

# USER`S MANUAL

MIG-270E

**ANDELI**

## **Read me first**

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**Thank you for using welder! For the important safety of your body, please read this manual book and understand its contents before operation. Thank you for your cooperation!**

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## Use and Characteristic

Inverter MIG welding machine, combines 2 functions in one – MMA and MIG . The machine is suitable for many different materials' welding, such as carbon steel, stainless steel, copper, titanium, and so on. It has good static load and dynamic characteristic, complete control function, other advantages going as below:

- IGBT high frequency soft switch transform , high efficiency, compact and portable
- Advanced control system, significantly improve the welding performance, to meet the welding process requirements to a great extent
- MIG and MMA 2 in 1
- Easy to arc starting, stable arc, high performance
- Small spatter,stable current, high reliability, good weld-seam shaping

## Safety Precaution



### Generally Safety Precaution

- Ensure to follow precautions specified in this manual, or else, an accident may happen.
- The design and construction of input power supply, selection of installation site and use of high pressure gas shall be performed according to the relevant standards and rules.
- Irrelevant personnel are not allowed to enter the welding workplace. Only the qualified personnel can install, overhaul, maintain and operate the welding machine.
- Qualified staff is needed for installation, maintenance and use.
- Make sure the welding machine is not used for other purposes except welding (such as charging, heating and pipeline unfreezing, etc).
- If the ground is uneven, please avoid dumping welding machine.



### Avoid electrical shock or burn

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- Touching electric parts is forbidden.
  - Ensure to invite professional electrician to ground the welding machine with copper conductor with specific cross section.
  - Ensure to invite professional electrician to connect power source in welding machine with copper conductor with specific cross section. The insulating sheath cannot be damaged.
  - Ensure to insulate the body and base metal when working in the wet and restricted area.
  - Please use safety net when working at heights.
  - Please close the input power when not in use.



#### **Avoid welding fume and gas damaging human body**

- Ensure to use specified exhaust equipment to avoid gas poisoning and suffocation.
- The protective gas will be deposited around the container bottom to cause suffocation. Pay attention to the ventilation.



#### **Avoid welding arc, splash and welding slag damaging human body**

- Ensure to wear protective glasses with enough overshadow. The arc will result in ocular inflammation and the welding splash and slag will burn eyes.
- Ensure to use protective supplies for welding, such as leather protective gloves, caftan, cap, welding spats and apron to avoid welding arc light, welding splash and slag burning skin.



#### **Avoid fire, explosion and fracture and other accidents**

- The welding place cannot have the combustibles because splash and hot weld joint will result in fire.

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- The cables and base metal must be connected firmly, or else, it may be heat to result in fire.
  - Must not weld in the combustible gas or container with the combustibles, or else, it may result in explosion.
  - Ensure to prepare fire extinguisher just in case.



#### **To prevent the rotating moving parts wounding**

- Must not make fingers, hair and clothes close to the cooling fan and wire feed roll and other rotating parts.
- When feeding wire, must not make the welding gun end close to eyes, face and body to avoid wire damaging person.



#### **Avoid falling gas cylinder and breaking gas regulator**

- The gas cylinder shall be fixed reliably, or else it may dump to result in human injury.
- Must not put gas cylinder in a place with high temperature or sunshine.
- When opening gas cylinder valve, must not make face close to the gas outlet, or else high-pressure gas may damage person.
- Ensure to use gas regulator provided by the company and follow the use regulations.



#### **Prevent the movement of welding**

- Must not stand under the welding machine and motion direction when moving welding machine with fork lift truck or crane, or else, the welding machine may fall to cause injury.
- The rope sling shall bear enough pull force and cannot be broken when suspending. The angle between rope sling and hook shall be no more than 30°.

## **Precautions of electromagnetic compatibility**

### **1. Overview**

Welding brings electromagnetic interference.

Minimize the interference emission of arc welding equipment with proper installation way and correct application method.

The products described in the manual belong to Class A equipment (all occasions except residential area powered by public electrical power system).

Warning: Class A equipment is not applicable to residential area powered by public electrical power system. It is difficult to guarantee electromagnetic compatibility because of conduction and radiated interference.

