Operating Instructions

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

Piston pump P 13 EMR

Machine no.

Putzmeister Mörtelmaschinen GmbH
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Putzmeister

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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.pmmortar.de.

1.1 Foreword

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

These Operating Instructions do not describe the engine - for information regarding the engine, please refer to the enclosed operating instructions issued by the engine manufacturer.

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 — 4)*	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 people.

2.1.1 Piston pump

The piston pump is a machine for mixing and pumping different types of plaster and mortar. The mortar is mixed in a positive mixer and emptied through a flap downwards into the reservoir. The mortar is delivered with the installed mortar pump. An air compressor provides the necessary spray air and control air.

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 machine is designed exclusively to mix, pump and spray premixed dry mortar and site mixes of up to 8 mm grain size through delivery lines with 50 mm maximum diameter.

Performance must be limited to pumping operations on construction sites. The maximum delivery pressure must not exceed that specified on the rating plate or in the technical data. The delivery line through which the pump delivers must be designed for the delivery pressure and installed and secured properly in line with the recognised rules of engineering.

The machine is filled via the 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 electric or hydraulic system of the machine must be carried out only by qualified personnel trained in electrics or hydraulics.

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 subject 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 forbidden.

A new delivery line is only suitable for 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 containers, 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 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 397:2013-04; Industrial safety helmets)
	Safety footwear Safety footwear protects your feet against falling objects and against penetration by projecting nails. (DIN EN ISO 20345:2012-04; 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 352-1:2003-04; Hearing protectors - General requirements - Part 1: Earmuffs or DIN EN 352-3:2003-04; 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 388:2017-01; 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 166:2002-04; 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 361:2002-09; 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 149:2009-08; 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 transporting, setting up, operating and maintaining 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 caused by unauthorised start-up or use of the machine.
- Injuries due to reaching into the agitator or into running V-belts.

- Risk of permanent hearing damage due to noise level if persons are permanently in the vicinity of the machine without hearing protectors.
- Injuries to the skin and eyes due to splashing material, dust particles or other chemical substances.
- Damage to health due to breathing in dust particles, cleaning agents, solvents and preservatives.
- Risk of burning due to hot machine components. These are the compressor, air valve, excess pressure safety device and pump.
- Injuries caused by the machine rolling away as a result of the brake, support feet or chocks becoming released.
- Injuries due to bursting delivery line or delivery pipes.
- Injuries caused by opening pressurised delivery lines (e.g. following blockages).
- Injuries caused by tripping over cables, hoses or reinforcements.

2.11 Electrical contact

There is a risk of death from electrical contact on the control cabinet, the electrical lines and the engine 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 40050 ICE 144 .

Use only original fuses with the specified voltage rating. Overriding fuses or fuses that are too strong may destroy 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.

2.12 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.

2.13 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 — 3)

2.14 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.

2.15 Noise emissions

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

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

Above 85 dB (A), hearing protectors must be worn. You will find the value for the sound pressure level in the “Technical data” section.

⚠ WARNING

Hearing loss caused by noise

- ▸ Wear the mandatory personal hearing protectors.

2.15.1 Operator

The operator must provide their 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.

2.16 Safety-related parts (SRPs)

⚠ WARNING

Risk of death

Incorrect assembly of safety-related parts can result in malfunctions.

- Safety-related parts (SRP) should only ever be repaired, maintained or replaced by qualified personnel with the necessary authorization.

Safetyrelated parts (SRP) are components that ensure the safety of the machine functions. They are specially marked on spare parts sheets. When a spare part that can be used as an SRP is ordered, it is delivered in separate, clearly labelled packaging.

Read the “EB00-5-xxxxx-xxxx” sheet to ensure that you are aware of the SRPs fitted on the machine.

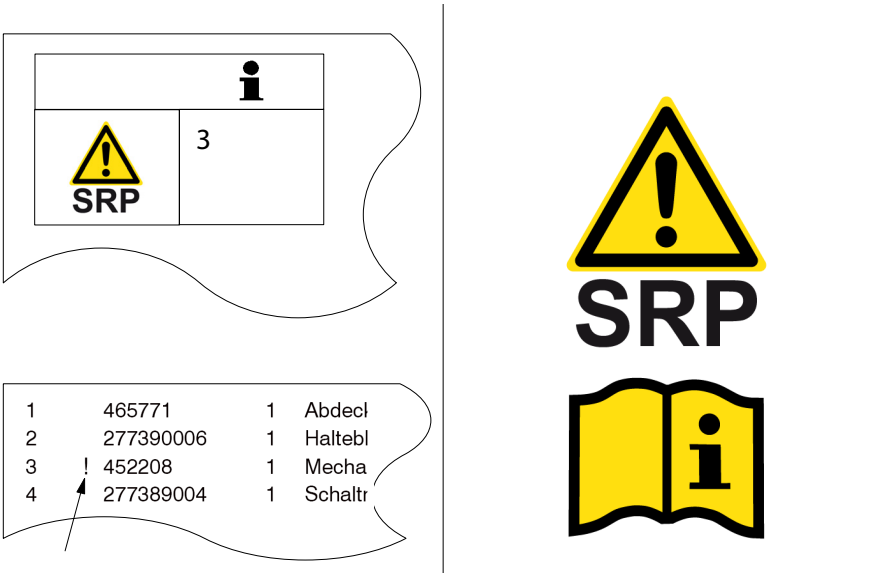

Figure 1: SRP marking

Item	Designation
Left	Spare parts sheet
Right	Spare part packaging

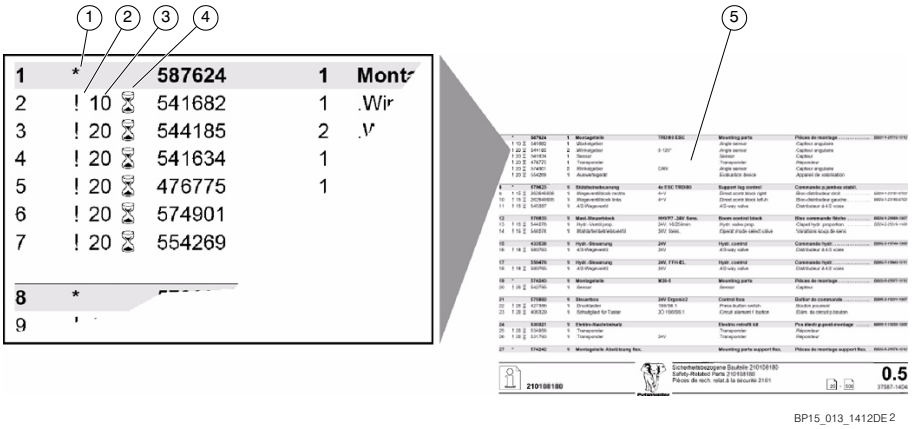

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Figure 2: Extract from an example spare parts sheet

Item	Designation
1	Asterisk “*” – item cannot be ordered
2	Exclamation mark “!” - Safety-related part (SRP)
3	SRP service life in years 10 = 10 years
4	Hourglass – SRP service life
5	Example spare parts sheet “EB00-5-xxxxx-xxxx”

Putzmeister specifies a service life *(3)* for every safety-related part (SRP). The SRPs must be replaced once this service life has elapsed.

2.17 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.

2.18 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.

2.19 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.

2.20 Unauthorised start-up or use of the machine

2.20.1 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

2.20.2 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 off the main switch
- Lock the main switch with a padlock

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 a P 13 piston pump from Putzmeister Mörtelmaschinen GmbH.

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.

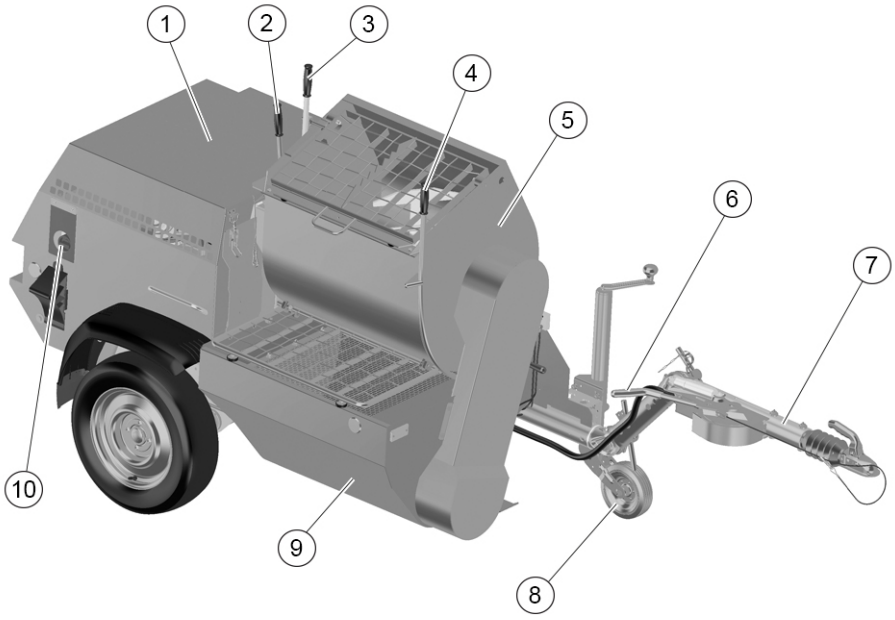


Figure 3: Compressed air conveyor overview

Item	Designation
1	Hood
2	Lever (pump ON/OFF)
3	Lever (mixer and agitator ON/OFF)
4	Lever (mixer shutter)

Item	Designation
5	Mixer
6	Parking brake
7	Towing gear
8	Support wheel
9	Hopper with agitator
10	Main switch

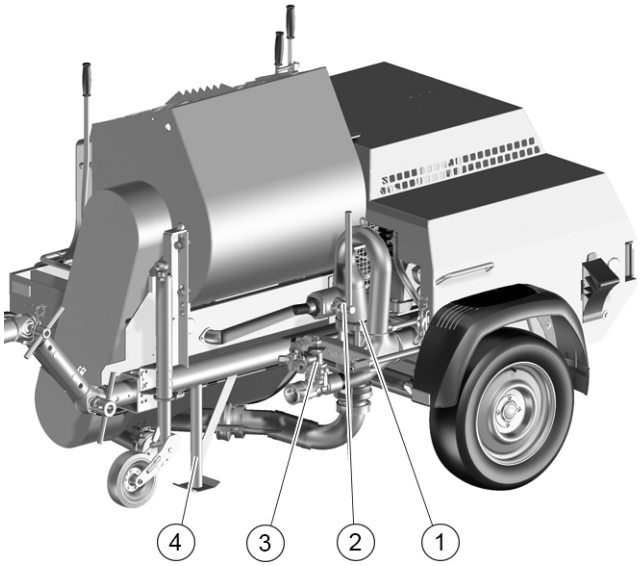


Figure 4: Compressed air conveyor overview

Item	Designation
1	Piston pump
2	Return valve
3	Excess pressure safety device
4	Support foot

3.3 Motor compartment

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

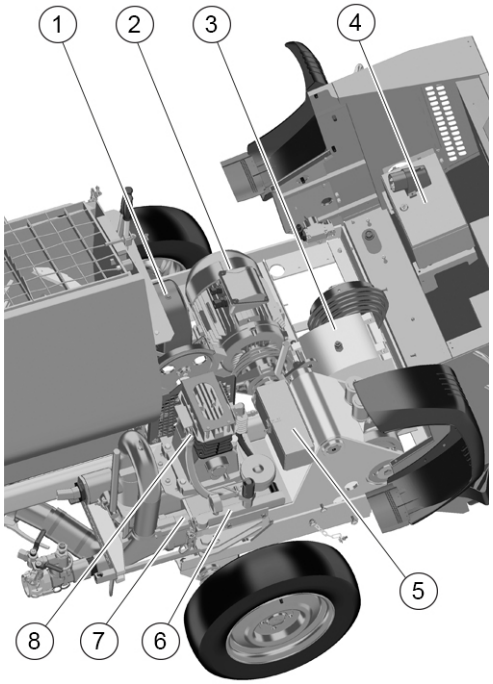


Figure 5: Motor compartment overview

Item	Designation
1	Mixer transmission
2	Electric motor
3	Pump transmission
4	Control cabinet
5	Toolbox
6	Air valve
7	Piston pump
8	Compressor

3.4 Technical data

Dimensions	P13 EMR braked	P13 EMR non-braked
Length with drawbar	3530 mm	3000 mm
Width	1640 mm	
Height	1450 mm	
Filling height	1300 mm	

Weight	P13 EMR braked	P13 EMR non-braked
Permissible gross weight	See rating plate	
Weight	See rating plate	
Drawbar load	See rating plate	

Axle and wheels	P13 EMR braked	P13 EMR non-braked
Technically permissible maximum speed	100 km/h	

Tyres	P13 EMR braked	P13 EMR non-braked
Tyre size	175/70 R13 (see registration papers)	
Rim size	4 1/2 J X 13 H2 ET 30	
Inflation pressure	2.7 bar (see plate)	
Tightening torque of wheel bolts	90 Nm	

After mounting the wheels, retighten the wheel bolts or wheel nuts with the specified tightening torque after a 50 km journey.

Performance data	P13 EMR braked	P13 EMR non-braked
Drive motor	Electric motor, 7.5 kW, 2900 rpm	
Compressor	Two-cylinder compressor, 10 bar, 1440 l/min	
Delivery rate	KA 139 = 20–80 l/min	
	KA 230 = 30–90 l/min	
Max. delivery pressure	See rating plate	
Max. delivery distance	150 m wide, 80 m high; Plaster/fine plaster: 60 m wide, 40 m high	
Max. particle size of conveyed material	KA 139 = 6 mm	
	KA 230 = 8 mm	
Sound power level	see plate on the machine	
Sound pressure level	< 85 dB(A)	
Inclination angle in longitudinal direction	Max. 5°	
Inclination angle in transverse direction	5°	
Temperature range	-5 °C to +45 °C	
Installation altitude (without reduction in performance)	Up to 1000 m above sea level	

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

Electrical connection	P13 EMR braked	P13 EMR non-braked
Mains voltage	See rating plate	
Device connector	See electrical circuit diagram	
Connecting cable	See electrical circuit diagram	
Max. pre-fuse	See electrical circuit diagram	
Electrical output	7.5 kW	

Fill volumes	P13 EMR braked	P13 EMR non-braked
Compressor oil	0.75 l	
Pump transmission oil	5.8 l	
Mixer transmission oil	0.5 l	
Hopper volume	200 l	
Mixer volume	170 l	

The capacity specifications are guide values and may vary depending on the model and quantity of fluid remaining. The marking on the fluid measuring equipment always applies.

3.5 Rating plate

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

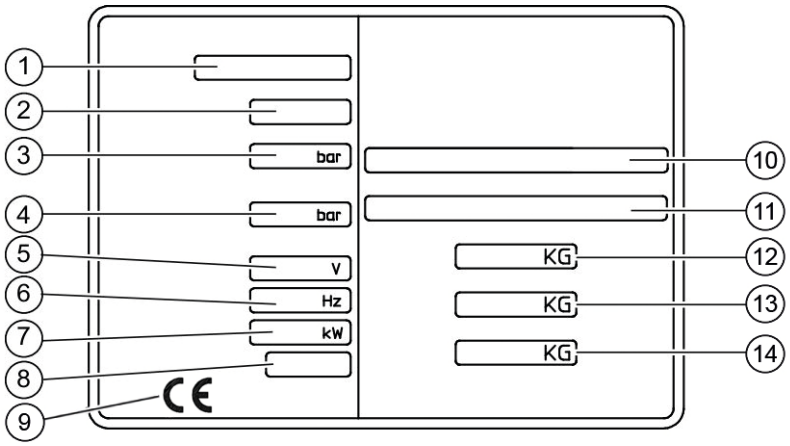


Figure 6: Rating plate

Item	Designation
1	Model (machine model)
2	Year of manufacture
3	Max. delivery pressure [bar]
4	Max. hydraulic pressure [bar]
5	Voltage [V]
6	Frequency [Hz]
7	Power [kW]
8	Identification number for certification and monitoring office
9	CE marking
10	Registration number
11	Chassis number
12	Permissible gross weight [kg]
13	Permissible drawbar load [kg]
14	Permissible axle load [kg]

3.6 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 7: Plate – sound power level

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

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 Excess pressure safety device

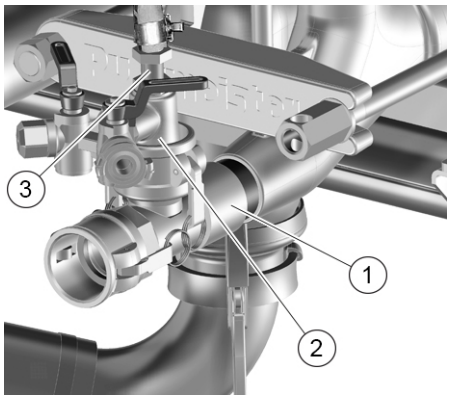


Figure 8: Excess pressure safety device

Item	Designation
1	Pressure connection
2	Excess pressure safety device
3	Adjustable tube

The excess pressure safety device for the balance piston pump is immediately installed on the pressure connection of the pump. Its effect is based on the fact that the mortar pressure pushes a rubber ball into a cone. The lower opening of the adjusting tube is covered and thus the flow of spray air to the spray gun is blocked. This allows the pump to be shut down due to a pressure increase by disengaging the clutch, just as if the air cocks on the spray gun were closed.

So if the air stays away from the spray gun, then this is a sign that the excess pressure safety device is responding and there is a blockage.

If the pressure in the delivery line falls again, then the ball is pushed downwards again owing to its elastic properties and frees the airway, upon which the pump switches on again.

3.7.2 Safety valve

DANGER

Danger due to manipulation of the safety valve

1. Never damage or remove the seal on the safety valve.
2. Never change the blow-off pressure of the safety valve.
3. Do not carry out repairs on the safety valve.
4. Never remove the safety valve and never replace it with a safety valve with a higher setting.

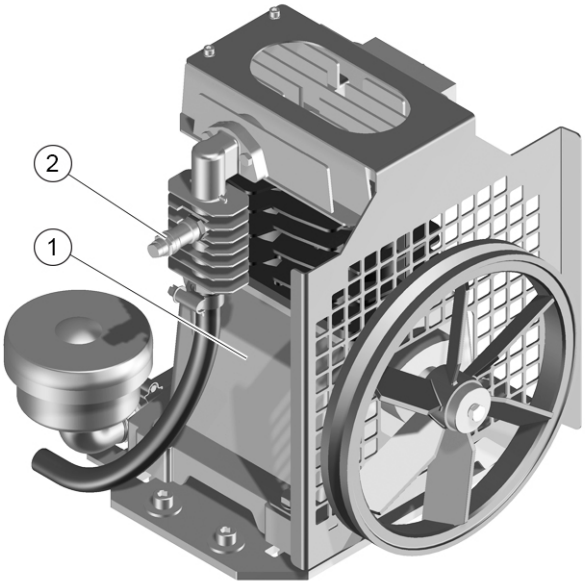


Figure 9: Safety valve

Item	Designation
1	Compressor
2	Safety valve

The safety valve limits the blowoff pressure of the compressor. If the compressor exceeds the preset pressure, the safety valve opens and releases the excess pressure into the open.

The blow-off pressure is set to 3.7 ± 0.1 bar and must not be changed.

Oily compressed air is discharged when blowing out the safety valve. This leads to a loss of oil in the long term.

3.7.3 Mixer grille

⚠ WARNING

Risk of injury due to removed protective grille

Amputations resulting from the crushing, shearing, entanglement or drawing of limbs into the rotating mixing apparatus.

1. Make sure that the mixer grille is fitted in every operating mode.
2. Fit the mixer grille again every time maintenance work is completed.
3. Only operate the machine when the mixer grille is closed.
4. Do not reach through the mixer grille; do not put objects through the mixer grille.

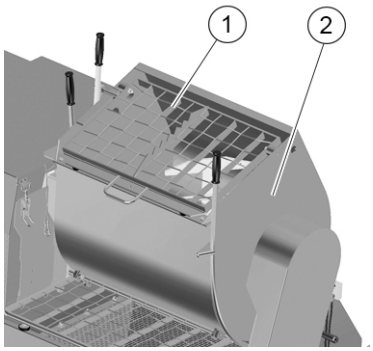


Figure 10: Mixer grille

Item	Designation
1	Mixer grille
2	Mixer

The mixer grille has a mechanical safety device. When the mixer grille is opened, the mixer shaft is automatically switched off.

