小黄蜂CNC

LITTLE WASP CNC

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安徽呲铁科技有限公司

Anhui Citie Technology Co., Ltd

安全操作规程

注意安全！

小黄蜂CNC的旋转切削刀具、皮带、高压电、噪音等方面均存在危险，所以在使用设备及其组件时，为避免人身伤害及机械损坏，相应的安全守则必须严格遵守。

重要——只有经过操作手册和机床安全使用培训的专业人员才可以对机床进行操作。

操作本机前请仔细阅读：

只有经过授权的人员方可使用本机，未经培训人员在使用机床时可能对人身及机床造成伤，由于不正确的操作而造成的问题不在保修范围内。 机床在起吊和搬运时，人应远离机床以免发生意外。 操作机床时使用合适的眼、耳保护装置，以防止切屑造成伤害。 旋转的刀具可能造成严重的人身伤害，当程序在运行时，机床工作台及主轴头会随时向任一方向做非常快的移动。机床是自动控制的，可能会随时启动运行。机床工作时，必须使 手指远离零件和切削刀具。机床运转时，不正确的夹装工件可能会导致工 件在高速、高进给时弹出，加工相对过大尺寸工件或在平台边缘夹装也是不安全的。机床运转时,不要调节或移动机床。改变主轴转速之前，应停止机床移动元件的运行。

机床必须在其性能范围内工作，对被加工件使用正确的切削速度和进给量。为了获得有关切削速度、检修和操作方面的细则，请查阅《机械手册》或类似这方面的书籍。

不要加工有毒的或易燃材料，这样会放出致命的烟气。在加工前咨询材料供应商获得安全的材料。

必须使用状态良好的切削刀具。操作前请认真检查零配件及刀具，所有损坏的配件和刀具应当由专业人员修理或替换。一旦有部件显示异常，不要操作， 应及时修复。

不要对机床进行带电维修。定期检查机床的控制元件和操作元件，以保证机床正常工作。检修机床时必须使用合格的替换零件。

不要对设备进行任意改装、改变，如有必要，需由我公司处理。由于对数控铣床任何改装和改变所造成的人身伤害或机械损坏，均不在我公司责任范围内. 确保所有相关人员在实际操作、安装前经过相关内容及安全的指导，保证机床在以后使用中的生产及人身安全。保持工作环境的清洁。让孩子们远离机床。

自动化设备　本机为可编程控制，因此可能非预期性启动，操作人员及其他相关人员应予以重视。除了在装、卸工件和刀具时需要，请远离加工区域。

机床防护　机床上一些防护设施和接触面板可能由于机床的运行突然关闭，应确保所有防护设施及面板是封闭的并尽可能安全。在防护设施脱落或接触面板转动闭合时可能会造成人身伤害。

旋转部件　如果需要在机床上进行旋转部件维修工作时，应先断开机床电源，机床的旋转部件可能会造成严重或致命的人身伤害。

危险电压系统中存在着致命的电压或电流，机床维修仅限于合格的专业人员。

进给设定不正确的刀具使用、机床试加工、装夹工件、夹具使用均会导致灾难性后果，所以进行任何加工操作之前应反复对设定进行检查。

机床警告　机床的大多数区域并非能够支撑操作者的体重。

合理的衣着　小心宽松衣物及身上佩戴的其它物品，它们也许会被卷入机床从而造成人身伤害。

刀具不要试图用手减速或停下正在旋转的刀具。由于其特别锋利从而会造成严重的人身伤害。

眼睛保护　在机床运行时应一直佩戴安全护目镜或安全面罩，飞溅的高温切屑会造成人身伤害。

电气设备任何机床发生电击情况均是可能的，所以仅仅经过授权的专业人员才可对机床进行维修，不要打开电控箱或其它电力安全保护设施。

注意事项

安全警告及注释标识的说明

本手册包含保护用户和防止机床损坏的安全预防措施，这些预防措施根据安全性质分为警告和注意，补充的信息作为注释叙述，在操作机床之前请仔细地阅读警告、注意和注释。

产品说明书申明

无特殊说明，本说明书所阐述的对象。注：本机床采用MACH3控制系统

我公司将一直致力于机床的完善工作，以使机床性能更好，操作更简便。可能会对机床做一些细微的调整，将在本版本中不做特殊说明。

重要提示

本机床最高转速为3000转/分钟，用户自备刀具许用转速不得小于最高转速，否则应限制机床转速，确保人身和设备安全。

通用要求

工作温度范围　　5℃至 40℃（41℉~ 104℉）

存储温度范围　　-25℃~ +55℃

本机床最佳使用环境温度：20℃

安装位置无显著冲击和震动。附近无干扰源，避免阳光直射

电气要求

无特殊说明，本机床采用 220V/50HZ 或者 120V/50HZ 交流电源供电，波动不超过±10%的线电压。

如果输入电压的不稳定状态超过了允许界限的话，就可能无法实现机床的额定 马力。机床可能会运转正常，但是无法传输所宣传的功率。可靠的接地是人身安全以及机床安全运行的保障。用户给机床引入电源线时应首先连接接地保护导线，接地线规格不得小于动力线规格。接地线不能与靠近机床的冷却水管或接 地棒连接。

输入机床的电源必须接地。 用户应经常检机床接地线连接是否可靠。

操作要求

为了能正确使用本机床，操作、编程及维修人员必须仔细阅读此说明书。此外， 还必须阅读数控系统的操作与编程、安装与调试等手册。操作工不仅要充分了解一般的安全技术措施，还要熟悉机床详细参数和安全章程，才允许操作机床。

机床性能

机床的主要性能、用途及特点

本机床标准配置 mach3 数控系统，适用于加工各种平面、孔或平面复杂形状的零件，是机械制造、教学等应配置的重要设备。

机床的主传动采用直流无刷电机配合同步带传动实现主轴的无级调速。X、Y、Z 三坐标均采用步进电机与滚珠丝杠直接相连，以实现各向的进给运动。滚珠丝杠采用预拉伸结构，可保证机床的传动刚度和位置精度。滚珠丝杠副全部消除间隙，提高了运动部件的运动刚性。通过显示器，可以显示刀具在机床中的坐标位置、所执行程序段内的剩余移动量、程序号、正在执行中或正编辑中的程序、顺序号、输入的字与数值、

报警号与简单报警内容；还可以对进行状态和模态指令值、设定的数据和参数等予以显示。通过手轮可手动控制机床的X、Y、Z 三轴电机做各方向的调整。

主要规格与参数

工作台		
尺寸	400x140mm（长x宽）	
T形槽	12x3x24mm（槽宽x数量x间距）	
最大载荷	40Kg	
工作台行程		
X	220mm	
Y	120mm	
Z	200mm	
主轴端面到工作台最大距离	280mm	
主轴中心至立柱表面距离	190mm	
主轴		
主轴锥孔	ER20	
主轴最大转速	3000r/min	
电机与速度		
主轴		
主轴	电机额定功率	400W
	额定转矩	1.4N.M
X、Y、Z轴	电机扭矩	XY：2.5N.M；Z：3.2N.M
	最大进给速度	2500

定位精度	±0.02mm
重复定位精度	±0.015mm
包装箱	
毛重	115KG
尺寸（长x宽x高）	59x59x78cm

机床结构

床身部分

底座

底座是机床的重要基础部件，前半部分是滑鞍沿Y 向移动的导轨,后半部用来连接立柱。导轨装有可伸缩导轨护罩用来防止灰尘。Y 向的移动是由步进电机带动滚珠丝杠副旋转，继而驱动工作台而实现的。
为了提高滚珠丝的轴向刚性和传动精度，对滚珠丝杠轴以及丝杠副均施加了预紧力。

导轨为滚动直线导轨副，在高速长时间运转下维持高精度，快速移动缩短了定位时间提高生产力。

工作台

工作台是拖动被加工零件沿X、Y 作进给运动以完成切削加工的关键部件。工作台沿X 向的进给运动是由安装在右侧的步进电机通过联轴器带动滚珠丝杠副旋转，从而拖动工作台实现的。对滚珠丝杠轴以及丝杠副施加了预紧力以提高丝杠的轴向刚度和传动精度。

