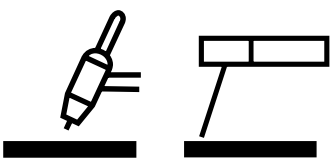
EN

INSTRUCTION MANUAL - Translation of the original instructions



WIN TIG

WIN TIG AC-DC 230 M	Art. 559
WIN TIG DC 320 T	Art. 560

TABLE OF CONTENTS

IMPORTANT: BEFORE USING THIS DEVICE, READ THIS MANUAL CAREFULLY AND MAKE SURE YOU UNDERSTAND ITS CONTENTS.

IMPORTANT: **Before reading the following instruction manual, read the instructions in General Warnings manual 3301151 carefully and make sure you understand them.**

Copyright
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Always keep this manual at the place where the device is used.

The equipment can only be used for welding or cutting operations. Do not use this device to charge batteries, defrost pipes or start motors.

Only expert staff can install, operate, maintain and repair this device. An expert staff member means someone who can judge the work assigned to them and recognise possible risks based on their vocational training, knowledge and experience.

Any use that differs from what is expressly indicated and is implemented in different ways or contrary to what is indicated in this publication amounts to improper use. The manufacturer declines any liability arising from improper use that may cause accidents to people and possible system malfunctions.
This exclusion of liability is acknowledged upon commissioning of the system by the user.

The Manufacturer is unable to monitor compliance with these instructions or device installation, operation and use, and maintenance conditions and methods.

Inappropriate execution of the installation may lead to material damage and possible personal injury. Therefore, no liability is assumed for loss, damage or cost arising out of or in any way connected with improper installation, incorrect operation or inappropriate use and maintenance.

It is not permitted to connect two or more power sources in parallel.
If you wish to connect several power sources in parallel, ask for written authorisation from CEBORA which will determine and authorise procedures and conditions for the required application in compliance with current product and safety regulations.

The installation and management of this device/system must comply with the IEC EN 60974-4 standard.

Liability regarding system operation is expressly limited to the system's function. Further liability of any kind is expressly excluded. This exclusion of liability is acknowledged upon commissioning of the system by the user.
The Manufacture is unable to monitor compliance with these instructions or device installation, operation and use, and maintenance conditions and methods provided in the 3301151 manual.

Inappropriate execution of the installation may lead to material damage and consequently to personal injury. Therefore, no liability is assumed for loss, damage or cost arising out of or in any way connected with improper installation, incorrect operation or inappropriate use and maintenance.

The welding/cutting power source complies with the regulations set out on the power source technical data plate. Use of the welding/cutting power source built into automatic or semi-automatic systems is permitted.
The system installer is responsible for checking the complete compatibility and correct operation of all components used in the system. Cebora S.p.A. therefore disclaims all liability for malfunctions/damage to its welding/cutting power sources and system components due to the installer's failure to perform these checks.

1 SYMBOLS

	**DANGER**	Indicates a situation of **imminent** danger that could cause severe injury to people
	**WARNING**	Indicates a situation of **potential** danger that could cause severe injury to people
	**CAUTION**	Indicates a situation of potential danger that could cause slight injury to people and material damage to equipment if not respected.
NOTICE!		Provides important information to the user that could lead to damage to equipment if not observed.
INSTRUCTION		Procedure to be followed to achieve optimal use of the equipment.

The colour of the box indicates the category into which the operation falls: DANGER, WARNING, CAUTION, NOTICE or INSTRUCTION.

2 WARNINGS

 **DANGER**

Before handling, unpacking, installing and using the welding power source, it is obligatory to read the WARNINGS set out in manual 3301151

2.1 Warning plate

The following numbered text reflects the numbered boxes on the plate.

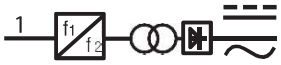
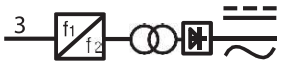
B. Wire feed rollers can injure the hands.
C. The welding wire and wire feeder unit are live during welding. Keep hands and metal objects well away.

1. Electric shocks caused by the welding electrode or cable can be fatal. Protect yourself properly against the danger of electric shocks.
1.1 Wear insulated gloves. Never touch the electrode with bare hands. Never wear damp or damaged gloves.
1.2 Insulate yourself from the workpiece and the ground.
1.3 Disconnect the supply cable plug before working on the machine.
2. Inhaling fumes produced by welding can be harmful to the health.
2.1 Keep your head away from the fumes.
2.2 Use a forced ventilation system or local exhaust to remove fumes.
2.3 Use a suction fan to remove fumes.
3. Sparks generated by welding can cause explosions or fires.
3.1 Keep flammable materials well away from the welding area.
3.2 Sparks caused by welding can cause fires. Keep an extinguisher nearby and ensure that someone is ready to use it.
3.3 Never weld with closed containers.
4. Arc rays may injure the eyes and burn the skin.
4.1 Wear a safety helmet and goggles. Use appropriate ear protectors and overalls with the collar buttoned up. Use helmet masks with filters of the correct grade. Wear a full-body protection.
5 Read the instructions before using the machine or carrying out any operation on it.
6 Do not remove or cover warning labels.

3 GENERAL DESCRIPTION

This welding machine is an inverter power source. The power source is built according to IEC 60974-1, IEC 60974-3, IEC 60974-10 (CL. A), IEC 61000-3-11 and IEC 61000-3-12 standards.
The power source is suitable for TIG welding with contact and high-frequency ignition. It also manages the MMA process (only for manual application). The power source can also be equipped with an external control panel Item No. 457.

3.1 Explanation of plate data

No.	Serial number, to be indicated on any request regarding the welding machine.
	Single-phase static frequency converter transformer-rectifier.
	Three-phase static frequency converter
MMA	Suitable for welding with coated electrodes.
TIG	Suitable for TIG welding.
PW	Suitable for Plasma 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 welding current I2.
Up	High-frequency ignition voltage for TIG process
U2	Secondary voltage with I2 current.
U1	Rated supply voltage
1~ 50/60Hz	50 or 60-Hz single-phase power supply.
3~ 50/60Hz	50 or 60-Hz three-phase power supply
I1max	Max. absorbed current at the corresponding I2 current and U2 voltage.
I1eff	This is the maximum value of the actual current consumed, 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.
IP23S	Degree of housing protection. Grade 3 as the second digit means that this device may be stored, but it is not suitable for use outdoors in the rain, unless it is protected
	Device suitable for use in locations with increased electrical risk

3.2 Installation

WARNING

Connecting high power devices to the mains could have negative repercussions on mains power quality. Line impedance values lower than the Zmax value indicated in the table may be required for compliance with IEC 61000-3-12 and IEC 61000-3-11. It is the responsibility of the installer or user to ensure that the device is connected to a line of correct impedance. It is advisable to consult your local electricity supplier.

Make sure that the mains voltage matches the voltage indicated on the specifications plate of the welding machine. Connect a plug of adequate capacity for the current consumption I1 indicated on the data plate. Make sure that the yellow/green conductor of the power cable is connected to the plug's earth contact.

WARNING

The capacity of the overload cut-out switch or fuses, positioned between the power supply network and the device, must
be adequate for current I1 consumed by the machine. Check the device's technical data.

CAUTION: If mains power extensions are used, the cable supply cross-section must be appropriately sized. Do not use extensions longer than 30 m.

