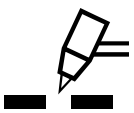
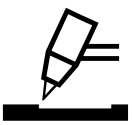
EN INSTRUCTION MANUAL FOR PLASMA CUTTER

Translation of the original instruction

PLASMA iQC 130 T	Art. 603
PLASMA iQC 110 T	Art. 602
PLASMA iQC 70 T	Art. 601
	
	
	

IT	L'USO DI CONSUMABILI NON ORIGINALI CEBORA FA AUTOMATICAMENTE DECADERE OGNI GARANZIA E/O RESPONSABILITÀ SU GENERATORI E TORCE PER IL TAGLIO AL PLASMA.
EN	THE USE OF NON-GENUINE CEBORA CONSUMABLES AUTOMATICALLY VOIDS ANY WARRANTY AND/OR RESPONSIBILITY ON PLASMA CUTTING POWER SOURCES AND TORCHES
DE	DIE GARANTIE UND/ODER HAFTUNG FÜR DIE STROMQUELLEN UND BRENNER ZUM PLASMASCHNEIDEN VERFÄLLT AUTOMATISCH, WENN ANDERE ALS DIE ORIGINAL-VERBRAUCHSTEILE VON CEBORA VERWENDET WERDEN.
FR	L'UTILISATION DE CONSOMMABLES NON ORIGINAUX CEBORA REND AUTOMATIQUEMENT CADUQUE TOUTE GARANTIE ET/OU RESPONSABILITÉ CONCERNANT LES GÉNÉRATEURS ET LES TORCHES POUR LE DÉCOUPAGE PLASMA
ES	EL USO DE CONSUMIBLES NO ORIGINALES CEBORA DETERMINA AUTOMÁTICAMENTE LA INVALIDACIÓN DE TODA GARANTÍA Y/O RESPONSABILIDAD RESPECTO DE GENERADORES Y ANTORCHAS PARA EL CORTE POR PLASMA.
PT	O USO DE CONSUMÍVEIS NÃO ORIGINAIS CEBORA ANULA AUTOMATICAMENTE QUALQUER GARANTIA E/OU RESPONSABILIDADE DO FABRICANTE NOS GERADORES E MAÇARICOS DE CORTE COM PLASMA.
FI	EI-ALKUPERÄISTEN KULUTUSOSIEN KÄYTÖN SEURAUKSENA CEBORA MITÄTÖI AUTOMAATTISESTI KAIKKI TAKUUT JA/TAI VAPAUTUU KAIKESTA VASTUUSTA VIRTALÄHTEIDEN JA PLASMALEIKKAUSPOLTINTEN OSALTA.
DA	BRUG AF FORBRUGSMATERIALER, SOM IKKE ER FREMSTILLET AF CEBORA, MEDFØRER AUTOMATISK BORTFALD AF ENHVER FORM FOR GARANTI OG/ELLER ANSVAR VEDRØRENDE STRØMKILDER OG SVEJSESLANGER TIL PLASMASKÆRING.
NL	DOOR HET GEBRUIK VAN CONSUMPTIEMATERIAAL DAT NIET DOOR CEBORA GELEVERD WORDT, VERVALT AUTOMATISCH ELKE GARANTIE EN/OF AANSPRAKELIJKHEID VOOR GENERATOREN EN PLASMA SNIJTOORTSEN.
SV	VID ANVÄNDNING AV FÖRBRUKNINGSDELAR SOM INTE ÄR CEBORA ORIGINALDELAR BORTFALLER GARANTIN AUTOMATISKT OCH/ELLER TILLVERKAREN AVSÄGER SIG ALLT ANSVAR FÖR GENERATORER OCH SLANGPAKET FÖR PLASMASKÄRNING.
PL	UŻYCIE CZĘŚCI EKSPLOATACYJNYCH INNYCH NIŻ ORYGINALNE DOSTARCZANE PRZEZ CEBORA UNIEWAŻNIA GWARANCJĘ ORAZ ZNOSI ODPOWIEDZIALNOŚĆ PRODUCENTA ZA AGREGATY PLAZMOWE ORAZ PALNIKI DO CIĘCIA PLAZMOWEGO.
EL	Η ΧΡΗΣΗ ΜΗ ΑΥΘΕΝΤΙΚΩΝ ΑΝΑΛΩΣΙΜΩΝ CEBORA ΑΚΥΡΩΝΕΙ ΑΥΤΟΜΑΤΑ ΤΗΝ ΟΠΟΙΑΔΗΠΟΤΕ ΠΑΡΕΧΟΜΕΝΗ ΕΓΓΥΗΣΗ Η/ΚΑΙ ΕΥΘΥΝΗ ΕΠΙ ΤΩΝ ΓΕΝΝΗΤΡΙΩΝ ΚΑΙ ΤΩΝ ΦΑΚΩΝ ΚΟΠΗΣ ΜΕ ΠΛΑΣΜΑ.

TABLE OF CONTENTS

This manual is part of the overall documentation and is invalid unless it is used in conjunction with the following parts of the documentation that you can consult in the Support-Documentation section of the website welding.cebora.it:

3301151	**General warnings**

IMPORTANT - Before using this device, read the instructions in this manual and in General Warnings manual code 3301151 carefully and make sure you understand them.
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.

Liability regarding system operation is expressly limited to the system's function. Further liability of any kind is expressly excluded.
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 provided in General Warnings manual code 3301151.

Observe the accident prevention regulations and the regulations in force in the country of installation (for example IEC EN 60974-4 and IEC EN 60974-9).

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 manufacturer therefore disclaims all liability for malfunctions or damage to its welding/cutting power sources and system components resulting from improper installation.

The welding or cutting power source complies with the regulations set out on the power source technical data plate.
Use of the welding or 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.

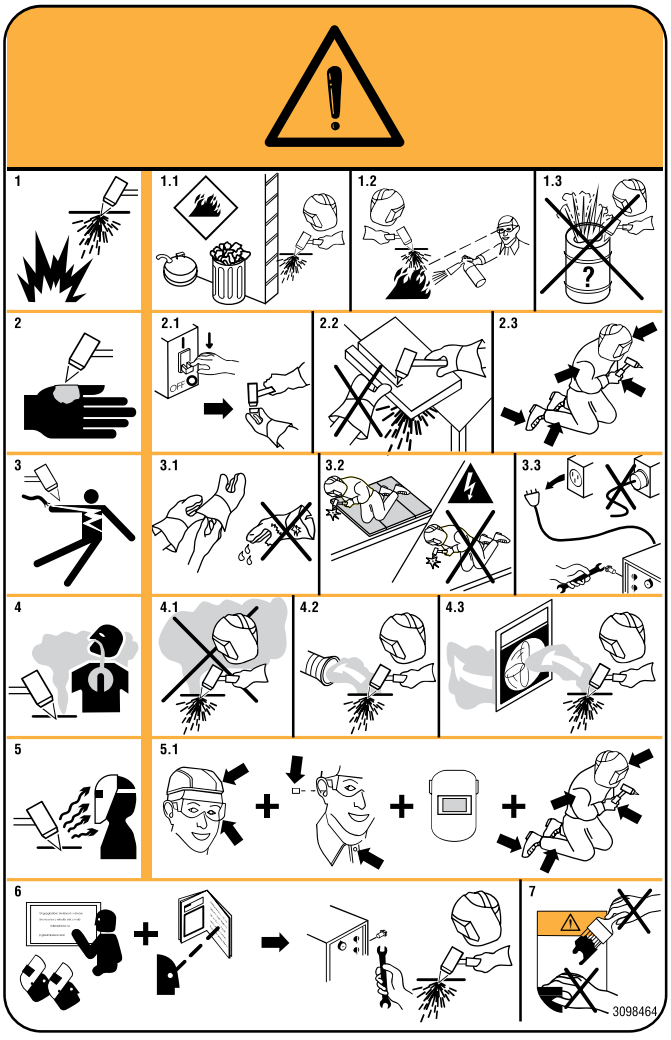
It is forbidden to connect two or more power sources in parallel without the prior written authorisation of the manufacturer, which will determine and authorise the procedures and conditions for the required application in compliance with current product and safety regulations.

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.

1.1 Warning plate



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

1. Sparks generated by cutting can cause explosions or fires.
1.1 Keep flammable materials well away from the cutting area.
1.2 Sparks caused by cutting can cause fires. Keep an extinguisher nearby and ensure that someone is ready to use it.
1.3 Never cut closed containers.
2. The plasma arc may cause injuries and burns.
2.1 Turn off the electrical power supply before removing the torch.
2.2 Do not keep material near the cutting pathway.
2.3 Wear a full-body protection.
3. Electric shocks caused by the torch or cable can be fatal. Protect yourself properly against the danger of electric shocks.
3.1 Wear insulated gloves. Never wear damp or damaged gloves.
3.2 Ensure you are insulated from the workpiece and the ground.
3.3 Disconnect the supply cable plug before working on the machine.
4. Inhaling fumes produced during cutting can be harmful to the health.
4.1 Keep your head away from the fumes.
4.2 Use a forced ventilation system or local exhaust to remove fumes.
4.3 Use a suction fan to remove fumes.

5. Arc rays may injure the eyes and burn the skin. Operators must therefore shield their eyes with lenses with a protection rating equal to or greater than DIN11 and protect their faces properly.
5.1 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.
6. Read the instructions before using the machine or carrying out any operation on it.
7. Do not remove or cover warning labels.

2 WARNINGS

DANGER

Before handling, unpacking, installing and using the welding/cutting power source, it is obligatory to read the General warnings manual code 3301151.

2.1 Lifting and transport

DANGER

For lifting and transport methods, refer to General warnings Manual code 3301151.

3 INSTALLATION

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).

3.1 Mains connection

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 Technical specifications table may be required for compliance with IEC 61000-3-11 and IEC 61000-3-12. 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.

DANGER

- Make sure that the mains voltage matches the voltage indicated on the specifications plate of the welding/cutting power source. 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.
- If mains power extensions are used, the cable supply cross-section must be appropriately sized. Do not use extensions longer than 30 m.
- 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.

3.2 Environmental and storage conditions

The device must be installed and operated only on an appropriate, stable, flat surface and not in the open air. The user must ensure that the ground is flat and not slippery and that the workplace is properly lit. Safe use of the device must be ensured at all times. The device can be damaged by particularly high quantities of dust, acids, gases or corrosive substances. Prevent the device from coming into contact with high quantities of smoke, steam, oil mist or grinding powders! Poor ventilation will result in reduced performance and damage to the device:

- Observe the recommended environmental conditions
- Leave cooling air inlets and outlets unobstructed
- Leave a minimum distance of 0.5 m from any obstructions

Ambient temperature range under working conditions from -10 °C to +40 °C, under transportation and storage conditions from -20 °C to +55 °C. Air relative humidity: up to 50% at 40 °C, up to 90% at 20 °C.

