

INSTRUCTION MANUAL FOR PLASMA CUTTER

IMPORTANT: BEFORE STARTING THE EQUIPMENT, READ THE CONTENTS OF THIS MANUAL, WHICH MUST BE STORED IN A PLACE FAMILIAR TO ALL USERS FOR THE ENTIRE OPERATIVE LIFE-SPAN OF THE MACHINE. THIS EQUIPMENT MUST BE USED SOLELY FOR WELDING OPERATIONS.

1 SAFETY PRECAUTIONS



WELDING AND ARC CUTTING CAN BE HARMFUL TO YOURSELF AND OTHERS. The user must therefore be educated against the hazards, summarized below, deriving from welding operations. For more detailed information, order the manual code 3.300.758

NOISE



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

AND MAGNETIC FIELDS - May be dangerous.



- Electric current following through any conductor causes localized Electric and Magnetic Fields (EMF). Welding/cutting current creates EMF fields around cables and power sources.
- The magnetic fields created by high currents may affect the operation of pacemakers. Wearers of vital electronic equipment (pacemakers) shall consult their physician before beginning any arc welding, cutting, gouging or spot welding operations.

- Exposure to EMF fields in welding/cutting may have other health effects which are now not known.
- All operators should use the following procedures in order to minimize exposure to EMF fields from the welding/cutting circuit:

- Route the electrode and work cables together - Secure them with tape when possible.
- Never coil the electrode/torch lead around your body.
- Do not place your body between the electrode/torch lead and work cables. If the electrode/torch lead cable is on your right side, the work cable should also be on your right side.
- Connect the work cable to the workpiece as close as possible to the area being welded/cut.
- Do not work next to welding/cutting power source.

EXPLOSIONS



- Do not weld in the vicinity of containers under pressure, or in the presence of explosive dust, gases or fumes.
- All cylinders and pressure regulators used in welding operations should be handled with care.

ELECTROMAGNETIC COMPATIBILITY

This machine is manufactured in compliance with the instructions contained in the standard IEC 60974-10 (CL. A), **and must be used solely for professional purposes in an industrial environment. There may be potential difficulties in ensuring electromagnetic compatibility in non-industrial environments.**



DISPOSAL OF ELECTRICAL AND ELECTRONIC EQUIPMENT

Do not dispose of electrical equipment together with normal waste! In observance of European Directive 2002/96/EC on Waste Electrical and Electronic Equipment and its implementation in accordance with national law, electrical equipment that has reached the end of its life must be collected separately and returned to an environmentally compatible recycling facility. As the owner of the equipment, you should get information on approved collection systems from our local representative. By applying this European Directive you will improve the environment and human health!

IN CASE OF MALFUNCTIONS, REQUEST ASSISTANCE FROM QUALIFIED PERSONNEL.

