

PLASMA 36 COMPRESSOR INVERTER

POWER SOURCE art. 481

SERVICE MANUAL



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1 - GENERAL INFORMATION

1.1 - Introduction.

The purpose of this manual is to train personnel assigned to carry out maintenance on the power source art. 481 for plasma cutting systems.

1.2 - General service policy.

It is the responsibility of the customer and/or operator to use the equipment appropriately, in accordance with the instructions in the Instruction Manual, as well as to maintain the equipment and related accessories in good working condition, in compliance with the instructions provided in the Service Manual.

Any internal inspection or repairs must be carried out by qualified personnel who are responsible for any intervention on the equipment.

It is forbidden to attempt to repair damaged electronic boards or modules; replace them with original ELETTRO CF s.r.l. spare parts.

1.3 - Safety information.

The safety notes provided in this manual are an integral part of those given in the Instruction Manual. Therefore, before working on the machine, please read the paragraph on safety instructions in the aforementioned manual.

Always disconnect the power cord from the mains, and wait for the internal capacitors to discharge (1 minute) before accessing the interior of the equipment.

Some internal parts, such as terminals and swirl rings, may be connected to mains or otherwise hazardous potentials. It is therefore forbidden to work with the safety guards removed from the machine unless strictly necessary. In this case, take special precautions such as wearing insulating gloves and footwear, and working in a perfectly dry environment with dry clothing.

1.4 - Electromagnetic compatibility.

Please read and observe the instructions provided in the paragraph “Electromagnetic compatibility” of the Instruction Manual.

2 - SYSTEM DESCRIPTION

2.1 - Introduction.

The PLASMA 26 COMPRESSOR INVERTER is a plasma arc system for cutting electrically conductive materials.

It consists of an electronic power source (item 481) and a series of accessories which allow its adaptation to several kinds of uses.

The power source is controlled by microprocessor boards, which manage the cutting system's operational functions and the operator interface.

2.2 - Technical specifications.

To verify the technical specifications, see the machine plate and Instruction Manual.

2.3 - Description of power source item 481.

Item 481 is a controlled current inverter power source, consisting of a single-phase rectifier bridge, a PFC module and an IGBT DC/DC converter.

Referring to the wiring diagram, you can identify the main blocks that make the power source.

The main switch (24) powers the fan (9) and the power board (8) that contains the filter to reduce conducted interference reflected in the mains, the pre-charge circuit and the PFC circuit.

The pre-charge resistance limits the amount of current absorbed from the mains, only during the starting of the machine.

When the group of electrolytic capacitors reaches a certain voltage threshold, the pre-charge relay short-circuits the pre-charge resistance and only the green LED A remains lit on the front panel.

The power board (8) is the real cutting current generator, which converts the alternating voltage at switch (24) input into continuous voltage adjusted according to cutting requirements.

The adjustment of the cutting current is made by the power board (8) and depends on signals and parameters set by the power board itself.

The signalling LEDs and the potentiometer for setting working parameters are positioned in the power board (8).

3 - MAINTENANCE

WARNINGS

ANY INTERNAL INSPECTIONS OR REPAIRS MUST BE CARRIED OUT BY QUALIFIED PERSONNEL.

BEFORE BEGINNING MAINTENANCE OPERATIONS, UNPLUG THE POWER SOURCE FROM THE MAINS AND WAIT FOR THE INTERNAL CAPACITORS TO DISCHARGE (1 MINUTE).

3.1 - Periodic inspection, cleaning.

Periodically open the power source grids and check inside the aeration tunnel.

Remove any dirt or dust to ensure smooth air flow, and thus adequate cooling of the internal parts of the power source.

Check the condition of the output terminals, output and power supply cables of the power source; replace if damaged.

Check the condition of the internal power connections and connectors on the electronic boards; if you find “loose” connections, tighten or replace the connectors.

3.2 - Operating sequence (pict. 3.2.1).

The following sequence represents correct functioning of the machine. It may be used as a guiding procedure for troubleshooting.

It must be carried out after each repair without any errors.

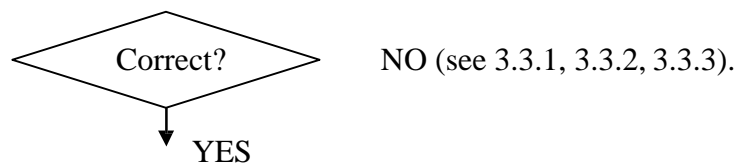
3.2.1 - Power source commands and signals.



