Operating Instructions

for the machine operator and maintenance personnel
always keep by the machine
Translation of the original instructions

Worm pump S 5 EV / S 5 EV/TM

Machine no.

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Putzmeister

Table of contents

1 Guide to the Operating Instructions

In this chapter you will find notes and information that will help you use these Operating Instructions. If you have any queries, please contact us in confidence at:

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or contact the branch responsible for you or your service dealer. You can find a selection of responsible contacts online at: www.putzmeister.com.

1.1 Foreword

These Operating Instructions aim to help you to familiarise yourself with the machine and make use of its possible applications as designated.

The Operating Instructions contain important information on how to operate the machine safely, properly and economically. Observing these instructions helps to avoid danger, to reduce repair costs and downtimes and to increase the reliability and service life of the machine.

The operator undertakes to supplement the Operating Instructions with the relevant national rules and regulations for accident prevention and environmental protection.

The Operating Instructions must always be available at the machine's site of use.

The Operating Instructions must be read and applied by anyone who will be carrying out the following work with/on the machine:

- Operation, including setting up, fault rectification in the course of work, removal of production waste, maintenance and disposal of functional fluids and auxiliary materials
- Maintenance (service, inspection, repair)
- Transport

The generally recognised rules of technology for safe and proper working must be observed in addition to the Operating Instructions and mandatory rules and regulations for accident prevention in the country and site of use of the machine.

Should you have any questions after studying the Operating Instructions, the relevant branch, your service dealer or the manufacturer will be happy to provide more information.

You will make it much easier for us to respond to any questions if you can give us the details of the machine model and the machine number.

For the purpose of continuous improvement, changes are made at certain times, meaning that these changes may in some circumstances not yet have been taken into account by the time these Operating Instructions are sent to print.

In the event of any amendment, the copy of the Operating Instructions intended for the machine will be replaced in full.

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The pages are divided into chapters, where they are numbered consecutively.

Example: 3 – 2 (chapter 3 – page 2)

1.2 Icons and symbols

The following icons and symbols are used:

Icon/symbol/ designation	Meaning
▸	Individual instruction or alternative step.
1. 2. 3.	Instructions to be carried out as described in the specified sequence.
⇒	Result or intermediate result of previous steps.
➞	Result of an instruction or of several steps.
•	Marking for simple lists.
Cross reference *(Icons and symbols P. 1 — 3)*	Cross references refer to chapters, sections or figures, for example. A cross reference is depicted in brackets.
	Fault rectification – Instructions to be carried out in accordance with fault messages.
	View additional steps. For example, “Contact a qualified electrician”.
✓	Inspection or maintenance activity must be carried out.

Icon/symbol/ designation	Meaning
	Special tools are required. This icon is followed by a list of special tools that are required to carry out the task. (Normal tools, i.e. conventional tools or tools carried in the vehicle, are not listed specially.)
	This icon is followed by an indication of required maintenance work.
	This indicates a tip, helpful note or additional information regarding machine maintenance, environmental protection, etc.

1.2.1 Layout of warning notices

⚠ WARNING

Type and cause of risk

Consequences of not observing the risk.

- What to do in order to provide a remedy or avoid the risk.

Signal words

The signal word is selected in accordance with the ANSI Z535.6:2011 safety standard.

The following signal words are used:

⚠ DANGER

Indicates a dangerous situation in which an accident resulting in serious injuries and/or death may occur. Highest level of risk.

- After identifying the risk, instructions are set out which are intended to avoid or remedy the risk.

⚠ WARNING

Indicates a dangerous situation in which an accident resulting in serious or fatal injuries may occur.

- After identifying the risk, instructions are set out which are intended to avoid or remedy the risk.

⚠ CAUTION

There is a risk of injury to the entire body, however there is no risk of serious or fatal injuries.

- After identifying the risk, instructions are set out which are intended to avoid or remedy the risk.

NOTICE

Risk of damage to the machine. There is no risk of injury.

- After identifying the risk, instructions are set out which are intended to avoid or remedy the risk.

2 Safety regulations

This chapter summarises the most important safety regulations. This chapter must be read and understood by all persons who come into contact with the machine. The various regulations also appear again at the appropriate points in the Operating Instructions.

Special safety regulations may be necessary for some tasks. These special safety regulations will only be found in the description of the particular task.

The following safety instructions should be regarded as a supplement to existing applicable national legal norms and accident prevention regulations.

Existing legal norms and accident prevention regulations must be observed in all cases.

2.1 Definition of terms

The following sections explain the terms used in these operating instructions and describe the requirements for specific groups of personnel.

2.1.1 Auger pump

Depending on the model, the auger pump is a machine designed for site-made mixes and processing premixed dry mortar and self-levelling floor screed. It mixes, pumps and sprays continuously.

2.1.2 Manufacturer

Any natural or legal person who puts into circulation any complete or incomplete machine included in these operating instructions.

2.1.3 Operator

An authorised representative of the machine owner. The operator is responsible for the use of these machines.

2.1.4 Machine operator

Machine operators are personnel trained and assigned to perform the following activities:

- Operating the machine
- Simple inspection and maintenance work
- Testing
- Cleaning

2.1.5 Subject expert

For the purposes of the German Industrial Health and Safety Ordinance, a subject expert is a person who, through their professional training, their professional experience and their recent professional activity, has the required specialist knowledge to inspect the tools.

2.1.6 Qualified personnel

Personnel who have successfully completed a specialist training course that qualifies them to carry out specific activities.

2.1.7 Service technician

Personnel qualified or authorised by the manufacturer to perform maintenance tasks.

2.1.8 Maintenance

Maintenance includes all measures required to inspect and repair a machine.

2.1.9 Workplace

The workplace is the area in which people must remain in order to carry out the work.

The **workplace of the machine operator** during use is at the operating elements of the machine.

The workplace of the operator of connected accessories is where work is being carried out with these accessories. The machine operator and accessories operator must maintain visual contact.

2.1.10 Working area

The working area is the area in which work is carried out with and at the machine. Parts of the working area can become danger zones, depending on the job being performed.

The working area is also the area where work is carried out with and on delivery lines and attached accessories.

Secure the working area and affix signs clearly indicating the dangers. Suitable protective equipment is compulsory within the working area. The machine operator is responsible for safety in the working area when the machine is in use.

2.2 Basic principle

The machine must only be operated in technically perfect condition, as designated and observing the Operating Instructions while remaining conscious of safety and dangers. Faults, particularly those which may compromise safety, must be rectified immediately.

Observe the following basic principles:

- Safety equipment must not be removed, decommissioned or otherwise modified.
- Safety equipment removed for maintenance work must be fitted again as soon as work is complete.
- Following assembly, the safety equipment must be checked to ensure it is fully functional.

Check operational safety every time you start work. Any defects found or suspected must be eliminated immediately. If necessary, inform the project supervisor.

If defects or faults are found or suspected during operation, operation must cease immediately. Rectify the defects or faults before restarting the machine.

2.2.1 Onwards sale

Observe the following for an onwards sale of the machine:

Pass on all accompanying documentation (operating and maintenance instructions, plans, inspection certificates, etc.) you received with your machine to the new operator. If necessary, you must re-order the papers from us, citing the machine number. The machine must not be sold on without the accompanying documentation under any circumstances.

Notifying the manufacturer of the onwards sale/purchase ensures that you will also receive support from the manufacturer as well as any information on safety-relevant changes.

2.3 Designated use

The machine is designed in accordance with current engineering standards and recognised safety rules. However, its use may still present a risk of machine operators or third parties suffering death or injury, or the machine and other property becoming damaged.

The machine may only be used as designated in the Operating Instructions and the accompanying documentation. All notes and safety regulations in the Operating Instructions must be observed.

The S5 auger pump is intended exclusively for mixing and pumping premixed dry and site-made mixes with a particle distribution of up to 6 mm through delivery lines with a maximum nominal diameter of 50 mm.

The auger pump is filled via the hopper or the attached plate mixer.

All protective covering elements of the machine must be fitted during operation. The machine must be operated only with the safety equipment fitted.

Specified inspection work must be carried out at regular intervals.

Any work on the electrical system of the machine must be carried out by trained and qualified electricians only.

Conversions, alterations or modifications to the machine must not be carried out without permission from the manufacturer.

The operational safety of the machine must be inspected by a technical expert at least once a year. The operator is responsible for commissioning the inspection.

2.4 Improper use

Use is defined as contrary to the designated use if it is not described in or goes beyond that described in the “Designated use” section. The manufacturer accepts no liability for damage resulting from such use. The risk lies solely with the machine operator.

2.4.1 Operation with defects

The machine must not be operated with defects. A few examples are listed below:

- Loose or damaged bolts
- Leaks
- Impermissible fill levels
- Wrong functional fluids
- Worn, damaged or defective components
- Worn, damaged or illegible plates
- Worn, damaged or defective safety equipment
- Deactivated or modified safety equipment
- Impermissible or modified connections or fuses

2.4.2 Removal or modification of safety equipment

Depending on the model, the machine is fitted with different safety equipment for protection against serious personal injury.

Removing, modifying or decommissioning safety equipment is prohibited.

If safety equipment has been modified, damaged, removed or is not fully functional, the machine must be shut down and secured immediately. Defects must be rectified immediately.

All protective devices must be undamaged, completely fitted and fully functional. This must be checked through daily visual checks.

If moving protective devices are fitted, an additional function check must be carried out every time before using the machine.

2.4.3 Conveyed material

The machine is only designated for conveying media specified in the machine's technical data. Its performance is limited to operation on construction sites or in workshops. The maximum delivery pressure must not exceed that specified on the rating plate or in the technical data.

2.4.4 Extending the delivery line

Extension of the delivery line beyond the length specified in the technical data is prohibited.

A new delivery line is only suitable for the pressures entered on the rating plate.

2.4.5 Pressurised systems

Opening pressurised systems (delivery line) is prohibited. Before opening, the pressure must be dumped or the entire system must be depressurised.

2.4.6 Site of use

The machine is not approved for operation in potentially explosive areas (unless stated otherwise).

2.4.7 Transport

The machine may only be transported as stated. During transport, lifting equipment, lifting tackle or other auxiliary devices that are unsuitable or not reliable and safe in operation must not be used. Loading the machine with unauthorised materials and accessories, as well as exceeding the maximum permissible gross weight of the machine, is prohibited.

2.4.8 General maintenance

Maintenance measures must not be carried out while the machine is switched on or unsecured. The machine must be set up sufficiently safely and must be secured against unauthorised or accidental switching on. Other necessary safety measures depend on the type of maintenance and are the responsibility of the relevant, authorised and qualified personnel.

Machine components not intended for this purpose must not be stepped on.

It is prohibited to use other components or spare parts than those approved by the manufacturer for maintenance work.

Tools that are unsuitable or not reliable and safe in operation must not be used.

If safety equipment needs to be removed to carry out maintenance work, it may only be removed for the duration of that work. Safety equipment must be fitted again and checked to ensure it is fully functional as soon as maintenance work is complete.

2.4.9 Safety equipment maintenance

The specified inspection and replacement intervals for safety equipment must be observed.

Safety equipment may only be repaired, adjusted or replaced by authorised qualified personnel.

Unauthorised changes to safety-related parts (SRP), adjustable devices, machine data or the removal of seals by the operating company or its authorised maintenance personnel are not permitted.

2.4.10 Changing the works settings

The works settings must not be changed. A few examples are listed below:

- Pressure and performance settings
- Software versions and software parameters

2.4.11 Structural changes

Structural changes must not be implemented without permission from the manufacturer. A few examples are listed below:

- Accessories and attachments not explicitly approved by the manufacturer must not be fitted.
- Alterations or modifications that could compromise safety must not be carried out.
- Welding work on load-bearing parts, pressure vessels, fuel or oil systems is not permitted.
- Welding work is only permitted following consultation with the manufacturer and with express permission.
- Welding work may only be carried out by authorised qualified personnel.

2.4.12 Wrong bolts/nuts and tightening torques

Only nuts and bolts corresponding to the specifications in the spare parts sheets may be used.

Nuts and bolts may only be tightened with the specified tightening torques.

The following nuts and bolts must not be reused:

- Self-locking nuts
- Bolts with adhesive in the locking threads
- Bolts of property class 10.9 and higher

2.5 Liability

The operator is obliged to act in accordance with the Operating Instructions.

The safety and accident prevention regulations from the following institutions must be observed:

- The legal authority of the country of use
- The Industrial Employers' Liability Insurance Associations
- The responsible commercial liability insurance company

The legal authority places liability for accidents caused by not observing safety and accident prevention regulations or by lack of care with the operating personnel or (where they cannot be held responsible due to lack of training or basic knowledge) the supervisory personnel.

2.5.1 Exclusion of liability

We state here expressly that the manufacturer accepts no liability for damage arising from incorrect or negligent operation or maintenance or as a result of improper use. This statement is also valid for modifications to, additions to and customisation of the machine that are liable to compromise safety. The warranty will no longer be valid in such cases.

2.6 Personnel selection and qualifications

Only the following persons may be tasked with the independent operation, servicing or maintenance of the machine:

- Persons above the legally permitted minimum age
- Persons who are physiologically capable (rested and not under the influence of alcohol, drugs or medication)
- Persons who are instructed in the operation and maintenance of the machine
- Persons who can be expected to reliably execute the tasks with which they are charged
- Persons who have been explicitly tasked with the stated activities by the employer

2.6.1 Training

The machine must only be operated, serviced or maintained by trained subject experts. The areas of responsibility for personnel must be clearly defined.

The following personnel must only work on the machine under the permanent supervision of an experienced person:

- Personnel participating in training courses
- Trainees
- Personnel being instructed
- Personnel receiving general training

2.6.2 Qualified personnel

Personnel who have successfully completed a specialist training course that qualifies them to carry out specific activities.

2.6.3 Subject expert

For the purposes of the German Industrial Health and Safety Ordinance, a subject expert is a person who, through their professional training, their professional experience and their recent professional activity, has the required specialist knowledge to inspect the tools.

2.7 Sources of danger

2.7.1 General sources of danger

Never reach into moving machine components, whether the machine is running or switched off. Always switch off the main switch first. Take note of the warning plate.

In case of malfunctions, shut the machine down immediately and secure it. Have faults rectified immediately.

Secure the machine at the set-up site against rolling away by means of chocks.

Make sure than no one can be endangered by the machine starting up before you switch on the machine.

Do not loosen or tighten pressurised threaded unions.

2.7.2 Danger from hot machine components

During and after work, there is a risk of burning from hot parts of the motor and the frame.

2.7.3 Danger from the delivery line and coupling system

The delivery line and coupling system is designed for a maximum operating pressure of 40 bar. The maximum operating pressure must not exceed 40 bar.

2.8 Safety equipment

Never remove or modify safety equipment on the machine.

If safety equipment needs to be removed for set-up, maintenance or repairs, the safety equipment must be refitted and checked immediately upon completion of the maintenance and repair work.

All equipment required for safety and accident prevention (warning signs and information plates, cover grilles, guards, etc.) must be in place. Such equipment must not be removed, modified or damaged.

All warning and information plates on the machine must be complete and fully legible at all times.

It is your responsibility as operator to ensure that any warning and information plates that have been damaged or rendered illegible are replaced without delay.

2.9 Personal protective equipment

To reduce the risk to life and limb, personal protective equipment must be used by the operating personnel whenever necessary or required by regulations. Safety helmet, protective gloves and safety footwear are specified for all persons working at or with the machine.

Personal protective equipment must at least comply with the specified standards.

Symbol	Meaning
	Safety helmet The safety helmet protects your head, e.g. against falling concrete or parts of the delivery line if the lines burst. (DIN EN 397:2013; Industrial safety helmets)
	Safety footwear Safety footwear protects your feet against falling objects and against penetration by projecting nails. (DIN EN ISO 20345:2012; Safety footwear for professional use; category S3)
	Hearing protectors Hearing protectors protect you against the noise generated in the vicinity of the machine when you are standing close to it. (DIN EN 352-1:2003; Hearing protectors - General requirements - Part 1: Earmuffs or DIN EN 352-3:2003; Hearing protectors - General requirements - Part 3: Earmuffs attached to an industrial safety helmet)
	Protective gloves Protective gloves protect your hands against aggressive or chemical substances and against mechanical effects (e.g. knocks) and cutting injuries. (DIN EN 388:2017; Protective gloves against mechanical risks; classification 1111)
	Protective goggles Protective goggles protect your eyes from injuries due to concrete spatter and other particles. (DIN EN 166:2002; Personal eye protection - Specifications)

Symbol	Meaning
	Safety harness When working at heights, use climbing aids and platforms that are intended for this purpose and comply with the safety regulations or wear a safety harness. Relevant national regulations must be observed. (DIN EN 361:2002; Personal protective equipment against falls from a height - Full body harnesses; category III)
	Respiratory protection and face mask Respiratory protection and face masks protect you from particles of building materials that may enter your body through the respiratory passages (e.g. concrete admixtures). (DIN EN 149:2009; Respiratory protection devices - Filtering half masks to protect against particles - Requirements, testing, marking; classification FFP1)

2.10 Risk of injury, residual risks

The machine is designed in accordance with current engineering standards and recognised safety rules. However, its use may still present a risk of machine operators or third parties suffering death or injury, or the machine and other property becoming damaged.