WARNING

Disconnect the device from the power supply before transporting it.
During transport of the device, ensure that all applicable local accident prevention guidelines and regulations are observed.
Use a fork lift truck to lift the power source; consider the position of the device's centre of gravity when positioning the lift truck forks.

DANGER

It is essential to use the device only if connected to a power supply with an earth conductor.
Using the device connected to the mains without an earth conductor or to a socket without a contact for this conductor constitutes very serious negligence.
The manufacturer declines all responsibility for damage to people or property that may occur.
The user is bound to have the efficiency of the earth conductor of the system and the device in use periodically checked by a qualified electrician.

NOTICE

When switch G is set to OFF position, the display shows the message: Power Off
Wait for this message to disappear from the screen before turning back on.
If the power source is turned on with the Power Off message active, the power-on stage will be unsuccessful.

3.3 Lifting and transport

DANGER

For lifting and transport methods, refer to Warnings Manual 3301151.

3.4 Set-up

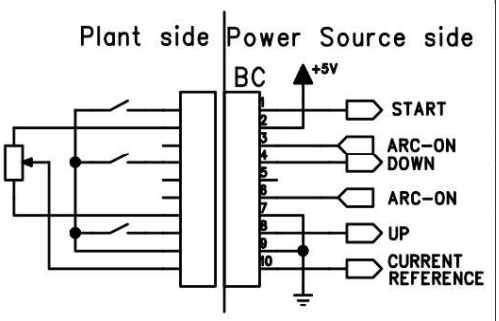
WARNING

The machine must be installed by professional personnel. All connections must be carried out according to current regulations, and in full observance of safety laws (CEI 26-36 and IEC/EN 60974-9).
The power source is turned on and off using switch G.

3.5 Description of the device

A	DISPLAY SCREEN
B	ENCODER KNOB
C	POSITIVE OUTPUT TERMINAL (+)
D	NEGATIVE OUTPUT TERMINAL (-)
E	FITTING (1/4 GAS)
G	SWITCH
H	GAS INLET FITTING
L	MAINS CABLE
O	FUSE HOLDER
P	TORCH REMOTE CONTROL AND START 10-PIN CONNECTOR

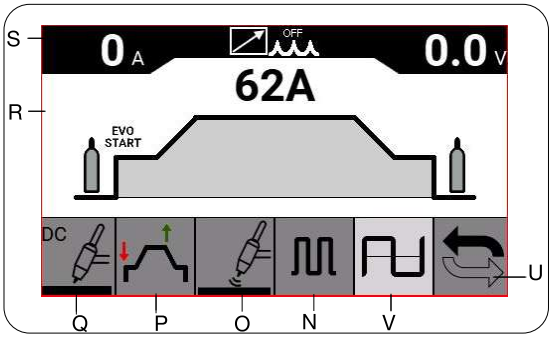
3.6 Front panel connector description (P)

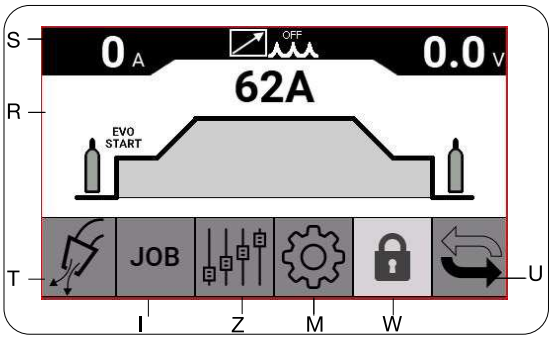
Pin	Description	Wiring diagram
1	**START** Digital input	
2	**+ 5 VDC** Output voltage for the power supply of the external potentiometer	
3-6	**ARC-ON** Relay contact (30 VDC 125 VAC, 0.5 A max). arc on = contact closed arc off = contact open	
4	**DOWN** Digital input for reducing the welding current setpoint	
5	n.c.	
7	**GND 0 V** Output voltage reference for the power supply of the external potentiometer	
8	**UP** Digital input for increasing the welding current setpoint	
9	**GND 0V** Output voltage reference for the power supply of the external controls	
10	**Current Ref**. Analog welding current setpoint signal	

3.7 Description of display

This power source is equipped with a 5” LCD display and resistive touchscreen that can be used even when wearing welding gloves.

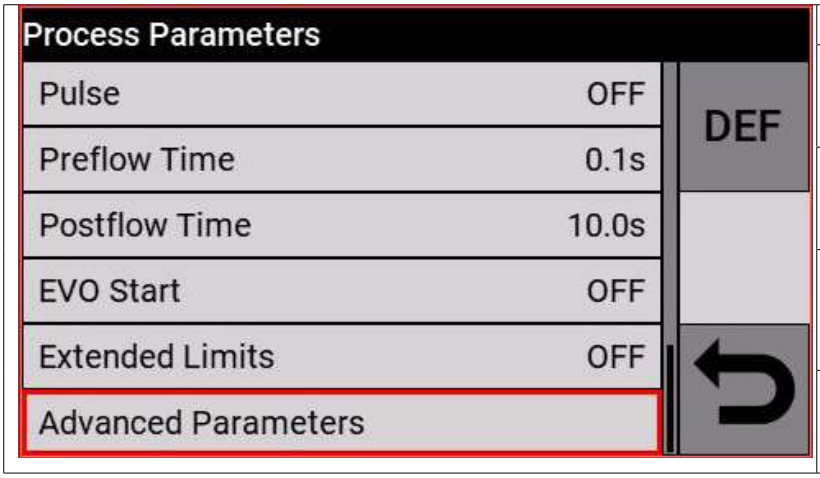
During start-up, for a few seconds the display presents all the information regarding the machine item number, the serial number, the software version, and when the software was updated.
The display then presents the main screen (factory setting).





S	Main screen status bar
R	Main welding parameter settings menu
Q	Selection of welding process type TIG DC, TIG DC APC, TIG DC XP, TIG AC, MIX AC, MMA DC, and MMA AC (*).
P	Selection of start type, two stroke, four stroke, three level, four level and spot.
O	Selection of ignition type, HF, Lift, EVO Lift
N	Selection of DC pulse parameters, duty cycle frequency, second current level.
V	Selection of AC process, frequency, horizontal balancing, vertical balancing, penetration waveform type and cleaning parameters and the MIX AC process parameter settings (*).
M	Main menu for machine setup, accessories and settings
T	Gas test menu
I	JOB management menu
Z	Menu for the management of all process parameters
U	Selection of status bar buttons
W	Machine settings lock

(*) Note: the TIG AC process is not supported by TIG DC power source Item No 560.



Permitted Actions
Turn encoder **B** to select one item on the screen in use
Press encoder **B** to enter an individual submenu or confirm a recently changed parameter.(*)
RETURN press to go back to the higher level menu.
Select by touching one section of the panel (pushbutton).

NOTICE

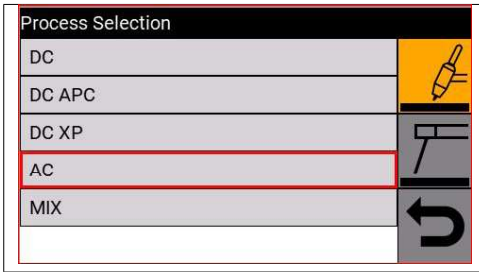
The software could have been updated, therefore the device in use may offer functions not described in these user instructions, or the opposite may apply. Individual figures may also deviate slightly from the control elements present on the device in use. The operation of these control elements is nevertheless identical.

