

INSTRUCTION MANUAL FOR ARC WELDING MACHINES

IMPORTANT!!!

READ THIS MANUAL CAREFULLY BEFORE INSTALLING, USING OR PERFORMING ANY FORM OF MAINTENANCE ON THE MACHINE, PAYING SPECIAL ATTENTION TO THE SAFETY REGULATIONS. CONTACT YOUR DISTRIBUTOR IF YOU DO NOT FULLY UNDERSTAND THESE INSTRUCTIONS.

INTRODUCTION

This equipment must be used solely for welding operations. We urge you to pay especially close attention to the chapter on safety precautions.

This manual must be carefully stored in a place familiar to everyone involved with the machine. It must be consulted whenever doubts arise and accompany the machine throughout its operative life-span. It shall also serve as a reference for ordering spare parts.

1 GENERAL DESCRIPTIONS

This welding machine is a constant current power source built using INVERTER technology, designed to weld covered electrodes (not including cellulosic) and for TIG procedures, with scratch start and high frequency. Art. 342 delivers direct current, while Art. 348 delivers both direct and alternating current.

In order to be operative, this power source must be used in combination with one of the control panels available.

1.2 EXPLANATION OF TECHNICAL SPECIFICATIONS

IEC 974.1 The welding machine is manufactured according to these international standards EN60974.1.

N°. Serial number. Must be indicated on any type of request

..... regarding the welding machine.

 Three-phase static frequency converter transformer-rectifier.

 Drooping characteristic.

 MMA Suitable for welding with covered electrodes.

 TIG Suitable for TIG welding.

U₀. Secondary open-circuit voltage (peak value).

X. Duty cycle percentage

The duty cycle expresses the percentage of 10 minutes during which the welding machine may run at a certain current without overheating.

I₂. Welding current

U₂. Secondary voltage with current I₂

U₁. Rated supply voltage

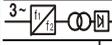
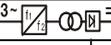
3~ 50/60Hz 50- or 60-Hz three-phase power supply

I₁. Absorbed current at the corresponding current I₂ during welding.

IP23 Protection rating for the housing

Grade 3 as the second digit means that this equipment is suitable for use outdoors in the rain.

 Suitable for use in high-risk environments.

										IEC 974-1 EN 60974-1			
 -A / -V - -A / -V					 -A / -V - -A / -V								
		U ₀	X	%	%	%			U ₀	X	%	%	%
		V	I ₂	A	A	A			V	I ₂	A	A	A
		PEAK	U ₂	V	V	V			PEAK	U ₂	V	V	V
U ₁				U ₁									
3x400V-50/60Hz				3x400V-50/60Hz									
I ₁		A		A		A		I ₁		A		A	
N°		CE		MADE IN ITALY				IP 23					

NOTE: The welding machine has also been designed for use in environments with a pollution rating of 3. (See IEC 664).

1.3 DESCRIPTION OF PROTECTIVE DEVICES

1.3.1 Thermal protection

This device is protected by a thermostat.

When the thermostat is tripped, the machine stops delivering current but the fan continues to run. The LED **AM** on the control panel lights to indicate that the thermostat has been tripped.

1.3.2 Block protection

This protection is indicated by the LED **AN** on the control panel.

2 INSTALLATION

2.1 PLACEMENT

Install the control panel, following the corresponding instructions.

The welding machine must be placed in a sufficiently ventilated, non-dusty area, taking care not to obstruct the air entering or leaving the cooling slots.

WARNING: REDUCED AIR FLOW causes the internal parts to overheat and may damage them.

- Keep at least 200 mm of free space all around the machine.
- Never connect any filtering device to the air intake passages of this welding machine.

Use of any type of filtering device shall immediately void the warranty.

