

Stealth

DIGI-CUT 100 CNC

Part No. 9032H

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 100 CNC Air Plasma Cutting Machine 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.

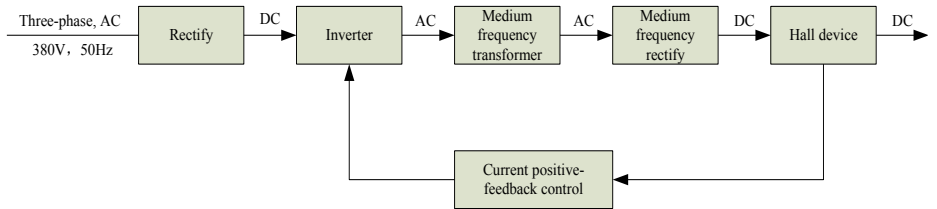


Fig. 2.1 Working principle diagram

DIGI-CUT 100 CNC		
Power Supply Voltage (V)		3~400±10%
Frequency Hz		50/60
Rated input current (A)		28
Rated input power (Kw)		14.5
Adjustment range of current (A)		20~100
Max no-load voltage (V)		420
Duty cycle (40°C / 10 minutes)		100A @ 80%
Severance Cut for Carbon Steel (mm)		≤60
Optimal cutting thickness (mm)	Carbon Steel	≤45
	Stainless Steel	≤45
	Aluminium	≤36
	Copper	≤20
Dimensions (mm) L x H x W		630 x 240 x 445
Protection class		IP23
Insulation class		H
Net weight (Kg)		30.5
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 3.1.

- 3.2.1 Check your power source for correct voltage before plugging 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.