### **2. Advice of environment assessment**

Before installing the arc welding equipment, the user shall evaluate the potential electromagnetic disturbance of the surrounding. The considerations are as follows:

- ◆ Check surrounding of arc welding equipment for other power cables, control cables, signals and telephone wire.
- ◆ Check for broadcasting and television launching and receiving equipment;
- ◆ Check for computer and other controllers;
- ◆ Check for high security level equipment, such as industrial protective equipment;
- ◆ Consider the health of surrounding staffs, such as staffs with hearing aid and cardiac pacemaker;
- ◆ Check for calibrating or detection equipment;
- ◆ Pay attention to immunity to interference of other equipment. The user shall make sure that the surround equipment can be compatible. The additional protective measures may be required;
- ◆ Welding or other activity time.

The environmental range is decided based on the building structure and possible activities. This range may exceed the boundary of building.

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### **3. Method of reducing radiation emission**

#### **◆ Public power supply system**

The arc welding equipment shall be connected into public power supply system with the method recommended by the manufacturer. In case of interference, please take addition preventive measures, such as connecting filter with public power supply system. Ensure to consider power able shielding for fixed arc welding equipment. The power cables can be shielded with the metal pipe or other equivalent methods. Ensure to keep electrical continuity for shielding.

#### **◆ Maintenance of arc welding equipment**

Ensure to perform routine maintenance for arc welding equipment according to the method recommended by the manufacturer. When welding equipment runs, all equipment inlets, auxiliary doors and panels shall be closed and tightened appropriately. The arc welding equipment cannot be changed in any form, unless the relevant change and adjustment are allowed in the manual. The spark gap of arc initiation device and arc stabilizing device shall be adjusted and serviced according to the suggestion of manufacturer.

#### **◆ Welding cable**

The welding cable shall be short as much as possible and close to each other. Moreover, welding cable shall be next to or close to ground cable.

#### **◆ Equipotential lap**

Pay attention to lapping of metal objects in the surrounding. The lapping of metal objects and workpiece will increase job hazard. When the operator touches these metal objects and electrode, he may suffer from electrical shock. The operator shall be insulated from these metal objects.

#### **◆ Workpiece earthing**

The workpiece may be not provided with earthing because of electrical safety or workpiece position, such as hull or building steel frame. When earthing is available for workpiece, radiation emission may be reduced. But it is not always the case. Therefore, we must prevent the increased risk of electric shock of users caused by the workpiece earthing or the damage of other electric equipment. When



necessary, some workpiece should be directly earthed, but directly grounding is not allowed in some countries, user can achieve this effect only by selecting the appropriate capacitor according to the regulations of the host countries.

◆ Shielding

The shielding of surrounding equipment and other cables can reduce the electromagnetic interference. The whole welding area can be shielded for special applications.

## Main technical information

### 1、 Main technical parameter

Model	MIG-270E			
Function	MIG	TIG	MMA	
Power Supply Voltage(V)	220V±15%			
Frequency(Hz)	50/60			
Rated Input Power(KW)	5	3.7	6	
Rated Input Current(A)	23	17	27	
Effective Current(A)	14.5	10.8	17	
Welding Current Range(A)	20-160			
No-Load Voltage(V)	55V			
Duty cycle ( % 40°C 10min )	40%	160A,22V	160A,16.4V	160A,26.4V
	100%	101A,19V	101A,14V	101A,24V
Power Factor	0.93			
Protection Class	IP21S			
Insulation Class	F			
Cooling	AIR			
Net Weight(KG)	About7.5			
Dimension(MM)	406*171*245			

## Installation

### 1. Environment

- ◆ Install in a dry environment with humidity less than 90% at 20°C and 50% at 40°C.
- ◆ The temperature should be in the range of -10°C-40°C when welding, and -20°C-55°C for storage and transportation.
- ◆ Shelter the machine from direct sunshine and rain. Avoid raindrops.
- ◆ Avoid using it in an environment with strong air flow when TIG welding.
- ◆ The inclination of the welding power is less than 10° the altitude no more than 1000m.
- ◆ Avoid using it in a dusty, acid or other corrosive environment.
- ◆ The machine should be placed more than 20cm from the wall, and more than 10cm from other welding machines.

