

# MICROCUT 600

## Owner's Manual



## MANUFACTURER'S WARRANTY

It is expressly agreed that there are no warranties, expressed or implied, made by either the Salesman, Dealer, or HTP America, Inc. on products or parts furnished hereunder, except the Manufacturer's Warranty against defective materials or workmanship as follows:

HTP America, Inc. warrants each new Microcut 600 to be free from defects in material and workmanship under normal use and service for one year after delivery to the original purchaser. HTP America, Inc. will repair and replace, at its factory, any part or parts thereof, products to be returned to HTP America, Inc. with transportation charges prepaid and which its examination shall disclose to its satisfaction to have been thus defective. This warranty being expressly in lieu of all other warranties, expressed or implied, and all other obligation or liabilities on its part and it neither assumes nor authorizes any other person to assume for it any other liability in connection with the sale of its machines.

This warranty shall not apply to any cutting machine which has been repaired or altered by unauthorized service departments in any way so as in the judgment of HTP America, Inc. to affect its stability and reliability, nor which has been subjected to misuse, negligence or accident.

HTP America, Inc. shall not be liable in any event, unless HTP America, Inc. receives notice of alleged breach of warranty within 30 days after the discovery, actual or construction alleged breach of warranty specifying the claimed defect.

HTP America, Inc. has reserved the right to make changes in design or add any improvements to its products at any time without incurring any obligation to install same on equipment.

This warranty is void unless warranty card is sent to HTP America, Inc. within 15 days from the date of purchase.

### **NOTE: Exclusions to Warranty:**

1. The Plasma Torch is warranted for a period of ninety (90) days against defects in material and workmanship.
2. The shield cup, nozzle, gas diffuser and electrode are consumable items, **WHICH CARRY NO WARRANTY.**

## SAFETY SUMMARY

Every worker respects the tools with which they work. They know that the tools represent years of constantly improved designs and developments. The true craftsman also knows that tools are dangerous if misused or abused.

Reading this operator's manual before using the plasma cutter will enable you to do a better, safer job. Learn the plasma cutter's applications and limitations as well as the specific potential hazards peculiar to plasma cutting.

### IMPORTANT SAFETY INFORMATION

The following safety information is provided as guidelines to help you operate your new plasma cutter under the safest possible conditions. Any equipment that uses electrical power can be potentially dangerous to use when safety or safe handling instructions are not known or not followed. The following safety information is provided to give the user the information necessary for safe use and operation.

A procedure step preceded by a **WARNING** is an indication that the next step contains a procedure that might be injurious to a person if proper safety precautions are not heeded.

A procedure preceded by a **CAUTION** is an indication that the next step contains a procedure that might damage the equipment being used.

A **NOTE** may be used before or after a procedure step to highlight or explain something in that step.

### READ ALL SAFETY INSTRUCTIONS

**CAREFULLY** before attempting to install, operate, or service this plasma cutter. Failure to comply with these instructions could result in personal injury and/or property damage.

### RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCE.

#### Note:

- The following safety alert symbols identify important safety messages in this manual.
- When you see one of the symbols shown here, be alert to the possibility of personal

injury and carefully read the message that follows.



This symbol indicates that the possibility of electric shock hazard exists during the operation of the step(s) that follow.



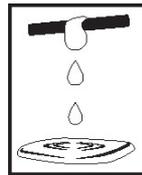
This symbol indicates that the possibility of fire hazard exists during the operation of the step(s) that follow.



This symbol indicates that the helmet must be worn during the step(s) that follow to protect against eye damage and burns due to flash hazard.



This symbol indicates that the possibility of toxic gas hazard exists during operation of the step(s) that follow.



This symbol indicates that the possibility of being burned by hot slag exists during operation of the step(s) that follow.



This symbol indicates that the eye protection should be worn to protect against flying debris in the following step(s).



This symbol indicates that the possibility of injury or death exists due to improper handling and maintenance of compressed gas cylinders or regulators.



This symbol indicates that plasma arc can injure.

- Published standards on safety are available. They are listed in **ADDITIONAL SAFETY INFORMATION** at the end of this **SAFETY SUMMARY**.

The National Electrical Code, Occupation Safety and Health Act regulations, local industrial codes and local inspection requirements also provide a basis for equipment installation, use, and service.

## SHOCK HAZARD



**WARNING**

**ELECTRIC SHOCK CAN KILL!** To reduce the risk of death or serious injury from shock, read, understand, and follow the following safety instructions. In addition, make certain that anyone else who uses this equipment, or who is a bystander in the operating area understands and follows these safety instructions as well.

- **IMPORTANT! TO REDUCE THE RISK OF DEATH, INJURY, OR PROPERTY DAMAGE, DO NOT ATTEMPT OPERATION** of this equipment until you have read and understand the following safety summary.
- Do not, in any manner, come into physical contact with any part of the cutting current circuit. The cutting current circuit includes:
  - a. the work piece or any conductive material in contact with it,
  - b. the ground clamp,
  - c. the torch,
  - d. any metal parts on the torch.
- Do not operate in a damp area or come in contact with a moist or wet surface.
- Do not attempt to cut if any part of clothing or body is wet.
- Do not allow the equipment to come in contact with water or moisture.
- Do not drag cables, cutting torch, or power cord through or allow them to come into contact with water or moisture.
- Do not touch unit, attempt to turn unit on or off if any part of the body or clothing is moist or if you are in physical contact with water or moisture.
- Do not attempt to plug the unit into the power source if any part of body or clothing is moist, or if you are in physical contact with water or moisture.
- Do not connect ground clamp to or cut on electrical conduit.
- Do not alter power cord or power cord plug in any way.
- Do not attempt to plug the unit into the power source if the ground prong on power cord plug is bent over, broken off, or missing.
- Do not allow the unit to be connected to the power source or attempt to operate if

the unit, cables, work area, or power cord are exposed to any form of atmospheric precipitation, or salt water spray.

