Operating Instructions

BMS-6 ISO
Stud Welder

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Stud Welder

Serial number*

BMS-6 ISO stud welder _____

Please enter the serial number here, so that the data is immediately available if you need service support.

Heinz Soyer Bolzenschweißtechnik GmbH
Etterschlag
Inninger Straße 14
82237 Wörthsee
Telephone +49 (0) 8153 - 885 - 0
Telefax +49 (0) 8153 – 8030
www.soyer.de

We congratulate you on purchasing the BMS-6 ISO SOYER stud welder.
You have made an excellent choice. Your BMS-6 ISO SOYER stud welder was especially developed for high-speed fastening of insulating nails, cupped head pins and SOYER welding studs in compliance with **DIN EN ISO 13 918** on metallic workpieces .

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 data in this documentation, however, have been verified regularly and necessary corrections will be incorporated in future impressions. We appreciate any suggestions for improvement.

Date of issue: April 01, 2002 (Update Declaration of Conformity: 2021-02)

Printed in the Federal Republic of Germany

Heinz Soyer Bolzenschweißtechnik
GmbH Inninger Straße 14
82237 Wörthsee

CE - Declaration of Conformity

We herewith declare that the design of the machine described below as well as in the version marketed by us meets the safety and health requirements of the stated guidelines and standards. Any modification of this machine without confirmation shall automatically annul this declaration.

Designation of the machine	Stud welding device
Machine type	BMS-6 ISO
Machine no.	_____
Applicable EU guidelines	RoHS directive (2011/65/EU) Low-voltage directive (2014/35/EU) EMC directive (2014/30/EU)
Harmonised standards applied, in particular	EN 60 974-1:2018 + A1:2019 EN 60 974-10:2016
National regulations applied	DGUV directive 1
Date	01 February 2021
Manufacturer - signature	
Function of the signatory	

Inhaltsverzeichnis

Appendix A / PS-1 and PS-1K – Capacitor discharge

Appendix B / PS-1KI – Capacitor discharge

1 General

1.1 The following should be principally observed...

With this 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 installation. Each operator should confirm this per signature.

• Prevent the stud welder being operated by unauthorized personnel

• Only trained personnel may operate the stud welder

MORTAL DANGER

Persons with pacemakers must not operate the stud welding equipment and must not stay near it while it is running. Ensure that the stud welding equipment is not operated near electronically sensitive life-supporting equipment, such as in intensive care units in hospitals.

WARNING

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).

• Moreover, please observe the safety instructions in chapter 3.

• Call a doctor in case of an accident.

1.2 Application

The BMS-6 ISO SOYER ® stud welder with capacitor discharge allows you to weld SOYER threaded studs, nails and pins with flange in compliance with **DIN EN ISO 13918** and ranging from M3 - M6 or Ø 2 - 5.5 mm made of coppered steel, stainless steel, brass and aluminium as well as steel cupped head pins from 2 - 2.7 mm diameter. No auxiliary aids such as shielding gas, ceramic ferrules or soldering materials are required.

There is usually no reverse marking, discoloration or deformation of the sheet, so that even thin sheet metals with a thickness of below 1 mm retain their decorative appearance.
If you need consultation or assistance in solving problems, please contact either our parent company or our field engineers.

1.3 Information on the product

Manufacturer	Heinz Soyer Bolzenschweißtechnik GmbH Etterschlag Inninger Straße 14 D-82237 Wörthsee Telephone +49 (0) 8153-885-0 Telefax +49 (0) 8153-8030
Product designation	BMS-6 ISO stud welder
Country of origin	Germany

1.4 Type plate

The type plate is located on the rear side of the stud welder. It contains the following information:
- Manufacturer’s name
- Manufacturer’s address
- Country of origin
- Product designation
- Date of construction
- Production number
- Performance data
- Mains connection values

1.5 Information on the documentation

The following operating instructions are supplied with the BMS-6 ISO stud welder:

- Operating instructions for BMS-6 ISO
  Order no.: **P00252**

For repeat-orders please contact your responsible service office or our parent company. Please refer to chapter 1.6.

1.5.1 Chapters of operating instructions

The operating instructions describe the start-up and operation of the BMS-6 ISO stud welder under normal conditions.
The present operating instructions of the BMS-6 ISO stud welder comprise the following chapters in detail:

- Chapter 1 "General".
  Information on application and product, as well as supplementary information.
- Chapter 2 "Description of stud welder". Description of technology.
- Chapter 3" Safety instructions". All safety regulations which are relevant with regard to installation and operation of the stud welding system.
- Chapter 4 "Installation of stud welder".
- Chapter 5 "Start-up".
- Chapter 6 "Quality control".
- Chapter 7 "Maintenance". Maintenance measures.
- Chapter 8 "Spare parts"
- Chapter 9 "Troubleshooting”.
- Chapter 10 "Transport and storage".
- Chapter 11 "Terms of warranty".
- Chapter 12 "Standards and guidelines".

1.5.2 Information on operating instructions

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.

WARNING
Do not carry out any actions on the stud welding system 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.

1.5.3 Conduct in the case of malfunctions

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

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

•Customer number
•Product designation
•Serial number
•Year of construction
•Options
•Material of stud and workpiece
•Stud diameters

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

1.6 Contacts and service address

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

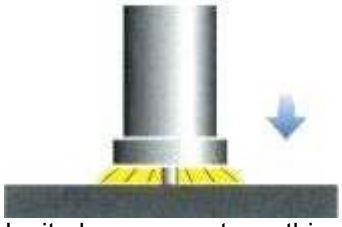
Heinz Soyer Bolzenschweißtechnik GmbH
Etterschlag
Inninger Straße 14
D-82237 Wörthsee
Telephone +49 (0) 8153-885-0
Telefax +49 (0) 8153-8030
info@soyer.de
www.soyer.de

2 Description of stud welder

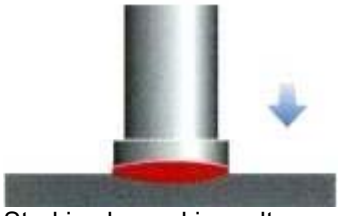
2.1 Description of technology

BMS-6 ISO SOYER stud welding systems function according to the principle of capacitor discharge (TS) in compliance with DIN EN ISO 14555 and as defined in DVS information sheet 0903 (German Welding Society).
This system takes advantage of the sudden discharge of a capacitor battery to generate electric arc energy.

Stud tip touches workpiece. Electric arc is initiated.



Ignited arc generates a thin fusion zone on stud and workpiece.



Stud is plunged in molten pool. Material solidifies and stud is welded.

The electric arc is initiated via the calibrated and close-fit ignition tip of the welding studs and welding elements. The stud weld base and the opposite surface of the workpiece thus start to melt. The stud is then automatically dipped into the thin fusion zone or into the liquid weld pool. After immediate solidification of the material, an homogenous high-strength joint is produced in an extremely short welding time of only 1 – 3 milliseconds (0.001 – 0.003 sec.).

2.2 Stud welder set-up

The standard gun to be connected to the BMS-6 ISO stud welder is the PS-1 stud welding gun with control cable and support tube.
Optionally it is possible to connect the PS-1KI stud welding gun for cupped head pins or the PS-3K, PS-0K, PS-1K contact guns for studs and insulating nails with ignition tip to the stud welder. These operating instructions only refer to the BMS-6 ISO stud welder.

For information regarding the stud welding guns required and their adjustment, please refer to the relevant operating instructions of the stud welding guns.

2.3 View

The BMS-6 ISO stud welder has a handy, compact and robust design. It has a carrying handle and can be optionally equipped with a shoulder strap.

Illustration: Front view of BMS-6ISO
Dimensions 300 x 120 x 320 mm (w x h x d)