2.2 START-UP

Only skilled personnel should install the machine. Connections must be carried out according to current regulations, and in full observance of safety laws (standard CEI 26-10 - CENELEC HD 427)

2.3 DESCRIPTION OF THE EQUIPMENT (fig. 1-1a)

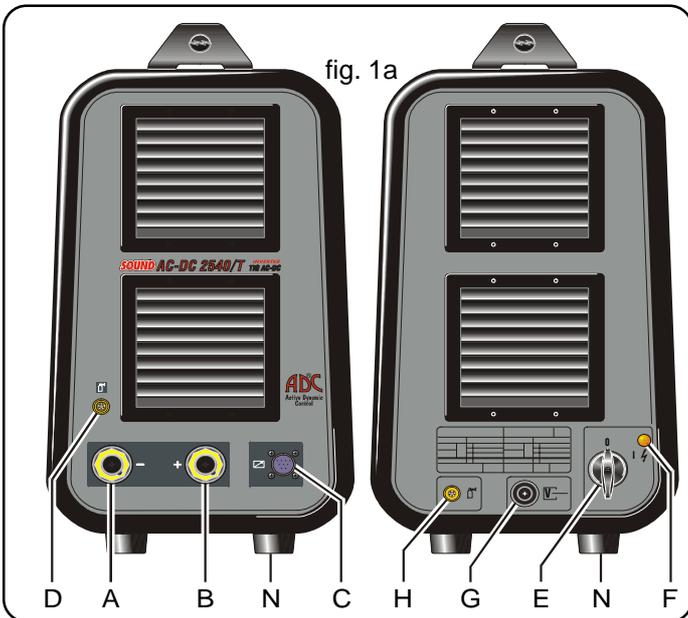
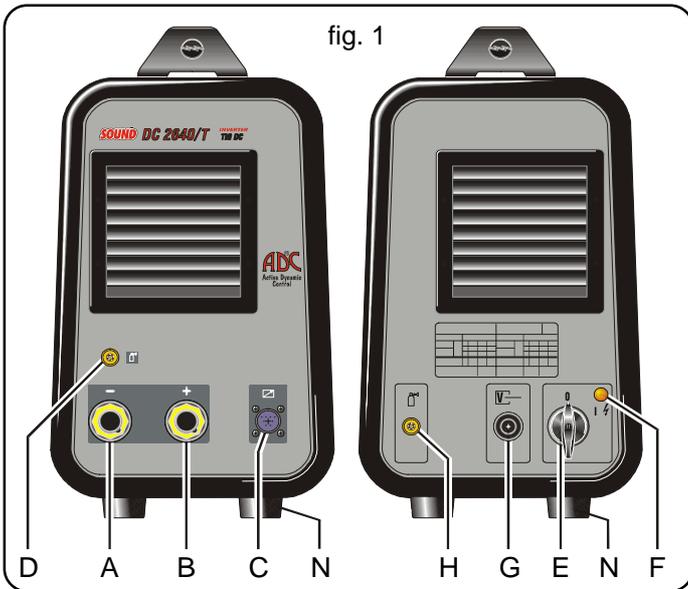
A) **Negative output terminal (-).**

B) **Positive output terminal (+).**

Note: during the welding, an alternated voltage is present on the terminals A and B of art. 348.

C) **Connector for the TIG torch trigger, foot control or cooling unit.**

The torch pushbutton wires must be connected to pins 1 and 9



D) Fitting (1/4 gas).

This is where the gas hose of the TIG welding torch is to be connected.

E) Main switch.

F) Power ON lamp.

G) Power cord.

H) Gas supply fitting.

2.4 GENERAL NOTES

Before using this welding machine, carefully read the standards CEI 26/9 - CENELEC HD 407 and CEI 26.11 - CENELEC HD 433. Also make sure the insulation of the cables, electrode clamps, sockets and plugs are intact, and that the size and length of the welding cables are compatible with the current used.

2.5 MMA WELDING

- Use electrode clamps in compliance with current safety regulations, and without protruding screws.
- Make sure that the main switch is set to 0, and that the power cable plug is not inserted in the power socket. Then

connect the welding cables, observing the polarity required by the manufacturer of the electrodes you are using.

