Factory Smart

COLLABORATIVE
Robot Welding Machine

The information reserves the right to be modified without prior notice.

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1. EQUIPMENT NAME AND DESCRIPTION

1.1 Safety Information

This product uses a fiber laser and is a Class 4 laser product. The following safety measures must be implemented when using this machine:

1. Establish a laser safety management system. A laser safety management system shall be developed for the use of the equipment. Based on existing laser safety control measures, workplace management shall be strengthened to prevent hazards.
2. Train operators. Operators of the laser welding machine must receive specialized training, reach the required level, and obtain approval from the laser safety officer before taking up operation.
3. Protective goggles. Operators of the laser welding machine or personnel approaching laser equipment in operation shall wear appropriate protective goggles.
4. Key controller. When the laser equipment is not in use, remove the equipment switch key. If the laser is separately equipped with a key, remove it as well to prevent misuse by unauthorized personnel.
5. Safety control of hazardous and processing areas. During machine operation, no personnel may approach the processing area. Entry into the hazardous area while the machine is operating is strictly prohibited. Personnel may enter the processing area only after the equipment has stopped running.

1.2 Equipment Applications

This equipment is mainly used to complete welding processes such as laser autogenous welding and laser wire-feed welding for small components. It is suitable for sheet-metal processing and the welding of common thin metal sheet parts and thin-walled components.

- Continuous welding and spot welding
- Welding of three-dimensional and planar weld seams
- Flat welding, horizontal welding and vertical welding
- Weld seam cleaning process

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1.3 Equipment Features

- Welding and weld seam cleaning functions
- Compact size and easy movement
- Quick switching between automatic and manual welding
- Automatic welding and one-button start
- Simple operation and easy programming
- Rapid expansion to other modules

2. EQUIPMENT CONFIGURATION

No.	Name	Model/Specification	Qty
1	Water-cooled handheld welding unit	SWAN HW1500-A	1
2	Wire feeder	Penta match	1
3	Electrical system	Customized by Penta Laser	1
4	Robot and controller	FAIRINO FR5	1
5	Handheld display	Provided by FAIRINO	1
6	Welding rotary table	Customized by Penta Laser	1
7	Flange connector	Customized by Penta Laser	1
8	Product certificate and operation manual	Penta Laser	1
9	Packaging and transportation	Penta Laser	1

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3 CONFIGURATION INTRODUCTION

1. Collaborative Robot Parameters

FR5 Specifications		
Payload	5 kg	
Reach	922 mm	
Degrees of Freedom	6	
HMI	10.1-inch teach pendant or mobile terminal APP	
Repeatability	±0.02 mm	
Axis Movement	Working Range	Maximum Speed
Axis 1	±175°	±180°/s
Axis 2	+85° / -265°	±180°/s
Axis 3	±160°	±180°/s
Axis 4	+85° / -265°	±180°/s
Axis 5	±175°	±180°/s
Axis 6	±175°	±180°/s
Typical TCP Speed	1 m/s	
IP Classification	IP54 (IP66 optional)	
Noise	<65 dB	
Robot Mounting	Any orientation	
End-effector I/O Ports	Digital Output (DO): 2; Digital Input (DI): 2; Analog Input (AI): 1; Analog Output (AO): 1	
Tool-end Power Supply	24V / 1.5A	

Communication	I/O, TCP/IP, Modbus_TCP/RTU, Profinet
Development Environment	C#/C++/Python/Java/ROS
Footprint	150 mm
Weight	≈22 kg
Operating Temperature	0-45°C
Operating Humidity	90% RH (non-condensing)
Materials	Aluminum, Steel

4 SPARE PARTS AND DOCUMENTS

4.1 Spare Parts

No.	Name	Quantity
1	Shielding gas hose	1 pc
2	Laser protective goggles	1 pair
3	Gloves	2 pairs
4	Protective lens	5 pcs
5	Nozzle	7 pcs

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4.2 List of Accompanying Documents

1. Equipment certificate: 1 copy
2. Equipment packing list: 1 copy

5 EQUIPMENT INSTALLATION CONDITIONS

1. On-site distribution cabinet: 220V and 380V, 50Hz; three-phase imbalance <2.5%; line voltage fluctuation <5%; capacity not less than 15kVA.
2. The equipment shall be installed with a dedicated grounding connection, and the grounding resistance shall not exceed 4Ω.
3. Provide necessary lifting equipment and personnel, including lifting and handling equipment.
4. Provide materials required for on-site equipment commissioning. From the day the equipment arrives on site, the buyer shall prepare the materials required for equipment commissioning.
5. Provide temporary access passes for commissioning personnel.

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6 EQUIPMENT INSTALLATION, COMMISSIONING AND TRAINING

6.1 Installation and Commissioning

The equipment will be installed at the user's factory. The user is required to provide sufficient space, power supply and ventilation system for installation. The supplier will provide remote installation guidance via installation videos.

6.2 User Training

Personnel training may be provided as free online training or paid on-site training. Trainees may operate the equipment only after passing the supplier-organized assessment covering equipment operation, basic laser knowledge, safety protection and maintenance.

7 AFTER-SALES SERVICE

1. The supplier ensures free online service for the equipment during the warranty period. If accessories (excluding consumables) need to be replaced due to quality reasons, no fee will be charged. If replacement is required due to human-caused damage or for consumable/wear parts (including but not limited to nozzles, optical lenses, optical fibers and other accessories), the supplier will charge for the parts.
2. During the warranty period, the supplier provides one online training service; on-site training service will be charged separately.