

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 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.

TIG/MMA 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

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

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.

 Suitable for hazardous environments.

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

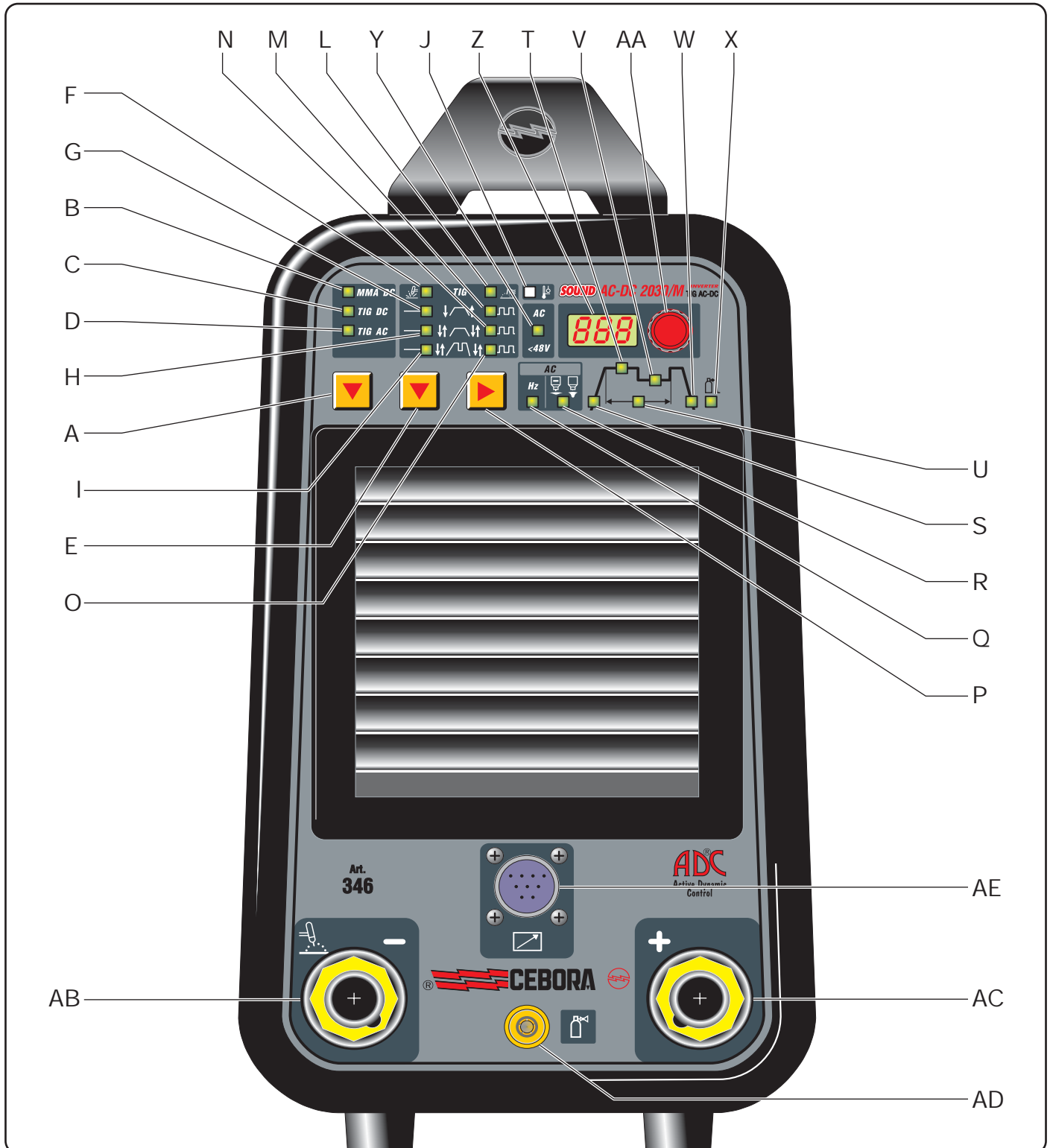
Make sure that the supply voltage matches the voltage indicated on the specifications plate of the welding machine. When mounting a plug, make sure it has an adequate capacity, and that the yellow/green conductor of the power supply cable is connected to the earth pin. The capacity of the overload cutout 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





A - Procedure selector switch

This push-button selects the welding procedure (MMA or TIG).

When selected, one of the following LEDs lights:

B MMA DC, **C** TIG DC, or **D** TIG AC.



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:



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.



H - LED. Continuous 4-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.



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 **P** key until the LED **T** lights, and adjust the main current using the knob **AA**.

Second level: press the **P** 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.



M - LED. Pulsed 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.



