Owner's Manual

HTP Air Plasma Cutting Systems

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Introduction

Congratulations on your purchase of an HTP America Air Plasma Cutting System. Your purchase of an HTP Air Plasma Cutting System means that you have purchased one of the most technologically advanced, safest and economical plasma cutters available today.

The owner's manual has been designed to instruct you on the safe operation of your HTP Plasma Cutting System. If you read and follow the instructions in this manual, your plasma cutter will provide you with years of trouble free operation. If you fail to read and understand this manual, and correctly follow the operating instructions, you will significantly shorten the operating life of your plasma cutter.

Operation of your plasma cutting system without proper understanding of the facts contained within this manual or under unsafe or hazardous conditions may lead to SERIOUS INJURY OR DEATH!

Limited Warranty

Subject to the terms and conditions hereof, HTP warrants to its Distributor/Dealer that all new and unused Equipment furnished by HTP is free from defect in workmanship and material as of the time and place of delivery by HTP. No warranty is made by HTP with respect to trade accessories or other items manufactured by others. Such trade accessories and other items are sold subject to the warranties of their respective manufacturers, if any.

Except as specified below, HTP's warranty does not apply to components having normal useful life of less than one (1) year, such as relay and contactor points.

HTP shall be required to honor warranty claims on warranted Equipment in the event of failure resulting from a defect within the following periods from the date of delivery of Equipment to the original user:

1.Arc welders, power sources and components: 1 year.

2.All welding guns and plasma toches: 90 days.

3.The electrode, cutting nozzle, insulator, spring, and gas diffuser are consumable items, WHICH CARRY NO WARRANTY.

provided that HTP is notified in writing within thirty (30) days of the date of such failure.

As a matter of general policy only, HTP may honor claims submitted by the original user within the foregoing periods.

In the case of HTP's breach of warranty or any other duty with respect to the quality of any goods, the exclusive remedies therefore shall be, at HTP's option (1) repair or (2) replacement or, where authorized in writing by HTP in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized HTP service station upon return of the goods at Customer'r risk and expense. HTP's option of repair or replacement will be F.O.B., Factory at Palatine, Illinois, therefore, no compensation for transportation costs of any kind will be allowed. Upon receipt of notice of apparent defect or failure, HTP shall instruct the claimant on the warranty claim procedures to be followed.

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

ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY HTP IS EXCLUDED AND DISCLAIMED BY HTP.

Safety Precautions

WARNING: Before performing any installation or operating procedures read and follow the safety precautions listed below. Failure to observe these safety precautions can result in personal injury or death.

Personal Protection: Skin and eye burns resulting from body exposure to the electric-arc welding rays or hot metal can be more severe than sunburn:

a. Use a proper face shield fitted with correct filter and cover plates to protect your eyes, face, neck and ears from sparks and rays of the cutting arc when cutting or observing cutting. WARN bystanders not to watch the arc or expose themselves to the welding-arc rays or hot metal.

b. Wear flameproof gauntlet-type gloves, heavy long-sleeve shirt, cuffless trousers, high topped shoes and a welding helmet or cap for hair protection to protect the skin from arc rays and hot sparks or metal. A flameproof apron may also be desirable as protection against radiated heat and sparks.

c. Hot sparks or metal can lodge in rolled up sleeves, trouser cuffs or pockets. Sleeves and collars should be buttoned, and pockets eliminated from the front of the clothing. Protect other nearby personnel from arc rays and sparks with a suitable non-flammable partition.

d. Always wear safety glasses or goggles within the cutting area. Use safety glasses with side shields or goggles when chipping slag or grinding. Chipped slag is hot and can travel considerable distances. Bystanders should also wear safety glasses or goggles.

Fire Protection: Hot slag, or sparks, can cause serious fires when in contact with combustible solids, liquids or gases:

a. Remove all combustible materials well away from the welding area or completely cover the materials with a non-flammable covering. Such combustible materials include wood, clothing, sawdust, gasoline, kerosene, paints, solvents, natural gas, acetylene, propane and similar combustible articles.

b. Hot sparks or hot metals can fall into cracks in floors or wall openings and cause a

hidden smouldering fire. Make certain that such openings are protected from hot sparks and metal. Do not weld, cut or perform other work on used barrels, drums, tanks or other containers until they have been completely cleaned.

c.For fire protection, have fire extinguishing equipment handy for instant use. After completion of cutting, inspect the work area for hazardous hot sparks or metal.

