

# HTP MicroCut 45 DV

## OPERATOR'S MANUAL



HTP America, Inc. · 180 Joey Drive · Elk Grove Village, IL 60007-1304  
Phone: 847-357-0700 · Fax: 847-357-0744 · Web: [www.usaweld.com](http://www.usaweld.com)

**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 we have provided for your protection. Contact your distributor if you do not fully understand this manual.



# General Information

Thank you and congratulations on purchasing an HTP MicroCut 45DV. With many welding and cutting equipment options available on the market today, we appreciate your purchase, as well as the confidence you put into HTP through purchasing one of our products.

The versatile MicroCut 45DV works as a manual cutter and/or with a CNC plasma cutting table. The HTP MicroCut 45DV has a dedicated CNC mode. In order to use this as a CNC cutter you will need to purchase the CNC torch. You can also operate the MicroCut 45 DV manually with a 20' hand torch. If you purchased the 20' hand torch, you can always upgrade your machine to meet CNC plasma cutting table compatibility at a later date. As an added bonus, the hand torch and machine torch utilize the same consumables, apart from the shield cap, so you only need to keep on-hand a single style of replacement parts.

We hope you enjoy working with your new plasma cutting machine! If, at any time, you need help setting up or operating your plasma cutter, at any time, please feel free to contact us: 847-357-0700

## Manufacturer's Warranty

Subject to the terms and conditions hereof, HTP warrants that all MicroCut 45 DV plasma cutters furnished by HTP are free from defects 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 subject to the warranties, if any, of their respective manufacturers only.

HTP shall be required to honor warranty claims on MicroCut 45 DV plasma cutters in the event of a failure resulting from a defect. Please reference the warranty chart below to see the warranty period. The warranty starts at the time of delivery of the MicroCut 45 DV to the original owner, you must notify HTP in writing within thirty (30) days of the date of failure:

1) Plasma cutters, power sources, and components:	2 Years
2) Plasma torches:	90 Days
3) The shield cap, shield cup body, cutting tip, electrode, and swirl ring are consumable items and CARRY NO WARRANTY.	

As a matter of general policy only, HTP may honor claims submitted by the original owner within the above times.

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 the Customer's risk and expense. HTP's option of repair or replacement will be F.O.B., to the factory in Elk Grove Village, 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 the same on previously purchased equipment.

This warranty is null and void unless the warranty registration is sent to HTP America, Inc. within fifteen (15) business days from the date of purchase.

Any express warranty not provided herein and any implied warranty, guarantee or representations 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.

Note: This warranty is to the original purchaser only. The warranty can be transferred to another owner for a \$25 warranty transfer fee. HTP must be notified within fourteen (14) days of the sale and must be provided with the contact info of the original owner and the contact info of the new owner.

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# 1. Safety

## Important Safety Precautions



OPERATION AND MAINTENANCE OF PLASMA EQUIPMENT CAN BE DANGEROUS AND HAZARDOUS TO YOUR HEALTH.

Plasma 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 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 kinds of fumes and gases from the plasma arc depend on the kind of metal being used, coatings on the metal, and the different processes. You must be very careful when cutting any metals which may contain one or more of the following:

Antimo	Chromiu	Mercury	Berylliu
Arsenic	Cobalt	Nickel	Lead
Barium	Copper	Seleniu	Silver
Cadmiu	Manganes	Vanadiu	

Always read the Material Safety Data Sheets (MSDS) that should be supplied with the material you are using. These MSDSs 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/explosive gases or materials are located.
- Phosgene, a toxic gas, is generated from the vapors of chlorinated solvents and cleansers. Remove all sources of these vapors.



## ELECTRIC SHOCK

Electric Shock can injure or kill. The plasma 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 vapors from the workplace.
- Do not cut or weld on containers that may have held combustibles.
- Provide a fire watch when working in an area where fire hazards may exist.
- Hydrogen gas may be formed and trapped under aluminum 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 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.