立柱部分

立柱是机床的重要基础部件之一，在其上有主轴箱上下移动的导轨和Z轴滚珠丝杠副。

主轴箱沿Z向的进给运动是由步进电机通过联轴器带动滚珠丝杠副旋转而实现的，对滚珠丝杠轴以及丝杠副施加了预紧力，提高了传动精度和传动精度。立柱导轨也滚动直线导轨副，在高速长时间运转下维持高精度，快速移动缩短了定位时间提高生产力。

主轴箱部分

主轴旋转由主电机通过同步带、同步带轮驱动而实现。 机床刀具的放松通过主轴尾部的ER 弹簧夹头实现。

机床冷却选配（需另购）

冷却系统简介

本机床的冷却水箱为外置移动式，在机床使用时放置于机床下方。通过输送管将冷却液传到软管式喷嘴，喷嘴位置及冷却液流量可任意调整。用后的冷却液过滤后可流回冷却箱以供循环使用。

冷却泵简介

本机床采用的是三相或单相立式机床冷却泵，冷却液一般为皂化液、乳化液、苏打水、轻矿 物油及无严重腐蚀性的其它液体。

额定电压： 380 V/220V/其他电压

额定频率： 50 Hz

额定扬程： 3 m

保证值： 12 L/Min

输入功率： 40 W

维护保养及注意事项

机床在开机前，检查接屑盘中切屑的沉积量，及时进行清除。

每6个月必须更换冷却液，彻底清洁冷却液箱。

矿物切削油会损坏机床内的橡胶部件。加工铸件时，铸件处理中的砂子，铸铝和铸铁中的研磨性成分将缩短泵的寿命。

陶瓷与类似物品加工不在磨损保证声明范围内，其风险完全由客户自己承担。

研磨性切削需要增加保养计划。冷却液必须更频繁的更换，必须更频繁的清理冷却液箱底的沉积物。 推荐使用更大的冷却箱。在研磨性粉末环境中，导致泵的寿命缩短，压力减小，保养次数增多，不在冷却泵的保修范围内。

搬运与安装

拆箱

拆包装箱时，应先将上部盖板拆去，再拆去四周箱板。当运到安装位置后再将底座去掉。拆箱后应首先检查机床的外部情况，并按照本机床的装箱单清点附件工具， 如有问题请立即与我公司联系。

机床搬运

搬运前应将主轴箱降至行程的中或下部位置，以防搬运中的震动影响机床精度。 搬运时，推荐使用叉车。用叉车缓缓托起，运送至安装位置。用行车或吊车搬运机床应按

照吊装标志，起吊和卸放应平稳不得过度倾斜，不应使底部和侧面受到冲击或过大的震动，以免影响机床的精度。

安装

机床的工作精度是否稳定取决于机床的安装精度，如果能稳固和精确的安装机床，就能保证机床的工作精度。机床在出厂前已经进行了全面调整和切削试验，如安装不正确，将会影响机床精度及其性能，请务必注意。机床水平调整调整机床的安装水平时， 应用水平仪进行，在纵

向及横向的允差均为： 0.02/1000毫米。此后，不许剧烈震动机床。

机床安装、调整完后，需将防锈剂清除干净（为防止锈蚀，本机床在包装出厂 时，已经在易锈蚀部位涂有防锈涂料）。可用软布沾煤油或汽油将防锈涂料清除防锈剂。

影响机床精度的各个部位严禁拆开擦洗。 切勿使用对机床喷漆面有损伤的溶剂，以防漆层剥落。 清洗完毕后，应立即在所有外露加工表面涂一薄层机油，以防锈蚀。

机床电气

安装机床处，电源容量充足稳定，否则，电源容量不足或电压变化较大，将对 本机床各种机能有意想不到的影响，降低各种电器元件的寿命，同时还可能引起安全方面的事故。因此，请注意电源的容量，本机床总装机容量为2KVA。

检查电源相序

总电源相序应与本机床规定的相同。否则机床就会误动作，保险丝会熔断，甚至会引起安全方面的事故，因此必须检查总电源相序。

注意!

1、如电压不稳，请装稳压器。
2、保持电气箱内干燥。
3、连接电源时，所有电源开关都必须关闭。

机床的运行

本机床虽然提供一些安全装置，在机床各部贴有警告铭牌，但是由于在操作机 床时， 仍会有一些不可预料的危险情况发生，所以请操作

员在详读这些警告事项和使用说明手册后，才能操作这台机床。

机床启动安全注意事项

开机前的确认

确定电缆线没有破损，以避免有短路、漏电及电击发生。确定电力供给足够。

确定电缆线使用正确，线径可确实承受负载。

确定电源线是接至主电源上,确定接地线已经接上。

确定操作按钮键是经确认可以操作的。

确定润滑油已加到正常液位。

确定机床各部位和工作区环境整洁有序。

确定机床不在超载下运行。

确定机床的包装件，固定件全部拆去。

确定对机床有足够的了解或者已经详细阅读本机床的说明书。

热机！警告！

在试机过程中，不可只用G00的速度去跑完全程，G00通常是运用于返回 原点及快速到达定点，千万不能只用 G00 来回运动，这样会使机床寿命损 伤，如有上述情况本公司不负责保修。

每天第一次开机时需热机，在各轴手动回参考点之后，用 AUTO 或 MDI方式将主轴以 S250、S500、S1000 及 S2000 每段运转 1 分钟以上，进给轴以 G01 F1000 的速度持续运转3至5分钟。

运行

操作者先仔细阅读使用说明书（机械、电气部分），机床数控系统操作手册、伺服单元、伺服电机使用说明书等资料、按照有关操作方法及顺序先手动、后自动、依次进行运转。 电源接好后，必须开空车检查

一下各部位运行情况，才可进行工作。

机床保养

事前保养

在事前保养方面,清洁是非常重要的因素。灰尘、湿气、油烟等皆会加速间歇操作电气接触面的腐蚀,有效的执行保养计划,应准备一份时间表并严格遵行。即使 保养计划与生产进度有冲突,亦要以原保养计划为优先以延长机床本身及控制器寿命,当执行任何保养动作,特别对控制器有关的皆需作记录。这些记录有助于了解各 零件寿命且了解到何种常备更换零件应作库存。

