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XCS3000S

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Laser Cutting System Commissioning Manual

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A CNC System

B Laser Delivery

C IOT

XC3000S Series Laser Cutting

System Commissioning Manual

Document History

Edit date	Version	Topic, revision, action taken
2023/5/26	V1.2	First edition

Thank you for choosing our product!

This manual describes the installation and commissioning of laser cutting head in details so that you can use this product quickly. You can consult us directly for more details.

Due to the continuous updating of product functions, the product you receive may differ from the introduction in this manual in some aspects.

We reserve all rights in this document including the issued patents and other registered commercial ownership related to this document. It is strictly prohibited to use this document in an improper way especially to copy and disseminate it to third parties.

If you find any errors in this document, please inform us as soon as possible. The data contained in this manual is only used to describe the product and shall not be regarded as a statement of security interest.

For the benefit of our customers, we will constantly try to ensure that the products we develop comply with the latest technology.

Raytools AG

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System Commissioning Manual Disclaimer

• We reserve the right to change the design in order to improve the quality or expand the application or comply to manufacturing workmanship.

• We will not bear any responsibility for losses and accidents caused by wrong operation or improper handling of our products.

• Dismantling of product will lose all warranty claims excluding the normal replacement of worn parts and components required for maintenance or commissioning operations.

• Unauthorized modification of products or use of non-original spare parts will directly lead to the invalidation of warranty and liability exemption.

• It is recommended to only use the spare parts provided by us or submit them to us or the designated professional team for installation.

Use Regulations

- Ensure that the product is used in a dry environment.
- Ensure that the product is used in the environment required by EMC standards.
- The product is only allowed to run within the parameters specified in the technical data.

Personnel Responsibilities

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• Be familiar with the basic provisions of work safety & accident prevention and have received equipment operation guidance.

- Read and understand basic safety instructions and operations.
- You must have studied the relevant regulations and safety instructions and understand the possible hazards.
- Comply with relevant regulations and implement corresponding protective measures.

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Safety Instructions

Prevent Electric Shock

• Parts of the laser head such as nozzle, sensor, sensor interface and attached fasteners may not be fully protected by the ground wire due to function fault. These parts may have low voltage. When installing electrical equipment, please pay attention to taking anti electric shock measures for relevant personnel.



Note that the equipment shall be grounded as specified.

Guard against Danger

- Never put your hands or other body under the laser head.
- Repair and maintenance work can only be carried out after the power is turned off.
- Do not exceed the specified maximum pressure.
- It must be ensured that the laser head is in normal condition at all times.
- All fasteners such as bolts and nuts must be tightened.

Aser Caution

- Avoid direct laser radiation or scattering to the skin.
- Do not stare at the laser beam even when wearing optical equipment.
- Use special laser protective eyeglasses that meet the requirements of safety standards IEC 60825-1.

Prevent Waterway Corrosion

• In order to avoid corrosion, use the specified coolant and comply with relevant requirements and specified maintenance intervals.

Noise Prevention

• The corresponding measures shall be specified or explained and observed in order to prevent personnel from being harmed by noise when the cutting air pressure is high.

Storage and Transportation

- Observe the storage temperature range allowed by the technical data.
- Take reasonable measures to prevent fire, vibration or impact.

Do not store in or near the magnetic field.

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1 Product Overview SGIOUD.IU

The manual includes the summarized instruction of installation, setting, use and operation of professional RAYTOOLS XC3000S Series laser cutting software. Main functions are introduced here as there are too many modules to describe.

XC3000S Series laser cutting software is a professional CNC software of RAYTOOLS, adapted to industrial laser production application. This software can work with popular laser cutting equipment in the market with its advantages covering rich functional modules, independent process database, along with human machine interface, which is smooth and convenient to operate for users.



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1.2 System connection schematic



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Pulse type servo connection method



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1.3 Technical parameters

		EtherCAT	Support stand	ard Ethe	erCAT for flexible access to the system topology		
Motion	Control Method	Pulse	5-way universal interface of axis, which can be adapted to diffe types of servo drives and provide high-precision position feedbac supporting CiA402 standard				
Control	r	nisc	1-way F-axis int	terface d	edicated to laser head focus control		
		Control Period		1ms			
	Motion	Acceleration and	deceleration	S-type			
		Advanced-planne	ed speed with m	otor reve	ersing and intelligent lifting speed		
	24 ways of digital inputs with flexible configuration of high/low side input						
	16 ways of 24V generic digital outputs						
	4 ways of 16-bit h	igh-resolution AD	inputs with a vol	tage ran	ge -10V ~ +10V		
IO Function	2 groups PWM ou Frequency range	tputs, supporting 24V and 5V PWM signals (adjusting by picks), ~30kHz with an accuracy of 1%					
	1 laser follow control interface, with external capacitance amplifier, to achieve EtherCAT-type high-precision capacitive height control						
	Temperature	nisc	JOI		0° C ~ +80° C		
Work Environment	Environmental pressure				0.096MPa ~ 0.106MPa		
	Relative humidity (non-condensing)				0 ~ 70%		
Power	EPC-2000				24V DC (9-36V wide voltage module)		
Requirement	EDS-3000	ples	Irol		24V DC		

2 Wiring instructions SCIOUD IU

2.1 EPC-1020 interface description

EPC-1020 (optional) is our new HMI PC, with good performance in graphics processing and response speed.

EPC-1020	
Network Card	2× Gigabit NIC
USB	4 x USB3.0, 1 built-in USB2.0 onboard
Storage Device	1 x mSATA HDD card slot 1 x M.2(B Key, Type 2280)SSD Card slot, SATA signal
Ambient temperature	-20°C~60°C
Ambient humidity	5%~95% (non-condensing)
Display	Support both HDMI / DVI-D interface
Power supply	DC12~24V ±10%, Over-current, over-voltage and anti-reverse protection
Size	(L x W x H) 200mm x 154.5mm x 57.6mm

System Commissioning Manual 2.1.1 EPC-1020 interface description



>LAN2 connects with master control EPC-2000 for human machine interaction.

4×USB

2xRS232/RS485

DC IN 12V~24V

>24V (12V~24V) DC power supply input.

7

8

9

2.2 EPC-2000 interface description

EPC-2000 real-time EtherCAT master PC is the core component of motion control system of the machine, developed by Raytools technology with motion control algorithm and professional control logic designed for laser use. It also supports a variety of modes like online upgrade or real-time upgrade, with features

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including good stability, anti-interference ability, high-performance computing mode, and easy to upgrade and operate.

EPC-2000	
Network Card	2×Gigabit NIC
USB	4×USB2.0, 2个USB3.0
Storage Device	1×2.5HD,1×MSATA
Ambient temperature	-20°C~60°C
Ambient humidity	5%~95%
Display	Support both HDMI / VGA interface
Power supply	9-36V wide voltage module
Size	(L x W x H) 181.7mm×126.5mm×54mm

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2.2.1 EPC2000 Interface Layout



1	Startup button
2	HMI (LAN2) master control module communication interface
3	EtherCAT (LAN1) connection interface
4	DC power input 9-36VDC

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>EtherCAT (LAN1) port is defined as EtherCAT connection interface to be connected with the servo motor and EDS board.

>HMI (LAN2) port is defined as the connection to the IPC / EPC-1010.

>Please input 24V (9-36V wide voltage) DC power.

2.3 EDS3000 Interface Description

EDS3000 is an EtherCAT-based slave interface board with a rich set of IO, motion control and laser follow interfaces and resources, especially for signal acquisition and motion control applications in the laser industry.

EDS3000			
Module	Qua.	Description	Remark
Power supply	/	^{24V DC} misgroup.r	Voltage range (18~36V)
PWM	2	5V、24V; Duty cycle: 0%-100%; Fre.: 20kHz	
DA	4	Output: 0~+10V; 16bit; Accuracy: 10mV	
AD	4	Input: 0~+10V; 16bit; Accuracy: 10mV	
Digital input	24	24V/0V (variable), COM port wiring control	5
Digital output	16	Single output high level 24V DC	
Ambient environme	nt	Temperature : 0~+55 ℃ ; Ambient humidity (non-condensing) : 5%~95%	U
Size		129.36*350.5	

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2.3.1 EDS3000 Interface Description



The board has a boundary dimension of 122mm*348mm and can be assembled on a module rack for mounting on the DIN C45 rail.

On the upper left there are 4 DB15 ports for external servo drives. From left to right, they are Y-axis, X-axis, Y1-axis and Z-axis. At the lower left, there is one F-axis interface and two RJ45 ports for external F-axis servo drive and EtherCAT cables.

The upper right ports are 2 PWM output ports, 4 analog input ports, 4 analog output ports and 1 laser head height sensor port respectively. The lower right port is a 24V power input port with 2 PWMs which can work with 24V or 5V output.

From left to right on the lower part, there are 12 dedicated digital inputs, 12 generic digital inputs, 16 generic digital outputs, and 1 brake output connector.



System Commissioning Manual 2.3.2 Power supply interface description



EDS3000 board power interface needs to be externally connected to the DC24V switching power supply, where the 24V, 0V and PE input terminals are connected to the output interface 24V, 0V and PE of external switching power supply respectively.

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2.3.3 Digital input interface

When COM1 is connected to 24V, the input signal is active low; when COM1 is connected to 0V, the input signal is active high. Take NPN and PNP sensors as an example:

When using the NPN type limit, the COM1 port is connected to 24V.





When COM1 is connected to 24V, the input signal is active low; when COM1 is connected to 0V, the input signal is active high. Take contact switch as an example.

Active low-evel connection



Active high-evel connection



2.3.4 Digital output interface

DO1-DO16 are 16-way digital output interfaces (24V output), which can be configured as "oxygen valve", "laser enable", "focus enable", "indicator" and other related control interfaces. The definition of each port is preset in the software, as shown below:

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All DO1~DO16 output 24V high level, with the maximum output current of 0.5A. If it's connected to a high- power load, please connect an external relay and connect a current- continuing diode (MIC 10A6) in parallel with the oxygen and nitrogen solenoid valve.

In addition, it is better to use another power supply DC24V2 control valve, which can be separated from the system IO power supply DC24V1.

Take the shown below as an example:



2.3.5 Analog input interface

A total of 4 A/I analog input interfaces are provided, with a signal input range $0V \sim 10V$.

2.3.6 Analog input interface

A total of 4 A/O analog output interfaces are provided, with a signal output range $0V \sim 10V$. The way is as shown in the figure.



2.3.7 PWM Interface SCIOUD.IU

There are 2 PWM pulse width modulation signals, which can be used to control the average power of the fiber laser. The PWM signal supports 24V or 5V (manually adjusting), and the duty cycle is adjustable from 0% to 100%.



2.3.8 Sensor Interface

There is a sensor interface circuit for laser head height adjustment. The output signal from the receiving capacitor amplifier circuit is fed to the CPU through the conditioning circuit, and the interface is defined as follows:



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2.4 Servo Drive Interface

1. 5 servo control interfaces on the board card to connect the generic axis (X, Y, Y1, Z and F axes) interface use a double-row DB15 female socket, as shown in the following figure:



The pins are defined as follows:

	Servo interface signal description				
Foot	Signal	Function	Foot	Signal	Function
No.	Name		No.	Name	
3	A+	A-phase encoder pulse	2	XD+	Axis rotation direction
		input +			switching output +
11	Δ	A-phase encoder pulse	10	XD-	Axis rotation direction
	A-	input -	101		switching output -
4		B-phase encoder pulse	14	ALM	Servo alarm input
	B+	input +			
12		B-phase encoder pulse	6	SON	Servo enable output
	В-	input -			
5	7.	Z-phase encoder pulse	7	CLR	Axis Clear Output
	Ζ+	input +		μρ.	IU
13	Z-	Z-phase encoder pulse	8	P24V	24V power supply
		input -			
1		Axis speed control	15	PGND	Power Ground
		output +			
9	VD	Axis speed control	$\mathbf{\hat{\mathbf{D}}}$		ru
	AF-	output -			

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Note: EDS3000 board ALM signals are active low, which can be switched to active high by the jumper cap next to the corresponding axis port. The alarm polarity of the axis port can also be set in the configuration



tool to change the alarm trigger conditions. LOW

2. Servo drive control signal wiring diagram

Note: The following should be noted when connecting the servo drive:

EDS3000 uses a pulse + direction signal to control the servo drive, and it must be confirmed that the drive

supports this mode; and whether the type of servo drive enable signal (SON) selected is active low;

Confirm the servo drive parameters are set correctly. If the servo cannot run, the parameters should be set to not use the "forward and reverse input prohibition";

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2.4.1 Yaskawa Servo Drive Wiring Diagram

00-DB15	2-pin (male)	- -			shielded wire	Yask	awa serv	o 50 Pin i
	Signal	Pin	Line	-			Pin	Signal
	A+	3	purple	-11			33	PAO
	A-	11	yellow				- 34	/PAO
	B+	4	yellow & black				35	PBO
	B-	12	blue	t i		iii	36	/PB0
	Z+	5	blue & black	Di		- i -	19	PCO
	Z-	13	black & white				20	/PC0
	XP+	1	red & black			- <u>i-i-</u>	7	PULSE
	XP-	9	green				8	/PULSE
	XD+	2	green & black				11	SIGN
	XD-	10	brown	<u></u>			12	/SIGN
				1 C				
	ALM	14	orange				31	ALM+
	SON	6	orange &black	+ +		-+	40	/S-ON
	CLR	7	red & black	+ +			44	/ALM-RST
	P24V	8	black			++	47	+24VIN
	PGND	15	black & brown	11			1	SG
				1			32	ALM-

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Vaskawa Sarya Daramatar Satting

	Тазка	wa Servo I arameter Setting
Parameter Type	Recommended Value	Setting range
Pn000	0.0.1.0	0.0.x.0 (0 speed; 1 position) 0.0.0.X (0 forward; 1 reverse)
Pn000	0.1.0.1	0.X.0.0 (0 3-phase power; 1 single-phase power); 0.0.0.X (0 display setting, 1 display all parameters)
Pn200	0.0.0.0	0.0.0.X (0pulses +direction positive logic, 5 pulses +direction negative logic) . X.0.0.0 (linear 1M)
Pn50A	8100	Positive turn prohibition cancellation
Pn50B	6548	Reverse prohibition cancellation

2.4.2 HCFA Servo Drive Wiring Diagram

Signal	Pin	Line		7	Line	Signal
A+	3	purple			36	OUTA
A-	11	yellow	11		37	/OUTA
B+	4	yellow&black	1 1	1 1	38	OUTB
B-	12	blue	1 1	1 1	39	/OUTB
Z+	5	blue&black	1 1		40	OUTZ
Z-	13	black&white	Sara		41	/OUTZ
XP+	1	red&black	<u>ogio</u>	OP	26	CMD PLS
XP-	9	green			27	/CMD PLS
XD+	2	green&black			30	CMD DIR
XD-	10	brown			31	/CMD DII
ALM	14	orange	+ +		21	S ERR+
SON	6	orange&black			4	S ON
CLR	7	red&black			5	ERR-RST
P24V	8	black			3	COM+

HCFA Servo Parameter Setting				
Parameter	Recommended	Setting Range		
Туре	Value			
P00-01	0	0 Position mode; 1 Speed mode; 7 EtherCAT mode		
P00-07	0	0: Pulse + direction positive logic; 1 Pulse -		
	mlec	direction negative logic		
P00-16	111150	0: forward; 1: reverse		

2.4.3 Panasonic Servo Drive Wiring Diagram

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Servo control interface

EDS3000-DB15 2-pin (male)

shielded wire

Panasonic servo 50 Pin interface

					2
Signal	Pin	Line		Pin	Signal
A+	3	purple		21	0A+
A-	11	yellow		- 22	OA-
B+	4	yellow&black		48	OB+
B-	12	blue	11 11	49	OB-
Z+	5	blue&black	11 11	23	0Z+
Z-	13	black&white		- 24	0Z-
XP+	1	red&black	<u>Isarouo r</u>	- 44	PULSH1
XP-	9	green		45	PULSH2
XD+	2	green&black		46	SIGNH1
XD-	10	brown		47	SIGNH2
ALM	14	orange		- 37	ALM+
SON	6	orange&black	1	- 29	SRV-ON
CLR	7	red&black	dara un kr	31	A-CLR
P24V	8	black	SCHOUDIL	7	COM+
PGND	15	brown&black		41	COM-
				36	ALM-

Panasonic Servo Setting Parameters				
Parameter Type	Recommended Value	Setting Range		
Pr001	0	0: Position control, 1: Speed control		
Pr007	3	3: Pulse plus direction		
Pr005	IIIISY	1: High-speed pulse 3mpa; 0: Low- speed pulse 500kpps		

2.4.4 Delta Servo Drive Wiring Diagram

Signal Pin Line A+ 3 purple A- 11 yellow B+ 4 yellow&black B- 12 blue Z+ 5 blue&black Z- 13 black&white XP+ 1 red&black XP- 9 green XD+ 2 green&black	Pin 21 22 25 23 13 24 	Signal OA /OA OB /OB OZ /OZ
A+ 3 purple A- 11 yellow B+ 4 yellow&black B- 12 blue Z+ 5 blue&black Z- 13 black&white XP+ 1 red&black XP- 9 green XD+ 2 green&black	21 22 25 23 13 24 38	0A /0A 0B /0B 0Z /0Z
A- 11 yellow B+ 4 yellow&black B- 12 blue Z+ 5 blue&black Z- 13 black&white XP+ 1 red&black XP- 9 green XD+ 2 green&black	22 25 23 13 24 38	/0A 0B /0B 0Z /0Z
B+ 4 yellow&black B- 12 blue Z+ 5 blue&black Z- 13 black&white XP+ 1 red&black XP- 9 green XD+ 2 green&black	25 23 13 24 38	0B /0B 0Z /0Z
B- 12 blue Z+ 5 blue&black Z- 13 black&white XP+ 1 red&black XP- 9 green XD+ 2 green&black	23 13 24 38	/0B 0Z /0Z
Z+ 5 blue&black Z- 13 black&white XP+ 1 red&black XP- 9 green XD+ 2 green&black	13 24 38	0Z /0Z
Z- 13 black&white XP+ 1 red&black XP- 9 green XD+ 2 green&black	24	/0Z
XP+ 1 red&black XP- 9 green XD+ 2 green&black	38	
XP- 9 green XD+ 2 green&black		HPULSE
XD+ 2 green&black	36	/HPULSE
	42	HSIGN
XD- 10 brown	40	/HSIGN
ALM 14 orange	28	ALRM+
SON 6 orange&black	9	SON
CLR 7 red&black	33	ARST
P24V 8 black	11	COM+
PGND 15 brown&black	14	COM-