### 2. Requirement of the input power source

- ◆ Waveform: standard pure sine wave
- ◆ Fluctuation range: 220V±15%
- ◆ Frequency: 50Hz/60Hz

### 3. Input power

Model	MIG-270E	
Input power	AC220V±15%,50/60Hz	
Min. power of power grid	8	
Input protection	Fuse	40
	Circuit breaker	63
Cable	input	4mm <sup>2</sup>
	output	25mm <sup>2</sup>
	ground	4mm <sup>2</sup>

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Enlarge the input , output and grounding cable according to the cable length.

Remark: the specifications of fuse and circuit breaker in the table above are only for reference.

#### 4. Installation of the machine

The power supply should be single phase AC 220v/50Hz. Use a distribution cabinet with an automatic air switch. Ensure safe grounding.

##### 4.1 MMA welding:

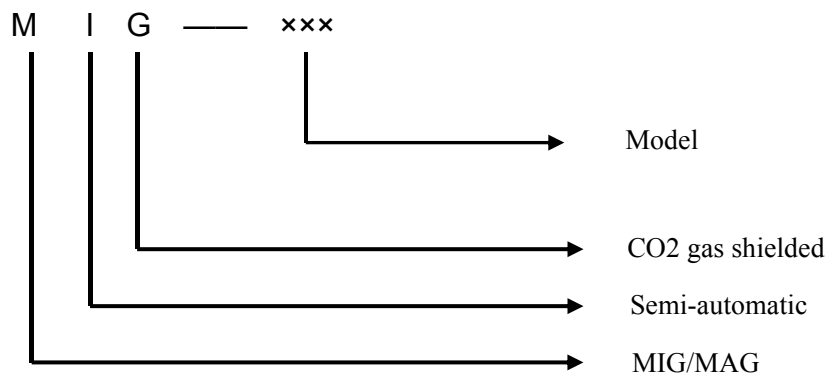
- ◆ Connect welding cable to the machine.
- ◆ Turn off the machine.
- ◆ Connect the input cable to the distribution cabinet, switch on.

##### 4.2 MIG welding:

- ◆ Connect the earth cable to the negative pole, feeder cable to the positive pole.
- ◆ Connect the hose to the machine and gas bottle.
- ◆ Turn off the machine.
- ◆ Connect the input cable to the distribution cabinet, switch on.

### Model establishment and illustration

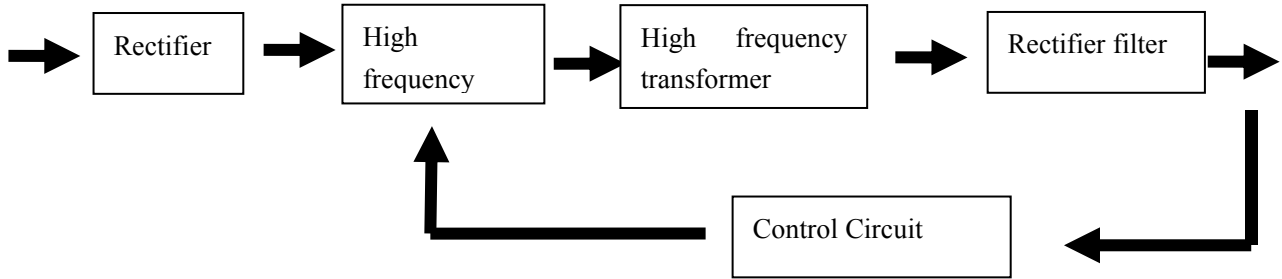
MIG series welding machine model establishment and description as shown in figure 1



( Figure 1 ) MIG series welding machine model establishment and description.

## Brief description of the principle

The schematic diagram of the MIG series welding machine is show figure 2:



(Figure 2) MIG series welding machine schematic

The welding machine adopts IGBT high frequency inverter technology, power frequency 220V power input , direct rectification and then sent to the inverter composed of IGBT and other components to become high frequency alternating current, high frequency alternating current obtained after inverter is passed through high frequency transformer after the step-down,high frequency rectifier rectifies and filters, the output is suitable for the DC current of the welding. Through this process, the dynamic response of the welder is improved, the volume and weight of the transformer and the reactor are reduced, and the efficiency of the whole machine is improved.

The design of the control circuit enables the welder to always achieve good welding process performance when external conditions change(such as grid voltage fluctuations and different output cable lengths).It is easy to arc,the are is stable,the weld is well formed,and the welding current can be continuously adjusted.

The output characteristics of the MIG series welder are shown in Figure 3



(3a) MIG welding output characteristics (3b) MMA welding output characteristics

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MIG welding output characteristics: Flat characteristics.

