


# INSTRUCTION MANUAL FOR ARC WELDING MACHINE

**IMPORTANT:** BEFORE STARTING THE EQUIPMENT, READ THE CONTENTS OF THIS MANUAL, WHICH MUST BE STORED IN A PLACE FAMILIAR TO ALL USERS FOR THE ENTIRE OPERATIVE LIFE-SPAN OF THE MACHINE. THIS EQUIPMENT MUST BE USED SOLELY FOR WELDING OPERATIONS.

## 1 SAFETY PRECAUTIONS

 **WELDING AND ARC CUTTING CAN BE HARMFUL TO YOURSELF AND OTHERS.** The user must therefore be educated against the hazards, summarized below, deriving from welding operations. For more detailed information, order the manual code 3.300.758

**ELECTRIC AND MAGNETIC FIELDS -** May be dangerous.



· Electric current following through any conductor causes localized Electric and Magnetic Fields (EMF). Welding/cutting current creates EMF fields around cables and power sources.

· The magnetic fields created by high currents may affect the operation of pacemakers. Wearers of vital electronic equipment (pacemakers) shall consult their physician before beginning any arc welding, cutting, gouging or spot welding operations.

· Exposure to EMF fields in welding/cutting may have other health effects which are now not known.

· All operators should use the following procedures in order to minimize exposure to EMF fields from the welding/cutting circuit:

- Route the electrode and work cables together
- Secure them with tape when possible.
- Never coil the electrode/torch lead around your body.
- Do not place your body between the electrode/torch lead and work cables. If the electrode/torch lead cable is on your right side, the work cable should also be on your right side.
- Connect the work cable to the workpiece as close as possible to the area being welded/cut.
- Do not work next to welding/cutting power source.

### EXPLOSIONS



· Do not weld in the vicinity of containers under pressure, or in the presence of explosive dust, gases or fumes. · All cylinders and pressure regulators used in welding operations should be handled with care.

### ELECTROMAGNETIC COMPATIBILITY.

This machine is manufactured in compliance with the instructions contained in the standard IEC 60974-10 (CL. A), and must be used solely for professional purposes in an industrial environment. There may be potential difficulties in ensuring electromagnetic compatibility in non-industrial environments.



### DISPOSAL OF ELECTRICAL AND ELECTRONIC EQUIPMENT.

Do not dispose of electrical equipment together with normal waste! In observance of European Directive 2002/96/EC on Waste Electrical and Electronic Equipment and its implementation in accordance with national law, electrical equipment that has reached the end of its life must be collected separately and returned to an environmentally compatible recycling facility. As the owner of the equipment, you should get information on approved collection systems from our local representative. By applying this European Directive you will improve the environment and human health!

**IN CASE OF MALFUNCTIONS, REQUEST ASSISTANCE FROM QUALIFIED PERSONNEL.**

### 1.1 WARNING LABEL

The following numbered text corresponds to the label numbered boxes.



B. Drive rolls can injure fingers.

C. Welding wire and drive parts are at welding voltage during operation — keep hands and metal objects away.

1 Electric shock from welding electrode or wiring can kill.

1.1 Wear dry insulating gloves. Do not touch electrode with bare hand. Do not wear wet or damaged gloves.

1.2 Protect yourself from electric shock by insulating yourself from work and ground.

1.3 Disconnect input plug or power before working on machine.

- 2 Breathing welding fumes can be hazardous to your health.
  - 2.1 Keep your head out of fumes.
  - 2.2 Use forced ventilation or local exhaust to remove fumes.
  - 2.3 Use ventilating fan to remove fumes.
- 3 Welding sparks can cause explosion or fire.
  - 3.1 Keep flammable materials away from welding.
  - 3.2 Welding sparks can cause fires. Have a fire extinguisher nearby and have a watchperson ready to use it.
  - 3.3 Do not weld on drums or any closed containers.
- 4 Arc rays can burn eyes and injure skin.
  - 4.1 Wear hat and safety glasses. Use ear protection and button shirt collar. Use welding helmet with correct shade of filter. Wear complete body protection.
- 5 Become trained and read the instructions before working on the machine or welding.
- 6 Do not remove or paint over (cover) label.

IP23S



NOTES:

- 1- The machine has also been designed for use in environments with a pollution rating of 3. (See IEC 60664).
- 2- This equipment complies with a IEC 2-61000-3 standard provided that the allowed maximum impedance  $Z_{max}$  of the unit is lower or equal to 0.093 (Art. 369) - 0,044 (Art. 370) - 0,031 (Art. 371) at the interface point between the user unit and the mains. The fitter or the unit user are responsible for connecting the unit to a power supply with a maximum allowed system impedance  $Z_{max}$  lower or equal to 0.093 (Art. 369) - 0,044 (Art. 370) - 0,031 (Art. 371). If required, they may contact the electric power supplier to check this value.

rent absorbed, considering the duty cycle. This value usually corresponds to the capacity of the fuse (delayed type) to be used as a protection for the equipment.

Degree of housing protection.

Grade 3 as the second digit means that this machine may be stored, but it is not suitable for use outdoors in the rain, unless it is protected.

Suitable for use in high-risk environments.

## 2 GENERAL DESCRIPTIONS

### 2.1 SPECIFICATIONS

This welding machine is a DC power source built using INVERTER technology, engineered to weld with all types of coated electrodes (cellulosic type not included) and with TIG welding process with scratch starting and high frequency.

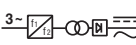
MUST NOT BE USED TO DEFROST PIPES.


### 2.2 EXPLANATION OF THE TECHNICAL SPECIFICATIONS LISTED ON THE MACHINE PLATE

This machine is manufactured according to the following international standards:


IEC 60974-1 / IEC 60974-3 / IEC 60974-10 (CL. A) / IEC 61000-3-11 / IEC 61000-3-12 (see note 2).

N° . Serial number, which must be indicated on any request regarding the welding machine.

 Three-phase static frequency converter transformer - rectifier.

 Drooping characteristic.

 MMA Suitable for welding with covered electrodes.

 TIG Suitable for TIG welding.

U0. Secondary open-circuit voltage.

X. Duty cycle percentage.  
The duty cycle expresses the percentage of 10 minutes during which the welding machine can run at a certain current without overheating.

I2. Welding current

U2. Secondary voltage with current I2

U1. Rated supply voltage

3~ 50/60Hz Three-phase 50 or 60 Hz power supply.

I1 Max Max. absorbed current at the corresponding current I2 and voltage U2.

I1 eff This is the maximum value of the actual cur-

### 2.3 DESCRIPTION OF PROTECTION DEVICES

#### 2.3.1 Thermal protection

This machine is protected by a number of temperature probes, which prevent the machine from operating if the allowable temperatures are exceeded. The thermostat tripping is signalled by the glowing abbreviation "tH0" or "tH1" on display **D1** located on the control panel.

#### 2.3.2 Alarm display

When the machine detects a temporary alarm, displays **D1** and **D2** show a flashing wording related to the alarm cause (see paragraph 5).

#### 2.3.3 Error display

When the machine detects a serious alarm, displays **D1** and **D2** show a wording "Err" followed by the relevant error code.

In this case, switch off the machine and contact technical service (see par. 5).

## 3 INSTALLATION

Make sure that the supply voltage matches the voltage indicated on the specifications plate of the welding machine.

When mounting a plug, make sure it has an adequate capacity, and that the yellow/green conductor of the power supply cable is connected to the earth pin.

The capacity of the overload cutout switch or fuses installed in series with the power supply must be equivalent

