

INSTRUCTION MANUAL FOR WIRE WELDING MACHINES

IMPORTANT:

READ THIS MANUAL CAREFULLY BEFORE INSTALLING, USING, OR SERVICING THE WELDING MACHINE, PAYING SPECIAL ATTENTION TO SAFETY RULES. CONTACT YOUR DISTRIBUTOR IF YOU DO NOT FULLY UNDERSTAND THESE INSTRUCTIONS.

1 INSTALLATION

This machine must be used for welding only. It must not be used to defrost pipes.

It is also essential to pay special attention to the chapter on SAFETY PRECAUTIONS.

The symbols next to certain paragraphs indicate points requiring extra attention, practical advice or simple information.

This manual must be stored carefully in a place familiar to everyone involved in using the machine. It must be consulted whenever doubts arise and be kept for the entire lifespan of the machine; it will also be used for ordering replacement parts.

2 DESCRIPTION OF THE MACHINE

- A) **Switch**
Turns the machine on and off.
- B) **Adjustment switches**
By means of these switches one adjusts the welding voltage.
- C) **Earth cable**
- D) **Yellow Lamp** 
Lights only when the thermostat is tripped and interrupts the machine operation.
- F) **Welding torch**
- G) **Setting knob**
This knob serves to adjust the welding wire speed.
- (H-I) **Sockets**
- (L) **Mode switch**

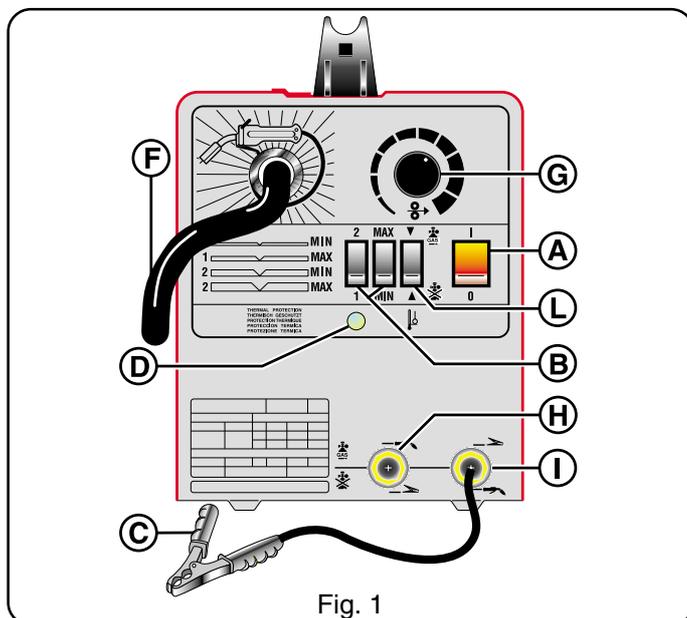


Fig. 1

3 GENERAL DESCRIPTIONS

3.1 SPECIFICATIONS

This welding machine allows welding of soft steel, stainless steel and aluminium.

3.2 RECOMMENDED WIRES

Ø 0,9 mm. flux cored wire
 Ø 0,6 copper coated mild steel
 Ø 0,8 copper coated mild steel
 Ø 0,6 mm. stainless steel
 Ø 0,8 mm. aluminium
 other wires with bigger or smaller diameters cannot be used for the following reasons:

- 1 - the wire feed roller is not available
- 2 - the machine is not suitable
- 3 - the contact tips are not available

3.3 WELDABLE THICKNESSES

With aluminium wire Ø 0,8 = 1 ÷ 3 mm

With copper coated mild steel wire (AR CO₂) Ø 0,6 = 0,6 ÷ 5 mm.

With copper coated mild steel wire Ø 0,8 = 1 ÷ 5 mm.

With stainless steel wire Ø 0,6 inox = 1 ÷ 3 mm.

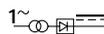
3.4 WELDABLE MATERIALS

With flux cored wire IRON
 With copper coated mild steel wire MILD STEEL
 With stainless steel wire (304 L) STAINLESS STEELS with same composition (18 Cr 8 Ni) which represents 90% of the steels which are used.
 With 0,8 Al wire (Mg.5) all materials with 3,5 ÷ 5% magnesium

3.5 EXPLANATION OF TECHNICAL SPECIFICATIONS

EN60974.1 The welding machine is built according to these international standards.

N° Serial number, which must always be indicated in any inquiry regarding the welding machine.

 Single-phase rectifier - transformer.

 External machine characteristic.

U₀ Secondary no-load voltage (peak value)

X The duty cycle expresses the percentage of 10 minutes during which the welding machine can run at a certain current without overheating. Example: X = 60% at I₂ = 100 A

This means that the machine can weld with a current I₂ = 100A for 6 out of 10 minutes, thus 60%.

I₂ Welding current

U₂ Secondary voltage with welding current I₂

- U₁** Rated power voltage.
1~ 50/60 Hz Single-phase 50-or 60-Hz power supply.
I₁ Current absorbed at the corresponding welding current I₂
IP21 Degree of housing protection.
 Grade one as the second digit means that this device is not suitable for use outdoors in the rain.
S Suitable for use in increased hazard areas.
I₂ Min/max Non-conventional welding current. These values represent the minimum and the maximum and the maximum current that one can obtain in welding.

