

INSTRUCTION MANUAL FOR MIG WELDERS

Important: Read this instruction manual before operating the Mig Welding Machine and related equipment. This booklet has been prepared to help you operate the equipment properly.

Remember: YOUR SAFETY DEPENDS ON YOU!

Follow all safety rules and directions. This machine has been built for your efficient operation. You will get years of satisfactory use from this unit if you follow all safety guidelines.

NOTHING CAN REPLACE GOOD COMMON SENSE

SAFETY GUIDELINES FOR ARC WELDING

It is your job to protect yourself and others from the hazards associated with welding. To do this you must familiarize yourself with the safety rules for arc welding, with the high-pressure gas cylinders, and with the general safety rules.

The following is a brief and partial safety list to act as a reminder. It is important that you are aware of all safety rules before welding.

We strongly recommend that you read:

SAFETY IN WELDING AND CUTTING CEI 26-9 HD 407

EQUIPMENT SAFETY

- Have all electrical installations, maintenance, and repair work done by qualified electricians.
 - Always keep the welding machine clean, dry and in good working order
 - Make sure that the ventilation openings are always clean and leave room (about 12") around machine so that it can breathe.
 - Always unplug the welder before moving it from the feeding source.
 - Be sure that the feeding cable is correctly connected.
- Keep your mig gun well maintained. A mig gun with broken or worn parts will contribute to poor welds and can often be unsafe. Always have the correct type of fire extinguisher handy when welding.

ENVIRONMENTAL SAFETY

Arc welding produces hot metal and sparks. Check welding area and remove all flammable material.

Do not weld near explosives or explosive materials such as gasoline tanks, etc.

When welding, make sure area is properly ventilated.

Important: Never use oxygen for ventilation.

Do not weld or cut when strong fumes are present.

To prevent electrical shock, do not weld in wet areas.

Always check welding area one-half hour after welding for indications that a fire may be starting.

Do not weld around oil, grease, paint, etc. These materials may be flammable, and they often give off toxic fumes. Remove them before welding.

Remember: Use adequate ventilation when welding!

PERSONAL SAFETY

You, the welder, are responsible for your own safety and the safety of others in the work area. You must know all safety rules and obey them.

Electric shock can kill. All electric shocks are potentially fatal.

Always wear dry gloves when arc welding. Keep yourself well insulated from the floor when arc welding.

Wear thick soled shoes and keep them dry to keep yourself from becoming grounded.

If you feel the slightest electrical shock sensation, **Stop welding at once!** Do not use equipment until the problem is identified and repaired.

Always unplug welding machine from power outlet before you attempt to work on inside it.

Arc welding gives off fumes - which can be a potential health hazard.

Always use adequate ventilation when welding.

Some materials give off fumes which are toxic (poisonous). For example, galvanized and zinc coated metals. Prior to welding metals with these coatings, remove the coating from the weld zone by grinding or sanding.

Arc welding makes hot metal, hot sparks, and molten metal drips.

Protect yourself from burns, fires and explosions.

Always wear safety glasses when under the welding hood.

The welding mask must be complete with glasses having a protection degree of 10 DIN at least.

Always wear dry, fire resistant clothing which are free from oil and grease.

Never carry matches, cigarette lighters, etc., in pockets, they could catch fire or explode.

Arc welding gives off rays which can burn the skin and eyes.

Exposed skin can be burned by the arc's rays.

Warn people in the vicinity of arc welding prior to striking an arc.

Remember: The arc can flash or damage the eyes. The arc is considered dangerous for the distance of 50 feet. Protect your fellow workers.

SHIELDING GAS AND HIGH PRESSURE GAS CYLINDER PRECAUTIONS

Gas content must always be identified before operating welder.

If gas leaks occurs, immediately close the cylinder valve. If regulator is faulty, close cylinder valve and remove it from service immediately. Regulator is faulty if any of the following occur:

1. gas leaks detected externally.
2. delivery pressure continues to rise with (down stream) valve closed.
3. If gauge needle does not move off stop pin when pressurized, nor returns to stop pin after pressure released.

Do not attempt repair of regulators or compressed gas handling equipment. Send faulty regulators for repair to manufacturer's designated repair location, where special techniques and tools are used by trained personnel.

Cylinders must be handled carefully.

