

Stealth

DIGI-CUT 60-1

Part No. 9031H

OPERATOR'S MANUAL



SWP

IMPORTANT

Read this Owner'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 provided for your protection. Contact your distributor if you do not fully understand this manual.

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1 SAFETY



OPERATION AND MAINTENANCE OF PLASMA ARC EQUIPMENT CAN BE DANGEROUS AND HAZARDOUS 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 determine 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 types of fumes and gases from the plasma arc depend on the kind of metal being used, metal coatings, and the different processes. You must be very careful when cutting any metals which may contain one or more of the following:

Antimony	Chromium	Mercury	Beryllium
Arsenic	Cobalt	Nickel	Lead
Barium	Copper	Selenium	Silver
Cadmium	Manganese	Vanadium	

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

These MSDS 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 vapours of chlorinated solvents and cleansers. Remove all sources of these vapours.



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 vapours from the workplace.
- Do not cut or weld on containers that may have held combustibles.
- Provide a fire extinguisher when working in an area where fire hazards may exist.
- Hydrogen gas may be formed and trapped under aluminium 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 infra red 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 TECHNICAL INFORMATION

2.1 Main circuit functions

The working principle of DIGI-CUT 60 is shown as the following figure. Three-phase 380V work frequency AC is rectified into DC (about 530V), then it is converted to medium frequency AC (about 20 KHz) by the inverter device (discrete IGBT). The voltage is reduced via the medium transformer and rectified by the medium frequency rectifier (fast recovery diode) then outputted by inductance filtering. The circuit adopts current feedback control technology to ensure the current output is stable. The cutting current parameter can be adjusted continuously to meet with the requirements of cutting.

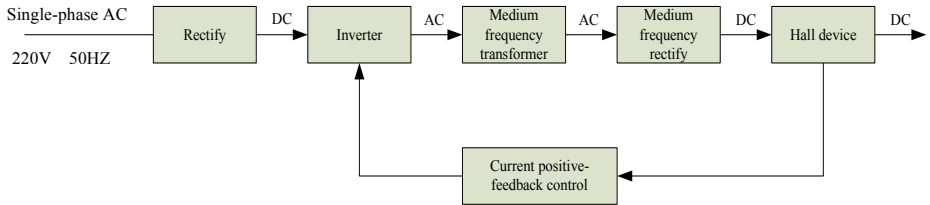


Fig. 2.1 Working principle diagram

DIGI-CUT 60		
Power Supply Voltage (V)	1-230V±10%	
Frequency Hz	50/60	
Rated input current (A)	41	
Rated input power (Kw)	7.1	
Adjustment range of current (A)	20~60	
Max no-load voltage (V)	400	
Duty cycle (40°C / 10 minutes)	95% 60A 100% 58A	
Severance Cut for Carbon Steel (mm)	≤35	
Optimal cutting thickness (mm)	Carbon Steel	≤25
	Stainless Steel	≤25
	Aluminium	≤20
	Copper	≤14
Dimensions (mm) L x W x H	640 x 240 x 445	
Protection class	IP23	
Insulation class	H	
Net weight (Kg)	23	
Cooling method	AF	

Table 2.1 Technical information

2.2 Features

- 2.3.1 IGBT parallel balanced current technology and digital control technology.
- 2.3.2 Wider input voltage flexibility provides peak performance power under variable conditions (±15%) for steady cuts.
- 2.3.3 EMI filter restrains the EMI transmission of the power.
- 2.3.4 Starts without high-frequency so it will not interfere with controls or computers.
- 2.3.5 Pilot Arc Controller increases cutting capabilities and speeds, and improves tip life.
- 2.3.6 Various protective and alarm functions over-temperature and over-current allow faster troubleshooting and eliminates unnecessary downtime.
- 2.3.7 Back striking tip and electrode ensure velocity of striking and quality of arc for prolonged usage.

3 INSTALLATION

3.1 Unpacking

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

- 3.1.1 Inspect each item for possible shipping damage. If damage is evident, contact your distributor and / or shipping company before proceeding with the installation.
- 3.1.2 When using a forklift, its arm length must be long enough to reach the outside so as to ensure safe lifting.
- 3.1.3 The movement may cause potential danger or substantive hazard. Make sure the machine is in a safe position before using.

3.2 Input Power Connections

Supply input connection of CUT 60 power is shown as the Fig

- 3.2.1 Check your power source for correct voltage before plug in or connecting the unit
- 3.2.2 Power Cord and Plug. This power supply includes an input power cord and plug suitable for 220V AC 1 – Phase input power.
- 3.2.3 If the power supply voltage continually goes beyond the range of safe work voltage range, it will shorten the machine’s life-span. The following measures can be used:
 - Change the power supply input, eg. connect the machine with the stable power supply voltage of distributor.
 - Reduce the machine’s power supply at the same time.
 - Set the voltage stabilisation device in the front of power cable input.

