

激光切割机用户使用手册

Laser Cutting Machine User Manual

MK-3015ST1



本使用手册只适用于本公司生产的设备。

本手册最终解释权归本公司所有。

This user manual is applicable only to equipment manufactured by our company.

The final interpretation of this manual rests with our company.

前言

Preface

感谢您选择使用我公司的产品。我们将为您提供完善的售后服务和解决方案，请您妥善保管本说明书及其他附件，以便您更好地使用。本说明书对产品的安全事项、工作原理、运输储存、安装方法、操作使用、故障排除、维护保养等进行说明。本说明书适用于我司产品的标准配置。为快速有效使用该产品需操作人员具备以下条件：

1. 操作者需要一定的电脑专业知识，会使用相关编辑绘图软件，例如：SolidWorks、AutoCAD、等制图软件。
2. 操作者具有一定的光学知识和相关机电设备的维修与维护知识。
3. 设备开机前，请确认您熟悉操作流程并能按要求操作。由于产品功能持续更新，您收到的产品可能与本手册描述存在差异，对此我们深表歉意。

Thank you for choosing our company's products. We will provide you with comprehensive after-sales service and solutions. Please keep this instruction manual and other attachments safe for your better use. This manual explains the product's safety precautions, working principle, transportation and storage, installation methods, operation, troubleshooting, and maintenance. This manual applies to the standard configuration of our products. For quick and effective use of this product, operators must meet the following requirements:

1. the operator needs to have certain computer expertise and be able to use relevant editing and drawing software, such as SolidWorks, AutoCAD, and other drafting software.
2. The operator must have certain optical knowledge and knowledge of the repair and maintenance of related electromechanical equipment.
3. Before starting the equipment, please confirm that you are familiar with the operating procedures and can operate it accordingly. Due to continuous updates to product functionality, the product you receive may differ in some aspects from the descriptions in this manual. We apologize for this.

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一、安全警告

一、Safety Warning

1. 综述

1. Overview

1. 在操作机床和进行日常维修之前，操作人员必须仔细阅读本章节，以对机床安全措施和要求有所了解，并遵守相关的安全预防措施。

1. Before operating the machine tool and performing daily maintenance, the operator must carefully read this chapter to understand the safety measures and requirements of the machine tool and comply with the relevant safety precautions.

2. 安全管理的警告

2. Security warning

1. 指定安全管理人员，确定其职责范围，并对操作者进行安全操作及安全防护教育。

1. Select a safety manager, define their responsibilities, and educate operators on safe operation and protection.

2. 指定激光安全管理区域，在管理区域的出入口设立警告牌，内容包括：激光加工机的功率、激光种类、禁止外人进入、注意保护眼睛和安全管理者姓名。

2. The laser safety management area is designated, and warning signs are set up at the entrance and exit of the management area, including the power of the laser processing machine, the type of laser, the prohibition of outsiders entering, the attention to protect the eyes and the name of the safety manager.

3. 激光加工机的操作人员，必须经过专门培训，达到一定水平，并在安全管理员同意的前提下，才能上岗操作。

3. Operators of laser processing machines must undergo specialized training, reach a certain level, and obtain the consent of the safety manager before they can operate the machine.

3. 激光安全通告

3. Laser Safety Notice

1. 激光对人体的主要危害是眼睛和皮肤，激光照射到人体的任何部位都会引起灼伤。尤其光纤激光长时间观察会严重危害到眼睛视网膜！所有操作人员必须严格佩戴1064nm激光防护眼镜！禁止不佩戴眼镜进行操作以及观察！应避免将身体任何部位置于激光切割的范围中，以免误操作造成伤害。

1. The main hazards of lasers to the human body are the eyes and skin; laser radiation can cause burns to any part of the body. Prolonged observation with fiber lasers, in particular, can severely damage the retina! All operators must strictly wear 1064nm laser safety goggles! Operating or observing without goggles is strictly prohibited! Avoid placing any part of the body within the laser cutting area to prevent injury from accidental operation.

4. 眼睛和皮肤的保护

4. Eye and skin protection

1. 在激光加工中，受到直接光束或散射光束照射时，都会伤害眼睛与皮肤，甚至导致火灾。该机床所配激光器为光纤激光器，操作人员应严格佩戴防护眼镜。并且对于设备的激光调整时，必须由受过培训的专业人员对激光进行调整，操作及调整时避免皮肤及眼睛受到直接照射。

4. During laser processing, exposure to direct or scattered laser beams can damage the eyes and skin, and may even cause fires. This machine tool is equipped with a fiber laser, and operators must wear protective eyewear. Furthermore, laser adjustments must be performed by trained professionals, and direct exposure to skin and eyes should be avoided during operation and adjustments.

5. 防火保护

5. Fire Protection

1. 激光切割时，会产生火花的飞溅，容易导致火灾的危险。因此工作区不应有易燃易爆物品存在，同时具备相应的防范设施。

1. Laser cutting can generate sparks that can easily cause a fire hazard. Therefore, flammable and explosive materials should not be present in the work area, and appropriate preventative measures should be in place.

6. 电气安全

6. Electrical safety

1. 不要用湿手接触任何开关以免触电。机床贴有闪电标牌的部位，表示这些部位有高压用电器或电气元件，操作者在接近这些部位或打开维修时应格外小心，以免触电。

1. Do not touch any switch with wet hands to avoid electric shock. The parts of the machine tool with lightning signs indicate that these parts have high voltage electrical appliances or electrical components. Operators should be extra careful when approaching these parts or opening for maintenance to avoid electric shock.

2. 全面仔细阅读机床说明书，以便熟悉各项功能和对应键的操作方法。不要轻易打开电气柜门，禁止私自改变已设定的机床参数。如果需要改变，必须由设备制造厂培训且取得认可的专业人员操作，并记录下变动前的参数值，以便在必要时，能恢复原始状态。d) 加工用的激光，一般供电电压为高压，应防止激光器内部高压电及高压电下产生的X射线伤害的危险。e) 在通电状态下不要触摸电气柜内带电。

2. Read the machine manual carefully to familiarize yourself with all functions and their corresponding key operations. Do not open the electrical cabinet door without authorization. Unauthorized modification of preset machine parameters is strictly prohibited. Any required adjustments must be performed by certified personnel trained by the equipment manufacturer, with pre-change parameter values documented for potential restoration. d) Processing lasers typically operate at high voltages. Prevent hazards from internal high-voltage currents and associated X-rays. e) Never touch live components inside the electrical cabinet while powered on.

7. 机器的防护措施

7. Machine protection measures

1. 指定安全管理员，确定其职责范围，并对操作者进行安全操作及安全防护教育。

1. Appoint a safety manager, define their responsibilities, and provide safety operation and protection training to operators.

2. 指定激光切割机安全管理区域，在管理区域的出入口设立警告牌，内容包括：激光切割机的功率、激光种类、禁止外人进入、注意保护眼睛和安全管理者姓名等。

2. Designate a safety management area for the laser cutting machine, and erect warning signs at the entrances and exits of this area, including: the laser cutting machine's power, laser type, prohibition of unauthorized personnel, cautions to protect eyes, and the name of the safety manager.

3. 激光切割机不用时，应断掉总电源，以免闲杂人员误操作引起危害。

3. When the laser cutting machine is not in use, the main power supply should be disconnected to prevent accidental operation by unauthorized personnel.

4. 应把加工过程中产生的烟尘气体及激光工作气体通过废气管道排放到室外，所有气瓶均应摆放整齐、稳固。

4. Fumes and gases generated during processing, as well as laser working gases, should be discharged outdoors through exhaust pipes. All gas cylinders should be neatly and securely arranged.

8. 使用人员常识

8. Common sense for users

1. 激光切割机的操作人员，必须经过专门培训，达到一定水平，并在安全管理员同意的前提下，才能上岗操作。

1. The operator of laser cutting machine must undergo special training, reach a certain level, and can only operate with the consent of the safety administrator.

2. 激光切割机的操作者或在激光使用期间接近激光的人员，应戴上适当的激光防护镜，一定要有良好的室内光照，以保证操作者顺利操作。

2. The operator of the laser cutting machine or the person who is close to the laser during the use of the laser should wear the appropriate laser protection glasses, and there must be good indoor lighting to ensure the smooth operation of the operator.

9. 警告

9. Warn

1. 断电后，必须等待5分钟以上再触及端子。因断电后在一段时间内动力线端子间留有高电压，为避免触电请不要立即触及。

1. After power failure, you must wait for more than 5 minutes before touching the terminals. Because there is a high voltage between the power line terminals for a period of time after power failure, please do not touch them immediately to avoid electric shock.

二、产品概述

二、Product Overview

1. 产品介绍

1. Product presentation

1. 金属激光切割机，是我公司自主研发并已标准化的成熟产品，利用光纤激光器产生的激光光束聚焦后照射到板材表面时释放的能量将金属材料融化，同时利用高压气体将金属材料融化产生的熔渣吹走，从而达到切割的目的。主要用于不锈钢、碳钢、锰钢、弹簧钢、等金属板材的切割。激光切割是板材加工中采用的一种先进加工方法，具有效率高、精度高、切割面光洁度高等优点，其它加工方式无法同时具备上述优点。本公司生产的激光切割机可根据客户需求选配进口激光器或国产激光器，同时伺服电机、减速机、齿轮齿条、丝杠导轨等零部件均选配了国际知名品牌的产品，保证了切割机产品的高质量、高精度。

1. The metal laser cutting machine, a mature product independently developed and standardized by our company, utilizes the energy released when the laser beam from an optical fiber laser focuses on the surface of metal sheets to melt the material. Simultaneously, high-pressure gas blows away the molten slag, achieving precise cutting. It is primarily suitable for cutting metal sheets such as stainless steel, carbon steel, manganese steel, and spring steel. Laser cutting is an advanced processing method in sheet metal fabrication, offering unparalleled advantages like high efficiency, precision, and smooth cutting surfaces—features unmatched by other processing methods. Our laser cutting machines can be equipped with either imported or domestic lasers according to customer needs. Additionally, components such as servo motors, reducers, gear racks, and lead screw guides are all sourced from internationally renowned brands, ensuring the high quality and precision of our cutting machines.

2. 主要特点

2. Main features

1. 高性能激光器，配合稳定操作系统，使切割效果达到最优。
1. High-performance laser, combined with a stable operating system, ensures optimal cutting results.
2. 具有完善的冷却、润滑及除尘系统，使整机运行稳定、高效、耐用。
2. It has a complete cooling, lubrication and dust removal system, which makes the whole machine run stably, efficiently and durable.
3. 带自动调高，保持焦距恒定，切割质量稳定。
3. Features automatic height adjustment to maintain a constant focal length and ensure stable cutting quality.
4. 可对多种金属材质切割，切割效果优秀稳定。
4. It can cut a variety of metal materials with excellent and stable cutting results.
5. 采用龙门结构、整体铸造横梁以及航空铝材横梁，具有较高的刚性、稳定性、抗震性。

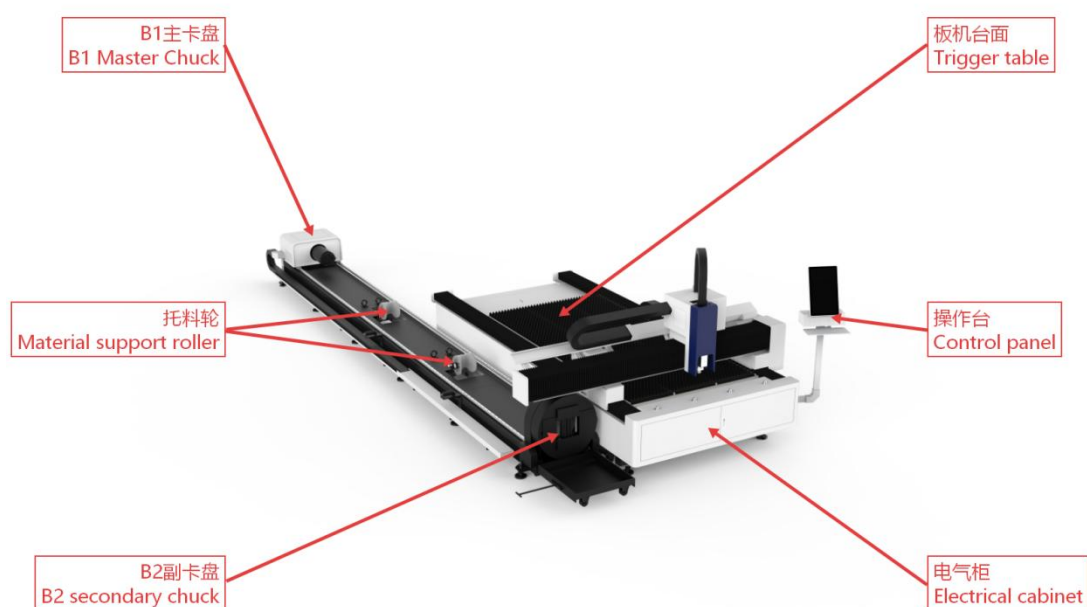
5. It adopts a gantry structure, integral cast crossbeams, and aviation aluminum crossbeams, which have high rigidity, stability, and seismic resistance.
6. 以精密直线导轨和齿轮齿条作为传动元件，精度高、速度快。
6. It uses precision linear guides and gear racks as transmission elements, resulting in high precision and high speed.
7. 可通过网线通讯，对激光切割过程进行远程交流和监控。
7. The laser cutting process can be remotely communicated and monitored via network cable.