- Do not carry coiled cables around shoulders, or any other part of the body, when they are plugged into the unit.
- Do not modify any wiring, ground connections, switches, or fuses in this equipment.
- Wear welding gloves to help insulate hands from cutting circuit.
- Keep all liquid containers far enough away from the unit and work area so that if spilled, the liquid can not possibly come in contact with any part of the unit or electrical circuit.
- Replace any cracked or damaged parts that are insulated or act as insulators such as cables, power cord, or torch body **IMMEDIATELY**.

## FLASH HAZARDS



**WARNING**

### **ARC RAYS CAN INJURE EYES AND BURN SKIN!**

To reduce the risk of injury from arc rays, read, understand, and follow the following safety instructions. In addition, make certain that anyone else that uses this equipment, or is a bystander in the working area understands and follows these safety instructions as well. Headshields and filter should conform to ANSI Z87.1 standards.

- Do not look at an electric arc without proper protection. A cutting arc is extremely bright and intense and, with inadequate or no eye protection, the retina can be burned, leaving a permanent dark spot in the field of vision. A shield or helmet with a number 10 shade filter lens (minimum) must be used.
- Do not strike an arc until all bystanders and you (the operator) have protective shields and/or helmets in place.
- Do not wear a cracked or broken helmet and replace any cracked or broken filter lenses **IMMEDIATELY**.
- To prevent an arc flash from being created on contact do not allow the uninsulated portion of the cutting torch to touch the ground clamp or grounded work.

- Provide bystanders with shields or helmets fitted with a #10 shade filter lens.
- Wear protective clothing. The intense light of the cutting arc can burn the skin in much the same way as the sun, even through light-weight clothing. Wear dark clothing of heavy material. The shirt worn should be long sleeved and the collar kept buttoned to protect chest and neck.
- Protect against REFLECTED ARC RAYS. Arc rays can be reflected off shiny surfaces such as a glossy painted surface, aluminum, stainless steel, and glass. It is possible for your eyes to be injured by reflected arc rays even when wearing a protective helmet or shield. If working with a reflective surface behind you, arc rays can bounce off the surface, then off the filter lens on the inside of your helmet or shield, then into your eyes. If a reflective background exists in your working area, either remove it or cover it with something non-flammable and non-reflective. Reflective arc rays can also cause skin burn in addition to eye injury.

## FIRE HAZARDS



**WARNING**

### **FIRE OR EXPLOSION CAN CAUSE DEATH, INJURY, AND PROPERTY DAMAGE!**

To reduce the risk of death, injury, or property damage from fire or explosion, read, understand, and follow the following safety instructions. In addition, make certain that anyone else that uses this equipment, or is a bystander in the working area, understands and follows these safety instructions as well. **REMEMBER!** Plasma Arc cutting by nature produces sparks, hot spatter, molten metal drops, hot slag, and hot metal parts that can start fires, burn skin, and damage eyes.

- Do not wear gloves or other clothing that contains oil, grease, or other flammable substances.
- Do not wear flammable hair preparations.
- Do not work in an area until it is checked and cleared of combustible and/or flammable materials. BE AWARE that sparks and slag can

- fly 35 feet and can pass through small cracks and openings. If work and combustibles cannot be separated by a minimum of 35 feet, protect against ignition with suitable, snug-fitting, fire resistant, covers or shields.
- Do not cut on walls until checking for and removing combustibles touching the other side of the walls.
- Do not weld, cut, or perform other such work on used barrels, drums, tanks, or other containers that had contained a flammable or toxic substance. The techniques for removing flammable substance and vapors, to make a used container safe for welding or cutting, are quite complex and require special education and training.
- Do not strike an arc on a compressed gas or air cylinder or other pressure vessel. Doing so will create a brittle area that can result in a violent rupture immediately or at a later time as a result of rough handling.
- Do not weld or cut in an area where the air may contain flammable dust (such as grain dust), gas, or liquid vapors (such as gasoline).
- Do not handle hot metal, such as the work piece or electrode stubs, with bare hands.
- Wear leather gloves, heavy long sleeve shirt, cuffless trousers, high-topped shoes, helmet, and cap. As necessary, use additional protective clothing such as leather jacket or sleeves, fire resistant leggings, or apron. Hot sparks or metal can lodge in rolled up sleeves, trouser cuffs, or pockets. Sleeves and collars should be kept buttoned and pockets eliminated from the shirt front.
- Have fire extinguisher equipment handy for immediate use! A portable chemical fire extinguisher, type ABC, is recommended.
- Wear ear plugs when working overhead to prevent spatter or slag from falling into ear.
- Make sure working area has a good, solid, safe floor, preferably concrete or masonry, not tiled, carpeted, or made of any other flammable material.
- Protect flammable walls, ceilings, and floors with heat resistant covers or shields.
- Check working area to make sure it is free of sparks, glowing metal or slag, and flames before leaving the working area.

## PLASMA ARC HAZARDS



### WARNING

**THE HEAT FROM THE PLASMA ARC CAN CAUSE SERIOUS BURNS. THE FORCE OF THE ARC ADDS GREATLY TO THE BURN HAZARD. THE INTENSELY HOT AND POWERFUL ARC CAN QUICKLY CUT THROUGH GLOVES AND TISSUE.**

- Keep away from the torch tip.
- Do not grip material near the cutting path.
- The pilot arc can cause burns - keep away from torch tip when trigger is pressed.
- Wear proper flame retardant clothing covering all exposed body areas.
- Point torch away from your body and toward work when pressing the torch trigger.
- Turn off power source and disconnect input power before disassembling torch or changing torch parts.

## FUME HAZARDS



### WARNING

**FUMES, GASSES, AND VAPORS CAN CAUSE DISCOMFORT, ILLNESS, AND DEATH!**

To reduce the risk of discomfort, illness, or death, read, understand, and follow the following safety instructions. In addition, make certain that anyone else that uses this equipment or is a bystander in the working area, understands and follows these safety instructions as well.

- Do not cut in an area until it is checked for adequate ventilation as described in ANSI standard #Z49.1. If ventilation is not adequate to exchange all fumes and gasses generated during the cutting process with fresh air, do not cut unless the operator and all bystanders are wearing air-supplied respirators.
- Do not heat metals coated with, or that contain, materials that produce toxic fumes (such as galvanized steel), unless

the coating is removed. Make certain the area is well ventilated, and the operator and all bystanders are wearing air-supplied respirators.