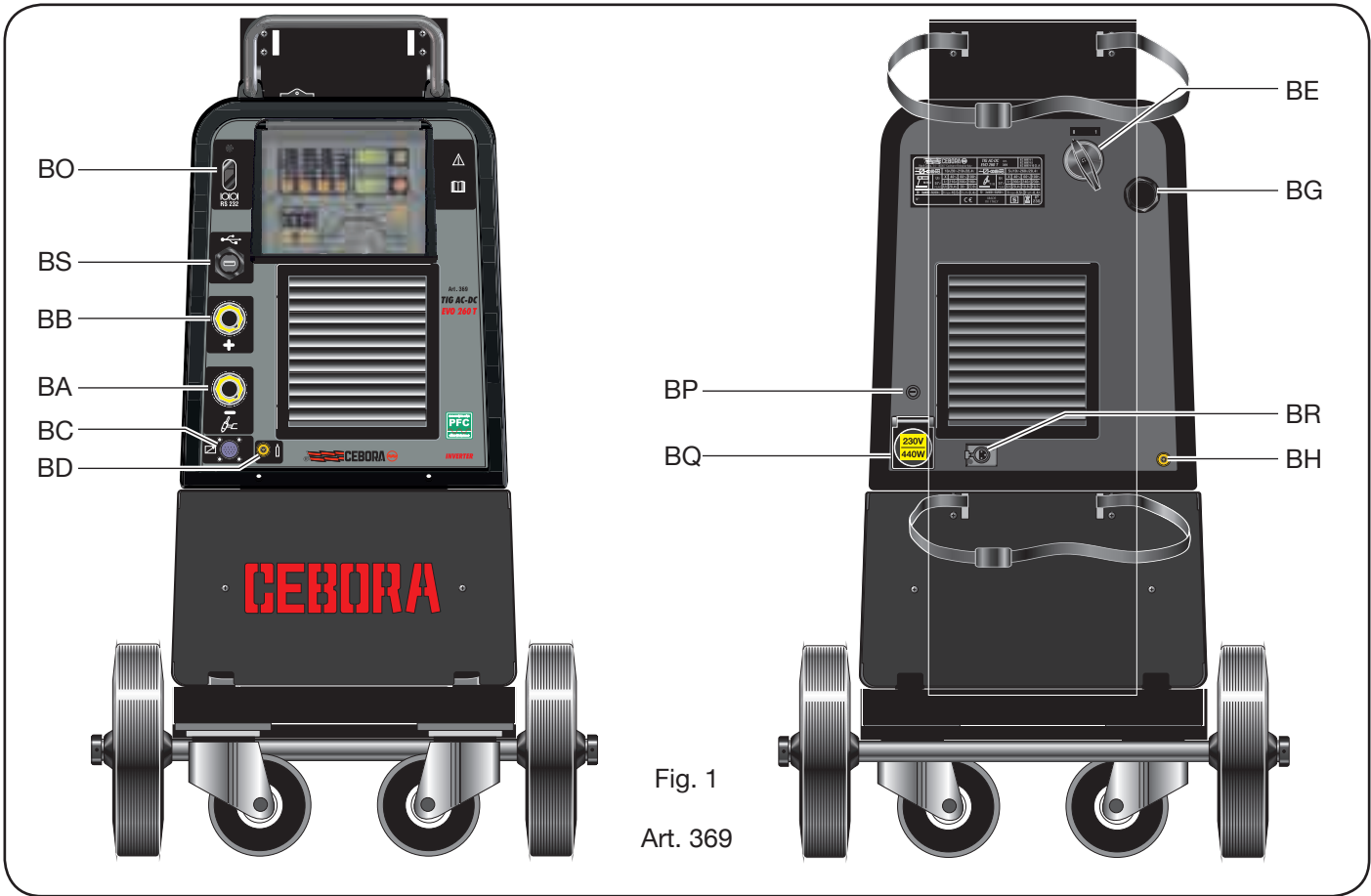


Fig. 1

Art. 369

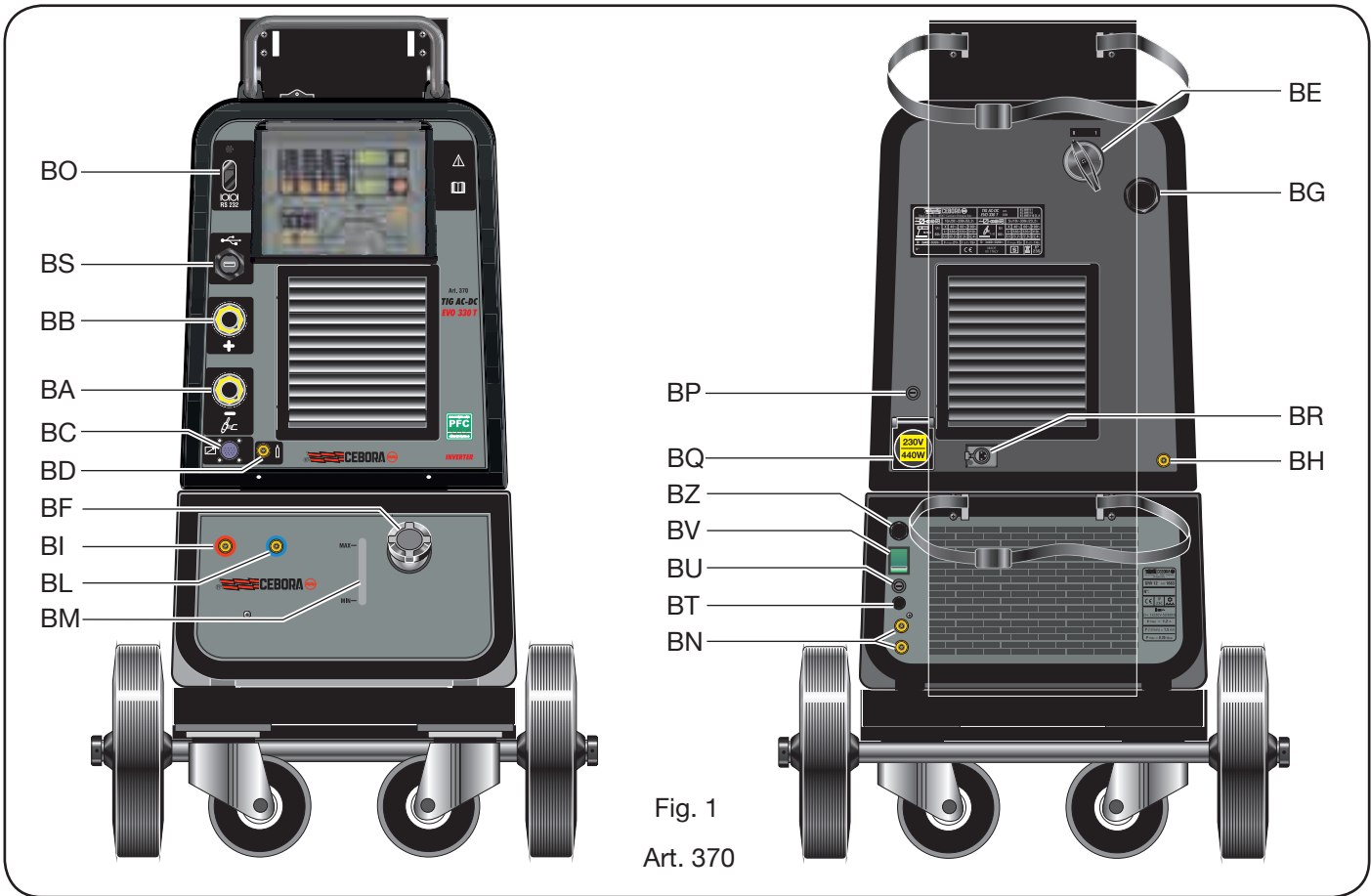


Fig. 1

Art. 370

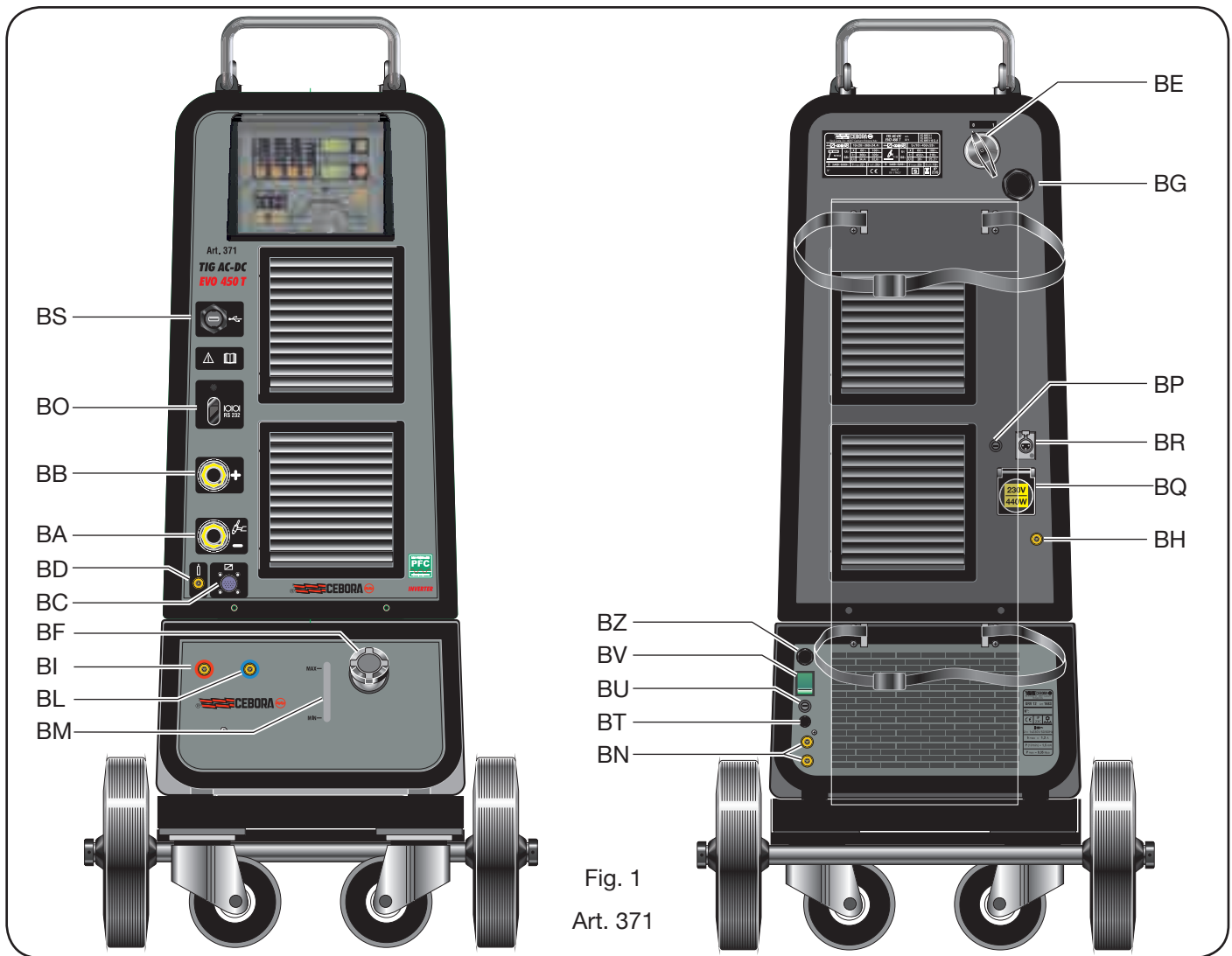


Fig. 1  
Art. 371

lent to the current  $I_{lmax}$ . absorbed by the machine.

### 3.1. GENERAL NOTES.

Only skilled personnel should install the machine. All connections must be carried out according to regulations in force, and in full observance of safety laws (IEC 26-23 / IEC CLC 62081).

Also make sure the insulation of the cables, electrode clamps, sockets and plugs are intact, and that the size and length of the welding cables are compatible with the current used.

### 3.2 DESCRIPTION OF THE EQUIPMENT (Fig.1).

BA) **Output terminal, negative (-).**

BB) **Output terminal, positive (+).**

BC) **10-pin connector.**

Remote controls described in paragraph 4 must be connected to this connector.

Between pin 3 and 6 a clean contact is available that signals the arc ignition (Max 0.5 A - 125 VAC / 0.3 A - 110 VDC / 1A - 30 VDC).

BD) **Fitting (1/4 gas)**

Used to connect TIG welding torch gas hose .

BE) **Main switch.**

BF) **Tank cap.**

BG) **Power cable**

BH) **Gas supply fitting .**

BI) **Hot water inlet fitting**  
(use only for TIG torches).

BL) **Cold water outlet fitting**  
(use only for TIG torches).

BM) **Slot to inspect the coolant fluid level.**

BN) **Fittings for TIG torches**  
(there must be no short-circuits).

BO) **Connector Type DB9 (RS 232).**

To be used for updating the power source software or firmware.

BP) **Fuse holder.**

BQ) **Power supply socket.**

BR) **Pressure switch socket.**

BS) **USB socket.**

To be used for updating the power source firmware.

BT) **Cooling unit pressure switch cable.**


BU) **Cooling unit fuse holder.**

BV) **Cooling unit main switch .**

BZ) **Cooling unit power cable.**

### 3.3 CONTROL PANEL DESCRIPTION (Fig. 2).

#### T1 process key.

 With a long pressure of this key, LEDs **L1** or **L2** are alternatively chosen.



LED **L1** (TIG)



LED **L2** (MMA)

With a short pressure of this key, LEDs **L35** or **L36** are alternatively chosen.




LED **L35** (DC)



LED **L36** (AC)

2 LEDs will be always selected: one between LED **L1** and **L2** and one between LED **L35** and **L36**.

#### T2 program key.

 One of the LEDs **L3, L4, L5, L6** or **L7** lights when selected.

#### LED **L3** - (manual) spot welding.

After selecting the welding current (LED **L28**) and the spot welding time (LED **L34**) using key **T8**, set the values using the knob **M1**.

This welding mode can only be selected in start-up mode with HF (LED **L9**). The operator presses the torch trigger,

the arc lights and shuts off automatically after the pre-set spot welding time. In order to weld the following spot, it is necessary to release the torch trigger and press it again. Range from 0.1 to 30 s.

To obtain points in sequence split up by intervals, the item "tin" (time interval) is available from the second functions menu; this item is displayed only if spot welding is selected.

To activate the function proceed as follows:

1. Press keys **T7** and **T8** at the same time to enter the "Second Functions" menu.
2. Briefly press key **T8** until the display **D1** shows the abbreviation "tin". The display **D2** will show the word "OFF".
3. Turn knob **M1** to select the time interval. Range from 0.1 to 25 s.
4. Press keys **T7** and **T8** at the same time to return to normal display.

#### LED **L4** - 2-stage TIG welding (manual).

By pressing the torch trigger the current moves to first level (LED **L23**) and remains there for the time previously regulated and displayed by the LED **L24** before reaching the welding current in the "slope-up" time indicated by the LED **L25** the reaching of the welding current is indicated by the start-up of the LED **L28**; when the torch trigger is released, the current starts to drop, taking the "slope-down" time indicated by the LED **L30**, before reaching the

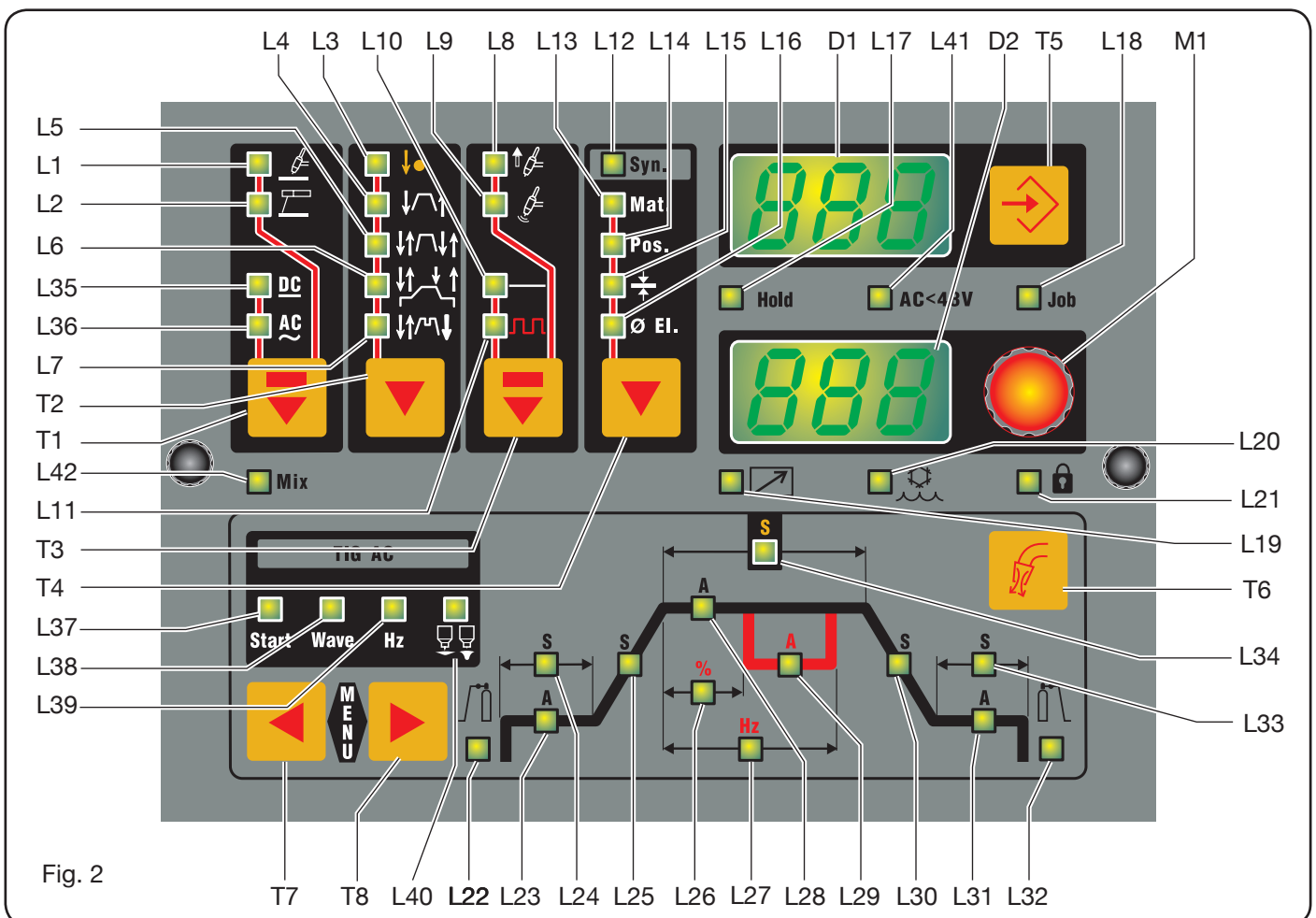


Fig. 2

third current LED **L31** where it stays for the time regulated and displayed by the LED **L33**.

In this position the pedal control accessory **ART. 193** can be connected.

**NOTE: in order for art. 193 to work well set:**

1. first current value (LED **L23**) at the desired one as pedal minimum value
2. first current time at zero (LED **L24**).
3. slope-up and slope-down time at zero (LED **L25** and **L30**)
4. third current at the minimum.



#### LED **L5** - 5-stage TIG welding (automatic).

This program differs from the previous one in that the arc is both started and shut off by pressing and releasing the torch trigger.



#### LED **L6** - TIG welding with three levels of current.

To set the three minimum welding currents, proceed as follows:

Press key **T8** until the LED **L28** lights, then adjust the main current value using knob **M1**.

Press key **T7** until the LED **L23** lights, then adjust the initial current value using knob **M1**.

Press key **T8** until the LED **L31** lights, then adjust the final current value using knob **M1**.

When the arc strikes, the current reaches the first setting (LED **L23**lit); By keeping the key pressed, the operator can maintain this current as long as desired (for example until the part is heated). Upon releasing the torch trigger, the current passes from first to second level during the slope time (LED **L25**); once the 2<sup>nd</sup> level of welding current is reached the LED **L28** lights.

In order to pass to the 3<sup>rd</sup> current level the torch trigger is to be pressed and kept pressed, while the current reaches the 3<sup>rd</sup> value selected, in the slope time (LED **L30**): The LED **L31** will light, and the LED **L28** will go off.

To switch off, press the torch trigger.



#### LED **L7** - TIG welding with 4-stage current levels.

To set the welding currents, proceed as follows:

Press key **T8** until the LED **L28** lights, then adjust the main current value.

Press key **T7** until the LED **L23** lights, then adjust its value; later on it is possible to adjust also this current time LED **L24**.

Press key **T8** until LED **L29** lights, then adjust its value.

Press key **T8** until LED **L31** lights, then adjust its value. Later on it is possible to adjust also this current time LED **L33**.

By pressing and releasing the torch trigger, the current moves to first level (LED **L23**) and stays there for the time previously regulated and displayed by the LED **L24** before reaching the welding current in the "slope-up" time indicated by the LED **L25** the reaching of the welding current is indicated by the start-up of the LED **L28**.

Should it be necessary to reduce the current during welding, without shutting off the arc (for instance when

changing the welding material or working position, moving from horizontal to upright, etc.), press and immediately release the torch trigger, the current reaches the second set value, the LED **L29** lights and the LED **L28** shuts off.

When the torch trigger is released, the current starts to drop and takes the "slope-down" time indicated by the LED **L30**, before reaching the third current LED **L31** where it stays for the time regulated and displayed by the LED **L33**.

In order to go back to the previous main current, repeat the same torch trigger pressing and releasing action, the LED **L28** lights while LED **L29** shuts off.

To stop welding at any time, simply hold down the torch trigger **for more than 0.7 seconds**, then release it; the current starts to gradually decrease in the time previously set (LED **L20** lit) until reaching the crater current (LED **L31**).

#### T3 Mode key.



With a long pressure (more than 0.7 sec) of this key LEDs **L8** or **L9** are alternatively chosen.

With a short pressure (less than 0.7 sec) of this key LEDs **L10** or **L11** are alternatively chosen.

2 LEDs will be always selected: one between LED **L8** and **L9** and one between LED **L10** and **L11**.



#### LED **L8** - TIG welding with contact starting (striking).



#### LED **L9** - TIG welding starting with high voltage/frequency device.



#### LED **L10** - CONTINUOUS TIG welding.



#### LED **L11** - PULSE TIG welding.

The pulse frequency is adjustable from 0.1 to 2,500 Hz (LED **L27**), peak current and base current can be activated via LEDs **L28** and **L29**, respectively, and are adjustable using the knob **M1**.

With pulse frequency from 0.1 to 1.1 Hz display **D1** alternatively shows peak current (main) and base current; LEDs **L28** and **L29** are alternatively on.

With pulse frequency over 1.1 Hz the display **D1** shows the mean current between these two.