Delta B Series Servo Drive Wiring Diagram

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ignal	Pin	Line		Pin	Signal
A+	3	purple		21	OA
A-	11	yellow	1	22	/OA
B+	4	yellow&black		25	OB
B-	12	blue		23	/0B
Z+	5	blue&black		50	0Z
Z-	13	black&white	¢ droi ir	24	/0Z
XP+	1	red&black	guru	38	HPULSE
XP-	9	green		29	/HPULSE
XD+	2	green&black		46	HSIGN
XD-	10	brown	1	40	/HSIGN
ALM	14	orange	1	28	005+ ALRM
SON	6	orange&black	A AKALIK	9	DI1 SON
CLR	7	red&black		33	DI5 ARST
P24V	8	black		11	COM+
PGND	15	brown&black		45	COM-
			`	27	D05-

Delta A2 Series Servo Drive Wiring Diagram

Delta Servo Setting Parameters				
Parameter Type	Recommended Value	Setting Range		
P1-00	0x1002	Thousands of bits 1 High-speed differential		
P1-01	0x0000 SQ	Percentile 1 is the reverse		
P2-10	0x0101	DI1		

2.4.5 Fuji Servo Drive Wiring Diagram

Servo control interface

Fuji servo 26 Pin interface

EDS3000-DB15 2-pin	(male)		Tuji servo z	
		shielded wire		
Signal	Pin Line	·	Pin	Signal
A+	3 purpl		9	FFA
A-	11 yello		10	*FFA
B+	4 yellow&b		11	FFB
B-	12 blue		12	*FFB
Z+	5 blue&bl	ick	23	FFZ
Z-	13 black&w	ite I	24	*FFZ
		1.1. 1.1		
XP+	1 red&bla	ck	7	CA
XP-	9 gree		8	*CA
XD+	2 green&l	lack	20	CB
XD-	10 brown		21	*CB
ALM	14 orange		17	OUT3
SON	6 orange&	Ласк	2	CONT1
CLR	7 red&bla	ck i	3	CONT2
P24V	8 black		1	COMIN
PGND	15 brown&	lack	14	COMOUT
	n	h l'é ar conna-"r	1	

Fuji servo 26 Pin interface

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Fuji Servo Setting Parameters				
Parameter Type	Recommended Value	Setting Range		
PA-101	° mis	<pre>0position 1speed 2torque 3position <=> speed 4position <=>Torque 5Speed <=> Torque 6Extended mode 7Positioning operation</pre>		
PA-103	¹ mls	0Differential input: Command pulse/symbol 1Differential input: Forward pulse/reverse pulse 2Differential input: 90° bit phase difference 2 signal 10Open collector input : Command pulse/symbol 11Collector Open-collector input: Forward pulse/ reverse pulse 12open collector input :90° bit phase difference 2 signal		

2.4.6 LEAD-Motion Servo Drive Wiring Diagram



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Servo control interface

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LEAD servo P series interface

shielded wire EDS3000-DB15 2-pin (male) Signal Pin Line Pin Signal A+ 3 1 PAO purple L 1 11 2 /PAO Ayellow 1 1 1 1 B+ 3 **PBO** 4 yellow&black I I 12 4 /PB0 Bblue I I Z+ PC0 5 5 blue&black Z-13 /PCO 6 black&white L Г 1 1 XP+ 1 red&black 8 PULSE XP-9 9 /PULSE green I XD+ 2 12 SIGN green&black XD-10 13 /SIGN brown I I I I I ALM D00 ALM+ 14 orange SON 6 DIO /S-ON orange&blac 7 CLR DI1 ALM-RST red&black P24V 8 ICOM +24VINblack ۱ PGND 15 OCOM SG brown&black 11 11 ALM-

P Series Servo Drive Wiring Diagram

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Servo control interface

LEAD servo M series interface

ED<u><u>\$3000-DB1</u>5 2-pin (male)</u> shielded wire Signal Pin -Pin Line Signal purple 3 21 PAO A+ L yellow A-11 22 /PAO 4 I B+ 4 yellow&black 25PB0 I 1 1 B-12 /PBOblue 23 l 1 Z+ PC0 5 blue&black 13 black&white Z-13 24 /PCO XP+ PULSE 1 41 red&black XPgreen /PULSE 9 43 I XD+ 2 green&black 37 SIGN I I XD-10 /SIGN 39 brown I I I I ALM 14 ALM+ 1 orange SON 6 /S-ON 33 orange&black CLR 7 8 ALM-RST red&black P24V 8 11 COM+ black 1 brown&black PGND 15 COM-14 11 11 26 ALM-

M Series Servo Drive Wiring Diagram

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2.5 Laser Wiring

2.5.1 Max Chuangxin Fiber Laser Wiring Diagram



Notes:

1. PD+ PD- is the laser alarm output, connected to the DI20 input of the EDS3000 terminal block, "Platform Configuration - Digital Input - DI20" default Laser alarm (NO);

- 2. The red light and the light enable ground pin can be integrated into any 0V of the EDS3000 terminal block together to ensure the same source as the laser
- 3. Chuangxin laser PWM selects 24V to control.

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2.5.2 Hotspot Single-mode Continuous Fiber Laser Wiring Diagram



Notes:

1. PD+ PD- is the laser alarm output, connected to the DI20 input of the EDS3000 terminal block, "Platform Configuration - Digital Input - DI20" default Laser alarm (NO);

- 2. The red light and the light enable ground pin can be integrated into any 0V of the EDS3000
- terminal block together to ensure the same source as the laser
- 3. Hotspot laser PWM selects 24V to control.

2.5.3 Raycus RFL-C3000 Continuous Fiber Laser Wiring Diagram



Notes:

1. In REM state, the control board is powered up to give a high level to enter the external AD mode.

2. REM laser enable and red light for the same interface, up enable for closing red light, down enable for opening red light.

3. REM laser PWM selects 24V to control.

4. Laser system fault alarm output high level to the card.
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2.6 EDS2010 Interface Layout



The card has a form factor of 185mm*122mm and can be assembled on a module frame for use on DIN C4535 rails. The functional layout is shown in the figure below.

The upper left two RJ45 ports are connected to the EtherCAT cable, EtherCAT IN and EtherCAT OUT.

The upper right is the 16 digital input interfaces. For left: channel 1 to channel 8 and its common terminal; for right: channel 9 to Channel 16 and its common side.

The lower left to right is 8 sets of relay outputs and 8 transistor outputs.

The lower right corner is the board power supply, 24V power connector

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2.6.1 Power connector



The EDS2010 board power interface needs to be connected to an external DC24V switching power supply, where the input terminals 24V, 0V and PE are connected to external switching power supply 24V, 0V and P E respectively.

2.6.2 Digital input interface

There are 16-way digital input DI interfaces, which are divided into two groups, each 8-way for a group and high and low active can be configured in groups. The common terminal of DI1-DI8 is COM1, and the common terminal of DI9-DI16 is COM2, where the input signal is active low when COM1 and COM2 are connected to 24V, and active high when COM1 and COM2 are connected to 0V.

2.6.3 Output interface definition

DO1-DO8 are 8-way relay output mode refer to the following figure:



DO9-DO16 are 8-way transistor output mode refer to the following figure:



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3 Preparation for software installation

3.1 Self-hosted recommended configuration

СРИ	Inter i5 1.6GHz (4 cores) and above
Memory	8GB and above
Storage Devices	120G hard drive and above
Network Card	2×10/100/1000 Gigabit NIC
USB	4×USB3.0 4×USB2.0
Show	Support both HDMI or VGA interface
Operating System	Genuine Windows 10 (64-bit Professional Edition) / Genuine Windows 7
	(64-bit Flagship Edition)

3.2 Installation Software

3.2.1 Installation of cutting software

1) Right-click on the software installation package and select Open or Run as Administrator.



2) Follow the prompts and click Next.



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3) The installation environment. The system will automatically identify whether the installation environment is complete. It is not recommended to select it by yourself, you can directly click Next.



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4) Select the installation path, the default installation path is C:/HMI, it is not recommended to change it, you can directly click Install.

👼 2DCutAhead2.0 Setup		1200		×
Installation Folder		Adv	anced Ins	taller
 Collecting information Preparing installation Installing Finalizing installation 	This is the folder where 2DCutAhead2.0 will be installed. To install in this folder, dick "Install". To install to a different folder, "Browse". Eolder: C: \HMI\	enter it b	elow or clic Br <u>o</u> wse	*
	< <u>B</u> ack <u>Install</u>		Cancel	

5) After the software installation is complete. Wait for the update of the underlying firmware, this step will take a long time, please be patient.

U <mark>p</mark> date u	nderlying firmw	are version :242_202	30717		
	Updating, plea	se wait patiently			- E+
RavTooLt		ISGI	ou	р.	
					3

3.2.2 Filter by actual configuration

7) System: XC3000S; Keyword 1: EDS3000. Keyword 2: Pulse-dir drive or COE drive according to the actual configuration.

Standard configuration selection		n rt	-
System XC3000S ~ Keyword1 EDS3000	~ Keyword	2 EDS3000	Search
Config Description (C3000S+COE drive+EDS3000+EDS2010(Internal PLC pallet) (C3000S+COE drive+EDS3000 (C3000S+Pulse-dir drive+EDS3000+EDS2010 (Internal PLC pallet) (C3000S+Pulse-dir drive+EDS3000		COE drive COE drive EIM Moudle DX150P EDS2010 Single Axis Gantry Axis Internal PLC pallet External PLC pallet	
mlsgr			

8) Check the standard configuration in the configuration description, after which click Use selected config.

Standard configuration selection	X
Standard configuration selection	
Filter criteria System XC3000S V Keyword1 EDS3000	Keyword2 COE drive Search
Config Description XC30005+ COE drive+EDS3000+EDS2010(Internal PLC pallet) XC30005+ COE drive+EDS3000	System Configured EtherCAT Modules Node 0:General COE Drive(VID:0000000, PID:0000000) Node 1:General COE Drive(VID:0000000, PID:0000000) Node 2:General COE Drive(VID:0000000, PID:0000000) Node 3:General COE Drive(VID:0000000, PID:0000000) Node 4:EDS3000 V0X10105(PID:00000b96)
misqr	> Selected configuration Exit

3.2.3 Software parameters setting

Set the parameters of X, Y, and Z-axis, Pitch compensation, Verticality correction, Laser head, Laser Device, Assist gas, Dust removal valve, Alarm, Button, Pallet changer, Lubrication and other parameters according to the actual situation of the machine. Please refer to Chapter 5 "Platform Configuration Tools" for details.

3.2.4 Save and activate the master

9) Click Save and then click Restart Controller to update the master module configuration information.



10) Wait for the controller to restart, then click Exit config. Start HMI to open the cutting software.

Restart kernel		×
Restart command has	been sent	
	Exit config. Start HMI	Exit



3.2.5 Registration is required to open the process, you can register through the mobile WeChat applets.

		10:24 授权 解密	#‼ ≎ 63 ⊙
		692F4D-E8EEEE-EABCJEEEEE	13
License		 清法拝要新司的设备(中参法) 授权期限: 資源日期 ○永久 授权截止日期: 	
Machine Code:	691326-56EEE-EZ03		解密
Registration Code:			
	Register		
Expiration Reminder:	3 - Day		
Authorization period:	2023-07-20~Permanent		

3.2.6 Use XC3000S software

After opening the software, import the graphics to be processed and configure the process parameters for processing. Please refer to the latest "XC3000S Series Laser Cutting System User Manual" for details.

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3.3 Software Licensing

1) Open the software and click the "?" at the top right corner of the software page. 2) Open the WeChat applet "KIC Cloud", log in, click Authorize, then click Swipe icon and scan the QR code of the software, as shown in the figure below:

3) After scanning, the machine code and dog number will appear, and then select the "license expiration

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date".

- 4) Click "Decrypt".
- 5) Copy the "registration code "in the interface into software registration code box.

6) Click "Register", you can see that the authorization period on the software has changed, as shown in the following figure:



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4 Machine tool commissioning

After installation, a password 4006701510 is required to enter the configuration tool. Then you can select the category configuration in the menu bar, you will see the Parameter button. Click the corresponding parameter button, the parameter dialogue box will show to modify the parameter. After changing the parameter and checking it, restart the software then the changed parameter will take effect.



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4.1 Set the parameters in the parameter screen according to the actual configuration

1) XY axis mechanical parameters and hardware configuration

XY axis mechanical parameters: Encoder pulse count, Pitch

XY axis point and port config: XY hard limit, XY axis servo axis port, XY soft limit.

axis mechanical parame	ter			X axis point and port (config			
Encoder pulse count	10000 * *	Motor direction	Reverse 🗸 *	Positive hard limit signal	Node 4:DI_3	v	NO	1
Pitch	36mm * *	Backlash compensation	Omm *	Zero signal	Node 4:DI_2	v	NO	,
Max speed	60m/min *	Max following offset	60mm *	Negative hard limit signal	Node 4:DI_1	v	NO	1
Max acceleration	10000mm/s^2 *			Servo axis	Node 1:Axis			
				Coft limit range	-2 * ~ 60	0 • mm		
Sync X narameters to 1	(I O Sync Y naran	neters to Xt	Senarate set	O All limits NO	O All limits NC	0 Se	narate s	at
Sync X parameters to axis mechanical parame	1 O. Sync Y paran	neters to X1 O	Separate set	O All limits NO Yaxis point and port of	O All limits NC	● Se	parate s	et
Sync X parameters to ' axis mechanical parame Encoder pulse count	1 O Sync Y paran ter 10000 *] * [meters to X1 •	Separate set Reverse v *	All limits NO Yaxis point and port of Positive hard limit signal	O All limits NC config Node 4DL6	• Se	parate s	et
Sync X parameters to axis mechanical parame Encoder pulse count	1 O Sync Y paran ter 10000 • • (36mm •) •	meters to X1 •	Separate set Reverse + Omm +	O All limits NO Y axis point and port of Positive hard limit signal Zero signal	O All limits NC config Node 4DL6 Node 4DL5	• Se	parate s NO NO	et
Sync X parameters to axis mechanical parame Encoder pulse count Pitch Max speed	1 O Sync Y paran ter 10000 * . [36mm * * 60m/min *	meters to X1 Motor direction Backlash compensation Max following offset	Separate set Reverse	O All limits NO Y axis point and port of Positive hard limit signal Zero signal Negative hard limit signal	O All limits NC config Node 4D1_5 Node 4D1_4	• Se	NO NO NO	et
Sync X parameters to ' axis mechanical parame Encoder pulse count Pitch Max speed Max acceleration	1 O Sync Y paran ter 10000 • . 36mm • . 60m/min • 10000mm/s*2 •	neters to X1 Motor direction Backlash compensation Max following offset	Separate set Reverse + Omm + 60mm +	All limits NO All limits NO Yaxis point and port of Positive hard limit signal Zero signal Negative hard limit signal Servo axis	O All limits NC config Node 401_6 Node 401_5 Node 401_4 Node 401_4	• Se	NO NO NO	et

2) XY axis return to origin parameter

XY axis return to origin parameters: Return origin mode, Return origin direction and type, Zero signal, Aft back set coordinate.

axis		Y axis	
Return origi	Increment ~	Return origin	Increment ~
Return origin direct	Negative 🗸 Limit 🗸	Return origin directi	Negative V Zero V
Return oriq	1.8m/min *	Return orig	1.8m/min *
back dis	5mm *	back dis	5mm *
Aft back set coordi	Omm *	Aft back set coordi	0mm *
Absolute zero of	0mm +	Absolute zero of	0mm ×



3) Z-axis parameters

Servo parameters: Pulse number, Pitch

Homing parameters: Homing mode, Return origin direction and type, Zero signal, Zero signal logic, Coordinate aft backward set

Axis point and port config: Servo axis, positive and negative hard limit, soft limit

Motor direction Positive Pulse number 10000 m Pitch 10mm * Return origin direction a Positive Limit Max follow-up offset Smm * Speed unit of Drive pulse/s * ippeed loop feedforwa 0.01 * Axis point and port config Servo axis Node 3:Axis Positive hard limit Node 4:DI_9 NO No Soft limit range -55 * ~ 2 * mm Brake output Not used Not sugary Soft limit range -55 * ~ 2 * mm Soft limit range -55 * ~ 2 * mm Soft limit range -55 * ~ 2 * mm Soft limit range -55 * ~ 2 * mm Soft limit range -55 * ~ 2 * mm Soft limit range -55 * ~ 2 * mm Soft limit range -55 * ~ 2 * mm Soft limit range -55 * ~ 2 * mm Soft limit range -55 * ~ 2 * mm Soft limit range -55 * ~ 2 * mm Soft limit range -55 * ~ 2 * mm Soft limit range -55 * ~ 2 * mm Soft limit range -55 * ~ 2 * mm Soft limit range -55 * ~ 2 * mm Soft limit range <td< th=""><th>Servo Parameter</th><th></th><th></th><th>Return to Origin P</th><th>arame</th><th>eter</th><th></th><th></th><th></th></td<>	Servo Parameter			Return to Origin P	arame	eter			
Pulse number 10000 * * Pitch 10mm * Max follow-up offset 5mm * Speed unit of Drive pulse/s · * ipeed loop feedforwa 0.01 * Axis point and port config Servo axis Node 3:Axis V Positive hard limit Node 4:D1.7 No Node 4:D1.7 Soft limit range -55 * ~ 2 * mm Brake output Not used	Motor direction	Positive 💉		Homing r	node	Incremental M	lode 🗸		
Pitch 10mm * Max follow-up offset 5mm * Speed unit of Drive pulse/s ippeed loop feedforwa 0.01 * Speed unit of Drive 0.01 * Origin point offset com 0 * Origin point offset com 0 mm * Speed loop feedforwa 0.01 * Speed loop feedforwa 0.01 * Origin point offset com 0 mm * Servo axis Node 3:Axis Positive hard limit Node 4:DL9 NO Negative hard limit Node 4:DL7 NO Soft limit range -55 * 2 * mm Brake output Not used	Pulse number	10000	*	Return origin direction	on a	Positive ~	Limit	~	
Max follow-up offset 5mm * Speed unit of Drive pulse/s · * peed loop feedforwa 0.01 * Origin point offset com 0 · · Servo axis Node 3:Axis · · Positive hard limit Node 4:DI_9 · · Nogative hard limit Node 4:DI_7 · · Soft limit range -55 · · 2 · · Brake output Not used · ·	Pitch	10mm -	*	Return origin s	peed	0.9m/m	in -		
Speed unit of Drive pulse/s * peed loop feedforwa 0.01 * Origin point offset com 0mm * axis point and port config Servo axis Node 3:Axis Positive hard limit Node 4:DI_9 Nogative hard limit Node 4:DI_7 Soft limit range -55 * Brake output Not used	Max follow-up offset	5mm ·	·	Back Dis	tance	5m	m *		
Origin point offset com Orm Origin point offset com Orm axis point and port config Servo axis Servo axis Node 3:Axis Positive hard limit Node 4:DL 9 Nogative hard limit Node 4:DL 7 Soft limit range -55 * Brake output Not used	Speed unit of Drive	pulse/s	*	Coordinate aft backw	ard	_	0 -		
axis point and port config Servo axis Servo axis Node 3:Axis Positive hard limit Node 4:DL9 NO Negative hard lim Node 4:DL7 NO Soft limit range -55 * 2 * Brake output Not used V	peed loop feedforwa	0.01	•	Origin point offset o	om	0m	1m -=		
Soft limit range -55 * ~ 2 * mm Brake output Not used ~				Negative hard lim	Node	e 4:DI_7		~ NO	3
Soft limit range -55 * ~ 2 * mm Brake output Not used ~				Negative hard lim	Node	e 4:DI_7		~ NO	
Brake output Not used V				Soft limit range		-55 * ~	2	* mm	
				Brake output	Not	used		~	

4) Laser head

Laser head parameters: Brand, Model, Focus control mode, Height sensor type, Height sensor signal port.