3.2.2 - Power source operation.

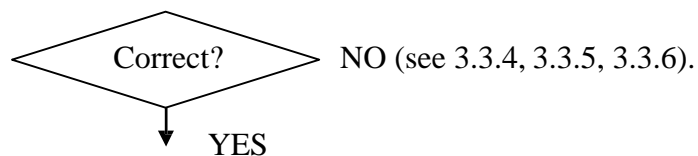
NOTE

- Operations marked with this symbol refer to operator actions.
- ◆ The operations marked with this symbol refer to machine responses that must occur following an operator action.
- System shut off and unplugged from the mains.
- Connect the cable of the positive pole of the power source to the workpiece.
- Connect the power source to the mains.
- Close the switch (H) on the power source.
 - ◆ System powered, led (A) lit, fan running.
 - ◆ On front panel, leds (C) and (D) off; led (B) lit for the first 5 seconds (analysis phase), then off

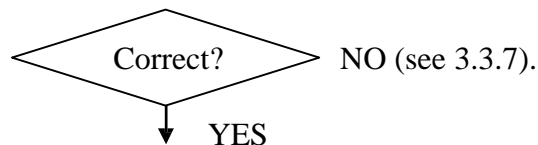


DURING THE FOLLOWING TESTS, DO NOT POINT THE TORCH AT PEOPLE OR PARTS OF THE BODY, BUT ALWAYS TOWARDS AN OPEN SPACE OR THE WORKPIECE.

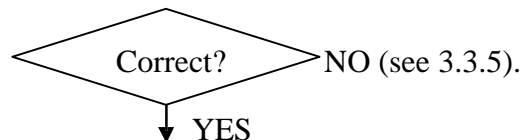
- Press the torch start button and hold it down.
 - ◆ Gas flows from the torch and the pilot arc starts for the maximum pilot arc time (2 sec.). The gas continues to flow for approximately another 100 sec. after the start button is released (post-gas time).



- With pilot arc lit, place the torch close to the workpiece.
 - ◆ Begin cutting.



- Release the torch start button.
 - ◆ The arc shuts off immediately. The gas continues to flow for the post-gas time (approximately 100 seconds after the start button is released) to cool the torch.



REGULAR OPERATION.

3.3 - Troubleshooting.

WARNINGS

ANY INTERNAL INSPECTION OR REPAIR MUST BE PERFORMED BY QUALIFIED PERSONNEL.

BEFORE REMOVING THE PROTECTION COVERS AND ACCESSING INTERNAL PARTS, DISCONNECT THE MACHINE FROM THE MAINS AND AND WAIT FOR THE INTERNAL CAPACITORS TO DISCHARGE (1 MINUTE).

NOTE

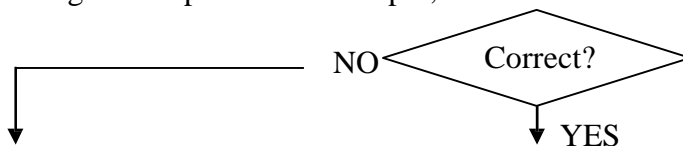
Items in **boldface** describe problems that may occur on the machine (symptoms).

- Steps marked with this symbol refer to situations for which the operator must determine the causes (causes).
- ◆ Operations preceded by this symbol refer to actions the operator must perform in order to solve the problems (solutions).

3.3.1 - **The power source does not start, led (A) off.**

MAINS SUITABILITY TEST.

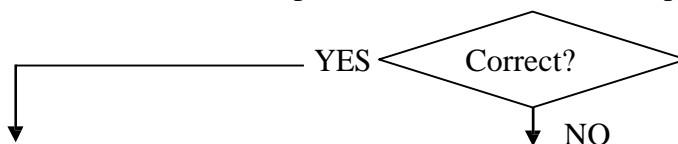
- No voltage at the power source input, because the mains surge protector is tripped.



- ◆ Eliminate any short-circuits in the connections between the power cable, switch (24) and power board (8).
- ◆ Mains not suited to power the power source (ex.: insufficient installed power).

MAINS CONNECTION TEST.

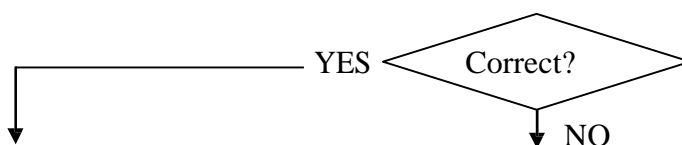
- Input terminals J2 – J3 on power board (8) = 230 Vac approx., with switch (24) closed.



