TIG200PACDC PFC LCD

TIG200PACDC LCD

IGBT INVERTER WELDER

Thank you for selecting this new JASIC equipment!

This operating manual contains important information on the use and maintenance of this product, as well as safe handling of the product. Please refer to technical parameters of the equipment in Technical Parameter section in this manual, and read the manual carefully before using the equipment for the first time. For your own safety and that of your working environment, please pay particular attention to the safety instructions in the manual and operate the equipment according to the instructions. For more information on JASIC products, please contact **J**ASIC Technology, consult an authorized JASIC dealer or visit JASIC website at www.jasictech.com.

Disclaimer

Shenzhen JASIC Technology Co., Ltd. solemnly promises that this product is manufactured according to relevant domestic and international standards, and that this product conforms to EN60974-1 International Safety Standard. Patents protect the relevant design scheme and manufacturing technology adopted in this product.

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Contents

For your safety, please read this manual carefully before installing and operating this JASIC equipment.

Pay extra attention to all content marked with "  ".

All operations must be carried out by professional, suitably qualified persons!

1. Safety precautions

1.1. General safety

SAFETY INSTRUCTION

These general safety norms cover both arc welding machines and plasma cutting machines unless otherwise noted.

It is important that users of this equipment protect yourselves and others from harm or even death.

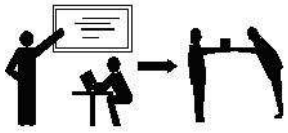
The equipment must only be used for the purpose it was designed for. Using it in any other way could result in damage or injury and in breach of the safety rules.

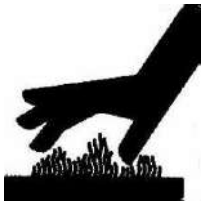
Only suitably trained and competent persons should use the equipment.

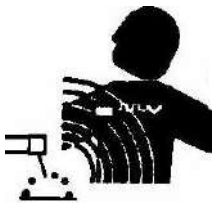
Pacemaker wearers should consult your doctor prior to using this equipment

PPE and workplace safety equipment must be compatible for the application of work involved.

Always carry out a risk assessment before carrying out any welding or cutting activity

	**Only qualified personnel should operate this machine!** ·Always use the appropriate personal protective equipment. ·Always pay attention to the safety of other persons around the working zone ·Do not carry out any maintenance with the power on the machine
	**Electric shock——May cause serious injury or even death!** ·The equipment should be installed by a qualified person and in accordance with current standards in operation. It is the user's responsibility to ensure that the equipment is connected to a suitable power supply. Consult with your utility supplier if required. Do not use the equipment with the covers removed. ·Do not touch live electrical parts or parts, which are electrically charged. ·Turn off all equipment when not in use.
	**Fumes and gases——May be hazardous to your health.** Locate the equipment in a well-ventilated position and keep your head out of the fume. Do not breathe the fume. Ensure the working zone is well ventilated and provision should be made for suitable local fume extraction system to be in place. If ventilation is poor, wear an approved air fed welding helmet or respirator. Read and understand the Material Safety Data Sheets (MSDS's) and the manufacturer's instructions for metals, consumable, coatings, cleaners and de-greasers. Do not work in locations near any de-greasing, cleaning or spraying operations. Be aware that heat and rays of the arc can react with vapours to form highly toxic and irritating gases.

	**Arc rays——May injure the eyes and burn the skin.** The arc rays from all processes produce intense, visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. ·Wear an approved welding helmet fitted with an appropriate shade of filter lens to protect your face and eyes when working or watching. ·Wear approved safety glasses with side shields under your helmet. ·Never use broken or faulty welding helmets. ·Always ensure there are adequate protective screens or barriers to protect others from flash, glare and sparks from the working area. ·Ensure that there are adequate warnings that welding or cutting is taking place. ·Wear suitable protective flame resistant clothing, gloves and footwear.
	**Precautions against fire and explosion** Avoid causing fires due to sparks and hot waste or molten metal. Ensure that appropriate fire safety devices are available near the welding and cutting area. Remove all flammable and combustible materials from the welding, cutting and surrounding areas. Do not weld or cut fuel and lubricant containers, even if empty. These must be carefully cleaned before they can be welded or cut. Always allow the welded or cut material to cool before touching it or placing it in contact with combustible or flammable material. Do not work in atmospheres with high concentrations of combustible fumes, flammable gases and dust. Always check the work area half an hour after cutting to make sure that no fires have begun. Take care to avoid accidental contact of electrode to metal objects. This could cause arcs, explosion, overheating or fire.
	**Risks due to hot material** · The process will create hot metal, sparks and drips of molten metal, so it's very important to ensure the operator is equipped with full PPE and to always ensure there are adequate protective screens or barriers to protect others from flash, glare and sparks from the working area. Hot surfaces will create fires and will burn any exposed skin. Always protect your eyes and body. Use the correct welding screen and filter lens and wear full PPE protective clothing. Do not touch any hot surfaces or parts bare handed. Always allow hot surfaces and parts to cool down first before touching or moving. If you are required to move hot parts, ensure you use proper tools and insulated welding gloves (PPE) to prevent burns to your hands and arms.

	**Noise——Excessive noise may be harmful to hearing** ·Protect your ears by ear shields or other hearing protectors. ·Give warning to nearby personnel that noise may be potentially hazardous to hearing.
	**Risks due to magnetic fields** The magnetic fields created by high currents may affect the operation of pacemakers or electronically controlled medical equipment. Wearers of vital electronic equipment should consult their physician before beginning any arc welding, cutting, gouging or spot welding operations. Do not go near welding equipment with any sensitive electronic equipment as the magnetic fields may cause damage. Keep the torch cable and work return cable as close to each other as possible throughout their length, this can help minimize your exposure to harmful magnetic fields. Do not wrap the cables around the body.
	**Protection from moving parts** When the machine is in operation keep away from moving parts such as motors and fans. Moving parts, such as the fan, may cut fingers and hands and snag garments. Protections and coverings may be removed for maintenance and controls only by qualified personnel after first disconnecting the power supply cable. Replace the coverings and protections and close all doors when the intervention is finished and before starting the equipment. Take care to avoid getting fingers trapped when loading and feeding wire during set up and operation. When feeding wire be careful to avoid pointing it at other people or towards your body. Always ensure machine covers and protective devices are in operation.
	**Troubleshooting** Before the machines are dispatched from the factory, they have already been checked thoroughly. The machine should not be tampered with or altered. Maintenance must be carried out carefully. If any wire becomes loose or is misplaced, it maybe potentially dangerous to user! Only professional maintenance personnel should repair the machine! Ensure the power is disconnected before working on the machine. Always wait 5 minutes after power switch off before removing the panels. If you still do not fully understand or cannot solve the problem after reading the instructions in this manual, you should contact the supplier or JASIC's service center immediately for professional help.

1.2. Other precautions

Warning! Location

The machine should be located in a suitable position and environment. Care should be taken to avoid moisture, dust, steam, oil or corrosive gases. Place on a secure level surface and ensure that there is adequate clearance around the machine to ensure natural airflow.

Warning! The handle or strap on the machine is only suitable for manual lifting of the machine. If mechanical equipment such as crane is used to lift the machine, please ensure the machine is secured with suitable lifting equipment.

Warning!

Input connection

Before connecting the machine, you should ensure that the correct supply is available. Details of the machine requirements can be found on the data plate of the machine or in the technical parameters shown in the manual. The equipment should be connected by a suitably qualified competent person. Always ensure the equipment has a proper grounding.

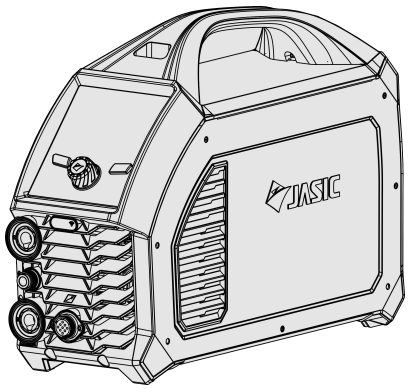
Never connect the machine to the mains supply with the panels removed.

1) When the operator's movement is limited by the surroundings (for example, the operator can only bend his knees, barefoot, or lie down during operation), the operator shall practice proper insulation and avoid direct contact with conductive parts on the equipment.
2) Do not use the machine in closed containers in narrow spaces where conductive components cannot be removed.
3) Do not use the machine in humid environments where the operator is prone to the risk of electric shock.
4) Do not use the machine in sunlight or rain, and no water or rainwater shall seep into the machine.
5) Do not perform gas shielded welding in an environment with strong air flow.
6) Avoid welding or cutting in dusty area or environment with corrosive chemical gas.
7) The ambient temperature must be between-10°C and 40°C during operation and between-25°C and 50°C during storage.
8) Welding or cutting shall be carried out in a relatively dry environment, and the air humidity shall not exceed 90%.
9) The inclination of the machine shall not exceed 10°.
10) Ensure that the input power supply voltage does not exceed 15% of the rated voltage of the machine.
11) Beware of falling when welding or cutting at heights.

2. Description of symbols

	Warning! Read the Manual		Current unit "A"
	WEEE tag		Time unit "S"
	Overheat indicator		Percentage
	VRD function indicator		Frequency unit "Hz"
	Warning tag		Lift TIG mode
	MMA mode		Wireless receiver module indicator
	MMA current		Pairing of wireless simple remote controller (optional)
	MMA hot start current		Remote control key
	MMA arc force current		Water cooler function
	HF arc ignition mode		Parameter adjustment knob and confirmation key
			DC mode
			Pulse mode

3. Product overview



This is a digital inverter AC/DC welder with complete functions, excellent performance and advanced technology. It supports AC TIG (with optional square wave, triangular wave and sine wave), AC pulse TIG, DC TIG, DC pulse TIG, MMA (DC), and TIG spot welding (DC/AC), and can be widely used for precise welding of an extensive range of materials. The unique electrical structure and air passage design inside the machine increase the dissipation of heat generated by power devices, thus improving the duty cycle of the machine. Due to the unique heat dissipation efficiency of the air passage, it can effectively prevent damage to the power devices and the control circuits caused by fan dust inhalation, thus greatly improving the reliability of the machine.

Note: The functions described below are only a general overview, and the specific functions are subject to the machine model.

Main functions include:

- Multiple welding modes and optional torch control modes.
- Real-time output current display: Easily displays the welder output state.
- Anti-stick function: Prevents the welding electrode from sticking to the workpiece during welding.
- VRD function: Protects the operators from high voltage electric shock when the machine is not operational.
- MMA hot start function: Makes MMA arc ignition easier and more reliable.
- Smart fan temperature control: Prolongs the fan lifespan and reduces internal dust accumulation.
- TIG welding: Supports both contact and non-contact arc ignition. Non-contact arc ignition includes a high-voltage arc ignition circuit for high arc ignition success rate.
- Parameters are automatically saved when the machine is turned off or during power cut, after restarting, the welder will restore previous parameters.
- Optional wired handheld remote controller and wireless remote controllers.

4. Technical parameters

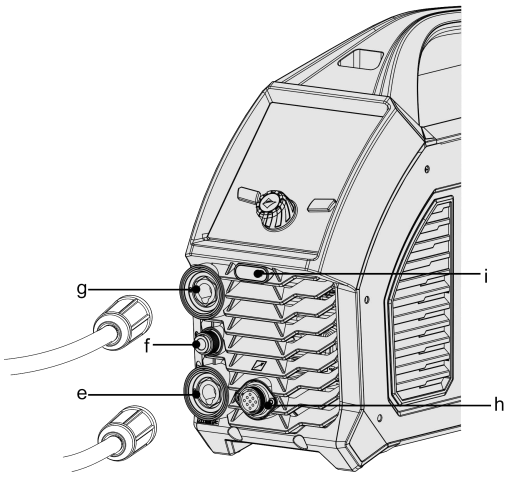
Item	Unit	Parameters	
Model	/	TIG200PACDC PFC	TIG200PACDC
Input voltage	VAC	AC115±15%~230V±15%	AC230V±15%
Input frequency	Hz	50/60	50/60
Rated input current (AC230V)	A	20.2@TIG 22.4@MMA	31.6@TIG 34.1@MMA
Rated input current (AC115V)	A	30.6@TIG 32.8@MMA	/
Rated input power (AC230V)	kVA	4.7@TIG 5.6@MMA	6.0@TIG 7.0@MMA
Rated input power (AC115V)	kVA	3.5@TIG 3.9@MMA	/
Output current range (TIG_DC)	A	230V: 5~200 115V: 5~160	5~200
Output current range (TIG_AC)	A	230V: 20~200 115V: 20~160	20~200
Output current range (MMA)	A	230V: 10~160 115V: 10~120	10~160
Rated operating voltage (AC230V)	V	18@TIG 26.4@MMA	18@TIG 26.4@MMA
Rated operating voltage (AC115V)	V	16.4@TIG 14.8@MMA	/
Arc force range	A	0~-40	0~40
Hot start range	A	0~80	0~80
No-load voltage	V	64	60
VRD voltage	V	11.5	11.5
AC output frequency	Hz	20~250	20~250
AC balance	%	20~-60	20~60
Base current	A	5~200	5~200
Pulse frequency (DC)	Hz	0.5~200	0.5~200
Pulse frequency (AC)	Hz	AC frequency: 20Hz Pulse frequency: 0.5-2Hz	AC frequency: 20Hz Pulse frequency: 0.5-2Hz
		AC frequency: 250Hz Pulse frequency: 0.5-25Hz	AC frequency: 250Hz Pulse frequency: 0.5-25Hz

Pulse duty factor	%	10~90	10~90
Pre-flow time	S	0~3	0~3
Post-flow time	S	0~15	0~15
Upslope time	S	0~10	0~10
Downslope time	S	0~10	0~10
Spot welding time	S	0.1-10	0.1-10
Remote controller	-	Digital remote controller, analog remote controller, wireless remote controller	Digital remote controller, analog remote controller, wireless remote controller
Arc start mode	/	HF arc ignition and lift arc ignition	HF arc ignition and lift arc ignition
Duty cycle	%	TIG: 25% MMA: 30%	TIG: 25% MMA: 20%
Efficiency	%	80	80
Power factor	/	0.95	0.75
Insulation class	/	H	H
Protection class	/	IP23S	IP23S
Dimensions L*W*H	mm	490*165*341	490*165*341
Package dimensions L*W*H	mm	735*230*440	735*230*440
Net weight	Kg	12	12
Overall total weight	Kg	16.9	16.7
Characteristics	/	CC	CC
Pollution level	/	Level 3	Level 3

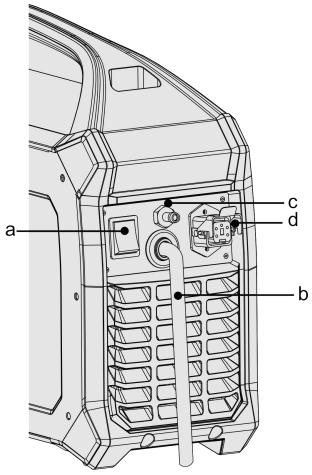
5. Installation

Warning! All connections shall be made after the power supply is turned off.
Warning! Electric shock may cause death; after power failure, there is still a high voltage on the equipment, do not touch the live parts on the equipment.
Warning! Incorrect input voltage may damage the equipment.
Warning! This product meets the requirements of Class A equipment in EMC requirements and is not to be connected to a residential low-voltage power supply grid.