3.7.4 Protective grille on the agitator hopper

⚠ 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.

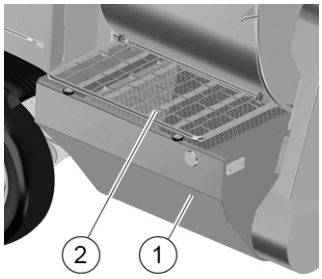


Figure 11: Protective grille

Item	Designation
1	Hopper with agitator
2	Protective grille

The protective grille has a mechanical safety device. It can only be opened if the agitator is switched off.

3.7.5 EMERGENCY STOP switch

On your machine, the main switch acts as an EMERGENCY STOP switch. Switching the machine off at the main switch causes an EMERGENCY STOP.

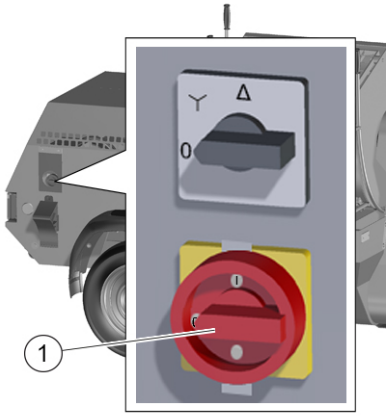


Figure 12: EMERGENCY STOP switch

Item	Designation
1	EMERGENCY STOP switch (main switch)

⚠ 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 switch.
2. After an EMERGENCY STOP, eliminate the danger before re-starting operation.

If you press the EMERGENCY STOP switch, the following actions are triggered:

- The drive motor is stopped.
- All functions are deactivated.

3.7.6 Hood safety lock

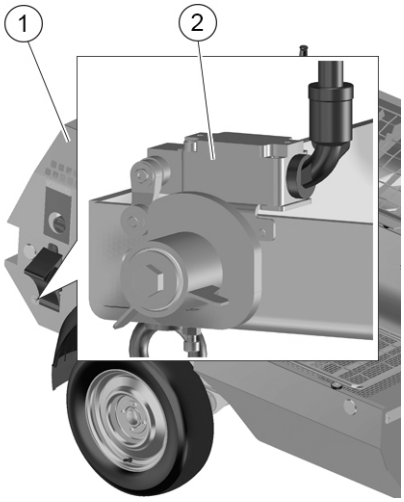


Figure 13: Hood safety switch

Item	Designation
1	Hood
2	Safety switch

The machine is fitted with a hood safety lock. If the hood is opened during operation, a safety switch is actuated and the machine drive motor switches off immediately.

You must close the hood after carrying out the check and test operations. The machine may be operated only with the hood closed.

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.

3.8.1 Functional overview

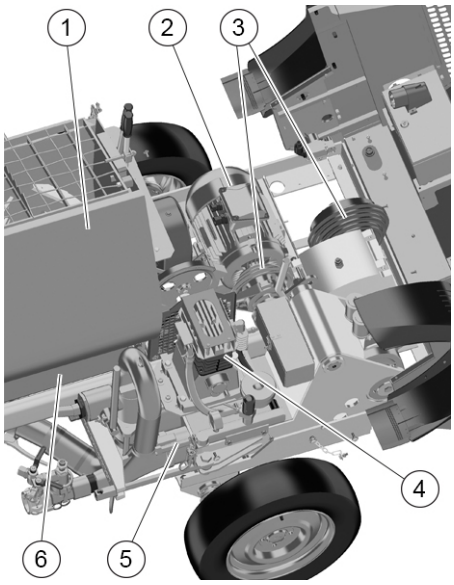


Figure 14: Functional overview

Item	Designation
1	Mixer
2	Electric motor
3	V-belt pulley
4	Compressor
5	Piston pump
6	Hopper with agitator

The P 13 piston pump is a machine for mixing and pumping different types of plaster and mortar. The mortar is mixed together in the mixer and emptied downwards through a shutter into the hopper (with agitator). The mortar is pumped from there with the piston pump. A 2cylinder air compressor provides the necessary spray air and control air.

The delivery rate is determined by the ratio of belt pulleys (drive motor) to belt pulleys (pump transmission). For this purpose, the V-belt can be switched to three pairs of pulleys.

3.8.2 Remote control

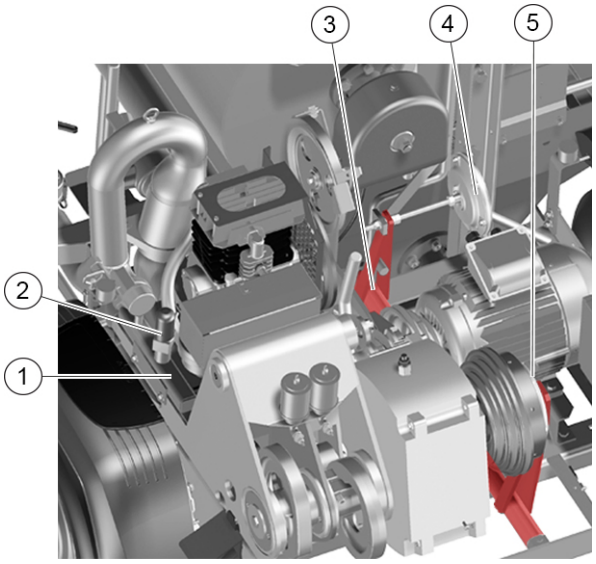


Figure 15: Remote control

Item	Designation
1	Air battery
2	Remote control regulator
3	Linkage
4	Disengaging diaphragm
5	Coupling

Remote control of the pump is carried out automatically via the remote control regulator. When you open the air cocks (stop cock and remote control valve), the pressure in the air line decreases and the remote control regulator vents the disengaging diaphragms. The disengaging diaphragm couples the clutch via the linkage and actuates the pump. When the air cocks are closed the same process is performed in reverse.

3.9 Control cabinet

The machine is operated and controlled from the control cabinet.

3.9.1 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.

3.9.2 Overview

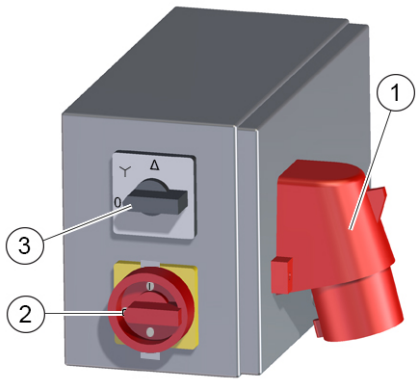


Figure 16: Control cabinet

Item	Designation
1	**CEE external device plug**
2	**Main/reversing switch (EMERGENCY STOP switch)** Switching on/off the supply voltage/direction of rotation of the electric motor/EMERGENCY STOP.
3	**Stardelta switch** Switching on/off the drive motor.

3.10 Compressor

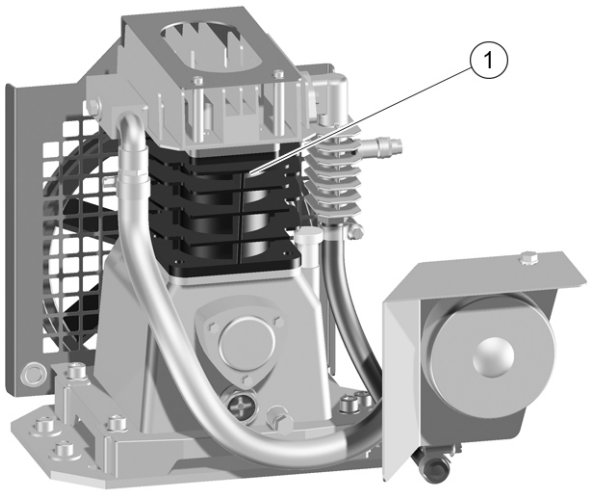


Figure 17: Compressor

Item	Designation
1	Compressor

A compressor has been integrated to generate the air required to spray the mortar. The air generated is transported through the air battery and an air hose to the spray gun. The spray air is also used to pneumatically control the machine.

3.11 Spray gun

The spray gun is attached to the end of the delivery line.

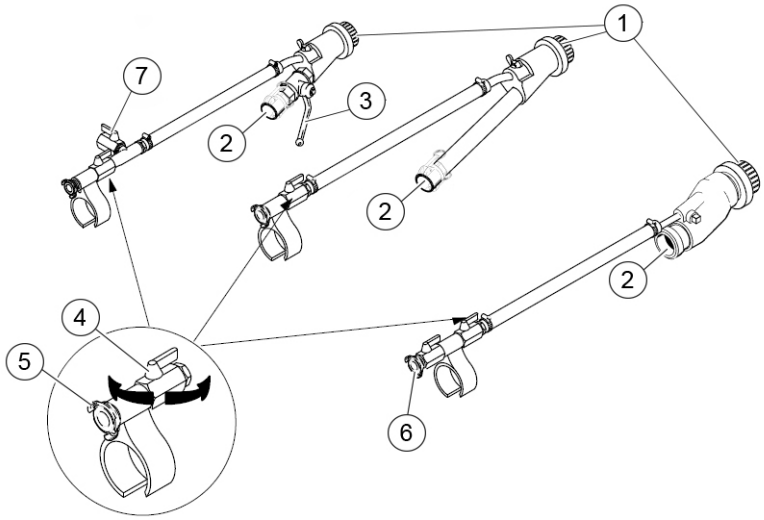


Figure 18: Spray gun overview

Item	Designation
1	Rubber fine plaster nozzle
2	Delivery line connection
3	Material lever (dependent on model)
4	Remote control valve
5	Air supply coupling
6	Stop cock (dependent on model)
7	Air-regulation cock (dependent on model)

3.12 Water supply fitting

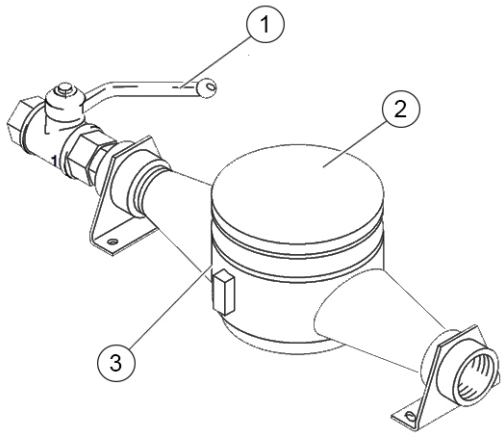


Figure 19: Water supply fitting

Item	Designation
1	Ball valve
2	Water gauge
3	Water supply fitting

The machine can be equipped with an optional tempering fitting. The tempering fitting ensures that the correct water volume is dosed.

To provide the machine with water, a suitable hose must be connected from the water mains to the water fitting. The water supply is regulated by the ball valve. The water goes from the water fitting into the mixer via a sprinkler. The water gauge indicates the water volume. Once the required water volume is reached, stop the supply of water manually using the ball valve.

3.13 Options

Consult your dealer or local Putzmeister Mortar Machines GmbH representative as to how and whether you should upgrade your machine.

The following options can be installed on your machine:

- KA 139 double piston pump
- KA 230 double piston pump
- Pass. car coupling
- Water supply fitting

You can find further options and accessories in the Putzmeister Mörtelmaschinen GmbH catalogue or online at: www.pmmortar.de

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 the other tasks necessary for the assembly and connection of the machine. Starting up the machine is described in the “Starting up” chapter.

4.1 Transport and driving

Putzmeister trailer machines may only use public roads with the relevant approval. If they are being towed in road traffic, they are subject to road traffic regulations. These will also specify the permissible driving speed for the trailer machine in the country of use.

The trailer machines must not be used to transport goods. The regulations for operating trailers, in particular those regarding the permissible trailer load of the tractor unit, must be observed. Before the start of a journey, make sure that the towing gear, brakes and lighting equipment are fully functional.

4.2 Loading the machine

The machine has no lifting eye. Always load the machine onto a suitable transport vehicle via a ramp.

⚠ WARNING

Risk of injury due to improper loading

If the machine is not loaded onto the transport vehicle properly, it can slip, roll away or topple over.

1. Use a transport vehicle designed for the weight of the machine.
2. Observe the maximum gross weight on the rating plate. Additional loads on the machine are not permitted.
3. Use lifting tackle, support trestles and other auxiliary devices that are reliable and safe in operation.
4. Secure the machine on the transport vehicle to prevent it from rolling away, slipping and toppling over.

NOTICE

The machine can be damaged if loaded improperly

1. Use a ramp for loading.
2. Do not use a crane or fork-lift truck to load the machine.

4.3 Preparing the transport

Before the machine may be moved by a tractor unit in road traffic, the following aspects must be prepared:

The tractor unit must be equipped with a trailer coupling designed to withstand the relevant trailer and drawbar loads.

1. Take into account the gross weight of the machine.
2. Check the permissible drawbar load and trailer load of the tractor unit.
3. Shut the machine down properly. See the “Decommissioning” chapter.
4. Close the hood.
5. Empty the mixer and hopper.
6. Check whether the lighting equipment is fully functional.
7. Connect the machine properly *(Hitching the ball hitch P. 4 — 10)*.
8. Fasten the brake safety cable (if fitted) to the tractor unit *(Brake safety cable P. 4 — 7)*.
9. Put the support wheel (if fitted) in an upper position after attaching and secure it.
10. Remove the chocks and secure them in the bracket.

Observe the permissible total towed weight. Additional loads on the machine are not permitted. Observe the maximum gross weight on the rating plate.

4.4 Towing gear

The tractor unit must be equipped with a trailer coupling designed to withstand the relevant trailer and drawbar loads.

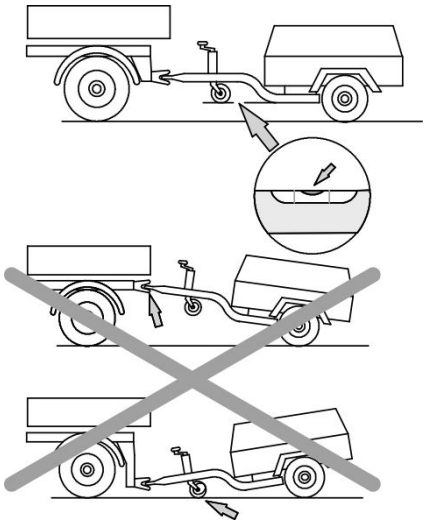


Figure 20: Attaching the machine horizontally

The machine must have maximum ground clearance while being towed. It must be ensured that the machine is horizontal when it is attached ready for towing. The towing ring/ball hitch must be horizontal when inserting it in/attaching it to the trailer coupling of the tractor unit.

4.4.1 Ball hitch/towing ring

The chassis is designed for transport via a ball hitch or towing ring.

The products supplied with the machine contain either a ball hitch or a towing ring.

- Mount the ball hitch or towing ring as described in the Maintenance work *(Changing the drawgear P. 8 — 46)* chapter, otherwise the machine's operating permit will expire.

4.4.2 Adjusting the towing gear

Adjust the towing gear gradually.

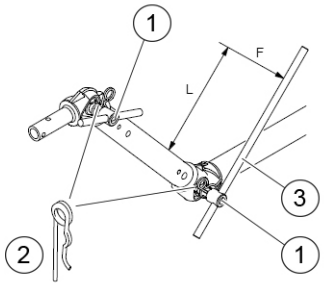


Figure 21: Towing gear (different models are available)

Item	Designation
1	Locking toggle
2	Spring pin
3	Lever (pipe)

1. Pull out the spring pin *(2)* on the locking toggle *(1)*.
2. Release the locking toggle and turn it as far as the stop.
   ⇒ The towing gear can now be adjusted upwards and downwards to the stops.

	M16x1.5	M20x1.5	M28x1.5	M36x1.5
Tightening torque MA [Nm]	150	250	400	650
Length L [mm]	1000	1000	1000	1000
Force F [kg]	15	25	40	65

3. Tighten the locking toggle at the specified tightening torque.
4. Insert the spring pin again firmly to secure it.
5. Check that the locking toggle is firmly seated after travelling approx. 100 km.

4.5 Parking brake

A parking brake is fitted to secure the machine when parked.

The axle and wheels are equipped with a pneumatic spring. The pneumatic spring assists the braking force. If the automatic reverse braking system is activated (machine rolling backwards), the pneumatic spring automatically retightens the wheel brake.

The machine must be secured with the parking brake when parked:

⚠ WARNING

Danger due to the machine rolling away

1. Always pull the brake lever firmly beyond the dead centre.
2. In addition, secure the machine with chocks.

The parking brake must be released before the start of a journey:

- To release the parking brake, push the brake lever back beyond the clearly noticeable dead centre and into the zero position while pressing the push button.

4.5.1 Brake safety cable

The brake safety cable connects the trigger mechanism on the parking brake lever with the tractor unit. It acts as the trailer's emergency brake, should it become disconnected from the tractor unit for any reason.

The brake safety cable is designed such that it cannot pull the trailer along if the trailer coupling is undone. Once a specified tensile load is reached, it triggers the parking brake and tears off, causing the trailer to brake independently.

⚠ WARNING

Danger due to accidental tensioning of the brake safety cable

1. In normal driving mode, there must not be any tension on the brake safety cable under any circumstances when the trailer is attached. The brake safety cable must not be completely taut even when travelling around a corner.
2. Never attach the brake safety cable on a frame section of the tractor unit so that it is stretched.
3. Secure the brake safety cable so that the cable cannot tension and trigger the trailer's parking brake, even when travelling around a tight corner or when the train is compressed.

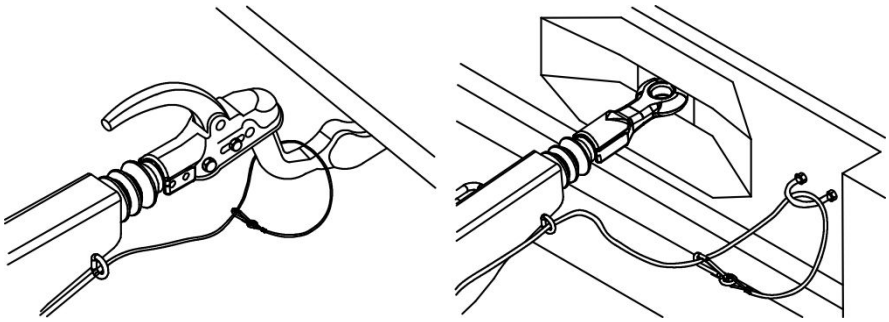


Figure 22: Towing gear with ball hitch or towing ring

- Fasten the brake safety cable to the tractor unit after hitching the trailer (see figure).

4.6 Ball hitch

The ball hitch is fitted with a safety control display. This comprises clearly marked symbols, a red/green/red label and an indicator.

⚠ WARNING

Risk of accident due to trailer becoming released

If the ball hitch is not properly hitched, the trailer may disconnect from the tractor unit.

1. After hitching, always check the ball hitch for wear and correct seating.
2. Check on the display whether the ball hitch is engaged correctly.
3. Only drive the trailer if the ball hitch is properly closed and locked.

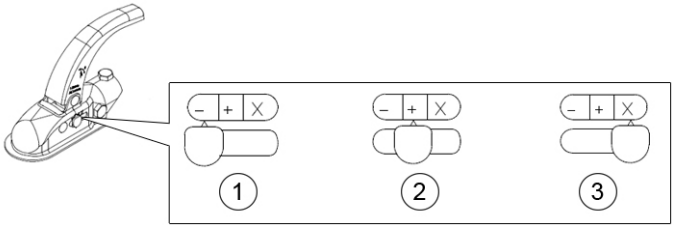


Figure 23: Ball hitch with safety control display

Item	Designation
1	**Red marking: -** The ball hitch is not closed properly or worn.
2	**Green marking: +** The ball hitch is locked correctly.
3	**Red marking: X** The ball hitch is open.

▶ To connect or disconnect the ball hitch, proceed as follows.

