CUT 100GT

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

Version YF-TAE-0071, A3, Released at 29th, Apr., 2019.

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

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.**
	✧ **Never stand in front of the swang equipment or under it, or it may fail and cause injury.**

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.

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 CO_2 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.

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.

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 appropriative 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 cannot meet the gas cylinder.

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

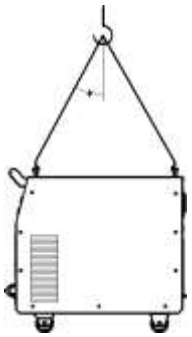
- Never use the machine when the enclosure is off.
- Install, operate, check and maintain the machine by professional person.
- Keep your fingers, hair, clothes etc. away from the switch parts such as the fan.

⚠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 φ15 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 body hurt.
~ 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（φ≤15°）

⚠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 cutting machines are rectifiers adopting the most advanced inverter technology, which can apply in plasma cutting system of using pressing air.

The development of inverter cutting equipment benefits from the development of the inverter power supply theory and components Inverter plasma cutting machine. Inverter current firstly commutates the working voltage of 50/60 Hz to Direct Current. (DC). Then inverter cutting power source utilizes high-power component IGBT to transfer 50/60Hz frequency up to 37KHz, then reduces the voltage and commutates, and exports high-power voltage via PWM technology, resulting in the great reduce of the main transformer's weight and volume and the efficiency increasing by 30%. Arc initiation system adopts HF surging theory. It is easy for arc initiation and has function for early feeding air and shutting air and its characteristics are arc stable, reliable, portable, and power saving and no electromagnetic noise, high speed of cutting, the glabrous shear-out and without polish.

Plasma Cutting Machine series can product the stronger, the more concentrated and the more stable arc. The arc is pressed fiercely by the quickly flowing air and the temperature can be up to 10000-16000 centigrade degree. That forms the electrolyte estate and then form strong plasma arc. It has the functions of arc initiation current, arc stop current, cutting current, basic value current, current ascending time, current descending time, post gas time, continuous adjustment. What's more, pulse frequency and pulse duty can also be adjusted independently. It has the characteristics of automatic control of arc initiation, arc stop and stable arc, which make the best result for shape and inner quality of the cutting surface. Its exclusive design is especially suitable for bicycle industry.

Compared with the others plasma cutting machine. The plasma cutting machine series are using the advanced electron circuit to supply the quick power and control it. Moreover, they have top-ranking cutting operation and the extremely high transfer efficiency.

The plasma cutting machine series can easily design into different cutting power, and the output current is constant and adjustable as well as excellent operation performance. In common situation its transfer efficiency is above 85%.

The machine is used widely; it is easier to design into plasma cutting machine with different dynamic characteristics. And it can cut stainless steel, carbon steel, copper and other color metal, and also can be used for traditional electric cutting.

Thanks for purchasing our products and hope for your precious advice. We will be dedicated to produce the best products and offer the best 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

