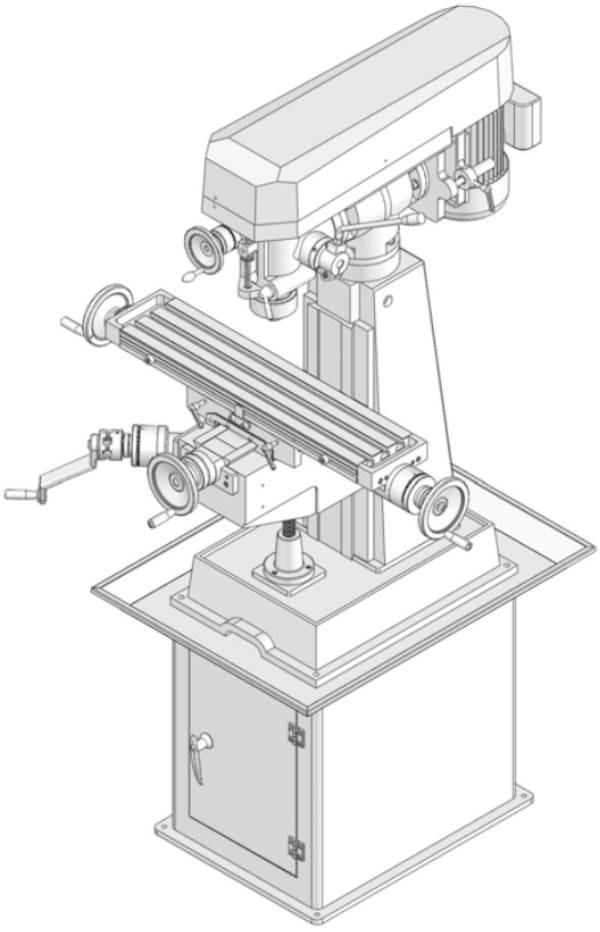
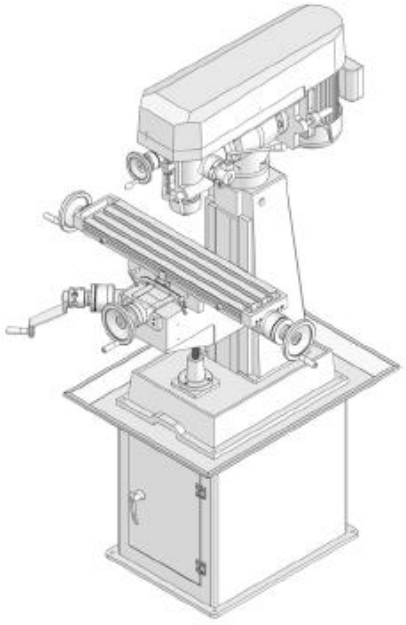
X28 立式铣床
VERTICAL MILLING MACHINE



使用手册
Operation Manual

呲铁机械有限公司
Citie Machinery Co., Ltd.

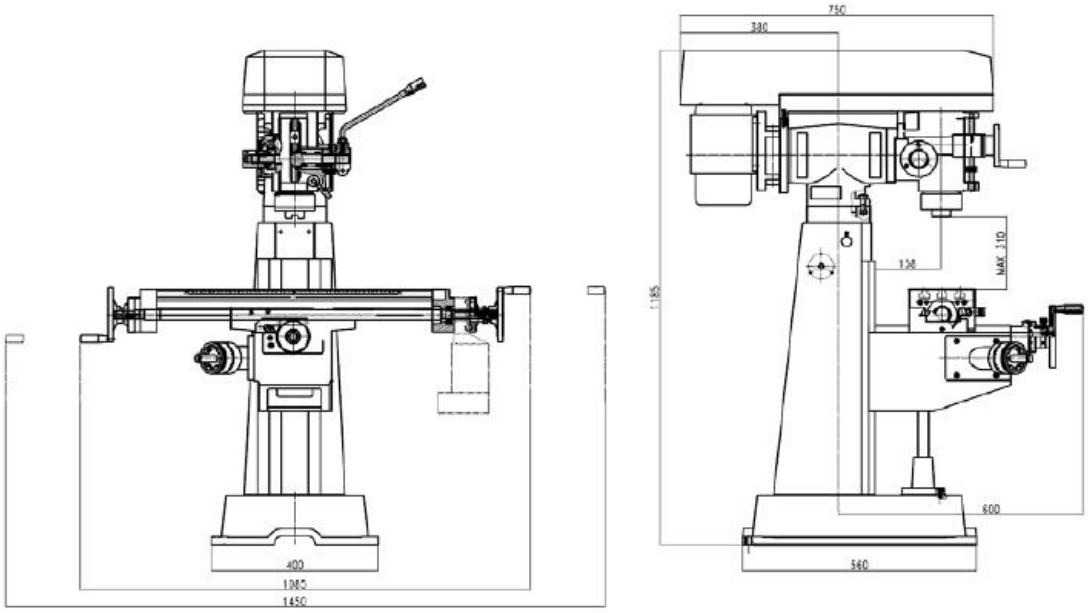
仔细阅读本手册
在任何维修顺序中都必须提供机器的出厂编号
确保及时和准确服务的零件
按编号、描述和机器编号订购维修零件



