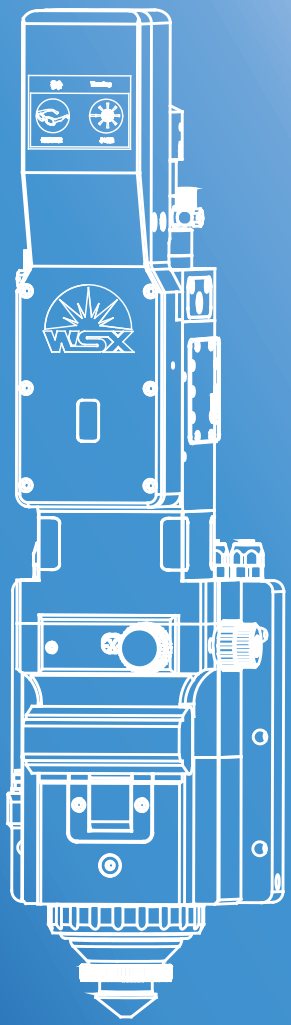
Automatic Focusing Fiber Laser Cutting Head NC60



User Manual

Shenzhen Worthing Technology Co.,Ltd.

Attention

Please read this manual carefully and make sure you understand its contents before using the laser head.

Please keep this manual for future operation and maintenance.

Test Condition

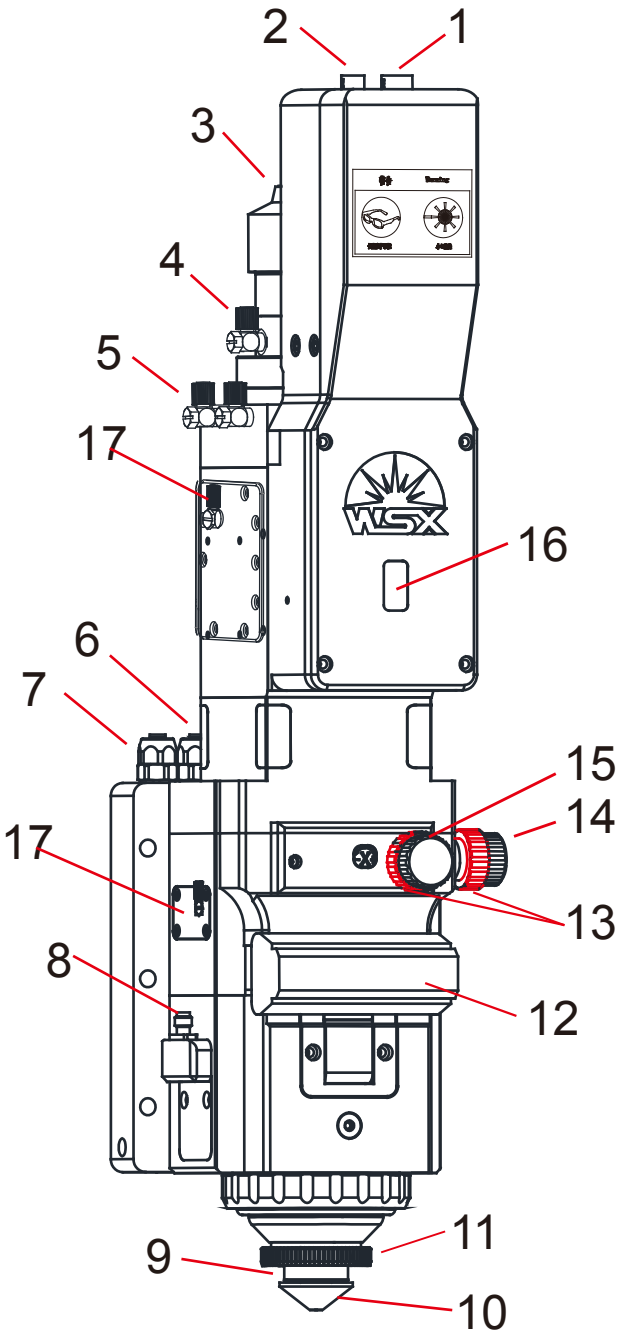
Correct wiring, normal electric, good earthing with smoothing and voltage stabilizing circuit.

Steps

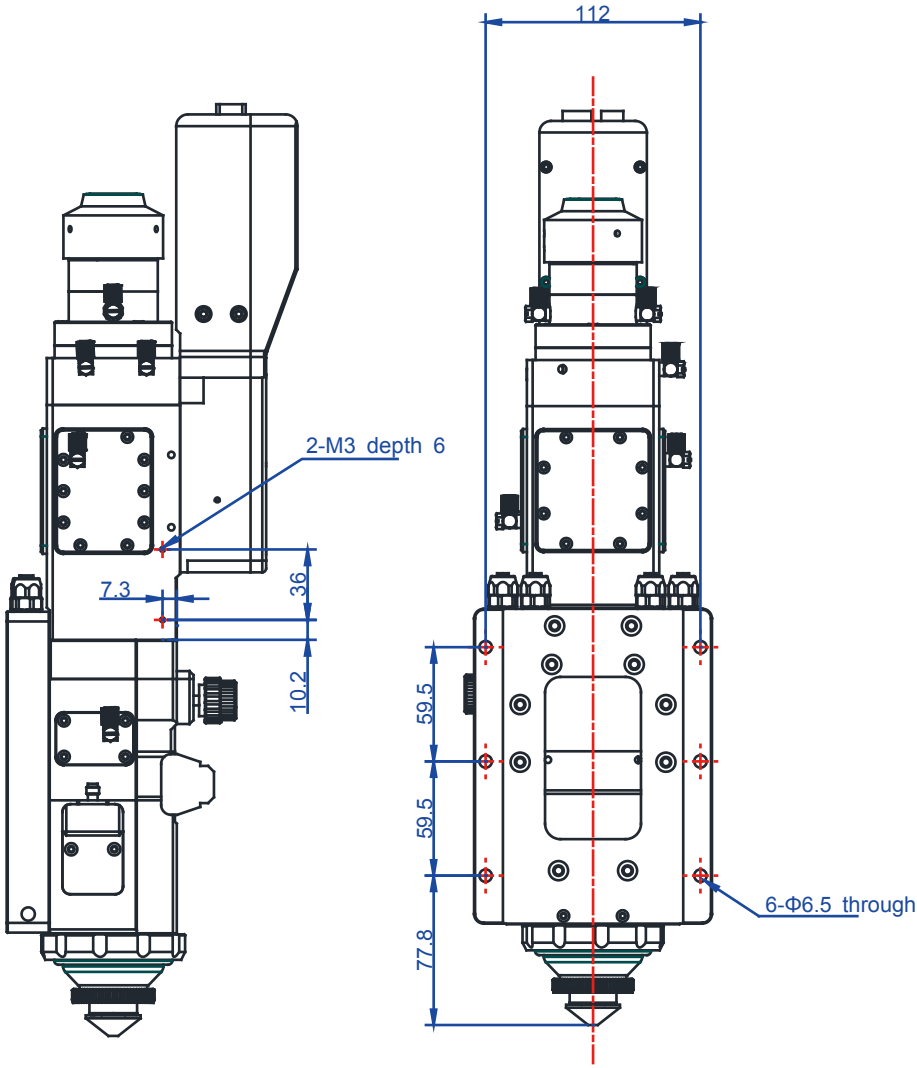
1.Adjust soft limitation to -100~100
2.Set inching speed to 1mm/s
3.Inching at positive direction until reach positive limitation
4. Inching at negative direction until reach negative limitation
5. After confirming effectiveness of positive & negative limitation, set back to origin
6. Restore soft limitation & inching speed to origin

