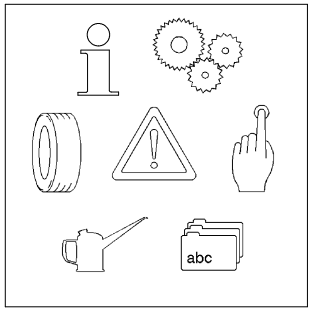
Operating Instructions



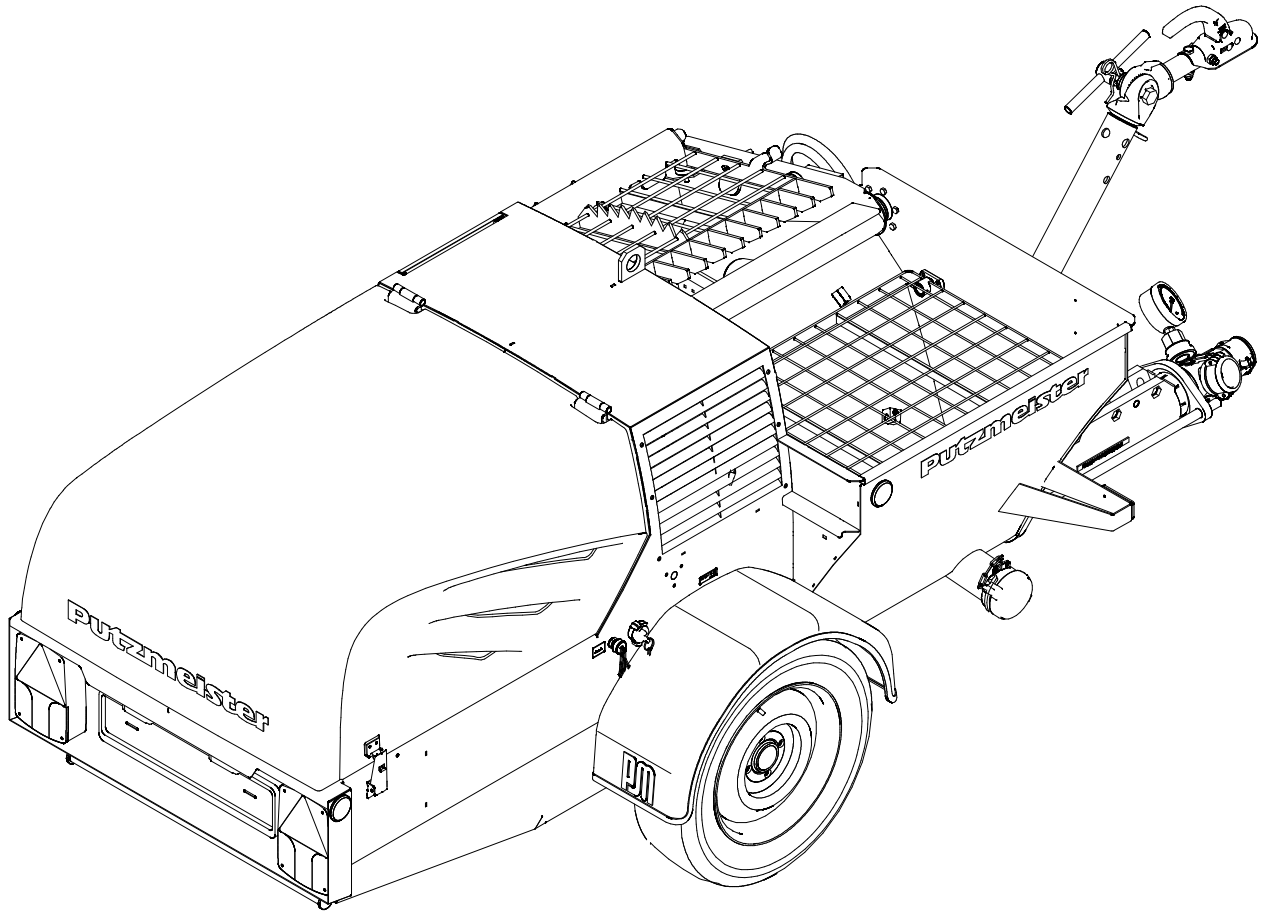
Translation of the original Operating Instructions

for machine operator and maintenance staff

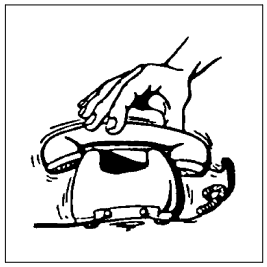
always keep by the machine

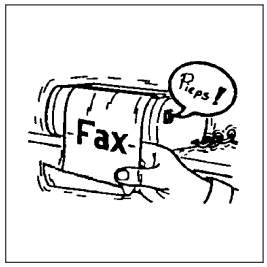
Motar machine SP11 LMR

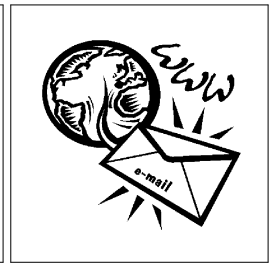
Machine no.



Putzmeister
Mörtelmaschinen







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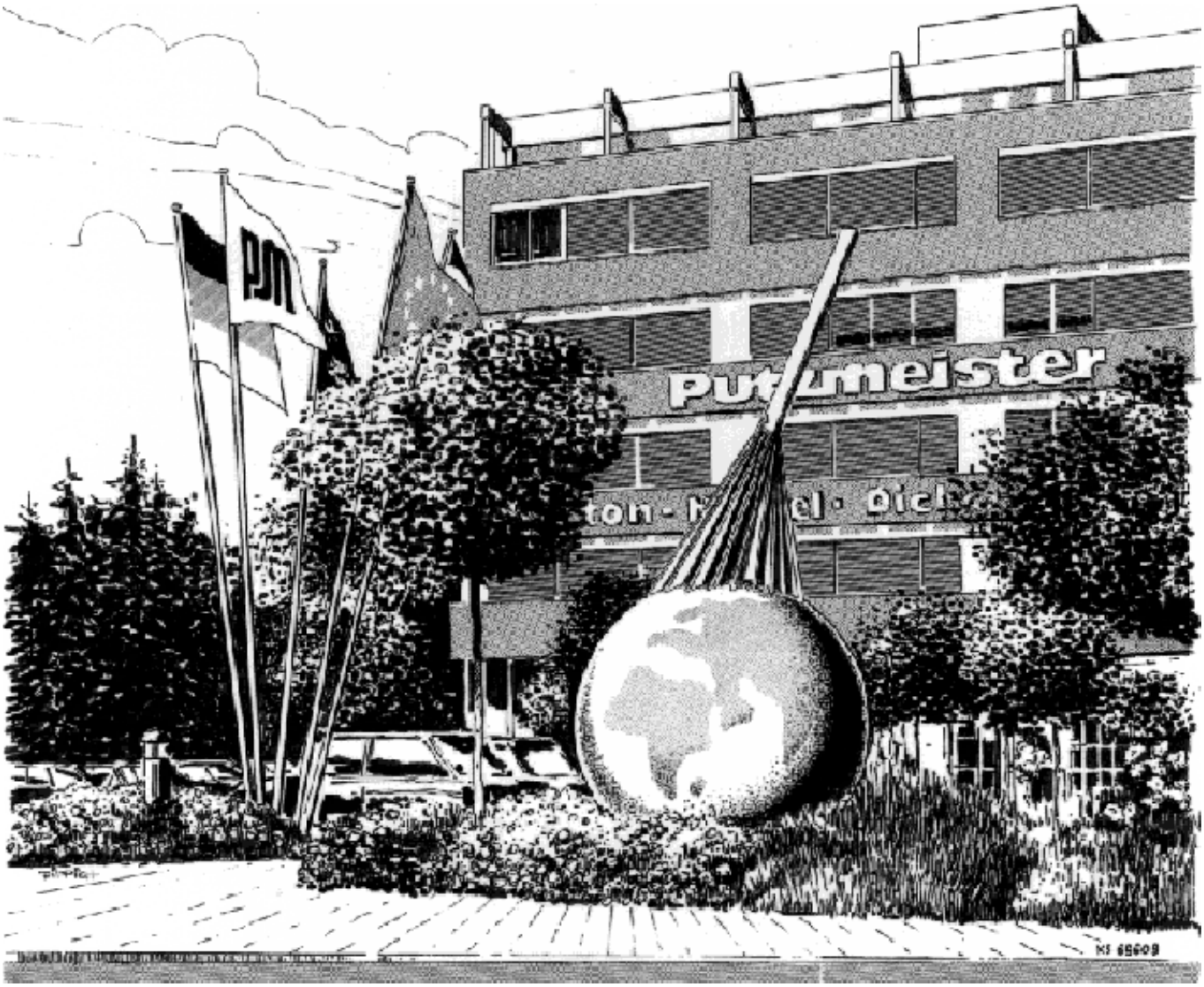
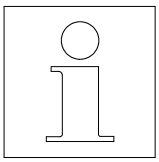
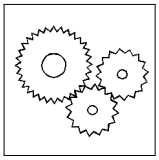




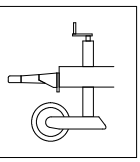
1 About these Operating Instructions

2 Safety Regulations

Contents

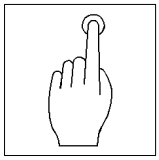


3 General Technical Description



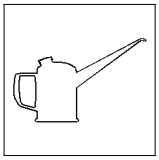
4 Transport, Set-up and Connection

5 Starting up

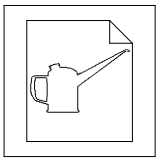


6 Operation

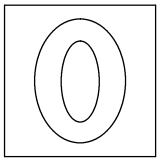
7 Faults, Cause and Remedy



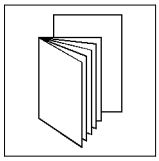
8 Maintenance



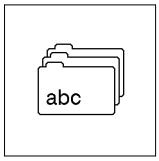
Maintenance Chart



9 Decommissioning



10 Appendix



Index of Key Words

1 About these Operating Instructions

In this chapter you will find notes and information that will help you use these Operating Instructions. Do not hesitate to contact us if you have any queries:

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or the branch or services agent responsible for you.

Address: _____

_____

_____

Telephone: _____

Fax: _____

E-mail: _____

1.1 Foreword

These Operating Instructions are intended to familiarise the user with the machine and to assist him in using the machine properly in various possible applications.

The Operating Instructions contain important information on how to operate the machine safely, properly and economically. Taking these instructions into consideration will help
- to avoid dangers,
- to reduce repair costs and downtimes,
- to increase the reliability and service life of the machine.

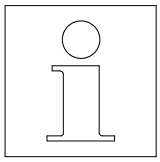
The Operating Instructions must be supplemented by the relevant national rules and regulations for accident prevention and environmental protection.

The Operating Instructions must always be available wherever the machine is in use.

The machine owner must make the location of these Operating Instructions known to all personnel charged with performing jobs on the machine and ensure they are accessible. These operating instructions must be read and applied by any person who carries out work with or on the machine, e.g.
- operation, including setting up, fault rectification in the course of work, removal of production waste, care and disposal of fuels and consumables,
- service (maintenance, inspection, repair), and/or
- 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 and environmental protection in the country and place of use of the machine.

Continuation next side



The Branch or Agent serving you, or the Aichtal Works, will be happy to give you more information, should you have any questions following your study of the Operating Instructions.

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

These operating instructions do not include a description of the drive motor; please refer to the operating instructions provided by the motor manufacturer.

Modifications are made from time to time in the interests of constant improvement and it could be possible that we were unable to take these into consideration when these Operating Instructions were printed.

These operating instructions are not covered by the Amendment Service of Putzmeister Mörtelmaschinen GmbH. Alterations may be made to these operating instructions without prior notification.

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

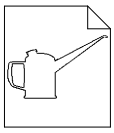
Example: Page 3-2
Chapter 3
Page 2

1.2 Icons and symbols

The following icons and symbols are used in the Operating Instructions:

▶ Action symbol
Text following this symbol describes tasks which you are required to work through, generally in the sequence shown from top to bottom.

⇒ Text after this icon describes the result or the effect of an activity.



Refer also to the maintenance charts:
This symbol is used to refer to the maintenance charts required, possibly as a supplement to the maintenance charts you are currently reading.

The following special tool is required:
This icon identifies the special tools necessary to carry out the work. Normal tools, i. e. standard tools or tools carried in the vehicle are not listed additionally.

Environmental protection

This symbol is used to identify tasks during which particular attention is to be paid to environmental protection. The associated text is written in italics and is closed off with a line.

Notes

Particular specifications with regard to the economic use of the machine are introduced with the word "Note" and the pictogram illustrated. The associated text is written in italics and is closed off with a line.

Caution

Particular specifications or instructions and prohibitions with regard to the prevention of damage are introduced with the word "Caution" in bold and the pictogram illustrated. The associated text is written in italics and is closed off with a line.

Continuation next side

Danger

Particular specifications or instructions and prohibitions with regard to the prevention of personal injury or significant damage are introduced with the pictogram illustrated, the word "Danger" written in bold and a line. The associated text is written in italics and is closed off with a line.

The appropriate symbol will be used if it is possible to identify the source of the danger precisely.

Suspended Load

This symbol is used to identify tasks in which suspended loads may fall down.

Danger of crushing

This symbol is used to identify tasks during which there is the danger of being crushed.

Heavy current

This symbol is used to identify tasks in which there is the danger of electrocution, possibly with lethal consequences.

2 Safety Regulations

This chapter summarises the most important safety regulations. This Chapter must be read and understood by all persons who handle the machine. The various regulations are also repeated once more at the appropriate points in the Operating Instructions.

Notes

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 already existing valid national accident prevention regulations and laws.

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

2.1 Principle

Use only machines in a technically perfect condition, as designated and being conscious of safety and the dangers, taking account of the Operating Instructions. Any faults, especially those affecting the safety of the machine, must, therefore, be rectified immediately.

Make sure that
- no safety equipment is removed, rendered inoperable or modified,
- safety equipment removed for the purposes of maintenance work is refitted immediately after the work is completed.

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. Eliminate the defect or fault before restarting.

Onwards sale

The following should be noted if you sell the machine on:

Pass on to the new operator all the accompanying documentation (Operating Instructions, Maintenance Instructions, diagrams, inspection certificates etc.) you received with your machine. If necessary, you may have to order the papers from us, quoting the machine number. The machine may not be sold on without the accompanying documentation under any circumstances.

Reporting an onwards sale or acquisition to Putzmeister ensures that you will be sent any information relating to modifications or innovations relevant to safety, and you will also be eligible for technical consultancy from our works.

2.2 Designated use

The machine has been built in accordance with the state of the art and recognised safety rules. Nevertheless, its use may constitute a risk to life and limb of the operator or of third parties, or cause damage to the machine and to other property.

The machine must only be used as specified in the Operating Instructions and the enclosed documentation. All information and safety regulations in the Operating Instructions must be observed.

The auger pump SP 11 is designed exclusively to mix and pump premixed dry mortar and site mixes of up to 6 mm grain size through hose lines with 50 mm maximum diameter.

Performance must be restricted to pumping operations on building sites. The maximum delivery pressure must not be higher than that specified on the rating plate or in Technical Data.
The delivery line through which the pump is to deliver must be designed for the delivery pressure and installed and secured correctly in accordance with recognised technical regulations.

Filling of the auger pump is carried out in the reservoir / hopper.

Any protective covers belonging to the machine should be attached before operation.
The machine must be operated only with the safety equipment fitted.

Specified inspection work should be carried out at regular intervals.

Any work on the electric or hydraulic unit of the machine must be carried out only by trained and qualified hydraulic and electrotechnical specialists.

Never make any modifications, additions or conversions to the machine without first obtaining the manufacturer's approval.

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

2.3 Use contrary to the designated use

Use of the machine other than described in the section "Designated use", or which goes beyond such use, is considered contrary to the designated use. Putzmeister Mörtelmaschinen GmbH accepts no liability for damage resulting from such use. The risk of such misuse lies entirely with the machine operator.

Extending delivery line

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

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

Modifications

Never make any modifications, additions or conversions to the machine which might affect safety without first obtaining the manufacturer's approval. This also applies to the installation and adjustment of safety devices and valves as well as to welding work on load-bearing elements.

The values quoted on the rating plate and in the technical data are the maximum permissible values.

The control and safety settings made at Putzmeister Mörtelmaschinen GmbH must not be changed.

The machine must not be operated with deactivated, modified or defective safety devices.

Safety devices must only be repaired, adjusted or replaced by technically qualified experts.
All devices of relevance for safety must be in place and fully functional.

2.4 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:
- Industrial Employers' Liability Insurance Association,
- the responsible corporate liability insurance company.
- the legal authorities in your country.

The following persons are liable under the law for accidents which can be ascribed to the failure to comply with safety regulations and accident prevention regulations:
- the operating personnel or (unless not liable due to lack of training or basic knowledge)
- their supervisors.

under the law.
Please therefore ensure that the necessary caution prevails.

Exclusion of liability

We state here expressly that Putzmeister Mörtelmaschinen accepts no liability for damage arising from incorrect or negligent operation, servicing or maintenance or as a result of use contrary to the designated use. This statement is equally valid for modifications to, additions to and customization of the machine which may compromise safety. The guarantee will no longer be valid in such cases.

2.5 Personnel selection and qualifications

The machine may only be operated or serviced independently by persons who

- have reached the legally required age;
- are physically capable (rested and not under the influence of alcohol, drugs or medication);
- have been instructed in the operation and maintenance of the machine;
- can be expected reliably to execute the tasks they are charged with.

Training

The machine must only be operated, serviced or maintained by persons who are trained to carry out such tasks and have been commissioned to do so.
The staff areas of responsibility must be clearly defined.

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

- persons who have not yet completed training or instruction,
- persons taking a general training course.

Qualified electrician

Work on the electrical system and equipment of the machine must 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.

Hydraulics technician

Only persons having special knowledge and experience in hydraulic systems may work on hydraulic equipment.

2.6 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 the event of malfunctions, stop the machine immediately and secure it. Have any faults rectified immediately.

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

Make sure that nobody is placed at risk by the running machine before starting up the machine.

Never release or tighten threaded unions that are under pressure.

Hot machine components

During and after completion of work, there is a risk of burns from hot parts on the drive motor.

Delivery line and coupling system

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

2.7 Safety equipment

Never remove or modify safety devices on the machine.

Any safety devices removed for set-up, maintenance or repair purposes must be refitted and checked immediately upon completion of the maintenance and repair work.

Safety devices must only be repaired, adjusted or replaced by technically qualified experts.

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.

2.8 Personal protective clothing

To reduce the risk to life and limb, the following personal protective clothing must be worn whenever necessary or required by regulations.
Protective helmet, protective gloves and safety boots are always specified for all persons working at or with the machine.

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

Protective helmet
The protective helmet protects your head, e.g. against falling concrete or parts of the delivery line if the lines burst.
(EN ISO 397; Industrial safety helmet)

Safety boots
Safety boots protect your feet against falling objects and against penetration by projecting nails.
(EN ISO 345; Safety boots for industrial purposes; classification S2)

Ear defenders
Ear defenders protect you against the noise generated by the machine when you are standing close to it.
(EN ISO 352-1; Hearing protectors – General specifications – Part 1: Ear muffs
or
EN ISO 352-3; Hearing protectors – General specifications – Part 3: Ear muffs fitted to industrial safety helmets)

Protective gloves
Protective gloves protect your hands from harsh or chemical substances, from mechanical factors (e.g. impacts) and from cuts.
(EN ISO 388; Protective gloves against mechanical risks; classification 111)

Fortsetzung nächste Seite

Protective goggles
Protective goggles protect your eyes against injuries from concrete spatters or other particles.
(EN ISO 166; Personal eye protection – Specifications)

Safety harness
A safety harness protects you against falling when you are working on scaffolding, bridges or in similar areas.
(EN ISO 361; Personal protective clothing against falls – safety harnesses; classification III)

Face-mask and respiratory protector
A face-mask and respirator protector prevent particles of dust from entering your body through your respiratory passages (particles such as concrete additives).
(EN ISO 149; Respiratory protection devices – Filtering half-masks to protect against particles – Specifications, test, type; classification FFP1)

2.9 Risk of injury – residual risk

The machine has been built in accordance with state of the art technology and recognised safety rules. Nevertheless, its use may constitute a risk to life and limb of the operator or of third parties, or cause damage to the machine and to other property.

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

- Danger of crushing and bumping when moving and setting up the machine.
- Electric contact (in some circumstances with fatal consequences) with the electrical equipment. If the connection has not been made correctly or electric subassemblies are damaged.
- Risk of burns from hot machine components. This includes engine, exhaust system and frame.
- Injuries through unauthorised starting or use of the machine.
- Noise pollution is a danger for persons working continuously in the vicinity of the machine without ear defenders.
- Eye and skin injuries from escaping hydraulic fluid if threaded unions are opened without first dumping the pressure in the entire system.Injuries caused by sprayed material, dust particles or other chemical substances.
- Eye and skin injuries from escaping hydraulic fluid if threaded unions are opened without first dumping the pressure in the entire system.
- Eye and skin injuries caused by dust particles, concrete spatter, water glass or other chemical substances.
- Damage to health through inhalation of dust particles or cleaning agents, solvents or preserving agents.
- Risk of scalding by hot hydraulic fluid or other hot functional fluids escaping under pressure.
- Injuries caused by the machine rolling away as a result of support feet or wedges under the wheels releasing themselves.
- Injuries caused by opening pressurised delivery lines (e.g. after blockages).
- Injuries caused by tripping over cables, hoses or reinforcing steel.

2.10 Risk of crushing and bumping

During the following machine operating modes:
- Set-up
- Starting up
- Operation
- Cleaning, Troubleshooting, Maintenance
- Decommissioning

there is a risk of injury through crushing or bumping.

Transporting the machine

When loading the machine with a crane onto a transport vehicle, the machine must only be suspended on the lifting eyes provided. Only in this way can you be sure that the machine is suspended horizontally and securely in the hook and will not be able to tip over.

Danger of crushing

The machine may only be loaded by crane if fitted with suitable attachment points.

Use only suitable lifting equipment for lifting components.
Lifting equipment, lifting tackle, support trestles and other auxiliary equipment must be reliable and safe in operation.
Make sure that the loadbearing capacity is sufficient.

When lifting with the crane, determine the centre of gravity of the machine by lifting carefully. All cables or chains on the lifting gear must be tensioned evenly and the machine must be raised evenly at all support points.

The machine must only be loaded onto a suitable transport vehicle and must be secured against rolling, sliding and overturning during transport.

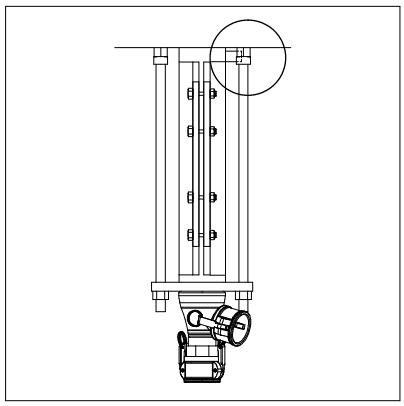
Suspended Load

Hoisted loads may fall if they are not loaded properly or if the auxiliary loading equipment is damaged.
Make sure personnel do not walk under suspended loads.
Only use an auxiliary loading device with a loadbearing capacity designed to support the gross weight of the machine!

Continuation next side

Assembly of the auger pump

There is a risk of crushing when installing the auger pump.
Depending on the mounting position of the stator or auger barrel, these may turn until they rests against the stop when the machine is switched on.
Never place hands into the auger pump when switching the machine on.



Risk of crushing in the end stop area of the auger pump

2.11 Electrical contact

The control cabinet, electrical wiring and drive motor pose a risk of fatal injury from electrical contact during the following:

- Setting up
- Operation
- Cleaning, Troubleshooting, Maintenance
- Decommissioning

All electrical assemblies are protected as standard, as per IEC 60204 Part1 or DIN 40050 IEC 144 in accordance with protection category IP 54.

Use only original fuses with the specified amperage! The electrical system can be destroyed by overrated fuses or overriding.

Heavy current

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

2.12 Risk of burns and scalding

The drive motor and the frame pose a risk of burns during the following:

- Starting up
- Operation
- Cleaning, Troubleshooting, Maintenance
- Decommissioning

Risk of burns.

Danger

The control cabinet switches off the drive motor in the event of overheating. However, the drive motor and frame can still become very hot during operation.
Allow the machine to cool before starting any maintenance work.
Work with protective gloves.

Hydraulic fluid

Particular care must be taken when working with the hydraulic system. Serious scalding including eye and skin injuries can result from escaping hydraulic fluid if threaded unions are opened.

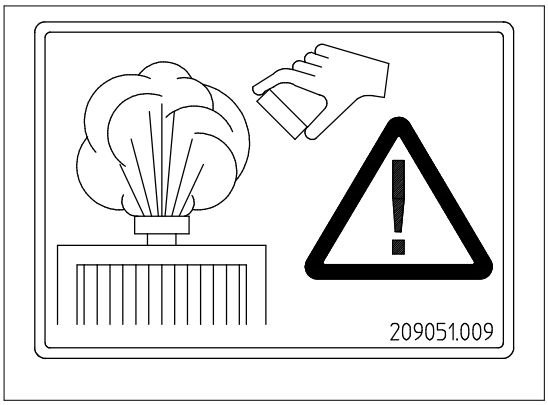
Danger

Risk of scalding when hot hydraulic fluid shoots out.
Allow the machine to cool and relieve pressure in the entire hydraulic system before starting any maintenance work.
Work with protective gloves and face mask.

Continuation next side

Coolant

Particular care must be taken when handling the end cover of the water cooler. The end cover must be sealed and closed firmly.



Danger

Never remove the cooler end cover if the drive motor is running or is still hot.
Hot water may spray out and scald bystanders.
After switching off the drive motor, wait at least 10 minutes before removing the cover.
Work with protective gloves and face mask.

2.13 Starting up

When starting the machine at temperatures below +10 °C, a vacuum may develop in the hydraulic hoses due to the increased oil viscosity. Under unfavourable conditions, this may damage the hydraulic fluid circuit in the machine.

Danger

The hydraulic fluid circuit may be blocked!

To avoid damage at temperatures below +10 °C, the machine must only be started at half throttle and warmed up in this position for at least 2 minutes.

The hydraulic fluid can heat up.

The machine can then be operated at full throttle.

2.14 Blockage

Avoid blockages. A well cleaned and leak-tight delivery line is the best assurance against formation of a blockage! Blockages considerably increase the risk of accident.
Always use cement grout for initial pumping.

Danger

Never attempt to blow out a blockage with compressed air. There is a risk of fatal injury because the delivery line can burst!

Injury through the force of bursting couplings, pipelines or blockages flying out of delivery lines.

Always attempt to remove the blockage by reverse pumping followed by normal pumping.

Relieve pressure in the delivery pipe by briefly reverse pumping. Then uncouple the delivery line and clear the blockages in the line by shaking and tapping it.

If the obstruction is not released, the affected delivery section must be disassembled.

When you start the drive motor up again, add a cement grout to the delivery line.

2.15 Hydraulic and pneumatic equipment

Work on hydraulic equipment may be carried out only by persons having special knowledge and experience in hydraulic systems, who can demonstrate to us appropriate certification of competence (certificates of training).

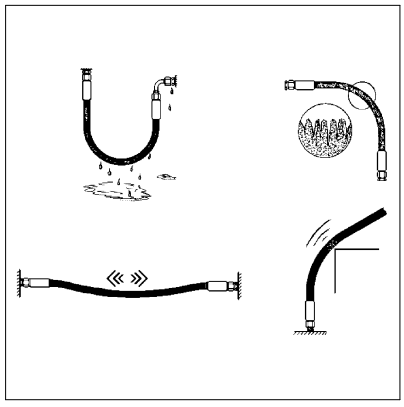
Couplings must be fitted to hoses by persons who possess the necessary experience and equipment required for this task.

Wear a face mask and gloves whenever you work on the hydraulic system. Escaping fluid is toxic and can penetrate the skin.

Never work without protective equipment

Check

Check all lines, hoses and threaded unions regularly for leaks and obvious damage. Repair damage immediately. Splashed fluid may cause injury and fire.



Check hydraulic hoses

Continuation next side

Regular inspections are specified as part of the safety inspections of the machine. Bursting lines present a risk of injury. The manufacturer accepts no responsibility for damage resulting from the use of worn or defective components.

Do not repair damaged hydraulic lines, but replace them. Replace damaged or saturated hydraulic hoses immediately.

Even if no external damage is detected, hydraulic hoses must be replaced every six years (including a storage time of no more than two years). For this purpose, the period must be calculated from the marking on the fitting (date of manufacture of the hose).

Dumping pressure

Depressurise, in accordance with the specific instructions for the unit concerned, all system sections and pressure lines (hydraulic and pneumatic systems) to be removed before carrying out any repair work!

Bleeding

Carefully bleed the hydraulic system after any maintenance or repair work.

2.16 Place of work

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

Operator

The place of work of the operator during use of the machine is at the operating panel of the machine.

2.17 Working area

The working area is the area where work is carried out with the delivery line, or the machine is filled with material. Parts of the working area can become danger areas, depending on the job that is being performed with the delivery line or machine filling.
The working area and the working environment around the machine must be cordoned off against unauthorised access by other personnel when work is carried out. If necessary, install warning plates and barricades.
The operator is responsible for safety in the working area when the machine is in use.

2.18 Conduct in emergencies

Switch off the machine at the EMERGENCY STOP button in an emergency situation.

Caution

In the event of malfunctions, stop the machine immediately and secure it. Have any faults rectified immediately.

2.19 Noise pollution

During the following operating modes at the machine:
- Starting up
- Operation
- Cleaning, Troubleshooting, Maintenance
- Decommissioning

there is a risk of noise pollution.

In the vicinity of the machine, a sound level of up to 85 dB(A) is possible.
Wear the specified ear defenders.

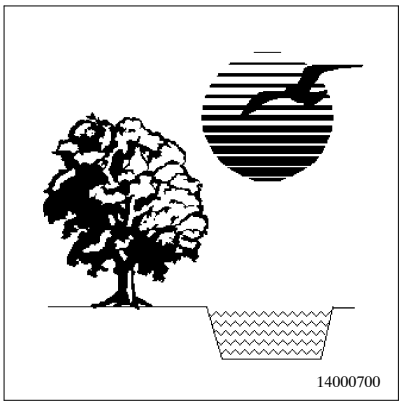
Wear your personal ear defenders.

Operator

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

2.20 Environmental protection

Have old operating materials such as oils, filters, batteries, replacement parts etc. disposed of in line with regulations. Used cleaning cloths must also be disposed of properly.



Environmental protection

2.21 Spare parts

Spare parts must comply with the technical requirements specified by the manufacturer. Spare parts from original equipment manufacturers guarantee this.

Use only original spare parts.
Putzmeister Mörtelmaschinen GmbH accepts no liability for damage caused as a result of using non-original spare parts.

2.22 Storing the machine

The machine should only be stored in a dry, clean and well ventilated area.

If there is a risk of freezing in the storage area, you must check the anti-freeze content of the cooling water once it has cooled off and, if necessary, top it up.

Caution

If there is inadequate frost-protection, the engine, cooler and/or lines can burst in frosty conditions.

For further details, refer to the chapter: “Decommissioning”.

2.23 Sound emissions

Sound emissions are generated during the following operating modes at the machine:
- Starting up
- Operation
- Cleaning, Troubleshooting, Maintenance
- Decommissioning

Refer to the technical data for the sound pressure level value in the vicinity of the machine.

We recommend wearing ear defenders for noises louder than 85 dB (A); the employer should provide personnel with ear defenders although this is not compulsory.
Wearing ear defenders for noises louder than 90 dB (A) is compulsory.

Wear your personal ear defenders.

Operator

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

All soundproofing equipment must be present and in perfect condition. This equipment must be set to protective position during operation. High sound levels can cause permanent hearing damage.

2.24 Place of work

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

Machine operator

The place of work of the machine operator during operation is at the operating panel on the machine.