N°		EN 60974.1		CE	
1~		A / V - A / V			
		X	%	%	%
	U ₀ PEAK V ÷ V	I ₂	A	A	A
		U ₂	V	V	V
1~50/60Hz	U ₁ V	I ₁	A	A	A
S	MADE IN ITALY		IP 21		
I₂ min. A - max. A					

NOTE: The welding machine has also been designed for use in environments with grade 3 pollution (see IEC 664)

3.6 DESCRIPTION OF PROTECTION

This device is protected by a normally closed thermostat on the power transformer.
 When the thermostat is tripped the machine stops welding, while the motor-driven fan continues to run and the yellow lamp lights.
 After it has been tripped, wait a few minutes to allow the generator to cool down.

4 STARTUP AND MILD STEEL WELDING WITH OUT GAS

The machine must be installed by skilled personnel. All connections must be made in compliance with current regulations and in full respect of safety laws (see standards CEI 26-10 and CENELEC HD 427).

preparing the welding mask
 Prepare the mask (with CE approval marking) using colored glass (adiactinic) and clear protective glass as shown in fig. 2:
 - mount the protective glass (with CE marking) in the case provided, in the following order:

- 1 - the transparent glass **A** on the outside.
- 2 - the colored glass (non-actinic) **B**, which must have a level of protection of:
 DIN 10 if used with welding currents of up to 80 A,
 DIN 11 if used with welding currents of up to 175 A,
 - tighten the screw;
 - install the mask handle.
 Some masks have supplementary appendices **C** to increase

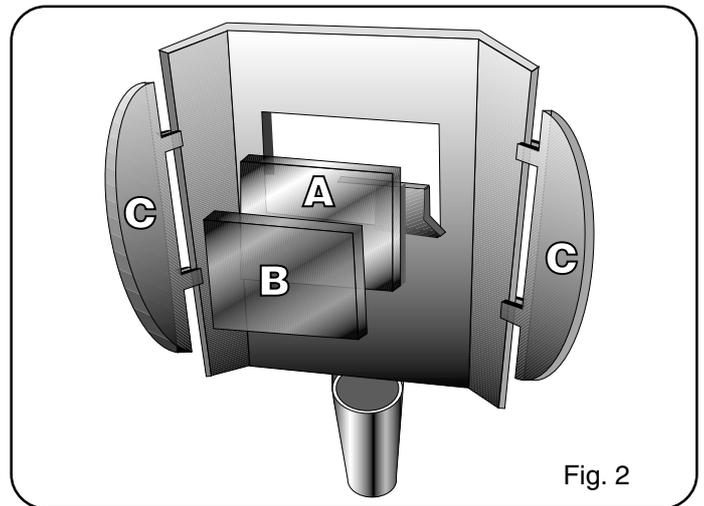


Fig. 2

the protection surface.
 Remove the movable cover (1)
 Take the belts (20) supplied as equipment away from the coil area and insert them in the special seats.
 Prepare the mask as shown in Fig.2.
 Draw out the wire stump present in the torch which served for the machine test.
 Remove the wire sheathing.
 Take the wire away from the coil outlet and cut a necessary length in order to have its end straight, insert the wire in the inlet (R) and let it pass over the driving shaft (S) and insert it in the sheath (T) for at least 50/60 cm.
 Lower the wire holder group (U) taking care that the wire is remained inside the spline (groove) of the shaft.(fig. 3)

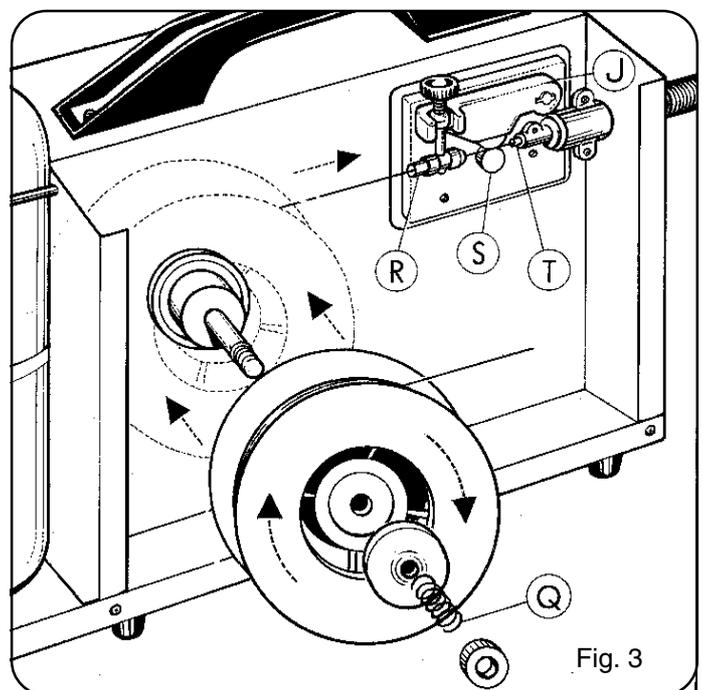
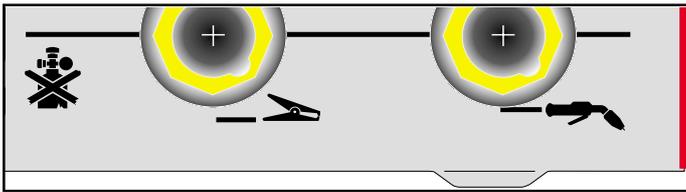