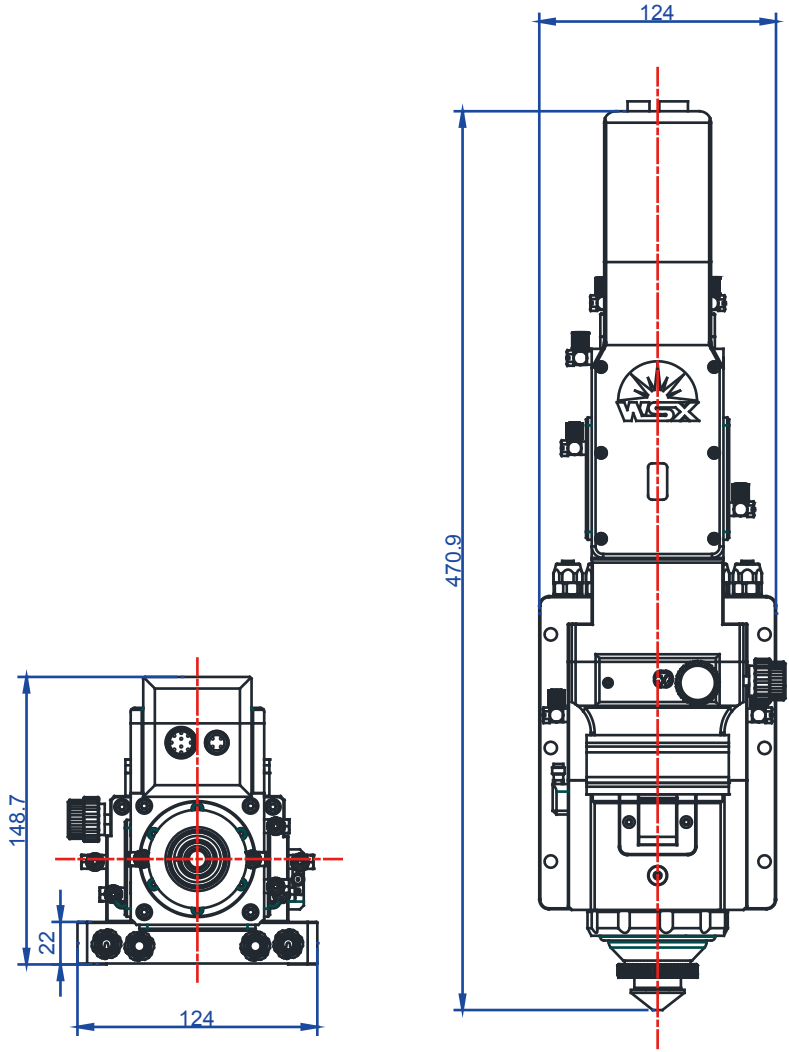
Instruction

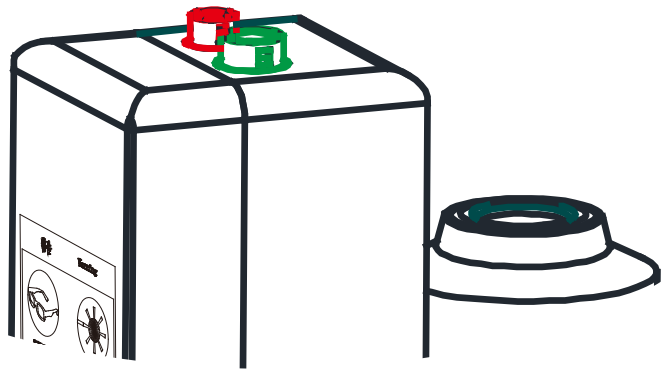
1. Make sure manual inching can find limit swicth
2. Reduce manual speed to ensure that invalid limitation will not cause structural damage.
3.Make sure wire connection of negative limitation swicth is correct and signal is normal
4. It's allowed to restore to origin automaticly only after confirming positive & negative limitation
5. Restore parameters to ensure system running correctly

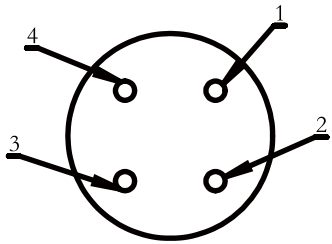


1. Encoder&Limitation Signal
2. Triphase power wire
3. Fiber Access
4. Cooling Water Connector 1
5. Cooling Water Connector 2
6. Cooling Gas Connector
7. Cutting Gas Connector
8. Moving Signal Interface
9. Ceramic Ring
10. Nozzle
11. Locking Rim
12. Protective Window
13. Center Locking Rim
14. Center Adjusting (Y)
15. Center Adjusting (X)
16. Observation Window
17. Cooling Water Connector 3


112
2-M3 depth 6
7.3
36
10.2
59.5
59.5
77.8
6-Φ6.5 through

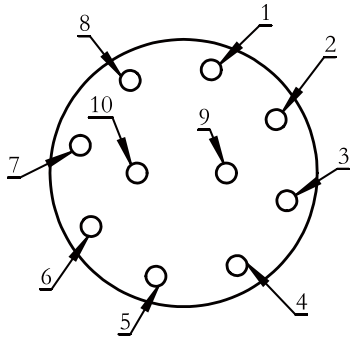

124
470.9
148.7
22
124





1	W
2	U
3	V
4	FG (Earthing)

Servo Motor Power Supply Interface (Red)



1	FG (Shield Wire)
2	-D (Encoder Signal Data-)
3	+D (Encoder Signal Data+)
4	SG (Signal Ground Wire)
5	VCC (Encoder Power +5V)
6	+24V (Approach Switch Power Line)
7	0V (Approach Switch Power Line)
8	W+ (Approach Switch Signal Line)
9	W- (Approach Switch Signal Line)