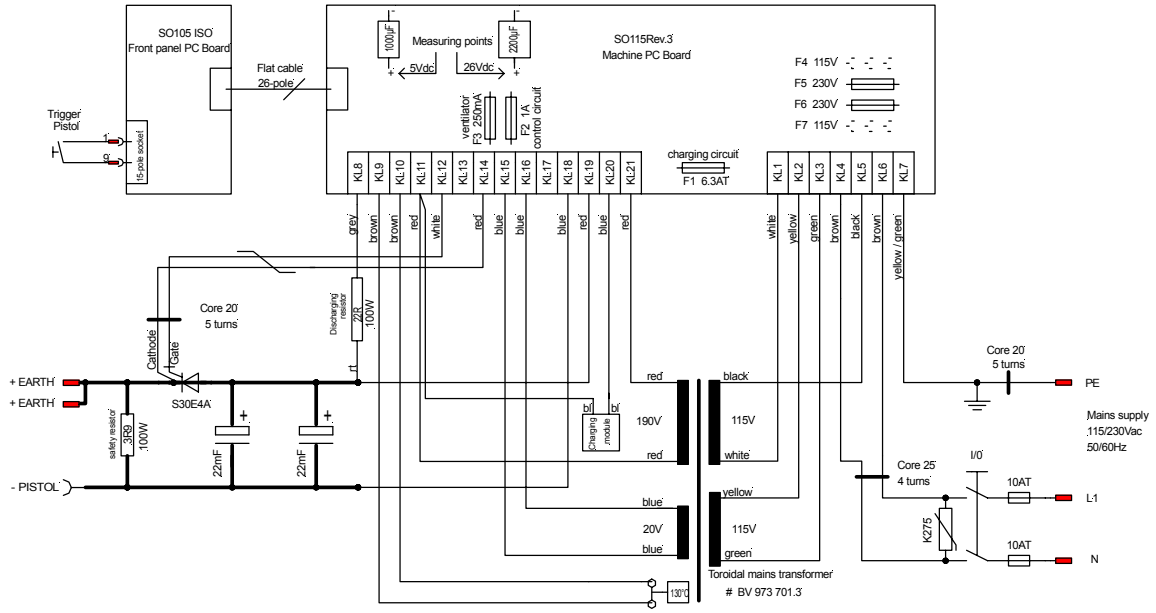
Illustration: Rear view of BMS-6ISO

2.4 Technical data

Designation	BMS-6 ISO
Welding range	SOYER threaded flanged studs, nails and pins as per DIN EN ISO 13918 from M3 – M6 or 2 – 5.5 mm dia, as well as cupped head pins from 2 –2.7 mm dia and 10 – 55 mm in length
Material	Steel, stainless steel, aluminium and brass
Welding process	Capacitor discharge according to DIN EN ISO 14555 and DVS information sheet 0903
Standard gun	PS-1 stud welding gun with support tube
Power source	Capacitor battery
Charging capacity	44,000 µF
Charging voltage	50 – 200 volt infinitely variable
Welding time	0.001 – 0.003 sec
Welding sequence	up to 20 nails or studs / min., depending on stud diameter
Mains supply	115 / 230 V~, 50/60Hz 16/10 AT shock-proof socket Operation with 115 V ~ 50/60 Hz Volt is possible when carrying out reclamping works in the control device
Fuse element	G - fuse link 5 x 20 mm, 2 x 10 A slow, 250 V. The fuse links are integrated in the cold mounting plug at the rear side of the stud welder
Weight*	8.4 kg (stud welder without cable)
Colour	RAL 5009 azure blue
Subject to technical changes	

*Slight deviations are possible depending on accessories.

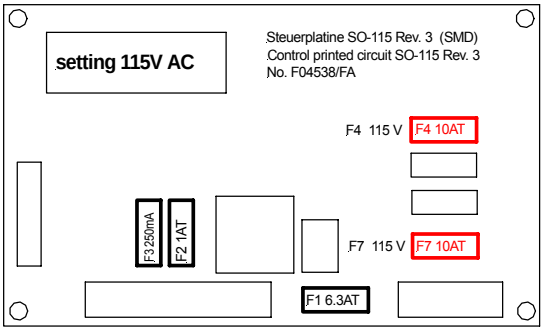
2.5 Circuit diagram of BMS-6 ISO



Subject to technical changes

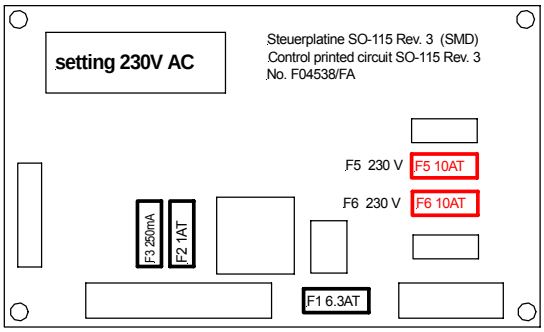
2.6 Alteration of mains voltage to 115 / 230 volt

MORTAL DANGER
Always disconnect the connecting plug from the mains supply socket before opening the housing of the stud welding equipment. Only trained and appropriately qualified personnel are allowed to carry out works on the electric power supply and stud welder.



Netzspannung / Line voltage 115 Volt AC

Sicherung 10AT in Sicherungshalter F4 und F7 einsetzen.
Insert fuse 10AT into F4 and F7 fuse holders



Netzspannung / Line voltage 230 Volt AC

Sicherung 10AT in Sicherungshalter F5 und F6 einsetzen.
Insert fuse 10AT into F5 and F6 fuse holders

3 Safety instructions

These operating instructions contain basic instructions which have to be complied with during installation or operation. It is therefore absolutely necessary that these operating instructions are read by the operator and responsible specialist staff prior to assembly and start-up. The operating instructions must always be available at the installation site.

Not only the general “safety instructions” listed under this main item, but also the special safety instructions e.g. for high temperatures, voltage etc. listed under the other main items have to be complied with.

3.1 Description of reference signs in the operating instructions

The non-observance of safety instructions can cause damage to persons. The safety instructions of this manual are marked with the general symbol for danger

safety symbol in compliance with DIN 4844 - W9

Warning of electric voltage is specially marked with the

safety symbol in compliance with DIN 4844 - W8.

In addition to these symbols, the terms "**DANGER TO HEALTH**" or "**MORTAL DANGER**" refer to the degree of a possible danger.
Safety instructions, the non-observance of which may endanger the machine and its functions, are marked with the words "**CAUTION** " or **"WARNING**".

General instructions are marked with the hand symbol

3.2 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 has 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.

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

The non-compliance with safety instructions may not only endanger persons, but also the welding equipment and its environment. Any non-compliance with safety instructions may result in a complete loss of damage claims.
Non-compliance with safety instructions may have the following consequences:
• Failure of important system functions
• Failure of prescribed methods for maintenance
• Danger of persons through electric, mechanic, thermal and acoustic influences

3.4 Safety-conscious working

The safety instructions listed in this manual, existing national accident prevention regulations and possible international working, operating and safety regulations of the user must be complied with.

3.5 Safety instructions for the operator/user

When stud welding, danger may result from

• electric current
• optical radiation
• harmful substances (smoke)
• acoustic shock
• spraying sparks

Your are therefore obliged to restrict dangers to an inevitable degree and to point these dangers out to the operator and other persons involved.

MORTAL DANGER
Persons with pacemakers must neither operate the stud welder nor stay near it.

3.6 The following should be observed before starting the system…

Before starting up the system, pay attention to the following information:

• Juveniles under the age of 16 years must not operate the stud welding system.
• Read all of the operating instructions before starting the system.
• Only qualified personnel are allowed to operate the system.
• Prevent unauthorized use of the system by children or unqualified personnel.
•.Wear non-combustible closed working clothes.
• Wear a leather apron to protect your clothes from welding spatters that are generated during the welding process.
• Wear a head protection when carrying out welding works above your head.

MORTAL DANGER

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

• Wear gauntlet gloves made of leather.
• Wear neither rings, watches nor electrically conductive jewellery.

- Wear protective goggles with eye-protecting lens number 2 (DIN 58211, part 6) to protect your eyes from welding spatters and flashes of light that are generated during the welding process.
- Wear side-shielded glasses.
- Wear ear protection. Capacitor discharge generates a loud bang.

3.7 Before starting to weld ...

- Check the state of all cables and cable connections before starting to weld.
- Immediately replace defective cables and cable connections.
- Ensure that the air apertures of the housing are not covered. Heat accumulation may damage the stud welding device.

3.8 Safety precautions at installation site

- When placing the stud welder on tables or similar workshop furniture, ensure that the system stands firmly and that the table can bear its weight.
- Make sure mains socket and stud welding system are properly earthed.
- Comply with fire prevention regulations and do not weld in hazardous locations.
- Make sure room is well ventilated or extract welding fumes, if necessary.

 DANGER TO HEALTH

When welding, fumes and suspended matters may be generated. Beware of fumes detrimental to health, particularly when using surface-treated materials. If possible, only weld in rooms which are higher than 3 m. As per VBG 15 special regulations apply to narrow rooms.

3.9 Working with the stud welding equipment

- Comply with all accident prevention regulations which apply to the operation of your stud welding device.

 One of the accident prevention regulations applicable to stud welders is VGB15 “Welding, cutting and similar working methods”. For more information, please contact the Employer’s Liability Insurance Association.

 **MORTAL DANGER**

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

MORTAL DANGER

Persons with pacemakers must neither operate the stud welder nor stay near it.

If an accident happens,

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

3.10 Safety instructions for maintenance, inspection and assembly works

Only carry out maintenance works when the welding equipment has been switched off

The user must ensure that all maintenance, inspection and assembly works are only carried out by authorized and qualified technical personnel.

Generally, only work at the system when it has been switched off and after having disconnected it from the mains supply. The safety instructions described in the operating instructions have to be complied with.

Immediately after having completed your work, re-install and activate all safety and protective devices.

3.11 Unauthorized retrofit and spare parts production

The system may only be retrofitted and modified after consultation with the manufacturer. Original spare parts and accessories authorized by the manufacturer guarantee safety. The use of other parts may result in the cancellation of warranty for any consequences thus caused.

3.12 Inadmissible operating methods

Limit values

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

3.13 Stopping the stud welder

• Switch off the mains switch (item 7, chapter 5.1) at the rear side of the stud welder
• Disconnect the mains plug from the socket.
• Disconnect
- the control cable (item 4, chapter 5.1)
- the welding cable (item 5, chapter 5.1)
- the earth cable (item 6, chapter 5.1)

from the stud welder.

