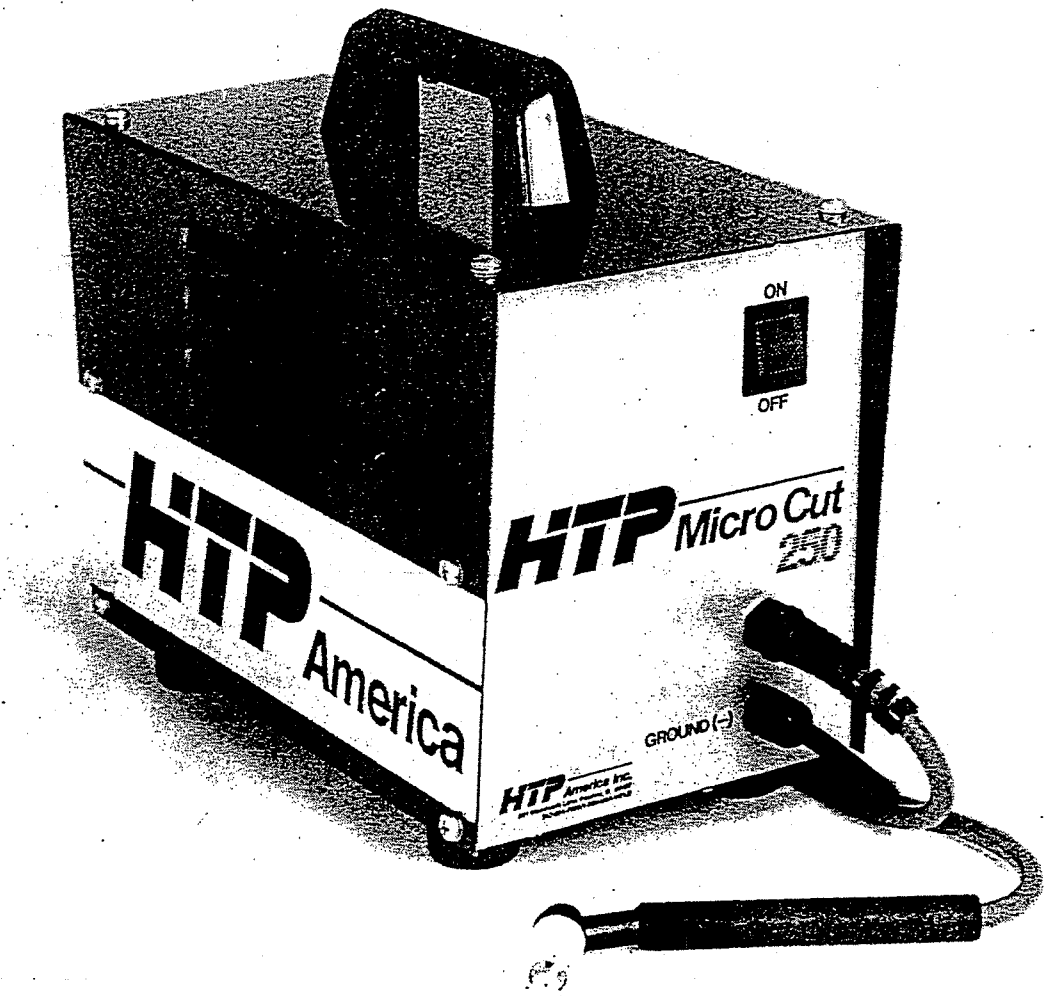

Owners Manual

HTP Micro Cut 250



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Introduction

Congratulations on your purchase of an HTP Micro Cut 250 plasma cutter. You have purchased one of the most technologically advanced and safest plasma cutters available today. Your new Micro Cut 250 will allow you to cut almost any material that conducts electricity, from thin sheet to a maximum thickness of 1/4". This owner's manual has been designed to instruct you on the safe operation and maintenance of your Micro Cut 250. If you read and follow the instructions in this manual your Micro Cut 250 will give you years of trouble-free operation. If you do not read and understand this owner's manual you will significantly shorten the operating life of your Micro Cut 250 and may also operate the unit under unsafe conditions which may result in **SERIOUS INJURY OR DEATH!** If you have any questions regarding the information contained in this manual contact your local distributor or HTP direct at 1-800-USA-WELD or ~~612-934-7060~~ in Illinois.