每日保养

1、清扫工作台、底座、滑鞍等处的切屑。

2、擦干净机床表面的油、冷却液等。

3、清扫、擦拭导轨防护罩。

4、用清洁的抹布擦拭主轴锥孔，并涂上轻质油。

5、所有防护面上不得放置工具等物。

6、冷却液管路应流畅，保证有足够的冷却液，否则要及时处理。

每月保养

1、处理每日保养记录。

2、强电箱，数控柜内部清扫。

3、工作台、底座水平检查，有必要时进行调整。

4、机械手动作的检查，有必要时进行调整。

5、检查电线接线端子，不能有松动。

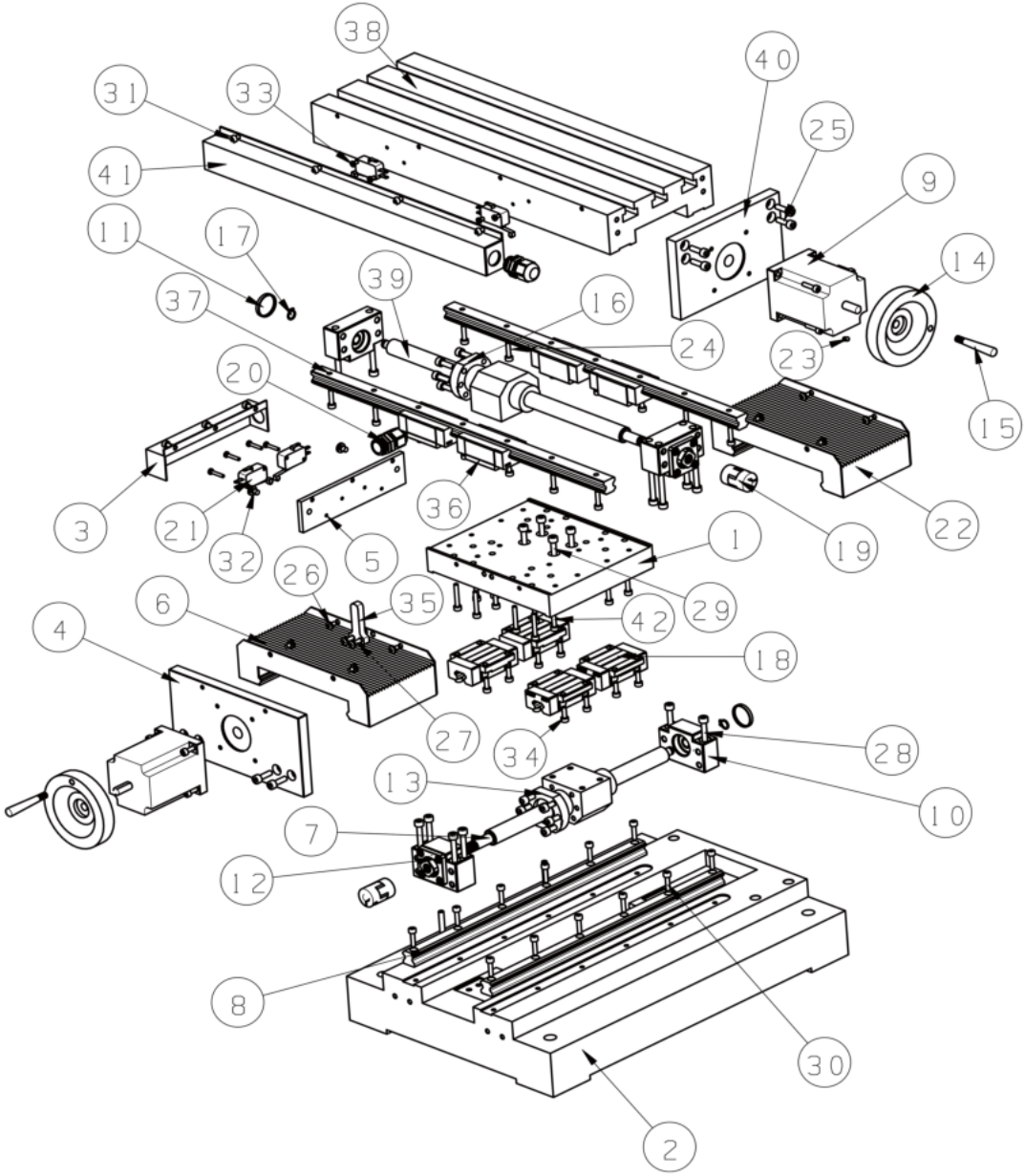
6、倒出冷却箱中的冷却液，清洗冷却箱，注入新冷却液。

半年保养

1、处理每月保养记录。

2、对数控装置、强电柜、机床进行全面清扫。

3、清洁所有伺服电机及普通电机。
4、检查伺服电机与机床联接环节，并及时维修或更换。
5、检查机床的各定位、补偿。
6、检查所有电器部件
7、检验机床全部运转动作的正确性。
8、对各坐标轴、间隙消除机构进行测量、并作适当调整。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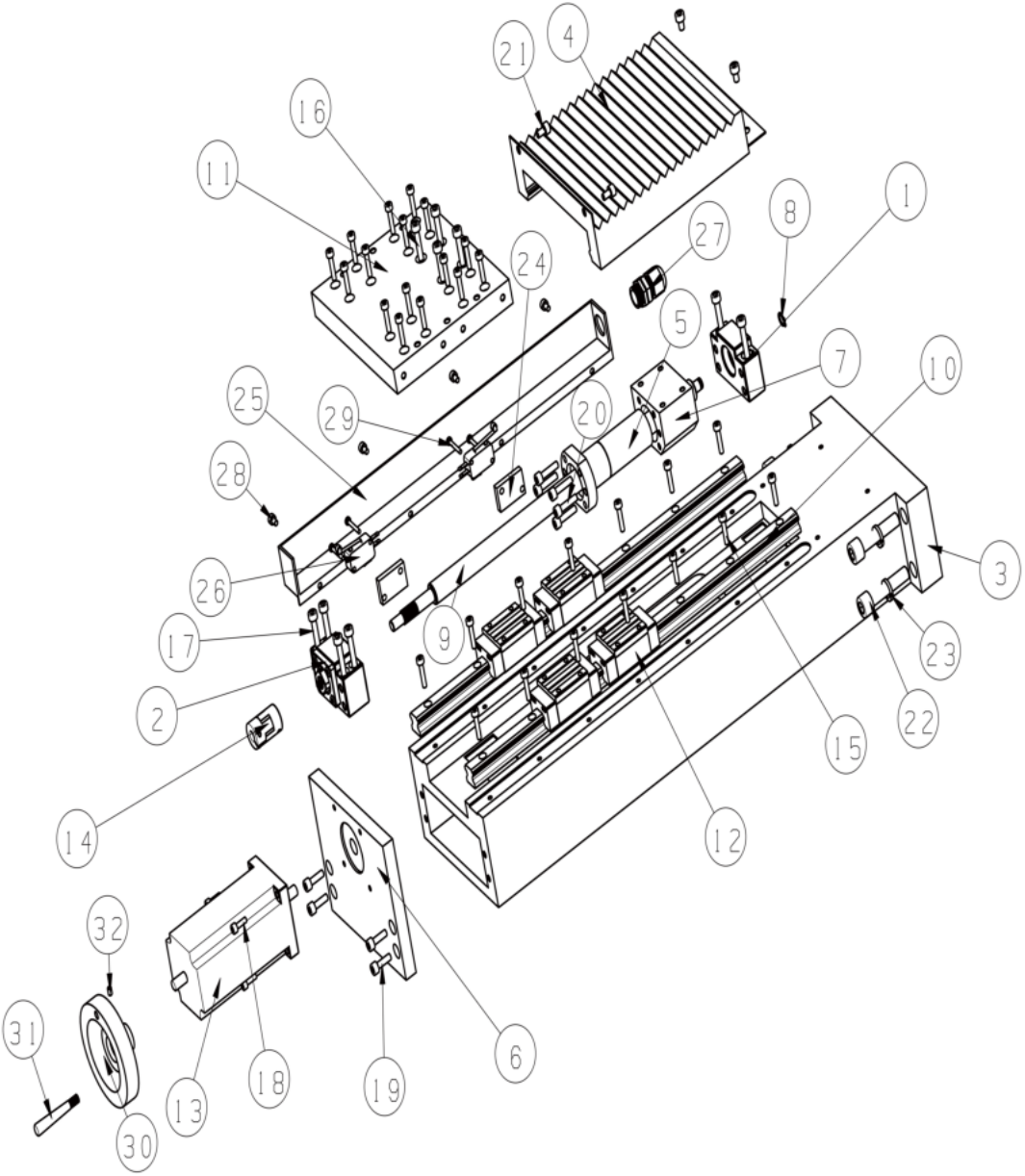
部件列表