- Do not weld, cut, or heat lead, zinc, cadmium, mercury, beryllium, or similar metals without seeking professional advice and inspection of the ventilation of the working area. These metals produce EXTREMELY TOXIC fumes which can cause discomfort, illness, and death.
- Do not weld or cut in areas that are near chlorinated solvents. Vapors from chlorinated hydrocarbons, such as trichloroethylene and perchloroethylene, can be decomposed by the heat of an electric arc or its ultraviolet radiation. These actions can cause PHOSGENE, a HIGHLY TOXIC gas to form, along with other lung and eye-irritating gasses. Do not weld or cut where these solvent vapors can be drawn into the work area or where the ultraviolet radiation can penetrate to areas containing even very small amounts of these vapors.
- Do not weld or cut in a confined area unless it is being ventilated or the operator (and anyone else in the area) is wearing an air-supplied respirator.
- Stop working if you develop momentary eye, nose, or throat irritation as this indicates inadequate ventilation. Stop work and take necessary steps to improve ventilation in the working area. Do not resume work if physical discomfort persists.

## **ADDITIONAL SAFETY INFORMATION**

For additional information concerning welding and cutting safety, refer to the following standards and comply with them as applicable.

- ANSI Standard Z49.1 – SAFETY IN WELDING AND CUTTING – obtainable from the American Welding Society, 550 NW Le Jeune Road, Miami, FL 33126 Telephone (800) 443-9353, Fax (305) 443-7559 – [www.amweld.org](http://www.amweld.org) or [www.aws.org](http://www.aws.org)
- ANSI Standard Z87.1 – SAFE PRACTICE FOR OCCUPATION AND EDUCATIONAL EYE AND FACE PROTECTION – obtainable from the American National Standards Institute, 11 West 42nd St., New York, NY 10036 Telephone (212) 642-4900, Fax (212) 398-0023 – [www.ansi.org](http://www.ansi.org)
- NFPA Standard 51B – CUTTING AND WELDING PROCESS – obtainable from the National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101 Telephone (617) 770-3000 Fax (617) 770-0700 – [www.nfpa.org](http://www.nfpa.org)
- OSHA Standard 29 CFR, Part 1910, Subpart Q, WELDING, CUTTING AND BRAZING – obtainable from your state OSHA office or U.S. Dept. of Labor OSHA, Office of Public Affairs, Room N3647, 200 Constitution Ave., Washington, DC 20210 – [www.osha.gov](http://www.osha.gov)
- CSA Standard W117.2 – Code for SAFETY IN WELDING AND CUTTING. – obtainable from Canadian Standards Association, 178 Rexdale Blvd., Etobicoke, Ontario M9W 1R3 – [www.csa.ca](http://www.csa.ca)
- American Welding Society Standard A6.0. WELDING AND CUTTING CONTAINERS WHICH HAVE HELD COMBUSTIBLES. – obtainable from the American Welding Society, 550 NW Le Jeune Road, Miami, FL 33126 Telephone (800) 443-9353, Fax (305) 443-7559 – [www.amweld.org](http://www.amweld.org) or [www.aws.org](http://www.aws.org)

# PLASMA CUTTER SPECIFICATIONS

## DESCRIPTION

Your new Plasma Cutter is designed as a clean, distortion free means of cutting through metal, up to 1/2" inch thick. The plasma cutter power generator consists of a transformer, an inverter unit, and a PC Board. The PC Board controls the unit safeguards and governs the work cycles of the various components which make up the unit, such as the solenoid valve, the power contactor, etc.

Table 1 lists your Plasma Cutter specifications.

Primary (input) volts	230 Vac
Primary (input) I <sub>max</sub> Amps	28,5
Phase	Single
Frequency	60Hz
Secondary (output) volts	96
Secondary amps	18
Duty Cycle	40Amps@20% 25Amps@60% 20Amps@100%

## PLASMA CUTTER OPERATING CHARACTERISTICS

### DUTY CYCLE

The duty cycle rating of a plasma cutter defines how long the operator can cut and how long the unit must be rested and cooled. Duty cycle is expressed as a percentage of 10 minutes and represents the maximum cutting time allowed. The balance of the 10-minute cycle is required for cooling. This plasma cutter is designed for 20% duty cycle at 40Amps. This means that you can cut for 2 minutes out of 10 with the remaining 8 minutes required for cooling.

### INTERNAL THERMAL PROTECTION CAUTION

Do not constantly exceed the duty cycle or damage to the unit can result.

If you exceed the duty cycle of the plasma cutter, an internal thermal protector will open, shutting off all functions except the cooling fan. If this happens, DO NOT SHUT OFF THE UNIT. Leave the unit turned on with the fan running. After cooling, the thermal protector will automatically reset and the unit will function

normally again. However you should wait at least ten minutes after the thermal protector opens before resuming work. You must do this even if the thermal protector resets itself before the ten minutes is up or you may experience less than specified duty cycle performance.

### ELECTRIC SHOCK PROTECTION

An electric shock protection device prevents the operator from coming into contact with electrically live parts of the torch (such as the electrode, etc.). This consists of a safety device, built into the body of the torch, which puts the unit in safety mode when the end part of the torch is removed to replace the electrode or the nozzle. NOTE: When the electrical protection device is activated, the unit is prevented from operating.

### PLASMA ARC AND BASIC PRINCIPLES FOR THE PERFORMANCE OF PLASMA CUTTING

- Plasma is a gas that is heated to an extremely high temperature and ionized so that it becomes a conductor of electricity.
- This cutting procedure utilizes the plasma to transfer the electric arc to the metal workpiece, which is melted by the heat and then separated.
- The torch uses compressed air from a single source, for both the plasma and cooling and protective gas.
- The plasma cycle is started when the airflow moves the electrode away from the cutting tip, which initiates the pilot arc.
- When the torch is brought into direct contact with the workpiece to be cut (connected to the positive polarity of the power source) the pilot arc is transferred between the electrode and the workpiece itself thus striking a plasma arc, also called cutting arc.
- The duration of the pilot arc is set in the factory at 3 seconds; if the transfer has not been made within this time, the cycle is automatically stopped except for the cooling air which is kept on.