#### Key **T4**:



By briefly pressing it synergy, where available, is activated and selects LEDs **L12**, **L13**, **L14**, **L15**, and **L16** (see paragraph 3.7.4).

If, after selecting the parameters, the electrode diameter is not confirmed, a brief pressure of this key exits synergy. If on the contrary, after confirming the parameter, synergy is to be exited, it is necessary to press it for a long time (1.5 s).



#### LED **L13**: Material.

The types of materials that may be selected are in relation to the welding process and are:

In TIG AC, aluminium (Al), and magnesium (Mg).

In TIG DC, stainless steel (SS), copper (Cu), iron (Fe) and titanium (Ti).



### LED L14: Welding position.

The abbreviations that appear on the display **D1** meets ISO 6947 standards and correspond to the welding positions listed in figure 3.

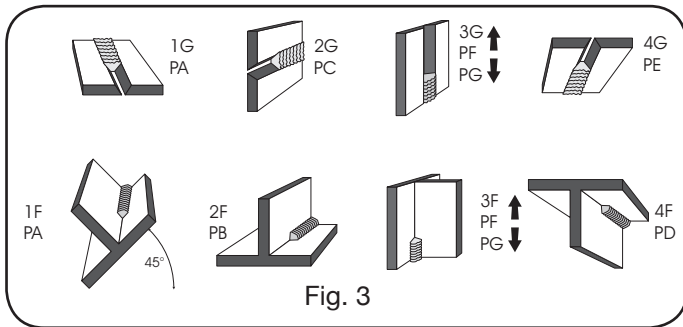


Fig. 3

ASME standard abbreviations are made up of one figure and one letter. For clarity purposes, they are listed below.



### LED L15: Thickness.

The display **D1** lights and shows the set current, while the display **D2** shows the thickness corresponding to the current.

Turning knob **M1** changes the thickness and the current will also be adjusted accordingly.

Obviously the thickness and corresponding current will be measured in relation to the material and the welding position settings.



### LED L16: Electrode diameter.

The electrode diameter is displayed as a result of the material setting (LED **L13**), of the position (LED **L14**), and of the thickness (LED **L15**).

**Display D2 will show the electrode diameter recommended;** the operator may use the knob **M1**, to also display **other diameters**, but these will be shown **flashing** to indicate that they are not recommended.

### Knob M1.



Normally adjusts the welding current (LED **L28**).

Furthermore, if a function is selected with key **T8** this knob adjusts its size.

### Display D1.



Shows:

1. In MMA, when not welding, the open-circuit voltage and, during welding, the load voltage.
2. In TIG continuous, when pressing the welding torch trigger, but without welding, the open-circuit voltage and, while welding, the load voltage.
3. Menu entries (par. 3.3.1).
4. Additionally, with LED **L17** (Hold) lit, it displays the welding voltage.

### Display D2.



Shows:

1. in stand-by conditions, the preset current (LED **L28**).
2. during welding, the measured welding current.

3. Additionally, with LED **L17** (Hold) lit, it displays the last welding voltage.

4. The numerical value of the magnitudes selected with keys **T7** or **T8**.



### LED L19

It turns on after the intervention of a remote control (Torches – remote controls – pedal control).



### LED 20.

This lights up when the cooling unit is on.



### LED L17 - Hold.

It signals that the values shown on the displays **D1** and **D2** (normally current and voltage) are those used during last welding. Activated at the end of each welding session.



### LED L21 Lock.

Indicates that the panel has been blocked in order to avoid undesired modifications.

### Key T5.



Selects and saves programs.

The welding machine can save nine welding programs P01.....P09, and call them up using this button. A work program **PL** is also available.

### Selection:

If this key is briefly pressed the display **D1** shows the number of the program following the one being used. If it has not been saved the message will flash, otherwise it will remain steady. LED **L18** turns on.

### Saving (see par. 3.6):

Once the program has been selected, hold for more than 1.5 seconds to save the data. As confirmation, the program number on the display **D1** will stop flashing.

### Key T8.



When this key is pressed, the following LEDs light in succession, going from left to right: **L37-L38-L39-L40-L22-L23-L24-L25-L28-L26-L27-L29-L34-L30-L31-L33-L32**.

**Warning!** only those LEDs that refer to the chosen welding mode will light; e.g. in continuous TIG welding LED **L27**, that represents the pulse frequency, will not glow.

Each LED shows the parameter that can be set by means of knob **M1** during the time when the LED is glowing. 5 seconds after the last change the concerned LED shuts off and LED **L28** turns on again showing the main welding current.

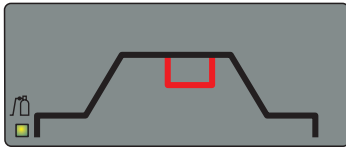
### Key T7.



Like key **T8** but moving in the opposite direction, from right to left.

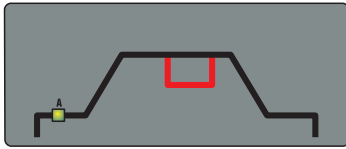
**LEDs THAT MAY BE SELECTED ONLY IN TIG DC (DIRECT CURRENT) OR TIG AC (ALTERNATING CURRENT) WELDING:**

**LED L22 - Pre-gas time.**



Gas delivery time before welding starts.  
Range from 0.05 s to 2.5 s.

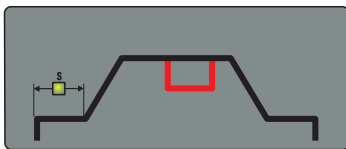
**LED L23 - Welding start current.**



This is a percentage of the welding current (LED L28).  
Pre-set adjustment is 25% of welding current.  
Range from 1 to 100%.

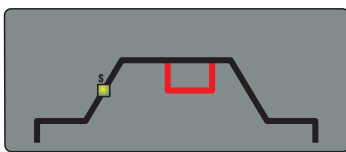
The displayed value is in amperes [A].

**LED L24 - Welding start current time.**



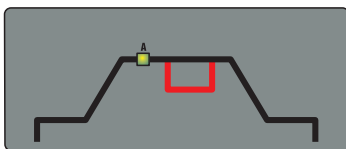
It is the duration of welding start current time.  
Range from 0 to 30 s.  
Pre-set adjustment is 0 s.

**LED L25 - Slope up time.**



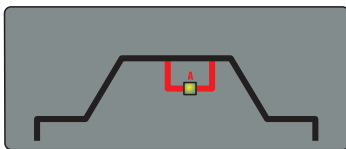
This is the time in which the current reaches the set current value.  
Range from 0 to 10 s.  
Pre-set adjustment is 0 s.

**LED L28- Main welding current.**



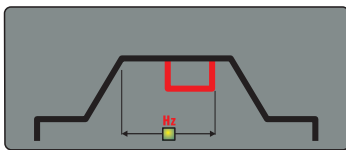
It is the main welding current value.  
The displayed value is in amperes [A].  
Range from 5 to 500.

**LED L29 - basic or second level welding current (FOR PULSE).**



This current is always a percentage of the main current.  
The displayed value is in amperes [A] between 1 and 100%. Pre-set adjustment is 50 %.

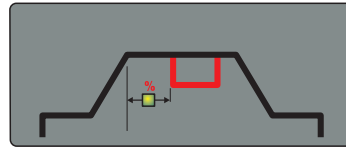
**LED L27 - Pulse Frequency**



Range from 0.1 to 2,500 Hz.  
In DC and AC welding procedure the frequency increase results in:

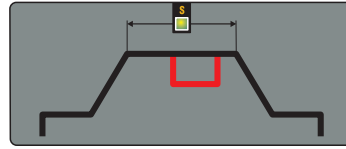
1. higher arc concentration.
2. reduction of the thermally altered area.

**LED L26.**



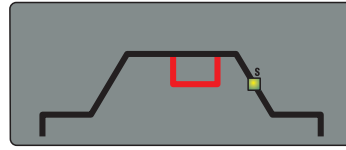
Adjusts the percentage ratio between the peak current time L28 and the frequency L27.  
Pre-set adjustment is 50 %.

**LED L34.**



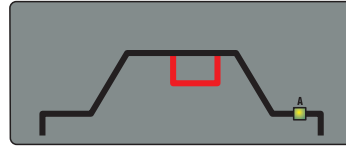
Indicates the spot welding time (see description of LED L3).

**LED L30 - Slope down time.**



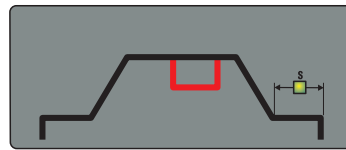
This is the time in which the current reaches the value of welding end, crater filler or arc shutdown.

**LED L31 - Welding end current (crater arc).**



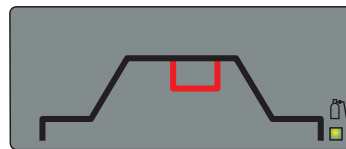
This current setting is used particularly for closing the final crater.  
Range from 1 to 100%.  
The displayed value is in amperes [A]. Pre-set adjustment is 10 %.

**LED L33 - Welding end current time (crater arc).**



It is the duration of welding end current time.  
Range from 0 to 30 s.

**LED L32 - Post-gas.**



Sets gas output time when welding is over.  
Range from 0 to 30 s.

**LED THAT MAY BE SELECTED ONLY IN TIG AC (ALTERNATING CURRENT) WELDING MODE:**



**LED L37 - Start.**

Adjusts the "hot-start" level to maximize starts in TIG AC mode for each electrode diameter. When this LED lights the display D2 shows a numerical value that refers to the electrode diameters. The operator may use the knob M1 to set the diameter being used and obtain a good start immediately. Range from 0.5 to 4.8.



**LED L38 - Wave.**

Selects the welding waveform. When this LED lights display D2 shows a number corresponding to the selected waveform (see table).

- |                      |                    |
|----------------------|--------------------|
| 11 = square - square | 22 = sine - sine   |
| 33 = delta - delta   | 12 = square - sine |




13 = square - delta      23 = sine - delta  
 21 = sine - square      32 = delta - sine  
 31 = delta - square.


**Default** = square - sine (12).

This combination of numbers may be changed using the encoder **M1**.

**NOTE:** The first number that makes up the figure refers to the negative or penetration half-wave, the second number refers to the positive or cleaning half-wave.

**Changing the type of waveform may also reduce noise in the arc in AC welding.**


 **LED L39 - Hz.**  
 Adjusts the frequency of the alternating current.  
 Range 50-100 Hz.

 **LED L40 - Adjusts the wave balance.**  
 Adjusts the percentage of the negative (penetration) half-wave in the alternating current period.


Range -10/0/10 where 0 = 65% (recommended) -10 = 50% and 10 = 85%.


Consequences due to value increase

1. Better welding penetration.
2. Less piece cleaning.

 **LED L41:**  
 LED indicating that the device to reduce the risk of electric shock is in good working order.

#### Key T6 gas test.

 When this key is pressed, the gas flows out for 30 seconds. If pressed again the flow stops.

 **Led L42 MIX:**  
 The start-up of this led indicates that "MIX" welding has been set, i.e. an alternation of alternate and direct current. The purpose of this welding is to obtain greater penetration with respect to traditional aluminium alternate current welding.

To start up this welding, the AC welding must have been set (**L1+L36**) in continuous mode (**L10**). To activate the function proceed as follows:

1. Press keys **T7** and **T8** at the same time to enter the "Second Functions" menu.
2. Briefly press key **T8** until the display **D1** shows the abbreviation "ACM" (AC Mix). The display **D2** will show the word "OFF".
3. Turn knob **M1** to select "On".
4. Only by activating the item "ACM" will it be possible to select the abbreviation "ACd" which is the ratio between the AC part and the DC part of the period. 10 – 80% period adjustment. Default=50%
5. Press keys **T7** and **T8** at the same time to return to normal display.

**CAUTION: it is normal for the MIX welding to take the form of a pulse when continuous welding has been selected.**

Consequences due to ACd value increase:

1. Better welding penetration
2. Fewer deformations.
3. Quicker creation of the weld pool.
4. Less piece cleaning.


**AAd** = Adjustment of amplitude of the negative half wave. Adjustable from the second functions menu. Permits adjusting the amplitude of the negative half wave which regulates alternate current welding penetration.

Adjustment = -/+ 80% of amplitude Default = 0

Consequences due to a value increase

1. Narrower arc.
2. Better welding penetration.
3. Reduced pickling.
4. Less electrode deformation

#### 3.3.1 Menu of second functions.

 Access to "second functions" menu is obtained by pressing simultaneously keys **T7** and **T8**.

Exit from menu is always obtained by pressing simultaneously keys **T7** and **T8**.

Display **D1** shows the function abbreviation, display **D2** shows its value that can be adjusted by means of knob **M1**.

The existing functions are:

##### 1. Cooling unit (TIG only).

**H2O**

Range:

**OFF** = off (manufacturer's setting).

**OnC** = Continuous always on.

**OnA** = automatic start-up.

##### 2. EST (Evo Start) enable TIG DC.

The enabling of this function forces the welding machine to start with a synergic pulsed current. Once the time preset for automatic pulsation has passed, switch is made to the welding current selected from the panel.

The aim of this function is to quickly create the thin metal plate welding melting bath or create a stable bath with very low currents.

Default = OFF

Regulation = 0.1 – 10 Sec.

##### 3. ELF (Evo Lift) TIG DC must be enabled with H.F.

With function enabled the operation starts with contact between the electrode and the piece being worked. The instant the short circuit is solved, a high voltage/frequency discharge is triggered which lights the arc.

The purpose of this function is to make cold and precise welds on the metal plates.

Default = OFF

Regulation = OFF - ON.

##### 4. tIn. Spot pause time (LED L3) (only high frequency TIG).

Adjusts the pause time between two spot welding processes.

Range:

**OFF** = off; (manufacturer's setting).

**MIN** = 0.0 s.

**MAX** = 25.0 s.

**ACM** = Activation of MIX welding (only TIG AC)

**ACd** = Duty cycle of AC part compared to entire MIX period (only active if ACM On).

**AAd** = adjustment of amplitude of the negative half wave (active in welding with alternate current).

#### 5. **HS** (only MMA)

Percentage of hot-start current:

in order to improve electrode start-up the power source delivers an overcurrent as against the current set.

Manufacturer's setting: 50%.

**MIN** = 0 %

**MAX** = 100 %

#### 6. **tHS** (MMA only)

Duration of hot-start current.

Manufacturer's setting: 0.15%.

**MIN** = 0 s

**MAX** = 0.5 s

#### 7. **AF** (MMA only)

Percentage of arc-force current.

This is a percentage of the welding current.

This overcurrent facilitates transfer of melt metal drops.

Manufacturer's setting: 30%.

**MIN** = 0 %

**MAX** = 100 %

#### 8. **USb**

This function is used to update the machine;

To do this proceed as follows:

1. Fit a USB flash drive containing the file with extension "fwu" relating to the Cebora firmware of the welding machine to be updated into the **BS** connector.

NOTE. The USB flash drive must be formatted with file system FAT 32 and the file must be copied in the BIN folder.

2. Enter the second functions menu and select the USb function of the display screen **D1**. On the display screen **D2** "rEM" (remove) appears.

