



Operating Manual

Sabre-arc 351i & 351iAS Air Plasma Cutting Systems



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



DECLARATION OF CONFORMITY

Murex Welding Products Ltd.

Declare hereby that:

Murex Sabre-arc 351i & 351iAS Air Plasma Cutting Equipments

Part No: 1416119 & 1416118

- are manufactured in accordance with the Council Directive 73/23/EEC (1973-02-19) and 89/336/EEC (1989-05-03) amended by Council Directive 93/68/EEC relating to electrical equipment designed for use within certain voltage limits.
- conform with the protection requirements of Council Directive 89/336/EEC, amended by Council Directives 91/263/EEC, 92/31/EEC and 93/68/EEC relating to electromagnetic compatibility.
- are manufactured in accordance with EN60974-1 Safety Requirements for Arc Welding Equipment and EN50192 Plasma Cutting Systems.
- are manufactured in accordance with EN50199 Electromagnetic Compatibility for Arc Welding Equipment.

On behalf of ESAB Group (UK) Ltd
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A handwritten signature in black ink, appearing to read "P.G. Dodd".

P.G. Dodd
Managing Director
ESAB Group (UK) Ltd
1st September 2002



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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 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 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 arc 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 arc welding 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.

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 welding area.
- ⚠ Do not weld 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 welding be aware of the possibility of 'hidden wires' behind panels or bulkheads.

INTRODUCTION

1. Sabre-arc 351i & 351iAS Power Sources

The Murex Sabre-arc 351i & 351iAS are small portable plasma cutting systems designed to work on 230V 1ph electricity supplies as well as 110V with the 'AS' version. They utilise factory compressed air for both the plasma and secondary cooling gas. The power sources use inverter technology to give precise control of cutting current and together with the PT-50 torch and patented HD consumables, enable conducting materials up to 13mm thick to be cut (6mm on 110V).

2. 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.

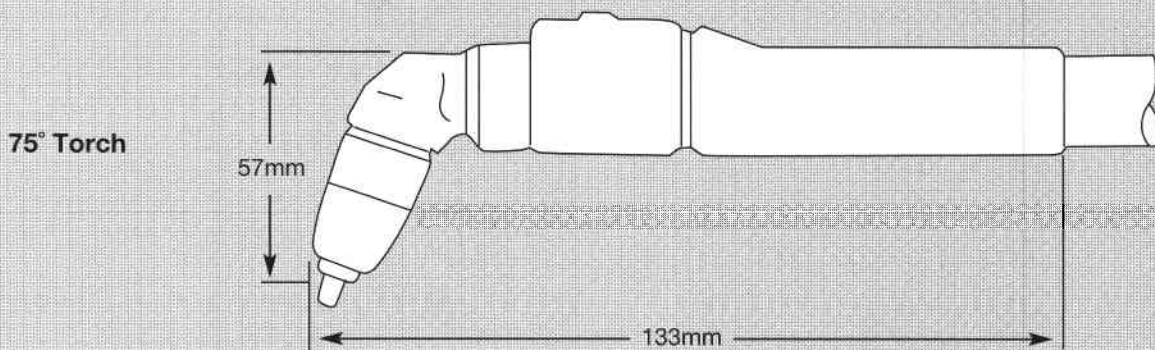
The PT-50 is available with either 4.5 or 7.6m cable (4.5m standard with the Sabre-arc 351i) and has a 75° head angle. See Fig 1.

The torch can be used in contact cutting mode for sheet metals up to 5-6mm thick. A stand off (tip to work) distance of 1-2mm 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 grilles. In addition a Circle Cutting Attachment is available as an Option for cutting accurate circles from 125 to 680mm diameter. The circle cutting attachment dual castor assembly is also useful for maintaining a constant stand-off for general sheet cutting.

SPECIFICATION		
	351i	351iAS
Output		
Open Circuit Voltage	230V dc	230V dc
Output Current	15-35A	15-35A (15-25A max on 110V)
Cutting Voltage	Continuously variable	Continuously variable
Cutting Thickness (mild steel)	120V dc	120V dc
Rating (10 minute cycle)	0.5-13mm	0.5-13mm (6mm max on 110V)
	35A 40% duty	35A 40% duty (230V)
	30A 60%	30A 60% (230V)
	22A 100%	22A 100% (230V)
Input		
Mains Voltage	230V	110/230V (autosetting)
Frequency	50/60Hz	50/60Hz
Phase	1	1
Input Fuse	30A slow	30A slow
Kva	6.6	6.6
Kw	5.3	5.3
Air Requirement	6-10 bar	6-10 bar
	100-150 lpm	100-150 lpm
Dimensions		
Height	322mm	322mm
Width	156mm	156mm
Depth	362mm	362mm
Weight	15kg (excl torch)	16kg (excl torch)
PT-50 Torch		
Current Rating	50A 100% duty	
Plasma/Cooling Gases	Air	
Head Angle	75°	
Cable Length	4.5m (7.6m Optional)	
Weight (shipping)	0.9kg	
Air Pressure	5.2 bar/75psi	
Air Flow	120 lpm/250cfh	

Fig 1. PT-50 Torch



UNPACKING

The Murex Sabre-arc equipment comprises the following items:

Part No. 1416119/1416118 Sabre-arc 351i/351iAS Power Source. Plus Part No. 558001466 PT-50 plasma torch with 4.5m lead and a work return lead and clamp (fitted). Plus Consumables spares kit.

Check that all the 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

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

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

2. The Sabre-arc 351i & 351iAS power supply is equipped with a 3m primary input cable. Connection should be made as follows:-

Brown	L	} 230Vac or, for the 351iAS, 110Vac
Blue	N	
Green-Yellow	Earth	

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

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

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

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.

INSTALLATION

Radio Interference

Murex welding power sources have been designed to high standards of electromagnetic compatibility. However, arc welding, by its very nature, generates radio-frequency energy and may cause interference. By installing and using the equipment correctly, in accordance with these instructions, the problems of interference may be minimised.

This equipment satisfies the requirements of the EU Directive 89/336/EC on EMC and complies with the limits in EN 50 199, 'EMC product standard for arc welding equipment'. These limits are designed to provide reasonable protection against interference in heavy industrial areas.

If this equipment is used in domestic areas, eg. for repair or maintenance, particular care should be taken. The time of day should be chosen and the duration of welding limited, to minimise any potential problems.

If this equipment causes interference the guidance given below should be considered. If a solution cannot be found please contact your distributor or the manufacturer.

Before installing this welding equipment an assessment should be made of potential EMC problems that may occur. It is good practice not to install welding equipment next to computers or safety critical control circuits, eg. electronic machine guards, unless they have been suitably protected.

This equipment should be connected to the primary supply using the cable provided. However, for permanent installation, if interference problems occur, shielded cable or conduit should be considered. The primary cabling and welding cables should be kept separate to other mains wiring and control, signalling or communications (eg. telephone) cables. If interference occurs then greater separation or re-routing should be considered. Welding cables should be kept as short as practically possible.

Interference may also be reduced by separating the welding equipment from the other equipment affected. A partition, brick wall or, particularly, a metal screen will also reduce interference. Earthing and equi-potential bonding should also be considered but guidance should be sought from a competent person, the distributor or manufacturer.

To ensure continued compliance with the EMC Directive this equipment should be routinely maintained according to the manufacturer's instructions and using only approved spare parts. In particular, the spark gaps of HF units should be adjusted and maintained according to the manufacturer's recommendations.

All access and service door covers should be closed and properly fastened when the equipment is being used. This equipment should not be modified in any way except for those changes and adjustments approved by the manufacturer.