



# 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

### NOISE.

 This machine does not directly produce noise exceeding 80dB. The plasma cutting/welding procedure may produce noise levels beyond said limit; users must therefore implement all precautions required by law.

### 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 diffi-

culties 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.

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



Suitable for hazardous environments.

Note:

- 1- The machine has also been designed for use in environments with a pollution rating of 1. (See IEC 60664).
- 2- This equipment complies with IEC 61000-3-11 provided that the maximum permissible system impedance  $Z_{max}$  is less than or equal to 0,294 at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with maximum permissible system impedance  $Z_{max}$  less than or equal to 0,294.

## 2.3 DESCRIPTION OF PROTECTIVE DEVICES

### 2.3.1 Thermal protection.

This machine is protected by a temperature probe, which prevents the machine from operating if the allowable temperatures are exceeded. The thermostat tripping is signalled by the glowing abbreviation "OPn" on display **U** located on the control panel.

### 2.3.2 Block protection.

This welding machine is equipped with various protective devices that stop the machine to avoid machine damages. The tripping of each protection device is signalled by the glowing abbreviation "Err" on display **U** and by a digit shown on display **O**.

**If a water low level for the cooling unit is detected the flashing abbreviation H2O will glow on display U.**

## 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 61000-3-12 - IEC 61000-3-11 (see note 2).

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

 Single-phase static transformer-rectifier frequency converter.

 Drooping characteristic.

SMAW. Suitable for welding with covered electrodes.

TIG Suitable for TIG welding.

U0. Secondary open-circuit voltage

X. Duty cycle percentage. % of 10 minutes during which the welding machine may run at a certain current without overheating.

I2. Welding current

U2. Secondary voltage with current I2

U1. Rated supply voltage

The machine has an automatic supply voltage selector.

1~ 50/60Hz 50- or 60-Hz single-phase power supply

I1 max. This is the maximum value of the absorbed current.

I1 eff. This is the maximum value of the actual current absorbed, considering the duty cycle.

IP23S Protection rating for the housing.

## 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 to the absorbed current I1 of the machine.

### 3.1. ASSEMBLY

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 (CEI 26-23 / IEC-TS 62081)

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

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

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

BC) **Connector for TIG welding torch trigger .  
Connect torch trigger cables to pins 1 and 9.**

