

User Manual

MODEL:PC-14/PA-14/PC-34

Foreword

Thank you for choosing our portable PC series- inverter air plasma cutting machine.

Before use portable PC Series Inverter Air Plasma Cutting Machine, please carefully read this Manual to ensure correct use. Incorrect use may lead to abnormal operation, failure and reduction of service life of PC Series Inverter Air Plasma Cutting Machine and even personal injury accidents. Therefore, you must carefully read this Manual and strictly follow it. This Manual is a standard Annex, which is must be properly kept after reading for overhauling and maintaining the Inverter Air Plasma Cutting Machine in future.

Except Operating Instructions stated herein, this Manual also provides the circuit diagram for your information. If you have any questions or special requirements on this products, please contact our local offices or distributors, you also can phone the Customer Service Center of our headquarters directly, we are at your service.

The contents of this Manual are subject to change without prior notice.

Before unpacking, please carefully read the following contents:

1. Whether the products are damaged, the spare parts are broken and fall off or main body is scratched during the transportation.
2. Whether the rated value stated on the nameplate of this machine is consistent with your ordering requirements, as well as the machine ordered, Product Certificate, User's Manual and Warranty are within the carton.

Our company has strict Quality Assurance System on the manufacturing and packaging of the

products, in case of any inspection omitted, please immediately contact our Company or your supplier to deal with it.



Warning

Without written permission, no reproduction, dissemination or use of this Manual and its related contents are allowed, or you'll be investigated for legal responsibility for any damages

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I. Product introduction

Portable PC series cutting machine are proven product with stable performance which is manufactured with advanced invert cutting technology. Its operating principle is that converts operating frequency of 50/60 Hz to direct current, then invert to high frequency at approximate 100 kHz, and performs voltage dropping and rectification by PWM and high power, and then output high power DC power for cutting by PWM. The weight and size of cutting machine has been reduced and with the efficiency improvement of more than 30% due to invert technology.

Main features:

- Gas source economy: take high pressure air as plasma gas source;
- High speed for cutting: the cutting speed has been improved approximate 2 times compared with traditional gas cutting;
- Sheet cutting is easier and faster. Arcing is easier;
- It is applicable to cut stainless steel, copper and aluminum etc;
- It is easy to control. Notch is flat and artistic;
- Advanced contact arcing cutting method.

II. Notice for Safety



IMPORTANT:

- Do not cut off power in order to prevent damage of machine during cutting.
- Turn off control switch for cutting torch in order to ensure disconnection of cutting torch and base metal to prevent burning by electric arc before cutting.
- It is necessary to install safety protection switch for electric leakage.
- The labor protection appliances must be approved by department of state administration of work safety supervision.
- Operator must be with effective qualification “Welding (gas cutting) operation for metal” for special operation.
- Do not perform operation with electricity for maintenance and repair of welding machine!

Electric shock – may cause serious injury!

- Install grounding device according to relevant requirements.
- Do not contact live component while skin is exposed, wearing with wet gloves or in wet clothes.
- Ensure the insulation among you, ground and work piece.
- Ensure your operating position is safe.

Flue gas – it is harmful to health!

- Keep head away from flue gas.
- Operator must use ventilation device or air extraction device to prevent breathing of flue gas while operate cutting machine.

Arc radiation – may damage your eyes and burn your skin!

- Wear appropriate mask, optical filter and protective cloth to protect your eyes and body.
- Protect observer by appropriate mask or curtain.

Fire – welding sparks may cause fire. Ensure there is no inflammable material approach to cutting area and keep safe.

Noise – excessive noise may damage your hearing.

- Protect your ears by ear muff or other hearing protective device.
- Warn observers that noise may damage their hearing.

Fault – seek professional service for fault.

- Troubleshoot according to relevant items of this manual while there are difficulties for installing and operating.
- If you still not understood after reading or not troubleshoot according to this manual, please contact your distributor or our service center for professional service immediately.

III. Main Technical Parameters

Model	PC-14	PA-14	PC-34
Input voltage	AC 110/220 V ± 10% 50/60Hz	AC 110/220 V ± 10% 50/60Hz	AC 110/220 V ± 10% 50/60Hz
No-load Voltage (V)	230	230	320
Output current range (A)	20-50	20-50	20-60
Rated output voltage (V)	96	98	104
Load succession rate (%)	30	30	30
Loss for no load (W)	40	40	40
Efficiency (%)	85	85	85
Power factor	0.93	0.93	0.93
Arcing method	Contact arcing	Non Contact arcing	Contact arcing
Recommended pressure for air compressor (MPa)	0.45	0.45	0.45
Insulation Level	F	F	F
Shell Protection Level	IP21S	IP21S	IP21S
Dimension (L×W×H)mm	375x155×295	375x155×295	375x155×295
Weight (kg)	8	8	9

IV. Installation and Operation



2T/4T:

2T is the normal/common cutting status, you need to KEEP pressing the torch when you cut the work piece, and release the torch when you finish the cutting.

