Foreword

The manual is English Version TA20.03, which is used for TA-FLS-T series single table fiber laser metal sheet cutting machines with tube cutting system manufactured by Wuhan TA Laser Machinery Co.,Ltd!

This document is only applicable to the standard configuration of the corresponding product model. For special customized products, please read extra explanatory materials carefully.

This manual details the installation, use and related maintenance steps of the cutting machine. Before you use the machine, please note the followings:

• It is recommended that every staff (maintenance, operation, daily maintenance, fixed-point inspection) related to this machine read this manual.

• The operator should have relevant technical training or be instructed by a special person.

• If you can follow the instructions in the manual, you can not only avoid dangerous accidents, reduce maintenance costs, reduce downtime, but also improve the working efficiency and service life of the machine.

• The instructions should be kept for reference at any time.

Attention:
Please read this instruction carefully before using the laser cutting machine. Miss operation by the user may cause the equipment to run poorly, damage the equipment, or even cause personal injury.

Warning:
The laser used by this cutting machine is invisible light and should not be viewed directly, otherwise it may cause eye injury. Please wear protective goggles when using.

INDEX

Foreword
INDEX..... 1
I Preface.....3
1.1 Welcome.....3
1.2 Company Introduction..... 3
II Machine Instructions..... 4
2.1 Machine Image and Working Bed Exploded View..... 4
2.2 Instructions For Machine Model.....5
III Safety Instructions.....5
3.1 Table Of Safety Symbols..... 6
3.2 Operation Cautions..... 6
IV Self-preparation Before Installation..... 8
4.1 Machine Layout..... 8
4.2 Electricity..... 9
4.3 Water..... 9
4.4 Gas.....9
4.5 Power Supply..... 9
4.6 Ground Line..... 10
4.7 The Working Environment And Working Conditions..... 10
V On-site Installation And Debugging..... 10
5.1 Laser Generator Installation.....10
5.2Water Chiller Installation..... 11
5.3 Gas Circuit Installation..... 11
5.4 Electrical Circuit installation..... 13
5.5 Optical Path Installation.....15
VI Equipment Operation.....16
6.1 Equipment On/Off.....16
6.1.1 Turn On Sequence:.....16
6.1.2 Turn Off Sequence:..... 16
6.2 Cypcut Instructions.....错误！未定义书签。
6.2.1 How To Import DXF And cut.....错误！未定义书签。
6.2.2 Layer Parameter Settings.....错误！未定义书签。
6.2.3 Global Parameter Settings.....错误！未定义书签。
6.2.4 How To Re-install The Laser Cutting Software?.....错误！未定义书签。
6.2.5 How To Close The C Disk Protection Function?.....错误！未定义书签。
6.2.6 How To Exchange The Sheet Cutting To Tube Cutting?.....错误！未定义书签。
6.2.7 How To Exchange The Tube Cutting To Sheet Cutting?.....错误！未定义书签。
6.3 Tube T/Tube Pro Instructions..... 18
6.3.1 Cutting Drawings Format Description..... 18
6.3.2 Tube T..... 21
6.3.3 Tube Pro.....25
6.3.4 Tube Pro Parameter.....31
6.3.5 One Key For Pipe Aligen.....39
6.3.6 How To Adjust Tube Cutting Size Deviation..... 40
6.3.7 How To Install The Laser Cutting Software TubePro..... 43

6.4 Laser Cutting Head Instructions..... 44
6.4.1 Laser Cutting Head Calibration..... 44
6.4.2 How To Adjust Nozzle Center?..... 46
6.4.3 How To Find The Focus?..... 48
6.4.4 Removal And Installation Of Protective Lenses..... 48
6.4.5 How To Change The Ceramic Ring? 50
6.4.6 How To Check The Optical System?..... 50
6.5 Chuck Instructions..... 51
6.5.1 How To Check The Front Chuck Mechanical Center?..... 错误！未定义书签。
6.5.2 How To Adjust The Consistency Of The Front Chuck And The Main Chuck?..... 51
VII Equipment Maintenance..... 53
7.1 Machine Mechanical Part..... 53
7.2 Optical Part..... 56
7.3 Electrical Part..... 58
7.3.1 Electrical Cabinet..... 58
7.3.2 Air Conditioner..... 59
7.3.3 Voltage Stabilizer..... 59
7.4 Water Chiller..... 61
7.4.1 Maintenance Table:..... 62
7.4.2 How To Clean Chiller? 63
7.4.3 How To Clean Air Filter?..... 63
7.4.5 How To Change Water?..... 64
7.4.6 How To Change The Ions Cylinder?..... 65
7.5 Laser Generator..... 65
7.5.1 Laser Generator Maintenance..... 65
7.5.2 Laser Generator Dew Formation..... 66
7.5.3 IPG Circuit Diagram (YLR-K/YLR/YLS-CUT)..... 67
7.5.4 Raycus Circuit Diagram..... 70
7.6 Air Compressor(optional)..... 71
VIII Common Problems Troubleshooting..... 75
8.1 Z+/Z- Limit Enable..... 81
8.2 Capacity Is 0..... 81
8.3 Local Capacity Small..... 81
8.4 Machine Can Not Cut Well..... 81
8.5 Z-/Z+ Limit Signal Is Valid..... 82
8.6 X-/X+ Y-/Y+ Limit Signal Is Valid..... 82
8.7 Axis 4 Limit 4 Alarm..... 83
8.8 Not Detect The Motion Card, The System Will Run In Demo Mode..... 83
IX Diagram..... 85
X Service..... 95

I Preface

1.1 Welcome

Thank you for purchasing a fiber laser cutting machine from TA Laser Machinery Co.,Ltd. If you are using this product for the first time, please read this instruction manual carefully before installation and use.

1.2 Company Introduction

Wuhan TA Laser is an ambitious fiber laser metal cutting machine manufacturer and exporter in China. We are also a service provider, including machine installation, debugging, upgrading, maintenance and trouble- shooting.

Our main products include laser cutting machine, laser marking machine, laser welding machine and laser washing machine. They can widely used for the industries include sheet metal, hardware, kitchenware, electronic, automotive parts, spectacles, advertising, craft, lighting, decoration, jewelry, etc. Focus on quality and service, we dedicated to provide customers with perfect sheet metal processing solutions and high quality after-sales service.



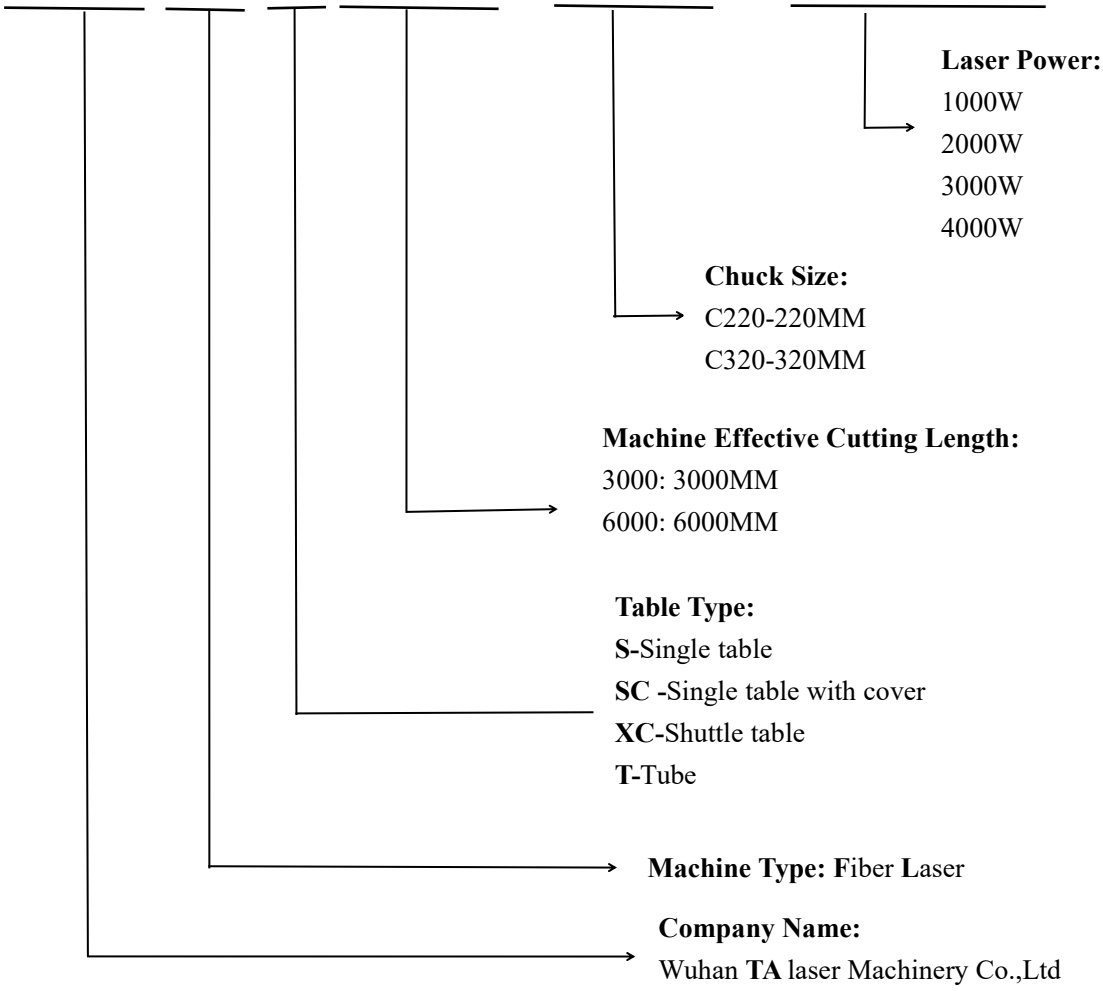
II Machine Instructions

2.1 Machine Image and Working Bed Exploded View



2.2 Instructions For Machine Model

TA-FLT6000-C220-1000W

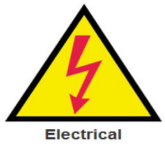


III Safety Instructions

To ensure the safe operation and performance of the product, follow all warnings in this guide, safety precautions must be observed during all phased of operation, maintenance and service.

Operators must adhere to these recommendations and to apply sound laser safety practices all times. Never open the chassis. All internal service and maintenance should only be performed by qualified personnel.

3.1 Table Of Safety Symbols

	Text marked with an Electrical Warning symbol refers to a potential personal hazard. It requires a procedure that, if not correctly followed, can result in bodily harm to you or others. Do not proceed beyond the Electrical Warning until you completely understand and meet the required conditions.
	Text marked with an Laser Warning symbol refers to a potential personal hazard. It requires a procedure that, if not correctly followed, can result in bodily harm to you or others. Do not proceed beyond the Electrical Warning or Laser Warning symbols until you completely understand and meet the required conditions.
	Text marked with a Caution symbol refers to a potential personal hazard. It requires a procedure that, if not correctly followed, can result in mechanical injury.
	Text marked with a Caution symbol refers to a potential personal hazard. Do not running the machine before effective dust removal equipment installation completed.
	Text marked with a Caution symbol refers to a potential personal hazard. Do not touch the laser head and the parts just finished cutting.

3.2 Operation Cautions



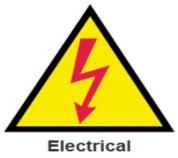
WARNING: Specular Reflections often there can be numerous secondary laser beams produced at various angles near the laser aperture. These beams are called “Specular Reflections” and are produced when the laser light reflects off a surface where the primary beam is incident. This laser Beam reflection will damage the eyes.

Safety Recommendations

You must wear protective goggle used protects against light emitted by the device over its entire range of wavelengths.







WARNING: The input voltage to the laser is potentially lethal. All electrical cables and connections should be treated as if it were a harmful level. All parts of the electrical cable, connector, or device housing should be considered dangerous.

Safety Recommendations

1. Make sure the device is properly grounded through the protective conductor of the AC power cable. Any interruption of the protective grounding conductor from the protective earth terminal can result in personal injury.
2. Before supplying the power to the instrument, ensure that the correct voltage of the AC power source is used. Failure to use the correct voltage can cause damage to the instrument.
3. Before switching the power on, ensure that line voltage corresponds to the specified level.
4. Do not open the electrical cabinet without TA engineer remote support.



WARNING: Machine fast movement, if not correctly followed the operate instruction, can result in mechanical injury.

Safety Recommendations

1. Make sure do not approach the machine frame when machine running.
2. Any maintenance need turn off the machine, make sure the main electricity cut off.
3. Any time operator must nearby the machine.



WARNING: Metal dust is produced during the cutting process of the equipment, will be harm the human body.

Safety Recommendations

1. Make sure the dust collect device is properly installed before machine running.
2. Must wear mask to avoid the metal dust harm.









WARNING: The laser light is strong enough to cut or weld metal, burn skin, clothing, and paint. In addition, this light can ignite volatile substances such as alcohol, gasoline, ether, and other solvents. Exposure to solvents or other flammable materials and gases must be avoided and must be relocated away from this device.

Safety Recommendations

TA recommends that you follow these procedures to operate the laser machine safely:

• Never look directly into the laser output port when power is supplied to the laser.

• Avoid positioning the laser and all optical components at eye level.

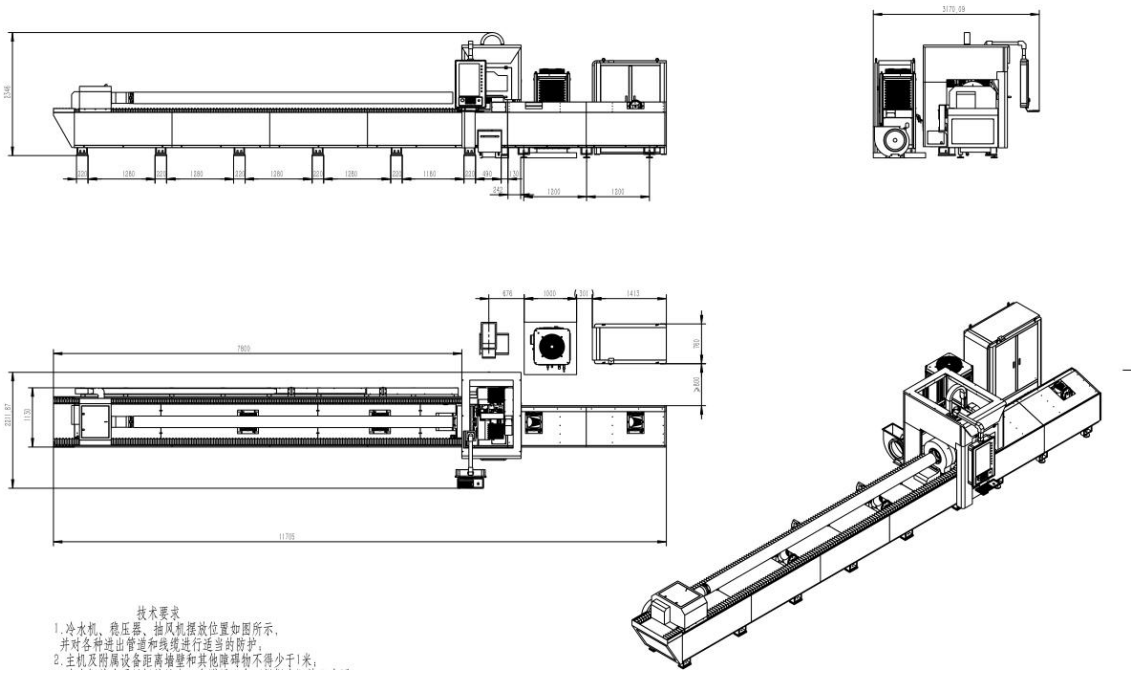
• Must wear protective Gloves. Avoid high temperature hurt finger when taking the finish parts.



IV Self-preparation Before Installation

4.1 Machine Layout

TA-FLT6000-C220:



4.2 Electricity

TA-FLT6000-C220 Power Consumption and Air Switch Model:

S.N.	Laser Power	Power Consumption	Air switch model
1	1000W	21KW	63A/4P（L1 L2 L3 N)
2	1500W	23KW	63A/4P（L1 L2 L3 N)
3	2000W	28KW	80A/4P（L1 L2 L3 N)
4	3000W	31KW	80A/4P（L1 L2 L3 N)
5	4000W	36KW	100A/4P（L1 L2 L3 N)

Electrical Devices Preparation:

S.N.	Item	Model/Spec	Unit	QTY	Remarks
1	Circuit Breaker	63A-100A/4P (L1 L2 L3 N)	piece	1	Refer to table
2	Circuit Breaker	32A/3P (L1 L2 L3)	piece	1	For Dust Blower
3	Electrical Socket	For the two breakers	piece	2	
4	Power Cable	RV 10mm^2 (Cu 5 core every core 10mm^2)	meter	Several	L1 L2 L3 N Ground

4.3 Water

S.N.	Item	Model/Spec	Unit	QTY	Remarks
1	Deionized Water/ Distilled Water	1000W-3000W:80L 4000W-6000W:150L	barrel	1	Dedicated for Chillers

4.4 Gas

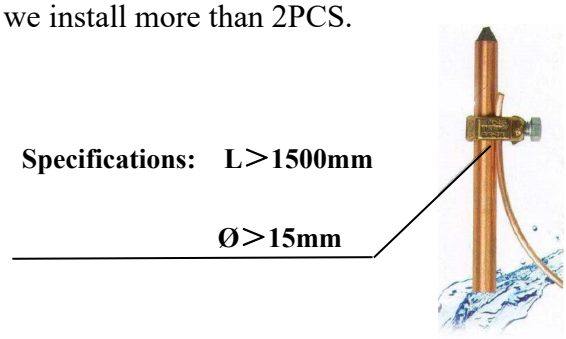
S.N.	Item	Model/Spec	Unit	QTY	Remarks
1	Ordinary Nitrogen(N2)	Purity 99.95%	bottle	4	
2	Ordinary Oxygen(O2)	Purity 99.95%	bottle	4	
3	Oxygen Gauge	25MPa/1MPa	piece	1	
4	Nitrogen Gauge	25MPa/3MPa	piece	1	
5	Compressor Air	1.6MPa	set	1	Optional

4.5 Power Supply

The user should be equipped with a workshop of three-phase five wire (L1 L2 L3 N) 380V, 50HZ/60HZ, the load power capacity please refer the table and grounding reliably.

4.6 Ground Line

Good and stable ground line for this laser machine is very important, if the factory electricity do not have the good ground line, please go to electricity market buy the Cu Stick (Length more than 1.5M), and install in the ground for the machine use, normally we install more than 2PCS.



4.7 The Working Environment And Working Conditions

a) Less dust
b) No vibration; (No heavy machine near the laser machine, like press break machine, punching machine.....)
c) The environment temperature: 5°C-40°C
d) The relative humidity of environment: 5%-75%
e) Power supply: Three-phase, Null line, Ground line, 380V;50HZ/60HZ
f) Cooling water: deionized water or distilled water

V On-site Installation And Debugging

5.1 Laser Generator Installation

Please take out the generator from the professional wooden case. If there's any damage on the package, please check the product immediately and inform the shipping agent. Please contact our service staff at the first time, don't try to install or operate the product once you found the product damaged.

Under the safety condition, please install and fasten the generator in electrical cabinet. In the process of installation, the output fiber can be put at the safety place Pay attention that the minimum bending radius is 150mm.

Please keep all the package material for transportation or storage use.

Primary Box | Remove the Tie Wraps | Lift the Unit



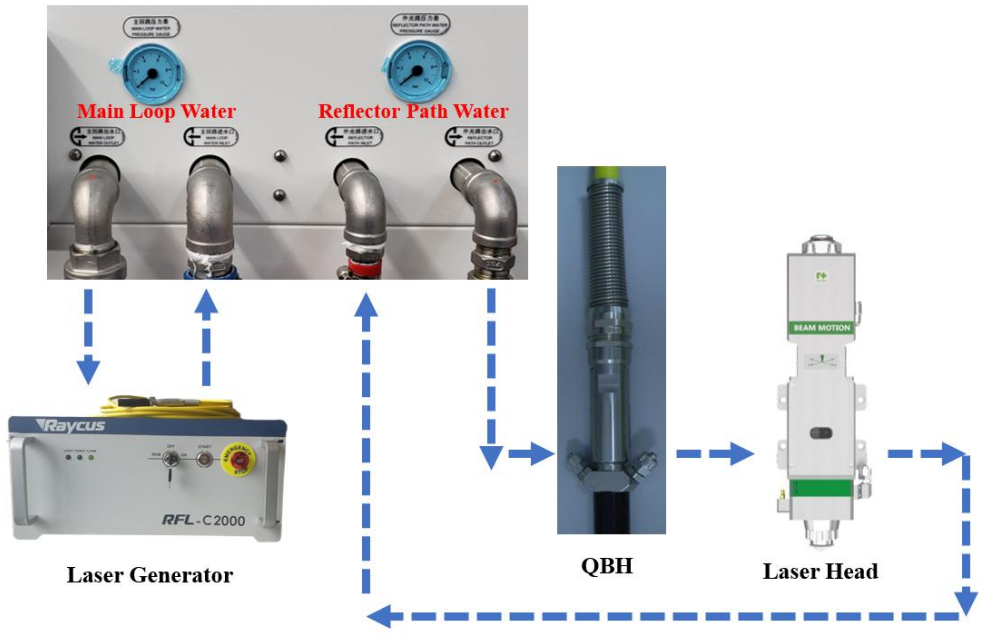




Install and fasten the laser generator in the electricity cabinet

5.2 Water Chiller Installation

The slope cannot be more than 45 degree when you carry the chiller. Please make sure the package without any damage, obvious signs of impact and refrigerant leakage. Please check below chat to get more information about waterway installation, the joint direction must comply with the chart. Since the water pressure is very high when the chiller is working, please fasten the water pipe joint to make sure no water leak.

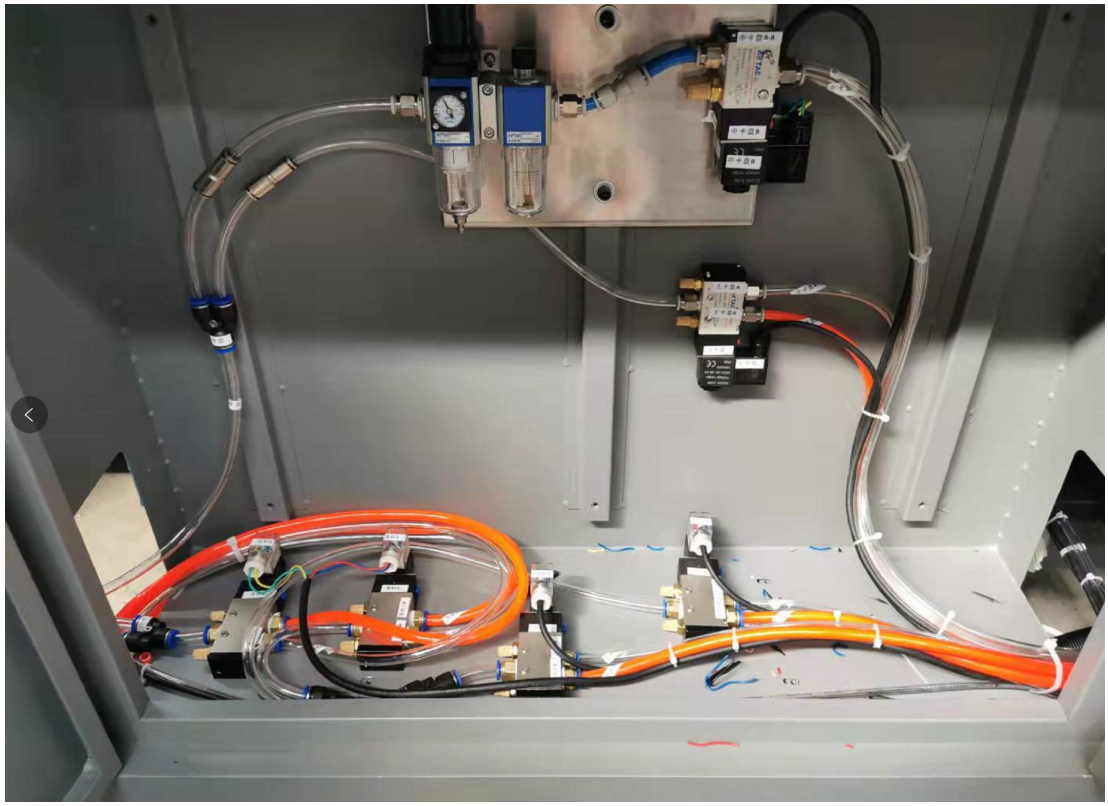


Connect here for pneumatic supports

5.3 Gas Circuit Installation







Gas Circuit Connection Schematic Diagram

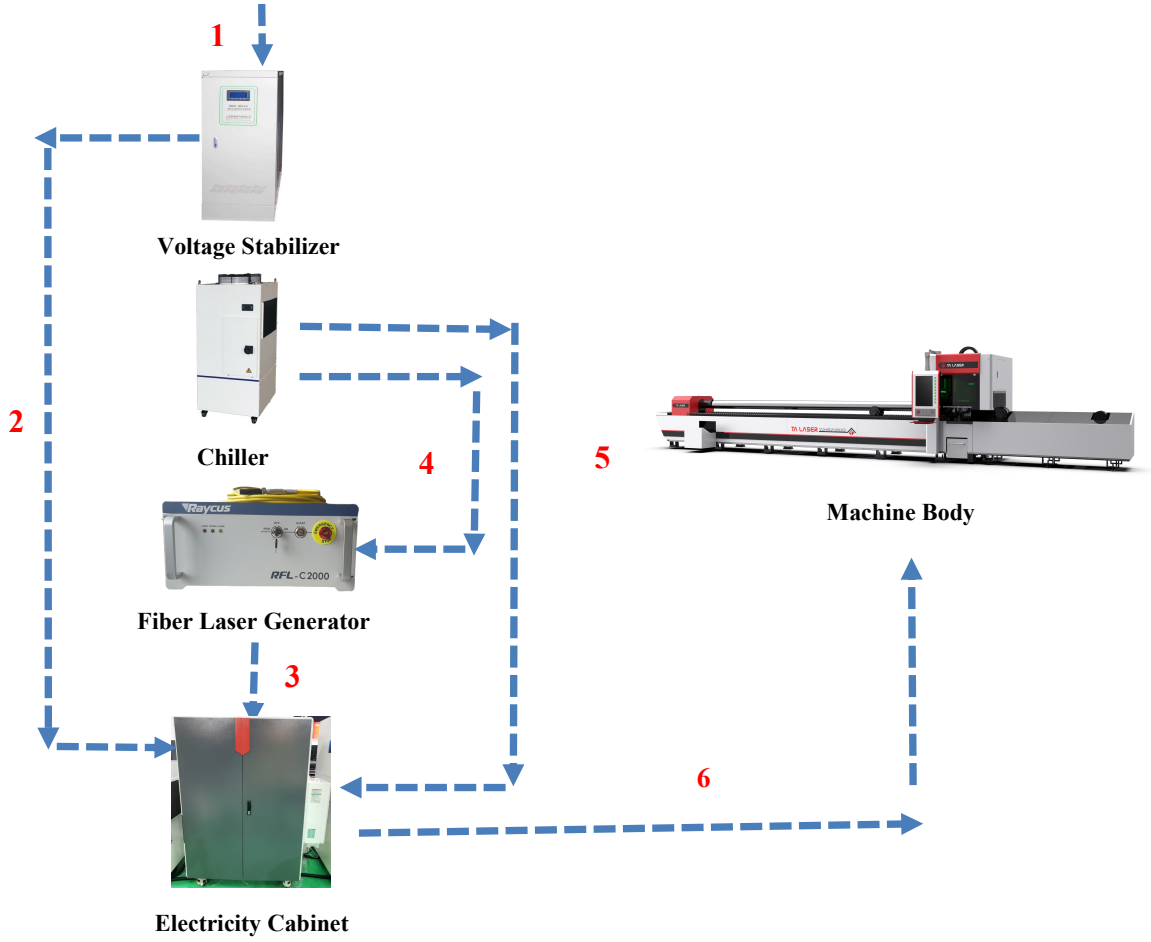
This is gas circuit connection schematic diagram. We use quick fittings, so user only need to insert the gas pipes. Please make sure the gas pipe joints were fastened and without gas leak when you install it.

Note: Return to zero when using a pressure reducing&boost gauge, then turn on the gas and set the pressure to the required pressure.

5.4 Electrical Circuit installation

Item	Function
1	The main power supply cable of the whole machine enters the voltage stabilizer
2	Voltage stabilizer provides integral main cable
3	Electric cabinet supply laser power cable and laser signal
4	Electric cabinet supply chiller power cable
5	The signal of water chiller flow give feedback to the laser generator
6	Servo motor power supple cables, encoder cables, origin and limit switch cables, gas control cables, height controller cables, oil pump cables etc

Circuit And Cables Schematic



Circuit and Cables Schematic

1. To connect laser generator, please check as the 7.5.3 and 7.5.4.
2. Connect electrical cables corresponding to the connection with Plug-in connector.



TA-01 Main Power Supply
TA-02 Servo Motor Cable, Height Control RF Cable
TA-03 Water input for laser
TA-04 Water output for laser
TA-05 31 cores plug-in connector
TA-06 5 cores plug-in connector for Chiller's Power Signal
TA-07 7 cores plug-in connector for X/Z servo motors
TA-08 7 cores plug-in connector for Y1/Y2 servo motors

5.5 Optical Path Installation

Taking out the output fiber from electrical cabinet, and then from the output port along with towline to the generator head, please don't let the flammable, corrosive, sharp and other objects to damage the fiber. The particular connection method of fiber and fiber terminal please check below:

First step, use optical cleaning paper dip with absolute ethyl alcohol to clean the outside of fiber terminal and then dry it with compressed air.

The second step, take out protection cap and aluminum protection drive pipe of fiber terminal, as chart 1. Please check the surface carefully, if there are any contamination, it will cause black spot and lead to fiber damage. We can carry on if it's clean, otherwise we should clean the surface firstly. It should be guided by manufacturer(The protection cap should be placed in a clean flat surface upside down and if you can put an optical cleaning paper under it will be better) .



Chart 1 Fiber Terminal Cap

The third step, as shown in chart 1, remove the protection cover of the cutting head, place the cutting head horizontally, check whether the cutting head is contaminated from this side of the cover and the copper mouth, if there is no problem go to next step, if there is any problem, please contact the manufacturer.

The fourth step, the installation of fiber terminal as shown in chart 2,

1. Take out the plastic protection cap of external connector;
2. Lease align the both red pot of QBH terminal and external connector before insert the fiber terminal;
3. Push the QBH terminal into connector lightly;
4. Revolve knurling parts of external connector to lock it. You can only use the hands to lock the connector, because the tool may damage the parts.

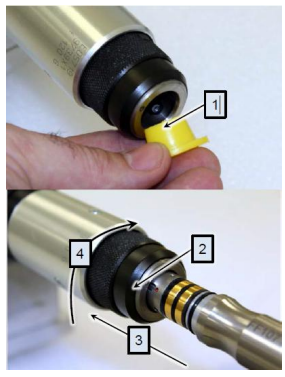


Chart 2 Fiber Terminal Installation

VI Equipment Operation

6.1 Equipment On/Off

6.1.1 Turn On Sequence:

Step 1: Turn on **main air switch** in the factory.
Step 2: Turn on voltage stabilizer.
Step 3: Turn on **main switch** on the electrical cabinet.
Step 4: Turn on **key switch.**
Step 5: Check **E-STOP** button Non-pressed.
Step 6: Press **PC**.
Step 7: Press **Servo On**.
Step 8: Press **Chiller On**. (In winter, must wait for main loop water temperature up to 18℃. In summer, must wait for main loop water temperature down to 26℃ then go to step 9)
If your laser source brand is IPG
Step 9: Press **Laser On**. (Must wait for 1 minutes then go to step 10)
Step 10: Press **Laser Start**.
Step 11: Turn on software **Cypcut**
Step 12: Press **Aiming**
Step 13: Press **Shutter**
Step 14: **Go origin**
Step 15: Confirm **Soft limit protectio**n was selected
Step 16: Do Z-axis calibration
Step 17: Turn on gas
If your laser source brand is Raycus
Step 9: Press **Laser On**
Step 10: Turn on **Raycus** key switch to REM location.
Step 11: Turn on software **Cypcut**
Step 12: **Go origin**
Step 13: Confirm **Soft limit protection** was selected
Step 14: Do Z-axis calibration
Step 15: Turn on gas

6.1.2 Turn Off Sequence:

Step 1: Turn off gas
Step 2: Press **blow** select O2/N2, make all gas pipes empty
If your laser source brand is IPG
Step 3: Press **Aiming**

Step 4: Press **Shutter**
Step 5: Press **Laser Off** (Must wait for chiller fans stop working, then go to step 6)
Step 6: Press **Chiller Off**
Step 7: Press **Servo Off**.
Step 8: Save cutting files and tun off **Cypcut**
Step 9: Turn off PC.
Step 10: Turn off key switch.
Step 11: Turn off the **main switch** on the electrical cabinet.
Step 12: Turn off voltage stabilizer
Step 13: Turn off **main air switch** in the factory.

If your laser source brand is Raycus

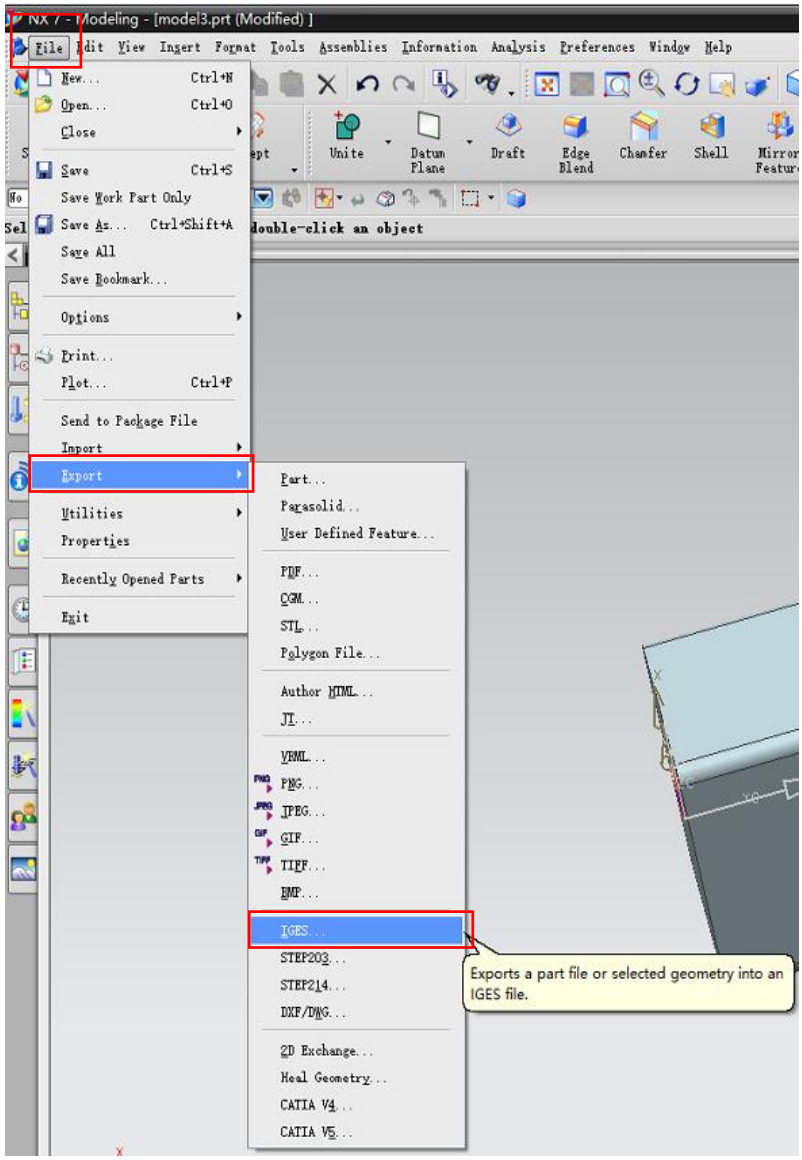
Step 3: Turn off **Raycus** key switch to off location.
Step 4: Press **Laser Off** (Must wait for chiller fans stop working, then go to step 5)
Step 5: Press **Chiller Off**
Step 6: Press **Servo Off**.
Step 7: Save cutting files and tun off **Cypcut**
Step 8: Turn off PC.
Step 9: Turn off key switch.
Step 10: Turn off the **main switch** on the electrical cabinet.
Step 11: Turn off voltage stabilizer
Step 12: Turn off **main air switch** in the factory.