3. With the encoder **M1** set "UPd" (update) on the display screen **D2**.

4. Press key **T5** for longer than 3 seconds to start the update sequence. Wait a few minutes. At the end of the update sequence, the welding machine will be operative again.

5. Remove the flash drive.

#### 9. **FAC (Resetting of Settings)**

**ALL** resets all.

**NoP** resets all except JOBs.

**PRG** deletes all JOBs saved.

Once the desired option has been set, press key T5 for activation.

#### 3.4. WELDING WITH COVERED ELECTRODES (MMA).

- This welding machine is suitable for welding all types of electrodes which can be welded in **direct current**, with the exception of cellulosic (AWS 6010).

- Check that switch **BE** is in O position, then connect the welding cables in compliance with the polarity requested by the manufacturer of the electrodes you are going to use; connect the earth cable terminal to the workpiece as close as possible to the welding point and make sure that there is a good electric contact.

- Do not touch the torch or electrode clamp simultaneously and the mass terminal at the same time.

- Turn the machine on using the switch **BE**.

- Select MMA process, by pressing key **T1** until LED **L2** lights.

- Adjust the current according to electrode diameter, welding position and type of joint to be made.

- Always remember to shut off the machine and remove the electrode from the clamp after welding.

If you wish to adjust the Hot-start and Arc force functions, see second functions (paragraph 3.3.1).

#### 3.5. TIG WELDING.

By selecting TIG (LED **L1**) with contact start-up or HF (LED **L8** or **L9**), you can weld:

- in TIG AC welding, aluminium, brass, and magnesium

- in TIG DC welding, stainless steel, iron, and copper.

Connect the mass cable connector to the positive pole (+) of the welding machine, and the terminal to the workpiece as close as possible to the welding point, making sure there is good electrical contact.

Connect the power connector of the TIG torch to the negative pole (-) of the welding machine.

Connect the torch controlling connector to connector **BC** of the welding machine.

Connect the fitting of the torch gas hose to the **BD** machine connector and the gas hose coming from the cylinder pressure regulator to the gas fitting **BH**.

##### 3.5.1 Cooling unit (optional for Art. 369).

If you use a water cooled welding torch, use the cooling unit.

Insert the torch cooling hoses in the fittings **BI** and **BL** of the cooling unit, being careful to correctly place the delivery and return.

##### 3.5.1.1 Description of protection devices.

###### - Coolant pressure protection device.

This protection is achieved by means of a pressure switch, inserted in the fluid delivery circuit, which controls a microswitch. Low pressure is indicated by the flashing message H2O on the display **D1**.

##### 3.5.1.2 Start-up

Unscrew the cap **BF** and fill the tank (the equipment is supplied with approximately one liter of fluid).

It is important to periodically check, through the slot **BM**, that the fluid remains at the "max" level".

Insert the pressure switch connector and the power cord into the sockets **BR** and **BQ**.

Turn on the machine.

To select the operating mode of the cooling unit, proceed as follows:

1. Select the TIG Process.
2. Press at the same time keys **T7** and **T8** and hold both down until the display **D1** shows the abbreviation **H2O**.
3. Select the operation by means of knob **M1**.  
OnC = continuous operation  
OnA = automatic operation

**To exit this selection briefly press keys T7 and T8.**

If on start-up the fluid does not circulate, it is necessary to remove air from the tubes. In this case shut off the power source, connect one end of the torch hose to fitting **BL** and insert the other end into the tank.

Turn the power source on for approximately 10 to 15 seconds while checking that water exits the tube. Shut off the welding machine, connect the tube to the fitting **BI**.

**NOTE:** "Automatic operation" means that the cooling unit starts when the torch trigger is pressed and stops running approximately 2 minutes after the torch trigger is released.

**Warning!** If MMA electrode welding is selected, cooling is not on and may not be selected. It is normal for the machine display **D1** to show the flashing message H2O on start-up.

### 3.5.2 Start-up

Do not touch live electrical parts and output terminals when the machine is powered.

At first start-up, select the operation mode by means of key **T3** and the welding parameters by means of key **T8** and knob **M1** as indicated in paragraph 3.3.

The inert gas flow must be set at a value (liters per minute) approximately 6 times the electrode diameter.

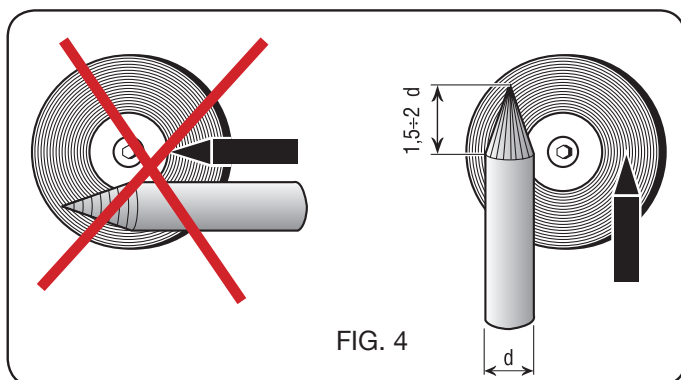
If gas-lens type accessories are used, the gas delivery can be reduced by approximately 3 times the electrode diameter.

The ceramic nozzle diameter must be between 4 and 6 times the electrode diameter.

**When you have finished welding, do not forget to shut off the machine and close the gas cylinder valve.**

### 3.5.3 Preparing the electrode

Be especially careful when preparing the electrode tip. Grind it so that it has a vertical groove as shown in the figure 4.



**WARNING:** LOOSE HOT METAL PARTS may cause personal injuries, fires and damages to the equipment; TUNGSTEN CONTAMINATION may lower the quality of the weld.

- Use only a grinder equipped with adequate safety guards

to shape the tungsten electrode and wear protections for face, hands and body.

- To shape the tungsten electrodes, use a hard, fine-grained abrasive grinding wheel used solely for this purpose.
- Grind the tungsten electrode tip in a conical form and a length 1.5 to 2 times the electrode diameter (fig. 3).

### 3.5.4 "Synergy" welding.

The purpose of "Synergy" is to give the operator a quick guidance to TIG welding parameters setting. **It is therefore not compulsory, but only a suggestion.**

"Synergic" relationships between current thickness and electrode diameter have been developed using Ceriati grey 2% electrodes (EN 26848 WC20), at an alternating current frequency of 90 Hz.

The tests were carried out with the waveform n°. 12 (square penetration - sinusoidal cleaning).

**The logic:**

The operator sets the type of material to be welded, the welding position and thickness in relation to the welding process; an electrode diameter is suggested based on these choices, and if confirmed the machine prepares for welding.

**Turn Synergy on.**

Briefly (less than 1.5 s) press key **T4**: LED **L12** (Syn) lights simultaneously with LED **L13** (material). Display **D1** shuts off and Display **D2** shows an abbreviation corresponding to the material to be welded (see description LED **L13**). Turn the knob **M1** to choose.

Pressing the key **T4** again confirms the choice of material and causes the LED **L14** to light; the display **D2** then shows the welding positions available (see description of LED **I14**).

Turn the knob **M1** to choose. Pressing key **T4** again confirms the position selected and causes LED **L15** to light; the display **D1** shows the set current, while the display **D2** shows the thickness in millimeters that corresponds to the current (see description of LED **I15**).

A further pressing of key **T4** confirms the choice of thickness and causes LED **L16** to light.

One or more electrode diameters are proposed based on the set choice of material, position, thickness and current. The recommended electrode will be proposed first and the numerical value of the diameter will always be steadily lit, next to the letter A; if the amp setting selected for welding falls within the current range of two diameters, the second choice of electrode diameter will be proposed only by turning knob **M1**. The second choice will also be displayed steadily lit. If you turn the knob further, on the display **D2** the diameter above the second choice and the diameter below the first choice will be flashing.

Given that the electrode diameter mainly defines the start current level (LED **L34**) and the minimum current (LED **L23**), the operator may choose a combination that is not recommended.

At this point the operator has two choices:

1. To exit synergy without confirming the choices made. To do this, briefly press key **T4**, the LED **L12** shuts off and the panel displays the settings in effect before you entered synergy.

2. Confirm synergy by pressing key **T4** for more than 1.5 seconds. At this point all synergy functions are set and, if selected using the key **T8**, the display **D2** shows the message “AU” (automatic).

The LED **L12** remains lit to confirm that the parameters have been set.

When the electrode is confirmed, the LED **L16** shuts off and the LED **L12** lights.

To summarize, when you confirm the electrode diameter (by holding down the button **T4** when the LED **L16** is selected) the start (LED **L37**), wave (LED **L38**), Hz (LED **L39**), balance (LED **L40**) and current (LED **L23**) functions are arranged according to the automatic logic described previously.

When the electrode is confirmed, the LED **L16** shuts off and the LED **L12** lights.

### 3.6. SAVING (JOB)

With this function the user can save in the machine the settings

chosen and call them up later on. The machine features 9 memory positions for user settings, called **JOBS**.

When the operator is working and using one of these 9 settings saved LED **L18** (JOB) is on and display **D1** briefly shows the wording **P01... P09**.

#### 3.6.1 Saving of parameters.

While in main display page (LED **L18** off) the operator can change any welding parameter.

By briefly (one or more times) pressing key **T5** the user can select the memory position chosen in a range from **P01** to **P09**. Display **D1** flashes, **D2** shows: --- and all LEDs are off to indicate that that memory position is empty. With a longer pressing of key **T5** (for over 1.5 s) the machine saves the settings in the selected position, the display stops flashing and the LEDs light to indicates the setting saved.

From position **P09** by briefly pressing key **T5** the user exits JOB mode (LED **L18** off).

#### 3.6.2 Creating a JOB.

Briefly press key **T5** until finding a position P.... empty (display **D1** flashing and display **D2** showing ---). Going from left to right use keys **T7** and **T8** and knob **M1** all welding parameters desired.

A long pressure of key **T5** saves those parameters.

#### 3.6.3 Deleting a JOB.

Briefly press key **T5** until reaching the desired position P... (display **D1** is not flashing), turn knob **M1** until the display **D2** shows the wording **DEL** and press key **T5** for over 1.5 s. Display **D1** starts flashing to indicate the JOB has been deleted.

#### 3.6.4 Modifying a JOB.

Briefly press key **T5** until reaching the desired position (display **D1** is not flashing) and use keys **T7** and **T8** and knob **M1** to modify the parameters selected. When first modifying a parameter LED **L18** starts flashing to indicate that present position setting has been modified.

At this point it is possible:

- to overwrite present position: press key **T5** till LED **L18** stops flashing.
- to save in another position: briefly press key **T5** until reaching the new position desired and press key **T5** for a long time for the new saving.
- to cancel modifications: press key **T5** ten times until returning to the preceding position. LED **L18** is not flashing.

## 4 REMOTE CONTROLS

The following remote controls may be connected to adjust the welding current for this welding machine

:

Art.1256 TIG Welding torch only START button. (water cooled).

Art.1258 TIG torch with START and UP/DOWN buttons (water-cooled).

Art. 193 Pedal control (used in TIG welding).

Art 1192+Art 187 (used in MMA welding).

Art . 1180 Connector to connect torch and pedal control at the same time. Art 193 may be used in any TIG welding mode with this accessory.

**Controls that include a potentiometer adjust the welding current from initial (LED L23) to current set by means of knob M1.**

**Controls with UP/DOWN logic control welding current from the minimum to the maximum value.**

## 5 ERROR CODES

DISPLAY	ERROR DESCRIPTION
TRG flashing	Release the torch trigger
Err 54	Short circuit on secondary circuit
Err 56	Anomalous condition while welding
Err 58	Error of alignment between the firmware versions or error during the auto-upgrade phase (repeat the upgrade procedure)
Err 61	Low supply voltage
Err 62	High supply voltage
TH 0	Output diodes overtemperature
TH 1	IGBT overtemperature
H2O flashing (followed by Err 75)	Cooling pump problem (pressure switch)
H2O nc flashing	Cooling pump problem (not connected)

In the case of an error code different from those listed please contact technical service

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## 6 MAINTENANCE

All maintenance jobs must be performed by professional personnel according to the IEC 26-29 (IEC 60974-4) standard.

### 6.1 MAINTENANCE - POWER SOURCE

In case of maintenance inside the appliance, make sure the switch **BE** is in "O" position and that the power supply cable is disconnected from the mains.

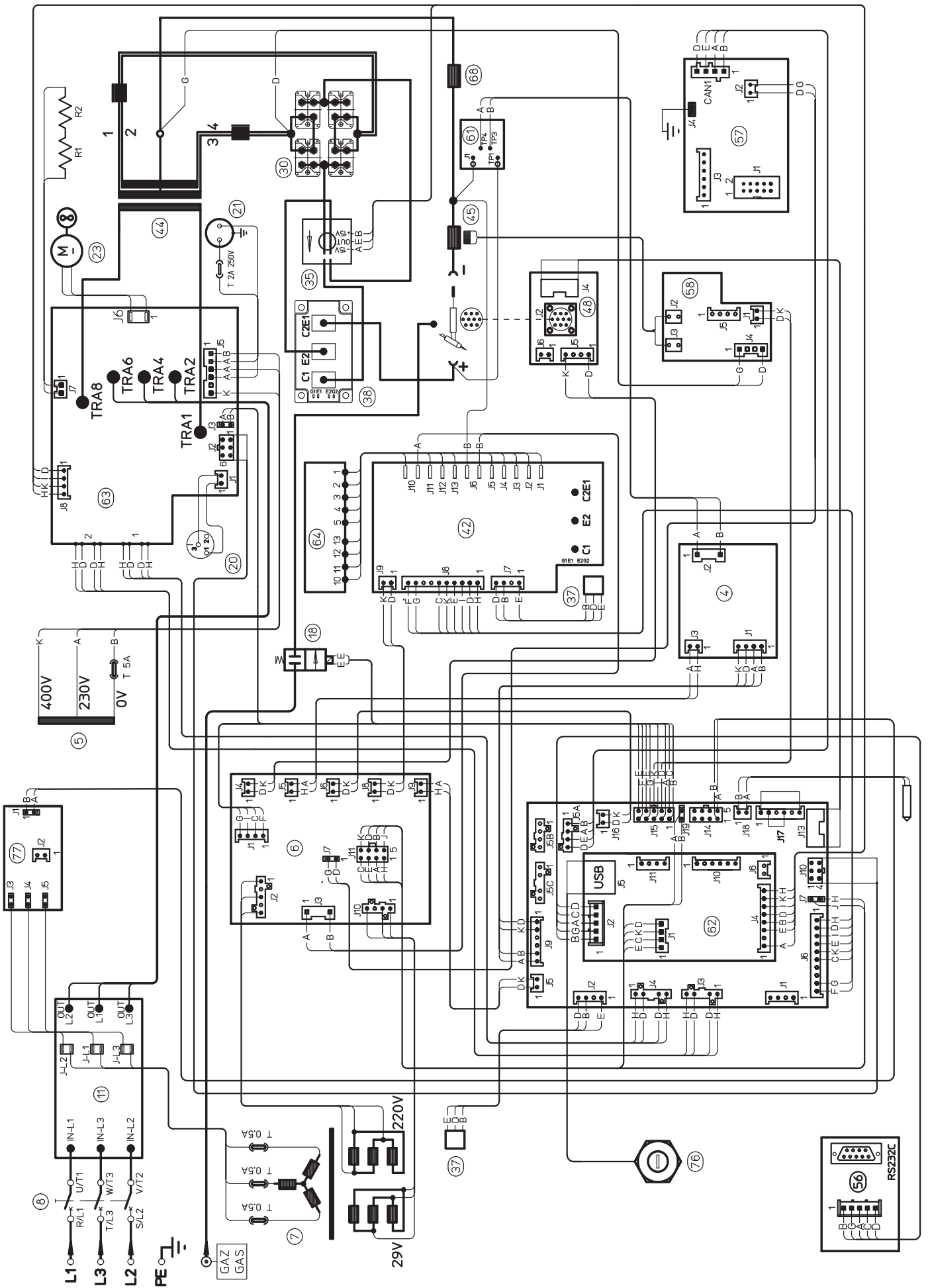
Periodically, also clean the inside of the appliance and remove any metal dust using compressed air.