- ◆ Check power cable and plug and replace if necessary.
- ◆ Check the switch (24) and replace if defective.
- ◆ Check the mains voltage conditions.
- ◆ Check the integrity of the rectifier bridge DS1 on power board (8).

POWER BOARD PRE-CHARGE TEST (8).

- Power board (8), pre-charge relay K1 closes when the machine is switched-on.

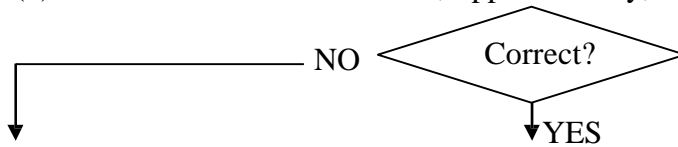


- ◆ Check working conditions of relay K1
- ◆ Check working conditions of pre-charge resistance PT1
- ◆ Replace the power board (8)
- ◆ Replace the power board (8).

3.3.2 - Power source powered, led (A) lit, fan (9) stopped.

FAN (9) TEST.

- Fan (9) fast-on terminals = 230 Vac, approximately, after closing switch (24).



- ◆ Make sure that there are no mechanical impediments blocking the fan (9).
- ◆ Replace the fan (9).
- ◆ Check the wiring between fan (9) and connector J2 and J3 on power board (8).
- ◆ Check the presence of 230V approx. on switch (24).
- ◆ Check the switch (24) and replace if defective.

3.3.3 – Power source powered, the signals do not indicate correct values.**LED (D) steady lit, insufficient air.**

- Carry out the compressor test, see par. 3.3.5.

LED (C) steady lit, thermal protection.

- Check the working conditions of thermostat and replace if defective.
- Replace the power board (8).

LED (B) steady lit, power source blocked.

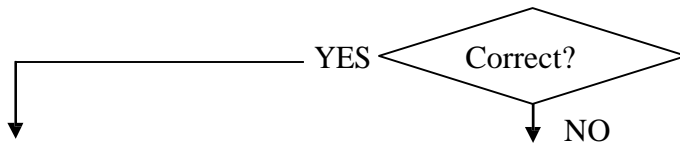
This indicator indicates that the power source is in an analysis phase, in the first 5 seconds after closing the switch (24), or, thereafter, is blocked due to a hazardous condition. Check the value of supply voltage.

If previous steps have not solved the problem, replace the power board (8).

3.3.4 – Pressing start button produces no effect.

START COMMAND TEST.

- Press the torch button and check the electrical continuity between torch button contacts on terminals 1-2 of connector J16 on power board (8).

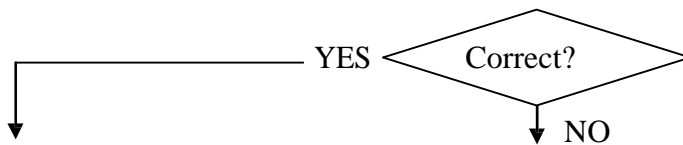


- ◆ Check wiring between terminals 1 – 2 of J16 and the torch (16).
- ◆ Check that the nozzle protection is properly mounted on the torch and in good working conditions. If defective or showing signs of wear, replace.
- ◆ Check the torch button. If defective, replace it.
- ◆ Replace the power board (8).
- ◆ Replace the power board (8).

3.3.5 – No air flows from the torch.

COMPRESSOR (10) TEST.

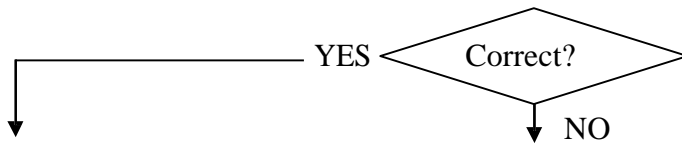
- Compressor terminals (10) = 230 Vac approx. with the torch button pressed and for the post-gas time.



- ◆ Check the wiring between the compressor (10) and J4 of power board (8).
- ◆ Replace the power board (8).
- ◆ Replace the compressor (10).

3.3.6 – Gas flows from the torch, but the pilot arc does not light.