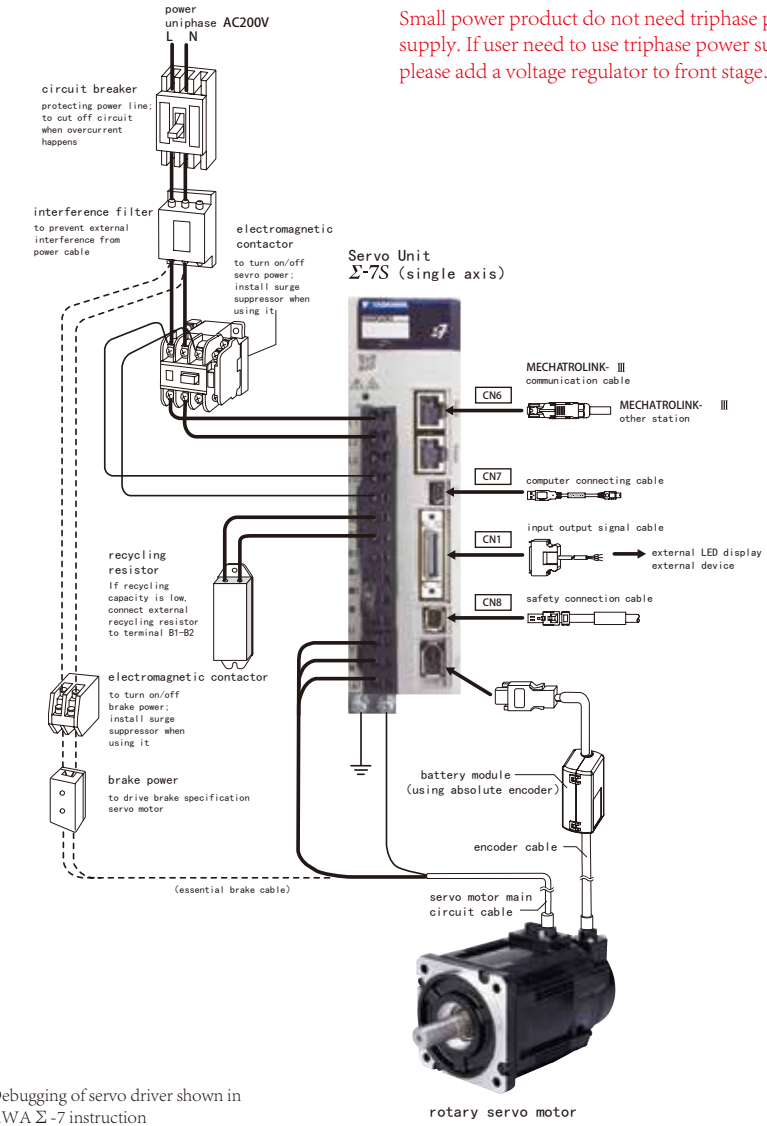
Servo Motor Encoder & Approach Switch Interface (Green)

Servo Driver Connects to Motor

YASKAWA-7S System Construction Example

Σ-7S Servo Unit & Rotary Servo Motor

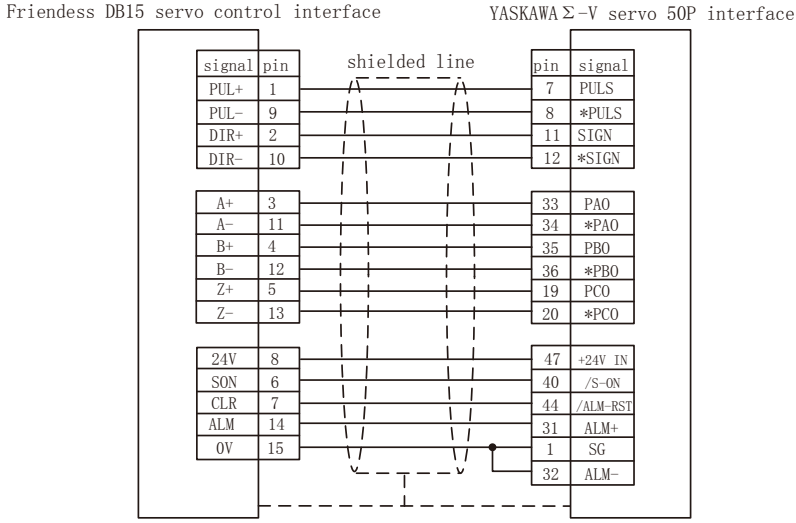
Uniphase AC200V



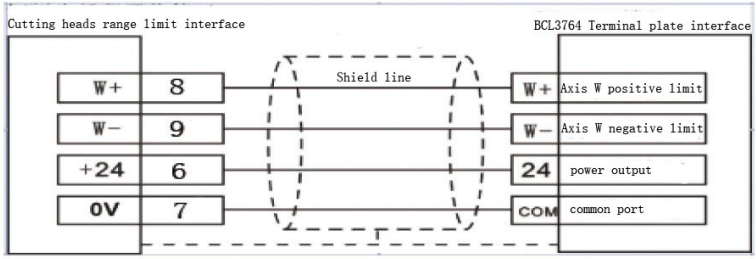
Note:
Small power product do not need triphase power supply. If user need to use triphase power supply, please add a voltage regulator to front stage.

Note: Debugging of servo driver shown in YASKAWA Σ-7 instruction

Friendess FSCUT2000A laser cutting control system BCL3764 terminal plate W axis DB15 servo control interface connect with YASKAWA servo driver 50P interface definition



Definition of laser focusing djustment range limitation switch connector

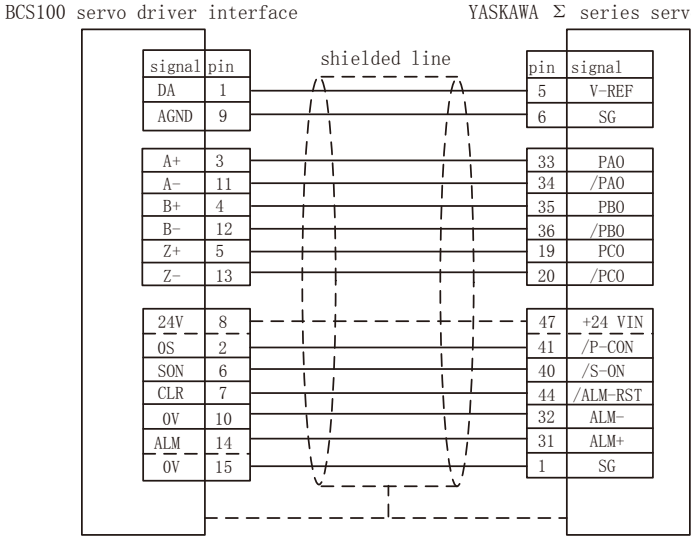


Parts of parameter list, subject to actual using and YASKAWA servo instruction.

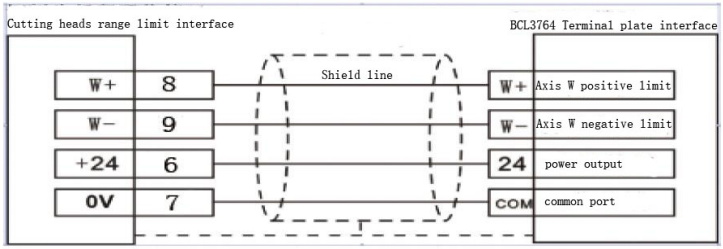
parameter	value	parameter	value	parameter	value
PN000	0011	PN170	1400	PN402	50
PN00B	0101	PN200	0000	PN403	50
PN100	120	PN20E	4194304	PN406	100
PN102	180	PN210	2500	PN50A	8100
PN103	100	PN212	2500	PN50B	6548

Note: 1.Definitions of servo driver and servo motor connector shown in YASKAWA servo driver instruction;
2.Please use uniphase power, L connects to L1&L1C; N connects to L2&L2C.