Electrical Shock: Voltages in excess of 110V can cause severe burns or fatal shock. Severity of electrical shock is determined by the path and amount of current through the body:

a.Never allow live metal parts to touch bare skin or wet clothing. When standing on metal or welding in a damp area you must be well-insulated. Wear dry gloves and rubber-soled shoes. Stand on a dry board or platform.

b.Always ground the plasma cutter by connecting a ground wire between the machine and electrical ground. Do not use worn, damaged or overloaded welding cables. Use well maintained equipment.

c.When not cutting, turn off the equipment. Accidental grounding can cause overheating and create a fire hazard. Do not coil or loop the welding cable around parts of your body. Be sure the ground cable is connected to the workpiece as close to the cutting area as possible. Ground connected to building framework or remote locations increase the possibility of the stray cutting current.

d.Keep everything dry; clothing, work area, welding cables, electrode holder, and cutting machine. Fix water leaks immediately.

Ventilation: Cutting fumes, particularly in confined places, can cause discomfort and physical harm if breathed over an extended period of time:

a.Provide adequate ventilation by natural or mechanical means. Do not cut on galvanized zinc, lead, beryllium, or cadmium materials unless positive mechanical ventilation is provided!

b.Do not cut in locations close to chlorinated hydrocarbon vapors from degreasing or spraying operations. Heat or arc rays react with solvent vapors forming phosgene, a highly toxic gas.

c.If you develop momentary eye, nose or throat irritation during cutting, ventilation is not adequate. Stop work and take necessary steps to improve ventilation. Discontinue cutting if physical discomfort persists.

d.Refer to AWS Standard Z49.1 in Item 6 for specific ventilation recommenda- tions.

Equipment Maintenance: Faulty or improperly maintained plasma cutting equipment results in poor cut-quality. It can cause physical injury or death through fires or electrical shock.

a.Whenever possible, have a qualified person perform the installation, troubleshooting and maintenance work on the plasma cutter. Do not perform any electrical work on the plasma cutter unless qualified to perform such work. Before performing any maintenance work inside the plasma cutter, disconnect the machine from the main electrical power source.

b.Maintain plasma cutting cables, grounding wire and connections, power cord and plasma cutter in safe working order. Do not operate the welding machine or accessory equipment in faulty condition. Keep the equipment away from heat sources such as furnaces, wet conditions such as water puddles, oil or grease, corrosive atmospheres and inclement weather.

c.Keep all safety devices and cabinet covers in position and in good repair. Use the plasma cutter for its intended purpose and do not modify it in any manner. Unauthorized maintenance repair will result in loss of warranty coverage.

Additional Safety Information:

a."Safety in Welding and Cutting" - AWS Z49.1

b."Recommended Safe Practices for Gas-Shielded Arc Welding" - AWS A6.1

c."Safe Practices for Welding and Cutting Containers that Have Held Combustibles" - AWS A6.0

d."Recommended Safe Practices for Plasma Arc Cutting" - AWS A6.3

e. "Recommended Safe Practices for Plasma Arc Welding" - AWS C5.1

Inspection

After removing your MICROCUT 375 from its shipping carton, inspect the plasma system for any concealed damage not seen upon receiving the unit. Any claims for loss or damage occurring during shipping must be filed by the purchaser with the freight company. Your HTP America, Inc. PCA Plasma Systems are shipped completely assembled with a 12' or 25' NPT-3R Plasma Torch, 10' Ground Cable Assembly, and 10' input power cord.

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

Electrical Connection

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 PCA Plasma System, the yellow-green wire MUST BE CONNECTED TO GROUND, OR SERIOUS INJURY OR DEATH MAY RESULT!

ELECTRICAL 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 machine. This would provide a safe and easy method to remove all electrical power from your plasma system whenever it is necessary to perform internal inspection or servicing.

BEFORE ATTEMPTING TO MAKE ANY PRIMARY POWER CONNECTIONS TO YOUR MICROCUT 375, BE SURE THAT ALL POWER IS OFF BY OPENING THE LINE DISCONNECT SWITCH.