- Pressing the torch button, the pilot arc lights

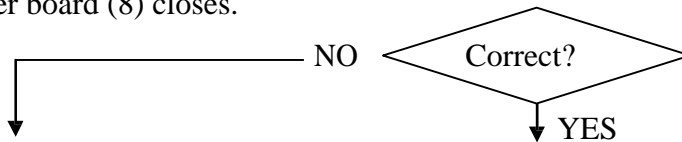


- ◆ Check the conditions of torch consumables. If showing signs of wear, replace.
- ◆ Check wiring between terminals 3 of J16 and torch (16).
- ◆ Check the working conditions of pilot arc relay K2 on the power board (8).
- ◆ Replace power board (8).
- ◆ Regular operation

3.3.7 – Transfer arc does not take place or is too weak for cutting.

TRANSFER ARC SWITCHING TEST

- Make sure that with the torch close to the workpiece and the pilot arc lit, the reed relay contact L3 on power board (8) closes.



- ◆ Check the working conditions of relay K3 on power board (8).
- ◆ Make sure that the earth cable (27) is connected to the workpiece.
- ◆ Check the wiring between the earth cable (27) and the connector J17 on power board (8).
- ◆ Check the wiring between the torch (16) and the connector J18 on power board (8).
- ◆ Replace the power board (8).
- ◆ Replace the power board (8)

4 - COMPONENTS LIST**4.1 - Power source art. 481****4.2 - Table of components****4.3 - List of spare parts.****Essential spare parts.**

Ref.	Description	Qty.
8	power board	1

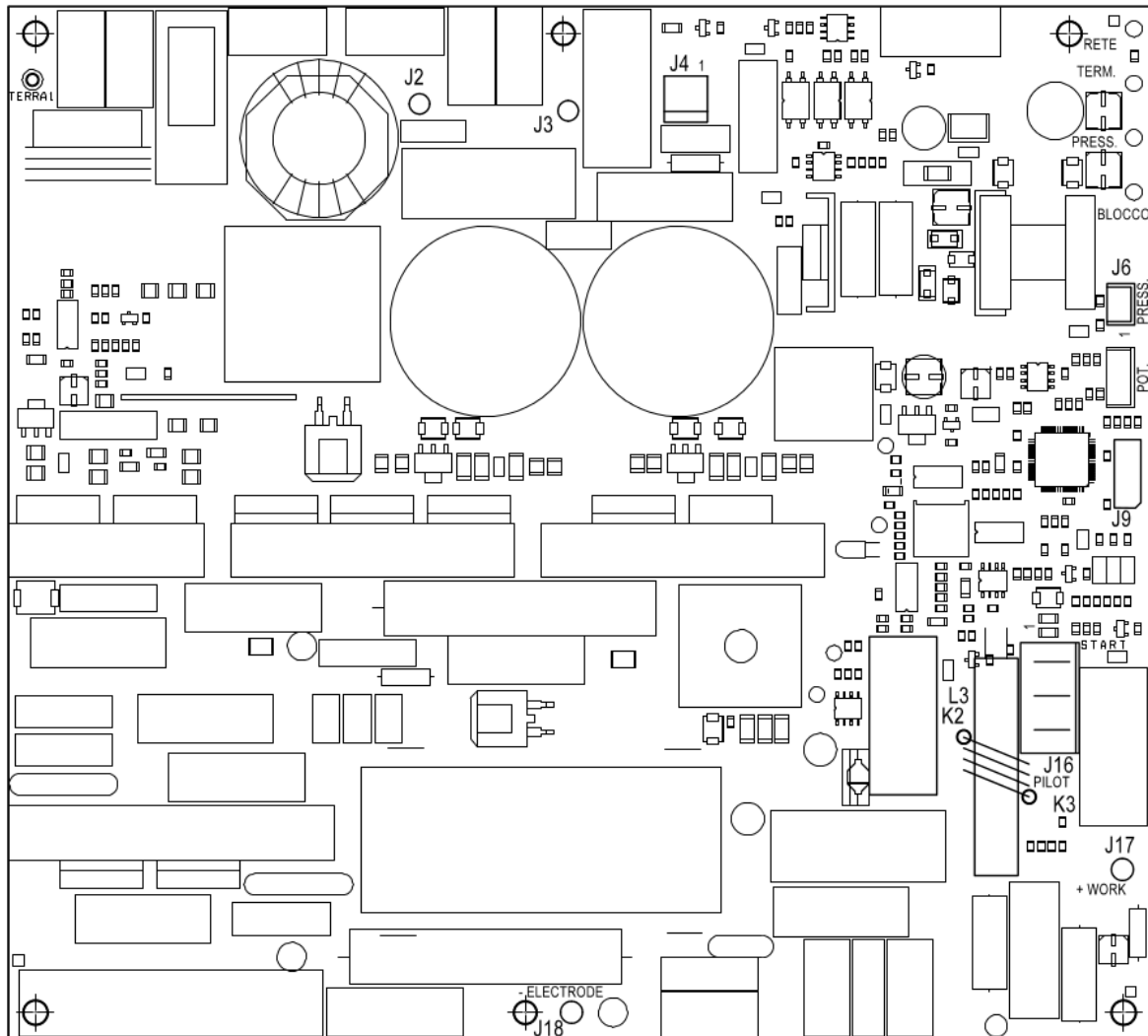
Recommended spare parts.