(*) Inside a parameter change menu, by pressing encoder **B** without releasing immediately it is possible to set the default value of the selected parameter.

4 TIG WELDING

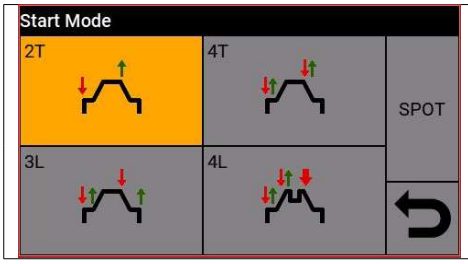
4.1 Select welding process

To choose the welding process from those available select pushbutton **Q - Fig 4.**

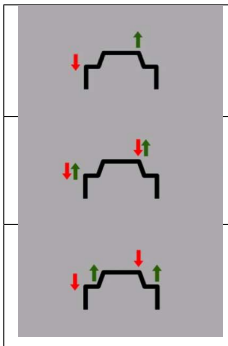
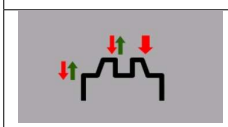
	Select the main process pushbutton **TIG: the pushbutton turns orange.** Select the relevant process from amongst those listed by turning encoder **B** and confirm by pressing **B**.

4.2 Start mode

To choose the start mode, select pushbutton **P – Fig. 4**. Start modes are the same for all TIG processes.

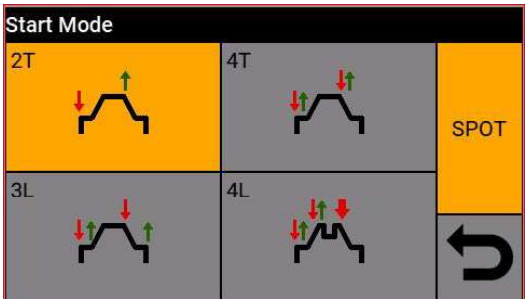
	 Start command pressed
	 Start command released

The **START** pushbutton for manual applications is present on connector **P** fig. 1.

	**2 stroke mode**	Mode appropriate for short welding bursts or automated robotised welding. Welding is started by pressing the torch trigger and ends when the trigger is released.
	4 stroke mode	Appropriate mode and perform long-term welding. Starting and stopping are controlled by pressing and releasing the torch trigger. ***Not available with robot mode activated***.
	3 level mode	When the arc strikes, the current is set to the first level. As long as the torch trigger is pressed, the current remains on the first level. Upon releasing the torch trigger, the current passes from first to second level within the slope time; once the second level is reached, this is maintained. In order to pass to the third current level, simply press the torch trigger and the current is adjusted to the fourth value selected within the set slope time. When the torch trigger is released welding stops and the post-flow procedure is run. ***Not available with robot mode activated***.
	**4 level mode**	When the torch trigger is pressed and released, the torch switches between two preset levels as many times as the operator wishes. Welding stops when the operator holds the torch trigger continually pressed for at least 1 second. ***Not available with robot mode activated***.
	**SPOT mode**	This mode is for spot welding. ***Not available with robot mode activated.***

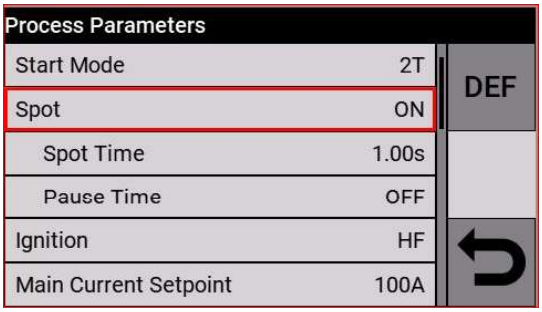
4.2.1 SPOT mode

The procedure may be used for fastening or for steel and CrNi alloy panel joint welding up to a thickness of approximately 2.5 mm. It is also possible to weld panels of different thickness placed on top of one another.



In **SPOT** mode, spot welding work can be carried out in combination with the 2 stroke and 4 stroke start modes described previously.
To activate the mode, select the **SPOT** pushbutton.
To select the **SPOT** mode parameters, follow the pathway:
Press the Z key and then the item > *Spot*.

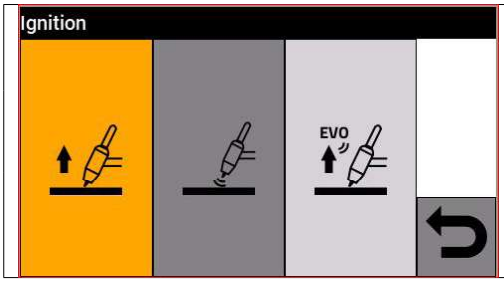
Setting **SPOT** mode parameters:

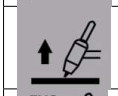


Spot	ON OFF	**SPOT** mode activated **SPOT** mode deactivated	
Spot time	Welding spot duration		0.01-25 s
Pause time	Duration of pause between two consecutive spots. (Intermittent function)		OFF–5 s

4.3 Arc striking modes

Weld arc ignition mode is chosen by selecting pushbutton **O – Fig. 4**.



	**HF** High-frequency ignition.
	**Lift** contact ignition.
	**EVO Lift** ignition

4.3.1 HF High-frequency ignition

The arc is ignited by means of a high frequency/voltage discharge, the discharge stops as soon as welding current begins to circulate or after a timeout (3s). This type of ignition does not require the workpiece to be touched with the electrode tip. Unlike contact ignition, with **HF** ignition, there is no risk of contaminating the workpiece with the tungsten electrode. Always try to ignite the arc at a maximum distance of 2-3 mm from the workpiece.

WARNING

CEBORA WinTIG range power sources comply with regulations governing strikers in the welding field. Take care when working with this type of procedure. Under certain circumstances, HF ignition may involve an electric shock that is perceptible but not damaging to the operator. To avoid this, wear appropriate equipment and take care not to work in wet or humid environments.

4.3.2 Lift contact ignition

This type of ignition involves the electrode coming into contact with the welding workpiece. The starting sequence is as follows:

1- Touch the workpiece to be welded with the electrode tip.
2- Press the torch trigger: a very low current now begins to circulate in the workpiece to be welded, which will not spoil the electrode at the stage when it is detached from the workpiece.
3- Lift the electrode tip from the workpiece: the electric arc is now triggered, the required welding current begins to circulate in the workpiece and the shielding gas flow is activated.

4.3.3 EVO Lift ignition

This type of ignition is particularly well-suited for precision spot welding. It allows the workpiece to be contaminated as little as possible at the ignition point. The starting sequence is as follows:

1- Touch the workpiece with the electrode tip.
2- Press the torch trigger:
3- Lift the electrode tip; as soon as the electrode is raised, a high frequency/voltage discharge is generated which ignites the arc.

4.4 TIG parameter settings table

Process parameters can be set directly using the following sequence:

- press **B**
- turn **B** to select a single parameter
- press **B** to enter parameter modification mode (the parameter turns red)
- turn **B** to select the desired value
- press **B** again to exit modification mode**.**
- press **B** without releasing immediately to set the default value.

