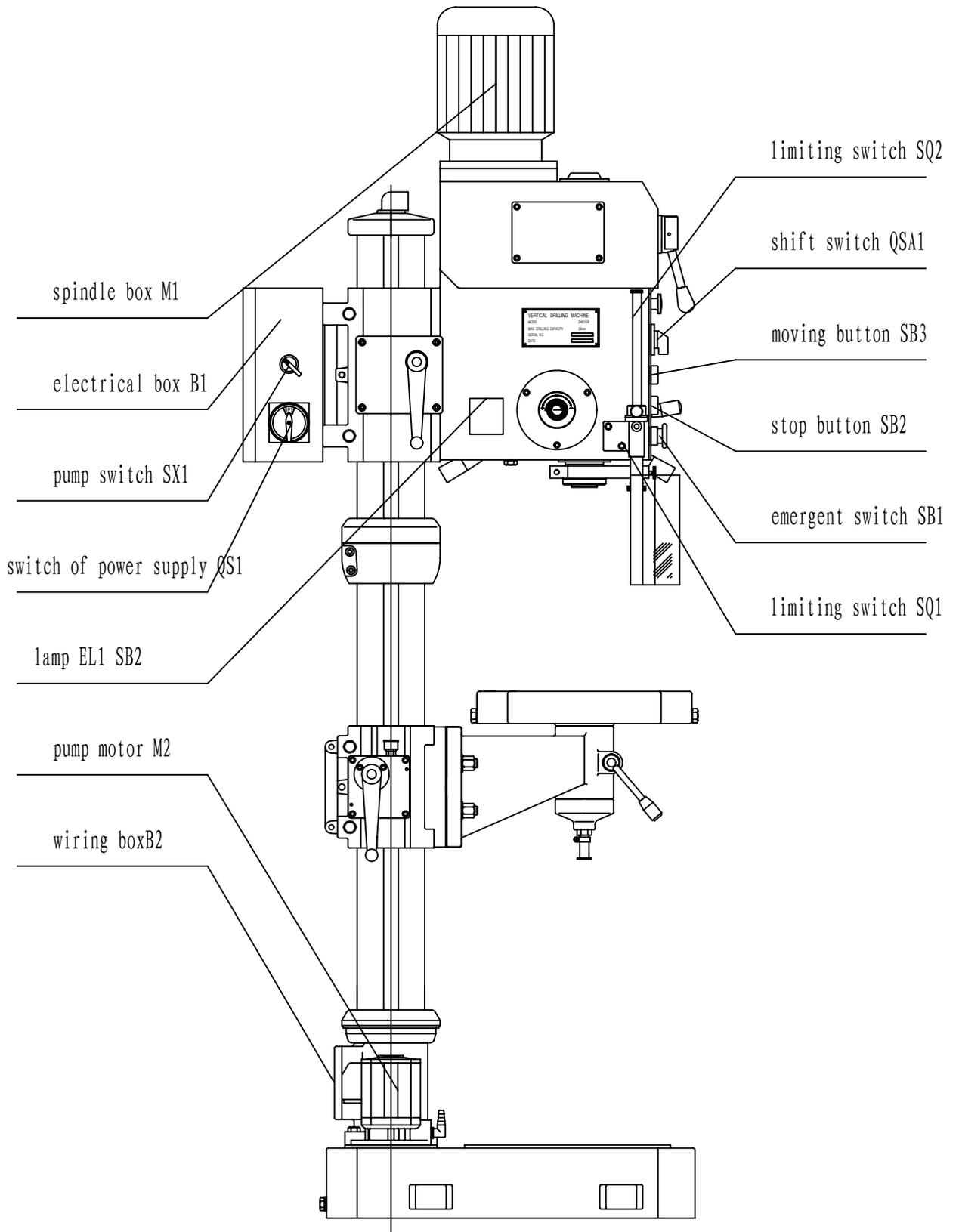
table (1)

Number on the drawing	17	18	19	20	21	22	23	24	
Part drawing NO.	32009 /ZS5030	32010 /ZS5030	32014 /ZS5030	32011A /ZS5030	32012A /ZS5030	32013A /ZS5030	32016 /ZS5030	32002/Z S5030A	
Number of teeth and starts	17	51	41	24	34	17	58	55	
Module	2	2	2	2	2	2	2	2	
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	8	
Material	40Cr	40Cr	40Cr	40Cr	40Cr	40Cr	40Cr	40Cr	
Heat treatment and hardness	G52	G52	G52	G52	G52	G52	G52	C48	
Number on the drawing	25	26	27	28	29	30	31	32	33
Part drawing NO.	32002/Z S5030A	12001/Z S5025A	32001/ ZS5032	32002/ ZS5032	31005/ ZS5032	12005/ ZS5025	12014/ ZS5030	12006/ ZS5025	12003/Z S5025A
Number of teeth and starts	22	26	1	12	30	15	1	28	66
Module	1.5	2.5	2	2.5	2	2.5	1.5	1.5	2.5
Direction of helical angle							Left	Left	
Class of Accuracy	8	9	9	9	9	9	9	9	9
Material	40Cr	45	45	45	HT200	45	45	45	45
Heat treatment and hardness	C48	T235		T235		T235	C42	T235	T235



