PLASMA PROF 55

POWER SOURCE art. 965

SERVICE MANUAL

CONTENTS

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. 965 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 Cebora 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 before accessing the interior of the equipment.

Some internal parts, such as terminals and dissipaters, 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 PROF 55 is a system for cutting electrically conductive materials, using a plasma arc process.

It is made up of an electronic power source (art. 965), with built-in torch.

The power source is controlled by microprocessor circuits, which manage the operative functions of the cutting system and operator interface.

2.2 - Technical specifications.

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

2.3 - Description of power source art. 965.

Art. 965 is a direct current power source, essentially consisting of a three-phase transformer and a rectifier bridge.

Referring to the electrical diagram in par. 5.1, the drawing in par. 4.1 and table 4.2, we can identify the main blocks that make up the power source.

The switch (29) powers the power transformer (44), the primary circuit of which consists of three windings that, star-delta appropriately switched by the switch (29), allow the power source to operate at 230 or 400 Vac (for mains voltage selection see Instruction Manual).

Voltage may be delivered (always at 230 Vac) from 2 terminals of one of the primary winding of the transformer (44), to power the lamp (38) (mains voltage presence), the control board (6) and thus auxiliary services (fan, contactor, solenoid valves).

The power transformer (44) secondary winding is connected to the contactor TLP (30), that when closed, supply the three-phase rectifier bridge (32) that rectifies the power source output voltage.

At the rectifier bridge (32) positive output is connected the solenoid (43) with reed bulb (42) to detect the cutting current on the earth conductor of the power source, and pilot arc resistors (37), used for limiting pilot arc current and to facilitate the transferred arc operation.

At the rectifier bridge (32) negative output is connected the HF transformer (31) used to engage the pilot arc.

The control board (6) manages the power source output voltage, by means of the input contactor TLP (30) and the firing of the pilot arc, by means the built in HF generator circuit. Combined with the HF transformer (31), generates the high voltage and high frequency pulses needed to start the pilot arc. Its operation is controlled by the microprocessor on control board (6) and is subject to the rectifier bridge (32) output voltage presence.

Near the output terminals of the power source is the HF-filter board (47), which serves to prevent the high voltage and high frequency pulses generated by the HF transformer (31) from traveling along the wiring into the power source, where they would cause malfunctions or errors. Therefore, during maintenance operations, make sure that this board is always firmly connected to the original terminals before striking the arc.

The pressure switch (33) inserted on the plasma gas line stops the power source and lights the lamp (L)(45) when the pressure falls below the minimum permitted value.

The thermostat in reality is made by two thermostatic switches connected in series between them, located on two columns of the transformer (44) (temperature correct = contacts closed). The intervention of one of the two thermostats is sufficient to produce the power source block, signaled by lamp G (45).

With the switch (29) closed, the control board (6) is powered and awaiting for the start signal from the torch button. The power source provides no output voltage.

When the start button is pressed, the control board (6) strikes the pilot arc by activating the solenoid valve EL1 (34) (the one with the flow reducer), the input contactor TLP (30) and high frequency generation.

When solenoid valve EL1 (34) is opened, the gas starts to flow out from the torch for the pressure on the start button lasting time plus the post-gas time (90 seconds).

With the contactor TLP (30) closed, the voltage rectified by the bridge (32) is applied to the torch nozzle through the resistors (37).

High frequency generation lasts approximately 300 msec., during which the pilot arc must light on. If pilot arc doesn't start, you need to release and press again the start button, to perform a new tentative.

When the pilot arc is lit, you have approximately 2 seconds to begin cutting, after which timer the pilot arc shuts off until the start button is pressed again.

When the torch with lit pilot arc is placed near the workpiece, the arc current begins circulating on the earth conductor due to the potential difference caused by the resistors (37).

The solenoid with reed bulb (42) detects this arc current and provides information about it to the control board (6), which begins operation in transfer arc, thus it opens solenoid valve EL2 (34) (the one without flow reducer).

When cutting ends, input contactor TLP (30) and solenoid valve EL2 (34) are deactivated, while solenoid valve EL1 (34) remains powered for the post-gas time (approximately 90 seconds).

The signals processed by the electronic boards and present at their connectors are listed in the tables in chapter five of this manual.

3 - MAINTENANCE

WARNINGS

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

DISCONNECT THE POWER SOURCE FROM THE MAINS BEFORE PERFORMING MAINTENANCE.

3.1 - Periodic inspection, cleaning.

Periodically remove dirt and dust from the internal parts of the power source, using a jet of low-pressure dry compressed air or a brush.

Check the condition of the power cables of the power source and torch; replace if aged or 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.

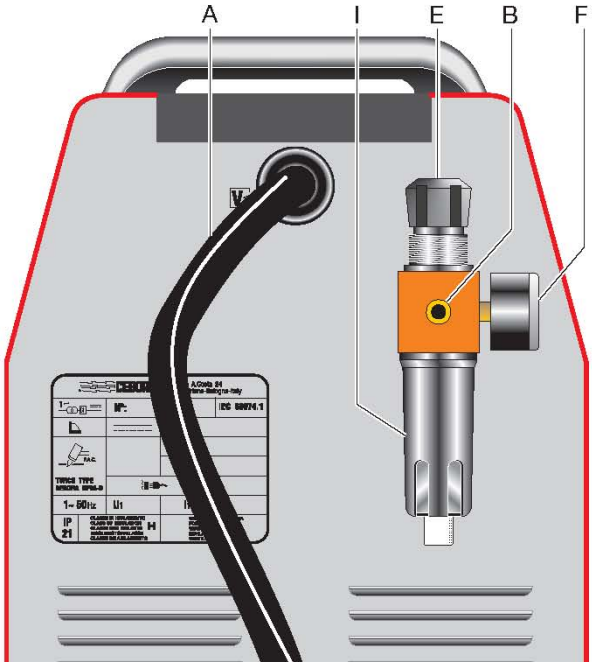
The following sequence reflects correct machine operation. It may be used as a guiding procedure for troubleshooting.

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

NOTE

- ❑ Operations preceded by this symbol refer to operator actions.
- ♦ Operations preceded by this symbol refer to machine responses that must occur following an operator action.

3.2.1 - Power source commands and signals.



3.2.2 - Power source operation.

