INSTRUCTION MANUAL FOR TIG WELDER

IMPORTANT

Read these instructions before using the welding machine and related equipment. This manual has been prepared for proper use and maintenance of the machine.
Remember: YOUR SAFETY DEPENDS ON YOU!!
Follow all regulations and safety instructions.
You will use the machine satisfactorily and for many years if you follow all directions.
NOTHING CAN REPLACE COMMON SENSE.

DIRECTIONS FOR ARC WELD

- It is your duty to protect yourselves and others against any risks related to weld.
- To that purpose you should know the safety rules related to arc weld, to high-pressure gas containers and the general safety rules.
- The following is a brief and partial list to be used as a reminder.
- It is important that you become aware of all safety rules prior to starting welding.
- We recommend warmly to read: SAFETY RULES CEI 26-9 HD 407

SAFETY RULES TELATED TO EQUIPMENT

- All electric installations, mainentance and repair should be carried out by skilled personnel.
- Keep the machine always clean, dry and in good conditions.
- Make sure that vents are always clean and leave free room (about 30 cm.) around the machine so as it can "breathe".
- Make sure that the feeding cable is properly connected. Disconnect the welding machine always before shifting it from the feeding source.
- Always keep available the proper type of extinguisher while welding.

ENVIRONMENTAL SAFETY RULES

- Arc weld generates warm material and sparks which can create local fire.
- Remove all inflammable material (rags, oils, petrol) from the weld area.
- Do not weld near inflammable material or explosive such as petrol tanks.
- Prior to welding, make sure that the area is properly vented.

Important: Never use oxygen for ventilation.

- Do not weld or cut when intense fumes are present.
- To avoid electric shocks, do not weld in wet areas.
- Always check the weld area half an hour after welding to make sure that any fire is not going to occur.
- Do not weld when oils, grease, paints, etc.. are present. These materials are inflammable and emit toxic fumes.
- Clean surfaces before welding.

PERSONAL SAFETY RULES

- Operator is responsible for his own safety and for the one of those who are in the working area. He must then be aware of all safety rules and follow them.
- Electric shock may kill. All electric shocks are potentially fatal.
- Always wear dry gloves while welding.
- Make sure that you are well insulated from the floor.
- Wear shoes with thick soles and keep them dry so as to avoid any leak towards the ground.
- If you feel even the smallest electric shock immediately stop welding. Do not use it until the problem is identified and solved.
- Disconnect the welding machine from the current tap always before working inside it.
- Arc weld creates fumes - which can be dangerous for health.

WELD IN PROPERLY VENTED ROOMS

- Some elements emit toxic fumes (poisonous), for instance galvanized or zinc-plated materials. Prior to welding materials with this coating remove it from the welding area.
- Arc weld heats metals and generates sparks and drops of cast metal.
- Protect oneself against burns, fire and explosions.
- Always wear protection goggles under the weld mask.
- The weld mask should be provided with glass with protection level DIN 10 at least.
- Always wear dry, fireproof, grease and oil-free clothes.
- Never keep matches. lighters etc. in your pockets, because they may give rise to fire or explosions.
- Arc weld emits radiations that may brun skin and eyes.
- The skin exposed may burn with arc radiations.
- Protect yourselves and make other people close to the arc weld area protect themselves before operating.

Remember: The arc may dazzle or damage your eyes. It is considered dangerous up to a 15-mt distance.

PRECAUTIONS TO FOLLOW WHEN USING PROTECTION GASES OR HIGH-PRESSURE BOTTLES

1) Refillable 200 bar gas bottles

- If gas leaks occurs, close the bottle valve.
- The flowmeter is faulty if one of the following phenomena occur:

a) gas leaks detected from the outside.
b) the delivery pressure still increases when the flowmeter valve is closed.
c) if the gauge needle does not shift from the stop pin when the flowmeter is under pressure or if it returns to the stop pin once pressure has been released.

