



**OPERATING INSTRUCTIONS  
AND  
TECHNICAL MANUAL  
FOR**

***PRIME-CUT***  
*ULTRATHERMIC CUTTING SYSTEM*



**READ THIS MANUAL  
BEFORE OPERATING**

**ARMY EXOTHERMIC CUTTER  
PC/MIL-60 (RECOVERY) REV. June 2015**

## **WARNING: Read this Manual Before Operating**

**WARNING!** You must read and understand these operating instructions thoroughly and follow the procedures contained herein for the operation and servicing of the Prime-Cut equipment to avoid serious injury or death to operator or bystanders or damage to property.

Employers must be familiar with the correct operation of this torch and provide operator training before allowing their personnel to begin using the Prime-Cut equipment.

Prime-Cut cutting systems operate at a temperature of approximately 10,000°F, enabling them to cut or melt virtually any known material. Sparks, splatter and molten material generated by this process can cause fire, severe property damage, bodily injury or death.

### **TO AVOID SERIOUS INJURY OR DEATH:**

- Never use the Prime-Cut cutting system or rods underwater with a welding power source.
- Always use a DC ignition system.
- Always wear flame or spark resistant clothing, shoes and eye and face protection.
- Always know the composition of the target material.
- Always know what is behind the target material.
- Always clear the work area of bystanders and flammable materials.
- Never point the torch at anybody.
- Always use caution when cutting overhead to avoid falling sparks, molten material and falling objects.
- Always ensure that all parts of the Prime-Cut system are in good working order prior to use to avoid potential malfunction.

If you have any questions regarding the safe operation of Prime-Cut systems please call:

**Broco, Inc.  
400 S. Rockefeller Ave.  
Ontario, CA 91761  
Tel: (800) 845-7259; (909) 483-3222**

## TABLE OF CONTENTS

1.0	PURPOSE AND SCOPE
2.0	WARNINGS AND SAFETY PRECAUTIONS
2.1	Warnings
2.2	Safety Precautions
3.0	COMPONENTS
3.1	Required Equipment
3.2	Accessory Equipment
4.0	SETUP PROCEDURES
4.1	Preparing the Work Area
4.2	Pre-Assembly Inspection
5.0	ASSEMBLY PROCEDURES
5.1	Oxygen System
5.2	Battery
5.2.1	Slave Plug (600143)
5.3	Leather Shield (PC/LS)
5.4	Cutting Rod Insertion
5.5	16" Rod Extender (PC/TACXT16)
5.6	Hose/Cable Extension Kit (PC/EXMIL60)
6.0	OPERATING PROCEDURES
6.1	Cutting Rod Ignition
6.2	Techniques
6.2.1	Piercing
6.2.2	Cutting
6.2.3	Gouging
6.3	Shutdown
7.0	PRIME-CUT TORCH MAINTENANCE
7.1	Flash Arrestor & Flash Arrestor Screen
7.2	Coupler Assembly Removal/Replacement
7.3	Oxygen Control Valve Disassembly/Reassembly
7.4	Oxygen Control Valve Assembly Leak Testing Procedure
8.0	STRIKER PLATE ASSEMBLY
8.1	Inspection
8.2	Striker Plate Disassembly
8.3	Striker Plate Reassembly
9.0	TROUBLESHOOTING
9.1	Oxygen Leaks
9.2	Uneven Oxygen Flow
9.3	Cutting Rod Doesn't Fit Collet
9.4	Valve Stem Won't Move Freely
10.0	REPLACEMENT PARTS, SERVICE & REPAIR

## **1.0 PURPOSE AND SCOPE**

The purpose of this document is to describe the recommended operating procedures, maintenance requirements and repair procedures necessary to ensure proper operation of the Broco® Prime-Cut cutting torch system.

Components for which procedures are described are the cutting torch, the striker plate assembly, and accessory equipment.

Oxygen regulator repairs should be conducted only by qualified personnel trained and authorized to perform work on high pressure oxygen regulators.

Inspection/repairs of oxygen cylinders and oxygen cylinder valves should be conducted only by qualified personnel trained and authorized to perform work on high pressure oxygen cylinders and oxygen cylinder valves.

## **2.0 WARNINGS AND SAFETY PRECAUTIONS**

### **2.1 Warnings**

All users and their supervisory personnel must read and be thoroughly familiar with the contents of this manual prior to using this equipment or disassembling any part of the Prime-Cut cutting torch system.

Never modify this equipment in any manner or use it in any way not specified in this manual.

Oxygen mixed with oil or grease reacts explosively. Never use compressed air, oil, solvents or other material to clean the oxygen system. Always keep oil and grease away from the cutting torch, oxygen cylinders, valves, regulators, hoses and fittings.

Never use this equipment in conjunction with any power source other than a 12 volt DC or 24 volt DC battery.

Never use the Prime-Cut exothermic cutting system or rods underwater with a welding power source. Prime-Cut products are not intended for diving operations and are not insulated to protect from the risk of electrical shock.

Never use this equipment unless you are familiar with acceptable industrial welding and cutting procedures and practices.

Always use this equipment following generally accepted industrial safety procedures and practices.

Always apply and adhere to ANSI/ASC Z49.1-88 "Safety in Welding and Cutting" standards, or similar locally prevailing standards when using this equipment.

Never remove, cover or alter the warning labels attached to this equipment.

Never modify this equipment in any manner or use it in any way not specified in this manual.

## 2.2 Safety Precautions

**WARNING!** *Failure to heed these safety precautions may result in severe property damage, bodily injury or death.*

*Protect yourself and others. Fumes and gases developed may be dangerous to your health. Arc rays and splatter can injure eyes and exposed skin. Electric shock can kill.*

*Oxygen mixed with oil or grease reacts explosively.*

The operator and all bystanders must always wear adequate protective clothing, shoes and welder's gloves when Prime-Cut systems are being used.

Never operate this equipment without proper eye protection. Always use a number 5 or 6 shade filter.

Always use the Leather Shield to protect yourself from sparks and splatter.

Always keep your head away from the fume plume.

