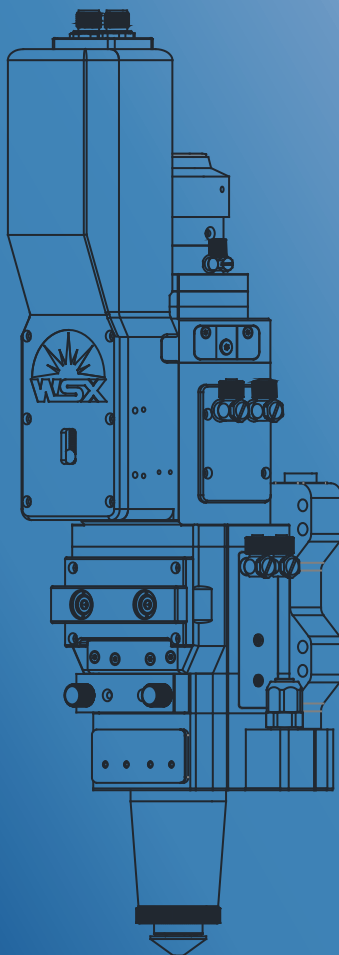




Autofocus Fiber
Laser Cutting Head
NC62



User Manual
Shenzhen Worthing Technology Co., Ltd.

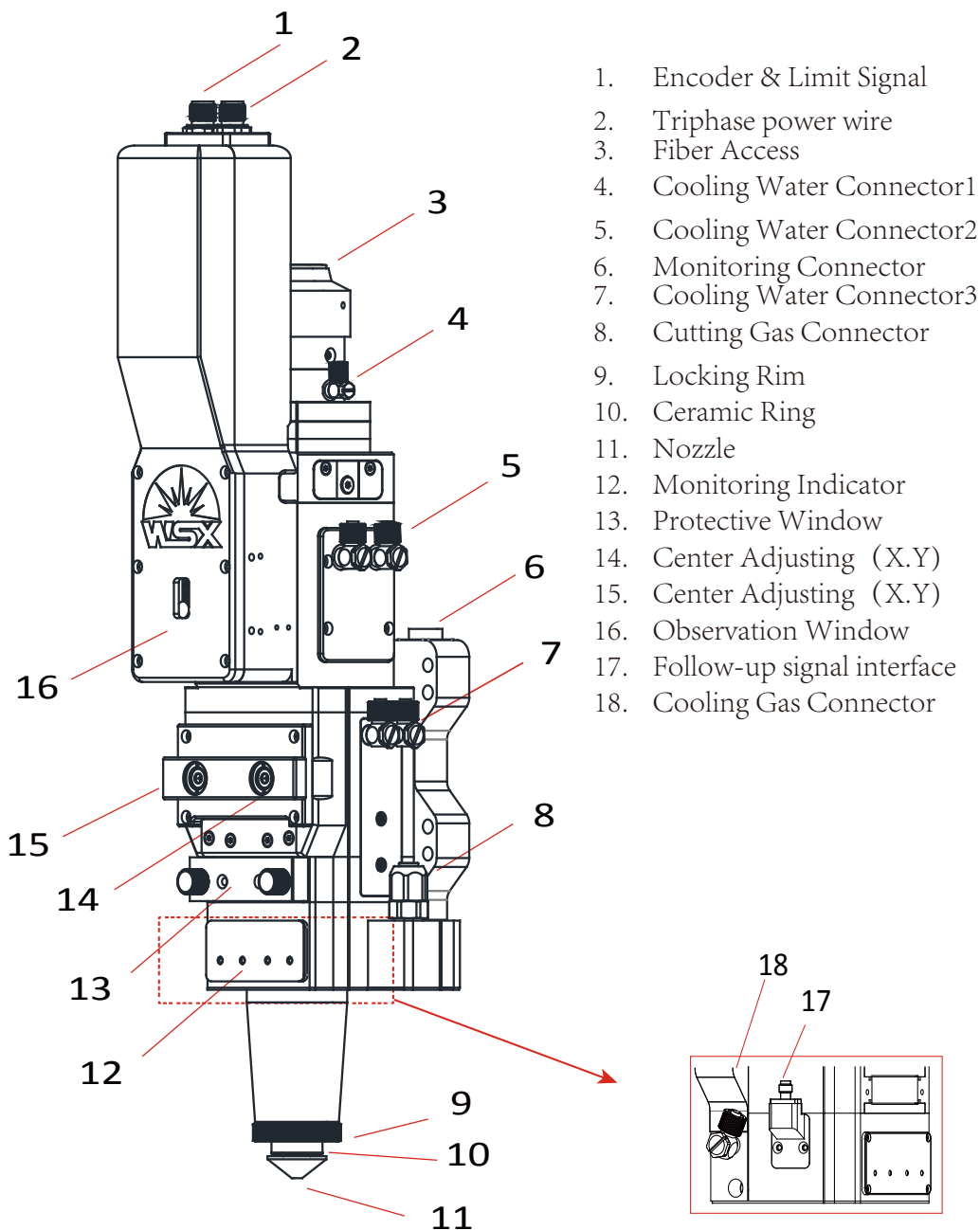
Attention

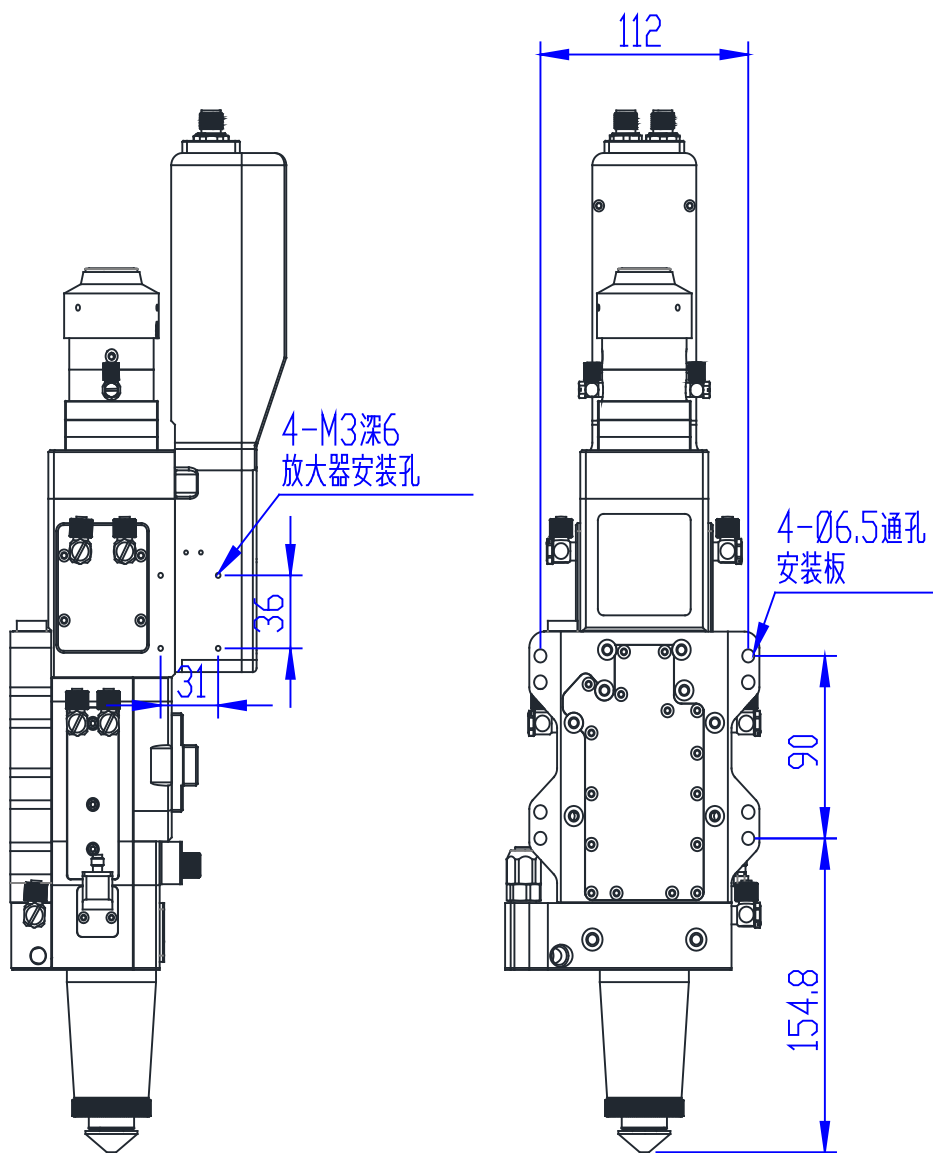
Please read this manual carefully and make sure you understand its contents before using the laser head.