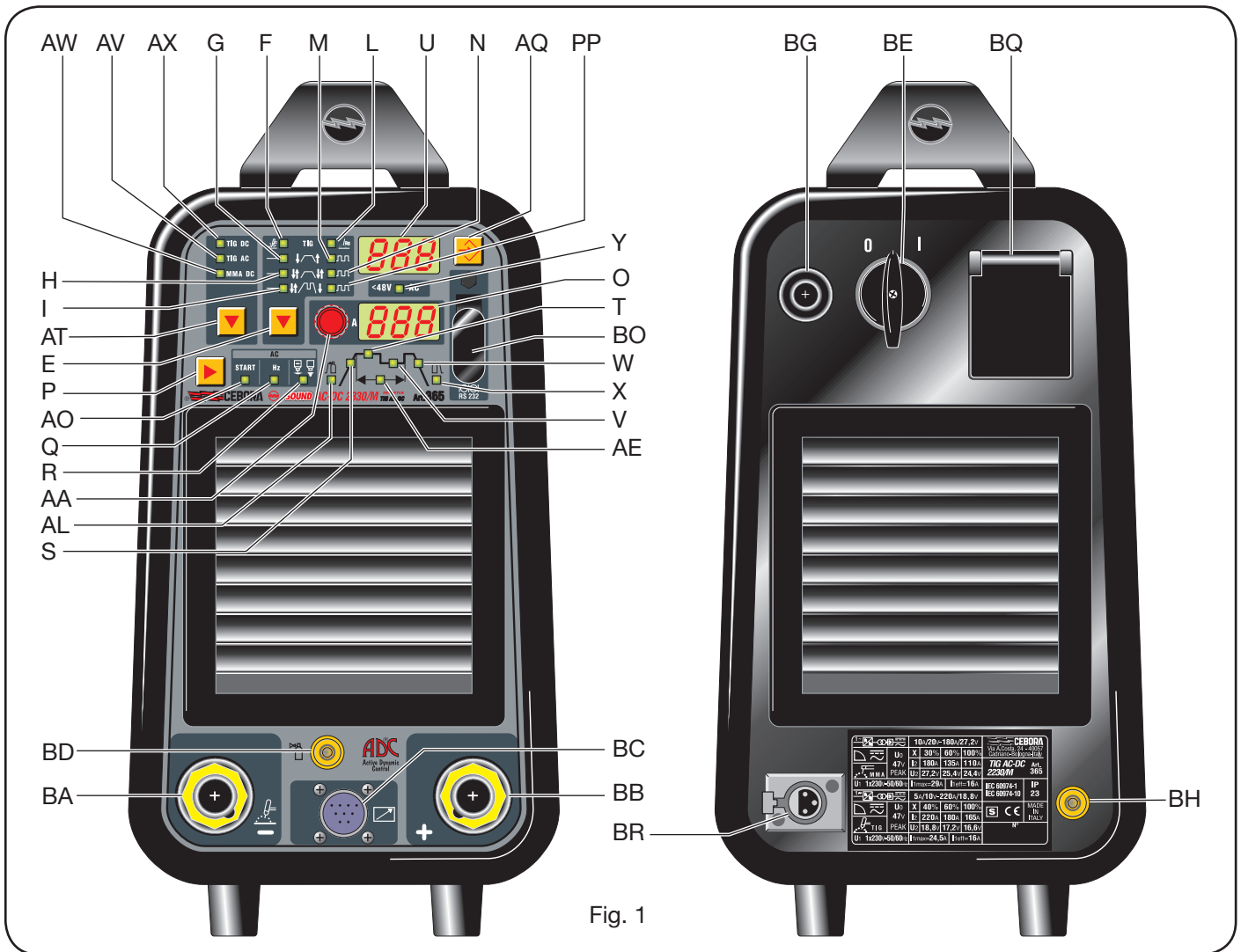


Fig. 1

- BD) **Fitting (1/4 gas)**  
Used to connect TIG welding torch gas hose .
- BE) **Main switch.**
- BG) **Power cable**
- BH) **Gas supply fitting .**
- BO) **Connector Type DB9 (RS 232).** To be used for updating the microprocessor programs.
- BQ) **Power supply socket.**
- BR) **Pressure switch socket.**

### 3.3 PANEL DESCRIPTION (fig. 1).

#### AT process key.

Selection is shown by one of the glowing LEDs **AX, AV, or AW.**

Led <b>AX</b>	Led <b>AV</b>	Led <b>AW</b>

#### Mode button E.

Selection is shown by one of the glowing LEDs **F, G, H, I, L, M, N, or PP.**

The TIG LEDs lighted will be two at any time, one showing the HF or contact start-up mode and the other showing the continuous or pulsed mode with 2 or 4 sta-

ges control. Every time this push-button is pressed a new selection is obtained. The LEDs glowing against the concerned symbols show your selection.

**TIG F - LED. TIG welding with arc start-up without high frequency.**

To light the arc press the welding torch button and with the tungsten electrode touch the workpiece and then take it up. The stroke must be firm and rapid (0.3 sec).

**L - LED. TIG welding with arc start-up with high frequency.**

Press the torch trigger and a high voltage/frequency pilot spark will light the arc.

**G - LED. TIG 2 stages continuous welding (manual).**

When the torch trigger is pressed, the current begins to increase over the previously set "slope up" time, until it reaches the value set by means of the knob AA. When the trigger is released the current starts to decrease over the previously set "slope down" time and returns to zero. In this position the pedal control accessory ART. 193 can be connected.

**H - LED. TIG 4 stages continuous 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.

### Special 4 Stages ( Automatic ).

This function can be used with:

 - 4 stages double level current

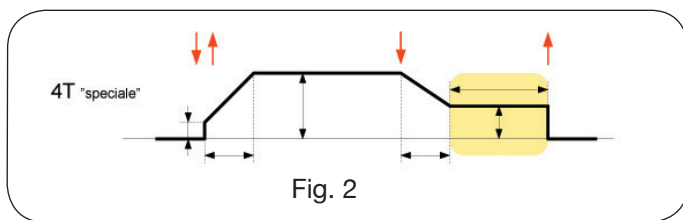
 - pulsed 4 stages

 - 4 stages double level pulsed current

It allows the crater current to be maintained (**CrC**) when the welding process is over until the welding torch trigger is pressed. In order to obtain this 4 stages the final crater filler function (**CrA**) must be ON and the crater current (**tCr**) must be 0.0.

Welding starts when the welding torch trigger is pressed and immediately released. Starting current is the current controlled by parameter **SC**, the up slope follows and the welding current is reached.

To stop welding the operator presses the welding torch trigger and keeps it held down, the machine then follows the slope down and reaches the crater current (**CrC**), this value remains active until the welding torch trigger is released Fig. ( 2 ).



 - **I - LED. 4 stages double level pulsed current (automatic).**

Before lighting the arc set the two current levels:

First level: Press button **P** until led **T** glows and then use knob **AA** to set the main power

Second level: press button **P** until led **V** glows and use knob **AA** to set the main power.