• Roll up the cables without buckling them.

Our GK-2 SOYER suitcase (optional equipment) is the optimum solution for properly storing SOYER stud welders as well as welding guns, cables, studs, retrofit kits etc.

- Make sure stud welder can not be used by unauthorized persons.
- 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.

3.14 The “S” symbol


MORTAL DANGER

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.

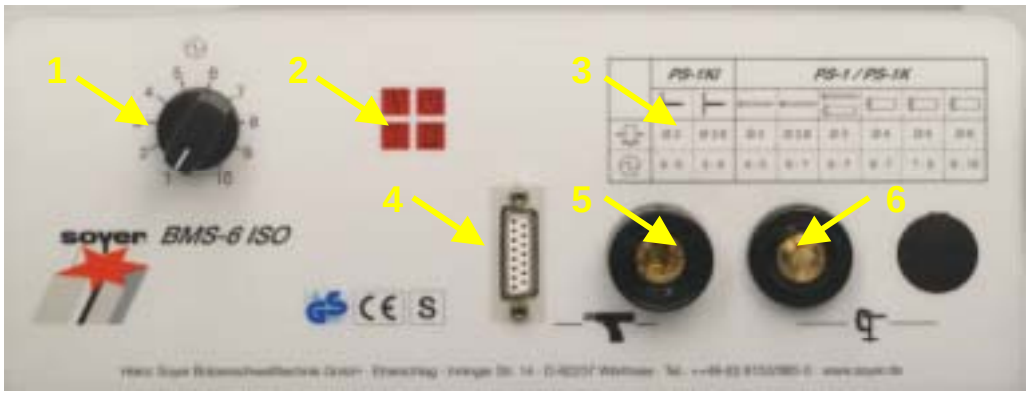
4 Installation of stud welder

- Only install the stud welder on an even surface. The four anti-vibration pads located on the bottom of the system guarantee its anti-skid position.
- Although the stud welder is resistant to environmental influences, it should be protected against dampness and dust. This is easily achieved by installing the system on a workbench.
- Please pay particular attention to the bearing strength of the workshop furniture and a safe and stable position.
- Install the stud welder close to the welding location.
- Please consider that additional extension cables cause a voltage drop which might lead to disturbances in the stud welder.

The housing of the BMS-6 ISO 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.

5 Start-up

5.1 Total view



1 Potentiometer for charging voltage
2 Light-emitting diodes for function control
3 Table indicating welding parameters
4 Control cable connection
5 Welding cable socket
6 Earth cable connector
7 Mains switch
8 Fuses
9 Mains connection
10 Type plate

5.1.1 Operating elements

• **Potentiometer (item 1, chapter 5.1)**
The potentiometer enables the continuous adjustment of the charging voltage.

• **Mains switch (item 7, chapter 5.1)**
The mains switch located at the rear of the stud welder serves to switch the stud welder on and off.

5.1.2 Display elements

• LED displays (item 2, chapter 5.1)
The LED displays show the respective operational states.

4.1 LED "Malfunction"			4.3 LED "Release"
4.2 LED "Ready"			4.4 LED "Stud on Workpiece"

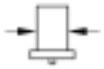
5.1.3 Connecting elements

• Control cable socket (item 4, chapter 5.1) and welding cable socket (item 5, chapter 5.1)
The control cable connection and welding cable socket serve to connect the stud welding gun to the stud welder .

• Earth cable connector (item 6, chapter 5.1)
The earth cable connector serves to connect the earth terminals to the stud welder.

• Mains connection (item 9, chapter 5.1)
The mains connection is located at the rear side of the stud welder. Use the mains cable supplied to connect the stud welder to the power supply.

5.1.4 Symbols

Symbol	Designation	Function
	Potentiometer	Infinitely variable adjustment of charging voltage
	LED “Malfunction“	LED lights up when stud welder fails
	LED "Ready"	LED lights up when stud welder is ready for operation
	LED "Stud on Workpiece”	LED lights up when earth terminal is connected and stud touches the workpiece
	LED "Release"	LED lights up when trigger switch on welding gun or welding head is pressed
	Stud diameter	Symbol of stud diameter
	Ground	Symbol of earth cable connector for connecting the earth cable
	Gun	Symbol of control cable and welding cable sockets for connecting the gun

5.1.5 Fuse elements

The BMS-6 ISO stud welder is protected by the following fuses:

- Mains supply fuses: 2 x 10 A slow, plug-in unit (item 8, chapter 5.1)
- Charging fuse F1: 6.3 A slow, control board S0-115
- Control fuse F2: 1 A slow, control board S0-115

- Fuse for the ventilator (optional) F3: 250 mA slow, S0-115 control board (ventilator is optionally available)

WARNING

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

Always disconnect mains plug from the power supply when replacing fuses!

5.2 Preparation for start-up

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

5.2.1 Earth connection

- Connect earth cable to earth cable connector (item 6, chapter 5.1) and lock by turning to the right until stop.
- Connect earth terminal to workpiece.

Ensure optimum contact with workpiece.

5.2.2 Connection of stud welding gun

- Connect welding cable of welding gun to welding cable socket (item 5, chapter 5.1) and lock by turning to the right until stop.
- Insert control cable into control cable socket (item 4, chapter 5.1) and secure with both locking screws.
- Please make sure that the connecting instructions for welding guns are complied with (see relevant operating instructions).

5.2.3 Mains supply

- Compare the nameplate rating (line voltage / current consumption) (item 10, chapter 5.1) with the data (line voltage / fuse protection) of your power supply.

Always comply with the correct line voltage as indicated on the type plate.
Never connect the stud welder to a power supply with the wrong line voltage.

- Insert mains cable into mains connection of stud welder (item 9, chapter 5.1) and connect to the power supply.

MORTAL DANGER

Only connect stud welder to authorized shockproof sockets. If need be, have an electrician check whether the socket is earthed.

5.3 Operation

- Switch on mains switch (item 7, chapter 5.1).
  The four LED displays (item 2, chapter 5.1) on the front panel of the stud welder shortly light up after switching the stud welder on.

- Use potentiometer (item 1, chapter 5.1) to select charging voltage according to the respective stud diameter (see table on the front panel).

- Position gun with welding stud on the workpiece.
  When earth connection is made and the stud in the gun touches the workpiece, the LED "Stud on Workpiece" (item 2, chapter 5.1) lights up.

- Press gun switch. The LED "Release" (item 2, chapter 5.1) lights up and stud welding process is started.

Note regarding PS-1 stud welding gun
Pull the trigger handle of the PS-1 stud welding gun rapidly to be sure to release the welding process. Please also refer to chapter 9.2, “Troubleshooting”.

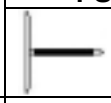
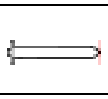
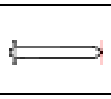
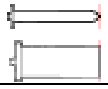
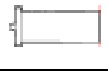
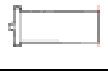
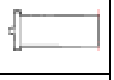
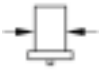
Hold the gun steady during the welding process and wait until the welding process has been completed before removing it vertically from the welded stud. A possible operating error e.g. the welding gun glides off during welding, is identified by the stud welder and indicated as failure by LED "Malfunction" (item 2, chapter 5.1) lighting up (also refer to chapter 9.1 “Error Code”).

After removing the welding gun from the welded stud, the capacitor battery is recharged. Stud welder is ready for welding again after a few seconds (LED "Ready", item 2, chapter 5.1 lights up).

Adjustment and installation of stud holder into welding gun and adjustment of spring pressure are described in the operating instructions of the welding gun (see **appendix**).

5.4 Welding parameters

The welding parameters of BMS-8N stud welder were determined by means of the PS-1, PS-1K and PS-1KI stud welding guns.

	PS-1KI		PS-1 / PS-1K					
								
	*Ø 2*	*Ø 2.6*	*Ø 2*	*Ø 3*	*Ø 3*	*Ø 4*	*Ø 5*	*Ø 6*
	*4 - 5*	*5 - 6*	*4 - 5*	*6 - 7*	*6 - 7*	*6 - 7*	*7 - 8*	*9 - 10*

The charging voltages indicated in the diagram are standard values only. They may vary from the stated setting depending on material, workpiece thickness and surface condition of the workpiece.

6 Quality control

6.1 General

The DVS Guideline 0905, part 2, of April 1979 is applicable with regard to quality assurance of stud weld joints. The tests described in this section are written in simplified terms, following above regulation. They refer to work tests that are carried out and supervised by the user prior to and during welding.

Heinz Soyer Bolzenschweißtechnik GmbH is member of the German Welding Society (DVS = Deutscher Verband für Schweißtechnik e. V.), Munich.

6.2 Demands on the company

The company must employ a technical supervisor responsible for welding matters, as well as qualified operating personnel for stud welding (see DVS Guideline 0905, part 2, section 4).