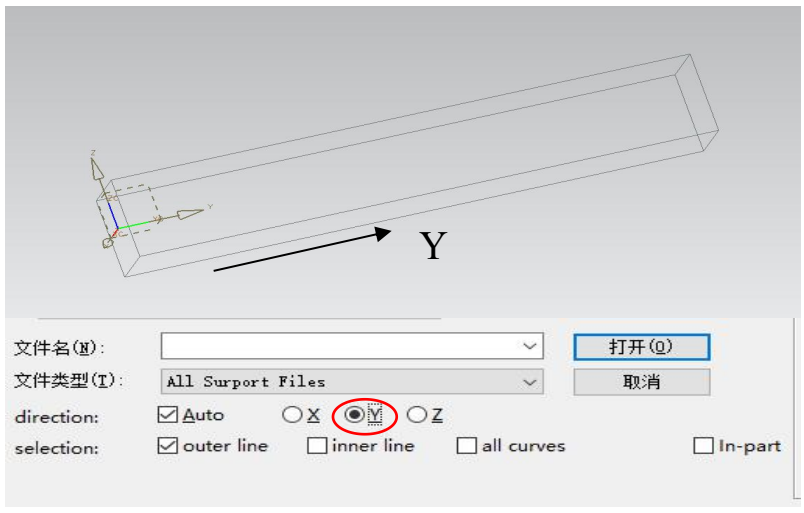
6.3 Tube T/Tube Pro Instructions

6.3.1 Cutting Drawings Format Description

1. IGS/IGES

Support IGS format file saved by Solid Works and UG (the stretching direction needs to be the same as any one axis of X / Y / Z).


NX 7 - Modeling - [model3.prt (Modified)]
File Edit View Insert Format Tools Assemblies Information Analysis Preferences Window Help
New... Ctrl+N
Open... Ctrl+O
Close
Save Ctrl+S
Save Work Part Only
Save As... Ctrl+Shift+A
Save All
Save Bookmark...
Options
Print...
Plot... Ctrl+P
Send to Package File
Import
Export
Utilities
Properties
Recently Opened Parts
Exit
Part...
Parasolid...
User Defined Feature...
PDF...
CGM...
STL...
Polygon File...
Author HTML...
JT...
VRML...
PNG...
JPEG...
GIF...
TIFF...
BMP...
IGES...
STEP203...
STEP214...
DXF/DWG...
2D Exchange...
Heal Geometry...
CATIA V4...
CATIA V5...
Unite
Datum Plane
Draft
Edge Blend
Chamfer
Shell
double-click an object
Exports a part file or selected geometry into an IGES file.


Y
文件名(N):
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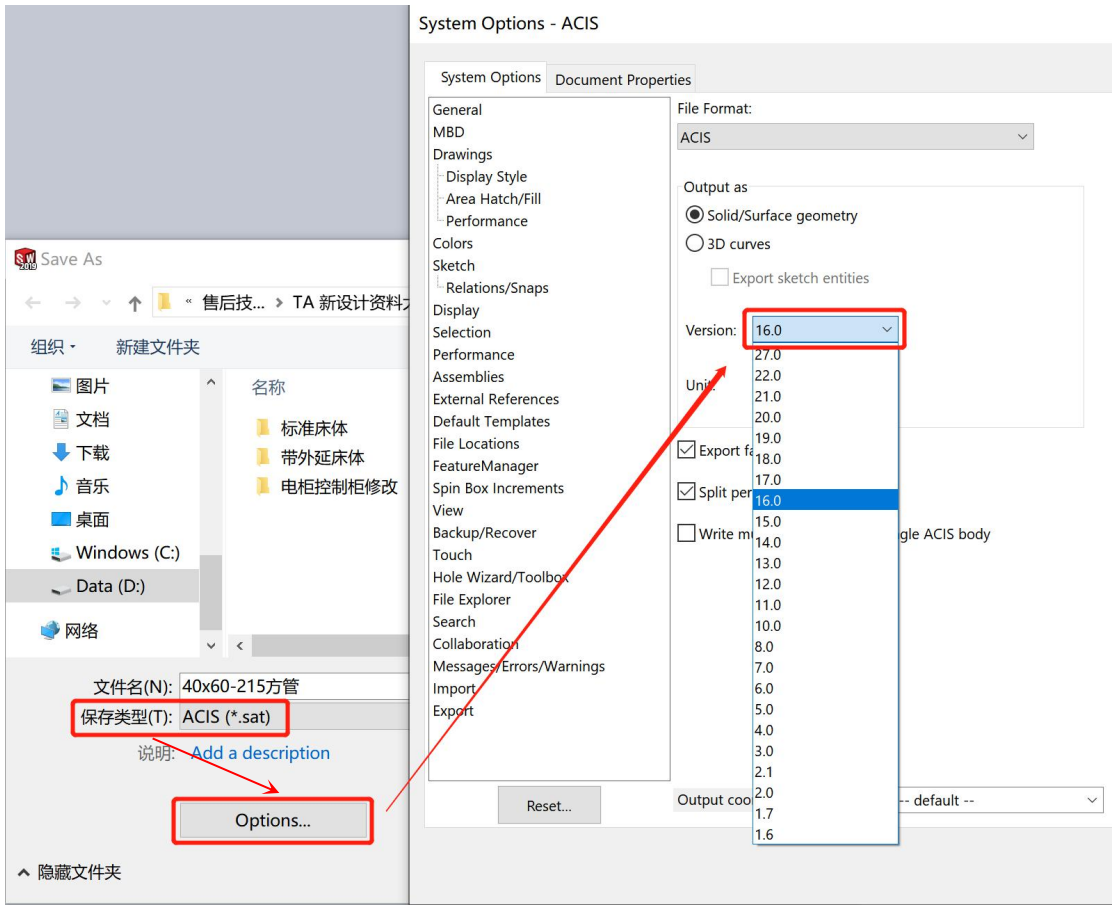
All Surport Files
打开(O)
取消
direction:
Auto
X
Y
Z
selection:
outer line
inner line
all curves
In-part

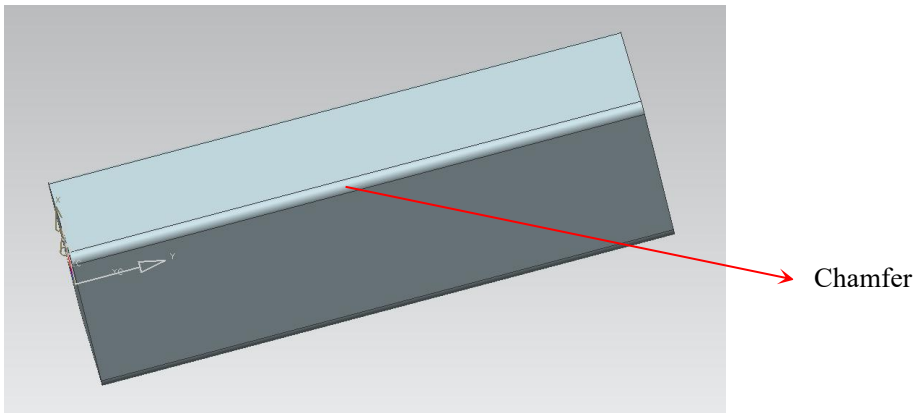
2. SAT

Support SAT format files saved in Solid Works version 2016 and above (the stretching direction is not limited);

(If the SAT saved in Solid Works above 2016 cannot be imported, please set the ACIS version of the SAT to 16.0)

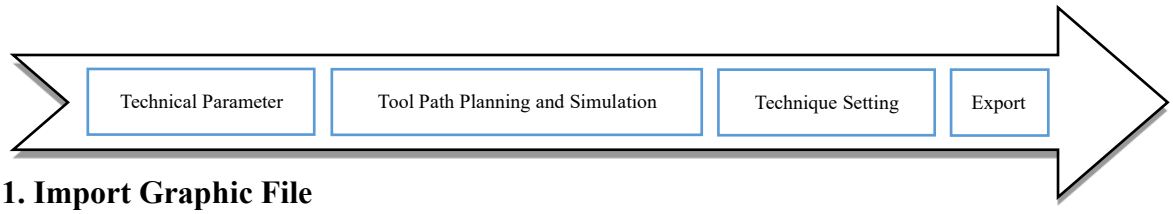


3. The square/rectangle tube file need Chamfer as the real raw tube. This is very important, which will affect the next cutting accuracy.



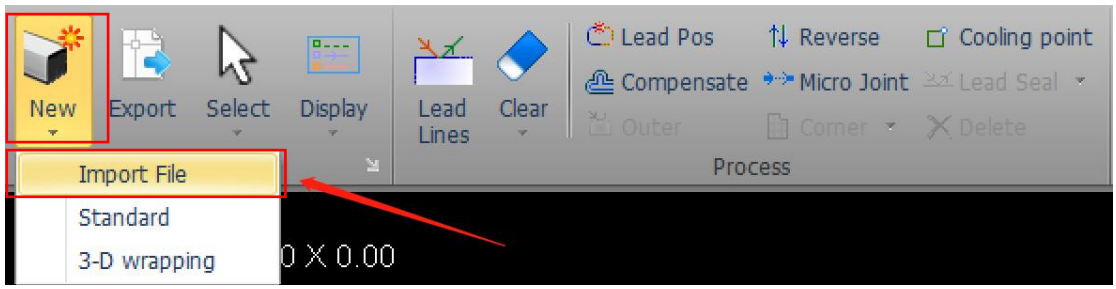
Match the real raw tube

6.3.2 Tube T

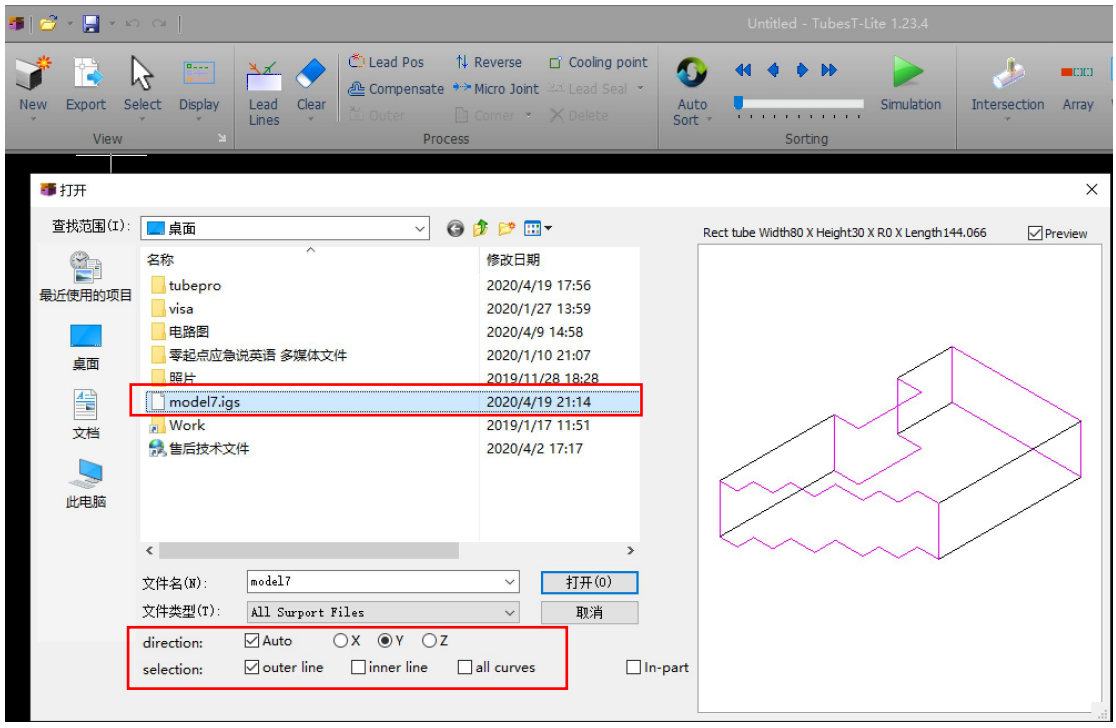


1. Import Graphic File

Click the " New" on the left- up side of the interface, select "import file" in pulldown menu to load the IGS file.



Select the IGS file in "Import Object" dialog box; the preview window on the right side will help you find the file quickly.

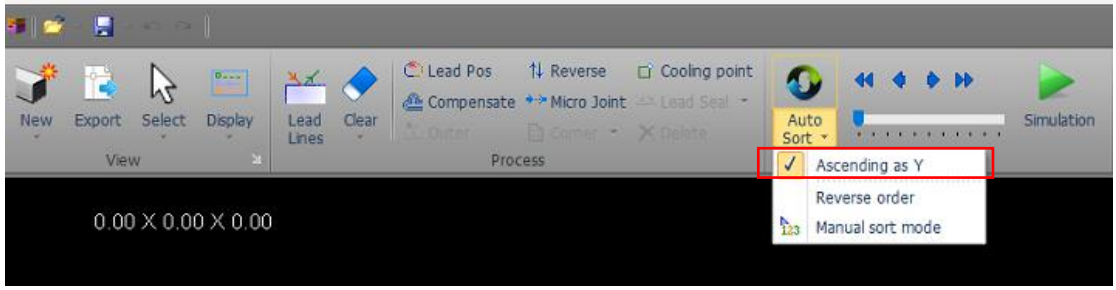


2. Tool Path Setting

(1) Auto Sort

Click " 

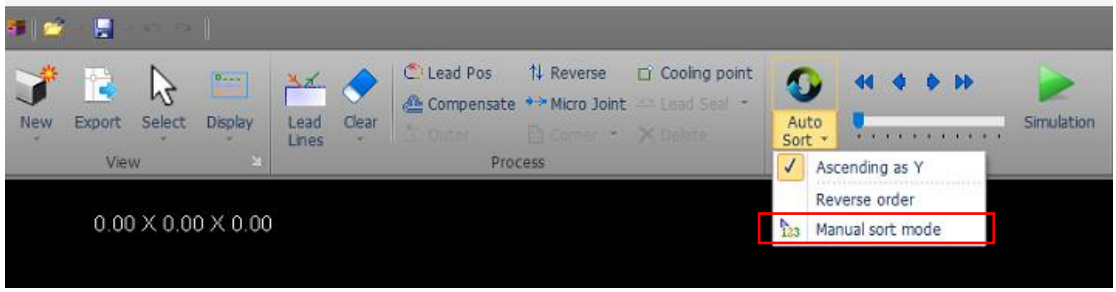
" to Auto-Sort the object, and then click the drop-down menu to choose "Ascending as Y ".

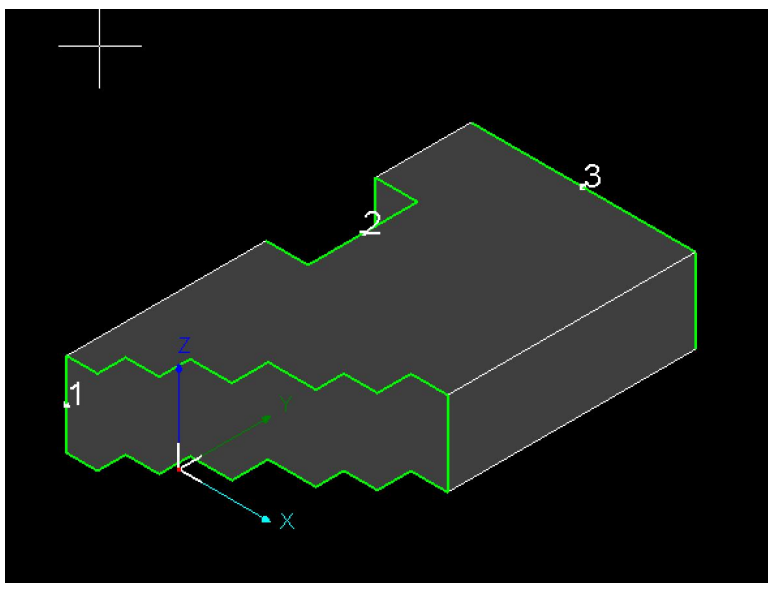


(2) Manual Sort

Click " 

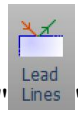
" to Auto-Sort the object, and then click the drop-down menu to choose "Manual sort mode", then Manually select cutting features one by one to confirm the cutting sequence.



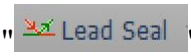


3. Technical Parameter

You may use most of the functions under "Technical parameter" column in the menu bar, including setting the lead-in lines and compensation, etc.

(1) You can set lead-in lines under button " 

".

(2) Set seal, notch or over-cut parameters under button " 

".

(3) The button " 

" is used to set compensation.

(4) The button " 

" is used to set a micro-joint that will not be processed on the object.

(5) " 

" is to reverse the machining direction of a single object selected.

(6) " 

" is to set the cooling point

(7) Click the " 

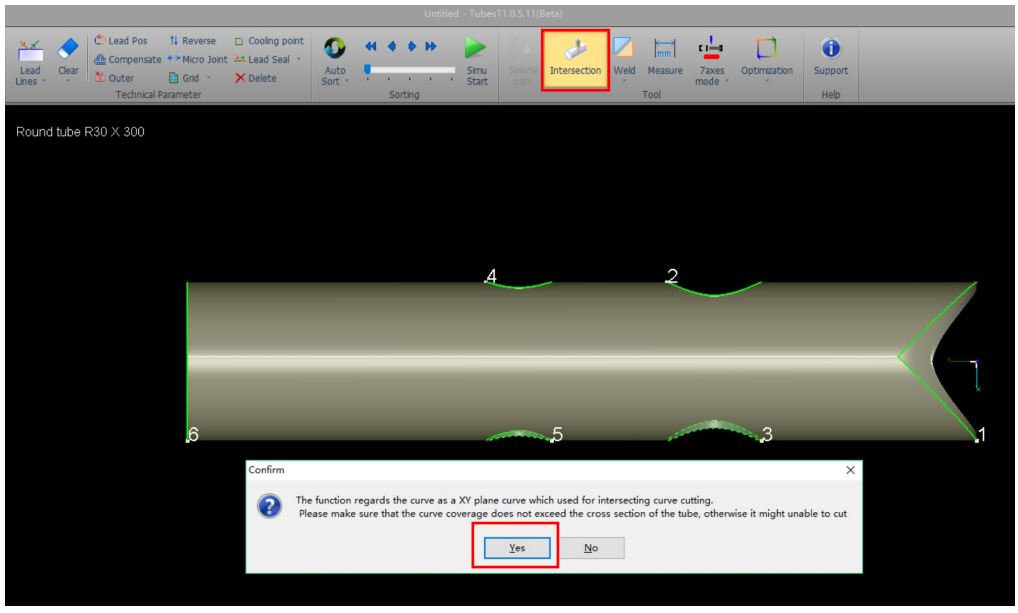
" to enable this function and click where you want to add start point on the parts.

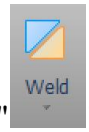
4. Technique Setting (Optional)

(1) Intersection setting: Select the hole on the tube surface and click " 

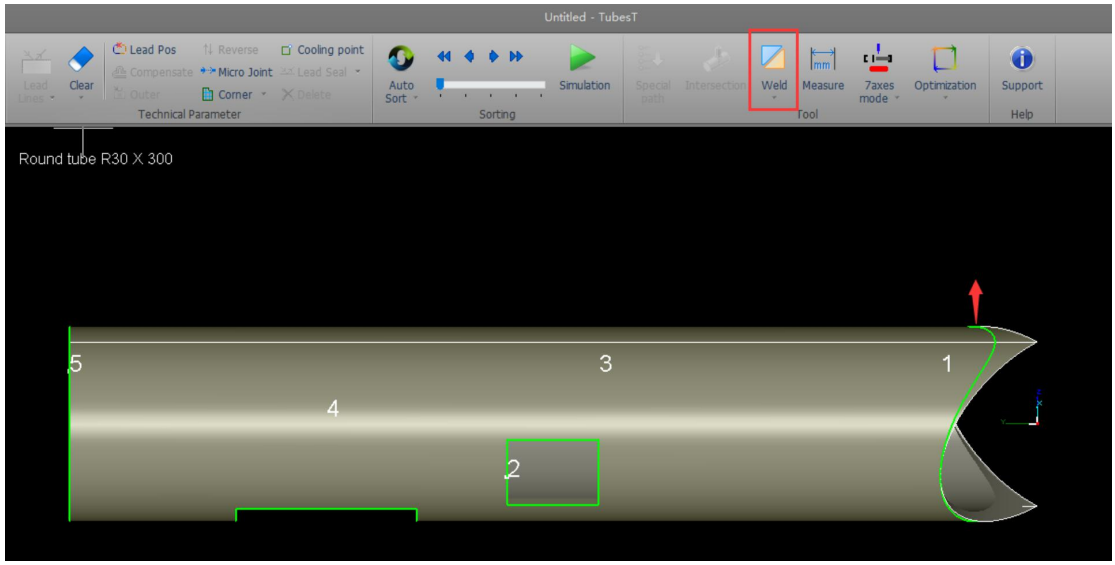
" to enable the intersection setting. Then the tube will not rotate when machining.

Note: This function use for cutting small intersection holes on the circular tubes/oval tubes.



(2) Weld compensation setting: Select the end surface and click " 

" to generate the compensation line in white.

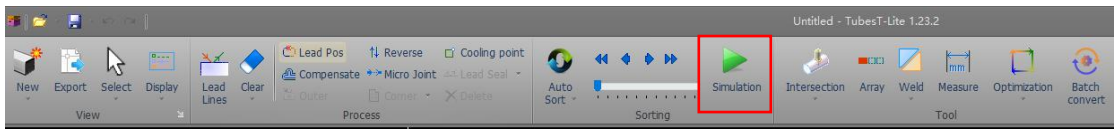


Note:

This function use for bevel cutting on all kind of tubes.

The Tube thickness of design files must be correct as the real one.

5. Simulation



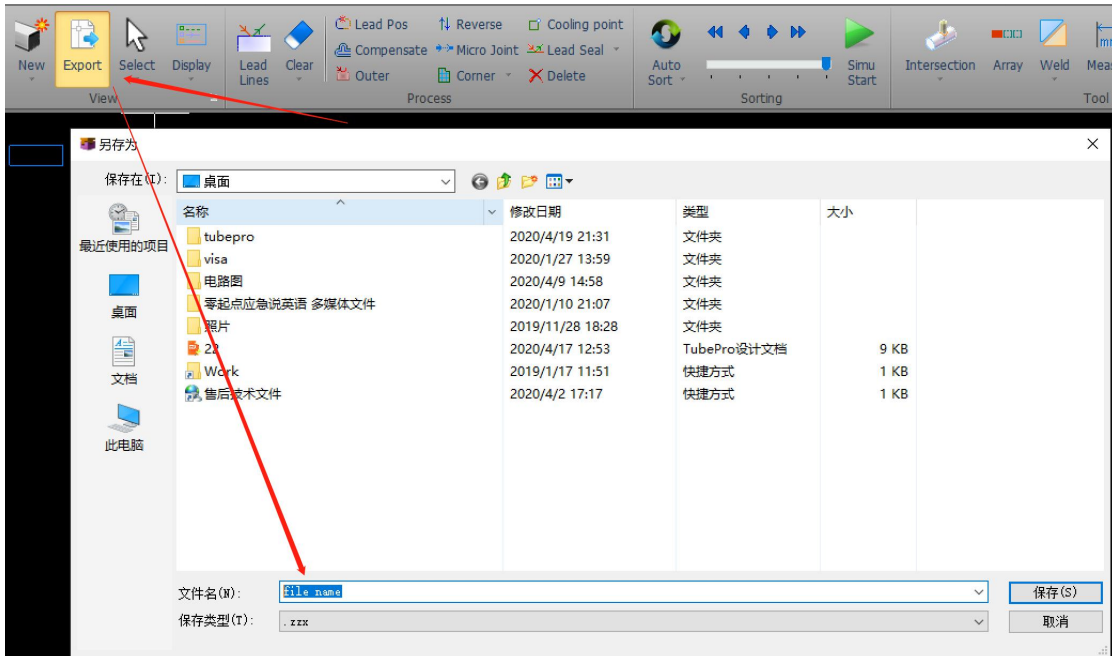
Click " 

" to preview the simulated tool path of the current object.

6. Export

Click" 

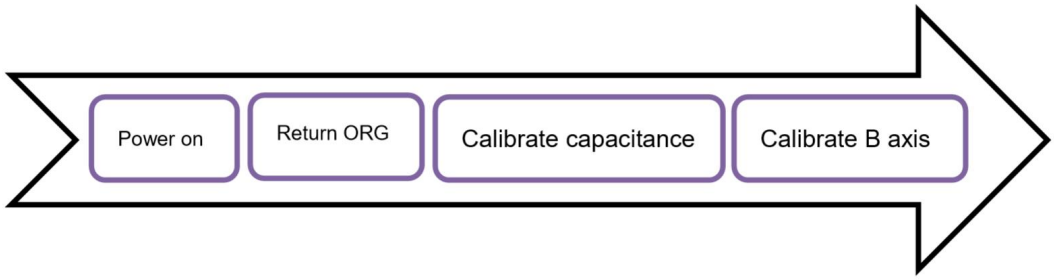
" Export the program, and save as .zzx.



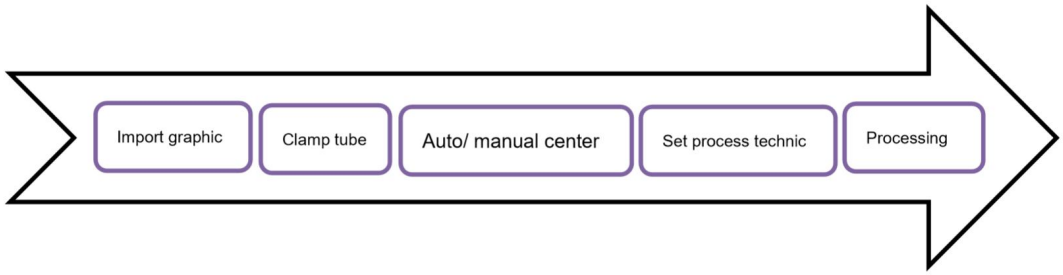
6.3.3 Tube Pro

1. Quick start

(1) Adjust process



(2) Processing Flow



2. Adjust Process

(1) Turn On Machine

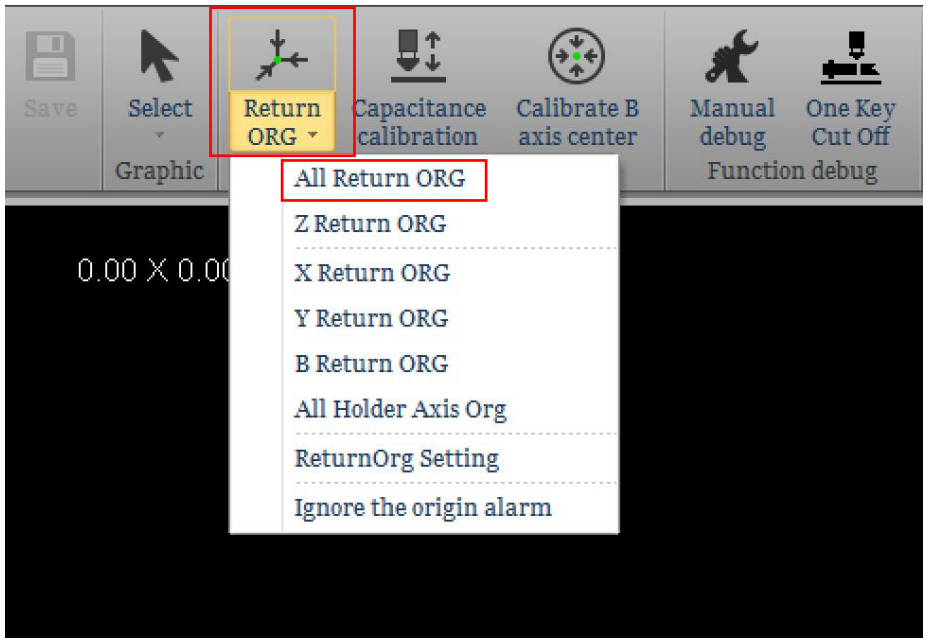
(2) System Return ORG

Open TubePro software, click [Return ORG] menu-> [All Return ORG].

Return ORG operation menu prompts and specifies the actions to be executed in return ORG process: Holder goes down-> Z axis returns ORG ->X axis returns ORG-> Y axis returns ORG-> B axis returns ORG. When the return ORG process is successfully completed, click [OK] to exit dialog.

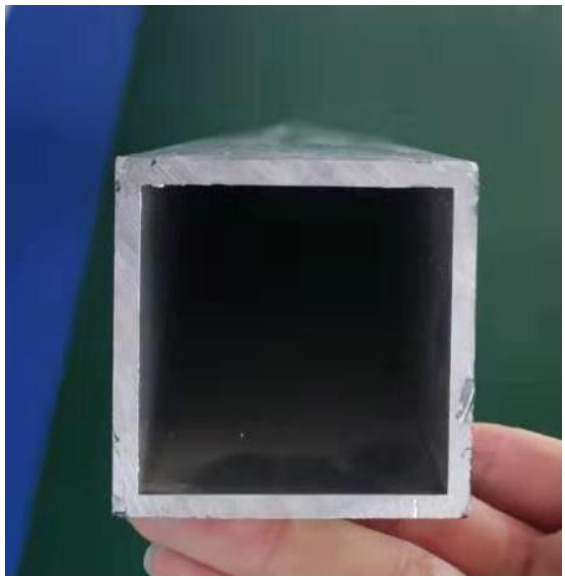
Note:

1. Please make sure no tubes are clamped on the machine.
2. The first-time adjust, please adjust single axis return ORG separately.



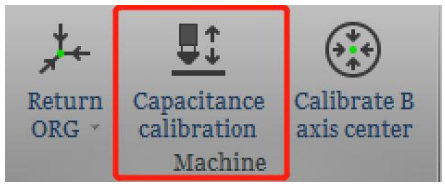
(3) Capacitance Calibrate

A. Load a standard square tube as below.



Note: The center calibration of B axis requires using a standard square tube without chamfering. if use no-standard tube, the next cutting will not accurate.

B. Move tube under the nozzle by Jog the X/Y/B axis. Then level the upper surface of the tube horizontally and Jog the Z axis to move the nozzle close to tube material. Select [OK] on Confirm Security dialog box. Then BCS100 height controller starts calibration.

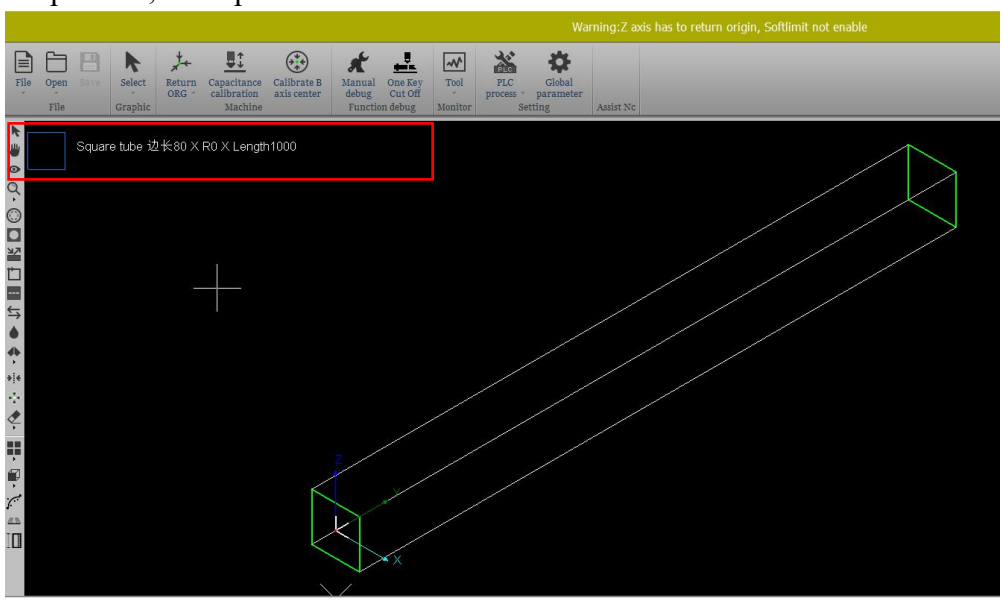




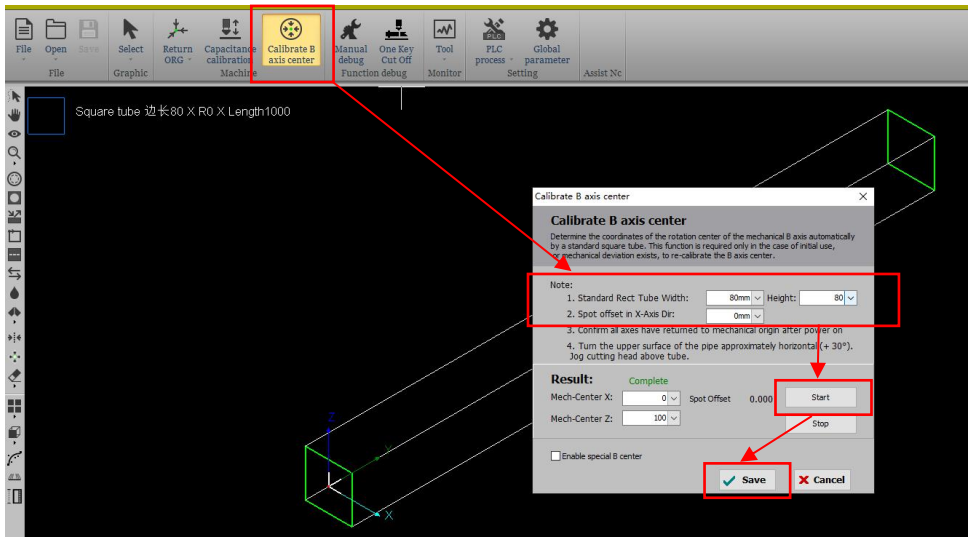
Move tube under the nozzle by Jog the X/Y/B axis

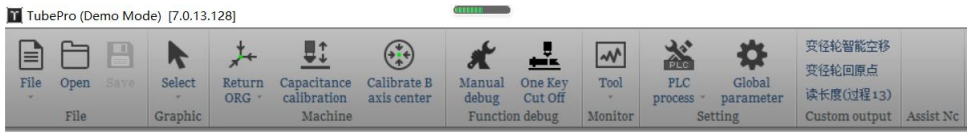
(4) Calibrate B Axis Center

A. Prepare a zzx file as the real size (80*80*1000MM) of the standard square tube we provide, and open this file.



B. Move tube under the nozzle by Jog the X/Y/B axis and level the upper surface of the tube horizontally. Then click [Calibrate B axis center] on menu bar, enter the size of tube, click [Start calibrate center], and click [save] exit.





