

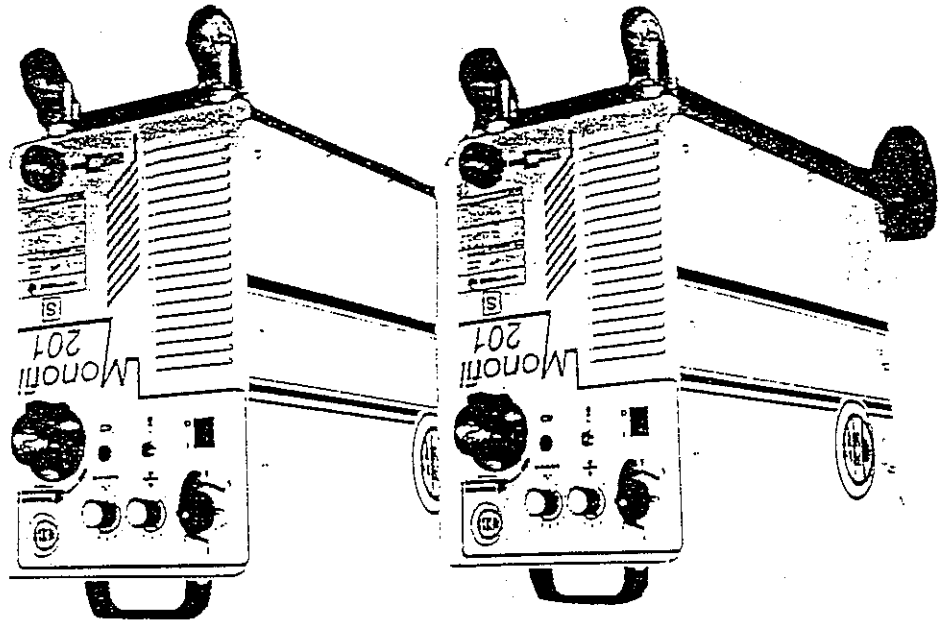
AMERICAN & EUROPEAN MACHINERY, INC.  
10730 LOGAN STREET  
P.O. BOX 2518  
WHITEHOUSE, OHIO 43571  
(419) 877-1000  
Fax (419) 877-1001

63201

**M.I.G. WELDERS**  
**200 / 201 / 251**  
**FOR**  
**MANUAL**  
**INSTRUCTION**  
**PARTS & SERVICE**

ISO 9001  
REGISTERED  
QUALITY SYSTEMS

TWO YEAR  
BUMPER-TO-BUMPER  
WARRANTY



MONOTTI 201 & 251

# AMERICAN & EUROPEAN MACHINERY, INC.

Other than consumables, it is covered.

- |              |                     |
|--------------|---------------------|
| Wire Feeders | Ground Clamps       |
| HF Units     | Adjusting Dials     |
| Feed Motors  | Transformers        |
| Recutters    | Controls            |
| Wheels       | Power Sources       |
| Guns         | Interconnect cables |
|              | Feed Rolls          |

Includes

All C.E.A. equipment is warranted for two years from the date of purchase. The warranty is against any and all defects in the equipment used under normal and proper conditions. This two year warranty covers the front to the back of the equipment.

## TWO YEAR BUMPER-TO-BUMPER WARRANTY

TECHNICAL DATA					
MONOFIL	201	MONOFIL	251		
Single Phase Input	V	220	220		
		50/60 Hz			
Fuse	A	20	25		
Open Circuit Voltage	V	23-44	24-50		
Adjustment Positions	#	6	7		
Current Range	A	50-190	40-250		
Duty Cycle At 100%	A	70	110		
Wires	Dia.	.023/.035	.023/.040		
Dimensions	inches	L 31 W 13 H 24	L 31 W 13 H 24		
Weight	Lbs.	110	132		

### STANDARD FEATURES:

- Welding current adjustment by protected switches to grant a long life.
- Automatic burn-back control
- Suitable for use with 8 lbs. to 30 lbs. wire spools.
- Welding current adjustment switch
- Wire feed speed adjustment
- Spot welding time adjustment
- Line switch
- Line lamp
- Protected fuse
- Thermostatic protection
- Spot welding nozzles
- Nail spot welding nozzles

SEMI-AUTOMATIC WELDING MACHINES WITH UNDERGEAR  
 A new series of semi-automatic welding machines with wire feeder mounted in the same case, suitable for the use with CO<sub>2</sub> gas and mixture. They are suitable for medium fabrication work, agricultural repairs, maintenance, and do it yourselfers. Thermostatic protection. Continuous welding.

We thank you for your purchase of a CSA products. Before using the machine you must carefully read the directions for use listed in this manual.

## INTRODUCTION

The semi-automatic welding machine MONOFIL 200 has been studied for semi-automatic welding of steel and stainless steel wires diam. 0,5 - 0,8 mm.

It consists basically of:

- a constant voltage transformer,
- a silicon rectifier with thermostatic protection against overloading;
- 42 V D.C. geared motor with electronic control of wire-speed and of burn-back.

## 1) TECHNICAL FEATURES

TECHNICAL FEATURES		MONOFIL 200	
CURRENT RANGE	A	35 ± 180	
CONSUMPTION MAX	KVA	5	
POWER FACTOR	cos φ	0,9	
OPEN CIRCUIT VOLTAGE	V	21 ± 36	
DUTY CYCLE 100%	A	70	
DUTY CYCLE 60%	A	90	
DUTY CYCLE 35%	A	120	
DUTY CYCLE 15%	A	180	
ADJUSTMENT POSITIONS	m/min	5	
WIRE SPEED MAX	m/min	22	
WIRE DIAMETER	∅ mm	0,5 ± 0,3	
INSULATION CLASS		H	
PROTECTION CLASS		IP 22	
DIMENSIONS	mm	790 - 330 - 500	
WEIGHT	Kg	50	

## 2) SAFETY

### Main safety standards

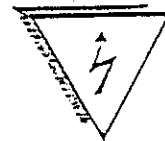
This product must be used only by people having a certain experience in welding equipments. The operator must observe certain safety rules (CEI 25 - 9 HD - 407) to ensure his personal safety and to protect those working near him.

### Prevention against electric shocks

- Disconnect the power source before checking the machine or performing any maintenance operation.
- Be sure the machine is properly connected to a good electrical earth.
- Have the wiring for the welding machine installed by a qualified electrician. All connections must meet CEI 25-10 (HD 427) and safety standards.
- Do not weld in damp or wet conditions. Always avoid the contact of the torch or of the electrode with water.
- Do not operate with worn cables or poorly connected cables. Inspect all cables frequently for insulation failures, exposed wires and loose connection.
- Do not overload welding cables or continue to operate with hot cables. Cables which are too small for the carried current will overheat causing rapid deterioration of the insulation.
- Be careful that the torch is not in contact with any metal connected to the earth cable. Use an insulated hook to hang it on when you are not using it.

### Safety against fume and welding gases

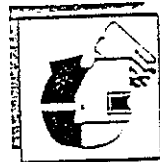
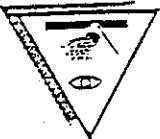
- Be sure to provide adequate ventilation for removal and dilution of fume and gases, especially when welding is executed in a limited space. Always remove the paint layers covering the parts to be welded, because these can generate toxic gases.
- Do not weld in places where you suspect some gas escapes or near motors with inside combustion.
- Locate the welding operation far enough from any vapour-type degreaser using trichloroethylene hydrocarbons as solvents.



— The ultraviolet light from the arc can decompose these vapours into toxic gas forming the "FOSGENE" a very toxic gas.

### Protection against radiations and burns

- Do not use cracked or defective or shields.
- Never look at the electric arc without wearing adequate eye protection.
- Immediately replace damaged or non-suitable lenses.
- You should always put a transparent lens over the inattentive one to protect it.
- Never strike an arc when there is anyone nearby who is not protected from the strong light of the arc.
- Be alert for bystanders who are not aware of the dangers of ultraviolet light.
- The eye damaged by ultraviolet light creates more or less serious conjunctivitis.
- Always use the proper protective clothing and gloves.
- Use ear-plugs.
- Always check welded metal for heat before picking it up.



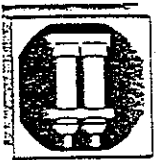
### Prevention against flames and explosions

- Remove any combustible from the working area.
- Do not weld near flammable materials or liquids, in or near explosive atmosphere.
- Do not wear clothes impregnated with oils or greases because fire can be struck from sparks.
- Do not weld in containers which have held combustible or flammable materials, or on materials which give off flammable or toxic vapours when heated, without proper cleaning.
- Verify what was held in the container or use an exsosisimeter. A little remainder of flammable gas or liquid can cause an explosion.
- Never use oxygen to remove gas from a container.
- Avoid the welding of grooved castings from where you have not removed the gas.
- Keep an extinguisher near the working place.
- Never use oxygen in a welding torch, but only inert gases and mixtures, as requested by the work process.



### Gas preparation and storage

- Use precaution in handling compressed gas in cylinders.
- Avoid any accidental contact between the gas cylinders or any other container of gas under pressure and the electrode or the torch or any other current circuits.
- Identify the gas type by the plate placed on the cylinder. In case the type is not stated, do not use it. Don't simply trust the colour that usually identifies it.
- Keep the cylinders far away from sparks, hot scoria, free flames and any other source of excessive heat.
- When placing the cylinders pay attention to avoid any contact with current sources.
- Always close the valves after completing each single operation and when the cylinder is empty.
- Return the empty cylinder to the supplier and never try to refill it yourselves.
- Cylinder location should be safe to avoid its dropping or being accidentally hit.
- Use only certified tubes and connections, according to the gas type to be used and replace them when damaged.
- Use a proper pressure regulator, mount it manually on the cylinders and, in case of inadequate working, replace it immediately. Slowly open the cylinder valve, so that the regulator pressure can slowly increase. When the gauge index is pressurized, leave the valve in the reached position. For inert gases completely open the valve. For combustible gas open the valve less than one complete turn, so that you can quickly reclose it in case of emergency.



## 3) LOCATION AND CONNECTIONS

Select the location of the power source carefully to ensure satisfactory and reliable services.

The power source components are cooled by forced air drawn by a fan into the front of the machine and expelled at the rear. The power source must be located so that the air can circulate freely at the front and the rear opening of the cabinet. Select a location at which a minimum of dirt, dust, moisture or corrosive vapours will be drawn into the machine.

Locate the machine so that the cover can be removed easily for cleaning the inside of the machine.

### a) Main cable connection

Before connecting the power source to the main supply, check that the data stated on the machine plate correspond to the voltage to be used and that the switch is on the "0" position.

The connection to the supply can be made with a three core cable which is supplied with the machine, connecting:

— 2 wires to the supply.

— the third one, YELLOW-GREEN, to "EARTH".

CONNECTION DATA

TAV. 1

Welder type	Power max. KVA	Fuses Ampères					Supplied cable
		220 V	240 V	380 V	500 V	Section mm <sup>2</sup>	
MONOFIL 200	6	20	20	16	10	3 x 1,5	4
		20	20	16	10		

NOTE: any extension of the main cable must be of adequate size and never less than that of the cable already fitted.

b) Torch and ground cable connection

The welding torch, complete with gas hose and trigger cable, must be fitted correctly (pos. 1 - fig. 2). The brass end must be fixed on the wire feeder by the nut (pos. 2 - fig. 2).  
The gas hose and the push buttons must be connected to the relating nipples (pos. 3 - fig. 2) (pos. 4 - fig. 2).  
The ground cable must be fitted into the fast safety connection (pos. 6 - fig. 9).

c) Wire loading

Open the side panel and insert the spool (diam. 300 mm) on the proper support, keeping the exit of the wire upward and centring the protruding stud of the support into the corresponding hole in the spool. For the loading of spools of smaller diameter, use the proper spacer supplied. Unwind the coil anticlockwise and insert the end of the wire into the guide (pos. 5 - fig. 2). Check that the drive roll (pos. 6 - fig. 2) has pivoted on the external side the diameter corresponding to the wires used. If not, reverse the roll.  
Insert the wire in the torch liner (pos. 7 - fig. 2) for a few centimetres. Lower the idler roll being sure that the wire enters in the drive roll groove (pos. 3 - fig. 2). The right pressure is the minimum that prevents the rolls from slipping. Excessive pressure could cause wire deformation and raveling at the liner inlet (pos. 3 - fig. 2); insufficient pressure causes uneven welding.

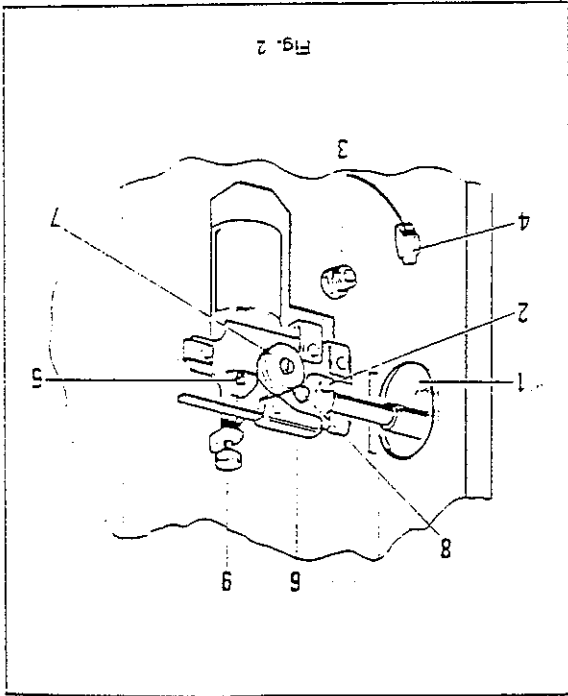


Fig. 2

d) Gas connection

The units are supplied with a regulator for the adjustment of the gas pressure. The connections of gas cylinder, regulator and gas hose that comes out from the back of the welder, must be made as shown in fig. 3.

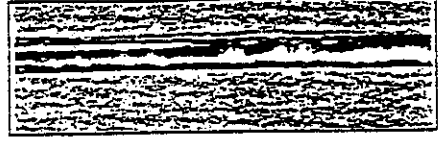
NOTE: when using MIG gas use PURE ARGON use the "A" adaptor cod. 302600, supplied on request.

SEMI-AUTOMATIC WELDING

a) Instructions

The gas used for the weld pool protection states the process type. When using carbon dioxide (CO<sub>2</sub>) the process is called MAG (Metal-Active-Gas) and states an active action of the gas with regard to the melted metal. On the contrary by using Argon or some mixtures with CO<sub>2</sub> or oxygen, the process is called MIG (Metal-Inert-Gas) and determines the inert action of the gas with regard to the melted metal. Welding obtained with MAG method, in comparison with welding obtained with MIG method, are more penetrated and less sensitive to the formation of porosity, especially when there is moisture or some other extraneous materials (rust, paint, etc.).  
The use of CO<sub>2</sub> (MAG) is indispensable in the welding of sparking steels that are the poorest on the market (see fig. 4).  
The welding with argon mixture (MIG) can be used with carbon steel with high and low alloyed steels, and also with stainless steel, copper and aluminium.  
In case of medium or thin thickness, we suggest the MIG process with argon/CO<sub>2</sub> mixture, whose advantages in comparison with MAG

The welding with argon mixture (MIG) can be used with carbon steel with high and low alloyed steels, and also with stainless steel, copper and aluminium.  
In case of medium or thin thickness, we suggest the MIG process with argon/CO<sub>2</sub> mixture, whose advantages in comparison with MAG



1. ANSI Standard Z49.1-SAFETY IN WELDING AND CUTTING

This can be obtained from:

American Welding Society  
P.O. Box 352040  
Miami, Florida 33135

2. ANSI Standard Z87.1-SAFE PRACTICE FOR OCCUPATION AND EDUCATIONAL EYE AND FACE PROTECTION.

This can be obtained from:

American National Standards Institute  
1430 Broadway  
New York, New York, 10018

3. AWS Recommended Practice F4.1-RECOMMENDED SAFE PRACTICES FOR THE PREPARATION FOR WELDING AND CUTTING CONTAINERS AND PIPING THAT HAVE HELD HAZARDOUS SUBSTANCES.

