PoWer MIG Series

GeKaMac®

Power MIG 2000 PULSE

Users Manual

Please Read and Understand This Manual
Before Operating The Welding Machine

www.gedikwelding.com

This machine is for internal use only.

It complies with the WEEE Directive.

This machine has been designed in accordance with the EN 60974-1 and EN 60974-10 standards.

The machine is safe when installation, operation, and maintenance are performed in accordance with the user manual and regulations. The operator and machine owner are responsible for adhering to safety rules.

Gedik Kaynak San. Ve Tic. A.Ş. assumes no responsibility for safety or CE compliance if any modifications are made to the machine or if safety rules are not followed.

This Class A equipment is not suitable for use in homes and similar residential areas where the power supply is provided by the low-voltage public electricity network.

This machine is not household waste and cannot be disposed of in the trash.

When the machine reaches the end of its service life or becomes obsolete, it must be disposed of in accordance with regulations.

COMPLIES WITH THE WEEE DIRECTIVE.

Eco Design Statement

This machine has been designed and manufactured in accordance with the requirements of the 2009/125/EC Eco Design Directive concerning the environmentally friendly design of energy-related products.

Accordingly, machines with an idle mode are as follows.

	Idle Mode
MMA	**X**
MIG	√
TIG	√
Plazma	√
SAW	**Out of Scope**

Efficiency measurements should be conducted only on the power unit. The water cooling system should be disabled. For more information on measurements and machine settings, Gedik Kaynak Sanayi ve Ticaret A.Ş. should be consulted.

AT UYGUNLUK BEYANI

EU DECLARATION OF CONFORMITY

Bu uygunluk beyanı yalnızca imalatçının sorumluluğu altında düzenlenir.

This declaration of conformity is issued under the sole responsibility of the manufacturer.

İstanbul, Turkey, 08.03.2024

İmalatçı / Manufacturer

GEDİK KAYNAK SANAYİ ve TİCARET A.Ş.

Ankara Cad. No.306 Seyhli Pendik ISTANBUL TURKIYE

Ürün / Product	ARC WELDING MACHINE
Marka-Model / Brand- Model	POWER MIG 2000 PULSE

Yukarıda tanımlanan beyanın nesnesi ilgili uyumlaştırılmış AB mevzuatı ile uyumludur.

The object of the declaration described above, is in conformity with the relevant union harmonisation legislation.

Direktifler / Directives	2014/30/EU & 2014/35/EU & 2009/125/EC EU/2019/1784

Uyumlaştırılmış standartlar ve uygunluğun deklare edilmesiyle ilişkili diğer referanslar.

References to the relevant harmonised standarts used and references to the other technical specifications in relation to which conformity is declared.

Standartlar / Standards	EN IEC 60974-1 EN IEC 60974-10

Bu ekipman, talimatlara uygun kurulduğunda, bakımı yapıldığında ve kullanıldığında belirtilen standartlara uygundur. Makine üzerinde bir değişiklik yapıldığında veya yanlış kullanımda deklarasyon geçersiz olur.

The equipment is in compliance with pertinent legislation when installed, utilized, and maintained in accordance with the enclosed instructions. This declaration will be invalid under any modification or improper use.

İmalatçı Adına İmzalayan / Signed for and on behalf of:

Hatice Özel, Equipment Business Unit Director

EN ENGLISH

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Introduction

Thank you for buying our product.
In order to get the best performance out of the equipment and ensure the maximum lifespan of its parts, the use and maintenance instructions contained in this manual must be read and strictly complied with, as well as **the safety instructions contained in the relevant folder**. If repairs to the equipment are required, we recommend that our clients contact our service centre workshops, as they have the necessary equipment and personnel that are specifically trained and constantly updated. All our machines and equipment are constantly developed and so changes may be made in terms of their construction and features.

Description

MULTI-FUNCTION INVERTER GENERATOR SUITABLE FOR SINGLE-PHASE POWER SUPPLIES FOR MIG PULSE, MIG DOUBLE PULSE, MIG-MAG, MMA, and TIG WELDING (with “Lift” type ignition)
Multifunction synergic power source, based on the leading-edge IGBT inverter technology and fully digitally controlled, offer premium welding quality in both MIG/MAG and Pulsed / Dual-Pulsed MIG on all materials, especially stainless steel, aluminium and galvanized steel; the spatter-free welding feature minimises reprocessing work. It also ensures excellent performance in TIG and MMA welding prcesses.
Innovative, versatile, light-weight, easily portable, simple to use, **POWER MIG 2000 PULSE** is a very high level product that is absolutely irreplaceable technologically for all internal and external maintenance works, vehicle bodyworks, agricultural and small light metalwork jobs.
The principal characteristics of welding units are:

- Multifunction power source with premium welding quality in MIG pulse / double pulse, MMA and TIG with “Lift” type ignition welding processes.
- Standard polarity inversion for welding with the most common core wires and without gas.
- Central Euro connection on torch.
- Innovative practical design.
- Supporting structure in metal with front panel in special shockproof material.
- Protective visor on the control panel.
- Robust handle integrated into the chassis.
- Professional 2-roller wire feeder that guarantees precise feeding of the wire.
- The double slot rollers can be replaced without using any tools.
- A graduated knob for precise adjustment of the wire pressure that stays unvaried when the arms open and close.
- Housing for coils of wire with max Ø 200 mm – 5 kg.
- Possibility of fitting coils of wire up to max Ø 300 mm - 15 kg thanks to the exclusive “retrofit kit adaptor” optional extra.
- Synergic digital control of all welding parameters, shown on the display, also featuring the following functions:
  - Allows less expert operators to regulate all welding parameters, choosing the type of program on the basis of the material, wire diameter, and gas used.
  - Innovative software “VISION ARC” for controlling all welding parameters.
  - Digital Voltmeter / Ammeter with HOLD function (saving of latest data on both displays).
  - “Energy Saving” function to operate the power source cooling fan only when necessary.
  - Auto-diagnostic feature for trouble shooting.
  - Ability to store personalized welding programmes (JOB).
  - MIG-MAG welding:
    - BURN BACK control. At the end of each weld, in any condition and with any material, the digital control ensures a perfect wire cut, prevents the typical “wire globule” from forming and ensures correct arc restriking.
    - WSC Wire start control. This arc striking control device prevents wire from sticking to the workpiece or torch nozzle and ensures precise and smooth arc striking, particularly when welding aluminium.
    - Welding parameters that are controlled digitally by a microprocessor, are monitored and modified in just a few seconds, maintaining a consistently precise and stable arc as the welding conditions continue to vary due to the movement of the torch and the irregularities of the parts to be welded.

- MMA welding:
  - "Arc Force" adjustable to select the best dynamic characteristics for the welding arc.
  - "Hot Start" adjustable to improve ignition with particularly difficult electrodes.
  - Anti-sticking function to avoid the electrodes sticking.
  - Vrd (Voltage Reduction Device), which makes it possible to use the machine in environments where the risk of electric shock or electrocution caused by arc welding is enormously increased by the presence of water, humidity, or heat, and particularly where the ambient temperature exceeds 32°C.
- TIG welding:
  - "Lift" type ignition, with TCS "Thermal Control Start" device to further reduce tungsten inclusions.
  - Exclusive SWS "Smart Welding Stop" system at the end of TIG welding. Lifting up the torch without switching off the arc will introduce a SLOPE DOWN and it will switch off automatically.

Technical data

The general technical data of the system are summarized in table 1.

Usage limits (IEC 60974-1)

The use of a welder is typically discontinuous, in that it is made up of effective work periods (welding) and rest periods (for the positioning of parts, the replacement of wire and underflushing operations etc. This welder is dimensioned to supply a I_2 max nominal current in complete safety for a period of work of X% of the total usage time. The regulations in force establish the total usage time to be 10 minutes. The work cycle is considered to be X% of this period of time. When the work cycle permitted is exceeded a trip switch trips, which protects the welding machine's internal components against dangerous overheating and prevents incorrect functioning of the machine (for further information see the TSP control panel manual). After several minutes the overheat cut-off rearms automatically and the welder is ready for use again (Automatic reset error). This equipment is built to have a protection level of IP 23 S, which means:

- That it is protected against the penetration of solid foreign bodies with diameters in excess of Ø 12 mm.
- That it is protected against water spray hitting the surface with an angle of incidence up to 60°.
- That the equipment has been tested for withstanding harmful effects due to water getting in when the moving parts on the equipment are moving.

Table 1

Model		**POWER MIG 2000 PULSE**		
		MIG/MAG	**TIG**	**MMA**
Single-phase input 50/60 Hz	V	230 ± 15%		
Mains supply: Z_{max} (*)	Ω	0,21		
Power input (I_2 Max)	kVA	9,7	6,4	7,8
Delayed fuse (I eff)	A	16		
Power factor / cosφ		0,64 / 0,99	0,64 / 0,99	0,64 / 0,99
Efficiency degree	η	0,83	0,8	0,83
Voltage without load	V	60		
Current range	A	10 ÷ 200	5 ÷ 175	10 ÷ 150
Duty cycle @ 100% (40°C)	A	100	100	90
Duty cycle @ 60% (40°C)	A	115	115	110
Duty cycle @ X% (40°C)	A	200 (15%)	175 (20%)	150 (25%)
Wires diameter	mm	0,6 - 1,2	-	-
Spool Diameter / Weight	mm / kg	200 / 5 (300 / 15 optional)	-	-
N° rollers		2	-	-
Power output of feeder motor	W	40	-	-
Rated wire feeding speed	m/min	1 - 20	-	-
MMA electrodes	mm	-	-	1,6 - 3,2
TIG electrodes	mm	-	1,0 - 3,2	-
Protection gas		• Carbon dioxide • Pure Argon • Argon - Carbon dioxide - Oxygen • Argon and Carbon dioxide blends	-	-
Standards		IEC 60974-1 - IEC 60974-5 - IEC 60974-10 - S		
Protection class		IP 23 S		
Insulation class		H		
Dimensions	mm	500 - 425 - 220		
Weight	kg	16		

(*) Mains supply Z_{max}: maximum impedance value allowed for the grid according to the **EN/IEC 61000-3-11** standard.

WARNING: *This equipment does not comply with* **EN/IEC 61000-3-12**. *If it is connected to a public low voltage system, it is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment may be connected.*

How to lift up the machine

The weld machine has a strong handle all in one with the frame, used for transporting the machine manually only.

NOTE: *These hoisting and transportation devices conform to European standards. Do not use other hoisting and transportation systems.*

Open the packaging

The system essentially consists of:
- Welding unit **POWER MIG 2000 PULSE**
- Ground cable (3m long).
- MIG-MAG or TIG (optional) welding torches.
- Transport trolley (optional).
- Retrofit kit adaptor for Ø 300 mm - 15 kg coil of wire (optional).
- Coil cover in impact resistant material (optional).

Upon receiving the system:
- Remove the welding generator and all relevant accessories-components from their packaging.
- Check that the weld machine is in good condition, if not report any problems immediately to the seller-distributor.
- Make sure all ventilation grilles are open and that no foreign bodies are blocking the air circulation.

Installation and connections

The installation site for the system must be carefully chosen in order to ensure its satisfactory and safe use. The user is responsible for the installation and use of the system in accordance with the producer's instructions contained in this manual. Before installing the system the user must take into consideration the potential electromagnetic problems in the work area. In particular, we suggest that you should avoid installing the system close to:
- Signalling, control and telephone cables.
- Radio and television transmitters and receivers.
- Computers and control and measurement instruments.
- Security and protection instruments.

Persons fitted with pace-makers, hearing aids and similar equipment must consult their doctor before going near a machine in operation. The equipment's installation environment must comply to the protection level of the frame i.e. IP 23 S (IEC 60529 publication). The system is capable of working in environments where working conditions are particularly hard. This system is cooled by means of the forced circulation of air, and must therefore be placed in such a way that the air may be easily sucked in and expelled through the apertures made in the frame.

The equipment must be assembled as follows:
- Mount on the trolley (optional extra).
- Fit the kits ("Retrofit kit adaptor" - optional, etc.) on the welding unit.
- Fix the welding unit to the trolley.
- Connect the welding machine to the utility line.
- Connect up the welding cables.

Instructions for fitting the individual optional extras are contained in the relevant packaging.

Connecting the welding machine to the utility line

Connection of the machine to the user line (electrical current) must be performed by qualified personnel.
Before connecting the welding machine to the mains power supply, make sure that rated voltage and frequency correspond to those provided by the mains power supply and that the welding machine's power switch is turned to "O".
Connection to the power supply must be carried out using the tripolar cable supplied with the system, of which:
- 2 conducting wires are needed for connecting the machine to the supply.
- The third, which is YELLOW GREEN in colour is used for making the "GROUND" connection.

Connect a suitable load of normalised plug (2p + e) to the power cable and provide for an electrical socket complete with fuses or an automatic switch. The ground terminal must be connected to the ground conducting wire (YELLOW-GREEN) of the supply.
Table 2 shows the capacity values that are recommended for fuses in the line with delays.

NOTE: *Any extensions to the power cable must be of a suitable diameter, and absolutely not of a smaller diameter than the special cable supplied with the machine.*

Command and control units (Fig. A)

Pos. 1 "TSP" control panel.
Pos. 2 Fast coupling straight polarity.
Pos. 3 Fast coupling reverse polarity.
Pos. 4 Centralised MIG-MAG torch connection.
Pos. 5 Power supply switch. In the "O" position the welder is off.
Pos. 6 Mains cable.
Pos. 7 Weld gas inlet coupling.
Pos. 8 Cable clamp for the welding cable to pass (with the "Retrofit kit adaptor" fitted).

Table 2

Model		POWER MIG 2000 PULSE		
		MIG/MAG	TIG	MMA
Power input (I_2 Max)	kVA	9,7	6,4	7,8
Delayed fuse (I eff)	A	16		
Duty cycle @ X% (40°C)	A	200 (15%)	175 (20%)	150 (25%)
Mains cable				
Length	m	3		
Section	mm^2	2,5		
Ground cable				
Length	m	3		
Section	mm^2	16		

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FIG. A

Loading wire

- Open the side panel on the left using the relevant Allen key and insert the coil (use coils with a MAX diameter of 200 mm and MAX weight of 5 kg) that suits the material to be welded on the relevant support so that the wire unwinds anticlockwise and aligning the protruding marker on the support with the relevant hole in the coil.
- Thread the end of the wire into the back guide (Pos. 7, Fig. B) on the drawing mechanism.
- Lift up the idle roller Ø 26 mm (Pos. 1, Fig. B) releasing the roller pressure mechanism (Pos. 6, Fig. B). Check that the drive roller (Pos. 4, Fig. B) has the diameter corresponding to the wire being used printed on the outer side.
- Thread the wire into the central wire guide and into the wire guide of the centralized attachment (Pos. 3, Fig. B) for a few centimetres. Lower the idle roll-holder arm making sure the wire goes into the slot of the drive roll. If necessary, adjust the pressure between the rollers with the screw provided (Pos. 5, Fig. B). The correct pressure is the minimum that does not allow the rollers to skid on the wire. Excessive pressure will case deformation of the wire and tangling on the entrance of the sheath; insufficient pressure can cause irregular welding.

Assembly of drive roller

Follow instructions given below for mounting the drawing roller onto the mechanism:

- Unscrew the screw (Pos. 5, Fig. B).
- Lift up the idle roll-holder arm Ø 26 mm (Pos. 2, Fig. B).
- Each roller shows the type of wire and diameter on the two external sides.
- Mount the appropriate roller (Pos. 4, Fig. B) making sure the groove is in the right position for the diameter of the wire being used.
- Screw the screw (Pos. 5, Fig. B).

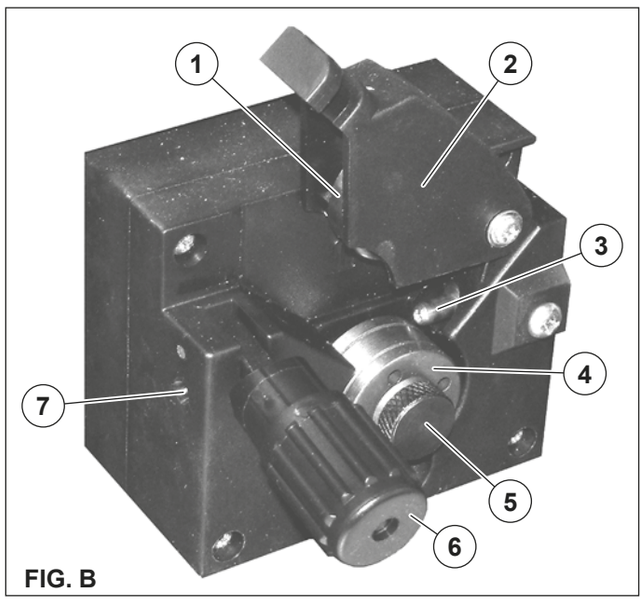

FIG. B

MIG-MAG / PULSE MIG / DOUBLE PULSE MIG welding with GAS

To begin MIG-MAG / PULSE MIG / DOUBLE PULSE MIG welding, carry out the following tasks (with the machine switched off):

1 - Connecting the cables (Fig. C1-C2)

1) Connect the gas hose to the pressure reducer fitted on the cylinder beforehand. Gas cylinders are supplied with a pressure reducer to adjust pressure of the gas used for welding.
2) Screw the torch to the centralised connection on the front panel of the welding machine (Pos. 4, Fig. A).
3) Connect up the earthing system cable to the rapid coupling marked by a - (negative) symbol and then the relevant ground clamps to the piece being welded or to its support in an area free from rust, paint and grease. Using particularly long earthing cables reduces the voltage and causes some problems from increased resistance and inductance of the cables that could cause faulty welding. Follow instructions to avoid these problems:
   - Use earthing and extension cables with appropriate section.
   - Lay out the cables as a flat as possible to prevent them from coiling up.
4) Open the moving cover, remove the protection box for changing polarity (see Fig. C2) and make sure that the change polarity cable is connected to the positive pole (+).

2 - Welding

1) Open the moving cover and fit the coil of wire.
2) Load the wire (see the “Loading the wire” paragraph).
3) Switch the welding machine on by moving the power supply switch to **I** (Pos. 5, Fig. A).
4) Carry out the following operations on the MIG-MAG torch:
   - Remove the gas-guide and wire-guide nozzles, allowing the wire to flow freely during loading. Remember that the contact tip must correspond to the wire diameter.
   - Push the torch push button or the motor check push button until the wire end comes out from the torch.
   - Tighten the contact tip on the torch.
   - Attach the correct gas-guide nozzle.
   - Protect the gas-guide nozzle and the wire-guide nozzle of the torch from sprays of solder.
5) Make the adjustments and select the parameters on the control panel (for further information see the TSP control panel manual).
6) Open the tap on the cylinder slowly and adjust the reducer knob to obtain a pressure of about 1,0 to 1,5 bar, and regulate the flow to about 15 lit/min (to suit the current to used for welding).
7) The welding machine is ready for welding. To begin welding, approach the point to be welded and press the button on the torch.
8) When you have finished welding, remove the waste, turn off the machine and close the gas cylinder.