3.3 Gas cylinders

WARNING

Position the gas cylinders so that they are stable on a solid, flat base.
Secure the cylinders to prevent accidental falling: fasten the safety tape to the top of the gas cylinder. Never attach the safety tape to the cylinder neck.
Observe the gas cylinder manufacturer's safety instructions.

3.4 General Information

NOTICE

- During power-on with a high-frequency strike device, keep the earth cable and torch cable at least 30 cm apart to prevent sparking between them.
- The cable bundle must not exceed a total length of 30 m. Never stand between the welding cables. Connect the earth cable to the workpiece that is as close as possible to the welding or cutting area.
- In applications with multiple welding/cutting sources, make sure that the cable bundles of each source are spaced at least 30 cm apart.
- In applications with multiple sources, each power source must have its own connection to the welding/cutting workpiece. Never use a shared earth for multiple power sources.
- Install and use the device only in accordance with the protection class indicated on the data plate. During installation, leave a gap of 1 m around the device to ensure that cooling air can flow in and out freely.
- The use of non-original accessories may compromise the correct operation of the power source and even the integrity of the system, rendering any warranty and liability cover that the Manufacturer may provide for the welding power source null and void.

4 DESCRIPTION OF THE POWER SOURCE

This equipment is a direct current continuous power source designed for plasma arc cutting of electro-conducting materials (metals and alloys).
Together with the torch it forms a fully microprocessor-controlled, single-gas (air or nitrogen) plasma cutting system, with a maximum current output of 130 A (Item No. 603), 110 A/100 A @ U1= 400/230 VAC (Item no. 602), or 70 A (Item no. 601). All process parameters (material, gas and current) can be selected from the display and the optimal gas flow reading is automatically indicated according to the option selected.
Different consumable sets are available depending on the cutting current. These are calibrated and tested to obtain maximum cutting quality.

4.1 Front, rear and side views

(Fig. 4.1, 4.1/a, 4.1/b, 4.1/c, 4.1/d)

A) Power cable

B) Power switch

C) Gas supply fitting (1/4" gas female thread)

D) Gas pressure adjustment knob

E) Condensation collecting tray

F) Interface connectors (upon request for Item no. 502)

