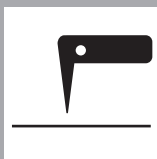


- (EN) INSTRUCTION MANUAL  
 (IT) MANUALE D'ISTRUZIONE  
 (FR) MANUEL D'INSTRUCTIONS  
 (ES) MANUAL DE INSTRUCCIONES  
 (DE) BEDIENUNGSANLEITUNG  
 (RU) РУКОВОДСТВО ПОЛЬЗОВАТЕЛЯ  
 (PT) MANUAL DE INSTRUÇÕES  
 (NL) INSTRUCTIEHANDLEIDING  
 (EL) ΕΓΧΕΙΡΙΔΙΟ ΧΡΗΣΗΣ  
 (RO) MANUAL DE INSTRUCȚIUNI  
 (SV) BRUKSANVISNING  
 (CS) NÁVOD K POUŽITÍ  
 (HR-SR) PRIRUČNIK ZA UPOTREBU  
 (PL) INSTRUKCJA OBSŁUGI  
 (FI) OHJEKIRJA  
 (DA) INSTRUKTIONSMANUAL  
 (NO) BRUKERVEILEDNING  
 (SL) PRIROČNIK Z NAVODILI ZA UPORABO  
 (SK) NÁVOD NA POUŽITIE  
 (HU) HASZNÁLATI UTASÍTÁS  
 (LT) INSTRUKCIJŲ KNYGELĖ  
 (ET) KASUTUSJUHEND  
 (LV) ROKASGRĀMATA  
 (BG) РЪКОВОДСТВО С ИНСТРУКЦИИ  
 (AR) دليل التشغيل

EN IT FR ES DE RU PT  
 NL EL RO SV CS HR-SR  
 PL FI DA NO SL SK HU  
 LT ET LV BG AR



- ▶ (EN) Spot welder  
 ▶ (IT) Puntatrice  
 ▶ (FR) Poste de soudage par points  
 ▶ (ES) Soldadora por puntos  
 ▶ (DE) Punktschweißmaschine  
 ▶ (RU) Аппарат для точечной сварки  
 ▶ (PT) Aparelho de soldar por pontos  
 ▶ (NL) Puntflasmachine  
 ▶ (EL) Πόντρα  
 ▶ (RO) Aparat de sudură în puncte  
 ▶ (SV) Punktsvets  
 ▶ (CS) Bodovačka  
 ▶ (HR-SR) Stroj za točkasto varenje  
 ▶ (PL) Spawarka punktowa  
 ▶ (FI) Pistehitsauslaite  
 ▶ (DA) Punktsvejsmaskine  
 ▶ (NO) Punktveiseapparat  
 ▶ (SL) Točkalnik  
 ▶ (SK) Bodovačka  
 ▶ (HU) Ponthegesztő  
 ▶ (LT) Taškinio suvirinimo aparatas  
 ▶ (ET) Punktkeevitusseade  
 ▶ (LV) Punktmetināšanas aparāts  
 ▶ (BG) Апарат за точково заваряване  
 ▶ (AR) آلة لحام بالتدريس







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**APPLIANCES FOR RESISTANCE WELDING FOR INDUSTRIAL AND PROFESSIONAL USE**

Note: In the following text the term "spot welder" will be used.

**1. GENERAL SAFETY RULES FOR RESISTANCE WELDING**

The operator should be properly trained to use the spot welder safely and should be informed of the risks connected with resistance welding procedures, of related protection measures and of emergency procedures.

(Only for pneumatic cylinder-operated versions) The spot welder is provided with a main switch with emergency functions, fitted with a padlock for locking it in the "O" (open) position.

The padlock key should be handed over only and exclusively to an expert operator or to an operator who has been trained for the tasks assigned to him and has been warned of the possible hazards arising from this welding procedure and from neglectful use of the spot welder.

When the operator is absent the switch should be set to the "O" position, the padlock should be closed and the key removed.



