

USER'S MANUAL

IceFuse 250 — Welding machine / TIG welding / Cold welding / Weld bead cleaning



NOTE: Please read this manual carefully before use.

Product specifications and functions are subject to change without prior notice. While every effort has been made to provide the most accurate and up-to-date information possible at the time of publication, this manual is intended to be a general guide.



WARNING! Please read these instructions before installing and commissioning the device.

1. GENERAL COMMENTS

Start and operate the device only after reading this manual carefully.

Damage to the device caused by improper handling will result in the loss of warranty rights.

It is forbidden to modify the device or to interfere with its construction.



ATTENTION



Welding may endanger the safety of the operator and of other people in the vicinity. Therefore, special precautions must be taken during welding. Before welding, read the occupational health and safety regulations in force at the workplace.

When using the MMA and TIG methods for welding, the following hazards are present:

Electric shock

The harmful effect of arc rays on the eyes and the skin

Poisoning and gas damage

Burns

Noise

Prevention of electric shock

- Connect the device to a technically sound and efficient electrical installation with proper protection.
- Assemble the current-carrying wires with the device switched off.
- Do not use handles and power cables with damaged insulation.
- Assist welders in their work by paying attention to safety, and use clothing and gloves with good insulation in situations where there is a risk of electric shock (working in environments with high humidity and in closed tanks).
- If you notice any irregularity, ask a competent person to remove it.
- It is forbidden to operate the device with the covers removed.
- Do not touch the torch or the gas connector while the device is connected. Press the trigger and do not ignite the electrode head when starting the arc.

Prevention of the harmful effects of the arc on the eyes and the skin

- Wear protective clothing (gloves, apron, leather shoes).
- Use shields or protective screens with a correctly selected filter.
- Use protective covers made of non-combustible material, and choose a wall colour that absorbs harmful radiation properly.

Prevention of poisoning by the vapours and gases emitted during welding from electrode coating and metal evaporation

- Use ventilation devices at the work station.
- Supply fresh air when working in a confined space.

Prevention of burns

- Use appropriate protective clothing and footwear to protect against burns caused by arc radiation and spatter.
- Avoid staining clothes with lubricant and oil, which may cause them to catch fire.

Prevention of the harmful effects of noise

- Use earplugs or other noise protection measures.
- Warn nearby people of the dangers.

Before starting the device

- Check the condition of the electrical and mechanical connections. It is forbidden to use handles and power cables with damaged insulation. Improper insulation of holders and power cords may result in electric shock.
- Ensure proper working conditions: the right temperature, humidity and ventilation in the workplace. Prevent atmospheric precipitation outside enclosed spaces.

Personnel operating the welder should

- Have the ability to weld with electrodes, coated electrodes and the TIG method.
- Understand and comply with the applicable health and safety regulations when performing welding work.
- Use appropriate professional protective equipment: gloves, aprons, rubber boots, shields or welding helmets with a correctly selected filter.
- Be familiar with the contents of these operating instructions and operate the welder for its intended purpose.

Any repairs to the device may only be made after disconnecting the plug from the mains socket. When the device is connected to the power supply, it is not allowed to touch any element of the welding current circuit with bare hands or through damp clothing. It is forbidden to remove the outer cover while the device is connected to the power supply. Maintenance and repair work must only be carried out by authorised personnel on electrical equipment, where the safety and operating conditions are suitable.

2. GENERAL DESCRIPTION

The Cruxweld **IceFuse 250** synergistic welding machine is used for manual welding by direct current using Manual Metal Arc (MMA) and Gas Tungsten Arc Welding (GTAW), also known as Tungsten Inert Gas (TIG) welding, and for cold welding and weld bead cleaning. In the design and construction of the device, the latest developments in PWM technology (pulse width modulation) and IGBT modules (bipolar transistors with an insulated gate) have been used, making the welding machine small in size and low in weight.

The ARC FORCE function is available during the MMA welding process. During TIG welding, the rise and fall of the current, pre-flow and gas flow, as well as the pulse and current parameters, can be adjusted. The device has a memory of 10 sets of parameter settings for the TIG HF and MMA methods.

