

QUBOX 405W - 505W PULSE

EN ENGLISH



**WELDING
TOGETHER**

CEA COSTRUZIONI ELETTRMECCANICHE ANNETTONI S.p.A.

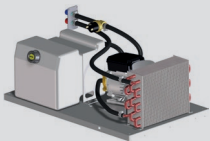
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Thank you for buying our product. In order to get the best performance out of the plant and ensure the maximum lifespan of its parts, the use and maintenance instructions contained in this manual must be read and strictly complied with, as well as the safety instructions contained in the relevant folder.

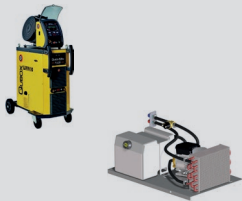
The manual consists of the following sections:



QUBOX PULSE Generator Manual



QBW1 cooling unit manual



List of spare parts: QUBOX PULSE Generator / QBW1 cooling unit



QF4 wire feeder manual



List of spare parts: QF4 wire feeder



QM/QP Series Control Panel Manual



QUBOX 405W - 505W PULSE

EN

Operator's manual

READ
CAREFULLY



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Innovative, technologically advanced, robust, and easy to use, they can be used for very high quality MIG-MAG and Pulse MIG welding for all materials and especially stainless steel and aluminium, reducing repeat work due to spray to a minimum, using electrodes, and in TIG with "Lift" type ignition, and they represent the best solution for all industrial fields and all specialist welding purposes that call for high precision and repeatable results. **QUBOX PULSE** equipments, fitted with an innovative synergic digital control and the extraordinary VISION-ARC meet the needs of those that wish to combine synergy with complete control of all welding parameters.

They come in a version with a separate feeder (QF4). These are systems open to the future evolution of technology - the control software can be kept up to date with the latest versions with the help of a personal computer.

Operating features

The main feature of the welding unit **QUBOX PULSE** are:

- Metallic main structure.
- Controls on the QF4 feeder protected by a visor.
- Exceptional MIG/MAG welding characteristics.
- High welding performance in both MMA and TIG by "Lift" mode striking.
- Synergic digital control (QM) of all welding parameters featuring the following functions:
 - Allows less expert operators to regulate all welding parameters in a user-friendly way and extremely easily, choosing the type of program on the basis of the material, wire diameter, and gas used.
 - Innovative "VISION ARC" software for controlling all welding parameters.
 - With the special MIG torches you can adjust the welding parameters at a distance straight from the torch.
 - 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 micro-processor, 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.
 - 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.
 - "Energy Saving" function to operate the power source cooling fan and the torch water cooling only when necessary.
 - Auto-diagnostic feature for trouble shooting.
 - Password-controlled total or partial equipment access.
- High electrical performance resulting in a reduction in energy consumption.
- Setting of all parameters on the QF4 feeder itself.

Introduction

Thank you for buying our product.

In order to get the best performance out of the plant 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 plant 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 FOR MIG-MAG, PULSE MIG, MMA, and TIG WELDING

A practical, robust metal structure combined with the latest generation inverter technology with digital welding control, characterise the multifunctional systems in the **QUBOX PULSE** series.






Special processes for QUBOX PULSE

The specific utilization of special welding processes is an ideal choice for automation and allows to optimize specific welding applications, by granting far better performances in terms of quality and welding speed.

Special processes (optional)

vision.ARC, available on **QUBOX PULSE** equipment, is the support basis in order to weld by means of the special processes shown in table 1.

Table 1

MIG/MAG	
	vision.PIPE for a more accurate welding in pipe first root pass.
	vision.COLD to weld thin thickness laminations with low heat transfer.
	vision.ULTRASPEED for high speed welding.
	vision.POWER for a more concentrated arc and deeper penetration on medium and thick thickness.
	Extended Curve Package (E.C.P.) This is a package of additional curves, dedicated to highly specialised machining and procedures.


Technical data

The general technical data of the system are summarized in table 2.

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 60% 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 60% of this period of time. Exceeding the work cycle allowed could cause a trip switch to trip (for further information see the QM control panel manual), which protects the components inside the welding machine against dangerous overheating. After several minutes the overheat cut-off rearms automatically and the welder is ready for use again.

Table 2

Model		QUBOX 405w pulse	QUBOX 505w pulse
		MIG-MAG welding	
Three-phase input 50/60 Hz	V	400 ± 20%	400 ± 20%
Mains supply: Z_{max}	Ω	0,030	0,020
Input power @ I_2 Max	kVA	22,5	29,5
Delayed fuse (I eff)	A	32	40
Power factor / cosφ		0,7 / 0,99	0,75 / 0,99
Efficiency degree	η	0,88	0,89
Open circuit voltage	V	62	62
Current range	A	10 ÷ 400	10 ÷ 500
Duty cycle @ 100% (40°C)	A	350	420
Duty cycle @ 60% (40°C)	A	400	500
Wires diameter (*)	mm	0,6 ÷ 1,6 (*)	0,6 ÷ 1,6 (*)
N° rollers (*)		4 (*)	4 (*)
Power output of feeder motor (*)	W	100 (*)	100 (*)
Rated wire feeding speed (*)	m/min	1,5 ÷ 25 (*)	1,5 ÷ 25 (*)
Spool (*)			
Diameter	mm	Ø300 (*)	Ø300 (*)
Weight	kg	15 (*)	15 (*)
Standards		IEC 60974-1 - IEC 60974-5 (*) - IEC 60974-10 CE S	
Protection class		IP 23 S	IP 23 S
Insulation class		H	H
Dimensions 	mm	1030 - 515 - 950	1030 - 515 - 950
Weight	kg	82	85

(*) On the QF4 feeder, fitted separately.

WARNING: This equipment complies with **EN/IEC 61000-3-12** provided that the maximum permissible system impedance Z_{max} is less than or equal to 0,030 Ω QUBOX 405w pulse - 0,020 Ω QUBOX 505w pulse at the interface point between the user's supply and the public 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 is connected only to a supply with maximum permissible system impedance Z_{max} less than or equal to 0,030 Ω QUBOX 405w pulse - 0,020 Ω QUBOX 505w pulse.

This system, tested according to **EN/IEC 61000-3-3**, meets the requirements of **EN/IEC 61000-3-11**.

Ambient conditions

The manufacturer does not accept any responsibility for damage that may result from the plant being used or stored in ambient conditions that do not conform.

- The ambient air temperature range must be as follows:
 - When in use: from -10 °C to +40 °C (from 14 °F to 104 °F).
 - When being transported and stored: from -20 °C to +55 °C (from -4 °F to 131 °F).
- The relative humidity of the air must be as follows:
 - Up to 50% at 40 °C (104 °F).
 - Up to 90% at 20 °C (68 °F).
- Altitude (above sea level): up to 2000 m (6561 feet 8.16 in.).
- Ambient air: free of dust, acids, corrosive substances or gases, etc.

How to lift up the system

Before lifting the unit, open the bag containing the eyebolts (attached to machine), remove the two eyebolts complete with fibre washers and mount them on the upper part of the cover. Only lift the unit using the two eyebolts.

These lifting and conveying devices conform to the requirements laid down by the international standard. Do not use other hoisting and transportation systems.

The angle of incidence on the chains or cables must be as small as possible.

Always remove the gas cylinder and feeder.

Serial number

The welding machine's serial number is shown on the unit's data plate.

The serial number provides the key to tracing the production lot applicable to the product. The serial number may be essential with ordering spare parts or planning maintenance.

Opening the packaging

The system essentially consists of:

- **QUBOX PULSE** weld unit.
- Separately:
 - QF4 wire-feeder unit (supplied separately).
 - MIG-MAG welding torch (optional).
 - Wire-feeder/generator interconnection cable (supplied separately).

Perform the following operations on receiving the apparatus:

- Remove the welding generator and all accessories and components from the packaging.
- Check that the welding apparatus is in good condition; otherwise immediately inform the retailer or distributor.
- Check that all the ventilation grilles are open and that there is nothing to obstruct the correct air flow.

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.

The welding unit is characterized by the following classes:

- IP 23 S protection class indicates that the generator can be used in both interior and exterior environments.
- The "S" usage class indicates that the generator can be employed in environments with a high risk of electrical shocks.

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.

Assemble the system in the following way:

- Fitting the feeder unit to the generator.
- Connect up the welder to the mains.
- Connect up the wire-feeder/generator interconnection cable.
- Connect up the welding cables.

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

Connection to the electrical supply

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".

Use the welder's own plug to connect it up to the main power supply. Proceed as follows if you have to replace the plug:

- 3 conducting wires are needed for connecting the machine to the supply.
- The fourth, which is YELLOW GREEN in colour is used for making the "GROUND" connection.

Connect a suitable load of normalised plug (3P+T) 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 3 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.

Table 3

Model		QUBOX 405w pulse	QUBOX 505w pulse
		MIG-MAG welding	
Input power @ I ₂ Max	kVA	23,5	29,5
Delayed fuse (I eff)	A	32	40
Duty cycle @ 60% (40°C)	A	400	500
Mains cable Length / Section	m	4,5	4,5
	mm ²	4 × 6	4 × 6
Ground cable	mm ²	50	70

Usage norms

CONTROL APPARATUS (Fig. A)

- Pos. 1 Front panel.
- Pos. 2 Fast coupling positive polarity.
- Pos. 3 Fast coupling negative polarity.
- Pos. 4 Cooling system tank cap.
- Pos. 5 Mains switch. In the "O" position the welder is off.
- Pos. 6 Mains cable.
- Pos. 7 Cooling system fuse.
- Pos. 8 Quick water couplings.
- Pos. 9 Quick positive pole connection on the connecting cable.
- Pos. 10 Connector for connecting the interconnection cable.
- Pos. 11 White LED: signals power supply presence. When it is switched on, the system is powered up and ready for operation.
- Pos. 12 Yellow LED: signals intervention of overheat cutoff. This LED shines to indicate that the overheating protection has cut in because the work cycle is not being followed. After several minutes the overheat cut-off rearms automatically (and the yellow LED turns itself off) and the welder is ready for use again.

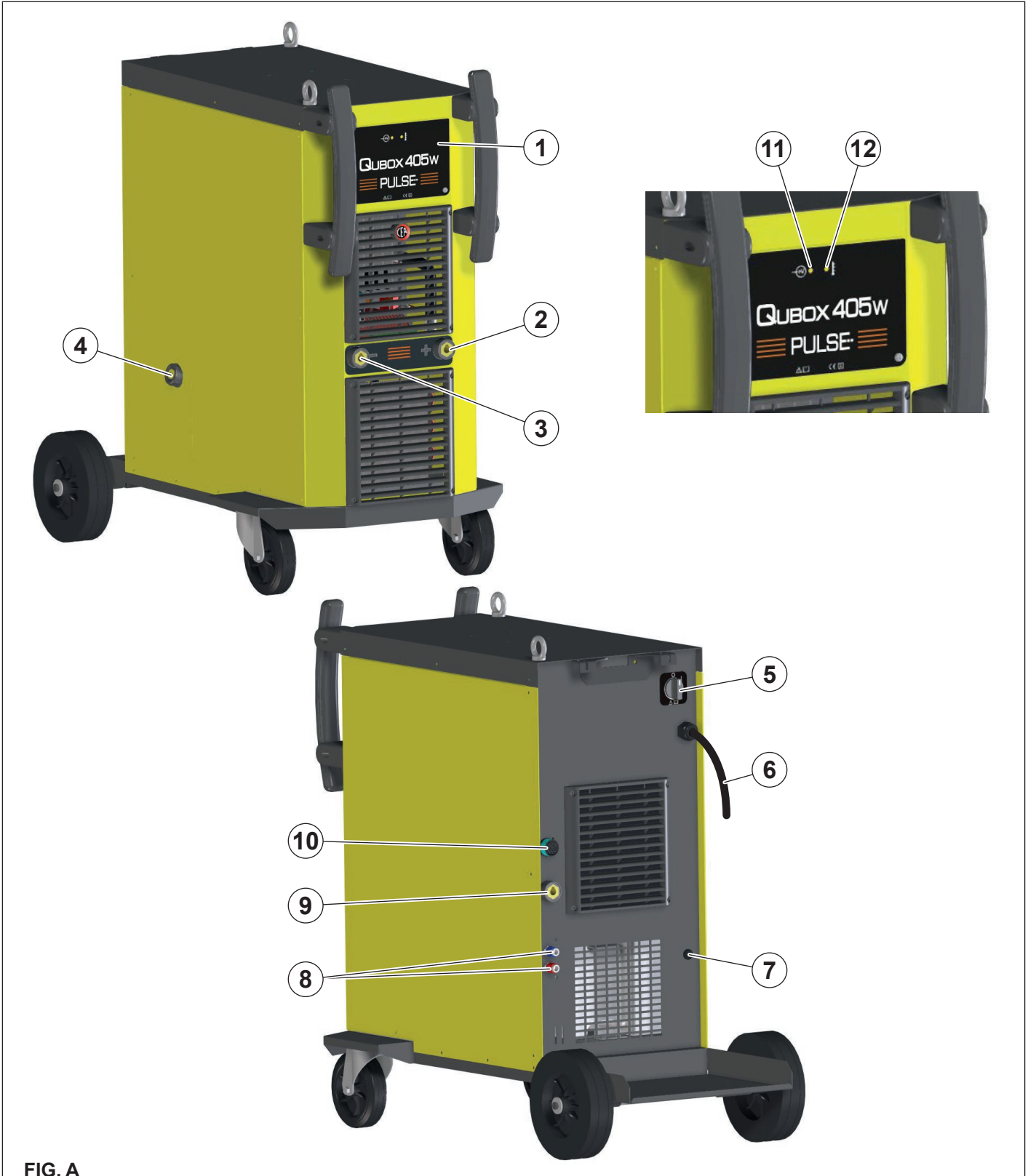


FIG. A

MIG-MAG welding / PULSE MIG

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

1 - Connecting the gas hose and torch (Fig. B1-B2)

- Connect the gas hose to the pressure reducer fitted on the cylinder beforehand.
- Screw the torch onto the centralised connection on the front panel of the feeder and connect the feed (blue) and return (red) water hoses for cooling the torch to the respective (blue and red) rapid couplings on the front panel of the feeder.

2A - Connecting the cables - Welding with a POSITIVE POLE TORCH (Fig. B1)

- 1) The feeder - generator connecting cable is used to connect the welding machine to the feeder.

WARNING: Do not disconnect the wire-feeder until the machine has been switched off.

Connect up the interconnection cables (power cable, ancillary wiring and gas tube) to the special attachments and couplings shown in Fig. B1.

The delivery (blue coloured) and return (red coloured) water tubes, used for cooling the torch of the welding machine, are part of the interconnection cable and should be connected as follows:

- Interconnection cable on generator side: connect up tubes to their rapid couplings (blue and red coloured) at the back of the coolant system.
 - Wire feeder side connecting cable: connect the red and blue pipes to their respective bulkhead grommets on the rear panel of the feeder.
- 2) 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.

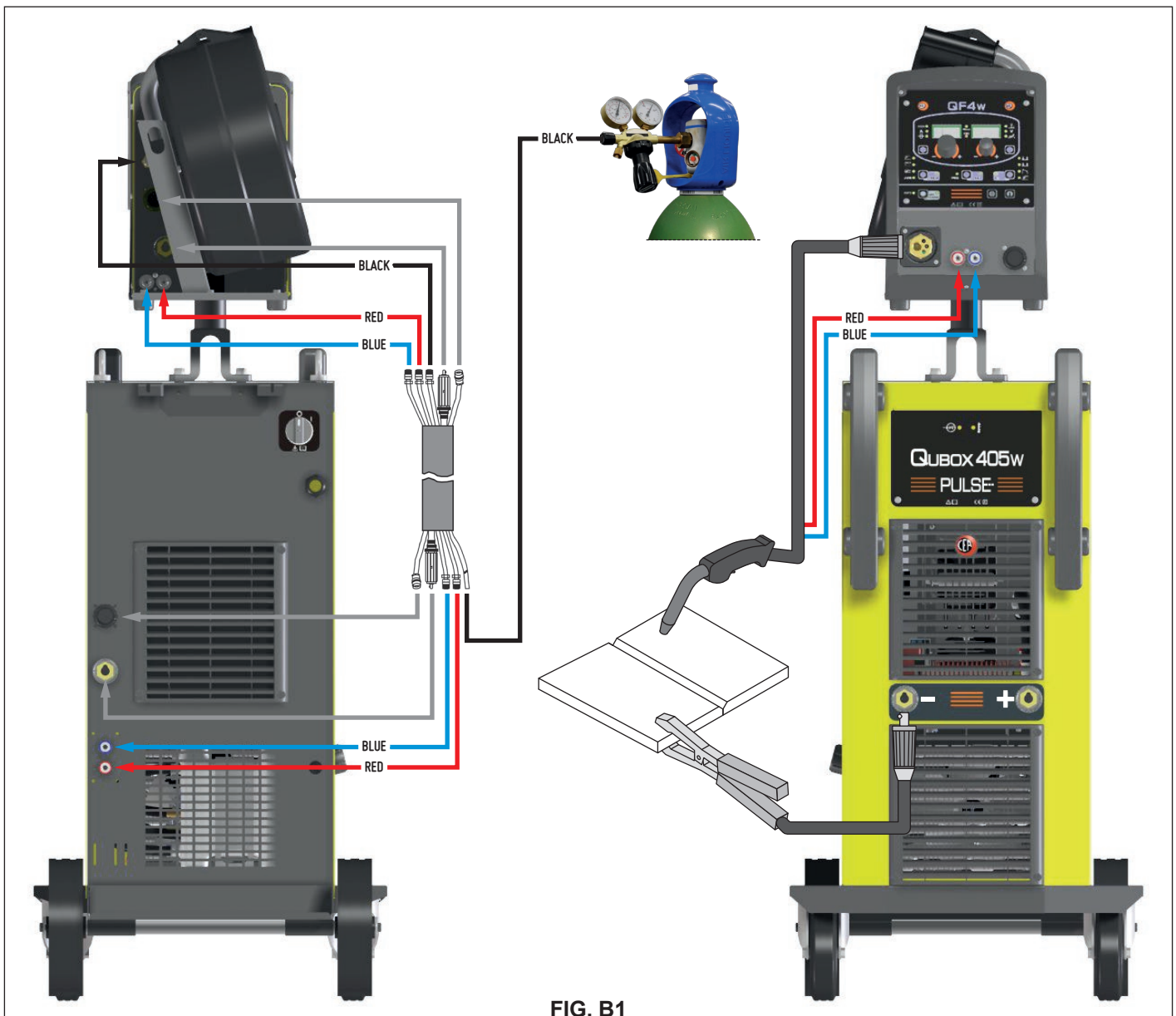


FIG. B1

2B - Connecting the cables - Welding with a NEGATIVE POLE TORCH (Fig. B2)

- 1) Connect the generator - feeder connection cable using the extension cable in addition to invert the polarity (optional).

WARNING: Do not disconnect the wire-feeder until the machine has been switched off.

Connect up the interconnection cables (power cable, ancillary wiring and gas tube) to the special attachments and couplings shown in Fig. B2.

The delivery (blue coloured) and return (red coloured) water tubes, used for cooling the torch of the welding machine, are part of the interconnection cable and should be connected as follows:

- Interconnection cable on generator side: connect up tubes to their rapid couplings (blue and red coloured) at the back of the coolant system.
- Wire feeder side connecting cable: connect the red and blue pipes to their respective bulkhead grommets on the rear panel of the feeder.

- 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 - Welding

- 1) Switch the welding machine on by moving the power supply switch to I (Pos. 4, Fig. A).
- 2) Make the adjustments and do the parameter settings on the control panel (for further information see the QM/QP control panel manual).
- 3) Load the wire (see the relevant paragraph in the feeder manual) using the motor test button, after having removed the wire guide nozzle from the torch to allow the wire to come out freely during loading (remember that the wire guide nozzle must correspond to the diameter of the wire used).