参数

工作台	660×156mm
纵向行程	350mm
横向行程	160mm
工作台 Z 轴行程	280mm
主轴套筒行程	80mm
主轴与工作台的最大距离	310mm
主轴锥度	MT3
垂直头部倾斜角度(左/右)	±45°
铣头绕立柱旋转	360°
主轴转速(2)	100-600/425-2500rpm
电机功率	1.5KW
净重≈	330KG
毛重≈	375KG

参考尺寸：



特点:

1、本机型为小型立式铣床。操作简便，双表手轮，操作方便。

2、非常实用，适用于技校、小零件生产、工具室、研发工作、维修车间甚至业余爱好使用。

3、本机适用于铣削、铣角、雕刻、钻孔、齿轮镗孔等多种操作。

4、所有“方式”均采用手工刮拭，以保证轴承和对准。这张桌子被磨成完全的正方形。

5、铸件为高强度材料。在正火和回火之前，它们要经过几个月的老化，以减小变形。

注意！

1、小心拆下保护性的板条箱和木箱，在运输过程中如有损坏，请与我方代表和运输公司联系。

2、机器出厂前由 qc 人员仔细检查和测试运行情况。如果在交货时发现任何缺陷，请直接写信给我们。

3、阅读目录，熟悉图纸上的零件位置，这样更容易理解本操作手册。

Ⅰ安装:

为了使机器安装在坚实的混凝土基础上，建议在混凝土中涂抹一点灌浆来修补任何不平整的地方，以便在所有点上获得坚实的基础。

当将机器安装在有任何表面不规则的地板上时，应使用垫片来最大限度地纠正这种情况。

Ⅱ润滑油:

用汽油或煤油彻底清洗机器，然后用 S.A.E.# 10 润滑油润滑所有的滑轨，用 S.A.E.#30 润滑油润滑齿轮。开机前一定要把机器润滑好。

Ⅲ 检查机床平衡度:

用精密调平仪对工作台进行纵向和横向调平设置机器(参考附件测试记录中的测试读数)。

Ⅳ 检验:
用汽油或煤油彻底清洗机器，然后用润滑油润滑所有的滑轨，用润滑油润滑齿轮。开机前一定要把机器润滑好。

Ⅴ开关箱:
开关箱位于立柱的左侧，仅供出入口使用。

Ⅵ 工作台进给行程调整:
工作台的纵向和横向进给可以通过调节位于工作台前面和膝盖右侧的限位螺钉来设定任何行程距离。

Ⅶ 调节工作台进给松紧度
工作台在鞍座上装有一个全长锥形支架，两端各有一个调节螺钉。用夹具拧紧两个螺丝，直到用手移动工作台时感到轻微的阻力。如果工作台不够紧，松开小端调整螺丝，拧紧大端调整螺丝。如果感觉太紧，反向调整程序。
Ⅷ鞍座和膝关节的调整:
使用与上述相同的方法来紧固机架

Ⅸ 工作台、马鞍、膝:
当仅用纵向工作台进给铣削时，建议用立柱夹紧膝关节，用膝关节夹紧鞍座，以增加这些构件的刚性，并以最小的振动提供较重的切割。鞍座锁紧杠杆位于鞍座与操作者的左侧，适当地施加夹紧压力，因为这将使鞍座保持足够的刚性。
工作台夹紧杠杆位于鞍座的前面，当不需要纵向运动时，应始终夹紧。

Ⅹ 拆卸工作台:
拆下工作台如下：手轮、拨盘、轴承支架，将丝杠旋到底，这样就可以拆下来了。完成所有步骤后，工作台就可以轻松拆卸了。

Ⅺ 拆卸鞍:
拆卸方法如下:手轮、表盘座、轴承支架，将丝杠一路旋转，松开鞍座中间的定紧螺钉，取下丝杠螺母，将鞍座叉抽出。然后鞍座就可以拆除了。

Ⅻ 安装电机和变速皮带以提高速度：
电机安装在与皮带轮外壳铰接的板上。通过转动电机侧面的手柄松开皮带组，然后根据需要将皮带切换到适当的速度，然后拉紧皮带组，内部附有变速表滑轮盖。

XIII 主轴套筒进给锁定和垂直进给：
机头右下角的手柄为套筒锁，不使用垂直进给时，设置手柄锁定套筒，使机头更稳定。
千分尺深度挡块以英寸为单位。通过利用这些简单的刻度，可以非常精确地工作到不同的深度。千分尺螺母下方的锁紧螺母确保千分尺螺母正确固定。