- The welding circuit must never be deliberately placed in direct or indirect contact with the safety conductor except on the workpiece.
- If the workpiece is deliberately grounded by means of the safety wire, the connection must be as direct as possible, and made using a wire having a cross-section at least equal to that of the welding current return wire. It must also be connected to the workpiece at the same point as the return wire, using the return wire clamp or a second earth clamp placed immediately adjacent to it.
- Every precaution must be taken to avoid welding current leakage.
- Make sure that the supply voltage matches the voltage indicated on the specifications plate of the welding machine.
- Connect the power cable, making sure that the brown, black and blue wires correspond to the three phases, and that the yellow-green wire corresponds to the earth terminal of the system
- If the machine is used in combination with the cooling unit Art. 1337 or 1338, it may be powered by means of the socket **E** on the cooling unit itself.
- The capacity of the overload cutout switch or fuses installed in series with the power supply must be equivalent to the absorbed current **I1** of the machine.
- The absorbed current **I1** can be determined by reading the technical specifications indicated on the machine, in regards to the supply voltage **U1** available.
- Any extension cords must be sized appropriately for the absorbed current **I1**.
- Turn the machine on using the main switch **E**.
- If the machine is powered via the cooling unit, it can be turned on by means of the switch **A** located directly on the cooling unit.
- Do NOT touch the torch or electrode clamp simultaneously with the mass terminal.

Select MMA on the control panel using the push-button **A**, and adjust the current by means of the knob **AC**.

Always remember to shut off the machine and remove the electrode from the clamp after welding.

WELDING CABLE CROSS-SECTION in mm²

CURRENT WELDING IN AMPERES	WELDING MACHINE DISTANCE IN METERS						
	15	20	30	40	45	50	60
100	35	35	35	35	50	50	50
150	35	35	50	50	70	70	90
200	35	50	50	70	70	95	100
250	35	50	70	70	95	100	150

2.6 TIG WELDING

- Connect the earth cable connector to the positive pole (+) of the welding machine, and the clamp to the workpiece as close as possible to the welding point, making sure there is good electrical contact.
- The welding circuit must never be placed deliberately in direct or indirect contact with the safety wire except on the workpiece.
- If the workpiece is deliberately grounded by means of the

safety wire, the connection must be as direct as possible, and made using a wire having a cross-section at least equal to that of the welding current return wire. It must also be connected to the workpiece at the same point as the return wire, using the return wire clamp or a second earth clamp placed immediately adjacent to it.

- Every precaution must be taken to avoid welding current leakage.
- Use a TIG torch appropriate for the welding current, and connect the power connector to the negative pole (-) of the welding machine.
- Connect the torch connector to the welding machine connector **C**.
- Connect the torch gas hose fitting to the fitting **D** on the machine, and the gas hose from the cylinder pressure regulator to the gas fitting on the rear panel.
- Make sure that the supply voltage matches the voltage indicated on the specifications plate of the welding machine.
- Connect the power cable, making sure that the brown, black and blue wires correspond to the three phases, and that the yellow-green wire corresponds to the earth terminal of the system
- If the machine is used in combination with the cooling unit Art. 1337 or 1338, it may be powered by means of the socket **E** on the cooling unit itself.
- The capacity of the overload cutout switch or fuses installed in series with the power supply must be equivalent to the absorbed current **I1** of the machine.
- The absorbed current **I1** can be determined by reading the technical specifications indicated on the machine, in regards to the supply voltage **U1** available.
- Any extension cords must be sized appropriately for the absorbed current **I1**.
- Turn the machine on using the main switch **E**.
- If the machine is powered via the cooling unit, it can be turned on by means of the switch **A** located directly on the cooling unit.
- Do NOT touch the torch or electrode clamp simultaneously with the earth clamp.
- Follow the instructions given in the control panel manuals to adjust the TIG welding parameters.
- Use a 2% thorium tungsten electrode, chosen based on the table below and prepared as described in paragraph 2.6.1.

electrode diam. tungsten 2% thorium (red band)	direct current negative electrode (Argon)
0.5mm (0.020")	15A - 40A
1mm (0.040")	25A - 85A
1.6mm (0.060")	70A - 150A
2.4mm (0.095")	150A - 250A
3.2mm (0.130")	200A - 350A

WARNING: ELECTRIC SHOCK CAN BE FATAL!