Brand	Focus adjmt
Raytools	Limit C
Model	Soft Limit Rar
BS20K ~	Close Focus Head
Focus control mode	Close Cavity Temp
BS Smart Focus 🗸	Close Cavity Gas
Height sensor type	Close WIFI Alarm
EDS On Board 🗸 🗸	
Height sensor signal port	
Node 4:Height Sensor Capacitan 🗸	

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5) Laser Device

Laser brands and parameters: Laser brand, Laser power, Frequency

Laser brand:	Raycus	~	
Laser power:	1500	*	W
Frequency:	5000	•	Hz
Voltage of max power:	10	-	v
lback voltage of max power:	10	*	v
Analog output delay	0	*	ms
FlyCut laser on delay	0	•	ms
FlyCut laser off delay	0	*	ms

6) Gas interface common settings

Gas pressure control: default can be, change if there are special needs.

Gas process control: default can be, change if there are special needs.

Pressure standard: default can be, change if there are special needs.

Gas control: default can be, change if there are special needs.

7) Physical button

Control panel: Start signal logic, Pause signal logic, Reset signal logic, Emergency stop alarm logic

Control Panel	9.0		
Start signal logic	Node 4:DI_14	~	NO
Pause signal logic	Node 4:DI_17	~	NO
Reset signal logic	Not used	~	NO
Emergency stop alar	Node 4:DI 13	~	NC

4.2 Test if each axis limit is effective

Note: The motor should be in the no enable state throughout this step!

1) Enter the HMI software interface, File - Diagnostic Tool- IO Monitor



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 $2\,\,)\,$ Trigger the limit switch and observe whether the corresponding point position in the monitoring interface has changed



3) Verify the panel buttons for energy stop, each axis limit and zero switch, and start/pause in turn until each input is confirmed to be normal.

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4.3 Zeroing the machine and adjusting the servo gain

1) Click CNC in the menu bar, click Return origin, and click OK in the pop-up window that appears.

FormMain	
View	
	2
Motor Return Edge Detect Arc Detect Focus Task Batch Processing Parameter	Forced Reset
Function Follow-up	Force
250 260 270 280 290 300 310	
🖳 Home setting	\times
X Y Z Set Zero Set Zero Set Zero	
matters needing attention: 1.Please ensure that the limit or origin sensor is normal. 2.Return to the original status: 3.Press [Start origin] button to do referencing.	
Start origin Stop	
megroupha	

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Draw a garden of about 30mm, turn on error detection, and then adjust the cutting speed to 30m/min up or down in the process. Then select the drawing and click on the empty walk.



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After the motion is completed, the system draws the position of the encoder feedback on the software and the servo error can be seen using the measurement. This error can be used as the basis for adjusting the servo parameters.



5 Platform Configuration Tools

After installation, a password is required to enter the configuration tool, which is 4006701510.



5.1

						C:\/R	2 Raytool5oftware 20CutAhead2.0 AheadLaserConfigFles(Work(WorlProject.2DLaserConfig - Version:2.4.2.20985	(– a <u>x</u>
File Config by	types Tool							
Save Restart Controler	C I/O card config ~	Y Axis Ptch compensat	XY Back	Z-Axis Verticality Flow correction	Laser Lase head Devic	Assist Dust re gas val	Image: Second Amms Button Physical Palet: Lubrication Panel Segmented button dhanger 0000 terminal Amms Button Physical Palet: Lubrication Panel Segmented button 0000 terminal Palet: Lubrication Panel Segmented button	
Save	I/O con	CAT Modu	Mechanical	Unline Detected	Beam path	Gas path	ath Oustom	^
B → ≠ Node B → ≠ Node B → ≠ Node B → ≠ Node B → ≠ Node	0:General COE Dr 1:General COE Dr 2:General COE Dr 3:General COE Dr 3:General COE Dr 4:EDS3000 V0X1	ve(VID:00000000, ve(VID:00000000, ve(VID:00000000, ve(VID:00000000, ve(VID:00000000,)105(PID:0000005	PID:00 PID:00 PID:00 PID:00 5)	Node 0:Empowe	r EDS2000 XFC VC	X10201(PID:0000065	Coord input/output and axis config Cerneral Configuration Palet changer Configuration Palet changer	
							PLC variable definition Connected hardware pin	^
							Main aves Váris-Gantry Main Node Dávis	
							XAxis Node 1:Axis	
							Y1Axis-Gantry Slave Node 2:Axis	
							ZAxis Node 3:Axis	
							FAutis-Focus Node 4:Focus Autis (9-Pin)	
							Height Sensor Capacitance	
							Sensor capacitance value Node 4:Height Sensor Capacitance	
	> 2						Digital input PLC variables	
	- 3				▶ 4		Negative hard immit signal of X-axis Node 4:0U[1 Mense ind 4: X mit is Node 4:0U[1	
					1.5		Pontine signal of X-axis Node +NU_Z	
							Neative hard limit signal of Yaxis Node 4DI 4	
							Home signal of Y-axis Node 4:DL5	
							Positive hard limit signal of Y-axis Node 4:DL6	
							Negative hard limit signal of Z-axis Node 4:DL7	
							Home signal of Z-axis Node 4-DL8	
							Positive hard limit signal of Z-axis Node-4D19 Conserve that any other signal of Z-axis Node-4D19	
							Emergency stop Node-KUL_15 Starts function Node-KUL_14	
							Orven presure alarm Node 4DI 18	
							Pause button Node 4:DL 17	
							Positive hard limit signal of F-axis Node 4-DL 10	
							Negative hard limit signal of F-axis Node 4:DL11	
							Nitrogen pressure alarm Node 4:DL19	
							High oil level alarm	
							Low on dealth node stor_12	×
							🗹 Display all 🗹 Main axes 🗹 Digital input 🖓 Analog input 🔽 PWM signal	
							Hide all Aux axes Digital output Analog output	
<			> <				Config Descript XC30005+COE drive+EDS3000	
16:10:09:037 Co	mparing slave sta	ions						^
16:10:09:040	>Module online	letection failed. Pk	ase confirm	current config mat	ches the online r	nodule!!	O O PATELO PLI	v
CNC online	2UCutAhead C	itting System		_			· · · · · · · · · · · · · · · · · · ·	

1: Menu bar area; 2: PLC Variable Classification Area; 3: Current configuration area; 4: Online module area; 5: PLC Variable Area; 6: PLC Variable Pin Selection; 7: Journal area; 8: Status area



5.1.1 Menu bar area

Including: File, category configuration, Tool and Help File



Save button: Save the current configuration file.



Restart kernel

Restart kernel: Activate current configuration Reads the configuration from the kernel module and import it into the current configuration area Activate current configuration

Category Configuration



Save button: Save the current configuration file.



Restart Controller: Activate the current configuration reads the configuration from the kernel module and import it into the current configuration area activates the current configuration.



Online Slave Check

Online Slave Check: Check if the connected modules are the same as the modules in the configuration area.



Import Standard Config

Import Standard Config: Import the standard configuration file preset by the system.



Activation history

Activation history: View the history of activations and select the history to load into the current configuration area.

• XY axis mechanical parameters and hardware configuration

XY axis mechanical parameters and hardware configuration, as shown in the figure below. Please refer to the 7.4.1 for details.

	C:\RaytoolSoftware\2DCutAhead2.0\AheadLas	serConfigFiles\Work\Wo	orkProject.2DLaserConf	g - Version:2.4.2.20985			
ile Config by types Tool	Help						
ave Restart 1/0 card	XY Axis Prtch XY Back Z-Axis Verticality	Laser Laser As	ssist Dust removal A	larms Button Physical	Pallet Lui	ا brication ا	14 11
Save I/O con	Mechanical	Beam path	Gas path	Custom	changer		
XY mechanical par	ameter and hardware config						
X axis mechanical parameter		, (axis point and port	config			
Encoder pulse count	10000 - Motor direction Re	everse 🗸 🔹	Positive hard limit signal	Node 4:DI_3	~	NO	~
Pitch	36mm - Backlash compensation	0mm - *	Zero signal	Node 4:DI_2	~	NO	~
Max speed	60m/min - Max following offset	60mm ~ N	legative hard limit signal	Node 4:DI_1	~	NO	\sim
Max acceleration	10000mm/s^2 -		Servo axis	Node 1:Axis			\sim
			Soft limit range	-2	600 - mm	1	
			Soft limit range	-2 • -	600 - mm	1	
D Sync X parameters to Y1	 Sync Y parameters to Xt September 2018 	parate set	Soft limit range	O All limits NC	600 - mm	eparate s	et
 Sync X parameters to Y1 Y-axis mechanical parameter 	O Sync Y parameters to X1 O Sep	arate set	Soft limit range O All limits NO f axis point and port	O All limits NC	600 • mm	eparate s	Pt
Sync X parameters to Y1 Y-axis mechanical parameter Encoder pulse count	Sync Y parameters to X1 Sep	verse V *	Soft limit range All limits NO axis point and port Positive hard limit signal	-2 - ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	600 • mm	eparate so NO	et ~
Sync X parameters to Y1 Y-axis mechanical parameter Encoder pulse count Pitch	Sync Y parameters to Xt Sep	verse · ·	Soft limit range All limits NO (axis point and port Positive hard limit signal Zero signal	-2 - ~ O All limits NC config Node 4:DL_6 Node 4:DL_5	600 - mm • Se ~	eparate si NO NO	et
Sync X parameters to Y1 Yaxis mechanical parameter Encoder pulse count Pitch Max speed	Sync Y parameters to X1 Sep	verse v + I 0mm - + 60mm - N	Soft limit range All limits NO f axis point and port Positive hard limit signal Zero signal legative hard limit signal	-2 ~ ~ All limits NC config Node 4:DL6 Node 4:DL5 Node 4:DL4	600 - mm	NO NO NO	et ~ ~
Sync X parameters to Y1 Y-axis mechanical parameter Encoder pulse count Pitch Max speed Max acceleration	Sync Y parameters to X1 Sep	Nerse set	Soft limit range D All limits NO f axis point and port Positive hard limit signal Zero signal legative hard limit signal Servo axis	-2 ~ ~ O All limits NC config Node 4:DI_6 Node 4:DI_5 Node 4:DI_4 Node 0:Axis	600 - mm	NO NO NO	et ~ ~ ~
Sync X parameters to Y1 Y-axis mechanical parameter Encoder pulse count Pitch Max speed Max acceleration	Sync Y parameters to X1 Sep	overse - I 0mm - * 60mm + N	Soft limit range O All limits NO If axis point and port Positive hard limit signal Zero signal Equive hard limit signal Serve axis Soft limit range	-2 ~ ~	600 - mm	NO NO NO	et > > > > >
Sync X parameters to Y1 Y-axis mechanical parameter Encoder pulse count Pitch Max speed Max acceleration	Sync Y parameters to X1 Sep	warate set	Soft limit range 2 All limits NO 4 axis point and port Positive hard limit signal Legative hard limit signal Legative hard limit signal Soft limit range Soft limit range Dual drive	-2 - ~ ~	600 - mm	NO NO NO	
Sync X parameters to Y1 Y-axis mechanical parameter Encoder pulse count Pitch Max speed Max acceleration	Sync Y parameters to X1 Sep	wrse V + Omm V 60mm V N	Soft limit range All limits NO r axis point and port Positive hard limit signal Zero signal Servo axis Soft limit range Dual drive Slave axis V1 pot	-2 - ~ ~	600 - mm	NO NO	et
Sync X parameters to Yi Y-axis mechanical parameter Encoder pulse count Pitch Max speed Max acceleration	Sync Y parameters to X1 Sep	Averse V + I Omm - V 60mm - V	Soft limit range All limits NO raxis point and port Positive hard limit signal Zero signal Servo axis Soft limit range Dual drive Slave axis Y1 pot Master-Slave Axes SYN	-2 * ~ All limits NC config Node 4:D1_6 Node 4:D1_5 Node 4:D1_4 Node 0:Axis -2 * ~	600 - mm	NO NO NO	
Sync X parameters to Y1 Y-axis mechanical parameter Encoder pulse count Pitch Max speed Max acceleration	Sync Y parameters to X1 Sep	Averse V + I Omm - + 60mm - N	Soft limit range All limits NO raxis point and port Positive hard limit signal Legative hard limit signal Servo axis Soft limit range Dual drive Slave axis V1 pot Vlaster-Slave Axes SVN ax offset in Master-Slav.	-2 * ~ All limits NC config Node 4:DL6 Node 4:DL5 Node 4:DL4 Node 0:Axis -2 * ~ Node 2:Axis Same direction * *	Gear reverse, j or screw in sa	NO NO NO NO	et v v v or
Sync X parameters to Y1 Yaxis mechanical parameter Encoder pulse count Pitch Max speed Max acceleration	Sync Y parameters to X1 Sep	Averse V + I Omm + + 60mm - N	Soft limit range O All limits NO axis point and port Zero signal Zero signal Zero signal Serve axis Soft limit range Dual drive Slave axis V1 pot Vlaster-Slave Axes SVN ax offset in Mater-Sla Duration	-2 * ~ ~	See See	NO NO NO	et v v v v or

◆ Pitch compensation (the parameters from the interferometer are imported, and the error is inverted according to the actual situation. The import file format rtl, pos, lin) is shown below. Please refer to the 7.4.2 for details.

	Y axis						
Op	en Pitch .						
File			Import	Offset	Note: After imported d	ata, select the offset	negation if with larger o
	No	Position	Positive measured	Positive offset	Reverse measured	Reverse offset	Reverse backlash
•	1	0	0.0214	-0.0214	0.0453	-0.0453	0.0239
	2	140	140.0227	-0.0227	140.0441	-0.0441	0.0214
	3	280	280.0204	-0.0204	280.0455	-0.0455	0.0251
	4	420	420.0096	-0.0096	420.0447	-0.0447	0.0352
	5	560	560.0290	-0.0290	560.0449	-0.0449	0.0160
	6	700	700.0351	-0.0351	700.0496	-0.0496	0.0145
	7	840	840.0247	-0.0247	840.0461	-0.0461	0.0215
	8	980	980.0252	-0.0252	980.0465	-0.0465	0.0214
	9	1120	1120.0292	-0.0292	1120.0487	-0.0487	0.0195
	10	1260	1260.0334	-0.0334	1260.0668	-0.0668	0.0334
		1	1400.0400	0.0402	1400 0470		0.0012
Draw -0.00	96	1400	1400.0492	-0.0492	1400.0479	-0.0479	-0.0013
Draw 0.00	96 44 91 39	1400	1400.0492		1400.0479	-0.0479	-0.0013
Draw 0.00 0.01 0.01 0.02	96 44 91 39 87	1400	1400.0492		1400.0479	-0.0479	-0.0013
Draw -0.00 -0.01 -0.01 -0.02 -0.02	96 44 39 87 34	1400	1400.0492		[1400.0479	-0.0479	0.0013
Draw -0.00 -0.01 -0.02 -0.02 -0.03 -0.03	11 96 91 39 87 34 82 	1400	1400/0432		1400.04/9		0.0013
Draw -0.00 -0.01 -0.02 -0.02 -0.03 -0.03 -0.03	11 96 91 39 87 34 82 30	1400	1400492		1400.043		0.0013
Draw -0.00 -0.01 -0.02 -0.02 -0.03 -0.03 -0.03 -0.04	11 96 44 91 	12400	1400,0432		1400.04/3	-1.0479	0.0013
Draw -0.00 -0.01 -0.02 -0.03 -0.03 -0.03 -0.04 -0.04	11 96 44 91 39 37 34 30 77 25 	12400	1400.0492		1400.04.3		
Draw 0.00 0.01 0.01 0.02 0.02 0.03 0.03 0.04 0.04 0.05	11 96 44 91 39 39 87 34 82 30 77 73 73 	12400	1400.0452		1400.04/3		
Draw -0. 00 -0. 01 -0. 02 -0. 02 -0. 03 -0. 03 -0. 04 -0. 04 -0. 05 -0. 05	11 96 44 91 39 87 34 30 30 30 30 77 25 73 20	12400	1400,0452		1400.04/3		
Draw -0.00 -0.01 -0.02 -0.03 -0.03 -0.03 -0.04 -0.05 -0.05 -0.06	11 96 44 91 	12400			1400.049		

• XY Back origin

Back origin XY Back origin parameter, as shown in the figure below. Please refer to the 7.4.3 for details.

