OPERATOR'S MANUAL

CUT 40 COM PLASMA CUTTER

Part No. **9129H**

IMPORTANT

Read this Operator's Manual completely before attempting to use this equipment.

Save this manual and keep it handy for quick reference.

Pay particular attention to the safety instructions we have provided for your protection.

Contact your distributor if you do not fully understand this manual.

CONTENT

§1 SAFETY

Notice: **The instructions are for reference only. The manufacturer reserves the right to explain the differences between the description and the product due to product changes and upgrades!**

Important Safety Precautions

OPERATION AND MAINTENANCE OF PLASMA ARC EQUIPMENT CAN BE DANGEROUS AND HAZ- ARDOUS TO YOUR HEALTH.

Plasma arc cutting produces intense electric and magnetic emissions that may interfere with the proper function of cardiac pacemakers, hearing aids, or other electronic health equipment. Persons who work near plasma arc cutting applications should consult their medical health professional and the manufacturer of the health equipment to deter- mine whether a hazard exists.

To prevent possible injury, read, understand and follow all warnings, safety precautions and instructions before using the equipment.

GASES AND FUMES

Gases and fumes produced during the plasma cutting process can be dangerous and hazardous to your health.

- Keep all fumes and gases from the breathing area. Keep your head out of the cutting fume plume.
- Use an air-supplied respirator if ventilation is not adequate to remove all fumes and gases.
- The kinds of fumes and gases from the plasma arc depend on the kind of metal being used, coatings on the metal, and the different processes. You must be very careful when cutting or cutting any metals which may contain one or more of the following:

Antimo	Chromiu	Mercury	Berylliu
Arseni	Cobalt	Nickel	Lead
Barium	Copper	Seleniu	Silver

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Always read the Material Safety Data Sheets (MSDS) that should be supplied with the material you are using.

These MSDSs will give you the information regarding the kind and amount of fumes and gases that may be dangerous to your health.

- Use special equipment, such as water or down draft cutting tables, to capture fumes and gases.
- Do not use the plasma torch in an area where combustible or explosive gases or materials are located.
- Phosgene, a toxic gas, is generated from the vapors of chlorinated solvents and cleansers. Remove all sources of these vapors.

ELECTRIC SHOCK

Electric Shock can injure or kill. The plasma arc process uses and produces high voltage electrical energy. This electric energy can cause severe or fatal shock to the operator or others in the workplace.

- Never touch any parts that are electrically “live” or “hot.”
- Wear dry gloves and clothing. Insulate yourself from the work piece or other parts of the cutting circuit.
- Repair or replace all worn or damaged parts.
- Extra care must be taken when the workplace is moist or damp.
- Disconnect power source before performing any service or repairs.
- Read and follow all the instructions in the Operating Manual.

FIRE AND EXPLOSION

Fire and explosion can be caused by hot slag, sparks, or the plasma arc.

- Be sure there is no combustible or flammable material in the workplace. Any material that cannot be removed must be protected.
- Ventilate all flammable or explosive vapors from the workplace.
- Do not cut or weld on containers that may have held combustibles.
- Provide a fire watch when working in an area where fire hazards may exist.
- Hydrogen gas may be formed and trapped under aluminum workpieces when they

are cut underwater or while using a water table. DO NOT cut aluminum alloys underwater or on a water table unless the hydrogen gas can be eliminated or dissipated. Trapped hydrogen gas that is ignited will cause an explosion.

NOISE

Noise can cause permanent hearing loss. Plasma arc processes can cause noise levels to exceed safe limits. You must protect your ears from loud noise to prevent permanent loss of hearing.

- To protect your hearing from loud noise, wear protective ear plugs and/or ear muffs. Protect others in the workplace.
- Noise levels should be measured to be sure the decibels (sound) do not exceed safe levels.