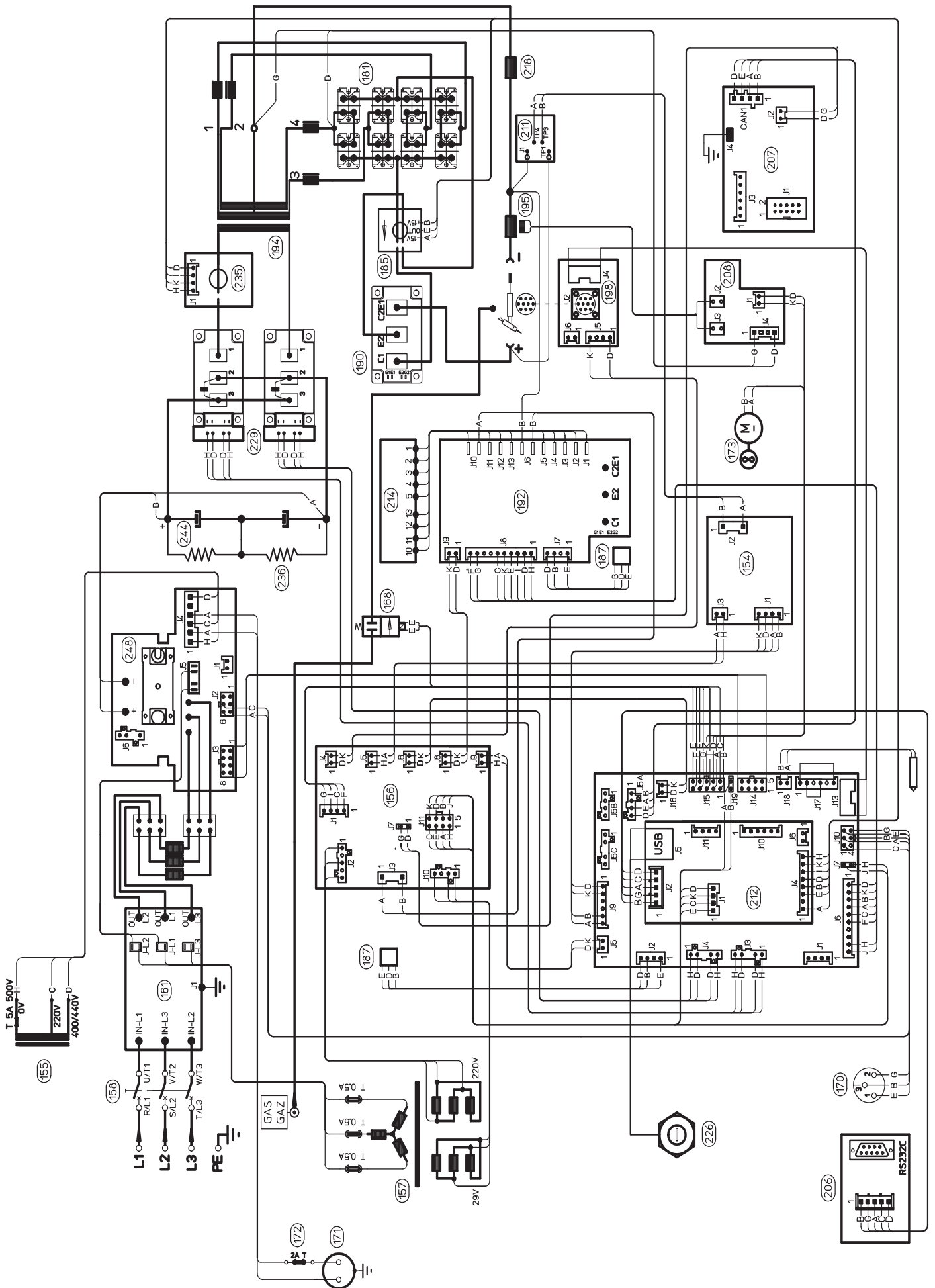
### 6.2 HOW TO PROCEED AFTER MAKING REPAIRS.

After making repairs, always ensure the wires are fully insulated between the primary side and the secondary side of the machine. Avoid the wires coming into contact with moving parts or parts that heat up during operation. Fit all the clamps back as on the original machine so as to avoid any contact between the primary and secondary side in case of accidental lead breakage or disconnection. Also fit the screws back on with the toothed washers as on the original machine.

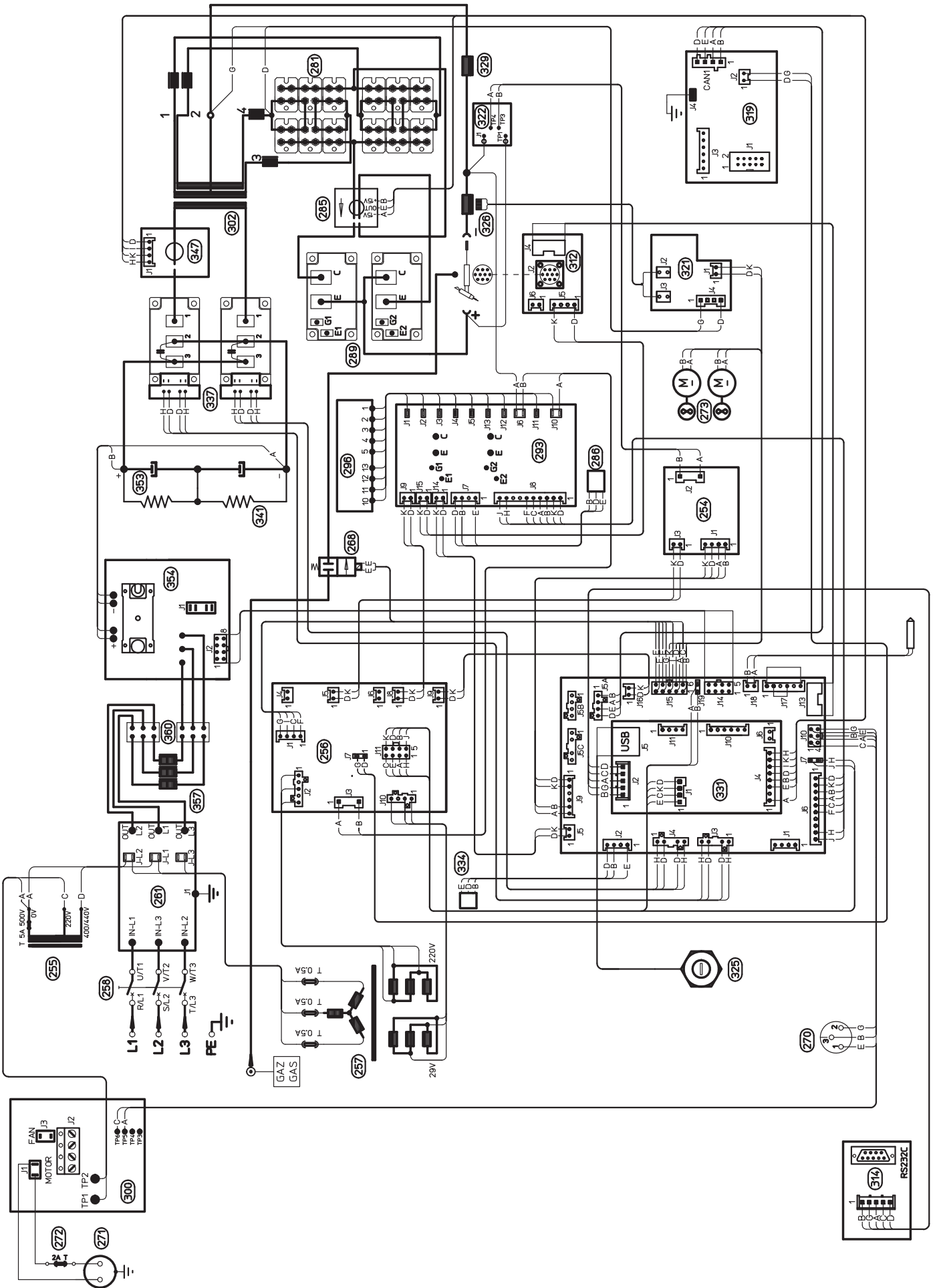
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QUESTA PARTE È DESTINATA ESCLUSIVAMENTE AL PERSONALE QUALIFICATO.  
THIS PART IS INTENDED SOLELY FOR QUALIFIED PERSONNEL.  
DIESER TEIL IST AUSSCHLIEßLICH FÜR DAS FACHPERSONAL BESTIMMT.  
CETTE PARTIE EST DESTINEE EXCLUSIVEMENT AU PERSONNEL QUALIFIE.  
ESTA PARTE ESTÁ DESTINADA EXCLUSIVAMENTE AL PERSONAL CUALIFICADO.  
ESTA PARTE È DEDICADA EXCLUSIVAMENTE AO PESSOAL QUALIFICADO.  
TÄMÄ OSA ON TARKOITETTU AINOASTAAN AMMATTITAITOISELLE HENKILÖKUNNALLE.  
DETTE AFSNIT HENVENDER SIG UDELUKKENDE TIL KVALIFICERET PERSONALE.  
DIT DEEL IS UITSLUITEND BESTEMD VOOR BEVOEGD PERSONEEL.  
DENNA DEL ÄR ENDAST AVSEDD FÖR KVALIFICERAD PERSONAL.  
ΑΥΤΟ ΤΟ ΤΜΗΜΑ ΠΡΟΟΡΙΖΕΤΑΙ ΑΠΟΚΛΕΙΣΤΙΚΑ ΓΙΑ ΤΟ ΕΙΔΙΚΕΥΜΕΝΟ ΠΡΟΣΩΠΙΚΟ.









CODIFICA COLORI CABLAGGIO ELETTRICO		WIRING DIAGRAM COLOUR CODE
A	NERO	BLACK
B	ROSSO	RED
C	GRIGIO	GREY
D	BIANCO	WHITE
E	VERDE	GREEN
F	VIOLA	PURPLE
G	GIALLO	YELLOW
H	BLU	BLUE
K	MARRONE	BROWN
J	ARANCIO	ORANGE
I	ROSA	PINK

CODIFICA COLORI CABLAGGIO ELETTRICO		WIRING DIAGRAM COLOUR CODE
L	NROSA-NERO	PINK-BLACK
M	GRIGIO-VIOLA	GREY-PURPLE
N	BIANCO-VIOLA	WHITE-PURPLE
O	BIANCO-NERO	WHITE-BLACK
P	GRIGIO-BLU	GREY-BLUE
Q	BIANCO-ROSSO	WHITE-RED
R	GRIGIO-ROSSO	GREY-RED
S	BIANCO-BLU	WHITE-BLUE
T	NERO-BLU	BLACK-BLUE
U	GIALLO-VERDE	YELLOW-GREEN
V	AZZURRO	BLUE