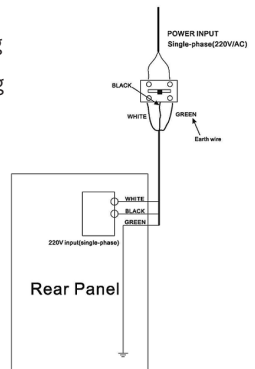


Fig. 3.1 Correct method of main supply

3.3 Gas Connections

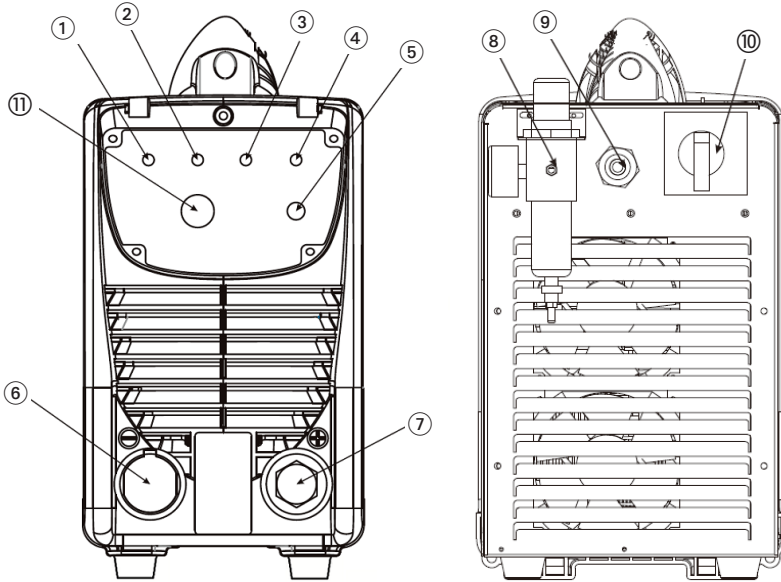
3.3.1 Connecting Gas Supply to Unit

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

3.3.2 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 CONTROL AND CONNECTORS

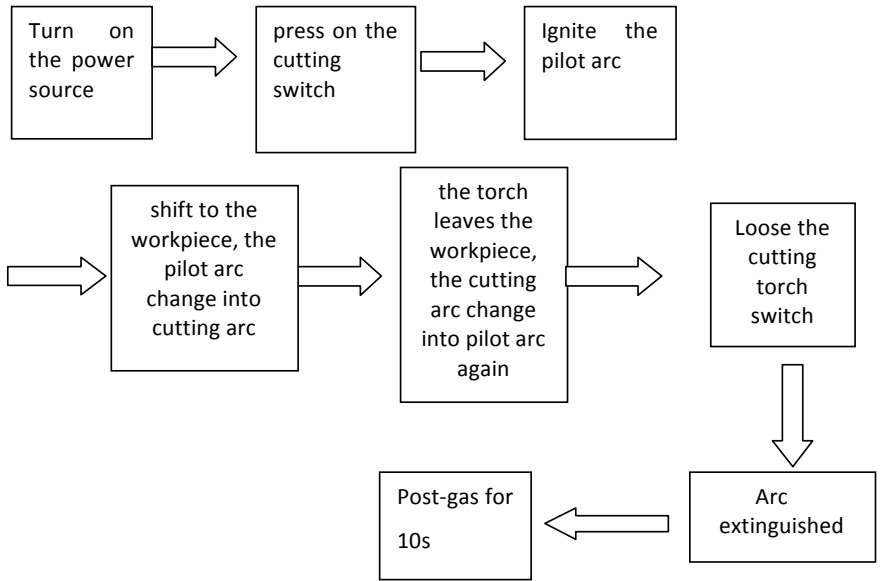


1. **POWER PILOT LAMP** – Lit when power is on
2. **ALARM PILOT LAMP** – When lit, the protection of the machine has been activated
3. **CUTTING GUN INCORRECT INSTALLATION AND AIR PRESSURE LOW ALARM**
 - (a) When a sudden short circuit occurs between the electrode and the nozzle, the lamp is lit and air pulses
 - (b) When the cutting gun has no electrode or cutting tip in place, the air pulses
 - (c) Lamp flashes when no shield cup in place
 - (d) When the air pressure is low, lamp is lit
4. **READY (DC INDICATOR)** – Lamp is lit when DC output is present
5. **RUN/SET SWITCH**
6. **CUTTING GUN CONNECTION**
7. **POSITIVE OUTPUT CONNECTION** – For connection of earth return lead
8. **AIR REGULATOR**
9. **MAINS CABLE**
10. **ON/OFF SWITCH**
11. **CUTTING CURRENT REGULATOR**

