MUREX

Operating Manual

Sabre-arc 40*i*

PT - 50

Air Plasma Cutting System

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

Contents

WARNING

This welding 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 welding 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 and 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 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

1. Sabre-arc 40*i* Power Source

The Murex Sabre-arc 40*i* is a small portable plasma cutting system designed to work on industrial 380/415V power supplies and utilises factory compressed air for both the plasma and secondary cooling gas. The power source uses inverter technology to give precise control of cutting current and, together with the PC-50 torch and patented HD consumables, enables conducting materials up to 15mm thick to be cleanly cut.

PT - 50 Plasma Cutting Torch

The patented Murex PT-50 torch and HD consumables are designed for manual plasma cutting up to 50A at 100% duty using **clean dry air** as both plasma and cooling gases. The PT-50 torch head contains an air flow check valve which, in conjunction with a flow switch in the Murex Sabre-arc power source, provides a safety interlock preventing the torch from being accidentally energised when the heatshield is removed.

The PT-50 is available with either 7.6 or 15m cables (7.6m standard with the Sabre-arc 40*i*) and has a 75° head angle. A pencil type 180° head is available as an optional extra, see Fig. 1 and Optional Extras section.

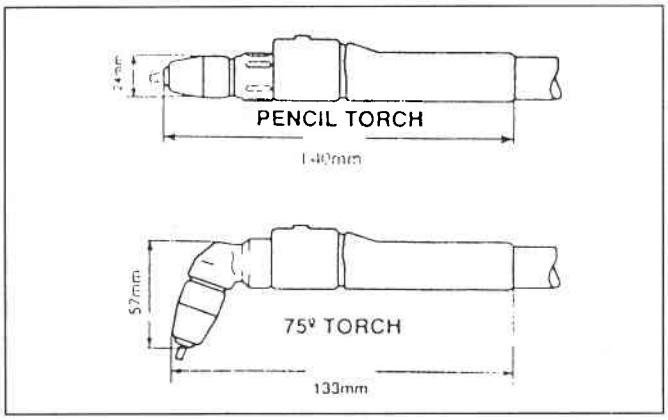

Fig. 1 PC - 50 Torch

The torch can be used in either contact cutting mode for sheet metals up to 5-6mm thick. A stand off (tip to work) distance of 2-3mm is recommended for plates greater than 6mm thickness.

A cutting guide plate can be used to aid straight line cutting, see OPERATION, this technique is also useful when cutting mesh or grilles. In addition a Circle Cutting Attachment is available as an Option for cutting accurate circles from 125 to 680mm in diameter. The circle cutting attachment dual castor assembly is also useful for maintaining a constant standoff for general sheet cutting.

SPECIFICATION

Sabre-arc 40*i* Power Source

Output:	
Open Circuit Voltage	200V dc
Output Current	10-40A continously variable
Output Voltage	120V dc
Cutting Thickness (mild steel)	0.5 - 15mm
Rating (10 minute cycle)	40A 60% duty
Input:	
Mains Voltage	380/415V
Frequency	50/60Hz
Phases	1 (2)
Input Fuse	30A
Dimensions	
Height	438mm
Width	210mm
Depth	420mm
Weight	21kg

PT - 50 Torch

Current Rating	50A 100% duty
Plasma/Cooling Gases	Air
Head Angle	75° (180° 'Pencil' Option)
Cable Length	7.6m (15m Optional)
Weight (shipping)	0.9kg
Air Pressure	60-70 psi
Air Flow	120 lpm/250cfh

UNPACKING

The Murex Sabre-arc 40*i* system comprises the following items:

Pt.No. 1414201	Sabre-arc 40*i* Power Source with fitted primary cable
1414206	PT - 50 plasma torch with 7.6m lead
1414203	Air filter regulator and mounting hardware
1414204	Air hose assembly 0.75m
1414205	Work return lead and earth clamp 7.6m long
1414207	Kit of consumables for the PT-50 torch:-

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.

INSTALLATION - see Fig. 2

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 40*i* power source is equipped with a 3m, 3 conductor primary input cable suitable for use on 380/415V 50hz 1(2) phase power. Connection should be made as follows:-

Brown	-	L1
Blue	-	L2
Green/Yellow	-	Earth

A suitable switched isolator should be used and the circuit must be protected by a 30A fuse.

3. Set the mains voltage selector switch on the rear panel of the unit to the correct value for the supply to be used, 380 or 415V. Note that failure to do this will not damage the machine but may cause the overload/fault light to illuminate.

4. 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.

