

PRIMA

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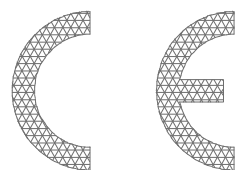
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ALSPOTTER USER MANUAL



PLEASE NOTE

BEFORE USING THE WELDER, PLEASE READ THIS MANUAL CAREFULLY



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A. Introduction

The capacitive discharge spot welder, which is equipped with a pin-welder gun, is intended for use in body shops to correct dents in sheet aluminium or iron through the use of an inertia hammer.

This manual has been drafted in order to provide the necessary information and guidance to guarantee safe use of the unit. All users of the unit should read this manual carefully before the unit is commissioned and should take care to respect all of the instructions and guidelines set out here.

The capacitive discharge spot welder has been designed and manufactured for use in combination with the supplied welding gun to carry out welding operations.

The information given in this manual should be followed closely. Any alternative use of the unit is contrary to the purposes for which it has been constructed.

B. Warranty

On taking delivery of the capacitive discharge spot welder, please check to ensure there are no defects. Should you discover any defects, please make sure these are noted down as per the legal guidelines. The warranty, which lasts for two years from the date of delivery, covers all of the parts of the unit that are not subject to wear-and-tear.

Please note that any unauthorised opening of, or tampering with, the unit will invalidate the warranty, the CE mark and the manufacturer's declaration, and will release the manufacturer from any liability arising from damage to persons or property that may result from the unauthorised opening of, or tampering with, the unit. In addition, the manufacturer shall not be deemed liable for damages in any of the following cases:

- Incorrect maintenance
- Failure to carry out scheduled maintenance
- Improper use of the capacitive discharge spot welder.

PRIMA S.r.l. does not provide any guarantees in relation to this manual. PRIMA S.r.l. reserves the right to make changes to this manual (to correct spelling errors or inaccurate content, or to reflect improvements in the programs or equipment). Any variations will be included in subsequent editions of this manual. Under no circumstances may PRIMA S.r.l. be held liable for direct, indirect, specific, accidental or subsequent damages deriving from the use or incapacity to use the welder or this manual.

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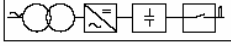





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C. Description of capacitive discharge spot welder

1. Identification

The welder features an identification plate displaying – along with the CE marking – the following information:

Name and address of the manufacturer.

PRIMA I - 35020 Albignasego-PD Via Garibaldi, 28				
Type ALSPOTTER 33				
Serial Number:				
		EN 60974/1		
		$U_2 = 30 \text{ V DC} \dots 195 \text{ V DC}$		
		$U_3 < 20 \text{ V}$	I_2 1,5kA	I_1 5kA
			U_1 30V	U_2 195V
		$\cos \phi = 0,85$		
U_1			I_1	I_1
I.CL. H	230V	3,15A	2,5A	1,2A
COOLING AF	50Hz	SI	0,6kVA	0,3kVA
		IP 22		



2. General information

As shown in Fig.1, the capacitive discharge spot welder must be attached to a gun in order to carry out welding operations. This creates a welding system composed of the following elements:

- (1) capacitive discharge spot welder
- (2) ground cable
- (3) gun connection cable
- (4) contact gun
- (5) control cable
- (6) base plate
- (7) pin to be welded inserted in the gun.