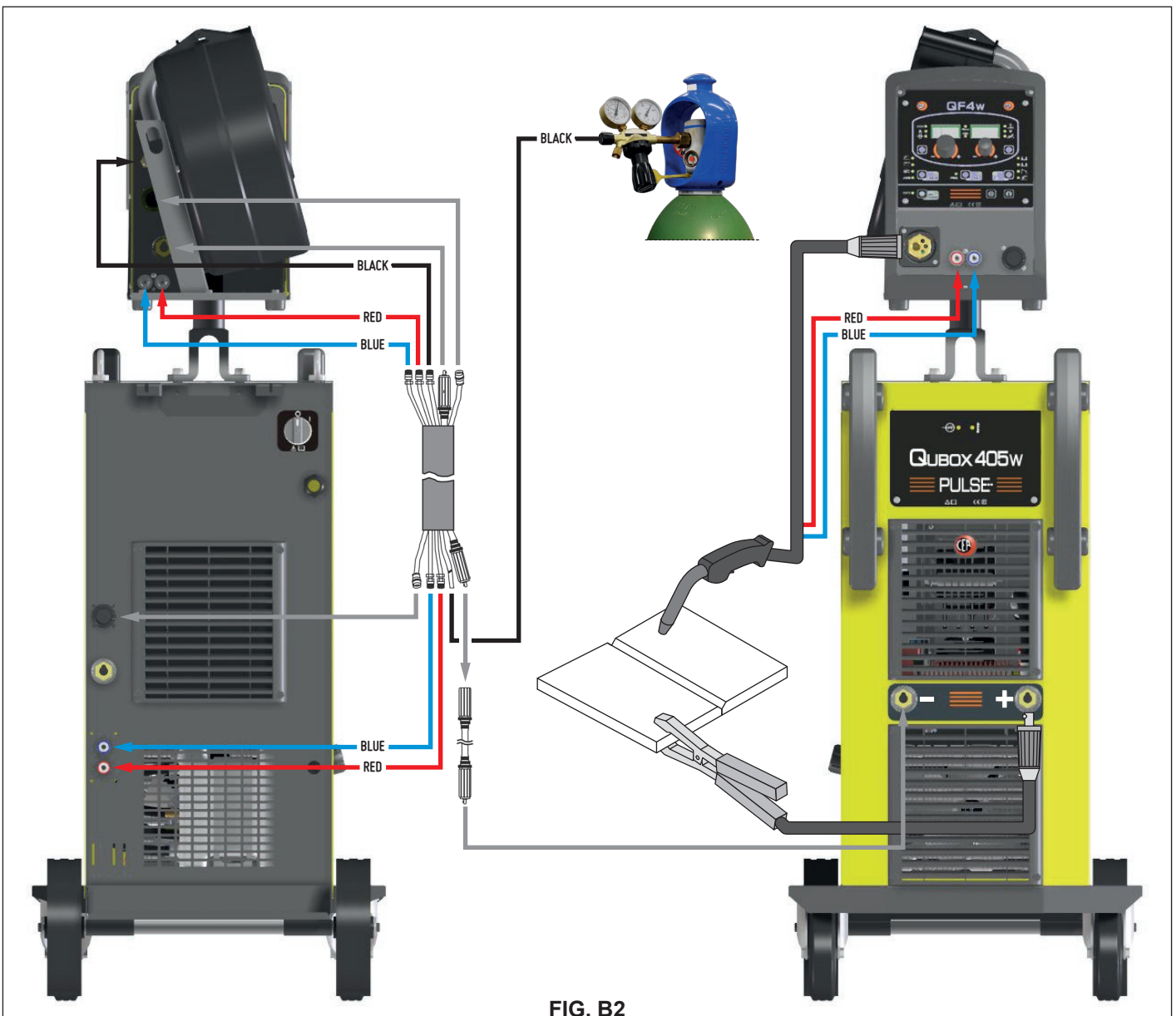


FIG. B2

- 4) Open the tap on the cylinder slowly and adjust the reducer knob to obtain a pressure of about 1,3 to 1,7 bar, and then activate the gas test button and regulate the flow to a value between 14 and 20 lit/min to suit the current used for welding.
- 5) The welding machine is ready to weld. Make the adjustments and select the parameters for the feeder or, if selected, on the control panel (for further information see the QM/QP control panel manual). Start welding by moving close to the welding point and press the torch button.
- 6) Once welding has been completed remove any slag, switch off the machine (which is only to be done when the fan is not running), and close the gas cylinder.

Spot welding

The substantial difference with MIG-MAG welding is essentially related to the torch and the settings that must be done on the QF4 feeder's control panel.

- The gas guide nozzle specifically for spot welding must be fitted on the torch.



- On the QF4 feeder's control panel, select spot welding mode and set the time.

To begin spot welding:

- Press the torch button to start the welding current and wire feed.
- When the spot welding time expires, the wire feed stops automatically.
- When the torch button is pushed again a new welding cycle starts.
- Release the torch button.

Interval welding

The basic difference from spot welding is the addition of an additional time known as the "stitch pause".

On the QF4 feeder's control panel, select intermittent welding mode and then set the following times for it:

- Stitch time.
- Stitch pause.

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 followed by a 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 rolls with special ones 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 and regulate the flow to a value between 14 and 20 lit/min to suit the current used for welding.

Electrode welding (MMA)

On the **QUBOX PULSE** machine, 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 6 mm, and devices that the user can adjust for "Arc Force", "Hot Start", and Anti-sticking functions to avoid the electrodes sticking.

- 1) Connecting the welding cables (Fig. C):
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. C). 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) Set up the parameter selections / settings on the QF4 feeder's control panel (for more information see the QM operator software 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 at an inclination of about 60° compared with the metal in relation to the direction of welding.

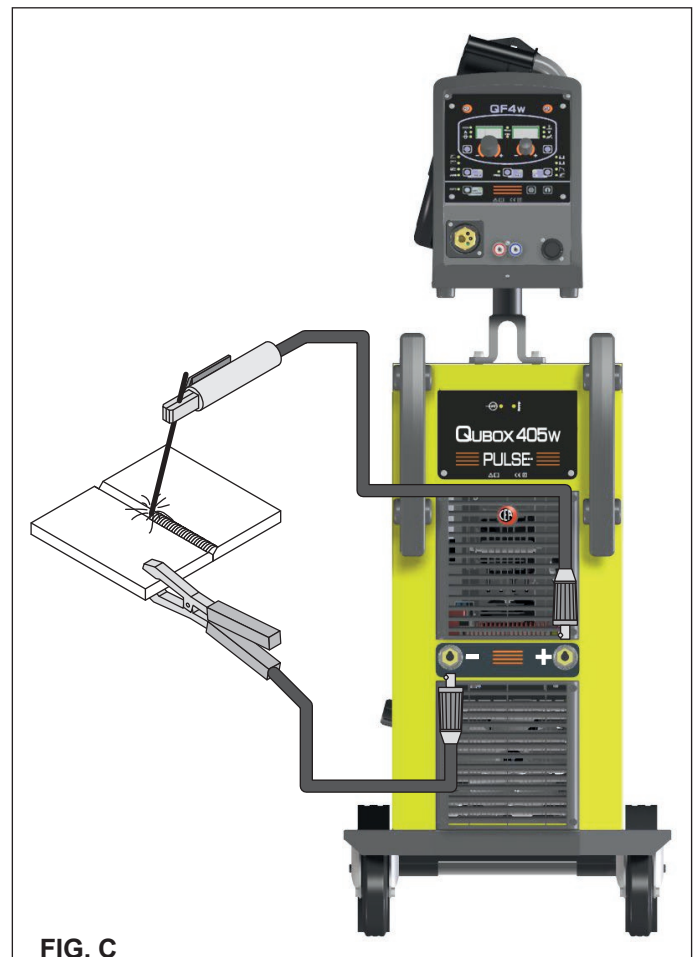


FIG. C

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 5 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.

Table 4

Welding thickness (mm)	Ø electrode (mm)
1,2 ÷ 2	1,6
1,5 ÷ 3	2
3 ÷ 5	2,5
5 ÷ 12	3,25
≥ 12	4
≥ 20	≥ 5

Table 5

Ø electrode (mm)	Current (A)
1,6	30 ÷ 60
2	40 ÷ 75
2,5	60 ÷ 110
3,25	95 ÷ 140
4	140 ÷ 190
5	190 ÷ 240
6	220 ÷ 330

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 4 is:

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

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

$$I = 50 \times (\text{Ø}e - 1)$$

Where:

I = intensity of the welding current

Øe = electrode diameter

Example:

For electrode diameter 4 mm

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

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" type ignition used in **QUBOX PULSE** 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. D):
 - Connect one end of the gas hose to the gas connector 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) Set up the parameter selections / settings on the QF4 feeder's control panel (for more information see the QM operator software 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).
- 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.

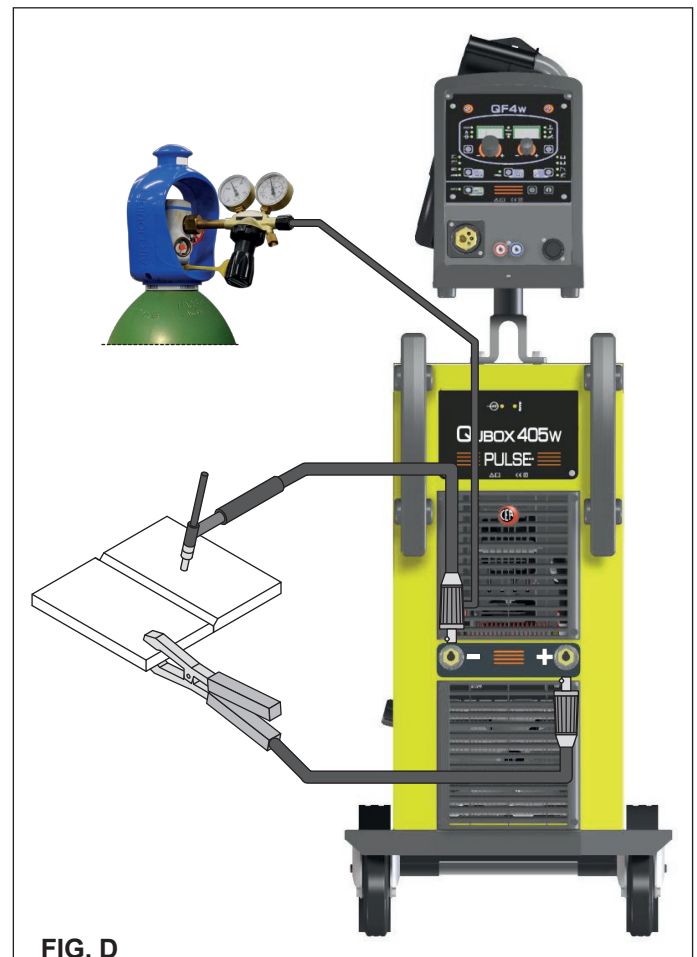


FIG. D

Table 6 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 6

Ø ELECTRODE (mm)	ELECTRODE TYPE Current adjustment field (A)	
	TIG DC	
	Tungsten Ce 1% Grey	Tungsten Rare ground 2% Turquoise
1	10-50	10-50
1,6	50-80	50-80
2,4	80-150	80-150
3,2	150-250	150-250
4	200-400	200-400

Maintenance

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

QUBOX PULSE

IMPORTANT: For fully electronic welding machines, removing the dust by sucking it 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.

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.

Optional

NOTE: The digital control unit of the generator is fitted with a control recognition device which allows it to identify which device is connected and take action accordingly.

REMOTE CONTROL ANALOGIC RC

(must be plugged into the relevant connector on the front panel of the QF4 drawing unit)

This command works as an alternative to:

- Completely replaces the ENCODER - A knob on the QF4 feeder's front panel.
- Partially (depending on the welding process selected) replaces the ENCODER - V knob on the QF4 feeder's front panel (for further information see the QM/QP control panel manual).

AIR AND/OR WATER COOLED UP/DOWN TORCH

(must be plugged into the relevant connector on the front panel of the QF4 drawing unit)

This command works as an alternative to:

- The ENCODER - A knob on the QF4 feeder's front panel. In "synergic" MIG MAG and "manual" MIG MAG welding processes, by pressing the two right (+) and left (-) buttons you can regulate the values for the synergic welding parameters.
- The ENCODER - V knob on the QF4 feeder's front panel. In the JOB welding process, by pressing the two right (+) and left (-) buttons you can scroll the welding points set previously.

PUSH-PULL TORCH

(must be plugged into the relevant connector on the front panel of the QF4 drawing unit)

The push-pull torch makes it possible to improve the aluminium wire feed, using the motor on the torch itself. The parameters normally regulated using the ENCODER - A knob on the QF4 feeder's front panel, when this torch is on, are now regulated using the potentiometer on the torch itself.

TORCH WITH DISPLAY (DIGITORCH)

(must be plugged into the relevant connector on the front panel of the QF4 drawing unit)

The new Digtorch keep all information within easy reach. The innovative microcontroller with display integrated into the grip allows the main welding parameters to be displayed and adjusted:

- Current
- Thickness of material
- Wire speed
- Arc length
- Electronic inductance
- Memorised programme number

Press the up/down buttons, depending on the selected operating method, to move from one programme to another or increase and decreases the parameters on the synergic curves in use.

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

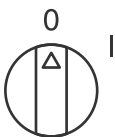









NOTE: Given the required technical skills necessary for the repair of the generator, in case of breakdown we advise you to contact skilled personnel or our technical service department.

Replacing the digital interface PCB

Proceed as follows:

- Unscrew the 4 screws fastening the front rack panel.
- Extract wiring connectors from the digital interface PCB.
- Remove the digital interface PCB by lifting it out of its supports.
- Proceed vice versa to assemble the new digital interface PCB.

Meaning of graphic symbols on machine

 <p>Power supply switch</p>	 <p>Positive pole snap-in connector</p>
 <p>System for use in environments with increased risk of electroshock</p>	 <p>Negative pole snap-in connector</p>
 <p>Product suitable for free circulation in the European Community</p>	 <p>Warning!</p>
 <p>Danger! high voltage</p>	 <p>Before using the equipment you should carefully read the instructions included in this manual</p>
 <p>Grounding</p>	 <p>Special disposal</p>

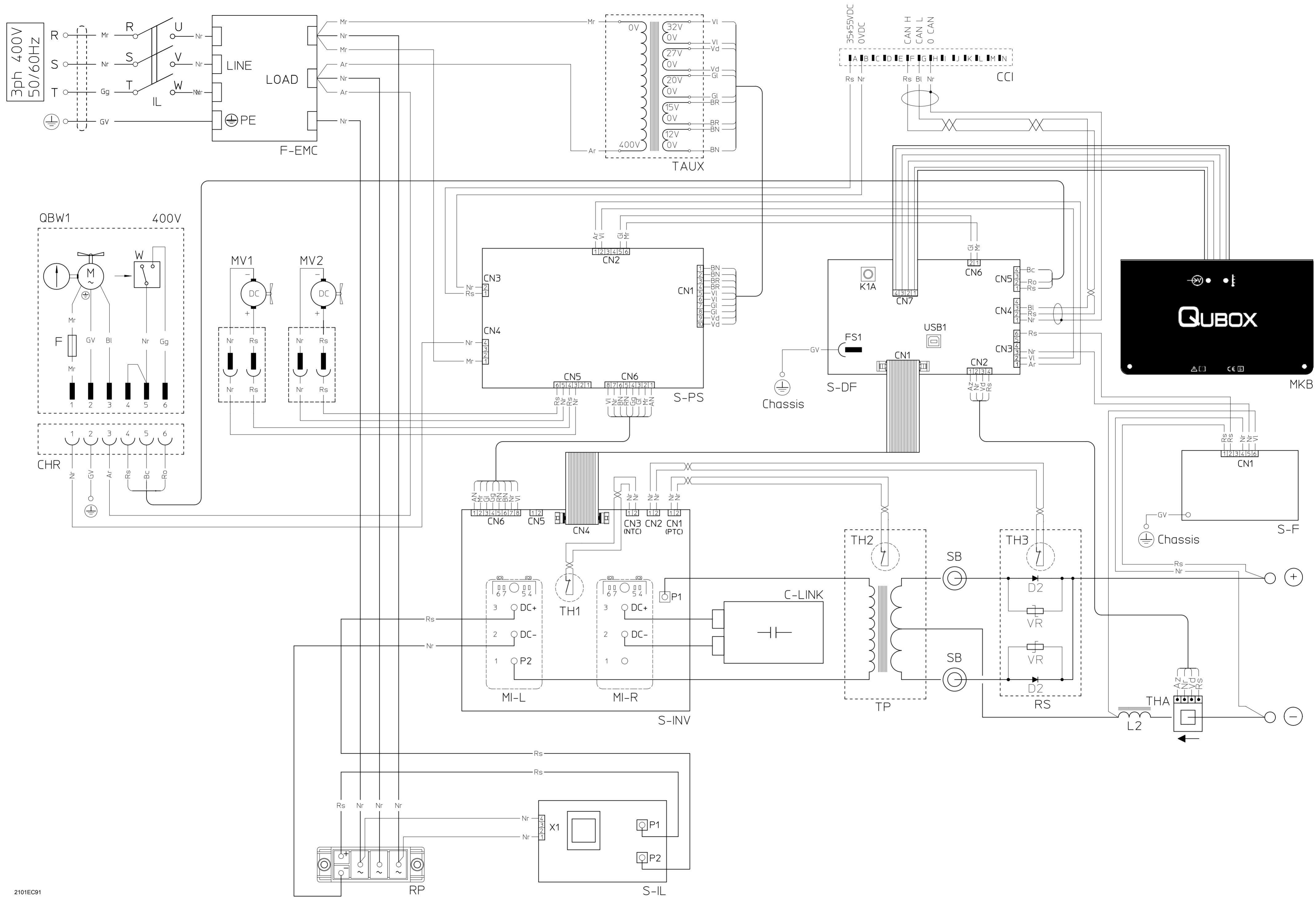
Wiring diagram

Key to the electrical diagram

C-LINK	Capacitor
CCI	Interconnection cable connector
CHR	Power supply connector for the cooling system
CN	Connectors on PCB
D2	Secondary diode
F	Fuse
F-EMC	EMC filter
IL	Power supply switch
L2	Secondary inductor
M	Electric pump
MI-L	Primary left IGBT
MI-R	Primary destroy IGBT
MKB	Membrane keyboard
MV1-2	Fan motor
P1-P2	Primary circuit connectors
QBW1	Integrated cooling unit (when fitted)
RP	Primary rectifier
RS	Secondary rectifier
S-DF	Digital interface PCB
S-F	Secondary filter PCB
S-IL	In Rush Limiter PCB
S-INV	Inverter PCB
S-PS	Power Source PCB
SB	Spikes Blocker
TAUX	Auxiliary transformer
TH1	Primary inverter thermistor
TH2	Main transformer thermistor
TH3	Secondary rectifier thermostat
THA	Hall effect transformer
TP	Main transformer
VR	Output diodes snubber varistor
W	Pressure switch
X1	In Rush Limiter PCB connector

Colour key

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

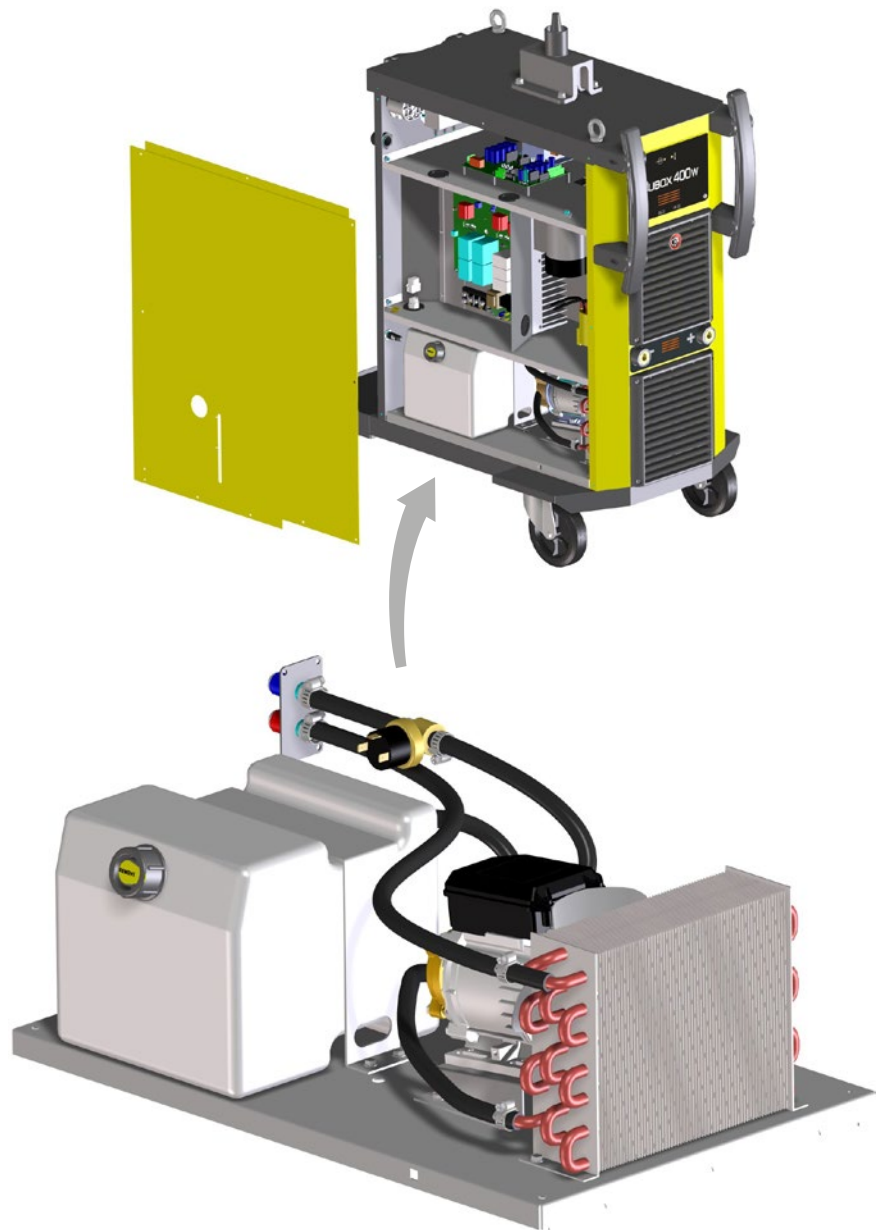


QBW1 COOLING UNIT

EN

Operator's manual

READ CAREFULLY



**WELDING
TOGETHER**

CEA COSTRUZIONI ELETTROMECCANICHE ANNETTONI S.p.A.

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Description	2
Technical data	2
Usage limits (IEC 60974-1)	3
Installation	3
Usage norms	3
Start-up / drainage	4
Meaning of graphic symbols on machine	6
Hydraulic diagram	6
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Introduction

Thank you for buying our product.

In order to get the best performance out of the plant 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 plant are required, we recommend that our clients contact our service centre work-shops, 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

The device, particularly suited for cooling by means of water circulation utilised in particularly heavy welding operations, is composed in its essential parts of:


- A single-phase electric pump.
- A plastic tank.
- A radiator.
- A pressure switch.
- A protection fuse.

Compact and lightweight, this is an integral part of QUBOX 400w - QUBOX 500w welding machines.

Technical data

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

Table 1

Model	WR 35	
Single-phase input	V	400
Frequency	Hz	50/60
Max power supply	kW	0,3
Max current absorbed	A	0,9
Delayed fuse	A	1,6
Coolant	<ul style="list-style-type: none"> • 20%-30% antifreeze • 70%-80% distilled water 	
Cooling power Φ_1	kW	0,95
Capacity with 4 m TIG torch	l/min	1,6
Capacity with 4 m MIG/MAG torch	l/min	1,4
Capacity with 4 m MIG/MAG torch + 10 m extension cable	l/min	1,15
Max pressure	bar	4,3
Standards	IEC 60974-2 CE	
Protection class	IP 23	
Insulation class	F	
Tank capacity	l	5
Dimensions 	mm	460-205-520
Weight	kg	11
Weight with liquid	kg	16

Usage limits (IEC 60974-1)

The cooling device is sized for cooling by means of water circulation in the welder in a continuous manner. As a work cycle, it is considered at 100%.