After the arc is lighted, the current begins to increase over the previously set "slope up" time (led **S** on), until it reaches the value set by means of knob **AA**. The LED **T** lights and the display **O** shows it.

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 **V** lights and the led **T** shuts off. In order to go back to the previous main current, repeat the same torch trigger pressing and releasing action, the led **T** lights while led **V** 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 decrease down to zero in the "slope down" time previously set (led **W** on).

During "slope down" phase, if you press and immediately release the torch trigger, the current goes back to the previously set lower level.

**IMPORTANT:** "PRESS AND IMMEDIATELY RELEASE" refers to a maximum 0.5 sec. time.

 - **M - LED. TIG 2 stages pulsed welding (manual).**

When the torch trigger is pressed, the current begins to increase over the previously set "slope up" time, until it reaches the value set by means of the knob **AA**. When the trigger is released the current starts to decrease over the previously set "slope down" time and returns to zero. In this position the pedal control accessory ART. 193 can be connected.

 - **N - LED. TIG-pulsed 4 stages 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.

 - **PP - LED. TIG- pulsed 4 stages double level welding (automatic).**

The welding process mode is the same as the one described for led **I**. Once the first level peak currents are set, the ratio between them will be kept in the second level as well.

 - **AA - KNOB**

Set the welding current at 10-180A in MMA and 5-220A in TIG.

Together with button **P** it is possible:

- to set the current second level **V**
- to set the "slope up" **S**
- to set the "slope down" **W**
- to set the pulse frequency **AE**
- to set post gas **X**
- to set AC welding current frequency **Q**
- to set wave balance in AC welding **R**

 - **U - Display**

Shows:

1. In MMA the open-circuit voltage and during welding the load voltage.
2. In TIG continuous, without pressing the torch trigger, the abbreviation **PL** (free program). In **TIG continuous**, when pressing the welding torch trigger, but without welding, the open-circuit voltage. In **TIG continuous** when pressing the torch trigger, but while welding, the load voltage.
3. Displays by the number all sizes, except current ones, selected by means of button **P**.
4. Displays all the abbreviations of the **service functions menu**.
5. Abbreviation "**OPn**" flashing when the thermostat is on.
6. During the selection of free or saved programs abbreviations **PL...P01...P09**.

 - **O - Display**

Shows:

- 1 in open-circuit mode the reset current
2. In load conditions, the welding current and its levels.
3. In TIG-pulsed, load mode, the currents changing from one level to the other.

4. Shows all sizes and the value of the second functions menu.



#### AQ - SELECTOR SWITCH

Selects and saves programs.

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

#### Selection

If this button is briefly pressed the display **U** 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.

#### Saving (see par.3.6)

Once the program has been selected, if the button is pressed for more than 3 seconds, data are saved.

As confirmation, the program number on the display **U** will stop flashing.



#### P - SELECTOR SWITCH

When this button is pressed, the LEDs light in succession:

Important! only those LEDs that refer to the chosen welding mode will light; i.e. in TIG-continuous led **Q** that represents the pulse frequency will not glow.

Each led shows the parameter that can be set by means of knob **AA** during the time when the led is glowing. 5 seconds after the last change the concerned led shuts off and the main welding current is shown and the corresponding led **T** glows.

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



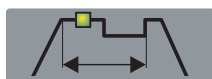
#### AL- Pre-gas Led

Setting 0.05 to 2.5 seconds. Gas delivery time before welding starts.



#### S - Led Slope up.

This is the time in which the current, beginning from the minimum, reaches the set current value. (0-10 sec.).



#### T - Main welding current Led.



#### V - Basic or second level welding current Led.

This current is always a percentage of the main current.



#### AE - Pulsed frequency led (0.16-500 Hz).



#### W - Slope down Led.

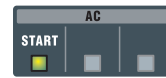
This is the time in which the current reaches the minimum value and the arc shuts down (0-10 sec.).



#### X - Post-gas Led.

Sets gas output time when welding is over. (0-30 sec.).

#### LEDS THAT MAY BE SELECTED ONLY IN TIG AC (ALTERNATING CURRENT) WELDING MODE:



#### AO Start led

Sets the "hot start" level to maximize TIC AC ignitions for each electrode diameter. When this led lights the display **O** will display a digital value referred to the electrode diameters and the operator may use the knob **AA** to set the diameter being used and obtain a good start immediately. Range from 0.5 to 4.0.



#### Hz Q led

Sets the frequency of the alternating current. Range from 50 to 150 Hz.