Ref.	Description	Qty.
09	fan	1
24	switch	1

5 – ELECTRICAL DIAGRAMS

5.1 – Power board (8)

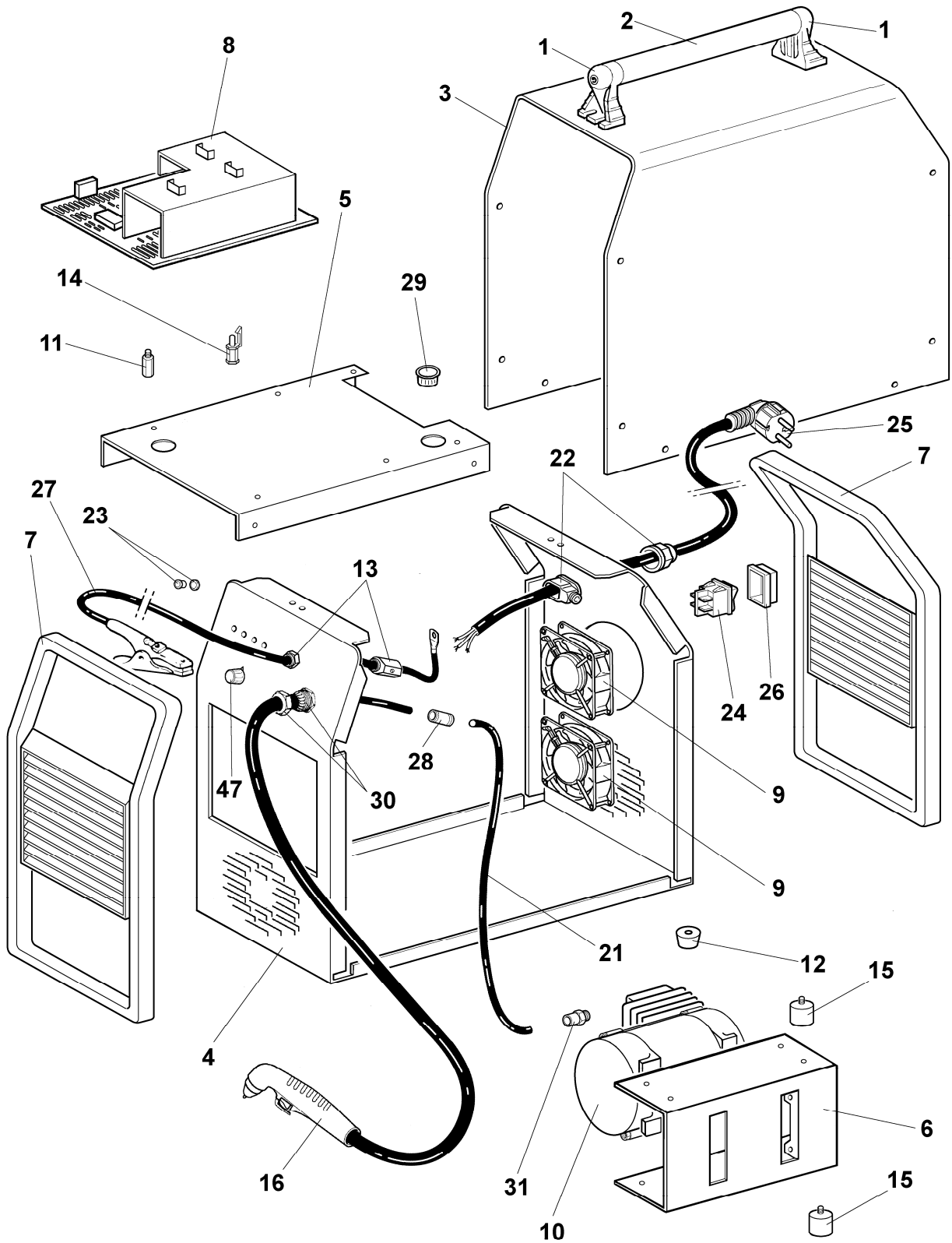
5.1.1 - Topographical drawing.