- System shut off and unplugged from the mains.
- Connect the gas intake to the fitting (B) on the rear panel.
- Turn the gas setting knob (E) to a pressure, as read on the pressure gauge (F), suited to the type of torch being used (see Instruction Manual).
- Connect the cable of the positive pole of the power source to the workpiece.
- Connect the power source to the mains.
- Close the switch (C) on the power source.
  - ♦ System powered, lamp (M) lit, fan (39) running.
  - ♦ On the front panel lamps (G) and (L) off.

Correct? NO (see 3.3.1, 3.3.2).

▼ YES

WARNING

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

- Briefly press the torch start button.
  - ♦ Gas flows from the torch for approximately 90 seconds (post-gas time). The pressure reading on the pressure gauge (F) remains constant.

Correct? NO (see 3.3.3, 3.3.4).

▼ YES

- Press the start button and hold it down for approximately 5 seconds.
  - ♦ Pilot arc lights for approximately 2 seconds (pilot arc maximum time). The gas continues to flow for approximately 90 sec. more (post-gas time).

Correct? NO (see 3.3.5, 3.3.6, 3.3.7, 3.3.8).

▼ YES

- With pilot arc lit, place the torch near the workpiece.
  - ♦ Begin cutting.

Correct? NO (see 3.3.9).

▼ YES

- Release the torch start button.
  - ♦ The arc shuts off immediately. The gas continues to flow for approximately 90 sec. more (post-gas time).

Correct? NO (see 3.3.4).

▼ YES

REGULAR OPERATION.

3.3 - Troubleshooting.

WARNINGS

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

BEFORE REMOVING THE PROTECTIVE GUARDS AND ACCESSING INTERNAL PARTS, DISCONNECT THE POWER SOURCE FROM THE MAINS.

NOTE

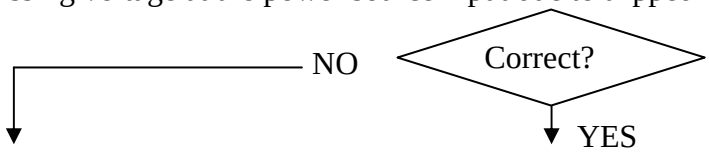
Items in **boldface** describe problems that may occur on the machine (symptoms).

- ❑ Operations preceded by this symbol refer to situations that the operator must verify (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, lamp (38) off.

MAINS SUITABILITY TEST.

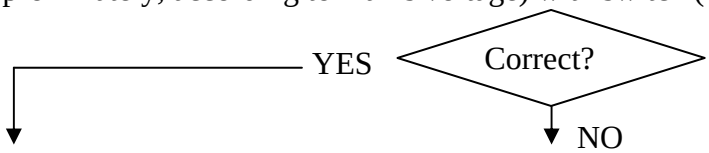
- ❑ Missing voltage at the power source input due to tripped mains protections.



- ♦ Eliminate any short-circuits on the connections between power cable, switch (29), transformer (44), contactor TLP (30) and control board (6).
- ♦ Check the insulation towards earth of the transformer (44) and fan (39). If leaking or short-circuited towards earth, replace.
- ♦ Mains not suitable to power the power source (ex.: insufficient installed power).

MAINS CONNECTION TEST.

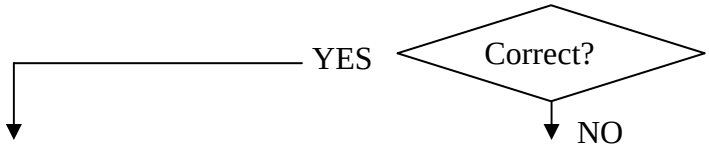
- ❑ Terminals U, V and W of switch (29) = approximately 3 x 400 Vac (or 3 x 230 Vac, approximately, according to mains voltage) with switch (29) closed.



- ♦ Check power cable and plug and replace if necessary.
- ♦ Check switch (29) and replace if defective.
- ♦ Check the mains voltage conditions, and especially that none of the three power supply phases is missing.

CONTROL BOARD (6) POWER SUPPLY TEST.

- ❑ Control board (6), connector J7, terminals 1 and 7 = 230 Vac approximately.
- ❑ Control board (6), terminal 1 of J1 and terminals 1 of J2 = 24 Vac approximately.
- ❑ Control board (6), terminal (-) of bridge rectifier W1 (-) and D5 diode cathode (+) = +16 Vdc approximately; terminal (-) bridge rectifier W1 (-) and D5 diode anode (+) = +5 Vdc approximately. All with switch (29) closed and both with mains at 230 and at 400 Vac.



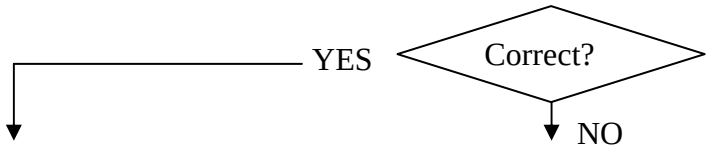
- ♦ Check the wiring between switch (29) and control board (6).
- ♦ Check integrity of fuses on control board (6), considering that:
  - F1 is inserted in the supply circuit for torch start button insulated circuit. For checking performs START COMMAND TEST, par. 3.3.3.
  - F2 is inserted in the control board (6) supply circuit. In this case replace control board (6).
  - F3 is inserted in the supply circuit for control board (6) service transformer. In this case replace service transformer on control board (6) or control board (6) complete.
- ♦ Check the mains voltage conditions.
- ♦ Replace control board (6).

♦ Replace lamp (38).
♦ Replace control board (6).

3.3.2 - Power source powered, lamp (38) lit, fan (39) stopped.

FAN (39) TEST.

❑ Fan (39) terminals = approximately 230 Vac, with switch (29) closed, both with mains at 230 and at 400 Vac.



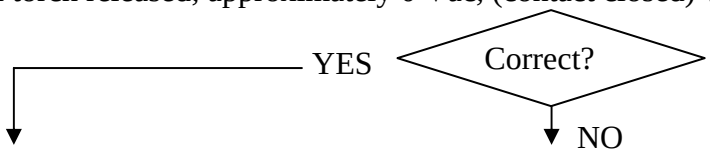
- ♦ Check the wiring between terminals J8 and J9 of control board (6) and fan (39).
- ♦ Check the presence of control board supply voltages, performing the CONTROL BOARD (6) POWER SUPPLY TEST in par. 3.3.1 if necessary.
- ♦ With power source off, temporarily disconnect terminals J8 and J9 on control board (6) and make sure resistance on the terminals of the fan (39) disconnected from J8 and J9. Corrected value = approximately 60 ohm. If 0 ohm (short circuit) replace fan (39) and control board (6).
- ♦ Replace control board (6).