#### Led R - Wave balance setting

Sets the percentage of the negative semi-wave **PEn** (penetration) by means of knob **AA**; the value may change from 1 to 10.

Sets the percentage of the positive semi-wave **CLn** (cleaning) by means of knob **AA**; the value may change from 1 to 10. The recommended setting value is 0.



#### Y Led.

Led that shows the correct operation of the device which reduces risks of electric shock.



#### BC - 10-pin connector

Remote controls described in paragraph 5 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).

#### 3.3. GENERAL NOTES

Before using this welding machine read carefully CEI 26-23 / IEC-TS 62081 standards and check integrity of cable isolation, electrode clamp, sockets and plugs and that the section and length of welding cables conform to the used power.



#### 3.4. MMA WELDING WITH COVERED ELECTRODES

- This welding machine is suitable for welding all types of electrodes, 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.
- Turn the machine on using the switch **BE**.
- Select MMA process, by pressing button **AT**, led **AW** is on.
- Adjust the current according to the 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.

### 3.5. TIG WELDING

If the TIG AC  is selected you can weld aluminium, aluminium alloys, brass and magnesium; if the TIG DC  mode is selected you can weld 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 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. 1341).

If you use a water cooled welding torch, use the cooling unit. Insert the torch cooling hoses into the fittings of the cooling unit, being careful to correctly place the delivery and return.

##### 3.5.1.1 Description of protections.

###### - Coolant pressure protective device.

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

##### 3.5.1.2 Instructions


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

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

As a coolant, use water (preferably deionised) mixed with alcohol in percentages defined according to the following table:

temperature	Water/alcohol
-0°C up to -5°C	4L/1L
-5°C up to -10°C	3.8L/1.2L

If the pump turns with no coolant present, you must remove all air from the tubes.

In this case shut off the power source, fill the tank, connect one hose to fitting  and insert the hose end into the tank.

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

- Turn the power source on for approximately 10 to 15 seconds and the **N** connect the hoses again.

Turn on the machine.

See chapter "SERVICE FUNCTIONS MENU" to select the cooling unit operation mode.

#### 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 button **E** and the welding parameters by means of **P** button and knob **AA**.

**Warning!** Settings for LEDs **AO** = start, **Q** = Hz, **R** = wave balance can be selected in TIG AC mode only.

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 must 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.

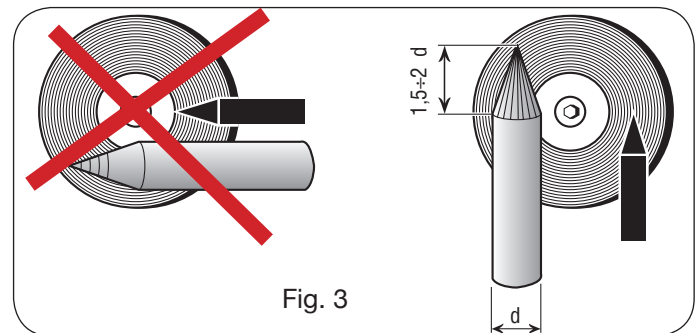
Be especially careful when preparing the electrode tip.

**WARNING:** LOOSE HOT METAL PARTS may cause personal injuries, fires and damage 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).



### 3.6. SAVING

**A long or short pressure of button AQ is used for programs to be saved, their restoring and saving.**

**Short pressure to select, long pressure to save.**

**Programs to be saved (memories) are displayed by display U: flashing are free, non flashing contain already stored data.**

#### 3.6.1. Saving data from the PL program

##### When using the machine the first time

Work programs and memories (P01... etc.) are always displayed by display **U**, their selection is obtained by a short pressure of button **AQ**.

Once all the parameters to be saved are decided, press shortly button **AQ**, the display **U** will show the flashing abbreviation **P01** and display **O** will show three lines (---); hold down the button **AQ** for more than 3 seconds, until

the symbol **P01** stops flashing and a sound will signal that data have been stored.

If a different program must be selected, hold down button **AQ** until the number of the selected program is displayed on display **U**.

### 3.6.2. Saving from a free program

The operator can change and save the selected program using the following procedure:

Hold down button **AQ** shortly and select the number of the selected program.

**Do not touch live parts and output terminals while the machine is powered.**

Hold down button **AT** and select the welding process and by means of the button **E** select the mode.

Turn knob **AA** and set the welding current.

If TIG process is selected, activate led **X** (post gas) by means of button **P** and set by means of knob **AA** the selected value.

After these settings **that are required for saving**, if you wish to set the "slope" times or other times, follow the procedure given in the corresponding paragraph.

To save the previously selected program hold down button **AQ** for more than 3 seconds, until the program number stops flashing.