# KNOW YOUR PLASMA CUTTER

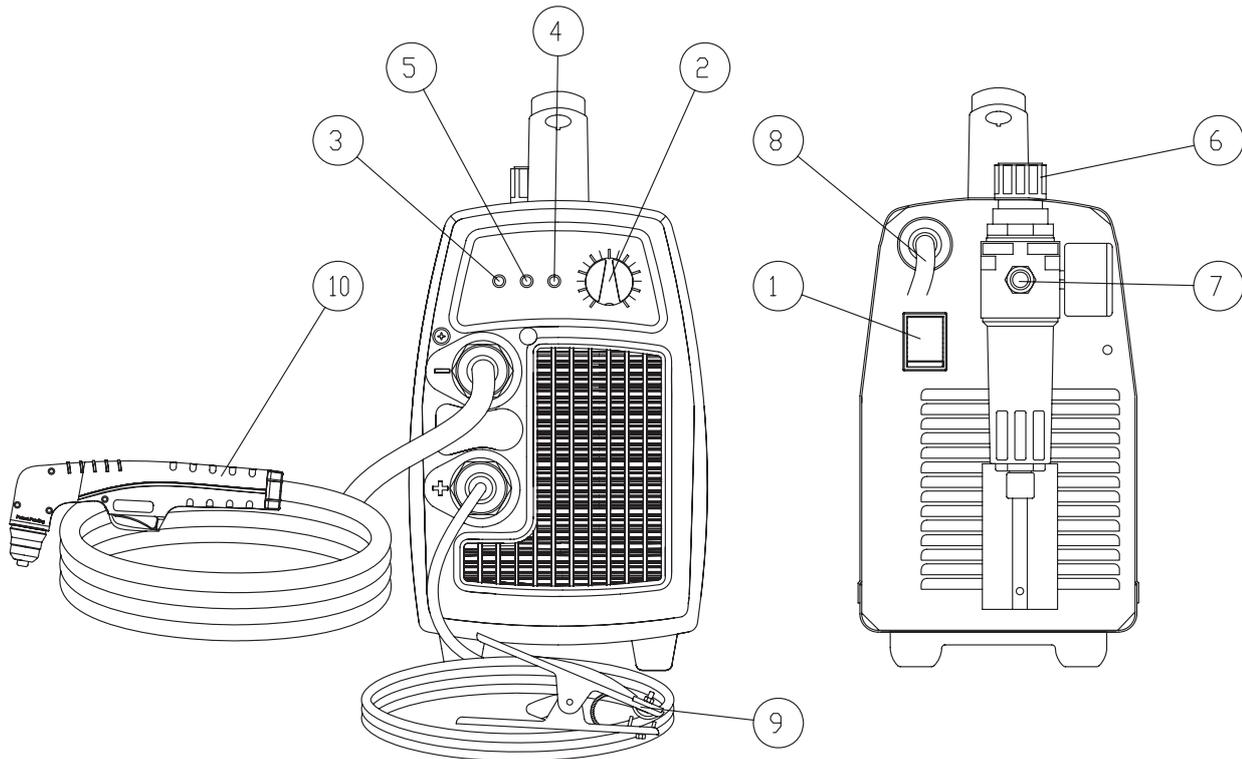


Figure 1 MICROCUT 600

## 1. ON/OFF SWITCH

In the ON position the machine is ready for normal operation. All system control circuits are activated. OFF position deactivates control circuits.

## 2. OUTPUT CURRENT KNOB

Adjusts the cutting current supplied by the machine according to the thickness of material/speed.

## 3. GREEN LED (220V POWER)

Turns ON when input voltage is applied within normal range – blinks slowly when input voltage goes above 260Vac, or below 180Vac.

## 4. RED LED (CUTTING CURRENT)

Turns ON when torch is triggered. Blinks quickly during 3 second safety pre-flow prior to pilot arc ignition. Blinks slowly if cutting arc is not initiated after 3 second pilot arc ignition.

## 5. YELLOW LED (THERMO/AIR PRESSURE)

Turns ON when the thermal protection is activated. Blinks slowly when air pressure is too low (less than 55 Psi).

## 6. AIR REGULATOR

Adjusts the input air pressure - pull upward to unlock - nominal air pressure setting is 65 Psi - while the air is flowing. Note: the regulator should never be set above 87 Psi.

## 7. COMPRESSED AIR CONNECTION

## 8. INPUT CORD

## 9. WORK CABLE WITH CLAMP

## 10. PLASMA TORCH

# PLASMA CUTTER INSTALLATION

## POWER SUPPLY CONNECTION



This plasma cutter is designed to operate on a properly grounded 230 volt, 60Hz, single-phase alternating current (ac) power source fused with a 30 amp time delayed fuse or circuit breaker.

## EXTENSION CORD RECOMMENDATIONS

Use an extension cord of an appropriate wire size for the cord length and system voltage. Use a cord that meets national and local codes.

<b>Input Voltage</b>	<b>Phase</b>
230VAC	1
<b>Recommended cord gauge size</b>	<b>Length</b>
8 AWG	up to 33 ft (10m)

## GENERATOR RECOMMENDATIONS

When using a generator with this machine, it should produce 230VAC.

<b>Engine Drive Rating</b>	<b>Output Current</b>	<b>Performance</b>
8KW	40Amps	Full Arc Stretch

## CONNECTION TO GROUND CABLE

Connect the dinse plug to the socket and the work cable clamp to the piece to be cut or to the metallic workbench. Take following precautions:

- Verify that there is a good electrical contact particularly if insulated or oxidated coated sheets are cut.
- Make ground connections as close as possible to the cutting area. The use of the metallic structures which are not part of the workpiece, such as the return cable of the cutting current, may endanger the safety system and give poor cutting results.
- Do not make a ground connection on the piece which has to be removed.