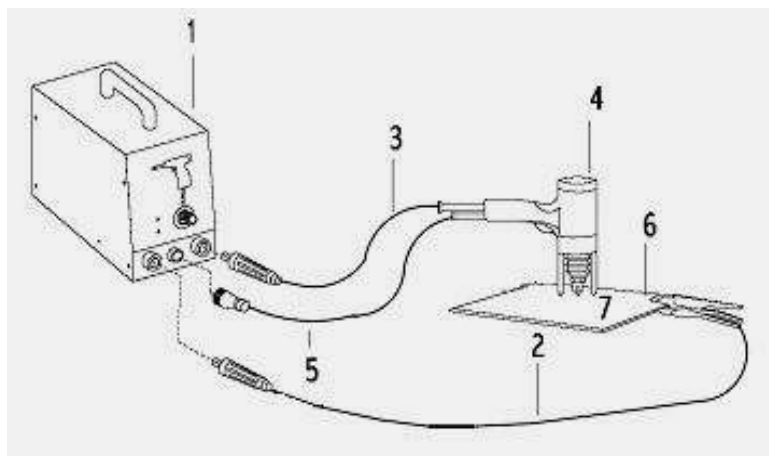


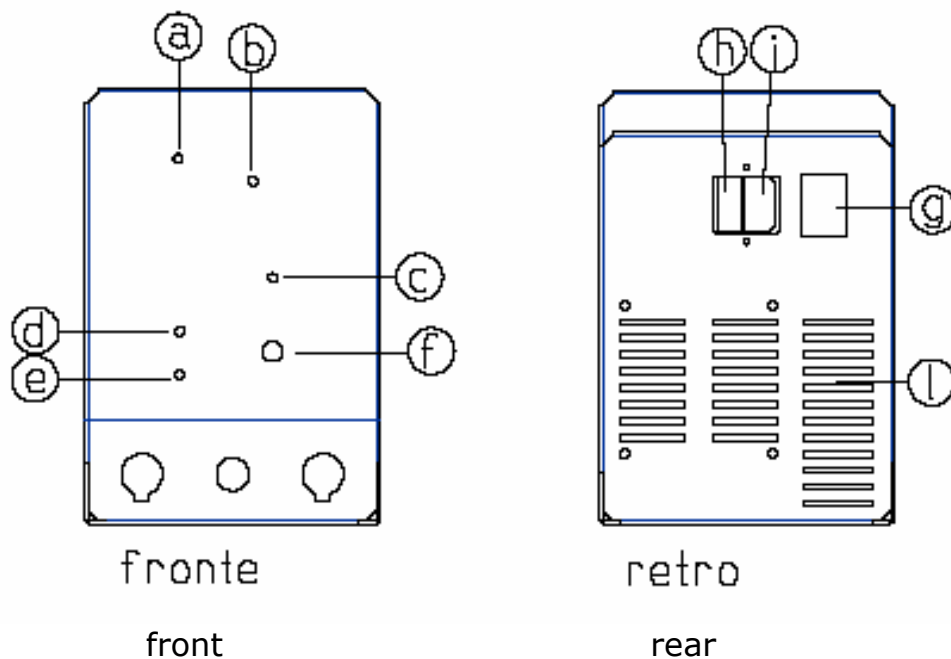
FIG. 1



3. Technical data

Unit type	ALSPOTTER welder
Supply voltage	230 V – 50 Hz
Absorbed power	0.6 kW max
Maximum no-load voltage	15 V
Maximum permissible contact resistance	100 Ω
Total capacity	33,000 μ F
Charging voltage	40 – 200 V DC
Maximum re-charge time	12 seconds
Working temperature range	0-40 °C
Power cable	2m-long, detachable, with 10 A plug
Unit dimensions without handle	l x d x h (cm) 15 x 32 x 22
Unit weight	8.0 kg
Length of ground cable	3 metres

4. Controls on the capacitive discharge spot welder



- a. Yellow 'contact' LED.
- b. Red 'start command' LED.
- c. Green 'capacitor charged' LED.
- d. Yellow 'overheat protection' LED.
- e. Red 'mains' LED.
- f. Load voltage adjustment dial.
- g. Illuminated bipolar mains power switch.
- h. Housing for two power fuses (3.15 A, delayed)
- i. Mains power cable socket
- j. Air vents.

5. P.I.S. gun

The 35kg contact gun is equipped with a pin-holder (spindle) for a threaded pin measuring no more than 40 mm in length.



***It is strictly prohibited to remove the limit pin from any spindle.
It is strictly prohibited to insert pins longer than 40 mm by altering the spindle as this could compromise the safety of the system.***

Gun type	Contact
Maximum weldable diameter	4 mm Al – 5 mm Fe
Gun weight (with cable)	1.9 kg
Cable length	4 m

The gun is fitted with a tripod to ensure it remains in a vertical position.



D. Appropriate and inappropriate uses

1. Appropriate uses

The capacitive discharge spot welder is designed and built for the welding of pins through the process of contact arc-welding using the supplied welding gun, as described in this manual. Any other use of the capacitive discharge spot welder is contrary to the purposes for which it has been constructed.



CAUTION

If the capacitive discharge spot welder is fitted with specific devices or modified for specific purposes, it must undergo new compliance testing.

2. Inappropriate uses

The capacitive discharge spot welder is not intended to be used at supply voltages and frequencies other than those shown on the identification plate.

The supplied gun must be used in conjunction with the original tripod and spindles. Non-original accessories or accessories of different types or sizes should not be used.

The welder as supplied is not designed for use in automatic welding cycles. The safety of the welder/gun will be compromised if opened or tampered with.

E. Procedures

The welding process exploits the fusion of a small, cylindrical, base-material droplet that forms under the pin when a suitably calibrated current is passed through the system.

Due to the minimal energy used, the weld produced in this way is not subject to the problems associated with arc-welding or resistance welding, such as surface deformation or thermal stress. It is important that the droplet on the pin is not inserted into small depressions or engravings in the base material.

The welder is essentially constituted by an electronic control circuit that supplies the electrical capacitors with a voltage proportionate to the diameter of the pins to be welded.

At the user's command, the power module delivers the capacitive discharge current on the pin/base-piece assembly, causing the fusion of the pin droplet and, due to the light pressure exerted on the droplet, creating a weld once the fused material solidifies.

F. Commissioning

1. Connection to the power supply board



WARNING

Before supplying the welder with power, it is advisable to ensure that the electrical power supply system has been set up properly – i.e. that it is fitted with a yellow/green ground cable and a high-sensitivity differential switch.

DO NOT USE EXTENSION CABLES AND DO NOT PLUG THE UNIT INTO A MULTI-PLUG SOCKET.



USE HAZARD SIGNAGE TO INDICATE ANY ENCLOSURES CONTAINING LIVE PARTS.



PLEASE NOTE

The working voltage of the system is 230 V, 50 Hz, Monophase.



CAUTION

Before supplying the welder with power, it is advisable to ensure that the electrical power supply system has been set up properly – i.e. that it is fitted with a yellow/green ground cable and a high-sensitivity differential switch.

- Connect the two-pin gun-control plug to the corresponding connector panel on the front of the welder, then tighten the retaining ring nut.
- Insert the ground lead into the corresponding socket and tighten slightly by turning it clockwise, and attach the clamp – fitted to the other end of the cable – to the base piece to be processed.
- Insert the power supply lead (connected to the gun) into the socket with the gun symbol and tighten slightly by turning clockwise.
- Connect the unit to the mains, taking care to ensure that the unit's on/off switch is in the 'off' position (position 0).
- Before turning the unit on, turn the power dial anti-clockwise as far as possible.
- Activate the system by switching the on/off switch to position 1 (the 'on' position) and ensure that the LEDs have the following statuses:

Yellow 'overheat protection' LED	Off
Red 'mains' LED	On
Green 'status OK' LED	On once charged
Yellow 'contact' LED	Off
Red 'trigger' LED	Off

2. Adjusting the welder

Consult the table showing the voltage/diameter combinations, and then adjust the dial to match the figure shown in the table. These figures are indicative, and once the user has become proficient in using the unit, they may be freely adjusted in order to achieve the most effective weld on the pieces in question.