### 3.6.3 Saving from a saved program.

**Beginning with a previously saved program**, the operator may modify the data in memory to update the program itself, or to find new parameters to be saved in another program.

#### 3.6.3.1 Up-dating

Once the machine is started, select the parameters to be modified and modify them: the abbreviation of the selected program will then change from steady to flashing.

Hold down for more than 3 seconds button **AQ**, display **O** will show abbreviation **Sto**.

Hold down button **AQ** for more than 3 seconds, until the program abbreviation **P01** stops flashing and a sound signals that data have been stored.

#### 3.6.3.2 Saving from a new program.

Once the machine is started, select the parameters to be modified and modify them.

Press shortly button **AQ** until the selected program is displayed.

Hold down button **AQ** for more than 3 seconds until the saving is confirmed (program abbreviation changes from flashing to steady).

#### 3.6.4 Deleting a saved program

Select the program (memory) to be deleted, hold down for more than 3 seconds button **AQ** and display **O** will show abbreviation **Sto**, turn knob **AA** until abbreviation **dEL** is displayed, hold down button **AQ** for more than 3 seconds and the program abbreviation will start flashing

## 4 SERVICE FUNCTIONS MENU

To enter this submenu press the button and, while holding it down, press shortly button **AQ**

To exit repeat the procedure described above.

The service functions selection is obtained by holding down shortly button **AQ**.

Changing the functions selected with button **AQ** is obtained by means of knob **AA**.

**Functions visible in TIG Process only.**

### 4.1.COOLING UNIT MANAGEMENT

Display **U** shows abbreviation H2O and display **O** shows abbreviation OFF (default).

Turn knob **AA** to select the type of operation:

- OFF = off.

- ON = always on

- On A = automatic start-up .

In automatic operation, at the machine start-up the cooling unit goes on for 30 seconds and then shuts off.

When the torch trigger is pressed the cooling unit starts operating and shuts off 3 minutes after the torch trigger is released. If the coolant pressure is too low, the power source delivers no current and display **U** will flash the message H2O.

### 4.2 SP SPOT- AND STITCH WELDING

Is activated in two stages welding (led **G**) or 4 stages (led **H.**) when the high frequency start-up is selected (led **L**).

Select abbreviation **SP** (spot) on display **U** by means of button **AQ**, display **O** shows abbreviation **OFF**, by means of knob **AA** set ON to activate the function.

Press shortly button **AQ** to select abbreviation **tSP**.

#### 4.2.1 tSP ( Spot time)

Display **U** shows the abbreviation SP, display **O** shows 1 sec. time, by means of knob **AA** set the desired time, range from 0.1 to 25 seconds.

If you want to set **jog** (welding with automatic interval) press shortly button **AQ** and select abbreviation tin.

#### 4.2.2 tin (interval time)

Display **O** will show abbreviation **OFF**.

Turn knob **AA** to select the interval time (range from 0,1 to 25 sec.).

### 4.3 PDU-(DUTY CYCLE PULSED active in pulsed mode only).

This is the duration of the highest selected current in pulsed mode.

It is expressed as a percentage of the time against the Fdp frequency (default 50%)

Range: minimum 10% maximum 90%.

#### 4.4 SC (START-UP CURRENT).

Always active in all TIG processes.  
Start current level where the welding process begins.  
Especially used for AC starts-up with big electrodes and slope up.  
Sets the pedal minimum level - Art. 193  
Default 25%.  
Range: minimum 1% - maximum 100%

#### 4.5- CRA (FINAL CRATER FILLER).

Select abbreviation **CrA** on display **U** by means of button **AQ**, display **O** shows abbreviation **OFF** by means of knob **AA** set ON to activate the function.  
Press shortly button **AQ** to select abbreviation **CrC**.

##### 4.5.1 CrC (Carter current)

This current is a percentage of the welding current and the process final current.  
Default 50%  
Range:  
minimum 10%  
maximum 100%

##### 4.5.2 tCr (Carter current time)

Crater current time duration.  
Default 0.5 sec.  
Range:  
minimum 0.0 sec.  
maximum 30 sec.

Functions visible in MMA process only.

#### 4.6 HS (PERCENTAGE OF HOT-START CURRENT)

It is an overvoltage used to improve start-up.  
Default 50%  
Range:  
minimum 0%  
maximum 100%

#### 4.7T HS (DURATION OF HOT-START CURRENT)

Default 0.15 sec.  
Range:  
minimum 0 sec.  
maximum 0.5 sec.