三、设备结构

三、Equipment Structure

1. 切割机结构介绍

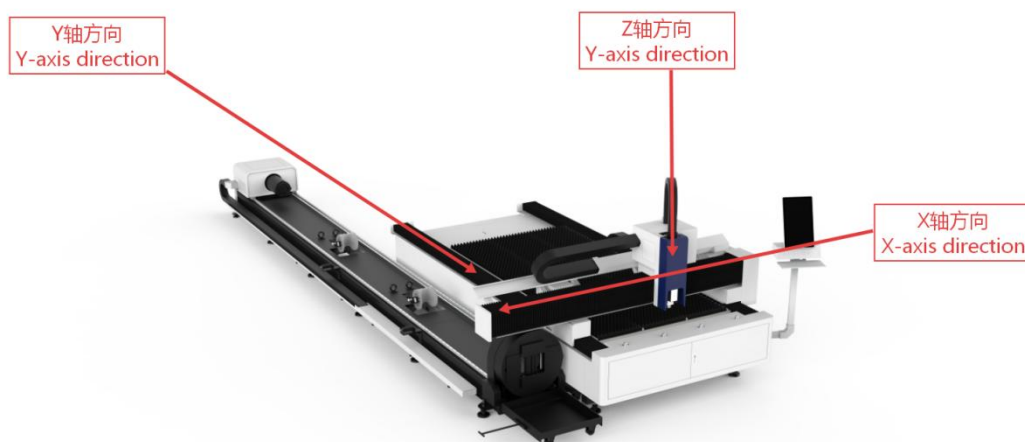
1. Introduction to the Structure of a Cutting Machine



参考示图，具体以实物为准
Refer to the illustration; the actual product shall prevail.

2. 床身部分

2. Bed part



参考示图，具体以实物为准

Refer to the illustration; the actual product shall prevail.

3. 横梁

3. Crossbeam

横梁采用可热处理强化铝合金加工而成,采用因激光切割为非接触切割,对横梁进行轻量化设计,而铝合金密度低,强度高,满足激光切割高速度,高精度的要求。

The crossbeam is equipped with high-precision linear guides and a rack-and-pinion transmission mechanism, enabling the Z-axis device to perform reciprocating motion in the X direction. Switches and buffer blocks are also installed at both ends of the travel path to provide dual safety protection for the movement.



4. 卡盘

4. Chuck

1. 前后两个卡盘均为气动卡盘。使用压缩空气提供动力。最大加工管材尺寸由B2副卡盘决定。

1. Both front and rear chucks are pneumatic chucks powered by compressed air. The maximum pipe processing size is determined by the B2 auxiliary clamp.

2. B1主卡盘可以更改夹爪的形式和安装方法来适应不同的管材安装。

2. The B1 rear chuck can change the form and installation method of the clamp to adapt to different pipe installation.



5. 伺服系统

5. Servo system



1. 所有轴和卡盘运动均采用伺服系统控制。精度高，反应灵敏。保障加工提供精密尺寸。

1. All axis and chuck movements are controlled by servo system, which ensures high precision and sensitive response, and guarantees the precision dimensions of machining.

6. 润滑系统

6. Lubrication system

1. 集中润滑系统，对滑块自动供油，保证了传动系统的精度，提高了直线导轨的使用寿命，在机床后方安装一个智能油泵。此油泵接受系统信号，通常以时

间为节点，大约设备每运行100分钟自动润滑15秒；没有到时间节点时油泵处于休眠状态。请时常关注油泵的油量，以便及时补充润滑油；本机使用的润滑油为68号导轨油。

1. An intelligent oil pump is installed at the rear of the machine tool. It operates based on system signals, automatically lubricating for 15 seconds every 100 minutes of equipment operation, with the pump remaining dormant until the scheduled time. Regularly check the oil level to ensure timely replenishment. The machine uses 68-grade guide rail lubricant.



2. 油路直接传输至滑块，实现精准润滑。

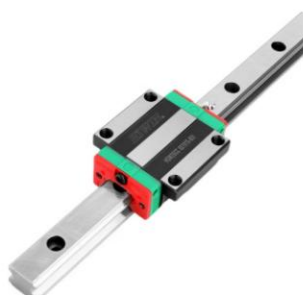
2. The oil is directly delivered to the slider, ensuring precise lubrication.



分油排
Oil separation



分油排
Oil separation



导轨滑块
Guide rail slider



导轨滑块
Guide rail slider

7. 冷却系统

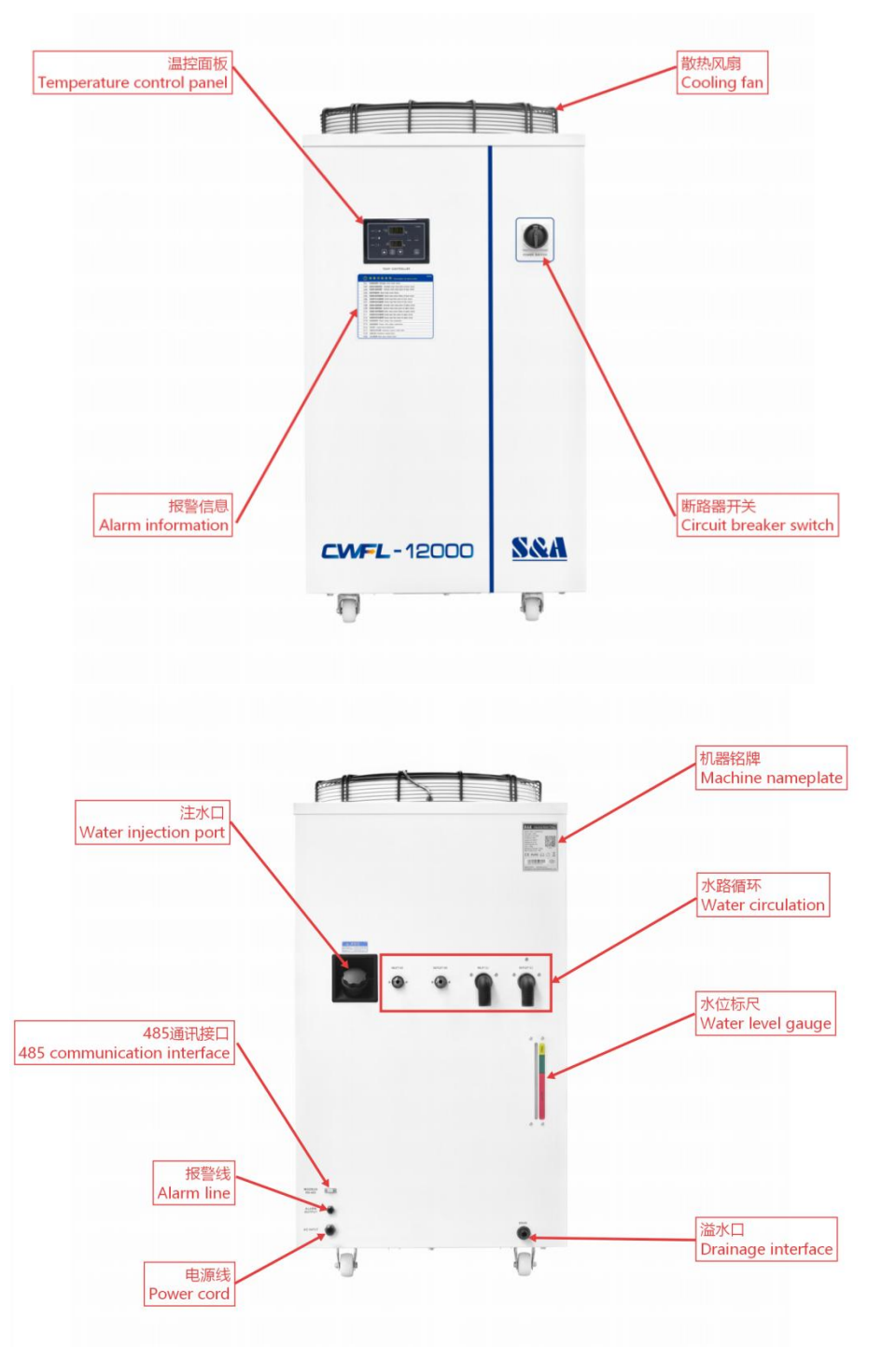
7. Cooling system

1. 激光切割机的水路系统采用的是双温冷水机，一路对激光器进行冷却，一路对切割头进行冷却。

1. The water system of the laser cutting machine uses a dual-temperature chiller, one cooling the laser and the other cooling the cutting head.

2. 以下为水冷机面板功能介绍

2. The following describes the functions of the water-cooled machine panel



8. 气路系统

8. Air system

1. 激光切割机的气路可以满足同时使用氧气和氮气，切割用氧气安装电器比例阀可通过软件实现气压调节。氧气主要用于切割普通碳钢；氮气主要用于切割不锈钢和合金钢。针对不同的材料选用不同的切割气体。大功率的激光器还可以根据客户的实际情况增加冷却气路，为切割头和喷嘴进行吹气冷却。还可以用压缩空气代替氮气切割。压缩空气必须使用激光专用空气压缩机，产生无水、无油、干燥的压缩空气。

1. The gas system of laser cutting machines supports simultaneous operation with both oxygen and nitrogen. The oxygen supply valve for cutting can be adjusted via software to regulate pressure. Oxygen is primarily used for cutting ordinary carbon steel, while nitrogen is mainly employed for stainless steel and alloy steel. Different cutting gases are selected based on material properties. High-power lasers may also incorporate cooling gas circuits according to customer requirements, providing airflow cooling for cutting heads and nozzles. Compressed air can alternatively replace nitrogen in cutting processes, provided it is generated by laser-specific air compressors that produce dry, oil-free, and dehydrated compressed air.



比例阀
Proportional valve



比例阀
Proportional valve



电磁阀
Solenoid valve



单向阀
One-way valve



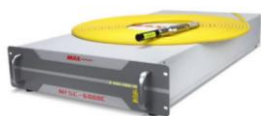
压力报警开关
Pressure alarm switch

13. 激光器

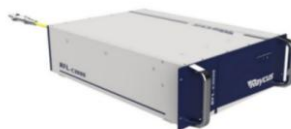
13. Laser

1. 激光器:切割机使用光纤激光器; 类型为连续激光器。作用是产生激光通过光纤传导至切割头。为切割板材提供激光能量。对于3000W以下或体积较小的激光器。我们通常会安装于机床内部, 激光器的电源由机床提供。当安装于机床内部时, 不需要客户进行二次安装, 所有连接均属于出厂设置。当使用6000W及以上的级别或体积较大的激光器时, 我们会选择激光器独立供电, 在安装时需要为激光器单独提供电源, 并且连接激光器与机床的信号线、光纤等。

1. Laser System: The cutting machine employs a continuous-wave fiber laser, which generates laser energy transmitted through optical fibers to the cutting head for sheet metal processing. For 3000W or smaller laser systems, we typically install them internally within the machine tool, with power supplied by the machine. This in-machine configuration eliminates the need for secondary installation, as all connections are factory-configured. For 6000W+ systems or larger units, we opt for independent power supply solutions requiring separate installation of the laser unit, along with dedicated signal cables and fiber optics connecting the laser to the machine tool.