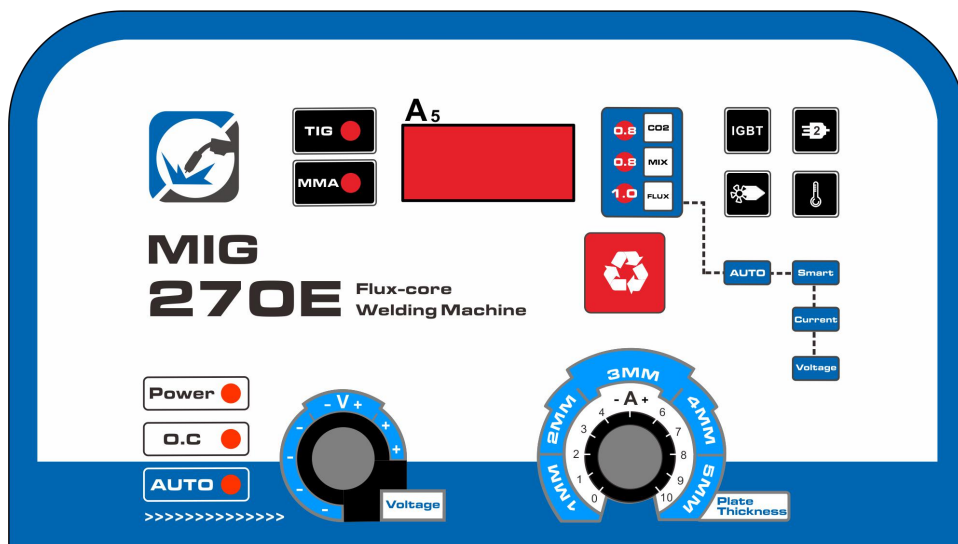
MMA welding output characteristics: Drooping characteristics.

## Operation and instruction

### 1. Introduction of main function

#### 1.1 Front panel

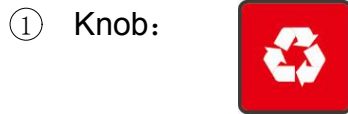
As shown in figure 4, control panel is used for selecting functions and setting data of welding machine and welding output interface.



(Figure4) MIG-270E Control Panel

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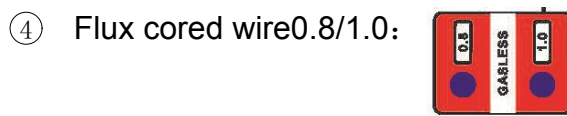
### 1.1.1 MIG-120 Function selection and parameter setting



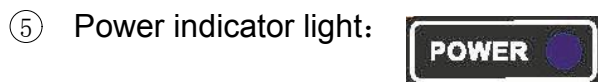
Function selection, Lift TIG、MMA、 Gasless flux cored wire 0.8/1.0。



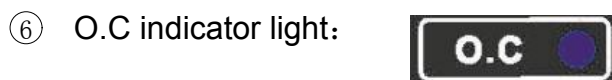
Contact the workpiece to start arc without High frequency , shorten the tungsten and workpiece, lift the torch in the moment of arc starting



Choose the flux cored wire 0.8-1.0.



Send signals of power is on。



Send signals of machine over temperature or abnormal;

Over heat, machine is protected from over temperature ,

leave the machine unloaded , after cooling it can work as usual;

Over current, there may be some components broken. Be cautious ,restart the machine after checking.If misjude, please just restart the machine.



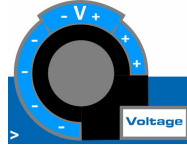
Synergic indicator light, synergic means current and voltage change in same

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step and match automatically;

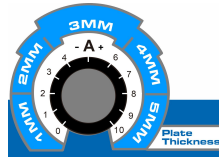
Indicate automatically under the mode of Gasless MIG

⑧ Voltage:



Under the mode of Gasless MIG , fine tune the welding voltage, negative value is decreasing, positive value is increasing.

