Operating Instructions

Alu Pull Kit
AK 98

Operating Instructions

CE

Alu Pull Kit
AK 98

☐ Serial number*
Alu Pull Kit AK 98_____

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

MV Marketing und Vertriebs-GmbH & Co. KG
Wieländer+Schill
Professionelle Karosserie-Spezialwerkzeuge
Siederstraße 50
D-78054 Villingen-Schwenningen
Telephone 07720/8317-0 · Telefax 07720/1255

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

We have certified 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: 01.01.1998

Subject to technical alterations

Printed in the Federal Republic of Germany

EC Conformity Declaration

in compliance with EC Directive on Machinery 89/392/EEC, annex IIA

Producer:	Heinz Soyer Bolzenschweißtechnik GmbH Etterschlag Inninger Straße 14 D-82237 Wörthsee
Declaration:	We herewith declare that the machine described in the following and the version available on the market correspond in design and construction to the fundamental safety and health requirements stipulated by the EC Directive on Machinery. Any modification of this machine without confirmation shall automatically annul this declaration.
Designation of machine:	Alu Pull Kit
Machine type:	AK 98
Machine no.:	_____
Applicable EC directives:	EC Directive on Machinery (89/392/EEC) in the version 91/368/EEC EC Directive on Low Voltage (73/23/EEC) EC Directive on Electromagnetic Compatibility (89/336/EEC) in the version 93/31 EEC
Applied harmonised standards, in particular:	EN 292-1 and EN 292-2, EN 60 204-1 EN 60 974-1
Applied national standards and technical specifications, in particular:	VBG 1, VBG 5, VDE 0544
Date:	December 1, 1997
Producer's signature:	_____
Signer's function:	Technical Management

Contents

1 General

1.1 The following should be principally observed ...

With this Alu Pull Kit AK 98 you have purchased a product which

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

Before putting the Alu Pull Kit AK 98 into operation, always 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 by signature
- Prevent the Alu Pull Kit AK 98 being operated by unauthorized persons
- Only trained personnel may operate the Alu Pull Kit AK 98

MORTAL DANGER

Persons with pacemakers must not operate the Alu Pull Kit AK 98 and must not stay in the vicinity of the Alu Pull Kit AK 98 while it is running.
Ensure that the Alu Pull Kit AK 98 is not operated near electronically sensitive life-supporting equipment, such as in intensive care units in hospitals.

WARNING
Keep sufficient distance from electronic devices. Highly intensive electromagnetic fields are created which may permanently damage these devices (e.g. television sets) when using the Alu Pull Kit AK 98.

- Moreover, obeserve the safety instructions in chapter 3.
- Call a doctor in case of an accident.

MORTAL DANGER

The "S" symbol is the symbol for welding current sources permitted for operation with increased electric danger. The "S" symbol on our Alu Pull Kit AK 98 refers exclusively to the welding current circuit and not to the complete Alu Pull Kit AK 98.

1.2 Application

The Alu Pull Kit AK 98 allows welding pins to be welded on deformed sheet metals made of steel, stainless steel and aluminium. The welding pins are welded in the depressions and dents and pulled upwardly by means of a sliding hammer. Complicated pressing from the inside and removing internal casings is no longer necessary.The reverse side of the aluminium sheet metal is spared from fire marks.

The AK 98 is applicable for
- small delves
- dents
- longitudinal scratches
- damage caused by hail

Moreover, the Aku Pull Kit AK 98 allows you to weld pins and threaded studs of M3 - M8 or Ø 3 - 7.1 mm as well as numerous fastening elements made of steel and stainless steel (see chapter 2.4, Technical Data). It is also possible to weld fastening elements made of aluminium and brass.

The visible side of the workpiece is spared to a large extent from pressure marks or deformations, so that even thin sheet metals under 1 mm sheet thickness 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 Phone 08153-885-0 Fax 08153-8030 Website http://www.soyer.de (national) http://www.soyer.com (international)
Product designation	Alu Pull Kit AK 98
Country of origin	Germany

1.4 Type plate

The type plate is located at the rear side of the Alu Pull Kit AK 98.
It comprises the following information:
- Manufacturer's name
- Manufacturer's address
- Country of origin
- Product designation
- Method of welding
- Date of construction
- Production number
- Performance data
- Mains connection values

1.5 Contents of consignment

Consignment comprises the following:
- Control unit AK 98
- Pistol AK 98 Alu
- Sliding hammer
- Socket wrench 14/17 mm
- 2 earth cables
- 1 nail holder Ø 2 mm
- 1 nail holder Ø 3 mm
- Welding pins Ø 2 mm, 50 pieces
- Welding pins Ø 3 mm, 50 pieces
- Case with insert

1.6 Information on the documentation

The following operating instructions are supplied with the Alu Pull Kit AK 98:
- Operating instructions for Alu Pull Kit AK 98
  Order no.: P00299

For repeat-orders please contact:
MV Marketing und Vertriebs-GmbH & Co. KG
Wieländer+Schill
Professionelle Karosserie-Spezialwerkzeuge
Siederstraße 50
D-78054 Villingen-Schwenningen
Phone (0 77 20) 83 17-0
Fax (0 77 20) 12 55

1.6.1 Chapters of operating instructions

The operating instructions describe the initiation and operation of the Alu Pull Kit under normal conditions and comprise the following chapters in detail:

- Chapter 1 "General"
  Information on application and product, as well as supplementary information
- Chapter 2 “Description of Alu Pull Kit AK 98"
  Description of technology
- Chapter 3" Safety instructions"
  All safety regulations which are relevant with regard to initiation and operation of the Alu Pull Kit
- Chapter 4 "Installation of Alu Pull Kit AK 98"
- Chapter 5 "Initiation"
- Chapter 6 "Quality control"
- Chapter 7 "Maintenance"
  Maintenance measures
- Chapter 8 "Spare parts"
- Chapter 9 "Malfunctions"
  Errors, possible causes and remedies
- Chapter 10 "Transport and storage"
- Chapter 11 "List of standards and guidelines"
- Chapter 12 "Terms of warranty"
- Appendix A/AK-98 Alu/Alu Pull Kit AK 98

1.6.2 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 Wieländer+Schill 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 activities on the Alu Pull Kit AK 98 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.

1.6.3 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". In all other cases, contact our service department.