Installation

WARNING: The cooling device may only be installed horizontally.

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 installation environment of the device has to be in conformance with the protection degree of the carcass, which is equivalent to IP 23 (publication IEC 60529), which means that the device may be used in closed environments as well as outdoors. 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.

Usage norms

CONTROL APPARATUS (Fig. A)

- Pos. 1** Red snap-in connector for water intake.
Pos. 2 Blue snap-in connector for water outlet.
Pos. 3 Cap for filling of the tank with coolant.
Pos. 4 Level indicator for presence of coolant in the tank (the level of the liquid must never be inferior to the notch indicated).
Pos. 5 Protection fuse.
Pos. 6 Cable for electric connection of the device to the generator cooling device.



FIG. A

Start-up / drainage

Before connecting the equipment to the utilities check the rating plate to make sure the voltage and frequency of the mains correspond and check that the main circuit breaker on the equipment is turned to "O".

Upon the first usage following a period of extended inactivity of the device or in the case in which the electropump does not go under pressure (slight whistle), it is necessary to undertake drainage in order to eliminate all the air bubbles present within the hydraulic circuit.

Carry out the following operations following the assembly instructions indicated here (Fig. B) and also contained in the accessories packet:

- 1) Unscrew the tank's cap and, using a funnel, fill it with distilled water. In case of particularly rigid climates with air temperature near to 0° C it is necessary to add antifreeze to the cooling distilled water. Do not use antifreeze containing propylene because it could provoke blockage of the electropump. Screw the tank cap back on.
- 2) Connect the hose supplied to the blue quick coupling and insert the other end of the hose into a receptacle that contains water.
- 3) Switch on the welding machine, turn the main switch to position 1, and wait for the time required for the cooling plant to circulate the liquid. Wait for the exit of the liquid. The operation will be terminated when the liquid exits in a constant way and without any traces of air bubbles.
- 4) Upon the completion of the operation, turn the welder off.
- 5) Connect the water pipes before beginning work.

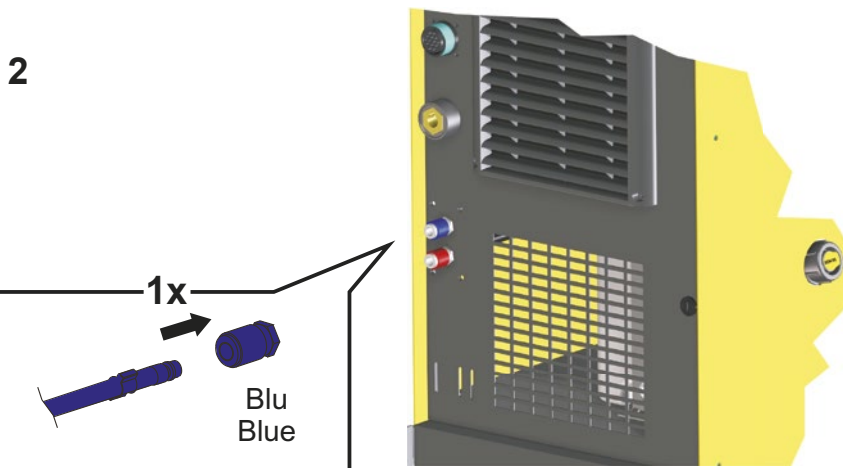
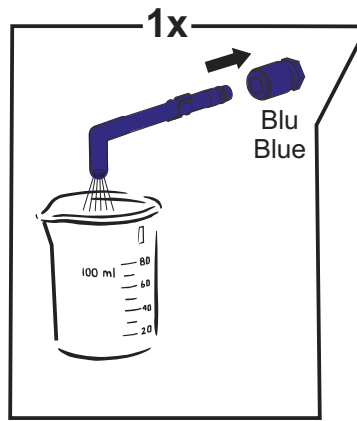


FIG. B

ON



3

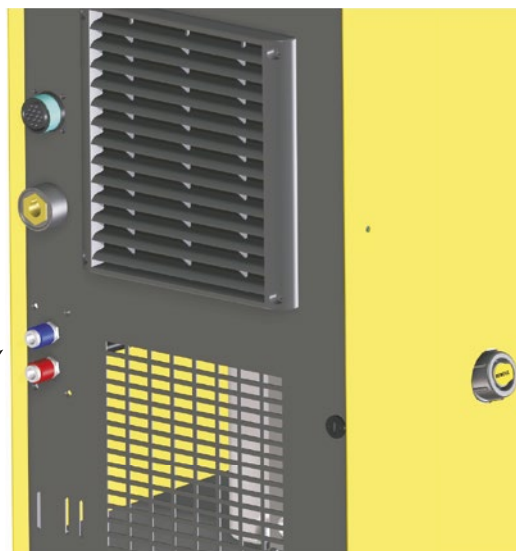
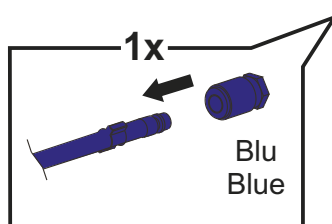


OFF

4



5



Maintenance

WARNING: Prior to undertaking any kind of inspection within the machine, unplug the device from feed.

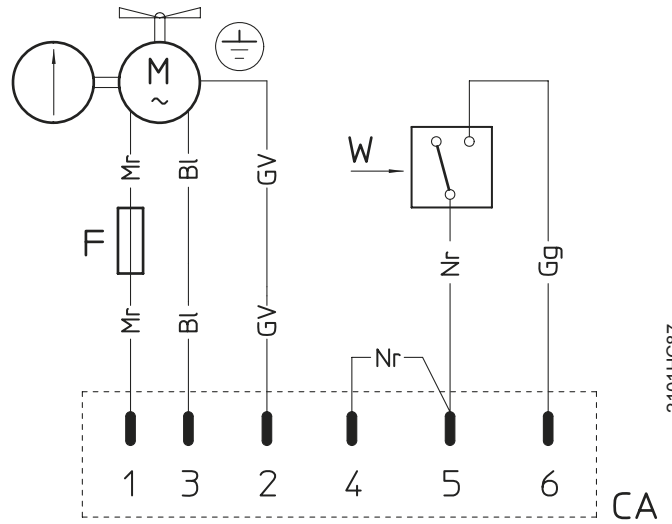
- Periodically check the level of the cooling fluid.
- Add fluid whenever it drops below the minimum level indicated.
- Add antifreeze when the room temperature is below 2°C (table 2).
- Make sure all joints are tight and that there are no leaks
- Periodically clean the radiator with compressed air to eliminate the dust that reduces the cooling capacity.

IMPORTANT: Original spare parts have been specially designed for our equipment. The use of non-original spare parts may cause variations in performance or reduce the foreseen level of safety. We decline all responsibility for the use of non-original spare parts.

Table 2

Distilled water	Antifreeze	External temperature			
		0°C	-10°C	-15°C	-20°C
80%	20%				
75%	25%				
70%	30%				
65%	35%				

Wiring diagram

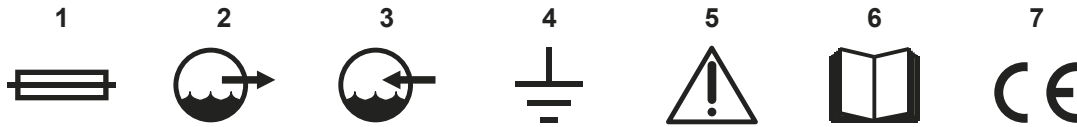


- CA** Power supply connector
F Fuse
M Electric pump
W Pressure switch

- BI** Blue
Gg Grey
GV Yellow Green
Mr Brown
Nr Black

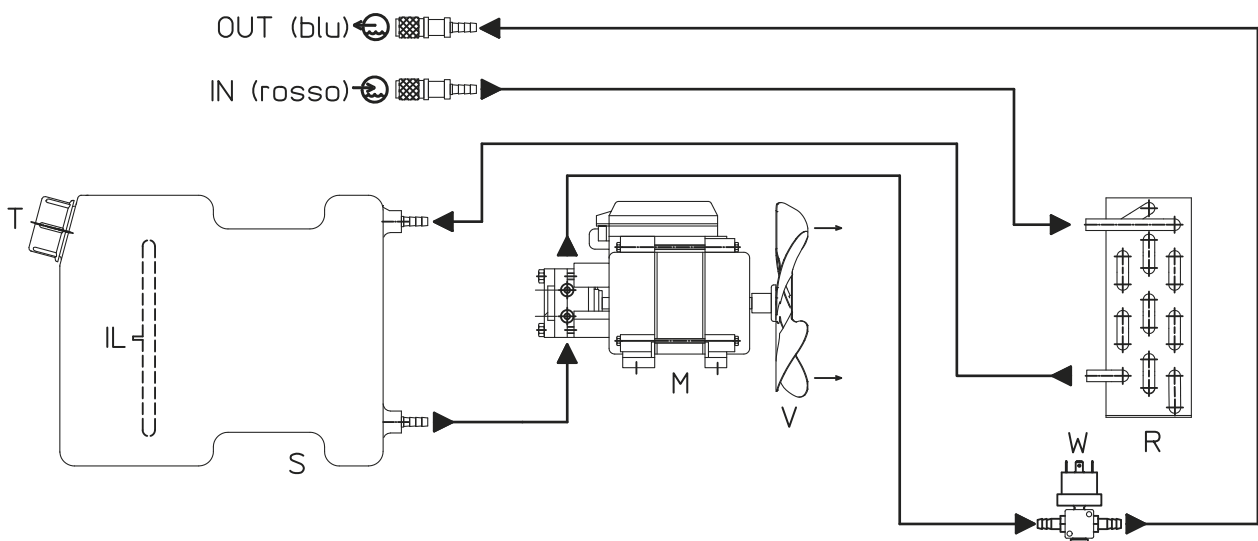
2101HC87

Meaning of graphic symbols on machine



•1 Fuse •2 Cold water outlet •3 Hot water intake for cooling in the unit •4 Grounding •5 Warning! •6 Before using the equipment you should carefully read the instructions included in this manual •7 Product suitable for free circulation in the European Community

Hydraulic diagram



- IL** Depth gauge
IN Red snap-in connector for water intake
M Electric pump
OUT Blue snap-in connector for water outlet
R Radiator
S Tank

- T** Cap for filling of the tank with coolant
V Fan
W Pressure switch

2104F573

QUBOX 405W - 505W PULSE

IT

Lista ricambi

LEGGERE ATTENTAMENTE

EN

Spare parts list

READ CAREFULLY



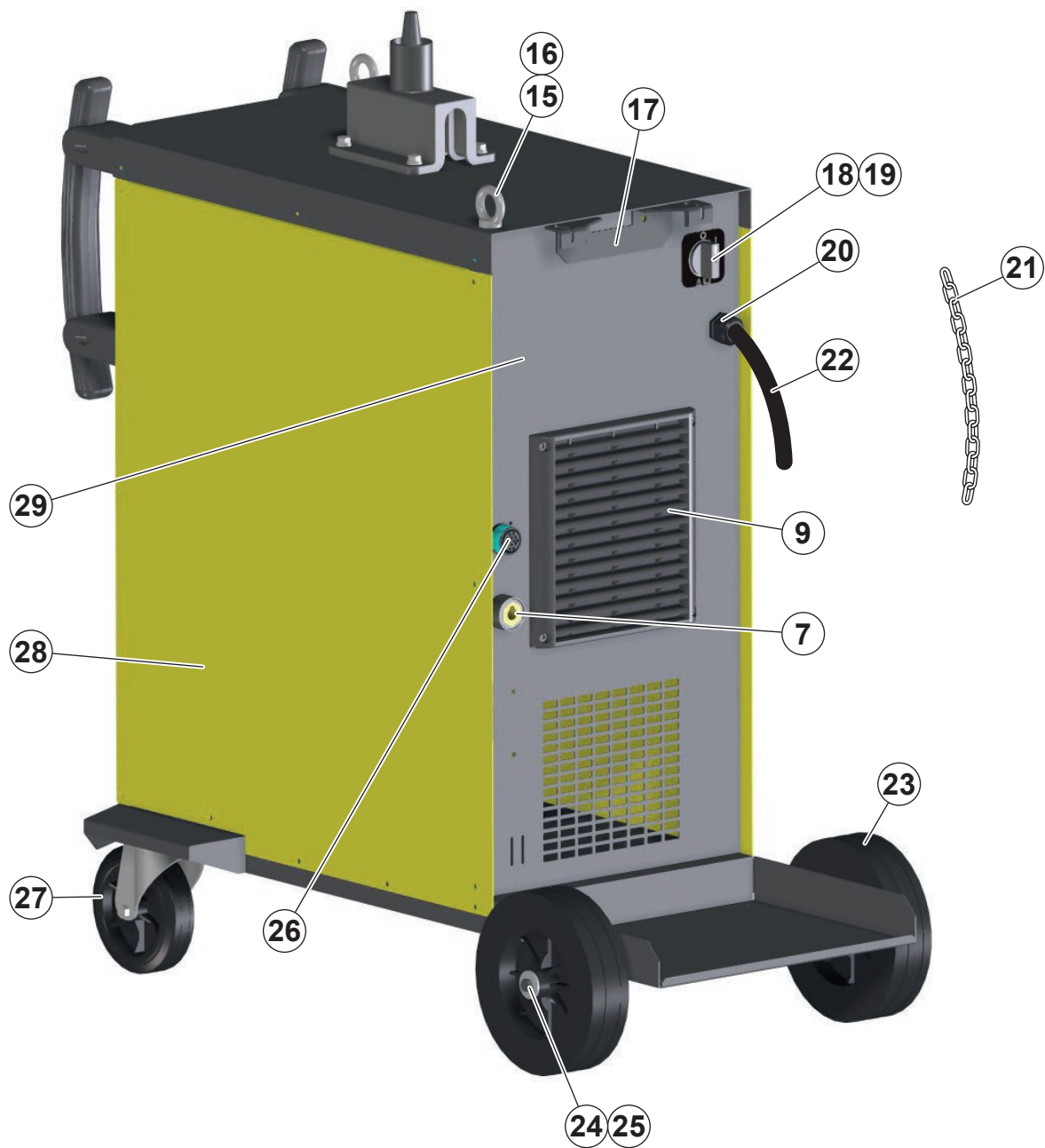
**WELDING
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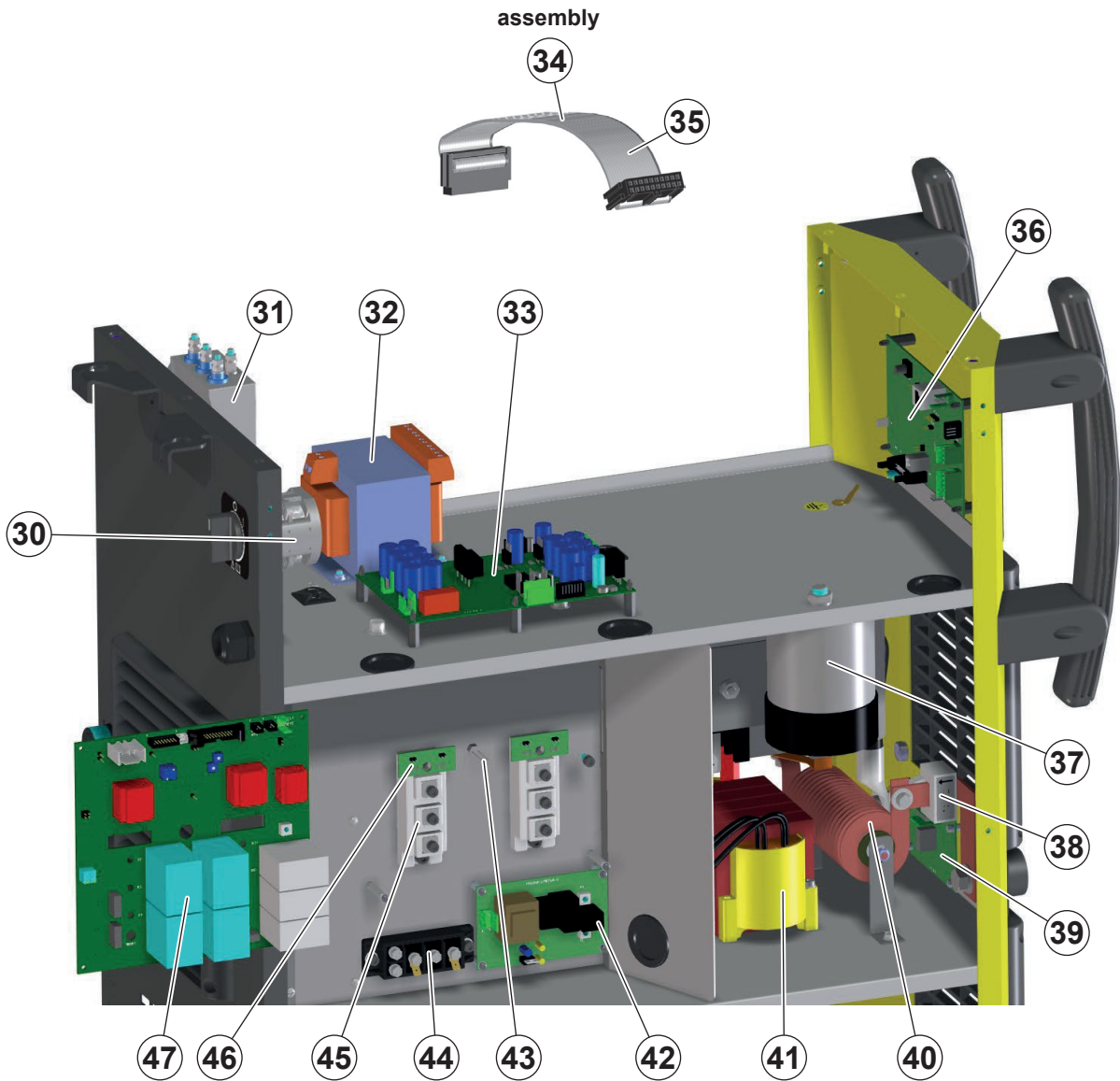
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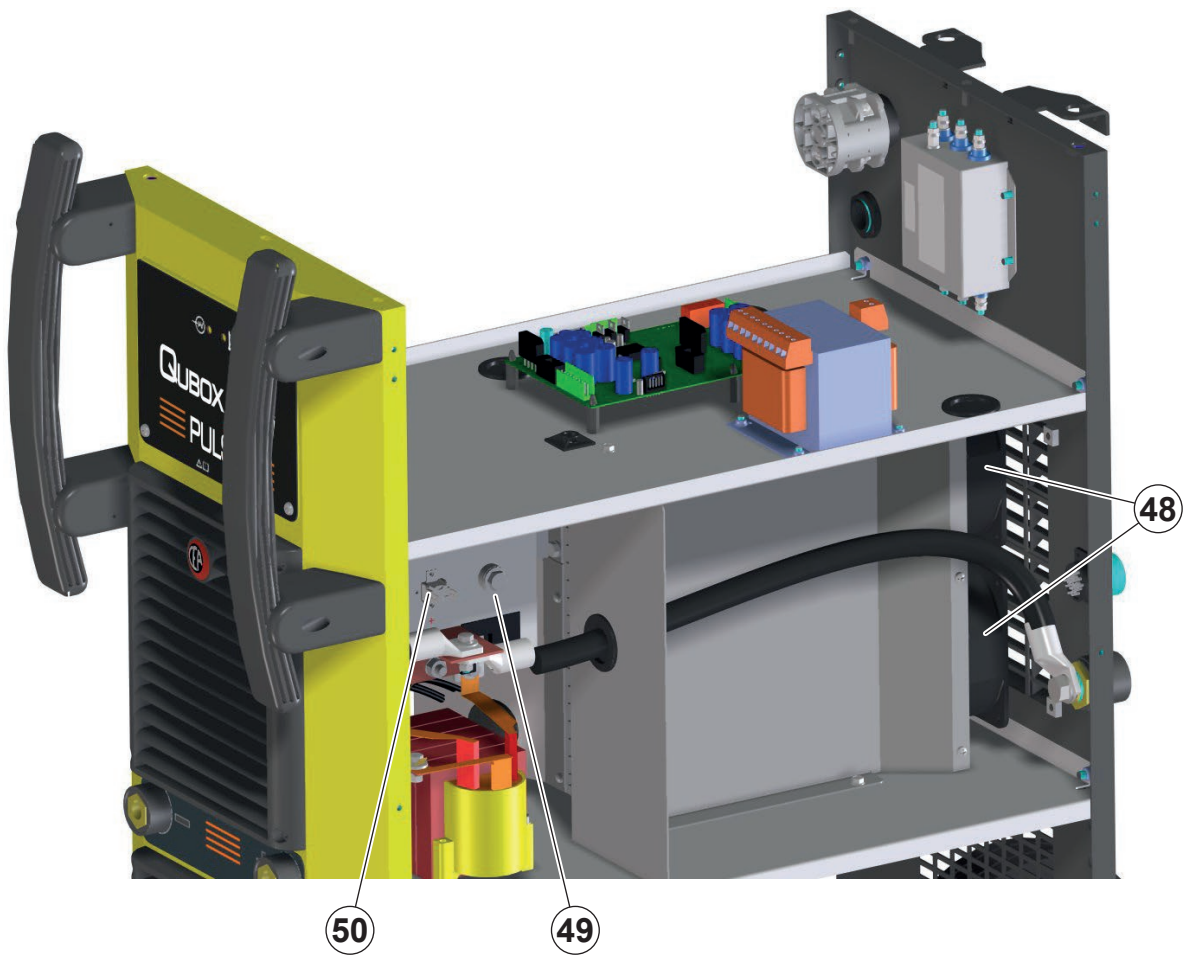
Pos.	Qubox 405w pulse	Qubox 505w pulse	Descrizione	Description
1	352389	352389	Pivot	Pivot
2	447892	447893	Tastiera a membrana	Membrane keyboard
3	439294	439294	Pannello rack	Rack panel
4	438101	438101	Maniglia in fibra	Fiber handle
5	468725	468725	Adesivo logo CEA Ø30mm	CEA logo sticker Ø30mm
6	352362	352362	Alette di aerazione in fibra + sede logo	Fiber air-cooling fins + logo housing
7	403617	403617	Attacco rapido	Quick connection
8	466833	466833	Adesivo frontale per attacchi rapidi	Quick connection sticker
9	352361	352361	Alette di aerazione in fibra	Fiber air-cooling fins
10	446622	446622	Pannello frontale	Front panel
11	404875	404875	Basamento	Base
13	420606	420606	Pannello laterale sinistro	Left side panel
14	420607	420607	Coperchio superiore	Top cover