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## 2. Parameters

### 2.1 Parameters

Parameters	Models	MicroCut45DV			
		Normal/Grid		Gouge	
Input power	1-120/230V, 50/60Hz				
	1-120V	1-230V	1-120V	1-230V	
Rated input current (A)	38	33	20.9	20.6	
Rated input power (KW)	4.47	7.03	2.30	6.18	
Adjustment range of current (A)	20~25	20~45	10~25	10~45	
Max no-load voltage(V)	230				
Duty cycle: (40°C, 10 minutes)	40% 25A145V	50% 45A145V	40% 25A110V	50% 45A118V	

Note: The above parameters are subject to change with the improvement of machines.

Maximum permissible system impedance 0.387Ω.

#### Generator Information:

When operating on a generator you will need to have 9500 continuous or running watts.



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## **3. Installation**

### **3.1 Unpacking**

1. Use the packing lists to identify and account for each item.
2. Inspect each item for possible shipping damage. If damage is evident, contact HTP before proceeding with the installation.

### **3.2 Input Power Connections**

Note: Check your power source for correct voltage before plugging in or connecting the unit.

### **3.3 Air Connections**

#### **A. Connecting Air Supply to Unit**

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

#### **B. Check Air Quality**

To test the quality of air, press on the function button briefly and hold the torch head near a paper towel or clean surface. Check if there is any oil or moisture residue on the clean surface when the air is coming out of the torch.

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# 4. Operation

## 4.1 Layout Of The Front And Rear Panel

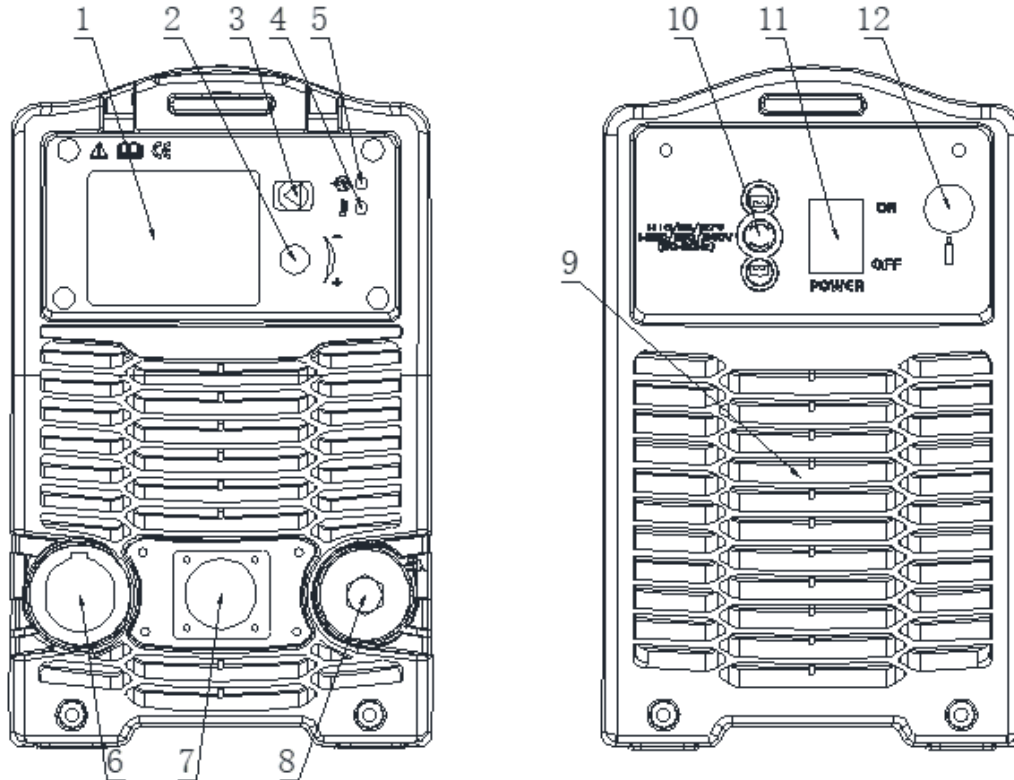


Figure 1.