3. TECHNICAL PARAMETERS

Model		IceFuse 250 — DC TIG / Cold Welding / MMA welder
Input voltage (V)		1 × 220 – 240 V + 1 × 110 – 120 V
Frequency (Hz)		50 / 60
Power capacity (kVA)		7.1
Max. input current (A)		38
No-load voltage (V)		68 V (230 V) 64 V (110 V)
Rated duty cycle (%)		60
TIG / COLD / MMA current range (A)		5 – 200 / 5 – 220 / 20 – 180
MMA arc force current range (%)		0 – 100
MMA hot start range (%)		0 – 100
TIG / DC	Base current (%)	10 – 100
	Pulse frequency (Hz)	0.2 – 500
	Duty cycle (%)	5 – 95 (>200 Hz duty 50%)
AC MMA frequency (Hz)		20 – 250 (duty 50%)
Sync AC/DC MMA	Electrode dia. (mm)	1.6, 2.0, 2.5, 3.2, 4.0
	Offset current (A)	±20 A
Pulse TIG frequency (Hz)		0.2 – 500
Pulse TIG duty (%)		5 – 95 (>200 Hz duty 50%)
Sync TIG offset current (A)		±35 A
Base current (%)		10 – 100
Initial / final current (%)		10 – 100
Up / down slope time (s)		0.0 – 15.0
Pre / post flow time (s)		0.1 – 15.0 / 0.5 – 15.0
Spot / dead (interval) time (s)		0.1 – 15.0 / 0.0 – 15.0
TIG tungsten dia. (mm)		1.0, 1.6, 2.0, 2.4, 3.2
AC TIG	Frequency (Hz)	20 – 250
	Balance (%)	Sync set ±10% adjust
MIX TIG	Frequency (Hz)	0.5 – 20
	Ratio	5 – 95
Efficiency (%)		85
Power factor		0.93

Protection class	IP23
Insulation class	F
Dimensions (mm)	400 × 150 × 230
Weight (kg)	7.5

Level of protection

The IP rating determines how resistant the device is to solid particles and water. IP23 means the device is designed to work indoors and is not suitable for use in the rain.

4. PANEL INSTRUCTION



IceFuse 250 control panel

4.1 Mode option (in the non-welding working state)

The image shows the 'MODE' button with three indicator lights: MMA (red), TIG (grey), and CLEAN (grey).	Manual welding method with coated electrodes (MMA) Thermal arc current and thrust current can be adjusted independently.
The image shows the 'MODE' button with three indicator lights: MMA (grey), TIG (red), and CLEAN (grey).	High-frequency argon arc welding mode (TIG) High-frequency arc ignition in TIG welding eliminates the need for the tungsten electrode to come into contact with the workpiece, minimising tungsten inclusion in the molten pool. Can work in DC mode, DC pulse mode and cold welding mode.

	Weld bead cleaning method (CLEAN) Used for cleaning the weld seam of stainless steel, making the welded workpiece cleaner and more attractive.
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4.2 Output option (in the non-welding working state, press the “TIG” key to select)

	DC output * DC MMA can weld a variety of electrodes, such as basic and acid electrodes. * DC TIG can be used for welding most metals except aluminium, magnesium and their alloys.
	Pulse output mode in the argon arc welding state TIG PULSE is generally used for welding alloys other than aluminium and magnesium. The frequency and duty cycle can be adjusted to the actual requirement, which minimises tungsten electrode loss. Arc concentration is good, penetration is deep, and a neat rippled weld can be formed.
	Cold welding output Cold welding can be used for welding alloy metals such as gold, silver and copper. The output energy during the welding process is accurately controlled. There is not too much energy acting on the workpiece, and the welding time and interval time are adjusted separately.

4.3 Selection of the torch triggering method (in the non-welding state, press the “OPER” key to select)

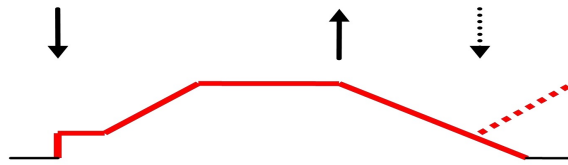


2T: pressing the switch in the torch handle activates the ionizer and ignites the arc. Welding is carried out with the switch pressed. Releasing the switch ends welding.

Note: the foot pedal is valid only in 2T mode.

(1) Press and hold the handle button. The shielding gas begins to flow. When the arc is ignited, the welding current increases from the minimum value to the set welding current value. During the welding process the handle button must remain pressed.

(2) Release the torch button and the welding current begins to drop. The welding current is reduced to the minimum value and the arc is extinguished. The solenoid valve closes the gas flow, completing the weld.

