POWER SPOT 5500

POWER SOURCE art. 2153

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. 2153 for welding systems of threaded stud bolts and rivets.

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 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, and wait for the internal capacitors to discharge before accessing the interior of the equipment.

WARNINGS

The discharge time of the DC-capacitors (24) depends on the status of the power source. In normal situations it takes approximately 1 MINUTE, while in the event of a malfunction or in the presence of error code “E5”, it may take as long as **several hours.**

Therefore, MEASURE THE VOLTAGE ON THE DC-CAPACITORS (24) EVERY TIME YOU ACCESS THE INTERIOR OF THE POWER SOURCE, AND DISCHARGE THEM MANUALLY IF NECESSARY BY TEMPORARILY APPLYING A 470 OHM 50 W RESISTOR IN PARALLEL TO THE DC-CAPACITORS (24).

NEVER SHORT-CIRCUIT THE TERMINALS OF THE DC-CAPACITORS (24).

The large capacity of the DC-capacitors (24) may produce very high currents, even with just a few volts, with serious danger to the operator.

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 POWER SPOT 5500 is a system for welding ferrous and non-ferrous threaded stud bolts or rivets, on various types of sheet metal.

It is made up of an electronic power source (art. 2153), and a set of accessories to adapt to various applications and tasks (see Sales Catalogue).

The power source is controlled by microprocessor-controlled electronic circuits that manages the operator interface and operation.

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. 2153.

Art. 2153 is a capacitor discharge power source made up of a single-phase transformer, a rectifier bridge, a battery of capacitors and a scr static switch.

It may be powered at either 115 or 230 Vac; the unit adapts automatically based on the voltage applied to the power source input.

Referring to fig. 3.2.1, the electrical diagram in par. 5.1, drawing 4.1 and table 4.2, you can identify the main blocks that make up the unit.

The operating principle is based on the effects of the passage of high current, supplied by the DC-capacitors (24) (capacitor discharge), onto the small contact surface offered by rivets or bolts with the sheet metal to which they are being welded. The amount of energy needed at the welding point is adjusted by checking the dc voltage on the DC-capacitors (24). This adjustment is made by means of a “triac” that partializes the supply voltage provided by the 190 Vac secondary circuit of the transformer (31).

The DC-capacitors (24) that create the welding point are discharged by means of a “scr” (3) static switch on the high current circuit, which becomes conductive and directly connects the DC-capacitors (24) to the output terminals (F) and (G) of the power source.

The main switch (21) powers the power board (12), which contains:

- the filter to reduce conducted interference reflected in the mains;
- the circuits to select the supply voltage via the relay RL1;
- the “triac” to adjust the voltage on the DC-capacitors (24);
- the rectifier bridge that keeps the voltage adjusted by the “triac” continuous.

The power board (12) is connected to the transformer (31) that generates the supply voltages for the power (190 Vac) and control circuits (18 Vac), and galvanically isolates the output and control circuits from the input circuits linked to mains potential.

The control board (2), powered by the same service voltages generated on the power board (12), also acts as a control panel as it contains both the control circuits and the command and signaling circuits, and is mounted on the front panel of the power source.

Depending on the supply voltage applied to the power source input, the check either does or does not activate relay RL1 on power board (12), which adapts the power source operation to the mains voltage by connecting in series (for 230 Vac main) or parallel (for 115 Vac mains) the two primary windings at 115 Vac of the transformer (31). In this way both the control and power circuits are always powered by the same secondary voltages.

Once the power source is powered, the control checks the triac on power board (12), which partializes the voltage supplied by the secondary circuit at 190 Vac of the transformer (31) to slowly charge the DC-capacitors (24) until the programmed voltage shown on display (E) is

reached. Normally the programmed voltage that appears upon start-up matches the voltage used the last time welding was performed.

This voltage may be changed using the keys on the control panel. If the accessory (gun) connected to the connector (H) changes, the programmed voltage becomes the standard voltage for the connected accessory. The check recognizes the accessory connected to the power source by means of a special signal in connector (H), and based on that signal activates a working program with a voltage specific to the type of accessory. The working program is shown on display (E) (ex.: P_0) during start-up.

When lowering the direct current, the check automatically inserts the discharge resistor (7) in parallel to the DC-capacitors (24), to discharge them until they reach the programmed voltage.

Once the programmed voltage is reached, the power source awaits the start command via the gun trigger.

The start signal may be provided from the gun only when the start button (trigger) is pressed and with the gun pressed against the sheet metal. There is a spring inside the gun whose force must be adjusted based on the type of rivet being used (see Instruction Manual), which activates an interface switch serially connected to the start button.

In addition, the check carries out the start command only if a voltage of 0 Vdc is detected, on output terminals (F) and (G) of the power source, to enable welding only if the high current circuit is actually closed, thus if the rivet is truly in contact with the workpiece, with clamps firmly grasping the sheet metal.

When the start command reaches control board (2), the scr (3) connecting the DC-capacitors (24) to the output terminals (F) and (G) of the power source is engaged. This allows the rapid discharge of the DC-capacitors (24) on the point of contact between rivet and workpiece, essentially welding the rivet to the sheet metal.

When you have finished welding, the check pauses for approximately 1 second, after which it recharges the DC-capacitors (24) for a new welding cycle. During this pause the gun must be removed from the welded rivet, thus open the high current circuit; if the gun remains in contact with the newly welded rivet for longer, this may block the power source with message “E2” on the display (E) (see Error codes par. 3.4). To reset you must shut down the power source then switch it back on.

On the transformer (31) is a thermostat that blocks operation of the power source in case of overtemperature, showing the corresponding alarm code on the display (E) (see Error codes par. 3.4).

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

3 - MAINTENANCE

WARNINGS

ANY INTERNAL INSPECTIONS OR REPAIRS MUST BE CARRIED OUT BY QUALIFIED PERSONNEL.
BEFORE BEGINNING MAINTENANCE OPERATIONS, UNPLUG THE MACHINE FROM THE MAINS AND WAIT FOR THE INTERNAL CAPACITORS TO DISCHARGE.

