



# Operating Manual

## **Sabre-arc 50i Sabre-arc 80i PT-81 Plasma Torch Plasma Arc Cutting Packages**



**Please ensure that this  
Instruction Manual is made  
available to the user of  
the equipment**



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## WARNING



This cutting equipment has been designed, manufactured and tested to the highest standards to ensure long and trouble free life. However, regular maintenance is an essential part of keeping the machine operating in a reliable and safe manner and your attention is drawn to any maintenance instructions that are contained in this manual.

In general, all cutting equipment should be thoroughly inspected, tested and serviced at least annually. More frequent checking will be required when the equipment is heavily used.

Wear and tear, particularly in electro-mechanical and moving components, are gradual processes. Caught in time, repair costs are small and the benefits in performance reliability and safety are significant. Left alone, they can put the equipment, and you, at risk.

Have this equipment regularly inspected and maintained by an approved service centre.



## WARNING



**ARC WELDING AND CUTTING CAN BE INJURIOUS TO YOURSELF AND OTHERS. TAKE PRECAUTIONS WHEN WELDING. ASK FOR YOUR EMPLOYER'S SAFETY PRACTICES WHICH SHOULD BE BASED ON MANUFACTURERS' HAZARD DATA.**

### **ELECTRIC SHOCK - Can Kill**

- Install and earth the welding unit in accordance with applicable standards.
- Do not touch live electrical parts or electrodes with bare skin, wet gloves, or wet clothing.
- Insulate yourself from earth and work.
- Ensure your working position is secure.

### **FUMES AND GASES - Can be Dangerous to Health**

- Keep your head out of the fumes.
- Use ventilation, extraction at the arc, or both, to keep fumes and gases from your breathing zone and the general area.

### **ARC RAYS - Can Injure Eyes and Burn Skin**

- Protect your eyes and body. Use the correct welding screen and filter lens and wear protective clothing.
- Protect bystanders with suitable screens or curtains.

### **NOISE- Excessive noise can damage hearing**

- Protect your ears. Use ear defenders or other hearing protection.
- Warn bystanders of the risks.

**READ AND UNDERSTAND THE INSTRUCTION MANUAL  
BEFORE INSTALLING OR OPERATING AND SEE 18 PUBLICATION 237  
'The arc welder at work' AVAILABLE FROM THE MANUFACTURER.**

**PROTECT YOURSELF AND OTHERS**

## SAFETY

In any arc welding or cutting operation, it is the responsibility of the user to observe certain safety rules to ensure his personal safety and to protect those working near him.

Read all safety articles relevant to arc welding or cutting published by the WMA. Pay particular attention to any **CAUTION** or **WARNING** Notes included in this manual. **CAUTION** indicates possible equipment damage. **WARNING** indicates possible hazard to life.

⚠ **WARNING** ⚠

*The ON/OFF switch on this equipment does not isolate the unit from the mains electrical supply. **AC POWER IS PRESENT ON THE ON/OFF SWITCH TERMINALS.***

*The On/Off lamp is an indication that the supply is switched on and does not imply that the unit is isolated from the supply. **BEFORE REMOVING THE COVERS FOR MAINTENANCE, ISOLATE THE UNIT FROM THE MAINS ELECTRICAL SUPPLY.***

### 1. Electrical

- ⚠ Treat electricity with respect. Even the open circuit voltage of this equipment can be dangerous. Adjustments to the torch or replacement of torch parts should be undertaken with the mains supply isolated from the unit.  
If damaged torch cables or torch components are found, the unit must be disconnected from the mains and defective parts must be replaced using only Murex spare parts.
- ⚠ Do not work on live circuits or cables. Disconnect the main power supply before checking the machine or performing any maintenance operation.
- ⚠ Be sure the case of the welding machine is properly connected to a good electrical earth.
- ⚠ Have the wiring for the welding machine installed by a qualified electrician. All connections must be made according to specifications in force and to general safety standards.
- ⚠ Do not stand in water or on damp floors while using an arc welder or cutter. Do not use in the rain.
- ⚠ Do not operate with worn or poorly connected cables. Inspect all cables frequently for insulation failure, exposed wires and loose connections.
- ⚠ Do not overload cables or continue to operate with overheating cables. Cables which are too small for the current carried will overheat, causing rapid deterioration of the insulation.
- ⚠ Pay attention that live parts of the torch do not touch any metal which is connected to the earth cable. Fix an insulated hook to hang the torch on when it is not in use.