4.6.1 Hitching the ball hitch

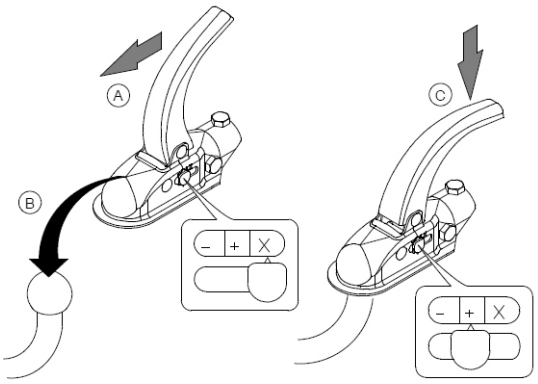


Figure 24: Hitching the ball hitch

⚠ WARNING

Risk of crushing

- No persons can be between the tractor unit and the trailer.

1. Move the tractor unit close to the hitch handle of the parked trailer by reversing it.
2. Open the ball hitch by pulling the hitch handle upwards (A).
3. Fit the open ball hitch (position X) onto the ball head of the tractor unit and let it engage audibly (B).
   ⇒ The drawbar load causes the ball hitch to engage automatically.
   ⇒ After the ball hitch has been engaged correctly, the indicator springs into the green area of the marking labelled with a “+”.

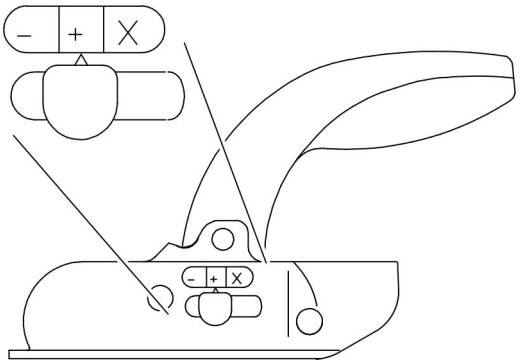


Figure 25: “Correctly closed” ball hitch position

Depending on the model, a support wheel can be used to facilitate raising and lowering in case of higher drawbar loads.

4. In addition, push the hitch downwards by hand to be safe. The coupling mechanism is correctly locked when the hitch handle can no longer be pressed down (C).
5. Check the indicator on the ball hitch.
   ⇒ If the indicator is within the green “+” area, the ball hitch is properly closed and locked and the ball on the tractor unit still shows signs of sufficient wear reserves.

Only in this manner can a secure connection be set up between your tractor unit and the trailer, allowing the train to take part in road traffic.

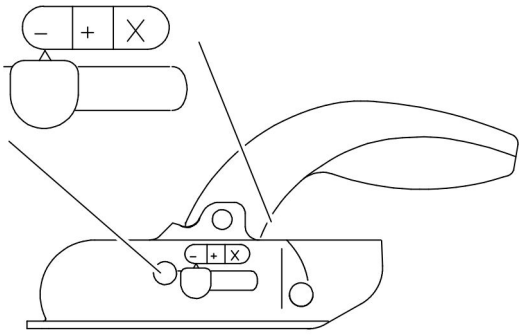


Figure 26: “Incorrectly closed” ball hitch position

⇒ If the indicator is in the red “-” area, the ball hitch is not properly closed and the trailer must under no circumstances be transported.

For further details, see also the ““Faults, cause and remedy”” chapter, section *(Tow hitch does not latch into position when rested on tractor unit P. 7 — 8)*.

4.6.2 Disconnecting the ball hitch

⚠ CAUTION

Risk of crushing due to closing coupling

Even a low pressure on the spherical cap can activate the spring-loaded closing mechanism and cause an injury to fingers.

- ▸ Do not reach into the open ball hitch.

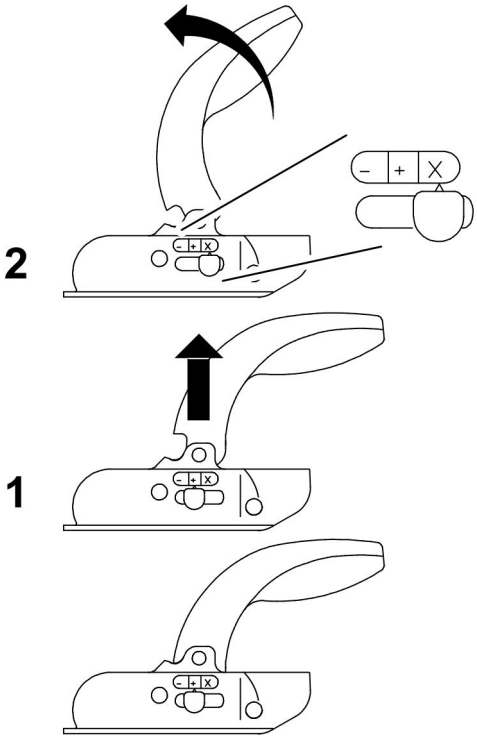


Figure 27: Disconnecting the ball hitch

1. Secure the machine using chocks.
2. Support the machine with any supports or support wheels that may be present.
3. Pull the hitch handle upwards.
   ⇒ The hitch handle is unlocked.
4. Turn the hitch handle.
   ⇒ The coupling is open. The coupling remains in this position independently. The indicator points to the red area with the “X”.
5. Lift the open ball hitch off the ball of the tractor unit.

Depending on the model, a support wheel can be used to facilitate raising/lowering in case of higher drawbar loads.

4.6.3 Permissible ball hitch slewing circle

The slewing circle of the ball hitch around the longitudinal axis of the vehicle is max. +/-25°. Horizontally, slewing angles within a range of +/-20° are possible.

NOTICE

Machine damage caused by exceeding the permissible slewing circle

If the permissible slewing circle is exceeded, the components are overloaded and the function of the ball hitch is no longer guaranteed.

- Drive in such a way as complies with the permissible slewing circle.

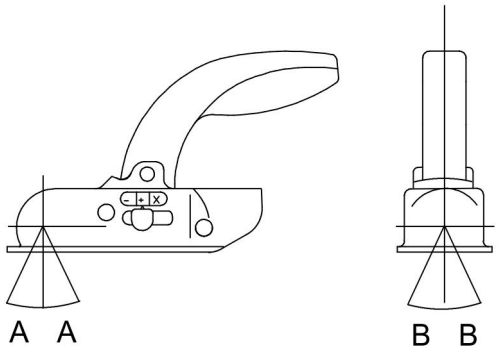


Figure 28: Ball hitch slewing circle

Item	Designation
A	Slewing circle 20°
B	Slewing circle 25°

4.7 Lighting equipment

The machine is fitted with lighting equipment.

⚠ WARNING

Risk of injury due to lighting equipment not being fully functional

- ▸ Always check the function of the lighting before the start of a journey.

- ▸ Check whether the lighting equipment is fully functional before each journey.

4.8 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 supporting ground must be firm enough to absorb the forces passed on from the machine into the ground. There must be no hollow spaces or ground unevenness under the machine.
- It must be possible to open all flaps and hoods.
- A clearance of at least 1 m must be provided around the machine.
- The set-up site must be sufficiently illuminated.
- Sharp pipe or hose bends should not be required.
- Hoses should not be laid on top of one another (risk of chafing).
- The lines should be as short as possible.

⚠ 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.

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

4.9 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 angles of the machine during set-up and operation, as specified in the technical data.

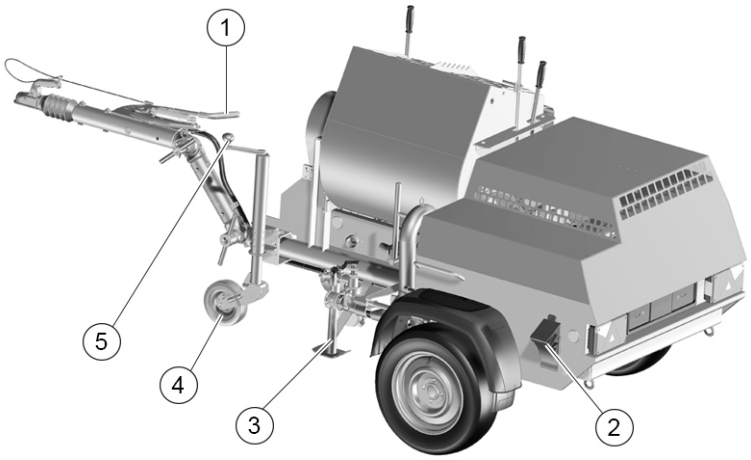


Figure 29: Setting up the machine

Item	Designation
1	Parking brake
2	Chock
3	Support foot

Item	Designation
4	Support wheel
5	Crank handle

1. Secure the machine against rolling away by placing chocks under the wheels.
2. On machines with a braking device, apply the parking brake.
3. Turn the support wheel on the crank handle upwards until the machine is on the support foot.
4. Align the machine horizontally. Use suitable packing plates for the support foot as required.

4.10 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.

For the electrical connected loads, please refer to the “General technical description” chapter or the electrical circuit diagram.

The electrical connected loads are also shown on the machine's rating plate.

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.

4.10.1 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 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.

4.10.2 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 cabinets and terminal boxes

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

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

- Only qualified personnel may open the control cabinet.

4.10.3 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.
  ⇒ The machine is ready for operation.

4.11 Connecting the delivery line

Use only original Putzmeister delivery lines that can withstand the specified operating and bursting pressures.

Only Putzmeister couplings and connections guarantee compliance with the values specified in the German Accident Prevention Regulation.

⚠ WARNING

If the delivery lines or couplings are damaged or worn, they must be replaced immediately.

1. You can limit the wear by installing the delivery lines in wide arcs.
2. Do not kink the delivery lines.
3. When using risers, hang the delivery lines on hose hooks near the coupling area to prevent the delivery line from becoming constricted.

⚠ WARNING

Risk of accident due to material spraying around

Material can spray out if the delivery lines and couplings are disconnected while still pressurised.

1. Only disconnect the delivery line when you are certain that the system is depressurised.
2. Always wear protective goggles. Turn your face away when opening the coupling.

⚠ WARNING

Risk of injury due to contaminated couplings.

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

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

Using the correct couplings and fittings greatly avoids the danger of blockages forming. The quality of the delivery line is also a decisive factor in operational safety. For this reason, you must only use delivery line grades and couplings approved and recommended by Putzmeister. Each type of delivery line can be identified by its marking.

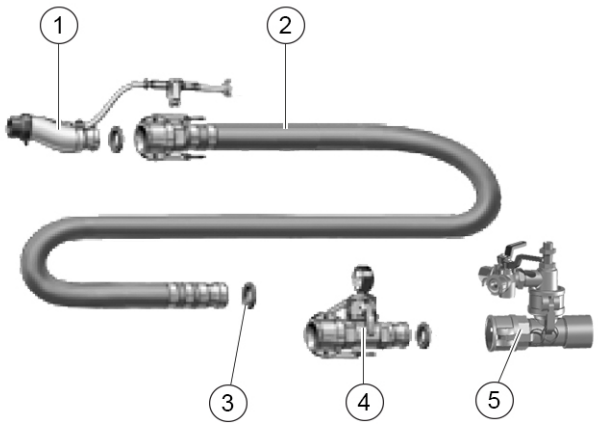


Figure 30: Connecting the delivery line

Item	Designation
1	Spray gun
2	Delivery line
3	Gasket
4	Pressure gauge
5	Pressure connection

Lay out the delivery line directly to the place of work to keep it as short as possible.

A gasket must be used on each line connector (see figure).

1. Connect the pressure gauge to the pressure connection.
2. Connect the delivery line to the pressure gauge.
3. Connect the delivery line to the spray gun as required.

4.12 Connecting the air line

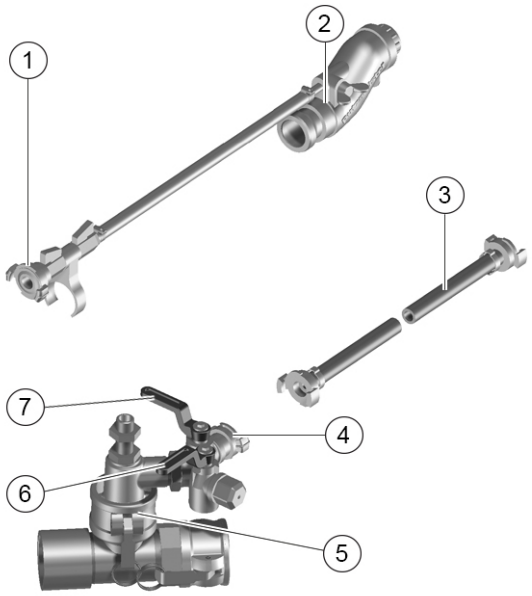


Figure 31: Connecting the air line

Item	Designation
1	Coupling
2	Spray gun
3	Air hose
4	Coupling
5	Excess pressure safety device
6	Waste air cock
7	Air valve

1. Connect the air hose to the coupling of the excess pressure safety device and the spray gun.
2. Close the waste air cock.
3. Open the air cock.
4. Lay out the air hose without kinks or narrowing.

4.13 Water connections

If your machine is equipped with a water supply fitting, you must connect this to the water mains. The water supply network may only be connected as per DIN 1988 – Technical Rules for Water Installations, i.e. by means of installation type 1 backflow preventers or an independent outlet (intermediate tank with a pressure booster pump).

NOTICE

Machine damage due to excessive water supply pressure

The water that is used must have a supply pressure of below 6 bar.

- ▸ Use a pressure reducer if the water pressure is higher than 6 bar.

NOTICE

Machine damage caused by contaminated water

The water used must be clean and of drinking water quality. Salt water, sea water, completely desalted water and water with added chemicals cause damage to the machine.

- ▸ Only feed in clean water.

NOTICE

Machine damage caused by pipes freezing

- ▸ If there is a risk of freezing, the lines must be laid out so as to exclude the possibility of the water freezing.

- The water supply pipe must be at least 3/4" in diameter.
- The water pressure must be at least 0.5 bar.

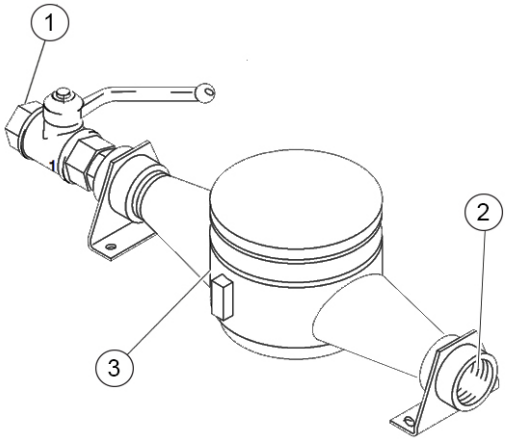


Figure 32: Water connection

Item	Designation
1	Water supply connection
2	Water outlet connection
3	Water supply fitting

1. Please ensure that you check the requirements for connection to the water supply before beginning connection work.
2. Lay out the pipes for the water supply so that they do not obstruct operating personnel.
3. Lay out the pipes for the water supply neatly and in such a way that they are protected from damage.
4. Connect the water line to the water supply connection.

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.

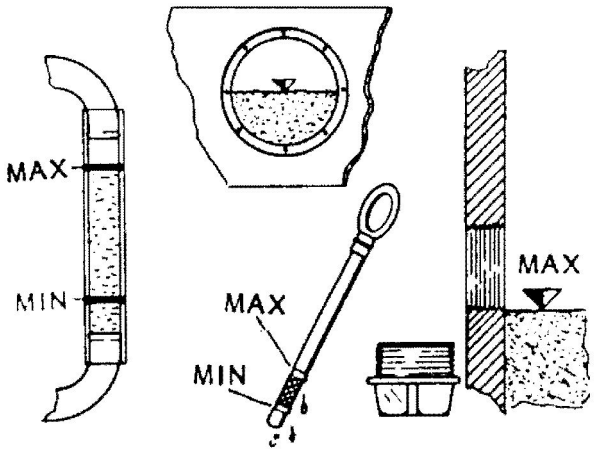
5.1.1 Visual checks

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

1. Always check the machine thoroughly for obvious defects before starting work.
2. Open up the hood to do this.
3. Check that all safety equipment is fitted and fully functional.
4. Make sure that the protective grille on the agitator hopper and the mixer grille are closed.
5. Check the most important wear parts.
6. Check the fill levels of the functional fluids.
7. Check whether all caps are properly closed.
8. Check all lubrication points.
9. Check whether the machine is set up correctly.
10. Check the delivery line for damage.
11. Observe the warning and information plates on the machine.

You must close the hood after carrying out the check and test operations. The machine may be operated only with the hood closed.

5.1.2 Checking the functional fluids



Item	Designation
1	Checking the water, fluid and fuel levels

⚠ 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.

NOTICE

Risk of machine damage caused by unauthorised functional fluids

The manufacturer accepts no liability for damage caused by using unauthorised functional fluids.

- Use only the lubricants specified in the lubricant recommendation.

1. Position the machine horizontally before checking the functional fluids.

The capacities can be taken from the “Technical data” section in the “General technical description” chapter, and the oil grade from the “Lubricant recommendation” section in the “Appendix” chapter.

2. Check the **pump transmission oil level** and top up oil if necessary *(Pump transmission – checking and correcting oil level P. 8 — 32)*.
3. Check the **compressor oil level** and top up oil if necessary *(Compressor – checking the oil level P. 8 — 25)*.
4. Check the oil level of the **drip feed lubricator** and top up oil if necessary *(Drip feed lubricator – topping up the oil P. 8 — 40)*.
5. Close all filler lids after completing the tasks.

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 Switching on and starting up the machine

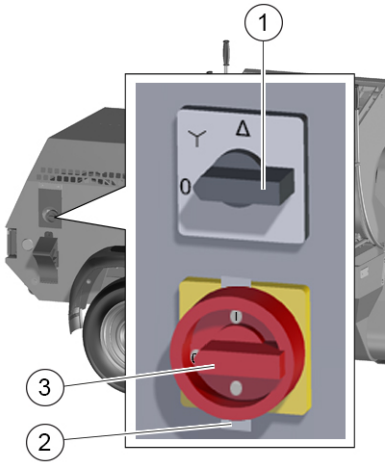


Figure 33: Switch

Item	Designation
1	**Stardelta switch** Switching on/off the drive motor.
2	**Main switch (with reversing switch)** Switches the power supply on/off.
3	**Reversing switch (in main switch)** Direction of rotation of the electric motor.

1. Switch the machine on at the main switch.
   ⇒ The machine power supply is switched on.

When switching on the machine at the stardelta switch, always switch first to the star position, stay there for approx. five seconds and then switch to the delta position.

2. Switch on the drive motor with the stardelta switch.

5.2.2 Switching the mixer and agitator on/off

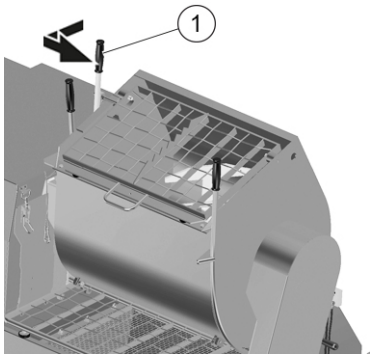


Figure 34: Switching the mixer and agitator on

Item	Designation
1	Lever (mixer and agitator ON/OFF)

Mixer and agitator run only if the drive motor is switched on.

Mixer and agitator can be coupled if the drive motor is switched off. The drive motor can be switched on with a coupled mixer and stirring value.

1. Pull the lever (mixer and agitator ON/OFF) in the direction of the arrow.
   ⇒ Mixer and agitator are switched on.
2. Push the lever (mixer and agitator ON/OFF) in the opposite direction to the arrow.
   ⇒ Mixer and agitator are switched off.

5.2.3 Switching on/off the pump

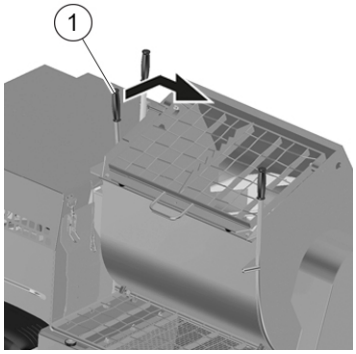


Figure 35: Switching on the pump

Item	Designation
1	Lever (pump ON/OFF)

The pump runs only if the drive motor is switched on.

The pump can, however, be coupled if the drive motor is switched off. The drive motor can be switched on with a coupled pump.

1. Push the lever (pump ON/OFF) out of the connecting link in the direction of the arrow.
   ⇒ Pump is coupled.
2. Pull the lever (pump ON/OFF) in the opposite direction to the arrow.
   ⇒ Pump is uncoupled.

