

CUT 40CT

PLASMA CUTTING MACHINE

USER MANUAL



Preface

This manual includes hardware description and operation introduction of equipment. For your and other people's safety, please read the manual carefully.

Pay attention

Pay attention to the words after the signs below.

Sign	Description
	The words after this sign means there is great potential danger, which may cause major accident, damage or even death, if it is not followed.
	The words after this sign means there is some potential danger, which may cause hurt or property lose, if it is not followed.
	The words after this sign means there is potential risk, which may cause equipment fault or break, if it is not followed.

Version

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The contents of this manual are updated irregularity for updating of product. The manual is only used as operation guide, except for other promises. No warranties of any kind, either express or implied are made in relation to the description, information or suggestion or any other contents of the manual.

The images shown here are indicative only. If there is inconsistency between the image and the actual product, the actual product shall govern



CONTENTS

SAFETY WARNING	4
MACHINE DESCRIPTION	9
TECHNICAL PARAMETERS TABLE.....	10
INSTALLATION INSTRUCTION	11
AIR REGULATOR INSTALLATION AND OPERATION.....	12
PANEL FUNCTION INSTRUCTION.....	13
OPERATION INSTRUCTION	14
NOTES OR PREVENTIVE MEASURES	15
QUESTIONS TO BE RUN INTO DURING CUTTING.....	16
MAINTENANCE	17
NOTES BEFORE CHECKING	17
TROUBLESHOOTING AND FAULT FINDING	18
CIRCUIT DIAGRAM	20



SAFETY WARNING

The safety notes listed in this manual is to ensure correct use of the machine and to keep you and other people from being hurt.

The design and manufacture of plasma cutting machine considers safety. Please refer to the safety warning listed in the manual to avoid accidents.

Different damage would be caused by wrong operation of the equipment as follows. Please read the user manual carefully to reduce such damage.

Sign	Description
	Any contact of electric parts may cause fatal electric shock or burnt.
	- Gas and fumes are harmful to health. - Operation in narrow space may cause choke .
	- Spark and hot workpiece after cutting may cause fire. - Bad connected cable may cause fire. - Incompletion connection of workpiece side circuit may cause fire. - Never cut on the case of tinder stuff, or it may cause explode. - Never cut airtight containers such as slot, pipe etc., or it may break.
	- Arc ray may cause eye inflammation or skin burnt. - Spark and residue will burn your eyes and skin.
	- Toppling over of the gas cylinder will cause body hurt. - Wrong use of the gas cylinder will lead to high-pressure gas eruption and cause human hurt.
	Never let fingers, hair, clothes or etc. near the moving parts such as the fan.
	The wire shoot out of the torch may stab eyes, face and other naked parts.
	The machine is portable, never lift it by any equipment.





Please follow the rules below to avoid heavy accidents.

- ☐ Never use the equipment to do other things but cutting.
- ☐ Follow related regulations for the construction of the input-driven power source, choice of place, usage of high-pressure gas, storage, configuration, safe-keeping of workpiece after cutting and disposal of waste, etc.
- ☐ Nonessentials do not enter the cutting area.
- ☐ People using heart pacemaker is not allowed to get close to the plasma cutting machine or area without doctor's permission. The magnetism created by energizing the plasma cutting machine can have a bad effect to the pacemaker.
- ☐ Install, operation, check and maintain the equipment by profession personnel.
- ☐ Understanding the contents of the user manual for safety.



Please follow the rules below to avoid electric shock.

- ☐ Keep away from any electric parts.
- ☐ Earth the machine and workpiece by professional personnel.
- ☐ Cut off the power before installation or checking, and restart 5 minutes later. The capacitance is chargeable device. Please ensure it has no voltage before start again even if the power source is cut off.
- ☐ Do not use wire with inadequate section surface or damage insulation sleeve or even exposed conductor.
- ☐ Do ensure well isolation of wire connection.
- ☐ Never use the device when the enclosure is removed.
- ☐ Never use broken or wet insulation gloves.
- ☐ Use firenet when work at high position.
- ☐ Check and maintain regularly, don't use it until the broken parts are fixed well.
- ☐ Turn off the power when not in used.
- ☐ Follow the national or local related standard and regulations when using the DC plasma cutting machine at narrow or high position.