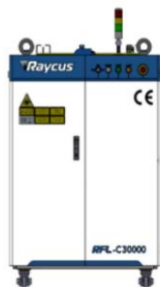
创鑫
MAX



锐科
Raycus



创鑫
MAX



锐科
Raycus



2. 使用方法：当使用max激光器时，为激光器接通电源后，复位急停开关，转动钥匙，等待水冷机温度稳定后（在寒冷冬季大约需要10分钟时间），按下并点亮start按钮后便可以使用。

2. Operating instructions: To operate the Max laser, first power it on. Then reset the emergency stop switch and turn the key. Wait until the water-cooled unit stabilizes (about 10 minutes in cold winter). Finally, press and activate the start button to begin operation.

3. Raycus激光器部分型号没有钥匙和按钮，只需要接通电源后等待水冷机稳定后可以使用。如果设有钥匙和按钮，请参考MAX激光器。

3. Some Raycus laser models require no key or button; simply power them on and wait for the water-cooled unit to stabilize before use. For models with a key or button, refer to MAX laser specifications.

4. 当激光器遭遇非正常操作或环境发生较大变化时（如电压、温度），激光器会发出警报（可能伴随灯光闪烁、蜂鸣声等）并停止工作。这是需要你打开激光器内控软件查明原因并解除警报。激光器内控软件会安装于机器的电脑上。当你不能操作时请联系我司的技术人员。

4. When the laser encounters abnormal operation or significant environmental changes (e.g., voltage or temperature fluctuations), it will trigger an alarm (possibly with flashing lights or a buzzer) and shut down. In such cases, you must activate the laser's internal control software to diagnose the issue and disable the alarm. The software is installed on the machine's computer. If you cannot operate the system, please contact our technical support team.

四、设备参数

四、Technical parameter

1. 主要参数

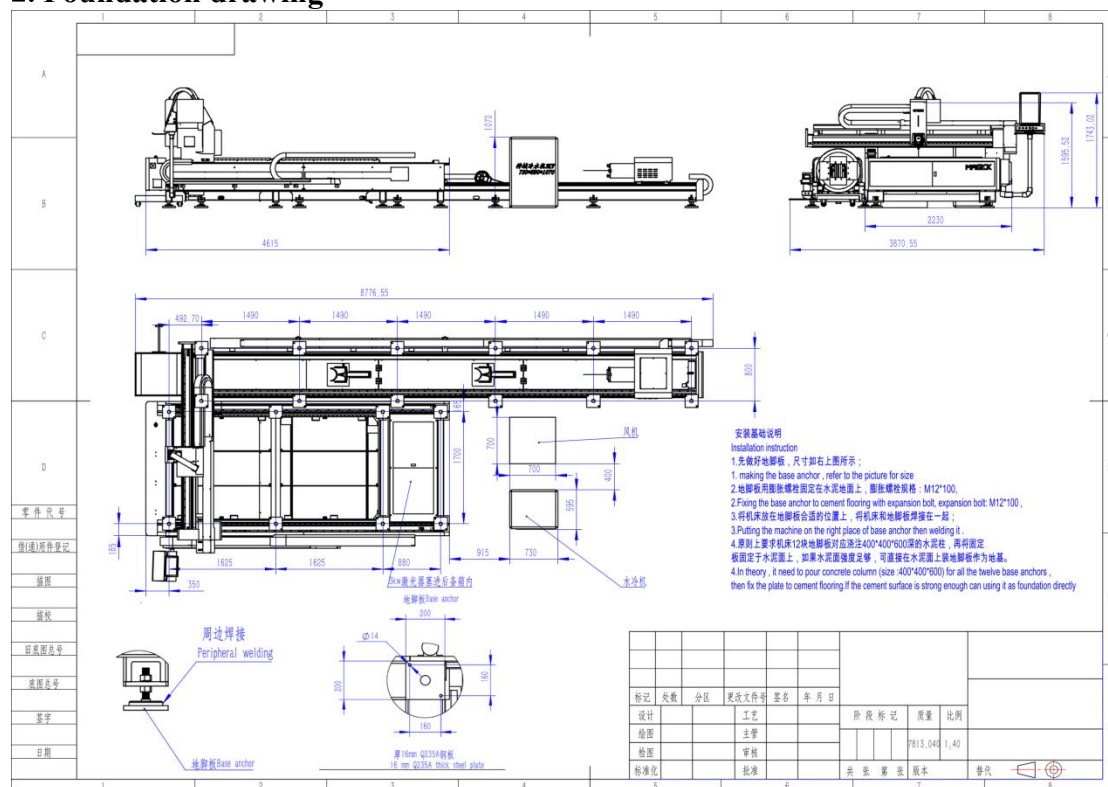
1. Main parameters

型号	MK-3015ST1	
净重	3.9T	
适配功率	1.5-12Kw	
最大加工范围(板机)	3000*1550mm	
最大加工范围(管机)	230-L6000mm	
Z轴行程	300mm	
加速度	1.2G	
最大移动速度	120m/min	
定位精度	±0.02mm	
重复定位精度	±0.03mm	
氧气比例阀	SMC/安沃驰	
电压/频率	380V/50HZ	
外观尺寸	8676*3670*2000mm	
总功耗	1.5Kw	25.5Kw
	2Kw	29Kw
	3Kw	33Kw
	6Kw	56Kw
	12Kw	88Kw

Model	3015ST1	
Net weight	3.9T	
Matching power	1.5-12Kw	
Maximum machining range (trigger)	3000*1550mm	
Maximum processing range (tube machine)	230-L6000mm	
Z-axis stroke	300mm	
Maximal acceleration	1.2G	
Maximum mobile speed	120m/min	
Positioning accuracy	±0.02mm	
Repeated positioning accuracy	±0.03mm	
Oxygen proportional valve	SMC/Avanoc	
Voltage frequency	380V/50HZ	
External dimensions	8676*3670*2000mm	
Total power consumption	1.5Kw	25.5Kw
	2Kw	29Kw
	3Kw	33Kw
	6Kw	56Kw
	12Kw	88Kw

2. 地基图

2. Foundation drawing



五、电气部件简介

五、 Introduction to Electrical Components

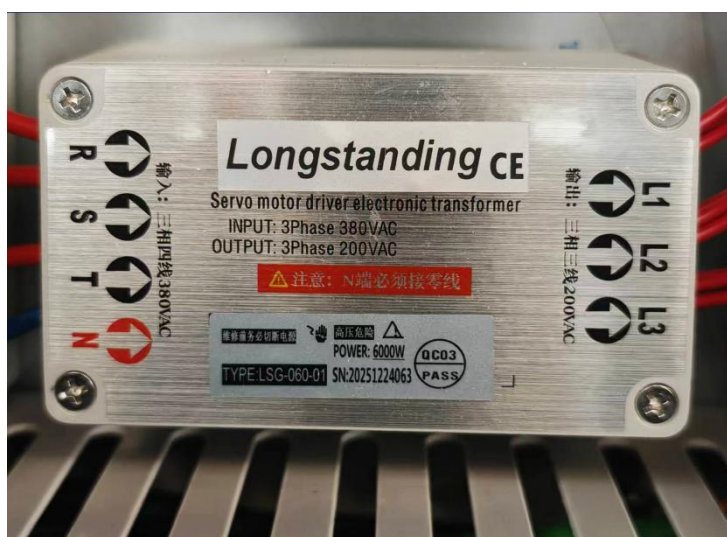
1. 伺服驱动器：是用来控制伺服电机的一种控制器，其作用类似于变频器作用于普通交流马达，属于伺服系统的一部分，主要应用于高精度的定位系统。一般是通过位置、速度和力矩三种方式对伺服马达进行控制，实现高精度的传动系统定位，目前是传动技术的高端产品。

1. Servo driver: A controller designed to regulate servo motors, functioning similarly to a frequency converter for standard AC motors. As a core component of servo systems, it is primarily employed in high-precision positioning applications. By controlling the motor through three parameters—position, speed, and torque—it achieves ultra-accurate positioning in transmission systems. Currently recognized as a cutting-edge product in transmission technology.



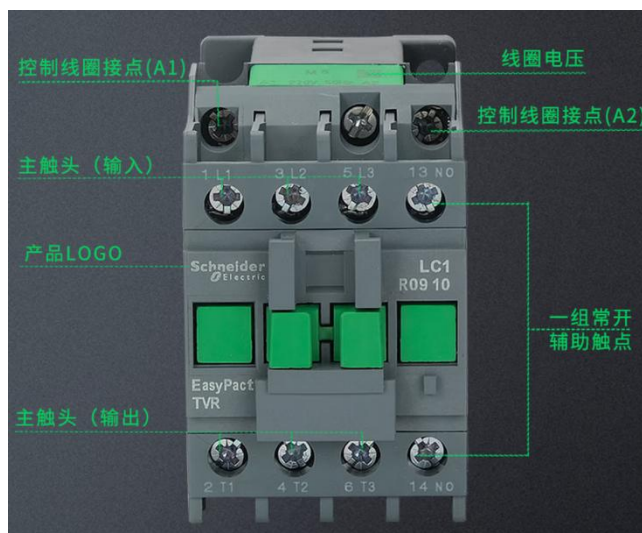
2. 伺服变压器：伺服变压器就是专门为伺服驱动系统提供的变压器，该类型的变压器可以有效地为伺服驱动器提供必要的电能。

2. Servo transformer: A servo transformer is a specialized transformer designed for servo drive systems, which efficiently supplies the necessary electrical power to servo actuators.



3. 交流接触器：利用线圈流过电流产生磁场，使触头闭合，以达到控制负载的电器。

3. AC contactor: An electrical device that uses a magnetic field generated by current flowing through a coil to close contacts, thereby controlling a load.



4. 断路器：断路器可用来分配电能，不频繁地启动异步电动机，对电源线路及电动机等实行保护，当它们发生严重的过载或者短路及欠压等故障时能自动切断电路，其功能相当于熔断器式开关与过欠热继电器等的组合。而且在分断故障电流后一般不需要变更零部件。

4. Circuit Breaker: A circuit breaker is designed to distribute electrical power, prevent frequent startups of asynchronous motors, and protect power lines and motors. It automatically cuts off the circuit when severe faults like overloads, short circuits, or under voltage occur. Its functionality combines that of a fuse switch with over/under heat relays. Importantly, it typically requires no component replacement after interrupting fault currents.



5. 系统控制板：系统板卡在设备中负责收集、发送控制信号和回应信号。类似于人体大脑。其控制设备的激光器、伺服电机、气体、润滑、以及切割软件的承载等。连接工控的电脑能实现集中处理报警信号和对设备的控制。

5. System Control Board: This board in the equipment collects and transmits control signals and response signals, functioning similarly to the human brain. It controls the laser, servo motor, gas, lubrication, and software for cutting operations. The connected industrial computer centralizes the processing of alarm signals and equipment control.



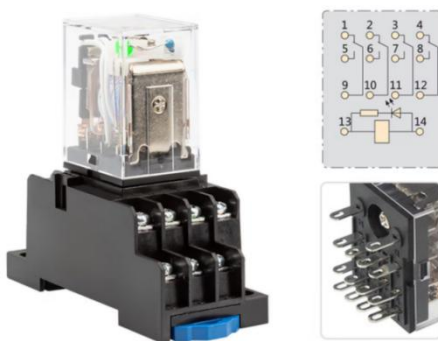
6. 扩展卡：这是为了扩展功能使用，连接到系统板，与系统控制板一起进行上述动作。

6. Expansion card: This is used to extend functionality by connecting to the system board to perform the aforementioned actions with the system control board.



7. 中间继电器：用于继电保护与自动控制系统中，以增加触点的数量及容量。它用于在控制电路中传递中间信号。

7. Intermediate relay: used in relay protection and automatic control system to increase the number and capacity of contacts. It is used to transmit intermediate signals in control circuits.