N - LED. Pulsed 4-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.



O - LED. Pulsed TIG welding with dual current level - 4 stages (automatic).

The welding mode is the same as described for LED **I**. After adjusting the peak and base currents for the first level, the relationship between the two will also be upheld in the second level.

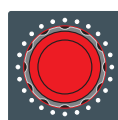
J - LED - THERMAL PROTECTION

Lights when the operator exceeds the duty cycle or percentage intermittence admissible for the machine, and simultaneously blocks the current output.

NOTE: In this condition the fan continues cooling the power source.

Y - LED

This LED must always be lit to ensure safe welding conditions in AC mode.



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

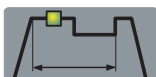
(BAL = balance 0 - Cleaning = from C1 a C8 - Penetration = from P1 to P8).

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.



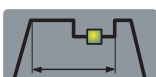
S - LED

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.)

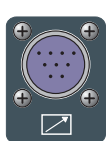


X - LED

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

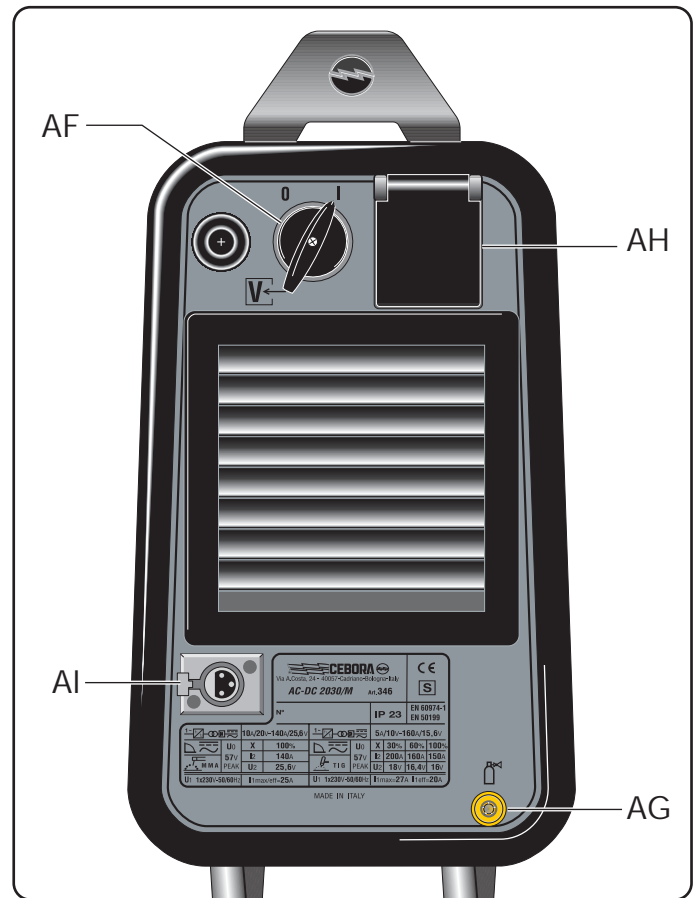
The following remote controls are connected to this connector:

- 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.



AB - Negative output terminal (-)



AC - Positive output terminal (+)



AF - switch

Turns the machine on and off

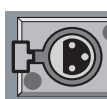


AG - gas intake fitting



AH - Socket

To which to connect the cooling unit Art. 1341.



AI - Connector

Three-pin connector to which to connect the wire of the cooling unit pressure switch.



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:

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

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

	D.C.	A.C. (frequency 50 Hz)					
		Pos. Max Penetration		Pos. Balanced zero		Pos. Max Cleaning	
Electrode Type ▶ ∅ ▼	Tungsten Thorium 2% Red	Tungsten Pure Green	Tungsten Zr 0,8% White	Tungsten Pure Green	Tungsten Zr 0,8% White	Tungsten Pure Green	Tungsten Zr 0,8% White
1,6	70A ÷ 150A	50A ÷ 100A	70A ÷ 150A	30A ÷ 60A	50A ÷ 80A	20A ÷ 40A	30A ÷ 60A
2,4	150A ÷ 250A	100A ÷ 160A	140A ÷ 235A	60A ÷ 120A	80A ÷ 140A	40A ÷ 100A	60A ÷ 120A
3,2	200A ÷ 350A	150A ÷ 210A	225A ÷ 325A	80A ÷ 160A	100A ÷ 180A	60A ÷ 140A	80A ÷ 160A
4	300A ÷ 400A	200A ÷ 275A	300A ÷ 400A	100A ÷ 240A	150A ÷ 280A	80A ÷ 200A	150A ÷ 250A

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.
- ART. 193 may be used in any TIG welding mode with this accessory.

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.