3. Processing Flow

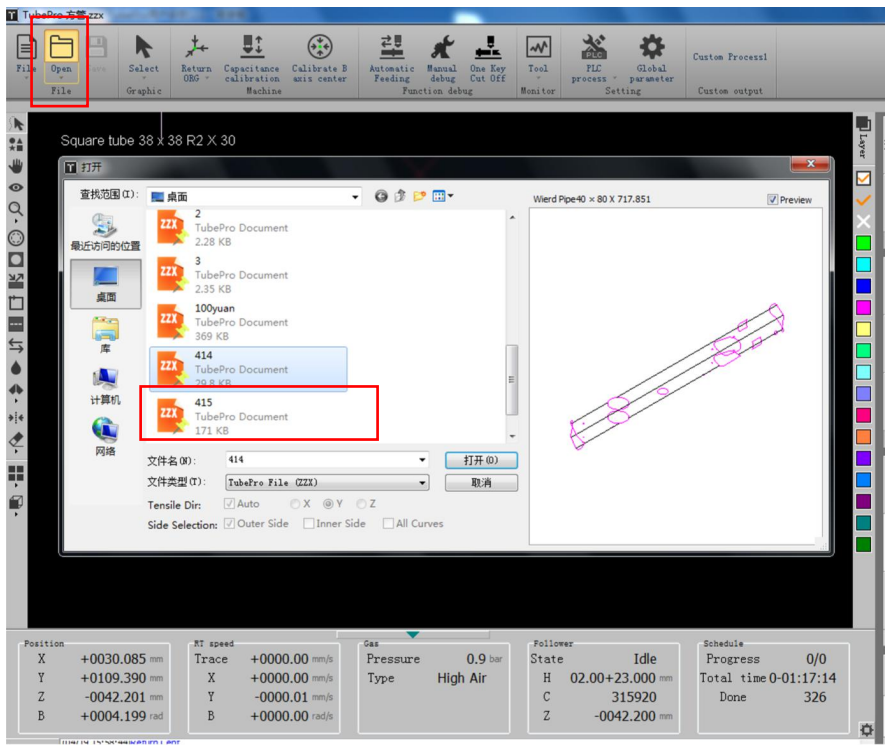
(1) Turn on machine

(2) System Return ORG

(3) Load tube

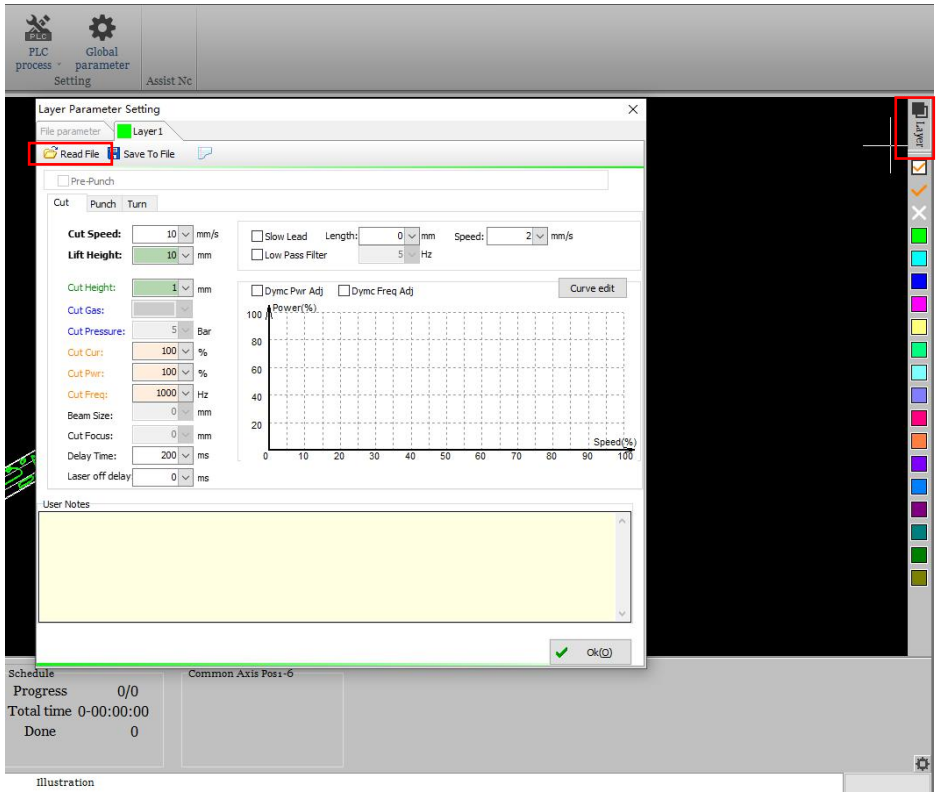
(4) Import Graphics

Click [Open] on menu bar, select the *.zzx file to be processed. Open the right side of the menu you can preview the graphics and its size.



(5) Layer Parameters Setting

Click [Layer] in tool menu to set the process parameters of the layer. Click [Read File] to choose the parameters we already test.



(6) Auto Center

Please click [Auto center] under operation bar first, make sure the actual size of tube material correspond with the size displayed in pop-up window then click Start to execute Auto Center. Click [Save] exit after the operation is completed.

Note:

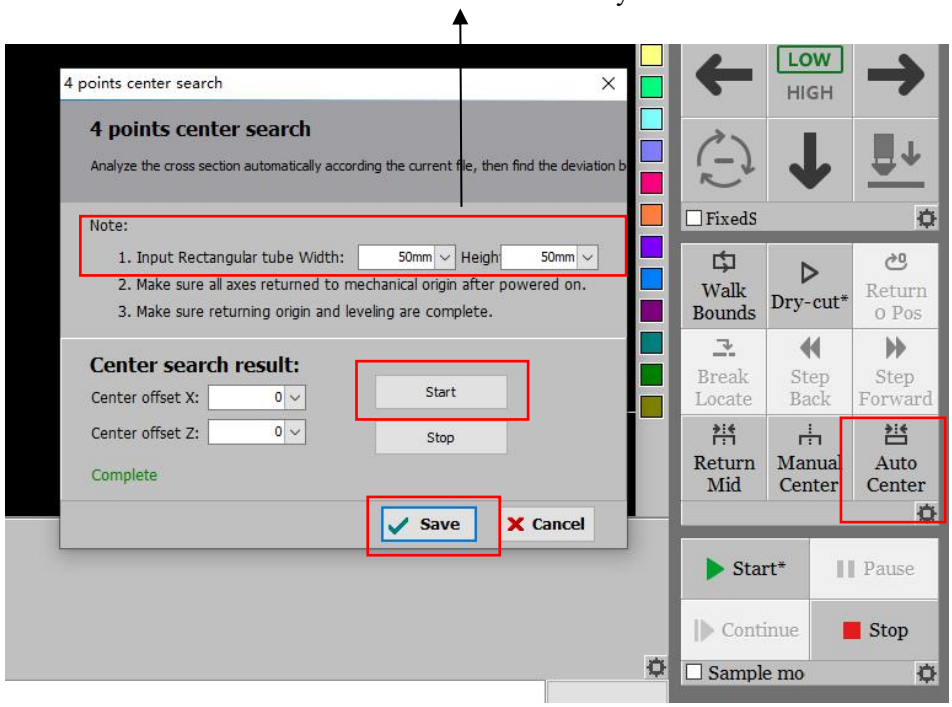
1. Auto Center is just available for square tube and Rectangle tube.
2. If the raw material is rectangle tube, after w axis go back to origin, the wider side faces up.



Wider side face up

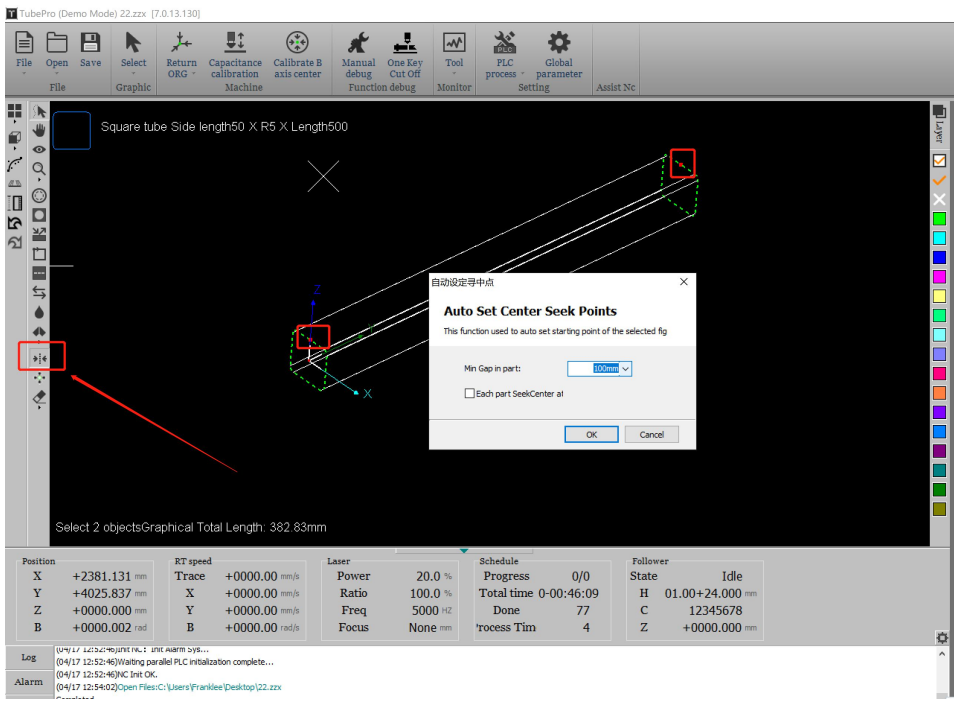
3. If your raw tubes specifications are standard enough, we can ignore this step.

Fill the real size of the tube you load



4. Add auto center seek points

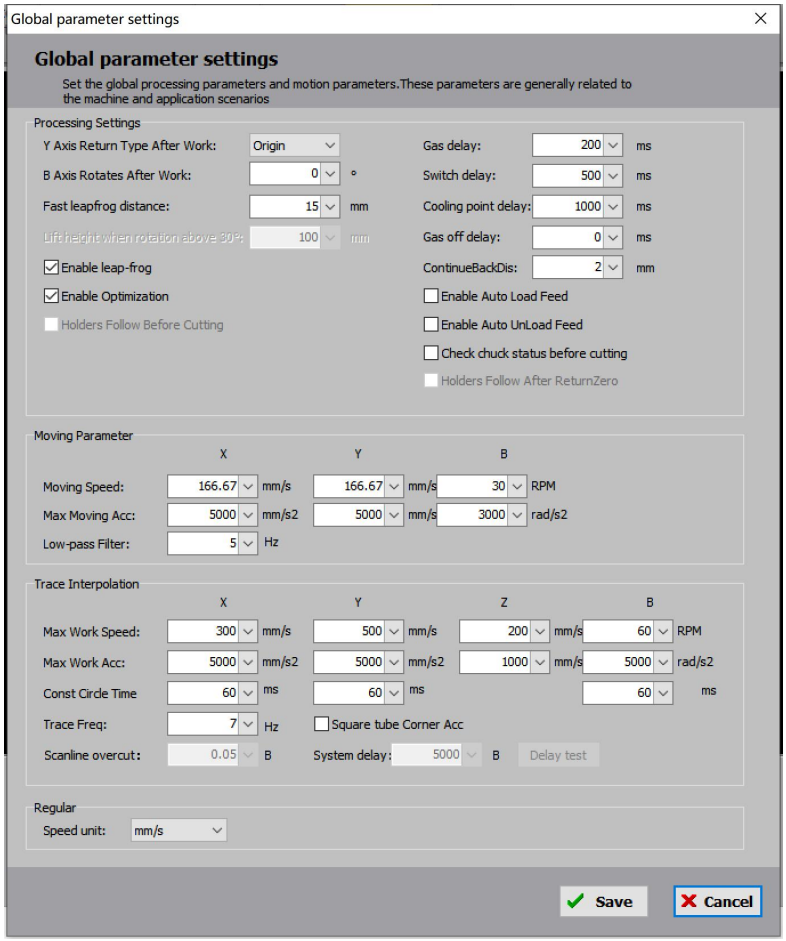
Longer pipes will be twisted, eccentric, and deformed due to gravity and other factors. After processing a certain distance, the center of the pipe may change, affecting the processing accuracy. so you can set a search center point on the processing graphics. When processing to this graphic, you can perform an automatic center search before continuing the processing.



5. Click the [Start] button in the operation bar to start processing.
You can see the progress of the parts in the State Bar.

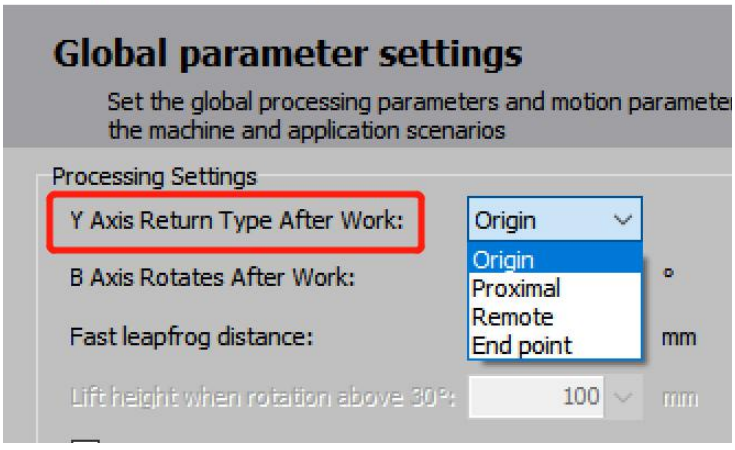
6.3.4 Tube Pro Parameter

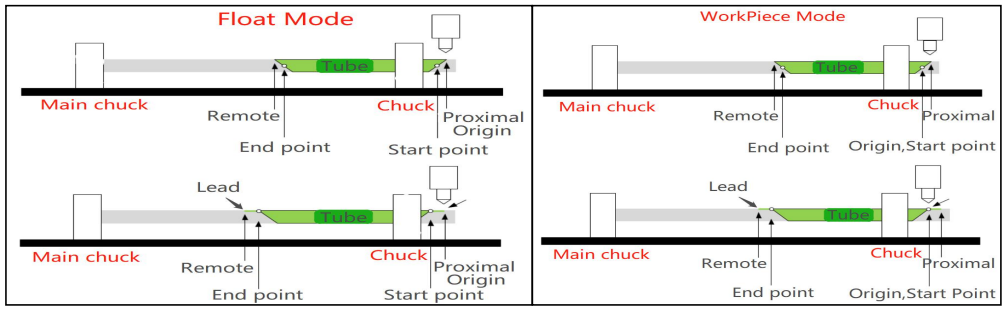
1. Global Parameter Settings



Y Axis Return Type After Work: Select Origin/Proximal/Remote/End point after the processing finish.

Global parameter settings





B Axis Rotates After Work: The B axis will be rotated by an angle after processing.

Note: For normal tubes, set 0, for some special tubes, we can set the rotate angle after processing, for easy loading.

Fast Leap-frog Distance: After select leap-frog, the dry movement less than this set value will execute fast leap-frog (the leapfrog without rising and falling delay), if more than this setting value will execute the frog with rising and falling delay.

Note: We must choose Enable leap-frog, this function will be activated.

Life Height When Rotation Above 30°: The height of Z axis lifted when changing the pipe face.

Note: This function has no effect when Enable optimization was selected.

Enable Leap-frog: After Z axis lifts to the mid-height, X-coordinate and Y-coordinate begin lost motion, so as to shorten the time of dry movement.

Enable Optimization: If selected this function, the Z axis will be appropriately lifted according to the pipe size in the drawing. The software will calculate automatically.

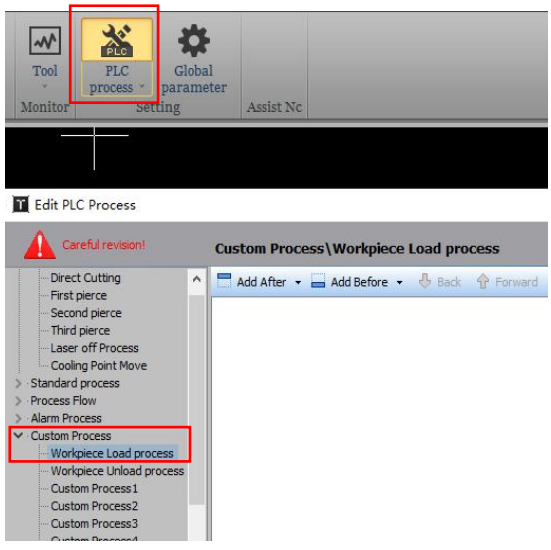
Gas Delay: Gas delay time of PLC during punching.

Switch Gas Delay: When switch the gas, the delay time for switch.

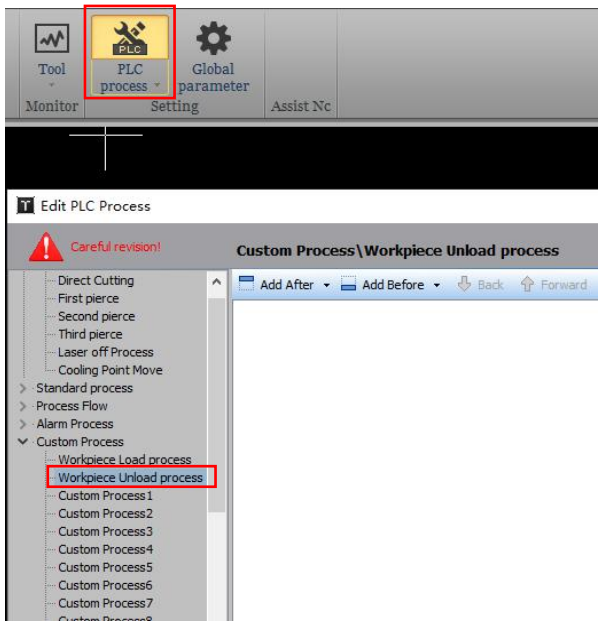
Cooling Point Delay: Blow cooling delay time at the cooling point.

Gas Off Delay: Delay time when turning off gas

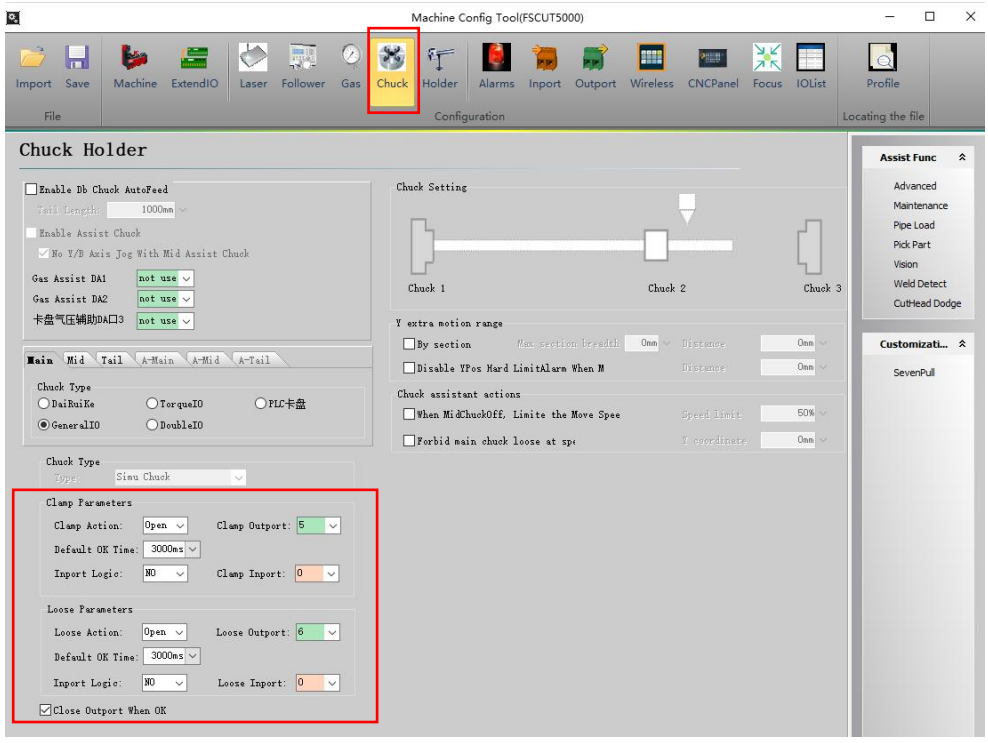
Enable Auto Load Feed: Click to start work, the file needs to execute the loading PLC action before the PLC starts to execute.



Enable Auto Unload Feed: After the processing is finished, then PLC action after finishing the file PLC action.



Check Chuck Status Before Cutting: Check the status of the chuck before starting processing. If it is not clamped, a alarm will appear.



Holders Follow Before Cutting: If a follow-up holder is configured, it can be selected, and the holder will be automatically set to the follow-up state before starting processing.

Note: This function use for professional tube cutting machine.

Holders Follow After Return Zero: After select， After each return to zero, the holder is set to the follow-up state.

Note: This function use for professional tube cutting machine.

X/Y/B Moving Speed: Machine dry move speed.

X/Y/B Max Moving Acc: The acceleration of dry move. Match using with Move Speed.

Low-pass Filter: Set the low-pass filter frequency of idle shift. This parameter is related to mechanical performance, and the default is 5Hz. If the cutting error is large, you can try to reduce this parameter.

X/Y/Z/B Max Work Speed: Constrain the processing speed of single axis.

X/Y/Z/B Max Work Acc: Constrain single-axis processing acceleration.

Cost Circle Time: The minimum time parameter for processing small circles can ensure the accuracy of small circles; the larger the setting, the higher the precision of processing small circles.

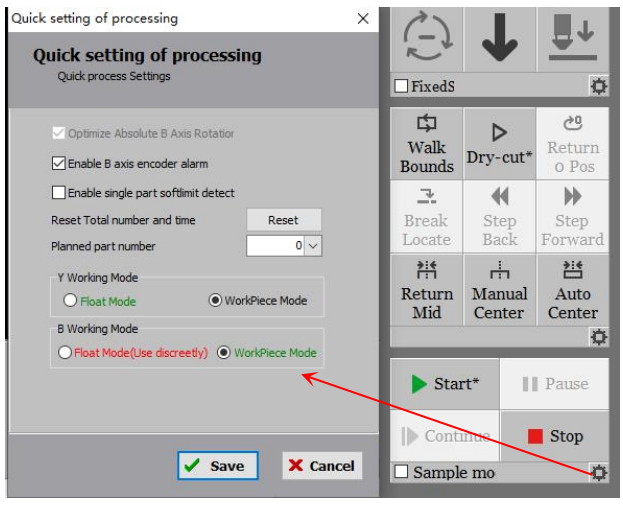
Note: The default set value is normal 50ms.

X/Y/Z/B Trace Freq: Processing low-pass filter frequency, the default is 5Hz. The better the performance of the machine tool, the higher acceleration and the higher the low-pass filtering.

Square Tube Corner Acc: When it is not select, the corner of the square tube is limited by the B-axis small circle time constant, and the corner will limit the speed; after choose, the corner of the square tube is not limited and the processing is faster.

Speed Unit: The unit of speed can be changed. Optional are mm/sec, m/sec, m/min, mm/min, in/min, in/s.

Quick setting of processing:



Optimize Absolute B Axis Rotation: Without affecting the length of the dry movement, the B-axis dry moves will toward the zero point. So when machine finish cutting return to zero point will save time.

Note: This function always select.

Enable B Axis Encoder Alarm: When the B axis is definitely an encoder, this function is enabled by default; the purpose is to predict the encoder overflow alarm before processing to avoid the alarm during processing.

Note: This function always select.

Enable Single Part Soft Limit Detect: The software limit detection is performed in units of parts. When the software limit protection is enabled, if this function is enabled, even if the drawing exceeds the Y-axis travel, it will not be reported as "out of travel range", but will allow the machining of parts within the travel. Parts that exceed part or all of the Y-axis travel will not be processed.

Note: This function use for single part cut, for example, if we cut a 1m finished part with 1m raw tube. Normally It is not recommended to use.

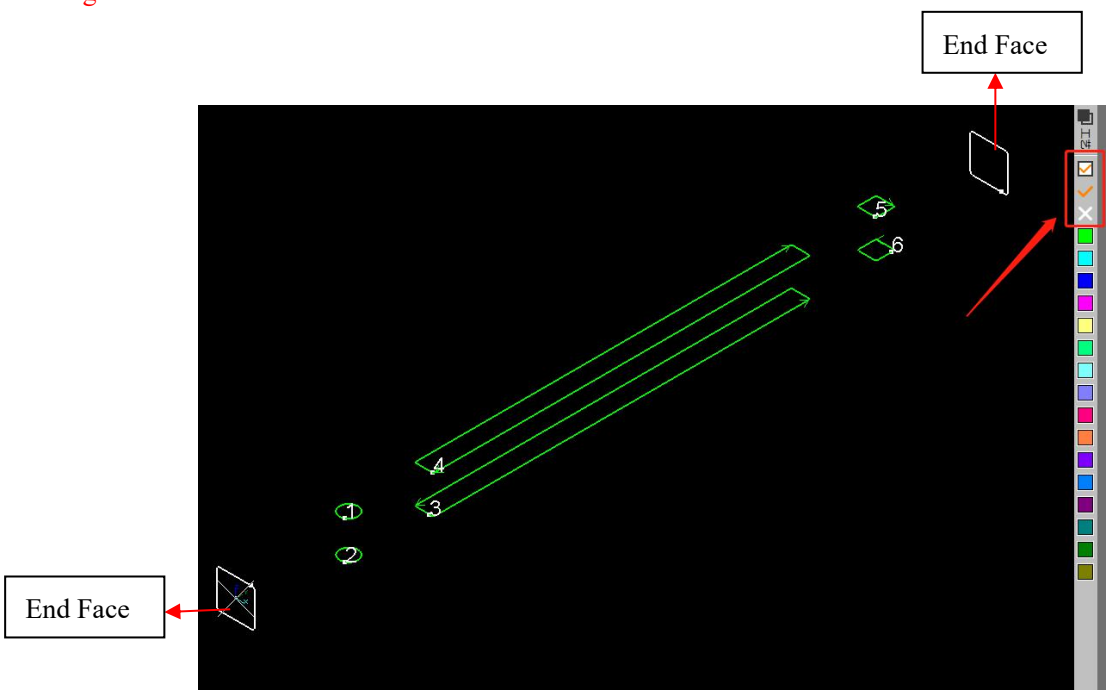
Planned Process Time: Clear the statistical processing total and total time.

Planned Part Number: After processing to the specified number of parts, it will automatically stop and print the information; 0 means not open. Sample mode will also count, while simulation and idling will not count.

Y Working Mode:

Floating Mode: The current Y coordinate is used as the zero point of the processed graphics (excluding the end face no cutting).

Note: This function do not suggest to use. Because the below situation we can not cut by Floating mode.



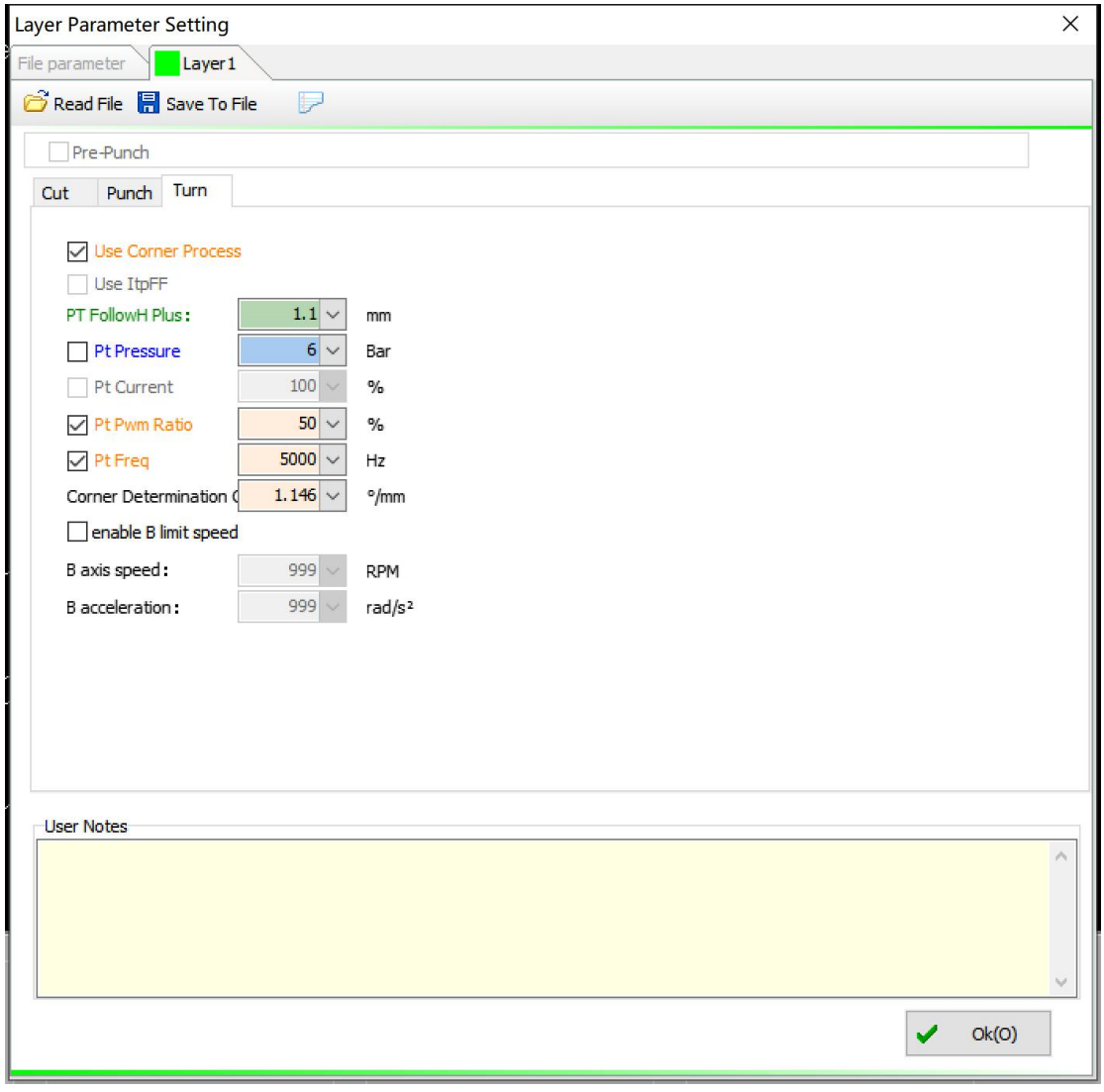
Workpiece Mode: The current Y coordinate is used as the zero point of all the graphics.

Note: It is recommended to use the workpiece mode always.

B Working Mode: It is recommended to use the workpiece mode. The floating mode is to process the current B coordinate as the zero point of the B axis. Please use it with caution. Processing tubes other than round tubes may cause collisions.

Note: Please always select Workpiece mode.

Interpretation of corner craft:



Enable the corner process can make the tube corner cutting better. In the corner process, you can set the corner air pressure, peak power, duty cycle, pulse frequency, and you can also constrain the speed and acceleration of the B axis.

PT Follow H Plus: The true following height at the corner = cutting following height + cutting height correction.

PT Pressure: Set the cutting gas pressure for the corner cutting.

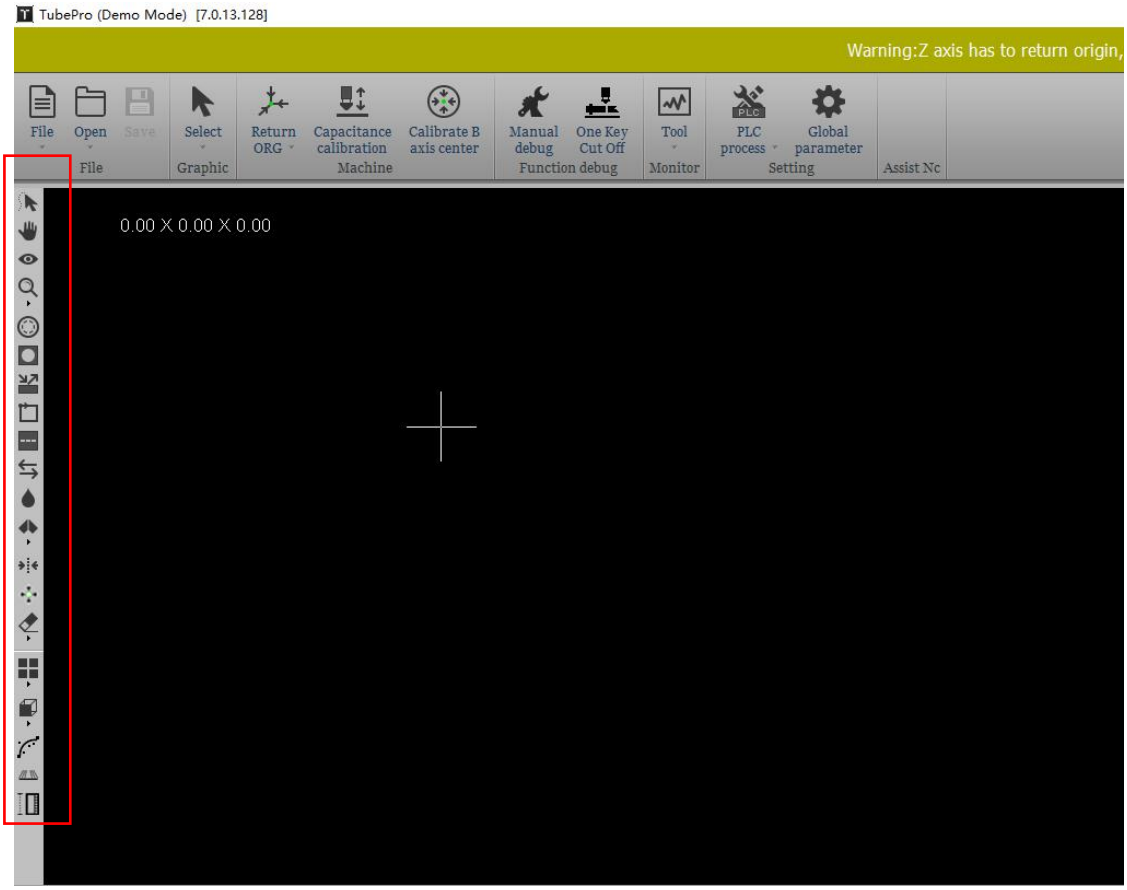
Pt Pwm Ratio: Set the laser power used in cutting, i.e., the duty ratio of PWM modulation signal.

Pt Frequency: Set the carrier frequency of PWM modulation signal during cutting, i.e., the laser number within one second. The larger the value is 5000.

Corner judgment standard： If the B-axis is to turn the set angle every 1mm in the X direction, it is considered to have entered the corner section. It is recommended to use the default value of 1.146 °/mm.