- Do not try to repair flowmeters. Send the faulty flowmeters to the workshop recommended by the manufacturer where special techniques and equipment are used by skilled personnel.
- Handle bottles with care.
- Check the gas contained in bottles. Only use bottles on which the name of the gas is indicated. Do not trust the color to identify the gas contained. Warn the supplier if the name is not indicated. Never damage or alter the name, number or other indications on the bottle. It is illegal and dangerous.
- Always handle bottles as if they are full. Place bottles so as to avoid falling. Do not switch the arc on over a bottle. Do not expose bottles to high temperatures (above 45 degrees).

2) Non-refillable 110 bar gas bottles

In addition to the precautions under paragraph 1, please remember that the 110 bar 1 litre gas bottles, like the one included in the machine kit, CAN NOT BE REFILLED.

GENERALITIES

This unit is an electronically-controlled single-phase direct current rectifier suitable for continuous TIG or pulsed TIG welding of carbon steels, stainless steels, copper and cast iron.

INSTALLATION

Ensure that mains voltage corresponds to that shown in the rating plate on the machine rear panel. Connect to a supply having an amperage sufficient to supply the machine before

starting up, and ensure that the yellow-green wire corresponds to the earth wire.

OPERATION

For correct use carefully follow the instructions below:

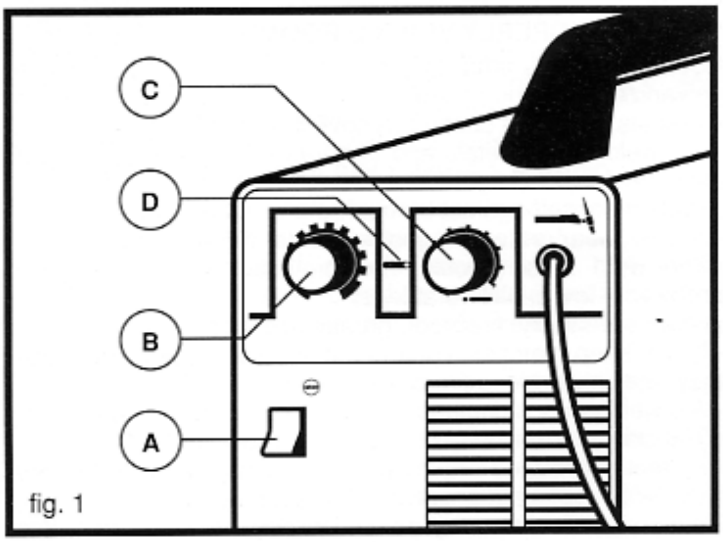

fig. 1

- use pure Argon as welding gas
- screw the flowmeter on the cylinder
- connect the gas hose from the machine rear panel to the flowmeter
- adjust the gas flow to 2-3 ltr./min. if you are welding in a draft free position or 5-6 ltr./min. in a drafty area
- turn on the machine by positioning the "A" switch (fig. 1) to ON.

Attention: the switch incorporates a lamp that turns on when the thermostat trips.

Continuous T I G Welding

This type of welding is used where there are no distortion problems due to heat input.

- Position the knob "C" (fig. 1) to continuous position and adjust the welding current by means of the knob "B" (fig. 1), bearing in mind that 20-30 A per mm. of thickness are required for carbon steels and stainless steels.

Pulsed TIG welding

This consists of two alternate current modes; one called Peak Current that melts the material, the other called Base Current which maintains the arc without diffusing any heat into the material.

This welding method is used for thin materials, where heat problems cause distortion.

- Adjust the peak current by means of the knob "B" (fig. 1) (peak time is fixed)
- set the time of base current from 0 to 2,5 sec (max) by means of the knob "C" (fig. 1) (the base current is fixed at 5 Amperes)

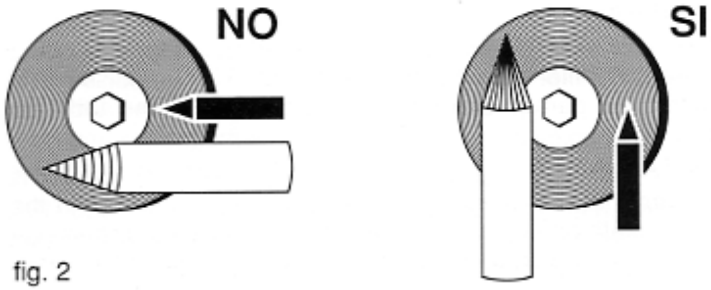

fig. 2

- a 2% thorium tungsten electrode (red colour) of 1.6 mm. diameter has to be used for this equipment. Special care should be taken in preparing the electrode point; it should be ground so as to show a vertical scoring as shown in fig. 2.