5.1.2 - Connector table.

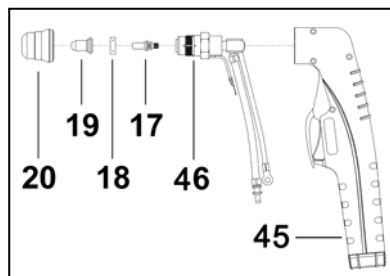
J2 – J3		230 Vac supply voltage input.
J4	1 - 2	230 Vac output for compressor (10).
J6	1 - 2	compressor (10) thermal signal input.
J16	1 - 2	“start” signal input from torch (16) button
J16	3	output for torch (16) nozzle
J17		output for earth cable (27)
J18		output for torch (16) electrode

Art./Item 481
Ricambi - Spare parts - Ersatzteile - Pièces de rechange - Piezas de repuesto - Peças

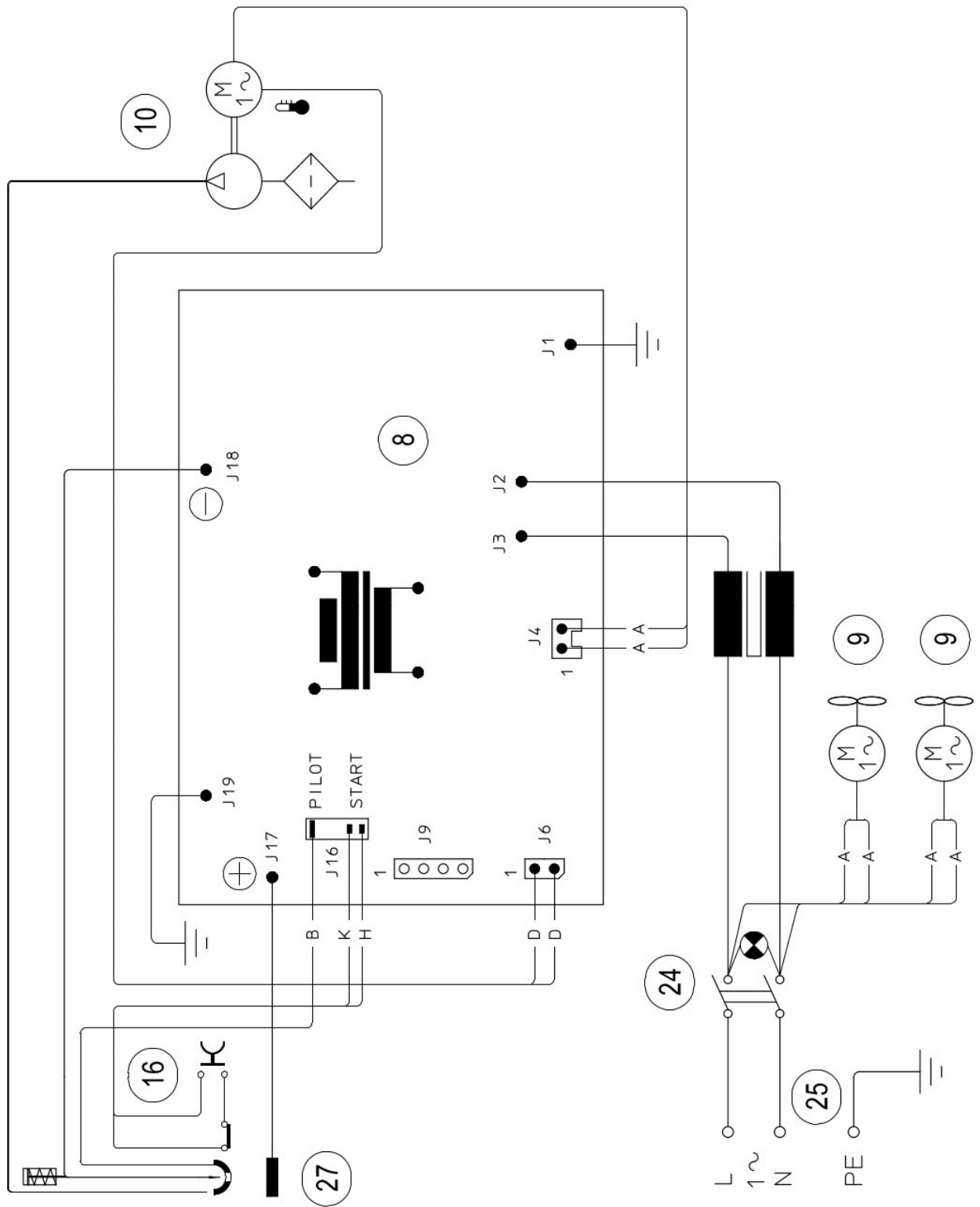


POS.	DESCRIZIONE	DESCRIPTION	STÜCKLISTE	DESIGNATION	DENOMINACIÓN	DESCRIÇÃO
1	SUPPORTO MANICO	HANDLE HOLDER	GRIFF HALTER	SUPPORT MANCHE	SOPORTE MANIJA	SUPORTE PEGA
2	MANICO	HANDLE	GRIFF	MANCHE	MANGO	PEGA
3	FASCIONE	HOUSING	GEHÄUSE	CARROSSERIE	CARCASA	INVÓLUCRO
4	FONDO	BOTTOM	BODENBLECH	FOND	FONDO	BASE
5	PIANO INTERMEDIO	INTERMEDIATE PANEL	ZWISCHENWANDFLÄCHE	PANNEAU INTERMEDIAIRE	PANEL INTERMEDIO	PAINEL INTERMÉDIO
6	SUPPORTO COMPRESSORE	COMPRESSOR HOLDER	KOMPRESSORTRÄGER	SUPPORT COMPRESSEUR	SOPORTE COMPRESOR	SUPORTE COMPRESSOR
7	CORNICE	FRAME	RAHMEN	CADRE	MARCO	CAIXILHO
8	CIRCUITO POTENZA	POWER CIRCUIT	LEISTUNGS-PLATINE	CIRCUIT PUISSANCE	CIRCUITO POTENCIA	CIRCUITO POTÊNCIA
9	VENTILATORE	FAN	VENTILATOR	VENTILATEUR	VENTILADOR	VENTAROLA
10	COMPRESSORE	COMPRESSOR	KOMPRESSOR	COMPRESSEUR	COMPRESOR	COMPRESSOR
11	DISTANZIALE	SPACER	DISTANZSTÜCK	ENTRETOISE	DISTÂNCIALE	ESPAÇADOR
12	PIEDINO	SUPPORT	HALTERUNG	SUPPORT	SOPORTE	SUPORTE
13	BLOCCA CAVO	CABLE GLAND	KABELVERSCHRAUBUNG	PRESSE-ETOUPE	PRENSA CABLE	PRENSA CABO