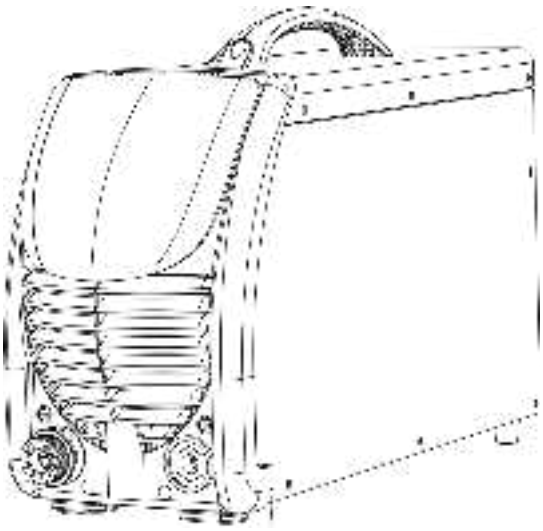
PLASMA ARC RAYS

Plasma Arc Rays can injure your eyes and burn your skin. The plasma arc process produces very bright ultra violet and infrared light. These arc rays will damage your eyes and burn your skin if you are not properly protected.

- To protect your eyes, always wear a cutting helmet or shield. Also always wear safety glasses with side shields, goggles or other protective eye wear.
- Wear cutting gloves and suitable clothing to protect your skin from the arc rays and sparks.
- Keep helmet and safety glasses in good condition. Replace lenses when cracked, chipped or dirty.
- Protect others in the work area from the arc rays. Use protective booths, screens or shields.

§2 Technology Parameters

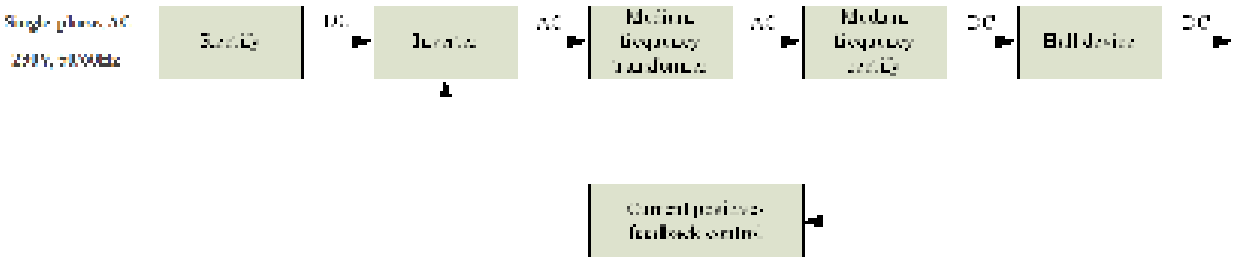
§2.1 Features



1. IGBT parallel balanced current technology and digital control technology.
2. EMI filter restrains the EMI transmission of the power.
3. Pilot Arc Controller increases cutting capabilities and speeds, and improves tip life. So it can be applied to cut netlike workpiece.
4. Various protective and alarm functions over-temperature and over-current allow faster troubleshooting, eliminating unnecessary downtime.
5. Back striking tip and electrode ensure the velocity of striking and the quality of arc, and extend the life of them.
6. Machine built-in air pump to provide gas for cutting operation.

§2.2 Working principle of main circuit

The working principle of CUT series of Air Plasma Cutting machines is shown as the following figure. Single-phase 230V work frequency AC is rectified into DC, then it is converted to medium frequency AC by inverter device (discrete IGBT), after reducing voltage by medium transformer (the main transformer) and rectified by medium frequency rectifier (fast recovery diode), and is outputted by inductance filtering. The circuit adopts current feedback control technology to insure current output stably. Meanwhile, the cutting current parameter can be adjusted continuously and steplessly to meet with the requirements of cutting craft.