This can be obtained from:

American Welding Society  
P.O. Box 351035  
Miami, Florida 33135

4. NFPA Standard 61-OXYGEN-FUEL GAS SYSTEMS FOR WELDING AND CUTTING.

This can be obtained from:

National Fire Protection Association  
#1 Battery March Park  
P.O. Box 9146  
Quincy, Mass. 02259

5. NFPA Standard 518-CUTTING AND WELDING PROCESSES.

This can be obtained from the same source as item #4

6. CGA Pamphlet P-1, SAFE HANDLING OF COMPRESSED GASES IN CONTAINERS.

This can be obtained from:

Compressed Gas Association  
1235 Jefferson Davis Highway  
Arlington, Virginia 22202

7. OSHA Standard 29 CFR, Part 1910, Subpart Q-WELDING, CUTTING AND BRAZING

MIG WELDING-HOW IT WORKS

MIG (Metal Inert Gas) or GMAW (Gas Metal Arc Welding) welding is a welding process in which a power wire electrode is fed continuously into the welding puddle at a controlled constant rate.

The wire is connected to the positive side of a rectified voltage supply. The workpiece is connected to the negative side of the supply.

When the wire is fed, it comes into contact with the workpiece and an arc is struck. The arc melts the wire and it is deposited onto the workpiece.

The wire, which is fed by the wire feed motor, is fed into the weld pool, burning itself off at a rate dependent upon the selected wire feed speed.

The faster the motor speed the higher the current drawn by the arc. Thus, wire feed speed controls welding currents.

To protect the weld puddle from oxidation and impurities during the welding process, a shielding gas flows over and around the weld puddle.

This gas flow must be sufficient to protect the weld, but not wasteful.

NOTE: Poor gas coverage will result in poor welding. Excessive gas coverage is expensive.

DUTY CYCLE

Duty cycle is shown by the plate reporting the technical data (in the machine panel) with the symbol X. This means the use percentage in a 10 minute period.

For example:

If the duty cycle corresponds to the 15% with an output of 100 amps. The use will be 1.5 minutes; cooling rate will be 8.5 minutes.

BENEFITS OF MIG WELDING

1. 50% faster welding time
2. Operator training time kept to a minimum.
3. There is no slag removal, thus eliminating almost all post-welding cleaning operations.
4. Minimum waste of welding consumables.
5. Overall, a faster more efficient way of getting the job done.

WELDER SPECIFICATIONS

Primary and secondary technical data are shown by the plate placed on the panel of the welder.

USABLE WIRE SIZES

.023-.030 Steel Wire (Recommended ER70S-6)  
.030-.035 Aluminum Wire (Recommended ER5356)

USABLE GASES

- 75% ARGON 25% CO<sub>2</sub> - Thin Sheet Metal, Mild Steel
- 100% Argon - Welding Aluminum
- 100%CO<sub>2</sub> - Mild Steel
- 92% Argon 8% Oxygen - Stainless Steel
- 90% Argon 10% CO<sub>2</sub> - High Strength Steel
- Low Carbon Mild Steel
- 89% Argon 6% CO<sub>2</sub> 5% O<sub>2</sub> - High Speed Welding on Mild Steel.

## PREPARATION FOR WELDING

1. Before connecting the power cord into outlet, verify that the main voltage corresponds to that one shown by the technical data plate of the welder.

2. Open the gas valve of gas bottle. Refer to page 8 for installation instructions for regulator.

3. Attach ground clamp to work piece making sure of good contact.

4. Adjust the gas regulator.

## WELDING PROCEDURES

1. The MIG welder has 4 positions in which to regulate current for various conditions.

2. The selection of a welding position is determined by the thickness of the metal to be welded. The thicker it is,

the higher the current must be.

3. According to the thickness to be welded, the amount of gas regulated to the work also varies and must be adjusted to comply.

## WELDING TECHNIQUES

Before welding, READ SAFETY INSTRUCTIONS carefully; make sure flammable materials are removed from work area.

Keep a fire extinguisher handy. Wear protective clothing so that all skin areas are covered. Use approved helmet (with shade 10 lens) and gloves and protective clothing.

## TUNING WELDER

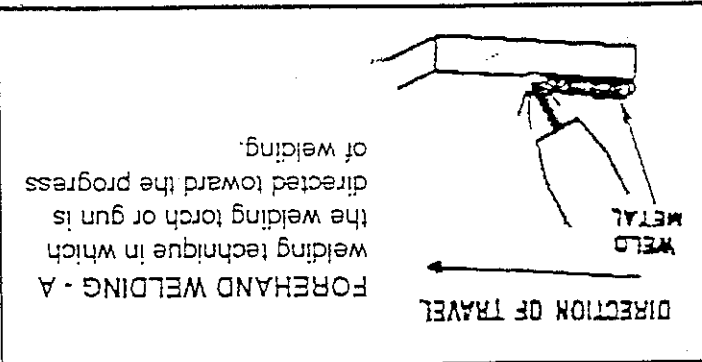
TO SET HEAT: Use proper stick out. Wire stick out is the distance from the CONTACT TIP to the WORK. Wire stick out (sometimes incorrectly called arc length) should be between 3/8" to 1/2" to achieve optimum welding conditions and sound.

1. First turn heat (voltage) setting to desired number. Lower settings for light sheet metal, higher settings for thicker metal.

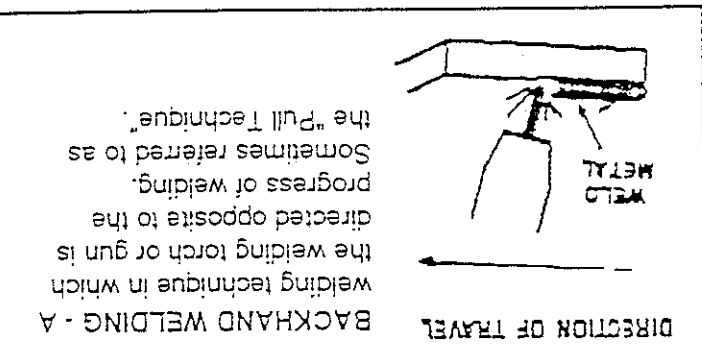
2. Next adjust wire feed speed. Start with a piece of scrap metal that is free of paint and rust. Attach the ground clamp to the scrap metal. Turn the wire feed to a high setting. Pull trigger, initiate an arc and start to turn the wire feed down slowly. Listen as you continue to decrease the wire feed speed. The sound will go from a sputter to a high pitched buzz (like the sound of bacon frying). This buzz will indicate the proper wire speed setting for the thickness of metal you are welding.

You must retune the wire speed whenever the heat setting is changed. Always start with a higher wire feed speed setting. This will reduce the number of contact tips that are burned up during the welder tuning procedure.

As you weld, the gun should be held at approximately a 45 degree angle. Keep the bottom of the nozzle 1/4" to 1/2" from the work



Forehand welding technique in which the welding torch or gun is directed toward the progress of welding.



Backhand welding technique in which the welding torch or gun is directed opposite to the progress of welding. Sometimes referred to as the "Pull Technique".



WELDING HINTS

5. Always apply anti-spatter welding spray when the nozzle and the tip are hot. This prevents slag build-up and allows proper gas flow.
6. Sharp bends or kinks on the welding torch should be avoided.
7. The gun liner should be cleaned when you change a spool of wire. Use compressed air.
8. Using low pressure air, occasionally blow the dust from the inside of the welder. This keeps the machine running cooler.

1. Hold gun at a 45° angle to the work with the nozzle about 1/4" from the surface. The closer the gun, the deeper the weld.
2. Move the gun smoothly and steadily as you weld.
3. Avoid welding in very drafty areas. A weak pitted weld will result due to air blowing away the welding gas.
4. Keep wire and liner clean.

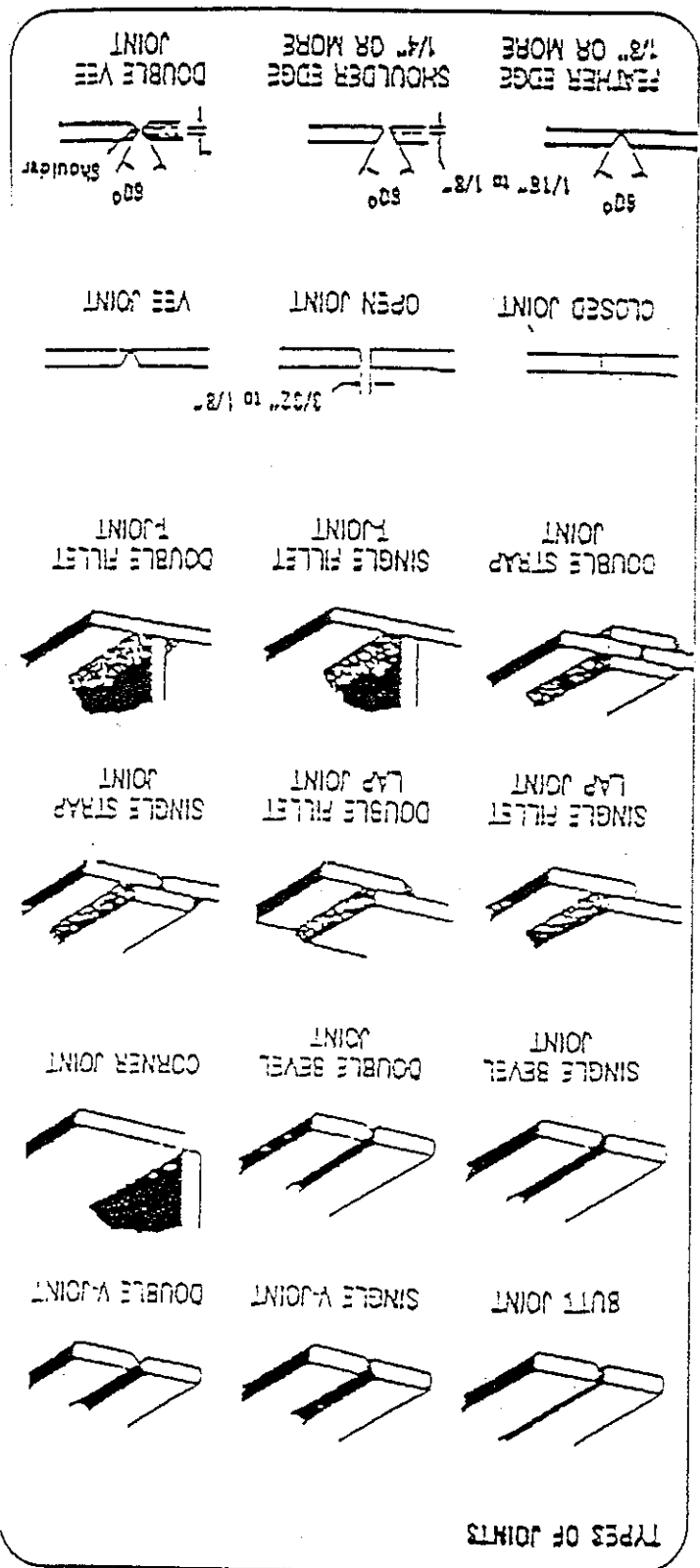
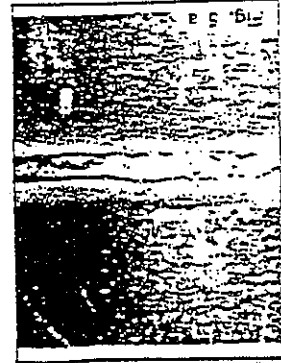
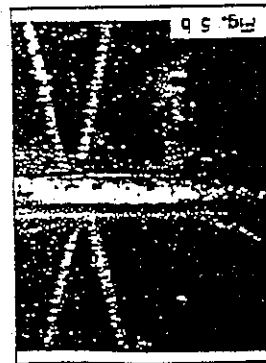


Fig. 5 shows the aesthetical differences between two welds made with the same settings with CO<sub>2</sub> (MAG) Fig. 5 a or Mixture Argon-CO<sub>2</sub> (MIG) Fig. 5 b.

- 1) Higher arc stability;
- 2) Formation of smaller metal droplets with a remarkable reduction of projections or spunking;
- 3) More regular and aesthetically better weld beads;
- 4) Less metal excess;
- 5) Higher work speeds;
- 6) Increases of wire efficiency owing to less spatter losses;
- 7) Lower arc voltage with relevant adjustments;
- 8) Lower gas consumption, balancing the higher cost of mixtures.



### c) How to start welding

Hold the torch so that the wire is touching the starting point of the weld. Press the torch trigger to start the following:

- 1) Gas coming out due to solenoid valve opening.
- 2) Switch intervention with relevant current delivery of the welding machine and arc firing.
- 3) Wire feeding by the wire feed motor.

The obtain a good welding result it is absolutely necessary that the torch is well orientated with regard to the weld. The distance between the nozzle and the workpieces must be of 5-10 mm (fig. 6).

A different position causes a wire projection increases, too much or insufficient penetration and more arc blow.

Fig. 7 shows the different orientations of the torch for different welding positions.

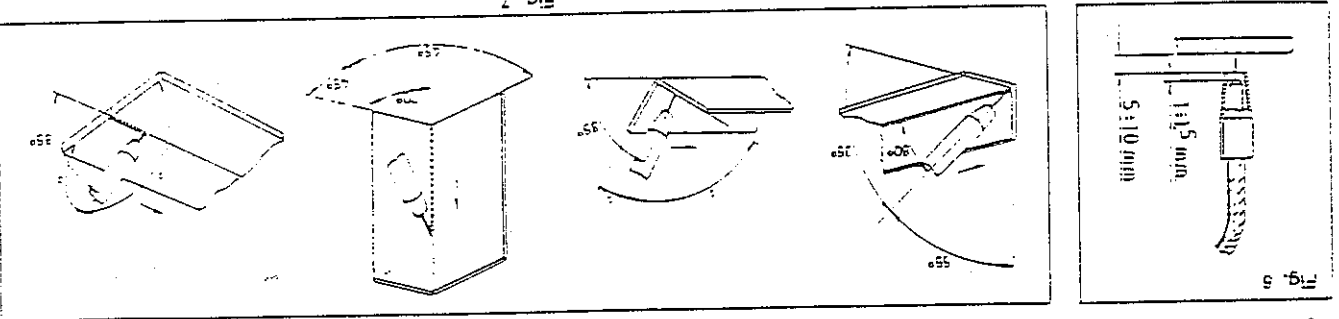
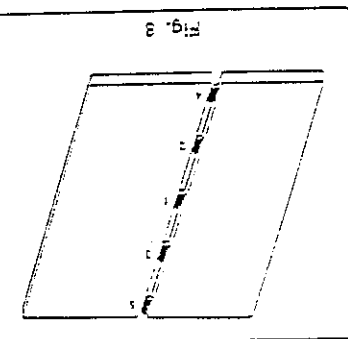


TABLE 2

Thicknesses (mm.)	Wire diameter (mm.)	Current intensity (A)
0.5 + 0.9	0.6	35 - 60
0.8 - 3	0.8	60 - 130
3 + 10	1	130 + 200



The torch movement must be steady, preferably in the direction of the wire thrust in order to obtain flatter and smoother welds.