- Electrical installation should be carried out following accident-prevention legislation and standards.
- The spot welder should be connected only and exclusively to a power supply with the neutral conductor connected to earth.
- Make sure the power supply outlet is correctly connected to the earth protection.
- Do not use cables with worn or damaged insulation or with loosened connections.
- Use the spot welder in an ambient air temperature ranging from 5°C to 40°C, with relative humidity equal to 50% up to a temperature of 40°C, and 90% for temperatures up to 20°C.
- Do not use the spot welder in damp or wet environments or in the rain.
- The connection of the welding cables and any routine maintenance operations on the arms and/or electrodes must be carried out with the spot welder switched off and disconnected from the electric and pneumatic (if present) power supply networks. Pneumatic cylinder-operated spot welders should be locked with the main switch in the "O" position and the padlock closed.

The same procedure should be followed when making connections to the water supply or to a closed circuit cooling unit (water-cooled spot welders) and whenever repairs are made (extraordinary maintenance).

- When using spot welders operated with pneumatic cylinder, the main switch must be locked at "O" using the supplied lock.

The same procedure must be respected when connecting to the hydraulic network or a closed circuit cooling unit (water cooled spot welders) and whenever repairs (extraordinary maintenance) are carried out.

- It is forbidden to use the equipment in environments comprising areas classed as being at risk of explosion because of the presence of gas, dust or mist.



- Do not weld on containers, receptacles or piping that contain or have contained flammable liquid or gas products.
- Do not operate on materials cleaned with chlorinated solvents or near such substances.
- Do not weld on pressurised containers.
- Remove all flammable substances from the work area (e.g. wood, paper, rags etc.).
- Allow newly-welded pieces to cool! Do not leave the piece near flammable substances.
- Make sure there is sufficient ventilation or provide means for removing welding fumes near the electrodes; a systematic approach is necessary to evaluate limits of exposure to the welding fumes depending on their composition and concentration and on the length of exposure.



- Always protect the eyes with suitable eye protectors.
- Wear protective gloves and clothing suitable for resistance welding work.
- Noise levels: If the personal daily exposure level (LEPd) is found to be greater than 85db(A) due to particularly intensive welding operations, wearing personal protection devices is compulsory.



- The flowing of spot welding currents generates electromagnetic fields (EMF) around the spot welding circuit.

Electromagnetic fields can interfere with certain medical equipment (e.g. Pace-makers, respiratory equipment, metallic prostheses etc.).

Adequate protective measures must be adopted for persons with these types of medical apparatus. For example, they must be forbidden access to the area in which spot welding machines are in operation.

This spot welder conforms to technical product standards for exclusive use in an industrial environment for professional purposes. It does not assure compliance with the basic limits relative to human exposure to electromagnetic fields in the domestic environment.

The operator must adopt the following procedures in order to reduce exposure to electromagnetic fields:

- Fasten the two spot welding cables (if present) as close together as possible.
- Keep head and trunk as far away as possible from the spot welding circuit.
- Never wind spot welding cables around the body.
- Avoid spot welding with the body within the spot welding circuit. Keep both cables on the same side of the body.
- Connect the spot welding current return cable to the piece being spot welded, as close as possible to the welding joint.
- Do not spot weld while close to, sitting on or leaning against the spot welder (keep at least 50 cm away from it).
- Do not leave objects in ferromagnetic material in proximity of the spot welding circuit.
- Minimum distance:
  - d= 3cm, f= 50cm (Fig. E);
  - d= 3cm, f= 50cm (Fig. F);
  - d= 30cm (Fig. G);
  - d= 20cm (Fig. H) Studer.



- Class A equipment:

This spot welder conforms to technical product standards for exclusive use in an industrial environment and for professional purposes. It does not assure compliance with electromagnetic compatibility in domestic dwellings and in premises directly connected to a low-voltage power supply system feeding buildings for domestic use.

**INTENDED USE**

The system was designed to be used only and exclusively in body shops to repair vehicles: it must be used for spot welding one or more steel plates with a low carbon content, having a shape and size that vary according to the work to be carried out.



**RESIDUAL RISKS**

The operating functions of the spot welding machine do not foresee a push-button to start the welding operation, but simply the contact of the gun electrode with the machined piece connected to the earth: there is the risk of starting the welding process by inadvertently placing the gun electrode on the earth or parts connected to the same!

When the work has been completed, place the gun on an insulating surface and switch off the machine!