8. 电源模块：提供24V电源。

8. Power module: Provides 24V power supply.



9. 滤波器：电源滤波器是由电容、电感和电阻组成的滤波电路。滤波器可以对电源线中特定频率的频点或该频点以外的频率进行有效滤除，得到一个特定频率的电源信号，或消除一个特定频率后的电源信号。

9. Filter: A power filter is a filtering circuit composed of capacitors, inductors, and resistors. It can effectively filter out specific frequencies or frequencies outside the target range in the power line, obtaining a power signal with a specific frequency or eliminating a power signal after removing a specific frequency.



六、设备连接

六、Device attachment

1. 电路要求

1. Circuit requirements

1. 在开始连接机器电源之前，要保证车间的配电设施满足需求。首先准备一个带有漏电保护的空气开关，并且预留足够的接线位置。断路器容量约63A~100A。

1. Before connecting the machine's power supply, ensure the workshop's electrical distribution meets the requirements. First, prepare an air switch with leakage protection and reserve sufficient wiring space. The circuit breaker capacity should be approximately 63A to 100A.



2. 安装准备

2. Installation preparation

1. 为了保证安装顺利，一些物料必不可少请在安装前准备妥当。

1. To ensure a smooth installation, make sure to prepare all necessary materials beforehand.

2. 主电源线：本机使用3相380V电源，请准备最少一根5*10平方毫米的电源线。机床到配电柜的距离决定电源线的长度。若机器配备稳压器等电源设备或激光器水冷机为独立供电，请准备2-3根不等。

2. Main power cable: This machine operates on a 3-phase 380V power supply. Please prepare at least one 5×10 mm² power cable. The cable length depends on the distance between the machine and the power distribution cabinet. If the machine is equipped with voltage stabilizers or other power devices, or if the laser water-cooled unit requires independent power supply, prepare 2-3 additional cables as needed.

3. 水平仪：为了使机器运行更加稳定，请准备水平仪对机器的安装进行测量。

3. Level: To ensure stable machine operation, prepare a level to measure the installation.

4. 压缩空气：配备了接料和支撑功能或增加切割头气冷的机器，需要准备气泵为气缸提供动力。

4. Compressed air: Machines equipped with material handling and support functions, or those with added air-cooled cutting heads, require a gas pump to power the cylinders.

5. 铁片若干：当车间地面高度差异过大时，需要使用厚度不同的铁片调节水平。

5. Multiple iron plates: When the workshop floor has significant height variations, use iron plates of different thicknesses to level the surface.

6. 气体减压阀：切割气体使用氧气或氮气，需要准备气体减压阀来连接机床气体接口。

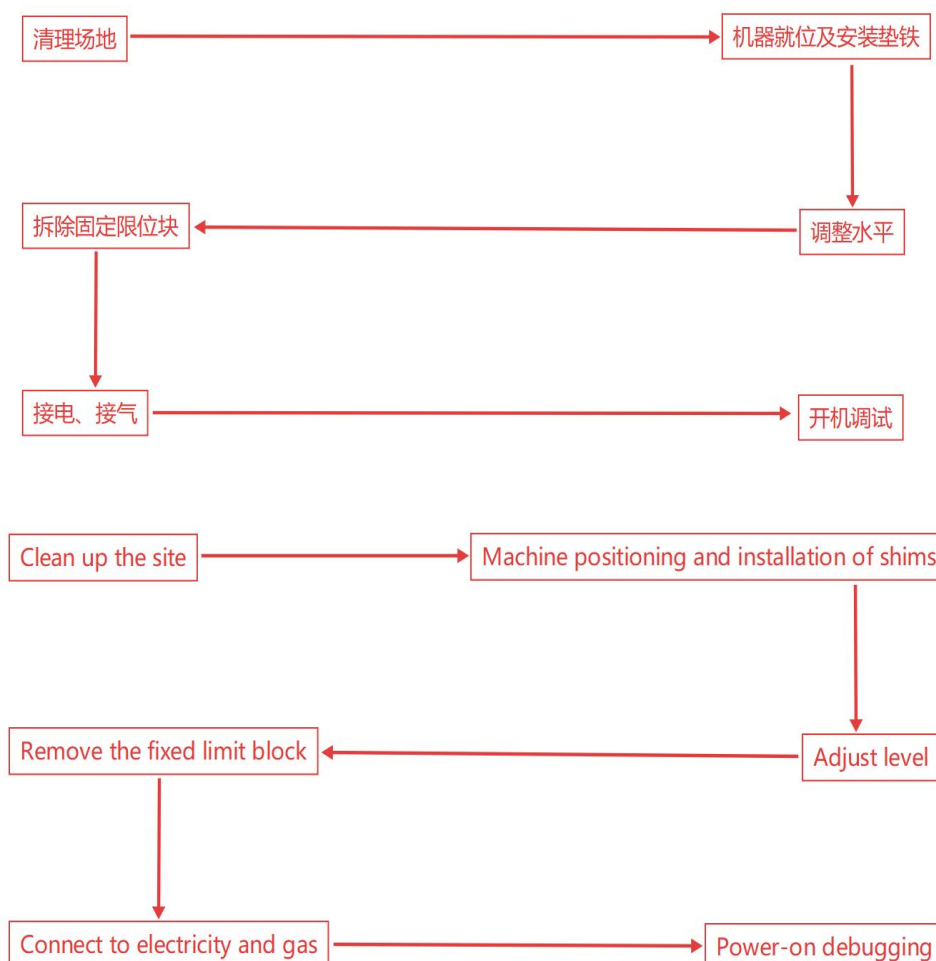
6. Gas pressure reducing valve: When cutting with oxygen or nitrogen, a pressure reducing valve must be installed to connect the machine tool's gas port.

7. 工具箱：准备各种工具来应对可能遇到的安装需要。

7. Toolbox: Prepare various tools to handle installation needs.

3. 安装流程

3. Installation



4. 电路连接

4. Circuit connection

1. 机器有多部分组成，每个部分都要接电，请确保每部分电路连接正确。错误的连接可能会造成设备的损坏；推荐专业电工进行安装接线；设备电源应使用380V三相电源，三相不平衡度<2.5%，线电压波动<5%。若用电环境不理想请加装

稳压器。三根相线请按照L1L2L3NPE顺序与外部电源对应（定制机除外）；水冷机、激光器需要单独为其连接电源，除尘风机可以连接到电气柜内部。

1. The machine consists of multiple components, each requiring electrical connections. Ensure all circuit wiring is properly installed. Incorrect connections may cause equipment damage; professional electricians are recommended for installation and wiring. The device must be powered by a 380V three-phase supply with an unbalance factor $<2.5\%$ and line voltage fluctuation $<5\%$. A voltage stabilizer should be added if the electrical environment is suboptimal. The three-phase lines should be connected to the external power supply in the L1L2L3NPE sequence (except for custom models). Water-cooled systems and lasers require separate power connections, while dust removal fans can be integrated into the electrical cabinet.

2. 用电安全注意事项:

2. Precautions for electrical safety:

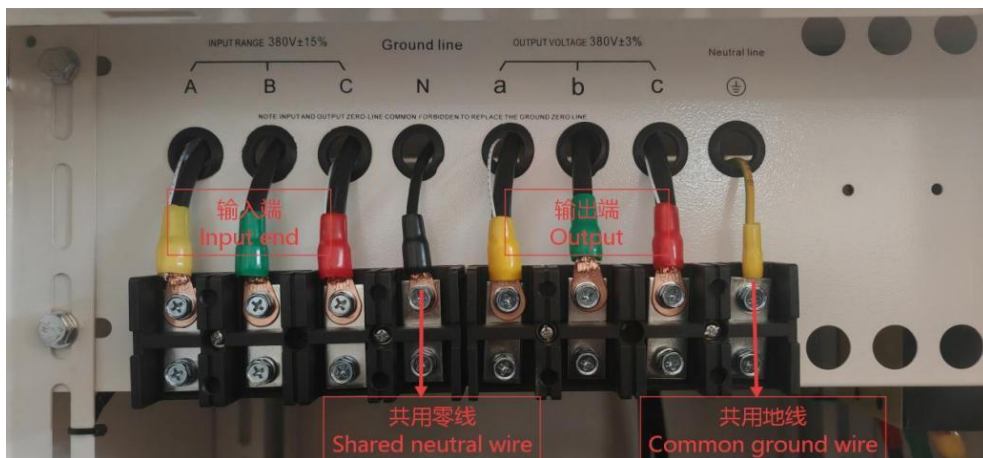
确保所有设备电压符合机器要求，确保电源线与断路开关连接牢固，以免电源缺相造成的设备损坏；各设备外壳必须接地，防止静电对设备电器元件造成损害，同时防止电路损坏漏电时对操作人员造成人身伤害；维修更换电器元件时应切断电源并等待一段时间后操作，严禁带作业；定期清除断路器、变压器、及接线板上面的灰尘，以免电流击穿灰尘，造成设备损坏；工作完成后应关闭电源。

Ensure all equipment voltage meets machine specifications and secure power cords to circuit breakers to prevent equipment damage caused by phase loss. All equipment casings must be properly grounded to protect electrical components from static electricity and to prevent operator injuries during circuit failures or leakage currents. When replacing electrical components, disconnect power supply and allow sufficient downtime before operation—never perform maintenance while powered on. Regularly clean dust from circuit breakers, transformers, and terminal blocks to avoid current-induced dust discharge that may damage equipment. Always turn off power after completing operations.

3. 若用电环境不理想则必须使用稳压器，稳压器接线方式如下。

3. If the electrical environment is suboptimal, a voltage stabilizer must be used.

The wiring method for the voltage stabilizer is as follows.



5. 水冷水路的连接

5. Connection of water and cooling water

1. 水冷机使用前必须加水，否则会造成水冷机损坏。水位保持在标尺的绿色区域。首次使用水冷机时，通电循环后水位会下降，请立即关机补水至绿色区域。水冷机为设备提供循环水冷，水冷水路分为两个路线。一部分为切割头循环水冷，另一部分为激光器循环水冷；水冷机管路与机床管路按照标签一一对应，因水冷机循环有一定压力，请连接可靠以免水压崩开管路。

1. The water-cooled machine must be filled with water before use to prevent damage. The water level should remain in the green zone on the scale. When using the machine for the first time, the water level will drop after the power cycle. Immediately shut down and refill the water until the level reaches the green zone. The water cooler supplies circulating water to the equipment, with two separate water circuits: one for the cutting head and the other for the laser. The water cooler pipes are labeled and matched with the machine tool pipes. Since the water cooler's circulation carries pressure, ensure a secure connection to prevent pipe rupture due to water pressure.



注意事项

Precautions

1. 水冷机内添加不含矿物质的纯净水、蒸馏水或去离子水，禁止添加任何有腐蚀性的液体或异味的水均不可注入水冷机。

1. The water-cooled machine must be filled with mineral-free purified water, distilled water, or deionized water. The injection of corrosive liquids or water with unusual odors is strictly prohibited.

2. 加水时应避免任何与水的无必要接触（例如手），所有注水的辅助设备，如泵、软管等，均应只用于此水冷机。

2. Avoid any unnecessary contact with water (e.g., hands) during refilling. All water-filling accessories, including pumps and hoses, must be used exclusively for this water-cooled machine.

3. 打开水冷机电源前，应检查水冷机水位，严禁无水或水位过低时开启水冷机，以免造成水冷设备损坏。水冷机进出水管严禁挤压、踩踏，保持水路畅通。

3. Before powering on the water-cooled machine, check the water level. Never start the machine without water or when the water level is too low, as this may damage the equipment. Do not squeeze or step on the inlet and outlet pipes to ensure the water flow remains unobstructed.

4. 气温在0℃以下时，应冷却水中加注防冻液，比例为70%水+30%防冻液；建议每两到三个月更换一次水冷机内的水。

4. When the temperature is below 0°C, antifreeze should be added to the cooling water in the ratio of 70% water+30% antifreeze. It is recommended to replace the water in the water-cooled machine every two to three months.