#### 4.8 AF (PERCENTAGE OF ARC-FORCE CURRENT)

It is a current that allows the electrode transfer.  
Default 30%  
Range:  
minimum 0%  
maximum 100%

## 5 REMOTE CONTROLS AND ACCESSORIES

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

Art. 193	Pedal control (used in TIG welding)
Art. 1260	BINZEL "ABITIG 200" Torch (200A-35%) m.4
Art. 1262	BINZEL "ABITIG 200" Torch Up/Down (200A - 35%) - m. 4
Art. 1256	Water cooled torch BINZEL "ABITIG 450 W" (450A) - m. 4
Art. 1258	Water cooled BINZEL torch "ABITIG 450 W Up/Down" (450A) - m. 4
Art. 1656	Power source carriage
Art. 1281.03	Accessory for electrode welding
Art. 1341	Cooling unit
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 the minimum to the maximum current setting by means of knob AA.**

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

## 6 MAINTENANCE

Any maintenance operation must be carried out by qualified personnel in compliance with standard CEI 26-29 (IEC 60974-4).

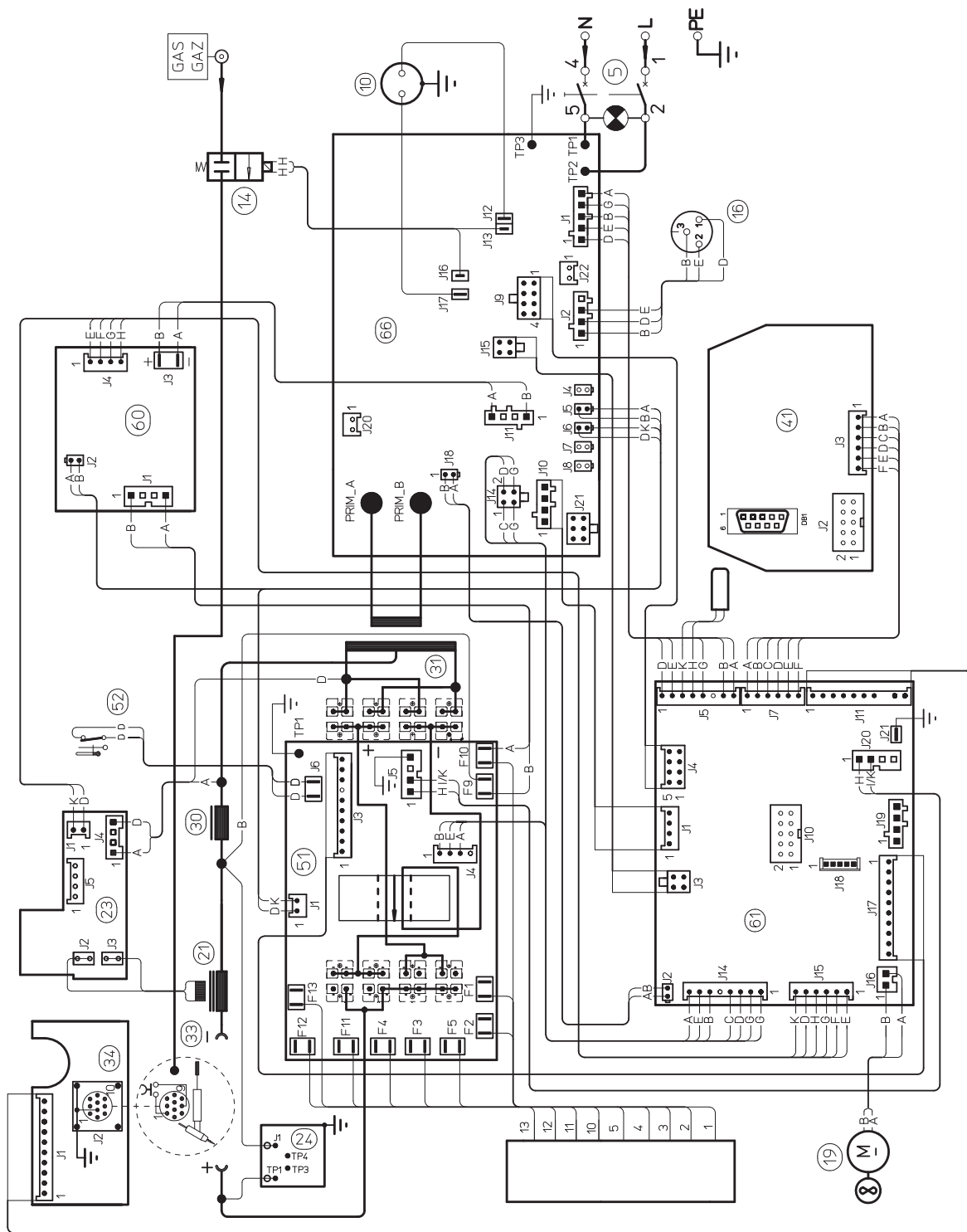
### 6.1 GENERATOR MAINTENANCE

In the case of maintenance inside the machine, make sure that the switch **BE** is in position "O" and that the power cord is disconnected from the mains.  
It is also necessary to periodically clean the interior of the machine from the accumulated metal dust, using compressed air.