Some of the injuries that may be caused by improper use of the machine are listed below:

- Risk of crushing and impact when moving and setting up the machine.
- Electrical contact (possibly with fatal consequences) with the electrical equipment, if the connection has not been made properly or electrical assemblies are damaged.
- Injuries through unauthorised start up or use of the machine.
- Noise exposure, if persons without hearing protectors are permanently in the vicinity of the machine.

- Injuries to the skin and eyes caused by dust particles, concrete spatter, water glass or other chemical substances.
- Damage to health caused by breathing in dust particles or cleaning agents, solvents and preservatives.
- Injuries caused by opening pressurised delivery lines (e.g. following blockages).
- Injuries caused by tripping over cables, hoses or reinforcements.

2.11 Risk of crushing and impact

2.11.1 Operating modes

There is a risk of crushing and impact at the machine during the following operating modes:

- Transport
- Setting up
- Starting up
- Operation
- Cleaning, troubleshooting and maintenance
- Decommissioning

2.11.2 Transporting the machine

The machine has no attachment points. It is loaded on suitable transport handling equipment (Euro pallet). Use a suitable crane with lifting gear or a forklift truck to lift the machine.

⚠ WARNING

Risk of crushing due to lifting and loading the machine

1. Lift the machine carefully with a forklift truck and move it with great care.
2. When lifting with the crane, determine the centre of gravity of the machine by lifting it carefully. All cables or chains on the lifting gear must be tensioned evenly and the machine must be raised evenly at all support points.
3. Load the machine on a suitable transport vehicle.
4. Secure the machine to prevent it from rolling away, slipping and toppling over during transport.

⚠ WARNING

Risk of death or injury from falling loads

Hoisted loads may fall if they are not loaded properly or if the auxiliary loading equipment is damaged.

1. Use only undamaged auxiliary loading equipment designed for the gross weight of the machine.
2. Do **not** walk under suspended loads.

2.11.3 Assembly of the worm pump

There is a risk of crushing when mounting the worm pump.

⚠ WARNING

Risk of crushing due to turning of the auger pump

Depending on the mounting position of the stator or screw conveyor barrel, it can turn all the way to the stop when the machine is switched on.

1. Secure the machine against unauthorised or accidental starting.
2. Never reach into the auger pump while switching the machine on.
3. For screw conveyor barrels with a stop, this must be secured at the stop of the mixing pipe.

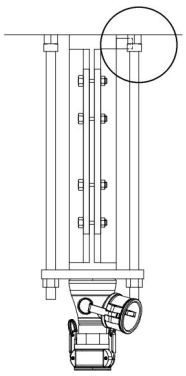


Figure 1: Risk of crushing in the end stop area of the auger pump

2.12 Electrical contact

There is a risk of death from electrical contact on the control cabinet, the electrical lines and the motor during the following operating modes:

- Starting up
- Operation
- Cleaning, troubleshooting and maintenance
- Decommissioning

As standard, all electrical assemblies are protected according to degree of protection IP 54 in line with IEC 60204 part 1 or DIN EN 60529.

Use only original fuses with the specified voltage rating. Bridging or the use of fuses with too high a rating can irreparably damage the electrical system.

Work on the electrical systems and equipment of the machine must only be carried out by a qualified electrician or by instructed persons under the supervision and guidance of a qualified electrician and in accordance with electrical engineering rules and regulations.

2.13 Blockage

Blockages increase the risk of accidents. A well-cleaned and leak-tight delivery line prevents the formation of a blockage.

Using the correct couplings and delivery line connections largely prevents the formation of a blockage. To prevent blockages in the delivery lines, you must moisten the inside of the delivery lines.

DANGER

Risk of death due to the incorrect removal of a blockage

When removing a blockage with compressed air, the delivery line may burst or the blockage may be ejected from the delivery line at a high pressure.

- **Never** remove a blockage using compressed air.

⚠ WARNING

Risk of death due to ejected blockage

1. Align the delivery line so that no persons are hit by ejected blockages.
2. Secure the danger zone to prevent unauthorised access.
3. Always wear personal protective equipment.

2.14 Conduct in an emergency

In case of an emergency or malfunctions, shut the machine down immediately and secure it. Rectify faults immediately or, if needed, consult an authorised service technician.

For further details, see also the “Emergency shutdown procedure” section in the “Operation” chapter.

(Emergency shutdown procedure P. 6 — 2)

2.15 Environmental protection

Collect residual hydraulic fluid, grease, solvent or cleaning agent separately, safely and in an environmentally friendly manner in suitable collectors. Store and dispose of them in an environmentally friendly manner according to applicable local regulations.

Use only suitable and sufficiently large containers to drain functional fluids. Escaped functional fluids must be bound with binding agents immediately and contaminated soil must be disposed of in line with regulations.

Always close fuel, hydraulic fluid or grease containers carefully.

Make sure that you dispose of empty functional fluid containers, old filters, batteries, replacement parts, used cleaning rags, etc. in line with regulations and in an environmentally friendly manner.

Only work with waste disposal companies who are approved by the responsible authorities. Ensure that different oils are never mixed.

2.16 Noise emissions

Noise emissions are created at the machine during the following operating modes:

- Starting up
- Operation
- Cleaning, troubleshooting and maintenance
- Decommissioning

Wear hearing protectors during machine operation if the sound pressure level reaches 85 dB(A) or higher. Above 85 dB (A), hearing protectors must be worn. You will find the value for your machine's sound pressure level in the "Technical data" section.

2.16.1 Operator

The operating company must provide personnel with hearing protectors.

Instruct your personnel to always wear their personal hearing protectors. As the operator, you are responsible for ensuring that your personnel comply with this regulation.

All soundproofing equipment must be fitted and in perfect condition. It must be fitted during operation. A high sound level can cause permanent hearing damage.

2.17 Safety-related parts (SRP)

⚠ WARNING

Risk of death

The incorrect assembly of safety-related parts may lead to malfunctions.

- ▸ Only have safety-related parts (SRP) repaired, serviced or replaced by authorised and qualified personnel.

Safetyrelated parts (SRP) are parts used to ensure the machine's functional safety. They are specially marked on spare parts sheets. If you order a spare part that can be used as a safety-related part, it is delivered in its own separate, labelled package.

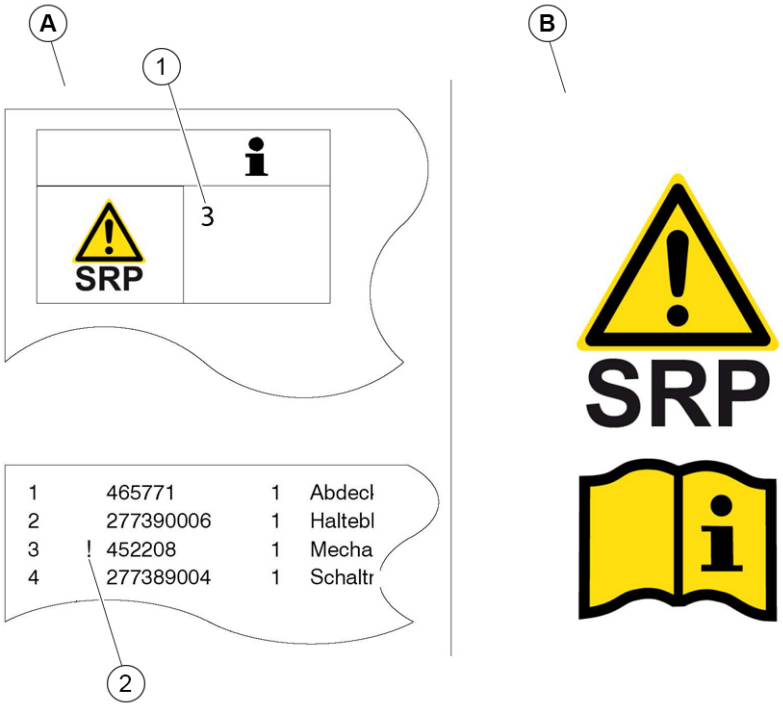


Figure 2: SRP marking

Item	Designation
A	Spare parts sheet
1	Parts list position
2	Marking as safety-related part (SRP)
B	Spare parts packaging

2.18 Spare parts

Spare parts must meet the technical requirements specified by the manufacturer. This is always guaranteed for original spare parts.

Use only original spare parts. The manufacturer accepts no liability for damage caused by the use of spare parts that are not original spare parts.

2.19 Accessories

Accessories must meet the technical requirements specified by the manufacturer and be compatible with one another. This is always guaranteed for original accessories.

Accessories not included in the products supplied with the machine are supplied by the manufacturer and can be purchased via the Parts Sales department. The supplied accessories are listed on the delivery note.

The operating company is responsible for ensuring that the correct accessories are used. The manufacturer accepts no responsibility or liability for damage caused by the use of third-party accessories or by incorrect use.

2.20 Storing the machine

The machine should be stored only in a dry, frostfree location.

If there is a risk of freezing at the storage location, corresponding frost protection measures must be implemented.

2.21 Unauthorised start-up or use of the machine

2.21.1 Operating modes

There is a danger posed by unauthorised start up or use of the machine during the following operating modes:

- Starting up
- Operation
- Cleaning, troubleshooting and maintenance
- Decommissioning

2.21.2 Securing the machine

The machine operator must always be able to see the machine. If necessary, the machine operator must appoint a person to monitor the machine. If unauthorised persons approach the machine, the machine operator must cease work immediately.

Always secure the machine against unauthorised start-up before you move away from the machine:

- Switch the machine off at the main switch.
- Secure the main switch.

3 General technical description

This chapter describes the components and assemblies on this machine and describes how they function. Please note that possible (optional) auxiliary equipment is also described.

3.1 Machine model

Your machine is an S 5 worm pump.

The following data can be found on the rating plate:

- Machine model
- Machine number

You will make it much easier for us to respond to any questions or orders if you give us the details of the machine model and the machine number.

3.2 Overview

Below you will find an overview of the most important components that are described on the following pages.

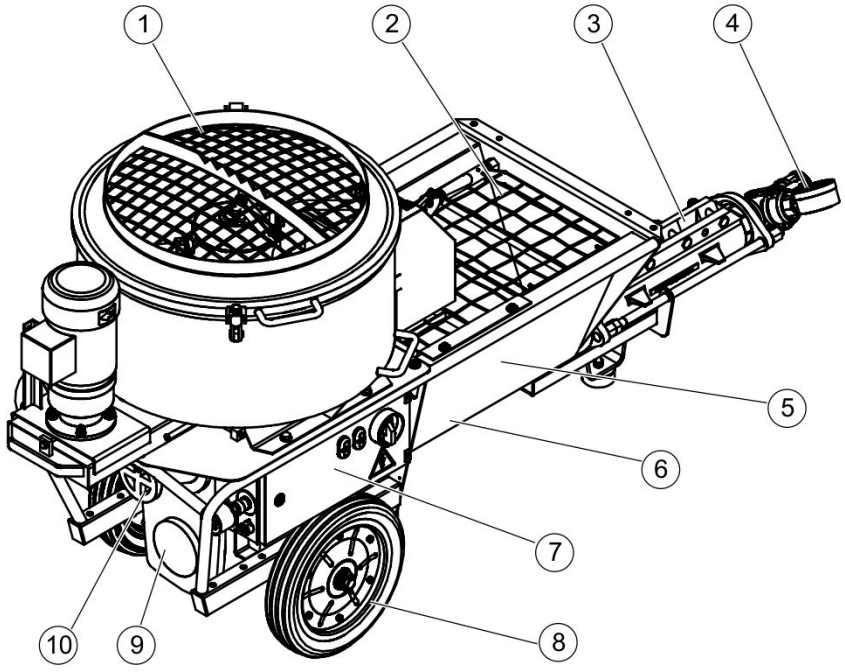


Figure 3: Machine overview

Item	Designation
1	Pan mixer (S 5 EVTM)
2	Protective grille
3	Worm pump

Item	Designation
4	Pressure connection
5	Hopper
6	Cardan shaft
7	Control box
8	Axle and wheels
9	Engine
10	Handwheel adjuster

3.3 Technical data

Dimensions	S 5 EV	S 5 EVTM
Length	2290 mm	2840 mm
Width	680 mm	680 mm
Height	650 mm	1150 mm

Weights	
Gross weight	See rating plate

Performance data	
Voltage	See rating plate
Frequency	
Power	
Power connection	The electrical connection must be made on the basis of the electrical circuit diagram supplied. The electrical circuit diagram can be found in the machine spare parts list.
Worm pump	2L6 (standard) 2L54 (option)

Performance data	
Worm pump	Depending on the application, different auger pumps are more suitable. If you have any queries, please contact us your service dealer.
Delivery rate	7 to 40 l/min (2L6) 8 to 55 l/min (2L54)
Max. delivery pressure	See rating plate
Max. delivery distance[1]	60 m horizontal, 40 m vertical
Max. particle size of conveyed material	6 mm (2L6) 10 mm (2L54)
Sound power level	See plate on the machine
Inclination angle in longitudinal direction	Max. 7°
Inclination angle in transverse direction	Max. 7°
Engine	Electric motor
Mixer drive (EVTM version)	2.2 kW
Hopper volume	100 l

The output specifications are guide values.

The maximum delivery rate and the maximum delivery pressure cannot be achieved simultaneously.

The specifications depend on the following variables:

- Material to be pumped
- Material composition
- Consistence

1 The data provided represents maximum values and depends on the material type and consistence, hose cross section and delivery rate.

3.4 Rating plate

The most important machine specifications are shown on the rating plate.

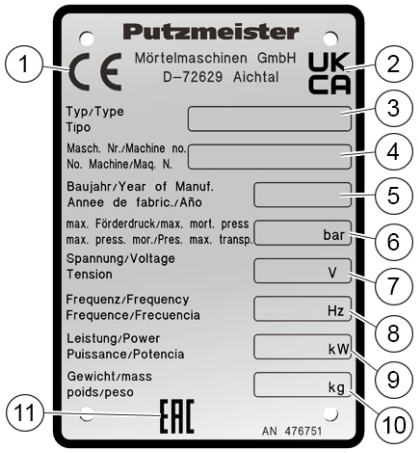


Figure 4: Rating plate

Item	Designation
1	CE marking (product complies with European regulations)
2	UKCA marking (product complies with the technical regulations of the United Kingdom)
3	Model (machine model)
4	Machine no. (machine number)
5	Year of manufacture
6	Max. delivery pressure [bar]
7	Voltage [V]
8	Frequency [Hz]
9	Power [kW]
10	Weight [kg]
11	EAC marking (product complies with the technical regulations of the Eurasian Economic Union)

3.5 Sound power level

Next to the rating plate on the machine there is the plate shown in the picture below, which gives the machine's sound power level measurement.

Figure 5: Plate – sound power level

Item	Designation
L_{WA}	Sound power level
dB	Value in decibels

3.6 Options

Talk to your service dealer or representative of the manufacturer to discuss if and how you can upgrade your machine.

The following options can be installed on your machine:

- Automatic water metering
- Compressed-air remote control
- Vibrator
- Pan mixer
- Reversing switch for adjusting the pan mixer’s direction of rotation
- Compressor (supplied)

You can find further options and accessories in the Putzmeister Mortar Machines GmbH catalogue or online at: www.putzmeister.com

3.7 Safety equipment

The following is a list of safety equipment installed on the machine.

⚠ WARNING

Risk of injury if not all safety equipment is fitted and fully functional

- ▸ Only operate the machine with all safety equipment fitted and fully functional.

3.7.1 EMERGENCY STOP button

The machine is fitted with an EMERGENCY STOP button.

⚠ WARNING

Danger to persons from the machine

1. If situations arise during operation which could endanger persons, the machine must be stopped immediately by pressing the EMERGENCY STOP button.
2. After an EMERGENCY STOP, eliminate the danger before restarting operation.

NOTICE

Machine damage caused by incorrect actuation of the EMERGENCY STOP button

1. Only press the EMERGENCY STOP button in the event of danger.
2. Do **not** use the EMERGENCY STOP button to switch off the machine.

i Familiarise yourself with the position of the EMERGENCY STOP button(s) on your machine.

Pressing the EMERGENCY STOP button triggers the following actions:

- The pump stops.
- The mixing apparatus stops.
- All control panels and switch boxes are electrically locked.

To cancel the EMERGENCY STOP status, unlock the depressed EMERGENCY STOP button by turning it.

3.7.2 Protective grille

There is a divided protective grille on the machine's hopper. One half of the protective grille is screwed in place. The other half of the protective grille can be folded.

The protective grille in the machine's plate mixer is also screwed in place.

The mesh size of the protective grille is such that material can fall unobstructed into the container, yet it guarantees protection for the machine operator.

⚠ WARNING

Risk of injury due to removed protective grille

1. Make sure that the protective grille is fitted in every operating mode.
2. Fit the protective grille again every time maintenance work is completed.
3. Only operate the machine when the protective grille is closed.

⚠ WARNING

Danger due to defective protective grille

Protective grilles are subjected to wear as a result of operation.