5. Remove the cover and thread the lug end of the work return through the RH bushing and connect it to the work terminal. It may be necessary to slit the rubber skin inside the bushing.

6. Thread the power cable and torch switch lead of the PT-50 torch through the L.H. bushing in the cover and connect the power cable to the torch fitting (LH threads). Connect the torch switch plug to the receptacle provided. Ensure all three connections are tight. Refit the cover to the unit.

7. Assemble the air filter regulator to the rear of the unit as shown in Fig. 2. Connect the 0.75m long air hose to the filter regulator output (LH thread) and to the air inlet connection on the rear of the power source (RH thread). Ensure both hose connections are tight.

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

9. Clamp the earth clamp onto the workpiece ensuring that connection point is free from rust, scale or paint.

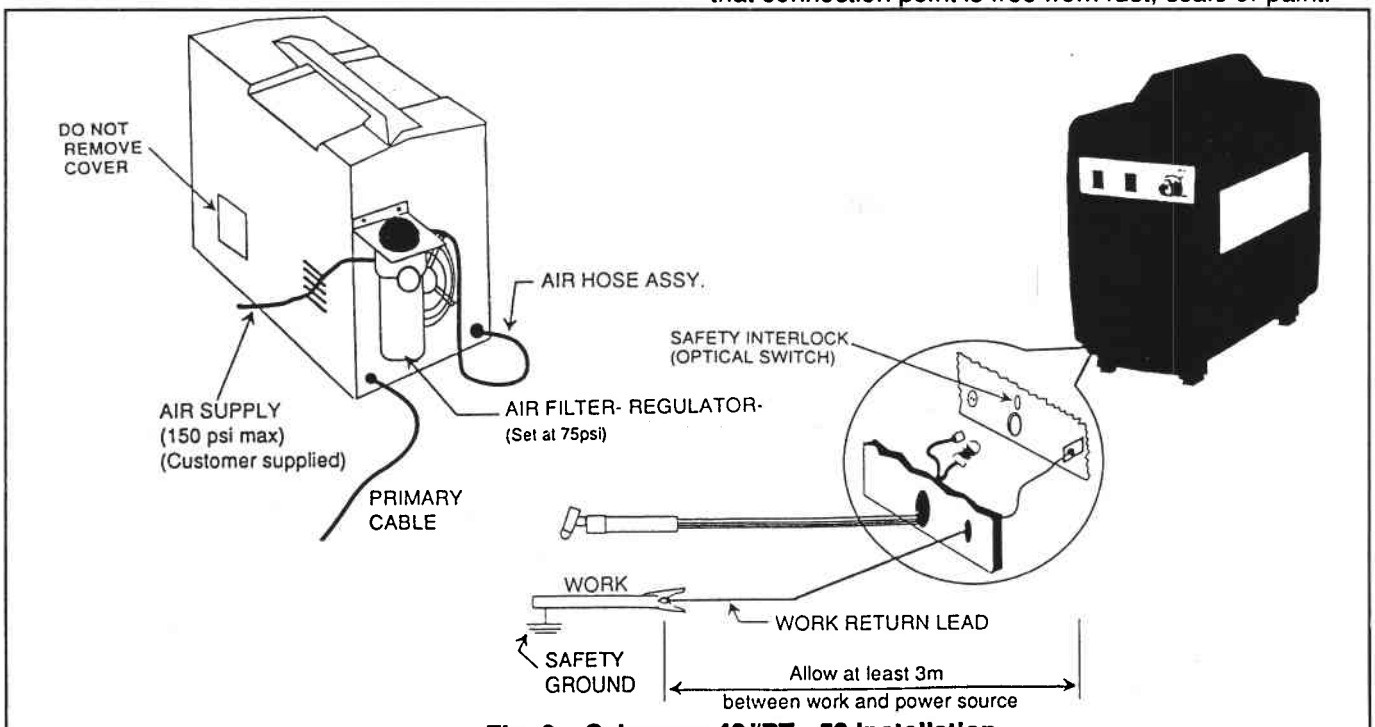

Fig. 2 Sabre-arc 40*i*/PT - 50 Installation

ASSEMBLING PT-50 TORCH CONSUMABLES - see Fig. 3

This section deals with fitting the electrode, tip etc. to the torch head.