Please follow the below notes to avoid fire and explode, etc.

- ☐ No combustible in cutting area.
- ☐ Keep off combustible when cutting.



- ☐ Keep hot workpiece after cutting away from flammable gas.
- ☐ Do move away the combustible around when cut the dooryard, ground and wall,.
- ☐ The wire connection of base metal should be as close to the cutting place as possible.
- ☐ Never cut those facilities with gas pipe or airtight slot.
- ☐ Put fire extinguisher around the cutting area to prevent fire.

 **WARNING** The gas and fumes are harmful to health, please wear protective device according to regulations.

- ☐ Wear exhaust equipment and breathe preventive facilities to prevent gas poisoning or choke.
- ☐ Use suggested part exhaust equipment and breathe preventive facilities to prevent hurt or poisoning by gas and other powder, please.
- ☐ To prevent oxygen-deficiency, air out the gas-filled room which is full of CO₂ and argon on the bottom, when operating on trunks, boilers, cabins, etc.
- ☐ Please accept the supervisor's inspection when operating in narrow space. Air the room and wear breathe preventive facilities.
- ☐ Never operate in degrease, washing or spray space.
- ☐ Using breathe preventive facilities when cut shielded steel for it will cause poisonous dust and gas.

 **WARNING** The arc, spark, residue and noise are harmful to health, please wear protective appliance.

- ☐ Eye protection against arc is recommended when cutting or supervise cutting.
- ☐ Please wear preventive spectacles.
- ☐ Operator's gloves, operator's goggles, long sleeve clothes, leather apron, and other standard protection equipments must be worn for cutting operation.
- ☐ A screen to protect other people against the arc must be set in the cutting place.

 **WARNING** Please follow the notes below to avoid gas cylinder toppling over or broken.

- ☐ Use the gas cylinder correctly.
- ☐ Use the equipped or recommended gaseous regulator.
- ☐ Read the manual of gaseous regulator carefully before using it, and pay attention to the safety notes.



- ☐ Fix the gas cylinder with appropriate holder and other relative parts.
- ☐ Never put the cylinder under high temperature or sunshine environment.
- ☐ Keep your face away from the gas cylinder exit when opening it.
- ☐ Put on the gas shield when it is not used.
- ☐ Never put the torch on the gas cylinder. The electrode can not meet the gas cylinder.



WARNING

Any touch of the switch part will cause injury, please note the following.

- ☐ Never use the machine when the enclosure is off.
- ☐ Install, operate, check and maintain the machine by professional person.
- ☐ Keep your fingers, hair, clothes etc. away from the switch parts such as the fan.



WARNING

The wire end may deal damage, please note the following.

- ☐ Never look into the electric conduction hole when checking the wire feeding is normal or not, or the shooting wire may stab your eyes and face.
- ☐ Keep your eyes, face or other naked parts away from the end of torch when feeding the wire manually or pressing the switch.

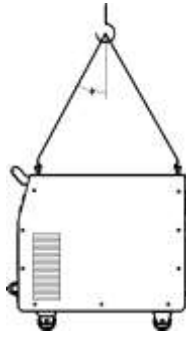


ATTENTION

For better work efficiency and power source maintenance, please note the following.

- ☐ Precautions against toppling over.
- ☐ Never use the cutting equipment for pipe thawing.
- ☐ Lift the power source from side when use the up-down forklift truck to avoid toppling over.
- ☐ When using the crane for lift, tie the rope to the ears with an angle no more than $\phi 15$ to the vertical direction.
- ☐ When lifting the plasma cutting machine which equipped with gas cylinder and wire feeder, download them from the power source and ensure the horizontal of the machine. Do fix the gas cylinder with belt or chain when moving it to avoid bodyhurt.
- ☐ Ensure fastness and insulation when lifting the wire feeder through the swing ring for cutting.





Lifting way for the machines with swing ring on the top ($\varphi \leq 15^\circ$)



ATTENTION Electromagnetic interference needing attention.

