

Inverter Welder

OWNER'S MANUAL

**CUT100IGBT、CUT120IGBT
CUT160IGBT**

WARNING

Welding and cutting is dangerous to the operator, people in or near the working area, and the surrounding, if the equipment is not correctly operated. Therefore, the performance of welding/cutting must only be under the strict and comprehensive observance of all relevant safety regulations. Please read and understand this instruction manual carefully before the installation and operation.

- The switching of function modes is possibly damaging to the equipment, while the welding operation is performed.
- Do not disconnect the electrode-holder cable with the equipment, before the performance of welding.
- A safety switch is necessary to prevent the equipment from electric-leakage.
- Welding tools should be of high quality.
- Operators should be qualified.

Electric Shock: It may be fatal

- connect the earth cable according to standard regulation.
- Avoid all contact with live components of the welding circuit, electrodes and wires with bare hands. It is necessary for the operator to wear dry welding gloves while he performs the welding task.
- The operator should keep the working piece insulating from himself/herself.

Smoke and Gas generated while welding or cutting: harmful to people's health.

- Avoid breathing the smoke and gas of welding or cutting.
- Keep the working area in good ventilation.

Arc light-emission: harmful to people's eyes and skin

- Wear the welding helmet, anti-radiation glass and work clothes while the welding operation is performed.
- Measures also should be taken to protect people in or near the working area.

Fire hazard

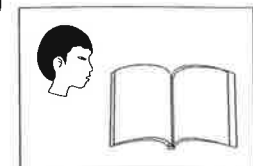
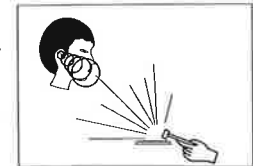
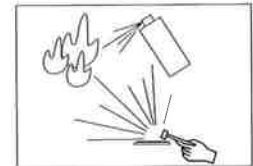
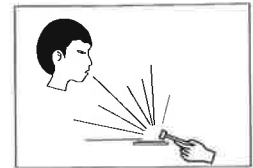
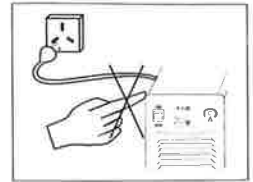
- The welding splash may cause fire, thus remove flammable material away from the working place.
- Have a fire extinguisher nearby, and have a trained fire person ready to use it.

Noise: Possibly harmful to people's hearing.

- Surface noise is generated while welding/cutting, the hearing aids is necessary in some cases.

Machine Fault:

- Consult this instruction manual.
- Contact your local dealer or supplier for further advice.



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An introduction to plasma cutter

First of all, thank you using our plasma cutters of this serial!

Our plasma cutters CUT100 and CUT160 are made with advanced IGBT inverter technology. The basic theory is to first change the 50Hz/60Hz rectifier to DC, and then inverter DC to HF (high as 20KHz) ,and third down the voltage rectifier by using IGBT switch of high power factor; and output DC power supply with PWM technology. The machine has accurate feedback control and stable current output .The cutting current ranges freely from 20A to max ,satisfying all kinds of work piece, thickness and speed with perfect cutting. It employs non-touch arc leading and has good spontaneous arc-leading ,which makes it much convenient to do with rusty metals or metals with paint on the surface. The three-phase voltage provides strong fitness, ranging between $\pm 15\%$. Also , the machine is well equipped with such functions as over-v protection, over-heat protection and inadequate power supply, inadequate compressed air pressure, etc. The use of inverter technology highly reduces the weight and volume of the machine ,and consequently greatly reduces that of the mains transformer. In a word, it's stable, light, smart, noiseless and energy-saving, speedy, and well-cutting.

The cutters are widely used and suitable to cut such metals as carbon steel, stainless steel, Zn-coated steel, copper and aluminum with the max thickness of 30mm(carbon steel, cutting current 100A, 5Kgf/cm)。

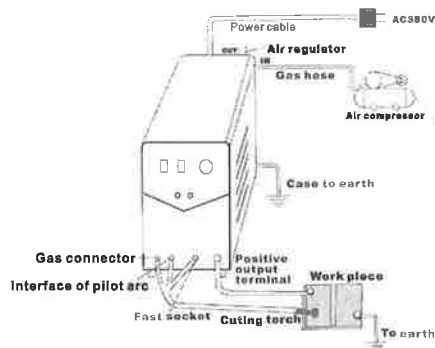
We warmly welcome all friends use our products, and offer your suggestion; we will try our best to make our products and service better!