Always use adequate ventilation and exhaust at the arc point to keep fumes and gases from your breathing zone and the general area. Special breathing apparatus must be used when welding or cutting galvanized, cadmium plated (or other heavy metal plated) or painted parts to avoid inhalation of toxic fumes.

Always keep the ignited tip of the rod away from the oxygen cylinder, battery and hoses.

Always use extreme caution when operating the torch in windy or adverse conditions.

Never allow falling sparks or molten metal to contact any part of the Prime-Cut system. Damage may result which could render the equipment unsafe to operate.

Always keep oil and grease away from oxygen cylinders, valves, regulators, hoses and fittings.

Never clean any internal part of the oxygen system. Never use compressed air, oil, solvents or any other material to clean the oxygen system. The oxygen system could become contaminated and cause internal burning in the torch or hose. All service on oxygen delivery parts must be performed by a qualified and knowledgeable technician.

Never leave the torch unattended while the oxygen cylinder valve is open and/or there is pressure in the hose.

Never touch live electrical parts. Always wear welder's gloves when inserting the rod into the torch and/or extender. Never let the rod touch any unprotected part of your body.

SEE: American National Standard Z49.1 "Safety in Welding and Cutting"  
Published by the American Welding Society, 8669 NW 36 Street, # 130,  
Miami, Florida 33166-6672.

OSHA Safety and Health Standards "29 CFR 1910" available from the  
U.S. Department of Labor, Washington, D.C. 20210.

**IN CASE OF EMERGENCY – CALL IMMEDIATELY FOR MEDICAL AID**

## **3.0 COMPONENTS**

### **3.1 Required Equipment**

- Torch Assembly (PC/T-30)
- Striker Plate Assembly (PC/SP-30)
- 3/16", 1/4", 3/8" or 1/2" Collet with Collet Washer
- Broco® Prime-Cut Cutting Rods
- Leather Shield (PC/LS)
- Oxygen Regulator (HR-3500-1)
- Oxygen Supply
- 12 Volt DC or 24 Volt DC Battery
- Protective Clothing: welding leathers, gloves and tinted eye shield (See Safety Precautions).

### **3.2 Accessory Equipment**

- 16" Cutting Rod Extender (PC/TAC-XT)
- Slave Plug with Cam-Lok Quick Connects (600143)

## 4.0 SETUP PROCEDURES

### 4.1 Preparing the Work Area

**WARNING!** *Never operate the torch in an explosive or flammable environment. Never cut into unknown material.*

*Never operate the torch with other personnel or bystanders in front of the torch or in the immediate work area.*

**Caution:** *Some plastics, paints and plated parts give off toxic fumes. Organic materials may be combustible. Exotic metals may ignite. Glass and thin porcelain may shatter. Rock and minerals may spall.*

1. Clear the work area of bystanders.
2. Place the oxygen supply and battery in a location away from the immediate work area.
3. Know the composition of the target material.
4. Know what is beyond the target material. Never cut near power cables, pipes, flammable objects or bystanders.
5. When the target material is a container or pipe, know the material previously contained therein. Always thoroughly purge pipelines and containers with an inert gas (such as nitrogen or argon) prior to cutting.
6. Check to see that falling material (molten metal, sparks or severed pieces of target material) will not cause injury to operator or bystanders or damage to property.

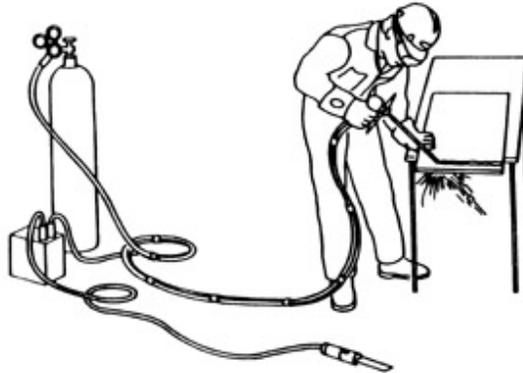
## 4.2 Pre-Assembly Inspection

**WARNING!** *Never use any equipment which is unsafe or appears to be unsafe. Always replace damaged or worn components to reduce the risk of injury.*

*Never operate the torch without the flash arrestor and flash arrestor screen in place.*

1. Always inspect the oxygen hose for damage or wear prior to and immediately following each use of the Prime-Cut system.
2. Always inspect the ignition power cables and connectors for damage or wear prior to and immediately following each use of the Prime-Cut system.
3. Always inspect the torch for damage or wear prior to and immediately following each use.
4. Always inspect the collet, collet washer, flash arrestor and flash arrestor screen prior to and immediately following each use of the Prime-Cut torch.
5. Check the battery for leaks. Never use a leaking battery.

## 5.0 ASSEMBLY PROCEDURES



### 5.1 Oxygen System

**WARNING!** *Never stand directly in front of or directly behind the oxygen regulator while opening the oxygen cylinder valve to reduce the risk of injury in the unlikely event of regulator failure.*

*Oxygen mixed with oil or grease reacts explosively. Never use compressed air, oil, solvents or other material to clean the oxygen system. Always keep oil and grease away from the cutting torch, oxygen cylinders, valves, regulators, hoses and fittings.*

*Always make sure the oxygen cylinder is a safe distance from the immediate work area. Never let sparks or molten material come into contact with the oxygen cylinder.*

1. Connect the oxygen regulator to the oxygen source.
2. Purge the regulator to remove debris by slightly opening the oxygen cylinder valve and turning the regulator knob clockwise until a small stream of gas escapes. Close the oxygen cylinder valve. (For preset regulators that have no adjustment knob, slightly open, then immediately close the oxygen cylinder valve to purge the regulator.)
3. Connect the oxygen hose to the regulator.
4. Slowly open the oxygen cylinder valve, pausing to let the pressure in the cylinder, regulator and hose equalize before continuing.
5. Adjust the oxygen regulator to between 10 and 80 psig, depending on the target material and the type of work being performed. (Typical setting is 60-70 psig for cutting steel approximately 1" thick.)
6. Check all connections for oxygen leaks.