6.3 Proof of qualification

In the case of components which documentation must be provided for, or stud welding works which as per DIN 14100, DIN 4113 are subject to acceptance, the processing company must submit a certificate of competence or a proof of qualification for working with stud welding equipment (see DVS Guideline 0905, part 2, section 4.1 and 4.2). The proof of qualification applies in particular to the fastening of structures that are relevant in terms of safety regulations. When being used in the building industry, only approved base and stud materials may be used (for example, see DIN 4001, section 2.1, certificate of approval for stainless steel ifBT, DIN 4113, part 2).

6.4 Type and scope of test

Provided that the SOYER stud welding equipment 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:

•Standard work test (see DVS Guideline 0905, part 2, section 5.1.2).

•Simplified work test (see DVS Guideline 0905, part 2, section 5.1.2).

6.4.1 Standard work test

Generally, standard work tests have to be carried out and supervised by the user before welding at a structure and after a certain number of welds has been made. The number of welds after which a standard work test is required is agreed upon with the customer.

The standard work test is restricted to the stud diameter, base material and type of equipment used. It comprises the following tests:

- Visual inspection (all samples)
- Tensile test (at least 3 samples)
- Bend test (at least 3 samples)

When in doubt, the test scope should be extended in compliance with DVS Guideline 0905, part 2, section 5.1.1.

6.4.2 Simplified work test

Simplified work tests serve to check the correct setting and function of the equipment. They are carried out at the beginning of every working shift and after several hours of interruption.

Simplified work tests include:

- Visual inspection (all samples)
- Bend test (all samples)

6.5 Test execution

6.5.1 Production of samples

The studs for the work test are welded on a sheet metal the minimum size of which is 700 mm x 200 mm. Use the same welding positions and edge distances as on the component to be welded later. If it is possible and sensible from an economical point of view, use parts that are identical to those used in later production.

6.5.2 Visual inspection

The visual inspection serves as a rough check for major defects. The uniformity of the weld is assessed. When in doubt, tensile and bend tests should be carried out.

6.5.3 Tensile test

The tensile test serves to test the metallic bond of the stud with the base metal. At least 3 studs are welded and then axially loaded by means of an appropriate tension device until they break. If the customer demands that a certain percentage of the welded studs should be tested with a specific test load in production, a tension device with load indicator should be used.
If the stud breaks outside the welding zone, the test is regarded as successful. If it breaks within the welding zone, however, the fractured surface must be examined. The unwelded surface may not exceed a maximum 20% of the welding surface. When in doubt, the breaking load in accordance with DIN 267, part 3, should be determined. If the quantity of defective studs in one random sample exceeds the acceptance number specified in DIN 267, part 5, as per AQL 4, it is necessary to find out the reason for the faults. The setting values must be modified and the test repeated.

6.5.4 Bend test

The bend test is a simple work test which serves to roughly check the setting values selected. The welding zone is subjected to undefined tension, pressure and bending. A minimum of three studs is welded and bent to an angle of 30° by means of a tube that is slipped over the stud. The test is considered as successful, if no superficial fissure or fracture is detected in the welding zone. The acceptance number in accordance with DIN 267, part 5, as per AQL 4 must be complied with. If the quantity of defective parts in one inspection lot exceeds the acceptance number AQL 4 (see DIN 267), the cause of trouble must be determined and the test repeated again.

7 Maintenance

7.1 Stud welder

The stud welder is constructed in such a way that a minimum of maintenance is required. The stud welder should, however, be cleaned by a specialist at regular intervals depending on the environmental conditions at the location of use. Any defects of the stud welder's control part can be easily eliminated by replacing the printed circuit boards and/or the clearly arranged fuses.

MORTAL DANGER

Before replacing any components, disconnect the mains cable from the mains supply. Electric and electronic components may only be replaced by a specialist. Contact the SOYER ® customer service, if necessary.

DANGER TO HEALTH

Before replacing any components, make sure that the capacitors of the stud welder have been discharged.

7.2 Cleaning

Cleaning should be carried out once a week depending on how soiled the stud welder is.
Please pay particular attention to foreign substances in and around the air apertures in the housing.

7.2.1 Detergents

Almost every detergent is suitable for cleaning purposes. However, please observe the manufacturer's specifications on the detergent you intend to use.

7.3 Replacement of components

Defective 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.

7.4 Fuses

The BMS-6 ISO stud welder is protected by the following fuses:

- Mains supply fuses: 2 x 10 A slow, plug-in unit (item 8, chapter 5.1)
- Charging fuse F1: 6.3 A slow, control board S0-115
- Control fuse F2: 1 A slow, control board S0-115
- Fuse for the ventilator (optional) F3: 250 mA slow, S0-115 control board


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


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

8 Spare parts for BMS-6 ISO

8.1 Spare parts for BMS-6 ISO

Item	Qty.	Designation		Order No.
x		x	BMS-4 ISO complete	P01054
1		1	Front PC Board SO-105 ISO	F04674/FA
2		1	Control board SO-115 SMD	F04538/FA
3		2	Capacitor 22000 µF / 200 volt	E01199
4		1	Earth connector SEM-25	E01964
5		1	Earth socket BEM-25	E01958
6		4	Fine-wire fuse 10A slow	E01898
7		1	Fine-wire fuse 6.3A slow	E01897
8		1	Fine-wire fuse 1A slow	E01892
9		1	Fine-wire fuse 250mA slow (optional)	E03535

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.
For address and telecommunication data, please refer to chapter 1.6 (contacts and service address).

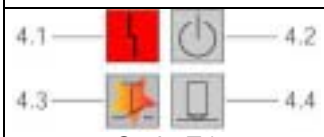
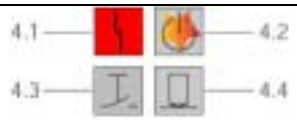
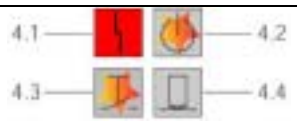
MORTAL DANGER
Always disconnect the connecting plug from the socket before opening the housing of the stud welding equipment. Only trained and appropriately qualified personnel are allowed to carry out works at the electric power supply and welding system.

DANGER TO HEALTH
Only trained and appropriately qualified personnel are allowed to replace components of the stud welding equipment.

MORTAL DANGER
Before replacing any components, make sure that the capacitors of the stud welder have been discharged.

9.1 Error code overview

The stud welder switches off when malfunctions occur. The charging voltage of the capacitors is internally discharged. An error message appears as code on the charging voltage display (item 2, chapter 5.1):

Code	Description	Possible cause
 Code E1	Safety circuit activated. LED 4.1 lights up and LED 4.3 is blinking	Welding operating error
 Code E2	Charging duration exceeded LED 4.1 lights up and LED 4.4 is blinking	Charging fuse is defective
 Code E3	Internal error LED 4.1 lights up, LED 4.3 and 4.4 are blinking	Safety circuit is defective
 Code E4	Mains voltage is in bad order LED 4.1 lights up and LED 4.2 is blinking	Mains voltage deviation is too large
 Code E5	Excess temperature of transformer LED 4.1 lights up, LED 4.2 and 4.3 are blinking	Excessive welding cycle

The error message is acknowledged by switching the stud welder off and then on again. If the error message appears again, please inform the customer service responsible for your area.

If the error message “Excess temperature of transformer” appears, the stud welder waits till it has cooled down before restarting the welding process.

9.2 Troubleshooting

Error	Cause → Elimination
System does not weld, no sparking	System is not switched on →.Switch on system, LED ”Ready” and charging voltage display must light up
	Welding cable or control cable are not connected properly or damaged → Connect cables properly or check for damage. Replace if necessary
	Both earth cables are not connected or are not properly connected and/or earth clamps are not attached to the workpiece → Connect earth cables, attach earth clamps to the workpiece
	Welding points and/or earth connection points at the workpiece are not blank → Prepare workpiece and/or studs
System is switched on, but does not function	Mains supply is defective → Check mains supply fuse
	Fuse of stud welder is defective → Replace defective fuse (see chapter 7.4)
There is no arc even though system is ready for operation	Stud without ignition tip or centre mark too deep for the ignition tip → Use stud with ignition tip or reduce centre mark
	Control of stud welder or welding gun is defective → Inform SOYER customer service
	Stud is too loose in stud holder → Press stud holder together or tighten it
Stud thread scorched	Stud holder worn → Replace stud holder
Varying welding results	Welding energy not correctly adjusted → Adjust welding energy
	Cable connections too loose. Transition resistances are generated → Check all cable connections and earth clamps for tight fit
	Stud too loose or not fully inserted into stud holder until stop → Insert stud into stud holder until stop. Replace stud holder, if necessary
	Magnetic blowing action. Arc is forced into a certain direction → Alter earth clamp fixture, place iron parts on the edges and/or rotate welding gun
Intensive sparking, stud flange almost melted away	Welding energy is set too high → Reset welding energy

Error	Cause → Elimination
Stud not welded with total flange surface, deficient weld joint strength	Welding energy is set too low → Reset welding energy
	Poor earth connection → Check earth cables and earth clamps for tight fit, tighten if necessary
	Workpiece surface too soiled → Clean workpiece surface
	Stud face deformed → Use new welding studs
	Stud projection over stud holder incorrectly set → Set distance between stud holder and stud weld base to 2-3 mm
	Spring pressure incorrectly set → Adjust spring pressure
	Welding gun in tilted position → Ensure that all three gun legs are simultaneously and evenly positioned on the workpiece
	Base metal not suitable for welding → Use suitable material combinations
System does not weld	Release period of 0.6 sec. exceeded after pressing the trigger switch of the gun → Trigger handle of PS-1 welding gun too slowly pulled → Trigger switch of gun incorrectly set or defective → Welding gun mechanically defective (e.g. jammed or sluggish piston) **Release period:** For safety and welding quality reasons, the ignition tip of the welding studs must touch the workpiece and be ignited within 0.6 sec. after pressing the trigger switch of the gun. The welding process is not released when exceeding this period of time.