PC NO	PART NAME	QTY
42	GB-T70.1-2000,M4X25	16
41	工作台开关护板	1
40	X轴步进电机连接座	1
39	滚珠丝杆（长）	1
38	XK7113工作台	1
37	直线导轨（长）	2
36	方滑块	4
35	工作台挡柱	1
34	GB-T70.1-2000,M4X12	16
33	GB-T818_H-2000,M3X16	8
32	GB-T818_H-2000,M5X6	2
31	GB-T70.1-2000,M4X6	7
30	紧盯螺丝M5X35	2
29	GB-T70.1-2000,M5X25	6
28	GB-T70.1-2000,M5X35	12
27	GB-T818_H-2000,M4X10	2
26	GB-T818_H-2000,M4X6	8
25	GB-T70.1-2000,M5X16	20
24	GB-T70.1-2000,M4X16	34
23	GB-T77-2000,M4X6	2
22	底座防尘护罩后	1
21	昌得微动开关带杆	4
20	电缆锁头M16	2
19	联轴器	2
18	法兰滑块	4
17	卡簧M8	2
16	丝杆螺母座	2
15	XK7113手轮柄	2
14	XK7113手轮	2
13	DFS1605	2
12	BK10	2
11	BF防尘盖	2
10	BF10	2
9	57步进电机双出轴小	2
8	直线导轨（短）	2
7	滚珠丝杆（短）	1
6	底座防尘护罩前	1
5	Y轴限位开关垫板	1
4	Y轴步进电机连接座	1
3	Y轴开关护罩	1
2	XK7113底座	1
1	XK7113中托板	1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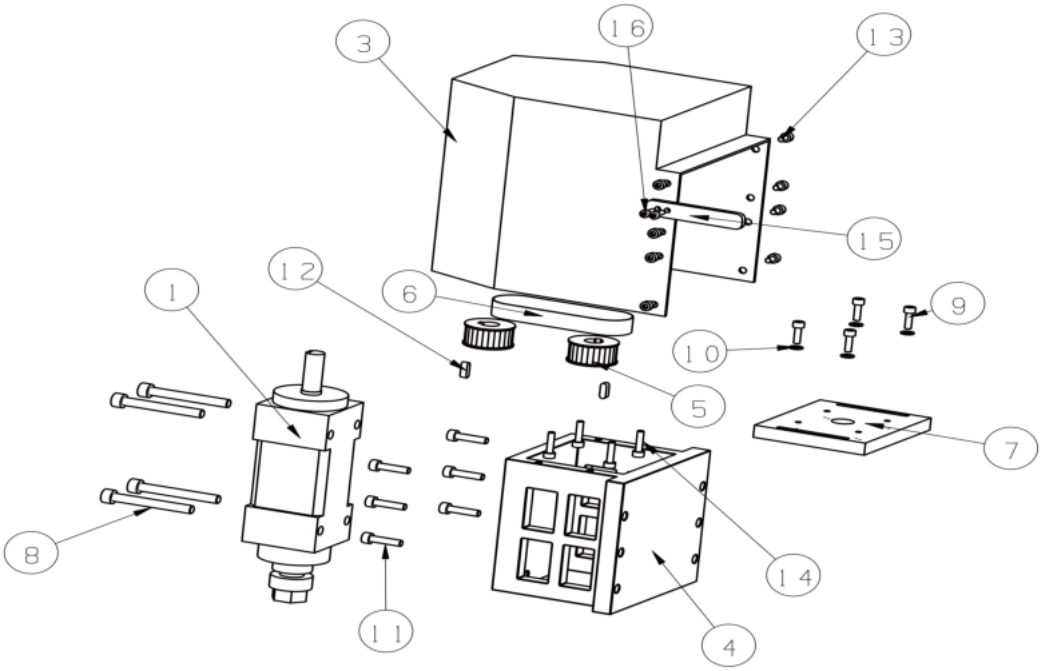
部件列表

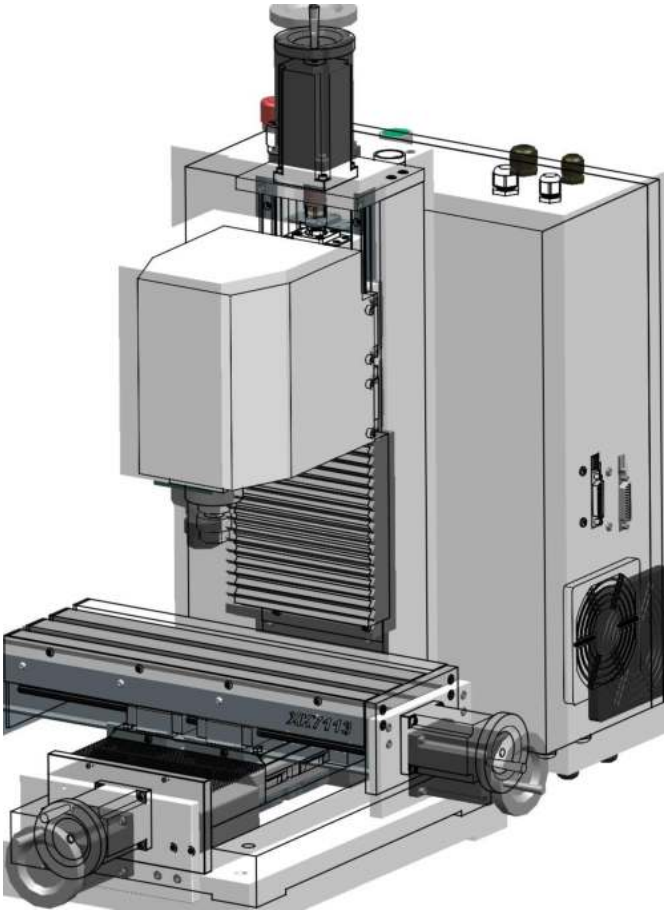
PC NO	PART NAME	QTY
32	GB-T77-2000, M4X6	1
31	XK7113手轮柄	1
30	XK7113手轮	1
29	GB-T818_H-2000, M3X20	4
28	GB-T70. 1-2000, M4X6	4
27	电缆锁头M16	1
26	昌得微动开关带杆	2
25	工作台开关护板	1
24	POMZ轴限位开关垫块	2
23	GB93-87, 10	4
22	内六角M10x45	4
21	内六角M5x8	4
20	内六角M5x20	6
19	内六角M5x16	4
18	内六角M4x12	4
17	内六角M5x35	6
16	内六角M5x25	4
15	内六角M4x20	30
14	联轴器	1
13	57步进电机双出轴大	1
12	方滑块	4
11	Z连接板	1
10	直线导轨（长）	2
9	滚珠丝杆（长）	1
8	卡簧M8	1
7	丝杆螺母座	1
6	Z轴步进电机连接座	1
5	DFS1605	1
4	立柱防尘护罩	1
3	XK7113立柱	1
2	BK10	1
1	BF10	1



部件列表

16	GB-T70.1-2000,M4X12	2
15	XK7113 Z轴限位块	1
14	GB-T70.1-2000,M5X20	4
13	内六角M5x8	8
12	平键5×15	2
11	内六角M6x25	6
10	GB-T95-2002,M5	4
9	内六角M5x16	4
8	内六角M8x65	4
7	主轴电机连接板	1
6	皮带	1
5	同步轮	2
4	XK7113主轴箱	1
3	主轴护罩	1
2	主电机	1
1	ER20主轴	1
PC NO	PART NAME	QTY

yellow jacketCNCintroduce



Safety operation

Don not get caught up in your work!

All milling machines contain hazards from rotating parts, belts and pulleys, high voltage electricity, noise, and compressed air. When using CNC machines and their components, basic safety precautions must always be followed to reduce the risk of personal injury and mechanical damage.

Important - This machine to be operated only by trained personnel in accordance with the Operator' s manual and instructions for safe operation of machine.

READ BEFORE OPERATING THIS MACHINE:

No staff, unless authorized, can operate this machine. There may be injury or damage caused to persons or the machine, when it is operated by those staff who have not been trained.Those troubles resulted from improper operation are beyond the range of maintenance under warranty.

When lifting and handling the machine, persons should keep far away from it, so as to prevent any accident from occurring unexpectedly.

Put on suitable eye and ear protection articles, when operating this machine, so as to prevent any injury caused by chips.

Be sure to have the door closed, when operating this machine. The rotating tools may cause injury to persons, as, when the program is running, the work table and the spindle head may shift very fast in any direction at any time.

As this machine is automatically controlled, it may start to run at any time.

When the machine is working, fingers should be kept far away from the workpiece and the cutting tool.

When the machine is running, the workpiece that is clamped improperly may be ejected out and shot through the safety door caused by the high feed at a high speed.
Machining a workpiece too large in size or clamping at the edge of the platform is also not safe.

When the machine is running, do not make any adjustment or move of the machine. Have the moving parts running in the machine stopped before changing the rotation speed of the spindle.

The emergency stop button is a red button on the control panel. With it pressed down, all motion of the motors, tool change and cooling pump in the machine are stopped. Only in case of emergency to prevent any collision in the machine, can this emergency stop button be used.