♦ Make sure that there are no mechanical impediments blocking the fan (39).
♦ With power source off, temporarily disconnect terminals J8 and J9 on control board (6) and make sure resistance on the terminals of the fan (39) disconnected from J8 and J9. Corrected value = approximately 60 ohm. If >Mohm (circuit interrupted) replace fan (39).
♦ Replace the fan (39).

3.3.3 - The start button produces no effect.

START COMMAND TEST.

- Control board (6), connector J3, terminals 1 and 2 = approximately 24 Vac, with start button on torch released; approximately 0 Vac, (contact closed) with button pressed.



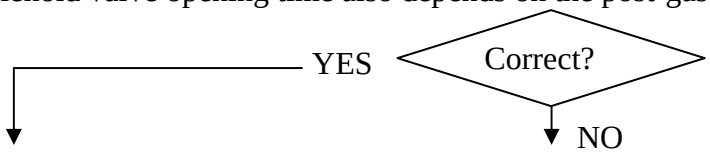
  - Check the wiring between J3 of control board (6) and J2 HF-filter board (47), and between J1 HF-filter board (47), torch cable, torch button and contact of the nozzle guard on the torch.
  - Make sure connection between J1 and J2 on HF-filter board (47).
  - Make sure the insulation between torch start button cables and electrode and nozzle cables on the torch cable. If insulation is reduced replace the torch complete. An eventual insulation loss between conductors may damage control (6) and HF-filter (47) boards.
  - Perform CONTROL BOARD (6) POWER SUPPLY TEST, par. 3.3.1.
  - Replace control board (6).

- Perform CONTROL BOARD (6) POWER SUPPLY TEST, par. 3.3.1.
- Replace control board (6).

3.3.4 - No gas flows from the torch.

PILOT ARC SOLENOID VALVE EL1 (34) TEST.

- Solenoid valve EL1 (34) terminals = approximately 230 Vac, with torch button pressed. The solenoid valve opening time also depends on the post-gas time.



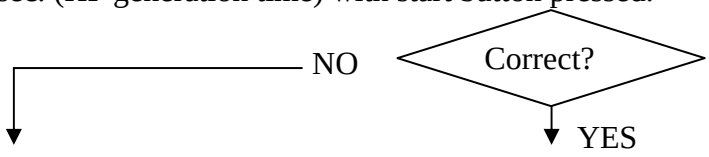
  - Check the wiring between solenoid valve EL1 (34) and terminals 4 and 10 of J7 on control board (6).
  - With power source off, check the resistance between the terminals of solenoid valve EL1 (34) = approximately 2500 ohm. If 0 ohm (short-circuit), replace solenoid valve EL1 (34) and control board (6).
  - Perform the CONTROL BOARD (6) POWER SUPPLY TEST, par. 3.3.1.
  - Replace control board (6).

- With power source off, check the resistance between the terminals of solenoid valve EL1 (34) = approximately 2500 ohm. If >Mohm (winding broken) replace solenoid valve EL1 (34).
- Make sure there are no occlusions in the gas hoses of the power source.
- Check the presence of the gas at the inlet fitting (B) and that the pressure and flow rate in the intake conduit meet the specification values (see Instruction Manual).
- Make sure that the pressure regulator (E) and pressure gauge (F) are working properly.
- Make sure that the threaded part of the air fitting (B) inserted in the pressure regulator (E) is no more than 6 - 8 mm (1/4” - 5/16”) long, to avoid any possible malfunction of the regulator (E).
- Replace solenoid valve EL1 (34).

3.3.5 - Gas flows from the torch, the pilot arc does not light (high frequency missing).

HF OSCILLATOR TEST.

- Control board (6), discharger SCI1 discharges at regular intervals, for approximately 300 msec. (HF generation time) with start button pressed.



  - Check wiring between HF transformer (31) and terminals J5 and J6 of control board (6). More specifically, make sure the primary winding circuit is not interrupted or in short-circuit. If necessary fix the connection or replace control board (6) or HF transformer (31).
  - Check connection of the HF transformer (31) secondary winding with rectifier (32) negative terminal and torch cable electrode terminal. If you find loose connections, tighten them and replace any components with damaged terminals.
  - Check the condition of the torch cable and torch; especially make sure there are no short-circuits or insulation leaks between the conductors, and that electrode, nozzle, nozzle holder and diffuser are not to be replaced (see Instruction Manual).
  - Make sure that the gas pressure in the torch plasma chamber is not too high. If necessary check operation of the pressure regulator (E) and pressure gauge (F) and adjust in observance of the technical specifications.
  - Go to par. 3.3.6.
- Check the distance between the tips of the discharger SCI1 (correct value = 0.85 mm.).
- Check the wiring between J10 of control board (6) and rectifier (32) (+) and (-) terminals.
- Make sure the power source output voltage presence, performing if necessary tests of par. 3.3.6.
- Make sure the start command working condition, performing if necessary START COMMAND TEST, par. 3.3.3.
- Replace control board (6).
- Replace HF transformer (31).

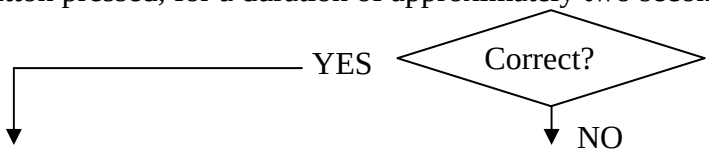
3.3.6 - Gas flows from the torch, the pilot arc does not light (nozzle voltage missing).

WARNING

FOR THE FOLLOWING TESTS **DISCONNECT TERMINALS J5 AND J6** ON CONTROL BOARD (6) TO PREVENT HIGH FREQUENCY FROM BEING GENERATED.

POWER SOURCE OUTPUT VOLTAGE TEST.

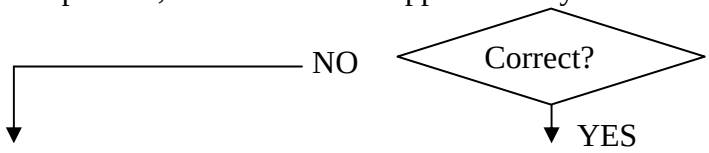
- Output terminal (21) of the power source (+) (workpiece potential) and HF transformer (31) secondary winding terminal (-) (electrode potential) = +250 Vdc approximately, with start button pressed, for a duration of approximately two seconds (maximum pilot arc time).