### 1. Ventilation

- ⚠ Do not weld or cut on containers which have held combustible or flammable materials, or materials which give off flammable or toxic vapours when heated, without proper cleaning.
- ⚠ Locate the welding/cutting operation far enough from any vapour-type degreaser using trichlorethylene or other chlorinated hydrocarbons as solvents. The ultraviolet light from the arc can decompose these vapours into toxic gases at a considerable distance from the arc, even though the concentration of the gases is low enough to be undetectable by smell.
- ⚠ Be sure to provide adequate ventilation for removal and dilution of fume and gases. Fume exhaust facilities near the arc, or a ventilated helmet should be used when cutting in confined spaces or on toxic material.

### 2. Glare

- ⚠ Never look at the arc without wearing eye protection. Always use the proper protective clothing, filter glasses, and gloves. Be careful to avoid exposed skin areas. Do not use cracked or defective helmets or shields.
- ⚠ Never strike an arc when there is someone near who is not protected from the strong light of the arc.
- ⚠ Warn bystanders who are not aware of the dangers of ultraviolet light.

### 3. General

- ⚠ Take care when lifting the unit.
- ⚠ Ensure that cylinders are secured by chains.
- ⚠ Locate the unit so that there is adequate air flow to the ventilation louvres.
- ⚠ Always dress correctly to protect against glare, radiation and spatter.

### 4. Fire

- ⚠ Ensure that the correct type of fire extinguisher is available in the operating area.
- ⚠ Do not use near flammable materials or liquids, in or near explosive atmospheres, or on pipes carrying explosive gases.

### 5. Vehicle Electrics

- ⚠ When working on motor vehicles, remove the battery and any circuitry which may be damaged by the arc.
- ⚠ Whilst cutting be aware of the possibility of 'hidden wires' behind panels or bulkheads.

## INTRODUCTION

### Sabre-arc 50i & 80i power sources

The Murex Sabre-arc 50i and 80i are portable plasma cutting systems designed to work on industrial 380/415V power supplies and utilise clean and dry factory compressed air for both the plasma and secondary cooling gas. The power sources use inverter technology to give precise control of the cutting current and together with the PT-81 torch enables conducting materials up to 18mm (50i) and 25mm (80i) respectively.

### PT-81 Plasma Cutting Torch

The patented Murex PT-81 torch is designed to operate to a maximum of 80 amperes at 100% duty cycle using clean dry air for both cooling and plasma gases. A built in air check valve inside the PT-81 torch head, in combination with air flow detection circuitry in the Sabre-arc power source, ensures the torch cannot be energised when the heatshield is removed.

The PT-81 is available with either 7.6m or 15m cables (7.6m is standard with both the Sabre-arc 50i and 80i).

The PT-81 is best applied using a 3mm to 6mm stand off (tip to work) for cutting material thicknesses of 3mm to 25mm.