5.1. External interface description



(Front panel view)



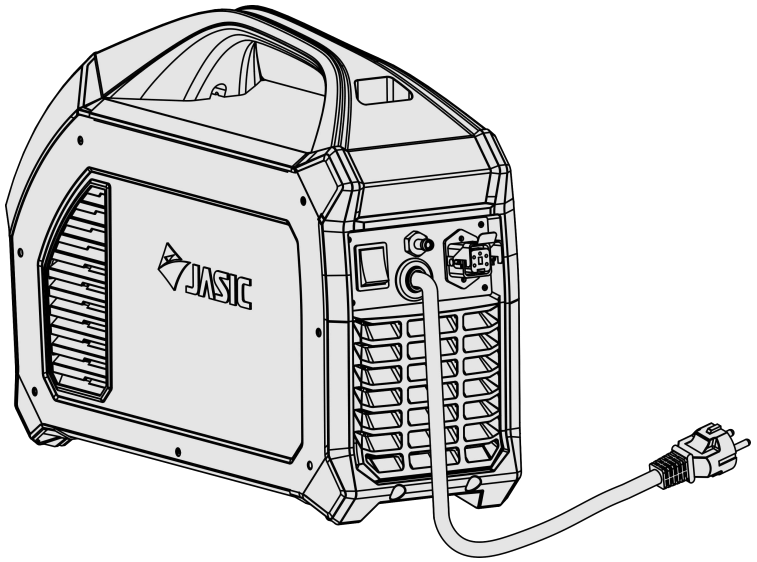
(Rear panel view)

a. Power switch
b. Input power cord
c. Inlet nozzle
d. Water cooler socket
e. Negative polarity
f. TIG welding torch gas connector
g. Positive polarity
h. 9-pin aviation socket
i. Wireless receiver module (optional)

5.2. Power installation

Warning! The electrical connection of equipment shall be carried out by suitably qualified personnel.
Warning! All connections shall be made after the power supply is turned off.
Warning! Incorrect input voltage may damage the equipment.

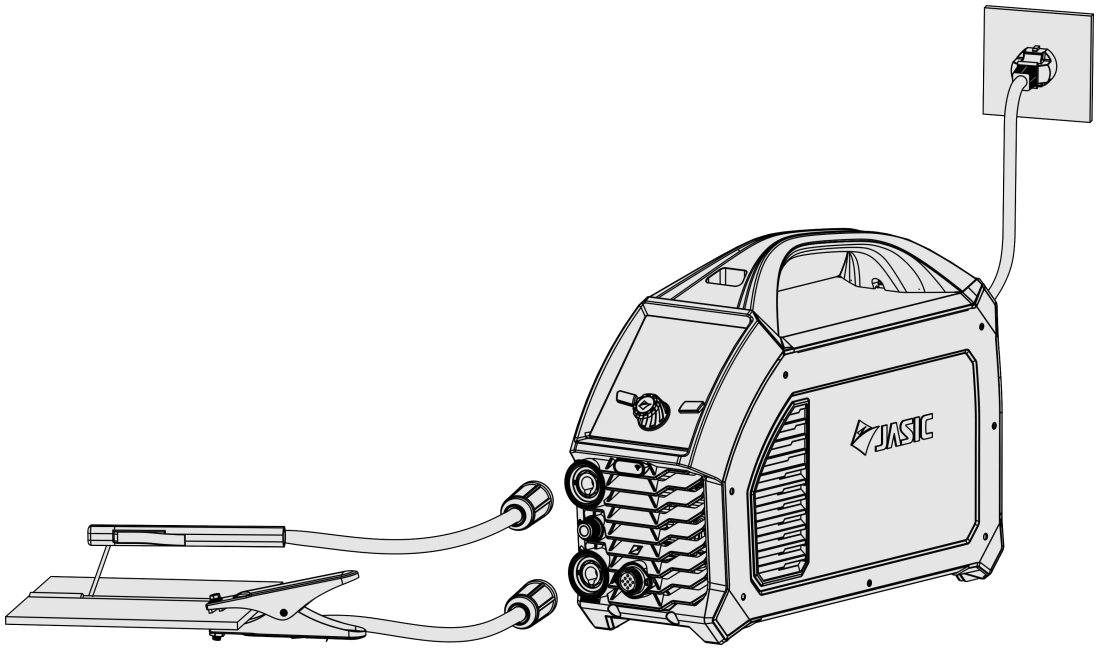
1) Connect the welder to the corresponding voltage grade according to its specified input voltage. DO NOT connect to the wrong voltage grade.
2) Ensure that the input power cable is in good contact with the power terminal or socket.
3) Ensure the input voltage value is within the specified input voltage range.
4) Ground the power supply well. (As shown in the diagram, the Euro plug has a grounding terminal, no additional grounding is required.)
5) Ensure that the welder power switch is turned off.



(Wiring diagram)

NOTE! If the input cable needs to be extended, please use a cable with larger cross-sectional area to reduce the voltage drop, 3x2.5mm2 or more is recommended.

5.3. MMA electrode holder and earth cable connection



(Wiring diagram)

Pay attention to the polarity of the wiring before MMA. Generally, there are two connection methods for DC welder: DCEN and DCEP.

DCEN: The electrode holder is connected to the negative polarity, and the workpiece is connected to the positive polarity;

DCEP: The electrode holder is connected to the positive polarity, and the workpiece is connected to the negative polarity.

The operator can also choose the DCEN according to the base metal and electrode type being used. Generally speaking, it is recommended to adopt DCEP for basic electrode (i.e., welding electrode connected to the positive polarity), while no special provisions are made for acid electrode.

1) Ensure that the welder power switch is turned off.

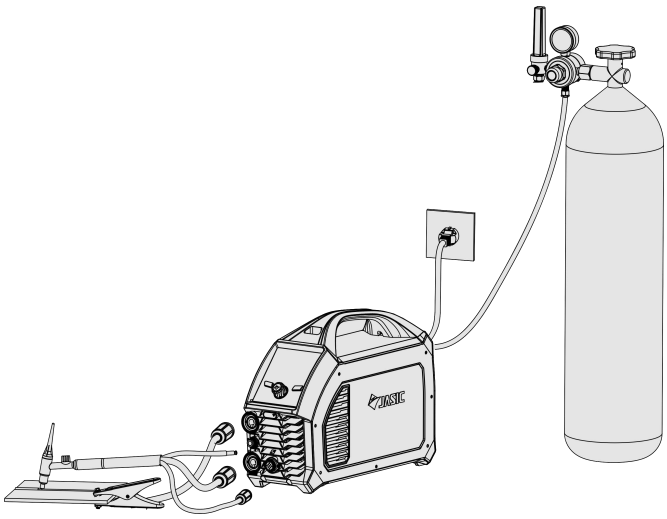
2) Insert the cable plug with electrode holder into the corresponding socket on the front panel of the welder and tighten it clockwise.

3) Insert the cable plug with earth clamp into the corresponding socket on the front panel of the welder and tighten it clockwise.

NOTE! If you want to use long secondary cables (electrode holder cable and earth cable), you must ensure that the cross-sectional area of the cable is increased appropriately in order to reduce the voltage drop due to the cable length.

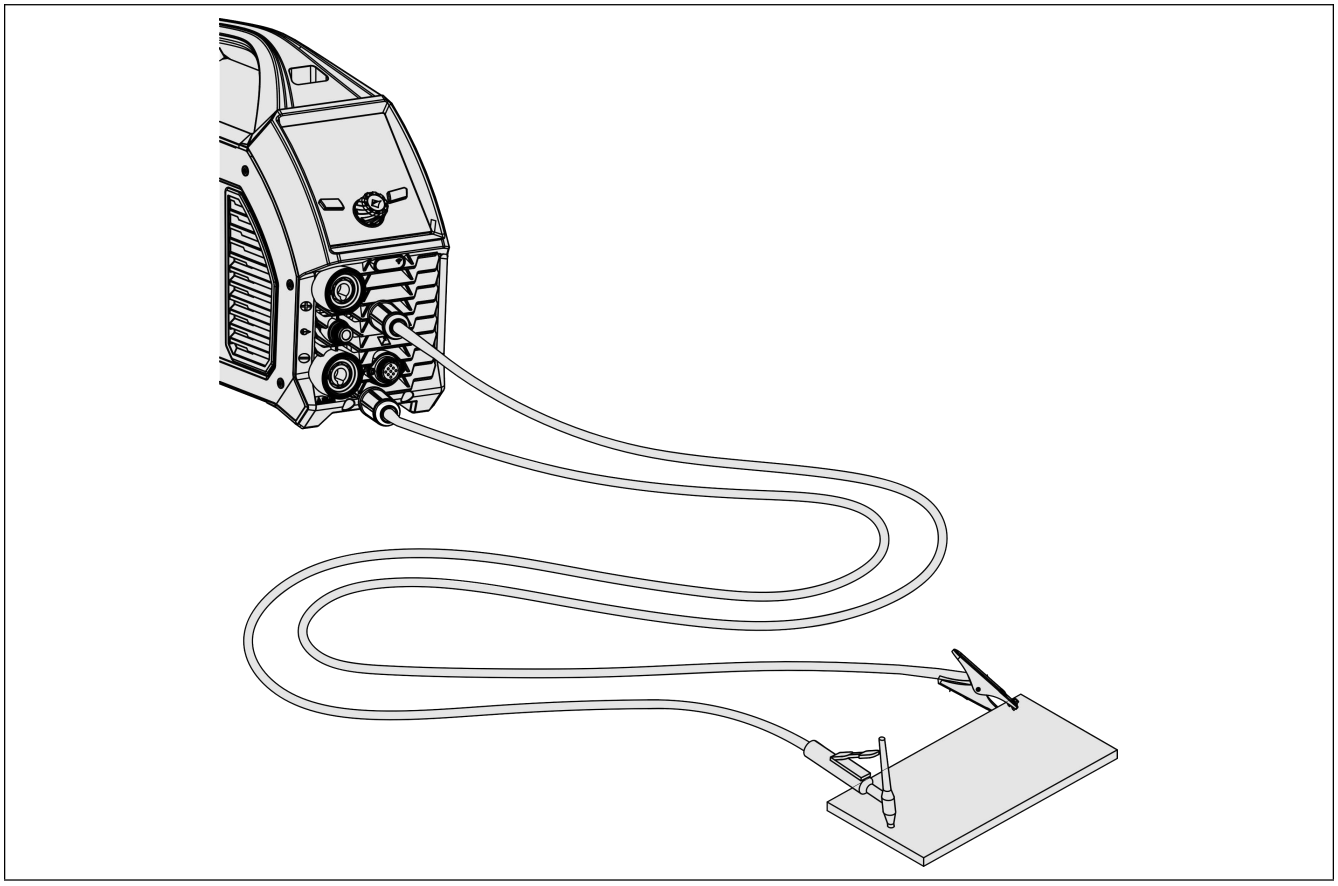
5.4. TIG welding torch and earth cable connection

1) Ensure that the welder power switch is turned off.
2) Insert the cable plug with the earth clamp into the positive socket on the front panel of the welder and tighten it clockwise.
3) Insert the cable plug of the welding torch into the corresponding negative socket on the front panel of the welder and tighten it clockwise.
NOTE! The positive and negative polarities should not be reversed as this will prevent normal welding operation.
4) Insert the welding torch gas connector into the gas vent on the front panel.
5) Connect the gas hose of the argon cylinder to the inlet nozzle on the rear panel of the machine.

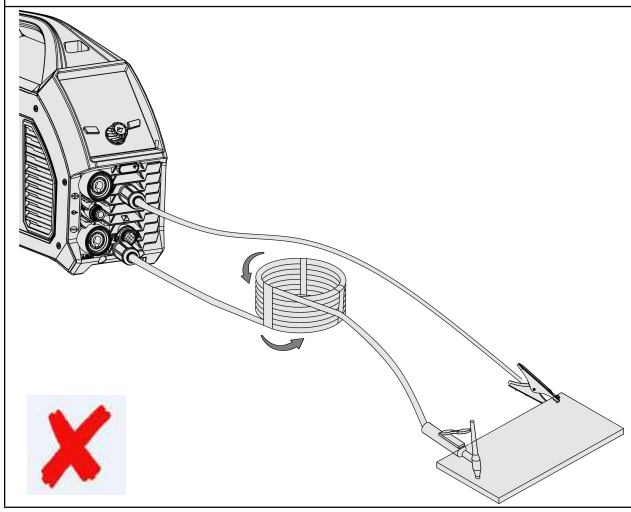
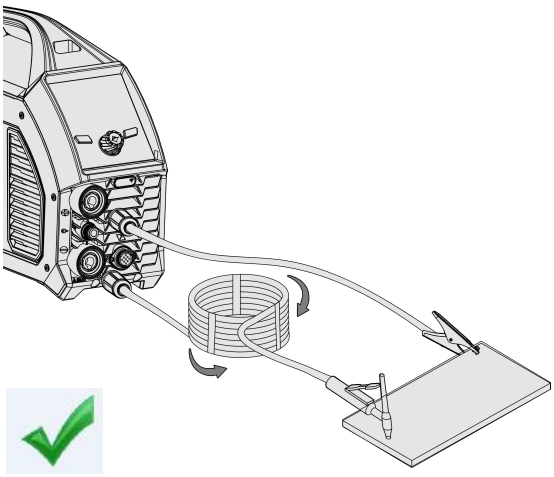


(Wiring diagram)

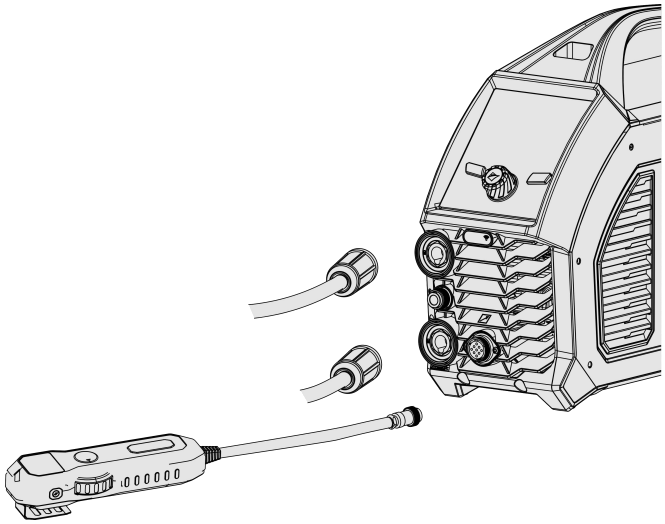
NOTE! If you want to use long secondary cables (torch cable and earth cable), you must ensure that the cross-sectional area of the cable is increased appropriately in order to reduce the voltage drop due to the cable length.
6) In AC TIG welding mode, please shorten the power cable as much as possible. If the cable must be extended, please pay attention to the following:
● Bind the cables for the base metal and the welding torch together.
● Straighten the cable as much as possible.
● If the cable cannot be straightened, straddle the welding torch cable across the base metal.



- If excessive cable must be wound up, please refer to the following good practices

Bad practice	Good practice
Do not wind up excess cable along the same direction.	Wind up the same number of turns in the cable winding direction and the opposite direction, and stack them together.
	

5.5. Wired handheld remote controller connection (optional)

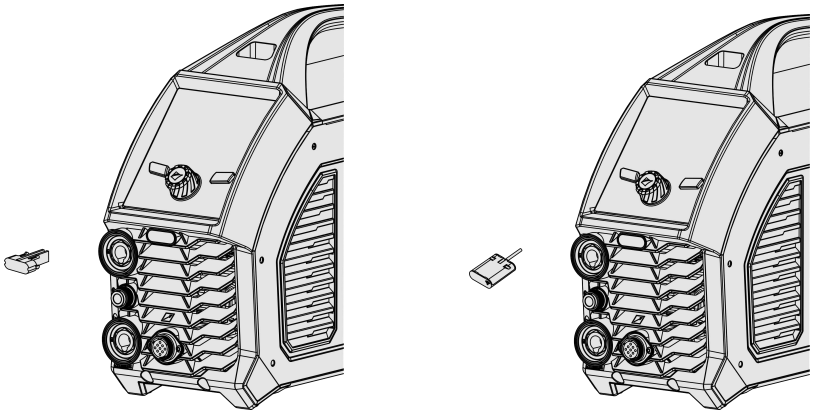


(Wiring diagram)

Insert the 9-pin aviation plug of the handheld remote controller directly into the corresponding aviation socket of the machine.

