Operating Instructions

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

Piston pump P 718 TD / SD

Machine no.

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Putzmeister

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1 Guide to the Operating Instructions

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

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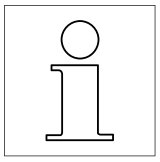
or contact the branch responsible for you or your service dealer. You can find a selection of responsible contacts online at: www.pmmortar.de.



1.1 Foreword

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

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

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

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

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

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

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

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

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

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

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

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

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

Example: 3 – 2 (chapter 3 – page 2)

1.2 Icons and symbols

The following icons and symbols are used:

Icon/symbol/ designation	Meaning
▸	Individual instruction or alternative step.
1. 2. 3.	Instructions to be carried out as described in the specified sequence.
⇒	Result or intermediate result of previous steps.
➞	Result of an instruction or of several steps.
•	Marking for simple lists.
Cross reference *(Icons and symbols P. 1 — 4)*	Cross references refer to chapters, sections or figures, for example. A cross reference is depicted in brackets.
	Fault rectification – Instructions to be carried out in accordance with fault messages.
	View additional steps. For example, “Contact a qualified electrician”.
✓	Inspection or maintenance activity must be carried out

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

1.2.1 Layout of warning notices

⚠ WARNING

Type and cause of risk

Consequences of not observing the risk.

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

Signal words

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

The following signal words are used:

⚠ DANGER

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

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

⚠ WARNING

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

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

⚠ CAUTION

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

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

NOTICE

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

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

2 Safety regulations

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

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

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

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

2.1 Definition of terms

The following sections explain the terms used in these Operating Instructions and describe the requirements for specific groups of people.

2.1.1 Piston pump

The piston pump is a machine for pumping anhydrite and cement self-levelling floor screed, fine concrete and mortar grouting, as well as concrete spattering.

2.1.2 Manufacturer

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

2.1.3 Operator

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

2.1.4 Machine operator

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

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

2.1.5 Subject expert

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

2.1.6 Qualified personnel

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

2.1.7 Service technician

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

2.1.8 Maintenance

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

2.1.9 Workplace

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

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

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

2.1.10 Working area

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

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

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

2.2 Basic principle

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

Observe the following basic principles:

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

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

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

2.2.1 Onwards sale

Observe the following for an onwards sale of the machine:

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

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

2.3 Designated use

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

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

Only the following materials may be produced, pumped and used on the machine:

- Anhydrite, cement and cementite, self-levelling floor screed and
- Fine concrete with particle distribution of up to 32 mm.

Its operation must be restricted to the specified use. Materials with other specifications may only be used with the approval of the manufacturer.

The maximum delivery pressure must not exceed that specified on the rating plate or in the technical data.

The machine is filled via the hopper.

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

Specified inspection work must be carried out at regular intervals.

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

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

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

2.4 Improper use

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

2.4.1 Operation with defects

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

- Loose or damaged bolts
- Leaks
- Impermissible fill levels
- Wrong functional fluids
- Worn, damaged or defective components
- Worn, damaged or illegible plates

- Worn, damaged or defective safety equipment
- Deactivated or modified safety equipment
- Impermissible or modified connections or fuses

2.4.2 Removal or modification of safety equipment

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

Removing, modifying or decommissioning safety equipment is prohibited.

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

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

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

2.4.3 Conveyed material

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

2.4.4 Extending the delivery line

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

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

2.4.5 Pressurised systems

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

2.4.6 Site of use

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

2.4.7 Transport

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

2.4.8 General maintenance

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

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

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

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

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

2.4.9 Safety equipment maintenance

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

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

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

2.4.10 Changing the works settings

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

- Pressure and performance settings
- Software versions and software parameters

2.4.11 Structural changes

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

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

2.4.12 Wrong bolts/nuts and tightening torques

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

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

The following nuts and bolts must not be reused:

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

2.5 Liability

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

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

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

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

2.5.1 Exclusion of liability

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

2.6 Personnel selection and qualifications

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

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

2.6.1 Training

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

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

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

2.6.2 Qualified personnel

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

2.6.3 Subject expert

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

2.7 Sources of danger

2.7.1 General sources of danger

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

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

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

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

Do not loosen or tighten pressurised threaded unions.

2.7.2 Danger from hot machine components

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

2.7.3 Danger from hot exhaust gas

During work, there is a risk of ignition due to the supporting ground being heated up by hot exhaust gas. If the machine is stationary at one set-up site for a prolonged period, no flammable or melting objects (asphalt, slides, paper bags) may be located in the exhaust gas flow from the machine.

2.7.4 Danger from the delivery line and coupling system

Observe the maximum operating pressure of the connected delivery hose and coupling system. The pressure adjusting device is used to adjust the delivery pressure to a setting between 40 and 70 bar. Never select the 70 bar position on the pressure calibrator if the connected delivery hose and coupling system is not designed for the max. operating pressure of 70 bar.

2.7.5 Danger from the high-pressure cleaner

During work with the high-pressure cleaner, water is emitted under high pressure. The water pressure can be up to 120 bar. The operator is responsible for providing waterproof protective equipment.

2.7.6 Emergency manual operation as a source of danger

The machine control system allows for emergency manual operation when the EMERGENCY STOP is activated.

The hood must be closed during machine operation in order to prevent anyone from activating the pump by means of emergency manual operation after the EMERGENCY STOP has been activated. When performing maintenance work on the pump while it is running, the hood must be closed and sealed by the lock. The key must be removed.

2.8 Safety equipment

Never remove or modify safety equipment on the machine.

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

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

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

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

2.9 Personal protective equipment

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

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

Symbol	Meaning
	Safety helmet The safety helmet protects your head, e.g. against falling concrete or parts of the delivery line if the lines burst. (DIN EN 397:2013-04; Industrial safety helmets)
	Safety footwear Safety footwear protects your feet against falling objects and against penetration by projecting nails. (DIN EN ISO 20345:2012-04; Safety footwear for professional use; category S3)

Symbol	Meaning
	Hearing protectors Hearing protectors protect you against the noise generated in the vicinity of the machine when you are standing close to it. (DIN EN 352-1:2003-04; Hearing protectors - General requirements - Part 1: Earmuffs or DIN EN 352-3:2003-04; Hearing protectors - General requirements - Part 3: Earmuffs attached to an industrial safety helmet)
	Protective gloves Protective gloves protect your hands against aggressive or chemical substances and against mechanical effects (e.g. knocks) and cutting injuries. (DIN EN 388:2017-01; Protective gloves against mechanical risks; classification 1111)
	Protective goggles Protective goggles protect your eyes from injuries due to concrete spatter and other particles. (DIN EN 166:2002-04; Personal eye protection - Specifications)

Symbol	Meaning
	Safety harness When working at heights, use climbing aids and platforms that are intended for this purpose and comply with the safety regulations or wear a safety harness. Relevant national regulations must be observed. (DIN EN 361:2002-09; Personal protective equipment against falls from a height - Full body harnesses; category III)
	Respiratory protection and face mask Respiratory protection and face masks protect you from particles of building materials that may enter your body through the respiratory passages (e.g. concrete admixtures). (DIN EN 149:2009-08; Respiratory protection devices - Filtering half masks to protect against particles - Requirements, testing, marking; classification FFP1)

2.10 Protective equipment for work with high-pressure water jets

Working with the high-pressure cleaner entails a risk of high-pressure injection. When working with high-pressure cleaners, for your own safety, always wear personal protective equipment designed for work with high-pressure jets.

⚠ WARNING

Risk of injury due to high-pressure water jet

The machine operator must be informed that waterproof protective clothing only provides protection from spray water and splash particles.

In case of direct contact with the high-pressure water jet, sufficient protection against injuries caused by the high-pressure water jet is not guaranteed.

- Never direct the high-pressure water jet at persons to clean dirty protective equipment.

Figure 1: Protective equipment for work with high-pressure water jets

Item	Designation
1	Safety helmet
2	Hearing protectors
3	Protective goggles
4	Face mask visor
5	Protective suit
6	Protective gloves
7	Protective boots

2.11 Risk of injury, residual risks

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

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

- Risk of crushing and impact when transporting, setting up, operating and maintaining the machine.
- Electrical contact (possibly with fatal consequences) with the electrical equipment, if the connection has not been made properly or electrical assemblies are damaged.
- Injuries caused by unauthorised start-up or use of the machine.
- Injuries caused by reaching into the agitator, into the water box when the piston is running, or into the running Vbelt, fan blade or dynamo.
- Injuries caused by inserting objects or reaching into the hopper.
- Risk of permanent hearing damage due to noise level if persons are permanently in the vicinity of the machine without hearing protectors.
- Injuries to the skin and eyes due to hydraulic fluid shooting out when opening threaded unions without dumping the pressure in the entire system first.
- Injuries to the skin and eyes due to splashing material, dust particles or other chemical substances.
- Damage to health due to breathing in dust particles, cleaning agents, solvents and preserving agents or exhaust gases.
- Risk of burning due to hot machine components. These are the engine, exhaust system and the frame.
- Risk of scalding due to hot hydraulic fluid shooting out or other hot functional fluids.
- Injuries caused by the machine rolling away as a result of the brake, support feet or chocks becoming released.
- Injuries due to bursting delivery line or delivery pipes.
- Injuries caused by opening pressurised delivery lines (e.g. following blockages).
- Injuries caused by opening pressurised hydraulic system or improper use of hydraulic hose lines.

- Injuries caused by tripping over cables, hoses or reinforcements.
- Risk of ignition and explosion if the machine is filled with fuel incorrectly.
- Risk of explosion if batteries are charged incorrectly.

2.12 Electrical contact

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

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

As standard, all electrical assemblies are protected according to degree of protection IP 54 in line with IEC 60204 part 1 or DIN 40050 ICE 144 .

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

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

2.13 Blockage

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

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

DANGER

Risk of death due to the incorrect removal of a blockage

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

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

WARNING

Risk of death due to ejected blockage

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

2.14 Hydraulic and pneumatic system

Work on hydraulic equipment must only be carried out by qualified personnel. Couplings must be fitted to hoses by persons who possess the necessary experience and equipment required for this task.

WARNING

Risk of injury due to hydraulic fluid shooting out

Hydraulic fluid that shoots out is toxic and may penetrate the skin.

- Wear protective goggles and protective gloves in addition to your personal protective equipment.

All lines, hoses and threaded unions must be regularly checked for leaks and external signs of damage. Damage must be rectified immediately.

All hydraulic equipment must be maintained and inspected regularly. Observe the maintenance plan in the “Maintenance” chapter. Bursting lines can endanger persons. The manufacturer accepts no liability for damage resulting from the use of worn or defective components.

Damaged hydraulic lines must not be repaired. Instead, they must be replaced. Damaged or saturated hydraulic hoses must be replaced immediately. Splashing hydraulic fluid may cause injuries and fire.

Hydraulic hoses should be replaced every 6 years (including a maximum storage time of 2 years), even if there are no signs of external damage. For this purpose, the period must be calculated from the marking on the fitting (date of manufacture of the hose).

Depressurise sections of the system and pressure lines (hydraulic and pneumatic system, delivery line) which you intend to open prior to commencing repair work in line with the assembly descriptions. Check the pressure gauge indicator to ensure that the affected system sections and pressure lines are depressurised.

Carefully vent the hydraulic system following all maintenance or repair work.

2.15 Conduct in an emergency

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

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

2.16 Environmental protection

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

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

Always close fuel, hydraulic fluid or grease containers carefully.

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

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

2.17 Noise emissions

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

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

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

⚠ WARNING

Hearing loss caused by noise

- ▸ Wear the mandatory personal hearing protectors.

2.17.1 Operator

The operator must provide their personnel with hearing protectors.

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

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

2.18 Safety-related parts (SRPs)

⚠ WARNING

Risk of death

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

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

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

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

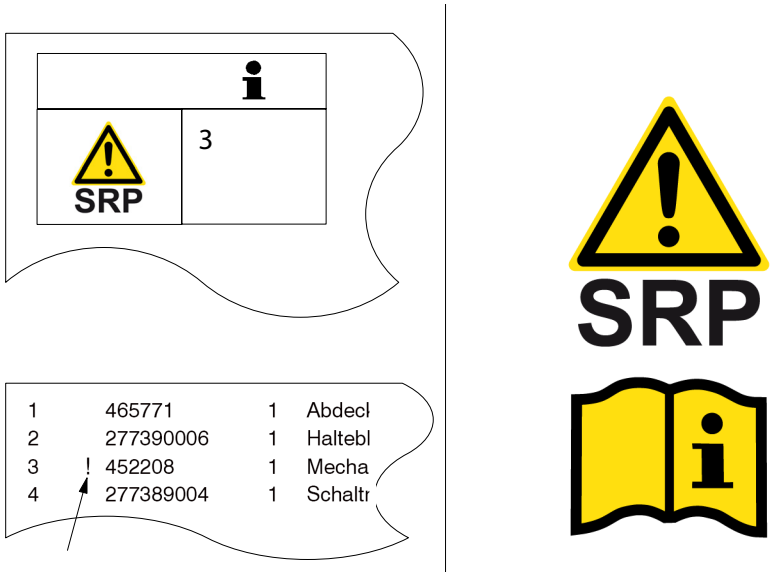


Figure 2: SRP marking

Item	Designation
Left	Spare parts sheet
Right	Spare part packaging

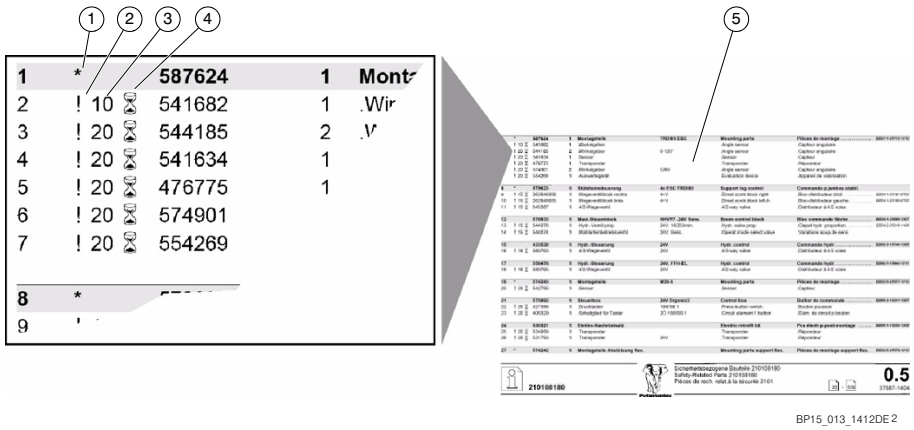


Figure 3: Extract from an example spare parts sheet

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

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

2.19 Spare parts

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

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

2.20 Accessories

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

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

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

2.21 Storing the machine

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

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

2.22 Unauthorised start-up or use of the machine

2.22.1 Operating modes

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

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

2.22.2 Securing the machine

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

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

- Switching off the pump and drive motor
- Locking the control cabinet
- Locking the hood

3 General technical description

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

3.1 Machine model

Your machine is a P 718 piston pump from Putzmeister Mörtelmaschinen GmbH.

The following data can be found on the rating plate:

- Machine model
- Machine number

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

Possible machine models and versions for the P 718 series are as follows:

Machine model	Version
P 718 TD	Diesel-powered machine with road travel chassis
P 718 TE	Electric-powered machine with road travel chassis
P 718 SD	Diesel-powered machine on skid frame
P 718 SE	Electric-powered machine on skid frame

3.2 Overview

You can find an overview of the most important components below.

3.2.1 Machine with road travel chassis

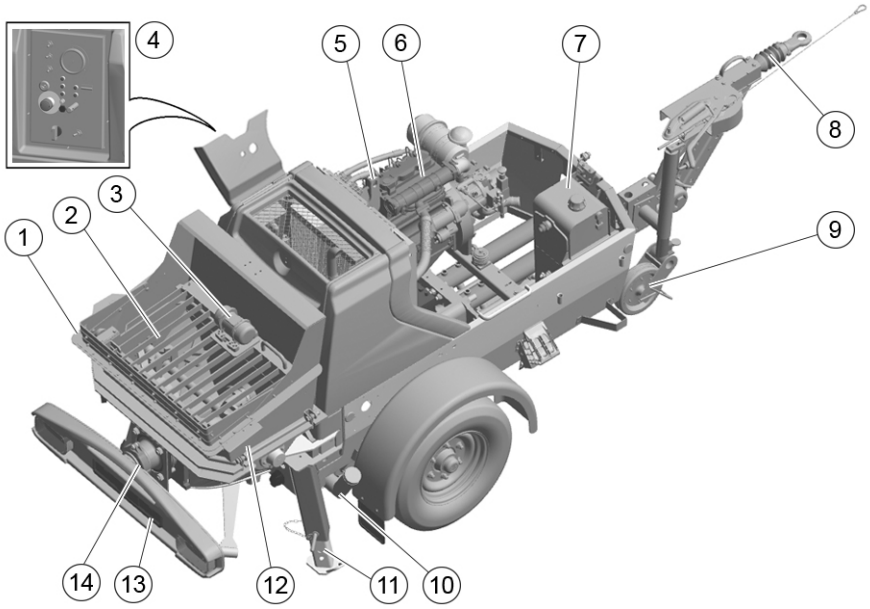


Figure 4: Figure showing diesel model (without hood)

Item	Designation
1	Hopper
2	Hopper grille
3	Vibrator
4	Control cabinet
5	Lifting eye
6	Drive motor
7	Hydraulic fluid reservoir
8	Towing ring
9	Support wheel
10	Fuel tank filler pipe
11	Support leg with support foot
12	Agitator cutout
13	Lighting equipment
14	Pressure connection

3.2.2 Machine on skid frame

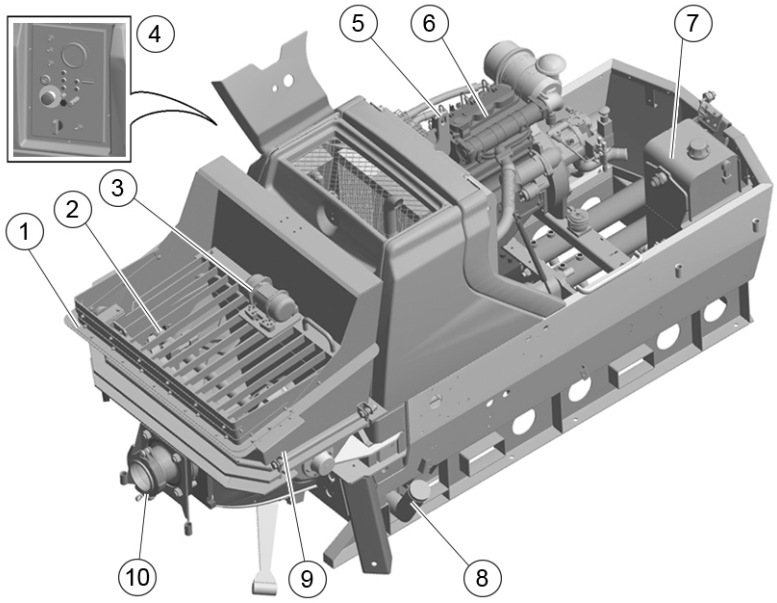


Figure 5: Figure showing diesel model (without hood)

Item	Designation
1	Hopper
2	Hopper grille
3	Vibrator
4	Control cabinet
5	Lifting eye
6	Drive motor
7	Hydraulic fluid reservoir
8	Fuel tank filler pipe
9	Agitator cutout
10	Pressure connection

3.3 Technical data

The technical data and characteristics mentioned below refer to the P 718.