Besides you have to eliminate from the dates to be welded paint and rust that cause firing difficulties, arc-blow and spatter.

You have to choose the wire diameter according to the date thickness and to current intensity. See table 2.

Welding thin dates, especially when welding edge to edge it is suggested to cut spot welds at intervals of 30-40 mm (see fig. 8). This minimises distortion.

### c) Welding of stainless steels (MIG method)

The gas used is normally: Argon mixture with 2-3% of oxygen for the more binding metallurgical welding and Argon - CO<sub>2</sub> for carpentry welding.

The welding machine is set up in the same way as for welding mild steel.

The filler wire must be compatible with the material to be welded. Generally we suggest the use of stainless steel wire with low carbon content to avoid weld decay.

The welding parameters are similar to the ones for standard steel welding, but you have to increase arc voltage by about 1-2 Volts with the same wire speed.

It is consequently necessary that the edges to be welded are free from grease and paint that cause corrosion problems porosity and the formation of toxic gas.

The minimum thickness we suggest for welding is of 0.8 - 1 mm.

### b) DIRECTIONS FOR USE

#### a) Control equipments (fig. 9)

Pos. 1 - 6 positions switch for the adjustment of welding voltage.

Pos. 2 - Potentiometer for the adjustment of wire speed.

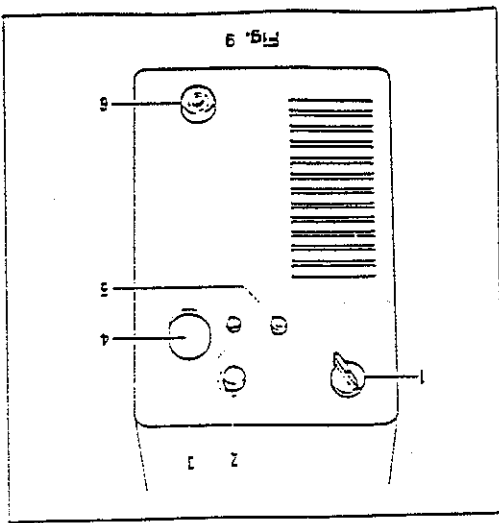
Pos. 3 - Auxiliary circuit fuse.

Pos. 4 - Hole for introduction of the torch.

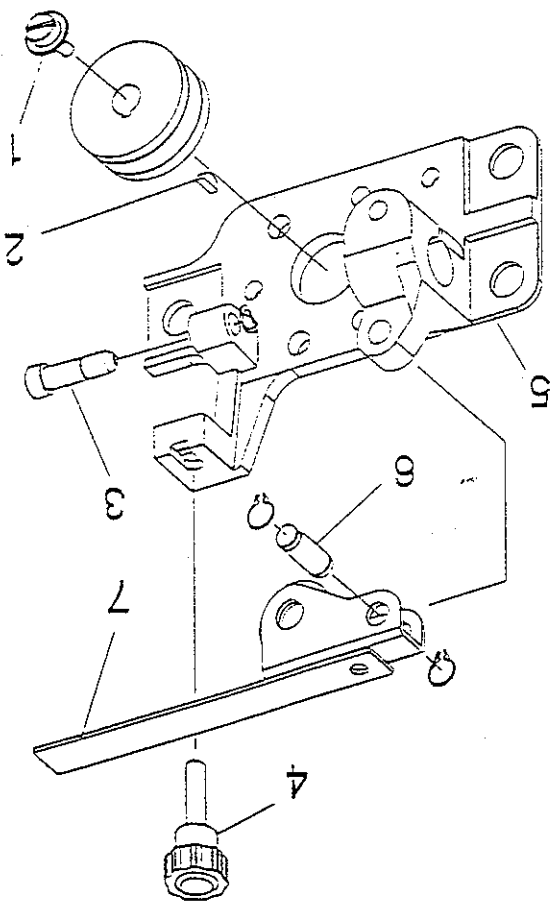
Pos. 5 - Pilot light.

This light is on when power is applied to the machine and the same is ready to work.

Pos. 6 - Fast safety socket for ground cable connection.



- COMPLETE WIRE FEED MECHANISM - CODE No. 240660



Part.	Code	Code	Code	Code	Code	Code	Code
1	487835	637296	434253	488014	307254	448460	437070
2							
3							
4							
5							
6							
7							

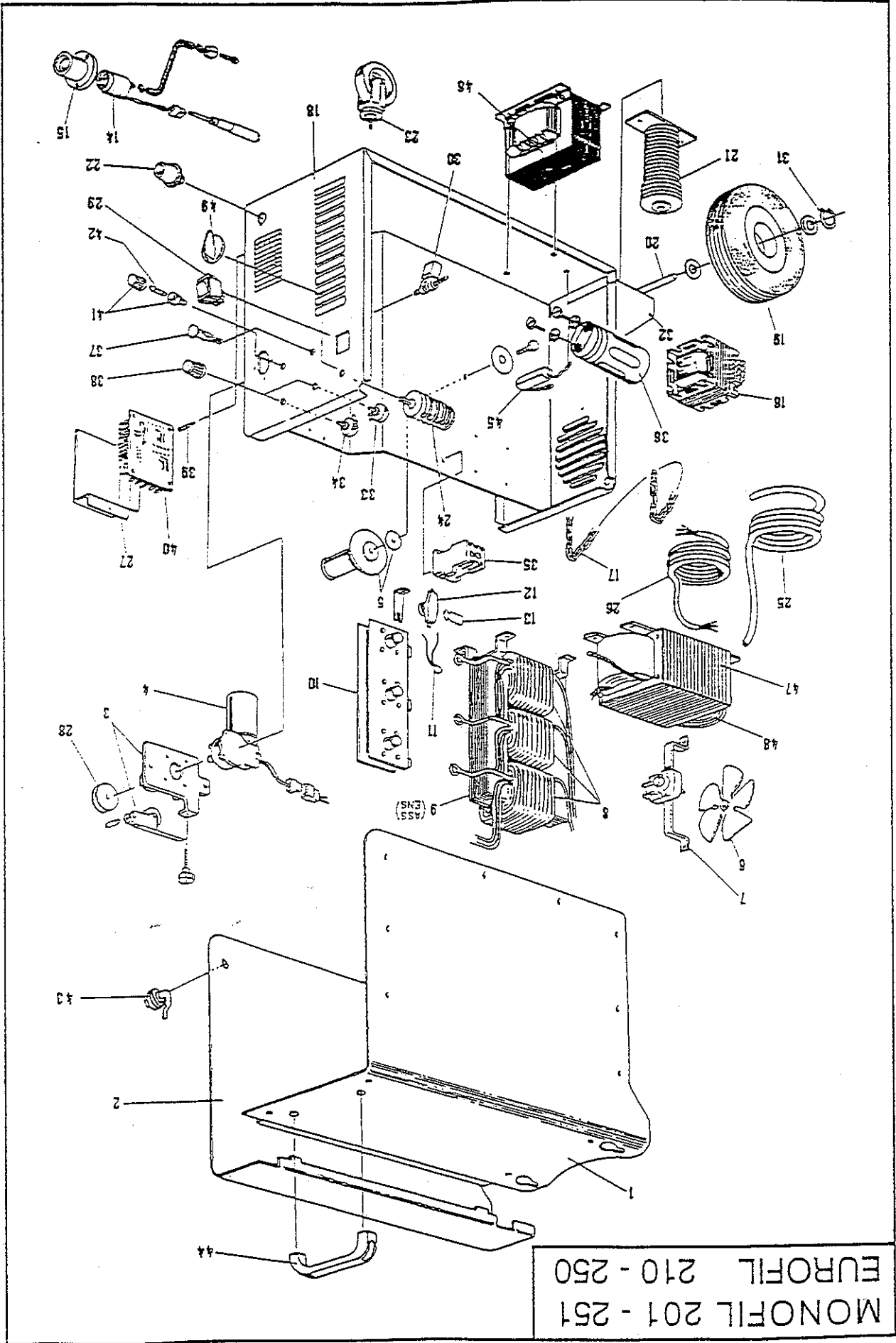
IMPORTANT

To ask for spare parts clearly state:

- 1) The code number of the piece.
- 2) The type of the machine.
- 3) The serial number of the same.

EXAMPLE

No. 2 pieces code 240036 for welding machine type EUROFIL 250 Serial number \_\_\_\_\_



MONOFIL 201 - 251  
 EUROFIL 210 - 250

**b) Sequence of operations to be done before welding**

**IMPORTANT:** before turning the unit on, check once more that the data stated on the machine plate correspond to the main voltage.

1. Turn the welding on selecting pos. 1 on the switch; this situation is confirmed by the illuminated pilot light.
2. Remove the gas nozzle from torch extremity and loosen the contact tip. Remember that the contact tip must correspond to the diameter of the wire.
3. Adjust the wire speed potentiometer on pos. 3 of relating range.
4. Push the torch button until the wire comes out.
5. Tighten the contact tip and insert again gas nozzle on torch extremity; protect both of them from welding spatters by the aid of proper spray without silicon.
6. Open the gas bottle valve slowly and adjust the reducer knob to obtain the right pressure (about 1-1.2 bars).
7. Choose the most suitable voltage and wire speed adjustments acting on the right controls according to the type of work to be done.

**6) MAINTENANCE AND TROUBLE SHOOTING**

**a) Power source**

As these welders are completely static, except the fan motor maintenance is limited to a periodic check to see if there are worn-out cables or loose connections. We also suggest regular cleaning of the inside of the machine. To do this you have to remove the cover, with the machine disconnected from the main supply, and remove dirt and dust using dry compressed air. Be careful not to direct the air jet on the electronic components. Check that gas circuit is completely free from dirt and that all connections of the same are well tightened and without leaks. Give particular attention to the solenoid valve. Clean the switch contacts and replace them if worn.

**b) Torch**

The torch is subjected to high temperatures and to pulling and twisting. We recommend avoiding tight bends of the cable and not to use the torch to drag the machine along.

Due to the above, the torch will need frequent maintenance, including:

- cleaning weld spatter from the torch head and gas cup to allow a free gas flow;
- replace the contact tip when the hole for the wire is misshapened and burnt;
- cleaning the torch liner by trichloroethylene or other solvent;
- checking the insulation and main cable connections; the connections must be electrically and mechanically in good conditions.

**TROUBLE**

**PROBABLE CAUSE**

**REMEDY**

<ul style="list-style-type: none"> <li>- No mains</li> <li>- Faulty switch</li> <li>- Torch push button does not work</li> <li>- Faulty electronic card</li> <li>- Faulty rectifier</li> <li>- Faulty auxiliary transformer</li> </ul>	<ul style="list-style-type: none"> <li>- Fuse blown</li> <li>- Faulty electronic card</li> <li>- Faulty motor reducer</li> <li>- Worn drive rolls</li> <li>- Worn torch liner</li> <li>- Faulty contact tip</li> </ul>	<ul style="list-style-type: none"> <li>- Replace</li> <li>- Check and replace</li> <li>- Replace</li> <li>- Check and replace</li> <li>- Replace</li> <li>- Check and replace</li> <li>- Replace</li> </ul>
--	--	---

**No welding current**

- Faulty gas circuit
- Wire of low quality or gas of low quality
- Dirty pieces to be welded
- Burnt or badly connected earth cable
- Wrong welding voltage and wire speed adjustment
- Faulty torch

**Loss of wire feed**

- Check that the gas bottle valve is open.
- Check the solenoid valve.
- Tight all connections. Clean from any obstructions the holes of the torch head
- Change the quality of gas or wire used
- Clean the pieces
- Check the earth and that the cable is well tightened
- Increase or decrease the parameters locking for the right adjustments
- Check all the components of the torch and replace any faulty part

**Defective welding**

1. Remove the electronic card protection cover by pulling with only one hand without the help of any specific tool, the fixing push-buttons (see fig. 10).
2. Extract the two side connectors of the card electric connection.
3. Release the brake of the electronic card rotating and-clock wise the elastic brackets of a quarter of turn (see fig. 10).
4. Remove the faulty card.

**NOTE:** to replace the card go on as following:

<ul style="list-style-type: none"> <li>- Check that the gas bottle valve is open.</li> <li>- Check the solenoid valve.</li> <li>- Tight all connections. Clean from any obstructions the holes of the torch head</li> <li>- Change the quality of gas or wire used</li> <li>- Clean the pieces</li> <li>- Check the earth and that the cable is well tightened</li> <li>- Increase or decrease the parameters locking for the right adjustments</li> <li>- Check all the components of the torch and replace any faulty part</li> </ul>	<ul style="list-style-type: none"> <li>- Faulty gas circuit</li> <li>- Wire of low quality or gas of low quality</li> <li>- Dirty pieces to be welded</li> <li>- Burnt or badly connected earth cable</li> <li>- Wrong welding voltage and wire speed adjustment</li> <li>- Faulty torch</li> </ul>	<ul style="list-style-type: none"> <li>- Replace</li> <li>- Check and replace</li> <li>- Replace</li> <li>- Check and replace</li> <li>- Replace</li> <li>- Check and replace</li> <li>- Replace</li> </ul>
<ul style="list-style-type: none"> <li>- Check the main cable connection to the supply and repair as necessary</li> <li>- Check the torch switch and repair or replace</li> <li>- Check the torch push button and repair or replace</li> <li>- Replace</li> <li>- Replace</li> <li>- Replace</li> <li>- Replace</li> <li>- Wait for the automatic reset</li> </ul>	<ul style="list-style-type: none"> <li>- Faulty electronic card</li> <li>- Faulty motor reducer</li> <li>- Worn drive rolls</li> <li>- Worn torch liner</li> <li>- Faulty contact tip</li> </ul>	<ul style="list-style-type: none"> <li>- Replace</li> <li>- Check and replace</li> <li>- Replace</li> <li>- Check and replace</li> <li>- Replace</li> <li>- Check and replace</li> <li>- Replace</li> </ul>