MICROCUT 250 P

Your Microcut 250 P has been designed to operate from 220 volt single phase power wired for a minimum of 35 amps. The green or yellow-green wire must be connected to ground. To ensure proper operation, the correct input voltage must be selected.

Actual Input Voltage	Machine Setting
200 to 214	208 v
215 to 228	220 v
229 to 245	235 v

MICROCUT 375 P

Your MICROCUT 375 has been designed to operate from three, standard, single phase input voltages. 115 volts @ 25 amps, 230 volts @ 16 amps, or 460 volts @ 8 amps. Each machine leaves the factory wired for 230V. The green or yellow-green wire must be connect to ground.

To change voltages, taps on both the main transformer and the control transformer must be changed. If you do not change the taps on both the main and control transformer, serious damage will result.

The following diagram indicates how the taps on the main transformer must be changed

to accommodate different voltages.

To change the control transformer, you will notice one wire on the front side (terminals 1 thru 7) is not soldered on and can be moved. When the machine comes from the factory, this wire is in position 4, or the 220 volt position. Moving this wire from position 4 to position 3 will wire the control transformer for 110 volts. Likewise, position 7 is for 460 volts and position 6 is for 240 volts.

PCA 65

Your PCA 65 plasma cutter is designed to operate on 220 volt single phase power wired for a minimum of 60 amps. The green or yellow-green wire must be connected to ground. To ensure proper operation, the correct input voltage must be selected.

Actual Input Voltage	Machine Setting
200 to 214	208 v
215 to 228	220 v
229 to 245	235 v

Plasma/Cooling Gas Connection

Your Plasma Cutter has been designed to use Clean, Dry Compressed Air as both the plasma and cooling gas. Water and/or Oil in the air will significantly reduce the life of the electrode and the cutting nozzle, at the same time reducing the quality of the cut. Specifications on proper pressure and volume are noted on the specification sheet.

Safety sensing circuitry has been installed to eliminate arc-initiation if the pressure and volume are inadequate. Check the pressure and volume levels per the specification sheet.

Damage to your Plasma Cutter due to excessive water and/or oil in the air supply line is not carried under warranty. HTP America, Inc. recommends part no. 807.0001 as a solution to excessive water or oil.

Machine Model	Plasma/Cooling Gas Pressure and Volume
Microcut 250	80 to 100 psi 2 1/2 cfm
Microcut 375	60 psi 3 1/2 cfm
PCA 65	75 psi 7 3/4 cfm

WARNING: Check the air regulator set every day for proper pressure, volume and water/oil levels.

Torch Connection

MICROCUT 250P and 375

These cutters come with the plasma torch installed on the machine and ready for use.

PCA 65

Disconnect power from the machine. Remove the four phillips head screws holding the upper side panel on. Insert the torch cable assembly through the opening in the front of the machine. Connect the brass fitting to the appropriate male threaded receptible. Connect the two trigger wires to the spade terminals. Using a 10mm wrench, connect the high frequency cable eyelet to the ground block and tighten securely. Install the side cover.

Ground Cable Connection

Connect the ground clamp as close to the workpiece as possible. This will reduce the possibility of current loss through stray paths. Always connect the clamp to a clean, bare metal.

MICROCUT 250P and 375

The Ground Cable is connected to the machine at delivery. No installation is required. To replace or repair the Ground Cable, please contact HTP America, Inc. directly.

PCA 65

The ground cable is connected to the front of the machine. Plug the cable into the recepticle labeled "WORK" and twist clockwise until tight.

Operation

MICROCUT 250 P

1.Be sure your Micro Cut 250P is connected to a clean, dry source of compressed air with a line pressure between 80 and 100 psi.

2.Connect your Micro Cut 250P to a 220 volt power supply. (see electrical connection). Turn the On-Off switch on. The indicator lamp will light and the fan will begin to turn.

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 or the work piece that is as close as possible to the area to be cut. Make sure the ground clamp comes in contact with clean, bare metal. If you are working on an automobile, make sure the ignition is off, and possibly disconnect the battery. Many auto manufacturers recommend the removal of on-board computers - if you have any questions, check with the vehicle manufacturer.

5.Your Microcut 250P has a safety clip which prevents the trigger from being operational if the plasma torch is disassembled. Make sure that your safety clip is correctly installed on the cutting torch. If the brass strip on the safety clip is not in contact with the brass ears on the cutting torch then the machine will not operate.