🔅 C:\RaytoolSoftware\2DCutAhead2.0\AheadLaserConfigFiles\Work\WorkProject.2DLaserConfig - Version:2.4.2.20985 🛱 — 🗇 🗙									
File Config by types Tool Help									
Save Restart Controller Save I/O card Save I/O con KY Save I/O con Mecha	Flow correction f	Laser Laser Ar head Device g	sist Dust removal as valve Gas path	Alarms Button Physical button Custom	Pallet Lubrication changer	• • • •			
Return to origin									
X axis	ICO	Y axis							
Return origi Increment. ~			Return origin	Increment ~					
Return origin direct Negative ~ Limit		Ret	urn origin directi	Negative ~ Zero	~				
Return orig 1.8m	n/min 👻		Return orig	1.8m/mi	in -				
back dis	5mm ~		back dis	5mr	m *				
Aft back set coordi	0mm *	A	it back set coordi	0mr	m -				
Absolute zero of	0mm -		Absolute zero of	Omr	m -				
PowerOn Config									
Auto-open Return to origin if not returne Prompt for return to origin by alarm	ed yet in starting software								

♦ Z-axis follow

The Z-axis follow parameters are shown in the figure below. Please refer to the 7.4.4 for details.

C:\RaytoolSoftw	are\2DCutAhead2.0\AheadLaserConfigFiles\Work\WorkProject.2DLaserConfig - Version:2.4.2.20985 🛱 — 🗗 🗙
File Config by types Tool Help	
Save Restart Controller Save V/O card V/O con VY Axis Pitch compensatio	XY Back Z-Axis Verticality Laser Laser Assist Dust removal Alarms Button Physical Pallet Lubrication Dust removal iechanical Beam path Gas path Custom Custom Custom Custom
Z-Axis Filow	
Servo Parameter	Return to Origin Parameter
Motor direction Positive \checkmark *	Homing mode Incremental Mode ~
Pulse number 10000 - *	Return origin direction a Positive ~ Limit ~
Pitch 10mm * *	Return origin speed 0.9m/min *
Man fallen un affant	Back Dictance
Speed unit of Drive pulse/s ~ *	Coordinate aft backward
Speed loop feedforwa 0.01 *	Origin point offset com 0mm *
	axis point and port config
	Servo axis Node 3:Axis 🗸
	Positive hard limit Node 4:DL 9 V NO V
	Negative hard lim Node 4:DL_7 VNO V
	Soft limit range -55 - ~ 2 - mm
	Brake output Not used ~



Verticality correction ٠

learninri Verticality correction, as shown in the figure below. Please refer to the 7.4.5 for details.

•	G:1	\RaytoolSoftware\2DCutA	head2.0\AheadLase	erConfigFiles\Worl	<pre>c\WorkProject.2DLaserC</pre>	onfig - Version:2.4	4.2.20985	e –	o x
File Config by ty	<mark>ypes Tool He</mark> lp	0							
Save Restart Controller Save	I/O card L/O con	Pitch XY Back compensation Origin Mechanical	Z-Axis Fllow	Laser Laser head Device Beam path	Assist Dust removal gas Dust removal valve Gas path	Alarms Button	Physical Pallet button	Lubrication	
Verticality	correction		•						
Verticality 1.Cut a rectar 2.Select vertic	correction ngle. Measure and in ality correction and	nput AB,AC, L1 and L2 save	ISC	<u>)</u>](Ju	ρ.	U		
Length AB Length AC Length L1 Length L2	100mm 100mm 141.4mm 141.4mm	Y + C + A + A + A + A + A + A + A + A + A			DUI	0.	ru		

Laser head

Laser head parameters, as shown in the following figure. Please refer to the 7.4.6 for details.

File Config by types Tool Help Save Restart Save I/O con XY Axis (XY Axis (Save I/O con	Raytool5oftware\2DCutAhead2.0\AheadLaserConfigFiles\Work\WorkProject.2DLaserConfig - Version:2.4.2.20985 24 - O × Pitch XY Back Z-Axis Verticality Pitch KY Back Z-Axis Verticality Mechanical earn path Gas path Custom Physical Device Custom
Brand Bayes Model BS20K Focus control mode BS Smart Focus Height sensor type EDS On Board Height sensor tignal port Height sensor Capacitan	Focus adjmt Limit Correspond Scale 1.7 * Soft Limit Rangemm -20 * 0 * Close Focus Head Enabl Close Covity Temp Alarm Close Cavity Temp Alarm Close Cavity Gas Pressur Close Bottom Cover Tem Close WIFI Alarm Close Bottom Cover Tem Close WIFI Alarm Close Bottom Cover Tem
Restore to factory default	mlsgroup.ru

System Commissioning Manual

♦ Laser Device

Laser Device parameters, as shown in the following figure. Please refer to the 7.4.7 for details.

File Config by types	C:\RaytoolSoftware\2DC Tool Help	utAhead2.0\AheadL	aserConfigFiles\Work	\WorkProject.2DLa	aserConfig - Version:2	2.4.2.20985	а —	ø	×
Save Restart Save I/O confi	ard XY Axis Pitch XY Ba compensation Origi	ck Z-Axis Verticalit Filow correctio	y Laser head Beap path	Assist Dust remo gas Valve Gas path	Alarms Button Custo	Physical Pallet button chang	Lubrication		
Laser Device									
Board card output t	to laser signal		Laser Brand and	Parameter		2			
Laser Enable Laser Red Light Laser Shutter Laser Reset	Node 4:D0_4 ~ Node 4:D0_13 ~ Node 4:D0_9 ~ Node 4:D0_10 ~ Shutter and Red Light are mutua ~	lly exclusive	Voltage Feedback voltage Anale FlyCu	Laser brand: Laser power: Frequency: of max power: of max power: goutput delay t laser on delay	Raycus V 1500 - W 5000 - Hz 10 - V 0 - ms 0 - ms	ru			
	All outputs of PWM		FlyCu	t laser off delay	0 * ms				
Laser input to boar	d card signal								
Laser alarm:	Node 4:DI_20 ~	NO ~							
Chiller alarm:	Node 4:DI_21 ~	NO ~							
Safety door alarm:	Node 4:DI_22	NO ~	ard	ЭН	h	rH			

♦ Assist gases

Assist gas cell valve and analog output settings, as shown below. Please refer to the 7.4.8 for details.

•		Software\	2DCutAhead2		serConfigFiles\W		Project.2DLaser		:2.4.2.20985			
File Config t	by types Tool Help											
Save Restart Controlle Save	r I/O card config v I/O con	tch XY ensation C Mecha	Back Z-Axis Filow	Verticality correction	Laser Laser head Devic Beam path	Assis gas	t Dust removal valve Gas path	Alarms Butto	on Physical button	Pallet L changer	Jubrication	~
Assist a	as magnetic valve a	nd ana	log outr	out sett	ina	/						
Assist gas	magnetic valve and analog ou	tput setti	ng									
	Magnetic Valve	Pro	oportion Valve	Power	Max pre	sure	Proportion	Valve Analog				
Air Ne	ot used 🗸 🗸	Not use	d	~	- 30BA	R -	Not used		~	Main I	Magnetic Valve	
Oxygen N	ode 4:DO_1	Not use	d	~	10B/	R -	Node 4:AO_2		~	Not used	```	-
Nitro N	ode <mark>4</mark> :DO_2	Not use	d	~	30B/	R -	Not used		~			
1.Open 2.Singa	proportion valve power control si Is in green area support repeated s	Gnal when c	the power super gas, and	ipply of all pr	ropo n gas off. Close v	ilve signa	l when it's anoth Enable cutting	er gas type and	confi	Not used		
Assist gas	digital alarm and analog feed	back settir	ıg		Gas analog al	arm sett	ing					
	Digital gas pressure alarn	n	Logic			An	alog gas pressure	feedback	Max press	ure fee	Alarm threshold	(
Air	Not used	~	NO	~	Air	Not use	d	~	30BAR	-	0 ~	
Oxygen	Node 4:DI_18	~	NO	~	Oxygen	Not use	d	~	30BAR	-	0 -	
Nitrogen	Node 4:DI_19	~	NO	~	Nitrogen	Not use	d	~	30BAR	-	0 ~	
1. Digita	Gas diqital/analog alarm d al alarm configured on-demand, tl	elay he way with	5ms 👻 gas alarm trig	igered	1. Please c 2.When th	onfirm th e feedbac	e equipment has k pressure is lowe	0-10V analog si ar than the alarn	gnal gas press n threshold, th	ure feedbac ie alarm will	k sensor. If not, p be triggered. Wh	-
Handling o	f gas pressure alarm during p	rocessing										
	Suspend processing	when gas p	ressure alarm	on	Open ~							

System Commissioning Manual

• Dust removal valve

Dust removal valve parameters, as shown in the following figure. Please refer to the 7.4.9 for details.

C:\RaytoolSoftware\2DCutAhead2.0\AheadLaserConfigFiles\Work\WorkProject.2DLaserConfig - Vers	ion:2.4.2.20985 🛱 — 🗇 🗙
File Config by types Tool Help	
Save Restart U/O cord XY Axis Pitch XY Back Z-Axis Verticality Save V O con Machanical Save Restart Control of the save Restart Control of	Litton Physical Palet Lubrication III
Dust removal valve	
Dust Removal Setting	
Carable partition output:	(602,602)
Only open output in cutting	
Overlayed area length(X/Y):	502
X: 20 - Y: 50 - (e) Set output port b O Set output by X-Y coordinates	
Note: 1. Click left mouse button and drag to adjust dust removal area. 2. Accurate adjust by pressing Ctrl key to drag	401
<u>4-D07</u>	301
4 <u>-D06</u>	201
4-D05	
ннадгоор.	1U

♦ Alarm

1-16 custom alarm settings, as shown below. Please refer to the 7.4.10 for details.

٥			C:\RaytoolS	oftware\2DCutA	head2.0\AheadLa	serConfigFiles\Wo	k\WorkProject.2DLas	erConfig - Versi	on:2.4.2.20985	a —	0
File	Config by 1	types To	ol Help					-			
	R	G	*	1 1	2				1 2 0	ند را ا	
Save	Restart	I/O card	XY Axis Pitc	h XY Back	Z-Axis Verticality	Laser Laser	Assist Dust remo	val Alarms Bu	tton Physical Pallet	Lubrication	
	Controller	config ~	compen	sation Origin	Fllow correction	head Device	gas valve		button chang	er	- ·
5	ave	I/O con		Mechanical		Beam path	Gas path	CL	istom		
C	tom al	0.000						1			
Cu	stom ai	arm						-			
2	Alarm info (CNS)			Alarm in	fo (EN)		Logic	Process allow	Allow return to ori	Allow move	Filtering tim
28	1报警			Custom	er Warning Custon	nerOne	Normally open	~	 Image: A set of the set of the	 Image: A set of the set of the	20
29	2报警			Custom	er Warning Custon	Normally open		1	1	10	
30	自定义报	警3报警		Custom	er Warning Custon	Normally open	~	~	~	10	
31	自定义报警4报警				er Warning Custon	nerFour	Normally open	~	~	\checkmark	10
32	自定义报警5报警				er Warning Custon	nerFive	Normally open	\checkmark	~	\checkmark	10
33	自定义报	警6报警		Custom	er Warning Custon	nerSix	Normally open	~	~		10
34	自定义报警7报警				er Warning Custon	nerSeven	Normally open	~	~		10
35	自定义报警8报警			Custom	er Warning Custom	nerEight	Normally open	~	~	~	10
36	自定义报	警9报警		Custom	er Warning Custon	nerNine	Normally open	~	~		10
37	自定义报	警10报警		Custom	er Warning Custon	nerTen	Normally open	~	1	1	10
80	自定义报	警11报警		Custom	tomer Warning CustomerEleven		Normally open	~	~	~	10
81	自定义报	醫12报醫		Custom	er Warning Custon	Normally open	\checkmark	Image: A start of the start	\checkmark	10	
82	自定义报	警13报警		Custom	er Warning Custon	Normally open	~		\checkmark	10	
83	自定义报	警14报警		Custom	er Warning Custon	Normally open	1	~		10	
84	自定义报	整15报警		Custom	er Warning Custon	Normally open				10	
85	自定义报	警16报警		Custom	er Warning Custom	nerSixTeen	Normally open	~	\checkmark	1	10
IO po	ints		Logic		Process allow		Allow return to ori	gin	Allow move		
			-					-			
	IO confi	g	All NO	All NC	All allow	All deny	All allow	All deny	All allow	All deny	
								10		1	

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Button

Buttons are divided into custom buttons and physical buttons.

Custom button, as shown in the following figure. Please refer to the 7.4.11 for details.

•		C:\RaytoolSo		Ahead2.0\AheadLas	erConfigFiles\Worl		onfig - Version:2.4.2.2098	
File Config by	types To	ol Help						
Save	I/O card config ~ I/O con	XY Axis Pitch compensa	XY Back tion Origin Mechanical	Z-Axis Verticality Fllow correction	Laser head Device Beam path	Assist Dust removal valve Gas path	Alarms Button Physical button	Pallet Lubrication
Custom b	utton						1	
Number index Us	ed	Cmd ID	name (CNS)			name (EN)		Signal type
1		401	备用1			Spare1		Triggered type signal
2		402	备用2			Spare2		Holding type signal
3		403	备用3			Spare3		Holding type signal
4		404	备用4			Spare4		Holding type signal
5		405	备用5			Spare5		Holding type signal
6		406	备用6			Spare6		Holding type signal
7		407	备用7			Spare7		Holding type signal
8		408	备用8			Spare8		Holding type signal
9		409	备用9			Spare9		Holding type signal
10		410	备用10			Spare10		Holding type signal
11		411	备用11			Spare11		Holding type signal
12		412	备用12			Spare12		Holding type signal
13		413	备用13			Spare13		Holding type signal
14		414	备用14			Spare14		Holding type signal
15		415	备用15			Spare15		Holding type signal
16		416	备用16			Spare16		Holding type signal
IO points		Onekey to	o set usage stat	us	On	ekey to set signal type		
10 c	onfig	Enabl	e All	Disable 4		All Holding	All Triggere	

Physical button, as shown in the following figure. Please refer to the 7.4.12 for details.

	C:\RaytoolSof	tware\2DCutAhead2.0	\AheadLa	serConfigFiles\Work\\	VorkProject.2DLaser	Config - Version:2.4.2	.20985		6	i x
e Config by types	Tool Help									
ave Restart Controller	rd XY Axis Pitch compensat	XY Back Z-Axis ion Origin Fllow	Verticality	Laser Laser head Device	Assist Dust removal gas valve	Alarms Button Ph	ysical Pallet tton	Lubrication r	ی ۱	~
Save I/O co	1	Mechanical		Beam path	Gas path	Custom				
Control Panel						- 1				
Control Panel		_		3-color light outp	ut signal config					
Start signal logic	Node 4:DI_14	~ NO	~	Red lin	ht Node 4:DO_16	~				
Pause signal logic	Node 4:DI_17	✓ NO	~	Yellow li	ht Node 4:DO_14					
Reset signal logic	Not used	~ NO	~	Green li	ht Node 4:DO_15	~				
-	Node 4:DI 13	✓ NC	~							

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• Pallet changer

Pallet changer parameters, as shown in the following figure. Please refer to the 7.4.13 for details.

Config by types Tool F	ielp 💼 +	7	- 1			A 💽 📼	000	
n Bastart I/O card XY/A		7.4%	ticalhu La	🛃 🌴 🛤 🔛 🦀	🔺 🚠 🖌 🧐	🥪 🎼 📃	000	
Controller config ~	compensation Origin	Flow corr	ection he	ad Device gas valve	button changer	control axis config	remote	
Save I/O con	Mechanical		E	learn path Gas path	Custom			
allet changer								
Start pallet changer	Horizontal switch	Hydraul	ic lift	O Motor lift	External pallet changer			
Signal Input				Signal Output		Hardware Button		
Emergency stop	Not used	~	W0	~				
Stop	Not used	~ [V0			Forward	d Not used VNO V	
Forward in-pos	Not used	~	NO	~ Forwa	d Not used 🗸	Backwa	d Not used VNO V	
Backward in-pos	Not used	~	NO	~ Backwa	d Not used 🗸	OneKey exchance	e Not used VNO V	
Forward deceleration	Not used	~	NO OV	✓ High sper	d Not used 🗸	Asce	nt Not used V NO V	
Backward deceleration	Not used	~	V0	 Low spee 	d Not used 🗸	Desce	Not used V NO V	
Up-row unclamed in-pos logic	Not used	~	NO	Up-pallet cylinder unclampe	d Not used 🗸	Manual mor	le Notused V NO V	
Up-row clamped in-pos logic	Not used	×	NO	Up-pallet cylinder clampi	d Not used 🗸	Jog/Auto mode swite	h UseHMI v	
Low-row unclamped in-pos logic	Not used	. ~	NO OV	 Low-pallet cylinder unclampe 	d Not used ~			
Low-row clamped in-pos logic	Not used	~	N0	 Low-cylinder clampe 	d Not used ~			
Cylinder unclamped in-pos sig	500 ms		No	~				
Cylinder clamped in-pos signal		Į	No	~				
Hydraulic lift								
Rise in-nos sinnal lonic	Not used		NO	V	· Manual ·			
Dercent in-por signal logic	Not used	~	NO	Cocking cylinder unclamp	Met used			
Un-nallet mark logic	Not used	~	NO	Locking cytinder clamp	A Notured			
Low-pallet mark logic	Not used	~	NO	Hydrautic pump enable outp v p:	a Notused			
Cylinder unclamped in-new logic	Not used	~	NO	v Durus i	A Not used			
Cylinder clamped in-pos logic	Not used	~	NO	Vescent comma	10			
0:09:040 ==>Module online deter	ction failed. Please confirm c	urrent confi	g matches t	he online module!!				

