

# Operating Instructions

## Stud Welding Head

### SK-5AP | SK-5AP/KS



**GB:** English version

Read these operating instructions before starting any work!



CE

### **Notes for easier understanding of the operating instructions**

The term "stud welding head" in these operating instructions means the SK-5AP and/or SK-5AP/KS stud welding head.

Complex stud welding systems generally have multiple welding heads. For better readability, product names are used in the singular even when referring to more than one product.

For reasons of better readability, the masculine, feminine and neutral (m/f/n) linguistic forms are not used concurrently.

### Device numbers

We recommend entering the device numbers here so that they can be accessed quickly if servicing is required.

Device	Model	Serial number
Stud welding head	SK-5AP	
Stud welding head	SK-5AP/KS	

### Operating instructions

Document no.: P00268  
 07-2024, translation of the original German instructions  
 (German: P00168)

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### Revision status

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## 1 General information

These operating instructions contain important information and rules for the operation of the devices. Keep these operating instructions in a safe place and within easy reach.

The term 'Devices' in the operating instructions refers to the stud welding systems and the stud welding heads.

Carefully read the operating instructions and any other documents contained in the technical documentation. Pay particular attention to the safety instructions which are intended to help you recognise any possible residual risks and prevent hazards.

The drawings and diagrams in these operating instructions are for illustration purposes and may vary slightly from the actual equipment.

The manufacturer reserves the right to make technical changes.

### 1.1 Validity of the operating instructions

These operating instructions apply to the following devices:

Stud welding head	SK-5AP
Stud welding head	SK-5AP/KS

### 1.2 Registered trademarks

The following terms in these instructions are used with registered trademarks:

SOYER®:      Developments/technologies of Soyer GmbH.

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### 1.3 Declaration of incorporation

These operating instructions are accompanied by a declaration of incorporation for the installation of an incomplete machine in accordance with the EC Machinery Directive (2006/42/EC).



**Please note that significant changes to the device will cause the declaration of incorporation to become void.**

**Furthermore, the manufacturer's warranty may be rendered invalid.**



Heinz Soyer Bolzenschweißtechnik GmbH



Inninger Straße 14  
82237 Wörthsee

## EC Declaration of Incorporation

We herewith declare that the machine described in the following and the version available on the market correspond in design and construction to the safety and health requirements of the listed guidelines and standards. The machine component may only be operated once it has been confirmed that the machine in which the machine component is to be installed complies with the provisions of the EC Machinery Directive (2006/42/EC). Any unauthorised modification to this machine component automatically annuls this declaration.

Designation of machine: Stud welding head

Machine type: SK-5AP | SK-5AP/KS

Serial no.: \_\_\_\_\_

Applicable EU directives:

- EC Machinery Directive (2006/42/EC)
- Low Voltage Directive (2014/35/EU)
- EMC Directive (2014/30/EU)
- RoHS Directive (2011/65/EU)

Applied harmonised standards :

DIN EN 60204-1: 2019-06	DIN EN ISO 4414: 2011-04
DIN EN 12100: 2010-11	DIN EN 61000-6-4: 2020-09
DIN EN 55011	DIN EN 60974-10

Other applied standards and technical specifications:

We further declare that the specific technical documentation for this incomplete machine has been prepared in accordance with Annex VII, Part B and undertake to submit these to the market surveillance authorities via our sales department upon request.

Date of delivery:

Producer's signature:

Signer's function:

  
\_\_\_\_\_  
(23.07.2024)  
Managing Director



#### 1.4 Manufacturer

The manufacturer of the devices is:

Heinz Soyer Bolzenschweißtechnik GmbH  
Inninger Straße 14  
82237 Wörthsee  
Tel.: 0049-8153-885-0  
Fax: 0049-8153-8030  
Mail: [info@soyer.de](mailto:info@soyer.de)  
Web: [www.soyer.de](http://www.soyer.de), [www.soyer.com](http://www.soyer.com)

#### 1.5 Instruction, training

SOYER<sup>®</sup> offers optional and individual instruction in the operation of the devices.

Moreover, SOYER<sup>®</sup> offers training for customer-specific use of the devices.

Information on the scope and costs of instruction and training can be obtained from Soyer GmbH.



You can also watch our video instructions at

[www.youtube.com/user/SoyerGmbH](http://www.youtube.com/user/SoyerGmbH).

#### 1.6 Other applicable documents

Please also take note of the following operating instructions/documents:

- Stud welding device
- Feeder
- Other manufacturer documents in the technical documentation










## 2 Important safety instructions

Read the following chapters carefully and follow the safety instructions. Please contact the manufacturer if you are uncertain or an instruction cannot be followed.

The devices have been constructed according to the generally accepted codes of practice and in compliance with, and application of, the usual and established safety requirements. In order to reach maximum safety, it is essential that all of the safety instructions in these operating instructions are heeded and followed.

### 2.1 Warning signs used

Warning signs are used in this document depending on the potential danger of the situation.

Safety and information symbols used in this manual	
	This warning sign indicates imminent danger leading to severe injuries or death.
	This warning sign indicates a potentially dangerous situation that may lead to severe injuries or death.
	This warning sign indicates a potentially dangerous situation that may lead to minor injuries.  Without the warning triangle, this warning sign is also used in the event of imminent damage to property.
	Additional sign indicating danger from electric current. The additional sign is used in connection with a warning.
	Additional sign indicating the danger of burns. The additional sign is used in connection with a warning.
	Do not touch the surface or the housing: shock hazard.
	Do not touch or open, danger to unauthorised persons.
	Danger to persons with medical implants such as pacemakers.
	The information sign is not a warning sign. It indicates important and useful information on the subject.



### Safety instructions on the devices

As an additional warning of danger, warning labels can be found on the devices. Warning labels are affixed by the manufacturer and must not be removed. If a warning label is damaged and thus illegible, a new warning label must be affixed immediately.

Warning labels must be obtained from the manufacturer.

## 2.2 General safety instructions

### Electric current

 
<b>Danger from electric current, general information</b>
When working on live components, there is a danger to life from electric current.
<ul style="list-style-type: none"><li>• Work on electric or electronic components may only be performed by trained electrotechnical personnel in accordance with currently applicable electrotechnical regulations.</li><li>• Before performing any work on the device, the mains switch of the device must be turned off and the mains plug must be disconnected.</li><li>• Before performing any work on the device, the supply cables to the device must be disconnected.</li></ul>

## Protection devices

### **WARNING**

#### **Check safety devices**

Before the start of each work shift, check that all safety devices are functioning. If proper functioning is not guaranteed, the system must not be operated any longer.

In this case, immediately contact the responsible department manager or the responsible department to carry out the necessary repairs or maintenance works.

### **WARNING**





#### **Danger due to missing protection devices**



Various dangers for operators and third parties may arise while operating the equipment (stud welding system). For protection, each system has model-specific protection devices (protective hood or light curtain).

- Protection devices must not be manipulated or disabled. Protection devices include, for example, housing and housing covers, fuses, power switches and light curtains.
- Starting the system with faulty protection devices is not permitted. Faulty protection devices must be repaired or replaced immediately. Unintentional operation by third parties must be prevented.
- If protection devices have to be removed for maintenance work, the system may only be switched on again when all protection devices are installed and their functionality has been checked.
- If light curtains are used as protection devices, they must be firmly fixed to the floor at a distance from the system defined by the manufacturer.

### Protection devices

 
<b>Protection devices at the stud welding head</b> The stud welding head was developed for use in stationary stud welding systems. Please observe the protection devices of the stud welding system.

### Electromagnetic fields

 
<b>Danger from magnetic fields</b> In the area surrounding the devices, strong magnetic fields occur during the welding process, which may influence medical auxiliary aids and therefore result in danger to life. <ul style="list-style-type: none"><li>• Persons with electrical medical aids (such as pacemakers) must keep away from the devices.</li><li>• The operating personnel must ensure that persons with medical aids keep away from the devices.</li><li>• Locally applicable provisions on dealing with electromagnetic fields must be observed.</li></ul>

### Operation site

 
<b>Danger of explosion from an inappropriate installation location in explosive atmospheres</b> The devices are not designed for use in explosive zones. <ul style="list-style-type: none"><li>• The devices must not be installed and operated in explosive atmospheres.</li></ul>

## Burns, fire



### Danger of burns due to hot surfaces

During the welding process, the workpieces and some parts of the welding head gets so hot that touching them may cause burns.

- Always use personal protective equipment.
- Before working on hot parts of the device, check if they have cooled down



### Danger of burns from hot welding spatter

During the welding process, dangerous, very hot welding spatter may occur.

- Always use personal protective equipment.
- Keep third parties away from the system / welding area.



### Danger of fire from hot welding spatter

Welding spatter and hot workpieces resulting from the welding process may represent a danger of fire.

- Do not store combustible or highly flammable materials in the welding area.

## Poisonous vapours



### Danger of poisoning from poisonous welding vapours

There may be a danger of poisoning from the vapours produced during the welding process.

- Do not operate the system without suitable extraction.
- The danger from the welding vapours and the necessary protective measures are to be determined by the operating company as part of their risk assessment.

## Blinding



### Danger of blinding from arcs during welding

In systems that are protected by a light curtain and do not have a protective hood, there is a risk that workpieces will be thrown off the machining table by the axes moving if the system is operated incorrectly. Do not operate the system without suitable extraction.

- Make sure that neither operating personnel nor third parties look at the arcs without protective goggles, especially when it comes to systems without a protective hood.

## Pneumatics



### Danger from pneumatic hoses

Loose pneumatic hoses may whip about when pressurised and thus pose a danger.

- Always secure pneumatic hoses to the hose clamps provided.
- Regularly check that the pneumatic hoses are secure and undamaged.

## 2.3 Personal protective equipment




Wearing personal protective equipment is recommended when working on the devices. The selection of and regulations regarding wearing suitable personal protective equipment are the responsibility of the company operating the system.

### **WARNING**



#### **Danger due to missing or incorrect personal protective equipment**

Stud welding may lead to danger of burns, especially due to hot welding spatters. Danger of blinding may arise due to strong arcs, and there may also be loud banging noises. Always wear suitable and closed protective clothing.

- Always wear suitable and closed protective clothing.
- The type and extent of the required protective equipment depend on the welding project in question. The dangers vary depending on the basic material, stud material, stud size and the required welding performance.
- Please take note of the following instructions for protective equipment.