NOTE! Please check that the machine supports wired handheld remote controller before installation.

5.6. Installation of wireless receiver module (optional)



(Installation drawing)

Remove the wireless remote controller plug cover shown in the above left figure. Insert into the wireless receiver module shown in the above right figure.

1) Remove the screws on the left cover of the machine.

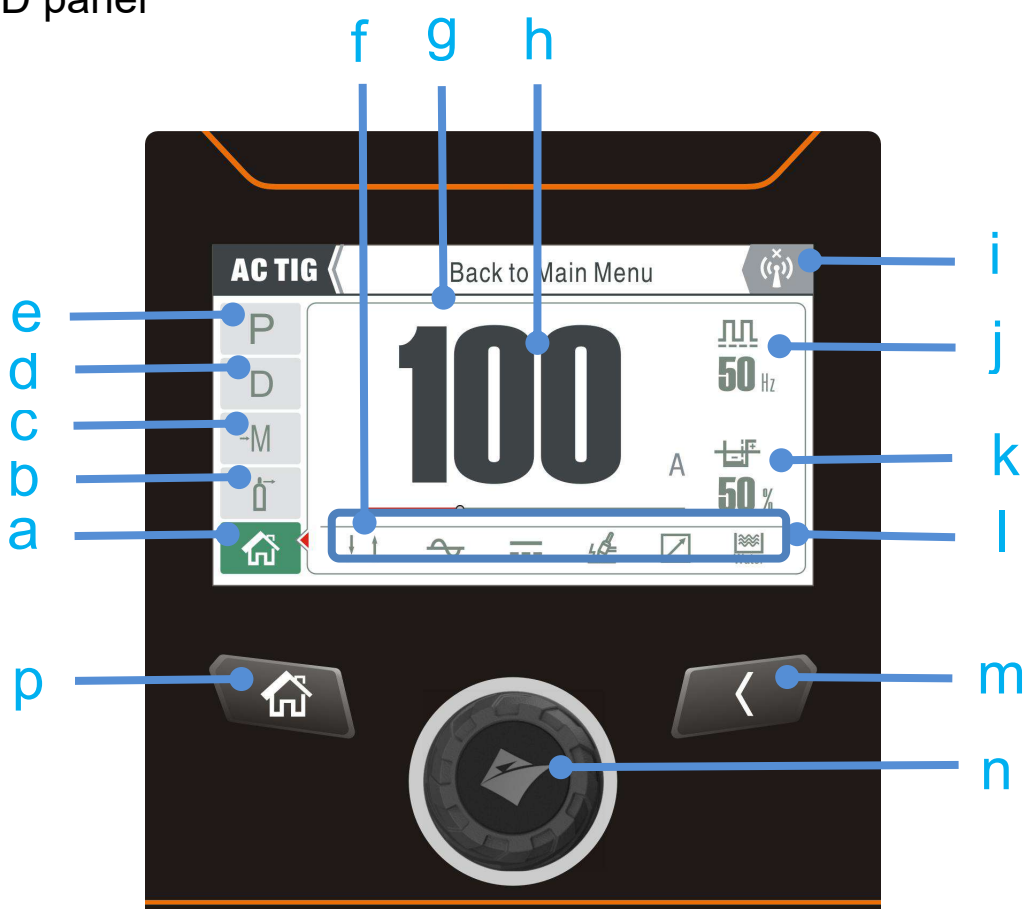
2) Remove the buckle inside the front panel of the machine and pull out the wireless plug.

3) Insert the wireless receiver module into the front panel, and then connect the receiver module connection line to the CN2 socket on the control panel PK-442.

NOTE! Please check that the machine supports wireless handheld remote controller before installation.

6. Control panel

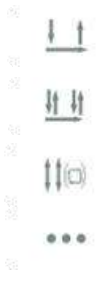
6.1. LCD panel



6.2. LCD screen function table

a	Back to main menu		Press the "Home" key to return to the main menu interface.
b	Gas check function		1. Press the gas check icon to open the submenu and enter the gas check state; after 20s, the system will automatically exit the gas check function and return to the previous menu; 2. During gas check, press any key to close the gas check function.

c	Memory function	→M	The table header shows the specific value of the parameters; 1. Press the "Memory" key and Channel 1, Channel 2, Channel 3 and Channel 4 will be displayed; select a channel and corresponding parameters saved will be displayed; 2. Press a channel key to display three control options: Save, Load and Delete.
d	Parameter setting		Pre-flow time icon, indicates the pre-flow protection time.
			Initial current icon, indicates the initial current.
			Upslope time icon, indicates the time for the initial current to reach the peak current.
			Peak current icon, indicates the welding current during operation.
			Base current icon, indicates the pulse base current.
			Downslope time icon, indicates the time from the peak current to the crater current.
			Crater current icon, indicates the crater current.
			Post-flow time icon, indicates the post-flow time.
			AC frequency icon, indicates the AC frequency.
			AC balance icon, indicates the ratio of tungsten anode time to AC cycle.
			Duty-ratio icon, indicates the ratio of peak current time to pulse period.
			Pulse frequency icon, indicates the pulse frequency.
			Spot welding time icon, indicates the spot welding time.
			Mixed frequency icon, indicates the mixed AC frequency in MIX TIG mode.
			Mixed duty-cycle icon, indicates the ratio of DC time to mixed period.

e	Function selection		1. 2T icon. If checked, it indicates that the machine is in 2T mode; 2. 4T icon. If checked, it indicates that the machine is in 4T mode; 3. Repeat icon. If checked, it indicates that the machine is in repeat mode; 4. Spot welding icon. When the indicator is on, it indicates the machine is in spot welding mode.
			1. No-pulse indicator. When the indicator is on, it indicates there is no pulse. 2. Pulse indicator. When the indicator is on, it indicates the pulse state; Generally, the LF pulse frequency is 0.5-10Hz. The interactive effect of heating and cooling can reduce deformation by reducing the average current. LF pulse current, coupled with proper welding speed, can form fish-scale welds. Besides, it is convenient to use wire filling device under low-frequency pulse to optimize the weld formation. Pulse can oscillate the molten pool and improve the microstructure of the weld. HF pulse can enhance the concentration and stiffness of the arc. Stable arc can increase the molten pool depth and welding speed;
			1. Square wave indicator. When the indicator is on, it indicates that square wave is selected; Standard AC square wave can achieve fast polarity switching, high arc stability, good dynamic characteristics and strong ability to clean aluminum oxide film. It is suitable for welding a wide range of aluminum and aluminum alloy parts. 2. Triangular wave indicator. When the indicator is on, it indicates that triangular wave is selected; The triangular wave reduces heat input, so the weld can form rapidly, reducing welding deformation. It is suitable for welding thin plates. 3. Sine wave indicator. When the indicator is on, it indicates that sine wave is selected. Sine waveform achieves reduced and softer arc noise.
			1. Switch between HF arc ignition and lift arc ignition; 2. Select spot welding mode. If this mode is selected, it only supports HF arc ignition.

f	Progress bar		1. Rotate the adjustment knob to adjust the welding current; 2. Rotate the knob clockwise to increase the value, and counterclockwise to decrease the value. 3. When rotating the knob, the progress bar adjusts proportionally with the value.
g	Function key description	/	Display in English by default. The language can be switched to Chinese display to explain the current operation.
h	Welding current	/	When numbers are highlighted, rotate the knob to adjust the welding current.
i	Wireless connection indicator		1. For failed pairing, the icon with a cross on the top will be displayed; 2. For successful pairing, the icon without a cross will be displayed.
j	AC frequency		Quickly display the AC frequency to facilitate adjustment by encoder.
k	AC balance		Quickly display the AC balance to facilitate adjustment by encoder.
l	Function display	/	Quickly display the operation mode, waveform selection, pulse selection, arc ignition method, control mode and cooling method.
m	Single-step return key		Press the single-step return key to return to the previous menu.
n	Parameter adjustment knob		1. Rotate the adjustment knob to adjust the current menu options; 2. Rotate the adjustment knob to adjust the current parameters; 3. Rotate the knob clockwise to increase the value, and counterclockwise to decrease the value; 4. When rotating the knob, the adjustment is displayed in the parameter display area, and the progress bar on the left side of the knob adjusts proportionally with the value.
p	Home key		Press the "Home" key to go to the home interface and the AC TIG option will be highlighted by default.

6.3. Welding mode

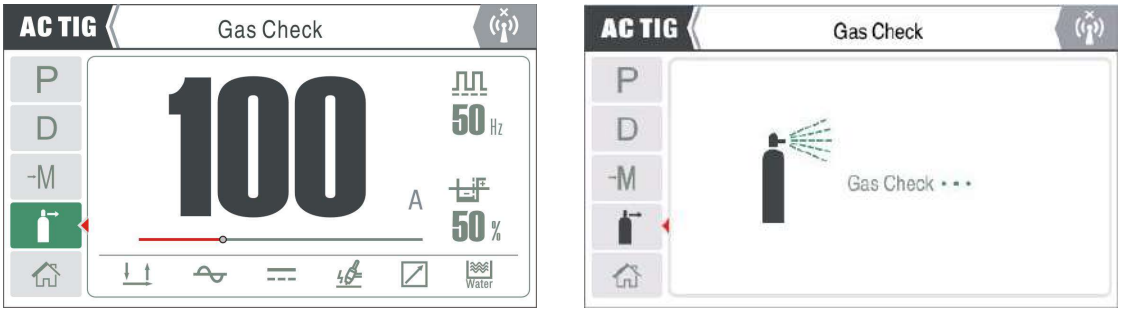
1) Before welding, press the "Home" key to return to the home page; rotate the knob to select DC TIG, AC TIG, MIX TIG and MMA; and press the knob to select the corresponding welding mode.

2) In addition to the four welding modes, there are two other options in the Home page, i.e. System Settings and User Manual. Select an option and press knob to enter the corresponding page.

Home page operations

6.4. Gas check function

1) In non-welding state, select the gas check function in the AC TIG, DC TIG or MIX TIG page.



Gas check function operation

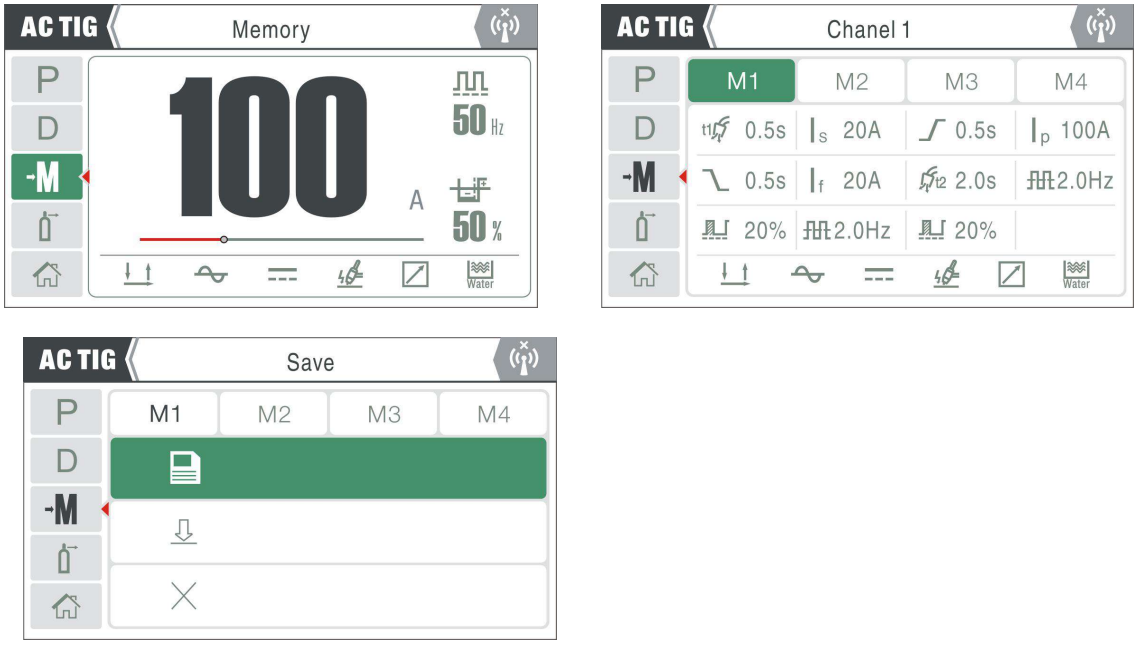
2) If the gas check animation is played, it indicates that the machine has entered Gas Check mode.

3) Press the Gas Check key again or wait for 20s to close the animation and exit Gas Check mode.

6.5. Channel storage

1) In non-welding state, select the Memory function in the AC TIG, DC TIG, MIX TIG or MMA page.

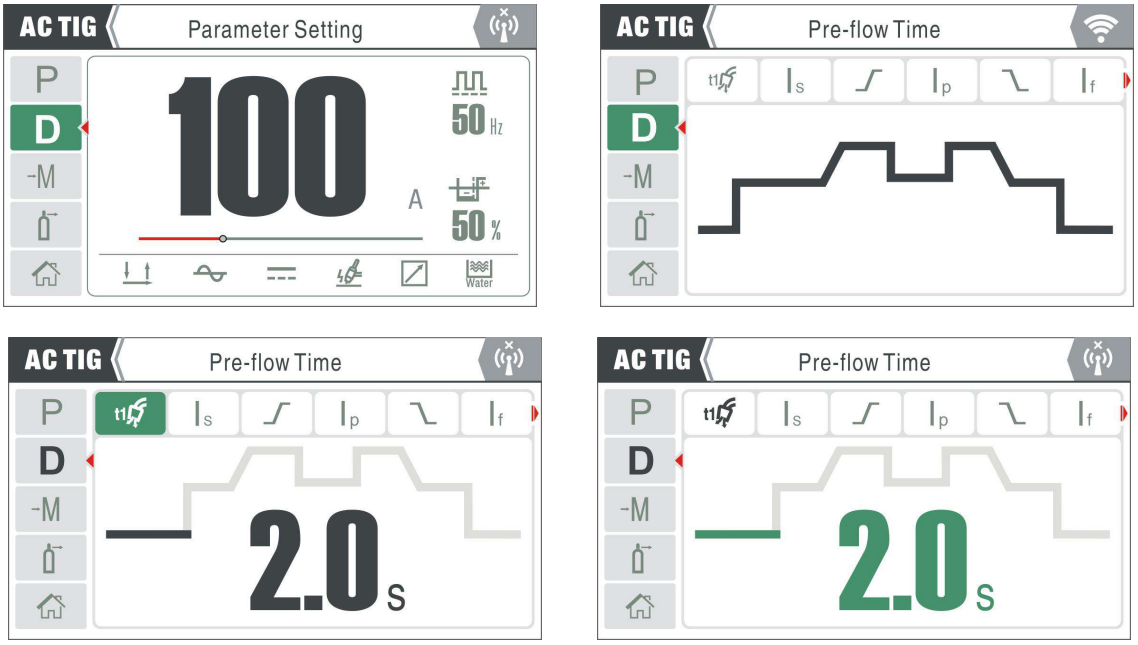
2) Select "M1", "M2", "M3" or "M4" to display the welding parameters stored in the archive. Press the knob to display and enter the Memory operation. There are three options, and the "Save" option is displayed by default when entering the page. Rotate the knob to select other options in the order of Save - Load - Delete.