- ☐ It may need extra preventive measures when the equipment is used in particular location.
- ☐ Before the installation, please estimate the potential electromagnetism problems of the environment as follows.
 - a) Upper and lower parts of the cutting equipments and other nearby power cable, control cable, signal cable and phone cable.
 - b) Wireless electric as well as TV radiation and reception equipment.
 - c) Computer and other control equipments.
 - d) Safety-recognition equipment etc. Such as supervise of industrial equipments.
 - e) Health of people around. Such as personnel using the heart pacemaker or audiphone.
 - f) Equipments for adjustment and measurement.
 - g) Anti-disturb capability of other used equipments .Users should ensure these equipments and the environment are compatible, which may need extra preventive measures.
 - h) Practical state of the cutting and other activities.
- ☐ Users should observe the following dos and don'ts to decrease radiation interference.
 - a) Connect the cutting equipments to the power supply lines.
 - b) Maintain the cutting equipments regularly.
 - c) The cable should be short enough to be close to each other and the ground.
 - d) Ensure the safety of all the cutting metal parts and other parts nearby.
 - e) The workpiece should be well earth.
 - f) Shield or protect the other cable and equipments to decrease the effects of disturbances. The cutting equipments can be complete shielded in some special conditions.
- ☐ Users are responsible for interference due to cutting.



MACHINE DESCRIPTION

The plasma welding machine adopts the most advanced inverter technology, it's applicable for plasma cutting system with compressed air.

The development of welding and cutting equipment benefits from the appearance of the inverter power supply theory and components.

Inverter cutting machine, firstly transfers the working voltage of 50/60Hz to high frequency (above 100KHz) via high-power device MOSFET, then reduces the voltage and adjusts the current, delivers high-power cutting current via PWM technology.

Compared with traditional cutter, inverter technology has advantages of low energy consumption, light weight, compact and excellent performance.

The Plasma Cutting Machine series can provide more powerful, concentrated and stable electric arc. The arc temperature can rise up to 10,000-15,000°C, forming powerful plasma arc. That means the plasma arc can be applied to cut metal rapidly, and make its heat affluence area as small as possible, energy to be efficiently utilized, also can get a very smooth cutting section, which greatly facilitates consequent processes.

The welding machine series can be easily designed into different cutting power sources, whose output current is constant and adjustable. With excellent operation performance, its transfer efficiency is commonly above 85%.

The machines have been widely applied in many areas, primarily focus on metal plate cutting and special situations that are not suitable to be applied and achieved with common devices. Applicable for various metal materials with different characteristics, including stainless steel, alloy steel, carbon steel, cuprum and other ferrous metallic materials.

Compared with the others cutting machines, this cutting machine series provide functions of quick power adjusting and controlling via advanced circuit module. Moreover, they have first-class cutting operation and the enormous transfer efficiency.

Thanks for purchasing our products and looking forward to your precious advice. We will be dedicated to provide our best products and service.



WARNING !

The machine is mainly used in industry. It will produce radio wave, so the worker should make fully preparation for protection.



TECHNICAL PARAMETERS TABLE

Model Parameters	CUT 40CT
Input voltage (V)	AC220V±15%
Frequency (Hz)	50/60
Rate input current (A)	30
No-load voltage (V)	275
Current Range (A)	15-40
Rate output voltage (V)	96
Duty cycle (%)	30
Efficiency (%)	80
Power factor	0.78
Insulation Class	F
Housing Protection Class	IP21
Arcing Way	Contact
Pressure of air compressor (Kgf/cm ²)	4-5
Limited cutting thickness (mm)	16
Recommended cutting thickness (mm)	1-10
Weight (kg)	7.3
Dimensions L*W*H (mm)	With angle: 402×160×300