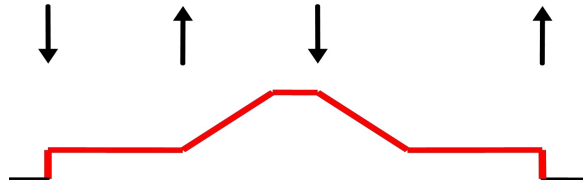


Note: ↓ means pressing the handle button; ↑ means releasing the handle button.



4T: pressing the switch in the torch handle activates the ionizer and ignites the arc; the switch is then released and welding continues with the switch released. Pressing the switch again ends welding.

- (1) Press and hold the handle button. The shielding gas begins to flow and continues during the arc ignition phase.
- (2) Release the handle button; the welding current increases from the minimum value to the set welding current value.
- (3) Press the handle button; the welding current drops to the crater current value.
- (4) Release the handle button. The arc is extinguished and shielding gas flows out; the solenoid valve then closes the gas flow, completing the weld.

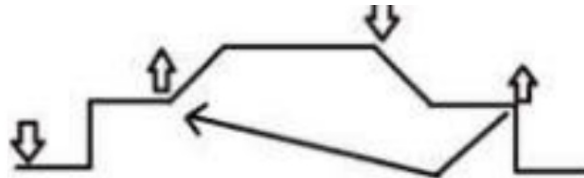


Note: ↓ means pressing the handle button; ↑ means releasing the handle button.



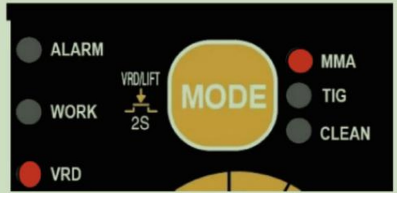
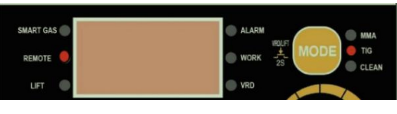
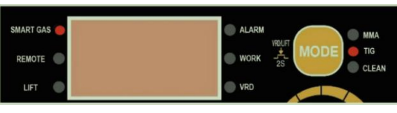
Repeat: pressing the switch in the torch handle starts the ionizer and ignites the arc. Releasing the switch lets the current climb to the set peak welding current. Pressing the switch again makes the current drop to the arcing set value, and it then climbs again to the set current value, repeatedly. After welding is completed, pull out the handle to finish the weld.

- (1) Press and hold the handle button. The shielding gas begins to flow and continues through the arc ignition phase.
- (2) Release the handle button; the welding current increases from the minimum value to the set welding current value.
- (3) Press the handle button; the welding current drops to the initial current value and then gradually rises to the set peak current value.
- (4) The welding then repeats between the minimum and maximum values; pull the welding handle when the weld is finished. The solenoid valve closes the gas flow; release the button to complete welding.



Note: ↓ means pressing the handle button; ↑ means releasing the handle button.

4.4 Panel adjustments

	VRD (low no-load voltage) is on During MMA manual welding mode, press and hold “PULSE” for 2 seconds to enter the VRD state. VRD mode: generally used in a damp or closed workplace. After turning on the VRD function, the open-circuit voltage is less than 15 V, which minimises the risk of electric shock caused by a higher open-circuit voltage. VRD mode can be used in specific environments and in environments where a low voltage is required.
	LIFT is on In TIG argon arc welding mode, press and hold for 2 seconds to enter the LIFT state. LIFT mode: TIG welding with lift arc initiation has no high-frequency interference caused by high-frequency arc ignition.
	Remote control is on The maximum welding current output is determined by the welding current value set on the panel. The movement of the foot pedal then regulates the welding current output. In this way the uphill and downhill times set on the panel are inactive, and the uphill and downhill times are controlled by the pedal.
	SMART GAS saving mode is on In the TIG gas arc welding state you can use DC welding, pulse welding and cold welding. Before welding, turn the post-flow time down to the minimum state and the device automatically matches the output gas time and flow to the current you have set, so as to save gas.

5. SETTING



HOT START & ARC FORCE — allows the dynamics of the welding arc to be adjusted during MMA welding. Shortening the arc length is accompanied by an increase in the welding current, which stabilises the arc. Decreasing the value gives a soft curve and a smaller depth of penetration, while increasing the value causes deeper penetration and makes short-arc welding possible. When a large value of the ARC FORCE function is set, you can weld while maintaining an arc of minimum length and a high melting rate of the electrode.

Adjustment range: 0 – 100

INITIAL CURRENT — the current appearing in the circuit after pressing the button in the torch handle. The higher the initial current, the easier it is to ignite the arc.

