

# CLOOS

Weld your way.

## Operation Manual MicroPulse 200



qineo®

## EU declaration of conformity

No. CMM0516QNMIP2\_01

**Product description:** MIG/MAG welding machine  
**Model name:** QINEO MICRO PULSE 200  
**Serial number:** Refer to the nameplate on the back of the device  
**Manufacturer:** CARL CLOOS Schweisstechnik GmbH  
**Address:** Industriestrasse 22-36  
35708 Haiger  
Germany

**The manufacturer bears sole responsibility for issuing the declaration of conformity.**

**The aforementioned products covered by the declaration satisfy the relevant statutory provisions of the Union:**

### Low Voltage Directive:

**2014/35/EU** Directive of the European Parliament and of the Council of 26 February 2014 on the harmonisation of laws of Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits; Official Journal of the EU L96, 29/03/2014, Pages 357 - 374

### EMC Directive:

**2014/30/EU** Directive of the European Parliament and of the Council of 26 February 2014 on the harmonisation of laws of Member States relating to electromagnetic compatibility; Official Journal of the EU L96, 29/03/2014, Pages 79 - 106

### RoHS Directive:

**2011/65 /EU** Directive of the European Parliament and of the Council of 8 June 2011 on the restriction of use of certain hazardous substances in electrical and electronic equipment; Official Journal of the EU L174, 01/07/2011, Pages 88 - 110

Agreement of the product stated with the regulations in the directives applied is verified with conformance to the following standards and regulations:

- EN 60974-1 Arc Welding Equipment  
Part 1: Welding Power Sources
- EN 60974-5 Arc Welding Equipment  
Part 5: Wire Feed Units
- EN 60974-10 Arc Welding Equipment  
Part 10: Requirements of Electromagnetic Compatibility (EMC)

Major conversions and add-ons which are not carried out by the manufacturer or the manufacturer's authorised representative(s) result in termination of this declaration of conformity.

Signed for and in the name of:  
CARL CLOOS Schweisstechnik GmbH

35708 Haiger, 30/05/16

Signature:  
Identification of signatory:

  
Gerald Mies  
Managing director

# ENGLISH

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**1.1 INTRODUCTION**

Make sure this manual is carefully read and understood by the welder, and by the maintenance and technical workers.

**1.2 PERSONAL PROTECTION**

Welding processes of any kind can be dangerous not only to the operator but to any person situated near the equipment, if safety and operating rules are not strictly observed.



**Arc rays can injure your eyes and burn your skin. The welding arc produces very bright ultra violet and infra red light. These arc rays will damage your eyes and burn your skin if you are not properly protected.**

- Wear closed, non-flammable protective clothing, without pockets or turned up trousers, gloves and shoes with insulating sole and steel toe. Avoid oily greasy clothing.
- Wear a non-flammable welding helmet with appropriate filter lenses designed so as to shield the neck and the face, also on the sides. Keep protective lens clean and replace them when broken, cracked or spattered. Position a transparent glass between lens and welding area.
- Weld in a closed area that does not open into other working areas.
- Never look at the arc without correct protection to the eyes. Wear safety glasses with the side shields to protect from flying particles.



**Gases and fumes produced during the welding process can be dangerous and hazardous to your health.**

- Adequate local exhaust ventilation must be used in the area. It should be provided through a mobile hood or through a built-in system on the workbench that provides exhaust ventilation from the sides, the front and below, but not from above the bench so as to avoid raising dust and fumes. Local exhaust ventilation must be provided together with adequate general ventilation and air circulation, particularly when work is done in a confined space.
- Welding process must be performed on metal surfaces thoroughly cleaned from rust or paint, to avoid production of harmful fumes. The parts degreased with a solvent must be dried before welding.
- Be very carefull when welding any metals which may contain one or more of the follwing:  
Antimony    Beryllium    Cobalt    Manganese    Selenium    Arsenic  
Cadmium    Copper    Mercury    Silver    Barium    Chromium    Lead  
Nickel    Vanadium
- Remove all chlorinated solvents from the welding area before welding. Certain chlorinated solvents decompose when exposed to ultraviolet radiation to form phosgene gas (nerve gas).

**1.3 FIRE PREVENTION**

**Fire and explosion can be caused by hot slag, sparks or the welding arc.**

- Keep an approved fire extinguisher of the proper size and type in the working area. Inspect it regularly to ensure that it is in proper working order;
- Remove all combustible materials from the working area. If you can not remove them, protect them with fire-proof covers;
- Ventilate welding work areas adequately. Maintain sufficient air flow to prevent accumulation of explosive or toxic concentrations of gases;
- Do not weld on containers that may have held combustibles;
- Always check welding area to make sure it is free of sparks, slag or glowing metal and flames;
- The work area must have a fireproof floor;

**1.4 ELECTRIC SHOCK**

**WARNING: ELECTRIC SHOCK CAN KILL!**

- A person qualified in First Aid techniques should always be present in the working area; If a person is found unconscious and electric shock is suspected, do not touch the person if she or he is in contact with cable or electric wires. Disconnect power from the machine, then use First Aid. Use dry wood or

- other insulating materials to move cables, if necessary away from the person.
- Wear dry gloves and clothing. Insulate yourself from the work piece or other parts of the welding circuit.
- Make sure the main line is properly grounded.
- Do not coil the torch or the ground cables around your body.
- Never touch or come in physical contact with any part of the input current circuit and welding current circuit.

**Electric warning:**

- Repair or replace all worn or damaged parts.
- Extra care must be taken when working in moist or damp areas.
- Install and maintain equipment according to local regulations.
- Disconnect power supply before performing any service or repair.
- Should you feel the slightest electrical shock, stop any welding immediately and do not use the welder until the fault has been found and corrected.



**1.5 NOISE**

Noise can cause permanent hearing loss. Welding processes can cause noise levels that exceed safe limits. You must protect your ears from loud noise to prevent permanent loss of hearing.

- To protect your hearing from loud noise, wear protective ear plugs and/or ear muffs.
- Noise levels should be measured to be sure the decibels (sound) do not exceed safe levels.

**1.6 ELECTROMAGNETIC COMPATIBILITY**

Before installing your welder, carry out an inspection of the surrounding area, observing the following guidelines:

- Make sure that there are no other power supply cables, control lines, telephone leads or other equipment near the unit.
- Make sure that there are no radio receivers, television appliances, computers or other control systems near the unit.
- People with pace-maker or hearing-prosthesis should keep far from the power source.

**! In particular cases special protection measures may be required.**

Interference can be reduced by following these suggestions:

- If there is interference in the power source line, an E.M.T. filter can be mounted between the power supply and the power source;
- The output cables of the power source should be not too uch long, kept together and connected to ground;
- After the maintenance all the panels of the power source must be securely fastened in place.

**1.7 PROTECTIVE WELDING GASES**

**Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Treat them carefully.**

- These welders use only inert or non-flammable gases for welding arc protection. It is important to choose the appropriate gas for the type of welding being performed;
- Do not use gas from unidentified cylinders or damaged cylinders;
- Do not connnect the cylinder directly to the welder, use a pressure regulator;
- Make sure the pressure regulator and the gauges function properly;
- Do not lubricate the regulator with oil or grease;
- Each regulator is designed for use with a specific gas. Make sure the regulator is designed for the protective gas being used;
- Make sure that the cylinder is safely secured tightly to the welder with the chain provided.
- Never expose cylinders to excessive heat, sparks, slag or flame;
- Make sure that the gas hose is in good condition;
- Keep the gas hose away from the working area.



### 2.1 LOCATION

**Be sure to locate the welder according to the following guidelines:**

- In areas, free from moisture and dust;
- Ambient temperature between 0° to 40°C;
- In areas, free from oil, steam and corrosive gases;
- In areas, not subjected to abnormal vibration or shock;
- In areas, not exposed to direct sunlight or rain;
- Place at a distance of 300mm or more from walls or similar that could restrict natural air flow for cooling.



### 2.2 VENTILATION

Since the inhalation of welding fumes can be harmful, ensure that the welding area is effectively ventilated.



### 2.3 MAIN SUPPLY VOLTAGE REQUIREMENTS

Before you make any electrical connection, check that supply voltage and frequency available at site are those stated in the ratings label of your generator.

The main supply voltage should be within  $\pm 10\%$  of the rated main supply voltage. Too low a voltage may cause poor welding performance. Too high a supply voltage will cause components to overheat and possibly fail. The welder Power Source must be:

- Correctly installed, if necessary, by a qualified electrician;
- Correctly grounded (electrically) in accordance with local regulations;
- Connected to the correct size electric circuit.

In case the supply cable is not fitted with a plug, connect a standardized plug (2P+T) to the supply cable (in some models the supply cable is supplied with plug).

To connect the plug to the supply cable, follow these instructions:

- the brown (phase) wire must be connected to the terminal identified by the letter L
- the blue (neutral) wire must be connected to the terminal identified by the letter N
- the yellow/green (ground) wire must be connected to the terminal identified by the letter PE or by the symbol  $\perp$ .

In any case, the connection of the yellow/green wire to the PE terminal  $\perp$  must be done in order that in the event of tearing of the power supply cable from the plug, the yellow/green wire should be the last one to be disconnected.

**The outlet should be protected by the proper protection fuses or automatic switches.**

Notes:

- Periodically inspect supply cable for any cracks or exposed wires. If it is not in good conditions, have it repaired by a Service Centre.
- Do not pull violently the input power cable to disconnect it from supply.
- Do not squash the supply cable with other machines, it could be damaged and cause electric shock.
- Keep the supply cable away from heat sources, oils, solvents or sharp edges.
- In case you are using an extension cord, try to keep it well straight and avoid its heating up.



### 2.4 SAFETY INSTRUCTIONS

For your safety, before connecting the power source to the line, closely follow these instructions:

- An adequate two-pole switch must be inserted before the main outlet; this switch must be equipped with time-delay fuses;
- The connection with ground must be made with a two-pole plug compatible with the above mentioned socket;
- When working in a confined space, the power source must be kept outside the welding area and the ground cable should be fixed to the workpiece. Never work in a damp or wet area, in these conditions.
- Do not use damaged input or welding cables
- The welding torch should never be pointed at the operator's or at other persons' body;
- The power source must never be operated without its panels; this could cause serious injury to the operator and could damage the equipment.

This manual was edited to give some indications on the operation of the welder and was thought to offer information for its practical and secure use. Its purpose is not teach welding techniques. All given suggestions are indicative and intended to be only guide lines.

To ensure that your welder is in good conditions, inspect it carefully when you remove it from its packing having care to ascertain that the cabinet or the stocked accessories are not damaged.

Your welder is capable of daily activity of construction and reparation. Its simplicity and versatility and its excellent welding characteristic are granted by the inverter technology. This welding inverter allows to be finely set to obtain optimal arc characteristics with a reduced consumption of energy with respect to the welders based on a traditional transformer.