Safety Suggestions

Plasma cutting produces magnetic fields that can affect pacemaker operation. Persons wearing any type of electronic life support equipment (pacemakers and other devices) should consult with their doctor before going near plasma cutting or MIG welding operations.

Plasma cutting and MIG welding operations produce ultra-violet radiation which are harmful to skin and eyes. NEVER LOOK AT THE ARC PRODUCED BY CUTTING OR WELDING OPERATIONS WITHOUT PROTECTION. This ultra-violet radiation can penetrate lightweight clothing and reflect from light-colored surfaces, SEVERELY BURNING THE SKIN AND EYES. Always wear a full face welding helmet with a minimum number nine or darker lens to protect the eyes and face from ultra-violet radiation. Always wear safety goggles or glasses with side shields underneath the welding helmet for further eye protection. Wear a cap to protect the hair from fire and the scalp from ultra-violet radiation. Wear flameproof welding gloves to protect the hands from ultra-violet radiation and burns from hot metal. Wear a heavy, pocketless, long-sleeve shirt, cuffless trousers, and high-topped work shoes to protect the body from ultra-violet radiation and burns from hot metal. Ear plugs should be worn when working overhead to prevent hot metal from falling into one's ear. Never wear oily or greasy clothing as a spark will ignite them. Never wear flammable hair preparations as a spark will ignite the hair and cause serious burns.

Always warn bystanders not to watch the arc, expose themselves to the ultra-violet rays or to hot metals.

CUTTING AND WELDING FUMES CAN BE TOXIC! Always provide adequate ventilation in the welding or cutting area by natural ventilation (opening up doors and windows), mechanical ventilation (use of fans and vacuum systems), or air supplied respirators. If you develop momentary eye, nose, or throat irritation while cutting or welding, stop immediately! This is an indication that ventilation is not adequate. Do not continue to cut or weld until ventilation is improved. Do not continue to cut or weld if physical discomfort persists.

Metals coated with materials that emit toxic fumes (paint, undercoating, etc.) should not be cut or welded unless the coating is heated and removed from the work surface, the operator wears an air supplied respirator, or the area is well-ventilated.

Metals bearing lead, zinc, cadmium, beryllium and similar materials produce hazardous concentrations of toxic fumes when cut or welded. Adequate LOCAL exhaust ventilation must be used, or each person in the area, as well as the operator, must wear an air supplied respirator. When cutting beryllium bearing materials, both local exhaust ventilation and air supplied respirators must be used.

Do not cut or weld in areas close to degreasing or spraying operations or any other areas where chlorinated hydrocarbon solvents may be present. The heat of the arc will decompose vapors from chlorinated hydrocarbon solvents to form highly toxic phosgene gas. The ultra-violet radiation will decompose trichloroethylene and perchlorethylene vapors and also form deadly phosgene gas.

CUTTING AND WELDING PRODUCES SPARKS AND HOT SLAG THAT WILL IGNITE COMBUSTIBLE MATERIALS. If combustible materials are in the area, do not weld or cut. Move the work to an area that contains no combustible materials. If the work can not be moved, protect against fire by using suitable, snug fitting, fire proof covers or shields.

Never cut or weld in an area where the air may contain flammable gas, dust or liquid vapors (such as paint or gasoline vapors).

Never cut or weld on drums, barrels, tanks or other empty containers that have held combustibles or that may produce toxic or flammable vapors when heated without first cleaning as described in AWS Standard A6.0. When dealing with a container having unknown contents, do not rely on sight or smell to decide whether it is safe to cut or weld. Always clean container as described in AWS Standard A6.0.

Hot sparks, slag, or hot metal produced from cutting or welding can fall into cracks in floors or wall openings and cause hidden smoldering fires. Be sure that these openings are properly protected from sparks.

When cutting or welding on vehicles, be sure that sparks or hot metal do not come in contact with combustible materials, or lodge in an area where it may come in contact with combustible materials. Do not cut near fuel tanks, batteries, fuel lines or brake lines.