4.1 Cutting Preparation

- 4.2.1 Tightly connect the power cable to an electrical socket outlet (refer to the Input Voltage in section 2 Technology Parameters).
- 4.2.2 Connect the air pipe to the air supply equipment and the earth cable to the workpiece.
- 4.2.3 Turn on the power switch, the power source lamp is lit.
- 4.2.4 Turn the RUN/SET switch to SET position – the air flows, Regulate the air pressure to 3.5-6.0 bar
- 4.2.5 Turn the RUN/SET switch to RUN position. Regulate the current after the flow stops.
- 4.2.6 Preparation is complete.

4.2 Cutting Operation

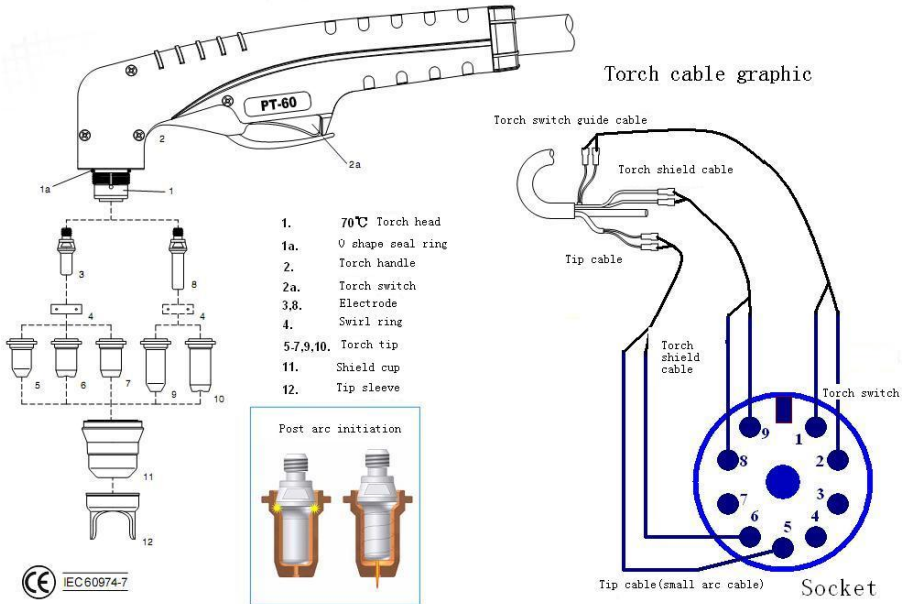


- NOTE** (1) The alarm lamp is on when cutting. Switch off the torch until the alarm sounds, then press the switch again to restart cutting.
- (2) During automatic gas test and examination, press on the cutting torch.
- (3) After long use, the surface of the electrode and nozzle will have an oxidation reaction. Replace the electrode and nozzle. The alarm lamp will light when you remove the shield cup as a safety precaution.

5 CUTTING GUN MAINTENANCE

- WARNING**
1. Check consumable parts for damage and replace if worn.
 2. Turn off the power source before checking or removing cutting gun parts

NOTE When operating the torch in normal conditions, 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.



6 TROUBLESHOOTING

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.

6.1 Power lamp and temperature lamp is on.

- 6.1.1 Check for blocked air flow around the unit and it is in good working order.
- 6.1.2 Fan blocked – check and correct condition.
- 6.1.3 Unit is overheated – allow it to cool down for at least 5 minutes and make sure the unit has not been operated beyond Duty Cycle limit. Refer to Technical Information in Section 2.
- 6.1.4 Faulty components in unit – return to your distributor for repair or have a qualified technician repair using the Service Manual.

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

- 6.2.1 System is in ‘SET’ mode – change to ‘RUN’ mode.
- 6.2.2 Faulty torch parts – inspect torch parts and replace if necessary.
- 6.2.3 Gas pressure is too high or too low – adjust to correct pressure.
- 6.2.4 Faulty components in unit – return to your distributor for repair or have a qualified technician repair using the Service Manual.

6.3 No cutting output. Torch is activated, power source is on, gas flows and fan operates

- 6.3.1 Torch not properly connected to power supply – check that torch leads are properly connected to power supply.
- 6.3.2 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.
- 6.3.3 Faulty components in unit – return to your distributor for repair or have a qualified technician repair using the Service Manual.
- 6.3.4 Faulty Torch – return to your distributor for repair or have a qualified technician repair using the Service Manual.