WARNING Under no circumstances may the manufacturer of the welder be held liable for damage to persons or property resulting from poor-quality welding.

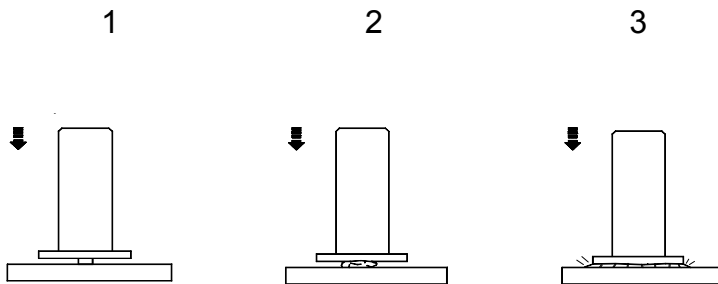


CAUTION To ensure that the weld has the desired levels of mechanical resistance, the levels must always be verified using destructive and/or non-destructive mechanical tests.

- Make a new welded joint and check it both visually and mechanically by applying vertical traction to the welded pin.

The welding process involves the following three phases:

- the gun, with the pin inserted, is put in position
- the weld command is given and the electrical arc is activated
- the droplet under the pin fuses and the fusion area expands to encompass the entire surface of the pin.



3. Welding combinations

As indicated in the table, it is possible to weld together materials that share a similar composition. The most common combinations are:

ferrous materials	↔	with stainless steels
aluminium	↔	aluminium

4. How to achieve a properly welded joint

In order to achieve a properly welded joint, it is essential to ensure that certain criteria are met in terms of the support surface, positioning of the pieces, status of the ground plane and use of the gun.

a. Characteristics of the support surface

The support surface must be:

- uncoated
- free of oils or chemical agents
- smooth or only slightly ribbed (less than or equal to around 70×10^{-6} m).

b. Positioning of the pieces

The pieces to be processed must be positioned on a solid, non-deformable surface in order to ensure that the gun and the welded pins are perpendicular. Moreover, a solid surface will prevent deformation, which is especially important if the piece in question is of limited thickness.

c. Using the gun

First of all, select the pin holder that most closely matches the diameter of the pin to be welded (ϕ 4 mm). Then adjust the overhang of the pin beyond the copper pin holder by around 2-3 mm by moving the limit screw, which will then be blocked by the counter nut.

It is then necessary to insert the adjusted pin holder into the gun, tightening the nut using the box spanner while also ensuring that the tripod feet are stable.

Move the pin into the desired position by applying light vertical pressure on the gun, thus compressing the contrast spring until the support feet are sitting stably on the piece to be processed.

The precompression of the spring can be adjusted by turning the ring nut on the gun clockwise to increase or anticlockwise to decrease. The level of precompression is shown by the indicator on the left-hand side. Adjusting the precompression changes the speed at which the pin is immersed into the welding bath, thus ensuring optimum results.

While maintaining the chosen gun position, pull the trigger to initiate the welding cycle and then remove it from the welded pin vertically, without twisting the gun, which could damage the pin holder.

It is good practice to ensure that the pin holder is properly attached to the pin in order to avoid damage to the external surface of the pin.



PLEASE NOTE:

A pin holder that is suffering from internal wear due to excessive use could result in the generation of a current arc between itself and the pin inserted into it, dispersing the welding energy and, as a result, wearing down the crest of the thread.

5. Operations to be avoided

OPERATIONS TO BE AVOIDED	CONSEQUENCES
Using the unit without first putting on fireproof garments, protective goggles, protective/insulating gloves and ear-defenders.	- Physical harm to the user
Using the unit under humid conditions	- Damage to the unit - Risk of electric shock for the user
Using the unit at the same time as other welding devices (particularly high-frequency devices such as inverters)	- Dangerous interference
Locating the ground connection at some distance from the welding area	- Damage to the unit and the premises
Using sanders or grinders in the vicinity of the welding unit	- Electrical damage to the unit caused by the aspiration of ferrous residues
Making any changes to the pin holder (spindle) or to the gun in general	- Risk of electrical shock for the user

G. Safety measures

1. Safety devices installed on the capacitive discharge spot welder

a. The welder is fitted with a contact-resistance measurement circuit, which permits the welding current to flow only when the resistance is at a suitable level to provide a good contact between the pin to be welded and the ground plate. As such, with the gun connected to the other pole of the welding circuit, when the pin is being inserted into the gun or the gun is being moved around at some distance from the surface onto which the pins are to be welded, the uncovered metal parts of the gun **are not live**.

When the trigger is pulled to start the welding cycle, the resistance of the welding circuit is measured and, if the resistance is lower than the upper threshold set by the manufacturer, the capacitive discharge current starts to flow, causing the pin to be welded.