Enable B Limit Speed: When cutting pipes of different sizes, the speed and acceleration of the B axis often affect the cutting quality of the entire cutting surface. Using a separate corner B-axis speed can improve the cutting quality without affecting the overall processing efficiency.

Interpretation of shortcut toolbar:



Make Up: Set slit compensation for the selected figure or all figures.

After the compensation is added, the original graphic becomes white, and the graphic after compensation is the original layer color. It will follow the compensated trajectory during actual cutting.

Inside And Outside: Setting the graphic to negative or positive cut will affect whether the lead and compensation are inside or outside the graphic.

Lead Line: Set the leading line for the selected figure or all figures. The type, length and position of the lead can be set, and a cooling point can be added at the introduction point.

Starting Point: Set the starting position of each track in the graph.

Micro Joint: Insert one or more micro-joints in the track without cutting.

Reverse: Reverse the direction of trajectory movement in the graphics.

Cooling Point: During the processing, the cooling point will stop blowing, and the processing will continue after the cooling point is delayed. The cooling point delay is configured in the global parameters.

Weld: Set whether to use welding compensation for the cut surface of the pipe.

Seek Center: Selecting a single graphic and clicking on the seek center will set the starting point of the graphic as the seek center; by setting the minimum distance between the seek center, the seek center will be automatically added to the appropriate graphic. When processing to the seek center, it will automatically find the center and then continue to process.

Micro Move: It will carry out small movement debugging along the X-axis or Y-axis along the graph.

Clear: You can choose to clear slit compensation/lead line/micro joint/ cooling point/seek center/clear all.

Display Mode: Choose to display or not to display unclosed graphics/ machining order/trajectory starting point/trajectory direction/empty path/section/surface rendering.

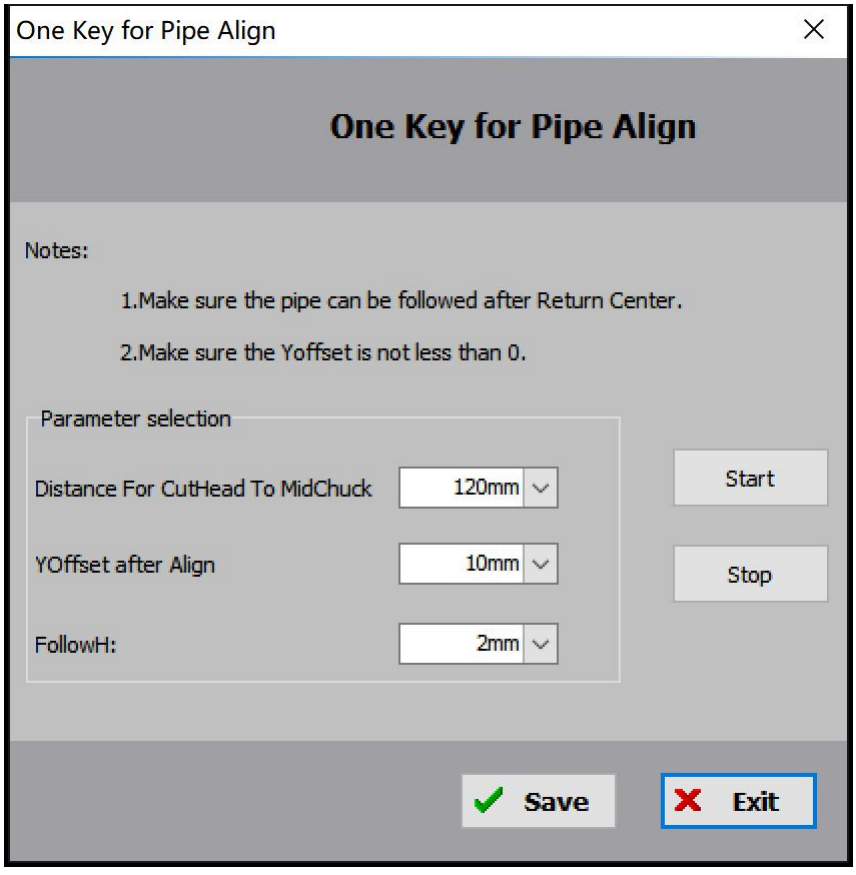
View Selection: Select the view mode. You can choose to view/top view/ main view/bottom view/back view/right view/left view/southwest isometric view

/northeast isometric view/southeast isometric view/southeast isometric view /northwest isometric view; you can open/Close view refresh.

Reverse View: Rotate the drawing 180° along the Z axis. It is used when the clamping method of the pipe that is not symmetrical about the YOZ plane, such as angle steel and special-shaped steel, is inconsistent with the drawing. Then actual direction is consistent with the drawing.

Curve Smooth: Smooth the curve of the selected graphic. It only takes effect on the graphics on the surface, not on the cross-sectional graphics.

6.3.5 One Key For Pipe Align



<One Key For Pipe Align> software can automatically find the pipe end-face and make the cutting head finally stop at a certain distance from the pipe end-face.

Distance For Cutting Head To Mid-chuck:

In order to avoid that the pipe does not extend below the cutting head and lead to follow the piercing head, the pipe will be sent forward a certain distance when performing the function. The default parameter is 120mm, which can be adjusted according to the actual situation.

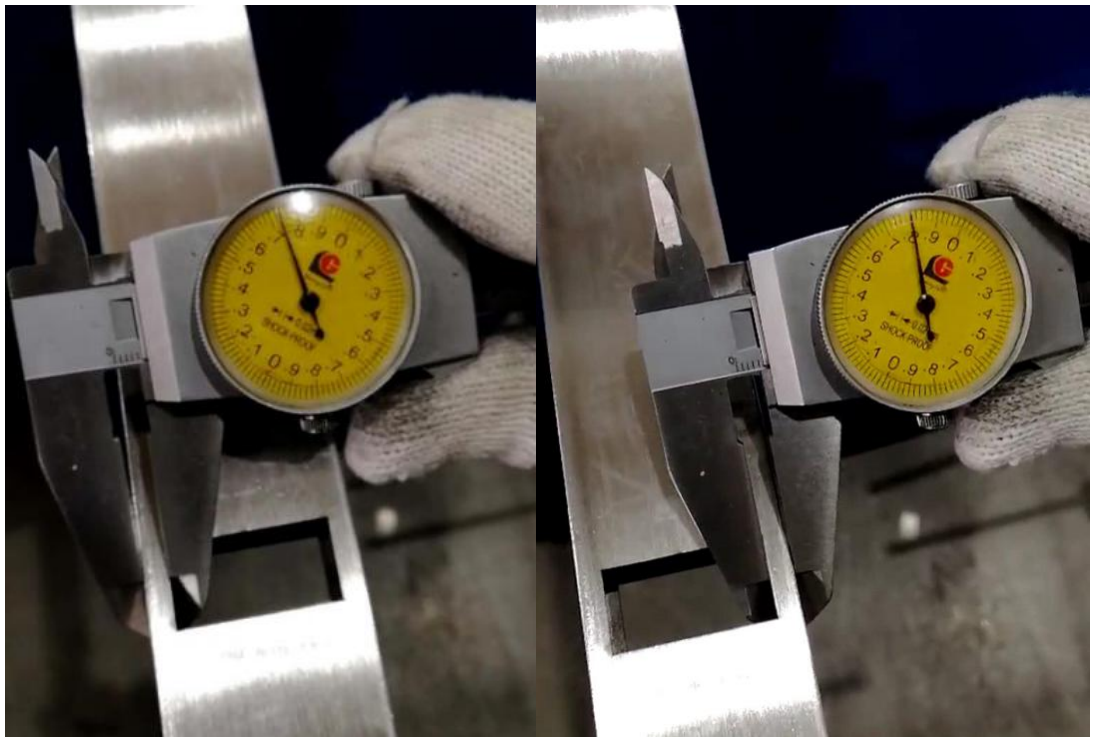
Y offset After Align:

After the cutting head goes out to find the pipe end-face, the Y axis will move forward by an offset distance to prevent the cutting head from processing at the edge

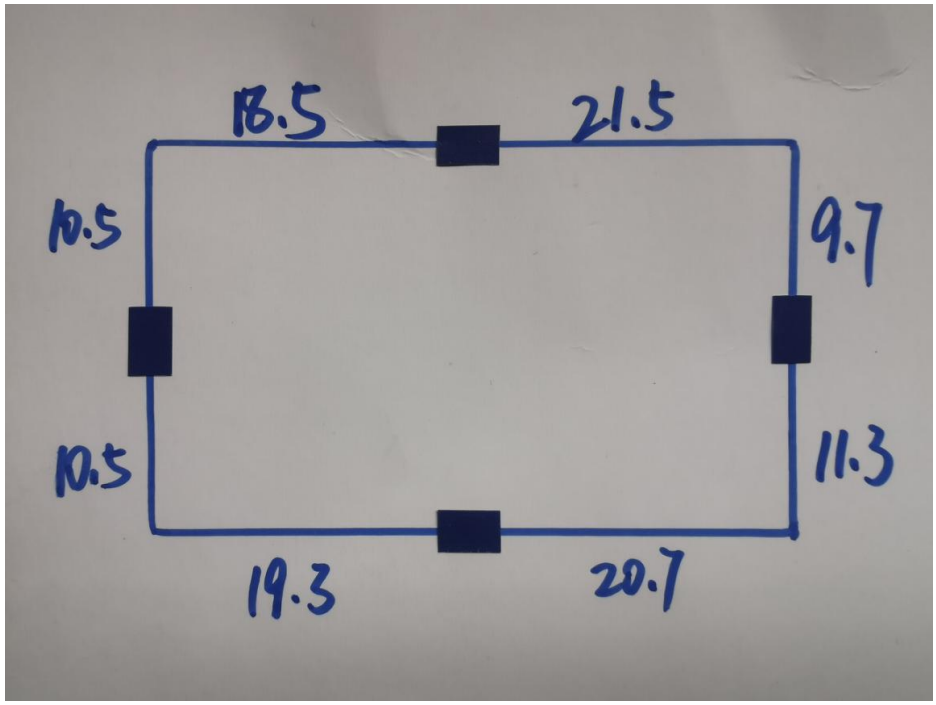
of the pipe and causing jitters.

6.3.6 How To Adjust Tube Cutting Size Deviation

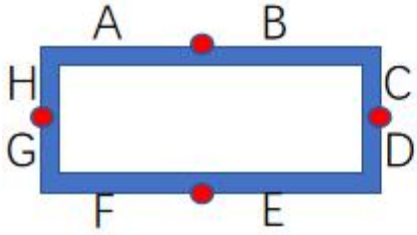
Step 1: Use calipers to measure the left-to-right distance from each hole to the edge.



Step 2: Please write all measurement result on the paper.

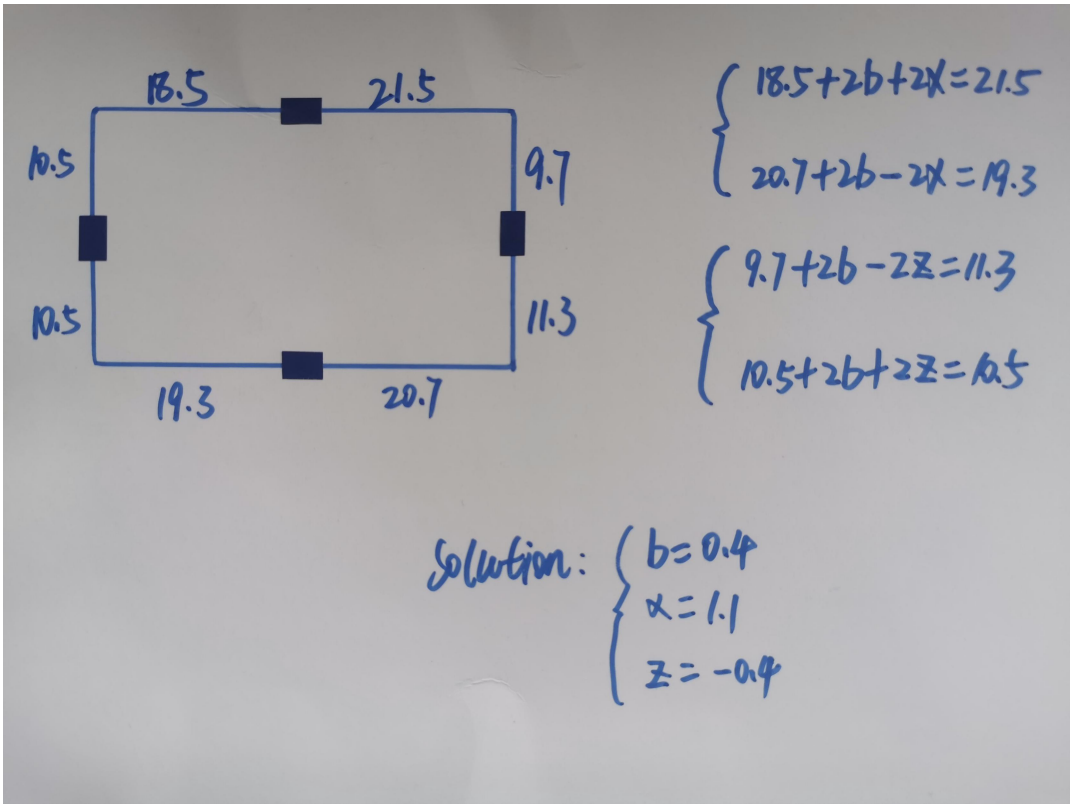


Step 3: Use equation and calculate the result b.x.z



$$\begin{cases} A+2b+2x=B \\ E+2b-2x=F \end{cases}$$

$$\begin{cases} C+2b-2z=D \\ G+2b+2z=H \end{cases}$$



Solution b：

A+E+C+G+8b=B+F+D+H

8b=B+F+D+H-A-E-C-G

$$b=\frac{B+F+D+H-A-E-C-G}{8}$$

Solution X:

A-E+4X=B-F

4X=B-F-A+E

$$X=\frac{B-F-A+E}{4}$$

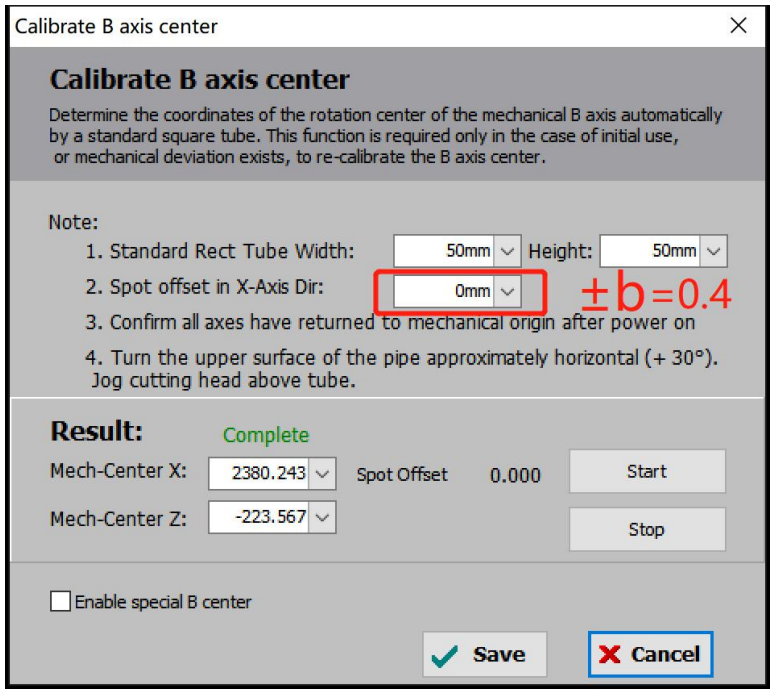
Solution Z:

G-C+4Z=H-D

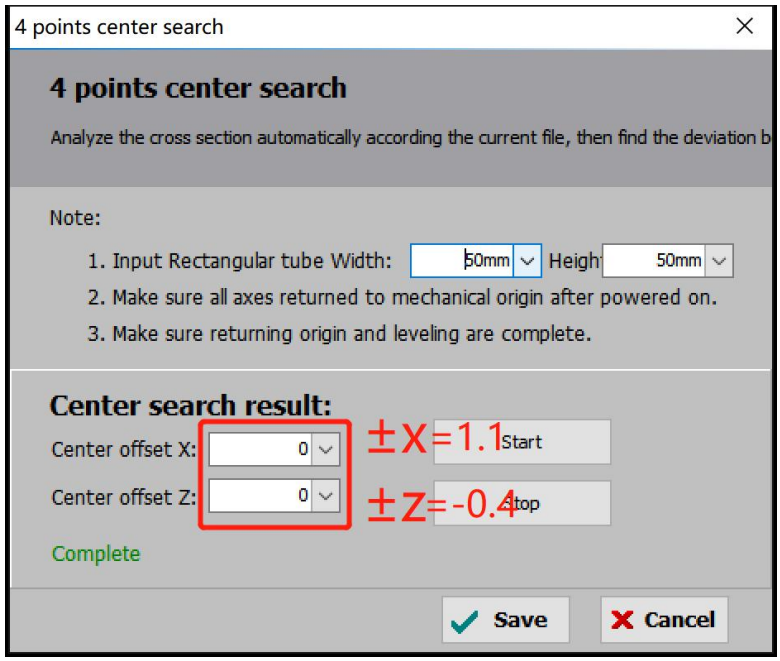
4Z=H-D-G+C

$$Z=\frac{H-D-G+C}{4}$$

Step 4: The b value is directly compensated into coordinate X in <B-axis center> and saved;



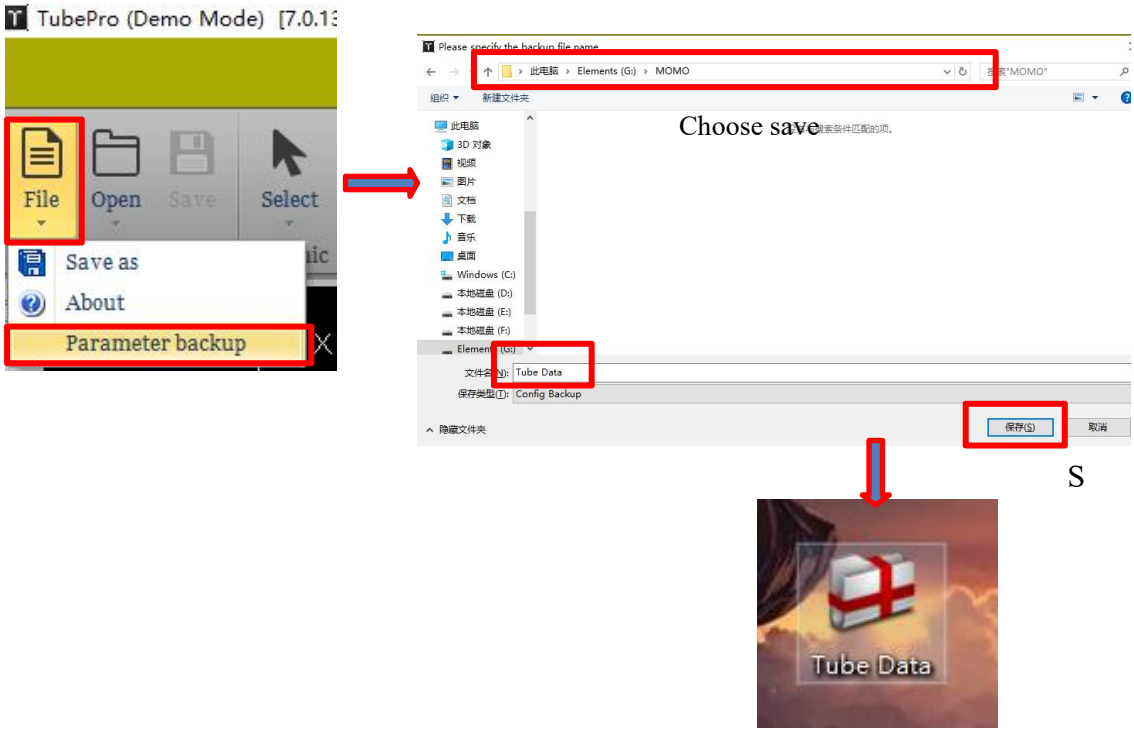
Then, the x and z values are compensated into the x and z deviation values in <Auto Find>, and saved;



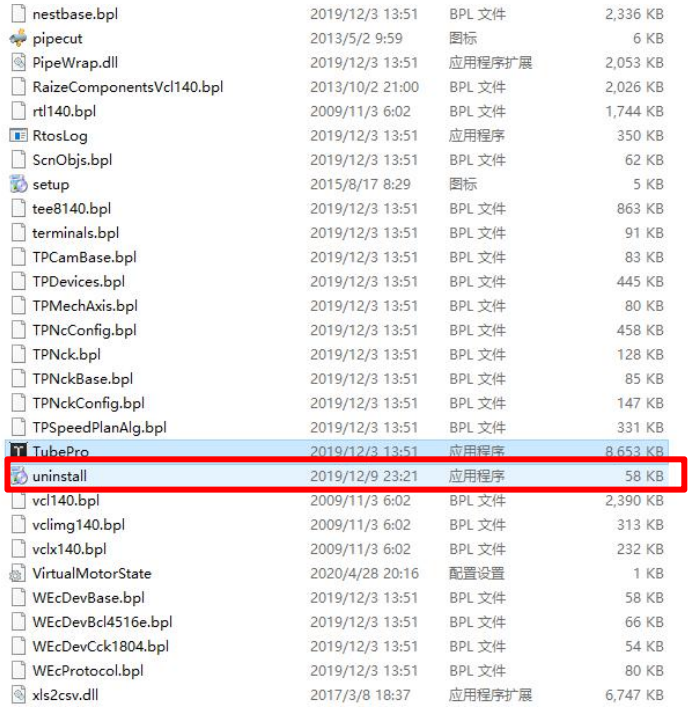
Do not perform auto-centering any more, just cut the inspection results directly.
(The result of direct B-axis center calibration, not necessarily very accurate)

6.3.7 How To Install The Laser Cutting Software TubePro

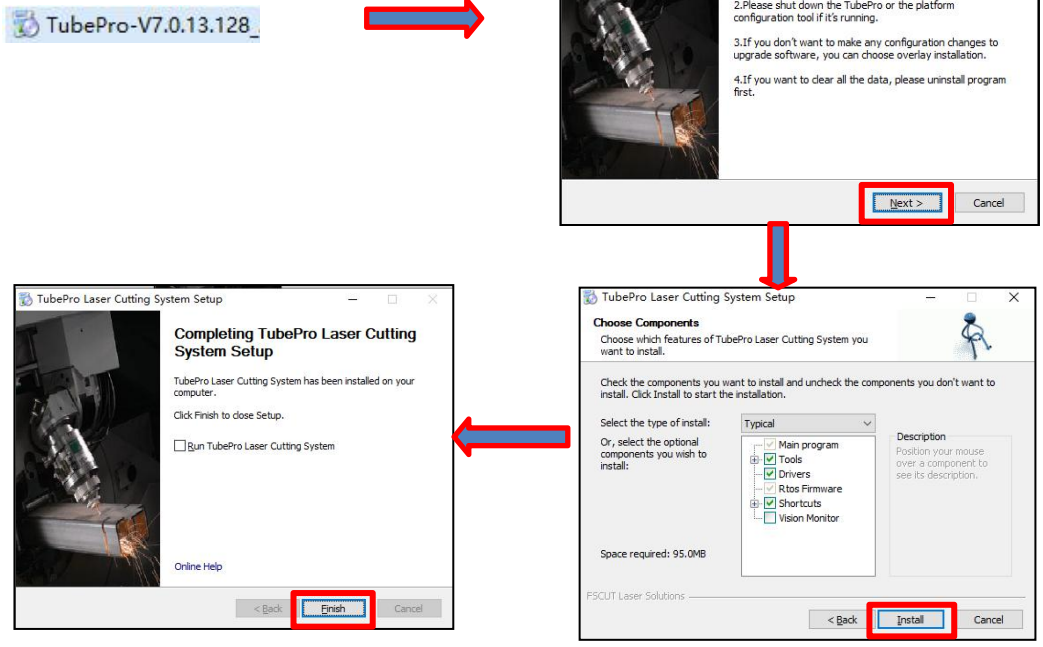
1. Backup the machine data



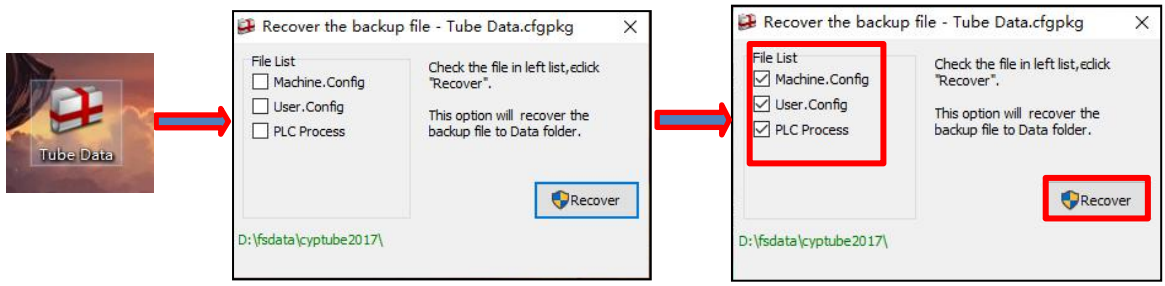
2. Uninstall the current software



3. Install the new software



4. Reset the machine data



6.4 Laser Cutting Head Instructions

6.4.1 Laser Cutting Head Calibration

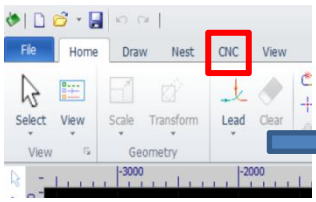
1. Turn on the machine and put a square tube under the laser cutting head.

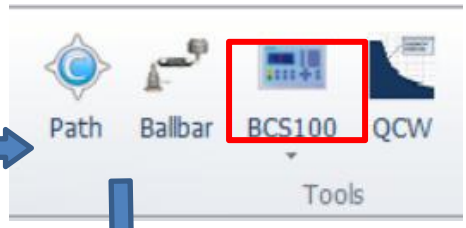
Note: The metal sheet must be stable on the machine table, any little shaking is not allowed, because any little shaking will effect the calibration.



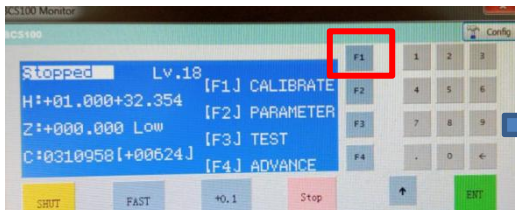
Put a metal sheet and no any shaking

2. Open Cypcut and then go to do calibration.(Normal Way)

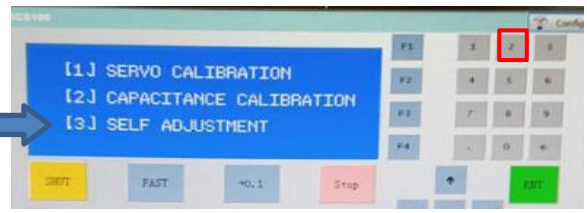




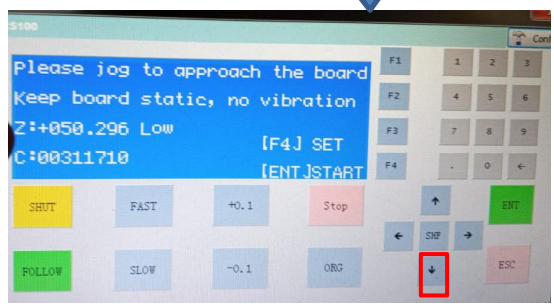
Note: Here do not press the small triangle, press  area.



Press F1

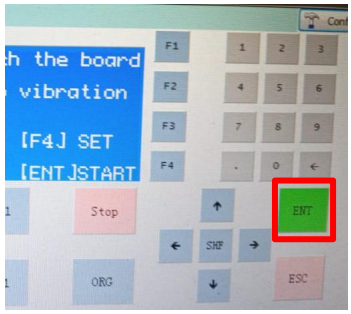


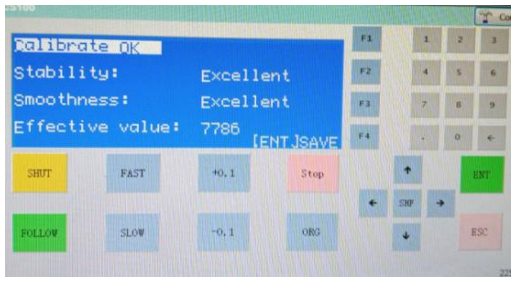
Press 2



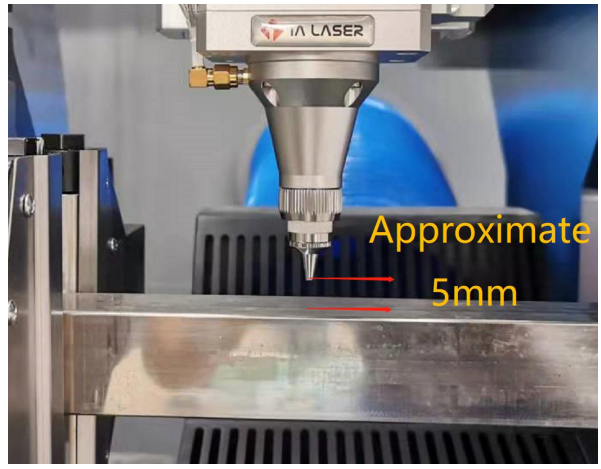
Press down arrow, make the laser head down till 5MM distance to the metal sheet.

Press ENT

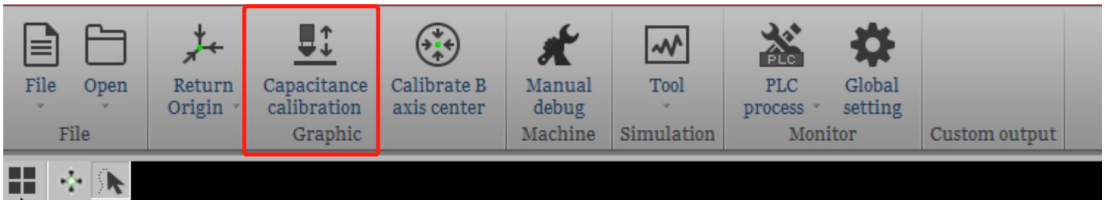




Wait several seconds Press ENT

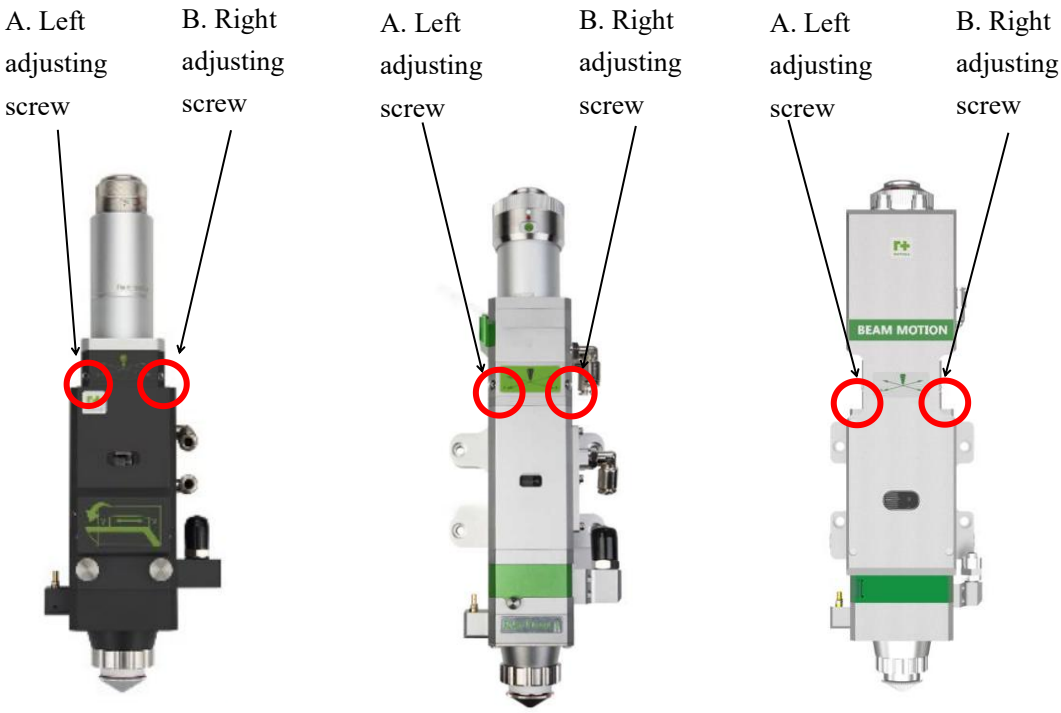


3. Open Cypcut and then go to do calibration.(Fast Way)



Note: If machine have any alarm, do not suggest use this way.

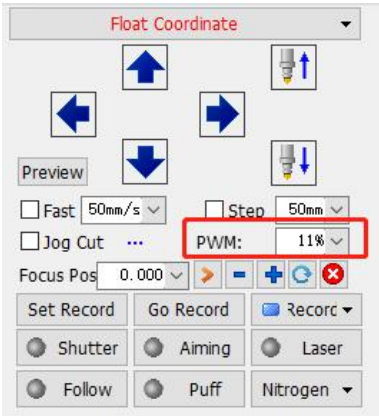
6.4.2 How To Adjust Nozzle Center?



BT240S **BM109** **BM111**

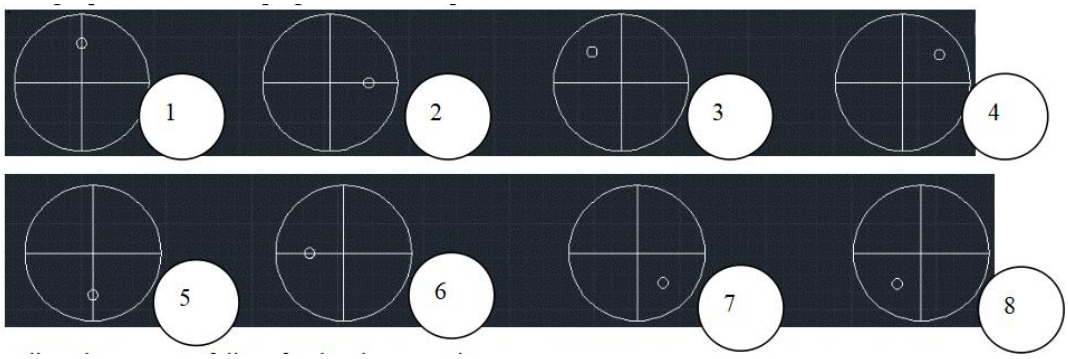
1. Use transparent tape stick on the nozzle and make laser out twice shot the tape.





Please set the PWM 11%. Then press the laser button twice.

2. Use a piece of scotch tape get the laser output results as follow:



Adjust the screw as follow for the above results:

Result 1: Anticlockwise adjust A&B.

Result 5: Clockwise adjust A&B.

Result 2: Anticlockwise adjust A and Clockwise adjust B.

Result 6: Clockwise adjust A and Anticlockwise adjust B.