- RISK OF BURNS

Some parts of the spot welder (electrodes arms and nearby areas) may reach temperatures of over 65°C: suitable protective clothing must be worn. Allow newly-welded pieces to cool before touching them.

- RISK OF TIPPING AND FALLING

Place the spot welder on a level horizontal surface that is able to support its weight; confine the spot welder to the support surface (when required in the "INSTALLATION" section of this manual). Otherwise with inclined or uneven floors or moveable supporting surfaces there is the danger of tipping.

- Never lift the spot welder unless explicitly required by the "INSTALLATION"

section of this handbook.

- When using machines on wheels: disconnect the spot welder from the electric and pneumatic (if present) power supplies before moving the unit to another work area. Pay attention to obstacles and unevenness on the ground (for example cables and piping).

#### UNINTENDED USE

It is dangerous to use the spot welder for any purpose other than that for which it is intended (see INTENDED USE).

#### STORAGE

- Place the machine and its accessories (with or without packaging) in closed areas.
- The relative humidity of the air must not exceed 80%.
- The environmental temperature must be between -15°C and 45°C.

If the machine has a water cooling unit and the environmental temperature is lower than 0°C: add the indicated antifreeze liquid or completely empty the hydraulic circuit and the water tank.

Always use suitable measures for protecting the machine from humidity, dirt and corrosion.

## 2. INTRODUCTION AND GENERAL DESCRIPTION

### 2.1 INTRODUCTION

Mobile resistance welding system (spot welding machine) with digital control by microprocessor. The system can perform numerous hot and spot welding operations on the sheet metal that are specific to the automobile body shop sector and those with similar processing of sheet metal.

Their main characteristics are:

- automatic choice of the welding parameters;
- possibility of varying the welding time compared to the value selected automatically;
- limitation of line overcurrent at insertion (insertion cos φ check);
- backlit LCD display that shows the controls and the set parameters;
- specific programme for welding of the earth to the sheet metal to repair.

The spot welding machine also enables connection of two studder guns and rapid use of one or the other gun with independent programmes (for "DUO" version only).

The spot welding machine can work on sheet metal in iron with low carbon content or on sheet metal in zinc-plated iron.

### 2.2 STANDARD ACCESSORIES

- Studder gun with trigger (for "DUO" version only).
- Studder gun without trigger.
- Earth cable with earth to spot weld.
- Extractor with blowback.
- Electrode for star washers.
- Star washers for traction.

For further details please consult the latest catalogue.

### 2.3 OPTIONAL ACCESSORIES

- Consumables box.
- Trolley.
- Ringvolver.
- Quick connection cable.
- Various tools for traction.

For other accessories please consult the latest catalogue

## 3. TECHNICAL DATA

### 3.1 RATING PLATE (FIG. A)

The main data relating to use and performance of the spot-welder are summarised on the rating plate and have the following meanings:

- 1- Number of phases and frequency of power supply.
- 2- Power supply voltage.
- 3- Rated mains power with 50% duty cycle.
- 4- Mains power with permanent running (100%).
- 5- Maximum loadless voltage over electrodes.
- 6- Maximum current when electrodes are shorted.
- 7- Safety symbols, the meaning of which is given in chapter 1 "General safety rules for resistance welding".
- 8- Current to secondary when running permanently (100%).

Note: The rating plate shown is an example to show the meaning of the symbols and numbers; the exact values of the technical properties of your spot-welder can be found on the rating plate of the spot-welder itself.

### 3.2 OTHER TECHNICAL DATA

#### General specifications

- (\*)Power supply voltage and frequency: 400V ~ 2ph-50/60 Hz  
or: 230V ~ 1ph-50/60 Hz
- Electrical protection class: I
- Insulation class: H
- Enclosure protection rating: IP 22
- Weight: 18kg

#### Input

- Max. power when spot-welding (S max): 13kVA
- Power factor at Smax (cosφ): 0.8
- Main supply delayed fuses: 10A (400V)/16A (230V)
- Automatic circuit-breaker: 10A (400V)/16A (230V)
- Power supply cable (L≤4m): 3G x 2.5mm<sup>2</sup>

#### Output

- Loadless secondary voltage (U<sub>0</sub> max): 5.6V
- Max. spot-welding current (I<sub>2</sub> max): 2.5kA
- Spot-welding capacity (low carbon steel): max 1.5 + 1.5mm

#### (\*)NOTES:

- The spot-welder can be supplied for a 400V or 230V power supply; make sure the value on the data plate is correct.