Adjustment range (%): 10% – 100%

UP SLOPE (time of current rise) — the time of the welding current rise from the initial current to the set welding current value.

Adjustment range: 0.0 – 15.0 s

WELDING CURRENT (peak) — the main welding current.

Adjustment range: 10 A – maximum current

COLD WELDING — welding time

Adjustment range: 1 – 999 ms

COLD WELDING — interval time (residence time)

Adjustment range: 0 – 10 s

WELD BEAD CLEANING

The working principle is a method of stainless steel weld treatment based on electrolytic cleaning. The thermal tint (thermal reaction zone / oxide layer) produced during welding is removed by applying an acidic or neutral electrolyte with a conductive carbon-fibre brush. The purpose of this cleaning method is to restore the corrosion resistance of stainless steel by removing the depleted layer.

The working principle of weld bead treatment is characterised by electrolytic pickling, which does not involve the use of traditional pickling chemicals. The effect is similar to other pickling methods: a thin layer of oxide is dissolved from the surface of the base material through this process, achieving a passivation effect.

The principle of weld bead processing is local electrolysis. It is recommended that the contact area between the electrolytic pen (wrapped in gauze) and the workpiece is about 2 – 3 square centimetres, with a current of 10 – 40 amperes. The positive electrode is connected to the workpiece; the negative electrode is connected to the electrolytic pen, and the end of the electrolytic pen is wrapped in gauze. Dipping it in electrolyte and brushing the weld bead carries out electrolytic cleaning and makes the weld bead clean and bright.

Further settings

PULSE CYCLE (pulse duty cycle) — pulse duration, allowing the depth of penetration to be adjusted. An increase in width increases the depth of penetration, reduces the heat entering the material and reduces the risk of burning thinner sheets or smaller components.

Adjustment range: duty cycle 1 – 100% (frequency 200 Hz)

PULSE FREQUENCY — the frequency at which the current pulse value changes between the welding current and the base current.

Adjustment range: 0.2 – 200 Hz (200 Hz suggested)

BASE CURRENT — responsible for maintaining the current during the welding process; it is the lower value of the current pulse. It reduces the heat entering the material. Base current adjustment can only be performed during pulse welding.

Adjustment range: 10% – 100%

DOWN SLOPE (time of current descent) — the time of transient current from the welding current to the final current.

Adjustment range: 0.0 – 15.0 s

END OF ARC — the final current at the end of the welding sequence.

Adjustment range: 10% – 100%

POST FLOW — the time from quenching the arc to closing the gas valve, to cover the solidifying weld pool and cool the tungsten electrode. Too short an outflow time may result in oxidation of the weld.

Adjustment range: 0.5 – 15.0 s

FUNCTIONS OF THE IceFuse 250

Manual welding (MMA)

- Manual metal arc welding with coated electrodes.
- VRD status and thrust (arc force) adjustment in manual welding mode.
- Hot start and arc force adjustable independently, 0 – 100.

Argon arc welding (TIG)

- Pre-gas, arc ignition, up-slope time, down-slope time, arc stopping and post-gas time.
- Two-step (2T), four-step (4T) and repeat (low-frequency) welding.
- Automatic intelligent gas saving (SMART GAS).
- High-frequency arc ignition or LIFT arc ignition.

Cold welding

- In the cold welding state, welding time, interval time and post-gas time are set.
- **NOTE:** the four-step function cannot be used in the cold welding state, and closing the interval time gives the single-spot welding mode.

Cold welding is suitable for users who want to achieve rapid spot welding of thin alloy materials such as gold, silver, copper and other alloy metals, in situations where the instantaneous current is high and the workpiece receives the lowest heat without deformation. Put more simply, TIG COLD has a higher arc energy and outputs less heat into the plate, or has a higher welding efficiency compared with regular TIG at the same welding current.

When cold welding mode is used, the first step is to set welding parameters such as “welding current”, “welding time” and “interval time”, just as in DC TIG. The thermal impact generated by this function is minimal and the output energy can be accurately controlled. The ideal setting makes the output energy only just enough for fusion between the welding wire and the workpiece, without too much energy acting on the workpiece — minimising the thermal impact on the surface of the workpiece and achieving the ideal repair result.