Result 3: Anticlockwise adjust B.(Mainly adjust B)

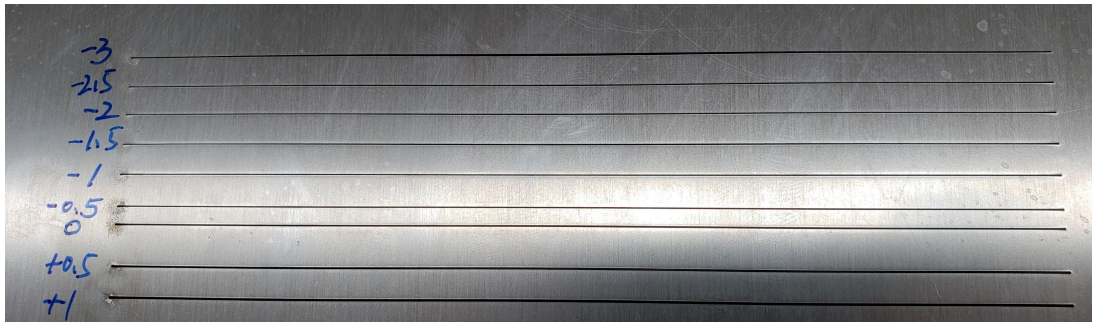
Result 7: Clockwise adjust B. (Mainly adjust B)

Result 4: Anticlockwise adjust A. (Mainly adjust A)

Result 8: Clockwise adjust A. (Mainly adjust A)

6.4.3 How To Find The Focus?

Use N2 cut 0.5MM/1MM Stainless steel with 150MM straight line.
Use focus -2,-1.5,-0.5,0,0.5,1,2……

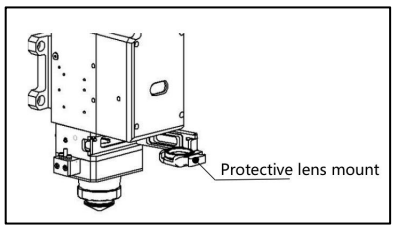


Find the finest line,which shows the focus. Refer to the above photo, the focus is -1.5.

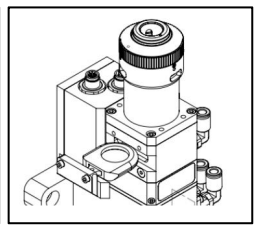
6.4.4 Removal And Installation Of Protective Lenses

The whole process needs to be completed in a clean environment. Wear dust-proof gloves or fingertips when removing or installing the lenses.

Raytool BM111(Auto-focus 500W-3000W)

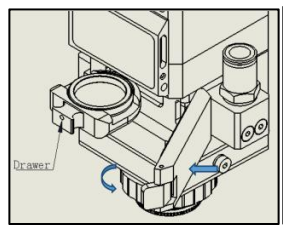


Focusing Protective Lenses

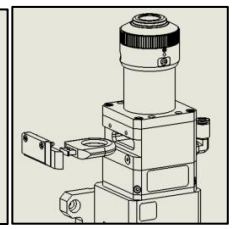


Collimating Protective Lenses

Raytool BT240S(Manual-focus 500W-1500W)

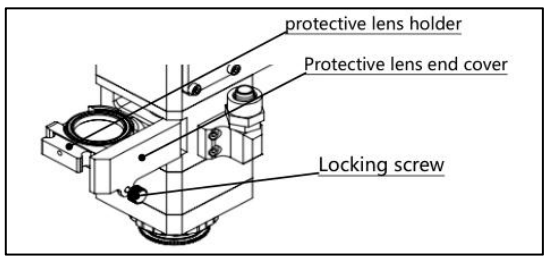


Focusing Protective Lenses

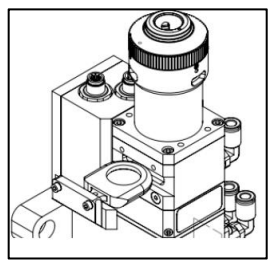


Collimating Protective Lenses

Raytool BM109(Auto-focus 500W-1500W)



Focusing Protective Lenses



Collimating Protective Lenses

Removal and Installation of Focusing Protective Lenses of Laser Head

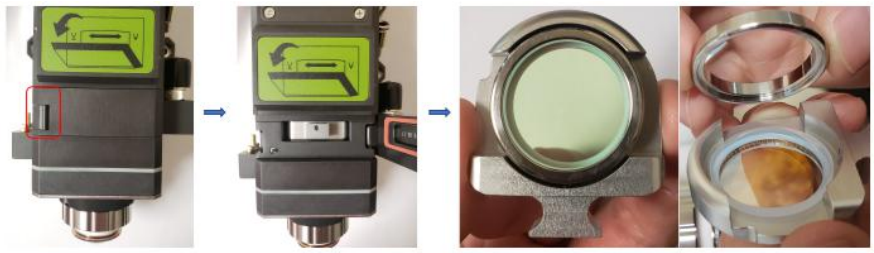
Protective lens are wearing parts and need to be replaced after damage. Refer to Figure 7 and 8.

• Slightly touch the edge of the dust-proof cover to raise and the dust cover will pop open.

• Pinch the two sides of the drawer-type lens holder and pull out the base of

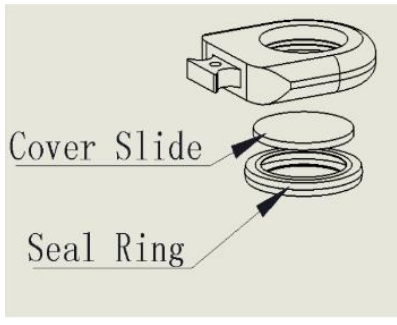
protective lens.
• Lock the pressure ring of stainless steel with hands and lift it upwards.
• Remove the protective lens and clean or replace the lens.
• Install the lens (regardless of the positive or negative sides) into the drawer type lens holder.
• Put the pressing ring of the protective lens back into the slot.
• Keep the stainless steel ring pressed upwards and slowly insert it the lens holder.
• Buckle the dust cover.

Actual operation picture reference (BT240S)

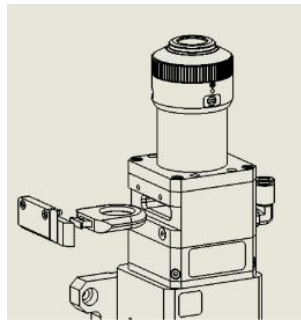


Removal and Installation of Collimating Protective Lenses of Laser Head

Protective lens are wearing parts and need to be replaced after damage. Refer to Figure 9 and 10.
• Loosen the lock screw
• Pull out the protective lens holder by holding both sides of the drawer lens holder
• Press the edge of the lens with fingers, push one side of the lens of the spring seal ring from the lens holder so that both the seal ring and the protective lens can be pulled out(please place the spring seal ring)
• Clean or replace the lenses
• Install the lens (regardless of the positive or negative sides) into the drawer type lens holder.
• Gently put the spring seal ring back into the slot, if it has been damaged, please change it into a new spring seal ring.
• Pinch the two sides of the protective lens holder and reinsert the lens holder into the laser processing head.
• Tighten the screw



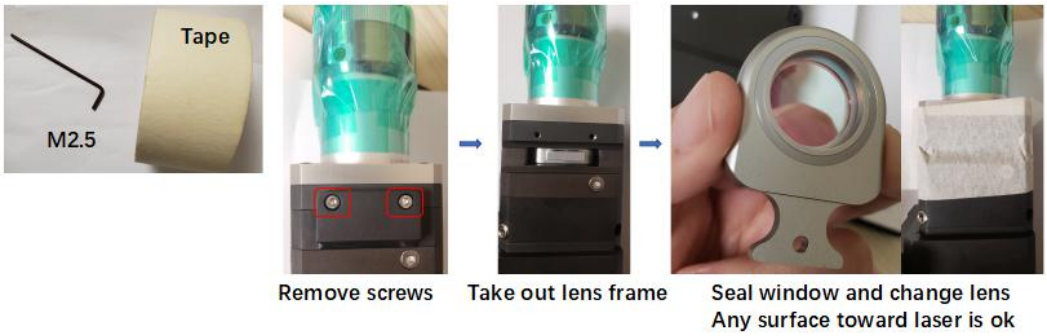
Structure of protective lens holder


Structure of protective lens

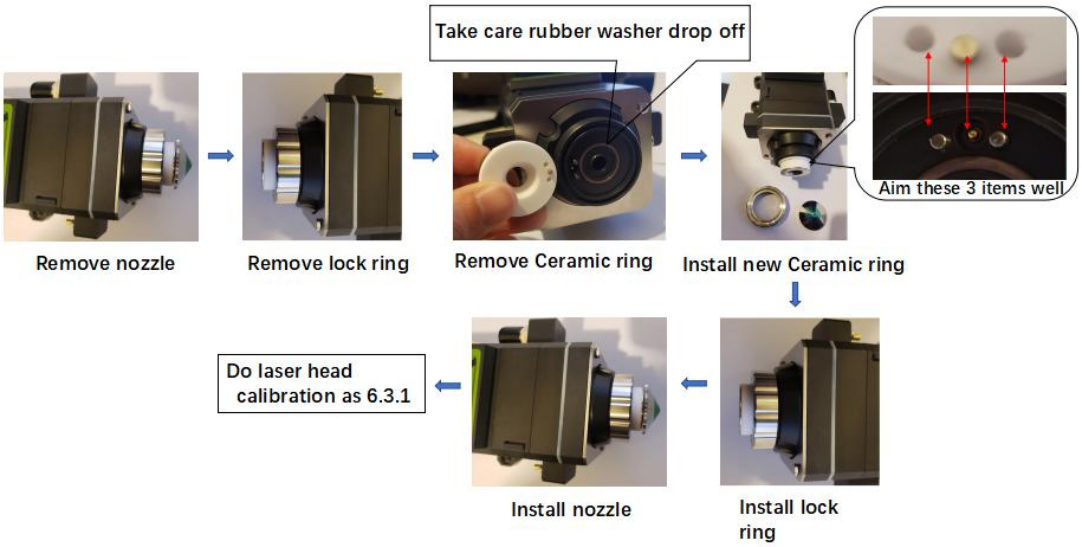


Note: do not pull out the edge of the spring seal ring directly, which is very easy to damage the spring seal ring.

Actual operation picture reference (BT240S)

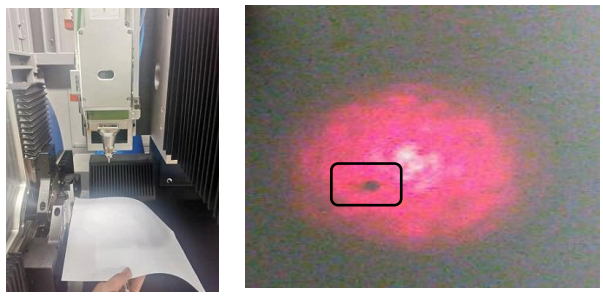


6.4.5 How To Change The Ceramic Ring?



6.4.6 How To Check The Optical System?

Use a piece of A4 white paper to check whether the red indicator light spot has obvious black spots. If there are black spots, it means that there is a lens damage inside the laser head, please contact TA engineers in time.

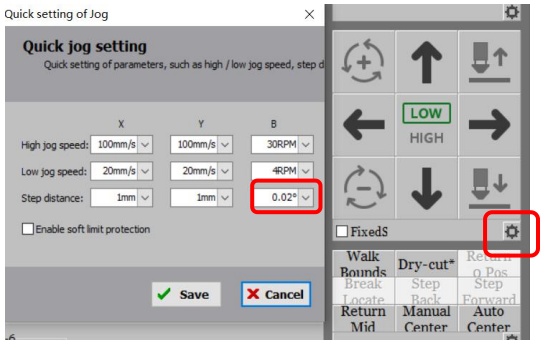


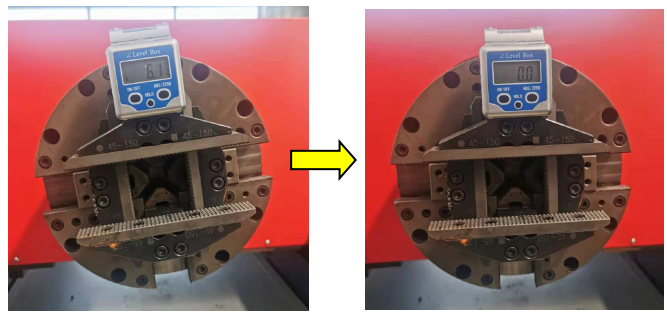
6.5 Chuck Instructions

6.5.1 How To Adjust The Consistency Of The Front Chuck And The Main Chuck?

1. Adjust the Main Chuck.

Put the level box on the main chuck, and change the B axis step distance to 0.02 and then use remote to step rotate the chuck till the level box show 0.0.

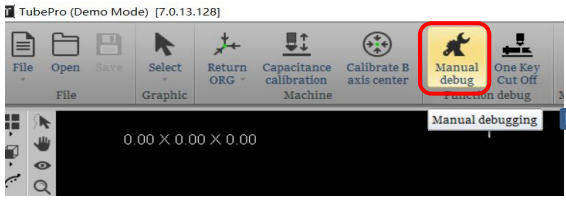


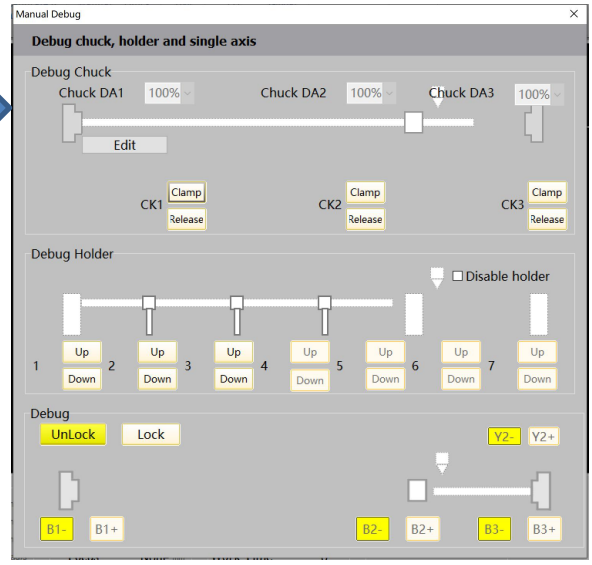


Note: The level box should be ABS model.

2. Adjust the Front Chuck.

(1) Change setting in the Tube-pro.



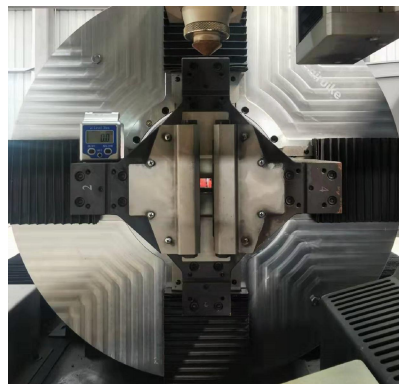


Note: After we unlock here, we press W rotate, just the front chuck will rotate.

Password: 61259023

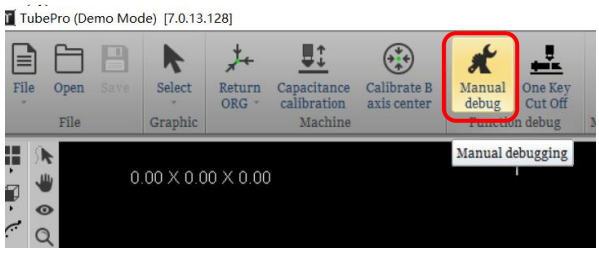
(2) Put the level box in the front chuck, and change the B axis step distance to 0.02 and then use remote to step rotate the chuck till the level box show 0.0.

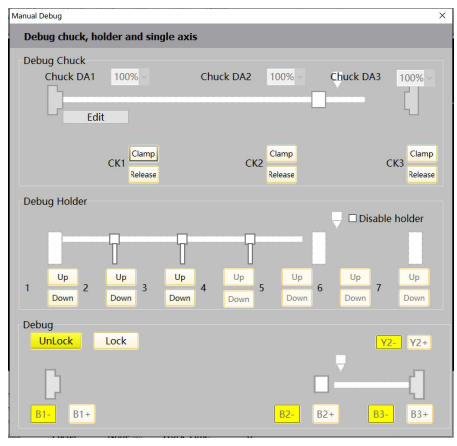




Note: The level box should be ABS model.

(3) Change setting back in the Tube-pro.





Note: After we lock here, we press W rotate, the front chuck and main chuck will rotate together.

Password: 61259023

VII Equipment Maintenance

7.1 Machine Mechanical Part

In order to ensure the normal operation of the laser cutting machine, the daily maintenance of the mechanical parts of the equipment must be carried out. The whole machine is composed of high-precision mechanical components. In the maintenance process must strictly follow the operating procedures, avoiding damage to the parts.

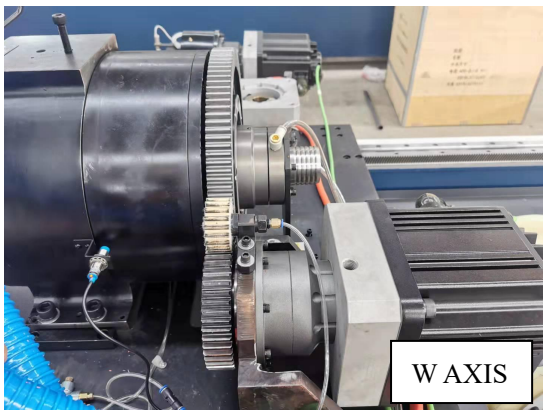
Maintenance preparation tools:
(1)WD-40
(2)Rags
(3)Machine tool

Maintenance period: 30 days

1. Use WD40 to clean the impurities on the guide rails, gears and racks.





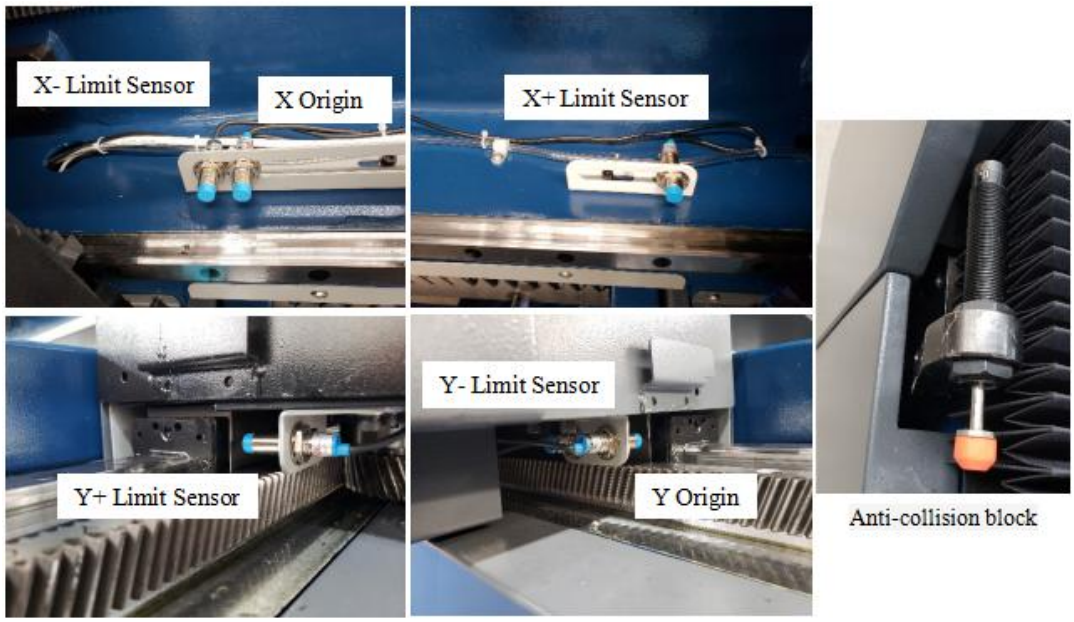


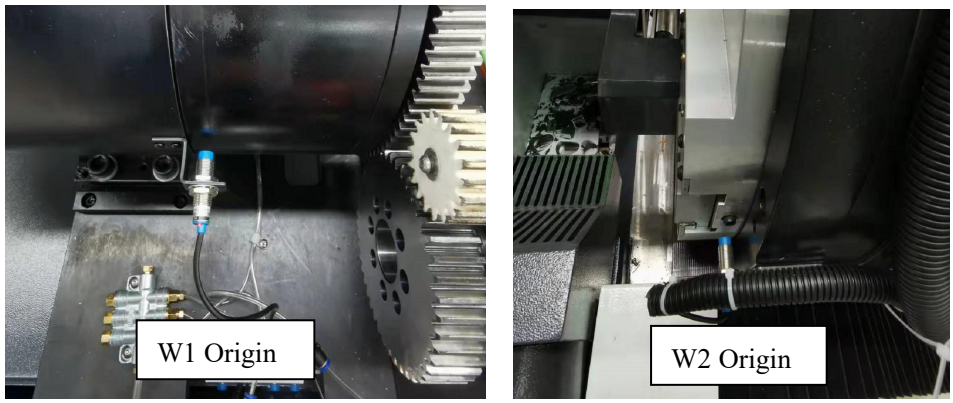


2. Check oil pump system working situation. If there is a leakage in the oil circuit, please add lubricating oil in time.



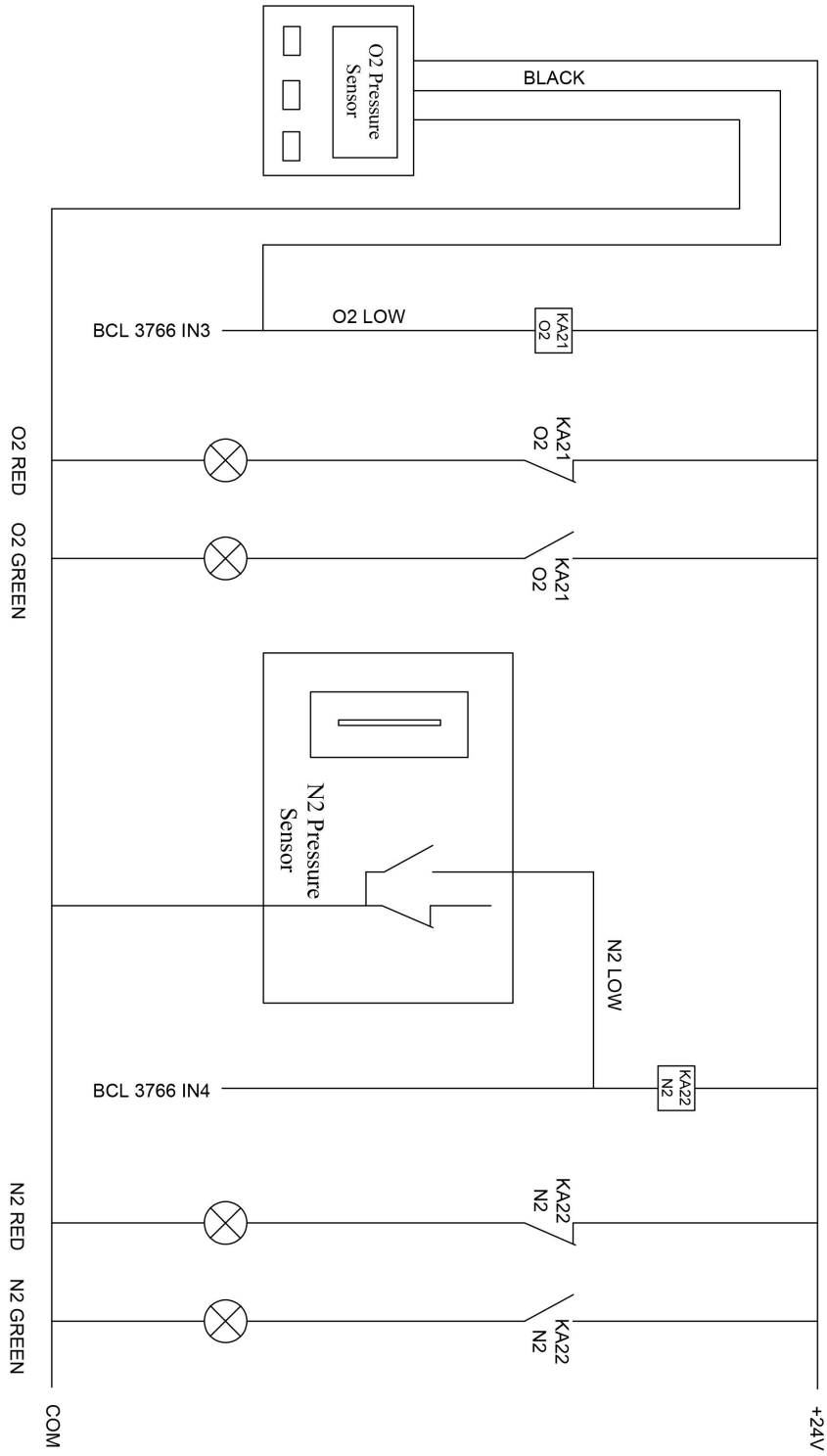
3. Check the X-axis, Y-axis Limit Sensors and Anti-collision Blocks.



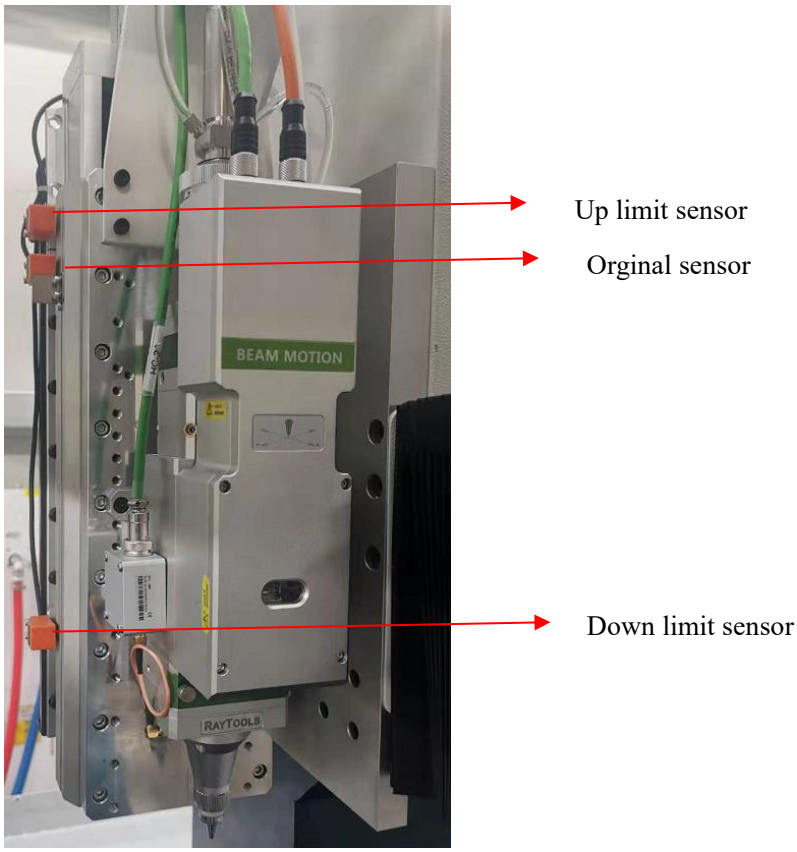


4. Clean the gas cabinet and check whether there is any loose air leakage in each gas circuit connector.

Gas Monitor System Diagram



5. Clean the dust inside the laser head mechanical components, pay special attention to the handling of dust near the limit sensor, and add lubricating oil to the Z-axis guide rail and ball screw.



1. Use air gun clean the dust, specially the dust on the Z axis limit sensor, the dust will effect the alarm.
2. Add lubricating oil to the guide rails and the ball screw.

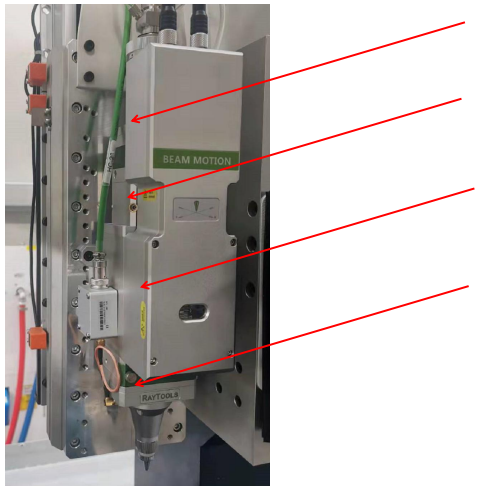
7.2 Optical Part

In order to ensure the normal operation of the laser cutting machine, the daily maintenance of the optical parts of the equipment must be carried out. The whole machine is composed of high-precision optical components. In the maintenance process must strictly follow the operating procedures, avoiding damage to the parts.
Maintenance preparation tools:

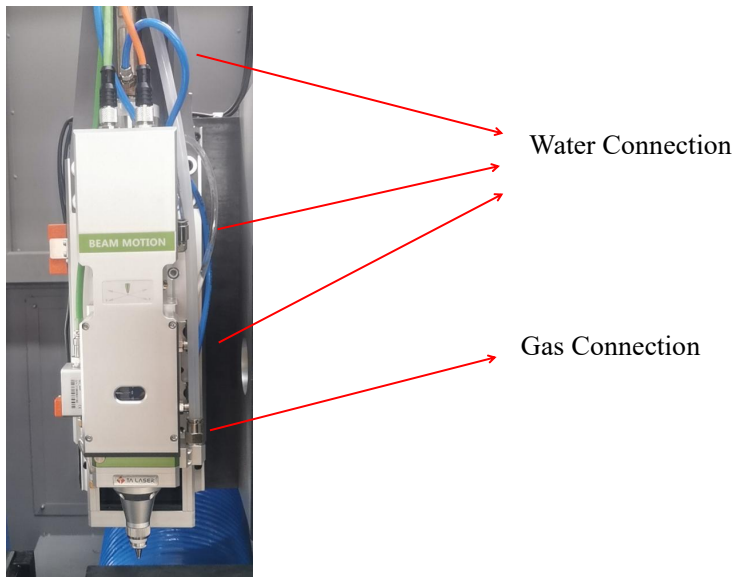
(1) IPA
(2) Cotton swab
(3) Lens clean paper
(4) Allen key
(5) A4 white paper
(6) Commonly used spare parts like protection lens, ceramic ring etc.
(7) Compressor Air

Every 30 days

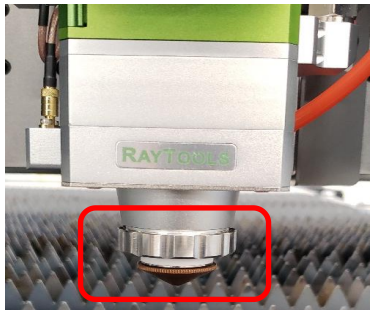
1. Clean the laser head dust, pay attention to the dust cleaning with low-pressure clean air.



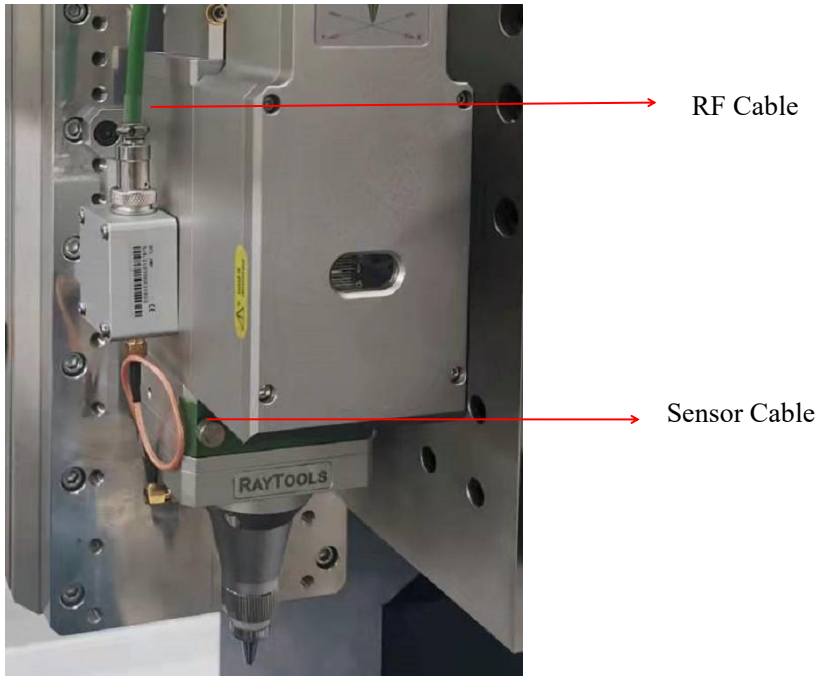
2. Check whether the laser head water circuit and gas circuit is normal and check for leaks.



3. Check laser nozzle, ceramic ring.



4. Check sensor cable, RF cable loosen installation or not.



5. Check focusing protective lens, please refer to 6.3.4.
6. Check focus lens and calibration lens, please refer to 6.3.6.

7.3 Electrical Part

In order to ensure the normal operation of the laser cutting machine, the maintenance of the electrical part must be carried out. The whole machine is composed of high-precision components. In the maintenance process must strictly follow the operating procedures, avoiding damage to the parts.

Maintenance preparation tools:

(1) Compressor air

(2) Electrical multimeter

(3) Machine tool

Note: Before the Machine Maintenance (Electrical Part), please cut off the main electricity.

7.3.1 Electrical Cabinet

1. Use low pressure clean air to clean the dust inside the electrical cabinet.



2. Check the ground cable connections, make sure the machine ground cable connected well.
3. Check each cable terminal connections. If have cable connection lose please tighten it.

7.3.2 Air Conditioner

1. Take the air filter out and clean it.
2. Use air gun clean dust on the condenser.



7.3.3 Voltage Stabilizer

Voltage stabilizer is a power supply device that automatically adjusts the output voltage; its main function is to stabilize the power supply voltage with large fluctuations or unsuitable electrical equipment within its set value range, to make the electrical equipment work normally under the rated working voltage.

In the laser cutting machine, the voltage stabilizer mainly provides a stable working voltage for the laser to avoid damaging the laser or other electrical equipment due to unstable voltage or non-compliant voltage. The use of voltage stabilizer in laser cutting machines is particularly important and the maintenance of voltage regulators is also essential. For specific maintenance operations, please refer to maintenance instructions.

Maintenance Instructions

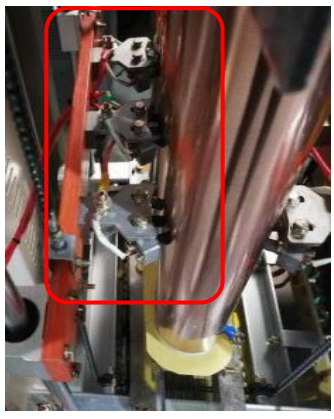
Voltage Stabilizer	Model: SBW-	
Cycle	**Maintenance Content**	**Maintenance Target**
Daily	1. Check if the load current is within the allowable rang	Ensure the normal operation of the machine
	2. Remove stains and dirt on the surface of the machine	Keep the machine clean
	3. Check three-phase voltage stability	Ensure the normal power supply to the machine.
Monthly	1. Clean the parts of the voltage regulator, especially when the brush, the exposed part of the voltage regulator, the sliding guide of the brush, and the variable speed transmission parts must be washed with gasoline and cotton cloth;	Ensure good heat dissipation of accessories and extend the service life of accessories
	2. Replace worn or broken brushes；	Ensure the stability of the three-phase voltage
	3. Adjust the tightness of the chain or the clearance of the screw, just a little space for movement	Ensure the normal operation of the machine

★★★NOTES：

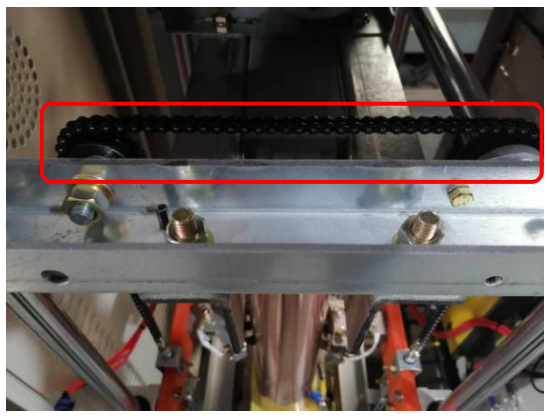
A. The input voltage is within the allowable range, and the output voltage should be checked immediately when it is unstable.