5.2.4 Stopping and switching off the machine

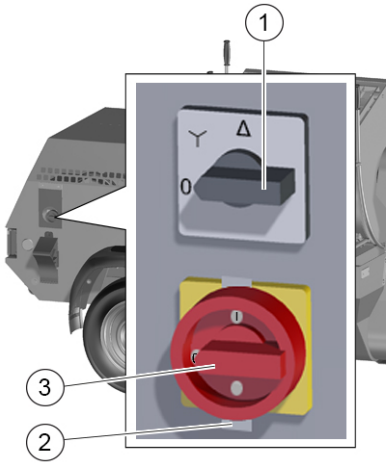


Figure 36: Switch

Item	Designation
1	**Stardelta switch** Switching on/off the drive motor.
2	**Main switch (with reversing switch)** Switches the power supply on/off.
3	**Reversing switch (in main switch)** Direction of rotation of the electric motor.

NOTICE

Damage to the coupling due to the drive motor switching off

The coupling can be damaged by switching off the drive motor when the pump is switched on.

- ▶ Disengage the pump before you switch off the drive motor.

1. Switch the pump off *(Switching on/off the pump P. 5 — 8)*.
2. Switch off the drive motor with the stardelta switch.
3. Switch the machine off at the main switch.
   ⇒ The machine power supply is switched off.

5.3 Function checks

Before using the machine, check the following functions when the machine is running.

⚠ WARNING

Risk of crushing due to moving assemblies

The machine may only be operated if its hood is fully closed and fully functional.

- Close and lock the hood once you have carried out all checks and tests.

5.3.1 Checking the function of safety devices

Check whether all safety equipment is fitted and fully functional as follows.

⚠ WARNING

Risk of injury due to defective safety equipment

Defective safety equipment may appear safe even though it is not. This can lead to the machine continuing to run or not switching off quickly enough in the event of an impending danger.

1. Always check the function of the safety equipment before the start of work
2. If a safety device does not respond during the check, the machine must not be started up.
3. Eliminate the fault.

Check:

1. The function of the EMERGENCY STOP switch,
2. The function of the hood safety lock,
3. The function of the locking mechanism on the mixer grille,
4. The function of the locking mechanism on the agitator grille,
5. The function of the excess pressure safety device *(Checking and setting the excess pressure safety device P. 8 — 35)*.

5.3.1.1 Checking the EMERGENCY STOP switch

On your machine, the main switch acts as an EMERGENCY STOP switch. Switching the machine off at the main switch causes an EMERGENCY STOP.

⚠ WARNING

Risk of injury due to defective EMERGENCY STOP switch

The machine is no longer safe to operate if the EMERGENCY STOP switch 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 switch does not respond during the check, the machine must not be started up.
2. Eliminate the fault.

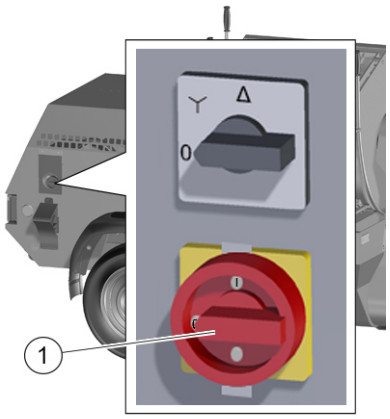


Figure 37: EMERGENCY STOP switch

Item	Designation
1	EMERGENCY STOP switch (main switch)

1. Switch on the machine and start up the drive motor *(Switching on and starting up the machine P. 5 — 6)*.
2. Switch the machine off at the EMERGENCY STOP switch.
   ⇒ The power supply is interrupted and all functions ceased.

5.3.1.2 Checking the hood safety lock

The machine is fitted with a hood safety lock. If the hood is opened while the drive motor is running, the hood switch is activated and the drive motor switched off.

⚠ WARNING

Risk of injury due to defective hood safety lock

1. If the hood switch does not respond when the hood is opened, the machine must not be started up.
2. Eliminate the fault.

1. Close the hood.
2. Switch on the machine and start up the drive motor *(Switching on and starting up the machine P. 5 — 6)*.
3. Open the hood.
   ⇒ The motor is switched off.

If the drive motor is not switched off, switch the machine off immediately. The machine must not be operated in this condition. Have the fault rectified in a specialist workshop.

4. Switch off the machine *(Stopping and switching off the machine P. 5 — 9)*.

5.3.1.3 Checking the mixer grille locking mechanism

The machine is fitted with a mixer grille mechanical lock. The mixer grille can only be opened when the mixer and agitator are uncoupled.

⚠ WARNING

Risk of crushing and risk of injury by shearing due to rotating mixer shaft

Serious injuries and amputations of limbs due to open, accessible rotating parts.

1. Always check that the safety equipment is working before starting work.
2. Switch the machine off immediately if the mixer grille can be opened when the mixer shaft is running.
3. Restore the safety function.

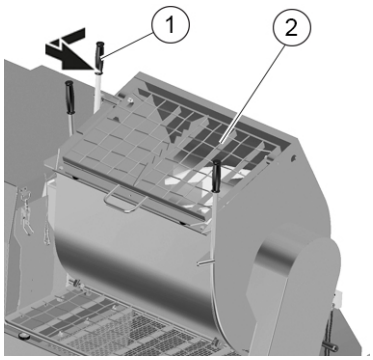


Figure 38: Switching on the mixer

Item	Designation
1	Lever (mixer and agitator ON/OFF)
2	Mixer grille

1. Pull the lever (mixer and agitator ON/OFF) in the direction of the arrow.
2. Switch on the machine and start up the drive motor *(Switching on and starting up the machine P. 5 — 6)*.
   ⇒ Drive motor is running.
   ⇒ Mixer is running.
3. Try to open the mixer grille.
   ⇒ Mixer grille cannot be opened.

If the mixer grille can be opened, switch the machine off immediately. The machine must not be operated in this condition. Have the locking mechanism checked and repaired.

4. Switch off the machine *(Stopping and switching off the machine P. 5 — 9)*.

5.3.1.4 Checking the agitator grille locking mechanism

The machine is fitted with an agitator grille mechanical lock. The agitator grille can only be opened when the agitator is switched off.

⚠ WARNING

Risk of crushing and risk of injury by shearing due to rotating agitator

Serious injuries and amputations of limbs due to open, accessible rotating parts.

1. Always check that the safety equipment is working before starting work.
2. Switch the machine off immediately if the agitator grille can be opened when the agitator is running.
3. Restore the safety function.

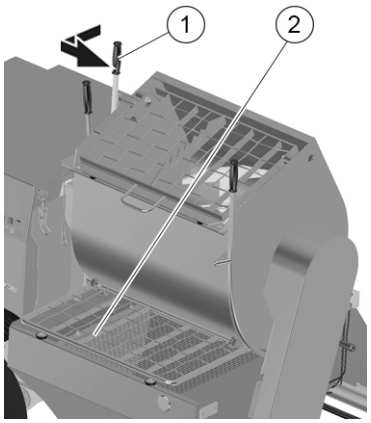


Figure 39: Agitator

Item	Designation
1	Lever (mixer and agitator ON/OFF)
2	Agitator grille

1. Push the lever (mixer and agitator ON/OFF) in the direction of the arrow.
2. Switch on the machine and start up the drive motor *(Switching on and starting up the machine P. 5 — 6)*.
   ⇒ Drive motor is running.
   ⇒ Agitator is running.
3. Try to open the agitator grille.
   ⇒ Agitator grille cannot be opened.

If the agitator grille can be opened, switch the machine off immediately. The machine must not be operated in this condition. Have the locking mechanism checked and repaired.

4. Switch off the machine *(Stopping and switching off the machine P. 5 — 9)*.

5.3.2 Checking and switching over the direction of rotation of the machine

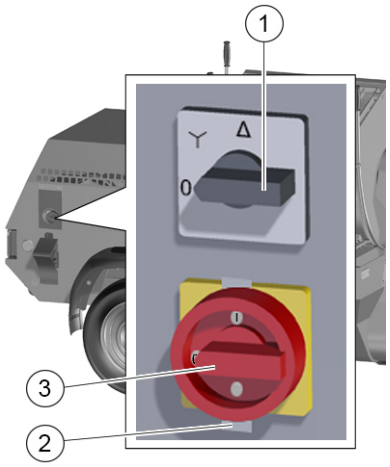


Figure 40: Switch

Item	Designation
1	**Stardelta switch** Switching on/off the drive motor.
2	**Main switch (with reversing switch)** Switches the power supply on/off.
3	**Reversing switch (in main switch)** Direction of rotation of the electric motor.

1. Switch the machine on at the main switch.
   ⇒ The machine power supply is switched on.

When switching on the machine at the stardelta switch, always switch first to the star position, stay there for approx. five seconds and then switch to the delta position.

2. Switch on the drive motor with the stardelta switch.

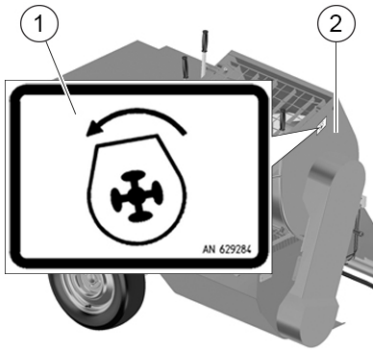


Figure 41: Mixer – direction of rotation

Item	Designation
1	Direction of rotation label
2	Mixer

3. Check whether the mixer is turning in the right direction.

If the mixer is not turning in the specified direction, you must change the direction of rotation as follows:

4. Switch off the drive motor with the stardelta switch.
5. Switch the machine off at the main switch.

NOTICE

Damage to the main switch

- Only press the reversing switch if the main switch is switched off (rotating-field mechanism is locked when switched on).

6. Switch over the direction of rotation on the reversing switch.

5.3.3 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.

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
- The hood is closed

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.

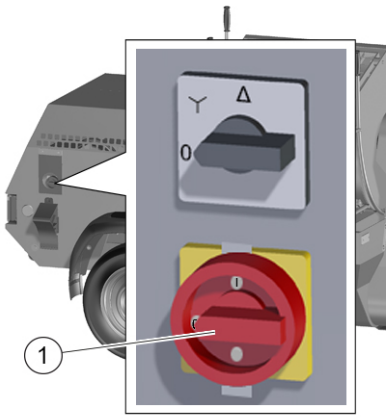


Figure 42: EMERGENCY STOP switch

Item	Designation
1	EMERGENCY STOP switch (main switch)

1. Immediately switch the machine off at the EMERGENCY STOP switch (main switch) in the event of an emergency.
2. Disconnect the mains plug from the machine if possible.
3. If necessary, take first-aid measures.
4. Note down the incident and report it in line with company codes of practice.
5. Look for the cause of the fault and rectify it or have it rectified.
6. Start the machine up again. See the chapter “Starting up” for more information.

6.3 Setting the delivery rate

The delivery rate of the machine can be set as follows by the ratio of the belt pulleys (drive motor) to belt pulleys (pump transmission).

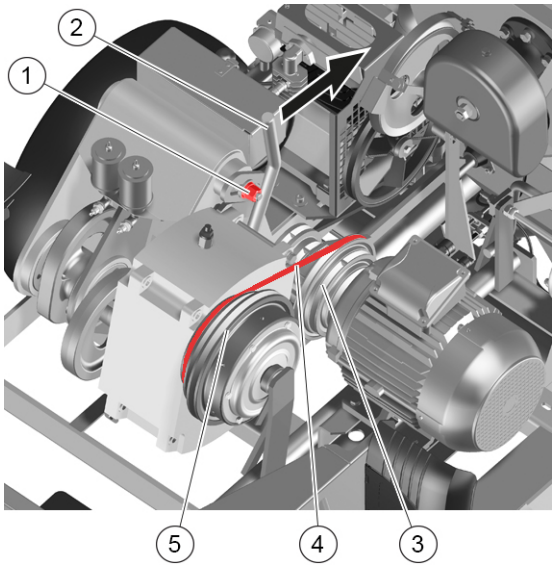


Figure 43: Setting the delivery rate

Item	Designation
1	Nut
2	Lever
3	Belt pulleys (drive motor)
4	Vbelt
5	Belt pulleys (pump transmission)

⚠ WARNING

Risk of injury by shearing or being drawn in on the running V-belt

Drawing in and shearing of body parts like fingers and hands on the running V-belt.

1. Switch off the machine and secure it against restarting.
2. Disconnect the machine from the mains.

1. Switch off the machine *(Stopping and switching off the machine P. 5 — 9)*.
2. Secure the machine to prevent restarting.
3. Disconnect the machine from the mains
4. Open the hood.
5. Unscrew the nut.
6. Swing the lever in the direction of the arrow.
   ⇒ V-belt is not under tension.
7. Put the V-belt on other belt pulleys to change the output.

The V-belt must always be aligned from belt wheel to belt wheel, i.e. it may only ever be put down on opposing belt pulleys.

Large belt wheel (drive motor) and small belt wheel (pump transmission) = high delivery rate

Small belt wheel (drive motor) and large belt wheel (pump transmission) = low delivery rate

8. Swing the lever in the opposite direction to the arrow.
   ⇒ V-belt is under tension.
9. Screw in the nut.
10. Check the V-belt tension *(Checking the Vbelt tension P. 8 — 13)* and reset as required.
11. Close the hood.

6.4 Opening/closing drip feed lubricator valves

The drip feed lubricators lubricate the pump. The valves of the drip feed lubricators must be opened before operating the pump.

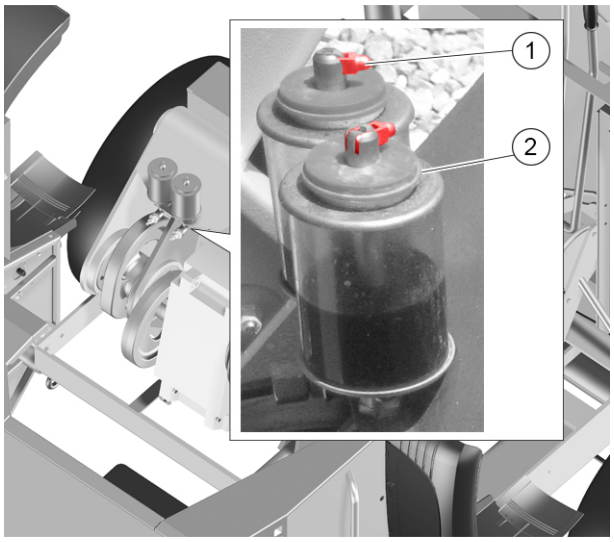


Figure 44: Setting the delivery rate

Item	Designation
1	Nipple
2	Drip feed lubricator

1. Open the hood.
2. Check the oil level in the drip feed lubricators and correct it as required *(Drip feed lubricator – topping up the oil P. 8 — 40)*.
3. Swing the nipples of the drip feed lubricators into a vertical position.
   ⇒ The valves of the drip feed lubricators are opened.

Close the valves of the drip feed lubricators after finishing work, as otherwise oil escapes.

4. Close the hood.

6.5 Pumping operations

The mixer has a usable volume of 170 l. With normal concrete mix proportions, these contents are enough to process a whole sack of binder. This is thrown onto the comb of the mixer grill, undone and can then be easily emptied. The aggregate is then added accordingly.

Ensure that the individual mortar components are put in the mixer in the following sequence:

- Water
- Binder
- Sand

The mixer is designed so that normal rendering mortar can be mixed without difficulty. The mixer will be overloaded if the mortar is too thick or too dry. The engine output will then not be sufficient, if the mortar pump is being driven at the same time.

If there are coarse stones or foreign bodies in the sand, there is a risk of jamming, and the mixing paddles bend or get broken. So that no damage arises with such overloading, the Vbelt for the mixer transmission are allowed to be tensioned only to a moderate degree. If the mixer is overloaded, the belt will then simply slip. The mixer must then immediately be disengaged and the drive motor switched off. Then open the mixer grille and remove the blockage.

6.5.1 Starting to pump with grout

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 priming the pump. This can take place at the start of site use, but also after breaks in pumping.

Pumping must generally be started with the aid of grout. The composition of the grout depends on the material to be processed.

The grout pre-lubricates the inside of the delivery line and prevents blockages.

6.5.1.1 Preparing the grout

The selection of the grout is based on the material to be pumped:

Material to be pumped	Grout
All materials	Putzmeister grout (Item no.: 265389003)
Concrete	Cement grout
Anhydrite screed	Anhydrite binder

The quantity of the required grout depends on the length and diameter of the delivery line (the measurement in the table refers to a bucket with a capacity of 18 l):

Delivery line diameter	Delivery line length in metres							
	10	20	30	40	50	100	150	200
50 mm	1	1	1	1	1	2	2	3
65 mm	1	1	1	1	1	2	2	4
75 mm	1	1	1	1	2	2	3	4
100 mm	1	1	1	2	2	2	4	6
125 mm	1	1	1	2	2	3	5	7
150 mm	1	1	2	3	3	4	7	8

⚠ WARNING

Dust particles in breathable air

Injury to the respiratory passages and lungs due to breathing in dust particles

1. Wear respiratory protection for all work in which dust particles 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.

Mixing Putzmeister grout

1. Remove the outer packaging of the grout packet.
2. Mix the grout powder (with inner packaging soluble in water) with 18 l of water.

3. Churn the grout with a mixer for a minute.
4. Let the grout rest for at least five minutes.

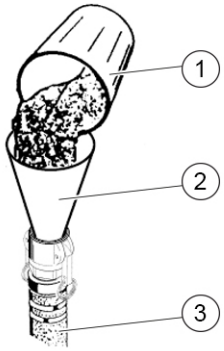
Mixing cement grout

1. Put 18 l of water into a bucket.
2. Put cement into the bucket and mix the two.
3. Mix in enough cement to create a fluid mixture.

Mixing anhydrite grout

1. Put 18 l of water into a bucket.
2. Put anhydrite binder into the bucket and mix the two.
3. Mix in enough anhydrite binder to create a fluid mixture.

6.5.1.2 Starting to pump



Item	Designation
1	Bucket
2	Hopper
3	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. Check that all the seals are present in the hose couplings and that the delivery line is clear of material residues inside.
2. Disconnect the delivery line at the first coupling point (delivery line/delivery line).
3. Soak a sponge ball in water.
4. Insert the sponge ball into the delivery line.
5. Reconnect the delivery line.
6. Disconnect the delivery line from the pressure gauge.
7. Fill the delivery line with grout using a hopper.

8. Connect the delivery line to the pressure gauge *(Connecting the delivery line P. 4 — 18)*.

The sponge balls and the grout are pumped through the delivery line with the first mixture.

9. Pump the sponge ball and the grout through the delivery line with the first mixture *(Mixing and pumping P. 6 — 11)*.
10. Collect the sponge ball and grout in a suitably large container at the end of the delivery line and dispose of the grout according to regulations.

6.5.2 Mixing and pumping

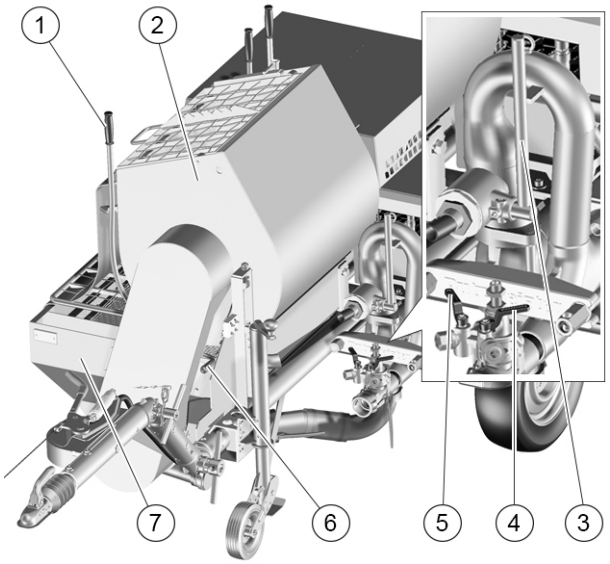


Figure 45: Mixing and pumping

Item	Designation
1	Lever (mixer shutter)
2	Mixer
3	Return line cock
4	Air valve
5	Waste air cock
6	Quick release (vibrator)
7	Hopper

⚠ WARNING

Risk of injury due to the conveyed material spraying out

Conveyed material that escapes under pressure can injure personnel.

1. Delivery lines must not be opened or tapped while they are pressurised.
2. Always dump the pressure in the delivery line before opening it.
3. Only disconnect the delivery line when you are certain that the system is depressurised.
4. You must wear protective goggles.
5. Never work bent directly over the coupling. Turn your face away when opening the coupling.