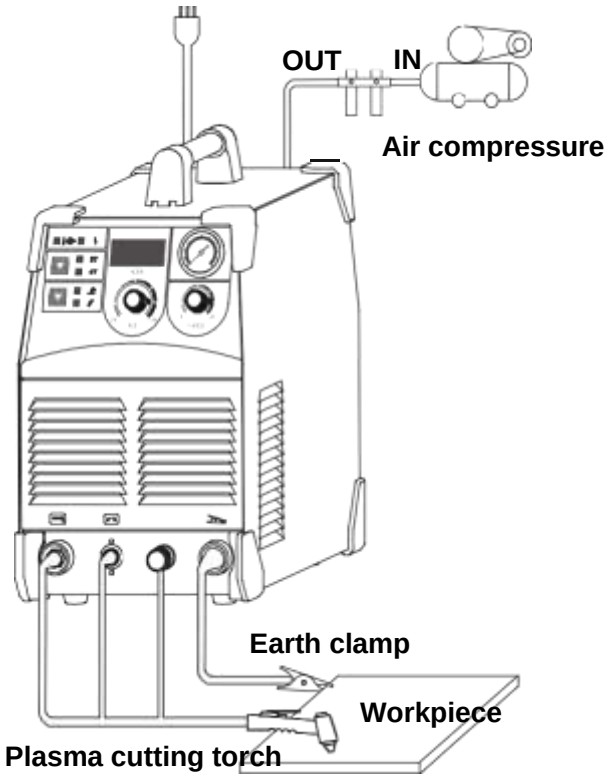
Model / Parameters	CUT 100GT	
Input voltage（V）	AC380V± 15%	AC415V ±15%
Frequency（Hz）	50/60	
Rate input current（A）	23	21
Rated power（KVA）	15.1	
No-load voltage（V）	300	328
Current Range（A）	20-100	
Rate output voltage（V）	120	
Duty cycle（%）	40	
Efficiency（%）	85	
Power factor	0.9	
Post flow time（S）	5-20	
Insulation Class	H	
Housing Protection Class	IP21	
Arcing Way	HF	
Pressure of air compressor (Kgf/cm^2)	4.5-5	
Limited cutting thickness（mm）	45	
Recommended cutting thickness（mm）	1-30	
Weight（kg）	25.6	
Dimensions L*W*H（mm）	526*272*468	

INSTALLATION INSTRUCTION

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

When the machine is used with long cables, in order to prevent voltage form 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.



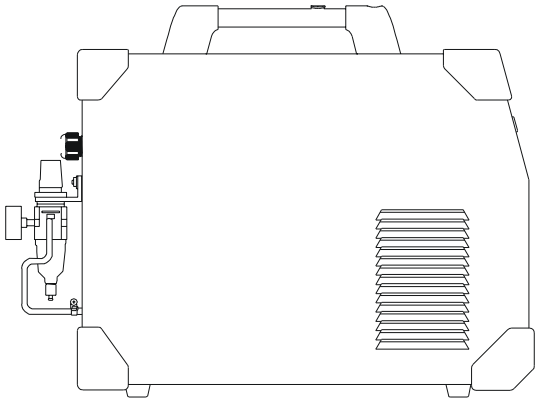
Related Parts Specification

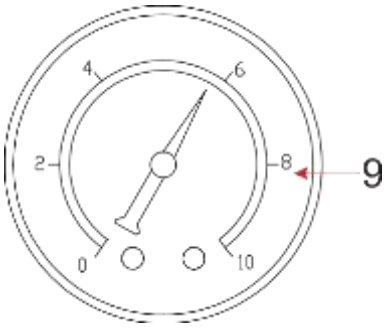
Model		CUT 100GT
Rated current		32 A
Cable	Input side	≥2.5 mm^2
	Output side	16 mm^2
	Earth wire	≥2.5 mm^2
Cutting torch		Recommended specification ≥100 A

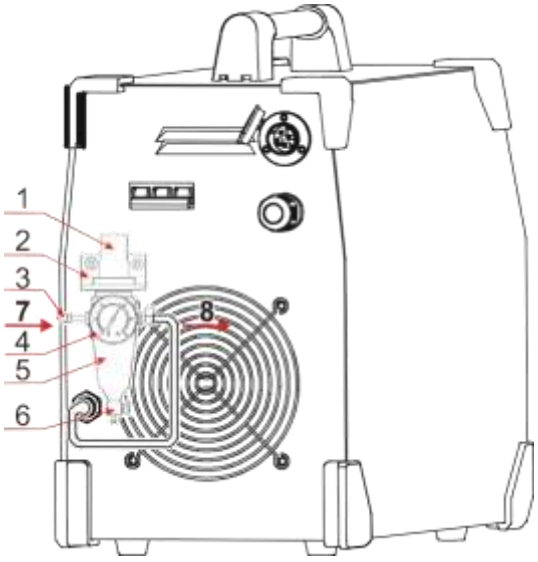
AIR REGULATOR INSTALLATION AND OPERATION