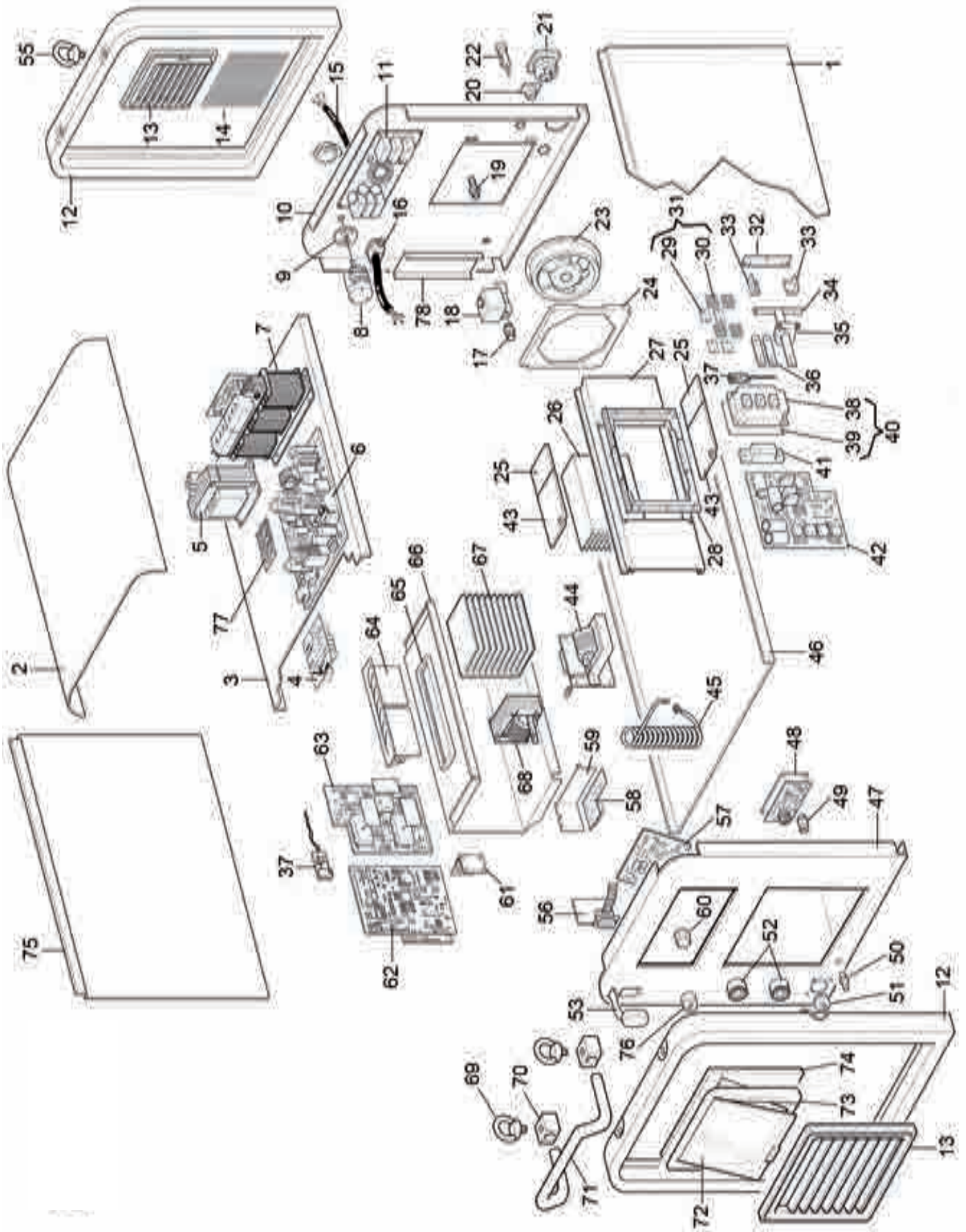
## ART. 369.00 - 369.55

POS	DESCRIZIONE	DESCRIPTION
01	LATERALE FISSO	FIXED PANEL
02	COPERCHIO	COVER
03	PIANO INTERMEDIO	INSIDE BAFFLE
04	CIRCUITO DI MISURA	MEASURE CIRCUIT
05	AUTOTRASFORMATORE	AUTOTRANSFORMER
06	CIRCUITO ALIMENTAZIONE	SUPPLY CIRCUIT
07	TRASFORMATORE DI POTENZA TRIFASE	THREE PHASE POWER TRANSFORMER
08	INTERRUTTORE	SWITCH
09	PROTEZIONE	PROTECTION
10	PANNELLO POSTERIORE	REAR PANEL
11	CIRCUITO FILTRO RETE	FILTER CIRCUIT
12	CORNICE	FRAME
13	PANNELLO ALETTATO	FINNED PANEL
14	PROTEZIONE	PROTECTION
15	CAVO RETE	POWER CORD
16	PRESSACAVO	STRAIN RELIEF
17	RACCORDO	FITTING
18	ELETTRIVALVOLA	SOLENOID VALVE
19	RACCORDO	FITTING
20	CONNESSIONE	CONNECTION
21	PRESA	SOCKET
22	PORTAFUSIBILE	FUSE HOLDER
23	MOTORE CON VENTOLA	MOTOR WITH FAN
24	SUPPORTO MOTOVENTOLA	MOTOR WITH FAN SUPPORT
25	ISOLAMENTO DISSIPATORE	RADIATOR INSULATION
26	DISSIPATORE	RADIATOR
27	SUPPORTO CENTRALE DX.	RIGH CENTRAL SUPPORT
28	CORNICE	FRAME
29	ISOLAMENTO	INSULATION
30	DIODO	DIODE
31	KIT DIODO	DIODE KIT
32	CAVALLOTTO	JUMPER
33	CAVALLOTTO	JUMPER
34	CAVALLOTTO	JUMPER
35	TRASDUTTORE	TRANSDUCER
36	CAVALLOTTO	JUMPER
37	CIRCUITO TERMOSTATO	THERMOSTAT CIRCUIT
38	I.G.B.T.	I.G.B.T.

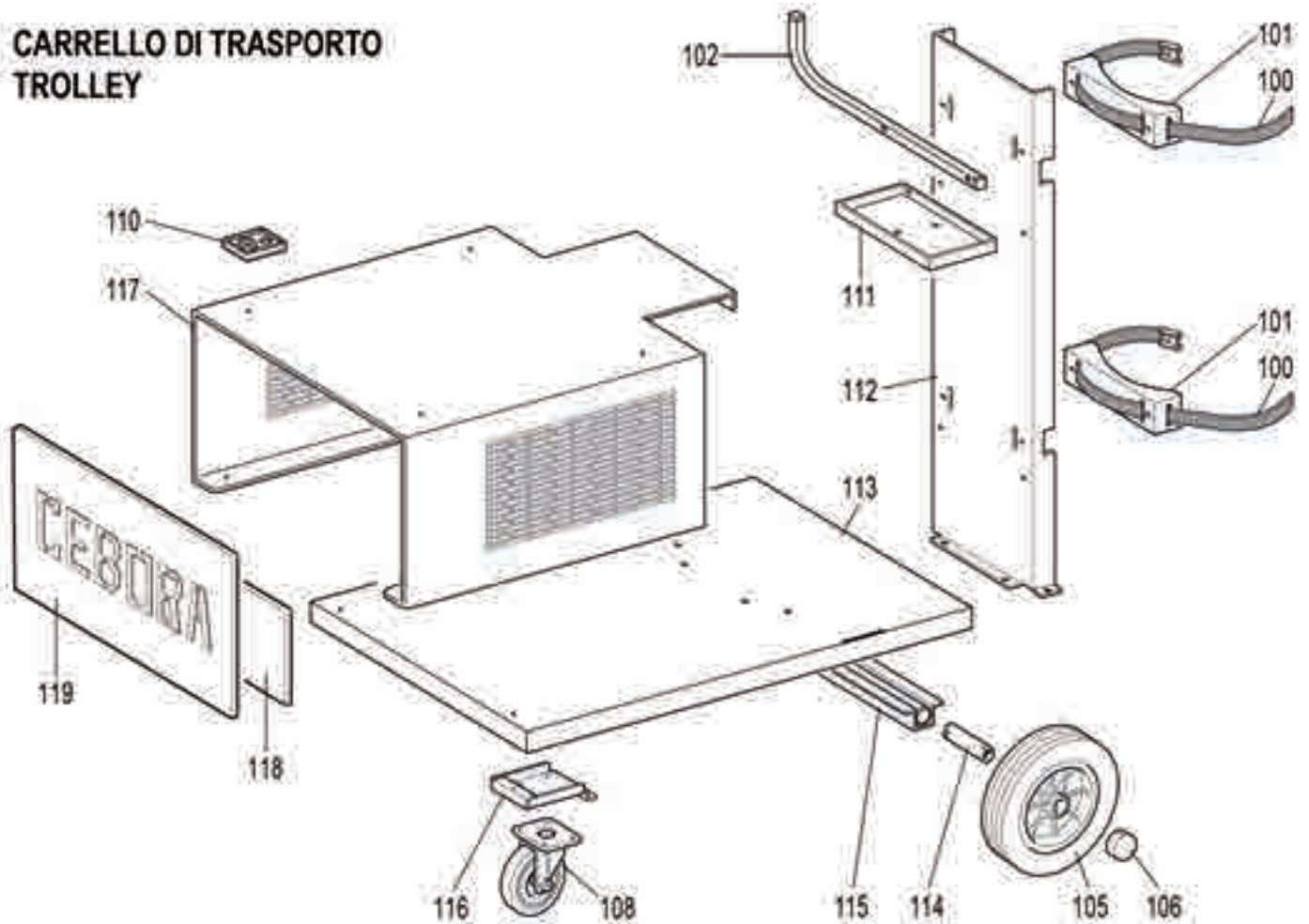
POS	DESCRIZIONE	DESCRIPTION
39	ISOLAMENTO	INSULATION
40	KIT I.G.B.T.	I.G.B.T KIT
41	SUPPORTO CAVALLOTTI	JUMPERS SUPPORT
42	CIRCUITO DRIVER	DRIVER CIRCUIT
43	ISOLAMENTO	INSULATION
44	TRASFORM. DI POTENZA	POWER TRANSFORMER
45	TRASFORMATORE HF	HF TRANSFORMER
46	FONDO	BOTTOM
47	PANNELLO ANTERIORE	FRONT PANEL
48	CIRCUITO CONNETTORE	CONNECTOR CIRCUIT
49	RACCORDO	FITTING
50	RACCORDO	FITTING
51	TAPPO	CAP
52	PRESA GIFAS	GIFAS SOCKET
53	PROTEZIONE	PROTECTION
55	GOLFARA	EYEBOLTS
56	CIRCUITO SERIALE	SERIAL CIRCUIT
57	CIRCUITO PANNELLO	PANEL CIRCUIT
58	CIRCUITO ALTA FREQUENZA	HIGH-FREQ. CIRCUIT
59	PROTEZIONE	PROTECTION
60	MANOPOLA	KNOB
61	CIRCUITO FILTRO HF	HF FILTER CIRCUIT
62	CIRCUITO DI CONTROLLO	CONTROL CIRCUIT
63	GRUPPO I.G.B.T.	IGBT UNIT
64	GRUPPO RESISTENZA	RESISTANCE UNIT
65	CORNICE	FRAME
66	SUPPORTO CENTRALE SX	LEFT CENTRAL SUPPORT
67	DISSIPATORE	RADIATOR
68	IMPEDENZA	CHOKE
69	GOLFARA	EYEBOLTS
70	SUPPORTO MANICO	HANDLE SUPPORT
71	MANICO	HANDLE
72	PANNELLO	PANEL
73	CORNICE	FRAME
74	DISTANZIALE CORNICE	FRAME SPACER
75	LATERALE SINISTRO	LEFT SIDE PANEL
76	CONNESSIONE USB	USB CONNECTION
77	CIRCUITO SENSORE RETE	SENSOR CIRCUIT
78	PANNELLO CHIUSURA	CLOSING PANEL

La richiesta di pezzi di ricambio deve indicare sempre: numero di articolo, matricola e data di acquisto della macchina, posizione e quantità del ricambio.

When ordering spare parts please always state the machine item and serial number and its purchase data, the spare part position and the quantity.



## CARRELLO DI TRASPORTO TROLLEY



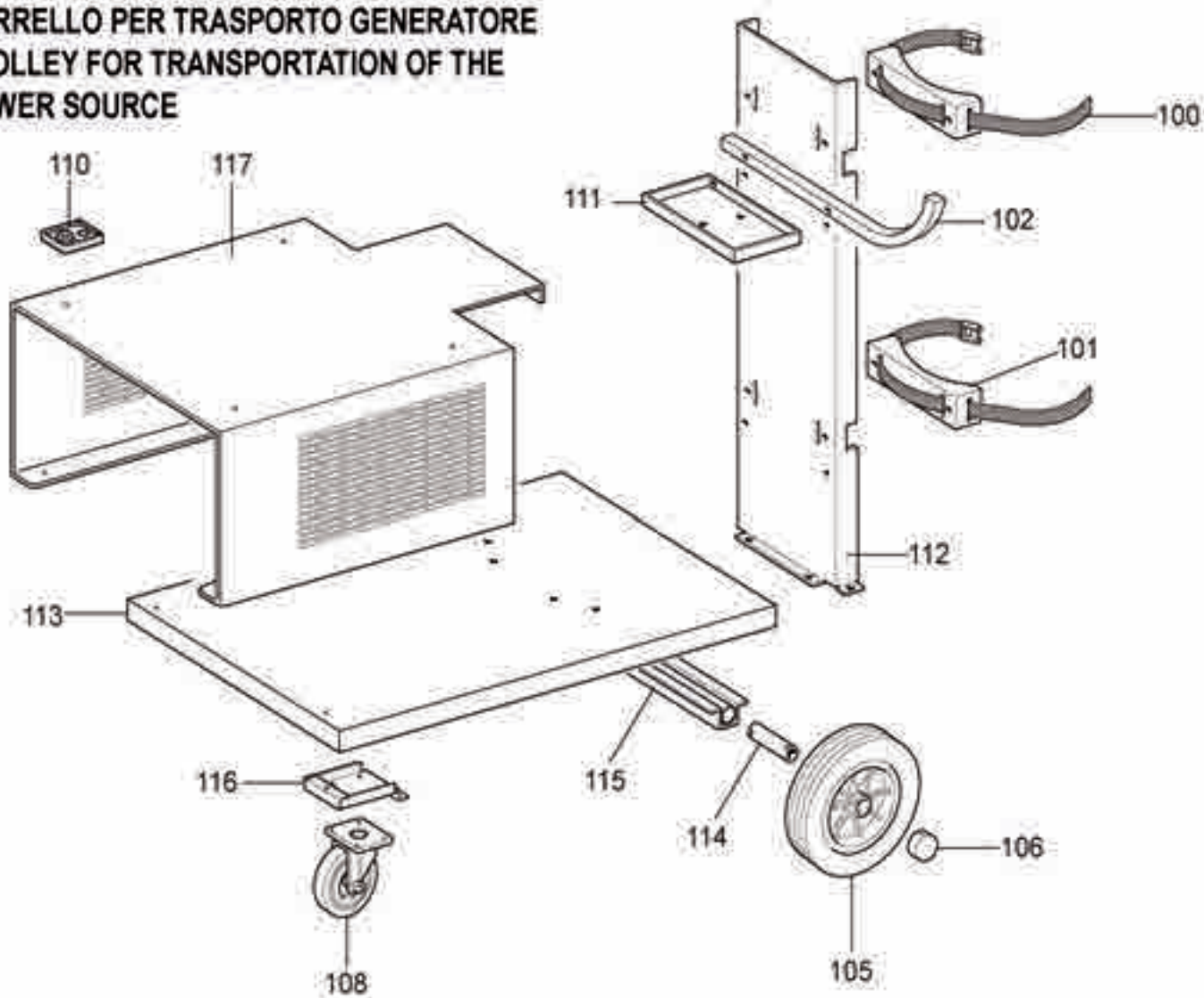
POS	DESCRIZIONE	DESCRIPTION
100	CINGHIA	BELT
101	APPOGGIO BOMBOLA	GAS CYLINDER SUPPORT
102	SUPPORTO CAVI	CABLES SUPPORT
105	RUOTA FISSA	FIXED WHEEL
106	TAPPO	CAP
108	RUOTA PIROETTANTE	SWIVELING WHEEL
110	APPOGGIO	REST
111	ATTACCO SUPP. BOMBOLA	SUPPORT CONNECTOR

POS	DESCRIZIONE	DESCRIPTION
112	SUPPORTO BOMBOLA	GAS CYLINDER SUPPORT
113	FONDO	BOTTOM
114	ASSALE	AXLE
115	SUPPORTO ASSALE	AXLE SUPPORT
116	SUPPORTO RUOTE	WHEELS SUPPORT
117	SUPPORTO GENERATORE	POWER SOURCE SUPPORT
118	PANNELLO INTERNO	INSID PANEL
119	PANNELLO CHIUSURA	CLOSING PANEL

La richiesta di pezzi di ricambio deve indicare sempre: numero di articolo, matricola e data di acquisto della macchina, posizione e quantità del ricambio.

When ordering spare parts please always state the machine item and serial number and its purchase data, the spare part position and the quantity.

