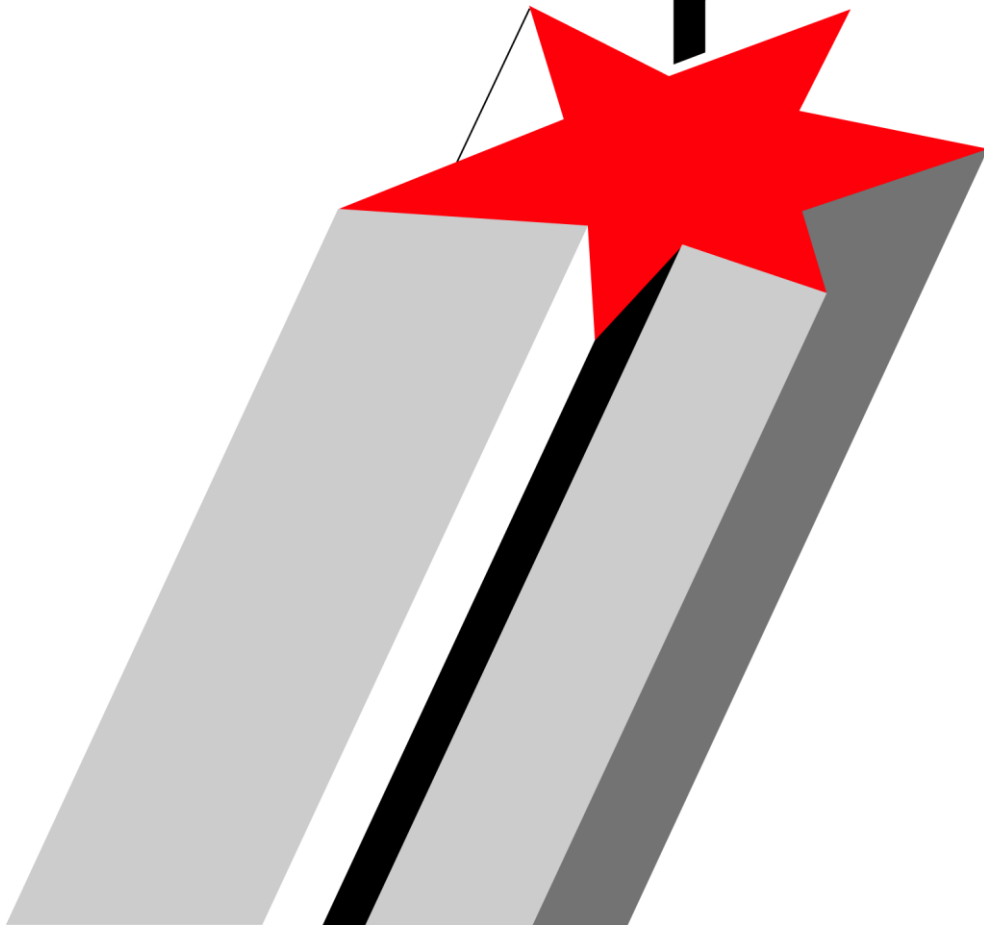




Operating Instructions

BMS-9
BMS-9 V
Stud Welders

soyer®







Operating Instructions

BMS-9 / BMS-9 V Stud Welders

Serial number*

BMS-9 / BMS-9 V Stud Welders

Please enter the serial number here to have it immediately available if you need service support.

Order No.	Code designation	Note
P01070	BMS-9	Capacitor bank 66,000 μ F
P01071	BMS-9 V	Capacitor bank 90,000 μ F

Thank you!

Congratulations on purchasing the BMS-9 SOYER[®] stud welder. You have made an excellent choice. Your BMS-9 SOYER[®] stud welder was specially developed for the high-speed fastening of SOYER[®] weld studs in compliance with **DIN EN ISO 13 918** (capacitor discharge) on metallic, weldable workpieces.

Our devices have been tested with regard to safety requirements and correspond to the currently valid European and national guidelines. Proof of conformity has been established and the manufacturer is in possession of the corresponding documents.

FOR YOUR SAFETY



Read all of these operating instructions prior to start-up. Please follow all safety precautions as well as all chapters of these operating instructions before starting to weld. Non-compliance with the safety precautions can result in serious personal injuries or death.

SOYER[®] is a registered trade mark of Heinz Soyer Bolzenschweißtechnik GmbH.

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Non-compliance with this regulation is liable to compensation. All rights reserved, particularly in the case of a patent grant or a GM registration.

We have verified that the contents of this pamphlet correspond to the hard- and software described. Deviations, however, cannot be excluded so that we cannot warrant for absolute compliance.

The illustrations contained in this instruction manual may vary in some details from your product. This, however, has no influence on the handling of the machine.

The data in this documentation have been verified regularly and necessary corrections will be incorporated in future impressions. Any suggestions for improvement will be appreciated.

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**Heinz Soyer Bolzenschweißtechnik GmbH
Inninger Straße 14
82237 Wörthsee**

EC Conformity Declaration

We herewith declare that the machine described in the following and the version available on the market correspond in its design and construction to the fundamental safety and health requirements stipulated by EC Directive on Machinery. Any modification of this machine without confirmation shall automatically annul this declaration.


Designation of machine	:	<u>Stud welder</u>
Machine type	:	<u>BMS-9 / BMS-9 V</u>
Machine no.	:	_____
Applicable EC directives	:	DIN EN 60974-10 EC Directive on Low Voltage (2006/95/EC) EC Directive on EMC (2004/108/EC)
Applied harmonised standards, in particular	:	DIN EN 60 974 - 1
Applied national standards and technical specifications, in particular	:	BGV A1, BGV A2, BGV A3, VBG 5 VDE 0544
Date	:	September 01, 2010
Producer's signature	:	 _____
Signer's function	:	Managing Director



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1 Safety precautions

These safety precautions are for your safety.



General safety instructions

Become trained and read and follow all safety precautions listed below as well as all chapters of this manual before starting to weld.

Non-compliance with the safety precautions can result in personal injuries or death.



Only qualified persons are allowed to install, operate and maintain the equipment.

Keep away children and juveniles under the age of 16 years from the equipment.



WARNING

It is prohibited to open the stud welder.

The service personnel are required to meet special qualifications.

Our after-sales service has adequately trained personnel, suitable service equipment and the means to carry out all necessary works.



Warning of electromagnetic fields

Keep sufficient distance from electronic devices. When stud welding, highly intensive electromagnetic fields are created which may permanently damage these devices (e.g. television sets, airbags).