Do not cut or weld on wood, plastic tile, or carpeted floors. Concrete or masonry floors are safest.

A fire watcher should always be standing by during and some time after cutting to be sure sparks and hot metal do not get near combustibles and ignite a fire. After work is done, check that the area is free from sparks, smoldering fires, and flames.

Always have fire extinguishing equipment (commercial fire extinguisher, water hose or bucket, sand bucket) available for immediate use.

ELECTRIC SHOCK CAN KILL! Plasma cutting equipment uses higher operating voltages than MIG welders. Therefore, never cut with broken or damaged cables or a broken or damaged handle on the cutting torch. Due to the high operating voltages found in plasma cutters, do not attempt to repair broken or damaged handles or cables. To additionally protect against a fatal shock, always wear welding gloves when cutting.

NEVER cut in a damp area or stand in a puddle while cutting. This increases the possibility of a lethal shock.

Exposed electrically hot conductors or any other bare metal in the cutting circuit, or ungrounded electrically hot equipment can fatally shock a person whose body becomes a conductor. Do not stand, sit, lie, lean on or touch a wet surface when welding.

Place the ground cable as close to the cutting area as possible. This will reduce the possibility of the cutting current taking a stray path.

Always ground the cutting machine by connecting a ground wire between the machine and a good electrical ground.

Never allow electrically hot conductors or any other bare metal in the cutting circuit to come in contact with bare skin or wet clothing.

Never operate the plasma cutter without all side panels in place.

When leaving the plasma cutter unattended, always turn off all power to the unit.

A power disconnect switch must be available near the plasma cutter's power source.

Always turn off all power to the unit whenever performing any maintenance to the plasma cutter, even to the cutting torch.

We STRONGLY RECOMMEND you consult the following standards booklets for additional information:

1. ANSI Standard Z49.1, SAFETY IN WELDING AND CUTTING, obtainable from the American Welding Society, 2501 NW 7th St., Miami, FL 33125.
2. ANSI Standard Z87.1, SAFE PRACTICES FOR OCCUPATION AND EDUCATIONAL EYE AND FACE PROTECTION, obtainable from American National Standards Institute, 1430 Broadway, New York, NY 10018.
3. ANSI Standard Z49.2, FIRE PREVENTION IN THE USE OF CUTTING AND WELDING PROCESSES, obtainable from the same as item 2.
4. ANSI Standard Z88.2, PRACTICE FOR RESPIRATORY PROTECTION, obtainable from the same as item 2.
5. American Welding Society Standard A6.0, WELDING AND CUTTING CONTAINERS WHICH HAVE HELD COMBUSTIBLES, obtainable from the same as item 1.
6. American Welding Society Standard AWSF4.1, RECOMMENDED SAFE PRACTICES FOR THE PREPARATION FOR WELDING AND CUTTING OF CONTAINERS AND PIPING THAT HAVE HELD HAZARDOUS SUBSTANCES, obtainable from the same as item 1.
7. OSHA SAFETY AND HEALTH STANDARDS, 29CFR 1910, obtainable from the U.S. Government Printing Office, Washington, D.C. 20402.
8. NIOSH SAFETY AND HEALTH IN ARC WELDING AND CUTTING, obtainable from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.
9. American Welding Society Standard A6.3, RECOMMENDED SAFE PRACTICES FOR PLASMA ARC CUTTING, obtainable from the same as item 1.
10. NFPA Standard 51, OXYGEN — FUEL GAS SYSTEMS FOR WELDING AND CUTTING, obtainable from the National Fire Protection Association, 470 Atlantic Ave., Boston, MA 02210.
11. NFPA Standard 51B, CUTTING AND WELDING PROCESSES, obtainable from the same as item 10.
12. NFPA Standard 70-1978, NATIONAL ELECTRICAL CODE, obtainable from the same as item 10.

Inspection

After removing your HTP Micro Cut 250 from its shipping carton, inspect the plasma cutter for any concealed damage that you may not have seen upon receiving the unit. Any claims for loss or damage that may have occurred during shipping must be filed by the purchaser with the freight line. Your Micro Cut 250 is shipped completely assembled with a 12' Plasma Cutting Torch, 12' ground cable, and 12' input power cord.