§2.3 Parameters

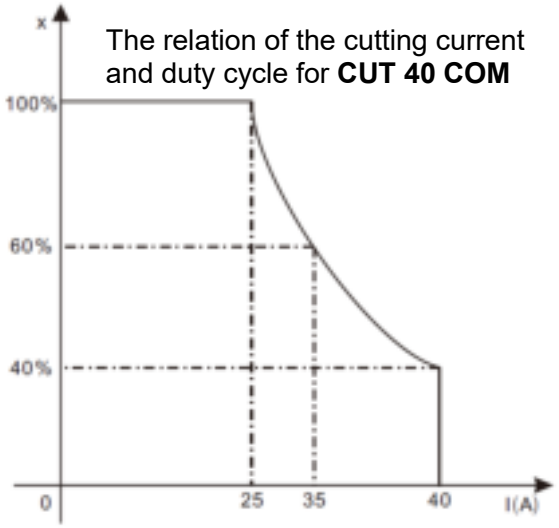
Parameters \ Models		CUT 40 COM
Input power (V)		1-phase, 230±10%
Frequency (Hz)		50/60
Rated input current (A)		31.5
Rated input power (kVA)		7.22
Adjustment range of current (A)		20～40
Max no-load voltage (V)		375
Duty cycle (40℃, 10 minutes)		40% 40A 60% 35A 100% 25A
Severance cut for Carbon Steel (MM)		≤18
Production cut (MM)	Carbon Steel	≤14
	Stainless Steel	≤14
	Aluminum	≤14
	Copper	≤5
Net Weight (kg)		14.5
Dimensions (MM)		480*200*360
Circuit breaker		JD03-A1 30A
Protection Class		IP21S
Cooling		AF

Note: The above parameters are subject to change with the improvement of machines.

§2.4 Duty Cycle and Over-heat

The letter “X” stands for Duty Cycle, which is defined as the portion of the time a cutting machine can cut at maximum rated output current within a 10-minute cycle.

If the cutting machine is operated beyond the rated duty-cycle, the IGBT heat sensor will send a signal to the cutting machine control unit to switch the output cutting current OFF and light the over-heat. The machine should not be operated for 10~15 minutes to allow cool down. When operating the machine again, the cutting output current should be reduced to match the duty cycle.



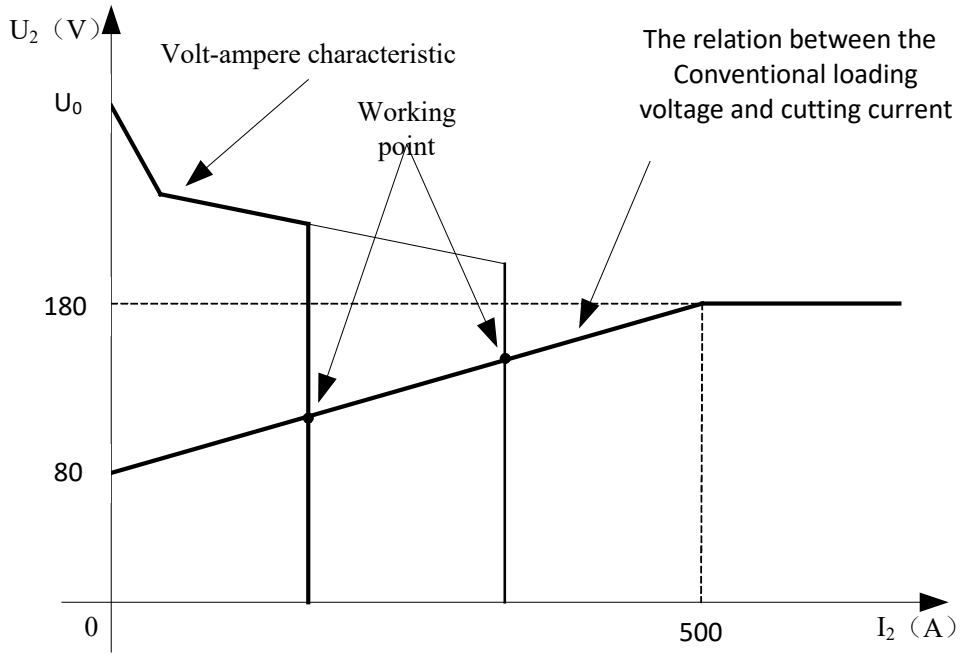
The relation of the cutting current and duty cycle for **CUT 40 COM**

§2.5 Volt-Ampere Characteristic

CUT series of Air Plasma Cutting machines has excellent volt-ampere characteristic. Referring to the following graph. The relation between the rated loading voltage U_2 and welding current I_2 is as follows:

When $I_2 \leq 600A$，$U_2 = 80 + 0.4\ I_2$（V）；When $165A < I_2 \leq 500A$，$U_2 = 130 + 0.1\ I_2$（V）；

When $I_2 > 500A$，$U_2 = 180$（V）.