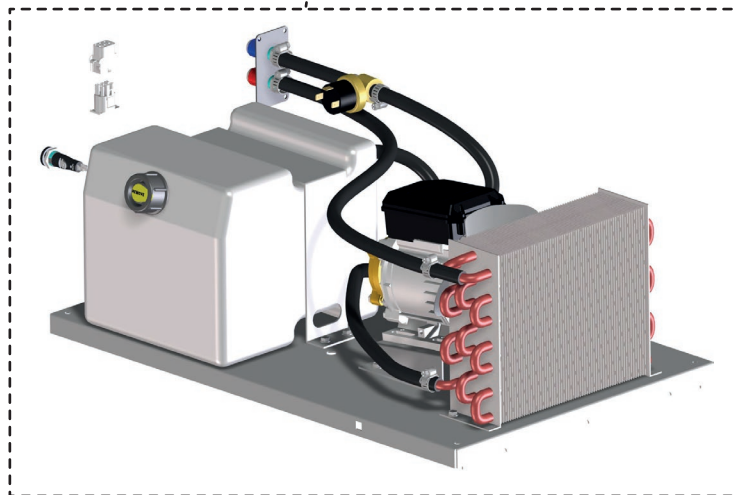
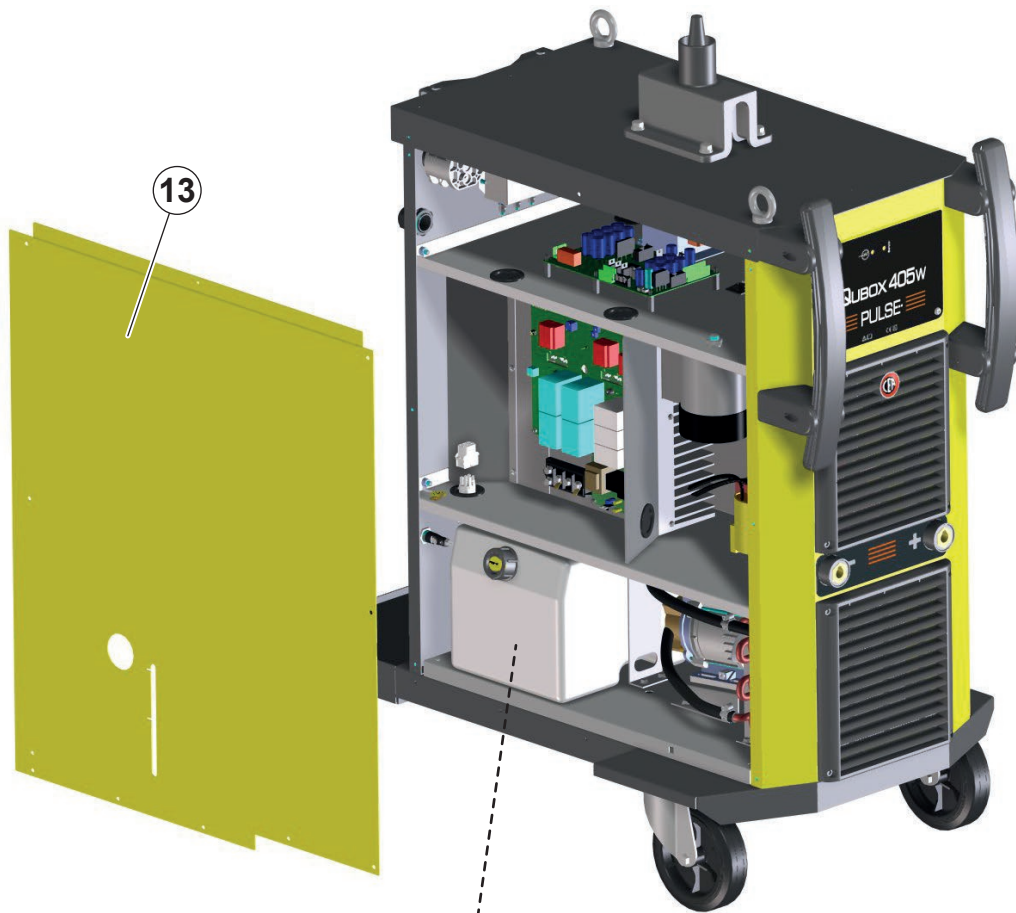
Pos.	Qubox 405w pulse	Qubox 505w pulse	Descrizione	Description
15	622020	622020	Golfare	Eyebolt
16	447720	447720	Guarnizione	Gasket
17	447226	447226	Ancoraggio bombola gas	Gas cylinder holder
18	438720	438720	Manopola interruttore di linea	Mains switch knob
19	468286	468286	Adesivo interruttore di rete	Mains switch sticker
20	427883	427883	Pressacavo con ghiera	Cable clamp with nut
21	412921	412921	Catena	Chain
22	235943	235943	Cavo di linea	Mains cable
23	459960	459960	Ruota fissa	Wheel
24	402547	402547	Assale	Axle
25	458555	458555	Rondella speciale	Special washer
26	453145	453145	Connettore cavo interconnessione	Interconnecting cable connector
27	459680	459680	Ruota pivotante	Pivoting wheel
28	420605	420605	Pannello laterale destro	Right side panel
29	447045	447045	Pannello posteriore	Rear panel

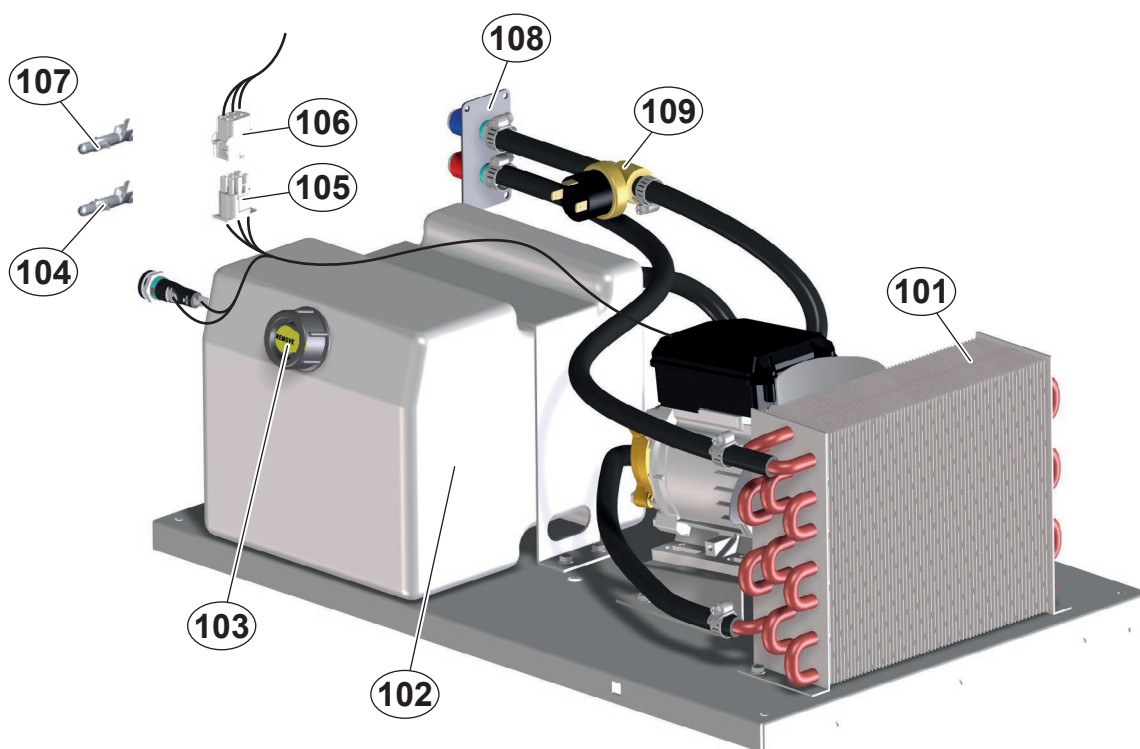


Pos.	Qubox 405w pulse	Qubox 505w pulse	Descrizione	Description
30	435753	435753	Interruttore di linea	Mains switch
31	427667	427667	Filtro EMC	EMC Filter
32	481454	481454	Trasformatore ausiliario	Auxiliary transformer
33	377213	377213	Scheda alimentazioni	Power source PCB
34	413421	413421	Cablaggio ausiliario	Auxiliary wiring
35	413424	413424	Flat cable	Flat cable
36	377198C	377198D	Scheda interfaccia digitale (versione standard)	Digital interface pcb (standard version)
	377198PRC	377198PRD	Scheda interfaccia digitale (versione premium)	Digital interface pcb (premium version)
37	418745	418745	Condensatore	Capacitor
38	481954	481954	Trasformatore ad effetto di Hall	Hall effect transformer
39	377209	377209	Scheda filtro secondario	Secondary filter pcb
40	247498	247498	Induttore secondario	Secondary inductor
41	481559	481559	Trasformatore principale	Main transformer
42	377212	377212	Scheda Inrush limiter	Inrush limiter PCB
43	478867	478867	Termistore primario	Primary thermistor
44	455513	455513	Raddrizzatore primario	Primary rectifier
45	286049	286050	IGBT primario	Primary IGBT
46	377210	377210	Scheda interfaccia pilotaggi	Gate interface PCB
47	377211	377216	Scheda Inverter primario	Primary inverter PCB

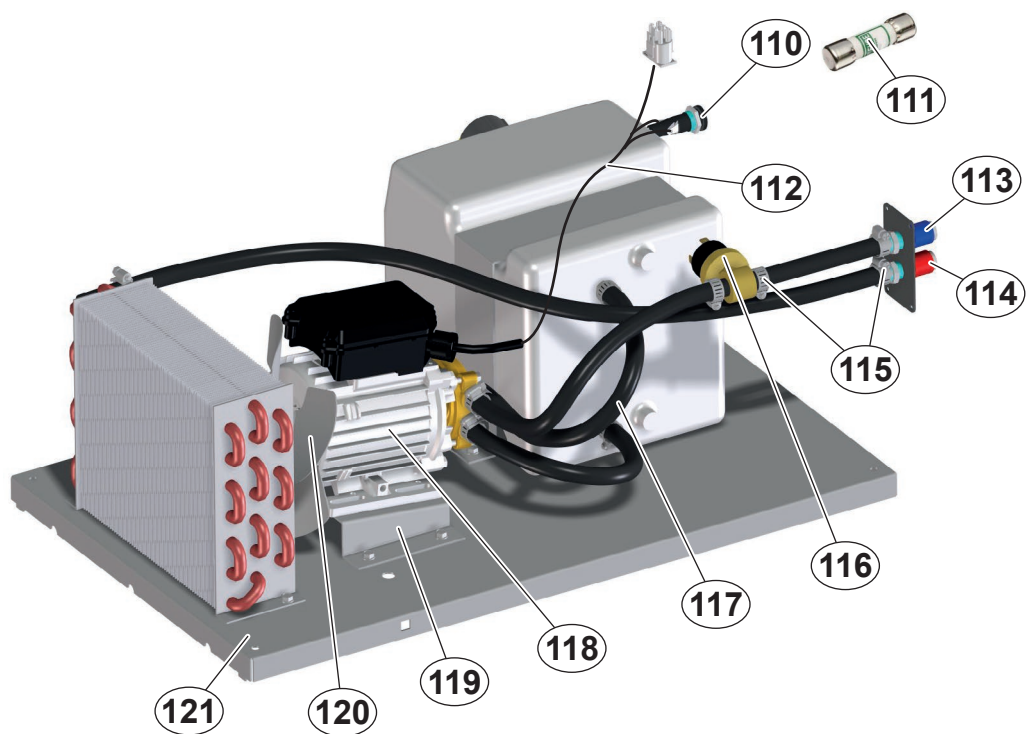


Pos.	Qubox 405w pulse	Qubox 505w pulse	Descrizione	Description
48	486383	486383	Ventilatore	Fan
49	455515	455515	Raddrizzatore secondario	Secondary rectifier
50	478790	478790	Termostato raddrizzatore secondario	Secondary rectifier thermostat





Pos.	Qubox 405w pulse	Qubox 505w pulse	Descrizione	Description
101	418847	418847	Radiatore	Radiator
102	460255	460255	Serbatoio	Tank
103	466467	466467	Tappo serbatoio	Tank cap
104	403783	403783	Terminale per connettore maschio 3x2 vie (lato raffreddamento)	Terminal for 3x2 poles male connector (water cooler side)
105	403779	403779	Connettore maschio 3x2 vie (lato raffreddamento)	3x2 poles male connector (water cooler side)
106	419074	419074	Connettore femmina 3x2 vie (lato generatore)	3x2 poles female connector (generator side)
107	403782	403782	Terminale per connettore femmina 3x2 vie (lato generatore)	Terminal for 3x2 poles female connector (generator side)
108	453808	453808	Supporto attacchi acqua	Water quick connection support
109	457761	457761	Ripartitore acqua	Water distributing nipple



Pos.	Qubox 405w pulse	Qubox 505w pulse	Descrizione	Description
110	451740	451740	Portafusibile	Fuse holder
111	429049	429049	Fusibile	Fuse
112	413385	413385	Cablaggio ausiliario per impianto di raffreddamento	Auxiliary wiring for water cooler
113	403625	403625	Attacco rapido blu	Blue quick connection
114	403632	403632	Attacco rapido rosso	Red quick connection
115	426400	426400	Fascetta di fissaggio tubi idraulici	Steel clamp for hoses
116	453246	453246	Pressostato	Pressure switch
117	482794	482794	Kit tubi acqua	Kit water hoses
118	345468	345468	Elettropompa 400V 50/60Hz	Electropump 400V 50/60Hz
119	465461	465461	Supporto elettropompa	Steel electropump support
120	486560	486560	Ventola	Impeller
121	404876	404876	Basamento metallico unità di raffreddamento	Metallic base for cooling unit

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. 435753 - per l'impianto Qubox 405w pulse - 400 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. 435753 - for Qubox 405w pulse - 400 V - 50/60 Hz - Serial number

FR Commande 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 435753 - pour l'installation Qubox 405w pulse - 400 V - 50/60 Hz - Matr. Numéro

DE Bestellung Ersatzteile

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 435753 - für Anlage Qubox 405w pulse - 400 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 frecuencia 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 435753 - para instalación Qubox 405w pulse - 400 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 435753 - voor apparaat Qubox 405w pulse - 400 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. 435753 - para o equipamento Qubox 405w pulse - 400 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 435753 - til anlæg model Qubox 405w pulse - 400 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 på apparatens märkplåt
- 4) Svetsens serienummer

EXEMPEL

2 st. detaljer kod 435753 - för apparat Qubox 405w pulse - 400 V - 50/60 Hz - Serienummer

FI Varaosien tilaus

Tiedustellessanne varaosia, ilmoittakaa selvästi:

- 1) Osan koodinnumero
- 2) Laitteiston tyyppi
- 3) jännite ja taajuus, jotka on ilmoitettu laitteistolle sijoitetusta tietokyltistä
- 4) Hitsauskoneen sarjanumero

ESIMERKKI

2 osaa, koodi 435753 - laitteistoon Qubox 405w pulse - 400 V - 50/60 Hz - Sarjanumero

N Bestilling av reservedeler

Ved bestilling av reservedeler må du oppgi:

- 1) Delenes kodennummer
- 2) Type apparat
- 3) Apparatets spenning og frekvens som finnes på merkeplaten for data på apparatet
- 4) Sveiseapparatets serienummer

EKSEMPEL

2 stk. kode 435753 - for apparat Qubox 405w pulse - 400 V - 50/60 Hz - Serienummer.....

EL Παγγελία των ανταλλακτικών

Όταν ζητάτε ανταλλακτικά παρακαλείσθε να ημειώνετε καθαρά:

- 1) τον κωδικό της λεπτομέρειας
- 2) τον τύπο της μονάδας ψύξης
- 3) την τάση και τη συχνότητα που αναγράφονται στην πινακίδα των τεχνικών χαρακτηριστικών
- 4) τον αριθμό μητρώου της μηχανής

Αριθ.

2 τεμάχια κωδικό 435753 για τη μονάδα ψύξης Qubox 405w pulse - 400 V - 50/60 Hz - Αριθ. Μητρώου

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 435753, для сварочной машины Qubox 405w pulse - 400 V - 50/60 Hz

Серийный номер

QF4 - QF4w



**WELDING
TOGETHER**

CEA COSTRUZIONI ELETTROMECCANICHE ANNETTONI S.p.A.

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Introduction

Thank you for buying our product.

In order to get the best performance out of the plant 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 plant 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.

IMPORTANT: *The wire feeder must only be used together with the welding generator and not for any other use.*

Description


Professional large diameter 4-roller wire feeder that guarantees precise and constant feeding of the wire. This wire feeder's principal characteristics are:

- Designed for use with all types of solid and core type wire.
- A 24 V direct current ratio motor.
- A gas solenoid valve.
- Wire speed (welding current) and welding voltage adjustment.
- Gas and wire feed test.
- Graduated knobs for precise adjustment of the wire pressure that stays unvaried when the arms open and close.
- The feeder rollers can be replaced without using any tools.

Technical data

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

Table 1

Model		QF4
Input voltage of wire feeder	V	24 DC
Power output of feeder motor	W	100
N° rollers		4
Rated wire feeding speed	m/min	1,5 ÷ 25
Compatible wire types		<ul style="list-style-type: none"> • Carbon steel • Stainless steel • Aluminium magnesium • Aluminium silicon • Basic and rutile cored wires
Spool Diameter	Ømm	300
Weight	kg	20 (max)
Protection gas		<ul style="list-style-type: none"> • Carbon dioxide • Pure Argon • Argon-Carbon dioxide-Oxygen • Argon and Carbon dioxide blends
Duty cycle at 60%	A	600
Duty cycle at 100%	A	460
Standards		IEC 60974-5 CE
Insulation class		F
Protection class		IP 23 S
Dimensions 	mm	635 - 415 - 270
Weight	kg	15

How to lift up the system

The wire feeder is fitted with a strong handle, built into the frame, which is only used to facilitate lifting and carrying it.

NOTE: *The lifting and transporting devices conform with European regulations. Do not use other equipment to lift or transport the feeder.*

Opening the packaging

The system essentially consists of:

- QF4 wire-feeder unit.
- Separately:
 - Weld unit (supplied separately).
 - MIG-MAG welding torch (optional).
 - Wire-feeder/generator interconnection cable (supplied separately).

When receiving the equipment remove the feeder and all its accessories / components from the relevant packing, and check that they are in good condition. If not, report the situation to the dealer immediately.

Installation and connections

CONNECTION OF THE INTERCONNECTING CABLE BETWEEN WIRE FEEDER AND GENERATOR

The extension between the generator and wire feeder consists of a power cable, a multipolar cable for auxiliary power supply and a gas hose which are to be connected to the rear of the wire feeder.

- The gas tube must be connected to the quickfit connector (Pos. 5, Fig. A).
- The power cable must be fixed to the quick-fit connector (Pos. 7, Fig. A).
- The auxiliary cable must be fixed to the special connector (Pos. 6, Fig. A).

QF4w - The connecting cable also includes the feed (blue) and return (red) pipes for the water that are used for cooling the welding equipment's torch that must be connected to the respective (blue and red) rapid couplings on the back of the feeder (Pos. 3, Fig. A). Once this task has been completed, do not forget to secure the connecting cable to the base, using the special little strap provided.

CONNECTING THE TORCH

Screw the torch onto the centralised connection on the front panel of the feeder (pos. 4, Fig. A) and connect the feed (blue) and return (red) water hoses for cooling the torch to the respective (blue and red) rapid couplings on the front panel of the feeder (Pos. 3, Fig. A).

Loading wire

- Insert the spool (300 mm MAX) onto its support so that the wire unwinds anticlockwise and centre up the protruding reference point on the support with the respective opening in the spool.
- Thread the end of the wire into the back guide (Pos. 1, Fig. B) on the drawing mechanism.
- Lift up the idle rolls (Pos. 4, Fig. B) releasing the roll pressure device (Pos. 2, Fig. B). Make sure that the drive rolls (Pos. 7, Fig. B) have the diameter corresponding to the wire being used stamped on the outside.
- Insert the wire into the central wire guide and the wire guide on the centralised connection (Pos. 5, Fig. B) by a few centimetres. Lower the idle roller holder arms, making sure that the wire slots into the hollow in the motor's roller. If necessary, adjust the pressure between the rollers by turning the relevant screw (Pos. 2, Fig. B). The correct pressure is the minimum that does not allow the rollers to skid on the wire. Excessive pressure will cause deformation of the wire and tangling on the entrance of the sheath; insufficient pressure can cause irregular welding.

Assembly of drive rollers

Unscrew the two screws (Pos. 6, Fig. B). Lift up the idle rollholder arm (Pos. 3, Fig. B) and proceed as follows:

- Each roller shows the type of wire and diameter on the two external sides.
- Install the right rolls (Pos. 7, Fig. B) making sure the groove is in the correct position for the diameter of the wire being used.