## 4. SPOT WELDING MACHINE DESCRIPTION

### 4.1 THE SPOT WELDING MACHINE AND ITS MAIN COMPONENTS (Fig. B)

#### At the front:


- 1 - Control panel;
- 2 - Studder gun cable attachment with trigger;
- 3 - Studder gun 14 pin connector attachment with trigger;
- 4 - Studder gun cable attachment without trigger or rapid connection cable (see catalogue);
- 5 - Earth cable.

#### At the back:




- 6 - Power cable input.

## 4.2 CONTROL AND ADJUSTMENT DEVICES



### 4.2.1 Control panel (Fig. C)

1.  Multifunction button
  - a) "START" FUNCTION:  
starts the machine at first starting or after an alarm state.  
NOTE: Whenever necessary, the display indicates to the operator that he must press the "START" button to use the machine.
  - b) "MODE" FUNCTION:  
selects the programme of the tool in use (fig. C-8a / 8e).
  - c) CHOOSING THE UNIT OF MEASUREMENT:  
keeping this key pressed for 3 seconds, the operator can set the units for measuring the thickness of the sheets in "millimetres" [mm], "gauge" [ga] or inches [in].


### 2-3. Double function buttons


- a) SHEET THICKNESS FUNCTION:  
keeping the [+ ] key pressed increases the sheet thickness, while pressing the [- ] key decreases it.
- b) TIME  SELECTION FUNCTION :  
by keeping the [- ] key pressed for 3 seconds, the welding time  can be increased or decreased as to the value set automatically by the machine .


### 4. LCD display


5.  Signals that the  key must be pressed to prepare the machine for welding.


6.  Displays the programme "Gnd" for welding the earth clamp; also displays the thickness of the sheet metal and any alarm codes.

7.  Indicates the Studder gun without trigger (contact version) or with trigger (for "DUO" version only).


- 8a.  Indicates spot welding of plugs, rivets, washers, slotted washers, bits for special traction with specific hammers (see catalogue).


- 8b.  Indicates the spot welding of screws having a diameter of 4-6 and rivets having a diameter of 5 with suitable electrode.


- 8d.  Indicates sheet tempering with the carbon electrode.


- 8e.  Indicates sheet upsetting with the relative electrode.


9.  Indicates the level of the welding time  respect at the automatically set value .

12.  Indicates that the clamp being used is energised.

13.  activated using the Studder gun.

16.  Is the thickness of the sheet to be welded.

17.  Indicates that the machine is being thermostatically protected.

19.  Indicates the measurement unit of the metal sheet thickness .

## 4.3 SAFETY FUNCTIONS AND INTERLOCK

### 4.3.1 Safeguards and alarms (TAB. 1)

- a) Thermostatic safeguard:  
Intervenes if the spot welding machine overheats because the cooling liquid is missing or is insufficient, or due to a work cycle that exceeds the permitted limit. The icon on the display (fig. C-17) switches on to signal intervention and with: AL1 = machine thermal alarm.  
AL2 = clamp, studder thermal alarm (if planned).  
EFFECT: current block (welding inhibited).  
RESET: manual (action on "START" button after falling within the allowed temperature limits - icon switch off).
- b) "START" button (Fig. C-5).  
This push-button must be pressed to control welding in each of the following conditions:

- on first start-up of the machine;
- each time the safety/protection devices cut in;
- when the power supply is reinstated (electricity) following a shutdown of power supplies or a malfunction;

## 5. INSTALLATION



**ATTENTION! CARRY OUT ALL INSTALLATION AND ELECTRICAL AND PNEUMATIC CONNECTION OPERATIONS WITH THE SPOT WELDING MACHINE RIGOROUSLY SWITCHED OFF AND DISCONNECTED FROM THE MAINS. THE ELECTRICAL AND PNEUMATIC CONNECTIONS MUST ONLY BE CARRIED OUT BY EXPERT OR QUALIFIED TECHNICIANS.**

### 5.1 PRELIMINARY OPERATIONS

Unpack the spot-welder, assemble the separate parts included in the package.