The machine should work within its performance range and workpieces should be machined at

proper cutting speeds and with proper feed rate. To obtain the detailed regulations on cutting speeds, maintenance & service and operation, refer to such documents as 《Mechanical Handbook》or its similar manuals.

Do not machine toxic or flammable materials, which will give out fatal smoke and fume, when machining. Consult your material supplier to obtain safe materials before machining.

It is necessary to use cutting tools in good condition. Check carefully the fitting parts and the tools before operation. All the damaged fitting parts and the tools should be repaired and replaced by professional staff. If there is anything abnormal found, do not operate and have it recovered before operation.

Do not carry out any maintenance & service, when the machine is power-on. Check the control elements and the operation elements regularly, so as to ensure the machine working normally.

Qualified parts should be used for replacement, when repairing the machine.

No refitting or alteration should be made presumptuously on the equipment, which, if necessary, should be solved by this company. Any personal injury or mechanical damage resulted from such refitting or alteration made on the CNC Milling Machine should not be within the responsibility of this company.

Be sure that all the staff related should be instructed on the relevant items and safety before actual operation and installation, so as to ensure production and personal safety in subsequent applications.

Keep the work environment tidy and clean.

Keep children far away from the machine.

Before shutdown of the machine, the tool used for the last machining should be sent back to the tool magazine before the spindle is cool down. Be sure not to fall into a bad habit to keep the tool in the spindle for a long time, or otherwise 10% of the tool shanks would be difficult to be drawn out as a result of rustiness in the tool shanks because of expansion on heating and contraction on cooling and corrosion by the cutting fluid for a long time.

Some or all of these warnings may be on your machine.

Be aware of the possible dangers.

If a sticker is missing from the machine, or an extra one is needed to remind employees of the need to work safely contact the Haas factory

Automatic Equipment

As this machine equipment is programmable it may start unexpectedly. Operators and other shop personnel need to be aware of this. Keep the doors closed at all times other than loading
or unloading parts and tools.

Machine Guarding

Some guarding and access panels may close unexpectedly due to machine operation. Ensure all guarding and panels are losed and if possible, secured. Personal injury will result if the guarding falls or the access panels swing closed.

Rotating Parts

If it is necessary to work on the machine, ensure the power is disconnected before servicing the machine.
Rotating parts within the machine can cause serious or fatal injuries.

Dangerous Voltages

Potential lethal voltages and currents are present within the system.Service should be done only by qualified personnel.

Job Set-up

Incorrect tooling, machining practices, or improperly clamped workpieces or fixtures will create devastating results. Double check
your set-up before beginning any machining operations.

Hot Areas

This warning is on areas of the machine that have a lot of heat associated with it. Serious burns will result if personnel come in contact with these areas.

Machine Awareness

Most areas of the machine are not designed to support the weight of the operator.

Proper Attire

Watch for loose clothing and other personal belongings. These may become entangled in the machine and cause personal injury.

Tooling

Do not slow, or try to stop the rotating tools. These are extremely sharp and will cut or cause extensive bodily harm.

Eye-Safety

Always wear safety glasses or a face mask during machine operation.Flying hot chips will cause injury.

Electrical Service

Electrical shock is possible with any machine. Only authorized certifiedpersonnel should service the machine. Do not open the control cabinet or any other electrical guarding.

Spills

Clean up spills immediately. Liquids, such as machine coolant will be slippery and will cause a hazardous work environment.

Fixtures

Improperly clamped workpieces can be thrown from the fixture with deadly force.

Keep Clear

Do not put anything between the tool and the workpiece. Severe personal injury can occur.

Safety Windows

Workpieces clamped improperly may be caused to fly out of the safety window, during machining, thus leading to serious injury to personal body. In the course of all operations, prudential and proper machining technologies should be adopted.

Points of Attention

2.1 Instruction for Safety Warnings and Note Markings

There are safety precautions included in this manual for the purpose of protection of the users and prevention of the machine tool from any damage, which
are classified into warnings and cautions according to the nature of safety and the supplementary information is described in notes. Read these warnings, cautions and notes carefully before operation of the machine.

Warning		Noteare not observed, the users may get injured orharmed or the equipment damaged.
Caution		If these operation methods or steps specified are not observed, the equipment may get damaged.
Note		Notes are used to provide supplementaryinformation other than warnings and cautions.

2.2 Statement on Product Instructions

Note: This machine comes with Mach 3control system

This company will go on to devote its effort in the perfection of machines, so as to make the machines better in performances and simpler in operation. There may be some small adjustment in the machines, which are not described specially in this edition.

2.3 Serious Warning!

The max rotation speed of this machine is 3000 r/min. The rotation speed permissible for the tools self-provided by the customers should be no less than this max rotation speed, or otherwise the rotation speed of the machine should be limited, so as to ensure the personal and equipment safety.

2.4 General Requirements

Operating temperature range: 5℃ to 40℃ (41℉ to 104℉)

Storage temperature range: -25℃～+55℃

Optimal environment temperature for this machine: 20℃

The place where this machine is installed should be free of any obvious impact or vibration.

There should be no interference sources in the surroundings and the machine should be kept from direct sunshine.

2.5 Power Requirement

Unless otherwise stated, the power supply for the machine is three-phase four-wire system AC220V, 50 Hz. AC120V,60HZ Its fluctuation should be within ±10% of the line voltage.

If the voltage inputted is not stable, going beyond the limit permitted, it is impossible to reach the rated horsepower of the machine. The machine may run normally but can not transmit the power required.

The reliable earthing is a guarantee for personal safety and the safe running of the machine. When connecting the power wires to the machine, it should be first to connect the protective earth wire, which should not be connected to the cooling pipes or the ground bar
at the side of the machine. The specification of the earth wire should be no less than that of the power conductors.

The power inputted into the machine should be earthed.

Customers are requested to check the machine frequently to make sure that its earth wire is connected reliably.

2.6 Operation Requirement

The operatior must read the manual carefully before he starts the machine.

Performances of Machine

3.1 Main Performances, Applications and Features of Machine

This machine comes with Mach 3 CNC control. It can machine flat surface, hole. The machine is very suitable for mechanism and training.

The main transmision adopts DC brushless motor and spindle various speed. X、Y、Z axises are connected by step motor and ball screw. Then all axises achieve feeding. The handwheel can controls the XYZ axis.

3.2 Main specification

Machine size	L×W[mm]	400×140
T slot	W×N×D[mm]	12×3×24
Loading [kg]		50

Table travel

X[mm]	
Y[mm]	
Z[mm]	
Distance between end surface of spindle to work table[mm]	
Distance between center of spindle to vertical column[mm]	

Spindle

Spindle taper hole	ER20、ER25
Spindle speed [r/min]	3000/6000

Motors and Speeds

Spindle	Rated power of motor[kW]	400W
	Rated torque[Nm]	1.4N.M
X、Y、Zaxes	Max torque of motor[Nm]	XY： 2.5N.M ； Z： 3.6N.M
	Max feed rate[mm/min]	2000
Cooling pump (Optiona)	Power of motor[kW]	
	Rated flow rate[L/min]	

Position accuracy [mm]	±0.02
Reposition accuracy[mm]	±0.015

Weight

N W/ GW[kg]	95/115

Packing size

L*W*H[cm]	

Machine struture

4.1 Main body

4.1.1 Base

This machine is mainly composed of a base, a vertical column, a work table, a headstock, a tool magazine, an electric cabinet, a control panel and button station, a cooling tank and a lubrication system, with the electric cabinet installed on the back side of the machine, the overall layout of which is compact in structure, convenient in operation and small in area occupied.

4.1.2 Worktable

The work table is a key component to put the workpiece to be machined into feed motion along the X and Y direction to fulfill the cutting processing. The feed motion along the

X direction is realized by the stepping motor installed on the right side, in which the stepping motor drives, through a coupling, the ball screw pair into rotation and the ball screw pair drives further the work table intoworking.

The ball screw shaft and the screw pair have been applied with pre-tightening force to increase the axial rigidity and the transmission accuracy of the screw.