  - Go to par. 3.3.7.
- Power source output voltage regular.

NOZZLE VOLTAGE TEST.

- Terminal TP8 on HF-filter board (47)(+) (nozzle potential) and HF transformer (31) secondary winding terminal (-) (electrode potential) = +250 Vdc approximately, with start button pressed, for a duration of approximately two seconds (maximum pilot arc time).



  - Check the wiring between rectifier (32) negative terminal, HF transformer (31) secondary winding terminal and torch cable electrode terminal, and between rectifier (32) positive terminal, resistors (37), HF-filter board (47) and torch cable nozzle terminal. If you find loose connections, tighten and replace any components with damaged terminals.
  - Check condition of torch cable and torch, especially make sure there are no short-circuits or insulation leaks between the conductors or between electrode, nozzle, nozzle holder and diffuser.
  - With power source off, check the resistance of resistors (37). Corrected values = 1 ohm and 2,4 ohm. If not correct replace resistors (37).
  - Replace HF-filter board (47).
- Check connection between torch cable and HF transformer (31) secondary winding, and TP8 on HF-filter board (47). If you find loose connections, tighten and replace any components with damaged terminals.
- Make sure the internal parts of the torch are properly isolated, including the cables, and if in doubt replace the entire torch.
- Check the electrode, swirl ring and torch nozzle; replace if worn or damaged.
- Make sure HF generator working condition, performing if necessary test of par. 3.3.5.
- Check correct gas flux in the torch, performing if necessary PLASMA GAS PRESSURE TEST in par. 3.3.8.

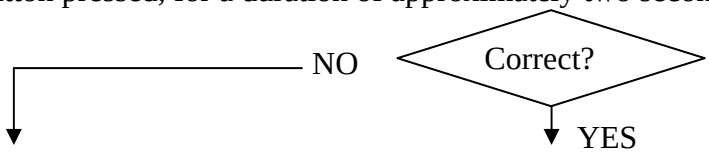
3.3.7 - In open circuit operation, the output voltage is not regular.

WARNING

FOR THE FOLLOWING TESTS **DISCONNECT TERMINALS J5 AND J6** ON CONTROL BOARD (6) TO PREVENT HIGH FREQUENCY FROM BEING GENERATED.

POWER SOURCE OUTPUT VOLTAGE TEST.

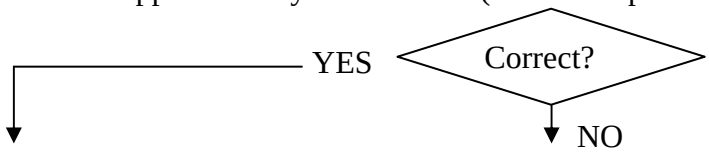
- Output terminal (21) of the power source (+) (workpiece potential) and HF transformer (31) secondary winding terminal (-) (electrode potential) = +250 Vdc approximately, with start button pressed, for a duration of approximately two seconds (maximum pilot arc time).



  - ♦ Open circuit output voltage regular.

CONTACTOR TLP (30) COMMAND TEST.

- Contactor TLP (30) = closed (230 Vac on coil terminals), with start button pressed, for a duration of approximately two seconds (maximum pilot arc time).

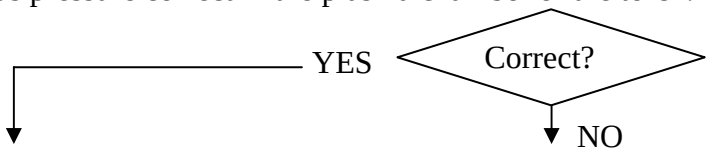


  - ♦ Check the wiring between contactor TLP (30) coil terminals and control board (6).
  - ♦ With power source off, check the resistance between terminals of contactor TLP (30) coil. Corrected value = approximately 430 ohm. If 0 ohm (short-circuit), replace contactor TLP (30) and control board (6).
  - ♦ Perform CONTROL BOARD (6) POWER SUPPLY TEST, par. 3.3.1.
  - ♦ Perform START COMMAND TEST, par. 3.3.3.
  - ♦ Replace control board (6).
- ♦ With power source off, check the resistance between terminals of contactor TLP (30) coil. Corrected value = approximately 430 ohm. If >Mohm (circuit interrupted), replace contactor TLP (30).
- ♦ Check the wiring between switch (29) and transformer (44) primary winding; and between transformer (44) secondary winding, contactor TLP (30) and rectifier (32). If you find loose connections, tighten them and replace any components with damaged terminals.
- ♦ With the power source off and disconnected from the mains, check the efficiency of the contacts of contactor TLP (30), manually activating it, and make sure that the resistance on each contact is approximately 0 ohm. If you find burnt contacts or interference in moving the parts, replace the TLP (30).
- ♦ Check the condition of the windings of transformer (44), especially making sure that there are no signs of overheating or dents in the winding columns that may lead to partial short-circuits in the turns. If necessary, replace the transformer (44).
- ♦ With the power source off and disconnected from the mains, check efficiency of rectifier (32).
- ♦ Check the presence of the power supply three phases at the rectifier (32) input terminals.
- ♦ Check the mains voltage conditions.

3.3.8 - Irregular pilot arc starts, unstable pilot arc.

PLASMA GAS PRESSURE TEST.

- Gas pressure correct in the plasma chamber of the torch.



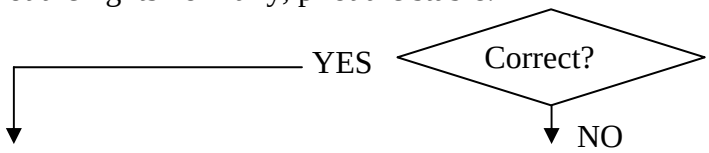
  - ♦ Check for the presence of gas at the intake fitting (B) and make sure that the pressure and flow rate in the intake line meet specifications.
  - ♦ Make sure that the threaded part of the fitting (B) inserted in the pressure regulator (E) is no more than 6 - 8 mm (1/4” - 5/16”) long, to avoid any possible malfunction of the regulator (E).
  - ♦ Make sure that the pressure regulator (E) and pressure gauge (F) are working properly.
  - ♦ Make sure there are no occlusions in the gas hoses of the power source.
  - ♦ Make sure that solenoid valve EL1 (34) = open, and solenoid valve EL2 (34) = closed, during the pilot arc.