WARNING

Ensure the power switch on Sabre-arc 40i is in the off position before installing or inspecting torch consumable parts

The Sabre-arc 40*i* package is supplied with a kit of consumables parts (Pt.No. 1414207) as follows:-

2	Plunger	Part No. 1414212
3	Electrode HD	Part No. 1414210
1	Swirl baffle	Part No. 1414211
4	Tip HD	Part No. 1414209
2	Heatshield	Part No. 1414208

Remove the Seat (1414229) from the torch using a suitable spanner. Insert a Plunger (1414212) into the head (the Plunger is reversible). Reassemble the Seat into the torch tightening firmly with a spanner. Install the Electrode (1414210), Swirl baffle (1414211), tip (1414209) and Heatshield (1414208) as shown in Fig. 3 tightening the Heatshield firmly by hand.

Note: *The torch head contains a flow check valve that, along with flow sensing circuitry in the Sabre-arc power source, prevents the torch from being accidentally energised with the Heatshield removed.*

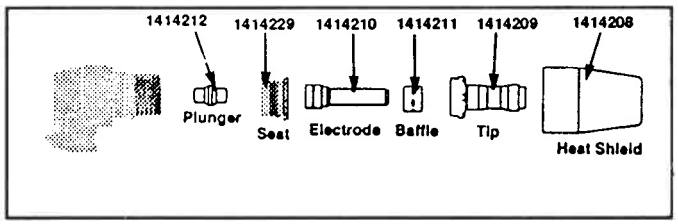

Fig. 3 PT - 50 Consumables

CONTROLS AND FACILITIES - see Fig. 4

1. Power On/Off Switch (rear panel). In the ON position the green pilot lamp is illuminated, the control circuitry is powered and the fan will run.

WARNING

Placing the power switch in the OFF position does not totally isolate the unit from mains electrical power. Always isolate the machine from the electrical supply before carrying out any work on or in the power source.

2. Mains Voltage Selector (rear panel). Sets the machine for use with either 380 or 415V supplies. Note the machine includes circuitry providing both under and over voltage protection hence inadvertent operation on the wrong setting will not damage the unit.

3. Output Current Control. Enables the precise cutting current to be set for the plate to be cut. Control range is 10-40A. see Fig. 5.

4. Air Check Switch. In the **ON** position, the air filter regulator can be adjusted to the required pressure, normally 60-70 psi, before cutting operations. In this mode air flows continuously and it is recommended, at least at the beginning of each shift, that the system is purged of any condensation that may have accumulated during the off period. Ensure the switch is in the **OFF** position before cutting.

5. Lock-in Switch In the **ON** mode the torch switch can be released after the cutting arc has been established. To stop the cutting operation momentarily operate the torch switch again or pull the torch away from the work. In the **OFF** mode the torch switch must be pressed during the entire cutting cycle.

6. Overload Light This light will be illuminated (Red) and the machine output will be shut off under the following conditions:

a. When the duty cycle has been exceeded. The duty cycle of the Sabre-arc 40*i* is 60% at rated output current of 40A based on a 10 minute cycle, i.e., 6 minutes cutting and 4 minutes idling. Leave the machine with the power on and fan running, the thermal protection will automatically reset after a few minutes.

b. When the mains input voltage is outside acceptable limits i.e., ±10% of nominal values. Ensure the rear panel Mains Voltage Selector is correctly set for the mains supply in use. To reset the machine turn the Power On/Off switch Off and then On.

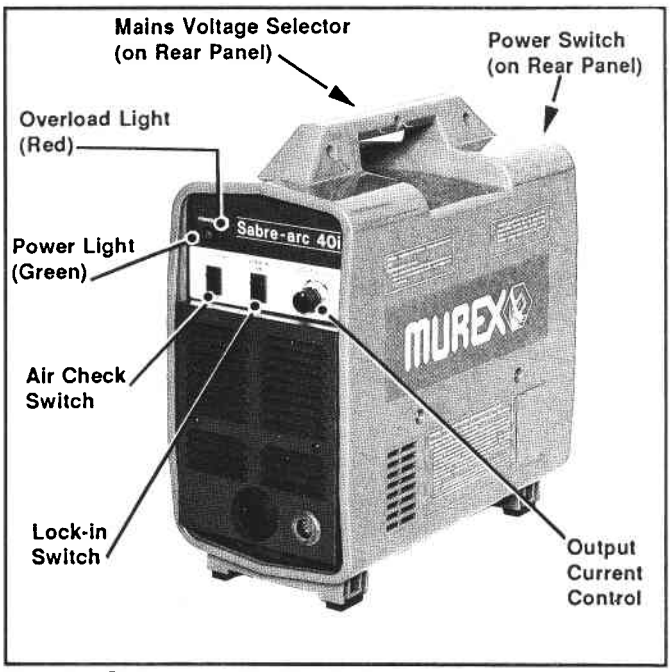

Fig. 4 Sabre-arc 40*i* Controls