◆ Lubrication

Lubrication parameters, as shown in the figure below. Please refer to the 7.4.14 for details.

		C:\	RaytoolSoftwa	re\2DCutAh	ead2.0\AheadLas	serConfigFiles\\	Vork\Work	Project.2DLaser	Config - Versi	ion:2.4.2.2098	5	g –	٥	×
File Config by	types To	ol Help				11								
Save Restart Controller	C I/O card config ~	XY Axis	Pitch compensation	XY Back Z Origin F	Axis Verticality	Laser Las head Dev	er Assis	t Dust removal valve	Alarms Bu	Jtton Physical button	Pallet changer	Lubrication	.	•
Save	I/O con		Me	chanical		Beam pat	1	Gas path	Ci	ustom	1			^
Lubricatio	n													
Interval			3 *	h	9									
Duration			30 *	s										
Pump overpre	ssure alarm	Not used		~	N0 ~									
Low oil alarm		Node 4:E	1_15	~	N0 ~									
Oil pump outp	out	Node 4:E	10_12	*	20	r		Ir		r				

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Panel Control

1. Select the software interface display according to the display, as shown in the following figure:

•								C:\RaytoolS	oftware\	2DCutA	head2.0\A	headLase	ConfigFiles\\	Work\Wo	rkProject.2DL	aserConfig -	- Version
File Config by	types Tool He	elp															
Save Restart Controller	I/O card config v	s Pitch compensation	XY Back Z-Axis Origin Flow	Verticality correction	U Laser head	Laser Device	Assist [gas	Dust removal valve	Alarms	Button	Physical button	Pallet changer	Lubrication	Panel control	Gegmented axis config	000 000 Wireless remote	
Save	I/O con	Ме	chanical		Beam	n path	Ga	s path		Custon	-	-					
Panel Con	itrol					-	_										
Mod	le Selection	Display main	form only 🔹														
		n		50													

2. Set Mainform height of the main interface, Number of camera, Camera brand, and Display monitor panel:

Mode Selection	Contain Monitor Pa
Mainform Settings	
Mainform Height	1080
Camera Setting	
Number of c	2
Camera brand	HIKVISION -
🗸 Display moni	tor panel

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3. Open the software and right-click on an empty space in the monitoring panel.



4. Setting the camera's user name, password, IP, and port number↔



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• Segmented axis configuration

Mechanical parameters and hardware configurations for the three segmented axis parameters C, V and B can be configured as shown below. Please refer to the 7.4.15 for details.

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Ele Config by types Tool Help	C:\RaytoolSoftware\2DCutAhead2.0\AheadLaserConfigFiles\Work\WorkProject.2DLaserConfig - Ve
Save I/O con	XY Back Z-Axis Verticality Laser Laser Asist Dust removal gas Akirns Button Physical button Palet Lubrication Panel Segmented Control Segmented S
Segmented cutting axis parame	ter config
C Axis V Axis B Axis	
Servo Parameter	Return to Origin Parameter
Motor direction Negative ~ *	Homing mode Set current point to \vee
Pulse number 10000 - *	Return origin direction a Positive -> Limit ->
Pitch 10mm - *	Return origin speed 0. 12m/min
Speed unit of Drive pulse/s ~ *	Back Distance 5mm -
Speed loop feedforwa 0.01 -	Coordinate aft backward s 0 ~
Max follow-up offset 5mm +	Origin point offset compe 0mm ~
System Latency 5ms +	
Manual Speed	axis point and port config
Manual slow 0. 12m/min *	Servo axis Not used
Manual fast 0.24m/min *	Positive hard limit s VNO V
Auto Speed	Negative hard limit NO V
Speed 1.8m/min *	Soft limit Close ~
Acceleration 2000mm/s^2 *	Soft limit range -10 * ~ 10 * mm
Acc time 100ms -	Axis taq
Torque control	
Motor polarity 1 ~	
Max torque 200 ~	
Torque feedforward a 0 *	

• Handle configuration

You can configure the functions of K1~K4 and Fn+K1~K4 keys in the wireless handle, and you can also change the up/down/left/right axis motorized direction, as shown in the following figure.

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Tools



firmware: Update firmware

Update to the main control module firmware, the update will overwrite the original program and configuration information, then re-activate the configuration.



: Firmware authorization

For kernel master authorization, if not authorized, contact our after-sales professionals.



: Advanced option, please refer to the 7.4.16 for details.

Language: Simplified Chinese, Traditional Chinese and English are available.

Advanced option: Please do not change the check box, if you need to change, please contact us.



: Machine backup

Back up the machine configuration parameters, process parameters, and system parameters.



: Machine restore

Restore the machine configuration parameters, process parameters, and system parameters.

Help



: About

Copyright notice and tips for this software.



: Information

Set the machine name, machine model, machine number and machine factory date.

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5.1.2 PLC Variable Classification Area

By selecting different tabs, the variables displayed in the PLC variables area will follow the changes including: Flat General Configuration, Switchboard, Dust Extraction Valve, Custom

General Configuration General Configuration. This tab contains: cutting motion axes, height sensors and PLC variables such as capacitance value, limit signal, button

input, nitrogen and oxygen pressure alarm, and start/pause / emergency stop /reset button can be selected through the PLC variable pin selection area.



Pallet changer. This tab contains all the variables related to the switch.

Dust removal valve



U

Dust removal valve. This tab contains the 32-way dust partition variables

Custom. This tab contains custom alarms, user custom IO inputs.

User custom I outputs, 16 of each, 48 variables in total.

Among them, custom alarm name and NO/NC can be set in the HMI alarm; user custom IO output can be customized in the HMI output point for hold or trigger type.



Extension axis config. This tab contains the PLC defined variable IO input 10 positive and 10 negative limits and 10 extension axes.

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Current configuration area 5.1.3

You can view the current profile's point link definition and connection order in this area. You can also add, insert, change or delete slave and point link information; Please refer to section 5.3 for details. aroup.ru

Online Module Area 5.1.4

This area will only appear when the configuration of the current configuration area is different from the actual configuration, at which time the module online detection button will also have a red flashing alert.

PLC Variable Area 5.1.5

The PLC Variables area lists all PLC variables, and point link information.

5.1.6 **PLC Variable Pin Selection**

You can select variables by variable type, and find the required PLC variables faster.

5.1.7 Journal area

The log area displays important information such as the status of the connection to the master, whether the activation was successful, etc.

5.1.8 **Status Area**

The status area shows whether the CNC master is offline, whether the configuration platform is pipe cut or flat, the version number of the XStudio compilation, the Information such as whether the CCD pin is supported.

5.2 Configure and change points

5.2.1 Operation on slave stations

Add:

1) Right-click - Append EtherCAT Node - select the slave to be added.

C:\Raytool Config by types Tool Help	sortware\2DCutAnead2.U\AneadLaserConfigH	BS_WORK/WORKProject.2DLaserCommg - Version:2,4,2,21030 44 -
I 🚱 🥵 😫 🔳	I I 🛃 🔜 💙	* 🋎 🔛 🔺 🚣 🚄 🦈 💊 🤏 👘
Restart I/O card XY Axis Pite Controller config x	h XY Back Z-Axis Verticality Laser	Laser Assist Dust removal Alarms Button Physical Pallet Lubrication
Save I/O con	Mechanical Ream	path Gar path Curtom
System Configured EtherCAT Modules		bach custom
	Append EtherCAT node	Empower EDS2000 3
1	Insert EtherCAT node	Empower EDS3000
	Append EIM Module to EIM9100	Empower EDS2010(16In 16Out)
	Append EIM Module	Empower EDS100
	Insert EIM Module	Empower EDS2011(8In 8Out)
	Delete node	Empower C300 height controller
	Change node VID-PID	Empower DX150P
	Update firmware	Empower EIM9100
	opuate innivate	Empower-Cutting headBS06K/BS12K(PID:0000eb06)
	Y1Axis-Gantry Slave	Empower-Cutting headBS20K(PID:0000eb10)
	ZAXIS	Empower-Cutting headBS04KE(PID:0000eb12)
	PAXIS-FOCUS	Empower-Cutting headBS06KE(PID:0000eb13)
	Feight sensor capacitance	Empower-Cutting headBS08KE(PID:0000eb14)
	Disitel insut DLC ussishing	Empower-Cutting headBS12KE(PID:0000eb11)
	Digital input PLC variables	Empower-Cutting headBS20KE(PID:0000eb15)
	Home signal of X-axis	LGR(PID:19501068)
	Positive hard limit signal of X-axis	Empower COE Drive(PID:003e0402)
	Negative hard limit signal of Y-axi	INVT COE Drive(PID:0000000)
	Positive bard limit signal of Y-axis	ServoTronix COE Drive(PID:00000000)
	Negative hard limit signal of Z-axi	Yaskawa COE Drive(PID:02200301)
	Home signal of Z-axis	Panasonic COE Drive(PID:6038000a)
	Positive hard limit signal of Z-axis	Delta COE Drive(PID:10305070)
	Emergency stop	Inovance COE Drive(PID:000c0108)
	Start button	KollMorgen COE Drive(PID:00414b44)
	Oxygen pressure alarm	CoolDrive Drive(PID:0000006)
	Pause button Positive hard limit signal of E-avia	LICHUAN ELECTRICAL Drive(PID:00001100)
	Negative hard limit signal of F-axis	DuanHui Drive(PID:00001001)
	Nitrogen pressure alarm	General COE Drive(VID:0000000,PID:00000000)
	High oil level alarm	
	enets tio mo t	

2) Appending completed



Insert
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1) Select the insert location, right-click - Insert EtherCAT Node - select the slave to be inserted.

C:\Raytool	Software\2DCutAhead2.0\AheadLaserConfigFiles\	Work\WorkProject.2DLaserConfig - Version:2.4.2.21030	x - o ×
File Config by types Tool Help			
Save I/O con	th XY Back Z-Axis Verticality sation Origin Flow correction Beam pai	iser Assist Dust removal vice gas valve th Gas path Custom	Lubrication
System Configured EtherCAT Modules			
Node Utempower EDS2000 V0X00	Append EtherCAT node	and axis config	
	Insert EtherCAT node +	Empower EDS2000	config 🛖
	Append EIM Module to EIM9100	Empower EDS3000	
	Append EIM Module	Empower EDS2010(16In 16Out)	
	Insert EIM Module >	Empower EDS100	^
	Delete node	Empower EDS2011(Sin Bodd)	· · · · · · · · · · · · · · · · · · ·
	Change node VID-PID	Empower Csoo height controller	
	Update firmware	Empower EIM9100	
n	ZAris ZAris Facility Ensor Capacitance Sensor Capacitance value Digital input PLC variables Negative hand limit signal of X-awis Negative hand limit signal of F-awis Nitrogen pressure alarm High oi li evid alarm Low oil alarm Safely protection of 2Dplane and tube Store button	Empower-Cutting headBS06K/BS12K(PID.0000eb06) Empower-Cutting headBS20K(PID.0000eb12) Empower-Cutting headBS20K(PID.0000eb12) Empower-Cutting headBS06K(PID.0000eb13) Empower-Cutting headBS06K(PID.0000eb11) Empower-Cutting headBS12K(PID.0000eb11) Empower-Cutting headBS12K(PID.0000eb13) IGR(PID.19501068) Empower COE Drive(PID.003e0402) IINVT COE Drive(PID.003e0402) INVT COE Drive(PID.003e0402) ServoTronix COE Drive(PID.003e0402) INVT COE Drive(PID.003e0000) ServoTronix COE Drive(PID.0030010) Panasonic COE Drive(PID.00300108) KollMorgen COE Drive(PID.00001100) Deantful Drive(PID.00001001) General COE Drive(PID.00000100)	

2) Insertion completed



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Delete

1) Select the slave that needs to be deleted, right-click - Delete node, and select Yes in the pop-

up dialog box



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2) Delete completed

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٥			C:\	RaytoolSoft	ware\2	DCutAhead2	.0\AheadLas	erConfigFiles
File	Config by	types To	ol Help	D				
Save	Restart Controller	C I/O card config ~	XY Axis	Pitch compensatio	xy on O	Back Z-Axis rigin Fllow	Verticality correction	Laser La head De
	Save	I/O con	hCAT A	ta dulas	Mecha	nical		Beam pa
÷	Node 0:	Empower ED	S2000 V0	X00		IO car	d input/	output
	<u> </u>	m	Sg	TO	u	Pallet chang	ier í	Dust re

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5.2.2 Changing the slave connection order

Method 1: Use the above add, insert, delete, and repeat operation to change the slave connection order. Method 2: Select the slave station you need to move, press and hold the mouse and drag it to the location you want to move, and then release the left mouse button.

Note: The order from top to bottom is the actual order of the actual network cable serial slave, and the position must correspond one by one, otherwise the slave can't enter the OP state, resulting in the software can't operate!

5.2.3 Linking operations to slave sites

Add link:

1) Select the hardware pins to be linked and right click - Connection request.

C:\RaytoolSoftware\2	DCutAhead2.0\AheadLaser	rConfigFiles\Work	\WorkProject.2DLaser	Config - Version:2.4.2.2103	0 ¤ —	o x
File Config by types Tool Help						
Save I/O con.	Back Z-Axis Verticality Fllow correction	Laser head Device Beam path	Assist Dust removal gas valve Gas path	Alarms Button Physical button	Pallet Lubrication	~ ^
System Configured EtherCAT Modules Solution	IO card input/o	output and	d axis config			
 Servo Port_2<=> Servo Port_3<=> Servo Port_4<=> Focus Axis (9-Pin)<=> Height Sensor Capacitance=> 	General Configuration General PLC and axis va	Pallet change ariable	er 🙀 Dust r	emoval valve 👝 Cust	om <u>A</u> ex	tension :
DL1=> DL2=> DL3=> DL3=> DL5=> DL3=> DL3=> DL3=> DL3=> DL3=> DL1== DL1== DL	PLC variable definition Main axes Yaxis-Gantry Main Xaxis Y1Axis-Gantry Slave ZAxis FAxis-Focus Height Sensor Capacit Sensor capacitance value Digital input PLC variat Negative hard limit signal Home signal of X-axis	ance bles of X-axis	Connecte Node 1:5 Node 1:5 Node 1:5 Node 1:5 Node 1:Fr Node 1:Fr Node 1:D Node 1:D	d hardware pin ervo Port_1 ervo Port_2 ervo Port_3 ervo Port_4 bocus Axis (9-Pin) eight Sensor Capacitance		^

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2) Select the PLC variable to be linked in the PLC variable area and right-click - Confirm connection.

IO card input/output and	axis config	
General Configuration	ℚ Dust removal valve ෬ Custom A Extension	ion :
General PLC and axis variable		
PLC variable definition Main axes	Connected hardware pin	^
YAxis-Gantry Main	Node 1:Servo Port 1	
XAxis	Node 1:Servo Port 2	
Y1Axis-Gantry Slave	Node 1:Servo Port_3	
ZAxis	Node 1:Servo Port_4	
FAxis-Focus	Node 1:Focus Axis (9-Pin)	
Height Sensor Capacitance		
Sensor capacitance value	Node 1:Height Sensor Capacitance	
Digital input PLC variables		
Negative hard limit signal of X-axis Home signal of X-axis	Node 1:DL1 2	
Positive hard limit signal of X-axis	Node 1:DI_3	
Negative hard limit signal of Y-axis	Node 1:DI_4 Confirm connection <= > Node 0:DI_3	
Home signal of Y-axis	Node 1:DI_5 Delete connection	
Positive hard limit signal of Y-axis	Node 1:DL6 Display PLC path	
Negative hard limit signal of Z-axis	Node 1:DL_7	_
Home signal of Z-axis	Node 1:DI_8	
Positive hard limit signal of Z-axis	Node 1:DI_9	
Emergency stop	Node 1:DI_13	
Start button	Node 1:DI_14	

3) The link is complete and both the current configuration area and the PLC variable area have dotted link information.

🔅 C:\RaytoolSoftware\	2DCutAhead2.0\AheadLase	rConfigFiles\Work	<pre>c\WorkProject.2DLaserC</pre>	onfig - Version:2.4.2.2103	0 X – D	×
File Config by types Tool Help						
🔒 🚱 🚱 🔝	1 🏒 🛄	₽ *	🎫 🔛	🔔 🏯 🧷	🤣 🍐 👒	
Save Restart I/O card XY Axis Pitch XY Controller config ~ Compensation (Back Z-Axis Verticality Origin Fllow correction	Laser Laser head Device	Assist Dust removal gas valve	Alarms Button Physical button	Pallet Lubrication	
Save I/O con Mecha	inical	Beam path	Gas path	Custom		^
System Configured EtherCAT Modules Server EDS2000 V0X00 Serve Port_1<=>	IO card input/	output and	d axis config			
Servo Port_2<=>	General Configuration	Pallet change	er Dust re	moval valve Cust	om Q Extension	
Servo Port_3<=>						4 1
Focus Axis (9-Pin)<=>	General PLC and axis v	ariable				
Height Sensor Capacitance=>						
	PLC variable definition		Connecter	l hardware pin		^
DI 2=>	National Action		Connected	indianale pin		
DI_3=>POSICIVE Hard while signal of X-axis	Iviain axes					
====================================	YAxis-Gantry Main		Node 1:Se	rvo Port_1		
² DI_6=>	XAxis		Node 1:Se	rvo Port_2		
	V1Axis-Gantry Slave		Node 1:Se	rvo Port_3		
DI_8=>	ZAxis		Node 1:Se	rvo Port_4		
	FAxis-Focus		Node 1:Fo	cus Axis (9-Pin)		
DI 11=>	Height Sensor Capaci	tance				
	Sensor capacitance value	6	Node 1:He	ight Sensor Capacitance		
	Disital issue DLC use	la la se		,		
DI_14=>	Digital input PEC varia	ibles				
DI 16=>	Negative hard limit signa	l of X-axis				
DI_17=>	Home signal of X-axis					
	Positive hard limit signal	of X-axis	Node 0:DI	3		
DI_19=>	Negative hard limit signa	l of Y-axis				
DI_20=>	Home signal of Y-axis					
DI 22=>	Positive hard limit signal	of Y-axis				
DI_23=>	Negative hard limit signa	l of Z-axis				
	Home signal of Z-axis					
DO_1<=	Positive hard limit signal	of Z-axis				

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Delete the link:

Method 1:

1) Select the pin in the current configuration area where the link needs to be removed and

 $right\mbox{-click}-Delete\mbox{ connection}.$





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Method 2:

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1) In the PLC Variables area, select the variable that needs to be deleted from the link and right-

click - Delete connection.