### 6.2 PRECAUTIONS AFTER REPAIRS.

After making repairs, take care to organize the wiring so that there is secure insulation between the primary and secondary sides of the machine. Do not allow the wires to come into contact with moving parts or those that heat up during operation. Reassemble all clamps as they were on the original machine, to prevent a connection from occurring between the primary and secondary circuits should a wire accidentally break or be disconnected.  
Also mount the screws with geared washers as on the original machine.





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	

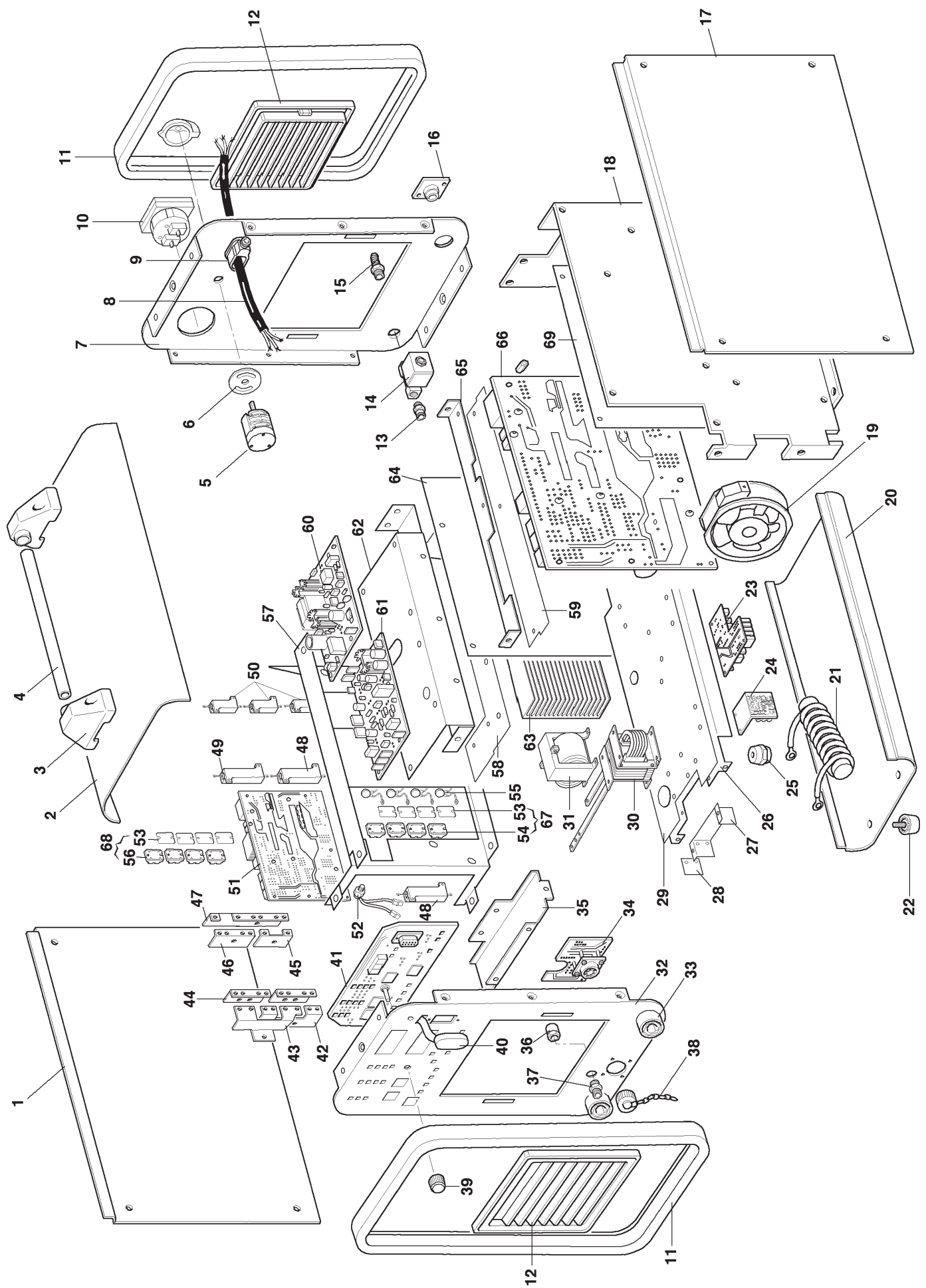
CODIFICA COLORI CABLAGGIO ELETTRICO		WIRING DIAGRAM COLOUR CODE	
L	NROSA-NERO	PINK-BLACK	
M	GRIGIO-VIOLA	GREY-PURPLE	
N	BIANCO-VIOLA	WHITE-PURPLE	
O	BIANCO-NERO	WHITE-BLACK	
P	GRIGIO-BLU	GREY-BLUE	
Q	BIANCO-ROSSO	WHITE-RED	
R	GRIGIO-ROSSO	GREY-RED	
S	BIANCO-BLU	WHITE-BLUE	
T	NERO-BLU	BLACK-BLUE	
U	GIALLO-VERDE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