§3 Installation

§3.1 Unpacking

Use the packing lists to identify and account for each item.

1. Inspect each item for possible shipping damage. If damage is evident, contact your distributor and/or shipping company before proceeding with the installation.
2. When using forklift, its arm length must be long enough to reach the outside so as to ensure lifting safely.
3. The movement may bring the potential danger or substantive hazard, so please make sure that the machine is on the safe position before using.

§3.2 Input Power Connections

1. Check your power source for correct voltage before plugging in or connecting the unit
2. Power cord and plug

   This power supply includes an input power cord and plug suitable for 220V AC, 1-phase input power.
3. If the power supply voltage continually goes beyond the range of safe work voltage range, it will shorten the welder life-span. The following measures can be used:

- Change the power supply input. Such as, connect the welder with the stable power supply voltage of distributor;
- Reduce the machines using power supply in the same time;
- Set the voltage stabilization device in the front of power cable input.

§3.3 Gas Connections

A. Connecting Gas Supply to Unit

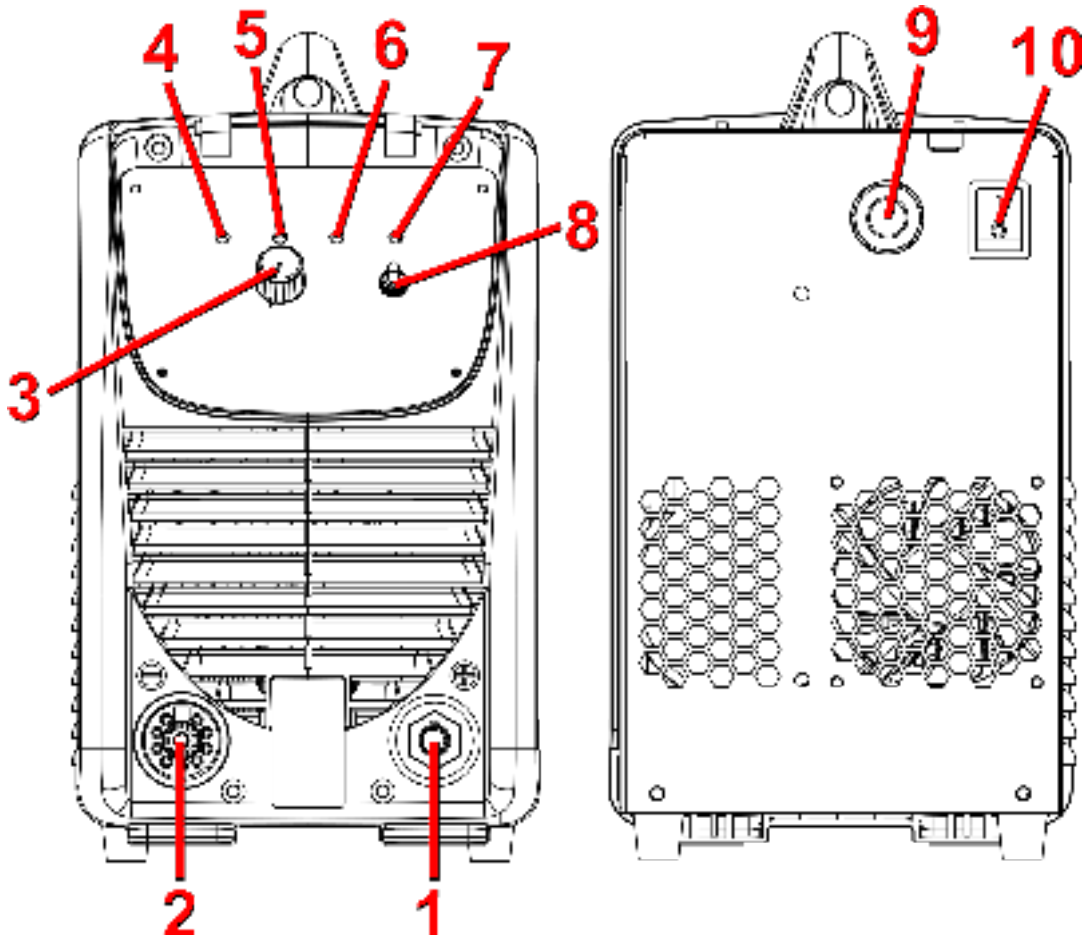
Connect the gas line to the inlet port of the gas filter on the rear panel.