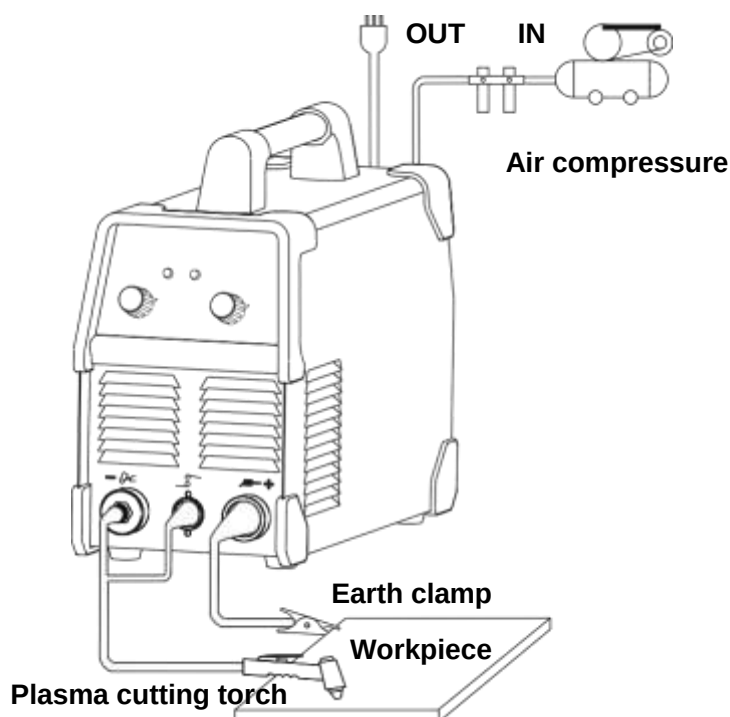
INSTALLATION INSTRUCTION

The plasma cutter is equipped with power voltage compensation equipment. When power voltage fluctuates between $\pm 15\%$ of rated voltage, it still can work normally.

When the machine is used with long cables, in order to prevent voltage from going down, bigger section cable is suggested. If cable is too long, it may affect the performance of the power system. So, we suggest you use configured length.

1. Make sure the intake of the machine not blocked or covered to avoid the malfunction of system.
2. Make sure the earth end of power interface has been reliably and independently grounded.
3. Use pressure-resisting air pipe to connect the air intake and compressed air source, and use hoop and other way to tighten the joint. Air source should supply suitable pressure, flow and be dry. If your air source does not meet the above requirements, you should consider using sole compressor of the right power and air-decompressing filter, in order to supply suitable pressure and eliminate the impurity and moisture in the air.

4. Install the air-electricity system plug to the socket in the panel and fix it clockwise. Air plug of the cutting torch and arc-keeping cable should be connected to relevant socket, and fix the screw.
5. Put the loop cable plug to the fastening socket, and tighten clockwise, another terminal holds the work piece.
6. According to input voltage grade, connect power supply box of relevant voltage grade. Make sure there is no mistake and make sure the voltage is different among permission rang.



7. Connect the cable as the picture shows, you can start cutting.

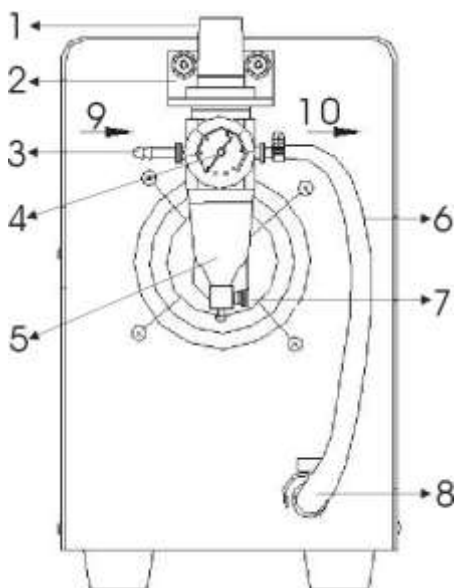
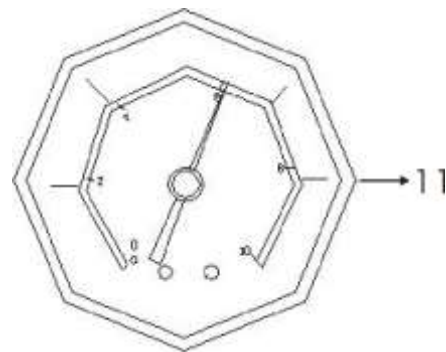
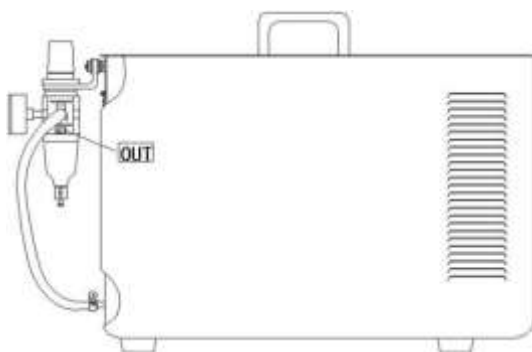
Related Parts Specification