MEASURE THE VOLTAGE ON THE DC-CAPACITORS (24) EVERY TIME YOU ACCESS THE INTERIOR OF THE POWER SOURCE, AND DISCHARGE THEM MANUALLY IF NECESSARY BY TEMPORARILY APPLYING A 470 OHM 50 W RESISTOR IN PARALLEL TO THE DC-CAPACITORS (24) (see warnings par. 1.3).
NEVER SHORT-CIRCUIT THE TERMINALS OF THE DC-CAPACITORS (24).

3.1 - Periodic inspection, cleaning.

Periodically remove any dirt or dust from the air vents 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.

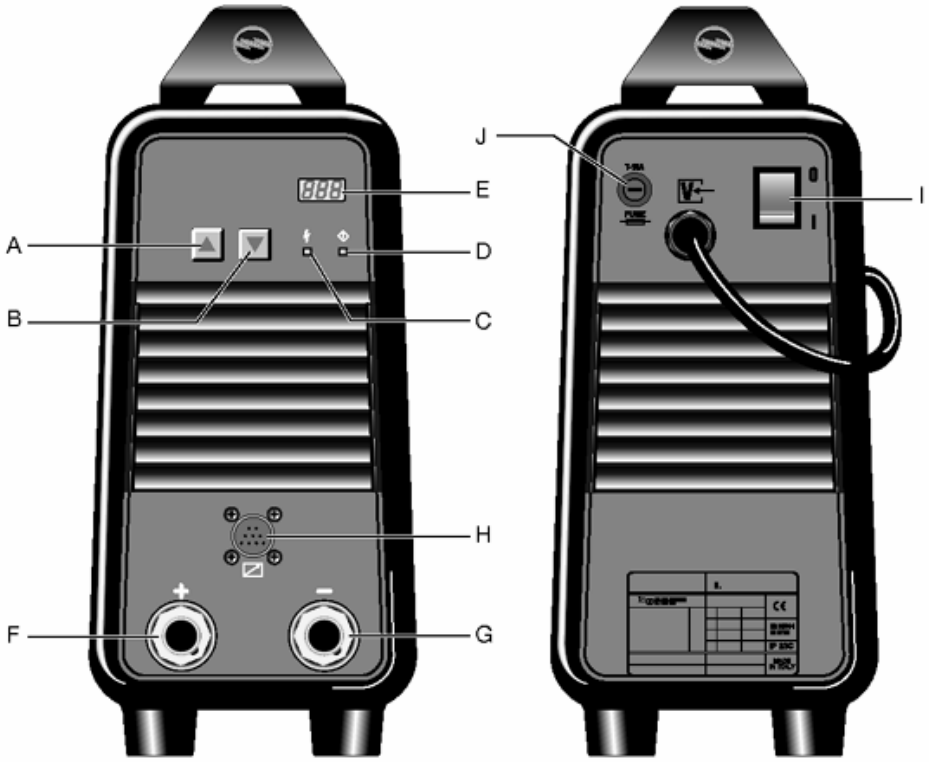
Check the condition of the internal power connections and connectors on the electronic boards; if you find “loose” connections, tighten or replace the connectors.

3.2 - Sequence of operations (fig. 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.



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.

3.2.2 - Starting the power source.

- ❑ System shut off and unplugged from the mains.
- ❑ Connect the cable with the gun to terminal (G) of the power source.
- ❑ Connect the start signal cable of the gun to connector (H).
- ❑ Connect the cable with earth clamps to terminal (F) of the power source, and the earth clamps to the metal workpiece (see the Instruction Manual on how to fasten them).
- ❑ Close the switch (I).
  - ♦ System powered, green led (C) lit, fan (34) running.
  - ♦ Display (E) reads “P_0”, thus the working program for the gun provided.
  - ♦ After two seconds display (E) shows the programmed voltage for the DC-capacitors (24).

Correct? NO (see 3.3.1, 3.3.2).
YES

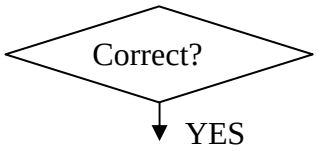
- ❑ Press the tip of the gun to an insulating surface, with no rivets inserted in the mandrel, and press the start button of the gun (trigger).
- ❑ Holding down the start button on the gun, lift the gun from the surface against which the tip was pressed.
  - ♦ Led (D) on control panel lights for as long as the start button is held down and the tip of the gun pressed against the test surface. Release the start button or lift the gun from the test surface. The led (D) shuts off to indicate that the start command is no longer present.

Correct? NO (see 3.3.3).
YES

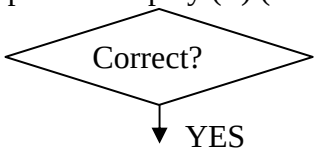
- ❑ Press and hold down the key (A).
- ❑ Press and hold down the key (B).
  - ♦ The programmed voltage on display (E) increases (with key (A)) or decreases (with key (B)).
  - ♦ When the buttons are released, display (E) flashes to indicate that the voltage on the DC-capacitors (24) is reaching the new programmed value. When the flashing stops, the voltage on the DC-capacitors (24) has reached the new programmed value.

Correct? NO (see 3.3.4).
YES

- Use the (A) or (B) keys to set a voltage on display (E) suitable for the welding to be done.
- Insert a rivet in the mandrel of the gun and press the tip of the rivet against the surface of the sheet metal to which it is to be welded; press the gun start trigger.
    - Current output is activated for a few tenths of a second, during which time the rivet is welded to the sheet metal.



- As soon as you have finished welding, release the torch trigger and immediately move the gun away from the sheet metal.
    - The power source is awaiting a new start command for a new welding cycle (if you pause with the torch in contact with the workpiece, you will cause a block and message “E2” will appear on display (E) (see Error codes, par. 3.4).



REGULAR OPERATION.

3.3 - Troubleshooting.

WARNINGS

ANY INTERNAL INSPECTIONS OR REPAIRS MUST BE CARRIED OUT BY QUALIFIED PERSONNEL.
BEFORE BEGINNING MAINTENANCE OPERATIONS, UNPLUG THE MACHINE FROM THE MAINS AND WAIT FOR THE INTERNAL CAPACITORS TO DISCHARGE.