## 5.2 Battery

- **CHARGE A NEW BATTERY BEFORE USING.**
- **CHARGE AFTER EACH SUBSEQUENT USE.**
- **DO NOT STORE A RECHARGEABLE BATTERY IN A FULLY OR PARTIALLY DISCHARGED STATE.**
- **NOTE- BATTERIES MAY LOSE UP TO 3% OF THEIR CHARGE PER MONTH DURING STORAGE.**

**WARNING!** *Always use a 12 volt DC or 24 volt DC battery. Never use any other power source.*

*Always make sure the battery is a safe distance from the immediate work area. Never let sparks or molten material come into contact with the battery.*

*Never use a battery for ignition that is connected to a battery charger. Always unplug the battery charger before attaching the ignition power cables to the battery.*

*Never let the striker plate accidentally contact the torch, rods, or work area. Electrical shock and sparks may result.*

**Caution:** *The battery can discharge if the striker plate continuously contacts the work area. Exercise caution to prevent complete discharge of the battery.*

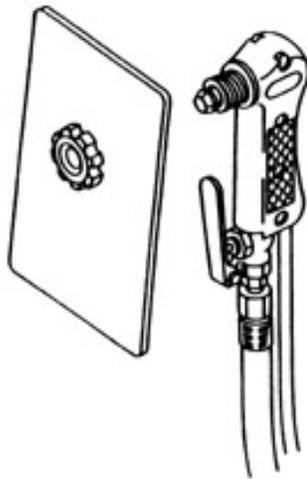
**NOTE:** *Polarity does not matter for ignition since a direct short is required to ignite the rod.*

1. Connect the power cable from the torch to the black battery clamp by connecting the black Cam-Lok plug on the torch cable to the Cam-Lok receptacle inside of the black handle grips.
2. Connect the power cable from the striker plate to the red battery clamp by connecting the red Cam-Lok plug on the torch cable to the Cam-Lok receptacle inside of the handle grips.
3. Connect the battery clamps to the terminals of a 12v or 24v battery.

### 5.2.1 Slave Plug (600143)

1. Connect the power cable from the torch to the slave plug by connecting the black Cam-Lok plug on the torch cable to the black Cam-Lok receptacle on the slave plug.
2. Connect the striker plate to the slave plug by connecting the red Cam-Lok plug on the torch cable to the red Cam-Lok receptacle on the slave plug.
3. Plug the slave plug into the vehicle slave receptacle.

### 5.3 Leather Shield (PC/LS)



**WARNING!** Always use the leather shield (PC/LS) designed for the torch to protect yourself from spark and splatter burns.

**NOTE:** Make sure the leather shield is not between the oxygen control lever and the torch handle where it would interfere with the operation of the torch.

1. Remove the collet nut from the torch.
2. With the smooth finished side of the shield facing away from the torch, slide the leather shield onto the collet nut.
3. Screw the collet nut back onto the torch.
4. Position the leather shield so the long end covers the oxygen control lever.

### 5.4 Cutting Rod Insertion

**WARNING!** Always wear welding gloves when inserting rods into or removing rods from the Prime-Cut torch.

*Always insert the correct end of the cutting rod into the torch.*

*Never use a damaged cutting rod.*

*Always ensure the neoprene collet washer is in good condition and in place to prevent oxygen leaks.*

**Caution:** *Always use Broco® Prime-Cut cutting rods with the Prime-Cut torch. Never use any other rods as hazardous backflashes or internal burning may result.*

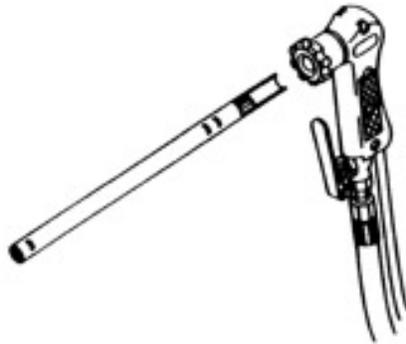
**Note:** *To determine the correct rod size for the target material and type of work being performed refer to the table below. Use the appropriate collet washer for the rod being used. Red washer is for 3/16" rod. All other rods use black washer.*

1. Check to see that the collet in the torch is the appropriate size to properly fit the rod being used.

To replace collet:

Remove the collet nut and collet from the torch. Make sure the neoprene collet washer is in place. Insert the desired collet and replace the collet nut.

2. Loosen the collet nut 1/2 turn.
3. Insert the end of the rod that has the recessed internal rods into the collet until it is securely bottomed out on the collet washer. Tighten the collet nut to lock the rod in place.



4. Check for oxygen leaks at the collet nut. If a leak exists:

- a. Make sure the rod is firmly seated on the collet washer.
- b. Inspect the rod for damage.
- c. Inspect the collet washer for damage and replace if necessary.

**Note:** Place the end of the rod with the recessed internal wires into the torch.

## Cutting Rod Size Selection Chart

3/16"	1/4"	3/8"	36"L	1/2"	
X		X			<p><b>CUTTING</b>                      Lock hasps and shanks                      Reinforcement bar in concrete (re-bar)                      All steel plate (mild and high strength) to 1/2" thick                      All steel plate (mild and high strength) over 1/2" thick to 2" thick                      All steel plate (mild and high strength) over 2" thick                      Aluminum, titanium, magnesium alloys and other volatile alloys*</p> <p><b>PIERCING</b>                      Broken bolts to 3/4" diameter                      Pins and broken bolts 3/4" diameter to 1 1/4" diameter                      Steel plate less than 6" thick                      Steel plate greater than 6" deep*                      Concrete to 4" thick*                      Concrete over 4" thick*</p> <p><b>GOUGING</b>                      Gouge cutting steel composite barriers to 2" thick                      Gouge cutting steel composite barriers over 2" thick</p> <p>* Use the accessory cutting rod extender</p>
	X				
		X	X	X	
		X	X	X	
		X	X	X	
X					
	X				
		X			
			X	X	

### 5.5 16" Rod Extender (PC/TACXT16)

**Note:** The rod extender is used to enable the operator to reach otherwise inaccessible places and provide a safety standoff when cutting materials that may spall or be under tension.