drawing 3 . picture of roll bearing

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Roller bearing table					
Table (2)					
No.	Model	Name	Specification	Q'ty	Accuracy
1	180108K; GB276	Deep racing ball bearing	40×68×15	1	
2	AS3552; GB/T4605	Roller bearing	35×52×1	2	
	AXK3552; GB/T4605		35×52×2	1	
3	1180909K; GB276	Deep racing ball bearing	45×68×12	1	
4	36104; GB292	Thrust bearing	20×42×12	2	
5	101; GB276	Deep racing ball bearing	12×28×8	1	
6	8101; GB301	Thrust bearing	12×26×9	1	
7	8102; GB301	Thrust bearing	15×28×9	1	
8	1000905; GB276	Deep racing ball bearing	25×42×9	1	
9	61902; GB/T 276	Deep racing ball bearing	15×28×7	1	
10	50202; GB277	Deep racing ball bearing with stop moving racing outside	15×35×11	1	
11	302; GB276	Deep racing ball bearing	15×42×13	1	
12	202; GB276	Deep racing ball bearing	15×35×11	1	
13	2007106; GB297	Taper roller bearing	30×55×17	1	
14	7000106; GB276	Deep racing ball bearing	30×55×9	2	
15	50204; GB277	Deep racing ball bearing with stop moving racing outside	20×47×14	1	
16	303; GB276	Deep racing ball bearing	17×47×14	1	
17	108; GB276	Deep racing ball bearing	40×68×15	1	
18	7000103; GB276	Deep racing ball bearing	17×35×8	1	
19	1000803; GB276	Deep racing ball bearing	17×26×5	1	
20	50303; GB277	Deep racing ball bearing with stop moving racing outside	17×47×14	2	
21	D1000906; GB276	Deep racing ball bearing	30×47×9	1	D
22	8103; GB301	Thrust bearing	17×30×9	1	
23	8107; GB301	Thrust bearing	35×52×12	1	
24	D7000107; GB276	Deep racing ball bearing	35×62×9	2	D
25	8103; GB301	Thrust bearing	17×30×9	1	



drawing 4. picture of element of machine

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total power supply	Total switch	spindle box	coolant pump	total direction	lamp	spindle control																																																																																																		
explanation of parts																																																																																																								
<p>3 φ AC400V 50Hz</p> <p>advise 10A</p> <p>equipment dividing line</p> <p>1.5mm²</p> <p>0.75mm²</p> <p>M1 0.85/1.1kW</p> <p>M2 0.18kW</p> <p>HL1</p> <p>EL1</p> <p>KM1</p> <p>SB3</p> <p>SB2</p> <p>SB1</p> <p>SQ2</p> <p>SQ1</p> <p>QSA1</p> <p>QSA1</p> <p>U1 V1 W1</p> <p>U2 V2 W2</p> <p>U3 V3 W3</p> <p>U4 V4 W4</p> <p>U5 V5 W5</p> <p>U6 V6 W6</p> <p>FU1 (3A)</p> <p>FU2 (3A)</p> <p>FU3 (3A)</p> <p>FU4 (3A)</p> <p>T1</p> <p>AC24V</p> <p>1.5mm²</p> <p>1.5mm²</p>																																																																																																								
<p>6LBB-20/V1710.7opening and close of contact</p> <p>6LBB-20A picture of connection</p> <table border="1"> <thead> <tr> <th>Handle Position</th> <th>R</th> <th>0</th> <th>1</th> <th>2</th> <th>0</th> <th>R</th> </tr> <tr> <th>Contact Code</th> <th>135°</th> <th>90°</th> <th>45°</th> <th>0°</th> <th>45°</th> <th>90° 135°</th> </tr> </thead> <tbody> <tr> <td>1-2</td> <td>×</td> <td></td> <td>×</td> <td></td> <td></td> <td></td> </tr> <tr> <td>3-4</td> <td></td> <td></td> <td></td> <td>×</td> <td></td> <td>×</td> </tr> <tr> <td>5-6</td> <td>×</td> <td></td> <td>×</td> <td></td> <td></td> <td></td> </tr> <tr> <td>7-8</td> <td></td> <td></td> <td></td> <td>×</td> <td></td> <td>×</td> </tr> <tr> <td>9-10</td> <td></td> <td></td> <td></td> <td>×</td> <td></td> <td>×</td> </tr> <tr> <td>11-12</td> <td>×</td> <td></td> <td>×</td> <td></td> <td></td> <td></td> </tr> <tr> <td>13-14</td> <td></td> <td></td> <td></td> <td>×</td> <td></td> <td>×</td> </tr> <tr> <td>15-16</td> <td></td> <td></td> <td></td> <td>×</td> <td></td> <td>×</td> </tr> <tr> <td>17-18</td> <td></td> <td></td> <td>×</td> <td></td> <td></td> <td></td> </tr> <tr> <td>19-20</td> <td>×</td> <td></td> <td></td> <td></td> <td></td> <td>×</td> </tr> <tr> <td>21-22</td> <td>×</td> <td></td> <td></td> <td></td> <td></td> <td>×</td> </tr> <tr> <td>23-24</td> <td></td> <td></td> <td>×</td> <td></td> <td></td> <td>×</td> </tr> </tbody> </table> <p>switch have connected, inside connecting: 1-3, 5-7, 9-11, 14-16, 18-20, 22-24. outside connecting: 17-21, 19-23, 2-13, 3-20, 6-14, 7-24, 12-15.</p>							Handle Position	R	0	1	2	0	R	Contact Code	135°	90°	45°	0°	45°	90° 135°	1-2	×		×				3-4				×		×	5-6	×		×				7-8				×		×	9-10				×		×	11-12	×		×				13-14				×		×	15-16				×		×	17-18			×				19-20	×					×	21-22	×					×	23-24			×			×
Handle Position	R	0	1	2	0	R																																																																																																		
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<p>Attention: The diameter of the line without indicating is 0.75mm .</p>																																																																																																								

drawing 5. picture of electrical elements

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Electric components list:

Table (3)

Code of elements	Name	Specification	Q'ty	Remark
QS1	Instruction switch	JCH13-20	1	
QF1	Breaker	DZ108-2.5/4A	1	
QSA1	Convertiblewitch	3LBB-20,V1710.7	1	
KM1	Connector	AS12-30-01-20(AC24V)	1	
SB1	Emergency stop button	MPMT3-10R	1	
		MCBH-00	1	
		MCB-01	1	
SB2	Push button	CP1-10R-01	1	
SB3	Push button	CP1-10G-10	1	
SX1,	Selection switch	LA42XL2-30/B	1	
SQ1	Micro switch	E62-10A	1	
SQ2	Micro switch	LXW16-16/61C	1	
HL1	Signal lamp	AD17-16 AC24V	1	
T1	transformer	JBK6-63TH 400/24	1	
EL1	Lamp	25W ,AC24V	1	
FU1-3	Fuse seat	RT18-32A/3	3	
FU1-3	Fuse	3A (match fuse seat)	3	

4.2 Explanation of the circuit(refer to drawing4、 5)

The spindle of the machine is moving by two-speed motor, it is controled by switch(QSA1) AC contactors(KM1) and so on.

When using the machine, the breaker QF1, fuse FU1,FU2,FU3 which is in the electrical box must be put on, when examining and repairing, it could be put off. The spindle motor and pump motor use breaker and fuses for his protection, and the switch features overload protection, short cut protection and phase break protection. Press the main power switch QS1,the electrical source HL1 light up, it is working now,contrary,work is stopped.

4.3 Machine operation

Put the switch(QSA) at the position which is required (“1” main motor 1440 r/min.”2”main Motor 2880 r/min, “R” the reversion of main motor, “0” machine is stopped).Press the The button SB3,it is working normally. When put the switch (QSA) at “R”,the main motor Stop working.

4.4 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.

4.5 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 .

4.6 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 in order to keep machine works well.

Warning: when the machine connect the electrical source line at beginning, the Switch (QSA1) should be push at “1” or “2” position, then press the button, make the spindle rotate clockwise, otherwise, it will destroy the parts of machine.

5. Lubrication and coolant system:

5.1 There are two types of lubrication in this machine:

- a. Grease
- b. Lubrication by manual filled oil

5.2 Gears in the spindle box are lubricated by grease, it uses NO.3 Lithium industrial grease, for the new machine, washing and grease replacement after six months running. Later, washing and grease replacement once a year is required, in the Feed box, gears are also lubricated by grease of NO.3 industrial Lithium, worm wheel is lubricated by thin grease, oil tool must be inside of the bottom of the spindle box, and it needs to be exchanged once every six months, the machine has oil fill holes, oil lever and oil release hole (bottom side of the base), oil lever 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.

5.3 The machine needs manual oil fill lubrication.

Manual oil fill lubrication place, see diagram (6)

5.4 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:

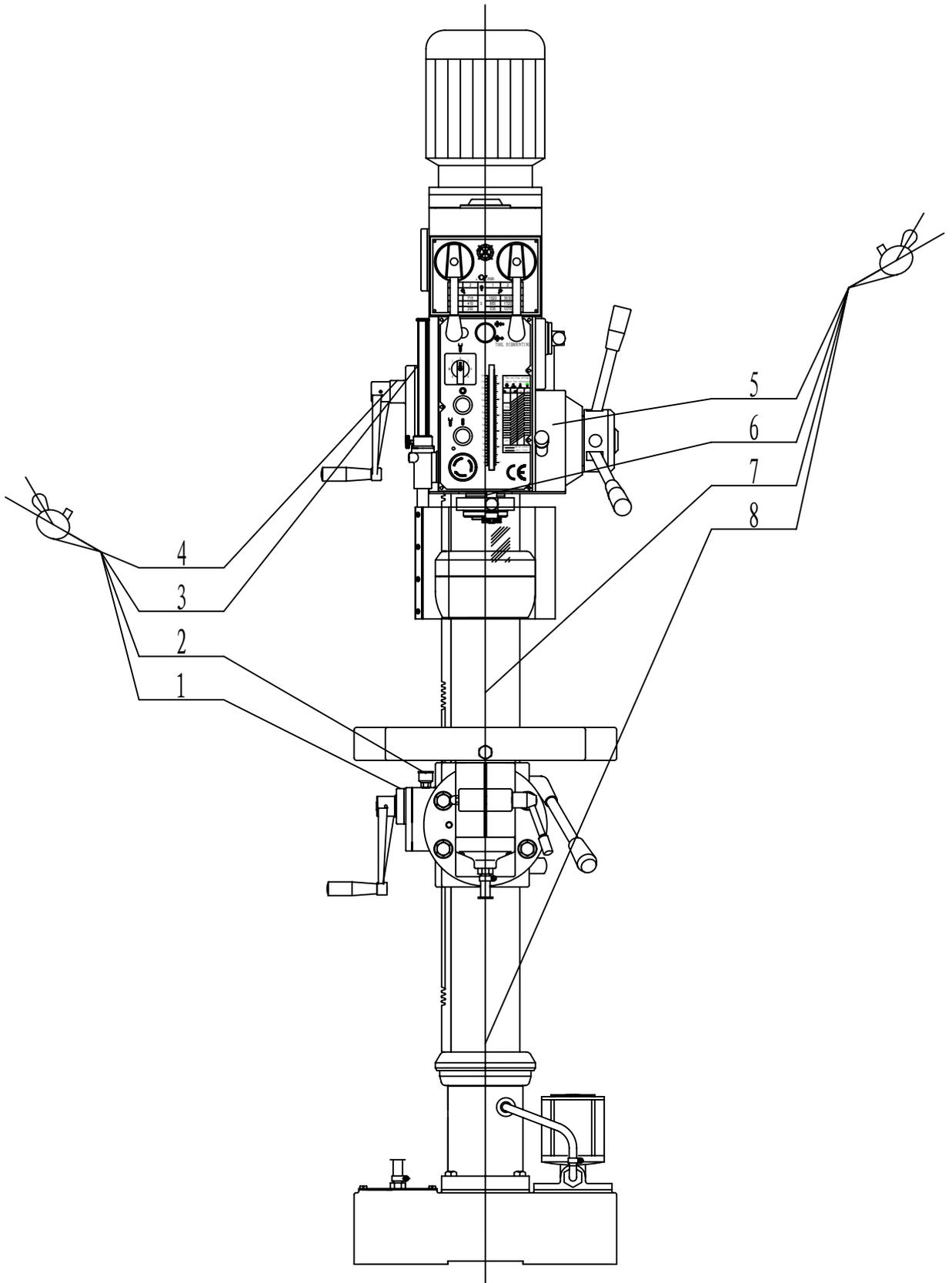
6.1 Hoisting:

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).

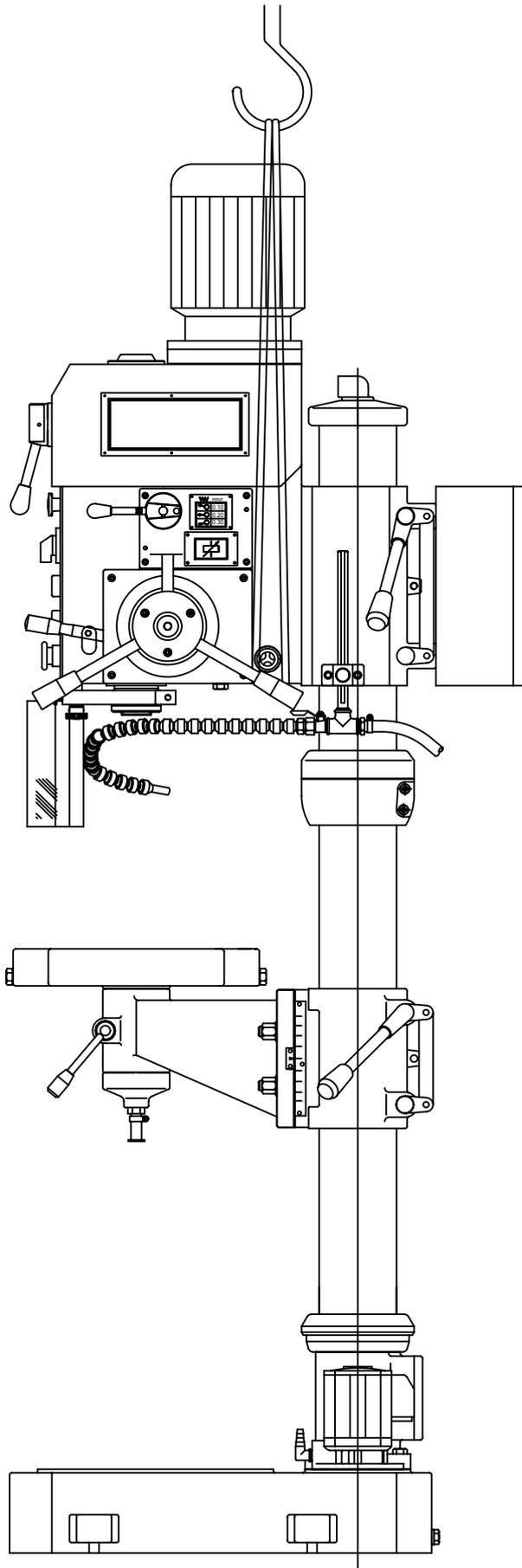
The crate must not be reversed or inclined and must not be strongly stroked when lift up the machine.

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.