XVI 立铣头套筒离合器：
垂直进给由机头前部手轮和机头右侧手柄控制。使用手轮时用手拧紧离合器锁紧螺母，或松

开手柄操作时，使用手轮用于精细进给，手柄用于快速进给。

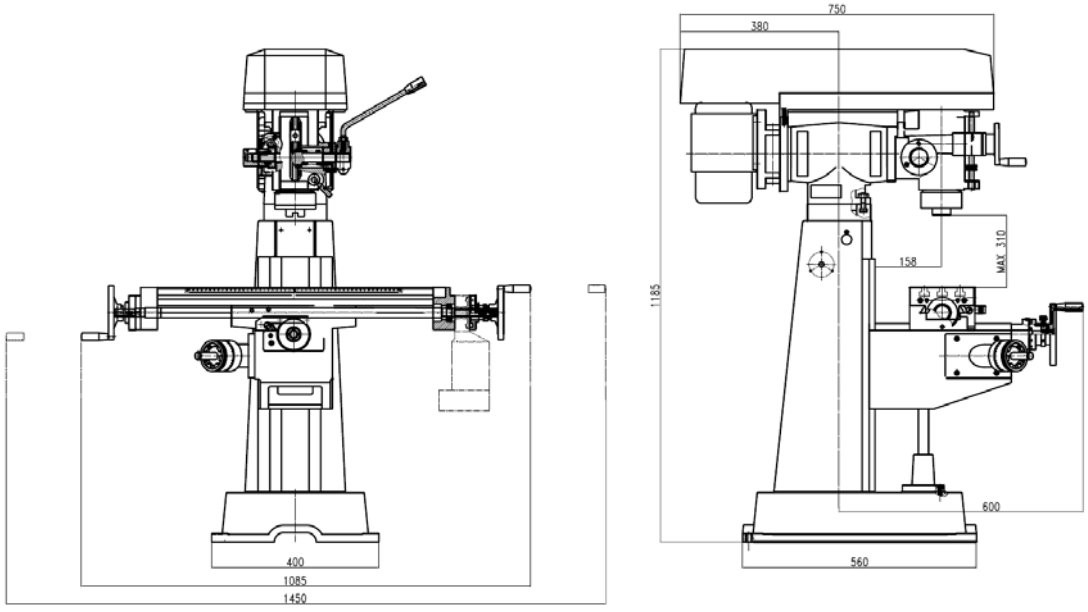
XV 铣头可倾斜或旋转：

松开三通接头上的四个锁紧螺栓，立铣头可以左右倾斜 90°。松开接头上的两个定位螺栓，立铣头可以旋转 120°；旋转后拧紧定位螺栓。电机和铣头必须一起倾斜，因为电机和铣头悬挂在同一个皮带轮外壳上。

VERTICAL MILLING MACHINE X28

Table size	660×156mm
Longitudinal travel	350mm
Cross travel	160mm
Vertical knee travel	280mm
Quill travel	80mm
Max.distance spindle to table	310mm
Spindle taper	MT3
Vertical head tilting angle(R&L)	±45°
Ram swivelling angle	360°
Spindle speeds(2)	100-600/425-2500 rpm
Drive motor	1.5KW
Net weight(approx)	330KG
Shipping weight	375KG

REFERENCE DIMENSIONS:



FEATURES:

1、 Model is a compact vertical milling machine. It is easy to set up .the controls are designed for operator convenience with dual table hand wheel.

2、 It is very practical for technical schools, small parts productions, toolrooms,R&D work,maintenance shops and even hobby use.

3、 Themachine is idealy suited for many operations,including milling,compound angle milling,engraving,drilling and jid boring.

4、 All “ways”are hand scraped for perfect bearing and alignment.the table is ground for perfect square ness.

5、 Castings are high strength material.they are aged for several months,before normalizing and tempering,tominimize deformation.

NOTICE

1、 Remove protective crating and sikds carefully,in the event of damage in transit,contact our representative and the transportation company making delivery.

2、 The machine is carefully inspected and tested in operation by Q.C.personnel before it leaves our factory.if any defects are

found on delivery write us directly.

3、 Read the catalogue and become familiar wih the parts locations on the drawings as it will be easier to understand this operator’s manual.

Ⅰ INSTALLATION:

To set the machine on a solid concrete foundation,it’s advisable to apply a little grout to touch up any unevenness in the concrete in order to get a solid foundation at all points.

When setting machine on a floor that has any surface irregularities,shims should be used to correct this condition to the greatest extent possible.

Ⅱ PRE-LUBRICATION:

Thoroughly clean the machine with gasoline or kerosene,then lubricate all the slide ways with S.A.E.

#10 and gears with S.A.E.#30 lubricant.be sure the machine is lubricated properly before starting.

Ⅲ LEVELLING MACHINES:

Set machines by levelling the work table lengthwise and crosswise with a precision levelling instrument(refer to the test readings in the attached test records).

Ⅳ INSPECTION:

Inspect the machine with the attached original testing records

for reference.

Ⅴ SWITCH BOX:

Switch box is located on the left side of the column,ou-off only.

Ⅵ ADJUSTMENT OF TABLE FEED TRAVEL:

Table longitudinal and cross feed can be set for any travel distance by adjusting stop set screws that are located in front of table and at the right side of knee.

Ⅶ ADJUSTMENT OF TABLE GIB:

The table is provided with a full length tapered gib in the saddle with an adjusting screw on each end. to take up gib tighten the two screws untill a slight drag is felt when moving the table by hand. if the table is not tight enough, loosen the adjusting screw on small end, and tighten up adjusting screw on big end. if feel is too tight, reverse the adjusting procedures.

Ⅷ ADJUSTMENT OF SADDLE AND KNEE GIBS:

To tighten gibs the same method as described above is used

Ⅸ CLAMPING TABLE, SADDLE AND KNEE:

When milling with longitudinal table feed only, it is advisable to clamp the knee with the column and the saddle with the knee to add rigidity to these members and provide for heavier cuts with a minimum of vibration. the saddle locking lever is located on the left side of saddle to the operator, apply clamping

pressure properly,as this will hold saddle sufficiently rigid.

The table clamping levers are located in front of saddle an should always be clamped when longitudinal movement is not required.

The knee clamping lever is at the left side of knee,leave clamped at all times unless the knee is in operation.

X REMOVING TABLE:

Remove the table as follows:hand wheel,dial hplder,bearing bracket,turn the lead screw all way,so thatit can be removed.complete all the steps then the table can be disassembled easily.