Respect the duty cycle of the welder making reference to the technical data label on the welder's back. Duty cycle is given as percentage on a 10 minute time. During this period of time the unit can be used at a defined power regulation. Duty cycle exceeding may cause overheating or welder's damage.

Welder's basic specifications:

Power Voltage:  
220/240V, 50/60Hz

U<sub>o</sub>:  
10 ÷ 35V MIG/MAG - 65V MMA/TIG

Current Output Range:  
20 ÷ 200 MIG/MAG - 5 ÷ 200 MMA/TIG

Duty Cycle:  
35% 200A MIG/MAG/MMA/TIG  
100% 140A MIG/MAG - 100% 120A MMA/TIG

Welding Wire Selection:

This welder can work with Aluminium wire 0,8 ÷ 1,2 thick, solid steel wire 0,6 ÷ 1,0 thick and stainless steel wire 0,8 ÷ 1,0 thick (Gas Welding) and with flux core wire 0,8 ÷ 1,0 thick (No Gas Welding).

Feed Rolls:

groove 0,6-0,8mm for wires 0,6 ÷ 0,8mm

groove 1,0-1,2mm for wires 1,0mm

Teflon feed rolls for Aluminium, groove 0,8 ÷ 1,0mm for wires 0,8 ÷ 1,0mm, groove 1,2 for wires 1,2.

Gas Selection

According to the material to be welded and to the wire you are going to use select the protection gas. The here below table can give you some useful indications:

<b>MATERIAL TO WELD</b>	<b>GAS CYLINDER</b>	<b>WIRE</b>
Mild steel	Argon + CO <sub>2</sub> cylinder or CO <sub>2</sub> cylinder	Copper coated mild steel wire spool. For no gas welding use flux-cored wire spool
Stainless steel	Argon cylinder	Stainless steel wire spool.
Aluminium	Argon cylinder	Aluminium wire spool

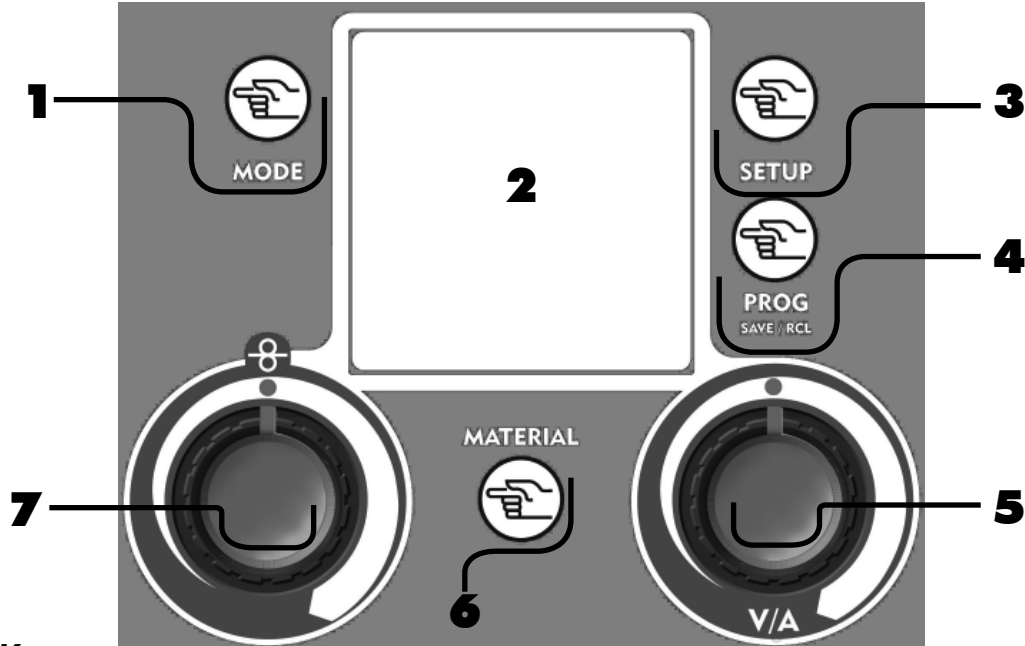


Figure 1

**1 Mode Key**

- welding process selection
- return to the main screen after parameters setting

**2 Graphic Display**

**3 Setup Key**

setting of the secondary parameters in all welding processes

**3.1 Tig Function**

2stroke/4stroke, Slope Up (0-10 sec), Slope Down (0-20 sec), crater Filler value in 4stroke function only, Post Gas Time 0-5 sec

**3.2 Mig/Mag Function**

Synergy: OFF /ON/PULSED, 2Stroke/4Stroke/Spot welding, Spot Time, Motor Slope, BBT, Electronic Inductance, Post Gas, Crater Filler

**4 Prog save & recall Key**

saves and recalls the functioning points that may be changed by the operator

**5 Right Regulation Knob ( Volts / Amps)**

Main Regulation Knob

**6 Material Key**

submenus selection key

**6.1 TIG**

- NORMAL
- PULSED:
  - Pulse Frequency
  - $\delta$  ( Ton)
  - I Max (peak current)
  - I Min (base current)

**6.2 MIG/MAG**

**6.2.1 Manual Mig/Mag (synergy OFF)**

Adjustment of the electronic inductance value

**6.2.2 Synergic Mig/Mag/ Synergic Pulsed**

Screen access for the synergic program selection

**7 Left Regulation Knob**

**7.1 MMA**

- HOT START

**7.2 TIG**

- Slope Down ( Tig )
- Pulse Frequency (Pulsed Tig)

**7.3 MIG/MAG**

- Wire speed ( Mig )
- Balance (Synergic and pulsed Mig)



MODE Key works as BACK key in all menus.  
 SETUP Key allows to run through the menus by selecting in sequence the modifiable parameters.  
 The right knob changes the value previously selected with the SETUP Key.



## 4.1

## BASIC SETUP MENU

To enter the Basic Setup Menu power the unit on; while the display views the unit logo, press the Setup Key - **3** -. Use the Right Regulation Knob - **5** - to adjust the modifiable parameters:

### MAX LINE CURRENT - L/H

Setting of the maximum current that the unit may absorb by the input power supply according to the branch circuit capability. In order to utilize the maximum output capability of the unit, a branch circuit capable of 32 amps is required. Note: if L (low) is set, the absorbed current will be automatically reduced.

The **L** letter will appear on the unit main screen if selected.

### INITIAL SPEED - reduced/normal

Reduced Initial Speed reduces the speed of the wire at start up to provide a soft start.

### VRD - ON/OFF

Selection of the Voltage Reduction Device ON or OFF. If the device is on, in arc mode, the unit powers off at the end of welding to automatically restart when the electrode gets in touch with the workpiece. As default the device is OFF.

### D.M. DIGITAL METER - ON/OFF

Set the digital display ON to view the real voltage and current values while welding. As default this is ON.

### LCD CONTRAST - 30/63

Setting of the LCD display contrast according to the environment temperature and brightness.

### UNITS

Select the desired unit of length between meters or inches.

BASIC SETUP MENU	
MAX LINE CURRENT	<b>H</b>
INITIAL SPEED	<b>REDUCED</b>
VRD VOLTAGE REDUCE	<b>ON</b>
D.M. DIGITAL METER	<b>ON</b>
LCD CONTRAST	<b>54</b>
UNITS	<b>METERS</b>

Figure 2

Press the Mode Key - **1** - to go back to the welding process screen and save set parameters. The Display views the screen of the last welding process performed by the unit.

### RESET

Press and hold Prog key - **4** - to reset all parameters and go back to the parameters set as default.

## 5.0 CONNECTION AND PREPARATION FOR MMA WELDING

- Connect the earth cable to the Negative output terminal on the front of the unit.
- Connect the work cable to the Positive output terminal on the front of the unit.
- Power the unit ON. The display views the screen of the last welding process performed by the unit.

### Mode Key - 1 -

Press the Mode Key till the MMA Welding Screen is viewed on the display.

### Graphic Display - 2 -



Figure 3

### Right Regulation Knob - 5 -

adjusts the welding current amps (A) on a range from 5 to 200 amps.

Note: adjust the welding current according to the diameter of the electrode to be used.

RANGE	Ø MM
UP TO 40 A	1.6mm
40 ÷ 70 A	2.0mm
55 ÷ 90 A	2.5mm
90 ÷ 135 A	3.2mm
135 ÷ 160 A	4.0mm

### Left Regulation Knob - 7.1 -

adjusts, in the start phase, the welding current increase percentage variable from 0 to 50% of the set current. Thanks to an initial peak current, this function makes the welding arc easier to start (Hot Start).


## 6.0

# CONNECTION AND SETUP FOR TIG WELDING

- Connect the earth cable to the Positive output terminal on the front of the unit.
- Connect the Tig Torch to the Negative output terminal on the front of the unit.
- Connect the torch trigger plug and the gas hose to the corresponding connectors on the front panel (use only Argon)
- Power the unit ON. The display views the screen of the last welding process performed by the unit.

### Mode Key - 1 -

Press the Mode Key till the TIG Welding Screen is viewed on the display.



The TIG welding processes that may be selected are:

**NORMAL**  
Continuous TIG welding;  
2 stroke welding;  
4 stroke welding with possible regulation of Slope Up, Slope Down, final current and post gas. This mode of welding is suggested to weld thick metal sheets.

**PULSED**  
Pulsed TIG welding;  
2 stroke  
4 stroke welding with possible regulation of Pulse frequency,  $\delta$ , I max, I min, Slope Up, Slope Down, final current and post gas. This mode of welding is suggested to weld thin metal sheets and for precision works. The low heat injection reduces the workpiece deformation granting high quality weldings.

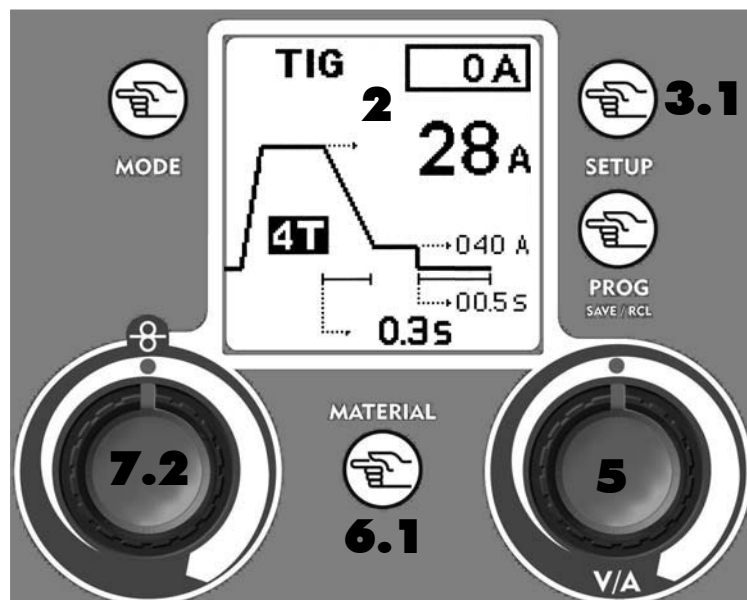


Figure 4

### Tig Function Setup Key - 3.1 -

Press the Setup Key - 3 - in TIG mode to access the parameters' setup screen. Use the Right Regulation Knob - 5 - to select 2 or 4 Stroke Welding.