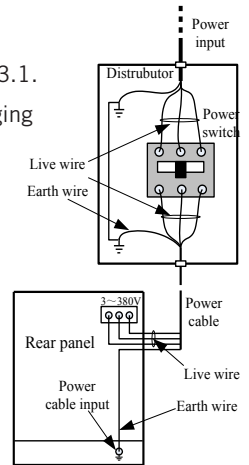


Fig. 3.1 Correct method of main supply

3.3 Gas Connections

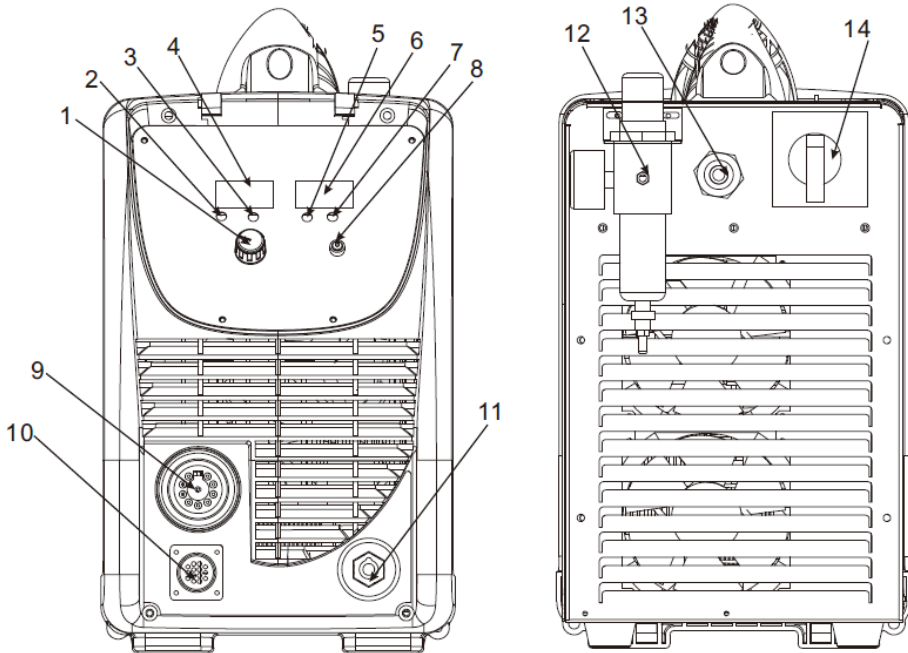
3.3.1 Connecting Gas Supply to Unit

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

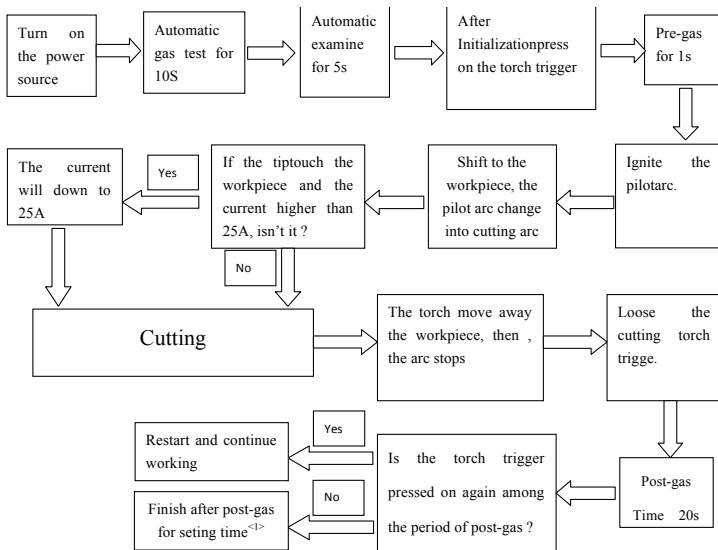


1. **Cutting current regulator** – used to regulate the current when cutting.
2. **Power pilot lamp**
3. **Over-current / Over-heat alarm** – when over-heat or over-current, the lamp would be lit.
4. **Current display**
5. **Cutting gun incorrect installation and air pressure low alarm**
6. **Barometer display**
7. **Work lamp** – turn on the switch of the cutting gun, generate the voltage, the lamp on
8. **RUN/SET** – when cutting the workpiece, turn to 'RUN'. When performing a gas test, turn to 'SET'.
9. **Cutting gun connector** – connect to the cutting machine.
10. **Remote control plug**
11. **Positive output cable** – connect to the workpiece.
12. **Barometer** – ensure there is no impurity and moisture in the compressed air.
13. **Power cable** – connect to the appropriate power supply.
14. **Power switch** – turn on or off the power source.

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.
 - (4) If the cutting current is higher than 40A when the tip touches the work-piece, the current will reduce to 40A in order to protect the tip.
 - (5) During post gas, if you hold down the trigger for a long time the arc restarts, if you press and loosen the trigger quickly the gas stops, you can then hold down the trigger to restart the machine.

4.3 Alarm Indicator

- 4.3.1 When the machine appears to over-heat or over-current, the yellow indicator (lamp 2) on the front panel remain on.
- Over-heat – the alarm will release after the fan cooling period. You can then restart the machine.
 - Over-current – the alarm is beyond retrieve. You must ask a qualified technician to check the machine.
- 4.3.2 When any of the torch parts (including tip, electrode, shield cup and gas distributor) are not correctly installed, the red indicator (lamp 3) lights.
- 4.3.3 When the air pressure is too low, the indicator (lamp 3) will remain on.
- 4.3.4 When the gas distributor is un-installed, there is no alarm while operating the machine and when the trigger is pressed, there is no arc and no load. Open the torch and check.