High-pressure gun operator

The place of work of the high-pressure gun operator is within the danger zone of the high-pressure gun. Proceed with extreme caution here. The high-pressure gun operator and the machine operator must have visual contact.

Danger

Removed material may spray back and cause serious injury. Never work alone.
If an operator falls unconsciousness or suffers serious injuries, you are advised to call for help as you will not be able to secure the machine alone.

2.25 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 areas, depending on the job being performed.

The working area is also the area in which work is carried out with and on the high-pressure gun.

Any persons other than the operator of the high-pressure gun must keep a distance of at least 10 metres from operating area around the high-pressure gun while work is being performed.

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

2.26 Conduct in an emergency

Switch off the machine immediately in an emergency situation.

Refer also to chapter: ”Operation” - section: ”Emergency shutdown procedures” for further details

Caution

In the event of malfunctions, stop the machine immediately and secure it. Have any faults rectified immediately.

2.27 Accessories

Accessories must meet the requirements specified by Putzmeister Mörtelmaschinen GmbH and be compatible with one another. Using accessories from original equipment manufacturers guarantee this.

Notes

Accessories that are not included in the scope of supply delivered with the machine are supplied by Putzmeister and can be purchased through Parts Sales.

Please refer to the delivery note for a list of accessories supplied.

The operating company is responsible for ensuring that the correct accessories are used.
Putzmeister Mörtelmaschinen GmbH declines all responsibility and liability for damage caused as a result of using non-original accessories or using correct accessories inappropriately.

2.28 Storing the machine

The machine should be stored only in a dry, frost-free location.

If there is a danger of freezing at the storage location, take appropriate antifreeze protection measures.

For further details, refer also to chapter: ”Decommissioning”.

2.29 Injuries through unauthorised starting or use of the machine

During the following operating modes at the machine:
- Starting up
- Operation
- Cleaning, Troubleshooting, Maintenance
- Decommissioning

there is a risk due to unauthorised starting or use of the machine.

Always secure the machine against unauthorised starting before leaving the work area. This means:
- Switch off the pump drive and motor.
- Switch the main switch to OFF.
- Secure the control cabinet against opening with a lock.
- Close the hoods.

The operator must always have a clear view of the machine. If necessary, the operator will have to appoint a person to monitor the machine.
If unauthorised persons approach the machine, the operator must stop work immediately.

2.30 Safety-related parts (SRP)

Safety-related parts (SRP) are parts used to ensure the machine's functional safety.

Safety-related parts are parts that
- are used to ensure safety functions and
- which, if they fail or are missing, endanger personal safety.

Unauthorised interference with safety-related parts (SRP), adjustable equipment, machine data or removal of seals by the operator or the operator's authorised maintenance and repair staff is prohibited. The manufacturer accepts no liability for damages caused by unauthorised interference.

Danger

Increased risk of injuries (including fatal injuries) resulting from the absence and/or malfunction of safety functions.
Safety-related parts (SRP) much only be maintained, repaired and replaced by authorised Putzmeister specialists.
If a safety-related part (SRP) is incorrectly maintained, repaired or replaced, this can result in safety functions not operating correctly.

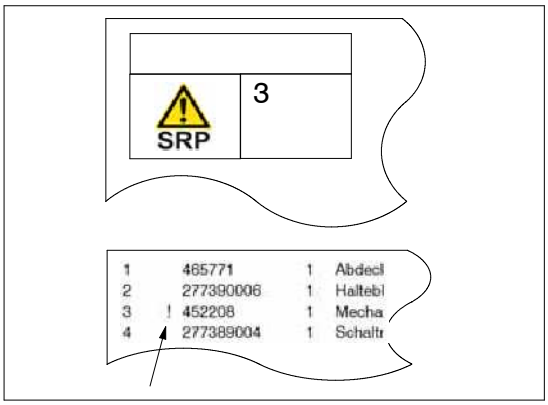
2.31 Spare parts

Spare parts must comply with the technical requirements specified by the manufacturer. Spare parts from original equipment manufacturers guarantee this.

Use only original spare parts. Putzmeister Mörtelmaschinen GmbH accepts no liability for damage caused as a result of using non-original spare parts.

Labelling of safety-related parts in the spare parts sheets

Safety-related parts (SRP) are specially labelled on the spare parts sheets.

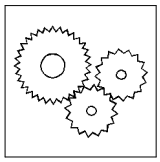


Labelling of SRP in spare parts sheets

Spare delivery of safety-related parts

If you order a safety-related part (SRP), it is delivered in its own separate, labelled package.

Labelling of SRP as spare parts



3 General Technical Description

This chapter describes the components and assemblies on this machine and describes how they function. Please note that available options are also described.

3.1 Machine versions

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

The following data can be found on the rating plate:
- Machine model
- Machine number

Notes

The machine number is allocated by Putzmeister Mörtelmaschinen GmbH. Each machine number is only allocated once. This means that the machine number identifies each individual machine.

3.2 Machine designation

Your machine is an SP11 auger pump from Putzmeister Mörtelmaschinen GmbH.

3.3 Machine model

The machine model designation is printed on the cover sheet of the operating instructions and on the rating plate of your machine.

Machine model	Models with
SP11 LMR	Lifting mixer

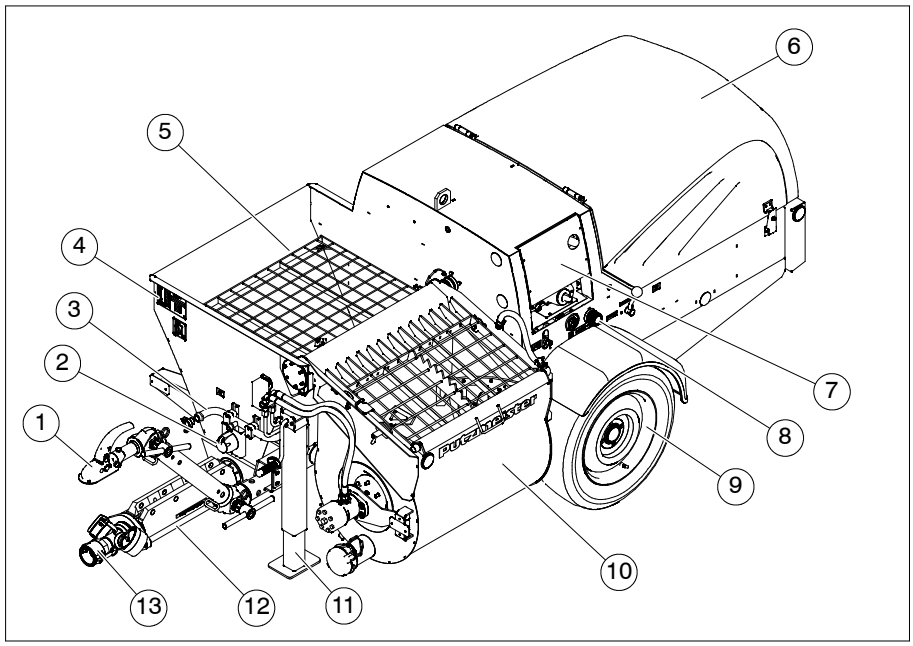
3.4 Machine number

The machine number is located on the rating plate and stamped and marked in red on the front right of the machine viewed in the direction of travel.

3.5 Summary

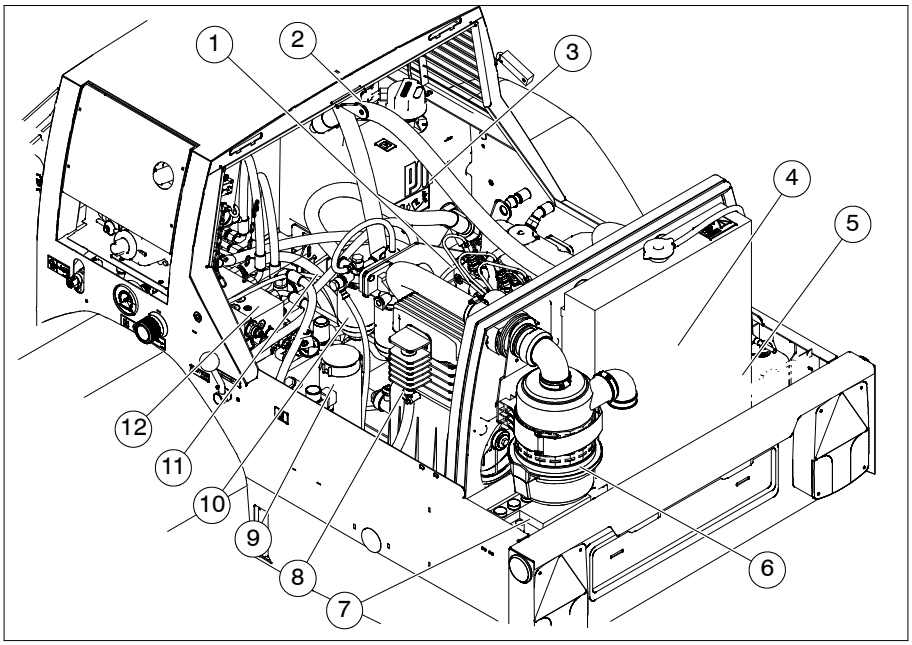
Below you will find a summary of the most important components, which are described on the following pages.

Machine



Item	Designation
1	Towing gear
2	Socket
3	Air valve fitting
4	Rating plate
5	Hopper
6	Hood
7	Control cabinet
8	Operating elements
9	Axle and wheels
10	Lifting mixer unit
11	Support foot
12	Auger pump
13	Pressure connection

Engine compartment



Item	Designation
1	Engine
2	Return line suction filter
3	Hydraulic fluid reservoir
4	Radiator
5	Expansion tank for coolant
6	Dry air filter
7	Battery
8	Compressor
9	Fuel tank filler neck
10	Fuel filter
11	Hydraulic pump
12	Hydraulic control block

3.6 Technical data

The following technical data and characteristics relate to the SP11.

	SP 11 LMR
Dimensions	
Length:	3480 mm
Width:	1420 mm
Height:	1162 mm
Fill height:	750 mm
Weight	
Permitted gross weight:	750 kg
Permitted drawbar load:	max. 75 kg
Chassis	
Permitted driving speed:	In accordance with regulations in the country of use.

Caution

Observe the maximum speed regulations in force in the country of use.

	SP 11 LMR
Tyres	
Tyre size:	165 SR 13
Rim size:	4 1/2JX13H2 ET 30
Inflation pressure:	2.4 bar
Tightening torque of wheel nuts:	90 Nm

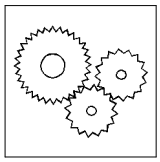
Danger

When assembling the wheels, retighten the wheels to 90 Nm after driving 50 km.

	SP 11 LMR
Performance data	
Engine:	3-cylinder diesel engine 16.3 kW at 2600 rpm
Compressor:	2 cylinders; 3.5 bar; 400 $^{l}/_{min.}$
Auger pump: (depending on model)	2 L 6
Delivery rate:	0 - 55 $^{l}/_{min.}$
Delivery pressure:	25 bar
Max. delivery pressure:	40 bar
Max. hydraulic pressure	210 bar
Delivery distance:	120 m distance, 60 m high
Max. grain size of conveyed medium:	6 mm
Control voltage:	12 V
Temperature range:	-5 °C to +45 °C
Installation height (without reduction in performance):	up to 1000 m above sea level

Notes

The delivery rate specifications are only guide values!
The maximum delivery rate and the maximum delivery pressure cannot be reached simultaneously.
The actual rates depend on the properties and consistency of the material being delivered.



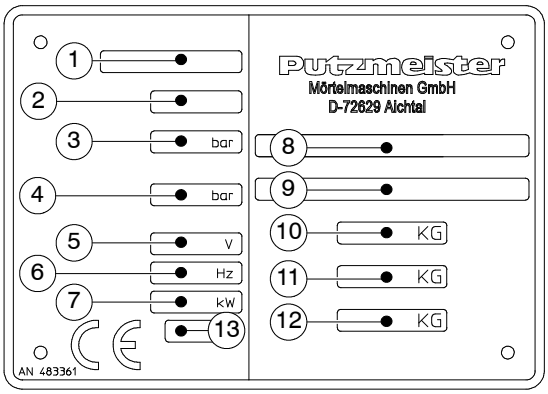
	SP 11 LMR
Fluid capacities	
Engine oil:	Engine oil volume 5.3 l with filter change Refer also to the documentation provided by the engine manufacturer.
Fuel:	Diesel fuel capacity approx. 25 l
Compressor oil:	Compressor fluid volume approx. 1.0 l
Hydraulic fluid reservoir:	Capacity approx. 14 l
Coolant tank:	Coolant capacity approx. 0.5 l

Caution

The capacities are only approximate values and may vary depending on the model and quantity of oil remaining.
The upper marking on the oil dipstick always takes precedence.

3.7 Rating plate

The most important machine data is shown on the rating plate.

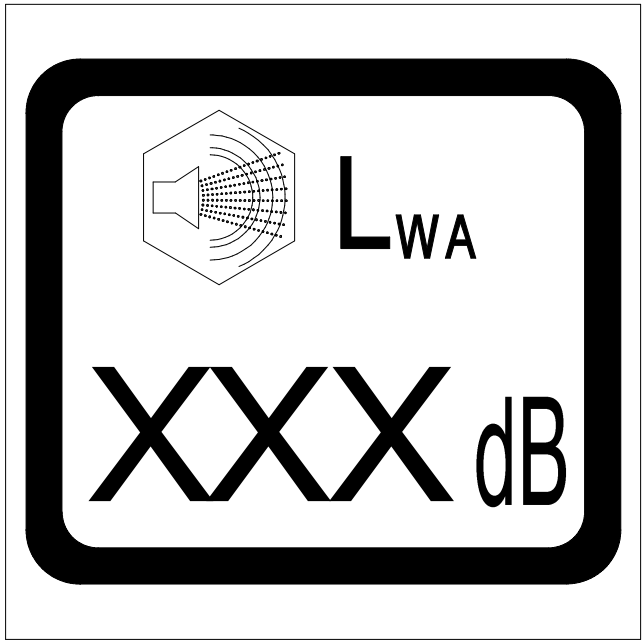


Item	Designation
1	Model (machine model)
2	Year of manufacture
3	Maximum delivery pressure [bar]
4	Hydraulic pressure [bar] (maximum fluid pressure in the hydraulic system)
5	Voltage [V]
6	Frequency [Hz]
7	Power [kW]
8	Licence number
9	Chassis number no.
10	Permitted gross weight [kg]
11	Permitted axle load [kg]
12	Maximum permitted drawbar load [kg]
13	Identification number for certification and monitoring office

3.8 Sound power level

In accordance with Directive 2000/14/EC the sound power level emitted by the machine is given below.

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.



Item	Designation
L_{WA}	Sound power level
dB	Decibel value

3.9 Safety equipment

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

Danger

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

EMERGENCY STOP button

The control cabinet of the machine accommodates an EMERGENCY STOP button.

Danger

Should situations arise during operation which may endanger the operator, third parties or the machine, the machine must be stopped immediately by pressing the EMERGENCY STOP button. After an EMERGENCY STOP, eliminate the danger before restarting the machine.

Caution

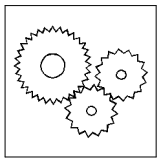
Familiarise yourself with the position of the EMERGENCY STOP buttons on your machine.

Pressing the EMERGENCY STOP button triggers the following activities:

- The machine stops immediately.
- The compressor is switched off.
- The drive motor is switched off.
- The drive motor is switched off.
- The mixing mechanism stops.
- The hydraulic system is deactivated (if fitted).

Notes

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



Hood safety device

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

Notes

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

Protective grilles

Protective grilles are fitted to the machine.
The mesh size is such that material can fall unobstructed into the drum, yet guarantees protection for the operator.

Danger

The protective grille must be installed in every operating mode and after every repair.
The machine may be operated only with the protective grille closed.

The grille on the machine is protected by a safety switch that switches off the mixer shaft automatically when the mixer grille is opened.

Safety switch

The safety device on the protective grille is fitted with a safety switch that shuts down the mixing mechanism when the protective grille is raised.

Danger

The protective grille must be installed in every operating mode and after every repair.
The machine may be operated only with the protective grille closed.

3.10 Functional description

The following chapter is intended to help you understand the functions of the machine so that you can limit the field of the machine's applications to suitable areas and avoid errors in operation.

General set-up of the machine

Putzmeister machines are easy to assemble and operate. In spite of this, certain precautionary measures must be taken when operating the machine to ensure that the wear parts have as high a life limit as possible.

The SP11 mortar spray pump is designed to process premixed dry mortar and site mixes. It mixes, pumps and sprays continuously.

Dry mortar, water and concrete admixtures are mixed in the mixer and poured into the hopper. The mixed material is conveyed from the hopper by an auger pump.
A spray gun can be attached to the end of the delivery hose. Air is introduced from the compressor and the mortar applied at the desired coat thickness.

3.11 Control cabinet

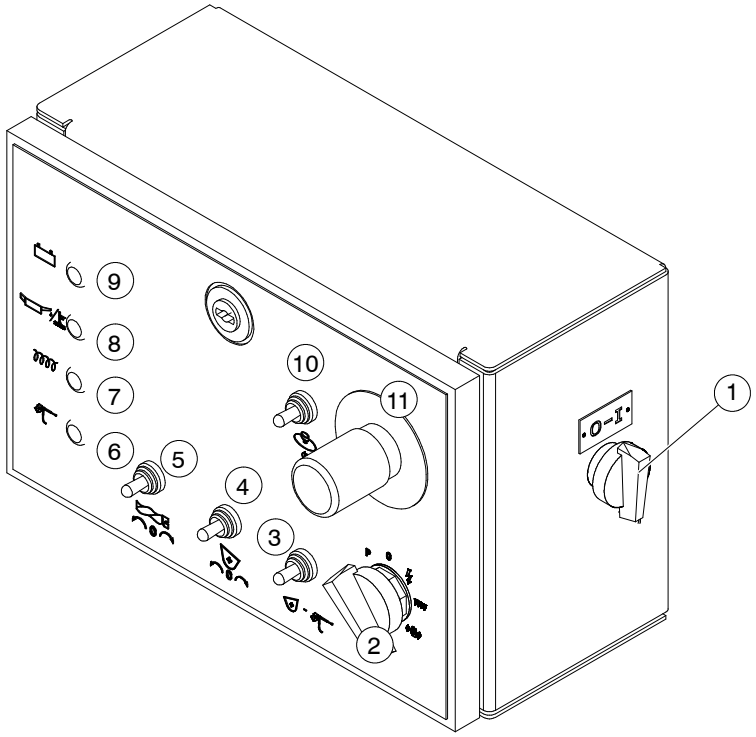
The machine is operated and controlled from the control cabinet.

Heavy current

Work on the machine's electrical system and equipment may only be carried out by a qualified electrician or by instructed persons under the supervision and guidance of a qualified electrician in accordance with electrotechnical rules and regulations.

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

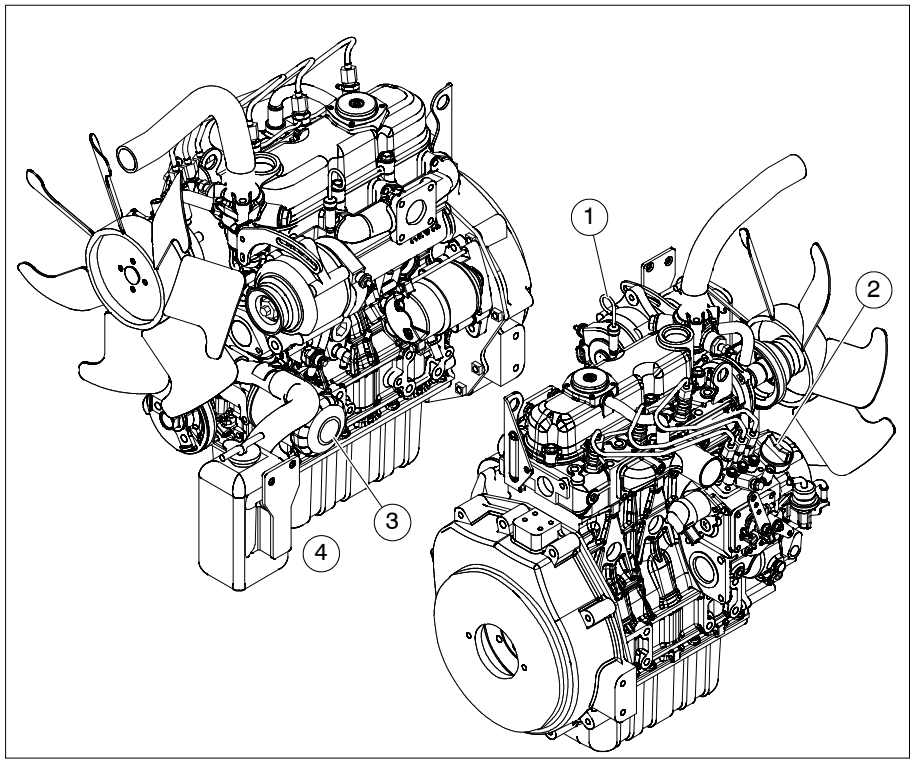
Only use original fuses with the specified amperage! Fitting over-rated fuses or bypassing fuses may destroy the electrical system.



Item	Operating / control elements	Function / display
1	Master switch (under hood)	Power supply OFF / ON
2	Ignition switch	Starts the engine
3	Rocker switch	High-pressure cleaner ON / OFF
4	Toggle switch	Mixer unit BACKWARDS – 0 – FORWARDS
5	Toggle switch	Auger pump BACKWARDS – 0 – FORWARDS
6	Indicator lamp	High-pressure cleaner (optional) ready
7	Indicator lamp	Preheat
8	Indicator lamp	Engine oil pressure
9	Indicator lamp	Charge monitor
10	Rocker switch	Acknowledge engine start Acknowledge after EMERGENCY STOP
11	EMERGENCY STOP button	Switch off the machine in an emergency (mixer unit, high-pressure cleaner and auger pump come to a halt)

3.12 Engine

The machine is powered by a 3-cylinder diesel engine.



Different models available

Item	Designation
1	Oil dipstick
2	Oil filler
3	Engine oil filter
4	Oil drain plug (obscured)

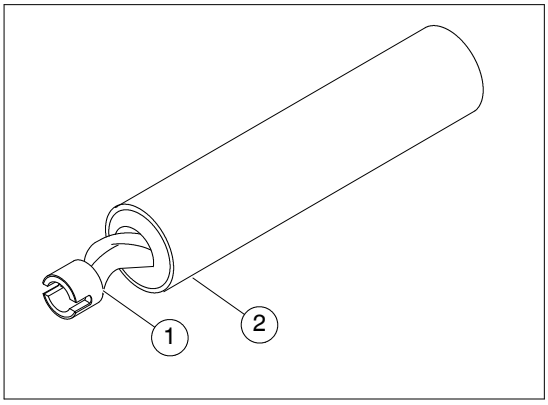
The engine has different performance data, depending on the model. Please refer to the rating plate or “Technical data” section of the chapter “General Technical Description” for information on machine values.

Notes

For further information on the engine, refer also to the documentation provided by the engine manufacturer.

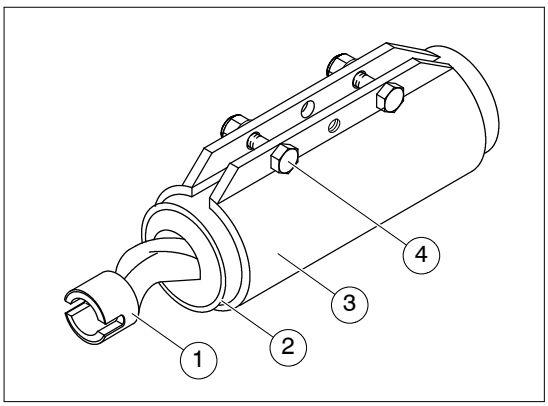
3.13 Auger pump

The auger pump built into the machine is called a displacement pump. An auger (rotor) rotates inside a fixed auger barrel (stator). The auger consists of a highly wear-resistant, very hard metal alloy and the auger barrel of a multi-notched steel sleeve with vulcanised elastic rubber core.

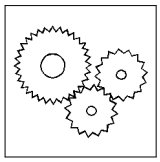


Item	Designation
1	Auger
2	Auger barrel

The auger pump may be fitted with a clamping sheath for tightening, depending on the model.



Item	Designation
1	Auger
2	Auger barrel
3	Clamping sheath
4	Tensioning screws



3.14 Hydraulic control

The machine is equipped with a hydraulic constant-displacement pump.

The hydraulic fluid supply is sufficient to power several functions simultaneously.

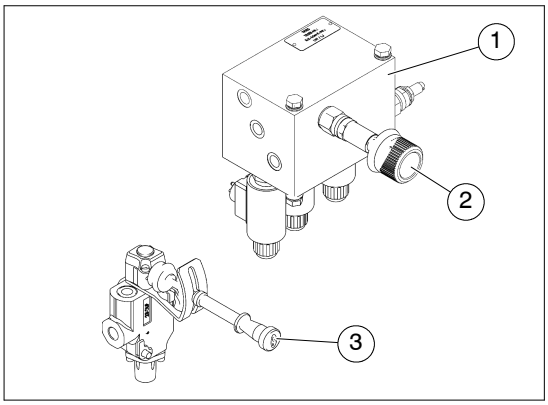
The variable output auger pump, the mixing mechanism, the mixer lifting device (depending on model) and the high-pressure cleaner (optional) are driven via 2 separate hydraulic circuits, depending on the model of the machine.

Hydraulic control block SP11

The SP11 has an electromagnetic hydraulic control block with valves for the auger pump and the mixer. Output can be regulated using the output controller under the control cabinet.

Notes

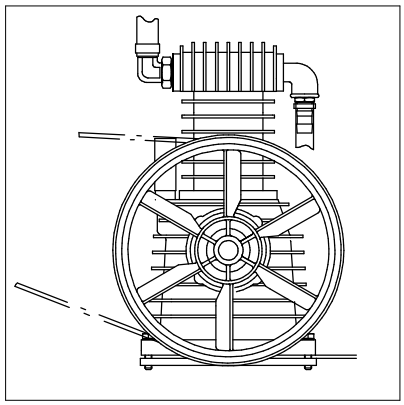
Reducing the output with the output controller will not reduce the engine's power.
The engine output can only be reduced by modifying the consistence and quality of the material or by fitting an auger pump with output volumes.



Item	Designation
1	Hydraulic control block
2	Rotary output regulator switch
3	Control lever for the lifting mixer unit

3.15 Compressor

A 2-cylinder compressor has been integrated into the SP11 to generate the air required to spray the mortar. This is driven by V-belts from the diesel engine.



2-cylinder compressor

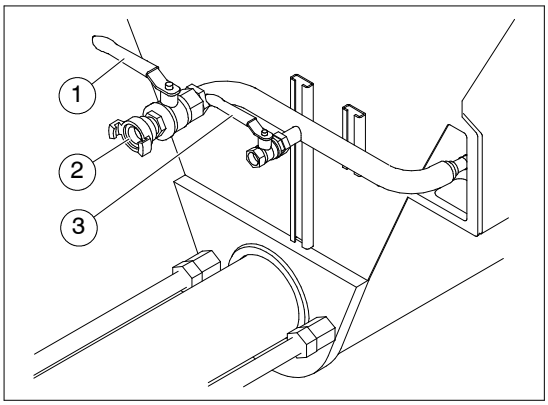
The air generated is transported through the air battery and an air hose to the spray gun. The spray air is also used to control the mortar pump pneumatically.

Caution

Check the oil level on the inspection glass of the compressor daily. Do not overfill the compressor with oil. Place horizontally when filling.

3.16 Air valve fitting

The air valve fitting is located on the front of the machine, viewed in the direction of travel.

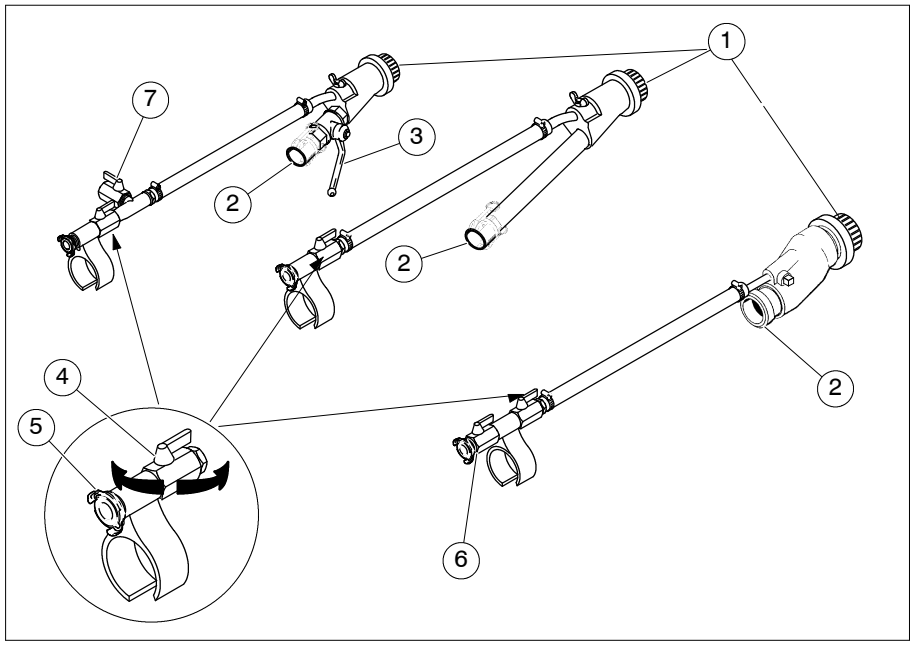


Item	Designation
1	Valve for spray air
2	Air hose connector
3	Air valve for controlling the pump

Air is channelled from the compressor into the air valve fitting for spray gun operation. This fitting comprises two air valves and an air hose connector.
A spray gun is fitted to the end of the hose and a coat of mortar applied with the desired thickness.

3.17 Spray gun

The spray gun can be attached to the end of the delivery line.



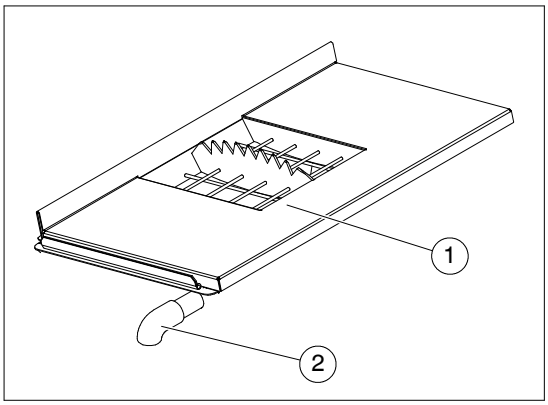
Different models available

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

If your machine is not fitted with these components, consult your dealer or local Putzmeister Mörtelmaschinen GmbH representative as to how and whether you should upgrade your machine.

3.18 Dust extraction (option)

As an option, the machine can be fitted with a dust extraction system.



Item	Designation
1	Mixer cover
2	Dust extraction

Dust is extracted above the filling opening on the mixer.

Caution

Only regular cleaning will guarantee that the dust extraction system functions correctly.
Observe the maintenance intervals.

▶ Clean the mixer cover on a daily basis.