1. Open the valves of the drip feed lubricators *(Opening/closing drip feed lubricator valves P. 6 — 6)*.
2. Close the mixer hood.
3. Close the waste air cock.
4. Open the air cock.
5. Connect the return line cock to the pump.
6. Switch the drive motor on *(Switching on and starting up the machine P. 5 — 6)*.
7. Before mixing for the first time or after breaks in pumping, carry out the process for starting to pump *(Starting to pump with grout P. 6 — 7)*.

Pumping is always started without a spray gun, so that the sponge ball can escape the delivery line again.

8. Switch the mixer on *(Switching the mixer and agitator on/off P. 5 — 7)*.
9. Pour the mortar components into the mixer in the sequence given above.
10. Mix the mortar components until you have a homogeneous mixture.
11. Switch on the vibrator as required by swinging the quick release downwards.

12. Open the mixer lid.
    ⇒ The mortar falls into the hopper.

Mixer and agitator are running simultaneously.

13. If you want to work with the spray gun, connect it now *(Using the spray gun P. 6 — 14)*.

If the sponge balls and grout are still in the delivery line after pumping has started, these must first be pumped out.

14. Switch the pump on *(Switching on/off the pump P. 5 — 8)*.
    ⇒ Material is being pumped.
15. Close the mixer shutter as soon as the mixer is empty.
16. Switch the vibrator off by swinging the quick release upwards.
17. Pour the mortar components into the mixer again in the sequence given above.
18. Open the mixer shutter before the hopper is completely emptied.
19. Repeat the last two work steps until no more material is needed.
20. Switch the pump off *(Switching on/off the pump P. 5 — 8)*.
21. Switch off the machine *(Stopping and switching off the machine P. 5 — 9)*.
22. Clean the machine *(Cleaning the machine P. 6 — 21)*.

6.5.3 Using the spray gun

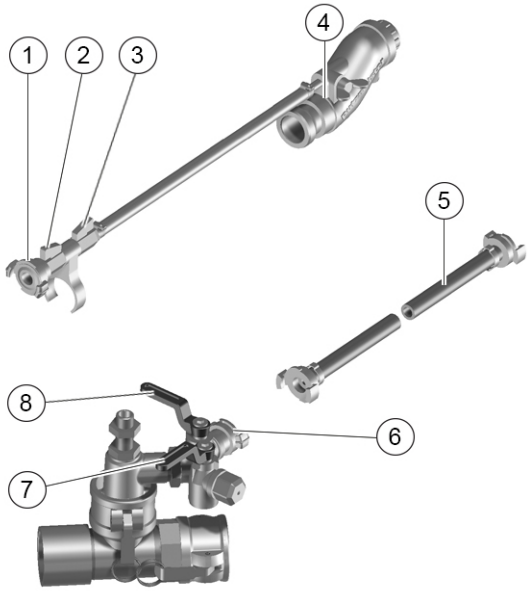


Figure 46: Connecting the spray gun

Item	Designation
1	Coupling
2	Remote control valve
3	Stop cock
4	Spray gun
5	Air hose
6	Coupling
7	Waste air cock
8	Air valve

The process of mixing and pumping is the same when working with and without the spray gun. They differ only in the control system of the pump. Start your work as described in chapter *(Mixing and pumping P. 6 — 11)*.

1. Connect the delivery line to the spray gun *(Connecting the delivery line P. 4 — 18)*.
2. Connect the air hose to the coupling on the air cock and on the spray gun.
3. Close the remote control valve on the spray gun.

⚠ 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.

4. Switch the pump on *(Switching on/off the pump P. 5 — 8)*.
5. Open the stop cock on the spray gun.

Opening and closing the remote control valve on the spray gun switches the pump on and off. If the machine is switched off via the remote control valve, it is still ready for operation and can be started again at any time by reopening the remote control valve.

6. Open the remote control valve on the spray gun.
   ⇒ The pump starts delivering.
7. Set the required air volume using the remote control valve.

6.5.3.1 Adjusting the air nozzle tube

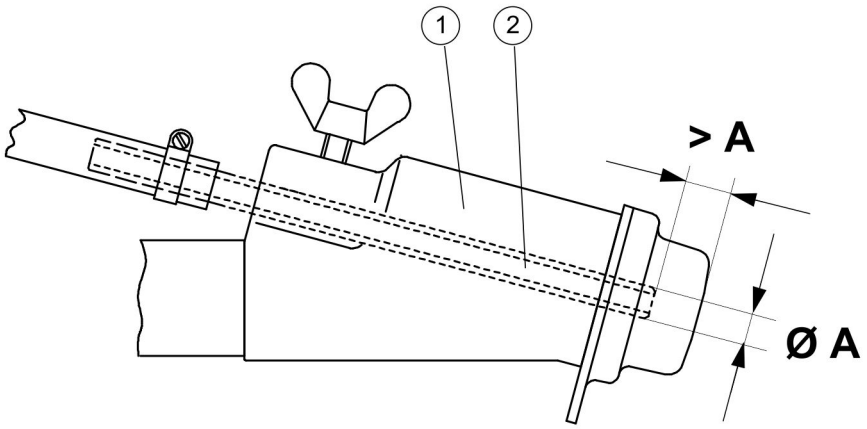


Figure 47: Air nozzle tube overview

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.

6.5.3.2 Using the spray gun correctly

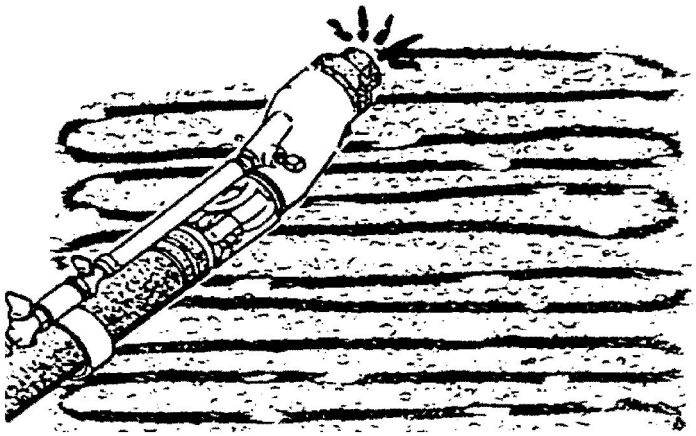


Figure 48: Guide the spray gun back and forth in smooth movements

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.

6.6 Breaks in pumping

Breaks in pumping should be avoided as much as possible, as the conveyed material can segregate or set in the delivery line. Observe the binding time of the material.

NOTICE

Risk of formation of a blockage due to pumping of set conveyed material

- Never pump segregated concrete or material that is lumpy because it is beginning to set into the delivery line by force.

If breaks in operation are unavoidable, observe the following points:

1. Switch the pump off *(Switching on/off the pump P. 5 — 8)*.
2. Never leave the delivery line under pressure. During short breaks in pumping, dump the delivery line pressure by opening the return valve.
3. Switch off and clean the machine in the event of longer breaks.
4. Every interruption to the spraying process can cause slight irregularities in the consistency; however, these will return to normal on their own.

6.7 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.

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

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.

6.7.1 Eliminating blockages

To eliminate a blockage, proceed as follows:

⚠ 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.

1. Switch off the machine *(Stopping and switching off the machine P. 5 — 9)*.
2. Open the return valve.
   ⇒ The pressure in the system is relieved.
3. Check the pressure gauge to ensure the system is depressurised.

⚠ 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.

4. Tap the delivery line to check for hard spots.
5. Disconnect the delivery line close to the hard spot.
6. Pick up the delivery line and clear the blockage in the line by shaking and tapping it.
7. With stubborn blockages, rinse the delivery line with water.
8. When you start the machine up again, add cement grout to the delivery line *(Starting to pump with grout P. 6 — 7)*.
9. Connect the delivery line again.

6.8 Cleaning

6.8.1 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 cabinets and electrical plug-in 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.

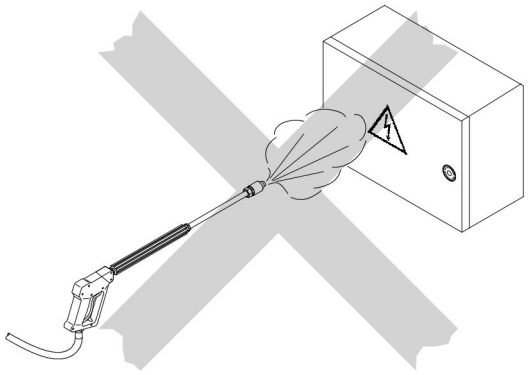


Figure 49: No water in the electrical system

1. 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.
2. Do not use any aggressive cleaning agents.
3. Never use sea water or other water containing salt for cleaning purposes.
4. Rinse the machine immediately with clean water if it comes into contact with sea water.
5. Completely remove all covers/tape after cleaning.

6.8.2 Cleaning the machine

Clean the machine first, then the delivery line.

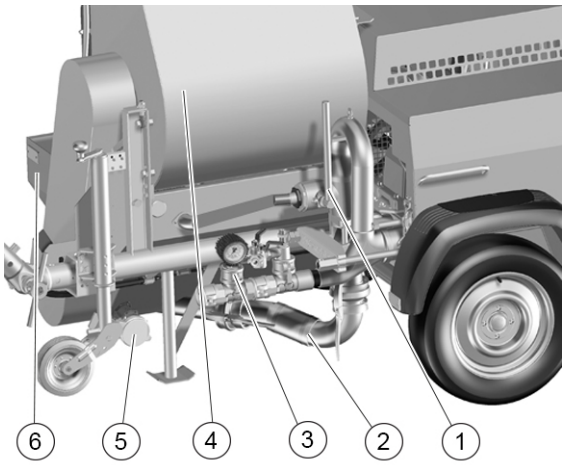


Figure 50: Cleaning the machine

Item	Designation
1	Return valve
2	Suction elbow
3	Pressure gauge
4	Mixer
5	Wash-out adapter
6	Hopper

⚠ WARNING

Risk of injury due to the conveyed material spraying out

Conveyed material that escapes under pressure can injure personnel.

1. Delivery lines must not be opened or tapped while they are pressurised.
2. Always dump the pressure in the delivery line before opening it.
3. Only disconnect the delivery line when you are certain that the system is depressurised.
4. You must wear protective goggles.
5. Never work bent directly over the coupling. Turn your face away when opening the coupling.

1. Pump the hopper empty.

2. Switch off the machine *(Stopping and switching off the machine P. 5 — 9)*.
3. Open the return valve.
   ⇒ The pressure in the system is relieved.
4. Check the pressure gauge to ensure the system is depressurised.
5. Disconnect the delivery line.
6. Disconnect the pressure gauge and flush it with water.
7. Disconnect the suction elbow and flush it with water.
8. Open the wash-out adaptor and flush it with water.

Loosen material residue stuck on the pressure gauge, suction elbow and wash-out adaptor with a blunt tool and re-flush.

9. Flush out the mixer and hopper with plenty of water.
10. Clean the machine with clean water.
11. Reconnect the suction elbow.
12. Close the wash-out adaptor.
13. Fill the hopper with water.
14. Switch the machine on *(Switching on and starting up the machine P. 5 — 6)*.
15. Switch the pump on *(Switching on/off the pump P. 5 — 8)*.
16. Close the return valve as soon as clean water is being reverse-pumped into the hopper.
17. Pump water from the hopper through the pump until the water exiting the pressure connection is clean.
    ⇒ The machine is now fully cleaned out.
18. Switch the pump off *(Switching on/off the pump P. 5 — 8)*.
19. Then clean the delivery line.

6.8.3 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.

Insert a sponge ball into the delivery line first before pumping water through the delivery line. Otherwise, sand residue remains in the delivery line, which may later result in blockages.

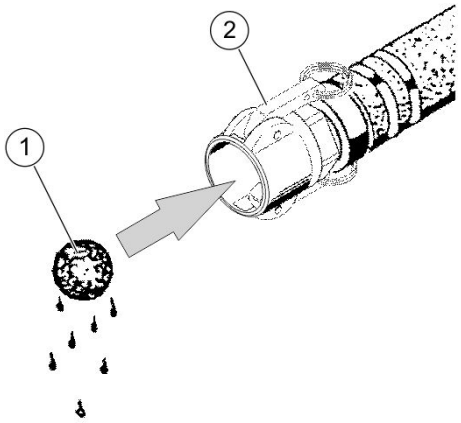


Figure 51: Cleaning the delivery line

Item	Designation
1	Sponge ball
2	Delivery line

1. Soak a sponge ball in water.
2. Push the wellsoaked sponge ball into the delivery line.
3. Reconnect the delivery line to the pressure connection.
4. Half fill the hopper with water.
5. Switch the machine on *(Switching on and starting up the machine P. 5 — 6)*.
6. Switch the pump on *(Switching on/off the pump P. 5 — 8)*.
7. Pump the water through the delivery line until the sponge ball exits the end of the line.
8. Repeat the cleaning process until only clean water exits the end of the line.
9. Switch the pump off *(Switching on/off the pump P. 5 — 8)*.
10. Switch off the machine *(Stopping and switching off the machine P. 5 — 9)*.

6.8.4 Cleaning seals

Contaminated couplings are not sealed and lead to blockages.

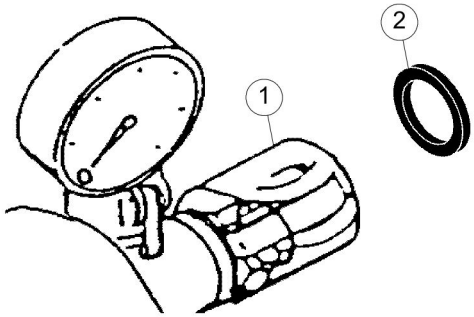


Figure 52: Cleaning seals

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.

6.8.5 Cleaning the spray gun

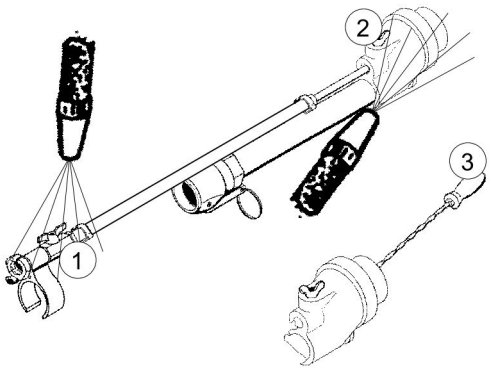


Figure 53: Cleaning the spray gun

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 Piston pumps, general

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

7.1.1 Pump is not switched on when the air cocks on the spray gun are opened

Cause	Remedy
Air nozzle tube is blocked.	Clean the air nozzle tube with the nozzle cleaner. Clean the air cocks and lines.
Air line lengthened too much.	Shorten air line; if not possible, set the remote control regulator higher (2–2.4 bar)

When the air cocks on the spray gun are slowly opened and pressure decreases, the relief valve must close again at a pressure of 2.8 to 3.0 bar. If the closing pressure is under 2.8 bar, then the valve is damaged and worn and must be replaced.

7.1.2 Pump is not switched on when the air cocks on the spray gun are opened

Cause	Remedy
The valves are leaking. The valve balls or valve seats are worn. The pump draws in air.	Replace defective parts. If the pump is sucking in air, open the return-flow cock and pour water into the return line with the pump running. The pump must now begin to suck. If this is not successful, remove any intake line and pump head briefly and inspect.

If the air line is extended beyond 40 m, it may be necessary to increase the remote controller setting (2 - 2.4 bar).

7.1.3 Mortar flow of the spray gun is suddenly suspended, spray air stays away

Cause	Remedy
Blockage in the mortar line and due to the excess pressure safety device responding the pump switches off. Excess pressure safety device is set too low and is responding.	Clear the blockage *(Blockages P. 6 — 17)*. Clean or replace the excess pressure rubber ball, and reset the pressure on the excess pressure safety device *(Checking and setting the excess pressure safety device P. 8 — 35)*.
Blockage in pump or delivery line. If there is a blockage in the delivery line, the machine continues to run and the pump turns off and on at short intervals. If there are blockages inside the pump, the safety coupling slips, the motor may also be shut down due to overload or the coupling whistles and after a long period of slipping it will emit smoke. Shut down the machine immediately!	If this occurs, it is essential to immediately close the air cocks on the spray gun, then open the return line cock. If the drive motor has come to a stop or the coupling has overheated, you must get rid of the blockage inside the pump by removing the pump head.

After blockages, start up the pump again only when the coupling and the excess pressure safety device are functioning properly.

7.1.4 Mortar flow of the spray gun is suddenly suspended, spray air continues to escape

Cause	Remedy
Hopper is empty, pump is sucking in air.	Top up the mortar, possibly opening the return line cock if the drawn-in air does not escape by itself. If the pump starts to pump again, close the return line cock.

7.1.5 Irregular spray from the pump on the spray gun, or dropouts observed.

Cause	Remedy
Valve balls are not co-ordinated with the delivery medium or are worn, the suction line may also be leaky.	Remove the pump head and check the valves. You must replace severely worn valve seats and valve balls *(Maintaining the pump head P. 8 — 41)*. Examine the intake line and piston cups for leaks by seeing whether the air can be drawn in. Replace leaky parts.

7.2 Chassis

The following section describes possible general causes of faults affecting the chassis, and their remedies.

7.2.1 Braking effect too weak

Cause	Remedy
Excessive play in the braking system	Have checked and set/rectified by a specialist workshop.
Brake linings glazed, oily or damaged	
Brake linkage is jammed or bent	
Brake cable control is rusty or kinked	
Brake linings not run in	Tighten the handbrake slightly, drive 2–3 km
Overrunning brake equipment is sluggish	Grease overrunning brake equipment

7.2.2 Brakes jerk and jolt

Cause	Remedy
Excessive play in the braking system	Have checked and set/rectified by a specialist workshop.
Shock absorber of overrunning brake equipment defective	
Clamp brake clips into brake clip supports	

7.2.3 One-sided trailer brakes

Cause	Remedy
Wheel brake operation is one-sided	Have checked and set/rectified by a specialist workshop.

7.2.4 Trailer brakes when the accelerator is released on the tractor unit

Cause	Remedy
Shock absorber of overrunning brake equipment defective	Have checked and set/rectified by a specialist workshop.

7.2.5 Reverse travel is sluggish or not possible

Cause	Remedy
Braking system set too tightly	Have checked and set/rectified by a specialist workshop.
Bowden controls preloaded	
Clamp brake clips into brake clip supports	

7.2.6 Handbraking effect too weak

Cause	Remedy
Incorrect setting of the braking system	Have checked and set/rectified by a specialist workshop.
Handbrake is not tightened firmly enough	Tighten the handbrake as far as possible

7.2.7 Wheel brakes become hot

Cause	Remedy
Incorrect setting of the braking system	Have checked and set/rectified by a specialist workshop.
Wheel brakes are contaminated	
Crank lever of overrunning brake equipment jams	
Spring brake is already preloaded in zero position	
Handbrake lever was not, or only partly, released	Set the handbrake lever to the zero position.

7.2.8 Tow hitch does not latch into position when rested on tractor unit

Cause	Remedy
Interior contaminated	Clean and lubricate.
Ball on tractor unit is too large	Measure the ball: The trailer coupling on the tractor unit must be between dia. 50 mm and 49.5 mm (DIN 74058) when new. If the diameter of the ball falls below 49.0 mm, it must be replaced. The ball must not be out of round.

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 tables show the intervals for individual maintenance work.