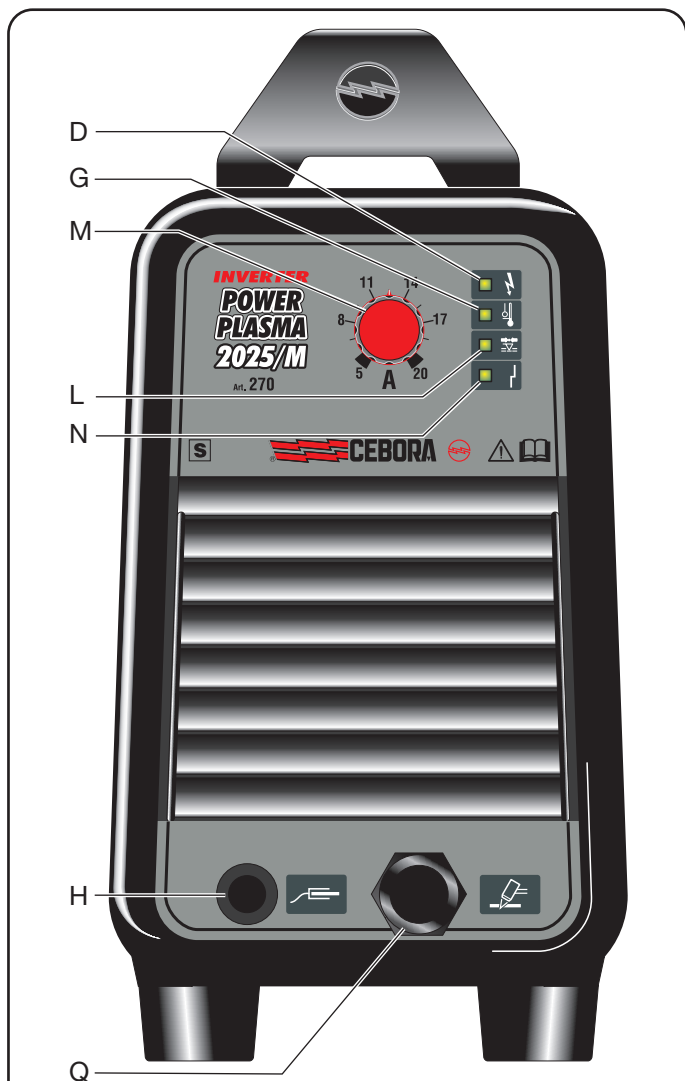
1.1 WARNING LABEL

The following numbered text corresponds to the label numbered boxes.



1. Cutting sparks can cause explosion or fire.
 - 1.1 Keep flammable materials away from cutting.
 - 1.2 Cutting sparks can cause fires. Have a fire extinguisher nearby, and have a watchperson ready to use it.
 - 1.3 Do not cut on drums or any closed container.

2. The plasma arc can cause injury and burns.
 - 2.1 Turn off power before disassembling torch.
 - 2.2 Do not grip material near cutting path.
 - 2.3 Wear complete body protection.
3. Electric shock from torch or wiring can kill.
 - 3.1 Wear dry insulating gloves. Do not wear wet or damaged gloves.
 - 3.2 Protect yourself from electric shock by insulating yourself from work and ground.
 - 3.3 Disconnect input plug or power before working on machine.
4. Breathing cutting fumes can be hazardous to your health.
 - 4.1 Keep your head out of fumes.
 - 4.2 Use forced ventilation or local exhaust to remove fumes.
 - 4.3 Use ventilating fan to remove fumes.
5. Arc rays can burn eyes and injure skin.
 - 5.1 Wear hat and safety glasses. Use ear protection and button shirt collar. Use welding helmet with correct shade of filter. Wear complete body protection.
6. Become trained and read the instructions before working on the machine or cutting.
7. Do not remove or paint over (cover) the label.



2 GENERAL DESCRIPTION

This machine is a constant direct current power source, designed for cutting electrically conductive materials (metals and alloys) using the plasma arc procedure. The plasma gas may be air or nitrogen.


2.1 DESCRIPTION OF DEVICES ON THE MACHINE

- A) Power cord
- B) Compressed air fitting (1/4" female gas thread)
- C) Mains power switch
- D) Mains power led
- E) Pressure regulator knob
- F) Pressure gauge
- G) Thermostat LED
- H) Grounding cord
- I) Water trap
- L) Low air pressure LED
- M) Cutting current regulator knob
- N) Blocked LED; lights when hazardous conditions arise.
- Q) Plasma torch.


2.2 SAFETY DEVICES

This system comes equipped with the following safety devices:

Overload cutout:

-  To avoid overload while cutting.
- The LED G (see fig 1) lights when active.

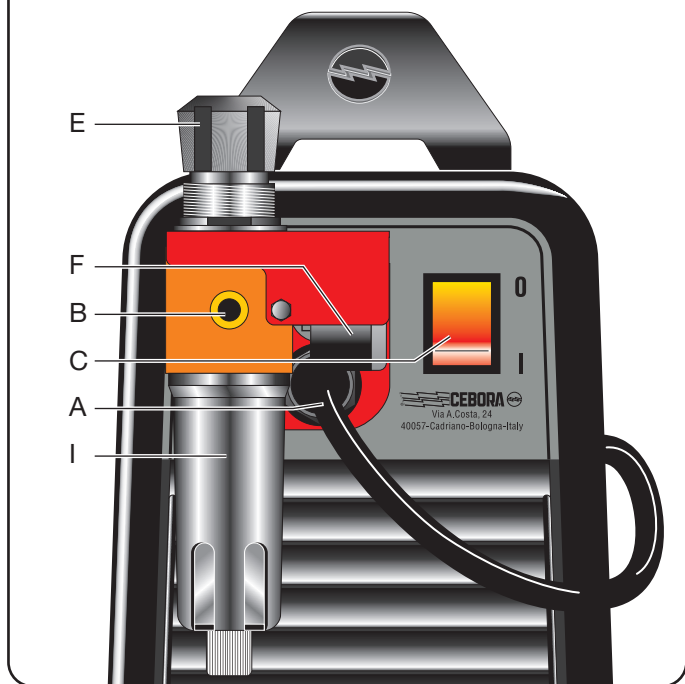
Pneumatic:

-  Located on the torch inlet to prevent low air pressure. The LED L lights when tripped (see fig.1).