- ♦ Make sure the power source open circuit working condition, performing if necessary tests in par. 3.3.7.
- ♦ Check the wiring between TP8 on HF-filter board (47), resistor (37) and nozzle terminal of torch cable; between TP7 on HF-filter board (47) and HF transformer (31) secondary winding; between TP3 on HF-filter board (47) and power source output terminal (21); between TP5 on HF-filter board (47) and ground. If you find loose connections, tighten and replace any components with damaged terminals.
- ♦ Check integrity of resistor (59). Correct value = 50 ohm.
- ♦ Make sure the internal parts of the torch are properly isolated, including the cables, and if in doubt replace the entire torch.
- ♦ Check the electrode, swirl ring and torch nozzle; replace if worn or damaged.
- ♦ Replace HF-filter board (47).

3.3.9 - Transfer arc does not take place or is too weak for cutting.

PILOT ARC OPERATING TEST.

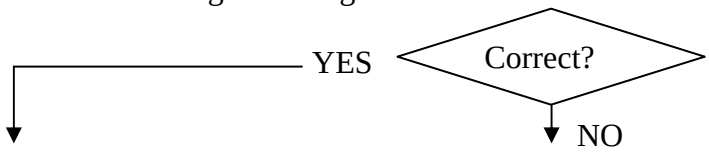
- Pilot arc lights normally, pilot arc stable.



  - Go to par. 3.3.8.

TRANSFER ARC SWITCHING TEST.

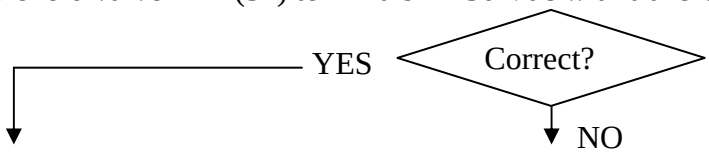
- Control board (6), connector J2, terminals 1 and 2 = 0 Vac, reed contact closed, with transfer arc, thus while cutting (24 Vac reed contact opened, with pilot arc on). This situation remains constant for as long as cutting continues.



  - Make sure reed bulb (42) is properly mounted in the corresponding solenoid (43).
  - With the power source off, make sure that the switch in the reed bulb (42) is working properly: move a magnet near the bulb and check the resistance between the terminals 1 and 2 of J2 on control board (6) = 0 ohm (reed contact closed). Move the magnet away from the bulb; resistance = approximately 5 Kohm (reed contact open). If incorrect replace reed bulb (42) and solenoid (43).
  - Replace control board (6).

TRANSFER ARC SOLENOID VALVE EL2 (34) TEST.

- Solenoid valve EL2 (34) terminals = 230 Vac with transfer arc, for the entire cutting time.



  - Check wiring between EL2 (34) and terminals 2 and 8 of J7 on control board (6).
  - With power source off, check resistance between terminals of EL2 (34) = approx. 2500 ohm. If 0 ohm (short-circuit), replace EL2 (34) and control board (6).
  - Replace control board (6).
- With power source off, check the resistance between the terminals of solenoid valve EL2 (34) = approximately 2500 ohm. If >Mohm (winding broken) replace solenoid valve EL2 (34).
- Check connections between torch cable electrode terminal, HF transformer (31) secondary winding and rectifier (32) negative terminal; between earth cable, output terminal (21) of the power source, solenoid (43), and rectifier (32) positive terminal. If you find any deteriorated connections, reset them and replace any damaged components.
- Check the condition of the electrode, nozzle, nozzle holder and swirl ring of the torch.
- Check the presence of the gas at the inlet fitting (B) and that the pressure and flow rate in the intake conduit meet the specification values (see Instruction Manual).
- Make sure the pressure regulator (E) and pressure gauge (F) are working properly.
- Make sure that the gas lines in the power source are not partially clocked, so that the gas throughput is enough for the pilot arc but not for the transfer arc.
- Replace solenoid valve EL2 (34) and/or control board (6).

3.4 - Alarm signals.

3.4.1 - Lamp (G) (45) lit, with fix light = transformer (44) temperature above the limit.

Power source remains in block with contactor TLP (30) opened.

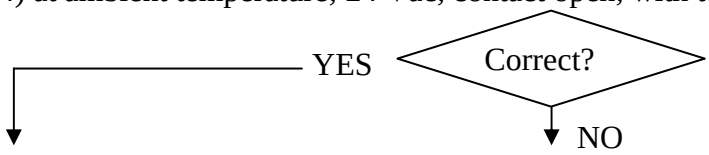
We recommend not to shut off the power source, to keep the fan (39) running and thus allow rapid cooling.

This is reset automatically when the temperature returns within the allowed limits.

Thermostat in reality is made by two thermostatic switches connected in series between them, located on two columns of the transformer (44).

THERMOSTAT ON THE TRANSFORMER (44) TEST.

- Control board (6), connector J3, terminals 6 and 7 = 0 Vac, contact closed, with transformer (44) at ambient temperature; 24 Vac, contact open, with temperature beyond limits.



  - Check the wiring between thermostats on transformer (44) and terminals 6 and 7 of J3 on control board (6), considering that in reality thermostatic switches are two, series connected between them.
  - Make sure that the two thermostatic switches are intact and properly positioned on the windings of the transformer (44).
  - If the alarm occurs while cutting, and the transformer (44) is evenly heated, make sure that the duty-cycle is not greater than indicated in the power source specifications.
  - If the alarm occurs while cutting, and only some of the windings of the transformer (44) are heated, one may infer that the transformer (44) is partially short-circuited, and must therefore be replaced.
  - Replace thermostat on transformer (44).
- Replace control board (6).

3.4.2 - Lamp (G) (45) flashing (two flashes with one second pause) = start button pressed during power source start-up.

If at the start up the start button on the torch is detected closed, the power source remains in block with contactor TLP (30) opened, without output voltage and with lamp (G) (45) flashing.

The reset is automatic when the start button is released.

For the problem analysis perform the START COMMAND TEST, par. 3.3.3.

3.4.3 - Lamp (G) (45) flashing (three flashes with one second pause) = reed contact (42) closed at power source start-up.

If the reed contact (42) is found closed upon start-up, the power source remains blocked, with contactor TLP (30) opened, without delivering current and with lamp (G) (45) flashing.