Maintenance chart: *Cleaning the dust extractor*

3.19 High-pressure cleaner (option)

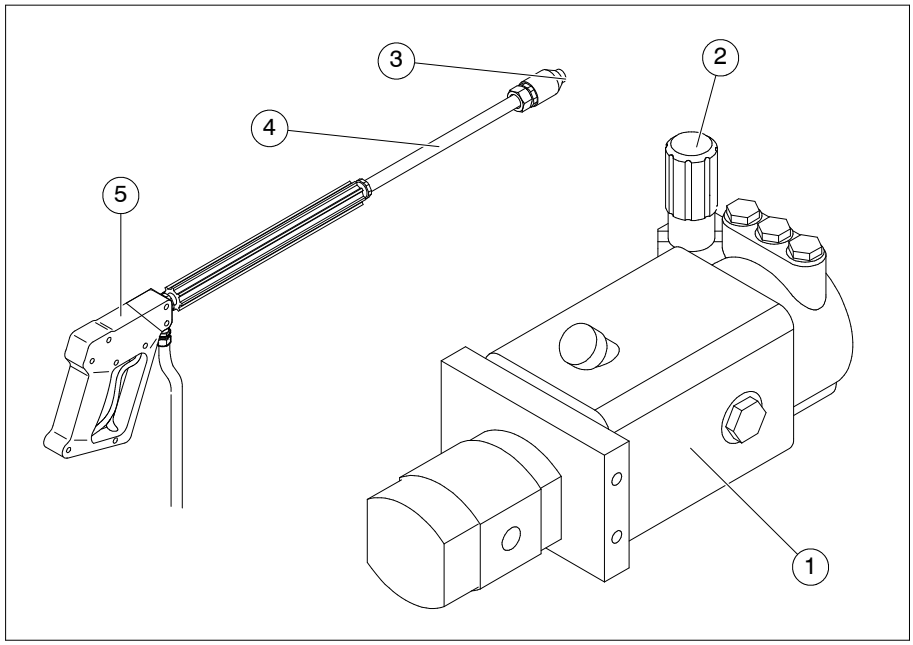
A hydraulically driven high-pressure cleaner can be installed as an option.
The high-pressure cleaner is used to clean the outside of the machine with pressurised water.

Caution

The high-pressure cleaner must never be operated without water.
Make sure that the water inlet is connected correctly.

Notes

The high-pressure cleaner is not a suction pump.
It must be connected to the mains water supply.
The available water pressure must be at least 0.5 bar.



Different models available

Item	Designation
1	High-pressure cleaner
2	Handwheel
3	Fan jet nozzle
4	Nozzle
5	High-pressure gun

Continuation next side

Wear all the necessary personal protective equipment during operation. Refer also to chapter: ”Safety regulations” – section: ”Protective equipment”.

Danger

Waterproof protective equipment only provides protection from spray water and splash particles. In the case of direct contact with the high-pressure water jet, protective clothing does not provide sufficient protection from injury.

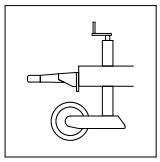
The control range of the high-pressure cleaner is from 5 to 140 bar and depends on the number of engine revolutions. The pressure can be regulated by turning the handwheel.

There is a trigger safety device on the high-pressure gun trigger that prevents the high-pressure gun from triggering accidentally. and prevent personnel from actuating the gun trigger by mistake.
The red securing lever is folded in and locked.

Caution

The machine and lines must be drained fully of residual water if there is a risk of freezing.
Only operate and store the machine in a frost-free location.

Maintenance chart: *High-pressure cleaner anti-freeze protection*



4 Transport, Set-up and Connection

In this chapter you will find information concerning safe transport of the machine. In addition this chapter describes operations that remain to be carried out to assemble and connect the machine. Starting up the machine will not be described until the chapter ”Starting up”.

4.1 Transport and driving

Putzmeister trailer machines may only use public roads if properly approved. They are subject to Road Traffic laws when being towed in road traffic. This also stipulates the maximum permissible road speed for trailer machines in Germany.

They must not be used for the transport of goods. The regulations governing the operation of trailers, in particular the permissible trailer loading of the tractor unit, must be observed.
Make sure that the trailer equipment, brakes and lighting equipment are functioning correctly before starting a journey.

The machines are certified for roadworthiness in Germany. You will receive operating permission on delivery; this must be carried with the machine during transport at all times.

You may have to obtain an additional licence depending on the country of use and the relevant regulations. The registration regulations applicable in the country of use shall always apply.

The trailer-mounted machine in Germany must display its own official registration and is thus subject to the two-yearly roadworthiness test according to § 29 StVZO. The registration can be obtained on production of the operating permission at the licensing office responsible.

4.2 Transporting the machine

If you wish to load the machine onto a suitable transport vehicle, jack rings must be fitted on the machine.
Use the slinging points provided on the machine when loading it by crane. Only in this way can you be sure that the machine is suspended horizontally and securely in the hook and will not be able to tip over.

Danger of crushing

When lifting with the crane, determine the centre of gravity of the machine by lifting carefully. All cables or chains on the lifting gear must be tensioned evenly and the machine must be raised evenly at all support points.

Suspended Load

Make sure personnel do not walk under suspended loads.
Only use an auxiliary loading device with a loadbearing capacity designed to support the gross weight of the machine!

Danger

The machine may only be loaded by crane if it is attached by the lifting eyes designed for this purpose. Lifting equipment, lifting tackle, support trestles and other auxiliary equipment must be reliable and safe in operation. Make sure that the load-bearing capacity is sufficient.

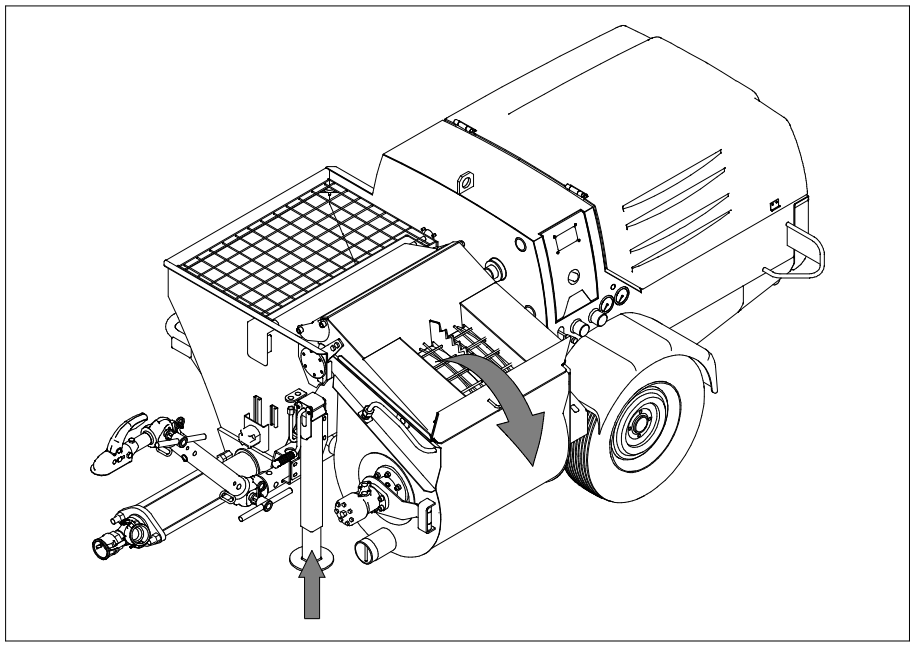
Additional loads on the machine are not permitted. Observe the maximum gross weight on the rating plate.

The machine must be properly secured on the transport vehicle to prevent it rolling away, slipping or tipping over.

4.3 Machine transport position

Set the machine to transport position before towing on the open road.

Machine lifting mixer unit



Lifting mixer unit in transport position

Check that the machine is in transport position:
- The lifting mixer unit is lowered.
- The mixer cover is closed and secure.
- The hood is closed properly and secure.
- All protective grilles are closed.
- The towing gear is at the same height as the trailer coupling on the towing vehicle (truck = high, car = low).
- The supporting foot is wound up after the trailer is attached.

4.4 Before a journey

The following points must be observed before the machine can be moved by a tractor unit on the open road:

- The towing gear is fully functional.
- The machine is in transport position.
- The hood must be tightly closed.
- The lighting equipment is fully functional and well secured.
- The machine is correctly coupled.

Notes

Observe the permitted towed load for the tractor unit.

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

Ground clearance

The machine must have the maximum possible ground clearance while it is being towed. It must be ensured that the machine is horizontal when it is attached ready for towing.

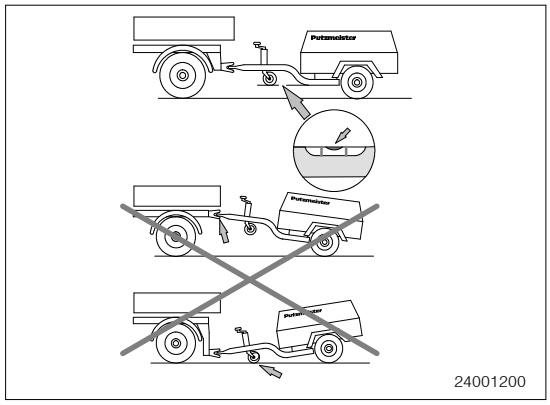
Caution

The machine must be kept horizontal when being towed by the tractor unit.

Towing gear

The tractor unit must be equipped with a trailer coupling complying with DIN specifications. The adjustable drawbar must be set up in such a way that the trailer coupling ring may be inserted horizontally into the trailer coupling.

- ▶ Place the drawbar at the same height as the tractor unit's trailer coupling before attaching the machine to the tractor unit (truck = high, car = low).



Attach the machine horizontally

Caution

Special high-strength bolts are used for the drawbar bracket connection. These may only be replaced with original spare parts. (tightening torque = 110 Nm +15 Nm)

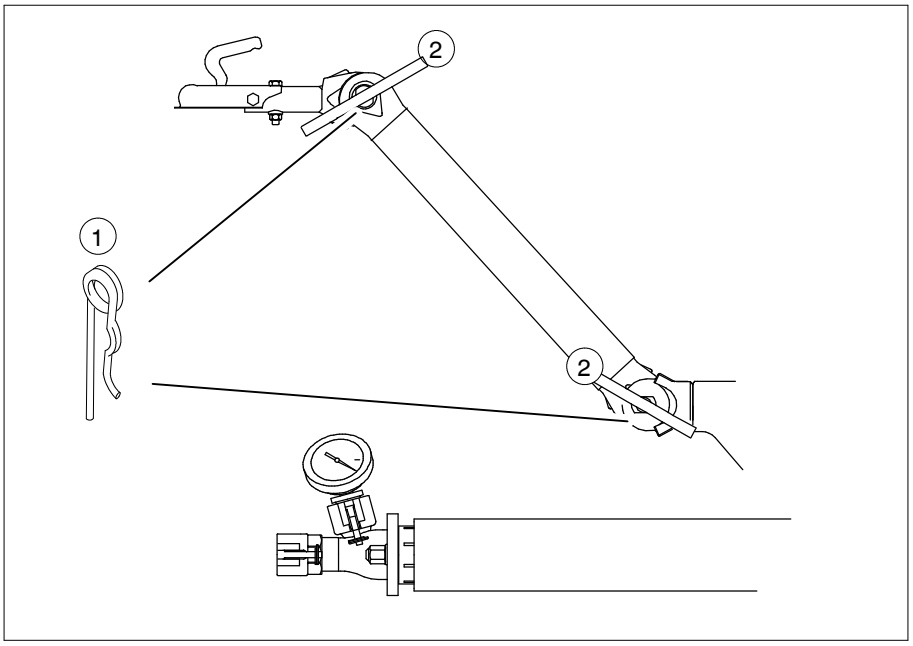
Transport position

Before transportation, the machine must be placed in transport position:

- ▶ Please ensure that the towing gear is functioning correctly.
- ▶ Observe the permitted towed load for the tractor unit.
- ▶ Additional loads on the machine are not permitted. Observe the maximum gross weight on the rating plate.
- ▶ The mixer must be in transport position before the machine is transported.
- ▶ Please ensure that the lighting equipment is functioning correctly and is secure.

Adjusting the towing gear

To adjust the towing gear, proceed as follows:



Symbolic illustration

Item	Designation
1	Spring pin
2	Locking toggle

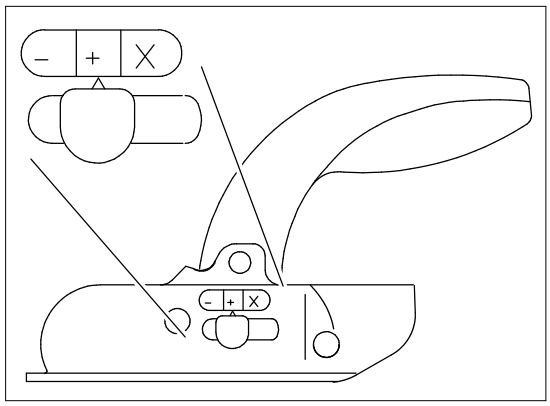
- ▶ Pull the spring pin(1) from the locking toggle(2).
- ▶ Release the locking toggle and turn it as far as the stop.
  ⇒ The intermediate element can now be adjusted upwards and downwards to the stops.
- ▶ Tighten the locking toggle again and secure it by striking once with a hammer (hard rubber mallet).
- ▶ Insert the spring pin again firmly to secure.
- ▶ Retighten the locking toggle after approx. 50 km.

Ball hitch

The ball hitch is equipped with a safety control display. This consists of clearly imprinted symbols, which are pasted over with a red-green-red label with the same symbols, and a pointer.

Coupling the ball hitch

To couple, place the opened ball hitch (X-position) on the ball of the tractor unit until it clearly audibly engages.



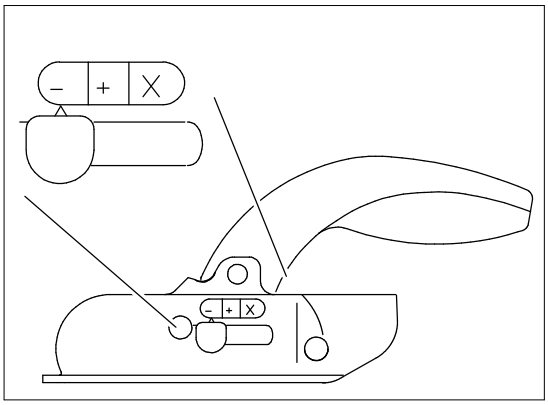
After correct engagement of the ball hitch, the pointer jumps to the green area of the marking, which is identified by a "+" sign.

After connection, you absolutely must use the indicator to check whether the ball hitch is correctly closed and locked, and the ball on the towing vehicle still shows sufficient signs of wear reserves.

Notes

Only in this manner can a secure connection be set up between your tractor unit and the trailer/combination be made roadworthy.

Continuation next side



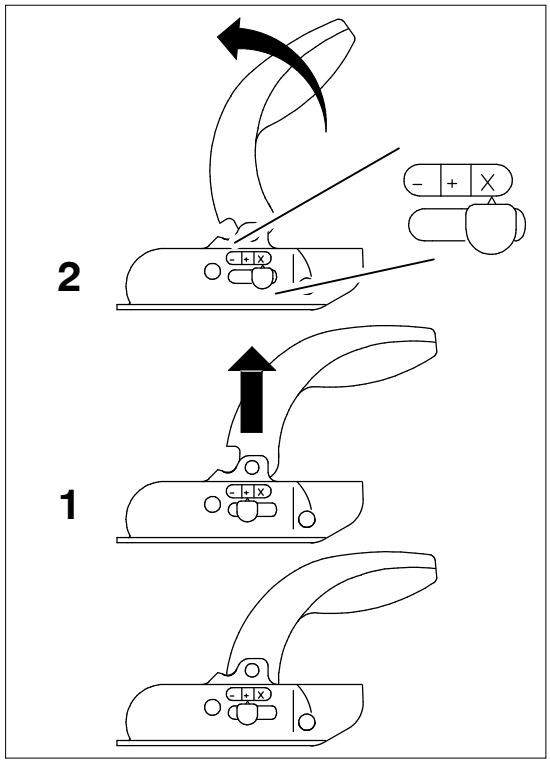
Caution

If the indicator is in the red "-" area, then the ball hitch is not properly closed and the trailer must under no circumstances be driven.

For further details, refer to the chapter: "Faults, Cause and Remedy" - Section: "Chassis".

Disconnecting the ball hitch

To disconnect the trailer, proceed as follows.



▶ Open hitch handle, pull up and then swivel forwards.
⇒ The ball hitch stays in the “open” position, in which the indicator points at the red area with the large “X”.

Danger

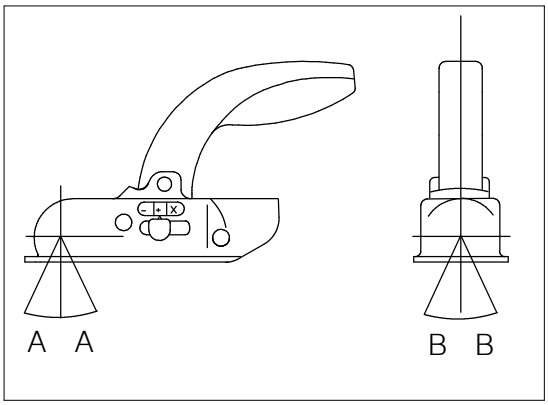
The trailer must never be driven in this condition.

Danger of crushing

Never reach into the opened ball hitch.
Even low pressure on the spherical cap can activate the spring-loaded closing mechanism and cause an injury.

Permitted slewing circle of the ball hitch

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



A slewing circle 20°

B slewing circle 25°

Caution

If the slewing circles are exceeded, the components are overloaded and operation of the ball hitch is no longer guaranteed.

Permitted drawbar load

The permitted drawbar load is imprinted in the handle of the ball hitch.

Danger

Never drive with a negative drawbar load because this impairs the driving stability of the trailer.

A negative drawbar load can result from residual material in the machine or loading with additional weight.

Caution

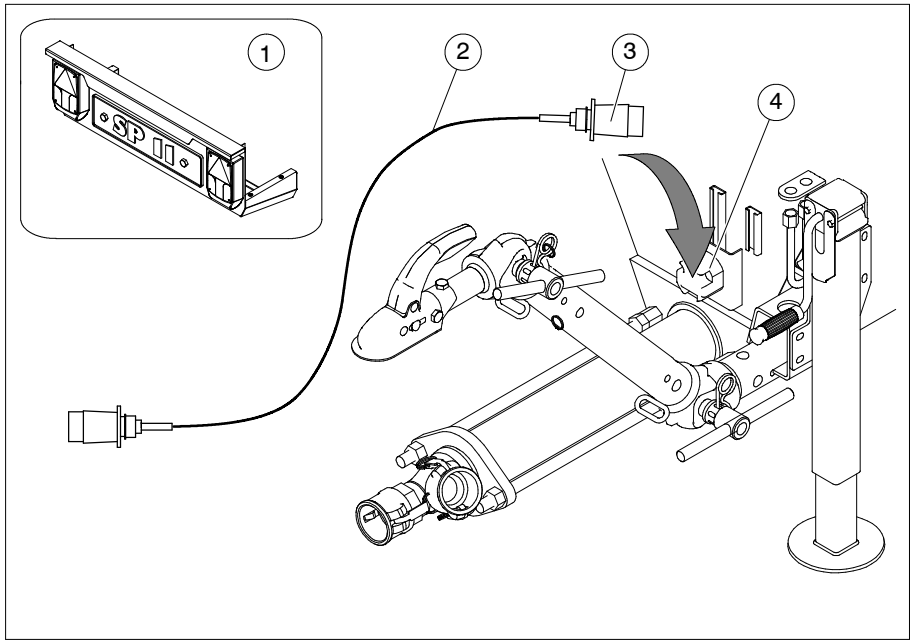
Loading the trailer with additional weight is not permitted!

4.5 Lighting equipment

The machine is fitted with lighting equipment.

Notes

The lighting equipment is designed to run off 12 V as standard.



Item	Designation
1	Lighting equipment
2	Power cable
3	Connector
4	Socket

The vehicle registration plate is also located next to the lighting at the lighting equipment(1). Plug the connector(3) on the power cable(2) into the socket(4) on the machine and towing vehicle. In addition the function of the lighting must be guaranteed prior to commencing each journey.

Caution

Please ensure that the lighting equipment is functioning correctly and is secured before every journey.

4.6 Selecting the set-up site

The set-up site of the machine is usually determined and appropriately prepared by the site management.

Notes

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

4.7 Set-up site requirements

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

The set-up site must:
- be horizontal,
- have level, firm supporting ground,
- be large enough to allow you to open all flaps and hoods unhindered. You should therefore leave a clearance of at least 1 metre around the entire machine,
- such that the machine is accessible from all sides for servicing and repairs.

Caution

The machine be situated outside the danger zone of elevated worksites, or protective roofing must be provided for the machine at its operating sites.

Supporting ground

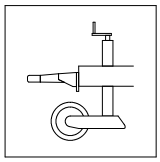
The support ground must be firm enough to absorb the forces passed on from the machine into the ground. There must be no hollow spaces or ground unevenness under the machine.

If the machine is to remain at a set-up site for a long period, it is advisable to select a site with a concrete base.

In the case of machines which operate with at high pressure and high delivery rate, it is advisable to anchor the machines to the ground.

Lighting

Ensure that there is adequate lighting at the set-up site.



4.8 Setting up

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

- ▶ Secure the machine against rolling by placing chocks under the wheels.
- ▶ Apply the handbrake on machines with brake equipment.
- ▶ Align the machine horizontally. Observe the permitted inclination angles.

On machines with detachable lighting equipment, fit this equipment to the bracket provided before operating the machine.

Inclination angles

Observe the maximum inclination angles during machine set-up and operation.

Refer also to chapter: "General Technical Description" - section: "Technical data" for the maximum permitted inclination angles.

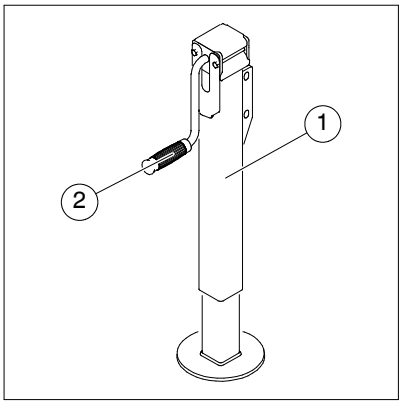
Danger

Lubrication is no longer guaranteed at excessive inclination angles. These conditions will lead to increased wear or machine damage.

Do not operate the machine at inclination angles greater than those specified!

Aligning the machine

Align the machine horizontally.

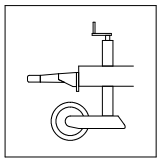


Item	Designation
1	Support foot
2	Crank

▶ Wind down the support foot (1) using the crank (2) until the machine is horizontal.

Caution

Wind the support foot back to its transport position before transporting the machine.



4.9 Water connections

The following section describes how to connect the machine to the water supply.

The water supply may only be connected as per DIN 1988 – Technical Rules for Water Installations, i.e. using installation type 1 backflow preventers or an independent outlet (buffer tank with a booster pump).

Please ensure that you check preconditions for connection to the water supply before beginning connection work.
- The pipe must be at least 3/4” in diameter.
- The available water pressure must be at least 0.5 bar.

Water pipes must be laid visibly, taking local conditions into consideration, and protected against damage. They must not be allowed to obstruct operating personnel.

Caution

The water used must be clean and of drinking water quality.
Never use: salt water, sea water, completely desalted water or water with added chemicals.

If there is a risk of freezing, the pipes must be laid so as to exclude the possibility of the water freezing.

▶ Attach the water hose to the water connection.

5 Starting up

In this chapter you will find information on starting up the machine. The work steps for initial operation of the machine are described as well as how to prepare the machine for operation after a long break. 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.

Notes

The operating personnel should be trained on the machine during initial operation.

Every time the machine is in operation, the operator accepts full responsibility for the safety of anyone located in the machine's danger zone. He is therefore obliged to ensure absolute operating safety of the machine.

The operator must familiarise himself with the machine during machine handover.
This means:
- He must have read and understood the Operating Instructions (especially the chapter on Safety Regulations).
- He must be in a position to carry out the correct measures in case of emergency and switch off and secure the machine.

The entire system must be observed during the initial hours of operation to identify possible malfunctions.

5.1 Checks

Each time the machine is used, you should check the condition of your 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.

Visual checks

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

- ▶ Always check the machine thoroughly for apparent defects before starting work.
- ▶ Open up the hood to do this.
- ▶ Move the safety lock which may be attached to the securing bracket.
- ▶ Check the fill levels of the operating materials.
- ▶ Check that all closures are tightly sealed.
- ▶ Inspect the main wear parts such as mixing unit, outlet connections, couplings etc.
- ▶ Check that all lubrication points are lubricated as described in the lubrication diagram.

Maintenance chart: *Lubrication diagram*

- ▶ Check whether the machine has been correctly erected.

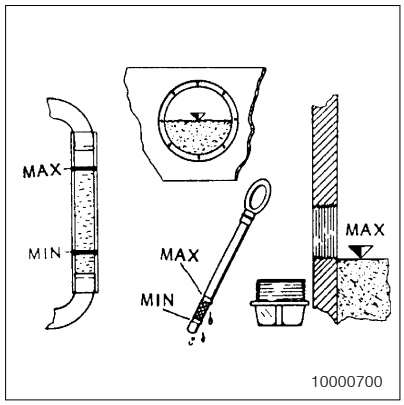
For further details, refer also to chapter: “Transport, Set-up and Connection”.

- ▶ Check the delivery line for damage.
- ▶ Check that all safety equipment is fitted and fully functional.
- ▶ Observe the warning and information signs on the machine.

Notes

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

Operating materials



Water, oil and fuel levels

Danger

Oils and other operating materials can pose a threat to health if they come into contact with the skin or similar.
You must, therefore, always wear personal protective clothing and equipment when you are handling toxic, caustic or other operating materials that are injurious to health and always take note of the manufacturer's information.

Notes

The machine must be level when you check the operating materials.

▶ Check all water, oil and fuel levels and top these up as necessary.

For fluid capacities, refer also to chapter: "General Technical Description" – section: "Technical data".

Caution

After checking and topping up (if necessary), all filler lids must again be sealed tightly.

Fuel level

The fuel level must be as close as possible to the “Max” marking.

- ▶ Check the fuel level at the viewing window in the frame on the left of the machine exterior.
- ▶ Top up the fuel if necessary.

For further details, refer also to the chapter: “Starting up” – section “Filling the machine with fuel”.

Engine oil level

Check the engine oil level of the engine as follows:

- ▶ Withdraw the oil dipstick from the engine, wipe the dipstick with a lint-free cloth and insert it again.
- ▶ Pull the oil dipstick out again for a further check. You can read off the engine oil level at the dipstick marking.
- ▶ Top up the engine oil if necessary.

Notes

The engine oil level is correct when it reaches the upper oil dipstick marking.
Refer also to the documentation provided by the engine manufacturer.

- ▶ Insert the oil dipstick again.

Compressor oil level

You can check the compressor oil level at the level indicator on the compressor.

- ▶ Check the compressor oil level at the level indicator on the compressor.
- ▶ Top up the compressor oil if necessary.

Notes

Do not top up the beyond the "Max" marking. Too much oil causes an increased oil consumption.

Hydraulic fluid level

You can check the hydraulic fluid level at the hydraulic fluid reservoir.

- ▶ Check the hydraulic fluid level at the hydraulic fluid reservoir.
- ▶ Note the Min. and Max. markings on the hydraulic fluid reservoir
- ▶ Top up the hydraulic fluid if necessary.

For fluid capacities, refer also to chapter: "General Technical Description" – section: "Technical data".

Caution

The capacities are only approximate values and may vary depending on the model and quantity of oil remaining.
The upper mark on the fill level indicator is always decisive.

For types and grade of hydraulic fluid, refer also to chapter: "Maintenance" – section: "Operating materials".

Coolant level

Check the coolant level at the expansion tank on the cooling system as follows:

Notes

The coolant level must be as close as possible to the "Max" marking.

▶ Top up the coolant if necessary.

Checking cooling fins on the radiator

The air side of the radiator can become clogged if the unit is operating in dusty conditions.

▶ Check the cooling fins on the radiator for contamination.
The cooling fins on the radiator must be cleaned if they are contaminated.

Maintenance chart: *Cleaning the cooling fins on the radiator*

5.2 Refuelling the machine

Before starting up, check that there is sufficient fuel in the tank and, if necessary, top up with fuel via the filler neck. The machine can be filled with fuel via the filler neck when it has been shut down.

Notes

Always fill the tank in good time because otherwise you will have to vent the fuel line to the diesel engine.
Use summer or winter diesel fuel depending on outside temperature!

Caution

Fill the fuel tank only with fuels available from regular commercial outlets - otherwise the drive motor could be damaged.

When filling with fuel, pay particular attention to cleanness!

Danger

Fill the machine with fuel only when the drive motor is at a standstill!

No smoking is allowed when you are filling up!
Never fill the fuel tank near naked flames or ignitable sparks.
Ensure that no fuel spills onto hot machine parts while you are filling up. There is a risk of the fuel igniting!
Avoid naked flames at the machine and lock the fuel tank after refuelling - danger of fire!
Do not spill fuel!
Make sure that there are fire extinguishers in the vicinity of the machine.

5.3 Test run

Carry out a test run before operating the machine.

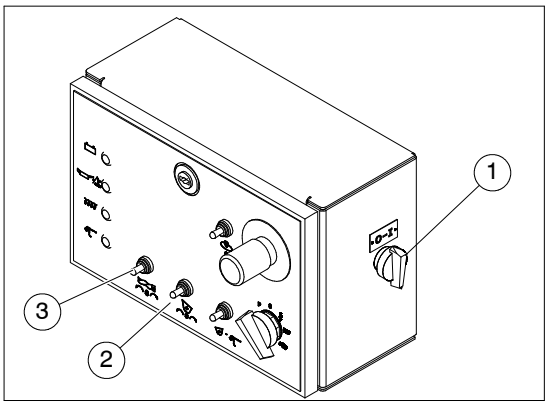
Start the engine to perform a test run. Some functions must be chekked while the machine is running.

Notes

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.

Starting the engine

The engine may only be started under no load, i.e. no consuming devices should be switched on.



Item	Designation
1	Main switch (under hood) “Power supply OFF / ON”
2	Toggle switch “Mixer unit BACKWARDS – 0 – FORWARDS”
3	Toggle switch “Auger pump BACKWARDS – 0 – FORWARDS”

▶ Open the hood.

▶ Switch on the power supply to the machine at the main switch “Power supply OFF / ON” (1) (under hood).

▶ Close the hood again.

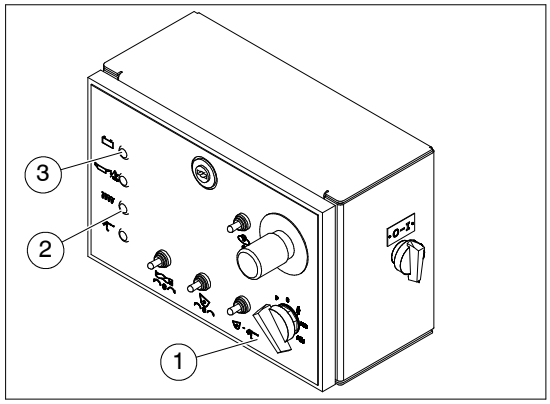
Danger

The machine must only be operated with the hood closed.

▶ Switch off the auger pump at the “Auger pump BACKWARDS – 0 – FORWARDS” switch (2).

▶ Switch off the mixer at the “Mixer unit BACKWARDS – 0 – FORWARDS” switch (3).

▶ Set the output controller to “Max”.



Item	Designation
1	Ignition switch
2	“Preheat” indicator lamp
3	“Charge monitor” indicator lamp

▶ Turn the ignition switch (1) clockwise until the “Charge monitor” indicator lamp (3) lights up.

Notes

Preheating for approx. 10 seconds is necessary at temperatures below 5 °C.

▶ Continue turning the ignition switch clockwise to the preheating position.
⇒ The “Preheat” (2) indicator lamp lights up and the preheating process commences.

Caution

Preheat the engine no longer than necessary (max. 20 s)!
Otherwise the spark plugs and starting solenoid could be damaged!

▶ Then turn the ignition switch clockwise even further to start the engine.
⇒ The engine starts.
⇒ All indicator lamps go out.

Caution

Attempt to start the engine for a maximum of 10 seconds.
Wait at least 30 seconds before attempting to start the machine again.
If you are unable to start the engine during the second attempt, refer to the chapter "Faults, cause and remedy" to determine the cause.

Caution

If there is a risk of freezing, allow the machine to run and warm up for a minimum of 2 minutes with no load. Otherwise there is a risk that the engine will be damaged.

5.4 Function checks

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

Notes

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

Checking the function of the safety equipment

Check whether all safety equipment are fitted and fully functional.