Electrical:

- The machine features an error detection system. Each fault is indicated by a different flashing mode of LED N:

Fig.1



- A) One/two flashes followed by a 2-second pause means a high/low piloting voltage of the IGBT. In this case, switch off the machine and contact the Cebora S.p.A. technical service.
- B) Three flashes, followed by a 2-second pause means the reed contact of the power circuit is in short circuit during start. In this case, switch off the machine and contact the Cebora S.p.A. technical service to change the reed.
- C) Four flashes followed by a 2-second pause mean there is a short circuit in the torch (e.g., between electrode and nozzle) or between the positive and negative in the generator. Switch off the machine and remedy the problem if this is located in the torch; otherwise contact the Cebora S.p.A. technical service.
- D) On steady means the start button has been pressed when the machine was on. Release the button.

Moreover, the torch has an electric safety device on the torch body, to prevent hazardous power voltages when the nozzle, electrode, diffuser or nozzle holder are replaced.

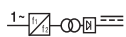
- Do not remove or short-circuit the safety devices.
- Use only original spare parts.
- Always replace any damaged parts of the machine with original materials.
- Use only CEBORA torches type CP41 C.
- Do not run the machine without its housings. This would be dangerous to the operator and anyone else in the work area, and would prevent the machine from being cooled properly.

2.3 EXPLANATION OF TECHNICAL SPECIFICATIONS

This machine is manufactured according to the following international standards: IEC 60974.1 - IEC 60974.7 - IEC 60974.10 CL. A - IEC 61000-3-11 - IEC 61000-3-12.

N°..... Serial number.

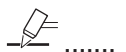
Always indicate this for any request regarding the machine.



Single-phase static transformer-rectifier frequency converter.



..... Drooping characteristic.



..... Suitable for plasma cutting.

TORCH TYPE. Type of torch that may be used with this machine.

U_0 . Secondary open-circuit voltage. Peak value.

X..... Percentage duty cycle.

The duty cycle expresses the percentage of 10 minutes for which the machine may work at a certain current I_2 and voltage U_2 without overheating.

I_2 Cutting current.

U_2 Secondary voltage at cutting current I_2 .

This voltage is measured when cutting with the gas nozzle in contact with the workpiece. **If this distance increases, the cutting voltage also increases and the duty cycle X% may drop.**

U_1 Rated supply voltage

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

I_1 Max Max. absorbed current at the corresponding current I_2 and voltage U_2 .

I_1 eff This is the maximum value of the actual current absorbed, 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..... Housing protection rating.

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

S..... Suitable for working in hazardous environments.

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

2.4 START-UP

The machine must be installed by qualified personnel. All connections must be made in compliance with current safety standards and full observance of safety regulations (see CEI 26-23 / IEC-TS 62081).

Connect the air supply to the fitting **B**.

- If the system air contains a considerable amount of moisture and oil, it is best to use a drying filter to avoid excessive oxidation and wear of the consumer parts, damaging the torch and reducing the cutting speed and quality.

If the air supply comes from a pressure regulator of a compressor or centralized system, the regulator must be set to an output pressure of no more than 8 bar (0.8 Mpa). If the air supply comes from a compressed air cylinder, the cylinder must be equipped with a pressure regulator. **Never connect a compressed air cylinder directly to the regulator on the machine! The pressure could exceed the capacity of the regulator, which might explode!**

Connect the power cord **A**: the yellow-green cable wire must be connected to an efficient grounding socket on the system. The remaining wires must be connected to the power supply line by means of a switch placed as close as possible to the cutting area, to allow it to be shut off quickly in case of emergency.

The capacity of the cut-out switch or fuses installed in series with the switch must be equal to the current I_1 absorbed by the machine.