1. **LCD** - Display machine status, such as the cutting current, air pressure, cutting mode, etc
2. **Encoder** - Adjust the cutting current and air pressure
3. **Function Button** - Select cutting mode, switch between first and second menu.
4. **Over-Heat Alarm** - When over-heating, the yellow light will be on.
5. **Power Light** – A solid green light indicates the power is on.
6. **Cutting Torch Connector**
7. **Torch Central Connector**
8. **Positive Output For GROUND Cable**
9. **Fan**
10. **Power Cable** - Connected to the appropriate power supply
11. **Power Switch** - Turn on or off the power source
12. **Compressed Air Connector**

## 4.2 Function Introduction

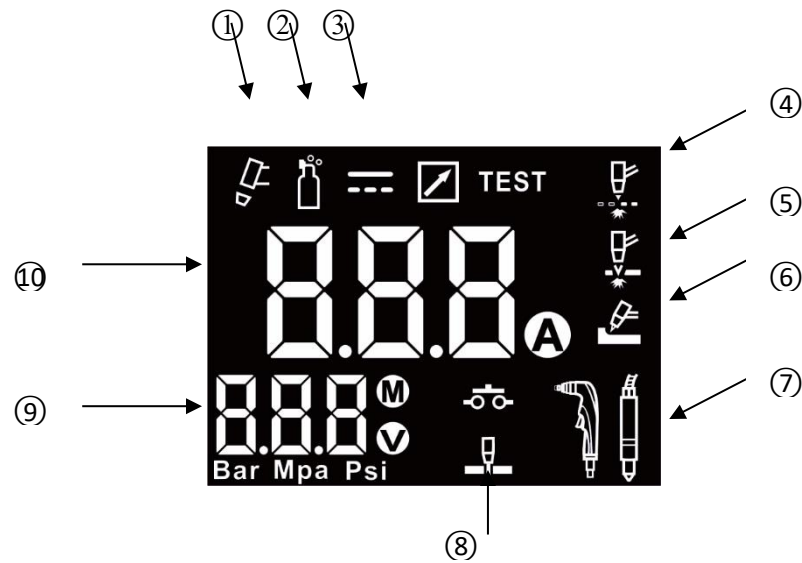
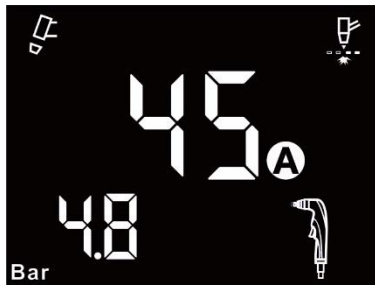


Figure 2.

- ① Check whether the cutting torch is connected
- ② Air pressure light
- ③ The machine is in working condition
- ④ Grid cutting mode
- ⑤ Normal cutting mode
- ⑥ Gouging/marking cutting mode
- ⑦ The types of the cutting torch
- ⑧ Transfer arc/ Arc OK signal
- ⑨ Cutting parameters which contains air pressure/output voltage/ the recommended length of the cutting torch
- ⑩ Cutting current

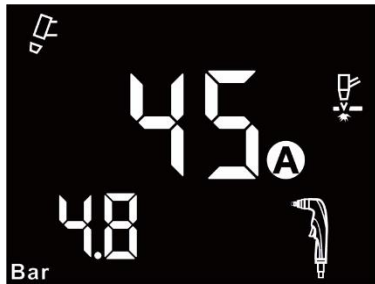
**Tips: The LCD contains two menus. In the first menu, the cutting current and the cutting mode can be adjusted. To get to second menu, hold down the function button for 1 second, the cutting parameters flashes. Now it is on the second menu. If there is no operation for 6 seconds, hold down the function button for 1 second again, the cutting current display flashes, it will switch back to first menu.**

## 1. Cutting mode selection



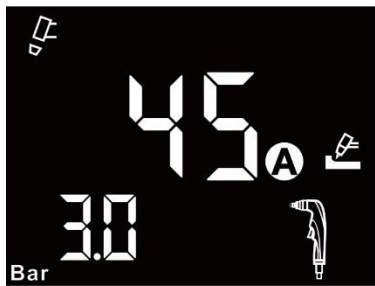
Grid cutting mode: use the encoder to adjust the cutting current, press on the function button briefly to switch cutting mode.