4.4 About the CUT voltage divider

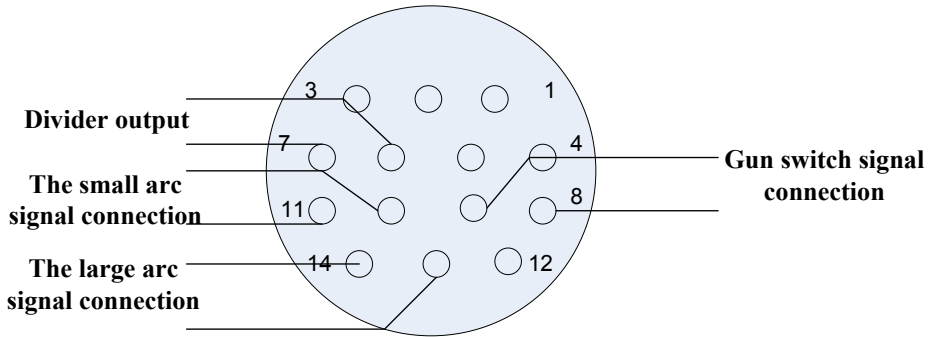
CUT power supplies are equipped with an optional, factory-installed, four-position voltage divider that is designed to be safely connected without tools. The built-in voltage divider provides a scaled down arc voltage of 20:1, 30:1, 40:1, and 50:1 (maximum output of 18V). An optional receptacle on the rear of the power supply provides access to the scaled down arc voltage and signals for arc transfer and plasma start.

NOTE The factory presets the voltage divider to 20:1. To change the voltage divider to a different setting, refer to the section on the next page.

The factory-installed internal voltage divider provides a maximum of 18V under open circuit conditions. This is an impedance-protected functional extra low voltage (ELV) output to prevent shock energy, and fire under normal conditions at the machine interface receptacle and under single fault conditions with the machine interface wiring. The voltage divider is not fault tolerant and ELV outputs do not comply with safety extra low voltage (SELV) requirements for direct connection to computer products.

NOTE The cover on the machine interface receptacle prevents dust and moisture from damage when not in use. This cover should be replaced if damaged or lost. Installation of the machine interface cable must be performed by a qualified service technician. To install a machine interface cable:

1. Turn OFF the power and disconnect the power cord.
2. Remove the machine interface receptacle's cover from the rear of the power supply.
3. Connect the machine interface cable to the power supply.



Refer to the following table when connecting the CUT system to a torch height controller or CNC controller with a machine interface cable.

Signal	Type	Instruction	Connector socket	Cable ends
Start (start plasma)	Input	Normally open. 18 VDC open circuit voltage at START terminals. Requires dry contact closure to activate.	8, 9	8 (yellow) 9 (green)
Transfer (start machine motion)	Output	Normally open. Dry contact closure when the arc transfers. 120 VAC/1 A maximum at the machine interface relay or switching device (supplied by the customer).	13, 14	13 (blue) 14 (white)
Ground	Ground			
Voltage divider	Output	CUT: Divided arc signal of 20:1, 30:1, 40:1, 50:1 (provides a maximum of 18 V).	6 (+), 7 (-)	6 (red) 7 (black)

Setting the five-position CUT voltage divider

The factory presets the voltage divider to 20:1. To change the voltage divider to a different setting:

1. Turn OFF the power supply and disconnect the power cord.
2. Remove the power supply cover.
3. Locate the voltage divider DIP switches on the left side of the power supply.

Shift and Scale Selection

Dial Number	Scale Selection			
	20:1	30:1	40:1	50:1
1	ON	1	1	1
2	2	ON	2	2
3	3	3	ON	3
4	4	4	4	ON

CNC Control Cable Selectable Type

Number	Standard (m)
6.310.660	5
6.310.660-D	10
6.310660-E	15

5 MAINTENANCE AND 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.

5.1 BASIC PROBLEMS

5.1.1 When the machine is turned on, the power indicator lights up but both the fan and the air control valve are not working.

5.1.1.1 Check the input lines and reconnect as necessary.

5.1.1.2 The main board in the machine has failed. A qualified technician should change it.

5.1.2 Turn on the machine – the TIP/GUN/GAS indicator lights up.

5.1.2.1 Gas pressure is too low. Adjust the gas pressure to 65psi/4.5bar and the barometer indicator to 0.45~0.5MPa.

5.1.3 Turn on the machine – the TIP/GUN/GAS indicator flickers.

5.1.3.1 The shield cup is not properly installed. Turn off the power source, install and secure a good fit. Turn on the power source.

5.1.3.2 The Tip or electrode is not properly installed. Turn off the power source and install the shield cup securely. Turn on the power source.