Channel function operation

6.6. Parameter setting

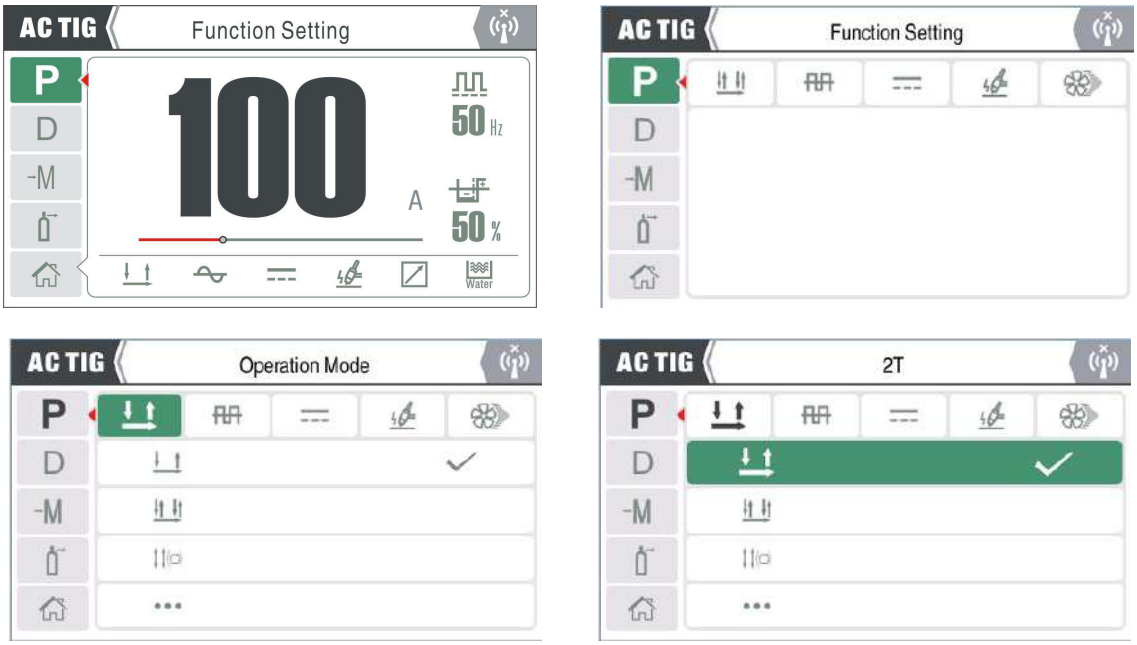
1) In non-welding state, select the Parameter Setting function in the AC TIG, DC TIG, MIX TIG or MMA page.
2) Press the knob to display a row of welding parameters; rotate the knob to select different parameters and the corresponding values are displayed below. When rotating the knob, the parameter options can be scrolled until all options are displayed.
3) Select Pre-flow Time and press the knob, the value will be displayed in green; at this time, the value can be adjusted by rotating the knob; press knob and the system will return to the previous menu.



Parameter Setting operation

6.7. Function setting

1) In non-welding state, select Function Setting in the AC TIG, DC TIG or MIX TIG page.



Function Setting operation

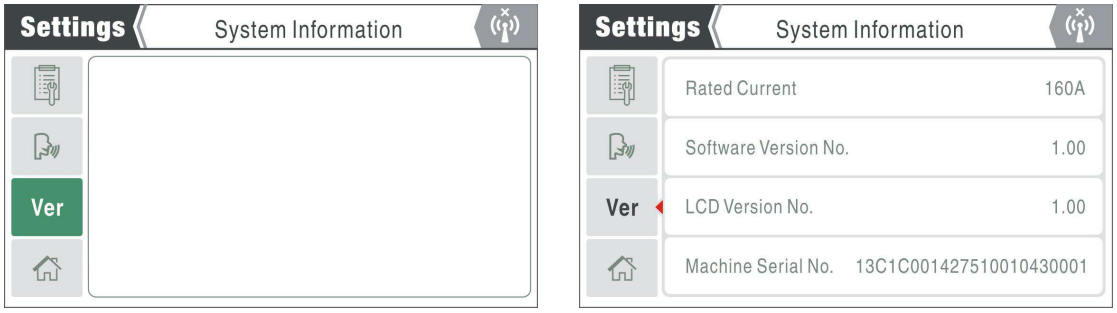
2) Press the knob to display a row of function options; rotate the knob to select different functions, the corresponding function options are displayed below.

3) After selecting an operation mode and pressing the knob, rotate the knob to select 2T, 4T, repeat or spot welding mode, then press knob to complete selection and return to the previous menu.

6.8. Other functions

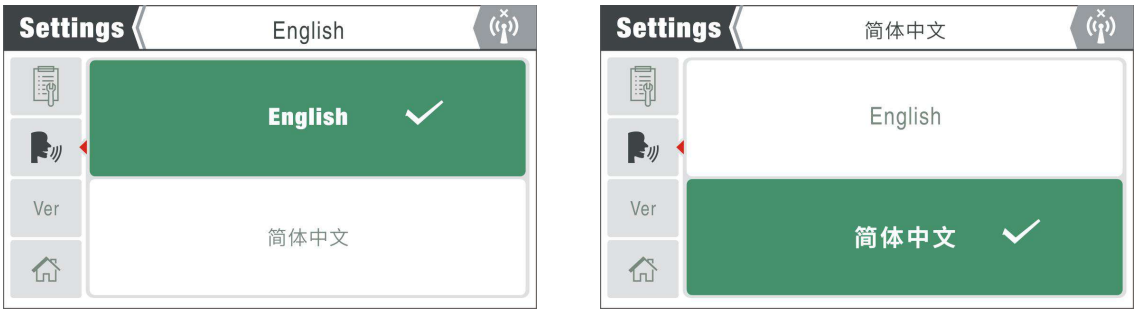
6.8.1 System information view

Enter the Settings page, rotate the knob to select System Information, and press knob to display the system information, which is displayed in order from: Rated Current, Software Version No., LCD Version No. and Machine Serial No.



System information view

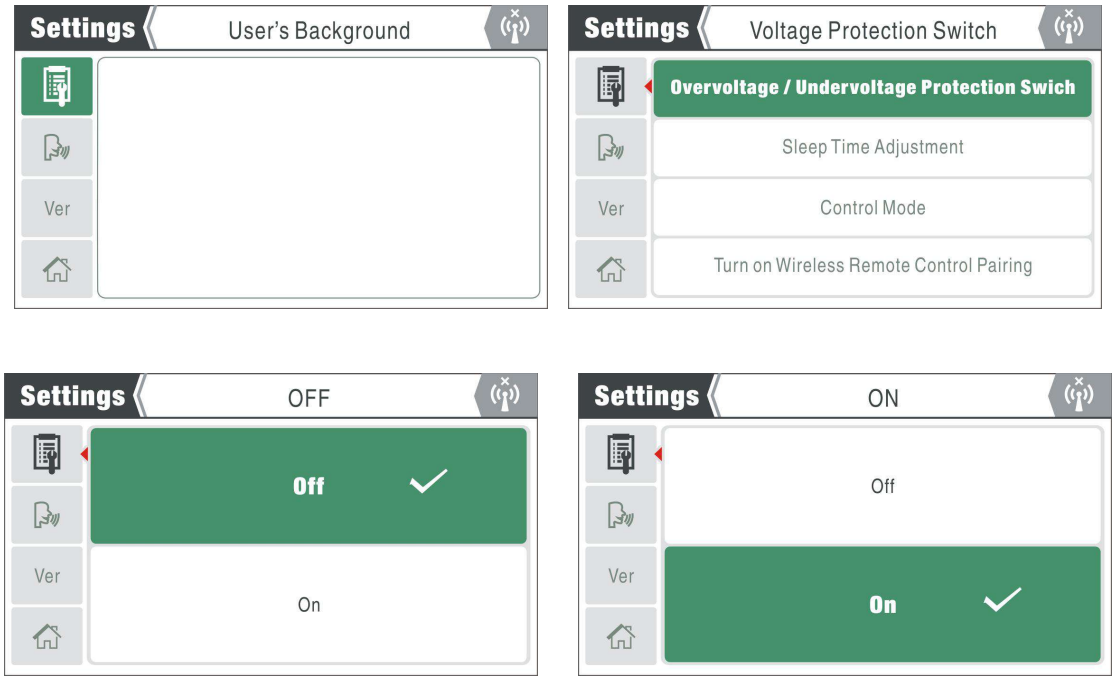
6.8.2 Language selection



Language selection

Enter the Settings page, rotate the knob to select System Information, press knob to enter the Language Selection, and rotate the knob to switch between English and Simplified Chinese.

6.8.3 Input overvoltage/undervoltage protection function

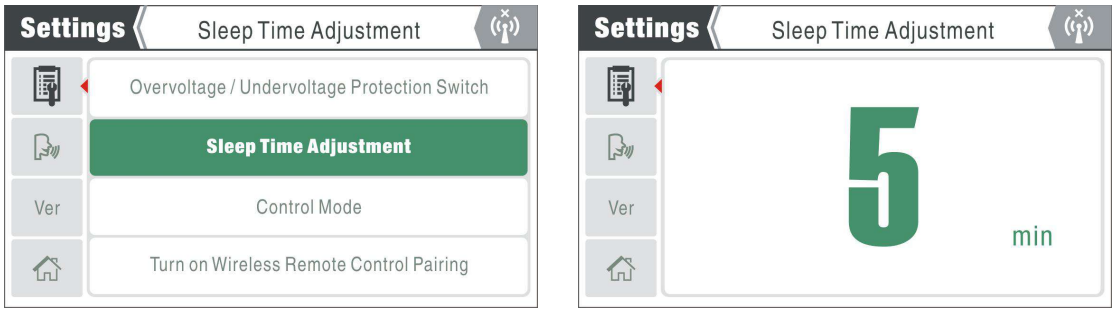


Overvoltage/undervoltage protection switch

1) Select User's Background option, press knob to enter the selection interface, and the Overvoltage/undervoltage Protection Switch is selected by default;
2) Press knob to enter the "ON/OFF" selection interface;
3) Rotate the knob to select the required option, press knob to complete settings and return to the previous menu.

6.8.4 Sleep time adjustment

1) Select User's Background option, press knob to enter the selection interface, and rotate the knob to select the Sleep Time Adjustment option;
2) Press knob to enter the "Sleep Time Parameter" interface, rotate the knob to adjust the sleep response time, increasing clockwise and decreasing counterclockwise. (The standby response time is divided into four levels: 0, 5, 10, and 15, of which 0 means not enabled, and the other numbers correspond to the response time. Unit: minutes; Default: 5.)
3) After adjusting the sleep response time, press knob to save the current settings;
4) Press any key to exit sleep response time setting.
5) The sleep function is only available in TIG mode. If the machine is not used within the set response time, it will enter sleep state, and the LCD screen will display the screen protection picture. The machine will wake up immediately when the torch trigger, operation panel, or remote controller is used.



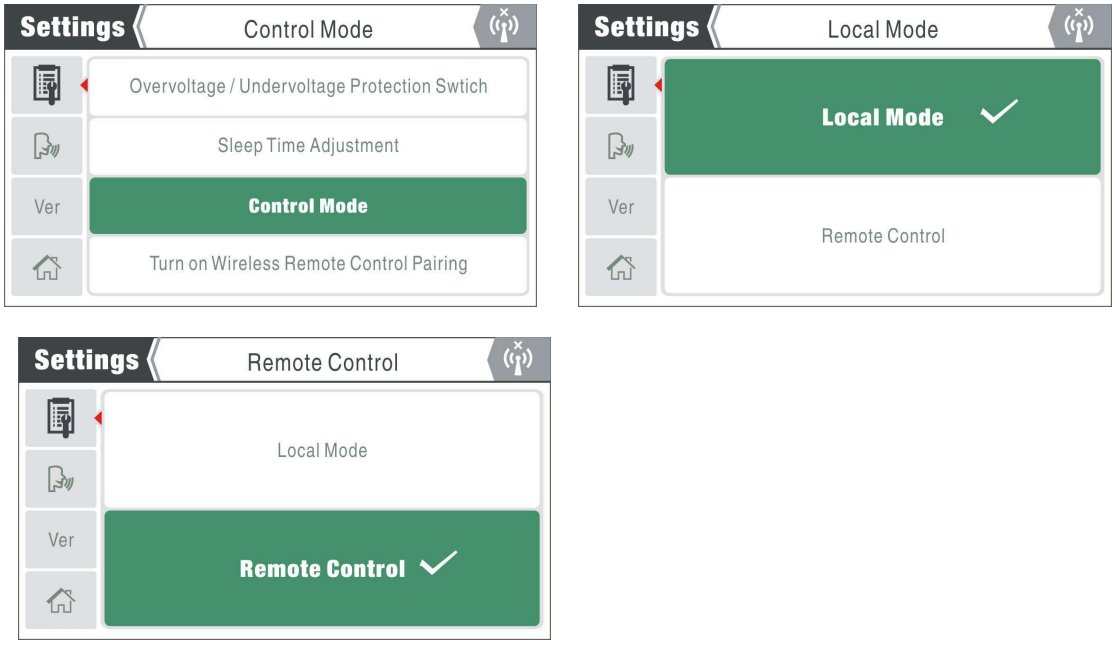
Sleep time setting

6.8.5 Control mode

1) Select User's Background option, press knob to enter the selection interface, and rotate the knob to select the Control Mode option;

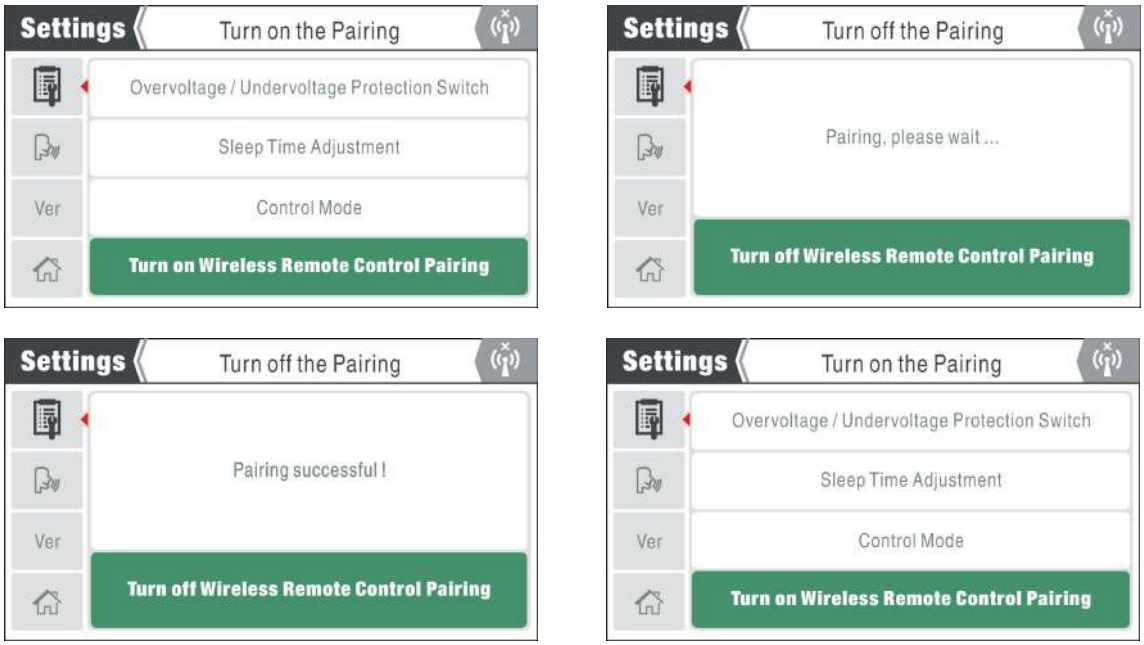
2) Press knob to enter "Local Mode" and "Remote Mode" options;

3) Rotate the knob to select the required option, press knob to complete settings and return to the previous menu.