Important information if service is required

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

- Customer number
- Product designation
- Serial number
- Year of construction
- Options
- Material of stud and workpiece
- Stud dimensions

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

1.7 Contacts and service address

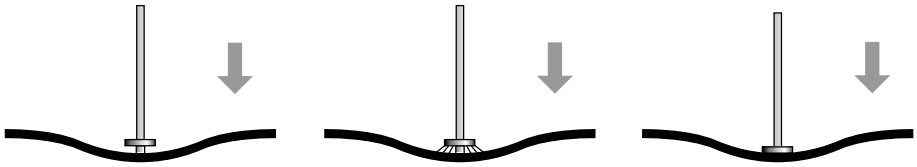
If you have any questions regarding the operation of the Alu Pull Kit, retrofits or if you require service, please contact your responsible service office or the following address:

MV Marketing und Vertriebs-GmbH & Co. KG
Wieländer+Schill
Professionelle Karosserie-Spezialwerkzeuge
Siederstraße 50
D-78054 Villingen-Schwenningen
Phone (0 77 20) 83 17-0
Fax (0 77 20) 12 55

2 Description of Alu Pull Kit AK 98

2.1 Tip ignition technology

The Alu Pull Kit AK 98 runs according to the principle of capacitor discharge with tip ignition as defined in DVS leaflet 0903 (German Welding Society). This system uses the abrupt discharge of a capacitor battery to generate arc energy.



Tip of the welding pin touches the workpiece. Arc is initiated.

Ignited arc generates a thin fusion zone on welding pin and workpiece.

Welding pin immerses in welding pool. Material solidifies and welding pin is welded.

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The electric arc is initiated via the calibrated and close-fit ignition tip on the welding studs and welding elements. The stud weld base and the opposite surface of the workpiece are melted on. The stud is then automatically dipped in the thin fusion zone or liquid weld pool. After the 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 Set-up of Alu Pull Kit AK 98

The standard pistol to be connected to the Alu Pull Kit is the welding pistol AK 98.

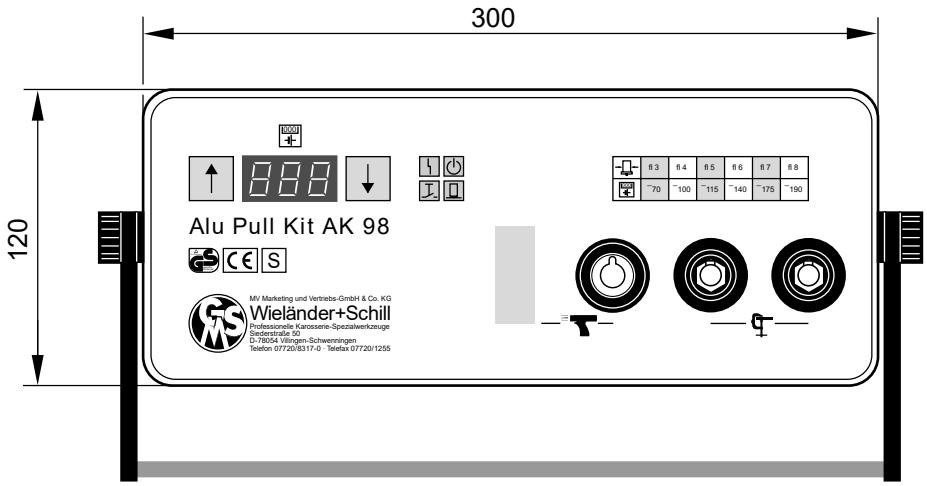
The Alu Pull Kit can also be operated as stud welder when using the stud welding pistol BS-98.

These operating instructions describe the Alu Pull Kit AK 98 and its usage as stud welder.

For information regarding the stud welding pistols required and their setting, please refer to the respective operating instructions of the stud welding pistols.

2.3 Dimensions

The Alu Pull Kit AK 98 has a handy and compact design.
It has a carrying handle and can be optionally equipped with a shoulder strap.



Depth 320 mm

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2.4 Technical data

Description	Alu Pull Kit AK 98
Welding range	Aluminium welding pins Ø 2 mm and Ø 3 mm Studs M3 - M8 or Ø 3 - 7.1 mm
Material	Steel, stainless steel, aluminium and brass
Welding method	Tip ignition according to DVS Leaflet 0903
Standard pistol	Pistol AK 98 when using the system as Alu Pull Kit Stud welding pistol BS-98 when using the system as stud welding equipment
Current source	Capacitor battery
Charging capacity	66,000 F
Charging voltage	50 - 200 V infinitely variable up/down
Welding time	0.001 - 0.003 sec.
Welding sequence	up to 20 studs/min, depending on stud diameter
Mains supply	115/230 V AC, 50/60 Hz, 10/16 AT shock-proof socket (automatic voltage selection 115/230 V AC)
Temperature range	0° up to +60° C
Fuse element	G-fuse link 5 x 20 mm, 2 x 10 A slow, 250 V. The fuse links are integrated in the unit mounting plugs at the rear side of the stud welder.
Welding cable	3 m highly flexible
Earth cable	2 x 3 m highly flexible
Dimensions	300 x 120 x 320 mm (w x h x d)
Weight	11 kg including pistol
Colour	RAL 3020
Subject to technical changes	