Instructions for use

COMMAND AND CONTROL UNITS (Fig. A)

- Pos. 1** Control panel "QF4". **WARNING: For indications on how the feeder control panel works, read the QM operator software manual carefully.**
- Pos. 2** 17-pole connector for remote control connections.
- Pos. 3** **QF4w**: Rapid couplings for cooling MIG-MAG welding torch.
- Pos. 4** Centralized torch connection.
- Pos. 5** Rapid coupling for connecting the gas hose.
- Pos. 6** 14-pole connector the interconnecting cable connections.
- Pos. 7** Fast coupling reverse polarity.

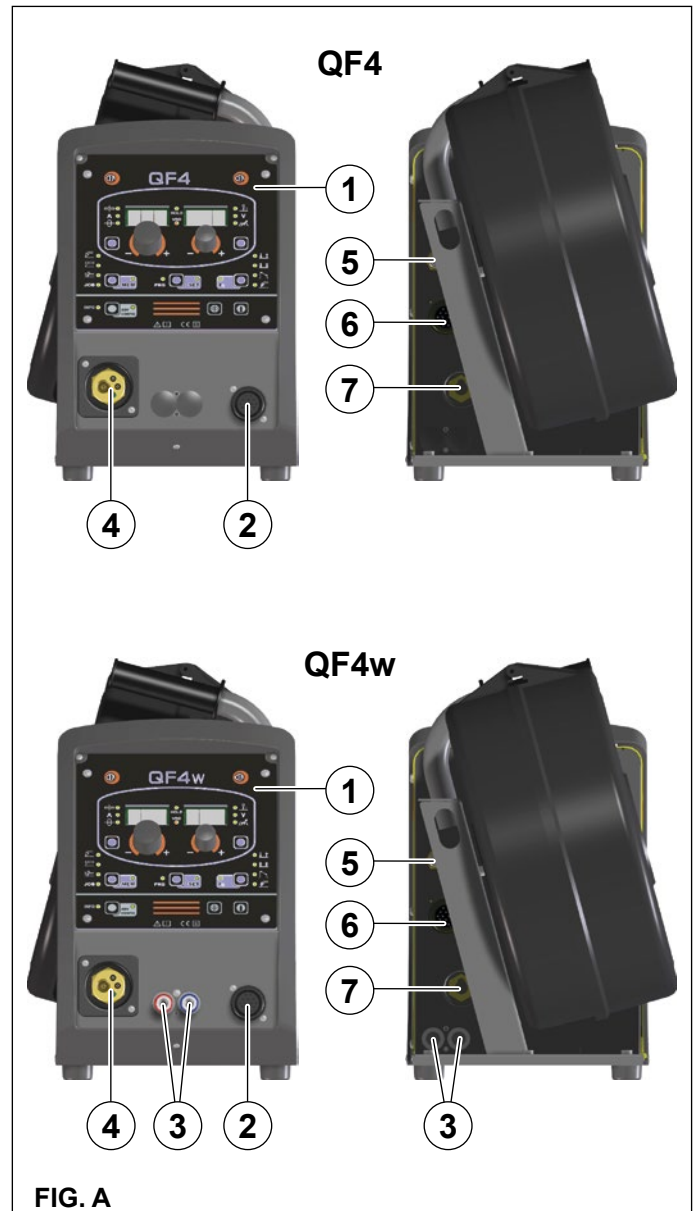


FIG. A

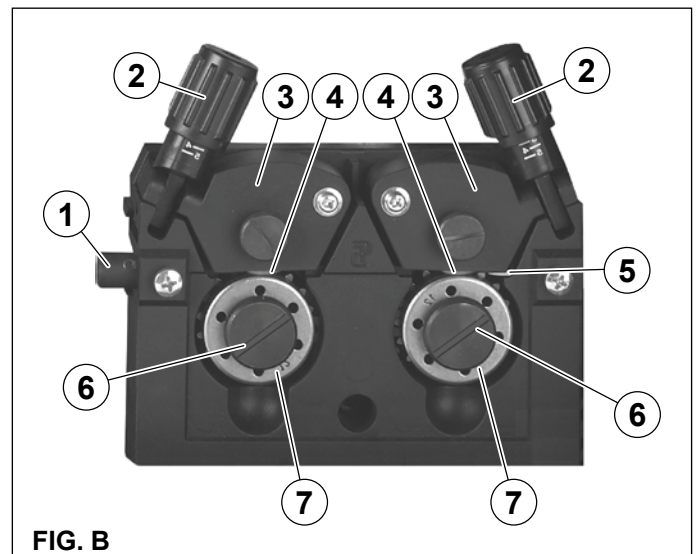


FIG. B

Before welding

- Before welding, check that the data on the power source plate correspond to the supply voltage and frequency.
- Make sure that the wire feeder is correctly connected to the power source through the interconnecting cable and that the ground cable is connected to the piece to be welded.
- Preset the adjustments using the encoders on the control panel.

Optional

WARNING: *The digital control unit of the generator is fitted with a control recognition device which allows it to identify which device is connected and take action accordingly.*

REMOTE CONTROL ANALOG RC

This command:

- Completely replaces the ENCODER - A knob on the QF4 feeder's front panel.
- Partially (depending on the welding process selected) replaces the ENCODER - V knob on the QF4 feeder's front panel (for more information see the QM operator software manual).

AIR AND/OR WATER COOLED UP/DOWN TORCH

This command works as an alternative to:

- The ENCODER - A knob on the QF4 feeder's front panel. In "synergic" MIG MAG and "manual" MIG MAG welding processes, by pressing the two right (+) and left (-) buttons you can regulate the values for the synergic welding parameters.
- The ENCODER - V knob on the QF4 feeder's front panel. In the JOB welding process, by pressing the two right (+) and left (-) buttons you can scroll the welding points set previously.

PUSH-PULL TORCH

The push-pull torch makes it possible to improve the aluminium wire feed, using the motor on the torch itself. The parameters normally regulated using the ENCODER - A knob on the QF4 feeder's front panel, when this torch is on, are now regulated using the potentiometer on the torch itself.

TORCH WITH DISPLAY (DIGITORCH)

The new Digitorch keep all information within easy reach. The innovative microcontroller with display integrated into the grip allows the main welding parameters to be displayed and adjusted:

- Current
- Thickness of material
- Wire speed
- Arc length
- Electronic inductance
- Memorised programme number

Press the up/down buttons, depending on the selected operating method, to move from one programme to another or increase and decreases the parameters on the synergic curves in use.

Maintenance and trouble shooting

SUPPLY WIRE FEEDER

The maintenance of this equipment is limited to the cleaning of the inside of the frame and periodic inspection of worn cables or loose connections. At regular intervals disconnect the welder from the mains, take off the cover and use dry compressed air to remove possible accumulations of dirt and dust. During this operation do not direct the jet of air onto electronic components. Check, that the gas circuit is completely free from impurities and that the connections are tight and that there are no leaks. Carefully check that the electric valve does not leak. 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.

Replacing the motor control board

Proceed as follows:

- Unscrew the 4 screws on the sides of the panel to loosen it.
- Extract the panel pulling it towards you with a gentle movement.
- Extract the back connectors.
- Unscrew the 4 nuts at the sides of the electronic control board.
- Unscrew the two nuts that secure the encoders.
- Remove the faulty card.
- Proceed the other way round for reassembly.

Simple automation

This paragraph describes how to interface the welding machine with an automatic welding plant. The connection signs are marked and available on the "17-pole connector for accessory / optional extra connections" (Connector **CA** - see the "Wiring diagram" and "Wiring Diagram Legend" paragraphs).

DIGITAL INPUTS

Activating a digital input signal means applying a clean closed contact to it.

- TORCH BUTTON • Terminals **C / D (COM)**
When this signal is activated, the welding machine starts the welding process.
- UP SIGNAL • Terminals **D (COM) / F**
When this signal is activated, the welding machine increases the value set beforehand for the welding synergy parameters.
- DOWN SIGNAL • Terminals **D (COM) / E**
When this signal is activated, the welding machine decreases the value set beforehand for the welding synergy parameters.

ANALOGUE INPUTS

These inputs must be piloted by a direct voltage that can be regulated between 0V and 10V.

Their input impedance exceeds 400 k Ω (to enable functionality of these inputs the voltage between terminals **P(-)** and **R (+)** must exceed 0,5V).

- PARAMETER REGULATION - A • Terminals **P(-) / R (+)**
By regulating the voltage on this input between 1V and 10V the welding synergy parameters (WELDING WORKPIECE THICKNESS, WELDING CURRENT, WIRE SPEED) are regulated from the minimum to the maximum value.
- PARAMETER REGULATION - V • Terminals **P(-) / S (+)**
By regulating the voltage on this input between 1V and 10V the welding parameters (ARC LENGTH, WELDING VOLTAGE, ELECTRONIC INDUCTANCE) are regulated from the minimum to the maximum value.

DIGITAL OUTPUTS

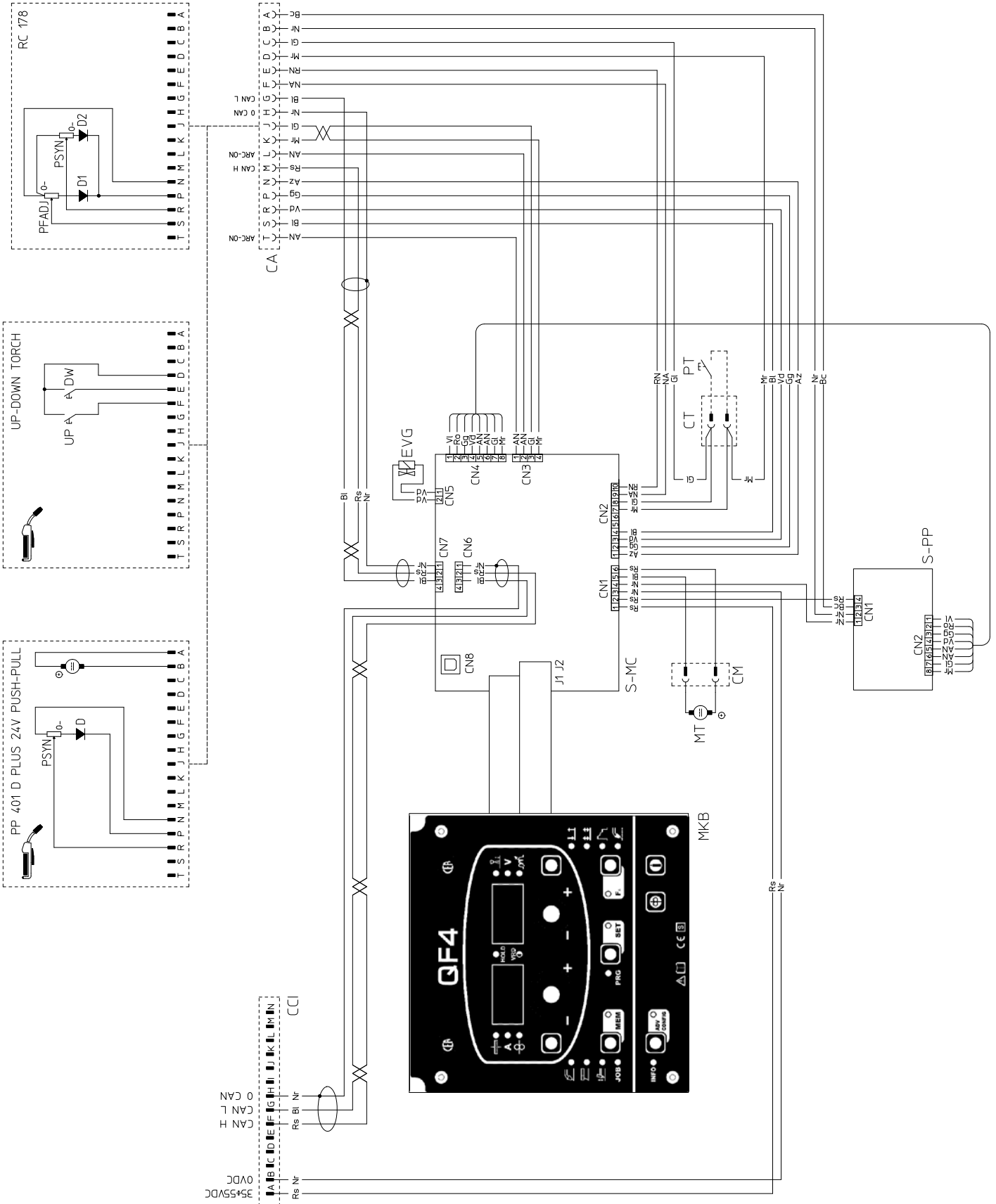
Activating digital output signals means closing a clean contact.

- ARC ON • Terminals **T / L**
The welding machine activates this signal when it detects current passing through the welding circuit.

Welding defects

Problem	Cause	Remedy
The welder does not supply current	• No power	• Check that the power cable from the generator to the line and repair if necessary
	• Torch button does not work	• Check that the torch switch gives consensus; if not, replace the torch button or the central connection
The wire does not come out	• Motor reducer failure	• Check and replace if necessary
	• Worn wire-feeder rollers	• Replace
	• Wire guide sheath dirty	• Clean and replace if necessary
	• Worn contact prod	• Replace
Poor welding (porous, splashes, etc)	• Faulty gas circuit	• Check that the valve on the gas cylinder is open. Check the electric valve and replace if necessary. Tighten all the connections. Free the holes in the gas diffuser of foreign material.
	• Poor quality wire or gas	• Change the filter or gas
	• Parts to be welded are dirty or rusty	• Clean the parts
	• Rusty or incorrectly connected ground wire	• Check the ground terminal and check that the cable is not damaged and is well connected
	• Incorrect adjustment of welding voltage or speed of wire	• Increase or reduce the settings until correct
	• Faulty torch	• Check torch components and replace faulty parts if necessary

Wiring diagram







Key to the electrical diagram




CA	17 pin connector for accessories / optional
CCI	17 pin connector for remote control connections
CM	Drive motor connector
CN	Connectors on PCB
CT	Torch connector
EVG	24VDC solenoid valve
MKB	Membrane keyboard
MT	Ratio-motor
PT	Torch button
S-MC	Motor control PCB
SPP	Push-pull PCB / optional

Colour key

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

Meaning of graphic symbols on machine

	Danger! Parts moving
	It is forbidden to use gloves
	Warning!
	Before using the equipment you should carefully read the instructions included in this manual

	MIG-MAG welding
	Product suitable for free circulation in the European Community
	Special disposal

QF4 - QF4w

IT

Lista ricambi

LEGGERE ATTENTAMENTE

EN

Spare parts list

READ CAREFULLY



**WELDING
TOGETHER**

CEA COSTRUZIONI ELETTROMECCANICHE ANNETTONI S.p.A.

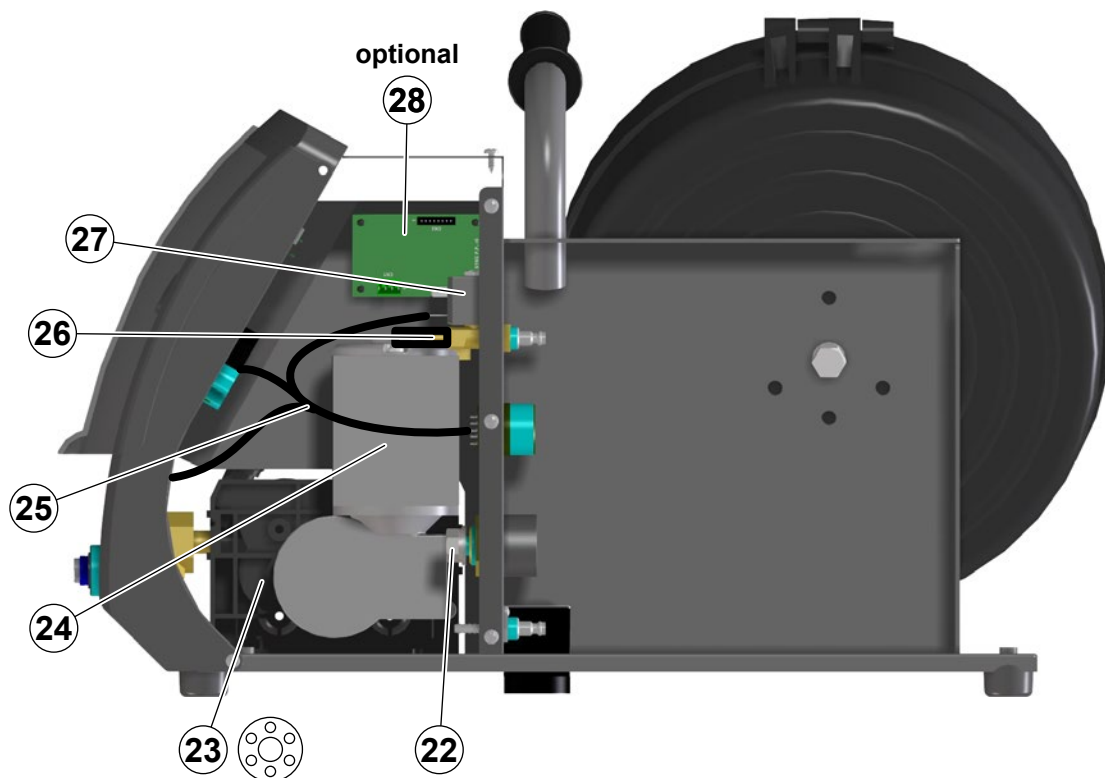
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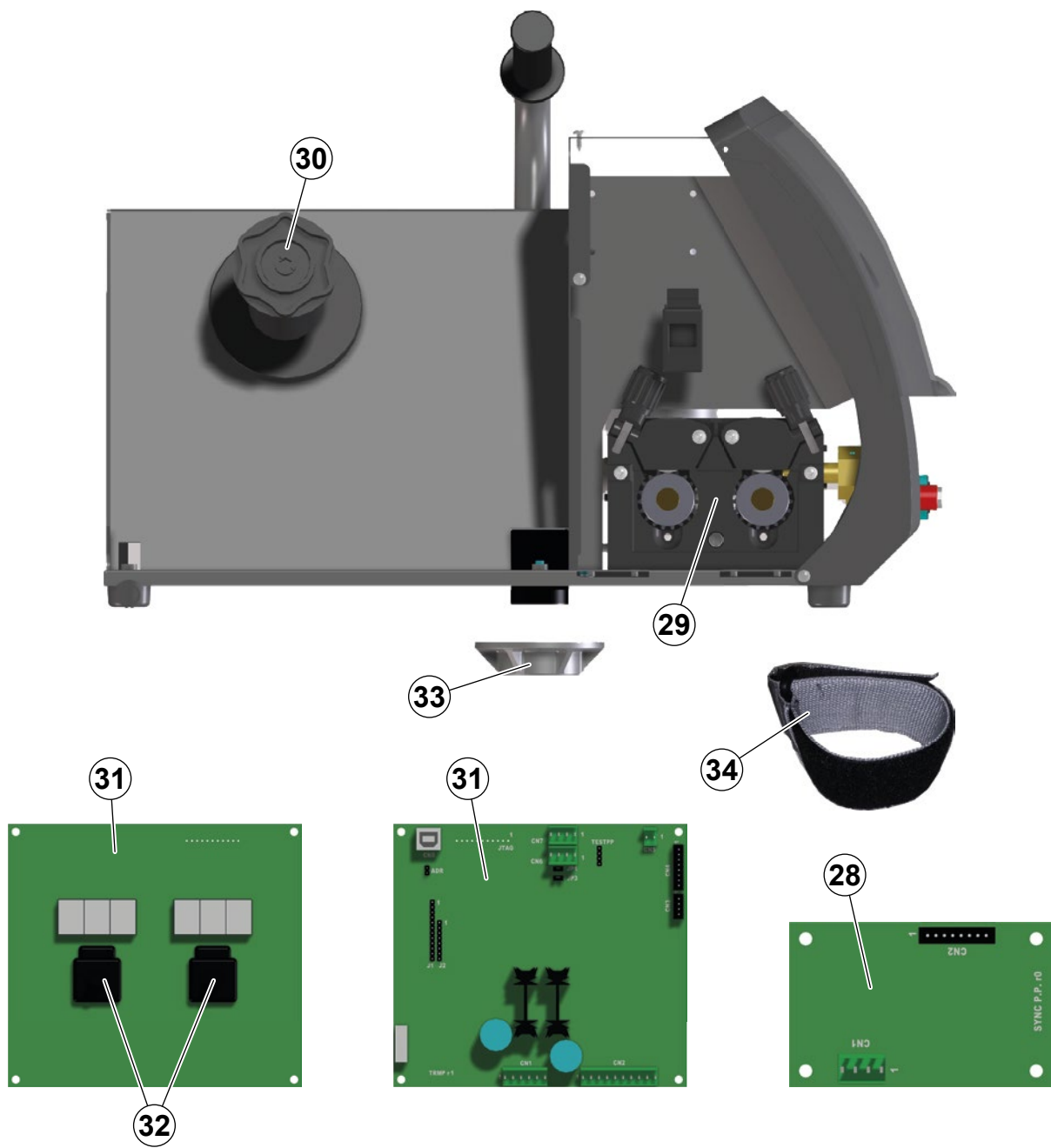
Pos.	QF4	QF4w	Descrizione	Description
1	447886	447888	Tastiera a membrana	Membrane keyboard
2	438849	438849	Manopola senza indice Ø22mm	Ø22mm Knob without index
3	438888	438888	Manopola senza indice Ø29mm	Ø29mm Knob without index
4	352386	352386	Schermo trasparente	Transparent front screen
5	419051	419051	Connettore 17 poli per collegamento accessori / optional	17 Pole connector for accessories / optional
6	403933	403933	Attacco rapido blu	Blue quick connection
7	403934	403934	Attacco rapido rosso	Red quick connection
8	428110	428110	Flangia	Flange
9	236641	236641	Attacco Euro con tubetto guidafile	Euro connection with wire guide tube
10	434247	434247	Tubetto guidafile 61mm	61mm Wire guide tube
11	420485	420485	Coperchio parte mobile con adesivo logo CEA	Movable cover with CEA logo sticker
12	414326	414326	Chiavistello	Latch