<b>Recommended personal protective equipment</b>	
	<p>Safety goggles</p> <p>Welding spatters and flashes occur during the welding process. In order to protect your eyes, wear appropriate safety goggles with side protection and a filter protector, if necessary.</p> <p>Filter protector recommendation: Corresponding to the standards DIN EN 166 and DIN EN 169.</p>
	<p>Protective gloves</p> <p>During the welding process, the workpieces and components of the welding gun get hot and welding spatters occur. Wear appropriate, non-flammable, heat-resistant protective gloves.</p>
	<p>Protective clothing</p> <p>Welding spatters occur during the welding process. Wear appropriate, non-flammable and, if necessary, heat-resistant protective clothing.</p>



<b>Recommended personal protective equipment</b>	
	<p><b>Safety footwear</b></p> <p>Welding spatters occur during the welding process. Wear appropriate, non-flammable, heat-resistant safety footwear.</p>
	<p><b>Hearing protection</b></p> <p>Relatively loud welding noises may occur, depending on the welding device and the welding application. In that case, wear appropriate hearing protection.</p>

## 2.4 Intended use

These operating instructions and the declaration of incorporation only apply if the named stud welding head is used as described in these operating instructions.

With the SOYER® stud welding head SK-5AP and/or SK-5AP/KS, pins and threaded studs from M3 to M8 as well as many different weld fasteners made of steel, stainless steel, aluminium and brass can be welded in accordance with DIN EN ISO 13918 (and in accordance with SOYER® standard). The stud welding head is designed for stationary installation on systems and machines or on a robot.

The stud welding heads require a pneumatic slide with a lift of at least 60 mm and an adjustable end position damping for the lift movement and setting. For robot applications, a pneumatic slide also serves as a levelling element. Please also refer to chapter "6.5 Connection and installation" on page 27.

The use of the stud welding head is only permitted in protected industrial and commercial areas.

With the semi- and fully automatic stud feed system and in connection with a feeding unit (feeder), the weld studs can be fed automatically using compressed air. In automatic mode, the stud welding head may only be operated with the accessories described in these operating instructions.

The devices described here can also be operated separately in other combinations. If these are used outside of the automatic system, the operating instructions for the respective device must be observed.

Special studs or diameters upon request.

Operation of the stud welding head must be in accordance with the technical data.



**The stud welding head may only be operated with the devices specified in the technical data.**

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### **2.4.1 Incorrect use**

Any use of the devices deviating from the intended use is considered as not intended. If in any doubt, ask SOYER® whether the planned use is permissible.

Not intended use, unauthorised modification, separate device operation or manipulation of one or multiple devices will void the declaration of conformity and warranty claims against the manufacturer.

## **2.5 Operating company prerequisites**

The operating company of the devices must ensure that the prerequisites for safe device operation described in these operating instructions are met.

These include, for example, conditions at the installation site, regulatory requirements for a safe workplace, training operating personnel and qualified personnel in using the device, if applicable, compliance with required maintenance work as well as monitoring the intended use of the stud welding system.

These operating instructions must be stored at the workplace.

The operating company of the devices must ensure that all protection devices are present, active and intact before the welding system is used.

### **2.5.1 Prerequisites for personnel**

#### **Operating personnel**

Personnel tasked with operating the devices must be familiar with the stud welding system and trained accordingly. They must have read and understood these operating instructions. When working on the stud welding system, they must also be able to avert possible residual danger to themselves or third parties or minimise them as far as possible.

To retain the qualification, safety training must be carried out at least once a year. If necessary, specially trained personnel or the manufacturer must be consulted in case of failure or for maintenance work.

Operators of stud welding equipment must have technical expertise for operating and adjusting the device properly as well as for properly carrying out welding work.

If welding personnel has to be qualified for certification of welding, the standards DIN EN ISO 14555 and DIN EN ISO 14732 are to be observed.

### Trained electrotechnical personnel

In general:

Work on live elements may only be performed by authorised electricians. This work must be performed in accordance with the applicable technical rules for electrotechnical devices.



**All devices of Soyer Bolzenschweißtechnik GmbH may only be opened by SOYER® personnel or personnel authorised by SOYER®.**

## 3 Transport

When transporting the devices, make sure they cannot be damaged. Appropriate packaging can protect the device against weathering effects, especially moisture.

## 4 Storage, shutdown

Switch the device off at the main switch when the stud welding head is connected to the device and remove (disconnect) the main compressed-air supply.

During storage or shutdown, make sure to protect the devices against dirt and humidity. Protect the stud welding system against unauthorised access by third parties.

## 5 Disposal

Local environmental directives must be observed when disposing of the device.

Water-endangering as well as environmentally hazardous substances are to be disposed of in accordance with legal regulations.

If applicable, materials must be separated according to regulations.

## 6 Description of stud welding head

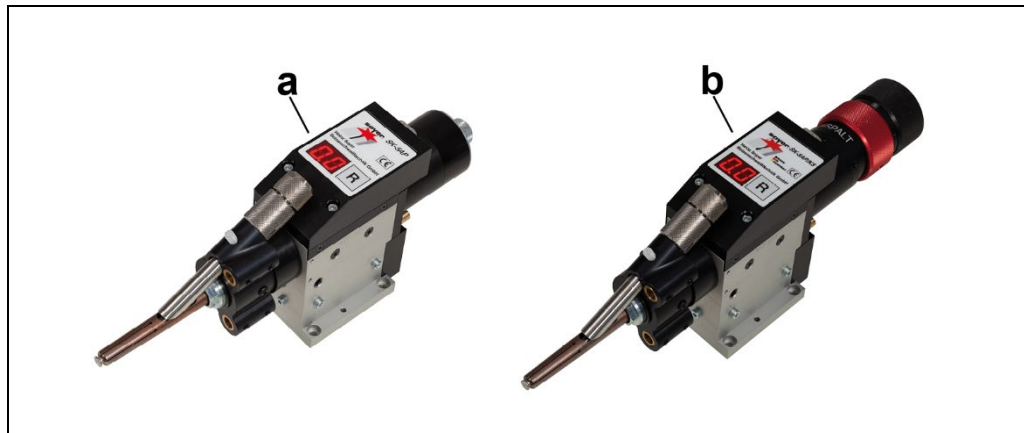


Figure 01: SK-5AP/KS stud welding head

Item	Designation
a	SK-5AP stud welding head, with gap welding procedure.
b	SK-5AP/KS stud welding head, with contact and gap welding procedure (switchable).

### General description

The stud welding head is designed for stationary installation on systems and machines or on a robot.

The compact stud welding head is equipped with a stud feed system and can be quickly converted to other stud dimensions.

The stud welding head is equipped with a lifting magnet. The stud is lifted by means of a magnet prior to welding and automatically lowered again for welding (gap welding procedure).

The height of lift is a decisive factor for the welding result. The currently set value for the height of lift can be read in [mm] through an integrated distance measuring system.

In combination with a SOYER® energy source and a SOYER® feeding unit (and slide and cabling) you get a powerful stud welding system.

All electrical and pneumatic connection lines are equipped with quick-release couplings and plug connections. This allows the welding heads to be replaced swiftly, e.g. during maintenance work.

## 6.1 Distance measuring system

The stud welding head is equipped with an integrated distance measuring system. The measured values are directly issued (displayed) in [mm] via the stud welding head's display. This helps the user to precisely set the welding parameters, such as lift and immersion distance. Please observe chapter "9.1.2 Manually setting the depth of immersion" on page 49 and chapter "9.1.3 Adjusting the height of lift" on page 51.

The measured values can be transferred to an external control unit for evaluation (quality control) via an interface.

The distance measuring system requires an external power supply.

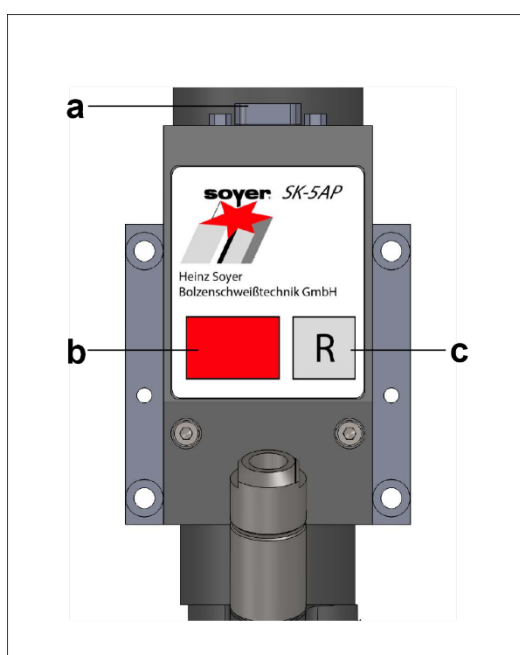


Figure 02: SK-5AP stud welding head

Item	Designation
a	Connection for power supply and data transmission
b	Digital display
c	Reset key for distance measuring

Measuring range - distance measuring system: 0.0 up to approx. 7.0 mm, resolution: 0.1 mm

The reset button (c) can be used to reset the display (b) to 0.0 at any position within the measuring range.

## 6.2 Different welding methods

The following welding methods are possible with the SK-5AP and/or SK-5AP/KS SOYER® stud welding head:

- Capacitor discharge stud welding
- SRM® welding (stud welding in a radial symmetrical magnetic field)
- Short-cycle drawn arc welding
- Drawn arc stud welding using shielding gas

Additional accessory is required depending on the welding process.