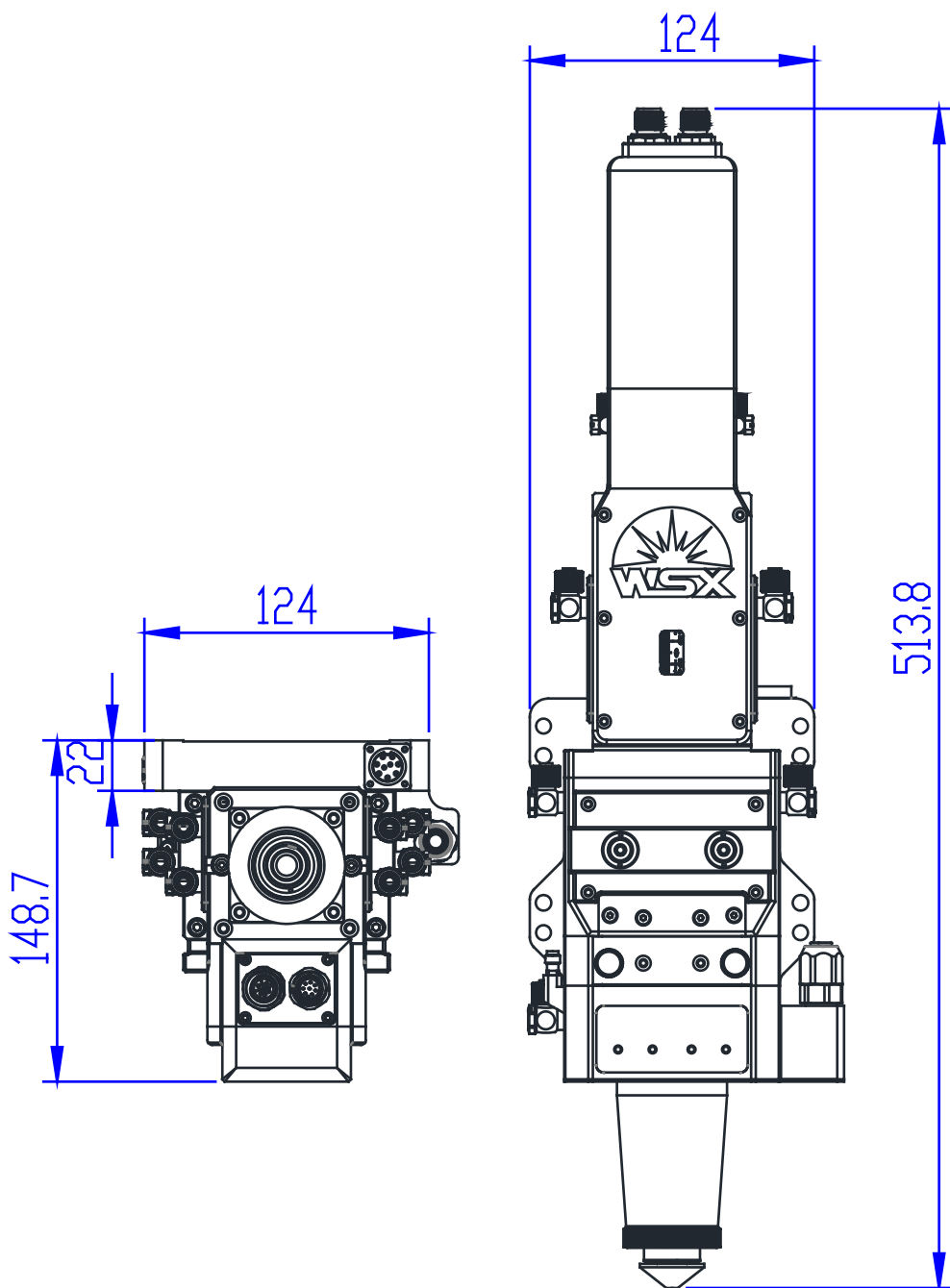
Please keep this manual for future operation and maintenance.

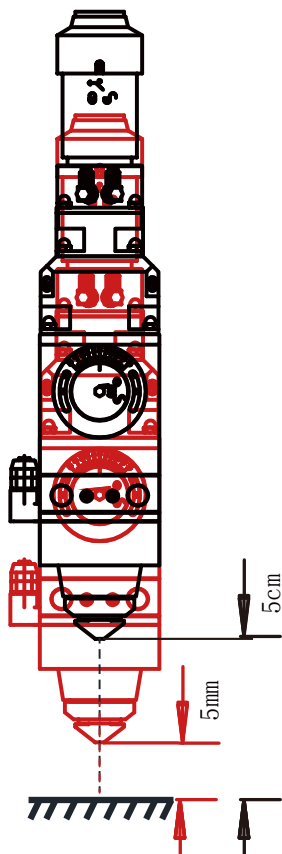
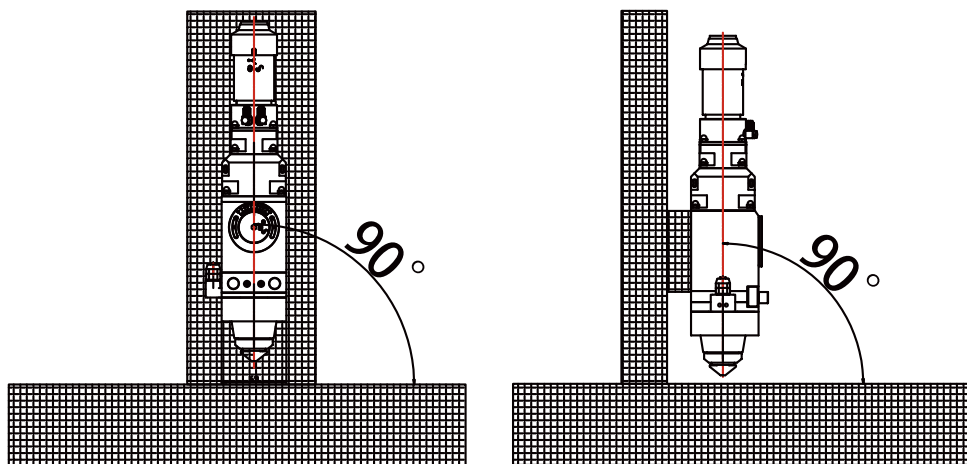
Contents