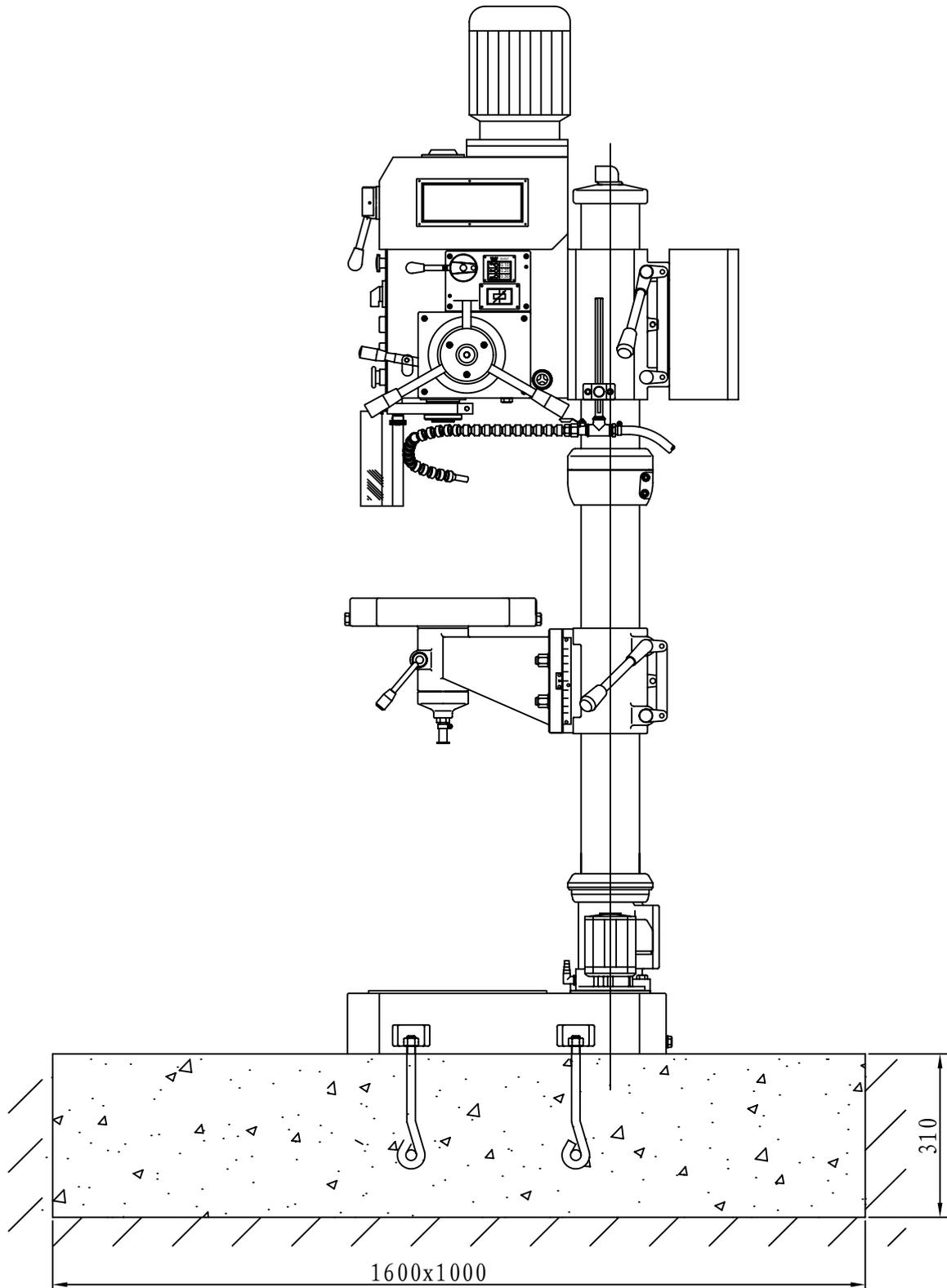
Please refer to the diagram 7 for the machine lifting. A soft pad between machine and wire cable is necessary in order to avoid paint damage of the machine. Lifting must be slow at beginning to see if the gravity center is correct.



drawing 6 . picture of lubrication



drawing 7. picture of hoisting



drawing 8. foundation of installation of machine

6.2 Installation:

Working area of the machine shall be the size when the spindle box rounds its column in one cycle. Its diameter is about $\varnothing 2000\text{mm}$. 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 0.04/1000 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.

6.3 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:

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

7.2 Mounting and dismounting of tool cutters:

The machine equipped with a tool dismounting device to be controlled by a nob (15). Push forward the nob (15) to the spindle box direction when tool mounting is required. As for dismounting tool cutters, pull out the nob (15), hold the tool cutter by left hand, meanwhile, turn the feed lever (3) 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.

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.

Warning: The nob (15) 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 (13) and (14) located in the front of the spindle box. Relations between spindle speed revolution and levers position is indicated at the speed change label.

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 (6) in the upper right side position of the spindle box.

7.4 Selection and operation of the spindle feed:

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

Manual feed: At the right side of the spindle box, there are three feed levers (3) with two positions, push one of any three feed levers to the left side position and turn it, The spindle will move down if turned the lever in counter clockwise direction. The spindle will move up if turned the lever in clockwise direction

Auto feed: Push the feed lever (3) to the right side position, the lever (4) will be automatically lift up, spindle auto feed could be realized as per your prior feed selection. Suppose you want to stop the feed, you could simply push down the lever (4) until a click sound is heard, then the lever (3) will be returned to the left side position automatically and feed of spindle stopped.

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 (8) by turning nob (2), moving the scale to the required depth, then fastening the knurled screw(8). Now the machining depth could be controlled.

7.6 Tapping

Turn the feed lever (3) and let the tap approaches the work piece (The lever should be in the left manual feed position. The knurled nob (17) should be pushed into the lock position in order to prevent unexpected engagement with auto feed) 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. Promptly turn the feed lever(16) in counter clockwise direction, in order to let the tap comes out..

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 warm 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 5000N, Over feed resisting force will cause un-safety, be sure to lock it by screw bolt or nut after adjustment.

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. Otherwise transmission parts and bearings will be damaged.
- 9.3 Max. spindle torque of this machine is 70 Nm. Max. feed resisting force in the driving system is 5000 N. 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 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.
- 9.8 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.

Vertical Drilling Machine

Model: ZN5030B

Certificate of Inspection

Max. Drilling Diameter: 30mm

Series Number:

We certified that the machine has been inspected and all items of the machine are in conformity With Q/320684FNC01-2006 standard. Delivery is permitted.