- Replace the protective grille if the residual material thickness of the grille rods falls below 50%.

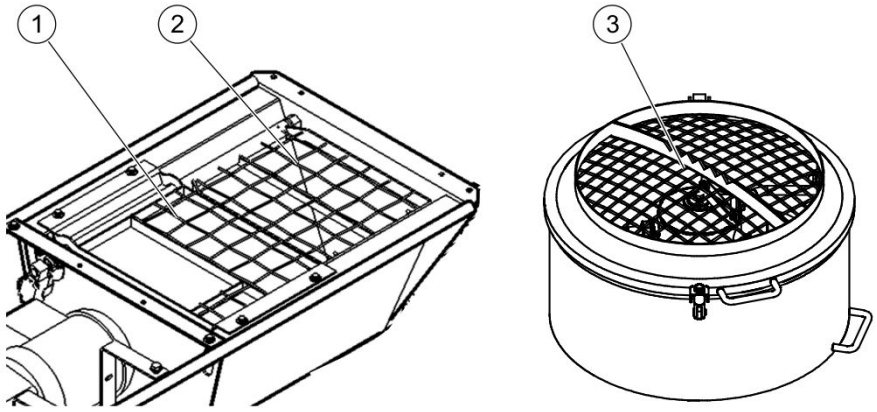


Figure 6: Protective grille

Item	Designation
1	Fixed protective grille on the hopper
2	Folding protective grille on the hopper
3	Protective grille on the plate mixer

Protective grille safety switch

The machine is equipped with a safety switch for the protective grille. The mixing apparatus switches off immediately when the protective grille is raised.

3.8 Description of the functions

The following sections are intended to help you understand the operational sequences of the machine so that you can limit the field of application of the machine to suitable areas and avoid faults in operation.

The machine is exclusively intended for pumping pre-mixed, pumpable dry and wet mortars with a particle distribution of up to max. 6 mm. It mixes, pumps and sprays continuously.

The machine is filled via the hopper.

From the hopper, the mixed material is pumped through an auger pump and into the delivery hose. A spray gun can be attached to the end of the delivery hose. Air is introduced from the compressor and the mortar applied in the desired layer thickness.

A provided compressor is required for spraying works.

3.9 Plate mixer

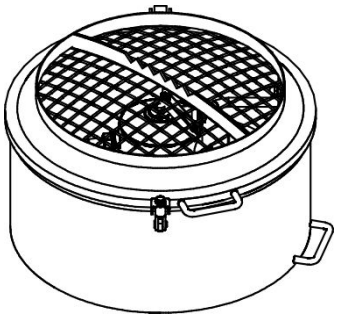


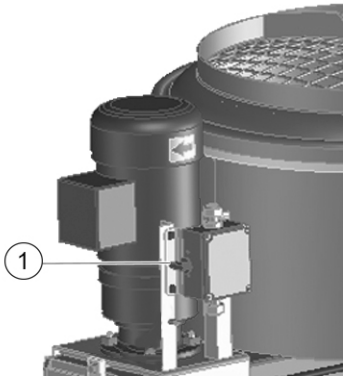
Figure 7: Plate mixer

On its mixer side, the machine can be combined with a plate mixer. The plate mixer forms a unit in its own right, and will work independently of the machine.

The plate mixer is used for premixed dry mortars, which must be mixed either particularly intensively or for longer periods.

The plate mixer is fitted on the machine. The electrical connection is made at the machine control cabinet.

The plate mixer is filled from the mixer drum, where the mortar is mixed to the required consistence. The pumpable material is then drained into the machine's hopper through a flap.



Item	Designation
1	Switch for adjusting the plate mixer's direction of rotation

The plate mixer's direction of rotation can be changed using the optional reversing switch.

3.10 Control cabinet

The machine is operated and controlled from the control cabinet.

3.10.1 General

DANGER

Risk of death due to fatal electric shock

- Work on the electrical system may only be carried out by certified, licensed and qualified electricians (proof of qualification in line with EN 60204, part 1, page 14, item 2.21).

NOTICE

Machine damage caused by incorrect fuses

Overriding fuses or fuses that are too strong may destroy the electrical system.

- Use only original fuses with the specified voltage rating.

The wiring, earthing and connections on the control cabinet comply with VDE codes of practice.

3.10.2 Overview

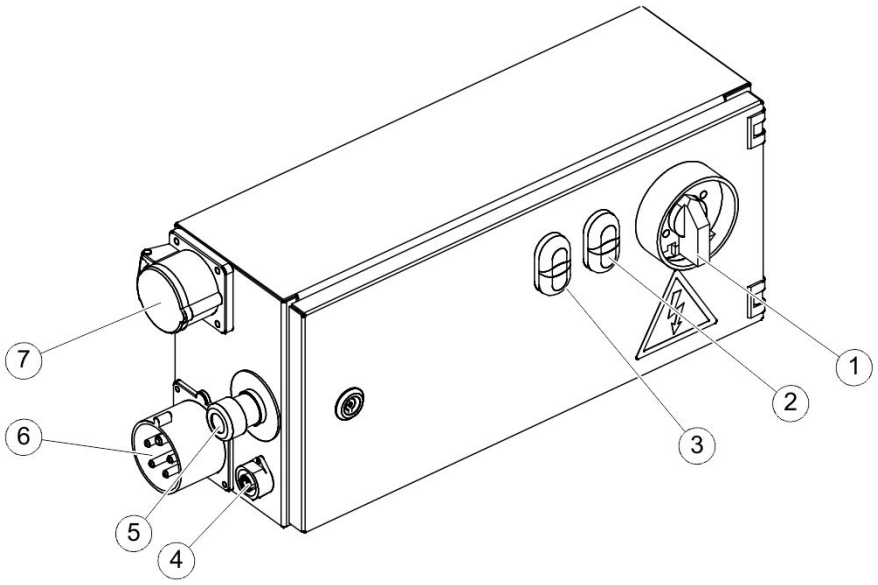


Figure 8: Control cabinet

Item	Designation
1	“Power supply ON/OFF” main switch
2	“Pump ON/OFF” double push-button
3	“Plate mixer ON/OFF” double push-button (option)
4	“Remote control connection” blanking plug
5	EMERGENCY STOP button – switches the machine off in an emergency
6	“Power supply connection” CEE external device plug
7	“Compressor connection” CEE external device socket

3.11 Drive

The machine is powered by an electric motor. The infinitely adjustable delivery rate is set using the handwheel adjuster.

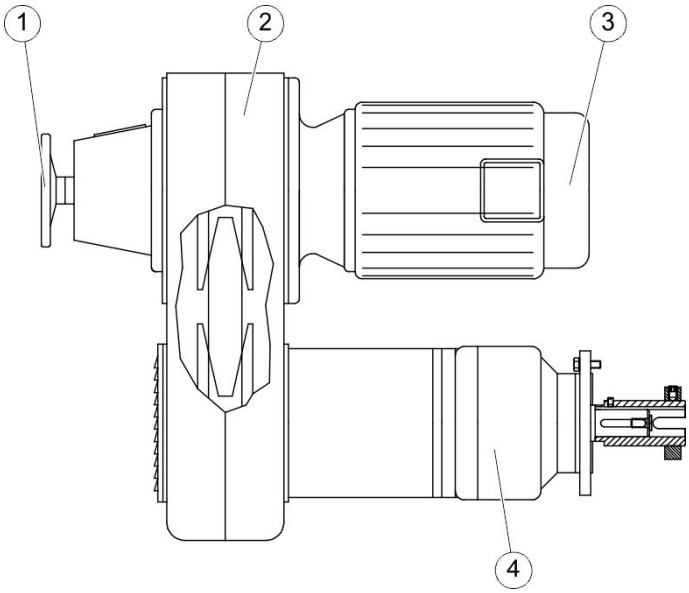


Figure 9: Drive

Item	Designation
1	Handwheel adjuster
2	Variable drive
3	Drive motor
4	Gearbox

Depending on the model, the motor has different connected loads. The connected loads of your machine are shown on the rating plate.

Further information regarding the motor can be found in the documentation from the motor manufacturer.

3.12 Worm pump

The worm pump fitted in the machine is a so-called displacement pump. An screw conveyor (rotor) rotates inside a fixed screw conveyor barrel (stator). The screw conveyor is made from a highly wear-resistant and extremely hard metal alloy; the screw conveyor barrel from a steel sleeve with an elastic, vulcanised rubber core.

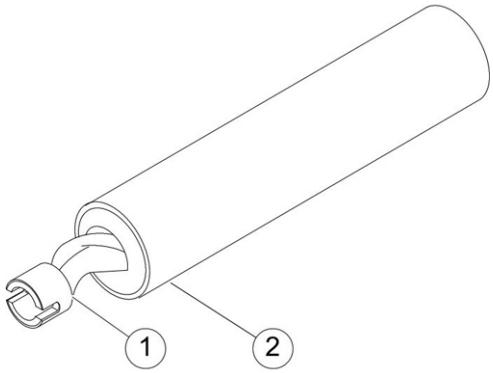


Figure 10: Auger pump overview

Item	Designation
1	Screw conveyor
2	Screw conveyor barrel

Depending on the model, the worm pump can be equipped with a clamping sheath for tightening.

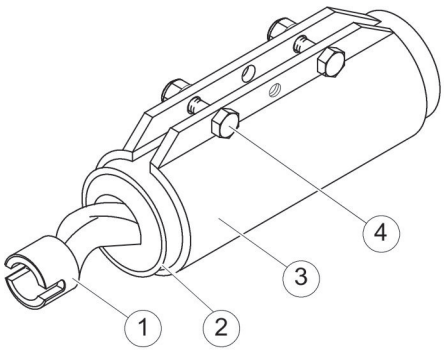


Figure 11: Auger pump with clamping sheath overview

Item	Designation
1	Screw conveyor
2	Screw conveyor barrel
3	Clamping sheath
4	Clamping bolts

The wear of the worm pump can be compensated by tightening. You can also adjust the delivery pressure by pre-tightening or relieving the tension on the screw conveyor barrel. The “Maintenance” chapter describes how to adjust the worm pump. *(Checking and adjusting the worm pump P. 8 — 15)*

3.13 Cable remote control

The machine is fitted with a cable remote control as an option.

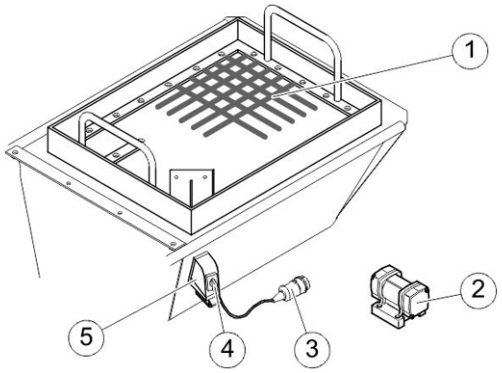
It can be used to switch the auger pump on and off. The socket for this is located on the control cabinet.

Figure 12: Cable remote control

Item	Designation
1	Cable remote control
2	EMERGENCY STOP button
3	“ON/OFF” toggle switch – switches the auger pump on/off.
4	“Remote control” connector plug

3.14 Vibrator

As an option, the machine can be equipped with a vibrating screen and a vibrator.



Item	Designation
1	Vibrating screen
2	Vibrator
3	“Vibrator ON/OFF” rotary switch
4	“Power supply connection” CEE external device plug
5	“Vibrator connection” CEE wall socket

The vibrator fitted on the vibrating screen is connected to the “Vibrator connection” wall socket. The “Power supply connection” external device plug is plugged in at the control cabinet.

The vibrator is switched on and off using the “Vibrator ON/OFF” rotary switch.

3.15 Compressed-air remote control

As an option, the machine can be equipped with a compressed-air remote control.

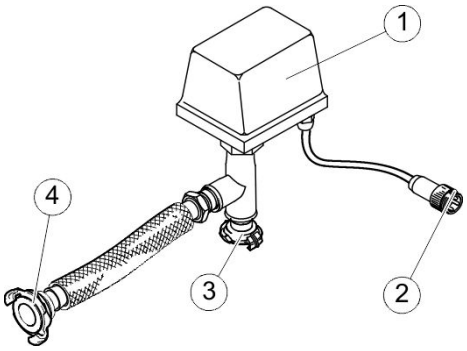


Figure 13: Compressed-air remote control

Item	Designation
1	Pressure switch
2	“Control cabinet connection” connector plug
3	“Compressor connection” hose coupling
4	“Air tapping” hose coupling

When working with the spray gun, the pump is switched on and off via the pressure switch of the compressed-air remote control.

The connector plug is plugged in at the control cabinet in place of the cable remote control.

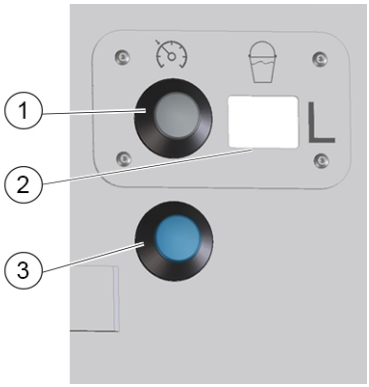
Air for spraying is fed from the provided compressor to the spray gun via the compressed-air remote control.

Adjusting the pressure switch is described in the “Maintenance” chapter, section *(Adjusting the pressure switch P. 8 — 8)*.

3.16 Automatic water metering

The machine can be equipped with automatic water metering as an option. The required water volume can be set on the water supply fitting. The water supply automatically stops once the required volume has been supplied.

Select the water volume (litres) in accordance with the manufacturer’s information specified on the bagged goods used.



Item	Designation
1	Grey button: Set the required water volume (litres)
2	Set water volume indicator
3	Blue button: Start (or stop) the water supply

3.16.1 Setting the water volume

1. Briefly press the grey button
   ⇒ The first digit of the indicator flashes.
2. Now press and hold the grey button
   ⇒ The indicator automatically counts up from 0 to 9.
3. Release the button once the required water volume (litres) is displayed.
4. To switch to a different digit on the indicator, briefly press the grey button again and proceed as described above.

➔ Once you have entered the required water volume, the indicator mode changes from flashing to continuous display.

3.16.2 Starting and stopping the water supply

▸ Press the blue button to start the water supply
   ⇒ The indicator displays the supplied water volume.

➔ The water supply automatically stops once the preset volume has been reached.

The water supply can be stopped prematurely by pressing the blue button again.

4 Transport, setting up and connection

In this chapter you will find information concerning safe transport of the machine. In this chapter, you will furthermore find information on tasks necessary for the assembly and connection of the machine. Starting up the machine is described in the *(Starting up P. 5 — 1)* chapter.

4.1 Unpacking the machine

The machine is packaged for transport at the works. The packaging is made from recyclable material.

Dispose of the packing material in compliance with the nationally valid environmental protection regulations.

4.2 Transporting the machine

The machine has no lifting points. It is loaded on suitable transport handling equipment (Euro pallet). Use a suitable crane with lifting gear or a forklift truck to lift the machine.

⚠ WARNING

Risk of crushing due to lifting and loading the machine

1. Lift the machine carefully with a forklift truck and move it with great care.
2. When lifting with the crane, determine the centre of gravity of the machine by lifting it carefully. All cables or chains on the lifting gear must be tensioned evenly and the machine must be raised evenly at all support points.
3. Load the machine on a suitable transport vehicle.
4. Secure the machine to prevent it from rolling away, slipping and toppling over during transport.

⚠ WARNING

Risk of death or injury from falling loads

1. Use only auxiliary loading equipment designed for the weight of the machine.
2. Use all available lifting points.
3. Do **not** walk under suspended loads.

4.3 Selecting a setup site

As a rule, the site management determines the set-up site for the machine and prepares the site accordingly.

The responsibility for setting up the machine safely falls on the machine operator.

The set-up site must fulfil the following criteria:

- The supporting ground must be level, even and firm.
- The set-up site must be large enough to open all flaps and hoods without obstruction.
- A clearance of at least 1 m must be provided around the machine.
- The set-up site must be sufficiently illuminated.

Inspect the proposed site carefully and reject the set-up site if you have any doubts in respect of safety.

⚠ WARNING

Risk of injury due to falling items

People may be seriously injured or killed by falling items.

1. Set up the machine outside the danger zone of elevated workplaces.
2. Protect workplaces at the machine with suitable protective roofs.

4.3.1 Supporting ground

The supporting ground must fulfil the following criteria:

- The supporting ground must be firm enough to absorb the forces passed on from the machine into the ground.
- There must not be any voids or ground unevenness under the machine.
- The set-up site must be concreted if the machine will stand there for a longer period of time.
- The machine must be anchored at the set-up site while working with high pressure or large delivery rates.

4.4 Setting up the machine

The machine must be set up so that it is absolutely stable and secured against slipping.

NOTICE

Machine damage caused by not observing the permissible inclination angle

The lubrication function is no longer ensured for larger inclination angles. These conditions will lead to increased wear or machine damage.

- Observe the maximum inclination angle of the machine *(Technical data P. 3 — 3)* during set-up and operation.

1. Secure the machine against rolling by placing chocks under the wheels.
2. On machines with a braking device, apply the parking brake.
3. Align the machine horizontally. Observe the permitted inclination angles.
4. On machines with removable lighting equipment, fit this equipment in the provided brackets before starting the machine.