6. 气路的连接

6. Connection of airway

1. 机床会配备两根白色的气管，一根用来连接氮气（切割用压缩空气与氮气共用），另一根用来连接氧气。请通过氮气表把氮气管和提供氮气的装置连接起来，通过氧气表把氧气管和提供氧气的装置连接起来。机床床身有氧气和氮气连接口的标签，请对应标签连接气管。

1. The machine tool is equipped with two white air hoses: one for nitrogen (shared by cutting compressed air and nitrogen systems) and another for oxygen. Connect the nitrogen hose to the nitrogen supply device using a nitrogen pressure gauge, and link the oxygen hose to the oxygen supply device via an oxygen pressure gauge. The machine tool bed features labels indicating oxygen and nitrogen connection ports; connect the hoses accordingly to these labeled ports.



注意事项

Precautions

1. 氧气、氮气的连接和氮气表、氧气表的压力范围应满足上图要求，气体应满足下表要求：

1. The pressure ranges for oxygen and nitrogen connections, as well as for nitrogen and oxygen gauges, must comply with the requirements specified in the diagram above. The gases must meet the specifications listed in the table below:

切割气体	纯度（最低）	主要应用板材
氧气	99.99%	碳钢
氮气	99.99%	不锈钢
空气	洁净、无油、无水等杂质	条件允许的碳钢、不锈钢

Cutting gas	Purity (minimum)	Main application boards
Oxygen	99.99%	Carbon steel
Nitrogen	99.99%	Stainless steel
Air	Clean, free of oil, water and other impurities	Carbon steel and stainless steel, if conditions permit

2. 气体的纯度会对切割速度以及效果造成影响高纯度的气体会得到更佳的速度与效果。

2. The purity of gas will affect the cutting speed and effect, and the high purity gas will get better speed and effect.

3. 因各国家或地区标准不一样, 我司展示的氮气表和氧气表可能不能连接到您的供气装置上, 所以请在当地另外采购氮气表和氧气表。

3. Due to varying national or regional standards, the nitrogen and oxygen gauges displayed by our company may not be compatible with your gas supply system. Please purchase these gauges separately in your local area.

4. 使用气体温度不允许超过50 °C。

4. The gas temperature should not exceed 50°C.

5. 原则上建议气体方面的问题与气体供应商保持联系。

5. In principle, it is recommended to contact the gas supplier for gas-related issues.

6. 气体初次安装应排气, 保证管路清洁后才可接入机床。

6. The gas should be vented during the initial installation and the pipeline should be cleaned before connecting to the machine tool.

7. 本台机器还需要使用压缩空气。切管单元卡盘, 支架等部件使用的压缩空气; 接气入口在切管单元的左侧。

7. This machine also requires compressed air. The air is used for components such as the pipe-cutting unit's chuck and bracket. The air inlet is located on the left side of the pipe-cutting unit.

7. 激光器的安装

7. Laser installation

1. 激光器为独立安装, 那么需要重新连接激光器与机床的连接, 第一步需要把光纤连接切割头。

1. If the laser is installed independently, the connection between the laser and the machine tool needs to be reconnected. The first step is to cut the fiber optic connector.



2. 光纤必须穿过线槽, 进入横梁。然后穿过X轴拖链, 进入机头。然后穿过Z轴拖链连接至切割头。

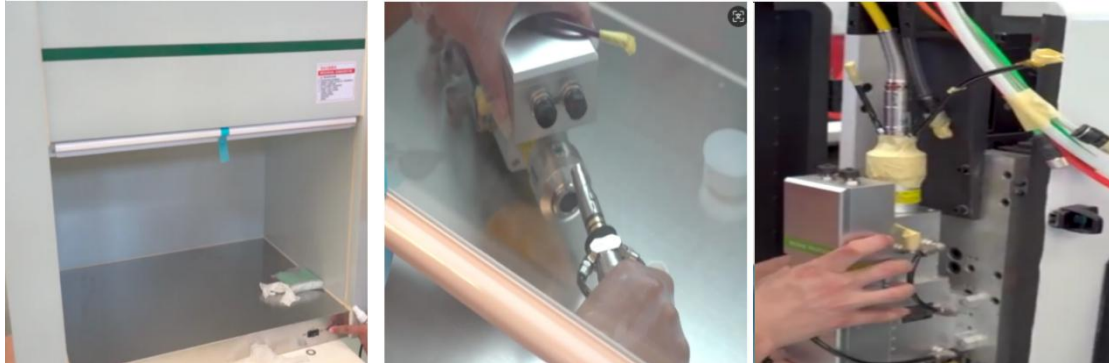
2. The optical fiber must pass through the cable tray and enter the crossbeam. It then passes through the X-axis drag chain to the machine head, and finally through the Z-axis drag chain to connect with the cutting head.

3. 光纤与切割头的连接必须要在无尘箱中进行, 不能使切割头受到任何污染, 否则可能会引起切割头的烧坏。

3. The connection between the fiber optic and the cutting head must be performed in a clean room to prevent any contamination of the cutting head, which could otherwise cause it to burn out.

4. 连接光纤与切割头之后，请把切割头按照原来的安装方式安装好复位。所有连线都按照最初的方式重新连接。整个安装过程一定要保证不能使切割头任何部位受到污染。

4. After connecting the optical fiber and cutting head, reinstall the cutting head to its original position. Reconnect all cables as initially. Ensure the cutting head remains uncontaminated throughout the installation process.



5. 连接光纤与切割头之后，请把切割头按照原来的安装方式安装好复位。所有连线都按照最初的方式重新连接。整个安装过程一定要保证不能使切割头任何部位受到污染。

5. After connecting the optical fiber and cutting head, reinstall the cutting head to its original position. Reconnect all cables as initially. Ensure no contamination occurs on any part of the cutting head during the entire installation process.

6. 激光器信号线的连接：通常会设置一个接线排在线槽内或机床内部，线排的一端有接好的信号线，只需要将激光器的信号线按照线排另一侧的标识对应链接。

6. Laser signal line connection: Typically, a terminal block is installed in the cable tray or machine tool. One end of the block has pre-wired signal lines. Simply connect the laser signal lines to the other side of the block according to the markings.

七、设备开机试运行

七、Device startup trial run

1. 开机前准备

1. Preparations before turning on the device

1. 注：机器上电前请再次确认各设备动力电源线的连接符合设备要求，接线牢靠，设备安装完整且各运动轴方向无异物无阻碍，检查后方可开机供电。

1. Note: Before powering on the machine, verify that all power cables meet the equipment requirements, ensure secure wiring, complete installation, and no foreign objects or obstructions on the movement axes. Power on only after inspection.



2. 初次上电请在确保接线正确后，打开电箱门依次将断路器上电，每个断路器上有标签显示。闭合断路器没有异常后关闭电箱门进行下一步操作。

2. When powering on for the first time, ensure the wiring is correct, then open the power box door and power on the circuit breakers in sequence. Each circuit breaker has a label indicating its status. After closing the circuit breakers without any abnormalities, close the power box door and proceed to the next step.

3. 上电后安装遥控手柄和键盘鼠标，遥控器和键盘鼠标均为无线安装。需将接收器插进屏幕侧面的USB接口。

3. After powering on, install the wireless remote control and keyboard/mouse. Connect the receiver to the USB port on the side of the screen.

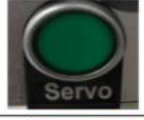


键盘鼠标接收器
Keyboard and mouse receiver

无线遥控器及接收器
Wireless remote control and receiver

2. 开机并检查伺服运动系统

2. Check the servo motion system after turning on the device.

第一步：打开旋钮开关 Step 1: Turn on the knob switch	
第二步：打开 PC 钥匙开关 Step 2: Turn on the PC key switch	
第三步：按下伺服按钮 Step 3: Press the servo button	
第四步：图标启动软件 第四步：Icon to launch the software	

1. 按顺序打开开关后等待电脑开启后点击

1. Turn on the switch in sequence, wait for the computer to start, then click.

2. 打开软件（打开软件有回原点的提示，请取消）。找到软件运动控制按钮（下图所示）低速运动各运动机构（X轴、Y轴、Z轴等）是否正常下运动，并移动至限位开关处测试所有限位开关是否有效。

2. Open the software (a prompt will appear asking to return to the origin; please cancel). Locate the motion control button (as shown in the figure below). Check if all motion mechanisms (X-axis, Y-axis, Z-axis, etc.) move normally at low speed, then move to the limit switches to test if all limit switches are effective.

3. 检查冷水机水路

3. Check the water circuit of the chiller.

1. 电箱内的断路器开启后，打开水冷机上的空气开关，这时水冷机会工作，查看整个水路各接口，若发现漏水，立刻关闭水冷机，再去整修漏水的地方。整修后再进行测试，确保无漏水为止。

1. After activating the circuit breaker in the electrical cabinet, open the air switch on the water-cooled machine to start its operation. Inspect all water line connections. If any leakage is detected, immediately shut down the machine and locate the leak. Conduct repairs and retest until no leakage is found.

4. 检查气路和气体控制

4. Check the airway and gas control

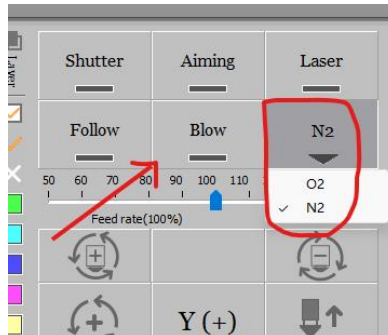
1. 首先确保您的供气装置内有相应气体，再检查一下各气路及接口是否都已连接。打开各供气装置的开关，分别旋开氧气表和氮气表上的开关，建议氧气表旋至0.3-1.0Mpa之间，氮气表旋1.0-2.5Mpa之间，若听到有漏气的声音，找到其位置，解决漏气现象。

1. First, ensure that the gas supply device has the corresponding gas, then check if all gas lines and connections are properly connected. Turn on the switches of each

gas supply device, and turn the oxygen meter and nitrogen meter switches separately. It is recommended to turn the oxygen meter to between 0.3-1.0Mpa and the nitrogen meter to between 1.0-2.5Mpa. If you hear any gas leakage sounds, locate the source and address the leak.

2. 确保无漏气后，如下图，在操作软件中点击“Blow”，是否出气，再点击“Blow”，是否关气。更换另一种气体（“Blow”右面的按钮），再点击“Blow”，是否出气，再点击“Blow”，是否关气。若有异常，需解决。见下图：

2. After confirming no gas leakage, follow these steps: In the software interface, click 'Blow' to test airflow, then click 'Blow' again to verify gas shutdown. Switch to another gas (the button to the right of 'Blow'), then click 'Blow' to test airflow, followed by 'Blow' to confirm gas shutdown. If any issues occur, troubleshoot accordingly. See the diagram below:

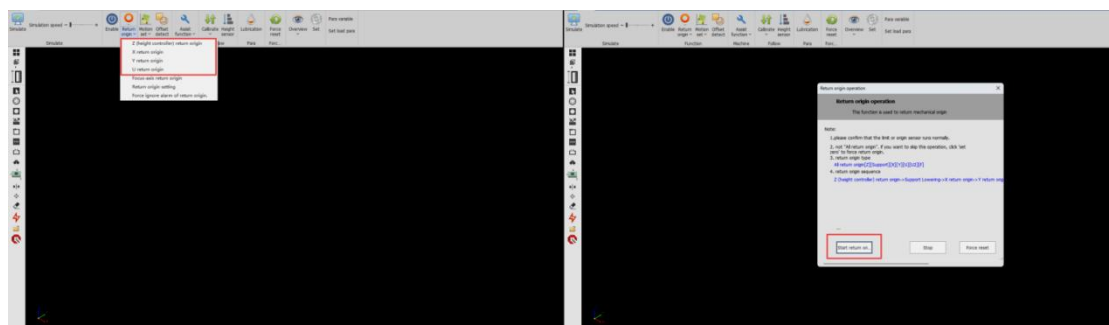


5. 开机回原点设置

5. Reset to origin on startup

1. 打开软件后，点击遥控器上的X.Y.Z.B轴确保各轴能正常运动，点开软件的回原点✓下箭头图标，分别以此对.Z.B.X.Y轴进行回原点，以此完成以后进行下一步，或者在机器正常运动完成之后，重新开启软件，各个轴质检并无阻碍，然后直接进行回原点操作，期间需要观察机器，随时进行暂停操作。

1. After launching the software, press the X.Y.Z.B axis buttons on the remote control to verify all axes' normal operation. Click the reset arrow icon in the software interface to calibrate the Z.B.X.Y axes to their reference points. Complete this calibration before proceeding to the next step. Alternatively, after the machine has completed its normal operation, restart the software. If all axes show no calibration issues, proceed directly with the reset operation while monitoring the machine and pausing the process as needed.