1.Product Structure-----	1
1.1Dimension-----	2-3
1.2Debugging-----	4
1.3Port Definitions-----	5-11
1.4Fiber Connection-----	12-13
1.5Optical Center Adjustment-----	14
1.6Platform Configuration-----	15
2.Maintenance	
2.1Regular Maintenance-----	16
2.2Ceraminc/Nozzle-----	17
2.3Protective Window1-----	18
2.4Protective Window2-----	19
2.5Protective Window3-----	20
2.6Collimating Lens-----	21
2.7Focusing Lens-----	22
3、 Lens detection and monitoring	
3.1 Monitoring interface -----	23
3.2 Monitoring parameter -----	24

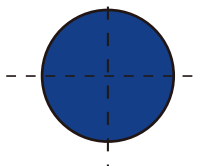




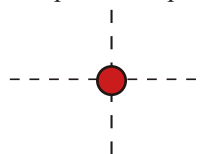




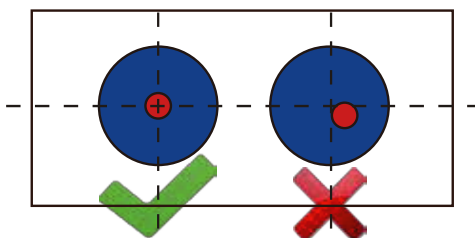
Step 1: set the laser power to 500W, make a short burst at the height of 5cm from the plate, burn a round scorch on the plate;

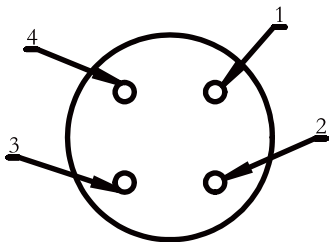
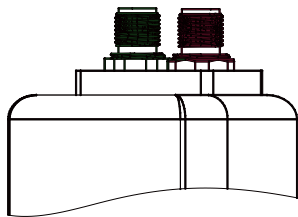


Step 2: set the laser power to 100W, make a short burst at the height of 1~5 cm from the plate, burn a round scorched spot on the plate;



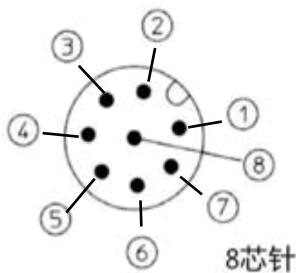
Step 3: compare the concentricity;





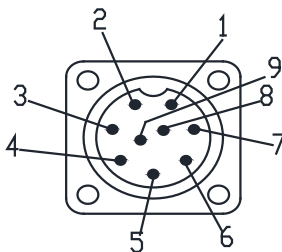
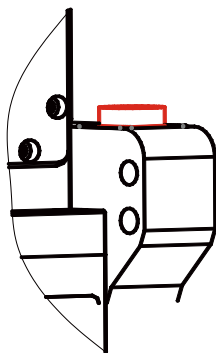
1	W
2	U
3	V
4	FG(Ground)

Servo Motor Power Supply Interface (Red)



Pin	Definition
shell	Shielded wire
1	-D (Encoder Signal Data-)
2	+D (Encoder Signal Data+)
3	SG (Signal Ground)
4	VCC (Encoder Power +5V)
5	+24V(Approach Switch Power)
6	0V (Approach Switch Power)
7	W+ (Approach Switch Power)
8	W- (Approach Switch Power)

Servo Motor Encoder & Approach Switch Interface (Green)



Pin	Definition
1	24V Ground
2	24+ Power
3	232 Ground
4	Alarm reset
5	ALM - OUT
6	232 TX
7	232 RS
8	Null
9	Null

Lens Monitoring Signal Interface (Red)

Sankyo Servo Drive and Motor Connection

单轴驱动器 50W~400W TYPE-M, TYPE-M2

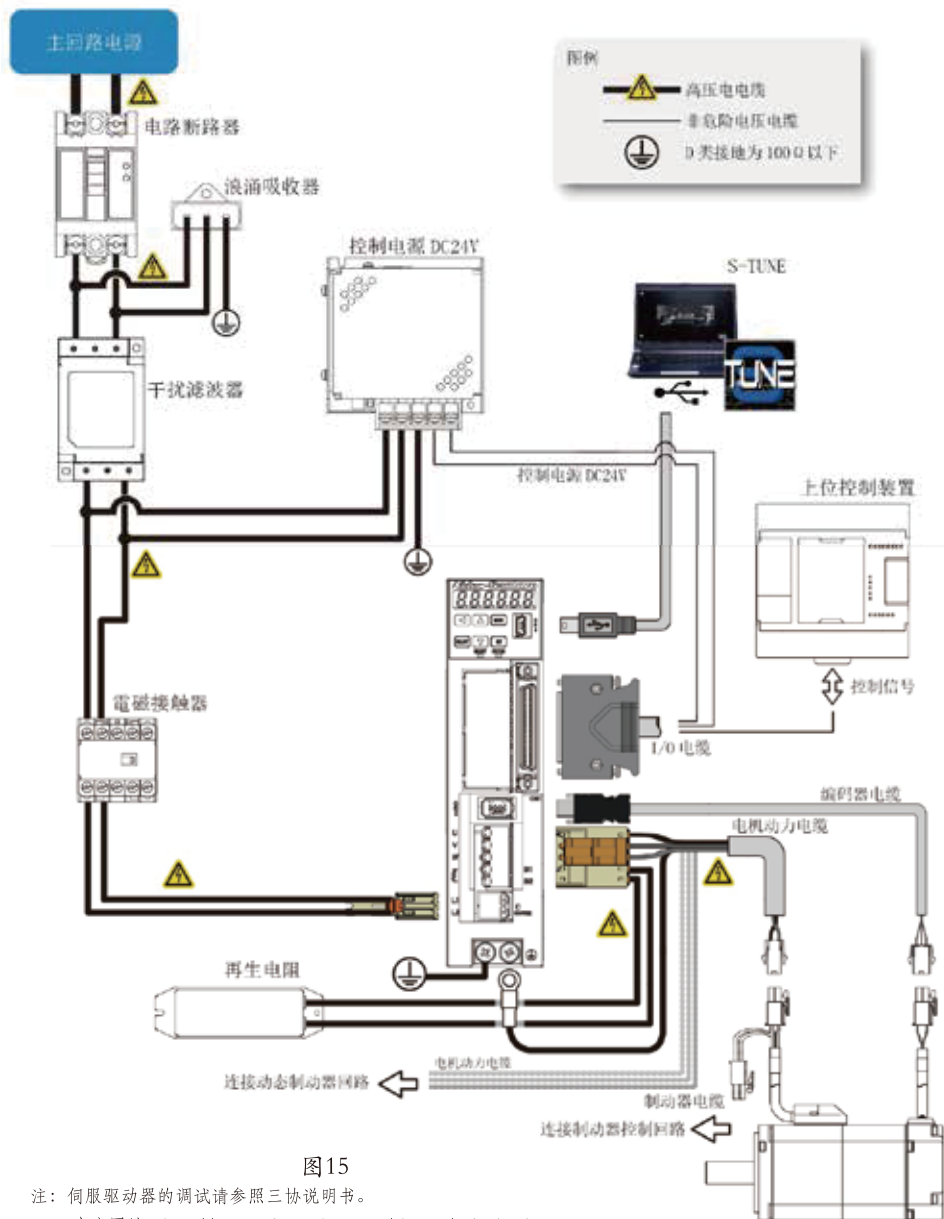
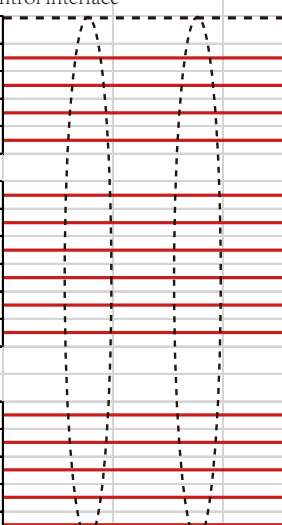