The current range is 20-45A, the air pressure range is 4.2-5.6Bar.



Normal cutting mode, use the encoder to adjust the cutting current, press on function button briefly to switch cutting mode.

The current range is 20-45A, the air pressure range is 4.2-5.6Bar.



Gouging/marking cutting mode, use the encoder to adjust the cutting current, press on function button briefly to switch operational mode. The current range is 10-45A. When the current is between 20A and 45A, the cutting mode is gouging, the air pressure range is 2.1-3.5 Bar. When the current is between 10A and 20A, the cutting mode is marking, the air pressure range is 2.1-3.1Bar.

**2. Cutting parameters** (which contains air pressure/output voltage/ the recommended length of the cutting torch) Hold down the function button for 1 second, the cutting parameters flashes, then you can adjust the air pressure. Press on the function button briefly to set Bar, Mpa or Psi. Continue to press on function button briefly, the output voltage and the recommended length of the cutting torch will display as shown in the Figure 6 and 7. Figure 6 shows the arc voltage and that the arc is on. Figure 7 shows the torch length in meters, arc is not on.



Figure 3.



Figure 4.



Figure 5.

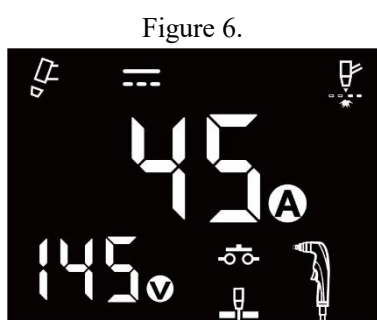


Figure 6.

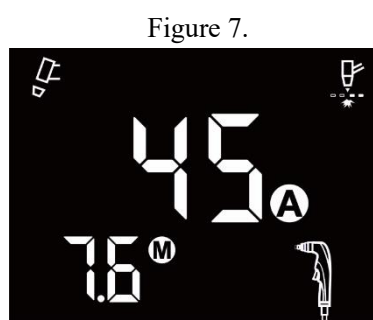


Figure 7.

### 3. Two different kinds of cutting torches

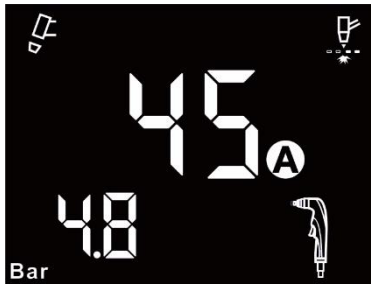


Figure 8. Hand Torch

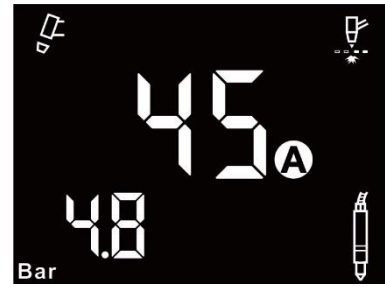
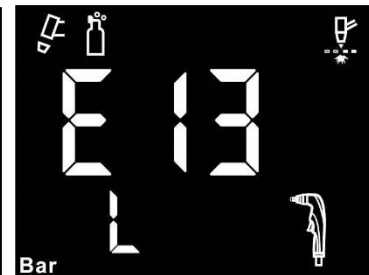
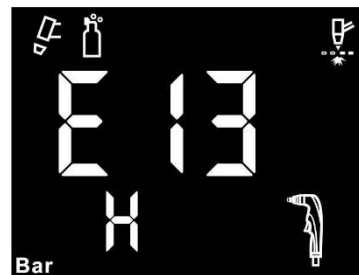
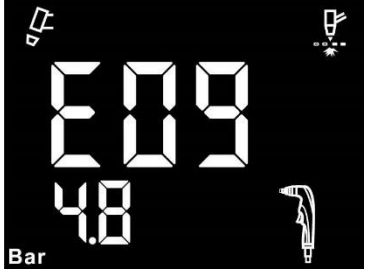
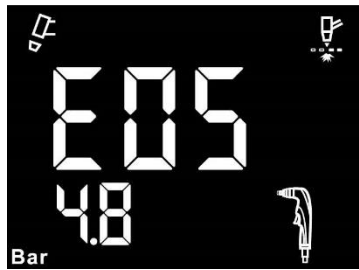