G) Socket for earth cable

H) Cutting parameters selection and adjustment knob

J) Fixed torch fitting

M) Mobile torch fitting

N) Screen for displaying cutting parameters and other information

ITEM NO 603

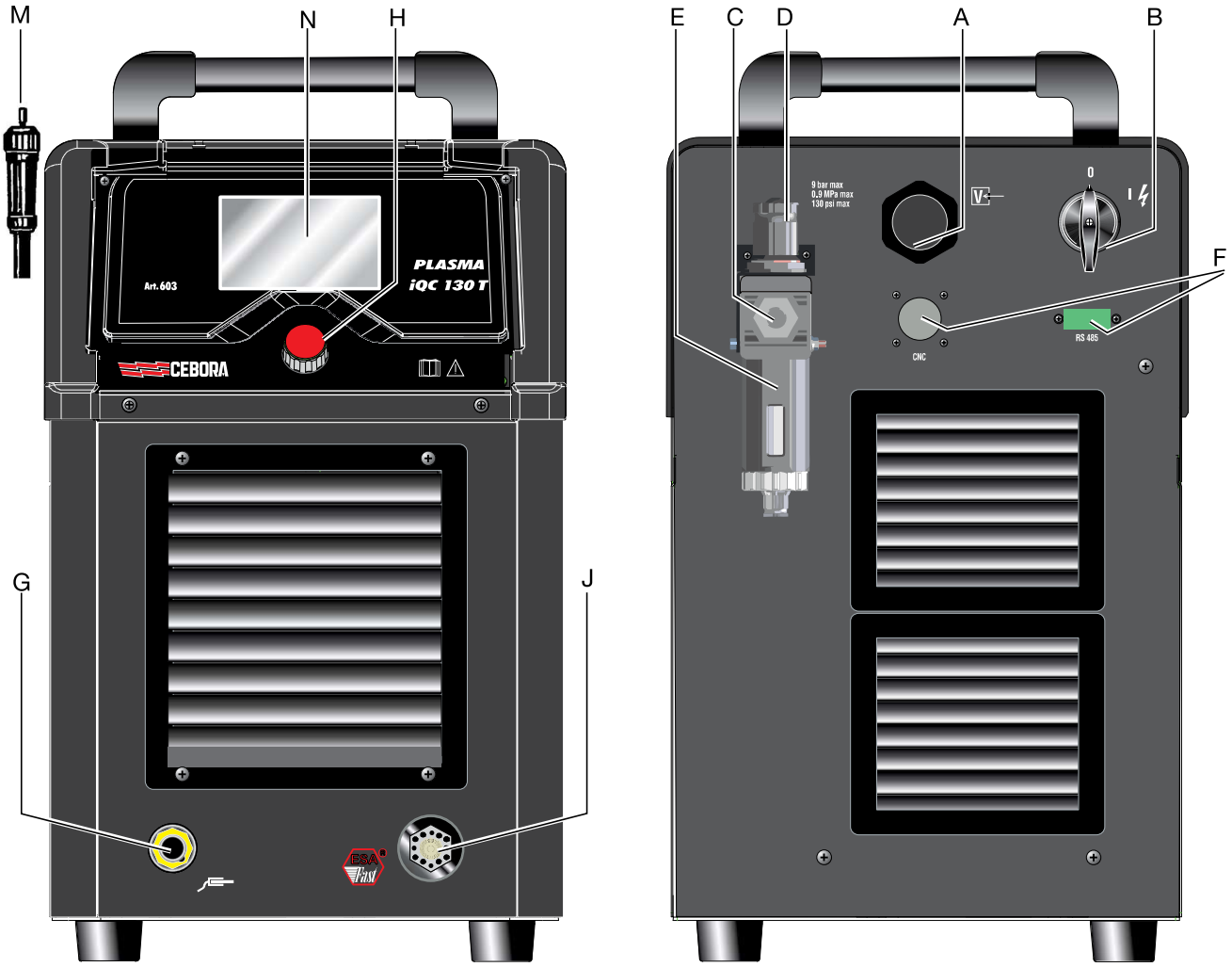


Fig. 4.1

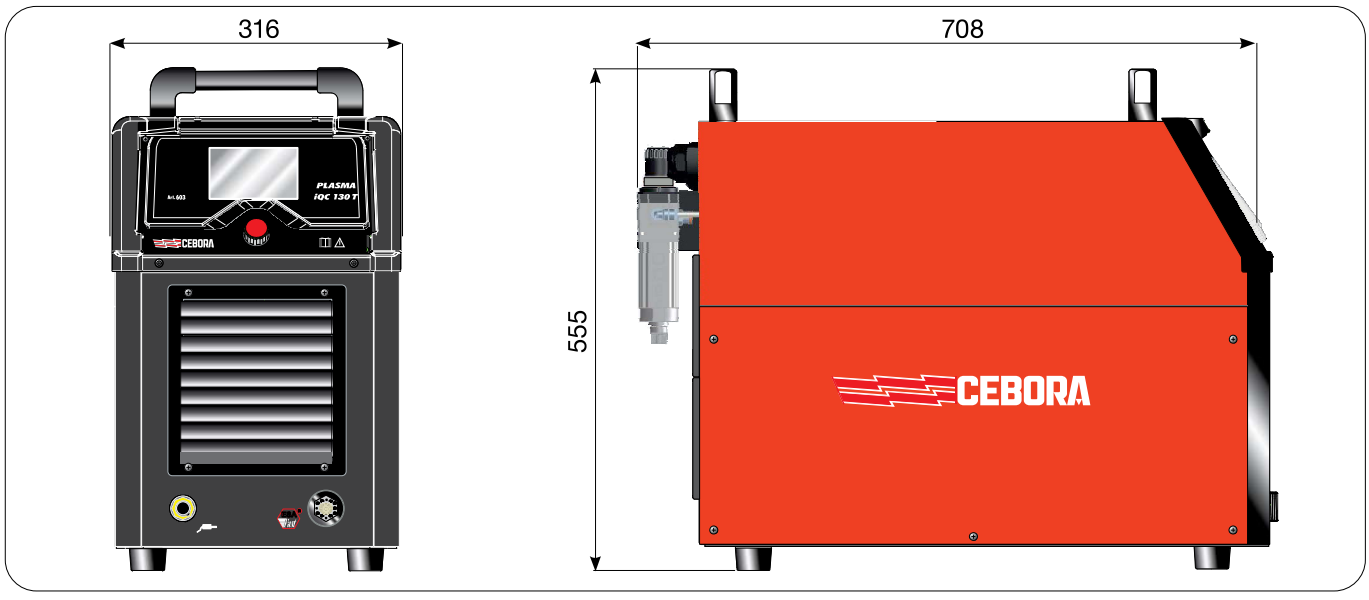


Fig. 4.1/a

ITEM NO 602

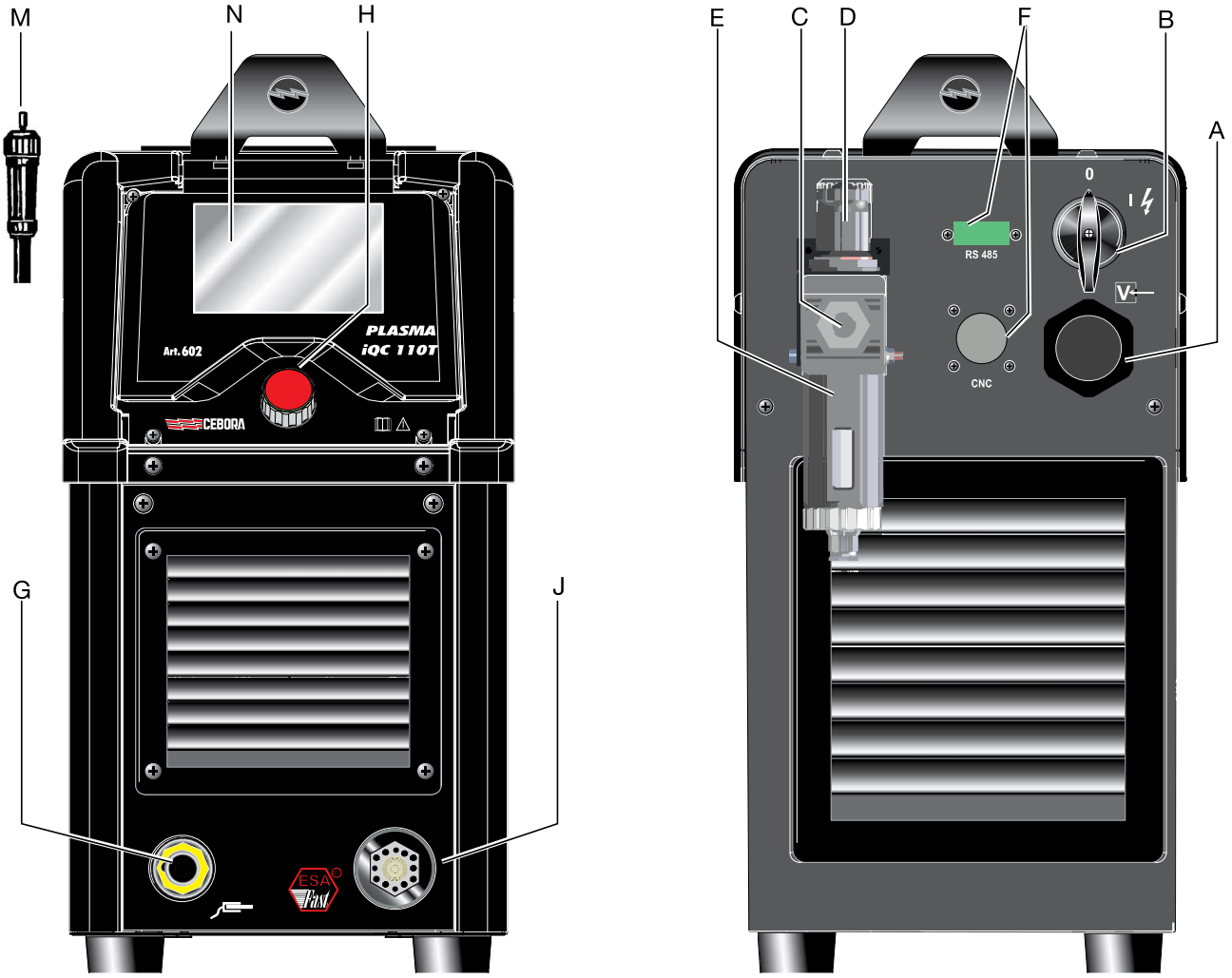


Fig. 4.1/b

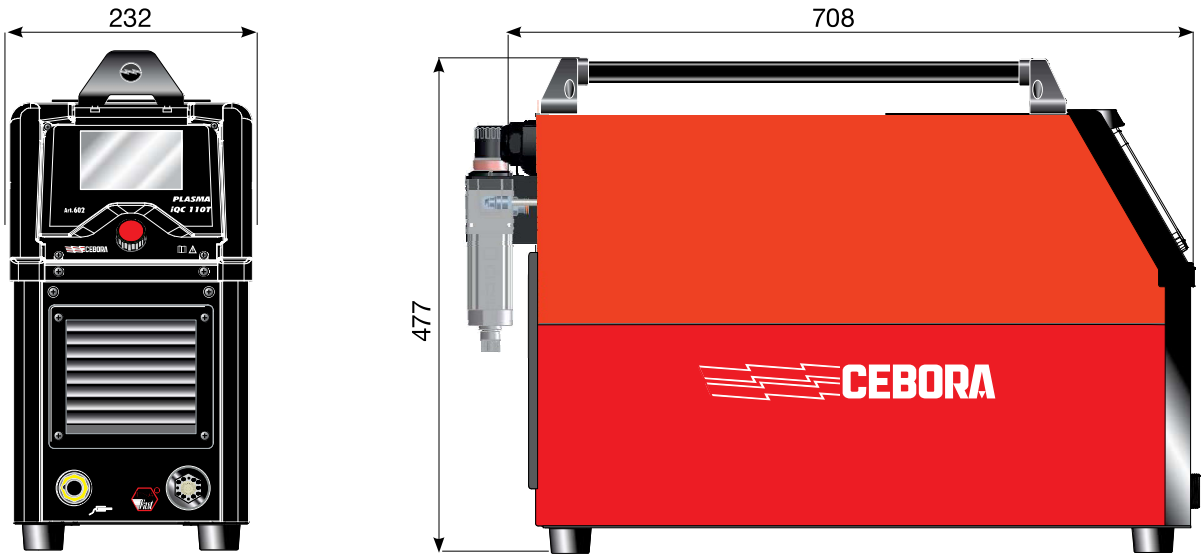


Fig. 4.1/c

ITEM NO 601

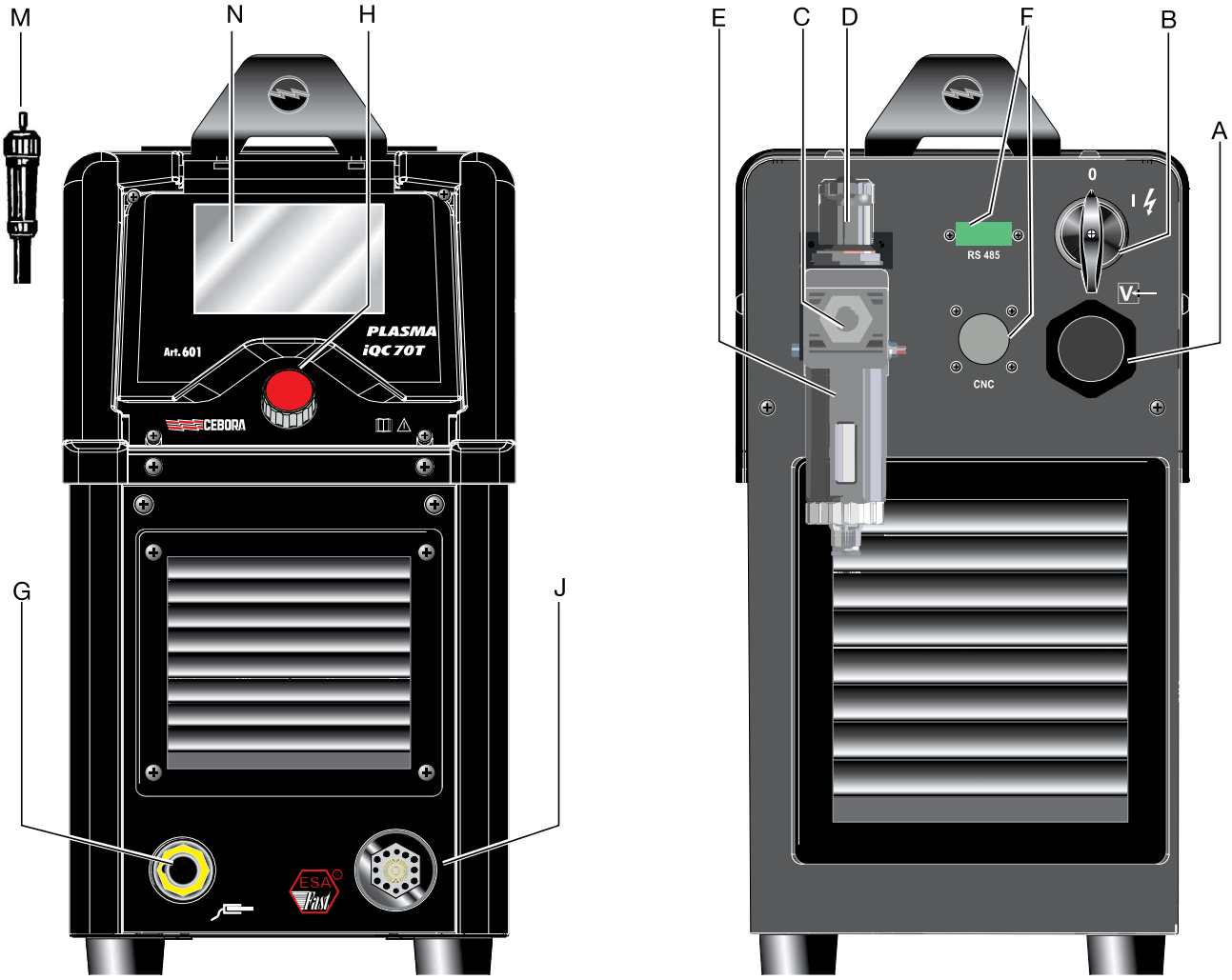


Fig. 4.1/d

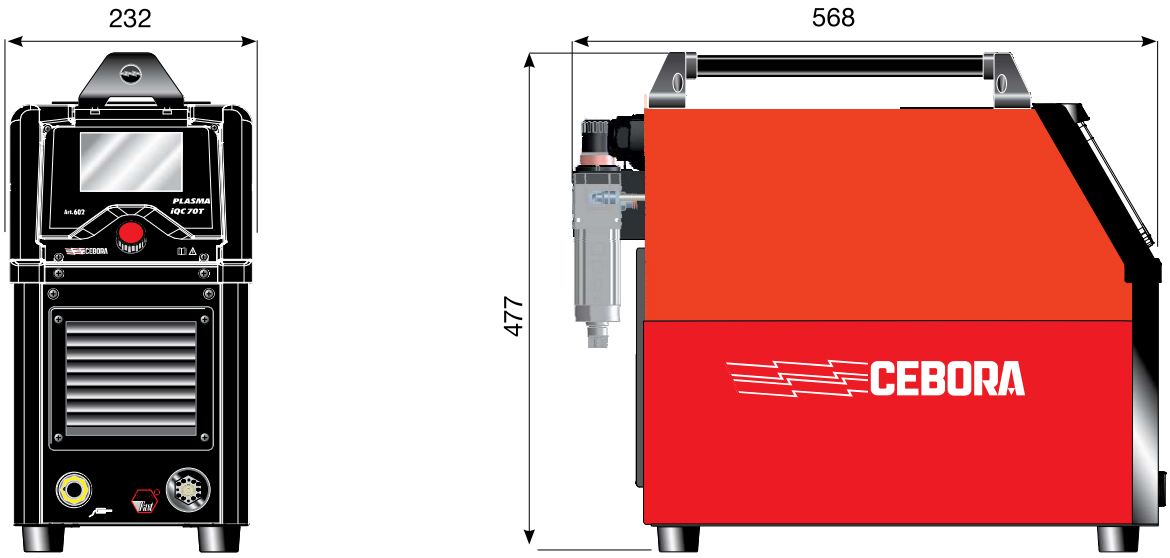
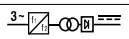


Fig. 4.1/e

4.2 Explanation of the technical specifications listed on the machine plate.

	Three-phase static transformer-rectifier frequency converter.
No.	Serial number
	Descending feature
	Suitable for plasma cutting
Torch type	Type of welding torch that forms a safe system when used with this equipment.
U0	Secondary open-circuit voltage (peak value)
X	Duty cycle percentage Expresses the percentage of 10 minutes during which the device may run at I2 current and U2 voltage without overheating.
I2	Cutting current
U2	Secondary voltage with I2 cutting current. This voltage depends on the distance between nozzle and the workpiece. **If this distance increases also the cutting voltage increases and the duty cycle X% may decrease**.
U1	Rated supply voltage
3~ 50/60Hz	50 or 60-Hz three-phase power supply
I1 max.	Max. current consumption at the corresponding current I2 and voltage U2
I1 eff.	Maximum value of the current consumed, considering the duty cycle*
IP23S	Degree of protection. The power source is protected against solid foreign bodies larger than 12 mm (IP2X) and against rain only if it is not powered (IPX3S).
	Suitable for use in high-risk environments

* This value usually corresponds to the capacity of the fuse (delayed type) to be used as a protection for the equipment.