## TORCH CONNECTION

**WARNING!: BEFORE STARTING THE CUTTING OPERATIONS VERIFY THAT THE PARTS ARE PROPERLY ASSEMBLED BY INSPECTING THE HEAD OF THE TORCH AS SHOWN ON PARAGRAPH "TORCH MAINTENANCE"**

## LOCATION AND HANDLING OF THE POWER SOURCE

- Choose location verifying that there is a good air flow and no dust, smoke or gas is present.
- Make sure that obstacles do not prevent the cooling air flow out of front and rear openings of the machine.
- Arrange an open space of at least 16ft around the machine.
- In the case the machine has to be moved, always disconnect the plug from the outlet and gather the cables and pipes so as not to damage them.

## COMPRESSED AIR

A source of clean, dry air or nitrogen must be supplied to your plasma cutting unit. The supply pressure must be between 72.5 and 150 psi. The flow rate is approximately 3.5 cu.ft./min. Failure to observe these precautions could result in excessive operating temperatures or damage to the torch.

An air regulator is included with the unit with optimum pressure setting set to 65 PSI.

**NOTE: THE REGULATOR SHOULD NEVER BE SET ABOVE 87 PSI.**

# CUTTING OPERATION

## PRELIMINARIES

### WARNING:

unplug the unit from the power supply before assemble or disassemble piled parts, single parts, parts of the torch, torch assemblies or cables.

- Check and follow instructions as foreseen in the paragraphs "Safety and Installation" of the present instructions manual.

## PARTS OF THE TORCH

- Check the torch for proper assembly. Install proper torch parts for the desired application (refer to Section called Torch Consumable Parts Selection). NOTE: The power supply will not operate unless the torch shield cup is fully seated against the PIP (Parts in Place) pins in the torch head.

## INPUT POWER

- Check the power source for proper input voltage.
- Make sure the power source meets circuit protection and wiring requirements.
- Plug unit in and close main disconnect switch to supply primary power to the system.

## GROUND CABLE

- Check for a solid ground cable connection to the workpiece.

## AUTOMATIC PURGE SYSTEM

- Place the ON/OFF switch to the ON position. The ON light will flicker momentarily as the system powers up and then stays on. Activate the torch button to initiate gas purge (pre-flow) to remove any condensation that may have accumulated in the torch and leads while the system was shut down. When the gas purge is complete, pilot arc will be initiated.

### WARNING

**Do not** initiate pilot arc during adjustment.

## MANUAL PURGE

Oil in the air is a severe problem and must be avoided.

The unit is also equipped with an air filter which captures water and oil vapor.

The vapor collected can be drained out turning the drain knob located on the air filter. Three Position Drain knob, select the desired position:

1. Open
2. Open when no air pressure, closed when air pressure.

**THE DRAIN KNOB SHOULD NOT BE LEFT IN THIS POSITION DURING CUTTING OPERATIONS.**

3. Closed

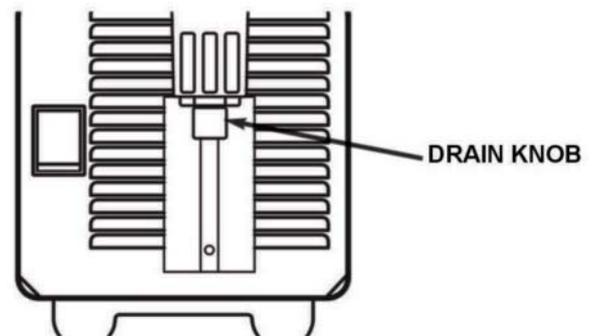


Figure 2 DRAIN

**Note: The unit will not operate if the input air pressure is below 55 PSI.**

## CUTTING

### A. CUTTING WITH A HAND TORCH

- The torch can be comfortably held in one hand or steadied with two hands. Choose the technique that feels most comfortable and allows good control and movement. Position the index finger or thumb to press the control switch on the torch handle.
- For edge starts, hold the torch perpendicular to the workpiece with the front of the tip on the edge of the workpiece at the point where the cut is to start. - Figure 3. For piercing, angle the torch slightly to direct sparks away from the torch until the pierce is complete. Figure 4.

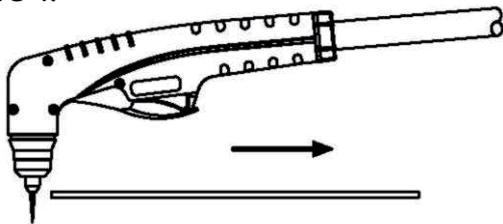


Figure 3

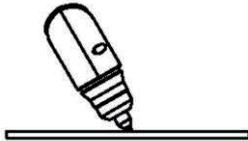


Figure 4

- For drag cuts keep the torch in contact with the workpiece. For standoff cutting, hold the torch within 5/64" - 1/8" from the work.
- With the torch in starting position, press the control switch. After an initial gas purge (pre-air), the pilot arc will come on and remain on for 3 seconds until the cutting arc starts.
- Once on, the main arc remains on as long as the control switch is held down, unless the torch is withdrawn from the work or torch motion is too slow. Keep moving while cutting. Cut at a steady speed without pausing. Maintain the cutting speed so that the arc lag is about 30° behind the travel direction. Fig. 5

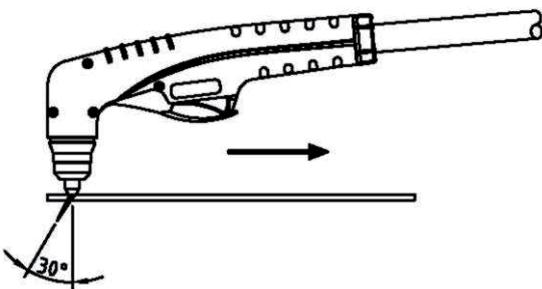


Figure 5

- If the cutting arc is interrupted, and the torch trigger is still pressed, the pilot arc comes back on automatically for 3 seconds.
- To shut off the torch simply release the control switch. When the switch is released a post-flow will occur. If the torch trigger is pressed during the post-flow, the pilot arc will restart.

### B. PIERCING WITH A HAND TORCH

Note: Recommended maximum piercing capacity is 5/64". If necessary to make a cut on a metal sheet with a thickness more than 5/64" without an edge start, make a hole at least 1/4" using an electric drill to start cutting.