Model		CUT 40CT
Rated current		20A
Cable	Input side	$\geq 4\text{mm}^2$
	Output side	$\geq 6\text{ mm}^2$
	Earth wire	$\geq 4\text{ mm}^2$
Cutting torch		Recommended specification $\geq 30\text{A}$

AIR REGULATOR INSTALLATION AND OPERATION

1. Firmly tight and seal the copper air hole at IN and OUT terminal by high pressure rubber tube firmly.
2. Tight and seal the meter with meter face rubber tube.
3. Fix the sheet holder with screw as the regulator position.
4. Get down the plastic screw and fix the regulator on the shelf.
5. Turn on the air valve, turn up the pressure adjusting knob, Turn the pressure to rated volume (meter inside shows Kgf/cm^2), and then put down the knob. (+ means increasing pressure, - means decreasing pressure.)
6. Scale of the meter is as follow. The volume in the picture is 4kgf/cm^2 .
7. If the water in the gas filtering bottle is too much, please turn on the water valve to let the water go out.

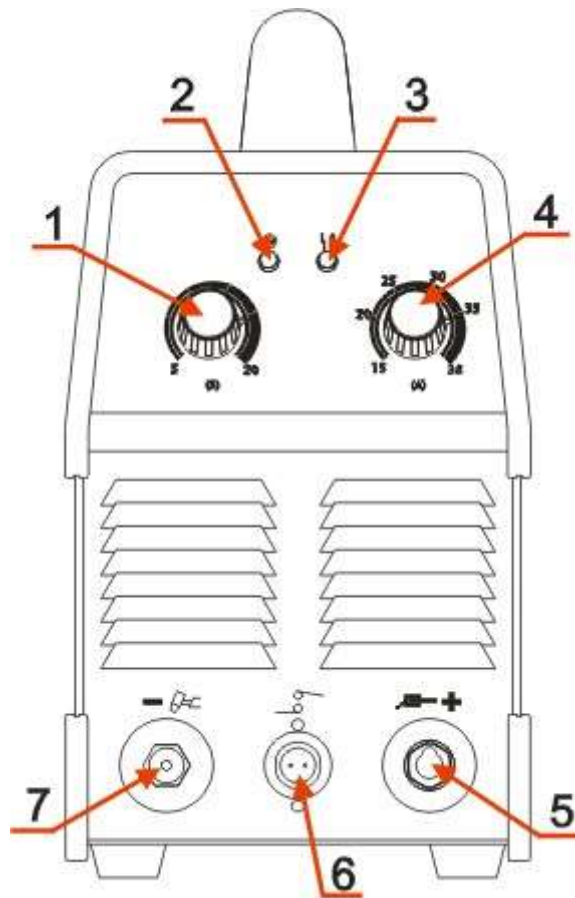
Regulator installation



1	Pressure adjustment knob
2	Sheet holder
3	Copper air mouth
4	Pressure meter
5	Air filtering bottle
6	Air pipe
7	Drain knob
8	Electromagnetic air-in
9	Air in
10	Air out
11	Pressure meter face



PANEL FUNCTION INSTRUCTION



1	Post gas adjusting knob
2	Power indicator
3	Abnormal indicator
4	Welding current adjusting knob
5	Positive output terminal
6	Plasma cutting torch switch socket
7	Negative output terminal

The panel picture above is for reference only. If any difference with the real machine, please follow with the real machine.



OPERATION INSTRUCTION

1. Turn on the power switch of front panel, make the power switch is in “on” position. At this time indicator of power switch is on.
2. Adjust the gas pressure to be adequate to machine, turn on the valve of pressed air.
3. Adjusting the cutting current according to the thickness and technology of the work piece.
4. Press the cut torch switch to start magnetic valve, the Plasma cutting torch nozzle will blow out plasma arc.