Pulse argon arc welding

- Compared with ordinary argon arc welding, pulse argon arc welding adds base current, duty cycle and pulse frequency.
- ① When each pulse current is applied, a molten pool is generated in the arc action zone. When the arc current is applied, the molten pool solidifies and forms a welding wave.
- ② When the next pulse current is applied, a second welding pool is generated over the area of the solidified welding wave and the base metal. When the arc current is applied, it solidifies into a second welding wave and overlaps the first welding wave.
- ③ This cycle goes on and on, resulting in a weld seam formed by many overlapping welding waves.

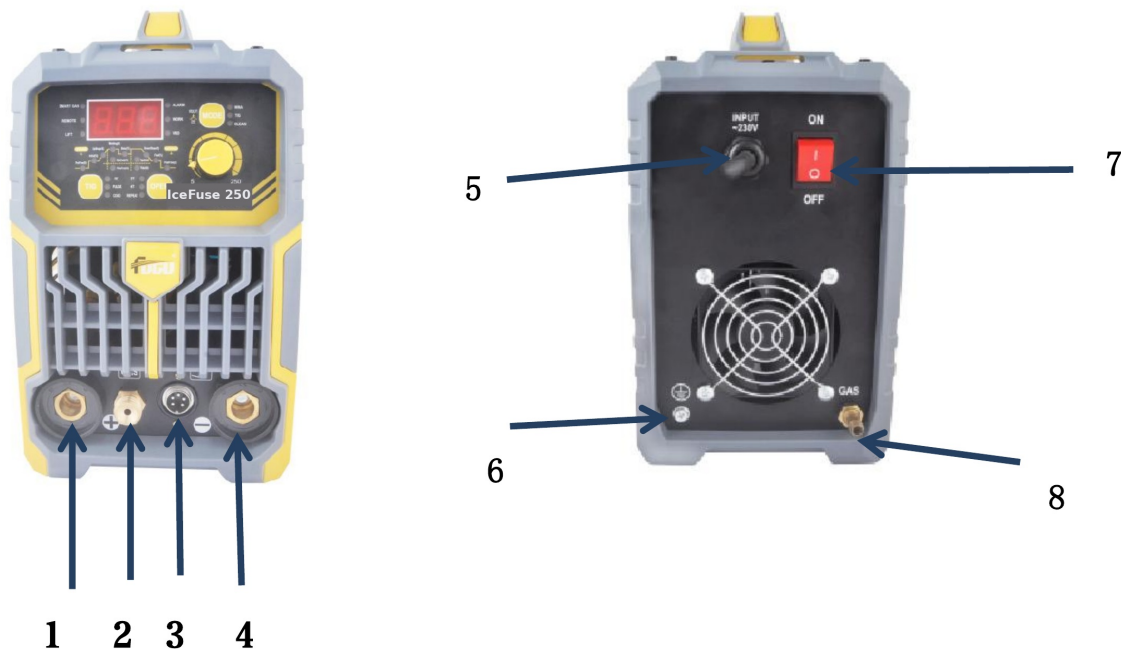
Weld bead cleaning (CLEAN)

- Electrolytic cleaning of stainless steel weld seams, restoring the corrosion resistance of the surface.

6. PREPARATION BEFORE OPERATING THE MACHINE

If the equipment has been stored or transported at low temperature, it must be brought to the correct temperature before starting work.

6.1 Operating connections



No.	Connection	No.	Connection
1	Negative polarity socket “+”	5	Power supply cable
2	Gas connector	6	Grounding terminal
3	Remote socket	7	Power switch
4	Positive polarity socket “-”	8	Solenoid valve gas flow shielding connector

6.2 MMA method

The two ends of the welding cable should be connected to sockets (1) and (4) on the front panel, so as to maintain the polarity of the electrode in the electrode holder. The polarity of the welding cable connection depends on the type of electrode used and is given on the electrode packaging. The earth clamp must be firmly connected to the material being welded. Connect the device plug to a 230 V 50 Hz power outlet.

6.3 TIG method

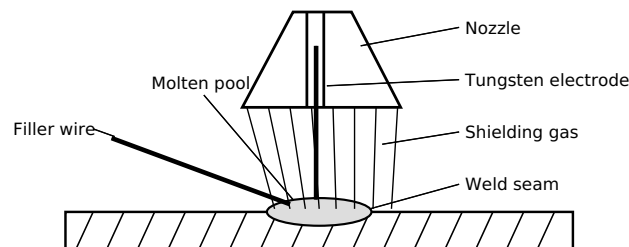
- The TIG torch should be connected to the gas connector (2) and the remote socket (3).
- The gas pipe of the regulator should be led out and connected to the gas connector (8) on the back of the housing.
- Connect the positive socket (4) to the material to be welded using an earth clamp.
- Connect the device plug to a 230 V 50 Hz power outlet.