### 5.2 LIFTING THE SPOT-WELDER

WARNING: None of the spot-welders described in this handbook have lifting devices.

### 5.3 POSITION

Reserve a space in the installation area that is large enough and without obstacles for guaranteeing access to the control panel, the main switch and the work area in complete safety.

Make sure there are no obstacles near the areas where the cooling air enters and exits, ensuring that conductive power, corrosive vapour, humidity, etc. cannot be sucked in. Place the spot welding machine on a surface of homogeneous material that is flat and compact, and suitable for supporting the weight (see "technical data") to prevent the danger of toppling or dangerous movements.



### 5.4 CONNECTION TO THE POWER NETWORK

#### 5.4.1 Warnings

Before making any electrical connection, make sure the spot welding machine plate data correspond with the mains voltage and frequency available in the installation area.

The spot welding machine must only be connected to a power supply system with neutral conductor connected to earth.

To guarantee protection against indirect contact, use residual-current devices of the following type:

- Type A () for single-phase machines;
- Type B () for three-phase machines.

- The spot welding machine does not meet the requirements of the IEC/EN 61000-3-12 directive.

If it is connected to a public power grid, the installer or user must make sure that the welding machine can be connected (if necessary consult the utility company).

#### 5.4.2 Plug and mains socket

##### - Version 230V:

The power supply cable is supplied with a Schuko (2 poles + earth) plug already assembled.

##### - Version 400V:

Connect a standard plug (3P + E: only 2 poles are used: INTERPHASE connection!) to the power supply cable of adequate capacity.

##### - Mains socket

Prepare a mains socket protected with fuses or an automatic circuit breaker switch; the specific earth lug must be connected to the earth conductor (yellow-green) of the power supply line.

The capacity and characteristics of fuse and circuit breaker switch intervention are outlined in the "TECHNICAL DATA" paragraph.

If multiple spot welding machines are used, distribute the power supply cyclically between the three phases to create a more balanced load; for example:

- spot welding machine 1: power supply L1-L2;
- spot welding machine 2: power supply L2-L3;
- spot welding machine 3: power supply L3-L1.



**ATTENTION! Failure to comply with the above rules renders the safety system (class I) ineffective, with resulting serious risks for people (e.g. electric shock) and for property (e.g. fire).**

## 6. WELDING (Spot welding)

### 6.1 PRELIMINARY OPERATIONS

Before commencing any spot welding operations, check, with the power cable disconnected from the mains, that the electrical connection is performed correctly in accordance with the instructions above.

#### 6.1.1 CONNECTION OF TOOLS (Fig. B)

For correct functioning of the machine, connect the tools to the relevant sockets as described below:

- Connect the studder gun with trigger to the socket in Fig. B-2 (for "DUO" version only).
- Connect the 14 PIN connector of the studder gun with trigger to the socket in Fig. B-3 (for "DUO" version only).
- To the socket in Fig. B-4 connect the studder gun without trigger or the quick connection cable (see catalogue).



#### ATTENTION!

- **Once spot welding has begun, using the button or contact with the piece, the machine energises both the tools connected to it (for "DUO" version only).**
- **AVOID RESTING THE TOOL NOT IN USE ON THE PIECE TO WORK!**
- **ALWAYS BRING THE TOOL NOT IN USE ON A STABLE AND NON-CONDUCTIVE SURFACE!**

### 6.2 PARAMETER ADJUSTMENT (in spot welding)

The parameters that determine the diameter (section) and mechanical seal of the spot are:

- Force exercised by the electrode.
- Spot welding current.
- Spot welding time.

If there is no specific experience, it is a good idea to carry out some spot welding tests using sheets of the same quality and thickness as those to be worked on.

The current and spot welding time parameters are adjusted automatically by selecting the thickness of the sheet to be welded with the (+ / - icons) keys. Adjustments can

be made to the standard spot time (DEFAULT), within set limits, using the key (icon fig. C-2).

## 6.3 PROCEDURE

### 6.3.1 SELECTION OF THE STUDDER GUN WITH OR WITHOUT TRIGGER (for "DUO" version only)

If the gun activates, it is the one WITH THE TRIGGER (see fig. C-7) the first contact with the sheet metal of the gun WITHOUT TRIGGER activates recognition of the tool. If the active gun is the one WITHOUT the trigger (see fig. C-7) simply press the trigger once on the other gun to select it.