Fig. 3

Verify that the line voltage corresponds to the one indicated on the data plate of the welding machine, and then connect the supply wire to the socket (PROVIDED WITH AN EFFICIENT EARTH PLATE).
 Remove the nozzle (41), unscrew the current nozzle (42)
 Position switches (B) on 1 MIN.
 Position the switch (A) on ON.

VERIFY THAT MOVABLE TORCH AND EARTH PLUGS (H - I) ARE POSITIONED ACCORDING TO THE SYMBOLS ON THE WELDING MACHINE.



Keep the torch sheath tight and without bendings. Press the torch pushbutton till the wire is gone out for some cm. of the lance. Connect the earth clamp 38 to the part to be welded. The welding circuit must not be deliberately placed in direct or indirect contact with the protection wire except in the workpiece.

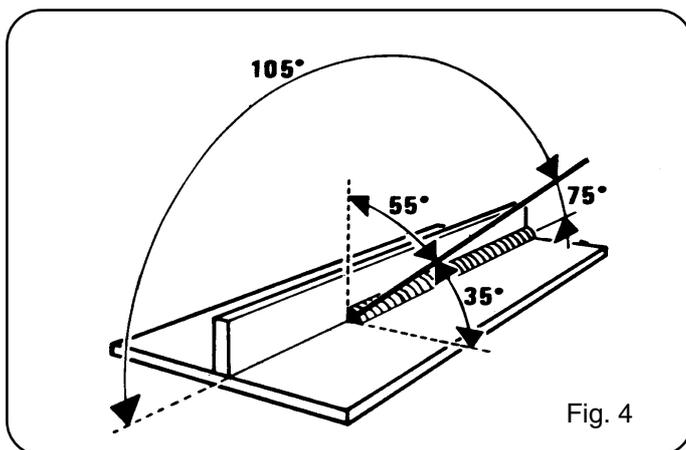
If the workpiece is deliberately grounded using the protection wire, the connection must be as direct as possible, using a wire at least as large as the welding current return wire, and connected to the workpiece at the same point as the return wire, using the return wire clamp or a second grounding clamp placed next to it.

Welding wire can cause puncture wounds.

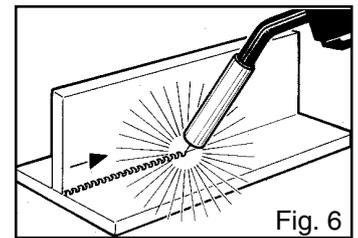
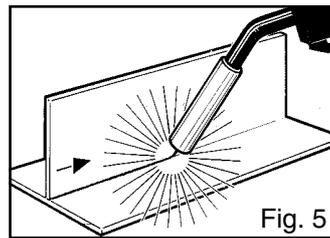
Never aim the torch at parts of the body, other people or metals when loading the welding wire. Screw the contact tip 42 back on, making sure that the hole diameter corresponds to the wire used. Slide the tapered gas welding tip 41 on, always turning clockwise.

4.1 THE MACHINE IS READY FOR WELDING

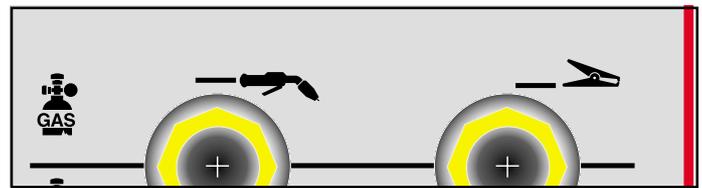
Position the mode switch (L) on . Select the weldinf position through switches (B), according to the thickness to be welded and following the indications shown on the panel. Bring the torch near to the welding point. Wear the mask (prepared as in fig.2to shield your eyes. Insert the welding arc by pressing completely the lever (39) of the torch. For a greater arc stability, keep the torch as nearest as possible to the piece to be welded and adjust the right wire speed through the knob (G) till the arc noise becomes continuous, regular and constant. With a too high speed the wire tends to beat on the piece with energy by making the torch reboung, with a too slow speed the wire fuses and moves away from the piece to be welded or the arc does not remain lit.



AT THE END OF EACH WELDING, REMOVE THE SLAG. For a perfect welding you must position as shown in fig. 4. For small thicknesses act as shown in fig. 5 and for greater thicknesses as follow indications of fig. 6.