The absorbed current I_1 may be determined by reading the technical specifications shown on the machine under the available supply voltage U_1 .

Any extension cords must be sized appropriately for the absorbed current I_1 .

3 USE

Make sure the trigger has not been pressed.

Turn the machine on using the switch **C**. The warning lamp **D** will light to indicate that the machine is on.

Press the torch button to start the pilot arc.

Now adjust the pressure, shown on the pressure gauge **F**, to 3.5 bar (0.35 MPa) using the knob **E** on the regulator, then lock the knob by pressing it downward.

Connect the grounding clamp to the workpiece.

The cutting circuit must not be deliberately placed in direct or indirect contact with the protective wire except in the workpiece.

If the workpiece is deliberately grounded using the protective conductor, the connection must be as direct as possible and use a wire of at least the same size as the

cutting current return wire, and connected to the workpiece at the same point as the return wire using the return wire clamp or a second grounding clamp placed in the immediate vicinity. Every precaution must be taken to avoid stray currents. Use the knob **M** to adjust the cutting current from 5 to 20 A based on the work at hand.

Make sure that the earth clamp and the workpiece are in good electrical contact, especially with painted or oxidized metal or with insulated coating; connect the clamp as close as possible to the cutting area.

Do not connect the grounding clamp to the part of the material that is to be removed.

Press the torch trigger to strike the pilot arc.

If cutting does not begin within 2 seconds, the pilot arc goes out; press the trigger again to re-strike it.

Begin cutting.

Hold the torch upright while cutting.

When you have finished cutting and released the trigger, air will continue to leave the torch for approximately 30 seconds to allow the torch to cool down.

It is best not to turn the machine off until this cool-down period is complete.

- Should you need to make holes or begin cutting from the center of the workpiece, you must hold the torch at an angle and slowly straighten it so that the nozzle does not spray molten metal (see fig. 2). This must be done when making holes in pieces more than 2 mm thick.

- Should you need to cut several layers of metal, as are normally used in auto body work, adjust the cutting current to the minimum values (5÷10 A).

Turn the machine off when the task is completed.



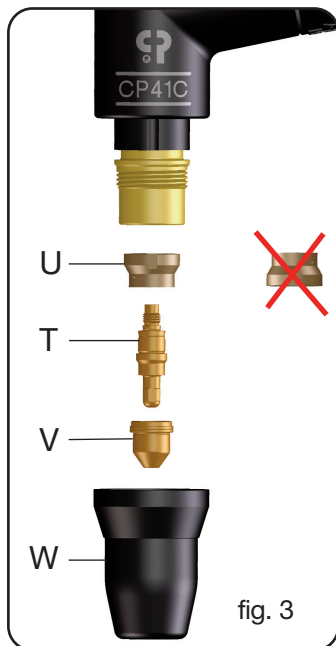
3.1 REPLACING CONSUMER PARTS

Always shut off the machine before replacing consumer parts.

- The electrode must be replaced when it has a crater in the center approximately 1 mm deep.

- The gas nozzle must be replaced when the hole is no longer smooth and the cutting capacity is diminished.

- The diffuser must be replaced when some areas are blackened. The electrode must be unscrewed or screwed onto the torch body by means of the specific wrench. The diffuser, the electrode and the nozzle must be fitted in the order indicated in figure 3.



- The nozzle holder must be replaced when the insulating part is deteriorated

Make sure the diffuser U, the electrode T and the nozzle V are correctly fitted and that the nozzle holder W is screwed on tight.

If any of these parts are missing, this will interfere with smooth operation of the machine and, especially, jeopardize operator safety

4 CUTTING ERRORS

4.1 INSUFFICIENT PENETRATION

This error may be caused by the following:

- high speed. Always make sure that the arc fully penetrates the workpiece and is never held at a forward angle of more than 10 -15°. This will avoid incorrect consumption of the nozzle and burns to the nozzle holder.

- Excessively thick workpiece (see cutting charts).

- Grounding clamp not in good electrical contact with the workpiece.

- Worn nozzle and electrode.

- Cutting current too low.

NOTE: When the arc does not penetrate, the molten metal scraps obstruct the nozzle.

4.2 THE CUTTING ARC GOES OFF

This error may be caused by:

- worn nozzle, electrode or swirl ring.

- air pressure too high.

- supply voltage too low.