4.5 Fitting the pan mixer

Fit the pan mixer on the machine as described below:

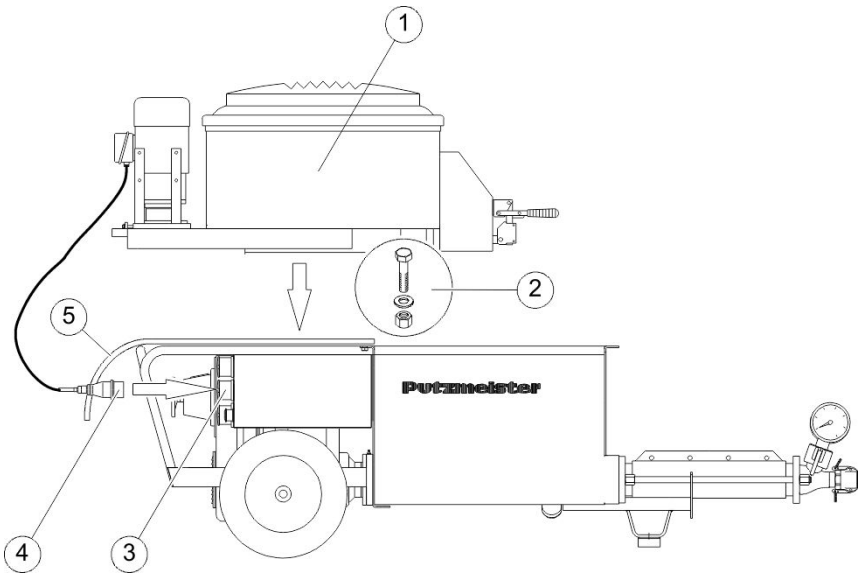


Figure 14: Fitting the plate mixer

Item	Designation
1	Plate mixer
2	Fastening bolts
3	“Plate mixer connection” CEE external device socket
4	“Plate mixer” CEE external device plug
5	Rubber cover

⚠ WARNING

Risk of crushing from lifting components

1. Use only suitable lifting equipment for lifting components.
2. Lifting equipment, lifting tackle, support trestles and other auxiliary equipment must be reliable and safe in operation.
3. Make sure that the load-bearing capacity of the lifting equipment is sufficient.

⚠ WARNING

Risk of death or injury from falling loads

1. Use only auxiliary loading equipment designed for the weight of the machine.
2. Use all available attachment points.
3. Do **not** walk under suspended loads.

1. Loosen the fastening bolts on the frame of the machine.

The rubber cover must remain on the machine for protection.

2. Place the pan mixer on the frame of the machine.
3. Attach the pan mixer tightly with the fastening bolts.
4. Plug the “Pan mixer” external device plug into the “Pan mixer connection” external device socket on the control box.
5. Fit all removed safety equipment again correctly.
6. To remove the pan mixer, repeat the process in reverse order.

4.6 Electrical connection

The electrical connection must be made on the basis of the electrical circuit diagram supplied. The electrical circuit diagram can be found in the machine spare parts list.

You can find the electrical connected loads in the electrical circuit diagram and on the machine rating plate.

The following requirements for the mains connection must be fulfilled by the operating company:

- The local laws and regulations must be observed.
- Protection in the case of indirect contact must be ensured through the automatic cut-out of the supply in line with IEC 60364-4-41:2005.

⚠ DANGER

Risk of death due to fatal electric shock

- Work on the electrical system may only be carried out by certified, licensed and qualified electricians (proof of qualification in line with EN 60204, part 1, page 14, item 2.21).

⚠ DANGER

Risk of death due to incorrect electrical connection or damaged electrical lines

1. Before establishing electrical connections, check that the electrical lines are not damaged.
2. Make sure that the electrical connections have been established correctly.

4.6.1 Power sources

Electrical installation prerequisites should be checked by a qualified electrician before connection work begins.

The machine must be connected to a separate feed point on construction sites. The following power sources are permissible as a special feed point:

- Site power distribution point
- Small site power distribution point
- Protective distributor
- Movable protective device

The power source must fulfil the following criteria:

- The power source is equipped with a residual current device (RCD).
- The connected load of the existing electrical installation must be sufficient for the machine. Please refer to the technical data for the maximum pre-fuse.
- All three phases and the protective earth conductor must be present.

4.6.2 Electrical supply cables

Supply cables must be laid neatly, taking local conditions into consideration, and safeguarded against damage.

DANGER

Risk of death due to fatal electric shock from damaged cables

If cables are installed unprotected on the construction site, they may be damaged by environmental or mechanical factors.

1. Install cables from the power source to the machine such that they are safe and protected.
2. Make sure that the cables are installed such that they are protected from mechanical damage and environmental influences. If necessary, install the cables in cable ducts.

DANGER

Risk of death due to fatal electric shock from control boxes and terminal boxes

It is possible to come into direct contact with live parts on control boxes and terminal boxes.

Please note that the control box can only be opened with a special key or tools.

- Only qualified personnel may open the control box.

4.6.3 Connecting the machine

DANGER

Risk of death from switching on the main switch too soon

1. The main switch must remain secured while the machine is set up.
2. Only switch on the main switch once the machine has been completely and correctly set up.

- Plug the connector of the supply cable into the external device socket.

5 Starting up

This chapter contains information on starting up the machine. It describes the work steps required for the initial commissioning of the machine and how to prepare the machine before use after longer breaks. There is also a description on how to check the condition of your machine and how to carry out a test run with function checks.

The operating personnel should be instructed on the machine during the initial commissioning.

For every use of the machine, the operator of the machine accepts full responsibility for the safety of anyone located in the device's danger zone. The operator is therefore under an obligation to ensure the operational safety of the machine.

After receiving the machine, the operator must ensure they are familiar with the machine. This means:

- The operator must have read and understood the Operating Instructions (particularly the “Safety regulations” chapter).
- The operator must implement the correct measures in an emergency and switch off and secure the machine.

The entire machine must be monitored during the first operating hours to detect any malfunctions.

5.1 Checks

Each time your machine is used, you should check the condition of the machine and carry out a test run including function checks. If you identify any defects during the checks, you must eliminate these (or have these eliminated) immediately.

5.1.1 Visual checks

Some visual checks should be carried out before starting up the machine.

1. Always check the machine thoroughly for defects before the start of work.
2. Check the delivery line for damage.
3. Check whether all safety equipment is fitted and fully functional.
4. Check that the components have been correctly assembled.
5. Observe the warning and information plates on the machine.

5.1.2 Electrical connection

Using faulty electrical components or connecting components incorrectly may result in serious (possibly fatal) injury or severe damage to the machine.

1. Always check all electrical components carefully for defects before the start of work.
2. Check whether the required power supply is available.

5.2 Test run

A test run must be carried out before operating the machine. During the test run, different functions are checked.

NOTICE

Machine damage caused by defects not having been rectified

- Any defects found during these tests must be rectified immediately. A fresh inspection is necessary after every repair. The machine may only be put into operation once all the inspections described below have been concluded satisfactorily.

5.2.1 Switchon conditions

Before switching on the auger pump, the following switch-on conditions must be present:

1. Check whether the machine is in a level position.
2. Check whether the required power supply is available.

5.2.2 Switching on the pump

Switch the pump on as described below.

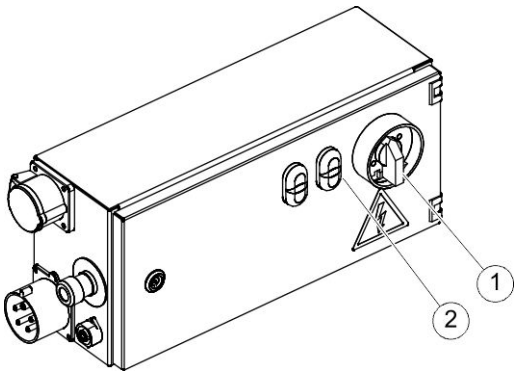


Figure 15: Switching on the pump

Item	Designation
1	Main switch
2	“Pump ON/OFF” double push-button

1. Switch on the main switch *(1)*.
2. Switch on the pump using the double push-button *(2)*.

5.2.3 Checking the direction of rotation

Check whether the pump's direction of rotation is correct as described below.

The Cardan shaft must turn in the direction of the arrow. If the direction of rotation is incorrect, the pump cannot deliver material.

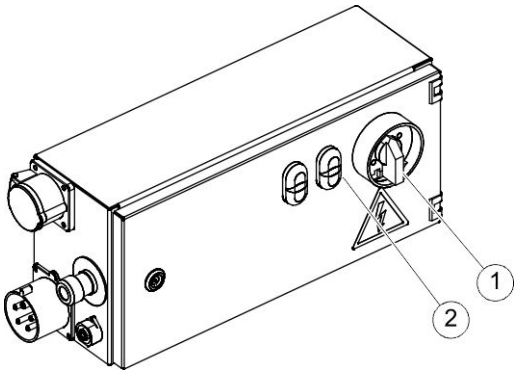


Figure 16: Switching on the pump

Item	Designation
1	Main switch
2	“Pump ON/OFF” double push-button

1. Switch the machine on at the main switch *(1)* (position “I”).
2. Switch on the pump using the “Pump ON/OFF” double push-button *(2)*.
3. Check whether the direction of rotation of the Cardan shaft is correct by noting the directional arrows on the gearbox.
4. Switch off the pump using the “Pump ON/OFF” double push-button *(2)*.
5. Switch the machine off at the main switch *(1)* (position “0”).

5.2.4 Changing the direction of rotation

Change the direction of rotation as described below.

NOTICE

Risk of damage to the reversing switch

The direction of rotation is set using the integrated main reversing switch.

- Never press the reversing switch while the main switch is in the “I” position. The rotating-field mechanism is locked – turning by force will damage the switch mechanism.

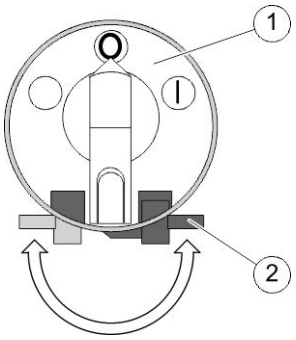


Figure 17: Changing the direction of rotation

Item	Designation
1	Main switch
2	Reversing switch

1. Switch the reversing switch *(2)* over.
   ⇒ The “I” symbol automatically changes to the other direction of rotation.
2. Switch on the main switch *(1)*.
3. Check whether the direction of rotation of the Cardan shaft is correct by noting the directional arrows on the gearbox.

5.2.5 Switching on the plate mixer

If your machine is equipped with a plate mixer (option), you can carry out a plate mixer test run using the steps explained below.

⚠ WARNING

Risk of injury due to plate mixer starting up

1. Make sure that no one can be endangered by the plate mixer starting up.
2. Check whether the protective grille is fitted before switching on the plate mixer.

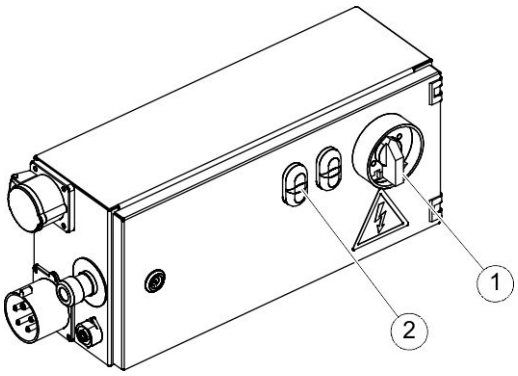


Figure 18: Switching on the plate mixer

Item	Designation
1	Main switch
2	“Plate mixer ON/OFF” double push-button

1. Switch the machine on at the main switch *(1)* (position “I”).
   ⇒ The power supply switches on.
2. Switch on the plate mixer using the “Plate mixer ON/OFF” double push-button *(2)*.
3. Check the function of the plate mixer.
4. Switch off the plate mixer using the “Plate mixer ON/OFF” double push-button *(2)*.
5. Switch the machine off at the main switch *(1)* (position “0”).

5.3 Function checks

Before using the machine, the following functions must be checked with the machine running.

5.3.1 Checking the safety equipment

Check whether all safety equipment is fitted and fully functional.

⚠ WARNING

Risk of injury due to defective safety equipment

1. If a safety device does not respond during the check, the machine must not be started up.
2. Eliminate the fault.

Check:

1. The function of the EMERGENCY STOP button,
2. Whether all protective grilles are fitted and securely locked,
3. The function of the protective grille cutout.

5.3.1.1 Checking the EMERGENCY STOP button

Before using the machine, you must check the function of the EMERGENCY STOP button.

NOTICE

Machine damage caused by incorrect actuation of the EMERGENCY STOP button

1. Only press the EMERGENCY STOP button in the event of danger.
2. Do **not** use the EMERGENCY STOP button to switch off the machine.

⚠ WARNING

Risk of injury due to defective EMERGENCY STOP button

The machine is no longer safe to operate if the EMERGENCY STOP button is defective, as you will no longer be able to switch off the machine quickly enough in the event of danger.

1. If the EMERGENCY STOP button does not respond during the check, the machine must not be started up.
2. Eliminate the fault.

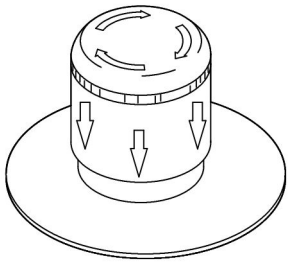


Figure 19: EMERGENCY STOP button

1. Switch the machine on at the main switch (position “I”).
2. Switch on the pump using the “Pump ON/OFF” double push-button.
3. Press the EMERGENCY STOP button.
   ⇒ The pump and agitator stop. All control panels and switch boxes are electrically locked.
4. Unlock the EMERGENCY STOP button by turning it.

5.3.1.2 Checking the protective grille cut-out on the hopper

The protective grille cut-out on the hopper is used to switch off the mixing apparatus and the auger pump.

⚠ WARNING

Risk of injury due to defective safety switch

1. If the safety switch does not respond during the check, the machine must not be started up.
2. Eliminate the fault.

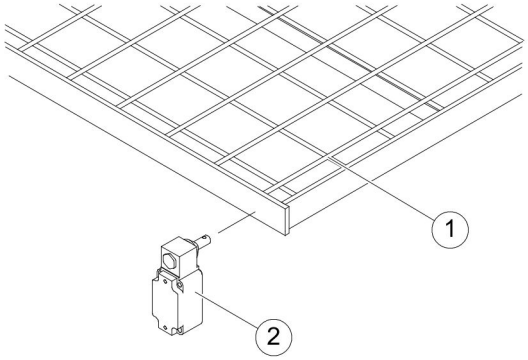


Figure 20: Example illustration of protective grille

Item	Designation
1	Protective grille
2	Safety switch

1. Switch the machine on at the main switch (position “I”).
2. Switch on the pump using the “Pump ON/OFF” double push-button.
3. Raise the protective grille.
   ⇒ The pump and agitator stop.
4. Close the protective grille again.
5. Switch off the pump using the “Pump ON/OFF” double push-button.
6. Switch the machine off at the main switch (position “0”).

5.3.1.3 Checking the protective grille cut-out on the plate mixer

The protective grille cut-out on the plate mixer is used to switch off the mixing apparatus.

⚠ WARNING

Risk of injury due to defective safety switch

1. If the safety switch does not respond during the check, the machine must not be started up.
2. Eliminate the fault.

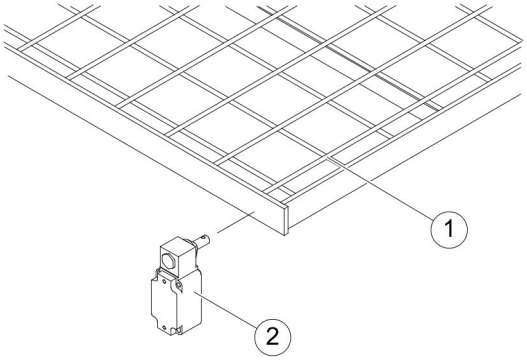


Figure 21: Example illustration of protective grille

Item	Designation
1	Protective grille
2	Safety switch

1. Switch the machine on at the main switch (position “I”).
2. Switch on the plate mixer using the “Plate mixer ON/OFF” double push-button.
3. Raise the protective grille.
   ⇒ The mixing apparatus stops.
4. Close the protective grille again.
5. Switch off the plate mixer using the “Plate mixer ON/OFF” double push-button.
6. Switch the machine off at the main switch (position “0”).

5.3.2 Checking the delivery line

Use only original delivery lines from the machine manufacturer that are designed for the required operating and maximum pressures.

NOTICE

Contaminated couplings

Contaminated couplings are not properly sealed and allow water to leak out under pressure. This inevitably causes blockages.

- Only couple delivery line couplings which have been cleaned and have fully functional gaskets.

Only original couplings and connections from the machine manufacturer guarantee compliance with the values specified in the German Accident Prevention Regulation.

Use only delivery lines with a suitable internal diameter.