• Remember to shut off the machine and close the gas cylinder valve when you have finished welding.

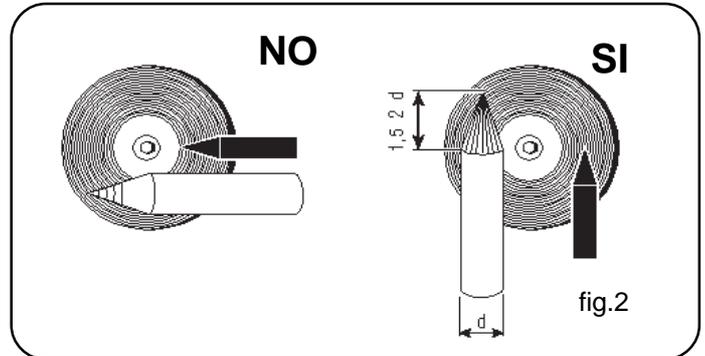
2.6.1 Preparing the electrode

Be especially careful when preparing the electrode tip. Grind it so that it has vertical grooves as shown in fig.2.

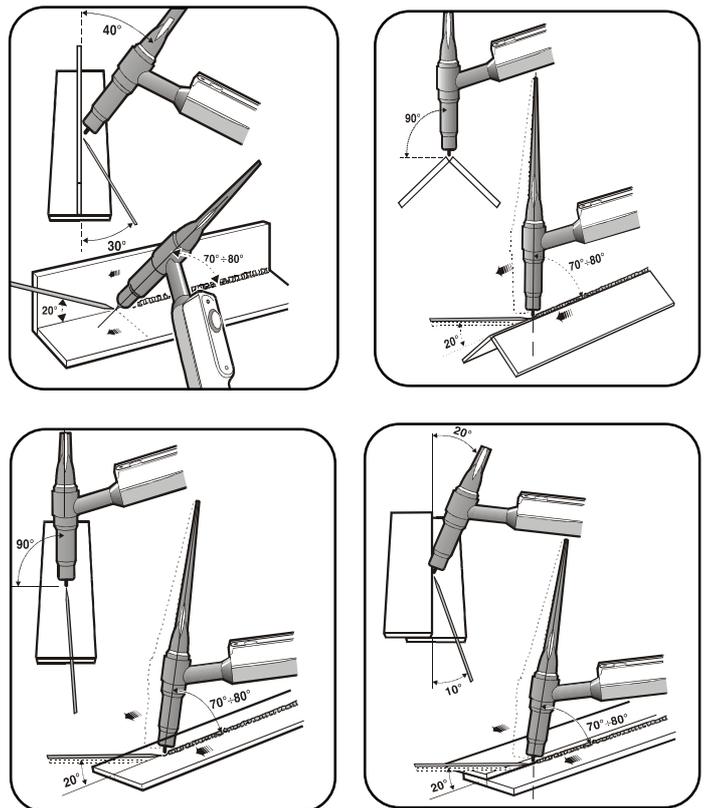
WARNING: LOOSE HOT METAL PARTICLES may injure

personnel, cause fires and damage equipment; **TUNGSTEN CONTAMINATION** may lower the quality of the weld.