4.3 SHORTER LIFE OF CONSUMER PARTS

This error may be caused by:

- oil or dirt in the arc intake,

- unnecessarily long pilot arc,

- low arc pressure.

5 HELPFUL HINTS

- If the system air contains considerable amounts of moisture and oil, it is best to use a drying filter to avoid excessive oxidation and wear on consumer parts, damage to the torch and a reduction in the speed and quality of the cutting.

- Make sure that the new electrode and nozzle to be mounted are thoroughly clean and degreased.

- **Always use original spare parts to avoid damaging the torch.**

6 MAINTENANCE

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

6.1 GENERATOR MAINTENANCE

In the case of maintenance inside the machine, make sure that the switch **C** is in position "O" **and that the power cord is disconnected from the mains.**

Also make sure the power voltage at the ends of the condensers is close to 0 V.

Even though the machine is equipped with an automatic condensation drainage device that is tripped each time the air supply is closed, it is good practice to periodically make sure that there is no condensation accumulated in the water trap **I** (fig.1).

It is also necessary to periodically clean the interior of the machine from the accumulated metal dust, using compressed air.

6.2 PRECAUTIONS AFTER REPAIRS.

After making a repair, make sure the wires are replaced so as to ensure safe insulation between the primary side and the secondary side of the machine. In particular make sure the cover of the power circuit dissipators (31) is fitted (see exploded diagram). Do not allow the wires to come into contact with moving parts or those that heat up during operation. Reassemble all clamps as they were on the original machine, to prevent a connection from occurring between the primary and secondary circuits should a wire accidentally break or be disconnected.

Also mount the screws with geared washers as on the original machine.

QUESTA PARTE È DESTINATA ESCLUSIVAMENTE AL PERSONALE QUALIFICATO.

THIS PART IS INTENDED SOLELY FOR QUALIFIED PERSONNEL.

DIESER TEIL IST AUSSCHLIEßLICH FÜR DAS FACHPERSONAL BESTIMMT.

CETTE PARTIE EST DESTINEE EXCLUSIVEMENT AU PERSONNEL QUALIFIE.

ESTA PARTE ESTÁ DESTINADA EXCLUSIVAMENTE AL PERSONAL CUALIFICADO.

ESTA PARTE È DEDICADA EXCLUSIVAMENTE AO PESSOAL QUALIFICADO.