XI REMOVING SADDLE:

Remove as follows:hand wheel,dial holder,bearing bracket,turn the leadscrew all the way,loosen set screw on the middle of saddle,take off the lead screw nut,and draw saddle gib out.the saddle can then be removed.

XII MOUNTING MOTOR AND SHIFTING BELTS FOR SPEEDS:

Motor is mounted on a plate hinged to the pulley housing.release the belt set unit by turning the handle at the side of motor,then shift belts to proper speed as desired ,then tighten the belt set unit,a speed change chart is attached inside the pully cover.

XIII QUILL LOCK AND VERTICAL FEED:

The handle at the right lower corner of the head is the quill lock. when vertical feed is not in use, set the handle to lock the quill and make the head more stable.

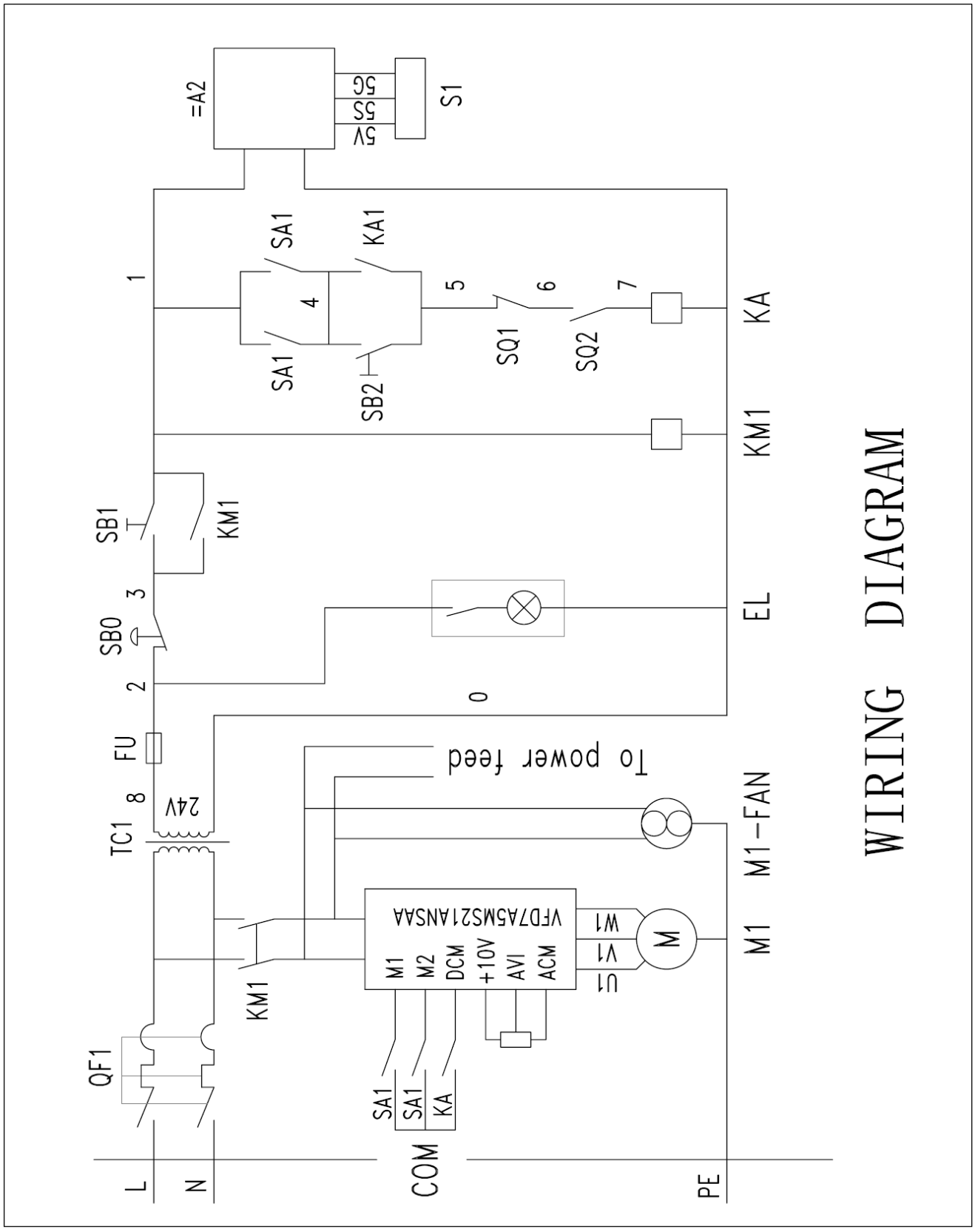
The micrometer depth stop is graduated in inches. by utilizing these simple graduations, it is possible to work very accurately to different depths. a lock nut under the micrometer nut assures that the micrometer nut is secured properly.

XVI QUILL CLUTCH OF VERTICAL MILLING HEAD:

The vertical feed is controlled by a hand wheel at the front of the head and a handle at the right hand of the head. when hand wheel is in use tighten the clutch lock nut by hand, or loosen it for handle operation, use hand wheel for fine feeds, handle for fast feeds.