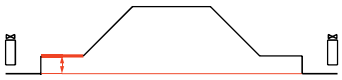
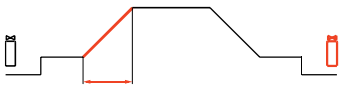
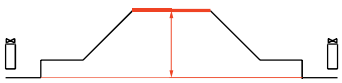
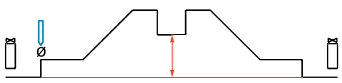
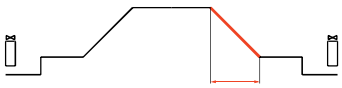
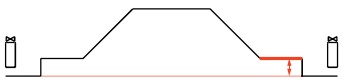
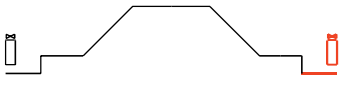
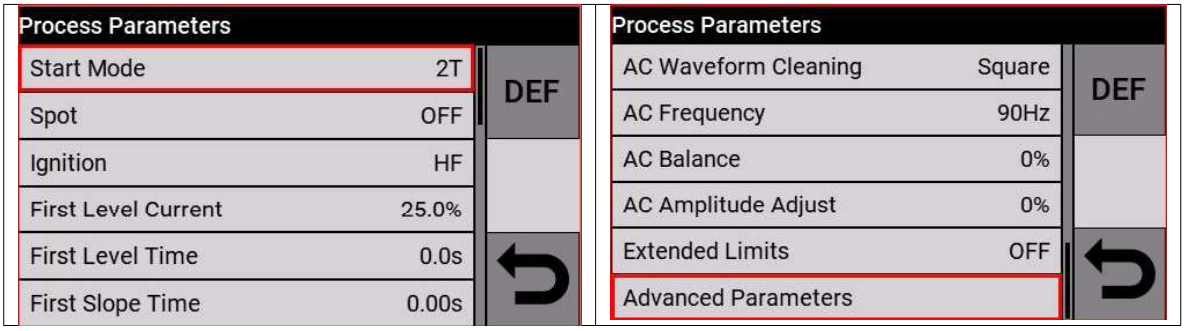
	Description	**Min.**	**DEF**	**Max**	**UM**	**Sol.**
	Pre-flow duration	0.1	0.1	10	s	0.1
	EVO START (**) (TIG DC HF)	OFF	OFF	1.0	s	0.1
	Hot Start AC (TIG AC HF) (TIG MIX HF)	0.1	1.6	6.0	mm	0.1
	First Level Current	3	25	I_SET	A	1
	First Level Duration	0	0	30	s	0.1
	Initial Ramp Duration	0	1.0	10	s	0.1
	Main Current	3	100	I2_max(*)	A	1
	Intermediate current	5	50	I2_max(*)	A	1
	Final Ramp Duration	0	1.0	10	s	0.1
	Crater Current Duration	0	0	10	s	0.1
	Crater Current	3	10	I_SET	A	1
	Duration postflow	0.1	10	50	s	1 (0.1-25) s 5 (25-50) s

Table 1

The parameters set out in Table 1, ignition type (HF, Lift etc.), start management (2 stroke, 4 stroke etc.) and the pulse parameters can be set in the section ***Key Z-> Process Parameters***.

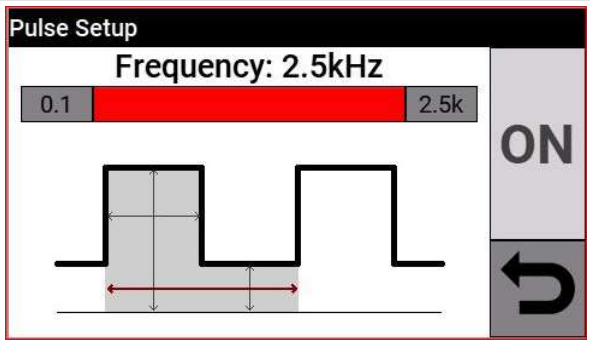


The menu includes a further item ***Advanced Parameters*** which includes advanced TIG process parameters. To use these parameters, contact Cebora technical assistance.

(**) The EVO START parameter generates a set of pulses at the start of the welding process to improve the joining of the two strips of material to be welded. The setting for this parameter depends on the geometrical shape of the parts to be welded.

4.5 Pulse Settings Menu

The welding current, particularly on thin sheets, can lead to the weld bath dripping downwards if the current is high, or ineffective melting if the current is low. The TIG ***Pulse*** function is useful in such cases.
The TIG ***Pulse*** function can be used to quickly melt small sections of the weld spot, which re-set just as quickly. The TIG-Pulse function is used for welding thin sheets.
To access the Pulsed TIG parameters, select pushbutton **N – Fig. 4,** or select
N key -> Pulse



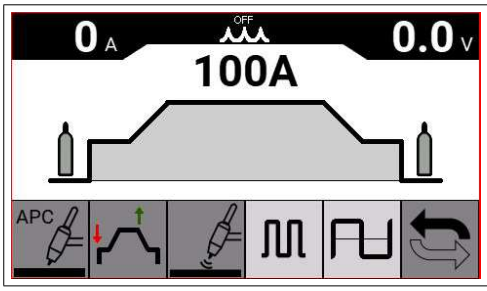
Turn **B** to parameter to be changed, then press **B** to modify the parameter.
The current value shown on the right against the dotted line is the average set current.

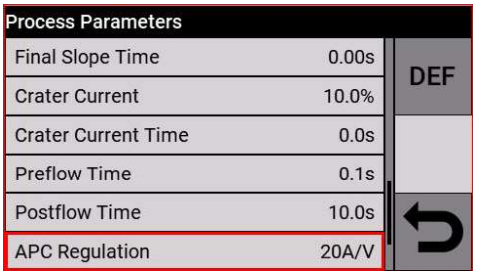
Parameter	Min	DEF	Max	UM	Sol.
Duty Cycle	10	50	90	%	1
Pulse level	0	50	100	A	0.1
Pulse frequency	0.1	1.0	2.5 kHz	Hz	0.1 (min)

In pulsed TIG welding, the pulse level parameter performs the task of keeping the arc ignited and sufficiently fluid between two successive pulses; when the current level is high, the droplet is detached from the filler rod. The pulse frequency is particularly significant. Increasing the frequency makes the arc more stable and narrower, and penetration into the workpiece therefore increases. The duty cycle affects weld heat input.

5 TIG DC APC

The TIG DC APC (Active Power Control) process ensures that a constant heat input to the workpiece is maintained. When the arc length is reduced and therefore weld voltage is reduced, the current is automatically increased. Conversely, if arc length is increased and weld voltage increases accordingly, the current is automatically decreased. The operator then controls the heat gain and penetration just by moving the welding torch.
The current variation amplitude per unit of voltage is adjustable by means of the APC Regulation parameter: e.g. if 20 A/V is set and during welding the welding voltage increases by 1 V in relation to the TIG process nominal voltage, then the current decreases by up to 20 A in order to restore nominal voltage.
To activate the welding process, press pushbutton **Q - Fig. 4** on the main screen and then select ***DC APC*** using encoder **B.**





Select the display pushbutton shown in the figure and turn encoder **B** to set the desired correction value.