1. Maintenance for main engine is one year, excluding other spare parts.
2. During the maintenance period, all maintenance is for free except intentional damage.
3. Customers are not allowed to unfold and refit or change the parts ,or the consequent trouble is on you ,and our company bears no duty over it.

THE MAIN PARAMETER

PARAMETER	TYPE	CUT-100IGBT	CUT-120IGBT	CUT-160IGBT
Input voltage (V)		Three-phase AC380V-420V ± 10%		
Input power capacitance (KVA)		15	19.4	29.1
No-load voltage (V)		330	400	350
Current adjustment range (A)		20-100	20-120	20-160
Rated output voltage (V)		120	128	144
Rated input current		23	29.6	44.3
Rated duty cycle (%)		80		
Efficiency		85		
Power factor (cos φ)		0.93		
Insulation class		F		
Protection class		IP23		
Arc-leading		Non-touch arc-starting		
Gas supply		Compress the air (no water, no oil, dry)		
Suggested air pressure (KG)		6	7	7
Suggested air compressing volume (KG)		0.36	0.5	0.5
Weight (kg)		52	55	56
size (mm) (L×W×H)		800×380×750	800×380×750	800×380×750
Input cable section (mm ²)		4	6.0	6.0
Output cable section		16	25	25
Gas hose		Internal Φ5mm Pa-resistant ≥10Kgf/cm ²		
Max pressure Kgf/cm ²)		9		
Min pressure (gf/cm ²)		5	5	5

INSTALLATION



2-1. Connection of the input wires

(enclosed the installation sketch)

- 1、 Each cutter is equipped with a power wire, and according to the input voltage of cutters, the wire must be connected to the suitable voltage class, and do not make mistakes. For example , once there was user connecting 380V to 220V, thus causing the machine abnormal working .
- 2、 The power wire should be well-connected with the power switch or the wire connector to avoid oxidization. If possible , check with meters to see whether the power voltage ranges within the given range.

2-2 .Connection of the output wires

- 1、 Connect the output terminal of the gas hose to the input of the air regulator, while the output terminal of the air regulator is connected to the HV leather hose for copper pipe use.
- 2、 Connect the copper screw on the cutter torch to the output terminal of the one-knob on the front panel, and tighten it in clockwise direction (To avoid gas-leaking) ,while the air plug of the earth clamp is connected to the positive output terminal on the front panel.
- 3、 The switch plug of the cutter torch is connected to the switch connector of the torch on the panel. (cutters with arc board, the arc-line is connected to the arc-line connector on the panel board) .
- 4、 Spin the electrode to the cutting torch in a certain order, and tighten it, and then installation of the nozzle, safety cap.
(Re: each time you check or change the nozzle and electrode ,please make sure the machine is turned off.)

2-3. Checking

- 1、 The case of the equipment should be safely earth-connected.
- 2、 Check whether all the connectors are well-connected.
- 3、 Check whether the power wire is connected to the right voltage.
- 4、 Make sure that all cables and hoses have no wear and tear

OPERATION

3-1. Panel board functions

- 1、 Switch : control the on and off of the power supply and over-current protection.
- 2、 Pilot light:
On ---Over-temperature of the power inner is too high.
Flash (2/s) ---phase-deficiency or over-voltage, voltage-deficiency.
Flash (20/s) ---Over-current protection of the main back circu

1、 Pilot light: on---the main power supply is on .

2、 Gas Pa pilot light: on----the gas supply Pa is not enough <3Kgf/cm²

5、 Current adjustment: adjust the current volume (freely ranges from 20A to 100A) .

3-2.Operation

1、 Turn on the power switch on the back panel board, and make it "On" , then the pilot light is on , and the meter indicates the set current.

2、 Adjust the gas winding to the needed pressure, and open the valve for compressing the air.