10 Transport and storage

The stud welder is robustly designed and has a two-piece metal housing. Owing to the electronic and mechanic components it should be ensured, however, that transport is free from vibrations.
The BMS-6ISO stud welder is equipped with a carrying handle for easy transport.

The GK-2 suitcase offers the optimum solution for storing and transporting the BMS-6 ISO stud welder and the PS-1K stud welding gun.

DANGER TO HEALTH
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

The housing of the BMS-6 ISO 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 Standards and guidelines

• 91/368/EEC (formerly 89/392 EEC)	EC Directive on Machinery
• 73/23/EEC	EC Directive on Low-Voltage
• 89/336/EEC	EC Directive on Electromagnetic Compatibility
• DIN EN 292 – 1	Safety of machinery; basic terms, general principles of construction; part 1: basic terminology, systems engineering
•DIN EN 292 – 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
• VBG 1	General instructions (instructions for accident prevention)
• VBG 5	Power-operated substances (instructions for accident prevention)
• DIN 4100	Welded steel structures with predominantly dead load
• DIN 267, part 5	Screws, nuts and the like, technical terms of delivery, testing and acceptance
• DIN EN ISO 14555	Arc welding of metallic materials
• DIN EN ISO 13918	Studs and ceramic ferrules for arc welding
• DIN 50049	Certificate on material tests
• DIN 50125	Testing of metallic materials, tensile tests, guidelines for production
• DVS Information Sheet 0903	Capacitor discharge stud welding

Stand:.

Appendix A / PS-1 and PS-1K / Capacitor Discharge

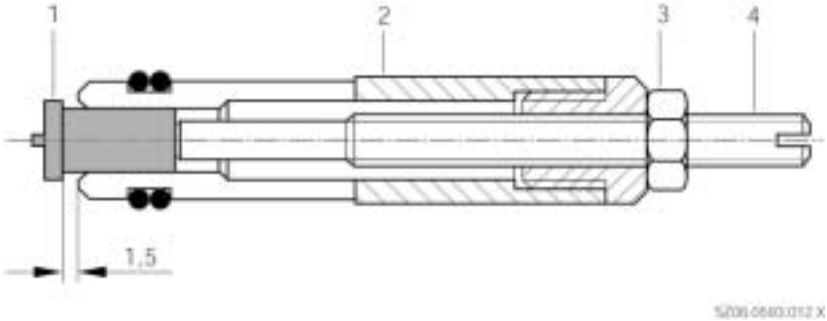
1 Adjustment of PS-1 / PS-1K stud welding guns

1.1 Adjustment of stud holder

The stud holders of PS-1, PS-3K, PS-0K and PS-1K stud welding guns are all of the same style. When using long welding studs with the short type PS-0K and PS-1K welding guns, however, it is necessary to shorten the stud holders' stop screw (4) correspondingly.

☞

For PS-1, PS-3K, PS-0K and PS-1K guns, use the standard stud holder with adjusting screw, having a length of 40 mm! Ensure that the maximum stud length does not exceed 35 mm!



1 Stud
2 Stud holder
3 Lock nut
4 Stop screw

Different stud holders are required for different stud diameters.

Adjust the stud holder as follows:

• Loosen lock nut (3)

• Insert stud (1) into stud holder.
The top edge of the stud flange must project for about 1.5 mm from the front edge of the stud holder.

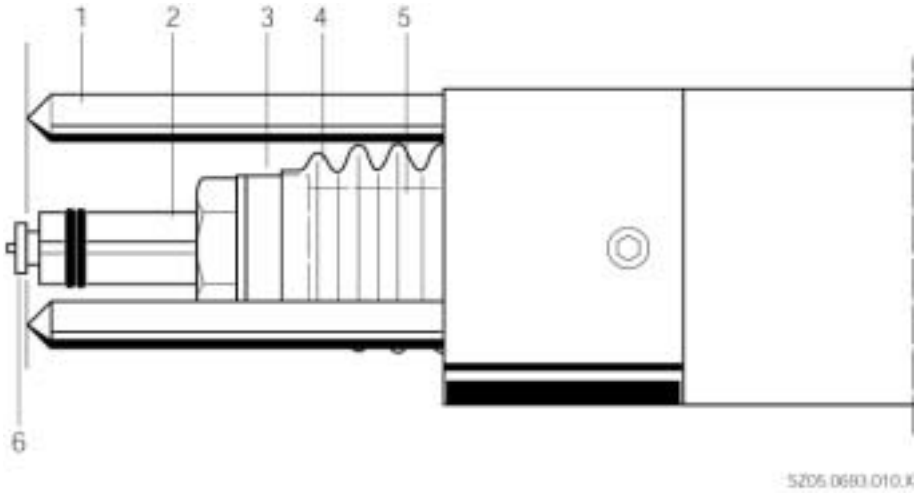
☞ The stud must come into contact with the stop screw (4).

• Adjust stop screw (4) in the stud holder by turning it until the distance from the top edge of the stud flange to the front edge of the stud holder is 1.5 mm.

• Secure stop screw (4) by means of lock nut (3)

1.2 Installation of stud holder into PS-1 and PS-3K stud welding guns

The illustration below shows how to install the stud holder into the PS-1 and PS-3K stud welding guns.



1 Gun leg
2 Stud holder
3 Sleeve nut
4 Bellows
5 Spring piston

• Loosen sleeve nut by means of socket wrench SW 14 .

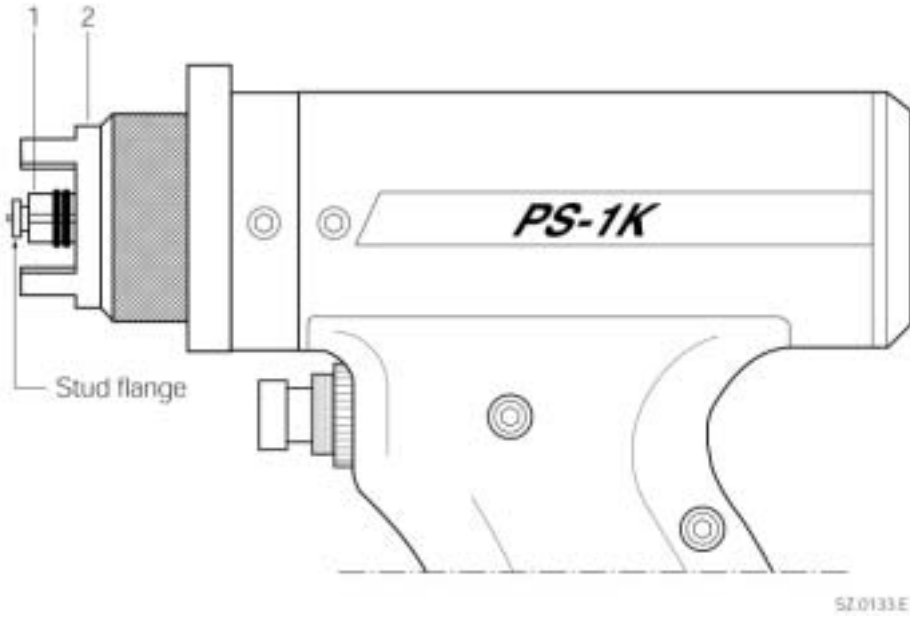
• Insert stud holder (2) into spring piston (5) until it stops.

• Tighten stud holder (2) by means of the sleeve nut (3).

The stud flange must project beyond the top of the gun legs or the support tube for the thickness of the flange. If need be, remove stud holder and correct the projection by means of the stop screw.

1.3 Installation of stud holder into PS-1K and PS-0K stud welding guns

The illustration below shows how to install the stud holder into the PS-1K stud welding gun. These instructions also apply to PS-0K stud welding gun.



1 Stud holder 2 Support tube

• Loosen sleeve nut by means of socket wrench SW 14 .

• Insert stud holder (1) into spring piston until it stops.