Check:
- whether all protective grilles are fitted and secure,
- the protective grilles are closed,
- the function of the protective grille cut-outs,
- the function of the EMERGENCY STOP button.

Danger

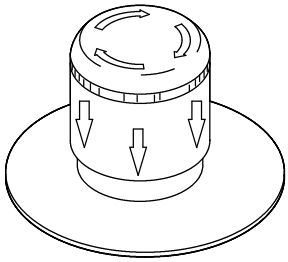
Defective safety devices could appear to be safe, but in reality pose a danger. This may result in the machine continuing to run or, if there is an imminent danger and the machine cannot be switched off quickly enough, injury to personnel.

If the safety device does not respond during the check, the machine must not be started up.

You must therefore check the operation of the safety device each time you start work.

Function check of EMERGENCY STOP button

Check the operability of the EMERGENCY STOP button.



Press: lock EMERGENCY STOP
Rotate: unlock EMERGENCY STOP

- ▶ Start the drive motor. Refer also to the section: ”Starting the drive motor”.
- ▶ Press the EMERGENCY STOP button.
  ⇒ The machine switches off.
- ▶ Unlock the EMERGENCY STOP button by turning it.

Caution

The machine is no longer safe to operate if the EMERGENCY STOP button is defective, as you will no longer be able to switch off the machine quickly enough if danger threatens.
If the EMERGENCY STOP button does not respond during the check, the machine must not be started up.
You must therefore check the functioning of the EMERGENCY STOP button each time you start work.

Function check of hood safety device

The machine is fitted with a hood safety device. If the hood is opened while the drive motor is running, the hood switch triggers and the machine switches off.

Danger

A defective hood switch could appear to be safe, but in reality poses a danger. As a result, rotating drives will continue running when the hood is opened and may cause personal injury.

There is an increased risk of accident when the hood is open due to exposed operating drives.

If the safety device does not respond during the check, the machine must not be started up.

You must therefore check the operation of the safety device each time you start work.

Notes

The machine may only be operated when the hood is closed to prevent dust being drawn in directly, and, above all, to see that safety and noise protection rules are observed.

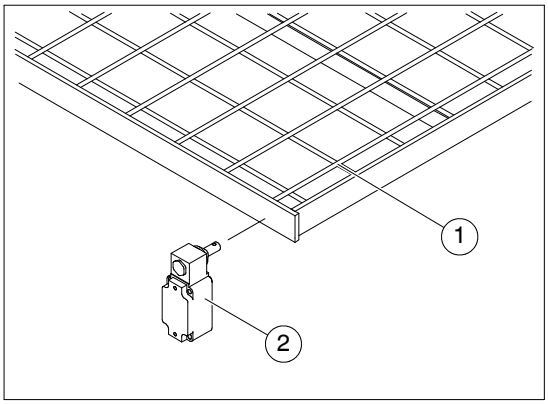
Check that the hood safety device is fully functional.

- ▶ Close the hood.
- ▶ Start the drive motor. Refer also to the section: ”Starting the drive motor”.
- ▶ Open the hood.
  ⇒ The machine switches off.

For further details, refer to the chapter: “Faults, Cause and Remedy”.

Function check of the protective grille cut-out

Check that the protective grille cut-out is fully functional.



Item	Designation
1	Protective grille (different versions)
2	Safety switch

Notes

The safety device at the protective grille (1) is equipped with a safety switch (2) which switches off the mixing mechanism as soon as the protective grille is raised.

Protective grille on the mixer

The auger pump is switched off by the protective grille cut-out on the mixer.

- ▶ Start the engine. Refer also to section “Starting the engine”.
- ▶ Set the toggle switch “Auger pump BACKWARDS – 0 – FORWARDS” on the control cabinet to “FORWARDS”.
  ⇒ The auger pump runs forwards.
- ▶ Raise the protective grille (1).
  ⇒ The auger pump switches off immediately.
- ▶ Close the protective grille (1) again.
- ▶ Press the “Acknowledge” rocker switch on the control cabinet to acknowledge.

Protective grille on the hopper

The mixer unit is switched off by the protective grille cut-out on the hopper.

- ▶ Start the engine. Refer also to section “Starting the engine”.
- ▶ Set the “Mixer unit BACKWARDS – 0 – FORWARDS” toggle switch to “FORWARDS”.
  ⇒ The mixer unit runs forwards.
- ▶ Raise the protective grille (1).
  ⇒ The mixer unit switches off immediately.
- ▶ Close the protective grille (1) again.
- ▶ Press the “Acknowledge” rocker switch on the control cabinet to acknowledge.

Pump functions

The auger pump is controlled independently via the “Auger pump BACKWARDS – 0 – FORWARDS” toggle switch.
The switch has a momentary contact function in a forwards direction and maintained contact function in a backwards direction.

- ▶ Start the engine. Refer also to section “Starting the engine”.
- ▶ Turn the output controller towards “+”.
- ▶ Set the “Auger pump BACKWARDS – 0 – FORWARDS” toggle switch to “FORWARDS”.
  ⇒ The auger pump runs forwards.

Then switch the auger pump to “backwards” and check.

- ▶ Set the “Auger pump BACKWARDS – 0 – FORWARDS” toggle switch to “BACKWARDS”.
  ⇒ The auger pump runs backwards.

Mixer functions

The mixer unit is controlled independently via the “Mixer unit BACKWARDS – 0 – FORWARDS” toggle switch.
The switch makes momentary contact in both a forwards and backwards direction.

- ▶ Start the engine. Refer also to section “Starting the engine”.
- ▶ Turn the output controller towards “+”.
- ▶ Set the “Mixer unit BACKWARDS – 0 – FORWARDS” toggle switch to “FORWARDS”.
  ⇒ The mixer unit runs forwards.

Then switch the mixer unit to “backwards” and check.

- ▶ Set the “Mixer unit BACKWARDS – 0 – FORWARDS” toggle switch to “BACKWARDS”.
  ⇒ The mixer unit runs backwards.

5.5 The delivery line

Only use original Putzmeister delivery lines which meet prescribed operating and burst pressures.

Notes

Only Putzmeister couplings and fittings are guaranteed to comply with the values specified in the German Accident Prevention Regulations.

You must secure delivery lines with threaded spouts by gluing. You must ensure that you use a seal which is designed for the purpose to secure any new coupling against being opened. You must screw the coupling to the stop. After this, it should no longer be possible to undo it by hand.

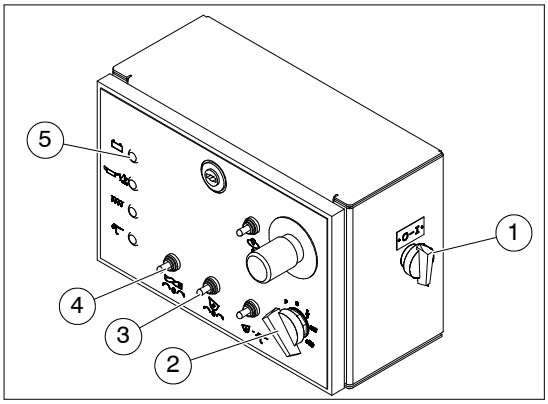
Only use delivery lines with a suitable internal diameter.

Caution

Only couple delivery line couplings which have been cleaned and have fully operational gaskets. Soiled couplings are not properly sealed and allow water to leak out under pressure. This leads inevitably to blockages.

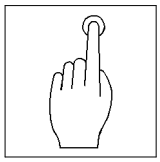
5.6 Shutting down machine after initial operation

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



Item	Designation
1	Main switch (under hood) “Power supply OFF / ON”
2	Ignition switch
3	Toggle switch “Mixer unit BACKWARDS – 0 – FORWARDS”
4	Toggle switch “Auger pump BACKWARDS – 0 – FORWARDS”
5	“Charge monitor” indicator lamp

- ▶ Switch off the auger pump at the “Auger pump BACKWARDS – 0 – FORWARDS” switch (4).
- ▶ Switch off the mixer at the “Mixer unit BACKWARDS – 0 – FORWARDS” switch (3).
- ▶ Switch off the machine at the “Ignition switch” (2).
- ▶ Set the output controller to “Max”.
- ▶ Open the hood.
- ▶ Switch off the power supply to the machine at the “Power supply OFF / ON” (1) main switch (under hood).
- ▶ Close and secure the hood.
- ▶ Secure the machine against unauthorised starting or use.



6 Operation

In this section you will find information on machine operation. You will learn what operations are required for setting up the machine, operation and for cleaning.

6.1 Requirements

Before starting to use the pump, you must carefully carry out the working steps for commissioning and installing the machine. Before you fill material into the machine and pump it through the delivery line you must be sure that

- the machine functions correctly,
- the delivery line is designed to withstand the intended delivery pressure and
- the delivery line has been laid professionally.

Notes

Should a malfunction occur when the pump is in operation, first consult the chapter "Faults, Cause and Remedy". Contact Putzmeister's After Sales department for advice, if you are unable to rectify the fault yourself.

6.2 Emergency shut-down procedures

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

Danger

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

EMERGENCY STOP button

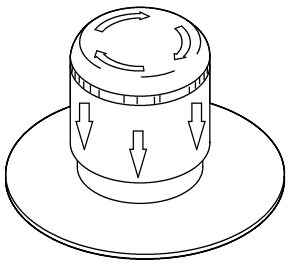
The control cabinet of the machine is fitted with an EMERGENCY STOP button.

Caution

Familiarise yourself with the position of the EMERGENCY STOP buttons on your machine.

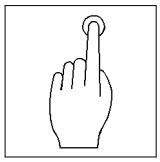
Danger

In the event of impending danger, press the EMERGENCY STOP button!



Press: lock EMERGENCY STOP button
Rotate: unlock EMERGENCY STOP button

Fortsetzung nächste Seite



- ▶ Press the EMERGENCY STOP button.
  ⇒ The auger pump must come to a halt immediately.
  ⇒ The agitator stops (if available).
  ⇒ The hydraulic system is deactivated (if available).
- ▶ Take first aid measures, where necessary.
- ▶ Note the incident and report in accordance with company codes of practice.
- ▶ Look for the cause of the fault and have it rectified/rectify it completely.
- ▶ Unlock the EMERGENCY STOP button by turning it.
- ▶ Acknowledge the EMERGENCY STOP using the rocker switch.

Notes

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

- ▶ Start up the machine in accordance with the rules for starting up the machine.

6.3 Initial pumping

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 building site operations, but also after pumping interruptions.

At the beginning of pump operation the entire delivery pipe has to be wetted.

Pumping must generally be started with the aid of a cement grout.

Notes

The grout lubricates the inside of the delivery line and prevents blokkages.
Operating the screw conveyor dry will destroy the conveying hose!

- ▶ Rinse the delivery line out briefly with water before connecting it. Use one or two of the sponge balls provided as standard accessories soaked in water to do this.
- ▶ Approx. 20 – 40 l of grout are required, depending on the length of the delivery line.
- ▶ Now mix in cement grout and add this to the hopper.
- ▶ Switch on the auger pump.
- ▶ Pump the grout slowly into the delivery line.

The process of priming with grout finishes when the 2 sponge balls and a full jet of material exit from the delivery line.

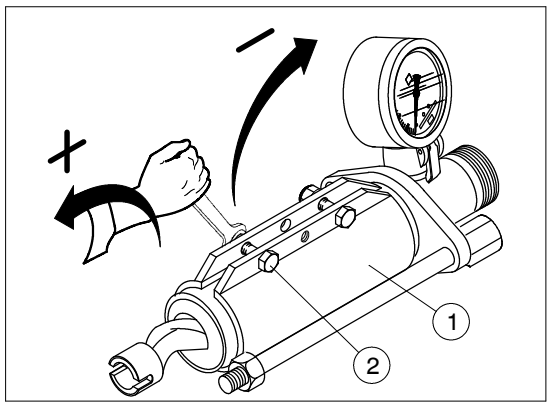
With the first mixture, pump the grout through the delivery line. As it leaves the delivery line, collect the grout in a suitable container and dispose of it.

6.4 Adjusting the auger pump

The tensioning casing is used to retension the auger pump. The wear of the auger pump can be compensated by reclamping. The delivery pressure can also be adjusted by pretensioning or relieving the auger barrel.

- ▶ Use the test pressure gauge to set the delivery pressure of the auger pump.
- ▶ Pressure test the auger pump using water.

Maintenance chart: *Setting the auger pump*



Item	Designation
1	Clamping sheath
2	Tensioning screw

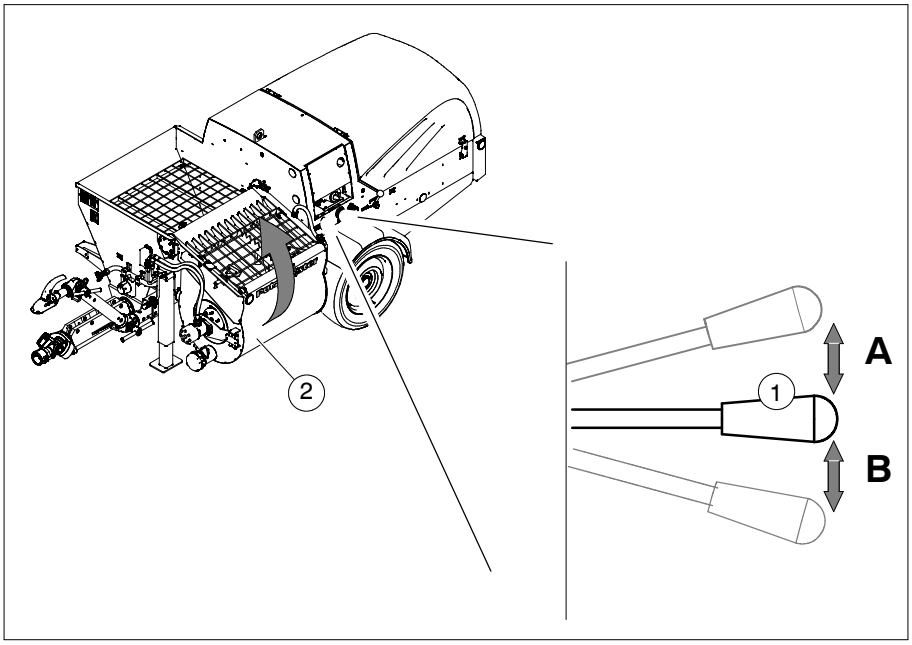
Notes

Set the auger pump with the test pressure gauge to a water pressure of approx. 15-20 bar.

6.5 Raising / lowering the lifting mixer unit

Site mixes are mixed in the lifting mixer unit and filled into the hopper as a ready mix.

While a mixture is being delivered, the next one can be prepared in the lifting mixer unit.

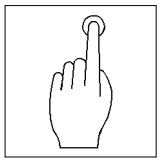


Item	Designation
1	Control lever for the lifting mixer unit
2	Lifting mixer

The lifting mixer unit control lever (1) is used to operate the lifting mixer unit (2). The control lever only has a momentary contact function in the central position.
Position A: Lifting the mixer unit
Position B: Lowering the mixer unit

Notes

The mixer unit on the lifting mixer unit is switched off during this procedure.



You must press the control lever valve all the time when raising or lowering the lifting mixer unit.

- ▶ You must pull the lock on the control lever in order to actuate the lever.
  ⇒ The control lever can be actuated.
- ▶ Move the lifting mixer unit control lever downwards.
  ⇒ The lifting mixer swings down.
- ▶ Move the lifting mixer unit control lever upwards.
  ⇒ The lifting mixer swings upwards and empties into the hopper.

The lifting device has a safety device which stops the mixer drum from lowering accidentally. This safety device is unlocked by retracting or extending the lifting cylinder.

Danger

Despite these safety precautions, you must switch off the machine when working under the mixer drum and support the mixer drum mechanically from below so that it cannot drop.

6.6 Pumping operations

Carefully carry out the operations for starting up the machine and setting up the machine and ensure that it is functioning perfectly before you fill the hopper with medium and begin pumping it through the delivery line.

Notes

Should a malfunction occur when the pump is in operation, first consult the Chapter "Faults, Cause and Remedy". Contact Putzmeister's After Sales department for advice, if you are unable to rectify the fault yourself.

▶ Switch the main switch on.

Notes

To prevent blockages in the delivery lines, the inside of the line must be prelubricated with a laitance.

At the start of pumping, the entire delivery line must be lubricated with a laitance.

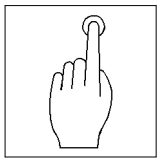
▶ Prelubricate the delivery line with a laitance. Refer also to the section: "Starting pumping".

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

Caution

Never pump demixed medium or medium that is lumpy due to the commencement of congealing into the delivery line with force. Blokkages are very easily caused by this.

▶ Add pumpable material to the hopper.
⇒ The material in the hopper is mixed together.



6.7 Pumping

When you have emptied the mixture from the mixer into the hopper, you can pump the material from the hopper into the delivery line.

▶ Switch on the auger pump. Refer also to chapter: “Starting up”, section: “Pump functions”.
⇒ The cardan shaft and the auger pump start delivering.

The mixture is conveyed by the cardan shaft in the hopper to the auger pump.

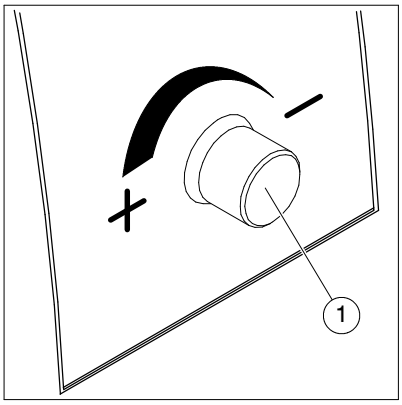
Notes

Start with a low output and increase this continuously.

You may change the rate of output using the output regulator. If the auger pump comes to a halt due to overload, this can be rectified by reducing the delivery rate. Further improvements are possible by reducing the load on the auger pump (reduction of delivery line length, larger diameter).

6.8 Output regulation

You can adjust the delivery rate at the output controller.



Item	Designation
1	Output controller

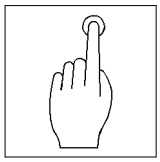
▶ With the pump running, turn the output controller towards “+”.
⇒ The delivery rate is increased.

▶ With the pump running, turn the output controller towards “–”.
⇒ The delivery rate is reduced.

Notes

Start with a low output and increase this continuously.

When interrupting pumping or shutting down the machine, always set the delivery rate to the highest setting.



6.9 Breaks in pumping

You should avoid breaks in pumping as far as possible, as the medium in the delivery line can start to set, or can become segregated. Note the following points if breaks are unavoidable:

- Never leave the delivery pipe under pressure.
- Relieve the delivery line of its load during short pumping breaks by briefly reverse pumping.
- Switch off the auger pump during long breaks.
- During long breaks, the agitator can remain switched on to prevent segregation of critical materials.

Caution

Never pump demixed medium or medium that is lumpy due to the commencement of congealing into the delivery line with force. Blokkages are very easily caused by this.

6.10 Blockages

Blockage can occur inside the pump itself as well as in the delivery line. When a blockage occurs, the flow of material at the end of the line stops and the pressure gauge indicates a rising pressure. If a blockage occurs inside the pump, the overload protection may switch off the drive motor.

Blockages can be avoided. However, they do still occur from time to time and are usually caused by:
- insufficient lubrication of the delivery line,
- mortar which is hard to pump and segregates easily,
- leaks at the couplings of the delivery hoses.

Rectifying blockages

Rectify blockages as follows:

▶ Pump in reverse for a short time to decrease the pressure in the delivery line.

▶ Switch off the drive motor.

Danger

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

▶ Uncouple the delivery line and clear the blockages in the line by shaking and tapping it.

Danger

Never attempt to blow out a blockage with compressed air. This would present a danger to life because the delivery line can burst!

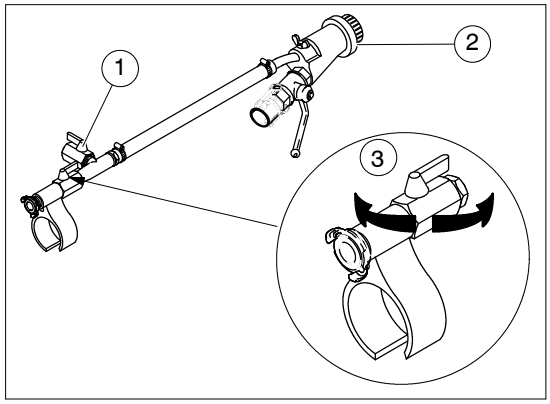
▶ With stubborn blockages, rinse the line with water.

▶ When you start the drive motor up again, add a cement grout to the delivery line.

6.11 Using the spray gun

To use the spray gun, proceed as follows:

- ▶ Connect the delivery line to the spray gun.
- ▶ Connect the air hose to the air valve fitting and the spray gun.
- ▶ Connect the air valves to the air valve fitting.



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

- ▶ Close the remote control valve(1) on the spray gun.

Danger

The machine must not be started when the remote control valve is open.
Risk of injury from material sprayed from spray gun.

- ▶ Start the drive motor. Refer also to the chapter: “Starting up” - section: “Starting the drive motor”.
- ▶ Switch the pump on. Refer also to chapter: “Starting up” - section: “Pump functions”.
- ▶ Open the air valves on the air valve fitting.

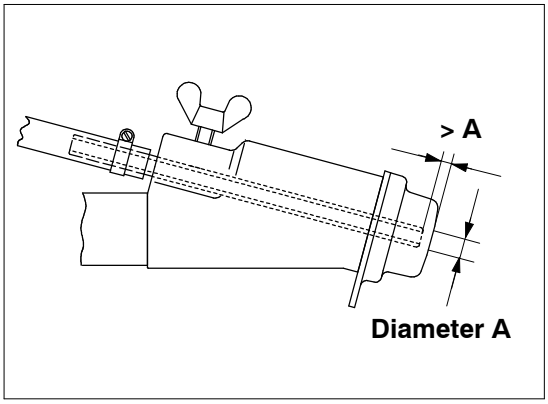
Continuation next side

Notes

Switch the pump on or off by opening or closing the remote control valve on the spray gun.
If the machine is switched off via the remote control valve, the machine is still on standby and can be started again at any time by re-opening the remote control valve.

- ▶ Open the air cock on the spray gun.
  ⇒ The Cardan shaft and the auger pump start delivering.
- ▶ Set the required delivery rate. Refer also to the section: “Delivery rate adjustment”.
- ▶ Adjust the air to the required quantity with the air cock.

Adjusting the air nozzle tube

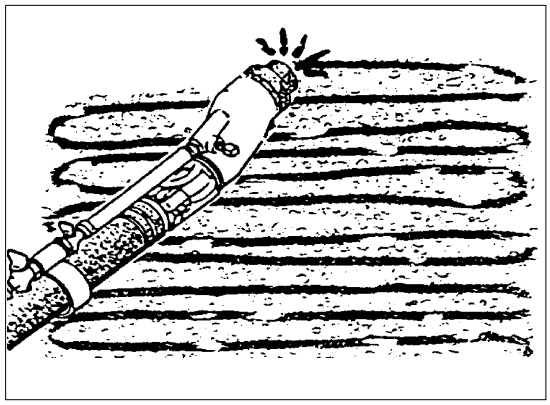


Item	Designation
1	Air nozzle tube
2	Mortar nozzle

The distance from the air nozzle tube(1) to the mortar nozzle(2) must be greater than the diameter of the mortar nozzle(2). The larger the distance selected, the fewer blockages occur between the air nozzle tube(1) and the mortar nozzle(2). The smaller the distance setting, the more cleanly and evenly the spray gun sprays.

Practical tip

Guide the spray gun back and forth at an even pace using uninterrupted horizontal movements. Circular movements are ineffectual. Direct the jet slightly upwards when plastering walls, but in all other cases always spray at right angles to the surface to be plastered. The distance between nozzle and wall should be between 20 and 30 cm. The closer the nozzle is to the wall, the sharper the jet is outlined, spray with less air here if necessary.



Guide the spray gun back and forth in smooth movements

6.12 Cleaning the machine

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

Material residues and contamination deposited in the machine and delivery line can impair operation!

Environmental protection

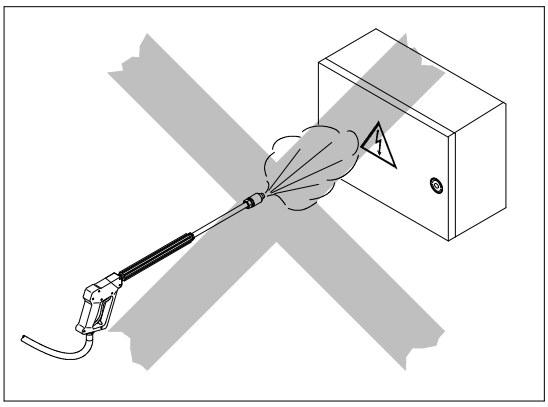
During all cleaning work, observe the waste disposal regulations that apply to your region.
Cleaning additives or diesel fuel must not be permitted to enter the sewage system.

Information on cleaning

Prior to cleaning the machine with water or a steam jet (H.P. 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 connectors.

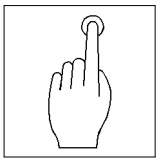
Caution

The machine must only be cleaned on the outside with a steam jet / high-pressure cleaner.
The hood must remain closed.



No water into electric systems

Continuation next side



Notes

In the first six weeks of operation, clean all painted surfaces with cold water only at a maximum water pressure of 5 bar. Do not use any aggressive cleaning additives. Only after this time will the paint have hardened completely, allowing you to use steam jet equipment or similar tools.

Under no circumstances use sea water or any other salty water for cleaning purposes. Should sea water get onto the machine you must rinse it off without fail.

Water which sprays the machine from all directions does not have any damaging effect. The system is splash-proof but not waterproof.

Notes

Completely remove the covers / seals after the cleaning process!

Caution

The machine and lines must be drained fully of residual water if there is a risk of freezing.

Machine

Clean the machine first, then the delivery line.

- ▶ Pump the hopper empty.
- ▶ Allow the machine to pump in reverse for a short time and disconnect the delivery line.

Danger

You should only uncouple the delivery line when you have checked on the pressure gauge that the system is fully depressurised.
You must wear protective goggles.
Turn your face away when opening the line coupling.

- ▶ Switch off the machine as described in the chapter: *"*Shutting down the machine after operation*"*.
- ▶ Now wash the machine clean with water. Rinse out the hopper and mixer drum until it is clean.
- ▶ Now pump water from the hopper through the pump until the water begins to exit the pressure connection cleanly once more. The machine is now fully cleaned out.
- ▶ Drain the leavings at the drainage connection and rinse the hopper out once more with water.
- ▶ Now clean the delivery line.

Delivery line

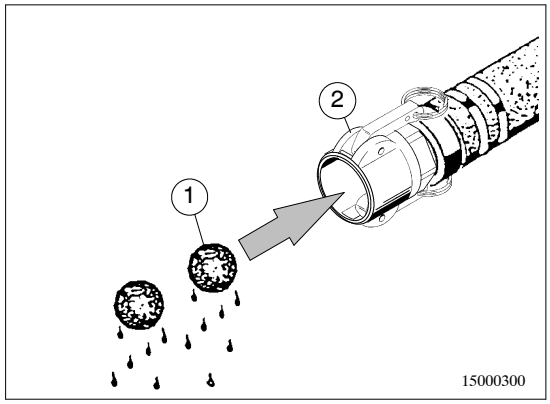
Material deposits inside the delivery line can cause damage and can continue to accumulate and thereby reduce the line cross-section. To allow problem-free operation at the next use, it is vital that all delivery lines are clean.

Danger

You clean the delivery line with compressed air at your own risk. Putzmeister accepts no liability for damage caused by compressed air cleaning.

Notes

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

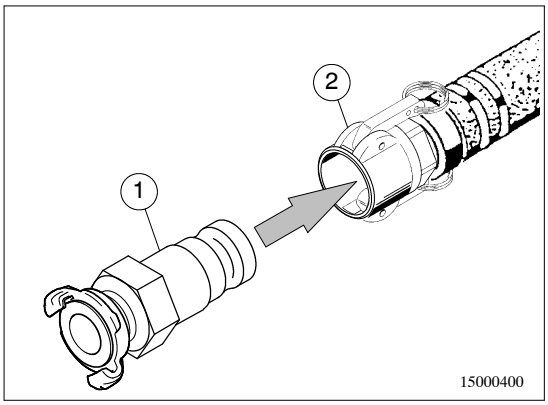


Item	Designation
1	Sponge ball
2	Delivery line

▶ Soak the Putzmeister sponge ball(1) in water and push it into the delivery line(2).

Continuation next side

The delivery line is cleaned by water pressure. Use the water connector included in the accessory package for this purpose.



Item	Designation
1	Water connection piece
2	Delivery line

- ▶ Connect the water connector to the delivery line.
- ▶ Use the water pressure to push the leavings and sponge balls out of the delivery line.

If the machine does not have a water pump and the water line pressure is not sufficient for cleaning the delivery line, you must use the pump for cleaning.

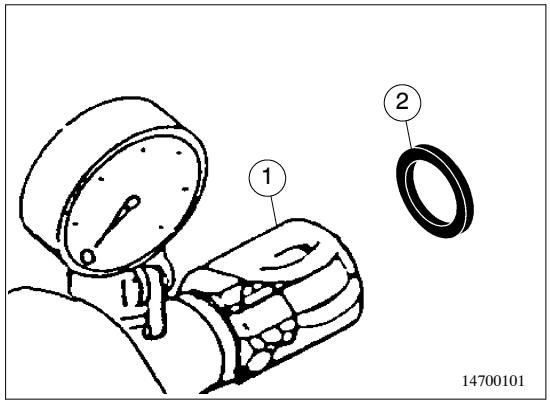
Notes

Using the pump for cleaning increases wear of the pump components. If the water line pressure is repeatedly insufficient, use an auxiliary water pump.

- ▶ Then reconnect the delivery line to the outlet connection.
- ▶ Half fill the mixing drum with water.

Continuation next side

- ▶ Start the pumping process and pump water through the delivery line until the sponge ball exits the hose end.
- ▶ Repeat the cleaning process until only clean water exits the line.



Item	Designation
1	Pressure connection
2	Rubber seal

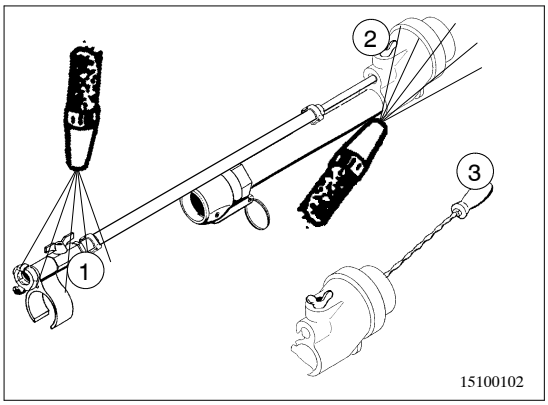
Clean all seals and the seal seats. Grease the seals before reassembling them. Dirty couplings are not sealed and will inevitably lead to blockages.

Caution

The machine and lines must be drained fully of residual water if there is a risk of freezing.

Spray gun

Clean the air cock and air nozzle tube on the spray gun. In addition, use the probe to clean the air nozzle tube.