Dimensions	P 718 TD	P 718 SD
Length:	4644 mm	3025 mm
Width:	1560 mm	1460 mm
Height:	1790 mm	1600 mm
Filling height:	1180 mm	1120 mm

Weights	P 718 TD	P 718 SD
Weight (standard version):	2320 kg	2000 kg
Permissible gross weight:	See rating plate	-
Permissible drawbar load:	See rating plate	-

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

Performance data	P 718 TD/P 718 SD
Drive motor:	Three-cylinder diesel engine 34.5 kW at 2600 rpm
Main pump hydraulic fluid pressure:	250 bar
Agitator pump hydraulic fluid pressure:	190 bar
Max. delivery rate:	17.4 m³/h
Max. delivery pressure – piston side:	68 bar
Min./max. theoretical strokes under no load – piston side	27/min
Max. particle size of conveyed material:	32 mm

Performance data	P 718 TD/P 718 SD
Conveyed material:	Fine concrete
	Anhydrite screed
	Cement screed
	Cementite screed
	Self-levelling floor screed
Inclination angle in longitudinal direction:	Max. 15°
Inclination angle in transverse direction:	Max. 15°
Control voltage:	12 V
Temperature range:	-5 °C to +45 °C
Installation altitude (without reduction in performance)	Up to 1000 m above sea level
Sound power level	See plate on the machine.
Sound pressure level	90 dB (A)

Contact the manufacturer for operating altitudes or temperatures different to those specified.

The output specifications are guide values.

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

The specifications depend on the following variables:

- Material to be pumped
- Material composition
- Consistence

Tyres (chassis 2500 kg)	P 718 TD
Tyre size:	225/75 R16C
Rim size:	6 J x 16 H2
Inflation pressure:	5.25 bar
Tightening torque of wheel nuts:	Flat collar nut, 210 Nm

After assembling the wheels, tighten the wheel nuts with the specified tightening torque after travelling for 50 km.

Fill volumes	P 718 TD/P 718 SD
Engine oil:	7 l engine oil volume with filter change
Fuel:	Diesel fuel Approx. 50 l fill volume
Hydraulic fluid reservoir:	Hydraulic fluid Approx. 35 l fill volume
Highpressure cleaner (option)	Engine oil Approx. 0.2 l fill volume
Centralised lubrication system (option)	Multipurpose grease Approx. 2 l fill volume

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

Use only the lubricants specified in the lubricant recommendation.
(Lubricant recommendation P. 10 — 3)

3.4 Information on the rating plate

Depending on the model, one of the following rating plates is fitted to your machine.

3.4.1 Rating plate

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

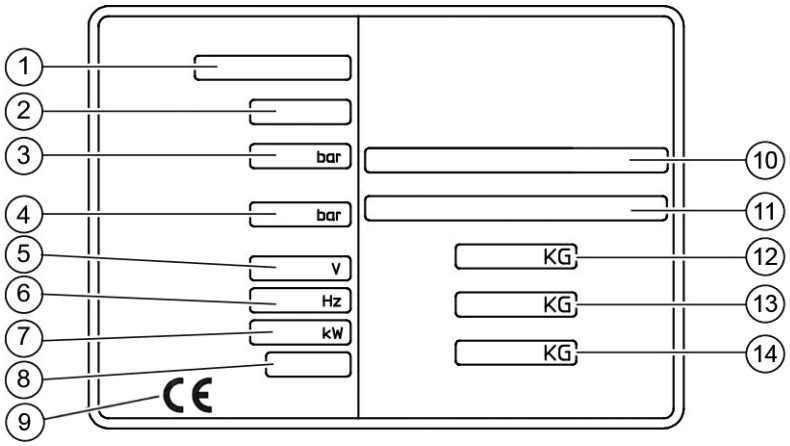


Figure 6: Rating plate

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

3.4.2 Rating plate

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

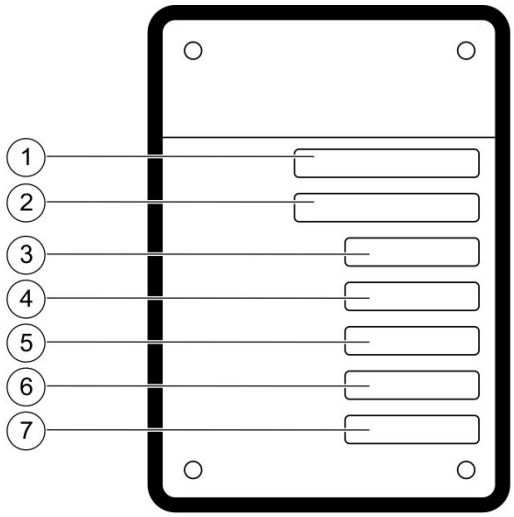


Figure 7: Rating plate

Item	Designation
1	Model (machine model)
2	Machine no. (machine number)
3	Year of manufacture
4	Max. delivery pressure [bar]
5	Voltage [V]
6	Frequency [Hz]
7	Power [kW]

3.5 Sound power level

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

Figure 8: Plate – sound power level

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

3.6 Safety equipment

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

- EMERGENCY STOP button
- Agitator cutout

⚠ WARNING

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

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

3.6.1 EMERGENCY STOP button

An EMERGENCY STOP button is located on the machine's control cabinet and, as an option, on the remote control unit of the cable or radio remote control.

⚠ WARNING

Danger to persons from the machine

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

NOTICE

Machine damage caused by incorrect actuation of the EMERGENCY STOP button

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

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

Pressing the EMERGENCY STOP button triggers the following actions:

- The pump stops immediately.
- The agitator stops.

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

The machine control system allows for emergency manual operation when the EMERGENCY STOP is activated. Emergency manual operation is possible by mechanically activating the switch-on valve and change-over valve on the fully hydraulic control block.

⚠ WARNING

Risk of injury due to unauthorised or accidental starting up of the machine using emergency manual operation

1. Make sure that the machine is secured against unauthorised or accidental starting up.
2. Close the hood when operating the machine.

3.6.2 Agitator safety cutout

Your machine is fitted with an agitator safety cutout. The agitator safety cutout switches off the agitator immediately if the grille or hopper attachment is opened during operation.

⚠ WARNING

Risk of injury due to rotating parts in the agitator

Risk of hands, feet and arms being crushed, shorn, struck and drawn in by rotating parts in the agitator.

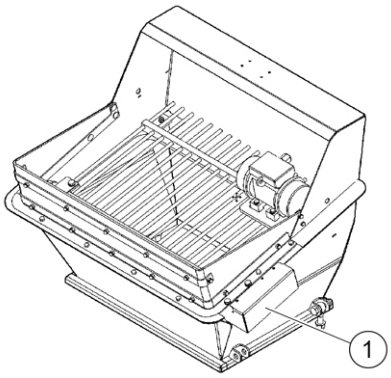
1. Only operate the machine if the grille is attached correctly.
2. Do not reach into the hopper.
3. Do not insert any objects through the grille.
4. The machine must only be operated if the agitator safety cutout is intact.

⚠ WARNING

Danger due to a defective grille

Sufficient protection cannot be guaranteed if the rods of the grille are subjected to wear as a result of operation.

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



Item	Designation
1	Agitator cut-out (partially obscured)

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

3.7 Control cabinet

The machine is operated and controlled from the control cabinet.

3.7.1 General

DANGER

Risk of death due to fatal electric shock

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

NOTICE

Machine damage caused by incorrect fuses

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

- Use only original fuses with the specified voltage rating.

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

3.7.2 Overview

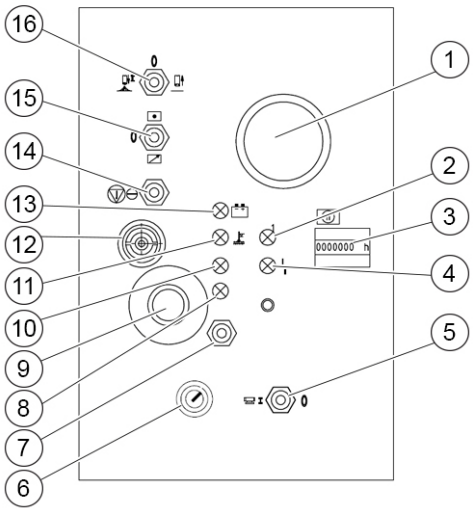


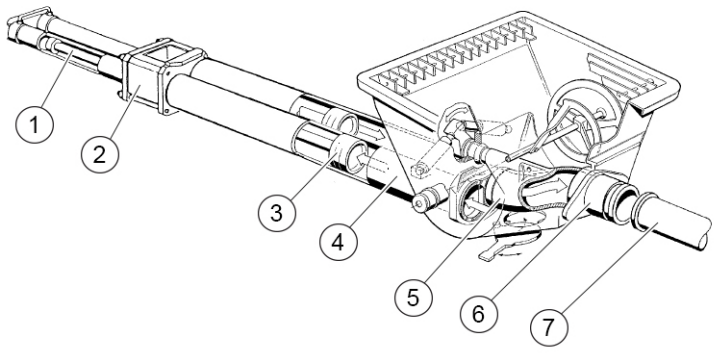
Figure 9: Machine with diesel drive motor

Item	Designation
1	**Pressure gauge** Hydraulic fluid pressure
2	**Indicator light** Lack of oil
3	**Operating hours meter** Visual indicator of total pumping time
4	**Indicator light** Fault
5	**Toggle switch** Vibrator ON/OFF
6	**Ignition starter switch** Drive motor ON
7	**Toggle switch (optional)** Intermediate lubrication
8	**Indicator light (optional)** Lights up: Intermediate lubrication active Flashes (briefly): Lubricant reservoir empty Flashes (extended): Lubrication circuit fault, no signal
9	**EMERGENCY STOP button** Switching off the machine in an emergency
10	**Indicator light** Engine oil pressure

Item	Designation
11	**Indicator light** Engine oil overheating
12	**Locking mechanism** Locking the control cabinet
13	**Indicator light** Charging indicator light
14	**Toggle switch** Acknowledge EMERGENCY STOP/acknowledge fault
15	**Toggle switch** Local – 0 – Remote
16	**Toggle switch** Pump ON – 0 – Reverse pumping ON

3.8 Core pump

Putzmeister pumps are driven by the drive motor hydraulically via oil pumps.



Item	Designation
1	Piston rod
2	Water box
3	Delivery piston
4	Delivery cylinder
5	S transfer tube
6	Pressure connection
7	Delivery line

The delivery pistons are connected to the piston rods of the drive cylinders by the intermediate flanges. The drive cylinders are extended and retracted hydraulically and thus push the delivery pistons forwards and backwards in the delivery cylinder. The drive cylinders are hydraulically coupled together so that they run in counter stroke.

3.8.1 S transfer tube

The transfer tube is integrated into the hopper on the pump. Its wear ring is located on the spectacle wear plate. Its other end is fitted in the pressure connection to which the delivery line is connected. The transfer tube is switched by two switch cylinders.

3.8.2 Water box

The water box is fitted between the drive and delivery cylinders. The water in the water box performs the following functions:

- It cools the delivery pistons and the piston rods.
- It rinses the inner wall of the delivery cylinders.

3.8.3 Pumping

The returning delivery piston draws the medium out of the hopper. At the same time, the advancing delivery piston forces the medium previously drawn in through the transfer tube into the delivery line.

At the end of the stroke, the pump switches over, i.e. the transfer tube is swung in front of the full delivery cylinders and the delivery pistons reverse their direction of movement.

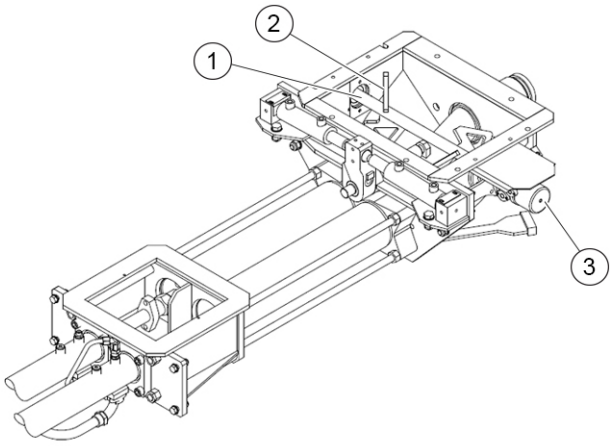
3.8.4 Reverse pumping

When reverse pumping, the delivery pistons reverse their direction during the stroke movement. The transfer tube does not switch over, meaning that the pump now runs in reverse. The medium is drawn from the delivery line and reverse pumped into the hopper and the pressure in the delivery line is relieved.

3.9 Agitator

The hopper is fitted with a hydraulically powered agitator. It performs two functions:

- It improves the fill level in the delivery cylinders.
- It mixes the medium together.



Item	Designation
1	Mixer shaft
2	Mixing paddles
3	Hydraulic motor

3.9.1 Improving the fill level

When pumping, the fill level in the delivery cylinders should be as high as possible. To achieve this, set the mixing paddle's direction of mixing motion towards the delivery cylinder.

3.9.2 Mixing the material together

After reverse pumping from the delivery line into the hopper, the material should be mixed together. To do this, set the mixing paddle's direction of mixing motion away from the delivery cylinder.

3.10 Drive motor

3.10.1 Diesel engine

The machine is powered by a threecylinder diesel engine.

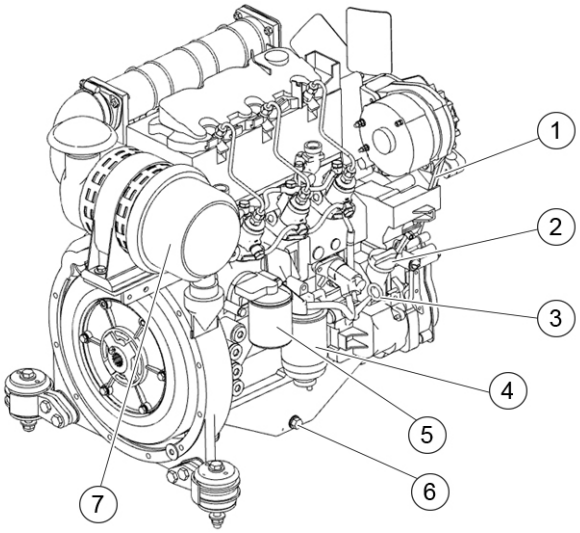


Figure 10: Diesel engine (different models available)

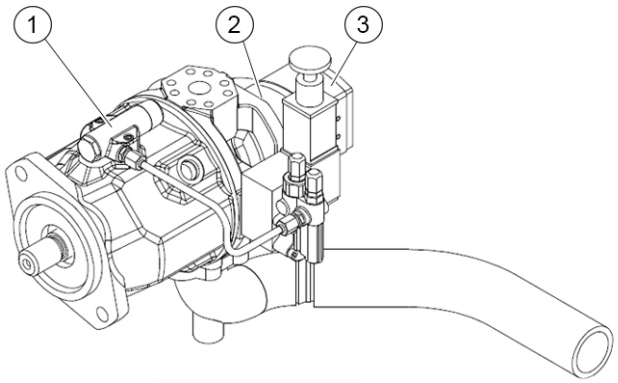
Item	Designation
1	Vbelt
2	Oil filler
3	Oil dipstick
4	Fuel filter
5	Oil filter
6	Oil drain plug
7	Dry air filter

The performance values can be found on the rating plate or in the “Technical data” section *(Technical data P. 3 — 5)*.

For further information on the engine, see the documentation provided by the engine manufacturer.

3.11 Hydraulic pump

The hydraulic pump is flange-mounted on the drive motor.

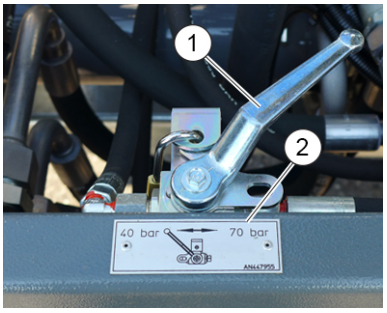


Item	Designation
1	Main pump
2	Switch cylinder auxiliary pump
3	Agitator auxiliary pump

The hydraulic pump comprises main and auxiliary pumps. The drive motor drives the machine's hydraulic pumps. These are connected to the machine by hydraulic hoses. The hydraulic pumps generate the required fluid pressure and flow in the connected hydraulic circuits. The main pump generates the fluid flow in the closed fluid circuit, which drives the machine's drive cylinders. Two further pumps are flange-mounted in front of the main pumps and these drive the machine's switch cylinders and the agitator.

3.12 Pressure calibrator

A pressure calibrator is integrated in the machine. The pressure adjusting device is used to adjust the delivery pressure to a setting between 40 and 70 bar. A padlock is attached for security. The pressure calibrator is located at the front left of the frame, viewed in the direction of travel. To reach the pressure calibrator, you must open the hood.



Item	Designation
1	Ball valve pressure calibrator
2	Function label 40 or 70 bar

When assembling an air vessel or delivery lines, which are only designed for 40 bar, select the 40 bar position on the pressure calibrator.

⚠ WARNING

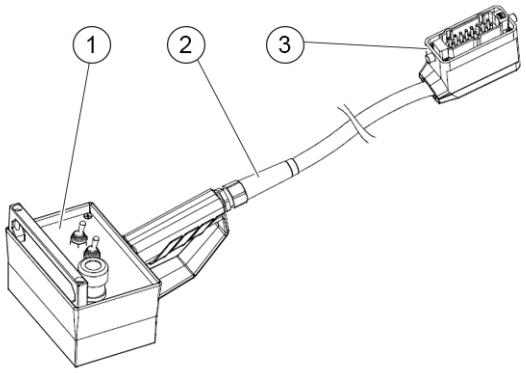
Danger due to conveyed material spraying out

There is the risk of the delivery line bursting if delivery lines, line components and couplings which are not approved for the maximum delivery pressure are used.