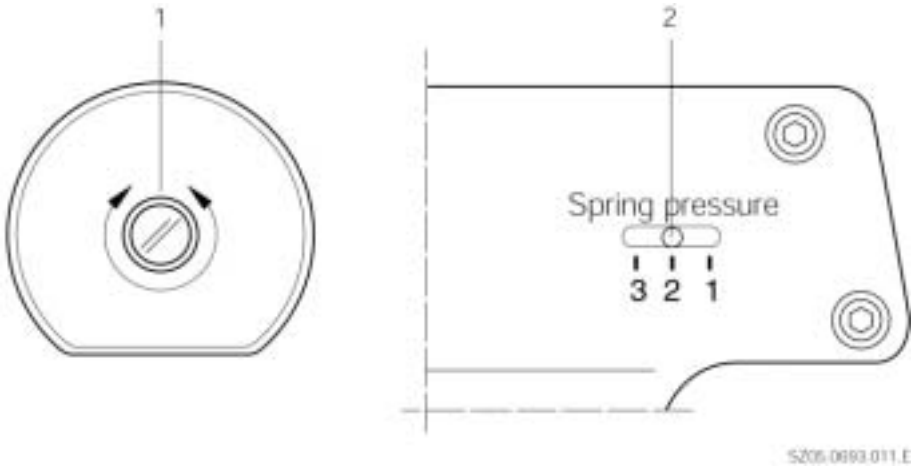
• Tighten stud holder (1) by means of the sleeve nut.
Remove the support tube (2) to easily install the stud holder.

The stud flange must project beyond the top of the gun legs or the support tube for the thickness of the flange. If need be, remove stud holder and correct the projection by means of the stop screw.

1.4 Adjustment of spring pressure

The pressure with which the stud is pressed against the workpiece during the welding process is called spring pressure.

The illustration below shows how to adjust the spring pressure of PS-1 stud welding gun which is equipped with a spring pressure indicator. The PS-3K stud welding gun is equipped with a similar spring pressure indicator. The PS-0K and PS-1K welding guns do not have a spring pressure indicator.



1 Adjusting screw 2 Spring pressure indicator

The spring pressure for all stud welding guns described here is adjusted by means of the adjusting screw (1). The adjusted spring pressure is indicated on the spring pressure scale (2). Adjust the spring pressure as follows:

• Turn adjusting screw (1) to the left until stop
Indicator position 1 = low pressure

• Turn adjusting screw (1) 3.5 turns to the right
Indicator position 2 = medium pressure

• Turn adjusting screw (1) to the right until stop
Indicator position 3 = strong pressure

The adjustment of spring pressure depends on the material of both the welding stud and the workpiece.

Before starting work, carry out some experimental welds and test them to find out the optimum adjustment.

Several samples have to be taken during production to ensure constantly good welding results (see DVS Guideline 0905, part 2, "Quality assurance of stud welding joints").

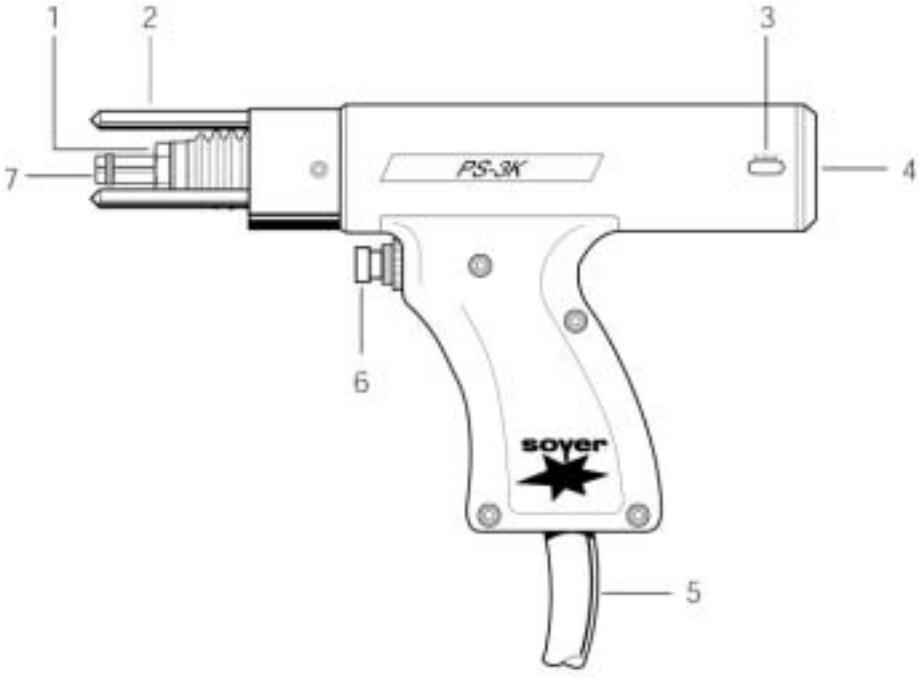
2 Start-up

2.1 Total view

The illustration below shows PS-3K stud welding gun. The indicated components are only slightly different from those of PS-1, PS-3, PS-0K and PS-1K stud welding guns.

• The PS-0K and PS-1K stud welding guns are equipped with support tubes instead of gun legs (2).

• The PS-0K and PS-1K stud welding guns are not equipped with a spring pressure indicator. The PS-1K stud welding gun is optionally available with three gun legs.



1 Sleeve nut
2 Gun leg
3 Spring pressure indicator
4 Adjusting screw for spring pressure
5 Connecting cable
6 Push-button
7 Stud holder

2.2 Connecting stud welding guns to stud welder

The stud welding guns are connected to the stud welder by means of the gun and control cables.

2.3 Operation

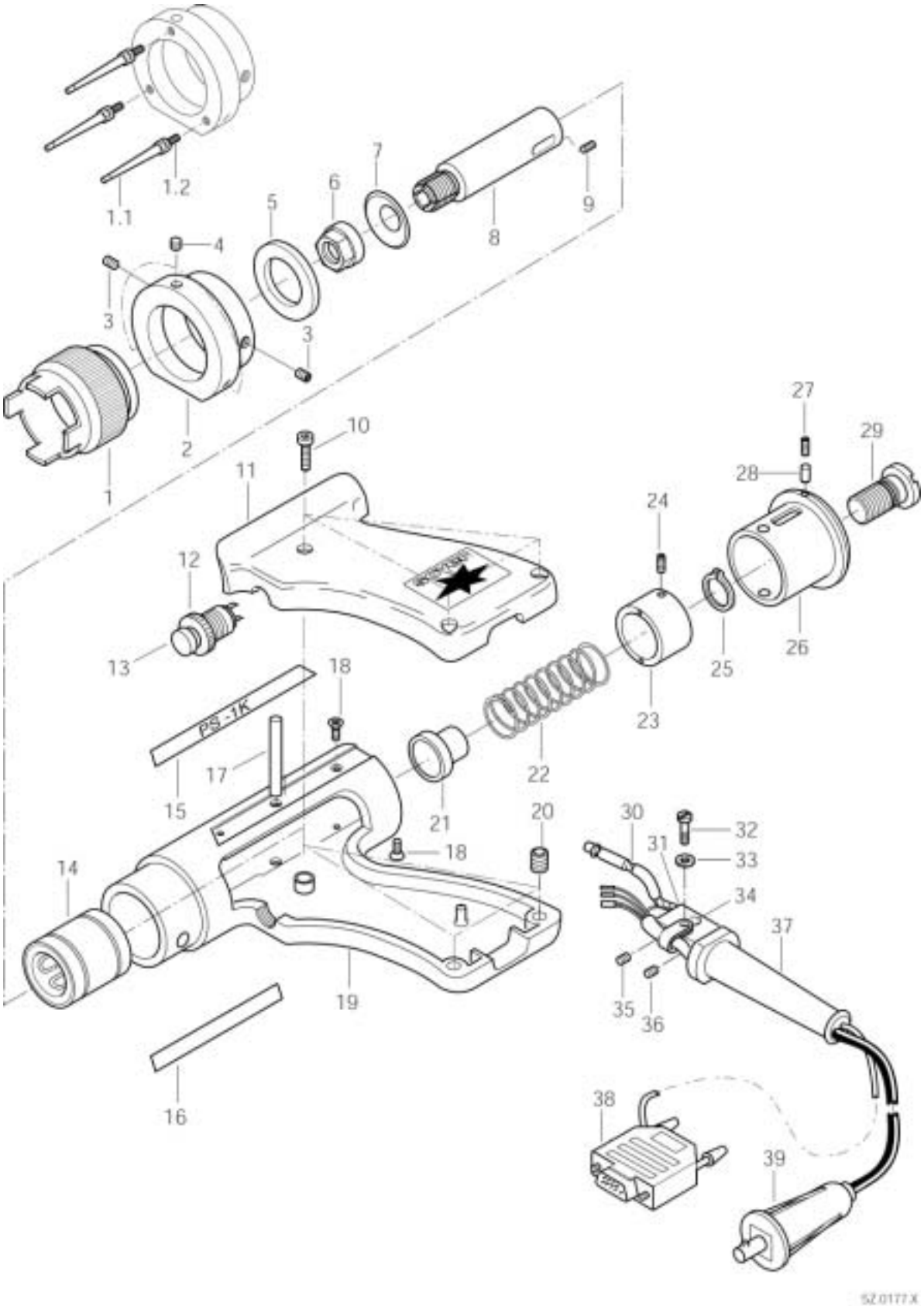
- Connect stud welder to earth
- Connect stud welding gun as described in chapter 5
- Adjust welding gun as described in Appendix A, chapter 1
- Connect stud welder to the mains supply
- Adjust stud welder for the welding studs to be used
- Insert welding stud into stud holder
- Position stud welding gun on the workpiece and press push-button