Item	Designation
1	Air cock
2	Air nozzle tube
3	Probe

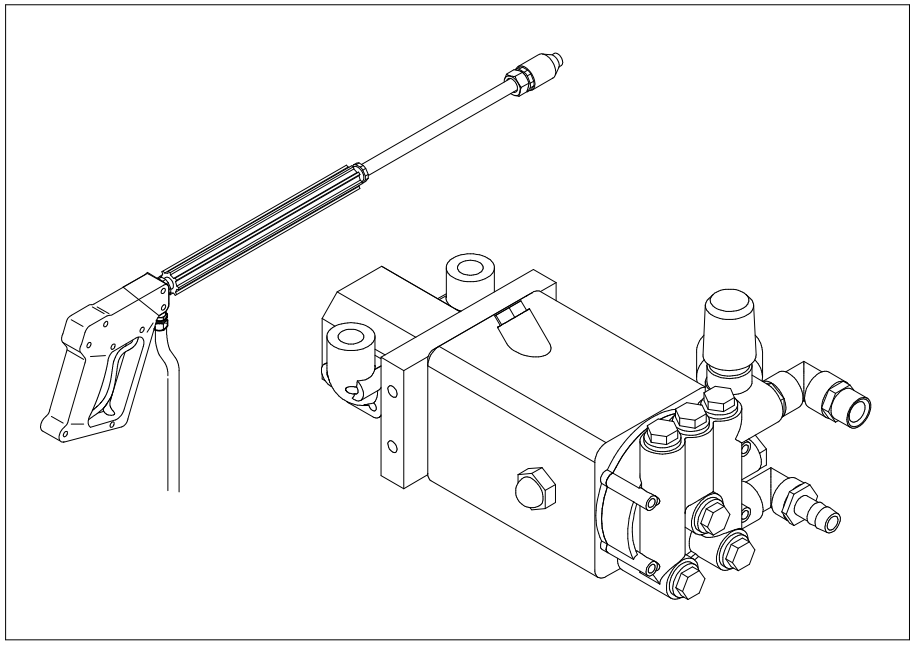
6.13 High-pressure cleaner (optional)

A hydraulically driven high-pressure cleaner can be installed as an option.
The high-pressure cleaner is used to clean the outside of the machine with pressurised water.

Notes

The high-pressure cleaner is not a suction pump.
It must be connected to the mains water supply.

A pressure switch monitors the water supply (min. 0.5 bar) in the water block so that the high-pressure cleaner cannot operate dry.



High-pressure cleaner

Caution

Never direct the water jet at electric components on the machine (e.g. control cabinet, electric motors) or at soundproofing equipment inside the hood.

Under no circumstances may explosive or inflammable materials be conveyed. The high-pressure water pump is designed to deliver clean water or other non-aggressive or abrasive media with a similar specific weight to water.

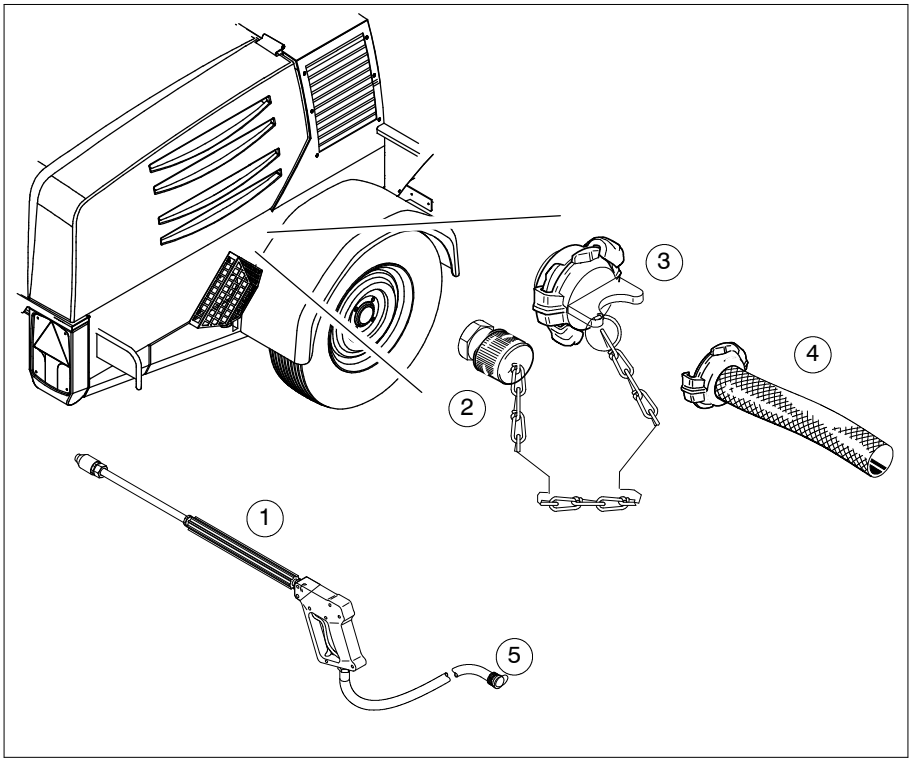
Take note of the following points before initial operation of the high-pressure cleaner:

- The high-pressure cleaner is not a suction pump. It must be connected to the mains water supply.
- The high-pressure cleaner must never be run without water. Make sure that the water inlet is connected correctly.

Danger

Always wear protective goggles and protective clothing when working.

Never direct the water jet at other personnel - the high operating pressure can lead to serious injuries.



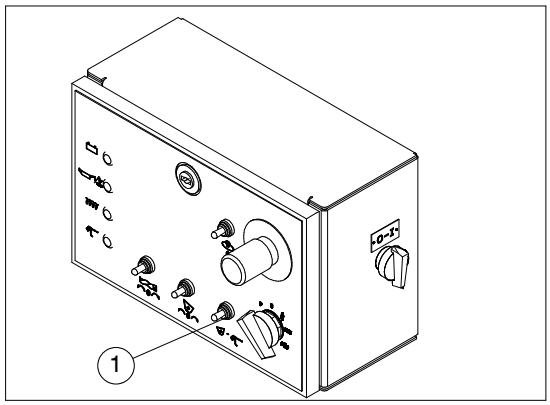
Item	Designation
1	Cleaning gun
2	Cleaning gun connection
3	Water inlet connection
4	Water hose
5	High-pressure hose

- ▶ Switch off the machine. Refer also to chapter “Starting up” - section “Shutting down the machine after initial operation”.
- ▶ Connect the high-pressure hose (5) to the cleaning gun (1).
- ▶ Connect the high-pressure hose on the cleaning gun (5) to the cleaning gun connector (2).
- ▶ Connect the mains water supply to the water inlet connector (3) using a suitable water hose (4).
- ▶ Close the ball valve to the high-pressure cleaner.
- ▶ Close the ball valve to the water dosing block.
- ▶ Open the water supply.

Caution

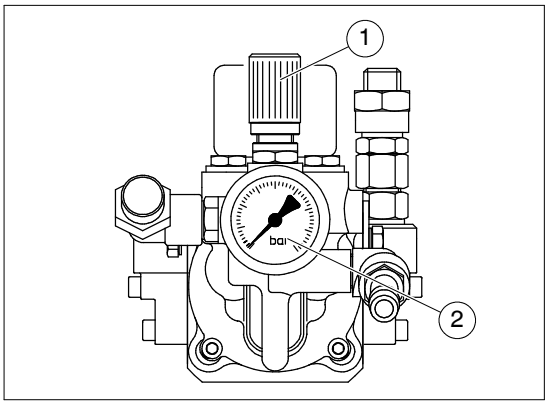
The high-pressure cleaner must never be run without water.
Make sure that the water inlet is connected correctly.

- ▶ Open the cleaning gun and keep it open until water runs out of the spray nozzle.
  ⇒ In this way you prevent the high-pressure cleaner from sukking in air.



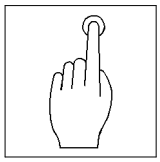
Item	Designation
1	“High-pressure cleaner ON / OFF” rocker switch

- ▶ Start the engine. Refer also to chapter: “Starting up” - section: “Starting the engine”.
- ▶ Press the “Change to high-pressure cleaner” button.
  ⇒ The high-pressure cleaner is selected.
- ▶ Open the cleaning gun.
  ⇒ The operating pressure can be read off at the pressure gauge.



Item	Designation
1	Handwheel
2	Pressure gauge

The high-pressure water pump has a control range between 5 and 120 bar and is dependent on the engine speed.
The pressure can be regulated by turning the handwheel.



Tip

Do not direct the cleaning jet vertically onto the surfaces to be cleaned. Try to “peel off” the dirt layer from the painted surfaces. Maintain a minimum clearance of 30 cm between the cleaning lance and the surface being cleaned.

Caution

After cleaning with the high-pressure cleaner, you have to select the mixer unit again.
Otherwise the mixer unit will not function when the machine is operated again.

- ▶ Press the “Change to high-pressure cleaner” button.
  ⇒ The mixer unit is selected.
- ▶ Switch off the machine and shut off the water supply.

Notes

Before removing the pressure hose for the cleaning gun from the cleaning gun connection, open the cleaning gun and keep it open until any pressure present has been relieved.

It is not possible to operate the mixer and high-pressure cleaner simultaneously.

Caution

In frosty weather, you must drain any residual water out of the high-pressure cleaner and line with connections for the water supply and cleaning gun open.

7 Faults, Cause and Remedy

This chapter gives you a summary of faults and their possible causes, and also ways in which you may rectify them.
Observe the safety regulations when searching for a fault.

Danger

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

7.1 Machine, general

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

Caution

Inspection and maintenance personnel must have authorisation and the necessary technical qualification. They must have completed training relevant to working with the equipment on the machine and be conversant with the content of the operating instructions.

Notes

Consult the relevant service department at Putzmeister Mörtelmaschinen GmbH if you cannot rectify the fault by yourself.

Refer also to the documentation *provided by the engine manufacturer for more information on the causes of faults and remedies.*
Refer also to chapter: "General Technical Description" - section: "Technical data".

Use only original spare parts.
Putzmeister Mörtelmaschinen GmbH accepts no liability for damage caused as a result of using non-original spare parts.

Drive motor does not start or struggles to start.	
Cause	**Remedy**
Hood safety device activated	Close the hood Place the machine in a horizontal position. Take the maximum permissible inclination angle into account
User switched on	Switch off user Start up the drive motor under no load
Remote control switched on (latched pushbutton "Remote control OFF / ON" set to "ON"), remote control not connected, however	Deactivate remote control or plug in radio remote control

Drive motor does not start or struggles to start.	
Cause	**Remedy**
Empty or faulty battery	Check the electrolyte level, charge the battery and replace it if necessary
Ambient temperature too low	Use an engine oil grade suitable for the ambient temperature
Insufficient fuel in the tank	Add fuel
Incorrect fuel	Replace with the correct fuel
Fuel system dirty or blocked	Clean the fuel system
Fuel filter dirty or clogged	Clean the fuel filter, replace if necessary
Air in the fuel line	Bleed the fuel line
Engine oil with incorrect lubricant grade	Replace engine oil
Valve play incorrect	Have checked and adjusted
Valves worn or defective	Have replaced
Engine oil pressure too low	Switch off the machine immediately Check the engine oil system Refer also to the documentation of the engine manufacturer.
Incorrect timing of fuel injection	Have checked and adjusted
Injection nozzle dirty or worn	Clean and have replaced if necessary
Injection pump faulty	Have replaced
Starter faulty	Have replaced

The drive motor does not reach full power.	
Cause	**Remedy**
Incorrect fuel grade	Replace with the correct fuel
Fuel filter dirty or clogged	Clean the fuel filter, replace if necessary
Air in the fuel line	Bleed the fuel line
Engine oil level insufficient	Add engine oil
Engine oil filter dirty or clogged	Clean engine oil filter, replace if necessary
Dry air filter dirty	Clean filter element, replace if necessary
Radiator dirty	Clean the cooling fins on the radiator
Injection nozzle dirty or worn	Clean and have replaced if necessary
Injection pump dirty or worn	Have injection pump replaced
Injection pressure incorrect	Have checked and adjusted
Insufficient compression	Check, have repaired if necessary
Valve play incorrect	Have checked and adjusted
Valves worn or defective	Have replaced
Bearing defective	Have replaced

The drive motor stops suddenly.	
Cause	**Remedy**
Insufficient fuel in the tank	Add fuel
Fuel system dirty or blocked	Clean the fuel system
Fuel filter dirty or clogged	Clean the fuel filter, replace if necessary
Engine oil level insufficient	Add engine oil
Engine oil filter dirty or clogged	Clean engine oil filter, replace if necessary
Radiator dirty	Clean the cooling fins on the radiator
Coolant level too low	Add coolant
Coolant concentration is too high	Add water Always use the mixture ratio specified
Hydraulic filterclogged	Change the hydraulic filter
V-belt not tight enough or torn	Tighten or replace the V-belt
Heat dissipation impeded	Remove objects and obstructions in the area where heat is dissipated Close the hood
Drive motor overloaded	Reduce the drive motor load
Injection nozzle dirty or worn	Clean injection nozzle, have replaced if necessary
Bearing defective	Have replaced

Danger

Allow the drive motor and radiator to cool down before topping up the coolant. Risk of scalding.

The drive motor is smouldering.	
Cause	**Remedy**
Incorrect fuel grade	Replace with the correct fuel
Fuel system dirty or blocked	Clean the fuel system
Dry air filter dirty	Clean filter element, replace if necessary
Injection nozzle dirty or worn	Clean injection nozzle, have replaced if necessary
Fault in injection system	Have checked and remedied

Hydraulic fluid overheating.	
Cause	**Remedy**
Radiator dirty	Clean the cooling fins on the radiator
Hydraulic oil level insufficient	Add hydraulic oil

Material emerges alternately with a thick and thin consistency.	
Cause	**Remedy**
Worn screw conveyor parts	Tighten auger components or replace

No material is exiting from the end of the delivery line.	
Cause	**Remedy**
Blockages in the delivery line and shutdown of the pump due to activation of overpressure safety device.	Carefully complete the priming procedure before pumping material. Refer also to chapter: “Operation” – section: “Priming”. This prevents blockages where possible. ***Caution*** *You should only uncouple the delivery line once you have checked the pressure gauge to see that the system is fully depressurised.* *You must wear protective goggles.* *Turn your face away when opening the line coupling.*
	Turn off the machine. Depressurise the delivery line. Disconnect the delivery line and release the blockage by tapping and shaking. Flush out the delivery line with water if necessary. Start priming slowly after removing a blockage.

Flow of material interrupted.	
Cause	**Remedy**
The material exits the delivery line irregularly and is spraying with force.	Check whether the hopper is nearly empty thus allowing air to be sucked in. For this reason, always ensure that there is sufficient material in the hopper.
The flow of material is being constantly interrupted without spraying.	Check whether the delivery line forms a loop or is kinked.

Decreasing delivery pressure.	
Cause	**Remedy**
Worn screw conveyor parts.	Tighten auger components or replace

Auger pump produces no or insufficient power.	
Cause	**Remedy**
Delivery rate is not set to maximum.	Increase delivery rate

Pump functions cannot be executed on the control cabinet!	
Cause	**Remedy**
Remote control is active. (optional)	Set the “Remote control OFF / ON” latched pushbutton to “OFF”.

Notes

Should frequency interference be generated on the construction site e.g. by other radio-controlled construction machinery or electricity pylons, you will have to control the machine via the control cabinet.

The cardan shaft is not running.	
Cause	**Remedy**
The grille on the hopper is open or the safety switch is defective. (depending on model)	Close the grille on the hopper and check the safety switch. Please contact your specialist workshop if the cardan shaft still does not rotate when the grille is closed.
The vibrating screen is open or the safety switch is defective.	Close the vibrating screen and check the safety switch. Please contact your specialist workshop if the cardan shaft still does not rotate when the grille is closed.

Material is not stirred sufficiently.	
Cause	**Remedy**
Mixing paddles on the mixer are heavily worn. (depending on model)	Replace worn parts.

Mixer does not move, or speed insufficient. (depending on model)	
Cause	**Remedy**
Mixer control is not fully open.	Increase mixer speed.

The mixing apparatus in the mixer drum is not running. (depending on model)	
Cause	**Remedy**
The grille on the mixer is open or the safety switch is defective.	Close the grille on the mixer drum and check the safety switch. Please contact your specialist workshop if the mixing mechanism still does not rotate when the grille is closed.
The grille on the hopper is open or the safety switch is defective.	Close the grille on the hopper and check the safety switch. Please contact your specialist workshop if the mixing mechanism still does not rotate when the grille is closed.
The mixer is jammed (mixture too dry or stone chippings).	Switch the mixer drive switch on the switchboard to reverse drive, keep your finger on the switch and add water. Repeat this process until the mixer is running freely again. The machine must be shut down and the mixer drum cleared if this is not successful. Please contact your specialist workshop if the mixing mechanism still does not rotate when the grille is closed.

High-pressure cleaner does not switch on. (optional)	
Cause	**Remedy**
Insufficient delivery pressure	The delivery pressure must be at least 0.5, connect a booster pump upstream if necessary.

If water supply stops. (depending on model)	
Cause	**Remedy**
No water supply from mains.	Use a pressure booster pump to supply the machine from a tank containing clean water. Connect the pressure line on the pressure booster pump to the water connection on the machine.

Water dosage flow volume insufficient. (depending on model)	
Cause	**Remedy**
Clogged water filter.	Check the water filter for dirt and clean. Check the lines for kinks and leaks.

Water dosage unit does not supply any water. (depending on model)	
Cause	**Remedy**
Water dosage unit failure.	Unscrew the sealing plug on the water dosing block and check the turbine for ease of movement. Check the lines for kinks and leaks. Check the water filter for dirt and clean.

7.2 Electrical system

The following is a description of possible causes of faults, which affect the electrical system, and their remedies.

Heavy current

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

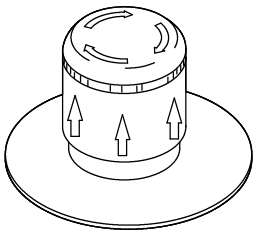
Charging indicator lamp flickers briefly when the main switch is actuated instead of lighting up permanently.	
Cause	**Remedy**
Switch B1 on the motherboard is closed.	Open switch B1 (starting switch for checking the software)

Charging indicator lamp stays lit while the drive motor is running.	
Cause	**Remedy**
The battery is not charging properly.	Check the cables, dynamo regulator.

Charging indicator lamp flickers briefly during machine operation.	
Cause	**Remedy**
Relay 3K65 is faulty	Check relay 3K65 and replace if necessary. See circuit diagram.

Continuation next side

The “Charge monitor” indicator lamp does not light up when the main switch is switched on. Machine cannot be started.	
Cause	**Remedy**
Empty or faulty battery.	Check the electrolyte level, charge the battery and replace it if necessary.
Loose battery connection or oxidised terminals.	Check the battery connection and repair it if necessary.
Loose connections or damaged wiring.	Check the wiring and connections and repair them if necessary.

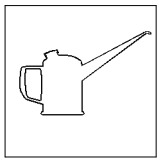
Drive motor does not start even though the main switch is actuated.	
Cause	**Remedy**
EMERGENCY STOP chain is activated (EMERGENCY STOP button pressed).	Unlock the EMERGENCY STOP button. 

7.3 Chassis

The following is a description of possible causes of faults, which affect the chassis, and their remedies.

Ball hitch does not engage after fitting on tractor unit	
Cause	**Remedy**
Inner section of ball hitch contaminated or movement obstructed.	Clean and lubricate ball hitch, have replaced at specialist workshop if necessary.
Ball diameter at tractor unit greater than Ø 50 mm.	Replace ball. In new condition, the ball on the towing vehicle has a maximum diameter of Ø 50 mm and a minimum of ∅ 49 mm (DIN 74058). If the diameter of the ball is larger than 50 mm, it must be replaced.

To much play between ball hitch and ball means there is a risk of disconnecting	
Cause	**Remedy**
Ball on tractor unit worn, ball diameter smaller than Ø 49 mm.	Replace ball. In new condition, the ball on the towing vehicle has a maximum diameter of Ø 50 mm and a minimum of Ø 49 mm (DIN 74058). If the diameter of the ball falls below 49 mm, it must be replaced.
Ball hitch worn.	Have specialist workshop replace ball hitch.
Swivel range exceeded.	
Rivet bent.	



8 Maintenance

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

Following the general maintenance information, you will find the maintenance charts necessary for this machine. A summary of the maintenance charts listed by number is included in the table of contents.

We should like here to emphasise expressly 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 to you with advice and help at any time should you be in doubt.

8.1 Maintenance intervals

The following table shows the intervals for the various maintenance tasks.

Caution

Inspection and maintenance personnel must have authorisation and the necessary technical qualification. They must have completed training relevant to working with the equipment on the machine and be conversant with the content of the operating instructions.

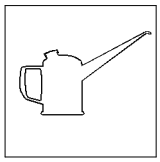
Notes

For the maintenance work intervals and performance, please also refer to the documentation provided:
– by the engine manufacturer

Use only original spare parts.
Putzmeister Mörtelmaschinen GmbH accepts no liability for damage caused as a result of using non-original spare parts.

For maintenance work, consult a Putzmeister service engineer, or a dealer authorised by Putzmeister as shown in the service reference in the table.

Have the initial after-sales service carried out by a Putzmeister Mörtelmaschinen GmbH service engineer, or by a dealer authorised by Putzmeister Mörtelmaschinen GmbH.

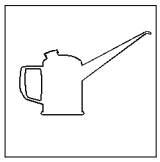


Criteria	Check ✓	Adjust ■	Replace ⇔	Clean ◇

Reference	Section	Service	MC
Description	Section contains a more detailed description	Maintenance work that should be performed by a service technician authorised by Putzmeister.	Maintenance chart

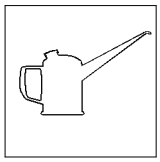
Action	daily	once after 50 h	every 50 h	every 100 h	every 150 h	every 300 h	every 400 h	every 500 h	every 1000 h	annually	every 2 years	other intervals	Reference
General machine													
Visual inspection: defects and leaks, rectify defects, seal leaks	✓	✓											
Check that the fastening bolts are seated correctly	✓	✓								✓		✓ 200 h	Section: General tightening torques
Electrical cabling: visual inspection, have repaired if necessary	✓	✓								✓			
Battery: check the acid levels				✓									MC 41-011
Charge the battery											⇔	✓ monthly	MC 41-011
Have a qualified service expert check for defects		✓										✓ 200 h	Service
Operational safety check (German Accident Prevention Regulation).										✓			Service
Delivery line: visual inspection for suitability, wear and damage, replace if necessary	✓												

Action	daily	once after 50 h	every 50 h	every 100 h	every 150 h	every 300 h	every 400 h	every 500 h	every 1000 h	annually	every 2 years	other intervals	Reference
General machine													
Lubricate the machine	⇔												MC 40-066 Section: Operating materials
Check the auger pump for wear and adjust or replace if necessary	✓												MC 46-028
Safety equipment													
EMERGENCY STOP button fully functional, have repaired if necessary	✓												Section: Function check of the EMERGENCY STOP button
Safety devices fitted and fully functional, have replaced if necessary	✓												Section: Safety equipment
Auger pump													
Check the output on the pressure gauge to detect wear, adjust if necessary or replace	■												MC 46-028
Replacing the screw conveyor												⇔ in case of wear	MC 46-027 MC 46-030
Checking the performance of the auger pump.												⇔ in case of wear	MC 46-028



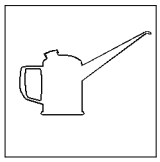
Action	daily	once after 50 h	every 50 h	every 100 h	every 150 h	every 300 h	every 400 h	every 500 h	every 1000 h	annually	every 2 years	other intervals	Reference
Engine													
Check engine oil level, top up if necessary	✓												Section: Checks
Engine oil		⇔										⇔ 200 h	MC 44-059
Engine oil filter		⇔										⇔ 200 h	MC 44-059
Check the dry air filter and clean if necessary	✓			◇						⇔		⇔ After cleaning for the 6th time	MC 44-096
Clean the dry air filter dust discharge valve												◇ weekly	MC 44-096
Check the intake air line, replace if necessary												✓ 200 h	
Intake air line											⇔		Service
Check fuel level, top up if necessary	✓												Section: Filling the machine with fuel
Fuel filter				◇			⇔						MC 44-140
Clean the fuel line filter, replace if necessary				◇			⇔						MC 44-140
Fuel line: check for leaks and wear, replace if necessary			✓								⇔		
Drain sludge from fuel tank								◇					
Cooler antifreeze protection												✓ if there is a risk of freezing	MC 44-095
Check radiator, clean cooling fins if necessary	✓							◇					MC 44-137

Action	daily	once after 50 h	every 50 h	every 100 h	every 150 h	every 300 h	every 400 h	every 500 h	every 1000 h	annually	every 2 years	other intervals	Reference
Engine													
Radiator hose: check for leaks and wear, replace if necessary											⇔	✓ 200 h	
Check coolant level, top up if necessary	✓												Section: Checks
Coolant											⇔		MC 44-090
Check the V-belt				✓									MC 44-138
Tighten or replace the V-belt								⇔					Service
Visual check: leaks	✓	✓										✓ 200 h	
Check engine feet mounting, tighten if necessary		✓										✓ 200 h	Section: General tightening torques
Check that hose connections and clamps are fastened securely, tighten if necessary		✓	✓										
Check the valve play and adjust												■ 800 h	Service
Cleaning the solenoid												◇ Every 6 months	MC 41-003
Check the turbocharger												✓ 3000 h	Service
Check the injection pressure of the fuel injection nozzle												✓ 1500 h	Service
Check the fuel injection pump												✓ 3000 h	Service
Check the fuel injection timer												✓ 3000 h	Service
Combustion pipes											⇔		Service



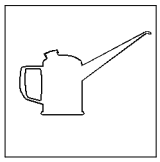
Action	daily	once after 50 h	every 50 h	every 100 h	every 150 h	every 300 h	every 400 h	every 500 h	every 1000 h	annually	every 2 years	other intervals	Reference
Hydraulic system													
Hydraulic hoses: visual inspection for ageing, leaks and damage, replace if necessary	✓									✓		⇔ 6 years	MC 44-062
Visual check: leaks	✓												MC 44-062
Check the hydraulic fluid level, top up if necessary	✓												Section: Checks
Hydraulic fluid		⇔								⇔		⇔ 200 h	MC 44-092
Hydraulic filter		⇔										⇔ 200 h	MC 44-093
Have a qualified service expert check for defects		✓								✓			Service
Compressor													
Check the compressor oil level, top up if necessary	✓												Section: Checks
Check the V-belt		✓		✓									MC 44-138
Compressor oil									⇔				MC 44-019
Clean the ventilation plugs									◇				MC 44-019
Mixer													
Empty and clean the mixer	✓												Section: Cleaning the machine
Lubricate the mixer shaft bearings												⇔ 3 times a day	MC40-066 Section: Operating materials

Action	daily	once after 50 h	every 50 h	every 100 h	every 150 h	every 300 h	every 400 h	every 500 h	every 1000 h	annually	every 2 years	other intervals	Reference
Water supply fitting (depending on model)													
Water supply fitting antifreeze protection												✓ if there is a risk of freezing	MC 52-010
High-pressure cleaner (optional)													
Check the high-pressure cleaner oil level, top up if necessary	✓											✓ 200 h	MC 52-008
High-pressure cleaner antifreeze protection												✓ if there is a risk of freezing	MC 52-026



Action	daily	once after 50 km after wheel change	every 1,000 km	every 5,000 km	every 10,000 km	every 15,000 km	annually	every 2 years	other intervals	Reference
Axle and wheels (depending on model)										
Lighting equipment fully functional, have repaired if necessary	✓									Section: Lighting equipment
Check the tyres for wear, replace if necessary	✓									
Check inflation pressure, correct if necessary	✓	✓								Section: Technical data
Check that wheel nuts/ bolts are seated correctly, tighten if necessary		■							■ After the first 500 km	Section: Technical data
Grease wheel bearings				⇔			⇔			Service
Check the wheel bearings, adjust the play if necessary				✓			✓		■ After the first 500 km	Service
Check that the fastening bolts are seated correctly, tighten if necessary				✓			✓		■ After the first 500 km	Section: General tightening torques
Check support wheel for ease of movement, have repaired if necessary	✓									
Check that the support wheel is fully functional / moves easily, repair if necessary				✓			✓			Service
Support wheel: check that the locking toggle is seated correctly, tighten if necessary	✓									Service
Support wheel: check mounting, bracket and locking toggle, repair if necessary				✓			✓			Service

Action	daily	once after 50 km after wheel change	every 1,000 km	every 5,000 km	every 10,000 km	every 15,000 km	annually	every 2 years	other intervals	Reference
Axle and wheels (depending on the model)										
Ball hitch: check indicator, have replaced if necessary	✓									Section: Ball hitch
Ball hitch: check indicator, replace if necessary				✓			✓			Service
Grease ball hitch				⇔			⇔		⇔ 6 months / as required	
Check that the ball hitch is fully functional / moves easily, repair if necessary.				✓			✓			Service
Ball hitch: check that the fastening bolts are seated correctly, tighten if necessary				✓			✓			Service
Ball hitch: check play, repair if necessary									✓ 20,000 km	Service
Lubricate the towing gear									⇔ 6 months / as required	Section: Lubrication diagram
Trailer coupling rings: check that the fastening bolts are seated correctly, tighten if necessary				✓			✓			Service
Clean the towing gear and lubricate				◇			◇			Service
Check the towing gear, repair if necessary				✓			✓			Service



Action	daily	once after 50 km after wheel change	every 1,000 km	every 5,000 km	every 10,000 km	every 15,000 km	annually	every 2 years	other intervals	Reference
Axle and wheels (depending on the model)										
Towing gear: check that the fastening bolts are seated correctly, tighten if necessary				✓			✓			Service
Towing gear: check that the locking toggle is seated correctly, tighten if necessary	✓								■ 50 km after height adjustment	
Towing gear: check the rubber gaiter, replace if necessary				✓					✓ 6 months	Service
Towing gear: check the dampers, replace if necessary				✓			✓		⇔ 20,000 km, at least after 3 years	Service
Towing gear: check the play on the towing tube bearing, repair if necessary				✓			✓			Service
Towing gear: clean the spur gearing and lubricate							◇			Service
Lubricate the moving gear				⇔			⇔			Service

8.2 Other risks during maintenance work

Certain maintenance, inspection and servicing activities may constitute a risk to life and limb of the maintenance, inspection and servicing personnel or third parties.

Personal protective clothing

Refer to the chapter “Safety regulations” for information on requirements relating to personal protective equipment.

Danger

Failure to wear personal protective equipment poses a risk of serious personal injury. Always wear your personal protective equipment when performing maintenance, inspection and servicing work.
The additional personal protective equipment described in the chapter “Safety regulations” is also required.

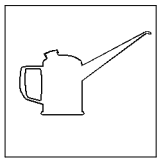
Personnel requirements

Maintenance, inspection and servicing work may only be carried out by specialist personnel. Personnel must have successfully completed a specialist training course that qualifies them to carry out such activities.

Inspection and maintenance personnel must have authorisation and the necessary technical qualification.

If none of your personnel are qualified to perform maintenance, inspection and servicing work, contact the After Sales department of the manufacturer to appoint a qualified specialist to maintain your machine.

Have the initial after-sales service carried out by a Putzmeister Mörtelmaschinen GmbH service engineer, or by a dealer authorised by Putzmeister Mörtelmaschinen GmbH.



Other risks

Certain maintenance, inspection and servicing activities may constitute a special risk of accident because protective devices may have to be removed to perform certain activities, for example. The following section outlines special residual risks that may arise during maintenance, inspection and servicing work.

Danger

Risk of injury from contact between skin and operating materials (e.g. hydraulic fluid). Avoid contact with operating materials. Always wear personal protective equipment. Observe the safety data sheets provided by the fluid manufacturer.

Danger

Risk of burns from hot operating materials and surfaces (e.g. engine, exhaust system and frame). Allow hot operating materials and surfaces to cool first. Always wear personal protective equipment. Cover hot surfaces using heat-resistant materials.

Danger

Risk of drawing in, pinching and shearing when raising or lowering mixing equipment. Working in this area is only permitted if the mixing equipment is adequately secured.

Danger

There is a risk of injury from thrashing hydraulic hoses. Mechanically pre-tightened hydraulic hoses may thrash around when the threaded union is loosened. Always wear personal protective equipment. Hold hydraulic hoses firmly when loosening the threaded union.

Danger

Risk of injury from accidental machine start-up. Before performing any maintenance, inspection or servicing work, shut down the machine and secure it against accidental start-up (e.g. lock control equipment). If this is not possible, enlist the help of a second person to prevent the machine from starting accidentally.

Danger

Eye and skin injuries from escaping hydraulic fluid if threaded unions are opened without first dumping the pressure in the entire system.

Danger

Injuries caused by the machine rolling away as a result of the brake, support legs or chocks becoming released.

8.3 Operating materials

This section lists all the operating materials used in your machine.

Caution

Putzmeister accepts no liability for damage resulting from the use of unauthorised operating materials. The documentation provided by the manufacturer is always decisive.