图15

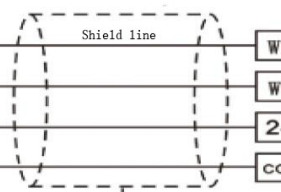
注：伺服驱动器的调试请参照三协说明书。

官方网址: <http://www.nidec-sankyo.co.jp/chinese/index.html>

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

Friendess DB15 servo control interface			Sankyo 50P interface		
Signal	Pin		Pin	Signal	
PUL+	1		26	CMD PLS	
PUL-	9		27	/CMD PLS	
DIR+	2		30	CMD DIR	
DIR-	10		31	/CMD DIR	
A+	3		36	OUT A	
A-	11		37	OUT /A	
B+	4		38	OUT B	
B-	12		39	OUT /B	
Z+	5		40	OUT Z	
Z-	13		41	OUT /Z	
24V	8		3	COM1	
SON	6		1, 3	24V, COM1	
CLK	7		4	SVON	
ALM	14		5	RESRT	
0V	15		21	ALM+	
			2, 12, 22	0V, COM2, ALM-	

Definition of laser focusing adjustment range limitation switch connector

Cutting heads range limit interface			BCL3764 Terminal plate interface		
W+	8		W+	Axis W positive limit	
W-	9		W-	Axis W negative limit	
+24	6		24	power output	
0V	7		COM	common port	

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

Parameter	Value	Parameter	Value	Parameter	Value
NO. 2	0	NO. 49	2500	NO. 55	5000
NO. 3	1	NO. 50	3000	NO. 102	750
NO. 32	0	NO. 51	5000	NO. 103	100
NO. 34	32768	NO. 52	3000	NO. 276	2500
NO. 36	2500	NO. 53	5000	NO. 278	32768
NO. 48	32768	NO. 54	3000	NO.32.1	1

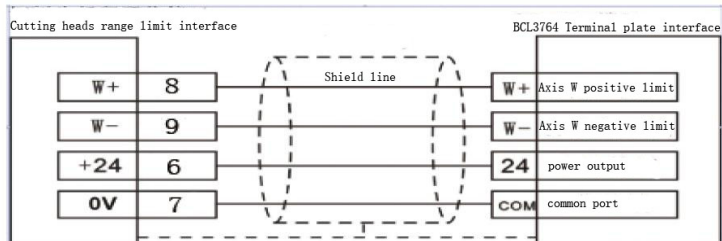
Baidu Cloud Disk : <https://pan.baidu.com/s/1c07iME>

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

Friendess FSCUT4000A laser cutting control system BCL3724 terminal plate W axis DB15 servo control interface connect with Sankyo servo driver 36P interface definition

Friendess DB15 servo control interface			Sankyo 50P interface	
Signal	Pin		Pin	Signal
DA	1		32	A-SPEED
AGND	9		33	A-GND
A+	3		36	OUT A
A-	11		37	OUT /A
B+	4		38	OUT B
B-	12		39	OUT /B
Z+	5		40	OUT Z
Z-	13		41	OUT /Z
24V	8		1, 3	24V, COM1
OS	2		--	--
SON	6		4	SVON
CLK	7		5	RESRT
0V	10		2	G24
ALM	14		21	ALM+
0V	15		12, 22	COM2, ALM-

Definition of laser focusing adjustment range limitation switch connector



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

Parameter	Value	Parameter	Value	Parameter	Value
NO. 2	1	NO. 49	2500	NO. 55	5000
NO. 3	2	NO. 50	3000	NO. 102	750
NO. 32	0	NO. 51	5000	NO. 103	100
NO. 34	32768	NO. 52	3000	NO. 276	2500
NO. 36	2500	NO. 53	5000	NO. 278	32768
NO. 48	32768	NO. 54	3000	NO.32.1	1

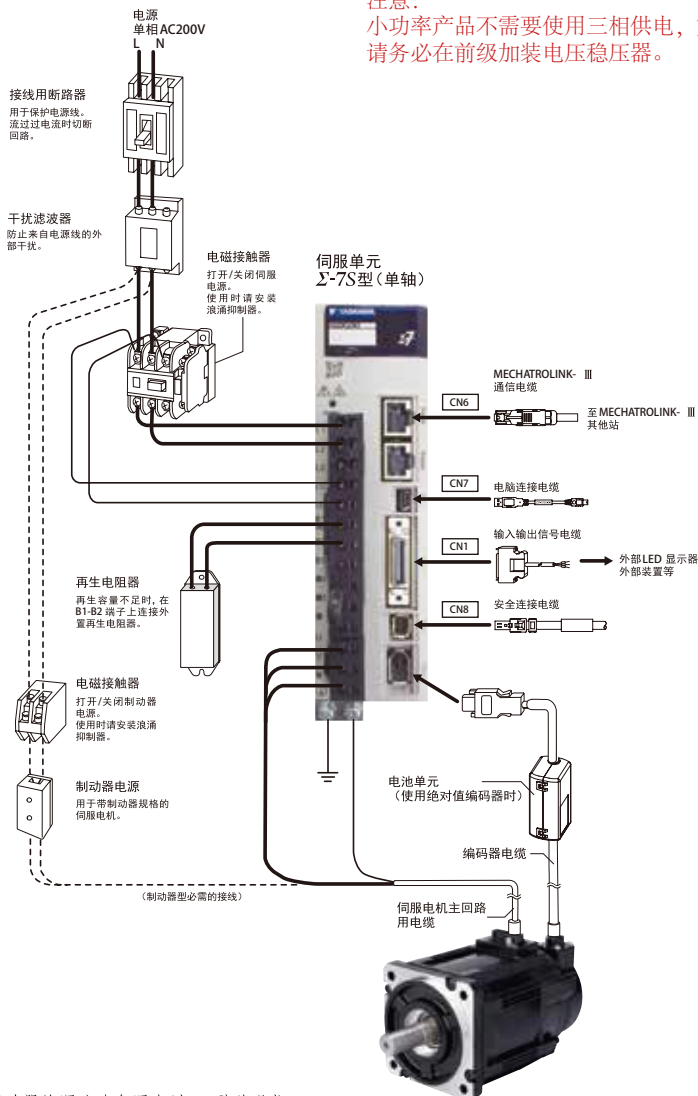
Baidu Cloud Disk : <https://pan.baidu.com/s/1c07iME>