4.3 Gas: Specifications and working conditions

The specifications of the gases used, together with their purity and working conditions, are shown below.

GAS	CONCENTRATION	MAX. INLET PRESSURE	FLOW RATE
Air	Clean, dry and oil free in compliance with ISO 8573-1: 2010 standard. Class 1.4.2 (particulate-water-oil)*	0.9 MPa (9 bar/ 130 psi)	295 l/min
Nitrogen	99.997%	0.9 MPa (9 bar/ 130 psi)	295 l/min

* the ISO 8573-1:2010 standard specifies the following for Class 1.4.2:
- Particulate: ≤ 20,000 solid particles per m3 of air with sizes between 0.1 and 0.5 µm;
  ≤ 400 solid particles per m3 of air with sizes between 0.5 and 1.0 µm;
  ≤ 10 solid particles per m3 of air with sizes between 1.0 and 5.0 µm.
- Water: the dew point in air pressure must be less than or equal to 3°C.
- Oil: the total oil concentration must be less than or equal to 0.1 mg per m3 of air.

5 SET-UP

5.1 Unpacking and assembly

The weight of the power source is as specified in the relevant technical specifications table, and requires the use of appropriate lifting and handling equipment.

The power source takes air from the rear and ejects it through the grates on the front. Position the power source in order to ensure a wide ventilation area and maintain a distance of at least 1 m from any walls.
Do not stack the power source or place anything on it.
Position the power source on a mainly flat surface with a gradient of no more than 10°.

5.2 Welding torch assembly

After inserting the mobile fitting **M** into the fixed fitting **J**, fully tighten the fitting collar **M** to prevent air leaks that could hinder effective operation.
Do not dent the contact tip, do not bend the mobile fitting **M** pins.

5.3 Connecting the power source

The machine must be installed by professional personnel. All connections must be carried out according to current regulations, and in full observance of accident prevention laws (CEI 26-36 /IEC60974-9 standard).

Connect the gas supply to fitting **C** making sure that the system can deliver sufficient flow and pressure to the torch being used.
If the air is supplied from a compressed air cylinder, the cylinder must be equipped with a pressure regulator; **never connect a compressed air cylinder directly to the machine regulator. Pressure may exceed the regulator's capacity and it could explode.**

Connect the power cable **A**: the yellow-green lead of the power cable must be connected to an efficient earth system; the remaining leads must be connected to the power supply line by means of a switch, located near the cutting area if possible to permit fast deactivation in an emergency.
The capacity of the circuit breaker or fuses in line with the circuit breaker must be the same as current I1eff consumed by the device during cutting.
Max current I1eff consumed can be deduced by reading the technical data on the device against available supply voltage U1.
Extension cords must have a section complying with the maximum absorbed voltage I1eff.

6 USE

When the device is turned on by means of the knob **B** on the back panel of the power source, the display **N** shows:

Fig. 6

- the name of the power source line
- the power source firmware version and release date

After a few seconds, the display **N** will show the relevant main screen for the recognised torch:

- MAR (see section 6.1), or
- DAR (see section 6.2)

6.1 CP180C MAR / CP 71C MAR torches

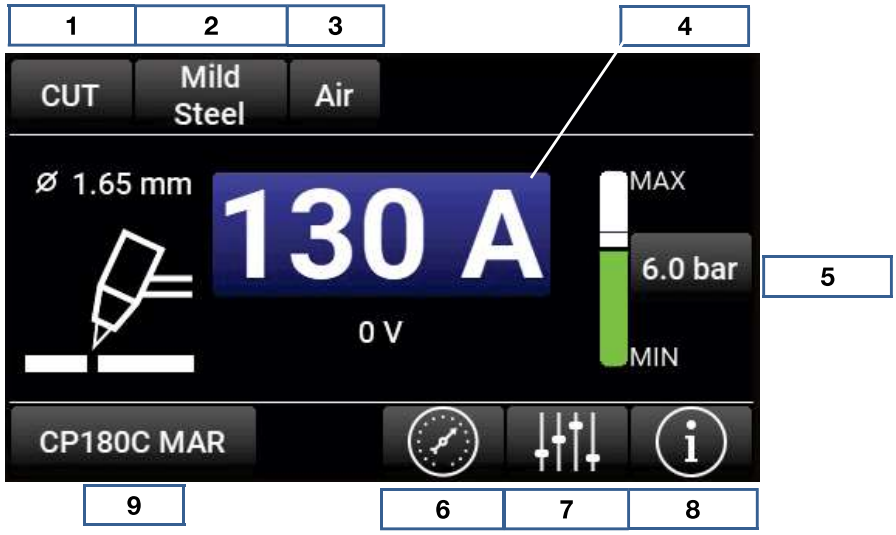


Fig. 6.1

Knob **H** is used to select the various items, namely:

1. Process type
2. Material type
3. Cutting gas
4. Working current
5. Working pressure
6. Power source status
7. Settings
8. Information on the power source
9. Information on the torch

Press the knob **H** over the selected item to enter modification mode (the background will become white)**.** Press it again to return to selection mode**.** The first time the system is started up, some parameters must be set; to do so, go to item (7) *Settings.*

6.1.1 Settings

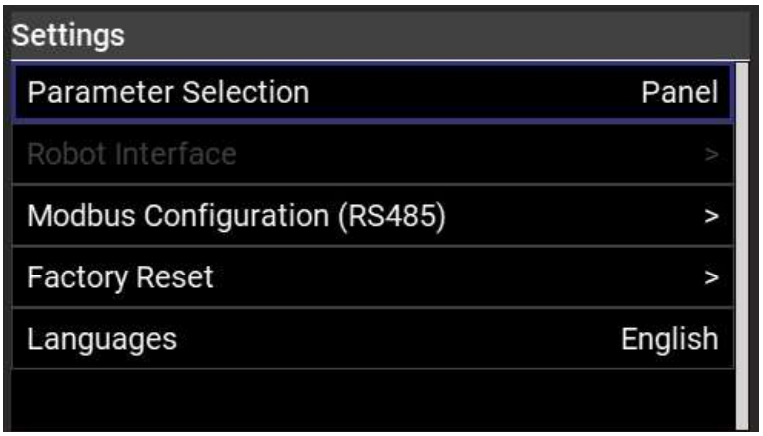


Fig. 6.1.1

Set the following:

- Parameter Selection
  - Panel: to manage the settings from the display of the power source, using knob **H**
  - Modbus: to manage the power source settings using a Modbus – RS485 (this requires using the Item no. 502 kit and selecting the *Modbus Configuration setting (RS485)* = ON)
- Factory Reset: restores the factory setup
- Language: select the required language

6.1.2 Cutting (“CUT” operating mode)

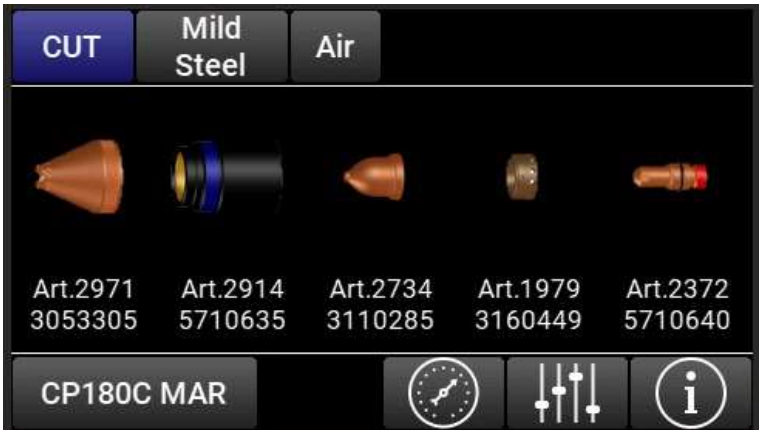


Fig. 6.1.2

Choose the type of material to be cut (*Mild Steel*, *Stainless Steel* or *Aluminium*) and the cutting gas (*Air* or Nitrogen N2).

Then regulate the cutting current based on:

- type of material chosen and the thickness to be cut
- the gas used

following directions shown in the cutting tables.
While the current is adjusted, display **N** will show the correct diameter of the nozzle to be used.

Now the correct working pressure can be set by selecting the relevant item (5) and pressing knob H: gas then flows from the torch.

Now turn pressure regulator knob **D**. The meanings of the working pressure colour are as follows:

- green = correct value
- yellow = temporarily acceptable value
- orange = incorrect value

Once the pressure is adjusted, lock knob **D** by pushing it downward.

Figure 6.1.2 shows the correct consumables set for the above setting.
Press the torch trigger to strike the pilot arc. If you do not start cutting, after 2 seconds the pilot arc goes out; to turn it back on, press the trigger again.
Do not keep the pilot arc lit unnecessarily in the air, as this will increase consumption of the electrode, swirl ring and nozzle.

Connect the earth cable clamp to the workpiece and make sure that the clamp and the workpiece are in good electrical contact, especially with painted sheet metal, oxidized, or insulated metal. Do not connect the clamp to the piece of material to be removed.

Hold the torch upright while cutting.
Once cutting is completed and after having released the trigger, air will keep coming out of the torch to allow it to cool. **Do not turn off the unit before this time has elapsed.**

When holes are to be cut or cutting must be started from the workpiece centre (see Fig. 6.1.2/a) the welding torch must be placed in an angled position and then slowly straightened to prevent melted metal from being sprayed onto the nozzle guard. This must be done when making holes in pieces thicker than 3 mm.

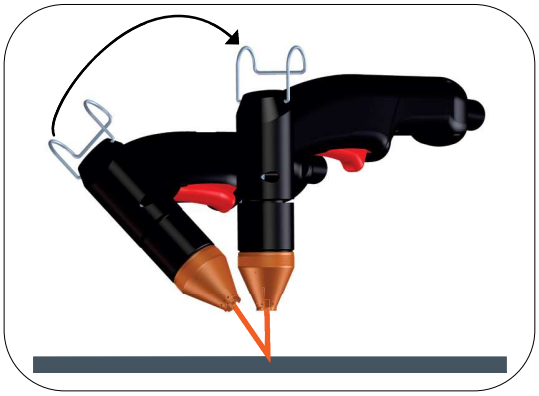


Fig. 6.1.2/a

If making circular cuts, we recommend using the special calipers supplied upon request.
It is important to remember that the calipers may make it necessary to employ the above-mentioned starting technique.