Friendess FSCUT4000A laser cutting control system BCL3724 terminal plate W axis DB15 servo control interface connect with YASKAWA servo driver 50P interface definition



Definition of laser focusing djustment range limitation switch connector



Definition of laser focusing djustment range limitation switch connector

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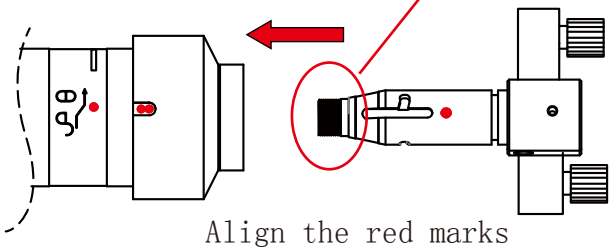
PN103	100	PN212	2500	PN50B	6548

Note: 1.Definitions of servo driver and servo motor connector shown in YASKAWA servo driver instruction; 2.Please use uniphase power, L connects to L1&L1C； N connects to L2&L2C。

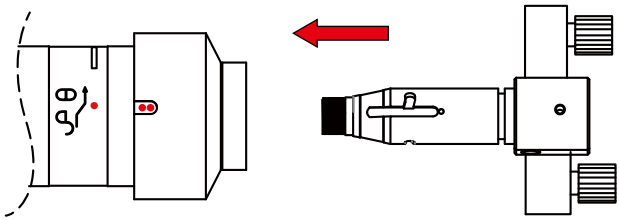
1. Place the laser head and optical fiber connector in a horizontal state;
2. Clean the QBH and fiber connector with clean rod and ethyl alcohol.

Inside the red circle is the plug of fiber rod; it is equipped with a protective cover. Before installation, tighten the cover to avoide it being loose duiring the processing which may cause offset light path and bad cutting quality or even cause burn damage to the fiber rod and cutting head.

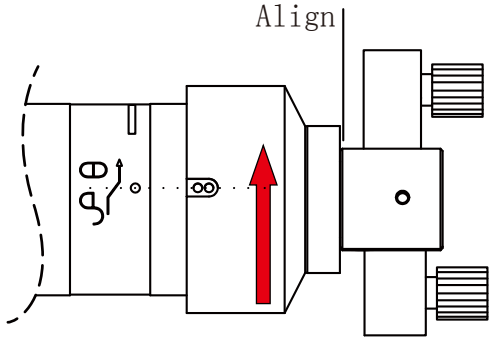


Align the red marks

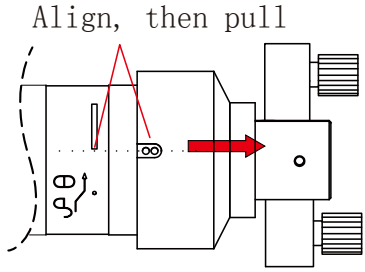
3. Insert the fiber connector into QBH gently;



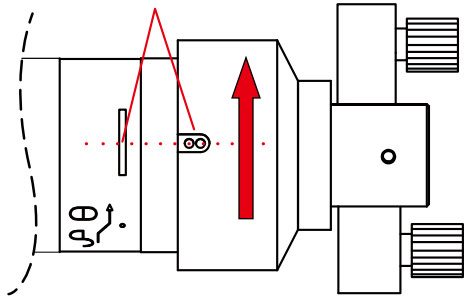
4. After inserting, turn the turning rim in the arrow direction untill the two red marks are aligned to the white mark;



5. Then pull the turning rim as the picture below;

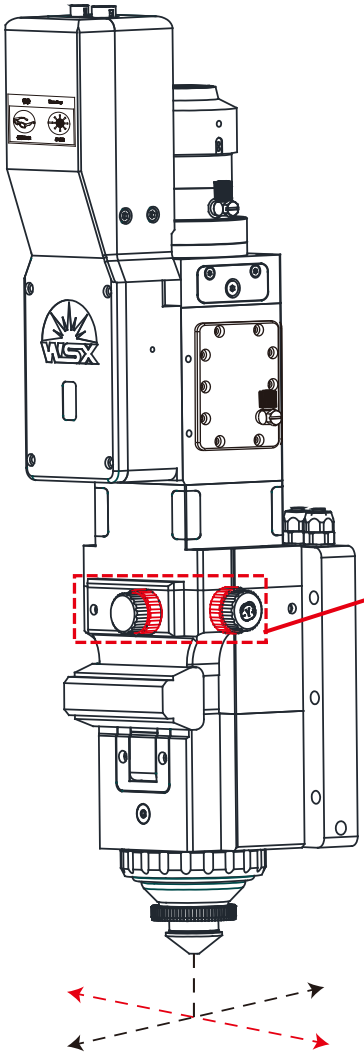


6. Turn the rim in the direction as picture below at moderate intensity to make it tight (Use thumb and index finger).
The red marks can be aligned to or over the middle of the white bar, but do not twist any more when it is in the right position.



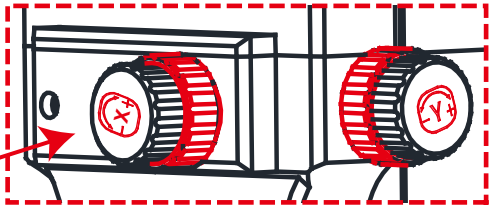
Note: Do not twist vigorously , it may cause damage to precision machinery.

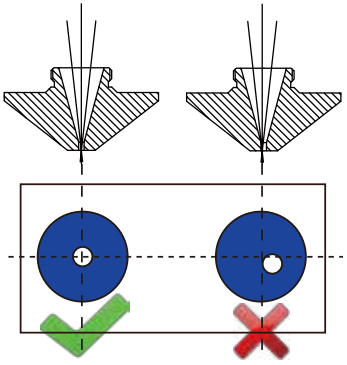
To avoid dust or dirt entering into the fiber optic connector by accident, please clean the fiber rod first. Insert the fiber plug with the laser head in a horizontal position.



1. Y-Direction Horizontally Adjusting Screw
2. X-Direction Horizontally Adjusting Screw

1. Adjust the X/Y screw as Picture 14 by allen wrench and make the beam pass through the center of nozzle;
2. The cutting effect is best when the beam pass through the center of nozzle;
3. If the beam does not pass through the center of nozzle, it may cause the beam could not be emitted out or bad cutting effect and so on.