1. Check to see that the collet in the rod extender is the appropriate size to properly fit the cutting rod being used.

To replace the collet:

Remove the collet nut and remove the collet from the PC/TACXT16. Make sure the neoprene collet washer is in place. Insert the desired collet and replace the collet nut.

2. Make sure the 3/8" collet is in the torch.
3. Loosen the torch collet nut 1/2 turn.

4. Insert the end of the rod extender into the torch collet until it is firmly seated on the collet washer.
5. Tighten the torch collet nut to lock the rod extender in place.
6. Check for oxygen leaks at the collet nut. If a leak exists:
  - a. Make sure the rod extender is firmly seated on the collet washer.
  - b. Inspect the rod extender for damage.
  - c. Inspect the collet washer for damage and replace if necessary.
7. Insert the cutting rod into the rod extender as instructed in the section "Cutting Rod Insertion."

### **5.6 Hose/Cable Extension Kit (PC/EXMIL60)**

**Note:** *The hose/cable extension kit is used to enable the operator to work farther from the oxygen source and battery than is possible with the standard 30' long hose.*

Disconnect the oxygen hose from the regulator utilizing the quick connect fitting.

Disconnect the torch power cable and striker plate power cable from the slave plug or battery clamps.

Connect the male plug on the torch hose into the quick connect coupler on the extension hose.

Connect the male plug on the extension hose into the quick connect coupler on the oxygen regulator.

Connect the torch power cable to the extension cable by connecting the black Cam-Lok plug on the torch cable to the black Cam-Lok receptacle on the extension cable.

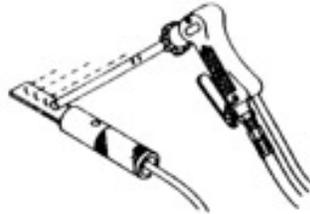
Connect the striker plate power cable to the extension cable by connecting the red Cam-Lok plug on the torch cable to the red Cam-Lok receptacle on the extension cable.

Connect the extension cables to the slave plug/battery clamps by connecting the Cam-Lok plugs on the extension cables to the Cam-Lok receptacles on the slave plug/battery clamps.

## 6.0 OPERATING PROCEDURES

**WARNING!** Always protect yourself from spark and splatter burns. Never operate the torch without the leather shield in place.

### 6.1 Cutting Rod Ignition



**WARNING!** Always hold the striker plate by the plastic handle to avoid electric shock. Never touch the copper plate.

Never touch or hold an ignited cutting rod.

**Caution:** Prolonged contact between the cutting rod and the striker plate can overheat the battery causing damage.

1. Point the cutting rod away from your body. Never point the rod at bystanders.
2. Start the flow of oxygen by lightly squeezing the oxygen control lever on the torch.
3. Bring the striker plate into contact with the end of the rod.
4. While holding the rod at a 45°- 90° angle to the striker plate, slowly pull the rod across the striker plate surface.
5. Rod sparking indicates ignition. Approximately 2-5 seconds of contact is required for ignition.
6. Maintain slight pressure on the oxygen lever to ensure complete ignition.
7. Lift the rod from the striker plate and bring it to the target material.
8. Place the striker plate in a safe location away from the work area.
9. Commence cutting, piercing or gouging according to the following directions.

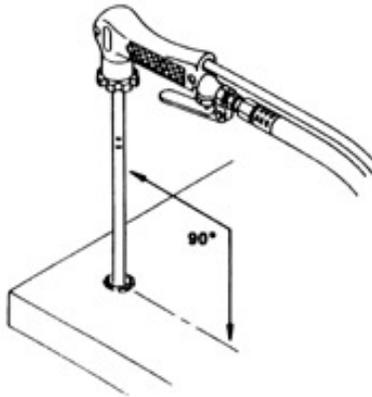
## 6.2 Techniques

**WARNING!** *Never let the cutting rod burn down into the torch. Always release the oxygen lever to extinguish the torch while there are at least 2 inches of rod remaining.*

### 6.2.1 Piercing

**WARNING!** *Always wear adequate protective clothing and a full face shield, and use the leather shield (PC/LS) during piercing operations. Blowback is greater when piercing. Exercise extreme caution.*

1. With the oxygen lever slightly depressed (low oxygen flow), press the burning tip of the rod against the target material at a 90° angle, allowing it to melt a 1/4" deep hole.
2. Insert the rod tip into the depression.
3. Keeping the tip of the rod in the hole, increase the oxygen flow to increase penetration by slowly depressing the oxygen lever.
4. As the target material melts and flows back out of the hole, move the rod in and out and around to enlarge the hole and allow the oxygen pressure to wash away molten material.
5. Remove the rod from the hole before releasing the oxygen lever.



6. When piercing is completed, release the oxygen control lever to extinguish the torch. The rod will continue to burn only as long as oxygen is supplied.
7. Never touch a used rod, the target material or the work surface with a bare hand until it has cooled. Always wear welding gloves.

**Suggestions:** Set the oxygen regulator to 35 psig when starting piercing operations to avoid excessive blowback. When the penetration is approximately 2" deep, increase the oxygen pressure to 50-60 psig.

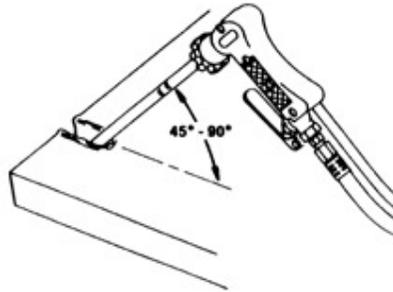
To pierce a pin  $\frac{3}{4}$ " in diameter or smaller, weld a small piece of angle iron on to the head of the pin at the 3 o'clock and 9 o'clock positions to establish a trough guide. This helps to assure the production of a straighter hole. After penetrating 3-4", remove the angle guide and complete the hole.

When piercing a pin longer than 5", it is best to use a  $\frac{3}{8}$ " diameter rod.