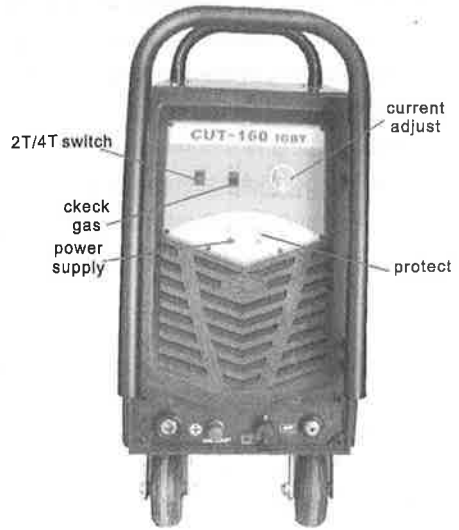
3、 Push the control button on the cutter torch, and then the valve works , you can

Hear the sound of HF arc-starting, and meanwhile argon gas flows from the nozzle. (for cutters with arc-maintaining, the nozzle has plasma arc flowing out.)

4、 According to the thickness of the work piece, set the cutting current.

5、 Touch the copper mouth of the torch to the work piece (copper mouth with arc-maintaining ,about 2mm to the work piece) , push the button on the torch until starting the arc, and then raise the cutting torch, make it about 1mm from the work piece, and then start cutting.

CUT-160 Panel board sketch



CAUTIONS

4-1.Working environment

- 1).The machine should be placed where there is little dust and no corrosive chemical gas or flammable gas or matter, and moisture≤80%;
- 2).Keep it away from the sun and rain , room temperature under -10℃ to +40℃ ;
- 3)30cm away from the wall;
- 4).There should be 30cm between each machine if many machines are put together;
- 5).If the air flow is not well in the room , fan is needed.

4-2. Safety tips

- 1) Make sure the air is flowing.

This machine is small in volume, tight in structure , large in current output, and the natural air circulation can no longer satisfy the need of heatsink, so we put fans in it to achieve cooling.

Cautions: make sure the two terminals and shutter of the cutter are not blocked and

Covered, and the machine should be placed 0.3m away from the surroundings; please always improve the circulating condition, because it's very important for the normal working of the welding machine.

2) No over-load working

Over-loading is forbidden, or the cutter may stop suddenly during the cutting course. That's, the inner thermal parts works under over-load condition. Under this circumstance, no need to cut off the power switch, leave the fan whirl to speed up the temperature-lowering. If the temperature drops to the given range, the work will recover.

3) No over-voltage

The power voltage range of the machine see the "Main parameter" table, under this circumstance, the inner voltage will complement all by itself, and guarantee the welding current not surpass the allowed value. Please be more careful if the parts are damaged because of over-voltage.

4) Each machine has a screw for earth connecting, the mark is earth signal, please choose a 10mm cable to connect the case of the machine to earth to avoid breakdown caused by static electricity or electricity-leaking.

5) Do not touch the output terminal when working, or it may cause electric shock.

4-3、Cautions for cutting

1、 To prepare for cutting, please hold the cutting torch (if it's non-touch arc-starting, the torch doesn't touch the work piece) and push the torch switch, then there will be plasma arc coming out of the nozzle, that's, the electrode and nozzle are correctly connected; if there is no or little arc coming out, that's, the electrode and nozzle are wrongly connected, please turn off the machine and restart.

2、 when the cutting starts, the outer edge of the nozzle is to fit that of the work piece. Just push the torch switch to start arc, if not succeed, restart it; if starts, move the torch at an even speed (the speed is different as the thickness of the welding materials are different, if there is overturn splash, it indicates that the work piece is not completely cut, and the moving speed should be adjusted.)

3、 At the end of the cutting, the work piece is going to be cut off, slow down the cutting speed, and then turn off the switch, and the cutting is finished.

4、 If there is splash on the surface of the nozzle, it will influence the cooling efficiency, so you should clean it in time, and remove the dust and splash on the torch head frequently to keep good heatsink.

5、 The torch rack is for maintaining the distance from the nozzle level to the welding piece. Please

do not discharge the rack during the course of cutting, or the distance cannot be maintained and may burn the torch if the nozzle touches the welding material.