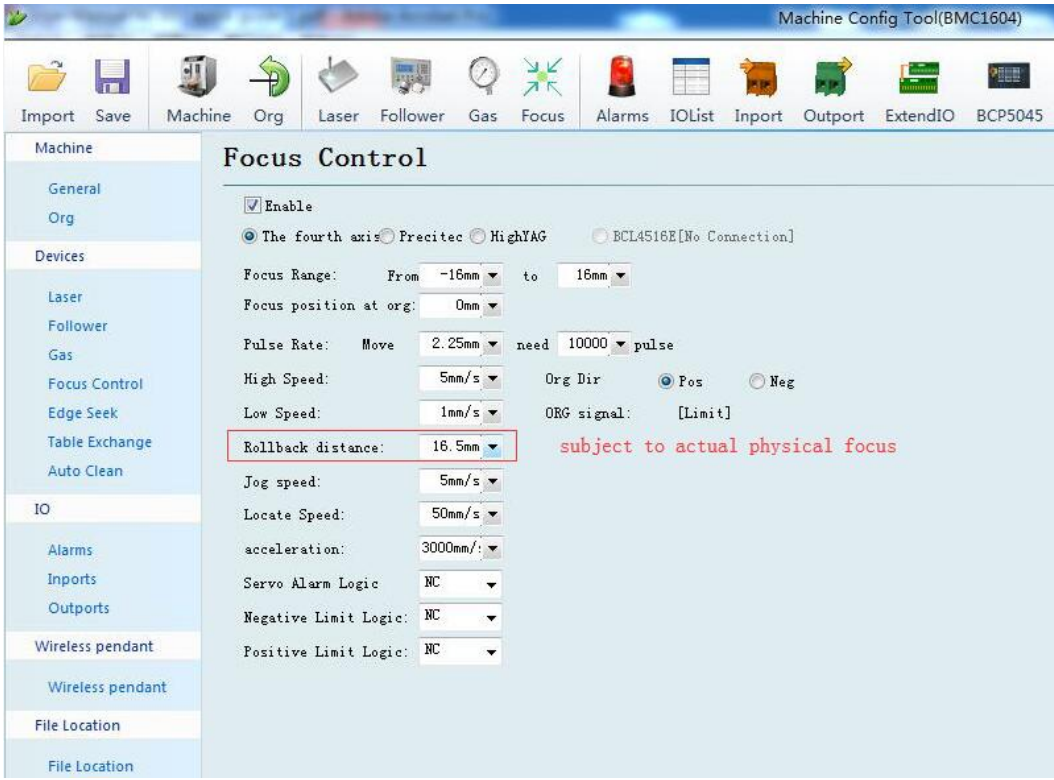


beam passes through the center (correct)

beam does not pass through the center(incorrect)

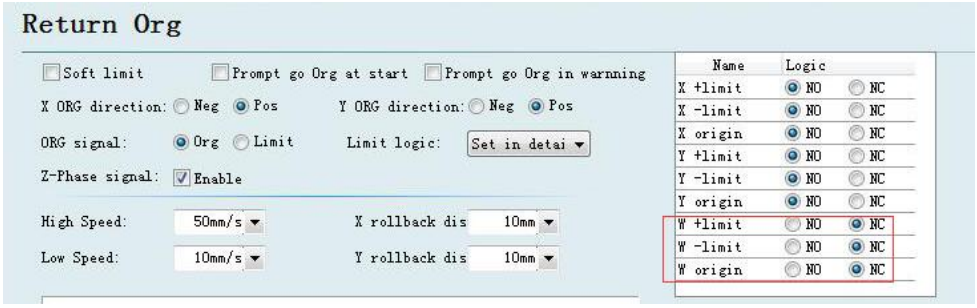
Methods of testing whether the beam pass through the center of nozzle:

1. Paste the transparent tape on the outlet of the nozzle (prefer to a new or undeformed nozzle);
2. Set the power of laser machine to 50W(take 500W for example,adjust the short burst power for 10%);
3. Take off the transparent tape after the beam has been emited for 1 - 2 seconds;
4. Face the tape to light source and observe the round mark of nozzle on the tape and burned spot of laser passing through the tape.
5. If they are concentric, the testing result is good, but if not, please keep adjusting.
6. When adjustment is finished, tighten the center locking ring (red part) immediately.



Note: 1.This parameter is default value; when user changes it, please avoid hard ware damage;

2.Please contact technicist to get specific parameters of different lens combinations.



Note: 1.Please choose normally closed mode for normally closed limitation switch.

Check

Distance

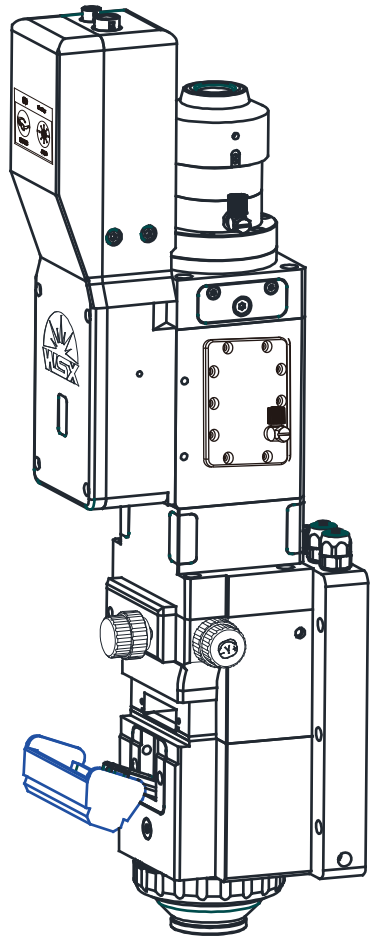
Replace

Adjust the lens

Maintenance

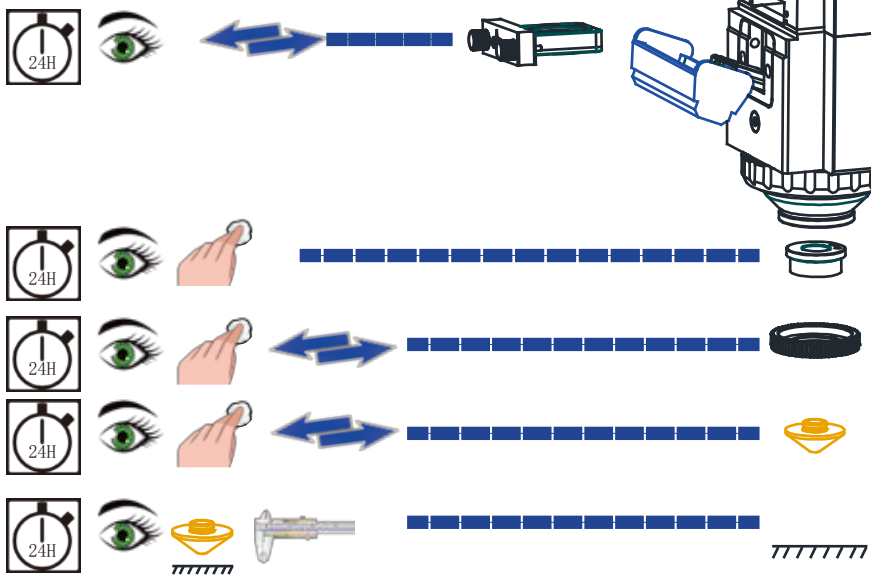
Maintenance Period

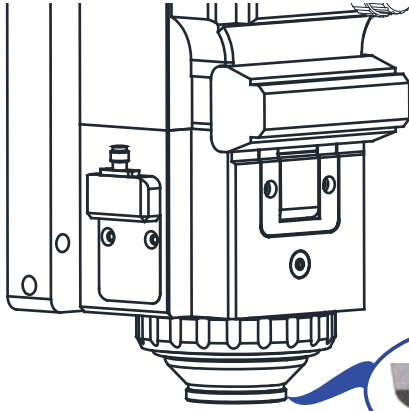
Calibration



Note:
Before maintenance, clean away the dust on the surface of the head with compressed air; then use clean cloth and ethyl alcohol to clean the related parts.