To restore proper operation, shut off and restart the power source after first removing the cause that closed the reed contact (42).

To analyze the problem, carry out the TRANSFER ARC SWITCHING TEST, par. 3.3.9.

3.4.4 - Lamp (L) (45) lit, with fix light = low gas pressure.

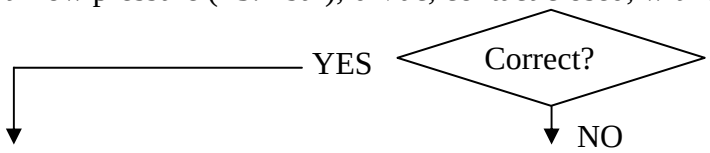
With this alarm the power source remains in block with contactor TLP (30) opened, without output voltage.

This is automatically reset when the pressure returns within the allowed limits, but to restart pilot arc you need a new start command by torch start button.

To analyze the problem perform the following test.

PRESSURE SWITCH (33) TEST.

- Control board (6), connector J3, terminals 3 and 5 (NC contact) = 0 Vac, contact closed, with low pressure (<3.2 bar); 24 Vac, contact opened, with suitable pressure.
- Control board (6), connector J3, terminals 3 and 4 (NO contact) = 24 Vac, contact opened, with low pressure (<3.2 bar); 0 Vac, contact closed, with suitable pressure.



- ♦ Check the wiring between pressure switch (33) and terminals 3, 4 and 5 on control board (6).
- ♦ Check for the presence of gas at the intake fitting (B) and make sure the pressure and flow rate in the intake line meet specifications (see Instruction Manual).
- ♦ Make sure that the pressure regulator (E) and pressure gauge (F) are working properly.
- ♦ Make sure that the threaded part of the air fitting (B) inserted in the pressure regulator (E) is no more than 6 - 8 mm (1/4” - 5/16”) long, to avoid any possible malfunction of the regulator (E).
- ♦ Make sure there are no occlusions in the gas hoses of the power source.
- ♦ Replace the pressure switch (33).
- ♦ Replace control board (6).

- ♦ Proper operation of the pressure switch (33).
- ♦ Replace control board (6).

4 - COMPONENTS LIST

4.1 - Power source art. 965 : see file ESP965.pdf enclosed at the end of the manual.

4.2 - Components table: see file ESP965.pdf enclosed at the end of the manual.

4.3 - List of spare parts.

Essential spare parts.

Ref.	Code	Description	Qty.
6	5602170	control circuit	1
11	3160166	pressure gauge	1
29	3190243	switch	1
32	3200069	rectifier	1
33	5710129	pressure switch	1
34	3160179	solenoid valve	1

Recommended spare parts.

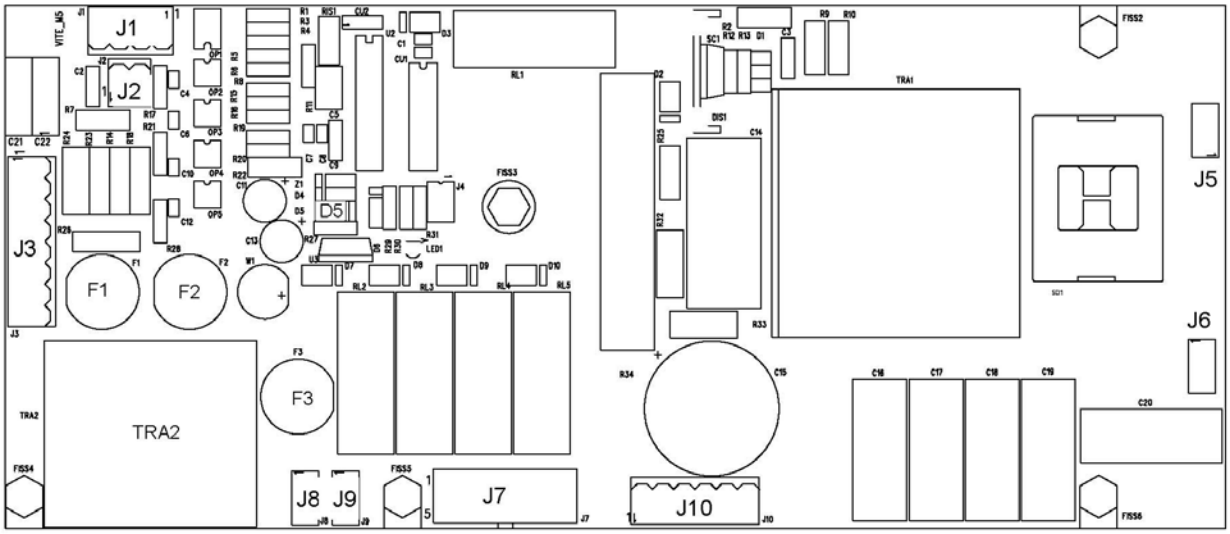
Ref.	Code	Description	Qty.
10	3160167	reducer	1
30	3190280	contactor	1
37	3205058	resistor	1
47	5602173	HF-filter circuit	1

5 - ELECTRICAL DIAGRAMS

5.1 - Power source art. 965 : see file SCHE965.pdf enclosed at the end of the manual.

5.2 - Control board (6) code 5.602.170.

5.2.1 - Topographical drawing.



5.2.2 - Connector table.

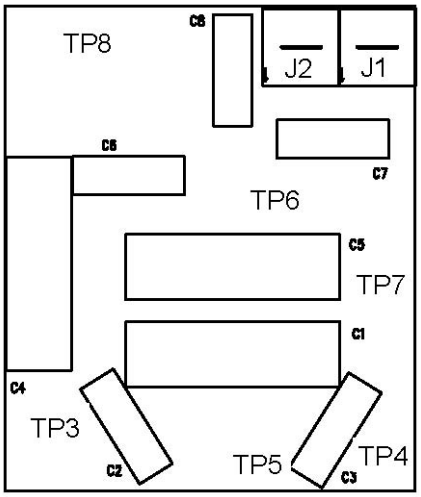
Connector	Terminals	Function
J1	1 - 2	lamp (L) command output (low pressure).
J1	3 - 4	lamp (G) command output (overtemperature).
J2	1 - 2	“transferred arc” signal input from reed (42).
J3	1 - 2	start signal input from torch button.
J3	3 - 4 - 5	pressure signal input from pressure switch (33).
J3	6 - 7	temperature signal input from thermostats on transformer (44).
J4	-	NU.
-	J5 - J6	output for HF transformer (31).
J7	1 - 7	230 Vac input for control board (6) power supply.
J7	2 - 8	230 Vac output to control solenoid valve EL2 (34).
J7	3 - 9	230 Vac output to control contactor TLP (30).
J7	4 - 10	230 Vac output to control solenoid valve EL1 (34).
J7	5 - 11	NU.
-	J8 - J9	230 Vac output for fan (39) power supply.
J10	1(+) - 6(-)	rectifier (32) output voltage signal input, for HF generator power supply.
J10	3	torch nozzle voltage input.