4T is a semi-automatic status, means: you only need to press the torch ONE TIME when you cut the work piece, then you can just release your finger from the torch button, the unit can still keep cutting/working. It reduces the fatigue of the finger if you work on a long cutting job.

Connection diagram for cutting machine (Figure 1)

First use heavy cable to prevent voltage dropping while using main input cable. The resistance of main cable may obstruct voltage dropping of input cable and affect arcing and other systems.

4.1 Connection for input cable

1) Each machine is equipped with a power cable. Please select appropriate voltage according to

input voltage otherwise it may damage internal elements inside.

- 2) Ensure good connection between power switch or positive electrode and power cable to prevent oxidation and measure power value for cutting by voltmeter.

4.2 Connection for output cable (Figure 1)

2a Connection for cutting torch

Connect copper nut of cutting torch with conductive cable. And connect plug on cable clamp to terminals on front panel by screwing in clockwise (prevent air leakage).

2b Connection for switch on cutting torch

Connect plug of switch on cutting torch to switch and screwing the electrode in sequence, and then assemble nozzle.

2c Grounding cable

Connect one end of grounding cable to the plug under front panel with mark of plug and rotate in clockwise; the other end of grounding cable connects to work piece.

4.3 Installation and operation of air compressor (Figure 2 and Figure 3)

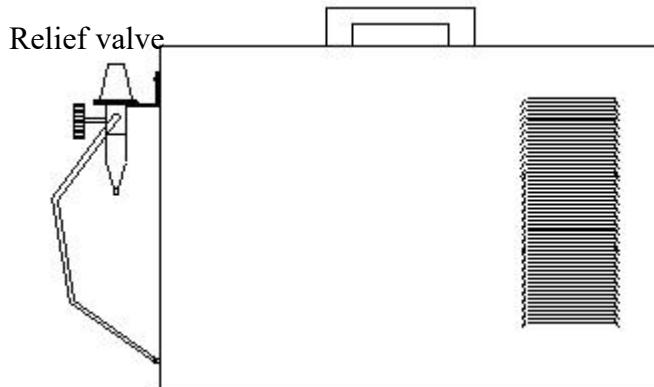


Figure 2

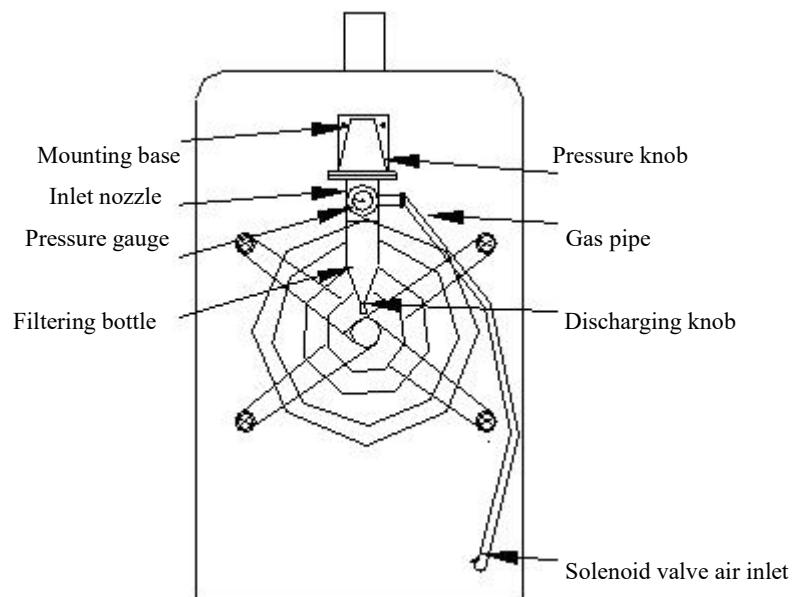


Figure 3

- 1) Apply sealant on the copper gas nozzle and set to position of IN and OUT.
- 2) Apply sealant on heading and then set it to the top.
- 3) Fix the joint frame in position by nut.
- 4) Unscrew nut and fix gas valve on joint frame. Adjust air pressure by pressure valve (“+” up, “-” down).
- 5) Press relief valve and air pressure of 4 kg will be displayed on heading.
- 6) Turn on discharging knob and turn it off after water is discharged completely if water in container is excessive.

4.4 Assembly instruction for cutting torch

- 1) Insert one end of electrode to cutting torch.
- 2) The other end of electrode connects with aviation socket.
- 3) One end of nozzle connects with electrode and the other end connects with protective casing.
- 4) Assemble into cutting torch and then screw it.