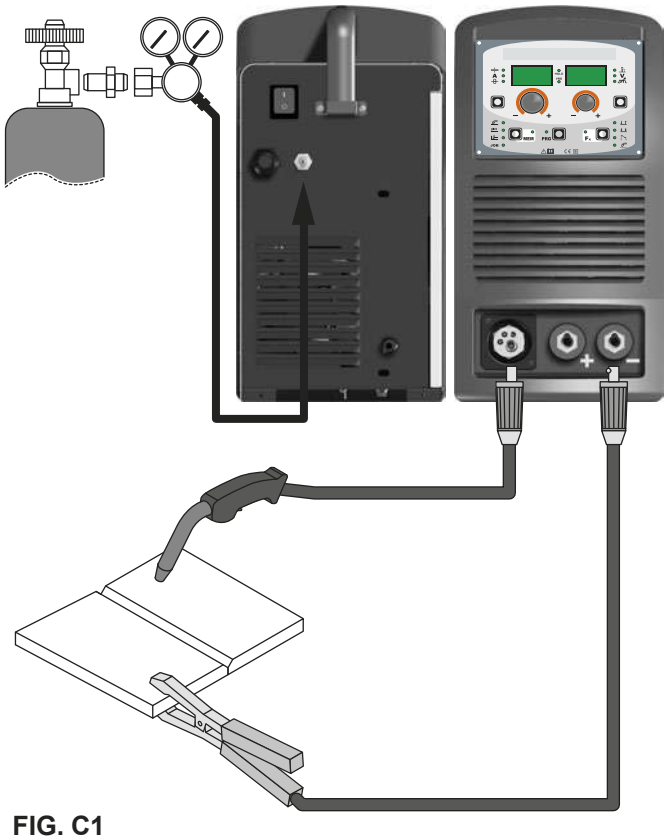

FIG. C1

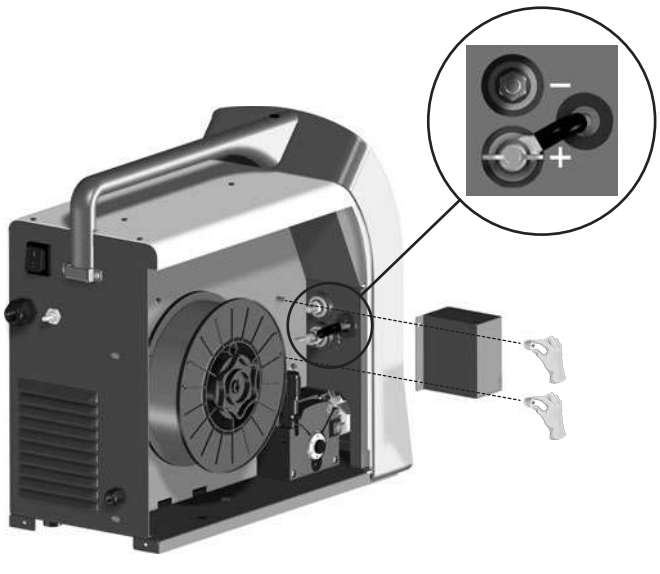

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FIG. C2

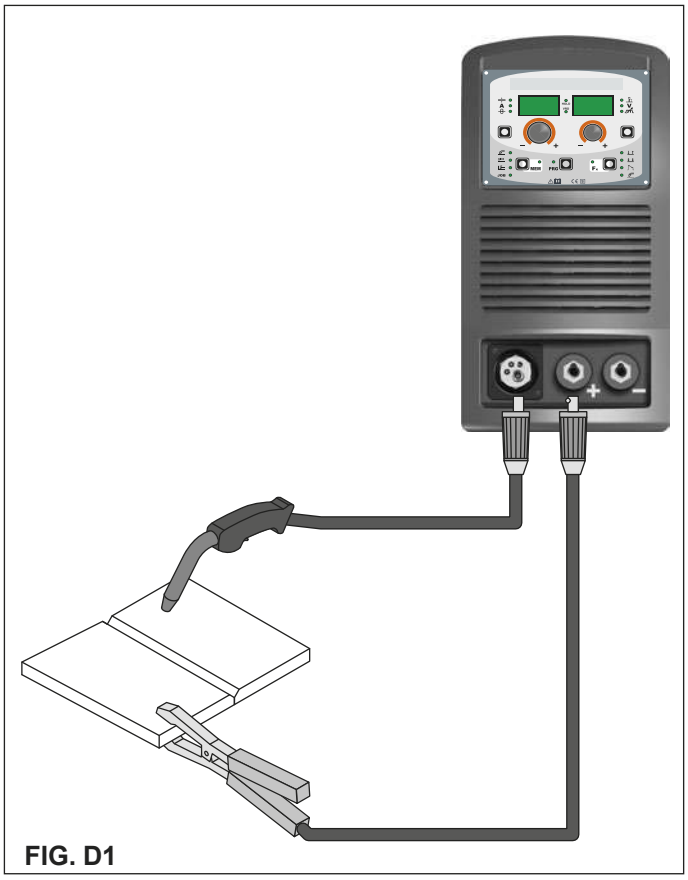


FIG. D1

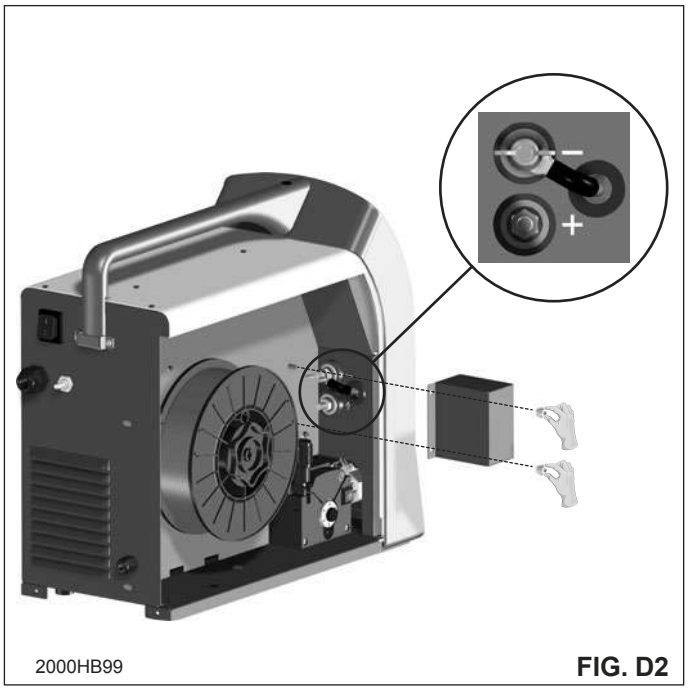


FIG. D2

MIG-MAG / PULSE MIG / DOUBLE PULSE MIG welding without GAS

To begin MIG-MAG / PULSE MIG / DOUBLE PULSE MIG welding without gas, carry out the following tasks (with the machine switched off):

1 - Connecting the cables (Fig. D1-D2)

1) Screw the torch to the centralised connection on the front panel of the welding machine (Pos. 4, Fig. A).
2) Connect up the earthing system cable to the rapid coupling marked by a + (positive) symbol and then the relevant ground clamps to the piece being welded or to its support in an area free from rust, paint and grease. Using particularly long earthing cables reduces the voltage and causes some problems from increased resistance and inductance of the cables that could cause faulty welding. Follow instructions to avoid these problems:
   - Use earthing and extension cables with appropriate section.
   - Lay out the cables as a flat as possible to prevent them from coiling up.
3) Open the moving cover, remove the protection box for changing polarity (see Fig. D2) and move the change polarity cable, connecting it to the negative pole (-).

2 - Welding

1) Open the moving cover and fit a coil of wire with a core for welding without using gas.
2) Load the wire (see the “Loading the wire” paragraph).
3) Switch the welding machine on by moving the power supply switch to **I** (Pos. 5, Fig. A).
4) Carry out the following operations on the MIG-MAG torch:
   - Remove the gas-guide and wire-guide nozzles, allowing the wire to flow freely during loading. Remember that the contact tip must correspond to the wire diameter.
   - Push the torch push button or the motor check push button until the wire end comes out from the torch.
   - Tighten the contact tip on the torch.
   - Attach the correct gas-guide nozzle.
   - Protect the gas-guide nozzle and the wire-guide nozzle of the torch from sprays of solder.
5) Make the adjustments and select the parameters on the control panel (for further information see the TSP control panel manual). Make sure that you have selected a program that is suitable for wire with a core.
6) The welding machine is ready for welding. To begin welding, approach the point to be welded and press the button on the torch.
7) Once welding has been completed remove the slag and switch off the machine.

Spot welding

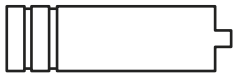


FIG. E

Welding can be done with or without gas. The substantial difference with MIG-MAG welding is essentially related to the torch and the adjustments that must be made on the TSP control panel.

- Depending on the torch chosen and the work to be done, a gas guide nozzle can be fitted on the torch that is specifically for spot welding (see Fig. E).
- Use the control panel to select the spot-welding mode and, if necessary, make the changes to the related “Special functions - Fx” (for further information see the TSP control panel

manual), which allows the machine to do this specific type of welding.

To begin spot welding:

- Place the gas guiding nozzle perpendicular on the workpiece to be spot welded.
- Press the torch button to start the welding current and wire feed.
- When the spot welding time expires (SPOT WELD TIME), the wire feed stops automatically.
- When the torch button is pushed again a new welding cycle starts.
- Release the torch button.

Interval welding (Stitch)

The substantial differences with the spot welding mainly concern the adjustments that must be carried on the welding machine.

Use the control panel to select the interval welding mode and then make the changes to the related “Special functions - Fx” (for further information see the TSP control panel manual), which allows the machine to do this specific type of welding.

To begin interval welding:

- Press the torch button to start the welding current and wire feed.
- At this point the welding machine automatically carries out a succession of welded portions (STITCH WELD TIME) followed by a pause (STITCH WELD PAUSE), according to the times entered previously. This procedure stops automatically only when the TORCH BUTTON is released.
- When the torch button is pushed again the torch begins a new interval welding cycle.

Aluminium welding

To weld with aluminum wire proceed as follows:

- Replace the drive roller with the appropriate for aluminum wire.
- Use a torch with a 3m cable and a carbon Teflon sheath.
- Set the pressure between the drive rollers at the minimum, by turning the screw provided.
- Use argon gas at a pressure of 1,3 - 1,7 bar.

TIG welding with “Lift”

In the TIG process welding is achieved by melting the two metal pieces to be joined, with the possible addition of material from the outside, using an arc ignited by a tungsten electrode. The “Lift” (TCS) type ignition used in GeKaMac equipments makes it possible to reduce tungsten inclusions on ignition to a minimum. The molten bath and the electrode are protected by and inert gas (for example, Argon). This type of welding is used to weld thin sheet metal or when elevated quality is required.

1) Connecting the welding cables (Fig. F):
   - Connect one end of the gas hose to the gas connecter on the TIG torch and the other end to the pressure reducer on the inert gas cylinder (Argon or similar).
   - With the machine switched off:
     - Connect the ground cable to the snap-on connector marked + (positive).
     - Connect the relative ground clamp to the workpiece or to the workpiece support in an area free of rust, paint, grease, etc..
     - Connect the TIG torch power cable to the snap-on connector marked - (negative).
2) Switch the welding machine on by moving the power supply switch to **I** (Pos. 5, Fig. A).
3) Make the adjustments and do the parameter settings on the control panel (for further information see the TSP control panel manual).
4) Open the gas cylinder and regulate the flow by adjusting the valve on the TIG torch by hand.
5) Ignite the electric arc by contact, using a decisive, quick movement without dragging the tungsten electrode on the piece to be welded (“Lift” type ignition - Fig. G).
6) The welder has a SWS “Smart Welding Stop” system for the end of TIG welding. Lifting up the torch without switching off the arc will introduce a slope down and it will switch off automatically.
7) When you have finished welding remember to shut the valve on the gas cylinder.

Table 3 shows the currents to use with the respective electrodes for TIG DC welding. This input is not absolute but is for your guidance only; read the electrode manufacturers’ instructions for a specific choice. The diameter of the electrode to use is directly proportional to the current being used for welding.

Table 3

Ø ELECTRODE (mm)	ELECTRODE TYPE Current adjustment field (A)	
	TIG DC	
	Tungsten Ce 1% Grey	Tungsten Rare ground 2% Turchoise
1	10-50	10-50
1,6	50-80	50-80
2,4	80-150	80-150
3,2	150-250	150-250

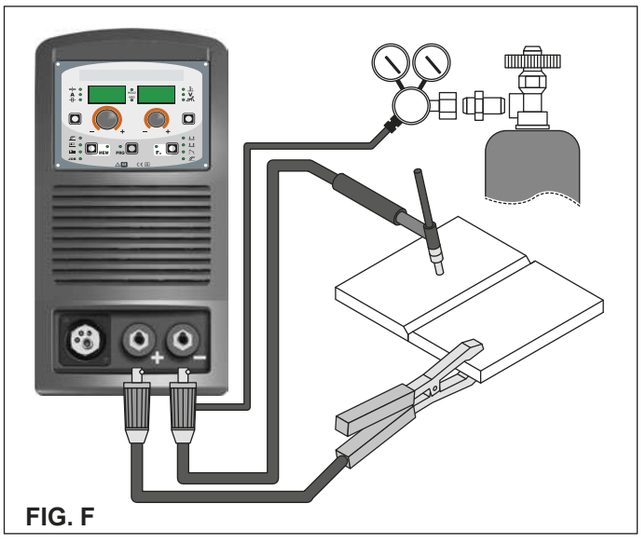


FIG. F

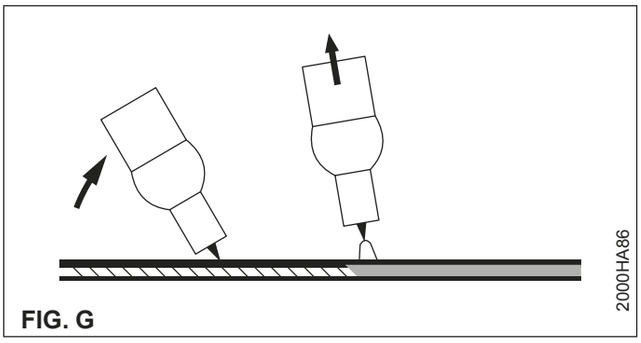


FIG. G

Electrode welding (MMA)

Electrode welding is used to weld most metals (different types of steel, etc.) using coated rutilic and basic electrodes with diameters ranging from Ø 1.6 mm to Ø 3,2 mm.

1) Connecting the welding cables (Fig. H):
   Disconnect the machine from the mains power supply and connect the welding cables to the output terminals (Positive and Negative) of the welding machine, attaching them to the clamp and ground with the polarity specified for the type of electrode being used (Fig. H). Always follow the electrode manufacturer's instructions. The welding cables must be as short as possible, they must be near to one another, positioned at or near floor level. Do not touch the electrode clamp and the ground clamp simultaneously.
2) Switch the welding machine on by moving the power supply switch to **I** (Pos. 5, Fig. A).
3) Make the adjustments and select the parameters on the control panel (for further information see the TSP control panel manual).
4) Carry out welding by moving the torch to the workpiece. Strike the arc (press the electrode quickly against the metal and then lift it) to melt the electrode, the coating of which forms a protective residue. Then continue welding by moving the electrode from left to right, inclining it by about 60° compared with the metal in relation to the direction of welding.

PART TO BE WELDED

The part to be welded must always be connected to ground in order to reduce electromagnetic emission. Much attention must be afforded so that the ground connection of the part to be welded does not increase the risk of accident to the user or the risk of damage to other electric equipment. When it is necessary to connect the part to be welded to ground, you should make a direct connection between the part and the ground shaft. In those countries in which such a connection is not allowed, connect the part to be welded to ground using suitable capacitors, in compliance with the national regulations.

WELDING PARAMETERS

Table 4 shows some general indications for the choice of electrode, based on the thickness of the parts to be welded. The values of current to use are shown in the table with the respective electrodes for the welding of common steels and low-grade alloys. These data have no absolute value and are indicative data only. For a precise choice follow the instructions provided by the electrode manufacturer.

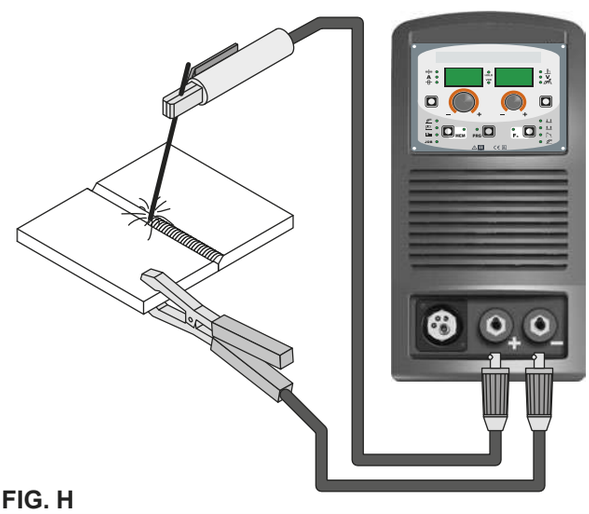


FIG. H

Table 4

WELDING THICKNESS (mm)	Ø ELECTRODE (mm)
1,2 ÷ 2	1,6
1,5 ÷ 3	2
3 ÷ 5	2,5
5 ÷ 12	3,2

The current to be used depends on the welding positions and the type of joint, and it increases according to the thickness and dimensions of the part.
The current intensity to be used for the different types of welding, within the field of regulation shown in table 5 is:

- High for plane, frontal plane and vertical upwards welding.
- Medium for overhead welding.
- Low for vertical downwards welding and for joining small preheated pieces.

Table 5

Ø ELECTRODE (mm)	CURRENT (A)
1,6	30 ÷ 60
2	40 ÷ 75
2,5	60 ÷ 110
3,2	95 ÷ 140

A fairly approximate indication of the average current to use in the welding of electrodes for ordinary steel is given by the following formula:

$$I = 50 \times (Øe - 1)$$

Where:
I = intensity of the welding current
Øe = electrode diameter
Example:
For electrode diameter 4 mm

$$I = 50 \times (4 - 1) = 50 \times 3 = 150A$$

Maintenance

ATTENTION: *Cut off the power supply to the equipment before effecting any internal inspection.*

POWER MIG 2000 PULSE

IMPORTANT: *Since the welding machines are fully electronic, removing the dust that is sucked into the machine by the fans, is of utmost importance.*

In order to achieve correct functioning of the machine, proceed as described:

- Periodic removal of accumulations of dirt and dust inside the equipment using compressed air. Do not point the jet of air directly at the electrical parts as this could damage them.
- Periodical inspection for worn cables or loose connections that could cause overheating.
- Make sure the air circuit is completely free of any impurities and that the connections are tight and free of any leaks. In this connection, inspect the solenoid valve very carefully.
- Check the wire feeder rolls periodically and replace them when wear impairs the regular flow of the wire (slipping etc).

TORCH

The torch is subjected to high temperatures and is also stressed by traction and torsion. We recommend not to twist the wire and not to use the torch to pull the welder. As a result of the above the torch will require frequent maintenance such as:

- Cleaning welding splashes from the gas diffuser so that the gas flows freely.
- Substitution of the contact point when the hole is deformed.
- Cleaning of the wire guide liner using trichloroethylene or specific solvents.
- Check of the insulation and connections of the power cable; the connections must be in good electrical and mechanical condition.