**For information on the welding processes, please refer to the respective operating instructions for the stud welding devices used.**

### 6.3 SK-5AP stud welding head

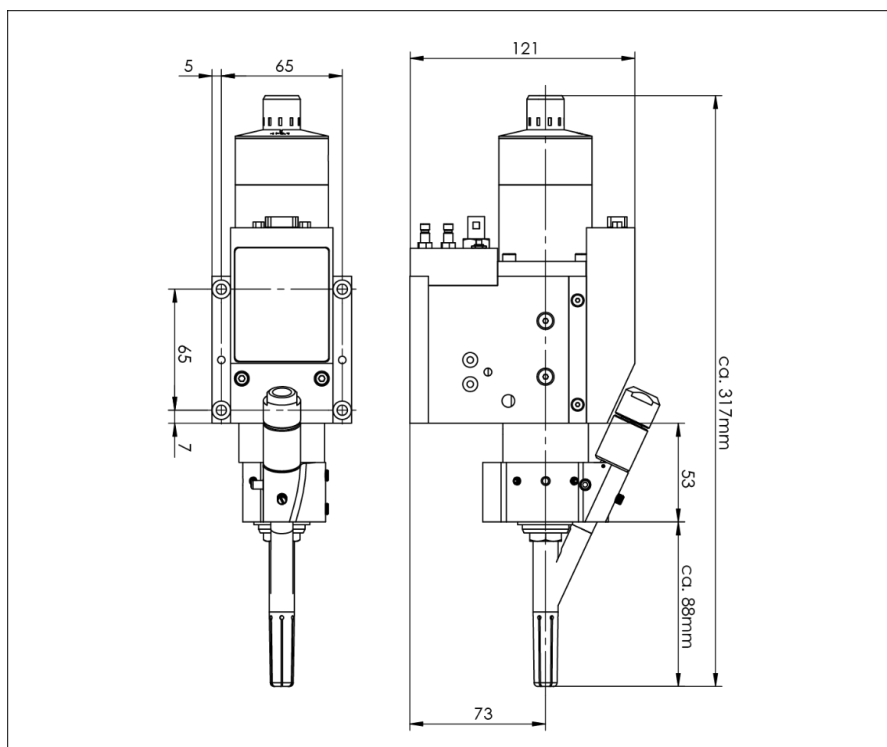


Figure 03: Dimensions of SK-5AP stud welding head

Note on the serial number! The serial number is engraved on the left & right-hand side of the housing.

#### 6.3.1 Technical data for the SK-5AP stud welding head

Designation	SK-5AP stud welding head
Item no.	P03325
Welding procedure	Gap welding process
Stud diameter	M3 - M8 and/or $\varnothing$ 2 - 8 mm
Stud chuck	SOYER® automatic stud chuck. See chapter "15.1 Spare and conversion parts for stud welding head and stud chuck" from page 63.
Stud length	Up to a maximum of 35 mm
Welding sequence	Up to 30 studs per minute (depending on stud diameter and type of feeding)
Weight	2 kg
Dimensions	75 x 317 x 121 mm (w x h x d)
Subject to technical changes without prior notice	

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### 6.3.2 Admissible stud welding devices for SK-5AP stud welding head

Stud welding device	Note
BMS-10P	Standard device
BMS-9 Automatik	
HesoMatic-9	
BMK-16i Automatik	



## 6.4 SK-5AP/KS stud welding head

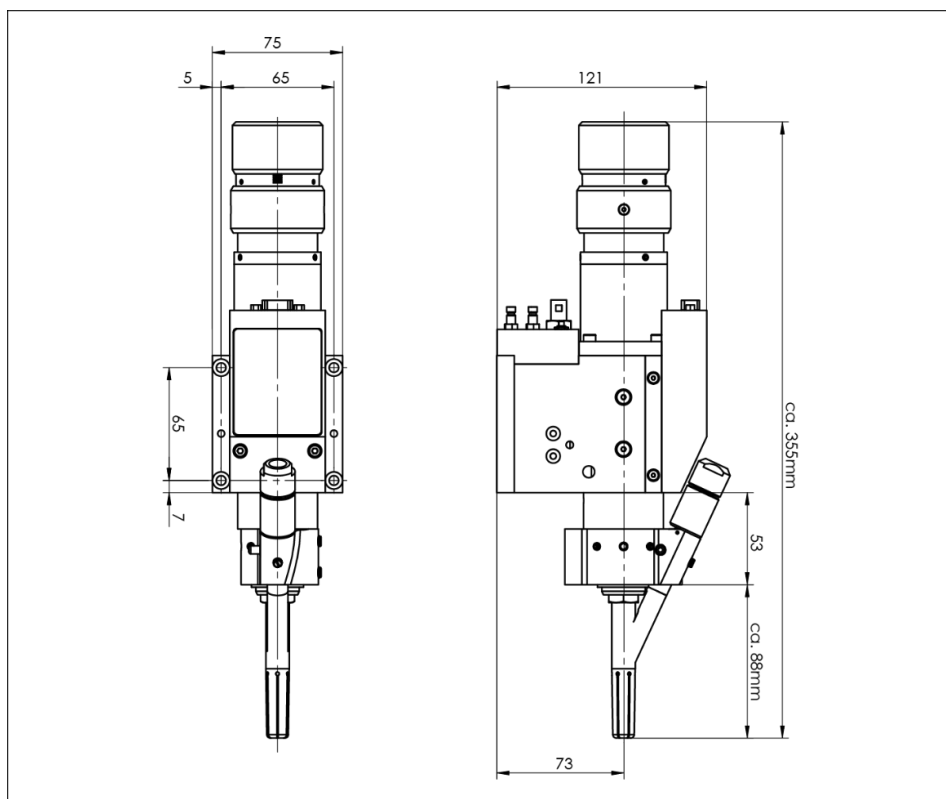


Figure 04: Dimensions of SK-5AP/KS stud welding head

Note on the serial number! The serial number is engraved on the right-hand side of the housing.

### 6.4.1 Technical data for the SK-5AP/KS stud welding head

Designation	SK-5AP/KS stud welding head
Item no.	P03326
Welding procedure	Contact and gap welding process (switchable)
Stud diameter	M3 - M8 and/or $\varnothing$ 2 - 8 mm
Stud chuck	SOYER® automatic stud chuck. See chapter "15.1 Spare and conversion parts for stud welding head and stud chuck" from page 63.
Stud length	Up to a maximum of 35 mm
Welding sequence	Up to 30 studs per minute (depending on stud diameter and type of feeding)
Weight	2.25 kg
Dimensions	75 x 355 x 121 mm (w x h x d)
Subject to technical changes without prior notice	

### 6.4.2 Admissible stud welding device for SK-5AP/KS

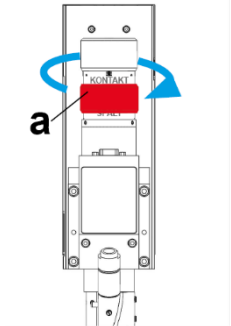
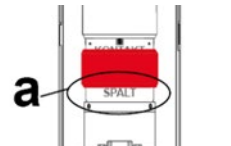
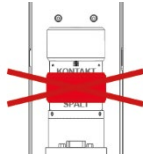

Stud welding device	Note
BMS-10P	Required software version: from V6.1 (as of 2016 device year of manufacture)

#### GAP/CONTACT switchover

The SK-5AP/KS stud welding head can be switched for gap or contact welding using the adjusting ring on the welding head. A time-consuming conversion or welding head change is therefore no longer necessary.

Contact welding is preferably used for stud welding on problematic surfaces.

#### Switching the SK-5AP/KS stud welding head

Step 1:	<b>Switch off the stud welding device connected to the stud welding head using the main switch.</b>	
Step 2:	Loosen the lock on the adjustment ring (a) by turning it.	
Step 3:	Move the adjustment ring to the desired position. Secure the adjustment ring by turning it until it clicks into place.	
Step 4:	The setting ring is now in one of the two positions. The adjusted operating mode (GAP or CONTACT) is shown on the housing (a).	
Step 5:	If the setting ring is still in the centre and the operating mode is not clearly legible, repeat steps 2 to 3.	
Step 6:	<b>Switch the stud welding device connected to the stud welding head on again using the main switch.</b>	
	 <p>The operating mode of the stud welding head is queried upon switch-on and the device is set accordingly.</p>	
The adjustment is complete.		

## 6.5 Connection and installation



**The stud welding head is already integrated into a SOYER® stud welding system in the factory.**

**This is the best solution. You are using a perfectly coordinated stud welding system.**

Observe the following instructions, particularly in combination with a robot or an external handling system (special system).

### **Mechanical installation / mechanical prerequisites**

The stud welding head should be installed in the customer's system with a pneumatic feed slide and an adapter plate where applicable.

The stud welding head is moved (positioned, controlled) via a pneumatic slide. The pneumatic slide (Z axis) moves the stud welding head, which is ready for welding, to the mounting device with the component. After the welding process is complete, the pneumatic slide lifts the stud welding head off the welded workpiece/stud again (back to the starting position). Important! The stud welding head must be removed from the workpiece at the same angle (direction of movement). As soon as the stud welding head has been moved away from the welded stud, it can be repositioned or a new workpiece can be inserted.

The position of the pneumatic slide with the stud welding head must be monitored by a higher-level control system using suitable proximity switches.

Appropriate pre-installed assemblies with stud welding head, pneumatic slide and with pneumatic and electrical cabling can be delivered upon request.

You can get more information from your responsible sales representative or directly from our company.

### **Notes on installation position / welding position**

The stud welding head should preferably be installed in a vertical installation position.

The preferred welding position is PA (flat position).

Information for robot systems: The stud welding head must be put/positioned back in a vertical position before the welding stud reloading process. Since the welding stud falls into the stud chuck owing to gravity, a fault-free reloading process is only guaranteed in this position.

## 6.6 Pneumatic slide

In the following, we explain the assembly using the example of a SOYER® pneumatic slide with 125 mm lift and a stud welding head.

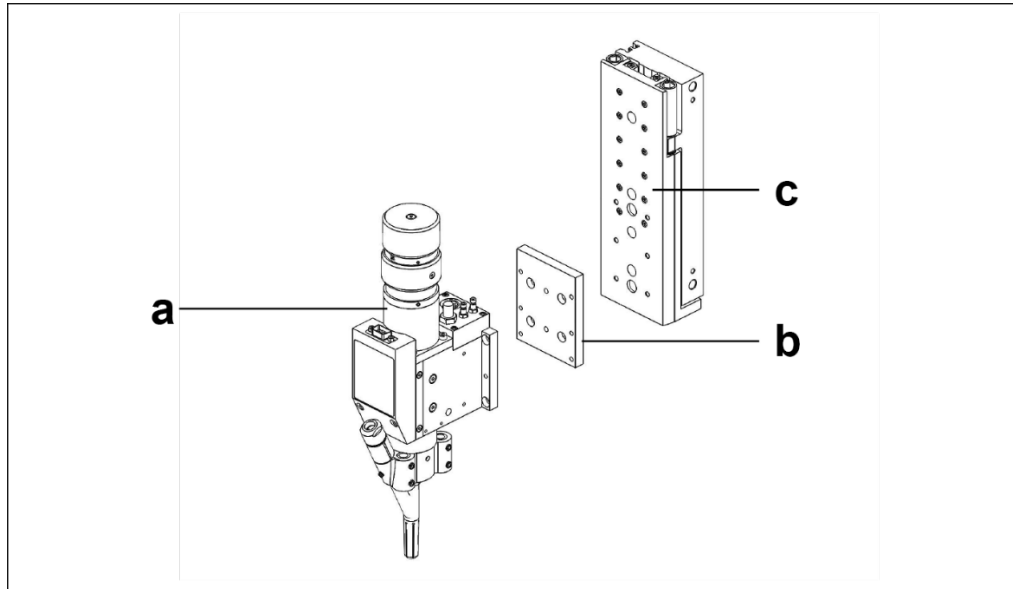


Figure 05: Mounting example with pneumatic slide

Item	Designation
a	SK-5AP/KS stud welding head
b	Adapter plate
c	Pneumatic slide

### 6.6.1 Aligning the welding head

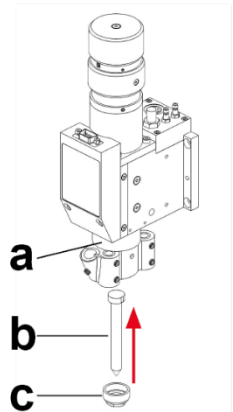
For an optimal welding result, the stud chuck in the welding head must be aligned at precisely 90 degrees to the work surface.