XV VERTICAL HEAD AND TEE ADAPTER:

Vertical milling head can be tilted 90° on each side by loosening the four locking bolts on tee adapter. loosen two set bolts on the adapter, the vertical milling head can then be swivelled 120° ; tighten the set bolts after swiveling. the motor and milling head must tilt together for the motor and head are suspended on the same pulley housing.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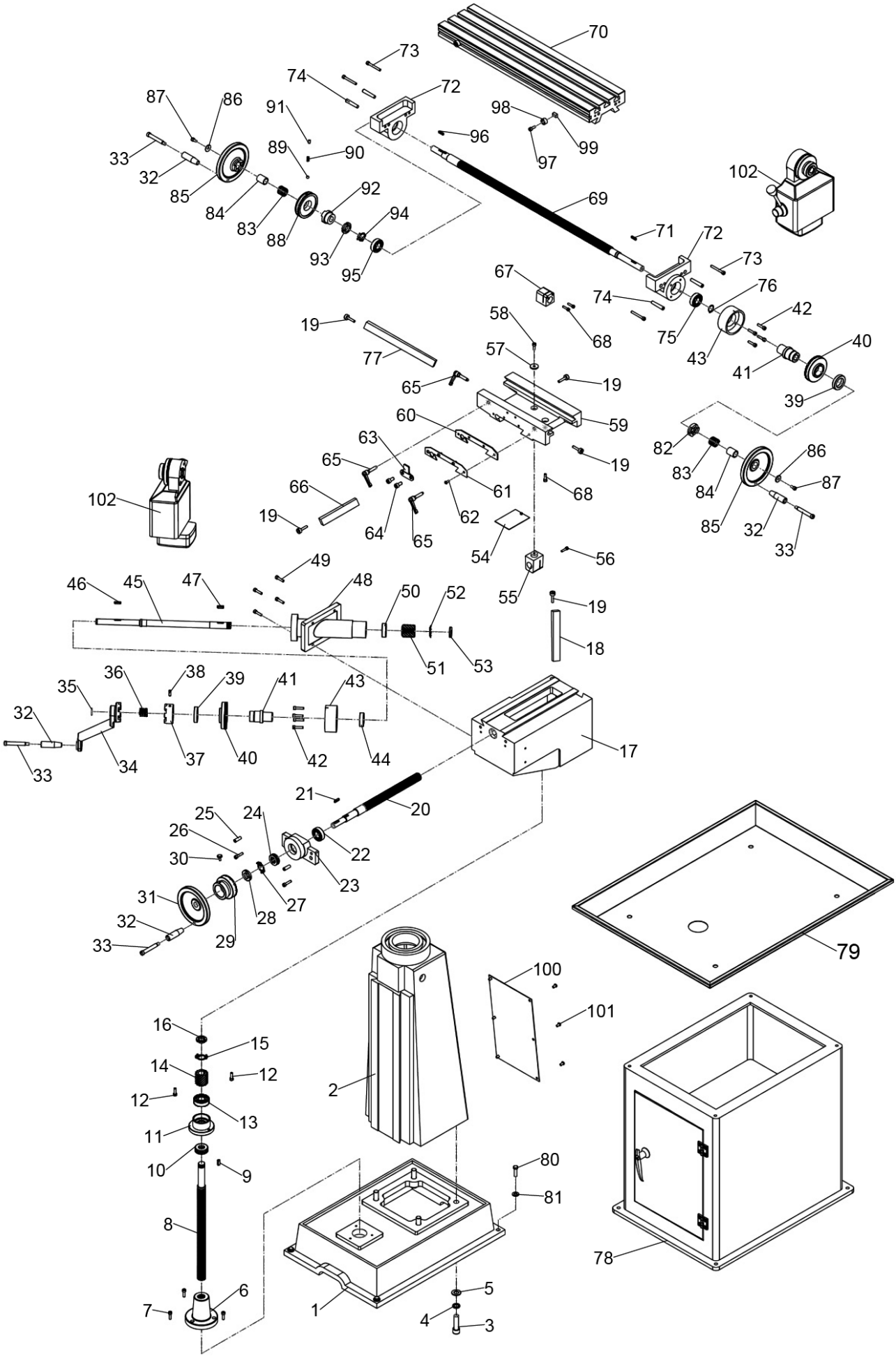
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Main parts list

NO	PART	DESCRIPTION	QTY
1	ZX5015-01-01	Base	1
2	ZX5015-02-01	Column	1
3	GB/T70.1-2000	Hex bolt M14x50	4
4		Washer M14	4
5		Washer M14	4
6	ZX5015-03-02	Elevation lead screw set nut	1
7	GB/T70.1-2000	Cap screw M6x20	3
8	ZX5015-03-03	Elevation leadscrew	1
9	GB/T1096-2003	Key 6x20	1
10	GB/T310-1995	Ball bearing 51204	1
11	ZX5015-03-05	Elevation bearing base	1
12	GB/T70.1-2000	Hex bolt M6x20	2
13	GB/T276-1994	Ball bearing 6204-2RS	1
14	ZX45-02-03	Elevation gear	1
15	GB/T858-1988	Spanner washer 20	1
16	GB/T810-1988	Spanner nut M20x1.5	1
17	ZX5015-01-01	Elevation work table	1
18	ZX5015-03-12	Gib	1
19	ZX5015-03-13	Gib adjust screw	6
20	ZX5015-04-02	Cross leadscrew	1
21	GB/T1096-2003	Key 5x20	1
22	GB/T276-1994	Ball bearing 6004-2RS	1
23	ZX5015-04-04	Bearing bracket	1
24	GB/T276-1994	Ball bearing 51104	1
25	GB/T118-2000	Pin 8x25	2
26	GB/T70.1-2000	Hex bolt M6x16	2
27	GB/T858-1988	Spanner washer 20	1
28	GB/T810-1988	Spanner nut M20x1.5	1
29	ZX5015-05-06	Graduated dial	1
30	GB/T73-1985	Adjust screw M6x16	1
31	ZX5015-06-40	Hand wheel	1
32	ZX5015-06-41	Handle	4
33		Handle screw	4
34	ZX5015-03-10	Elevation crank	1
35	GB/T894.1-1986	Special retaining ring 17	1
36		Spring	1
37	ZX5015-03-10D.2	Elevation handle clutch	1
38	GB/T77-2000	Screw	1
39	ZX5015-08-02D	Adjust nut	2