Figure 9. Machine Torch

### 4. Alarm display



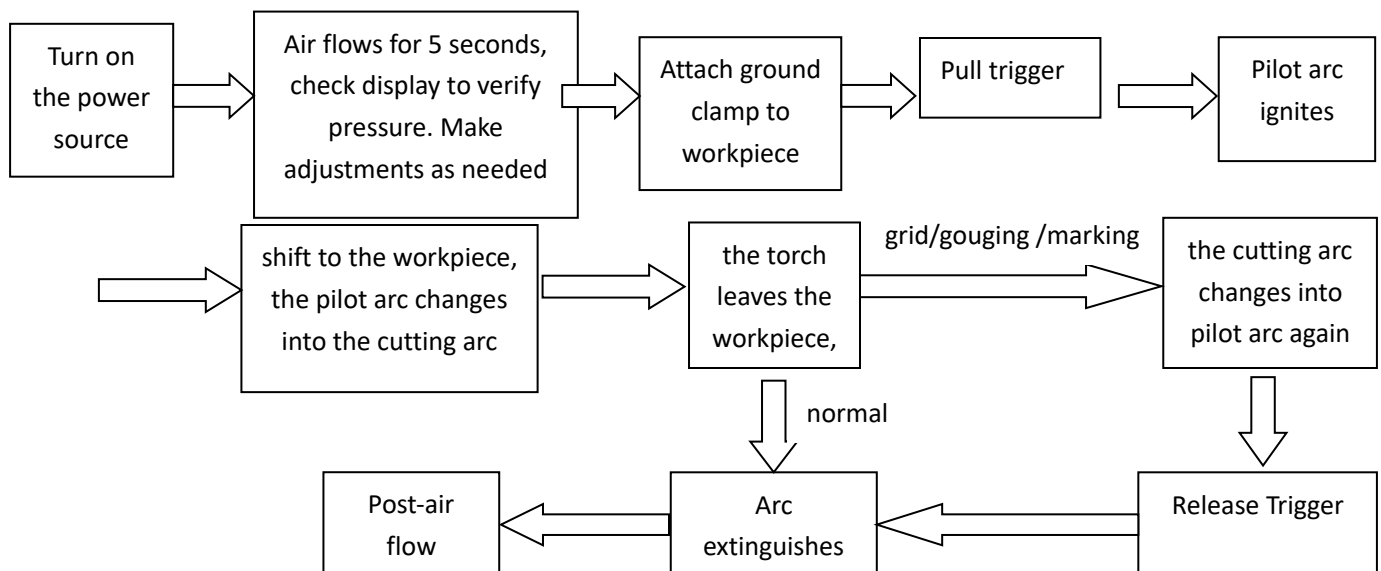
Light	Condition	Display	Status/Possible Cause
		E01	Over-Current- Check output diodes, main transformer and IGBT on the invert board.
Temp	On	E02	Over-Temperature- Stop cutting, allow machine to cool down.
		E03	No system is established- Check output diodes, main transformer and IGBT on the invert board.
Nozzle	Repetative flashing rate of 3 quick circles, then a 1 second pause for a 15 second period or until torch trigger is pressed again, whichever comes first.	E04	No pilot arc established possibly due to a loss of current- Check consumables.
Nozzle	Repetative flashing rate of 3 quick circles, then a 1 second pause for a 15 second period or until torch trigger is pressed again, whichever comes first.	E05	Consumables in torch failed to separate during pilot arc possibly due to being stuck- Check consumables.
		E09	No input power.
Cup & Nozzle	Repetative flashing rate of one quick circle.	E11	Torch cup is loose or off.
Pressure	Repetative flashing rate of 1 quick circle.	E13	E13 means air pressure is out of range. H means air pressure has exceeded setting range. L means air pressure is under setting range. In Normal/Grid, the setting range of air pressure is 4.2-5.6bar. In Gouging, the setting range of air pressure is 2.1-3.5bar. In Marking, the setting range of air pressure is 2.1-3.1bar.