MEASURE THE VOLTAGE ON THE DC-CAPACITORS (24) EVERY TIME YOU ACCESS THE INTERIOR OF THE POWER SOURCE, AND DISCHARGE THEM MANUALLY IF NECESSARY BY TEMPORARILY APPLYING A 470 OHM 50 W RESISTOR IN PARALLEL TO THE DC-CAPACITORS (24) (see warnings par. 1.3).
NEVER SHORT-CIRCUIT THE TERMINALS OF THE DC-CAPACITORS (24).

NOTE

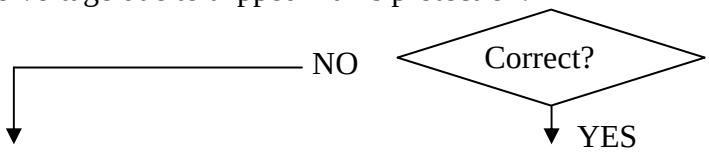
Items in **boldface** describe problems that may occur on the machine (symptoms).

- ❑ 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, led (C) on control panel unlit.

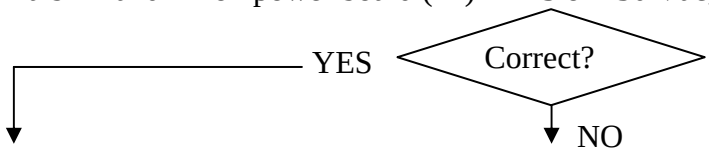
MAINS SUITABILITY TEST.

- ❑ No voltage due to tripped mains protection.



- ♦ Eliminate any short-circuits on the connections between power cable, switch (21), fuse (J) and power board (12).
- ♦ Make sure that terminals L1 and L2 of CN1 on power board (12) are not short-circuited between themselves or towards earth.
- ♦ Mains not suitable to power the power source (ex.: insufficient installed power).

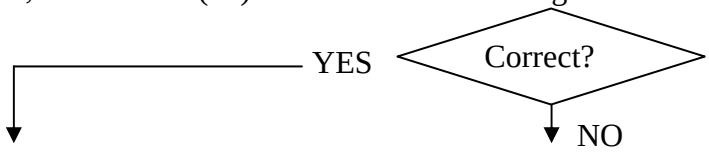
MAINS CONNECTION TEST.
Terminals L1 and L2 on power board (12) = 115 or 230 Vac, with switch (21) closed.



- ♦ Check power cable and plug and replace if necessary.
- ♦ Make sure the fuse (J) is intact on the rear panel of the power source.
- ♦ Check switch (21), and replace if defective.
- ♦ Check the mains voltage conditions.

SERVICES POWER SUPPLY TEST.

- Power board (12), rectifier bridge W1, negative terminal (-) and diode D2 cathode (+) = +25 Vdc, with switch (21) closed and mains voltage 230 Vac.



  - ♦ Check the wiring between CN3 of power board (12) and transformer (31).
  - ♦ With power source powered check the following voltages at the primary circuit of transformer (31):
    - CN3, terminals 8 and 10 = 115 Vac;
    - CN3, terminals 7 and 9 = 115 Vac;
    - CN3, terminals 7 and 10 = 0 Vac with mains 230 Vac; 115 Vac with mains 115 Vac.

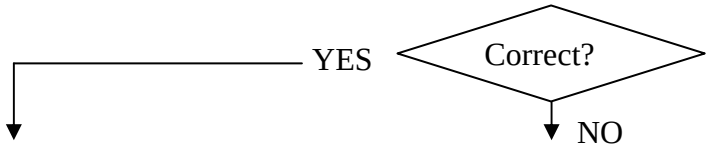
    If incorrect replace relay RL1 on power board (12) or complete power board (12). If correct, make sure the following voltages are present on the secondary circuits of the transformer (31):
    - CN3, terminals 1 and 2 = 190 Vac; terminals 4 and 5 = 18 Vac.

    If incorrect, with power source off temporarily disconnect CN3 from power board (12) and check the resistance between the following terminals of CN3:
    - CN3, terminals 1 and 2 = approximately 1.7 ohm; terminals 4 and 5 = approximately 0.7 ohm.

    If incorrect replace the power board (12). If correct, replace transformer (31).

CONTROL BOARD (2) POWER SUPPLY TEST.

- Control board (2), connector CN2, terminals 14 (–) and 1 (+) = + 5 Vdc, with switch (21) closed.



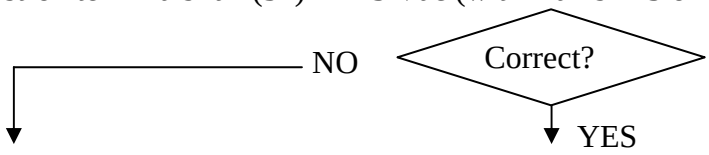
  - ♦ Check the wiring between CN2 control board (2) and CN4 power board (12).
  - ♦ With power source off, temporarily disconnect connector CN4 from power board (12) and turn the power source back on. Make sure that on CN4 of power board (12), terminals 14(-) and 1(+) = +5 Vdc. If correct, check the wiring between CN2 control board (2) and CN4 power board (12), and replace control board (2) if necessary. If incorrect replace the power board (12).

- ♦ Replace the control board (2).

3.3.2 - Power source powered, fan (34) stopped.

FAN TEST.

- Fast-on terminals fan (34) = 115 Vac (with mains 115 or 230 Vac).

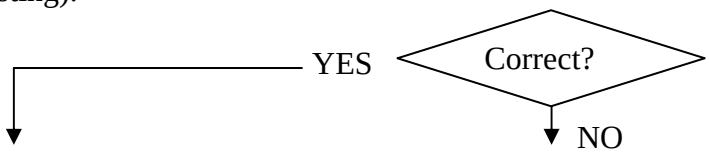


  - ♦ Make sure that there are no mechanical impediments blocking the fan.
  - ♦ Replace the fan (34).
- ♦ Check the wiring between fan (34) and terminals 8 and 10 of CN3 on power board (12).
- ♦ See SERVICE POWER SUPPLY TEST, par. 3.3.1.
- ♦ Replace the power board (12).

3.3.3 - Power source powered, the start button produces no effect.

START COMMAND TEST.