Director of the company:

Date:

Director of quality inspection department:

Date:

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	

Precision Inspection Record

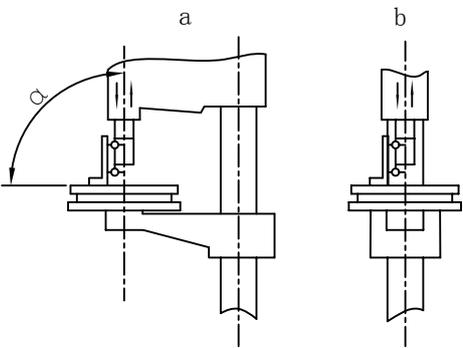
Geometrical Precision Test:

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* (a ≤ 90°) b) 0.06/300*	
G6	Perpendicularity of the spindle axis to Base plate table surface		a) 0.10/300* (a ≤ 90°) b) 0.10/300*	

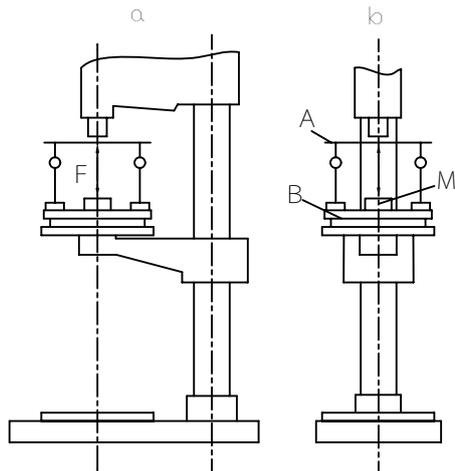
Distance between two contacts of indicator probe

Precision Inspection Record

Geometrical 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 Accuracy:

P1	The change of Perpendicularity of spindle axis to work table surface under the axial force.		F=5000N 2/1000	
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Vertical Drilling Machine

Model: ZN5030B

Packing list

Max. Drilling Diameter: 30mm

Series Number:

Packing list	Total	1
	page	1

Case No.: 1/1

Dimension (L ×W × H): × × **CM**

Gross weight:

Net weight:

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	3-2: JB3477	1 piece	
		3-1: JB3477	1 piece	
5	Taper wedge for shank	Wedge 1: JB3482	1 piece	
6	Double end wrench	21x24; GB4388	1 piece	
7	Fuse	Ø5×20 3A	2 pieces	
8	Operation manual		1 piece	
	Quality certificate		1 piece	
	Packing list		1 piece	

Inspector of the packing:

Date:

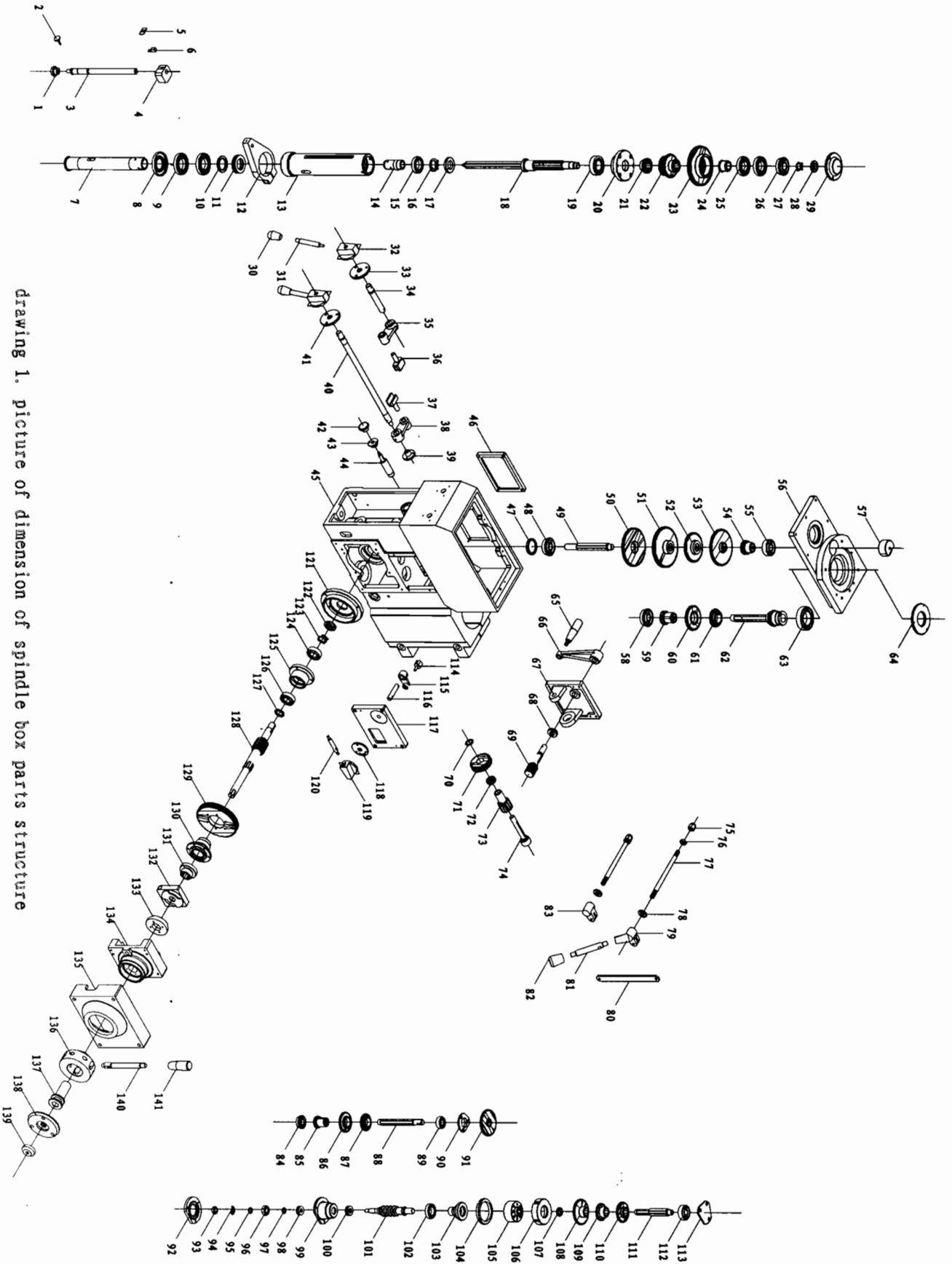
Vertical Drilling Machine

Model: ZN5030B

Ancillary page of Operation Manual

Max. Drilling Diameter: 30mm

Series Number:



drawing 1. picture of dimension of spindle box parts structure

Contrast for the parts number of ZN5030B spindle box and its three dimensions sketch.

No.	Parts number	Name of the parts	Q'ty	Remarks
1	32001/ZS5030	Knurled knob	1	
2	32002/ZS5030	Knurled screw bolt	1	
3	32001/ZS5025A	Scaled bolt	1	
4	31002/ZS5025A	Scaled nut	1	
5	35001/ZS5030	Scaled indicator sheet	1	
6	32004/ZS5030	Support for the indicator	1	
7	32002/ZS5025A	Main spindle	1	
8	32003/ZS5025	Bearing cover	1	
9	D7000107; GB276	Bearing	2	
10	32004/ZS5025	Washer	1	
11	8107; GB301	Bearing	1	
12	31002/ZS5025	Scale clamper	1	
13	32003/ZS5025A	Spindle quill	1	
14	32040/ZS5030	Spline sleeve	1	
15	D1000906; GB276	Bearing	1	
16	32042/ZS5030	Washer	1	
17	32043/ZS5030	Nut	1	
18	32004/ZS5025A	Transmission shaft	1	
19	2007106; GB297	Bearing	1	
20	32046/ZS5030	Bearing seat	1	
21	32005/ZS5030A	Feed gear	1	
22	32006/ZS5030	Gear	1	
23	32008/ZS5030	Gear	1	
24	32007/ZS5030	Bushing	1	
25	7000106; GB276	Bearing	2	
26	50204; GB277	Bearing	1	
27	18; GB858	Washer	1	
28	M18X1.5; GB812	Nut	1	
29	31004/ZS5030	Cover	1	
30	1.222/40-M8; 21101	Knob	2	
31	32032/ZS5030	Lever	2	
32	32031/ZS5030	Lever seat	2	
33	32028/ZS5030	Positioning Washer	1	
34	32029/ZS5030	Short fork shaft	1	
35	31013/ZS5030	Lever	1	
36	34007/ZS5030	Front fork	1	

Contrast for the parts number of ZN5030B spindle box and its three dimensions sketch.

No.	Parts number	Name of the parts	Q'ty	Remarks
37	34008/ZS5030	Rear fork	1	
38	31013/ZS5030	Lever	1	
39	31014/ZS5030	Shaft sleeve	1	
40	32033/ZS5030	Long fork shaft	1	
41	32030/ZS5030	Positioning Washer	1	
42	M8X32; GB4141.27	Knurled handle	1	
43	32045/ ZS5030	Bushing	1	
44	32044/ ZS5030	Positioning shaft	1	
45	31001/ZS5025A	Spindle box	1	
46	31012/ZS5030	Cover	1	
47	31008/ ZS5030	Cover	2	
48	50303; GB277	Bearing	1	
49	32018/ZS5030	Spline shaft	1	
50	32002/ ZS5030A	Feed gear	1	
51	32016/ ZS5030	Gear	1	
52	32014/ ZS5030	Gear	1	
53	32010/ ZS5030	Gear	1	
54	32009/ ZS5030	Gear	1	
55	303; GB276	Bearing	1	
56	31007/ ZS5030	Cover	1	
57	31005/ ZS5030	Bearing cover	1	
58	50303; GB277	Bearing	1	
59	32013/ ZS5030	Gear	1	
60	32012/ ZS5030	Gear	1	
61	32011/ ZS5030	Gear	1	
62	32015/ZS5030	Spline shaft	1	
63	108; GB276	Bearing	1	
64	31006/ZS5030	Bearing cover	1	
65	M10X80;GB4141.5	Hand quill for turning	1	
66	11014/ZS5030	Up and down handle for bracket	1	
67	31004/ZS5032	Up and down seat	1	
68	8103;GB301	Thrusting bearing	1	
69	32001/ZS5032	Up and down worm wheel	1	
70	12019/ZS5030	Washer	1	
71	31005/ZS5032	Up and down worm wheel for spindle box	1	
72	31006/ ZS5032	Sleeve	1	

Contrast for the parts number of ZN5030B spindle box and its three dimensions sketch.