Negative hard limit signal of X-axis	
Positive hard limit signal of X-axis	Node 0:DI_3
Negative hard limit signal of Y-axis	Confirm connection<=>Node 0:DI
Home signal of Y-axis	Delete connection
Positive hard limit signal of Y-axis	Display PLC path
Negative hard limit signal of Z-axis	subul i se ben

2) Delete completed

Change the link: first delete the original link, and then add the link again.

Height Sensor Capacitance=>		-	
DI_1=>	PLC variable definition	Connected hardware pin	
7 DI_3=>	Main axes		
DI_4=>	YAxis-Gantry Main	Node 1:Servo Port_1	
DI 6=>	XAxis	Node 1:Servo Port_2	
DI_7=>	Y1Axis-Gantry Slave	Node 1:Servo Port_3	
DI_8=>	ZAxis	Node 1:Servo Port_4	
DI_9=>	FAxis-Focus	Node 1:Focus Axis (9-Pin)	
DI 11=>	Height Sensor Capacitance		
DI_12=>	Sensor capacitance value	Node 1:Height Sensor Capacitance	
DI_13=>	Digital input PLC variables		
DI_14=>	Negative based line it signal of V avia		
DI 16=>	Negative hard limit signal of X-axis		

5.3 Example Demonstration

To familiarize customers with the overall usage process, this section will demonstrate two examples with the following requirements: Example 1:

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Requirements: 1. Import XC3000 standard configuration, machine configuration as follows:

4 pulse servos for X, Y, Y1, Z axes, one EDS3000 board, use this configuration for the points in the standard configuration.

Process:

Click

Open the configuration tool and enter the password: 4006701510.



the Import Standard Config and then select XC3000S, EDS3000

Module, Pulse-dir servo in the pop-up box. After that check the unique file in the configuration and click Use selected config.

Standard configura	tion selection						~
Filter criteria	2			3			
System XC3000S	V Keyword1 EDS2000	~	Keyword2	Pulse-dir drive	~	Qs	earch
Config Description (C3000S+Pulse-dir drive+EDS2000 (C3000S+Pulse-dir drive+EDS2000)+EDS2010 (Internal PLC pallet)	Syst 	t em Configu Node 0:Empo	red EtherCAT Mod ower EDS2000 V0X0	dules 0		
	4						
		Ψι					
		>		5			
		2	4	selected configu	uration	•	Exit

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Example 2:

Requirements:

1. The existing machine configuration is as follows:

Panasonic servo motors 4, respectively for X, Y, Y1, Z axis, an EDS board, you need to connect all the limit signals according to the standard points, the network cable connection order is Y, X, Y1, Z, EDS3000 board, delete the nodes in the current configuration area and create a new configuration, backup the new configuration in order to import to other replicators with the same configuration.

Process:

1) Open the configuration tool and input the password: 4006701510 to delete the previous configuration

node through the operation in subsection 4.2.1.

Add 4 Panasonic Servos and one EDS3000 board to the blank configuration and adjust the position according to the actual network cable connection order.



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2) Turn on the first servo (station 0) and connect it to the Y-axis; turn on the second

servo (station 1) and connect it to the X-axis; turn on the third servo (station 2) and connect it to the Y1-axis; turn on the fourth servo (station 3) and connect it to the Z-axis.



3) Tap on the EDS3000 and connect all limit signals according to the actual wiring.



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Confirm the configuration and click Save, then click

in Tool under the sub-page to

back up the current configuration. Subsequent copies of the model can be imported directly into this backup file.

Click



For another machine with the same configuration, you can directly click to open the previously saved backup file, to quickly copy the machine configuration and speed up the installation and commissioning efficiency.

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6 Precautions and exception handling

- 6.1 Electrical and commissioning considerations
- 6.1.1 Solenoid valve must be connected in parallel with a continuity diode



The diode has a unidirectional conductivity, that is, the diode anode and cathode with a positive voltage, the diode conducts. When the reverse voltage is added to the anode and cathode, the diode is cut off. Diode conduction and cut-off, then the equivalent of the switch on and off. Our diodes are equipped with MIC 6A10.

The following is a wiring diagram and a physical drawing





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DC power 24V to the cathode of the diode, DC power 0V to the anode of the diode; Connection in reverse will lead to a short circuit.

6.1.2 Power supply wiring specification

1. The power supply requires electrical installation specifications and separation of low and high voltage.

2、 24 power supply and payload with the relatively large interference (such as servo, solenoid valve) and the controller should take power supply separately.



3. Servo grounding recommended to use star connection, as the correct connection can ensure the stable operation of the equipment.

6.2 F-axis abnormality handling method

If F-axis control is abnormal without alarm when using axis control mode to control F-axis, please follow the steps below to troubleshoot.

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6.2.1 Control BM109 Cutting head abnormal treatment

If the servo does not have any alarm but the software has an F-axis drive alarm, change the drive parameter PR16 to 1 and save it according to the following procedure.



6.2.2 BM111 Yaskawa Focusing Driver

If the drive can be enabled, but cannot control the motor movement, please change the drive parameter Pn000 to 0011.

6.3 Normal Questions

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6.3.1 Host cannot enter the system

1. Confirm that the host and monitor 220V power supply is normal, and use the universal measurement host input power. The standard host power supply is DC12V.

2. Reboot the host to observe if it can enter the host interface normally.

3. Program run-down for abnormal system problems. The system is equipped with a one-key restore system function: one-key (OneKEY) to restore in the boot page.

6.3.2 Enter the system sheet showing that the slave is not connected or not

in OP status

1. Check whether the network cable order is connected as required, and the connection order please refer to (1.2 System Composition and Connection Order).

2. Check the network cable and the board for bad contact.

6.3.3 Software interface to view slave communication status

If you encounter communication interruptions, check the following steps: Find the "Hardware" button on the left side of the main screen, and click on it to refer to the communication problems.



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Slave station order	Slave station name	Op Status	P0-Crc	PO-PHY	P1-Crc	P1-PHY	P2-Crc	P2-PHY					
0	HCFA	OP	0	0	0	0							
1	HCFA	OP	0	0	0	0							
2	HCFA	OP	0	0	0	0							
3	HCFA	OP	0	0	0	0							
4	EDS3000	OP	0	140									
n	nls	50)	r (0	ι		0		r	ľ		
Master0		SQ)	(0	l		0		r	ľ	J	
Master0 Phase: Operatio Active: yes		SQ)	r (0	L		0		r	ľ	J	
Master0 Phase: Operatio Active: yes Slaves: 5		SQ)	r (0	ι		0		r	ľ		
Master0 Phase: Operatio Active: yes Slaves: 5 Ethernet devices		SQ)	r	C	L		0		r	ί	J	
Master0 Phase: Operatio Active: yes Slaves: 5 Ethernet devices Main: 00:e2:69:	n 22:47:76 (attached)	SQ)		C	L		0		r	ľ		
Master0 Phase: Operatio Active: yes Slaves: 5 Ethennet devicee Link: UP	n 22477:76 (attached)	SQ)	r	0	L		0	-	r	l	l	
Master0 Phase: Operatio Active: yes Slaves: 5 Ethernet devices Main: 00:e2:69: Link: UP Tx frames: 15	n 22477.76 (attached) 5650978	SQ	3	1	C	L		0		r	ľ	ļ	
Master0 Phase: Operatio Active: yes Slaves: 5 Ethernet devices: Main: 00:e2:69: Link: UP Tx frames: 19 Tx bytes: 54	n 22:47:76 (attached) 3650978 315999600	SQ	3		0			0	-	r	l	<u> </u>	

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If the OP status column doesn't show OP, the communication is not connected; if PO-Crc or P0-PHY has a non-zero value in any column, it means the slave is interfered with, and if the value is large, it means the communication is broken. You need to find the appropriate slave to observe if it is a wiring alignment problem, or a hardware or network cable problem.

Note: All network cables, encoder cables and sensor cables on the amplifier should not be tied together with the power cable.

If the servo is connected to the servo through the network cable, and the communication interruption between the servo is detected, check whether the network cable between the servo and the servo is well connected, and whether the connection between the crystal head of the network cable and the servo is well connected and loose.

Wiring Precautions:

(1.) Confirm that the site of the electrical control cabinet is well grounded. Resistance within 10 ohms, the smaller the better (preferably can be installed independent ground stake, only for laser cutting machine)

(2.) Low voltage and high voltage cables need to be separated. Don't entangle each other Network cable connection display indication



EtherCAT Interface / Ethernet Interface

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	Eth	nerCAT Interfac	e Connection S ription	Status	
EtherCAT	Tags	Description	LED Color	Status	Description
	1: Speed	EtherCAT bus	Green	Extinguished	10 Mbps connection
	n	connection speed	roui	Always bright	100 Mbps connection
			Orange	Always bright	1000 Mbps connection
	2: LINK	EtherCAT	Yellow	Extinguished	No connection
				Blinking	In data
	n	Bus Link	rolli	n ru	communication
		Status		Always bright	Connected

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	n.	Ethernet interface desc	e connection sta ription	atus	
	Tags	Description	LED Color	Status	Description
Ethernet	1: Speed	Ethernet communication connection speed	Green	Extinguished Always bright Always bright	10 Mbps connection 100 Mbps connection 1000 Mbps connection
	2: LINK	Ethernet Communication link status	Yellow	Extinguished Blinking Always bright	No connection In data communication Connected

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7 Appendix

7.1 EDS2000 (Optional)

The XC3000S is compatible with the EDS2000 board. EDS2000 is available when EDS3000 is not used.

7.1.1 EDS2000 IO Card



The EDS2000 is an EtherCAT bus-based slave interface board with a rich set of IO, motion control and laser follower interfaces and resources, especially for signal acquisition and motion control applications in the laser industry.

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7.1.2 EDS2000 Wiring Diagram



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7.1.3 EDS2000 Laser Point Diagram



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7.1.4 EDS2000 Servo Drive Interface

1) The four servo control interfaces on the general-purpose axis (X,Y, Y1, Z) interface board are three-row

DB15 (hole) sockets, as shown in the figure below



The pins are defined as follows:

Foot	Signal	Function	Foot	Signal	Function
number	Name	mlsar	number	Name	1
1	A+	A-phase encoder pulse	13	XD+	Axis rotation
		input +			direction switching
					output +
2	A-	A-phase encoder pulse	14	XD-	Axis rotation direction
		input - SOF	nu	n ri	switching output -
3	\mathbf{B}^+	B-phase encoder pulse	8	ALM	Servo alarm input
		input +			
4	B-	B-phase encoder pulse	9	SON	Servo enable output
		input -			
5	Z+	Z-phase encoder pulse	10	CLR	Axis Clear Output
		input +			
7	Z-	Z-phase encoder pulse	6	P24V	24V power supply
		input -			
11	XP+	Axis speed control	15	PGND	Power Ground
		output +	DU	D.rl	
12	XP-	Axis speed control			

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output -	

2) The 1 F-axis control connector on the focus axis (F-axis) interface board is a two-row DB9 (hole) socket, as shown in the following figure:



The pins are defined as follows:

		F-axis interfac	F-axis interface signal description						
Foot number	Signal Name	Function	Foot number	Signal Name	Function				
1	CLR	Axis Clear Output	6	SON	Axis rotation direction switching output +				
2	ALM	Servo alarm input	7 0	PP	Axis rotation direction switching output -				
3	NP	Axis speed control output -	8	ND	Servo alarm input				
4	PD	Axis rotation direction switching output +	9	PGND	Servo enable output				
5	P24V	24V power supply							

Note: EDS2000 board SON and ALM signals are active low (0V output active and 0V input active).

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3) Servo driver control signal wiring diagram.

The following items should be noted when connecting the servo drive:

The EDS2000 uses a pulse + direction signal to control the servo drive, and you must confirm that the drive supports this mode.

Confirm the selected type of Servo Drive Enable Signal (SON) is active low (ON when conducting with 24V power ground).

Confirm the selected type of Servo Drive alarm signal (ALM) is active low (ON when conducting with 24V power ground).

Confirm the servo drive parameters are set correctly. If the servo cannot run, the parameters should be set to "Forward and reverse input disable". The F-axis servo interface is an open-loop control interface and does not support encoder signal input.

Wiring with Yaskawa, HCFA, Panasonic, Delta B series & A2 series, and Fuji servo drives, please refer to the following wiring diagram.

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If you have any questions, please consult our technical professionals.

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7.1.5 EDS2000 Servo Drive Interface

Yaskawa E-7 Series AC Servo Drive

Wiring Diagram

Servo control in	terface
EDS3000-DB15	3-pin(male)

shielded wire

Yaskawa servo 50 Pin interface

A+ 3 purple 33 P A- 11 yellow 34 /F B+ 4 yellow & black 35 P B- 12 blue 36 /F Z+ 5 blue & black 19 P Z- 13 black & white 20 /F M red & black 11 S1 XP+ 1 red & black 11 S1 XD+ 2 green 8 /PU XD+ 10 brown 12 /S ALM 14 orange 31 AI SON 6 orange & black 40 /S CLR 7 red & black 44 /ALM P24V 8 black 47 +24	Signal	Pin	Line	A		Pin	Signal
A- 11 yellow 34 //F B+ 4 yellow & black 35 P B- 12 blue 36 /F Z+ 5 blue & black 19 P Z- 13 black & white 20 /F M - - 20 /F XP+ 1 red & black 7 PU XP- 9 green 8 /PU XD+ 2 green & black 11 S1 XD- 10 brown 12 /S ALM 14 orange 31 AI SON 6 orange & black 40 /S CLR 7 red & black 44 /ALM P24V 8 black 47 +24	A+	3	purple			33	PAO
B+ 4 yellow & black 35 P. B- 12 blue 36 /F Z+ 5 blue & black 19 P. Z- 13 black & white 20 /F XP+ 1 red & black 7 PU XP- 9 green 8 /PU XD+ 2 green & black 11 S1 XD- 10 brown 12 /S ALM 14 orange 31 AI SON 6 orange & black 40 /S CLR 7 red & black 44 /ALM P24V 8 black 47 +24	A-	11	yellow			34	/PAO
B- 12 blue 36 /F Z+ 5 blue & black 19 P Z- 13 black & white 20 /F XP+ 1 red & black 7 PU XP- 9 green 8 /PU XD+ 2 green & black 11 S1 XD- 10 brown 12 /S ALM 14 orange 31 AI SON 6 orange & black 40 /S CLR 7 red & black 44 /ALM P24V 8 black 47 +24	B+	4	yellow & black			35	PBO
Z+ 5 blue & black 19 Pr Z- 13 black & white 20 /F XP+ 1 red & black 7 PU XP- 9 green 8 /PU XD+ 2 green & black 11 S1 XD- 10 brown 12 /S ALM 14 orange 31 AI SON 6 orange & black 40 /S CLR 7 red & black 44 /ALM P24V 8 black 47 +24	B-	12	blue			36	/PB0
Z- 13 black & white 20 /F XP+ 1 red & black 7 PU XP- 9 green 8 /PU XD+ 2 green & black 11 S1 XD- 10 brown 12 /S ALM 14 orange 31 AI SON 6 orange & black 40 /S CLR 7 red & black 44 /ALM P24V 8 black 47 +24	Z+	5	blue & black	11		19	PCO
XP+ 1 red & black 7 PU XP- 9 green 8 /PU XD+ 2 green & black 11 S1 XD- 10 brown 12 /S ALM 14 orange 31 AI SON 6 orange & black 40 /S CLR 7 red & black 44 /ALM P24V 8 black 47 +24	Z-	13	black & white	11		20	/PCO
XP- 9 green 8 /PL XD+ 2 green & black 11 S1 XD- 10 brown 12 /S ALM 14 orange 31 AI SON 6 orange & black 40 /S CLR 7 red & black 44 /ALM P24V 8 black 47 +24	XP+	1	red & black	through		7	PULSE
XD+ 2 green & black 11 S1 XD- 10 brown 12 /S ALM 14 orange 31 AI SON 6 orange & black 40 /S CLR 7 red & black 44 /ALM P24V 8 black 47 +24	XP-	9	green			8	/PULSE
XD- 10 brown 12 /S ALM 14 orange 31 AI SON 6 orange &black 40 /S CLR 7 red & black 44 /ALM P24V 8 black 47 +24	XD+	2	green & black			11	SIGN
ALM 14 orange SON 6 orange █ CLR 7 red & black P24V 8 black	XD-	10	brown	 	1	12	/SIGN
SON 6 orange &black 40 /S CLR 7 red & black 44 /ALM P24V 8 black 47 +24	ALM	14	orange			31	ALM+
CLR 7 red & black 44 /ALM P24V 8 black 47 +24	SON	6	orange &black	1 1		40	/S-ON
P24V 8 black 47 +24	CLR	7	red & black	+ +		44	/ALM-RST
	P24	8	black		1	47	+24VIN
PGND 15 black & brown 1 S	PGNI	15	black & brown			1	SG