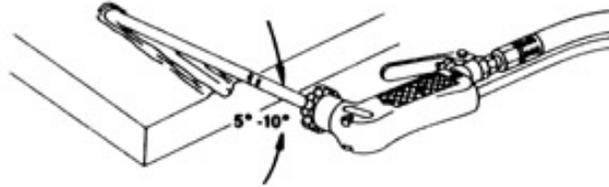
## 6.2.2 Cutting

**Note:** Keep the burning tip of the cutting rod in direct contact with the target material.

1. Place the burning tip of the rod against the target material at a 45°- 90° angle.
2. Increase the oxygen flow by slowly depressing the oxygen lever.
3. Keep the rod tip in the cut.
4. Pull the rod in the direction of the cut. Be sure that the molten material is blown forward through the cut and does not splash backwards towards the operator.
5. Complete the cut by making sure all the hangers are removed.
6. After completing the cut, release the oxygen control lever to extinguish the torch. The rod will continue to burn only as long as oxygen is supplied.
7. Never touch a used rod, the target material or the work surface with a bare hand until it has cooled. Always wear welding gloves.



### 6.2.3 Gouging



1. With the oxygen control lever slightly depressed (low oxygen flow), lay the rod flat on the work piece ( $5^{\circ}$  -  $10^{\circ}$  angle) with the burning tip of the rod against the target material.
2. Increase the oxygen flow by slowly depressing the oxygen lever.
3. The target material will puddle in approximately 1-2 seconds. Keep the rod at a very slight angle to the work piece and the tip of the rod in the puddle.
4. With the oxygen lever fully depressed, push the rod in the direction of the desired gouge.
5. When the gouge is complete, lift the rod tip from the target material.
6. Release the oxygen control lever to extinguish the torch. The rod will continue to burn only as long as oxygen is supplied.
7. Never touch a used rod, the target material or the work surface with a bare hand until it has cooled. Always wear welding gloves.

### 6.3 Shutdown

**WARNING!** *Always disconnect the ignition power cables prior to charging the battery.*

**Note:** *Always place a protective cap or piece of tape over the open end of the oxygen hose to prevent dirt or foreign objects from entering during storage.*

1. Close the oxygen cylinder valve.
2. Depress the oxygen control lever to relieve any pressure from the oxygen hose.
3. Turn the oxygen regulator adjustment knob counter-clockwise to take pressure off the diaphragm.

4. Disconnect the oxygen hose from the regulator and cap the open end of the hose.
5. Disconnect the torch and striker plate power cables from the battery.
6. Wipe down the torch assembly and striker plate assembly with a clean oil-free cloth.
7. Remove the collet nut, collet, collet washer, flash arrestor and flash arrestor screen and inspect for damage or wear. Clean and reassemble. Always replace any damaged or worn parts with factory replacement parts.
8. Always inspect the cables and hose for cuts, burns or any other signs of damage or wear.
9. Store the Prime-Cut torch in a clean, dry place.
10. Charge the battery according to the manufacturer's instructions for the battery and battery charger being used.

## 7.0 PRIME-CUT TORCH MAINTENANCE

### 7.1 Flash Arrestor and Flash Arrestor Screen Inspection/Replacement

**WARNING!** *Never operate the torch without a flash arrestor and screen in place. The flash arrestor and screen perform an important safety function by suppressing flashbacks which could otherwise cause injury to the operator or damage the equipment.*

**Note:** *It is recommended that the flash arrestor and screen be removed and inspected periodically to insure an unrestricted oxygen path.*

1. Remove the collet nut and collet from the torch.
2. Remove the neoprene collet washer from the torch head.
3. Using a standard screwdriver, turn the flash arrestor counter-clockwise until the threads are disengaged.
4. Remove the flash arrestor. Inspect for damage and clogging of the ports. Clean if necessary.
5. Remove the flash arrestor screen from the back of the flash arrestor. Inspect for damage, corrosion or clogging. If dirty, clean the screen with soapy water and rinse with fresh water. If damaged or corroded, replace with a new screen.
6. Replace by following steps 1 through 5 in reverse order.



## 7.2 Coupler Assembly Removal/Replacement

**Note:** *The coupler assembly is replaced as part of a major overhaul of the torch or when damaged by a catastrophic flashback. During the normal course of operations it should not be necessary to remove or replace the coupler assembly.*

*The repair procedure calls for securing brass components in a vise. Note that brass is a soft metal that bends or distorts easily. Damage to torch parts can affect fit-up and cause oxygen leakage, making the torch unsafe to operate.*

1. Disconnect the oxygen hose from the torch hose adapter.
2. Remove the collet nut and the collet.
3. Remove the nylon screws (4) securing the torch handle grip. Remove the left and right side handle grips. Carefully remove the nylon nuts (4) from the right side handle grip and set aside.
4. Disengage the valve lever screw from the brass lock nut and remove the control valve lever.
5. With the valve assembly exposed, secure the torch head in a vise.
6. Using a 9/16" open end wrench, unscrew the brass hose connector and remove it from the torch head. Remove the torch head from the vise and set aside.
7. Secure the valve assembly in a vise with the coupler exposed.
8. Using a 7/16" open end wrench, unscrew the hose connector and remove it from the top of the valve assembly to remove the coupler assembly.
9. Reassemble by following steps 1 through 8 in reverse order. Use PTFE tape on threaded hose fittings to prevent oxygen leakage. Do not over-tighten threaded fittings.