SPARE PARTS
Original spares have been specifically designed for our equipment. The use of spares that are not original may cause variations in the performance and reduce the safety level of the equipment. We are not liable for damage due to use of spare parts that are not original.

The pointing out of any difficulties and their elimination

The supply line is attributed with the cause of the most common difficulties. In the case of breakdown, proceed as follows:
1) Check the value of the supply voltage.
2) Check that the power cable is perfectly connected to the plug and the supply switch.
3) Check that the power fuses are not burned out or loose.
4) Check whether the following are defective:
   - The switch that supplies the machine.
   - The plug socket in the wall.
   - The generator switch.

NOTE: *Given the required technical skills necessary for the repair of the generator, in case of breakdown we advise you to contact skilled personnel or our technical service department.*

Replacing the digital interface PCB

Proceed as follows:
- Unscrew the 4 screws that fix the front rack panel.
- Remove both the adjustment knobs.
- Disconnect the electrical connectors for the board.
- Unscrew the support columns.
- Remove the electronic board by lifting it off its supports.
- To fit a new board, follow this procedure in reverse.

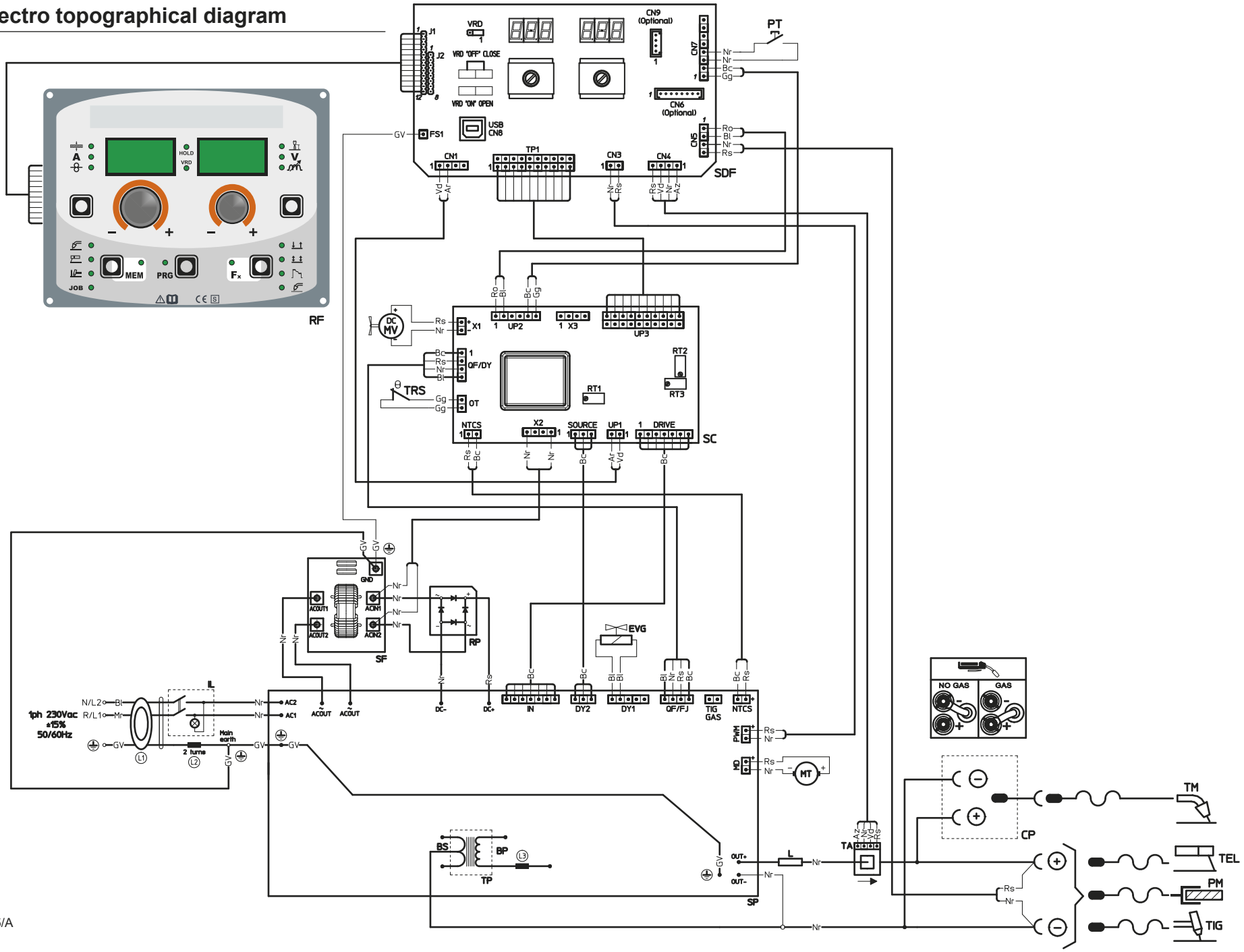
Troubleshooting table

WARNING: *Any internal inspections or repairs are only to be done by qualified personnel!*

IMPORTANT: *Remember to disconnect the mains power supply and wait for the internal capacitors to discharge (about 2 minutes) before starting to check and repair the machine if necessary.*

Defect	Solution
The welding machine does not switch on, TSP control panel switched off.	• Check that the welding machine is installed correctly and that the mains supply has sufficient power to supply the welding machine. • Check the switch, cable and plug on the power supply line and replace them if necessary. • Check, and if necessary replace, the digital interface PCB or the control PCB.
Line fuses fused “instantaneously”.	• Check that the welding machine is installed correctly. • Check and if necessary replace the motor, transformer, or rectifier.
Line fuses fused after a work period.	• Check that you have fitted line fuses of adequate absorption capacity.
Welding machine on, TSP control panel on, fan stopped.	• Check the wiring that powers the fans. • Check that there are no mechanical impediments blocking the fans. • Check and if necessary replace the digital interface PCB.
Welding machine on, display does not show correct values.	• See the error codes and signals shown in the manual for the TSP control panel. • Check the wiring that powers the various boards. • Check, and if necessary replace, the digital interface PCB or the control PCB.
No gas coming out of the torch.	• Check and if necessary replace the solenoid valve or gas hose. • Check the wiring that powers the gas solenoid valve. • Check, and if necessary replace, the digital interface PCB or the control PCB.
The wire feed motor does not work during MIG-MAG welding.	• Check the wiring that powers the wire feed motor. • Check that there are no mechanical impediments blocking the motor. • Check that the motor is working correctly and if necessary replace it. • Check and if necessary replace the digital interface PCB.
Welding current insufficient or not constant.	• Check the power supply line. • Check and if necessary replace the wires (section or length inadequate). • Check the line voltage using a voltmeter.
Arc ignition difficult, the arc switches off immediately after ignition during MIG-MAG welding.	• Use the TSP control panel manual to make sure you have set the various welding parameters correctly. • Check compatibility of the torch and the wire used. • Check that the torch and all its components are working correctly and replace them if necessary (e.g. worn components). • Check and if necessary replace the digital interface PCB.
The wire sticks to the workpiece to be welded.	• Check that there are no mechanical impediments blocking correct unwinding of the wire. • Check that the motor is working correctly and if necessary replace it. • Check and if necessary replace the digital interface PCB.

Electro topographical diagram



2101AC55/A

•1 BP	•2 BS	•3 CP	•4 EVG	•5 IL	•6 L	•7 L1-2-3	•8 MT	•9 MV	•10 PM	•11 PT
•12 RF	•13 RP	•14 SC	•15 SDF	•16 SF	•17 TA	•18 TEL	•19 TIG	•20 TM	•21 TP	•22 TRS

Electro topographical diagram key

•1 Primary transformer coil **•2** Secondary transformer coil **•3** Polarity change terminal board **•4** Gas solenoid valve **•5** Mains switch **•6** Secondary inductance **•7** Toroidal ferrite **•8** Drive motor **•9** Fan motor **•10** Earth terminal **•11** Torch button **•12** Rack panel **•13** Primary rectifier **•14** Control PCB **•15** Digital interface PCB **•16** EMC filter PCB **•17** Hall effect transformer **•18** MMA torch **•19** TIG torch **•20** MIG-MAG torch **•21** Main transformer **•22** Secondary diodes thermostat

Colour key

Ar Orange
Az Sky Blue
Bc White
Bl Blue
Gg Grey
Gl Yellow
GV Yellow-Green
Mr Brown
Nr Black
Ro Pink
Rs Red
Vd Green
Vl Violet

Meaning of graphic symbols on machine

S	System for use in environments with increased risk of electroshock
CE	Product suitable for free circulation in the European Community
	Dangerous voltage
	Grounding protection
+	Positive pole snap-in connector
−	Negative pole snap-in connector
	Warning!
	Before using the equipment you should carefully read the instructions included in this manual
	Danger! Parts moving
	It is forbidden to use gloves

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POWER MIG 2000 PULSE

IT	*Lista ricambi*	LEGGERE ATTENTAMENTE
EN	*Spare parts list*	READ CAREFULLY
FR	*Liste pièce de rechange*	LIRE ATTENTIVEMENT
DE	*Ersatzteilliste*	SORGFÄLTIG LESEN
ES	*Lista repuestos*	LEER ATENTAMENTE
NL	*Onderdelenlijst*	EERST GOED DOORLEZEN
PT	*Lista de peças de substituição*	LER ATENTEMENTE
DA	*Liste over reservedele*	LÆS OMHYGGELIGT
SV	*Reservdelslista*	LÄS NOGAS
FI	*Varaosaluettelo*	LUE HUOLELLISESTI
N	*Reservedelliste*	LES NØYE
RU	*Список запасных частей*	ПЕРЕД НАЧАЛОМ РАБОТЫ ВНИМАТЕЛЬНО ПРОЧТИТЕ ИНСТРУКЦИЮ

GeKaMac®

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P. +90 216 378 50 00 • **F.** +90 216 378 20 44
www.gedikwelding.com

Pos.	POWER MIG 2000 PULSE	Descrizione	Description
1	352374	Visiera rack frontale	Front rack transparent visor
2	352555	Pannelllo rack completo di tastiera a membrana	Rack panel with membrane keyboard
3	438849	Manopola senza indice Ø22mm	Ø22mm Knob without index
4	438888	Manopola senza indice Ø29mm	Ø29mm Knob without index
5	352373	Pannello frontale completo di logo	Front panel with logo
6	468725	Adesivo logo CEA Ø30mm	CEA logo sticker Ø30mm
7	468185	Adesivo dinse	Dinse sticker
8	403611	Attacco rapido	Quick connection
9	239624	Cavo massa	Ground cable
10	428110	Flangia	Flange
11	434250	Tubetto guidafilo 53mm	53mm Wire guide tube
12	236639	Attacco Euro con tubetto guidafilo	Euro connection with wire guide tube
13	414326	Chiavistello	Lock
14	420574	Coperchio lato mobile	Mobile steel cover
15	468704	Adesivo logo CEA	CEA logo sticker

Pos.	POWER MIG 2000 PULSE	Descrizione	Description
16	352419	Coperchio pannello frontale	Front panel cover
17	434664	Maniglia	Handle
18	465580	Staffa fissaggio maniglia	Fixing bracket handle
19	435364	Interruttore alimentazione	Mains switch
20	427895	Pressacavo completo di ghiera	Cable clamp with lock ring
21	235960	Cavo alimentazione	Mains cable
22	427866	Pressacavo completo di ghiera	Cable clamp with lock ring
23	420573	Coperchio lato fisso	Fixed steel cover

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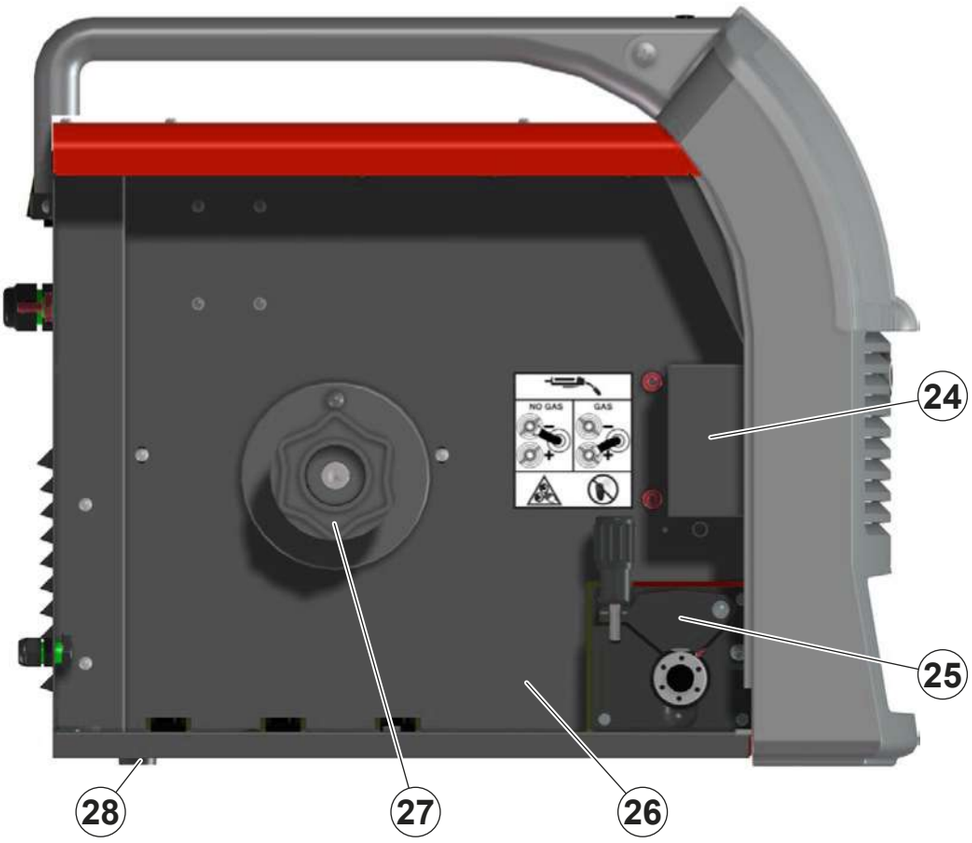

Pos.	POWER MIG 2000 PULSE	Descrizione	Description
24	450067	Scatola di protezione cambio polarità	Change polarity protection box
25	240561	Meccanismo di trascinamento con motoriduttore	Wire feed mechanism with motorgear
26	404913	Telaio metallico interno	Internal steel chassis
27	241844	Mozzo bobina	Hub coil
28	431333	Piedino d'appoggio	Rubber foot

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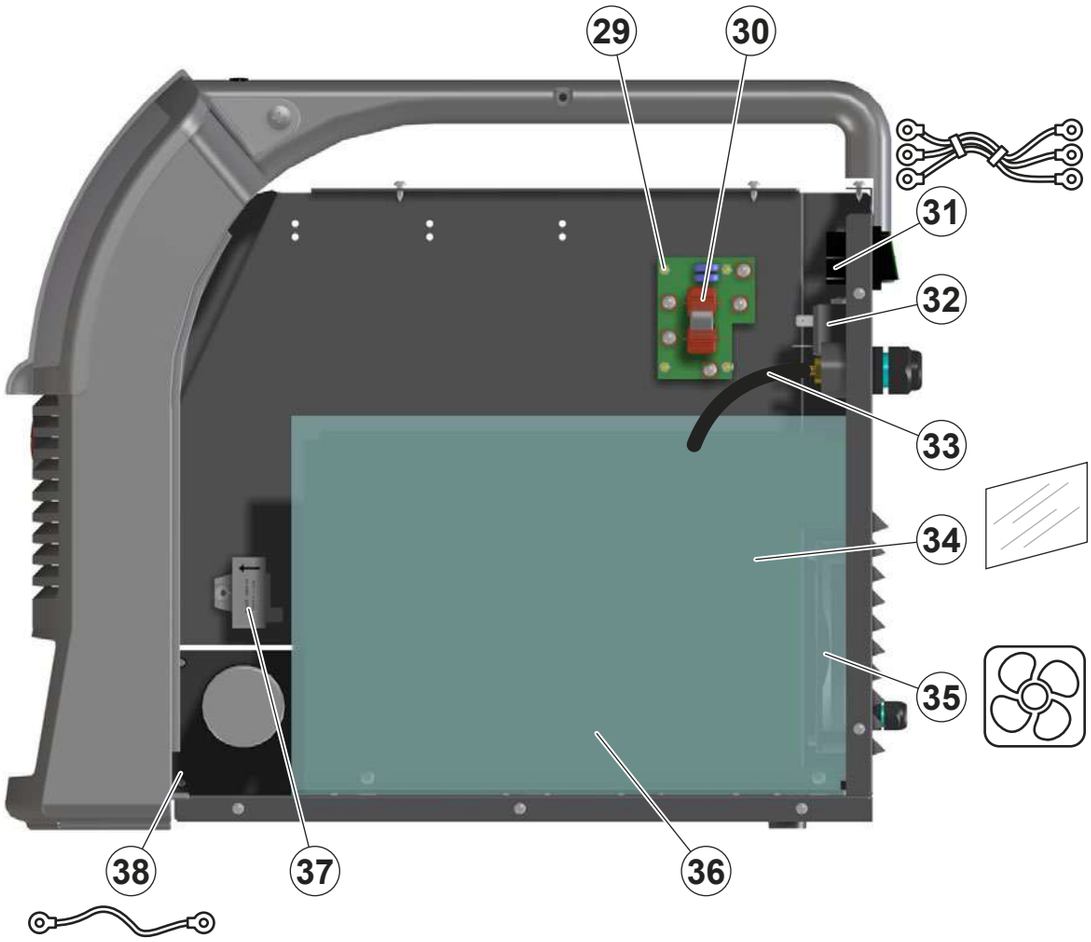

Pos.	POWER MIG 2000 PULSE	Descrizione	Description
29	424019	Distanziale scheda filtro EMC	EMC filter PCB spacer
30	377146	Scheda filtro EMC	EMC filter PCB
31	413471	Cablaggio ausiliario	Auxiliary wiring
32	425938	Elettrovalvola gas	Gas solenoide valve
33	485040	Tubo gas	Gas hose
34	353448	Isolamento laterale coperchio	Cover insulation
35	486386	Motore ventilatore	Fan motor
36	241266	Complessivo inverter di potenza	Power inverter assembly
37	481954	Trasformatore ad effetto di Hall	Hall effect transformer
38	235272	Cablaggio di potenza	Power cables wiring