	Yasl	kawa Servo Setting Parameters
Parameter Type	Recommended	Setting range
	Value	yiuup.iu
Pn000	0.0.1.0	0.0.x.0 (0 speed; 1 position) 0.0.0.X (0 forward; 1
		reverse)
Pn000	0.1.0.1	0.X.0.0 (0 three-phase power; 1 single-phase power);
	ml	0.0.0.X (0 display setting, 1 display all parameters)



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Pn200	0.0.0.0	0.0.0.X (0 pulses + direction positive logic, 5 pulses + direction negative logic). X.0.0.0 (linear 1M)
Pn50A	8100	Positive turn prohibition cancellation
Pn50B	6548	Reverse ban cancellation
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HCFA Servo Drive Wiring Diagram

-DB15 3-pin (male)			shielded wire		HCFA servo 50 Pin int	
Signal	Pin	Line		Line	Signal	
A+	3	purple	1	36	OUTA	
A-	11	yellow	1	37	/OUTA	
B+	4	yellow&black		38	OUTB	
B-	12	blue	1	39	/OUTB	
Z+	5	blue&black	u uu	40	OUTZ	
Z-	13	black&white		41	/OUTZ	
XP+	1	red&black		26	CMD PLS	
XP-	9	green	-	27	/CMD PLS	
XD+	2	green&black	-	30	CMD DIR	
XD-	10	brown	1	31	/CMD DIF	
ALM	14	orange		21	S ERR+	
SON	6	orange&black		4	S ON	
CLR	7	red&black	HUUP	5	ERR-RST	
P24V	8	black		3	COM+	
PGND	15	brown&black	i	12	COM-	
					S ERR-	

	HCF	A Servo Setting Parameters
Parameter	Recommended	Setting range
Туре	Value	jroup.ru
P00-01	0	0 Position mode; 1 Speed mode; 7 Bus mode
P00-07	0	0: Pulse + direction positive logic; 1 Pulse - direction negative logic
P00-16	misc	0: forward; 1: reverse

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Panasonic MINAS A6 AC Servo Drive

Wiring Diagram

Servo control in S3000-DB15 3	nterfac B-pin(m	e ale)		shielded wire	Panasonic serv	vo 50 Pin inter
Sig	nal	Pin	Line	<u> </u>	Pin	Signal
A	A+	3	purple		21	OA+
A	A-	11	yellow		22	OA-
В	B+	4	yellow&black	$\frac{1}{2}$	48	OB+
B	B-	12	blue	<u> </u>	49	OB-
Z	Z+	5	blue&black	11 1	23	0Z+
Z	Z-	13	black&white		24	OZ-
X	CP+	1	red&black		44	PULSH1
X	CP-	9	green		45	PULSH2
X	D+	2	green&black	chronni	46	SIGNH1
XI	ID-	10	brown	əyruupi	47	SIGNH2
A	LM	14	orange		37	ALM+
S	SON	6	orange&black	1	29	SRV-ON
C	LR	7	red&black	++	31	A-CLR
P2	24V	8	black		7	COM+
PG	GND	15	brown&black	N. N.	41	COM-
				d'arour'	36	ALM-
	_	-				

	Panasonic Servo	Setting Parameters
	1	
Parameter	Recommended	Setting range
Туре	Value	oup.ru
Pr001	0	0: Position control, 1: Speed control
Pr007	³ mloor	3: Pulse plus direction
Pr005	ımsyr	1: High-speed pulse 3mpa;0: Low- speed pulse 500kpps



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Delta B Series Servo Drive Wiring Diagram

3000-DB	15 3-р	in (male)	shielded wire	Delta serv	o 44 Pin interf
Signal	Pin	Line		Pin	Signal
A+	3	purple	· /	21	OA
A-	11	yellow	1	22	/OA
B+	4	yellow&black	1	25	OB
B-	12	blue		23	/0B
Z+	5	blue&black	1	13	OZ
Z-	13	black&white	daroun	24	/0Z
XP+	1	red&black	<u>agroup</u>	38	HPULSE
XP-	9	green		36	/HPULSE
XD+	2	green&black	-	42	HSIGN
XD-	10	brown		40	/HSIGN
ALM	14	orange	+ +	28	ALRM+
SON	6	orange&black		9	SON
CLR	7	red&black		33	ARST
P24V	8	black		11	COM+
PGND	15	brown&black		14	COM-
			· <u> </u>	27	ALRM-

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00-DB1	5 3-pin	-pin(male) shielded wire		Delta servo	Delta servo 50 Pin inte		
ignal	Pin	Line	<u>~</u>		Signal		
A+	3	purple	4	21	OA		
A-	11	yellow	1	22	/0A		
B+	4	yellow&black		25	OB		
B-	12	blue		23	/0B		
Z+	5	blue&black		50	OZ		
Z-	13	black&white		24	/0Z		
XP+	1	red&black		38	HPULSE		
XP-	9	green		29	/HPULSE		
XD+	2	green&black		46	HSIGN		
XD-	10	brown	1	40	/HSIGN		
ALM	14	orange	darour	28	005+ ALRM		
SON	6	orange&black	491001	9	DI1 SON		
CLR	7	red&black		33	DI5 ARST		
P24V	8	black	+	11	COM+		
PGND	15	brown&black	d	45	COM-		

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Delta Servo Setting Parameters				
Parameter	Recommended	Setting range		
Туре	Value SOI	bub.ru		
P1-00	0x1002	Thousands of bits 1 High-speed differential		
P1-01	0x0000	Percentile 1 is the reverse		
P2-10	0x0101			

Fuji ALPHA5 Smart Servo Drive

Wiring Diagram

Cignal	Din Lino	Din	Sign
Signai			Signa
A+	3 purple	9	FFA
A-	11 yellow	10	*FFA
B+	4 yellow&black	11	FFB
B-	12 blue	12	*FFB
Z+	5 blue&black	23	FFZ
Z-	13 black&white	24	*FFZ
XP+	1 red&black	7	CA
XP-	9 green	8	*CA
XD+	2 green&black	20	CB
XD-	10 brown	21	*CB
ALM	14 orange	17	OUT3
SON	6 orange&black	2	CONT 1
CLR	7 red&black	3	CONT2
P24V	8 black	1	COMIN
PGND	15 hoursehler	14	COMOU

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	mis	CITOLIO IL
	Fuji S	Servo Setting Parameters
Parameter	Recommended	Setting range
Туре	Value	
		aroup ru
PA-101	0	0position 1speed 2torque 3position <=>
		speed
		4position <=>
		Torque 5Speed <=> Torque 6Extended mode
	mls	7Positioning operation
PA-103	1	0Differential input: Command pulse/symbol
		1Differential input: Forward pulse/reverse
		Pulse 2differential input :90° bit phase
		difference 2
		signal 10open collector input
		Command pulse/symbol 11 open collector input:
		forward pulse/reverse pulse
		12open collector input :90° bit phase difference 2
	_	signal
	mla	droup ru

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F-axis Yaskawa servo drive wiring

diagram

Signal Pin Line XP+ 7 red&black XP- 3 green vp. p green	Pin 7	Signal
XP+ 7 red&black XP- 3 green vp. p green&black	7	PA11 .02
XP- 3 green vp. a green&black		PULS
vp. green&black	8	/PULS
AD+ 8 2	11	SIGN
XD- 4 brown	12	/SIGN
ALM 2 orange	31	ALM+
SON 6 orange&black	40	/S-0N
CLR 1 red&black	44	/ALM-RS1
P24V 5 black	47	+24VIN
L and D L L al	1	SG

Leadshine Servo Drive Wiring Diagram

Signal	Pin	Line			Signal	Pin
VP+	7	red&black	1	1	3 grian	DIT +
VP-	2	green			4	PUL+
XD+	8	green&black		1	5	DIR+
XD-	4	brown			6	DIR-
ALM	2	orange			12	ALM+
SON	6	orange&black	1-1-	1 1	1	ENA+
CLR	1	red&black	1 1	1 1		
P24V	5	black	1 1	1 1		
PGND	9	brown&black	11	11	9/18/26	SGND
			*		13	ALM-
					2	ENA-

Leadshine Servo Series Basic Parameter			
Parameter Type	Recommended	Setting range	
	Value		
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P0-01	° mis	0position 1Speed 2torque 3position <=> speed 4Position<=>Torque5Speed<=> Torque	
P0-07	3	3: Pulse + Direction	
P0-12		Encoder feedback reversal	
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7.2 EDS3000 Wiring Diagram



7.3 EDS2010 Wiring Diagram



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7.4 EPC-2000 Size Diagram



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7.5 EPC-1020 Size Diagram



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7.6 Parameter Definition

7.6.1 XY mechanical parameter and hardware config

X, Y-axis mechanical parameters			
Parameter Name	Default Value	Remarks	
Encoder pulse number	10000	How many pulses are sent to the servo and the motor turns one revolution	
Motor direction	Positive	Motor rotation direction is CW or CCW; when the shaft moves in the wrong direction, you can change this option	
Pitch	36	The actual distance the shaft moves when the motor turns one revolution	
Backlash compensation	0	For compensating the backlash of the gearbox	
Max speed	⁶⁰ mls	Limit the maximum speed of the machine. When the command speed is greater than this speed, this speed is more accurate. The maximum speed and pitch of the motor are generally used to calculate the maximum speed	
Max following offset	60	When the absolute value of the difference between the commanded position and the actual position is greater than this value, the software will alarm for stopping operating	
Max acceleration	6000	The maximum value of acceleration, if any acceleration value is greater than this value, then this value shall prevail	
Sync X parameters to Y	Unchecked	Synchronize X-axis mechanical parameters to Y-axis mechanical parameters	
Sync Y parameters to X	Unchecked	Synchronize Y-axis mechanical parameters to X-axis mechanical parameters	



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Separate set	Selected	X-axis mechanical parameters and Y-axis mechanical parameters are not synchronized, set separately		
Positive hard limit signal	DI3/D16	Positive and hard limit pins can be set		
	NO	NO: no output for limit in untriggered state, select this item		
		NC: output		
		NC: output for limit in untriggered state, select this item		
Zero signal	DI2/D15	Settable zero pins		
	NOS	NO: no output for limit in untriggered state, select this item		
		NC: output for limit in untriggered state, select this item		
Negative hard limit	DI2/D14	Negative hard limit nins can be set		
regative hard mint				
signal	NO	NO: no output for limit in untriggered state, select this item		
	mle	NC: output for limit in untriggered state, select this item		
Servo axis		Fill in according to the actual configuration		
Soft limit range	0~ 1500	Range of X-axis movement of the cutting head after the		
Soft mint funge	0 1200	realize of A axis movement of the catching head after the		
		software returns to zero		
All limits NO	Unchecked	X-axis and Y-axis limit signals are all NO		
	1113	group.ru		
All limits NC	Unchecked	All X-axis and Y-axis limit signals are NC		
Separate set	Selected	X-axis and Y-axis limit signals are set separately		
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misaralia rii				
	Dual-drive parameters			
Parameter Name	Default Value	Remarks		
Slave axis Y1 port	axis	Select axis and fill in according to the actual configuration		
Master-Slave Axes SYNC Dir	Reverse	Y1 axis motor rotation direction		
Max offset in Master-slave SYNC	10mm	When the absolute value of the difference between the commanded position and the actual position is greater than this value, the software will alarm and shut down.		
Duration	0 ms	Alarm for continuously reaching the set time exists exceeds the maximum tolerance error		
Master slave stop state error	1mm	In static conditions, if the absolute value of the difference between the commanded position and the actual position is greater than this value, the software will alarm and shut down.		

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7.6.2 Pitch

		Pitch parameters	
Parameter Name	Default	Remarks	
	Value		
Open Pitch	Unchecked	Enable and disable the pitch compensation function for the	
Compensation	mis	corresponding axis	
Reverse Offset	None	Interferometer parameters are inverted, and the error is inverted	
		for actual conditions	

7.6.3 X/Y Back origin parameter

	X/Y-axis Back origin parameters			
Parameter Name	Default	Remarks		
	Value	aroup ru		
Return origin mode	Absolute	Incremental: find the zero signal back to zero and use the zero signal as a reference point Absolute: move to the zero position of the driver feedback, the Position 0 of the drive feedback is the reference point		
Return origin direction and	Negative	Positive: When returning to zero, move in the positive		
type	direction,	direction		
-	zero	Negative: When returning to zero, move zero in the negative		
	position	direction:		
		Zero position: Use zero as the reference point to return to zero		
		Limit: determined according to the return to zero		
	mle	direction, if the positive direction is selected, the positive limit		
	1112	is reference point back to zero; if negative direction is		
		selected, the negative limit will be used as the reference point		

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		to return to zero
Return origin speed	^{1.8}	Speed of finding the reference signal when returning to zero
Back distance	0	Distance from zero return to limit signal setback
Aft back set coordinate	0	Coordinate value of the reference switch in the coordinate system
Absolute zero offset	mle	Use the current point as the zero point; commissioning without limit switches
		You can use it for temporary debugging when

7.6.4 Z-Axis follow parameter

		SUIUUU.IU
		Z-axis follow parameters
Parameter Name	Default Value	Remarks
Pulse number	10000	How many pulses to send to the servo, the motor turns one revolution
Motor direction	Positive	The motor rotation direction is CW or CCW; when the shaft moves in the wrong direction, it can change this option
Pitch	10	The actual distance the shaft moves when the motor turns one revolution
Speed unit of drive	pulse/s	Selectable pulse/s, 0.1RPM, RPM
Speed loop feedforward coefficient	0.01	Default is fine OUD IU
Max follow-up offset	30	When the absolute value of the difference between the commanded position and the actual position is greater than this value, the software will alarm and shut down.
Homing mode	Incremental	Incremental: Find the zero signal back to zero and use the zero signal as a reference point

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Absolute: Move to the zero position of the drive feedback, with the position 0 of the drive feedback as the reference pointReturn origin direction PositivePositive: When returning to zero, move in the positive direction to find the return to zero, refer to the switch Reverse: When returning to zero, move in the negative direction to find the return to zero, refer to the switch Reverse: When returning to zero reference switch Zero position: use zero position as a return to zero reference switchReturn origin speed0.9Speed of finding the reference signal when returning to zero Back distance0Ostance from zero return to limit signal setbackCoordinate aft packward set as00Use the current point as the zero point; for temporary debugging when commissioning without limit switchesServo axisaxisaxisFill in according to the actual configurationNO no output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit		System Commissioning Manual			
Return origin direction Positive and typePositive Positive Positive: When returning to zero, move in the positive direction to find the return to zero, refer to the switch Reverse: When returning to zero, move in the negative direction to find the return to zero, refer to the switch Reverse: When returning to zero, move in the negative direction to find the return to zero, refer to the switchReturn to home signalLimit Limit Umit: Use the limit as a return to zero reference switch Zero position: use zero position as a return to zero reference switchReturn origin speed0.9Speed of finding the reference signal when returning to zeroBack distance5Distance from zero return to limit signal setbackCoordinate aft packward set as0Coordinate value of the reference switch in the coordinate system when commissioning without limit switchesServo axisaxisFill in according to the actual configurationPositive hard limit gignalDI9Positive and hard limit pins can be set NO: no output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: ou			Absolute: Move to the zero position of the drive feedback, with the		
Return origin direction and typePositive PositivePositive: When returning to zero, move in the positive direction to find the return to zero, refer to the switch Reverse: When returning to zero, move in the negative direction to find the return to zero, refer to the switchReturn to home signalLimit Limit Limit Umit: Use the limit as a return to zero reference switch Zero position: use zero position as a return to zero reference switchReturn origin speed0.9Speed of finding the reference signal when returning to zeroBack distance5Distance from zero return to limit signal setbackCoordinate aft backward set as0Coordinate value of the reference switch in the coordinate system when commissioning without limit switchesPositive hard limit signalD19Positive and hard limit pins can be set NO: no output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untr			position 0 of the drive feedback as the reference		
Return origin direction Positive Positive: When returning to zero, move in the positive direction to find the return to zero, refer to the switch Return to home Limit Iimit: Use the limit as a return to zero reference switch Return origin speed 0.9 Speed of finding the reference signal when returning to zero Back distance 5 Distance from zero return to limit signal setback Coordinate aft 0 Coordinate value of the reference switch in the coordinate system backward set as Origin point offset 0 Use the current point as the zero point; for temporary debugging when commissioning without limit switches Servo axis axis Fill in according to the actual configuration Positive hard limit DI9 Positive and hard limit pins can be set NO NO: no output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NO NO: no output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NO NO NO: no output for limit in untriggered state, select this item NC: output for limit in untriggered state, select this item NC: output f			point COOO CO		
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Back output DI6 Settable holding brake output pins			returns to zero		
	Back output	DI6	Settable holding brake output pins		
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7.6.5 Verticality correction

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	Verticality corre	ection parameters		
Parameter Name	Default Value	Remarks		
Start verticality	Unchecked	Turn on and off the		
correcting		verticality correction		
n	hlsard	function		
Length AB	100mm	Verticality correction function tests the length of		
		one side of a cut rectangle		
Length AC	100mm	Perpendicularity correction function tests the		
		length of the other side of the cut rectangle		
Length L1	141.4mm	The length of one diagonal of the actual cut		
	IIISCIC	rectangle, which needs to be measured.		
	3	After that, fill in that length here		
Length L2	141.4mm	The length of the other diagonal of the rectangle		
		after the actual cutting, which needs to be measured.		
		After measuring, fill in that length here		
n	hlsard	bup.ru		

7.6.6 Laser head

Laser head				
Parameter Name	Default Value	Remarks		
Brand	RAYTOOLS	Select the cutting head brand		
Model	BT210/240	Select the cutting head model		
Focus control mode	Manual Focusing	Choose according to the type of focus supported by the cutting		

7.6.7 Laser Device

XC3000S Series Laser Cutting

System Commissioning Manual			
		head	
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Height sensor type	EDS On-Board Capacitive	Select by actual heightening	
	Sensors	equipment	
Height sensor signal port	Not used	Choose by actual configuration	

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Laser Device parameters Parameter Name Default Value Remarks Laser Shutter DO9 Pin selection according to actual wiring Laser Red Light DO13 Pin selection according to actual wiring Pin selection according to actual wiring Laser Enable DO4 Laser Reset Pin selection according to actual wiring DO10 Shutter and Red light are unchecked When checked, the red light button and the light gate button mutually exclusive. are mutually exclusive and cannot be turned on at the same time Pin selection according to actual wiring AO3 Laser power Just check the default box All outputs of PWM Check Laser Alarm Not in use, NO Settable laser alarm pins Alarm signal can be selected as NO or NC Chiller Alarm Chiller alarm pins can be set Not in use, NO Alarm signal can be selected as NO or NC Safety door alarm Not in use, NO Settable safety door alarm pins Alarm signal can be selected as NO or NC

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Safety door alarm stop	Unchecked	When checked, processing will be stopped when the	
processing	mler	safety gate alarm is activated during processing	
Laser brand		Just choose by the actual laser brand	
Laser power	1000	Average power of the filled laser	
Frequency	5000	Fill in the laser frequency, commonly 5000Hz	
Voltage of max power	10 SC	Fill in the maximum value of the laser feedback power analog, commonly 5V and 10V	
Feedback voltage of max	10	Fill in the maximum value of the laser feedback power	
power		analog, common 5V and 10V	
		Output delay 0 are filled in advance.	
Analog output delay	0	The analog output is filled in advance and then output	
	IIISQ	enable signal and PWM signal, generally for 50ms	
FlyCut laser on delay	0	How many ms in advance of the flying cut? This	
		parameter is usually filled in 0, and it is recommended	
		to use the advance distance in the nesting to adjust	
		whether the flying cut contour is closed or not.	
FlyCut laser off delay	0 50	How many ms of flying cut lag to turn off the light? This	
		parameter is usually filled in 0, and it is recommended to	
		use the advance distance in the nesting to adjust	
		whether the flying cutting contour is closed or not.	