This arrangement will give more concentrated arcs and a quick starting of the arc.

The correct electrode installation on the torch is shown in fig. 3.

The tungsten electrode has to be tightened by means of the back cap (E) so that the tip protrudes 2÷3 mm. from the ceramic nozzle F.

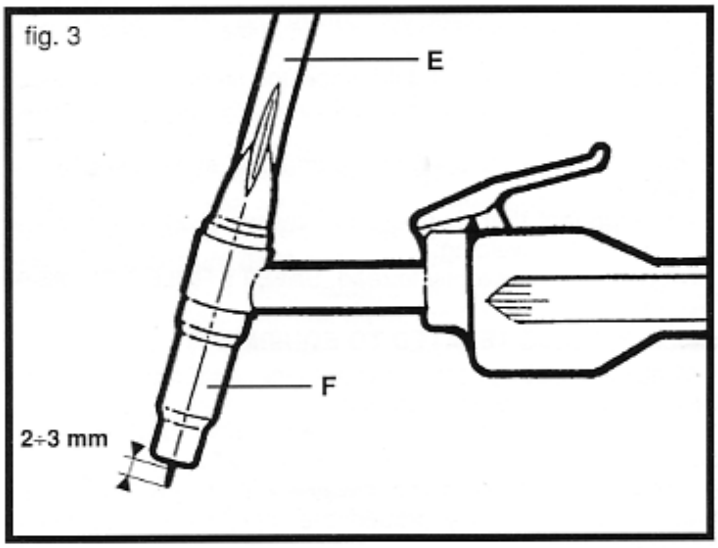

fig. 3

OPERATION

- Connect the earth clamp to the workpiece.

The arc starting in this equipment is achieved by contact. To avoid destroying the electrode tip during starting with high currents, a special system has been conceived that allows the arc to start at the lowest current. This system consists of a time delay of 1,5 secs between the moment the torch button is pressed and the moment when the welder delivers the current which was preset through the knob "B" (fig. 1).

During this time the device delivers the lowest possible current and the operator can start the arc without jeopardising the tip of the electrode. The starting techniques will therefore be as follows:

1) bring the ceramic nozzle onto the workpiece (fig. 7 A).

- protect your eyes with the welding headscreen;
- touch the workpiece (fig. 7 B) with the electrode. Then press the torch button and quickly move the electrode away, by 1-2 mm. max, (fig. 7 C), the selected current will now be established.


fig. 7a fig. 7b fig. 7c

When welding is completed, release the push button sufficiently to extinguish the arc, but keep sufficient pressure on the button to allow gas to flow for electrode cooling for 2-3 seconds before releasing the push button completely.

VERY IMPORTANT

Should the above recommendations not be followed, the electrode tip will rapidly wear out.
Standard TIG welding positions operation as per positions shown in fig. 4 - 5 - 6.