⑨ Plate Thickness:



Set current value under the mode of Lift TIG,MMA and Gasless MIG

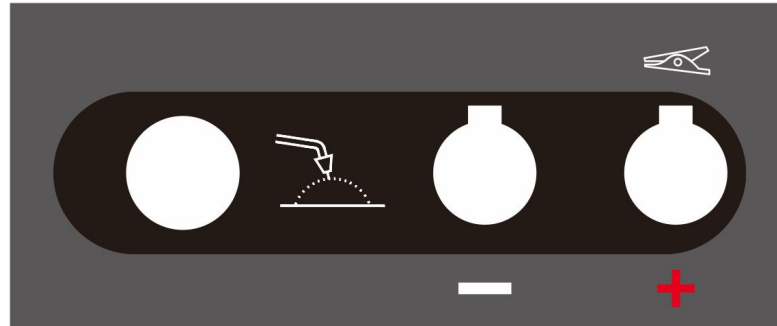
### 1.1.3 Welding output interface

From left:

① MIG torch socket;

② Cathode output fasting socket: connect TIG torch under mode of Lift TIG;  
connect workpiece under mode of MMA;

③ Anode output fasting socket, : connect workpiece under mode of Lift TIG ; connect electrode holder under mode of MMA; connect workpiece under mode of Gasless MIG;



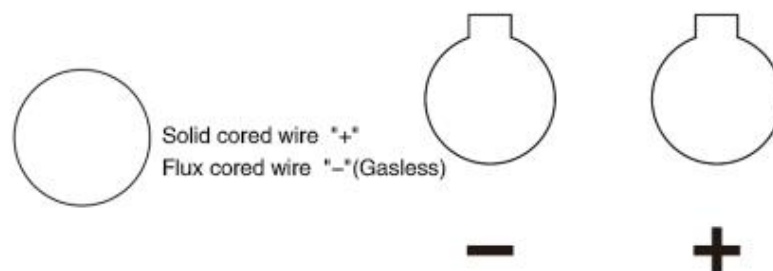
Above diagram is MIG-120 output interface

From left:

① Polarity conversion joint of MIG torch: connect anode under mode of MIG , connect Anode under mode of Gasless MIG;

② Cathode output fasting socket: connect TIG torch under mode of Lift TIG; connect workpiece under mode of MMA; connect workpiece under mode of MIG;

③ Anode output fasting socket, connect workpiece under mode of Lift TIG ; connect electrode holder under mode of MMA; connect workpiece under mode of Gasless MIG;



Above diagram is MIG-160 output interface

#### 1.1.4 Welding material table

Code	Abbreviation	Welding material	Gas
Fe CO2	FeCO	Carbon steel	CO2
Fe Ar82	FeA8	Carbon steel	Ar 82%+CO2 18%



E308Ar98	E308	Stainless steel wire ER308	Ar 98%+CO2 2%
E316Ar98	E316	Stainless steel wire ER316	Ar 98%+CO2 2%

CO<sub>2</sub>, Ar, Gas ratio is for reference only.

## 2. Installation instruction:

Note: Please strictly follow below steps to install and debug!

Before electrical connect operation the user has to turn off the power switch of the distribution panel!

This equipment protection level is IP21, avoid using in rain!

- ◆ Connect the welding input power wire to the corresponding voltage level and  $\geq 60\text{A}$  circuit breaker (connect the power wire  $\geq 4^2$ );
- ◆ The input power wire should be in good contact with the correspond power terminal or switch ,to prevent oxidation
- ◆ Use a multimeter to measure whether the input voltage is in the fluctuation range;
- ◆ Connect the yellow-green wire on the power cable and the grounding screw on the rear panel to  $\geq 4^2$  wire and ground well.;
- ◆ If the welder is placed on an inclined plane, the welder should be secured so that it does not slip;
- ◆ Each welder is equipped with an insulated handle, which can be lifted by hand when moving the welder

### 2.1 MMA welding

- ◆ DC EP: Cathode connect with work piece (“-”) , welding torch connect with anode (“+”) 。

- ◆ DC EN: Anode connect with work piece (“+”) , cathode connect with TIG torch (“-”) 。

The operator can according the base metal and electrode material choose the connection method, Generally,the alkaline electrode is recommended to use DC reverse connection method.Acid welding electrode are not specified.

**Quick check list of welding process (Only for reference)**

Electrode diameter (mm)	Recommended welding current (A)	Recommended welding voltage (V)
1.0	20-60	20.8-22.4
1.6	44-84	21.76-23.36
2.0	60-100	22.4-24.0
2.5	80-120	23.2-24.8
3.2	108-148	23.32-24.92
4.0	140-180	24.6-27.2

Note: this table is suitable for low carbon steel welding, other materials can refer to the relevant materials and process manual.