You must secure the coupling parts on delivery lines with threaded spouts by gluing. If a coupling part needs to be replaced, carry out the following steps:

1. Use a suitable device to secure the new coupling against being opened.
2. Screw the coupling onto the delivery line element as far as the stop.
   ⇒ It must no longer be possible to loosen the coupling by hand.

5.4 Shutting down the machine after starting up

After the function check, you can shut down the machine.

NOTICE

Risk of damage to the drive

When there are breaks in pumping or the machine is being shut down, always set the delivery rate to the lowest setting.

- Only turn the handwheel adjuster while the pump is running.

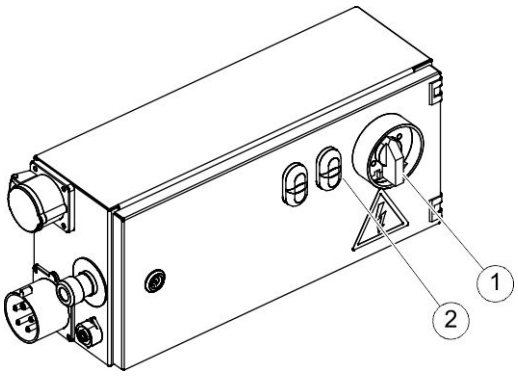


Figure 22: Switching on the pump

Item	Designation
1	Main switch
2	“Pump ON/OFF” double push-button

1. Adjust the delivery rate to the lowest setting when the pump is running by turning the handwheel adjuster anticlockwise.
2. Switch off the pump using the “Pump ON/OFF” double push-button *(2)*.
3. Switch the machine off at the main switch *(1)* (position “0”).

6 Operation

This chapter contains information on operating the machine. It explains the work steps required for setting, operation and cleaning.

6.1 Requirements

You must have completed the operations for setting up and starting up the machine before you begin operating the machine.

Before you fill the machine with material and start pumping it through the delivery line, you must make sure that:

- The machine functions correctly
- The delivery line is designed for the specified delivery pressure
- The delivery line has been installed properly

If a malfunction occurs during the pumping process, consult the “Faults, cause and remedy” chapter first. Contact the manufacturer's After Sales department for advice if you are unable to rectify the fault yourself.

6.2 Emergency shutdown procedure

Make sure you are completely familiar with the procedure for shutting down the machine in an emergency situation before you start operating the machine.

Proceed immediately as described below if an emergency occurs while you are operating the machine.

1. Close the air valve on the spray gun.
2. Press the EMERGENCY STOP button.
   ⇒ The auger pump stops instantly.
   ⇒ The mixing apparatus stops instantly.
   ⇒ All control panels and switch boxes are electrically locked.
3. If necessary, take first-aid measures.
4. Note down the incident and report it in line with company guidelines.
5. Look for the cause of the fault and rectify it.
6. Unlock the EMERGENCY STOP button by turning it.
7. Start the machine up again. (See the “Starting up” chapter.)

6.2.1 EMERGENCY STOP button

The EMERGENCY STOP button is fitted to the control cabinet of the machine.

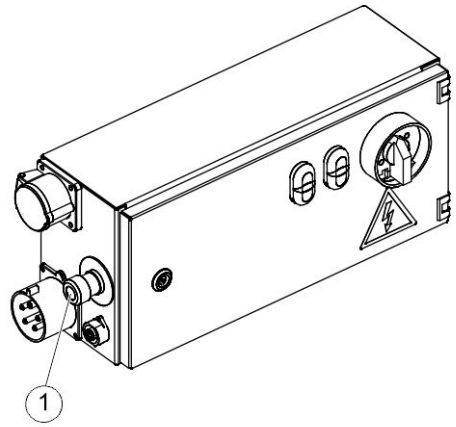


Figure 23: Position of the EMERGENCY STOP button

Item	Designation
1	EMERGENCY STOP button

6.3 Starting to pump

The process from the start of forward pumping to the time at which a continuous flow of material exits from the delivery line is known as starting to pump. This can take place at the start of site use, but also after breaks in pumping.

The inside of the entire delivery line must be pre-lubricated at the start of pumping operations.

NOTICE

Machine damage caused by dry running

The grout lubricates the inside of the delivery line and prevents blockages. It is destroyed if the screw conveyor runs dry.

- ▶ Use cement grout when starting to pump.

Depending on the length of the delivery line, you will need approx. 20–40 litres of cement grout.

1. Rinse the delivery line out briefly with water before connecting it. Use one or two of the sponge balls provided as standard accessories soaked in water to do this.
2. Mix the cement grout and fill it into the hopper.
3. Provide a suitable container at the end of the delivery line to collect the cement grout.
4. Switch the pump on. See the “Starting up” chapter.
5. Pump the grout slowly into the delivery line.
   ⇒ The cement grout is collected in the provided container.
6. Correctly dispose of the cement grout.

The process of starting to pump with grout is completed when the two sponge balls and a solid material stream exit from the delivery line.

6.4 Pumping operations

Carefully complete the operations for starting up and setting up the machine. Make sure that your machine is functioning correctly before you fill the hopper with material and start pumping it through the delivery line.

1. Switch on the main switch.
2. Pre-lubricate the delivery line with grout. (See the “Starting to pump” section.)

⚠ WARNING

Risk of the delivery line bursting in case of a blockage

- Never pump segregated material or material that has become lumpy because it is beginning to set into the delivery line.

3. Add pumpable material to the hopper.

⇒ The material in the hopper is mixed together.

The pump is generally started at a low speed of rotation. Once the delivery line has been lubricated, pumpable material is first delivered at the lowest possible speed of rotation. If the pump is working soundly, the delivery rate can be increased.

4. Switch on the auger pump. See the “Starting up” section.
   ⇒ The auger pump transports the material from the hopper to the delivery line.

NOTICE

Auger pump stops due to overloading

1. Reduce the delivery rate.
2. Reduce the length of the delivery line.

If a malfunction occurs during the pumping process, consult the “Faults, cause and remedy” chapter first.

Call the manufacturer's After Sales department if you cannot rectify the fault yourself.

6.5 Mixing with the pan mixer

The pan mixer mixes the dry mortar to make pumpable material when water is added.

⚠ WARNING

Risk of injury due to pan mixer starting up

- Check whether the safety grid is fitted before switching on the pan mixer.

⚠ WARNING

Risk of injury due to breathing in dust particles

1. Wear respiratory protection and a face mask for all work in which mortar dust can enter the body through the respiratory passages.
2. Observe the information on the safety data sheet provided by the manufacturer of the building material.
3. Keep first-aid equipment readily available.

To obtain optimum mixing results, the mixer drum may only be filled to the middle of the topmost mixing arm.

Fill the pan mixer as described below:

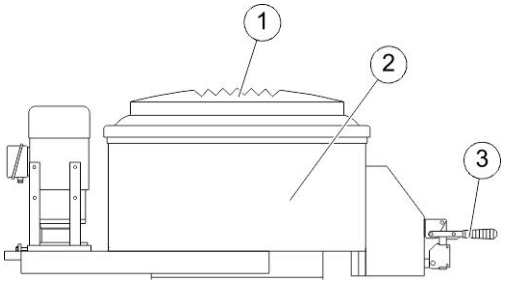


Figure 24: Protective grille on the plate mixer

Item	Designation
1	Protective grille
2	Mixer drum
3	Flap

1. Close the flap *(3)*.
2. Switch the machine on at the main switch .
   ⇒ The power supply switches on.
3. Switch on the pan mixer using the “Pan mixer ON/OFF” double push-button.
   ⇒ The mixer in the pan mixer rotates.
4. Fill the pan mixer with water.
5. Fill the pan mixer with dry material.
6. Use the bag opener at the top of the lid to open bags.

7. Fill the pan mixer evenly with dry material and do not create any unnecessary dust.
8. Fill dry material into the pan mixer until the required consistence has been reached.
9. Mix the material until it becomes free-pumping.

6.5.1 Draining the pan mixer

After the material has been mixed, it must be drained into the hopper for pumping.

⚠ WARNING

Risk of injury due to the conveyed material spraying out

1. Wear protective goggles while transferring the conveyed material.
2. Turn your face away from the plate mixer when opening the flap.

1. Open the flap *(3)* on the pan mixer.
2. Completely drain the pan mixer.
3. Close the flap *(3)* fully.

6.6 Pumping

After you have added the pumpable material to the hopper, you can pump the material from the hopper into the delivery line.

⚠ WARNING

Machine damage caused by the machine being switched on and off incorrectly

The pump must not be switched on and off via the main switch. This causes faults or damages the machine.

- ▸ Only switch the pump on and off via the double push-button or the remote control.

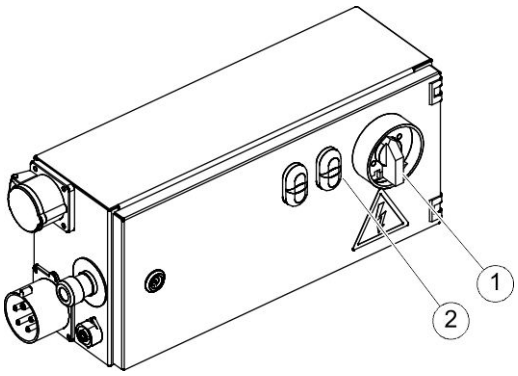


Figure 25: Switching on the pump

Item	Designation
1	Main switch
2	“Pump ON/OFF” double push-button

1. Switch on the main switch *(1)*.
2. Switch on the pump using the “Pump ON/OFF” double push-button *(2)*.
   ⇒ The auger pump starts pumping.
3. Start with a low delivery rate and increase this continuously.
4. Set the required delivery rate *(Delivery rate regulation P. 6 — 8)*.

6.7 Delivery rate regulation

The delivery rate can be adjusted by means of the handwheel adjuster on the drive.

NOTICE

Risk of damage to the drive

When there are breaks in pumping or the machine is being shut down, always set the delivery rate to the lowest setting.

- ▸ Only turn the handwheel adjuster while the pump is running.

NOTICE

Auger pump stops due to overloading

1. Reduce the delivery rate.
2. Reduce the length of the delivery line.

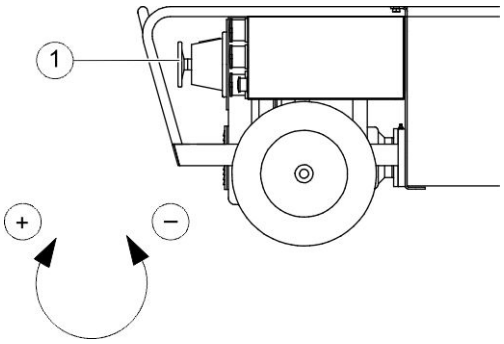


Figure 26: Delivery rate regulation

Item	Designation
1	Handwheel adjuster

Start with a low delivery rate and increase this continuously.

1. Turn the handwheel adjuster in the “+” direction while the pump is running.
   ⇒ The delivery rate is increased.
2. Turn the handwheel adjuster in the “-” direction while the pump is running.
   ⇒ The delivery rate is reduced.

6.8 Reverse pumping

The pressure on the delivery line is relieved through reverse pumping.

NOTICE

Risk of damage to the reversing switch

The direction of rotation is set using the integrated main reversing switch.

- Never press the reversing switch while the main switch is in the “I” position. The rotating-field mechanism is locked – turning by force will damage the switch mechanism.

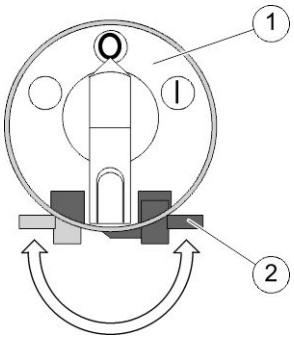


Figure 27: Changing the direction of rotation

Item	Designation
1	Main switch
2	Reversing switch

1. Switch off the main switch *(1)* (position “0”).
2. Switch the reversing switch *(2)* over.
   ⇒ The “I” symbol automatically changes to the other direction of rotation.
3. Switch on the main switch *(1)*.
4. Switch on the pump using the “Pump ON/OFF” double push-button.
5. Briefly set the machine to reverse pumping to depressurise the delivery line.

6.9 Breaks in pumping

Breaks in pumping should be avoided as much as possible, as the conveyed material can segregate or set.

NOTICE

Risk of damage to the drive

When there are breaks in pumping or the machine is being shut down, always set the delivery rate to the lowest setting.

- ▶ Only turn the handwheel adjuster while the pump is running.

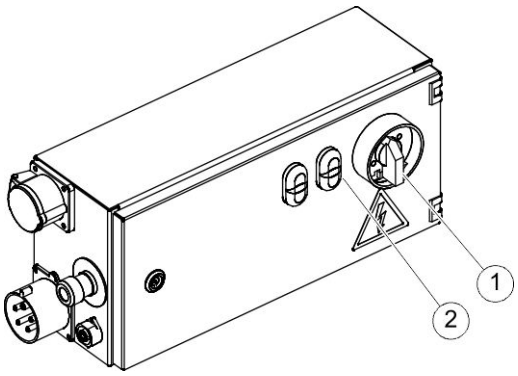


Figure 28: Switching on the pump

Item	Designation
1	Main switch
2	“Pump ON/OFF” double push-button

If breaks cannot be avoided, proceed as follows:

1. During short breaks in pumping, dump the delivery line pressure by brief reverse pumping.
2. Stop the material feed for longer breaks in pumping.
3. Pump the hopper empty.
4. Dump the delivery line pressure by brief reverse pumping.
5. Switch off the pump using the “Pump ON/OFF” double push-button *(2)*.
6. Switch the machine off at the main switch *(1)* (position “0”).

6.10 Blockages

Blockages can occur inside the pump itself as well as in the delivery line. A blockage can be recognised by no material exiting the end of the line and the pressure on the pressure gauge rising. If a blockage occurs inside the pump, the overload protection may switch off the motor.

Blockages have the following causes:

- Insufficient lubrication of the delivery line.
- Hard to pump or slightly segregating conveyed material.
- Leaks at the delivery line couplings.

6.10.1 Removing blockages

⚠ WARNING

Risk of injury due to the formation of a blockage

1. People responsible for removing blockages must wear personal protective equipment.
2. They must ensure that they cannot be hit by flying material.
3. All other personnel must vacate the danger zone.

⚠ WARNING

Risk of injury due to the conveyed material spraying out

1. Secure the danger zone to prevent unauthorised access.
2. Wear protective goggles.
3. Always wear personal protective equipment.
4. You should only uncouple the delivery line once you have checked the pressure gauge to see that the system is fully depressurised.
5. Turn your face away when opening the line coupling.
6. Open the coupling carefully.

1. Briefly set the machine to reverse pumping to reduce the pressure in the delivery line.
2. Check that the system is completely depressurised.
3. Switch off the motor.

4. Uncouple the delivery line and clear the blockage in the line by shaking and tapping it.

DANGER

Risk of death due to bursting delivery line

1. Never remove a blockage using compressed air.
2. With stubborn blockages, rinse the line with water.

5. When you start the machine up again, add cement grout to the delivery line.

6.11 Using the cable remote control

To use the cable remote control, proceed as follows:

If the power supply is interrupted, the machine cannot start up again automatically. The cable remote control must be switched off before the machine is enabled again. The pump can then be switched on using the double push-button. The cable remote control is now enabled again.

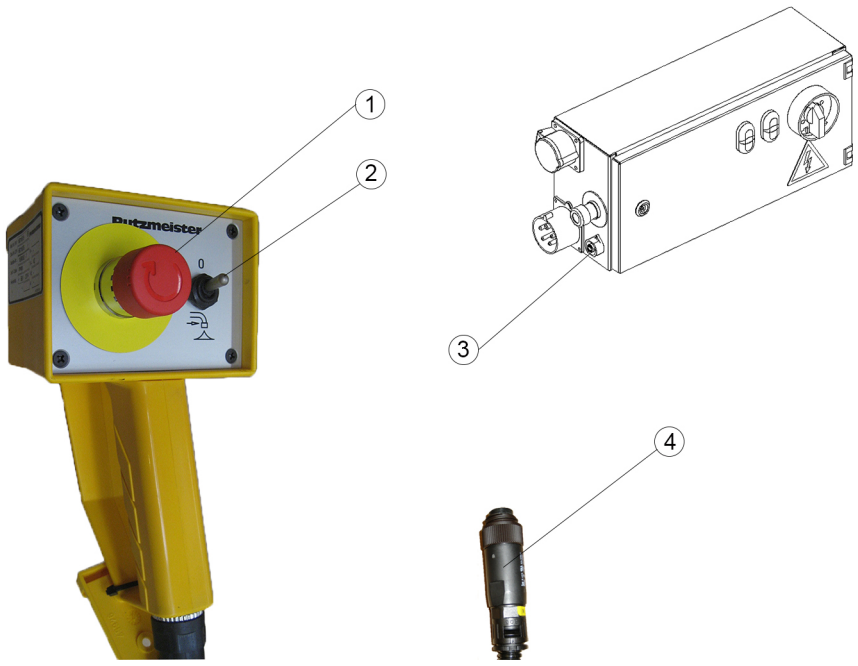


Figure 29: Cable remote control

Item	Designation
1	EMERGENCY STOP button (switches the machine off in an emergency)
2	Toggle switch on the cable remote control
3	“Remote control” socket on the control cabinet
4	“Remote control” connector plug

1. Plug the “Remote control” connector plug into the “Remote control” socket on the control cabinet.
2. Switch on the main switch.
3. Switch on the pump using the “Pump ON/OFF” double push-button.
4. Switch on the pump using the toggle switch on the cable remote control.
   ⇒ The auger pump starts pumping.
5. Set the required delivery rate.