General machine						
Action	every ... operating hours					Comments
	daily	once after 50	500	1000	other intervals	Reference
Visual inspection: Defects and leak tightness (leaks)	✓					Rectify the defects, establish leak tightness (eliminate leaks)
Check the fastening bolts for firm seating		✓	✓		✓ annually	See tightening torques in the spare parts sheets

General machine						
Action	every ... operating hours					Comments
	daily	once after 50	500	1000	other intervals	Reference
Visual inspection: Electric cabling	✓					Immediately have defects rectified
Have service engineers from the manufacturer check for defects		✓			✓ annually	Service
Operational safety check (German Accident Prevention Regulation)					✓ annually	Service
Delivery line: Visual inspection for suitability, wear and damage, replace if necessary	✓					
Air valve: Clean the air lines	✓					
Clean the excess pressure safety device	✓					
Lubricate the machine	✓					
Drip feed lubricator: Check the fill level, top up if necessary	✓					*(Drip feed lubricator – topping up the oil P. 8 — 40)*
Clean drip feed lubricators and drip feed lubricator lines					✓ every 50 h	
Lubricate hopper shaft bearing	✓					
V-belt – check tension, readjust or replace as required					✓ every 50 h, at least weekly	

Safety equipment						
Action	every ... operating hours					Comments
	daily	once after 50	500	1000	other intervals	Reference
Check the EMERGENCY STOP switch is functioning correctly	✓					*(Checking the EMERGENCY STOP switch P. 5 — 10)*
Check whether the safety equipment is fitted and fully functional	✓					*(Checking the function of safety devices P. 5 — 10)*
Check whether the locking mechanism of the agitator grille is fully functional	✓					*(Checking the agitator grille locking mechanism P. 5 — 13)*
Check whether the locking mechanism of the mixer grille is fully functional	✓					*(Checking the mixer grille locking mechanism P. 5 — 12)*
Clean and if necessary adjust the excess pressure safety device					✓ twice a day	*(Checking and setting the excess pressure safety device P. 8 — 35)*
Check whether the warning and information plates are complete and legible	✓					Replace signs and plates if damaged or illegible
Protective grille and mixer grille wear check	✓					*(Protective grille – wear check P. 8 — 45)* Replace if damaged or worn

Compressor						
Action	every ... operating hours					Comments
	daily	once after 50	100	200	other intervals	Reference
Check the compressor for leaks – visual inspection	✓					
Check the compressor oil level, top up if necessary	✓					
Check the air filter, clean if necessary	✓					*(Compressor – cleaning and replacing the air filter P. 8 — 29)*
Change the compressor oil		✓			✓ 500 h, at least once a year	*(Compressor – changing the oil P. 8 — 27)*
Replace the air filter					✓ annually	*(Compressor – cleaning and replacing the air filter P. 8 — 29)*
Check the Vbelt		✓	✓			Replace if damaged *(Replacing the compressor Vbelt P. 8 — 21)*.
Safety valve function check					✓ 3000 h, at least once a year	Service

Pump						
Action	every ... operating hours					Comments
	daily	once after 50	100	200	other intervals	Reference
Wear check of the balls and valve seats in the pump head					✓ weekly	*(Checking valves in the pump head P. 8 — 43)*
Clean the pump head (by removing it) Check parts for wear and clean the return line cock		✓			✓ weekly	*(Maintaining the pump head P. 8 — 41)*
Change the pump transmission gearbox oil		✓			✓ every 500 h	*(Pump transmission – replacing oil P. 8 — 34)*

Mixer						
Action	every ... operating hours					Comments
	daily	once after 50	100	500	other intervals	Reference
Empty and clean the mixer	✓					
Grease the mixer shaft bearings	✓					
Check the mixer shutter for leak tightness, if necessary replace the rubber plate		✓			✓ weekly	
Replace the mixer transmission oil		✓		✓		*(Mixer transmission – replacing oil P. 8 — 30)*

Axle and wheels				
Action	After 500 km, at the latest	Every 5000 km/at least annually	Other interval	Reference
Check or, if necessary, correct inflation pressure			Before every journey	See “Technical data”
Tighten wheel nuts/bolts with the specified tightening torque			✓ once after 50 km	even after a wheel change
Check brakes	✓			After the first journey under load
Check wheel bearing play	✓			
Tighten threaded unions	✓			
Brakes – check brake pad		✓		
Brakes – check brake mechanism		✓		
Brakes – grease sliding points		✓		
Brakes – check brake drums		✓		
Brakes – check and grease brake cables and linkage		✓		
Brakes – lubricate overrunning brake equipment and adjust brakes		✓		
Wheel bearings – check Simmerring/seal, dust caps		✓		
Wheel bearings – check, grease		✓		
Axles – check and lubricate mounting		✓		
Axles – check whether shock absorbers are tight and secure		✓		
Tyres/wheels – check tyre pressure and profile		✓		
Tyres/wheels – check for ageing and damage		✓		

Axle and wheels Action	After 500 km, at the latest	Every 5000 km/at least annually	Other interval	Reference
Frame – tighten threaded unions		✓		
Frame – tighten cracks and damage		✓		
Trailer coupling – check for function and play		✓		
Support wheel – check fastening and function		✓		
Support wheel – grease spindle		✓		
Electrical system – check connector, cable and lamps for damage and function		✓		

8.4 Maintenance work

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

8.4.1 Lubricating the machine

This section describes the position of the lubrication nipples for lubricating the machine with the grease gun. You can find information about lubrication intervals in the “Maintenance intervals” section.

Use only lubricants specified in the lubricant recommendation (see the “Appendix” chapter).

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

The following special tools are required:

- Grease gun

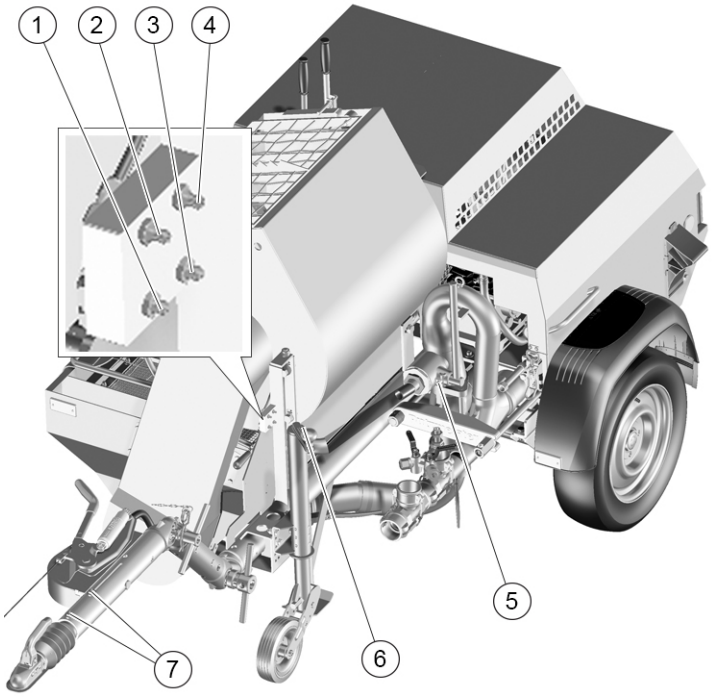


Figure 54: Lubrication points

Item	Designation
1	Front mixer shaft bearing
2	Front agitator shaft bearing
3	Rear mixer shaft bearing
4	Rear agitator shaft bearing
5	Return line cock
6	Support wheel bearing
7	Drawgear guide bearing

All lubrication nipples are provided with a red protective cap; these must be reattached after lubricating.

1. Switch off the machine *(Stopping and switching off the machine P. 5 — 9)*.
2. Remove the protective caps from the lubrication nipples.
3. Clean the lubrication nipples carefully before attaching the grease gun This prevents dirt from entering the lubrication system.

Before attaching the grease gun to the lubrication nipple, press it until grease escapes from the connecting piece to prevent air bubbles from entering the lubrication system.

4. Lubricate all lubrication nipples on the machine with the grease gun until grease visibly escapes from the depositories.
5. Remove the excess grease from the lubrication nipple.
6. Place the protective caps over the lubrication nipples.

8.4.2 Checking, tightening and replacing V-belts

This section describes how to check, tighten and replace V-belts.

There are specific risks of accidents associated with maintenance, inspection and repair work. You should particularly observe the “Safety regulations” chapter and the description of “Residual risks during maintenance work” at the beginning of this chapter.

⚠ WARNING

Risk of injury by shearing, being drawn in and crushing when starting up drive, pump and mixer equipment

1. Disconnect the machine from the mains.
2. Secure the machine to prevent restarting.

8.4.2.1 Checking the Vbelt tension

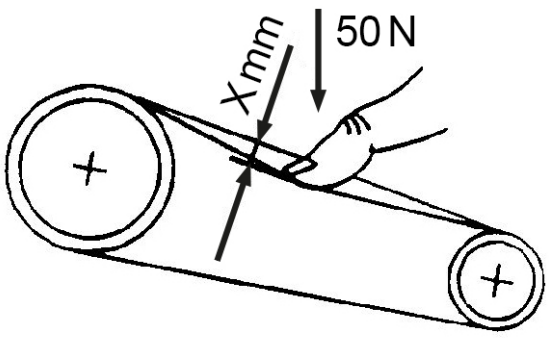


Figure 55: Checking the Vbelt tension

Vbelt	Time of inspection	Inspection force	Indent level
Pump transmission	Initial assembly	50 N	10 mm
	Retensioning		12 mm
Compressor	Initial assembly		10 mm
	Retensioning		11 mm
Mixer	Initial assembly		14 mm
	Retensioning		15 mm
Agitator	Initial assembly		14 mm
	Retensioning		17 mm

- Check the Vbelt tension by pressing with your thumb. The V-belt must be retightened if it can be pressed in by more than the value listed in the table.

8.4.2.2 Tensioning the pump transmission Vbelt

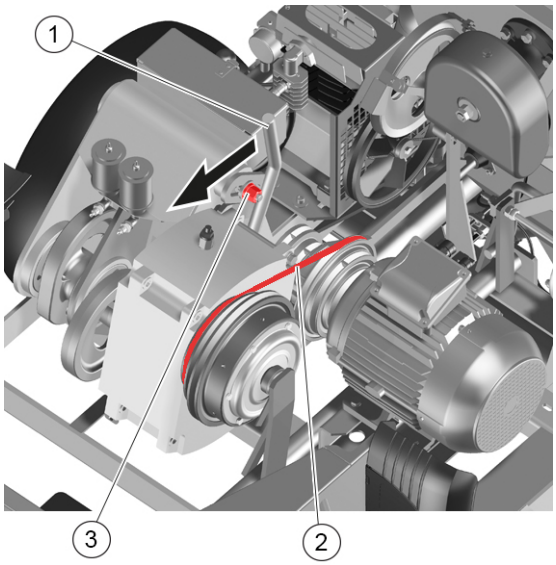


Figure 56: Tensioning the Vbelt

Item	Designation
1	Lever
2	Vbelt
3	Nut

⚠ WARNING

Risk of injury by shearing or being drawn in on the running V-belt

Drawing in and shearing of body parts like fingers and hands on the running V-belt.

1. Switch off the machine and secure it against restarting.
2. Disconnect the machine from the mains.

1. Switch off the machine *(Stopping and switching off the machine P. 5 — 9)*.
2. Secure the machine to prevent restarting.
3. Disconnect the machine from the mains.
4. Open the hood.
5. Unscrew the nut.
6. Swing the lever in the direction of the arrow.
   ⇒ V-belt is under tension.

7. Screw in the nut.
8. Check the V-belt tension *(Checking the Vbelt tension P. 8 — 13)* and reset as required.
9. Close the hood.

8.4.2.3 Tensioning the Vbelt compressor

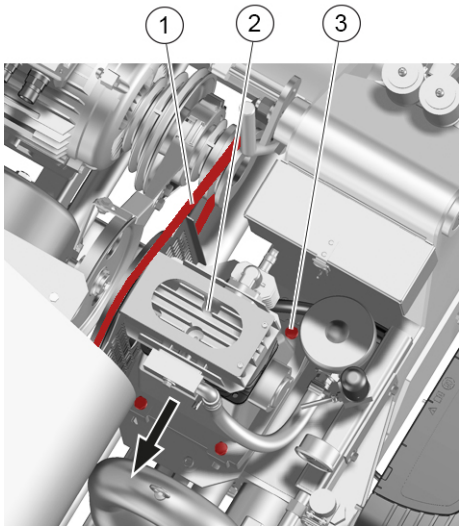


Figure 57: Tensioning the Vbelt

Item	Designation
1	Vbelt
2	Compressor
3	Bolt

⚠ WARNING

Risk of injury by shearing or being drawn in on the running V-belt

Drawing in and shearing of body parts like fingers and hands on the running V-belt.

1. Switch off the machine and secure it against restarting.
2. Disconnect the machine from the mains.

1. Switch off the machine *(Stopping and switching off the machine P. 5 — 9)*.
2. Secure the machine to prevent restarting.
3. Disconnect the machine from the mains.

4. Open the hood.
5. Undo the bolts (four pieces).
6. Push the compressor in the direction of the arrow.
   ⇒ V-belt is under tension.
7. Screw in the bolts.
8. Check the V-belt tension *(Checking the Vbelt tension P. 8 — 13)* and reset as required.
9. Close the hood.

8.4.2.4 Tensioning the Vbelt agitator

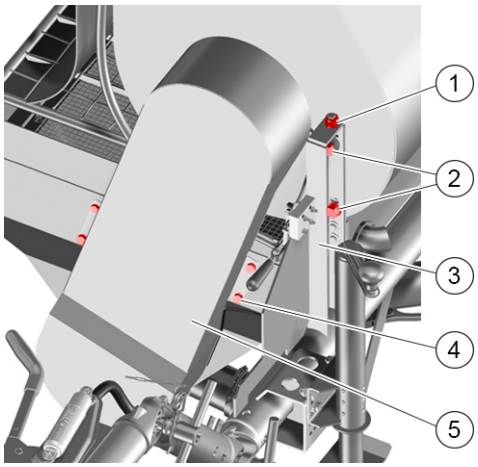


Figure 58: Tensioning the Vbelt

Item	Designation
1	Nut
2	Bolts
3	Bracket
4	Bolt
5	Cover

⚠ WARNING

Risk of injury by shearing or being drawn in on the running V-belt

Drawing in and shearing of body parts like fingers and hands on the running V-belt.

1. Switch off the machine and secure it against restarting.
2. Disconnect the machine from the mains.

1. Switch off the machine *(Stopping and switching off the machine P. 5 — 9)*.
2. Secure the machine to prevent restarting.
3. Disconnect the machine from the mains
4. Open the hood.
5. Unscrew the bolts *(4)* (four pieces) and remove the cover *(5)*.

The mixer is fastened to two brackets, which are attached diagonally, at the front and at the rear of the mixer. To adjust the height of the mixer, you must loosen it on both brackets and then lift or lower using the nuts *(1)*.

6. Loosen the bolts *(2)* on both brackets.
7. Tension the V-belt by turning the nuts *(1)*.

Ensure that you lift or lower the mixer equally at the front and at the rear.

8. Screw in the bolts *(2)*.
9. Check the V-belt tension *(Checking the Vbelt tension P. 8 — 13)* and reset as required.
10. Fit the cover *(5)*.
11. Close the hood.

8.4.2.5 Tensioning the Vbelt mixer

The V-belt of the mixer cannot be tensioned. If you determine when inspecting the V-belt tension that the V-belt is too loose, you must replace the V-belt *(Replacing the mixer Vbelt P. 8 — 24)*.

8.4.2.6 Replacing the pump transmission Vbelt

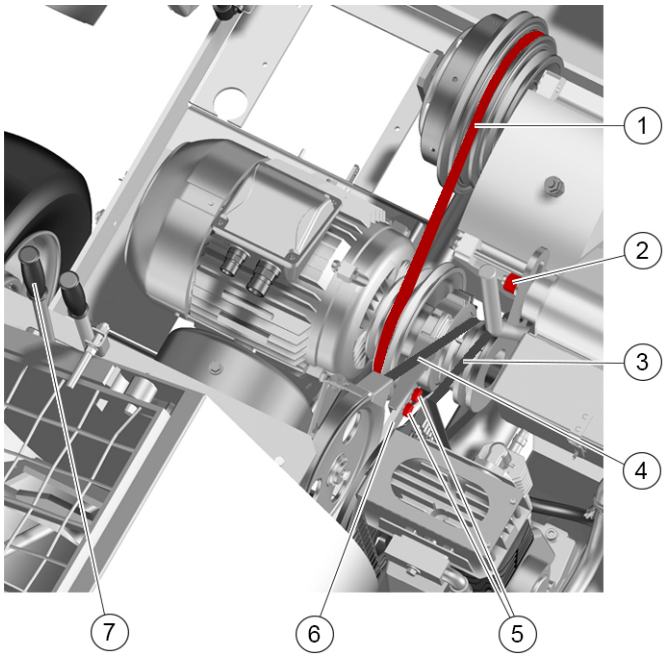


Figure 59: Change the V-belts

Item	Designation
1	V-belt (pump transmission)
2	Nut
3	V-belt (compressor)
4	V-belt (mixer)
5	Bolts
6	Vibration rod
7	Lever (pump ON/OFF)

⚠ WARNING

Risk of injury by shearing or being drawn in on the running V-belt

Drawing in and shearing of body parts like fingers and hands on the running V-belt.

1. Switch off the machine and secure it against restarting.
2. Disconnect the machine from the mains.

1. Switch off the machine *(Stopping and switching off the machine P. 5 — 9)*.
2. Secure the machine to prevent restarting.
3. Disconnect the machine from the mains.
4. Open the hood.
5. Disengage the pump on the lever (pump ON/OFF).
6. Remove the V-belt (compressor) *(Replacing the compressor V-belt P. 8 — 21)*.
7. Remove the V-belt (mixer) *(Replacing the mixer Vbelt P. 8 — 24)*.
8. Unscrew the bolts (two pieces) of the vibration rod.
9. Relax the V-belt (pump transmission) *(Tensioning the pump transmission Vbelt P. 8 — 15)*.

The vibration rod can be carefully pushed to the side so that the V-belt can be taken out.

10. Remove the V-belt from the V-belt pulleys and take it out of the motor compartment.
11. Fit the new V-belt by following these steps in reverse order.

8.4.2.7 Replacing the compressor Vbelt

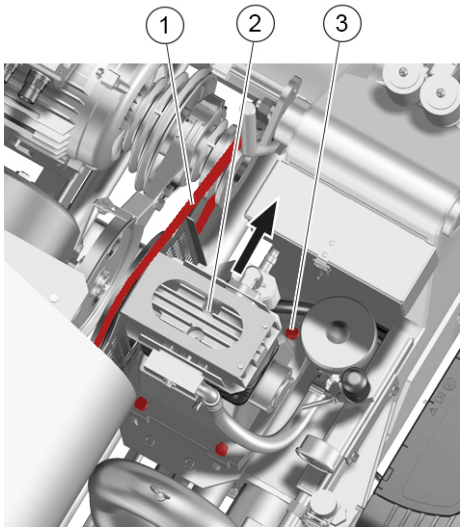


Figure 60: Change the V-belts

Item	Designation
1	Vbelt
2	Compressor
3	Bolt

⚠ WARNING

Risk of injury by shearing or being drawn in on the running V-belt

Drawing in and shearing of body parts like fingers and hands on the running V-belt.

1. Switch off the machine and secure it against restarting.
2. Disconnect the machine from the mains.

1. Switch off the machine *(Stopping and switching off the machine P. 5 — 9)*.
2. Secure the machine to prevent restarting.
3. Disconnect the machine from the mains.
4. Open the hood.
5. Undo the bolts *(3)* (four pieces).
6. Push the compressor in the direction of the arrow.
   ⇒ V-belt is not under tension.
7. Remove the V-belt from the V-belt pulleys.

8. Position the new V-belt on the V-belt pulleys.
9. Tension the V-belt by pushing the compressor in the opposite direction to the arrow *(Tensioning the Vbelt compressor P. 8 — 16)*.
10. Screw in the bolts *(3)* (four pieces).
11. Check the V-belt tension *(Checking the Vbelt tension P. 8 — 13)* and reset as required.
12. Close the hood.

8.4.2.8 Replacing the agitator Vbelt

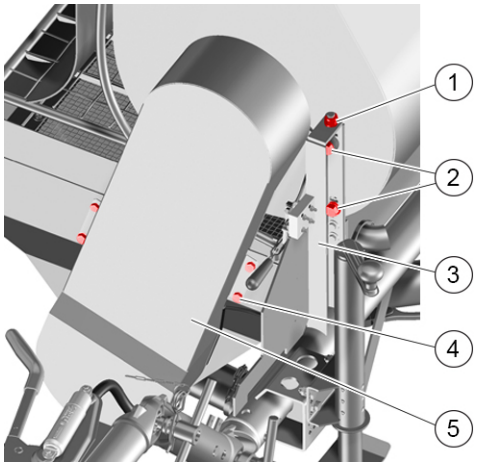


Figure 61: Tensioning the Vbelt

Item	Designation
1	Nut
2	Bolts
3	Bracket
4	Bolt
5	Cover

⚠ WARNING

Risk of injury by shearing or being drawn in on the running V-belt

Drawing in and shearing of body parts like fingers and hands on the running V-belt.