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7.6.8 Assist gas cell valve and analog output settings

System Commissioning Manual

Assist gas setting parameters			
Parameter Name	Default Value	Remarks	
Air Magnetic Valve	DO9	Settable air magnetic pin	
Air Proportional Valve Power	Not used	Settable air proportional valve power pin	
Air Max Pressure	10	Max pressure supported by the air proportional valve, e.g., if using 0-10BAR proportional valve, this value could be 10.	
Air Proportional Valve Analog	Not used	Settable proportional analog pins	
Oxygen Magnetic Valve	DO1 SO	Settable oxygen solenoid pin	
Oxygen Proportional Valve Power	Not used 🤍	Settable oxygen proportional valve power pin	
Oxygen Max Pressure	10	Max pressure supported by the air proportional valve, e.g., if using 0-10BAR proportional valve, this value could be 10.	
Oxygen Proportional Valve Analog	A02 50	Settable proportional valve analog pin	
Nitrogen Magnetic Valve	DO2	Settable nitrogen magnetic Valve pin	
Nitrogen proportional cell valve	Not used	Settable nitrogen proportional cell valve pin	
Nitrogen Max Pressure	30	Max pressure supported by the nitrogen proportional valve, e.g., if using 0-30BAR proportional valve, the value can be 30.	
Nitrogen Proportional Valve Analog	Not used	Settable nitrogen proportional valve analog pin	
Main Magnetic Valve	Not used	Settable main magnetic valve	

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Close the power supply of all	Unchecked	When checked, all proportional valve power is	
proportion valves after the		turned off after the processing program is rushed.	
procedure.	niso	roup.ru	
Enable cutting head air	Unchecked	When checked, blowing is turned on when the light	
cooling		comes out and off when the light stops.	
	Not used	Cutting head air cooling solenoid valve port setting	
A ¹ 1 ¹ 1 1			
Air digital gas pressure alarm	Not used	Settable air digital gas pressure alarm input pin	
Oxygen digital gas pressure	DI18	Settable oxygen digital gas pressure alarm input pin	
alarm			
Nitrogen digital gas pressure	DI19	Settable nitrogen digital gas pressure alarm input pin	
-1 - m			
alarm			
Air digital gas pressure alarm	NO SO	NO: No signal output in untriggered, select this item	
logic	1.63	NC: signal output in untriggered, select this item	
Oxygen digital gas pressure	NO	NO: No signal output in untriggered, select this item	
alarm logic		NC: signal output in untriggered, select this item	
Nitrogen digital gas pressure	NO	NO: No signal output in untriggered, select this item	
alarm logic	nisg	NC: signal output in untriggered, select this item	
Air analog gas pressure	Not used	Settable air analog gas pressure feedback pin	
feedback			
Oxygen analog gas pressure	Not used	Settable oxygen analog gas pressure feedback pin	
feedback	nlsq	roup.ru	
Nitrogen analog gas pressure	Not used	Settable nitrogen analog gas pressure feedback pin	
feedback			
Suspend processing when gas	Opening	Stopping processing for gas pressure alarm	
pressure alarm on			
	insg	TOUP.TU	

7.6.9 Dust removal valve

	<u> </u>		
Dust removal valve parameters			
Parameter Name	Default Value	Remarks	
Enable partition output	checked	Whether to open the dust removal function	
Row & Col	4/misgr	Number of rows and columns of partitioned dusting arrays	
Dust removal axis	DO5-DO8	Which axis coordinate is used to open the dust cylinder?	
Overlayed area length (XY)	misgr	Common zone with the next dusting area, in which this dusting and the next dusting point will be turned on at the same time to ensure the dusting effect	
Close output port delay	checked	After leaving the dusting area, the dusting output is closed with a delay to avoid frequent opening and closing of the dusting solenoid valve when the shaft is moving at the boundary of the area.	
Only open output in cutting	checked	When checked, the dust removal points are only output when the light is out	
Custom removal length	1500*3000	Distance to set up dust removal length	

7.6.10 Alarms

XC3000S Series Laser Cutting

System Commissioning Manual			
Alarms parameters			
Parameter Name	Remarks SCIOUD IU		
ID	Corresponds to custom alarms number 1, 2, 3		
Alarm info (CNS)	In Chinese language, this message will be printed after the alarm		
Alarm info (EN)	In English language, this message will be printed after the alarm		
Logic	Select whether the alarm signal is NO or NC, according to the actual choice		
Process allow	When checked, allow processing when an alarm occurs When unchecked, not allow processing when an alarm occurs		
Node Configuration	Settable custom alarm input pin		
All NO	After clicking, all custom alarms have become NO		
All NC	After clicking, all custom alarms have become NC		
All allow	After clicking, allow processing when custom alarm occurs		
All deny	After clicking, not allow processing when custom alarm occurs		
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System Commissioning Manual

7.6.11 Button

Parameter Name Remarks Corresponds to custom buttons number 1, 2, 3Number index When checked, the HMI interface will display this button Used Cmd ID Default Name (CNS) Button (Chinese) Name (EN) Button (English) Set the alarm signal as hold or trigger type Signal type Node configuration Settable custom button output pin Enable all After clicking, all custom buttons are enabled Disable all After clicking, all custom buttons are disabled All Hold-type After clicking, all custom buttons are now in the holding-type All Triggered-type After clicking, all custom buttons are in triggered-type

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7.6.12 Physical button Sgroup ru

Physical button			
Parameter Name	Default Value	Remarks	
Start signal logic	DI14 NO	Settable start signal input pins NO: No signal output in untriggered, select this item. NC: signal output in untriggered, select this item.	
Pause signal logic	DI17	Settable pause signal input pins	
		NO: No signal output in untriggered, select this item.	
n	NO SOI	NC: signal output in untriggered, select this item.	
Reset signal logic	Not use	Settable reset signal input pins	
	NO	NO: No signal output in untriggered, select this item. NC: signal output in untriggered, select this item.	
Emergency stop alarm logic	DI13	Settable emergency stopping alarm signal input pins	
	lisgi	NO: No signal output in untriggered, select this item.	
	NO	NC: signal output in untriggered, select this item.	
Red light	DO13	Red light of tricolor lamp	
Yellow light	DO14	Yellow light of tricolor lamp	
Green light	DO15	Green light of tricolor lamp	

7.6.13 Pallet changer

Input Signal parameters				
input orgnar parameters				
Parameter Name	Default Value	Remarks		
Start pallet changer	Unchecked	When checked, the pallet changer is started.		
Туре	Horizontal	Optional horizontal translation, hydraulic lift, motor		
	panning	lift, servo axis exchange, Y-axis pulling, external		
		exchange table Selection based on actual pallet		
	mlsar	changer.		
Emergency stop	Not used	Settable emergency stopping alarm signal input pin		
	NC	pallet changer emergency stop signal		
Stop	Not used	Settable stopping alarm signal input pins		
		pallet changer stop signal		
Forward in-pos	Not used	Settable input pins for sense signals.		
	NC	Select sense signal of the pallet changer according		
		to the actual configuration		
Backward in-pos	Not used			
	NC			
Forward deceleration	Not used	HOUID. LU		
	NC			
Backward deceleration	Not used			
	NC SOI	oup.ru		

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Up-row unclamped in-pos login	Not used	Settable top-row loose-in-place input pin		
n	NCISO	The output logic of the upper table fixed cylinder opening in place sensor		
Up-row clamped in-pos login	Not used NC	Settable top row clamping in place input pins The output logic of the upper table fixed cylinder clamping in place sensor		
Lower-row unclamped in-pos	Not used	Settable lower row release in place input pins		
login	NCISO	output logic of the lower table fixed cylinder		
		opening in place sensor		
Lower row clamped in-pos login	Not used	Settable lower row clamping in place input pins		
	NC	The output logic of the lower table fixed cylinder		
n	nisqr	clamping in place sensor		
Cylinder unclamped in-pos signal	Not used	Settable cylinder release in place pin		
	None	Fill in the actual configuration; if you choose		
		none, after the signal output, it will wait for the		
		time to fill in (wait for the cylinder to open		
n	hlear	completely), and then move the pallet changer.		
Cylinder clamped in-pos signal	Not used	Fill in according to the actual configuration		
	None			
Dual pallet use one cylinder	Close	Settable ON or OFF		
Jog/Auto mode switch	Use IO	Use IO: use external signal to switch between		
n	nlsgr	manual and automatic modes		
		Use HMI: use the software interface to switch		
		between manual and automatic modes		
Paller changer with bolt	No	Fill in according to the actual configuration		
	usgr	oup.ru		

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Π	Output Signal	l parameters
Parameter Name	Default Value	Remarks
Forward	Not used	Settable forward signal output pin
Backward	Not used	Settable backward signal output pin
High speed	Not used	Settable High speed signal output pin
Low speed	Not used	Settable low speed signal output pin
Up-pallet cylinder unclamped	Not used	Settable up-pallet cylinder unclamped output pin
Up-pallet cylinder clamped	Not used	Settable up-pallet cylinder clamped output pin
Low-pallet cylinder unclamped	Not used	Settable low-pallet cylinder unclamped output pin
Low-pallet cylinder clamped	Not used	Settable low-pallet cylinder clamped output pin

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Hardware Button

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Parameter Name	Default Value	Remarks	
Forward	Not used, NC	Settable forward button input pin Fill in the actual configuration, if there is no this button, please select NO	
Backward	Not used,	Settable backward button input pins	
n	nlsgr	Fill in the actual configuration, if there is no this button, please select NO	
OneKey exchange	Not used,	Settable oneKey exchange input pin	
	NC	Fill in the actual configuration, if there is no this button, please select NO	
Ascent	Not used,	Settable ascent button input pin	
	NC	Fill in the actual configuration, if there is no this	
		button, please select NO	
Descent	Not used,	Settable descent input pin	
n	^{NC} ISGI	Fill in the actual configuration, if there is no this button, please select NO	
Jog/Auto mode switch	Enable hardware	Optional IO or HMI	
	signals		

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Parallel exchange			
Parameter Name	Default Value	Remarks	
Pallet changer with bolt	No	Fill in according to the actual configuration	
Bolt unclamped in-pos	No	Fill in according to the actual configuration,	
		Settable delay time	
Bolt clamped in-pos	None SO (Fill in according to the actual configuration	
Up-bolt unclamped in-pos logic	Not used,	Settable up-bolt unclamped in-pos input pin	
	NC	Up-bolt unclamped in-pos sensor logic.	
		If this signal is available, just select it according to	
		the actual configuration;	
n	nisqr	If this signal is not available, select NO.	
Up-bolt clamped in-pos logic	Not used,	Settable up-bolt clamped in-pos input pin	
	NC	Up-bolt clamped in-pos sensor logic.	
Low-bolt unclamped in-pos logic	Not used,	Settable low-bolt unclamped in-pos input pin	
n	NCSOL	Low-bolt unclamped in-pos sensor logic.	
Low-bolt clamped in-pos logic	Not used,	Settable low -bolt clamped in-pos input pin	
	NC	Low-bolt clamped in-pos sensor logic.	
Up-pallet bolt unclamped	Not used	Settable up-pallet bolt unclamped output pin	
Up-pallet bolt clamped	Not used	Settable up-pallet bolt clamped output pin	
Lowpallet bolt unclamped	Not used	Settable low-pallet bolt unclamped output pin	
Lowpallet bolt clamped	Not used	Settable low-pallet bolt clamped output pin	
Z-axis up-pallet negative		When the up-pallet is in the cutting area, the	
soft limit	lisyi	Z-axis moves to this coordinate at the lowest	



	System Commis	ssioning Manual
Z-axis middle limit logic	Not used,	When the upper table is in the cutting area, Z-axis
n	NCISGI	hardware limit logic (different from Z- limit; it can be considered that Z-limit is the negative limit of the
		lower table and this limit is the negative limit of the
		upper table) can be set in hard limit input pins
Forward in-pos signal reached	Up-pallet	Fill in the actual configuration, it will determine
pallet	nogi	which table is currently in the cutting area, based on
		this parameter.
Cylinder only output after the	Unchecked	Check the box according to the actual
pallet is in place.	hlear	situation

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7.6.14 Lubrication

Parameter Name	Remarks
Interval	Output interval of lubrication pump
Duration	Duration of each output of the lubrication pump
Pump overpressure alarm	Settable alarm input pin and logic for oil pump alarm points
Low oil alarm	mlsaroun ru
Oil pump output	Settable oil pump output pin

7.6.15 Segmented axis parameters

		Icarolin rii		
Servo parameters				
Parameter Name	Default	Remarks		
	Value			
Motor direction	Negative	The motor rotation direction is CW or CCW; when the shaft		
	m	moves in the wrong direction, this option can be changed.		
Speed unit of drive	pulse/s	Selectable pulse/s, 0.1RPM, RPM		
Speed loop	0.01	Default		
feedforward				
coefficient				
		Icarolin ru		

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Max follow-up offset	5mm	When the absolute value of the difference between the		
		commanded position and the actual position is greater than		
		this value, the software will alarm and shut down.		
System Latency	5	Axis motion delay time		
System Latency				
Manual slow	0. 12m/min	Running slowly in manual mode		
Manual fast	0.24m/min	Run fast in manual mode		
	m	caroup ru		
Speed	1.8m/min	Running speed in automatic mode		
Acceleration	2000mm/s	Running acceleration in automatic mode		
Acc time	500	Time to run acceleration completion in automatic mode		
Motor polarity	¹ m	Under torque control, changing the motor polarity can change the direction of motion		
Max torque	200	Max torque value		
Torque feedforward	0	Default		
Adjmt. coefficient				
Homing mode	Absolute	Incremental: Find the zero signal back to zero and use the		
		zero signal as the reference point		
		Absolute: Move to the zero position of the driver feedback with the		
		position 0 of the driver feedback as the reference point		
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Return origin	Positive,	Positive: When returning origin, move in the positive direction to
direction and type	Limit	find the return to zero reference switch. Reverse: When returning origin, move in the negative direction to find the return to zero reference switch
	m	Limit: Use the limit as the return origin reference switch Zero position: Use zero position as the return origin reference switch
Return origin	0.12m/min	Speed of finding the reference signal when returning origin
speed		
Back distance	5 mm	Distance from zero return to limit signal setback
Coordinates aft	0	Coordinate value of the reference switch in the coordinate
backward set as		system
Origin point offset	0 mm	The current point as the zero point; commissioning without
compensation	m	limit switches for temporary commissioning
Servo axis	Not used	Fill in according to the actual configuration
Positive limit signal		Settable positive hard limit pin
		NO: no output in the untriggered state, select this item
		NC: output in untriggered state, select this item
Soft limit	Open	Settable negative hard limit pin
		NO: no output in the untriggered state, select this item
		NC: output in untriggered state, select this item
Soft limit range	-10~10mm	The range of axis movement after the software returns origin
Axis taq	m	Current axis for labeling, detailed information notes
		isgroup.ru

7.6.16 Advanced option

		Advanced option parameters
Darameter	Default	Pemarks
1 arameter	Delault	INCHIAINS
Name	Value	
DX150P	Unchecked	You can choose whether or not to search for edges before processing
position loop		in the software interface after checking the box.
mode (HMI	r	nlearoun ru
version		Insgroup.ru
greater than		
5(00)		
5609)		
Enable	Unchecked	The software supports nozzle cleaning after checking the box.
NozzleClean		
Enable Nest	Checked	Supporting nesting function after checking the box.
Docking	Unchecked	The docking point changes with the selected drawing; unchecked,
points follows		the docking point is planned according to the entire drawing, after
selected shape		checking the box.
Fix point	Unchecked	The interface uses manual speed for all fast-positioning movements
motion speed	l r	after checking the box; unchecked for duty speed.
is manual fast		insgroup.ru
(default speed:		
(default speed.		
G00)		
Enable servo	Unchecked	Checking special parts supports part of the support gantry drive
gantry axis		available; not recommended to arbitrarily check the box, and if you
control		have such requirements, please contact our after-sales professionals.
Display	Unchecked	Support the maintenance function after checking the box.
maintenance		
module		



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