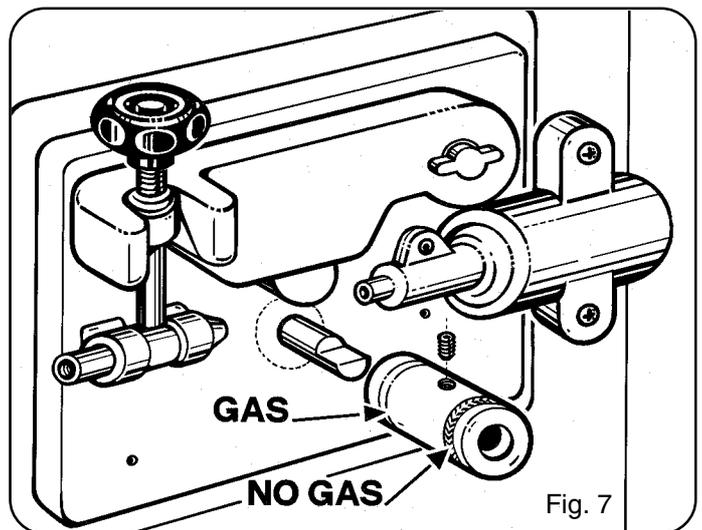


N.B.: WELDING WITH CORED WIRE DOES NOT NEED GAS SHIELDING. WITH THIS SPECIAL WIRE YOU CAN WELD ONLY MILD STEEL. FOR ALUMINIUM AND STAINLESS STEEL SEE PARAGRAPH WELDING WITH GAS.



5 MILD STEEL WELDING WITH GAS

POSITION MOVABLE TORCH AND EARTH PLUGS ACCORDING TO SYMBOLS. WITH THE SPECIAL SET SCREW WRENCH REMOVE THE SECURITY DOWEL BLOCKING THE WIRE TOWING ROLL ON THE DRIVING SHAFT. POSITION IT IN SUCH A WAY THAT THE NOT KNURLED GROOVE IS IN CORRESPONDENCE WITH THE WIRE GUIDE SHEATH. RE-BLOCK THE ROLL ON SHAFT THROUGH SECURITY DOWEL (FIG. 7).



Connect the cylinder to the belts (20) previously positioned. Non utilizzare bombole di altezza superiore ai 500 mm. Assemble the pressure reducer to the cylinder following the instructions shown in paragraph "Instructions for use for different types of cylinders". Insert a Ø 0,6 or Ø 0,8 steel wire reel in the coil support (U) for gas welding. POSITION THE DEVIATORE DI MODO ON and than act as refered in paragraph "Mild steel welding without gas".

N.B.: IT IS NECESSARY FOR THIS WELDING TO ASSEMBLE A CURRENT NOZZLE (42) WITH THE SAME DIAMETER OF THE USED WIRE THAT IS Ø 0,6 OR Ø 0,8 AND Ø 1 FOR ALUMINIUM WELDING.

To weld mild steel you can use a mixture with Argon (75%) + CO₂ (25%) or CO₂ (100%).

6 STAINLESS STEEL WELDING

The welding must be prepared as described in paragraph "Mild steel welding with gas" using the following equipment:
 — Cylinder containing mixture of Argon (75%) + CO₂ (25%)
 — Stainless steel wire coil.

The torch inclination and the welding direction advised are shown in fig. 4.

For welding in need of special corrosion strength, use an Argon (98%) and CO₂ (2%) gas mixture..

7 ALUMINIUM WELDING

The welding machine must be prepared as described in paragraph "Mild steel welding with gas" using the following equipment:

- Cylinder containing Argon (100%)
- Ø 0,8 aluminium wire coil
- Contact tip Ø 1 mm.

The torch inclination and the welding direction are shown in fig. 4.

8 RIVET WELDING

Damaged body panels which are only accessible from one side, are often repaired by spot-welding a pin (or rivet) to the panel prior to dent-pulling and straightening.

The welding machine you have purchased can be used for rivet spot-welding using the special optional nozzle.

Prepare the machine for "Mild steel welding" and replace the standard nozzle with the nozzle for rivets, act as follows:

- insert the rivet in the special tube ensuring that the wire does not touch the rivet.
- select the welding current using the front panel switches and visual sheet thickness indicators.
- press the torch lever for as long as it is necessary to complete the spot-weld.

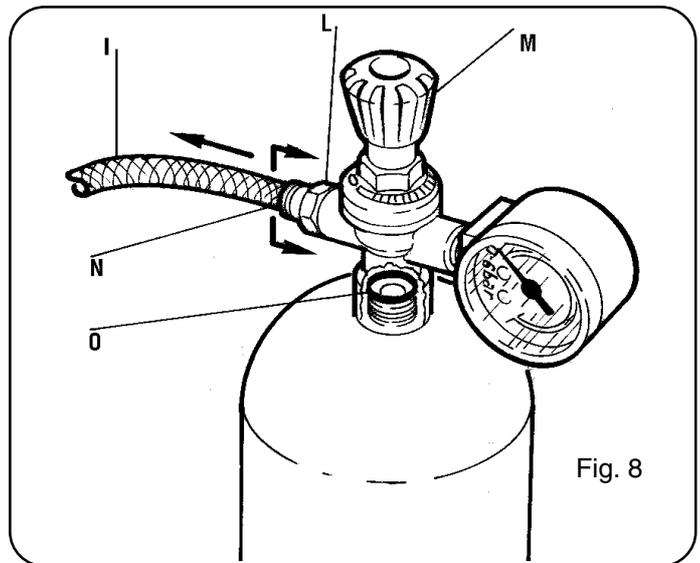
N.B.: Before starting the work and assembling the rivet nozzle, we advise you to carry out a short bead in order to correctly adjust the wire speed.