TIG connection with foot pedal — input 230 V

6.3.1 Overview of argon arc welding

Argon arc welding is a type of gas-shielded welding that uses argon as the protective gas. The argon gas flow sprayed from the torch nozzle forms a tightly closed protective layer in the arc area, isolating the molten pool from the air and preventing air intrusion. At the same time, the heat generated by the arc melts the filler wire and the base metal, and the liquid metal pool cools to form a weld seam.



Schematic diagram of argon arc welding

Because argon is an inert gas that does not react chemically with metals, it does not cause alloy elements in the welded metal to burn, and it fully protects the molten metal from oxidation. In addition, argon is insoluble in liquid metal at high temperature, making it less likely to cause porosity in welds. The protective effect of argon gas is therefore effective and reliable, and high welding quality can be achieved.

6.3.2 Characteristics of argon arc welding

Compared with other arc welding methods, argon arc welding has the following characteristics:

- ① Argon gas has excellent protective performance, and there is no need to prepare a corresponding welding flux. It is basically a simple process of metal melting and crystallisation, which produces relatively pure, high-quality welds.
- ② Because of the compression and cooling effect of the argon gas flow on the arc, the heat of the arc is concentrated and the temperature of the argon arc is high. The heat-affected zone is therefore very narrow, welding deformation and stress are small, and the crack tendency is also small. This is especially suitable for thin-plate welding.
- ③ Argon arc welding is an open-arc welding process that is easy to operate and observe, making it easy to achieve mechanisation and automation of the welding process. In addition, welding in various spatial positions can be carried out under certain conditions.
- ④ The range of materials that can be welded is very wide, and almost all metal materials can be welded by argon arc welding. It is especially suitable for welding metals and alloys with active chemical properties: usually aluminium, titanium, copper and their low-alloy steels, stainless steel and heat-resistant steel.

Because of the significant advantages of argon arc welding, and because the product structures made of non-ferrous metals, high-alloy steels and rare metals are increasing day by day, general gas welding and electric arc welding methods are no longer able to achieve the required welding quality easily. The welding technology of argon arc welding has therefore been increasingly widely used.

Welding parameters

The gas protection effect, the welding process stability and the weld quality of tungsten argon arc welding are directly related to the welding process parameters. A reasonable selection of welding process parameters is therefore an important guarantee for obtaining high-quality welded joints.

The welding process parameters of tungsten argon arc welding are: current type and polarity, tungsten electrode diameter, welding current, argon gas flow rate, welding speed and process factors.

- ① The current type and polarity of tungsten argon arc welding should be selected on the basis of the material being welded and the operating method.
- ② The diameter of the tungsten electrode is mainly selected on the basis of the thickness of the weldment. In addition, when the thickness of the welded material is equal, the allowable current of the tungsten electrode varies with the type and polarity of the current used, so the diameter of the tungsten electrode is also different. If the tungsten electrode diameter is not selected properly, it will cause an unstable arc, serious burning damage and tungsten inclusion in the weld seam.
- ③ After selecting the tungsten electrode diameter, select the applicable welding current. Excessive or insufficient welding current leads to poor weld formation or welding defects.

The allowable current range of thorium (cerium) tungsten electrodes of various diameters is listed in the table below.

Table 2-1 — Permissible current range of thorium (cerium) tungsten electrodes of various diameters

Tungsten electrode diameter (mm)	DC direct polarity (A)	DC reverse polarity (A)	AC (A)
1.0	15 - 80	—	20 - 60
1.6	70 - 150	10 - 20	60 - 120
2.4	150 - 250	15 - 30	100 - 180
3.2	250 - 400	25 - 40	160 - 250
4.0	400 - 500	40 - 55	200 - 320

- ④ The argon flow rate is selected mainly on the basis of the tungsten electrode diameter and the nozzle diameter. For a nozzle of a given aperture, an appropriate argon flow rate should be selected. If the flow rate is too high, the gas flow becomes turbulent, which is not conducive to the protection of the welding area and carries away more heat from the arc area, affecting the stable burning of the arc. However, too small a flow rate is also unsuitable, as it is prone to interference from external airflow, which reduces the effectiveness of the gas protection. Usually the argon flow rate is within the range of 3 - 20 L/min.
- ⑤ Under given conditions of tungsten electrode diameter, welding current and argon flow rate, an excessive welding speed can cause the protective airflow to deviate from the tungsten electrode and the molten pool, affecting the gas protection. Welding speed also significantly affects the shape of the weld seam, so an appropriate welding speed should be selected.
- ⑥ The process factors mainly refer to the shape and diameter of the nozzle, the distance from the nozzle to the weldment, the extension length of the tungsten electrode and the diameter of the filler wire. Although these factors do not change much, they have varying degrees of impact on the welding process and on the gas protection, so they should be selected according to the specific welding requirements.