B. The voltage stabilizer should be installed in a clean, dry, ventilated and cool place to avoid overheating during use. The using temperature suggested is 35℃ below.

C. During maintenance, it must be carried out with the power off.



Brush



Chains

7.4 Water Chiller

The main function of the chiller is to cool the laser generator and laser cutting head and keep it in a constant temperature working condition. So the strict regular maintenance of the chiller is a very important factor for the normal operation of the machine.

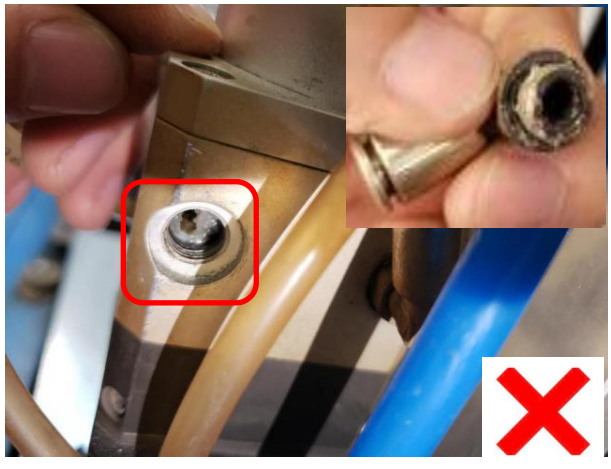
Chiller circulating water must be **Distilled or Deionized Water.** In production, some impurities such as minerals and dust still exist in the circulating water, if regular maintenance is ignored. The deposition of these impurities can cause dirty plugging of the water circulation system and the cutting machine optical components (such as metal filters, heat exchanger heads in the cutting machine). Seriously affect the cutting effect and even burn out the optical components.

Dust in the environment will be adsorbed on the condenser, water pump, and air filter.

If regular maintenance is ignored. It will cause poor cooling of the chiller and directly affect the cutting effect, even caused a chiller alarm.

Therefore, the maintenance of the chiller is particularly important, and it must be strictly follow the chiller maintenance manual.(refer to the attached table for details)

Warning case:

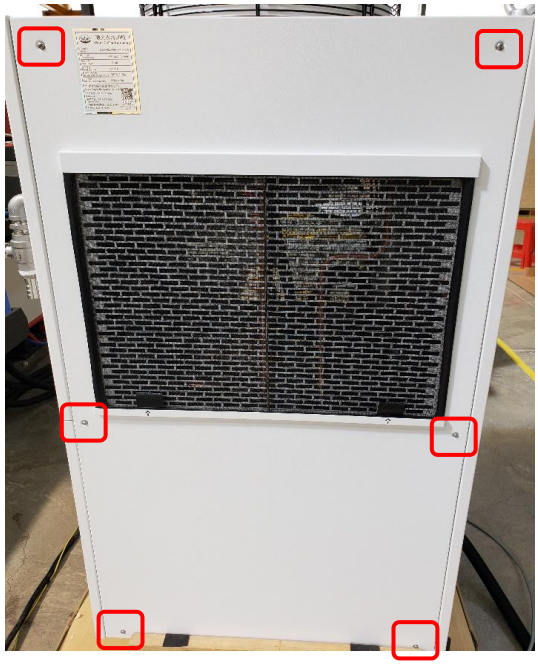


Do not change cooling water for long time or deionized water&distilled water is not used as required, which will contaminate the laser head, laser generator causing irreparable damage.

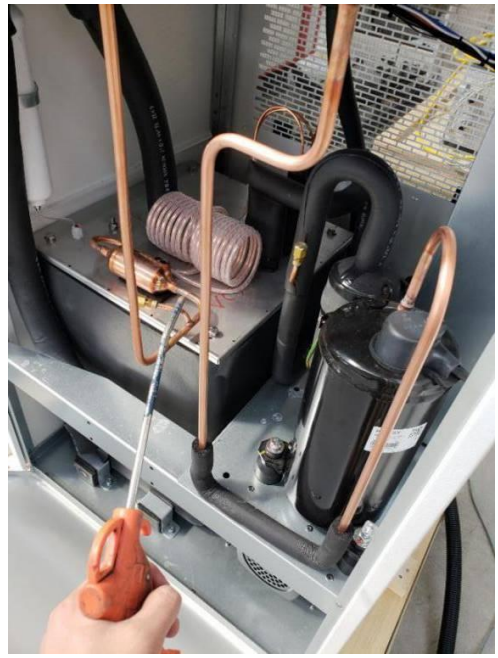
7.4.1 Maintenance Table:

Chiller Brand: TongFei		Model: TFLW-
Maintenance Cycle	**Maintenance content**	**Maintenance results**
Daily	1. Check chiller temperature setting	
	2. Check chiller seal-ability, water pressure, temperature	Ensure the equipment is running properly and no water leakage
	3. Keep working environment dry, clean and ventilated	
Monthly	1. Use a detergent or high-quality soap to remove dirt on the surface of the chiller. Do not use benzene, acids, abrasives, steel brushes, hot water, etc.	Keep chiller surface clean
	2. Check the condenser, please use compressed air or a brush to remove the dust from the condenser	Efficient heat dissipation
	3. Clean air filter. A. Open the panel of the air filter of the machine, pull up the air filter of the unit and pull it out; B. Use a vacuum cleaner, air spray gun, and brush to remove the dust on the filter. After cleaning, if the filter is wet, shake it to dry	Prevent chiller alarms due to poor heat dissipation
	4. Change water, clean the water tank and metal filter	Ensure the water always clean
Half Year	Inspect electrical components (such as switches, terminals, etc.) and clean dust with small pressure dry air.	Ensure that the electrical parts of the chiller are clean and have a longer using life
One year	Change Ion cylinder	
★★★ Long-term decommissioning of equipment: A. Drain the water from the chiller. B. Packed chiller avoid dust.		

7.4.2 How To Clean Chiller?



Remove the 6 screws and take out the cover



Use air gun to clean dust



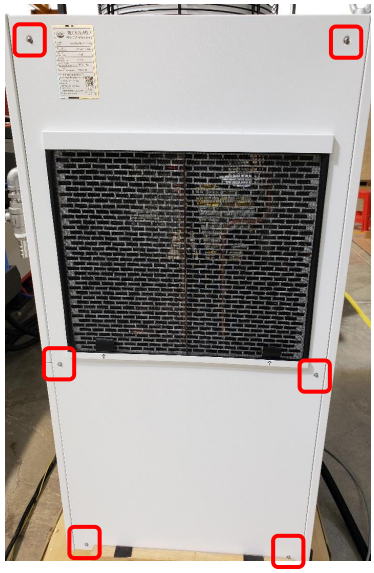
Use air gun to clean dust in the water pump

7.4.3 How To Clean Air Filter?

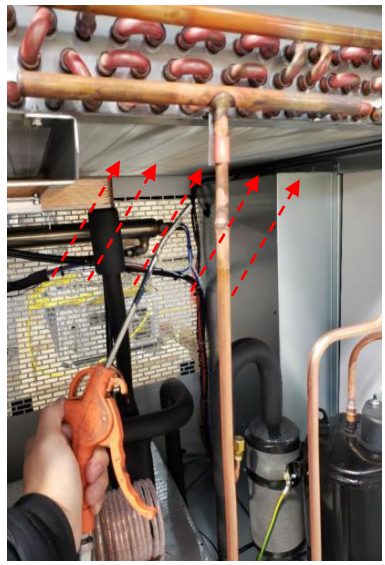


Take out the air filter and clean the dust.

7.4.4 How To Clean The Chiller Condenser?



Remove the 6 screws and take out the cover



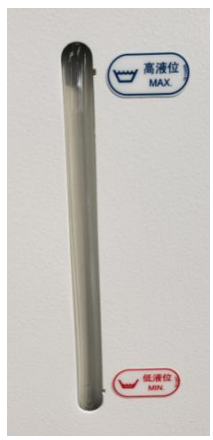
Use air gun to clean the dust on condenser

7.4.5 How To Change Water?



Connect a water pipe and drain all the water

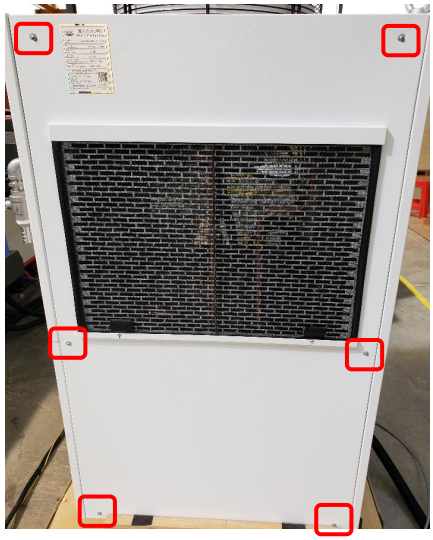




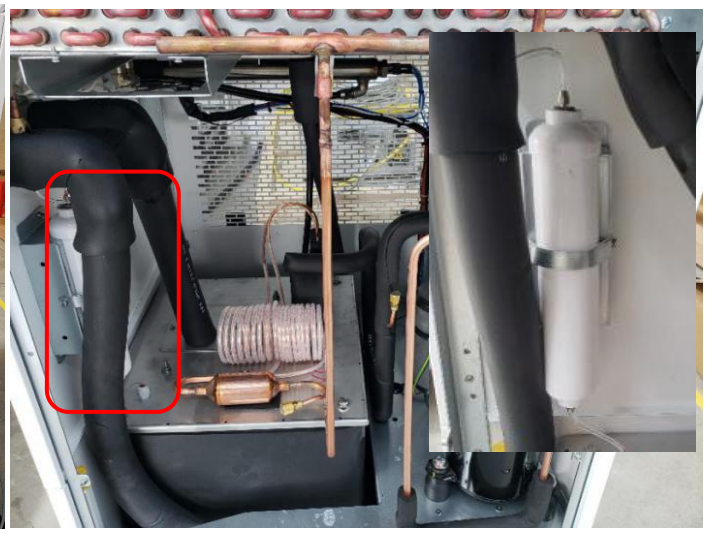
Check the water level

Add distilled or deionized water

7.4.6 How To Change The Ions Cylinder?



Remove the 6 screws and take out the cover



Change the new ions cylinder

7.5 Laser Generator

Laser generator is the core part of laser cutting machine, it provides cutting power. In order to ensure this core part high quality and long life work, please do the maintenance as below.

7.5.1 Laser Generator Maintenance

Every day：

1. After turn on machine, please check the chiller working condition, included the water temperature and water pressure.
2. Check the cabinet air-condition work condition and any alarm from the infrared monitoring detector.
3. Check the factory electricity condition.

Every Month：

1. Maintenance chiller as our manual book.(Very important)
2. Maintenance Air-condition as our manual book.(Very important)
3. Clean the dust around the laser generator.
4. Check the cables connections of laser generator.

7.5.2 Laser Generator Dew Formation

DEW-POINT TABLE:

AMBIENT DEWPOINT[1]										
Room Temperature	Maximum Relative Humidity									
	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%
10 °C	-20	-11.9	-6.8	-3.0	0.6	2.6	4.8	7.6	8.4	9.2
15 °C	-16.4	-7.9	-2.4	1.5	4.7	7.3	9.6	11.6	13.4	14.2
20 °C	-12.5	-3.7	1.9	6.0	9.25	12.0	14.4	16.4	18.3	19.2
25 °C	-8.7	0.5	6.2	10.5	13.8	16.7	19.1	21.3	23.2	24.1
30 °C	-5.0	4.6	10.5	15.0	18.4	21.4	23.9	26.2	28.2	29.1
40 °C	2.6	12.7	19.1	23.8	27.6	30.7	33.5	35.9	38.0	39.0
50 °C	10.0	20.8	27.6	32.6	36.7	40.0	43.0	45.6	47.9	49.0

This table temperature is the minimum chiller setting temperature,
For the machine, the setting temperature for laser generator is 25℃-26℃, for QBH and laser cutting head is 29℃-30℃.
For example:
Room temperature is 30℃, Room Humidity is 80%, the dew point is 26.2℃.
29℃≥26.2℃≥26℃, So this situation the laser generator 100% will dew and damaged. The QBH and the laser cutting head will not have dew formation.
So that means the dew-point must be lower than the chiller setting temperature.
If dew-point pass the chiller setting temperature, the dew formation will come. This is why we need maintenance the air condition and the chiller as the schedule.

Warning Case:



Laser generator outside



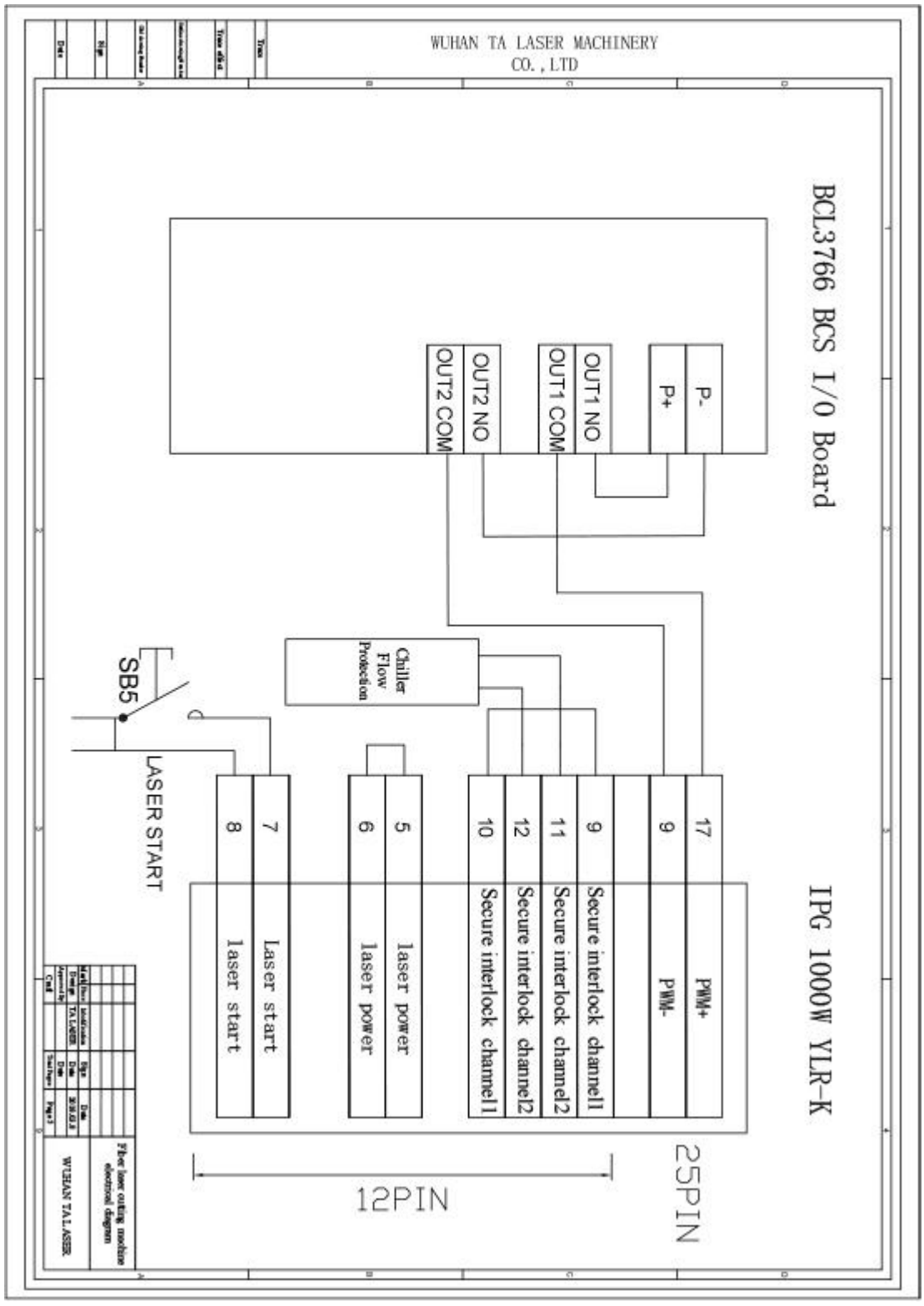
Laser generator inside

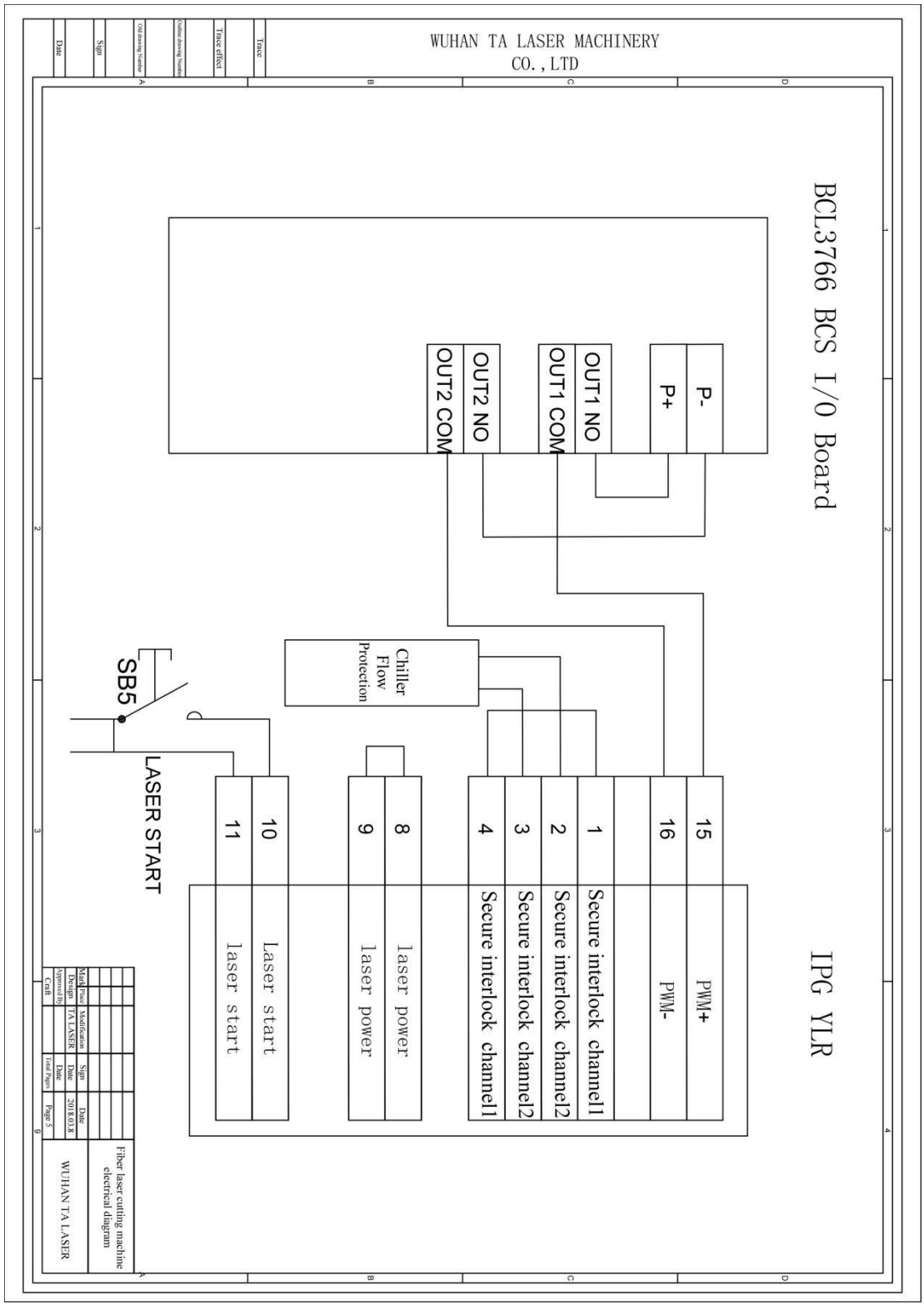


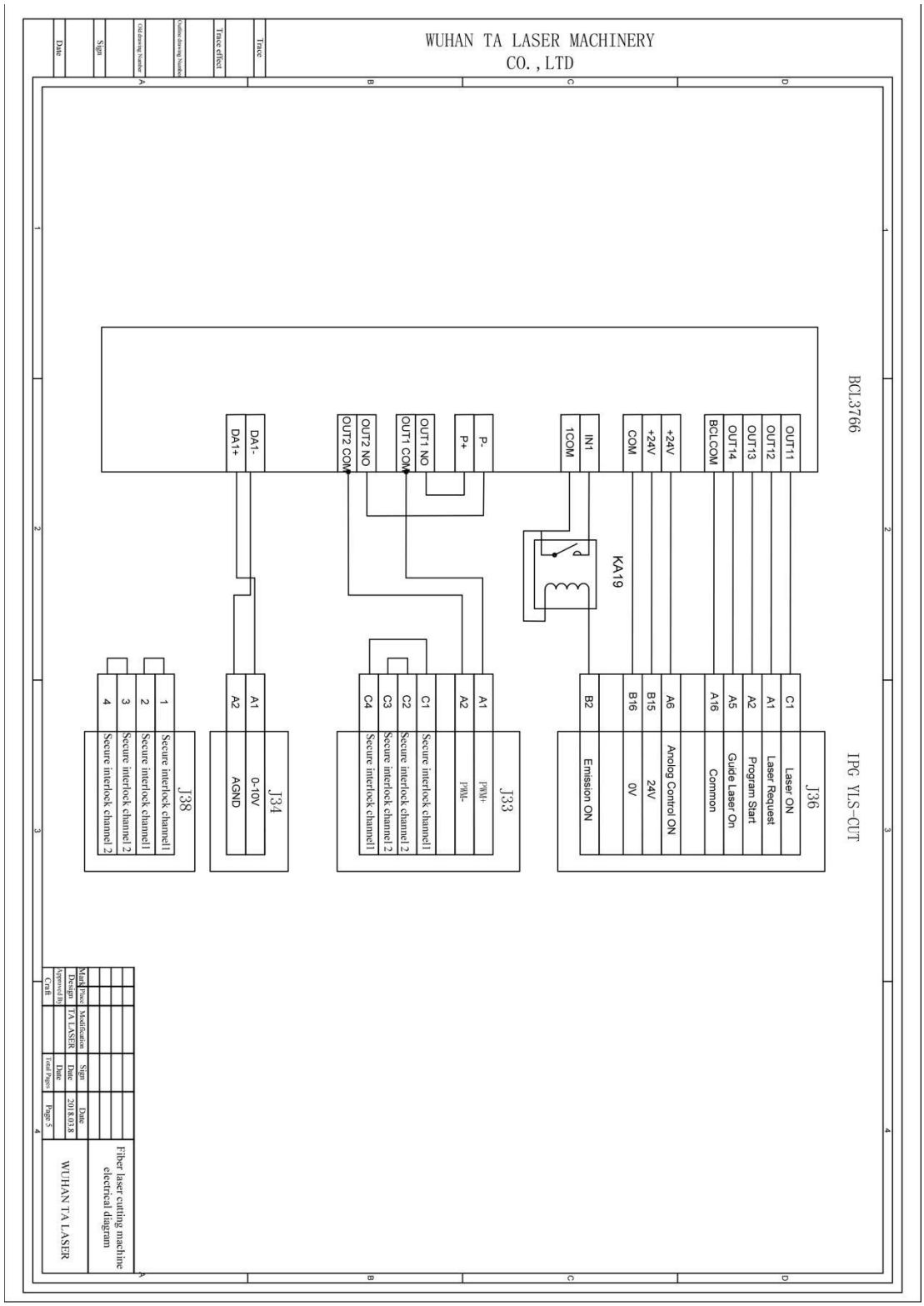
Fiber optical

Note: Fiber Laser Generator need to work in the Air-conditioned room.

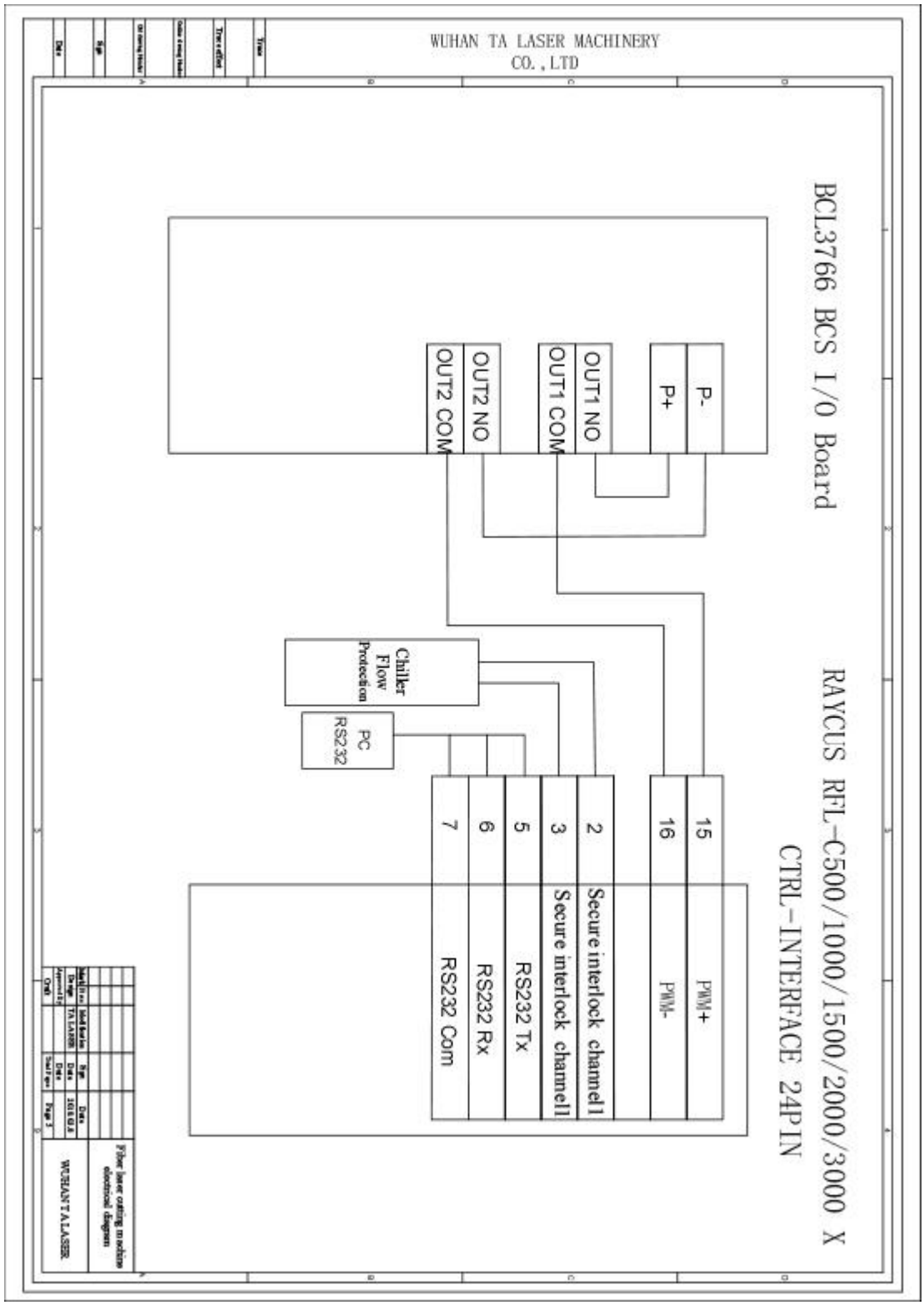
7.5.3 IPG Circuit Diagram (YLR-K/YLR/YLS-CUT)



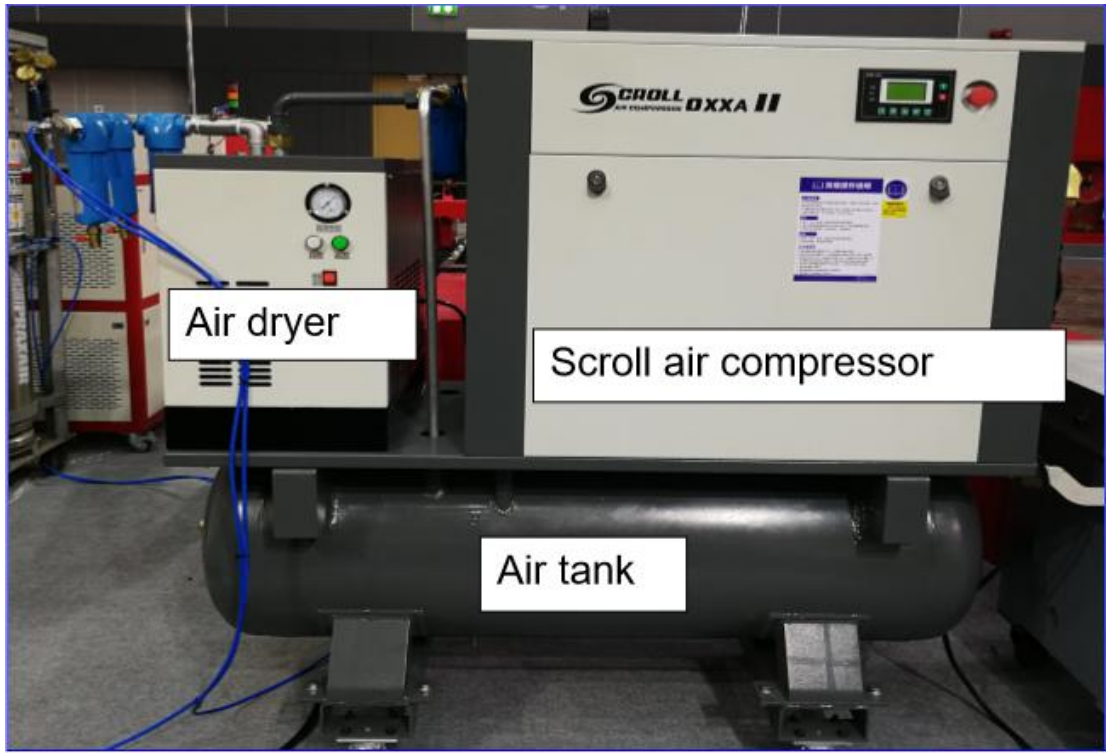

WUHAN TA LASER MACHINERY
CO., LTD
BCL3766 BCS I/O Board
IPG YLR
P-
P+
OUT1 NO
OUT1 COM
OUT2 NO
OUT2 COM
PWM+
PWM-
Secure interlock channel1
Secure interlock channel2
Secure interlock channel2
Secure interlock channel1
laser power
laser power
Laser start
laser start
Chiller Flow Protection
SB5
LASER START
15
16
1
2
3
4
8
9
10
11
Fiber laser cutting machine electrical diagram
WUHAN TA LASER


WUHAN TA LASER MACHINERY
CO. , LTD
BCL3766
IPG YLS-CUT
OUT11
OUT12
OUT13
OUT14
BCLCOM
+24V
+24V
COM
IN1
1COM
P-
P+
OUT1 NO
OUT1 COM
OUT2 NO
OUT2 COM
DA1-
DA1+
KA19
J36
Laser ON
Laser Request
Program Start
Guide Laser On
Common
Anolog Control ON
24V
0V
Emission ON
J33
PWM+
PWM-
Secure interlock channel1
Secure interlock channel 2
J34
0-10V
AGND
J38
Secure interlock channel1
Secure interlock channel1
Secure interlock channel 2
Secure interlock channel 2
Fiber laser cutting machine electrical diagram
WUHAN TA LASER
TA LASER
Page 5
2018.03.8

7.5.4 Raycus Circuit Diagram



7.6 Air Compressor(optional)



For Oil and Oil Filter, new machine need to change after using 500 hour, then change each 2000H! Others need to be changed every 2000H!

How to change the air filter?

Every 2000 hours change. And every 2 month use Air gun to clean the dust. If it is really very dirty even does not reach 2000 hours, please also change it!



Turn off machine, and remove the black cover,if dirty clean,if very dirty can not clean pls change it !



remove the air filter



clean or change it

Note: If you change the new one please reset parameters as the below PPT. Because every 2000 hours using finish the air compressor will alarm to remind you change! After change, we need to clean the max run time to cancel the alarm.



Press down



Press down

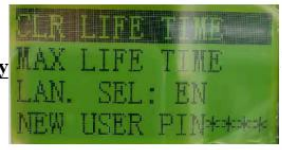


Choose USER PARA

Press play

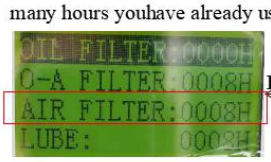


Press down



Choose CLR LIFE TIME

Press play



Here the time is show you how many hours youhave already used

Press play



Press play button to change the digit position,and press up and down to adjust the value.

Press S



Press down



Press play button to change the digit position,and press up and down to adjust the value.to change it to 0000H,and **press S to save.**

Reset the using time to 000H.



Press down



Press down



Choose USER PARA

Press play

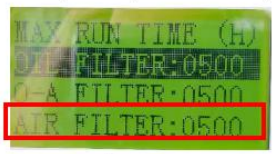


Press down



Choose CLR LIFE TIME

Press play



Here the time is show you how many hours youhave already used

Press play



Press play button to change the digit position,and press up and down to adjust the value.

Press S



change 0500H to 2000H

Reset the next alarm time to 2000H.

How to change the Oil?

We can go to market find the screw compressor oil.

1. Turn off the air compressor.
2. Open the ball valve make the oil out.
3. Open the add oil copper screw and use the screw air to blow the oil tank, make all oil out.
4. Rotate the coupling clockwise to make all the oil in the pipe out.
5. Close the ball valve and add new oil full of the tank.
6. Run the scroll air compressor and check the oil indicator, if not enough pls turn off and add again till the oil indicator reach the high level line.







coupling

After changing the oil, please reset the LUBE time to 0000H (the method please refer to the air filter reset way)



Reset the using time to 000H.



Reset the next alarm time to 2000H.

How to change the oil filter?

1.Turn off the air compressor.

2. change the oil filter.

Please use the chain wrench to do this job.





Reset the using time to 000H.



Reset the next alarm time to 2000H.

How to change the O-A filter?

1. Turn off the air compressor.
2. change the O-A filter.

Please use the chain wrench to do this job.





Reset the using time to 000H.



Reset the next alarm time to 2000H.