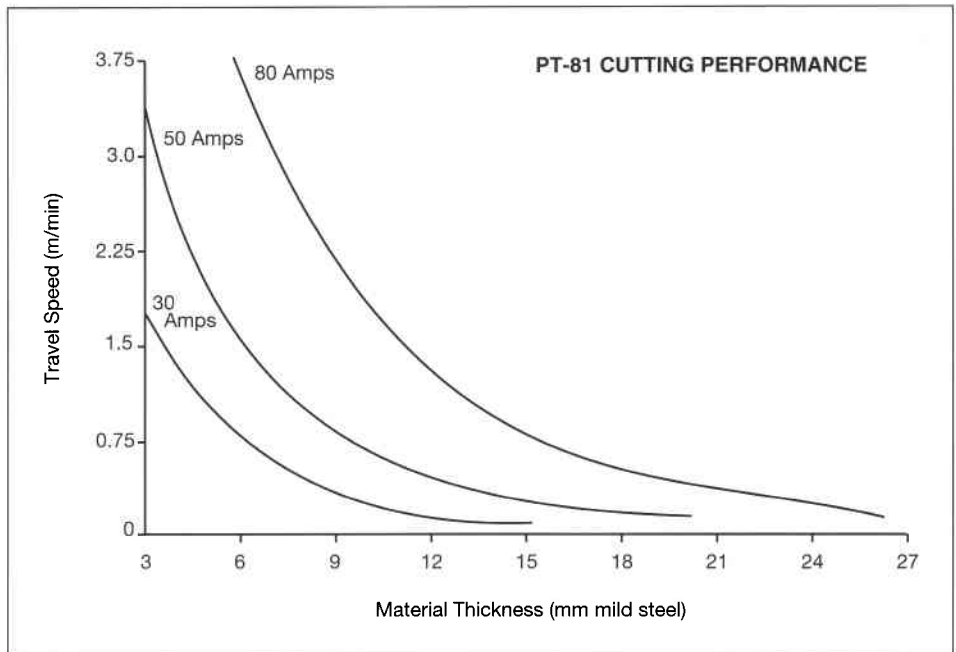


Figure 1.