- Control board (2), connector CN1, terminals 3(+) and 1(-) = 0 Vdc, led (D) lit, with start button and gun tip pressed (approximately +4 Vdc, led (D) off, with start button and gun tip resting).



  - ♦ Check the wiring between terminals 1 - 3 of CN1 control board (2), connector (38)(H) on the front panel of the power source, start button and interface switch in the gun.
  - ♦ Check the conditions and operation of the start button, interface switch in the gun, and gun patch connector. Replace if defective.
  - ♦ See CONTROL BOARD (2) POWER SUPPLY TEST par. 3.3.1.
  - ♦ Replace the control board (2).
- ♦ Regular operation.

3.3.4 - In open circuit operation, the voltage at the DC-capacitors (24) is not regular.

NOTE

To check the open circuit operation of the power source, you must measure the output voltage directly on the DC-capacitors (24), since the output terminals (F) and (G) of the power source are connected to this potential only at the moment of welding.

WARNINGS

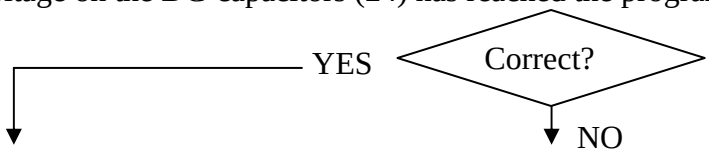
DC-capacitors (24) are normally discharged by the control, which inserts the discharge resistor (7) in parallel until the programmed voltage is reached.
If this circuit does not work the DC-capacitors (24) remain charged for **several hours.**
TO DISCHARGE THEM MANUALLY, TEMPORARILY APPLY A RESISTANCE OF 470 OHM 50 W IN PARALLEL TO THE DC-CAPACITORS (24).

NEVER SHORT-CIRCUIT THE TERMINALS OF THE DC-CAPACITORS (24).

The large capacity of the DC-capacitors (24) may produce very high currents, even with just a few volts, with serious danger to the operator.

VOLTAGE ON THE DC-CAPACITORS (24) ADJUSTMENT TEST.

- Terminals of the DC-capacitors (24) = same voltage used the last time welding was performed, or standard voltage for the type of accessory applied to the power source (ex.: 40 Vdc for the gun provided).
- Adjust the keys (A) or (B) to increase or decrease the programmed voltage, shown on display (E). When the keys are released, display (E) flashes to indicate that the voltage on the DC-capacitors (24) is changing to reach the programmed value. When the flashing stops, the voltage on the DC-capacitors (24) has reached the programmed value.



  - Check the flat cable between CN4 power board (12) and CN2 control board (2).
  - Check the status of the relay RL2 on power board (12). In normal conditions it must not be powered and its NC contact actually closed.
  - With the power source off, check on CN2 of power board (12) to make sure resistance of terminals 5 and 6 = approximately 60 ohm. If >Mohm (circuit broken) replace discharge resistor (7). If 0 ohm (short-circuit) replace discharge resistor (7) and power board (12).
  - See POWER SUPPLY AND CONTROL BOARD (2) TEST and SERVICES POWER SUPPLY TEST par. 3.3.1.
  - Replace the control (2) and/or power (12) boards.
- Regular operation.

3.3.5 - In resistive load operation, the output voltage is not regular.

NOTE

For the following test use a resistive load capable of circulating a current greater than 100 Adc, at a maximum voltage of 210 Vdc (for example 0.5 ohm).

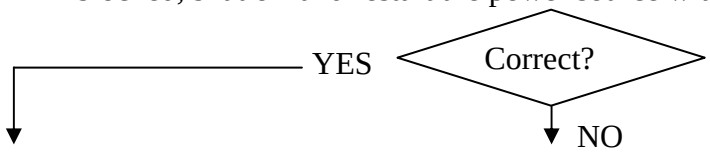
OUTPUT VOLTAGE TEST ON RESISTIVE LOAD.

- With power source powered, connect the resistive load to terminals (F) and (G) of the power source and the gun signals connector to connector (H) of the power source.
- Press the start button. Terminals (F) and (G) (gnd) = fig. 5.2.1 in the table conditions.

Programmed voltage (display (E).	Resistive load resistance.	Output voltage pulse.
210 Vdc	0.5 ohm	fig 5.2.1.

NOTE

In this test, at the end of each pulse it may be necessary to disconnect the load (as occurs normally when the rivet is changed in the gun), to avoid an "E2" block of the power source. If blocked, shut off and restart the power source without connecting any charge.



- ♦ Check the flat cable between CN4 power board (12) and CN2 control board (2).
- ♦ Check voltages on the windings of the transformer (31) see SERVICES POWER SUPPLY TEST in par. 3.3.1.
- ♦ Check the wiring between terminal (+) on power board (12), positive terminal of the DC-capacitors (24), and output terminal (F) of the power source; between terminal 2 of CN2 on power board (12) and scr (3) cathode (equivalent to the negative terminal of the DC-capacitors (24)), and between scr (3) anode and output terminal (G) of the power source. If you find loose or burnt connections, clean thoroughly and tighten, or replace any damaged terminals or components.
- ♦ Check operation of the start command, if necessary performing the START COMMAND TEST in par. 3.3.3.
- ♦ Replace the control (2) and/or power (12) boards.
- ♦ Replace scr (3).

♦ Regular operation.

3.3.6 - In actual working conditions (thus with high currents), the welding quality is not satisfactory.

In actual working conditions, thus with high currents, the welding quality may not be satisfactory even if the “no-load operating test” par. 3.3.4 and “resistive load operating test” par. 3.3.5 were successful.

To check whether the problem depends on the power source or any accessories connected to it (cables, clamps, gun, rivets or sheet metal), we recommend that you carefully check the operating conditions of the accessories and sheet metal, to make sure they are not responsible.

Should you determine that the cause lies in the power source you must consider the following:

- the DC-capacitors (24) may lose their efficiency over time, and no longer deliver the currents needed for welding. This decline may be detected by using an instrument to measure the capacity, checking the waveform of the output voltage pulse in the test in par. 3.3.5 (fig. 5.2.1), or checking the automatic discharge time if charges are left at the maximum voltage (210 Vdc). With new and efficient capacitors you may notice an automatic discharge of approximately 10 - 20 Vdc every hour.
- In certain applications the welding current may reach peak values of around 5 kA, for a duration of 2 - 3 msec. Any extension cords at the power source output, as well as partially rusted contacts in the internal power wiring and in the output terminals (F) and (G) of the power source, may make it impossible to attain these currents.