1. Never select the 70 bar position on the pressure calibrator if an air vessel is fitted.
2. For delivery lines which are only designed for 40 bar, never select the 70 bar position on the pressure calibrator.
3. Always secure the pressure calibrator with a padlock.

3.13 Cable remote control

A cable remote control is available as an option. The cable remote control can be used to activate the pump functions and the EMERGENCY STOP.



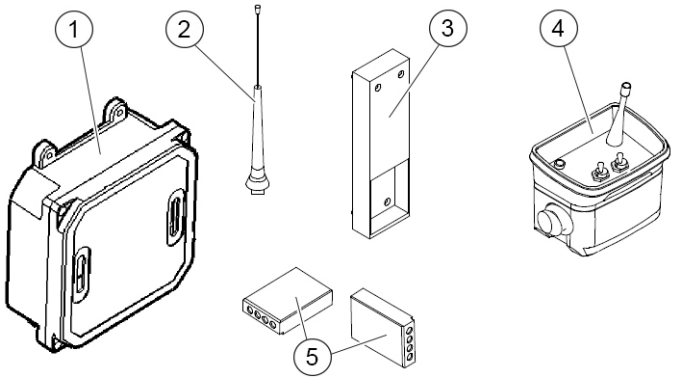
Item	Designation
1	Cable remote control
2	Interface cable
3	Connector

The socket for the interface cable is located under the control cabinet.

The “Operation” chapter describes “how to use the cable remote control”. *(Working with the cable remote control P. 6 — 32)*

3.14 Radio remote control

A radio remote control is available as an option. The radio remote control can be used to activate the pump functions and the EMERGENCY STOP.



Item	Designation
1	Receiver (integrated in side of frame)
2	Aerial
3	Charger (in the toolbox)

Item	Designation
4	Transmitter (in the toolbox)
5	Battery (two units)

The socket for the interface cable is located under the control cabinet.

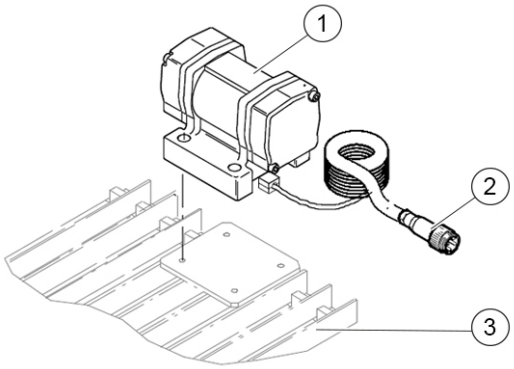
The charger is located in the toolbox, under the hood. This is where the empty battery is plugged in and charged. The charger's cable is plugged into the integrated socket in the toolbox for charging.

The transmitter is equipped with the electronic radiomatic masterkey. This key contains all of the data required to operate the transmitter. Operation is not possible without the radiomatic masterkey. Depending on the model, the radiomatic masterkey can also be used to operate replacement transmitters which are identical in design.

The “Operation” chapter describes “how to use the radio remote control”. *(Working with the radio remote control P. 6 — 33)*

3.15 Vibrator

The machine is fitted with a vibrator.



Item	Designation
1	Vibrator
2	Vibrator cable
3	Grille

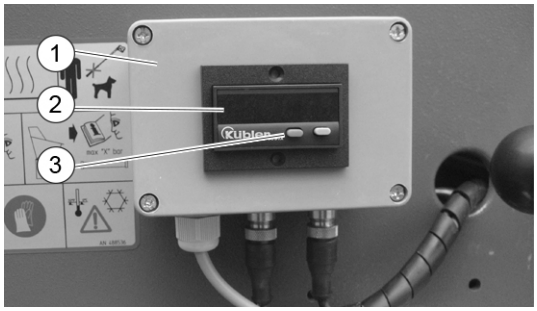
The vibrator mounted on the grille is connected to the socket provided on the machine.

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

The vibrator only works when the pump is switched on.

3.16 Stroke counter

As an option, the machine can be equipped with a stroke counter.

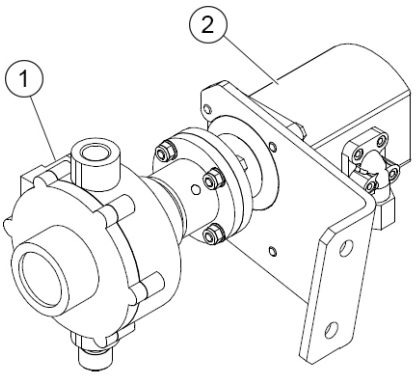


Item	Designation
1	Stroke counter
2	Digital display
3	“Reset” button

The stroke counter is preset so that it counts every stroke movement made by the delivery pistons. The counter reading is shown on the digital display. The counter reading can be reset to zero by pressing the “reset” button.

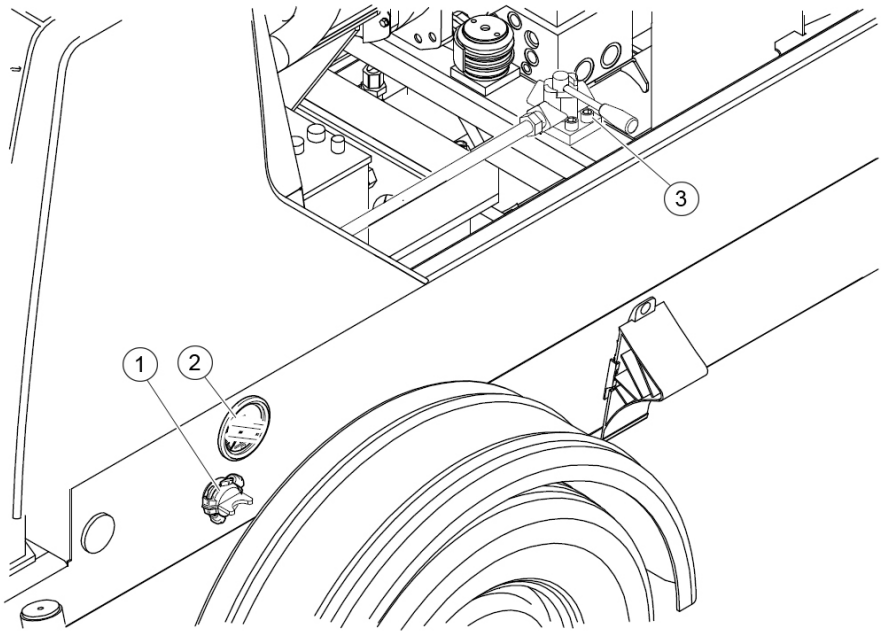
3.17 Flushing water pump

A hydraulically driven flushing water pump can be installed as an option. The flushing water pump is used to clean the outside of the machine with pressurised water. The flushing water pump is on the right side of the engine compartment in direction of travel.



Item	Designation
1	Flushing water pump
2	Hydr. motor

On the change-over valve in the motor compartment, you can choose between operating the flushing water pump or the agitator.



Item	Designation
1	Pressurised water hose connection
2	Flushing water pump pressure gauge
3	Change-over valve

To switch on the flushing water pump, set the change-over valve to the “flushing water pump” position.

3.18 Additive pump

An additive pump may be fitted on the machine as an option.

The additive pump mounting set comprises a metering pump, a hydraulic motor, a gearbox and a control cabinet.

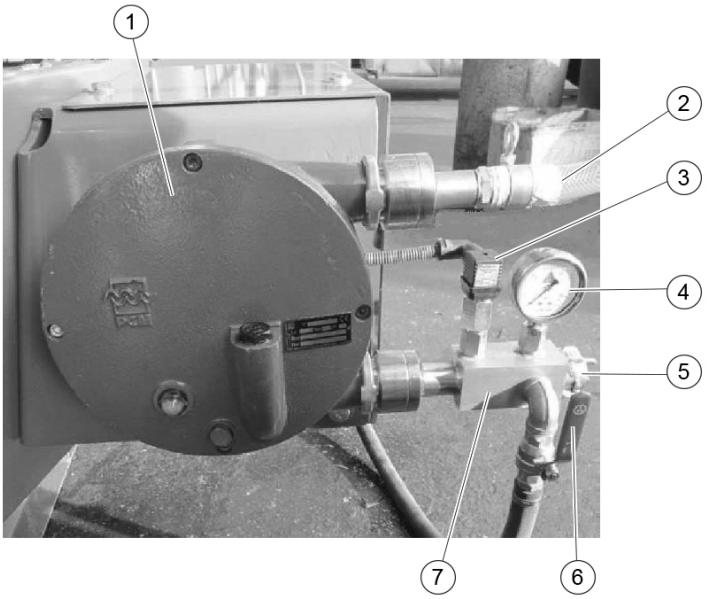


Figure 11: Different models available

Item	Designation
1	Metering pump
2	Intake line
3	Pressure switch
4	Pressure gauge
5	Dump pipe
6	Flush cock
7	Manifold block

3.18.1 Metering pump control cabinet

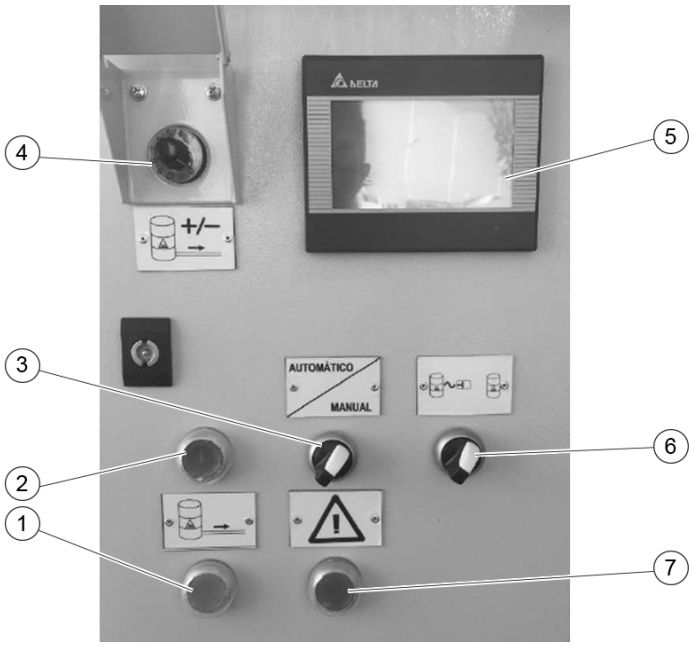


Figure 12: Different models available

Item	Designation
1	**Push-button** Switching off the additive pump
2	**Illuminated push-button** Switching on the additive pump
3	**Selector switch** Automatic mode/Manual mode
4	**Potentiometer** Adjusting the additive
5	**Display** Control and monitoring functions
6	**Selector switch** Proportional mode/Individual mode
7	**Illuminated push-button** Resetting the alarm and switching the PID control on/off

Push-button *(1)* OFF	In Manual mode, the additive pump can be switched off via the button.
Illuminated push-button *(2)* ON	In Manual mode, the additive pump can be switched on via the button.
Selector switch *(3)* Automatic mode/ Manual mode	In Manual mode, the additive pump can be switched on and off via the ON/OFF buttons. In Automatic mode, the additive pump is activated when you start pumping.
Potentiometer *(4)*	The potentiometer can be used to set the precise additive volume. The set volume is shown on the display.
Display *(5)*	All relevant data for the procedure is shown on the display.
Selector switch *(6)* Proportional mode/ Individual mode	In Proportional mode, the additive is metered based on the amount of concrete being pumped. In Individual mode, the additive volume per hour can be freely selected regardless of the amount of concrete being pumped.
Illuminated push-button *(7)* Resetting the alarm and switching the PID control on/off	An alarm is triggered if there is excess pressure (10.5 bar) in the additive system; the machine and additive pump are switched off automatically in this process. If the pressure falls again, the machine will restart after you have pressed the reset button. If no alarm is ongoing, this button is used to switch the PID control on and off. The respective setting is shown on the display (“PID on” or “PID off”).

3.19 Centralised lubrication system

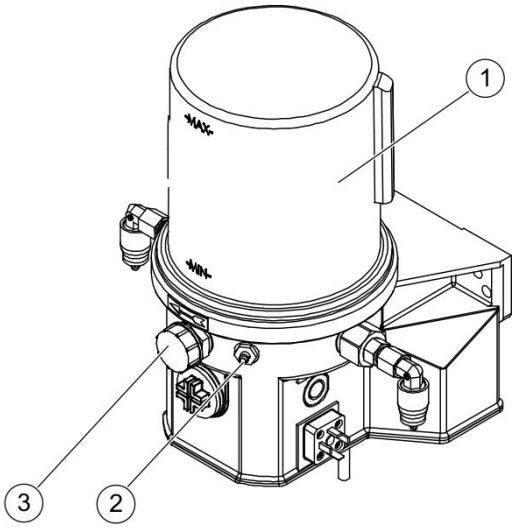


Figure 13: Centralised lubrication system

Item	Designation
1	Lubricant reservoir
2	Lubrication nipple
3	Lubricant reservoir filling point

The centralised lubrication system supplies the two mixer shaft bearings with lubricant.

The lubricant reservoir is filled on the lubricant reservoir filling point or the lubrication nipple. The lubricant pump conveys the lubricant to the lubrication points.

The continuous operation of the mixer places a high strain on the mixer shaft bearings. For this reason, they need to be lubricated at least three time a day.

3.20 Highpressure cleaner

As an option, the machine can be equipped with a high-pressure cleaner.

The highpressure cleaner is used to clean the outside of the machine with pressurised water.

The high-pressure cleaner is powered by a hydraulic drive.

NOTICE

Machine damage due to the high-pressure cleaner running dry

1. Make sure that the water supply to the high-pressure cleaner is guaranteed.
2. Connect a water supply with a minimum pressure of 0.5 bar.
3. Do not let the high-pressure cleaner run dry.

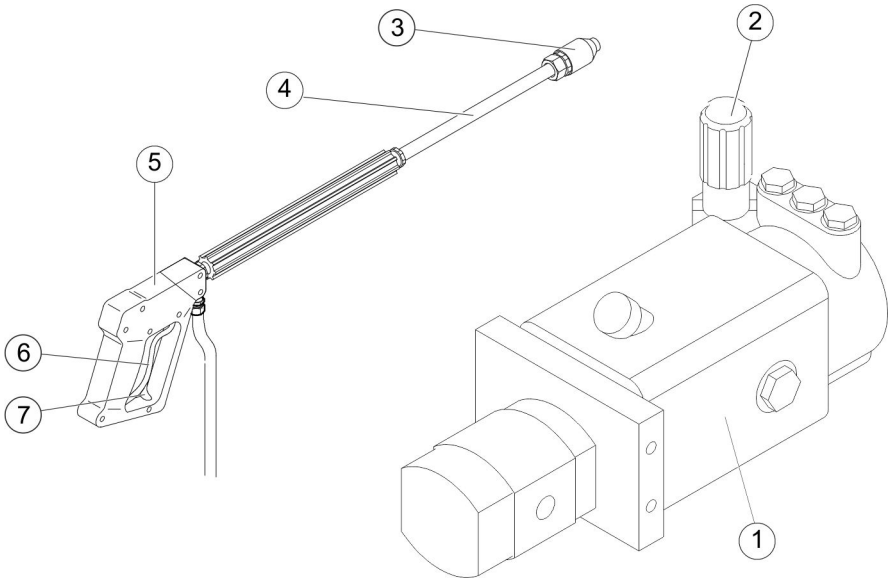


Figure 14: Highpressure cleaner overview

Item	Designation
1	Highpressure cleaner
2	Handwheel
3	Fan jet nozzle
4	Lance
5	High-pressure gun
6	Trigger
7	Securing lever

The control range of the high-pressure cleaner lies between 5 and 120 bar and depends on the speed of the drive. The pressure can be regulated by turning the handwheel.

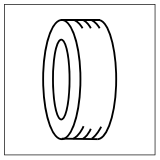
There is a trigger safety on the lever of the high-pressure gun to secure it against being activated accidentally. This safety prevents the trigger from being actuated accidentally.

Further information can be found in the “Cleaning” section of the “Operation” chapter. *(Cleaning with a highpressure cleaner P. 6 — 27)*

3.21 Options

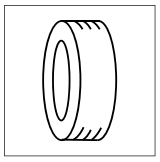
Consult your dealer or local Putzmeister Mörtelmaschinen GmbH representative as to how and whether you should upgrade your machine.

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



4 Transport, setting up and connection

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



4.1 Unpacking the machine

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

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

4.2 Loading the machine

Observe the specifications for the proper loading of the machine depending on your machine version.

⚠ WARNING

Risk of death or injury from falling loads

- Do not walk under suspended loads.

⚠ WARNING

Risk of injury due to improper loading

If the machine is not loaded properly, it can fall down, slip, roll away or topple over.

1. Use only auxiliary loading equipment designed for the gross weight of the machine.
2. Additional loads on the machine are not permitted.
3. Use only suitable lifting equipment for lifting. Lifting tackle, support trestles and other auxiliary devices must be reliable and safe in operation.
4. Secure the machine at the specified securing points to prevent it from slipping, rolling away and toppling over during transport.

4.2.1 Loading the machine on skid frame

The machine is fitted with runners with integral slots for accommodating the fork on a forklift truck.

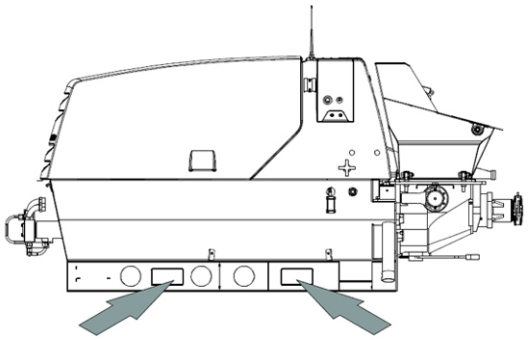


Figure 15: Options to plug into fork-lift trucks

1. Attach a suitable fork-lift truck to lift the machine at the slots provided for this purpose.
2. Lift the machine carefully and move it with great care.
3. Make sure that the fork-lift truck is designed for the gross weight of the machine.

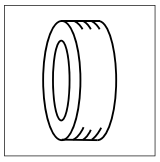
4.2.2 Loading the machine with road travel chassis

If your machine is fitted with a lifting eye, this is the only point at which is may be lifted with a crane.

1. When lifting with the crane, determine the centre of gravity of the machine by lifting it carefully.
2. Ensure that all cables or chains of the lifting gear are tensioned evenly.
3. The lifting eye is only designed for the gross weight of the machine. Additional loads are not permitted.