B. Check Air Quality

To test the quality of air, put the RUN/SET switch in the SET (down) position, check if there is any oil or moisture in the air.

§4 Operation

§4.1 Layout Of The Front And Rear Panel



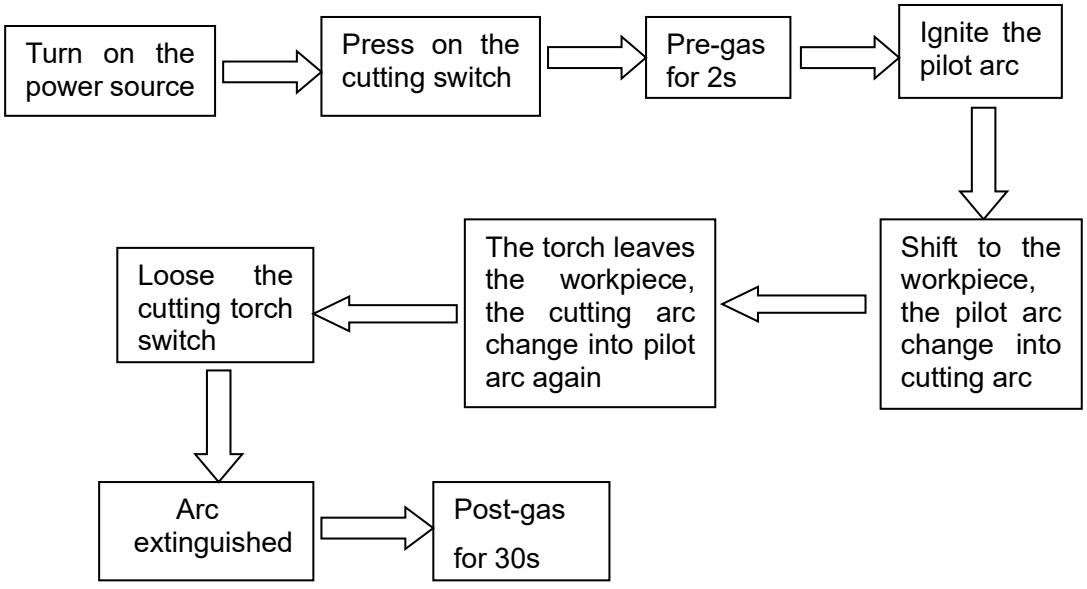
1. **Positive output cable**: Connected to the workpiece.
2. **Cutting gun connection**: Connect with the cutting gun.
3. **Cutting current regulator**: It is used to regulate the current when cutting.
4. **Power indicator**: Turn on power, the indicator light.
5. **Alarm indicator**: When over-heat, over-current, the indicator will light.
6. **Cutting gun improper installation and air pressure low alarm**:
   (1) When short circuit occurred between the electrode and the nozzle for abnormal reasons, the lamp on, air feeds intermittently.
   (2) When cutting gun with no electrode and nozzle installed, the lamp on, air feeds intermittently.
   (3) When the Shield Cup is not installed, the lamp flashes.
   (4) When the air low, the lamp on.
7. **Voltage pilot indicator**: Turn on the switch of the cutting gun, generate the voltage, the indicator light.

8. **RUN/SET**: When cutting the workpiece, turn to the “RUN”; when doing gas test, turn to the “SET”.
9. **Power cable**: Connected to the appreciate power supply.
10. **Power switch**: Turn on or off the power source.

§4.2 Cutting Preparation

1) Tightly connect the power cable to electrical socket outlet (the input voltage, refer to the section 2 technology parameters).
2) To connect the earth cable to the workpiece.
3) Turn on the power switch, the power indicator on.
4) Turn the RUN/SET switch to SET gear, the air flow, then regulate the air pressure to 3.5-6 bar.
5) Turn the RUN/SET switch to RUN gear, regulate the current after the flow stops.
6) Now all the preparation done.