1. Switch off the machine and secure it against restarting.
2. Disconnect the machine from the mains.

1. Switch off the machine *(Stopping and switching off the machine P. 5 — 9)*.
2. Secure the machine to prevent restarting.
3. Disconnect the machine from the mains.
4. Open the hood.
5. Unscrew the bolts *(4)* (four pieces) and remove the cover *(5)*.

The mixer is fastened to two brackets, which are attached diagonally, at the front and at the rear of the mixer. To adjust the height of the mixer, you must loosen it on both brackets and then lift or lower using the nuts *(1)*.

6. Loosen the bolts *(2)* on both brackets.
7. Relax the V-belt by turning the nuts *(1)* anticlockwise until you can remove the V-belts.
8. Remove the V-belts from the V-belt pulleys.
9. Position the new V-belts on the V-belt pulleys.
10. Tension the V-belt by turning the nuts *(1)* clockwise.

Setting values of the V-belt *(Checking the Vbelt tension P. 8 — 13)*.

Ensure that you lift or lower the mixer equally at the front and at the rear.

11. Screw in the bolts *(2)*.

12. Check the V-belt tension *(Checking the Vbelt tension P. 8 — 13)* and reset as required.
13. Fit the cover *(5)*.
14. Close the hood.

8.4.2.9 Replacing the mixer Vbelt

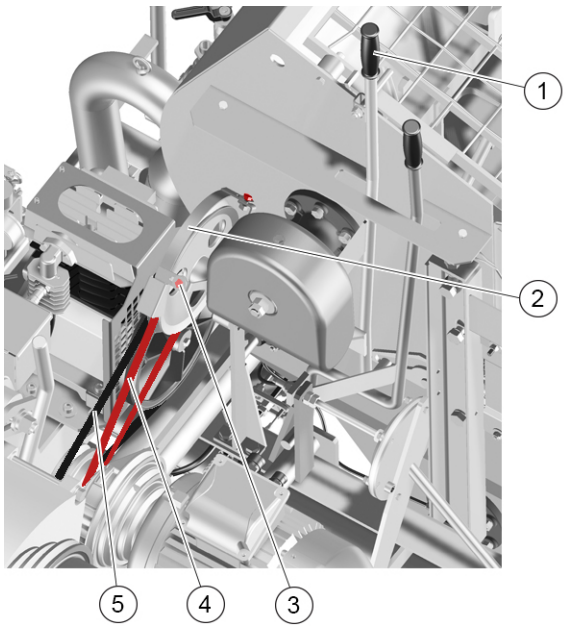


Figure 62: Change the V-belts

Item	Designation
1	Lever (mixer and agitator ON/OFF)
2	Cover
3	Bolt
4	V-belt (mixer)
5	V-belt (compressor)

⚠ WARNING

Risk of injury by shearing or being drawn in on the running V-belt

Drawing in and shearing of body parts like fingers and hands on the running V-belt.

1. Switch off the machine and secure it against restarting.
2. Disconnect the machine from the mains.

1. Switch off the machine *(Stopping and switching off the machine P. 5 — 9)*.
2. Secure the machine to prevent restarting.
3. Disconnect the machine from the mains.
4. Open the hood.
5. Extend the V-belt of the compressor *(Replacing the compressor Vbelt P. 8 — 21)*
6. Unscrew the bolts *(3)* (two pieces) and remove the cover *(2)*.
7. Relax the V-belt *(4)* by driving the lever *(1)* into the connecting link.
8. Remove the V-belt from the V-belt pulleys.
9. Fit the new V-belt by following these steps in reverse order.

8.4.3 Compressor – checking the oil level

⚠ WARNING

Risk of scalding due to compressor oil spraying out

1. Only open the oil filler once the pressure has been fully dumped.
2. Only correct the compressor oil level when the machine is cold.

NOTICE

Technical damage due to incorrect measurement of the compressor oil level

- ▶ Check the compressor oil level with the machine horizontal and correctly supported.

NOTICE

Technical damage due to contamination in the compressor oil system

The compressor's function can be impaired by small particles.

1. Prevent dirt or other impurities from entering the compressor oil system.
2. Never leave the filler pipe open longer than strictly required.

The following requirements must be fulfilled in order to check to compressor oil level:

- The machine is switched off.
- Machine is aligned horizontally.
- The compressor is depressurised and cold.

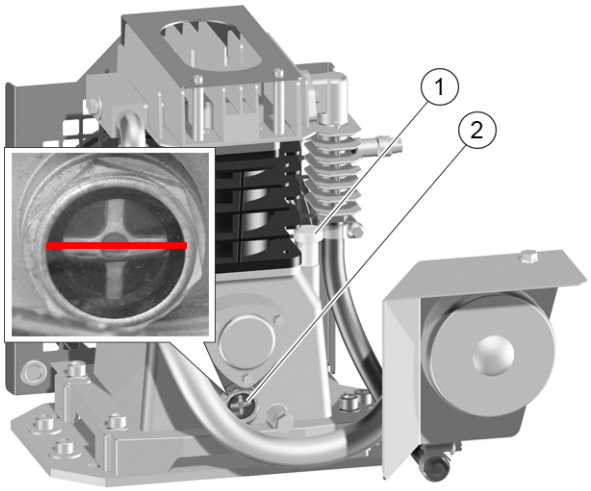


Figure 63: Checking the compressor oil level

Item	Designation
1	Plug
2	Inspection glass

1. Open the hood.
2. Check the compressor oil level at the oil level inspection glass of the compressor.
   ⇒ The compressor oil level is correct if the compressor oil reaches up to the middle of the inspection glass.
3. Top up the compressor oil via the oil filler if necessary. Remove the plug to do so.

8.4.4 Compressor – changing the oil

⚠ WARNING

Risk of burning – the unit components, oil and screw plug can reach temperatures of over 80 °C!

1. Let the unit cool down.
2. Always wear personal protective equipment.

⚠ WARNING

Risk of injury due to compressor oil spraying out

1. Only carry out a compressor oil/oil filter change when the engine is shut down and the compressor is depressurised.
2. Only open the filler pipe once the pressure has been fully dumped.

NOTICE

Technical damage due to contamination in the compressor oil system

The compressor's function can be impaired by small particles.

1. Prevent dirt or other impurities from entering the compressor oil system.
2. Never leave the filler pipe open longer than strictly required.

NOTICE

Environmental pollution

Lubricants and functional fluids are damaging to the environment.

1. Carefully collect all functional fluids and operating equipment (e.g. used oil, including biologically degradable oil), filters and auxiliary materials.
2. Dispose of these materials separately from other waste.
3. Keep the different categories of used oil separate in order to keep disposal costs as low as possible.
4. Comply with the relevant national and regional regulations.
5. Only work with waste disposal companies who are approved by the responsible authorities.

1. Place the machine in a horizontal position.
2. Switch off the machine *(Stopping and switching off the machine P. 5 — 9)*.
3. Secure the machine to prevent restarting.
4. Open the hood.

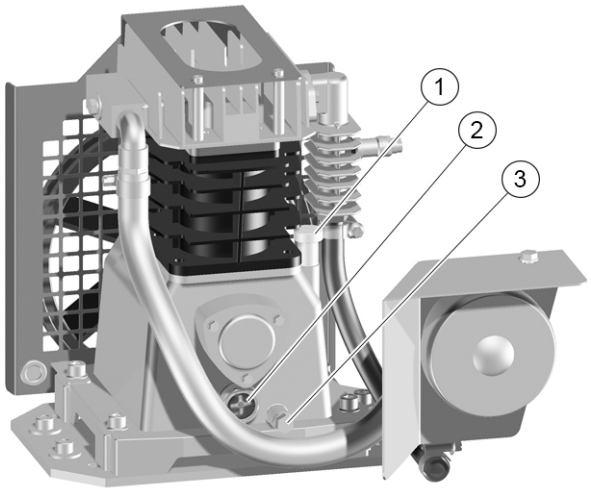


Figure 64: Changing the compressor oil

Item	Designation
1	Plug
2	Inspection glass
3	Oil drain plug

5. Assume an oil sump pan of sufficient size.
6. Unscrew the oil drain plug.
7. Pull the plug out the oil filler to accelerate dumping.
8. Screw in the oil drain plug as soon as no more compressor oil escapes.

The required oil volume and oil grade can be found in the following chapters of the Operating Instructions:

- Oil volume *(Technical data P. 3 — 6)*
- Oil grade *(Lubricant recommendation P. 10 — 3)*

9. Pour new compressor oil into the oil filler.
10. Put the plug into the oil filler.

11. Check the compressor oil level at the inspection glass.
    ⇒ The oil level must be in the middle of the inspection glass.
12. Correct the oil level as required.
13. Dispose of the collected used oil in line with regulations.

8.4.5 Compressor – cleaning and replacing the air filter

⚠ WARNING

Risk of burning from hot machine components

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

⚠ CAUTION

Risk of injury due to flying dust particles

- Work with respiratory protection and protective goggles.

Never clean with oil, petrol or other flammable liquids or solvents.

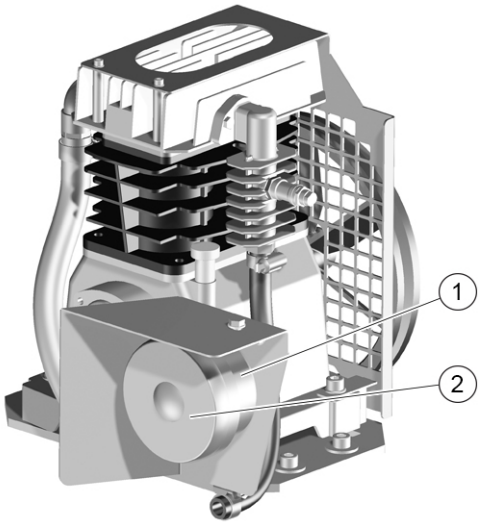


Figure 65: Replace the air filter

Item	Designation
1	Filter housing
2	Filter lid

1. Switch off the machine *(Stopping and switching off the machine P. 5 — 9)*.
2. Secure the machine to prevent restarting.
3. Open the hood.
4. Turn the filter lid anticlockwise and remove it.
5. Carefully pull the filter element out of the filter housing.
6. Clean the inside of the filter housing and filter lid with a clean cloth.
7. Clean the sealing surfaces.
8. Check the filter element. If it is damaged or severely clogged, it must be replaced.
9. Clean the filter element from the inside out with max. 5 bar compressed air. When cleaning, keep a sufficient distance between the hose nozzle and the filter element.
10. Insert the cleaned or the new filter element into the filter housing.
11. Place the filter lid on the filter housing and tighten the filter lid clockwise.
12. Close the hood.

8.4.6 Mixer transmission – replacing oil

The required oil volume and oil grade can be found in the following chapters of the Operating Instructions:

- Oil volume *(Technical data P. 3 — 6)*
- Oil grade *(Lubricant recommendation P. 10 — 3)*

NOTICE

Environmental pollution

Lubricants and functional fluids are damaging to the environment.

1. Carefully collect all functional fluids and operating equipment (e.g. used oil, including biologically degradable oil), filters and auxiliary materials.
2. Dispose of these materials separately from other waste.
3. Keep the different categories of used oil separate in order to keep disposal costs as low as possible.
4. Comply with the relevant national and regional regulations.
5. Only work with waste disposal companies who are approved by the responsible authorities.

1. Place the machine in a horizontal position.
2. Switch off the machine *(Stopping and switching off the machine P. 5 — 9)*.
3. Secure the machine to prevent restarting.
4. Open the hood.

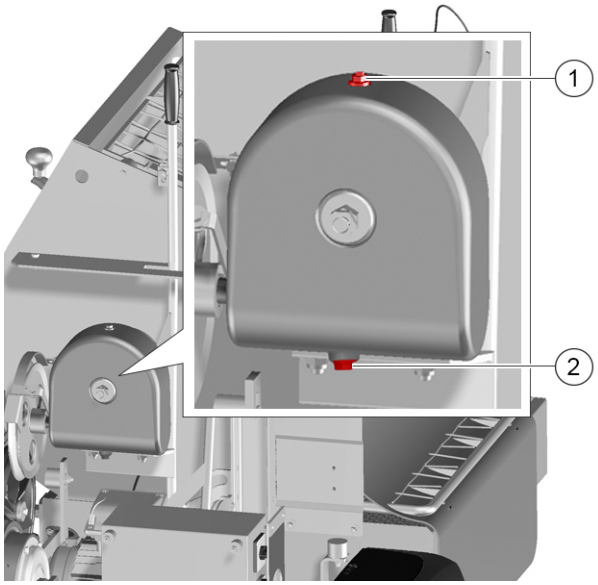


Figure 66: Replace the mixer transmission oil

Item	Designation
1	Expirator screw
2	Oil drain plug

5. Assume an oil sump pan of sufficient size.
6. Unscrew the oil drain plug.
7. Unscrew the vent screw to accelerate the dumping process.
8. Replace the seal ring of the oil drain plug.
9. Screw in the oil drain plug as soon as no more transmission oil escapes.
10. Fill with new transmission oil by opening the vent screw.
11. Screw in the vent screw.
12. Dispose of the collected used oil in line with regulations.

8.4.7 Pump transmission – checking and correcting oil level

The required oil grade can be found in the following chapter of the Operating Instructions: *(Lubricant recommendation P. 10 — 3)*

1. Place the machine in a horizontal position.
2. Switch off the machine *(Stopping and switching off the machine P. 5 — 9)*.

3. Secure the machine to prevent restarting.
4. Open the hood.

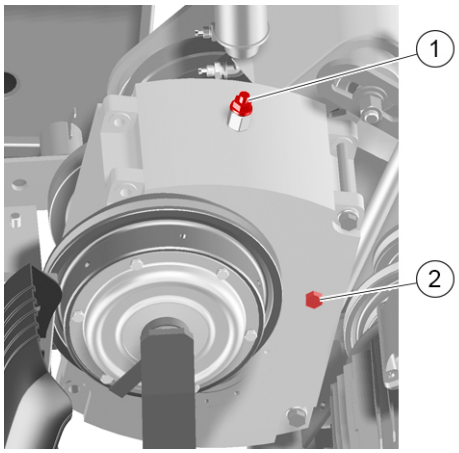


Figure 67: Pump transmission

Item	Designation
1	Expirator screw
2	Screw plug

To check transmission oil level:

5. Get an absorbent cloth ready.
6. Unscrew the screw plug.
   ⇒ If transmission oil escapes from the bore, the transmission oil level is OK.
   ⇒ If no transmission oil escapes from the bore, you must top up the transmission oil.

To top up the transmission oil:

7. Unscrew the vent screw.
8. Add new transmission oil through the opening of the vent screw, until transmission oil runs out the bore of the screw plug.
9. Screw in the screw plug.
10. Thoroughly clean escaped transmission oil with the cloth laid out ready.
11. Screw in the vent screw.

8.4.8 Pump transmission – replacing oil

The required oil volume and oil grade can be found in the following places in the Operating Instructions:

- Oil volume *(Technical data P. 3 — 6)*
- Oil grade *(Lubricant recommendation P. 10 — 3)*

NOTICE

Environmental pollution

Lubricants and functional fluids are damaging to the environment.

1. Carefully collect all functional fluids and operating equipment (e.g. used oil, including biologically degradable oil), filters and auxiliary materials.
2. Dispose of these materials separately from other waste.
3. Keep the different categories of used oil separate in order to keep disposal costs as low as possible.
4. Comply with the relevant national and regional regulations.
5. Only work with waste disposal companies who are approved by the responsible authorities.

1. Place the machine in a horizontal position.
2. Switch off the machine *(Stopping and switching off the machine P. 5 — 9)*.
3. Secure the machine to prevent restarting.
4. Open the hood.

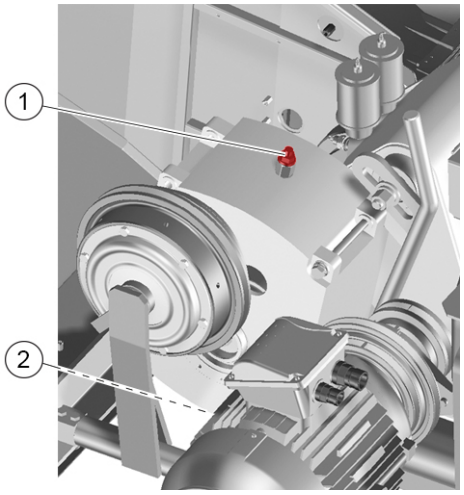


Figure 68: Replacing pump transmission oil

Item	Designation
1	Expirator screw
2	Oil drain plug (not visible)

5. Assume an oil sump pan of sufficient size.
6. Unscrew the oil drain plug (screw at the lowest position underneath the housing).
7. Unscrew the vent screw to accelerate the dumping process.
8. Replace the seal ring of the oil drain plug.
9. Screw in the oil drain plug as soon as no more transmission oil escapes.
10. Fill with new transmission oil by opening the vent screw.
11. Screw in the vent screw.
12. Dispose of the collected used oil in line with regulations.

8.4.9 Checking and setting the excess pressure safety device

Before starting work, the machine must be cleaned.

To set the excess pressure safety device, a delivery line with a diameter of 50 mm and a length of 13.3 m must be used. Otherwise, measurement errors will occur.

⚠ WARNING

Risk of injury due to delivery line bursting

Risk of injury to eyes, limbs and body due to the delivery line bursting under high pressure.

1. Immediately open the return line cock if the pressure on the pressure gauge increases above 40 bar.
2. Always wear personal protective equipment.

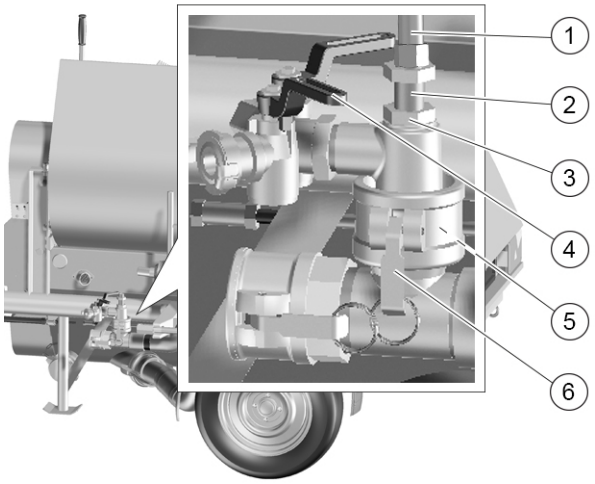


Figure 69: Excess pressure safety device

Item	Designation
1	Feed hose of air battery
2	Adjustable tube
3	Lock nut
4	Air valve
5	Rubber ball (not visible)
6	Cam lever (two pieces)

The excess pressure safety device must be opened twice a day and cleaned if necessary. When doing so, the rubber ball should be moistened before reinserting and turned from the previous installation position, otherwise the pressure setting changes due to deformation of the rubber ball. To this end, the upper part of the excess pressure safety device can be easily taken out by lifting both the cam levers. You must ensure that the gasket has a good seat.

1. Connect the delivery line (with the dimensions given above) to the pressure gauge.
2. Close the outlet of the delivery line.
3. Open the return line cock.
4. Open the air cock.
5. Half fill the hopper with water.
6. Switch the machine on *(Switching on and starting up the machine P. 5 — 6)*.
7. Switch the pump on *(Switching on/off the pump P. 5 — 8)*.
8. Close the return line cock slowly.
   ⇒ The pressure increases until the pressure-relief valve responds.
   ⇒ If the pressure-relief valve does not respond at 40 bar, immediately open the return line cock in order to relieve the pressure in the system. Reduce the response pressure of the excess pressure safety device as described below.
9. Read off from the pressure gauge the pressure at which the excess pressure safety device responds.

The excess pressure safety device is set at 35–40 bar. It may be altered within a range of 5–40 bar.

If the pressure is outside the tolerance, set the excess pressure safety device as follows:

10. Switch off the machine *(Stopping and switching off the machine P. 5 — 9)*.
11. Secure the machine to prevent restarting.
12. Unscrew the lock nut.