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

伺服驱动器与电机连接 安川7系系统构成示例

Σ -7S伺服单元+旋转型伺服电机

单相AC200V



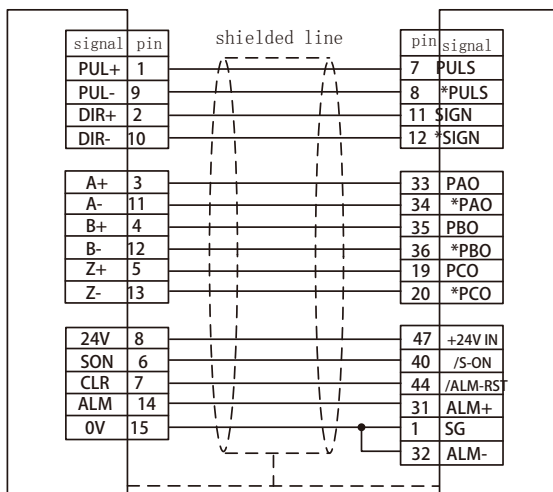
注:伺服驱动器的调试请参照安川 Σ -7型说明书。

旋转型伺服电机

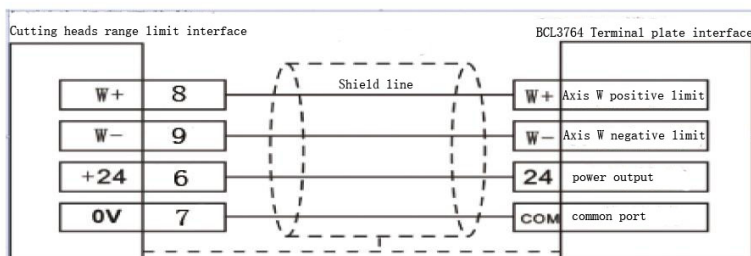
Friendess FSCUT2000A laser cutting control system BCL3764 terminal plate W axis DB15 servo control interface connect with YASKAWA servo driver 50P interface definition

Friendess DB15 servo control interface

YASKAWA Σ -V servo 50P interface



Definition of laser focusing djustment range limitation switch connector



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

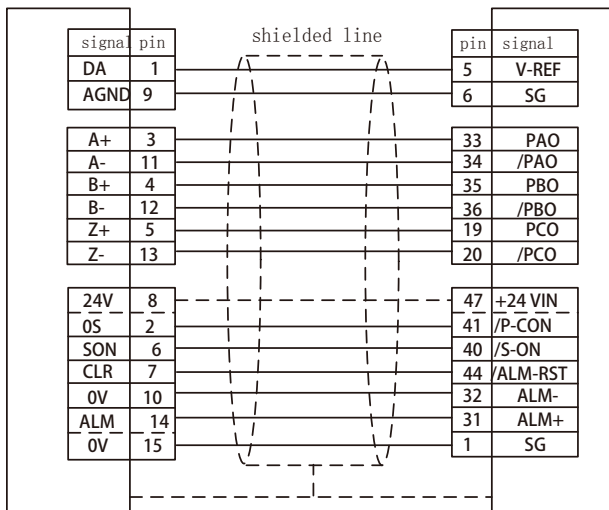
parameter	value	parameter	value	parameter	value
PN000	0011	PN109	0~100	PN210	2500
PN00B	0101	PN10A	0~6400	PN212	2500
PN100	120	PN170	1400	PN50A	8100
PN101	10	PN200	0000	PN50B	6548
PN102	180	PN20E	4194304	PN401	0.53
PN103	100				

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.

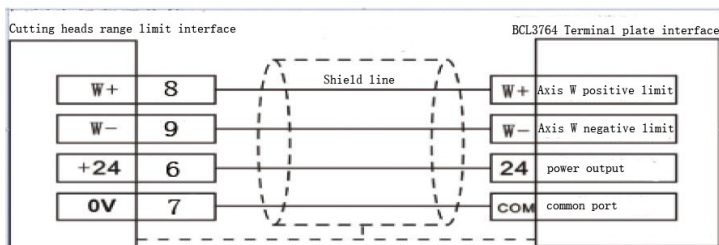
Friendess FSCUT4000A laser cutting control system BCL3724 terminal plate W axis DB15 servo control interface connect with YASKAWA servo driver 50P interface definition

BCS100 servo driver interface

YASKAWA Σ series servo 50P interface



Definition of laser focusing djustment range limitation switch connector

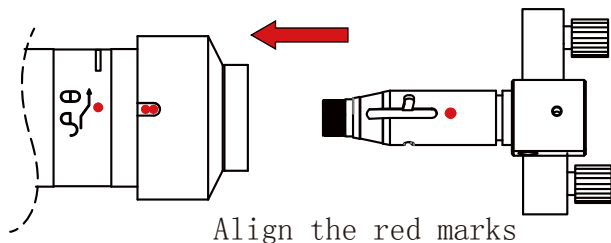


Definition of laser focusing djustment range limitation switch connector

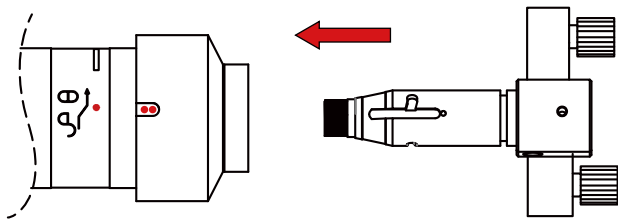
parameter	value	parameter	value	parameter	value
PN000	0001	PN109	0~100	PN210	2500
PN00B	0101	PN10A	0~6400	PN212	2500
PN100	120	PN170	1400	PN50A	8100
PN101	10	PN200	0000	PN50B	6548
PN102	180	PN20E	4194304	PN401	0.53
PN103	100				

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; connects to L2&L2C.

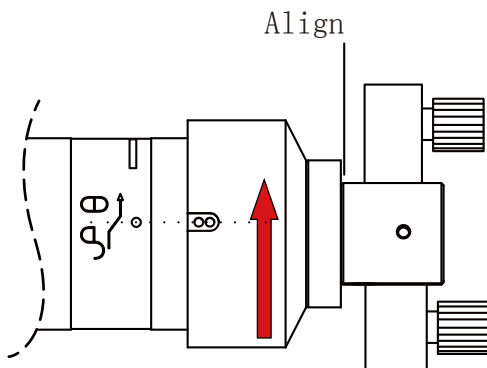
1. Place the laser head and optical fiber connector in a horizontal state;
2. Clean the QBH and fiber connector with clean rod and ethyl alcohol.



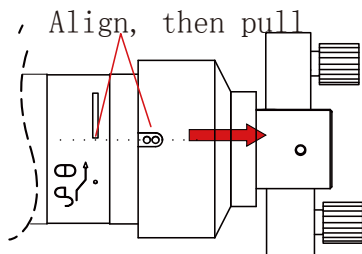
3. Insert the fiber connector into QBH gently;



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

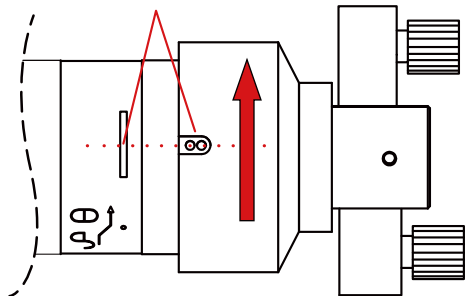


5. Then pull the turning rim as the picture below;



6. Turn the rim in the direction as picture below at moderate intensity to make it tight (Use thumb and index finger).

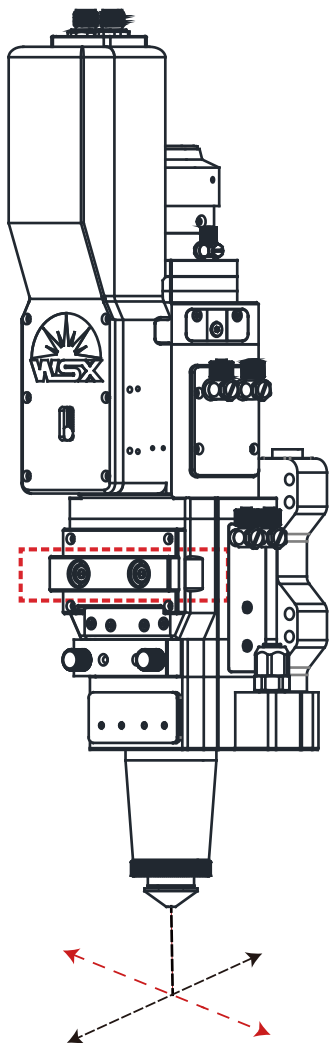
The red marks can be aligned to or over the middle of the white bar, but do not twist any more when it is in the right position.