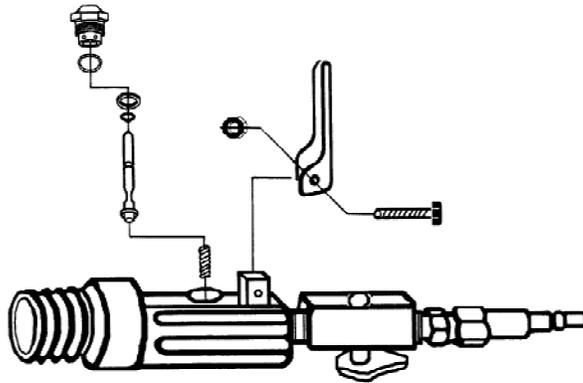
### 7.3 Oxygen Control Valve Disassembly/Reassembly

**WARNING!** *Oxygen mixed with oil or grease reacts explosively. Always keep oil and grease away from oxygen cylinders, valves, regulators, hoses and fittings. Use only certified oxygen compatible silicon lubricants on the valve stem and valve stem o-ring.*

**Note:** *The oxygen control valve is disassembled as part of a major overhaul of the torch when damaged, obstructed or when an oxygen leak is detected. During the normal course of operations it should not be necessary to disassemble the oxygen control valve.*

*The repair procedure calls for securing brass components in a vise. Note that brass is a soft metal that bends or distorts easily. Damage to torch parts can affect fit-up and cause oxygen leakage, making the torch unsafe to operate.*

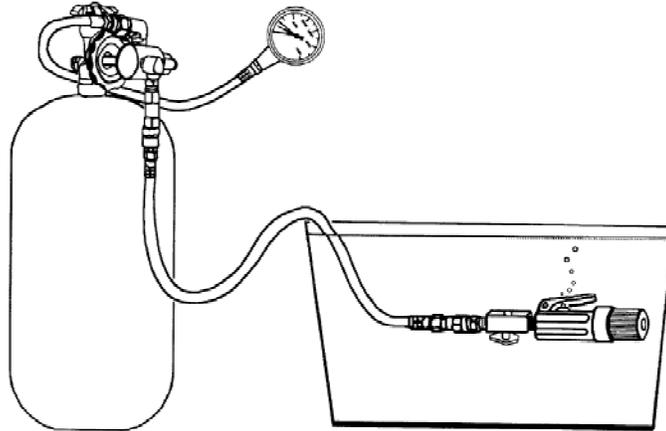
1. Disengage the valve lever screw from the brass lock nut and remove the control valve lever.
2. Secure the control valve assembly in a vise with the control valve nut facing up.
3. Using a 13/16" open end wrench or socket, unscrew the control valve nut until it disengages from the control valve body. Remove the control valve nut. Note the valve spring is under tension and may cause an uncontrolled separation of the valve nut from the valve body. Use caution to avoid damaging the rubber gasket.
4. Remove the control valve internal parts from the rear of the control valve nut.
5. Use care in disassembling the valve stem, valve stem spring and neoprene valve stem washer. Do not remove the o-ring from the valve stem unless it has first been determined the o-ring will be replaced.
6. Inspect the control valve body, control valve nut and internal parts for damage or wear. Replace if necessary.



**Reassembly:**

7. Place a new rubber gasket in the recess of the control valve nut.
8. If the valve stem o-ring is to be replaced, secure the valve stem with rounded end exposed.
9. Apply a light coating of silicon lubricant to the rounded end of valve stem. Slide the new o-ring on the valve stem until it seats in the groove. Remove the valve stem from fixture.
10. Slide valve stem washer over rounded end of valve stem until it seats against the back of the valve stem.
11. Press the valve stem assembly into the rear of the control valve nut.
12. Attach the valve stem spring to the rear of the valve stem.
13. Screw the control valve nut assembly into the control valve body. Hand tighten until it stops. Torque an additional 1/8 to 1/4 turn. Brass threads are easily stripped. Use caution not to cross-thread or over-tighten.
14. Assemble the control valve lever to the control valve using the brass screw and lock nut.
15. Attach to an oxygen source and check for leaks.

## 7.4 Oxygen Control Valve Assembly Leak Testing Procedure



1. Connect the oxygen hose to the oxygen hose adapter on the oxygen control valve assembly.
2. Connect the oxygen hose to a regulated oxygen source.
3. Fill a tank or tub with enough fresh water to completely submerge the control valve assembly.
4. Open the oxygen cylinder valve and adjust the regulator output pressure to 60 psig.
5. While submerging the torch in the water, depress and release the oxygen control valve lever three or four times. Inspect around the valve stem and the valve nut for bubbles that indicate oxygen leaks.
6. If leaks are found, rework the control valve assembly and retest. If no leaks are present, pass the control valve assembly and proceed with the next maintenance procedure, or if no further procedures are necessary, return the torch to working inventory.

## 8.0 STRIKER PLATE ASSEMBLY

**General:** Repeated ignitions will cause a buildup of slag deposits on the surface of the striker plate. This buildup is easily removed by scraping the striker plate across a rough surface or hard edge. Disconnect the striker plate power cable from the battery prior to cleaning the striker plate surface. Failure to do so could result in electric shock. After each use wipe the striker plate assembly and cable with a clean, dry, oil-free cloth. Inspect for damaged parts and replace or repair as necessary.

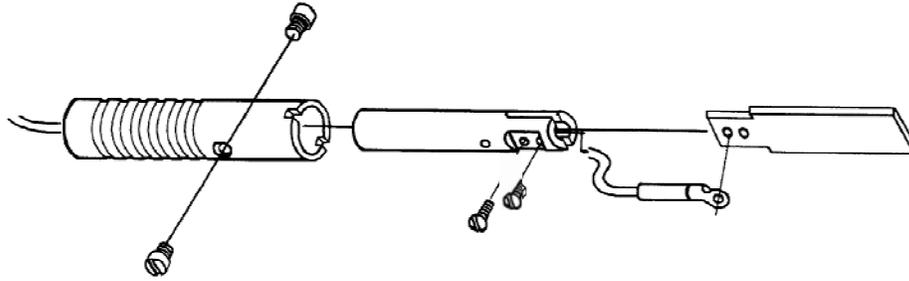
**WARNING!** *Always disconnect the striker plate power cable from the battery prior to disassembly or cleaning the striker plate surface. Failure to do so could result in electric shock.*

### 8.1 Inspection

1. Ensure the striker plate power cable and the wire terminal lug are free of cuts and not frayed. Repair or replace as required.
2. Ensure the two nylon screws, hex head screws and washers are present and properly tightened. Replace as required.
3. Inspect the striker plate handle, the copper striker plate, and the insulator for burns, gouges, deep scars and deformation. Repair or replace as required.