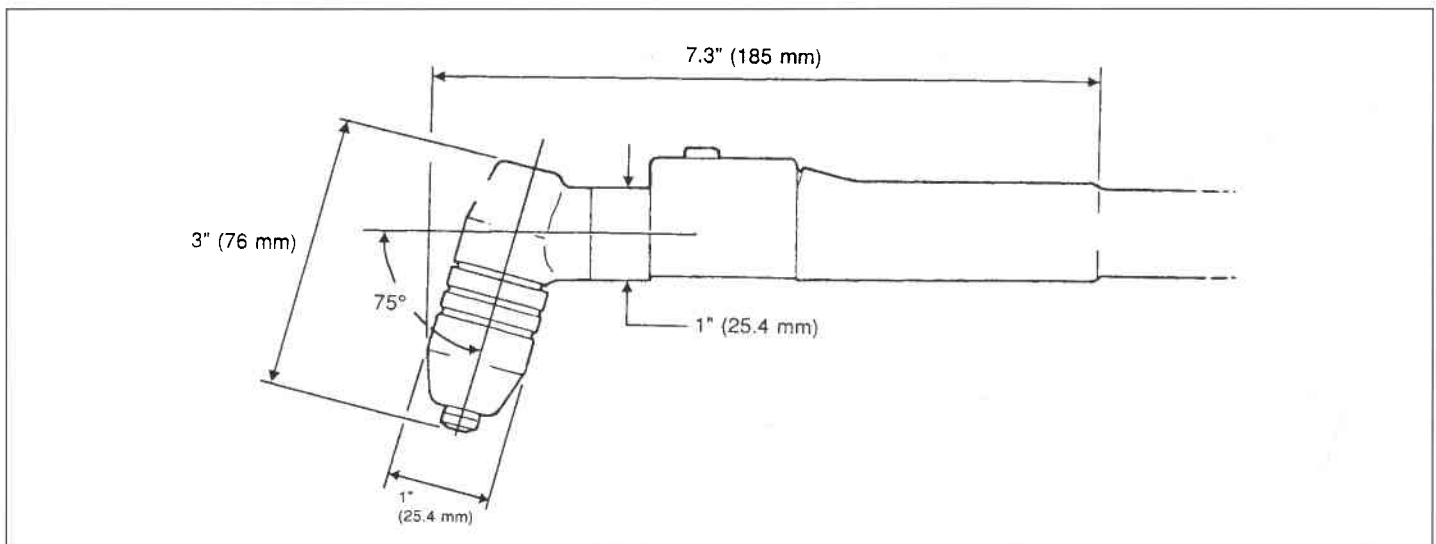


Figure 2. PT-81 Dimensions



**SPECIFICATION**

	<b>SABRE-ARC 50i</b>	<b>SABRE-ARC 80i</b>
<b>Output</b>		
Open Circuit Voltage	265Vdc	275Vdc
Output Current	10-50A	15-80A
Duty Cycle	50A @ 105Vdc 40A @ 104Vdc 30A @ 103Vdc	80A @ 108Vdc 50A @ 105Vdc
40%		
60%		
100%		
<b>Input</b>		
Mains Voltage	380/415Vac	380/415Vac
Frequency	50/60Hz	50/60Hz
Phases	3	3
Primary Current at Max Output	14A/Phase	20A/Phase
Fuse Rating	20 A	30A
<b>Dimensions</b>		
Length	483mm	750mm
Height	457mm	534mm
Width	305mm	305mm
(inclusive of torch storage)		
Weight	32kg	44kg

<b>PT-81 PLASMA TORCH</b>		
Duty Cycle		80A @ 100%
Weight	7.6m 15m	2.4kg 4.4kg

## UNPACKING

The Murex Sabre-arc systems comprise the following items

Description	Part No
<b>SABRE-ARC 50i PACKAGE</b> Containing: Sabre-Arc 50i Power Source with regulator	<b>1415300</b>
PT-81 Plasma Torch 7.6m	1415302
Work cable 7.6m	680560
Spare parts kit 50A (see table 1)	1415304
<b>SABRE-ARC 80i PACKAGE</b> Containing: Sabre-Arc 80i Power Source with regulator	1415301
PT-81 Plasma Torch 7.6m	1415302
Work cable 7.6m	30741
Spare parts kit 80A (see table 1)	1415305

Check that all required items are present and inspect carefully for evidence of damage which may not have been apparent on the external packing. If necessary notify the carrier or your Murex distributor immediately.

**Table 1 PT-81 Spare Part Kits**

Description	50i Kit 1415304	QTY	80i Kit 1415305	QTY
Heat Shield Long	1415306	2	1415217	2
50A Nozzle	1415211	4	-	
80A Nozzle	-		1415212	4
Stand off guide	1415215	1	1415215	1
Swirl Baffle	1415213	1	1415213	1
Electrode	1415214	3	1415214	3
Fuse	951780	4	951780	4
Valve Pin	21619	1	21619	1

## INSTALLATION

**Installation must only be undertaken by a qualified electrician or suitably trained person.**

1. Choose a location so that the louvres on the front and rear are clear of any obstruction and permit free flow of air through and around the unit. Refer to Safety section for other precautions regarding siting the unit.

### WARNING

*Electric shock can kill! Precautionary measures should be taken to provide maximum protection against electric shock. Be sure that all power is off by opening the line (wall) disconnect switch and by unplugging the primary cable to the unit when connections are made inside the power supply.*

2. The Sabre-arc 50i and 80i

Power sources are equipped with a 3m primary input cable suitable for use on 380/415V 50/60Hz supply.

Connection should be made as follows:-

Brown - L1  
Blue - L2  
Yellow - L3  
Green/Yellow - Earth

A suitable switched isolator should be used and the circuit must be protected by a suitable fuse.

Sabre-arc 50i - 20A fuse (slow blow)

Sabre-arc 80i - 30A fuse (slow blow)

3. For operator safety, the torch and work return cable connections are located on a panel behind the cover on the front bottom of the unit. Note that a safety interlock prevents the unit being operated whilst the cover is removed.

### WARNING!

*Before making any connections to the power source output terminals make sure that all primary input power to the machine is off at the main disconnect switch and that the input power cable is unplugged.*

### WARNING!

*Do not use any torch with this unit other than the PT-81 torch without consulting Murex Welding products technical department. Serious injury may occur if used with any other torch.*

4. Connect a supply of CLEAN DRY COMPRESSED AIR to the regulator input nipple. The supply requirements are 6 bar minimum, 10 bar maximum (90-150 psi) at 100-150 L/min. Do not use compressed air that has been oil loaded for pneumatic tools etc.