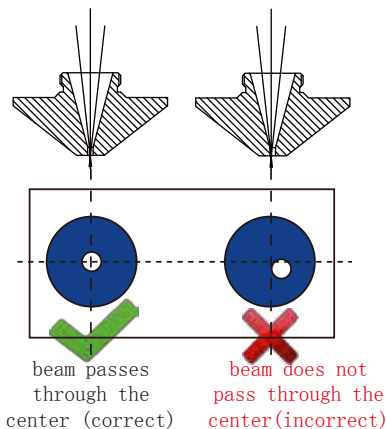
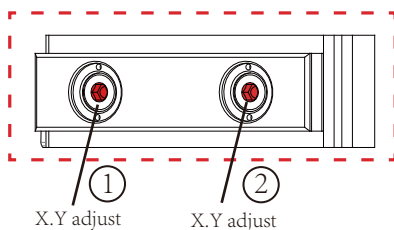
Note: Do not twist vigorously , it may cause damage to precision machinery.



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. Adjust the X/Y screw 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.



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 emitted 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.

Machine Config Tool(BMC1604)

Import Save Machine Org Laser Follower Gas Focus Alarms IOList Inport Output ExtendIO BCP5045

Machine

General Org

Devices

Laser Follower Gas Focus Control Edge Seek Table Exchange Auto Clean

IO

Alarms Inports Outports

Wireless pendant

Wireless pendant

File Location

File Location

Focus Control

☒ Enable

☒ The fourth axis
 ☐ Precitec
 ☐ HighYAG
 ☐ BCL4516E [No Connection]

Focus Range: From to

Focus position at org:

Pulse Rate: Move need pulse

High Speed: Org Dir: ☒ Pos ☐ Neg

Low Speed: ORG signal:

Rollback distance:

subject to actual physical focus

Jog speed:

Locate Speed:

acceleration:

Servo Alarm Logic:

Negative Limit Logic:

Positive Limit Logic:

Note: 1.This parameter is default value; when user changes it, please avoid hard ware damage;
2.Please contact technician to get specific parameters of different lens combinations.

Return Org

☐ Soft limit
 ☐ Prompt go Org at start
 ☐ Prompt go Org in warning

X ORG direction: ☐ Neg ☒ Pos
 Y ORG direction: ☐ Neg ☒ Pos

ORG signal: ☒ Org ☐ Limit
 Limit logic:

Z-Phase signal: ☒ Enable

High Speed:
 X rollback dis:

Low Speed:
 Y rollback dis:

Name	Logic
X +limit	☒ NO ☐ NC
X -limit	☒ NO ☐ NC
X origin	☒ NO ☐ NC
Y +limit	☒ NO ☐ NC
Y -limit	☒ NO ☐ NC
Y origin	☒ NO ☐ NC
W +limit	☐ NO ☒ NC
W -limit	☐ NO ☒ NC
W origin	☐ NO ☒ NC

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



Check



Distance



Replace



Adjust the lens



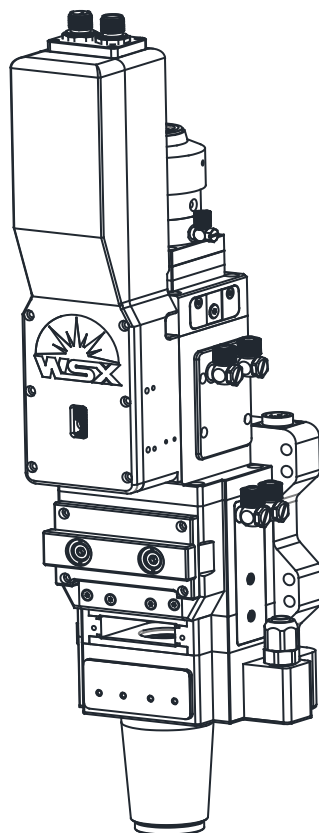
Maintenance

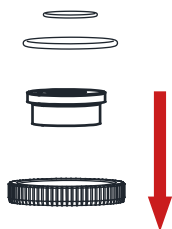
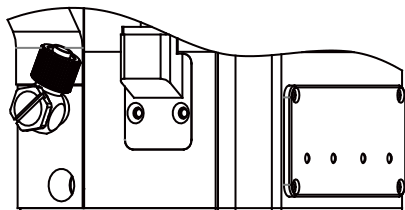


Maintenance Period



Calibration





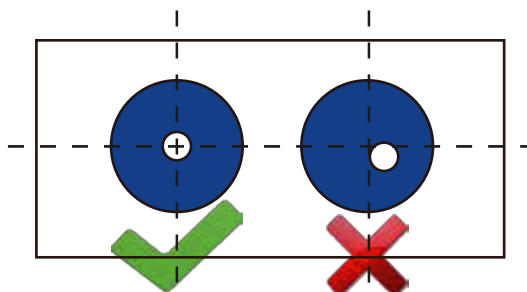
POWER



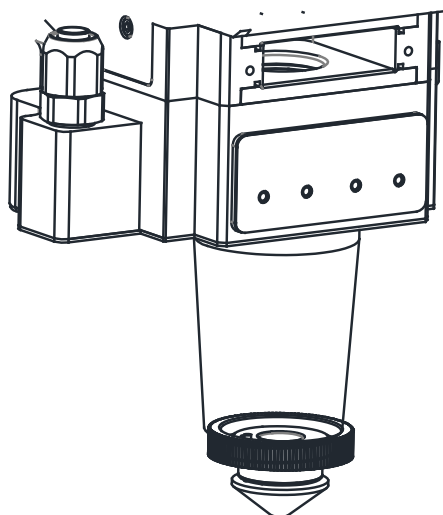
COOLING GAS



CUTTING GAS



center checking



POWER



COOLING GAS

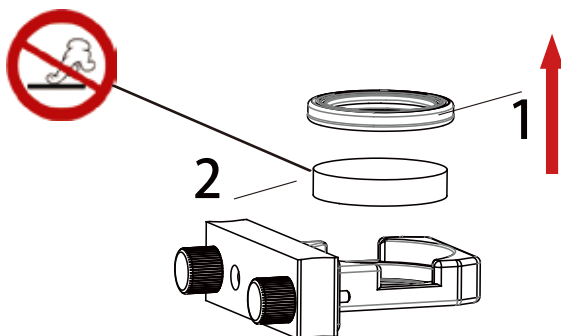


CUTTING GAS



Loosen the screws and remove

Pay attention to dust: when removing and installing the lens, wear dust gloves and finger covers in a clean place. When changing lens, use adhesive paper to paste sealed window, prevent dust to enter the interior cause pollution

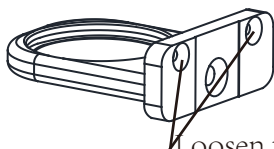
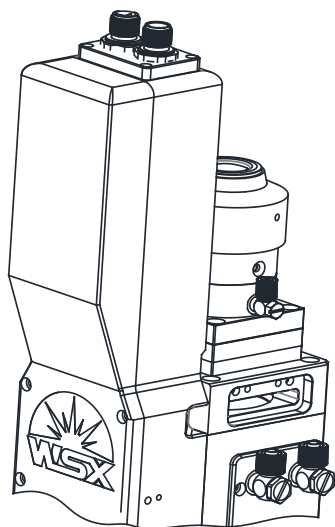


1、Pressing ring 2、Protective glass

Note : Remove in the direction of the arrow, otherwise it may cause damages.

