

# **Sabre-arc 150 PT - 150 Plasma Cutting & Gouging System**



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



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## **WARNING**

*This equipment has been designed, manufactured and tested to the highest quality 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 welding or 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/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 general area.

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

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

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

**PROTECT YOURSELF AND OTHERS**

## SAFETY

In any plasma cutting or gouging 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 plasma 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. The open circuit voltage of this equipment is a high dc voltage therefore contact with any live parts of the torch 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 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 cut 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.

- ⚠ Switch off and isolate from the mains whilst changing cutting tips and electrodes.

### 2. 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.

### 3. 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 ultra-violet light.

### 4. 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.

### 5. Fire

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

### 6. 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

The Murex Sabre-arc 150 power source with the PT-150 plasma torch is a high power, high duty cutting or gouging equipment for industrial applications. Utilising two separate gas supplies one for the plasma (cutting) gas, the other for the cooling (secondary) gas see below, the system will cut a wide range of ferrous and non-ferrous materials up to 40mm (1.5") thick. In addition high quality gouges can be made for reclamation and repair work.

### 1. Sabre-arc 150 Power Source

The Sabre-arc 150 power source operates from 3 phase 220/380/415V industrial supplies and incorporates power factor correction. Utilising electronic feedback control and thyristor technology the machine features continuous adjustment of cutting current, built in ammeter, pilot arc and High Frequency arc initiation. Although used with separate plasma and cooling gases with the Murex PT - 150 torch, optionally the Sabre-arc 150 power source can be used with a single supply of compressed air and the PT - 100 torch (up to 100A) providing a lower cost alternative particularly for carbon steels. Separate gas inputs, each of which incorporate solenoid control, pressure and flow monitoring, are available on the rear panel.

### 2. PT - 150 Plasma Cutting Torch

The Murex PT - 150 torch is designed for operation using separate plasma and cooling gases. The choice of gases depends on the cutting or gouging application, the mate-

rial, thickness etc., and on the quality of cut/gouge face required. The Gas Requirements section, see page 7, deals in detail with this subject.

Rated at 150A at 100% duty (cutting) the torch uses heavy duty front end parts which can be simply interchanged to match the cutting or gouging application, current and plasma gas. A unique feature is the extended front end system giving greater visibility and access whilst cutting or gouging.

The PT - 150 torch is compact and light in weight and incorporates a 75° head angle for good visibility and handling, see Fig. 1. As standard with the Sabre-arc 150 the torch is supplied with a 15m (50') cable but further 7.6m (25') extensions are also available.

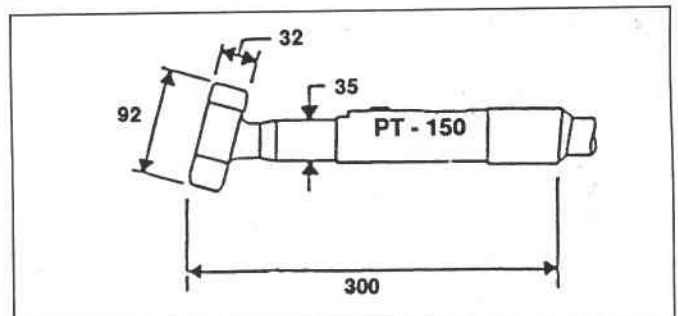


Fig. 1 PT - 150 Torch

## SPECIFICATION

### Sabre-arc 150 Power Source

#### Output:

|                             |                       |
|-----------------------------|-----------------------|
| Open Circuit Voltage        | 370V dc max.          |
| Current Range               | 25-150A               |
|                             | continuously variable |
| Output Rating 100%          | 125A/120V             |
| Volt Ampere characteristics | See Fig. 2            |

#### Input:

|                     |              |
|---------------------|--------------|
| Mains Voltage       | 220/380/415V |
| Frequency           | 50 Hz        |
| Phases              | 3            |
| Input Current       | 121/70/60A   |
| Power Factor        | 54%          |
| Fuse Rating at 415V | 90A slow     |

#### Gas Requirements:

|                         |  |
|-------------------------|--|
| Plasma (cutting) gas    | N <sub>2</sub> or Ar/H <sub>2</sub> mix or Air                   |
| Cooling (secondary) gas | Air or N <sub>2</sub> or CO <sub>2</sub> or O <sub>2</sub> or Ar |
|                         | (Usage depends on torch fitted)                                  |

#### Dimensions:

|        |       |                       |
|--------|-------|-----------------------|
| Length | 813mm | } Excluding undergear |
| Width  | 554mm |                       |
| Height | 788mm |                       |
| Weight | 290kg |                       |

### PT - 150 Torch

|                         |  |
|-------------------------|--|
| Rating                  | 150A at 100% duty  |
| Plasma (Cutting) gas    | N <sub>2</sub> or Ar/H <sub>2</sub> mix                          |
| Cooling (secondary) gas | Air or N <sub>2</sub> or CO <sub>2</sub> or O <sub>2</sub> or Ar |
| Cable Length            | 15m  |
| Gas Requirements        | See page 7   |
| Dimensions              | See Fig. 1   |