14	DISTANZIALE	SPACER	DISTANZSTÜCK	ENTRETOISE	DISTÂNCIALE	ESPAÇADOR
15	SUPPORTO ANTIVIBRANTE	SHOCK ABSORBER	ANTIVIBRATIONSPUFFER	TAMPON ANTI-VIBRATIONS	APOYO ANTIVIBRACIÓN	APOIO ANTI-VIBRAÇÃO
16	TORCIA COMPLETA	COMPLETE TORCH	BRENNER	TORCHE COMPLETE	ANTORCHA COMPLETA	TOCHA COMPLETA
17	ELETTRODO	ELECTRODE	ELEKTRODE	ELECTRODE	ELECTRODO	ELÉCTRODO
18	DIFFUSORE ISOLANTE	INSULATING DIFFUSOR	ISOLIERENDER DIFFUSOR	DIFFUSEUR ISOLANT	DIFUSOR AISLANTE	DIFUSOR ISOLADOR
19	UGELLO	NOZZLE	DÜSE	BUSE	TOBERA	INJECTOR
20	PORTAUGELLO	NOZZLE HOLDER	DÜSENHALTER	PORTE-BUSE	PORTA - INYECTOR	PORTA INJECTOR
21	TUBO TEFLON	TEFLON TUBE	PTFE-SCHLAUCH	TUYAU EN PTFE	PTFE TUBERÍA	TUBO DE PTFE
22	PASSACAVO	STRAIN RELIEF	ZUGENTLASTUNG	PASSE CABLE	PASA CABLE	PASSA CABO
23	PORTA-LED	LED HOLDER	LED-HALTER	SUPPORT LED	SOPORTE LED	SUPORTE LED
24	INTERRUTTORE	SWITCH	SCHALTER	INTERRUPTEUR	INTERRUPTOR	INTERRUPTOR
25	CAVO RETE	MAINS INPUT CABLE	NETZ-ANSCHLUSSLEITUNG	CABLE - RESEAU	CABLE RED	CABO DE ALIMENTAÇÃO
26	PROTEZIONE	PROTECTION	SCHUTZ	PROTECTION	PROTECCIÓN	PROTECÇÃO
27	CAVO MASSA	EARTH CABLE	MASSEKABEL	CABLE DE TERRE	CABLE MASA	CABO MASSA
28	RACCORDO	CONNECTOR	VERBINDUNGSSTÜCK	RACCORD	EMPALME	LIGAÇÃO
29	PASSACAVO	STRAIN RELIEF	ZUGENTLASTUNG	PASSE CABLE	PASA CABLE	PASSA CABO
30	BLOCCA CAVO	CABLE GLAND	KABELVERSCHRAUBUNG	PRESSE-ETOUPE	PRENSA CABLE	PRENSA CABO
31	RACCORDO	JOINT	VERBINDUNGSSTÜCK	RACCORD	EMPALME	LIGAÇÃO
45	IMPUGNATURA	HANDLE	GRIFF	POIGNEE	EMPUÑADURA	PUNHO
46	TESTINA	HEAD	SCHNEIDKOPF	TÊTE	CABEZA	CABECINHA
47	MANOPOLA	KNOB	DREHKNOPF	BOUTON	MANOPLA	BOTÃO