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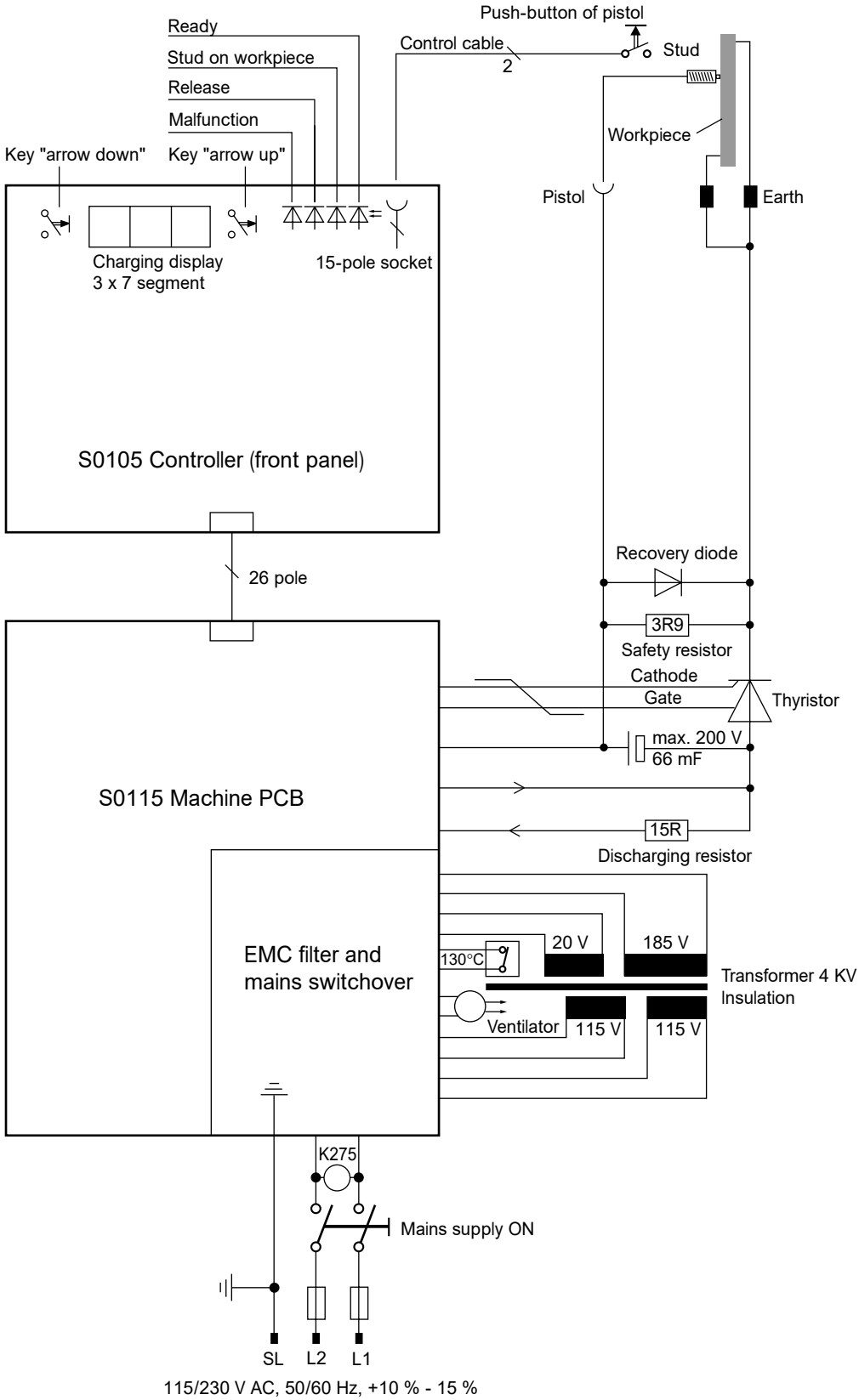
2.5 Block diagram of Alu Pull Kit AK 98



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3 Safety instructions

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

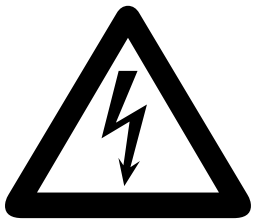
Not only the general "safety instructions" listed under this main item, but also the special safety instructions e.g. for high temperatures, voltages, etc. listed under the other main items have to be complied with.

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 words "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 terms

"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 welding equipment user. Furthermore, the user must ensure that the contents of the operating instructions are fully understood by the staff.

The training and testing institute of welding in Munich (SLV: Schweißtechnische Lehr- und Versuchsanstalt) offers the appropriate training courses for your personnel.

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 system 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 to 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 welding pins and studs, danger may result from

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

You are therefore obliged to restrict the 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 equipment nor stay near it.

WARNING

Electronic equipment (e.g. air bag) and the usage of explosive substances for fuel provision require additional safety instructions to be complied with when welding pins in vehicles. For more information, contact the Employer's Liability Insurance Association or the car manufacturers.

3.6 The following should be observed before starting the system ...

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

- Juveniles under the age of 16 years must not operate the equipment
- Read all of the operating instructions before starting the system
- Only qualified personnel are allowed to operate the equipment
- 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 to protect your eyes from welding spatters and flashes of light that are generated during the process.
- Wear ear protection. Capacitor discharge generates a loud bang.

3.7 Before starting welding ...

- Check the state of all cables 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 device.

3.8 Safety precautions at installation site

- When placing the equipment on tables or similar workshop furniture, ensure that the equipment stands firmly and that the table can bear its weight.
- Make sure mains socket and equipment 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 pins and studs, 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 are applicable for narrow rooms.

3.9 Working with theAlu Pull Kit 98

- Comply with all accident prevention regulations which apply to the operation of your equipment

One of the accident prevention regulations applicable for the Alu Pull Kit AK 98 is VBG15 "Welding , cutting and similar working methods". For more information, 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.

If an accident happens,

- switch off the equipment and disconnect it from the mains supply
- call a doctor.

3.10Safety instructions for maintenance, inspection and assembly works

Only carry out maintenance works when 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. It is indispensable to comply with the procedure for stopping the Alu Pull Kit AK 98 described in the operating instructions (chapter 3.13).

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

3.11Unauthorized 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.

3.12Inadmissible operating methods

Limit values

Working safety of the Alu Pull Kit AK 98 supplied can only be guaranteed when it is used in accordance with its purpose. The limit values indicated in the chapter "Technical data" must never be exceeded.

3.13Stopping the Alu Pull Kit AK 98

- Switch off the mains switch (chapter 5.1, item 9) located at the rear side of the Alu Pull Kit AK 98.
- Disconnect the mains plug from the socket.
- Disconnect
  - the earth cables (chapter 5.1, item 5)
  - the control cable (chapter 5.1, item 7)
  - the welding cable (chapter 5.1, item 6)

  from the Alu Pull Kit AK 98.
- Roll up the cables without buckling them.

Our tool and gear wagon GW-1 is the optimum solution for installing the equipment and for properly storing welding pistols, cables, studs, retrofit kits etc.

- Make sure equipment cannot be used by unauthorized persons.
- Check the welding cable and connections of the equipment for damage such as burn-off, mechanical wear etc. and have damaged parts replaced by Wieländer+Schill customer service.

3.14The "S" symbol

MORTAL DANGER

The "S" symbol is the symbol for welding current sources permitted for operation with increased electric danger. The "S" symbol on our Alu Pull Kit AK 98 refers exclusively to the welding current circuit and not to the complete Alu Pull Kit AK 98.