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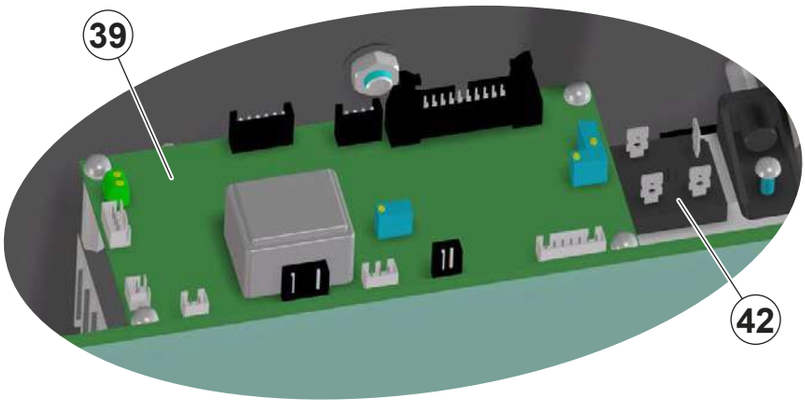
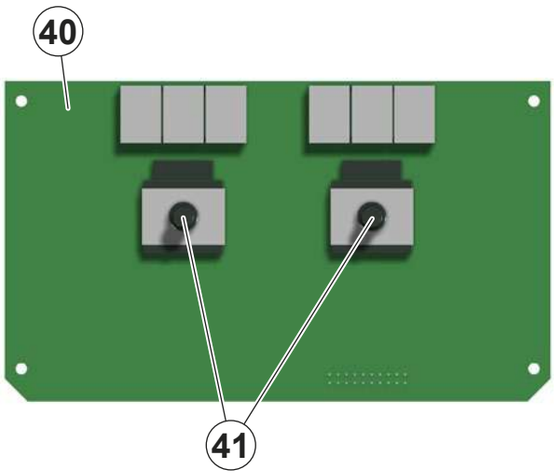
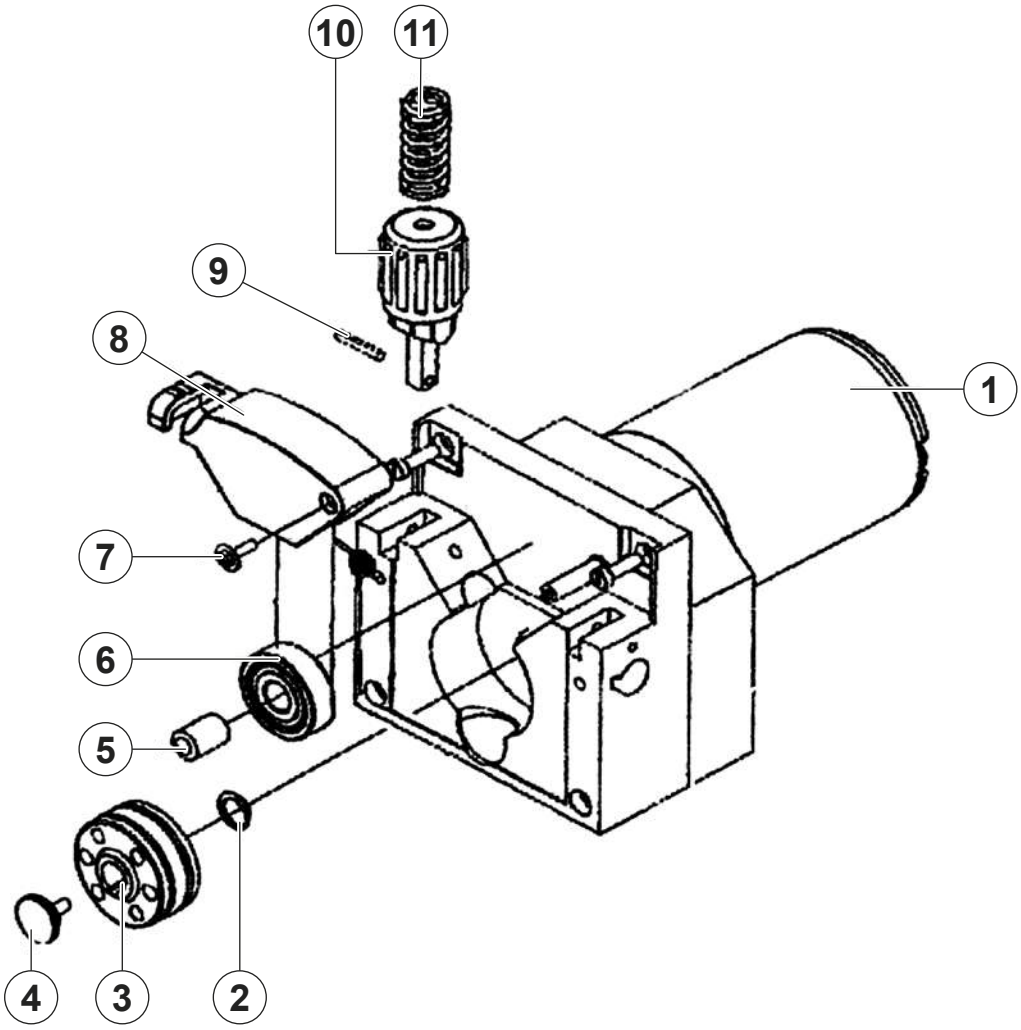




Pos.	POWER MIG 2000 PULSE	Descrizione	Description
39	377148	Scheda controllo	Control PCB
40	377179	Scheda interfaccia digitale	Digital Interface PCB
41	454150	Encoder	Encoder
42	455012	Raddrizzatore primario	Primary rectifier



Pos.	Cod.	Descrizione	Description
1	444468	Motore 24V/40W	24V/40W Motor
2	602025	Seeger 10mm	Seeger 10mm
3	Tab. A	Rullo Ø 30 mm	Feed roll Ø 30 mm
4	487803	Vite di fissaggio	Fixing screw
5	487858	Perno supporto del dispositivo di pressione	Axle shaft pressure arm
6	422923	Rullo di pressione Ø 26 mm	Feed roll Ø 26 mm
7	487808	Vite di fissaggio M4x8	M4x8 Fixing screw
8	356956	Leva di pressione completa	Complete pressure arm
9	676510	Spina elastica	Pin pressure device
10	356973	Complessivo dispositivo di pressione rulli	Pressure device complete
11	441209	Molla di pressione Ø 1,5mm	Ø 1,5mm pressure spring

A

IT FILO EN WIRE	IT Diametro filo EN Wire diameter	IT Diametro rulli EN Rolls diameter	IT Rullo inferiore EN Lower roller
IT Acciaio EN Steel	0,6 ÷ 0,8 mm 0,8 ÷ 1,0 mm 0,9-1,0 ÷ 1,2 mm 1,0 ÷ 1,2 mm	Ø 30 mm Ø 30 mm Ø 30 mm Ø 30 mm	459170 459172 459175 459174
IT Alluminio EN aluminum	0,8 ÷ 1,0 mm 1,0 ÷ 1,2 mm	Ø 30 mm Ø 30 mm	459180 459182
IT Filo animato EN Cored wire	1,0 ÷ 1,2 mm	Ø 30 mm	459190

IT Ordinazione dei pezzi di ricambio

Per la richiesta di pezzi di ricambio indicare chiaramente:
1) Il numero di codice del particolare
2) Il tipo di impianto
3) La tensione e la frequenza che rileverete dalla targhetta dei dati posta sull'impianto
4) Il numero di matricola

ESEMPIO
N° 2 pezzi, codice n. 211844 - per l'impianto POWER MIG 2000 PULSE - 230 V - 50/60 Hz - Matricola n° .....

EN Ordering spare parts

To ask for spare parts clearly state:
1) The code number of the piece
2) The type of device
3) The voltage and frequency read on the rating plate
4) The serial number of the same

EXAMPLE
N. 2 pieces code n. 211844 - for POWER MIG 2000 PULSE - 230 V - 50/60 Hz - Serial number .....

FR Commade des pièces de rechange

Pour commander des pièces de rechange indiquer clairement:
1) Le numéro de code de la pièce
2) Le type d'installation
3) La tension et la fréquence que vous trouverez sur la petite plaque de données placée sur l'installation
4) Le numéro de matricule de la même

EXEMPLE
N. 2 pièces code 211844 - pour l'installation POWER MIG 2000 PULSE - 230 V - 50/60 Hz - Matr. Numéro .....

DE Bestellung Ersatzeile

Für die Anforderung von Ersatzteilen geben Sie bitte deutlich an:
1) Die Artikelnummer des Teiles
2) Den Anlagentyp
3) Die Spannung und Frequenz, die Sie auf dem Datenschild der Anlage finden
4) Die Seriennummer der Schweißmaschine

BEISPIEL
2 Stück Artikelnummer 211844 - für Anlage POWER MIG 2000 PULSE - 230 V - 50/60 Hz - Seriennummer .....

ES Pedido de las piezas de repuesto

Para pedir piezas de repuesto indiquen claramente:
1) El número de código del particular
2) El tipo de instalación
3) La tensión y la frequencia que se obtien de la chapa datos colocada sobre la instalación
4) El número de matrícula de la soldadora misma

EJEMPLO
N. 2 piezas código 211844 - para instalación POWER MIG 2000 PULSE - 230 V - 50/60 Hz - Matrícula N. .....

NL Bestelling van reserveonderdelen

Voor het bestellen van onderdelen duidelijk aangeven:
1) Het codenummer van het onderdeel
2) Soort apparaat
3) Spanning en frequentie op het gegevensplaatje te vinden
4) Het serienummer van het lasapparaat

VOORBEELD
N. 2 stuks code 211844 - voor apparaat POWER MIG 2000 PULSE - 230 V - 50/60 Hz - Serie Nummer .....

PT Requisição de peças sobressalentes

Ao pedir as peças de substituição indique claramente:
1) O número de código da peça
2) O tipo de equipamento
3) A tensão e a frequência indicadas na la placa de dados do equipamento
4) O número de matrícula da própria máquina de soldar

EXEMPLO
N° 2 peças código n. 211844 - para o equipamento POWER MIG 2000 PULSE - 230 V - 50/60 Hz
Matrícula n. .....

DA Bestilling af reservedele

For at bestille reservedele skal man nøjagtigt angive:
1) Reservedelens kodenummer
2) Anlæggets type
3) Spænding og frekvens, som står på anlæggets typeskylt
4) Selve svejsemaskinens registreringsnummer

EKSEMPEL
2 stk. nummer 211844 - til anlæg model POWER MIG 2000 PULSE - 230 V - 50/60 Hz
Registreringsnummer Nr. .....

SV Beställning af reservdelar

Vid förfrågan av reservdelar ange tydligt:
1) Detaljens kodnummer
2) Typ av apparat
3) Spänning och frekvens - den står bland tekniska data påapparatens märkplåt
4) Svetsens serienummer

EXEMPEL
2 st. detaljer kod 211844 - för apparat POWER MIG 2000 PULSE - 230 V - 50/60 Hz - Serienummer .....

FI Varaosien tilaus

Tiedustellessanne varaosia, ilmoittakaa selvästi:
1) Osan koodinumero
2) Laitteiston tyyppi
3) jännite ja taaiuus, jokta on ilmoitettu laitteistolle sijoitetusta tietokyltistä
4) Hitsauskoneen sarjanumero

ESIMERKKI
2 osaa, koodi 211844 - laitteistoon POWER MIG 2000 PULSE - 230 V - 50/60 Hz - Sarjanumero .....

N Bestilling av reservedeler

Ved bestilling av reservedeler må du oppgi:
1) Delenes kodenummer
2) Type apparat
3) Apparatets spenning og frekvens som finnes på merkeplaten for data på apparatet
4) Sveiseapparatets serienummer

EKSEMPEL
2 stk. kode 211844 - for apparat POWER MIG 2000 PULSE - 230 V - 50/60 Hz - Serienummer.....

RU Заказ запасных частей

Для запроса запасных частей укажите точно:
1) код запчасти,
2) модель машины,
3) напряжение и частоту, написанные на пластине,
4) ее серийный номер.

ПРИМЕР
2 шт., код № 438401
n - штук деталей, код 211844, для сварочной машины POWER MIG 2000 PULSE - 230 В - 50/60 Hz
Серийный номер .....

PoWer MIG Series

GeKaMac®

Power MIG 2000 PULSE

Users Manual

Please Read and Understand This Manual
Before Operating The Welding Machine

www.gedikwelding.com

EN ENGLISH

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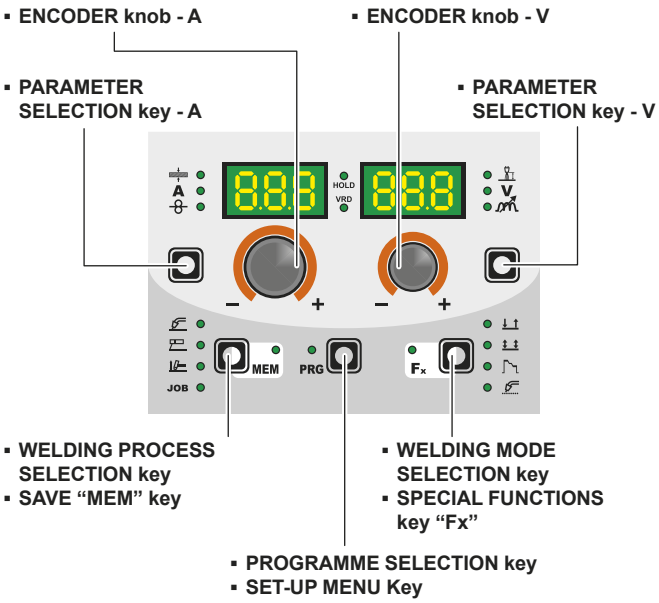
Introduction

Il presente manuale contiene tutte le informazioni necessarie per This manual contains all the information necessary to make the best use of this control panel. This control panel is specifically for multi-process welding machines: MIG-MAG, PULSED MIG, DOUBLE PULSED MIG, MMA and TIG.

Control panel

KEY AND KNOB COMMANDS



■ PARAMETER SELECTION key - A

This is used to select the following welding parameters:
- THICKNESS OF WELDED ITEM ( ).
- WELDING CURRENT (**A**).
- WIRE SPEED ( ).

■ ENCODER knob - A

This is used to set and edit the PARAMETERS - A based on the corresponding LED switched on and the value highlighted on the DISPLAY PARAMETERS - A display, required for correct functioning of the machine.

■ PARAMETER SELECTION key - V

This is used to select the following welding parameters:
- ARC LENGTH ADJUSTMENT ( ).
- WELDING VOLTAGE (**V**).
- ELECTRONIC INDUCTANCE ( ).

■ ENCODER knob - V

This is used to set and edit the PARAMETERS - V based on the corresponding LED switched on and the value highlighted on the DISPLAY PARAMETERS - V display, required for correct functioning of the machine.

■ PROGRAMME SELECTION key

It can be used to select the individual welding PROGRAM for MIG-MAG and MMA welding processes.

■ SET-UP MENU Key (T > 3 s)

This provides access to the SET-UP menu, which in turn provides access to a series of functions, suitable for an expert operator.

■ WELDING PROCESS SELECTION key

It can also be used to select the following welding processes:
- MIG-MAG / PULSED MIG / Double PULSED MIG.
- MMA.
- TIG.
- JOB.

■ SAVE "MEM" key (T ≥ 2 s)

It allows the saving of the parameters in the JOB.
It also allows one to view / change the parameters previously saved in the JOB.

WARNING: *No LED switches on when this key is activated!*

■ WELDING MODE SELECTION key

This is used to select the following welding modes (only for MIG welding processes) and each time the key is pushed the welding machine moves on to select the next welding mode in the following order:

TWO STROKE (2T)
2T LED ( ) switched on
Pressing the TORCH TRIGGER starts the welding cycle, which will stop when it is released.

FOUR STROKE (4T)
4T LED ( ) switched on
1) Pressing and releasing the TORCH TRIGGER will start the welding cycle.
2) Pressing and releasing the TORCH TRIGGER will start the welding cycle.

CRATER 2T
2T LED ( ) switched on - CRATER LED ( ) switched on
1) When the TORCH TRIGGER is pushed the arc ignites and the parameters assume the values for the "initial crater" for a time set by means of the CRATER START TIME (F10) function. After that the parameter values become those for "welding" for a time defined by the CRATER START SLOPE (F11) function.
2) When the TORCH TRIGGER is released the parameters take on the "final crater" values for a time set by means of the CRATER END TIME (F15) function, for a period of time set using the CRATER END SLOPE (F12) function.

CRATER 4T
4T LED ( ) switched on - CRATER LED ( ) switched on
1) When the TORCH TRIGGER is pushed the arc ignites and the parameters assume the values for the "initial crater".
2) When the TORCH TRIGGER is released the parameters take on the "welding" values for a time set using the CRATER START SLOPE (F11) function.
3) When the TORCH TRIGGER is pushed again the parameters take on the "final crater" values for a time defined using the CRATER END SLOPE (F12) function.
4) Releasing the TORCH TRIGGER will end the welding cycle.

SPOT WELDING 2T
2T LED ( ) switched on - SPOT LED ( ) switched on
This is used so that on pressing the TORCH TRIGGER spot welding is done for a time period set beforehand (in seconds), after which the arc switches off automatically (SPOT WELD TIME F07 function).

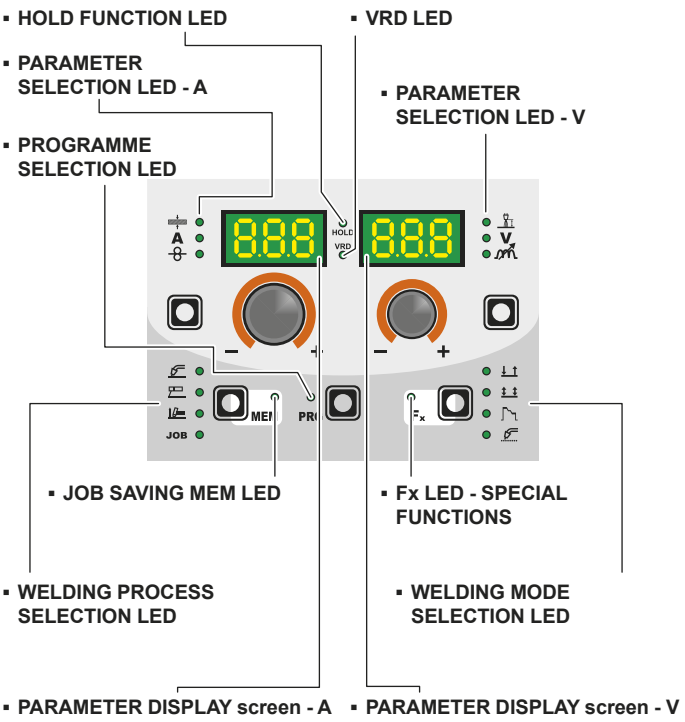
STITCH WELDING 2T
2T LED ( ) switched on - SPOT LED ( ) flashing
To begin stitch welding:
1) Press the TORCH TRIGGER to start the welding current and wire feed.
   At this point the welder will perform automatically a succession of a welded tracts followed by a pause, respecting the times set in the functions STITCH WELD TIME (F05) and STITCH WELD PAUSE (F06).
   This procedure stops automatically only when the TORCH TRIGGER is released.
2) When the TORCH TRIGGER is pushed again the torch begins a new interval welding cycle.

■ SPECIAL FUNCTIONS key "Fx" (T ≥ 3 s)

This key is used to display and edit some parameters (ADJUSTABLE FUNCTIONS "Fx") that are necessary and fundamental for welding and that have already been set by the manufacturer in the factory.
The parameters vary depending on the welding process and mode used, and are saved in the memory for each automatic welding point (JOB).

WARNING: *No LED switches on when this key is activated!*

DISPLAY AND LED INDICATIONS



■ PARAMETER SELECTION LED - A
When one of these LEDs is on it means that the corresponding welding parameter has been selected.

■ PROGRAMME SELECTION LED
This LED will be lit only when the operator selects a welding process (in which there welding programmes present) and the relative associated programme.