**TROUBLE SHOOTING**

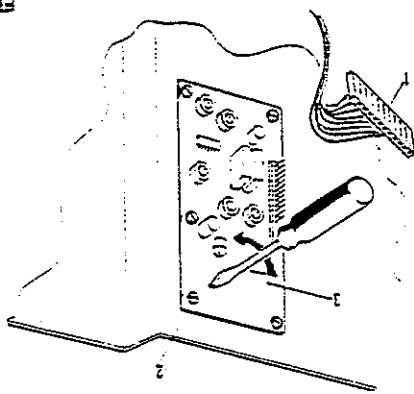


Fig. 10

MONOFIL 200	MONOFIL 201	EUROFIL 210	EUROFIL 250	MONOFIL 251
1   420762   Code	1   420762   Code	1   420762   Code	1   420762   Code	1   420762   Code
2   420761   Code	2   420761   Code	2   420761   Code	2   420761   Code	2   420761   Code
3   240660   Code	3   240660   Code	3   240660   Code	3   240660   Code	3   240660   Code
4   240755   Code	4   240755   Code	4   240755   Code	4   240755   Code	4   240755   Code
5   241845   Code	5   241845   Code	5   241845   Code	5   241845   Code	5   241845   Code
6   486564   Code	6   486565   Code	6   486565   Code	6   486565   Code	6   486565   Code
7   444580   Code	7   444575   Code	7   444575   Code	7   444575   Code	7   444575   Code
8 220V   212146   Code	8   455698   Code	8   211500   Code	8   211510   Code	8   455699   Code
8 240V   212147   Code	12   478781   Code	9   291130   Code	9   291135   Code	12   478781   Code
9 220V   243062   Code	14   236614   Code	10   455963   Code	10   455991   Code	14   236614   Code
9 240V   243063   Code	15   428105   Code	11   488299   Code	11   488299   Code	15   428105   Code
10   455698   Code	16   481539   Code	12   478860   Code	12   478860   Code	16   481539   Code
11   436301   Code	17   412921   Code	13   441305   Code	13   441305   Code	17   412921   Code
12   277525   Code	18   4050488   Code	14   236614   Code	14   236614   Code	18   4050488   Code
13   418743   Code	19   459830   Code	15   428105   Code	15   428105   Code	19   459830   Code
14   438865   Code	20   402538   Code	16   481539   Code	16   481539   Code	20   402538   Code
15   424010   Code	22   403614   Code	17   412921   Code	17   412921   Code	22   403614   Code
16 120/130   481538   Code	23   459683   Code	18   4050480   Code	18   4050480   Code	23   459683   Code
16 120/130   481538   Code	24   417532   Code	19   459830   Code	19   459830   Code	24   417531   Code
17   412921   Code	25   486044   Code	20   402538   Code	20   402538   Code	25   486044   Code
18   405053A   Code	26   235964   Code	21   240035   Code	21   240036   Code	26   414147   Code
19   459830   Code	27   454079   Code	22   403614   Code	22   403614   Code	27   454079   Code
20   402538   Code	28A   458846   Code	23   459683   Code	23   459683   Code	28A   458846   Code
21   240200   Code	28A   458846   Code	24   417721   Code	24   417722   Code	28A   458846   Code
22   403614   Code	28B   459107   Code	25   486044   Code	25   486044   Code	28B   459107   Code
23   459683   Code	28C   459125   Code	26   414158   Code	26   414158   Code	28C   459125   Code
24   417550   Code	28C   459125   Code	27   454079   Code	27   454079   Code	28C   459125   Code
25   486044   Code	29   435364   Code	28A   458846   Code	28A   458846   Code	29   435364   Code
26   235964   Code	30   245570   Code	28B   459107   Code	28B   459107   Code	30   245570   Code
27   429463   Code	31   602028   Code	28C   459125   Code	28C   459125   Code	31   602028   Code
28A   458846   Code	32   451571   Code	28C   459125   Code	28C   459125   Code	32   451571   Code
28B   459107   Code	33   453044   Code	29   435364   Code	29   435364   Code	33   453044   Code
28C   459125   Code	34   453004   Code	30   245570   Code	30   245570   Code	34   453004   Code
29   376818   Code	37   436362   Code	31   602028   Code	31   602028   Code	37   436362   Code
30   245570   Code	38   438865   Code	32   451571   Code	32   451571   Code	38   438865   Code
31   602028   Code	39   424010   Code	33   453004   Code	33   453004   Code	39   424010   Code
32   451740   Code	40   376840   Code	34   453004   Code	34   453004   Code	40   376840   Code
33   429661   Code	41   451740   Code	35   419942   Code	35   419937   Code	41   451740   Code
34   453000   Code	42   429661   Code	36   438865   Code	36   438865   Code	42   429661   Code
35   419942   Code	43   429463   Code	37   436362   Code	37   436362   Code	43   429463   Code
36   438695   Code	44   438168   Code	38   438865   Code	38   438865   Code	44   438168   Code
37   438168   Code	45   277525   Code	39   424010   Code	39   424010   Code	45   277525   Code
38   451571   Code	46   240199   Code	40   376840   Code	40   376840   Code	46   240199   Code
39   478781   Code	47   243066   Code	41   451740   Code	41   451740   Code	47   243066   Code
40   236614   Code	48   212151   Code	42   429661   Code	42   429661   Code	48   212149   Code
41   428105   Code	49   438695   Code	44   438168   Code	44   438168   Code	49   438695   Code

LIMITED WARRANTY

AMERICAN & EUROPEAN MACHINERY, INC.:

Except as noted herein, this equipment is warranted by American & European, Inc. to the original owner against defective materials or workmanship for a period of (2) years from the date of delivery. During the warranty period, equipment found to be defective will be replaced without charge. The equipment must be returned, with proof of purchase to an authorized service center. The replaced equipment will be returned with transportation charges prepaid by the service center.

ALL CONSUMABLE PRODUCTS (E.G., WELDING TIPS, CONTACT TIPS, NOZZLES AND ALL OTHER CONSUMABLE PRODUCTS) ARE WARRANTED TO BE FREE FROM MANUFACTURING DEFECTS AND WORKMANSHIP ONLY.

American & European Machinery, Inc. does not authorize any party including its authorized distributors, to offer any other warranty on their behalf. Upon expiration of the warranty period, American & European Machinery, Inc. shall have no further liability related to the product. But would repair and service at a fair price.

THIS WARRANTY IS OFFERED IN LIEU OF ANY OTHER EXPRESSED WARRANTY, AND, EXCEPT TO THE EXTENT PROHIBITED BY APPLICABLE LAW, TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, IS LIMITED TO THE DURATION OF THIS WARRANTY.

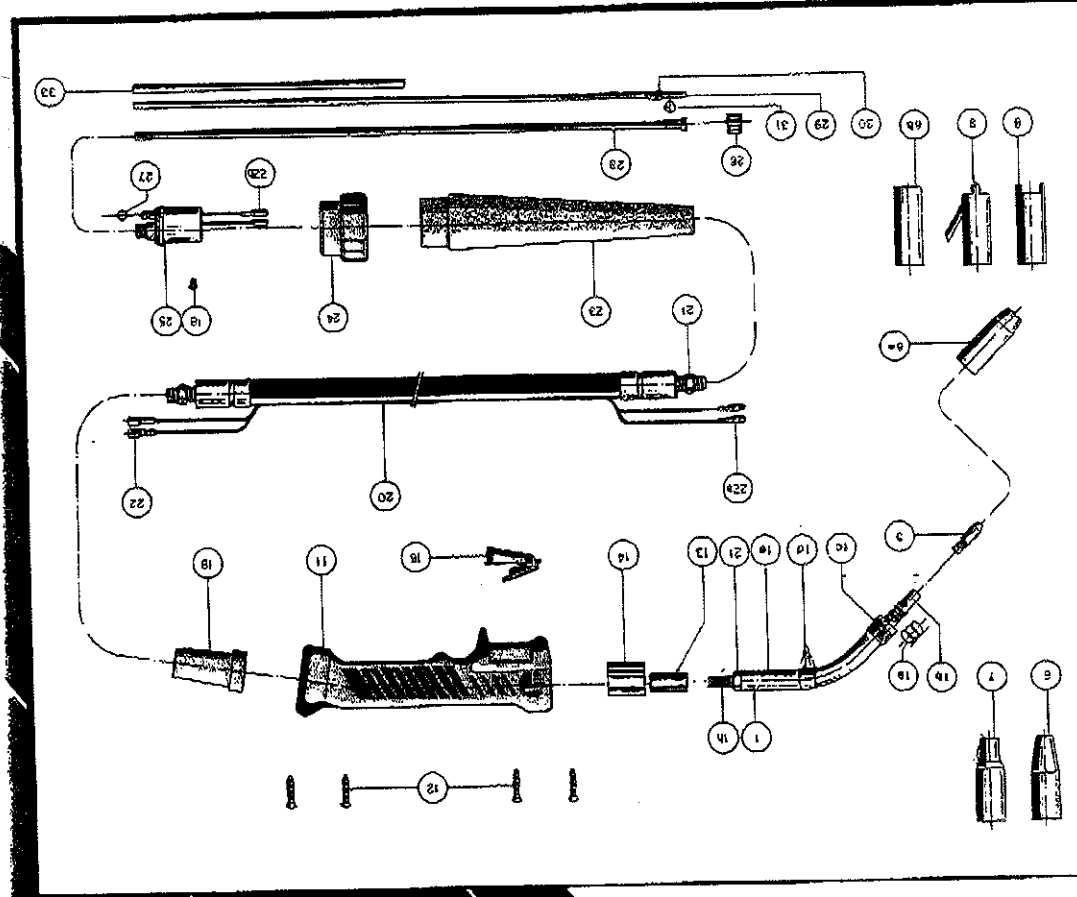
This warranty does not extend to any product subjected to misuse, neglect, accident, or in-warranty repair by anyone except American & European Machinery, Inc.

For additional PRODUCT AND SERVICE information, contact:

American & European Machinery, Inc.  
10730 Logan Street, P.O. Box 2518  
Whitehouse, Ohio 43571  
(419)877-1000

fronfront

POS.	ARTICOLO	ITEM	CODICE
1	Corpo torcia completo	Torch head complete	MP 32
1a	Molla per ugello	Nozzle spring	EA 303
1b	Diffusore gas	Gas diffuser	FB 117
1c	Isolante corpo torcia	Head insulator	BW 85
1d	Boccola per corpo torcia	Torch head spacer	BW 86
1e	Copertura isolante	Torch head boot	MQ 11
1h	Lancia	Torch head body brass	FB 116
5	Punta guida filo M6 Ø 0,6	Contact tip M6 Ø 0,6	MD 8-06
5	Punta guida filo M6 Ø 0,8	Contact tip M6 Ø 0,8	MD 8-08
5	Punta guida filo M6 Ø 0,9	Contact tip M6 Ø 0,9	MD 8-09
5	Punta guida filo M6 Ø 1,0	Contact tip M6 Ø 1,0	MD 8-10
5	Punta guida filo M6 Ø 0,8 Alluminio	Contact tip M6 Ø 0,8 Aluminium	MD 8-58
5	Punta guida filo M6 Ø 1,0 Alluminio	Contact tip M6 Ø 1,0 Aluminium	MD 8-60
6	Ugello conico Ø 9,5	Small conical shroud Ø 9,5	MC 17
6a	Ugello conico Ø 12	Conical shroud Ø 12	MC 18
6b	Ugello cilindrico Ø 16	Cylindrical shroud Ø 16	MC 19
7	Ugello a bottiglia Ø 13	Tapered shroud Ø 13	MC 266
8	Ugello per puntatura	Spot welding shroud	MC 20
9	Ugello per chiodatura	Stud welding shroud	MC 21
11	Impugnatura	Handle	MP 36
12	Vite	Screw	EA 64
13	Raccordo esagonale	Torch body seat brass	FB 112
14	Blocco centrale	Torch body plastic	BW 80
16	Pulsante	Trigger assembly	BX 20
18	Vite	Screw	EA 18



**AMPERE 60 %**  
**180 CO2**  
**150 MIX**  
**FIL-O-WIRE Ø**  
 0,6-0,8-0,9  
**PESO-WEIGHT**  
 900 g.  
**LUNGHEZZA**  
 LENGTH  
 3 m. 4 m. 5 m.  
**AIR COOLED**