4.5 Main power switch

Control switch for cutting power and over current protection.

4.6 Indicator lamp for protection

Indicator lamp will be on due to high temperature caused by over voltage or current, and machine is in protection status. The operation will be normal after voltage or current is normal.

4.7 Current

Select cutting current according to thickness of work piece.

4.8 Indicator lamp for power

Display input voltage whether it is normal.

4.9 Connect integral plug for electric and gas with cutting torch.

4.10 Aviation socket: disconnect between cutting torch and aviation socket.

4.11 Base metal connects with positive electrode of cutting machine.

V. Preparation and Operation of Cutting

5.1 Preparation for plasma cutting machine.

- 1) Ensure cutting machine to be with reliable grounding.
- 2) Ensure connector to be with good connection.
- 3) Ensure voltage to be appropriate.
- 4) Ensure input cable and gas bottle to be without corrosion and damage.

5.2 Operating instruction for plasma cutting machine

- 1) On the front panel, turn the power switch to position of “ON”. Indicator lamp for power will be on and cooling fan is operating.
- 2) Turn on air valve or switch for controlling air and set the pressure and flow to rated value (refer to flow table).
- 3) Press switch on cutting torch to activate solenoid valve. You will hear sound of spark discharging caused by high frequency and see gas flow out of cutting torch. Do not aim to self or other personnel to prevent injury. (Nozzle of cutting torch will inject plasma arc for cutting machine with pilot arc).
- 4) Select appropriate cutting current according to thickness and technology requirement of work piece.
- 5) Maintain distance between nozzle and work piece at 1 to 2 mm. Press control switch on cutting torch, and then there is high frequency discharging between nozzle and work piece. The sparks caused by high frequency arc will disappear after arcing. Operator may cut work piece at this time.



Caution

Plasma cutting requires coordination between cutting current and air pressure to achieve optimum cutting performance and quality therefore adjust air pressure and flow repeat to achieve optimum cutting performance. Larger flow may enhance cooling effect and cause not arc or unstable arcing, however, smaller flow may cause overheating of nozzle and electrode to make them burn out.



Warning

Do not insert or draw cables or connectors while cutting machine is in operation, otherwise it may be harmful for personnel safety and damage machine. Cut off power first if it is necessary to do this.

VI. Routine maintenance and precautions



Warning

All maintenance must be performed while power is off. Open cover after remove power plug.

6.1 Maintenance

1. Purge inside by dry and clean compressed air regularly. Remove dust every month if cutting machine is operated in the environment of heavy smoke and serious air pollution. Above operations must be performed while power is off.
2. Pressure of compressed air should be not larger in order to prevent damage of elements inside. Above operations must be performed while power is off.
3. Check circuit connections inside regularly in order to ensure correct connection and firm connectors (especially for inserted connector or element). Remove rust and oxidation film by abrasive paper if they are rusty and looseness, and then reconnect and fix.
4. Prevent the ingress of water or water vapor for cutting machine. Dry it if there is water or water vapor. And then measure the insulation condition of cutting machine by megameter (including space between connecting points and space between connecting point and body shell). Perform cutting operation after ensure they are normal.
5. Store cutting machine in the original package and place it in dry condition if it is not used for long time.

ⓘ Cautions: Free maintenance assurance may be failure if customer repair any fault of cutting machine power by themselves without our authorization during warranty period

6.2 Precautions

1. Environment

- 1) Cutting operation must be preformed in a dry condition with air humidity of not greater than 90%.
- 2) Ambient temperature range between -10°C to 40°C
- 3) Do not operate cutting machine in sunshine or in the rain to prevent the ingress of water or rainwater.
- 4) Do not operate cutting machine in the environment with dust or corrosive gas.
- 5) Do not perform gas protective welding in the environment with strong air flow.

2. Keys to Safety

This cutting machine is equipped with protection circuits for over voltage, over current and over heating. System will shut down if network voltage, output current and inside temperature exceed setting value. Cutting machine will be normal after relevant phenomenon is normal. Indicator lamp for fault will be off and cutting machine is normal while cut off power and then turn

it on for over current condition. Excessive operation may damage cutting machine as well (e.g. voltage is higher), therefore you must be in accordance with following:

1) Good ventilation!

This cutting machine is small one. During the operation, nature ventilation may not meet the cooling requirements of cutting machine due to the larger current. In order to ensure good ventilation, operator must ensure air vent is not covered or blocked and the distance between cutting machine and surrounding objects should be not less than 0.3 meter. Above items are important for the operation and service life of cutting machine.

2) Do not overload!