■ PARAMETER DISPLAY screen - A
This Display shows the values / numbers (set or measured) of the following parameters (if active):
- THICKNESS OF WELDED ITEM ( ).
- WELDING CURRENT (**A**).
- WIRE SPEED ( ).
- WELDING PROGRAM (PRG).

■ HOLD FUNCTION LED
Flashing, it indicates that the values of the parameters views on the PARAMETER DISPLAY - A and V are respectively the values that are set or measured at the conclusion of the last welding. The LED flashes for **15** seconds consecutively before turning itself off or until the moment that the operator varies any parameter by means of the use of the handles.

■ WELDING PROCESS SELECTION LED
When one of these LEDs is on it means that the corresponding welding process has been selected.

■ PARAMETER SELECTION LED - V
When one of these LEDs is on it means that the corresponding welding parameter has been selected.

■ PARAMETER DISPLAY screen - V
This Display shows the values / numbers (set or measured) of the following parameters (if active):
- ARC LENGTH ADJUSTMENT ( ).
- WELDING VOLTAGE (**V**).
- ELECTRONIC INDUCTANCE ( ).

■ JOB SAVING MEM LED
Flashes while saving a JOB.

■ Fx LED - SPECIAL FUNCTIONS
Switched on when special Fx parameters are displayed.

■ VRD LED
The Voltage Reduction Device (VRD) is a safety device that reduces voltage. It prevents voltages forming on the output terminals that may pose a danger to people.
Two-tone LED (off - red - green) indicates enabling of the VRD. In the welding process:
- MIG MAG (Synergic and Manual) / JOB: the VRD device is not managed and therefore the LED always will be off.
- MMA: the operator can decide whether or not to activate the VRD device (to activate the VRD device see the corresponding paragraph) based on its necessities and therefore the LED will be lit and will indicate the activation of the device.
- TIG Lift: the VRD device is always inserted, independently from the state of the JUMPER and therefore the LED always will be lit.

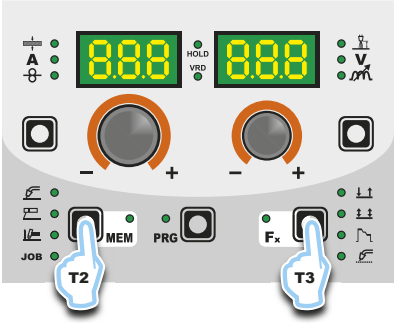
■ WELDING MODE SELECTION LED
When one or a combination of these LED is lit, it means that the corresponding manner of welding has been selected.

Switching on the welding machine and initial screen

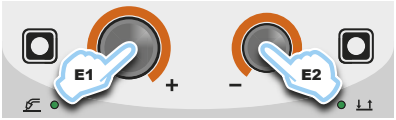
At the switching on of the welder (press the switch, located on the back panel, at the position I), the control performs a short operation of MACHINE CHECK (all of the LED light themselves simultaneously so as to verify their actual operation), and the panel display the INITIAL SCREEN (see the demonstrative figure), after which the operator can begin to work.

Viewing the software version installed

1) When the welding machine is working hold down the WELDING PROCESS SELECTION key (T2) and WELDING MODE SELECTION key (T3) together for about 2 consecutive seconds.



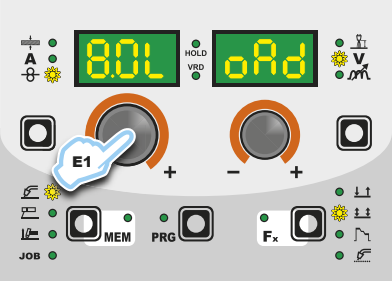
2) On both displays appears a running string that indicates the VERSION OF THE SOFTWARE installed on the welder.
The rotation of one of the two ENCODER Knobs - A (E1) or V (E2) by the operator during the display of the string version software provokes the block (for **1** second), on both the displays, of the movement of the string itself.



3) Ending viewing of the software version on the control panel can come about in 2 different ways:
   - Automatically: by waiting for the display time to elapse.
   - Manually: by pushing any key.

Loading of the wire

In the MIG-MAG-PULSE-DOUBLE PULSE welding processes, with the welder in operation, it is possible to load the wire inside the torch, following this simple procedure:
- Keep the torch button held down.
- After a time of about 2 seconds, the wire begins to load itself at a constant speed.
- This operation is also indicated by a message made up of a numerical value for the wire speed, followed by “LoAd” (see figure).
- Rotate the ENCODER - A (E1) knob to change the wire loading speed.
- To finish the loading of the wire release the torch button.



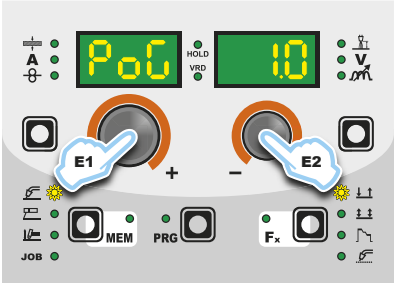
Special functions “Fx”

To access the SPECIAL FUNCTIONS “Fx” menu, hold the SPECIAL FUNCTIONS “Fx” key (T3) down for at least 3 consecutive seconds. The Fx LED switches on.

The special functions allow the operator to regulate further parameters, operations and do partial resetting, and are operative, in a different way, within each welding process.
Table 1 shows the special functions available. Details of the meaning of the columns are as follows:
- **FUNCTION** column: name of the special function.
- **DISPLAY** column: symbol for the special function (message shown in the PARAMETERS DISPLAY - A screen).
- **FACTORY** column: Factory setting for the special function (message shown in the PARAMETERS DISPLAY - V screen).
- **RANGE** column: regulation field for the special function.
- The last two groups of columns, **WELDING PROCESS** and **MIG-MAG WELDING MODE** indicate the welding process and mode in which the special function can be selected. Example: the SPOT WELD TIME function can be selected only when one is welding in synergistic MIG-MAG-PULSE or manual SPOT 2T mode.

1) Rotate the ENCODER - A knob (E1) to select the SPECIAL FUNCTION required. Rotate the ENCODER - V knob (E2) to edit the VALUE for the special function selected.

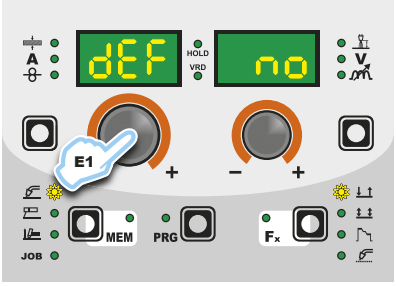
WARNING: *Changes to values are immediately activated (no further confirmation is required and they will be displayed immediately) or, at least they will become active the next time welding is done. The operator can edit the functions (not the wire speed and other parameters) when welding is underway and continue welding without having to exit the SPECIAL FUNCTIONS “Fx” menu.*



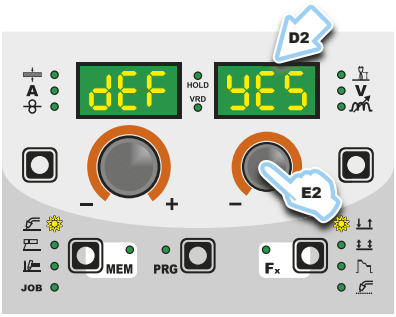
2) PROGRAM DEFAULT (dEF)

WARNING: *If carried out, this operation resets the program in use to the factory default settings.*

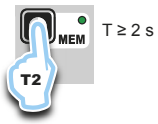
To carry out the reset of the settings / parameters, proceed in the following manner:
- Rotate the ENCODER - A (E1) knob until both the displays read **dEF no** (see figure).



- Rotate the ENCODER - V knob (E2) until the PARAMETERS DISPLAY - V screen (D2) reads **YES**.

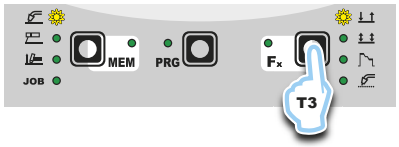


- Hold the SAVE “MEM” key (T2) down for at least **2** consecutive seconds.



- The program in use has now been completed successfully. To confirmation the above, the control panel of the welder performs a short operation of MACHINE CHECK (all of the LED stay lit simultaneously so as to verify their actual operation), the generator itself starts, having memorised the new settings and is again ready to weld.

3) To exit the SPECIAL FUNCTIONS “Fx” menu, push and release the SPECIAL FUNCTIONS “Fx” (T3) key once.



WARNING: *The functions that can be selected depend on the welding process activated. For this reason details of each function are given on the next pages, along with a description of the welding processes.*

SETUP Menu

Hold the PRG key down for at least 3 seconds to open the SET-UP menu, which provides access to various functions, which are suitable for expert operators. For further information, see table 1.

FACTORY DEFAULT (FAC)

WARNING: *If carried out, this operation results in complete resetting of all editable parameters to the factory settings (including cancellation of the JOBS).*

Table 1

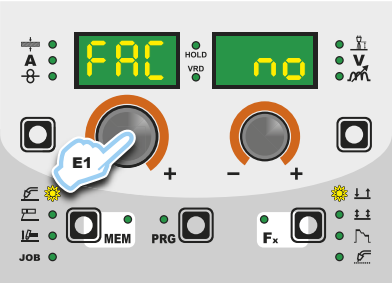
FUNCTION	DISPLAY	SETTINGS RANGE		WELDING PROCESS					MIG-MAG WELDING MODE					
		FACTORY	RANGE	MIG MAG / PULSE			TIG	MMA	2T	4T	Cra 2T	Cra 4T	Spot 2T	Stitch 2T
				MiG PLS	dPL	MAn								
ADJUSTABLE FUNCTIONS “Fx” Fx > 3s														
MIG-MAG process														
PRE GAS	PrG	0.1s	(0.0 ÷ 2.0)s	●	●	●			●	●	●	●	●	●
STARTING SPEED	Sts	0	-30 ÷ +30	●	●	●			●	●	●	●	●	●
HOT START	Hot	0	-30 ÷ +30	●	●	●			●	●	●	●	●	●
CRATER														
INITIAL CRATER														
CRATER START CURRENT	F08	20%	(-50 ÷ +100)%	●	●						●	●		
CRATER START SPEED	F08	5.0m/min	(1.5 ÷ 22.0)m/min			●					●	●		
CRATER START VOLTAGE	F09	15.0V	(10.0 ÷ 26.0)V			●					●	●		
CRATER START TIME	F10	1.0s	(0.0 ÷ 20.0)s	●	●	●					●			
CRATER START SLOPE	F11	1.0s	(0.0 ÷ 20.0)s	●	●	●					●	●		
FINAL CRATER														
CRATER END SLOPE	F12	1.0s	(0.0 ÷ 20.0)s	●	●	●					●	●		
CRATER END CURRENT	F13	-30	(-99 ÷ +50)%	●	●						●	●		
CRATER END SPEED	F13	5.0m/min	(0.6 ÷ 22.0)m/min			●					●	●		
CRATER END VOLTAGE	F14	15.0V	(10.0 ÷ 26.0)V			●					●	●		
CRATER END TIME	F15	0.0s	(0.0 ÷ 20.0)s	●	●	●					●			
SPOT WELD TIME	F07	3.0s	(0.1 ÷ 20.0)s	●	●	●							●	
STITCH WELD														
STITCH WELD TIME	F05	1.0s	(0.1 ÷ 20.0)s	●	●	●								●
STITCH WELD PAUSE	F06	1.0s	(0.1 ÷ 20.0)s	●	●	●								●
BURN BACK	bUb	0	-30 ÷ +30	●	●	●			●	●	●	●	●	●
POST GAS	PoG	1.0s	(0.0 ÷ 10.0)s	●	●	●			●	●	●	●	●	●
DUAL PULSE FUNCTIONS														
DUAL PULSE DELTA CURRENT	F23	40%	(-50 ÷ +50)%		●				●	●	●	●	●	●
DUAL PULSE BALANCE	F25	0%	(-20 ÷ +20)%		●				●	●	●	●	●	●
DUAL PULSE FREQUENCY	F26	1.5Hz	(0.1 ÷ 2.5)Hz		●				●	●	●	●	●	●
TIG process														
UP SLOPE	F29	0.0s	(0.0 ÷ 20.0)s				●							
DOWN SLOPE	F30	2.0s	(0.0 ÷ 20.0)s				●							
SWS VOLTAGE LIMIT	F31	0	-30 ÷ 30				●							
MMA process														
HOT START	Hot	50	0 ÷ 100					●						
ARC FORCE	ArC	50	0 ÷ 100					●						
PROGRAM DEFAULT	dEF	no	no - YES	●	●	●	●	●	●	●	●	●	●	●

SETUP (SEtUP) menu PRG > 3s														
FACTORY DEFAULT	FAC	no	no - YES	●	●	●	●	●	●	●	●	●	●	●

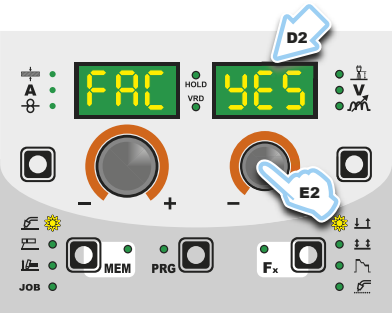
SPECIAL FUNCTIONS (SPC FnC) menu PRG > 3s														
SAFETY CALIBRATION CODE	SCC	7	0 ÷ 100	●	●	●			●	●	●	●	●	●
MOTOR CALIBRATION	Mot CAL													
SPEED MOTOR 1	SM1	75.0	50.0 ÷ 99.9	●	●	●			●	●	●	●	●	●
SPEED MOTOR 2	SM2	75.0	50.0 ÷ 99.9	●	●	●			●	●	●	●	●	●
SPEED MOTOR 3	SM3	75.0	50.0 ÷ 99.9	●	●	●			●	●	●	●	●	●

To carry out the reset of the settings / parameters, proceed in the following manner:

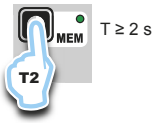
1) Rotate the ENCODER - A (E1) knob until both the displays read **FAC no** (see figure).



2) Rotate the ENCODER - V knob (E2) until the PARAMETERS DISPLAY - V screen (D2) reads**YES**.



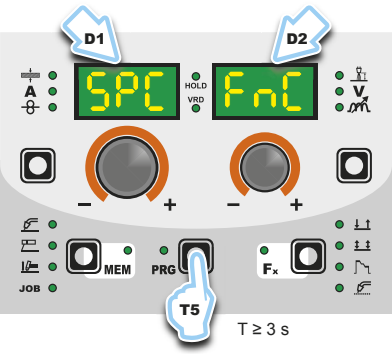
3) Hold the SAVE “MEM” key (T2) down for at least **2** consecutive seconds.



4) At this stage the **total reset** or **factory default** procedure has been completed successfully (the parameters have been taken back to the factory values and any JOBS saved have been deleted). To confirmation the above, the control panel of the welder performs a short operation of MACHINE CHECK (all of the LED stay lit simultaneously so as to verify their actual operation), the generator itself starts, having memorised the new settings and is again ready to weld.

Menu SPECIAL FUNCTIONS

From the **SEtUP** menu, push the **PRG** key (T5) for more than 3 seconds to access the SPECIAL FUNCTIONS menu, which provides access to additional functions that can only be managed by an expert, responsible operator. The two displays (D1-D2) will read **SPC FnC**.



SAFETY CALIBRATION CODE (SCC)

ATTENTION: *This operation, if carryed on, optimizes the efficiency of the welding circuit (only in MIG welding processes).*

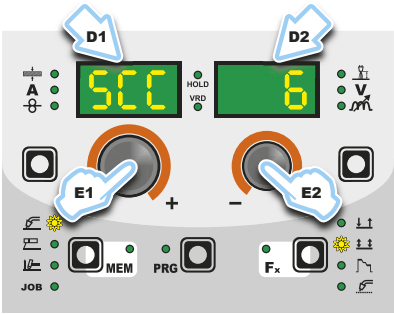
To set the length of the welding circuit (adjustable from 1 to 100 m) follow this procedure:

- Rotate the ENCODER knob - A (E1) until obtaining on the PARAMETER DISPLAY screen - A (D1) and the writing **SCC**.
- Rotate the ENCODER knob - V (E2) until obtaining on the PARAMETER DISPLAY screen - V (D2) the desired number.

CAUTION: *The operation does not require confirmation!*

CAUTION: *The data inserted is valid for all the MIG welding processes.*

Example:
Length of cable mass 3 m.
Length of welding torch cable 3 m.
The overall length of the welding circuit is 6 m (6 is the number that will therefore be inserted).

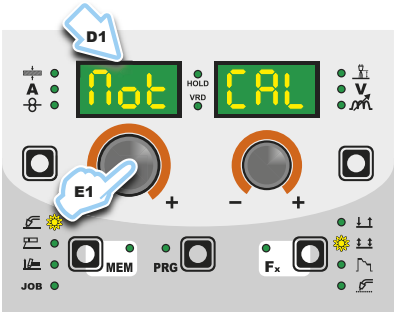


MOTOR CALIBRATION (Mot CAL)

ATTENTION: *This procedure allows you to calibrate the wire speed (only in MIG welding processes).*

Proceed as follows:

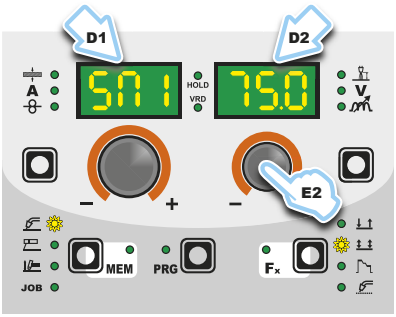
- Rotate the ENCODER - A (E1) knob until the PARAMETER DISPLAY - A (D1) screen reads **Mot CAL**.



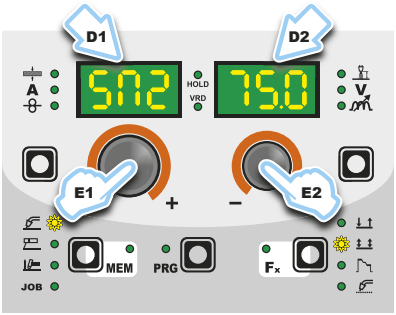
- To open the CALIBRATION menu, push the PRG key (T3).

- The procedure of calibration is carried out in 3 different phases:
  1. **Calibration parameter SM1 (MINIMUM SPEED)**
     Push and release the torch button, and then wait for the wire to stop automatically, and the **End MiS** message to appear. Measure (in cm) the dangling wire and insert the value shown, in the software of the welder, by means of the rota-

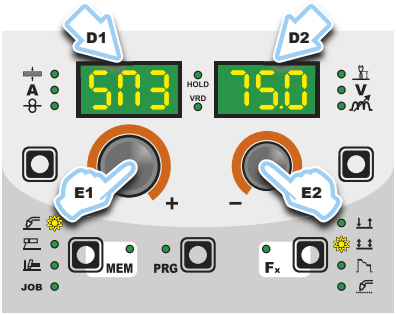
tion of the ENCODER knob - V (E2) appearing on the PARAMETER DISPLAY screen - V (D2) is the desired value.