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### 4.3 Cutting Preparation

1. Tightly connect the power cable to electrical socket outlet (the input voltage, refer to the section 2. technology parameters)
2. Connect the air line to the air supply equipment, and the ground cable to the workpiece.
3. Turn on the power switch. The power source light will be green when turned on.
4. Regulate the current after the fan stops.

### 4.4 Cutting Operation



Note:

1. If alarm light is on when cutting, you will need to let go of the trigger on the torch until the alarm releases. Then press on the trigger to start cutting again.
2. In the automatic air test the machine will read the target air pressure in idle. To adjust air pressure, press and release the trigger so air starts flowing. Open the side door of the cabinet to adjust the air pressure.
3. After using the machine for a longer period of time, the surface of the electrode and nozzle will have an Oxidation reaction. Please make sure to replace the electrode and nozzle. The alarm light will go on and the machine will stop working when it is time to install a new shield cup.

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# 5. Maintenance

## 5.1 Cutting Torch Maintenance

Warning :

1. Check the consumable parts for damage, if worn, make sure you replace the consumables.
2. Turn off the power source before checking or removing cutting torch parts.

Note: When operating the torch in a normal condition, a small amount of air vents through the gap between the shield cup and the torch handle, **Do not attempt to over tighten the shield cup as irreparable damage to internal components may result.**



Socket

1. Torch switch.
2. Common.
3. Machine/Manual torch.
4. Torch length.
5. Pilot arc cable.
6. Pilot arc cable.
8. Common.
9. Torch shield cable.

Function	Connection method
Torch switch	1.2
Machine torch	3.2
Manual torch	
Torch length	4.2
Pilot arc	5.6
Torch shield	8.9



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## 5.2 Troubleshooting Principle



### **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.

#### **A. Temperature light on.**

1. Fan blocked, check and correct condition.
2. Unit is overheated, let unit cool down for at least 5 minutes. Make sure the unit has not been operated beyond Duty Cycle limit, refer to technology parameters in Section 2.
3. Faulty components in unit, return for repair.

#### **B. Torch fails to ignite the arc when trigger is pulled**

1. Faulty torch parts, inspect torch parts and replace if necessary.
2. Air pressure too high or too low, adjust to proper pressure.
3. Faulty components in unit, return for repair.

#### **C. No cutting output; trigger pulled, power source on; air flows; fan operates**

1. Torch not properly connected to power supply, check that torch leads are properly connected to power supply.
2. Ground clamp not connected to work piece, or connection is poor, make sure that the ground cable has a proper connection to a clean, dry area of the workpiece.
3. Faulty components in unit, return for repair or have qualified technician repair.
4. Faulty Torch, return for repair or have qualified technician repair.

#### **D. Low cutting output**

1. Incorrect setting of CURRENT (A) control, check and adjust to proper setting.
2. Faulty components in unit, return for repair or have qualified technician repair.

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### **E. Difficulty Starting**

1. Worn torch parts (consumables), make sure to turn off the machine before checking the consumables. Remove and inspect torch shield cup, tip and electrode. Replace electrode or tip if worn; replace shield cup if there is excessive spatter adhering to it.

### **F. Arc shuts off during operation; arc will not restart when trigger is pulled**

1. Power Supply is overheated (OT light on), let unit cool down for at least 5 minutes. Make sure the unit has not been operated beyond Duty Cycle limit. Refer to Section 2 for duty cycle specifications.