*Cutting thickness up to 1.5" (40mm)*

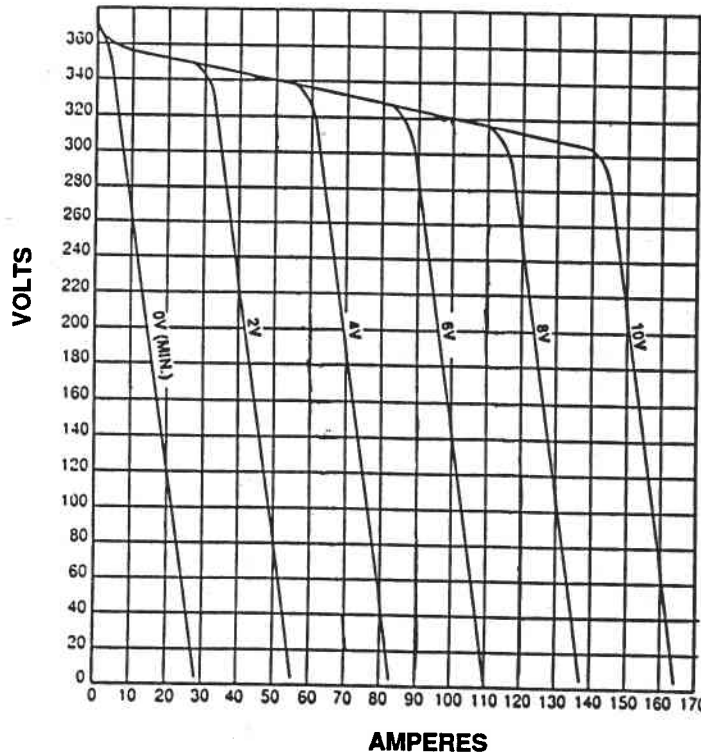


Fig. 2 Sabre-arc 150 Volt Ampere Characteristics

## EQUIPMENT SUPPLIED

The Murex Sabre-arc 150/PT-150 package (Pt.No. 1414300) includes the following items:

| Pt. No. | Description   |
|---------|---|
| 1414301 | Sabre-arc 150 Power Source (includes primary cable and undergear) |
| 1414302 | PT - 150 Torch with 15m lead                                      |
| 1414304 | Work return lead and clamp 15m long                               |
| 1414272 | Plasma gas hose 2m  |
| 1414305 | Cooling gas hose 2m   |
| 1414303 | Torch spare parts kit   |

PT - 150 Torch Spare Parts Kit - Pt. No. 1414303 comprises:-

| Qty | Description            | Part No. |
|-----|------------------------|----------|
| 1   | Torch Cap              | 1414322  |
| 2   | O - Ring               | 1414325  |
| 2   | Collet H D             | 1414312  |
| 1   | O - Ring               | 1414323  |
| 2   | Baffle Std.            | 1414320  |
| 5   | O - Ring               | 1414324  |
| 3   | Heat Shield Std.       | 1414313  |
| 2   | Heat Shield Long       | 1414314  |
| 2   | Heat Shield Drag       | 1414315  |
| 5   | Cutting Tip 1.4        | 1414307  |
| 5   | Cutting Tip 1.2        | 1414308  |
| 5   | Cutting Tip 0.8        | 1414309  |
| 5   | Cutting Tip 1.6        | 1414306  |
| 1   | Insert Front Body      | 1414316  |
| 1   | Insert Front Body Long | 1414317  |
| 5   | Electrode Std.         | 1414310  |
| 2   | Electrode Long         | 1414311  |
| 2   | Spacer                 | 1414321  |
| 2   | Centering Tool         | 1414326  |
| 2   | Wrench                 | 1414327  |
| 1   | Lubricant Silicone     | 1414217  |
| 1   | High Current Insert    | 1414318  |
| 2   | High Current Baffle    | 1414319  |
| 2   | Gouging Tip 150A       | 1414328  |
| 2   | Gouging Nozzle         | 1414329  |

## GAS REQUIREMENTS

The Murex PT - 150 torch requires separate plasma and cooling gas supplies. The choice of gases depends on the cutting or gouging application, material, thickness etc., and on the quality of the cut/gouge face required. See Fig. 3 for general comments and Figs. 4 & 5 for specific data.

### Plasma (Cutting) Gas

Nitrogen is the most commonly used gas for general cutting applications offering greatest economy. However for the highest quality cuts in aluminium or thick steels, stainless & mild, an Argon Hydrogen mixture (65%Ar, 35% Hydrogen) is the best choice offering greater thickness capability, higher cutting speeds and no Nitrogen entrainment problems. For plasma gouging 65% Argon/35% Hydrogen is the required plasma gas.

### Cooling (Secondary) Gas

Nitrogen, Carbon Dioxide, Oxygen or Air can be used as cooling gases, see Figs. 3, 4 & 5. 250cfh (120 lpm) of Air, Oxygen or Nitrogen at 50psi (3.5 bar) is required to cool the torch. Alternatively using CO<sub>2</sub>, 210 cfh (100 lpm) at 50 psi is needed. The use of Air or Carbon Dioxide will produce less bottom dross on stainless plate than Nitrogen.