6.Now we are ready to cut. First, depress the trigger on the cutting torch. You will hear a relay inside the cutter pull in and cooling air will start to flow. This will purge the lines and get any impurities out of the system. If you release the trigger the relay will kick out and the air will stop flowing.

Depress the trigger once again and you will hear the relay pull in and air start to flow. With the trigger depressed, bring the cutting torch in contact with the work. Push the cutting torch against the work and IMMEDIATELY let the spring in the torch head push the cutting torch back. The plasma arc will start.

When we push the cutting torch down, we are actually grounding the cutting nozzle against the electrode. By letting the spring push the cutting nozzle back, we then create a spark which initiates the plasma arc. See the cutting torch parts breakdown on page XXX to understand the relationship between these parts.

The highest cutting efficiency is acheived by keeping the plazma cutting nozzle perpendicular and in contact with the work surface putting very little downforce on the plasma torch. Begin to move the plasma torch where you want the metal to be cut.

If you move too fast, sparks will shoot up and you will not cut all the way through the work. If you are cutting correctly all the plasma sparks will go beneath the panel you are cutting.

To stop cutting, simply release the trigger on the plasma torch, and the arc will extinguish. After you have stopped cutting, the cutting nozzle, electrode, and gas diffuser will be hot. To help cool them off it is a good idea to depress the trigger for an additional 30 to 60 seconds. Allowing the torch to cool will lengthen the life of consumable parts.

WARNING: Never depress the cutting nozzle with your finger when power is supplied to the machine.

MICROCUT 375

1.Be sure your Micro Cut 375 is connected to a clean, dry source of compressed air with a line pressure between 80 and 100 psi. Set the air pressure with the regulator on the front of the cutter to 60 psi. 60 psi is a starting point for the pressure. You may need to fine tune the air pressure slightly to acheive maximum cutting thickness.

2.Plug your Micro Cut 375 into the proper power supply. (see electrical connection). Turn the On-Off switch on. The indicator lamp in the power switch will light and the fan will begin to turn. The ready light should also come on.

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 or the work piece that is as close as possible to the area to be cut. Make sure the ground clamp comes in contact with clean, bare metal. If you are working on an automobile, make sure the ignition is off, and possibly disconnect the battery. Many auto manufacturers recommend the removal of on-board computers - if you have any questions, check with the vehicle manufacturer.

5.Familiarize yourself with the consummable parts and their correct assembly onto the torch head. (See page XXX) Note that when the machine is not cutting, the spring in the torch head is pushing the cutting tip against the electrode. When the trigger is depressed, air will start flowing, overcoming the spring, and forcing the cutting tip against the gas diffuser. Therefore, when you are cutting, it is important to remember not to push down on the cutting tip, or you will ground it against the electrode.

WARNING: Never disassemble the cutting torch unless the machine has been disconnected from its power supply.

Keep in mind that the cutting tip must be able to move freely in the gas diffuser. If this does not happen, the air pressure will not move the cutting tip off the electrode and a direct short will occur. Also, as the cutting tip and electrode wear, it may be possible that the cutting tip is not making electrical contact with the electrode. If this happens, then depressing the trigger will do nothing. Turn the cutter off and push the cutting tip against the electrode while rotating the cutting tip. This should remove any corrosion that has occurred and will allow the torch to fire up.

6.With the power on and the ready light illuminated, depress the trigger and immediately release it. Air will start to flow. The air will flow for approximately 60 seconds and then stop. If you want to stop the flow of air before 60 seconds, depress the trigger and release it. The air will stop.

If the trigger is depressed and held, the pilot arc will start. Releasing the trigger will extinguish the pilot arc, and there will be a post air flow of approximately 60 seconds to cool the cutting tip and electrode.

When the trigger is depressed and the pilot arc has started, bringing the cutting torch to the grounded workpiece will start the main arc. Once the main arc has started, the pilot arc will extinguish, and the main arc will remain on. To stop cutting release the trigger switch.

7.The cutting power knob infinitely regulates the cutting power from as little as 7.5 amps to a maximum of 35 amps. Lower power ranges can be used when cutting light guage materials and it is desired to cut with a lower travel speed or emit fewer sparks.