2. **Calibration parameter SM2 (MEDIUM SPEED)**
Then turn the ENCODER - A knob (E1) until the PARAMETER DISPLAY - A screen (D1) shows the **SM2** parameter. Push and release the torch button, and then wait for the wire to stop automatically, and the **End MiS** message to appear. Measure (in cm) the dangling wire and insert the value shown, in the software of the welder, by means of the rotation of the ENCODER knob - V (E2) appearing on the PARAMETER DISPLAY screen - V (D2) is the desired value.



3. **Calibration parameter SM3 (MAXIMUM SPEED)**
Then turn the ENCODER - A knob (E1) until the PARAMETER DISPLAY - A screen (D1) shows the **SM3** parameter. Push and release the torch button, and then wait for the wire to stop automatically, and the **End MiS** message to appear. Measure (in cm) the dangling wire and insert the value shown, in the software of the welder, by means of the rotation of the ENCODER knob - V (E2) appearing on the PARAMETER DISPLAY screen - V (D2) is the desired value.



- At the end of the procedure, the software present in the welder will immediately re-calculate the characteristic curve of the engine, rendering it suitable to use.
- To exit from the CALIBRATION menu, press and release the SAVE “MEM” key (T2).

- To interrupt measuring, push the SAVE “MEM” (T2) Key.

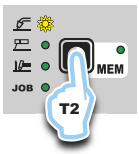
MIG-MAG synergic / MIG pulse / double pulsed MIG

Start the welder by pressing the switch, located on the back panel, at the position **I**.

1 - WELDING PROCESS SELECTION

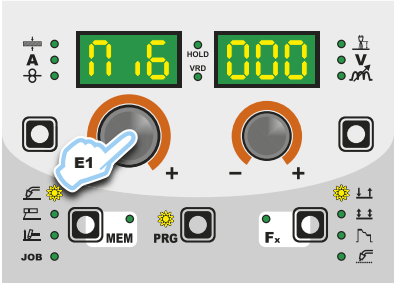
Select the MIG welding PROCESS this way:

1) Push the SELECT WELDING PROCESS (T2) key, even a number of times if necessary, until the corresponding LED switches on.

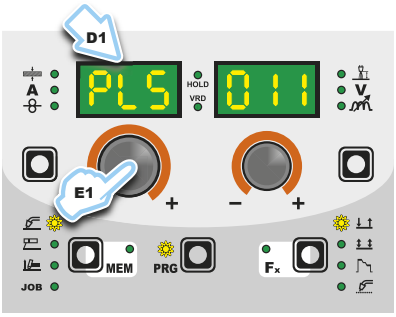


2) Push the SELECT PROGRAM (T5) key. The corresponding LED switches on.

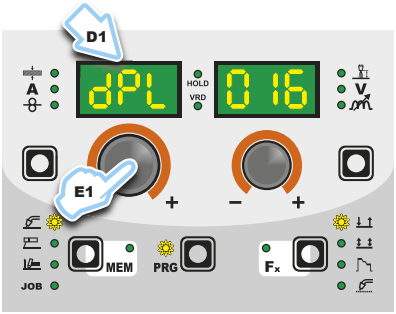
3A) To access the MIG-MAG synergic welding process: rotate the ENCODER knob - A (E1) until obtaining on the PARAMETER DISPLAY screen - A (D1) and the writing **MiG**.



3B) To access the MIG pulse welding process: rotate the ENCODER knob - A (E1) until obtaining on the PARAMETER DISPLAY screen - A (D1) and the writing **PLS**.



3C) To access the double pulsed MIG welding process: rotate the ENCODER knob - A (E1) until obtaining on the PARAMETER DISPLAY screen - A (D1) and the writing **dPL**.



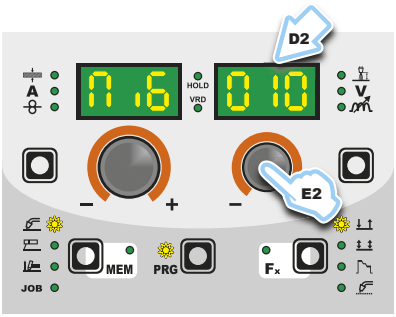
2 - SELECTION OF WELDING PROGRAMME

PROGRAM TABLE PRG						
MIG-MAG-PULSE PROCESS						
PROGRAM NUMBER	MATERIAL		WIRE Ø (mm)	GAS	DISPLAYS	
	TYPE	CLASS			MiG	PLS dPL
000	Fe	G3 Si-1	0.6	CO_2	•	
001	Fe	G3 Si-1	0.8	CO_2	•	
002	Fe	G3 Si-1	1.0	CO_2	•	
010	Fe	G3 Si-1	0.6	Ar/16-20%CO_2	•	
011	Fe	G3 Si-1	0.8	Ar/16-20%CO_2	•	•
012	Fe	G3 Si-1	1.0	Ar/16-20%CO_2	•	•
015	Fe	G3 Si-1	0.9	Ar/16-20%CO_2	•	•
051	Fe	G3 Si-1	0.8	Ar/21-25%CO_2	•	
055	Fe	G3 Si-1	0.9	Ar/21-25%CO_2	•	
195	Fe-rutil flux-cored	E71T-GS	0.9	-	•	
231	CrNi 308	G 19 9 LSI	0.8	Ar/2-3%CO_2	•	•
232	CrNi 308	G 19 9 LSI	1.0	Ar/2-3%CO_2	•	•
402	Al 99.9	S Al 1050	1.0	Ar	•	•
403	Al 99.9	S Al 1050	1.2	Ar	•	•
412	Al Mg 5	S Al 5356	1.0	Ar	•	•
413	Al Mg 5	S Al 5356	1.2	Ar	•	•
422	Al Si 5	S Al 4043A	1.0	Ar	•	•
423	Al Si 5	S Al 4043A	1.2	Ar	•	•
472	Al Si12	S Al 4047A	1.0	Ar	•	•
511	Cu Si 3	S CuSi3	0.8	Ar	•	•
512	Cu Si 3	S CuSi3	1.0	Ar	•	•
515	Cu Si 3	S CuSi3	0.9	Ar	•	•
911	Fe	BD140	0.8	Ar/16-20%CO_2	•	•
951	Fe	BD140	0.8	Ar/21-25%CO_2	•	
PLS / dPL= Pulse version only						

FACSIMILE

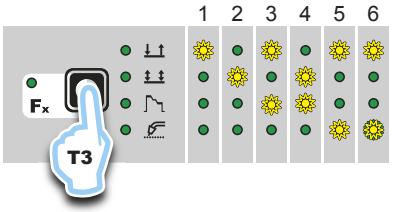
WARNING: *This table is merely an example, the welding programs can be updated and extended. See the table on the welding machine for the correct list of the programs available.*

Select the welding PROGRAMME rotating ENCODER knob - V (E2) until obtaining on the PARAMETER DISPLAY screen - V (D2) the desired number.



3 - WELDING MODE SELECTION

Select the MODE of welding, pressing and releasing, even various times if necessary, the WELDING MODE SELECTION key (T3) until the corresponding LED lights up.



1. TWO STROKE (2T)
2. FOUR STROKE (4T)
3. CRATER 2T
4. CRATER 4T
5. SPOT WELDING 2T
6. STITCH WELDING 2T

4 - SPECIAL FUNCTIONS "Fx" SELECTION

The SPECIAL FUNCTIONS "Fx" that are only available in the synergic MIG-MAG and pulsed / double pulsed MIG welding process are shown below. For all the other explanations regarding this menu make reference to the relative paragraph.

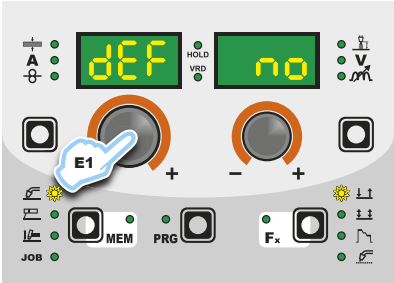
- **PRE GAS (PrG)** - Provides an additional quantity of gas for a defined time, before welding starts.
- **STARTING SPEED (StS)** - Regulates the speed at which the wire approaches the workpiece. The value indicated is a percentage variation in relation to the factory setting value.
- **HOT START (Hot) -** Regulates the current intensity for igniting the welding arc. The value indicated is a percentage variation in relation to the factory setting value.
- **CRATER START CURRENT (F08)** - Sets the initial starting current of the crater.
- **CRATER START TIME (F10)** - This function defines the time in which the current remains at the value of CRATER START CURRENT.
- **CRATER START SLOPE (F11)** - The time lapse for passing from the CRATER START CURRENT level to the welding current level.
- **CRATER END SLOPE (F12) -** Time required to go from the welding current level to the "CRATER END CURRENT" level.
- **CRATER END CURRENT (F13)** - Sets the final welding current of the crater.
- **CRATER END TIME (F15)** - This function defines the time in which the current remains at the value of CRATER END CURRENT.
- **SPOT WELD TIME (F07)** - The time during which spot welding takes place after the arc is ignited, after which the arc is extinguished automatically.
- **STITCH WELD TIME (F05)** - Time in which the welding in tracts is performed after the ignition of the arch, after which the arch switches off automatically.
- **STITCH WELD PAUSE (F06)** - Time of pause between one welding in tracts and another.
- **BURN BACK (bUb)** - Regulates the length of the wire after welding. The value indicated is a percentage variation in relation to the factory setting value. Higher numbers correspond to more burning of the wire.
- **POST GAS (PoG)** - Provides an additional quantity of gas for a defined time, after welding ends.
- **DUAL PULSE DELTA CURRENT (F23) -** This function determines the positive or negative percentage variation in the peak current, compared to the welding current set.
- **DUAL PULSE BALANCE (F25) -** This function determines the positive or negative percentage variation in the duration of the peak current, compared to that of the welding current.
- **DUAL PULSE FREQUENCY (F26) -** This function determines the variation in frequency (Hz) for double pulsed mode.

■ PROGRAM DEFAULT (dEF)

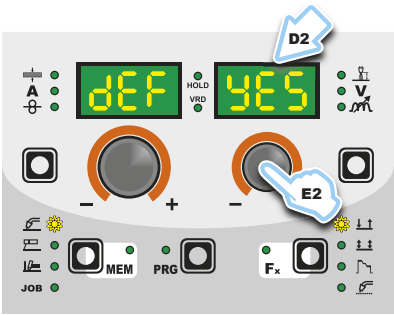
WARNING: *If carried out, this operation resets the program in use to the factory default settings.*

To carry out the reset of the settings / parameters, proceed in the following manner:

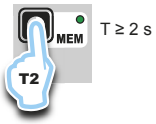
- Rotate the ENCODER - A (E1) knob until both the displays read **dEF no** (see figure).



- Rotate the ENCODER - V knob (E2) until the PARAMETERS DISPLAY - V screen (D2) reads **YES**.



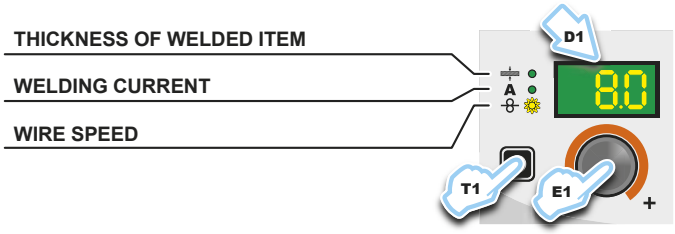
- Hold the SAVE "MEM" key (T2) down for at least **2** consecutive seconds.



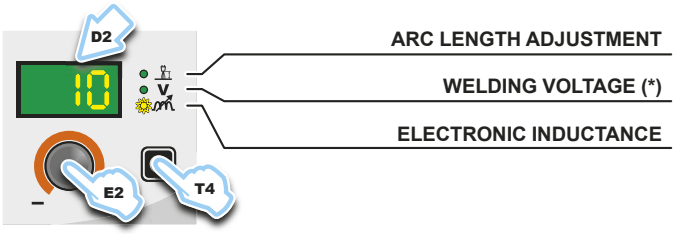
- The program in use has now been completed successfully. To confirmation the above, the control panel of the welder performs a short operation of MACHINE CHECK (all of the LED stay lit simultaneously so as to verify their actual operation), the generator itself starts, having memorised the new settings and is again ready to weld.

5 - PRE-SETTING

Before welding it is possible to set the following parameters:



Example: WIRE SPEED
Press the PARAMETER SELECTION - A key (T1) until the LED that corresponds to the WIRE SPEED switches on. Turn the ENCODER - A knob (E1) to change the value shown on the PARAMETER DISPLAY - A screen (D1).



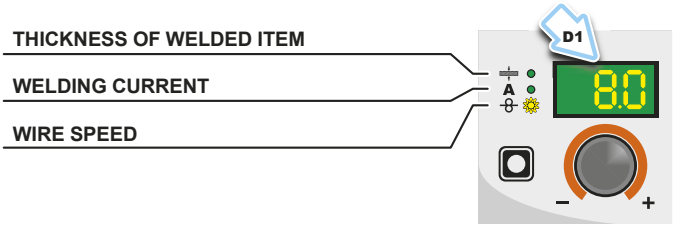
(*) The parameter is pre-set by means of synergy and can be changed by varying the ARC LENGTH ADJUSTMENT parameter.

Example: ELECTRONIC INDUCTANCE
Press the PARAMETER SELECTION - V key (T4) until the LED that corresponds to the ELECTRONIC INDUCTANCE switches on. Turn the ENCODER - V knob (E2) to change the value shown on the PARAMETER DISPLAY - V screen (D2).

6 - WELDING

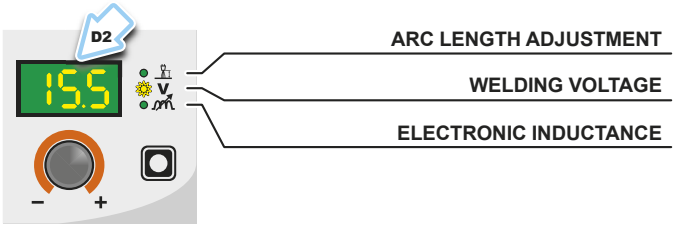
During the welding the display shows:

- PARAMETER DISPLAY screen - A (D1)



- THICKNESS OF WELDED ITEM (): the value previously set.
- WELDING CURRENT (**A**): the measured value of the current of what is being welded.
- WIRE SPEED (): the value previously set.

- PARAMETER DISPLAY screen - V (D2)



- ARC LENGTH ADJUSTMENT (): the value previously set.
- WELDING VOLTAGE (**V**): the measured value of the voltage of what is being welded.
- ELECTRONIC INDUCTANCE (): the value previously set.

During the welding the operator can change the following parameters:

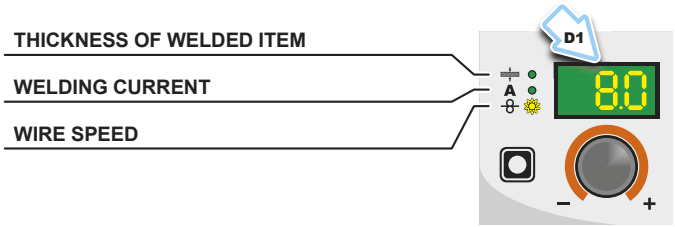
- THICKNESS OF WELDED ITEM ().
- WELDING CURRENT (**A**).
- WIRE SPEED ().
- ARC LENGTH ADJUSTMENT ().
- ELECTRONIC INDUCTANCE ().
- SPECIAL FUNCTIONS "Fx".

WARNING: *Remember that this process of welding is synergic and for this reason the alteration of an individual parameter synergically also influences other parameters according to the predefined settings that are not modifiable!*

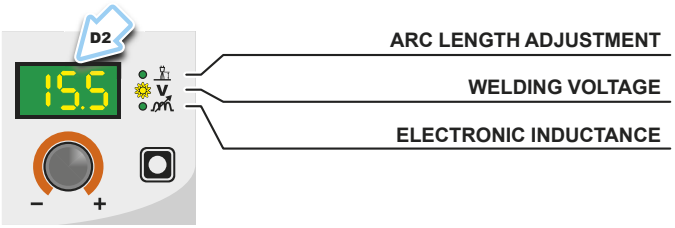
7 - HOLD

This function automatically starts itself at the conclusion of every welding operation and it is indicated to the operator by means of a flashing light of the HOLD FUNCTION LED for a specific amount of time.
Once the welding has been terminated, for about **15** seconds, both the DISPLAYS should show the same values of the parameters during the welding.
In this phase the displays show:

- PARAMETER DISPLAY screen - A (D1)

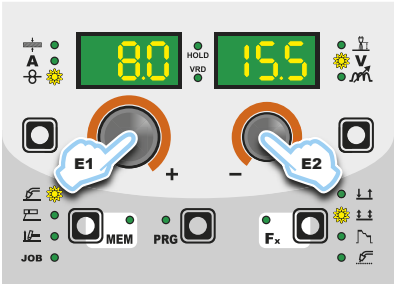


  - THICKNESS OF WELDED ITEM (): the value previously set.
  - WELDING CURRENT (**A**): the last current value measured.
  - WIRE SPEED (): the value previously set.
- PARAMETER DISPLAY screen - V (D2)



  - ARC LENGTH ADJUSTMENT (): the value previously set.
  - WELDING VOLTAGE (**V**): the last voltage value measured.
  - ELECTRONIC INDUCTANCE (): the value previously set.

To interrupt the HOLD function and go back to the PRESETTING phase before **15** seconds have passed, simply turn one of the two ENCODER knobs (E1-E2).



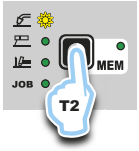
The HOLD function can be terminated ahead of time even while once again starting the welding.
Once **15** seconds have passed (HOLD FUNCTION) the control panel goes back to the PRESETTING phase.

MIG-MAG manual

Start the welder by pressing the switch, located on the back panel, at the position **I**.

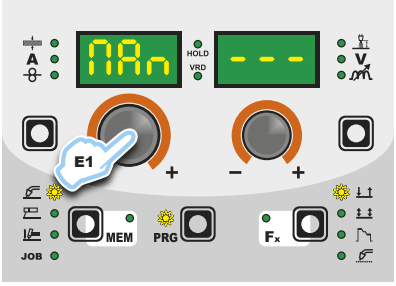
1 - WELDING PROCESS SELECTION

Select the MIG-MAG manual PROCESS of welding, pressing and releasing, even various times if necessary, the WELDING PROCESS SELECTION key (T2) until the corresponding LED lights up.



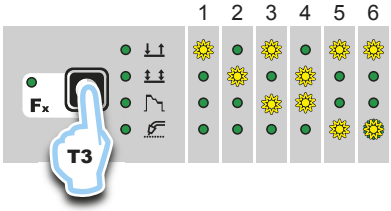
Push the SELECT PROGRAM (T5) key. The corresponding LED switches on.

To access the MIG-MAG synergic welding process: rotate the ENCODER knob - A (E1) until obtaining on the PARAMETER DISPLAY screen - A (D1) and the writing **MAn**.



2 - WELDING MODE SELECTION

Select the MODE of welding, pressing and releasing, even various times if necessary, the WELDING MODE SELECTION key (T3) until the corresponding LED lights up.



1. TWO STROKE (2T)
2. FOUR STROKE (4T)
3. CRATER 2T
4. CRATER 4T
5. SPOT WELDING 2T
6. STITCH WELDING 2T

3 - SPECIAL FUNCTIONS “Fx” SELECTION

The SPECIAL FUNCTIONS “Fx” that are only available in the MIG-MAG manual welding process are shown below. For all the other explanations regarding this menu make reference to the relative paragraph.