- Use only a grinder equipped with suitable safety guards to profile the tungsten electrode, and always wear protective gear for the face, hands and body.
- To profile the tungsten, use a hard, fine-grained abrasive grinding wheel used solely for this purpose.
- Grind the end of the tungsten electrode into a tapered shape, for a length equivalent to approximately 1.5-2 times the electrode diameter. (fig. 2)



2.6.2 Recommended welding positions



3 ACCESSORIES

3.1 WIRE FEEDER ASSEMBLY AND CONNECTION TO THE COOLING UNIT.

This welding machine may be used together with the cooling unit Art. 1337 or 1338. We recommend that you purchase the cart Art. 1424, which will allow you to assemble an easily portable system along with the gas cylinders. Remove the feet **N** from both the generator and cooling unit, and place them on the cart, in the upper and lower sections, respectively.

Reassemble the feet to fasten the equipment to the cart. Connect the torch connector or any remote controls to the socket **H** of the cooling unit, and the connector **I** to the socket **C** on the generator.

Connect the torch gas fitting to the fitting **D** on the generator. Connect the water hoses to the fittings **L** and **L1** of the cooling unit, making sure the blue hose is connected to the fitting **L1** and the red hose to the fitting **L**.

Connect the power source power cord to the 16-A type 3P+N+T three-phase socket of the cooling unit, then connect the cooling unit cable to a three-phase power supply.

Always remember that the black, brown and blue wires correspond to the phases, and the yellow-green wire to earth.

NOTE: If the cooling unit is shut off, or if the water does not circulate, a safety device will prevent the welding machine from operating.

3.2 REMOTE CONTROLS

This equipment may be used with the foot control Art. 193. If you wish to adjust the current using the pedal and the arc ignition using the torch, you must use the connection Art. 1180.

This equipment may also be used with the remote control Art. 187 together with the extension cable Art. 1192.

When the MMA mode is selected, the 10 pole connector of the extension must be connected to the **C** connector of the machine.

When the TIG mode is selected, you must use the connector Art. 1180.

CAUTION! These steps must be carried out in the sequence described in order for the machine to recognize the remote control.

4 MAINTENANCE AND CHECKS

Note: All repair work must be done by qualified personnel.

4.1 GENERAL NOTES

- Do not touch live electrical parts.
- Shut off the welding machine and unplug the power cord from the socket before all checks and maintenance operations. MOVING PARTS can cause serious injury. HOT SURFACES can cause serious burns.
- Let the welding machine cool before performing maintenance.

4.2 REPAIRING THE WELDING MACHINES

Experience has shown that many fatal accidents are caused by poor repairs. That is why it is just as important to fully check a repaired welding machine as a new one. This also protects manufacturers from being held liable for defects for which others are to blame.

- If the repairs are not performed by the manufacturer, repaired welding machine in which any components have been replaced or altered must be marked in such a way as to identify who carried out the repairs.

5 SAFETY PRECAUTIONS

5.1 ELECTRIC SHOCK



• **Disconnect the power cord from the mains before working on the cables or opening the machine.**

- Never touch live parts
- Never use the machine without the safety guards.
- Insulate yourself from the part to be cut/welded and from the earth by wearing insulating gloves and clothing.
- Keep all clothing (gloves, shoes, headgear) and your body dry at all times.
- Do not work in damp or humid environments
- Should you notice even the slightest sensation of electric shock, stop cutting/welding immediately. Do not use the equipment again until the problem has been identified and resolved.
- Include an automatic wall switch of adequate capacity placed near the equipment, to allow it to be shut off immediately in case of emergency.
- Inspect the power cord, torch cable, grounding cable and the torch itself often. Never use the machine if any of these parts are damaged.
- Make sure the power supply line is fitted with an efficient grounding socket.
- Plasma cutting equipment requires dangerous voltages to strike the arc (approximately 250/350 V DC). It is therefore recommended to take the following precautions during use.
- Never disable the safety devices on the torch and machine.
- If using the system for plasma cutting, always turn off the machine before replacing the nozzle, isolating diffuser, electrode or nozzle holder.
- **Only screw the nozzle holder onto the head with the electrode, the isolating diffuser and the nozzle mounted. If these parts are not present, the machine will not function properly and operator safety will be endangered.**

5.2 RADIATION



• The ultraviolet radiation emitted by the arc may harm eyes and burn the skin; it is therefore recommended to wear the appropriate safety garments and masks.