6、 Renewal of electrode and nozzle

Under the following circumstances, the electrode and nozzle are to be renewed:

- 1).the electrode wire thickness $\geq 1.5\text{mm}$
- 2).irregular deform of the nozzle hole
- 3).the cutting speed obviously slow down
- 4).difficulty in arc-starting
- 5).cutting mouth abnormal when the above phenomena happens, the electrode and nozzle is to be renewed ,or there will be strong arc in the nozzle , which will damage the electrode and nozzle, or even burn the torch. Different machines have different nozzles, please pay attention to this at renewal.
7. During the cutting, make sure the cable keeps straight, do not bend it even if there is not enough room, and do not thread on or squeeze the cable lest the gas flow is blocked and then damage the torch. The cutting cable is not to contact sharp things to avoid damage.
8. Take off the nozzle, electrode , and arc-maintaining line (if not, the torch may be damaged) turn on the machine and there will be gas coming out of the nozzle to clear away the dust, once a day and 15 seconds each day.
9. Do not use the cutting torch to knock.

MAINTENANCE

- 1) Clear the dust at regular intervals with clean and dry compressed air; if the working condition has heavy smoke and pollution , the welding machine should be cleaned once a month.
- 2) The compressed air should be reduced to the required pressure lest the little parts in the welding machine be damaged.
- 3)Check whether the inner gas-electricity connection is well (esp. the plugs) , and tighten the loose connection; if there is oxidization ,remove it with sand paper and then re-connect.
- 4)**Re:** The operator is supposed to have a learned knowledge of electric To avoid water and rain , if there is ,dry it in time, and check the insulation with multi-meter (including that between the connection and that between the case and the connection) .Only when there is no abnormal phenomena can the welding continue.
- 5)If the machine is not used for long time , put it into the original packing in dry condition.

BREAKDOWN-CHECKING

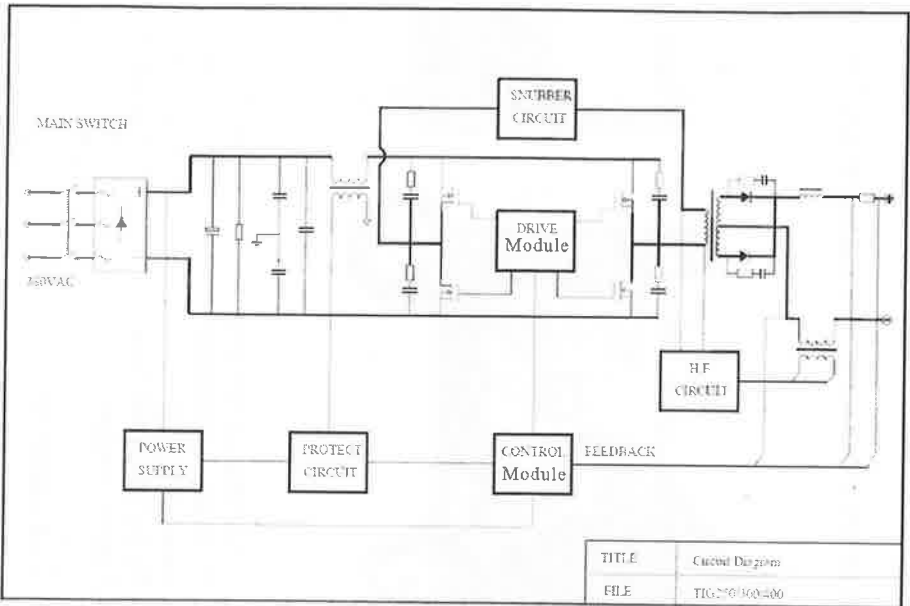
Cautions: The operators are supposed to have enough knowledge of electric electric-gas and common sense of safety, and concerning certificates are needed. We suggest you contact us before operation and meanwhile get permission.