Check the inlet air supply at the rear of the cabinet to be sure no packing materials may have gotten inside to obstruct the air flow to the plasma torch.

Electrical Connection

Your HTP Micro Cut 250 has been designed to operate only from a 220 volt single phase power supply wired for a minimum of 35 amps. All electrical connections should be performed by a qualified electrician in accordance with the National Electrical Code and local codes and ordinances. When connecting your Micro Cut 250 plasma cutter, the yellow-green wire **MUST BE CONNECTED TO GROUND OR SERIOUS INJURY OR DEATH MAY RESULT!**

ELECTRIC SHOCK CAN KILL! Do not connect an input wire to the ground terminal. Do not connect the ground (yellow-green) wire to an input (hot) line terminal. It is also strongly recommended that a fusible line disconnect switch be installed in the input power circuit to the plasma cutter. This would provide a safe and easy method to remove all electrical power from your Micro Cut 250 whenever it is necessary to internally inspect or service your plasma cutter.

BEFORE ATTEMPTING TO MAKE ANY PRIMARY POWER CONNECTIONS TO YOUR MICRO CUT 250, BE SURE ALL POWER IS OFF BY OPENING THE LINE DISCONNECT SWITCH.

Electrical Specifications:

Input Power — 220 volts single phase
Input Amperage — 35 amps
Maximum Open Circuit Voltage — 250 volts DC
Cutting Voltage — 75 volts DC
Maximum Cutting Amperage — 28 amps
Duty Cycle — 35% @ 28 amps (10 Min. Cycle)

Plasma Gas Connection

Your HTP Micro Cut 250 has been designed to use CLEAN, DRY, COMPRESSED AIR as both the plasma gas and the cooling gas. Water or oil in the air will significantly reduce the life of the electrode and the cutting nozzle while at the same time reducing the quality of the cut.

Clean, dry, compressed air must be supplied at a pressure of between 60 to 125 psi with a flow rate of 2-1/2 cfm. Depending on your machine, screw the proper fitting into the outlet of the back of the machine to match up with the air fittings in your shop. If your unit has been supplied with a brass quick disconnect, connect the gas hose directly to the barbed fitting on the end of the quick disconnect.

Your HTP Micro Cut 250 has a pressure sensing safety circuit that will not allow the plasma cutting voltage to start unless the air pressure is 50 psi. If during cutting, the air pressure falls below 50 psi the pressure sensing safety circuit will automatically shut off the plasma cutting voltage, preventing any damage to the plasma torch from loss of cooling gas.

Your HTP Micro Cut 250 has a self-draining air dryer/regulator built into the machine that is preset at the factory. If your shop has a problem with water or oil in the air lines, then we highly recommend the use of a second air dryer in the air supply line to your Micro Cut 250 to prevent damage to the electrode and cutting nozzles from oil or water in the air lines. Damage to your Micro Cut 250 from oil or water in the air supply line is not covered in any way, shape or form under warranty.

Operating Controls (see Fig. 1)

1. On-Off Switch — This switch controls the input power to your Micro Cut 250. When the rocker switch is in the on position, it will become illuminated. When the On-Off Switch is in the on position and you are not cutting with your Micro Cut 250, power is only supplied to the cooling fan and the circuit board, consuming very little electrical energy.

2. Plasma Torch Connection — This is where the plasma torch passes through the front panel of your Micro Cut 250. It is connected to the power supply inside the machine. Whenever performing any service work to the plasma torch, always disconnect the input power to the machine.

3. Ground Cable — The ground cable of your Micro Cut 250 should be connected as close as possible to the cutting area. This will reduce the possibility of the cutting current taking stray paths. Always be sure to connect the cable to a good clean surface.

4. Plasma Torch — The plasma torch on your Micro Cut 250 is a very important and critical part of your machine. The cutting nozzle (5) of the plasma torch is spring loaded which is what initiates the plasma cutting arc. The plasma torch also has a work safety circuit which will not allow the plasma cutting voltage to start without the cutting nozzle (5) being in contact with an electrically conducting part of the workpiece. This is a very important safety feature as it will not allow the plasma arc to ignite without the plasma torch being in contact with the work. Always disconnect the input power to your Micro Cut 250 before performing any service work on the plasma torch.