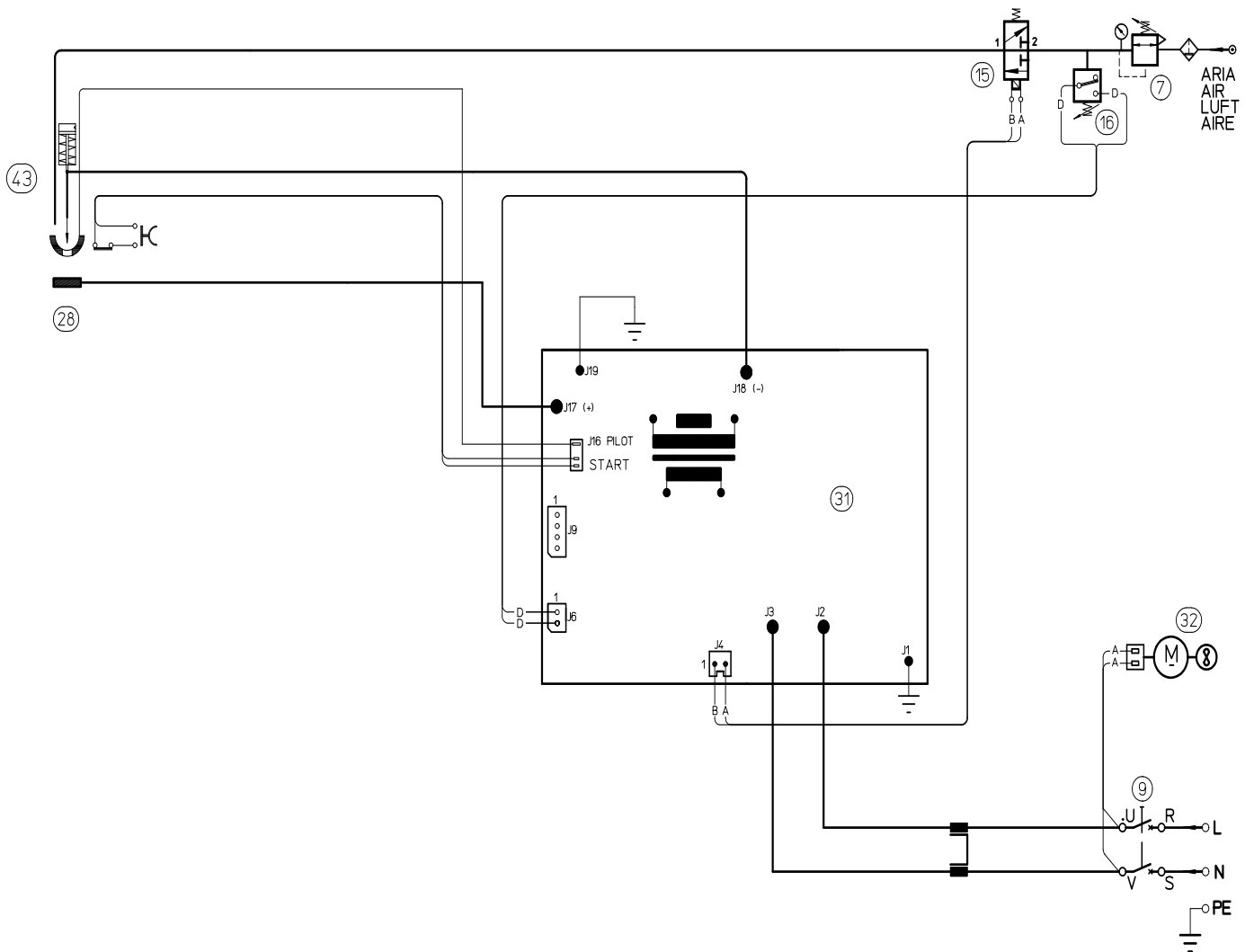
TÄMÄ OSA ON TARKOITETTU AINOASTAAN AMMATTITAITOISELLE HENKILÖKUNNALLE.

DETTE AFSNIT HENVENDER SIG UDELUKKENDE TIL KVALIFICERET PERSONALE.

DIT DEEL IS UITSLUITEND BESTEMD VOOR BEVOEGD PERSONEEL.

DENNA DEL ÄR ENDAST AVSEDD FÖR KVALIFICERAD PERSONAL.

ΑΥΤΟ ΤΟ ΤΜΗΜΑ ΠΡΟΟΡΙΖΕΤΑΙ ΑΠΟΚΛΕΙΣΤΙΚΑ ΓΙΑ ΤΟ ΕΙΔΙΚΕΥΜΕΝΟ ΠΡΟΣΩΠΙΚΟ.



CODIFICA COLORI CABLAGGIO ELETTRICO		WIRING DIAGRAM COLOUR CODE
A	NERO	BLACK
B	ROSSO	RED
C	GRIGIO	GREY
D	BIANCO	WHITE
E	VERDE	GREEN
F	VIOLA	PURPLE
G	GIALLO	YELLOW
H	BLU	BLUE
K	MARRONE	BROWN
J	ARANCIO	ORANGE
I	ROSA	PINK

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

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pos	DESCRIZIONE	DESCRIPTION
01	FASCIONE	HOUSING
02	SUPPORTO MANICO	HANDLE SUPPORT
03	MANICO	HANDLE
04	GHIERA	RING NUT
05	SUPPORTO RIDUTTORE	REGULATOR SUPPORT
06	MANOMETRO	GAUGE
07	RIDUTTORE	REGULATOR
08	RACCORDO	FITTING
09	INTERRUTTORE	SWITCH
10	COPERTURA	COVER
11	CAVO RETE	POWER CORD
12	PASSACAVO	CABLE OUTLET
13	PANNELLO POSTERIORE	BACK PANEL
14	CORNICE	FRAME
15	ELETTROVALVOLA	SOLENOID VALVE
16	PRESSOSTATO	PRESSURE SWITCH
17	RACCORDO A GOMITO	UNION ELBOW
18	RACCORDO	FITTING
19	RACCORDO	FITTING
20	RACCORDO	FITTING
21	GRUPPO ARIA	AIR UNIT
22	SUPPORTO GRUPPO ARIA	AIR UNIT SUPPORT