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 6kg.
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

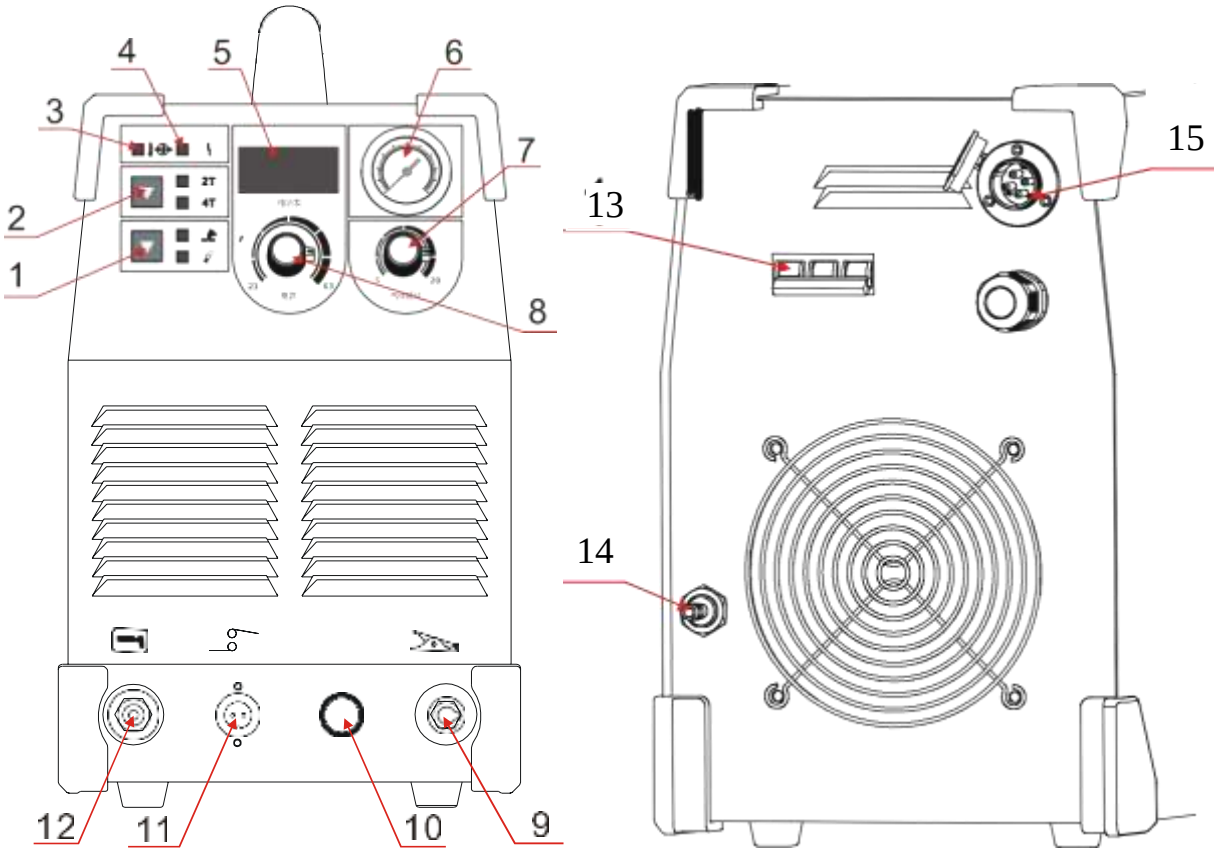






1	Pressure adjustment knob
2	Sheet holder
3	Copper air mouth
4	Pressure meter
5	Air filtering bottle
6	Drain knob
7	Air in
8	Air out
9	Pressure meter face