Identify gas content. Use only cylinders with names of gas marked on them. Do not rely on color to identify gas content. Notify supplier if unmarked. Never deface or alter name, number, or other markings on a cylinder. It is illegal and hazardous.

Always treat cylinders as if they are full.

Locate or secure cylinders so they cannot be knocked over.

Never strike an arc on a cylinder.

Avoid exposing cylinder to high temperatures (Above 110 degrees F.).

GENERAL DATA

This welding machine is a three-phase generator for MIG MAG welding.

It allows welding of mild steel, stainless steel, and aluminium, etc.

DESCRIPTION OF CONTROLS AND FUNCTIONS (see pict.1 and 2)

47 - LUMINOUS SWITCH on - off

53 - MEASURING DEVICE MADE OF: an amperometer indicating welding power and a voltmeter indicating secondary voltage

63 - COMMUTATOR for gross adjustment of welding voltage

66 - COMMUTATOR for accurate adjustment of welding voltage.

39 - FITTING for welding torch

48 A - POTENTIOMETER for continuous adjustment of wire speed.

48 B - POTENTIOMETER for controlling wire starting. This potentiometer makes it possible to adjust wire acceleration on starting in order to facilitate arc ignition.

70 - COMMUTATOR for selecting automatic/manual control. In AUT. position, after pressing and releasing the torch push-button, the machine is still on. In order to switch it off, it is required to repeat this operation.

In MAN. position, the machine works by keeping the torch push-button pressed and stops on releasing it.

32 - INDUCTANCE SOCKETS adjustable with ground terminal for the different welding types.

6 - TERMINALS AND SOCKETS 10-11 for polarity change. (see pict.2). This function makes it possible to invert (+) and (-) poles

and is mainly used for animated wires.

21 - 220 V SOCKET. Apt for use of pre-heater or a cooling unit with maximum power of 250 VA. Located on the machine rear side. (Pict.2)

INSTALLATION AND STARTER

Machine installation must be done by a competent staff. All connections must correspond to the rules in force (CEI 20-10 HD 427) and must respect laws concerning accidents.

Assemble the parts supplied together with the machine as indicated in picture 3. Mount the welding torch.

Check that the wire diameter corresponds to that indicated on the roll and mount the wire coil.

Connect the pipe coming out of the rear side with the cylinder flow-meter.

Before connecting the mains cable (22) make sure that voltage corresponds to that of the welding machine and the ground clamp is working.

WARNING: the yellow-green wire of the machine mains cable is to be connected to the protection lead (system ground).

The yellow-green wire must **NEVER** be combined with another phase wire (black-brown or blue) for voltage taking. In the models with two different supply voltages indicated on the specifications plate, it is possible to invert them, by operating on the terminal board (14), as indicated on pict.5 and following the instructions written inside the machine.

In order to accede to the voltage changer, it is necessary to remove the band (18).

WARNING: Before changing voltage or anyway before opening the machine, make sure that the mains cable is not connected to the socket.

Provide the supply system with fuses fitted for absorption as indicated in the specifications plate.

Position the welding machine so as to allow free air circulation insi-

de it and avoid that metal or any other dust enter it.

THE MACHINE IS READY TO WELD!

Connect the ground terminal to the part to be welded.

Put the luminous switch (47) on ON.

Extract the conic gas nozzle (41) by rotating it clockwise.

Unscrew the current nozzle (43).

Press the torch push-button and release it only when the wire comes out.

WARNING: Keep your face away from the terminal nozzle while the wire comes out.

Screw the current nozzle (43) again, making sure that the hole diameter be the same as that of the wire used.

Insert the welding conic gas nozzle (41) by rotating it clockwise.

Open the gas cylinder and adjust flowmeter at 8-10 l/min.

WARNING: Check that the gas used is compatible with the material to be welded.

MAINTENANCE

WARNING: Before inspecting the machine inside, disconnect the machine mains cable from the mains.