## CARRELLO PER TRASPORTO GENERATORE TROLLEY FOR TRANSPORTATION OF THE POWER SOURCE



POS	DESCRIZIONE	DESCRIPTION
100	CINGHIA	BELT
101	APPOGGIO BOMBOLA	GAS CYLINDER SUPPORT
102	SUPPORTO CAVI	CABLES SUPPORT
105	RUOTA FISSA	FIXED WHEEL
106	TAPPO	CAP
108	RUOTA PIROETTANTE	SWIVELING WHEEL
110	APPOGGIO	REST

POS	DESCRIZIONE	DESCRIPTION
111	ATTACCO SUPP. BOMBOLA	SUPPORT CONNECTOR
112	SUPPORTO BOMBOLA	GAS CYLINDER SUPPORT
113	FONDO	BOTTOM
114	ASSALE	AXLE
115	SUPPORTO ASSALE	AXLE SUPPORT
116	SUPPORTO RUOTE	WHEELS SUPPORT
117	SUPPORTO GENERATORE	POWER SOURCE SUPPORT

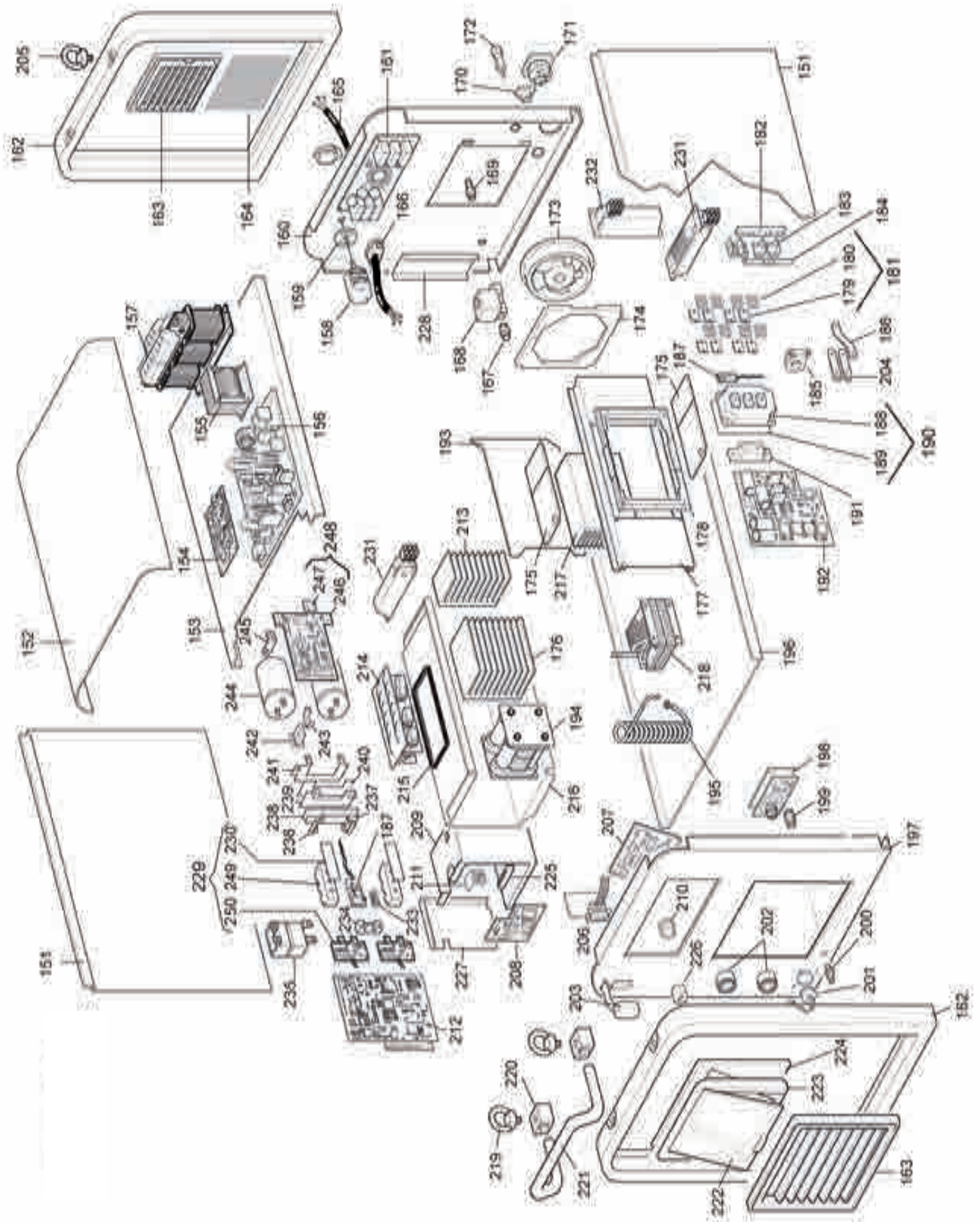
La richiesta di pezzi di ricambio deve indicare sempre: numero di articolo, matricola e data di acquisto della macchina, posizione e quantità del ricambio.

When ordering spare parts please always state the machine item and serial number and its purchase data, the spare part position and the quantity.

## ART. 370.00 - 370.55

POS	DESCRIZIONE	DESCRIPTION
151	LATERALE FISSO	FIXED PANEL
152	COPERCHIO	COVER
153	PIANO INTERMEDIO	INSIDE BAFFLE
154	CIRCUITO DI MISURA	MEASURE CIRCUIT
155	AUTOTRASFORMATORE	AUTOTRANSFORMER
156	CIRCUITO ALIMENTAZIONE	SUPPLY CIRCUIT
157	TRASFORMATORE DI POTENZA TRIFASE	THREE PHASE POWER TRANSFORMER
158	INTERRUTTORE	SWITCH
159	PROTEZIONE	PROTECTION
160	PANNELLO POSTERIORE	REAR PANEL
161	CIRCUITO FILTRO RETE	FILTER CIRCUIT
162	CORNICE	FRAME
163	PANNELLO ALETTATO	FINNED PANEL
164	PROTEZIONE	PROTECTION
165	CAVO RETE	POWER CORD
166	PRESSACAVO	STRAIN RELIEF
167	RACCORDO	FITTING
168	ELETTROVALVOLA	SOLENOID VALVE
169	RACCORDO	FITTING
170	CONNESSIONE	CONNECTION
171	PRESA	SOCKET
172	PORTAFUSIBILE	FUSE HOLDER
173	MOTORE CON VENTOLA	MOTOR WITH FAN
174	SUPPORTO MOTOVENTOLA	MOTOR WITH FAN SUPPORT
175	ISOLAMENTO DISSIPATORE	RADIATOR INSULATION
176	DISSIPATORE	RADIATOR
177	SUPPORTO CENTRALE DX.	RIGH CENTRAL SUPPORT
178	CORNICE	FRAME
179	ISOLAMENTO	INSULATION
180	DIODO	DIODE
181	KIT DIODO	DIODE KIT
182	CAVALLOTTO	JUMPER
183	CAVALLOTTO	JUMPER
184	CAVALLOTTO	JUMPER
185	TRASDUTTORE	TRANSDUCER
186	CAVALLOTTO	JUMPER
187	CIRCUITO TERMOSTATO	THERMOSTAT CIRCUIT
188	I.G.B.T.	I.G.B.T.
189	ISOLAMENTO	INSULATION
190	KIT I.G.B.T.	I.G.B.T KIT
191	SUPPORTO CAVALLOTTI	JUMPERS SUPPORT
192	CIRCUITO DRIVER	DRIVER CIRCUIT
193	CONVOGLIATORE D'ARIA	AIR CONVEYOR
194	TRASFORMATORE DI POTENZA	POWER TRANSFORMER
195	TRASFORMATORE HF	HF TRANSFORMER
196	FONDO	BOTTOM
197	PANNELLO ANTERIORE	FRONT PANEL
198	CIRCUITO CONNETTORE	CONNECTOR CIRCUIT
199	RACCORDO	FITTING
200	RACCORDO	FITTING

POS	DESCRIZIONE	DESCRIPTION
201	TAPPO	CAP
202	PRESA GIFAS	GIFAS SOCKET
203	PROTEZIONE	PROTECTION
204	CAVALLOTTO	JUMPER
205	GOLFARA	EYEBOLTS
206	CIRCUITO SERIALE	SERIAL CIRCUIT
207	CIRCUITO PANNELLO	PANEL CIRCUIT
208	CIRCUITO ALTA FREQUENZA	HIGH-FREQ. CIRCUIT
209	PROTEZIONE	PROTECTION
210	MANOPOLA	KNOB
211	CIRCUITO FILTRO HF	HF FILTER CIRCUIT
212	CIRCUITO DI CONTROLLO	CONTROL CIRCUIT
213	DISSIPATORE	RADIATOR
214	GRUPPO RESISTENZA	RESISTANCE UNIT
215	CORNICE	FRAME
216	SUPPORTO CENTRALE SX	LEFT CENTRAL SUPPORT
217	DISSIPATORE	RADIATOR
218	IMPEDENZA	CHOKES
219	GOLFARA	EYEBOLTS
220	SUPPORTO MANICO	HANDLE SUPPORT
221	MANICO	HANDLE
222	PANNELLO	PANEL
223	CORNICE	FRAME
224	DISTANZIALE CORNICE	FRAME SPACER
225	GUIDA SCHEDA H.F.	RIGHT SIDE PANEL
226	CONNESSIONE USB	USB CONNECTION
227	COPERCHIO	COVER
228	PIASTRA CHIUSURA	CLOSING PLATE
229	GRUPPO I.G.B.T.	IGBT UNIT
230	ISOLAMENTO	INSULATION
231	GRUPPO IMPEDENZA ORRIZZONTALE	HORIZONTAL CHOKES UNIT
232	GRUPPO IMPEDENZA VERTICALE	VERTICAL CHOKES UNIT
233	MOLLA	SPRING
234	SUPPORTO TERMOSTATO	THERMOSTAT SUPPORT
235	CONDENSATORE	CAPACITOR
236	RESISTENZA	RESISTANCE
237	CAVALLOTTO	JUMPER
238	ISOLAMENTO	INSULATION
239	CAVALLOTTO	JUMPER
240	ISOLAMENTO	INSULATION
241	CAVALLOTTO	JUMPER
242	CIRCUITO MISURA	MEASURE CIRCUIT
243	SUPPORTO CIRCUITO	CIRCUIT BOARD SUPPORT
244	CONDENSATORE	CAPACITOR
245	SUPPORTO CONDENSATORE	CAPACITOR SUPPORT
246	CIRCUITO PRECARICA	PRECHARGE CIRCUIT
247	ISOLAMENTO	INSULATION
248	KIT CIRCUITO PRECARICA	PRECHARGE CIRCUIT KIT
249	I.G.B.T.	I.G.B.T.
250	CIRCUITO DRIVER	DRIVER CIRCUIT



La richiesta di pezzi di ricambio deve indicare sempre: numero di articolo, matricola e data di acquisto della macchina, posizione e quantità del ricambio.

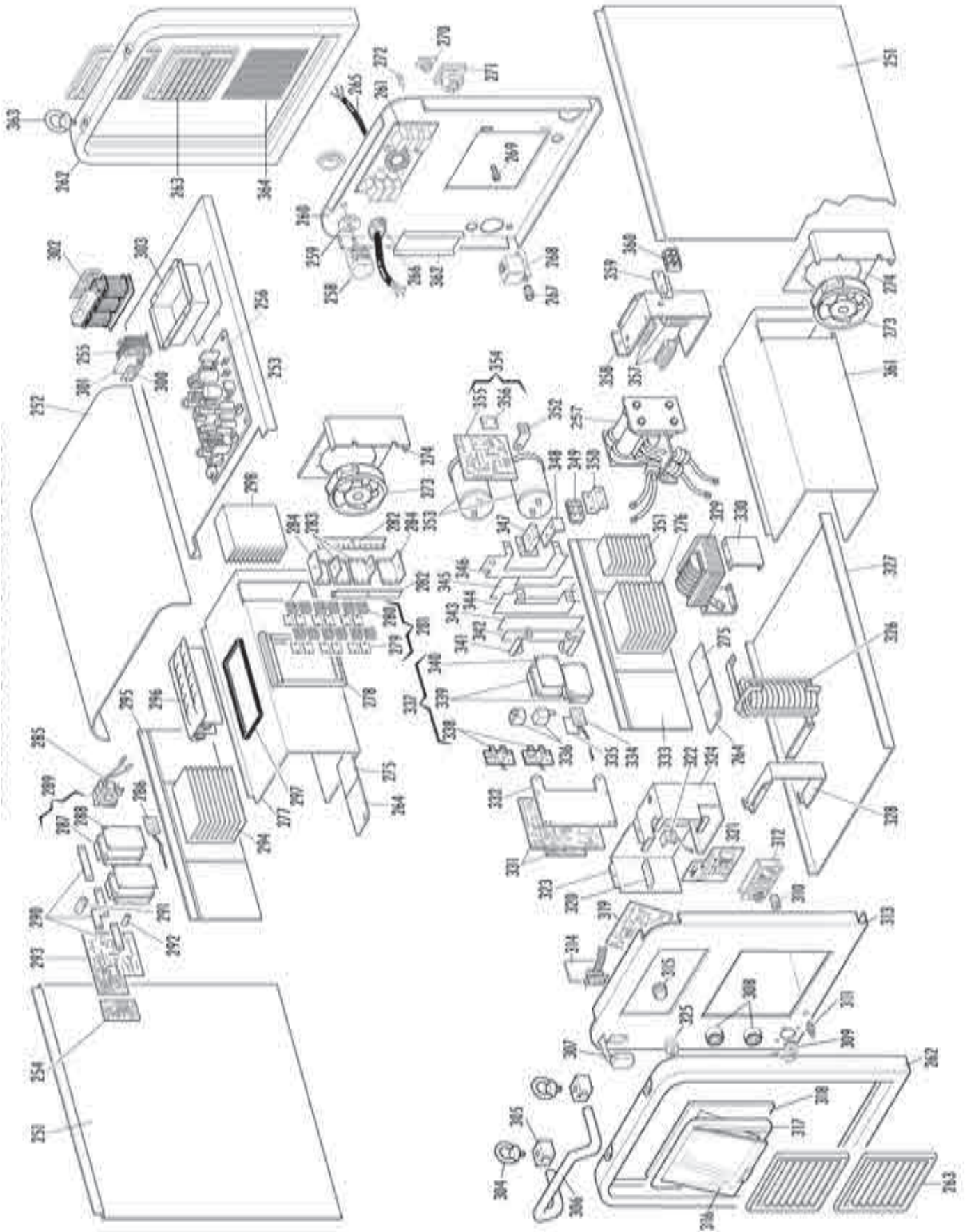
When ordering spare parts please always state the machine item and serial number and its purchase data, the spare part position and the quantity.