#### 6.3.1.1 SPOT WELDING WITH GUN WITH TRIGGER

After recognition, spot welding begins simply by resting the tool on the piece to weld and pressing the trigger.

#### 6.3.1.2 SPOT WELDING WITH GUN WITHOUT TRIGGER


To spot weld, just place the tool against the piece to be welded, which is connected to the earth cable: after a few moments, the machine recognises the contact and starts the spot weld automatically.



#### ATTENTION!

- **To fix or remove the tools from the gun spindle, use two hex keys in a manner that stops the spindle from rotating.**
- **If working on doors or hoods, connect the earth bar to them to prevent current from passing through the hinges, and near the area to be spot welded (long current runs reduce spot efficiency).**
- **DO NOT PLACE THE STUDDER ON THE PIECE IF YOU DON'T INTEND TO START WELDING!**

### 6.3.2 FASTENING THE EARTH CABLE TO THE SHEET METAL

a) Switch on the machine and press the "Start" button (fig. C-1). The display shows the spot welding programme for the earth ".

- Bare the sheet metal as near as possible to the point where you intend to work, for a surface corresponding to the contact surface of the earth nut (fig. D-26).
- Connect the head of the earth electrode to the eyelet of the earth cable (fig. I).
- Rest the tip of the earth electrode (fig. D-25) on the bare sheet metal previously prepared and close the circuit resting the tip of the studder gun without trigger on the bare sheet metal.
- Check the welding seal of the earth electrode by exerting light traction of the electrode in an orthogonal direction compared to the surface on which it is welded and then fasten the earth nut against the sheet metal (fig. L).

Note: if the earth electrode should easily detach during traction, try to increase the welding time using the "+" and "-" buttons (fig. C-2, C-3).

#### Washer welding for mass terminal fixing

Select the programme in fig. C-8a using the "MODE" key.

Mount the relative electrode (POS. 9, Fig. D) in the gun spindle, and insert the washer (POS. 13, Fig. D).

Place the washer in the selected area. Place the earth terminal in contact in the same area; press the gun push-button to weld the washer, which should be fixed as indicated previously.

#### Slotted washers spot welding

Select the icon of the slotted washer using the potentiometer.

This function is executed by assembling and tightening the electrode holder (POS. 28, Fig. D) of the gun. Insert the slotted washer (POS. 27, Fig. D) in the electrode holder and spot weld as previously described.

#### Screw, washer, nail, rivet spot welding

Select the programme in fig. C-8b using the "MODE" key.

Fit the most suitable electrode on the gun, insert the element to be spot welded and place it on the sheet in the necessary spot; press the gun push-button: release the push-button only after the set time has elapsed.

#### Contemporaneous spot welding and drawing of special washers

Select the programme in fig. C-8a using the "MODE" key

This function can be carried out by assembling and fully tightening the spindle (POS. 4, Fig. D) on the body of the extractor (POS. 1, Fig. D): hook and fully fasten the other end of the extractor on the gun. Insert the special washer (POS. 14, Fig. D) into the spindle (POS. 4, Fig. D), and lock it with the relative screw (Fig. D). Spot weld in the relative area, adjusting the spot welding machine as if spot welding washers, and start drawing.

At the end, rotate the extractor by 90° to release the washer, which can be spot welded in a new position.

#### Sheet metal heating

Select the programme in fig. C-8d using the "MODE" key.

In this mode the TIMER is disabled.

Operation duration is therefore manual, being determined by the time for which the gun electrode is kept pressed on the piece connected to the earth. Current intensity is adjusted automatically according to the thickness of the selected sheet.

Assemble the carbon electrode (POS. 12, FIG. D) on the gun chuck and block in place with the ring nut. Touch the area, that was previously bared, with the carbon tip. Work from the outside to the inside, using a circular movement to heat the sheet which undergoes work hardening and returns to its original position.

To prevent the sheet from drawing too much, treat small areas and immediately after wipe using a damp cloth to cool the treated part.

#### Sheet metal recalculation

Select the programme in fig. C-8e using the "MODE" key.