6.4 Low cutting output

- 6.4.1 Incorrect setting of CURRENT control – check and adjust to correct setting.
- 6.4.2 Faulty components in unit. Return to your distributor for repair or have a qualified technician repair using the Service Manual.

6.5 Difficulty Starting

- 6.5.1 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.

6.6 Arc shuts off during operation. Arc will not restart when torch switch is activated.

- 6.6.1 Power Supply is overheated (OC/OT lamp is lit) – allow unit to 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.
- 6.6.2 Gas pressure too low (the TIP/GUN/GAS lamp is lit when torch is switched on) – check source for at least 4bar/60psi and adjust as required (the machine cover will require opening).
- 6.6.3 Torch consumables worn – check torch shield cup, tip, starter element and electrode. Replace as required.
- 6.6.4 Faulty components in unit – return to your distributor for repair or have a qualified technician repair using the Service Manual.

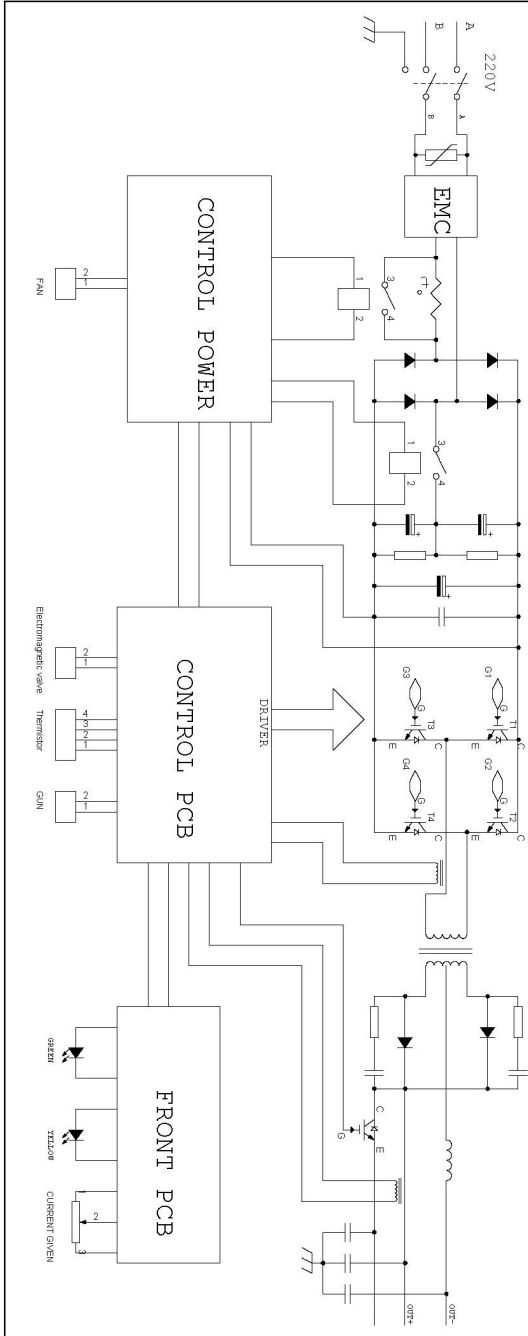
6.7 No gas flow, the power lamp is on and fan operates

- 6.7.1 Gas not connected or pressure too low – check gas connections. Adjust gas pressure to correct setting.
- 6.7.2 Faulty components in unit – return to your distributor for repair or have a qualified technician repair using the Service Manual.

6.8 Torch cuts but low quality

- 6.8.1 CURRENT control set too low – increase current setting.
- 6.8.2 Torch is being moved too fast across workpiece – reduce cutting speed.
- 6.8.3 Excessive oil or moisture in torch – hold torch 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 required.

7 MAIN ELECTRICAL DIAGRAM



8 PARTS LIST

9031H-02	COVER
9031H-04	FAN
9031H-05	REAR PANEL
9031H-07	AIR FILTER – USE 9030H-05
9031H-10	ON/OFF SWITCH
9031H-13	BASE
9031H-25	TORCH SOCKET
9031H-29	KNOB – USE 9000H-3
9031H-30	FRONT PCB
9031H-34	CONTROL PCB
9031H-37	AUX PCB
9031H-38	EMC PCB
9031H-39	RECTIFIER
9031H-40	PRIMARY PCB ASSEMBLY
9031H-41	SECONDARY PCB ASSEMBLY



Specialised Welding Products Ltd

Unit 1, Farringdon Industrial Centre, Farringdon, Nr Alton, Hampshire GU34 3DD, UK
tel: +44 (0)1420 588180 • fax: +44 (0)1420 588184 • email: sales@swp.uk.net