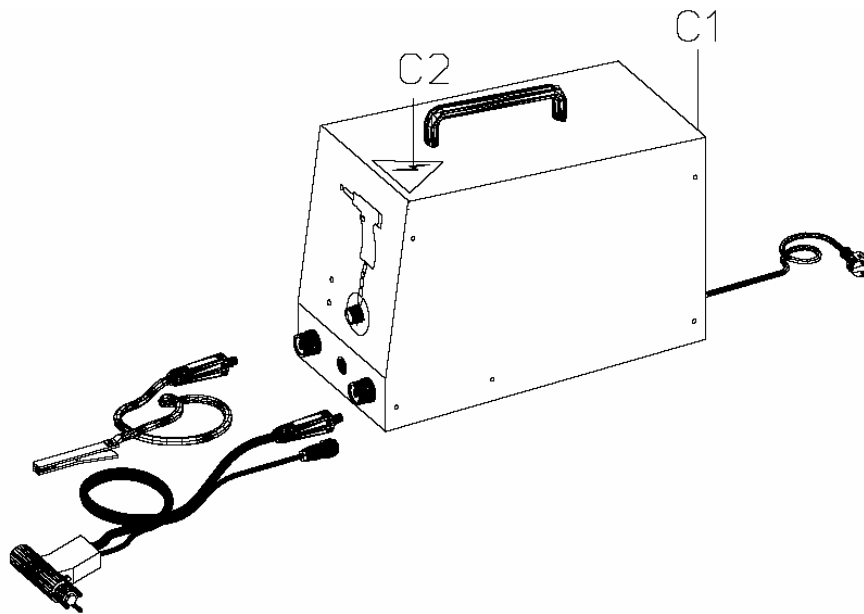
b. The capacitor charge circuit is fitted with an automatic discharge device, which is activated whenever the welder is turned off using the on/off switch or the power is cut for another reason, thus preventing the unit from storing dangerous levels of electrical charge.

c. Do not attempt to access the internal parts of the welder if the power cord is inserted.

d. Always wear suitable protective (electrically insulated) gloves, ear-defenders (ear-protectors or ear-plugs) and eye-protectors (goggles) when using the welder.

ENSURE THAT:

the electrical power supply for the capacitive discharge spot welder is equipped with a high-sensitivity ($I_{\Delta N} = 30 \text{ mA}$) differential switch, as well as an appropriate grounding system, in order to prevent indirect contact.



C1 CE identification plate

C2 'Warning! High Voltage' sign

2. Checking the safety device

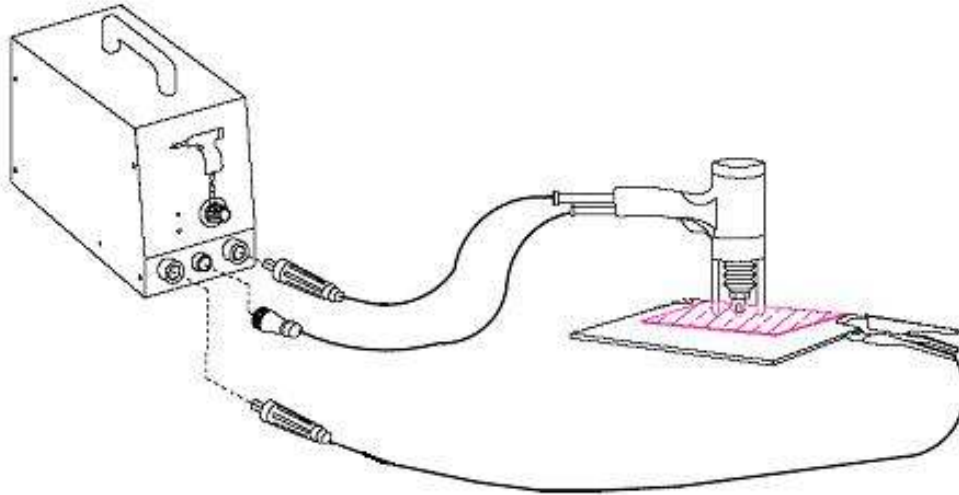


WARNING: It is essential to conduct the checks described in this manual on the protection circuit in order to guarantee the safety level prescribed by the manufacturer.

It is, therefore, essential to follow the procedure set out below:

- with the unit off, connect the ground cable to the unit and attach the clamp to a metallic base that is sufficiently large to contain the plate and to resist the insulation test:
 - connect the power cord to the gun socket
 - do not, under any circumstances, attach the control cable
 - switch the machine on and check that:
 - the red 'mains' LED is lit
 - the yellow 'overheat' LED is off
 - the green 'charge-complete' LED is lit

- the yellow 'contact' LED is off
- the red 'trigger' LED is off
- insert a pin into a suitable spindle and press the gun onto the metal support to check that the yellow contact LED lights up;
- SUBSEQUENTLY, REMOVE THE GUN AND PLACE THE SUPPLIED INSULATION-TEST PLATE (P) BETWEEN IT AND THE METAL BASE – WHEN THE TRIGGER IS PULLED THE YELLOW CONTACT LED SHOULD NOT LIGHT UP, THUS VERIFYING THAT THE WELDING SYSTEM IS BLOCKED IF THE RESISTANCE VALUE RISES EVEN SLIGHTLY ABOVE 27Ω , WHICH IS WELL BELOW THE RESISTANCE THAT WOULD BE GENERATED DUE TO A FAILURE ON THE PART OF THE USER TO MAKE THE NECESSARY CONTACT.



WARNING: *When using the welder, it is essential to wear protective (electrically insulated) gloves.*

If the yellow contact LED does light up under the circumstances described above, it is essential to stop using the unit immediately and to contact the supplier or the manufacturer.