9 INSTRUCTION FOR USE OF DIFFERENT TYPES OF CYLINDERS

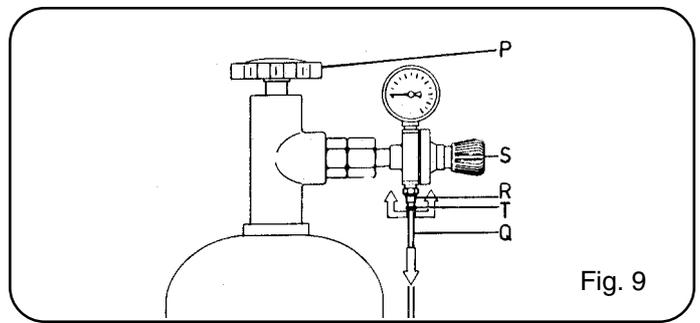
9.1 DISPOSABLE CYLINDERS (see fig.8)

Screw the cylinder to the gas regulator (hand-tight only). Insert the gas hose (I) completely into the valve (L) of the gas regulator. Press the torch lever and adjust the pressure to 2 litres/min. by turning knob (M). In ventilated area it is better to increase pressure to 3-4 litres/min. To replace the cylinder when empty, squeeze the gas hose (N) and pull from the valve (L), unscrew the cylinder from the gas regulator and replace.

N.B.: Check periodically the condition of the o-ring (O), and if necessary, replace it with a spare contained in the accessory kit.



IMPORTANT!!! Disposable cylinders cannot be refilled and must be disposed of safely.



9.2 REFILLABLE CYLINDERS (see fig.9)

Screw the gas regulator to the cylinder and tighten using the correct cylinder spanner to avoid possible gas leaks.

Open the cylinder valve (P).

Insert completely the gas hose (Q) into the valve (R).

If the gas hose is not long enough ask your supplier for an extension kit. Press the torch lever and adjust the rate of gas flow to 2 litres/min. using the pressure adjustment knob (S).

N.B.: it is normal for the gauge pressure to increase when the torch lever is released. The gas rate must be adjusted when the gas comes out from the torch, i.e. when the torch lever is pressed.

In order to avoid unnecessary strain to the gas regulator, it is important to unscrew knob (S) completely, before opening the cylinder valve.

In order to remove the gas hose from the valve (R) squeeze the ring (T) and remove the hose.

To save gas consumption it is possible, particularly with low welding currents, to lower the rate of flow to less than 2 litres/min. provided that the arc is sufficiently protected by gas to prevent porosity in the weld.

When you have finished welding don't forget to switch off the machine at the mains and turn off the gas at the cylinder.

10 MAINTENANCE AND USEFUL ADVICES

ATTENTION: before removing any panels, switch off the machine at the mains.

Do not bring the torch near to the face to check gas and wire.

To save energy, switch off the machine after use.
 Always turn off the gas after use.
 The welding machine is fitted with a thermal cut-out device.
 In the event of the cut-out device intervening, you will need to wait for at least ten minutes to allow the transformer inside the machine to cool down.
 Replacement or extensions to the mains lead must be of the same cross-section as the original lead.
IF IN DOUBT CONSULT A QUALIFIED ELECTRICIAN.
 Cut the wire with tools that do not bend it.
 During welding, small deposits of molten metal or spatter are left on the inside of the welding nozzle. This should be removed on a regular basis.
 Check periodically that the hole in the contact tip has not widened excessively.
 Inside the torch there is a wire-guide liner which must be cleaned periodically to avoid blockage by copper dust from the wire. This can be done by blowing a jet of dry, clean compressed air down the liner.
 Avoid damage to the torch through unnecessary strain or coiling whilst in use; periodically check the electrical and gas connections.

11 WELDING PROBLEMS

11.1 ALUMINIUM

WELDING DOES NOT FUSE OR FORMS INTO SMALL GLOBULES ON THE MATERIAL.

- 1) The gas is not PURE ARGON
- 2) The settings on the machine are incorrect
- 3) The position of the torch cable on the machine is wrong (polarity)
- 4) The material to be welded does not have the same composition as the wire
- 5) The material is too thick

11.2 STAINLESS STEEL

THE WELD IS DARK. THIS IS NORMAL. SUITABLE DEOXIDIZERS CAN BE BOUGHT TO SOLVE THIS PROBLEM. THE WELD BEAD PILES UP, FORMS SMALL GLOBULES OR DOES NOT FUSE ON THE MATERIAL.