### 8.2 Striker Plate Disassembly

1. Ensure the striker plate power cable is not connected to the battery.
2. Using a standard screwdriver, remove the two nylon screws from the striker plate handle.
3. Grasp the copper striker plate and slide the striker plate handle back over the striker plate power cable, exposing the insulator.
4. Use a 5/32" hex wrench to remove the two screws (and washers) that pass through the insulator into the copper plate. Note: The copper plate is threaded, there are no nuts. One screw secures the cable lug to the copper plate. The other screw prevents movement of the plate in the insulator.
5. Slide the copper striker plate from between the flanges of the insulator.
6. Pull the striker plate power cable from the base of the insulator.



### 8.3 Striker Plate Reassembly

1. Push the striker plate power cable up through the base of the insulator until the wire terminal lug slides into the relief in the insulator.
2. Insert the copper striker plate into the groove in the wooden insulator taking care to overlap the wire terminal lug with the copper striker plate. Align these parts so that the bottom-most hole in the insulator is in line with the hole in the cable terminal lug and the rearmost hole in the copper striker plate.
3. Place a lock washer and one flat washer onto a socket head screw. Insert the screw through the bottom-most hole in the insulator and cable terminal lug and turn clockwise to engage the threads in the copper plate. Place a lock washer and two flat washers onto the other socket head screw. Insert the screw through the upper hole in the insulator and turn clockwise to engage the threads in the copper plate. Tighten both screws with a 5/32" hex wrench.
4. Slide the striker plate handle over the insulator and align the holes in the handle with the threaded holes in the insulator.
5. Insert the two nylon screws into the holes in the handle and turn clockwise to engage the thread in the insulator. Turn the screws with a standard screwdriver until they are felt to 'bottom' on the insulator. Do not over-tighten.

## 9.0 TROUBLESHOOTING

This guide is intended to assist in determining the probable causes of torch malfunction and their associated repairs.

For each potential problem identified, a probable cause and recommended repair procedure is listed.

### 9.1 Oxygen Leaks

1. **Oxygen leaks at hose adapter:** Oxygen hose fittings are not tight enough. Tighten fittings and test with soapy water. Formation of bubbles identifies location of leak. A persistent leak can often be corrected by the use of PTFE tape.
2. **Oxygen leaks at collet nut:** The cutting rod is not seated against the neoprene collet washer, or the collet washer may be dirty, worn or missing. Loosen the collet nut 1/2 turn, firmly seat the rod and tighten the collet nut. If leak persists, remove the collet nut, collet and collet washer. Clean or replace the collet washer. If a collet washer is worn and a new one is not available, turn the washer over and replace with the least worn face exposed.
3. **Oxygen leaks at the control valve nut:**
  - a. The rubber gasket is dirty or worn. Remove and clean or replace as needed.
  - b. The valve stem o-ring is dirty or worn. Follow control valve disassembly procedures to remove valve stem. Clean or replace as needed.
  - c. The valve stem washer is dirty or worn. Follow control valve disassembly procedures to remove the valve stem washer. Clean or replace as needed.
  - d. The valve stem is worn. Replace the valve stem and install a new o-ring.
  - e. The control valve nut is loose. Partially unscrew the control valve nut. Ensure the rubber valve nut gasket is in place. Retighten as described in the control valve reassembly procedures.

## **9.2 Uneven Oxygen Flow**

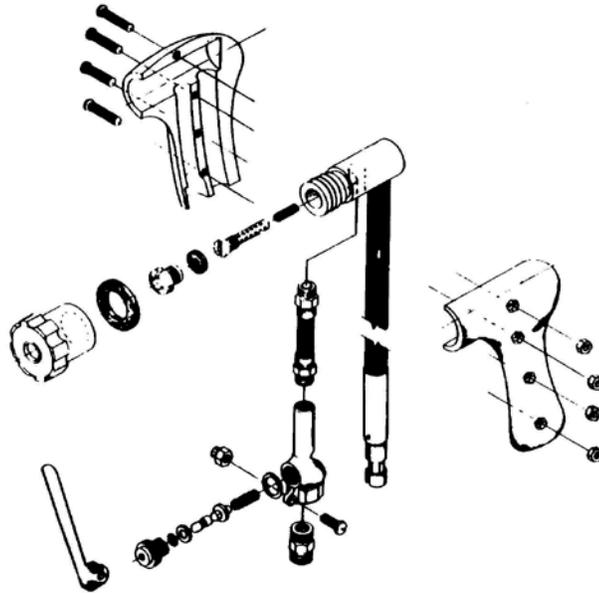
1. The flash arrestor is dirty or worn. Follow flash arrestor inspection/replacement procedures to remove the flash arrestor. Clean or replace as needed.
2. The screen is dirty or worn. Remove the screen as described in the repair procedure. Clean or replace with a new screen as needed.
3. The torch head is dirty. Remove the flash arrestor and screen as described in the inspection/replacement procedures. With the torch connected to an oxygen source, depress and release the oxygen control valve lever three or four times to clear the oxygen path. Reinstall the flash arrestor and screen.

## **9.3 The Cutting Rod Will Not Fit Into the Collet in the Torch Head**

1. The wrong size collet is in the torch head. Inspect the collet in the torch to determine if it is the correct size to fit the cutting rod to be used. If incorrect, remove the collet and replace with the correct collet.
2. The collet in the torch head is damaged:
  - a. Remove the collet from the torch. Inspect for burrs. If found, remove. Replace the collet in the torch.
  - b. Remove the collet from the torch. Use a slotted screwdriver to apply pressure in the collet slots to open up the collet. Replace the collet in the torch.

## **9.4 The Valve Stem Will Not Move Freely While Depressing and Releasing the Control Lever**

1. The valve stem is bent. Follow the oxygen control valve disassembly/reassembly procedures to remove and replace the valve stem. Always replace the valve stem o-ring when the valve stem is replaced.
2. The valve stem spring is worn. Follow the oxygen control valve disassembly/reassembly procedures to remove and replace the valve stem spring.
3. The valve stem o-ring is worn. Follow the oxygen control valve disassembly/reassembly procedures to remove and replace the valve stem o-ring.