§4.3 Cutting Operation



Note:

(1) The alarm lamp on when cutting, it is needed to loose the switch of the torch until the alarm release, then press on the switch to start cutting again.

(2) In the automatic gas test and examine, press on the cutting torch, there will no reflection.

(3) After a long usage, the surface of the electrode and nozzle will have oxidation reaction. Please replace the electrode and nozzle, for the alarm lamp will on when

install the shield cup, and stop working.

(4) It is forbidden to take down the fittings of the cutting indicator when the trigger is pressed.

(5) Among the period of post gas, if you press the trigger for a long time, the arc restars; if you press and loosen the trigger quickly, the gas stops, after it you can press the trigger for a long time to restart the machine as well.

2. Account for the alarm indicator:

1) When the machine appears over-heat or over-current, the yellow indicator (lamp 5) on the front panel will be on continually.
   a) Over-heat: The alarm will release after the period of fan cooling. You can restart the machine.
   b) Over-current: The alarm is beyond retrieve. You must ask the qualified technician to check the machine.
2) When any of the torch parts (include Tip, electrode, shield cup and gas distributor) isn't installed, the red indicator (lamp 6) glitters.
3) When the air pressure is too lower, the indicator (lamp 6) will on continually.
4) When the gas distributor is un-installed only, there is not alarm while operating the machine, and when you press the trigger, there is no arc and no load as well. Open the torch and check it.