- Protect anyone around the cutting/welding area. The arc is hazardous to a distance of up to 15 meters.
- Never look at the arc with your bare eyes!
- Prepare the cutting/welding area to reduce the reflection and transmission of ultraviolet radiation by painting the walls and other exposed surfaces black to decrease reflections, and installing protective screens or curtains to reduce transmitting ultraviolet rays.
- Do not wear contact lenses! The intense heat issued by the arc could melt them to the cornea.

The shields and helmet masks provided are in compliance with the European directive 89/686/CEE and satisfy European requirements and standards. For your protection, read all of the enclosed information carefully before using the screens and masks. This information forms an integral part of directive 89/686/CEE, enclosed in paragraph 1.4.

Make sure that the shield filter strength is appropriate to the tasks to be carried out. This filter strength is indicated by a progressive number that must be chosen based on the task to be carried out.

Arc process	Current (A)																						
	0,5	1	2,5	5	10	15	20	30	40	60	80	100	125	150	175	200	225	250	275	300	350	400	450
Manual metal arc welding							9	10	11			12			13			14					
MIG (heavy metal*)										10	11	12			13			14					
MIG (light metal)										10	11	12		13		14		15					
TIG				9		10	11		12		13		14										
MAG									10	11	12	13			14		15						
Arc gouging										10		11	12	13	14	15							
Plasma cutting										11		12		13									
Plasma welding	4	5	6	7	8	9	10	11	12		13		14			15							

* The term "heavy metal" covers e.g. stainless steel and copper alloys.

5.3 FUMES



Cutting and welding produce hazardous fumes and metal dust that may be hazardous to your health.

Therefore:

- Work only in adequately ventilated areas.
- Keep your head away from fumes.
- Use adequate ventilation systems in closed areas.
- Use approved respirators if the ventilation is not deemed adequate.
- Clean the material to be cut/welded if any solvents or halogen degreasers are present that may create toxic gases during cutting/welding. Some chlorinated solvents may decompose in the presence of the radiation emitted by the arc, and generate phosgene gases.
- Never cut/weld where solvent fumes are present or if the radiant energy can penetrate atmospheres containing even the slightest traces of trichloroethylene or perchloroethylene.
- Never cut/weld coated metals or those containing lead, graphite, cadmium, zinc, chrome, mercury or beryllium if you are not using an adequate respirator.
- The electric arc generates ozone. Prolonged exposure to atmospheres containing high concentrations of ozone may cause headaches, nasal, throat, and eye irritation, serious congestion and chest pains.
- **IMPORTANT: NEVER USE OXYGEN FOR VENTILATION PURPOSES.**

5.4 FIRE



Avoid producing fire due to sparks and hot scraps or incandescent pieces.

- Make sure that appropriate fire-fighting devices are available near the cutting/welding area.
- Remove all flammable and combustible materials from the cutting/welding area and its vicinity (at least 10 meters).
- Do not cut/weld on fuel and lubricate containers, even if empty. They must be cleaned thoroughly before being cut/welded.
- Let the cut/welded material cool before touching it or placing it in contact with combustible or flammable material.
- Do not operate in atmospheres having high concentrations of combustible fumes or flammable gases and dusts.
- Always check the work area half an hour after cutting to make sure no fires have started.
- Never keep combustible items such as cigarette lighters or matches in your pocket.

5.5 BURNS

• Protect your skin against burns from the ultraviolet radiation emitted by the arc, sparks and scraps of molten metal by wearing fireproof clothing that covers all exposed body surfaces.