3.4 - Error codes.

3.4.1 - E1 - Transformer (31) temperature above limits.

The power source delivers no current, but the fan continues running; we therefore recommend leaving the power source powered to ensure rapid cooling.

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

The thermostat is inserted on the windings of the transformer (31); its contact must be closed at ambient temperature.

If the alarm persists even with the power source powered and without welding, check the voltages on the windings of the transformer (31), performing the SERVICES POWER SUPPLY TEST in par. 3.3.1.. If the alarm occurs only when welding, make sure that the working cycle is not above specifications, or that the ambient temperature is not too high.

3.4.2 - E2 - Scr (3) short-circuited.

To allow the clamps, gun and rivet to be positioned, the output terminals (F) and (G) of the power source must be free from voltage until the moment of welding. In the event the scr (3) is short-circuited, there would be voltage on the output terminals (F) and (G), and this positioning would be difficult and hazardous. This check therefore makes sure there is no voltage on the output terminals (F) and (G); otherwise it blocks the unit and activates E2.

Check the wiring between cathode and gate of scr (3) and terminals 1 and 2 of CN2, power board (12). With CN2 disconnected from power board (12) measure the resistance between the anode and cathode of scr (3). Correct value = >Mohm in both measurement directions. If incorrect, replace scr (3).

3.4.3 - E3 - Dc voltage on the DC-capacitors (24) irregular.

The dc voltage on the DC-capacitors (24) has risen beyond the maximum allowed limits.

This may be due to a defect in the regulating circuits or a short-circuit of the triac TR1 on power board (12). This alarm also trips the relay RL2 on power board (12), which cuts off the power circuit (190 Vac secondary circuit of transformer (31)), to avoid the risk of explosion in the DC-capacitors (24).

To reset, shut off and restart the power source after removing the cause of the block.

Make sure that the triac TR1 on power board (12) is not short-circuited. Replace if necessary.

Replace the power (12) and/or control (2) boards.

3.4.4 - E4 - DC-capacitor (24) irregular charge.

Irregular (too slow) charge of the DC-capacitors (24). In this case the voltage regulator circuit is no longer deemed efficient. This control thus blocks the power source to avoid welding with potentially hazardous voltages.

To reset, shut off and restart the power source after removing the cause of the block.

Replace the power (12) and/or control (2) boards.

3.4.5 - E5 - DC-capacitors (24) irregular discharge.

To lower the voltage on the DC-capacitors (24), the check engages the discharge resistor (7) in parallel to them until the programmed voltage is reached. If this circuit does not work or if the discharge resistor (7) is interrupted, this control blocks the power source.

Check resistor (7), making sure whether on CN2 of power board (12), terminals 5 and 6, resistance = approximately 60 ohm. If >Mohm (circuit broken) replace discharge resistor (7). If 0 ohm (short-circuit) replace discharge resistor (7) and power board (12).

Replace the control board (2).

4 - COMPONENTS LIST

4.1 - Power source art. 2153: see file ESP2153.pdf enclosed at the end of the manual.

4.2 - Components table: see file ESP2153.pdf enclosed at the end of the manual.

4.3 - List of spare parts.

Essential spare parts.

Ref.	Code	Description	Qty
2	5602168	control circuit	1
3	5605538	scr group	1
12	5602169	power circuit	1

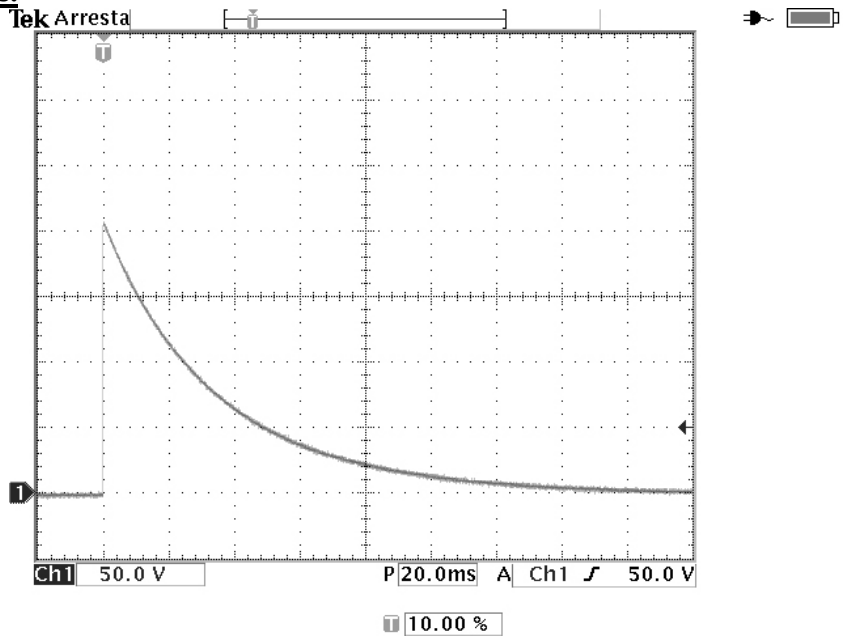
Recommended spare parts.

Ref.	Code	Description	Qty
21	3190014	switch	1
24	3175775	capacitor	1
31	5610050	power transformer	1
34	3165094	motor-driven fan	1

5 - ELECTRICAL DIAGRAMS

5.1 - Power source art. 2153: see file SCHE2153.pdf enclosed at the end of the manual.