Main Breakdown

NO	PART	DESCRIPTION	QTY
40	ZX45-01-06C	Graduated dial	2
41	ZX5015-08-01D	Bush	2
42	GB/T70.1-2000	Hex bolt M6x25	8
43	ZX5015-08-03D	Adapter sleeve	2
44	GB/T276-1994	Ball bearing 6004-2RS	1
45	ZX5015-03-07D	Elevation shaft	1
46	GB/T1096-2003	Key 5x20	1
47	GB/T1096-2003	Key 6x20	1
48	ZX5015-03-05D	Gear shaft sleeve	1
49	GB/T70.1-2000	Cap screw M8x20	4
50	GB/T276-1994	Ball bearing 6004-2RS	1
51	ZX45-02-03	Elevation gear	1
52	GB/T858-1988	Spanner washer 20	1
53	GB/T810-1988	Spanner nut M20x1.5	1
54		Splash guard	1
55	ZX5015-04-03	Cross leadscrew nut	1
56	GB/T70.1-2000	Hex bolt M5x25	1
57	ZX5015-03-15	Washer	1
58	GB/T70.1-2000	Hex bolt M6x20	1
59		Saddle	1
60		Splash guard	1
61		Splash guard	1
62	GB/T70.1-2000	Cap screw M5x12	4
63	ZX30-04-10	Fixed block	1
64	GB/T70.1-2000	Hex bolt M6x16	2
65		Adjust screw	3
66	ZX5015-04-09	Gib	1
67	ZX5015-05-03	Longitudinal leadscrew nut	1
68	GB/T70.1-2000	Hex bolt M5x25	2
69	ZX5015-05-02	Longitudinal leadscrew	1
70	ZX5015-05-01	Work table	1
71	GB/T1096-2003	Key 5x20	1
72	ZX5015-05-04	Longitudinal bearing bracket	2
73	GB/T70.1-2000	Hex bolt M6x50	4
74	GB/T118-2000	Pin 8x50	4
75	GB/T276-1994	Ball bearing 6204-2RS	1
76	GB/T894.1-1986	Special retaining ring 17	1
77	ZX5025-05-09	Gib	1
78		Cabinet base	1
79		Oil pan	1