4.3 Transport and driving

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



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

4.4 Preparing the transport

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

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

1. Take into account the gross weight of the machine.
2. Check the permissible towed load of the tractor unit.
3. Check the roadworthiness and operational safety of the machine.
4. The machine is shut down correctly. See the “Decommissioning” chapter.
5. The machine is in transport position. *(Transport position P. 4 — 6)*
6. After attaching the machine, the support feet (if fitted) are in the upper position and secured.
7. The chocks are removed and safely stored in the bracket.
8. Check the inflation pressure and correct this if necessary.
9. Check whether the lighting equipment is fully functional.
10. The machine is correctly hitched.
11. The brake safety cable (if fitted) is secured to the tractor unit.
12. The parking brake is released.
13. After attaching the machine, the support wheel is in the upper position and secured.

Observe the permissible towed load of the tractor unit and the total towed weight. Additional loads on the machine are not permitted. Observe the maximum gross weight on the rating plate.

4.4.1 Transport position

Set the machine into the transport position before transporting:

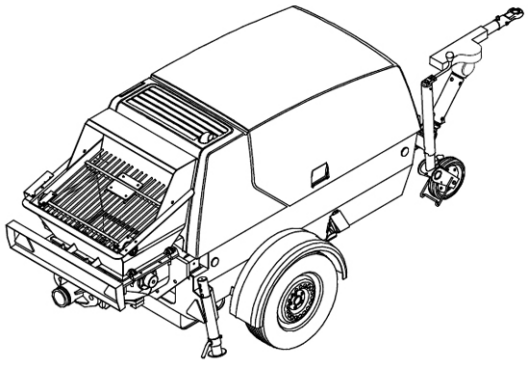


Figure 16: Machine in transport position

1. The lighting equipment is installed on the machine and connected.
2. The hood is closed tightly and locked.
3. The hopper is empty.
4. The grille is closed.
5. Any accessories accompanying the machine must be stowed away safely and secured properly.
6. The remote control (if available) is unplugged and stored safely.
7. All required attachment parts (if fitted) are removed.

4.4.2 Lighting equipment

The machine is fitted with lighting equipment.

⚠ WARNING

Risk of injury due to lighting equipment not being fully functional

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

The lighting equipment is designed for a voltage of 12 V as standard. You must use a suitable adapter to operate the option with a voltage of 24 V.

1. Before the start of a journey, the lighting equipment, which includes the license plate in addition to the lighting, must be inserted in the eyelet brackets on the rear of the machine and secured.

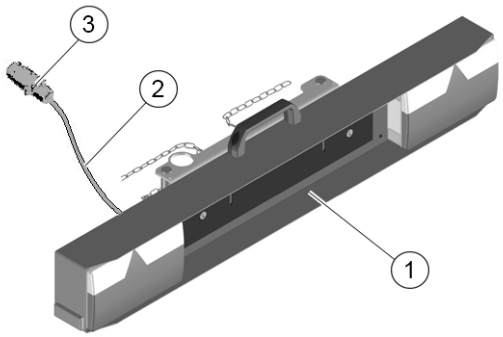


Figure 17: Lighting equipment (different models available)

Item	Designation
1	Lighting equipment
2	Power cable
3	Connector

2. Secure the lighting equipment using the spring pins.
3. Plug the power cable of the lighting equipment into the socket.

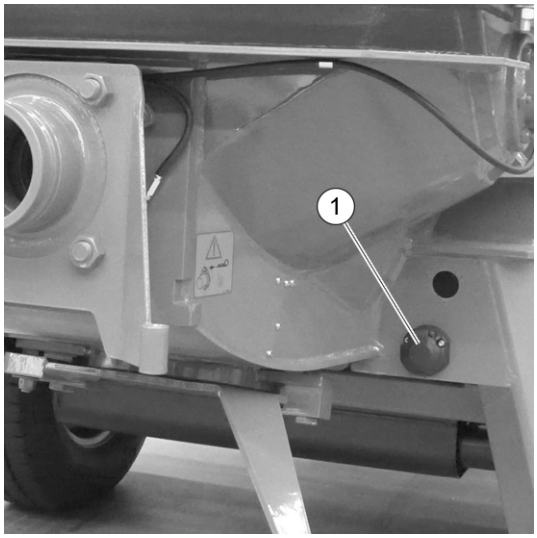


Figure 18: Socket

Item	Designation
1	Socket

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

4.5 Towing gear

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

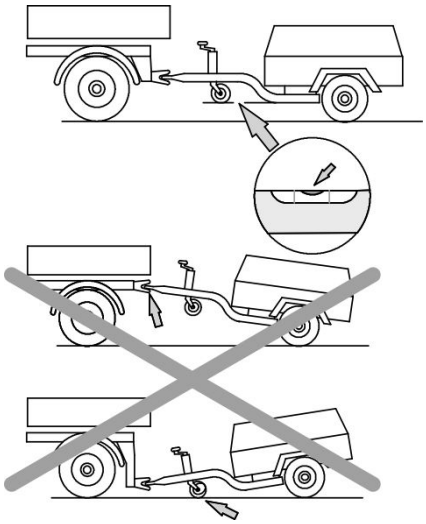


Figure 19: Attaching the machine horizontally

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

4.5.1 Ball hitch/towing ring

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

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

- Mount the ball hitch or towing ring as described in the Maintenance work *(Changing the drawgear P. 8 — 58)* chapter, otherwise the machine's operating permit will expire.

4.5.2 Adjusting the towing gear

Adjust the towing gear gradually.

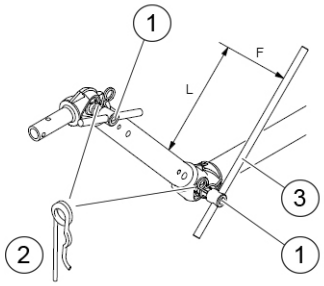


Figure 20: Towing gear (different models are available)

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

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

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

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

4.6 Ball hitch

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

⚠ WARNING

Risk of accident due to trailer becoming released

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

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

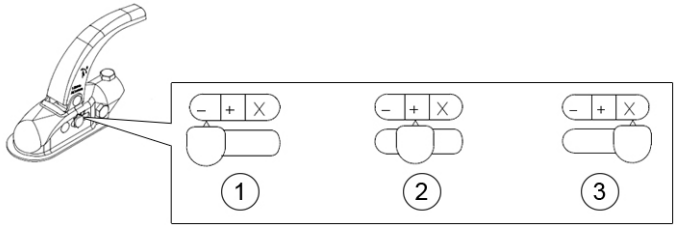


Figure 21: Ball hitch with safety control display

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

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

4.6.1 Hitching the ball hitch

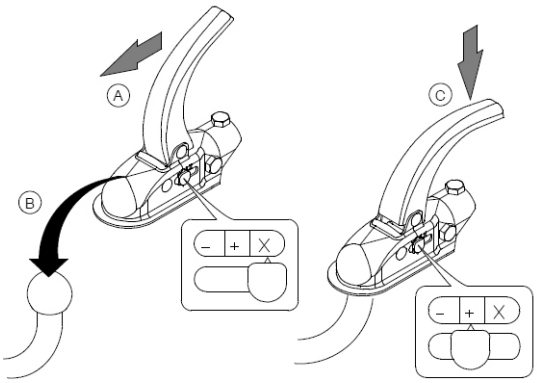


Figure 22: Hitching the ball hitch

⚠ WARNING

Risk of crushing

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

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

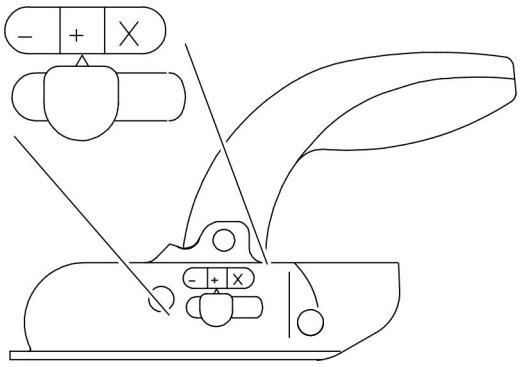


Figure 23: “Correctly closed” ball hitch position

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

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

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

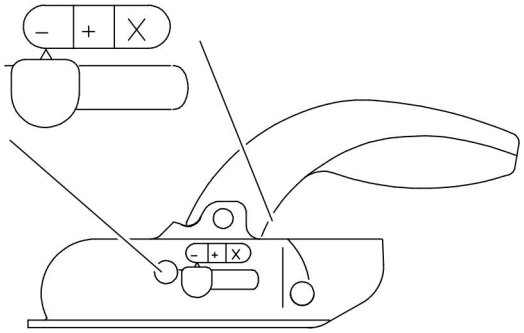


Figure 24: “Incorrectly closed” ball hitch position

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

For further details, see also the ““Faults, cause and remedy”” chapter, section *(Tow hitch does not latch into position when rested on tractor unit P. 7 — 15)*.

4.6.2 Disconnecting the ball hitch

⚠ CAUTION

Risk of crushing due to closing coupling

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

- Do not reach into the open ball hitch.

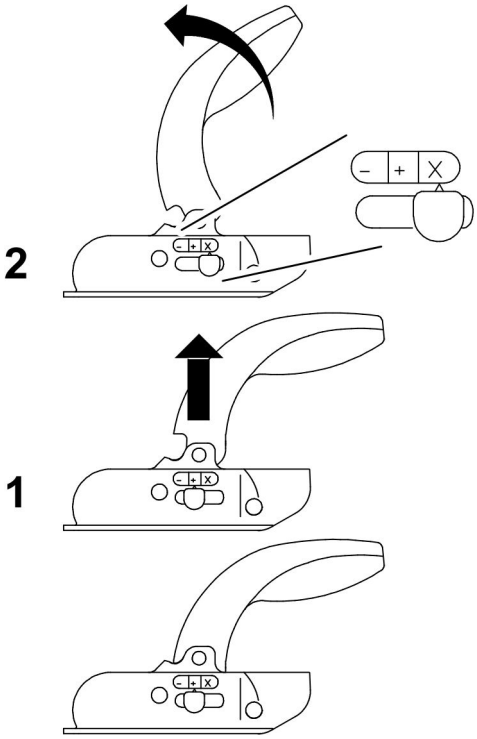


Figure 25: Disconnecting the ball hitch

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

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

4.6.3 Permissible ball hitch slewing circle

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

NOTICE

Machine damage caused by exceeding the permissible slewing circle

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

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

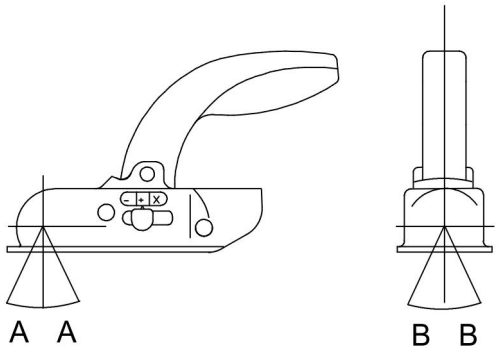


Figure 26: Ball hitch slewing circle

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

4.7 Parking brake

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

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

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

⚠ WARNING

Danger due to the machine rolling away

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

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

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

4.7.1 Brake safety cable

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

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

⚠ WARNING

Danger due to accidental tensioning of the brake safety cable

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

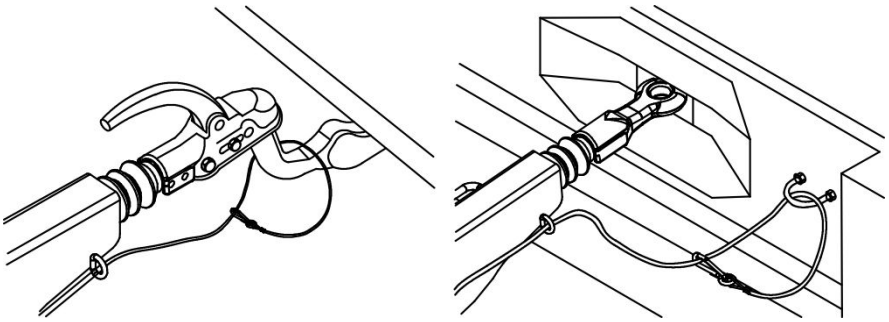


Figure 27: Towing gear with ball hitch or towing ring

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

4.8 Selecting a setup site

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

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

The set-up site must fulfil the following criteria:

- The supporting ground must be level, even and firm.

  The supporting ground must be firm enough to absorb the forces passed on from the machine into the ground. There must be no hollow spaces or ground unevenness under the machine.
- It must be possible to open all flaps and hoods.

- A clearance of at least 1 m must be provided around the machine.
- The set-up site must be sufficiently illuminated.
- Sharp pipe or hose bends should not be required.
- Hoses should not be laid on top of one another (risk of chafing).
- The lines should be as short as possible.

⚠ WARNING

Risk of injury due to falling items

People may be seriously injured or killed by falling items.

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

i

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

4.9 Setting up the machine

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

NOTICE

Machine damage caused by not observing the permissible inclination angle

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

▶ Observe the maximum inclination angles of the machine during set-up and operation, as specified in the technical data.

1. Secure the machine against rolling by placing chocks under the wheels.
2. On machines with a braking device, apply the parking brake.

3. Align the machine horizontally. Observe the permitted inclination angles.
4. On machines with removable lighting equipment, fit this equipment in the provided brackets before starting the machine.

4.9.1 Aligning the machine

NOTICE

Machine damage due to support wheel in support position while driving

- Bring the support foot into the transport position before driving.

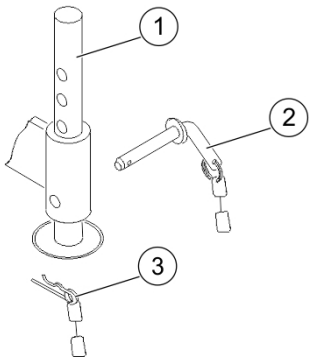
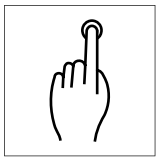


Figure 28: Support foot

Item	Designation
1	Support foot
2	Connecting bolt
3	Spring pin

1. Move the support wheel up or down using the crank handle until the machine is horizontal.
2. Pull out the spring pin .
3. Hold on to the support foot while pulling out the connecting bolt .
4. Lower the support foot. At the same time, align the bore for the connecting bolt.
5. Insert the connecting bolt and secure with the spring pin.

6. Continue turning the support wheel until the support feet are upright.



5 Starting up

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

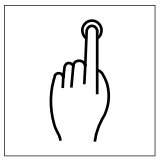
The operating personnel should be instructed on the machine during the initial commissioning.

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

After receiving the machine, the operator must familiarise themselves with the machine. This means:

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

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



5.1 Checks

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

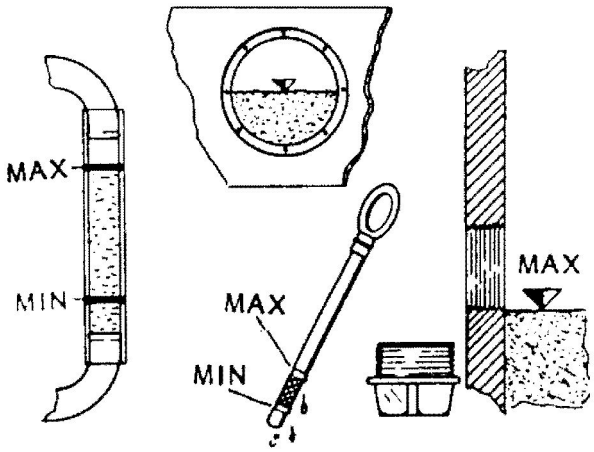
5.1.1 Visual checks

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

1. Always check the machine thoroughly for obvious defects before starting work.
2. Open up the hood to do this.
3. Check that all safety equipment is fitted and fully functional.
4. Make sure that the hopper attachment and grille are closed.
5. Check the most important wear parts.
6. Check the fill levels of the functional fluids. *(Checking the functional fluids P. 5 — 4)*
7. Check whether all caps are properly closed.
8. Check all lubrication points. *(Lubricating the machine P. 8 — 17)*.
9. Check whether the machine is set up correctly *(Setting up the machine P. 4 — 18)*.
10. Check the delivery line for damage.
11. Check whether all safety equipment is fitted and fully functional.
12. Check whether the lighting equipment (road travel chassis) is fully functional.
13. Observe the warning and information plates on the machine.
14. Close the machine hood after the visual checks.

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

5.1.2 Checking the functional fluids



Item	Designation
1	Checking the water, fluid and fuel levels

⚠ WARNING

Risk of injury due to skin contact with functional fluids

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

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

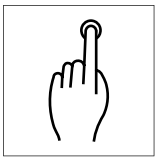
NOTICE

Risk of machine damage caused by unauthorised functional fluids

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

- Use only the lubricants specified in the lubricant recommendation.

1. Position the machine horizontally before checking the functional fluids.
2. Always check the functional fluids when the machine is cold.
3. Check all water, oil and fuel levels and top these up if necessary.



The fill volumes can be found in the “Technical data” section of the “General technical description” chapter. The fill volumes are only approximate values They may vary depending on the model and quantity of fluid remaining.

4. Close all filler lids after completing the tasks.

5.1.2.1 Checking the fuel level

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

1. Check the fuel level at the fuel tank.
2. If necessary, top up the fuel.

5.1.2.2 Checking the engine oil level

1. Pull out the engine oil dipstick, wipe it with a lint-free cloth and re-insert it.
2. Pull out the oil dipstick for a further check. You can read off the engine oil level from the oil dipstick marking. The engine oil level must be between the “Min.” and “Max.” markings.
3. Insert the oil dipstick again.
4. If necessary, top up the engine oil.

Further details can be found in the documentation from the engine manufacturer.

5.1.2.3 Checking the centralised lubrication system

- Check the fill level of the centralized lubrication system (option). If necessary, top up the lubricant reservoir. *(Centralised lubrication system – checking the fill level P. 8 — 21)*

5.1.2.4 Checking the hydraulic fluid level

You can check the hydraulic fluid level on the hydraulic fluid reservoir's fill level indicator.

1. Check the hydraulic fluid level on the hydraulic fluid reservoir's fill level indicator.
2. Top up the hydraulic fluid if necessary.

Only fill the hydraulic fluid reservoir through the screen in the oil filler. Only fill the hydraulic fluid reservoir to the “Maximum” mark in the fill level indicator. Use only the hydraulic fluids specified in the lubricant recommendation.

5.1.3 Checking the dry air filter

Check the maintenance indicator on the dry air filter. The filter element must be cleaned or replaced if the red area is visible in the window of the maintenance indicator.