Note:
When the maintenance of ceramic ring & nozzle is finished, it is necessary to calibrate every time.



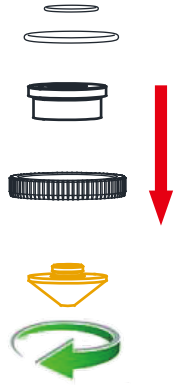


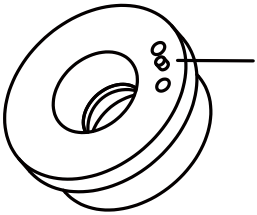
POWER

COOLING GAS

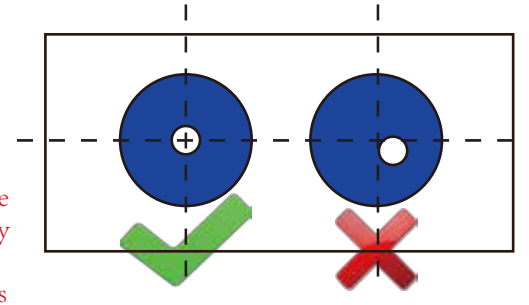
CUTTING GAS

Note:
Before maintenance, clean away the dust on the surface of the head with compressed air; then use clean cloth and ethyl alcohol to clean the related parts.

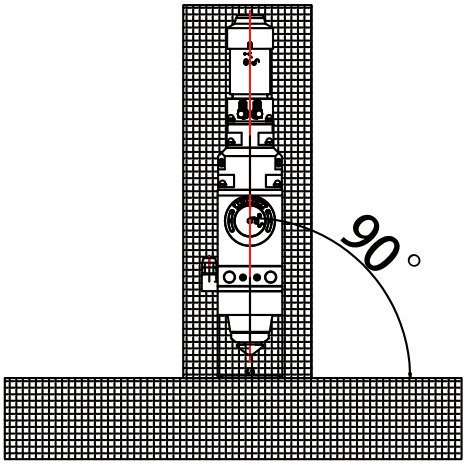


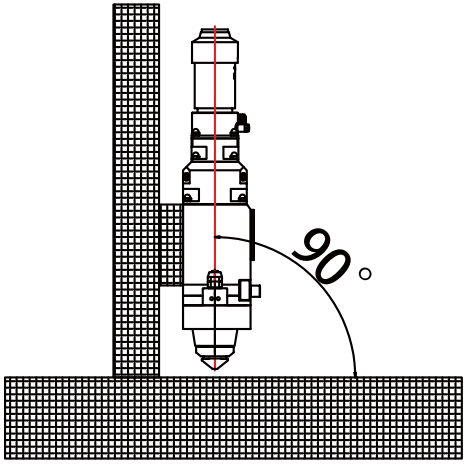


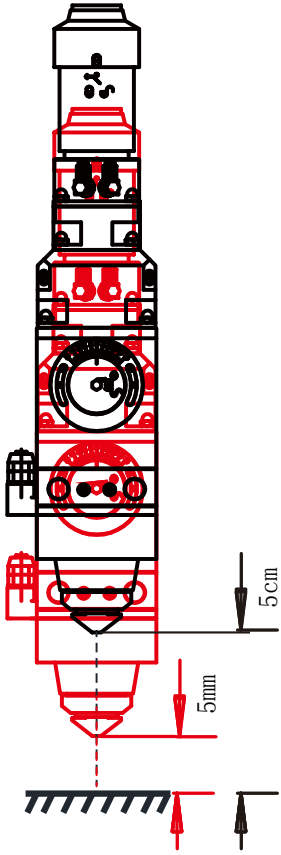
Note:
When the maintenance of ceramic ring & nozzle is finished, it is necessary to calibrate and test the beam to see whether it is in the center.



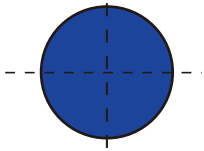
center checking



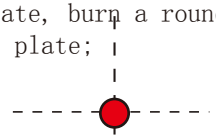




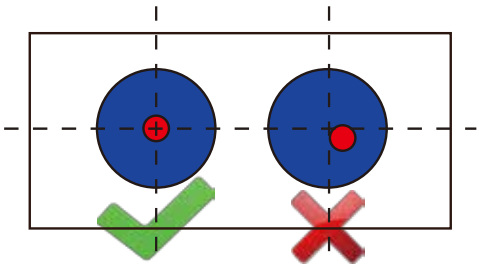
Step 1: set the laser power to 500W, make a short burst at the height of 5cm from the plate, burn a round scorch on the plate;



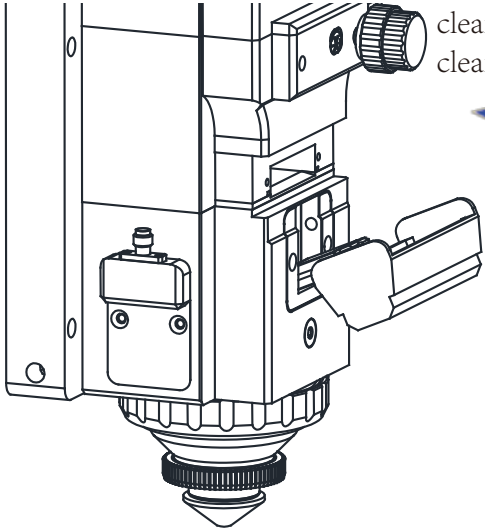
Step 2: set the laser power to 100W, make a short burst at the height of 1~5 cm from the plate, burn a round scorched spot on the plate;

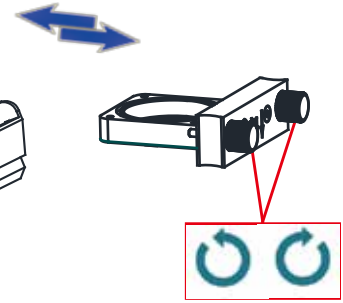


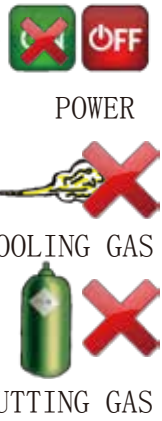
Step 3: compare the concentricity;



Note:
Before maintenance, clean away the dust on the surface of the head with compressed air; then use clean cloth and ethyl alcohol to clean the related parts.