6. B轴单面校平

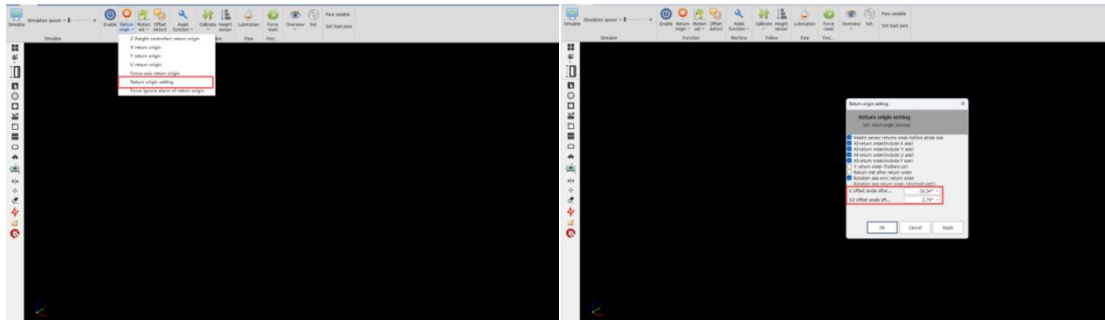
6. Single-sided leveling of the B-axis

1. B轴回原点以后，两个卡盘是否同步，查看卡盘是否出现倾斜，如果出现倾斜需要进行单面校平，如果正常，请跳过此环节。

1. After resetting the B-axis to the origin, check if the two chucks are synchronized and if they are tilted. If tilted, perform a single-side leveling. If normal, skip this step.

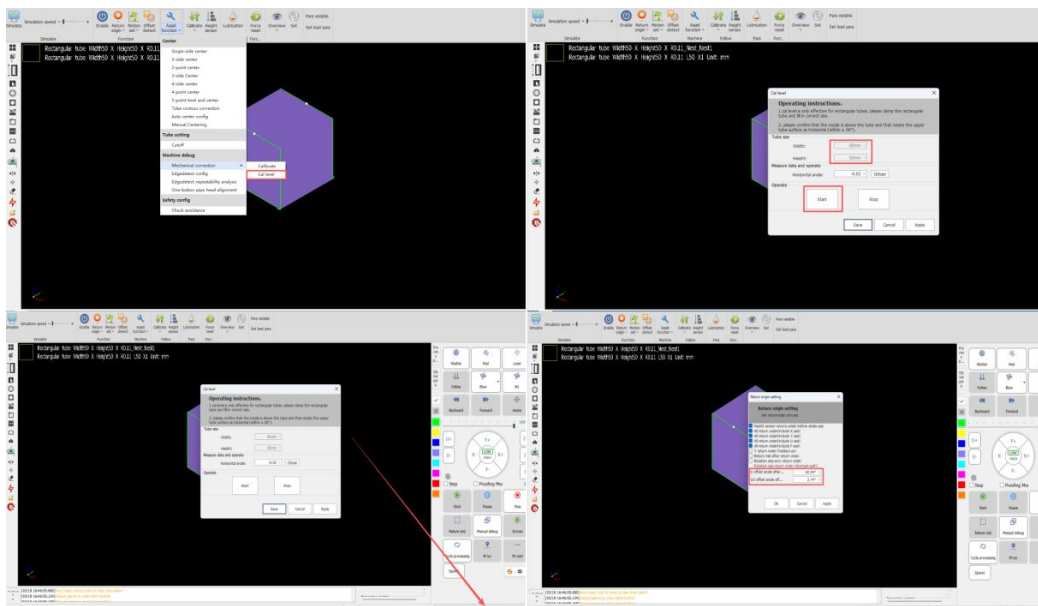
2. 打开回原点下箭头---回原点设置--把U. U2的值清零。

2. Open the Back to Origin arrow---Back to Origin settings--Clear the value of U.U2.



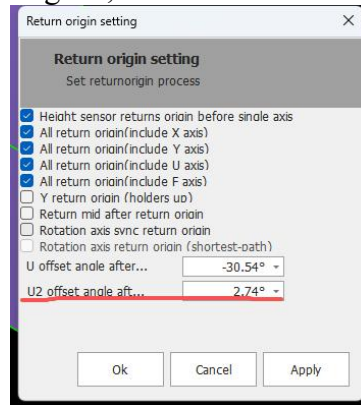
3. 先用B2夹持一根标准的铝管，B1卡盘不夹持，把B2卡盘手动转到相对平整的角度，把激光头移动到管材上方位置，打开工具下箭头-----机械校正-----校水平，确保激光头下面有管材，点击中间的开始单面较平，等待系统校平完成，查看左侧B轴出现的坐标数据。

3. First, secure a standard aluminum tube with B2 chuck while leaving B1 chuck free. Manually rotate B2 chuck to a relatively flat angle, then position the laser head above the tube. Click the arrow icon at the bottom of the tool menu → Mechanical Calibration → Level Adjustment to ensure the tube is aligned beneath the laser head. Click the Start Single-Side Leveling button in the center, wait for the system to complete leveling, and check the coordinate data displayed on the left B-axis.



4. 打开回原点下箭头，找到回原点设置，把B轴的数据，填写到B2回原点回退距离里面，点击保存，然后在重新B轴回原点，B1卡盘如果也不正，可以通此方法进行B1卡盘校正。

4. Open the origin return arrow, locate the origin setting, and enter the B-axis data into the B2 origin return distance field. Click Save, then reset the B-axis to the origin. If the B1 chuck is misaligned, this method can be used to correct it.

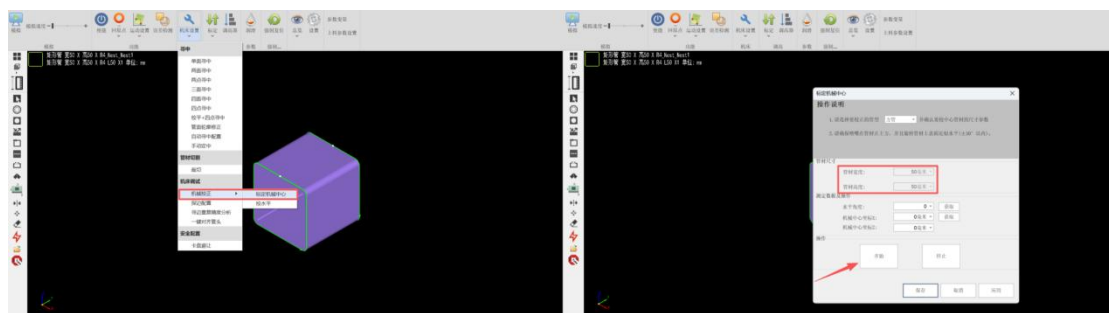


7. 标定B轴中心

7. Calibrate the center of the B-axis

1. 用B1.B2夹持标准铝管，（必须使用无倒角的管材）把卡盘调整到相对平行的位置，确保激光头在管材上方，点击手动定中，把里面的数据清零，然后点击标定B轴中心，确保管材尺寸正确，然后点击开始标定中心，设备会进行校正，等待完成以后点击保存完成（图片如下：）

1. Hold the standard aluminum tube with B1.B2 (must use unchipped tube) and adjust the chuck to a relatively parallel position, ensuring the laser head is above the tube. Click manual centering, reset the data inside, then click calibrate B-axis center to ensure the tube size is correct. Then click start calibration center, the equipment will perform the correction. After waiting for completion, click save to complete (as shown in the image below:)



2. 标定B轴中心前需要把手动定中的数据全部清楚，设置0点击保持。

2. Before calibrating the B-axis center, clear all manual centering data and set the zero click hold.

3. 当机械结构固定后，B轴旋转会有一个固定的旋转中心，标定B轴中心就是测定出这个旋转中心在XZ平面的坐标（X,Z）。测定B轴中心需要使用一个没有倒角的标准矩形管（或者没有倒角的矩形棒材）实现。标定之前，确定系统X，Z，

B轴已经回过原点，然后将切割头喷嘴移到标准管上方，并输入标准管宽和高，最后点击开始标定中心。标定完成后按 <保存> 退出。

3. When the mechanical structure is fixed, the B-axis rotation has a fixed center. To calibrate the B-axis center, measure its XZ plane coordinates (X, Z). This requires a standard rectangular tube (or rod) without chamfers. Before calibration, ensure the system's X, Z, and B axes are aligned with the origin. Position the cutting head nozzle above the standard tube, input its width and height, then click "Start Calibration". After completion, press <Save> to exit.

4. 注意事项:

用标准矩形管（建议使用没有倒角的标准矩形管。）标定过后，除非机械旋转中心发生偏移，否则没必要经常标定B轴中心。若使用带有倒角的矩形管进行标定，可能会影响B轴中心的精度。

4. Precautions:

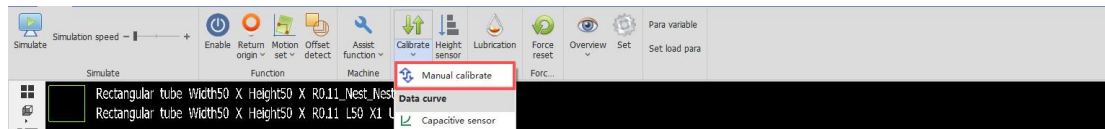
After calibrating with standard rectangular tubes (it is recommended to use standard rectangular tubes without chamfers), the B-axis center does not need frequent calibration unless the mechanical rotation center shifts. Using chamfered rectangular tubes for calibration may affect the accuracy of the B-axis center.

9. 电容标定

9. Capacitance calibration

1. 标定时，切割头下方必须有金属管材。移动切割头向下运动。距离管材大约50mm左右处停下。点击标定按钮进行标定。3

1. When calibrating, there must be a metal tube below the cutting head. Move the cutting head downward and stop about 50mm from the tube. Click the calibration button to calibrate.



2. 注意：以上两项参数标定出来的指标至少需要为“中”，否则会影响切割质量。而这两项指标比较理想的情况是“优”或“良”。如该结果不理想，需要重新标定。建议每次开机后或更换板材后，进行一次标定操作。

2. Note: The calibration results for these two parameters must be at least "Medium" to ensure cutting quality. The ideal calibration results should be "Excellent" or "Good". If the results are unsatisfactory, recalibration is required. We recommend performing a calibration after each startup or board replacement.