Main Breakdown

NO	PART	DESCRIPTION	QTY
80	GB/T70.1-2000	Hex bolt M10x45	4
81		Washer 10	4
82	ZX7550C-08-03D	Clutch	1
83	ZX7550C-08-05B	Spring	2
84	ZX7550C-08-04B	Spacer bush	2
85	ZX5015-08-06D	Handwheel	2
86	ZX5015-08-07D	Washer	2
87	GB/T70.1-2000	Cap screw M6x12	2
88	ZX5015-08-05D	Graduated dial	1
89	GB/T308-84	Steel ball	1
90	JZ08-026-11	Spring	1
91	GB/T70.1-2000	Cap screw M6x8	1
92	ZX5015-08-04D	Clutch	2
93	GB/T810-1988	Spanner nut M20x1.5	1
94	GB/T858-1988	Spanner washer 20	1
95	GB/T276-1994	Ball bearing 6204-2RS	1
96	GB/T1096-2003	Key 5x16	1
97	GB/T70.1-2000	Screw M6x16	2
98	ZX30-04-09	Retaining ring	2
99	ZX30-04-08	Nut M6	2
100	ZX5015-07-03	Rear column cover	1
101	GB67-76	Screw M6x12	6
102		Power feed	(optional)
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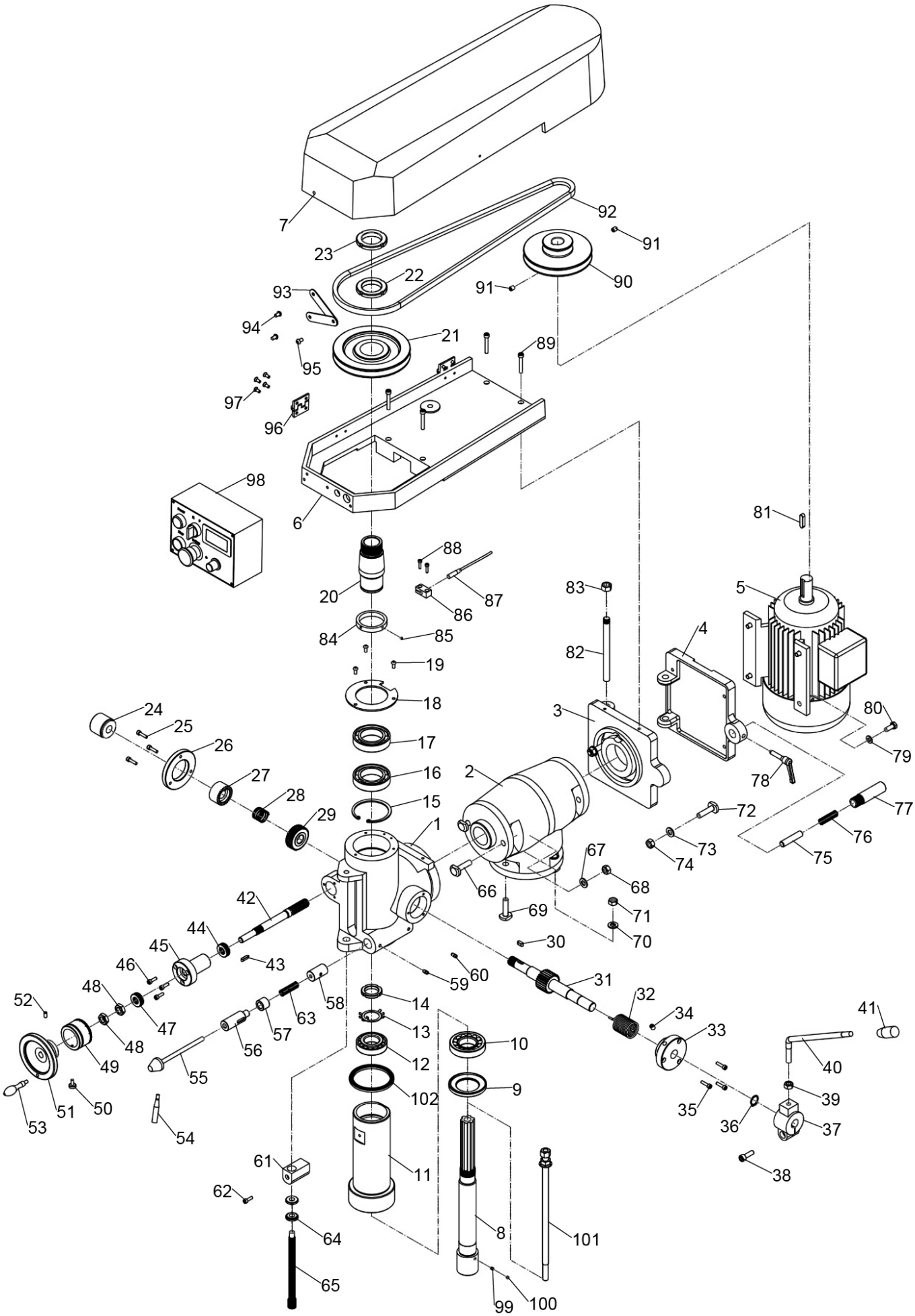
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Head parts list

NO	PART	DESCRIPTION	QTY
1	ZX5015-06-02	Spindle head	1
2	ZX5015-06-01	Rocker arm bridge	1
3	ZX5015-06-47	Motor bracket	1
4	ZX5025-06-09	Motor plate	1
5		Motor	1
6	ZX5015-06-42.2	Shield plate	1
7	ZX5015-06-42.1	Shield plate	1
8		Spindle	1
9	ZX30-05-28	Cover	1
10	GB/T297-1994	Bearing 30207	1
11	ZX5025-06-03	Spindle sleeve	1
12	GB/T297-1994	Bearing 30206	1
13	GB/T858-1988	Lock washer 30	1
14	ZX5025-06-04.1	Lock nut M30x1.5	1
15	GB/T893.1-1986	Retaining ring 75	1
16	GB/T276-1994	Ball bearing 6009	1
17	GB/T276-1994	Ball bearing 6009	1
18	ZX30-05-19	Spindle cover	1
19	GB67-76	Screw M5x12	3
20	ZX5025-06-05	Shaft	1
21	ZX5015-06-24	Pulley	1
22	ZX5015-06-38.1	Nut	1
23	ZX5015-06-38.2	Lock nut	1
24	ZX5015-06-21	Nut	1
25	GB/T70.1-2000	Hex bolt M5x16	3
26	ZX5015-06-22	Left cover	1
27	ZX5015-06-18	Clutch	1
28	ZX5015-06-15	Spring	1
29	ZX5025-06-17	Gear	1
30	GB/T1096-2003	Key 6x15	1
31	ZX5025-06-06	Gear shaft	1
32	ZX5015-06-27	Spring	1
33	ZX5015-06-16	Right cover	1
34	JB/T7940.4-1995	Oil cup	1
35	GB/T70.1-2000	Hex bolt M5x20	3
36	GB/T894.1-1986	Retaining ring 19	1
37	ZX5015-06-37.1	Hand base	1
38	GB/T70.1-2000	Hex bolt M8x25	1
39	GB/T6175-2000	Hex nut M10	1