4 Installation of Alu Pull Kit AK 98

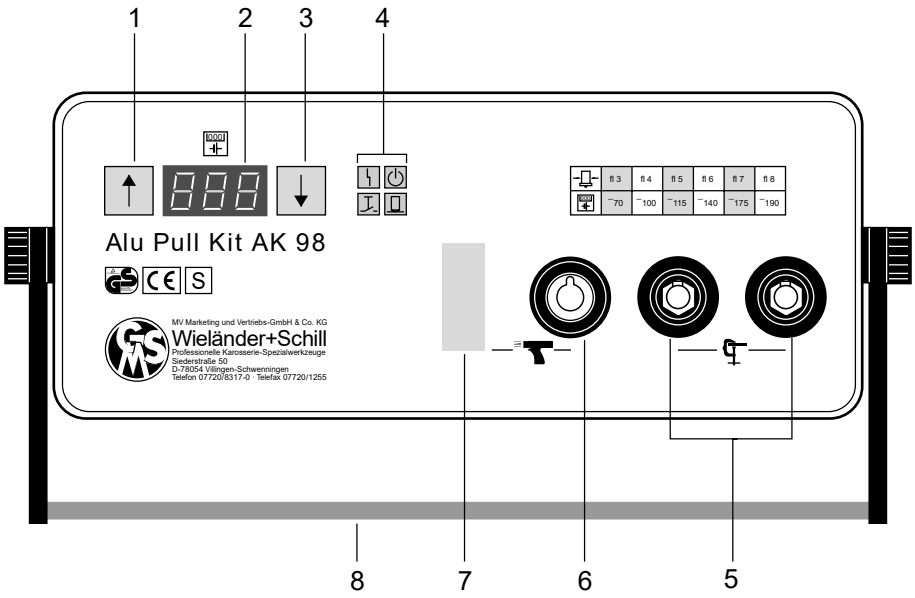
- Only install the Alu Pull Kit AK 98 on an even surface. The four anti-vibration pads located on the bottom of the Alu Pull Kit AK 98 guarantee its anti-skid position and serve as vibration dampers.
- Although the Alu Pull Kit AK 98 is resistant to environmental influences, it should be protected against dampness and dust.
- Please pay particular attention to the bearing strength of the workshop furniture and ensure a safe and stable position.
- Make sure there is sufficient free space around the air apertures.
- Install the Alu Pull Kit AK 98 close to the welding location.
- Ensure correct connected loads with mains operation.
- The electrical connecting cable used for mains operation is of adequate length. Additional extension cables cause a voltage drop, possibly leading to disturbances within the system.
- Ensure sufficient ventilation of the working room when operating the system.

The housing of Alu Pull Kit AK 98 corresponds to safety class IP 21. Please observe e.g. that this system of protection is not suitable for being operated or transported in the rain.

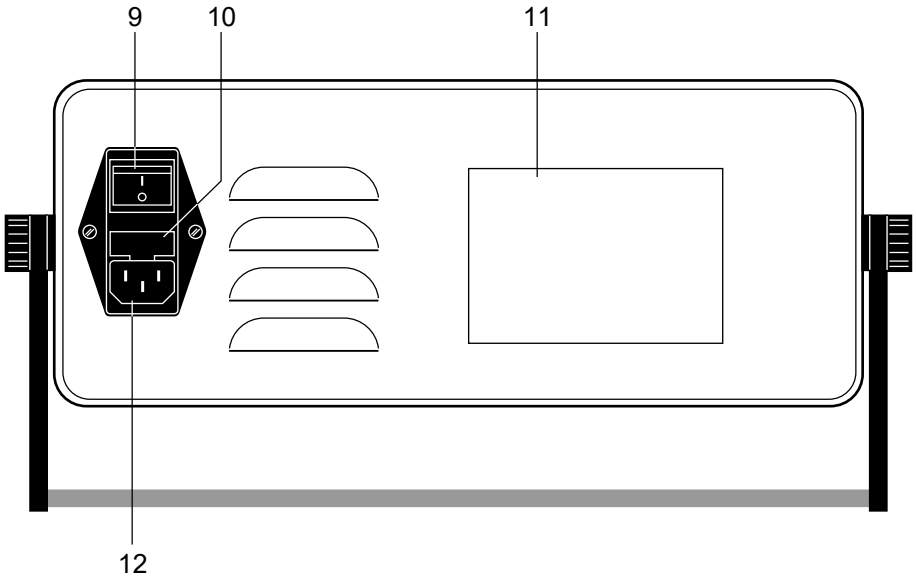
5 Initiation

5.1 Total view

Front view



Rear view



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1 Function key "Arrow up"
Increase of charging voltage
2 Charging voltage display
3 Function key "Arrow down"
Decrease of charging voltage
4 LED displays
5 Earth cable connectors
6 Welding cable socket
7 Control cable connection
8 Carrying handle
9 Mains switch
10 Fuses
11 Type plate
12 Mains connector

5.1.1 Operating elements

- Mains switch (item 9, chapter 5.1)
  The mains switch located at the rear side of the Alu Pull Kit AK 98 serves to switch the Alu Pull Kit AK 98 on and off.

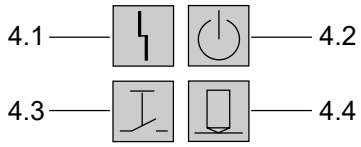
- Function key "Arrow up" (item 1, chapter 5.1)
  The function key "Arrow up" (1) enables continuous increase of the charging voltage for larger stud diameters (for setting values, refer to the table).

- Function key "Arrow down" (item 3, chapter 5.1)
  The function key "Arrow down" (3) enables continuous decrease of the charging voltage for smaller stud diameters (for setting values, refer to the table).

5.1.2 Display elements

- Charging voltage display (item 2, chapter 5.1)
  The digital display shows the adjusted energy value.
  (charging voltage in volts)

- LED displays (item 4, chapter 5.1)
  The LED displays show the respective operational states.



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

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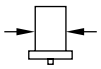
5.1.3 Connecting elements

- Earth cable connectors (item 5, chapter 5.1)
  The earth cable connectors serve to connect the earth terminals to the Alu Pull Kit AK 98.

- Welding cable socket (item 6, chapter 5.1) and
  control cable connection (item 7, chapter 5.1)
  The control cable connection and the welding cable socket serve to connect the stud welding pistol to the Alu Pull Kit AK 98.

- Mains connector (item 12, chapter 5.1)
  The mains connector is located at the rear side of the Alu Pull Kit AK 98. Use the mains cable supplied to connect the Alu Pull Kit AK 98 to the power supply.

5.1.4 Symbols

Symbol	Description	Function
	Digital display of measured values	Digital display of charging voltage in volts.
	Function key "Arrow up"	Increase of charging voltage.
	Function key "Arrow down"	Decrease of charging voltage.
	LED "Malfunction"	LED lights up when Alu Pull Kit AK 98 fails.
	LED "Ready"	LED lights up when Alu Pull Kit AK 98 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 pistol or welding head is pressed.
	Stud diameter	Symbol for stud diameter
	Earth	Marks where earth cable connectors are for earth cable connection.
	Pistol	Marks where control and welding cable sockets are for pistol connection.