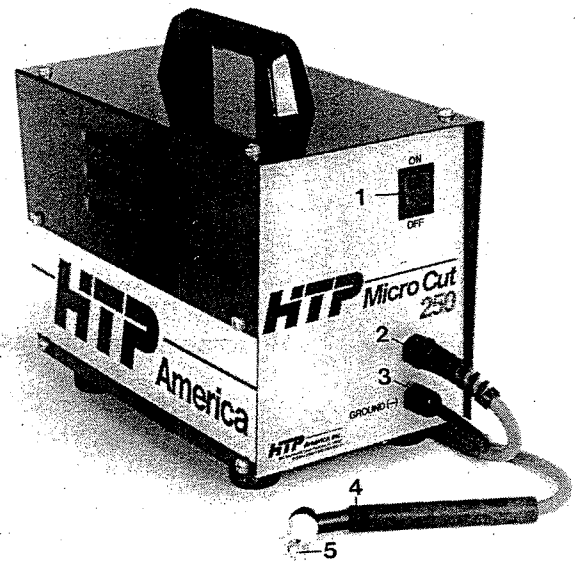


Fig. 1

Operating Your Micro Cut 250

1. Be sure your Micro Cut 250 is connected to a clean, dry source of compressed air with a minimum line pressure of 60 psi (see plasma gas connection).
2. Plug your Micro Cut 250 in to a 220 volt power supply (see electrical connection). Turn the On-Off switch on. The indicator lamp will light, and you will hear compressed air momentarily flow through the plasma torch and stop. At the same time, you will also hear the relays inside your Micro Cut 250 click on and off. This is a normal reaction, as your Micro Cut 250 is just checking itself.
3. Refer to the safety suggestions to be sure the operator has the correct eye protection, gloves, clothing, and that all of the safety precautions have been followed.
4. Connect the ground clamp to a clean surface on the vehicle that is as close as possible to the area to be cut. Be sure that the ignition on the vehicle is off.
5. The cutting nozzle, like the wire in a MIG welding gun, must come in contact with an electrically conductive part of the work before the plasma arc can start. This must be done to satisfy the work safety circuit. However, once the arc has started the Micro Cut 250 will easily cut through painted surfaces.

Hold the plasma torch so the cutting nozzle is perpendicular to the work surface. Push the plasma torch down. This will force the cutting nozzle down until it comes in contact with the electrode, at which time the plasma arc will start. IMMEDIATELY release the downward force on the plasma torch to let the cutting nozzle return to its normal position. It is not necessary to keep the cutting nozzle in contact with the work after the plasma arc has started, however, it is usually easier. If you keep the cutting nozzle in contact with the work, put very little, if any, downforce on the plasma torch. It is only necessary to drag it lightly on the work surface.

6. Begin to move the plasma torch where you want the metal to be cut. If you move too fast, you will not cut all the way through the workpiece. If you move too slow, you will put too much heat into the workpiece and may also extinguish the plasma arc.

IF YOU FAIL TO ESTABLISH A CUTTING ARC, OR YOU HAVE ERRATIC OR POOR QUALITY CUTS, REFER TO THE SERVICE SECTION, OR CALL HTP AT 1-800-USA-WELD OR 312-934-7060 IN ILLINOIS. DO NOT CONTINUE TO CUT.

Plasma Cutting Tips

1. Your Micro Cut 250 is capable of cutting steel to a thickness of 1/4", and piercing steel that is 1/8" thick. When piercing materials that are 1/8" thick, it is a good idea to angle the plasma torch at a 45 degree angle until the plasma arc pierces the material. This will allow the stream of arcs to shoot off at a 45 degree angle, away from the gas diffuser. If the plasma torch is held perpendicular to the work when piercing heavy gauge material, then the sparks will shoot back up at the gas diffuser. The molten metal will then collect on the gas diffuser, plugging the air holes and greatly shortening the life of the gas diffuser.