- 1) The gas is not suitable. Consult your gas supplier.
DO NOT USE CO₂.
 - 2) THE MATERIAL TO BE WELDED DOES NOT HAVE THE SAME COMPOSITION AS THE WIRE.
 - 3) The material to be welded is too thick.
 - 4) The position of the torch cable on the machine is wrong (polarity)
- THE MATERIAL TO BE WELDED WRITHES ITSELF DURING THE WELDING PROCESS.

This is normal for the welding process of these types of steels.

11.3 WELDING WITH GAS - COPPER COATED MILD STEEL WIRE

THE WELD BEAD PILES UP. FORMS SMALL GLOBULES AND PRODUCES EXCESSIVE SPARKS OR SPATTERS:

- 1) The position of the torch cable on the machine is wrong (polarity)
- 2) The speed adjustment of the wire is too high or the power is too low.

N.B.: If you use CO₂ as a shielding gas there is a significant increase in spatter during welding. This is normal.

11.4 POROUS WELD

THIS DEFECT IS COMMON TO ALL COPPER COATED MILD STEEL WIRES AND IS DUE TO THE LACK OF GAS.

11.5 WELDING WITHOUT GAS - FLUX CORED WIRE WELD MATERIAL DOES NOT SET. POROUS WELD:

- 1) The position of the torch cable on the machine is wrong (polarity)
- 2) The wire preceded the weld bead when the welding has been carried out.
- 3) The material to be welded is not suitable to be welded with that wire

N.B.: THIS WIRE CAN BE COMPARED TO A BASIC ELECTRODE.

N.B.: BEFORE WELDING WITH ANY WIRE AND ON ANY MATERIAL REMOVE OILS, GREASES, SUPERFICIAL TREATMENTS (ZINCPLATING-GALVANISATIONS, SILKINGS AND SO ON ...). THESE ELEMENTS MAY CAUSE POROSITY - CONTAMINATION AND SUBSEQUENT DEFECT IN THE WELD BEAD.

12 PROBLEMS WITH THE MACHINE

12.1 THE WIRE MOVES FORWARDS IN JERKS

- 1) The contact tip is the wrong size
- 2) The contact tip hole is worn out
- 3) Wire reel is not well wound
- 4) Ovalized roller (not round)
- 5) Knotted torch
- 6) Wire speed too low or too high
- 7) Wire pressing unit too tight

12.2 THE TORCH LEVER ACTIVATES BUT THE WIRE DOES NOT FEED.

- 1) The wire is tangled on the reel
- 2) A wire of the wire feed motor is loose
- 3) Contacts inside the torch are oxidized
- 4) Wire clamped too tightly

12.3 THE TORCH LEVER DOES NOT ACTIVATES AND THE WIRE DOES NOT FEED.

- 1) A wire inside the torch is loose
- 2) Contacts inside the torch are oxidized
- 3) A wire inside the machine is loose
- 4) Defective circuit board

12.4 THE MACHINE IS WELDING OR HAS WELDED FOR A LONG TIME AND STOPS

THE THERMOSTAT HAS BEEN ACTIVATED. THAT IS NORMAL. WAIT 10 MINUTES APPROX. AND THE MACHINE WILL START WORKING AGAIN.

WHEN THE TORCH LEVER IS PRESSED THE WIRE FEED MOTOR IDLES BUT WHEN THE WIRE CLAMPING DEVICE IS TIGHTENED THE WIRE FEED MOTOR STOPS.

CONTACTS INSIDE THE TORCH ARE OXIDISED.

13 OPTIONAL

Upon request the wheel kit for the assembly can be supplied - see fig. 10

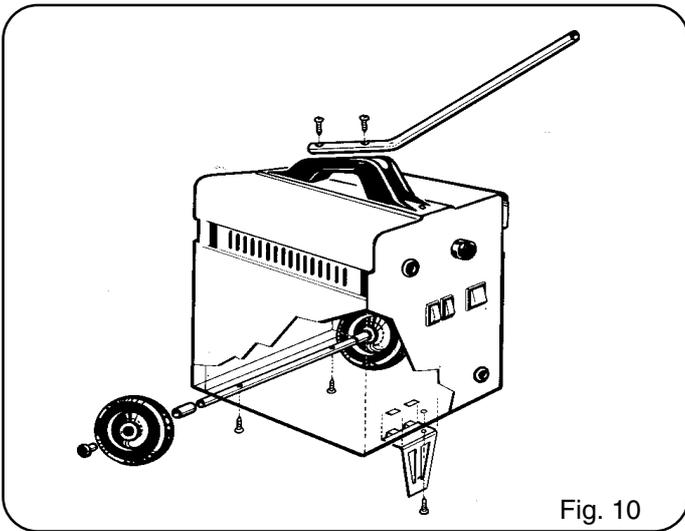


Fig. 10

14 REPAIRING THE WELDING MACHINE

Experience has shown that many accidents are caused by repairs performed incorrectly. That is why it is just as important to check a repaired welding machine carefully and completely as it is for a new welding machine.

In addition, this protects the manufacturer from being held liable for defects when the true fault lies elsewhere.