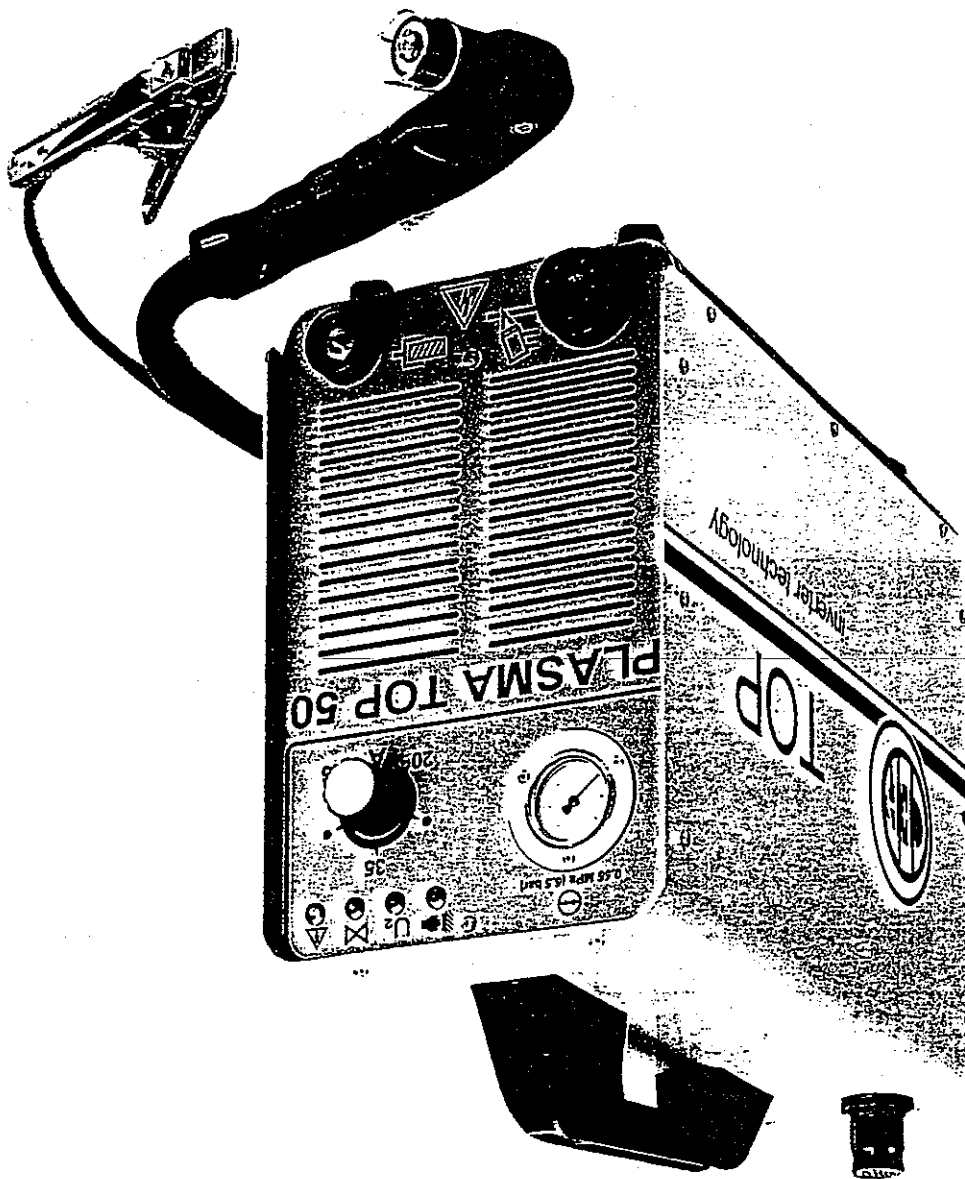
**Force MIG PLUS 15**



SPARE PARTS LIST

ISO 9001  
REGISTERED  
QUALITY SYSTEMS

TWO YEAR  
BUMPER-TO-BUMPER  
WARRANTY

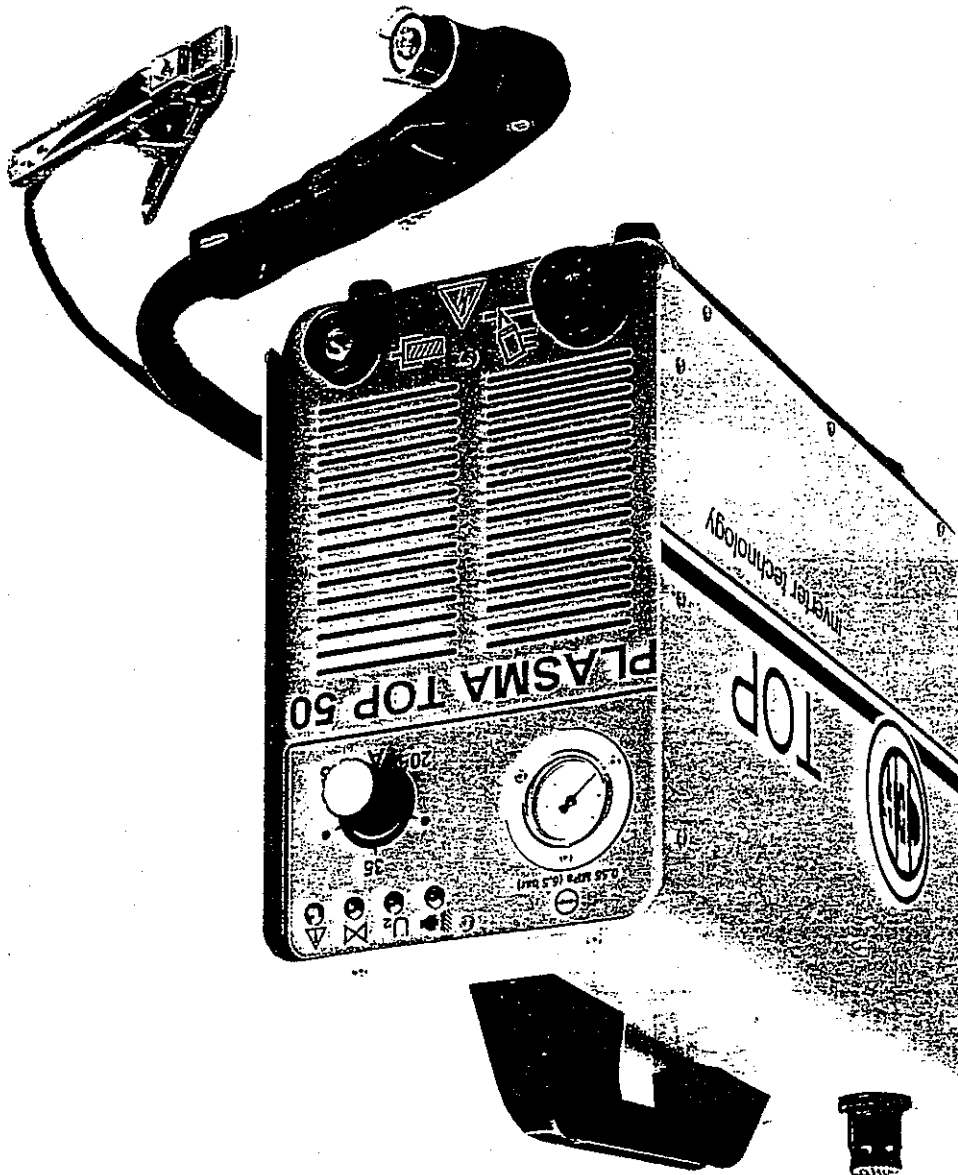


PLASMA TOP 50  
INSTRUCTION MANUAL

SPARE PARTS LIST

ISO 9001  
REGISTERED  
QUALITY SYSTEMS

TWO YEAR  
BUMPER-TO-BUMPER  
WARRANTY



PLASMA TOP 50  
INSTRUCTION MANUAL

# AMERICAN & EUROPEAN MACHINERY, INC.

Other than consumables, it is covered.

- |              |                     |
|--------------|---------------------|
| Wire Feeders | Ground Clamps       |
| HF Units     | Adjusting Dials     |
| Feed Motors  | Transformers        |
| Rectifiers   | Controls            |
| Wheels       | Power Sources       |
| Guns         | Interconnect cables |
|              | Feed Rolls          |

Includes

All C.E.A. equipment is warranted for two years from the date of purchase. The warranty is against any and all defects in the equipment used under normal and proper conditions. This two year warranty covers the front to the back of the equipment.

## TWO YEAR BUMPER-TO-BUMPER WARRANTY

Includes spare parts kit.

TECHNICAL DATA		PLASMA TOP 50
Single Phase Input 50/60 Hz	V	220
Fuse	A	20
Open Circuit Voltage	V	360
Cutting Voltage	V	100
Cutting Current	A	20-45
Cutting Current at 35%	A	45
Air Pressure	PSI	40-60
Torch Length	Feet	20
Max. Cutting Thickness	Inches	1/2
Dimensions	Inches	L 13 W 8 H 12
Weight	Lbs.	30

FRONT PANEL INCLUDES

- Cutting current adjustment
- Main supply LED light
- Torch button LED light
- Air shortage LED light
- Thermostatic protection LED light
- Air pressure gauge

STANDARD FEATURES:

- True inverter technology
- Thermostatic protection on power supply
- Low energy consumption
- Adjustable current control
- Excellent cutting characteristics thanks to inverter control
- Lightweight-portable
- Removable torch for speedy service

ISO-9001 REGISTERED QUALITY SYSTEMS

**EQUIPMENT FOR COMPRESSED AIR PLASMA CUTTING**

The PLASMA "TOP" equipment, for compressed air cutting, provides a low cost and efficient system for cutting which can be used on any metal, up to 1/2 inch. They are suitable for car body repairs and light/medium duty industrial applications. To ensure the safety of the operator, each model is provided with an electric device on the torch.

## Introduction

*We thank you for buying one of our products.*

Before using the equipment you must carefully read the instructions contained in this manual. To obtain the best performance from the machine and ensure the longest possible life of all its components you must carefully follow the instructions for use and maintenance detailed in this manual.

In the interest of our customers we suggest any maintenance or repair of the equipment is made by qualified personnel.

All our products are subjected to a constant development. We are therefore constrained to reserve the right to make any necessary or useful changes in design and equipment.

## 1. Description

This small but powerful D.C. power source is built according to the most advanced inverter technology - portable, light, handy, it is a competitive and serviceable cutting system for all solid pieces or grates made of metal (aluminium, stainless steel, etc.) with thickness from 0,5 up to 12 mm, suitable to car body repairs, outside fabrication and light / medium duty industrial applications.

The main technical features are:

- single-phase supply;
- complete stability of arc parameters within a  $\pm 10$  % feeding voltage range;
- thermostat protection against overloading;
- central adaptor for easy plasmatorch connection;
- it makes use of compressed air as plasma gas;
- forced air cooling;
- working cycle and warning signalled by LEDs;
- stepless adjustment of cutting current that confers a better appearance to the cut surface;
- fast dynamic response for greater plasma arc stability;
- arc parameters control unit to an excellent cut quality.

## 2. Limits of use (EN 60974-1)

a) The use of a cutting equipment is normally not continuous, since there are actual work periods (cutting time) and pause periods (positioning workpieces, etc.).

This cutting unit has been manufactured to supply the maximum nominal current  $I_n$  in complete safety for a working time of 35% of the total time. The standards in force state a work period of 10 minutes. The maximum duty cycle is 35% of this period.

If you exceed the recommended work/pause periods, you will cause overheating of the machine. The machine should be put out of order. A thermal protection device is installed, which is triggered by the turning on of a yellow LED (pos. 5, fig. 1) located on the front. After few minutes this device automatically turns on the machine, the yellow LED goes off and the machine is ready for use again.

b) This machine is built according to IP 21 protection standards and cannot therefore be used in the rain.

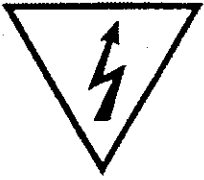
## 3. Safety norms

### 3.1 Main safety standards

This equipment must be used only for cutting and not for any other unsuitable uses. It must be used only by people trained and experienced in the use of cutting equipment. Operators must respect CEI 26-9 HD 407 safety standards in order to ensure their and third parties' safety.

### 3.2 Prevention against electric shock

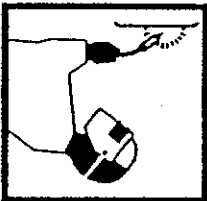
- Disconnect the power source before making any repairs or any maintenance operation (equipment with open-circuit voltage higher than 100 V).
- Make sure that the equipment is properly connected to a good earth.
- The equipment must be installed by qualified personnel. All connections must meet the standards in force (CEI 26-10 HD 427) and the accident-prevention laws.
- Do not cut in damp or wet conditions or in the rain.
- Do not cut with worn or loose cables. Inspect all the cables frequently to be sure that there are no insulation defects, exposed wires or loose connections.



- Do not overload power cables. Stop cutting if the cables overheat in order to avoid rapid wearing of the insulation.
- Never touch directly parts, which are electrically charged. After using the equipment, take care to put away the torch avoiding any contact with parts connected to the earth cable.

### 3.3 Safety against fumes and gases

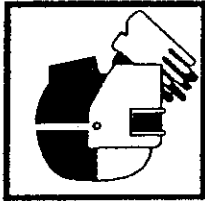
- Provide fume extraction equipment to remove gases and fumes produced while cutting, especially when cutting in confined spaces.
- Locate the equipment in a well-ventilated area.
- Do not cut in places where you suspect gas leakage or next to internal combustion engines.



- Locate the machine away from degreasers using trichloroethylene vapours or other chloride hydrocarbons as solvents, since the cutting arc and the ultraviolet light it produces react with these vapours producing phosgene, a highly toxic gas.

### 3.4 Prevention against radiation and burns

- Do not turn the plasmatorch on oneself, since an unintentional arc ignition can cause severe burns.
- Never use broken or faulty masks.
- Never look at the cutting arc without wearing the proper safety mask.
- Protect your eyes by means of the proper shield equipped with filter lens (protection degree : 9+14 EN 169 / BS 639).
- Replace unsuitable or damaged filter lens immediately.
- Never start the arc before making sure that everyone nearby is provided with the necessary protection.
- Take care that the bystanders are not hurt by the ultraviolet light of the plasma arc.
- Always use the proper clothing, safety goggles and gloves.
- Use ear protectors or ear plugs.
- Use leather gloves to avoid burns and abrasions while handling metal pieces.



### 3.5 Prevention against fire and explosion

• Remove any combustible matter from the working area.

• Do not cut next to flammable materials or liquids, or in a gas saturated room.

• Do not wear clothes soaked with oil or grease because fire can be started by sparks.

• Do not cut containers that hold flammable substances and materials giving off flammable or toxic vapours when heated.

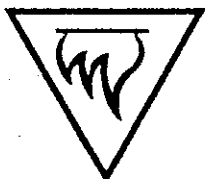
• Before cutting a container check what it contained. Even a little remainder of flammable gas or liquid can cause an explosion.

• Never use oxygen to remove gas from a container.

• Avoid cutting of grooved castings from which gas has not been properly removed.

• Keep an extinguisher into the working area.

• Never use oxygen in a plasmatorch, but only compressed air.



• Be careful when using containers under pressure.

• Avoid any contact between electrically charged parts and containers under pressure.

• Keep the pressure tank away from sparks, hot slag, naked flames and any other source of excessive heat.

• When positioning the pressure tank pay attention to avoid any contact with current sources.

• Always close the valves during every single interruption of work.

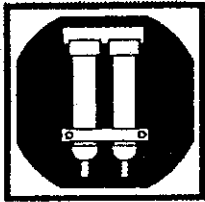
• Make sure that the pressure tank is not exposed to the possibility of being dropped or accidentally hit.

• Use only quality hoses and connections and replace them when damaged.

### 3.7 Risk due to magnetic field

• The magnetic field produced by the equipment may result injurious to people suffering from heartbeat disease and using pacemaker. These people must consult their doctor before going near the equipment.

• Do not go near the equipment with watches, timers, magnetic tapes, floppy disks, etc. Unrecoverable data loss or damage may occur.



### 3.8 Employed materials and recycle

- These machines are built with non-dangerous materials and without harmful substances for the operator.
- Disassemble the machine before disposal and separate its components according to each kind of material.



## 4. Plasma cutting

The cutting system used in the equipment is the type at low current. Compressed air is employed as plasma and cooling gas. The employed air is usually a mix of 79% nitrogen and 21% oxygen. These two diatomic gases have an enthalpy that is almost the same and make a very active mix. Furthermore, low current allows the use of plasmatrices that require low air flow and medium cutting speed, more suitable for manual operation.

### 4.1 Cutting parameters

When analysing the parameters, which characterise manual plasma cutting, it is necessary to remember that they depend on the material to be cut, on the thickness and on the operator's skill to execute the cutting. The ideal cutting speed depends on the material quality and on the operator's skill. At the ideal speed the melted metal should run through the cut without backflow toward the torch. Otherwise reduce cutting speed.

The parameters that affect the quality of the cut are:

- **Electric power.** Increasing electric power allows higher cutting speed or, at the same speed, a greater thickness can be cut.
- **Compressed air flow.** Increasing air flow provides cutting of greater thickness or better quality by the same thickness.
- **Distance between tip and piece.** The cut appearance and the wear of the active components of the torch depend on the correct distance between torch tip and workpiece.

**NOTE:** The cutting groove is about twice the tip hole diameter.

Following the indications given above, you will have very reduced distortion and heat affected zone of the cut metals, anyway less than the ones caused by oxygen cutting.

The heat affected zone is in any case smaller than the weld area; so you do not need any cleaning or grinding operation before welding.



The place where to install the machine must be chosen with great care, in order to ensure a safe and satisfactory service. It must conform to the protection class of the casing that is at IP 21 level (issue IEC 529). Do not use or store in the rain.

This machine is cooled by forced circulation of air and therefore must be located so that air can be easily drawn and expelled from the openings of the cabinet. Install the machine in a place free of dust and humidity.

## 6. Connection to the mains supply

Before connecting the equipment to the mains supply, check that the data on the machine plate correspond to the supply voltage and frequency and that its main switch is on the "O" position.

The connection to the mains supply must be made by using the three-core cable supplied with the machine, by connecting:

- the yellow-green wire to the earth;
- the remaining two wires to the live and neutral.

Connect a suitable plug to the primary cable and fix to a socket fitted with fuses or automatic switch; the earth terminal must be connected to the earth connector (yellow-green) of the main supply.

Table 2 indicates the values of current-carrying capacity suggested for time-delay fuses chosen according to the maximum rated current supplied by the machine and with the rated mains voltage.