The correction value can be set from the main screen or in the **Process parameter** menu: ***Z key -> APC Regulation***

APC Regulation	**(1 – 80) A/V**

NOTICE

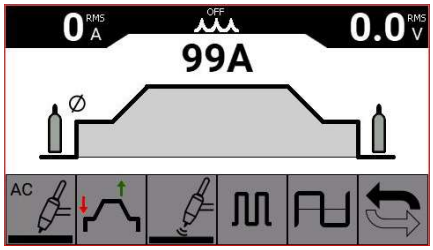
The APC process is not available when robot mode is activated.

6 TIG DC XP

TIG DC XP is a welding process where the current pulses at very high frequency and creates a more concentrated and penetrating weld bath, as well as excellent acoustic comfort. Using this process enables higher welding speeds to be achieved than with the standard TIG DC process. Using this process, it is possible to set all applicable parameters for the standard TIG DC process, including pulse.
The welding parameters to be set are the same as for the TIG DC process see Tab1.
To activate the welding process, press pushbutton **Q - Fig. 4** on the main screen and then select ***DC XP*** using encoder **B.**
The only difference between the TIG DC and TIG DC XP processes is the pulse function.
For TIG DC XP, the maximum frequency is 300 Hz while for TIG DC it is 2.5 kHz. Refer to Table 1 for the parameter settings.

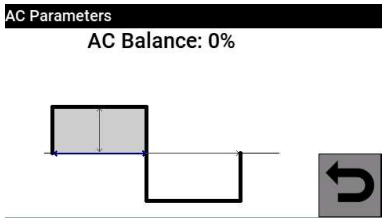
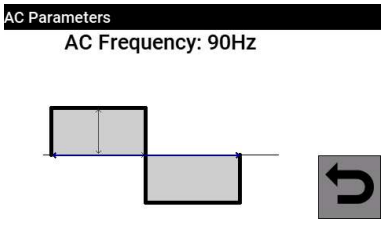
7 TIG AC

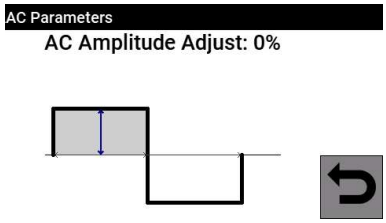
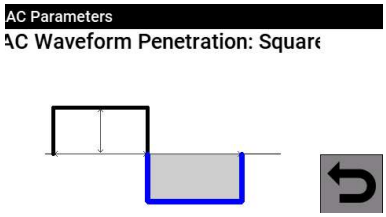
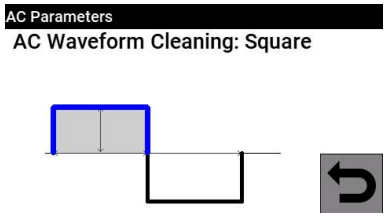
Note: the TIG AC process is not supported by TIG DC power source Item No 560.
AC welding is used to weld aluminium and aluminium alloys. The procedure involves continuous changes in the polarity of the tungsten electrode. Two phases are available (half-waves): a positive phase and a negative phase. The positive phase causes the aluminium oxide layer on the surface of the material to break down (cleaning effect), while at the same time a cap forms on the tungsten electrode tip. The size of this cap depends on the length of the positive phase. It should be noted that an over-large cap leads to a diffuse and unstable arc with reduced penetration. The negative phase cools the tungsten electrode while generating the necessary penetration. It is important to choose the correct time ratio (balance) between the positive phase (cleaning effect, cap size) and the negative phase (penetration depth). This requires the AC balance to be set. The factory setting is a zero balance.
To activate the welding process, press pushbutton **Q - Fig. 4** on the main screen and then select ***AC*** using encoder **B.**

	From the main menu, select pushbutton **V – Fig. 4**, to set the parameters of the **TIG AC process.**

NOTICE

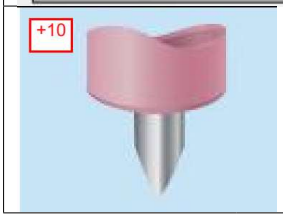
The AC process parameters can be selected from section **V – Fig. 4.**
In section **N** turn knob B to select the parameter to be modified, press the required parameter and adjust the value by turning encoder **B.** Once the change has been made, press **B** to confirm**.** The parameter can be modified when it turns red.

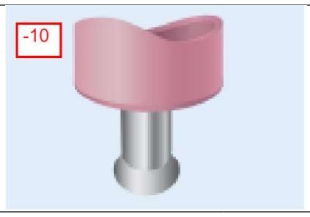
	Description	Min	DEF	Max	UM	Sol.
	**AC Balance** Adjust the percentage penetration in relation to the cleaning phase. The longer the cleaning phase (-10), the more the electrode is rounded.	-10	0	10	s	0.1
	**AC Frequency** Frequency of the alternating output current	50	90	200	Hz	1

	Description	Min	DEF	Max	UM	Sol.
	**AC Amplitude Adjust** Adjusting the cleaning penetration peak allows an improvement in wear and electrode rounding. -80 = -80% of penetration peak +80 = +80% of penetration peak	-80	0	80	%	1
	**AC Waveform Penetration** Square Sine Triangular	-	Square	-	-	-
	**AC Waveform Cleaning** Square Sine Triangular	-	Square	-	-	-

AC Balance

Balancing	Positive Electrode Cleaning	Negative Electrode Penetration	Oxide	Electrode rounding
0	33%	67%	Removed oxide moderately visible	Moderate
+10	23%	87%	Removed oxide barely visible	Bottom
-10	50%	50%	Removed oxide very visible	High





AC Frequency

Adjusting the frequency of the output waveform.

Frequency [Hz]	
50	Very wide weld bath, arc soft and barely controllable
200	Narrow weld bath, arc stable, precise and manageable

AC Amplitude Adjust

Independent regulation of penetration and cleaning half-wave amplitude allows control of heat on the workpiece

AC Amplitude Adjust	
+80%	Increased penetration and heat input, high welding speed, less electrode rounding, oxide removal area barely visible
-80%	Lower heat input, greater electrode rounding, oxide removal area highly visible.

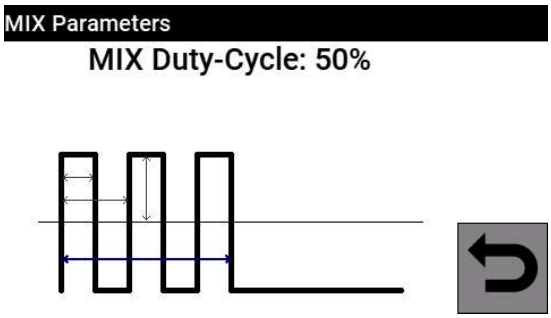
AC Waveform

AC waveform	
Square	Maximum bath control, high speed, stable arc and high noise level
Sinusoidal	Conventional characteristics, soft arc, high acoustic comfort and high melting of base metal.
Triangular	Reduced heat input, high welding speeds, low workpiece deformation on thin sheets

7.1 TIG MIX

Note: the TIG AC process is not supported by TIG DC power source Item No 560.