Ensure that the welding equipment is not operated near electronically sensitive life-supporting equipment, such as in intensive care units in hospitals.



Persons with pacemakers must neither operate the stud welding equipment nor stay near it while it is running.



Electric shock can cause death

Prevent electric shock by insulating your body from work and ground. Stand on dry insulating material and wear rubber soled shoes.

Inspect all cables including power cord for damage, wear or bare wiring. Immediately replace damaged or worn cables.



Always ensure the correct supply voltage in accordance with the data plate. Never connect the battery charger to a power supply network with incorrect supply voltage.

Always disconnect the battery charger from the mains supply before starting any cleaning works. Only trained and appropriately qualified personnel are allowed to carry out works at the electric mains supply and welding system.

Do not touch live electrical parts with bare hand. Wear dry, hole-free insulating gloves.

Do not wear rings, watches or electrically conductive jewellery.

Keep the work area, studs, stud chucks, guns, cables, power source as well as your clothes dry.



Fumes and gases can cause damage to your health

Fumes and suspended matters may be generated during welding. Beware of fumes detrimental to health, particularly when using surface treated materials. Please also observe the safety regulations applicable for your country.

Do not breathe fumes and gases. Use adequate ventilation in the work area to remove fumes and gases.



Welding can cause fire and explosions

Welding sparks and heat from flames and arcs can cause fires. Have a portable fire extinguisher handy for immediate use. Be sure you are trained for properly using it.



When welding, do not wear clothes soiled with easily combustible substances such as oil, grease and paraffin oil etc.



Comply with the fire regulations and do not weld, for instance, in hazardous locations.

Pay attention to flammable objects at the welding place. All flammable materials and liquids, such as oil, fuel, etc. must be removed prior to the start of work.

Electronic equipment (e.g. airbags) and the use of explosive substances for fuel supply require further safety precautions when carrying out welding operations on cars. Appropriate information can be obtained from the trade associations or the car manufacturers.



Skin and eye protection

Arc rays and welding spatters can injure eyes and skin.

Wear safety glasses with side shields and protective goggles with correct shade of filter to protect your eyes from welding spatters and flashes of light that are generated during the welding process.



Wear gauntlet gloves made of leather and non-combustible closed working clothes such as heavy long-sleeve shirts, cuffless pants and safety shoes.



Wear a leather apron to protect your clothes from welding spatters. Keep sleeves and collars buttoned and remove open pockets from the front side of your clothing.



We recommend using ear protection. Some welding and working processes may generate loud noises.

1.1 Description of reference signs in the operating instructions

The non-observance of safety instructions such as pictographs and warning words can cause damage to persons. The safety instructions of this manual describe the following:

Safety instructions



Danger!	Immediate hazards which could result in serious personal injuries or loss of life.
Warning!	Potential hazards which could result in serious personal injuries or loss of life.







Caution!	Potential hazards which could result in minor personal injuries.
Caution!	Warning of damage










Note!	Potential detrimental situation which may cause damage to the product or to an object surrounding it.
Important!	Instructions for application and other useful information facilitating the proper use of the product.





Safety symbols


The following pictographs for warnings, bans and decrees are used in this manual:

 Ban for persons with pacemakers	 Ban (only in combination with an additional safety symbol)	 Do not touch Housing is current-carrying	 Fire extinguisher
--	---	--	--

 Warning of a danger spot	 Warning of dangerous electric voltage	 Warning of electromagnetic field	 Warning of moving parts
---	--	--	--

 General ban (only in combination with an additional safety symbol)	 Warning of inflammable substances	 Warning of explosive substances	
---	--	---	--

 Eye protection required	 Protective clothing required	 Ear protection required	 Protective gloves required
--	---	---	---

	General instructions are marked with the hand symbol.
---	---



1.2 Staff qualification and training

The staff responsible for operation, maintenance, inspection and assembly must have the respective qualification for carrying out these works. Field of responsibility, competence and the supervision of staff have to be exactly regulated by the user. If your personnel do not have the necessary knowledge, they have to be trained and instructed. If necessary, this can be done by the manufacturer/supplier on behalf of the user. Furthermore, the user must ensure that the contents of the operating instructions are fully understood by the staff.

The society of welding institutes (GSI: Gesellschaft der Schweißtechnischen Institute mbH) offers the appropriate training courses for your personnel.

For information on branches, please refer to website <http://www.dvs-ev.de>.

1.3 Dangers in the case of non-compliance with safety instructions

The non-compliance with safety instructions may not only endanger persons, but also the equipment and its environment. Any non-compliance with safety instructions may result in a complete loss of damage claims.

- Failure of important system functions
- Failure of prescribed methods for maintenance
- Danger of persons through electric, mechanic, thermal and acoustic influences

1.4 Before starting to weld...

- Check the state of all cables and cable connections before starting to weld
- Immediately replace defective cables and cable connections

1.5 Working with the stud welding equipment

Comply with all accident prevention regulations which apply to the operation of your welding device. If an accident happens,

- switch off the welding device and disconnect it from the mains supply and
- call a doctor

1.6 Inadmissible operating methods

Limit values

Working safety of the stud welding equipment supplied can only be guaranteed when the system is used in accordance with its purpose. The limit values indicated in the chapter "Technical data" must never be exceeded.

1.7 Stopping the stud welder

- Turn off the stud welder's mains switch (chapter 5.1, item 1)
- Disconnect the mains plug from the mains socket
- Disconnect the earth cable, control cable and welding cable from the stud welder
- Roll up the cables without buckling them
- Prevent the stud welder being operated by unauthorized personnel
- Check welding cable and connections of the stud welder for damage such as burn-off, mechanical wear etc. and have damaged parts replaced by the SOYER® customer service

2 General

2.1 The following should be principally observed...

With the BMS-9 stud welder you have purchased a product which

- is state-of-the-art technology
- fully complies with the current safety requirements and
- enables successful working.

Before installing the stud welder, please observe the following:

- Store the operating instructions in a place accessible to every operator.
- Ensure that the respective operator has read and understood the operating instructions prior to start-up. Each operator should confirm this per signature.
- Prevent the stud welder being operated by unauthorized personnel.
- Only trained personnel may operate the stud welder.
- Call a doctor in case of an accident.

2.2 Intended use

The BMS-9 SOYER® capacitor discharge stud welder allows you to weld pins and threaded studs from M3 - M8 (M10 with BMS-9 V) or Ø 3 - 7.1 mm and many other types of weld fasteners in accordance with DIN EN ISO 13918 (capacitor discharge) manufactured of steel, stainless steel, aluminum and brass.