DO NOT operate with wrench or iron plier.





Loosen the screws and remove

Pay attention to dust: when removing and installing the lens, wear dust gloves and finger covers in a clean place . When changing lens, use adhesive paper to paste sealed window, prevent dust to enter the interior cause pollution



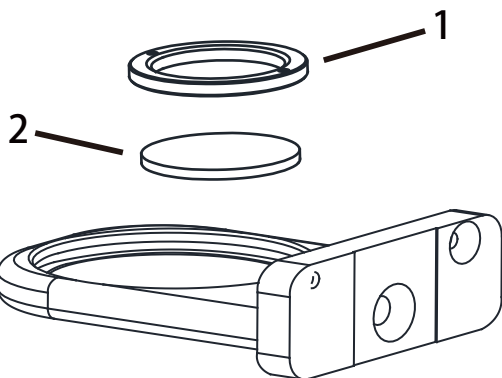
POWER



COOLING GAS



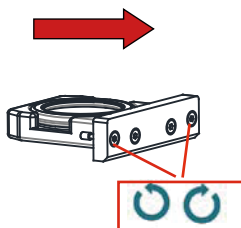
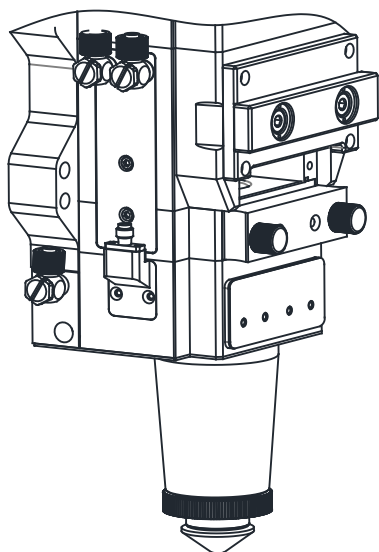
CUTTING GAS



1、Pressing ring 2、 Protective glass

Note : Remove in the direction of the arrow, otherwise it may cause damages.

DO NOT operate with wrench or iron plier.



Loosen the screws and remove



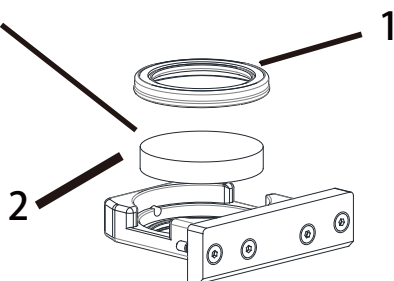
POWER



COOLING GAS



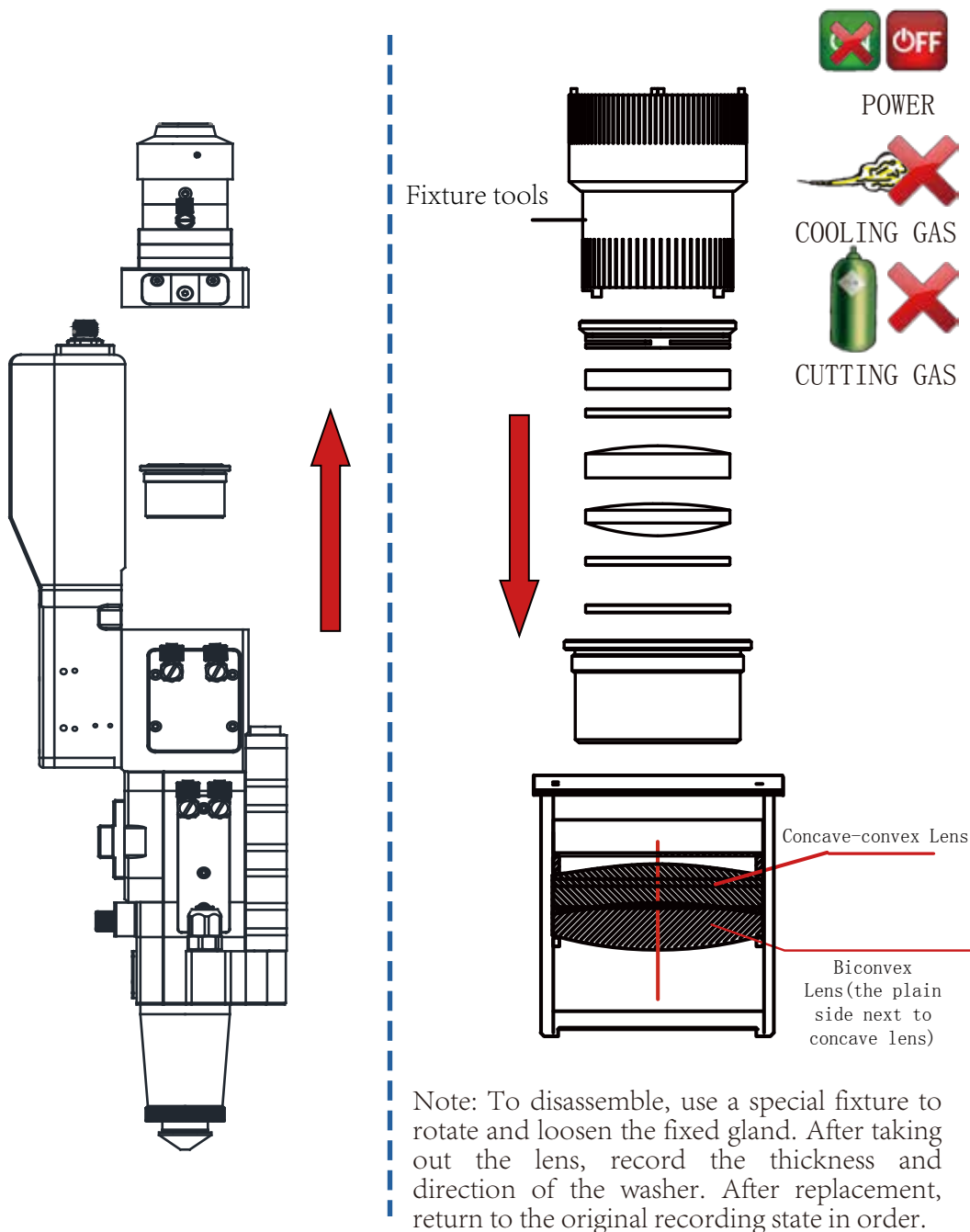
CUTTING GAS

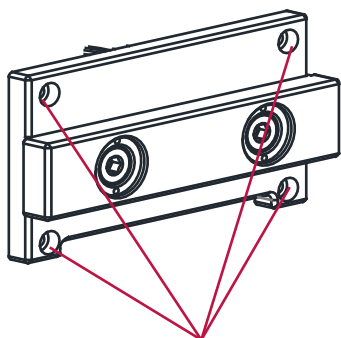
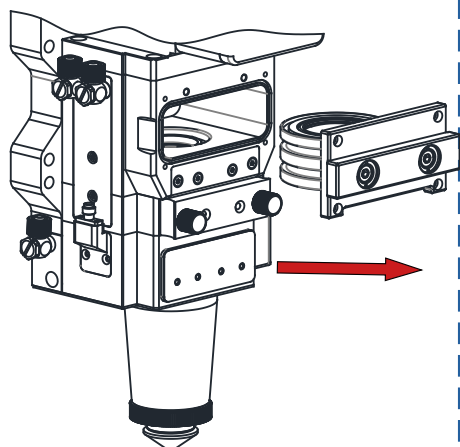