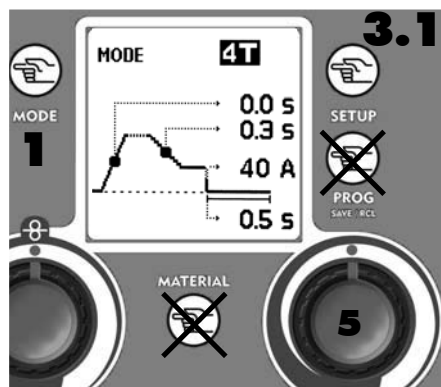


Figure 5

**2 Stroke** In Manual Welding Mode the unit will weld continuously while the torch trigger is depressed (Welding ON). Releasing the torch trigger will interrupt welding immediately (Welding OFF).

**4 Stroke** In Automatic Welding Mode the welding process is performed as follows:

- first torch trigger depression (Welding ON as current is fed, Slope Up as set till the set current value is reached)
- first torch trigger release, welding continues.
- second torch trigger depression (Slope down and Final Current)
- second torch trigger release (Arc OFF and Post Gas)

Use the Setup Key - 3 - to run through the parameters and adjust their values by turning the Right regulation Knob - 5 -.

**Slope Up** Regulation of the time needed by the welding current to reach the set value (0 – 10 Sec)

**Slope Down** Regulation of the time needed by the welding current to reach the final current value (Crater Filler 0 – 20 Sec)

**Final Current or Crater Filler** (active only for 4 Stroke Welding) Regulation of the Final Current Value or Crater Filler (5 amps to 200 amps)

**Post Gas** Regulation of the gas outflow time at the end of welding (0 – 5 Sec.)

Use the Mode Key - 1 - to go back to the TIG main screen after desired parameters are adjusted. To save and recall later these parameters use the Prog Save & Recall Key - 4 -. Refer to paragraph 11.0.

Pulse frequency,  $\delta$ , I max and I min values are adjustable by the Pulsed TIG Welding Menu.

## 6.1 TIG WELDING IN NORMAL MODE

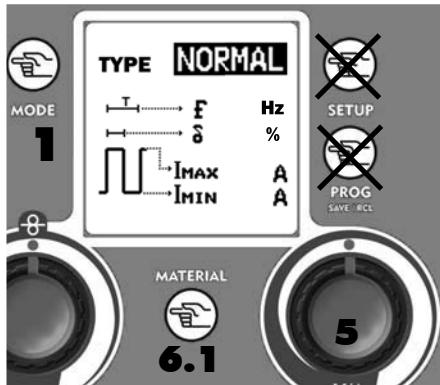


Figure 6

### Graphic Display - 2 -

- TIG Mode
- 2stroke or 4stroke Mode
- Slope Down expressed in seconds.

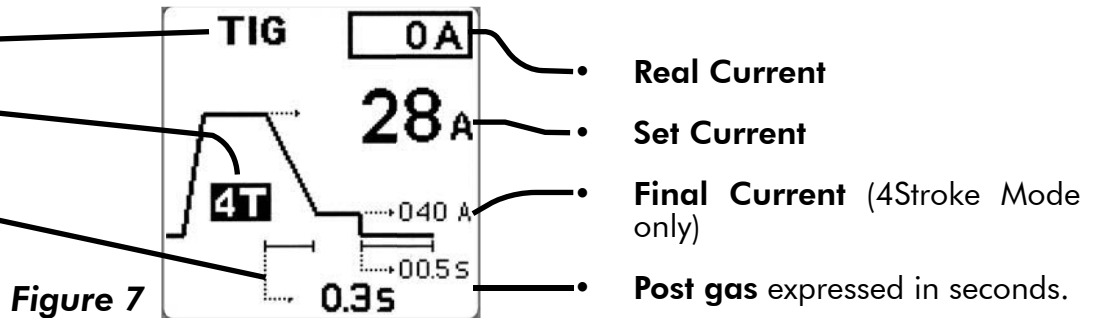


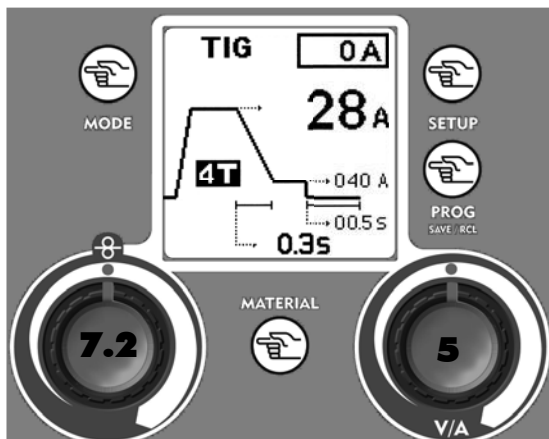
Figure 7

Real Current

Set Current

Final Current (4Stroke Mode only)

Post gas expressed in seconds.



In **NORMAL** Mode use the Regulation Knobs - **7.2** - and - **5** - to adjust the following parameters on the main screen:

**Left Knob - 7.2** - adjusts the Slope Down Time

**Right Knob - 5** - adjusts the welding current

Figure 8

## 6.2 TIG WELDING IN PULSED MODE

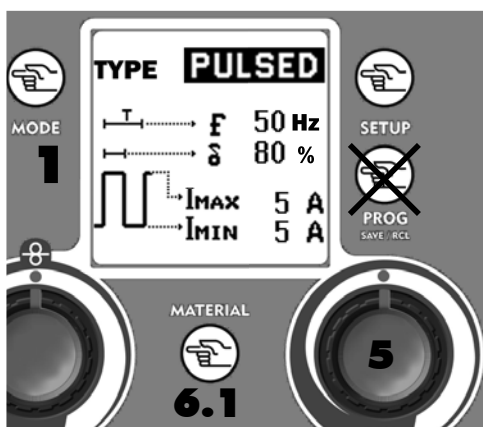


Figure 9

### MATERIAL KEY - 6.1 -

Press the Material Key and turn the Right Regulation Knob - **5** - to select the working "PULSED".

Press the Setup Key - **3** - to run through the adjustable parameters and adjust their values by turning the Right Regulation Knob - **5** -.

Adjustable parameters in Pulsed Mode are:

$f$  50 Hz **Pulse Frequency (f)** Regulation of the Pulse Frequency to grant excellent quality and appearance results (1-250 Hz)

$\delta$  80 %  $\delta$  corresponds to the Time on percentage (20% - 80%); adjusting the duty cycle in pulsed mode allows the peak current keeping for a longer or shorter time.

$I_{MAX}$  5 A **I Max (Peak Current)** Regulation of the peak current value (5 - 200 amps)

$I_{MIN}$  5 A **I Min (base current)** Regulation of the base current value (5 amps to I Max value)

To save and recall later these parameters use the Prog Save & Recall Key - **4** -. Refer to paragraph 11.0.

## Graphic Display - 2 -

- TIG Mode
- 2stroke or 4stroke Mode
- Pulse Frequency.

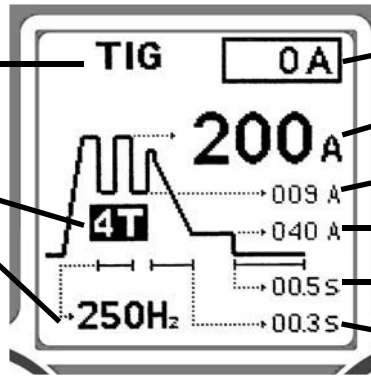


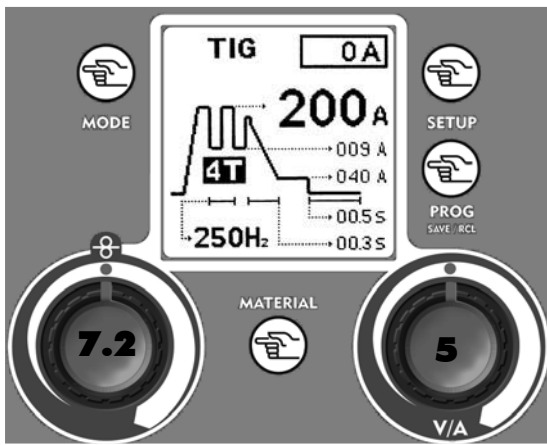
Figure 10

- Real Current
- Set Current
- I Min / Base Current
- Final Current (4stroke only)
- Post gas expressed in seconds
- Slope down

Use the Mode Key - **1** - to go back to the TIG main screen after desired parameters are adjusted.

## Tig Function Setup Key - 3.1 -

Follow instructions at paragraph 6.0 - Connection and Setup for TIG Welding



In **PULSED** Mode use the Regulation Knobs - **7.2** - and - **5** - to adjust the following parameters on the main screen:

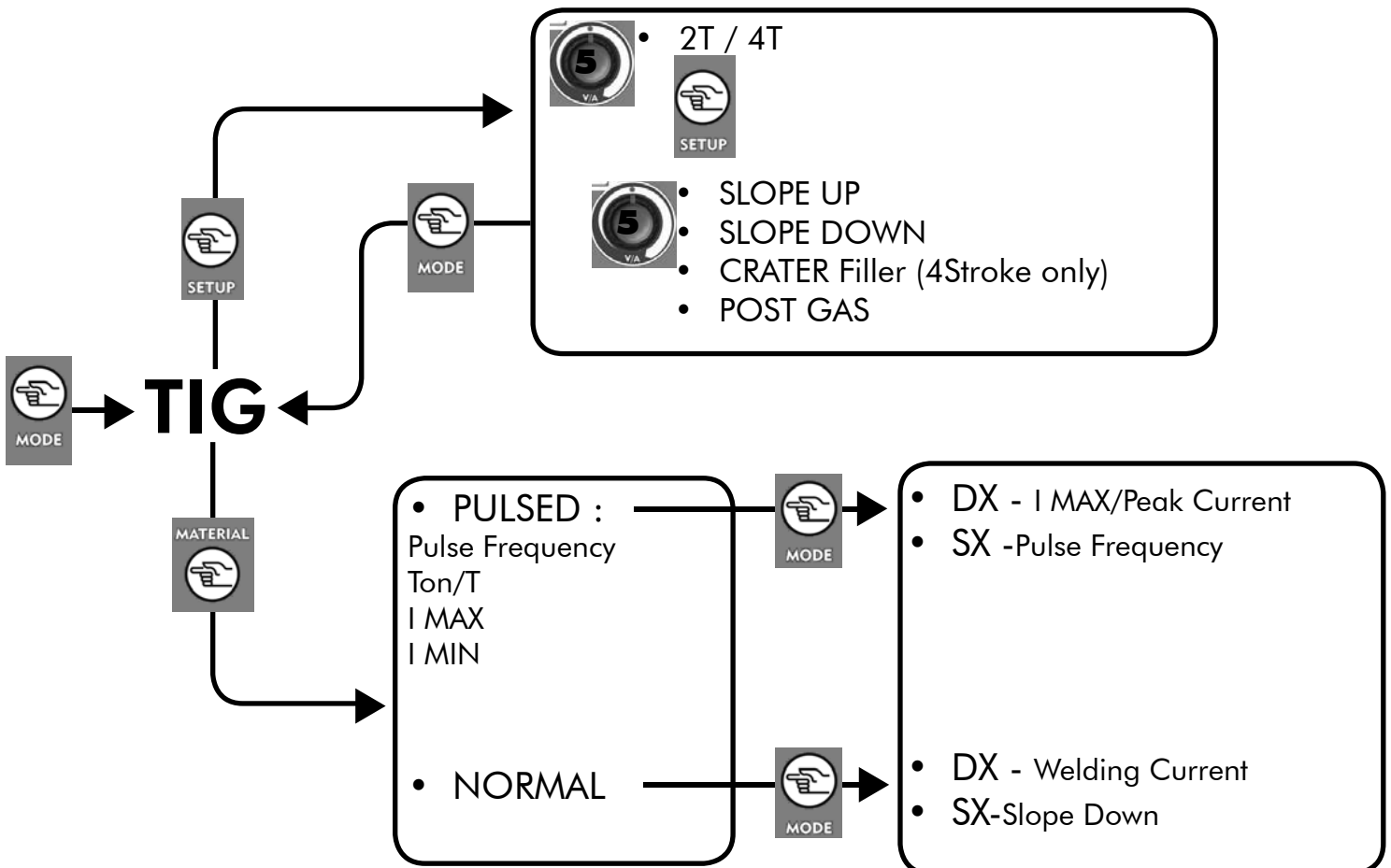
**Left Knob - 7.2** - adjusts the Pulse Frequency (20-250Hz).

**Right Knob - 5** - adjusts the maximum value of the Pulse current.

Figure 11

## 6.3

## QUICK START CHART



**MODE Key - 1 -**

Press the Mode Key till the MIG/MAG Welding Screen is viewed on the display.

Unit can be set for working in three different modes:

- Normal MIG
- Synergic MIG
- Pulsed MIG.

Follow carefully the following instructions paying particular attention to the pictures.

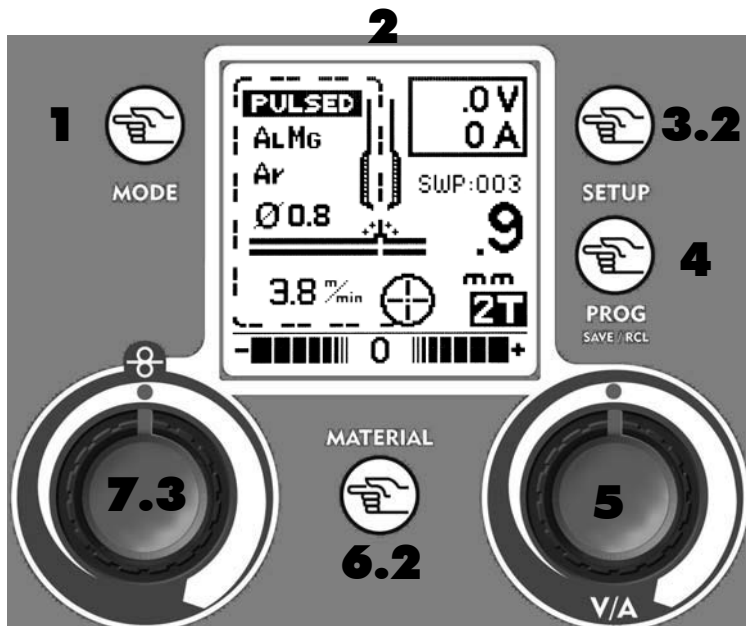


Figure 12

**MIG/MAG Function Setup Key - 3.2 -**

In MIG/MAG Mode press the Setup Key - 3 - to enter the parameters change screen. Use the Setup Key - 3 - to run through the parameters and adjust their values by turning the Right regulation Knob - 5 -.

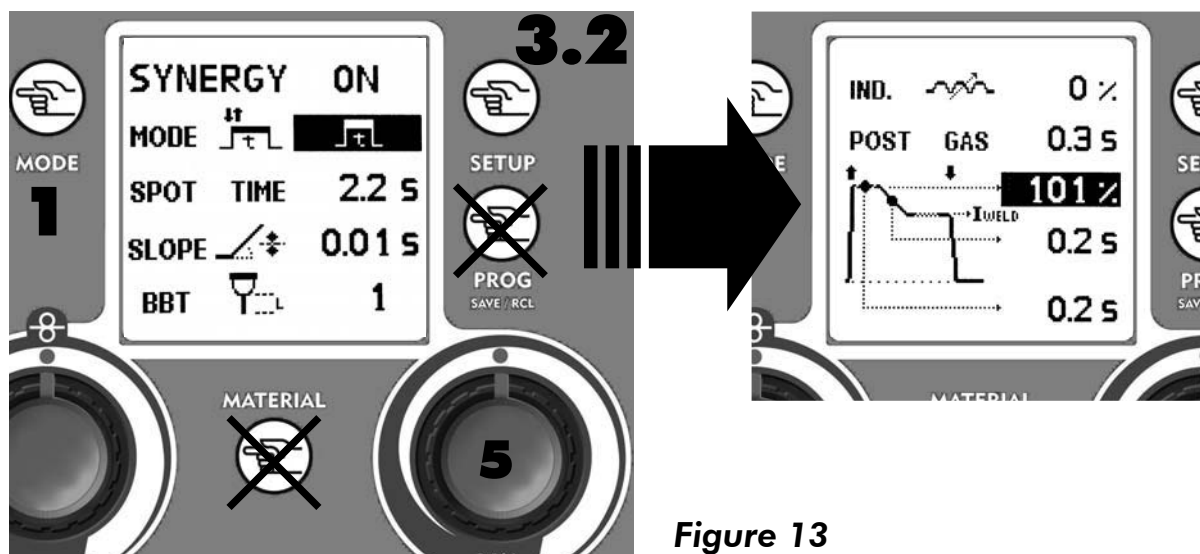



Figure 13

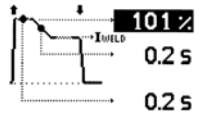
- SYNERGY **OFF** SYNERGY OFF - unit ready for NORMAL MIG/MAG welding, voltage and wire speed are adjustable
- SYNERGY **ON** SYNERGY ON - unit ready for Synergic Mode Welding
- PULSED - unit ready for Pulsed Mode Welding
- MODE MODE: selection of the 2Stroke / 4Stroke / Spot Welding Mode
- SPOT TIME 2.2 s Spot Time - adjustable only when Spot Welding Mode is set: regulation of the maximum duration of the Spot Welding Time (0-10 sec)
- SLOPE 0.01 s Slope Up: regulation of the time the wire needs from the striking speed to the welding speed (0-1.50 sec)
- BBT 1 BBT "Burn Back Time": regulation of the length of the wire protruding from the torch at the end of welding (1-10)

IND. 

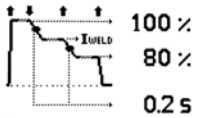
IND.: regulation of the electronic inductance value (0-11)  
 Low Value = more spatters  
 High Value = less spatters

POST GAS 0.0 s

POST GAS: Regulation of the gas outflow time at the end of welding (0 – 5 Sec.)



Hot Start: percentage of increase of welding current to make start easier (100 - 140%)  
 Duration of the Welding Current Slope Down (0,2 - 2s)  
 Hot Start Time



Hot Start: percentage of increase of welding current to make start easier (100 - 140%)  
 Percentage of reduction of the welding parameter during the crater Filler (30 - 100%)  
 Duration of the Welding Current Slope Down (0,2 - 2s)

Once a Synergic Curve is selected, Slope, BBT and Inductance settings go back to their default values.

**PROG save & recall Key - 4 -**

Use this Key to save and recall the points that the operator can customize. Refer to paragraph 10.

**MATERIAL Key - 6.2 -**

**6.2.1 Manual Mig/Mag (synergy OFF)**  
 Regulation of the electronic inductance.

**6.2.2 Synergic Mig/-----Mag, Pulsed Mig/Mag**  
 Access to the screen for the synergic program adjustment.

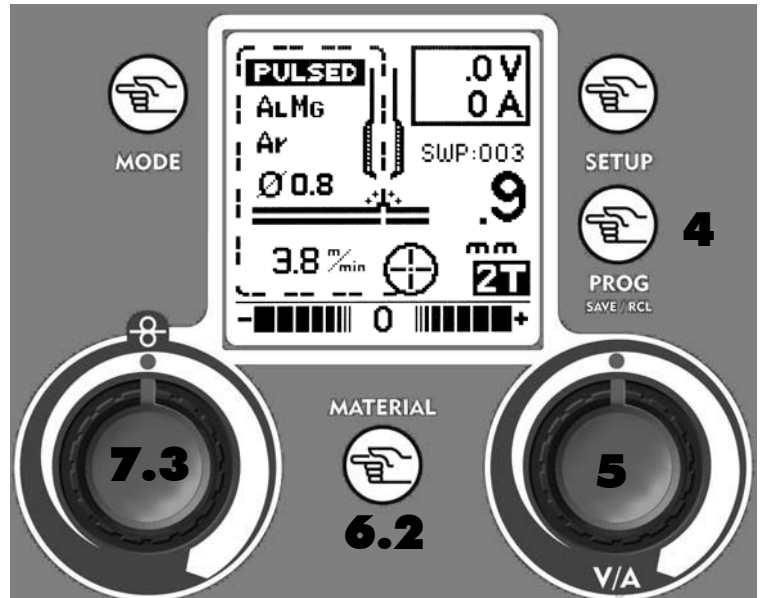


Figure 14

**Graphic Display - 2 -**

- MIG/MAG MODE:** PULSED, SYN ON, SYN OFF
- Synergic Program Information: ALMg, Ar, Ø 0.8
- Wire Speed: 3.8 mm/min
- Regulation Scale: Manual-electronic inductance, SYN / PULSED- balance
- Digital Ammeter/Voltmeter: .0V, 0A
- SWP:003
- Synergic Working Point: .9
- Pointer: Manual - voltage, SYN/PULSED - Thickness
- Working Modes: 2T, 4T, Spot

Figure 15

Note: based on the set welding mode, some data on the MIG/MAG screen can not be visualized.

SWP:003 **SYNERGIC WORKING POINT**

The Synergic Program indicates the effective working program inside the selected synergic curve (Gas, Diameter, Material).