Generally, the nozzle diameter should be selected within 5 - 20 mm; the distance from the nozzle to the welded part should not exceed 15 mm; the length of the tungsten electrode extending out of the nozzle should be 3 - 4 mm; and the diameter of the filler wire should be selected on the basis of the thickness of the weldment.

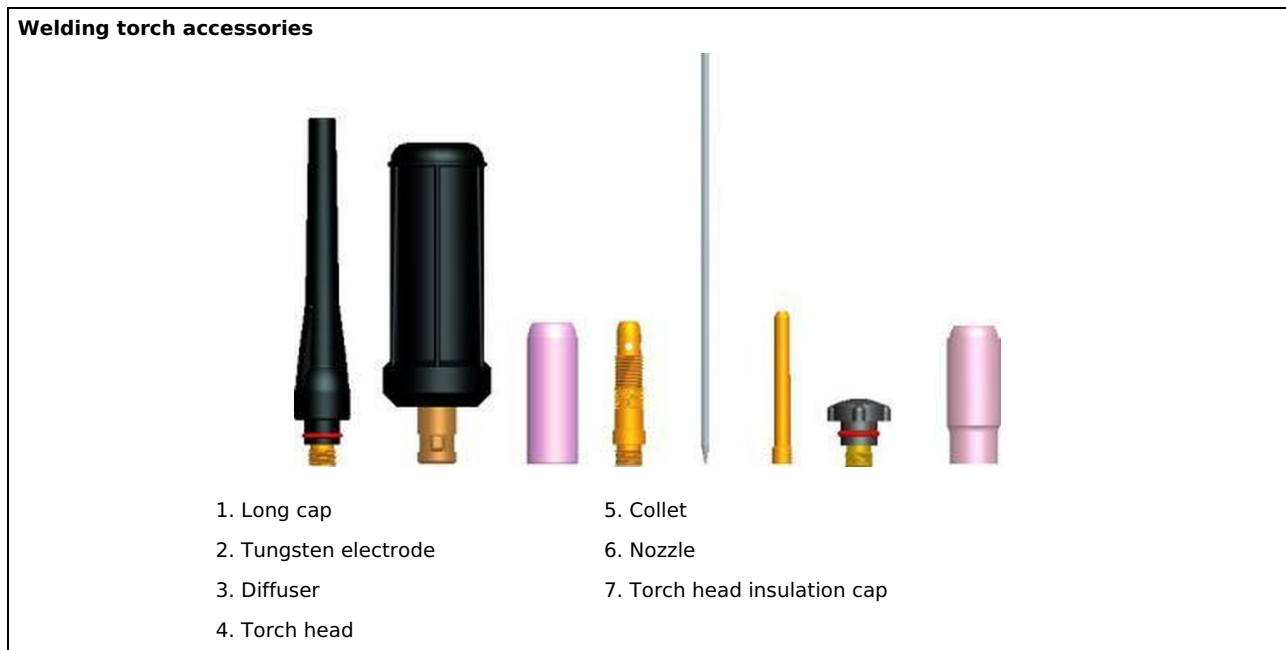
6.3.3 General requirements for argon arc welding

1. **Requirements for gas control:** the gas must come first and go last. Argon is an inert gas that is more prone to breakdown. First fill the gap between the workpiece and the electrode needle with argon, which is conducive to arcing; after welding is completed, maintaining the gas supply helps to prevent rapid cooling and oxidation of the workpiece, ensuring a good welding result.
2. **Requirements for controlling the hand switch of the current:** when the hand switch is pressed, the current is delayed and the hand switch is disconnected after welding is completed. According to the requirements, the gas supply current is disconnected first.
3. **Requirements for the generation and control of high voltage:** if the argon arc welding machine adopts a high-voltage arc starting method, high voltage is required during arc starting, and the high voltage disappears after the arc has started.
4. **Protection requirements for interference:** the high voltage of argon arc welding is accompanied by high frequency, which causes serious interference to the whole circuit and requires the circuit to have good anti-interference ability.