2.3 Marketing and service

If you have any questions regarding the operation of the stud welder, retrofits for special applications or if you require service, please contact your responsible service office or the following address:

Heinz Soyer Bolzenschweißtechnik GmbH

Inninger Straße 14

D-82237 Wörthsee

Telephone +49 8153-885-0

Telefax +49 8153-8030

www.soyer.com

export@soyer.de

2.4 Information on the documentation

The following operating instructions are supplied with the BMS-9 / BMS-9 V stud welders:

- Operating instructions for BMS-9 / BMS-9 V stud welders

2.5 Information on the documentation

Legal relationship

We draw your attention to the fact that the contents of these operating instructions are neither part of any former or existing arrangement, pledge or legal relationship nor are designed for modifying the latter. All obligations of **Heinz Soyer Bolzenschweißtechnik GmbH** result from the respective contract of purchase which also comprises the complete and generally valid warranties. These contractual warranty terms are neither extended nor restricted by the implementation of these operating instructions.



CAUTION

Do not carry out any actions on the stud welding equipment without specifically knowing the operating instructions or the respective part. Ensure that only qualified personnel familiar with the operating instructions and the necessary technical activities (training!) operate the system.



2.5.1 Conduct in the case of malfunctions

If malfunctions occur, first try to detect and eliminate the causes according to the "Troubleshooting" list in chapter 9 of these operating instructions. In all other cases, please contact our service department.

If you require our service, please make sure that you supply us with the following information:

- Customer number
- Serial number
- Stud and workpiece material
- Product designation / options
- Year of construction
- Stud dimensions

This information will help us both to save time and unnecessary costs, e.g. caused by delivering the wrong spare parts.

3 Description of stud welder

3.1 Description

The BMS-9 SOYER® capacitor discharge stud welder allows you to weld pins and threaded studs from M3 - M8 (M10 with BMS-9 V) or $\varnothing 3 - 7.1$ mm and many other types of weld fasteners in accordance with **DIN EN ISO 13918** (capacitor discharge) manufactured of steel, stainless steel, aluminum and brass.

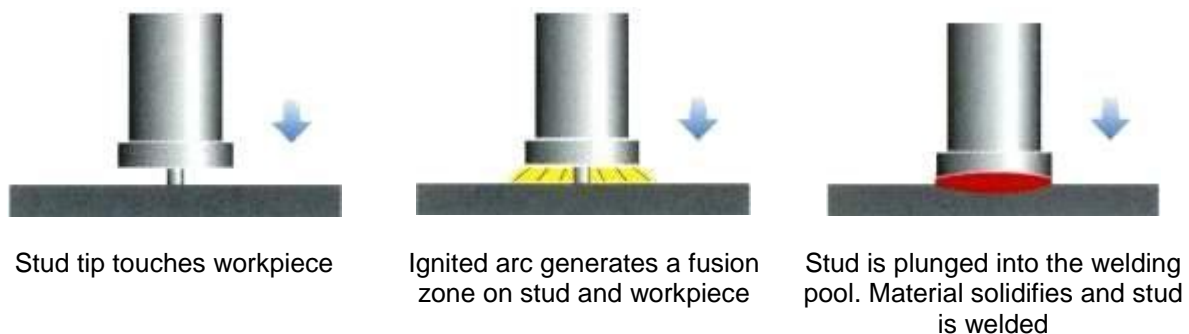
For the first time, it is possible for operators to view all important operating conditions with the help of an LED display using the traffic light principle on the welding gun. This makes the operator's job far easier and also considerably contributes to increasing the quality of the weld joints.

Product highlights

- Simple selection of the welding parameters using control keys
- Automatic recognition of the mains voltage 115/230V~
- Inverter switch-mode power supply for maximum welding capacity
- Automatic recognition of the welding gun (gap/contact)
- Control of the optical LED display on the PS-9 welding gun
- High capacity with compact structure and low weight
- Automatic storage of charging voltage
- Short charging cycles to increase productivity
- Precise digital displaying of the charging voltage
- Monitoring of all functions using a clear functional display panel

3.2 Capacitor discharge stud welding technology

The BMS-9 SOYER® stud welder runs according to the principle of capacitor discharge with tip ignition as defined in DVS Leaflet 0903 (DVS = German Welding Society). This system uses the sudden discharge of a capacitor battery to generate arc energy.



For further information, please refer to www.soyer.de



IMPORTANT INFORMATION

Ensure that the surface is electroconductive.
Grind coated parts

3.3 Technical data

Description	BMS-9/BMS-9 V
Welding process	Capacitor discharge stud welding
Standard gun	PS-9
Welding range	M3 - M8 or Ø 3 - 8 mm with steel, stainless steel, aluminium and brass (M8 or Ø 8 in aluminium and brass conditionally, depending on the respective requirements)
Power source	Capacitor bank 66,000 µF (option: BMS-9 V 99,000 µF)
Charging voltage	50 - 200 V infinitely variable up/down
Welding sequence	Up to 20 studs/min (depending on stud diameter and type of feed)
Power supply	Automatic recognition 115/230 V, 50/60 Hz, 10 A
Fuse	M 10 A (fuse 5x20mm medium time-lag)
Type of cooling	F
System of protection	IP 21
Dimensions	295 x 170 x 295 mm (w x h x d)
Weight*	8.5 kg
Colour	RAL 5009 azure
Technical specifications are subject to change without notice	



WARNING

The "S" symbol is the symbol for welding current sources permitted for operation with increased electrical danger. The "S" symbol on our stud welders refers exclusively to the welding current circuit and not to the complete stud welder.

* Slight deviations are possible depending on accessories.

4 Installation of stud welder

- Only install the stud welder on an even surface. The pads located on the bottom of the welding equipment guarantee its anti-skid position and serve as vibration dampers.
- Although the stud welder is resistant to environmental influences, it should be protected against dampness and dust.
- Please pay particular attention to the bearing strength of the workshop furniture and ensure a safe and stable position of the welding equipment.
- Make sure there is sufficient free space around the air apertures, otherwise the device safety mechanism will respond and interrupt the welding process.
- Install the stud welder close to the welding location.
- Ensure sufficient ventilation of the working room when operating the welding system.