- When piercing with a hand torch, tip the torch slightly so that blowback particles blow away from the torch tip (and operator) rather than directly back into it. Figure 4.

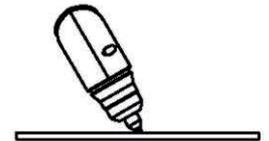


Figure 4

- Complete the pierce off the cutting line and then continue the cut onto the line. Hold the torch perpendicular to the workpiece after the cut is complete. Figure 6.

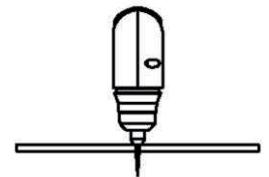


Figure 6

- Clean spatter and scale from the shield cup and the tip as soon as possible. Spraying or dipping the shield cup in anti-spatter compound will minimize the amount of scale which adheres to it.

### C. CUTTING GRATES

**To cut grates it is recommended to set the cutting current between 20 - 34A.**

#### WARNING

Disconnect primary power at the source and wait that the torch has cooled before disassembling the torch or torch leads. Frequently review the Important Safety Precautions at the front of this Manual. Be sure the operator is equipped with proper gloves, clothing, eye and ear protection. Make sure no part of the operator's body comes into contact with the work piece while the torch is activated.



### CAUTION

Sparks from the cutting process can cause damage to coated, painted, and other surfaces such as glass, plastic and metal.

**NOTE** Handle torch leads with care and protect them from damage.

## TORCH CONSUMABLE PARTS SELECTION

To change the torch consumable parts use the following procedure: Position the torch with the shield cup facing upward to prevent these parts from falling out when the cup is removed.

Use:

- .036 ø cutting tip to cut pieces more than .2 inch thick (output current 30-40 Amp)
- .031 ø cutting tip to cut pieces more than .2 inch thick (output current 20-30 Amp)
- .025 ø cutting tip to cut pieces less than .2 inch thick (output current 10-20 Amp)

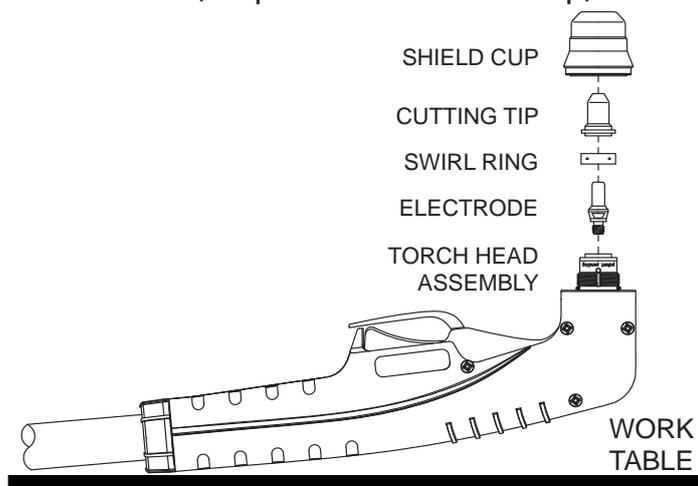


Figure 7 PLASMA TORCH CONSUMABLE PARTS

**WARNING: Wait the torch has sufficiently cooled before replacing torch parts.**

1. Unscrew and remove the shield cup from the Torch Head Assembly.
2. Remove the tip, swirl ring, and electrode.
3. Install the electrode, swirl ring, and tip.
4. Hand tighten the shield cup until it is seated on the torch head. If resistance is felt when installing the cup, check the threads before proceeding.

## OPERATING FAULTS

During cutting operations performance faults may arise which are not caused by the plasma cutter but by other operational faults such as:

- Insufficient penetration :
  - too high cutting speed;
  - torch is too tilted;
  - piece is too thick;
  - cutting current too low;
  - torch parts are worn out;
  - non-genuine Manufacturer's parts;
- Interruption of the cutting arc:
  - cutting speed too slow;
  - excessive distance between torch and workpiece;
  - AC line too low - reduce output current;
  - torch parts are worn out;
  - non-genuine Manufacturer's parts;
  - work cable is disconnected;
- Excessive dross:
  - too low cutting speed (bottom dross);
  - too high cutting speed (top dross);
  - excessive distance between torch and workpiece;
  - cutting current too low;
  - torch parts are worn out;
  - non-genuine Manufacturer's parts;
- Tilted cutting (not perpendicular):
  - torch position not correct;
  - asymmetric wear of nozzle hole and/or wrong;
  - assemblage of the torch parts;
- Excessive wear of nozzle and electrodes:
  - air pressure too low;
  - exceeding system capability (material too thick);
  - contaminated air (humidity-oil);
  - excessive pilot arc arc ignitions in the air;
  - Improperly assembled torch;
  - torch tip contacting workpiece;
  - damaged or loose torch head components;
  - non-genuine Manufacturer's parts.

## MAINTENANCE

Maintenance can only be carried out on the unit if the person in charge of this operation has the necessary technical knowledge and the correct tools. If this is not the case, contact your nearest service centre.

### CAUTION!

**Never access inside the machine (panel removal) or touch the torch (disassembly) without having disconnected power plug. Any inspection performed under voltage inside the machine or inside the torch may cause severe electric shocks caused by direct contact with parts under voltage.**

### UNIT

Keep the cutting or gouging area and the area around the machine clean and free of combustible materials. No debris should be allowed to collect, this could obstruct air flow to the machine.

Inspect the unit every 3-4 months (depending on how often the unit is used) and use compressed air to remove any dust deposits.

### CAUTION!

**Only use dry compressed air for cleaning. Do not point the jet of air at the electronic circuits.**

### TORCH

Periodically, according to its use or to cutting faults verify wear of the parts connected to plasma arc:

#### **Shield Cup:**

Unscrew manually from head of the torch. Clean thoroughly and replace if damaged (burns, distortions or cracks). Verify integrity of superior metal sector (actuator torch safety).