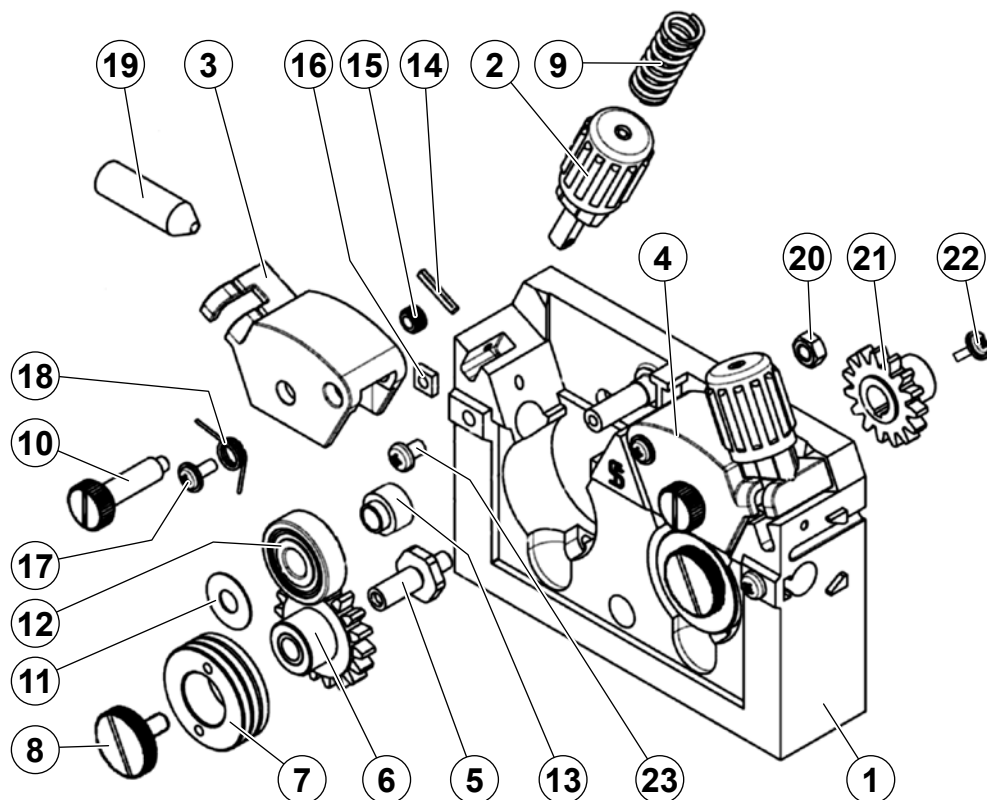
Pos.	QF4	QF4w	Descrizione	Description
13	420435	420435	Copribobina	Spool cover
14	431329	431329	Piedino in gomma	Rubber foot
15	404899	404899	Basamento	Base
16	403935	403935	Attacco rapido maschio	Male quick connection
17	352385	352385	Cornice	Frame
18	403617	403617	Attacco rapido	Quick connection
19	453146	453146	Connettore 14 poli collegamento cavo interconnessione	14 Pole connector the interconnecting cable connections
20	403941	403941	Attacco rapido maschio	Male quick connection
21	420484	420484	Coperchio parte fissa con adesivo logo CEA	Fixed cover with CEA logo sticker



Pos.	QF4	QF4w	Descrizione	Description
22	235237	235237	Cavo di potenza	Power cable
23	400000	400000	Adattatore	Adaptor
24	444471	444471	Motoriduttore	Drive motor
25	413379	413379	Cablaggio ausiliario	Auxiliary wiring
26	485040	485040	Tubo gas	Gas tube
27	425987	425987	Elettrovalvola	Solenoid valve
28	377208	377208	Scheda Push Pull (opzionale)	Push Pull pcb (option)



Pos.	QF4	QF4w	Descrizione	Description
29	Pag. 6	Pag. 6	Meccanismo di trascinamento	Wire feed mechanism assembly
30	241848	241848	Mozzo bobina	Spool holder
31	377207	377207	Scheda comando motore	Motor control PCB
32	454150	454150	Encoder	Encoder
33	406883	406883	Flangia di guida per pivot	Guide flange for pivot
34	415380	415380	Cinghia velcro fissaggio prolunga	Hook and loop strap for cable fixing



Pos.	Cod.	Descrizione	Description
1	307271	Base meccanismo di trascinamento	Wire feed mechanism base
2	437075	Dispositivo di pressione rulli	Pressure device
3	356963	Complesso leva di pressione sinistra	Pressure arm left complete
4	356964	Complesso leva di pressione destra	Pressure arm right complete
5	449038	Perno fissaggio ingranaggio	Axle to geared adapter
6	435070	Complesso ingranaggio	Geared adpter complete
7	Tab. A	Rullo inferiore Ø37mm	Feed roll Ø37mm
8	487805	Vite di fissaggio ingranaggio	Fixing screw gear
9	441210	Molla di pressione	Pressure spring
10	487897	Perno per meccanismo 4R	Axle shaft for 4R mechanism
11	424042	Rondella anteriore 8x20x0,5mm	8x20x0,5mm Front spacer
12	458902	Rullo superiore Ø30mm	Pressure roll Ø30mm
13	424051	Distanziale posteriore	Rear spacer
14	676510	Spina elastica	Pin pressure device
15	435294	Inserto in ottone M5	Brass insert M5
16	423135	Dado ad incasso M5	4 Cornered nut M5
17	487808	Vite di fissaggio M4x8mm	Fixing screw M4x8mm
18	441207	Molla per leva di pressione	Spring pressure arm
19	434275	Guida filo entrata	Inlet wire guide
20	612083	Dado M6	Nut M6
21	435065	Ingranaggio principale	Main gear
22	487807	Vite di fissaggio ingranaggio principale	Fixing screw main gear
23	690398	Vite di fissaggio M5x10mm	Fixing screw M5x10mm

A

IT FILO EN WIRE	IT Diametro filo EN Wire diameter	IT Rullo inferiore (doppia cava) Ø37 mm EN Lower roller (double slot) Ø37 mm	IT Rullo superiore (cava singola) Ø30 mm EN Upper roller (single slot) Ø30 mm	IT TWIN kit EN TWIN kit
	0,6 ÷ 0,8 mm	458903	458902	-
	0,8 ÷ 1,0 mm	458905	458902	-
IT Acciaio EN Steel	1,0 ÷ 1,2 mm	458915	458902	-
	1,2 ÷ 1,6 mm	458925	458902	-
	0,8 ÷ 1,0 mm	458968	458979 (0,8 mm) - 458981 (1,0 mm)	030895
IT Alluminio "TWIN" EN "TWIN" aluminum	1,0 ÷ 1,2 mm	458970	458981 (1,0 mm) - 458984 (1,2 mm)	030897
	1,2 ÷ 1,6 mm	458975	458984 (1,2 mm) - 458987 (1,6 mm)	030899
	1,0 ÷ 1,2 mm	458950	458902	-
IT Filo animato EN Cored wire	1,2 ÷ 1,6 mm	458955	458902	-

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. 414326 - per l'impianto QF4 - 24 V DC

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. 414326 - for QF4 - 24 V - DC

Serial number

QM / QP



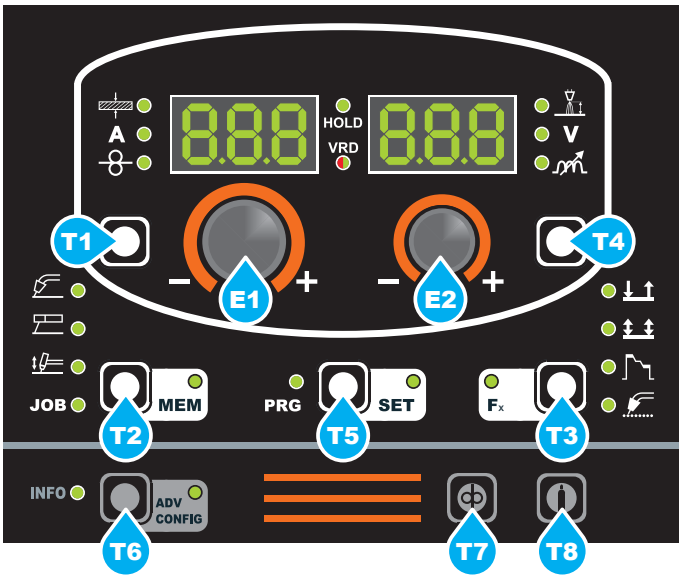
**WELDING
TOGETHER**

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2b - SELECTION OF WELDING PROGRAMME (advanced method)	18	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, PULSE MIG, MMA and TIG.	

KEY AND KNOB COMMANDS (1/2)



<p>E1</p>	<p>■ 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.</p>
<p>E2</p>	<p>■ 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.</p>
<p>T1</p>	<p>■ PARAMETER SELECTION key - A This is used to select the following welding parameters:</p> <ul style="list-style-type: none"> • THICKNESS OF WELDED ITEM (⇄). • WELDING CURRENT (A). • WIRE SPEED (⊖). • WELDING POWER (⇄ flashing).
<p>T2</p>	<p>■ WELDING PROCESS SELECTION key It can also be used to select the following welding processes:</p> <ul style="list-style-type: none"> • MIG-MAG • MMA • TIG • JOB <p>■ 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.</p>

T3 ■ **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.

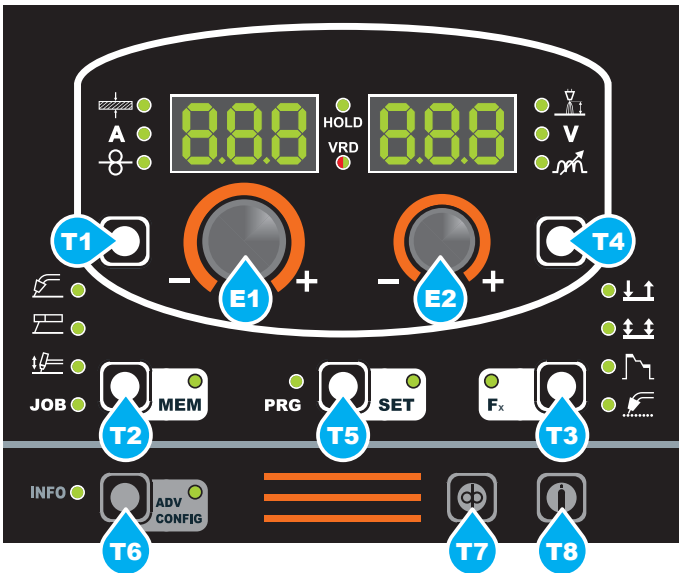
CRATER 4T
4T LED (⇄⇄) switched on - CRATER LED (↵) switched on

- 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).

(continued)

KEY AND KNOB COMMANDS (2/2)



T3	<p>STITCH WELDING 2T 2T LED (↕) switched on - SPOT LED (⚡) flashing To begin stitch welding:</p> <ol style="list-style-type: none"> 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. <p>CYCLE 4T LED (↕↕) switched on - CRATER LED (⚡) flashing</p> <ol style="list-style-type: none"> 1) When the TORCH BUTTON is pushed, the arc is ignited and the welding parameters take on the values for the <i>initial crater</i>. 2) When the TORCH BUTTON is released, the current goes to that for <i>welding</i> at a time defined by the CRATER START SLOPE function (F11). 3) When the TORCH BUTTON is pressed and released within 1 second, the current goes to that defined by the (F19) and (F20) "cycle" functions. By repeating this operation, you can switch an infinite number of times between the <i>cycle level</i> and <i>welding level</i>. 4) When the TORCH BUTTON is pushed again and held down for more than 1 second, after a time defined by the CRATER END SLOPE (F12) function, the welding parameters taken on the values for the <i>final crater</i>. When the TORCH BUTTON is released the welding cycle ends. <p style="text-align: right;"><i>(continued)</i></p>
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T3	<p>■ SPECIAL FUNCTIONS key "Fx" (T ≥ 2 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).</p>
T4	<p>■ PARAMETER SELECTION key - V This is used to select the following welding parameters:</p> <ul style="list-style-type: none"> • ARC LENGTH ADJUSTMENT (⚡). • WELDING VOLTAGE (V). • ELECTRONIC INDUCTANCE (⚡).
T5	<p>■ PROGRAMME SELECTION key PRG LED switched on It can be used to select the individual welding PROGRAM for MIG-MAG and MMA welding processes. For more information, see the Process selection / welding program in later sections of this manual.</p> <p>■ SET MENU Key (T > 3 s) SET LED switched on This provides access to the SET menu, which in turn provides access to a series of functions, suitable for a basic operator.</p>
T6	<p>■ INFO Key INFO LED switched on This allows access to the basic information menu (INFO) suitable for a less experienced operator. For more information, refer to the relevant paragraphs later in this manual.</p> <p>■ ADV CONFIG Key (T ≥ 3 s) ADV CONFIG LED switched on This allows access to the advanced configuration menu (ADVANCED CONFIGURATION) suitable for an experienced, responsible operator.</p>
T7	<p>■ WIRE LOADING key Pushing this key makes it possible to load the wire as explained in the relevant paragraph later in this manual.</p>
T8	<p>■ GAS TEST key Pressing and releasing this button controls the solenoid valve which allows the gas to escape from the welding torch for about 60 seconds. After this time the gas flow stops automatically. However, the gas flow can be interrupted at any time before 60 seconds by pressing the same key again.</p>

DISPLAY AND LED INDICATIONS



D1	<p>■ PARAMETER DISPLAY screen - A This Display shows the values / numbers (set or measured) of the following parameters (if active):</p> <ul style="list-style-type: none"> • THICKNESS OF WELDED ITEM (≡). • WELDING CURRENT (A). • WIRE SPEED (⊖). • WELDING PROGRAM (PRG).
D2	<p>■ PARAMETER DISPLAY screen - V This Display shows the values / numbers (set or measured) of the following parameters (if active):</p> <ul style="list-style-type: none"> • ARC LENGTH ADJUSTMENT (⊖). • WELDING VOLTAGE (V). • ELECTRONIC INDUCTANCE (⊖).
L1	<p>■ PARAMETER SELECTION LED - A When one of these LEDs is on it means that the corresponding welding parameter has been selected.</p>
L2	<p>■ PARAMETER SELECTION LED - V When one of these LEDs is on it means that the corresponding welding parameter has been selected.</p>
L3	<p>■ 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.</p>

L4	<p>■ 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:</p> <ul style="list-style-type: none"> • 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. • MIG MAG (Synergic and Manual) / TIG Lift: the VRD device is not managed and therefore the LED always will be off.
L5	<p>■ WELDING PROCESS SELECTION LED When one of these LEDs is on it means that the corresponding welding process has been selected.</p>
L6	<p>■ 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.</p>
L7	<p>■ JOB SAVING MEM LED Flashes while saving a JOB.</p>
L8	<p>■ PROGRAMME SELECTION LED When this LED is on, the operator can select a welding process and the relevant associated program. For more information, see the Process selection / welding program in later sections of this manual.</p>
L9	<p>■ WELDING PARAMETERS DISPLAY / SETTING LED When this LED is on, the operator can view and modify the parameters related to the welding program selected previously. For more information, see the Process selection / welding program sections later in this manual.</p>
L10	<p>■ F_x LED - SPECIAL FUNCTIONS Switched on when special F_x parameters are displayed.</p>
L11	<p>■ INFO LED Switched On when the operator wants to access the basic information menu. For more information, refer to the relevant paragraphs later in this manual.</p>
L12	<p>■ ADV CONFIG LED Switched On when the operator wants to access the advanced information menu. For more information, refer to the relevant paragraphs later in this manual.</p>

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.

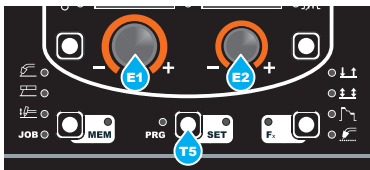


Viewing the software version installed

- 1) When the welding machine is working, press the INFO (T6) key (the relevant LED switches on). When the ENCODER-1 (E1) knob is rotated, the following messages are seen in succession: Pou uEr and Fed uER.



- 2) Press the PRG / SET (T5) key (no LED switches on). A running string appears on both displays, indicating the SOFTWARE VERSION installed on the welding machine and wire feeder. The movement of the string can be stopped by rotating one of the two Knobs: ENCODER - A (E1) or V (E2). Also either of the two encoders (E1 or E2) can be used to scroll the string both clockwise and anticlockwise, one position at a time, to assist the operator with interpreting the values displayed.



- 3) To go back to the previous menu, press the PRG / SET (T5) key.



- 4) To exit permanently press the INFO (T6) key (the LED will switch off).



Loading of the wire

In the MIG 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 approximately 2 seconds, the wire starts to load at a constant speed of 8,0 m / min (default value) as shown in the image.
- 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.



Wire loading can also be done using the WIRE LOAD (T7) key, applying the same procedure and replacing this key with the torch key in the same way. The difference compared to loading with the torch key is that the wire reaches the constant speed without the 2 second delay.



Gas test

In MIG-MAG welding processes, when the GAS TEST (T8) key is pressed and released, the solenoid valve is activated, which causes the gas to escape from the welding torch for approximately 60 seconds. After this time the gas flow stops automatically. However, the gas flow can be interrupted at any time before 60 seconds by pressing the same key again.



Table 1

PROG	MiG (MiG SYNERGIC)	PLS (PULSE)	CLd (vision.COLD)	USP (vision.ULTRASPEED)	Pow (vision.POWER)	PIP (vision.PIPE)								
FUNCTION	DISPLAY	SETTINGS RANGE		WELDING PROCESS			MIG-MAG WELDING MODE							
		FACTORY	RANGE	MIG MAG / PULSE / SPECIAL PROCESSES		TIG	MMA	2T	4T	Cra 2T	Cra 4T	Spot 2T	Stitch 2T	Cycle
				PROG	MA n									
ADJUSTABLE FUNCTIONS "Fx" <input checked="" type="checkbox"/> 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	25.0V	(10.0 ÷ 38.0/42.0)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	(1.5 ÷ 22.0)m/min		●					●	●			●
CRATER END VOLTAGE	F14	25.0V	(10.0 ÷ 38.0/42.0)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	●	●			●	●	●	●	●	●	●
CYCLE														
CYCLE CURRENT	F19	20%	(-99 ÷ 100)%	●										●
CYCLE WIRE SPEED	F19	5.0 m/min	(1.5 ÷ 22.0)m/min		●									●
CYCLE ARC LENGTH	F20	0	-30 ÷ +30	●										●
CYCLE VOLTAGE	F20	25.0V	(10.0 ÷ 38.0/42.0)V		●									●
DYNAMICS (vision.ULTRASPEED only)	dYn	0	-30 ÷ +30	●	●			●	●	●	●	●	●	●
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	●	●	●	●	●	●	●	●	●	●	●
INFO menu <input checked="" type="checkbox"/> INFO														
TIMER ARC ON	ArC ont			●	●	●	●	●	●	●	●	●	●	●
TIMER WELDING MACHINE ON	tIm Eon			●	●	●	●	●	●	●	●	●	●	●
ERROR LOG	Err Log			●	●	●	●	●	●	●	●	●	●	●
DIAGNOSTICS	diA Gno			●	●	●	●	●	●	●	●	●	●	●
TEST	tES t			●	●	●	●	●	●	●	●	●	●	●
POWER SOURCE SOFTWARE VERSION	Pou uEr			●	●	●	●	●	●	●	●	●	●	●
WIRE FEEDER SOFTWARE VERSION	FE d uER			●	●	●	●	●	●	●	●	●	●	●
SERIAL NUMBER	SEr nUM			●	●	●	●	●	●	●	●	●	●	●
ADVANCE CONFIGURATION menu <input checked="" type="checkbox"/> INFO > 3s														
FACTORY DEFAULT	FAC	no	no - YES	●	●	●	●	●	●	●	●	●	●	●
TORCH SELECTION	Gun	6	0 ÷ 9	●	●	●	●	●	●	●	●	●	●	●
SAFETY CALIBRATION CODE	SCC	13	0 ÷ 100	●	●	●	●	●	●	●	●	●	●	●
PUSH PULL SETTINGS														
PP SET														
TORCH SETTINGS	Gun	oFF	oFF-PP ÷ PPn-CAL	●	●			●	●	●	●	●	●	●
PCB SETTINGS	brd	oFF	oFF-Sin 10-Sin 150	●	●			●	●	●	●	●	●	●
DELTA OFFSET	doF	0.0	(-2.0 ÷ +2.0)m/min	●	●			●	●	●	●	●	●	●
DELTA GAIN	dGn	0	(-30 ÷ +30)%	●	●			●	●	●	●	●	●	●
MOTOR CALIBRATION														
Mot CAL														
SPEED MOTOR 1	SM1	75.0	50.0 ÷ 99.9	●	●			●	●	●	●	●	●	●
SPEED MOTOR 2	SM2	75.0	50.0 ÷ 99.9	●	●			●	●	●	●	●	●	●
ARC LENGTH ADJUST	ArC	U	U - rPM	●	●			●	●	●	●	●	●	●
CYCLE	CYC	oFF	oFF - on	●	●			●	●	●	●	●	●	●
WATER COOLING MODE *	H2O	dEMAnd	dEMAnd-ALLon-oFF	●	●	●	●	●	●	●	●	●	●	●
REMOTE CONTROL SELECTION	Adj	AuT	loC-AuT-rEM-PLC	●	●	●	●	●	●	●	●	●	●	●
PASSWORD	PAS	0	0 ÷ 999	●	●	●	●	●	●	●	●	●	●	●
BLOCKS	bLC	no	no - L1 - L2 - L3	●	●	●	●	●	●	●	●	●	●	●

*This string only appears if the cooling system is fitted.

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 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 (the Fx LED switches off).