For plasma gouging Argon, Air or Nitrogen can be used as the cooling (secondary) gas but pure Argon is generally recommended for the highest quality gouges with least fume production. Cooling gas pressure for gouging should be set to 50psi (3.5 bar)

### Note

*Air must not be used as the plasma gas with the PT - 150 torch*

| Tip Size & Pt.No. | Plate Thickness | Mild Steel                        |                |  |     | Stainless Steel                   |                |  |     | Aluminium                         |                |  |     | Current used with |                       |  |  |  |
|-------------------|-----------------|-----------------------------------|----------------|--|-----|-----------------------------------|----------------|--|-----|-----------------------------------|----------------|--|-----|-------------------|-----------------------|--|--|--|
|                   |                 | N <sub>2</sub> Plasma Gas (25psi) |                | 65Ar/35H <sub>2</sub> Plasma Gas (65psi) |     | N <sub>2</sub> Plasma Gas (25psi) |                | 65Ar/35H <sub>2</sub> Plasma Gas (65psi) |     | N <sub>2</sub> Plasma Gas (25psi) |                | 65Ar/35H <sub>2</sub> Plasma Gas (65psi) |     |                   |                       |  |  |  |
|                   |                 | Cooling Gas (50psi)               |                |  |     | Cooling Gas (50psi)               |                |  |     | Cooling Gas (50psi)               |                |  |     | N <sub>2</sub>    | 65Ar/35H <sub>2</sub> |  |  |  |
|                   |                 | O <sub>2</sub>                    | N <sub>2</sub> | CO <sub>2</sub>                          | Air | O <sub>2</sub>                    | N <sub>2</sub> | CO <sub>2</sub>                          | Air | O <sub>2</sub>                    | N <sub>2</sub> | CO <sub>2</sub>                          | Air |                   |                       |  |  |  |
| 0.8mm<br>1414309  | 0.8             | 1G                                | 4S             | 3F                                       | 2F  |                                   |                |  |     |                                   |                |  |     |                   |                       |  |  |  |
|                   | 1.6             | 1G                                | 4F             | 1G                                       | 3G  |                                   |                |  |     |                                   |                |  |     |                   |                       |  |  |  |
|                   | 3               | 4S                                | 3F             | 1G                                       | 2G  |                                   |                |  |     |                                   |                |  |     |                   |                       |  |  |  |
| 1.20mm<br>1414308 | 0.8             | 1E                                | 3G             | 2E                                       | 4G  |                                   |                |  |     |                                   |                |  |     |                   |                       |  |  |  |
|                   | 1.6             | 1G                                | 2G             | 3G                                       | 4F  |                                   |                |  |     |                                   |                |  |     |                   |                       |  |  |  |
|                   | 3               | 1G                                | 4F             | 2G                                       | 3G  |                                   |                |  |     |                                   |                |  |     |                   |                       |  |  |  |
|                   | 4.5             | 4S                                | 3F             | 2G                                       | 1G  |                                   |                |  |     |                                   |                |  |     |                   |                       |  |  |  |
|                   | 6               | 4S                                | 3F             | 1F                                       | 2F  |                                   |                |  |     |                                   |                |  |     |                   |                       |  |  |  |
| 1.40mm<br>1414307 | 1.6             | G1                                | F4             | G2                                       | G3  | S5                                |                |  |     |                                   |                |  |     |                   |                       |  |  |  |
|                   | 6               | G1                                | F4             | G2                                       | G3  | F5                                |                |  |     |                                   |                |  |     |                   |                       |  |  |  |
|                   | 12              | G1                                | S5             | G2                                       | G4  | G3                                |                |  |     |                                   |                |  |     |                   |                       |  |  |  |
| 1.60mm<br>1414306 | 12              | G1                                | F4             | F2                                       | F3  |                                   |                |  |     |                                   |                |  |     |                   |                       |  |  |  |
|                   | 18              | G1                                | F5             | F2                                       | F4  | F3                                |                |  |     |                                   |                |  |     |                   |                       |  |  |  |
|                   | 25              | G1                                | S5             | F3                                       | F4  | F2                                |                |  |     |                                   |                |  |     |                   |                       |  |  |  |
| 30                | NR              | NR                                | NR             | NR                                       | NR  | F1                                |                |  |     |                                   |                |  |     |                   |                       |  |  |  |
|                   | 37              | NR                                | NR             | NR                                       | NR  | F1                                |                |  |     |                                   |                |  |     |                   |                       |  |  |  |

Numbers indicate order of cooling gas preferred for a particular material and thickness.

- E (Excellent) - Essentially no bottom dross; excellent cut face.
- G (Good) - Moderate to no bottom dross; good cut face.
- F (Fair) - Moderate bottom dross, fair cut face.
- S (Sever) - Heavy tenacious dross; poor cut face.
- NR - Not recommended.

Fig. 3 PT - 150 Gas Selection Chart