5.1.4 The temperature indicator lights up after the machine has only been on for a short time.

5.1.4.1 Check for blocked air flow around the unit and correct as necessary.

5.1.4.2 Fan blocked. Check and correct as necessary.

5.1.4.3 The machine is over-heating. Let it cool down for at least five minutes. Ensure the machine has not been operated beyond the Duty Cycle (refer to Technical Information in Section 2).

5.1.4.4 Input voltage is over the normal range. Select the correct voltage (refer to Technical Information in Section 2).

5.1.4.5 Faulty components in the machine. Return for repair or have a qualified technician repair with reference to the Service Manual.

5.2 PILOT ARC PROBLEMS

5.2.1 Torch failed to ignite the arc when torch is triggered.

5.2.1.1 The system is set in 'SET' mode. Change to 'RUN' mode.

5.2.1.2 Faulty torch parts. Inspect and replace as necessary.

5.2.1.3 Gas pressure is too high or too low. Adjust to correct setting.

5.2.1.4 Faulty components in the machine. Return for repair or have a qualified technician repair with reference to the Service Manual.

5.2.2 Difficulty igniting

- 5.2.2.1 The gas distributor is not installed correctly.
- 5.2.2.2 Worn torch parts (consumables). Shut off input power. Remove and inspect torch shield cup, tip, starter cartridge, and electrode. Replace electrode or tip if worn. Replace starter cartridge if end piece does not move freely. Replace shield cup if excessive spatter adheres to it.
- 5.2.2.3 The machine is in trouble. Have a qualified technician repair with reference to the Service Manual.

5.2.3 The torch is triggered but the pilot arc does not change to the cutting pilot. The power indicator lights up. Gas flows. Fan operates.

- 5.2.3.1 Inaccurate connection between torch and power supply. Check the torch leads are properly connected to a power supply.
- 5.2.3.2 Work cable not connected to work piece or connection is poor. Ensure that work cable has an efficient connection to a clean and dry area of the workpiece.
- 5.2.3.3 Faulty components in the machine. Return for repair or have a qualified technician repair with reference to the Service Manual.
- 5.2.3.4 Faulty Torch. Return for repair or have qualified technician repair it.

5.2.4 Arc shuts off during operation and will not restart when torch is triggered.

- 5.2.4.1 Power Supply is overheated (OC/OT lamp lit) Let unit cool down for at least five minutes. Ensure the unit has not been operated beyond Duty Cycle limit. Refer to Section 2 for duty cycle specifications.
- 5.2.4.2 Gas pressure too low (the TIP/GUN/GAS lamp is lit when torch switch is pressed on). Check source for at least 65 psi / 4.5 bar; adjust as necessary.
- 5.2.4.3 Torch consumables worn. Check torch shield cup, tip, starter element, electrode and replace as necessary.
- 5.2.4.4 Faulty components in unit. Return for repair or have a qualified technician repair with reference to the Service Manual.

5.3 CUTTING PROBLEMS

5.3.1 No gas flow. The power lamp is lit and fan operates.

- 5.3.1.1 Gas pipe not connected or pressure is too low. Check gas connections. Adjust gas pressure to proper setting.
- 5.3.1.2 Faulty components in the unit. Return for repair or have a qualified technician repair with reference to the Service Manual.