8.The ready light indicates that your Microcut 375 is ready for operation. Should the ready light not come on, it indicates that either the duty cucly has been exceeded or there is insufficient air pressure.

PCA 65

1.Be sure your PCA 65 is connected to a clean, dry source of compressed air with a line pressure between 80 and 100 psi. The air pressure is preset at the factory anywhere between 60 to 75 psi. The factory setting is a starting point for the pressure. You may need to fine tune the air pressure slightly to acheive maximum cutting thickness. To adjust the pressure, you will find it necessary to remove the right hand side panel. This panel is held in place with four phillips head screws.

2.Connect your PCA 65 to the proper power supply. (See electrical connection). Turn the Power Selector Switch to either the 30 amp or 60 amp setting. The fan will begin to turn and the green ready light should also come on.

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 or the work piece that is as close as possible to the area to be cut. Make sure the ground clamp comes in contact with clean, bare metal. If you are working on an automobile, make sure the ignition is off, and possibly disconnect the battery. Many auto manufacturers recommend the removal of on-board computers - if you have any questions, check with the vehicle manufacturer.

5.If you disconnect the air supply from your PCA 65 and pull the trigger on the plasma torch, you will see the red trouble-alert lamp will come on. This lamp will turn on if: 1) There is insufficient air pressure, or 2) the duty cycle has been exceeded.

6.Reconnect the air supply. Pull the trigger on the plasma torch. The pilot arc will fire and the yellow pilot arc lamp will come on. Release the trigger. The pilot arc will extinguish and the pilot arc lamp will go out. Air will continue to flow out the cutting nozzle for approximately 60 seconds to cool the torch.

WARNING - Never obstruct the plasma torch nozzle. Always point the torch head away from yourself and bystanders. Severe shocks and/or burns may occur if operated carelessly.

To cut, pull the trigger to initiate the pilot arc. Place the plasma stream on the outside of the workpiece and draw the arc into the material. Releasing the trigger will extinguish the arc.

7.The 1.1 mm cutting nozzle should be used on the 30 amp setting. Depending on the application, use the 1.4 mm cutting nozzle on the 60 amp setting. If you are not satisfied with the results using the 1.4 mm cutting nozzle, change to the 1.1 mm nozzle. For maximum consumable life, do not operate the pilot arc without cutting.

Maintenance and Service

Always disconnect the machine from the main power source before performing any maintenance or service work.

1.Remove machine housing frequently and blow residual material from inside of machine.

2.Check Nozzle and Electrode often for excessive wear due to cutting.

3.Clean exposed torch consumables often. This will maintain their life.

4.Check Nozzle and Electrode often for proper installation.

5.Frequently check the Air Supply quality. This is the single most important factor in the maintenance of the plasma system.

6.If any damage to the machine or torch is noticed, contact your local distributor or HTP America, Inc. directly at 1-800-USA-WELD.

IF ANY SERVICE OTHER THAN THE AFOREMENTIONED IS NECESSARY, IT SHOULD BE PERFORMED BY AUTHORIZED PERSONNEL ONLY.

Cutting Tips

1.When making long, straight cuts, it may be easier to use a metal straight edge as a guide. Simply clamp it to the workpiece to be cut. HTP America, Inc. also manufactures a complete Circle-Cutting and Straight-Line Traversing Assembly for frequent cutting of circles and lines.

2.When cutting heavier gauge material (up to the machine capability) it is recommended to initiate the pilot arc off the edge of the material and dragging the pilot arc to the workpiece. This will prevent accidental piercing of the material.

3.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 cut the rust. This process works similarly when splicing a quarter panel.

4.Please note that sparks from cutting arcs can damage painted surfaces. The sparks will also pit glass. We recommend the use of a welding blanket to protect these surfaces.

5.The best cutting speed is achieved when the plasma arc penetrates the workpiece at an angle of 5-10 degrees. The cutting speed is dependent on material thickness and composition as well as operator proficiency.

6.Never turn the machine off immediately after cutting. Always allow the post air flow circuitry to run its complete cycle to ensure proper cooling of the torch head.

It is highly recommended that piercing requirements be kept to a maximum of 75% of rated cutting thickness. This will greatly enhance the plasma torch's consumable life.