5. Clamp the work return clamp onto the workpiece ensuring that the connection point is free from rust, salt or paint.

6. Connect the workpiece at work table to an approved earth ground with a properly sized ground cable refer to figs 3 & 4.



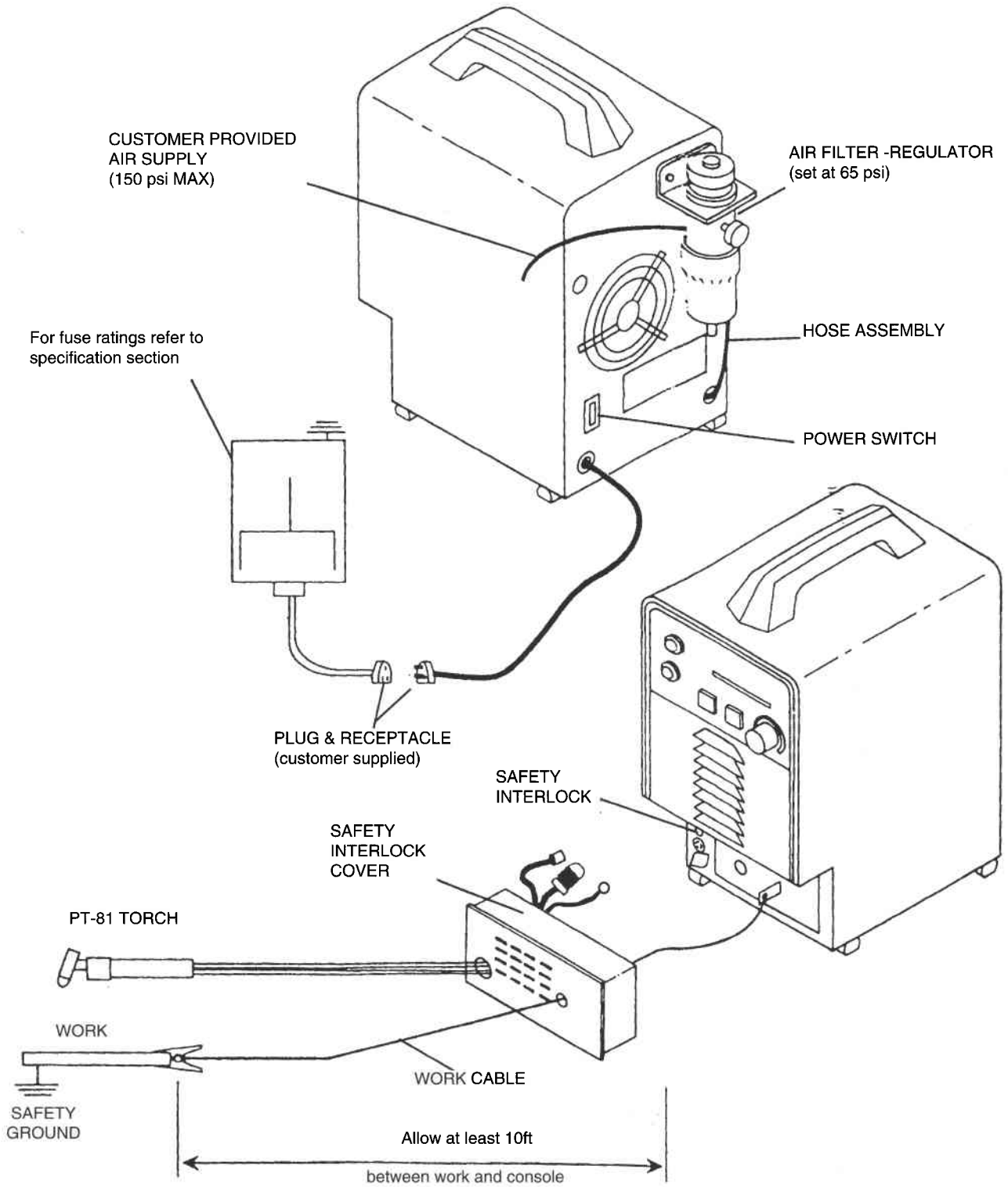


Figure 3. Sabre-arc Interconnection diagram

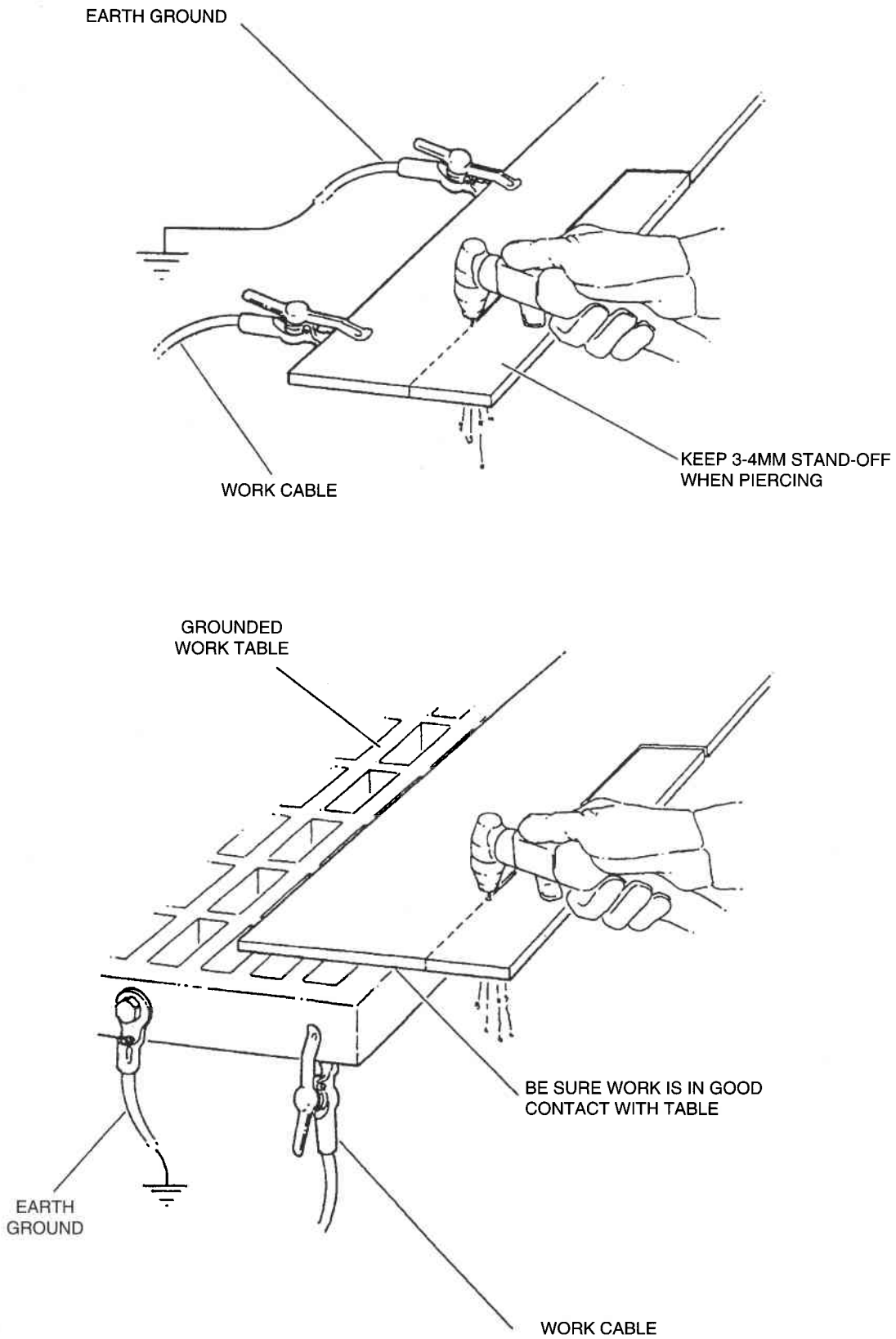


Figure 4. Ground and Work Cable Connections

## ASSEMBLING THE PT-81 TORCH CONSUMABLES

### WARNING!

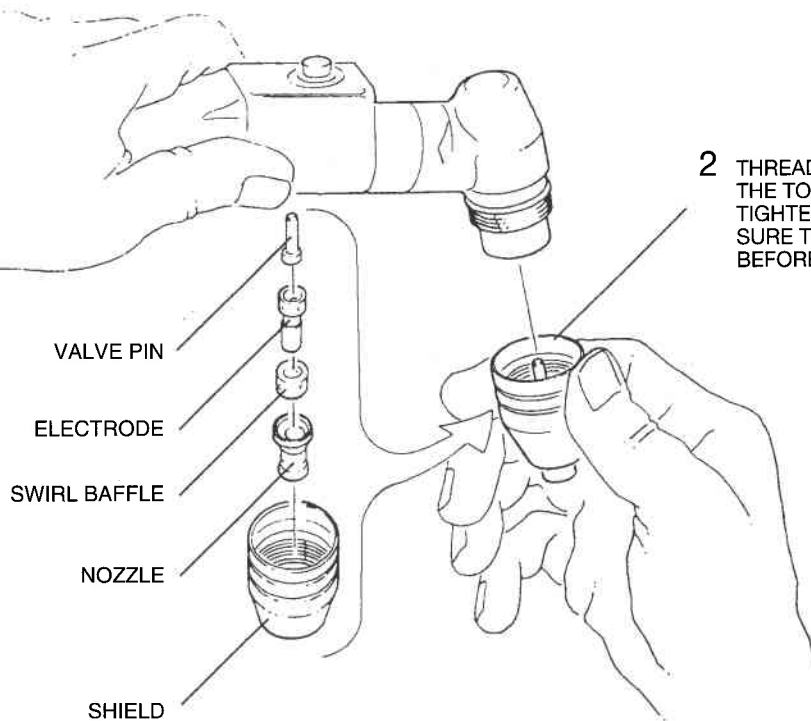
Make sure the power switch is on the Sabre-arc is in the off position and primary input power is de-energised.

The plasma arc process employs extremely high voltages. Contact with live parts of the torch and machine must be avoided.