The purpose of this welding is to obtain greater penetration than with alternating current welding on aluminium and it is suitable for welding different thicknesses. The percentage penetration is set in relation to the alternating current period. This type of welding involves the repetition of three alternating half-waves and a direct current quantity (penetration) adjustable via the DC parameter.
To activate the welding process, press pushbutton **Q - Fig. 4** on the main screen and then select ***MIX*** using encoder **B.**



Select pushbutton **Z – Fig. 4** and set the DC parameter.

Set the Duty-Cycle Mix parameter to define the direct current penetration percentage within the **AC welding period.** The alternating component parameters are defined in section **V of the display.**
For a description of parameters, refer to chapter 7 of the following manual.

8 MMA WELDING

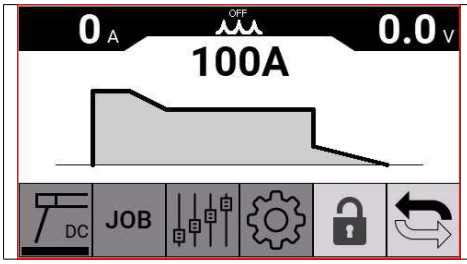
WinTIG range power sources are able to manage the MMA process in AC and DC mode. This welding machine is suitable for welding all types of electrodes, with the exception of cellulosic (AWS 6010).
- Make sure that the Power On switch is in position 0 (OFF), then connect the welding cables, respecting the polarity required by the manufacturer of the electrodes that you will be using and the terminal of the earth cable to the workpiece is at the closest point to the weld, ensuring that the electrical contact is good.
- Do not touch the torch or the electrode holder and the earth clamp simultaneously.
- Turn on the machine using the Power On switch.
- Select MMA process.
- Adjust the current based on the electrode diameter, welding position and type of weld to be made.
- After welding, always switch off the power source by removing the electrode from the electrode holder.

WARNING

Beware of electrical shocks
When the main switch is in ON position, the electrode and the non-insulated part of the electrode holder are live. Therefore, make sure that the electrode and the non-insulated part of the electrode holder do not come into contact with electrically conductive or earthed persons or components (e.g. outer casing, etc.).

8.1 MMA DC Process

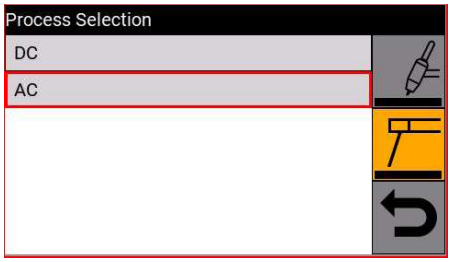
In section **Q - fig. 4** of the main screen, select ***DC***

	MMA Process main screen

8.2 MMA AC Process

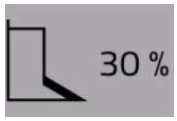
Note: the TIG AC process is not supported by TIG DC power source Item No 560.

In section **Q - fig. 4** of the main screen, select ***AC***

In the MMA AC this process, the output current frequency is 50 Hz and the output waveform is square. Frequency and waveform are fixed and unmodifiable, unlike the TIG AC process.

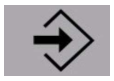
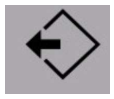
8.3 MMA DC/AC process parameters

	Description	Min	DEF	Max	UM	Sol.
	**Hot Start** Improves ignition even when using electrodes with poor ignition properties	0	50	100	%	1
	**Arc Force** 0 voltaic arc with little spatter, barely defined 100 voltaic arc with spatter, but stable	0	30	100	%	1
	Hot start time To be adjusted according to the diameter of the electrode to be welded.	0	0.15	1	s	0.01
	Antistick Function that prevents the electrode from bonding to the workpiece	OFF	ON		-	-
	Cut off Voltage Arc cut-off voltage. Once the set voltage is reached, the arc is extinguished, avoiding optical flashes and preserving the electrode for subsequent ignitions.	OFF	70	70	V	1
	VRD (Valid only for item 559) This function reduces power source no-load voltage, required in environments with a high explosion risk.	ON	OFF			

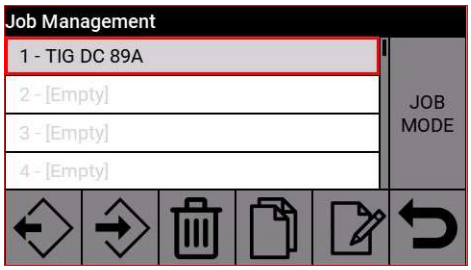
9 OTHER PANEL FUNCTIONS

9.1 Job management

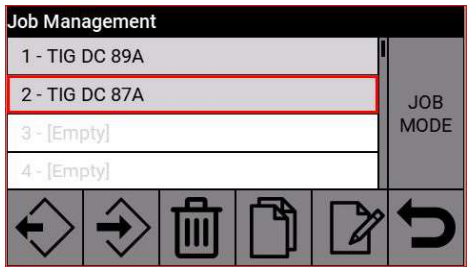
A welding programme and its parameters (process, ignition, mode etc.) can be saved on the JOB page.
The available JOBS are numbered and range from 1 to 99.
The operations that can be carried out on a JOB are listed below:

	Save
	Retrieve
	Delete
	Copy
	Details of the saved JOB.

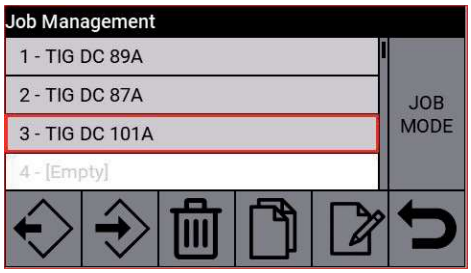
9.1.1 Saving a welding JOB

	Choose the memory position where the job is to be saved and confirm by pressing encoder B. A description of the saved process will now appear. Save by pressing the key 

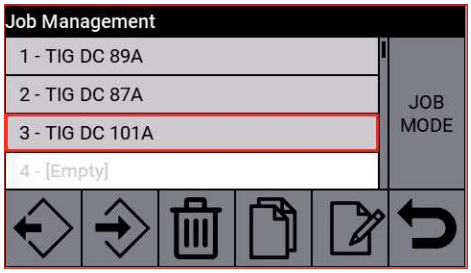
9.1.2 Modifying a JOB

	Select the relevant JOB Retrieve by pressing pushbutton  . Modify the welding parameters. Select JOB section I – Fig. 4. Overwrite the previous JOB or create a new one by selecting a free memory location and pressing 

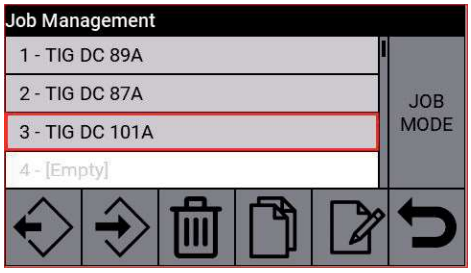
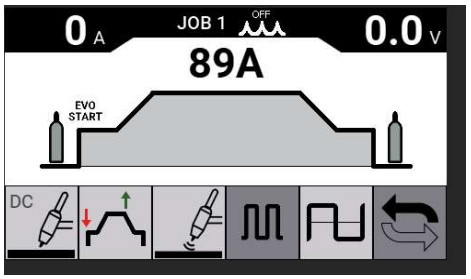
9.1.3 Deleting a JOB

	Select the JOB memory position, turning encoder **B.** Press pushbutton  and the JOB will be deleted.