2. Air pressure is out of range; adjust as needed.

3. Torch consumables worn, check torch shield cup, tip, starter element, and electrode; replace as needed.

4. Faulty components in unit: return for repair or have qualified technician repair.

### **G. No air flows; the power light is on; Fan operates**

1. Air is not connected or pressure is too low, please check your air connections. Adjust air pressure to proper setting.

2. Faulty components in unit, return for repair or have qualified technician repair.

### **H. Torch cuts but low quality**

1. Current (A) control set too low, increase current setting.

2. Torch is being moved too fast across workpiece, reduce cutting speed.

3. Excessive oil or moisture in torch, hold torch 1/8 inch (3 mm) from clean surface while purging the air line. Observe if there is an oil or moisture build up on the clean surface (do not activate torch). If there are contaminants in the air, additional filtering may be needed.

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## 6. Cutting Guidelines

Material Thickness	Cut Speed (IPM)	Pierce Height (Inches)	Pierce Delay (Sec)
20ga	380	.160	.2
16ga	350	.160	.2
14ga	280	.160	.2
12ga	190	.160	.3
10ga	140	.160	.4
3/16"	85	.160	.5
1/4"	52	.160	.6
3/8"	26	.180	.9
1/2"	16	.180	1

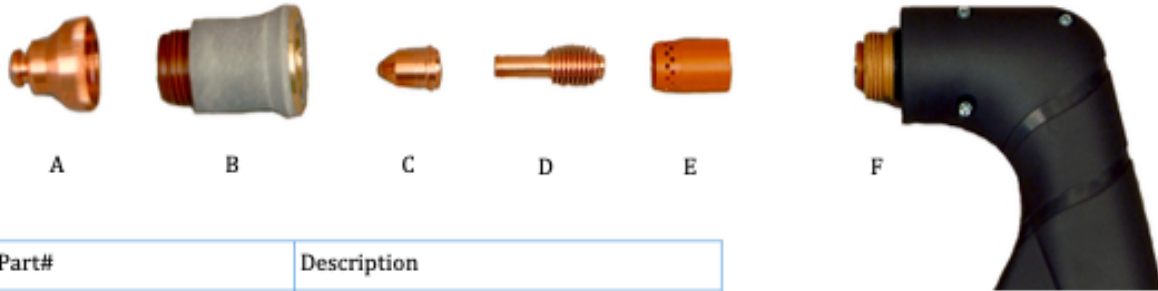
**Fig. 4:** Shows some guidelines for cutting steel. For aluminum, increase the travel speed slightly (about +5%), and for stainless steel, decrease the travel speed slightly (about -5%).

### *CNC Piercing*

You can also pierce materials up to 1/2" thick when connected to a CNC plasma cutting table. Cutting height is typically about .120" and pierce height is .130"- .180" depending on material thickness.

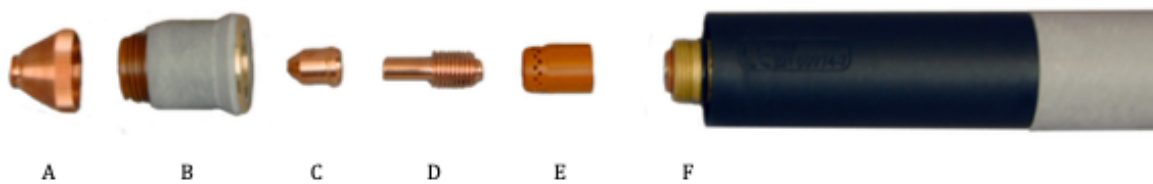
# 7. Consumable Breakdowns

## Consumable Parts Breakdown – Hand Torch



Part#	Description
A) 87005HSMO	Shield Cap
B) 87005HMO	Shield Cup Body
C) 87030MO	Contact Cutting Tip, 20-50A
D) 87003MO	Electrode
E) 87058MO	Swirl Ring
F) 87002HTH	Torch Head
87030GSMO (Not Pictured)	Gouging Tip, 45A
87005GMO (Not Pictured)	Gouging Shield
87002HT (Not Pictured)	20' Complete Hand Torch