Alignment is required as a one-off, after changing the welding head or after a crash of the Z-axis, for example.



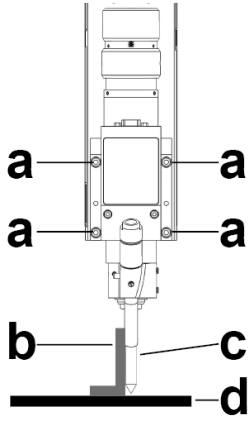


**The standard automatic stud chuck is not suitable for alignment!**  
**We recommend the adjusting mandrel (item no. F07171) and a precision stop angle for setting.**

#### Aligning the welding head

Step 1:	<p><b>WARNING</b></p> <p>Switch the device off at the main switch when the stud welding head is connected to the device and remove the main compressed-air supply.</p> <p>With a SOYER® CNC coordinate bench welding machine: Use the key switch to switch the system to the "Setup" mode.</p>	
Step 2:	Where applicable, replace the stud chuck with the adjusting mandrel (item no. F07171).	
Step 3:	<p>Push the adjusting mandrel (b) into the stud welding head (a) until the stop.</p> <p><b>i</b></p> <p><b>Pay attention to the installation position (guide pin) of the adjusting mandrel.</b></p> <p>Then, fix the adjusting mandrel in place with the union nut (c).</p>	

### Aligning the welding head

Step 4:	 <b>WARNING</b> <b>Check again that the stud welding device is switched off.</b>	
Step 5:	Position the stud welding head in the desired welding position in the setup mode or manual mode.  <b>The adjusting mandrel should not touch the workpiece!</b>	
Step 6:	Loosen the four fastening screws (a) slightly where necessary.	
Step 7:	Use a precision stop angle (b) to check whether the adjusting mandrel (c) is aligned precisely at a 90-degree angle to the workpiece (d). If not, the welding head must be realigned.	
Step 8:	Tighten the four fastening screws (a) where necessary without over-tightening them!	
Step 9:	Remove the adjusting mandrel and insert a suitable stud chuck and stud feed pipe again, as set out in chapter „7.2 Inserting the stud chuck and stud feed pipe“ from page 39.	
Alignment is complete.		

## 6.7 Compressed air connection

The compressed air must be dry, clean and oil-free. Otherwise the components that the air flows through may be damaged.

**We recommend upstream connection of air treatment!**

Required pressure	5 to 7 bar
Connection	1/8" quick coupling to the stud welding head

## 6.8 Hose packaging (cabling)

The stud welding head is connected to the stud welding device via a variety of quick couplings and connection plugs for the necessary power and air supply. Different plugs and markings on the connections facilitate fault-free connection.



**A hose package is not included in the scope of delivery. This must be ordered separately.**

**CAUTION**



### **Tension relief!**

The quick couplings and connectors are not suitable for tension relief. Ensure sufficient tension relief and secure cable routing for robot applications, for example.

## 6.9 Feed unit connections

Please refer to the operating instructions of the feeding unit (feeder).

### **CAUTION**

#### **Risk of injury due to ejected welding studs**

If the stud feed hose is used incorrectly, or an unsuitable hose is used, there is a risk of injury due to ejected welding studs.

- Only use original stud feed hoses from Soyer GmbH.
- Only ever use stud feed hoses which match the stud diameter.
- Pay attention to the correct and firm position of the stud feed hose in the plug connection of the stud welding head and the feeder.
- Ensure that the stud feed hose is intact. Do not use stud feed hoses that are damaged or worn.
- Do not bend the stud feed hose.



## 6.10 Inserting the stud feed hose

The studs are automatically fed via the stud feed hose from the feed unit (feeder) to the stud welding head using compressed air.

Please also observe the operating instructions of the feeding unit (feeder).

The stud feed hose is inserted into the stud feed pipe.

Ensure that the stud feed pipe and hose are suitable for the desired stud diameter.

Please also refer to chapter "15.1 Spare and conversion parts for stud welding head and stud chuck" on page 63.

### CAUTION

#### Risk of injury due to ejected welding studs

If the stud feed hose is used incorrectly, or an unsuitable hose is used, there is a risk of injury due to ejected welding studs.

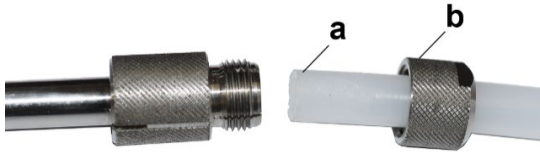
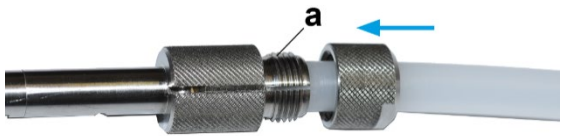
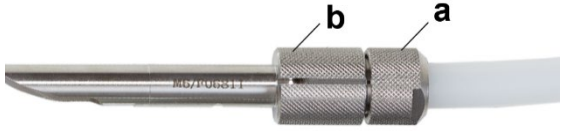
- Only use original stud feed hoses from Soyer GmbH.
- Only ever use stud feed hoses which match the stud diameter.
- Pay attention to the correct and firm position of the stud feed hose in the plug connection of the welding head and the feeder.
- Ensure that the stud feed hose is intact. Do not use stud feed hoses that are damaged or worn.
- Do not bend the stud feed hose.

### 6.10.1 Fastening with union nut

When fastening the stud feed hose (a) with a union nut (b), this serves to additionally secure the hose.

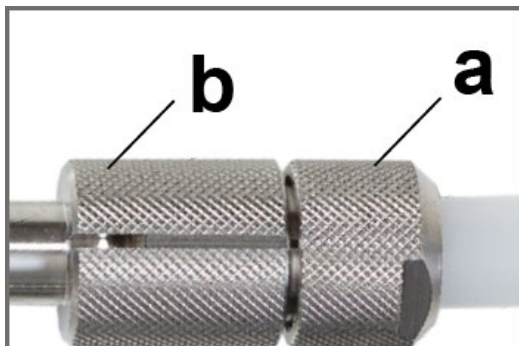


### Inserting the stud feed hose in a system with union nut

<p>Step 1:</p>	<p>With the stud feed hose, ensure that the hose end (a) is straight, clean and free of burrs.</p> <p>Place the stud feed pipe union nut (b) onto the hose.</p> 
<p>Step 2:</p>	<p>Insert the hose into the stud feed pipe (a) until the stop.</p> 
<p>Step 3:</p>	<p>Manually rotate the union nut (a) onto the stud feed pipe (b) until the stop.</p> 
<p>The assembly is complete.</p> <p>Insert the stud feed pipe into the welding head as described in chapter "7.2 Inserting the stud chuck and stud feed pipe" on page 39.</p>	



To avoid damage to the welding head, please observe the following information:



The spanner surface (a) on the union nut serves merely as an aid for opening the union nut, and not for tightening the union nut with an open-end spanner.

When opening and closing the union nut, always hold onto the stud feed pipe (b).

This applies in particular if the hose is to be changed when the stud feed pipe is still installed in the welding head.

For this reason: To avoid damage to the clamp of the stud feed pipe in the welding head, it is recommended to always remove the stud feed pipe from the welding head when changing the hose.

### 6.10.2 Connections on the SK-5AP and/or SK-5AP/KS stud welding head

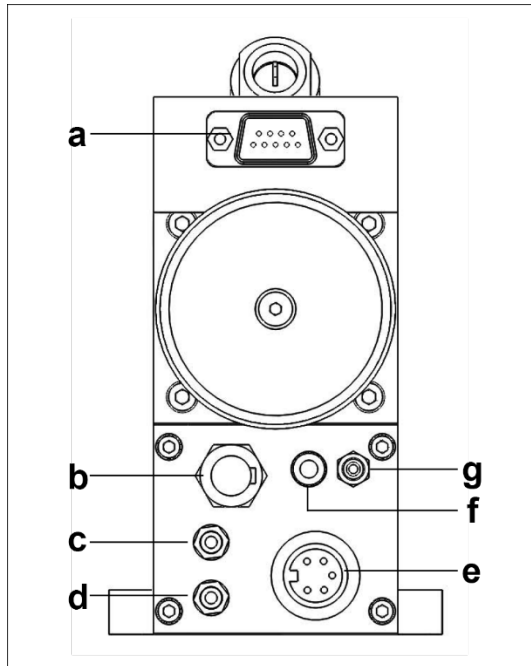


Figure 06: Connections on the SK-5AP and/or SK-5AP/KS stud welding head  
Top view

Item	Designation
a	Mains supply connection Connection of EQS-3 quality assurance unit (optional)
b	Welding cable connection
c	Air connection "backward"
d	Air connection "forward"
e	Control cable connection
f	Release switch
g	Connection for measuring lead

## 7 Description of the automatic stud chuck

In principle, a welding head is provided with a stud chuck that matches the welding stud.

Stud chucks must be installed/changed in the welding head according to the stud diameter.

The following describes the adjustable automatic stud chuck.