H. Fault finding

FAULT	POSSIBLE CAUSES	CORRECTION ACTION
Cannot make welds	Defective trigger	Check trigger LED status
	Power cable broken Control cable broken Ground cable broken	Check contact LED status
	Welder defective	Contact technical support
The welder has entered overheat-protection mode	Vents blocked by foreign bodies	Remove any foreign bodies / Contact technical support
Uneven welds	Worn spindle	Replace spindle
	Ground clamps loose or out of position	Check and reposition
Pins have broken free	Insufficient pressure on the spring	Increase pressure
	Cables loose	Tighten cables
	Inadequate load voltage	Adjust as per the table
	Gun not vertical	Check the height of the support feet
	Dirty surfaces	Clean the surfaces

I. Maintenance



CAUTION: before attempting any maintenance operations, always ensure that the power cord (230 V mains) has been disconnected.

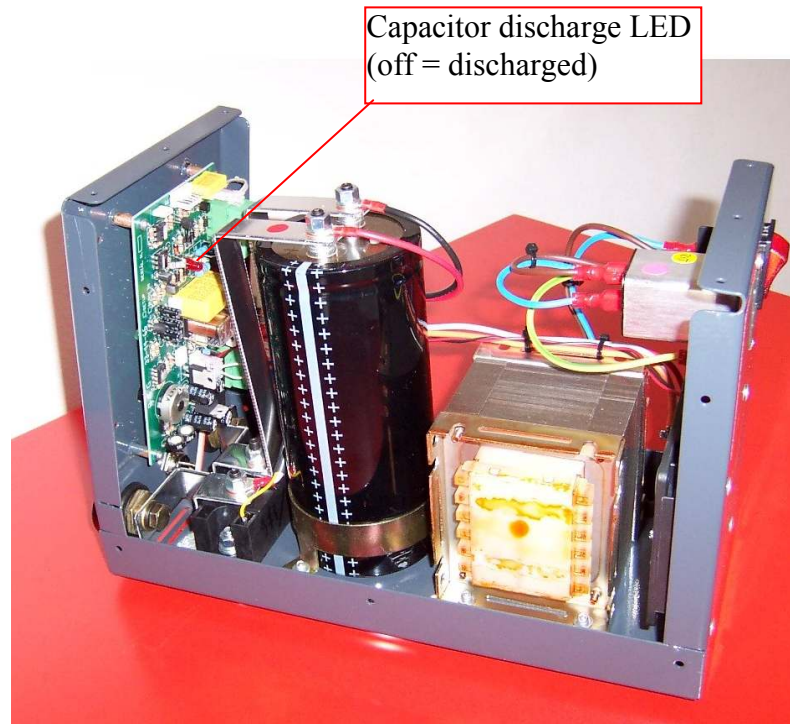
Disconnect the power cord





CAUTION: The capacitive discharge spot welder is equipped with an automatic capacitive discharge system that is activated as soon as the power supply is cut.

When the protective housing (upper casing) is opened, ensure that the red LED on the circuit board is off, thus confirming that discharge is complete.



The capacitive discharge spot welder must be maintained in order to ensure that it remains safe and continues to function properly.

Always use original spare parts. Do not carry out any operations that modify the capacitive discharge spot welder.

Any operations to adjust the functional parameters of the welder by altering the internal circuits should only ever be carried out directly by the manufacturer.



WARNING: If the safety circuit is defective, stop using the welder immediately and contact the manufacturer to arrange a repair.

To extend the unit's active life, ensure that:

- the cables (ground, gun power supply, gun control and unit power supply) are properly insulated
- the rubber covers of the power and control plugs are not worn
- the screws and internal parts of the plugs on the cables are tight
- the screws on the ground clamp are tight
- the unit is cleaned regularly (both inside and out).

1. Internal cleaning operations to be carried out by specialist personnel



CAUTION : *Failure to carry out the maintenance operations prescribed by the manufacturer will expose the user of the welder to serious risks.*

To clean the unit effectively it is necessary to:

- disconnect the unit from the power supply
- disconnect the ground, power-on and gun cables
- unscrew the cross-head screws that hold the upper casing in place, then raise the casing, taking care to disconnect the internal ground connection
- do not touch the parts located above until you have checked that the red LED on the inner side of the circuit board is fully off
- avoid touching the parts located below until you have verified the complete absence of any voltage on the capacitors using a tester (200 V DC FS)
- remove any internal impurities using **dehumidified** compressed air at a maximum pressure of two bars.

2. Scheduled maintenance operations

Operation	Frequency	Person responsible	Method
Check integrity of cables	Daily	User	Check that the welding unit's electrical cables have not been subject to abrasions or cuts, which can compromise performance.
Check effectiveness of signage/LEDs	Daily	User	Checks that the signage is accurate and that the LEDs are working properly.
Check the contact resistance safety circuit	Monthly	User	Every 100 hours of use, check that the welder's contact resistance safety circuit is working properly by using the appropriate plate, as described in the relevant paragraph above.
Check for wear on the gun spindle	Daily	User	Check that there is not excessive play between the spindle and the pin.
Clean the welder	Every 6 months	User	As specified in the paragraph on cleaning the welder.

3. **Unscheduled maintenance and repairs**

Description	Person responsible	Operational training level	Notes
Adjusting the circuit board parameters	Technical support	Specialised operation	
Substitution/repair of the contact resistance safety circuit	Technical support	Specialised operation	

J. Emergency situations

1. Due to fire



CAUTION: Do not carry out welding operations in the vicinity of flammable or combustible material.

Welding operations may produce sparks of incandescent material, which – if they come into contact with flammable items – may result in a fire.

A fire extinguisher should be located in the vicinity of the workstation. The extinguisher should be suitable for electrical equipment, and should be used if a rapid intervention is required and appropriate.

2. Due to equipment faults:

As prescribed in the periodic maintenance guidelines, the contact resistance safety circuit should be checked regularly. If the device is not functioning properly, stop using the unit immediately and contact technical support.