- Wear protective welder's garments/gloves, headgear and high-top shoes with reinforced toes. Button your shirt collar and pocket flaps, and wear trousers without cuffs to prevent scraps and sparks from falling in them.
- Avoid oily or greasy garments. A single spark could set them on fire.
- Incandescent metal parts such as pieces of electrode and the workpiece must always be handled with gloves.
- First aid equipment and a qualified person must be available for each working shift, unless there are health facilities nearby for the emergency treatment of eye or skin burns.
- Use earplugs when working overhead or in a small space. Use a helmet when others are working above you.
- People getting ready to weld/cut must not use flammable hair products.
- Wait for the torch to cool, then turn the machine off before touching the front part of the torch.
- Plasma cutting machines have a pilot arc, thus the arc strikes as soon as the torch trigger is pressed, even when the earth cable is disconnected. You must therefore avoid aiming the jet towards your body or towards the people present in the cutting area.
- When you are finished cutting, always hang the torch on the hook provided and turn off the machine to avoid accidentally striking the plasma arc.

5.6 EXPLOSIONS



- Never cut/weld above or near containers under pressure.
- Never cut/weld in atmospheres containing explosive dust, gases or fumes.
- Plasma cutting machines run on compressed air. Take the appropriate precautions if the air is drawn from cylinders. Welding/cutting machines use gases such as CO₂, ARGON, or blends of ARGON + CO₂ to protect the arc; you must therefore take the utmost care with:

5.6.1 Cylinders

- Large gas leaks may dangerously affect the concentration of oxygen.
- Never connect the cylinder directly to the machine: use a pressure regulator.
- The intake pressure must never exceed 6 bar (0.6 MPa) for plasma cutting machines, and 4 bar (0.4 MPa) for cutting/welding machines.
- Always observe current regulations when handling or using cylinders under pressure.
- Never use cylinders that leak or have been physically damaged.
- Always fasten the cylinders in place.
- Never move cylinders without protecting the valve.
- Use only cylinders whose contents have been clearly identified.
- Never use oil or grease to lubricate cylinder valves.
- Never place the plasma or welding arc in electrical contact with the cylinder.
- Never expose the cylinders to excessive heat (greater than 50°C), sparks, molten scraps or flames.
- Never tamper with the cylinder valves.
- Never try to release jammed valves with hammers, wrenches or other means.
- Never erase or alter the name, number or other markings on the cylinders. This is both illegal and dangerous.
- Never lift the cylinders off the ground by grasping the valve or cap, or by using chains, harnesses or magnets.
- Refill the cylinders at authorized centers only.
- The cylinder fittings must never be changed or switched.

5.6.2 Pressure regulators

- Keep pressure regulators in good condition.
- Never use a regulator that leaks or appears physically damaged.
- Never use oil or grease to lubricate a regulator.

5.6.3 Air/gas hoses

- Replace any hoses that appear damaged.
- Keep hoses stretched taut to avoid creasing.
- Keep any excess hose coiled and away from the work area to prevent it from being damaged.

5.7 MOVING PARTS

- Moving parts such as the fan may cut fingers and hands and snag clothing.
- Only qualified personnel may remove guards and coverings for maintenance, after first disconnecting the power cable.
- Replace all coverings and guards and close the doors when the task is complete, and before starting the machine.

5.8 NOISE



This machine does not in itself produce noise above 80 dB. The plasma cutting/welding procedure may produce noise levels above that limit; users must therefore take all precautions required by law.

5.9 PACEMAKERS

Magnetic fields caused by high currents may affect the operation of pacemakers. Wearers of any vital electronic equipment (pacemakers) must consult their physician before performing arc welding, cutting, deseaming or spot welding.

5.10 ELECTROMAGNETIC COMPATIBILITY

5.10.1 General notes

This machine has been built in conformity with the instructions of harmonized standard EN50199.

In this standard, the limits for electromagnetic emissions are based on practical experience. However, the machine's ability to function compatibly with other radio and electronic systems depends largely on how it is used. The limits set forth in the above standard may not be adequate to fully eliminate interference when a receiving apparatus is located in the immediate vicinity, or is highly sensitive. In these cases it may be necessary to adopt special measures to further reduce interference.