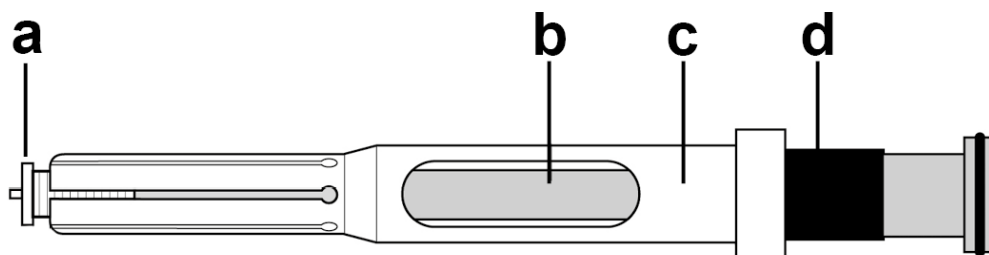


Figure 07: Automatic stud chuck

Item	Designation
a	Stud
b	Plunger
c	Stud chuck
d	Distance sleeve

The stud chuck must be adjusted to suit the length and diameter of the welding stud.

The stud chuck can hold studs with a length of up to 35 mm. Longer weld stud versions are available by request.



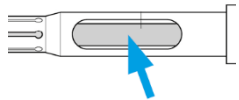
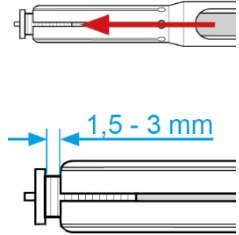

**Stud chucks are wear and tear parts.**  
**To avoid downtimes, we recommend that you keep sufficient stocks of the required dimensions. Please also refer to chapter "15.1 Spare and conversion parts for stud welding head and stud chuck" on page 63.**

## 7.1 Adjusting the stud chuck



You require several conversion parts to convert and adjust the stud chuck.  
Please also refer to chapter “15.1 Spare and conversion parts for stud welding head and stud chuck” on page 63.

### Adjusting the stud chuck

Step 1:	Select the appropriate conversion set for the stud diameter.	
Step 2:	Place the stud in the lateral opening of the stud chuck. The ignition tip of the stud must point in the direction of the stud chuck collet (here to the left).	
Step 3:	Insert the plunger into the stud chuck and using the flange, push the stud through the collet in such a way that the stud protrudes between 1.5 mm and 3 mm above the stud chuck with its flange upper edge.	
Step 4:	Place a distance sleeve or filling distance part combination between the plunger and the stud chuck.	
The adjustment is complete.		

## 7.2 Inserting the stud chuck and stud feed pipe

Please also refer to chapter “6.10 Inserting the stud feed hose” on page 33, which describes how the stud feed hose is inserted into the stud feed pipe.

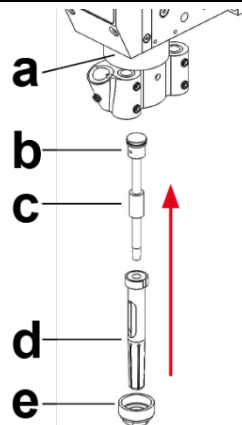
The stud welding head is usually supplied together with a SOYER® CNC coordinate bench welding machine and is ready for use. In the following, we explain the further procedure using the example of a SOYER® CNC coordinate bench welding machine.



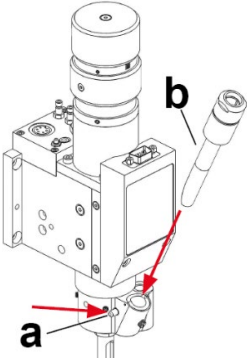
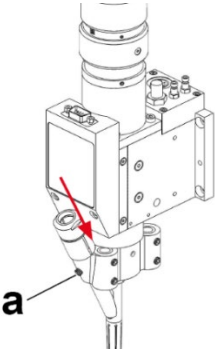
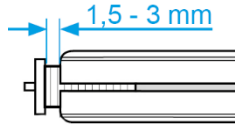
To avoid damaging the welding head bracket, the hose should first be inserted into the stud feed pipe before the stud feed pipe is mounted into the welding head.

### Inserting the stud chuck and stud feed pipe

Step 1:	<p><b>⚠ WARNING</b></p> <p>Switch the device off at the main switch when the stud welding head is connected to the device and remove the main compressed-air supply.</p> <p>With a SOYER® CNC coordinate bench welding machine: Use the key switch to switch the system to the "Set up" mode.</p>
Step 2:	<p>Set the stud chuck to the desired stud (see chapter “7.1 Adjusting the stud chuck“ on page 38).</p> <p><b>i</b></p> <p>In the following steps, the stud chuck containing a stud is inserted.</p>
Step 3:	<p>Push the stud chuck (d) into the welding head (a) using the plunger (b + c) until the stop.</p> <p><b>i</b></p> <p>Pay attention to the installation position (guide pin) of the stud chuck!</p> <p>Then, fix the stud chuck in place with the union nut (e).</p>



### Inserting the stud chuck and stud feed pipe

<p>Step 4:</p> <p><b>i</b></p> <p><b>Pay attention to the installation position of the stud feed pipe (position pin)!</b></p> <p>The stud feed pipe clicks into place.</p>	<p>Press the locking pin (a) on the top of the welding head and slide the stud feed pipe (b) through the support retainer until the stop.</p>	
<p>Step 5:</p>	<p>Secure the stud feed pipe with the plastic screw (a) located at the side.</p>	
<p>Step 6:</p>	<p>Before installing the support, check that the stud still protrudes 1.5 to 3 mm above the stud chuck (see chapter "7.1 Adjusting the stud chuck" on page 38). If not, the stud must either be moved into this position manually or the welding head must be hit with compressed air for the plunger to push the stud and position it.</p>	
<p>The assembly is complete.</p>		



## 8 Connecting the stud welding head

The following describes how the devices are connected to a SOYER® CNC coordinate bench welding machine, for example, and how they are interconnected.

### 8.1 Connection diagram (example)

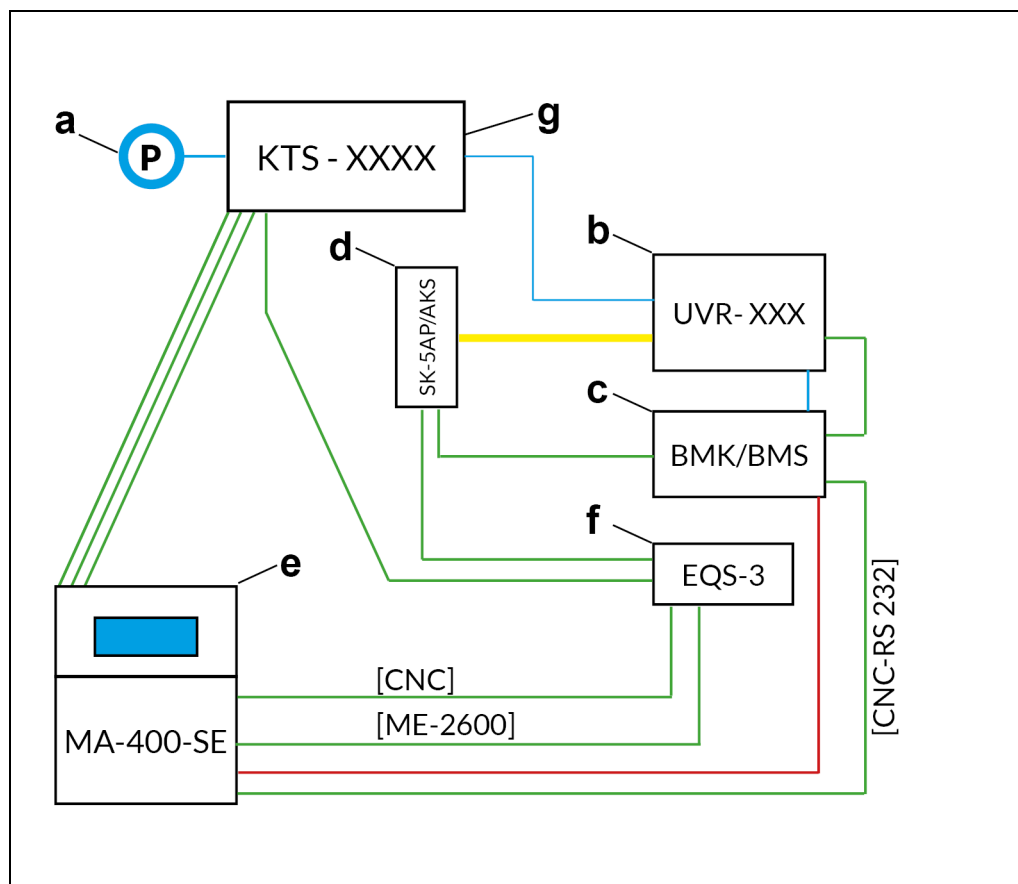


Figure 08: Connection diagram

Item	Designation	Colour legend
a	Main compressed air feed (6 - 7 bar)	Blue: Compressed air supply Green: Control/signal line Red: Power supply Yellow: Stud feed
b	Feeder (UVR) with stud magazine	
c	Stud welding device	
d	Stud welding head	
e	Control console	
f	Quality assurance system (optional)	
g	Coordinate table	