5.2.3 - Fuse table.

Fuse	Value	Function
F1	0,2 A.	torch start button insulated circuit power supply.
F2	0,2 A.	control board (6) internal circuits power supply.
F3	2 A.	service transformer TRA2 primary circuit power supply.

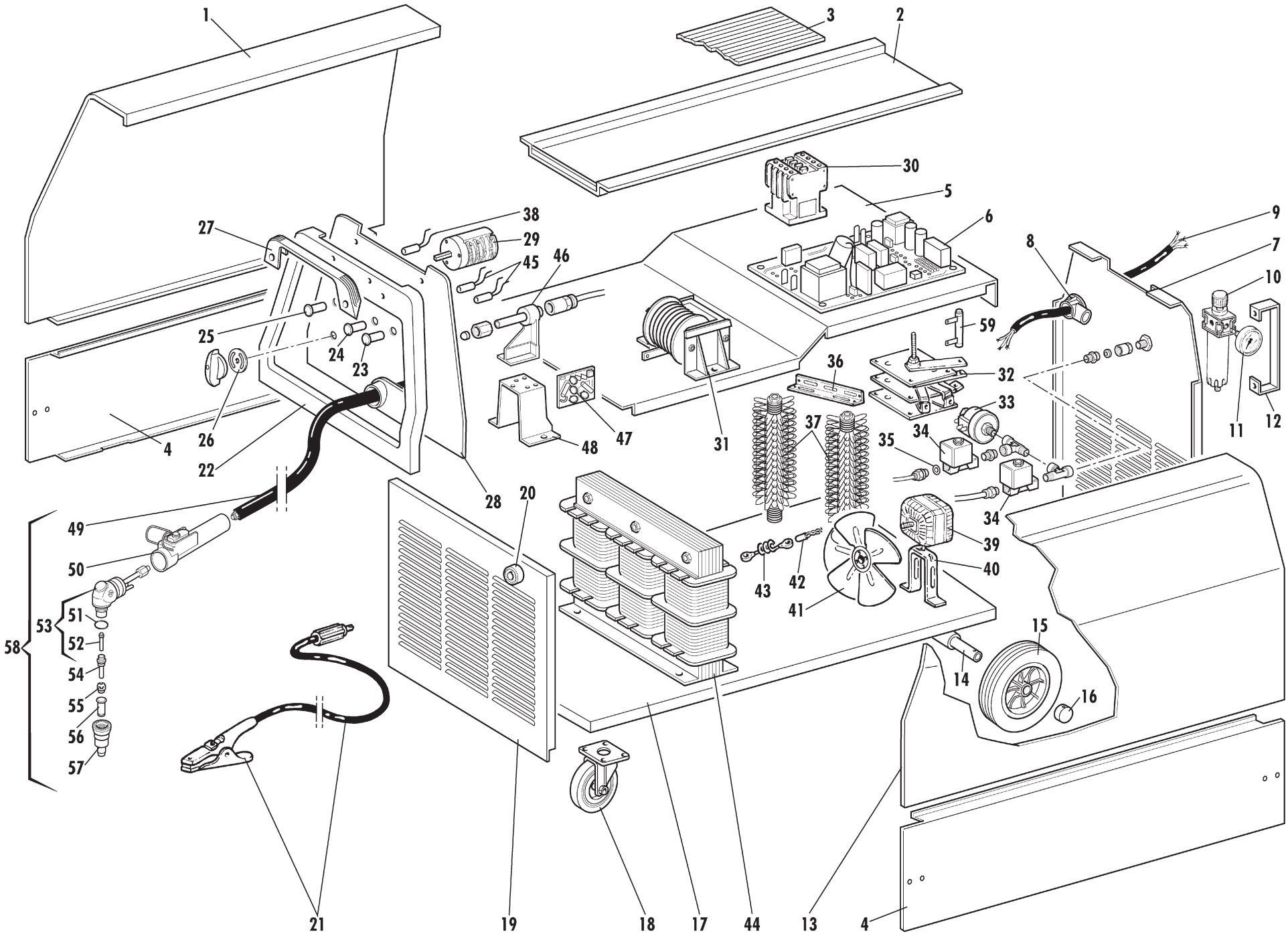
5.3 - HF-filter board (47) code 5.602.173.

5.3.1 - Topographical drawing.



5.3.2 - Connector table.

Connector	Terminals	Function
J1	A - B	start signal input.
J2	A - B	start signal output.
-	TP3	output voltage input (workpiece potential).
-	TP4 - TP7	rectifier (32) output voltage input.
-	TP5 - TP6	connection to earth.
-	TP8	torch nozzle voltage input.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pos	DESCRIZIONE	DESCRIPTION
01	LATERALE DESTRO	RIGHT SIDE PANEL
02	COPERCHIO	COVER
03	COPERTURA GOMMA	RUBBER MAT
04	LATERALE FISSO	FIXED SIDE PANEL
05	PIANO INTERMEDIO	INSIDE BAFFLE
06	CIRCUITO DI CONTROLLO	CONTROL CIRCUIT
07	PANNELLO POSTERIORE	BACK PANEL
08	PRESSACAVO	STRAIN RELIEF
09	CAVO RETE	POWER CORD
10	RIDUTTORE	REGULATOR
11	MANOMETRO	GAUGE
12	PROTEZIONE	PROTECTION
13	LATERALE SINISTRO	LEFT SIDE PANEL
14	ASSALE	AXLE
15	RUOTA FISSA	FIXED WHEEL
16	TAPPO	CAP
17	FONDO	BOTTOM
18	RUOTA PIROETTANTE	SWIVELING CASTOR
19	PANNELLO ANTERIORE	FRONT PANEL
20	PRESA GIFAS	GIFAS SOCKET
21	MORSETTO + CAVO	SCREW KNOB + CABLE
22	CORNICE	FRAME
23	PORTA LAMPADA	LAMP HOLDER
24	PORTA LAMPADA	LAMP HOLDER
25	PORTA LAMPADA	LAMP HOLDER
26	DISCO CAMBIATENSIONE	LOCKING DISC
27	MANICO	HANDLE
28	PANNELLO COMANDI COMP.	COMPLETE CONTROL PANEL
29	COMMUTATORE	SWITCH
30	TELERUTTORE	CONTACTOR