Table 2

Model	I <sub>2</sub> Max Max rated cutting current A	P <sub>Max</sub> kVA	Rated current class "gI" fuses A U1 = 230 V	Plasmatorch cable		Earth cable		Primary cable		Duty cycle
50	45 (35%)	4,5	20	6	6	10	4	3x2,5	3	
				Section mm <sup>2</sup> Length m	Section mm <sup>2</sup> Length m	Section mm <sup>2</sup> Length m	Section mm <sup>2</sup> Length m	Section mm <sup>2</sup> Length m	Section mm <sup>2</sup> Length m	

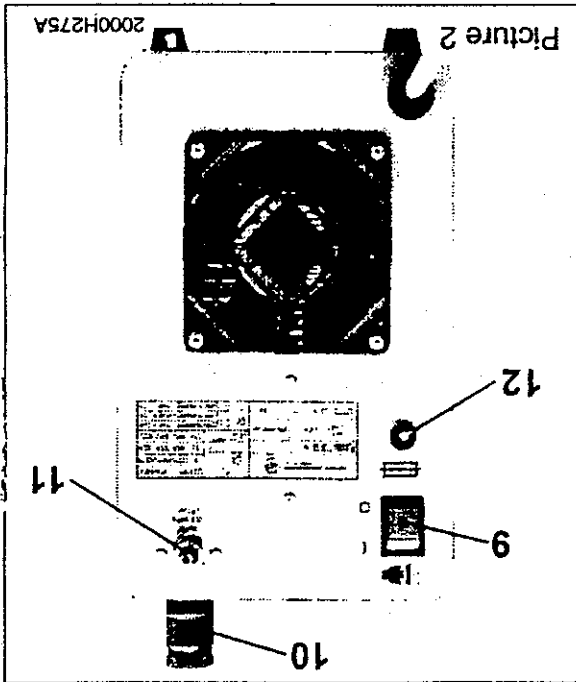
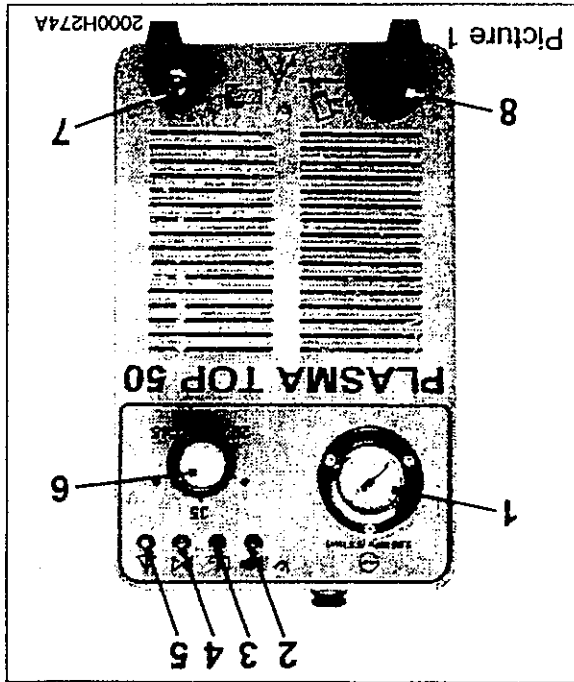
**Note:** Additional main cable extensions must have an adequate section, in no case must the extension's section be smaller than the one of the main cable supplied.

## 5. Installation

Table 1

Power source model	50	AC 50	20 ÷ 45 A	1 mm	0,5 + 12 mm
Torch model			Cutting current	Tip hole diameter	Workpiece thickness

**7. Direction for use**  
**7.1 Controls (pictures 1 - 2)**



Pos.1 Gauge for cutting air pressure measurement

Pos.2 Green LED signalling mains connection. When the LED is on, the equipment is on, ready to be used.

Pos.3 Red LED signalling that the torch trigger has been pressed. When the LED is on, the equipment is ready to perform cutting.

Pos.4 Yellow LED signalling insufficient air pressure. When the LED is on, the air pressure is less than 450 kPa (4,5 bar).

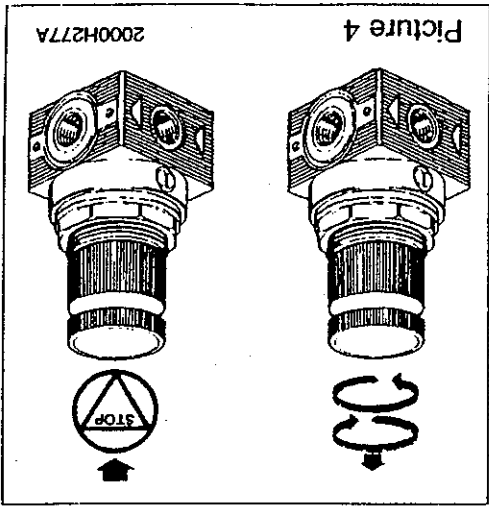
Pos.5 Yellow LED signalling generic warning. This LED goes on in the following cases:

- Activation of the thermal protection of primary INVERTER or main transformer
- Fuse blown (pos. 12, picture 2)
- Activation of the electric safety device on the torch body due to nozzle removal
- Activation of protection of pilot arc resistor

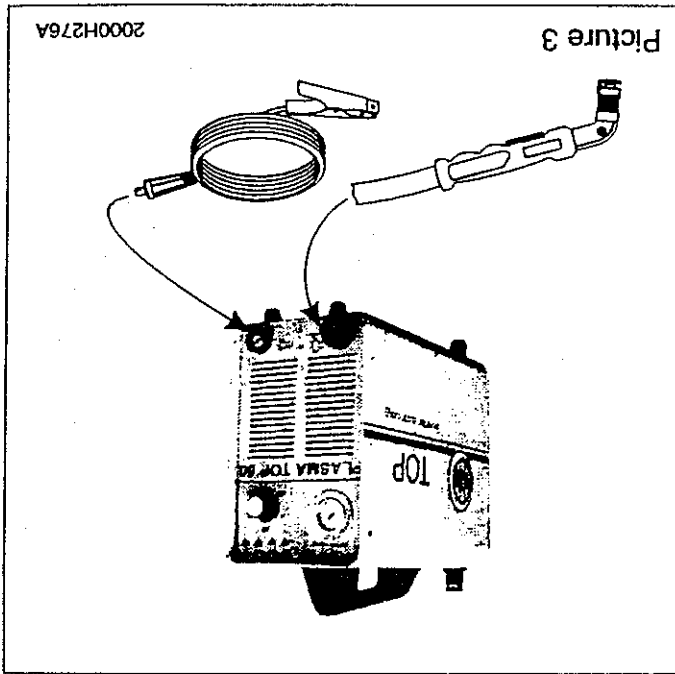
When this LED goes on a power contactor switch off the feeding voltage. After removing the cause that produced the LED activation, you must reset the equipment by turning the main switch (pos. 9, picture 2) off and on.

**NOTE:** Adjust pressure only by increasing its value.  
 completed push the knob.  
 shown in picture 4. When the adjustment is  
 Adjust the pressure reducer to obtain about 550 kPa  
 (5,5 bar) by pulling and turning the reducer knob as  
 kPa (5,5 bar).  
 constant air flow of at least 100 l / min at about 550  
 picture 2). The equipment should be supplied by a  
 Join the air hose with the quick connection (pos. 11,

### 7.3 Compressed air connection



deformed or enlarged hole.  
 Replace the tip when it shows a  
 before the insert is entirely worn.  
 torch head. Replace the electrode  
 electrode may result damaging to the  
 and  
 The excessive wear of torch tip and  
 operating manual.  
 Before cutting you must check the  
 plasmatorch as described in its  
 picture 1) and tighten it.  
 end into the central adaptor (pos. 8,  
 (pos. 7, picture 1). Insert the torch  
 Connect the earth cable to the socket  
 main supply.  
 Important: Before doing any ope-  
 ration concerning torch or earth  
 cable connection, be sure that the  
 machine is disconnected from the



### 7.2 Plasmatorch and earth cable connection (picture 3)

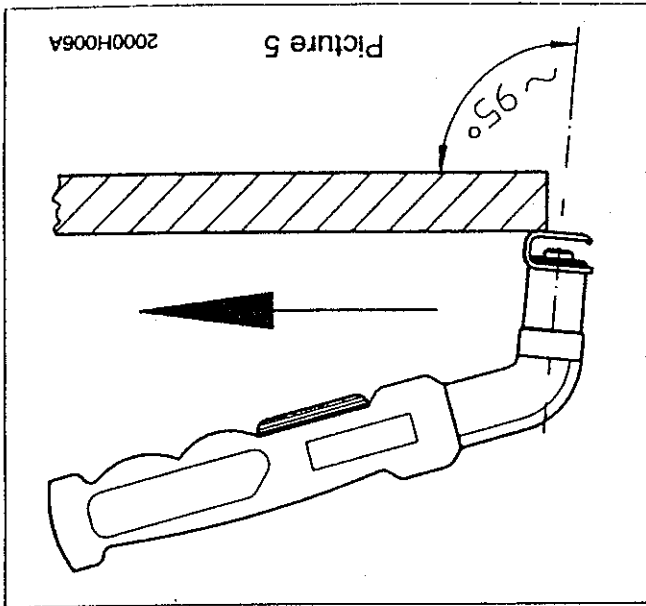
- Pos. 6 Potentiometer for cutting current adjustment
- Pos. 7 Quick release socket for earth cable connection
- Pos. 8 Central adaptor for plasmatorch connection
- Pos. 9 "ON-OFF" light emitting switch. When the light inside the switch is on, the equipment is on, ready to be used.
- Pos. 10 Air pressure reducer included a filter with automatic moisture expulsion. Adjust air pressure at about 550 kPa (5,5 bar).
- Pos. 11 Connection for compressed air hose. Max. 800 kPa (8 bar)
- Pos. 12 Ancillary control circuit protecting fuse.

## 7.4 List of operations to be done before cutting

**Important: Before turning on the equipment comply carefully with the following prescriptions:**

- verify that the mains voltage and frequency correspond to the data on the machine plate;
- check that all torch components are correctly mounted (refer to the torch manual);
- Do not turn the plasmatorch on oneself, since an unintentional arc ignition can cause severe burns.

- 1) Turn on the unit by activating the "ON-OFF" switch (pos. 9, picture 2).
- 2) Check that the light (pos. 9, picture 2) inside the "ON-OFF" switch is on. Verify that the green LED (pos. 2, picture 1) is on. All remaining LEDs must be off.
- 3) Check on the pressure gauge (pos. 1, picture 1) that air pressure is about 550 kPa (5,5 bar). If not, proceed as described in 7.3.
- 4) Adjust cutting current by turning the potentiometer (pos. 6, picture 1). Increasing current allows higher cutting speed or, at the same speed, a greater thickness can be cut.
- 5) Lean gently the torch spacer onto the piece (see picture 5) and push the torch trigger starting pilot arc ignition and air flow. Drive the torch inwards to begin cutting. During cutting the red LED is on. If not necessary, avoid keeping the pilot arc on, to prevent early electrode and tip wear.
- 6) Cut the workpiece paying attention that the melted metal run through the cut without backflow toward the torch. Otherwise reduce cutting speed.
- 7) End of cutting operation: the air flow continues for about a minute to cool the torch parts. Wait for air flow end before turning off the unit. During the torch cooling time it is possible, by pushing the torch trigger, to start again cutting.



## 8. Maintenance

Be careful: Always disconnect the equipment from the mains supply before making any inspection of the inner part of the equipment itself.

### 8.1 Spare parts

Genuine spare parts are designed especially for our machine. Non-performance and reduction of safety level may occur when not original spare parts are employed. We disclaim all responsibility for damages arising from the use of not original spare parts.

### 8.2 Power source

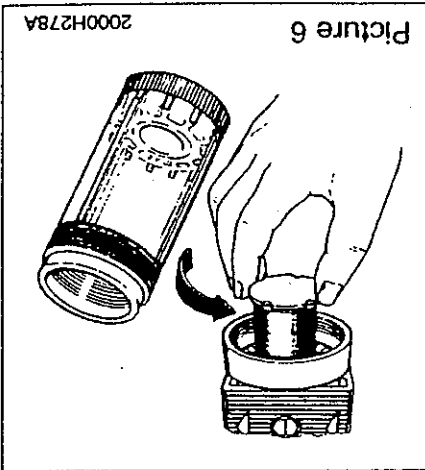
Since these machines are completely static, except for the sealed fan motor, the only maintenance operations to be done are:

- At regular intervals blow away dust and dirt from the inside of the equipment using compressed air. Do not turn the air jet on the electronic components since they could be damaged.

- At regular intervals check cables and connections. Worn out cables and poor connections cause overheating.

- Check that the air circuit is completely free from dirt and that all its connections are well tightened and without leaks. Pay particular attention to the solenoid valve.

- Although the air filter is provided with a device for automatic moisture expulsion, you should clean the inside of the filter unscrewing the shield of the centrifugal filter (see picture 6).



### 8.3 Plasmatorch

**CAUTION:** Always disconnect the power source from the mains supply before disassembling the torch.

- Avoid tight bends of the cable and do not use the torch to drag the machine along or as hammer to remove slag.
- Clean spatter from the torch head and gas nozzle by means of a wire brush to allow the correct gas flow.
- Replace the tip when its hole is worn.

## 9. Survey of possible troubles and remedies

- Replace the electrode when its hafnium core is completely worn out.
  - Replace nozzle spacer when its sliding shoes do not allow a smooth sliding on the workpiece or when the springiness decrease due to heat disallows a secure seat.
  - Check insulation and power cable connections. Connections must be electrically and mechanically in good condition.
- Refer to the torch instruction manual before maintenance.

The main supply is almost always the cause of problems. In case of trouble proceed as follows:

- 1) Check the line voltage value;
- 2) Check the correct connection of the mains cable to the plug and to the switch;
- 3) Check that the fuses are not blown or loose;
- 4) Check if any of the following components are faulty:
  - the wall switch feeding the machine;
  - the wall socket of the plug;
  - the machine main switch.

**Note:** Since any repair of the inverter in case of damage requires proper technical knowledge, we suggest you to contact qualified personnel or our technical service organisation, when malfunction is suspected.

### 9.1 Troubleshooting

The four diagnostic LEDs on the front panel allow usually to locate a malfunction. Examine the state of the four LEDs referring to the following table to draw the conclusion.