No.	Parts number	Name of the parts	Q'ty	Remarks
73	32002/ZS5032	Gear	1	
74	32003/ZS5032	Shaft	1	
75	M12;GB923	Cover type nut	2	
76	M12;GB6172	Thin nut	2	
77	32004/ZS5032	Double end bolt	2	
78	12013/ZS5030	Washer	2	
79	31004/ZS5025A	Connecting lever for hand seat	1	
80	32005/ZS5032	Connecting block bracket	1	
81	M12x80;GB4141.15	Hand lever	1	
82	M12x40;GB4141.12	Lever quill	1	
83	11010/ZS5030	Nut for clamping board	1	
84	50202;GB277	Bearing	1	
85	32004/ZS5030A	Feed gear	1	
86	32010/ZS5030A	Feed gear	1	
87	32009/ZS5030A	Feed gear	1	
88	32005/ZS5025A	Spline shaft(III)	1	
89	202;GB276	Bearing	1	
90	32007/ZS5030A	Bearing cover	1	
91	32008/ZS5030A	Feed gear	1	
92	32027/ZS5030A	Cover	1	
93	M10x1;GB812	Nut	1	
94	10;GB858	Washer	1	
95	32025/ZS5030A	Washer	1	
96	101;GB276	Bearing	1	
97	32024/ZS5030A	Washer	1	
98	8101;GB301	Bearing	1	
99	32026/ZS5030A	Bearing seat	1	
100	8102;GB301	Bearing	1	
101	32023/ZS5030A	Worm shaft	1	
102	1000905;GB276	Bearing	1	
103	32022/ZS5030A	Clutch seat	1	
104	32021/ZS5030A	Nut	1	
105	32018/ZS5030A	Overload protection sleeve	1	
106	32020/ZS5030A	Nut	1	
107	32017/ZS5030A	Washer for adjusting	1	
108	32016/ZS5030A	Feed gear	1	

Contrast for the parts number of ZN5030B spindle box and its three dimensions sketch.

No.	Parts number	Name of the parts	Q'ty	Remarks
109	32015/ZS5030A	Feed gear	1	
110	32014/ZS5030A	Feed gear	1	
111	32006/ZS5025A	Spline shaft(IV)	1	
112	302;GB276	Bearing	1	
113	32011/ZS5030A	Bearing cover	1	
114	34008/ZS5030A	Fork	1	
115	31006/ZS5030A	Connection block	1	
116	32037/ZS5030A	Shaft	1	
117	31003/ZS5025A	Side cover	1	
118	32035/ZS5030A	Positioning board	1	
119	32036/ZS5030A	Lever seat	1	
120	32038/ZS5030A	Hand lever	1	
121	31011/ZS5030	Spring box cover	1	
122	M20x1.5;GB812	Nut	1	
123	20;GB858	Washer	1	
124	36104;GB292	Bearing	1	
125	32006/ZS5030B	Bearing cover	1	
126	36104;GB292	Bearing	1	
127	32005/ZS5030B	Washer	1	
128	32007/ZS5030B	Cross shaft	1	
129	31013/ZS5030B	Worm shaft	1	
130	32004/ZS5030B	Connector	1	
131	32008/ZS5030B	Gear cover	1	
132	32009/ZS5030B	Moving block	1	
133	32010/ZS5030B	Fixed convex surface	1	
134	31004/ZS5030B	Cross shaft support	1	
135	31006/ZS5030B	Side cover	1	
136	31005/ZS5030B	Lever seat	1	
137	32012/ZS5030B	Moving sleeve	1	
138	32014/ZS5030B	Lever seat cover	1	
139	32013/ZS5030B	Cover	1	
140	32011/ZS5030B	Lever	3	
141	35002/ZS5030	Knob	3	

Contrast for the parts number of ZN5030B column and bracket and its three dimension sketch.

No.	Parts number	Name of the parts	Q'ty	Remarks
1	11001/ZS5025	Base	1	
2	12002/ZS5025	Cover	1	
3	12008/ZS5030	Cover board	1	
4	11008/ZS5025	Cover	1	
5	11003/ZS5025A	Column	1	
6	12003/ZS5025A	Up and down rack for worktable and its bracket	1	
7	12001/ZS5025A	Up and down rack for spindle box	1	
8	11002/ ZS5025	Thrusting sleeve	1	
9	11003/ ZS5025	Stop ring (below)	1	
10	11008/ ZS5025	Up and down device	1	
11	11001/ ZS5025A	Clamping ring	1	
12	12002/ZS5025A	Rolling ring	1	
13	11002/ ZS5025A	Stop ring(above)	1	
14	11004/ ZS5025A	Coping of column	1	
15	11005/ ZS5025A	Elbow bend	1	
16	12010/ ZS5030	Positioning shaft	1	
17	12005/ ZS5030	T type screw bolt	4	
18	11005/ZS5025	Device for bracket	1	
19	11004/ZS5025	Rind	1	
20	11009/ZS5025	Worktable tray	1	
21	M8; GB923	Cover type nut	1	
22	12001/ZS5025	Double end bolt	1	
23	M12x25;GB4141.16	Lever seat	1	
24	M8x65;GB4141.15	Hand lever	1	
25	M8x40;GB4141.14	Long hand quill	1	
26	12019/ZS5030	Washer	1	
27	12005/ZS5025	Gear	1	
28	12006/ ZS5025	Tilted gear	1	
29	12018/ZS5030	Shaft	1	
30	M10x80;GB4141.5	Lever for turning	1	
31	11014/ZS5030	Lever for bracket	1	
32	11016/ZS5030	Flange	1	
33	11011/ZS5025	Up and down for side cover	1	
34	8103;GB301	Thrusting bearing	1	
35	12014/ZS5030	Warm shaft	1	
36	M12;GB923	Cover type nut	2	