This machine must be used solely for professional purposes in an industrial environment. Keep in mind that it is potentially difficult to ensure electromagnetic compatibility in non-industrial environments.

5.10.2 Installation and use

The user is responsible for installing and using the cutting/welding equipment according to the manufacturer's instructions. If electromagnetic disturbances are detected, then it shall be the responsibility of the user of the cutting/welding equipment to resolve the situation with the technical assistance of the manufacturer. In some cases this remedial action may be as simple as grounding the cutting/welding circuit, (see NOTE). In other cases, it could involve constructing an electromagnetic screen enclosing the cutting/welding power source and the work complete with associated input filters. In all cases, electromagnetic disturbances shall be reduced to the point where they are no longer troublesome. Note: The cutting/welding circuit may or may not be grounded for safety reasons. Changing the grounding arrangements should only be authorized by a person who is competent to assess whether the changes will increase the risk of injury, e.g. by allowing parallel cutting/welding current return paths which may damage the grounding circuits of other equipment. Further guidance is given in IEC 974-13 "Arc welding equipment - Installation and use" (under preparation).

6.10.3 Assessing the area

Before installing cutting/welding equipment, the user shall make an assessment of potential electromagnetic problems in the surrounding area. The following shall be taken into account:

- a) other supply cables, control cables, signaling and telephone cables located above, below and adjacent to the cutting/welding equipment.
 - b) radio and television transmitters and receivers.
 - c) computer and other control equipment.
 - d) safety critical equipment, e.g. guarding of industrial equipment.
 - e) the health of the people around, e.g. the use of pacemakers and hearing aids.
 - f) equipment used for calibration or measurement.
 - g) the immunity of other equipment in the environment.
- The user shall ensure that other equipment being used in the environment is compatible. This may require additional protection measures.
- h) the time of day that cutting/welding or other activities are to be carried out.

The size of the surrounding area to be considered will depend

on the structure of the building and other activities that are taking place. The surrounding area may extend beyond the boundaries of the premises.

5.10.4 Methods of reducing emissions

- Mains power supply

The machine must be connected to the mains power supply according to the manufacturer's instructions. If interference occurs, it may be necessary to take additional precautions such as filtering the mains power supply. Consideration should also be given to shielding the supply cable in a metallic conduit or equivalent. Shielding should be electrically continuous throughout its length. The shielding must be connected to the cutting/welding power source so that good electrical contact is maintained between the conduit and the cutting/welding power source enclosure.

- Maintenance of the cutting/welding equipment

The cutting/welding equipment should be routinely maintained according to the manufacturer's recommendations. All access and service doors and covers should be closed and properly fastened while the machine is in operation. The cutting/welding machine should not be modified in any way, except for those changes and adjustments described in the manufacturer's instructions. In particular, the spark gaps of arc striking and stabilizing devices should be adjusted and maintained according to the manufacturer's recommendations.

- Welding and cutting cables

The cutting/welding cables must be kept as short as possible and should be positioned close together, running at or close to floor level.

- Equipotential bonding

Bonding of all metallic components in and adjacent to the cutting/welding installation should be considered. However, metallic components bonded to the workpiece will increase the operator's risk of electric shock by touching these metallic components and the electrode at the same time. The operator should therefore be insulated from all such bounded metallic components.

- Grounding the workpiece

If the workpiece is not grounded for electrical safety or due to its size and position (for example, ship hulls or building steel-work), a connection bonding the workpiece to earth may reduce emissions in some but not all instances. Care should be taken to prevent the grounding of the workpiece from increasing the risk of injury to users, or damage to other electrical equipment. Where necessary, the workpiece must be grounded by means of a direct connection, while in some countries where direct connections are not permitted, the bonding may be achieved by suitable capacitance selected according to national regulations.

- Shielding

Selective shielding of other cables and equipment present in the surrounding area may alleviate problems of interference. You may consider shielding the entire cutting/welding installation for special applications.