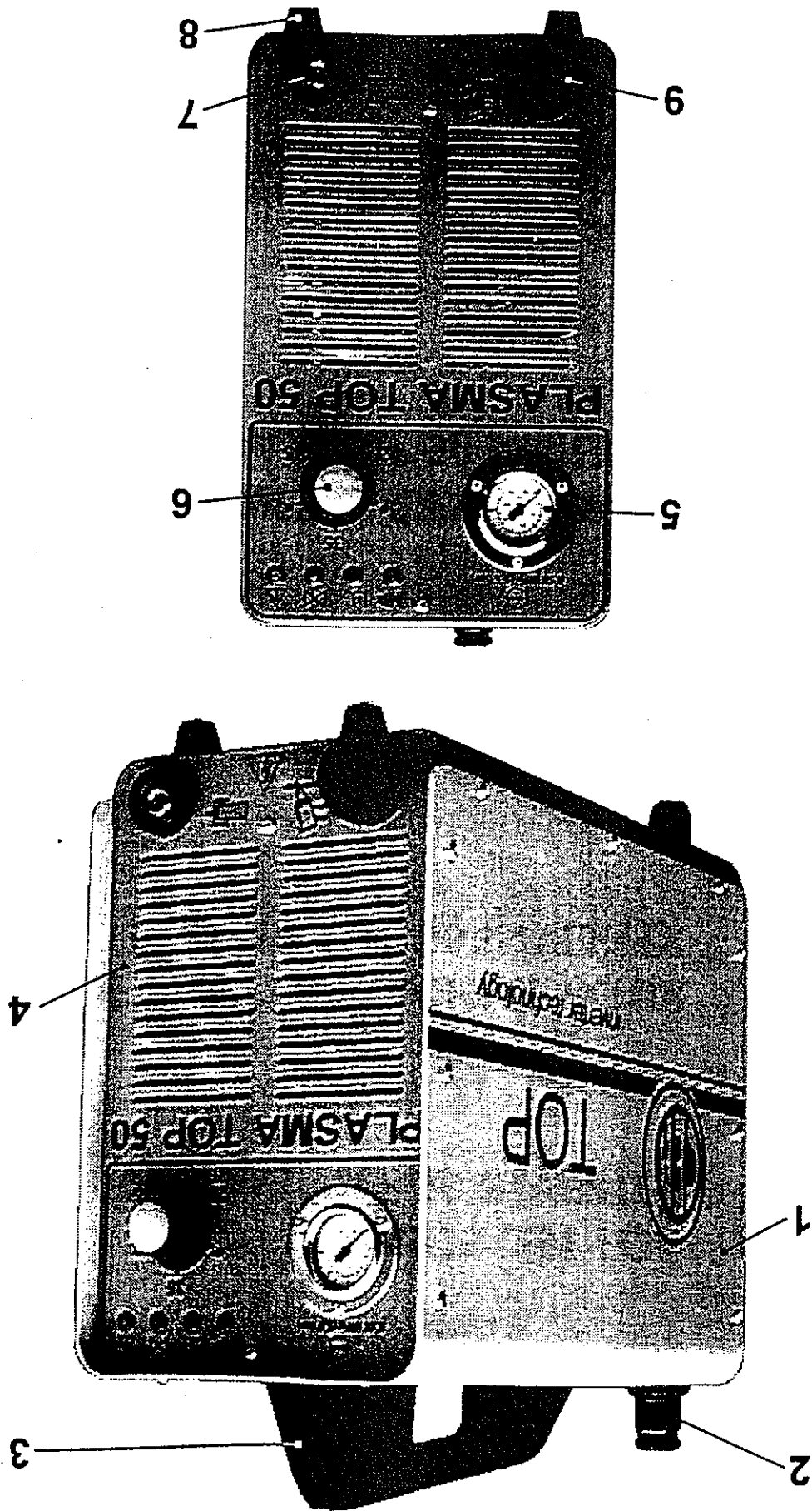
## Troubleshooting

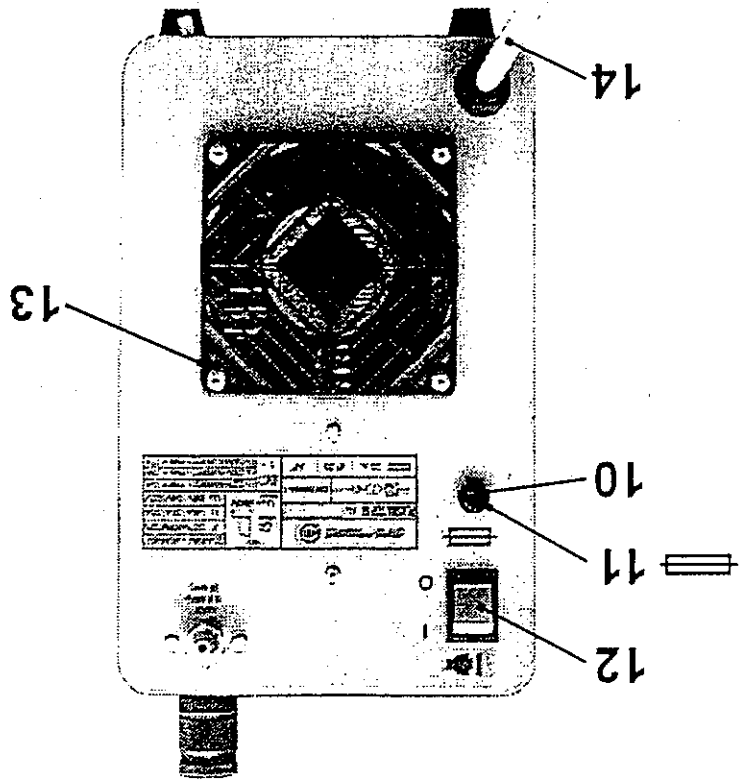
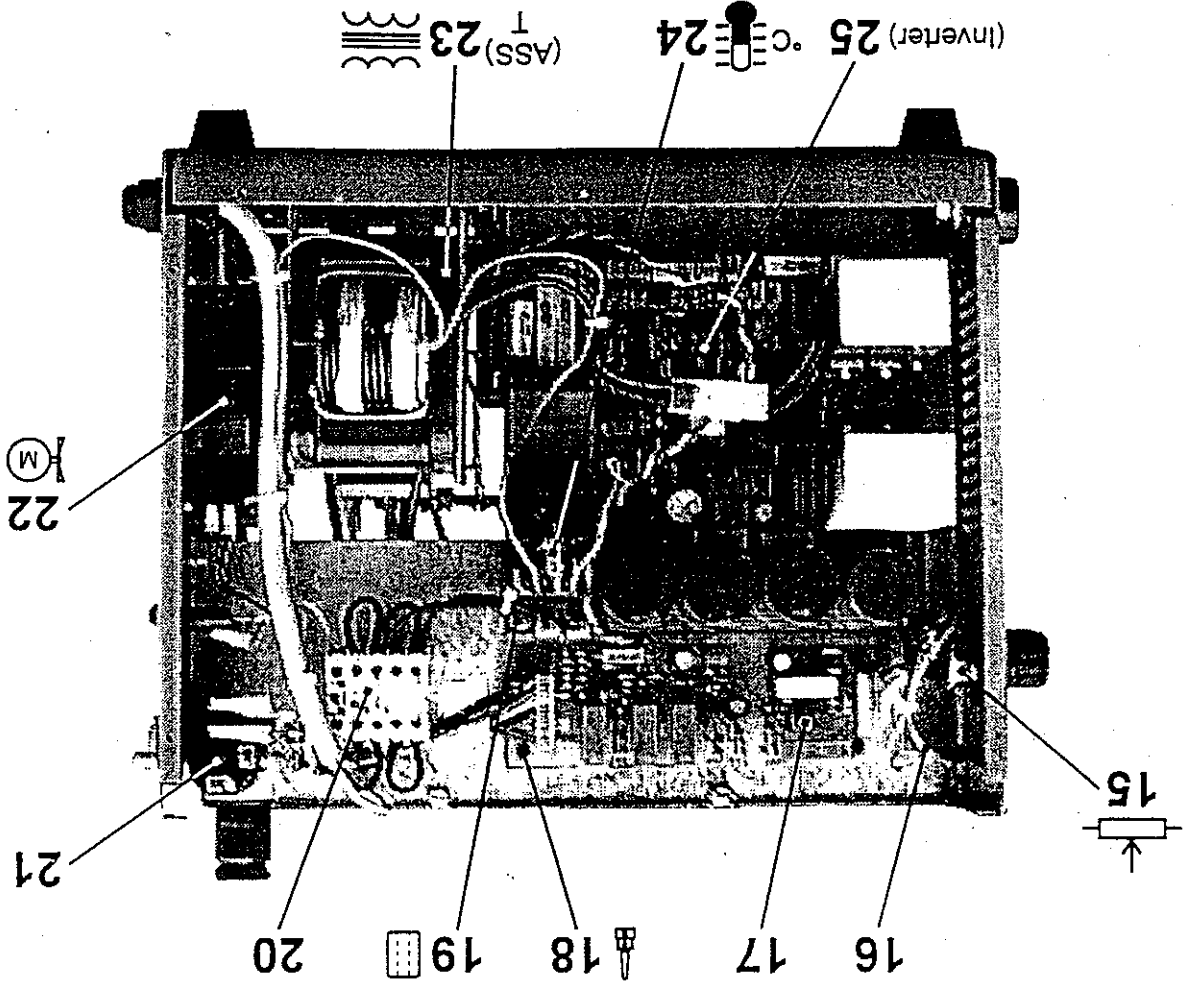
Trouble	Cause	Remedy
<ul style="list-style-type: none"> <li>• "ON-OFF" switch in ON position, but the light inside is off</li> </ul>	<ul style="list-style-type: none"> <li>• Wrong mains connection</li> <li>• Mains fuses blown or circuit breaker activated</li> </ul>	<ul style="list-style-type: none"> <li>• Check it and repair the possible damage</li> <li>• Replace or reset</li> </ul>
<ul style="list-style-type: none"> <li>• Green LED is off when the "ON-OFF" switch is in ON position</li> </ul>	<ul style="list-style-type: none"> <li>• Faulty LED</li> </ul>	<ul style="list-style-type: none"> <li>• Replace</li> </ul>
<ul style="list-style-type: none"> <li>• One of the following yellow LEDs is on</li> </ul>	<ul style="list-style-type: none"> <li>• The air pressure is less than 450 kPa (4,5 bar)</li> <li>• Faulty pressure switch</li> </ul>	<ul style="list-style-type: none"> <li>• Adjust air pressure</li> <li>• Replace</li> </ul>
<ul style="list-style-type: none"> <li>• Yellow LED signalling insufficient air pressure (pos. 4, picture 1) is on</li> <li>• Yellow LED signalling generic warning (pos. 5, picture 1) is on</li> </ul>	<ul style="list-style-type: none"> <li>• Activation of the thermal protection of primary INVERTER or main transformer</li> <li>• Activation of the electric safety device on the torch body</li> <li>• Activation of protection of pilot arc resistor</li> </ul>	<ul style="list-style-type: none"> <li>• Wait for automatic reset and then reduce duty cycle</li> <li>• Mount or tighten the torch nozzle</li> <li>• Replace electrode and tip</li> </ul>
<ul style="list-style-type: none"> <li>• No air flow by pressing the torch trigger</li> </ul>	<ul style="list-style-type: none"> <li>• Faulty electronic control card</li> <li>• Faulty solenoid valve</li> </ul>	<ul style="list-style-type: none"> <li>• Replace</li> <li>• Replace</li> </ul>
<ul style="list-style-type: none"> <li>• No pilot arc by pressing the torch trigger</li> </ul>	<ul style="list-style-type: none"> <li>• Faulty electronic control card (if the red LED is off)</li> <li>• Faulty INVERTER card</li> <li>• Torch tip and electrode worn</li> <li>• Interrupted pilot arc resistor</li> <li>• Faulty torch trigger</li> </ul>	<ul style="list-style-type: none"> <li>• Replace</li> <li>• Replace</li> <li>• Replace</li> <li>• Replace</li> <li>• Replace</li> </ul>
<ul style="list-style-type: none"> <li>• The arc extinguishes when it touches the workpiece</li> </ul>	<ul style="list-style-type: none"> <li>• No earth connection</li> </ul>	<ul style="list-style-type: none"> <li>• Connect the earth cable to the workpiece</li> </ul>
<ul style="list-style-type: none"> <li>• No cutting current regulation</li> </ul>	<ul style="list-style-type: none"> <li>• Faulty current adjusting potentiometer</li> <li>• Faulty INVERTER card</li> </ul>	<ul style="list-style-type: none"> <li>• Replace</li> <li>• Replace</li> </ul>

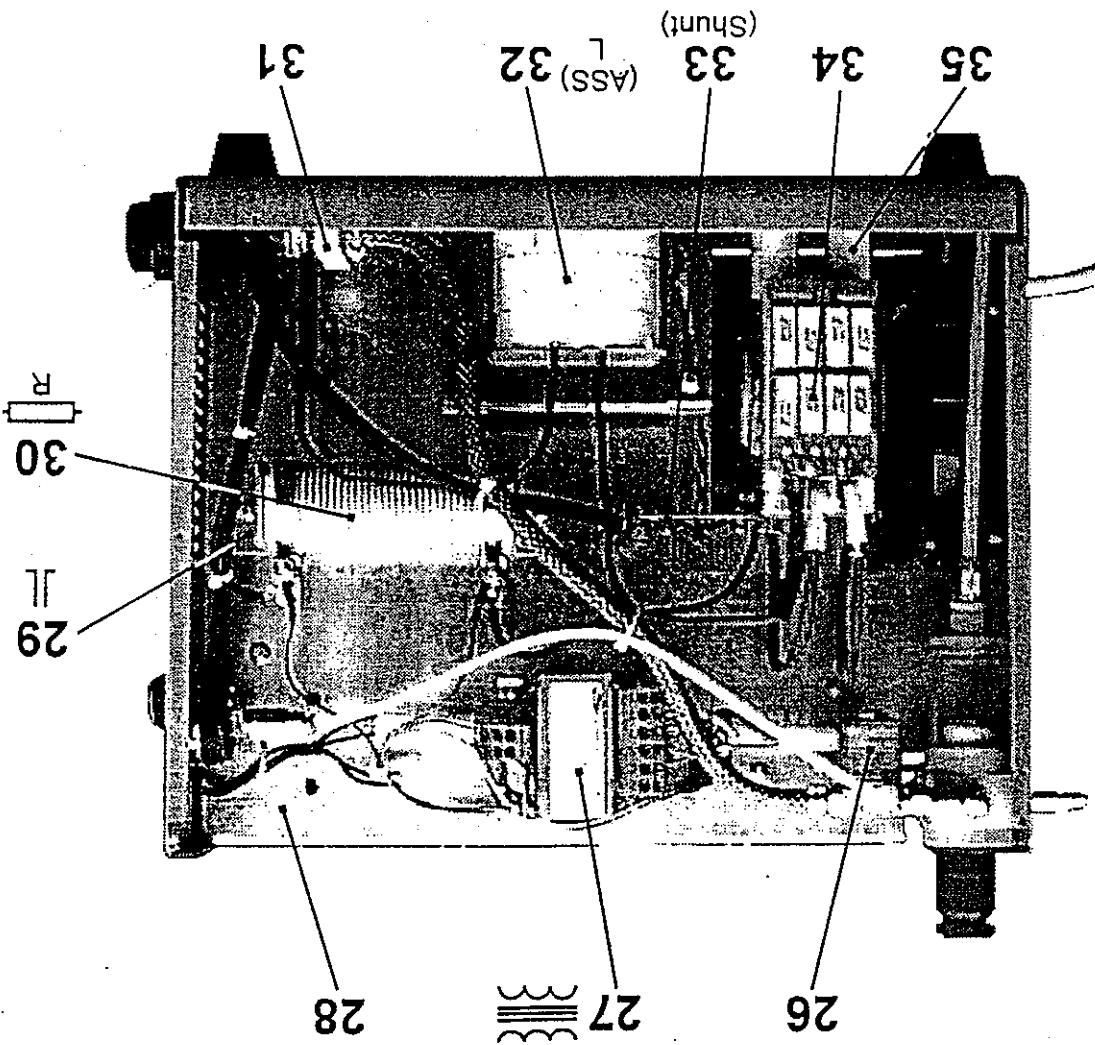
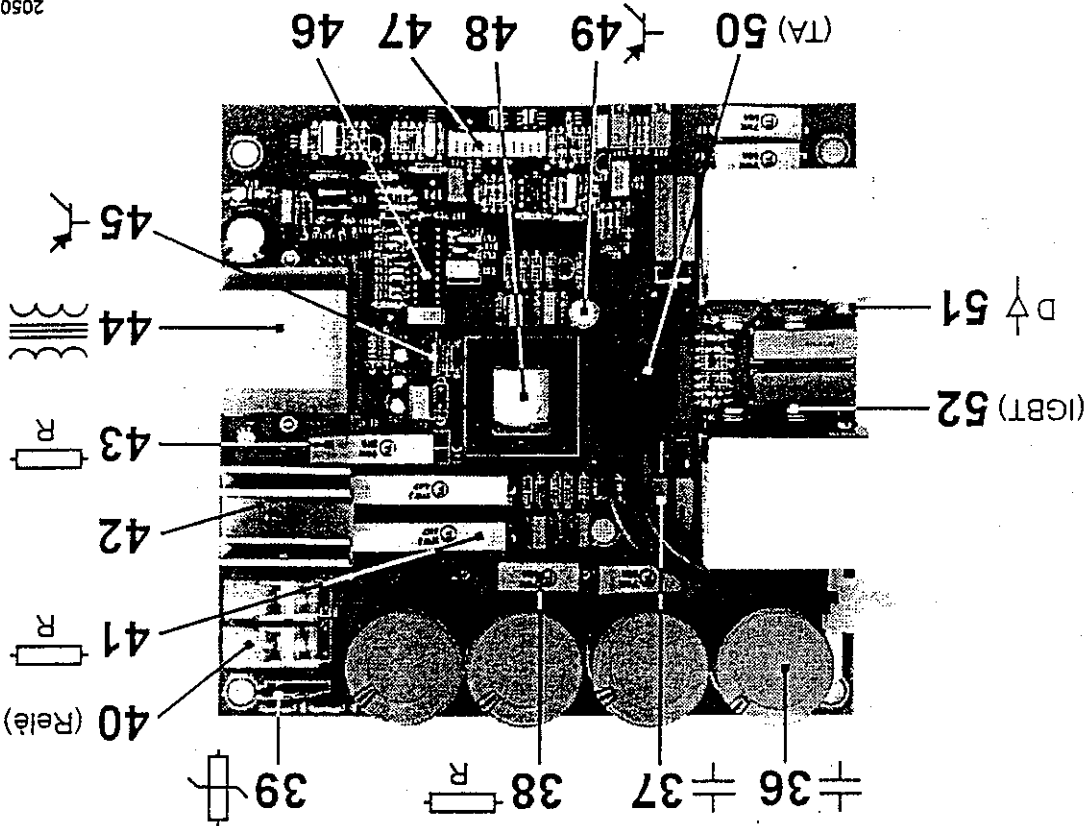
## 9.2 Common cutting troubles