pos	DESCRIZIONE	DESCRIPTION
23	PIEDE IN GOMMA	RUBBER FOOT
24	FONDO	BOTTOM
25	MORSETTIERA	TERMINAL BOARD
26	PRESSACAVO CN GHIERA	STRAIN RELIEF WITH NUT
27	PRESSACAVO	STRAIN RELIEF
28	CAVO CON MORSETTO	CABLE WITH CLAMP
29	MANOPOLA	KNOB
30	PANNELLO ANTERIORE	FRONT PANEL
31	CIRCUITO DI POTENZA	POWER CIRCUIT
32	MOTORE CON VENTOLA	MOTOR WITH FAN
33	SUPPORTO CIRCUITO	CIRCUIT SUPPORT
34	CAVO TORCIA	TORCH CABLE
35	ATTACCO TORCIA	TORCH CONNECTOR
36	IMPUGNATURA CON PULSANTE	HANDGRIP WITH PUSHBUTTON
37	O.RING	O.RING
38	CORPO TORCIA (TESTINA)	TORCH BODY (HEAD)
39	DIFFUSORE (CONF. DA 2 PZ.)	SWIRL RING (PACK. 2 PCS.)
40	ELETTRODO (CONF. DA 5 PZ.)	ELECTRODE (PACK. 5 PCS.)
41	UGELLO (CONF. DA 5 PZ.)	NOZZLE (PACK. 5 PCS.)
42	PORTAUGELLO	NOZZLE HOLDER
43	TORCIA COMPLETA	COMPLETE TORCHE

La richiesta di pezzi di ricambio deve indicare sempre: numero di articolo, matricola e data di acquisto della macchina, posizione e quantità del ricambio.

When ordering spare parts please always state the machine item and serial number and its purchase data, the spare part position and the quantity.