Consult the relevant service department at Putzmeister Mörtelmaschinen GmbH should you have any questions.

Environmental protection

You must carefully collect all operating materials, e.g. used oil, filters and auxiliary materials and dispose of them separately from other waste. Observe the national and regional regulations applicable to your area.
Only work with waste disposal companies who are approved by the responsible authorities.
You must keep used oils of various types separate in order to keep disposal costs as low as possible. Make sure different oils are never mixed.
Make contact with the appropriate authorities or waste disposal companies.

Refer also to section: “Maintenance intervals” for the change intervals of the operating materials.

Refer also to chapter: “General Technical Description” - section: “Technical data” for more information on fluid capacities.

Caution

The capacities are only approximate values. These may vary depending on the model and the quantity of oil remaining. The upper oil dipstick mark is always decisive.

Fuel

Fill the fuel tank only with fuels available from regular commercial outlets - otherwise the diesel engine could be damaged.
Use summer or winter diesel fuel depending on outside temperature!

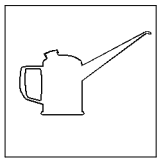
Caution

When filling with fuel, pay particular attention to cleanness!

Danger

Fill the machine with fuel only when the motor is at a standstill!

No smoking is allowed when you are filling up!
Never fill the fuel tank near naked flames or ignitable sparks.
Ensure that no fuel spills onto hot machine components while you are filling up. There is a risk of the fuel igniting!
Avoid naked flames at the machine and lock the fuel tank after refuelling - risk of fire!
Do not spill fuel!
Make sure that there are fire extinguishers in the vicinity of the machine.



Engine oil

The drive motor requires a year-round high pressure multigrade SAE 10W-40 oil.

The specified oil grades ensure perfect operation at ambient temperatures between -10 °C and 45 °C.

If the machine is used at other ambient temperatures, a separate request must be made regarding the required oil grade.
The oil should only be changed at operating temperature.
The first engine oil change is due during the initial customer service.

Notes

The drive motor has already been filled by the respective engine manufacturer.

Please refer to the documentation provided by the engine manufacturer for specifications on approved operating materials and the necessary fluid capacities.
Refer also to the documentation of the engine manufacturer.

Coolant

All water-cooled drive motors are filled with antifreeze ex works with a mixing ratio of 50% potable water. This produces antifreeze protection up to -35 °C.

Caution

Use only coolants and antifreezes specified by the engine manufacturer.
Antifreeze protection in accordance with manufacturer's specifications.
Refer also to the documentation of the engine manufacturer.

If there is insufficient antifreeze, the drive motor, cooling system and/or lines may burst in freezing conditions.

Hydraulic oil

The hydraulic system is filled with a
- mineral hydraulic fluid (HLP 46) or
- biologically degradable hydraulic fluid based on a synthetic ester base (HLP-E 46)

Notes

Please only use a hydraulic fluid complying with the requirements standard specified in the lubricant recommendation when topping up or for a full fluid change. Observe the manufacturer's information in doing so.

Danger

Never mix hydraulic fluids with different characteristics, i.e. do not mix biologically degradable hydraulic fluid with mineral hydraulic fluids etc.*

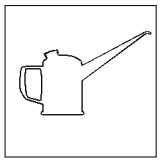
Compressor oil

The compressor requires a year-round grade high pressure multi-grade SAE 15W-40 oil.

The oil should only be changed at operating temperature.

Notes

Please only use a conventional multigrade engine oil complying with the requirements standard specified in the lubricant recommendation when topping up or for a full fluid change. Observe the manufacturer's information in doing so.



Mixer bearing

Use a multipurpose grease with a lithium soap based marked DIN 51 502: K2K, NLGI Class 2 to lubricate the mixer bearings.

The mixer bearings must be greased by hand at least three times a day.

Caution

Under no circumstances should you grease the plastic bushes with Molykote grease!

Axle and wheels

Lubricate the axle and wheels at least once a year using a universal grease for antifriction bearings and friction bearings (dropping point approx. 190 °C).

Maintenance in accordance with the moving gear manufacturer's specifications!

High-pressure cleaner (option)

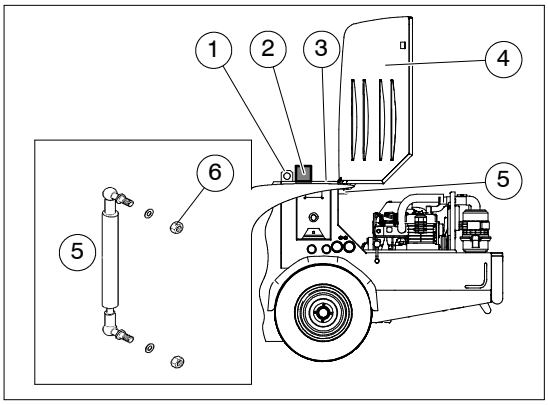
The high-pressure cleaner requires a year-round high-pressure multi-grade oil SAE 20W-30.

8.4 Maintenance work in the engine compartment

When performing maintenance work in the engine compartment that requires the hood to be opened completely, proceed as follows:

Danger

Never open the engine hood with the engine running.
Risk of injury!



Item	Designation
1	Jack ring
2	Timber block
3	Targa hoop
4	Hood
5	Gas-filled spring
6	Hexagon nut

▶ Place a timber block (2) of sufficient size on the Targa hoop (3) between the jack ring (1) and the hood (4).
⇒ This ensures that the hood is not damaged by the jack ring (1) when it is folded open.

Caution

The timber block must be large enough to prevent the hood from opening, resting on the jack ring and sustaining damage!

▶ Raise the hood (4) as far as the stop.

Danger

When the engine is switched off and the hood is subsequently opened, drive components may still be hot. Risk of injury!

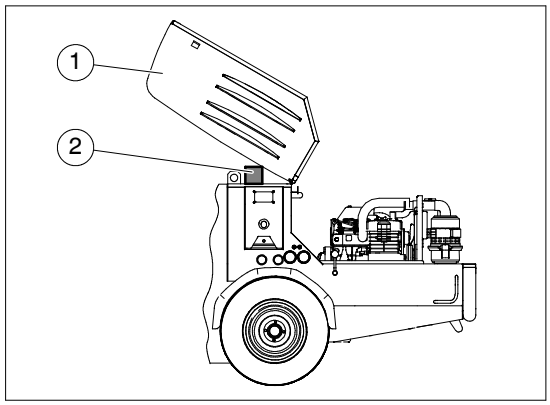
▶ Remove the hexagon nut (6) from the lower gas-filled spring.

▶ Hold the hood firmly, unhook the gas spring (5) sidewards from the bracket.

Danger

The hood could fall once the gas-filled spring has been detached - risk of injury.

▶ Carefully rest the hood back on the timber block as soon as the gas-filled spring has been detached.



Item	Designation
1	Hood
2	Timber block

The engine compartment is now freely accessible.

Maintenance charts

The following section contains the necessary maintenance charts for this machine. A summary of the maintenance charts listed by number is included in the table of contents.

Lubrication diagram

This maintenance chart shows you the location of the lubrication nipples for lubricating with a grease gun. You will find the maintenance intervals in the maintenance summary at the start of this chapter.

Notes

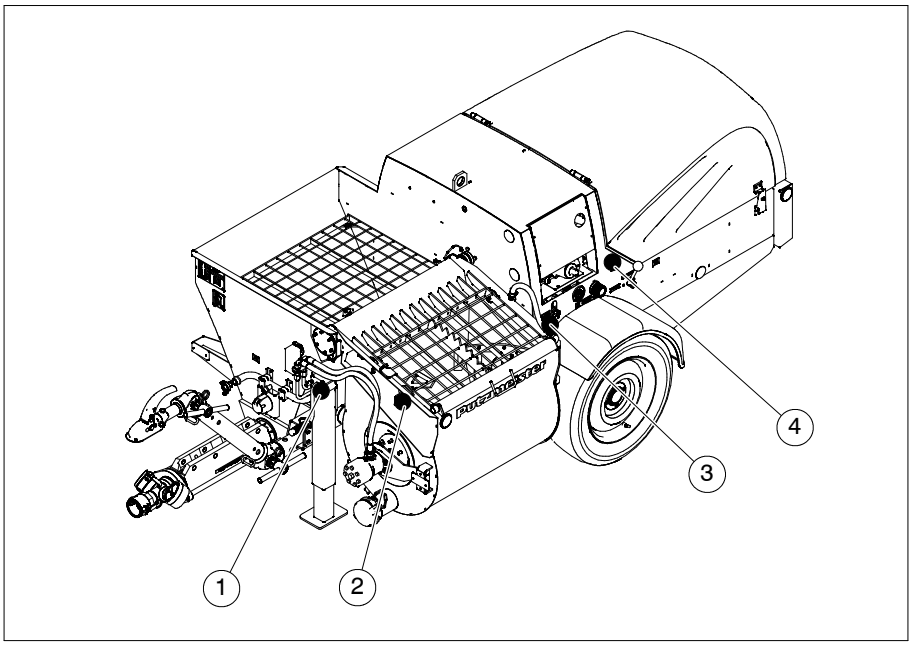
Maintenance, inspection and servicing work poses a particular risk of accident. Therefore always read the chapter "Safety regulations" and the description "Other risks during maintenance work" at the beginning of the "Maintenance" chapter.

The following special tool is required:
Grease gun

Notes

Use only lubricants specified in the lubricant recommendation table. The specified lubrication interval applies to normal operation. Under extreme operating conditions, more frequent lubrication may be necessary.

All the lubrication nipples have a red protective cap. There may be further lubrication nipples at the positions marked in the illustrations. At some points the lubrication nipples are located on the opposite side of the machine or inside the machine. Always lubricate until grease begins to escape.



Lubrication points on the machine.

No.	Designation
1	Support foot
2	Mixer grille latch
3	Bearing flange on lifting mixer
4	Auger pump drive

Cleaning the solenoids

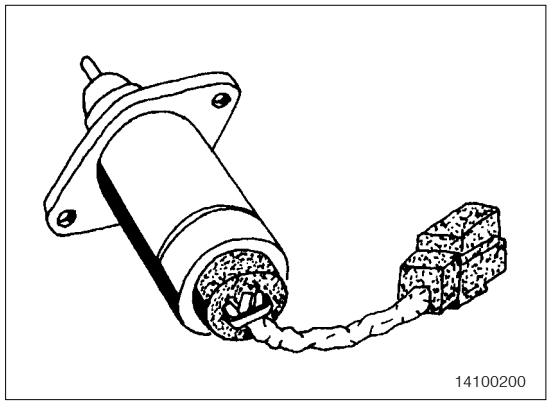
This maintenance chart describes how to clean the solenoid.
You will find the maintenance intervals in the maintenance summary at the start of this chapter.

Notes

Maintenance, inspection and servicing work poses a particular risk of accident. Therefore always read the chapter "Safety regulations" and the description "Other risks during maintenance work" at the beginning of the "Maintenance" chapter.

No further maintenance charts required.

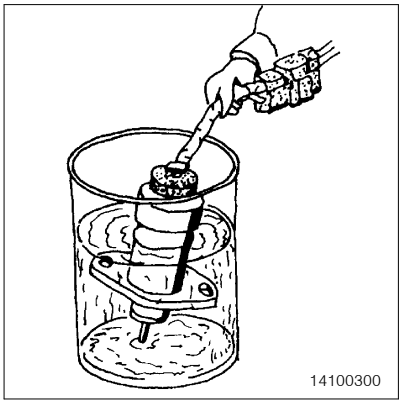
No special tools required.



1 Diesel engine solenoid

The starting solenoid for the diesel engine can become stiff from deposits of oil. This will mean that the machine will not start well. To prevent this occurring, dismantle the solenoid every six months - particularly at the beginning of the cold season - and clean as follows:

- Connect the solenoid to a power source:
  Black to negative
  Blue/red and white to positive
  Amperage 50 A
  Cable size 2.5
- Then immerse the disconnected solenoid approximately half way into a container filled with paraffin.



Immerse the solenoid half way up in paraffin

Caution

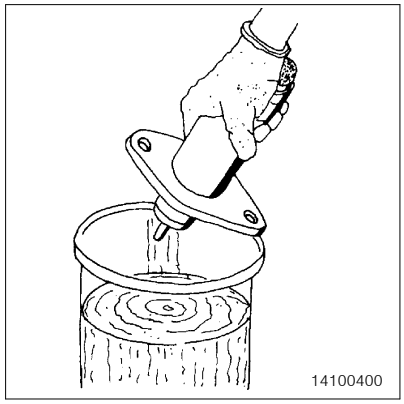
Never use petrol or water. Petrol attacks the rubber components and water can cause corrosion.

- Now turn the power on for 2 seconds, then off for 2 seconds. Repeat this action approximately 10 times.

Caution

The solenoid will become warm as a result of the high level of power consumption. This is why you should not switch on the power for longer than 2 seconds - the solenoid could otherwise break.

▶ Switch off the solenoid and remove it from the paraffin-filled container. Then switch it on and off again another 5-6 times for 2 seconds to allow the remaining paraffin to drain out of the solenoid.

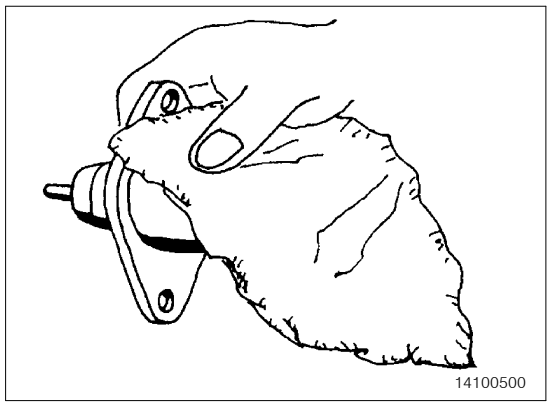


Remove the solenoid from the paraffin-filled container.

Caution

Do not overheat the solenoid since this may cause it to break.

▶ Now remove the plug and clean the outside of the solenoid.



Rub down the solenoid with a cleaning cloth

Checking acid level in the battery

This maintenance chart describes how to check the battery acid level.
You will find the maintenance intervals in the maintenance summary at the start of this chapter.

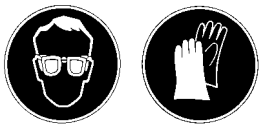
Notes

Maintenance, inspection and servicing work poses a particular risk of accident. Therefore always read the chapter "Safety regulations" and the description "Other risks during maintenance work" at the beginning of the "Maintenance" chapter.

Refer also to the maintenance charts:
General maintenance work

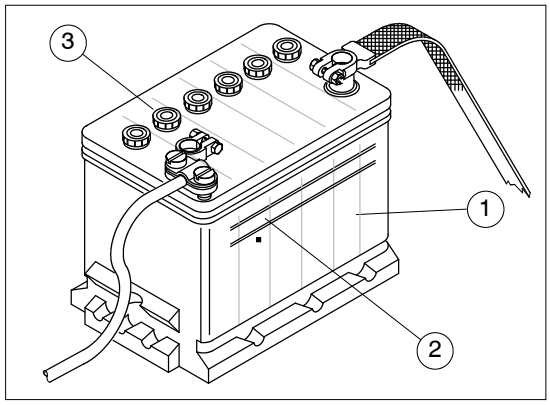
Danger

The gases given off by the battery are explosive. Avoid the creation of sparks or naked flames near the battery.
Battery acid (sulphuric acid) is caustic. Do not allow acid to come into contact with skin or clothing. If acid comes into contact with the skin, rinse off immediately with plenty of water.



Eye and skin protection
Wear protective goggles and gloves to protect yourself against injuries from battery acid.

Proceed as follows to check the acid level:



Item	Designation
1	Battery
2	Minimum/maximum mark
3	Cap on battery cell

▶ Check the acid level at the minimum/maximum mark.

To fill with distilled water, proceed as follows:

▶ Open each battery cell and fill with distilled water. The plates in the cells must be completely submerged in acid.

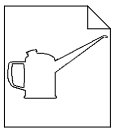
▶ Ensure that you close all the cells correctly.

Changing the oil in the compressor

This maintenance chart describes how to change the oil in the compressor.
You will find the maintenance intervals in the maintenance summary at the start of this chapter.

Notes

Maintenance, inspection and servicing work poses a particular risk of accident. Therefore always read the chapter "Safety regulations" and the description "Other risks during maintenance work" at the beginning of the "Maintenance" chapter.



No further maintenance charts required.

No special tools required.

Notes

You must make it impossible for dirt or other impurities to enter the compressor's oil system. The compressor's function can be impaired by small particles. Never leave oil filler cap off longer than necessary.

Change the oil once the compressor has warmed up.

Use SAE 15W40 engine oil according to the chapter "Lubricant recommendation".

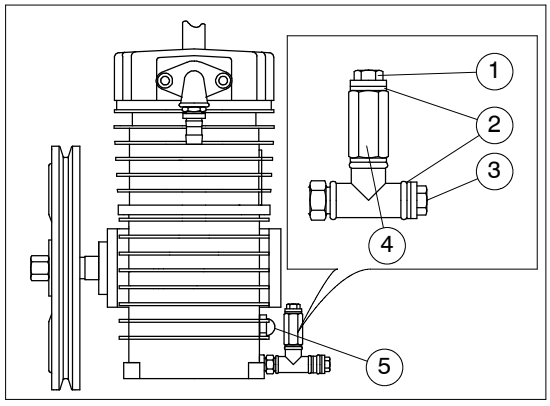
Preparation

The following tasks must be carried out on the deactivated machine before starting the oil change:

- ▶ Place the machine in a horizontal position.
- ▶ Open the hood.
- ▶ Remove the plastic plug in the base of the machine below the compressor.

Carry out the following steps for a full oil change:

Full oil change



1 Oil filler plug
2 Sealing ring
3 Oil drain plug
4 Oil filler
5 Oil inspection glass

- ▶ Place a sufficiently large oil sump pan near the compressor under the machine.
- ▶ Slowly unscrew the oil drain plug (3) and let the oil drain into the oil sump pan.
- ▶ Open the oil filler plug (1) to speed the process of draining.
- ▶ Once the used oil has completely drained, screw the oil drain plug (3) back into the drain opening with a new seal ring (2) and tighten it.
- ▶ Fill fresh oil into the oil filler (4) until the oil level is visible in the centre of the oil inspection glass (5).

Caution

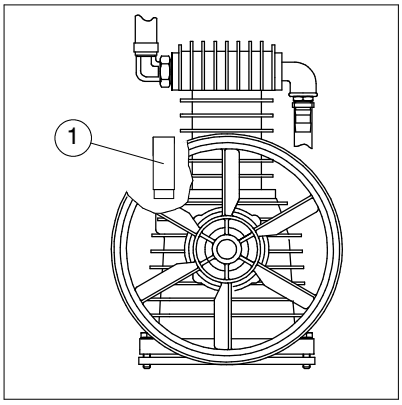
Max. oil level: overflow at oil filler (4).
Min. oil level: lower edge of oil inspection glass (5).

- ▶ Screw the oil filler plug (1) back into the oil filler (4) with a new seal ring (2) and tighten.
- ▶ Close the opening in the machine base under the compressor using the plastic plug.

Environmental protection

Always collect the old compressor oil. Guard against oil spillage. Discard collected oil in accordance with regulations!

Clean the ventilation plugs



1 Ventilation plug

You must unscrew and wash the ventilation plug (1) with petrol every month.

Danger

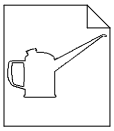
Oils, fuel and other operating fluids can pose a threat to health if they come into contact with the skin, or similar.
You must, therefore, always wear personal protective clothing and equipment when you are handling toxic, caustic or other operating materials that are injurious to health and always take note of the manufacturer's information.
Avoid naked flames - fire hazard!

Changing the engine oil and engine oil filter

This maintenance chart describes how to change the engine oil and engine oil filter.
You will find the maintenance intervals in the maintenance summary at the start of this chapter.

Notes

Maintenance, inspection and servicing work poses a particular risk of accident. Therefore always read the chapter "Safety regulations" and the description "Other risks during maintenance work" at the beginning of the "Maintenance" chapter.



Refer also to the maintenance charts:
General maintenance work

The following special tool is required:
Oil filter wrench
Oil drain hose

Notes

For changing the engine oil/engine oil filter, refer also to the documentation of the engine manufacturer.

Change the engine oil once the engine has warmed up. It is appropriate to change the engine oil and oil filter at the same time.

Use only original spare parts. Putzmeister Mörtelmaschinen GmbH accepts no liability for damage caused as a result of using non-original spare parts.

Caution

Ensure that dirt or other impurities cannot enter the engine oil system.

Maintenance and care work on the engine must only be carried out by a specialist authorised by Putzmeister Mörtelmaschinen GmbH or a technically qualified specialist workshop authorised by the engine manufacturer.

Environmental protection

Always collect the old engine oil with care. Guard against oil spillage. Separate the collected engine oil and old engine oil filter from other waste.
Dispose of all components in accordance with current applicable regulations!
Comply with the relevant national and regional regulations.
Only work with waste disposal companies who are approved by the responsible authorities.

Changing the engine oil filter

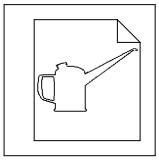
The engine oil filter is located on the same side as the engine.
Change the engine oil filter as follows:

- ▶ Place an oil catch pan under the engine oil filter.
- ▶ Always collect the escaping engine oil with care.

Danger

Take care when changing the engine oil filter.
There is a risk of burning. Work with protective gloves.

- ▶ Change the oil filter. Refer also to the documentation of the engine manufacturer.
- ▶ Dispose of the oil in the filter and the old filter element according to regulations.



Changing the engine oil

The oil drain plug for changing the engine oil is located underneath the engine.
Use the oil drain hose included in the scope of delivery.
Change the engine oil as follows:

Caution

Change the engine oil with the machine horizontal and supported.

- ▶ Place a sufficiently large oil catch pan under the machine.
- ▶ Guide the oil drain hose through the opening in the bottom plate on the right-hand wheel housing and connect it.

Danger

Take care when draining hot engine oil.
There is a risk of burning. Work with protective gloves.
Use the oil drain hose.

- ▶ Change the engine oil. Refer also to the documentation provided by the engine manufacturer.

Notes

Please refer to the documentation of the engine manufacturer for specifications on the tightening torques, the permissible lubricants and the necessary filling quantities.

Caution

The capacities are only approximate values and may vary depending on the model and quantity of oil remaining. The upper mark on the oil dipstick is always decisive.

- ▶ Remove the oil drain hose again.
- ▶ Dispose of the old oil in accordance with regulations.

Checking for leaks

The following checks are necessary after changing the oil and oil filter:

- ▶ Start the engine. Refer also to chapter: “Starting up” - section: “Starting the engine”.
- ▶ Allow the engine to run for approximately 2 minutes, checking for leaks from the oil drain plug and engine oil filter.
- ▶ Check the engine oil pressure at the “Engine oil pressure” signal lamp.
- ▶ Switch off the engine and check the oil level using the oil dipstick.
- ▶ Top up the oil level as necessary.
- ▶ Check the oil filter cartridge for leaks.
- ▶ Seal up any leaks that occur.

Checking and replacing hydraulic hoses

This maintenance chart describes how to inspect and replace the hydraulic hoses.
You will find the maintenance intervals in the maintenance summary at the start of this chapter.

Notes

Maintenance, inspection and servicing work poses a particular risk of accident. Therefore always read the chapter "Safety regulations" and the description "Other risks during maintenance work" at the beginning of the "Maintenance" chapter.

Refer also to the maintenance charts:
General maintenance work

Caution

Work on hydraulic equipment may only be carried out by persons with special knowledge and experience in hydraulic systems, who can provide appropriate certification of their expertise (training certificates).

Danger

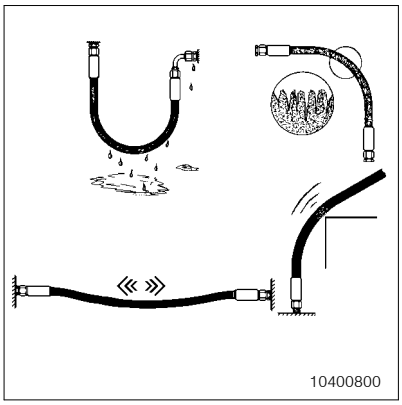
Hydraulic hose lines must not be more than six years old, including a storage period of two years. Take note of the date of manufacture on the hydraulic hose lines.

Risk of burns from hot machine components.
Allow the subassemblies to cool down.

Ensure that all pressures in the hydraulic system and in the delivery line have fallen to 0 bar.


Wear a face mask and gloves whenever you work on the hydraulic system. Escaping oil is toxic and can penetrate the skin.

Check for leaks



Damage to hydraulic hoses

Notes

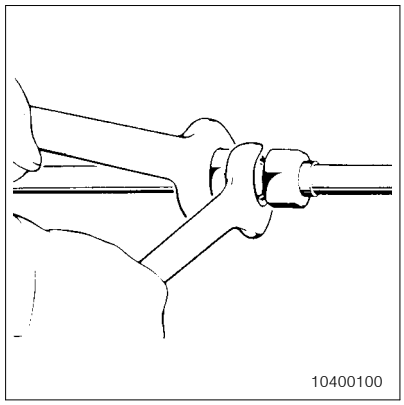
Check all hydraulic hoses (including hose fittings) with the machine switched off.
You must replace the hydraulic hoses at the slightest sign of damage or even a mere indication threatening damage.

Dark and moist patches on the fitting are external signs of incipient damage. Check:
- the hydraulic hoses for kinks, cracks or a porous surface and
- whether the hoses have been laid without restrictions.

Notes

Beware of strong sunlight, the action of heat and the effects of chemicals.

Checking the flared screwed joints



Tighten until there is a clearly perceptible increase in force

▶ Check whether the flared screwed joints are tight.

Notes

You may only tighten leaking flared screwed joints with the permitted tightening torque. Tighten the threaded union until you clearly feel an increase in the force required if you do not have a torque wrench available. You must replace these flared screwed joints if leaking continues.

Flared screwed joints					
Pipe outside diameter	**Type**	**Md [Nm]**	**Pipe outside diameter**	**Type**	**Md [Nm]**
6	L	20	16	S	130
8	L	40	18	L	120
10	L	45	20	S	250
12	L	55	25	S	400
	S	80	30	S	500
15	L	70	38	S	800

Replacing hydraulic hose lines

When replacing hydraulic hoses, proceed as follows:

Danger

Shut down the machine before starting work and secure it against unauthorised or accidental starting.

Ensure that all pressures in the hydraulic system and in the delivery line have fallen to 0 bar.

Hydraulic hoses may be mechanically prestressed. There is a risk of injury from whipping hoses.

▶ Relieve oil pressure completely.

Notes

Mark all hydraulic hoses and their corresponding connection points for reassembly.

Environmental protection

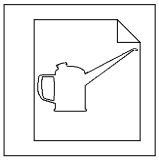
Carefully collect escaping hydraulic fluid without fail and dispose of in accordance with regulations! Guard against oil spillage. Biologically degradable hydraulic fluids must also be disposed of separately from other waste, just like mineral hydraulic fluids.
Comply with the relevant national and regional regulations.
Only work with waste disposal companies who are approved by the responsible authorities.

▶ Collect escaping hydraulic fluid in a suitable oil catch pan.

▶ Take care when undoing the joints.

▶ Close the connection points with a plug immediately after you have removed the old hydraulic hoses. No dirt may enter the hydraulic circuit and the hydraulic circuit must not be drained.

▶ Dispose of the collected hydraulic fluid properly.



Caution

Cleanliness is of the greatest possible importance in the maintenance of hydraulic systems. Ensure that dirt or other impurities cannot enter the hydraulic system. Even small particles may cause valves to be scored, pumps to seize and throttle and control bores to become blocked. Never leave the reservoir lid open longer than necessary.

- ▶ Make sure the hydraulic hoses are kept free of dirt at all times!
- ▶ Fit the new hydraulic hoses without kinks or friction points!

Notes

Always tighten connections to the permitted tightening torque.

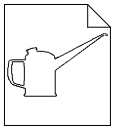
- ▶ Vent the hydraulic system.
- ▶ Check the hydraulic functions in a series of test runs.
  Check the hydraulic system for leaks and top up the hydraulic fluid level as required.
- ▶ Check all hydraulic hoses again!
- ▶ Refit safety equipment and replace all markings and information plates.

Changing the coolant

This maintenance chart describes how to change the coolant.
You will find the maintenance intervals in the maintenance summary at the start of this chapter.

Notes

Maintenance, inspection and servicing work poses a particular risk of accident. Therefore always read the chapter "Safety regulations" and the description "Other risks during maintenance work" at the beginning of the "Maintenance" chapter.



Refer also to the maintenance charts:
General maintenance tasks
Antifreeze protection for the radiator
Cleaning the cooling fins on the radiator

Notes

See also the documentation provided by the engine manufacturer for information on maintenance and antifreeze protection for the cooling system as well as fluid capacities.

Change the coolant with the machine horizontal and supported.

Caution

Use only coolants and antifreezes specified by the engine manufacturer.

If there is inadequate antifreeze, the engine, radiator and/or lines may burst in freezing conditions.

Danger

Change or add coolant only when the machine is at a standstill.
Open the cap on the expansion tank only when the engine has cooled.
There is a risk of burning. Work with protective gloves.

Environmental protection

Carefully collect the escaping coolant and keep it separate from other waste.
Dispose of all components in accordance with current applicable regulations!
Comply with the relevant national and regional regulations.
Only work with waste disposal companies who are approved by the responsible authorities.

The following steps describe how to change the coolant:

- ▶ Place a sufficiently large catch pan under the machine.
- ▶ Always take care when collecting escaping coolant.
- ▶ Replace the coolant. Refer also to the documentation provided by the engine manufacturer.
- ▶ When preparing coolant, observe the specifications regarding antifreeze protection. Always add antifreeze in the correct ratio. Refer also to the documentation provided by the engine manufacturer.

Maintenance chart: *Antifreeze protection for the radiator*

Refer also to chapter: “General Technical Description” - section: “Technical data” for more information on fluid capacities.

Caution

The capacities are only approximate values and may vary depending on the design and quantity remaining. The upper fill level mark is always decisive.

- ▶ Dispose of the used coolant according to regulations.

Check for leaks

The following checks are necessary after the coolant has been changed:

- ▶ Start the engine. Refer also to chapter: “Starting up” - section: “Starting the engine”.
- ▶ Leave the engine to run for approximately 2 minutes, checking for leaks from the cooling system.
- ▶ Switch off the engine and check the coolant level at the expansion tank.
- ▶ Top up the coolant level if necessary.
- ▶ Seal up any leaks that occur.
- ▶ Check the radiator for contaminant deposits and remove them if necessary.

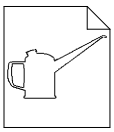
Maintenance chart: *Cleaning the cooling fins on the radiator*

Changing the hydraulic fluid

This maintenance chart describes how to change the hydraulic fluid. You will find the maintenance intervals in the maintenance summary at the start of this chapter.

Notes

Maintenance, inspection and servicing work poses a particular risk of accident. Therefore always read the chapter "Safety regulations" and the description "Other risks during maintenance work" at the beginning of the "Maintenance" chapter.



Refer also to the maintenance charts:
General maintenance tasks
Changing the hydraulic filter
Checking and replacing hydraulic hoses

Notes

Change the hydraulic fluid with the machine at service temperature. It is practical to change the hydraulic fluid and hydraulic filter at the same time.

Change the hydraulic fluid with the machine horizontal and supported.

Caution

Work on hydraulic equipment may only be carried out by persons with special knowledge and experience in hydraulic systems, who can provide appropriate certification of their expertise (training certificates).

Cleanliness is of the greatest possible importance in the maintenance of hydraulic systems. Ensure that dirt or other impurities cannot enter the hydraulic system. Even small particles may cause valves to be scored, pumps to seize and throttle and control bores to become blocked.
Never leave the hydraulic fluid reservoir open longer than necessary!

Clean bungs, filler lids and the area around them before changing oil.

Check all seals and replace if damaged.

Wear a face mask and gloves whenever you work on the hydraulic system. Escaping fluid is toxic and can penetrate the skin.