13. Set the response pressure of the excess pressure safety device by twisting the adjustable tube.

When unscrewing the adjustable tube, the response pressure increases by about 5 bar per half revolution. You must ensure that the lock nut on the excess pressure safety device is always tightened and the feed tube between the air battery and excess pressure safety device is screwed on extremely tightly.

14. Tighten the lock nut.
15. Check the response pressure again as described above.

The excess pressure safety device is only guaranteed to function perfectly when the disconnect clutch is fully functional.

The machine may be operated only with a fully functional excess pressure safety device.

16. If the response pressure is set correctly, open the return line cock.
17. Switch the pump off *(Switching on/off the pump P. 5 — 8)*.
18. Switch off the machine *(Switching on and starting up the machine P. 5 — 6)*.
19. Dismantle the delivery line.

8.4.10 Drip feed lubricator – checking and setting the volumetric flow rate

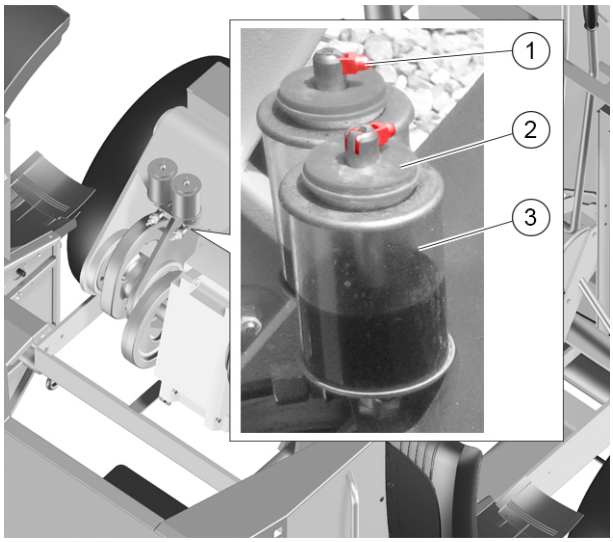


Figure 70: Setting the delivery rate

Item	Designation
1	Nipple
2	Cover
3	Drip feed lubricator

Inspect and set the drip feed lubricators one by one.

1. Open the hood.
2. Swing the nipple of the drip feed lubricator into a vertical position.
   ⇒ The valve of the drip feed lubricator is opened.

A small inspection glass is attached to the bottom of the drip feed lubricator. Here you can observe the volumetric flow rate.

3. Check over the course of a minute how many drops the drip feed lubricator yields.

The drip feed lubricator must yield approx. 6–10 drops of oil a minute.

If the drip feed lubricator yields too little or too much oil, adjust it as follows:

4. Swing the nipple of the drip feed lubricator into a vertical position.

5. Remove the cover upwards.
6. Release the anti-rotation device (threaded pin under the cover).
7. If the drip feed lubricator yields fewer than six drops, turn the nipple half a revolution anticlockwise.

▶ If the drip feed lubricator yields more than ten drops, turn the nipple half a revolution clockwise.

8. Check the volumetric flow rate again and continue adjusting as required, until you have achieved the correct volumetric flow rate.
9. Tighten the anti-rotation device.
10. Put the cover on the drip feed lubricator.
11. Swing the nipple of the drip feed lubricator into a horizontal position.
12. Close the hood.

8.4.11 Drip feed lubricator – topping up the oil

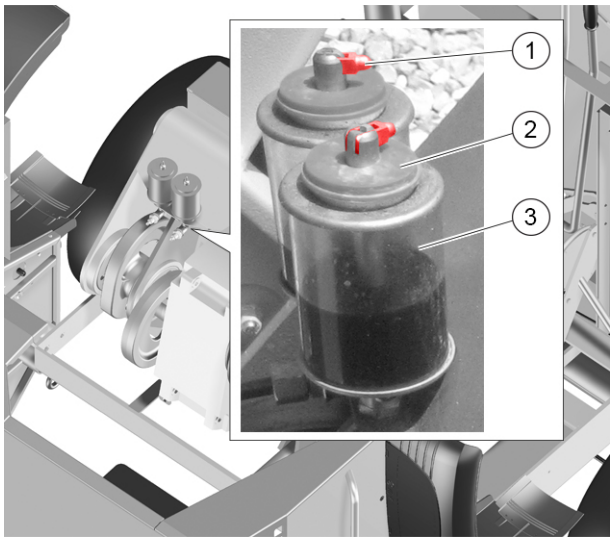


Figure 71: Setting the delivery rate

Item	Designation
1	Nipple
2	Cover
3	Drip feed lubricator

The drip feed lubricator must be filled with oil daily and before starting work. If the pump is operated without oil, wear is significantly increased. This is why, with large orders, you should also check the oil level during work and top up the oil as required.

The required oil grade can be found in the following chapter of the Operating Instructions: *(Lubricant recommendation P. 10 — 3)*

1. Open the hood.
2. Swing the nipple of the drip feed lubricator into a vertical position.
3. Remove the cover of the drip feed lubricator upwards.
4. Top up oil through the opening.
5. Put the cover on the drip feed lubricator.
6. Swing the nipple of the drip feed lubricator into a horizontal position.
7. Close the hood.

8.4.12 Maintaining the pump head

⚠ WARNING

Risk of injury due to pressure in the delivery system

Opening the pressurised delivery system (delivery line, pump) may cause very serious injuries to the head and body.

1. Never open a pressurised delivery system.
2. Always open the return line cock for depressurising.
3. Consult the pressure gauge to make sure that the delivery system is depressurised.

Before starting work, the machine must be cleaned.

8.4.12.1 Removing the pump head

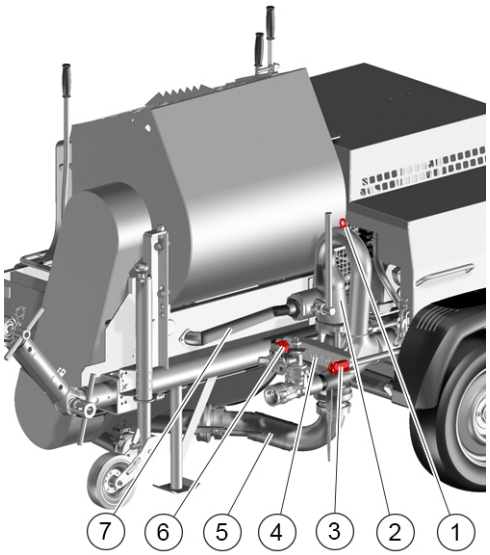


Figure 72: Removing the pump head

Item	Designation
1	Eye bolt
2	Pump head
3	Nut
4	Transition liner
5	Suction elbow
6	Nuts
7	Return line

1. Switch off the machine *(Stopping and switching off the machine P. 5 — 9)*.
2. Secure the machine to prevent restarting.
3. Open the return line cock.
   ⇒ The pressure in the system is relieved.
4. Check the pressure gauge to ensure the system is depressurised.
5. Disconnect the delivery line.
6. Disconnect the pressure gauge.
7. Remove the return line *(7)* from the return valve.
8. Dismantle the suction elbow *(5)*.

9. Attach the pump head *(2)* on the ring bolt *(1)* to the lifting equipment (KA 230) using suitable load-bearing equipment.

▶ Attach the pump head to the lifting equipment (KA 139) with a suitable sling.

10. Unscrew the *(3)* and *(6)* nuts.
11. Remove the transition liner *(4)*.
12. Remove the pump head *(2)*.
13. Carefully set down the pump head *(2)* using the lifting equipment.

8.4.12.2 Checking valves in the pump head

To check the valves in the pump head, you must remove the intake opening and valve body from the pump head.

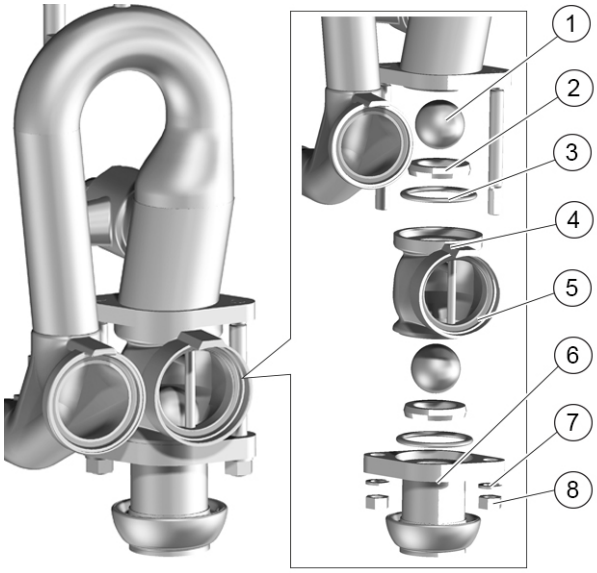


Figure 73: Checking the pump head

Item	Designation
1	Valve ball
2	Valve seat
3	Sealing ring
4	Valve body
5	Sealing ring
6	Intake opening
7	Washer
8	Nut

1. Unscrew the nuts and remove them with the washers.
2. Remove the intake opening from the studs.
3. Remove the valve body from the studs.
4. Check seal rings, valve seats and valve balls and replace these as required.
5. Clean all parts before assembly and grease the seal rings.
6. Assemble the pump head by following these steps in reverse order. Do not **yet** tighten the nuts here.

During assembly, the nuts are merely applied. They are tightened to the pump only after the pump head has been installed. This ensures that the valve body is aligned parallel to the pump and is consequently tight.

8.4.12.3 Installing the pump head

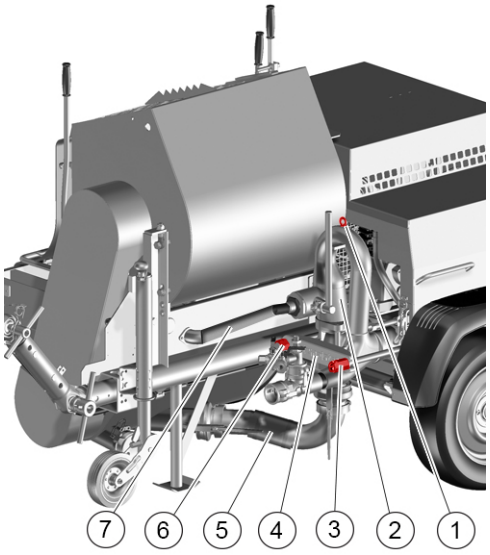


Figure 74: Removing the pump head

Item	Designation
1	Eye bolt
2	Pump head
3	Nut
4	Transition liner
5	Suction elbow

Item	Designation
6	Nuts
7	Return line

1. Carefully lift the pump head *(2)* using the lifting equipment.
2. Position the pump head *(2)* carefully on the pump.
3. Put the transition liner *(4)* on the studs.
4. Bolt the *(3)* and *(6)* nuts onto the studs and tighten them.
5. Unhook the lifting equipment from the ring bolt *(1)*.
6. Fit the suction elbow *(5)*.
7. Fit the return line *(7)* on the return valve.

8.4.13 Protective grille – wear check

This section describes checking wear on the protective grille and mixer grille.

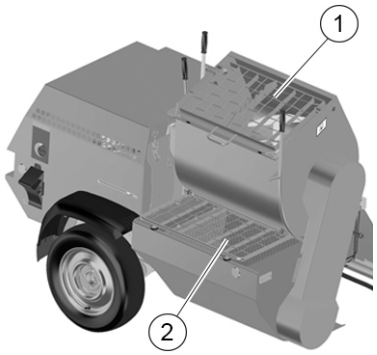


Figure 75: Protective grille

Item	Designation
1	Mixer grille
2	Protective grille

As soon as the thickness of the remaining material on a protective grille or mixer grille rod decreases to 50% of the height or width at any point, the protective grille or mixer grille must be replaced.

1. Check the protective grille and mixer grille wear every day.
2. Measure the width and the height of the grille rods in an area subject to high wear, preferably in the middle.
3. Measure the width and the height of the grille rods in an area subject to the least wear (edge).

4. Compare the measured values.
5. Replace the protective grille or mixer grille if the residual material thickness of the grille rods falls below 50%.
6. Check the protective grille and the mixer grille for other damage (broken grille rods, cracks in welded seams, etc.).
7. Replace the protective grille or the mixer grille if there are visible breaks or cracks.

8.4.14 Changing the drawgear

This section describes how to change the drawgear from a towing ring to a ball hitch or from a ball hitch to a towing ring.

The following special tools are required:

- Torque wrench

8.4.14.1 Preparation

The following activities must be completed prior to commencing the assembly:

1. Make sure that the machine is standing on level supporting ground.
2. Secure the machine against rolling away or toppling over.
3. Engage the handbrake.
4. Place the chocks in position.

8.4.14.2 Drawgear disassembly

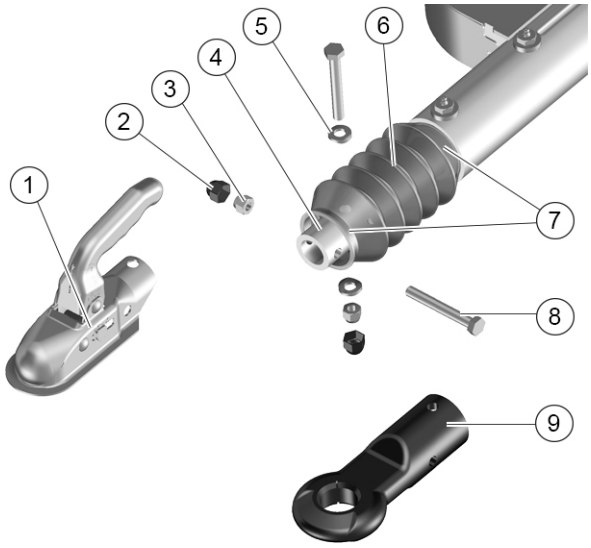


Figure 76: Drawgear

Item	Designation
1	Ball hitch
2	Protective cap
3	Nuts (self-locking)
4	Tie-rod
5	Radius washer
6	Rubber gaiter
7	Cable ties
8	Fastening bolt
9	Towing ring

1. Remove the cable ties .
2. Pull the rubber gaiter backwards and over the fastening bolts .
3. Unscrew the nuts from the fastening bolts .

DANGER

Risk of injury due to threaded unions coming undone

- Do not reuse self-locking nuts.

4. Drive out the fastening bolts.

5. Remove the drawgear.

8.4.14.3 Drawgear assembly

1. Position another drawgear. (Not included in scope of supply.)

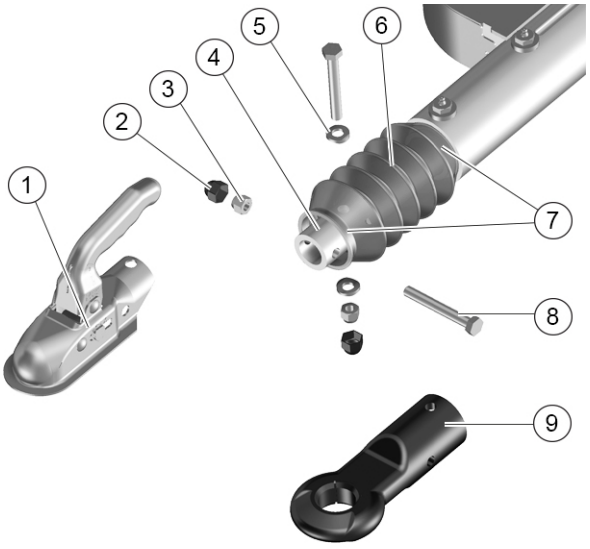


Figure 77: Drawgear

Item	Designation
1	Ball hitch
2	Protective cap
3	Nuts (self-locking)
4	Tie-rod
5	Radius washer
6	Rubber gaiter
7	Cable ties
8	Fastening bolt
9	Towing ring

⚠ WARNING

Risk of injury due to drawgear tearing off due to incorrectly fitted fastening bolts

- Viewed in the direction of travel, always insert the fastening bolts from the left-hand side.

2. Insert the radius washers and fastening bolts in the correct position.

Mounting the towing ring requires a radius washer at the top and bottom, mounting the ball hitch only requires a radius washer at the bottom.

3. Fit new self-locking nuts.
4. Tighten them with the correct tightening torque as specified in the table.
5. Place the protective caps over the nuts.

The model and version are marked on the drawgear.

Towing ring tightening torques				
Type	Version	Number of bolts	Bolt dimensions	Tightening torque
KR13/82	C/D45	2	M12 10.9	115 Nm

Ball hitch tightening torque				
Type	Version	Number of bolts	Bolt dimensions	Tightening torque
KK 14	B N3	2	M12 8.8	77 Nm

6. Slide the tie-rod in and out to check that the shock absorbers are functioning correctly.

7. Pull the rubber gaiter forwards and over the rear fastening bolt.
8. Secure the rubber gaiter with new cable ties.
9. Slide the tie-rod in and out to check that the shock absorbers are functioning correctly once again.

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 required capacities and lubricants can be found in the following chapters of the Operating Instructions:

- Fill volumes *(Technical data P. 3 — 6)*
- Lubricants *(Lubricant recommendation P. 10 — 3)*

8.5.1 Manual grease lubrication

Use a multipurpose grease corresponding to the lubricant recommendation for manual lubrication.

8.5.2 Axle and wheels

Lubricate the axle and wheels using a highquality multipurpose grease in accordance with the lubricant recommendation.

8.5.3 Drip feed lubricator

Use high-quality motor oil for topping up the drip feed lubricator according to the lubricant recommendation.

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.

1. Pump the hopper empty.
2. Switch the pump off *(Switching on/off the pump P. 5 — 8)*.
3. Switch off the machine *(Stopping and switching off the machine P. 5 — 9)*.
4. Clean the machine *(Cleaning the machine P. 6 — 21)*.
5. Secure the machine against unauthorised starting or use.

If the machine is to be shut down and stored for a longer period of time, take the following additional measures:

6. Fill with all functional fluids before putting into storage.
7. Lubricate the machine at the lubrication points.
8. Preserve the machine with a suitable agent.

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.

9. Only store the machine in a dry, clean and well ventilated location.

9.2 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.

⚠ CAUTION

Risk of injury due to functional fluids escaping and sharp machine 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.

9.2.1 Materials used

The main materials used for machine construction were:

Material	Used in
Copper	Cables
Steel	Machine frame
	Mixer drum parts
	Hopper parts
	Compressor parts
	Air valve parts
	Pump parts
Plastic, rubber, PVC	Seals
	Hoses
	Cables
	Wheels
Tin	Printed circuit boards
Polyester	Printed circuit boards

9.2.2 Parts requiring separate disposal

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

Designation	Applies for
Electronic scrap	Drive motor
	Electrical supply
	PCBs with electrical components
Oil	Compressor
	Gearbox

10 Appendix

This chapter contains the following topics:

- Lubricant recommendation
- Sample of the EC Declaration of Conformity

Depending on the machine model, further documents may be included in the appendix.

10.1 Lubricant recommendation

We have listed all suitable lubricants and hydraulic fluids 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.

NOTICE

Risk of machine damage caused by unauthorised functional fluids

The manufacturer accepts no liability for damage caused by using unauthorised functional fluids.

- ▸ Use only the lubricants specified in the lubricant recommendation.

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

NOTICE

Risk of machine damage

Possible machine damage if the temperature of the hydraulic fluid is not observed.

1. If the hydraulic fluid temperature of the machine you wish to operate is lower than 0 °C, run the machine to operating temperature first. Allow the machine to run for a few minutes under no load.
2. Only operate the machine at full load when the temperature of the hydraulic fluid (HLP, VG46) is 10 °C or higher.
3. The ideal temperature of the hydraulic fluid (HLP, VG46) is between 40 °C and 70 °C.

Greases	
Marking as per DIN 51502	K2K-25
Requirements standard	DIN 51825
Characteristics	mineral, lithium soap
NLGI Class	NLGI Class 2 DIN 51818
Container	400 g
Part number	000113007

Transmission oil (mixer/pump transmission)	
Type	CLP 220
Characteristics	mineral
Requirement	DIN 51 517
Part number	000101006

Compressor oil	
Type	Altair Pro
Part number	623228

Drip feed lubricator	
Marking as per DIN 51502	HD
Requirements standard	API CF
Characteristics	mineral
Viscosity grade, NLGI Class	SAE 10W40 as per DIN 51511
Part number	487039

10.2 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 / Maschinennummer** — Mörtelmaschine
en Herewith we declare that the machine –Designation / Model / Serial No. — P 13 EMR

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

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