NOTES OR PREVENTIVE MEASURES

1. Environment

- 1) The machine can perform in environment where conditions are dry with a dampness level of max 90%.
- 2) Ambient temperature is between -10 to 40 degrees centigrade.
- 3) Avoid cutting in sunshine or drippings. Do not let water enter the gas.
- 4) Avoid cutting in dust area or the environment with corrosive gas.
- 5) Avoid gas cutting in the environment with strong airflow.

2. Safety norms

Our plasma cutting machine has installed protection circuit of over voltage, over current and over heat. When voltage, output current and temperature of machine are exceeding the rate standard, plasma cutting machine will stop working automatically. Because that will be damage to plasma cutting machine, user must pay attention to following.

1) **The working area is adequately ventilated !**

Our plasma cutting machine is powerful machine, when it is being operated, it generated by high currents, and natural wind can't be satisfied with machine cool demands. So, there is a fan in inter-machine to cool down machine. Make sure the intake is not in block or covered, it is 0.3 meter from plasma cutting machine to objects of environment. User should make sure the working area is adequately ventilated. It is important for the performance and the longevity of the machine.

2) **Do not over load !**

The operator should remember to watch the max duty current (Response to the selected duty cycle). Keep cutting current is not exceed max duty cycle current. Over-load current will damage and burn up machine.

If cutting time is exceeded duty cycle limited, plasma cutting machine will stop working for protection. Because machine is overheated, temperature control switch is on "ON" position and the indicator light is red. In this situation, you don't have to pull the plug, in order to let the fan, cool the machine. When the indicator light is off, and the temperature goes down to the standard range, it can cut again.

3) **No over voltage !**

Power voltage can be found in diagram of main technical data. Automatic compensation circuit of voltage will assure that cutting current keeps in allowable range. If power voltage is exceeding allowable range limited, it is damaged to components of machine. The operator should understand this situation and take preventive measures.



QUESTIONS TO BE RUN INTO DURING CUTTING

Fittings, cutting materials, environment factor, supply powers maybe have something to do with cutting. User must try to improve cutting environment.

A. Cutting surface is rough, poor cutting result.

The machine may be not well operated. You can check it as follow:

1. Make sure the compressed air supply has enough pressure which is not less than 0.3MPa (3Kg/cm^2), and its range is $\pm 0.05\text{Mpa}$.
2. Electrode and nozzle are not matched with current. Check as follow:

Current	10-30A	30-40A	60-100A
Nozzle	¢ 1.0mm	¢ 1.2mm	¢ 1.3mm

B. Arc-striking is difficult and easy to pause.

1. Make sure quality of tungsten electrode is high.
2. Cutting current is too small and air flow is too big. And if cooling effect is too strong, it will lead to arc pause.
3. Power net voltage is low and input cable is too long.

C. Output current is not up to the rated value.

When power voltage departs from the rated value, it will make the output current not matched with rated value; when voltage is lower than rated value, the max output may be also lower than rated value.

D. Current is not stabilizing when machine is being operated.

It has something to do with factors as following:

1. Electric wire net voltage has been changed.
2. There is harmful interference from electric wire net or other equipment.

E. Electrode or nozzle burnt often.

1. Current is too big or nozzle is too small.
2. Air pressure is low and cooling effect is weak and nozzle is too hot.

F. Arc cannot cut into the steel plate fully, or too much spatter.

1. Maybe the machine capacity cannot meet the demand of that thickness, please use bigger machine.
2. Electrode or nozzle is burnt, please change it.



For normal operation you should cut from the edge of the work piece, in this way you can protect the torch from damage by spatter conglutination.



MAINTENANCE



WARNING :

Power must be turned off for all checking and maintenance, before opening the housing, make sure the power plug is disconnected.

1. Remove dust by dry and clean compressed air regularly, if plasma cutting machine is operating in environment where is polluted with smokes and pollution air, the machine need removing dust every day.
2. Pressure of compressed air must be inside the reasonable arrangement in order to prevent damaging to small components of inter-machine.
3. Check inter circuit of plasma cutting machine regularly and make sure the cable circuit is connected correctly and connectors are connected tightly (especially insert connector and components). If scale and loose are found, please give a good polish to them, then connect them again tightly.
4. Avoid water and steam enter into inter-machine, if they enter into machine, please dry inter-machine then check insulation of machine.
5. If plasma cutting machine will not be operated long time, it must be put into packing box and store in dry environment.