POS	DESCRIZIONE	DESCRIPTION
01	LATERALE SINISTRO	LEFT SIDE PANEL
02	COPERCHIO	COVER
03	SUPPORTO MANICO	HANDLE SUPPORT
04	MANICO	HANDLE
05	INTERRUTTORE	SWITCH
06	PROTEZIONE	PROTECTION
07	PANNELLO POSTERIORE	BACK PANEL
08	CAVO RETE	POWER CORD
09	PASSACAPO	CABLE OUTLET
10	PRESA	SOCKET
11	CORNICE	FRAME
12	PANNELLO ALETTATO	FINNED PANEL
13	RACCORDO	FITTING
14	ELETTROVALVOLA	SOLENOID VALVE
15	RACCORDO	FITTING
16	CONNESSIONE	CONNECTION
17	LATERALE DESTRO	RIGHT SIDE PANEL
18	SUPPORTO	SUPPORT
19	MOTORE CON VENTOLA	MOTOR WITH FAN
20	FONDO	BOTTOM
21	TRASFORMATORE H.F.	H.F. TRANSFORMER
22	PIEDE IN GOMMA	RUBBER FOOT
23	CIRCUITO ALTA FREQUENZA	HIGH-FREQ. CIRCUIT
24	CIRCUITO FILTRO	FILTER CIRCUIT
25	SUPPORTO	SUPPORT
26	PIANO INTERMEDIO	INSIDE BAFFLE
27	PROTEZIONE	PROTECTION
28	ISOLAMENTO	INSULATION
29	ISOLAMENTO	INSULATION
30	IMPEDENZA	CHOKER
31	TRASFORMATORE POTENZA	POWER TRANSFORMER
32	PANNELLO ANTERIORE	FRONT PANEL
33	SPINA	PLUG
34	CIRCUITO CONNETTORE	CONNECTOR CIRCUIT
35	PIANO SUPERIORE	SUPERIOR BAFFLE

POS	DESCRIZIONE	DESCRIPTION
36	RACCORDO	FITTING
37	RACCORDO	FITTING
38	TAPPO	CAP
39	MANOPOLA	KNOB
40	PROTEZIONE	PROTECTION
41	CIRCUITO PANNELLO	PANEL CIRCUIT
42	CAVALLOTTO	JUMPER
43	CAVALLOTTO	JUMPER
44	CAVALLOTTO	JUMPER
45	CAVALLOTTO IGBT	IGBT JUMPER
46	CAVALLOTTO PANNELLO	PANEL JUMPER
47	CAVALLOTTO IGBT	IGBT JUMPER
48	RESISTENZA	RESISTANCE
49	RESISTENZA	RESISTANCE
50	RESISTENZA	RESISTANCE
51	CIRCUITO AC-DC	AC-DC CIRCUIT
52	TERMOSTATO	THERMOSTAT
53	ISOLAMENTO	INSULATION
54	DIODO	DIODE
55	SOPPRESSORE	SUPPRESSOR
56	IGBT	IGBT
57	SUPPORTO DISSIPATORE	RADIATOR SUPPORT
58	ISOLAMENTO	INSULATION
59	ISOLAMENTO	INSULATION
60	CIRCUITO FLY BACK	FLY BACK CIRCUIT
61	CIRCUITO DI CONTROLLO	CONTROL CIRCUIT
62	PIANO SUPERIORE	SUPERIOR BAFFLE
63	DISSIPATORE	RADIATOR
64	ISOLAMENTO	INSULATION
65	PIANO SUPERIORE	SUPERIOR BAFFLE
66	CIRCUITO DI POTENZA	POWER CIRCUIT
67	KIT DIODI CON ISOLAMENTO	DIODES WITH INSULATION KIT
68	IGBT CON ISOLAMENTO	IGBT WITH INSULATION KIT
69	ISOLAMENTO	INSULATION

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.





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