Danger

Change the hydraulic fluid only with the machine at a standstill and the hydraulic system depressurised! Ensure that all pressures have fallen to 0 bar. Only open the plug screw once pressure has been fully dumped.

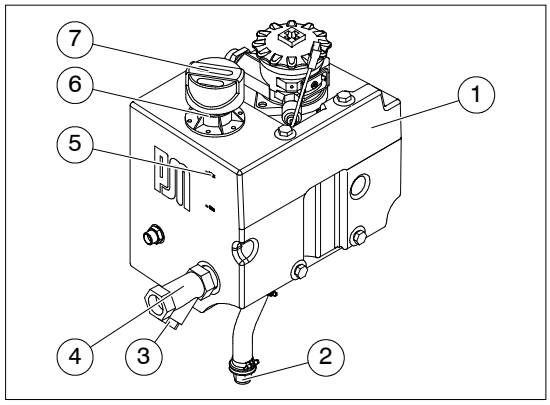
Take care when changing the filter and draining hot oil.
There is a risk of burning.

Environmental protection

Collect the old hydraulic fluid and dispose of it in accordance with the local specifications. Guard against oil spillage. Separate the collected hydraulic fluid and the used filter inserts from other waste. Dispose of all components in accordance with current applicable regulations!
Comply with the relevant national and regional regulations.
Only work with waste disposal companies who are approved by the responsible authorities.

The hydraulic fluid reservoir is located under the hood in the engine compartment.
The following steps describe how to change the hydraulic fluid:

▶ Place a sufficiently large oil catch pan under the machine.



Item	Designation
1	Hydraulic fluid reservoir
2	Oil drain plug
3	Screw plug
4	Dirt trap
5	Fill level indicator
6	Oil filler
7	Cover for oil filler pipe

▶ Carefully unscrew the oil drain plug on the hydraulic fluid reservoir and drain the old fluid into the oil catch pan.

▶ In addition, you can turn the cap on the oil filler pipe to open it slightly so that the hydraulic fluid can drain faster.

- ▶ Insert the oil drain plug again with a new seal ring and tighten.
- ▶ Dispose of the old oil in accordance with regulations.
- ▶ Remove the screw plug from the dirt trap.
- ▶ Remove the screen from the dirt trap and clean thoroughly (e.g. using benzene).
- ▶ Insert the screen in the dirt trap again.
- ▶ Screw the screw plug back onto the dirt trap.
- ▶ Change the hydraulic filter.

Maintenance chart: *Changing the hydraulic filter*

Notes

Only fill the hydraulic fluid reservoir through the filling screen in the filler pipe.
Only fill the reservoir to the "Maximum" mark in the fill level indicator.

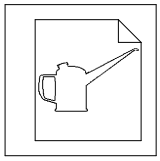
Use only the hydraulic fluids oils specified in the lubricant recommendation.

- ▶ Refill the hydraulic fluid reservoir through the filling screen in the oil filler.

Refer also to chapter: "General Technical Description" – section: "Technical data" for more information on fluid capacities.

Caution

The capacities are only approximate values and may vary depending on the model and quantity of oil remaining. The upper mark on the fill level indicator is always decisive.



- Check the hydraulic fluid level at the fill level indicator for the hydraulic fluid reservoir.
- Check all lines and threaded unions, tightening where necessary. Check the flared screwed joints. Replace any defective hydraulic hoses.

Maintenance chart: *Checking and replacing hydraulic hoses*

- Refit safety equipment and replace all markings and information plates.
- Carry out all function checks.
- Check the hydraulic functions with a series of test runs, check the system for leaks and top up the hydraulic fluid level as necessary.

Changing the hydraulic filter

This maintenance chart describes how to change the hydraulic filter. You will find the maintenance intervals in the maintenance summary at the start of this chapter.

Notes

Maintenance, inspection and servicing work poses a particular risk of accident. Therefore always read the chapter "Safety regulations" and the description "Other risks during maintenance work" at the beginning of the "Maintenance" chapter.

Refer also to the maintenance charts:
General maintenance work

Notes

Change the hydraulic fluid filter with the machine at service temperature.
It is practical to change the hydraulic fluid and hydraulic filter at the same time.

Caution

Work on hydraulic equipment may only be carried out by persons with special knowledge and experience in hydraulic systems, who can provide appropriate certification of their expertise (training certificates).

Cleanliness is of the greatest possible importance in the maintenance of hydraulic systems. Ensure that dirt or other impurities cannot enter the hydraulic system. Even small particles may cause valves to be scored, pumps to seize and throttle and control bores to become blocked.
Never leave the hydraulic fluid reservoir open longer than necessary!

Clean bungs, filler lids and the area around them before changing filters.

Check all seals and replace if damaged.


Wear a face mask and gloves whenever you work on the hydraulic system. Escaping oil is toxic and can penetrate the skin.

Danger

Change the hydraulic fluid filter only with the machine at a standstill and the hydraulic system depressurised! Ensure that all pressures have fallen to 0 bar. Only open the plug screw once pressure has been fully dumped.

Take care when changing the filter and draining hot oil.
There is a risk of burning.

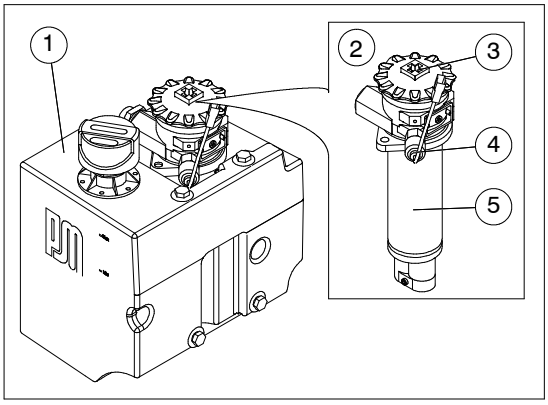
Environmental protection

Always take care when collecting the old hydraulic fluid.
Guard against oil spillage. Separate the collected hydraulic fluid and the used filter inserts from other waste.
Dispose of all components in accordance with current applicable regulations!
Comply with the relevant national and regional regulations.
Only work with waste disposal companies who are approved by the responsible authorities.

Changing the return line suction filter

The return line suction filter is located on the hydraulic fluid reservoir. Replace the filter cartridge on the return line suction filter when the contamination indicator shows.

Change the return line suction filter as follows:



Item	Designation
1	Hydraulic fluid reservoir
2	Return line suction filter
3	Cover
4	Contamination indicator sensor
5	Filter cartridge (case with filter insert)

- ▶ Place an oil catch pan of sufficient size in position.
- ▶ Unscrew the cover (4) from the return line suction filter (2).
- ▶ Remove the complete filter cartridge (5).
- ▶ Allow the hydraulic fluid to drain from the filter cartridge into the catch pan. Always take care when collecting the old hydraulic fluid.

- Remove the filter insert from the case.
- Dispose of the old filter insert and the drained hydraulic fluid in accordance with local specifications.

Caution

You must never attempt to clean filter inserts. You must always replace them.
Before you fit the new hydraulic filter, you must check all O-rings and other seals on the filter inserts and replace them if damaged.

- Clean the case thoroughly.
- Check all O-rings and other sealing elements. Replace them if damaged.
- Insert the new filter insert in the case.
- Insert the complete filter cartridge into the return line suction filter.
- Screw the cover back onto the return line suction filter.
- Refit safety equipment and replace all markings and information plates.
- Carry out all function checks.
- Check the hydraulic functions with a series of test runs, check the system for leaks and top up the hydraulic fluid level as necessary.

Antifreeze protection for the radiator

This maintenance chart describes antifreeze protection for the radiator.
If there is a danger of frost, you should check that there is sufficient antifreeze in the coolant and top up if necessary.

For all water-cooled engines, antifreeze with Putzmeister item number 273563002 is used ex works in a mixing ratio of 50 % potable water. This produces antifreeze protection up to -35 °C.

You will find the maintenance intervals in the maintenance summary at the start of this chapter.

Notes

Maintenance, inspection and servicing work poses a particular risk of accident. Therefore always read the chapter "Safety regulations" and the description "Other risks during maintenance work" at the beginning of the "Maintenance" chapter.

Refer also to the maintenance charts:
General maintenance tasks
Changing the coolant

The following special tool is required:
Antifreeze tester

Notes

See also the documentation provided by the engine manufacturer for information on maintenance and antifreeze protection for the cooling system as well as fluid capacities.

Caution

Use only coolants and antifreezes specified by the engine manufacturer.

If there is inadequate antifreeze, the engine, radiator and/or lines may burst in freezing conditions.

Danger

Change or add coolant only when the machine is at a standstill.
Open the cap on the expansion tank only when the engine has cooled.
There is a risk of burning. Work with protective gloves.

Mixing different types of antifreeze may generate hazardous materials! Refer also to the documentation provided by the engine manufacturer.

The following steps describe the antifreeze protection measures:

- ▶ Open the cap on the expansion tank.
- ▶ Check the antifreeze content using the antifreeze tester.
- ▶ Top up the antifreeze if necessary.

Maintenance chart: *Changing the coolant*

Notes

It is practical to add antifreeze when changing the coolant.

Only fill the expansion tank to the “Maximum” mark on the fill level indicator.

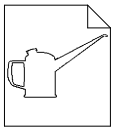
- ▶ Close the cap on the expansion tank again.

Cleaning and changing the dry air filter

This maintenance chart describes how to clean the dry air filter and replace the filter inserts.
You will find the maintenance intervals in the maintenance summary at the start of this chapter.

Notes

Maintenance, inspection and servicing work poses a particular risk of accident. Therefore always read the chapter "Safety regulations" and the description "Other risks during maintenance work" at the beginning of the "Maintenance" chapter.



Refer also to the maintenance charts:
General maintenance work

Danger

Wear respiratory protection and protective goggles to protect against particles of dust!

Risk of burning from hot engine components. Allow the subassemblies to cool down.Work with protective gloves.

Cleaning and changing filter element

The following steps describe how to clean and change the filter element:

- ▶ Open the retaining clips and fold them out of the way.
- ▶ Remove the filter cover.
- ▶ Pull the filter insert carefully from the filter housing. Avoid disturbing dust where possible.

Notes

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

- ▶ Clean the inside of the filter housing and cover with a clean cloth. Pay particular attention to cleaning the sealing surfaces.
- ▶ Inspect the filter element.If it is damaged, check all dry air filter connections and replace any damaged parts. A damaged filter element must be replaced and not reinstalled!

Face-mask and respiratory protector
A face-mask and respiratory protector protect you against particles of dust entering your body through your respiratory passages.

- ▶ Replace the filter cover on the filter housing to protect the air intake system during cleaning.
- ▶ Clean the filter element by blasting dry air along the folds from the inside to the outside.

Notes

When blowing out, the air pressure must not exceed 5 bar.
The filter element must not be damaged. A suitable distance must be maintained between hose nozzle and filter element.

- ▶ Record the cleaning date on the filter element so that you have documentation of the number of cleaning procedures carried out.

Notes

Filter inserts should be replaced after the third time of cleaning, or annually, depending on the degree of contamination.

- ▶ Place the cleaned or new filter element in the filter housing.
- ▶ Slide the filter lid back onto the casing. Ensure that it is correctly seated.
- ▶ Close the retaining clips. Ensure that the clips are also correctly seated.
- ▶ Reset the relevant air filter maintenance indicator after cleaning or changing the air filter insert by pressing the Reset button.

Cleaning the dust discharge valve

Clean the dust discharge valve as follows:

- ▶ Empty the dust discharge valve by pressing the discharge slot in direction of the arrow.
- ▶ Clean the discharge slot.
- ▶ Removing any dust caking by pressing the upper valve area.

Cleaning the radiator

This maintenance chart describes how to clean the radiator. The air side of the radiator can become clogged if the unit is operating in dusty conditions.Consequently, it is important to clean the cooling fins in the radiator at regular intervals.
You will find the maintenance intervals in the maintenance summary at the start of this chapter.

Notes

Maintenance, inspection and servicing work poses a particular risk of accident. Therefore always read the chapter "Safety regulations" and the description "Other risks during maintenance work" at the beginning of the "Maintenance" chapter.

Refer also to the maintenance charts:
General maintenance work

Caution

Do not use diesel fuel for cleaning purposes. Diesel fuel attacks rubber parts and encourages dust deposits in the cooling fins.

Do not use high-pressure cleaners. The cooling fins could be bent by the high pressure jet.

Danger

Never clean the radiator when at operating temperature.
There is a risk of burning.
Always carry out cleaning work when the machine is cold.

Wear respiratory protection and protective goggles to protect against particles of dust!

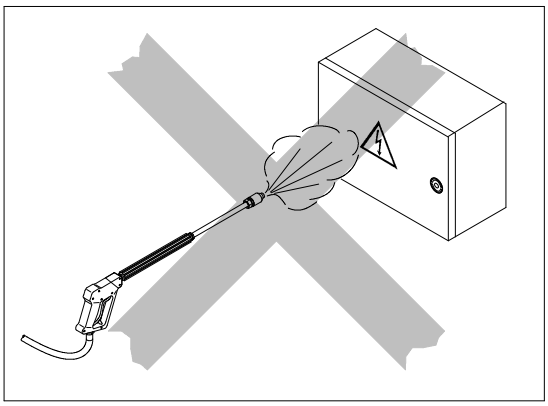
▶ Brush off light dirt with a soft brush or paint brush on the air side.

If they are badly clogged, wash out the cooling fins and dry them with compressed air.

Caution

Prior to cleaning with water or other cleaning agents, cover or seal all openings which water or cleaning agents must not penetrate for safety or operating reasons. Electric motors and switch cabinets are particularly at risk.

Completely remove the covers / seals after the cleaning process!



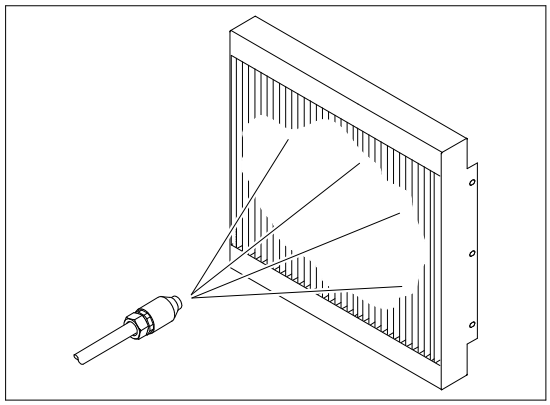
No water into electric systems

▶ Remove all electrical components such as fans (if fitted).

▶ Attach all necessary covers/seals.

Notes

Use a water hose with the correct nozzle to clean the radiator against the air flow. A line pressure of 4 bar is sufficient for this purpose. Where possible, always direct the water jet in the direction of the cooling fins.
A cold cleaner can be used.
You may use a paint brush or soft brush in addition to the water jet if the dirt is difficult to shift.
Please also ensure that the cooling fins are not damaged while doing this.



Spray the radiator down with a water jet

- In case of heavy contamination, wash out the cooling fins against the air flow.
- Then dry the cooling fins with compressed air.
- Completely remove all covers / seals after the cleaning process!
- Refit all dismantled electrical components such as fans (if fitted).

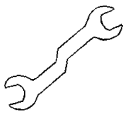
Checking the V-belt

This maintenance chart describes how to check the V-belt.
You will find the maintenance intervals in the maintenance summary at the start of this chapter.

Notes

Maintenance, inspection and servicing work poses a particular risk of accident. Therefore always read the chapter "Safety regulations" and the description "Other risks during maintenance work" at the beginning of the "Maintenance" chapter.

Refer also to the maintenance charts:
General maintenance work



No special tools required.

Notes

See also the engine manufacturer's operating instructions for chekking the V-belt.

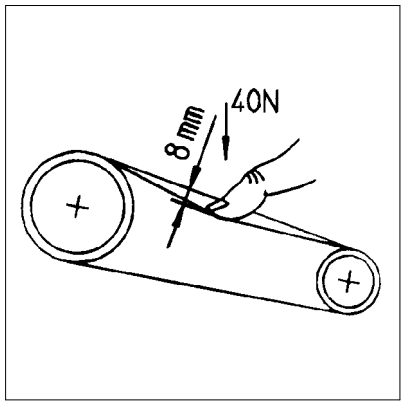
Caution

Maintenance work on the engine should only be carried out by a service engineer from Putzmeister Mörtelmaschinen GmbH, or by a specialised dealer authorised by Putzmeister Mörtelmaschinen GmbH.

Danger

Risk of burning from hot engine components. Allow the subassemblies to cool down. Work with protective gloves.

Checking the V-belt



Check V-belt tension

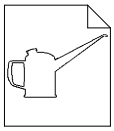
- ▶ Check the V-belt tension by pressing with your thumb.
  The V-belt must be retightened if it can be pressed in more than 8 mm.
- ▶ Have the V-belt tightened or replaced if necessary.
- ▶ Check the V-belt for damage or wear and have replaced if necessary.

Fuel filter

This maintenance chart describes how to change and drain the fuel filter.
You will find the maintenance intervals in the maintenance summary at the start of this chapter.

Notes

Maintenance, inspection and servicing work poses a particular risk of accident. Therefore always read the chapter "Safety regulations" and the description "Other risks during maintenance work" at the beginning of the "Maintenance" chapter.



Refer also to the maintenance charts:
General maintenance work

The following special tool is required:
Filter wrench

Notes

For changing the fuel filter, see also the engine manufacturer's documentation.

Use only original spare parts. Putzmeister Mörtelmaschinen GmbH accepts no liability for damage caused as a result of using non-original spare parts.

Caution

Ensure that dirt or other impurities cannot enter the fuel system.

Danger

Avoid fire and naked flame when changing the fuel filter. There is a danger of fire.

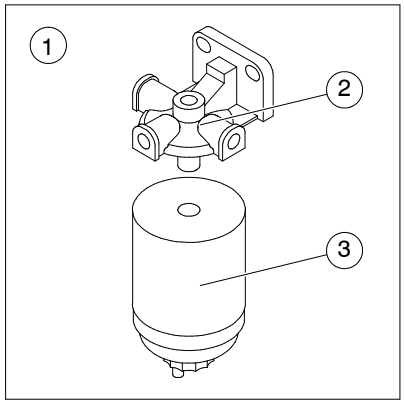
Take care when changing the fuel filter. There is a risk of burning. Work with protective gloves.

Environmental protection

Collect escaping fuel and avoid the fuel spillage.
Dispose of fuel and used filter cartridges according to regulations.
Comply with the relevant national and regional regulations.
Only work with waste disposal companies who are approved by the responsible authorities.

Changing the fuel filter

Several fuel filters may be available depending on the design.



Different models available

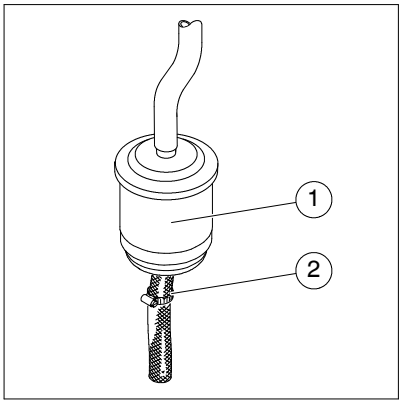
Item	Designation
1	Fuel filter
2	Filter head
3	Filter cartridge

Change the fuel filter as follows:

- ▶ Close the fuel cock (if available).
- ▶ Place a suitable oil sump pan under the fuel filter.
- ▶ Unscrew the filter cartridge (3) using a filter wrench.
- ▶ Collect the fuel from the filter and dispose of the filter cartridge according to regulations.
- ▶ Clean the sealing surface on the filter head (2) with a lint-free cloth.
- ▶ Lightly oil the sealing surface on the filter head and the seal on the new filter cartridge with engine oil.
- ▶ Screw on the new oil filter cartridge by hand until the seal is in position.
- ▶ Tighten the filter cartridge by a further half rotation.
- ▶ Open the fuel cock (if available).

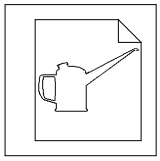
Changing the fuel line filter

There is one filter in the engine fuel line depending on the model.



Different models available

Item	Designation
1	Fuel line filter (depending on model)
2	Hose clamp



Change the fuel filter as follows:

- ▶ Close the fuel cock (if available).
- ▶ Place a suitable oil sump pan under the fuel line filter.
- ▶ Loosen the hose clamps (2) upstream and downstream of the fuel line filter (1).

Notes

Raise the ends of the hoses to prevent fuel from running out.

- ▶ Pull the fuel line filter from the hoses.
- ▶ Collect the escaping fuel and dispose of the fuel line filter according to regulations.
- ▶ Attach the new fuel line filter to the hoses. Pay attention to the flow direction.
- ▶ Tighten the hose clamps again.
- ▶ Open the fuel cock (if available).

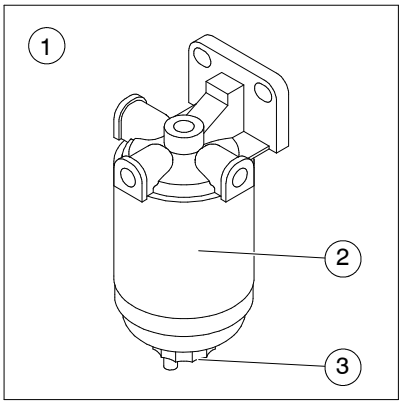
Checking for leaks

The following checks are necessary after you have changed the fuel filter:

- ▶ Start the engine. Refer also to chapter: “Starting up” - section: “Starting the engine”.
- ▶ Leave the machine to run for approx. 2 minutes.
- ▶ Then inspect all new fuel filters and fuel systems for leaks.
- ▶ Seal up any leaks that occur.

Draining water from the fuel filter

Several fuel filters may be available depending on the design.



Different models available

Item	Designation
1	Fuel filter
2	Filter cartridge
3	Drain plug

Drain water from the fuel filter as follows:

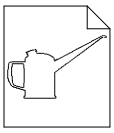
- ▶ Hold a suitable container under the drain plug (3) on the fuel filter.
- ▶ Open the drain plug and drain the water out until fuel escapes.
- ▶ Close the drain plug again.
- ▶ Comply with regulations when disposing of the water and fuel mixture.

Disassembly and assembly of the auger pump

This maintenance chart describes how to replace the auger pump. You will find the maintenance intervals in the maintenance summary at the start of this chapter.

Notes

Maintenance, inspection and servicing work poses a particular risk of accident. Therefore always read the chapter "Safety regulations" and the description "Other risks during maintenance work" at the beginning of the "Maintenance" chapter.

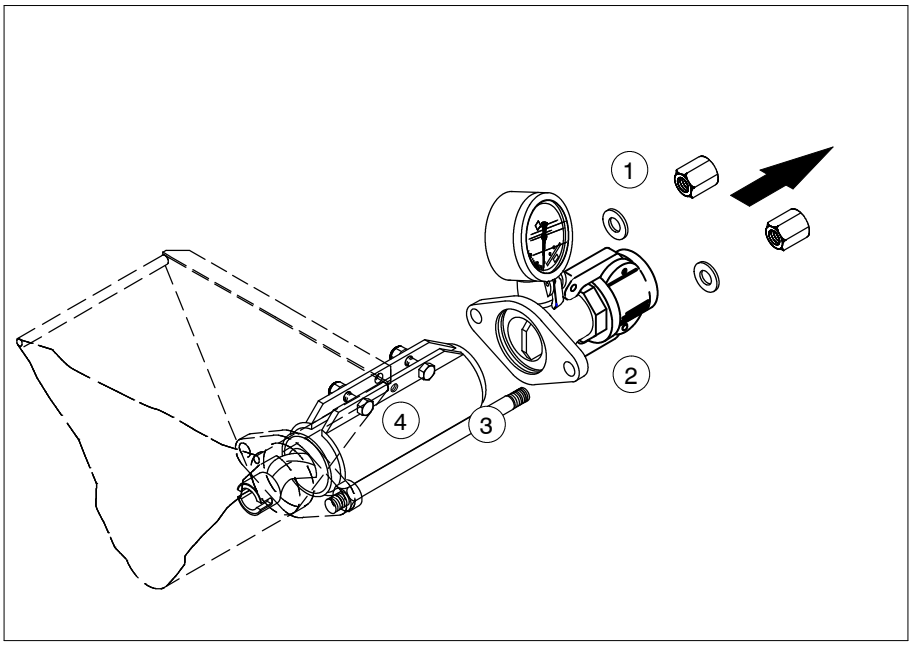


Refer also to the maintenance charts:
Replace the screw conveyor.

Notes

You must replace the wear parts if wear is identified during a visual inspection or if there is inadequate pressure build-up in the delivery line.

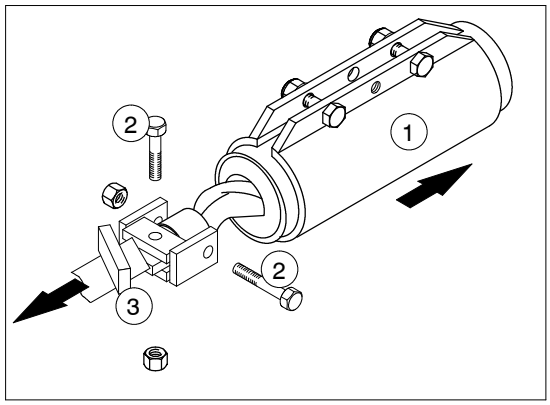
Disassembling the auger pump



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

▶ Unscrew the clamping nuts (1) on the tie bolt (3).

▶ Pull off the pressure connection (2).



Item	Designation
1	Auger pump
2	Through bolts
3	Cardan shaft

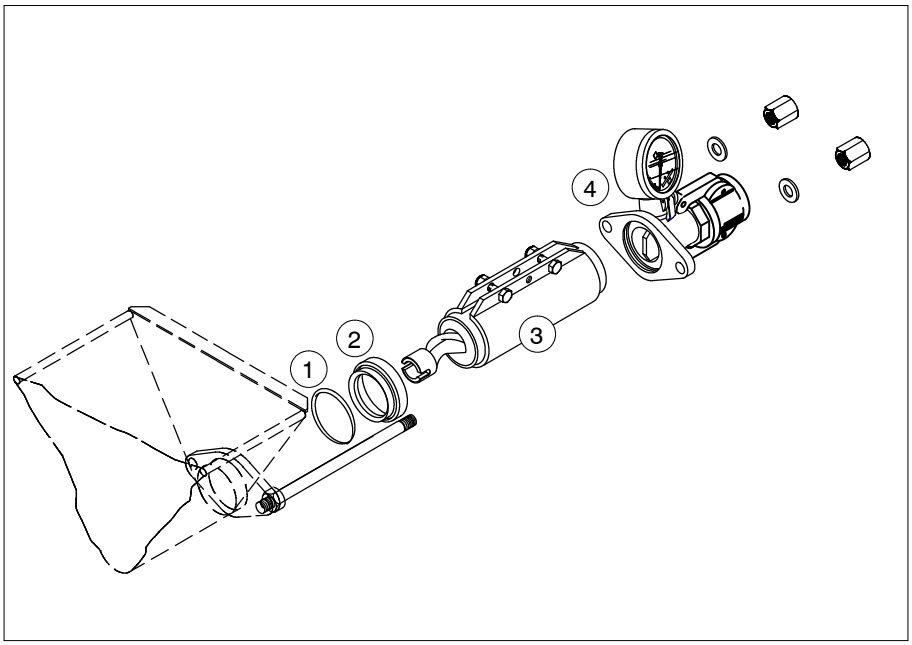
▶ Unscrew the through bolts (2) from the Cardan shaft (3).

▶ Pull the auger pump (1) from the hopper.

Notes

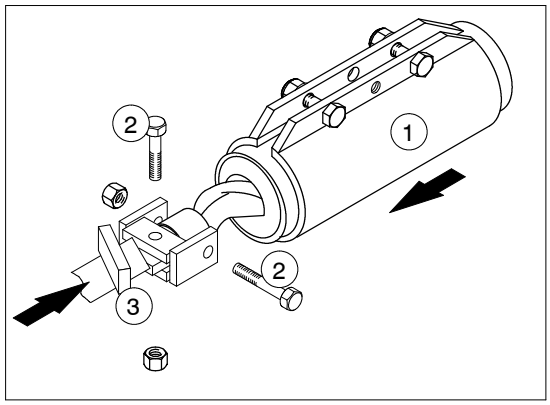
Replace the screw conveyor barrel and/or the screw conveyor with a new unit, if there is wear.

Assembling the auger pump



Item	Designation
1	O-ring
2	Spacer ring
3	Auger pump
4	Pressure connection

- ▶ Clean the O-ring (1) as required, replace if worn.
- ▶ Grease the O-ring (1) slightly before placing in the spacer ring (2) and then insert both into the side of the hopper.
- ▶ Insert the auger pump (3) into the spacer ring (2), then slide the pressure connection (4) onto the tie bolt and the auger pump (3) and align.

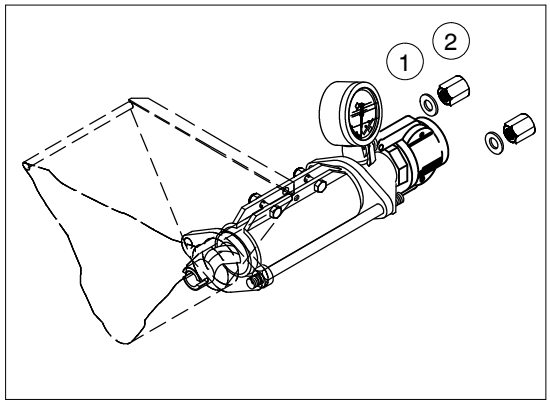


Item	Designation
1	Auger pump
2	Through bolts
3	Cardan shaft

▶ Fit the Cardan shaft (3) and auger pump (1) together and secure with the through bolts (2).

Caution

Only use new self-locking hexagon nuts.



Item	Designation
1	Washer
2	Clamping nut

▶ Place the washers (1) onto the tie bolts and screw on the clamping nuts (2), tightening the whole unit evenly.

Adjusting the auger pump

This maintenance chart describes how to adjust the auger pump. You will find the maintenance intervals in the maintenance summary at the start of this chapter.

Notes

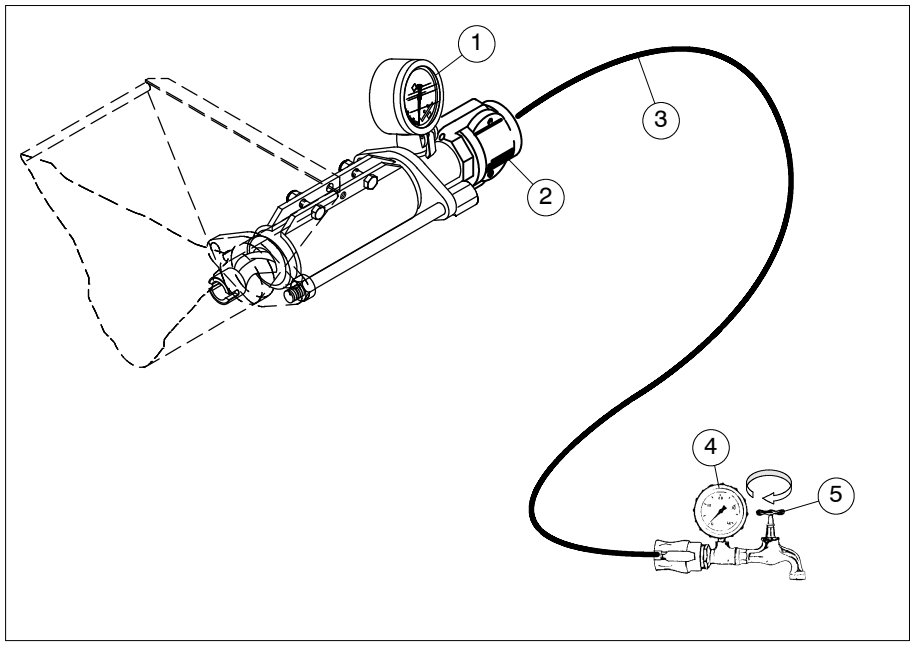
Maintenance, inspection and servicing work poses a particular risk of accident. Therefore always read the chapter "Safety regulations" and the description "Other risks during maintenance work" at the beginning of the "Maintenance" chapter.