La richiesta di pezzi di ricambio deve indicare sempre: l' art. e la data d'acquisto della macchina, la posizione e la quantità dei pezzi di ricambio.
In case spare parts are required please always indicate: item ref. no. and purchase date of the machine, spare part position no. and quantity.
In der Ersatzteilanfrage müssen immer Art. und Einkaufsdatum des Apparat, Ersatzteil-Nr. und Menge angegeben werden.
En cas de demande de pièces de rechange, toujours indiquer: l'article et la date d'achat de la machine, la position et la quantité des pièces.
Los pedidos de piezas de repuesto deben indicar siempre: el numero de articulo y la fecha de adquisición del aparato, la posición y la cantidad de las piezas.
O pedido de peças deve indicar sempre o modelo da máquina em causa e a data de aquisição da mesma, a posição e a quantidade de peças pedidas.



Art. 481-484: SCHEMA ELETRICO - WIRING DIAGRAM - ELEKTRISCHER SCHALTPLAN - SCHEMA ELECTRIQUE - ESQUEMA ELECTRICO



	Codifica colori cablaggio elettrico	Wiring diagram colour code	Farben-Codierung elektrische Schaltplan	Codification couleurs schéma électrique	Codificación colores cableado eléctrico	Codificação cores conjunto eléctrico de cabos
A	Nero	Black	Schwarz	Noir	Negro	Negro
B	Rosso	Red	Rot	Rouge	Rojo	Vermelho
C	Grigio	Grey	Grau	Gris	Gris	Cinzento
D	Bianco	White	Weiss	Blanc	Blanco	Branco
E	Verde	Green	Gruen	Vert	Verde	Verde
F	Viola	Purple	Violett	Violet	Violeta	Violeta
G	Giallo	Yellow	Gelb	Jaune	Amarillo	Amarelo
H	Blu	Blue	Blau	Bleu	Azul	Azul
K	Marrone	Brown	Braun	Marron	Marron	Castanho
J	Arancione	Orange	Orange	Orange	Nardnja	Alaranjado
I	Rosa	Pink	Rosa	Rose	Rosa	Rosa
L	Rosa-nero	Pink-black	Rosa-schwarz	Rose-noir	Rosa-negro	Rosa-negro
M	Grigio-viola	Grey-purple	Grau-violett	Gris-violet	Gris-violeta	Cinzento-violeta
N	Bianco-viola	White-purple	Weiss-violett	Blanc-violet	Blanco-violeta	Branco-violeta
O	Bianco-nero	White-black	Weiss-schwarz	Blanc-noir	Blanco-negro	Branco-negro
P	Grigio-blu	Grey-blue	Grau-blau	Gris-bleu	Gris-azul	Cinzento-azul
Q	Bianco-rosso	White-red	Weiss-rot	Blanc-rouge	Blanco-rojo	Branco-vermelho
R	Grigio-rosso	Grey-red	Grau-rot	Gris-rouge	Gris-rojo	Cinzento-vermelho
S	Bianco-blu	White-blue	Weiss-blau	Blanc-bleu	Blanco-azul	Branco-azul
T	Nero-blu	Black-blue	Schwarz-blau	Noir-bleu	Negro-azul	Negro-azul
U	Giallo-verde	Yellow-green	Gelb-gruen	Jaune-vert	Amarillo-verde	Amarelo-verde