6.1.3 Grid cutting (FAST RESTART operating mode)

Fig. 6.1.3

To cut drilled plates or grids, select this operating mode.

See the CUT operating mode section for:
- the material, gas and cutting current settings
- the adjustment of the working pressure
- the consumables set.

At the end of cutting, if the user continues to press the pushbutton, the plasma arc stays enabled but switches to pilot arc mode and is therefore ready to transfer again without delay.

6.1.4 Spot marking (“SPOT” operating mode)

Fig. 6.1.4

Select this mode to carry out spot mark operations.
A spot mark is a particular type of mark where the trace takes the form of a spot instead of a line or any design typical of normal marking.

See the CUT operating mode section for:
- the material, gas and cutting current settings
- the adjustment of the working pressure
- the consumables set

Throughout the spot marking operation, select the relevant item and press knob **H** to adjust the time.

The setting ranges are:
- spot marking current = 10 - 39 A
- spot marking time = 0.01 - 1.00 s

6.1.5 Marking (“MARK” operating mode)

Fig. 6.1.5

Plasma marking is a sheet metal engraving process involving the production of lines, designs or alphanumeric characters.
See the CUT operating mode section for:
- the material, gas and cutting current settings
- the adjustment of the working pressure
- the consumables set

The setting ranges are:
- marking current = 5 - 19 A for Item no. 603 or 10 - 19 A for Item nos. 602 and 601

6.1.6 Gouging (“GOUGE” operating mode)

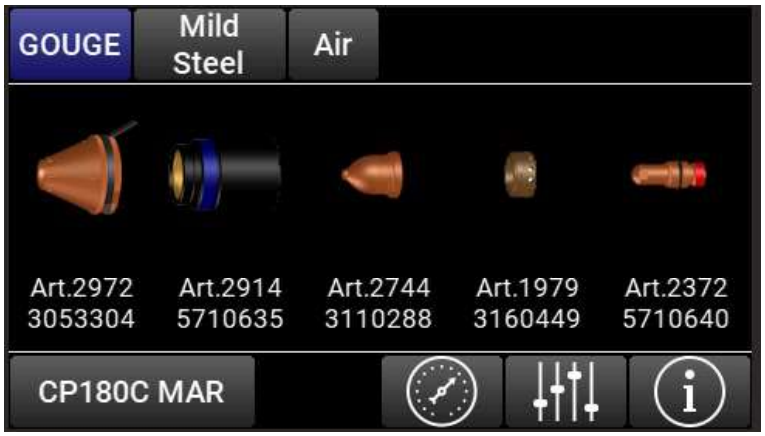


Fig. 6.1.6

Fig. 6.1.6/a

Select this mode to run gouging operations.

This operation makes it possible to remove defective welds, separate welded pieces, prepare edges, etc. For this operation use the appropriate nozzle (see Fig.6.1.6).

The current value to be used varies from 60 A - 130 A for Item no. 603, to 60 A - 110 A for Item no. 602 and 50 A - 70 A for Item no. 601, depending on the thickness and quantity of material to be removed. With the welding torch in slanted position proceed towards the melted metal so that the gas coming out of the welding torch keeps it away (see Fig.6.1.6/b).

The welding torch slanted position versus the workpiece depends on the penetration you want to obtain. As melted dross tends to stick to the nozzle holder and nozzle guard during this procedure, it is best to frequently clean them so as to avoid double arc events which may destroy the nozzle in a matter of seconds.

Given the strong (infra-red and ultraviolet) radiation emission during this operation, it is recommended that the operator and people in the vicinity wear adequate PPE.

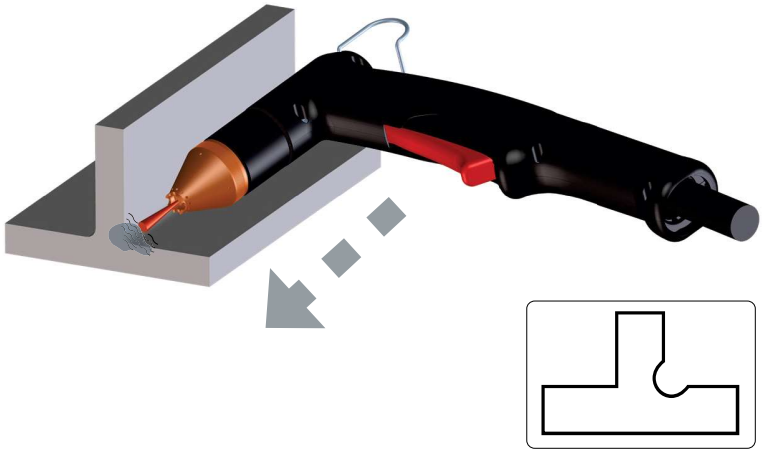


Fig. 6.1.6/b

6.2 CP180C DAR / CP71C DAR torches

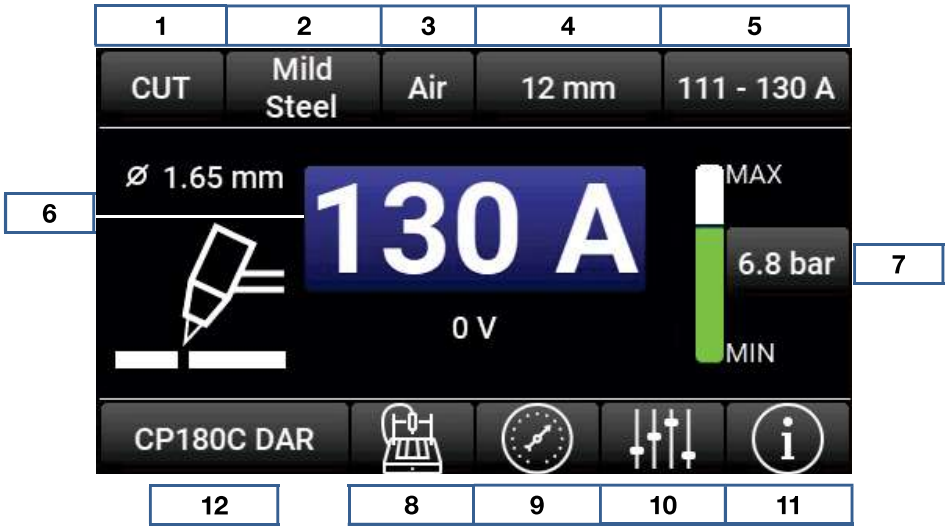


Fig. 6.2

Knob **H** is used to select the various items, namely:

1. Process type
2. Material type
3. Cutting gas
4. Material thickness
5. Working current range
6. Working current
7. Working pressure
8. Process parameters
9. Power source status
10. Settings
11. Information on the power source

12 Information on the torch

Press the knob **H** over the selected item to enter modification mode (the background will become white)**.** Press it again to return to selection mode**.** The first time the system is started up, some parameters must be set, by going to item (10) *Settings*.

6.2.1 Settings

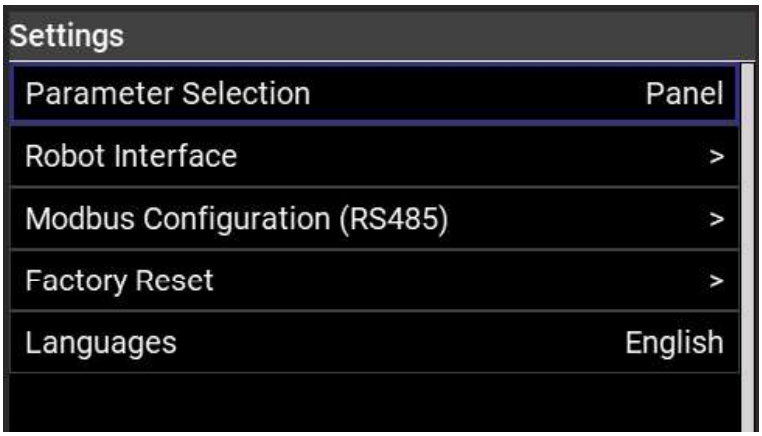


Fig. 6.2.1

Set the following:

- Parameter Selection
  - Panel: to manage the settings from the display of the power source, using knob H
  - Modbus: to manage the power source settings using a Modbus – RS485 (this requires using the Item no. 502 kit and selecting the *Modbus Configuration setting (RS485)* = ON)
  - Connector: to manage the power source settings using CNC connector signals
- Robot interface: see Fig.6.2.1/a and the corresponding description
- Factory Reset: restores the factory setup
- Language: select the required language

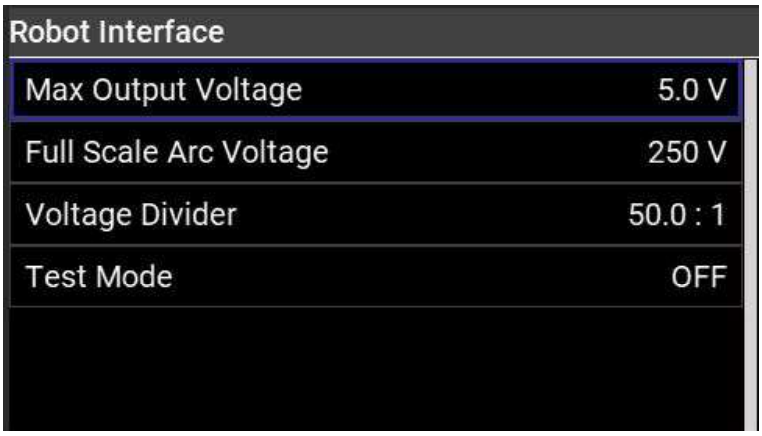


Fig. 6.2.1/a

Set the following:

- Robot interface
  - Max Output Voltage Vmax: maximum voltage value available on the relevant pins of the CNC connector, Item no. 502. Settable values: 2.0 - 10.0 V
  - Full Scale Arc Voltage Vfs: arc voltage value equal to the maximum voltage value on the pins of the CNC connector, Item no. 502. Settable value: 100 - 400 V.
  - Voltage Divider: voltage divider of the arc voltage obtained as the result of Vfs/Vmax. Settable value: 20.0:1 - 80.0:1
  - Test Mode: test mode of interface kit Item no. 502, which is useful for calibrating the pantograph/CNC voltage measurement. The output voltage value set coincides with an arc voltage of 125 V. When the START command is given, the transferred arc signal is also enabled, without switching on the power source.