Operator should observe the max. allowable load current (relative to load succession rate) and maintain cutting current not greater than max. allowable load current. Over current may shorten service life of cutting machine obviously or even burn it out.

3) Do not over voltage!

Power voltage listed in “main performance parameters list”. Generally, automatic compensation circuit in cutting machine may maintain rated output power required for normal operation. It may not meet the output power required if voltage is too low, however, it may damage cutting machine if power voltage exceeds power voltage. Operator must observe above condition and take proper preventive measures.

4) Each cutting machine is equipped with a grounding bolt behind machine and grounding mark. Select a cable with the section of not less than 4 mm² to discharge static electricity or prevent electric leakage for grounding of cutting machine before operating.

5) Cutting machine will enter into protection status and stop operating if it exceeds the standard load succession rate. It indicates that excessive heat activates the temperature control switch to stop operating of cutting machine, and red indicator lamp is on at front panel. During this condition, do not remove power plug and maintain cooling fan inside to operate to cool the power device. If yellow indicator lamp is off, it indicates that temperature is drop to normal range, system is back to normal.

VII. Troubleshooting

Schedule

Fault	Troubleshooting
Indicator lamp for power is off, fan is not operating and without cutting output	<ol style="list-style-type: none"> 1. Power switch is damaged 2. Ensure network connected with input cable is live or not. 3. Ensure input cable is open or not.
Indicator lamp for power is on, fan is not operating or operating for a while and without cutting output.	<ol style="list-style-type: none"> 1. Connect with 380 V power by mistake to cause it activate over voltage protection circuit. Reconnect with 220 V power and restart. 2. 220V power is unstable (input cable is too long) or connect with network to cause it activate over voltage protection circuit. Increase the diameter of input cable or joint for fixing input cable. Shut down and restart after 2 to 3 minutes. 3. Connect power switch for on and off in short time to cause it activate over voltage protection circuit. Shut down and restart after 2 to 3 minutes. 4. Wire between switch and power panel is looseness and fix them again. 5. 24 V relay in main circuit is not engaged or damaged. Check 24 V power and relay. Replace it by same model one if relay is damaged.
Fan is operating and indicator lamp for fault is off, without rustle caused by high frequency discharging. No arcing when struck.	<ol style="list-style-type: none"> 1. The voltage between positive and negative poles of VH-70 plug on MOS plate and power plate should be DV 308V measured by multimeter (CUT-50). 2. Auxiliary power is fault if the green indicator lamp for auxiliary power on MOS plate is off. Check fault point and contact distributor. 3. Check any poor contact for each wire. 4. Control circuit is fault. Check reason and contact distributor. 5. Control cable of cutting machine is broken.
Indicator lamp for fault is off and with rustle caused by high frequency discharging. No welding output.	<ol style="list-style-type: none"> 1. Cable of cutting machine is damaged. 2. Grounding cable is damaged or not connects with work piece to be welded. 3. Connections for positive output terminals or gas and electric output terminals of welding torch are looseness.
Indicator lamp for fault is off and with rustle caused by high frequency discharging. Arcing when struck.	<ol style="list-style-type: none"> 1. Poor contact between primary wire of arcing transformer and power plate. Refix it. 2. Discharge nozzle is oxidized or too long. Remove the surface oxidation film of discharge nozzle or adjust the distance of discharge nozzle to 1 mm. 3. Some elements of high frequency arcing circuit are damaged. Check and replace.

VII. Troubleshooting

<p>Indicator lamp for fault is on but without output.</p>	<ol style="list-style-type: none"> 1. Over current protection. Shut down and restart after indicator lamp for fault is off. 2. Overheating protection. Do not shut down and wait for 2 to 3 minutes. 3. Inverter circuit is fault. Remove power plug for main transformer on MOS plate (close to fan VH-07 inserter) and restart. 1) Indicator lamp for fault is still on. Shut down and remove high frequency arcing power plug (close to fan VH-03 inserter) and restart. <ol style="list-style-type: none"> a. Indicator lamp for fault is on due to some field effect transistors on MOS plate are damaged. Check and replace the same type field effect transistor. b. Indicator lamp for fault is off due to step up transformer of high frequency arcing circuit is damaged and need to be replaced. 2) Indicator lamp for fault is off. <ol style="list-style-type: none"> a. Medium transformer is damaged. Measure the primary inductance and Q value of transformer by electric bridge. b. Some transformer secondary rectifying tubes are penetrated. Check and replace by same type. 4. Feedback circuit is opened.
<p>Output current is unstable or not controlled by potentiometer during cutting.</p>	<ol style="list-style-type: none"> 1. The current potentiometer on panel (1K/2W) is damaged and need to be replaced. 2. Check poor contact for each connection especially for connector etc.