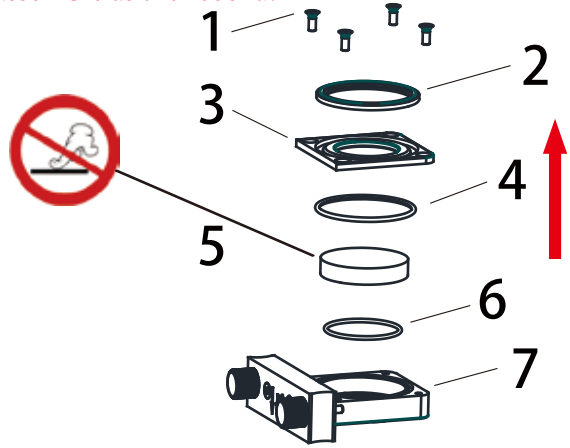






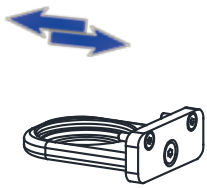
Pay attention to dustproof

Before maintenance, record the position and orientation of the lens; After maintenance, assemble as the record.

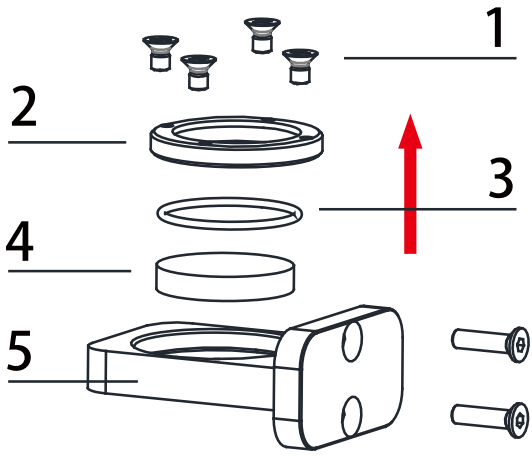


1 M3*8 Screw 2 Elastic Seal Ring 3 Gland 4 Seal Ring
5 Protective Window 6 Seal Ring 7 Pedestal
Note: Parts 1~6 must be removed in the direction of the arrow, otherwise it may cause damages.
DO NOT operate with wrench or iron plier.

Note:
Before maintenance, clean away the dust on the surface of the head with compressed air; then use clean cloth and ethyl alcohol to clean the related parts.



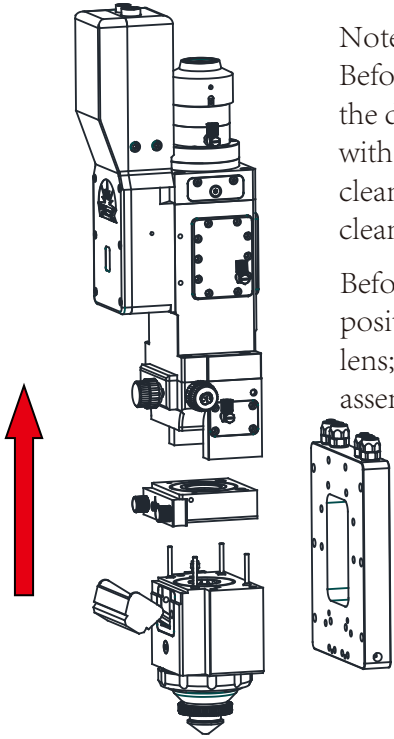
Beware of Dropping



Before maintenance, record the position and orientation of the lens; After maintenance, assemble as the record.

1 4-M3 Screw 2 Gland 3 Seal Ring 4 Protective Window 5 Pedestal

Note: Part 1~4 must be removed in the direction of the arrow, otherwise it may cause damages.



Note:
Before maintenance, clean away the dust on the surface of the head with compressed air; then use clean cloth and ethyl alcohol to clean the related parts.

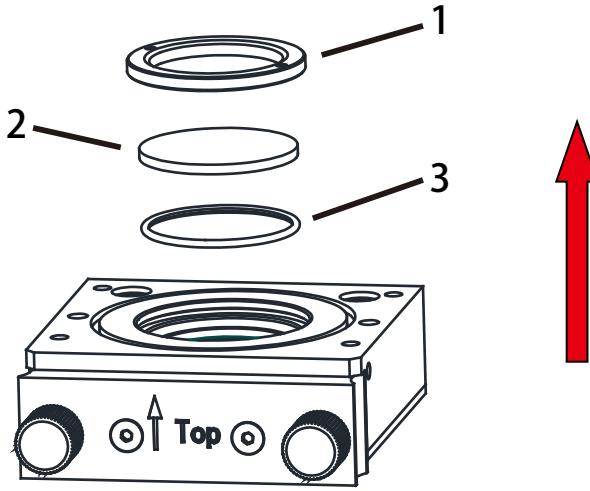
Before maintenance, record the position and orientation of the lens; After maintenance, assemble as the record.

POWER

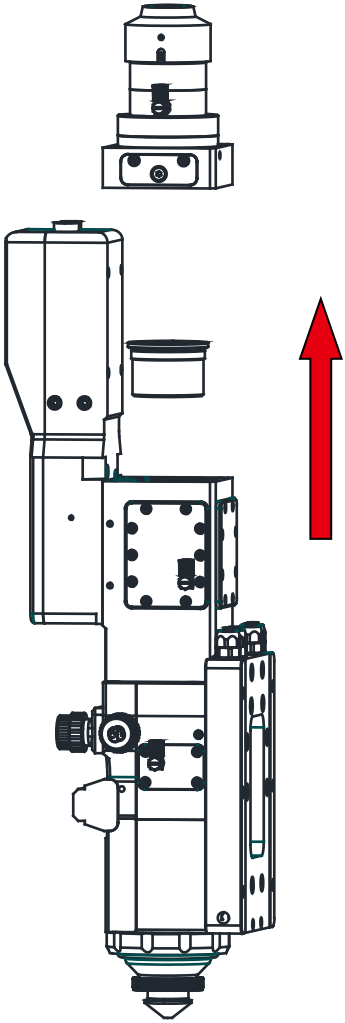
COOLING GAS

CUTTING GAS

Beware of Dropping



1 Gland 2 Protective Window 3 O-Type Ring Outer30*1.0



Note:
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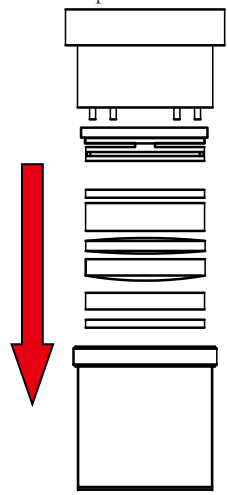
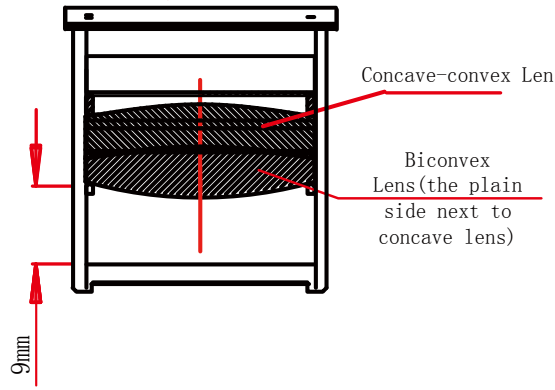