1. Check the maintenance indicator on the dry air filter.
2. If necessary, clean the dry air filter (see the “Maintenance” chapter).

5.1.4 Checking the radiator

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

- ▸ Check the cooling fins of the radiator for contamination.
  - ⇒ In case of contamination, you must clean the cooling fins (see the “Maintenance” chapter).

5.1.5 Draining condensation from the hydraulic fluid reservoir

If the machine is not used for a longer period, condensation may form in the hydraulic fluid reservoir and collect at the lowest point.

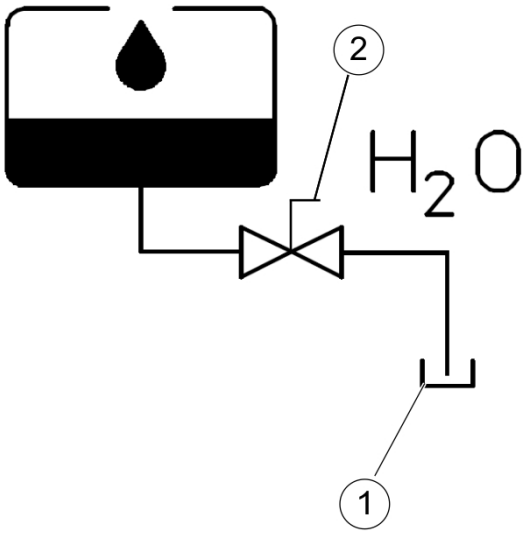


Figure 29: Draining condensation

Item	Designation
1	Container
2	Drain cock

1. Place a suitable container *(1)* under the drain cock *(2)* to catch the condensation.
2. Open the drain cock *(2)*. Close it as soon as hydraulic fluid begins to drain out.

5.1.6 Checking the hydraulic system

Check the hydraulic system for leak tightness.

⚠ WARNING

Risk of injury due to old hydraulic hose assemblies

Old hydraulic hose assembles could leak or burst.

- Hydraulic hose assemblies should not be more than six years old, including a storage time of two years. Please note the date of manufacture on the hydraulic hose assemblies.

- Check whether all hydraulic hose lines/threaded unions and cylinders are sealed. *(Checking and replacing the hydraulic hose lines P. 8 — 54)*

5.1.7 Checking the water box

⚠ WARNING

Risk of serious injury caused by reaching into the water box during pumping operations

Risk of crushing, injury by shearing, being pulled in or loss of limbs caused by reaching into the water box while the pistons are operating.

- Never reach into the water box during pumping operations.

1. Check the water level: The piston rods must be fully covered.

The water box must be filled during operation, even if there is a risk of freezing.

NOTICE

Risk of the pump overheating due to low fill level of the water box

The water box must always be filled during operation. The piston rods must be fully covered with water to prevent the pump from overheating and any consequential damage.

1. Check the water fill level in the water box at intervals of two hours.
2. If there is a low water level in the water box, refill it immediately with cold, clean water.

2. Check the condition of the water: If the fluid visibly escapes, particularly at the piston rods, this means that the drive cylinders are not properly sealed. If there is an unusually high amount of grout in the water box, this means that at least one delivery piston is worn.

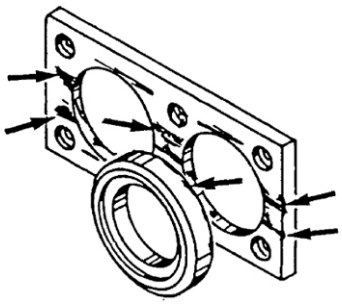
Small volumes of fluid in the water box come from the dry running cut-out on the delivery pistons. The drive cylinders are only not properly sealed if fluid visibly escapes.

3. Check the bolts' securing wires on the spacer flange: If the securing wires are damaged, the bolts' tightening torque must be checked.

5.1.8 Checking parts that come into contact with the medium

Before use, you should always check the condition of parts that come into contact with the medium:

1. From the pressure connection end, shine a light down the transfer tube using a pocket torch and check the inner wall of the tube and the thrust ring for wear.



2. Look into the hopper and check the condition of the spectacle wear plate and the wear ring. If wear is clearly visible (e.g. clear score marks), the parts must be replaced.

5.2 Filling the machine with fuel

⚠ WARNING

Risk of injury due to fuel igniting

Smoking is absolutely prohibited when fuelling.

1. Fill the machine with fuel only when the engine is switched off.
2. Keep a fire extinguisher readily available while fuelling.
3. Never fill the fuel tank near naked flames or ignitable sparks.
4. Do not spill fuel on hot machine components when fuelling.
5. Avoid naked flames at the machine and close the fuel tank after fuelling.
6. Use an auxiliary device such as a funnel to ensure that no fuel is spilled.

NOTICE

Risk of machine damage due to using the wrong fuel

1. Only fill the fuel tank with standard commercially available branded fuel, as the diesel engine may otherwise become damaged.
2. Use summer or winter diesel fuel depending on the outside temperature.

Always fill the fuel tank well in advance, as it will otherwise be necessary to vent the fuel line to the diesel engine.

5.3 Test run

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

NOTICE

Machine damage caused by defects not having been rectified

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

⚠ WARNING

Risk of crushing due to moving assemblies

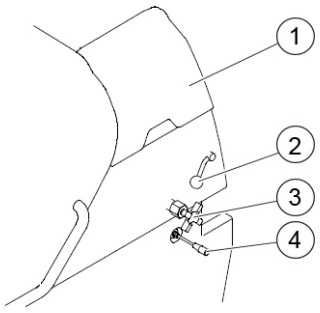
The machine may only be operated if its hood is fully closed and fully functional.

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

5.3.1 Starting up the drive motor

Do not exceed the motor speed specified in the “Technical data” section. Always set the motor to above the speed where it begins to shake. After periods of intense motor load, do not switch off the drive motor immediately, but first leave to cool in idling position. The drive motor can only be started under no load, i.e. no consumers should be switched on.

To facilitate start up of the drive motor at low temperatures, all consumers should be switched off.



Item	Designation
1	Control cabinet (under flap)
2	Manual throttle lever
3	Output controller
4	“Agitator PUMP – 0 – MIX” mixer lever

1. Set the output controller to “min”.
2. Set the “Agitator PUMP – 0 – MIX” mixer lever to the “0” position.

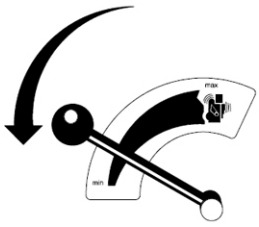
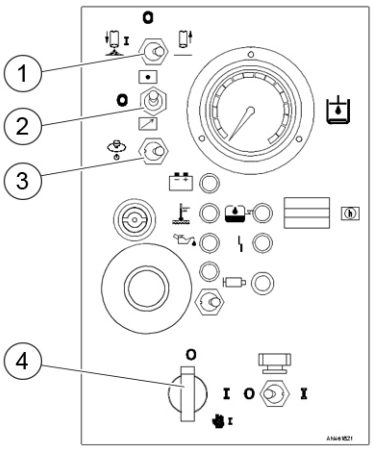


Figure 30: Decrease throttle

3. Set the manual throttle lever to the idle position.

The control cabinet is fitted with a visual warning system, i.e. if there is a fault, the corresponding indicator lamp lights up.



Item	Designation
1	**Toggle switch** Pump ON – 0 – Reverse pumping ON
2	**Toggle switch** Local – 0 – Remote
3	**Toggle switch** Acknowledge EMERGENCY STOP/acknowledge fault
4	**Ignition start switch** Engine ON

4. Switch the “Pump ON – 0 – Reverse pumping ON” toggle switch to the “0” position.

5. Switch the “Local – 0 – Remote” toggle switch to the “Local” position.
6. Start up the drive motor by turning the “Drive motor ON” ignition starter switch clockwise as far as the stop and wait until the drive motor starts.

Attempt to start the engine for a maximum of 20 seconds. Wait at least 1 minute before attempting to start the engine again. If you cannot start up the drive motor on the second attempt, look up the cause in the “Faults, cause and remedy” chapter.

7. Press the “Acknowledge EMERGENCY STOP/Acknowledge fault” toggle switch.
   ⇒ The machine is ready for operation.

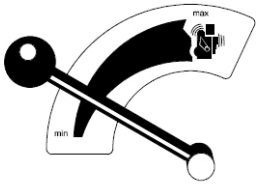


Figure 31: Manual throttle lever to slightly above idling speed

8. Set the manual throttle lever slightly above “min”.

NOTICE

Mechanical stress on the machine due to vibration

- Always set the motor speed to above the vibrating speed (500–700 rpm) to avoid unnecessary vibration.

9. Let the drive motor warm up before switching on the pump.

5.3.2 Switching on the pump

1. Switch the “Pump ON – 0 – Reverse pumping ON” toggle switch to the “Pump ON” position.
   ⇒ The pump starts up.

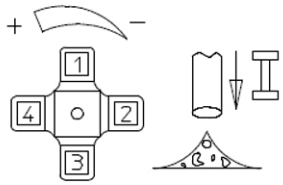


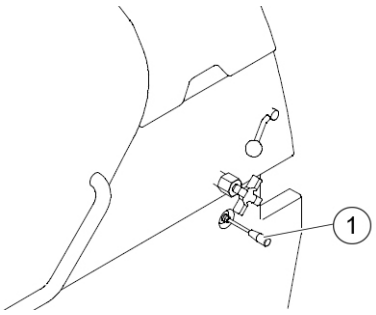
Figure 32: Output controller

2. Set the output controller to the desired output.
3. Let the pump run to warm up until the hydraulic oil is at least hand-hot.

5.3.3 Switching on the agitator

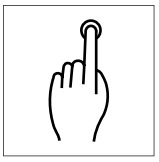
The agitator must be switched on for pumping or mixing.

1. Set the “Agitator PUMP – 0 – MIX” mixer lever to “PUMP”.



Item	Designation
1	“Agitator PUMP – 0 – MIX” mixer lever

2. Set the “Agitator PUMP – 0 – MIX” mixer lever to “PUMP”.
   ⇒ The agitator is switched on.
   ⇒ The mixing paddles rotate towards the delivery cylinder.
3. Set the “Agitator PUMP – 0 – MIX” mixer lever to “MIX”.
   ⇒ The agitator is switched on.
   ⇒ The mixing paddles rotate away from the delivery cylinder.



The machine is equipped with an agitator safety cutout. The agitator safety cutout switches off the agitator immediately if the grille or hopper attachment is opened during operation.

4. Set the “Agitator PUMP – 0 – MIX” mixer lever to “0”.
   ⇒ The agitator is switched off.

5.3.4 Switching off and shutting down the machine

In case of longer downtimes, the machine should be cleaned before switching it off.

1. Switch off the pump by setting the “Pump ON – 0 – Reverse pumping ON” toggle switch to “0”.
2. Switch off the drive motor by pressing the “Electric drive motor OFF” toggle switch.
3. Secure the machine against unauthorised starting or use.

5.4 Function checks

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

⚠ WARNING

Risk of crushing due to moving assemblies

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

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

5.4.1 Pump functions

A prerequisite for trouble-free operation is a fully functional pump.

- ▸ Check the function of all operating elements at the control cabinet and the remote control in succession.

5.4.2 Switchover

- Check whether the delivery piston and the transfer tube switch over perfectly by moving the delivery rate controller to different settings.

5.4.3 Stroke time

- Set the drive motor to maximum speed. Calibrate the quantity to maximum. Measure the stroke time over 10 individual strokes. The measured value divided by 10 must correspond to the specifications in the test reading.

5.4.4 Checking the function of safety devices

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

Check:

1. The function of the EMERGENCY STOP button,
2. The function of the agitator cut-out.

5.4.4.1 Checking the EMERGENCY STOP button

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

NOTICE

Machine damage caused by incorrect actuation of the EMERGENCY STOP button

1. Check that the EMERGENCY STOP button is fully functional every day.
2. Press the EMERGENCY STOP button only in case of danger.
3. Do not use the EMERGENCY STOP button to switch off the machine.

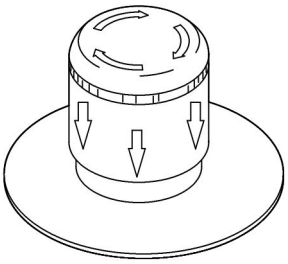


Figure 33: EMERGENCY STOP button

Item	Designation
a	**Press**: Lock EMERGENCY STOP button
b	**Turn**: Unlock EMERGENCY STOP button

1. Start up the drive motor.
2. Switch the pump on.
3. Press the EMERGENCY STOP button.
   ⇒ The pump stops.
   ⇒ The agitator stops.
   ⇒ The engine begins idling.
   ⇒ The “fault” indicator lamp lights up.

⚠ WARNING

Risk of injury due to defective safety equipment

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

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

4. Unlock the EMERGENCY STOP button by turning it.
5. Press the “Acknowledge EMERGENCY STOP” toggle switch.
   ⇒ The EMERGENCY STOP is acknowledged.
   ⇒ The “fault” indicator lamp goes out.

5.4.4.2 Checking the agitator safety cutout

The machine is equipped with an agitator safety cutout. The agitator safety cutout switches off the agitator immediately if the grille or hopper attachment is opened during operation.

Check whether the agitator safety cutout is fully functional.

⚠ WARNING

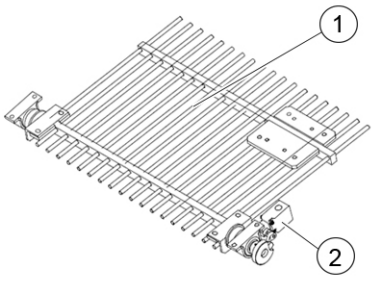
Risk of injury due to defective safety equipment

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

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

1. Start up the drive motor.
2. Switch on the agitator.

Hopper grille safety equipment

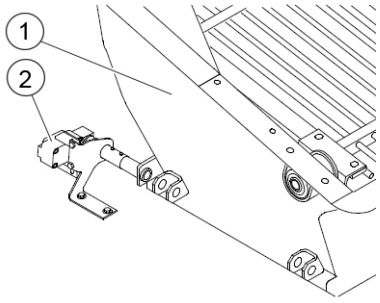


Item	Designation
1	Hopper grille
2	Limit switch

The safety device on the hopper grille *(1)* is fitted with a limit switch *(2)* which switches off the agitator as soon as the hopper grille is raised.

1. Raise the hopper grille.
   ⇒ The agitator stops.
2. Close the hopper grille again.
   ⇒ The agitator starts to run again.

Hopper attachment safety equipment



Item	Designation
1	Hopper attachment
2	Limit switch

The safety device on the hopper attachment *(1)* is fitted with a limit switch *(2)* which switches off the agitator as soon as the hopper attachment is raised.

1. Raise the hopper attachment.
   ⇒ The agitator stops.
2. Close the hopper attachment once again.

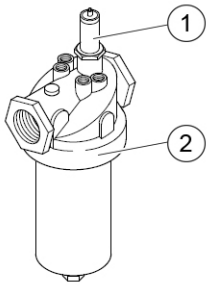
5.4.5 Hydraulic filter

Contaminated hydraulic filters considerably reduce the oil flow rate and may damage the hydraulic system.

Check the reverse fine filter as follows:

1. Let the pump run to warm up until the hydraulic oil has reached operating temperature. (>50 °C)
2. Set the output controller to the maximum output.

The contamination indicator of the reverse fine filter can only be checked under load and when the hydraulic oil is warm.



Item	Designation
1	Optical contamination indicator (red button)
2	Reverse fine filter

The reverse fine filter has an optical contamination indicator (red button), which indicates when the filter insert is contaminated and has to be replaced.

When switching on the machine, the red button on the contamination indicator can pop out if the engine is cold. Press the red button back in only when operating temperature has been reached.

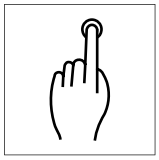
3. If necessary, press the red button of the contamination indicator back in.
4. Check the optical contamination indicator.

If the red button on the optical contamination indicator pops out again immediately, the filter insert must be replaced.

5. If necessary, replace the filter insert on the hydraulic filter. *(Changing reverse fine filters P. 8 — 50)*

5.5 Checking the delivery line

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



⚠ WARNING

Risk of injury due to use of unsuitable delivery line parts

Risk of extremely serious injuries due to bursting delivery line or conveyed material shooting out.

- Use only delivery lines, couplings etc. in perfect condition that are suitable for the delivery job and pressure, and are manufactured by the machine manufacturer.

⚠ WARNING

Risk of accident due to material spraying around

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

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

NOTICE

Contaminated couplings

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

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

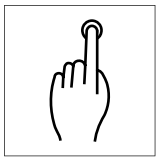
i

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

Use only delivery lines with a suitable internal diameter.

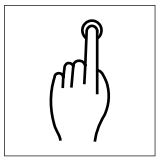
You must secure the coupling parts on delivery lines with threaded spouts by gluing. If a coupling part needs to be replaced, carry out the following steps:

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



6 Operation

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



6.1 Requirements

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

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

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

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

6.2 Emergency shutdown procedure

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

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

6.2.1 EMERGENCY STOP button

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

Item	Designation
1	EMERGENCY STOP button

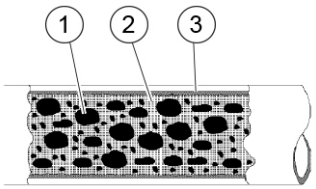
1. In the event of impending danger, press the EMERGENCY STOP button.
   ⇒ The pump stops immediately.
   ⇒ The agitator stops immediately.
   ⇒ The engine begins idling.
   ⇒ The “fault” indicator lamp lights up.
2. If necessary, take first-aid measures.
3. Note down the incident and report it in line with company guidelines.
4. Look for the cause of the fault and rectify it.
5. Unlock the EMERGENCY STOP button by turning it.

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

6. Press the “Acknowledge EMERGENCY STOP” toggle switch.
   ⇒ The EMERGENCY STOP is acknowledged.
   ⇒ The “fault” indicator lamp goes out.
7. You can now start up the machine correctly again.

6.3 Concrete properties

Concrete properties, such as consistency and grading curve, are crucial factors in ensuring an optimum fill level in the delivery cylinders. In turn, the fill level has a critical effect on the pump's efficiency, i.e. the concrete output per stroke.



Item	Designation
1	Aggregate
2	Cement paste
3	Boundary layer

If the aggregate has too stiff a consistency and an unfavourable grading curve (low sand content, crushed material), a low fill level is reached in the delivery cylinders. In such case, decreasing the delivery speed can increase the delivery rate.

6.4 Filling the hopper

The machine is filled via the hopper.