6.12 Using the spray gun

The machine is fitted with a compressed-air remote control. It is used to actuate a compressor.

Work with the spray gun is only possible when the compressor is switched on and the compressed-air remote control is connected.

6.12.1 Connecting the compressed-air remote control

To connect the compressed-air remote control, proceed as follows:

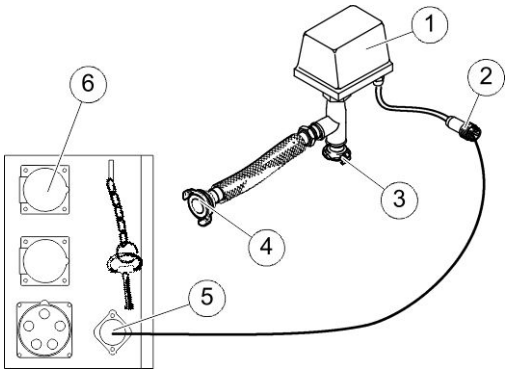


Figure 30: Connecting the compressed-air remote control

Item	Designation
1	Compressed-air remote control
2	“Compressed-air remote control” connector plug
3	Air valve
4	“Compressor” air port
5	“Remote control” blanking plug
6	“Compressor connection” CEE external device socket

1. Pull out the “Remote control” blanking plug *(5)* on the control cabinet.
2. Plug the “Compressed-air remote control” connector plug *(2)* into the socket of the remote control.
3. Connect the compressor to the “Compressor connection” external device socket *(6)*.
4. Connect the air hose *(4)* to the compressor.

6.12.2 Connecting the spray gun

To connect the spray gun, proceed as follows:

⚠ WARNING

Risk of injury due to material spraying out of the spray gun

- Close the remote control valve on the spray gun before switching on the machine.

The pump is switched on and off by opening and closing the remote control valve on the spray gun. When closing the remote control valve, the machine remains ready for operation and restarts once the remote control valve opens again.

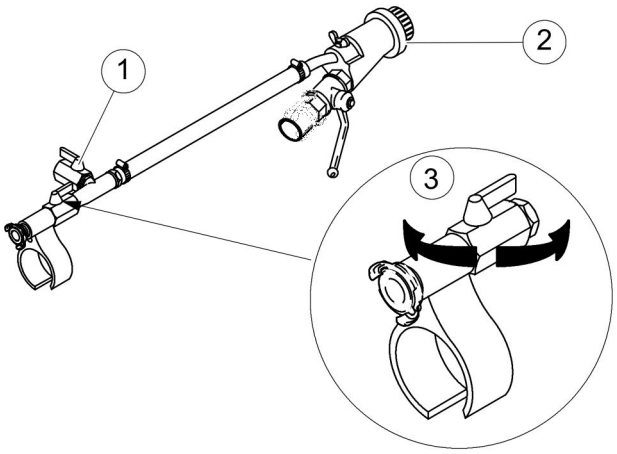


Figure 31: Spray gun overview

Item	Designation
1	Remote control valve
2	Spray gun
3	Air valve

1. Connect the delivery line to the spray gun.
2. Connect the air hose to the air valve of the compressed-air remote control and the spray gun.
3. Close the remote control valve *(1)* on the spray gun
4. Switch on the main switch.
5. Switch on the compressor.
6. Switch the pump on. See the “Starting up” chapter
7. Open the air valve *(3)* on the spray gun.
   ⇒ The auger pump starts pumping.

8. Set the required delivery rate.
9. Set the required air volume using the air valve.

6.12.3 Adjusting the air nozzle tube

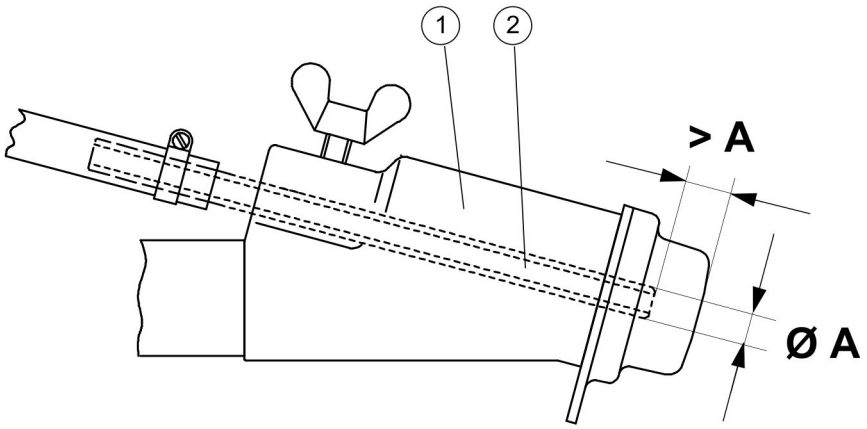


Figure 32: Air nozzle tube overview

Item	Designation
1	Air nozzle tube
2	Mortar nozzle

The distance between the air nozzle tube and the mortar nozzle must be larger than the diameter of the mortar nozzle. The larger the distance selected, the less likely it is that a blockage will occur between the air nozzle tube and the mortar nozzle. The smaller the distance is set, the cleaner and more evenly the spray gun will spray.

6.12.4 Using the spray gun correctly

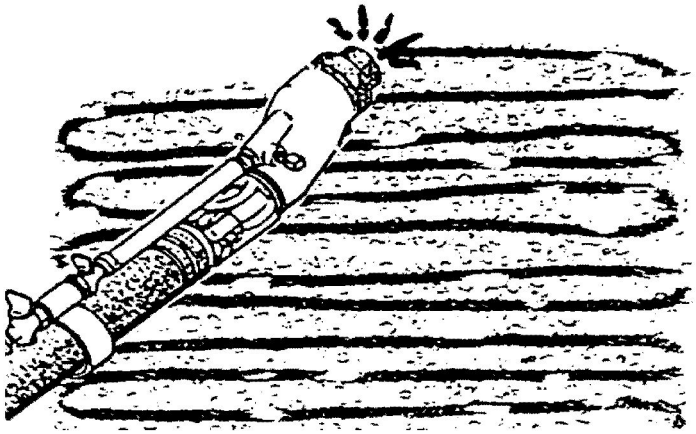


Figure 33: Guide the spray gun back and forth in smooth movements

1. Guide the spray gun back and forth in quick, horizontal movements at an even pace. Circular movements are ineffectual.
2. When plastering walls, point the jet slightly upwards.
3. For all other tasks, point the jet at a right angle to the surface to be plastered.
4. Maintain a distance of 20 cm to 30 cm between the nozzle and the wall.
   ⇒ The closer the nozzle is to the wall, the more sharply the jet is delimited.
5. Use less air for spraying close to the wall.

6.13 Cleaning

6.13.1 General

At the end of work, the machine and delivery line must be cleaned. A clean machine and delivery line are indispensable to permit fault-free delivery when they are next used.

Material deposits and contamination inside the machine and delivery line can impair the function of the machine.

NOTICE

Environmental pollution caused by cleaning agents or fuel

Cleaning agents or fuel must not enter the sewage system.

- During all cleaning work, observe the waste disposal regulations that apply to your region.

NOTICE

Machine damage caused by water penetration

1. Prior to cleaning the machine with water or a steam jet/high-pressure cleaner or other cleaning agents, cover or seal all openings which water, steam or cleaning agents must not penetrate for safety or operating reasons. Especially at risk are electric motors, control boxes and electric plugin connections.
2. The the machine may only by cleaned with a steam jet/high-pressure cleaner on the outside.

NOTICE

Machine damage caused by frost

- If there is a risk of freezing, drain the machine and all lines fully of residual water.

Water spraying on the machine from random directions has no damaging effect. The machine is splashproof but not watertight.

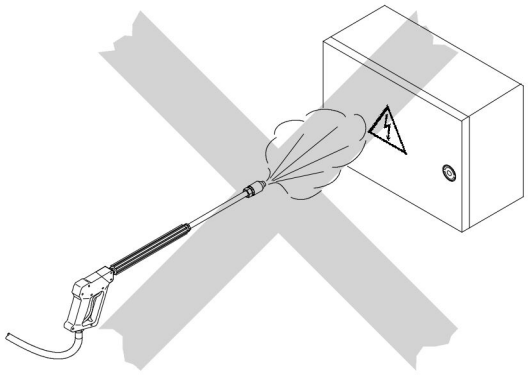


Figure 34: No water in the electrical system

- In the first six working weeks, clean all painted surfaces with cold water only at a maximum water pressure of 5 bar. Only after this time will the paint have hardened completely, allowing you to use steam jet equipment or similar auxiliary devices.
- Do not use any aggressive cleaning agents.
- Never use sea water or other water containing salt for cleaning purposes.
- Rinse the machine immediately with clean water if it comes into contact with sea water.
- Completely remove all covers/tape after cleaning.

6.13.2 Clean the machine

Clean the machine first, then the delivery line.

⚠ WARNING

Risk of injury due to the conveyed material spraying out

1. Secure the danger zone to prevent unauthorised access.
2. Wear protective goggles.
3. Always wear personal protective equipment.
4. You should only uncouple the delivery line once you have checked the pressure gauge to see that the system is fully depressurised.
5. Turn your face away when opening the line coupling.
6. Open the coupling carefully.

1. Adjust the delivery rate to the lowest setting when the pump is running.
2. Pump the hopper empty.
3. Briefly set the machine to reverse pumping and disconnect the delivery line.
4. Switch off the machine.
5. Clean the machine with clean water.
6. Rinse out the hopper and mixing vessel until they are clean.
7. Pump water from the hopper through the pump until the water exiting the pressure connection is clean.
   ⇒ The machine is now fully cleaned out.
8. Drain the residual material at the drainage connection and rinse the hopper out once more with water.
9. Then clean the delivery line.

6.13.3 Cleaning the delivery line

Material deposits inside the delivery line can cause damage and continue to accumulate, thereby reducing the line cross section. To allow faultfree operation at the next use, it is vital that all delivery lines are clean.

⚠ WARNING

Risk of injury due to the conveyed material spraying out

1. Secure the danger zone to prevent unauthorised access.
2. Wear protective goggles.
3. Always wear personal protective equipment.
4. You should only uncouple the delivery line once you have checked the pressure gauge to see that the system is fully depressurised.
5. Turn your face away when opening the line coupling.
6. Open the coupling carefully.

i To clean the delivery line, sponge balls of a suitable size are required.

A frequent error committed when cleaning the delivery lines is pumping water through the delivery line before a sponge ball has been inserted. This later leads to blockages in the delivery line caused by residual sand in the delivery line.

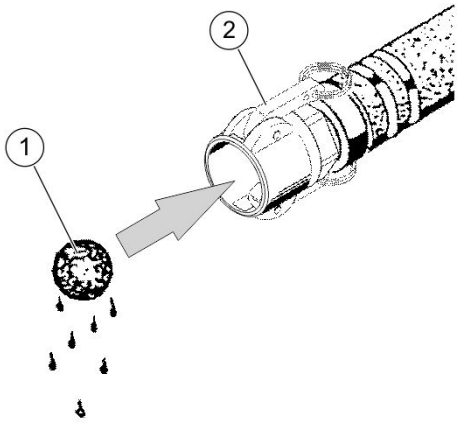


Figure 35: Cleaning the delivery line

Item	Designation
1	Sponge ball
2	Delivery line

1. Release the delivery line at the pressure connection.
2. Soak a sponge ball *(1)* in water.
3. Push the wellsoaked sponge ball into the delivery line.
4. Reconnect the delivery line to the pressure connection.
5. Half fill the hopper with water.
6. Start the pumping process and pump water through the delivery line until the sponge ball exits the end of the delivery line.
7. Repeat the washing out process until only clean water exits at the end of the delivery line.

6.13.4 Cleaning seals

Contaminated couplings are not sealed and lead to blockages.

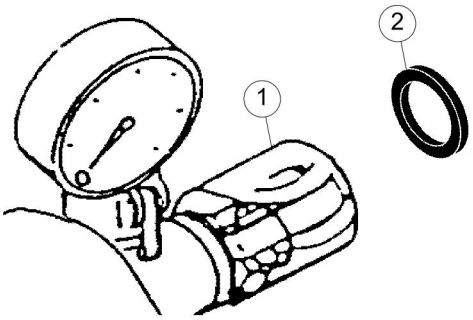


Figure 36: Cleaning seals

Item	Designation
1	Pressure connection
2	Rubber seal

1. Clean all seals and seal seats.
2. Grease the seals before replacing them.
3. If there is a risk of freezing, drain the machine and lines fully of residual water.

6.13.5 Cleaning the pan mixer

Clean the pan mixer as described below:

⚠ WARNING

Risk of injury due to moving machine components

- Never reach into moving machine components, whether the machine is running or switched off.

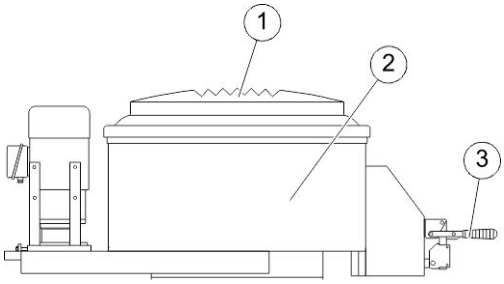


Figure 37: Protective grille on the plate mixer

Item	Designation
1	Protective grille
2	Mixer drum
3	Flap

Pay special attention to cleaning the sealing surfaces between the mixing vessel *(2)* and the safety grid *(1)*, as well as on the flap *(3)*.

1. Empty the mixing vessel *(2)*.
2. Switch off the main switch.
3. Disconnect the machine from the mains.
4. Open the safety grid *(1)*.
5. Open the flap *(3)*.
6. Clean the pan mixer with water on the inside and outside.
7. Then close the safety grid *(1)* again and screw it back on.

6.13.6 Cleaning after a power failure

If there is a site power failure, and the cause cannot be remedied immediately, you should clean the machine and the delivery lines at once.

Clean the machine and delivery lines as described in the “Cleaning” section.

⚠ WARNING

Risk of injury due to the conveyed material spraying out

1. Secure the danger zone to prevent unauthorised access.
2. Wear protective goggles.
3. Always wear personal protective equipment.
4. You should only uncouple the delivery line once you have checked the pressure gauge to see that the system is fully depressurised.
5. Turn your face away when opening the line coupling.
6. Open the coupling carefully.

1. Loosen the tie bolt on the auger pump and remove the pump.
2. Press the screw out of the screw conveyor barrel and clean it.
3. Clean the whole machine and reassemble it ready for operation.
4. Locate and remedy the cause of the power failure.

6.13.7 Cleaning the spray gun

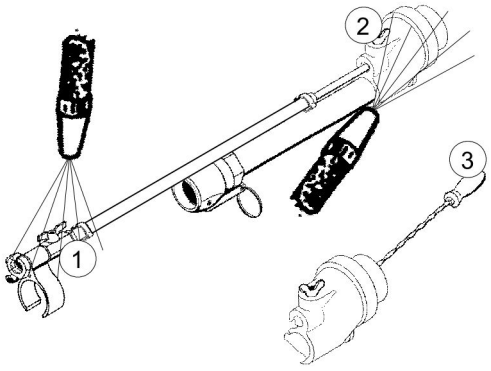


Figure 38: Cleaning the spray gun

Item	Designation
1	Air valve
2	Air nozzle tube
3	Nozzle cleaner

1. Clean the air cock and air nozzle tube on the spray gun.

2. Clean the air nozzle tube using the nozzle cleaner.

7 Faults, cause and remedy

This chapter gives you an overview of faults and their possible causes, and also ways in which you may rectify them. Observe the safety regulations when troubleshooting.

The inspection and maintenance personnel must have completed training relevant to working with the equipment on the machine and be conversant with the content of the Operating Instructions.

If you cannot rectify the fault yourself, contact the relevant Service department at the manufacturer or a dealer authorised by the manufacturer.

Use only original spare parts. The manufacturer accepts no liability for damage caused by the use of nonoriginal spare parts.

7.1 General machine

The following section provides a description of possible causes of faults and their remedies.

7.1.1 Material flow interrupted

Cause	Remedy
The material exits irregularly at the end of the delivery line and is spraying with force.	Check whether the hopper is nearly empty thus allowing air to be sucked in. Always ensure that there is sufficient material in the hopper.

7.1.2 No material is exiting from the end of the delivery line

⚠ WARNING

Risk of injury due to the conveyed material spraying out

1. Secure the danger zone to prevent unauthorised access.
2. Wear protective goggles.
3. Always wear personal protective equipment.
4. You should only uncouple the delivery line once you have checked the pressure gauge to see that the system is fully depressurised.
5. Turn your face away when opening the line coupling.
6. Open the coupling carefully.

Cause	Remedy
No material feed.	Add pumpable material to the hopper.
Drive direction of rotation incorrect.	Change the direction of rotation.