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5.1.5 Fuse elements

The Alu Pull Kit AK 98 is protected by the following fuses:

- Mains supply fuses:	2 x 10 A slow	Plug-in unit (item 10, 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 ventilator F3:	250 mA slow	Control board S0-115

WARNING

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

MORTAL DANGER

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

5.2 Preparation for initiation

Connect the stud welding pistol and the earth cables to the Alu Pull Kit AK 98 prior to initiation.

5.2.1 Earth connection

- Connect earth cables to earth cable connectors (item 5, chapter 5.1) and lock by turning to the right until stop.
- Connect earth clamps to the workpiece.

Ensure optimum contact with workpiece.
If necessary, clean contact surface for earth connection.

5.2.2 Connection of stud welding pistol

- Connect welding cable of welding pistol to the welding cable socket (item 6, chapter 5.1) and lock by turning to the right until stop.
- Insert control cable into the control cable socket (item 7, chapter 5.1) and secure with both locking screws.
- Please observe the connecting instructions given in the operating instructions of the welding pistols.

5.2.3 Mains supply

- Insert mains cable into mains connector (item 12, chapter 5.1) and connect to the power supply.

MORTAL DANGER

Only connect Alu Pull Kit AK 98 to authorized shock-proof sockets.

5.3 Operation as Alu Pull Kit AK 98

5.3.1 Welding of pins

- Remove any colour from the damaged area to prepare it for welding.
- Switch on mains switch.
  The 4 LED displays (item 4, chapter 5.1) on the front panel of the stud welder momentarily light up after switching the stud welder on.
- Preselect charging voltage by means of function keys "Arrow up" (item 1, chapter 5.1) or "Arrow down" (item 3, chapter 5.1).
  Welding pin Ø 2.0 mm - approx. 74 - 78 V
  Welding pin Ø 3.0 mm - approx. 83 - 87 V.

The setting value varies depending on the aluminium alloy. Please always carry out test weldings on a sample sheet first.

- Insert welding pin from the front into the stud holder of the welding pistol.
- Position pistol together with welding pin on the middle of the dent at an angle of 90°.
- Press pistol vertically downwards. When the optimum pressure is achieved, the welding process is automatically released and the pin is welded with a slight bang.
- Remove the pistol from welding pin in a straight line motion. Avoid putting lateral weight on the welding pin and do not bend it.

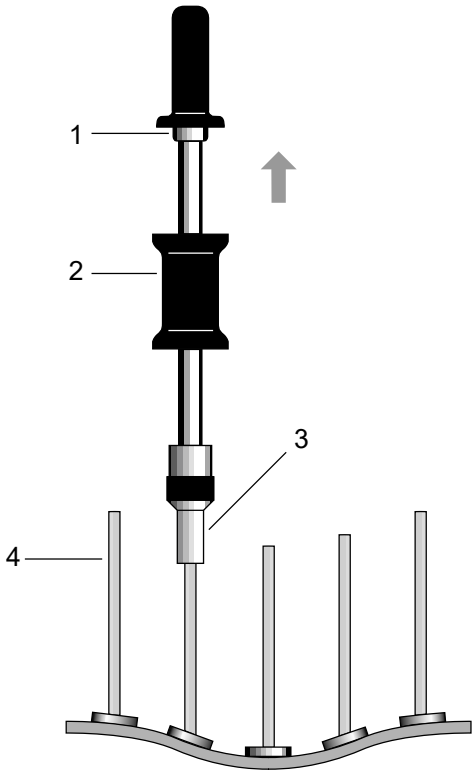
It cannot be ruled out that welding pins have occasionally a poor adhesion due to differing structures of sheet metals. In this case, you should increase or decrease the setting value and repeat the welding process.

The welding pins are lightly welded on the aluminium sheet to spare the sheet surface to the largest possible extent. Therefore avoid putting lateral weight on the welding pin.

WARNING

Electronic equipment (e.g. air bag) and the usage of explosive substances for fuel provision require additional safety instructions to be complied with when welding pins in vehicles. For more information, contact the Employer's Liability Insurance Association or the car manufacturers.

5.3.2 Removing dents



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1 Limit stop
2 Sliding hammer
3 Split taper socket
4 Welding pin

- Seize welding pin (4) by means of split taper socket (3)
- Move sliding hammer (2) gently against upper limit stop (1) and straighten the dent.
- Pinch off welding pin (4) after straightening the dent and grind off welding remains.

5.4 Operation as stud welder

- Switch mains switch on.
  The 4 LED displays (item 4, chapter 5.1) on the front panel of the stud welder momentarily light up after switching the stud welder on.
- Select the charging voltage by means of function key "Arrow up" (item 1, chapter 5.1) or "Arrow down" (item 3, chapter 5.1) depending on the respective stud diameter.
- Position pistol with welding stud on the workpiece.
  When earth connection is made and the stud in the pistol touches the workpiece, the LED "Stud on workpiece" (item 4.4, chapter 5.1.2) lights up.

- Press pistol switch. LED "Release" (item 4.3, chapter 5.1.2) lights up and welding process is released.

Hold the pistol still 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 pistol glides off during welding, is identified by the stud welder and indicated as failure by LED "Malfunction" (item 4.1, chapter 5.1.2) lighting up (also refer to chapter 9.1 "Error codes").

The capacitor battery is recharged after removing the welding pistol from the welded stud. The stud welder is ready again for welding after a few seconds. LED "Ready" (item 4.2, chapter 5.1.2) lights up.

5.5 Welding parameters

The welding parameters of the Alu Pull Kit AK 98 were determined by using the stud welding pistols AK-98 and BS-98.

The charging voltage levels shown in the table on the right are standard values. They vary from the stated setting depending on the material type, workpiece thickness and surface condition of the workpiece.

	Ø 2	Ø 3						
			Ø 3	Ø 4	Ø 5	Ø 6	Ø 7	Ø 8
	≈ 74-78	≈ 83-87	≈ 70	≈ 100	≈ 115	≈ 140	≈ 175	≈ 190

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6 Quality control

6.1 General

The 0905 DVS Guideline, 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.

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 4100, 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, sections 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 4100, section 2.1, certificate of approval for stainless steel ifBT; DIN 4113, part 2).

6.4 Type and scope of test

Provided that the Alu Pull Kit 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)

In case of 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 of 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 test 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 3 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 Alu Pull Kit AK 98

The Alu Pull Kit AK 98 is constructed in such a way that only a minimum of maintenance is required. The interior of the Alu Pull Kit AK 98 should, however, be cleaned at regular intervals depending on the environmental conditions at the location of use. Any defects of the system's control part can easily be eliminated by replacing the printed circuit board 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 Wieländer+Schill customer service department if necessary.

7.2 Replacement of components

Defective components may only be replaced by trained Wieländer+Schill servicemen. Perfect function of your Alu Pull Kit AK 98 can only be guaranteed when original Wieländer+Schill spare parts are used.

