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 SHOCK - May be fatal.
- Install and earth the welding machine according to the applicable regulations.
- Do not touch live electrical parts or electrodes with bare skin, gloves or wet clothing.
- Isolate yourselves from both the earth and the workpiece.
- Make sure your working position is safe.

FUMES AND GASES - May be hazardous to your health.
- Keep your head away from fumes.
- Work in the presence of adequate ventilation, and use ventilators around the arc to prevent gases from forming in the work area.

ARC RAYS - May injure the eyes and burn the skin.
- Protect your eyes with welding masks fitted with filtered lenses, and protect your body with appropriate safety garments.
- Protect others by installing adequate shields or curtains.

RISK OF FIRE AND BURNS
- Sparks (sprays) may cause fires and burn the skin; you should therefore make sure there are no flammable materials in the area, and wear appropriate protective garments.

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.

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

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 harmonized standard EN50199, 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.

IN CASE OF MALFUNCTIONS, REQUEST ASSISTANCE FROM QUALIFIED PERSONNEL.

2 GENERAL DESCRIPTIONS

2.1 SPECIFICATIONS
By selecting TIG AC welding mode you may weld aluminium, aluminium alloys, brass and magnesium, while selecting TIG DC allows you to weld stainless steel, iron and copper.
This welding machine is a direct and alternating current power source built using INVERTER technology, designed to weld covered electrodes (not including cellulosic) and for TIG procedures, with contact starting and high frequency

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

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

- Single-phase static transformer-rectifier frequency converter.
- Downslope.
- Suitable for TIG/MMA welding.

U0. Secondary open-circuit voltage (peak value)
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
I1. Absorbed current at the corresponding current I2.
IP23 Protection grade of the housing, approving the equipment as suitable for use outdoors in the rain.

NOTES: The welding machine has also been designed for use in environments with a pollution rating of 3. (See IEC 664).

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. Under these conditions the fan keeps running and the LED J lights.

2.3.2 Block protections
This welding machine is equipped with various safety devices that stop the machine before it can suffer damage. In the event of a malfunction, the letter E may appear on the display Z, followed by a flashing number:

52 = Start button pressed during start-up.
53 = Start button pressed during thermostat reset.
In both cases, release the start button. If different numbers appear on the display, contact technical service.

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. Any extension cords must be sized appropriately for the absorbed current I1.

3.1 START-UP

Only skilled personnel should install the machine. All connections must be carried out according to current regulations, and in full observance of safety laws (regulation CEI 26-10 - CENELEC HD 427).

3.2 DESCRIPTION OF THE EQUIPMENT
To light the arc, press the torch trigger: a high voltage/frequency pilot spark will light the arc.

In TIG mode there will always be two LEDs lit: one indicating HF or striking start mode, and the other indicating continuous or pulse mode with 2- or 4-stage command. The selection changes each time the button is pressed. The LEDs light alongside the various symbols to display your choice:

- **F** - LED. TIG welding with arc started without high frequency.
- **L** - LED. TIG welding with arc started with high frequency.
- **G** - LED. Continuous 2-stage TIG welding (manual).
- **I** - LED. Continuous TIG welding with dual current level - 4 stages (automatic).
- **N** - LED. Pulsed 4-stage TIG welding (automatic).
- **O** - LED. Pulsed TIG welding with dual current level - 4 stages (automatic).
- **J** - LED - THERMAL PROTECTION
- **AA** - KNOB
- **Z** - Display

**Mode key E.** When selected, one of the following LEDs lights: F, G, H, I, L, M, N, or O.

In TIG mode there will always be two LEDs lit: one indicating HF or striking start mode, and the other indicating continuous or pulse mode with 2- or 4-stage command. The selection changes each time the button is pressed. The LEDs light alongside the various symbols to display your choice:

- **TIG**
- **F** - LED. TIG welding with arc started without high frequency.
  To light the arc, press the torch trigger and touch the tungsten electrode to the workpiece, then lift it. This move must be quick and decisive (0.3 sec.).
- **L** - LED. TIG welding with arc started with high frequency.
  To light the arc, press the torch trigger: a high voltage/frequency pilot spark will light the arc.
- **G** - LED. Continuous 2-stage TIG 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 begins to drop over the previously set "SLOPE DOWN" time, until it returns to zero. In this position, you may connect the pedal control accessory ART. 193.
- **I** - LED. Continuous TIG welding with dual current level - 4 stages (automatic).
  Set the two current levels before lighting the arc: First level: press the key until the LED T lights, and adjust the main current using the knob AA. Second level: press the key until the LED V lights, and adjust the main current using the knob AA.
  When the torch trigger is pressed, the current begins to increase over the previously set "slope up" time (led S lit), until it reaches the value set by means of the knob AA. The LED T lights and appears on the display Z.
  Should it be necessary to reduce the current during welding, without shutting of 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 will switch to the second value selected, the LED V will light and T will go off.
  To return to the previous main current, press and release the torch trigger once again. The LED T will light, and the LED V will go off. To stop welding at any time, simply hold down the torch trigger for more than 0.7 seconds, then release. The current begins to fall to zero within the previously set "slope down" time interval (LED W lit). If you press and immediately release the torch trigger during the "slope down" phase, you will return to the lesser current value of those set.
  NOTE: The expression "PRESS AND IMMEDIATELY RELEASE" refers to a maximum time of 0.5 seconds.

**NOTE:**

- **AA** - KNOB
  Adjusts the welding current from 10-140A in MMA and 5-200A in TIG.
  Also, in combination with the push-button P, you may:
  - adjust the second level of current V
  - adjust the "slope up" S
  - adjust the "slope down" W
  - adjust the pulse frequency U
  - adjust the post gas X
  - adjust the current frequency in AC welding Q
  - adjust the wave balance in AC welding R
  - adjust the arc striking in relation to the diameter of the electrode used in TIG AC mode.

**Z** - Display
  Displays the welding current and the settings selected by means of the push-button P and adjusted via the knob AA.
**P - SELECTOR**

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

- **Q - LED**
  Current frequency in AC welding (50 - 100 Hz).

- **R - LED**
  Wave balance in AC welding
  (BAL = balance, 0 - Cleaning = from C1 a C8 - Penetration = from P1 to P8).

Between the LEDs R and S, the display Z shows the recommended electrode diameter. The choice of electrode diameter varies from 0.5mm to 4mm. Use the knob AA to change the diameter. This function is active only for AC TIG welding.

- **S - LED**
  Slope up. This is the time in which the current, starting from the minimum, reaches the set current value. (0-10 sec.)

- **T - LED**
  Main welding current. (10-140A in MMA and 5-160A in TIG)

- **V - LED**
  Second level of welding or base current. This current is always a percentage of the main current.

- **U - LED**
  Pulse frequency (0.1-250 Hz)

  The peak and base times are equal

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

- **X - LED**
  Post gas. Adjusts the time gas flows after welding ends. (0-30 sec.)

**Warning:** only those LEDs that refer to the chosen welding mode will light; i.e., in continuous TIG welding the LED U, representing the pulse frequency, will not light. Each LED indicates the parameter that may be adjusted by means of the knob AA while the LED itself is lit. Five seconds after the last variation, the LED involved will shut off; the main welding current will be displayed, and the corresponding LED T lights.

**AE - 10-PIN CONNECTOR**

The following remote controls are connected to this connector:

a) foot control
b) torch with start button
c) torch with potentiometer
d) torch with up/down, etc...

**AD - 1/4 GAS FITTING**

This is where the gas hose of the TIG welding torch is to be connected.
3.3 GENERAL NOTES

Before using this welding machine, carefully read the standards CEI 26-23 / IEC-TS 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.

3.4 MMA WELDING (MANUAL METAL ARC)

- Make sure that the switch AF is in position 0, then connect the welding cables, observing the polarity required by the manufacturer of the electrodes you will be using; also connect the clamp of the ground cable to the workpiece, as close to the weld as possible, making sure that there is good electrical contact.
- Do NOT touch the torch or electrode clamp simultaneously with the earth clamp.
- Turn the machine on using the switch AF.
- Select the MMA procedure by pressing the button A: LED B lit.
- Adjust the current based on the diameter of the electrode, the welding position and the 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

By selecting TIG AC welding mode you may weld aluminium, aluminium alloys, brass and magnesium, while selecting TIG DC allows you to weld stainless steel, iron and copper.