4.2 Column

The vertical column is also one of the base parts of the machine and on it there are the guideway, along which the headstock moves upward and downward, and the ball screw pair for the Z axis installed.

The feed motion of the headstock in the Z direction is fulfilled by a stepping motor, in which the stepping motor drives, through the coupling, the ball screw pair into rotation.

The ball screw shaft and the screw pair have been applied with pre-tightening force to increase the axial rigidity and the transmission accuracy of the screw.

The guideway is also in a rectangular structure and is ground precisely after supersonic frequency hardening treatment, so as to increase its rigidity and wear resistance.

4.3 Headstock

The spindle is driven by the main motor into rotation through the synchronous belt and the belt pulleys.

The tool unclamping in the machine is realized by the ER collet installed on the top of the spindle.

Coolant system (optional)

5.1 Brief Description of Cooling Pump

The cooling fluid tank used in this machine is of an external and mobile type, which is placed on the lower part at the rear of the machine, when it is used (see the figure below). The cooling fluid is sent through a conveying pipe to a hose nozzle, the position and the cooling fluid flow rate of which can be adjusted at will. The cooling fluid used flows back through filtration to the cooling tank for recycling use.

5.2 Brieft introduction

A three-phase vertical coolingpump for machine tools is adopted in this machine and the cooling fluid is usually saponification liquid, emulsion liquid, soda water, light mineral oil and other fluids without serious corrosion.

Rated voltage：	380 V/220V/ other voltage
Rated current：	50 Hz
Rated frequency：	3 m
Rated lift：	12 L/Min
Flow rate guaranteed：	40 W

5.3 Maintenance & Service and Points of Attention

Before the machine is started, check the cooling fluid level and check the deposition amount of chips in the chips collection pan and remove them timely.

Change the cooling fluid and clean the cooling tank thoroughly once every 6 months.

The mineral cutting oil can do damage to rubber parts in the machine.

When machining casting parts, sands on them and abrasive component in cast aluminum and iron will shorten the service life of the pump.

Porcelain and similar product machining is not included in the range of the statement of guarantee for wearing and its risk should be born by customers themselves. For the abrasive cutting, a maintenance plan should be prepared additionally. The cooling fluid should be changed and settlings at the bottom of the cooling tank should be cleared off more frequently. It is recommended to use a larger cooling tank. In an environment full of abrasive dust, that the service life of the pump is thus shortened is not within the range of guaranteed maintenance & repair under warranty.

Handling and Installation

6.1 Unpacking

When unpacking, first remove the top cover plate, then dismount the plates around and finally remove the bottom plate, when it is moved to its installation position. After unpacking, first check the external conditions of the machine and then check the accessories and tools attached against the packing list of the machine. If there is any question, contact this company immediately.

6.2 Handling of Machine

Before handling, bring down the headstock to its middle or lower position of its travel, pad the spindle with square pad wood under it (the supporting square wood has been provided in packing before delivery) and move the saddle and the working table to the middle position of their travel respectively, so as to prevent any impairment to the accuracy of the machine due to vibration during transportation.

When handling, it is recommended to use a fork lifter. Put steel bars through the lifting holes of the machine body, use a fork lifter to lift the machine up slowly and convey it to its installation position.

The machine, when handled with a travelling crane or a hoisting machine, should be lifted according to the marks. It should be lifted and put down smoothly without too much inclination. There should be no impact or too much vibration against the bottom and the sides, so as to prevent any impairment to the accuracy of the machine.

6.3 Installation

Whether the working accuracy of a machine is kept stable is decided by the installation accuracy of the machine. If the machine is installed securely and accurately, its working accuracy should be guaranteed. Keep this in your mind that the milling machine has been adjusted and cutting-tested comprehensively before delivery and, if installed improperly, its

accuracy and performances will be impaired.

To ensure the machine working stably, when installing, enough depth of foundation should first be guaranteed, usually no less than 470 mm in depth.

For the foundation screw bolts to fix the machine securely, customers are required to prepare them according to the drawing below by themselves.

Land Occupation Drawing for Milling Machine Installation :

The permissible error in both the longitudinal and the transverse direction is 0.03/1000 mm. If it is checked to meet the requirement, pour cement to fix the foundation bolts (Cement No.40 should be used for the machine foundation). From now on, the machine and the foundation should not be vibrated seriously. Wait till the cement is completely solidified and tighten up the nuts of the foundation bolts securely. Then use the level instrument to check it again to ensure that the installation requirement is satisfied.

When the machine has been installed in the foundation and adjusted properly, wipe off the anti-rust agent on it (For prevention of getting rusty, those locations of the machine liable to be eroded have been coated with anti-rust coating in the packing before delivery).

Use a piece of soft cloth soaked in kerosene or gasoline to clear off the anti-rust coating.

It is forbidden to dismount the components important for machine accuracy to clean.

Be sure not to use solution damageable to painted surfaces, so as to prevent their peeling off.

With the cleaning completed, apply a thin coating of engine oil on the exposed surfaces to prevent them from getting rusty.

Machine Electricity

The power supply in the machine place must be full and steady. Otherwise, the fluction may damage the machine and its electronics. What's worse, it may pose a threat to operator's safety. The total power is2KVA.

7.1 Check the power supply

The total power supply must be consistent with the machine specification. Otherwise, the machine works abnormally and the fuse blown, and it may even cause safety accidents.

! ATTENTION!

1. If the voltage is not steady, please install stabilizer.
2. Keep dry in the electric cabinet.
3. All swithes must be turned off when the machine connects the power supply.

Machine operation

Although the machine has some safety devices and a warning label is attached to each part of the machine, the operator may, after operating the machine, have some unpredictable hazards, so after reading these warnings and instruction manuals, In order to operate thismachine.

8.1 Machine Start-up Safety Precautions

8.1.1 Confirmation before starting up

Make sure the cable is not damaged, in order to avoid short circuit, leakage and electric shock.
Make sure the power supply is adequate.

Make sure the cable is properly used and the wire diameter can be reliablyloaded.

Make sure that the power cord is connected to the mains and that the ground wire is connected. Make sure that the operation button is confirmed for operation. Make sure the oil has been added to the normal level. To determine the machine tool parts and work area clean and tidy environment. Make sure the machine is not operating under overload. Determine the machine package, all fixed parts removed.
Make sure that you have sufficient knowledge of the machine or have read the instruction manual of the machine.

8.1.2 HOT! Warning!

1. In the test machine process, not only the speed of G00 to finish the whole process, G00is usually used in the return to the origin and quickly reach the designated point, do not just use G00 back and forth movement, this will make machine life damage, The company is not responsible for the warranty.

2. Operation

The first time every day to start the heat engine, manual reference point in the shaft back, with AUTO or MDI side

The spindle is operated for one minute or more in S250, S500, S1000 and S2000, and the axis is continuously operated for 3 to 5 minutes at the speed of G01 F1000.

8.2 Running

The operator should read the instruction manual (mechanical and electrical parts), the machine tool numerical control system operation manual, the servo unit, the instruction manual of the servomotor and so on, and then follow the relevant operating method and sequence first,Power is connected, you must open empty check the parts of the operation, in order to work.

Machine maintenance

9.1 Maintenance beforehand

Cleaning is very important in the maintenance before hand. Dust, moisture and fume intermittent and worktable rust.All maintenance method should be consisten with the effective plan. Even though the maintenance plan conflicts with the production plan, the operator must insist the maintenance plan to achieve longer life of the machine. The operator must take notes for the parts, especiall y those in the controller.