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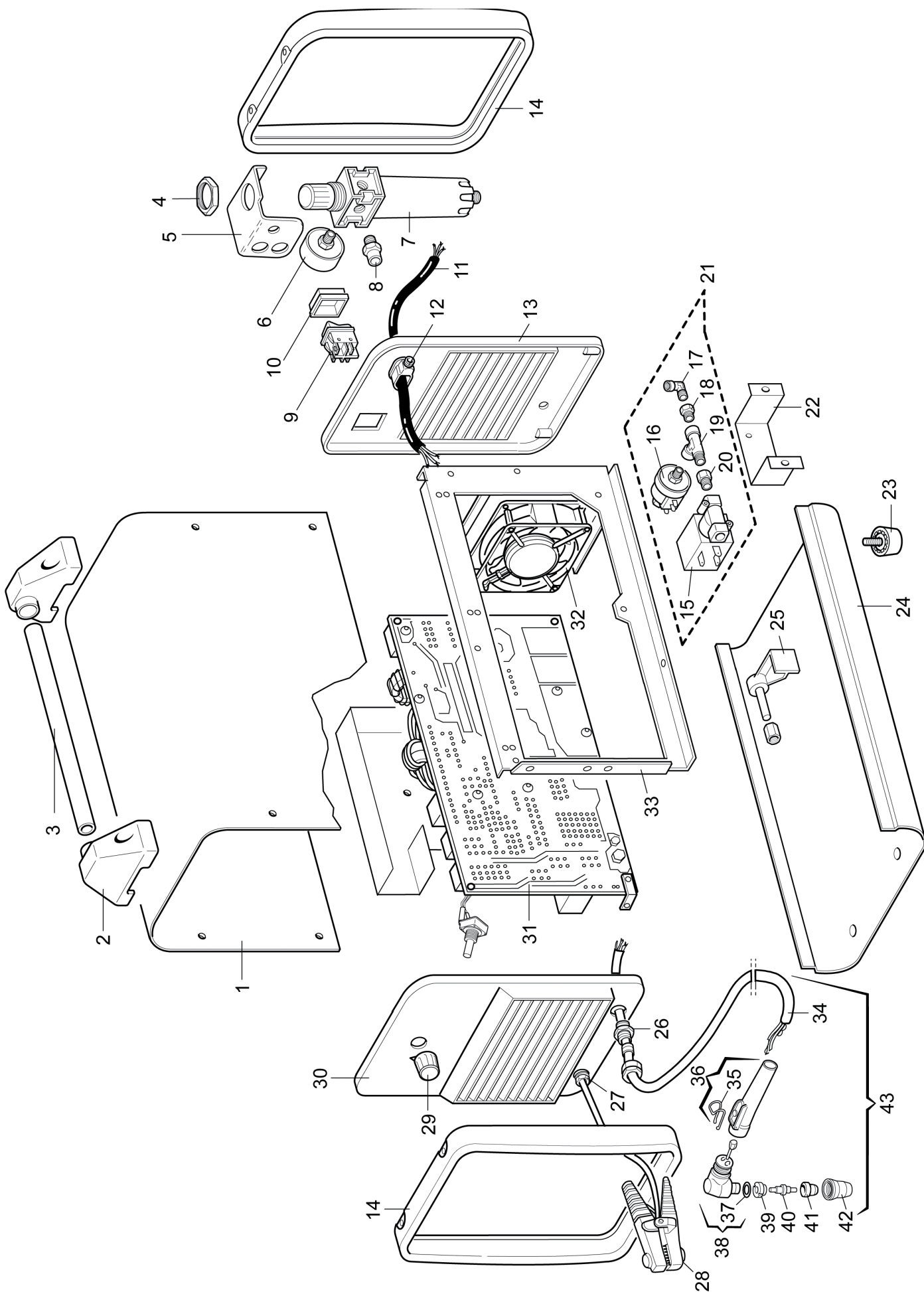
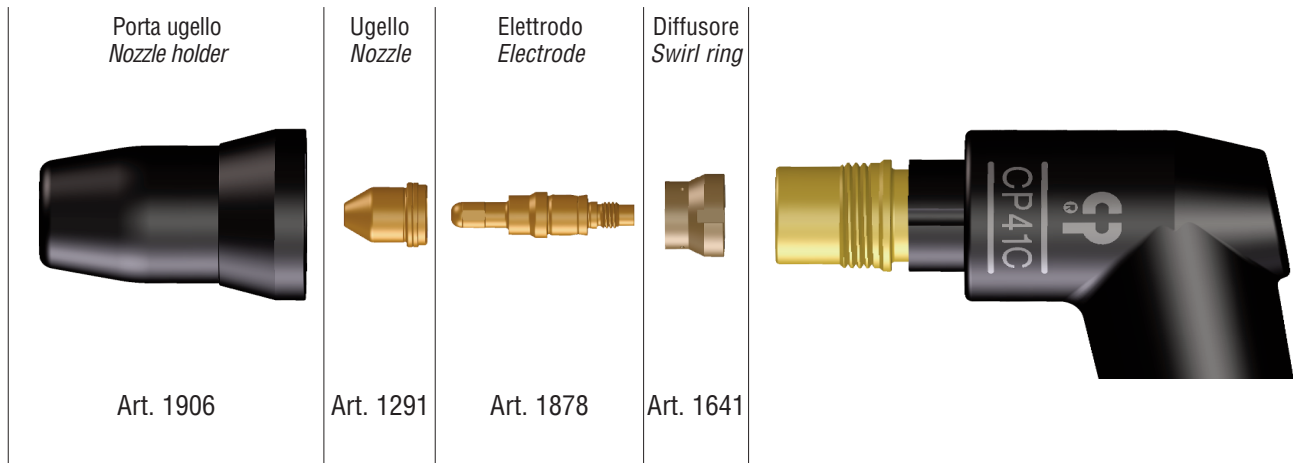


TABELLE DI TAGLIO CUTTING CHARTS

Art. 270 - 20 A



Corrente di taglio Cutting current	Acciaio dolce Mild steel		Acciaio inossidabile Stainless steel		Alluminio Aluminium	
	Spessore Thickness	Velocità di taglio Cutting speed	Spessore Thickness	Velocità di taglio Cutting speed	Spessore Thickness	Velocità di taglio Cutting speed
(A)	(mm)	(m/min)	(mm)	(m/min)	(mm)	(m/min)
20	1	4,00	1	3,00	1	4,60
20	2	1,70	2	1,20	2	2,40
20	3	1,10	3	0,70	3	1,50
20	4	0,70	4	0,50	4	0,90
20	6	0,40	6	0,30	6	0,55
20	8	0,19	8	0,14	8	0,23
20	10	0,11	10	0,07	10	0,14



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