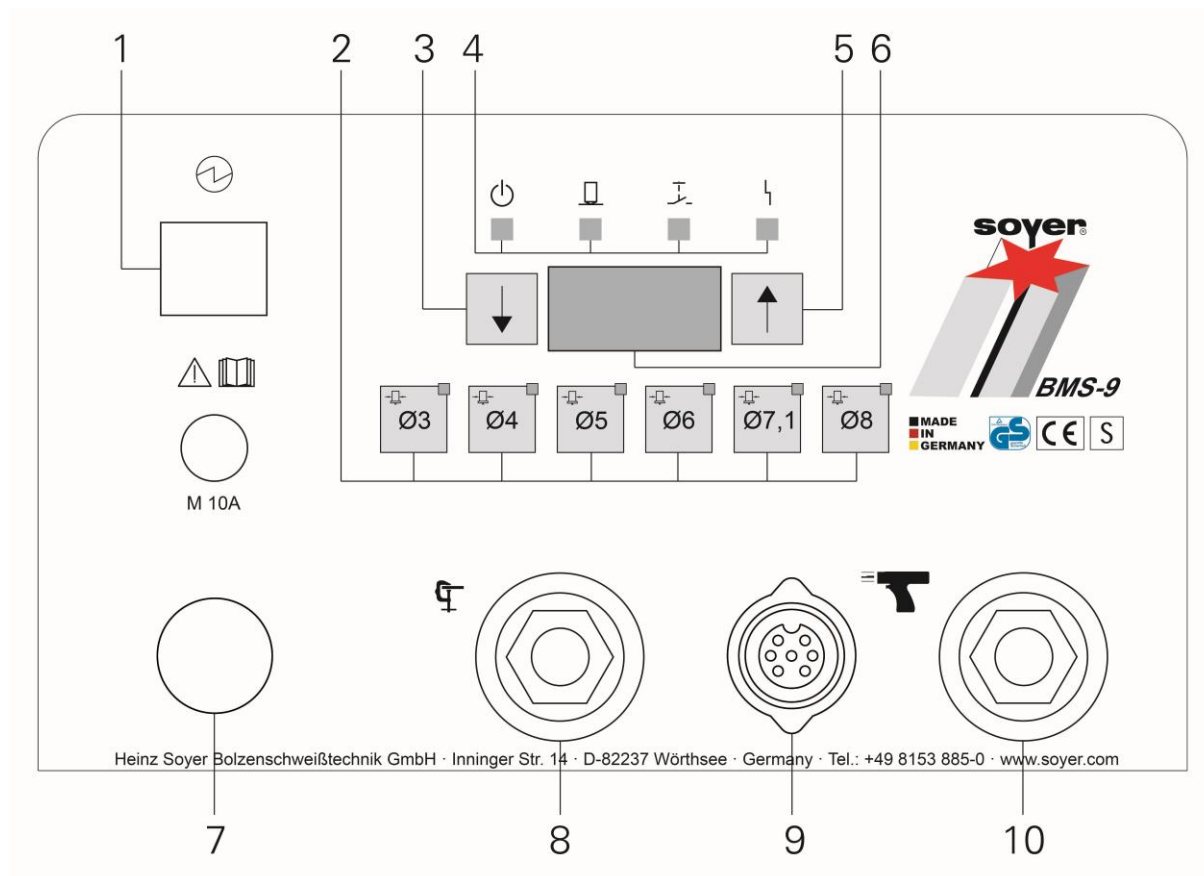
**NOTE**

The housing of the stud welder corresponds to safety class IP 21. Please observe that this system of protection is not suitable for being operated or transported in the rain.

- **Ensure correct connected loads for electrical connections as indicated on the type plate and charging device.**

5 Start-up

5.1 Front view



- 1 Mains switch
- 2 Selection keys
- 3 Function key ↓ "Down Arrow"
- 4 LED displays
- 5 Function key ↑ "Up Arrow"

- 6 Digital 7-segment display
- 7 Mains cable
- 8 Earth cable socket
- 9 Control cable socket 7-pole
- 10 Welding cable socket

5.1.1 Operating elements

Mains switch (item 1, chapter 5.1)

The mains switch is used to switch the stud welder on and off.

Selection keys (item 2, chapter 5.1)

The selection keys [Ø3] .. [Ø8] ([Ø3] .. [Ø10] with BMS-9 V) allow different parameters to be quickly selected according to the desired diameter.



NOTE

The charging voltage is pre-adjusted according to the table shown below. The charging voltage can be adjusted via the "arrow down [↓]" or "arrow up [↑]" key depending on the respective welding task.



NOTE

The stud welder recognises the type of gun connected.

Example Table for charging voltage (V) BMS-9 with PS-9 stud welding gun

[Ø3]	[Ø4]	[Ø5]	[Ø6]	[Ø7,1]	[Ø8]
70 V	100 V	115 V	140 V	175 V	195 V

Example Table for charging voltage (V) BMS-9 V with PS-9 stud welding gun

[Ø3]	[Ø4]	[Ø5]	[Ø6]	[Ø8]	[Ø10]
65 V	80 V	95 V	120 V	180 V	195 V





The welding parameters of the BMS-9 stud welder were determined with the PS-9 and PS-1K stud welding guns. The charging voltages shown in the table above are standard values only. They may vary from the stated setting depending on the type of workpiece, the workpiece thickness and the surface condition of the workpiece.

Function key "arrow down" (item 3, chapter 5.1)

The function key "arrow down" enables continuous reduction of the charging voltage e.g. for smaller stud diameters.

LED displays (item 4, chapter 5.1)

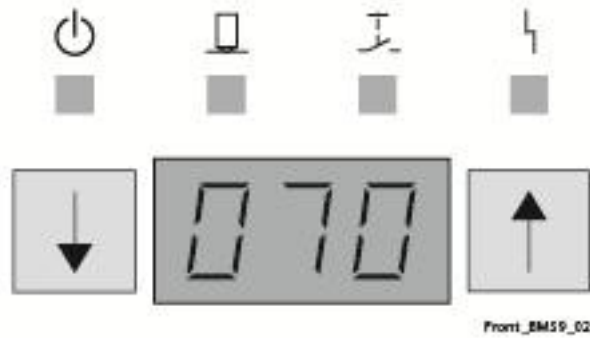
The four LED displays show the respective operating states.

Symbol	Designation	Function
	LED "Ready"	LED lights up when stud welder is ready for operation.
	LED "Stud on Workpiece"	LED lights up when earth terminal of stud welder is connected and stud touches the workpiece.
	LED "Release"	LED lights up when pressing trigger switch of welding gun.
	LED "Malfunction"	LED lights up when stud welder fails.