6.2.2 Cutting (“CUT” operating mode)

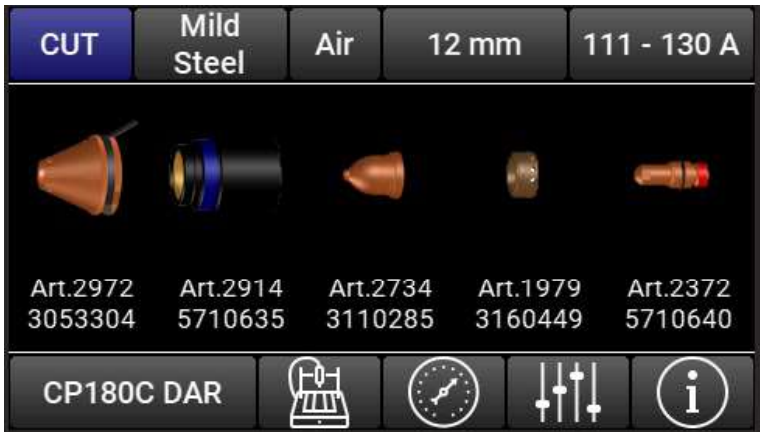


Fig. 6.2.2

Choose, in sequence:

- ♦ the type of material to be cut (*Mild Steel*, *Stainless Steel* or *Aluminium*)
  - – the cutting gas (*Air* or Nitrogen N2)
- ♦ the thickness and cutting current

The cutting current can be adjusted within the selected range; to do so, follow the directions provided in the cutting tables.

Now the correct working pressure can be set by selecting the relevant item and pressing knob **H**: gas then flows from the torch.

Now turn pressure regulator knob **D**. The meanings of the working pressure colour are as follows:

- ♦ green = correct value
- ♦ yellow = temporarily acceptable value
- ♦ orange = incorrect value

Once the pressure is adjusted, lock knob **D** by pushing it downward.

Figure 6.2.2 shows the correct consumables set for the above setting.

Once the parameters have been set as described above, the power source is ready for cutting using the CNC/robot commands.
Closely follow the instructions contained in the cutting chart regarding the pierce height, the working height and the maximum cutting thickness depending on the current (see fig. 6.2.2/a).
Also refer to the instruction manual of the optional kit (art. 502) for the pantograph connection.
Once cutting is completed and the CNC/robot has stopped, air will keep coming out of the torch to allow it to cool. **Do not turn off the unit before this time has elapsed.**

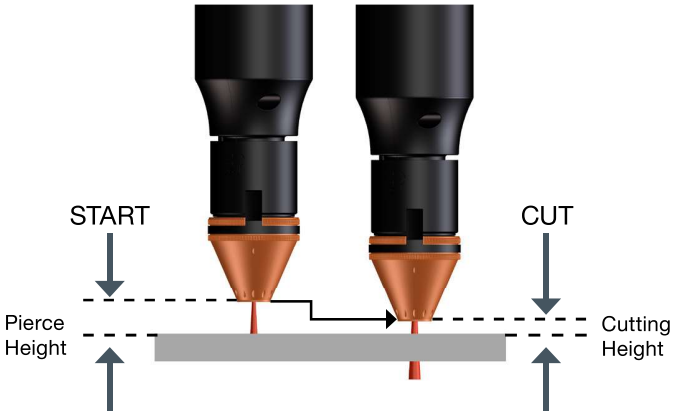


Fig. 6.2.2/a

6.2.3 Grid cutting (FAST RESTART operating mode)

Fig. 6.2.3

To cut drilled plates or grids, select this operating mode.
See the CUT operating mode section for:

- the material, gas and cutting current settings;
- the adjustment of the working pressure;
- the consumables set.

At the end of cutting with the pantograph/robot, the plasma arc automatically switches to pilot arc mode and the transferred arc signal stays enabled: the power source is therefore ready to transfer again without delay and without having to give the START command again.
To avoid excessive wear of the electrode and nozzle, only use this function when required.

It is possible to switch directly from cutting mode to “Fast Restart” mode with a signal in the relevant pins of the CNC connector, Item no. 502. To do so, go to the *Settings* screen -> *Parameter Selection* and select the Modbus or *Connector* option.

6.2.4 Spot marking (“SPOT” operating mode)

Fig. 6.2.4

Select this mode to carry out spot mark operations.
A spot mark is a particular type of mark where the trace takes the form of a spot instead of a line or any design typical of normal marking.
See the CUT operating mode section for:

- the material, gas and cutting current settings
- the adjustment of the working pressure
- the consumables set

Throughout the spot marking operation, select the relevant item and press knob **H** to adjust the time.
Using the pins in the Item no. 502 interface kits, it is possible to switch from cutting mode to spot marking mode (CUT -> SPOT) and vice versa.

The setting ranges are:

- spot mark current = 10 - 39 A
- spot marking time = 0.01 - 1.00 s

6.2.5 Marking (“MARK” operating mode)

Fig. 6.2.5

Plasma marking is a sheet metal engraving process making it possible to produce lines, designs or alphanumeric characters.

See the CUT operating mode section for:

- the material, gas and cutting current settings
- the adjustment of the working pressure
- the consumables set

Using the pins in the Item no. 502 interface kits, it is possible to switch from cutting mode to marking mode (CUT -> MARK) and vice versa.
The setting range is:

- marking current = 5 - 19 A for Item no. 603 or 10 - 19 A for Item nos. 602 and 601

6.3 Additional functions

Other power source parameters can be consulted or set by selecting one of the icons in the bottom right-hand part of Fig. 6.1 or Fig. 6.2.
A short description of the relevant features is provided below.

6.3.1 Process parameters

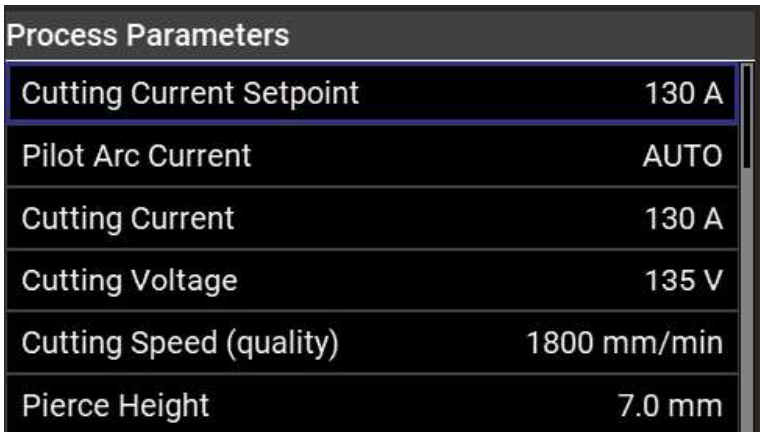


Fig. 6.3.1

Fig. 6.3.1/a

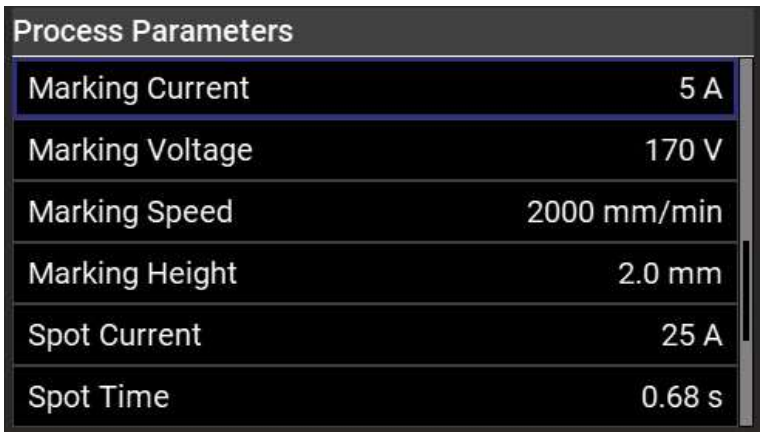


Fig. 6.3.1/b

All the parameters in the cutting tables relating to the settings described above can be **displayed**:

- Cutting current
- Cutting voltage
- Cutting Speed - quality
- Pierce Height
- Pierce Delay
- Cutting Height
- Kerf Width
- Edge Start
- Marking Current
- Marking Voltage
- Marking Speed
- Marking Height

It is also possible to **set** the following parameters:

- Cutting Current Setpoint
- Pilot Arc Current.
  Values from 15 to 40 A can be set; the default value is used if AUTO is selected.
- Marking Current Setpoint
- Spot Current
- Spot Time

6.3.2 Machine status

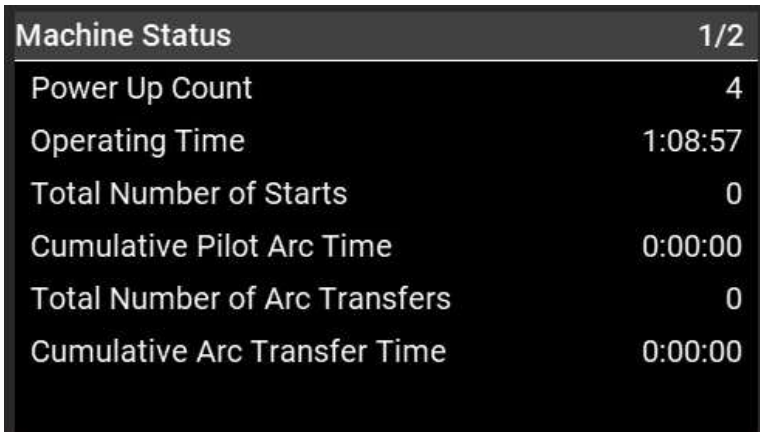


Fig. 6.3.2

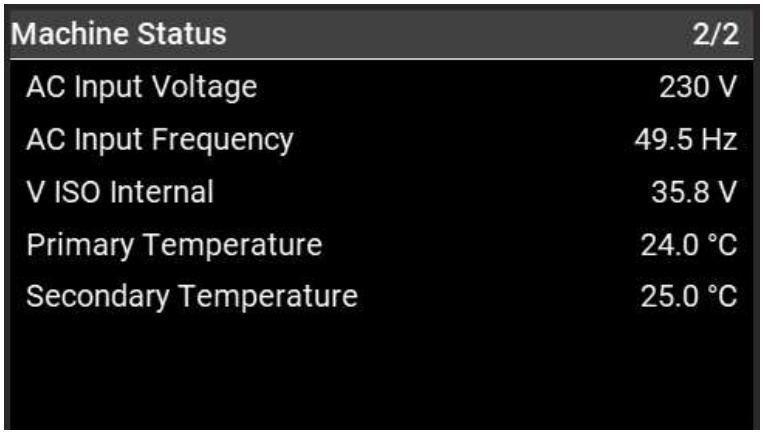


Fig. 6.3.2/a

The different power source use parameters can be **displayed**:

- Power Up Count: total number of times the power source has been powered up.
- Operating Time: total power source running time
- Total Number of Starts: total number of times the pilot arc has been started
- Cumulative Pilot Arc Time: total time in pilot arc status
- Total Number of Arc Transfers: total number of pilot arc transfers on to the workpiece to be cut
- Cumulative Arc Transfer Time: total time in arc transfer status
- AC Input Voltage: power source power supply
- AC Input Frequency: power source power supply frequency
- V ISO Internal: internal service voltage of the power source
  Generally speaking:
  - 33V ≤ V_ISO ≤ 43V for U1 = 400 VAC
  - 37V ≤ V_ISO ≤ 47V for U1 = 230 VAC
- Primary Temperature: temperature shown by the primary sensor
- Secondary Temperature: temperature shown by the secondary sensor

6.3.3 Information

Fig. 6.3.3

As regards Fig. 6.1 and 6.2, select item 8 or 11 respectively to display information on the power source:

- QR code: redirects the user to the power source web page
- Power source name and item number
- The power source firmware version and release date

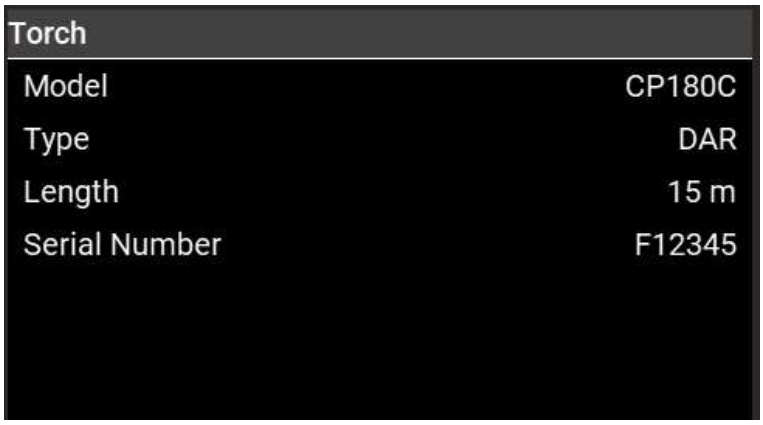


Fig. 6.3.3/a

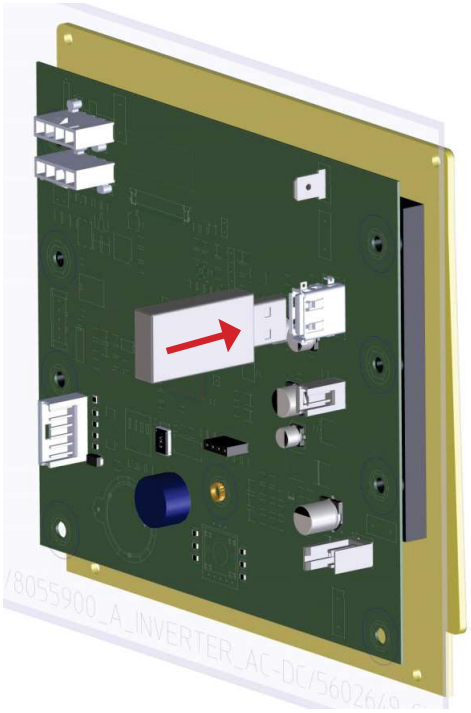
As regards Fig. 6.1 and 6.2, select item 9 or 12 respectively to display information on the torch:

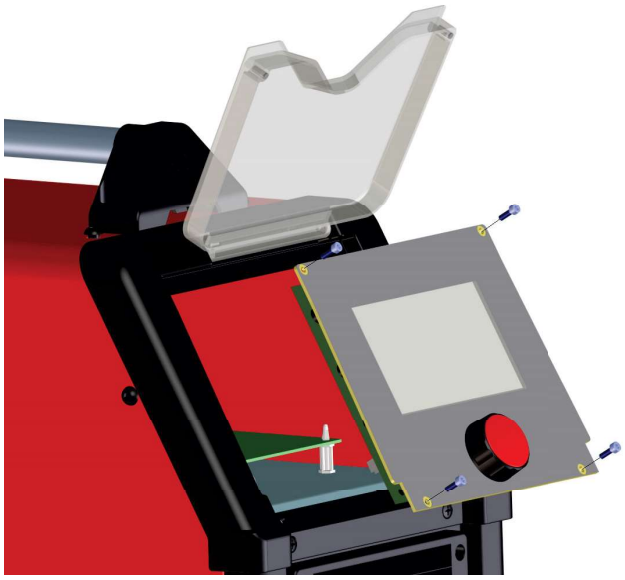
- Model: torch model
- Type: torch type, i.e. MAR (manual torch) or DAR (torch for automatic use)
- Length: length of the torch in metres
- Serial Number: serial number of the torch used, to be provided when requesting assistance

7 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 (see figure 6.1, point 8).

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

8 REPLACING THE CONSUMABLES

IMPORTANT: switch the power source off before replacing any consumables.

With reference to Fig. 7 and 7/A for torch CP CP180C and Fig. 7/B for torch CP CP71C, the parts subject to wear are as follows: electrode **A**, swirl ring **B**, nozzle **C** and nozzle guard **E**. These should be replaced after unscrewing nozzle holder **D**. Sometimes, for torch CP 180C, it may be necessary to clean the inside of swirl ring **B**. If necessary, use the appropriate tool as indicated in figure 7/A**.** Electrode A must be replaced when it shows a crater approx 1**.**2 mm at the centre.

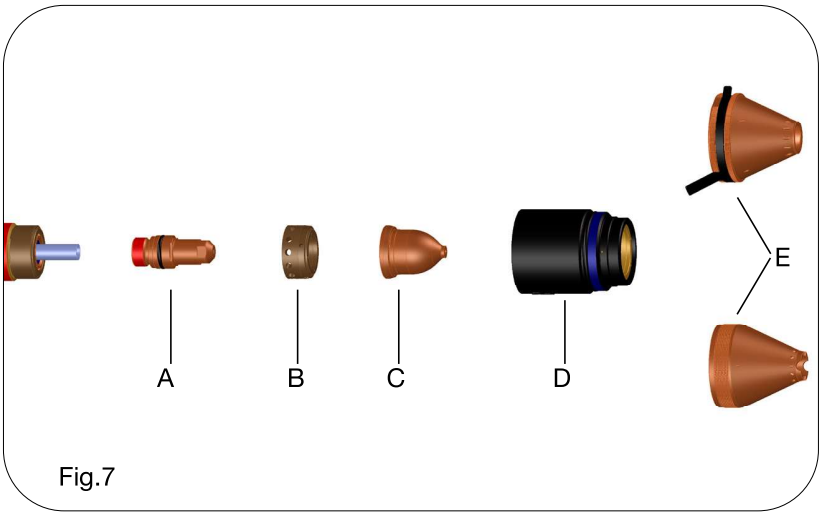


Fig.7

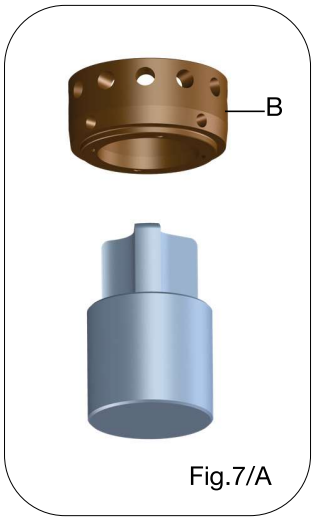
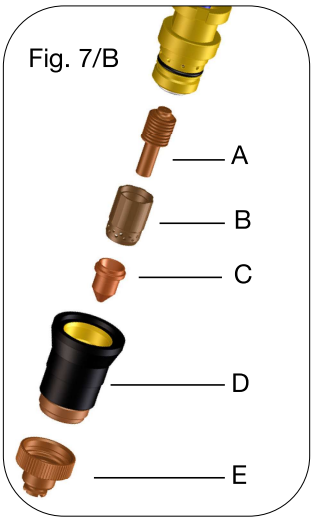


Fig.7/A



CAUTION: torch CP180C has a left-hand thread electrode. When unscrewing the electrode do not force it but apply force gradually until the thread is released. The new electrode must be screwed into its seat and locked without fully tightening.

Nozzle **C** is to be replaced when its central hole is damaged or enlarged as compared to a new one. Delaying replacement of electrode and nozzle causes part overheating, which can reduce the lifetime of swirl ring **B**.
After replacement, check that nozzle holder **D** is sufficiently tightened**.**

CAUTION: screw nozzle holder **D** onto the welding torch body only when electrode **A**, swirl ring **B**, nozzle **C** and nozzle guard **E** are fitted.

If these parts are not present, device operation and the operator's safety are at risk.

9 HINTS

- Power the power source with air of the purity stated in section 4.3
- Should the equipment air contain plenty of moisture and oil the use of a filter dryer is recommended**.** This will prevent excessive oxidation and wearing of consumables, welding torch damage and reduction in cutting rapidity and quality.
- Air impurities cause oxidation of the electrode and nozzle and may make pilot arc start-up more difficult. If this condition is present, clean the electrode terminal end and the nozzle interior with thin abrasive paper.
- Make sure that the new electrode and nozzle that are going to be assembled are perfectly clean and and oil-free.
- To avoid welding torch damage always use Cebora original parts.

10 CUTTING QUALITY

Various parameters and parameter combinations influence cutting quality: this manual gives the optimal settings for cutting a given material. However, the optimum parameters may require changes from those given in the cutting charts due to inevitable differences caused by installation on different pantographs and changes in the properties of the materials being cut.

NOTE: the data provided in the cutting tables are obtained in CEBORA S.p.A. laboratories with new consumables.

The following points can help the user to make the changes required to achieve a good quality cut.

Generally speaking, different cutting currents can be used for each thickness of a given material.
If high productivity requirements take precedence, set the maximum permitted current. Conversely, if the focus is on cutting quality (more squaring and a narrower cutting groove), choose a current for which the thickness being processed is at about mid-table height.
In any case, for automatic pantograph or robot cutting, initially set the speed shown in the 'Quality cutting speed'.
The cutting tables also show the 'Maximum cutting speed', which is the highest speed that can be achieved with manual cutting.
Before making any adjustments check that:

- the torch is at right angles to the cutting plane;
- electrode, nozzle and nozzle guard are not excessively worn and their combination is suitable for the chosen work;
- the cutting direction is correct for the figure to be obtained. Remember that the best cutting side is always clockwise in relation to the direction of motion of the torch (the holes in the plasma swirl ring used are arranged clockwise).