Menu INFO

Press the INFO key to enter the basic information menu (INFO) suitable for a basic operator (for further information refer to table 1). Turn the ENCODER-A (E1) knob on the two displays to show the functions available in the following sequence:

E1	ARC	ont	TIMER ARC ON
E1	W	on	TIMER WELDING MACHINE ON
E1	Err	Log	ERROR LOG
E1	d.A	Cno	DIAGNOSTICS
E1	TES	t	TEST
E1	POU	VER	POWER SOURCE SOFTWARE VERSION
E1	FEED	VER	WIRE FEEDER SOFTWARE VERSION
E1	SER	NUM	SERIAL NUMBER

TIMER ARC ON

This indicates the actual time the machine was used for welding.

WARNING: This time can only be zeroed using the **FACTORY DEFAULT (FAC in the ADVANCE CONFIGURATION menu)** for the welding plant.

- 1) Rotate the ENCODER - A (E1) knob, until both the displays (D1-D2) read **ArCont**.



- 2) Push the PRG/SET (T5) key to view the welding use time, expressed in DAYS (d), HOURS (H), MINUTES (M). Example: 2d-3H-25M.



- 3) The movement of the string can be stopped by rotating one of the two Knobs: ENCODER - A (E1) or V (E2). Also either of the two encoders (E1 or E2) can be used to scroll the string both clockwise and anticlockwise, one position at a time, to assist the operator with interpreting the values displayed.
- 4) To go back to the **INFO** menu, push the PRG/SET (T5) key.



TIMER WELDING MACHINE ON

This indicates the time the welding machine was switched on.

WARNING: This time can only be zeroed using the **FACTORY DEFAULT (FAC in the ADVANCE CONFIGURATION menu)** for the welding plant.

- 1) Rotate the ENCODER - A (E1) knob, until both the displays (D1-D2) read **timeOn**.



- 2) Push the PRG/SET (T5) key to view the time the welding machine was switched on, expressed in DAYS (d), HOURS (H), MINUTES (M). Exam-ple: 120d-13H-22M.



- 3) The movement of the string can be stopped by rotating one of the two Knobs: ENCODER - A (E1) or V (E2). Also either of the two encoders (E1 or E2) can be used to scroll the string both clockwise and anticlockwise, one position at a time, to assist the operator with interpreting the values displayed.
- 4) To go back to the **INFO** menu, push the PRG/SET (T5) key.



ERROR LOG

This allows the operator to know about the error states that have arisen on the welding plant.

- 1) Rotate the ENCODER - A (E1) knob, until both the displays (D1-D2) read **Err Log**.



- 2) Push the PRG/SET key (T5), and the display will show the error code under DISPLAY PARAMETERS - A (D1), and the number of times under DISPLAY PARAMETERS - V (D2). For the code error, see the list contained in the "Error Conditions" paragraph.



- 3) Rotate the ENCODER - A (E1) knob to scroll the list of errors.



At the end of the list the message "rES no" can be found, which can be used to reset the counters for all the errors. Rotate the ENCODER - V (E2) knob, until the word **YES** appears on display D2.



Hold the SAVE "MEM" key (T2) down for at least 3 seconds.



When complete the “Err LoG” message will be displayed.



- To go back to the **INFO** menu, push the PRG/SET (T5) key.



DIAGNOSTICS

The information contained in this menu allows service personnel to understand what is causing the system to malfunction.

- Rotate the ENCODER - A (E1) knob, until both the displays (D1-D2) read **diAGno**.



- Press the PRG / SET (T5) key again to access a sub-menu.



- By turning the ENCODER-A knob (E1) again, you can view the information available. In particular:

GUn	[on/off]	Torch button status
UP	[on/off]	Torch Up/Down UP button status
dn	[on/off]	Torch Up/Down DOWN button status
SrC	[0..100%]	Pot1 for the remote control (synergy)
urC	[0..100%]	Pot2 for the remote control (fine adjustment)
H2P	[yes/no]	Cooling system presence (inp H20 CN5-1 / 4 DMP01 board)
H2A	[yes/no]	Cooling system alarm (inp COOL CN5-2 / 4 DMP01 board)
Uv	[on/off]	Under Voltage alarm
ov	[on/off]	Over Voltage alarm
oC	[on/off]	Over Current alarm
t°C	[on/off]	Thermostat alarm
APF	[on/off]	Power Fail alarm
Jur	[on/off]	VRD jumper inserted (generator board)
JP1	[on/off]	JP1 jumper inserted (generator board)
JP2	[on/off]	JP2 jumper inserted (generator board)
JP3	[on/off]	JP3 jumper inserted (wire feeder board)
Adr	[0/1]	Adr jumper inserted (wire feeder board)
Cur	[A]	Welding current
uLt	[V]	Welding voltage
Can		Number of tx / rx CAN-Bus errors

- To go back the **INFO** menu press the PRG / SET (T5) key.

TEST

This configuration allows the operator to check that some functions of some devices.

- Rotate the ENCODER - A (E1) knob, until both the displays (D1-D2) read **tEST**.



- Push the **PRG** key (T5), and the display will show the parameter to be checked under **DISPLAY PARAMETERS - A (D1)**, and the set-ting under **DISPLAY PARAMETERS - V (D2)**.



- Rotate the ENCODER - A (E1) knob to select the device to be tested, from **GAS** (solenoid valve), **MoT** (wire feeder motor), **FAn** (fans), **H2o** (cooling unit, only if fitted) and **Aon** (access arch output).
- Rotate the ENCODER - V (E2) knob clockwise to go from the **off** state to the on state, which activates the device and allows the user to check it is working.



- To go back to the **off** state, rotate the ENCODER - V (E2) knob anticlockwise.
- To go back to the **INFO** menu, push the PRG/SET (T5) key.



SOFTWARE VERSION

This function allows the operator to view the version of the software installed. For more information, refer to the “Displaying the installed software version” paragraph on p. 6.

SERIAL NUMBER

This function allows the operator to view the serial number of the interface board.

- 1) Rotate the ENCODER - A (E1) knob, until both the displays (D1-D2) read **SERnum**.



- 2) Press the PRG / SET (T5) key to display scrolling text on both displays that indicates the serial number of the front interface board.



- 3) Rotating one of the two encoder knobs stops the serial number scrolling.
- 4) At this point it is possible to make reading the serial number easier by making it move to the right or to the left by turning one of the two encoder knobs clockwise or anticlockwise.
- 5) To go back to the **INFO** menu, push the PRG/SET (T5) key.



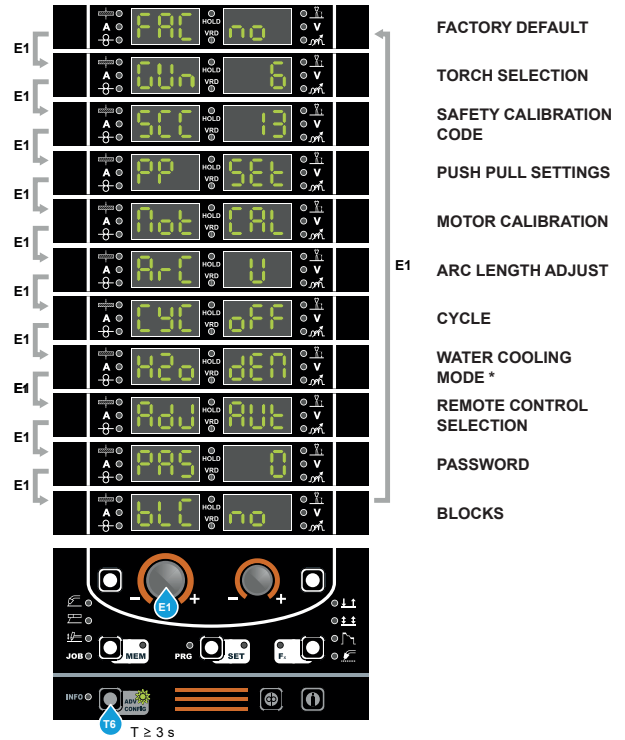
To exit the INFO menu press the **INFO** button (T6) (the INFO LED switches off).



Menu ADVANCE CONFIGURATION

Press the ADV CONFIG key (T ≥ 3 sec) to enter the advanced configuration menu, which provides access to additional features that can only be managed by an experienced, responsible operator (for further information refer to table 1).

Turn the ENCODER-A (E1) knob on the two displays to show the functions available in the following sequence:



* This string only appears if the cooling system is fitted.

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).

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 **3** 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.
- 5) To go back to the ADVANCED CONFIG menu, press the ADV CONFIG key (T ≥ 3 sec) (ADV CONFIG LED on).



TORCH SELECTION (GUn)

WARNING: This configuration makes it possible to choose the type of torch from those available (0-9).

To make the choice, proceed as follows:

- 1) Rotate the ENCODER - A (E1) knob until display D1 reads **GUn** (see figure).



Display D2 will show a number that indicates the torch set (DEFAULT 6).

- 2) Rotate the ENCODER-V (E2) knob until display D2 indicates the torch to be used. This choice does not need to be confirmed.

The choice can be made from 10 torches already configured, as indicated in table D2.

D2	TORCH DESCRIPTION
0	150 A (AIR)
1	200 A (AIR)
2	250 A (AIR)
3	350 A (AIR)
4	450 A (AIR)
5	300 A (H ₂ O)
6	400 A (H ₂ O)
7	500 A (H ₂ O)
8	PUSH PULL TORCH 8 m (H ₂ O)
9	PUSH PULL TORCH 12 m (H ₂ O)

- 2) To exit the ADVANCE CONFIG menu, push the ADV CONFIG (T6) key and the LED will switch off.



SAFETY CALIBRATION CODE (SCC)

ATTENTION: This operation, if carried 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).



PUSH PULL SETTINGS (PPSet)

WARNING: This procedure is only valid for MIG welding processes.

Proceed as follows:

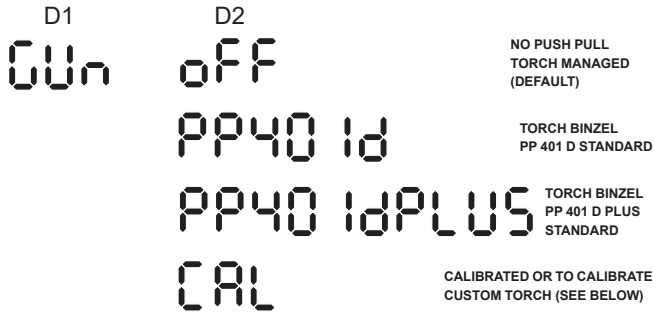
- Rotate the ENCODER - A (E1) knob until DISPLAYS D1 and D2 read **PPSet**.



- To access the PUSH PULL SETTINGS menu, push the PRG/SET (T5) key



- Rotate the ENCODER - A (E1) knob until the DISPLAY D1 reads **GU**n.
- Rotate the ENCODER-V (E2) knob until DISPLAY D2 reads **oFF** - PP 401 d - PP 401 d PLUS - CAL.



TORCH CALIBRATION (PUSH PULL)

- To calibrate a torch other than the standard torch already configured, proceed as follows:
- 1) **WARNING:** Before beginning the procedure it is essential that the welding wire is already loaded in the PUSH PULL torch (see the relevant "WIRE LOADING" paragraph).
- Close the torch rollers and the feeder adequately.



- 2) Push the torch button. At this stage, calibration is being executed. Displays E1 and E2 will read **CAL rUn**.



- On completion, displays D1 and D2 will read **CAL End**.



At this stage, calibration is completed.

- 3) Push the ADVCONFIG T6 key.



At this stage, the panel boots up again, on completion of which the PUSH PULL is set correctly.

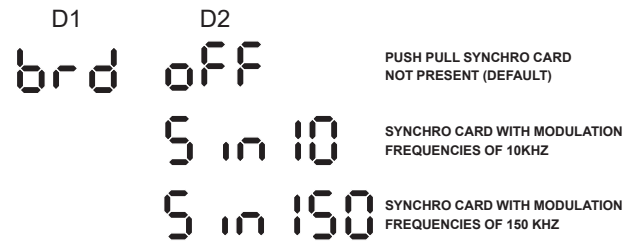
PCB SETTINGS



- To access the PUSH PULL SETTINGS menu, push the PRG/SET (T5) key



- Rotate the ENCODER - A (E1) knob until display D1 reads **brd**.
- Rotate the ENCODER-V (E2) knob until display D2 reads **oFF** - Sin 10 - Sin 150.



- Having chosen the configuration, push the ADV CONFIG (T6) key.



- At this stage, the panel boots up again, on completion of which the configuration chosen is loaded correctly.

DELTA OFFSET



- To access the PUSH PULL SETTINGS menu, push the PRG/SET (T5) key



- Rotate the ENCODER - A (E1) knob until display D1 reads **doF**.
- Rotate the ENCODER-V (E2) knob until the required value is displayed, in the range -2+2 m/min (DEFAULT 0.0).



- Display E2 indicates the speed change (expressed in m/min) for the wire, for all the regulation scales, in relation to the values attributed to the type of torch selected.
- Having set the correct value, push the ADV CONFIG (T6) key.



- At this stage, the panel boots up again, on completion of which the value chosen is loaded.

DELTA GAIN



- To access the PUSH PULL SETTINGS menu, push the PRG/SET (T5) key



- Rotate the ENCODER - A (E1) knob until display D1 reads **dGn**.
- Rotate the ENCODER-V (E2) knob until the required value is displayed, in the range -30%+30% (DEFAULT 0).



- Display D2 indicates the % speed change for the wire, for all regulation scales.
- Having set the correct value, push the ADV CONFIG (T6) key.
- At this stage, the panel boots up again, on completion of which the value chosen is loaded.

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 (T5).



- The procedure of calibration is carried out in 2 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 rotation of the ENCODER knob - V (E2) appearing on the PARAMETER DISPLAY screen - V (D2) is the desired value.



2. **Calibration parameter SM2 (MAXIMUM 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.



- 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 PRG/SET key (T5).



ARC LENGTH ADJUST

For MIG welding processes (pulsed, double pulsed, synergic, and manual), this function allows the operator to adjust the ARC LENGTH ADJUST (⚡) parameter, with the WELDING VOLTAGE (V) or the WIRE SPEED (⚡).

- 1) Rotate the ENCODER - A (E1) knob until the DISPLAY PARAMETERS - A (D1) display shows the **ArC** function, and the DISPLAY PARAMETERS - V (D2) display shows the two adjustment methods: **U** (VOLT - WELDING VOLTAGE) and **rPM** (SPEED - WIRE SPEED).
- 2) Rotate the ENCODER - V (E2) knob and choose the adjustment method required (this operation does not need to be confirmed).



- 3) To change the adjustment method, repeat steps 1 and 2.

CYCLE

If enabled, this function allows the operator to have a further welding mode (CYCLE) available, in MIG (pulsed, double pulsed, synergic and manual) welding processes, as well as the special functions associated with it:

- CURRENT CYCLE, CYCLE WIRE SPEED (see Table 1, Parameter F19).
- CYCLE ARC LENGTH, CYCLE VOLTAGE (see Table 1, Parameter F20).

- 1) Rotate the ENCODER - A (E1) knob until the DISPLAY PARAMETERS - A (D1) display shows the **CYC** function, and the DISPLAY PARAMETERS - V (D2) display shows the two choices available: **oFF** (cycle disabled) and **oN** (cycle enabled).
- 2) Rotate the ENCODER - V (E2) knob and choose whether to enable or disable the cycle (this operation does not need to be confirmed).



- 3) To change the mode, repeat steps 1 and 2.

WATER COOLING MODE

This configuration allows the operator to set cooling (only if available), in the following ways:

- **ON DEMAND** - In this case, cooling is managed in relation to the welding done.
- **ALWAYS ON** - In this case, cooling comes on when the machine is switched on, and stays on until the machine is switched off. Cooling only stops when an alarm is activated.
- **ALWAYS SWITCHED OFF**

To make the setting, proceed as follows:

- 1) Rotate the ENCODER - A (E1) knob until the DISPLAY PARAMETERS - A (D1) display shows the **H2o** function, and the DISPLAY PARAMETERS - V (D2) display shows the two choices available: **deMAnd** (ON DEMAND), **ALLOn** (ALWAYS ON) and **oFF** (ALWAYS SWITCHED OFF).
- 2) Rotate the ENCODER - V (E2) knob and choose the cooling mode required (this operation does not need to be confirmed).



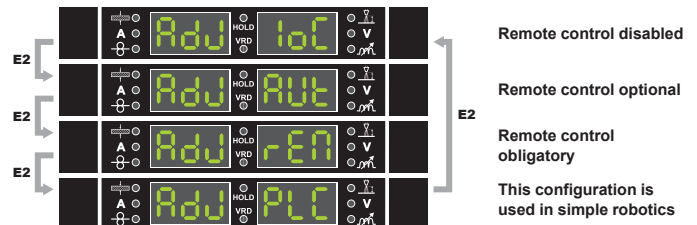
- 3) To change the mode, repeat steps 1 and 2.
- 4) To exit, press and release the PRG / SET (T5) key.



REMOTE CONTROL SELECTION

IMPORTANT: This function makes it possible to choose how to manage remote control.

- 1) Rotate the ENCODER - V (E2) knob until the management mode is displayed from among the following operating choices:



REMOTE CONTROL DISABLED - Means that remote control must not be managed by the plant, even if it is connected up.
REMOTE CONTROL OPTIONAL - This means that remote control can or cannot be connected to the welding plant. If it is disconnected while the plant is running, no alarm is raised.
REMOTE CONTROL OBLIGATORY - This means that it is obligatory for remote control to be connected to the welding plant, even when the plant is switched on.

A error condition is generated when:

- Switching on or at any other time if the welding plant does not detect the presence (only if set as obligatory).
- During normal operation, if the remote control is disconnected.

- 2) To return to the ADVANCE CONFIG menu, push the ADV CONFIG key (T6).



PASSWORD

The **ADVANCE CONFIG** Menu can be protected by entering a personalised user password.

- 1) Rotate the ENCODER - A (E1) knob, until both the displays (D1-D2) read **PAS 0**, which indicates that no password has been entered.



- 2) Rotate the ENCODER - V (E2) knob until the DISPLAY PARAMETERS V (D2) display shows the number required (from 0 to 999) (this operation does not need to be confirmed).



- 3) Once a **PASSWORD** has been entered, each time the **ADVANCE CONFIG** Menu is accessed, to be able to use it the correct number must be set (the operation does not need to be confirmed).
- 4) To change the **PASSWORD**, repeat steps 2 and 3.

IMPORTANT: If the password is lost, contact CEA's technical service department.

BLOCKS

If enabled, this function allows the operator to block or limit use of the welding machine and/or certain welding parameters / functions. There are 4 possible options to choose from:

- **BLOCK no** - Does not allow any block to be activated for the welding machine, but allows the operator to unblock the machine if it was blocked in the past.
- **BLOCK L1** - The operator can only weld using the parameters set prior to the block, and can set and/or modify the welding parameters, using the knobs on the control panel on the welding machine and the wire feeder (if installed).
- **BLOCK L2** - The operator can only weld using the parameters set prior to the block and cannot set and/or modify the welding parameters.
- **BLOCK L3** - Allows the voltage, current, and electronic inductance value to be corrected by $\pm 15\%$.

- 1) Rotate the ENCODER - A (E1) knob until the DISPLAY PARAMETERS - A (D1) display reads **bLC** and the DISPLAY PARAMETERS - V (D2) display shows the four choice options of: **no** (NO BLOCK), **L1** (PARTIAL BLOCK), **L2** (TOTAL BLOCK), **L3** (PERSONALISED BLOCK).
- 2) Rotate the ENCODER - V (E2) knob and choose one of the 4 options (this operation does not need to be confirmed).



- 3) To change the mode, repeat steps 1 and 2.

To exit the **ADVANCE CONFIG** menu press the **ADV CONFIG** (T6) key (the **ADV CONFIG** LED switches off).



MIG-MAG synergic / PULSE MIG / Special processes

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

1 - WELDING PROCESS SELECTION

Select the 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 key (T5). The corresponding LED switches on.