Function key "arrow up" (item 5, chapter 5.1)

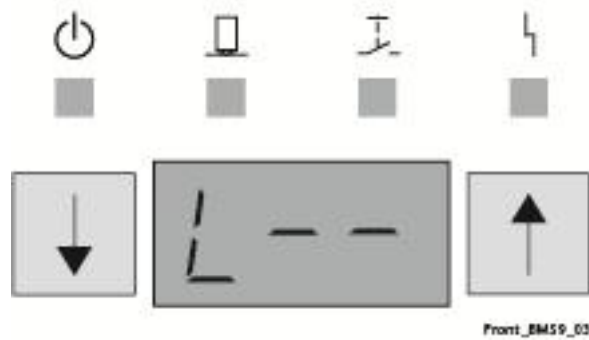
The function key "arrow up" enables continuous increase of the charging voltage e.g. for larger stud diameters.

Digital 7-segment display (item 6, chapter 5.1)



The digital 7-segment display shows the set energy (charging voltage in volts)

Depending on the respective operating state, other messages may be displayed.



5.1.2 Fuse element

The BMS-9 stud welder is protected by the following fuse:

- Power input fuse: 1 x M 10 A medium time lag (front panel item 7, chapter 5.1)

5.1.3 Connecting elements

Earth cable socket (item 8, chapter 5.1)

The earth cable socket serves to connect the ground clamps to the stud welder.

Control cable socket (item 9, chapter 5.1) and welding cable socket (item 10, chapter 5.1)

The control cable connection and the welding cable socket serve to connect the welding gun to the stud welder.

Mains cable (item 7, chapter 5.1)

The power cable is used to connect the stud welder to the power supply.



In the electrical connection, comply with the correct connection values according to the type plate at the stud welder.



5.2 Preparation for start-up

Connect the stud welding gun and earth cables to the stud welder prior to start-up.

5.2.1 Earth connection

- Attach earth cable to earth cable socket (item 8, chapter 5.1) and lock by turning to the right until stop.
- Connect ground clamps to the workpiece.



Ensure optimum contact with the workpiece.
→The contact areas must be metallically bright. (If necessary, grind the surface down.)

5.2.2 Connection of stud welding gun

- Connect welding cable of welding gun to the relevant socket (item 10, chapter 5.1) and lock it by turning to the right until stop.
- Insert control cable into control cable socket (item 9, chapter 5.1) and tighten it.

5.2.3 Power supply

- Connect power cable (item 7, chapter 5.1) to power supply.



MORTAL DANGER

In the electrical connection, comply with the correct connection values according to the type plate at the stud welder.

Only connect stud welder to authorized isolated ground receptacles.

5.3 Operation

**NOTE**

The applicable accident prevention and safety regulations have to be complied with when operating the stud welder.

**NOTE**

The welding areas must be metallically bright.
→ If necessary, grind the area to be welded

- Switch on mains switch.



After switching the stud welder on, all four LED lamps light up for a short period.

Depending on the respective operating state, further messages are shown via the digital 7-segment display.

- Choose charging voltage according to stud diameter by pressing "arrow down [↓]" or "arrow up [↑]" function key.

**NOTE**

This applies only to welding guns equipped with a lifting magnet (e.g. PS-9)
→ Check the height of lift (chapter 5.4)

- Position welding gun with weld stud on the workpiece. When earth connection is made and the stud in the gun touches the workpiece, the LED "Stud on Workpiece" lights up.
- Press the push button. The LED "Release" lights up and stud welding process is started.

During the welding process, keep the gun steady. After completion of the welding process, remove gun vertically from the welded stud. A possible operating error e.g. the welding gun glides off during welding, is identified by the stud welder and indicated as failure by LED "Malfunction" lighting up. After removing the welding gun from the welded stud, the capacitor bank is recharged. Stud welder is ready for welding again after a few seconds (LED "Ready" lights up).

Note regarding the PS-9 stud welding gun with innovative user guidance using a multi-coloured LED display

The green LED display on the welding gun tells the operator when the stud welding device is ready and can be operated. Faults are signalled using the red LED display. The circular LED display shows the current operating status from any angle.



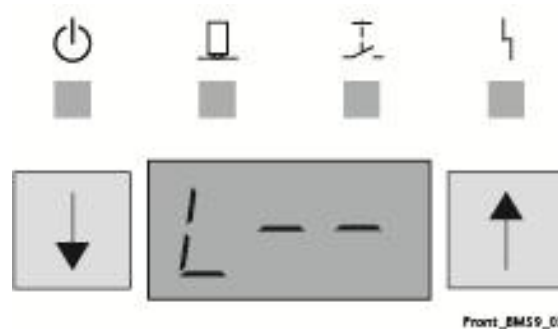


5.4 Notes with regard to the "Lifting test" operation mode

The lifting test allows for the activation of the gun's lifting magnet thus being able to control the setting.

Proceed as follows:

- The stud welder is still deactivated.
- Provide ground connection to the workpiece, connect welding gun.
- Mount stud chuck to the welding gun and insert weld stud into stud chuck.
- Simultaneously press "**Down arrow**" [↓] and "**Up arrow**" [↑] and switch stud welder on. Keep the keys pressed until [L--] appears on the display.



- After approx. 1 second, the stud welder displays the connected gun type and is adjusted to the corresponding control parameters: e.g. for PS-9 or PS-3.
- Position the welding gun onto the plate and actuate the release button. A lifting cycle is carried out using the control parameters for conventional welding.



NOTE

The appropriate lifting height can be adjusted by rotating the adjusting cap at the rear side of the welding gun to the left or to the right.

The lifting height shall be approximately 2 mm.

This procedure can be repeated as frequently as required. In order to avoid the overheating of the magnetic coil, a waiting time of approx. one second must be observed between the test lifts.

If at the beginning of the lifting cycle BAW (SOW = stud on the workpiece) is recognised, the stud welder will display the fall-back delay of the gun in ms (milliseconds) with a resolution of 0.1 msec. This delay measurement starts with the activation of the lifting magnet and stops as soon as the stud gets in contact with the workpiece.

If the lifting cycle is accomplished without prior BAW (no ground connection), [- -] is displayed.

Switch stud welder on and off to complete the test.

NOTES:

- If a contact gun is connected when the lifting test is started, the stud welder displays "Con" for approx. 3 seconds and automatically starts normal operation.
- If the control plug of the gun is disconnected during the lifting test, the apparatus displays "Con" for approx. 3 seconds and automatically starts normal operation.
- Every gap gun which is not recognised as PS-9 will be displayed as PS-3.