Control mode selection

6.8.6 Wireless remote control



Wireless remote control pairing switch

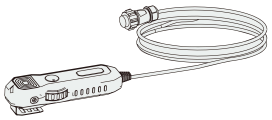
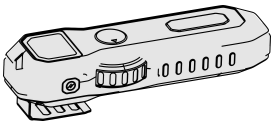
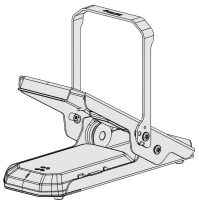
1) **Wireless remote control pairing:** When not welding, select User's Background option; press knob to enter the selection interface; rotate the knob to select Turn on Wireless Remote Control Pairing; press knob to turn on the pairing switch and the pairing key of wireless simple remote controller for 2s for wireless remote control pairing. During pairing, a green box is displayed indicating "Pairing, please wait..." After pairing, the box displays "Pairing successful!", and the wireless connection indicator icon displays  and returns to the previous menu.

2) **Disconnecting the wireless connection:** After the remote controller is successfully paired, press and hold the remote controller pairing key, or the wireless remote control pairing option, and the wireless connection will be disconnected. After disconnecting, the wireless connection indicator icon will display  .

6.8.7 Wired remote control

The operation process is the same as the wireless remote control. After inserting the 9-pin aviation plug of the wired remote controller into the aviation socket, the welding current can be adjusted by the remote controller.

6.8.8 Optional remote controller model

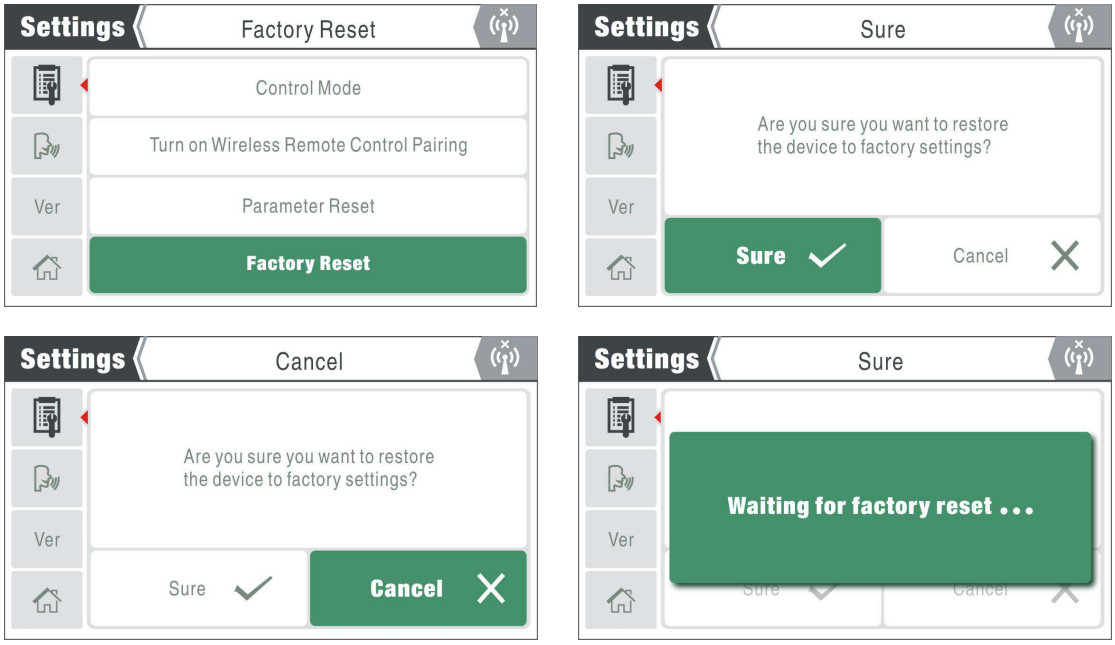
Type	Name	Model	Host-side receiver module	Welding mode	Picture
Wired	Analog torch control remote controller	10K potentiometer Analog welding torch	No	TIG	/
	Digital torch control remote controller	Digital welding torch	No	TIG	/
	Wired foot pedal controller	FRC-01(P1S3)	No	TIG	
	Wired handheld remote controller	HRC-01(P1S1)	No	MMA	
Wireless	Wireless handheld remote controller	HRC-02(P1S2)	Yes	TIG/MMA	
	Wireless foot pedal controller	FRC-02(P1S4)	Yes	TIG	

6.8.9 Factory reset function

1) Select User's Background option, press knob to enter the selection interface, and rotate the knob to select the Factory Reset option;

2) Press knob to enter the "Sure/Cancel" selection interface;

3) Rotate the knob to select the required setting option; press knob and a green box will be displayed indicating "Waiting for factory reset"; after approx. 10s, the system will complete the reset and return to the home page.



Factory reset

6.8.10 Parameter reset function

The operation process is the same as factory reset. After resetting parameters, the system will go back to the previous menu rather than returning to the home page.

Welding mode	Pre-flow time (s)	Initial current (A)	Upslope time (s)	Peak current (A)	Base current (A)	Downslope time (s)	Crater current (A)	Post-flow time (s)	Spot welding time (s)	Pulse frequency (Hz)	Duty cycle (%)	Welding current (A)	Hot start current (A)	Arc force current (A)
DC TIG	0.5	20	0.5	100	——	0.5	20	2	1	——	——	——	——	——
DC pulse TIG	0.5	20	0.5	100	50	0.5	20	2	——	50	50	——	——	——

MMA	——	——	——	——	——	——	——	——	——	——	——	100	30	30

Welding mode	Pre-flow time (s)	Initial current (A)	Upslope time (s)	Peak current (A)	Base current (A)	Downslope time (s)	Crater current (A)	Post-flow time (s)	Spot welding time (s)	Pulse frequency (Hz)	Duty cycle (%)	AC frequency (Hz)	AC balance (%)	——
AC TIG	0.5	20	0.5	100	——	0.5	20	2	1	——	——	20	20	——
AC pulse TIG	0.5	20	0.5	100	50	0.5	20	2	——	50	50	20	20	——

Welding mode	Pre-flow time (s)	Initial current (A)	Upslope time (s)	Peak current (A)	Base current (A)	Downslope time (s)	Crater current (A)	Post-flow time (s)	Mixed frequency (Hz)	Mixed duty cycle (%)	AC frequency (Hz)	AC balance (%)	——	——
MIX TIG	0.5	20	0.5	100	——	0.5	20	2	2	20	20	20	——	——

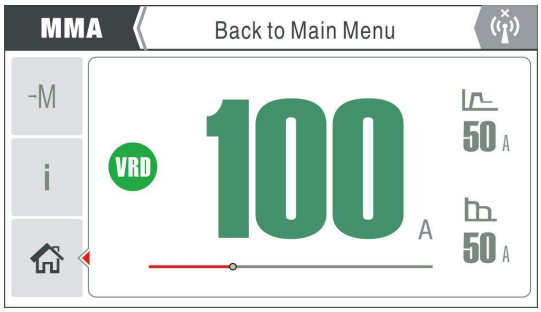
6.8.11 VRD Function

Warning! The electrical connection of equipment shall be carried out by suitably qualified personnel.

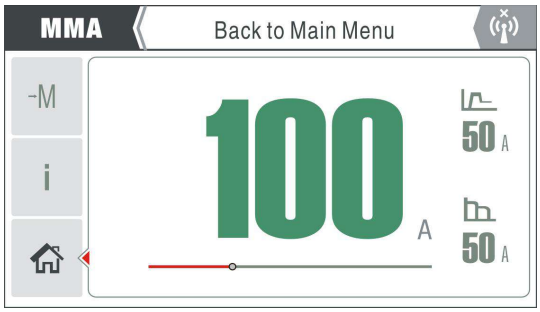
Warning! Electric shock may cause death; after power failure, there is still a high voltage on the equipment, do not touch the live parts on the equipment.

The MMA VRD mode is enabled by default in factory settings, and the user can disable it as required.

1) Open the right cover of the machine after the machine is powered off;
2) Turn the dial switch SW1 to "12" on control panel PK-442 to disable VRD;
3) Reinstall the machine cover and turn on the power; switch to MMA mode and the VRD indicator VRD will be on. At this time, the no-load voltage of the welder is 11.5V.



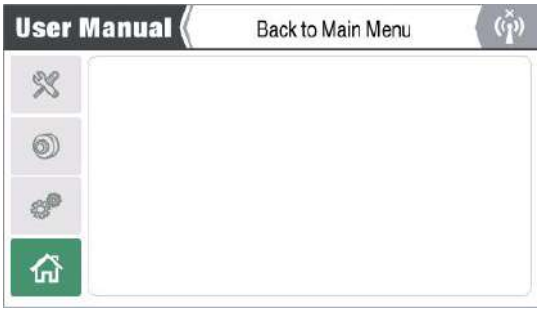
Turn on VRD

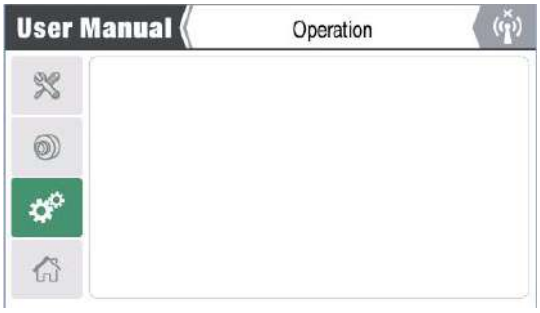


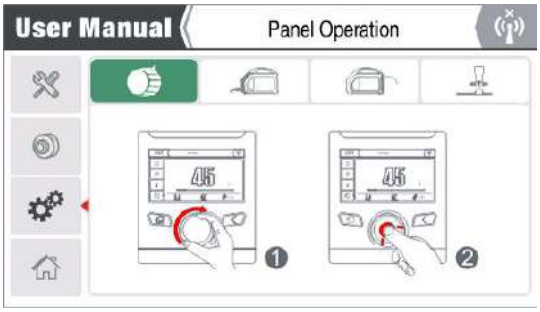
Turn off VRD

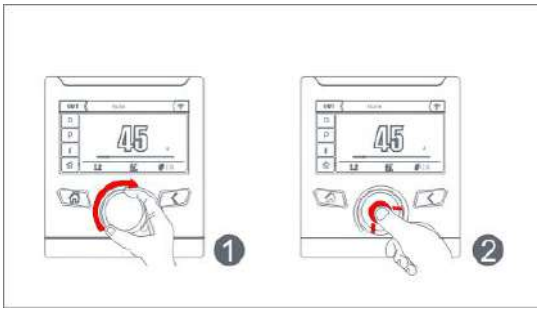
6.9. User Manual

1) In the home page, rotate the knob to select the User Manual, and press knob to enter the User Manual page;
2) There are three options, i.e. "Operation", "Spare Parts" and "Maintenance". "Operation" includes Panel Operation, Front Panel Connection, Rear Panel Operation and Welding Guide; "Spare Parts" includes Welding Torch, Wearable Parts, Earth Cable and other parts; "Maintenance" includes Alarms and Solutions, Repair Parts and Elimination of General Problems;
3) For example, press the Panel Operation key and an enlarged picture will be displayed. Some enlarged pictures size may be too large and can be scrolled by rotating the knob; press knob to return to the previous menu.









Operation display

6.10. Alarm function

1) If the welder malfunctions during operation, an alarm sign will be displayed above the current interface, as shown in the following figure;
2) There are seven alarm types, i.e. "Overvoltage Protection", "Undervoltage Protection", "Overheat Protection 1", "Overheat Protection 2", "Overcurrent Protection", "Data Error", and "Water Shortage".

Overheat alarm display

6.11. Screen protection function

1) If the LCD screen is not being operated and the standby time has reached the set value limit, then the welder will enter sleep mode and display the screen protection picture;
2) The machine will wake up immediately when the torch trigger, operation panel, or remote controller is used, and the screen protection picture will disappear and return to the previous state.

Screen protection picture

7. Welding function operation

Warning! Before turning on the power supply, make sure that the electrode holder or welding torch is connected to the output, do not touch the workpiece and earth clamp. Otherwise, an unexpected arc may be started when the power is turned on in the case of MMA by default. This can cause damage to the workpiece and to personnel.

Warning! Be sure to wear appropriate protective equipment during welding operation. Arcs, spatter, smoke, and high temperatures produced in the welding process may cause injury to personnel.

Warning! After the power supply is turned off, the output voltage of the welder may continue for a period and then drop slowly. Please do not touch the conductive part of the output before the panel is extinguished.

7.1. Function table

Rotate the encoder to select different welding parameters as required. Regardless of no-load or welding mode, parameter selection and adjustment can be carried out without affecting welding. Switch the mode by scrolling. "●" indicates that the parameter is optional, and "×" indicates that it is not optional.

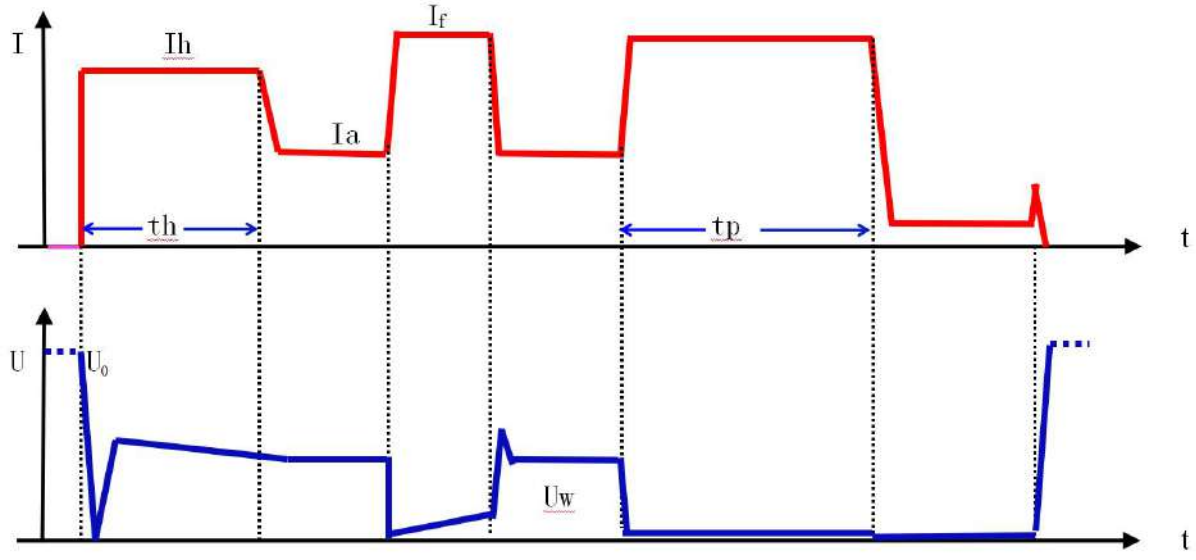
Welding mode	Torch trigger mode	MMA current	Hot start current	Arc force current
MMA	No	●	●	●

Welding mode	Torch trigger mode	Pre-flow time	Initial current	Upslope time	Peak current	Base current	Downslope time	Crater current	Post-flow time	Spot welding time	AC frequency	AC balance	Pulse frequency	Pulse duty factor
DC TIG	2T	●	●	●	●	×	●	●	●	×	×	×	×	×
	4T	●	●	●	●	×	●	●	●	×	×	×	×	×
	Repeat	●	●	●	●	×	●	●	●	×	×	×	×	×
	Spot welding	●	×	×	●	×	×	×	●	●	×	×	×	×
DC pulse TIG	2T	●	●	●	●	●	●	●	●	×	×	×	●	●
	4T	●	●	●	●	●	●	●	●	×	×	×	●	●
	Repeat	●	●	●	●	●	●	●	●	×	×	×	●	●

AC TIG	2T	●	●	●	●	×	●	●	●	×	●	●	×	×
	4T	●	●	●	●	×	●	●	●	×	●	●	×	×
	Repeat	●	●	●	●	×	●	●	●	×	●	●	×	×
	Spot welding	●	×	×	●	×	×	×	●	●	●	●	×	×
AC pulse TIG	2T	●	●	●	●	●	●	●	●	×	●	●	●	●
	4T	●	●	●	●	●	●	●	●	×	●	●	●	●
	Repeat	●	●	●	●	●	●	●	●	×	●	●	●	●