Connect the earth cable connector to the positive pole (+) of the welding machine, and the clamp 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 the welding machine connector AE.

Connect the torch gas hose fitting to the fitting AD on the machine, and the gas hose from the cylinder pressure regulator to the gas fitting AG on the rear panel.

Turn on the machine.

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

The first time the machine is turned on, select the process and mode using the push-buttons A and E, and the welding parameters by means of the key P and the knob AA as described in paragraph 3.2.

The type and diameter of the electrode to be used must be selected according to table A:

The flow of inert gas must be set to a value (in liters per minute) approximately 6 times the diameter of the electrode. If you are using gas-lens type accessories, the gas throughput may be reduced to approximately 3 times the diameter of the electrode. The diameter of the ceramic nozzle must be 4 to 6 times the diameter of the electrode.

Use D.I.N. 10 protective glasses for up to 75A, and D.I.N. 11 from 75A up.

3.5.1 Cooling unit (Art. 1341).

If using a water-cooled torch, use the cooling unit.

3.5.1.1 Description of protections

- Coolant pressure protection

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 H2O code blinking on the display Z.

3.5.1.2 Installation

Unscrew the cap and fill the tank (the equipment 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 deionized) mixed with alcohol in percentages defined according to the following table:

<table>
<thead>
<tr>
<th>Temperature Range</th>
<th>Water/Alcohol Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0°C up to -5°C</td>
<td>4L/1L</td>
</tr>
<tr>
<td>-5°C up to -10°C</td>
<td>3.8L/1.2L</td>
</tr>
</tbody>
</table>

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

If so, turn off the power source, disconnect the torch hoses, fill the tank, connect a hose to the fitting ( ), Insert the pressure switch connector and the power cord into the sockets AI and AH.

Before starting the power source, turn on the cooling unit. If the cooling unit has inadvertently not been switched on, the power source display will flash the message "H2O" and the power source will not work. To reset it, simply shut off the

<table>
<thead>
<tr>
<th>Electrode Type</th>
<th>D.C.</th>
<th>A.C. (frequency 50 Hz)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pos. Max Penetration</td>
<td>Pos. Balanced zero</td>
</tr>
<tr>
<td>Ø</td>
<td>Tungsten</td>
<td>Pure</td>
</tr>
<tr>
<td>1,6</td>
<td>70A + 150A</td>
<td>50A + 100A</td>
</tr>
<tr>
<td>2,4</td>
<td>150A + 250A</td>
<td>100A + 160A</td>
</tr>
<tr>
<td>3,2</td>
<td>200A + 350A</td>
<td>150A + 210A</td>
</tr>
<tr>
<td>4</td>
<td>300A + 400A</td>
<td>200A + 275A</td>
</tr>
</tbody>
</table>

Table A
power source, turn on the unit and restart the power source. The cooling unit is active only in TIG modes. After it is first switched on, the cooling unit shuts off after 30 seconds if the torch trigger is not pressed. After welding, the unit remains on for 3 minutes before shutting itself off. To reactivate it simply press the torch trigger or start welding again.

### 4 REMOTE CONTROLS AND ACCESSORIES

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

- **Art. 193** Foot control (used in TIG welding)
- **Art. 1260** BINZEL “ABITIG 200” Torch (200A – 35%) - m4
- **Art. 1262** BINZEL “ABITIG 200” Up/Down Torch (200A – 35%) - m4
- **Art. 1256** BINZEL “ABITIG 450 W” water-cooled torch (450A) - m4
- **Art. 1258** BINZEL “ABITIG 450 W Up/Down” water-cooled torch (450A) - m4
- **Art. 1655** Power source trolley
- **Art. 1281.03** Accessory for MMA welding
- **Art. 1341** Cooling unit
- **Art. 1192+Art 187** (used in MMA welding)
- **ART. 1180** Connection to simultaneously connect the torch and the pedal control.

**Remote controls that include a potentiometer regulate the welding current from the minimum to the maximum current set via the knob AA.**

**Remote controls with UP/DOWN logic regulate the welding current from the minimum to the maximum.**