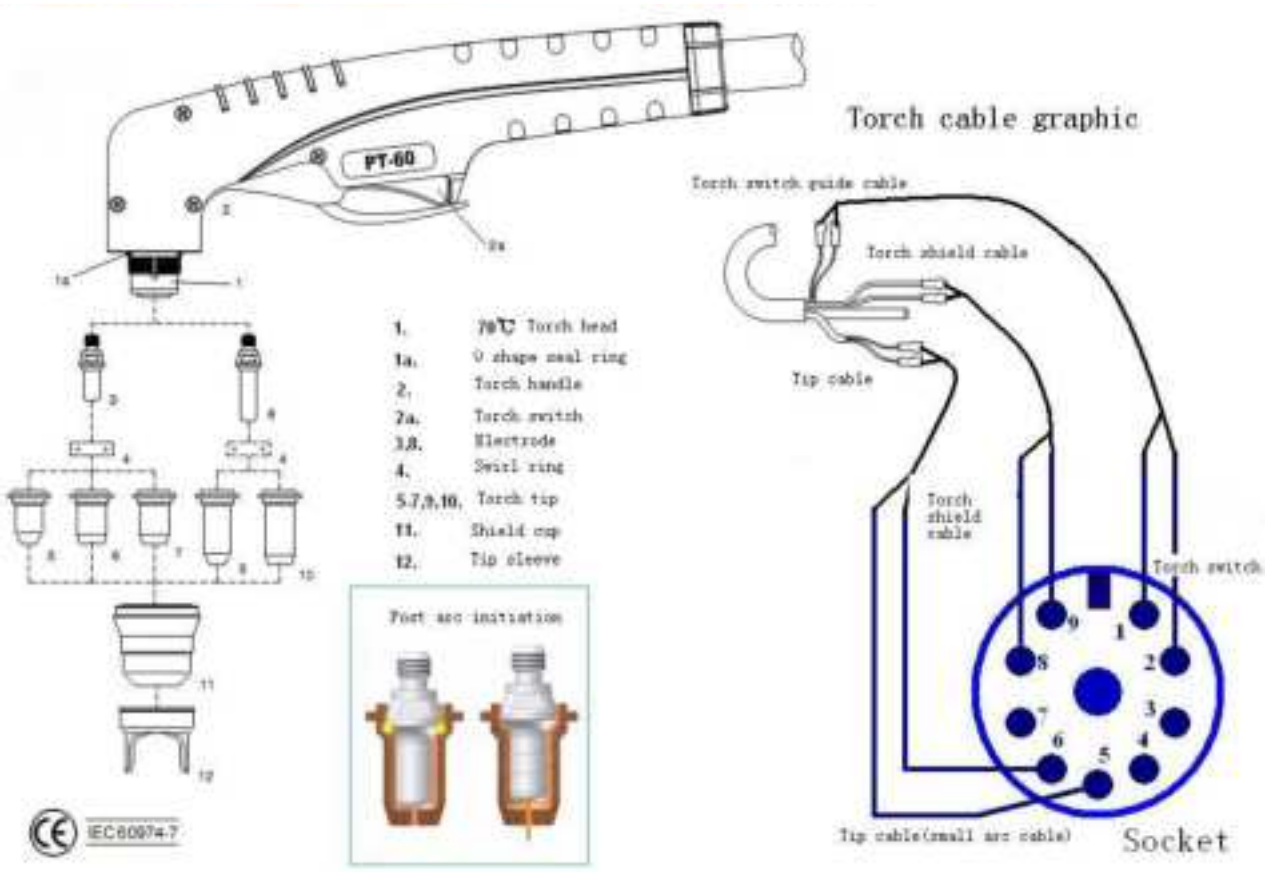
§5 Maintenance

§5.1 Cutting gun maintenance

Warning:

1. Check the consumable parts for damage, if worn, replace it.
2. Turn off the power source before check or remove cutting gun parts

Note: When operating the torch in a normal condition, a small amount of gas vents through the gap between the shield cup and the torch handle, do not attempt to over tighten the shield cup as irreparable damage to internal components may result.



§5.2 Troubleshooting principle

WARNING

There are extremely dangerous voltage and power levels present inside this unit. Do not attempt to diagnose or repair unless you have had training in power electronics measurement and troubleshooting techniques.

C. Power lamp and temperature lamp on.

1. Air flow blocked, check for blocked air flow around the unit and correct condition.
2. Fan blocked, check and correct condition.
3. Unit is overheated, let unit cool down for at least 5 minutes. Make sure the unit has not been operated beyond duty cycle limit, refer to parameters in Section 2.
4. Faulty components in unit, return for repair or have qualified technician repair per Service Manual.

B. Torch fails to ignite the arc when torch switch is activated

1. System is in SET mode, change to RUN mode.
2. Faulty torch parts, inspect torch parts and replace if necessary.
3. Gas pressure too high or too low, adjust to proper pressure.
4. Faulty components in unit, return for repair or have qualified technician repair per Service Manual.

C. No cutting output; Torch activated, power source on; Gas flows; Fan operates.

1. Torch not properly connected to power supply, check that torch leads are properly connected to power supply.
2. Work cable not connected to work piece, or connection is poor, make sure that work cable has a proper connection to a clean, dry area of the workpiece.
3. Faulty components in unit, return for repair or have qualified technician repair per Service Manual.
4. Faulty Torch, return for repair or have qualified technician repair.

D. Low cutting output.

1. Incorrect setting of CURRENT (A) control, check and adjust to proper setting.
2. Faulty components in unit, return for repair or have qualified technician repair.

E. Difficult Starting.

Worn torch parts (consumables), shut off input power. Remove and inspect torch shield cup, tip and electrode. Replace electrode or tip if worn; replace shield cup if excessive spatter adheres to it.

F. Arc shuts off during operation; arc will not restart when torch switch is activated.

1. Power Supply is overheated, let unit cool down for at least 5 minutes. Make sure the unit has not been operated beyond duty cycle limit. Refer to section 2 for duty cycle specifications.
2. Gas pressure too low, check source for at least 4 bar/ 60 psi; adjust as needed. It is need to open the machine cover.
3. Torch consumables worn, check torch shield cup, tip, starter element, and electrode; replace asneeded.
4. Faulty components in unit:, return for repair or have qualified technician repair per Service Manual.

G. No gas flow; The power lamp on; Fan operates.

Gas not connected or pressure too low, check gas connections. Adjust gas pressure to proper setting.

H. Torch cuts but low quality.

1. Current (A) control set too low, increase current setting.
2. Torch is being moved too fast across workpiece, reduce cutting speed.
3. Excessive oil or moisture in torch, hold torch 1/8 inch (3 mm) from clean surface while purging and observe oil or moisture buildup (do not activate torch). If there are contaminants in the gas, additional filtering may be needed.