- 3) When the ENCODER-A (E1) knob is turned, the two displays will show the processes available, in the following sequence:

E1		MIG synergic
E1		PULSE MIG
E1		vision.COLD
E1		vision.PIPE
E1		vision.POWER
E1		vision.ULTRASPEED
E1		MIG manual SEE PAGE 18

2a - SELECTION OF WELDING PROGRAMME (standard method)

PROGRAM TABLE										PRG
MIG MAG (MiG MAG) - PULSE (PLS) - VISION.COLD (CLd) - VISION.PIPE (PiP) VISION.POWER (Pou) - VISION.ULTRASPEED (USP) - EXTRA CURVES PACKAGE (ECP)										
MATERIAL		GAS	WIRE Ø (mm)							
TYPE	CLASS		0.6	0.8	1.0	1.2	1.6	0.9	2.4	
Fe	G3 Si-1	CO ₂	000	001	002	003	004	005		
Fe	G3 Si-1	Ar/16-20%CO ₂	010	011P	012P	013P	014P	015P		
Fe	G3 Si-1	Ar/11-15%CO ₂		021P	022P	023P	024P			
Fe	G3 Si-1	Ar/8-10% CO ₂		031P	032P	033P	034P			
Fe	G3 Si-1	Ar/2-3% CO ₂		041P	042P	043P	044P			
Fe	G3 Si-1	Ar/21-25% CO ₂		051	052	053	054	055		
Fe	G3 Si-1	Ar CO ₂ O ₂		072P	073					
Fe MAGNETIC CORRECTION		Ar CO ₂ O ₂		082P						
FCW RUTIL	T42 2	CO ₂					103			
FCW RUTIL	T42 2	Ar/16-20% CO ₂					113P			
FCW RUTIL	T42 2	Ar/21-25% CO ₂					123			
FCW BASIC	T42 4	Ar/16-20% CO ₂					143P	144P		
FCW METAL	T42 2	Ar/16-20% CO ₂					163P			
FCW METAL	T42 2	Ar/8-10% CO ₂					173P			
CrNi 316	G19 12 3	Ar/2-3%CO ₂		201P	202P	203P	204P			
CrNi 309	G23-12	Ar/2-3%CO ₂			222	223				
CrNi 308	G19 9	Ar/2-3%CO ₂		231P	232P	233P	234P			
CrNi 307	G18 8	Ar/2-3%CO ₂		241	242	243	244			
CrNi 385	G20 25 5	Ar/2 3%CO ₂					253			
CrNi 3xx		CO ₂		291	292	293	294			
FCW 316	T19 12 3	Ar/16-20% CO ₂					303			
FCW 309	T23 12	Ar/16-20% CO ₂					313			
Al 99,5	Al 1050	Ar 99,9%			402P	403P	404P			
Al Mg 5	S Al 5356	Ar 99,9%			412P	413P	414P			
Al Si 5	S Al 4043A	Ar 99,9%			422P	423P	424P			
Al Mg 4,5	S Al 5087/5183	Ar 99,9%			432P	433	434			
Al Mg 5	S Al 5356	Ar/30-50% He				463				
Al Mg 4,5	S Al 5087/5183	Ar/30-50% He				483				
CrNi 307	G18 8	CO ₂			282	283				
BRAZING	S Cu Si3	Ar 99,9%		511	512	513		515		
BRAZING	S Cu Al8	Ar 99,9%		521	522	523				
BRAZING	S Cu Si3	Ar/1-2% CO ₂		541	542	543				
DUPLEX	Er2209	Ar/2-3% CO ₂				703				
SUPER DUPLEX	Er2594	Ar/2-3% CO ₂				723				
SUPER DUPLEX	Er2594	Ar He CO ₂				733				
FCW	MF-10-60 GR	SELF SHIELDING							808	
FCW	MF6-55 RP	SELF SHIELDING							818	
SUBM. ARC	Fe S2	WELD FLUX				193				

EXAMPLE OF BOX : 012P = PRG N°012 = MIG MAG - V.COLD (CLd) - V.PIPE (PiP) - V.POWER (Pou) - V.ULTRASPEED (USP) - PULSE

AVAILABLE PROCESSES / PACKAGES		
xxx	MIG MAG only	MIG MAG - V.PIPE (PiP)
xxxP	PULSE only	MIG MAG - V.POWER (Pou)
xxxP	MIG MAG - PULSE	MIG MAG - V.COLD (CLd) - V.PIPE (PiP)
	MIG MAG - V.ULTRASPEED (USP)	V.ULTRASPEED (USP)
	MIG MAG - V.COLD (CLd)	V.POWER (Pou)
	V.POWER (Pou) - V.ULTRASPEED (USP)	
	MIG MAG - V.COLD (CLd) - V.PIPE (PiP) - V.ULTRASPEED (USP)	
	MIG MAG - V.COLD (CLd) - V.PIPE (PiP) - V.POWER (Pou) - V.ULTRASPEED (USP)	
	MIG MAG - V.COLD (CLd) - V.ULTRASPEED (USP)	
EXTRA CURVES PACKAGE (ECP)		

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.



At this point, if the operator wants, they can request additional information on the program chosen.

- 1) When the PRG / SET (T5) key is pressed (T ≥ 3sec), the SET LED switches on, and you access the SET menu which allows you to check the default values for the MATERIAL, GAS and WIRE DIAMETER respectively, for the program selected previously.



- 2) Viewing on the two displays is done by turning the ENCODER-A (E1) knob. You can check that these agree with those shown in the feeder's programs table.

MATERIAL		GAS	0.6
TYPE	CLASS		
Fe	G3 Si-1	CO ₂	000
Fe	G3 Si-1	Ar/16-20%CO ₂	010
Fe	G3 Si-1	Ar/11-15%CO ₂	001

- 3) To exit the SET menu, press the PRG / SET (T5) key (the SET LED switches off).



2b - SELECTION OF WELDING PROGRAMME (advanced method)

This type of programming does not require the use of the feeder's programs table.

- 1) Select the desired process: MiG, CLd, PiP, Pou, or USP by turning the ENCODER - V (E2) knob (not all of them are available, for further information refer to the "Special processes" paragraph).



- 2) Enter the SET menu by pressing the PRG / SET (T5) key (T ≥ 3sec).



- 3) Turn the ENCODER-A (E1) knob to choose between MATERIAL, GAS and WIRE DIAMETER.



- 4) Turn the ENCODER-V (E2) knob to change the value of the parameter selected. Once the chosen value is displayed, there is no need for confirmation, it is acquired immediately.



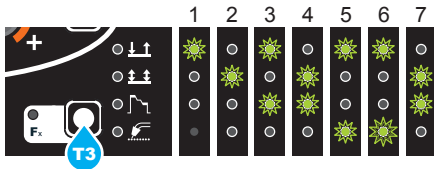
- 5) After setting the parameters, press the PRG / SET (T5) key again.



- 6) The displays will show the program that corresponds to the selected parameters.

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
7. 4 CYCLE (4T) (only if this cycle is enabled in ADVANCED CONFIGURATION)

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.
- **CYCLE CURRENT (F19)** - This function determines the positive or negative variation in cycle current, compared to the welding current set (only available if CYCLE is enabled in the ADVANCE CONFIGURATION).
- **CYCLE ARC LENGTH (F20)** - This function determines the variation in the cycle arc length, compared to the standard length (only available if CYCLE is enabled in the ADVANCE CONFIGURATION).

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**.



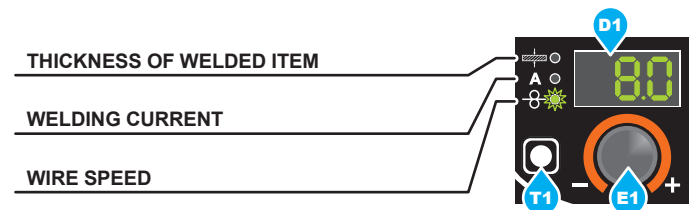
- Hold the SAVE “MEM” key (T2) down for at least 2 consecutive seconds.



- 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.

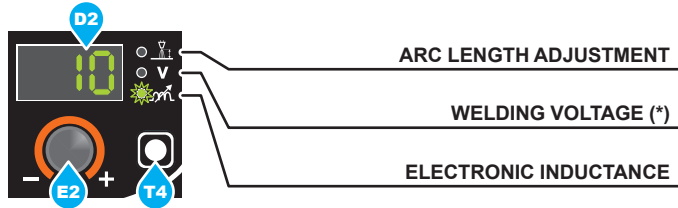
5 - PRE-SETTING

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.

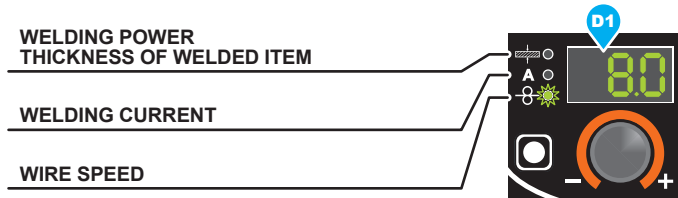
Example: ELECTRONIC INDUCTANCE

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).

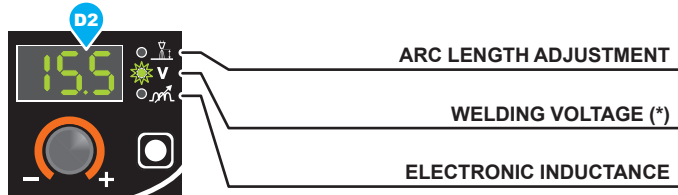
6 - WELDING

During the welding the display shows:

- PARAMETER DISPLAY screen - A (D1)



- WELDING POWER (kg/min) (⚡ flashing)
- 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.



- ARC LENGTH ADJUSTMENT (⚡): the value previously set.
- WELDING VOLTAGE (V): the measured value of the voltage of what is being welded.
- ELECTRONIC INDUCTANCE (m): 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 (m).
- 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 pre-defined settings that are not modifiable!

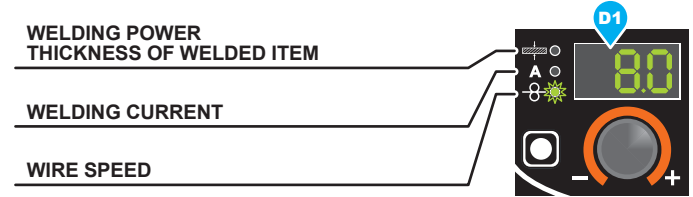
7 - HOLD

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.

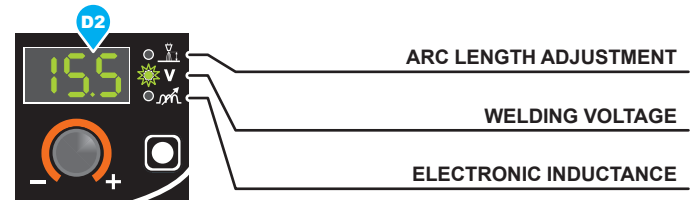
Once the welding has been terminated, for about **15** seconds, both the DISPLAYS should show the same values of the parameters during the welding.

In this phase the displays show:

- PARAMETER DISPLAY screen - A (D1)



- WELDING POWER (kg/min) (⚡ flashing)
- THICKNESS OF WELDED ITEM (⇄): the value previously set.
- WELDING CURRENT (A): the last current value measured.
- WIRE SPEED (⊖): the value previously set.



- ARC LENGTH ADJUSTMENT (⚡): the value previously set.
- WELDING VOLTAGE (V): the last voltage value measured.
- ELECTRONIC INDUCTANCE (m): 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 key (T5). The corresponding LED switches on.

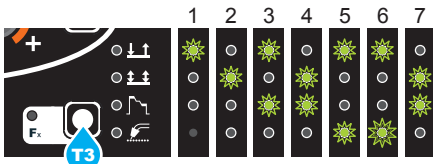


To access the MIG-MAG synergic welding process: rotate the ENCODER knob - A (E1) until obtaining on the PARAMETER DISPLAY screen - A (D1) and the writing **Man**.



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
7. 4 CYCLE (4T) (only if this cycle is enabled in ADVANCED CONFIGURATION)

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.
- **CYCLE WIRE SPEED (F19)** - Sets the speed for cycle welding (only available if CYCLE is enabled in the ADVANCE CONFIGURATION).
- **CYCLE VOLTAGE (F20)** - Sets the voltage for cycle welding (only available if CYCLE is enabled in the ADVANCE CONFIGURATION).

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 of 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.

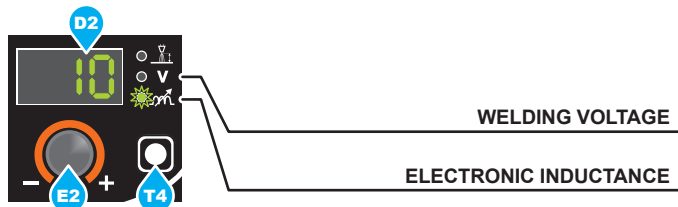
4 - PRE-SETTING

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).



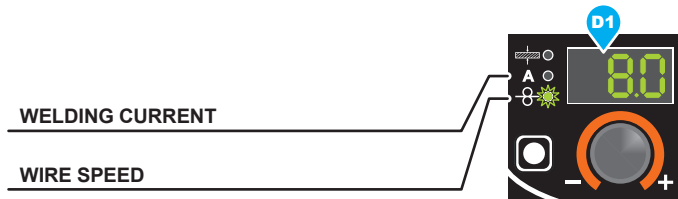
Example: ELECTRONIC INDUCTANCE

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).

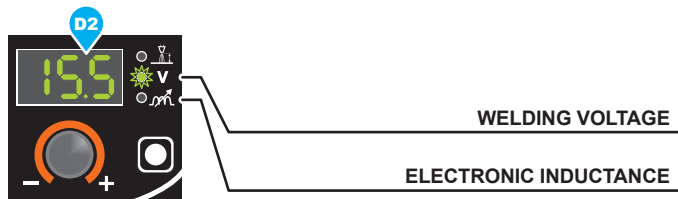
5 - WELDING

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 (-8-): 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 (**m**): the value previously set. During the welding the operator can change the following parameters:

- WIRE SPEED (-8-).
- WELDING VOLTAGE (V).
- ELECTRONIC INDUCTANCE (**m**).
- SPECIAL FUNCTIONS "Fx".

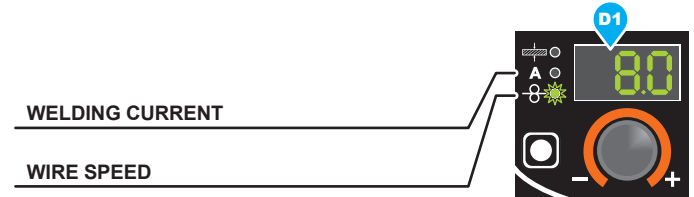
6 - HOLD

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.

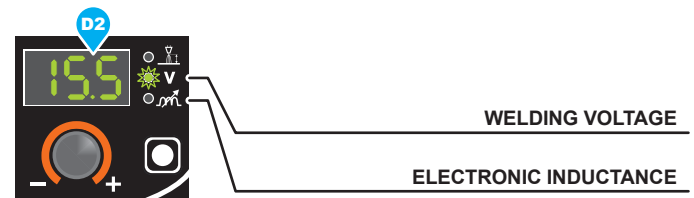
Once the welding has been terminated, for about **15** seconds, both the DISPLAYS should show the same values of the parameters during the welding.

In this phase the displays show:

- PARAMETER DISPLAY screen - A (D1)



- WELDING CURRENT (**A**): the last current value measured.
- WIRE SPEED (-8-): the value previously set.
- PARAMETER DISPLAY screen - V (D2)



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

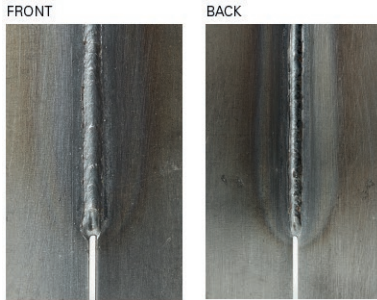
Special processes

The welding machine can be equipped with additional welding programs, by having some software packages activated, against payment and by request. CEA has designed and developed the following SPECIAL PROCESSES.

vision.COLD (CLd)

This is an innovative MIG/MAG process with low heat transfer, developed by CEA for welding thin plating and MIG brazing in all welding positions. The synergic vision-COLD programs make optimum quality welding possible, with minimum deformation and changes in metallurgical characteristics.

For this reason, the **vision.COLD** software is also an excellent solution for welding open joints.



vision.PIPE (PiP)

vision.PIPE is the innovative MIG/MAG process developed by CEA for first root pass whenever butt-joining pipes in all positions.

The supplied vision.PIPE synergic programs grant extremely high quality performance with an optimized arc for welding pipes in a precise and safe way also whenever having to deal with larger size open gap joints.

vision.PIPE process enables to replace MMA and TIG processes with a far shorter welding time.

vision.PIPE package is also an ideal solution for welding laminations with open gap joints.



vision.POWER (Pou)

vision.POWER is the innovative MIG/MAG process developed by CEA for welding medium large thickness steel and non ferrous materials (aluminium, copper, etc.), whenever high penetration is required.

By means of this special welding process, the arc cone becomes narrower, therefore its pressure is concentrated on a smaller area of the workpiece, thus heavily increasing the penetration.

vision.POWER more concentrated arc is ideal for fillet welding and to enter into very narrow joints requiring a very long stick-out.

vision.POWER enables to replace MIG/MAG spray arc welding with a remarkable increase in penetration and faster welding execution too.



vision.ULTRASPEED (USP)

This is an innovative MIG/MAG process developed by CEA for welding steel and non ferrous materials that, due to the increased magnetic resistance of the arc and the tighter cone, allows a significant increase in welding speed.

This process causes lower heating up at the base material, minimising deformation and making it possible to reduce work and finishing times for the welded item. **vision.ULTRASPEED** makes it possible to speed up welding compared with short arc and mixed arc MIG/MAG welding, greatly increasing productivity.



EXTENDED CURVES PACKAGE (ECP)

This is a package of additional curves, dedicated to highly specialised machining and procedures.



To set the welding machine and make use of the special processes purchased, the operator must refer to the relevant functions and programs table sold with the software.

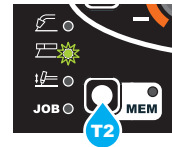
The **PREMIUM** version of the QUBOX series leaves CEA with the **vision.COLD**, **vision.POWER**, **vision.ULTRASPEED**, and **ECP** processes already installed. The **vision.PIPE** process is provided at the customer's request.

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 key (T5). The corresponding LED switches on.



2 - SELECTION OF WELDING PROGRAM

PROGRAM TABLE <input checked="" type="checkbox"/> PRG			
MMA PROCESS			
MATERIAL		DISPLAY	
TYPE	CLASS		
Basic	E7018	MMA	bAS
Rutil	E6013	MMA	rUt
Cr-Ni	E316L	MMA	Cm

Select the welding PROGRAM by pushing the SELECT PROGRAM key (T5), 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” <input type="checkbox"/> 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.

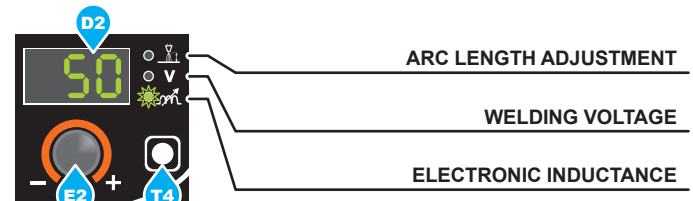
4 - PRE-SETTING

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

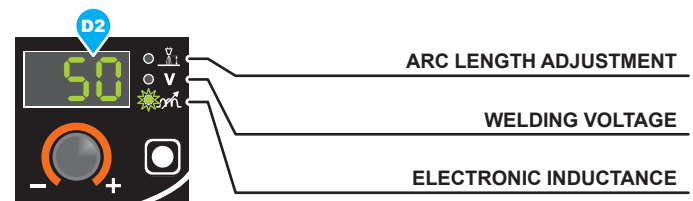
During the welding the display shows:

- 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 ($\frac{A}{I_1}$): the value previously set.
- WELDING VOLTAGE (**V**): the measured value of the voltage of what is being welded.
- ARC FORCE ($\frac{m}{A}$): the value previously set.

During the welding the operator can change the following parameters:

- WELDING CURRENT (**A**).
- HOT START ($\frac{A}{I_1}$).
- ARC FORCE ($\frac{m}{A}$).
- SPECIAL FUNCTIONS “Fx” - FIRST LEVEL MENU.

6 - HOLD

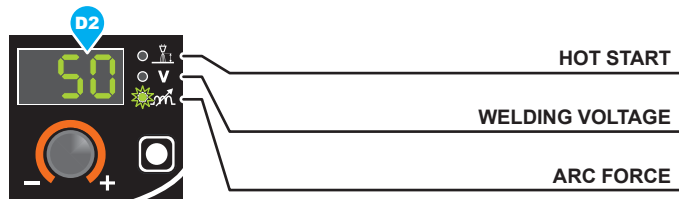
This function automatically starts itself at the conclusion of every welding operation welding and it is indicated to the operator by means of a flashing light of the HOLD FUNCTION LED for a specific amount of time. Once the welding has been terminated, for about **15** seconds, both the DISPLAYS should 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 (H): the value previously set.
- WELDING VOLTAGE (V): the measured value of the last voltage of what is being previously welded.
- ARC FORCE (M): 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**.

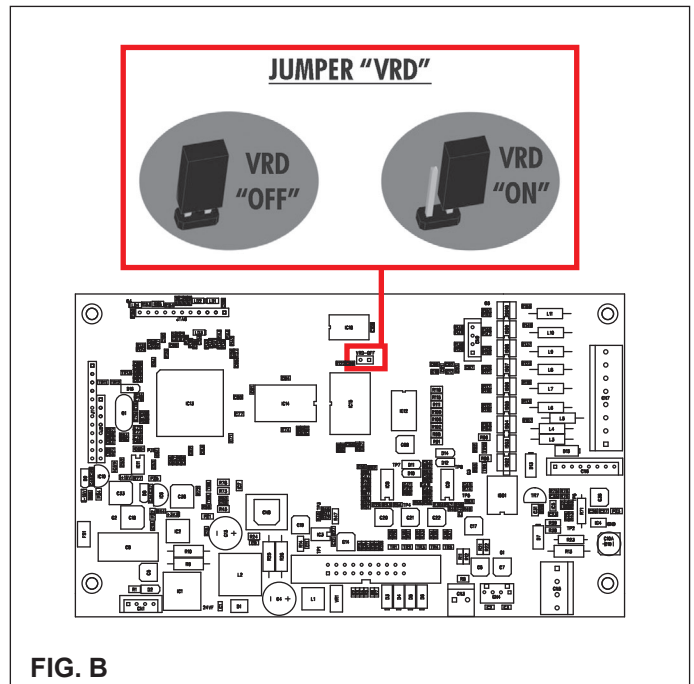


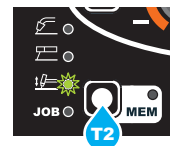
FIG. B

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" <input type="checkbox"/> 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 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).

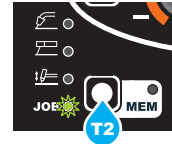


- 2) Hold down the SAVE "MEM" (T2) Key down for at least 2 consecutive seconds to save JOB and automatically load the settings / parameters (including special functions) for the JOB just saved.
- 3) To exit the JOB, press and release the WELDING PROCESS SELECTION key (T2).



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" if 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



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.

Table 2

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.
Err	T°C	THERMAL PROTECTION The welding stops due to an excessively high temperature (thermostat activated). Automatic reset error.
Err	H20	COOLER PRESSURE The fluid in the cooling system is at low pressure. NON 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.

(continued)

Error condition	Error code	Error description and possible diagnosis
Err	E0.2	OVER VOLTAGE Automatic reset error.
Err	E0.3	UNDER VOLTAGE Automatic reset error.
Err	E0.4	OVER CURRENT Automatic reset error.
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.
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	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.



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