9.1.4 Copying a JOB

	Select the memory position of the JOB to be copied, turning encoder **B.** Press  and the JOB will be copied to the memory. Select a free memory location using **B** and press  : the JOB will be copied to the new position.

9.1.5 Welding with a JOB

	Select the memory position of the JOB to be used, turning encoder **B.** Press the **Job Mode** button to activate welding with the selected JOB
	The **Job Mode** operating mode is active with the selected JOB (1 in the example).

Set Job Mode and turn encoder **B,** or the torch UP/DOWN pushbuttons to navigate between saved JOBS.
A JOB can be selected when the machine is in standby or while it is delivering power.
Switching between JOBS with the arc on is NOT allowed between processes:
- TIG -> MMA,
- TIG -> PW
- TIG DC -> TIG DC XP.

9.2 Power source status menu

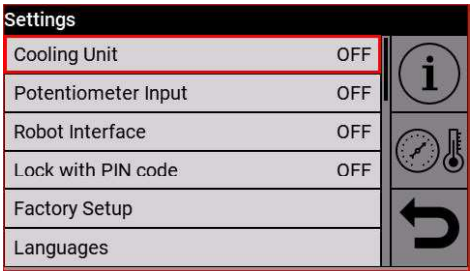
The power source status menu displays information about the welding time, number of ignitions, power source internal temperatures, and fan speed.

To access the power source status menu, select ***M key ->*** 

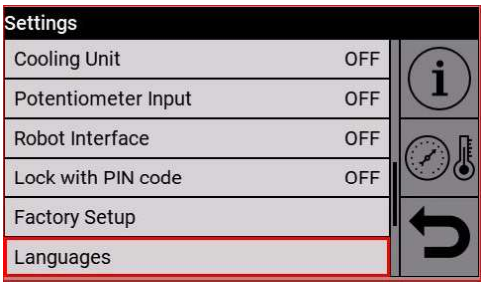
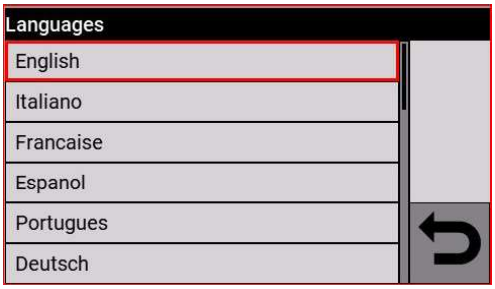
	

9.3 Settings menu

This menu is used for the welding power source basic settings:

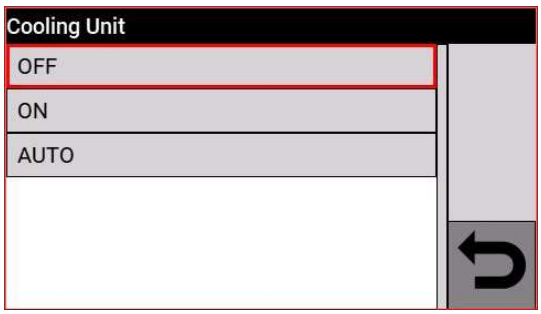
	Press ***M key -> Settings*** to access the power source settings page.

9.3.1 Language setting

	Select ***Language*** and press **B.**
	Turn **B** to set the desired language. Press **B** to confirm**.**

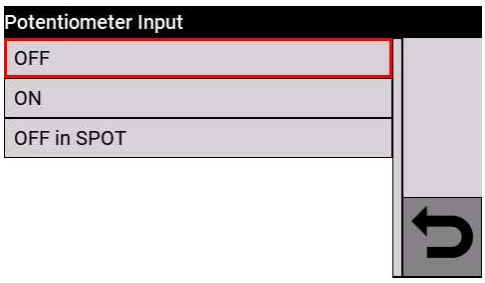
9.3.2 Cooling unit

The cooling unit to be used with the WinTIG power source is Item No. 1685 - GRV20.
The status bar **S** always shows the cooling unit icon  and unit status is shown in the upper part of the icon: ON, OFF, AUTO.

	Encoder **B** is used to select/activate the operating mode: OFF Cooling unit disabled. ON Cooling unit always on. AUTO Cooling unit operates in synchrony with the welding process

9.3.3 Input potentiometer

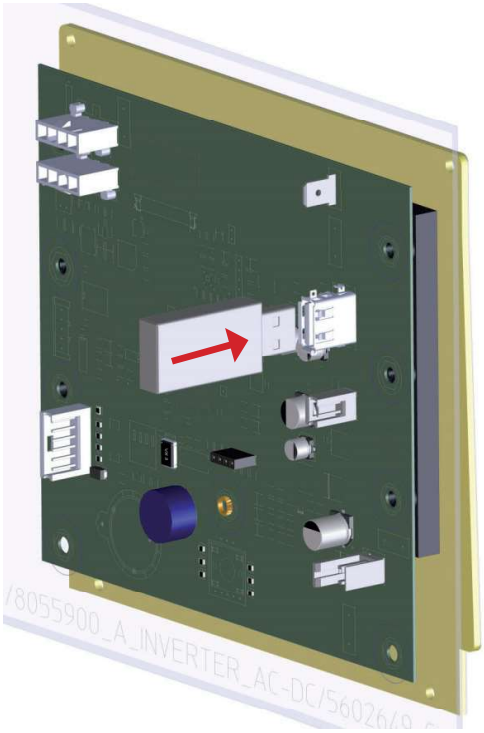
If the potentiometer accessory is recognised, the  symbol will appear in the status bar

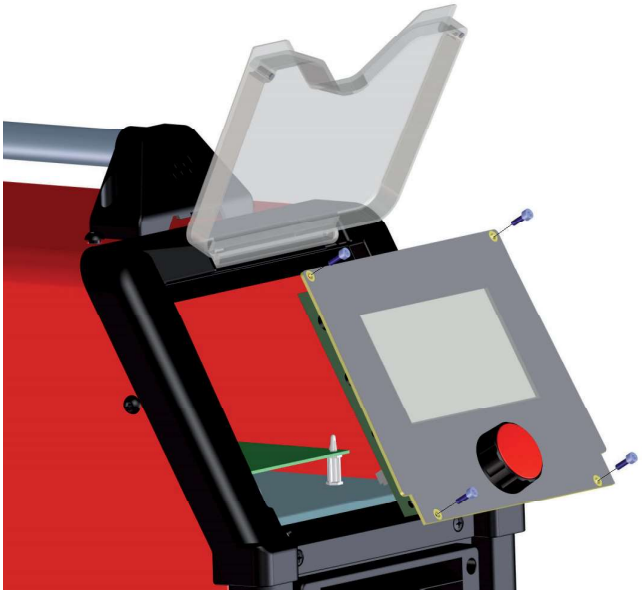
	ON: allows the potentiometric input on connector P to be read. OFF in Spot: the potentiometric input is not used, only in spot mode.

9.3.4 Firmware update

The machine can be updated using a USB memory stick (pen drive) inserted into the USB port on the back of the panel board. To extract the panel board, simply remove the 4 retaining screws (see figure). The operation must be carried out with the machine not powered.