## ART. 371.00 - 371.55

POS	DESCRIZIONE	DESCRIPTION
251	LATERALE FISSO	FIXED PANEL
252	COPERCHIO	COVER
253	PIANO INTERMEDIO	INSIDE BAFFLE
254	CIRCUITO DI MISURA	MEASURE CIRCUIT
255	AUTOTRASFORMATORE	AUTOTRANSFORMER
256	CIRCUITO DI ALIMENTAZIONE	SUPPLY CIRCUIT
257	TRASFORMATORE DI POTENZA	POWER TRANSFORMER
258	INTERRUTTORE	SWITCH
259	PROTEZIONE	PROTECTION
260	PANNELLO POSTERIORE	REAR PANEL
261	CIRCUITO FILTRO RETE	FILTER CIRCUIT
262	CORNICE	FRAME
263	PANNELLO ALETTATO	FINNED PANEL
264	ISOLAMENTO DISSIPATORE	RADIATOR INSULATION
265	CAVO RETE	POWER CORD
266	PRESSACAVO	STRAIN RELIEF
267	RACCORDO	FITTING
268	ELETTROVALVOLA	SOLENOID VALVE
269	RACCORDO	FITTING
270	CONNESSIONE	CONNECTION
271	PRESA	SOCKET
272	PORTAFUSIBILE	FUSE HOLDER
273	MOTORE CON VENTOLA	MOTOR WITH FAN
274	SUPPORTO MOTOVENTOLA	MOTOR WITH FAN SUPPORT
275	ISOLAMENTO DISSIPATORE	RADIATOR INSULATION
276	DISSIPATORE I.G.B.T	RADIATOR
277	SUPPORTO CENTRALE	CENTRAL SUPPORT
278	CORNICE	FRAME
279	ISOLAMENTO	INSULATION
280	DIODO	DIODE
281	KIT DIODO	DIODE KIT
282	CAVALLOTTO	JUMPER
283	CAVALLOTTO INTERNO	INTERNAL JUMPER
284	CAVALLOTTO ESTERNO	EXTERNAL JUMPER
285	TRASDUTTORE	TRANSDUCER
286	CIRCUITO TERMOSTATO	THERMOSTAT CIRCUIT
287	I.G.B.T.	I.G.B.T
288	ISOLAMENTO	INSULATION.
289	KIT I.G.B.T.	I.G.B.T KIT
290	CAVALLOTTO	JUMPERS
291	DISTANZIALE	SPACER
292	DISTANZIALE	SPACER
293	CIRCUITO DRIVER	DRIVER CIRCUIT
294	DISSIPATORE	RADIATOR
295	SUPPORTO ISOLANTE	INSULATING SUPPORT
296	GRUPPO RESISTENZA	RESISTORS SUPPORT
297	CORNICE	FRAME
298	DISSIPATORE	RADIATOR
300	CIRCUITO RAFFREDDAMENTO	COOLING CIRCUIT
301	SUPPORTO CIRCUITO RAFFREDDAMENTO	COOLING CIRCUIT SUPPORT
302	TRASFORMATORE	TRANSFORMER
303	SUPPORTO TRASFORMATORE	TRANSFORMER SUPPORT
304	GOLFARA	EYEBOLTS
305	SUPPORTO MANICO	HANDLE SUPPORT
306	MANICO	HANDLE
307	PROTEZIONE	PROTECTION

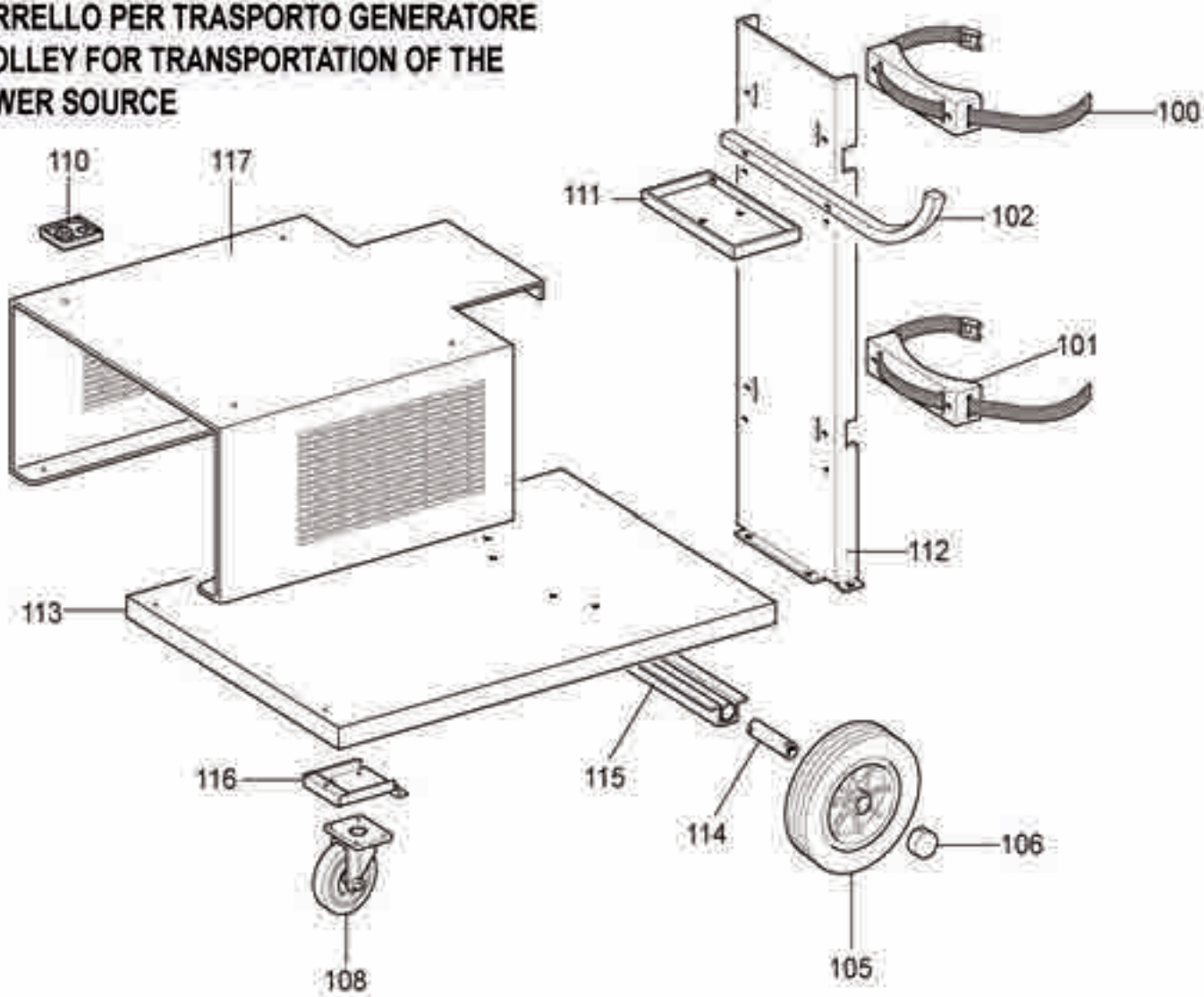
POS	DESCRIZIONE	DESCRIPTION
308	PRESA GIFAS	GIFAS SOCKET
309	TAPPO	CAP
310	RACCORDO	FITTING
311	RACCORDO	FITTING
312	CIRCUITO CONNETTORE	CONNECTOR CIRCUIT
313	PANNELLO ANTERIORE	FRONT PANEL
314	CIRCUITO SERIALE	SERIAL CIRCUIT
315	MANOPOLA	KNOB
316	PANNELLO	PANEL
317	CORNICE	FRAME
318	DISTANZIALE CORNICE	FRAME SPACER
319	CIRCUITO PANNELLO	PANEL CIRCUIT
320	GUIDA SCHEDA H.F.	CIRCUIT H.F. GUIDE
321	CIRCUITO ALTA FREQUENZA	HIGH-FREQ. CIRCUIT
322	CIRCUITO FILTRO HF	HF FILTER CIRCUIT
323	COPERCHIO	COVER
324	PROTEZIONE	PROTECTION
325	CONNESSIONE USB	USB CONNECTION
326	TRASFORMATORE HF	H.F. TRANSFORMER
327	FONDO	BOTTOM
328	SUPPORTO ANTERIORE	FRONT SUPPORT
329	IMPEDENZA SECONDARIO	SECONDARY IMPEDANCE
330	SUPPORTO IMPEDENZA	IMPEDANCE SUPPORT
331	CIRCUITO DI CONTROLLO	CONTROL CIRCUIT
332	SUPPORTO CIRCUITO	CIRCUIT BOARD SUPPORT
333	SUPPORTO ISOLANTE	INSULATING SUPPORT
334	CIRCUITO TERMOSTATO	THERMOSTAT CIRCUIT
335	ISOLAMENTO	INSULATION
336	CONDENSATORE	CAPACITOR
337	KIT DRIVER + I.G.B.T	DRIVER+IGBT KIT
338	CIRCUITO DRIVER	DRIVER CIRCUIT
339	I.G.B.T	I.G.B.T
340	ISOLAMENTO	INSULATION
341	RESISTENZA	RESISTANCE
342	CAVALLOTTO	JUMPER
343	ISOLAMENTO	INSULATION
344	CAVALLOTTO	JUMPER
345	ISOLAMENTO	INSULATION
346	CAVALLOTTO	JUMPER
347	CIRCUITO MISURA	MEASURE CIRCUIT
348	SUPPORTO CIRCUITO	CIRCUIT BOARD SUPPORT
349	MORSETTIERA	TERMINAL BOARD
350	SUPPORTO MORSETTIERA	TERMINAL BOARD SUPPORT
351	DISSIPATORE	RADIATOR
352	SUPPORTO CONDENSATORE	CAPACITOR SUPPORT
353	CONDENSATORE	CAPACITOR
354	KIT CIRCUITO PRECARICA	PRECHARGE CIRCUIT KIT
355	CIRCUITO PRECARICA	PRECHARGE CIRCUIT
356	ISOLAMENTO	INSULATION
357	IMPEDENZA PRIMARIA	PRIMARY CHOKE
358	SUPPORTO POSTERIORE	REAR SUPPORT
359	SUPPORTO MORSETTIERA	TERMINAL BOARD SUPPORT
360	MORSETTIERA	TERMINAL BOARD
361	SUPPORTO MOBILE	FLOATING PANEL
362	PANNELLO CHIUSURA	CLOSING PANEL
363	GOLFARA	EYEBOLTS
364	PROTEZIONE	PROTECTION



La richiesta di pezzi di ricambio deve indicare sempre: numero di articolo, matricola e data di acquisto della macchina, posizione e quantità del ricambio.

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## CARRELLO PER TRASPORTO GENERATORE TROLLEY FOR TRANSPORTATION OF THE POWER SOURCE

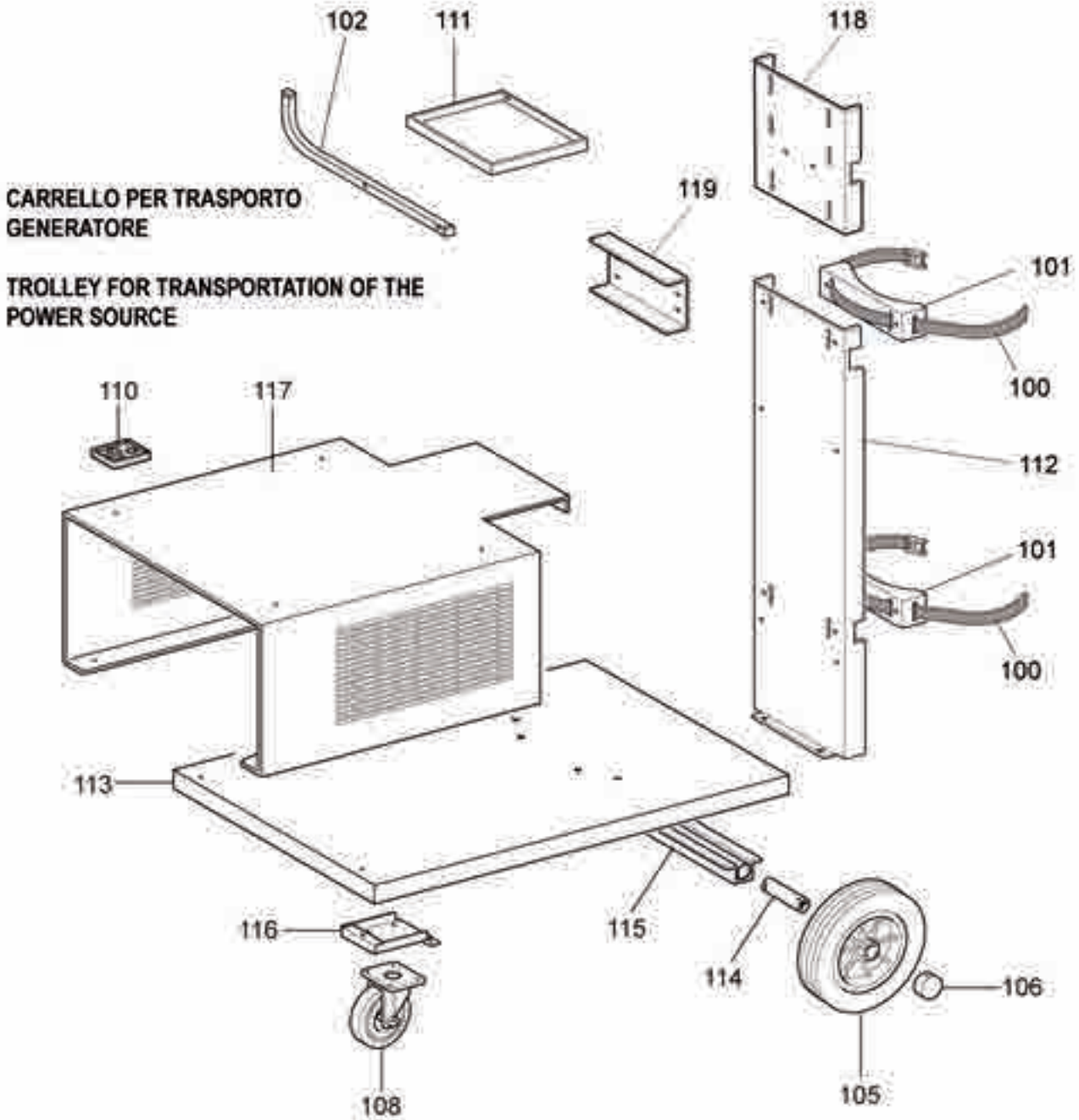


POS	DESCRIZIONE	DESCRIPTION
100	CINGHIA	BELT
101	APPOGGIO BOMBOLA	GAS CYLINDER SUPPORT
102	SUPPORTO CAVI	CABLES SUPPORT
105	RUOTA FISSA	FIXED WHEEL
106	TAPPO	CAP
108	RUOTA PIROETTANTE	SWIVELING WHEEL
110	APPOGGIO	REST

POS	DESCRIZIONE	DESCRIPTION
111	ATTACCO SUPP. BOMBOLA	SUPPORT CONNECTOR
112	SUPPORTO BOMBOLA	GAS CYLINDER SUPPORT
113	FONDO	BOTTOM
114	ASSALE	AXLE
115	SUPPORTO ASSALE	AXLE SUPPORT
116	SUPPORTO RUOTE	WHEELS SUPPORT
117	SUPPORTO GENERATORE	POWER SOURCE SUPPORT

La richiesta di pezzi di ricambio deve indicare sempre: numero di articolo, matricola e data di acquisto della macchina, posizione e quantità del ricambio.

When ordering spare parts please always state the machine item and serial number and its purchase data, the spare part position and the quantity.



POS	DESCRIZIONE	DESCRIPTION
100	CINGHIA	BELT
101	APPOGGIO BOMBOLA	GAS CYLINDER SUPPORT
102	SUPPORTO CAVI	CABLES SUPPORT
105	RUOTA FISSA	FIXED WHEEL
106	TAPPO	CAP
108	RUOTA PIROETTANTE	SWIVELING WHEEL
110	APPOGGIO	REST
111	ATTACCO SUPP. BOMBOLA	SUPPORT CONNECTOR

POS	DESCRIZIONE	DESCRIPTION
112	SUPPORTO BOMBOLA	GAS CYLINDER SUPPORT
113	FONDO	BOTTOM
114	ASSALE	AXLE
115	SUPPORTO ASSALE	AXLE SUPPORT
116	SUPPORTO RUOTE	WHEELS SUPPORT
117	SUPPORTO GENERATORE	POWER SOURCE SUPPORT
118	PROLUNGA APPOGGIO BOMBOLA	EXTENSION GAS CYLINDER SUPPORT
119	PIASTRA DI COLLEGAMENTO	PLATE CONNECTION

La richiesta di pezzi di ricambio deve indicare sempre: numero di articolo, matricola e data di acquisto della macchina, posizione e quantità del ricambio.

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