14.1 INSTRUCTIONS FOR PERFORMING REPAIRS

- After rewinding the transformer or inductance, the welding machine must pass the applied voltage tests as indicated in table 2 of paragraph 6.1.3 of the standard EN 60974.1 (CEI 26.13). Compliance must be verified as specified in 6.1.3.
- If no rewinding has been done, a welding machine that has been cleaned and/or revised must pass an applied voltage test with test voltage values equal to 50% of the values given in table 2 of paragraph 6.1.3. Compliance must be verified as specified in 6.1.3.
- After rewinding and/or replacing parts, the no-load voltage must not exceed the values given in paragraph 10.1 of EN 60974.1.
- If the repairs have not been performed by the manufacturer, repaired welding machines in which some components have been replaced or altered must be marked in such a way that the person who performed the repairs is clearly identifiable.
- After making repairs, take care to re-order the wiring so that there is certain insulation between the primary side and the secondary side of the machine. Prevent the wires from coming into contact with moving parts or parts that heat up during operation. Replace all clamps as on the original machine to prevent a connection from occurring between the primary and secondary side if a conductor accidentally breaks or disconnects.

15 TROUBLESHOOTING GUIDE

TROUBLE	PROBABLE CAUSE	REMEDY
The welding machine supplies limited current	Line fuse blown	Replace line fuse
	Burnt out diode or diodes	Replace
	Burnt out electronic board	Replace
	Loosened torch or earth connections or any other electrical power connections.	Tighten all connections
Welding with a lot of metal spatter	Voltage adjustment switch has a loose contact	Replace the switch
	Improper adjustment of welding parameters	Select the correct parameters through the welding-voltage switch and the wire speed adjustment potentiometer
	Insufficient grounding	Check grounding connections
The wire jams or entangles between the drive rolls and the torch infeed wire guide	Contact tip with wrong diameter	Replace
	Misalignment of the drive roll groove	Realign
	Obstructed or clogged liner	Remove and clean
No wire feed or irregular wire feed	Drive roll with too large a groove	Replace the drive roll
	Obstructed or clogged liner	Remove and clean
	Wire holding roller not completely tightened	Tighten all the way
	Clogged contact tip	Replace
Porosity in the welding seam	Insufficient shielding gas	Increase gas delivery
	Excess oxidation of the edges to be welded	Thoroughly clean the edges with a metal brush
	Gas nozzle partially or completely clogged by spatter	Remove and clean or replace being careful not to clog the gas outlets

16 SAFETY PRECAUTIONS

16.1 FIRE



- Avoid causing fire because of sparks, slag, hot metal or pieces.
- Make sure that suitable fire-fighting equipment is available close to welding area.
- Remove all flammable and combustible material from the welding area and its surrounding (32 ft minimum).
- Do not weld containers of combustible or flammable material, even when empty. These must be carefully cleaned before being welded.
- Allow the welded material to cool down before touching it or putting it in contact with combustible or flammable material.
- Do not weld parts with hollow spaces, containing flammables.
- Do not work under conditions with high concentrations of combustible vapours, gases, or flammable dust.
- Always check the work area half an hour after welding so as to make sure that no fire has started.
- Do not keep any combustible material such as lighters or matches in your pockets.

16.2 BURNS

- Wear fire-proof clothing all over your body in order to protect your skin against burns caused by ultraviolet radiation given off by the arc, and from weld metal sparks and slag.

- Wear protective clothing-gauntlet gloves designed for use in welding, hat and high safety-toe shoes. Button shirt collar and pocket flaps, and wear cuff-less trousers to avoid entry of sparks and slag.
- Wear helmet with safety goggles and glasses with side shields underneath, appropriate filter lenses or plates (protected by clear cover glass). This is a MUST for welding to protect the eyes from radiant energy and flying metal. Replace cover glass when broken, pitted, or spattered.
- Avoid oil or greasy clothing. A spark may ignite them. Hot metal such as electrode stubs and workpieces should never be handled without gloves.
- First-aid facilities and a qualified first-aid person should be available for each shift unless medical facilities are close by for immediate treatment of flash burns of the eyes and skin burns.
- Ear plugs should be worn when working on overhead or in a confined space. A hard hat should be worn when others work overhead.
- Flammable hair preparations should not be used by persons intending to weld or cut.

16.3 FUMES

 Welding operations give off harmful fumes and metal dusts which may be hazardous to your health, therefore:

- Work in a well-ventilated area.
 - Keep your head out of fumes.
 - In closed areas, use suitable exhaust fans.
 - If ventilation is not enough, use breathing sets approved for this procedure.
 - Clean the material to be welded of any solvents or halogen degreasers giving rise to toxic gases. Some chlorine solvents may decompose with the radiation emitted by the arc, and create phosgene gas.
 - Do not weld plated metals or those containing lead, graphite, cadmium, zinc, chrome, mercury or beryllium, unless you have the proper breathing set.
 - The electric arc creates ozone. A long exposure to high concentrations may cause headaches, nasal, throat and eye irritation as well as serious congestions and chest pains.
- IMPORTANT: DO NOT USE OXYGEN FOR VENTILATION.**
- Gas leaks in a confined space should be avoided. Leaked gas in large quantities can change oxygen concentration dangerously. Do not bring gas cylinders into a confined space.
 - DO NOT WELD where solvent vapors can be drawn into the welding atmosphere or where the radiant energy can penetrate to atmospheres containing even minute amounts of trichloroethylene or perchloroethylene.