⚠ WARNING

Conveyed material shooting out after the hopper has been filled incorrectly

Air must not been drawn in. Air pockets in the delivery line are dangerous because the compressed air at the end of the delivery line is suddenly released and the concrete can break away in explosive manner.

- Always fill the hopper with concrete up to the mixer shaft.

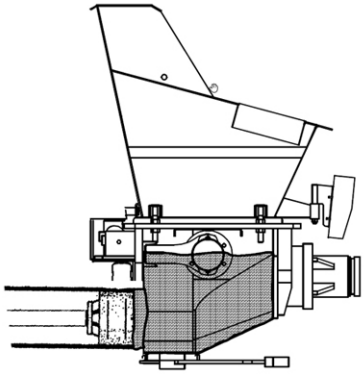


Figure 34: Always fill the hopper with concrete up to the mixer shaft

- Make sure that the agitator is running while filling the hopper.

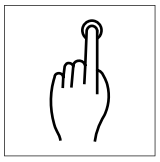
6.5 Starting to pump

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

In the case of new delivery lines, or if the delivery line has not been used for a long time, you must start pumping with a cement-water mixture (grout).

The entire delivery line must be wetted before pumping operations can commence.

1. Insert two sponge balls into the delivery line.
2. Switch on the agitator.
3. Fill the hopper with approx. 250 litres of low-viscosity concrete.
4. Slowly pump the concrete into the delivery line.
   ⇒ The process of starting to pump with low-viscosity concrete is completed when the two sponge balls and a solid concrete stream emerge from the delivery line.



6.6 Pumping

Start with a low delivery rate and increase it continuously after several cubic metres.

When using a diesel engine drive, you can operate your machine in an economic way if you choose the motor speed and delivery rate regulation in such a way that the motor does not run at too high a speed when the load is low.

Correctly mixing together the concrete has an impact on the pumping process.

1. Mix the concrete vigorously in the truck mixer at maximum speed. Ensure that the concrete mix is uniformly prepared.
2. If concrete additives (deflocculants, set retarding admixture) are required, mix again for at least four minutes after these have been added.
3. Switch on the agitator.
4. Fill the agitator hopper with concrete from the truck mixer, silo, etc.
5. Start pumping.

6.6.1 Monitoring the pumping operations

The indicators on the monitoring instruments must be observed during the entire pumping operation.

1. Check all indicators on the monitoring instruments.

Every time a fault is indicated, the machine must be switched off immediately and all faults must be resolved straight away, otherwise the guarantee will expire.

2. Pay attention to the hydraulic pressure indicated on the pressure gauge. The value displayed must not exceed the maximum value specified on the rating plate.
3. Check the bearings and seals on the switching shaft, pressure connection and agitator shaft at regular intervals.
4. Lubricate the machine as required.

Bearings and seals must be replaced as soon as a cement-coloured oil-grease mixture or grout emerges.

5. Repeat these checks regularly at short intervals over the entire operating time of the machine.

6.6.2 Breaks in pumping

Breaks in pumping should be avoided where possible because the concrete in the delivery line may begin to set or segregate due to vibrations from the machine.

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

1. Never leave the delivery line under pressure. During short breaks in pumping, dump the delivery line pressure by briefly reverse pumping.
2. Keep the concrete moving by forward and reverse pumping (2–3 strokes) at short intervals.

It is only possible to reverse pump for a few pump strokes, otherwise the hopper will overflow.

3. In the case of concrete with low water retentivity (bleeding tendency), you should avoid breaks as vibrations may segregate the concrete. When recommencing pumping, always leave the pump on reverse pumping until the transfer tube switches through completely on both sides. Only then switch over to forward pumping again.

NOTICE

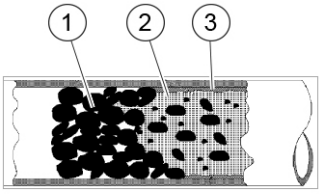
Risk of formation of a blockage due to pumping of set conveyed material

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

4. During longer breaks in pumping, reverse pump the concrete into the hopper. Before starting to pump again, you must mix the concrete together again.

6.7 Blockages

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



Item	Designation
1	Wedged aggregate
2	Cement paste
3	Boundary layer

The following faults may result in blockages:

- Delivery line is insufficiently wetted
- Transfer tube is not properly sealed.
- Lines are not properly sealed.
- Delivery line couplings are not clean.
- Concrete residue in transfer tube and delivery line.
- Unfavourable concrete composition.
- Segregated concrete.
- Set concrete.

6.7.1 Removing blockages

1. In the event of blockages, immediately reverse pump the concrete into the hopper and briefly mix it together.

DANGER

Risk of death due to the incorrect removal of a blockage

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

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

WARNING

Risk of injury

Concrete can spray out of the hopper during reverse pumping.

1. Wear protective goggles.
2. Wear respiratory protection.

2. If the delivery cylinders and the transfer tube automatically switch over again perfectly, you can switch over to forward pumping. Carefully start pumping again.

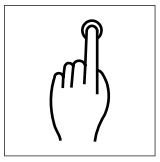
WARNING

Risk of injury due to pressurised delivery line

Risk of extremely serious injuries due to bursting delivery line or conveyed material shooting out.

1. Do not open the delivery line while it is pressurised.
2. Relieve the pressure in the delivery line by reverse pumping.
3. Check the pressure gauge indicator to ensure that the system is fully depressurised before disconnecting the delivery line.
4. Always wear personal protective equipment.
5. Turn your face away when opening the line coupling.

3. If the blockage is not released, disconnect the delivery line and release the blockage by shaking and tapping the line.
4. When you start pumping again, add cement grout to the delivery line.



6.8 Motor

Do not exceed the permitted motor speed specified on the rating plate of the machine. Always set the motor to above the speed where it begins to shake. After periods of intense motor load, do not switch off the drive motor immediately, but first leave to cool in idling position.

Also note the information in the documentation provided by the motor manufacturer.

6.9 Overheating of the hydraulic fluid

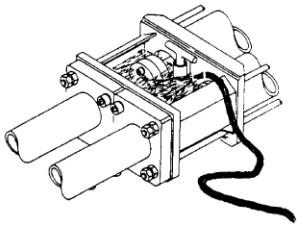
During normal pumping operations, the temperature of the hydraulic fluid is between 55 °C and 60 °C. The following causes, particularly when combined together, may lead to the hydraulic fluid overheating:

- Continuous work under high stress
- High ambient temperatures
- Too little hydraulic fluid in the hydraulic system
- Contaminated radiator grille
- Insufficient cooler supply air or exhaust air
- Radiator draws in hot exhaust gases
- Excess pressure due to a blockage
- Too little water in the water box

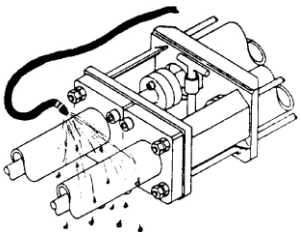
All pumps have a thermoelectric cut-out. If oil overheats to over 90 °C, the pump is switched off automatically. The motor continues to run to cool down the machine and the “fault” indicator lamp lights up on the control cabinet.

To prevent shutdown during pumping operation when a fault is pending, proceed as follows:

1. Reduce the delivery rate.
2. As soon as the fluid temperature rises above 70 °C, immediately fill the water box with fresh water.



3. If the temperature continues to rise, change the water constantly.
4. Pinpoint the cause of the fluid overheating and rectify the problem if the safety regulations permit this during pumping operations.
5. If the previous measures do not suffice, you may can cool the drive cylinders with a water jet if necessary.



6. Direct the water jet at the drive cylinders and their piston rods.

Never cool the machine down with seawater or water containing salt. This would destroy the chrome layer in the delivery piston rods and cylinders.

6.9.1 Restarting

If the pump has switched off again due to overheating, proceed as follows:

1. Switch the pump off.

Do not turn off the motor as the hydraulic fluid radiator must remain in operation.

2. Change the water in the water box.
3. Wait until the hydraulic fluid has cooled if you are not able to find the fault immediately.

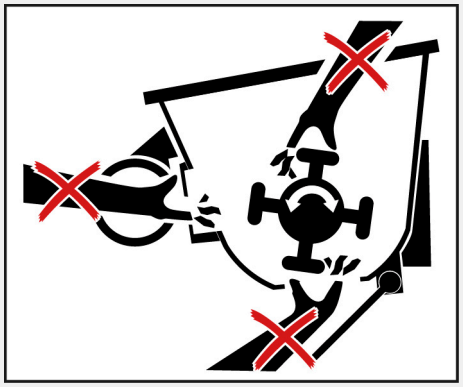
4. If the red indicator lamp has gone out, acknowledge the fault on the control cabinet.
5. Switch the pump on and slowly continue to pump with reduced power.
6. When pumping is finished, determine the cause of the fluid overheating and rectify the fault.

6.10 Cleaning

⚠ WARNING

Risk of injury due to rotating components in the hopper

Risk of hands, feet and arms being crushed, shorn, struck and drawn in by rotating parts in the agitator.



1. Do not reach into the hopper.
2. Do not insert any objects through the grille.
3. Never operate the pump without the grille.
4. Check the wear on the grille at regular intervals.

⚠ WARNING

Risk of injury due to the conveyed material spraying out

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

During cleaning operations, lock the remote control unit. The remote control unit does not have watertight housing. During cleaning operations, perform the required machine functions on the control cabinet.

6.10.1 General

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

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

NOTICE

Environmental pollution caused by cleaning agents or fuel

Cleaning agents or fuel must not enter the sewage system.

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

NOTICE

Machine damage caused by water penetration

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

NOTICE

Machine damage caused by frost

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

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

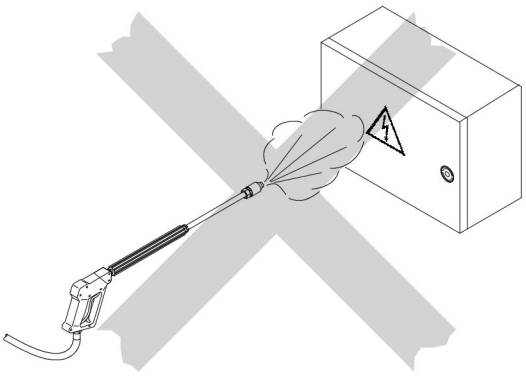


Figure 35: No water in the electrical system

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

3. Never use sea water or other water containing salt for cleaning purposes.
4. Rinse the machine immediately with clean water if it comes into contact with sea water.
5. Completely remove all covers/tape after cleaning.

6.10.2 Concrete residue

For environmental reasons, you should always find an appropriate use for concrete residue. Concrete residue should be used at construction sites. If this is not possible, concrete residue should be treated as building rubble or supplied to a recycling facility.

If the concrete is not to be used, you should bend a piece of structural steel into a hook and insert this into the concrete. If the concrete has set, the lump of concrete produced can be moved away with a site crane.

6.10.3 Cleaning the machine

Clean the machine first, then the delivery line.

Concrete residue which accumulates in the area of the wear ring can impair the functioning of the machine. This is why it is important to thoroughly rinse out the wear ring after work is completed, provided that the pump is not used again within the next hour.

6.10.3.1 Preparations

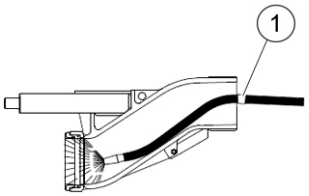
To optimally clean the wear ring and seal ring on the transfer tube, this area must be rinsed with water from a close distance for an extended period of time. So that the water hose is not cut off from the switching transfer tube, you should mark the water hose as described below.

Marking the water hose

⚠ WARNING

Risk of injury due to switching transfer tube

1. Switch the machine off while you measure the hose length.
2. Dump the pressure in the entire hydraulic system.



Item	Designation
1	Adhesive tape marking

1. Measure the required hose length on the outside of the transfer tube.

The spray nozzle for the hose should be located just in front of the wear ring so that, when the spray is set, concrete residue is washed out of the area of the wear ring and seal ring.

2. Mark the measured length on the water hose using adhesive tape or similar.

6.10.3.2 Cleaning the hopper, transfer tube and delivery cylinder

The following section describes a possible method of cleaning the hopper, delivery cylinder and transfer tube.

⚠ WARNING

Risk of injury due to moving S transfer tube

Objects which are captured and damaged by the switching transfer tube may flap around and injure you or other persons.

- Never insert the water hose, spray gun or other objects through the grille into the hopper to spray the delivery cylinders.

Draining concrete residue

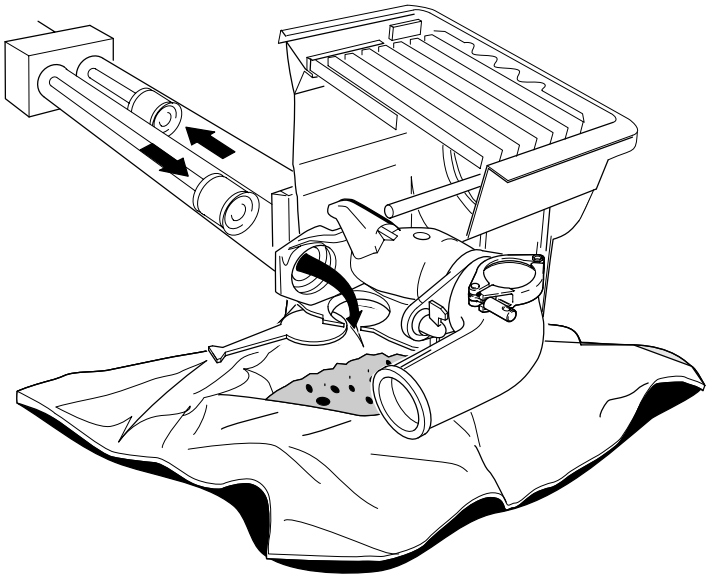


Figure 36: Lay the sheet down

1. Place a suitable film under the hopper.
2. Open the hopper flap underneath the hopper and let the concrete residue drain from the hopper.
3. Switch the pump to reverse pumping.
   ⇒ This pumps the concrete residue out of the delivery cylinders into the hopper and therefore also to the hopper opening.

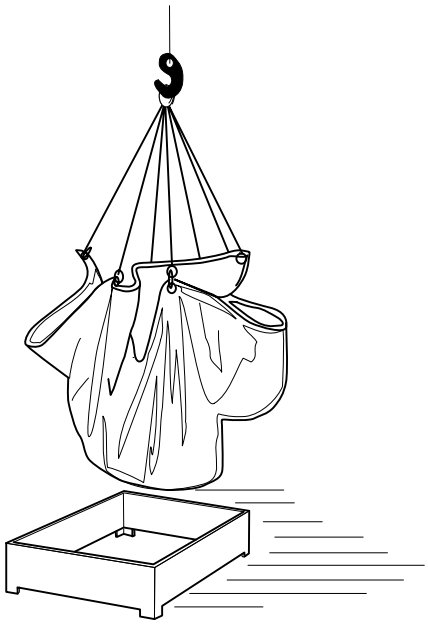


Figure 37: Hoisting the concrete away

4. Lift the concrete away in the film.

Cleaning the hopper

1. Adjust the delivery rate to the lowest setting when the pump is running.
2. Pump the hopper empty.
3. Reverse pump to depressurise the entire system.
4. Switch off the machine.
5. Disconnect the delivery line.
6. Clean the machine with clean water.
7. Spray the hopper until it is clean.

Spraying the transfer tube and delivery cylinder

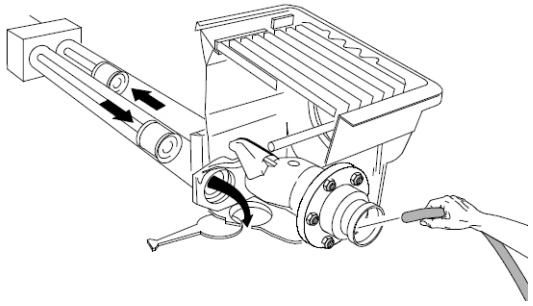


Figure 38: Spray the transfer tube and delivery cylinder while the concrete pump is slowly running backwards

1. Let the concrete pump slowly run backwards.
2. Carefully spray the transfer tube downwards from the pressure connection.
3. In doing so, slowly insert the hose as far as the marking. *(Marking the water hose P. 6 — 17)*

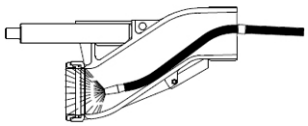


Figure 39: Inserting the water hose into the transfer tube to the marking

4. Keep the water hose that has been inserted to the marking in this position for several minutes until only clear water exits.
   ⇒ In the process, the delivery cylinders are rinsed out alternately.
5. Carefully spray the hopper with a water hose.
6. Spray off all parts that have come into contact with concrete with a hose.

After cleaning, check the wear ring and the spectacle wear plate for wear.

7. Then clean the delivery line.

6.10.4 Cleaning the delivery line

There are two methods for cleaning the delivery line: Suction cleaning and high-pressure water cleaning. The choice of cleaning method depends on how the concrete pump has been used and what equipment is available, among other factors.

6.10.4.1 Preparations

To ensure a proper cleaning process at construction sites, you not only require sufficient water, but also the relevant cleaning accessories in addition to sponge balls – depending on the intended cleaning method. A summary is provided below:

Catch basket

A catch basket is recommended for high-pressure water cleaning.

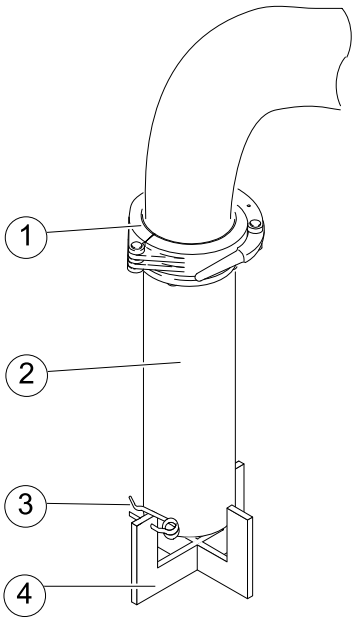


Figure 40: Fitted catch basket

Item	Designation
1	Coupling
2	Catch basket (closed pipe section)
3	Spring pin (on both sides)
4	Catch bracket

1. Use the catch basket *(2)* when pushing out concrete “forwards” with pressurised water.
2. Make sure that the concrete can flow out unimpeded and, at the same time, that the sponge ball (cube, scraper) is collected and therefore that the delivery line is sealed from the rear.

Wash-out adapter

The wash-out adaptor can be used when cleaning with pressurised water.

The wash-out adaptor must not be installed on the delivery line during pumping operations as the flushing connections and shut-off valves are not designed for the pressure from the concrete pump. The adapter may only be used to clean with pressurised water.