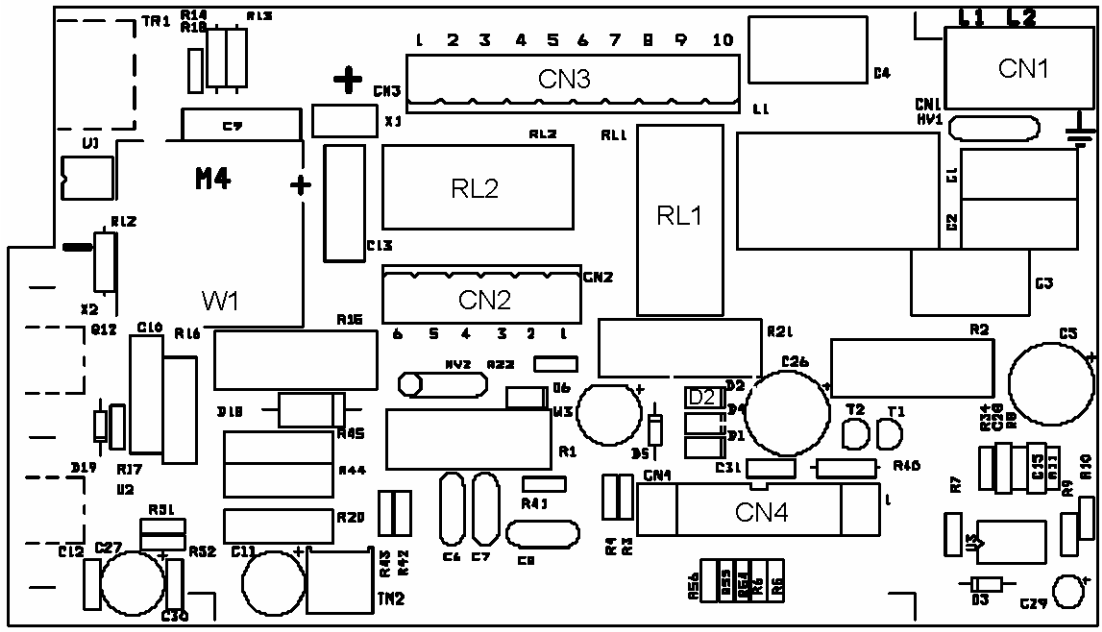
5.2 - Waveforms.



5.2.1 - Output voltage upon scr (3) engagement (par. 3.3.5).

5.3 - Power board (12) code 5.602.169.

5.3.1 - Topographical drawing.

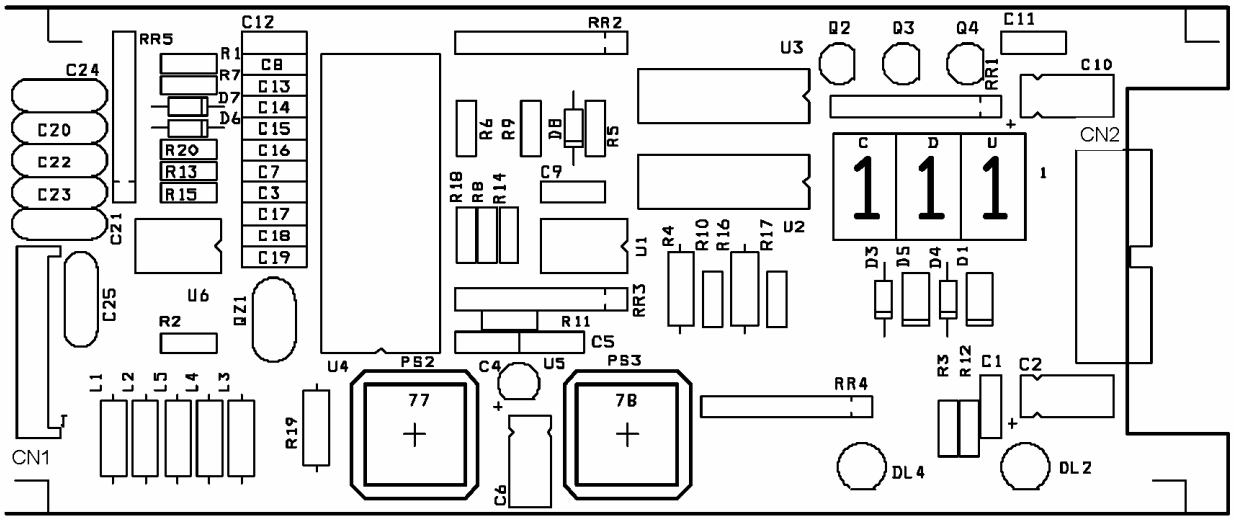


5.3.2 - Connector table.

Connector	Terminals	Function
CN1	1	input earth connection.
CN1	2 - 3	mains power supply input (115 / 230 Vac).
CN2	1(+) – 2(-)	scr (3) gate command output.
CN2	3	NU.
CN2	4	output voltage signal input.
CN2	5(+) – 6(-)	voltage output for discharge resistor (7).
CN3	1 - 2	190 Vac voltage input for power circuit power supply.
CN3	3	NU.
CN3	4 - 5	18 Vac voltage input for services power supply.
CN3	6	NU.
CN3	7 - 9	115 Vac voltage output for primary winding 1 of transformer (31) power supply.
CN3	8 - 10	115 Vac voltage output for primary winding 2 of transformer (31) power supply.
CN4	1-2	+5 Vdc output for control board (2) power supply.
CN4	3	engage command input for scr (3).
CN4	4	charge command input for triac TR1.
CN4	5	discharge command input for discharge resistor (7).
CN4	6	RL1 command input (mains voltage selection).
CN4	7	mains voltage signal output.
CN4	8	mains synchronism signal output.
CN4	9	scr (3) engage enable signal output.
CN4	10	DC-capacitors (24) voltage signal output for alarm threshold E3.
CN4	11	DC-capacitors (24) voltage signal output to adjust dc voltage.
CN4	12-13-14	0 Vdc output for control board (2) power supply.