1、Pressing ring 2、Protective glass

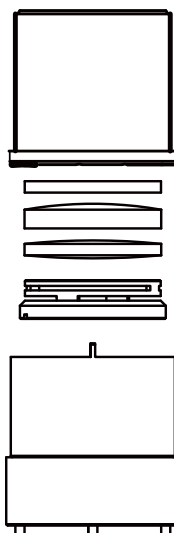
Note : Remove in the direction of the arrow,
otherwise it may cause damages.

DO NOT operate with wrench or iron plier.





Loosen the screws and remove



Fixture tools



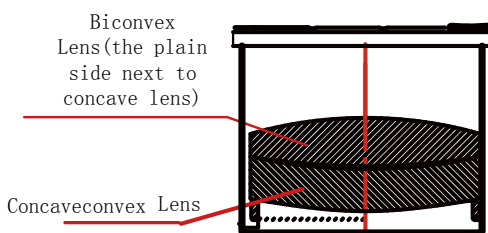
POWER



COOLING GAS



CUTTING GAS

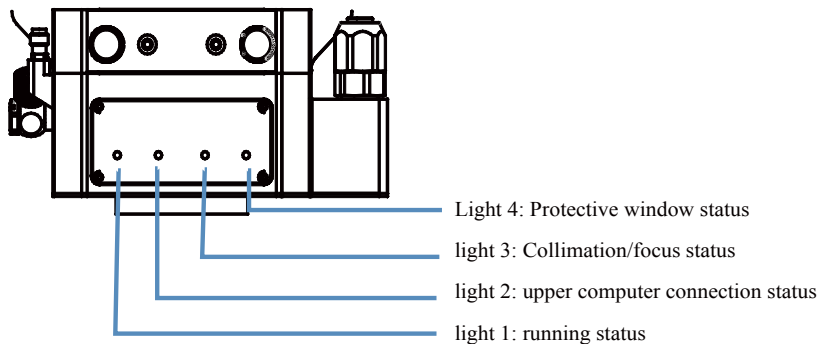


Biconvex
Lens (the plain
side next to
concave lens)

Concaveconvex Lens

Note: To disassemble, use a special fixture to rotate and loosen the fixed gland. After taking out the lens, record the thickness and direction of the washer. After replacement, return to the original recording state in order.

Cutting head indicator light function



Monitor real-time status interface :

The screenshot shows the '万顺兴激光头保护装置监视工具 V1.0' (WSX Laser Head Protection Device Monitoring Tool V1.0) software interface. The interface is divided into several sections for monitoring and setting various parameters:

- 传感器实时数据 (Sensor Real-time Data):**
 - 温度传感器 (Temperature Sensor):**

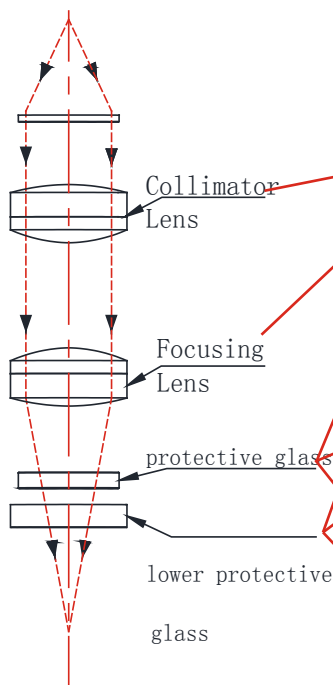
参数 (Parameter)	当前值 (Current Value)	单位 (Unit)	提示阈值 (Warning Threshold)	报警阈值 (Alarm Threshold)	操作 (Action)
准直镜片温度 (Collimation Lens Temperature)	0	度 (°C)			设置 (Set)
聚焦镜片温度 (Focusing Lens Temperature)	0	度 (°C)			设置 (Set)
聚焦保护镜温度 (Focusing Protection Lens Temperature)	0	度 (°C)			设置 (Set)
下保护镜片温度 (Lower Protection Lens Temperature)	0	度 (°C)			设置 (Set)
 - 压力传感器 (Pressure Sensor):**

参数 (Parameter)	当前值 (Current Value)	提示阈值 (Warning Threshold)	报警阈值 (Alarm Threshold)	操作 (Action)
聚焦镜腔压力 (Focusing Lens Chamber Pressure)	0			设置 (Set)
保护镜腔压力 (Protection Lens Chamber Pressure)	0			设置 (Set)
 - 光强传感器 (Light Intensity Sensor):**

参数 (Parameter)	当前值 (Current Value)	提示阈值 (Warning Threshold)	报警阈值 (Alarm Threshold)	操作 (Action)
聚焦镜腔散光值 (Focusing Lens Chamber Aberration Value)	0			设置 (Set)
下保护镜散光值 (Lower Protection Lens Aberration Value)	0			设置 (Set)

启用散光值报警 (Enable Aberration Value Alarm)
- 底部控制区 (Bottom Control Area):**
 - 当前时间 (Current Time): 0
 - 时间校准 (Time Calibration)
 - 串口号 (Serial Port Number): [Dropdown Menu]
 - 刷新串口 (Refresh Serial Port)
 - 启动 (Start)

1. Monitoring value bar: real-time monitoring status of the cutting head.
2. Alarm value setting column: The default alarm value has been given (to change the alarm value, you need to click the "Alarm Threshold Setting" button and enter the authority password to confirm the change)



万顺兴激光头保护装置监视工具 V1.0

传感器实时数据

温度传感器

	提示阈值	报警阈值	
准直镜片温度: 0 度			设置
聚焦镜片温度: 0 度			设置
聚焦保护镜温度: 0 度			设置
下保护镜片温度: 0 度			设置

压力传感器

	提示阈值	报警阈值	
聚焦镜腔压力: 0			设置
保护镜腔压力: 0			设置

光强传感器

	提示阈值	报警阈值	
聚焦镜腔散光值: 0			设置
下保护镜腔散光值: 0			设置

启用散光值报警

当前时间: 0 时间校准

串口号: 刷新串口 启动

Alarm function description:

1. When the monitored value exceeds the set alarm value, the system will alarm and continuously output an alarm signal (+24V voltage). It prompts that the current cutting head is abnormal, please consult after-sales personnel to troubleshoot the abnormality.
2. After removing the abnormality, input the alarm reset signal (0V voltage) to cancel the cutting head alarm.



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