Everyday need to do:

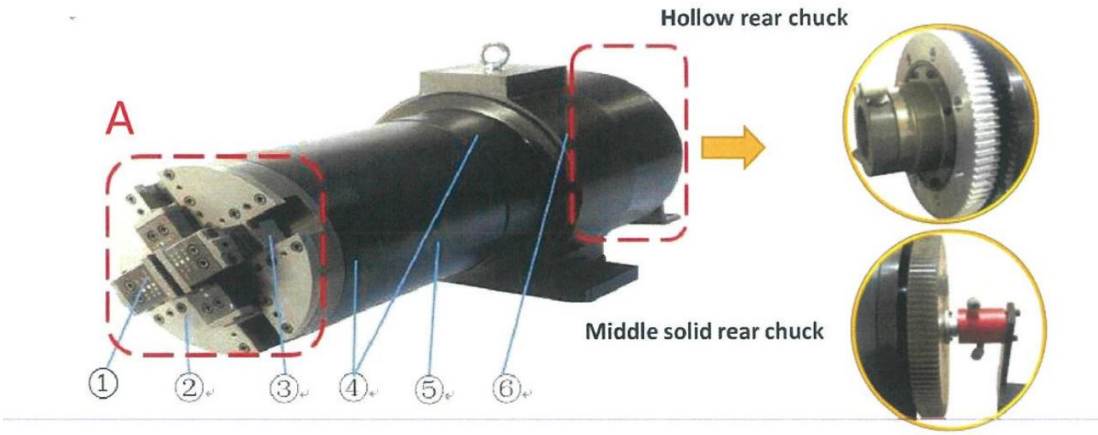
Open all switch under the filter to make the water out.



Open this ball valve everyday to make the water out.

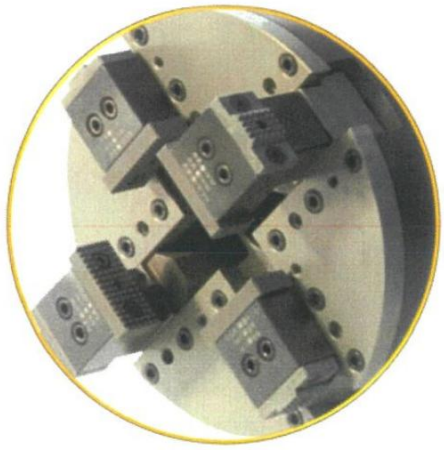


7.7 Pneumatic Chuck



No	Name	No	Name
1	Claw	4	Guide housing
2	Press plate	5	Dust cover
3	Claw seat	6	Bearing pedestal

Detail A:



Standard jaw

Middle solid rear chuck

First gear of inner clamp range:

15-80mm

The second range of inner clamp:

80-140mm

External support range:

140-218mm

Hollow rear chuck

First gear of inner clamp range:

15-95mm

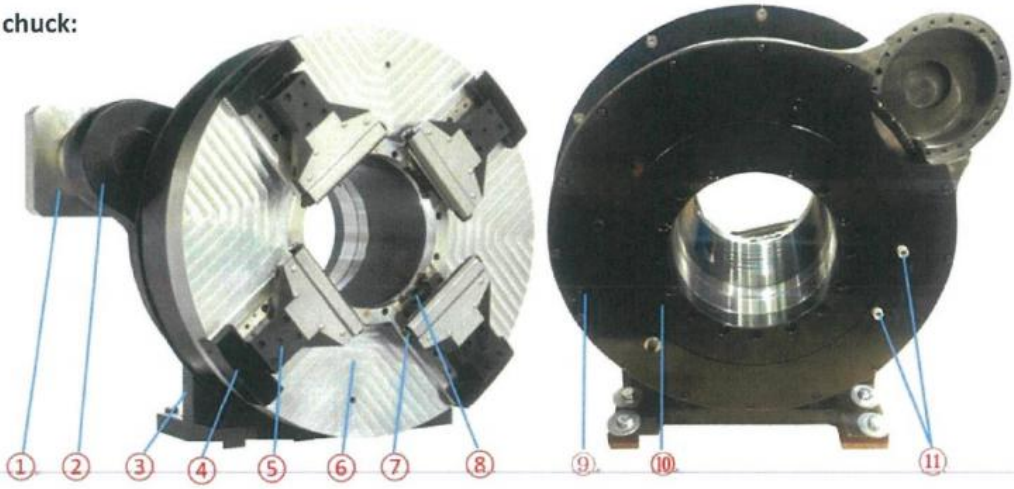
The second range of inner clip:

95-135mm

External support range:

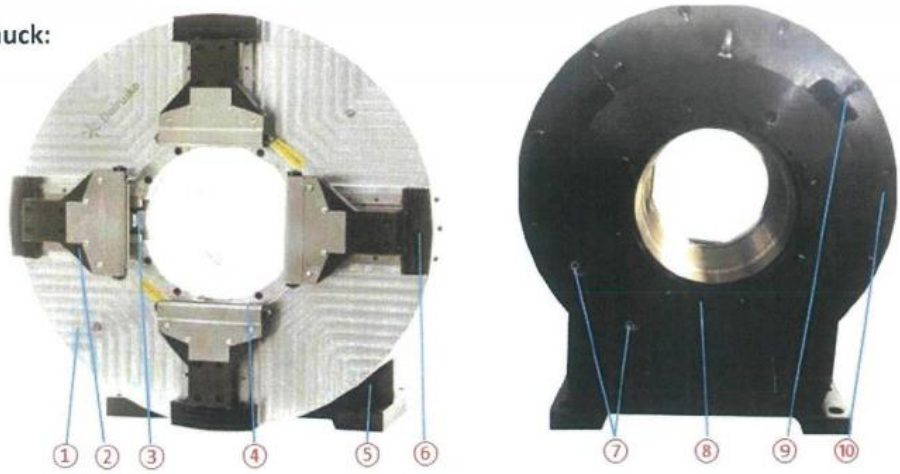
135-218mm

Integrated chuck:



No	Name	No	Name
1	Reducer	7	Claw eccentric shaft and roller
2	Rear cover of reducer	8	Slide block
3	Bearing pedestal	9	Back cover plate
4	Organ shield	10	Airtight sealing plate
5	Claw	11	Clamp and release the air inlet
6	Chuck body		

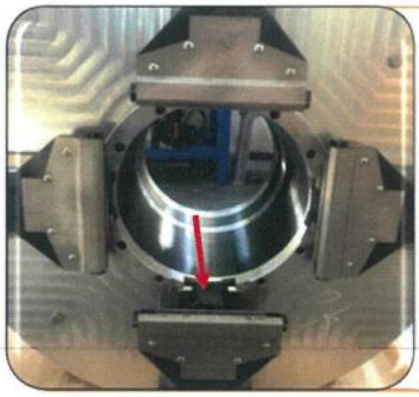
Split chuck:



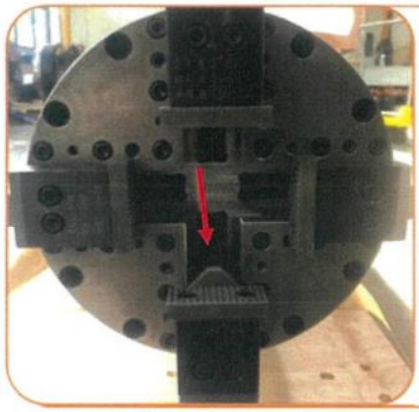
No	Name	No	Name
1	Chuck body	6	Organ shield
2	Claw	7	Intake port
3	Slide block	8	Airtight sealing plate
4	Claw roller	9	Anti rotation bracket
5	Bearing pedestal	10	Rear cover plate of chuck body

受控文件 2021-08-27

Daily maintenance



Clean part:
Sliding parts of four claw sliding blocks (as shown in the figure)
Cleaning cycle:
After each shift
Cleaning tools:
Carburetor cleaning agent (non oil type) and air gun



Clean part:
Four sliding parts of claw base (as shown in the figure)
Cleaning cycle:
After each shift
Cleaning tools:
Carburetor cleaning agent (non oil type) and air gun

Step:

- Before cleaning the front and rear sliding blocks, clean the four sliding blocks with air gun, and clean the clamping or loosening.
- Use the carburetor to spray clean the slider so that the remaining dust can be thoroughly removed.
- Finally, clean again with air gun.

Carburetor type:



If the front and rear chuck sliding blocks are not cleaned in time or not maintained, the chuck claws will be clamped and loosened, which will affect the normal use of the machine.

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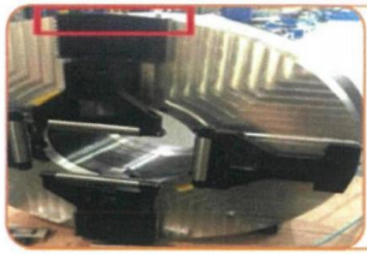
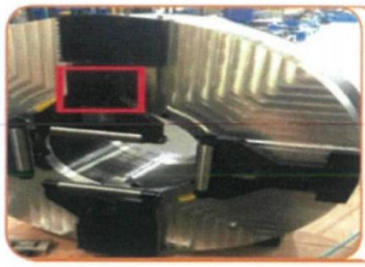
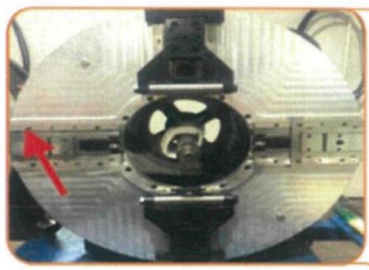
Monthly maintenance specification for front chuck



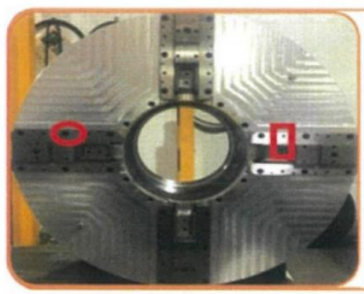
1、Loosen all the claws, remove three M4 * 10 screws at the top of the claw organ shield, and pay attention to the screw sliding teeth during the removal process.



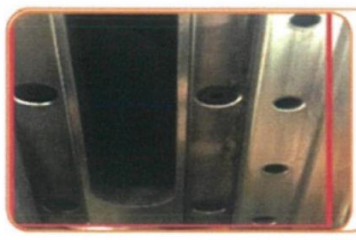
2、Remove four M8 screws from each end face of the four claws, and remove the claws and organ shield from above.



3、Remove four M4 screws on the guide rail of the organ shield on the left and right sides of the sliding block surface (see Figure). Pay attention to the screw sliding teeth during the removal process.

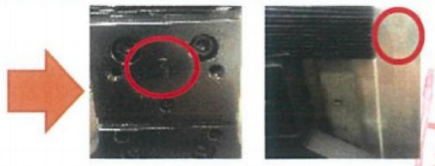


4、Remove the M6 screws of the strips on both sides of the sliding block (see the picture circle), use the hexagon wrench or pin puller to take out the > 6 locating pin on the strips, and then remove the strips on both sides (see the box).



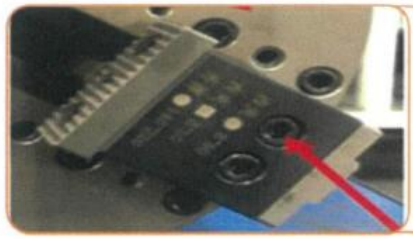
5、Remove the sliding block, clean the sliding groove and sliding block with carburetor. If there is slight scratch on the surface, polish it with oilstone before use.

- There are corresponding numbers on the surface of the claw, the surface of the white body of the chuck and the sliding block, and corresponding numbers are required for re installation.

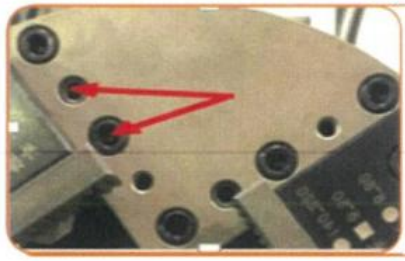


21

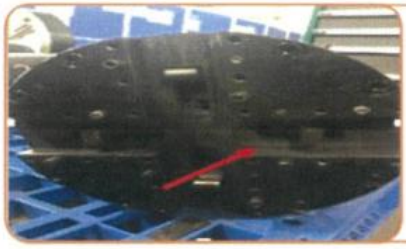
Monthly maintenance specification of rear chuck



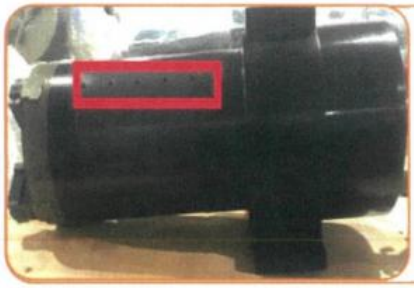
1、Remove the screw on the claw and take off the claw. Because the claw is located by the pin, if it is slightly tight, it can be knocked down with a copper rod.



2、Remove the claw and pressing plate screw, and remove the pressing plate. Before removing the pressing plate, please make matching marks one by one on the outside of the rear card and the surface of the pressing plate, so as to install according to the matching marks.



3、Take out the claw seat, clean the sliding groove, claw and claw seat, pay attention to whether the sliding groove and claw seat have wear marks, and remove them with oilstone if necessary.



4、Remove all the screws on the dust cover of the rear card, and then remove the dust cover from the claw part of the rear card. Do not force the dust cover to break off, which will deform the dust cover and cause the position of the threaded hole to be out of alignment during installation.



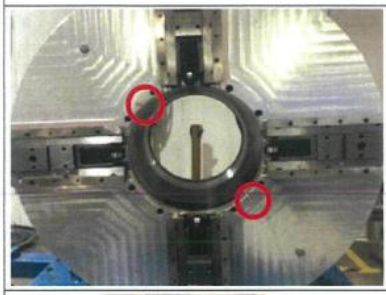
5、Check whether there is any abnormal situation such as cutting foreign body or spring falling off inside. Use air gun to remove the dust inside, and then use carburetor to clean the oil inside. After cleaning, carry out clamping test and install the protective cover after confirmation.

- There are corresponding numbers at the sides of the rear claw, the top of the claw seat and the top of the body. The corresponding number is required for the re installation. (see arrow and box on the right for number)



22

Split chuck lubrication：

Lubrication part	Lubrication instructions	Refueling cycle	Oiling tool
	This is the inner sleeve oil nozzle in the middle of the front claw. Please clean the oil nozzle before adding oil and then inject calcium grease (grease).	Cycle: once / 2 months Fuel volume: 15g applicable working hours: two shifts of 16 hours a day	
	Here is the bearing oil filling nozzle, add 2 g lithium grease, and add oil through the chuck rotation multi angle lubrication.	Cycle: once / 2 months Fuel volume: 30g Applicable working hours: two shifts of 16 hours a day	
	This is the ball oil nozzle inside the airtight sealing disc. Please clean the nozzle before filling and then fill it with calcium grease (grease).	Cycle: once / 2 months Fuel volume: 30g Applicable working hours: Two shifts of 16 hours a day	
	Here is the back stuck gear. Clean the gear first and add calcium base grease (grease).	Cycle: 2 times / 1 month Fuel volume: 30g Applicable working hours: Two shifts of 16 hours a day	

受控文件
生效 2021-08-27 日期

VIII Common Problems Troubleshooting

8.1 Z+/Z- Limit Enable

When system checked Z+/Z- limit input is enabled, the alarm happens. The reason includes:
Z+/Z- sensor detect something.
Z+/Z- sensor is broken. Or it is used for long time, there is oil contamination and powder on the surface.
The parameter of “Limit logic” can be set to normal open or normal close. The wiring is not correct.

8.2 Capacity Is 0

When system can not check the capacity of the nozzle, the capacity value is shown as 0 on the screen. The following situation may cause the alarm:
1. The nozzle touched the metal sheet.
2. There is water in cutting head.
3. The local capacity of the cutting head is large, which is out of the check range of the preamplifier.
4. The preamplifier is broken.
5. Connection is not fixed. Check ceramic ring, green RF cable, sensor cable.
6. In the internal of cutting head, the positive of capacity (nozzle) is short circle with the negative of capacity (the shell of machine).

8.3 Local Capacity Small

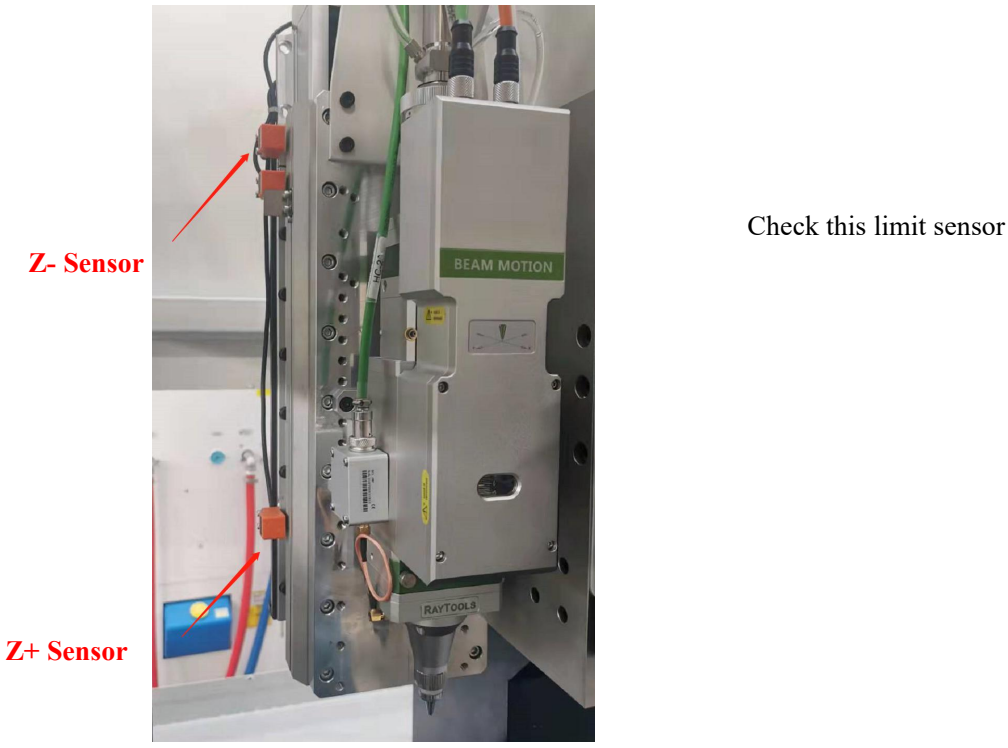
When local capacity changes less, the alarm happens. The reason includes:
1. Connection or some part is changed or moved. You can do calibration again.
2. Laser shoots on the nozzle, the temperature gets very high is short time.
Hands can not stay on the nozzle.
3. Connection is not fixed.
4. The parameter of calibration range is low can also cause the alarm. In 2D mode 15mm is recommended. And 10mm is recommended in 3D mode.
5. One of the reason is the cutting fire and electronic affects the capacity sensor when the board material is stainless steel.
If there is plastic film on the surface of steel, remove the film first. Check if the machine is connect to the ground well. The following height should be larger than 0.5 mm. Improve the blowing pressure.

8.4 Machine Can Not Cut Well

1. Check the cutting parameters and pierce parameters.
2. Check the cutting focus, if the cutting head is auto-focus head please go origin.
3. Check the protection lens, including calibration protection lens and focus

protection lens.
4. Do laser cutting head calibration.
5. Check the gas pipe connection of the laser head, if gas leakage or not.
6. Check the cutting material.

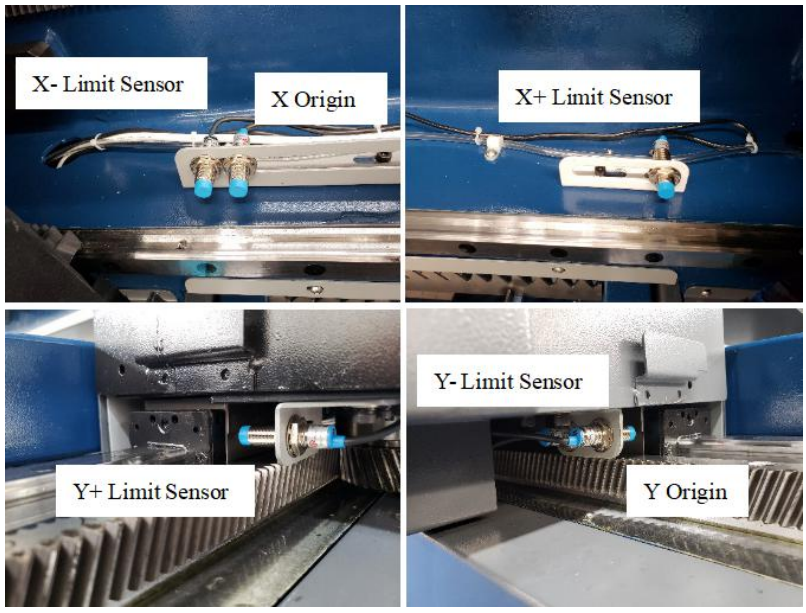
8.5 Z-/Z+ Limit Signal Is Valid



Check this limit sensor

8.6 X-/X+ Y-/Y+ Limit Signal Is Valid

Check the limit sensor work properly.



8.7 Axis 4 Limit 4 Alarm

1. Turn on software, see the alarm Axis 4 Limit. If it still appear, please press + several times see if the alarm will disappear. If it is still with alarm, please press - several times, until the alarm disappeared, and then the auto focus goes to origin.



2. If the first solution no work. Turn off the machine, and then use Allen key to adjust the screw, make the auto focus axis move to 0 direction. You can check as the scale window and then turn on the machine and then the auto focus goes to origin.



Adjust Screw



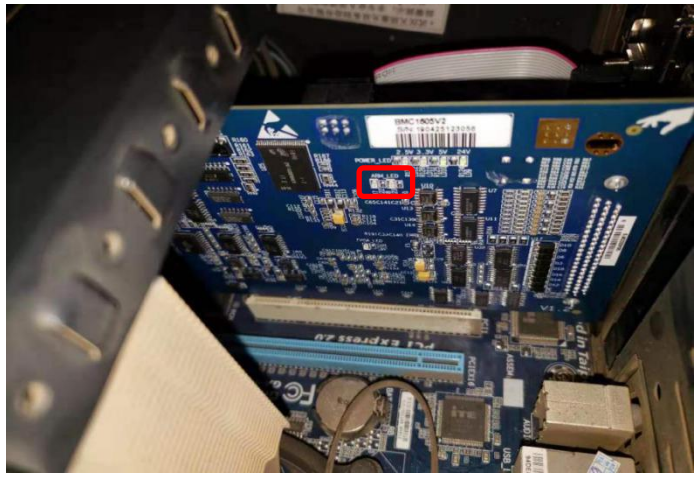
Scale Window

8.8 Not Detect The Motion Card, The System Will Run In Demo Mode

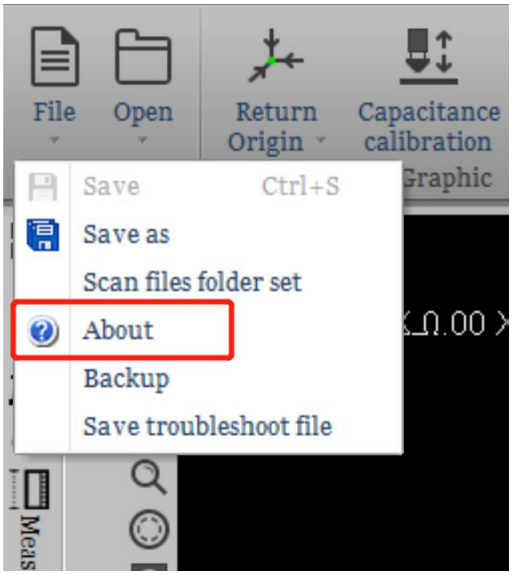
1. Check whether the computer device manager found the BMC motion card. If it is not found, you can re-plug the control card or replace the industrial computer. If it has been found, check whether the control card corresponding to the device manager has a yellow exclamation mark. Install the driver on the control card. If the driver

cannot be installed, check whether the driver is blocked by the computer firewall. If necessary, turn off the firewall and anti-virus software.

2. If you haven't found the BMC motion card in the device manager, check the blinking status of the two small lights (LED7, LED8) on the top of the control card in the computer. Flashing alternately, the control card may have failed, and you can upgrade or send it back for repair.

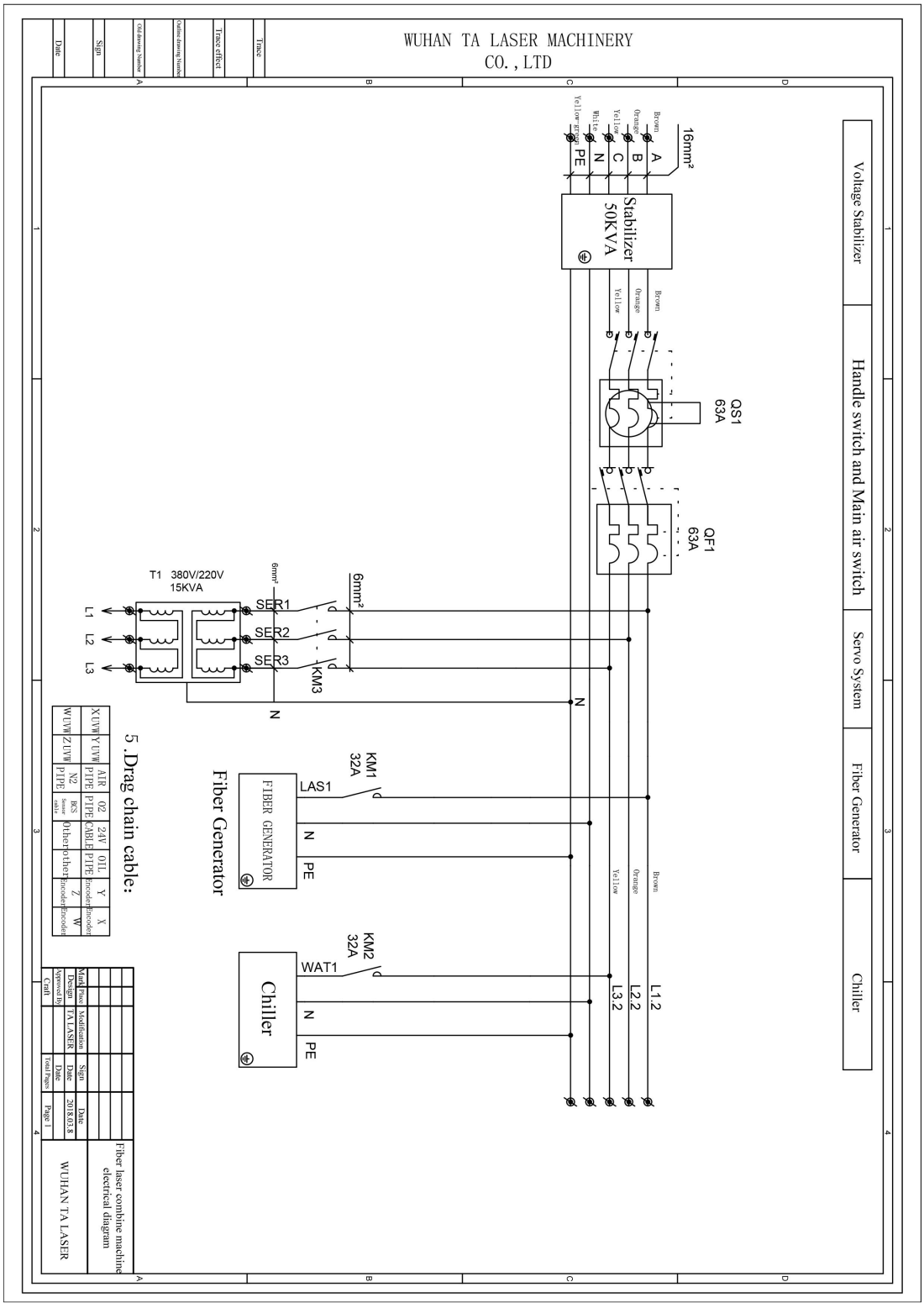


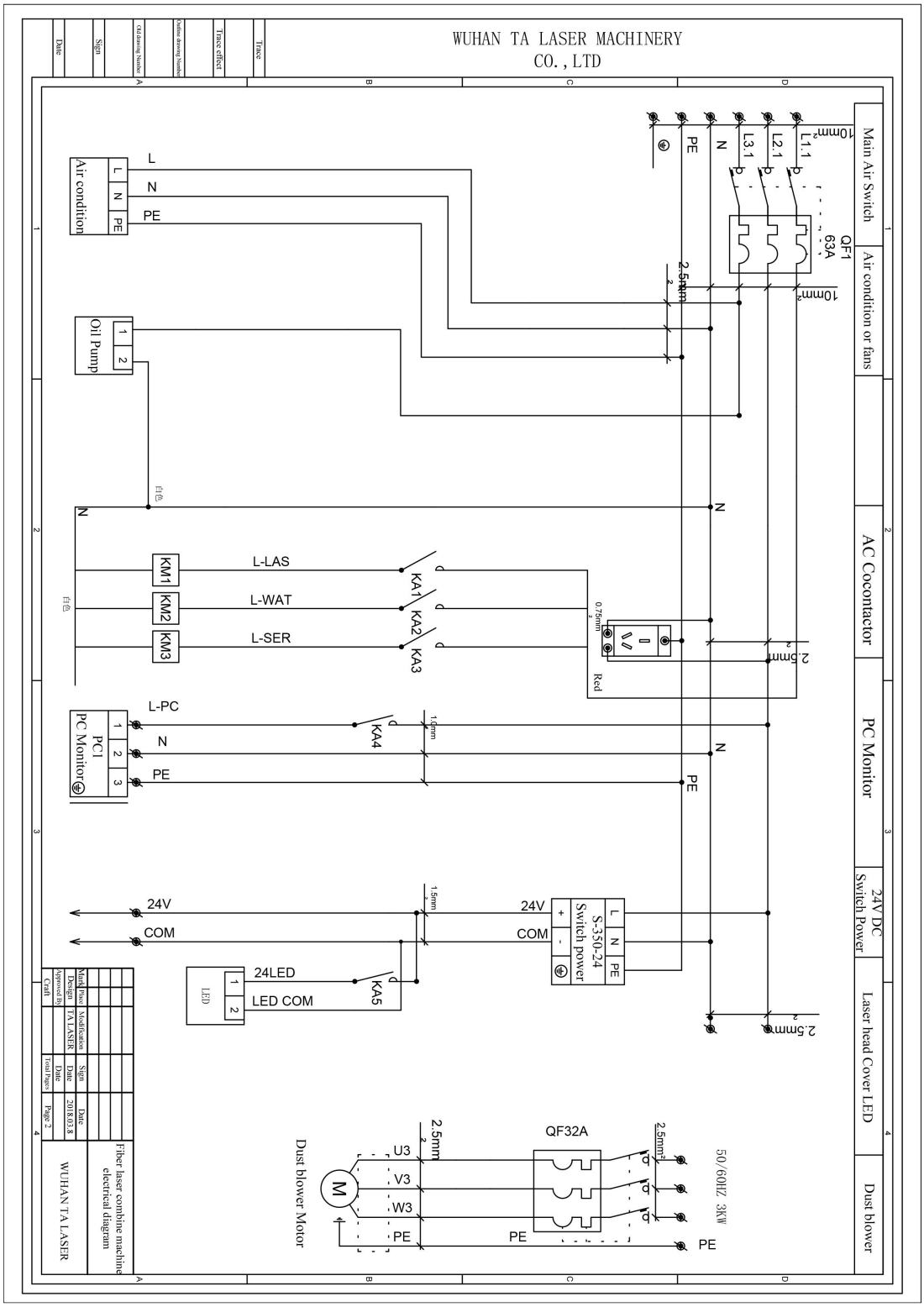
3. Check the in about to see if the system License has expired.