9.2 Daily maintenance

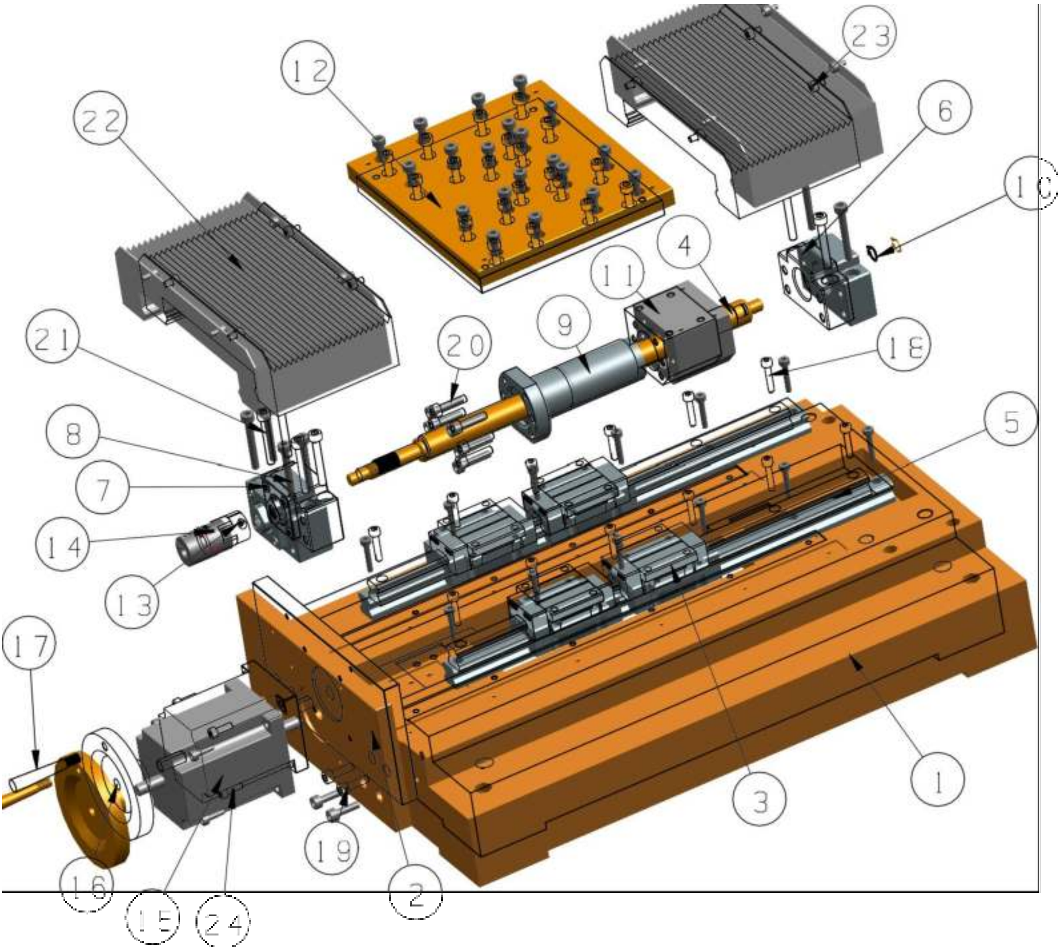
1. Remove the chips on the wortable, base and saddle.
2. Clean the oil and coolant liquid and other material on the machine surface.
3. Clean the cover on the guideway.
4. Clean the spindle hole by clean rag and apply thin oil.
5. No tools can be placed on the cover.
6. The coolant tube must be smooth to allow adequate liquid.

9.3 Monthly maintenance

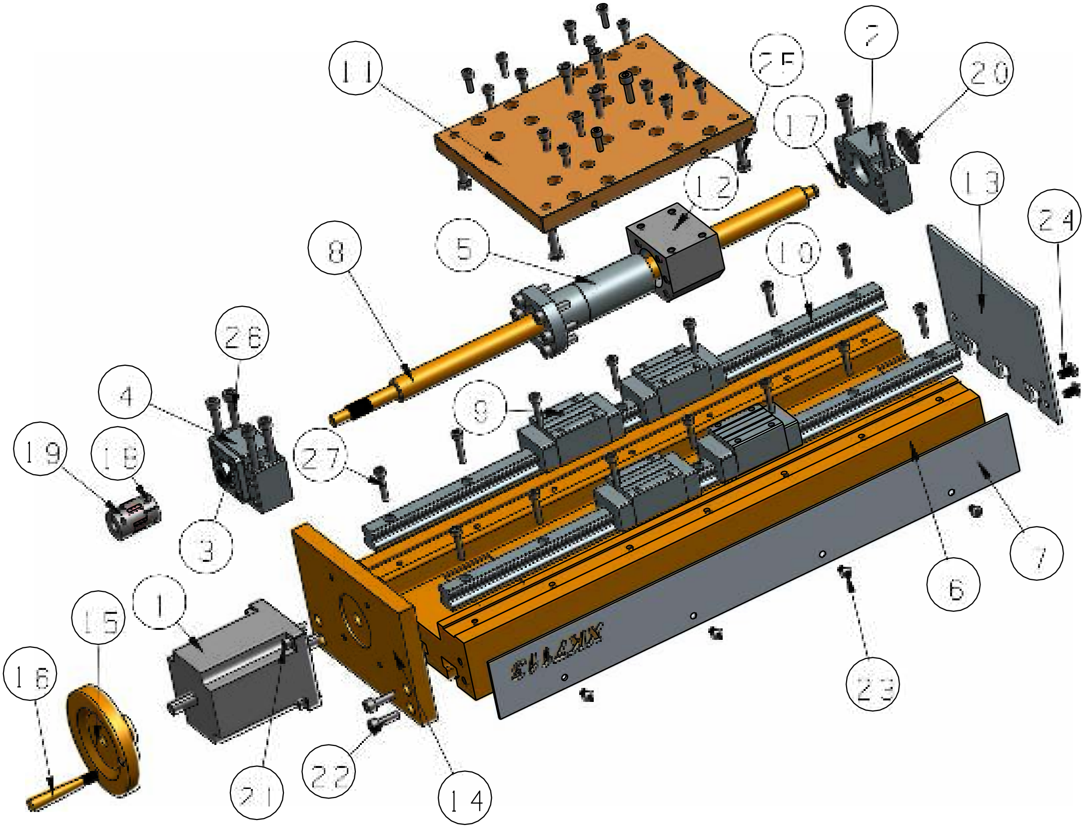
1. Deal with the daily maintenance record.
2. Clean the electric cabinet and machine.
3. Check the table and base.
4. Check the end of the wiring.
5. Romove the liquid in the. Clean the tank and add new liquid.

9.4 Manitenance twice a year

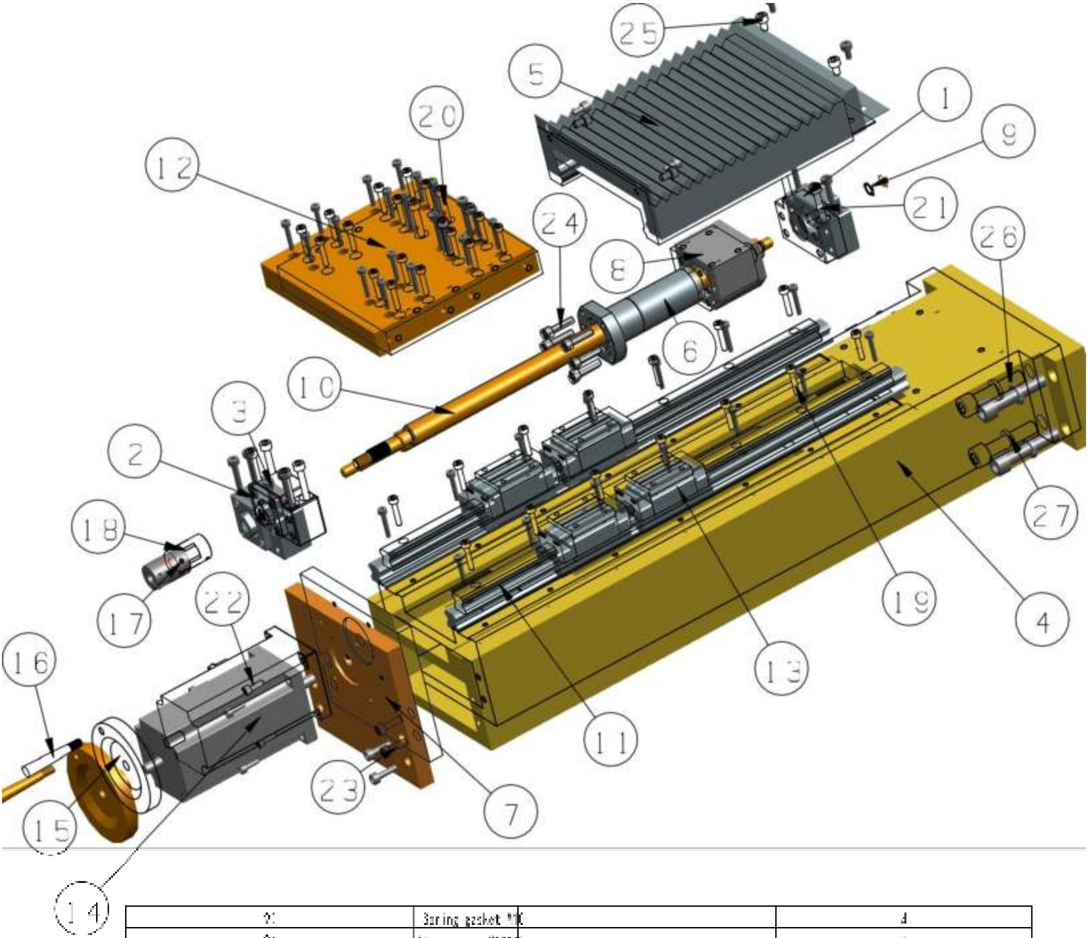
1. Deal with the monthly maintenance record.
2. Clean thoroughly on the electric cabinet and machine.
3. Clean all the motors on the machine.
5. Check the connection between motor and machine. Repair and replace them in time.