## 8.0 GETTING READY FOR MIG/MAG WELDING

### 8.1 TORCH CONNECTION

- Plug the torch hose into the socket on the front of the welder having care to not damage the contacts and secure by hand screwing in the threaded connection.

### 8.2 WIRE LOADING



**Ensure the gas and electrical supplies are disconnected. Before proceeding, remove the nozzle and the contact tip from the torch.**

- Open the side panel.
- Loosen the nut (A) of the spool holder (position 1) (brake drum). In the case you are replacing the wire spool, extract it by pushing the snap tongue (D) (Fig 16). Remove the plastic protection from the spool. Place it on the spool holder. Tighten the lock nut (A) turning it to position 2. (Fig. 16).

**The unit can also accept 100 mm diameter wire spools. For the mounting follow these instructions:**

- Remove the wire spool (B) from the spool holder (C).
- Loosen the nut (A), remove the spring and the washer; remove the spool holder (C) from the pivot.
- Insert on the pivot the 100mm diameter wire spool; Mount the washer and the spring.
- Tighten the lock nut (A).

**Tighten nut (A) to appropriate tightness. Excessive pressure strains the wire feeding motor. Too little pressure does not allow the immediate stop of the wire spool at the end of the welding.**

- Loosen and lower the plastic knob (A) (Fig.17). Open the pressure arm (B) of the feeder. Extract the wire from the torch liner.
- When the wire is disconnected, grasp it with pliers so that it cannot exit from the spool. If necessary, straighten it before inserting it in the wire input guide (C). Insert the wire on the lower roll (D) and in the torch liner.



**WARNING: keep the torch straight. When feeding a new wire through the liner, make sure the wire is cut cleanly (no burrs or angles) and that at least 2 cm from the end is straight (no curves). Failure to follow these instructions could cause damage to the liner.**

- Lower the pressure arm (B) and place the knob (A). Tighten slightly. If tightened too much, the wire gets locked and could cause motor damage. If not tighten enough, the rolls will not feed the wire.



**WARNING: When changing the wire diameter being used, or replacing the wire feed roll, be sure that the correct groove for the wire diameter selected is inside, closest to the machine. The wire is driven by the inside groove. Feed rolls are marked on the side identifying the groove nearest that side.**

- Close the side panel of the machine.
- Connect the power supply cable to the power output line. Turn on the switch. Press the torch switch. The wire fed by the wire feeding motor at variable speed must slide through the liner. When it exits from the torch neck, release the torch switch.

**Note: after three seconds torch trigger is pressed wire feeding speed increases to allow a fast exit of the wire on the torch neck.**

- Turn off the machine.
- Mount the contact tip and the nozzle.



**When checking the correct exit of the wire from the torch do not bring your face near the torch, you may run the risk to be wounded by the outgoing wire. Do not bring your fingers close to the feeding mechanism when working! The rolls, when moving, may crush the fingers. Periodically, check the rolls. Replace them when they are worn and compromise the regular feeding of the wire.**

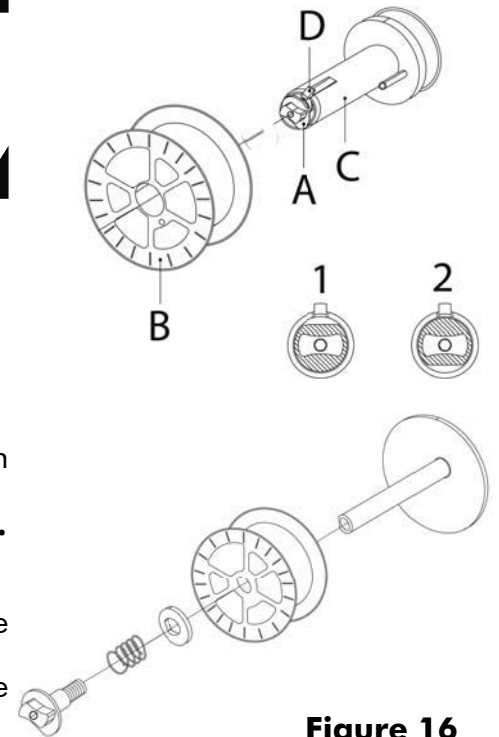


Figure 16

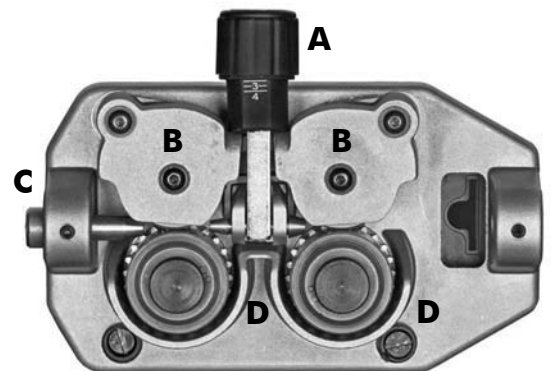


Figure 17

### 8.3 REPLACING THE WIRE LINER

- Disconnect the torch from the machine.
- Place it on a flat surface and carefully remove the brass nut (1).
- Pull the liner out of the hose.
- Install the new liner and mount the brass nut (1) again.

In case you are replacing a Teflon or graphite wire liner, follow these instructions:

- Install the new liner and insert the wire liner collet (3) and the O ring (4).
- Mount the brass nut (1).
- Cut the wire liner close to the brass nut



**Warning: the length of the new wire liner must be the same of the liner you have just pulled out of the hose.**

- Connect the torch to the machine and install the wire into the feeding system.

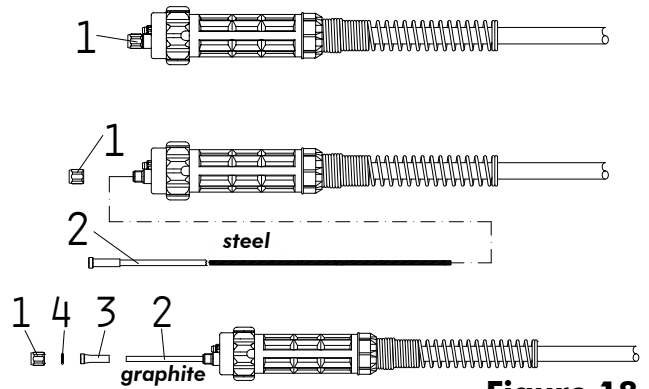


Figure 18

### 8.4 HOW TO CHOOSE THE WIRE LINER

Mainly we can have 2 types of wire liners: Steel wire liners and Teflon wire liners.

- The steel wire liners can be coated or not coated: the coated wire liners are used for air cooled torches; the wire liners which are not coated are used for water cooled torches.
- The Teflon wire liners are suggested for the welding of Aluminium, as they allow a smooth feeding of the wire.
- For Pulsed Welding of Aluminium a Teflon/Graphite wire liner with copper or brass terminal is required to ensure a good electric contact of the wire.

Colour	BLUE	RED	YELLOW
Diameter	Ø 0,6-0,9	Ø 1,0-1,2	Ø 1,2-1,6

### 8.5 GAS CYLINDER AND REGULATOR CONNECTION



**WARNING: Cylinders are highly pressurized. Handle with care. Serious accidents can result from improper handling or misuse of compressed gas cylinders. Do not drop the cylinder, knock it over, expose it to excessive heat, flames or sparks. Do not strike it against other cylinders.**

The bottle (not supplied) should be located at the rear of the welder, securely held in position by the chain provided.

For safety, and economy, ensure that the regulator is fully closed, (turned counter-clockwise) when not welding and when fitting or removing the gas cylinder.

- Install the Teflon or Graphite wire liner with copper or brass terminal specific for aluminium.
- Turn the regulator adjustment knob counter-clock wise to ensure the valve is fully closed.
- Screw the gas regulator fully down on the gas bottle valve, and fully tighten.
- Connect the gas hose to the regulator securing with clip/nut provided.
- Open the cylinder valve, then set the gas flow on the regulator to approx. 5-15l/min. For Pulsed Welding it is suggestable to set the gas flow to approx. 13-14l./min.
- Operate the torch trigger to ensure that the gas is flowing through the torch.

### 8.6 ALUMINIUM WELDING

The machine will be set up as for mild steel except for the following changes:

- 100% ARGON as welding protective gas.
- Ensure that your torch is set up for aluminium welding:
  1. The length of the torch should not exceed 3m (it is advisable not to use longer torches).
  2. Install a teflon or graphite wire liner with copper or brass terminal (follow the instructions for the renewing of the wire liner at paragraph 4.3.3).
  3. Ensure that drive rolls are suitable for aluminium wire.
  4. Use contact tips that are suitable for aluminium wire and make sure that the diameter of the contact tip hole corresponds to the wire diameter that is going to be used. To obtain a high duty cycle without wire feeding problems it is advisable to install the gas diffuser, the contact tip with 8mm thread and the nozzle.



For easy welding of Aluminium and good quality welding results it is advisable to work in Pulsed Mode. In Synergic Mode use the Mode Key - **1** - to select the correct Synergic curve according to the alloy type and the used wire diameter.

## 9.0 MIG/MAG - SYN OFF WELDING

In Manual Mode (SYN OFF) this unit can work with self-shielding, flux core wire. As default unit is ready for Gas Welding, so for Welding without Gas, Welding Current Polarity has to be changed according to the following steps.



**WARNING: Electric Shock can kill! Always turn the power OFF and unplug the power cord from the power source before changing polarity.**

- Connect the earth cable to the positive output terminal on the front of the unit.
- Connect the torch terminal ring to the negative mounting post on the Voltage Change Board located just over the wire feeding motor on the inside of the unit.

For Gas Welding remember to ripristinate the default polarity setting:

- Connect the earth cable to the Negative output terminal on the front of the unit.
- Connect the torch terminal ring to the Positive mounting post on the Voltage Change Board located just over the wire feeding motor on the inside of the unit.

**Note: remove diffuser when welding without gas to avoid excessive heating of the torch.**

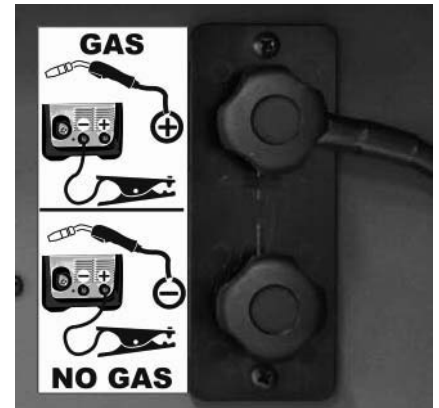


Figure 19

### Mode Key - 1 -

Press the Mode Key till the MIG/MAG Welding Screen is viewed on the display.

### MIG/MAG Function Setup Key - 3.2 -

Press the Setup Key - **3.2** - in MIG/MAG Mode to access the parameters' setup screen.

Use the Right Regulation Knob - **5** - to select the "Synergy OFF" Mode.