Head parts list

NO	PART	DESCRIPTION	QTY
40	ZX5015-06-37.2	Handle	1
41	JB/T7271.5-1994	Hand set M10x50	1
42	ZX5025-06-19	Gear shaft	1
43	GB/T1096-2003	Key 4x20	1
44	GB/T301-1995	Ball bearing 51102	1
45	ZX5015-06-20	Shaft sleeve	1
46	GB/T70.1-2000	Screw M5X16	3
47	GB/T301-1995	Ball bearing 51102	1
48	GB/T6173-2000	Hex nut M14x1.5	2
49	ZX5015-06-36	Graduated dial	1
50	ZX5105-05-07	Adjust screw	1
51	ZX5015-06-39	Handwheel	1
52	GB/T70.1-2000	Screw M5x16	1
53		Handle	1
54	ZX5025-06-33	Lock handle	1
55		Lock screw	1
56	ZX5025-06-30	Lock set	1
57	ZX5015-06-32	Spacer bush	1
58	ZX5025-06-31	Lock set	1
59	GB/T70.1-2000	Screw M6X12	1
60	GB/T70.1-2000	Screw M6X12	1
61	ZX5015-06-29.2	Limit plate	1
62	GB/T70.1-2000	Screw M5x16	1
63	ZX5015-06-13	Spring	1
64	ZX5015-06-29.2	Limit nut	2
65	ZX5015-06-29.1	Leadscrew	1
66	ZX5015-06-07	T bolt M10x40	2
67	GB/T97.1-2002	Washer 10	2
68	GB/T889.1-2000	Hex nut M10	2
69	ZX5015-06-07	T bolt M10x40	3
70	GB/T97.1-2002	Washer 10	3
71	GB/T889.1-2000	Hex nut M10	3
72	ZX5015-06-07	T bolt M10x40	2
73	GB/T97.1-2002	Washer 10	2
74	GB/T889.1-2000	Hex nut M10	2
75	ZX5015-06-12	Pin	1
76	ZX5015-06-13	Spring	1
77	ZX5015-06-11	Bush	1
78	ZX5015-06-14-01	Screw	1
79	GB/T97.1-2002	Washer 8	4

Head parts list

NO	PART	DESCRIPTION	QTY
80	GB/T5782-2000	Hex bolt M8x20	4
81	GB/T1096-2003	Key 8X35	1
82	ZX5015-06-10	Small Spindle	1
83	GB/T6175-2000	Hex nut M12	1
84	ZX5015V-06-05.2	Spacer bush	1
85		Magnetic beads	4
86		The probe holder	1
87		Searching unit	1
88	GB/T70.1-2000	Screw M4X16	2
89	GB/T70.1-2000	Hex bolt M6x35	2
90	ZX5015V-06-26	Motor pulley	1
91	GB/T70.1-2000	Screw M8X10	2
92		GS：V13X1395	1
93		Connect plate	1
94	GB/T70.1-2000	Screw M6X12	2
95	GB/T70.1-2000	Screw M6X12	1
96		Connect plact 40x40	2
97	GB/T70.3-2000	Screw M5x12	8
98		Electrical cabinet	1
99	GB/T70.1-2000	Screw M5X6	1
100	GB/T70.1-2000	Screw M5X5	1
101	ZX5025-05-18	Pull rod 7/16”-20	1
102	ZX30-05-28	Cushion	1
103			1
104			1
105			1
106			1
107			1
108			1
109			1
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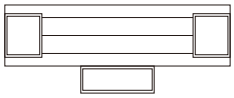
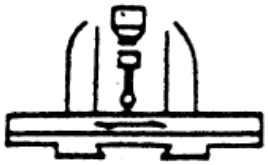
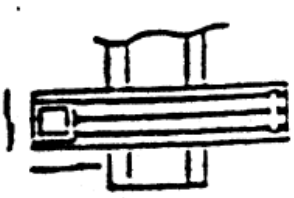
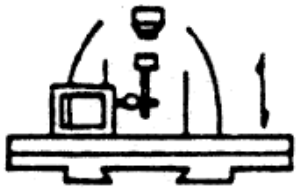
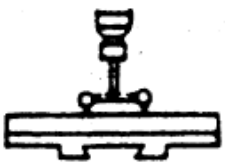
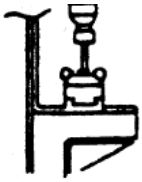
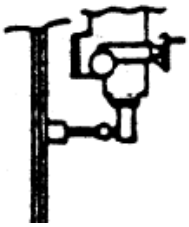
检验项目 TEST ITEMS		检验简图 INSPECTION DIAGRAM	允差 ALLOWABLE TOLERANCE	实测 ACTUAL MEASUREMENT
工作台的平面度 Straightness of uppersurface of table			0.08	
横向运动时台面的平行度 Parallelism of table surface in cross movement			0.02/100	
工作台纵向运动时的平行度 TEE ADAPTERParallelism of table in longitudinal movement			0.06	
工作台纵向和横向运动的垂直度 Perpendiculari ty of table longitudonal an cross movement			0.04/300	
主轴头运动到工作台上表面的垂直度 Squareness of movement of main spindle head to upper surface of table	左右方向 Right and left direction		0.05/100	
	前进和后退方向 Forward an backword direction		0.05/100	
工作台上表面与主轴中心线的垂直度 Squareness of upper surface of table to center line of main spindle	左右方向 Right and left direction		0.05/300	
	前进和后退方向 Forward an backword direction		0.05/300	

检验项目 TEST ITEMS		检验简图 INSPECTION DIAGRAM	允差 ALLOWABLE TOLERANCE	实测 ACTUAL MEASUREMENT
主轴锥度近端跳动 Spindle taper hold run-out			a. 0.015 b. 0.02	
膝关节垂直运动的线性度 Linearity of verticed movement ofknee	左右方向 Right and left direction		0.05/100	
	前进和后退方向 Forward an backword direction		0.05/100	

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我们将不断的开发新品，也同时不断的更新产品以及产品的质量，对产品数据的更新不包含在操作手册里。
最新的产品信息可在产品信息铭牌中查询。