MORTAL DANGER

Ensure that the capacitors are discharged before replacing any components.

7.3 Fuses

The Alu Pull Kit AK 98 is protected by the following fuses:

- Mains supply fuses:	2 x 10 A slow	Plug-in unit (item 10, 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 ventilator F3:	250 mA slow	Control board S0-115

DANGER TO HEALTH

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

MORTAL DANGER

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

8 Spare parts

8.1 Spare parts list for Alu Pull Kit AK 98

Spare parts list in preparation

8.2 Exploded view of Alu Pull Kit AK 98

Exploded view in preparation

9 Malfunctions

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 Wieländer+Schill customer service responsible for your area or Wieländer+Schill.
For address and telecommunication data, please refer to chapter 1.6, page 1-4.

MORTAL DANGER

Always disconnect the connecting plug from the mains socket before opening the housing of the Alu Pull Kit AK 98. Only trained and appropriately qualified personnel are allowed to carry out works on the electric power supply and the Alu Pull Kit AK 98.

WARNING

Only trained and appropriately qualified personnel are allowed to replace components of the welding system.

MORTAL DANGER

Before replacing components, ensure that the capacitors are discharged.

9.1 Error codes

The Alu Pull Kit AK 98 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):

Error code	Description	Possible cause
E-1	Safety circuit activated	Welding operating error
E-2	Charging duration exceeded	Charging fuse defective
E-3	Internal error	Safety circuit defective
E-4	Mains voltage not in order	Mains voltage deviation too large 115/230 V AC + 10 % - 15 %

The error message is acknowledged by switching the Alu Pull Kit AK 98 off and then switching it on again. If the error message appears again, please inform the customer service responsible for your area.

E-5	Excess temperature of transformer	Excessive welding cycle

If the error message E-5 appears, please do not switch off the Alu Pull Kit AK 98. The Alu Pull Kit AK 98 is ready for welding again after it has cooled down.

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 metallically blank → Prepare workpiece and/or studs
System is switched on, but does not function	Mains supply is defective → Check mains supply fuse
	Fuse of Alu Pull Kit AK 98 is defective → Replace defective fuse (see chapter 7.3)
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 Alu Pull Kit AK 98 or welding pistol is defective → Inform Wieländer+Schill 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 are too loose, generation of transition resistance → 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. If necessary, replace stud holder
Varying welding results	Magnetic blowing action. Arc is forced into a certain direction → Alter earth clamp fixture, place iron parts on the edges and/or rotate welding pistol

Error	Cause → Elimination
Intensive sparking, stud flange almost melted away	Welding energy is set too high → Reset welding energy
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 weld base deformed → Use new welding studs
	Stud projection over stud holder incorrectly set → Set projection to 2-3 mm (distance between stud holder and stud weld base)
	Spring pressure incorrectly set → Set spring pressure
	Welding pistol in tilted position → Ensure that all 3 pistol legs are simultaneously and evenly positioned on the workpiece
	Base metal not weldable → Use suitable material combinations

10 Transport and storage

The Alu Pull Kit AK 98 is sturdily designed and has a two-piece metal case with front and rear panel. Owing to the electronic components, however, please ensure that transport is free from vibrations.

The Alu Pull Kit AK 98 is equipped with a carrying handle for easy transport.

The unit suitcase GK-2 is the optimum solution for storing and transporting the Alu Pull Kit AK 98 and the welding pistol AK-98 Alu.

Prevent unauthorized use of the stud welding system by children and unqualified personnel.
After long system standstill, we recommend having the Alu Pull Kit AK 98 checked by Wieländer+Schill servicemen prior to initiation.

The housing of Alu Pull Kit AK 98 corresponds to safety class IP 21. Please observe e.g. that this system of protection is not suitable for being operated or transported in the rain.

11 List of standards and guidelines

• 91/368/EEC (formerly 89/392 EEC)	EC Directive on Machinery
• 73/23/EEC	EC Directive on Low Voltage
• 93/31/EEC (formerly 89/336/EEC)	EC Directive on Electromagnetic Compatibility
• EN 292 - 1	Safety of machinery; basic terms, general principles of construction; basic terminology, systems engineering
• EN 292 - 2	Technical principles, specifications
• EN 60204 -1 (formerly VDE 0113)	Electric equipment of machinery, general requirements
• EN 60974 - 1	Safety requirements for arc welding equipment, part 1 welding current sources
• EN 292-2	Operating instructions
• VDE 0544	Safety requirements for arc welding equipment
• VGB 1	General instructions (instructions for accident prevention)
• VBG 5	Power-operated equipment (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 17100	Constructional steels - general types, quality standard
• DIN 8563, part 10	Quality assurance of welding works
• DIN 32500, part 3	Studs for stud welding with retract ignition
• DIN 50049	Certificate on material tests
• DIN 50125	Testing of metallic materials, tensile tests, guidelines for production
• DIN 54111, part 1	Non-destructive method of testing
• DVS Leaflet 0902	Arc welding with retract ignition
• DVS Guideline 0905, part 1	Quality assurance of stud welding joints

12 Terms of warranty

We warrant for this equipment for a period of 6 months in accordance with our conditions of sale and delivery.

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 persons, or whenever accessories and spare parts have been used which do not match our equipment.

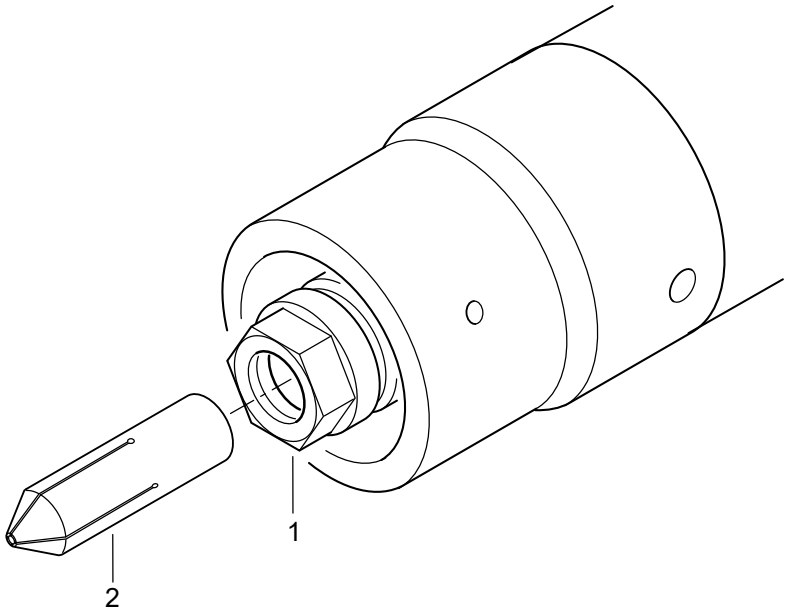
We cannot guarantee the quality of welding joints if welding pins and welding studs acquired from another company are used.