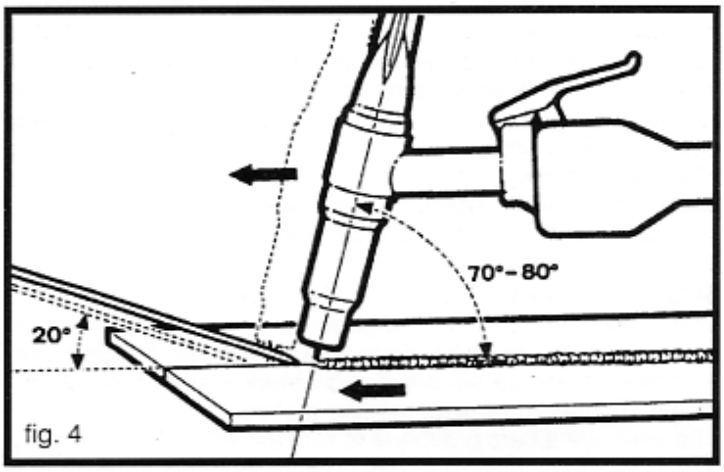

fig. 4

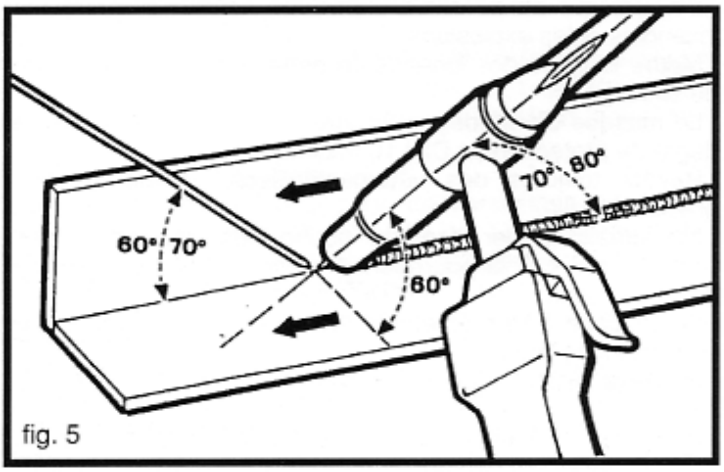

fig. 5

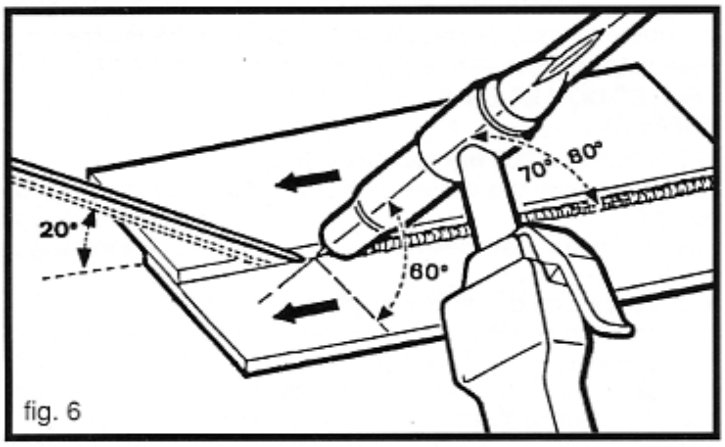

fig. 6

Note: the mode indicator (D in fig. 1) lights up whenever continuous TIG is selected and it follows the impulses in TIG pulsed mode.

MAINTENANCE

The machine needs very little maintenance.
- Periodically remove the cover and blow the dust away with a light jet of dry air.
- Ensure that welding cables and the supply cable are not damaged. Replace them if necessary.

TROUBLESHOOTING

DEFECT: - *Failre of the welding current*
CAUSES: - the thermostat has tripped; pilot light of switch A (fig. 1) turned on
- defecting regulation potentiometer B (fig. 1)
- cables of torch push button interrupted
- shunt black cable detached
- interrupted fuses on the circuit board (6).

DEFECT: - *Welding current not controllable by the potentiometer "B" (fig. 1)*
CAUSES: - shunt red wire detached
- defective control card.

DEFECT: - *Arc difficult to be maintained at low welding-current regulation*
CAUSES: - failure of base current resistance
- one wire of the base current resistance detached
- defective relay card (6)
- defective capacitor on card (6).

DEFECT: - *The line fuses blow*
CAUSES: - power transformer in short circuit
- SCR diodes in short circuit.

DEFECT: - *The arc does not start*
CAUSES: - defective electrode; restore the tip
- non suitable gas; use pure Argon
- defective relay card (6)
- defective capacitor on card (6).

ACCESSORIES ON REQUEST

For short works, it may be practical to use 1 litre cylinders (Art. 1480-08) non refillable. These cylinders have a capacity of 100 - 110 litres of gas and shall be used with the flowmeter art. 1450-32.
With gas flow regulation to 2/3 litres/min., the cylinders operation life is approx. 30 - 35 minutes of arc time.
NOTE: To avoid useless waste of gas, the torch push button should be kept pressed only during welding operations.