Refer also to the maintenance charts:
Disassembly and assembly of the auger pump
Replacingthe the screw conveyor

The following special tool is required:
Checking gauge, Putzmeister Art. No. 208745.002

The performance of the auger pump is checked by means of water pressure with the machine running.

- ▶ Check whether the drain connection on the hopper is closed.
- ▶ Fill the hopper with water.

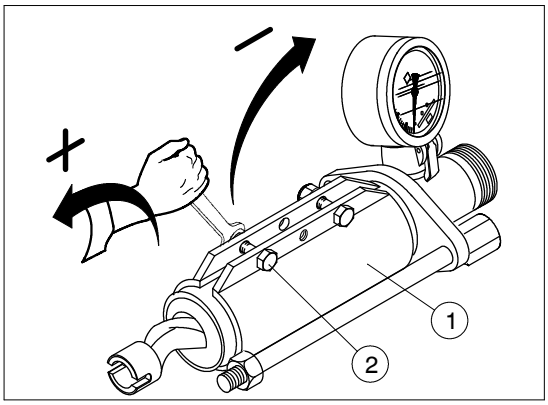


Item	Designation
1	Pressure gauge
2	Pressure connection
3	Delivery line
4	Checking gauge
5	Shut-off valve

- ▶ Connect a delivery line (3) to the pressure connection (2).
- ▶ Connect the checking gauge (4) to the end of the delivery line.
- ▶ Switch the machine on.
- ▶ Start operating the pump.
- ▶ Slowly close the shut-off valve (5) on the checking gauge (4).
  ⇒ Note that the pressure will increase.

Notes

If water pressure of approx. 20 bar is not reached at the checking gauge, increase the tension of the clamping sheath.



Item	Designation
1	Clamping sheath
2	Clamping bolt

▶ By tightening the clamping bolts (2) evenly, you increase the pretensioning.
⇒ The pressure increases.

Caution

If the clamping sheath (1) is tightened excessively, increased wear to the auger parts may result.
Pretension the clamping sheat only enough to achieve the required pressure.
If the required pressure cannot be achieved even at high pretension, you must dismantle the auger pump and check it for wear.

Notes

Repeat the test procedure to achieve an accurate measured result.

▶ Switch off the machine.

▶ Release the water pressure on the checking gauge.

▶ Disconnect the checking gauge.

Replacing the screw conveyor

This maintenance chart describes how to replace the screw conveyor.
You will find the maintenance intervals in the maintenance summary at the start of this chapter.

Notes

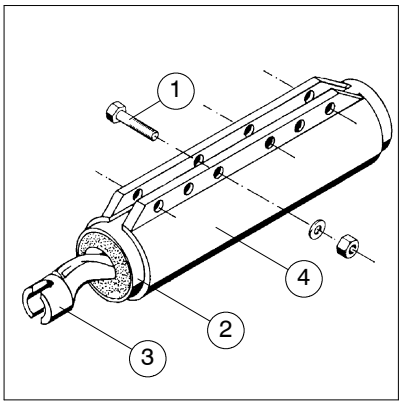
Maintenance, inspection and servicing work poses a particular risk of accident. Therefore always read the chapter "Safety regulations" and the description "Other risks during maintenance work" at the beginning of the "Maintenance" chapter.

Refer also to the maintenance charts:
Disassembling and assembling the auger pump

Notes

Only use genuine Putzmeister replacement parts.

Use original spare parts marked with the Putzmeister logo.



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

- ▶ Unscrew all clamping sheath bolts (1) and remove the auger barrel (2) and auger (3) from the clamping sheath (4).
- ▶ Clamp the screw conveyor barrel (2) and remove the auger (3) by rotating it anti-clockwise.
- ▶ Spray the new screw conveyor (3) with Putzmeister silicone spray.
- ▶ Insert the screw conveyor (3) into the clamped screw conveyor barrel (2) rotating it clockwise.
- ▶ Line up the end of the screw conveyor (3) and the screw conveyor barrel (2) so that they are flush.

Caution

The screw conveyor should be treated with Putzmeister silicone spray only prior to assembly.
Do not use used oil. Used oil corrodes the rubber.

High-pressure cleaner

This maintenance chart describes how to check the fluid level on the high-pressure cleaner.
You will find the maintenance intervals in the maintenance summary at the start of this chapter.

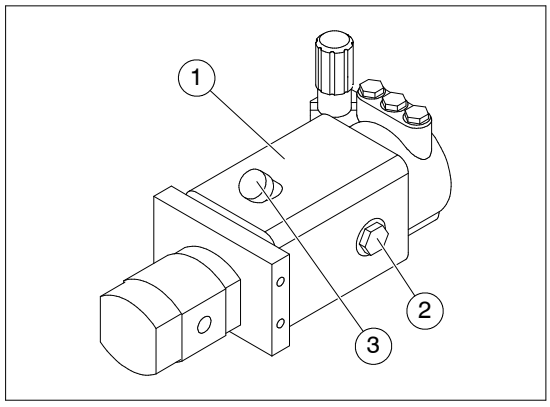
Notes

Maintenance, inspection and servicing work poses a particular risk of accident. Therefore always read the chapter "Safety regulations" and the description "Other risks during maintenance work" at the beginning of the "Maintenance" chapter.

Refer also to the maintenance charts:
General maintenance tasks
High-pressure cleaner antifreeze protection measures

Fluid level check

The high-pressure cleaner is located under the hood in the engine compartment.
Check the fluid level as follows:



Different models available

Item	Designation
1	High-pressure cleaner
2	Inspection glass
3	Bleed connection

▶ Check the fluid level for the high-pressure cleaner (1) at the inspection glass (2) and top up fluid if necessary.

Top up fluid

Top up the fluid as follows:

▶ Open the bleed connection.

Notes

Ensure that dirt or other impurities cannot enter the high-pressure cleaner.

Top up the fluid level of the high-pressure cleaner to the middle of the inspection glass.

Caution

The high-pressure cleaner requires a year-round high-pressure multi-grade oil SAE 20W-30.

▶ Now add new fluid through the bleed connection until the required fluid level has been reached.

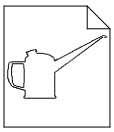
▶ Close the bleed connection securely.

Water supply fitting antifreeze protection

This maintenance chart describes antifreeze protection measures for the water supply fitting.
You will find the maintenance intervals in the maintenance summary at the start of this chapter.

Notes

Maintenance, inspection and servicing work poses a particular risk of accident. Therefore always read the chapter "Safety regulations" and the description "Other risks during maintenance work" at the beginning of the "Maintenance" chapter.



Refer also to the maintenance charts:
General maintenance tasks
High-pressure cleaner antifreeze protection measures

Freezing temperatures can cause the water in the water supply fitting and lines to freeze and result in components bursting.

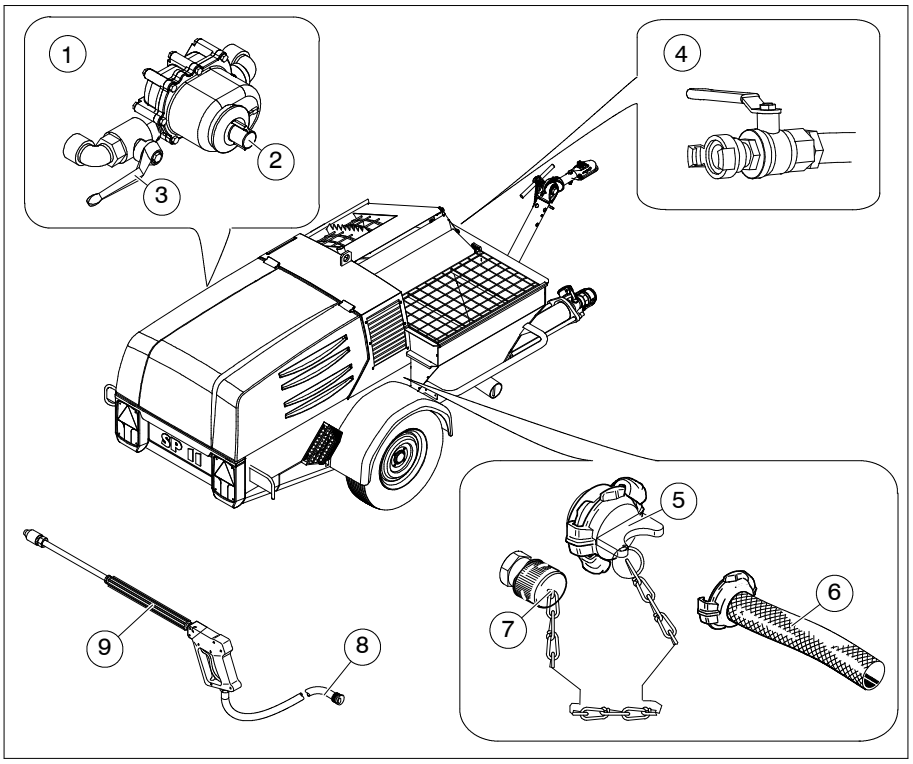
Caution

The machine and lines must be drained fully of residual water if there is a risk of freezing.
Only operate and store the machine in a frost-free location.

The following steps describe the antifreeze protection measures:

▶ Add antifreeze to the high-pressure cleaner.

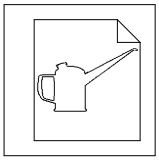
Maintenance chart: *High-pressure cleaner antifreeze protection*



Item	Designation
1	Water supply fitting
2	Water meter
3	Ball valve
4	Air valve
5	Water inlet connection
6	Air hose
7	High-pressure cleaner connector
8	High-pressure hose
9	Cleaning gun

▶ Attach the air hose (6) to the water inlet connector (5).

▶ Attach the high-pressure cleaner connector (7).



- Start the engine. Refer also to chapter: “Starting up” - section: “Starting the engine”.
- Set the water quantity (approx. 30 l) on the water meter (2).

Caution

The water meter setting must be higher than 0. Otherwise the water supply fitting may become damaged.

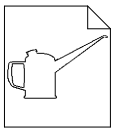
- Open the air valve (4) on the air valve fitting.
- Open the ball valve (3) on the water supply fitting and leave open until water stops flowing from the water sprinkler into the mixer drum.
- Close the ball valve on the water supply fitting.
- Close the air valve on the air valve fitting.
- Connect the high-pressure hose (8) to the cleaning gun (9).
- Connect the high-pressure hose to the high-pressure cleaner connector (7).
- Open the air valve on the air valve fitting.
- Open the cleaning gun and keep it open until water no longer escapes from the spray nozzle.
- Close the air valve on the air valve fitting.
- Detach the air hose from the water inlet connector.
- Switch off the machine. Refer also to chapter “Starting up” - section “Shutting down the machine after initial operation”.

High-pressure cleaner antifreeze protection measures

This maintenance chart describes antifreeze protection measures for high-pressure cleaners.
You will find the maintenance intervals in the maintenance summary at the start of this chapter.

Notes

Maintenance, inspection and servicing work poses a particular risk of accident. Therefore always read the chapter "Safety regulations" and the description "Other risks during maintenance work" at the beginning of the "Maintenance" chapter.



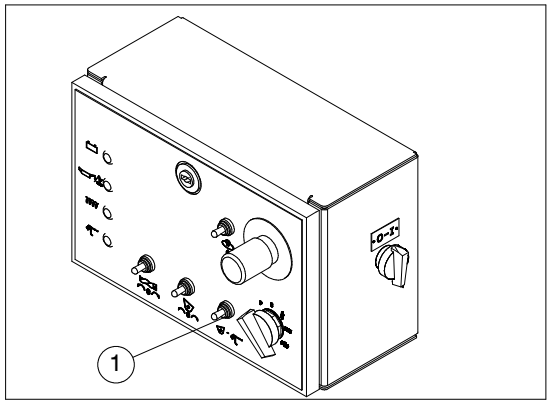
Refer also to the maintenance charts:
General maintenance tasks
High-pressure cleaner

Freezing temperatures can cause the water in the high-pressure cleaner and lines to freeze and result in components bursting.

Caution

The machine and lines must be drained fully of residual water if there is a risk of freezing.
Only operate and store the machine in a frost-free location.

The following steps describe the antifreeze protection measures:



Item	Designation
1	“High-pressure cleaner ON / OFF” rocker switch

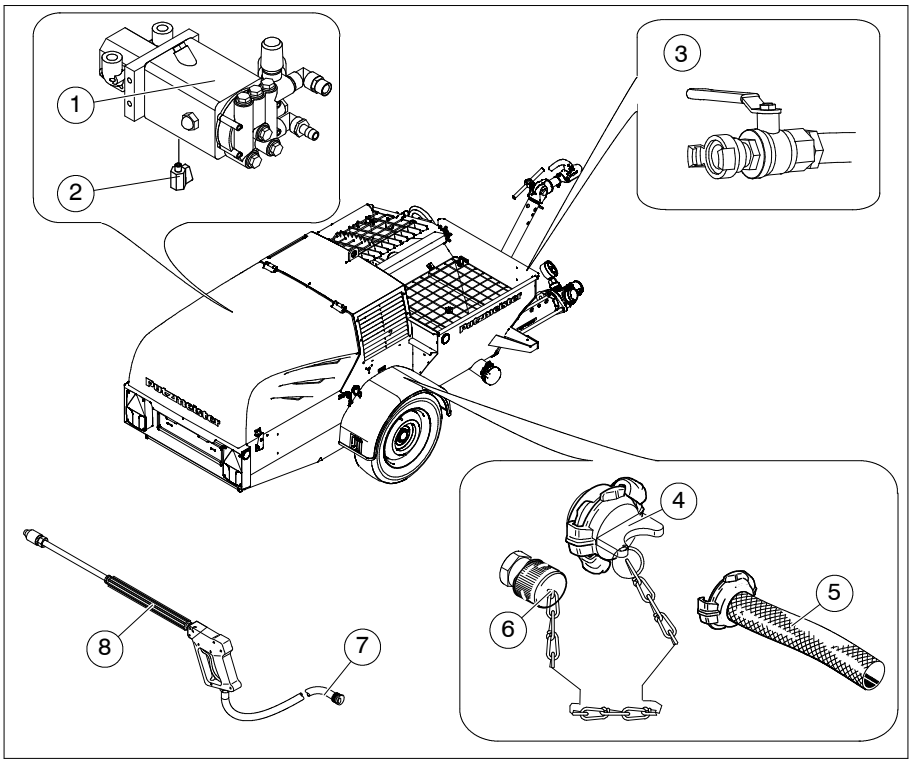
▶ Switch off the high-pressure cleaner using the “High-pressure cleaner ON / OFF” (1) rocker switch.
⇒ The high-pressure cleaner is switched off.

Caution

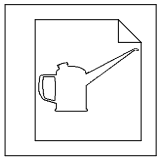
After cleaning with the high-pressure cleaner, you have to select the mixer unit again.
Otherwise the mixer unit will not function when the machine is operated again.

▶ Shut off the water supply.

▶ Disconnect the water supply line.



Item	Designation
1	High-pressure cleaner
2	Ball valve
3	Air valve
4	Water inlet connection
5	Air hose
6	High-pressure cleaner connector
7	High-pressure hose
8	Cleaning gun



- ▶ Attach the air hose (5) to the water inlet connector (4).
- ▶ Connect the high-pressure hose (7) to the cleaning gun (8).
- ▶ Connect the high-pressure hose to the high-pressure cleaner connector (6).
- ▶ Start the engine. Refer also to chapter: “Starting up” - section: “Starting the engine”.
- ▶ Open the air valve (3) on the air valve fitting.
- ▶ Actuate the cleaning gun (8) and release only when water stops escaping from the spray nozzle.
- ▶ Switch off the machine. Refer also to chapter “Starting up” - section “Shutting down the machine after initial operation”.
- ▶ Close the air valve on the air valve fitting.
- ▶ Detach the air hose from the water inlet connector.
- ▶ Open the ball valve (2) on the high-pressure cleaner (1).

Caution

Close the ball valves before starting the machine again.

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.

- ▶ Stop material feed.
- ▶ Pump the hopper empty.
- ▶ Allow the machine to pump in reverse for a short time and disconnect the delivery line.

Danger

You should only uncouple the delivery line when you have checked on the pressure gauge that the system is fully depressurised.
You must wear protective goggles.
Turn your face away when opening the line coupling.

- ▶ Switch off the machine as described in the chapter *"Shutting down the machine after operation"*.
- ▶ Clean the machine as described in the chapter *"Cleaning the machine"*.
- ▶ Shut down the machine only in current-free condition.

Continuation next side

Shutting the machine down

If you wish to take the drive motor out of service or place in storage, it must be greased and preserved as necessary.

Notes

Preservation and greasing the machine prevents corrosion and premature ageing. It is necessary, if the machine:
- *is not used for longer periods;*
- *is exposed to corrosive atmospheres during storage or transportation.*

- ▶ Lubricate the machine as described in the Lubrication diagram.
- ▶ Shut down the machine only in current-free condition.
- ▶ Protect the machine with a suitable agent.

Filling up the fuel tank

Fill up the fuel tank when work is completed. This prevents excessive condensation building up in the tank.

Notes

Never fill the reservoir beyond the "Filling" mark. This prevents fuel from emerging from the reservoir due to heating or inclination.
Never allow the fuel tank to run completely empty.

Danger

No smoking is allowed when you are filling up!
Never fill the fuel tank near naked flames or ignitable sparks.
Ensure that no fuel spills onto hot machine parts while you are filling up. There is a risk of the fuel igniting!

Frost protection

The machine must be drained fully of residual water if there is a risk of freezing.

Caution

The machine must be drained fully of residual water if there is a risk of freezing.

9.2 Final decommissioning, disposal

The final decommissioning and disposal requires 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.

Environmental protection

Final disposal of the machine is carried out by a qualified specialist company.

Danger

When decommissioning the machine permanently, escaping lubricants, solvents, preserving agents, etc. may pose a risk of injury. They can cause chemical burns in the event of direct skin contact. Risk of injury at sharp-edged machine components.

Continuation next side

Material used

The main materials used for machine construction were:

Material	Use for / in
Copper	– Cables
Steel	– Machine frame
	– Mixing hopper parts
	– Hopper parts
	– Pump units
	– Compressor components
	– Air valve components
Plastic, rubber, PVC	– Gaskets
	– Hoses
	– Cables
	– Wheels
Tin	– PCBs
Polyester	– PCBs

Parts requiring separate disposal

The following components and working materials must be separated prior to disposal:

Designation	Applies to ....
Electronic scrap	– Electrical supply
	– PCBs with electrical components
Oil	– High-pressure cleaner
	– Hydraulic pump
	– Hydraulic motor
	– Drive motor
	– Compressor

10 Appendix

10.1 General tightening torques

Tightening torques depend on bolt grade, thread friction and bolt head bearing area. The values given in the following tables are for guidance. These values should only be used if no other values are specified in the relevant chapters of the Operating Instructions or in spare parts sheets.

Caution

Bolts must always be replaced with bolts of the same size and grade.

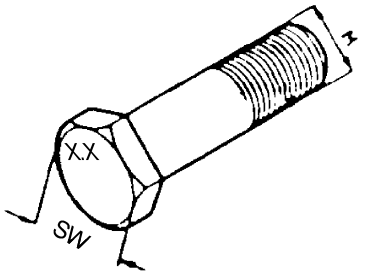
Bolts with adhesive in the locking threads and self-locking nuts must always be replaced after removal.

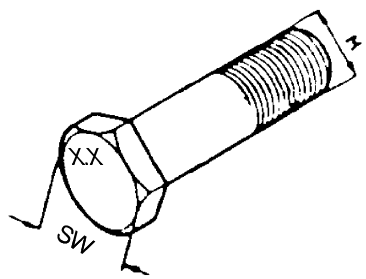
Continuation next side

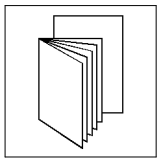
The tables below give the maximum tightening torques (maximum torque) in Nm for a friction factor of mtotal = 0.14, with the thread lightly-oiled or lightly-greased.

Notes

All tightening torques X 1.1 apply for bolts with cement in the thread.

Set screws – metric triangular thread, DIN 13, Part 13					
	Dimensions [mm]		Tightening torque Md [Nm]		
	M	SW	8.8	10.9	12.9
 SW = Width across flats (A/F) X.X = Grade 8.8, 10.9, 12.9	M 4	7	3.0	4.4	5.1
	M 5	8	5.9	8.7	10
	M 6	10	10	15	18
	M 8	13	25	36	43
	M 10	17	49	72	84
	M 12	19	85	125	145
	M 14	22	135	200	235
	M 16	24	210	310	365
	M 18	27	300	430	500
	M 20	30	425	610	710
	M 22	32	580	820	960
	M 24	36	730	1050	1220
	M 27	41	1100	1550	1800
	M 30	46	1450	2100	2450

Set screws – metric precision thread, DIN 13, Part 13					
	Dimensions [mm]		Tightening torque Md [Nm]		
	M	SW	8.8	10.9	12.9
 SW = Width across flats (A/F) X.X = Grade 8.8, 10.9, 12.9	M 8 × 1	13	27	39	46
	M 10 × 1.25	17	52	76	90
	M 12 × 1.25	19	93	135	160
	M 12 × 1.5	19	89	130	155
	M 14 × 1.5	22	145	215	255
	M 16 × 1.5	24	225	330	390
	M 18 × 1.5	27	340	485	570
	M 20 × 1.5	30	475	680	790
	M 22 × 1.5	32	630	900	1050
	M 24 × 2	36	800	1150	1350
	M 27 × 2	41	1150	1650	1950
	M 30 × 2	46	1650	2350	2750



10.2 Lubricant recommendation

We have listed all suitable lubricants and hydraulic fluids in the tables below. Putzmeister accepts no liability for the quality of the lubricants and hydraulic fluids listed or for changes in quality made by the lubricant producer without changing the grade designation.

Notes

If your machine is filled with extremely flammable hydraulic fluid ex works (HFC in accordance with 7th Luxembourg Report), please only use Putzmeister hydraulic fluid, item no. 239879002, when you top up or change the hydraulic fluid.

If your machine is filled with synthetic ester ex works, please only use Putzmeister hydraulic fluid, item no. 239693000, when you top up or change the hydraulic fluid.

Putzmeister accepts no liability for damaged caused by mixing hydraulic fluids from different producers.

Putzmeister accepts no liability for damaged caused by mixing oils from different producers.

If you wish to use hydraulic fluids with a viscosity grade different to VG46 (e,g, for higher ambient temperatures), please consult Putzmeister Mörtelmaschinen before filling your machine with this fluid.

When changing fluid from HLP to HEES, the residual oil content must not exceed 2%, i.e., a so-called flushing cycle must be carried out with a complete fill of new hydraulic fluid. For reasons of seal compatibility, the fluid should also be changed a max. of 6 months after putting the machine into service. You should also remember here that all filters must be replaced after 50 operating hours because the new fluid may dislodge any deposits and convey them to the filters.

Continuation next side

Caution

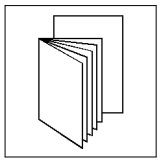
Note the following to avoid any damage:

- *If the hydraulic fluid temperature of the machine you wish to operate is below 0 °C, run the machine to operating temperature first. Allow the machine to run for a few minutes under no load.*
- *The machine should only be operated at full load when the temperature of the hydraulic fluid (VG46) is 10 °C or more.*
- *The ideal temperature of the hydraulic fluid (HLP or HEES, VG46) is between 40 °C and 70 °C.*

Danger

Never mix different types of hydraulic fluid, i. e. biodegradable hydraulic fluids with mineral hydraulic fluids, etc.

Continuation next side



	Engine oil	Gear-lubricant oil		Lubrication (manual)	Centralised lubrication system
Marking in accordance with DIN 51502	**HD**	**HYP**		**K2K-20**	**K1K-20**
Requirements standard	API CD/SF	API GL4		DIN 51 825	DIN 51 825
Characteristics	mineral			mineral, lithium soap	
Viscosity grade, NLGI Class	SAE 15W-40 DIN 51511	SAE 90 DIN 51512 standard	SAE 80 DIN 51512 Winter	NLGI Class 2 DIN 51818	NLGI Class 1 DIN 51818
PM	Part no. 000173005	Part no. 000101006	—	Part no. 360000009	Part no. 360001008
ARAL	Aral Multi Turboral engine oil SAE 15W-40	Aral transmission oil HYP SAE 85W-90	Aral gear-lubricant oil HYP SAE 80W	Aral Aralub HL 2 Aral multipurpose grease	—
BP	BP Vanellus Multigrade	BP Energear EP 90	BP Energear EP 80W	BP Energrease LS 2 BP multipurpose grease L2	BP Energrease LS-EP 1
DEA	DEA Cronos Super DX SAE 15W-40	Deagear EP-A SAE 85W-90	Deagear EP-A SAE 80W	Glissando 20	Paragon EP 1
elf	ELF PERFORMANCE XC 15W-40	TRANSELF EP SAE 80W-90	TRANSELF EP SAE80W	ELF MULTI 2	ELF ROLEXA 1
Esso	ESSOLUBE MHX 15W-40	ESSO GEAR OIL GP-D 85W-90	ESSO GEAR OIL GP D 80W	BEACON 2	BEACON EP 1
Mobil	Mobil DTE 25	Mobil DTE 24	Mobil DTE 27		
Shell	Shell Rimula TX	Shell Spirax EP 90	Shell Spirax MA 80 W	Shell Retinax A	Shell Alvania EP grease 1
wintershall BASF Gruppe	Wintershall Multi-Rekord	Wiolin Multipurpose transmission oil 85W-90	Wiolin Multipurpose transmission oil 80W	Wiolub LFK 2	Wiolub LFM 1

10.3 The correct mortar mixture

Today, premixed dry mortars are produced in such a way that they may be easily processed by mortar machines. Please also observe the advice of the material manufacturers.

Site mixes, however, are subject to particular laws which must be adhered to at all times.

While mortar for manual application needs only to be prepared to have good cured mortar characteristics and workability, mortar produced with mortar machines also has to be easy to pump and spray.

Although mortar which is too fat or sticky does not usually tend to cause blockages and separation, it will still cause high pump pressure. On the other hand, mortar which is too lean or short causes low delivery pressure which can easily cause separation and blockages in the pump or delivery line.

Consistency

Pumping mortar must be ductile, i.e. not too thick or thin. Mixtures which are too thin tend to allow the sand to settle and cause blockages. Mixtures which are too stiff cannot be sucked in.

Mortar pumps pump what is known as ”trowel-quality consistence” mortar best.

You can improve mortar consistence and quality, save water and improve the pumping ability of the mortar with the use of certain additives.

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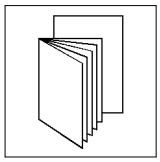

Mortar sand

The type of sand (grading curve) and the type of sand grain both determine render quality and have a strong influence on the pumping characteristics of the mortar produced from it.

Good grading curves are important. The sand must contain coarse, medium and fine grains and should also possess so-called "consumable" constituents. "Single grain sand" types, as they are known, in which the proportion of a single grain size group is excessive are not conducive to pumping, although their use is often unavoidable. It is important, in such an event, to mix different types of sand to obtain a satisfactory grain grading.

Well-graded sand grains with grain sizes up to 4 mm are easier to pump than fine beach sand (single grain sand)

In general, grain size must not exceed 4 mm.

A good grain combination for plastering sand is as follows:

Grain size below 0.2 mm	=	5%
Grain size from 0.2 –1.0 mm	=	60%
Grain size from 1.0 –4.0 mm	=	35%

Binder

The choice of binder depends on the intended application of the mortar. The following points are of significance in obtaining good pumping characteristics:

Slaked lime always produces grainy and firm, non-segregated mortar. It is often a 'miracle cure' against blockages, particularly if the sand is difficult to pump. In general, the addition of lime has a very favourable influence on the pumping characteristics of the mortar.

Pure cement mortar must be regarded as dangerous. In this case, you should obtain a pumpable mixture by including additives in the mix.

Continuation next side

Additives

Take extra care when choosing an additive from the extensive range which is available. We are only able to give general guidelines, e.g. chemical additives:

It has always proved to be useful to add a concrete liquifier without air-entraining agents and this also saves on water and improves the quality of the mixture (please contact local representatives or building materials suppliers for more information).

The following materials have also proved to be useful in practice for avoiding blockages in the case of sharp mortar:

Stone dust, fly ash etc.

If you are unsure of which mixture to use, please contact our specialist staff who will be pleased to prepare it for you. Please also bear in mind that we can only make recommendations for mixtures. The user is responsible for the quality and workability of a particular mortar.

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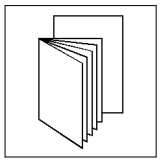


Site mixes

The following are our non-binding recommendations for common mortar compositions:

Cement mortar

This can be used to plaster pedestals, concrete elements etc. It is composed of river sand and cement.

Mix ratios:
approx. 1 quantity (by volume) of cement, 2 of river sand (0-4 mm) and additive.

Base plaster

This is used to plaster brickwork.

Mix ratios:

Different mixtures are possible in this case, depending on the region, method of operation and the available materials:

1 quantity (by volume) of slaked lime, 4 of river sand (0-4 mm) without the addition of mortar additive.
or
1 quantity (by volume) of hydraulic powder chalk, 2 of river sand, 1 of pit sand (the sand quantities could be reversed if required, depending on the sand type
or
1 quantity (by volume) of cement, 0-5 of chalk, 3 of river sand, 1 of quarry sand (possibly with additives or air-entraining agents).

10.4 Template for EC declaration of conformity

The original EC declaration of conformity is included in the machine's scope of supply. Store this in a safe place.

Putzmeister **2006/42/EC, II 1.A.**

1 **de** **EG-Konformitätserklärung im Sinne der EG-Maschinenrichtlinie 2006/42/EG, Anhang II 1.A.**
en EC declaration of conformity as defined by Machinery Directive 2006/42/EEC Annex II 1.A.

2 **de** **Hiermit erklären wir, dass die Maschine - Bezeichnung / Typ / Maschinennummer**
en Herewith we declare that the machine –Designation / Model / Serial No.

3 **de** **folgenden einschlägigen Bestimmungen entspricht:**
en Applied harmonized standards in particular
2006/42/EC
97/23/EC

4 **de** **Angewendete harmonisierte Normen, insbesondere**
en complies with the following provisions applying to it
EN 12001
EN 1829

5 **de** **Angaben zum Dokumentationsbevollmächtigten**
en Party authorized to produce documentation
Putzmeister Mörtelmaschinen GmbH
Max-Eyth-Straße 10
D-72631 Aichtal

6 **de** **Angaben zum Unterzeichner / Datum / Unterschrift**
en Signer / Date / Signature

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

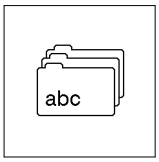
7 **de** **Geschäftsführer**
en Managing Director

2006/42/EC	**de**	**EG-Maschinenrichtlinie**
	en	Machinery Directive
	es	Directiva CE de máquinas
	fr	Directive-CE relative aux machines
EN 12001	**de**	**Förder-, Spritz- und Verteilmaschinen für Beton und Mörtel - Sicherheitsanforderungen**
	en	Conveying, spraying and placing machines for concrete and mortar — Safety requirements
	es	Máquinas para el transporte, proyección y distribución de hormigón y mortero – Requisitos de seguridad
	fr	Machines pour le transport, la projection et la distribution de béton et mortier - Prescriptions de sécurité
EN 1829	**de**	**Hochdruckreiniger, Hochdruckwasserstrahlmaschinen - Sicherheitsanforderungen**
	en	High pressure cleaners – High pressure water jet machines – Safety requirements
2006/95/EC	**de**	EG-Niederspannungsrichtlinie
	en	Low voltage equipment
2004/108/EC	**de**	Elektromagnetische Vertrâglichkeit (EMV)
	en	Electromagnetic compatibility (EMC)
97/23/EC	**de**	EG-Druckgerâterichtlinie
	en	Pressure equipment

Index of Key Words

This chapter contains the main key words with the number of the page on which they are to be found as a header in the left-hand margin. This Index of key words is listed alphabetically by the main concepts. These are subdivided into associated sub-concepts, marked with a dash.

Index of Key Words



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