Typical breakdown and solution :

NO	BREAKDOWN PHENOMENON	BREAKDOWN CAUSES	SOLUTION
A	The protection pilot light splashes at low frequency, and the power pilot light is on.	The electric net voltage is too high($\geq 437V$)	Turn off the power supply to check the electric net, and restart the power after the electric net recovers to the normal condition.
		The electric net voltage is too low.($\leq 323V$)	
		The electric net is short of phase.	
		The power input wire is not well connected.	Connect the power wire well.
		Others	Contact the company
B	The protection pilot light splashes rapidly, and the power light is on.	The IGBT model board is not well-connected.	Contact the company.
C	The protection pilot light is on, and the power pilot light is on.	The power supply is over-heat because of bad air circulation.	Improve the circulation condition, and it will recover after the temperature drops.
		The environment temperature is too high.	It will recover after the temperature drops.
		The duty cycle over the rated value.	It will recover after the temperature drops.
		Others	Contact the company.
D	The protection pilot light is on, while the power pilot light flashes.	The electric net is short of phase.	Turn off the power immediately and check the electric net until it recovers.
		The power input is not well connected.	Connect the input wire well
		Others	Contact the company
E	The protection pilot light is on, and the power pilot light is on.	The power input wire is not well-connected.	Connect the power input wire well
		The main power switch is damaged.	Renew the main power switch.
		Others	Contact the company
F	The air pilot light is on.	No compressed air	Connect compressed air
		Insufficient compressed air	Raise higher the air pressure($3kgf/cm^2$)

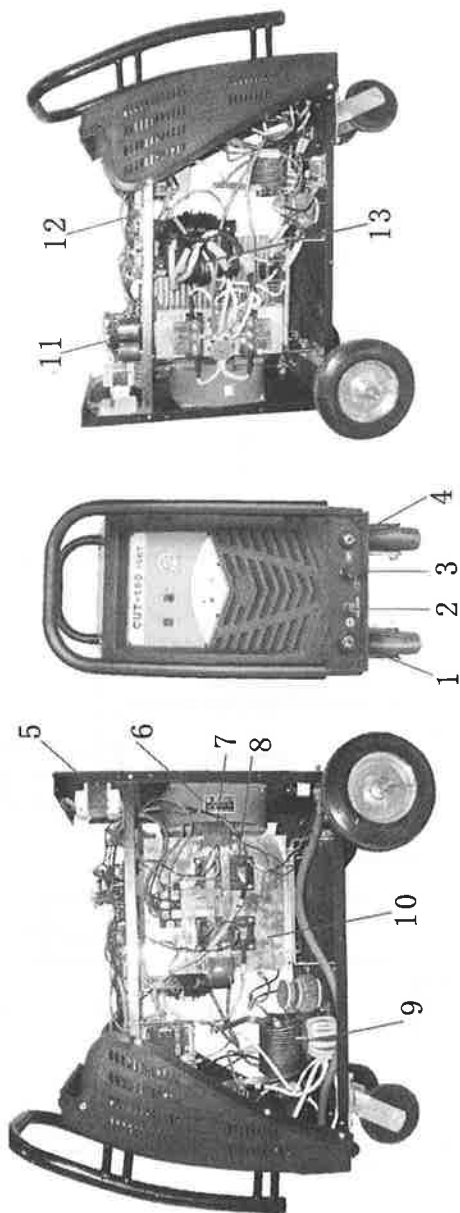
G	The fan doesn't work.	The power stopping time over 10 mins	No breakdown, once there is electricity, it will work.
		The power is newly started.	
		During the welding course	Fans or concerned circuit is damaged, please turn off the power supply at once and check it.
H	The panel knob doesn't work.	The potentiometer is damaged	Renew the potentiometer
I	The power trips	The first electricity after a long power-off.	No breakdown, the filter capacitor of the main circuit trips, and restart the main power switch.
		During the welding course	Contact the company

CIRCUIT DIAGRAM



INSTALLATION&OPERATION

This structure drawing is suitable for CUT160 welding machine



- 1. "+" output connector
- 2. Pilot arc connector
- 3. Aviation plug
- 4. To cutting machine
- 5. Power switch
- 6. Fan
- 7. CBB capacitor

- 8. IGBT module
- 9. Reactor
- 10. Radiator
- 11. Transformer
- 12. Drive module
- 13. Transformer