## Consumable Parts Breakdown- Machine Torch



Part#	Description
A) 87005SMMO	Shield Cap
B) 87005HMO	Shield Cup Body
C) 87030MO	Contact Cutting Tip, 20-50A
D) 87003MO	Electrode
E) 87058MO	Swirl Ring
F) 87002MTH	TM-70 Torch Head
87002MT (Not Pictured)	20' Tecmo TM-70 Complete Machine Torch

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## 8. APPENDIX

### 6.1 About the HTP MicroCut 45DV Voltage Divider

The MicroCut 45DV machines 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, 21.1:1, 30:1, 40:1, and 50:1 (maximum output of 18 V). 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 50:1.

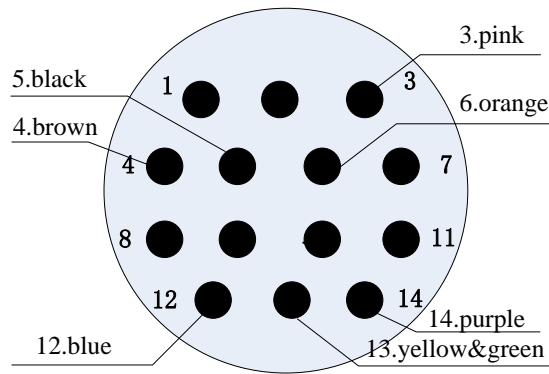
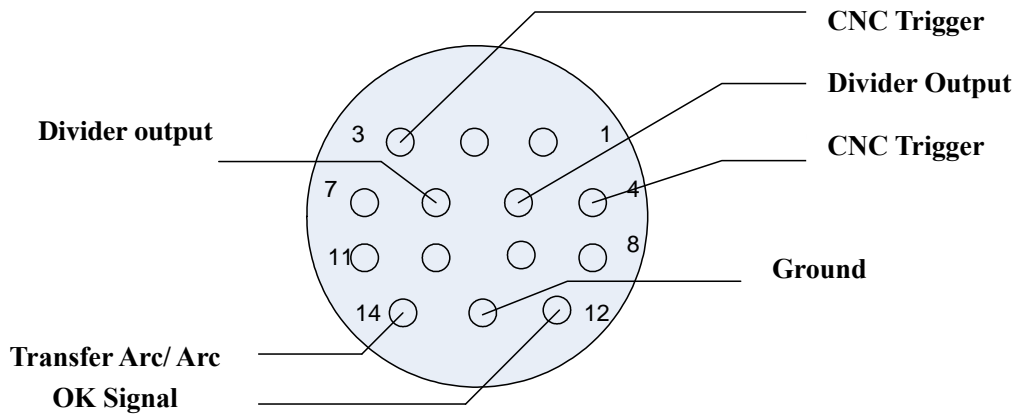
	<p><b>The factory-installed internal voltage divider provides a maximum of 18 V under open circuit conditions. This is an impedance-protected functional extra low voltage (ELV) output to prevent shock, energy, and fire under normal conditions at the machine interface receptacle and under single fault 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.</b></p>
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#### Note:

The cover on the machine interface receptacle prevents dust and moisture from damaging the receptacle 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	The connector socket	Cable ends
Start (start plasma)	Input	Normally open. Requires dry contact closure to activate.	3, 4	3(pink)、 4(brown)
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).	12, 14	12(blue)、 14(purple)
Ground	Ground		13	13(yellow & green)
Voltage divider	Output	CUT: Divided arc signal of 20:1, 21.1:1, 30:1, 40:1, 50:1 (provides a maximum of 10 V).	6 (+), 5 (-)	6(orange)、 5(black)

**Note:** the table below for the shift and scale selection

scale selection dial number	20:1	21.1:1	30:1	40:1	50:1
1	OFF	ON	OFF	OFF	OFF
2	OFF	OFF	ON	OFF	OFF
3	OFF	OFF	OFF	ON	OFF
4	OFF	OFF	OFF	OFF	ON