6 Instructions for the adjustment of stud welding guns

6.1 Start-up of PS-9 welding gun with adjustment-free stud chuck








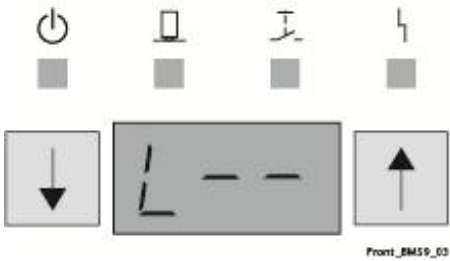

NOTE

The PS-9 welding gun in combination with the new adjustment-free stud chuck is only suitable for threaded weld studs from M3 - M8!

Note:

Thanks to the new stud chuck in conjunction with the PS-9 welding gun, there is no need to adjust the stud chuck for different stud lengths (6 - 40 mm). The weld stud must only be inserted into the stud chuck until it comes to a stop. The proper positioning of the welding gun with welding stud onto the workpiece is monitored by means of a safety switch in the welding gun. If there is no weld stud in the stud chuck, the welding process will not be started.

	<p>Choose stud chuck according to the stud size (M3 - M8)</p> <p>Insert weld stud into stud chuck until it comes to a stop.</p> <p>No further adjustment required!</p>
 <p>Support not shown in illustration</p>	<p>The stud welder must be <u>switched off</u> when installing the stud chuck. </p> <p>Loosen sleeve nut by means of SW 17 socket wrench.</p> <p>Insert the stud chuck into the spring piston and push it firmly until it comes to a stop.</p> <p>Circular LED display lights up green = Standby</p>

 <p>Stud chuck not shown in illustration</p>	<p>Hand-tighten sleeve nut by means of SW 17 socket wrench.</p> <p>Circular LED display lights up green = Standby</p>
 <p>Stud chuck not shown in illustration</p>	<p>Attach support tube.</p> <p>Circular LED display lights up green = Standby</p>
 <p>Front_BMS9_03</p>	<p><u>Adjusting and checking the height of lift</u></p> <p>The height of lift is the distance for which the weld stud is lifted from the workpiece during the welding process.</p> <p>To adjust and check the height of lift, please select the operating mode "Lift Test" (chapter 5.4).</p> <ul style="list-style-type: none"> • Switch stud welder off • Press both keys "arrow up" and "arrow down" and keep them pressed • Switch stud welder on • Keep the keys pressed for a few seconds >>> display changes
	<ul style="list-style-type: none"> • Position welding gun on the workpiece • Press push button. The gun lifts the chuck with weld stud away from the workpiece <p>Adjustment of the gun lift is achieved by turning the rear adjustment cap of the welding gun to the left or to the right.</p> <p>Anti-clockwise rotation increases the gun lift and conversely clockwise rotation reduces the gun lift.</p> <p>The height of lift should amount to approx. 2 mm</p>

- Switch stud welder off by means of the mains switch. Switch it on again after approx. 5 seconds.
- Stud welder is now ready for operation.
- Is the charging voltage set according to the stud diameter?
- Check and correct, if necessary.



Position welding gun vertically on the workpiece (at a 90-degree angle to the workpiece). Check once again the selected parameters. Release welding process by pressing the push button of the welding gun.

During the welding process, keep the gun steady. After completion of the welding process, remove the welding gun vertically from the welded stud to prevent widening and damaging of the stud chuck.

Please observe carefully all safety instructions!



Welding process



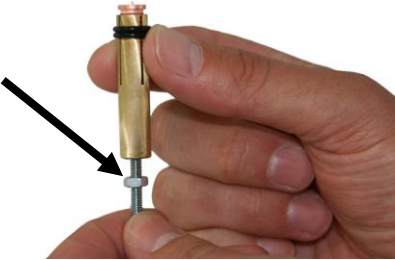
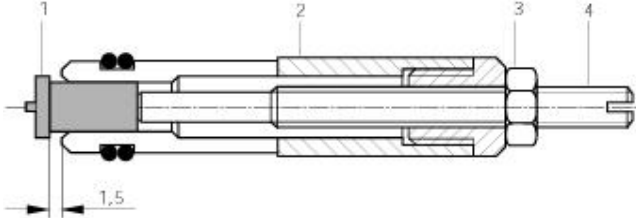

Firmly position welding gun on the workpiece. Hold the gun steady and make sure it does not tilt.

Green LED display lights up = Ready for operation

Press the push button of the welding gun.

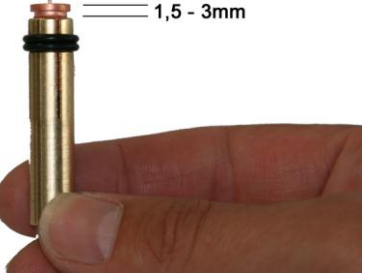





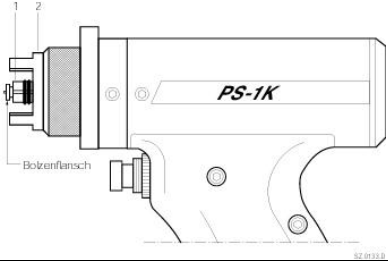




6.2 Basic setting of the stud chuck with adjusting screw

	<ul style="list-style-type: none"> • The stud chucks with adjusting screws of the PS-1, PS-3K, PS-0K and PS-1K welding guns are all of the same style. • For different stud diameters, different stud chucks are required. • For the PS-1, PS-9, PS-3K, PS-0K and PS-1K welding guns, use the standard stud chuck of 40 mm length with adjusting screw. Ensure that the maximum stud length does not exceed 35 mm. • When using long weld studs with the small-sized PS-0K and PS-1K welding guns, however, it is necessary to shorten the stud chucks' stop screw.
	<p>Insert weld stud into stud chuck.</p>
	<p>The weld stud must make contact with the stop screw. Adjust stop screw in the stud chuck by turning it until the distance between the top edge of the stud flange and the front edge of the stud chuck equals 1.5 mm. Secure stop screw (4) by means of counter nut (3).</p>  <p style="text-align: right; font-size: small;">S206 0508 0123</p>
	<p>Ensure depth of immersion / stud protrusion is set between 1.5 mm and 3 mm. After adjustment, check and correct if necessary. Hand-tighten by means of the fixing nut.</p>

6.3 Start-up of PS-1K welding gun

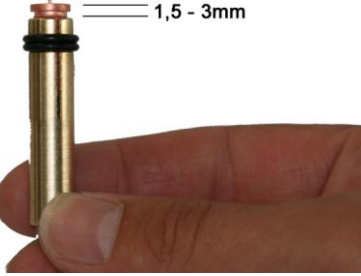




Note: The PS-1K stud welding gun is only suitable for stud sizes M3 - M8!