3 Spare parts

3.1 Spare parts list for PS-1K stud welding gun (new model)

Item	Qty.	Description	Order No.
X	X	Complete PS-1K stud welding gun (new model)	P02117
1	1	Support tube Ø 30 mm	F03813
1.1	1	3 gun legs (option)	F03890
1.2	1	3 grub screws (option)	M01338
2	1	Support tube retainer	F03812
3	1	Grub screw M6 x 5	M03541
4	3	Grub screw with spring, M4 x 10	M03542
5	1	Insulating ring	F03823
6	1	Sleeve nut	F01469
7	1	Bellows	F02989
8	1	Working piston	F03815
9	1	Grub screw M4 x 6	M01315
10	3	Cheese-head screw	M01998
11	1	Gun half shell, small (contained in item 19)	not numbered
12	1	Push-button, 1-pole	E02103
13	1	Cap, PVC	E02104
14	1	Ball bearing bush	F03824
15	1	PS-1K gun label	M02042
16	1	Gun label, company address	M01601
17	1	Cylindrical pin 6m6 x 36	M03594
18	2	Flat-head screw M3 x 6	M01561
19	1	Gun housing, complete	F03811/FA
20	2	Insert nut M4 x 6	M01809
21	1	Spring retainer	F03814
22	1	Pressure spring	F03891
23	1	Adjustable adapter	F02397
24	1	Grub screw M4 x 8	M01333
25	1	Locking ring	M01374
26	1	Split taper socket	F02402
27	1	Grub screw M4 x 6	M01315
28	1	PVC pin	F03128
29	1	Adjusting screw	F01729
30	1	Earth cable, complete	F02405/FA
31	1	Strain relief	F01715
32	1	Cheese-head screw M4 x 10	M01087
33	1	Spring ring M4	M01074
34	1	PVC clip	M01387
35	1	Grub screw M5 x 8	M01337
36	1	Grub screw M8 x 8	M02108
37	1	Anti-kink sleeve	E02349
38	1	Control cable	E02101
39	1	Gun cable complete with plug comprising:	F01100/FA
	1	Earth connector SKM-25	E01963
	3m	Earth cable 25 mm²	E02035

3.2 Exploded view of PS-1K stud welding gun



Appendix B / PS-1KI / Capacitor Discharge

1 Adjustment of PS-1KI stud welding gun

1.1 Adjustment of cupped head pin retainer

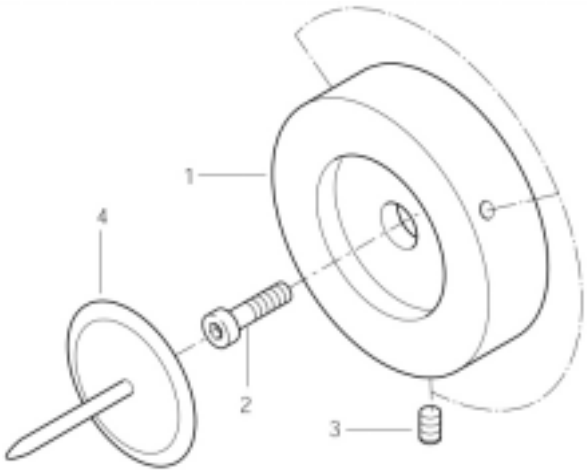
Instead of a stud holder the PS-1KI stud welding gun has a cupped head pin retainer (1). The adjustment of the stud welding gun is confined to the adjustment of the spring pressure which holds cupped head pins (4) in the cupped head pin retainer. The spring pressure, which has to be adjusted by means of three grub screws (3), determines how firmly the cupped head pin is held in the cupped head pin retainer. The cupped head pin is inserted against the spring pressure. Thereby the cupped head pin has to be pressed axially into the cupped head pin retainer against the spring pressure which is exerted on three balls located at an angle of 12°.

Adjust the spring pressure as follows:

• Loosen hexagon socket screw (2) and remove cupped head pin retainer (1) from the support tube.

• Turn grub screws (3) clockwise
= increase of spring pressure (holding force)

• Turn grub screws (3) anticlockwise
= decrease of spring pressure (holding force)



1 Cupped head pin retainer
2 Hexagon socket screw
3 Grub screw
4 Cupped head pin

1.2 Installation of cupped head pin retainer into stud welding gun

The cupped head pin retainer has to be installed into the stud welding gun as follows:

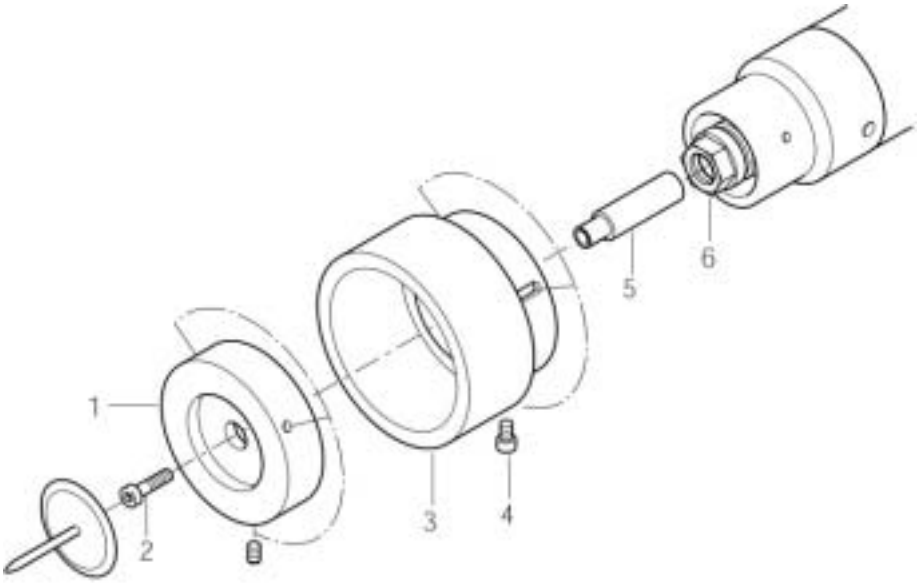
• Turn sleeve nut (6) anticlockwise by means of socket wrench SW17.

• Insert retaining pin (5) into spring piston until stop.

• Turn sleeve nut (6) clockwise by means of socket wrench SW17 and secure retaining pin (5) (hand-tighten the sleeve nut).

• Attach support tube (3) to gun and secure by means of three hexagon socket screws (4).

• Insert cupped head pin retainer (1) into support tube (3) and secure by means of hexagon socket screw (2).



1 Cupped head pin retainer	4 Hexagon socket screw
2 Hexagon socket screw	5 Retaining pin
3 Support tube	6 Sleeve nut

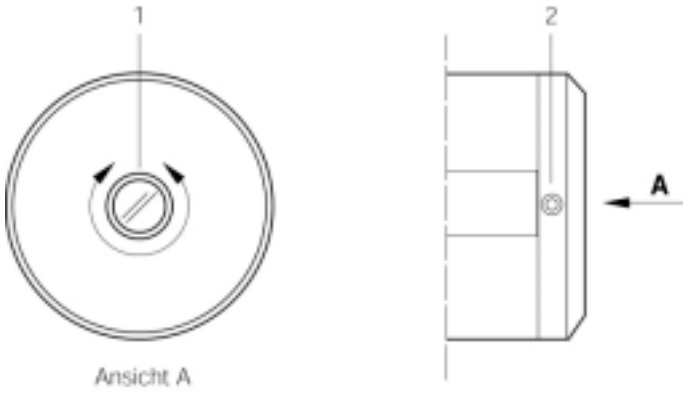
After installation of the cupped head pin retainer, check proper function as follows:

• Press cupped head pin retainer (1) about 5 mm into the support tube (3) against the spring pressure.
• Release pressure. The cupped head pin retainer is moved into its original position by the spring pressure. If the cupped head pin retainer gets caught in the pressed position, it has to be removed and cleaned. Clean the interior of the support tube as well. If these measures do not have any effect, replace the components.

1.3 Adjustment of spring pressure

The pressure with which the stud is pressed against the workpiece during the welding process is called spring pressure.

The following illustration shows how to adjust the spring pressure.



1 Adjusting screw 2 Grub screw

Adjust spring pressure by means of adjusting screw (1) as follows:

• Turn adjusting screw (1) anticlockwise until stop
= low pressure

• Turn adjusting screw (1) 3.5 turns clockwise
= medium pressure

• Turn adjusting screw (1) clockwise until stop
= high pressure

• Hand-tighten grub screw (2) by turning it clockwise by means of socket wrench SW2.

☞ After having adjusted the spring pressure, fix it by means of the headless pin (2).

The setting of the spring pressure depends on the material of both welding stud and workpiece.

Before starting the work, carry out some experimental welds and test them to find out the optimum setting.