Welding mode	Torch trigger mode	Pre-flow time	Initial current	Upslope time	Peak current	Base current	Downslope time	Crater current	Post-flow time	Spot welding time	AC frequency	AC balance	Mixed frequency	Mixed duty cycle
MIX TIG	2T	●	●	●	●	×	●	●	●	×	●	●	●	●
	4T	●	●	●	●	×	●	●	●	×	●	●	●	●
	Cycle	●	●	●	●	×	●	●	●	×	●	●	●	●

7.2. MMA function

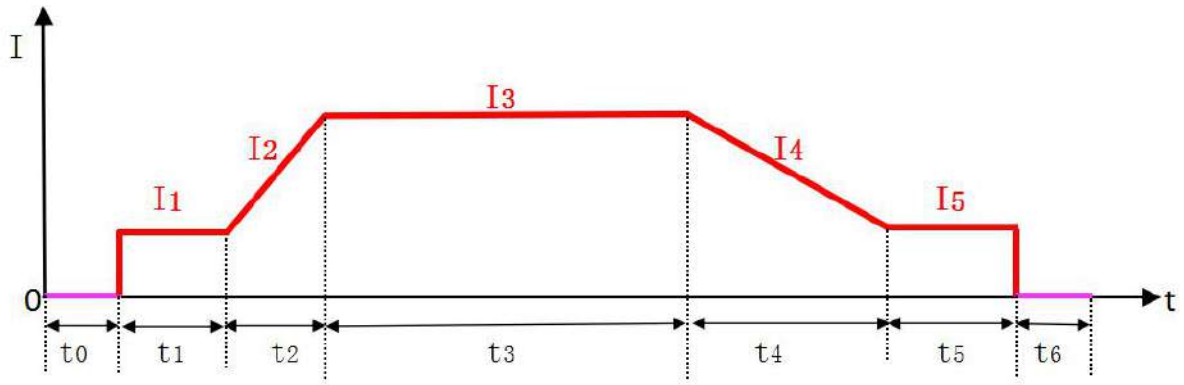


MMA electrode welding process

1. I_h (hot start current) = $I_{\Delta h}$ (arc ignition current)+ I_a (welding current); the hot start time is fixed at t_h, which is conducive to arc ignition and reduces sticking between the welding electrode and workpiece during arc ignition. The magnitude of hot start current is generally determined based on the type, specification, and welding current of the welding electrode. For welding electrodes with sound arc start performance and small diameter, generally select a smaller hot start current; large welding current also does not require much hot start current.
The hot start time is correlated with the hot start current – the greater the current, the shorter the hot start time.
2. I_f (plus arc force current) = $I_{\Delta f}$ (arc force current)+I_a (welding current). Use the electrode diameter, set current and process requirements to determine the arc force current. High arc force settings lead to faster metal transfer and non-sticking electrode but some spatter may occur. Low arc force settings provide a smooth arc with less spatter and good weld seam formation, but sometimes the arc is soft or the welding electrode can stick. The arc force should be increased especially when welding thick electrodes under less current. Generally, the arc force should be set to 20~40A.
3. After the short-circuit time exceeds Tp, it will enter the anti-sticking electrode current, which maintains a small current until the electrode is separated from the workpiece.
4. U_0 is no-load voltage and U_w is working voltage. When not performing MMA welding, the welder outputs the no-load voltage U_0 or the VRD voltage.

7.3. TIG function

7.3.1 DC TIG



DC TIG current waveform

I1-Initial current
I2-Current corresponding to the upslope time
I3-Peak current
I4-Current corresponding to down-slope time
I5-Crater current

t0-Pre-flow time
t1-Initial current period
t2-Upslope time
t3-Peak current period
t4-Down-slope time
t5-Crater current period

t6-Post-flow time

● Initial current (I1): The initial current is the current after pressing the torch trigger to start the arc, which should be determined according to the process requirements. A large initial current makes it easy to start the arc, but it should not be too large when welding thin plates, otherwise, it may burn through the workpiece. After the arc is started in some operations, the current remains at the initial current to achieve the purpose of preheating the workpiece or lighting.

● Up-slope time (t2): Refers to the time as the current slowly rises from the initial current to the peak current, which can be determined according to the usage and process requirements.

● Peak current (I3): Set by the user according to the actual process requirements.

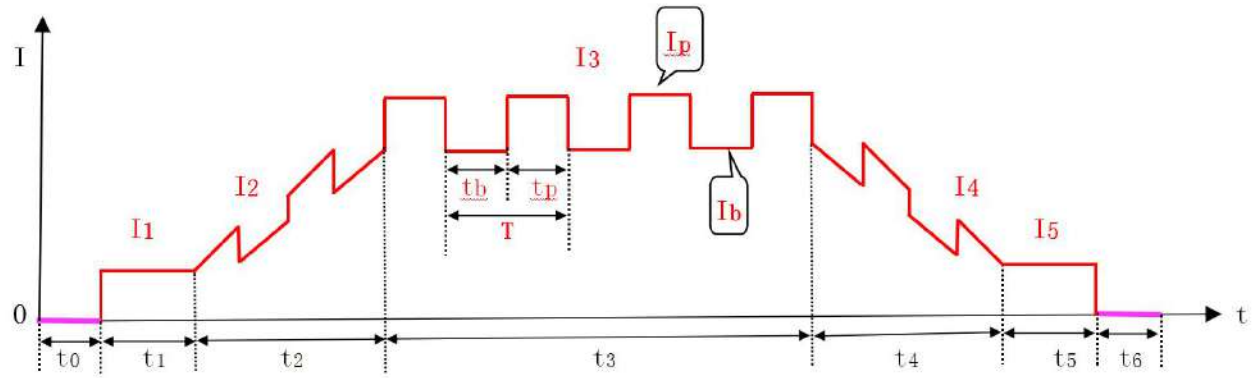
● Down-slope time (t4): Down-slope time refers to the time when the current drops from the peak to the crater current, which can be determined according to the usage and process requirements.

● Crater current (I5): In some operation modes, the arc is not extinguished after the current down-slope and remains in a state of continuous arcing. When welding, avoid immediately cutting off output, otherwise defects or large arching may occur. The current shall be determined according to the process requirements.

● Pre-flow time (t0): Refers to the time from pressing the torch trigger to sending argon gas and arc ignition. Generally, it should be greater than 0.5s to ensure that the gas has been sent to the welding torch at normal flow when discharging arc initiation. It should be increased according to gas pipe length.

● Post-flow time (t6): Refers to time from cutting off the welding current to turning off the gas valve in the welder. Extended time period will cause argon gas wastage, but too short time period will cause oxidation of the weld. A longer time period should be used for AC TIG and special material welding.

7.3.2 DC Pulse TIG



DC pulse TIG current waveform

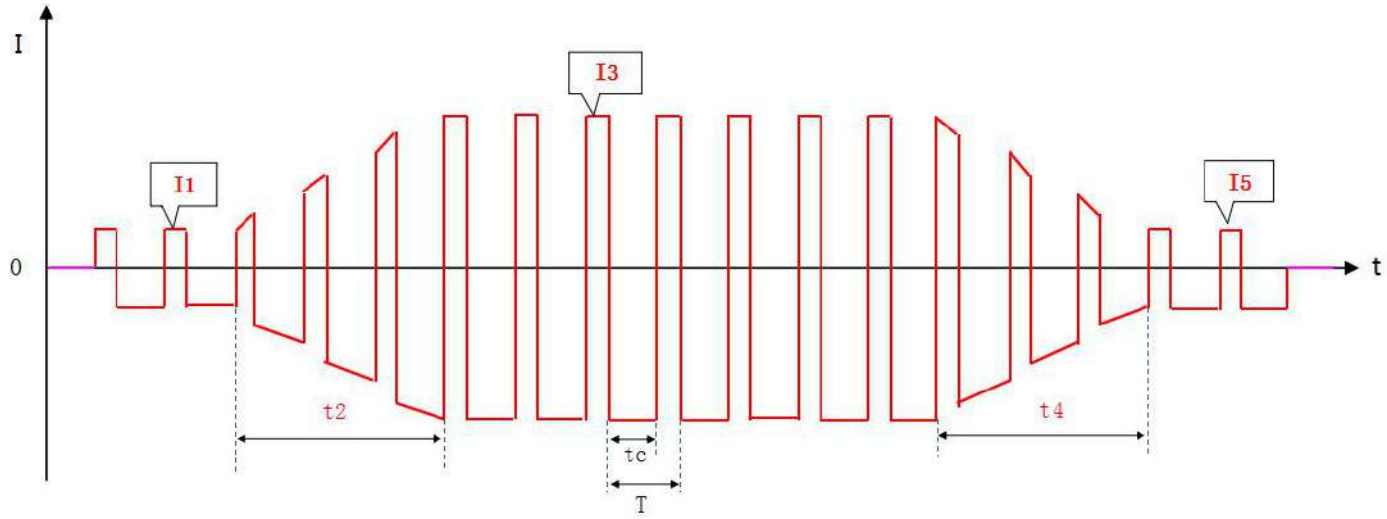
I1-Initial current
I2-Current corresponding to the upslope time
I3-Set pulse current
I4-Current corresponding to downslope time
I5-Crater current
IP-Pulse peak current
Ib-Pulse base current

t0-Pre-flow time
t1-Initial current period
t2-Upslope time
t3-Peak current period
t4-Downslope time
t5-Crater current period
t6-Post-flow time
tb-Pulse base time
tp-Pulse peak time
T-Pulse period

Pulse TIG includes all DC TIG parameters, except that the parameters are set differently. The repeated parameters will not be explained again here. In addition, there are 4 adjustable parameters, which are explained separately in conjunction with the figure:

- Peak current (Ip): Can be adjusted according to the process requirements.
- Base current (Ib): Can be adjusted according to the process requirements.
- Pulse frequency (1/T): T=tp+tb, can be adjusted according to the process requirements.
- Duty cycle (100%*tp/T): The duty cycle is the peak current duration as a percentage of the pulse period, adjusted according to the process requirements.

7.3.3 AC TIG



AC TIG current waveform

I1-Initial current
t2-Upslope time
I3-Set AC peak current
t4-Downslope time
I5-Crater current
tc-Clearing current time
T-AC period

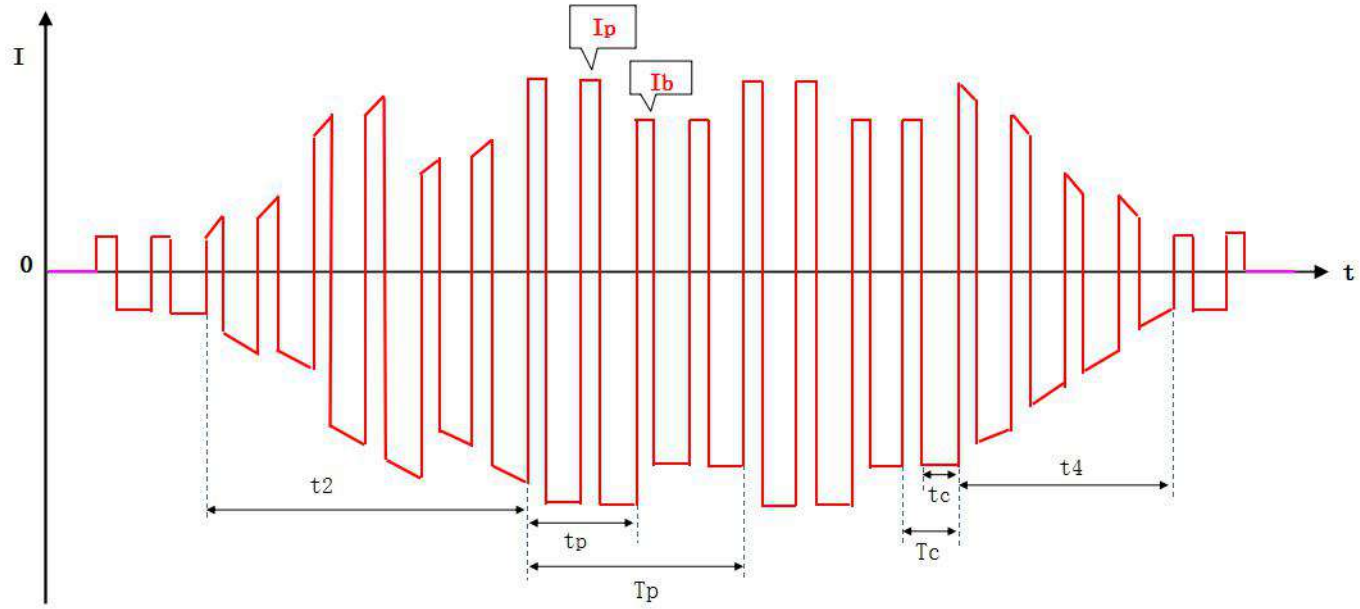
AC TIG supports square, triangular and sine output waveforms. AC and DC TIG have the same pre-flow time and post-flow time, but the other parameters are explained separately in conjunction with the figure:

● Initial current (I1), peak current (I3) and crater current (I5): These three parameters are set approximately equal to the effective values of the actual welding current, and can be adjusted as required.

● AC frequency (1/T): Can be adjusted as required.

● AC balance (100%*tc/T): Generally, the current of the positive tungsten electrode in AC welding is called the cleaning current. Its main function is to break the dense oxide layer of the workpiece, and AC balance represents a portion of the cleaning current, generally 10-40%. When the value is small, the arc is concentrated, the penetration depth is large, and the melting width is small; when the value is large, the opposite applies.

7.3.4 AC Pulse TIG



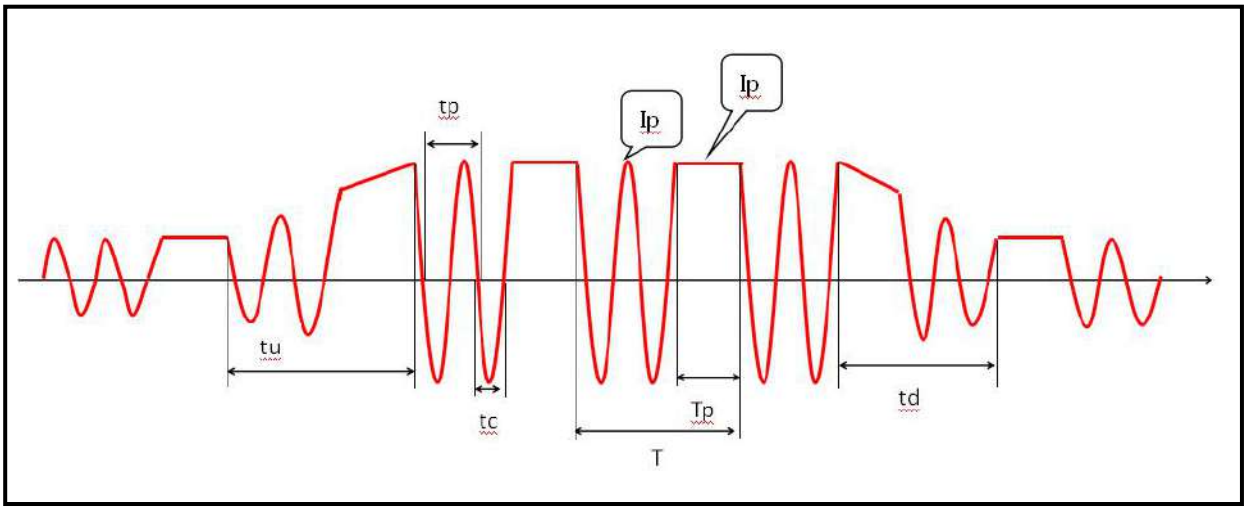
AC pulse TIG current waveform

tc-Clearing current time
Tc-AC period
tp-Pulse peak time
Tp-Pulse period
t2-Upslope time
t4-Downslope time
Ip-Peak current
Ib-Base current

- AC frequency (1/Tc): Can be adjusted according to the process requirement.
- Pulse frequency (1/Tp): Can be adjusted according to the process requirement.
- Duty cycle (100%*tp/Tp): Can be adjusted according to the process requirement.
- AC balance (100%*tc/Tc): Can be adjusted according to the process requirement.
- AC pulse TIG welding supports square, triangular and sine output waveforms. AC pulse TIG welding is basically the same as AC square wave TIG welding, but its welding current is controlled by a low-frequency pulse, and therefore changes with the pulse value to form peak and base current, which are the (average) peak and (average) base values of the low-frequency pulse.