## 8.2 Connection diagram – Stud welding head with BMS-10P

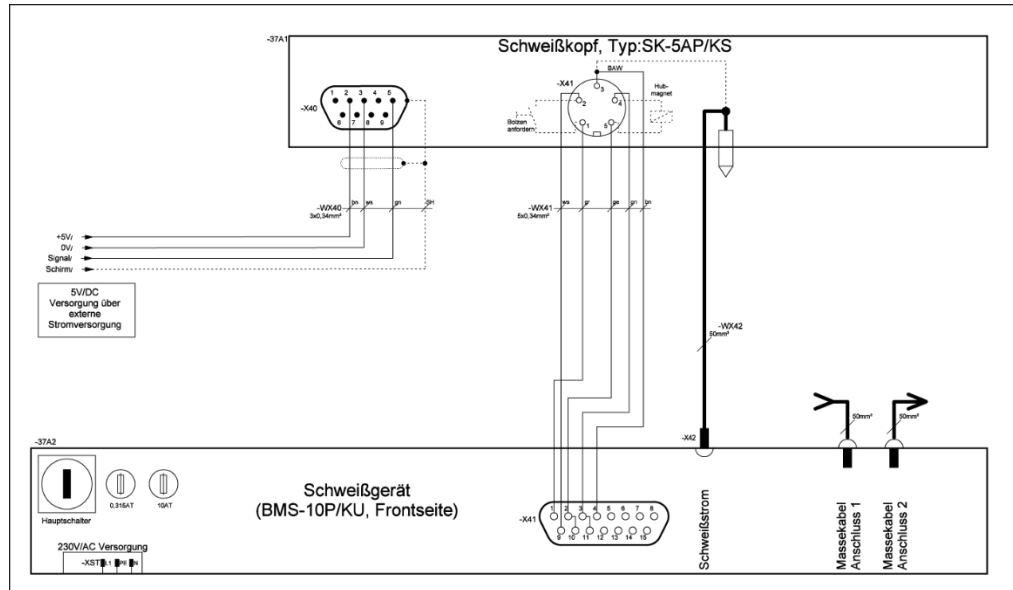


Figure 09: Connection diagram - Stud welding head with BMS-10P

## 8.3 Connection diagram – Stud welding head with BMS-10P and EQS-3

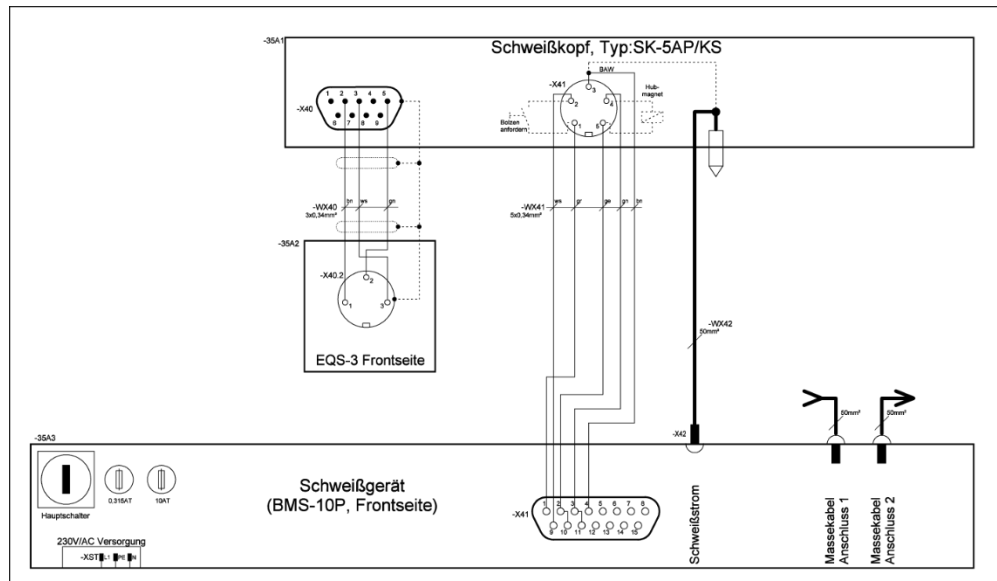


Figure 10: Connection diagram - Stud welding head with BMS-10P and EQS-3

#### 8.4 Connections on the BMS/BMK stud welding device

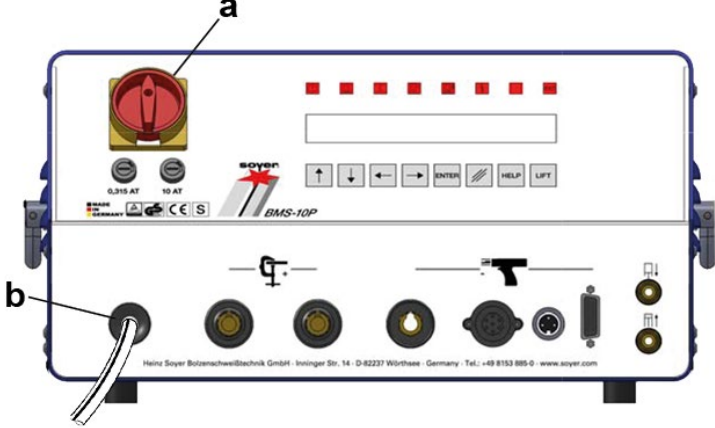
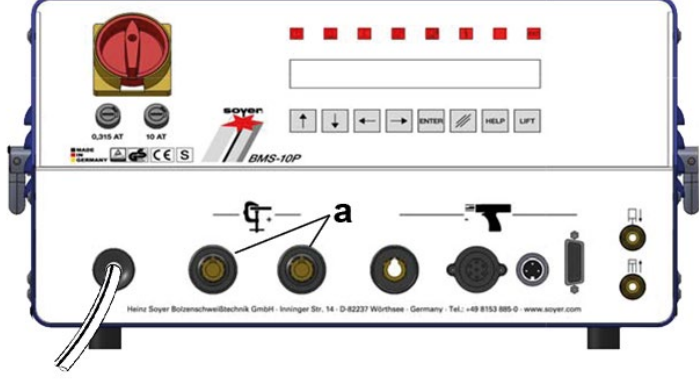
Please also observe the operating instructions for the stud welding device.



**The following describes how to connect to a BMS device. The connection process is the same for all BMS and BMK devices.**

**For BMK devices, the gas and SRM<sup>®</sup> lines also need to be connected.**

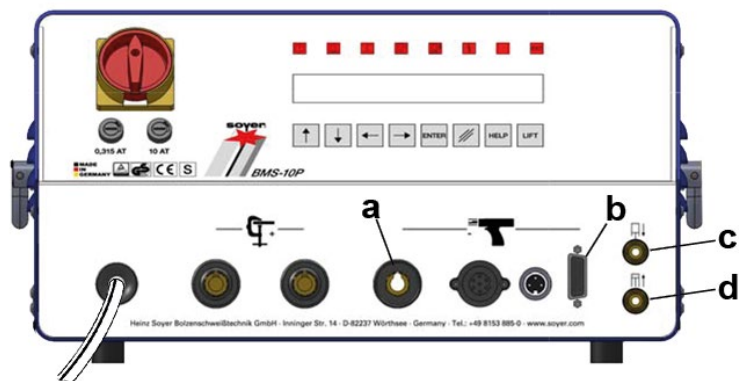
## Connecting the front panel of the BMS/BMK

<p>Step 1:</p>	<p><b>Mains connection</b></p>  <p>Check that the device switch (a) is off and after installation, connect the stud welding device to the power supply using the mains plug (b = mains cable).</p>
<p>Step 2:</p>	<p><b>Earth connection</b></p>  <p>Plug the earth cable connected to the workpiece into the sockets (a) and turn the plugs to the right up to the stop.</p>

## Connecting the front panel of the BMS/BMK

Step 3:

### Welding head connection

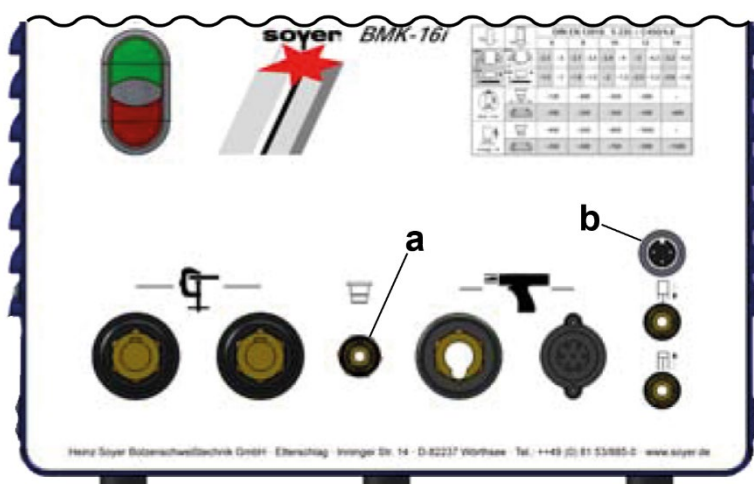


- Plug the welding cable into the socket (a) and turn the plug to the right up to the stop.
- Plug the control cable into the control cable socket (b).
- Connect both compressed air hoses for the plunger (c = forward, d = back) from the hose package.

**Take note of the labelling on the connection and hose, do not mix up!**

Step 4:

### Gas and SRM® connection (only for BMK devices!)



Connect the gas (a) and SRM® (b) lines.

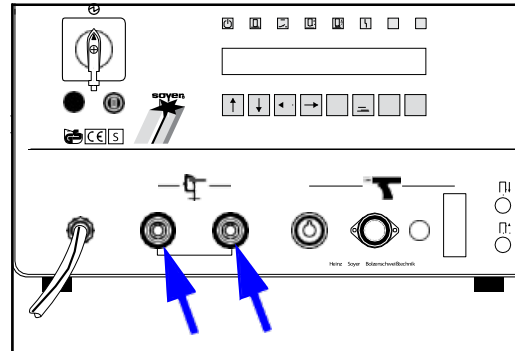
The front panel of the device is connected.

## 8.5 Information about connecting the earth cable

A secure earth connection must be established between the stud welding device and the workpiece onto which the studs are welded.

Insert the earth cable into the sockets and turn the plugs to the right up to the stop.

Then connect the earth cable to the clamp (ensure a conductive connection).



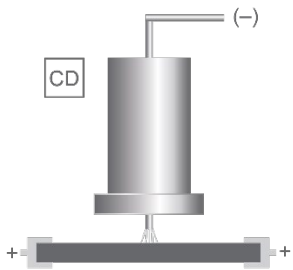
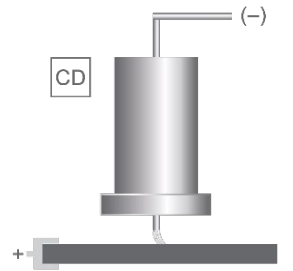
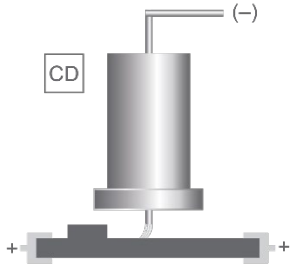
Then attach the earth clamps to the workpiece so that the welding heads are positioned as close as possible to the centre of the connecting line of the earth clamps. This guarantees a symmetrical current distribution around the stud as well as good welding results.

Problematic are areas where welding work has taken place on the edge of the workpiece or where there are great inhomogeneities in material thickness, i.e. the sheet thickness varies by a few millimetres or additional material is welded or riveted to the material. This also includes stud welding on vertical sections.

In order to achieve good welding results, carry out several welding test runs under different conditions. Simply change the position of the earth clamps, for example.