IMPORTANT — When angling the torch, be aware of the fact that the sparks will shoot off as far as 20 feet away. Be sure that there are no combustibles or bystanders in the area that may be ignited or hurt by the sparks.

2. When making long straight cuts, it may be easier to use a metal straight edge as a guide. Simply clamp it to the work to be cut.

3. When cutting 1/4" materials, it is beneficial to start your cut at the edge of the material.

4. When making rust repairs, it is possible to place the new metal over the rusted area and then cut your patch panel at the same time you are cutting the rust out.

This process also works when you are splicing in a quarter panel.

5. Be aware of the fact that the sparks from the cutting arc can damage painted surfaces. The sparks will also pit glass. We recommend the use of the HTP Welding Blanket (Part #12060) to protect these surfaces.

Maintenance and Service

Your HTP Micro Cut 250 is a very hard-working piece of equipment and is very simple to maintain. In order to keep it at its peak performance it is very important that you follow these simple maintenance procedures. **IMPORTANT** — whenever you perform any maintenance on your Micro Cut 250, even minor plasma torch service, always disconnect it from the input power source. **ELECTRIC SHOCK CAN KILL!**

1. Your Micro Cut 250 uses a forced air cooling system. When operated in a dusty environment such as a body shop, the cooling fan will have a tendency to introduce dust into the inside of the cabinet. To keep the cooling system operating at peak efficiency, the side panels should be removed monthly and the inside of the machine blown out with compressed air.
2. The orifice in the cutting nozzle (#25030) will increase in diameter as the plasma stream passes through it. When the orifice increases in size the cutting efficiency of the machine will decrease. When the cutting efficiency falls off, the cutting nozzle should be the first part to be inspected. If the orifice size has enlarged substantially, replace the cutting nozzle.
3. The electrode (#25003) is directly exposed to the heat of the plasma arc. It has a special zirconium insert to substantially increase its life. However, a pit will tend to develop in the center of the electrode. As this pit grows, the cutting efficiency will have a tendency to fall off. The electrode should be the second part to be inspected. If the pit is found to be excessive, or the electrode appears to be otherwise worn, replace the electrode.
4. As the gas diffuser (#25005) wears, it will have a tendency to distort, and cause the cutting tip to bind. When this occurs, the spring will not allow the cutting tip to return to its original position. The cutting tip will then remain in contact with the electrode, creating a direct short. The gas diffuser should then be replaced immediately.

The gas diffuser also has a ring of air holes around it. These air holes may become closed by slag. Periodically check to be sure that these air holes remain clear. If the air holes can not be cleared, replace the gas diffuser immediately or further damage to the plasma torch may occur.
5. Should the electrode become loose from the torch head, it will gradually unscrew itself until it comes in contact with the cutting nozzle. This will result in the plasma arc starting as soon as the cutting nozzle is brought in contact with the work. Should this condition occur, it is important that the electrode be tightened immediately.
6. Your Micro Cut 250 has a duty cycle of 35% at its rated output of 28 amps. The duty cycle is measured over a ten-minute period. This means that you can cut for 3-1/2 minutes and then the machine should be allowed to sit idle for 6-1/2 minutes. Should the duty cycle be exceeded, the main transformer has a thermoswitch that will automatically shut the machine down before any damage occurs. When this happens, the indicator lamp will remain on, however depressing the plasma torch will no longer initiate the arc. You will then have to wait approximately 10 minutes for the thermoswitch to reset itself.

7. Your Micro Cut 250 has an air safety circuit that will not allow the plasma arc to start unless there is compressed air with a minimum pressure of 50 psi connected to the machine. If your plasma arc will not start, check to be sure that you have compressed air.

IF ANY SERVICE WORK OTHER THAN THE AFOREMENTIONED IS NECESSARY IT SHOULD ONLY BE PERFORMED BY AUTHORIZED PERSONNEL. CONTACT YOUR LOCAL DISTRIBUTOR OR HTP AMERICA DIRECTLY AT 1-800-USA-WELD OR 312-934-7060 IN ILLINOIS.