**2.2 Gas shield welding:**

- ◆ Connect the gas cylinder with the CO2 gas regulator to the pipe of the wire feeder and fasten it with buckle; When using CO2 gas, the regulator should be connected to the heating power source to prevent the regulator from freezing during use and affect the welding quality; No need to connect heating power when using mixed gas
- ◆ Place the wire at the right wire groove according to wire diameter. Release the nut on the wire pressing wheel and feed the wire to the wire groove through wire hose. Adjust the wire pressing wheel to press the wire so it doesn't slip. Don't over-press it. Otherwise the wire would be distorted and can't be feeded normally.
- ◆ Connect the wire feeder polarity plug to the positive socket;Connect the earth clamp to the negative fast socket and tighten it clockwise.
- ◆ MIG torch:Feed the wire out by wire inspection,and choose the contact tip

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through the wire and tighten,press the gun switch to start.

- ◆ Try to fine tuning the voltage when the current and voltage do not matched well

### 2.3 Flux cored wire without gas

- ◆ Place the wire at the right wire groove according to wire diameter. Release the nut on the wire pressing wheel and feed the wire to the wire groove through wire hose. Adjust the wire pressing wheel to press the wire so it doesn't slip. Don't over-press it. Otherwise the wire would be distorted and can't be feeded normally.
- ◆ Connect the wire feeder polarity plug to the negative socket;Connect the earth clamp to the positive fast socket and tighten it clockwise.
- ◆ MIG torch:Feed the wire out by wire inspection,and choose the contact tip through the wire and tighten,press the gun switch to start.
- ◆ Try to fine tuning the voltage when the current and voltage do not matched well

Welding parameters(Please refer to the following figure)

Welding current (A)	Wire (mm)
60~80	φ0.6、0.8
80~130	φ0.8、1.0
130~200	φ0.8、1.0

Formula for your reference :  $U=14+0.05I\pm 3V$

### 2.4 Lift TIG

- ◆ Connect the gas pipe of TIG torch to the gas cylinder
- ◆ Conenct the seperated type TIG torch to negative socket,earth clamp to positive socket
- ◆ Scratch the tungsten on the workpiece to start the arc,and then lift the tig torch
- ◆ There is no control switch for gas flow and current. To avoid waste and safty problem, please turn off the gas cylinder and keep torch away from the workpiece.

**Titanium and alloy-TIG parameter for reference**

Thickness (mm)	Groove shape	Welding layer	Tungsten diameter (mm)	Wire diameter (mm)	current (A)	Argon gas volume (L/min)			Nozzle diameter (mm)
0.5	I-shape	1	1.5	1.0	30-50	8-10	6-8	14-16	10
1.0		1	2.0	1.0-2.0	40-60	8-10	6-8	14-16	10
1.5		1	2.0	1.0-2.0	60-80	10-12	8-10	14-16	10-12
2.0		1	2.0-3.0	1.0-2.0	80-110	12-14	10-12	16-20	12-14
2.5		1	2.0-3.0	2.0	110-120	12-14	10-12	16-20	12-14
3.0	Y-shape	1-2	3.0	2.0-3.0	120-140	12-14	10-12	16-20	14-18
4.0		2	3.0-4.0	2.0-3.0	130-150	14-16	12-14	20-25	18-20
5.0		2-3	4.0	3.0	130-150	14-16	12-14	20-25	18-20
6.0		2-3	4.0	3.0-4.0	140-180	14-16	12-14	25-28	18-20
7.0		2-3	4.0	3.0-4.0	140-180	14-16	12-14	25-28	20-22
8.0	3-4	4.0	3.0-4.0	140-180	14-16	12-14	25-28	20-22	
10	Double Y shape	4-6	4.0	3.0-4.0	160-200	14-16	12-14	25-28	20-22
20		12	4.0	4.0	200-240	12-14	10-12	20	18
22		12	4.0	4.0-5.0	230-250	15-18	18-20	18-20	20
25		15-16	4.0	3.0-4.0	200-220	16-18	20-26	26-30	22
30		17-18	4.0	3.0-4.0	200-220	16-18	20-26	26-30	22