## Blow effect

### *Blow effect due to earth connection or workpiece geometry*

Blow effect	Note
	<p>Symmetrical earth connection</p> <p>Ideally, the stud is located in the centre of the two earth connections.</p>
	<p>Asymmetrical earth connection</p> <p>The arc is deflected to the side where there is a lower current density.</p>
	<p>Workpiece geometry</p> <p>Additional workpiece masses disturb the arc symmetry.</p>

## 9 Start-up / Set-up of stud welding head

### 9.1 Setting the immersion depth & lifting height of the SK-5AP / SK-5AP/KS welding head

The depth of immersion and height of lift are crucial for the welding result.

#### Depth of immersion (contact and gap welding procedure)

The depth of immersion is the distance the stud immerses in the liquid molten pool on the workpiece during the welding process. When positioning the welding head on the workpiece the weld stud is pushed back this distance.

The depth of immersion always depends on the respective stud diameter and welding task. An immersion depth of approximately 2 mm serves as the standard value for all welding procedures.

Set the depth of immersion in such a way that the stud chuck cannot touch the workpiece when no stud is inserted, otherwise the stud chuck will be welded with the workpiece.

#### Height of lift (gap welding procedure)

The height of lift is the distance the stud is lifted from the workpiece during the welding process and which is required to ignite the arc. The height of lift always depends on the respective stud dimension and welding task.

With the SK-5AP and/or SK-5AP/KS stud welding head, the stud must be lifted to a defined height directly before the welding process and lowered again during the welding process. The height of lift must be set prior to the welding operation.

#### 9.1.1 Automatically setting the depth of immersion

##### Setting the immersion depth for SOYER® stud welding systems with MA-400 XX control unit

The immersion depth during lowering is entered into the Bolzit program in the basic parameters and the immersion is carried out by the program.



Step 1:	Click on the <Set up> button in the MA-400 program.
Step 2:	Then click on <Fully automatic set-up of all welding heads>. All the welding heads required in the program will be set to the first welding position. The programmed immersion depth will be set automatically.
Step 3:	Check the height of lift on the stud welding head. Correct the height of lift if necessary (see chapter "9.1.3 Adjusting the height of lift" from page 51).
The assembly is complete.	



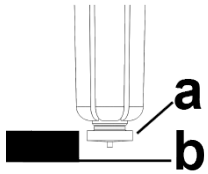
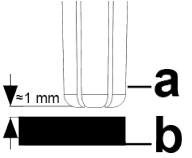
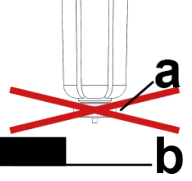
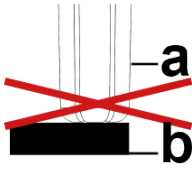
### 9.1.2 Manually setting the depth of immersion

In the following, we explain the manual setting of the depth of immersion using the example for a stud welding head and a pneumatic slide.

Connect the stud welding head as described in chapter “8 Connecting the stud welding head” from page 41.

Step 1:	Check that the stud welding head is correctly connected as described in chapter “8 Connecting the stud welding head” from page 41.
Step 2:	Check that the stud welding device is in the setting mode (lift test).
Step 3:	If necessary, check that your control unit (stud welding system) is in the set-up mode or manual mode.
Step 4:	<p>Check whether there is a stud in the stud chuck. If necessary, reload a stud by pressing the release button (see chapter “6.10.2 Connections on the SK-5AP and/or SK-5AP/KS stud welding head” on page 36) on the stud welding head.</p> <p> Reloading is not possible in the setting mode (lift test).</p>
Step 5:	<p> <b>WARNING</b></p> <p>Check again that the stud welding device is in the setting mode (lift test).</p> <p>If the stud welding device is still in the operating mode, a weld is performed when the trigger button is pressed.</p>
Step 6:	Check whether a workpiece has been placed on the welding table and the earth connection has been established.
Step 7:	In the set-up mode or in manual operation, position the stud welding head at the desired welding position. Usually, the stud welding head is moved to the welding position by means of a pneumatic slide (Z axis).
Step 8:	<p>Change the position of the Z-axis so that the ignition tip of the welding stud touches the workpiece.</p> <p>Reset the display on the stud welding head by pressing the reset button. The display shows 0.0. See chapter “6.1 Distance measuring system” on page 21.</p> <p>Change the position of the Z-axis until the display shows 2.0. Depending on the model of the pneumatic slide used, the position is changed using a hand crank or adjusting screw (end stop).</p>
The assembly is complete.	

**Example of immersion depth**

Setting	Note
	<p>The immersion depth is set correctly. This allows the welding stud (a) to immerse sufficiently into the workpiece (b).</p>
	<p>The immersion depth is set correctly. The stud chuck (a) (without weld stud) <u>does not</u> touch the workpiece (b).</p>
	<p>The immersion depth is not set properly. The weld stud (a) cannot immerse into the workpiece (b).</p>
	<p>The immersion depth is not set properly. The stud chuck (a) without weld stud touches the workpiece (b).</p>

### 9.1.3 Adjusting the height of lift

Setting the height of lift in the setting mode

The height of lift must be set for the SK-5AP and/or SK-5AP/KS stud welding head (GAP operating mode). The stud is lifted to a defined height/to a defined time directly before the welding process and automatically lowered again during the welding process.



**With the SK-5AP/KS stud welding head and the "CONTACT" operating mode, it is not necessary to adjust the height of lift (this is not possible!).**

The height of lift is shown on the stud welding head's digital display. See chapter "6.1 Distance measuring system" on page 21.

Depending on the stud welding device used, the equivalent "lift time" is also specified in addition to the height of lift.

A longer time means a larger height of lift. Please also refer to the operating instructions of the stud welding device.

When adjusting the height of lift in the following, the welding process is simulated in the setting mode. The stud is lifted and lowered as in the welding process, however, only the welding current is not activated.



## **WARNING**

### **Danger of wrong operating mode**

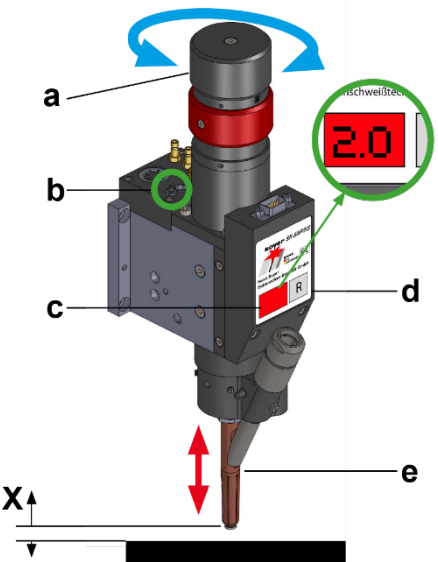
If the following adjustments are not made in the adjustment mode (lift test) but in the operating mode, a weld is carried out when pressing the release button on the stud welding head.

- Please also refer to the operating instructions of the stud welding device.

### **Adjusting the height of lift**

Step 1:	Check that the stud welding head is correctly connected as described in chapter "8 Connecting the stud welding head" from page 41.
Step 2:	Check that the stud welding device is in the setting mode (lift test).
Step 3:	If necessary, check that your control unit (stud welding system) is in the set-up mode or manual mode.
Step 4:	<p>Check whether there is a stud in the stud chuck. If necessary, reload a stud by pressing the release button on the stud welding head.</p> <p></p> <p>Reloading is not possible in the setting mode (lift test).</p>
Step 5:	<p> <b>WARNING</b></p> <p>Check again that the stud welding device is in the setting mode (lift test).</p> <p>If the stud welding device is still in the operating mode, a weld is performed when the trigger button is pressed.</p>
Step 6:	In the set-up mode or in manual operation, position the stud welding head at the desired welding position. Usually, the stud welding head is moved to the welding position by means of a pneumatic slide.
Step 7:	Check if the welding stud touches the workpiece (stud is seated on the workpiece).

### Adjusting the height of lift

	<p>Press the "R" key (d) on the stud welding head to set the digital display (c) to "0.0". Then press the release button (b) on the stud welding head.</p> <p>The currently set value for the height of lift (X) is shown in [mm] on the display (c).</p> <p>You can change the height of lift (X) by using the adjustment cap (a) on the stud welding head.</p>	
<p>The assembly is complete.</p>		

### Notes on the height of lift

Experience and a few attempts are needed to determine the correct height of lift.

With SRM<sup>®</sup>, drawn arc and short-cycle drawn arc operation, the stud should lift for 1 - 2 mm and with capacitor discharge operation for 2 - 4 mm from the surface to be welded.

For further reference values for the correct height of lift or lift time, please refer to the respective device instructions.

The adjustment can be repeated as often as needed. To prevent the magnetic coil from overheating, however, it is necessary to wait for approx. one second between two test lifts.


## 10 Check the automatic system before starting

The machining device and the machining program must be matched and adjusted for the respective work.

This requires mechanical adjustment/conversions to the respective stud diameter and program settings for the respective welding situation. The following checklist with the key points should help you check whether all activities and adjustments for a successful automatic start have been carried out.

Use each device's operating instructions for the check.

### System start checklist

<p><b>Programming a machining job</b></p> <p>Program the required machining parameters in the control program. To do so, use the operating instructions for the program used.</p> <p>If using an EQS-3 quality assurance system (optional), carry out the programming.</p>
<p><b>Set up system for stud type</b></p> <p>Check whether the correct studs are in the feeders. Check that the entire stud feed system is set up for the studs to be processed.</p>
<p><b>Check connections</b></p> <p>Check that all the line and hose connections have been correctly inserted and connected.</p>
<p><b>Check earth clamps</b></p> <p>Check that all the earth clamps are seated and connected correctly. Check that the clamps are firmly attached to the workpiece. Fix the hose lines in place.</p>
<p><b>Check safety devices</b></p> <div style="background-color: orange; padding: 5px; display: inline-block;">  <b>WARNING</b> </div> <p>Before the start of each work shift, check that all safety devices are functioning. If proper functioning is not guaranteed, the system must not be operated any longer.</p> <p>In this case, immediately contact the responsible department manager or the responsible department to carry out the necessary repairs or maintenance works.</p>
<p><b>Personal protective equipment (PPE)</b></p> <p>Use the personal protective equipment (e.g. hearing protection, glare protection, safety footwear, etc.) prescribed by the operating company.</p>

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### Check list for system start-up

#### Note for welding process



There may be a danger of poisoning from the vapours produced during the welding process. If you operate the system with an extraction system check that the extraction system is functioning properly before the start of each work shift.