Trouble	Cause	Remedy
Insufficient penetration	<ul style="list-style-type: none"> <li>• Cutting speed too high</li> <li>• Cutting current too low</li> <li>• Poor earth connection</li> </ul>	<ul style="list-style-type: none"> <li>• Decrease speed</li> <li>• Increase current</li> <li>• Check earth connection to the workpiece</li> </ul>
Cutting arc extinguishes	<ul style="list-style-type: none"> <li>• Cutting speed too low</li> <li>• Distance between torch and workpiece too long</li> </ul>	<ul style="list-style-type: none"> <li>• Increase speed</li> <li>• Shorten the spacer</li> <li>• Replace</li> </ul>
Heavy slagging	<ul style="list-style-type: none"> <li>• Erroneous air pressure</li> <li>• Cutting speed too low</li> <li>• Worn tip hole</li> <li>• Erroneous distance between torch and workpiece</li> </ul>	<ul style="list-style-type: none"> <li>• Adjust the reducer at correct</li> <li>• Increase speed</li> <li>• Replace torch tip</li> <li>• Shorten the spacer</li> </ul>
Overheated and blacked torch tip	<ul style="list-style-type: none"> <li>• Cutting current too high</li> <li>• Too short distance between torch tip and workpiece</li> <li>• Dirty air</li> <li>• Excessive electrode wear</li> </ul>	<ul style="list-style-type: none"> <li>• Decrease current</li> <li>• Increase distance</li> <li>• Clean air filter</li> <li>• Replace</li> </ul>
Intermittent or crackling pilot arc	<ul style="list-style-type: none"> <li>• Erroneous air pressure</li> <li>• Dirty, wet, oily air</li> <li>• Too low pilot arc current</li> </ul>	<ul style="list-style-type: none"> <li>• Adjust the reducer at correct</li> <li>• Clean air filter</li> <li>• Check pilot arc circuit in the power source</li> </ul>









Part. N°	Cod. N°	Part. N°	Cod. N°	Part. N°	Cod. N°
1	420558	19	424009	37	418779
2	432037	20	419947	38	457268
3	438172	21	453245	39	488296
4	405056A	22	486374	40	456764
5	438401	23	481553	41	457114
6	438865	24	478782	42	455500
7	403608	25	376732	43	457342
8	431333	26	425927	44	481938
9	236613	27	481738	45	286008
10	451740	28	443089	46	352501
11	428816	29	465746	47	419105
12	435363	30	457118	48	481939
13	454356	31	405881	49	286007
14	235961	32	240207	50	481937
15	453029	33	376502	51	423240
16	413836	34	241101	52	286006
17	376885	35	405880		
18	424010	36	418778		

# 1. Description

The main technical feature of this cutting compressed air plasmatorch are:

- arc striking without high frequency;
- pilot arc;
- safety system incorporated (microswitch).

# 2. Technical data

Air pressure	500 + 550 kPa (5 + 5,5 bar)
Air consumption	about 100 l / min
Cable length	6 m
Maximum cutting current	50 A, 60 %
Cutting arc voltage	100 V
Connection to the power source	CEA central adaptor

# 3. Working principle

The ignition of the pilot arc is provided by the contact between torch tip and electrode.

The operating sequence is the following:

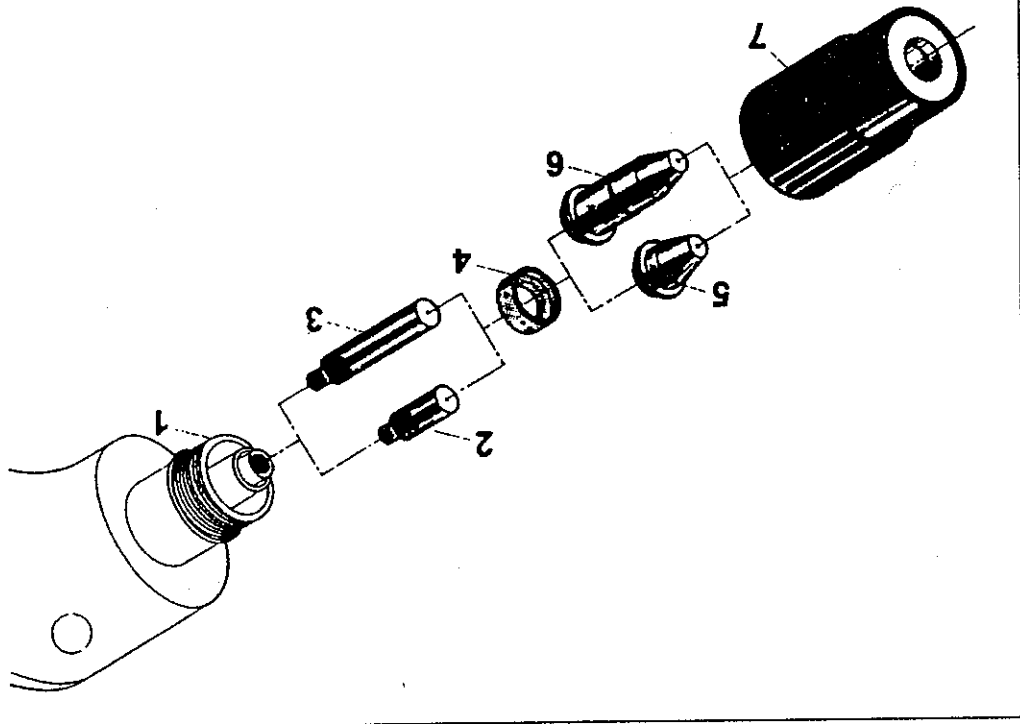
- By pushing the torch trigger, a current flows from the electrode to the torch tip. A sensor detects the current flow and gives immediately the signal for energising the compressed air solenoid valve.
- The electrode, thrust by the air flow, moves back from the torch tip so that the pilot arc ignition takes place.
- During the torch cooling time (about 1') it is possible, by pushing the torch trigger, to start again cutting. This is allowed by a device that stops for a short while air flow, so that electrode and torch tip make contact.

## Use of the plasmatorch

**CAUTION:** Always disconnect the power source from the mains supply before disassembling the torch.

Before starting cutting comply with the following prescriptions (see picture 1):

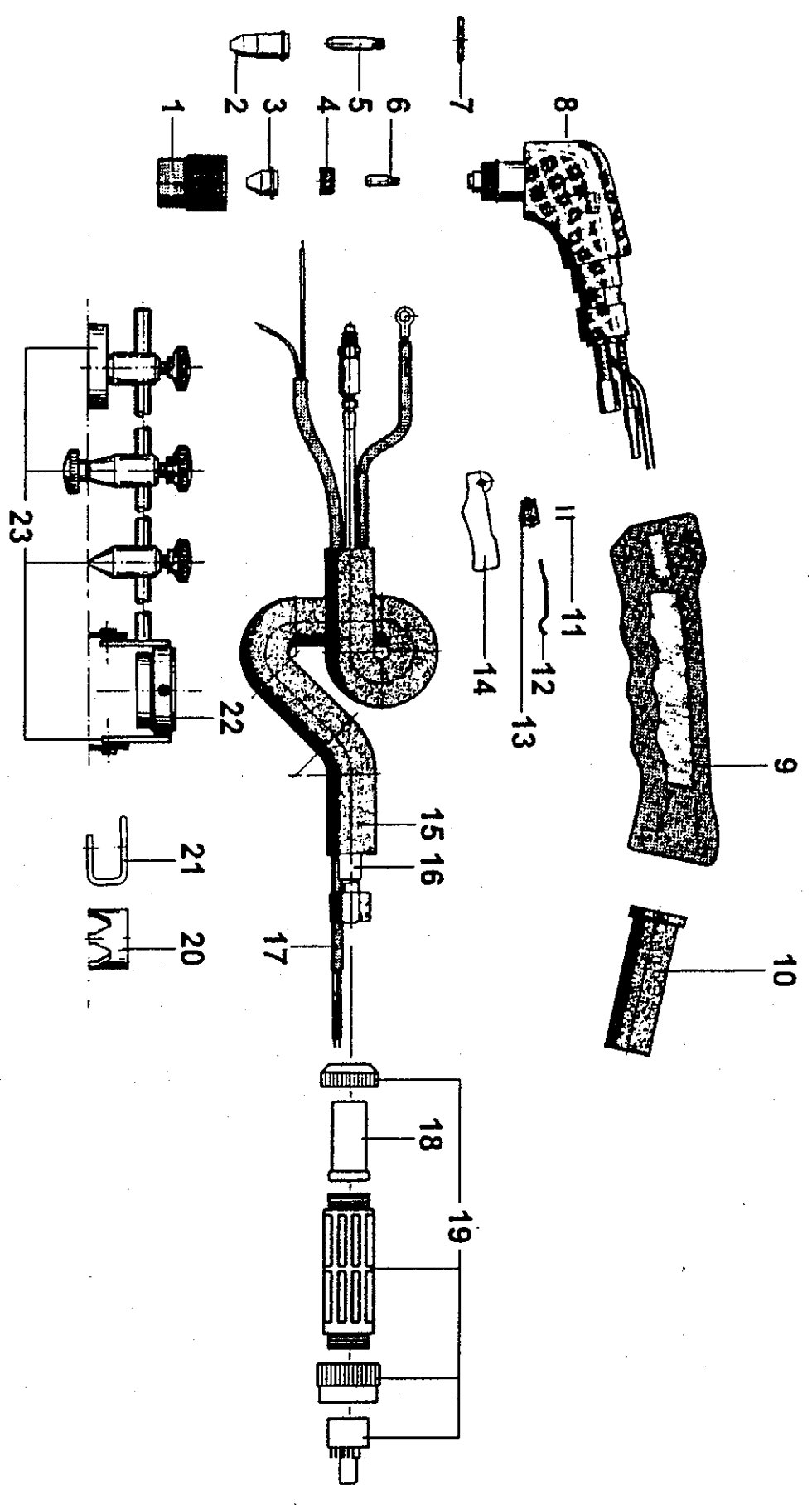
- Check the holes of the air diffuser (pos. 4) are free from dirt. The mounting sequence is shown in picture 1.
  - Use the plastic wrench to mount the electrode (pos. 2 - 3) avoiding excessive tightening. To remove the electrode wait for the air flow end.
  - Torch tip and electrode are in contact. After a certain number of arc strikings appears an oxydised area, which is the ground of ignition troubles. Check the surfaces, clean or, if necessary, replace them.
- The excessive wear of torch tip and electrode may result injurious to the torch body. Replace the electrode before the insert is entirely worn. Replace the tip when it shows a hole that is deformed or larger than the normal size.



Pict. 1

## Spare parts

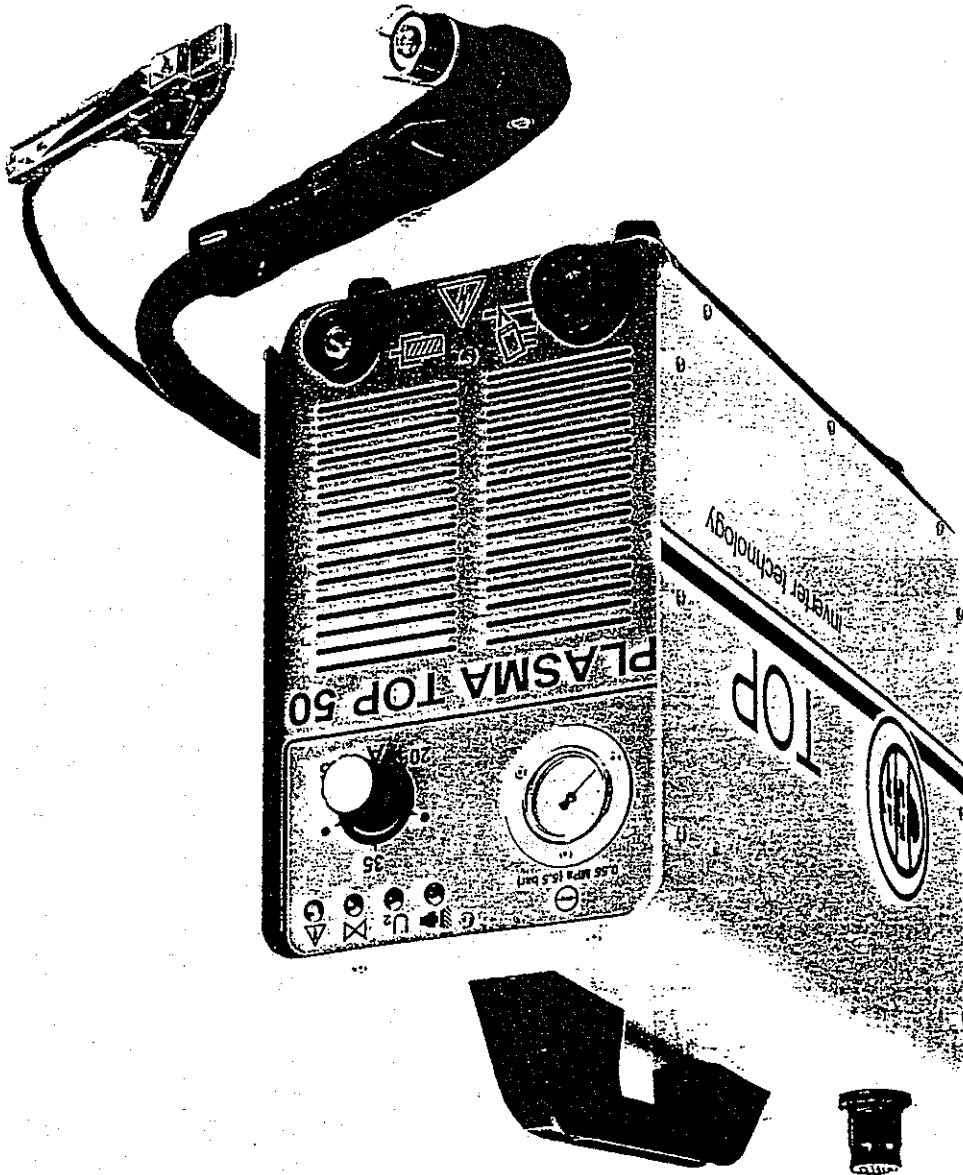
Genuine spare parts are designed especially for our machine. Non-performance and reduction of safety level may occur when not original spare parts are employed. We disclaim all responsibility for damages arising from the use of not original spare parts.



SPARE PARTS LIST

ISO 9001  
REGISTERED  
QUALITY SYSTEMS

TWO YEAR  
BUMPER-TO-BUMPER  
WARRANTY



PLASMA TOP 50  
INSTRUCTION MANUAL