16.4 EXPLOSIONS

 Do not weld above or near containers under pressure.

- Do not weld in environments containing explosive dusts, gases or vapours.
- This welding machine uses inert gases such as CO₂, ARGON, or a mixture of ARGON + CO₂ for the protection of the arc, thus you should take special precautions:

A) CYLINDERS

- Do not directly connect cylinder to the machine gas hose without a pressure regulator.
- Handle or use pressure cylinders in conformity with the

existing rules.

- Do not use leaking or damaged cylinders.
- Do not use cylinders which are not well secured.
- Do not carry cylinders without the protection of the installed valve.
- Do not use cylinders whose content has not been clearly identified.
- Never lubricate cylinder valves with oil or grease.
- Do not put the cylinder in electrical contact with the arc.
- Do not expose cylinders to excessive heat, sparks, molten slags or flame.
- Do not tamper with the cylinder valves.
- Do not try to loosen tight valves by means of hammers, keys, or any other object.
- NEVER DEFACE or alter name, number, or other markings on a cylinder. It is illegal and hazardous.
- Do not lift cylinders off the ground by their valves or caps, or by chains, slings or magnets.
- Never try to mix any gases in a cylinder.
- Never refill any cylinder.
- Cylinder fittings should never be modified or exchanged.

B) GAS REGULATORS

- Keep gas regulators in good condition. Damaged regulators may cause damages or accidents, they should only be repaired by skilled personnel.
- Do not use regulators for gases other than those for which they are manufactured.
- Never use a leaking or damaged regulator.
- Never lubricate regulators with oil or grease.

C) HOSES

- Replace hoses which appear damaged.
- Keep hoses unwound in order to avoid bending.
- Keep the excess hose wound and out of the working area in order to avoid any damage.

16.5 RADIATIONS

 Ultra-violet radiation created by the arc may damage your eyes and burn your skin. Therefore:

- Wear proper clothing and helmet.
 - Do not use contact lenses!! The intense heat coming from the arc may cause them to stick to the cornea.
 - Use masks with grade DIN 10 or DIN 11 safety lenses at the least.
 - Protect people in the surrounding welding area.
- Remember: the arc may dazzle or damage the eyes. It is considered dangerous up to a distance of 15 meters (50 feet). Never look at the arc with the naked eye.
- Prepare the welding area so as to reduce reflection and transmission of ultra-violet radiation. Paint walls and exposed surfaces in black to reduce reflection, install sheathings or curtains to reduce ultra-violet transmissions.
 - Replace mask lenses whenever damaged or broken.

16.6 ELECTRIC SHOCK

Electric shock can kill.

 All electric shocks are potentially fatal.

- Do not touch live parts.
- Insulate yourself from the piece to be cut and from the ground by wearing insulated gloves and clothing.
- Keep garments (gloves, shoes, hats, clothing) and body dry.
- Do not work in humid or wet areas.
- Avoid touching the piece to be welded.
- Should you work close to or in a dangerous area, use all possible precautions.

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- If you should feel even the slightest electric shock sensation, stop welding immediately. Do not use the machine until the problem is identified and solved.
 - Always fit an automatic wall switch with adequate power, possibly close to the machine, allowing you to immediately switch the machine off in case of an emergency.
 - Frequently inspect the power supply cable.
 - Disconnect power supply cable from mains before replacing cables or before removing unit covers.
 - Do not use the unit without protection covers.
 - Always replace any damaged parts of the unit, with original material.
 - Never disconnect unit safety devices.
 - Make sure that the power supply line is equipped with an efficient earth plug.
 - Make sure that the work bench and the workpiece are connected to an efficient earth plug.
 - Any maintenance should only be carried out by qualified personnel aware of the risks due to dangerous voltages necessary for the operation of the unit.

16.7 PACE MAKER

- Magnetic fields from high currents can affect pacemaker operation. Persons wearing electronic life support equipment (pacemaker) should consult their doctor before going near arc welding, gouging or spot welding operations.

16.8. CAUTION! WELDING WIRE CAN CAUSE PUNCTURE WOUNDS.

- Do not press gun trigger until instructed to do so.
- Do not point gun toward any part of the body, other people, or any metal when threading welding wire.

16.9. MOVING PARTS CAN CAUSE INJURY.

Moving parts, such as fans, can cut fingers and hands and catch loose clothing.

- Keep all doors, panels, covers, and guards closed and securely in place.
- Have only qualified people remove guards or covers for maintenance and troubleshooting as necessary.
- Keep hands, hair, loose clothing, and tools away from moving parts.
- Reinstall panels or guards and close doors when servicing is finished and before starting the machine.

16.10 NOISE



These power source alone do not produce noise levels exceeding 80 dB. The welding procedure, however, may produce noise levels in excess of 80 dB. In which case the machine operator must take the necessary safety precautions as prescribed by the national safety regulation.