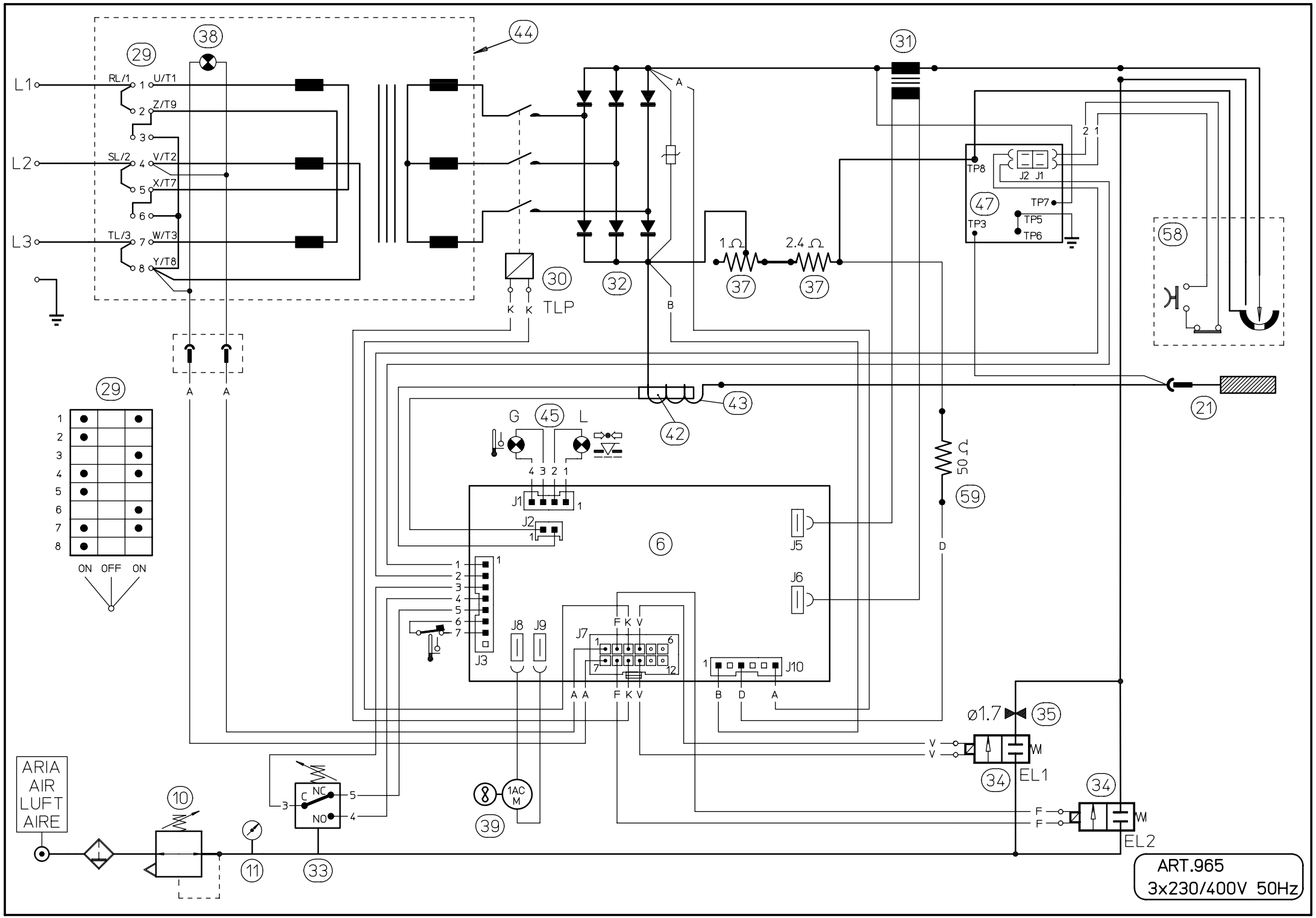
pos	DESCRIZIONE	DESCRIPTION
31	TRASFORMATORE H.F.	H.F. TRANSFORMER
32	RADDRIZZATORE	RECTIFIER
33	PRESSOSTATO	PRESSURE SWITCH
34	ELETTROVALVOLA	SOLENOID VALVE
35	CONTATTO	CONTACT
36	SERRAPACCO	PACK HOLDER
37	RESISTENZA	RESISTANCE
38	LAMPADA SPIA	LIGHT
39	MOTORE	MOTOR
40	SUPPORTO MOTORE	MOTOR SUPPORT
41	VENTOLA	FAN
42	CONNESSIONE	CONNECTION
43	AVVOLGIMENTO	WINDING
44	TRASFORMAT. DI POTENZA	POWER TRANSFORMER
45	CONNESSIONE	CONNECTION
46	MORSETTIERA	TERMINAL BOARD
47	CIRCUITO FILTRO	FILTER CIRCUIT
48	SUPPORTO MORSETTIERA	TERMINAL BOARD SUPPORT
49	CAVO TORCIA	TORCH CABLE
50	IMPUGNATURA CON PULSANTE	HANDGRIP WITH PUSHBUT TON
51	ANELLO O.R.	O.RING
52	DIFFUSORE	DIFFUSER
53	CORPO TORCIA (TESTINA)	TORCH BODY (HEAD)
54	ELETTRODO (CONF. DA 5 PZ.)	ELECTRODE (PACK. 5 PCS.)
55	DIFFUSORE ISOLANTE	SWIRL RING
56	UGELLO (CONF. DA 10 PZ.)	NOZZLE (PACK. 10 PCS.)
57	PORTAUGELLO	NOZZLE HOLDER
58	TORCIA COMPLETA	COMPLETE TORCHE
59	RESISTENZA	RESISTANCE

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.

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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U/T1
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31
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TP5
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J2 J1
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ART.965
3x230/400V 50Hz