10. 调光（激光同轴）

10. Dimming (laser coaxial)

调整激光从喷嘴中心穿过的步骤是：

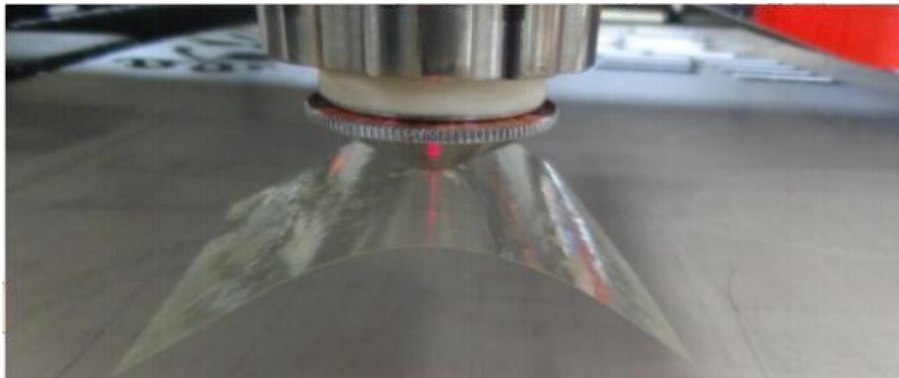
The step for adjusting the laser passing through the nozzle center is:

1. 打开软件，移动横梁和激光切割头至合适的位置。

1. Open the software and move the crossbeam and laser cutting head to the appropriate position.

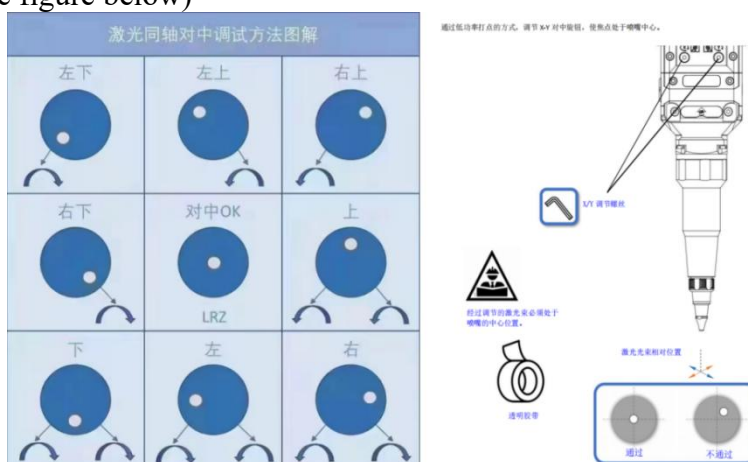
2. 将透明胶带用拇指均匀贴到喷嘴的端面上（见下图）。

2. Apply the transparent tape evenly with your thumb to the end face of the nozzle (see the picture below).



3. 在软件中点击“Laser”（或手柄上的“Laser”按钮），会在胶带上出现“⊙”图标，将透明胶带拿下来，注意不要转动其相对位置。若打出的光点不在喷嘴中心，需通过调整切割头的上面的旋钮，使光点在喷嘴中心。反复上述动作，直到激光在透明胶带上打出的孔与喷嘴的中心重合。（调整方法见下图）

3. In the software, click the "Laser" button (or the "Laser" button on the controller) to display the "⊙" icon on the tape. Remove the transparent tape, ensuring it doesn't shift position. If the laser spot isn't centered on the nozzle, adjust the knob above the cutting head to align the spot with the nozzle's center. Repeat this process until the laser hole on the tape matches the nozzle's center. (See the adjustment method in the figure below)



11. 托料轮托举

11. Material wheel lifting

1. 首先说明，后台配置中的参数是在出厂之前设置好的，在没有经过我们指导或者授权的情况下，不要进行后台配置中的参数修改，否则会对机器和自身造成不可逆的伤害

路径:后台配置工具—机床参数—支撑参数，可以看到“Y轴坐标”“避让距离”“安全距离”

“Y轴坐标”指的是，机床回原点之后，实际Y轴坐标位置。

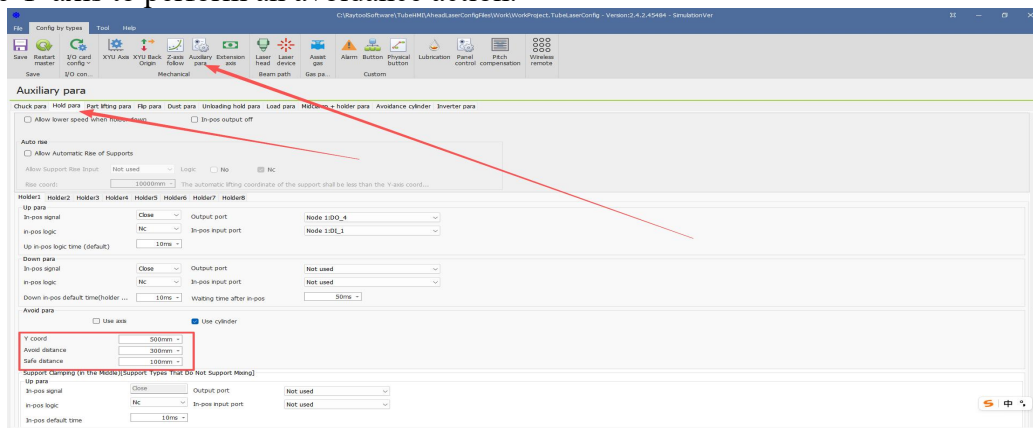
“避让距离”指的是，距离Y轴的距离，距离Y轴这个距离开始执行避让动作。

“安全距离”指的是，托料轮距离Y轴的极限距离，当到达这个距离托料轮因原因为执行避让动作，Y轴会自动停止。

1. Please note that the backend configuration parameters are pre-set before the device leaves the factory. Do not modify these parameters without our guidance or authorization, as doing so may cause irreversible damage to the device and yourself. Path: Back-end configuration tool--Machine tool parameters--Support parameters. You can see "Y-axis coordinate", "Avoidance distance", and "Safety distance". The Y-axis coordinate refers to the actual position of the Y-axis after the machine tool returns to the origin.

The "yield distance" is the distance from the Y-axis, from which the yielding action begins.

The "safe distance" refers to the maximum distance between the material-carrying wheel and the Y-axis. When this distance is reached, the wheel automatically stops on the Y-axis to perform an avoidance action.



12. 加工

12. Processing

1. 打开Tubekit软件导入图纸，点击遥控器的FN+K2支撑会自动安装图纸的高度上升到位，此时就可以把管材放入支撑进行夹持加工，加工的时候系统会根据Y轴的坐标进行减速，在确保支撑的下降到位后Y轴才会继续前进，（需要注意的是，手动移动的时候Y轴不会减速，在靠近支撑的时候需要开慢一些，以免发生碰撞）

1. Open the Tubepro software to import the drawings. Click the FN+K5 remote control to automatically position the pipe support at the designated height. Once the support is in place, place the pipe into the support for clamping and processing. During operation, the system will decelerate based on Y-axis coordinates, and only proceeds forward after confirming the support has fully descended. (Note: Manual movement does not slow down the Y-axis. Move slowly when approaching the support to avoid collisions.)

13. 敬告

13. Notice

1. 关于切割工艺参数的调试及常见的问题处理方法见我司发布的工艺手册

1. For debugging cutting process parameters and troubleshooting common issues, please refer to our company's published process manual.

八、常见故障排除

八、Common Troubleshooting

1. 激光器报警

1. Laser alarm

锐科激光器

Raycus Laser

锐科激光器在发生报警时不会发出蜂鸣声，也不会有任何提示，只会停止出光，报警灯常亮，报警内容五花八门，具体原因需要链接内控软件查看信息。目前为止：锐科CE版使用399内控锐科3000w使用399内控其他功率段非CE版本需要咨询激光器的售后需要使用哪个版本/版本不固定以下为锐科常用的内控软件。

Ruike lasers emit no audible alerts or visual indicators during alarms; they simply cease light output while keeping the alarm light on. Alarm messages vary widely, and specific causes require checking the internal control software. As of now: Ruike CE version uses 399 internal control, Ruike 3000w uses 399 internal control, other power segments use non-CE versions. Consult the laser's after-sales service for which version to use (version not fixed). Below are the commonly used internal control software for Ruike.

创鑫激光器

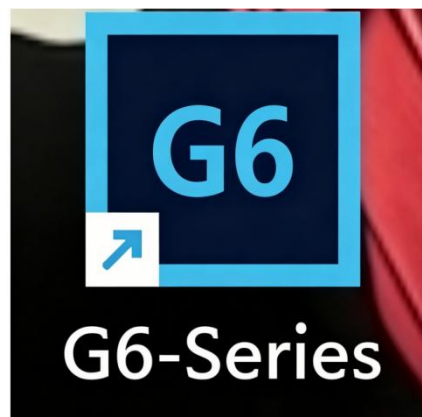
Max Laser

创鑫激光器在发生报警时，激光器会持续发出蜂鸣声，并且报警指示灯常亮，通常创鑫激光器出现报警绝大多数的问题是QBH松动未锁紧/水温过高或者过低/授权到期需要链接内控软件来查看报警内容并且解决问题。

内控软件：G3/G6

When an alarm occurs with Chuangxin Laser, the device continuously emits a beeping sound and the alarm indicator light remains illuminated. The majority of alarm issues with Chuangxin Laser typically involve QBH (Quasi-Ballistic Head) loosening or failure to secure, excessively high or low water temperature, or expired authorization. To diagnose and resolve the alarm, connecting to the internal control software is required to view the alarm details and implement corrective measures.

Internal control software: G3/G6



2. 水冷机报警

2. Water-cooled machine alarm

1. 如果发现水冷机有异常，报警或者高温低温，应该首先检查一下是否存在报警代码，如果有报警代码，按照报警代码查看水冷机说明书来检查问题，如果没有报警代码，需要先检查温度是否处于正常水温。

1. If you notice any abnormalities in the water-cooled machine, such as alarms or extreme temperatures, first check for any alarm codes. If present, refer to the machine manual to identify the issue. If no alarm codes are detected, verify the temperature is within normal range.

2. 出厂设置温度：低温25° 高温28° 温度会维持在25-28度之间，在此范围内属于正常值。

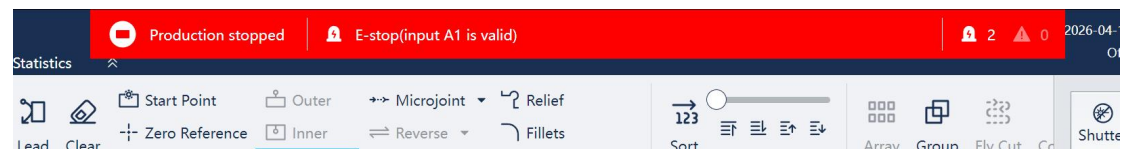
2. Factory temperature settings: 25°C for low temperature and 28°C for high temperature. The temperature will stabilize within the normal range of 25-28°C.

3. 软件警报

3. Software Alert

1. 切割软件的报警信息通常都在切割软件的上方，如果发生报警请查看报警内容，然后根据报警内容来检查哪个部位报警，然后进行逐步排查。

1. The alarm message in the cutting software is usually displayed at the top. If an alarm occurs, check the alarm content, identify the affected area, and then conduct a step-by-step troubleshooting.



4. 伺服驱动器报警

4. Servo driver alarm



1. 当伺服驱动器报警时，首先会在切割软件当中以报警的形式展现出来，所以当切割软件当中发出伺服驱动器报警时，请打开机器的配电柜，检查伺服驱动器是否有报警代码，如果有报警，请检查伺服品牌，查阅相对应的伺服驱动器说明书检查报警信息的原因，并逐步排查问题所在。