Cause	Remedy
Blockages in the delivery line. The overpressure device switches the pump off.	The pump should be carefully started up initially before any material is actually pumped. See *(Starting to pump P. 6 — 3)*. This prevents blockages.
	Turn off the machine. Depressurise the delivery line. Disconnect the delivery line and release the blockage by tapping and shaking. Flush out the delivery line with water if necessary. Start pumping slowly after removing a blockage.

7.1.3 Decreasing delivery pressure

Cause	Remedy
Worn auger components	Tighten or replace the auger components. *(Checking and adjusting the worm pump P. 8 — 15)*

7.1.4 Auger pump produces no or insufficient power

Cause	Remedy
Delivery rate is not set to maximum.	Increase the delivery rate.

7.1.5 Material is not mixed sufficiently

Cause	Remedy
Mixing paddles on the mixer are heavily worn.	Replace worn parts.

7.1.6 Using the spray gun

The following section provides a description of possible causes of faults affecting work with the spray gun, and their remedies.

7.1.6.1 Machine does not start despite compressor being switched on

Cause	Remedy
Insufficient drop in pressure in the remote control due to blocked air nozzle tube in the spray gun.	Clean air nozzle tube and air line. See *(Cleaning the spray gun P. 6 — 25)*

7.1.6.2 No air at the spray gun

Cause	Remedy
The pump is operating and material is arriving in the spray gun. However, there is only very limited air or no spray air at all.	Check whether the rubber seals are present on the delivery line couplings and ensure that the connections are tight. Check whether the delivery line is leaking or broken. Check whether the air hose from the compressor to the air battery is leaking.

7.1.6.3 Mortar flow interrupted

Cause	Remedy
The flow of material is being constantly interrupted without spraying.	Check whether the air valve on the spray gun is fully open. Check whether the air nozzle pipe on the spray gun is clear. If it is blocked, clean it with the mandrel (probe) from the accessories.

7.2 Electrical system

The following section provides a description of possible causes of faults affecting the electrical system, and their remedies.

DANGER

Risk of death due to fatal electric shock

- Work on the electrical systems and equipment of the machine must only be carried out by a qualified electrician or by instructed persons under the supervision and guidance of a qualified electrician and in accordance with electrical engineering rules and regulations.

7.2.1 The machine does not start

Cause	Remedy
No power present.	Check the electric lead.
The motor does not run in three phases.	Check the electric lead.
The fuse on the machine is too small.	Use the correct fuse.

7.2.2 The electrical fuse was tripped

Cause	Remedy
The fuse on the machine is too small.	Use the correct fuse.
The fuse triggers too readily.	Use the correct fuse.
The diameter of the electric supply lead is too narrow.	Use a supply lead with a larger diameter.

7.2.3 The motor protection switch was tripped

Cause	Remedy
The diameter of the electric supply lead is too narrow.	Use a supply lead with a larger diameter.
The electric supply lead is wound up, e.g. on a cable drum.	Unwind the supply lead.
The electrical connection is not compatible with the mains frequency.	Compare the mains frequency with the machine frequency specified on the rating plate. The two frequencies must correspond.
Ventilation for the engine is insufficient.	Position the machine so that sufficient air circulates around the engine.

8 Maintenance

In this chapter you will find information on maintenance work which is necessary for the safe and efficient operation of the machine.

We would like to explicitly emphasise here that all prescribed checks, inspections and preventative maintenance work must be conscientiously carried out. Otherwise we will refuse any liability or warranty claim. Our After Sales department is available at any time should you have any questions.

8.1 Maintenance and inspection by the machine operator

Regular preventative inspections allow you to detect machine damage well in advance and implement the necessary repair measures. See the “Maintenance intervals” section for information on the type and frequency of necessary inspection work. It is recommended that the details and results of the inspections are documented in a suitable format.

For inspection and maintenance work carried out by the machine operator, the inspection and maintenance personnel must have authorisation and the necessary technical qualification. The persons tasked with inspection and maintenance work must receive particular technical training. They must have completed training relevant to working with the equipment on the machine and be conversant with the content of the Operating Instructions.

Use only original spare parts. The manufacturer accepts no liability for damage caused by the use of nonoriginal spare parts.

If maintenance work with the reference “Service” appears in the table, consult a service technician from the manufacturer or a dealer authorised by the manufacturer.

Have the first After Sales service carried out by a service technician of the manufacturer or a dealer authorised by the manufacturer.

8.2 Residual risks during maintenance work

Maintenance work may present a risk of personnel or third parties suffering injury or death.

8.2.1 Personnel requirements

Only qualified personnel may carry out maintenance work. Qualified personnel must have successfully completed a specialist training course that qualifies them to carry out such activities.

If you do not have qualified personnel for carrying out maintenance work, you should commission the manufacturer's After Sales department with the maintenance of your machine.

Have the first After Sales service carried out by a service technician of the manufacturer or a dealer authorised by the manufacturer.

8.2.2 Personal protective equipment

See the ““Safety regulations”” chapter for personal protective equipment requirements.

⚠ WARNING

Risk of injury due to not wearing personal protective equipment

- Always wear your personal protective equipment during maintenance work.

8.2.3 Residual risks

There are specific risks of accidents associated with maintenance work, as protective devices must be removed to perform certain activities. There follows a list of residual risks, which may be present during maintenance, inspection and repair work.

⚠ DANGER

Risk of death due to fatal electric shock

- Work on the electrical system may only be carried out by certified, licensed and qualified electricians (proof of qualification in line with EN 60204, part 1, page 14, item 2.21).

⚠ WARNING

Risk of injury due to the machine starting unexpectedly

- Before performing any maintenance work, shut down the machine and secure it to prevent accidental startup (e.g. by locking control equipment). If this is not possible, enlist the help of a second person to prevent the machine from starting unexpectedly.

⚠ WARNING

Risk of injury due to the machine rolling away

1. Apply the brake before starting any maintenance work.
2. Use chocks to secure the machine against rolling away.

⚠ WARNING

Risk of injury due to skin contact with functional fluids

1. Avoid contact with functional fluids.
2. Always wear personal protective equipment.
3. Observe the safety data sheets provided by the manufacturer of the functional fluids.

⚠ WARNING

Risk of burning from hot machine components

- Allow the assemblies to cool down before you start the work.

8.3 Maintenance intervals

The following table shows the intervals for individual maintenance work.

⚠ CAUTION

Risk of fire and short circuiting from loose cable connections in the control cabinet

- Check whether all cable connections in the control cabinet (terminals, connectors) are firmly seated during the first maintenance.

Interval	Assembly	Test criterion	Corrective measure	Comments Reference
daily	Safety equipment	Visual inspection	Repair the safety equipment	
	Electric cabling	Visual inspection	Replace the electric cabling	
	Worm pump	Check the power of the worm pump	Check the output on the pressure gauge, adjust or replace if necessary	*(Checking and adjusting the worm pump P. 8 — 15)*
	Delivery line	Visual inspection to check: • Suitability and wear • That it is intended for the delivery pressure • That it has been installed properly • Sufficient wall thickness	Replace	
	Machine	Lubricate until you can see grease emerging		*(Lubricating the machine P. 8 — 6)*
as required	Screw conveyor or worm pump	Replace in case of wear		*(Replacing the screw conveyor P. 8 — 9)*
weekly	Axle and wheels	Check lubrication points for sufficient lubrication	Lubricating	*(Lubricating the machine P. 8 — 6)*
annually	Bolted connections	Torque	Check and adjust bolted connections with the torque wrench.	See tightening torques in the spare parts sheets

Interval	Assembly	Test criterion	Corrective measure	Comments Reference
annually	Entire machine	Industrial safety inspection (German Accident Prevention Regulation)	Industrial safety inspection by subject expert	Use industrial safety inspection form
Every 10,000 h, at least every 3 years	Gearbox	Change gearbox oil		Service *(Lubricant recommendation P. 8 — 19)*

8.4 Maintenance work

In this section you will find all maintenance work for this machine.

8.4.1 Lubricating the machine

The following overview shows the lubrication points on the machine.

The following special tools are required:

- Grease gun

Use only the lubricants specified in the lubricant recommendation.

The specified lubrication interval applies to normal operation. Under extreme conditions of use, more frequent lubrication may be necessary.

Sometimes there are several lubrication nipples at the positions indicated in the figure. At some points, the lubrication nipples are located on the opposite side of the machine or inside the machine.

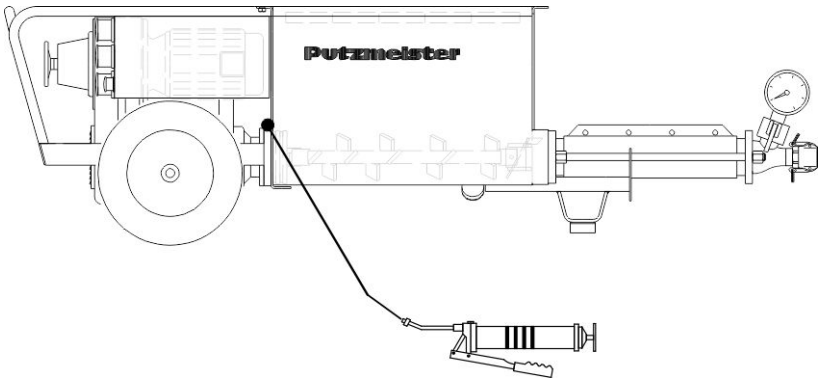


Figure 39: Lubricating the machine

1. Remove the protective cap from the lubrication point.
2. Clean the lubrication nipple.
3. Lubricate until fresh grease escapes.
4. Remove the excess grease from the lubrication nipple.
5. Place the protective cap over the lubrication point.

8.4.2 Lubricating the pan mixer

The following overview shows the lubrication points on the pan mixer.

The following special tools are required:

- Grease gun

Use only the lubricants specified in the lubricant recommendation.

The specified lubrication interval applies to normal operation. Under extreme conditions of use, more frequent lubrication may be necessary.

Sometimes there are several lubrication nipples at the positions indicated in the figure. At some points, the lubrication nipples are located on the opposite side of the machine or inside the machine.

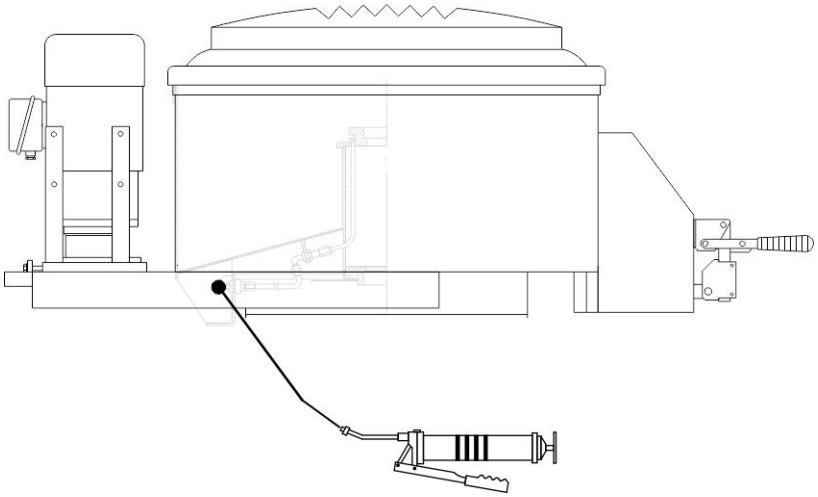


Figure 40: Lubricating the plate mixer

1. Remove the protective cap from the lubrication point.
2. Clean the lubrication nipple.
3. Lubricate until fresh grease escapes.
4. Remove the excess grease from the lubrication nipple.
5. Place the protective cap over the lubrication point.

8.4.3 Adjusting the pressure switch

You can obtain precise settings if you use the pressure gauge for comparison.

Pressure switch setting values:

Switch-on value: 2.0 bar

Switch-off value: 3.0 bar

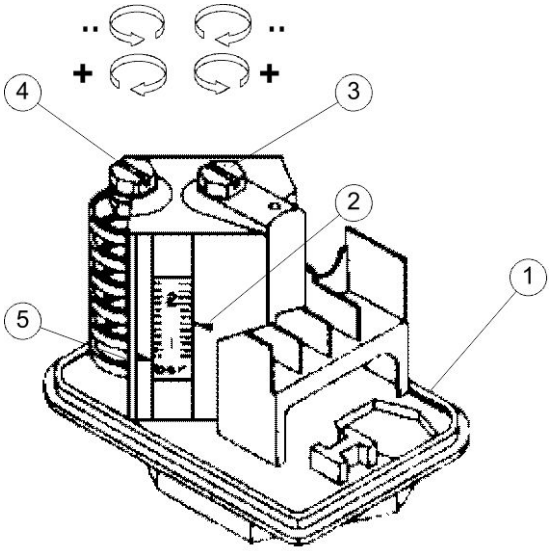


Figure 41: Adjusting the pressure switch

Item	Designation
1	Pressure switch
2	“Upper switching value” pressure indicator
3	“Upper switching value” adjusting screw
4	“Lower switching value” adjusting screw
5	“Lower switching value” pressure indicator

1. Remove the central screw on the housing lid with a screwdriver.
2. Pull the housing lid upwards to remove it.
3. Using the adjusting screw *(3)*, set the upper switching value to the required value.
   ⇒ The setting value is shown on the scale of the pressure indicator *(2)*.
4. Using the adjusting screw *(4)*, set the lower switching value to the required value.
   ⇒ The setting value is shown on the scale of the pressure indicator *(5)*.
5. Refit the housing lid to the housing with the screw.

8.4.4 Replacing the screw conveyor

See also the “Fitting/removing the auger pump” section.

NOTICE

Damage to the screw conveyor if the rubber of the screw conveyor comes into contact with used oil.

- Use only silicone spray from the manufacturer for assembly.

Only original spare parts may be used.

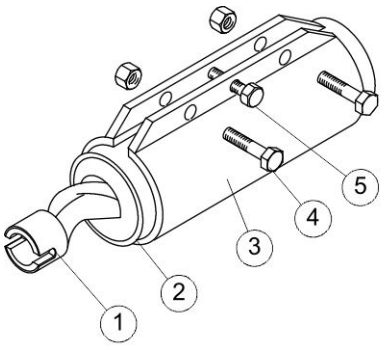


Figure 42: Replacing the screw conveyor

Item	Designation
1	Screw conveyor
2	Screw conveyor barrel
3	Clamping sheath
4	Clamping bolts
5	Bolt

1. Loosen the clamping bolts *(4)*.
2. Remove the screw conveyor barrel *(2)* from the clamping sheath *(3)*.

The screw conveyor barrel can normally be pulled out of the clamping sheath. If this is not possible, the clamping sheath can be pushed open.

3. Select a suitable bolt *(5)* and turn it into the open threaded hole.
   ⇒ The clamping sheath will be pushed open.
4. Pull the screw conveyor barrel *(2)* out of the clamping sheath *(3)*.

5. Clamp the screw conveyor barrel in a vice and unscrew the screw conveyor *(1)* by turning it anticlockwise.
6. Screw the new screw conveyor *(1)* into the clamped screw conveyor barrel *(2)* by turning it clockwise.
7. Adjust the end face of the screw conveyor and the screw conveyor barrel so that they are flush.

8.4.5 Fitting/removing the auger pump

See also the “Replacing the screw conveyor” section.

You must replace the wear parts if wear is identified during a visual check or if there is inadequate pressure buildup in the delivery line.

8.4.5.1 Removing the auger pump

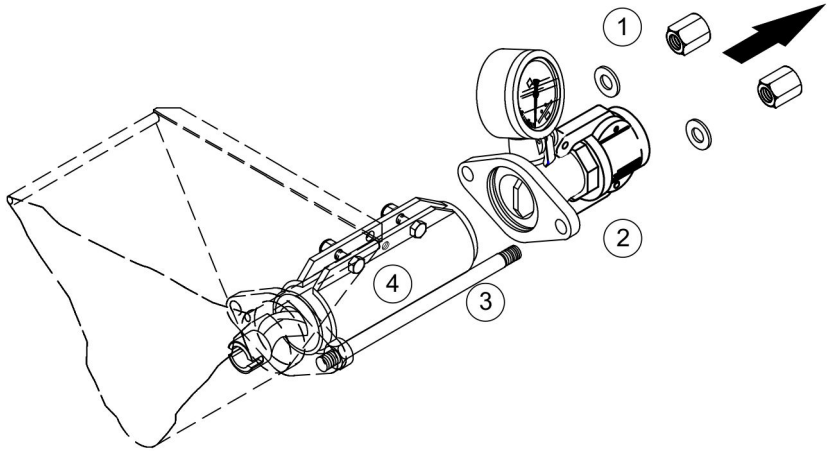


Figure 43: Removing the auger pump

Item	Designation
1	Clamping nut
2	Pressure connection
3	Tie bolt
4	Auger pump

1. Unscrew the clamping nuts *(1)* on the tie bolt *(3)*.
2. Pull off the pressure connection *(2)*.

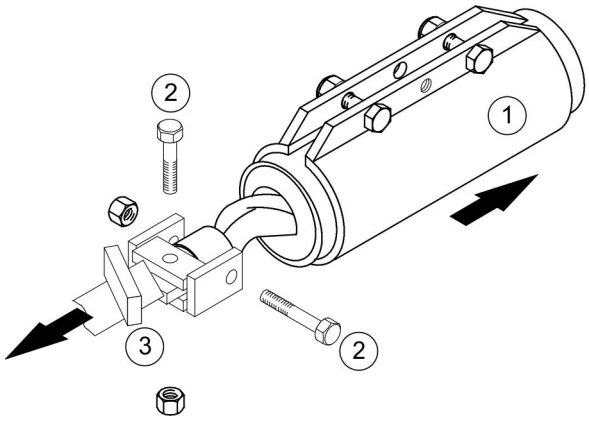


Figure 44: Pulling off the auger pump (different models available)

Item	Designation
1	Auger pump
2	Through bolts
3	Cardan shaft

3. Remove the through bolts *(2)* from the Cardan shaft.

On the plug-in model, the auger pump can simply be pulled out.