Plasma Torch Parts List (see Fig. 2)

Illustration #	Part #	Description
1	25002	Torch Head
2	25003	Electrode
3	25062	Spring
4	25058 25158	Insulator
5	25030	Cutting Tip
6	25005	Gas Diffuser
7	25008	Handle
8	25012	Power Cable — 12'
	25025	Power Cable — 25'
	25912	Plasma Torch — 12'
	25925	Plasma Torch — 25'

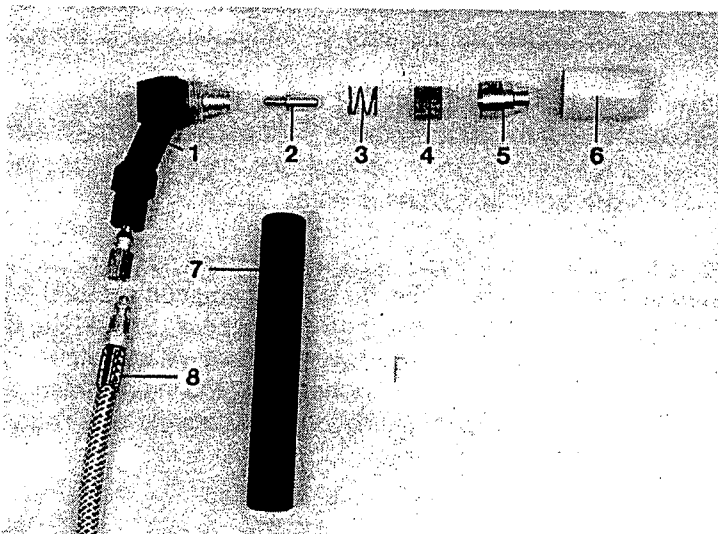
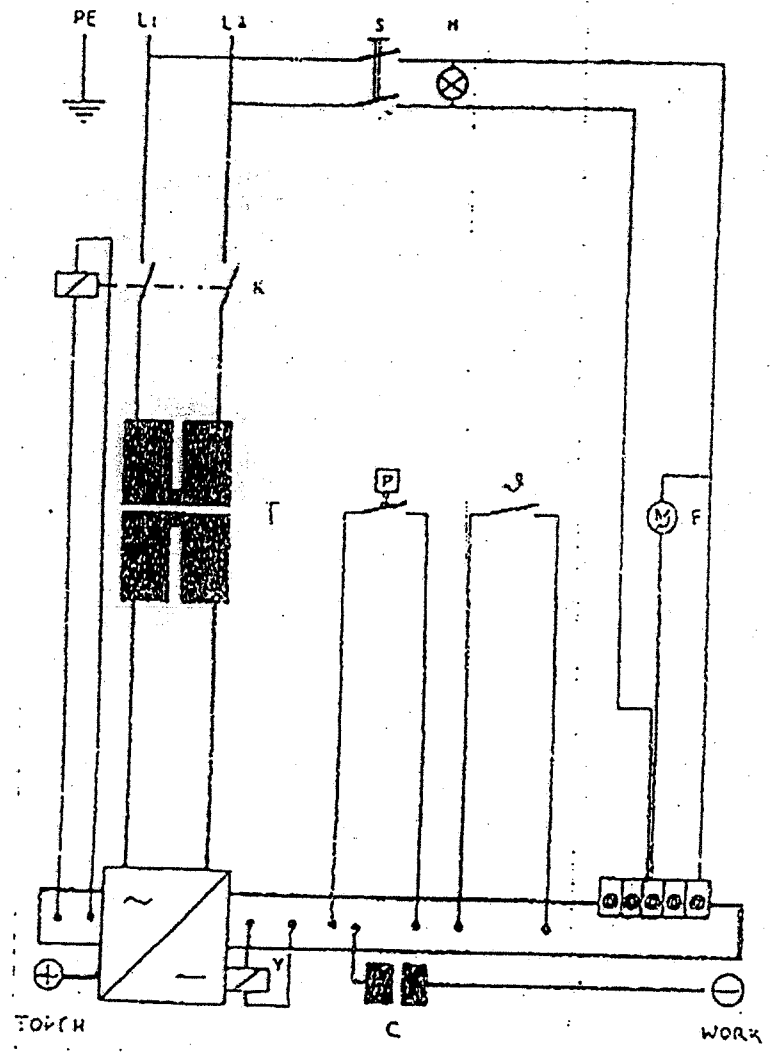