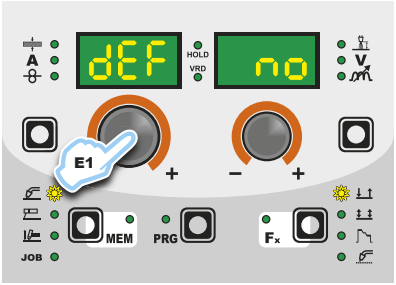
- **PRE GAS (PrG) -** Provides an additional quantity of gas for a defined time, before welding starts.
- **STARTING SPEED (StS) -** Regulates the speed at which the wire approaches the workpiece. The value indicated is a percentage variation in relation to the factory setting value.
- **HOT START (HoT) -** Regulates the current intensity for igniting the welding arc. The value indicated is a percentage variation in relation to the factory setting value.
- **CRATER START SPEED (F08) -** Sets the initial speed of the welding wire for the crater.
- **CRATER START VOLTAGE (F09) -** Sets the initial welding voltage for the crater.
- **CRATER START TIME (F10) -** This function defines the time in which the current remains at the value of CRATER START SPEED or CRATER START VOLTAGE.
- **CRATER START SLOPE (F11) -** Time taken to go from the CRATER START SPEED or CRATER START VOLTAGE level to the welding speed or voltage level.
- **CRATER END SLOPE (F12) -** Time required to go from the welding speed or voltage level to the CRATER END SPEED or CRATER END VOLTAGE level.
- **CRATER END SPEED (F13) -** Sets the final speed of the welding wire for the crater.
- **CRATER END VOLTAGE (F14) -** Sets the final welding voltage for the crater
- **CRATER END TIME (F15) -** This function defines the time in which the current remains at the value of CRATER END SPEED or CRATER END VOLTAGE.
- **SPOT WELD TIME (F07) -** The time during which spot welding takes place after the arc is ignited, after which the arc is extinguished automatically.
- **STITCH WELD TIME (F05) -** Time in which the welding in tracts is performed after the ignition of the arch, after which the arch switches off automatically.
- **STITCH WELD PAUSE (F06) -** Time of pause between one welding in tracts and another.
- **BURN BACK (bUb) -** Regulates the length of the wire after welding. The value indicated is a percentage variation in relation to the factory setting value. Higher numbers correspond to more burning of the wire.
- **POST GAS (PoG) -** Provides an additional quantity of gas for a defined time, after welding ends.

■ PROGRAM DEFAULT (dEF)

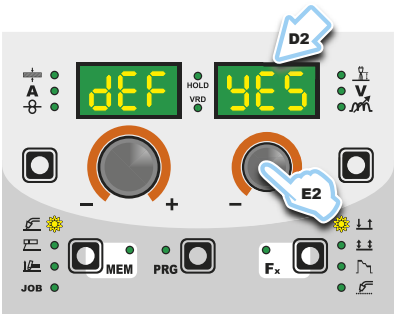
WARNING: *If carried out, this operation resets the program in use to the factory default settings.*

To carry out the reset of the settings / parameters, proceed in the following manner:

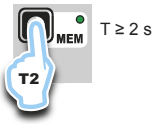
- Rotate the ENCODER - A (E1) knob until both the displays read **dEF no** (see figure).



- Rotate the ENCODER - V knob (E2) until the PARAMETERS DISPLAY - V screen (D2) reads **YES**.



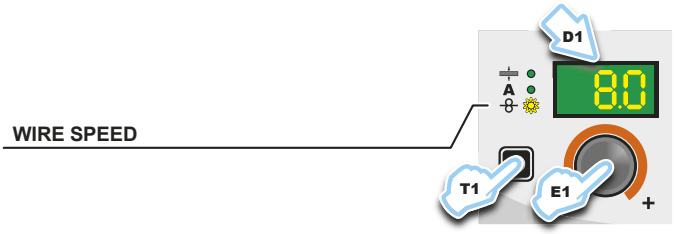
- Hold the SAVE “MEM” key (T2) down for at least **2** consecutive seconds.



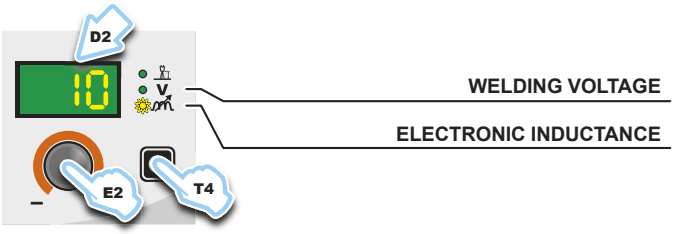
- The program in use has now been completed successfully. To confirmation the above, the control panel of the welder performs a short operation of MACHINE CHECK (all of the LED stay lit simultaneously so as to verify their actual operation), the generator itself starts, having memorised the new settings and is again ready to weld.

4 - PRE-SETTING

Before welding it is possible to set the following parameters:



Example: WIRE SPEED
Press the PARAMETER SELECTION - A key (T1) until the LED that corresponds to the WIRE SPEED switches on. Turn the ENCODER - A knob (E1) to change the value shown on the PARAMETER DISPLAY - A screen (D1).

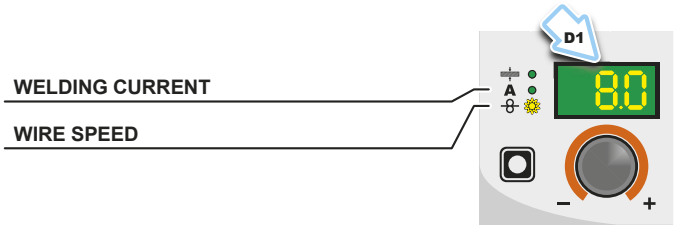


Example: ELECTRONIC INDUCTANCE
Press the PARAMETER SELECTION - V key (T4) until the LED that corresponds to the ELECTRONIC INDUCTANCE switches on. Turn the ENCODER - V knob (E2) to change the value shown on the PARAMETER DISPLAY - V screen (D2).

5 - WELDING

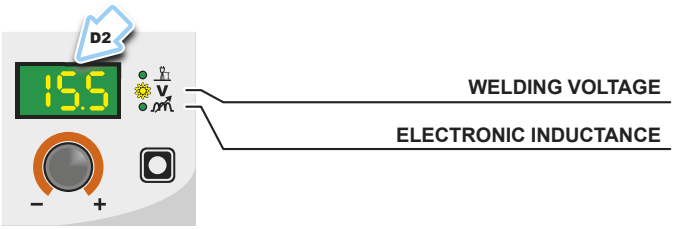
During the welding the display shows:

- PARAMETER DISPLAY screen - A (D1)



- WELDING CURRENT(**A**): the measured value of the current of what is being welded.
- WIRE SPEED (): the value previously set.

- PARAMETER DISPLAY screen - V (D2)



- WELDING VOLTAGE (**V**): the measured value of the voltage of what is being welded.
- ELECTRONIC INDUCTANCE (): the value previously set.

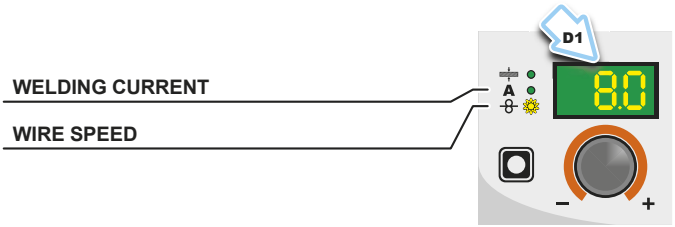
During the welding the operator can change the following parameters:

- WIRE SPEED ().
- WELDING VOLTAGE ().
- ELECTRONIC INDUCTANCE ().
- SPECIAL FUNCTIONS “Fx”.

6 - HOLD

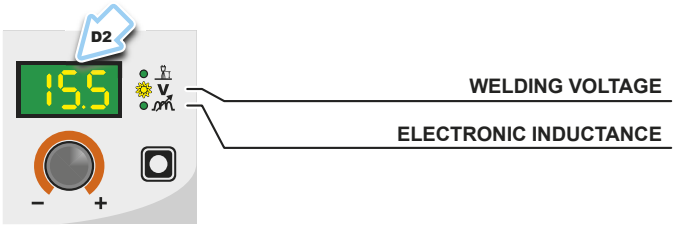
This function automatically starts itself at the conclusion of every welding operation and it is indicated to the operator by means of a flashing light of the HOLD FUNCTION LED for a specific amount of time.
Once the welding has been terminated, for about **15** seconds, both the DISPLAYS should show the same values of the parameters during the welding.
In this phase the displays show:

- PARAMETER DISPLAY screen - A (D1)



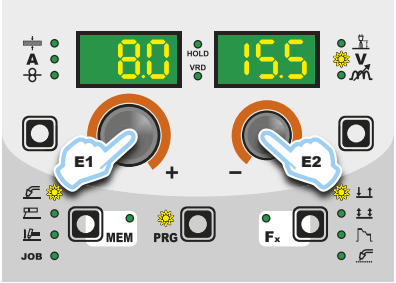
- WELDING CURRENT (**A**): the last current value measured.
- WIRE SPEED (): the value previously set.

- PARAMETER DISPLAY screen - V (D2)



- WELDING VOLTAGE (**V**): the last voltage value measured.
- ELECTRONIC INDUCTANCE (): the value previously set.

To interrupt the HOLD function and go back to the PRESETTING phase before **15** seconds have passed, simply turn one of the two ENCODER knobs (E1-E2).



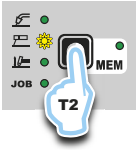
The HOLD function can be terminated ahead of time even while once again starting the welding.
Once **15** seconds have passed (HOLD FUNCTION) the control panel goes back to the PRESETTING phase.

Electrode (MMA)

Start the welder by pressing the switch, located on the back panel, at the position **I**.

1 - WELDING PROCESS SELECTION

Select the ELECTRODE PROCESS of welding (for welding with "HOT START" and "ARC FORCE" devices, programmable by the user) pressing and releasing, even various times if necessary, the WELDING PROCESS SELECTION key (T2) until the corresponding LED lights up.

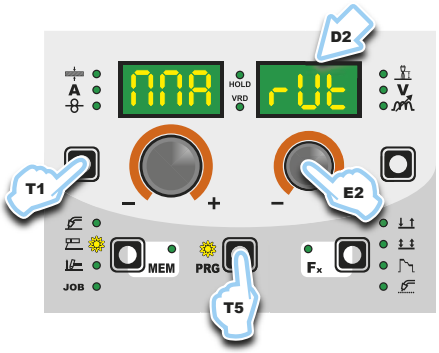


Push the SELECT PROGRAM (T5) key. The corresponding LED switches on.

2 - SELECTION OF WELDING PROGRAM

PROGRAM TABLE PRG			
MMA PROCESS			
MATERIAL		DISPLAY	
TYPE	CLASS		
Basic	E7018	MMA	bAS
Rutil	E6013	MMA	rUt
Cr-Ni	E316L	MMA	Crn

Select the welding PROGRAM by pushing the SELECT PROGRAM (T5) Key, and then rotate the ENCODER - V (E2) Knob until the VIEW PARAMETERS - V (D2) display shows the program required, chosen according to the type of electrode to be used (basic, rutile, and chrome-nickel).



3 - SPECIAL FUNCTIONS "Fx" SELECTION

ADJUSTABLE FUNCTIONS "Fx" Fx > 3s			
FUNCTION	DISPLAY	SETTINGS RANGE	
		FACTORY	RANGE
HOT START	Hot	50	0 ÷ 100
ARC FORCE	ArC	50	0 ÷ 100
PROGRAM DEFAULT	dEF	no	no - YES

The SPECIAL FUNCTIONS "Fx" that are only available in the MMA welding process are shown below. For all the other explanations regarding this menu make reference to the relative paragraph.

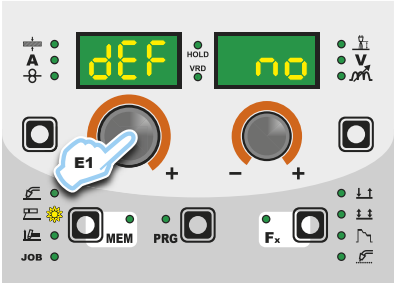
- **HOT START (Hot) -** At the start of the welding process it increases the current, adjustable in percentage, reducing in such a way the risk of low function at the start of the connection.
- **ARC FORCE (ArC) -** During the welding process, it increases the current in percentage, reducing in such a way the risk of fusing the electrode to the piece.

■ PROGRAM DEFAULT (dEF)

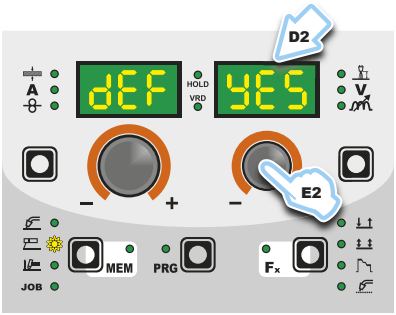
WARNING: *If carried out, this operation resets the program in use to the factory default settings.*

To carry out the reset of the settings / parameters, proceed in the following manner:

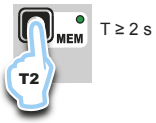
- Rotate the ENCODER - A (E1) knob until both the displays read **dEF no** (see figure).



- Rotate the ENCODER - V knob (E2) until the PARAMETERS DISPLAY - V screen (D2) reads **YES**.



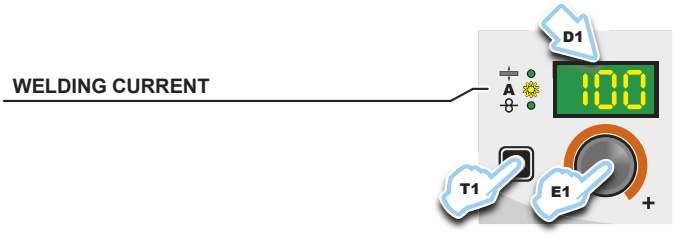
- Hold the SAVE “MEM” key (T2) down for at least **2** consecutive seconds.



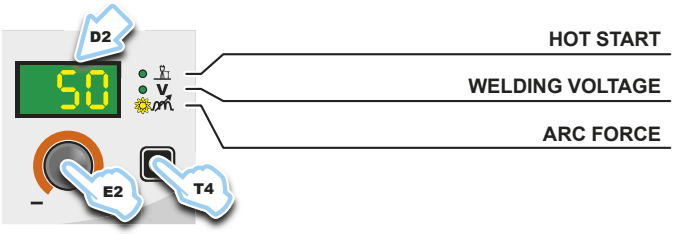
- The program in use has now been completed successfully. To confirmation the above, the control panel of the welder performs a short operation of MACHINE CHECK (all of the LED stay lit simultaneously so as to verify their actual operation), the generator itself starts, having memorised the new settings and is again ready to weld.

4 - PRE-SETTING

Before welding it is possible to set the following parameters:



Example: WELDING CURRENT
Press the PARAMETER SELECTION - A key (T1) until the LED that corresponds to the WELDING CURRENT switches on. Turn the ENCODER - A knob (E1) to change the value shown on the PARAMETER DISPLAY - A screen (D1).



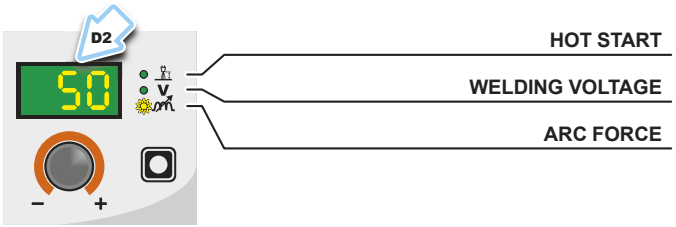
Example: ARC FORCE
Press the PARAMETER SELECTION - V key (T4) until the LED that corresponds to the ARC FORCE switches on. Turn the ENCODER - V knob (E2) to change the value shown on the PARAMETER DISPLAY - V screen (D2).

5 - WELDING

During the welding the display shows:
- PARAMETER DISPLAY screen - A (D1)

- WELDING CURRENT (**A**):the measured value of the current of what is being welded.

- PARAMETER DISPLAY screen - V (D2)



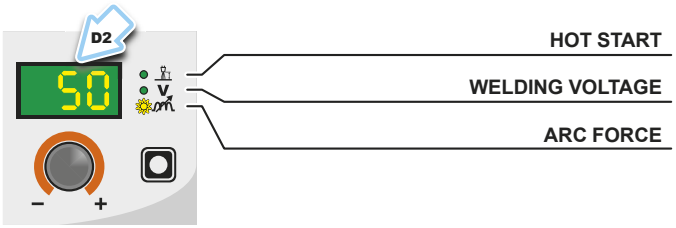
- HOT START (): the value previously set.
- WELDING VOLTAGE (**V**): the measured value of the voltage of what is being welded.
- ARC FORCE (): the value previously set.

During the welding the operator can change the following parameters:
- WELDING CURRENT (**A**).
- HOT START ().
- ARC FORCE ().
- SPECIAL FUNCTIONS “Fx” - FIRST LEVEL MENU.

6 - HOLD

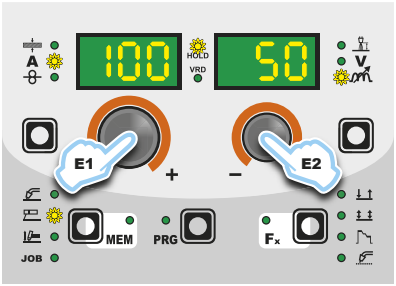
This function automatically starts itself at the conclusion of every welding operation welding and it is indicated to the operator by means of a flashing light of the HOLD FUNCTION LED for a specific amount of time. Once the welding has been terminated, for about **15** seconds, both the DISPLAYS should show the same values of the parameters during the welding.
In this phase the displays show:
- PARAMETER DISPLAY screen - A (D1)

- WELDING CURRENT (**A**): the last current value measured.
- PARAMETER DISPLAY screen - V (D2)



- HOT START (): the value previously set.
- WELDING VOLTAGE (**V**): the measured value of the last voltage of what is being previously welded.
- ARC FORCE (): the value previously set.

To interrupt the HOLD function and go back to the PRESETTING phase before **15** seconds have passed, simply turn one of the two ENCODER (E1-E2) knobs.



The HOLD function can be terminated ahead of time even once again starting the welding.
Once **15** seconds have passed (HOLD FUNCTION) the control panel goes back to the PRESETTING phase.

7 - ACTIVATING THE VRD DEVICE

The Voltage Reduction Device (VRD) is a safety device that reduces voltage. It prevents voltages forming on the output terminals that may pose a danger to people. The factory settings do NOT set out an active welding device during electrode welding.
If the operator wishes to weld in MMA using the VRD device (which must be done with the welding machine switched off), they must:

1) Use a suitable screwdriver to unscrew the 4 screws that fix the control panel to the welding machine.
2) Remove the "VRD" JUMPER on the DIGITAL INTERFACE PCB (Fig. B).
3) Use a suitable screwdriver to tighten the 4 screws that fix the control panel to the welding machine.
4) Start the welder by pressing the switch, located on the back panel, at the position **I**.