POWER

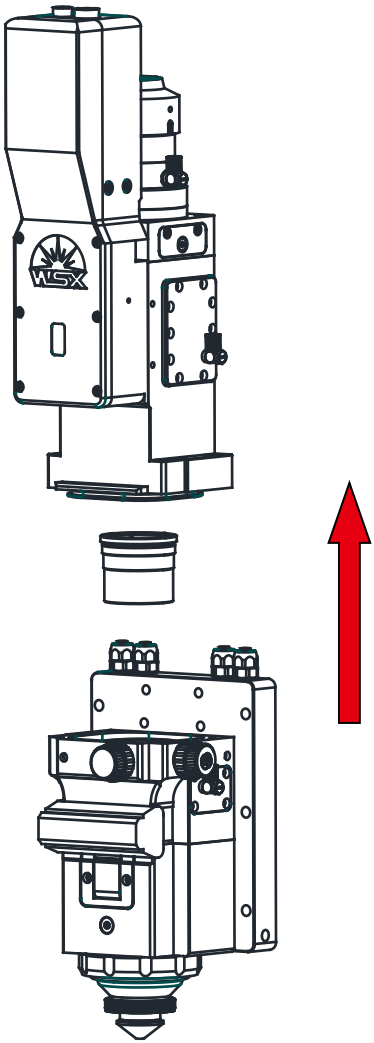
COOLING GAS

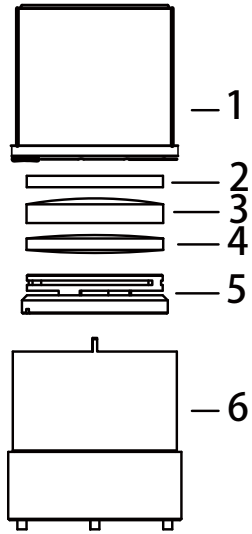
CUTTING GAS

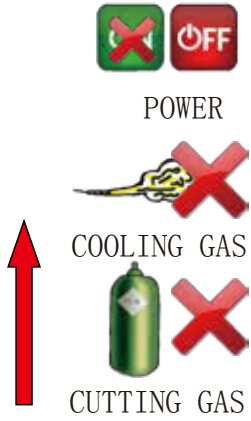
1.Before maintenance, record the position and orientation of the lens; After maintenance, assemble as the record.
2.Twist to the end and then turn backward 1/5 circle to prevent the lens being affected by temperature variation.



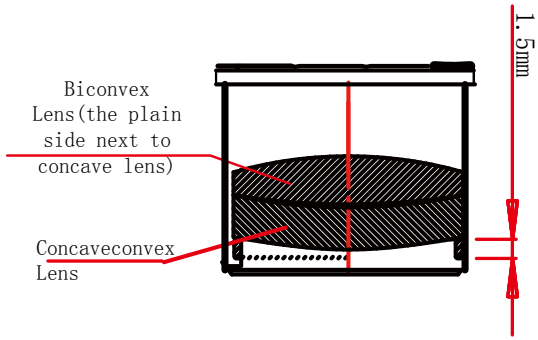
Note:
Before maintenance, clean away the dust on the surface of the head with compressed air; then use clean cloth and ethyl alcohol to clean the related parts.

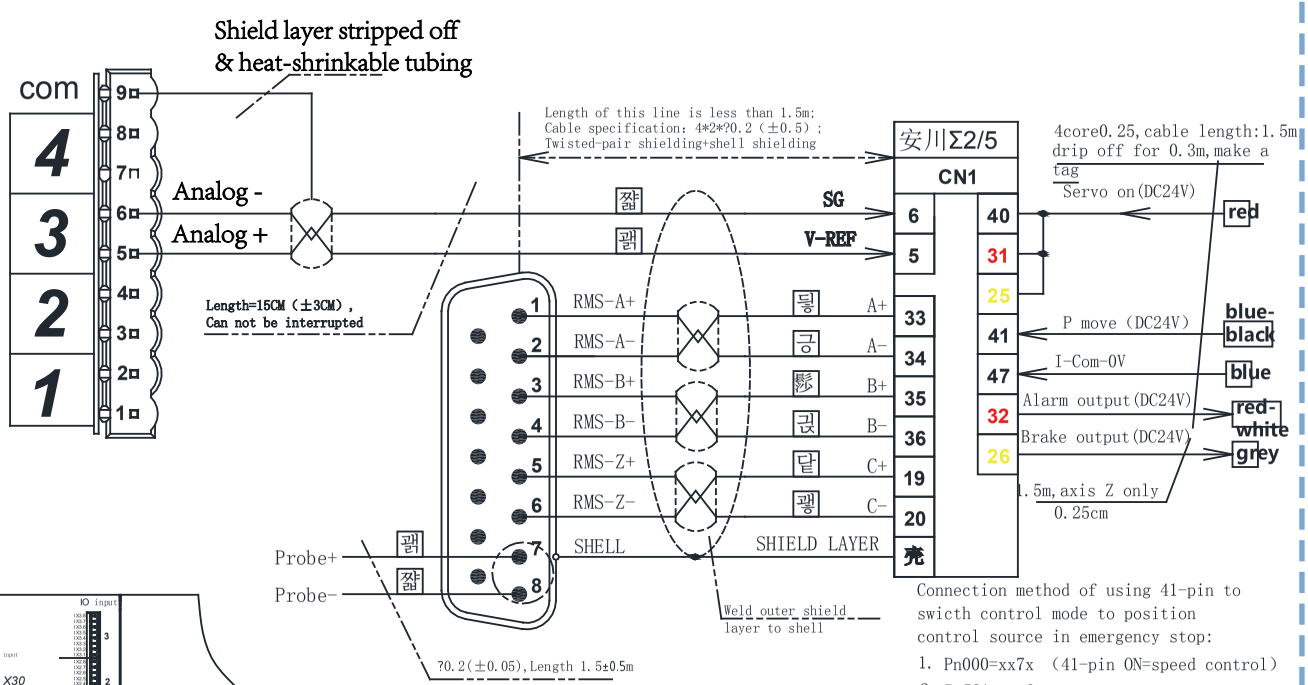






1.Before maintenance, record the position and orientation of the lens; After maintenance, assemble as the record.
2.Twist to the end and then turn backward 1/5 circle to prevent the lens being affected by temperature variation.





15P plastic shell side-stripped 2±0.2cm,twine with insulated tape for 10 circle,twine tool setting gauge for 8 circle
15P plastic shell side-stripped 2±0.2cm,twine with insulated tape for 10 circle,twine tool setting gauge for 8 circle
50P plug side-stripped 3±0.2cm,twine with insulated tape for 17 circle
50P specification of plug fly line is 1*?0.2(±0.05), length is 1.5±0.5m
Among all cables there shall not be any break or welding
Axis Z kit must be welded to brake and probe connection

地　　址：广东省深圳市龙华新区大浪街道浪口工业园青年梦工厂3栋3楼
Address：Floor 3, Building 3, Langkou Industrial Zone, Dalang, Longhua District, Shenzhen
电话 Tel：+86 0755 27702280
传真 Fax：+86 0755 27702881
网址 Web：www.szworthing.com.cn
邮箱 Email：info@szworthing.com.cn