#### **Tip:**

Check wear of plasma arc hole and of inner and outer surfaces. If the hole is widened compared to its original width or if it is damaged, replace tip. If surfaces are particularly oxidated clean them with extra fine abrasive paper.

#### **Swirl Ring:**

Verify there are no burns or cracks or that airflow holes are not obstructed. If damaged, replace immediately.

#### **Electrode:**

Replace electrode when crater settling on emitting surface is about 5/64".

### WARNING!

- Before disassembling to the torch let it cool for at least the "postgas" period.
- We recommend replacing the electrode and tip AT THE SAME TIME.
- Be sure to install the torch parts in the correct order.
- Be careful that swirl ring is assembled properly.
- Reassemble shield cup screwing tightly and manually.
- Never assemble shield cup without having assembled electrode, swirl ring and tip before hand.
- Timely and appropriate control procedures on torch parts are essential for safety and functionality of the cutting system.

### TORCH BODY, HANDLE AND CABLE

- These parts usually need no particular maintenance with the exception of a periodic inspection and an accurate cleaning to be made WITHOUT THE USE OF SOLVENTS. In case of damages to the insulation such as breaks, cracks and burns or even a loosening of electric conductors, the torch CANNOT BE USED FURTHER SINCE SAFETY CONDITIONS HAVE NOT BEEN RESPECTED. IN THIS CASE, REPAIRING (EXTRAORDINARY MAINTENANCE) CANNOT BE MADE ON SITE BUT NEEDS TO BE DELEGATED TO A SERVICE CENTER TO MAKE SPECIAL RESTRICTIONS AFTER REPAIRING HAS BEEN EXECUTED. In order to keep the torch and the cable efficient it is necessary to follow these precautions:
  - DO NOT touch torch and cable with warm or hot parts.
  - DO NOT strain the cable.
  - DO NOT move the cable on sharp edges or abrasive surfaces.
  - gather the cable in regular coils if it is too long.
  - DO NOT step on the cable.

### COMPRESSED AIR FILTER

The unit is equipped with a filter for the compressed air. This filter is fitted with a knob for the manual drain of the condensation. Purge periodically to remove the water/oil in the filter by following the instructions of paragraph "Compressed air".

## TROUBLESHOOTING

### SYMPTOM

### POSSIBLE CAUSE AND REMEDY

GREEN LED OFF, Fan not operating. No Input Power.

1. Plug unit into 230V outlet.
2. Reset Breaker.

GREEN LED ON, YELLOW Thermo LED ON. Unit is overheated.

1. Make sure the unit has not been operated beyond duty cycle limits.
2. Air Flow obstructed.

GREEN LED ON,  
YELLOW Thermo / air pressure LED blinks.

1. Air not connected or pressure too low. Check source for at least 72.5 PSI during purge or pre-flow, adjust air pressure to 65 PSI.
2. Air filter or air line blocked, torch blocked. Replace filter cartridge. Check that air line and torch leads are free of twists and kinks.

GREEN LED ON, YELLOW Thermo / air pressure LED OFF, no air flow when torch switch pressed.

1. Shield cup not properly installed on torch. Check that shield cup is fully seated against torch.
2. Faulty Torch Switch or Parts Assembly in torch holder. Refer to Maintenance paragraph.
3. Faulty Main PC Board Repair / Replace Power Supply.

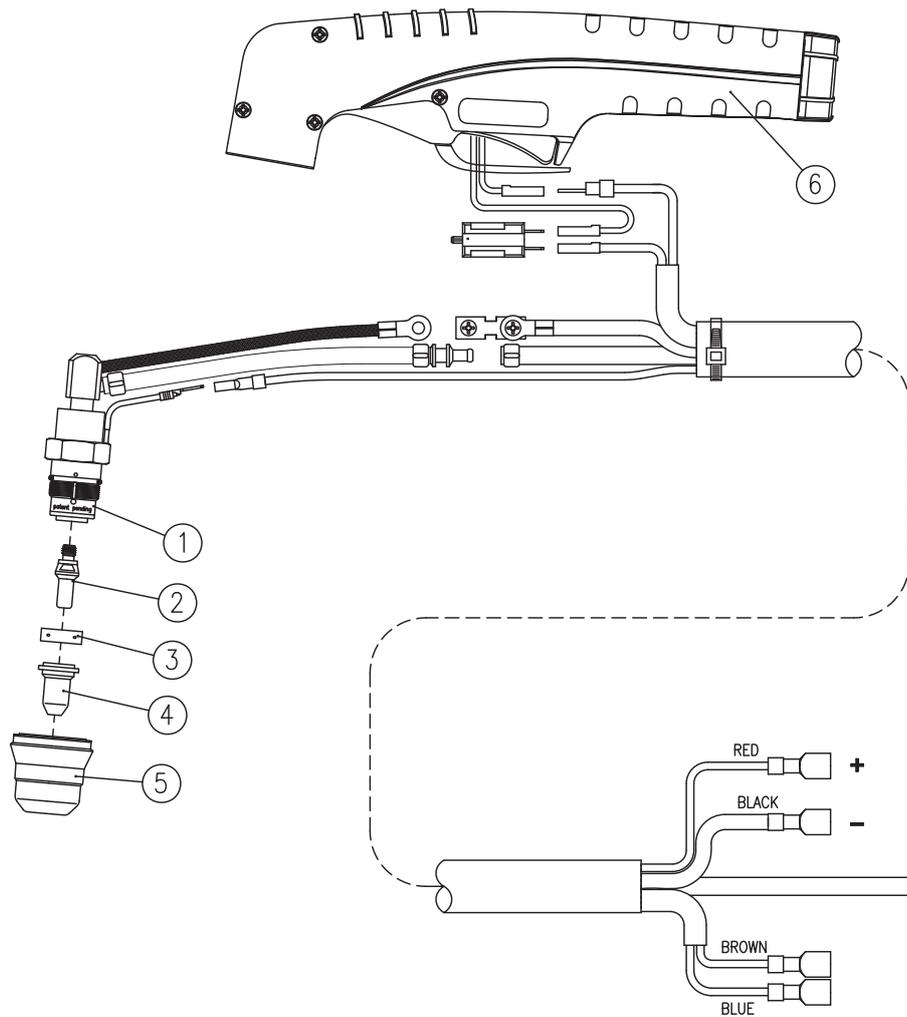
GREEN LED ON, YELLOW Thermo / air pressure LED OFF. Air flows, Pilot arc does not start.