## Service and Repair

If the torch needs service or repair return it to Broco, Inc. Use of non-factory replacement parts may render the torch unsafe to operate and lead to the risk of injury or death.

If there are any questions concerning the correct operation or care of this torch contact:

Broco, Inc.  
400 S. Rockefeller Ave.  
Ontario, CA 91761  
(800) 845-7259; (909) 483-3222  
Sales@Brocoinc.com

Broco, Inc. shall not otherwise be held liable in contract or in tort for any damages including but not limited to incidental damages, consequent damages, or special damages in any way related to this merchandise. Broco, Inc. neither expresses nor implies warranties which extend beyond the warranties contained herein. Broco, Inc. makes no warranty of merchantability or fitness for a particular purpose with respect to this equipment or parts thereof.

**NSN 3433-01-560-8668, PC/MIL-60, TORCH SET, CUTTING NSN 3439-01-553-0279,  
12478096, WELDING ACCESSORY KIT  
BROCO CAGE 59491**

BROCO PC/MIL-60 EXOTHERMIC TORCH SET					
ITEM NO	ITEM IDENTIFICATION	U/I	QTY	PART NO	NSN's
1	STORAGE CASE W/ CUSTOM FOAM	EA	1	PC/C-1600M	8145015549719
2	SHIELD, LEATHER	EA	1	PC/LS	3433014633286
3	ROD HOLDER, BLACK, 36"	EA	1	LBT-6160D (PC/NRHL)	3439015197478
4	TORCH WITH 30' CABLE & HOSE ASSEMBLY W/ QUICK DISCONNECT COUPLING	EA	1	PC/T-30	3433015546627
5	STRIKER PLATE 30' CABLE W/ CONNECTOR	EA	1	PC/SP-30	5340015545616
6	REGULATOR, INDUSTRIAL, ADJUSTABLE W/ QUICK DISCONNECT COUPLING	EA	1	HR-3500-1	
7	KIT, COLLET, 3/8"	EA	4	PCRP-305A	3431015197482
8	KIT, COLLET, 1/4"	EA	1	PCRP-305B	3431015197483
9	KIT, COLLET, 1/2"	EA	1	PCRP-305C	3433015365515
10	KIT, COLLET, 3/16"	EA	1	PCRP-305D	3431015545450
11	EXTENDER, ROD, 16" LONG	EA	1	PC/TACXT16	3433015876941
12	QUIVER, SHORT, 18", EXTENDER HOLDER	EA	1	LBT-6160C	3439016315785
13	GLOVES, WELDING	EA	1	PC/WGTAC	8415014633285
14	ADAPTER, YOKE, MEDICAL OXYGEN, CGA 870 X CGA 540	EA	1	M87-1	3431015877222
15	GOGGLES, SAFETY, #5 SHADE	EA	1	PC/S&W GOGGLE (PC/TSG)	4240015549687
16	STIX PAK, 1/4" CUTTING RODS (9 RODS)	EA	1	1418PC-SPS	3433015197492
17	STIX PAK, 3/8" CUTTING RODS (6 RODS)	EA	1	3818PC-SPS	3433015197490
18	KIT, BATTERY ADAPTER (CLAMPS)	EA	1	PC/BAK	6130015197494
19	EXTENSION SET, 30' HOSE & 35' CABLE W/ QUICK DISCONNECT COUPLING	EA	1	PC/EXMIL60	4720015548386
20	MANUAL, OPERATING INSTRUCTIONS	EA	1	INST-MIL60	7610015792049
21	SLAVE CONNECTOR ASSY	EA	1	600143 (PC/SR-CL)	3431015768427
22	CYLINDER WRENCH	EA	1	W1013	5120015792042
23	COLLET NUT (SPARE)	EA	1	PCRP-303	3431015548689
24	VALVE REPAIR KIT (SPARE)	EA	1	PC/VRK	4820015197500
25	HANDLE, STRIKER PLATE (SPARE)	EA	1	152	3431015770249
26	INSULATOR, STRIKER PLATE (SPARE)	EA	1	154	3431015769975
27	SCREW, NYLON, FILLISTER, STRIKER PLATE HANDLE (SPARE)	EA	2	158	5305015769633
28	CUTTING RODS, 36" X 3/8" (33 RODS)	BOX	1	3836PC-25	3439014113866

\* 36" LONG CUTTING RODS DO NOT FIT INSIDE STORAGE CASE.\*



1. PC/C-1600M  
STORAGE CASE



2. PC/LS  
LEATHER SHIELD



3. LBT-6160D  
ROD HOLDER



4. PC/T-30  
TORCH ASSEMBLY



5. PC/SP-30  
STRIKER PLATE



6. HR-3500-1  
OXYGEN REGULATOR



COLLET KITS  
7. PCRP-305A 3/8"  
8. PCRP-305B 1/4"  
9. PCRP-305C 1/2"  
10. PCRP-305D 3/16"



11. PC/TACXT16  
ROD EXTENDER



12. LBT-6160C  
ROD HOLDER



13. PC/WGTAC  
WELDING GLOVES



14. M87-1  
ADAPTER, OXYGEN



15. PC/S&W GOGGLES  
SAFETY GOGGLES



16. 1418PC-SPS  
STIX PAK, 1/4" RODS



17. 3818PC-SPS  
STIX PAK, 3/8" RODS



18. PC/BAK  
BATTERY ADAPTER



19. PC/EXMIL60  
HOSE/CABLE EXTENSION SET



20. PC/MIL-INST  
MANUAL



21. 600143  
SLAVE CONNECTOR ASSY



22. W1013  
CYLINDER WRENCH



23. PCRP-303  
COLLET NUT (SPARE)



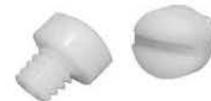
24. PC/VRK  
VALVE KIT (SPARE)



25. 152  
STRIKER PLATE HANDLE



26. 154  
STRIKER INSULATOR



27. 158  
STRIKER PLATE HANDLE SCREW



28. 3836PC-25  
CUTTING RODS, 3/8" X 36"

# **BROCO**<sup>®</sup>

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