NOTES BEFORE CHECKING



WARNING

Blind experiment and careless repair may lead to more problems and make formal check and repair more difficult. When the machine is electrified, the bared parts contain life-threatening voltage. Any direct and indirect touch will cause electric shock, and severe electric shock will lead to death.



NOTICE: In the period of guarantee maintenance, if user makes wrong check and repair for malfunction of plasma cutting machines without our permission, the free maintenance guarantee offered will be invalid



TROUBLESHOOTING AND FAULT FINDING



Notes: The following operations must be performed by qualified electricians with valid certifications. Before maintenance, please contact with us for professional suggestion.

Fault symptom and solutions

Faults	Solutions
Power indicator is not lit fan does not work and no welding output.	1. Power switch is out of work. 2. Check if electrify wire net (which is connected to input cable) is in work. 3. Check if input cable is out of circuit.
.Power indicator is lit ,fan does not work or revolve several circles ,no welding output	1. Maybe connect wrong to 380V power cause machine is in protection circuit connect to 220V power and operate machine again. 2. 220v power is not stable, (input cable is too slender) or input cable is connected to electrify wire net cause machine is in protection circuit. Add the section of cable and tighten input connector firmly. Close machine 2-3 minutes then open it again. 3. Open and close power switch constantly in short time cause machine is in protection circuit Close machine 2-3 minutes then open it again. 4. Cable s loosed from switch to power panel, tighten them again. 5. Main circuit 24V relay of power panel is not close or has damaged .Check 24V power source and relay .If relay has damaged replace it with same model.
Fan is working, Indicator is not lit and sound of HF arc-striking can not be heard ,wiping welding can not strike arc.	1. Positive and negative electrodes of VH-07 insert component voltage should be about DC308v from power panel to MOS board. 2. There is a green indicator in auxiliary power of MOS board, if it is not on, auxiliary power is out of work .Check fault spot and connect with seller. 3. Check if connector is poor contact. 4. Check control circuit and find out reasons or connect with seller. 5. Check if control cable of torch is broken.
Abnormal indicator is not on, sound of HF arc-striking can be heard, but there is no welding output.	1. Check if torch cable is broken. 2. Check if grounding cable is broken or not connected to welding piece. 3. Output terminal of positive electrode or torch electrify is loosed from inter-machine.



Abnormal indicator is not lit, sound of HF arc-striking can not be heard, wiping welding can strike arc.	1. Primary cable of arc-striking transformer is not connected to power panel firmly, tighten it again. 2. Arc-striking tip is oxidized or too far, give a good polish to it or change it is about 1 mm between arc-striking tip. 3. Switch (sticking/argon-arc welding) is damaged, replace it. 4. Some of HF arc-striking circuit components is damage, find out and replace it.
Abnormal indicator is lit.	1. Maybe it is overheated protection, please close machine first, then open the machine again after abnormal indicator is out. 2. Maybe it is overheated protection, wait for 2-3 minutes (argon-arc welding does not has overheated protection function) 3. Maybe inverter circuit is in fault, please pull up the supply power plug of main transformer which is on MOS board (VH-07 insert which is near the fan) then open the machine again. (1) If abnormal indicator is still lit ,close machine and pull up supply power plug of HF arc-striking power source (which is near the VN-07 insert of fan),then open machine : a. If abnormal indicator is still lit, some of field of MOS board is damaged, find out and replace it with same model. b. If abnormal indicator is not lit, rise transformer of HF arc-striking circuit is damaged, replace it. (2) If abnormal indicator is not lit, a. Maybe transformer of middle board is damage, measure inductance volume and Q volume of main transformer by inductance bridge ($L=0.9-1.6\text{mH}$ $Q>35$). If volume is too low, please replace it. b. Maybe secondary rectifier tube of transformer is damaged, find out faults and replace rectifier tube with same model. 4. Maybe feedback circuit is broken.
Output current is not stabilizing or out of potentiometer control and sometime is high, sometime is low.	1. 1K potentiometer is damage, replace it. 2. All kinds of connectors are poor connect, especial inserts etc. please check it.

If after checking and adjustment it still cannot work normally, please contact the local distributor or our service center.



CIRCUIT DIAGRAM