Argon arc welding torch

Install the welding torch as shown in the figure.

Standard welding torch parameters: WP-26 type, maximum current 200 A, rated current 160 A, cooling method: air-cooled, gas joint M10 × 1.0, rated load duration 40%.



7. PROBLEMS AND SOLUTIONS

If the equipment malfunctions, please check the basic fault list below and try to troubleshoot it yourself before sending the machine for repair.

Maintenance may only be carried out on the equipment after disconnecting the plug from the power socket.

Symptom	Solution
Control panel not lit, fan not working, no output voltage	1. Ensure that the switch is in the ON position. 2. Check the protection devices and the voltage situation in the network. 3. Remove the housing and check the connection of all electrical plugs inside the equipment.
The control panel is on, the fan is not working, and there is no output voltage	1. Check whether the device is connected to a higher-voltage network. If so, connect it to the 230 V power grid and turn it on again. 2. An unstable supply voltage causes the overvoltage protection to be activated. Turn off the device for 2 – 3 minutes and then turn it on again. 3. Short-term switching of the switch triggers overvoltage protection. Turn off the device for 2 – 3 minutes and then turn it on again. 4. There is other damage that must be repaired by an authorised repair centre.
Control panel lit, fan running, arc ignition issue	Check whether the TIG torch and the chuck guide are normal, and replace consumables if they are worn out.
Control panel lit, fan running, arc ignition issue (continued)	1. Check whether the conductivity of the wiring terminals, electrodes and earth wires is correct. 2. Check the connection between the TIG torch and the device to ensure that the pins inside the socket are not broken or stuck. 3. Unscrew the handle of the TIG torch and check whether the switch inside the bracket works.
The quality of the weld seam during MMA welding is not ideal, and the electrode sticks to the material being welded	1. Check the polarity of the welding cable connection. 2. Check that the electrodes are not damp. Replace the electrode. 3. The welding machine is powered by a generator set, or through a long extension lead with too small a cable cross-section. Connect the device directly to the main power supply.
Unsatisfactory TIG welding quality	1. Replace consumables. Replace the tungsten electrodes or gas cylinders with higher-quality material. 2. Check whether the shielding gas of the solenoid valve flows with the appropriate strength. 3. Check the gas supply hose, improve the connection between hose and connector, and check the condition of the quick-connect fitting. 4. Check the gas pressure regulator.

Code list

	Overcurrent protection The main power supply device of the welding machine is in an overcurrent working state. At this time the welding machine cuts off the output and displays the alarm.
	Overheat protection The welding machine is in an overloaded working state and the temperature of the main power supply device is too high. At this point the welding machine cuts off the output and displays the alarm. There is no need to switch off the welding machine: after the internal temperature drops, it automatically returns to its normal state.

8. OPERATING CONDITIONS

The operation of this equipment should be carried out in an environment free from corrosive components and high levels of dust. Do not place the equipment in dusty areas or near grinding machines. Dust and pollution caused by metal particles on the control board, wires and connectors inside the equipment may cause electrical short circuits and damage the welding machine.

Avoid operating in high-humidity environments, especially when there is dew on metal elements. For example, in the case of dew on metal elements after bringing a cool device into a warm room, wait until the dew has disappeared. When the machine is used outdoors, it should be placed under a roof so that it is not used in adverse weather conditions.

9. MAINTENANCE INSTRUCTIONS

- As part of daily service, maintain the cleanliness of the welder, inspect the condition of the external connections, and inspect the condition of the wires and cables.
- Regularly replace consumable parts.
- Regularly blow the interior of the equipment clean with compressed air to remove dust and metal particles from the control board, wires and electrical connections.
- A general review of the condition of the electrical connections should be carried out at least every six months, especially:
 - Protective measures against electric shock
 - Insulation condition
 - Safety system status
 - Proper operation of the cooling system

10. STORAGE AND TRANSPORT

The device should be stored at $-10\text{ }^{\circ}\text{C}$ to $+40\text{ }^{\circ}\text{C}$, with a relative humidity of up to 80%, and free from corrosive smoke and dust. Packaged equipment should be transported by covered transport. During transport, the packaged device must be secured to prevent movement and to keep it in the correct position.



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IceFuse 250 — TIG / Cold Welding / MMA / Weld Bead Cleaning

Product specifications and functions are subject to change without prior notice.