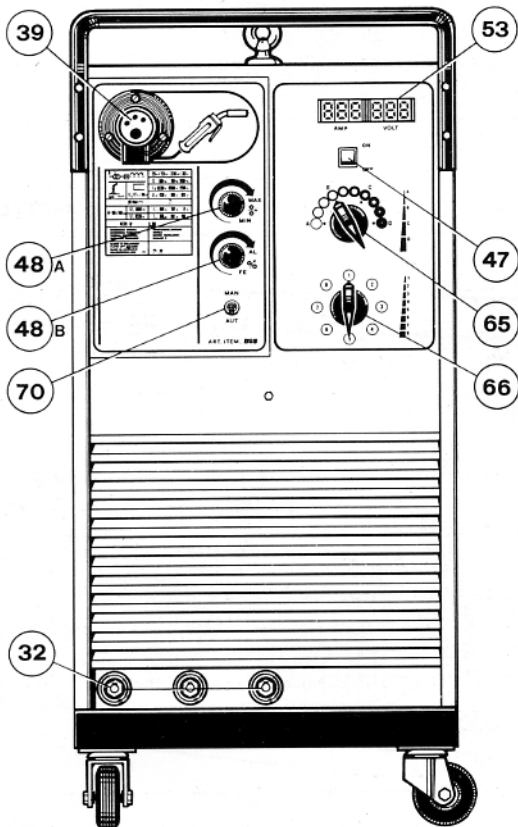
Periodically remove dust or any foreign materials which may have formed on the transformer or the rectifier plates; to do that use a jet of dry and clean air. On reassembling the wire roll make sure that the groove is in line with the wire and corresponds to the diameter of the wire used.

Keep the gas nozzle inside constantly clean so as to avoid metal parts made of spatters between gas and current nozzles.

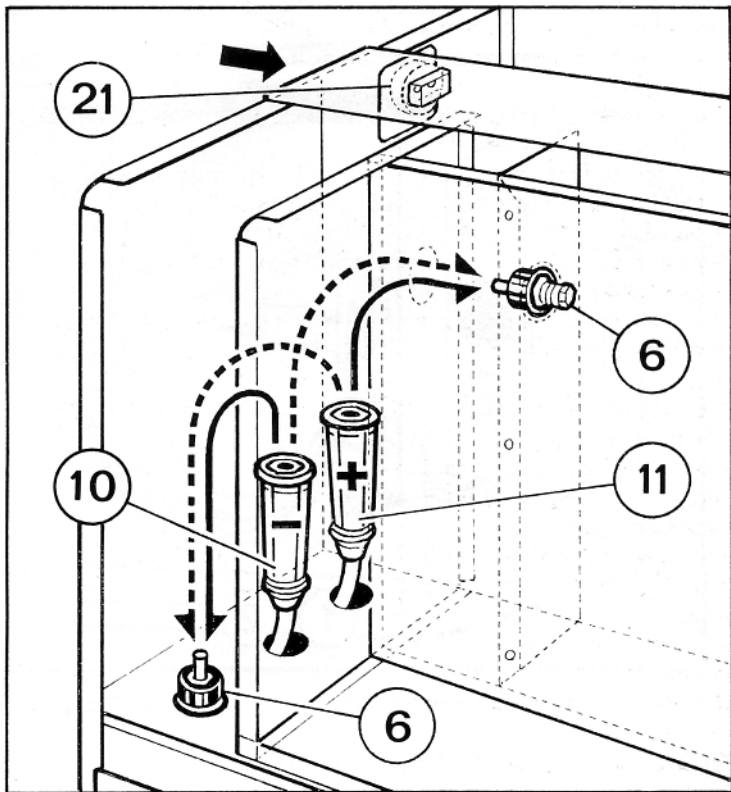
Make sure that the outlet hole of the current nozzle is not too wide, if so, replace it.

Inside the torch there is the sheath which we recommend to periodically remove and wash with degreasing solvents.

In order to weld with very thin wires it is recommended to use a sheath with appropriate hole. Otherwise the wire advances irregularly. Absolutely avoid to beat or hit the torch.