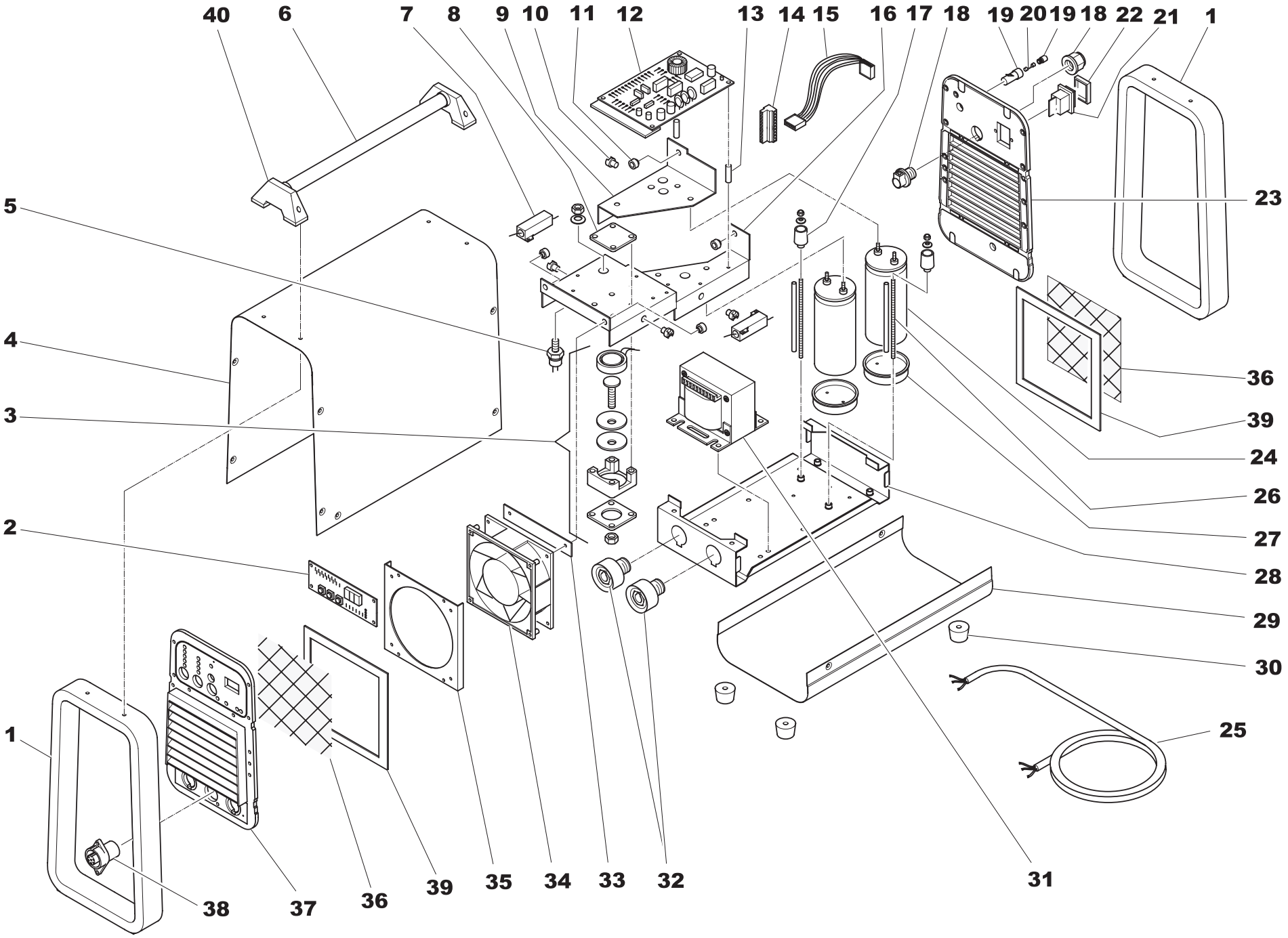
5.4 - Control board (2) code 5.602.168.

5.4.1 - Topographical drawing.



5.4.2 - Connector table.