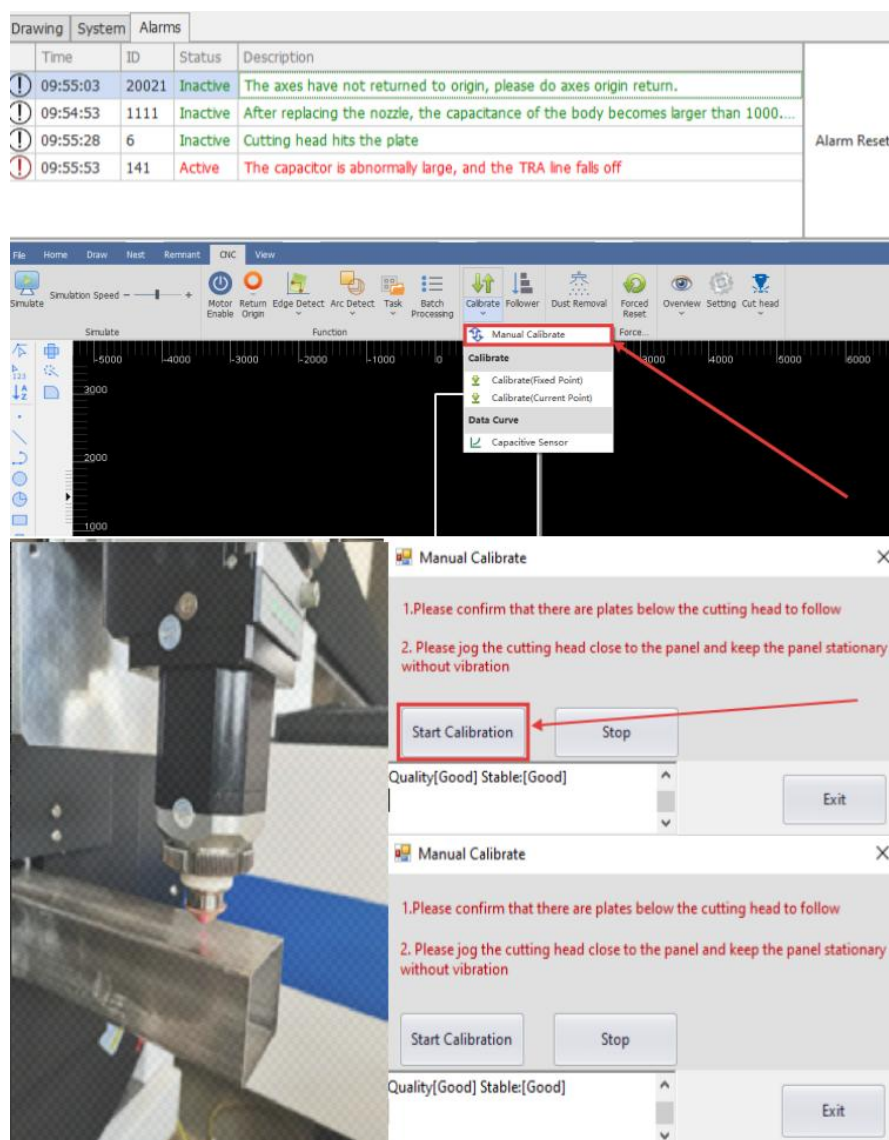
1. When a servo drive alarm occurs, it will first appear as an alert in the cutting software. If the software displays a servo drive alarm, open the machine's power distribution cabinet to check for any alarm codes. If detected, verify the servo drive's brand and consult the corresponding manual to identify the cause of the alarm, then systematically troubleshoot the issue.

5. 电容报警

5. Capacitance alarm

1. 问题：使用过程中出现电容变小或者变大的时候通过以下方法解决。：

1. Solution: If the capacitance decreases or increases during use, follow these steps:



2. 夹上管材，确保管材平行，如果不平行点击回中按钮，使管材平行，点开工具-监控工具-调高器-点击标定-通过下键使喷嘴离管材1CM，点击电容标定，标定完成Z轴会自动抬起，并提示电容标定成功，退出调高器页面，标定完成。

2. Align the pipe materials. If misaligned, click the center button to adjust. Navigate to Tools> Monitoring Tools> Height Adjuster, then select Calibration. Position the nozzle 1cm away from the pipe by pressing the down button. Click Capacitor Calibration. Upon completion, the Z-axis will automatically lift and display 'Capacitor Calibration Successful.' Exit the Height Adjuster interface to finalize the calibration.

6. 参数备份与还原

6. Backup and Restore Parameters

1. 提供参数备份功能，可以将用户配置、PLC过程等参数备份和还原。

注意事项：

如果是更换版本，只要不卸载并删除用户数据，覆盖安装并不会改动原有的参数。

如果需要卸载重装，或者担心使用者误卸载软件导致参数丢失，可以事先做好参数备份并保存好参数包。

使用方法：

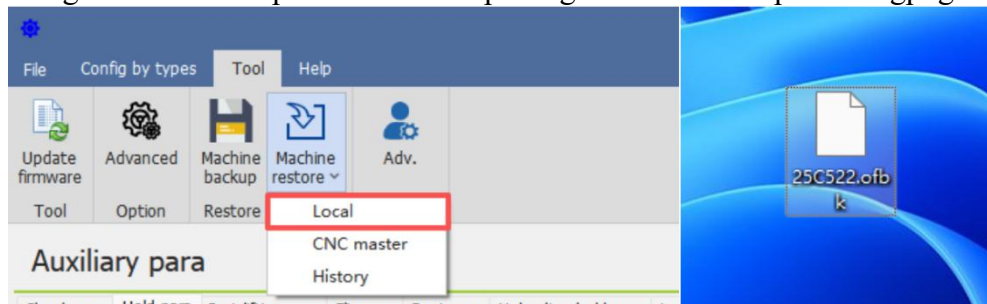
通过 <文件><参数备份>可以生成备份文件*.cfgpkg文件

1. The system provides parameter backup functionality, enabling users to save and restore configurations, PLC processes, and other parameters.

Note: If you upgrade the version, the overwrite installation will not change the original parameters as long as you do not uninstall or delete user data.

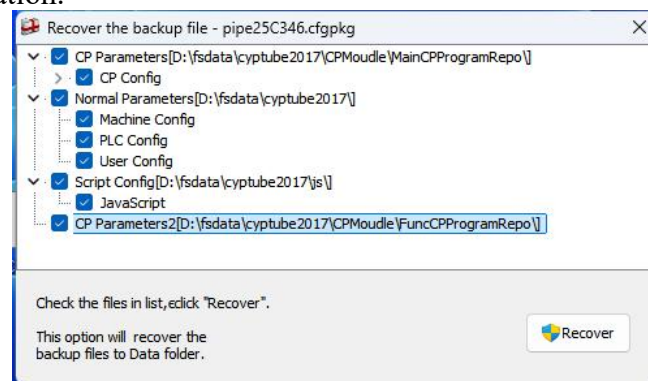
If you need to uninstall and reinstall the software, or are concerned that users might accidentally uninstall it and lose parameters, you can back up the parameters in advance and save the parameter package.

Usage: Use <file><parameter backup> to generate a backup file*.cfgpkg file



2. 需要恢复参数的时候，关闭软件 and 平台配置工具，双击备份文件*.cfgpkg，会弹出恢复参数备份文件对话框；选需要恢复的文件列表，点击恢复即可完成参数恢复。

2. To restore parameters, close the software and platform configuration tool, then double-click the backup file *.cfgpkg. A dialog box will appear to restore the parameter backup file; Select the file list to restore and click Restore to complete the parameter restoration.



九、维护保养

九、Maintenance

1. 使用的注意事项

1. Usage Notes

上文的介绍中，需要注意的地方已有所提及，请操作者仔细查阅。未尽事项补录如下：

1. 操作者必须严格遵守激光切割机的安全操作规程。
1. The operator must strictly comply with the safety operation procedures of the laser cutting machine.
2. 操作者须查阅随机附带的所有说明书或接受过我司客服人员的培训，熟悉设备结构、性能掌握操作系统有关知识。
2. Operators must review all included manuals or complete training from our customer service team, with proficiency in equipment structure, performance, and operating system knowledge.
3. 按规定穿戴好劳动防护用品，在激光束附近必须佩带符合规定的防护眼镜。
3. Wear protective equipment as required, and wear protective glasses that meet the requirements near the laser beam.
4. 在未弄清某一材料是否能用激光照射或加热前，不要对其加工，以免产生烟雾和蒸气的潜在危险。
4. Do not process a material before it is known whether it can be exposed to laser or heated, to avoid the potential risk of smoke and vapour.
5. 设备开动时操作人员不得擅自离开岗位或托人待管。
5. The operator must not leave the post or entrust the equipment to others for management when it is in operation.
6. 要将灭火器放在随手可及的地方；不加工时要关掉激光器或光闸；不要在未加防护的激光束附近放置纸张、布或其他易燃物。
6. Keep fire extinguishers within easy reach; turn off the laser or shutter when not in use; do not place paper, cloth or other flammable materials near unprotected laser beams.
7. 在加工过程中发现异常时，应立即停机，及时排除故障或上报主管人员。
7. If any abnormality is detected during processing, immediately stop the machine and either troubleshoot or report to the supervisor.
8. 保持激光器、床身及周围场地整洁、有序、无油污，工件、板材、废料按规定堆。
8. Keep the laser, machine bed and surrounding area clean, orderly and free from oil stains. Stack workpieces, plates and waste materials as required.
9. 使用气瓶时，应避免压坏电线、水管和气管，以免漏电、漏水和漏气的发生。气瓶的使用、运输应遵守气瓶监察规程。禁止气瓶在阳光下爆晒或靠近热源。开启瓶阀时，操作者必须站在瓶嘴侧面。
9. When using gas cylinders, avoid damaging wires, water pipes, and gas pipes to prevent electric, water, or gas leaks. The use and transportation of gas cylinders must comply with the Gas Cylinder Supervision Regulations. Do not expose gas

cylinders to direct sunlight or heat sources. When opening the valve, the operator must stand beside the nozzle.

10. 打开水冷机电源前，应检查水冷机水位，严禁无水或水位过低时开启水冷机，以免造成 水冷设备损坏。水冷机进水管严禁挤压、踩踏，保持水路畅通。

10. Before powering on the water-cooled machine, check the water level. Never operate it without water or when the water level is too low, as this may damage the equipment. Do not squeeze or step on the inlet and outlet pipes to ensure the water flow remains unobstructed.

11. 本产品产生的激光波长为1064nm，照射至人体皮肤会造成灼伤，长时间注视激光束时 会对眼睛视网膜造成严重伤害（如白内障），操作人员必须佩戴1064nm防护眼睛。

11. This product emits a laser with a wavelength of 1064nm. Exposure to human skin may cause burns, and prolonged exposure to the laser beam can lead to serious retinal damage (e.g., cataracts). Operators must wear 1064nm protective goggles.

12. 设备在切割某些板材时会产生大量烟尘，应将风机的出风管引至室外，或另加空气净化装置。另外操作人员应佩戴防尘口罩，防止职业病的发生。

12. When cutting certain plates, the equipment will produce a lot of smoke and dust. The exhaust pipe of the fan should be led to the outside or an air purification device should be added. In addition, the operator should wear a dust mask to prevent occupational diseases.

13. 激光切割头内保护镜片每天检查一次。准直镜或聚焦镜需要拆卸时，记录拆卸过程，尤其注意镜片的安装方向，不要装错。

13. The protective lens inside the laser cutting head should be checked daily. When removing the collimator or focusing lens, document the process and ensure the lens is installed correctly.

十、运输与安装

十、Transportation and installation

1. 拆卸固定装置：打开集装箱车门后，工人先进集装箱，拆掉设备和集装箱之间固定的钢丝和紧固器等装置。

1. Dismantling the fixing device: after opening the container door, the workers enter the container first and remove the steel wires and fasteners that are fixed between the equipment and the container.



2. 叉车叉出床身：为方便叉住更多的托盘，可以先叉起托盘一角，在托盘底部垫上一块木头或者其他垫板，使叉车的货叉完全插进托盘底部，开始往外挪床身；

2. Lifting the pallet from the bed: To facilitate handling more pallets, start by lifting one corner of the pallet. Place a piece of wood or other padding at the bottom to ensure the forklift's forks fully penetrate the pallet. Then begin moving the pallet outward.



3. 设备脱离集装箱：

3. 1. 当床身有2/3在外面的时候，使用另一台叉车从侧面中间托住床身，使床身脱离集装箱底部；（注意：叉车的货叉一定完全叉住设备，货叉长度不够一定加延长货叉装置，以免设备从叉车掉到地上）

3. 1. When two-thirds of the bed is exposed, use another forklift to support it from the side center, lifting the bed off the container bottom. (Note: The forklift's forks must fully engage the equipment. If the forks are too short, extend them with a fork extension device to prevent the equipment from falling to the ground.)

3. 2. 集装箱开始往前移动，注意是直线移动，直到设备完全离开集装箱

3. Device out of container:

3. 2. The container begins moving forward in a straight line until the device is fully removed.



4. 侧面托住床身的叉车开始缓慢下降，直至托盘接触地面。

4. The forklift supporting the bed begins to descend slowly until the pallet touches the ground.



5. 工人拆掉固定托盘和设备之间固定的螺栓。

5. The worker removed the bolts that secured the fixed pallet to the equipment.



6. 用叉车叉住设备，移动安装的位置，摆放好地脚后，完全降下来，接下来开始安装设备及辅助配件。

6. Hold the equipment with a forklift, move it to the installation site, place the feet, then lower it completely. Next, begin installing the equipment and auxiliary accessories.



十一、结束函

十一、End of Letter

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