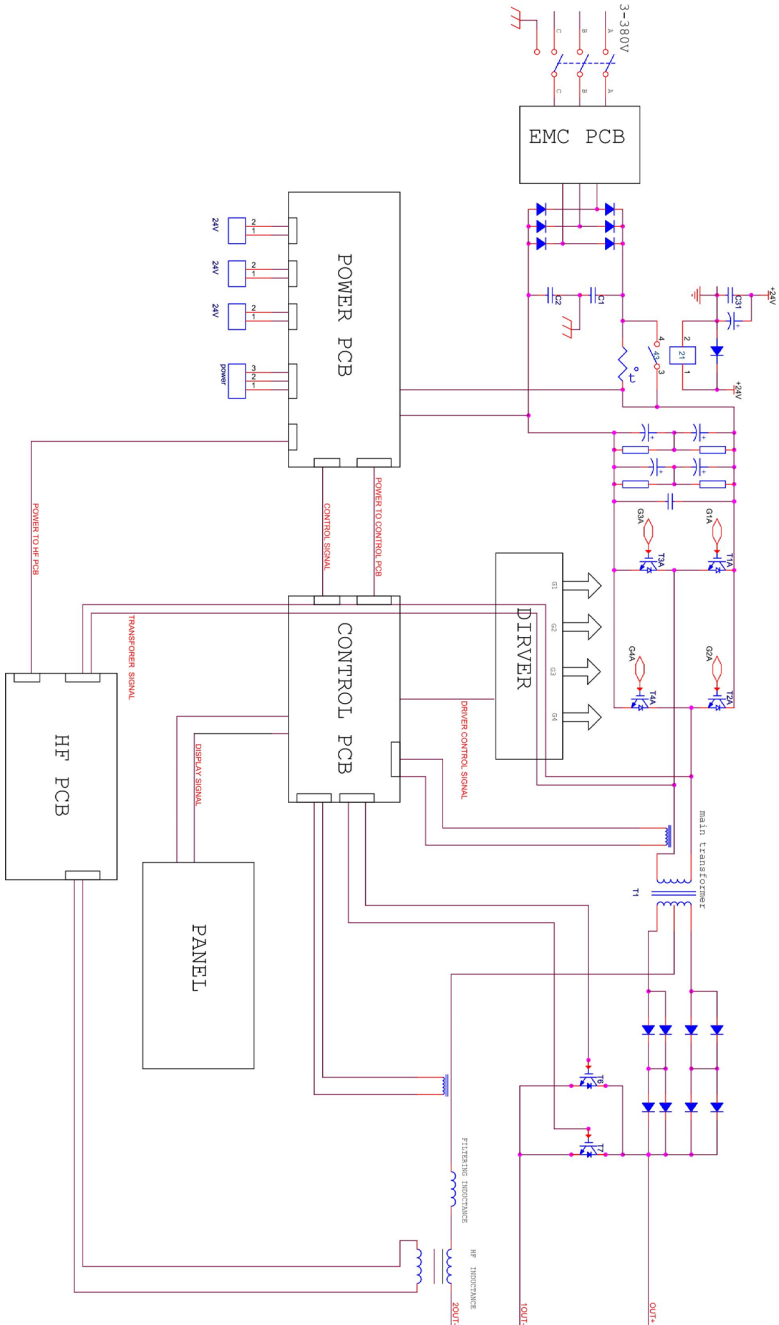
5.3.2 Low Cutting Output

- 5.3.2.1 Incorrect setting of cutting current (A). Check and adjust to correct setting.
- 5.3.2.2 Faulty components in unit. Return for repair or have a qualified technician repair with reference to the Service Manual.

5.3.3 Torch cuts but the cutting quality is poor.

- 5.3.3.1 Current (A) control set too low. Increase current setting.
- 5.3.3.2 Torch moves too fast across the workpiece. Reduce cutting speed.
- 5.3.3.3 Excessive oil or moisture in torch. Hold torch (3 mm) from clean surface while purging and observe oil or moisture build-up (do not activate torch). If there are contaminants in the gas, additional filtering may be needed.
- 5.3.3.4 Lack of air pressure. Check the air pressure and air flow and adjust to the appropriate position.

6 MAIN ELECTRICAL DIAGRAM



7 PARTS LIST

9032H-02	COVER
9032H-04	FAN
9032H-04	ON/OFF SWITCH
9032H-06	AIR FILTER – USE 9030H
9032H-09	REAR PANEL
9032H-13	BASE
9032H-22	FRONT PANEL
9032H-25	CENTRAL SOCKET – USE 9030H-17
9032H-27	KNOB – USE 9000H-33
9032H-29	FRONT PCB
9032H-31	CONTROL PCB
9032H-33	SOLENOID VALVE
9032H-38	AUX PCB
9032H-41	DRIVER PCB
9032H-42	CAP PCB
9032H-43	EMC FILTER
9032H-A01	FILTER PCB
9032H-49	MAIN PCB ASSEMBLY



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