The danger from the welding vapours is to be determined by the operating company as part of their risk assessment. The operating company is also responsible for defining the necessary protective measures, such as the necessary extraction of welding fumes.

#### Check area around the system

Check that there are no flammable/combustible materials in the vicinity of the system. Check that there are no objects within the range of motion of the linear axes. Check that all precautions have been taken to ensure that no unauthorised persons or persons without PPE come close to the system while it is in operation.

## 11 Welding operation

The following describes how welds are carried out and how possible welding errors can be avoided.

The stud welding head enables

- semi-automatic operation via manual stud feed into the stud feed pipe.
- fully automatic operation via automatic stud feed from the universal feeder into the stud feed pipe.

The following describes the tasks required for the fully automatic welding process.

### **The basic requirements for a welding process are:**

- All devices being properly connected.
- All devices must be appropriately equipped and set up for the workpiece to be processed.
- The machining program must be programmed.
- The programs required for the work must be adjusted to the workpiece and the tool.
- All protection devices of the system must be present, active and intact.
- Any personal protective equipment stipulated by the operating company must be worn.
- Please also refer to the checklist in chapter "10 Check the automatic system before starting" on page 54.

### **Welding operation**

With semi- and fully automatic operation, only a single stud may be in the stud feed pipe and stud chuck. Malfunctions may be caused if more studs are simultaneously fed via the stud feed pipe.

- Connect stud welding device to earth.
- Connect stud welding head as described in chapter "6 Description of stud welding head" and in chapter "8 Connecting the stud welding head".
- Connect stud welding device and universal feeder (if available) to the mains supply.
- Adjust setting parameters at the stud welding device.
- With semi-automatic operation, insert a welding stud into the stud feed pipe.
- With automatic operation, connect the universal feeder.
- Press release button on the welding head or on the control (stud is reloaded).
- Move welding head into welding position by supplying the air cylinder with compressed air. With SOYER® bench welding machines this can be done by operating the two-hand release or with SOYER® CNC bench welding machines by calling the welding program.

With automatic operation, ensure tight fit of the stud feed hose.

For further information regarding connection, operation and welding parameters to be set, please refer to the operating instructions of the respective stud welding device (energy source).



## **DANGER**

### **Danger from incorrect operation**

During stud welding, incorrect operation of the devices may cause many dangers.

- Before using the stud welding equipment, please also refer to chapter “2 Important safety instructions” on page 10.
- Please observe all safety measures prescribed by the operating company.
- If you have any problems understanding the operating instructions, contact the manufacturer, Soyer GmbH.

## 11.1 Notes on checking the quality of the weld

If the devices are handled correctly and the correct materials are selected, the strength of the welding joint (welding zone) is always greater than the strength of the stud or the base material.

In practice, the following production control tests have proved successful:

- Visual inspection
- Bend test

For further information, see standard:


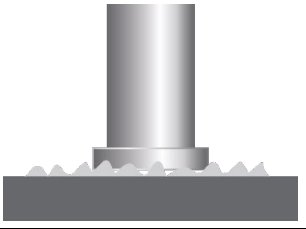


DIN EN ISO 14555 Arc stud welding of metallic materials or Technical Bulletin DVS 0904 Instruction for practice - Arc stud welding.

### 11.1.1 Visual inspection

The visual inspection serves as a rough check for major defects. The uniformity of the weld is assessed.

The following table serves as an aid for the assessment of the welding result:

#### Visual inspection

Welding image	Note
	<p>Good welding joint. Optimum setting. Even, bright and closed small welding bead.</p>
	<p>Poor welding joint, e.g. because the welding energy is too high or the immersion distance / lift is too small. The stud is constricted to the welding joint. The stud is only partially welded.</p>
	<p>Poor welding joint, e.g. because the welding energy is too low or the lift is too short. The welding bead is weak and unevenly formed.</p>
	<p>Poor welding joint, e.g. due to a blow effect or a welding gun that was shaken or applied at a slant. The stud flange is not welded completely and has visible imperfections. Undercuts are visible.</p>

## 11.2 Welding defects and their causes

In the following, the most common welding errors, possible causes and troubleshooting are described.

Please contact Heinz Soyer Bolzenschweißtechnik GmbH if a problem cannot be solved.

Error	Possible cause and troubleshooting
Device does not weld, no spark formation	Stud welding device is not switched on. <ul style="list-style-type: none"> <li>• When switching on the device, the indicator light "Device ready" must light up.</li> </ul>
	The welding points or earth connection points on the workpiece are not metallically bright. <ul style="list-style-type: none"> <li>• Prepare the workpiece or stud. Grind connection points to a bright metal finish.</li> </ul>
Scorched stud thread	The stud is too loose in the stud chuck. <ul style="list-style-type: none"> <li>• Replace the stud chuck.</li> </ul>
	Stud chuck is worn. <ul style="list-style-type: none"> <li>• Exchange stud chuck.</li> </ul>
Varying welding results with unchanged settings	Stud is too loose or not fully inserted into the stud chuck. <ul style="list-style-type: none"> <li>• Push in the stud until stop.</li> <li>• If necessary, exchange the stud chuck.</li> </ul>
	Welding studs manufactured inaccurately. <ul style="list-style-type: none"> <li>• Only use SOYER® welding studs.</li> </ul>
The stud is not welded to the whole flange surface, the strength of the welding is insufficient	The contamination on the surface of the workpiece is too great. <ul style="list-style-type: none"> <li>• Clean or grind the surface of the workpiece to a bright metal finish.</li> </ul>
	The front surface of the welding stud is deformed. <ul style="list-style-type: none"> <li>• Use new welding studs.</li> <li>• Only use SOYER® welding studs.</li> </ul>
	Welding head is not set straight. <ul style="list-style-type: none"> <li>• Adjust welding head. See chapter "6.6.1 Aligning the welding head" on page 29.</li> </ul>

### 11.3 Malfunctions with an error message

#### **DANGER**

##### **Dangers during troubleshooting**

During troubleshooting, various dangers may occur.

- All devices of Soyer Bolzenschweißtechnik GmbH must only be opened by SOYER® personnel or personnel authorised by SOYER®.
- For troubleshooting, the device must be disconnected from the power supply and secured against accidental switch-on.

In the event of a malfunction, look out for a message on the control console screen. Please then follow the operating instructions for the device shown there as malfunctioning.

## 12 Maintenance and repair

The welding heads are constructed in such a way that only a minimum of maintenance is required. Parts, however, which are exposed to damage by welding spatters, should be kept clean. Wear and tear parts such as stud chucks, gas shroud, support tube, plunger and stud feed pipe must be replaced when worn out.

Repair of the devices and their modules may only be performed by Heinz Soyer Bolzenschweißtechnik GmbH or authorised specialists.

### 12.1 Cleaning the stud welding head

Regularly remove slag and welding spatter from the stud welding head with a suitable tool.

The frequency of cleaning depends on the operating conditions of the stud welding head.

#### CAUTION

##### Risk of injury during cleaning

Welding spatter and slag can have sharp edges.

- Wear protective gloves when welding.



We recommend the use of SOYER® separating spray (order number M01464) in order to prevent impurities from welding spatter and slag and to simplify the cleaning process.



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## 13 Service

If servicing is required, please contact:

Heinz Soyer Bolzenschweißtechnik GmbH  
Inninger Straße 14  
82237 Wörthsee  
Tel.: 0049-8153-885-0  
Fax: 0049-8153-8030  
Mail: [info@soyer.de](mailto:info@soyer.de)

Please have the serial number ready during service requests.

Alternatively, you can also contact your respective SOYER® agent. Contact information can be found on our website at

[www.soyer.de](http://www.soyer.de) or  
[www.soyer.com](http://www.soyer.com) (English)

## 14 Warranty conditions

The warranty period for commercial use in single-shift operation or equivalent is 12 months. Wearing parts are excluded.

The warranty claim shall expire if damage is caused through improper operation, repairs or interventions are undertaken by unauthorised persons and accessories and spare parts are used that are not intended for our system.






When using welding studs from external manufacturers, we do not assume any warranty for proper function of the automatic system and the quality of the welding joint.

## 15 Spare and conversion parts




The following lists contain the required conversion parts for changing the stud diameter being processed.

### 15.1 Spare and conversion parts for stud welding head and stud chuck


#### Spare and conversion parts for stud welding head and stud chuck (standard)

Spare & conversion part	Description	Dimension	Item no.
	Automatic stud chuck standard (stud length 10-35 mm)	M3	F02055
		M4	F02056
		M5	F02057
		M6	F02058
		Ø 7.1 mm	F02059
		M8	F02060
	Feed pipe with hose fastening (stud length 10-35 mm)	M3	F06389
		M4	F06390
		M5	F06391
		M6	F06392
		M8 / Ø 7.1 mm	F06393
	Pushing piston standard (stud length 8-35 mm)	M3	F02048
		M4	F02049
		M5	F02050
		M6	F02051
		M8 / Ø 7.1 mm	F02053
	Set of distance rings 1 x 2 mm 1 x 4 mm 1 x 8 mm 1 x 12 mm 1 x 17 mm	M3	F02031
		M4 / M5	F02032
		M6, M8, Ø 7.1 mm	F02570
	Stud feed hose (always cut by metre. Please state desired length in metres). Item quantity 1 means 1 m.	M3	F01081
		M4	F01082
		M5	F01083
		M6	F01084
		M8 / Ø 7.1 mm	F01085

**Spare and conversion parts for stud welding head and stud chuck (special lengths)**

Spare & conversion part	Description	Dimension	Item no.
	Automatic stud chuck for short studs	M3 x 6 mm	F06080
		M4 x 8 mm	F06081
		M5 x 8 mm	F06082
		M6 x 8 mm	F06021
		Ø 7.1 x 10 mm	F06083*
		M8 x 10 mm	F06084*
	Feed pipe with hose fastening for short studs	M3 x 6 mm	F06399*
		M4 x 8 mm	F06400
		M5 x 8 mm	F06401
		M6 x 8 mm	F06402*
		M8 x 10 mm	F06403*
	Pushing piston for short studs	M5 x 6 mm	F04865
		M6 x 8 mm	F04866
		Ø 7.1 x 10 mm M8 x 10 mm	F04867

\* Availability on request

Auxiliaries / Tools	Description	Dimension	Item no.
	Adjusting mandrel for stud welding head	---	F07171









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