● In AC pulse mode, the pulse frequency range is affected by AC frequency and frequency division factor. The minimum frequency division factor is 10 times, and the maximum is 2 times the AC frequency. Therefore, the pulse frequency range is 0.5Hz to AC frequency/10Hz; the user can select any frequency within that range. When the AC frequency changes, the AC frequency/actual frequency of the current pulse is equal to the frequency division factor, and is updated. After the frequency division factor is determined, the division factor is set equal to the actual frequency of the current pulse and is saved, so the pulse frequency does not change. After setting the AC frequency and pulse frequency, the frequency division factor is determined, which is equal to the AC frequency/pulse frequency. Example: If the AC frequency is set to 100Hz, the pulse frequency range is 0.5-10Hz. Set AC frequency to 100Hz at the first time, then the pulse frequency is then set to 5Hz for the first time, the current frequency division factor is 100/5=20. If the AC frequency is updated to 70Hz, the frequency division factor is 70/5=14; that is, the frequency division factor is variable, but the pulse frequency is constant. **In other words, the AC frequency affects the pulse frequency range, but after setting the pulse frequency, it is no longer affected by the AC frequency.**

7.3.5 MIX TIG



MIX TIG current waveform

Note: tc-Clearing current time
tp-AC period
tp-DC operation time
T-Mixed cycle
tu-Upslope time
td-Downslope time
Ip-Peak set current

● AC frequency (1/tp): Can be adjusted according process requirements.
● Mixed frequency cycle (1/T): Can be adjusted according to the process requirement.
● Duty cycle (100%*Tp/T): Can be adjusted according to the process requirement.
● AC balance (100%*tc/tp): Can be adjusted according to the process requirement.
● MIX TIG supports the combination of square, triangular, and sine waveforms with DC.

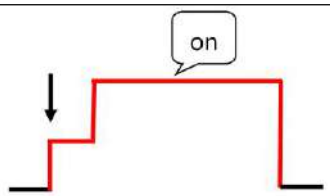
● In MIX TIG mode, the frequency range of the MIX TIG is affected by the AC frequency and frequency division factor. The minimum frequency division factor is 10, and the maximum AC balance is equal to the AC frequency. Therefore, the frequency range of MIX TIG welding is 1Hz to the AC frequency/10Hz, and the user can select any frequency within the range. When the AC frequency changes, the AC frequency/actual frequency of the current MIX TIG welding is equal to the frequency division factor, and is updated. After the frequency division factor is determined, the current AC frequency/frequency division factor is equal to the actual frequency of the current MIX TIG welding and is saved, so it does not change. After setting the AC frequency and MIX TIG frequency, the frequency division factor is determined as the AC frequency/MIX TIG frequency. Example: If the AC frequency is set to 100Hz, the frequency range is 1-10Hz. Set the AC frequency to 100Hz at the first time and then the MIX TIG frequency is set to 5Hz for the first time, the current frequency division factor is 100/5=20. If the AC frequency is updated to 70Hz, the frequency division factor is 70/5=14; that is, the frequency division factor is variable, but the MIX TIG frequency is constant. **In other words, the AC frequency affects the frequency range of MIX TIG welding, but after the mixed TIG frequency is determined, it is no longer affected by the AC frequency.**

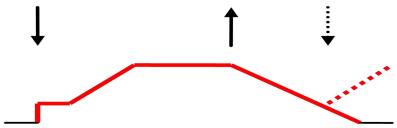
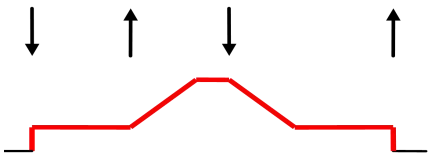
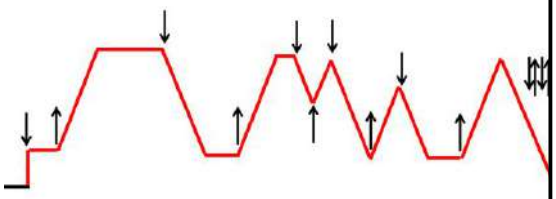
7.3.6 Welding mode description of TIG welding torch

TIG operation mode has a special convention, which specifies the mode or method of controlling the welding current change by different operations of torch trigger during TIG (DC, pulse, AC TIG, or MIX TIG) welding. The introduction of TIG operation strengthens the application of the torch trigger remote control function, so the user can obtain a practical welder remote controller without additional investment.

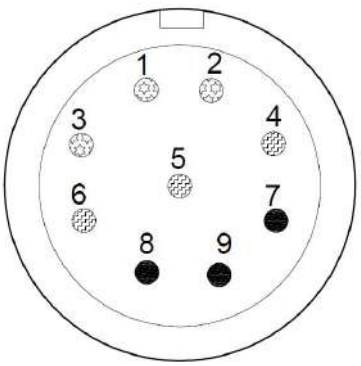
The TIG mode is determined according to the process requirements and operator preference. The symbols in the diagram are as follows:

Legend for commonly-used torch trigger operations			
↓	Press the torch trigger	↑	Release the torch trigger

Mode No.	Operation schedule	Torch trigger operation and typical DC TIG current curve
1	Spot welding mode: 1. Press the torch trigger to start the arc to the set value; 2. After completion of the set spot welding time, the arc will extinguish.	

2	2T mode: 1. Press the torch trigger to increase the arc up to the designated peak current; 2. Release the trigger to slowly extinguish the arc; 3. If the trigger is pressed again before the arc is extinguished, it will slowly increase to the peak current.	
3	4T mode: 1. Press the torch trigger to start the arc to the initial value; 2. Release the trigger to slowly increase to the peak current; 3. Press the trigger to slowly drop to the crater current; 4. Release the trigger to extinguish the arc.	
4	Cycle mode: 1. Press the torch trigger to start the arc to the initial value; 2. Release the trigger to slowly increase to the peak current; 3. Press the trigger to slowly drop to the crater current; 4. Release the trigger to slowly increase up to the peak current; 5. Repeat steps 3 and 4 until the arc is extinguished by pressing the torch trigger twice within 300ms.	

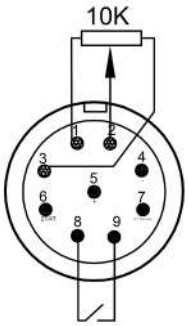
7.3.7 Aviation socket of torch trigger



1. Pins 1, 2 and 3 are used to adjust the current of the analog torch.
2. Pins 4, 5 and 6 are used to adjust the current of the digital torch. Pin 4 decreases the current, pin 5 increases the current, and pin 6 is 2T/4T.
3. **Pin 7 is the digital/analog identification port. The high level is digital, and the low level is analog.**
4. Pins 8 and 9 are the torch trigger (Pin 9 is GND).
5. The aviation socket of the torch trigger connects to the digital, analog torch or foot pedal controller.
6. Pin 2 is the common potentiometer port. If the torch control roller value is 0 and the current value is at the minimum, the resistance of pins 1 and 2 is 10kΩ, and pins 2 and 3 is 0Ω; when the roller value is the maximum and the current value is the maximum, the resistance of pins 1 and 2 is 0Ω, and of

pins 2 and 3 is 10kΩ.

7.3.8 Use of foot pedal controller

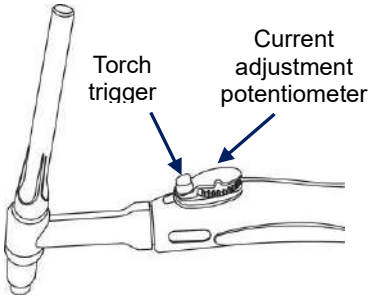


Aviation socket of foot pedal controller

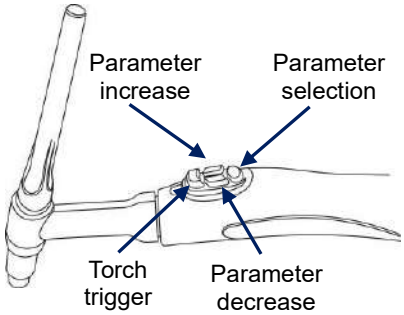
1. The foot pedal controller consists internally of a switch and potentiometer, as shown in the figure.
2. Use a dedicated cable to connect the remote controller to pins 1, 2, 3, 8 and 9 of the torch trigger's aviation socket on the front panel of the welder.
3. Under no load, press the key  and the foot pedal controller will enter the foot pedal control mode.
4. Adjust the maximum welding current on the panel to start welding.
5. Step on the foot pedal controller to ignite the arc, generally using the non-contact arc ignition mode. After successful ignition, the welding current will be controlled by the foot pedal controller, using the maximum output of the current setting.
6. Pin 2 is the common potentiometer port. When the foot pedal controller current is at the minimum, the resistance of pins 1 and 2 is 10kΩ, and of pins 2 and 3 is 0Ω; when the current is at the maximum, the resistance of pins 1 and 2 is 0Ω, and pins 2 and 3 is 10kΩ.

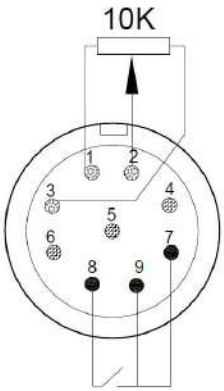
Note: The foot pedal controller is optional. Please specify before placing an order if required.

7.3.9 Use of wired welding torch

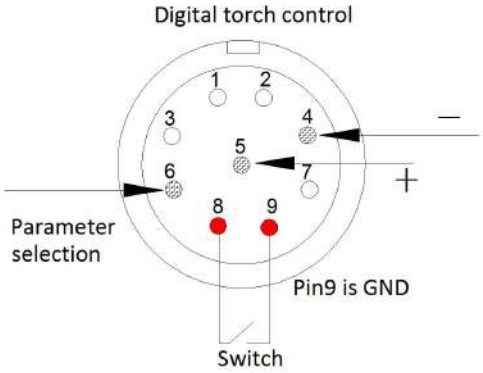


Analog welding gun





Wiring diagram of analog torch



Wiring diagram of digital torch

1. Wired welding torch include digital and analog types, as shown in the following figure.
2. Use a dedicated cable to connect the analog welding torch to pins 1, 2, 3, 8 and 9 of the torch trigger's aviation socket on the front panel of the welder; connect pin 7 of the torch to pin 9.

Pin 2 is the common potentiometer port. When the torch control value is 0 and the current value is at the minimum, the resistance of pins 1 and 2 is 10kΩ, and pins 2 and 3 is 0Ω; when the roller value is at the maximum and the current value is at the maximum, the resistance of pins 1 and 2 is 0Ω, and of pins 2 and 3 is 10kΩ.

3. Use a dedicated cable to connect the digital welding torch to pins 4, 5, 6, 8 and 9 of the torch trigger's aviation socket on the front panel of the welder. Pin 4 decreases the value, pin 5 increases the value, and pin 6 is 2T/4T. Pin7 of the digital torch is reserved.

4. Under no load, press the key  and the welding torch will enter torch control mode.

5. When using the analog welding torch, set the welding parameters on the panel to start welding. During welding, the potentiometer can be used to adjust the welding current from the minimum to the set value.

6. When using the digital welding torch, the Parameter Selection key on the torch can be used to switch the adjustment parameter; Parameter Increase and Parameter Decrease can be used to adjust the parameter value; and Torch Trigger on the welding torch can be used to control the output mode.

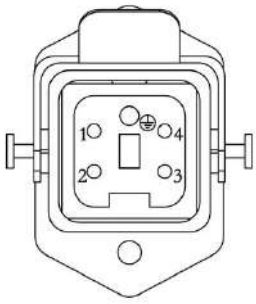
6.1 Wiring method:

Torch trigger: Pins 8-9; +: Pins 5-9; -: Pins 4-9

Functional parameter selection: Pins 6-9 (Pin 9 is GND)

Note: The analog and digital welding torches are optional. Please specify before placing an order if required.

7.3.10 Water cooler connector (optional)



Water cooler connector

1. Pins 1 and 2 are power output ports for the water cooler, and pins 3 and 4 are the abnormal signal inputs.
2. Under no-load state, press the key Water and the welder will enter the water-cooled mode during welding.
3. After welding, the water cooler will continue to operate for 5 minutes. If there is no welding operation within 5 minutes, the water-cooled mode will be automatically disabled.

Note: The welder is only permitted for use with the original supporting water cooler. Do not use water coolers purchased from other manufacturers.

8. Maintenance

Warning!
The following operation requires sufficient professional knowledge on electric aspects and comprehensive safety knowledge. Make sure the input cable of the machine is disconnected from the electricity supply and wait for 5 minutes before removing the machine covers.
Note! The following should only be carried out by an authorised electrical technician.

8.1. Power supply maintenance

In order to guarantee that the machine works efficiently and in safety, it must be maintained regularly. Operators should understand the maintenance methods and means of the machine operation. This guide should enable customers to carry out simple examination and safeguarding by oneself, try to reduce the fault rate and repair times of the machine, so as to lengthen service life of the machines.

Period	**Maintenance item**
Daily examination	Check the condition of the machine, mains cables, welding or cutting cables and connections. Check for any warnings LEDs and machine operation.

Monthly examination	Disconnect from the mains supply and wait for at least 5 minutes before removing the cover. Check internal connections and tighten if required. Clean the inside of the machine with a soft brush and vacuum cleaner. Take care not to remove any cables or cause damage to components. Ensure that ventilation grills are clear. Carefully replace the covers and test the unit. **This work should be carried out by a suitably qualified competent person.**
Yearly examination	Carry out an annual service to include a safety check in accordance with the manufacturers standard (EN 60974-1). **This work should be carried out by a suitably qualified competent person.**

8.2. Welding torch maintenance

In TIG mode, the TIG welding torch is used to clamp the electrode, conduct electricity and transport argon gas.
Regular maintenance of the welding torch is one of the most important measures to ensure its normal operation and extend lifespan. In order to ensure normal maintenance, the wearing parts of the torch should have spares, including the collet, nozzle, sealing mesh, insulating washer, etc. Common faults of the welding torch include overheating, gas leakage, water leakage, poor gas protection, power leakage, nozzle burn out, and cracking. The causes of these faults and troubleshooting methods are as shown in the following table:

Symptom	Reasons	Troubleshooting
The welding torch is overheated	The welding torch capacity is too small	Replace with a welding torch with large capacity
	The cooling water pipe is blocked, resulting in blockage or low cooling water flow	Blow the cooling pipe with compressed air to clear the blockage
	The collet fails to clamp the tungsten electrode	Replace the collet or electrode cap
Water leakage	The sealing ring is aged	Replace the sealing ring
	The water pipe joint is damaged or not fastened	Reconnect the water pipe and tighten it
	The weld between the welding torch and the water inlet pipe is leaking	Open up to repair the welding

Air leakage	The sealing ring is aged	Replace the sealing ring
	The connecting thread is loose	Tighten it
	The gas inlet pipe joint is damaged or not fastened	Cut off the damaged joint, reconnect and tighten the replaced gas inlet pipe or wrap up the damaged area
	The gas inlet pipe has been damaged by heat or aging	Replace the gas inlet pipe
Electric leakage	The welding handle is wet due to leakage or other reasons	Find the cause of water leakage, and fully dry the welding handle
	The welding handle is damaged or the live metal part is exposed	Replace the welding handle or wrap the exposed electrified metal part with adhesive tape
Poor gas protection	The welding torch is leaking	Locate the leakage
	The nozzle diameter is too small	Replace with a nozzle of larger diameter
	The nozzle is damaged or cracked	Replace with a new nozzle
	The gas circuit in the welding torch is blocked	Blow the circuit with compressed air to clear the blockage
	The gas screen has been damaged or lost during disassembly and assembly	Replace with a new gas screen
	The argon gas is impure	Replace with standard argon gas
	The gas flow is too large or small	Adjust the gas flow properly
Arc started between the collet and tungsten electrode or welding torch	The collet and tungsten electrode have poor contact, or arc is started when the tungsten electrode contacts the base metal	Replace the collet or repair
	The collet and welding torch have poor contact	Connect the collet and welding torch properly

9. Troubleshooting

Warning! Before arc welding machines are dispatched from the factory, they have already been checked thoroughly. The machine should not be tampered with or altered. Maintenance must be carried out carefully. If any wire becomes loose or is misplaced, it maybe potentially dangerous to user! Only professional maintenance personnel should repair the machine!
Ensure the power is disconnected before working on the machine. Always wait 5 minutes after power switch off before removing the panels.