Pict.1



--- FLUX CORED WIRE
— SOLID WIRE

Pict.2

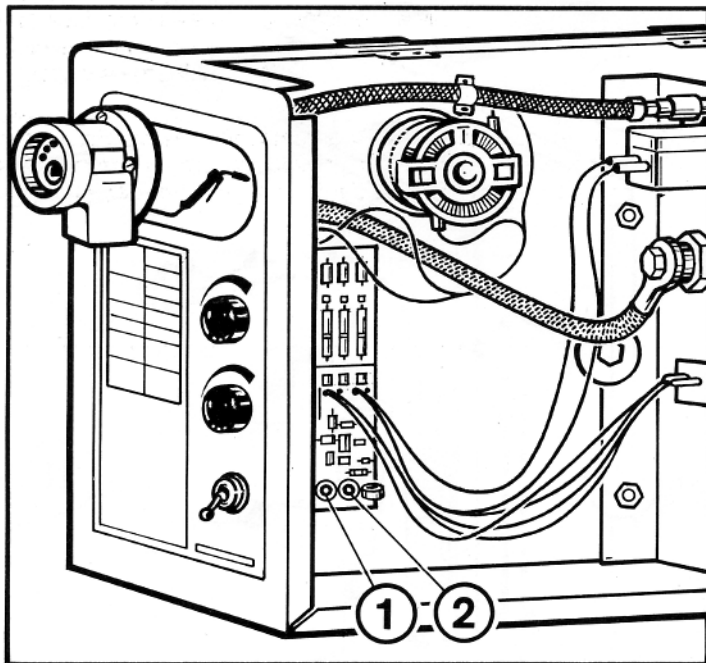
INSTRUCTION FOR THE SHEATH REPLACEMENT.

It is advisable to use the sheath (37) with 1,5 mm. inner diameter for wires with 0,8 diameter and the sheath (37) with 2 mm. inner diameter for 1,2 and 1,6 inner diameter wires.

ALUMINIUM WELDING

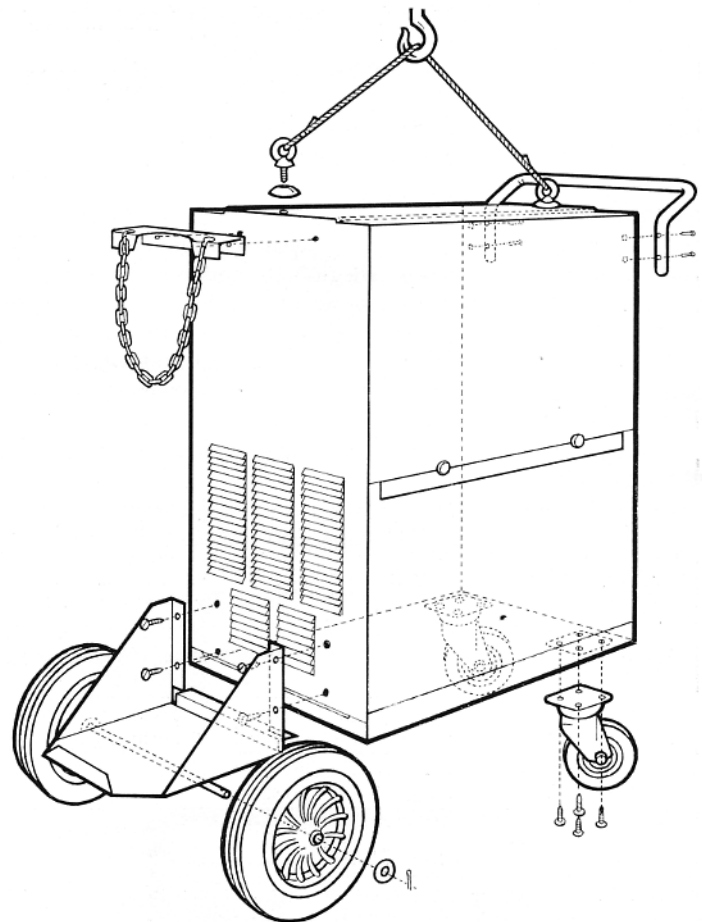
The following is required for aluminium welding:

1. 100% ARGON as welding protection gas.
2. A torch wire of composition suitable for the basic material to be welded.
 - For ALUMAN welding wire 3 ÷ 5% silicon.
 - For ANTICORODAL welding wire 3 ÷ 5% silicon.
 - For PERALUMAN welding wire 5% magnesium.
 - For ERGAL welding wire 5% magnesium.
3. A torch prepared for aluminium welding.
 - if you only have a torch for steel wires, the same shall be modified in the following way:
 - a) Make sure that length of torch cable does not exceed 118 inches (it is advisable not to use longer torches).
 - b) Remove the brass sheath-holding nut (38), the gas (45) and the current (43) nozzles, then slip the sheath off (37).
 - c) Insert the teflon sheath for aluminium and ensure it protrudes from both ends.
 - d) Screw the current nozzle so that the sheath adheres to it.
 - e) Insert the sheath holding nipple, the O ring in the free end of the sheath and secure with the nut without tightening too much.
 - f) Slip the brass tube on the sheath and insert both into the adapter (after removing the iron tube which was fitted inside the adaptor).
 - g) Cut the sheath diagonally so that it stays as close as possible to the wire slide roller.