K. Technical documentation

The following are enclosed with the manual:

- ◆ Exploded diagram of the welder
- ◆ List of spare parts for the welder
- ◆ Wiring diagram
- ◆ List of spare parts for the contact gun

L. Residual risks



WARNING If the use and maintenance guidelines set out in the manual are not followed closely, there is a risk of electrocution (risk of electric shock).



PLEASE NOTE If protective gloves are not worn when handling the gun and there is a malfunction of the safety circuit, the user may be exposed to the risk of direct contact with high-voltage (240 V) metal parts.



PLEASE NOTE During welding, high levels of noise are generated. For this reason, the user should wear ear-defenders.



PLEASE NOTE The pulses of electrical current that are generating during use of the unit generate strong electro-magnetic fields. Prohibit access to those with pacemakers and do not use sensitive electronic equipment.

M. Noise levels

The level of noise produced is heavily dependent on the working environment. The table below shows the most common noise levels:

Capacitor charging	Welding pins ϕ 3 mm	Welding pins ϕ 8 mm
68 dB(A)	89 dB(A)	96 dB(A)

The cables of the welding circuit should be kept separate and should not be pulled tight. This is to avoid the risk of creating electrodynamic actions of repulsion and attraction between the cables, which would generate high levels of noise during the discharge phase.



PLEASE NOTE The level of noise produced is heavily dependent on the type of support surface on which the welding operations are to be carried out. The user is responsible for checking the noise levels before commencing the welding operations.

N. Spare parts

In relation to spare parts, the capacitive discharge spot welder should be repaired and maintained by the specialist technical support team.

O. Information on disposal

When decommissioning the capacitive discharge spot welder, regulations on differentiated waste disposal must be adhered to fully, with particular reference to:

- the removal of the identification plate
- the making safe of the welder by cutting the power cord
- the transfer to differential disposal experts of the materials constituting the main body of the unit

Parts from the capacitive discharge spot welder must not be used as replacement parts for other machinery or equipment.

The decommissioning date must be noted in the maintenance manual.

P. Guidance on understanding the safety regulations

THE SAFETY SYMBOLS IN THIS MANUAL ARE USED TO SIGNIFY THE FOLLOWING:



WARNING: INDICATES A POTENTIAL RISK THAT COULD CAUSE SERIOUS DAMAGE TO THE USER

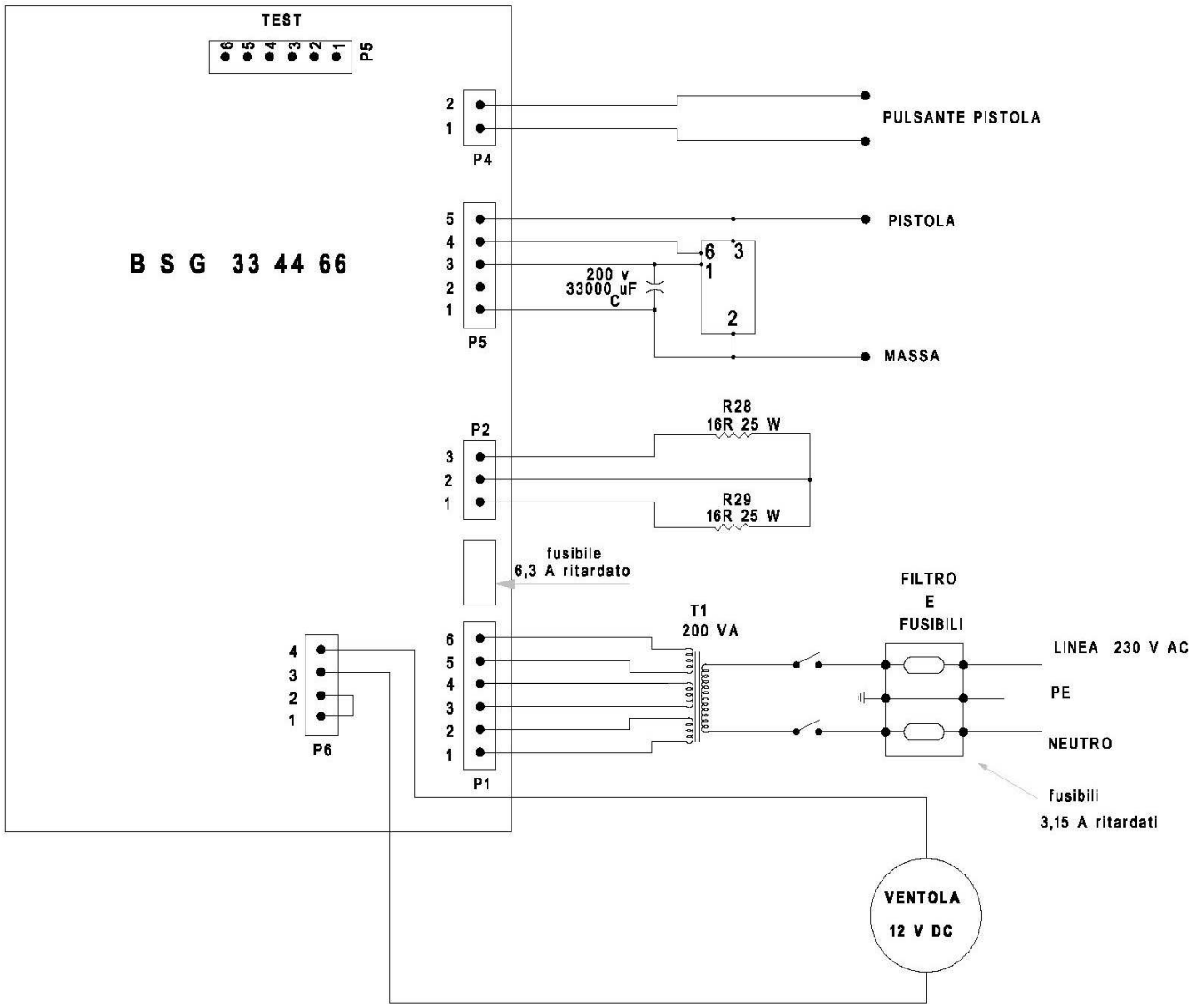


CAUTION: *indicates a minor risk or an improper use of the capacitive discharge spot welder*