Use the **Mode Key - 1** - to go back to the MIG/MAG main screen. Refer to paragraph 7 for the other parameters' setting.

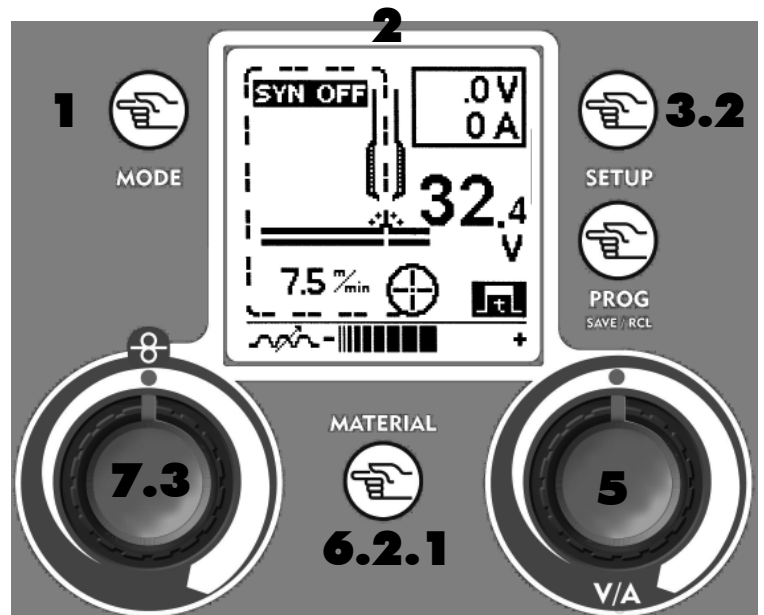


Figure 20

### Right Regulation Knob - 5 -

**32.4 V** Use the Right Regulation Knob to adjust the welding voltage.

### Material Key - 6.2.1 -



Use the Material Key to adjust the electronic inductance value. This setting allows to stabilize the arc by adapting it to the type of material and to the operator's hand.

Low Inductance = Cold Arc, more spatters, reactive arc  
High Inductance = Hot Arc, few spatters, unreactive arc

### Left Regulation Knob - 7.3 -

**3.8 %min** Use the Left Regulation Knob to adjust the wire speed.

## 10.0 MIG/MAG - SYN ON/PULSED WELDING

With the torch connected, the wire installed and the gas connection made, earth cable to the Negative output terminal on the front of the unit.

### Mode Key - 1 -

Press the Mode Key till the MIG/MAG Welding Screen is viewed on the display.

### MIG/MAG Function Setup Key - 3.2 -

Press the Setup Key - 3.2 - in MIG/MAG Mode to access the parameters' setup screen .  
Use the Right Regulation Knob - 5 - to select the "Synergy ON" Mode for normal welding or "PULSED" Mode for pulsed welding.  
Use the Mode Key - 1 - to go back to the MIG/MAG main screen. Refer to paragraph 7 for the other parameters' setting.

### Right Regulation Knob - 5 -

Use the Right Regulation Knob to select the thickness of the material to be welded.  
Note: thickness is referred to a fillet welding

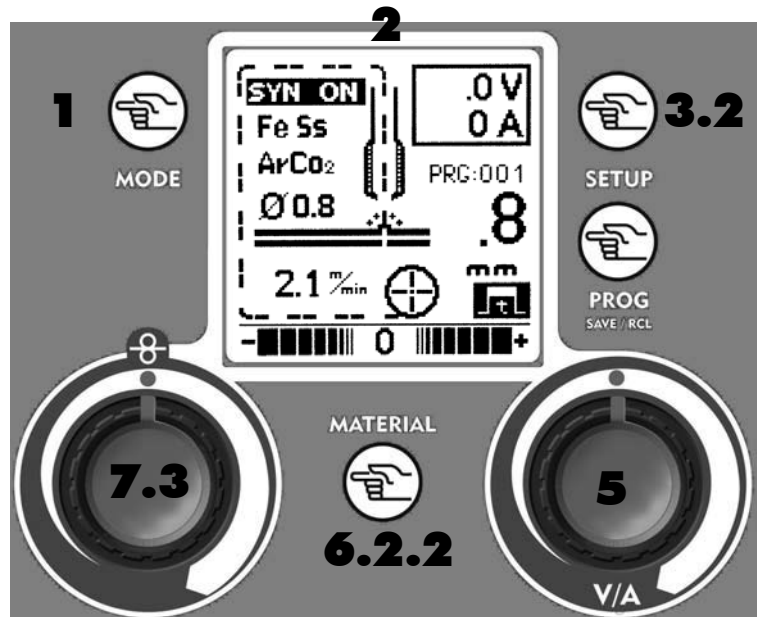


Figure 21

### Material Key - 6.2.2 -

Use the Material Key to view the Synergic Welding Curves available on the unit.  
Turn the Right Regulation Key - 5 - or press the Material Key - 6.2.2 - to choose the desired Synergic Curve, suitable to the type of wire and to the gas going to be used for welding; to confirm your choice simply press the Mode Key - 1 - to go back to the main screen.

Material

Welding Wire Thickness

MAT	GAS	D.	P.n.
Fe	Co2	0.8	02
Fe	Co2	1	03
Fe	Ar Co2	0.6	04
Fe	ArCo2	0.8	05
Fe	Ar Co2	1	06
Al	Ar	0.8	07
Al	Ar	1	08

GAS

Program number

Figure 22

Once a Synergic Curve is selected, Slope, BBT, Inductance, Wire Speed Balance and Material thickness settings go back to their default values.

### Left Regulation Knob - 7.3 -

Use the Left Regulation Key to balance the wire speed in % ( $\pm 40\%$ ) and increase or decrease the arc lengtht.

## 11.0 TIG AND MIG/MAG SETUPS SAVE & RECALL

### Prog Save & Recall Key - 4 -



OPERATOR POINT  
MIG SYN

PROGRAM N. 10

SAVING OK

OPERATOR POINT  
MIG SYN

PROGRAM N. 10

LOADING

Use the Prog Save & Recall Key to save and recall the parameters set by the operator (refer to paragraphs 6.0, 6.2, 9.0 and 10.0). To save the setup proceed as follows:

- Press the PROG Key - 4 -
- Turn the Right Regulation knob - 5 - to choose the program number to save in.
- To save the program keep the PROG Key pressed, a beep and a the wording "OK" will confirm the save.

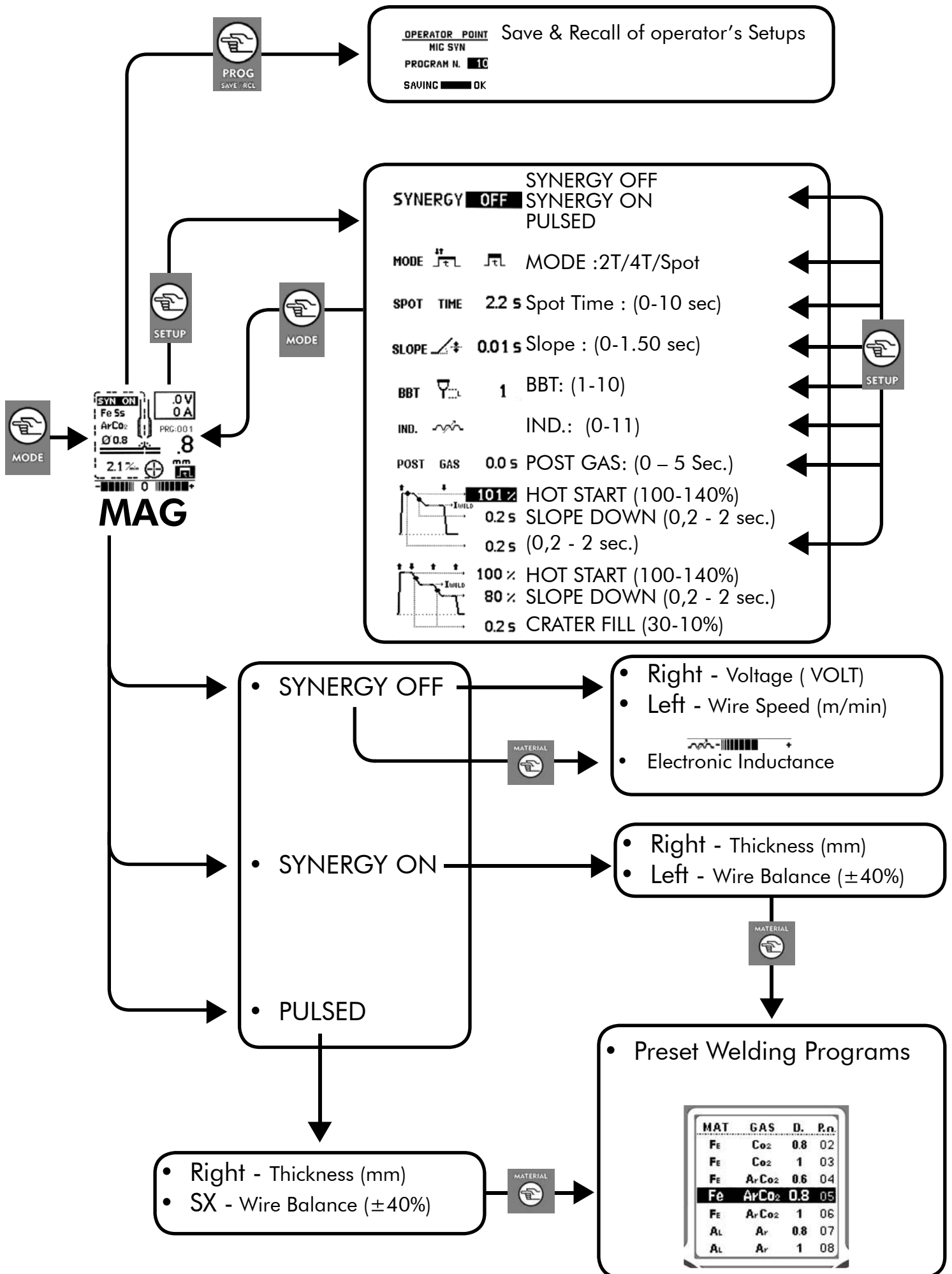
To recall a saved program proceed as follows:

- Press the PROG Key - 4 -
- Turn the Right Regulation knob - 5 - to choose the desired program number.
- Press the PROG Key - 4 -, the wording "LOADING" will confirm the program loading. Use the Mode Key - 1 - to go back to the MIG/MAG main screen.



Figure 23

# 12.0 QUICK START CHART FOR MIG/MAG WELDING



## 13.0

## SYNERGIC PROGRAMS LIST

In "Synergic ON" and "pulsed" Mode use the Material Key - **6.2.2** - to enter the synergic programs list.