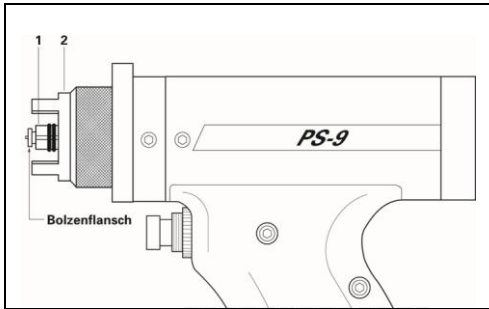
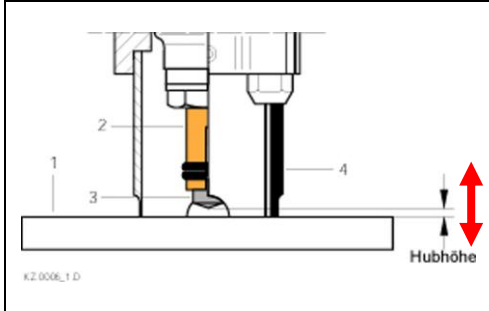
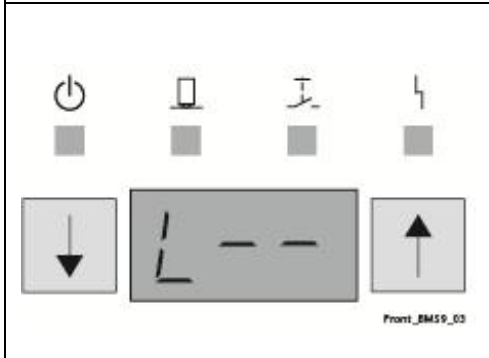

	<p>Ensure depth of immersion / stud protrusion is set between 1.5 mm and 3 mm. After adjustment, check and correct if necessary. Hand-tighten by means of the fixing nut.</p>
 <p>Support not shown in illustration</p>	<p>The stud welder must be <u>switched off</u> when installing the stud chuck.</p> <p>Loosen sleeve nut by means of SW 14 socket wrench.</p> <p>Insert the chuck into the spring piston and push it firmly until it comes to a stop.</p> 
	<p>Hand-tighten sleeve nut by means of SW 14 socket wrench.</p>
	<p>Attach support tube.</p>

	<p>Ensure stud protrusion is set between 1.5 mm and 3 mm</p> <p>The stud/stud flange must protrude for about 1.5 – 3 mm from the support tube!</p>
<ul style="list-style-type: none"> • Switch stud welder on by means of the mains switch. • Is the charging voltage set according to the stud diameter? • Check and correct, if necessary. 	
	<p>Please observe the safety instructions!</p>  <p>Firmly position welding gun on the workpiece and press the push button.</p> <p>Attention: Hold the gun steady and make sure it does not tilt.</p>
	<p>Welding process</p> 

6.4 Start-up of PS-9 welding gun (stud chuck with adjusting screw)

Note: The PS-9 stud welding gun is only suitable for stud sizes M3 - M8!

	<p>Ensure depth of immersion / stud protrusion is set between 1.5 mm and 3 mm. Check and correct, if necessary. Hand-tighten by means of the fixing nut.</p>
 <p>Support not shown in illustration</p>	<p>The stud welder must be <u>switched off</u> when installing the stud chuck. </p> <p>Loosen sleeve nut by means of SW 17 socket wrench.</p> <p>Insert the chuck into the spring piston and push it firmly until it comes to a stop.</p> <p>Circular LED display lights up green = Standby</p>
	<p>Hand-tighten sleeve nut by means of SW 17 socket wrench.</p> <p>Circular LED display lights up green = Standby</p>
	<p>Attach support tube.</p> <p>Circular LED display lights up green = Standby</p>

	<p>Ensure stud protrusion is set between 1.5 mm and 3 mm</p> <p>The stud/stud flange must protrude for about 1.5 – 3 mm from the support tube!</p>
	<p><u>Adjusting and checking the height of lift</u></p> <p>The height of lift is the distance for which the stud is lifted from the workpiece during the welding process.</p> <p>The height of lift should amount to approx. 2 mm.</p>
	<p>To adjust and check the height of lift, please select the operating mode "Lift Test" (chapter 5.4).</p> <ul style="list-style-type: none"> • Switch stud welder off • Press both keys "arrow up" and "arrow down" and keep them pressed • Switch stud welder on • Keep the keys pressed for a few seconds >>> display changes
	<ul style="list-style-type: none"> • Position welding gun on the workpiece • Press push button. The gun lifts the chuck with weld stud away from the workpiece <p>Adjustment of the gun lift is achieved by turning the rear adjustment cap of the welding gun to the left or to the right.</p> <p>Anti-clockwise rotation increases the gun lift and conversely clockwise rotation reduces the gun lift.</p> <p>The height of lift should amount to approx. 2 mm.</p>

- Switch stud welder off by means of the mains switch. Switch it on again after approx. 5 seconds.
- Stud welder is now ready for operation.
- Is the charging voltage set according to the stud diameter?
- Check and correct, if necessary.



Position welding gun vertically on the workpiece (at a 90-degree angle to the workpiece). Check once again the selected parameters. Release welding process by pressing the push button.

During the welding process, keep the gun steady. After completion of the welding process, remove the welding gun vertically from the welded stud to prevent widening and damaging of the stud chuck.

Please observe carefully all safety instructions!



Welding process

Firmly position welding gun on the workpiece. Hold the gun steady and make sure it does not tilt.

Green LED display lights up = Ready for operation

Press the push button of the welding gun.



7 Quality control (stud welding)

7.1 General instructions

Provided that the SOYER® stud welding system is properly used and the materials are appropriately selected, the strength of the welding joint (welding zone) will always be stronger than that of the stud or base material.

The following tests are carried out in general practice:

- Visual inspection
- Bend test


Please also refer to the following standard

- **DIN EN ISO 14555** Arc welding of metallic materials
or DVS information sheet
- **DVS 0902** Information on practical application – Arc stud welding


8 Maintenance


8.1 Important instructions

The stud welder is constructed in such a way that only a minimum of maintenance is required. It should, however, be cleaned by a specialist at regular intervals depending on the environmental conditions at the location of use.