**Thin stainless steel sheet——TIG parameter (only for reference)**

thickness (mm)	Joint type	Tungsten diameter (mm)	Wire diameter (mm)	Current type	current (A)	Argon gas volume (L/min)	speed (cm/min)
1.0	butt	2	1.6	DCEN	7-28	3-4	12-47
1.2	butt	2	1.6	DCEN	15	3-4	25
1.5	butt	2	1.6	DCEN	5-19	3-4	8-32

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## Welding machine precautions and maintenance

### 1. Safety points

The welding machine is equipped with overcurrent and overheat protection circuits. When the grid voltage, output current and internal temperature exceed the set standard the welding machine will automatically stop working, but excessive use (such as excessive voltage) will still lead to welding. The machine is damaged, so you still need to pay attention to the following:

◆ Make sure the ventilation is good!

When the machine is in operation, a large working current passes, natural ventilation can not meet the cooling requirements of the welder, so a fan is installed to effectively cool the welder to make it work smoothly. The user should confirm that the ventilation area is not covered or blocked, and the distance from the surrounding objects should be no less than 0.3 meters. Users should always pay attention to maintain good ventilation, which is very important for better working of the welding machine and guaranteeing longer service life of.

◆ It is forbidden to overload!

The user should pay attention to the use of the welder according to the allowable load duration of the welder (refer to the welder nameplate parameters) to keep the welding current not exceeding the maximum allowable load current. Current overload will significantly shorten the life of the welder and may even burn the welder. Load continuation rate: that is the current welding time under the load continuation rate, 10 minutes is a cycle, working time + rest time = 10 minutes; For example, 30%, 200 A/28 V, that is the output current 200 A state, should work for 3 minutes. Rest for 7 minutes; 60%, 141 A/25.6 V, in the state of output current 141 A, should work for 5 minutes, rest for 4 minutes.

Current overload will significantly shorten the life of the welder

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◆ Forbidden voltage too high!

The power supply voltage is listed in the "main performance parameters" table. In general, the automatic voltage compensation circuit in the welding machine will ensure that the welding current remains within the allowable range. If the power supply voltage exceeds the allowable value, it will damage the welder. The user should fully understand this situation and take corresponding preventive measures.

◆ It is forbidden to use the welding machine for thawing pipes.

◆ The back of each welding machine is attached with a ground screw, and marked with a ground mark. Before use, select a cable with a section greater than 2.5mm<sup>2</sup> and ground the welding machine shell reliably to release static electricity or prevent accidents that may occur due to electricity leakage.

◆ If the welding machine exceeds the standard load duration, the welding machine may suddenly enter the protection state and stop working, which means that the welding machine exceeds the standard load duration. If the temperature is too high, the temperature control switch will be triggered and the welding machine will stop working. Meanwhile, the yellow indicator light on the front panel will be on. In this case, you do not need to unplug the power supply so that the cooling fan can continue working to cool the welder. When the yellow indicator light is off, the temperature drops to the standard range and the welding can be resumed.

## 2. Maintenance



**Warning:**

All maintenance, service and cleaning work must be performed with power removed. Make sure you have unplugged the power cord before opening the casing.

◆ Dedust regularly. Use dry, clean compressed air to clean up the system. Dedust every day when operating in smoky conditions or severely polluted air.

◆ The compressed air should be delivered at the required pressure to avoid the

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destruction of the internal components.

- ◆ Check the internal contact areas to insure a tight connection (especially the plug-in joints or components) and reinforce the loose contact. If any rusting or oxidation occurs, use sandpaper to remove the oxide film and reconnect.
- ◆ Avoid water and moisture penetration. If this situation happens, apply a drying treatment to the inside of the welder and then start a megger insulation test which should include the insulation between connection joints as well as joints and casing. The welding operation could be continued only if no error detected.
- ◆ If the welder is not used for a long period of time, seal it in the original packaging and store in dry condition.

### 3. Before maintenance



**Warning:**

Blind experiments and imprudent overhaul could lead to the expansion of failure, and difficulty for a formal maintenance. Electronic equipment in the state of the exposed part of a voltage can lead to dangers. Any direct or indirect contacts may lead to electric shocks incidents, and serious electric shock will cause death!!!

**Attention:** During the warranty period, if not allowed by this Company, if there is any wrong maintenance to any fault of the welding power source, the suppliers will not provide free repairs.