1 Adjustment of stud welding pistol

1.1 Installation of nail holder into stud welding pistol AK-98 Alu

Install the nail holder into the stud welding pistol as follows:

- Turn sleeve nut (1) anticlockwise by means of socket wrench SW17.
- Insert nail holder (2) into spring piston until stop.
- Turn sleeve nut (1) clockwise by means of socket wrench SW17 and tighten nail holder (2) (hand-tighten sleeve nut only).



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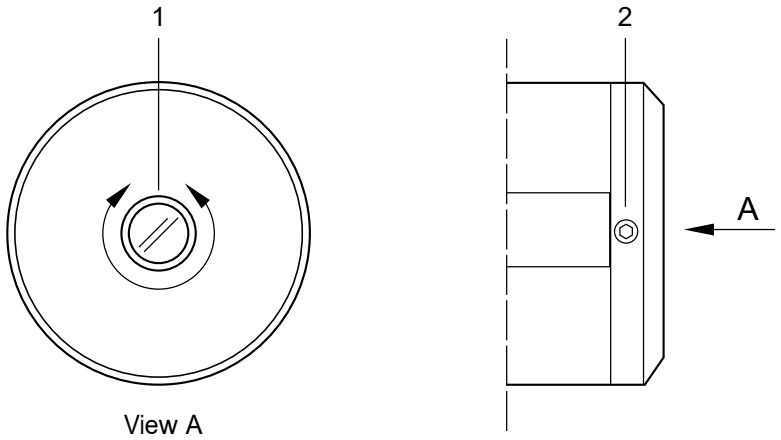
1.2 Adjustment of spring pressure

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

The illustration below shows how the spring pressure of our welding pistols is normally adjusted.

> The spring pressure of the welding pistol AK-98 Alu is fixed and can therefore not be altered. The adjusting screw (1) has no function.



1 Adjusting screw
2 Grub screw

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

- Turn adjusting screw (1) to the left until stop
  = low pressure
- Turn adjusting screw (1) 3.5 turns to the right
  = medium pressure
- Turn adjusting screw (1) to the right until stop
  = strong pressure
- Hand-tighten grub screw (2) by turning it clockwise with the Allen key SW2

> After having adjusted the spring pressure, fix it by means of the grub screw (2).

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 Initiation

2.1 Total view

The illustration below shows the stud welding pistol AK-98 Alu.

2.2 Connecting stud welding pistol to Alu Pull Kit AK 98

The stud welding pistol is connected to the Alu Pull Kit AK 98 by means of the pistol cable and control cable.

2.3 Operation

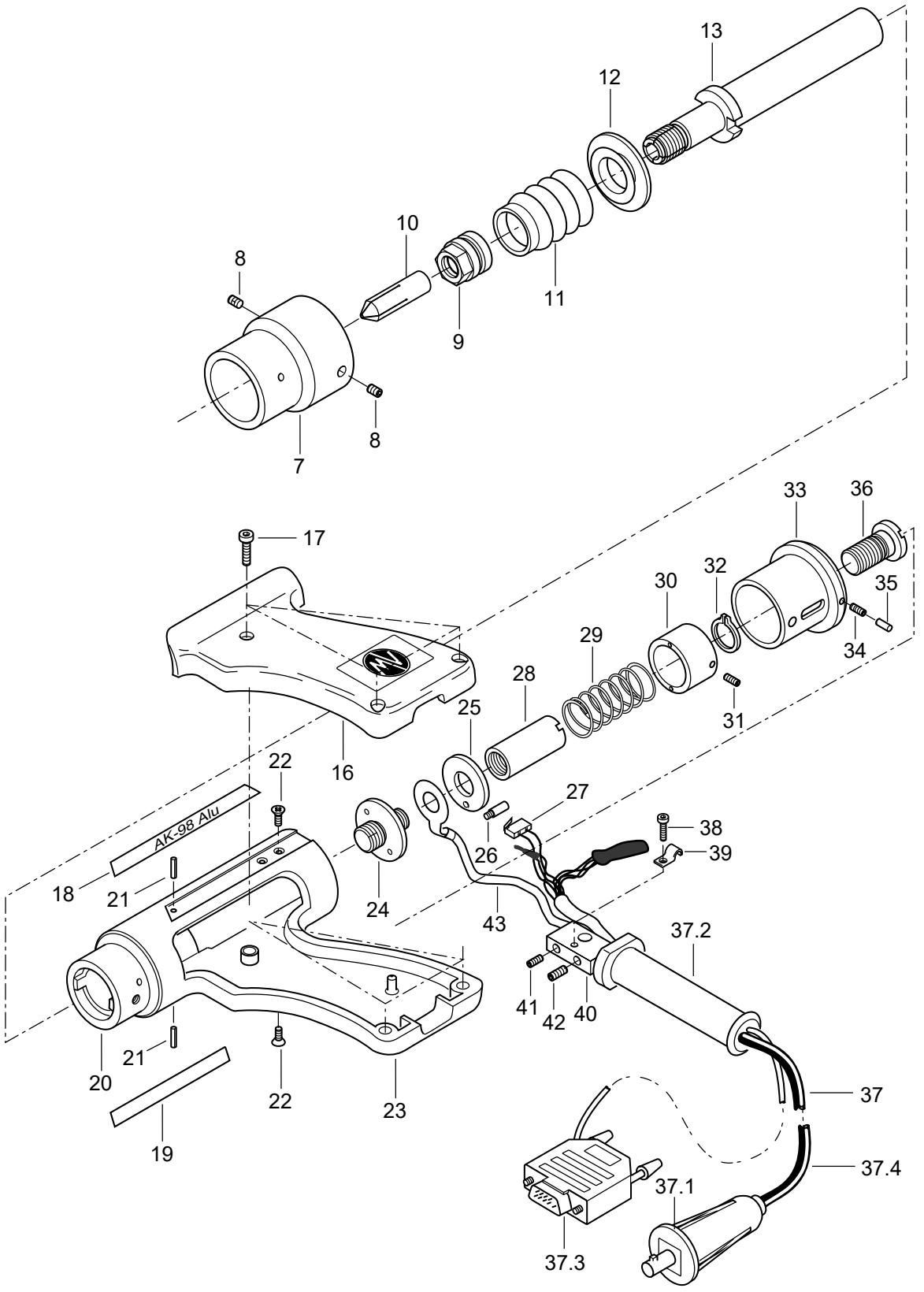
- Connect Alu Pull Kit AK 98 to earth
- Connect stud welding pistol as described in chapter 5
- Adjust welding pistol as described in Appendix A, Chapter 1
- Connect Alu Pull Kit AK 98 to the mains supply and switch it on
- Adjust Alu Pull Kit AK 98 for the welding pins to be used
- Insert welding pin into nail holder
- Position stud welding pistol on the workpiece and press the tip of the welding pin against the sheet metal. The welding process is released automatically when sufficient pressure is exerted on the workpiece.