The electrode seat comes factory assembled in the PT-81 Torch head. Make sure seat is firmly tightened with a 0.125-inch hex key. Do not overtighten. Refer to page 30 for installation procedure for installing seat in head.

Place the nozzle, swirl baffle, electrode and valve pin into the heatshield as shown in Figure 5. With the torch head front end facing downward, thread this assembly to the torch head and hand tighten snugly to hold parts in firm contact with each other and the torch head.

1 PLACE THE NOZZLE, SWIRL BAFFLE, ELECTRODE, AND VALVE PIN INTO THE SHIELD



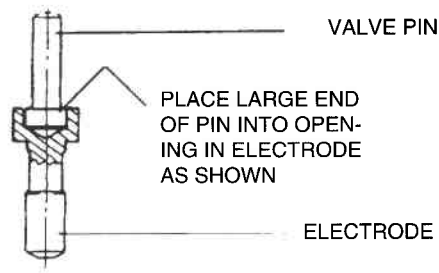
2 THREAD THIS ASSEMBLY TO THE TORCH BODY AND HAND TIGHTEN. ALWAYS MAKE SURE THE SHIELD IS TIGHT BEFORE CUTTING.

Figure 5 Assembly of PT-81 Torch Front End Parts

### WARNING!

\*The torch head contains a gas flow check valve that acts in conjunction with circuitry within the power source. This system prevents the torch from being accidentally energized with high voltage if the torch switch is closed when the shield is removed.

The valve pin is a crucial member of the system. Its function is to open the gas flow check valve that is permanently assembled within the torch head. If the pin is not correctly placed in the electrode, the valve will not open and the system will not function.



### CAUTION

DO NOT REVERSE. Inserting the pin upside down will restrict air flow.