In this position, working with the specific electrode, you can flatten the sheet metal that underwent localised deformation.

**NOTE: ALL THE PROGRAMMES DESCRIBED ABOVE CAN ALSO BE IMPLEMENTED WITH THE TOOL WITHOUT THE TRIGGER BY PLACING THE PIECE TO SPOT WELD IN CONTACT WITH THE SHEET METAL!**

#### Using the supplied extractor (POS. 1, Fig. D)

##### Washer hooking and drawing

This function is carried out by assembling and tightening the spindle (POS. 3, Fig. D) onto the body of the electrode (POS. 1, Fig. D). Hook the washer (POS. 13, Fig. D),

spot welded as described previously, and begin drawing. When finished, rotate the extractor by 90° to detach the washer.

#### **Plug hooking and drawing**

This function is carried out by assembling and tightening the spindle (POS. 2, Fig. D) onto the body of the electrode (POS. 1, Fig. D). Make the plug enter (POS. 15-16, Fig. D), after spot welding it as described previously, the spindle (POS. 1, Fig. D) keeping the terminal tightened towards the extractor (POS. 2, Fig. D). When completely introduced, release the spindle and start drawing. When finished, pull the spindle towards the hammer to remove the plug.



**WARNING:**  
when the work has been completed, place the tools on an insulating surface and switch off the machine!

### **7. MAINTENANCE**



**WARNING! BEFORE CARRYING OUT MAINTENANCE, MAKE SURE THE MACHINE IS OFF AND DISCONNECTED FROM THE MAINS.**

#### **7.1 ROUTINE MAINTENANCE**

**ROUTINE MAINTENANCE CAN BE CARRIED OUT BY THE OPERATOR.**

- adaptation/restoration of the diameter and profile of the electrode tip;
- replacement of the electrodes;
- check the integrity of the power cable;
- check the integrity of the gun and output cables.

#### **7.2 SPECIAL MAINTENANCE**

**SPECIAL MAINTENANCE MUST ONLY BE CARRIED OUT BY TECHNICIANS WHO ARE EXPERT OR QUALIFIED IN AN ELECTRIC-MECHANICAL AMBIT.**



**WARNING! BEFORE REMOVING THE SPOT WELDING MACHINE OR GUN PANELS AND ACCESSING THE UNIT, MAKE SURE THE SPOT WELDING MACHINE IS SWITCHED OFF AND DISCONNECTED FROM THE MAIN POWER AND PNEUMATIC SUPPLIES (if present).**

Carrying out checks while the inside of the spot welder is live can cause serious electric shock due to direct contact with live parts and/or injury due to direct contact with moving parts.

Periodically and as frequently as required by the use and environmental conditions, inspect inside the spot welder and clamp and remove the dust and metal particles that have deposited on the transformer, diode module, power terminal board, etc. using a blast of dry compressed air (max. 5 bar).

Do not direct the jet of compressed air onto the electronic circuit board; if necessary clean with a very soft brush or suitable solvents.

At the same time:

- Make sure the wiring does not show signs of insulation damage or loose-oxidised connections.
- Make sure the screws that connect the transformer secondary with the output bars / wires are tight and that there are no signs of oxidation or overheating.

### **8. TROUBLESHOOTING**

**SHOULD MACHINE OPERATION NOT BE SATISFACTORY, AND BEFORE CARRYING OUT MORE SYSTEMATIC CHECKS OR CONTACTING YOUR TECHNICAL ASSISTANCE CENTRE, MAKE SURE THAT:**

- With the power cable connected to the mains, the display is on; if this is not the case, the problem is in the power line (cables, plug and socket, fuses, excessive voltage drop etc.).
- The display does not show the alarm signals (see TAB. 1): when the alarm stops press "START" to reactivate the spot welder.
- The elements that are part of the secondary circuit (gun - cables) are not inefficient because of loose screws or oxidation.
- The welding parameters are suitable for the work to be carried out
- After having carried out maintenance or repairs, restore the connections and wiring as they were before, making sure they do not come into contact with moving parts or parts that can reach high temperatures. Band all the wires as they were before, being careful to keep the primary high voltage connections separate from the secondary low voltage ones.

Use all the original washers and screws when re-closing the structural work.