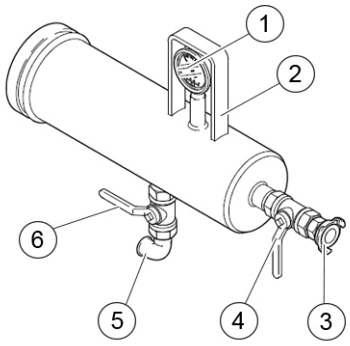


Figure 41: Structure of the wash-out adaptor

Item	Designation
1	Pressure gauge
2	Guard brackets
3	Pressurised water connection
4	Shut-off valve for connection
5	Pressure dump elbow
6	Dump cock

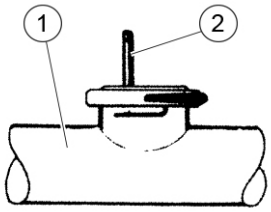
T delivery pipe with cleaning port

The T delivery pipe with cleaning port can be used when cleaning with pressurised water. The pipe is used to quickly insert wash-out sponges. During suction cleaning, it is used to collect the wash-out sponge .

⚠ WARNING

Risk of injury due to pressurised delivery line

1. You can only open the wash-out port lid when the delivery line is depressurised.
2. When using the T delivery pipe, make sure that it is designed for the pressure indicated on the rating plate on the pump.



Item	Designation
1	T delivery pipe with wash-out port
2	Wash-out port lid

6.10.4.2 Suction cleaning

Suction cleaning is the easiest and least dangerous method of cleaning a riser. This method is as follows.

Suction cleaning is only possible on pipelines.

1. Pump the agitator hopper empty to the upper edge of the delivery cylinder pumps.
2. Then switch the pump off.
3. At the site of concrete placement, press a water-soaked wash-out sponge into the end of the delivery line.
4. Switch the pump on to reverse pumping.
   ⇒ The concrete and wash-out sponge are reverse pumped through the delivery line.

Adjusting the wash-out sponge (without T delivery pipe)

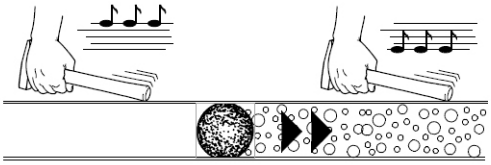


Figure 42: Tapping the delivery line with a hammer handle

1. During the cleaning process, tap the delivery line with hardwood (hammer handle) just in front of the cleaning port.
   ⇒ If there is concrete in the delivery line, the tapping will produce low, dull sounds. Once the concrete and wash-out sponge have passed the point where you are tapping, the tapping will produce high-pitched, light sounds.

Only tap the delivery line with the hammer handle. Otherwise, the pipe may be damaged.

2. Switch off the pump as soon as the wash-out sponge has passed the point where you are tapping.

Collecting the wash-out sponge (with T delivery pipe)

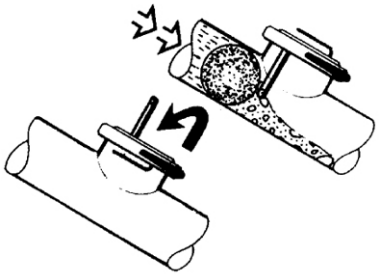


Figure 43: Turning the wash-out port lid

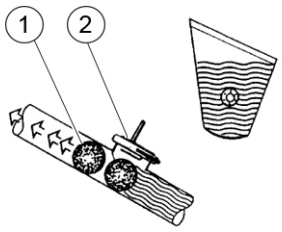
1. Open the cleaning port on the T delivery pipe, turn the wash-out port lid around and seal it again on the inside with the journal.
2. Switch the pump to reverse pumping again.
   ⇒ The wash-out sponge remains hanging to the journal on the wash-out port lid.

3. Then switch the pump off.
4. Open the wash-out port lid and remove the wash-out sponge.
5. Repeat the cleaning process as reverse pumping a wash-out sponge a single time is not sufficient.

6.10.4.3 High-pressure water cleaning

High-pressure water cleaning, which is more thorough but also more complicated than suction cleaning, is described as follows. This cleaning method can be performed by a machine or by using a wash-out adaptor.

1. Pump the hopper empty as far as is possible.
2. Switch the pump to “reverse pumping” and dump the pressure in the delivery line by reverse pumping for five to ten strokes.
3. Switch the pump off.



Item	Designation
1	Inserted wash-out sponge
2	T delivery pipe with cleaning port

4. Before starting cleaning, fit a catch basket to the end of the delivery line, if necessary.
5. Push one to two water-soaked wash-out sponges into the cleaning port on the T delivery pipe and close the port.
6. Spray the hopper with a water hose.
7. Fill the hopper with water.
8. Switch the pump to “forward pumping”.
   ⇒ The water pushes the concrete in the delivery line to the end of the delivery line.

9. In the case of longer delivery lines, refill the hopper with water in good time before air is drawn in.
10. Pump until the wash-out sponges exit at the end of the delivery line. Ensure that no exiting water runs into the formwork.
11. Then switch the pump to reverse pumping so that the washing water can drain from the delivery line.

6.10.5 Post-cleaning procedure

⚠ WARNING

Risk of injury

Auxiliary materials or functional fluids can cause poisoning, chemical burns or irritation.

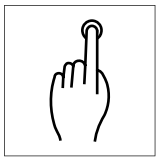
1. Take note of the safety data sheets for the auxiliary materials or functional fluids used.
2. Wear personal protective equipment.
3. Personnel who work with auxiliary materials or functional fluids must be trained in handling them.

⚠ WARNING

Risk of burning

Auxiliary materials and functional fluids can explode when atomized.

1. In the Operating Instructions, follow the safety instructions concerning highly explosive or atomized auxiliary materials or functional fluids (e. g. preserving agents).
2. Take note of the safety data sheets for the auxiliary materials or functional fluids used.
3. During spraying or preserving, smoking and naked flames are prohibited.
4. Always wear personal protective equipment.



NOTICE

Frost damage

Possible damage to the delivery line, water box, water tank and water pumps (if they are not emptied) when there is a risk of freezing.

1. Empty the water box, even at normal temperatures, during lengthy breaks in pumping (overnight, at the weekend, etc.).
2. Empty the delivery line, water box, water tank and water pump if there is a risk of freezing.
3. Leave the water outlet open until refilling is completed.

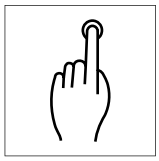
When the delivery line, hopper, delivery cylinder and S transfer tube have been cleaned, you still need to thoroughly spray all of the other machine components which have come into contact with concrete. Concrete that is not washed away immediately may corrode the paint, particularly if aggressive concrete additives have been used.

1. Clean all seals and the seal seats.
2. Grease the seals before replacing them.
3. Clean the remaining machine components by spraying them with a water hose.
4. Then spray the metal components with an anti-corrosion or anti-adhesion agent.

6.10.6 Cleaning with a highpressure cleaner

A hydraulically driven highpressure cleaner can be installed as an option.

The highpressure cleaner is used to clean the outside of the machine with pressurised water. The high-pressure cleaner is suitable for pumping clean water and other non-aggressive, non-abrasive media with a specific weight similar to water.



⚠ WARNING

Risk of injury due to high-pressure water jet.

1. Wear all necessary protective equipment. This also applies to all personnel standing within the field of application of the machine.
2. Never direct the water jet at people or animals.
3. When operating the high-pressure gun, always hold it firmly with both hands. Place one hand on the high-pressure gun trigger and the other hand on the insulation of the high-pressure pipe.
4. Ensure that the equipment is secure and stable. The highpressure gun produces recoil and torque when activated.
5. Pay attention to the confines of the special danger zone when performing work involving high-pressure water jets. No personnel apart from the machine operator should stand within a 10 m radius of the high-pressure gun.

⚠ WARNING

Risk of injury due to high-pressure water lines and/or fittings bursting

1. Do not wedge in highpressure hoses or guide them over sharp edges.
2. Avoid pulling or bending high-pressure hose lines.

The highpressure cleaner is supplied from the water mains.

⚠ WARNING

Risk of injury and machine damage due to using incorrect media

- Never convey explosive or combustible media.

NOTICE

Damage to electric components and soundproofing equipment of the machine due to high-pressure water

- Never direct the water jet at electronic components or sound-proofing equipment inside the hood.

NOTICE

Machine damage due to the high-pressure cleaner running dry

1. Always connect the water supply correctly.
2. Never let the high-pressure cleaner run dry.

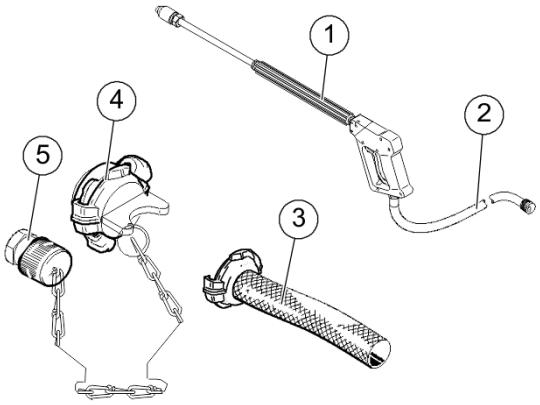


Figure 44: High-pressure cleaner – different models available

Item	Designation
1	Highpressure gun
2	Highpressure hose line
3	Water hose
4	Water supply connection (on the frame)
5	High-pressure gun connection (on the frame)

1. Switch off the machine (see the “Starting up” chapter, “Switching off and shutting down the machine” section).
2. Connect the high-pressure hose line *(2)* and the high-pressure gun *(1)*.

3. Connect the high-pressure hose line of the high-pressure gun to the high-pressure gun connection *(5)*.
4. Connect a suitable water hose *(3)* between the water mains and the water supply connection *(4)*.

⚠ WARNING

Risk of injury due to rotating components

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

5. Open the hood.

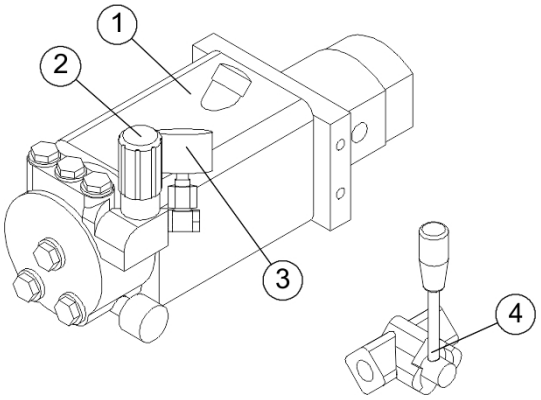
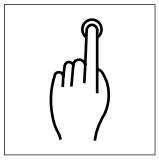


Figure 45: High-pressure cleaner – adjusting the lever

Item	Designation
1	Highpressure cleaner
2	Handwheel
3	Pressure gauge (depending on model)
4	Lever on the change-over valve

6. Open the water supply.
7. Set the lever on the change-over valve *(4)* to the “High-pressure cleaner” position.
8. Press the high-pressure gun trigger and hold it down until water exits the nozzle. This prevents the high-pressure cleaner from drawing in air.
9. Close the hood again.



10. Start the drive motor (see the “Starting up” chapter, “Switching on the machine” section).
11. Press the highpressure gun trigger.
    ⇒ The operating pressure is indicated on the pressure gauge *(3)*.
12. Regulate the operating pressure as required by turning the hand-wheel *(2)*.

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

Carry out the following steps after cleaning:

13. Switch off the machine (see the “Starting up” chapter, “Switching off and shutting down the machine” section).

After cleaning with the high-pressure cleaner, you must set the change-over valve back to the “Delivery” position.

NOTICE

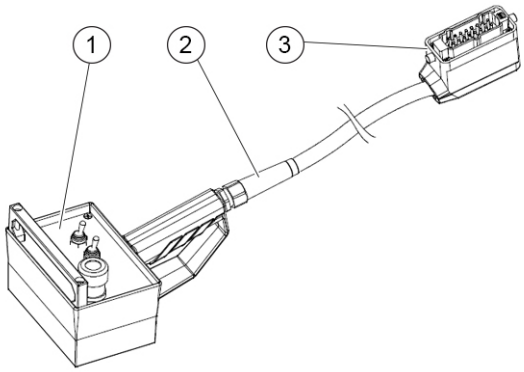
Machine damage caused by frost

1. In case of frost, drain the residual water from the high-pressure cleaner and the line by opening the connections of the water supply and the high-pressure gun.
2. Only operate and store the machine in a frost-free location.

14. Open the hood.
15. Set the lever on the change-over valve to the “Delivery” position.
16. Close the hood again.
17. Close the water supply.
18. Press the highpressure gun trigger to depressurise the system.
    ⇒ The residual pressure in the high-pressure hose line and the high-pressure gun is dumped.

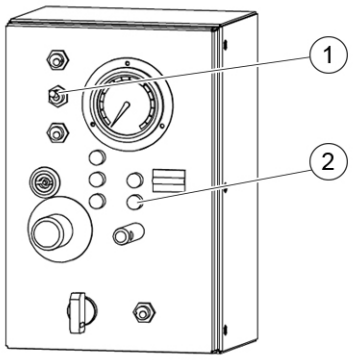
6.11 Working with the cable remote control

To use the cable remote control (option), proceed as follows:



Item	Designation
1	Cable remote control
2	Interface cable
3	Connector

1. Insert the connector on the interface cable into the socket under the control cabinet.



Item	Designation
1	“Local – 0 – Remote” toggle switch
2	“Fault” indicator lamp

2. Switch the “Local – 0 – Remote” *(1)* toggle switch to the “Remote” position.
   ⇒ The “fault” *(2)* indicator lamp lights up.

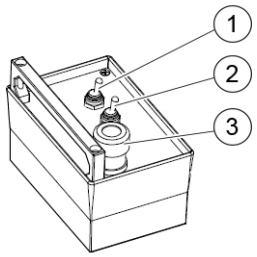


Figure 46: Remote control unit

Item	Designation
1	**Toggle switch** “Acknowledge EMERGENCY STOP/acknowledge fault”
2	**Toggle switch** “Pump ON – 0 – Reverse pumping ON”
3	**EMERGENCY STOP button** Switching off the machine in an emergency

3. Press the “Acknowledge EMERGENCY STOP” toggle switch
   ⇒ The “fault” indicator lamp goes out. The pump can be activated via the cable remote control.

6.12 Working with the radio remote control

Working with the radio remote control (option) is described as follows. The transmitter, batteries and charger are located in a watertight box in the frame of the machine, under the hood to the front right. Here, the components are protected from dirt and water. If the transmitter is not in use, it must also be stored in this box.

If other radiocontrolled construction machinery or electricity pylons on construction sites generate interfering frequencies, the machine must be operated from the control cabinet or using the optional cable remote control.

6.12.1 Battery and battery charger

The capacity of a battery depends entirely on the age of the battery and the ambient temperature. The capacity of older batteries decreases over time. At temperatures below 0 ˚°C and above 40 °C, the battery capacity will reduce more quickly.

1. Plug the charging cable plug into the socket in the storage box.
2. Insert the battery into the charger for charging.
   ⇒ Three LEDs indicate the current operating status:

The LED on the charger lights up:

- GREEN, if the battery is charged.
- ORANGE, if the battery is charging.
- RED, if the battery is deeply discharged or defective.

6.12.2 Activating the transmitter

The transmitter is equipped with the electronic radiomatic masterkey. This key contains all of the data required to operate the transmitter.

Operation is not possible without the radiomatic masterkey.

Depending on the model, the radiomatic masterkey can also be used to operate replacement transmitters which are identical in design.

Figure 47: Radio remote control transmitter

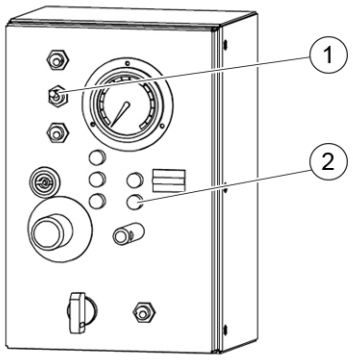
Item	Designation
1	**Electronic key** Contains all necessary data for operation
2	**Toggle switch** Pump ON – 0 – Reverse pumping ON
3	**Toggle switch** Acknowledge startup/acknowledge fault
4	**STOP button** On/off/stop the machine
5	**Battery compartment** Battery retainer
6	**Indicator light** Status LED

1. Insert a charged battery into the battery compartment.

If the status LED in the transmitter flashes red and an acoustic signal sounds, the battery must be replaced. Otherwise the transmitter will switch off after a few minutes. Always recharge the battery using the charger provided.

2. Insert the connector on the interface cable into the socket under the control cabinet.

You must switch over to remote control in the control cabinet to control the machine with the radio remote control.



Item	Designation
1	“Local – 0 – Remote” toggle switch
2	“Fault” indicator lamp

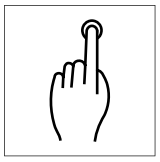
3. Switch the “Local – 0 – Remote” *(1)* toggle switch to the “Remote” position.
   ⇒ The “fault” *(2)* indicator lamp lights up.
4. Operate the STOP button on the transmitter.
5. Briefly press the “acknowledge startup/fault” toggle switch on the transmitter.
   ⇒ The status LED flashes green.

➞The transmitter is now ready for operation.

6.12.3 Deactivating the transmitter

The radio remote control must be switched off when changing site, working without radio remote control, during breaks in work or after work is completed.

1. Press the STOP button.



⚠ WARNING

Risk of injury due to unauthorised starting up of the radio remote control

1. Avoid damaging the control elements.
2. In the case of machines that are ready for operation, do not put the radio remote control down.
3. If you must put the radio remote control down, switch off the radio remote control.
4. Secure the radio remote control against use by unauthorised persons, by locking it away, for example.
5. Only operate the radio system when in perfect working order. Any faults and defects that may affect safety must be rectified by a qualified specialist before the system is operated again.

2. In the event of an emergency and any fault, switch off the radio remote control immediately.

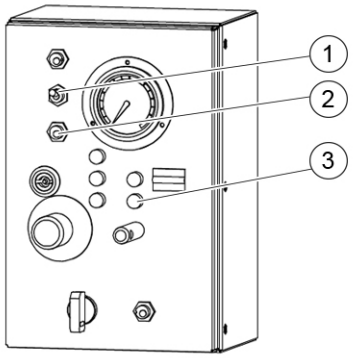
6.12.4 Fault acknowledgement

If a radio remote control fault or radio interference occurs, the EMERGENCY STOP is acknowledged as follows:

If the battery voltage decreases, if there is an open circuit, if the radio remote control switches off or the radio link is interrupted, the EMERGENCY STOP is activated. The EMERGENCY STOP button can only be acknowledged at the control cabinet with the radio remote control disconnected.