3 Spare parts

3.1 Spare parts for stud welding pistol AK-98 Alu

Item	Quantity	Description	Order No.
7	1	Support tube guide	
8	2	Grub screw M6 x 6	M01340
9	1	Sleeve nut	F01375
10	1	Nail holder Ø 2 mm	F03703
10.1	1	Nail holder Ø 3 mm	F01148
11	1	Bellows	F01376
12	1	Delrin ring for bellows	F01736
13	1	Working piston	F03153
16	1	Pistol half-shell, small	F01717/1
17	3	Cheese-head screw M4 x 8	M01998
18	1	Pistol label	
19	1	Pistol label, company address	
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	Pistol 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	Microswitch	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	Pistol 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	10 m	Welding cable 1 x 6 mm^2	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 stud welding pistol AK-98 Alu



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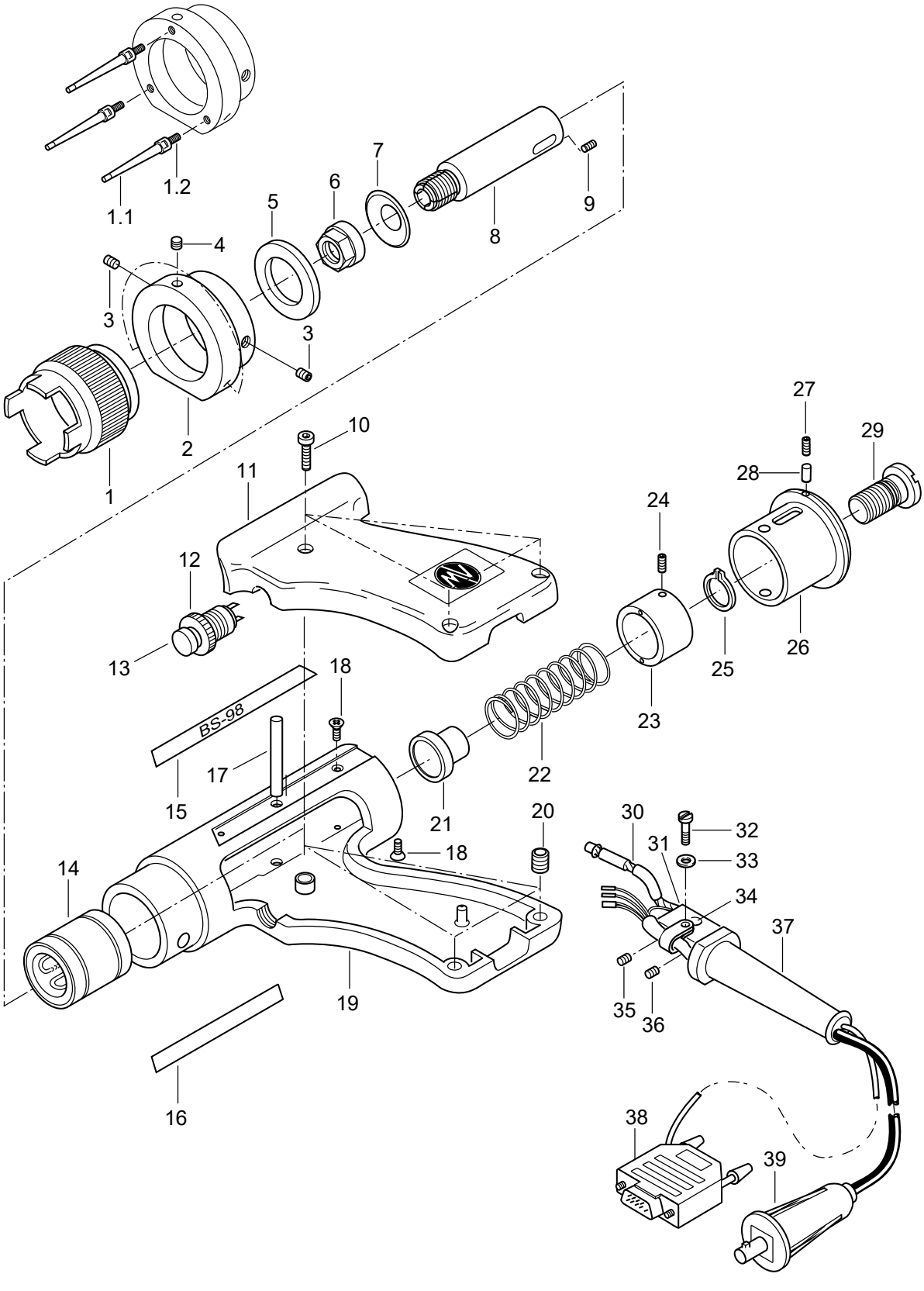
3.3 Spare parts list for stud welding pistol BS-98

Item	Quantity	Description	Order No.
1	1	Support tube Ø 30 mm	F03813
1.1	3	Pistol leg (optional)	F03890
1.2	3	Grub screw (optional)	M01338
2	1	Support tube retainer	F03812
3	2	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	F02689
8	1	Working piston	F03815
9	1	Grub screw M4 x 6	M01315
10	3	Cheese-head screw	M01998
11	1	Pistol half-shell, small (contained in item 19)	
12	1	Push-button, 1-pole	E02103
13	1	Cap, PVC	E02104
14	1	Ball bearing bush	F03824
15	1	Pistol label BS-98	
16	1	Pistol label, company address	
17	1	Cylindrical pin 6mm, 6 x 38	M03543
18	2	Flat-head screw M3 x 6	M01561
19	1	Complete pistol housing	F03811/FA
20	3	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 (stranded conductor)	F02405/FA
31	1	Strain relief	F01715
32	1	Cheese-head screw M4 x 10	M01087
33	1	Spring washer 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 complete with plug	E02101
39	1	Pistol cable complete with plug comprising	F01100/FA
	1	Earth connector SKM-25	E01963
	3 m	Earth cable 25 mm^2	E02035

3.4 Exploded view of stud welding pistol BS-98



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