N	Material	Gas	Diameter	
01	Fe	CO2	0.6	
02	Fe	CO2	0.8	
03	Fe	CO2	1.0	
04	Fe	ArCO2	0.6	
05	Fe	ArCO2	0.8	
06	Fe	ArCO2	1.0	
07	CrNi	ArCO2	0.8	
08	CrNi	ArCO2	1.0	
09	Al	Ar	0.8	
10	Al	Ar	1.0	
11	CuSi	Ar	0.8	
12	CuSi	Ar	1.0	
13	MSIP1	ArCO2	0.6	
<b>Pulsed</b>				
20	AlMg	Ar	0.8	Normal
21	AlMg	Ar	1.0	Normal
22	AlMg	Ar	1.2	Normal
23	AlMg	Ar	1.0	Low Energy (to close gap or very thin gauges)
24	AlSi	Ar	0.8	Normal
25	AlSi	Ar	1.0	Normal
26	AlSi	Ar	1.2	Normal
27	Fe	ArCO2	0.8	Normal
28	Fe	ArCO2	1.0	Normal
29	CrNi	ArCO2	0.8	Normal
30	CrNi	ArCO2	1.0	Normal
31	CrNi	C2-98%Ar-2% CO2	0.8	Normal
32	CrNi	C2-98%Ar-2% CO2	1.0	Normal

## 14.0

## PROTECTION GASES GUIDE

METAL	GAS	NOTE
Mild steel	CO2	High Penetration
	Argon + CO2	Argon controls spatters
	Argon + CO2 + Oxygen	Oxygen improves arc stability
Mild steel - Pulsed Mode	98%Argon + 2% CO2 (C2)	Recommended.
Aluminium	Argon	Arc stability, good fusion and minimum spatter. Higher heat input suitable for heavy sections. Minimum porosity.
	Argon + Helium	
Stainless steel	98%Argon + 2% CO2 (C2)	Recommended.
	80% Argon + 20% CO2	
	Argon + CO2 + Oxygen	Arc stability. Minimum spatter.
Copper, Nickel and Alloys	Argon	Suitable for light gauges because of low flowability of the weld pool.
	Argon + Helium	Higher heat input suitable for heavy sections.

**Contact the technical service of your gas supplier to know the percentages of the different gases which are the most suitable to your application.**

## 15.0

## WELDING HINTS AND MAINTENANCE

- Always weld clean, dry and well prepared material.
- Hold gun at a 45° angle to the workpiece with nozzle about 5 mm from the surface.
- Move the gun smoothly and steadily as you weld.
- Avoid welding in very drafty areas. A weak pitted and porous weld will result due to air blowing away the protective welding gas.
- Keep wire and wire liner clean. Do not use rusty wire.
- Sharp bends or kinks on the welding cable should be avoided.
- Always try to avoid getting particles of metal inside the machine since they could cause short circuits.
- Use compressed air to periodically clean the hose liner when changing wire spools
- **IMPORTANT: Disconnect from power source when carrying out this operation.**
- Using low pressure air (3/5 Bar=20-30 PSI), occasionally blow the dust from the inside of the welder. This keeps the machine running cooler. Note: do not blow air over the printed circuit board and electronic components.
- The wire feed roller will eventually wear during normal use. With the correct tension the pressure roller must feed the wire without slipping. If the pressure roller and the wire feed roller make contact (when the wire is in place between them), the wire feed roller must be replaced.
- Check all cables periodically. They must be in good condition and not cracked.

*This chart will assist you in resolving common problems you may encounter. These are not all the possible solutions.*

<b>PROBLEM</b>	<b>POSSIBLE CAUSE</b>	<b>POSSIBLE SOLUTION</b>
No "life" from welder	Input cable or plug malfunction.	Check for proper input cable connection
	Wrong size fuse.	Check fuse and replace as necessary
Fan operates normally, but when gun trigger pulled, there is no wire feed, weld output or gas flow	Faulty trigger on gun	Replace torch trigger
	Thermostat intervention	Allow welder to cool. The extinguishing of the pilot lamp / switch on the front panel indicates the thermostat has closed.
Feed motor operates but wire will not feed	Faulty wire feeding motor (rare)	Replace wire feeding motor
	Insufficient feed roller pressure	Increase roller pressure
	Burr on end of wire	Re-cut wire square with no burr
	Liner blocked or damaged	Clear with compressed air or replace liner
Lack of penetration	Voltage or wire feed speed too low.	Re-adjust the welding parameters.
	Loose connection inside the machine (rare).	Clear with compressed air and tighten all connections.
	Worn or wrong size contact tip.	Replace the contact tip.
	Loose gun connection or faulty gun assembly	Tighten or replace torch.
	Wrong size wire.	Use correct size welding wire.
	Torch moved too fast.	Move the gun smoothly and not too fast.
Wire is birdnesting at the drive roller	Excessive pressure on drive roller	Adjust pressure on drive roller.
	Gun liner worn or damaged Contact tip clogged or damaged	Replace wire liner Replace contact tip
	Liner stretched or too long	Cut wire liner at the right length
Wire burns back to contact tip	Contact tip clogged or damaged	Replace the contact tip
	Wire feed speed too slow	Increase wire speed
	Wrong size contact tip	Use correct size contact tip.
	Bad connection from cable to clamp	Tighten connection or replace cable.
	Slag buildup inside nozzle or nozzle is shorted.	Clean or replace nozzle.
Workpiece clamp and/or cable gets hot.	Wire feed speed too fast	Decrease wire feed speed

Gun nozzle arcs to work surface.	Nozzle clogged	Clean or replace nozzle
Wire pushes torch back from the workpiece	Torch held too far from the workpiece	Hold the torch at the right distance
	Bad connection between earth clamp and workpiece.	Clean and deoxidate the contact area of the earth clamp.
	The workpiece is excessively oxidized or painted.	Brush carefully the point to be welded.
Poor quality welds	Insufficient gas at weld area	Check that the gas is not being blown away by drafts and if so move to more sheltered weld area. If not check gas cylinder contents gauge, regulator setting and operation of gas valve.
	Rusty, painted, damp, oil or greasy workpiece	Ensure workpiece is clean and dry.
	Rusty or dirty wire	Ensure wire is clean and dry.
	Poor ground contact	Check ground clamp/workpiece connection
	Incorrect gas / wire combination	Check on the manual for the correct combination
Weld deposit "stringy" and incomplete	Torch moved over workpiece too quickly	Move the torch slower
	Gas mixture incorrect	See shielding gas table
Weld deposit too thick	Torch moved over workpiece too slowly	Move the torch faster
	Welding voltage too low	Increase welding voltage
Display not clear		Set display contrast.
When welder is turned on, the display shows ERR 1 and / or ERR2	Failure of system memory.	Contact the service center.



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Dieses Symbol auf dem Produkt oder dessen Verpackung gibt an, dass das Produkt nicht zusammen mit dem Restmüll entsorgt werden darf. Es obliegt daher Ihrer Verantwortung, das Gerät an einer entsprechenden Stelle für die Entsorgung oder Wiederverwertung von Elektrogeräten aller Art abzugeben (z.B. ein Wertstoffhof). Die separate Sammlung und das Recyceln Ihrer alten Elektrogeräte zum Zeitpunkt ihrer Entsorgung trägt zum Schutz der Umwelt bei und gewährleistet, dass sie auf eine Art und Weise recycelt werden, die keine Gefährdung für die Gesundheit des Menschen und der Umwelt darstellt. Weitere Informationen darüber, wo Sie alte Elektrogeräte zum Recyceln abgeben können, erhalten Sie bei den örtlichen Behörden, Wertstoffhöfen oder dort, wo Sie das Gerät erworben haben.

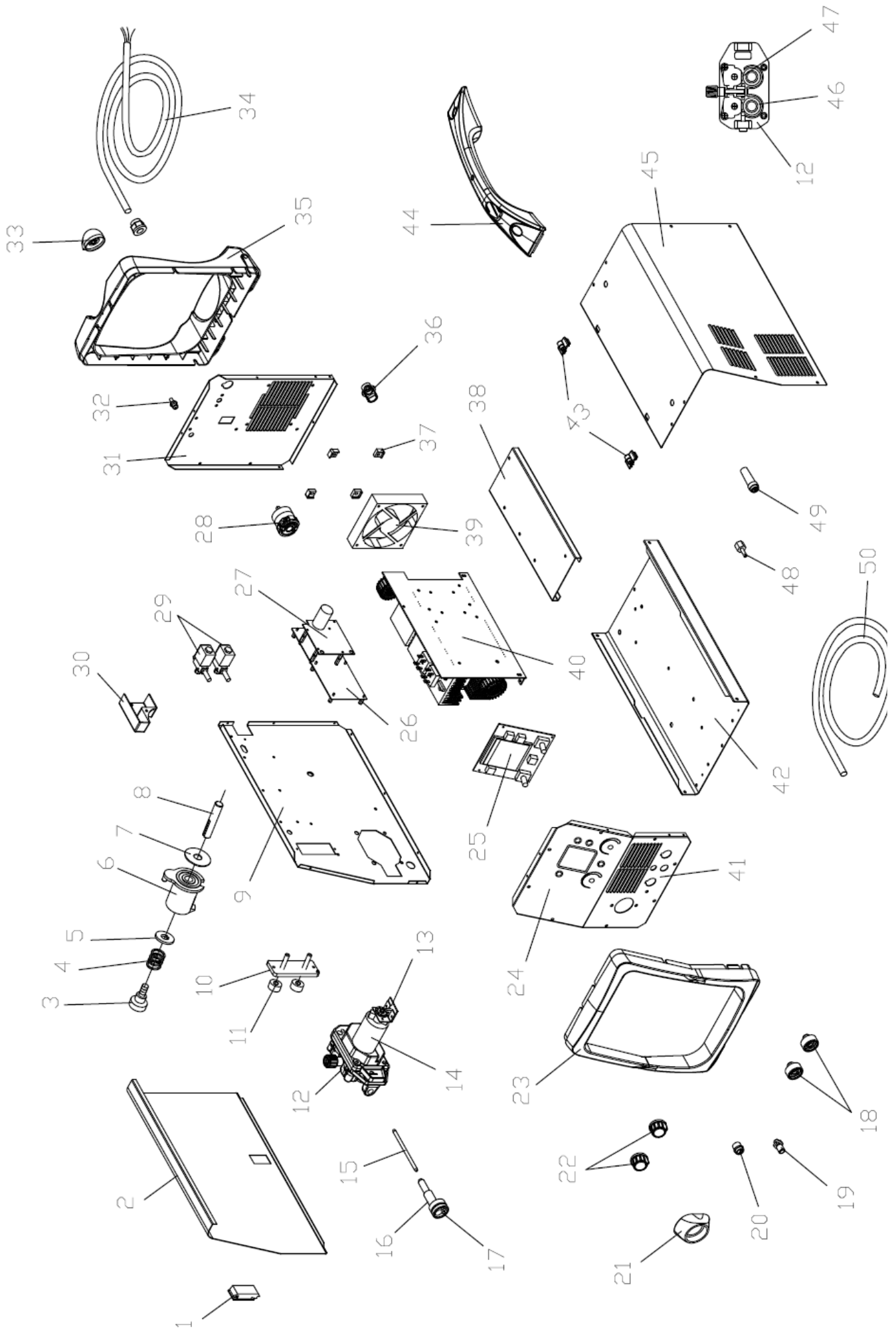
### **ELIMINACIÓN DE RESIDUOS DE APARATOS ELÉCTRICOS Y ELECTRÓNICOS POR PARTE DE USUARIOS DOMÉSTICOS EN LA UNIÓN EUROPEA**

Este símbolo en el producto o en el embalaje indica que no se puede desechar el producto junto con los residuos domésticos. Por el contrario, si debe eliminar este tipo de residuo, es responsabilidad de usuario entregarlo en un punto de recolección designado de reciclado de aparatos electrónicos y eléctricos. El reciclaje y la recolección por separado de estos residuos en el momento de la eliminación ayudarán a preservar recursos naturales y a garantizar que el reciclaje proteja la salud y el medio ambiente. Si desea información adicional sobre los lugares donde puede dejar estos residuos para su reciclado, póngase en contacto con las autoridades locales de su ciudad, con el servicio de gestión de residuos domésticos o con la tienda donde adquirió el producto.