Pict.3

| Regulation of printed circuit card | |
|------------------------------------|---------------------------------|
| Pos. | Description of trimers function |
| 1 | Post-gas setting |
| 2 | Burn-back setting |



Pict.4

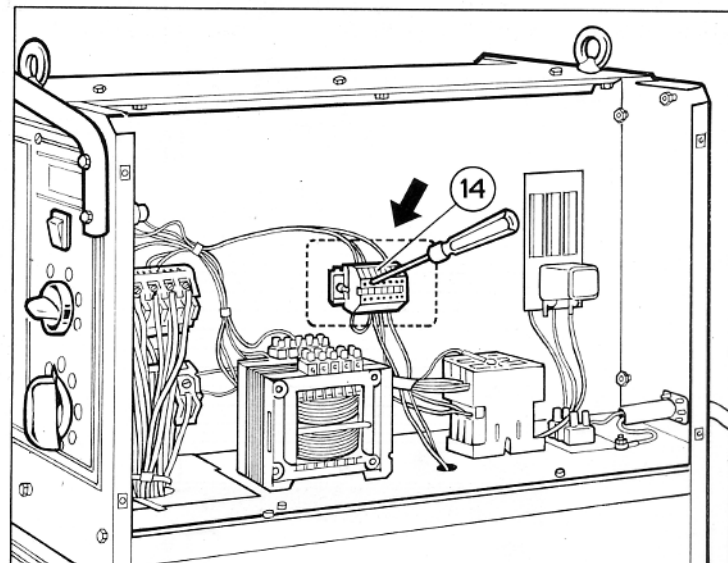


Fig.5

TROUBLE SHOOTING

| Trouble | Probable cause | Solution | Trouble | Probable cause | Solution |
|--|--|--|---|--|--|
| 1) Limited electric output | A phase is missing | Check the three phases of the feed line and/or the remote control switch contacts | 3) Wire not advancing or advancing improperly | Wire slide roller with too large race | Replace roller |
| | A line fuse is burnt | Replace it | | Obstructed or clogged sheath | Extract it and clean |
| | Wrong connection on the voltage changer terminal board | Check the terminal board connections by following the plate scheme | | Wire pressing roller not tightened | Tighten it |
| | The rectifier diode/s is/are burnt | Replace the rectifier | | Coil reel friction too tight | Loosen and adjust it |
| | Wire advancing improperly | Tighten all connections | | Current nozzle clogged | Replace it |
| | Limited electric output | Change the commutator | 4) Wire is blocked and kinks between rolls and wire guide entering the torch | Wrong current nozzle diameter | Replace it |
| | Unsufficient ground connections | | | Wrong roller groove alignment | Align it |
| 2) Welding with several metal protections | Loose torch or ground connections | Unscrew the commutator contact remove the wire insulation and put it under the contact | | Obstructed or clogged sheath | Extract it and clean |
| | Welding regulation commutator has an uncertain contact | Look for the correct parameters by means of welding voltage commutators (65) (66) and of wire speed adjusting potentiometer (48 A) | 5) Porous weld bead | Insufficient protection gas | Increase gas delivery |
| | Transformer wire interrupted on the commutator | See point 4 Uncorrect sheath diam. | | Too oxidated edges to be welded | Accurately clean the edges to be welded with metal brush |
| | Wrong adjustment of welding parameters | See point 1 | | Gas guide nozzle partially or completely clogged by spatters | Disassemble it and clean or replace it preventing the gas outlet holes to be clogged |
| | Wire roller with too wide groove | Check the connection efficiency | | | |

Warning: The service transformer has been protected by means of fuses connected to motor-driven fan (27), to external socket (21) (heating unit or pre-heater) and to secondary 0-27V outlet feeding remote-control switch (15), solenoid valve (7) and wire unit (2).

If some of these elements listed above does not work because fuse is burnt, replace it once the cause has been found out.

N.B: The unit is provided with a protection thermostat working with overload. It is sunk in the power transformer primary and once started up, wait some minutes so as to let generator cool down.