- Insert the USB memory stick (machine not powered).
- Switch on the power source and wait for the update to run.
- Once the update has been completed, switch off the power source, remove the USB memory stick and tighten the four retaining screws.



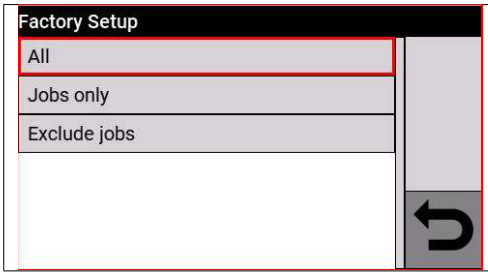


Information on the firmware version installed is provided in the home screen that appears when the welding power source is switched on or in section 

To download firmware updates, go to:
https://welding.cebora.it/it/assistenza/documentazione

9.3.5 Restore factory setup

Select this item to **restore factory settings.**

	Select ***M key -> Restore Factory Setup*** Turn **B** to select and confirm the relevant option.

All	Restore everything, which will also delete saved jobs.
Jobs Only	Delete only all saved jobs
Exclude Jobs	Restore all factory settings except saved jobs.

10 TECHNICAL SPECIFICATIONS

WIN TIG AC-DC 230 M Item No 559		
	TIG	MMA
Mains voltage (U1)	230 V	
Mains voltage tolerance (U1)	+15% / -20%	
Mains frequency	50/60 Hz	
Mains fuse (delayed action)	16 A	
Apparent power consumption	5.7 kVA 40%	6.2 kVA 40%
	4.8 kVA 60%	4.4 kVA 60%
	3.7 kVA 100%	3.6 kVA 100%
Mains connection Zmax	0.458 Ω	
Power factor (cosϕ)	0.99	
Welding current range	3 - 230 A	10 - 180 A
Welding current 10 min/40 °C (IEC 60974-1)	230 A 40%	180 A 30%
	200 A 60%	140 A 60%
	170 A 100%	120 A 100%
Open-circuit voltage (U0)	50 V	
Arc striking voltage (Up)	12 kV	
Usable electrodes		Ø 1 - 2.4 mm
Max. gas inlet pressure	6 bar / 87 psi	
Performance	81%	
Idle state power consumption	22 W	
Electromagnetic compatibility class	A	
Overvoltage class	III	
Degree of pollution (IEC 60664-1)	3	
Degree of protection	IP23S	
Cooling type	AF	
Working temperature	-10 °C ÷ 40 °C	
Transport and storage temperature	-25°C ÷ 55°C	
Marking and Certifications	CE UKCA EAC S	
Dimensions (WxDxH)	232 mm x 530 mm x 476 mm	
Net weight	21.5 kg	

Motor generator power required: greater than or equal to 18 kVA

WIN TIG DC 320 T Item No 560		
	TIG	MMA
Mains voltage (U1)	3 x 400 V	
Mains voltage tolerance (U1)	±15%	
Mains frequency	50/60 Hz	
Mains fuse (delayed action)	16 A	
Apparent power consumption	9 kVA 30%	9.5 kVA 40%
	6.6 kVA 60%	8.2 kVA 60%
	5.8 kVA 100%	6.3 kVA 100%
Mains connection Zmax	0.112 Ω	
Power factor (cosϕ)	0.99	
Welding current range	3 - 320 A	10 - 260 A
Welding current 10 min/40 °C (IEC 60974-1)	320 A 30%	260 A 40%
	260 A 60%	230 A 60%
	230 A 100%	190 A 100%
Open-circuit voltage (U0)	55 V	
Arc striking voltage (Up)	12 kV	
Usable electrodes		Ø 1 - 3.2 mm
Max. gas inlet pressure	6 bar / 87 psi	
Performance	87%	
Idle state power consumption	20 W	
Electromagnetic compatibility class	A	
Overvoltage class	III	
Degree of pollution (IEC 60664-1)	3	
Degree of protection	IP23S	
Cooling type	AF	
Working temperature	-10 °C ÷ 40 °C	
Transport and storage temperature	-25°C ÷ 55°C	
Marking and Certifications	CE UKCA EAC S	
Dimensions (WxDxH)	232 mm x 530 mm x 476 mm	
Net weight	24 kg	

Motor generator power required: greater than or equal to 25 kVA

11 ERROR CODES

Error management is divided into two categories:
Hardware errors [E]. These cannot be reset and require the power source to be restarted. They are displayed on the screen with a red background.
Alarms [W] linked to an external condition that can be reset by the user and does not require the power source to be restarted.
These are displayed on the screen with an amber background.

Code	Type	Error Description	Action
3	[E]	General fault error detected by the power source internal slave board	Switch the power source off and on. If the problem persists, contact technical assistance
6	[E]	Communication error detected by master panel board on CAN-bus	Switch the power source on and off. If the error persists, contact technical assistance.
10	[E]	Power output nil (I=0A, V=0V)	Hardware error, contact technical assistance. Probable break in inverter circuit of primary winding
11	[E]	Overload at output	Hardware error, contact technical assistance.
13	[E]	Problem on the PFC control board, the DC bus is not set properly.	Hardware error, contact technical assistance.
14	[E]	Undervoltage error detected on inverter control board.	Check machine supply voltages. If the problem persists, contact technical assistance.
20	[E]	Interlock signal absent	Switch the power source off and on. If the problem persists, contact technical assistance
25	[E]	Excessive primary winding current error	Switch the power source on and off. If the error persists, contact technical assistance. Probable break in output diodes or primary winding inverter circuit.
28	[E]	Fan malfunction	Check there are no mechanical blockages in the rotating parts of the fan. If the problem persists, contact technical assistance.
30	[E]	Output current sensor offset reading problem	Switch the power source on and off. If the error persists, contact technical assistance.
32	[E]	Voltage measuring reference out of specifications	Check there are no voltages connected to the machine output terminals upon ignition. Switch the power source on and off. If the error persists, contact technical assistance.
54	[E]	Power source test voltage nil or V Out > 48 VAC	Switch the power source on and off. If the error persists, contact technical assistance.
58	[E]	Firmware upgrade error	Contact technical assistance. or impose firmware update by turning DIP3 on the panel board ON.
63	[E]	Incorrect mains voltage value	Check that the mains plug phases are properly connected. If the error persists, contact technical assistance.
74	[W]	Thermal protection triggered due to excessive temperature in primary circuit TH1	Wait until the machine cools down. Check that the air intake and outlet grilles are not blocked. If the problem persists, contact technical assistance.

Code	Type	Error Description	Action
75	[W]	Coolant pressure too low.	Check the coolant level. Check the centrifugal pump turns correctly. If it does not turn correctly, release using a release screw. If the problem persists, contact technical assistance.
76	[W]	Cooling unit not connected	Check the pressure switch connection is intact.
77	[W]	Excessive temperature in secondary circuit TH2.	Wait until the machine cools down. Check that the air intake and outlet grilles are not blocked. If the problem persists, contact technical assistance.
90	[W]	CNC not connected error.	Check connections; if the problem persists, contact technical assistance.
99	[E]	Machine is powering down.	Wait for the power source to power down. During this stage, do not turn the power source back on by turning the mains switch because the power source would lock. Turn off the machine, wait for at least 30 seconds and turn back on.