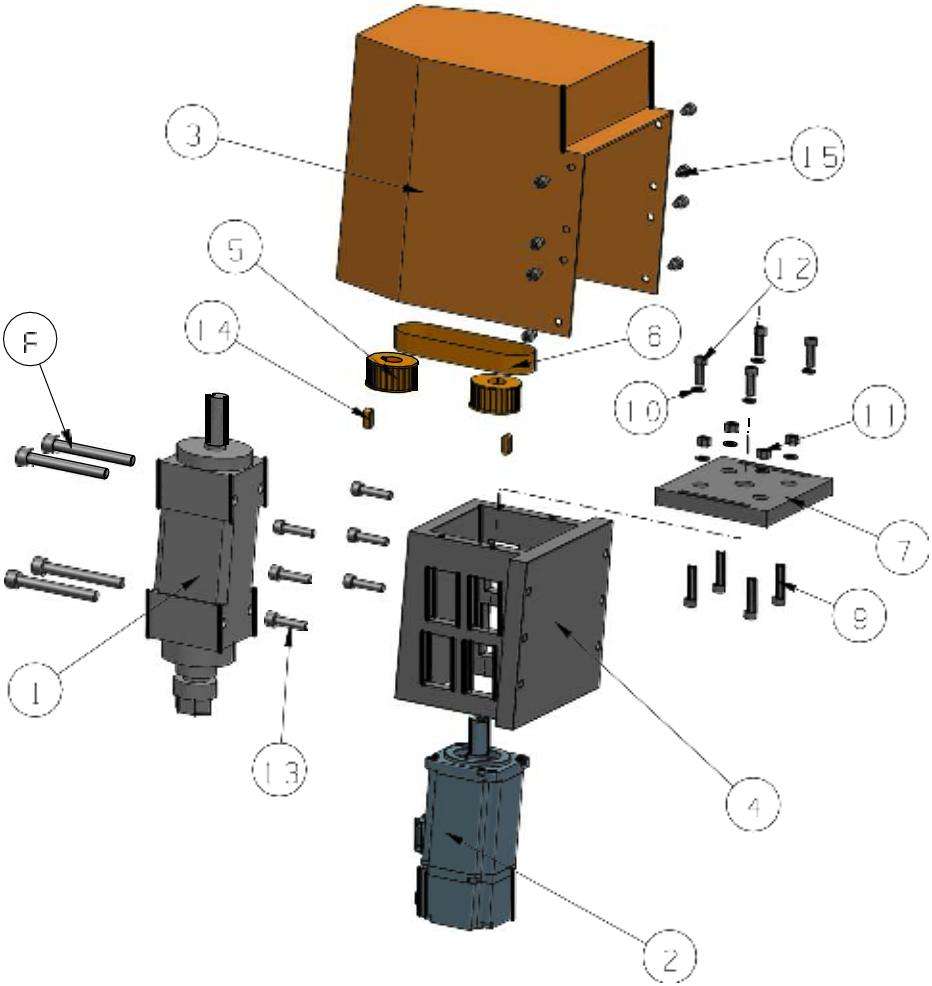
23	Allen screw M4X[illegible]	4
21	Allen screw M4X[illegible]	6
22	Base dust shield	[illegible]
[illegible]	Allen screw M5X[illegible]	4
20	Allen screw M5X[illegible]	4
19	Allen screw M5X[illegible]	[illegible]
18	Allen screw M[illegible]	[illegible]
17	The handwheel handle	1
16	The handwheel	1
15	Stepper motor	1
14	coupling	1
13	Allen screw M3X10	[illegible]
12	Under the dragging plate	1
11	Nut seat	1
10	Retaining ring M8	1
9	DFS1605	1
8	[illegible]	1
7	Allen screw M4X[illegible]	4
6	[illegible]	1
5	Linear guide	[illegible]
4	Ball screw	1
3	Guide flange slide block	4
2	Motor connecting seat 1	1
1	The base	1
PT NO	PART NAME	QTY



[illegible]	Allen screw M[illegible]	14
[illegible]	Allen screw M[illegible]	6
[illegible]	Allen screw M[illegible]	10
[illegible]	Half round head screw M[illegible]	4
[illegible]	Half round head screw M[illegible]	4
[illegible]	Allen screw M[illegible]	8
21	Allen screw M[illegible]2	[illegible]
[illegible]	Dustproof plug	1
19	coupling	1
18	Allen screw M[illegible]	2
17	Retaining ring [illegible]	1
16	The handwheel handle	1
15	The handwheel	1
14	Motor connecting seat [illegible]	1
13	Table cover	1
12	Nut seat	1
11	On the plate	1
10	Linear guide (long)	2
9	Guide rail sliding block	4
8	Ball screw (long)	1
7	Workbench page	1
6	The workbench	1
5	[illegible]	1
4	[illegible]0	1
3	Allen screw M[illegible]0	4
2	[illegible]0	1
1	Stepper motor	1
[illegible]	PART NAME	QTY



PT NO	PART NAME	QTY
27	Spring gasket M1[illegible]	4
26	Allen screw M10x[illegible]	4
25	Allen screw M5x[illegible]	4
24	Allen screw M5x[illegible]	[illegible]
23	Allen screw M5x[illegible]	4
22	Allen screw M4x[illegible]	4
21	Allen screw M5x[illegible]	[illegible]
20	Allen screw M5x[illegible]	4
19	Allen screw M[illegible]	[illegible]
18	coupling	1
17	Allen screw M3x[illegible]	[illegible]
16	The handwheel handle	1
15	The handle	1
14	Stepper motor big	1
13	Guide rail sliding block	4
12	Connection plate	1
11	Linear guide	[illegible]
10	Ball screw	1
9	Retaining ring M[illegible]	1
8	Nut seat	1
7	Motor connecting seat 2	1
6	[illegible]	1
5	Pillar seat side	1
4	Seat	1
3	DK[illegible]	1
2	Allen screw M[illegible]	4
1	DK[illegible]	1
PT NO	PART NAME	QTY



15	Allen screw M5X8	8
14	Flat key M5X15	2
13	Allen screw M6X25	6
12	Allen screw M5X16	4
11	nut M5X0.8	4
10	gasket M5	8
9	Allen screw M5X25	4
8	Allen screw M8X65	4
7	Spindle motor connection plate	1
6	Synchronous belt	1
5	Synchronous wheel	2
4	spindle box	1
3	Main shaft cover	1
2	Dc brushless motor	1
1	spindle	1
PC NO	PART NAME	QTY

CTMACH 驰铁

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