	WARNING The service personnel are required to meet special requirements. Our after-sales service has adequately trained personnel, suitable service equipment and the means to carry out all necessary works.
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8.2 Important instructions for all service works

	DANGER <i>Always</i> disconnect the mains cable from the mains supply before starting any repair work, maintenance work or cleaning work. <i>Always</i> disconnect the connecting plug from the mains supply socket before opening the housing of the stud welding system. Only trained and appropriately qualified personnel are allowed to carry out works at the electric mains supply and welding system.
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	NOTE Only use original SOYER® spare parts.
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8.3 Cleaning

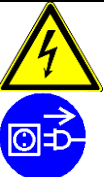
Cleaning works are to be carried out every now and then depending on how soiled the stud welder is.

8.3.1 Detergents for cleaning the housing

Almost every detergent without corrosive or acidic substances is suitable for cleaning purposes. However, please observe the manufacturer's specifications on the detergent you intend to use.

8.4 Replacement of components

Components may only be replaced by trained SOYER® servicemen. Perfect function of your stud welder can only be guaranteed when original SOYER® spare parts are used.

	CAUTION Disconnect the mains cable from the mains supply before replacing any components. Electric and electronic components may only be replaced by the SOYER® customer service or by trained and appropriately qualified personnel.
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CAUTION

Should it become necessary to replace fuses, only use fuses with the specified electrical values. Oversized fuses could either cause defects on the electrical system or a fire.



DANGER

Disconnect the mains plug from the mains supply when replacing fuses.

9 Troubleshooting

The following list of errors, their causes and remedies is designed to help you eliminate any trouble immediately on the spot. If it is difficult or impossible to eliminate the trouble, please contact the SOYER® customer service responsible for your area or Heinz Soyer Bolzenschweißtechnik GmbH.



DANGER



Before starting any repair work, maintenance work or cleaning work, always disconnect the mains cable from the socket.



CAUTION



Electric and electronic components may only be replaced by the SOYER® customer service or by trained and appropriately qualified personnel.

9.1 Malfunctions

Error	Cause → Elimination
System does not weld, no spark formation	System is not switched on: Switch system on. Blue pilot lamp "Ready" must light up.
	Welding points and/or earth connection points at the workpiece are not blank. LED display "Stud on Workpiece" (item 4, chapter 5.1) does not light up: Prepare workpiece or studs accordingly. Grind contact points.
Stud thread scorched	Stud is too loose in stud chuck: Press stud chuck together or tighten it.
	Stud chuck worn: Replace stud chuck.
Varying welding results	Stud too loose or not fully inserted into stud chuck until stop: Insert stud into stud chuck until stop. Replace stud chuck, if necessary.
	You have used low-quality studs e.g. with inaccurate dimensions: Only use SOYER® welding studs.
Stud not welded with total flange surface, deficient weld joint strength	Workpiece surface too soiled: Clean or grind workpiece surface.
	Stud weld base deformed: → Use new welding studs
	Welding gun in tilted position: Position welding gun evenly on the workpiece

9.2 Error codes (error messages on digital 7 segment display)

Code	Description	Cause
E01	Safety switch-off due to a voltage of more than 25 V measured for more than approx. 40 ms at the welding current sockets	- Stud inserted too deep in the stud chuck - Mechanical problems with the gap gun - External voltage of other welding devices - Apparatus error (thyristor short-circuit)
E02	Error when charging capacitors	Apparatus error, possible causes: - defective welding capacitor (leakage current) - defective charging current source
E03	Safety switch malfunction	Apparatus error, possible causes: - defective quick-discharging resistor - jamming or sticking safety relay - switching delay of safety relays too long
E04	Incorrect mains voltage	Mains voltage must be in the range of 90...130 V or 180...275 V at 50...60 Hz. The apparatus automatically identifies both ranges.
E05	Excess temperature of electronic system	The apparatus is subjected to increased ambient temperatures (>45°C) or direct sun during high welding sequences
E06	Incorrect BAW (SOW = stud on workpiece)	The connected welding gun has integrated BAW (SOW = stud on workpiece) wiring.
E07	Short-circuit in the magnetic circuit	6-pole plug, control cable or magnetic coil

NOTES:

- In case of errors E01 to E04, E06 and E07, the apparatus switches to malfunction. Welding is not possible. Re-commissioning only possible when switching the apparatus off and on again.
- In case of error E05 Excess temperature, it is impossible to continue the welding process until the error message goes off.
- If the apparatus operates with reduced charging current due to high internal temperatures, the LED flashes and displays "Malfunction".



10 Transport and storage

The stud welder is robustly designed and has a two-piece metal housing with front and rear panel. Owing to electronic components it should be ensured, however, that transport is free from vibrations.

The BMS-9 stud welder has two carrying handle on its top for easy transport and mobile use within short distances.

**NOTE**

Prevent unauthorized use of the stud welding system by children and unqualified personnel.

After long system standstill, we recommend having the stud welding system checked by SOYER® customer servicemen prior to start-up.

**NOTE**

The housing of the BMS-9 stud welder corresponds to safety class IP 21. Please observe that this system of protection is not suitable for being operated or transported in the rain.

11 Terms of warranty

We warrant for this equipment for a period of 12 months in the case of commercial, professional or equivalent use. When repairs are necessary, we guarantee to undertake them in our factory in Etterschlag. Parts subject to wear and tear are excluded.

Any claim to a warranty will be forfeited if damage is caused by improper operation, or if repairs or interferences have been made by unauthorized personnel, or whenever accessories and spare parts have been used which do not match our equipment.

We cannot guarantee the perfect function of the stud welder and the quality of welded joints if welding studs acquired from another company are used.

12 List of standards and guidelines

- 2006/42/EC EC Directive on Machinery
- 2006/95/EC EC Directive on Low-Voltage
- 2004/108/EC EC Directive on Electromagnetic Compatibility
- DIN EN 12100 – 1 Safety of machinery; basic terms, general principles of construction; Part 1: basic terminology, systems engineering
- DIN EN 12100 – 2 Safety of machinery; basic terms, general principles of construction; Part 2: technical principles, specifications
- EN 60204 –1
(formerly VDE 0113) Electric equipment of machinery, general requirements
- EN 60974 – 1
(DIN VDE 0544-1) Safety requirements for arc welding equipment part 1: welding current sources
- BGV A1, BGV A2,
• BGV A3, BGV 5 General instructions
(instructions for accident prevention)
- DIN EN ISO 14555 Arc welding of metallic materials
- DIN EN ISO 13918 Studs and ceramic ferrules for arc welding
- DVS Information Sheet 0903 Capacitor discharge stud welding with tip ignition
- DVS Information Sheet 0904 Practical information – Arc stud welding



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