PLEASE NOTE: *indicates the possibility that the capacity discharge spot welder could become damaged*

ALSPOTTER: WIRING DIAGRAM

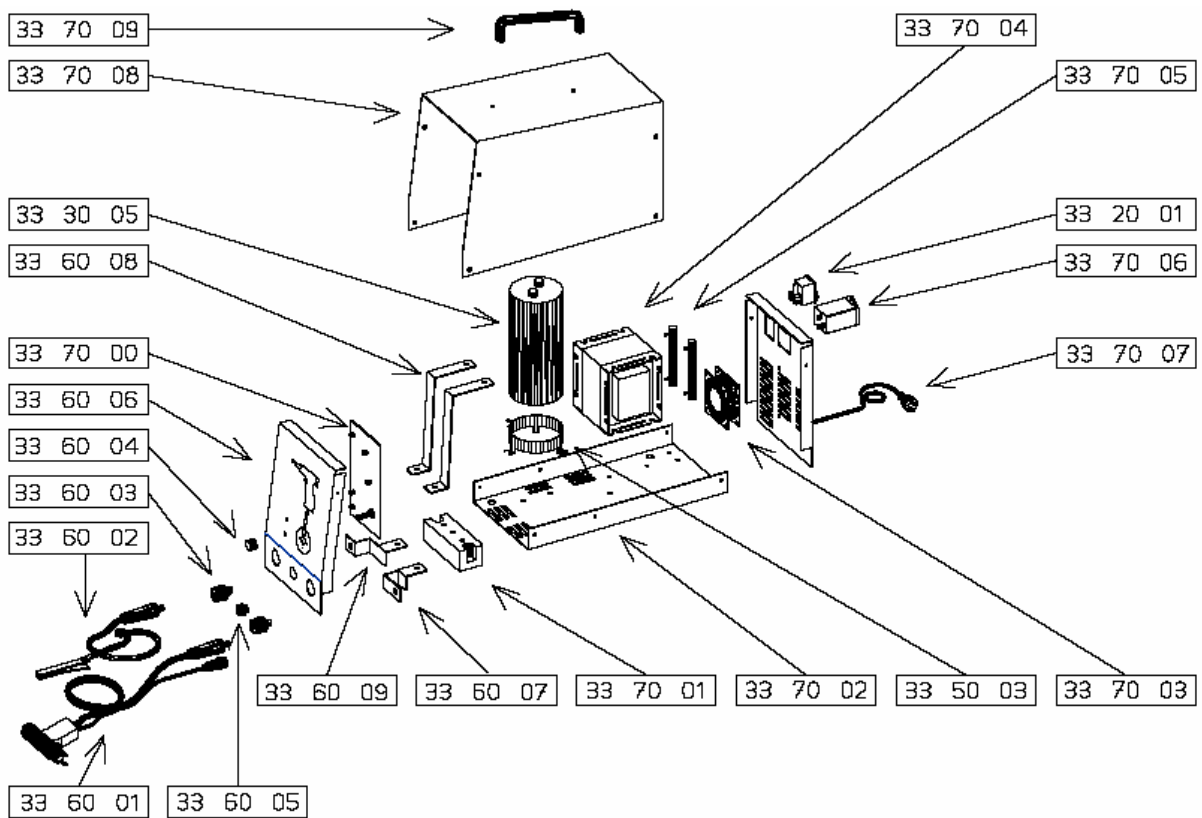


- Pulsante Pistola: Gun trigger
- Pistola: Gun
- Massa: Ground
- Filtro e fusibile: Filter and fuse
- Linea 230 V DC: 230 V DC Line
- PE: Ground
- Neutro: Neutral
- Ventola 12 V DC: 12 V DC Fan
- Fusibili 3.15 A ritardato: 3.15 A delayed fuses
- Fusibili 6.3 A ritardato: 6.3 A delayed fuses

ALSPOTTER: LIST OF REPLACEMENT PARTS

	Code	Description	Q.ty
1	33 20 01	Illuminated bipolar switch	1
2	33 30 05	33,000 uF 200 V capacitor	1
3	33 50 03	Capacitor strap	1
4	33 60 01	Contact gun plug 25 mm ² , 2-pin	1
5	33 60 02	Ground cable plug 25 mm ² + grip	1
6	33 60 03	Female socket 25 mm ² panel	2
7	33 60 04	Control + numbered index	1
8	33 60 05	Male socket panel, 2-pin	1
9	33 60 06	Satin-finish front panel	1
10	33 60 07	Aluminium bracket, gun output	1
11	33 60 08	Aluminium bracket, capacitor	2
12	33 60 09	Aluminium bracket, ground output	1
13	33 70 00	Control board	1
14	33 70 01	MOS.PWR.OUT. power module	1
15	33 70 02	Coated unit plate	1
16	30 70 03	80 x 80 12 V vent	1
17	30 70 04	200 VA power transformer	1
18	33 70 05	16 R 25 W resistance	2
19	33 70 06	Mains filter + 2 fuses, 3.15 A delayed	1
20	33 70 07	Power cable	1
21	33 70 08	Cover for coated unit plate	1
22	33 70 09	Plastic handle	1