1. Faulty torch parts. Inspect torch parts and replace if necessary.
2. Air pressure too high. Set pressure to 65 PSI while flowing.
3. Faulty main PC Board. Repair /replace.

Torch has pilot arc but does not cut.

1. Work lead not connected. Make sure work lead is connected securely to bare metal.
2. AC input power too low. Use shortest distance to breaker panel possible.
3. Faulty Main PC Board.Repair/Replace.

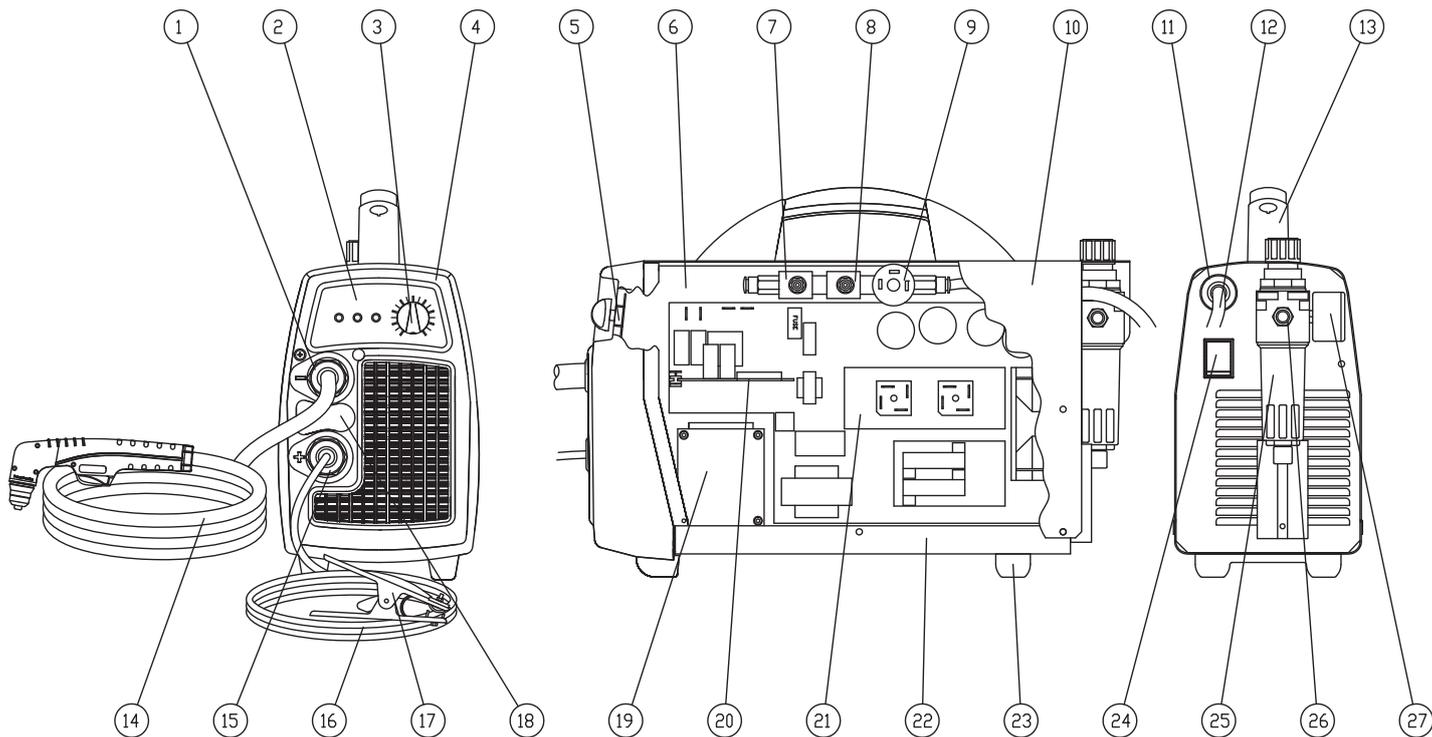
# TORCH PARTS DRAWING



# TORCH PARTS LIST

	60180	COMPLETE TORCH	
01	60002	TORCH HEAD	1
02	60003	ELECTRODE	1
03	60004	SWIRL RING	1
04	60025	TIP .025 (10-20A)	1
04	60031	TIP .031 (20-30A)	1
04	60036	TIP .036 (30-40A)	1
05	60005	SHIELD CUP	1
06	60008	HANDLE+MICRO	1

## UNIT PARTS DRAWING



## UNIT PARTS LIST

01	21605040	CABLE CLAMP	1
01	21605041	NUT FOR CABLE CLAMP	1
02	77650256	REGULATION PLATE	1
03	04600331	POTENTIOMETER KNOB	1
04	21690523	FRONT FRAME	1
05	22735213	FRONT PANEL P.C. BOARD	1
06	33620189	DIVIDING PANEL	1
07	22900020	SOLENOID VALVE	1
08	22900012	SOLENOID VALVE	1
09	22900016	PRESSURE SWITCH	1
10	04600226	COVER PANEL	1
11	21605040	CABLE CLAMP	1
11	21605041	NUT FOR CABLE CLAMP	1
12	20220120	INPUT CABLE	1
13	21600030	PLASTIC HANDLE	1
14	60180	PLASMA TORCH	1
15	21605039	CABLE CLAMP + NUT	1
16	43210150	EARTH CABLE	1
17	22110007	EARTH CLAMP	1
18	77650257	LABEL	1
19	44155067	TRANSFORMER	1
20	42735131	CONTROL P.C. BOARD	1
21	42735130	COMPLETE P.C. BOARD	1
22	33700300 9005	LOWER PANEL	1
23	21610019	LITTLE FEET	1
24	22200047	SWITCH	1
25	22905079	FILTER	1
26	22910068	1/4"G - 1/4" NPT FITTING	1
27	22905080	FILTER GAUGE	1