If high thicknesses are to be cut, particular care must be taken during the pierce phase: in particular, try to remove the build-up of molten metal around the hole from which cutting is started in order to prevent double-arc effects when the torch passes back over the starting point. In addition, always keep the nozzle guard free of any molten metal slag that may have stuck to it.

PROBLEM	CAUSE	SOLUTION
Inclined cut	Worn electrode or nozzle	Replace both
	Stand off too high	Lower the *stand off*
	Cutting speed too high	Adjust the speed
Insufficient penetration	Cutting speed too high	Adjust the speed
	Nozzle diameter too big for the current setting	Check the cutting charts
	Workpiece too thick for the current setting	Increase the cutting current
	Electrical contact between the earth cable and the cutting chart is not good	Check tightening of the earth terminal to the CNC
Presence of low-speed dross*	Cutting speed too low	Adjust the speed
	Cutting current too high	Decrease the cutting current
	Stand off too low	Raise the *stand off*
Presence of high-speed dross**	Cutting speed too high	Adjust the speed
	Cutting current too low	Increase the cutting current
	Stand off too high	Lower the *stand off*
Rounded cutting edge	Cutting speed too high	Adjust the speed
	Stand off too high	Lower the *stand off*

* *Low speed dross* is thick and globular, easily removable. The *kerf* is quite wide.
** *High speed dross* is thin and difficult to remove. If the speed is very high, the walls of the cut are somewhat rough.

11 MAINTENANCE AND REPAIR WORK

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

11.1 Power source and torch maintenance

Proper maintenance of the power source and torch ensures optimal performance and lengthens the life of all its components, including the consumables. It is therefore advisable to carry out the operations listed in the following table.
If a component is found to be excessively worn or operating irregularly following inspection, contact the CEBORA Assistance Service.

PERIOD	MAINTENANCE OPERATIONS
Daily	• Check the supply gas pressure is correct.
Weekly	• Check that the fans of the power source are working properly. • Clean the torch threads and check for signs of corrosion or electrical discharge.
Monthly	• Check the gas, water and electrical connections for cracks, abrasions or leaks. • Check the power source power cable for cracks or abrasions.
Every six months	• Clean the air filter and check that there are no traces of condensation in collection tray E; • Replace the torch O-rings; for torch *CP 180C, order kit Item no. 1398;

Request a call-out by qualified staff for maintenance of internal parts of the power source. In particular, we advise carrying out the following operations regularly.

- Clean the interior using compressed air (clean, dry and oil-free) to remove dust build-up. If possible, use a suction device;
- More specifically, clean the IGBT module and diode assembly radiators with compressed air, directing the air jet against the radiators;
- Check that the electrical connections are properly tightened without any sign of overheating.
- Check the internal air circuit for cracks or leaks.

Periodically, also check that the system is earthed.

11.2 Things to do after any repair.

After a repair, be careful to arrange the wiring to ensure secure insulation between the primary side and the secondary side of the machine.
Do not allow wires or gas hoses to come into contact with moving parts or parts that heat up during operation. Refit all the clamps as they were on the original device so as to avoid any contact between the primary and secondary side in case of accidental wire breakage or disconnection.
Also, fit the screws back on with the notched washers as on the original device.

12 ERROR CODES

The equipment is provided with protection devices labelled with “Err” on display **N** (see the ERROR CODES table below). To assure efficiency of these protective devices:

- **Do not remove nor by-pass the safety devices.**
- **Use only original Cebora spare parts.**
- **Always replace any damaged parts of the machine or the welding torch with original parts.**
- **Use torches CEBORA Type CP 180C and CP71C only.**

Errors are 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
2	[E]	Error in the power source display board EEPROM memory	Switch the power source off and then on again. If the error persists, contact the CEBORA Service Department.
3	[E]	Generic error on power source slave board	Switch the power source off and then on again. If the error persists, contact the CEBORA Service Department.
6	[E]	CAN-bus communication problem	Switch the power source off and then on again. If the error persists, contact the CEBORA Service Department.
10	[E]	Power output nil (output voltage and current nil)	Contact the CEBORA Service Department
12	[E]	Problem with the electrode-nozzle contact	Replace electrode and/or nozzle. Check the consumables are correctly fitted, depending on the type of work.
13	[E]	Input phases problem	Check the voltage of the electrical panel where the power source is connected. If the error persists, contact the CEBORA Service Department.
15	[E]	Safety microcontroller error	Switch the power source off and then on again. If the error persists, contact the CEBORA Service Department.
17	[E]	Invalid or unrecognised power source model.	Switch the power source off and then on again. If the error persists, contact the CEBORA Service Department.
20	[E]	No interlock on the power source control board	Contact the CEBORA Service Department
30	[E]	Transducer *offset* error on the output current	Contact the CEBORA Service Department
39	[E]	Transducer *offset* error on the current transferred to the workpiece	Contact the CEBORA Service Department
40	[E]	Hazardous voltage: fault in power circuit	Contact the CEBORA Service Department
49	[E]	Problem with the current sensor measurement transferred to the workpiece	Contact the CEBORA Service Department
50	[E]	Torch not enabled	Fit the torch. If the problem persists, contact the CEBORA Service Department.
51	[E]	Torch not recognised	Contact the CEBORA Service Department

Code	Type	Error Description	Action
53	[W]	Start button pressed during operating mode reset (process enabled)	Switch off the power source, remove the start command and restart the power source
55	[E]	Electrode exhausted	Replace electrode and nozzle
58	[E]	Error of alignment between the firmware versions or error during the auto-upgrade phase	Contact the CEBORA Service Department
61	[E]	Mains voltage lower than the minimum	Check that the supply voltage of the power source matches the values on the specifications plate with a tolerance of ±10%.
62	[E]	Mains voltage exceeds maximum	Check that the supply voltage of the power source matches the values on the specifications plate with a tolerance of ±10%.
63	[E]	No phase	Check the integrity of the fuses of the electrical panel to which the power source is connected and that the electrical plug wires are secure.
64	[E]	Neutral connected instead of a phase	Check that the electrical plug wires are secure.
65	[E]	Mains voltage reading error	Check the voltage of the electrical panel where the power source is connected. If the problem persists, contact the CEBORA Service Department.
67	[E]	Mains voltage does not meet specifications	Check the integrity of the fuses of the electrical panel to which the power source is connected. If the problem persists, contact the CEBORA Service Department.
74	[W]	Overtemperature on primary module	Do not turn off the power source, so as to maintain the fan in operation and therefore obtain effective cooling. Resetting of normal operation occurs automatically once the temperature returns within the permitted limits. If the problem persists, contact the CEBORA Service Department.
77	[W]	Overtemperature on secondary module	Do not turn off the power source, so as to maintain the fan in operation and therefore obtain effective cooling. Resetting of normal operation occurs automatically once the temperature returns within the permitted limits. If the problem persists, contact the CEBORA Service Department.
78	[W]	Low air pressure at the inlet	Increase the gas supply pressure.
79	[W]	High air pressure at the inlet	Decrease the gas supply pressure.
80	[W]	Incorrect assembly of nozzle holder	Check that the nozzle holder is correctly screwed into place
81	[W]	Pressure sensor not connected	Contact the CEBORA Service Department
90	[W]	CNC off, in emergency status or not connected to power source	Turn on the CNC and exit emergency status. Check the power source-CNC connection.

13 TECHNICAL SPECIFICATIONS

PLASMA iQC 130 T - ITEM NO. 603

Mains voltage (U1)	3x208 V	3x220 V	3x230 V	3x400 V	3x440 V
Mains voltage tolerance (U1)	±10%				
Mains frequency	50/60 Hz				
Mains fuse (delayed action)	50 A			32 A	
Apparent power consumption	22.4 kVA 60%				
	16.4 kVA 100%			21.9 kVA 100%	
Mains connection Zmax				0.063 Ω	
Power factor (cosϕ)	0.99				
Cutting current range	10 - 130 A				
Cutting current 10 min/40 °C (IEC 60974-1)	130 A - 132 V 60%				
	105 A - 122 V 100%			130 A - 132 V 100%	
Cebora CPXXX welding torch	CP71C - CP180C				
Cutting current (I2)	130 A				
Cutting voltage (U2)	160 V				
Max primary current (I1)	73 A	70 A	68 A	38 A	35 A
Max. apparent power consumption	26 kVA				
Performance	90%				
Idle state power consumption	38 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	316 mm x 708 mm x 555 mm				
Net weight	50 kg				

The power source can be powered by motor generators with a power output of 35 kVA or higher.

PLASMA iQC 110 T - ITEM NO. 602

Mains voltage (U1)	3x208 V	3x220 V	3x230 V	3x400 V	3x440 V
Mains voltage tolerance (U1)	±10%				
Mains frequency	50/60 Hz				
Mains fuse (delayed action)	40 A			25 A	
Apparent power consumption	14 kVA 50%				
	12.1 kVA 60%			16.2 kVA 60%	
	10.3 kVA 100%			14.3 kVA 100%	
Mains connection Zmax				0.146 Ω	
Power factor (cosϕ)	0.99				
Cutting current 10 min/40 °C (IEC 60974-1)	100 A - 120 V 50%				
	90 A - 116 V 60%			110 A - 124 V 60%	
	80 A - 112 V 100%			100 A - 120 V 100%	
Open-circuit voltage (U0)	282 - 316 V			273 - 297 V	
Cebora CPXXX welding torch	CP71C - CP180C				
Cutting current (I2)	100 A			110 A	
Cutting voltage (U2)	155 V			155 V	
Max primary current (I1)	55 A	52 A	50 A	31 A	28 A
Max. apparent power consumption	19.8 kVA			21.4 kVA	
Performance	91%				
Idle state power consumption	34 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 708 mm x 477 mm				
Net weight	39 kg				

The power source can be powered by motor generators with a power output of 26 kVA or higher.

PLASMA iQC 70 T - ITEM NO. 601

Mains voltage (U1)	3x400 V	3x440 V
Mains voltage tolerance (U1)	±10%	
Mains frequency	50/60 Hz	
Mains fuse (delayed action)	16 A	
Apparent power consumption	9.7 kVA 70%	
	8.3 kVA 100%	
Mains connection Zmax	0.157 Ω	
Power factor (cosφ)	0.99	
Cutting current range	10 - 70 A	
Cutting current 10 min/40 °C (IEC 60974-1)	70 A - 108 V 60%	
	60 A - 104 V 100%	
Open-circuit voltage (U0)	281 - 306 V	
Cebora CPXXX welding torch	CP71C	
Cutting current (I2)	70 A	
Cutting voltage (U2)	150 V	
Max primary current (I1)	19 A	17 A
Max. apparent power consumption	13.1 kVA	
Performance	91%	
Idle state power consumption	33 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 562 mm x 477 mm	
Net weight	24.5 kg	

The power source can be powered by motor generators with a power output of 19 kVA or higher.