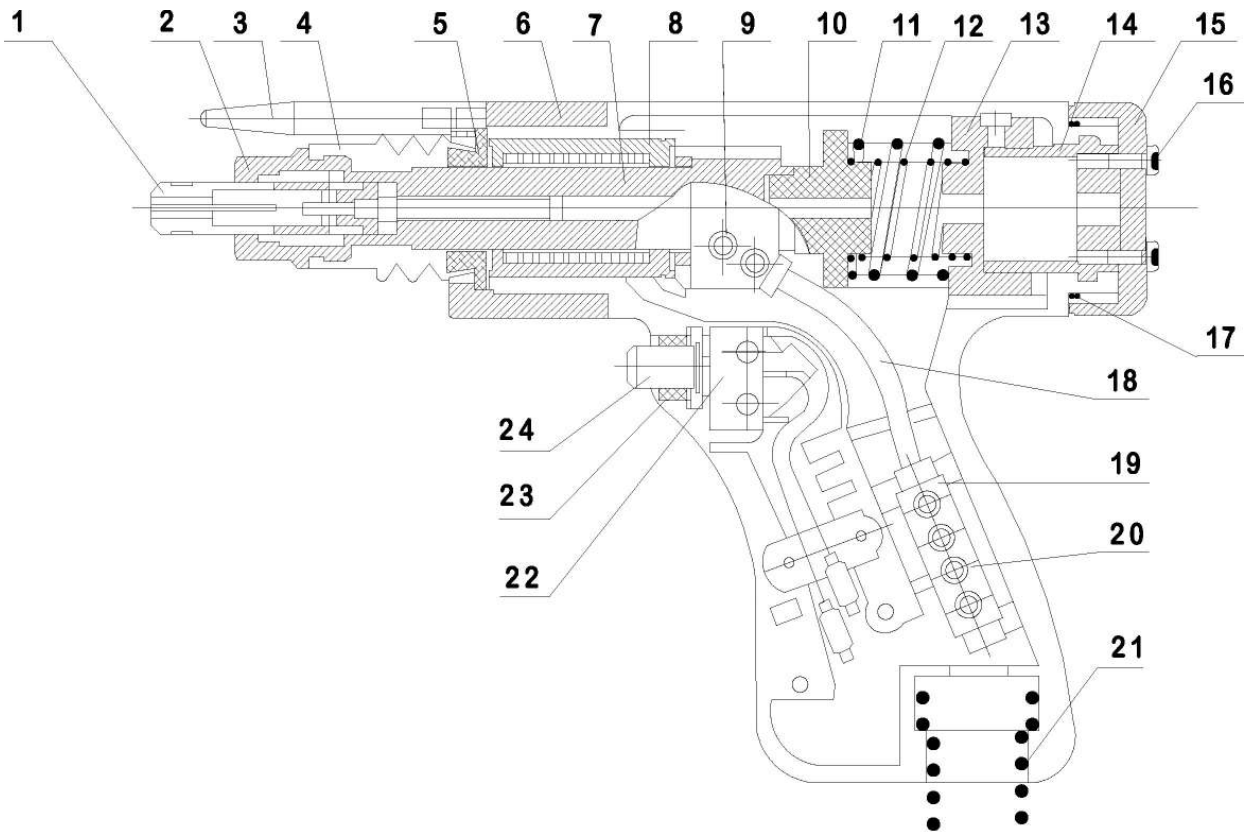
ALSPOTTER: SPARE PARTS DIAGRAM



P.I.S. GUN: LIST OF COMPONENTS

N	Description	Q.ty
1	Pin holder (spindle)	1
2	Spindle tightening nut	1
3	Support spacer (tripod stand)	3
4	Dust cover	1
5	Cover-holder ring	1
6	Tripod-holder front ring	1
7	Gun axle	1
8	Cylindrical bearing	1
9	Tightening screw (diameter M 5 x 8)	2
10	Insulating spacer	1
11	Reset spring, diameter 28 x 22	1
12	Reset spring, diameter 22 x 35	1
13	Spring-holder cylinder with index	1
14	Threaded adjustment drum	1
15	Knurled ring nut	1
16	Rear screws M 3 x 8	2
17	Spring ring	1
18	Flexible unsheathed copper cable	1
19	Cable relief block	1
20	Fixing screw M 5 x 8	4
21	Cable-guide spring	1
22	Microswitch, normally on	1
23	Trigger-guide ring nut	1
24	Trigger with spring return	1

P.I.S. GUN: DIAGRAM



PRIMA

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REGISTER OF PERIODIC MAINTENANCE ON THE CAPACITIVE DISCHARGE SPOT WELDER

Operations scheduled by the manufacturer

TABLE OF CHECKS TO BE CARRIED OUT AFTER EVERY 100 HOURS OF USE

CHECK TO BE MADE	SPECIFICATIONS	OUTCOME	SIGNATURE
Check the integrity of the insulation on the cables that form the welding circuit	Visual inspection		
Check the full integrity and efficiency of the insulating protection on the welding gun			
Check that the contact resistance measuring circuit is working properly	See relevant paragraph		
Check that the LEDs on the panel are working properly			
Check the condition of the signage on the welder			
Check the condition of the protective gloves			

Please note: copy the table shown above, compile the relevant information, then enclose it as a page in the register.

Date

The user who conducted the checks

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