9.1. Common malfunction analysis and solution

The symptoms listed here may be related to the accessories, gas, environmental factors, and power supply you use. Please try to improve the environment and avoid such situations.

Elimination of general problems in MMA

Symptom		Reasons	Troubleshooting
Fan does not rotate or rotates abnormally after power on		The temperature may be too low or the fan may be damaged	When the temperature is too low, leave the machine to operate for a while. The temperature in machine will rise, thenfan will resume normal operation. If it is still not working, it is necessary to replace the fan.
MMA	Hard to start arc	Arc hot start current is low Or the hot start time is short	Increase arc start current or arc start time
	Unstable arc or excessive molten pool during arc ignition	Arc start current is high Or the arc start time is long	Reduce arc start current or start time appropriately
	Cannot start normal arc	The power cord is not connected properly	Connect the power cord
	Electrode sticking	Low arc force	Increase the arc force
	Hot electrode holder	The rated current of the electrode holder is too low	Change the electrode holder with a high current one
	Arc is easily interrupted	Low mains voltage	Use after the mains power is normal
Other malfunction			Please contact the maintenance personnel of Shenzhen JASIC Technology Co., Ltd.

Elimination of general problems in TIG

Symptom		Reasons	Troubleshooting
Fan does not rotate or rotates abnormally after power on		The temperature may be too low or the fan may be damaged	When the temperature is too low, leave the machine to operate for a while. The temperature in machine will rise, then fan will resume normal operation. If it is still not working, it is necessary to replace the fan.
TIG	No current is output when torch trigger is pressed	Some TIG modes allow welding to end when the switch is pressed	Release the torch trigger and start over
		Welding circuit is blocked	Check the welding circuit and reconnect it
	No discharge and arc ignition after pressing the torch trigger during HF arc ignition	The torch trigger is not plugged in	Plug in the torch trigger
		Excessive spark gap of discharge plate	Adjust the spark gap on the discharge plate (to about 0.8 mm)
	Rapid tungsten electrode burnout	Welding torch and earth cable are connectedreversely	Switch two plug positions
	Blackening of solder joints	Welds are not effectively protected and become oxidized	(1) Ensure that the argon cylinder valve is open and there is enough pressure. Generally, if the cylinder pressure is lower than 0.5 MPa, it must be refilled. (2) Check whether the argon flow rate is normal. You can select the flow rate according to the welding current condition, but too low a flow rate may lead to insufficient shielding gas to cover all weld joints. It is suggested that the argon flow rate be no less than 5L/min, no matter how small the current. (3) Check whether the gas path is leaking, or whether the gas purity is too low. (4) Check whether there is strong ambient air flow.

	Hard to start arc Arc is easily interrupted	Poor quality or serious oxidation of the tungsten electrode	(1) Replace the tungsten grade with better quality. (2) Grind off the tungsten oxide layer. (3) Increase the post-flow delay time to avoid tungsten oxidation.
	Unstable current when welding	The voltage of the power grid fluctuates seriously or the joint contact with the power grid is poor. Serious interference from other electrical equipment.	(1) Check whether the power grid is normal and connect the power connector. (2) Use different power cords to connect equipment that could seriously interfere with the welder.
Other malfunction			Please contact the maintenance personnel of Shenzhen JASIC Technology Co., Ltd.

9.2. Alarm and solutions

Error code	Category	Possible cause	Countermeasure
E10	Overcurrent protection	Continuously output the maximum capacity current of the welder	Restart the welder. If the overcurrent protection alarm is still active, contact the after-sales department.
E31	Undervoltage protection	Input network voltage is too low	Turn off and restart the machine. If this the alarm cannot be eliminated and the grid voltage remains too low, check the power grid voltage and wait for the grid return to normal before welding. If the grid voltage is normal and the alarm persists, contact professional maintenance personnel.
E32	Overvoltage protection	Input network voltage is too high	Turn off and restart the machine. If the alarm cannot be eliminated and the grid voltage remains too high, check the power grid voltage and wait for the grid return to normal before welding. If the grid voltage is normal and the alarm persists, contact professional maintenance personnel.
E55	Data error alarm	Memory chip problem	Turn off and restart the machine. If the alarm cannot be eliminated, contact professional maintenance personnel.

E60	Overheat protection	Inverter IGBT temperature is too high	Do not turn off the machine. Wait for a while, and then continue welding after the indicator goes out.
E61	Overheat protection	Output rectifier diode temperature is too high	Do not turn off the machine. Wait for a while, and then continue welding after the indicator goes out.
E71	Water cooler alarm	Lack of water	Turn off and restart the machine. If the alarm cannot be eliminated, contact professional maintenance personnel.

NOTE! After applying the above countermeasures, the alarm still persists or reappears after lifting. Please contact professional maintenance personnel.

10. Packaging, transportation, storage and waste disposal

10.1. Transportation requirements

In the process of handling the equipment, it should be handled with care, and should not be dropped or severely impacted. Avoid moisture and rain during transportation.

10.2. Storage conditions

Storage temperature:-25 ℃ ~ + 50 ℃
Storage humidity: relative humidity ≤ 90%
Storage period: 12 months
Storage site: indoors with no corrosive gas and air circulation

10.3. Waste disposal

Disposal

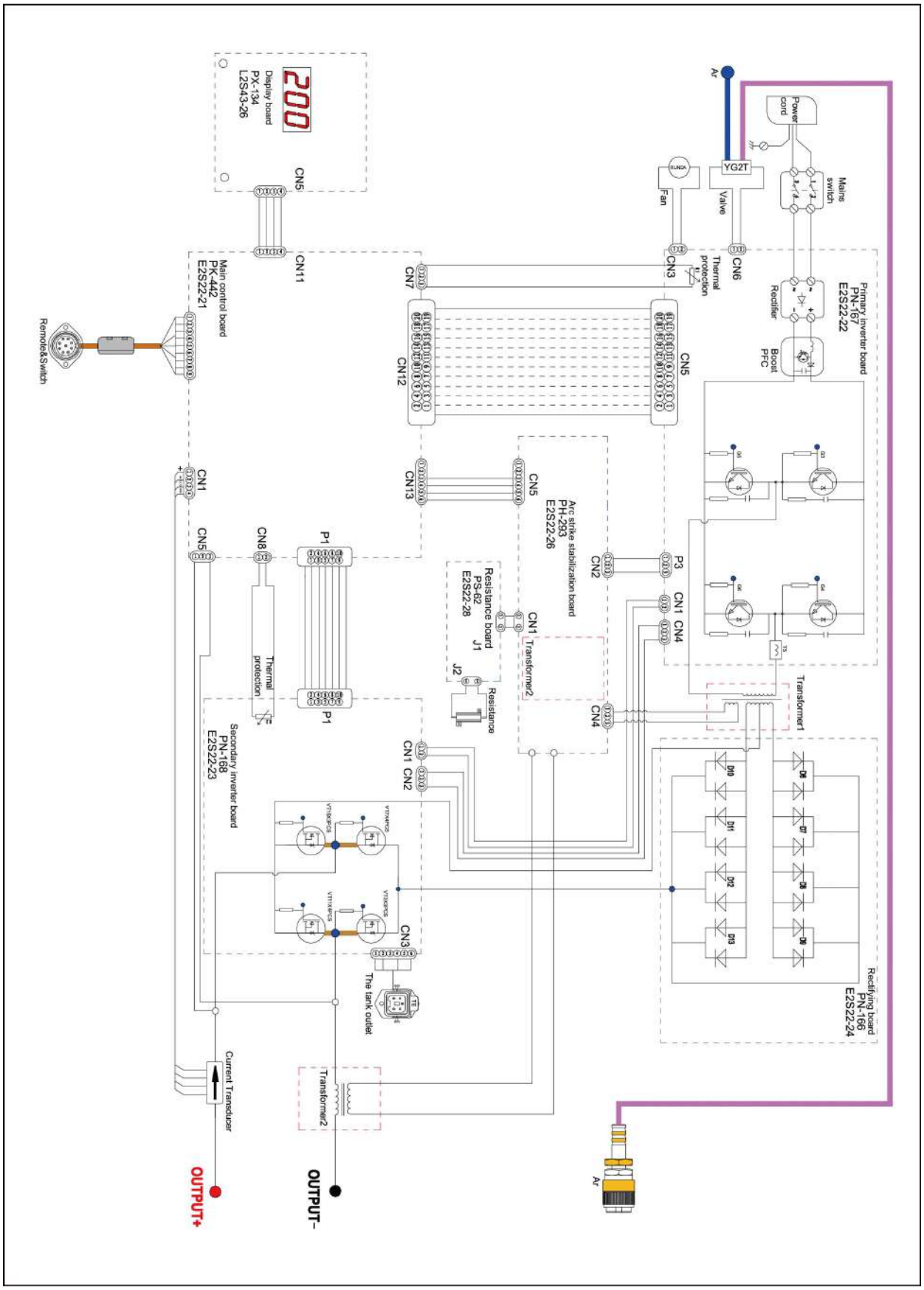
The equipment is manufactured with materials, which do not contain any toxic or poisonous materials dangerous to the operator.
When the equipment is scrapped, it should be dismantled separating components according to the type of materials.
Do not dispose of the equipment with normal waste. The European Directive 2002/96/EC on Waste Electrical and Electronic Equipment states the electrical equipment that has reached its end of life must be collected separately and returned to an environmentally compatible recycling facility.
In order to comply with WEEE regulations in your country you should contact your supplier.

RoHS Compliance Declaration

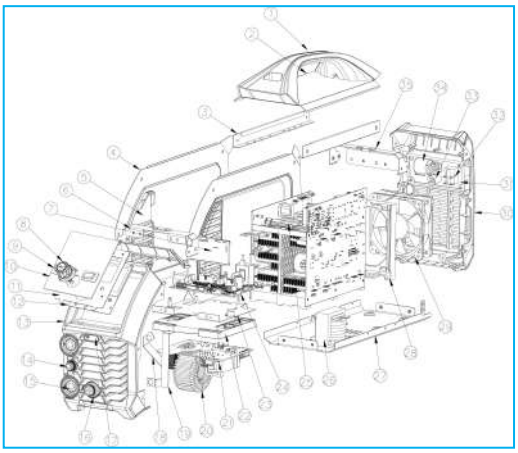
We herewith confirm, that the above-mentioned product does not contain any of the restricted substances as listed in EU Directive 2011/65/EC in concentrations above the limits as specified therein.

Disclaimer: Please note that this confirmation is given to the best of our present knowledge and belief. Nothing herein represents and/or may be interpreted as warranty within the meaning of the applicable warranty law.

Appendix 1: Wiring diagram



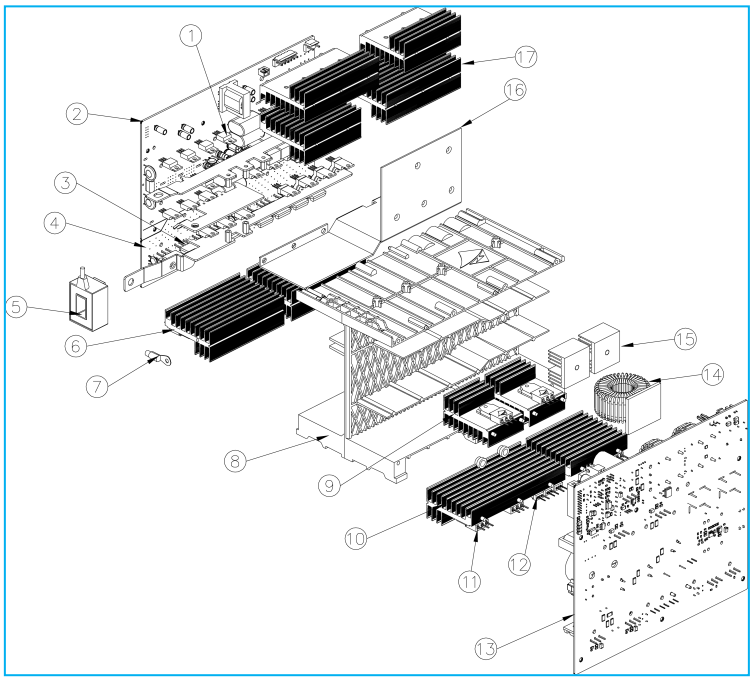
Appendix 2: List of common spare parts 1



List of spare parts

SN	Material code	Name	Quantity	SN	Material code	Name	Quantity
1	10084166	Handle	1	21	10084192	Control panel mount	1
2	10084064	Machine cover upper section	1	22	51000884	Large control panel	1
3	10084160	Beam	1	23	10056163	Small arc stabilizing board	1
4	10084068	Side cover	1	24	51000821	Main transformer	1
5	10084195	Louver	1	25	10084383	Chassis	1
6	10084066	Front panel bracket	1	26	10084196	Fan mount	1
7	51000881	Small control panel	1	27	51000956	DC fan	1
8	10084289	Silicon button	1	28	10084109	Rear panel	1
9	10084231	Knob	1	29	10084163	Rear panel mount	1
10	10084389	Acrylic front panel	1	30	10071118	Power switch	1
11	10084058	Display panel mount	1	31	51000659	Power cord	1
12	51000718	Display panel	1	32	51000658	Magnetic valve	1
13	10084193	Front panel	1	33	51000657	Water cooler socket	1
14	10081143	Outlet nozzle	1	34	10084057	Rear panel bracket	1
15	10021855	Fast socket	1				
16	51000660	Remote control socket	1				
17	10083487	Bluetooth plug	1				
18	10051952	Arc starting transformer	1				
19	51000847	Arc stabilizing board	1				
20	10084264	Plastic mount of arc stabilizing board	1				

Appendix 3: List of common spare parts 2



List of spare parts

SN	Material code	Name	Quantity	SN	Material code	Name	Quantity
1	51000093	FET	1	12	10064645	Rectifier diode 2	1
2	51000872	Secondary inverter main board	1	13	51000858	Primary inverter main board	1
3	10081176	Rectifier diode 1	1	14	51000456	PFC inductor (only for PFC machine)	1
4	51000854	Rectifier board	1	15	10050418	Heat sink 4	1
5	10084373	Current sensor	1	16	10084138	Aluminum connector	1
6	10084338	Heat sink 1	1	17	51000852	Heat sink 5	1
7	51000796	Thermal resistor	1				
8	10084197	Inverter wind shield	1				
9	10084337	Heat sink 2	1				
10	10084340	Heat sink 3	1				
11	51000601	IGBT	1				

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