After switching on, but with the machine at rest, the control panel will show the VRD LED on in the colour GREEN and this means that the device is active.
During the welding phase, this LED becomes RED, which however does not indicate a malfunctioning of the welder but the fact that the VRD device is in function and, at the conclusion of the welding operation, the tension will be reduced within a maximum greatest time of **0.3 seconds**.

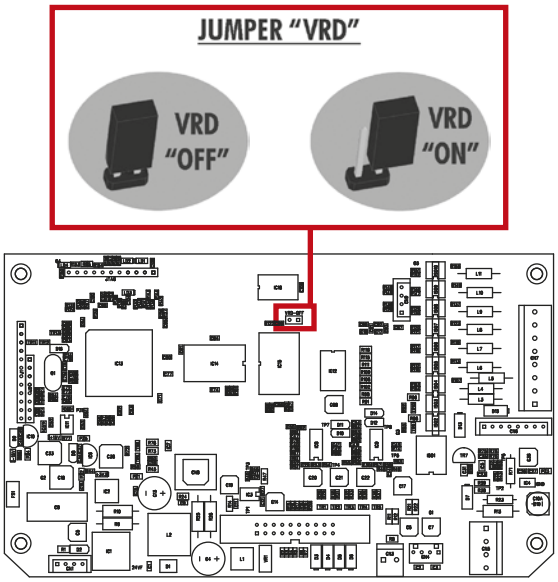


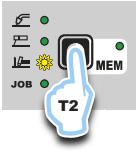
FIG. B

TIG with "Lift" striking

Start the welder by pressing the switch, located on the back panel, at the position **I**.

1 - WELDING PROCESS SELECTION

Select the TIG PROCESS of welding with "Lift" type starter for welding without high frequency, pressing and releasing, also more times if necessary, the WELDING PROCESS SELECTION key (T2) until the corresponding LED lights.



2 - SPECIAL FUNCTIONS "Fx" SELECTION

ADJUSTABLE FUNCTIONS "Fx" Fx > 3s			
FUNCTION	DISPLAY	SETTINGS RANGE	
		FACTORY	RANGE
TIG process			
UP SLOPE	F29	0.0s	(0.0 ÷ 20.0)s
DOWN SLOPE	F30	2.0s	(0.0 ÷ 20.0)s
SWS VOLTAGE LIMIT	F31	0	-30 ÷ 30
PROGRAM DEFAULT	dEF	no	no - YES

The SPECIAL FUNCTIONS "Fx" that are only available in the TIGLift welding process are shown below. For all the other explanations regarding this menu make reference to the relative paragraph.

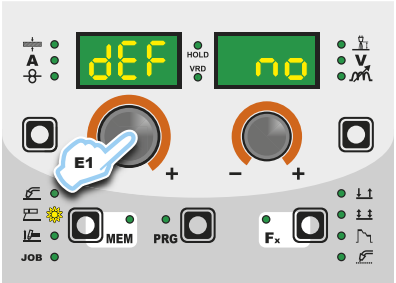
- **UP SLOPE (F29) -** Allows the joining of the WELDING CURRENT to the INITIAL CURRENT.
- **DOWN SLOPE (F30) -** Allows the joining of the WELDING CURRENT to the FINAL CURRENT.
- **SWS VOLTAGE LIMIT (F31) -** Regulates the voltage level for automatic automatic extinguishing.

■ PROGRAM DEFAULT (dEF)

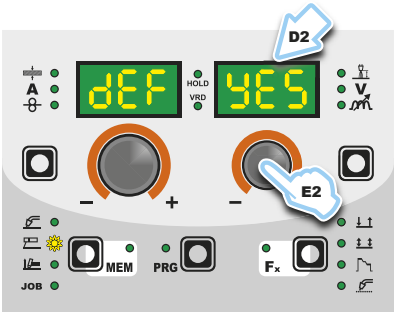
WARNING: *If carried out, this operation resets the program in use to the factory default settings.*

To carry out the reset of the settings / parameters, proceed in the following manner:

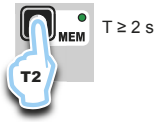
- Rotate the ENCODER - A (E1) knob until both the displays read **dEF no** (see figure).



- Rotate the ENCODER - V knob (E2) until the PARAMETERS DISPLAY - V screen (D2) reads **YES**.



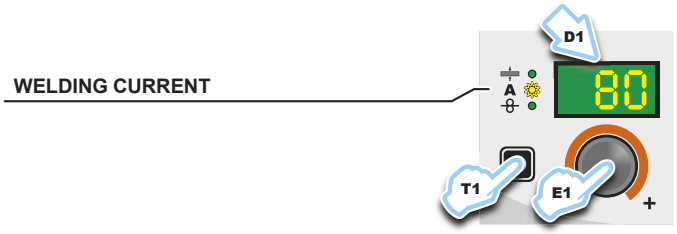
- Hold the SAVE "MEM" key (T2) down for at least **2** consecutive seconds.



- The program in use has now been completed successfully. To confirmation the above, the control panel of the welder performs a short operation of MACHINE CHECK (all of the LED stay lit simultaneously so as to verify their actual operation), the generator itself starts, having memorised the new settings and is again ready to weld.

3 - PRE-SETTING

Before welding it is possible to set the following parameters:



Example: WELDING CURRENT
Press the PARAMETER SELECTION - A key (T1) until the LED that corresponds to the WELDING CURRENT switches on. Turn the ENCODER - A knob (E1) to change the value shown on the PARAMETER DISPLAY - A screen (D1).

4 - WELDING

During the welding the display shows:

- PARAMETER DISPLAY screen - A (D1)

  - WELDING CURRENT (**A**): the measured value of the current of what is being welded.

- PARAMETER DISPLAY screen - V (D2)

  - WELDING VOLTAGE (**V**): the measured value of the voltage of what is being welded.

5 - HOLD

This function automatically starts itself at the conclusion of every welding operation welding and it is indicated to the operator by means of a flashing light of the HOLD FUNCTION LED for a specific amount of time. Once the welding has been terminated, for about **15** seconds, both the DISPLAYS should show the same values of the parameters during the welding.
In this phase the displays show:

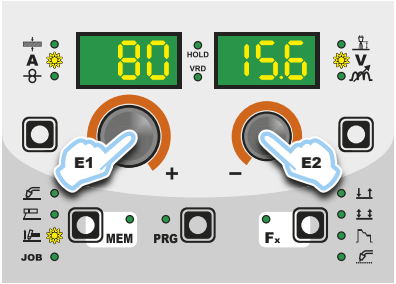
- PARAMETER DISPLAY screen - A (D1)

  - WELDING CURRENT (**A**): the last current value measured.

- PARAMETER DISPLAY screen - V (D2)

  - WELDING VOLTAGE (**V**): the measured value of the last voltage of what is being previously welded.

To interrupt the HOLD function and go back to the PRESETTING phase before **15** seconds have passed, simply turn one of the two ENCODER (E1-E2) knobs.

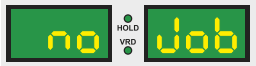


The HOLD function can be terminated ahead of time even once again starting the welding.
Once **15** seconds have passed (HOLD FUNCTION) the control panel goes back to the PRESETTING phase.

JOB

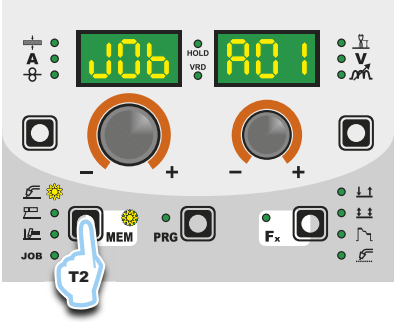
1 - CREATING AND SAVING A JOB

This operation makes it possible to create and save welding settings (points) that can be called up by the operator at any time. The control panel provides the possibility of saving a total of **99 JOBS** spread over all the welding processes. There are not limits to the quantity or position of the points that can be saved for each process!
When it leaves the factory the welding machine does not have any JOBS saved in it and so the operator will find the control panel in this condition:

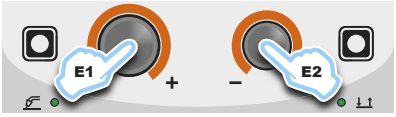


Having defined the parameters the operator needs to do their work correctly, they can be saved by creating an AUTOMATIC WELDING POINT (JOB), proceeding as follows:

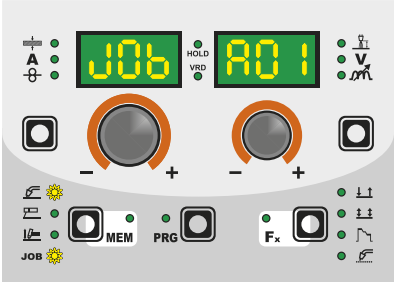
1) Hold the SAVE "MEM" key (T2) down for at least 2 consecutive seconds until both displays show the flashing wording that represent the first AUTOMATIC WELDING POINT (JOB) free and/or available to the operator that can be used for saving the data (e.g.: **A01**).



To be able to choose another automatic welding point (JOB) that is free for saving the data, simply turn one of the two ENCODER (E1-E2) knobs until you reach the required point.



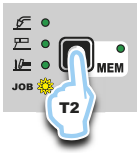
WARNING: *If all the automatic welding points (JOBS) are occupied, the check automatically goes to the first automatic welding point (JOB A01) as shown in the figure below).*



2) Hold down the SAVE "MEM" (T2) Key down for at least 2 consecutive seconds to save JOB and automatically load the settings / parameters (including special functions) for the JOB just saved.
3) To exit the JOB, press and release the WELDING PROCESS SELECTION key (T2).

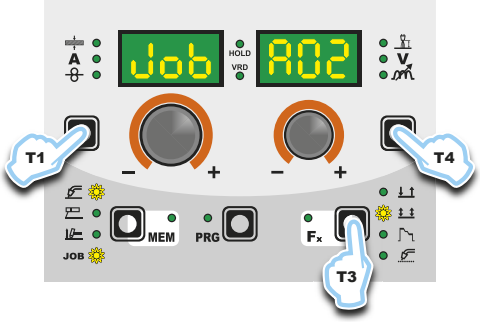
2 - JOB SELECTION

Select the JOB, pressing and releasing, even various times if necessary, the WELDING PROCESS SELECTION key (T2) until the corresponding LED lights up.



3 - PRE-SETTING / VIEWING MEMORISED JOB DATA

Since the parameters are memorised, within each JOB, viewable but not modifiable, the pre-setting phase does not exist, but the operator can see and verify the settings, previously saved and memorised, pressing and releasing the PARAMETER SELECTION key - A (T1) or in alternative the PARAMETER SELECTION key - V (T4).
The SPECIAL FUNCTIONS "Fx" Key (T3) contained within each individual JOB can be viewed (but not modified) by simply keeping the SPECIAL FUNCTIONS "Fx" key (T3) pressed for a duration of about **2** seconds.
The display of the parameters (special functions included) lasts only a few seconds, then the panel shows, in an automatic way, the previous working condition.

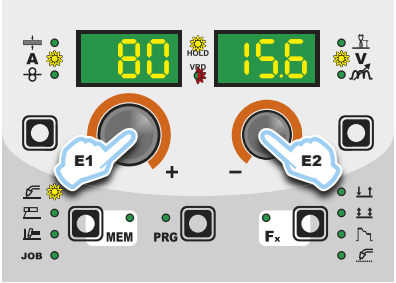


4 - WELDING

During the welding the display shows the values, if possible measured, of the active parameters, based on the type of welding process, memorised within the selected JOB.
As already indicated, the parameters can be viewed by pressing and releasing the PARAMETER SELECTION key - A (T1) or in alternative the PARAMETER SELECTION key - V (T4), while the SPECIAL FUNCTIONS "Fx" key (T3) contained within each individual JOB can be viewed (but not modified) by simply keeping the SPECIAL FUNCTIONS "Fx" key (T3) pressed for a duration of about **3** seconds.

5 - HOLD

This function automatically starts itself at the conclusion of every welding operation and it is indicated to the operator by means of a flashing light of the HOLD FUNCTION LED for a specific amount of time.
Once the welding has been terminated, for about **15** seconds, both the DISPLAYS should show the same values of the parameters during the welding.
To interrupt the HOLD function and go back to the PRESETTING phase before 15 seconds have passed, simply turn one of the two ENCODER (E1-E2) knobs.



The HOLD function can be terminated ahead of time even once again starting the welding.
Once **15** seconds have passed (HOLD FUNCTION) the control panel goes back to the PRESETTING phase.

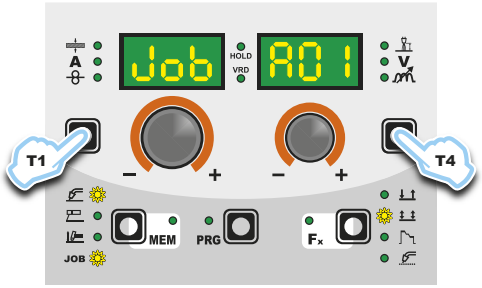
6 - MODIFICATION AND OVERWRITING OF A MEMORISED JOB

To edit and overwrite a JOB proceed as follows:

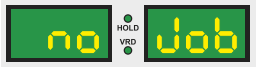
1) Select JOB, pressing and releasing, even various times if necessary, the WELDING PROCESS SELECTION key (T2) until the corresponding LED lights up.
2) Select the individual JOB to modify and overwrite rotating the ENCODER knob - V (E2).
3) Bring up and activate the JOB, loading its settings in the welding process it comes from, keeping the SAVE “MEM” key (T2) pressed for a duration of about **2** seconds.
4) Acquire the parameters necessary for editing the JOB.
5) Hold the SAVE “MEM” key (T2) down for at least **2** consecutive seconds until both displays show the flashing wording that represent the first AUTOMATIC WELDING POINT (JOB) free and/or available to the operator that can be used for saving the data.
6) Rotate the ENCODER knob - V (E2) until identifying the individual JOB that will be overwritten.
7) Keep pressed, for at least **3** consecutive seconds, the SAVE “MEM” key (T2) to confirm and make the operation effective.

7 - DELETING A JOB SAVED

In JOB mode, holding down the PARAMETER SELECTION - A (T1) and PARAMETER SELECTION - V (T4) keys down simultaneously for about **5** seconds deletes the current automatic welding point.



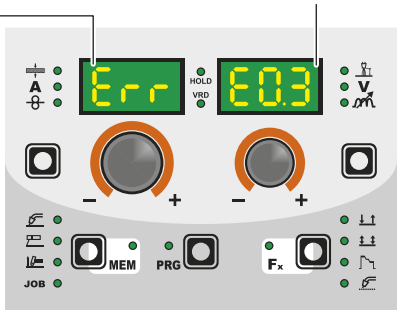
The control panel automatically goes to the first JOB saved or reads “**no JOB**” is no JOBS have been saved.



Error condition

This paragraph describes the error conditions that may arise on the welding machine, the codes and messages shown on both operator interface displays, and the diagnoses for attempting to correct and resolve them.
In an “error condition” the operator’s interface uses both displays to display:

- **ERROR CONDITION display**
- **ERROR DESCRIPTION display**



Error condition	Error code	Error description and possible diagnosis
Err	T°C	THERMAL PROTECTION The welding stops due to an excessively high temperature (thermostat activated). Automatic reset error.
Err	E0.0	POWER SUPPLY FAILURE **NON automatic reset error**. This error can only arise when switching on and not when the welding equipment is working normally.
Err	E0.1	OVER AND UNDER VOLTAGE Automatic reset error.
Err	E0.2	OVER VOLTAGE Automatic reset error.
Err	E0.3	UNDER VOLTAGE Automatic reset error.
Err	E0.4	OVER CURRENT **NON automatic reset error.** **Immediately contact technical assistance dept.**
Err	E1.0	CONFIG. FILE MISSING **NON automatic reset error.** **Immediately contact technical assistance dept.**
Err	E1.1	USER FILE MISSING **NON automatic reset error.** **Immediately contact technical assistance dept.**
Err	E1.3	CALIBRATION FILE MISSING **NON automatic reset error.** **Immediately contact technical assistance dept.**
Err	E1.6	MMA DEFAULTS MISSING **NON automatic reset error.** **Immediately contact technical assistance dept.**
Err	E1.7	DEFAULTS MISSING TIG **NON automatic reset error.** **Immediately contact technical assistance dept.**
Err	E1.8	DEFAULTS MISSING MIG **NON automatic reset error.** **Immediately contact technical assistance dept.**
Err	E1.9	WELDER DEFAULTS MISSING **NON automatic reset error.** **Immediately contact technical assistance dept.**

(continued)

Error condition	Error code	Error description and possible diagnosis
Err	E2.0	FILE SYSTEM ERROR **NON automatic reset error. Immediately contact technical assistance dept.**
Err	E3.2	STICKING This error is displayed when a shortcircuit has been formed between the machine's output terminals for more than 1.2 seconds. **NON automatic reset error.** To remove the error state, eliminate the short circuit so that the voltage on the torch goes above the threshold value again. At this stage the error condition disappears and the welding machine goes back to the mode prior to the sticking. If the torch trigger is still pushed, it must be released and pressed again to begin welding again.
Err	E3.4	SCC ERROR **NON automatic reset error.**
Err	E4.0	LAST SETUP NOT VALID **NON automatic reset error. Immediately contact technical assistance dept.**
Err	E4.1	JOBS WRONG **NON automatic reset error. Immediately contact technical assistance dept.**
Err	E4.2	MIG SYN SPECIAL FUNCTION "Fx" WRONG **NON automatic reset error. Immediately contact technical assistance dept.**
Err	E4.3	MIG MAN SPECIAL FUNCTION "Fx" WRONG **NON automatic reset error. Immediately contact technical assistance dept.**
Err	E4.4	SPECIAL "Fx" PULSED MIG FUNCTIONS NOT VALID **NON automatic reset error. Immediately contact technical assistance dept.**
Err	E5.0	MIG PROGRAMS MISSING **NON automatic reset error. Immediately contact technical assistance dept.**
Err	E5.1	NO PULSED MIG WELDING PROGRAMS **NON automatic reset error. Immediately contact technical assistance dept.**
Err	E5.3	PROGRAMS MISSING **NON automatic reset error. Immediately contact technical assistance dept.**
Err	E5.4	NO WELDING PROGRAMS **NON automatic reset error. Immediately contact technical assistance dept.**

(continued)

Error condition	Error code	Error description and possible diagnosis
AUT	ADJ	POWER LIMITATION This alarm appears if the power limit is exceeded. The alarm alternates with the standard display every 1.5 seconds, despite which the machine continues to weld, supplying limited power, but complying with the values shown on the data plate.

The table includes **2** types of errors:

- **Automatic reset error:** Once the alarm condition has been resolved the welding machine starts working again and the operator can weld again!
- **NON automatic reset error:** To remove the alarm status and reinstate correct operation of the machine, the welding equipment must be switched off.
  The machine will then be working again and the operator can weld again!
  PLEASE NOTE: If, when switching on, the error status presents itself again, immediately contact the Technical Assistance Department.

This is necessary so that our technical assistance dept (**that must be contacted each time the error messages appear on the welding machine's operator interface**) is able to resolve the problems more easily and as quickly as possible, thanks to the reports by the user, and also because, in the meantime the welding machine does not allow the operator to do their work.

PoWer MIG Series

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