Samples have to be taken during production to ensure constantly good welding results (see DVS Guideline 0905, part 2, "Quality assurance of stud welding joints").

2 Start-up

2.1 Total view

The illustration below shows PS-1KI stud welding gun

2.2 Connecting stud welding guns to stud welder

The stud welding gun is connected to the stud welder by means of gun cable and control cable.

2.3 Operation

• Connect stud welder to earth.

• Connect stud welding gun as described in chapter 5.

• Adjust stud welding gun as described in Appendix B, chapter 1.

• Connect stud welder to the mains supply and switch on.

• Adjust stud welder for the cupped head pins to be used.

• Insert cupped head pin into cupped head pin retainer.

• Position stud welding gun on workpiece and press the tip of the cupped head pin through the insulating jacket on the sheet metal. The welding process is released automatically when sufficient pressure is exerted on the workpiece.
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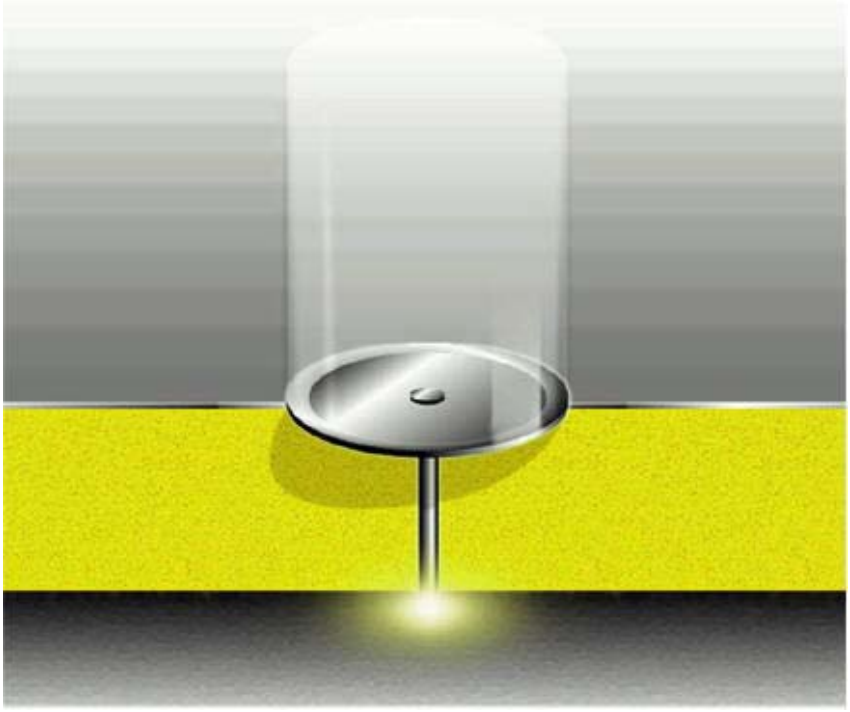
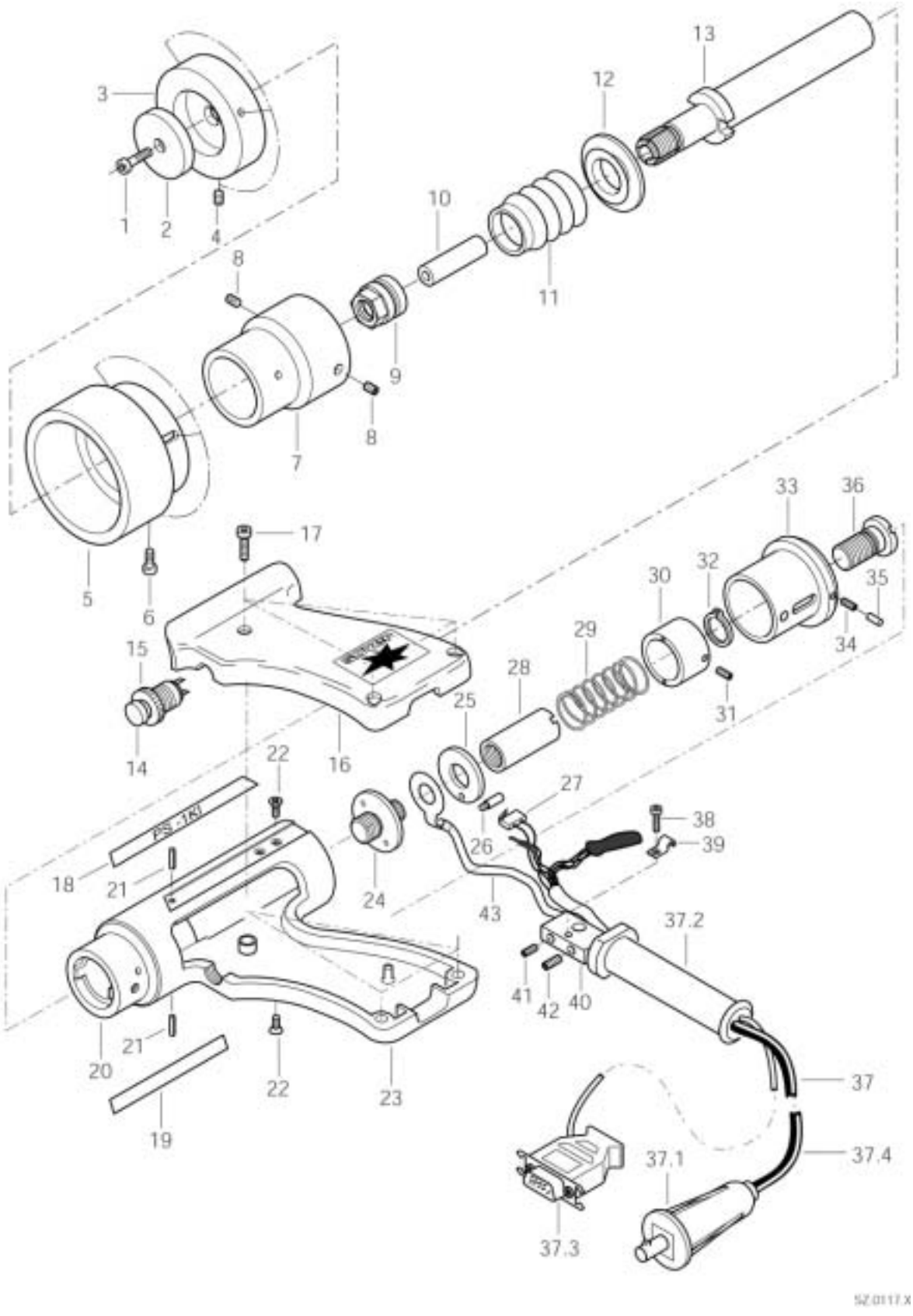


3 Spare parts

3.1 Spare parts list for PS-1KI stud welding gun (new model)

Item	Qty.	Description	Order No.
X	X	PS-1KI stud welding gun, complete (new model)	P02118
1	1	Cheese-head screw M3 x 12	F03930
2	1	Contact disk	M01980
3	1	Cupped head pin retainer	F03928
4	3	Grub screw with spring M4 x 10	M03542
5	1	Support tube for cupped head pins	F03926
6	3	Fillister head screw M4 x 8	M02021
7	1	Support tube guide	F03925
8	2	Grub screw M6 x 6	M01340
9	1	Sleeve nut	F01375
10	1	Contact pin	F03929
11	1	Bellows	F01376
12	1	Delrin ring for bellows	F01736
13	1	Working piston	F03153
14	1	Cap for push-button	E02104
15	1	Push button	E02103
16	1	Gun half-shell, small	F01717/1
17	3	Cheese-head screw M4 x 8	M01998
18	1	PS-1KI gun label	M01111
19	1	Gun label, company address	M01601
20	1	Piston guide sleeve	F03151
21	2	Clamping sleeve 3 x 10	M01562
22	2	Flat-head screw M3 x 6	M01561
23	1	Gun half-shell, large	F01717
24	1	Insulating disk, long	F01737
25	1	Pressure disk for switch contact	F03170
26	1	Pressure bolt for switch contact	F03171
27	1	Micro switch	E01215
28	1	Spring retainer	F03169
29	1	Pressure spring	F01722
30	1	Adjustable adapter	F01731
31	1	Grub screw M4 x 8	M01333
32	1	Locking ring	M01374
33	1	Split taper socket	F02402
34	1	Grub screw M4 x 8	M01333
35	1	PVC pin	F03128
36	1	Adjusting screw	F01729
37	1	Gun cable, complete	F03162/FA
37.1.	1	Earth cable plug	E01963
37.2	1	Anti-kink sleeve	E02349
37.3	1	Control cable with plug, complete	F03987/FA-E
37.4	10m	Welding cable 1 x 6 mm²	E03639
38	1	Cheese-head screw M4 x 10	M01087
39	1	Cable clip, white	E02858
40	1	Strain relief	F01715
41	1	Grub screw M5 x 8	M01337
42	1	Grub screw M8 x 8	M02108
43	1	Earth cable, complete	F03161/FA

3.2 Exploded view of PS-1KI stud welding gun



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