4. Pull the auger pump *(1)* from the hopper.

8.4.5.2 Fitting the auger pump

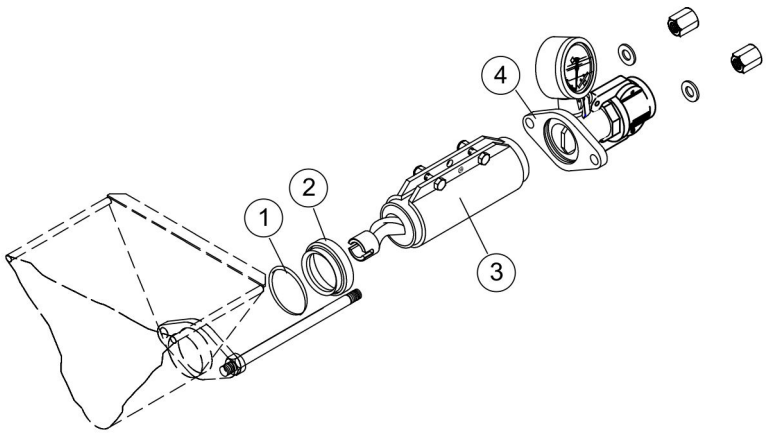


Figure 45: Fitting the auger pump

Item	Designation
1	Oring
2	Intermediate ring
3	Auger pump
4	Pressure connection

1. Clean the O-ring *(1)* or replace it if it is worn.
2. Slightly grease the O-ring *(1)* and insert it in the intermediate ring.
3. Insert the auger pump *(3)* in the intermediate ring *(2)*.
4. Slide the pressure connection *(4)* onto the tie bolt and auger pump *(3)* and align it correctly.

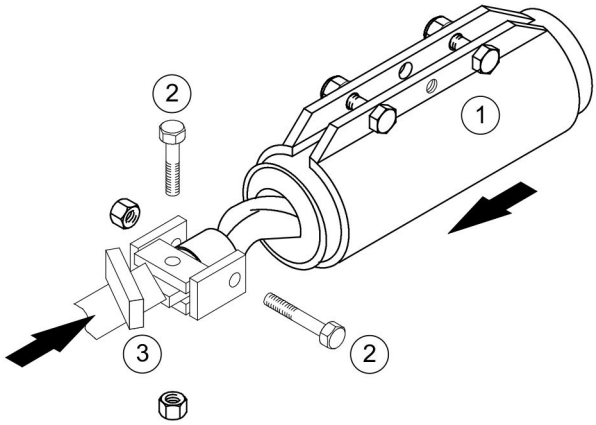


Figure 46: Connecting the Cardan shaft and the auger pump

Item	Designation
1	Auger pump
2	Through bolts
3	Cardan shaft

5. Connect the Cardan shaft *(3)* and the auger pump *(1)*.
6. Mount the through bolts *(2)* and screw on new self-locking nuts.

The threaded union is not present on the plug-in version.

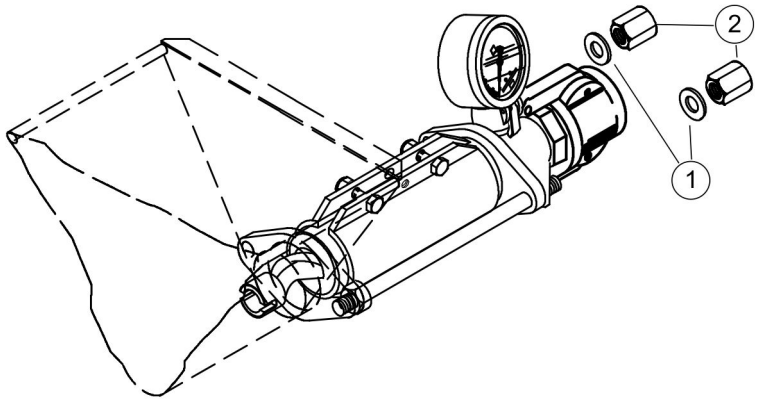


Figure 47: Tightening the clamping nuts

Item	Designation
1	Washer
2	Clamping nut

7. Place the washers *(1)* on the tie bolt and evenly tighten the entire unit with the clamping nuts *(2)*.

8.4.6 Checking and adjusting the worm pump

The following special tools are required:

- Putzmeister test pressure gauge, part no. 208745.002

The condition and setting of the worm pump are checked with a test pressure. Your worm pump must reach the following test pressure, otherwise the worm pump needs to be tightened or replaced.

Machine	Test pressure
S5	16–18 bar

8.4.6.1 Checking the worm pump

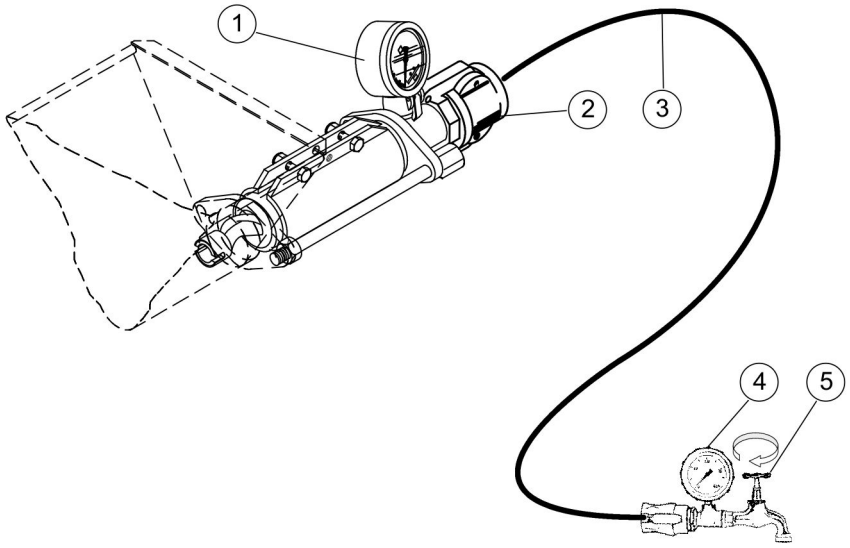


Figure 48: Auger pump layout

Item	Designation
1	Pressure gauge
2	Pressure connection
3	Delivery line
4	Test pressure gauge
5	Shut-off valve

1. Close the drainage connection on the hopper.
2. Connect a delivery line to the pressure connection.
3. Connect the test pressure gauge to the end of the delivery line.
4. Fill the hopper with water.
5. Switch the machine on .
6. Start the pumping operation.
7. Set the maximum delivery rate.
8. As soon as the air has escaped from the delivery line, slowly close the shut-off valve on the test pressure gauge.
   ⇒ The pressure increases.
9. Read off the maximum pressure on the test pressure gauge.

If the specified test pressure is not reached, you must replace a maintenance-free pump *(Fitting/removing the auger pump P. 8 — 11)*; an adjustable worm pump must be tightened *(Tightening the worm pump P. 8 — 17)*.

A new worm pump may exceed the specified test pressure. If the test pressure is exceeded with a used worm pump, the clamping sheath must be loosened.

10. Switch off the machine.

If you need to adjust the worm pump, go to chapter *(Tightening the worm pump P. 8 — 17)*, otherwise proceed as follows:

11. Dump the water pressure on the shut-off valve.
12. Open the drainage connection on the hopper.
13. Disconnect the test pressure gauge.

8.4.6.2 Tightening the worm pump

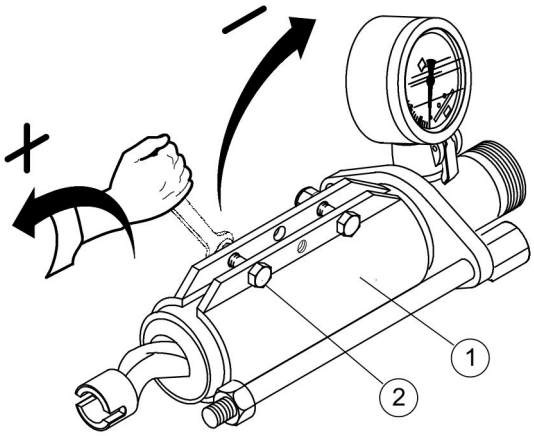


Figure 49: Adjusting the auger pump

Item	Designation
1	Clamping sheath
2	Clamping bolt

1. Tighten the clamping bolts evenly (approx. half a turn).

NOTICE

Increased wear on auger parts caused by tensioning the clamping sheath too much

1. Only pretension the clamping sheath until the required pressure is reached.
   If the required pressure is not reached even after strong tensioning:
2. Remove the auger pump and check it for wear.
3. Repeat the check to obtain a precise result.

2. Check the worm pump. *(Checking the worm pump P. 8 — 16)*

8.5 Functional fluids

The manufacturer accepts no liability for damage caused by using unauthorised functional fluids. The documentation provided by the manufacturer always applies.

Consult the relevant Service department at the manufacturer should you have any questions.

NOTICE

Environmental pollution caused by incorrect disposal of functional fluids

1. Collect all functional fluids, e.g. used oil, filters and auxiliary materials, separately.
2. Dispose of these in line with the relevant national and regional regulations.
3. Only work with waste disposal companies who are approved by the responsible authorities. Ensure that different oils are never mixed.

The fill volumes can be found in the “Technical data” section of the “General technical description” chapter.

The capacity specifications are guide values The capacity may vary depending on the model and remaining quantities. The marking on the fill level measuring equipment always applies.

8.5.1 Lubricant recommendation

We have listed all suitable lubricants for your machine in the tables below.

NOTICE

Risk of machine damage caused by mixing oils

1. The manufacturer accepts no liability for damaged caused by mixing oils from different manufacturers.
2. The manufacturer accepts no liability for the quality of the lubricants listed or for changes in quality made by the lubricant manufacturers without changing the grade designation.

The relevant Service department of the machine manufacturer can answer any questions you have about lubricants.

Mineral gearbox oil in accordance with DIN 51502	CLP ISO VG 220
Putzmeister	Part no. 212052008
ARAL	ARAL Degol BG 220
BP	BP Energol GRXP 220
ESSO	ESSO Spartan EP 220
MOBIL	Mobilgear 630
SHELL	SHELL Omala 220

Greases	
Marking as per DIN 51502	K2K-25
Characteristics	mineral, lithium soap

Greases	
Requirements standard	DIN 51825:2004
NLGI Class	NLGI Class 2 DIN 51818:1981
Container	400 g
Part number	000113007

8.6 General tightening torques for bolts

See the spare parts list for an overview of general tightening torques.

NOTICE

Risk of damage to components caused by incorrect bolts

1. Always use bolts of the same size and grade when you need to replace the bolts.
2. Bolts with adhesive in the locking threads and selflocking nuts must always be replaced after removal.

9 Decommissioning

This chapter contains information on decommissioning the machine.

9.1 Temporary decommissioning

If the machine is to be shut down temporarily, take the following measures.

⚠ WARNING

Risk of injury due to the conveyed material spraying out

1. Secure the danger zone to prevent unauthorised access.
2. Wear protective goggles.
3. Always wear personal protective equipment.
4. You should only uncouple the delivery line once you have checked the pressure gauge to see that the system is fully depressurised.
5. Turn your face away when opening the line coupling.
6. Open the coupling carefully.

⚠ WARNING

Risk of injury due to moving machine components

- Never reach into moving machine components, whether the machine is running or switched off.

1. Stop the material feed.
2. Run the hopper until it is empty.
3. Switch off the pump using the “Pump ON/OFF” double push-button.
4. Switch the machine off at the main switch.
5. Disconnect the machine from the mains.
6. Clean the machine as described in the “Operation” chapter.

9.2 Shutting down the machine

If the machine will be shut down or stored, it must be lubricated and, if needed, preserved.

Preserving and lubricating the machine protects it against corrosion and rapid ageing. This is required if the machine:

- Will be shut down for a longer period,
- Is exposed to corrosive atmospheres during storage or transport.

NOTICE

Damage to the machine caused by freezing water

- ▸ If there is a risk of freezing, you must drain the machine and the delivery line fully of residual water.

1. Perform all steps as described previously in the “Temporary decommissioning” section.
2. Shut down the machine only when de-energised.
3. Lubricate the machine.
4. Preserve the machine with a suitable corrosion protection agent.

9.3 Final decommissioning and disposal

The final decommissioning and disposal requires the complete disassembly of the machine into its individual components. When disposing of all machine components, ensure that there is no possibility of damage to health or the environment.

⚠ WARNING

Risk of injury due to skin contact with functional fluids

Hydraulic fluid and other functional fluids can be injurious to health in case of skin contact.

- ▸ Always wear your personal protective equipment when handling toxic, caustic or other functional fluids that can be injurious to health and observe the manufacturer’s information.

⚠ CAUTION

Risk of injury due to sharp, exposed components

- Always wear personal protective equipment.

NOTICE

Environmental pollution caused by functional fluids escaping

When decommissioning the machine permanently, escaping lubricants, solvents, preserving agents, etc. may pose a risk.

1. Collect all functional fluids separately.
2. Dispose of these in line with the relevant national and regional regulations.
3. Only work with waste disposal companies who are approved by the responsible authorities.
4. Ensure that different functional fluids are never mixed.

NOTICE

Environmental pollution caused by incorrect disposal of the machine

1. When disposing of all machine components, ensure that there is no possibility of damage to health or the environment.
2. Commission a qualified specialised company with the final disposal of the machine.

9.3.1 Materials used

The main materials used for machine construction were:

Material	Used in
Copper	Cables
Steel	Machine frame
	Hopper parts
	Pump parts
Plastic, rubber, PVC	Seals

Material	Used in
Plastic, rubber, PVC	Hoses
	Cables
	Wheels
Tin	Printed circuit boards
Polyester	Printed circuit boards

9.3.2 Parts requiring separate disposal

The following parts and functional fluids must be disposed of separately:

Designation	Applies for
Electronic scrap	Electrical supply
	PCBs with electrical components
	Engine
Oil	Gearbox

10 Appendix

This chapter contains the sample EC Declaration of Conformity for your machine.

10.1 Sample EC Declaration of Conformity

The original EC Declaration of Conformity is included in the machine's scope of supply. Keep it in a safe place.

Local Template

EG Konformitätserklärung

2006/42/EG, II 1.A.

Putzmeister

LT-170050-031

1	de	**EG-Konformitätserklärung im Sinne der Richtlinie 2006/42/EG, Anhang II 1.A des Europäischen Parlaments und des Rates vom 17. Mai 2006 über Maschinen**	
	en	**EC Declaration of Conformity as per directive 2006/42/EC, appendix II 1.A of the European Parliament and of the Council of 17 May 2006 on machinery**	
2	de	**Hiermit erklären wir, dass die Maschine - Bezeichnung / Typ / Maschinen-nummer**	**Mörtelmaschine**
	en	Herewith we declare that the machine –Designation / Model / Serial No.	**S5**
3	de	**allen einschlägigen Bestimmungen der Richtlinie entspricht:**	**2006/42/EG**
	en	**meets all relevant provisions of the directive:**	
4	de	Darüber hinaus entspricht die Maschine den einschlägigen Bestimmungen folgender weiterer Richtlinien:	**2014/35/EU** **2014/30/EU** **2000/14/EG**
	en	Moreover, the machine meets the relevant provisions of the other directives below:	
5	de	**Angewendete harmonisierte Normen, insbesondere**	**EN 12001**
	en	complies with the following provisions applying to it	
6	de	Angewandte sonstige technische Normen und Spezifikationen, insbesondere	
	en	Other, related technical standards and specifications, in particular:	
7	de	**Angaben zum Dokumentationsbevollmächtigten**	**Putzmeister Mörtelmaschinen GmbH Max-Eyth-Straße 10 D-72631 Aichtal**
	en	Party authorized to produce documentation	
8	de	**Angaben zum Unterzeichner / Datum / Unterschrift**	
	en	Signer / Date / Signature	

Putzmeister Mörtelmaschinen GmbH
Max-Eyth-Straße 10
D-72631 Aichtal

9	de	**Geschäftsführer**	
		den	
	en	Managing Director	

Index

In this chapter, you will find the most important keywords and the number(s) of the page(s) on which they appear. This index of key words is in alphabetical order.

T

U

V

W