### **DESCARTE DE EQUIPAMENTOS POR USUÁRIOS EM RESIDÊNCIAS DA UNIÃO EUROPEIA**

Este símbolo no produto ou na embalagem indica que o produto não pode ser descartado junto com o lixo doméstico. No entanto, é sua responsabilidade levar os equipamentos a serem descartados a um ponto de coleta designado para a reciclagem de equipamentos eletro-eletrônicos. A coleta separada e a reciclagem dos equipamentos no momento do descarte ajudam na conservação dos recursos naturais e garantem que os equipamentos serão reciclados de forma a proteger a saúde das pessoas e o meio ambiente. Para obter mais informações sobre onde descartar equipamentos para reciclagem, entre em contacto com o escritório local de sua cidade, o serviço de limpeza pública de seu bairro ou a loja em que adquiriu o produto.

# 17.0 EXPLODED VIEW

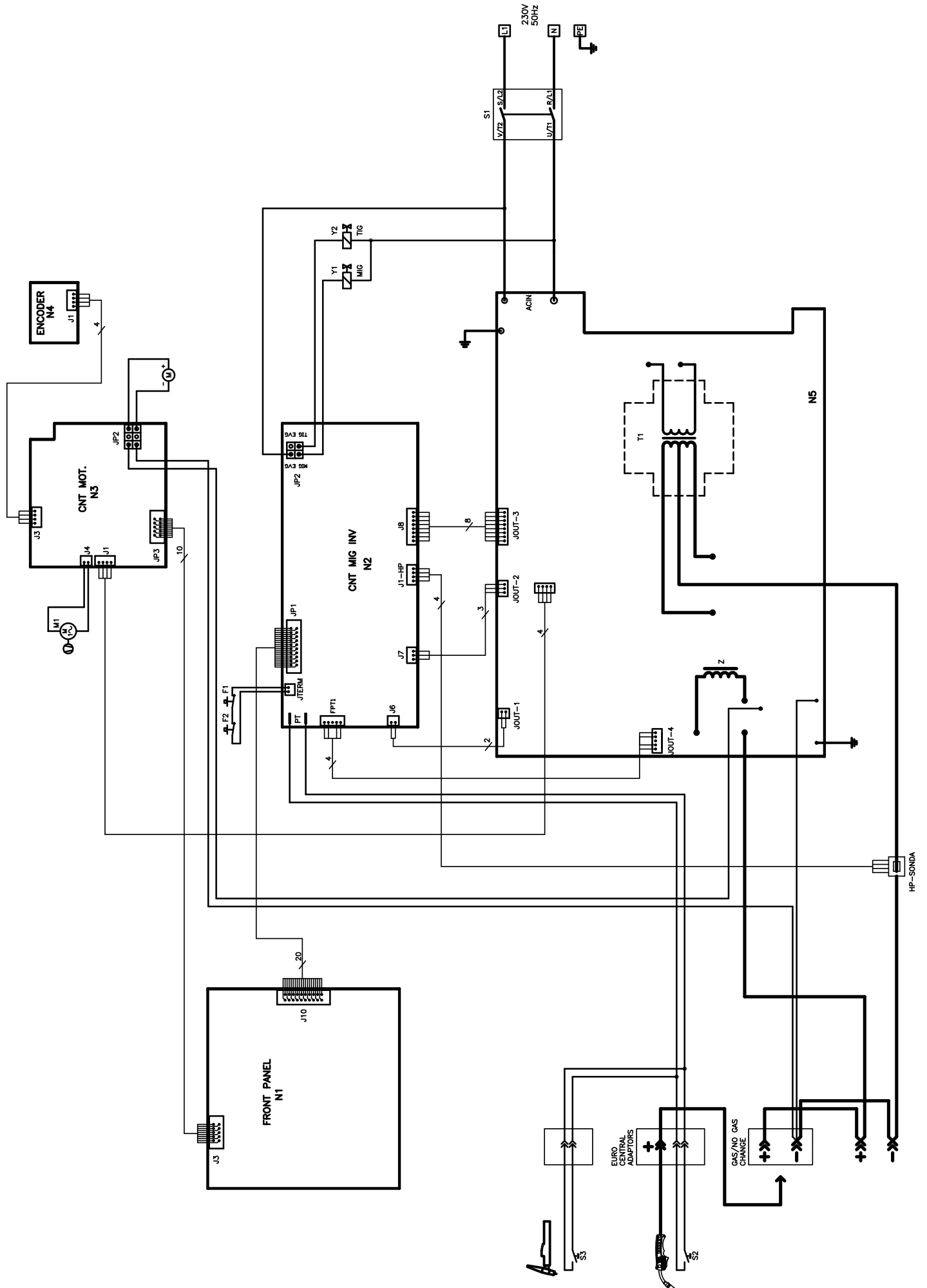




# 18.0 PARTS LIST

POSITION	PART NUMBER	MATERIAL SHORT DESCRIPTION
1	0831 90 00 02	SEAL
2	0831 90 00 03	SIDE WALL LEFT
3	0831 90 00 04	HANDWHEEL
4	0831 95 00 02	SPRING L=28MM
5	0831 90 00 06	DISK D.16X39 T 5MM
6	0831 90 00 07	COIL BRACKET FOR COILS D.50
7	0831 90 00 08	COUPLING DISK PVC 17X70
8	0831 90 00 09	BOLT FOR COIL BRACKET L=58
9	0831 90 00 10	INTERMEDIATE PLATE GREY
10	0831 90 00 11	CLAMP
11	0831 90 00 12	KNURLED SCREW D 30
12	0831 95 00 03	WIRE DRIVE UNIT
13	0831 95 00 04	ENCODER BOARD
14	0831 95 00 05	POTENTIOMETER KNOB D32
15	0831 95 00 06	WIRE GUIDE TUBE D.2X5 L=71
16	0831 90 00 17	WIRE INLET L=17MM
17	0831 90 00 18	MINI EURO CONNECTION
18	0831 90 00 19	POWER JACK 25MM <sup>2</sup> CX30
	0831 90 00 01	ADAPTER 25 <sup>2</sup> AT 50 <sup>2</sup> SK 35
19	0831 95 00 07	CONNECTION M12X1
20	0831 95 00 08	CONNECTOR BUSH 2 PINS
21	0831 90 00 20	COVER TORCH END
22	0831 90 00 21	FRONT COVER MICRO 180
23	0831 90 00 22	FRONT FRAME
24	0831 95 41 01	CIRCUIT BOARD FOR SLOPE CONTROL
25	0831 95 00 09	FRONT CIRCUIT BOARD
26	0831 95 00 01	CONTROL CIRCUIT BOARD
27	0831 95 00 10	MOTOR CONTROL CIRCUIT BOARD
28	0831 90 00 26	SELECTOR SWITCH 17A A 1702
29	0831 90 00 27	SOLENOID VALVE 4W 230V 50HZ 1/8"FF
30	0831 90 00 28	COVER SOLENOID VALVE
31	0831 90 00 29	REAR PANEL - GREY
32	0831 90 00 30	SCREWING D.6 1/8" M
33	0831 90 00 31	SWITCH BUTTON
34	0831 90 00 32	MAINS CABLE 3X2.5 M 2.5
35	0831 90 00 33	REAR FRAME
36	0831 90 00 34	SCREWING D10
37	0831 90 00 35	SPAVER FAN
38	0831 90 00 36	HOLDER
39	0831 90 00 37	FAN
40	0831 95 00 11	MODULE 200 A CPL.
41	0831 95 00 12	SWITCH FRONT PLATE - GREY
42	0831 90 00 40	GROUND PLATE
43	0831 90 00 41	HINGE 20X30
44	0831 90 00 42	HANDLE
45	0831 90 00 43	COVER - BLUE
46	0831 90 00 44	WIRE DRIVE ROLLER 0.6-0.8MM
46	0831 90 00 45	WIRE DRIVE ROLLER 0.8-1.0MM
47	0831 90 00 46	PRESSURE ROLLER D.17X30 H=9
48	0831 95 00 13	GAS PIPE CONNECTOR BUSH M12X1
49	0831 95 00 14	CONNECTION 2 PINS
50	0831 90 00 47	GAS PIPE D.5X10.5

# 19.0 WIRING DIAGRAM



F1-F2	THERMOSTAT	THERMOSTAT	THERMOSTAT	TERMOSTAT	TERMOSTATO
Y1-Y2	SOLENOID VALVE	ELEKTROVENTIL	ELETROVANNE	ELECTROVALVULA	ELETTROVALVOLA
M	WIRE FEEDING MOTOR	DRAHTVORSCHUB MOTOR	MOTEUR D'ENTRAINEMENT DU FIL	EQUIPO ARRASSTRA HILO	MOTORE TRAINA FILO
M1	FAN	VENTILATOR	VENTILATEUR	VENTILADOR	VENTILATORE
N1-N3	P.C. BOARD	ELEKTRONIK-PLATTE	FICHE ELECTRONIQUE	CIRCUITO ELECTRONICO	SCHEDA ELETTRONICA
HP	HALL PROBE	STROMSONDE	SONDE DE COURANT	SONDA HALL	SONDA DI CORRENTE
S1	ON - OFF	ON - OFF	ON - OFF	INTERRUPTOR ON - OFF	ON - OFF
S2-S3	TORCH TRIGGER	BRENNER SCHALTER	BOUTON TORCHE	PULSADOR DE LA ANTORCHA	PULSANTE TORCIA
T1	TRANSFORMER	TRANSFORMATOR	TRANSFORMATEUR	TRANSFORMADOR	TRASFORMATORE
Z	CHOKE	IMPEDANZ	IMPEDANCE	IMPEDANCIA	IMPEDENZA



Weld your way.

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