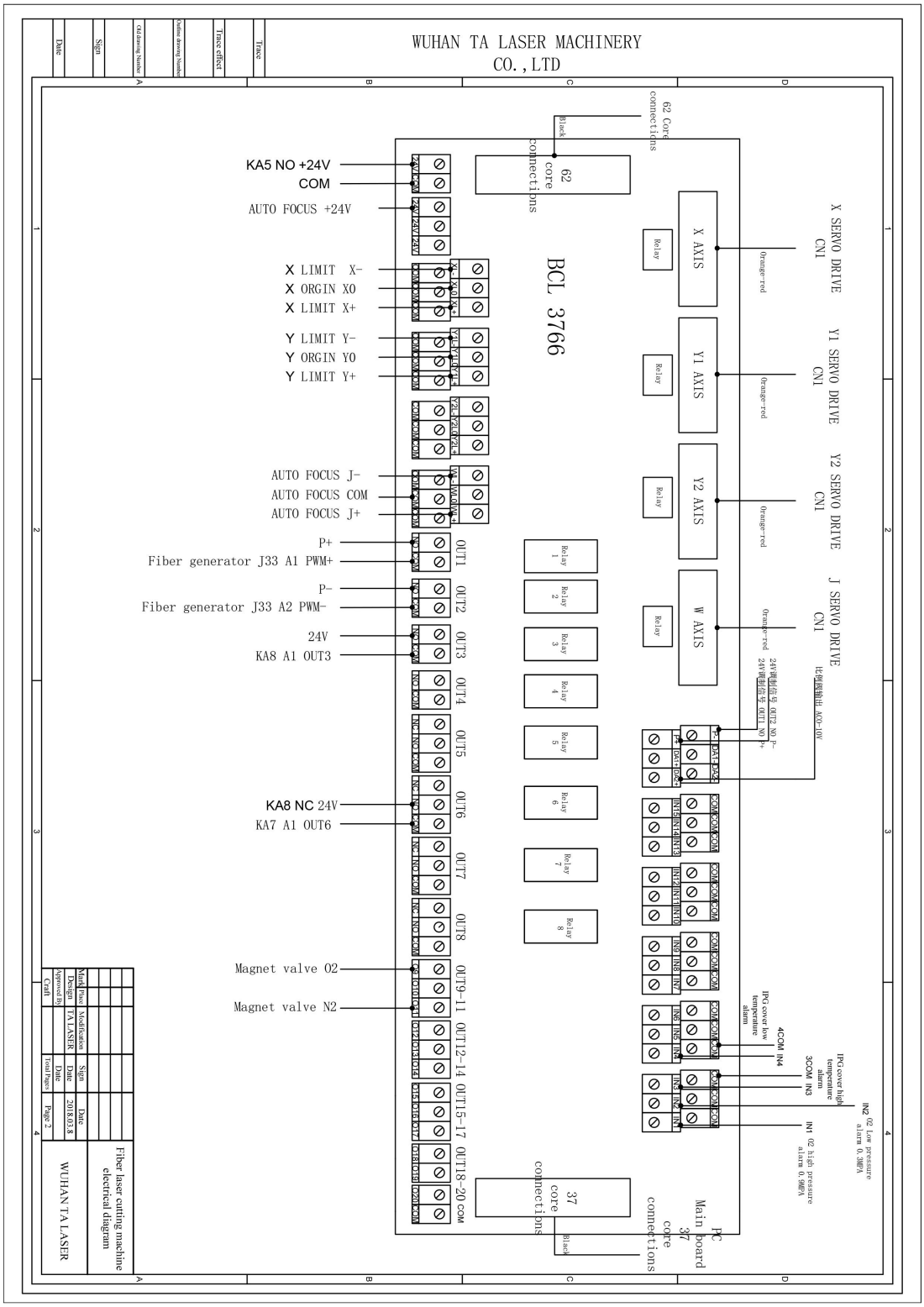


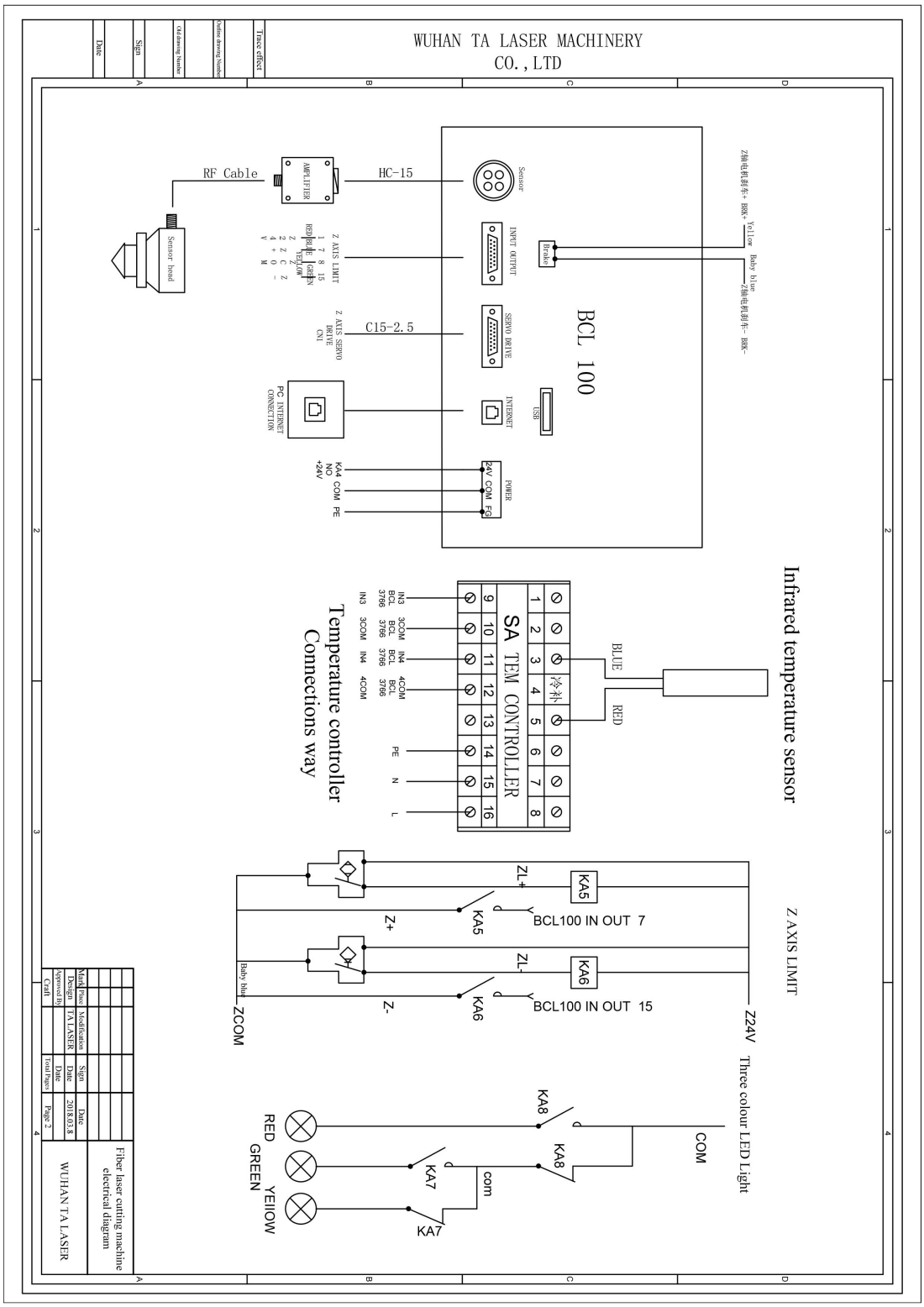


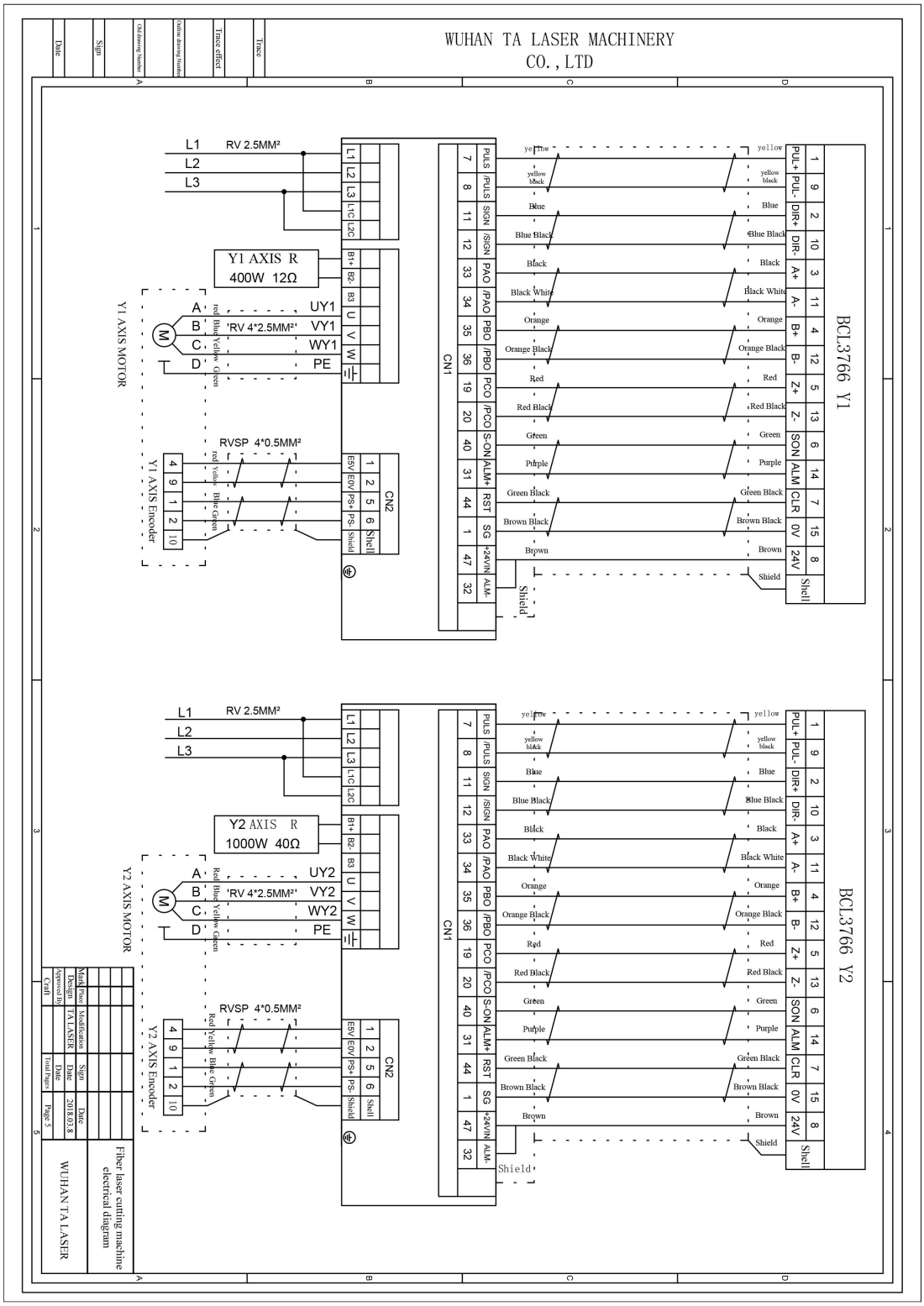
IX Diagram

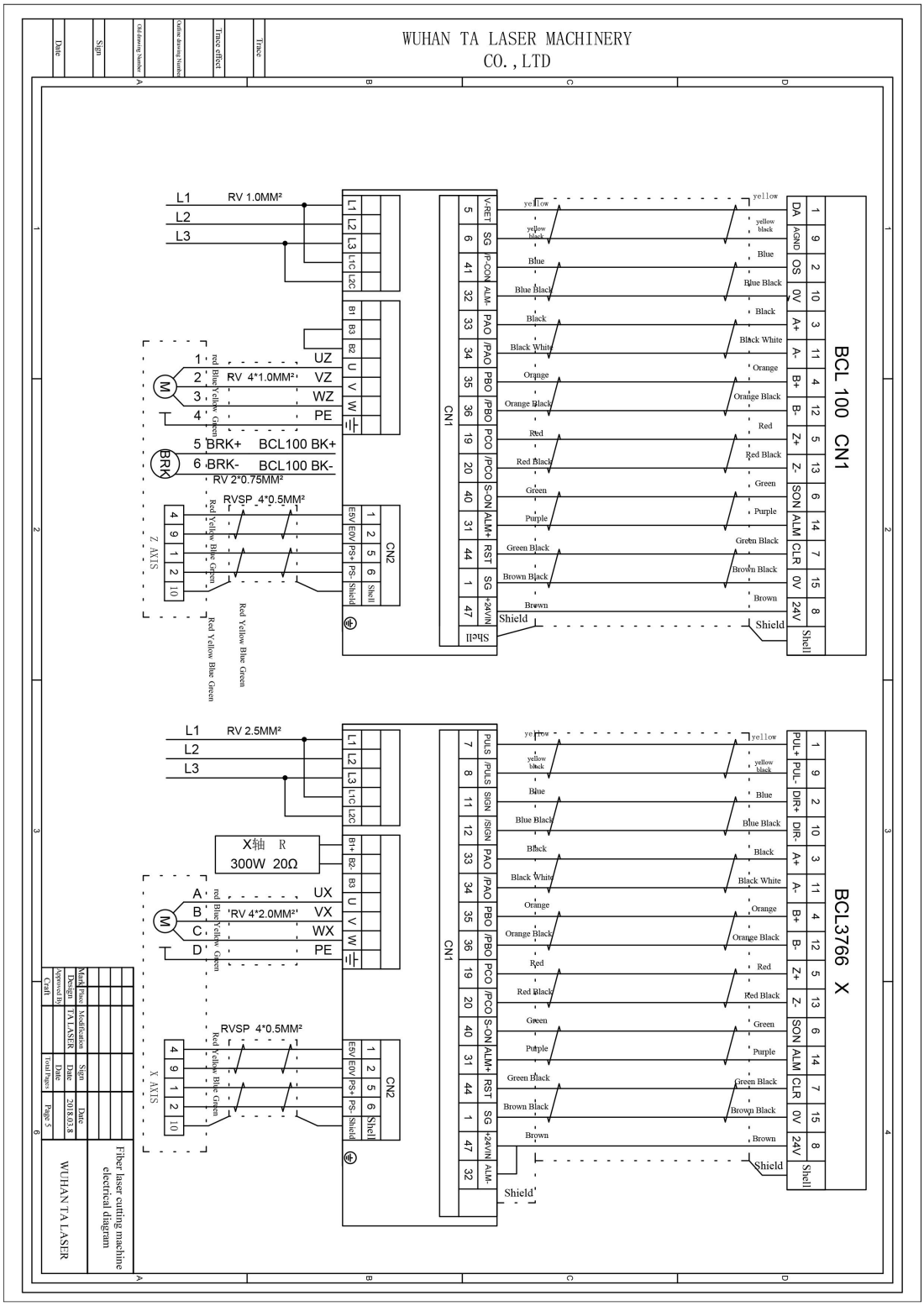

WUHAN TA LASER MACHINERY
CO., LTD
Voltage Stabilizer
Handle switch and Main air switch
Servo System
Fiber Generator
Chiller
16mm²
Stablizer
50KVA
QS1
63A
QF1
63A
T1 380V/220V
15KVA
6mm²
SER1
SER2
SER3
KM3
L1
L2
L3
N
KM1
32A
LAS1
FIBER GENERATOR
Fiber Generator
PE
KM2
32A
WAT1
Chiller
L1.2
L2.2
L3.2
5 .Drag chain cable:
Fiber laser combine machine electrical diagram
WUHAN TA LASER

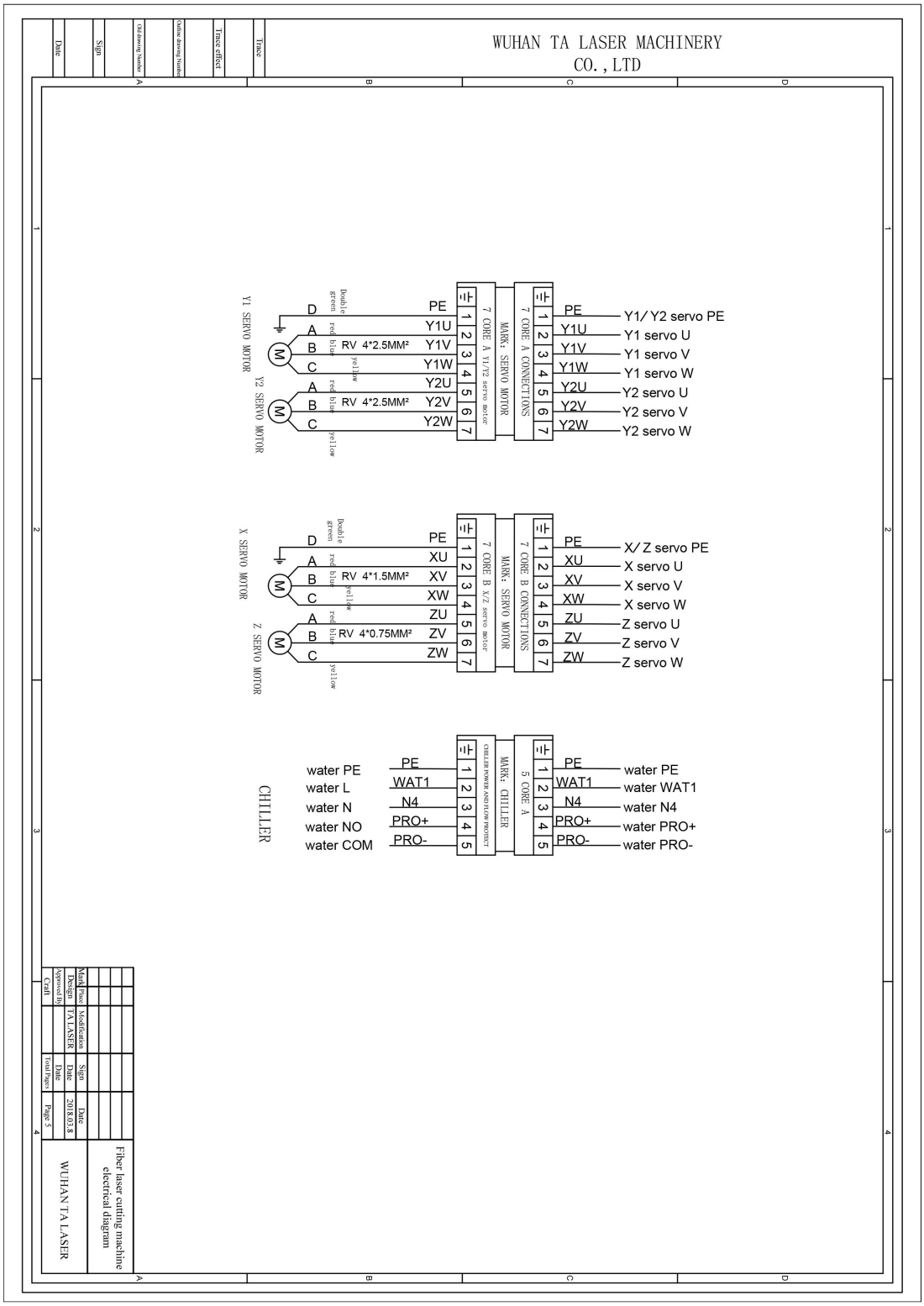

WUHAN TA LASER MACHINERY
CO., LTD
Main Air Switch
Air condition or fans
AC Cocontactor
PC Monitor
24V DC Switch Power
Laser head Cover LED
Dust blower
Air condition
Oil Pump
PC Monitor
Switch power
S-350-24
LED
Dust blower Motor
QF1
63A
QF32A
L1.1
L2.1
L3.1
PE
N
L
KM1
KM2
KM3
KA1
KA2
KA3
KA4
KA5
L-LAS
L-WAT
L-SER
L-PC
24V
COM
24LED
LED COM
U3
V3
W3
50/60HZ 3KW
Fiber laser combine machine electrical diagram
WUHAN TA LASER


WUHAN TA LASER MACHINERY
CO.,LTD
BCL 3766
KA5 NO +24V
COM
AUTO FOCUS +24V
X LIMIT X-
X ORGIN XO
X LIMIT X+
Y LIMIT Y-
Y ORGIN YO
Y LIMIT Y+
AUTO FOCUS J-
AUTO FOCUS COM
AUTO FOCUS J+
P+
Fiber generator J33 A1 PWM+
P-
Fiber generator J33 A2 PWM-
24V
KA8 A1 OUT3
KA8 NC 24V
KA7 A1 OUT6
Magnet valve O2
Magnet valve N2
62 core connections
37 core connections
X AXIS
Y1 AXIS
Y2 AXIS
W AXIS
X SERVO DRIVE CN1
Y1 SERVO DRIVE CN1
Y2 SERVO DRIVE CN1
J SERVO DRIVE CN1
IPC Main board 37 core connections
IPG cover high temperature alarm
IPG cover low temperature alarm
02 high pressure alarm 0.3MPA
02 Low pressure alarm 0.2MPA
Fiber laser cutting machine electrical diagram
WUHAN TA LASER
TA LASER
2018.03.8


WUHAN TA LASER MACHINERY
CO., LTD
BCL 100
RF Cable
HC-15
C15-2.5
Sensor head
AMPLIFIER
Sensor
Brake
INPUT OUTPUT
SERVO DRIVE
INTERNET
USB
POWER
Infrared temperature sensor
BLUE
RED
SA TEM CONTROLLER
Temperature controller
Connections way
Z AXIS LIMIT
BCL100 IN OUT 7
BCL100 IN OUT 15
ZCOM
Z24V
Three colour LED Light
RED
GREEN
YEIIOW
COM
KA5
KA6
KA7
KA8
Fiber laser cutting machine electrical diagram
WUHAN TA LASER


WUHAN TA LASER MACHINERY
CO., LTD
L1
L2
L3
RV 2.5MM²
Y1 AXIS R
400W 12Ω
'RV 4*2.5MM²'
UY1
VY1
WY1
PE
RVSP 4*0.5MM²
Y1 AXIS MOTOR
Y1 AXIS Encoder
CN1
CN2
BCL3766 Y1
Y2 AXIS R
1000W 40Ω
UY2
VY2
WY2
Y2 AXIS MOTOR
Y2 AXIS Encoder
BCL3766 Y2
Shield
Fiber laser cutting machine electrical diagram
WUHAN TA LASER


WUHAN TA LASER MACHINERY
CO., LTD
BCL 100 CN1
BCL3766 X
CN1
CN2
L1
L2
L3
RV 1.0MM²
RV 4*1.0MM²
UZ
VZ
WZ
PE
BRK+
BRK-
BCL100 BK+
BCL100 BK-
RV 2*0.75MM²
RVSP 4*0.5MM²
Z AXIS
RV 2.5MM²
X轴 R
300W 20Ω
RV 4*2.0MM²
UX
VX
WX
X AXIS
Shield
WUHAN TA LASER
Fiber laser cutting machine electrical diagram


WUHAN TA LASER MACHINERY
CO.,LTD
Y1 SERVO MOTOR
Y2 SERVO MOTOR
RV 4*2.5MM²
7 CORE A Y1/Y2 servo motor
MARK: SERVO MOTOR
7 CORE A CONNECTIONS
Y1/ Y2 servo PE
Y1 servo U
Y1 servo V
Y1 servo W
Y2 servo U
Y2 servo V
Y2 servo W
X SERVO MOTOR
Z SERVO MOTOR
RV 4*1.5MM²
RV 4*0.75MM²
7 CORE B X/Z servo motor
7 CORE B CONNECTIONS
X/ Z servo PE
X servo U
X servo V
X servo W
Z servo U
Z servo V
Z servo W
CHILLER
water PE
water L
water N
water NO
water COM
MARK: CHILLER
5 CORE A
water WAT1
water N4
water PRO+
water PRO-
Fiber laser cutting machine electrical diagram
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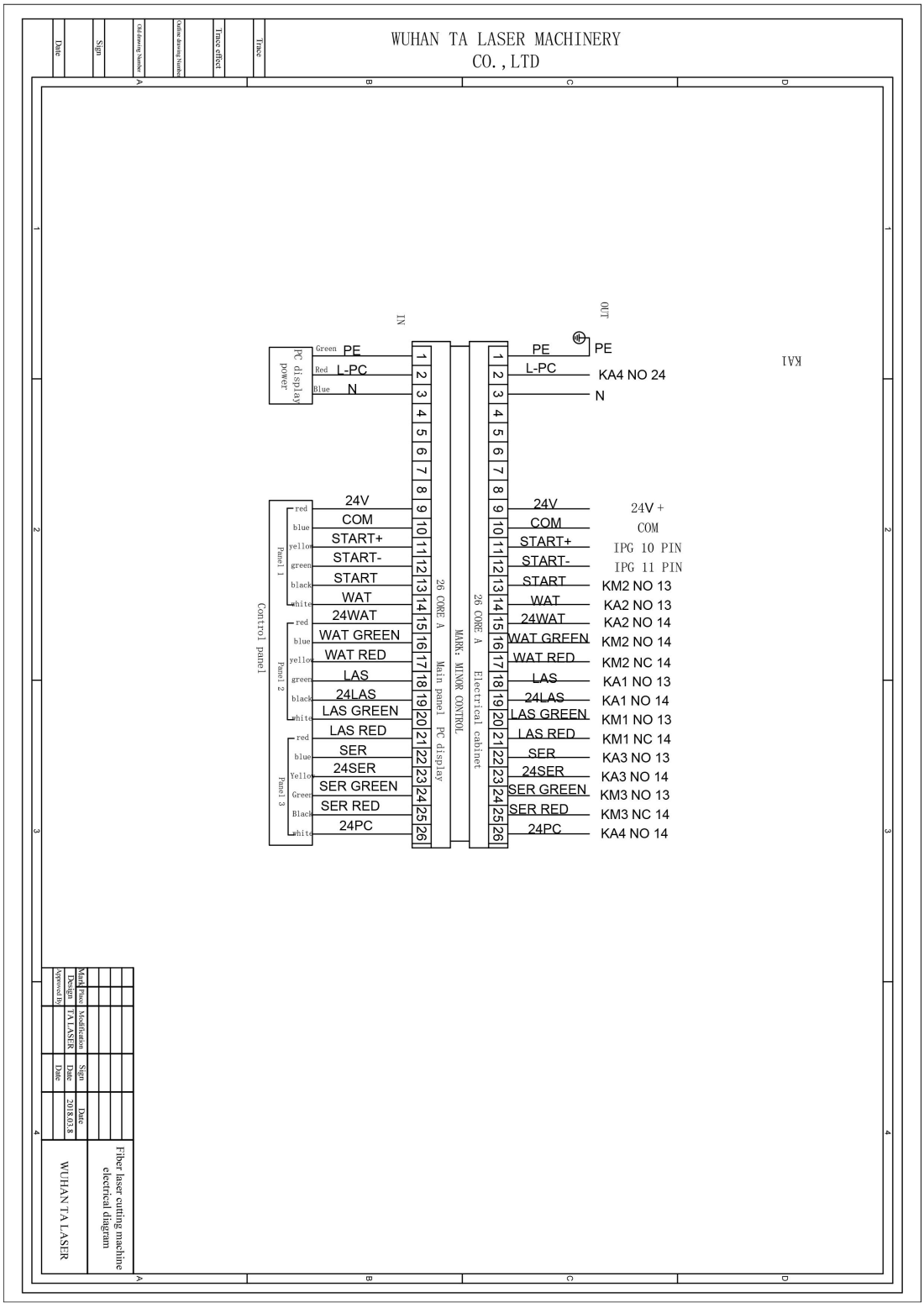
WUHAN TA LASER MACHINERY
CO., LTD
IN
OUT
PC display power
Green PE
Red L-PC
Blue N
Control panel
Panel 1
Panel 2
Panel 3
24V
COM
START+
START-
START
WAT
24WAT
WAT GREEN
WAT RED
LAS
24LAS
LAS GREEN
LAS RED
SER
24SER
SER GREEN
SER RED
24PC
26 CORE A
Main panel PC display
MARK: MINOR CONTROL
26 CORE A
Electrical cabinet
PE
L-PC
N
KA4 NO 24
24V +
COM
IPG 10 PIN
IPG 11 PIN
KM2 NO 13
KA2 NO 13
KA2 NO 14
KM2 NO 14
KM2 NC 14
KA1 NO 13
KA1 NO 14
KM1 NO 13
KM1 NC 14
KA3 NO 13
KA3 NO 14
KM3 NO 13
KM3 NC 14
KA4 NO 14
KA1
Fiber laser cutting machine electrical diagram
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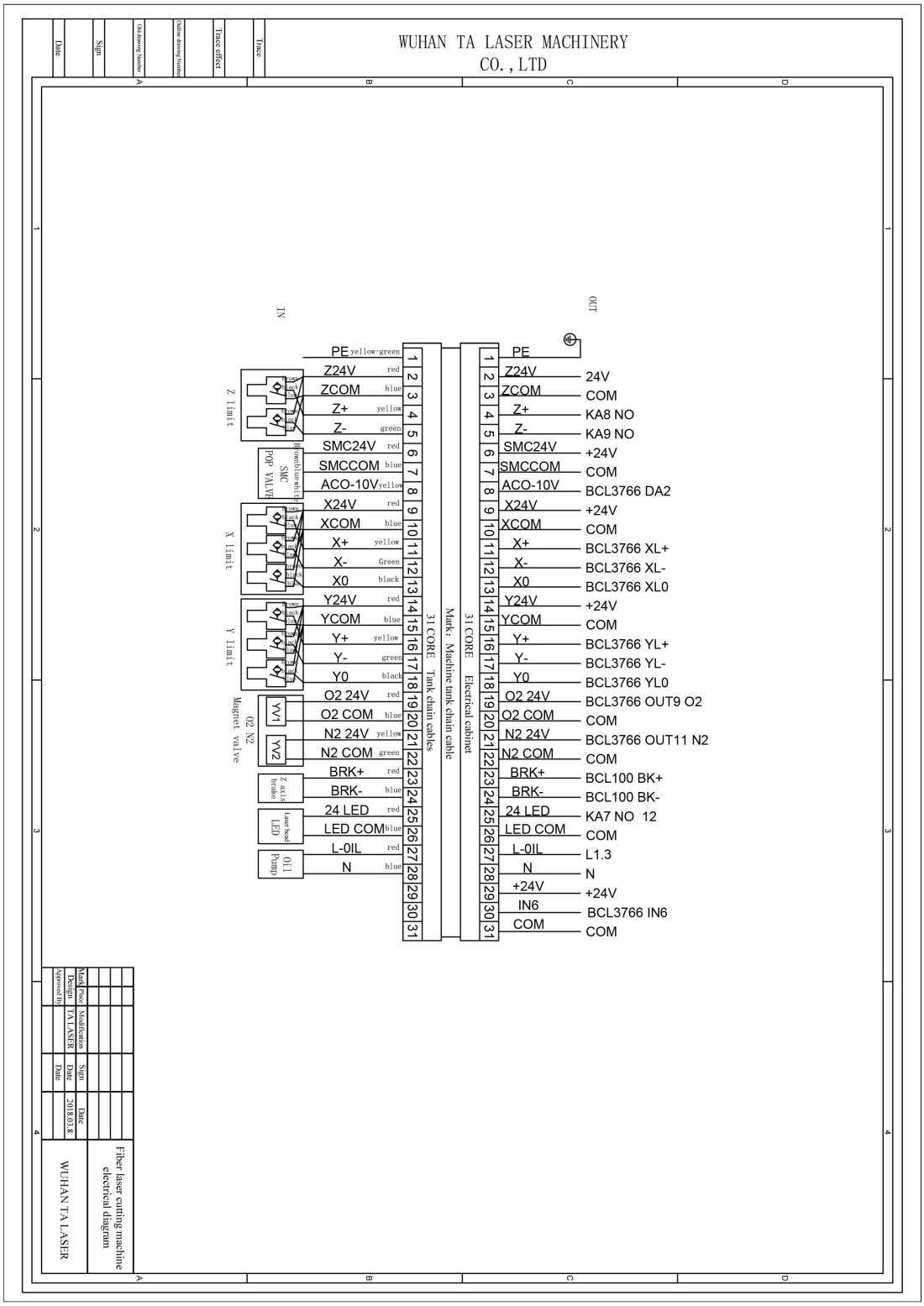
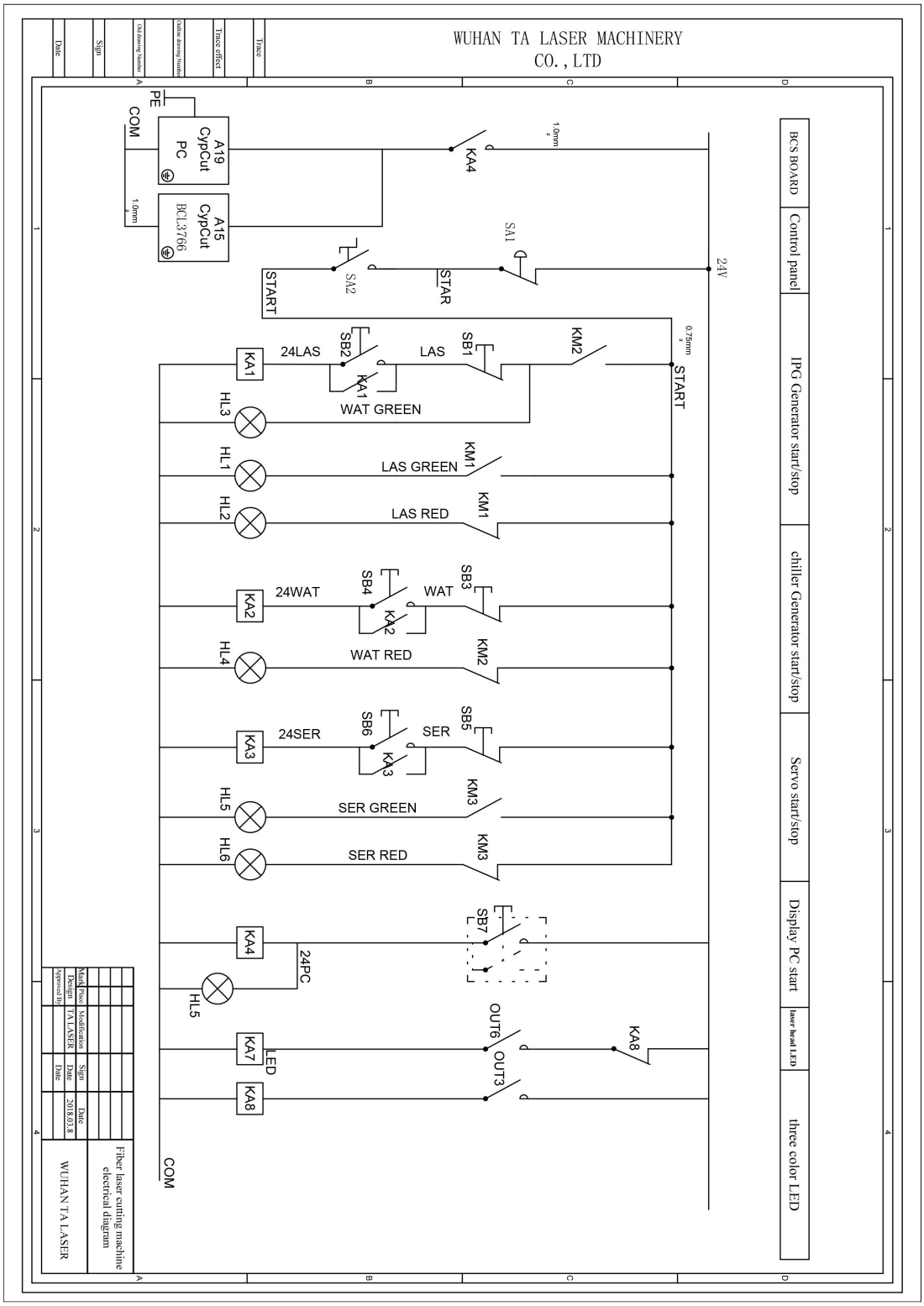
TA LASER
2018.03.8


WUHAN TA LASER MACHINERY
CO., LTD
IN
OUT
PE yellow-green
Z24V red
ZCOM blue
Z+ yellow
Z- green
SMC24V red
SMCCOM blue
ACO-10V yellow
X24V red
XCOM blue
X+ yellow
X- Green
X0 black
Y24V red
YCOM blue
Y+ yellow
Y- green
Y0 black
O2 24V red
O2 COM blue
N2 24V yellow
N2 COM green
BRK+ red
BRK- blue
24 LED red
LED COM blue
L-0IL red
N blue
Z limit
X limit
Y limit
SMC POP VALVE
O2 N2 Magnet valve
YV1
YV2
Z axis brake
Laser head LED
Oil Pump
31 CORE Tank chain cables
Mark: Machine tank chain cable
31 CORE Electrical cabinet
PE
Z24V 24V
ZCOM COM
Z+ KA8 NO
Z- KA9 NO
SMC24V +24V
SMCCOM COM
ACO-10V BCL3766 DA2
X24V +24V
XCOM COM
X+ BCL3766 XL+
X- BCL3766 XL-
X0 BCL3766 XL0
Y24V +24V
YCOM COM
Y+ BCL3766 YL+
Y- BCL3766 YL-
Y0 BCL3766 YL0
O2 24V BCL3766 OUT9 O2
O2 COM COM
N2 24V BCL3766 OUT11 N2
N2 COM COM
BRK+ BCL100 BK+
BRK- BCL100 BK-
24 LED KA7 NO 12
LED COM COM
L-0IL L1.3
N N
+24V +24V
IN6 BCL3766 IN6
COM COM
Fiber laser cutting machine electrical diagram
WUHAN TA LASER
2018.03.8


WUHAN TA LASER MACHINERY
CO., LTD
BCS BOARD
Control panel
IPG Generator start/stop
chiller Generator start/stop
Servo start/stop
Display PC start
laser head LED
three color LED
A19
CypCut
PC
A15
CypCut
BCL3766
PE
COM
KA4
SA1
SA2
START
STAR
24V
KA1
24LAS
SB2
LAS
SB1
KM2
HL3
WAT GREEN
HL1
LAS GREEN
KM1
HL2
LAS RED
KA2
24WAT
SB4
WAT
SB3
HL4
WAT RED
KA3
24SER
SB6
SER
SB5
HL5
SER GREEN
KM3
HL6
SER RED
KA4
SB7
24PC
HL5
KA7
LED
OUT6
OUT3
KA8
Fiber laser cutting machine
electrical diagram
WUHAN TA LASER

X Service

TA Laser is responsible to offer free fittings during the quality guarantee time (except consumable parts). So please keep the damaged fittings well, in order to send back to sellers.

After the warranty, we will also provide favorable service of long term technical supports and spare parts supply to ensure machine's stable and continuous running.

The artificial damage in the warranty period and damage after warranty period, TA Laser will offer paid service.

Hot-line: 0086-15871488866
E-mail: frank.lee@talasertech.com bob.ran@talasertech.com

Service Card

Repair Report Date: **Under Warranty** ☐ **Out of warranty** ☐

Machine Serial NO.	**Machine Type**	**Machine Arrive Date**	**Installation Date**
User's Company Name			
Address			
Contact Person		**Tel**	
Machine Fault Description			
Failure Analysis			
Repair Work Content			