PANEL FUNCTION INSTRUCTION



1	Cut/air test change-over button	**9**	Positive output terminal
2	2T/4T change-over button	**10**	Pilot arc output terminal
3	Over-heat/low gas pressure/lose phase protect indicator	**11**	Plasma cutting torch switch socket
4	Over-current protect indicator	**12**	Negative output terminal
5	Current digital meter	**13**	Power switch
6	Pressure meter	**14**	Air in
7	Post gas adjusting knob	**15**	Digital control signal output terminal
8	Current adjustment knob		

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

PANEL FUNCTION INSTRUCTION

1、Cut/gas switch

 ：Cut normal cutting.

 ： Gas test used for power gun cable and gas pressure adjustment. When adjusting the gas pressure, the indicator lighting, then adjust the air reducing valve of the rear panel, the gas pressure meter of front panel w indicates the pressure.

2、2T/4T switch

2T：Press the button for cutting, release for stop.

4T： Press the button: start cutting, release and press again: continue cutting, release again, stop cutting. Suitable for digital control machine.

3、Over-heat/low gas pressure/lose phase protect indicator

Over-heat：When the temperature of power parts exceeds its limit,the indicator lighting for protection; and the machine stops. After cooling, return to normal.

Low gas pressure：When the indicated pressure below 2.5 kgf/cm2, the indicator lighting, machine stop. After the pressure became normal, machine return to normal.

Lose phase protection：When the input power lose phase the indicator lighting for protection, machine stops. And return to normal after the power became normal.

4、Pressure meter

Indicate the pressed air pressure, indicating range: 0-10kgf/cm2.

5、Post gas adjusting knob

Adjust the post gas time, adjusting range：5~20s

START AIR PLASMA CUTTING

1、Turn on the switch of the rear panel, power digital display lighting, fan starts for cooling.

2、Turn on the air valve or switch, press “cut/air test button, choose air testing, adjust the gas pressure and flow. Press “cut/air test” button again, return to cut.

3、Choose “2T/4T” function according to the cutting requirement.

4 、 Adjusting the current and post gas knob according to the thickness and technology of the work piece.

5 、 Press the cut torch switch to start magnetic valve, the Plasma cutting torch nozzle will blow out plasma arc.

6、PT31 cutting fun is recommended for contact arc start, when the current is 20-40A.

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.

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.

4） There is a grounding screw behind plasma cutting machine, with a grounding marker on it. Before operation, cutting crust must be grounded reliable with cable which section is over 6 square millimeters, in order to prevent from static electricity, and accidents because of electricity leaking.

5） 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.

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±0.05Mpa.
2. Electrode and nozzle are not matched with current. Check as follow:

Current	10-30A	30-60A	60-100A	100-160A
Nozzle	¢ 1.0mm	¢ 1.2mm	¢ 1.3mm	Φ1.5 mm

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
Meter cannot display, fan cannot run.	1. Make sure air switch is on. 2. Power source of input cable has electricity. 3. Make sure power source not lack of phase.
Meter is normal, fan is normal, Plasma cutting torch switch cannot work	1. Check if cable is loosen. 2. Control wire of gun broken or switch broken. 3. Control circuit is broken (Contact factory) 4. Confirm power lost phase or not.
Abnormal indicator is lit, meter is normal, fan is normal	1. High-pressure device is broken. 2. IGBT is broken. 3. Rectifier broken. 4. Control board is broken. 5. Feeding circuit broken (abnormal indicator lit), contact factory.
Meter is normal, fan is normally working, electromagnetic valve is abnormal, no arc output, abnormal indicator is not lit.	1. Arcing part has problem. 2. Electricity-releasing nozzle is too far away. 3. High-pressure device is broken. 4. Relay is broken. 5. Control circuit broken.
Air switch cannot close.	1. Air switch quality is poor. 2. Three phase rectifying bridge is broken. 3. Check if any short circuit inside.

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

CIRCUIT DIAGRAM