Fig. 2

Wiring Diagram - Microcut 250

Symbol	Designation
L1, L2	Line Voltage
PE	Ground
S	On - Off Switch
H	Indicator Lamp
K	Contactors
T	Main Transformer
P	Pressure Switch
⚡	Thermo Switch
F	Fan Motor
Y	Air Solenoid
C	Choke Coil



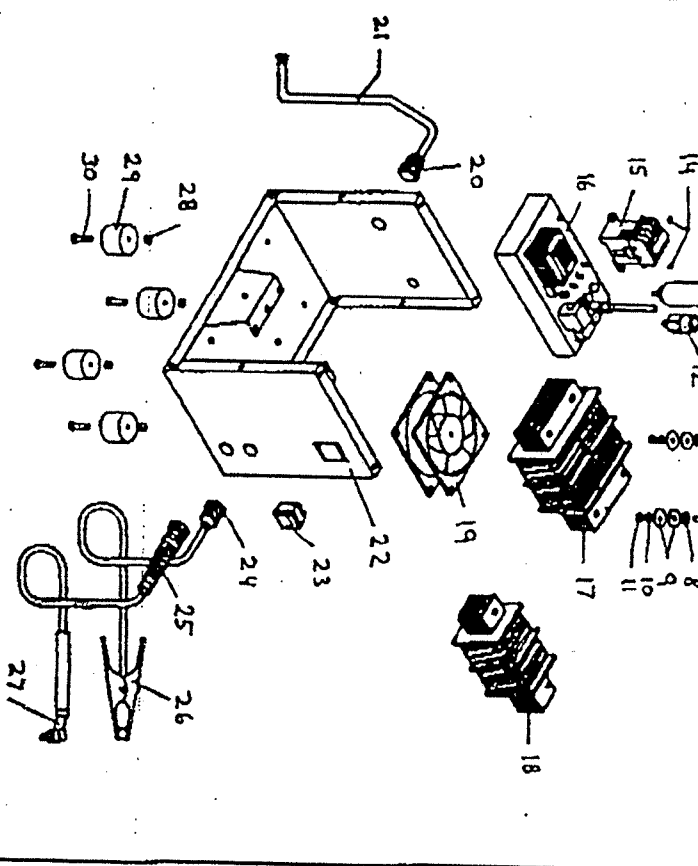
ITEM	DESCRIPTION	PART NO.	QTY.
PCB 10	PLASMA CUTTING SYSTEM	700.0030	1/1-

-All plasma cutting systems are complete with 12 ft. standard torch and ground cable, power cable and spare parts kit.

001-9	12 ft. Plasma Torch	001.1012
001-7	15 ft. Plasma Torch	001.1015

SECTION PARTS

1. Cabinet Top.....	107.0101
2. Handle.....	107.0102
3. Washer.....	107.0103
4. Nut.....	107.0104
5. Structural Feet.....	107.0105



6. Fuse.....	107.0106
7. Resistor.....	107.0107
8. Washer.....	107.0108
9. PIC-Washer.....	107.0109
10. Nut.....	107.0110
11. Nut.....	107.0111
12. Pressure Regulator.....	107.0112
13. Pressure Switch.....	107.0113
14. Nut.....	107.0114
15. Nut Relay.....	107.0115
16. Electronic Control.....	107.0116
17. Tilt Transformer.....	107.0117
18. Choke Coil.....	107.0118
19. Fan.....	107.0119
20. Strain Relief.....	107.0120
21. Power Cord.....	107.0121
22. Cabinet Base.....	107.0122
23. Nut Stritch.....	107.0123
24. Strain Relief.....	107.0124
25. Cable Support.....	107.0125
26. Ground Clamp.....	107.0126
27. Plasma Torch.....	107.1012
28. Nut.....	107.0128
29. Washer Pad.....	107.0129
30. Resistor.....	107.0130

PLASMA CUTTING SYSTEM