Connector	Terminals	Function
CN1	1	shared input for signals from outside.
CN1	2	temperature signal input from thermostat on transformer (31).
CN1	3	start signal input from gun button.
CN1	4	NU.
CN1	5	NU.
CN1	6	NU. (accessory connected recognition signal input).
CN1	7	NU.
CN1	8	earth connection.
CN2	1-2	+5 Vdc input for control board (2) power supply.
CN2	3	scr (3) engage command output.
CN2	4	charge command output for triac TR1.
CN2	5	discharge command output for discharge resistor (7).
CN2	6	RL1 command output (mains voltage selection).
CN2	7	mains voltage signal input.
CN2	8	mains synchronism signal input.
CN2	9	scr (3) engage enable signal output.
CN2	10	DC-capacitors (24) voltage signal input for alarm E3 threshold.
CN2	11	DC-capacitors (24) voltage signal input to adjust dc voltage.
CN2	12-13-14	0 Vdc input for control board (2) power supply.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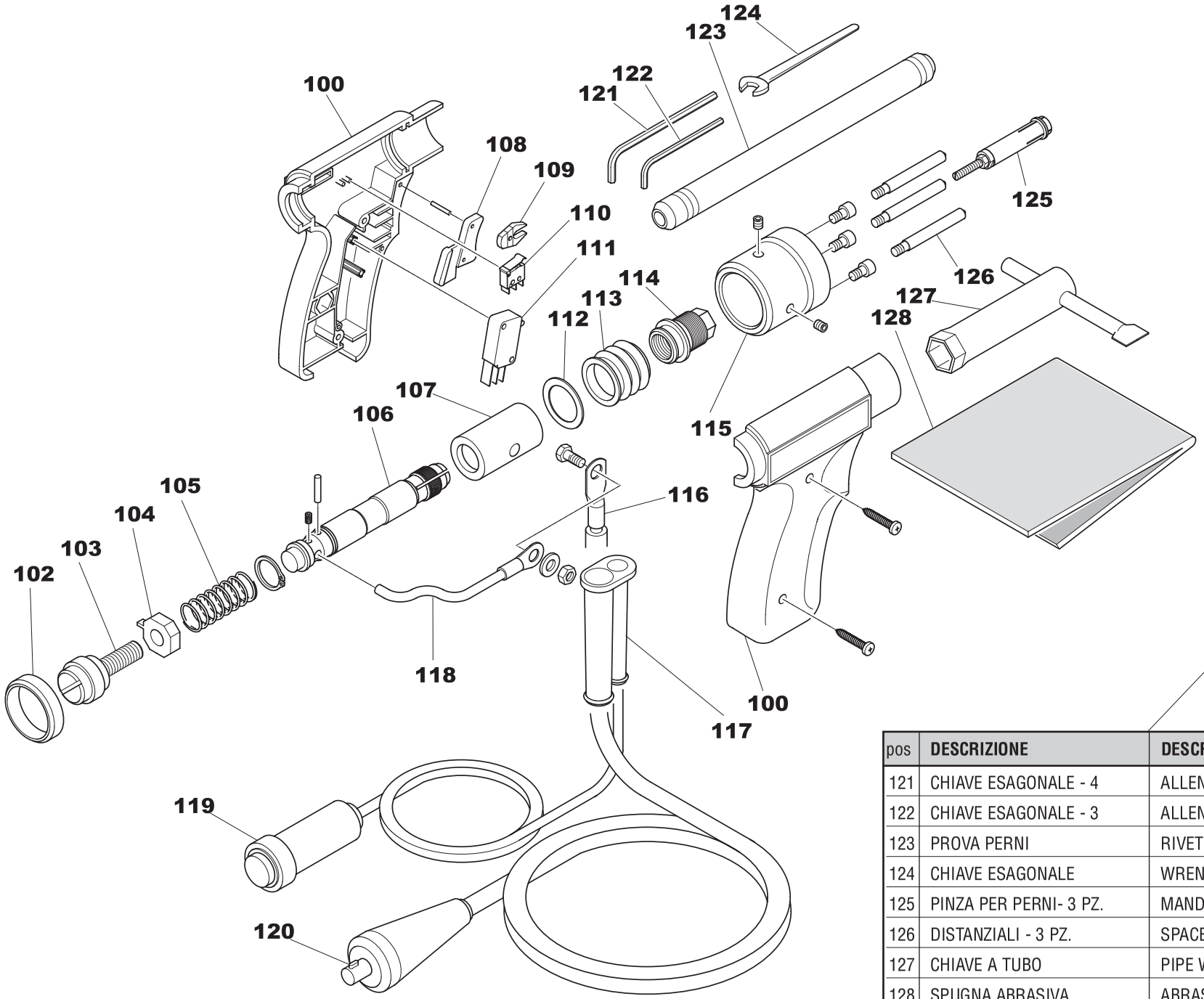
pos	DESCRIZIONE	DESCRIPTION
01	CORNICE	FRAME
02	CIRCUITO PANNELLO	PANEL CIRCUIT
03	GRUPPO SCR	SCR UNIT
04	FASCIONE	HOUSING
05	DIODO SKN	SKN DIODE
06	IMANICO	HANDLE
07	RESISTENZA	RESISTANCE
08	DISSIPATORE SCR	SCR RADIATOR
09	RADIATORE	RADIATOR
10	DISTANZIALE	SPACER
11	DISTANZIALE ISOLANTE	INSULATING SPACER
12	CIRCUITO DI POTENZA	POWER CIRCUIT
13	DISTANZIALE	DISTANZIALE
14	CONNETTORE	CONNECTOR
15	CONNESSIONE	CONNECTION
16	RADIATORE	RADIATOR
17	DISTANZIALE	DISTANZIALE
18	PASSACAVO	CABLE OUTLET
19	PORTA FUSIBILE	FUSE HOLDER
20	FUSIBILE	FUSE
21	INTERRUTTORE	SWITCH
22	COPERTURA	COVER
23	PANNELLO POSTERIORE	BACK PANEL
24	CONDENSATORE	CAPACITOR
25	CAVO RETE	POWER CORD
26	TIRANTE	TIE ROD
27	SUPPORTO CONDENSATORE	CAPACITOR SUPPORT
28	PIANO INTERMEDIO	INSIDE BAFFLE
29	FONDO	BOTTOM
30	PIEDE IN GOMMA	RUBBER FOOT
31	TRASFORMATORE	TRANSFORMER
32	PRESA	SOCKET
33	ISOLAMENTO	INSULATION
34	VENTOLA	FAN
35	SUPPORTO VENTOLA	FAN SUPPORT
36	PROTEZIONE	PROTECTION
37	PANNELLO ANTERIORE	FRONT PANEL
38	CONNETTORE	CONNECTOR
39	CORNICE	FRAME
40	SUPPORTO MANICO	HANDLE SUPPORT

pos	DESCRIZIONE	DESCRIPTION
100	IMPUGNATURA	HANDGRIP
102	ANELLO POSTERIORE	BACK RING
103	REGOLAZIONE MOLLA	SPRING ADJUSTMENT
104	INDICE DI REGOLAZIONE	REGULATION POINTER
105	MOLLA	SPRING
106	MANDRINO	HOOK
107	BOCCOLA	BUSH
108	PULSANTE	SWITCH
109	CAMMA	CAM
110	MICRO INTERRUTTORE	MICRO SWITCH
111	MICRO INTERRUTTORE	MICRO SWITCH
112	ROSETTA	WASHER
113	SOFFIETTO	BELLOWS
114	GHIERA MANDRINO	HOOK RING NUT
115	GHIERA	RING NUT
116	CAVO	CABLE
117	PASSACAVO DOPPIO	DOUBLE CABLE OUTLET
118	CAVO	CABLE
119	SPINA VOLANTE	WANDER PLUG
120	SPINA VOLANTE	WANDER PLUG
130	KIT ACCESSORI	ACCESSORIES KIT

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.



pos	DESCRIZIONE	DESCRIPTION
121	CHIAVE ESAGONALE - 4	ALLEN WRENCH - 4
122	CHIAVE ESAGONALE - 3	ALLEN WRENCH - 3
123	PROVA PERNI	RIVET TESTER
124	CHIAVE ESAGONALE	WRENCH
125	PINZA PER PERNI- 3 PZ.	MANDREL- 3 PCS.
126	DISTANZIALI - 3 PZ.	SPACER - 3 PCS.
127	CHIAVE A TUBO	PIPE WRENCH
128	SPUGNA ABRASIVA	ABRASIVE SPONGE

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C2
24
CN1
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2 1
CN2
14 13
1
M
1~
TERM.
31
34
115V 115V
180V18V
3
38
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5
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3
L2 L1 1
CN1
GND
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CN3
1
CN2
CN4 1
12
7
33R
R1
R2
33R
21
T
1
2
FUSE 16AT
115/230 V
50/60 Hz
4
5
6 5
110
111
ART. 2153