When switching on or if the radio link is interrupted (e.g. by radio taxis or if the range is exceeded), the radio responds by returning to the zero position.

1. Release all operating elements so that these can return to the zero position and press the “startup” toggle switch. The machine should now respond to radio commands.
   ⇒ The reset process was designed to prevent the machine from making uncontrolled movements following an interruption in the radio link.



Item	Designation
1	“Local – 0 – Remote” toggle switch
2	“Acknowledge EMERGENCY STOP” toggle switch
3	“Fault” indicator lamp

2. Switch the “Local – 0 – Remote” toggle switch to the “Local” position.
   ⇒ The “fault” indicator lamp lights up.
3. Press the “Acknowledge EMERGENCY STOP” *(2)* toggle switch
4. Operate the machine from the control cabinet.

The radio remote control may only be used again if the cause of the fault has been identified and rectified.

7 Faults, cause and remedy

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

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

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

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

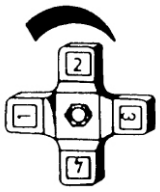
7.1 Piston pumps, general

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

7.1.1 Pump does not start

Cause	Remedy
Pump is not switched on.	Set the Pump ON – OFF switch to the ON position. Check shut-off valve position.
Safety equipment – grille and hopper attachment are not closed.	Set the Pump ON – OFF switch to the ON position. Check shut-off valve position. Check whether the safety equipment is closed. Check whether the LED lights up on the five pin plug on the main pump's control valve (if voltage is present).
Voltage is present at the control valve on the main pump.	Check whether the LED lights up on the five pin plug on the main pump's control valve (if voltage is present).
Fluid overheating in the hydraulic system	Check and, if necessary, top up the fluid level. Radiators contaminated – clean the radiators' fins.
Hydraulic fluid is too cold	Warm up idling hydraulic fluid.

7.1.2 Pump has insufficient output

Cause	Remedy
The hydraulic main pump is not fully swung out.	Close output controller, increase delivery rate. 

7.1.3 Pump does not reverse pump

Cause	Remedy
Change-over valve is jammed by fine contaminants or is defective.	Press the manual operation button several times, switch the pump to two to three strokes of reverse pumping. Check the magnets and their connections.

7.1.4 Drive cylinders are blocking in the end position

Cause	Remedy
No sequence signal from the switch cylinders is present.	Check whether the transfer tube switches through completely (possible mechanical problem – if necessary, loosen the S transfer tube bearing by 1/2 a turn or remove the material deposits in the hopper).
Due to wear in the ball cups, the plunger cylinder switches too far – no signal coverage.	Check adjustment dimension, replace and adjust worn parts. You can obtain setting values from your service dealer.
No sequence signal from the HCV valves is present.	Check whether the HCV valves are commonly used.

7.1.5 Transfer tube does not switch through completely

Cause	Remedy
If there are defective seals in the plunger cylinder, the sequential circuit signal will come too soon.	If the signal line is disconnected, check whether the transfer tube switches through completely. If this is the case, replace the seals on the switch cylinders.
One of the two 1/2 inch check valves (166 circuit diagram) is defective or loose.	Replace the check valves.
Material spreader in the hopper.	Drive back one stroke, changeover in the stroke if necessary. If the transfer tube does not switch through after being activated several times, check the hopper for material spreaders and remove it if necessary.

7.1.6 Delivery rate is difficult to regulate

Cause	Remedy
The main pump's delivery rate regulator is misaligned or blocked.	Set standby pressure in accordance with guideline. Setup must be performed by the service dealer.

7.1.7 Maximum delivery rate is not achieved

Cause	Remedy
Standby pressure is too low.	Set standby pressure in accordance with guideline. Setup must be performed by the service dealer.
Output regulator setting is too low.	Set beginning/end of regulating in accordance with specification. Setup must be performed by the service dealer.

7.1.8 Different stroke time between cylinder 1 and cylinder 2

Cause	Remedy
Shuttle valve (197 circuit diagram) is defective.	Check, or if necessary replace, shuttle valve or replace O-ring.

7.1.9 Transfer tube switches to the drive cylinders in an uncoordinated manner

Cause	Remedy
Depressurising check valves are leaking (166 circuit diagram)	Remove, check and, if necessary, replace valves – tighten in accordance with guideline.
Leak in the main slide valve from the P connection to control connection x or control connection y.	Replace main slide valve.

7.1.10 Transfer tube switches slowly at low delivery rates

Cause	Remedy
Shuttle valve 197 is defective	Check, or if necessary replace, shuttle valve or replace O-ring.
SOS valve 199 is defective	check

7.1.11 When forward pumping, the transfer tube only reaches the end position on one side. When reverse pumping, it reaches the end position on the other side

Cause	Remedy
Shuttle valve 197 is defective	Check, or if necessary replace, shuttle valve or replace O-ring.

7.1.12 Hydraulic fluid overheating

Cause	Remedy
At high power, insufficient flushing water in the water box	Top up the water.
Flushing water is too warm	Replace with cold fresh water.
Too little hydraulic fluid in the hydraulic system	Top up hydraulic fluid.
Pump is running in the max. pressure range due to poor concrete and high delivery rate	Reduce the pump speed, request better concrete (composition) if necessary.
Continuous max. pressure for long-distance conveying	Increase the pipe diameter.
Radiator contaminated	Clean the fins on the radiator.

7.2 Drive motor

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

7.2.1 The engine does not start or struggles to start

Cause	Remedy
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 filter dirty or clogged	Clean the fuel filter, replace if necessary
Engine oil with incorrect lubricant grade	Replace the engine oil
Valve play incorrect	Have checked and adjusted
Injection valve defective	Have replaced

7.2.2 The engine runs erratically or stops completely

Cause	Remedy
Fuel filter dirty or clogged	Clean the fuel filter, replace if necessary
Incorrect fuel grade	Replace with the correct fuel
Valve play incorrect	Have checked and adjusted
Fuel injection rail leaking	Have checked and repaired
Injection valve defective	Have replaced
Water in the fuel filter	Drain the fuel filter
Cable/electric problems	Check cables, replace if damaged

7.2.3 The engine does not run on all cylinders

Cause	Remedy
Fuel injection rail leaking	Have checked and repaired
Injection valve defective	Check, have replaced if necessary

7.2.4 The engine does not reach full power

Cause	Remedy
Engine oil level too high	Reduce the engine oil level
Fuel filter dirty or clogged	Clean the fuel filter, replace if necessary
Incorrect fuel	Replace with the correct fuel
Dry air filter clogged	Clean the filter element, replace if necessary
Dry air filter maintenance indicator defective	Have checked and repaired

Cause	Remedy
Radiator contaminated	Clean the cooling fins on the radiator
Charge air line leaking	Check, have repaired if necessary
Valve play incorrect	Have checked and adjusted
Fuel injection rail leaking	Have checked and repaired
Injection valve defective	Check, have replaced if necessary

7.2.5 Engine consumes too much oil

Cause	Remedy
Inclination angle of machine excessive	Align the machine horizontally
Engine oil level too high	Reduce the engine oil level

7.2.6 The engine is smouldering (blue)

Cause	Remedy
Inclination angle of machine excessive	Align the machine horizontally
Engine oil level too high	Reduce the engine oil level

7.2.7 The engine is smouldering (white)

Cause	Remedy
Ambient temperature too low	Use an engine oil grade suitable for the ambient temperature
Incorrect fuel	Replace with the correct fuel

Cause	Remedy
Valve play incorrect	Have checked and adjusted
Injection valve defective	Check, have replaced if necessary

7.2.8 The engine is smouldering (black)

Cause	Remedy
Dry air filter clogged	Clean the filter element, replace if necessary
Dry air filter maintenance indicator defective	Have checked and repaired
Charge air line leaking	Have checked and repaired
Valve play incorrect	Have checked and adjusted
Injection valve defective	Check, have replaced if necessary

7.3 Electrical system

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

DANGER

Risk of death due to fatal electric shock

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

7.3.1 Pump is switched on but does not start up.

Cause	Remedy
Delivery rate is too low	Increase the delivery rate.

7.3.2 The pump does not reverse pump

Cause	Remedy
For machines with proximity switches: A proximity switch is defective	Replace the proximity switch. Plunger cylinder sealing is defective.
A coil on the change-over valve is defective	Replace the change-over valve. Fully hydraulic control block check valve is defective.
Connector on the change-over valve is corroded	Mechanical blockage. Check the connector on the change-over valve. The LED on the five pin plug lights up on the main pump's control valve (if voltage is present).

7.4 Chassis

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

7.4.1 Braking effect too weak

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

7.4.2 Brakes jerk and jolt

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

7.4.3 One-sided trailer brakes

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

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

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

7.4.5 Reverse travel is sluggish or not possible

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

7.4.6 Handbraking effect too weak

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

7.4.7 Wheel brakes become hot

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

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

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

7.5 Radio remote control

The following section provides a description of possible causes of faults affecting the radio remote control, and their remedies.

DANGER

Risk of death due to fatal electric shock

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

First check the machine functions on the control cabinet or by using the cable remote control. If the functions cannot be controlled in this way, the cause of the fault is not due to the radio remote control.

7.5.1 No response when switching the transmitter on

Cause	Remedy
No operating voltage is present	Check the battery contacts for damage or contamination.
	Insert the charged battery into the battery compartment.
	Charge the battery completely.

7.5.2 Undervoltage warning after just a short operating time

Cause	Remedy
Battery contacts are contaminated or damaged	Check the battery contacts for damage or contamination.
Battery not charged	Insert the charged battery into the battery compartment.
	Charge the battery completely.

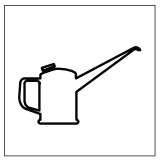
Cause	Remedy
Battery defective	Check whether the charging process works correctly
	Check transmitter function with a fully loaded or spare battery

7.5.3 The status LED in the transmitter flashes green but control commands cannot be executed

Cause	Remedy
The receiver has no operating voltage	Check the interface cable to the receiver
No radio link present	Monitor the LEDs in the indicator lamp area on the receiver to check the functions

7.5.4 Individual commands are not executed

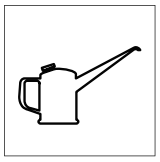
Cause	Remedy
Interface cable to the receiver is interrupted	Check that the interface cable leading to the receiver is seated correctly.



8 Maintenance

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

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



8.1 Maintenance and inspection by the machine operator

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

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

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

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

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

8.2 Residual risks during maintenance work

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

8.2.1 Personnel requirements

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

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

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

8.2.2 Personal protective equipment

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

⚠ WARNING

Risk of injury due to not wearing personal protective equipment

- Always wear your personal protective equipment during maintenance work.

8.2.3 Residual risks

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

⚠ WARNING

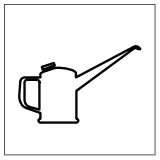
Risk of injury due to skin contact with functional fluids

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

⚠ WARNING

Risk of burning due to hot functional fluids and surfaces (e.g. engine, exhaust system and frame)

1. Allow hot functional fluids and surfaces to cool first.
2. Always wear personal protective equipment.
3. Cover hot surfaces with heatresistant materials.



⚠ WARNING

Risk of injury by shearing, being drawn in and crushing when raising or lowering the mixer equipment

- Only work in this area if the mixer equipment is sufficiently secured.

⚠ WARNING

Risk of injury due to swinging hydraulic hoses

Mechanically pretightened hydraulic hoses may swing around when the threaded union is loosened.

1. Always wear personal protective equipment.
2. Hold hydraulic hoses firmly when loosening the threaded union.

⚠ WARNING

Risk of injury due to the machine starting unexpectedly

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

⚠ WARNING

Risk of injury due to hydraulic fluid spraying out

Injuries to the skin and eyes can be caused by hydraulic fluid spraying out when opening threaded unions.

- Dump the pressure in the entire hydraulic system before opening threaded unions.

⚠ WARNING

Risk of injury due to the machine rolling away as a result of the brake, support feet or chocks becoming released

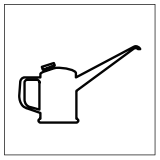
1. Apply the brake before starting any maintenance work.
2. Check whether the support feet are extended accordingly.
3. Use chocks to secure the machine against rolling away.

8.3 Maintenance intervals

You can find the intervals for individual maintenance tasks in the following table. All of the maintenance tasks that you can carry out with your equipment is described as follows in the “Maintenance” *(Maintenance work P. 8 — 17)* section.

The specified intervals apply to normal loading. If you pump highly abrasive media, you must shorten the intervals accordingly.

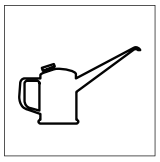
Drive motor						
Action	every ... operating hours					Comments
	daily	once after 100	500	1000	other intervals	Reference
Visual inspection: Leak tightness (leaks)	✓	✓				
Check the engine oil level	✓					Top up engine oil if necessary
Change the engine oil		✓		✓	✓ annually	*(Changing the engine oil P. 8 — 28)*
Change the engine oil filter		✓	✓	✓	✓ annually	*(Change the engine oil filter P. 8 — 27)*
Battery: Check the acid level					✓ 3 months	*(Checking the battery acid level P. 8 — 25)*



Drive motor Action	every ... operating hours daily	once after 100	500	1000	other intervals	Comments Reference
Check the dry air filter maintenance indicator	✓					Clean if necessary *(Cleaning and changing the dry air filter P. 8 — 29)*
Change the dry air filter element			✓		✓ annually	
Check the dry air filter dust discharge valve, clean if necessary	✓		✓		✓ weekly	Remove caked-on dust *(Cleaning the dust discharge valve P. 8 — 32)*
Check the fuel level	✓					Top up fuel if necessary *(Filling the machine with fuel P. 5 — 10)*
Change the fuel filter		✓	✓	✓	✓ annually	*(Replacing and draining the fuel filter P. 8 — 41)*
Drain the fuel filter		✓	✓		✓ annually	
Change the fuel line filter		✓	✓	✓	✓	
Check the radiator	✓		✓			Clean the cooling fins if necessary *(Cleaning the radiator P. 8 — 33)*
Check the Vbelt		✓	✓			*(Checking, tightening and replacing V-belts P. 8 — 35)*
Tighten or replace the Vbelt				✓	✓ 2 years	
Check the engine feet mounting, tighten if necessary		✓	✓			

Drive motor						
Action	every ... operating hours					Comments
	daily	once after 100	500	1000	other intervals	Reference
Check the mountings, hose connections/hose clamps		✓	✓			Service
Check the engine bearing				✓		Service
Check the engine monitor		✓	✓		✓ 2 years	Service
Crankcase vent valve					✓ 3000 h	Service
Check and/or adjust the injection valves					✓ 3000 h	Service
Check and adjust the valve play		✓		✓	✓ at least annually	Service
Replace the toothed belt					✓ 3000 h, at least every 5 years	Service
General drive motor overhaul					✓ 12,000 h	Service

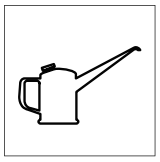
General machine						
Action	every ... operating hours					Comments
	daily	once after 100	500	1000	other intervals	Reference
Visual inspection: Defects and leak tightness (leaks)	✓	✓	✓			Rectify the defects, establish leak tightness (eliminate leaks)
Measure stroke time, have repaired if necessary		✓	✓			*(Function checks P. 5 — 15)*



General machine						
Action	every ... operating hours					Comments
	daily	once after 100	500	1000	other intervals	Reference
Visual inspection: Electric cabling	✓	✓	✓			
Check the fastening bolts for firm seating		✓	✓		✓ annually	See tightening torques in the spare parts sheets
Have service engineers from the manufacturer check for defects		✓	✓		✓ annually	Service
Operational safety check (German Accident Prevention Regulation)					✓ annually	Service
Check whether all operating elements are fully functional	✓					Monitor during pumping operation
Delivery line: Visual inspection for suitability, wear and damage, replace if necessary	✓				✓ as required	Designed for delivery pressure, correctly installed and sufficient wall thickness
Clean the delivery line	✓				✓ as required	*(Cleaning the delivery line P. 6 — 21)*
Tighten vibrator fastening bolts					✓ weekly	
Empty and clean the hopper	✓					

General machine						
Action	every ... operating hours					Comments
	daily	once after 100	500	1000	other intervals	Reference
Check mixer shaft bearings and seals	✓	✓	✓		✓ as required	Replace if necessary No cement-coloured oil-grease mixture or grout must emerge.
Check mixer shaft for wear and replace if necessary	✓				✓ as required	
Centralised lubrication system: Check the fill level, top up if necessary	✓					*(Centralised lubrication system – checking the fill level P. 8 — 21)*
Lubricate the machine	✓					*(Lubricating the machine P. 8 — 17)*

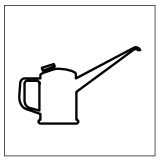
Safety equipment						
Action	every ... operating hours					Comments
	daily	once after 100	500	1000	other intervals	Reference
Check whether the EMERGENCY STOP buttons are fully functional	✓					Have replaced or repaired if necessary
Check whether the safety equipment is fitted and fully functional	✓					



Safety equipment						
Action	every ... operating hours					Comments
	daily	once after 100	500	1000	other intervals	Reference
Check whether the agitator cut-out is fully functional	✓					Have replaced or repaired if necessary *(Checking the agitator safety cutout P. 5 — 18)*
Check whether the warning and information plates are complete and legible	✓					Replace signs and plates if damaged or illegible.

Core pump						
Action	every ... operating hours					Comments
	daily	once after 100	500	1000	other intervals	Reference
Water box: Check water level and top up if necessary	✓					*(Checking the water box P. 5 — 8)* The piston rods must be completely covered
Water box: Drain water completely	✓				✓ if there is a risk of freezing	After every pumping operation
Water box: Check water quality and replace if necessary	✓					No hydraulic fluid or concrete in the water box
Water box: Check securing wire at the spacer flange and repair if necessary	✓					

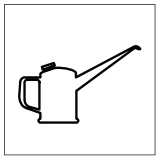
Core pump						
Action	every ... operating hours					Comments
	daily	once after 100	500	1000	other intervals	Reference
Water box: Check that the bolts on the spacer flange are firmly seated and tighten if necessary		✓	✓			
Check pressure connection and transfer tube bearing for leak tightness and wear, replace if necessary	✓	✓	✓			No cement-coloured oil-grease mixture or grout must emerge.
Check spectacle wear plate and wear ring for wear, have replaced if necessary	✓		✓		every 100 h	
Check delivery pistons for leak tightness and wear, replace if necessary	✓	✓	✓			Service
Clean the delivery cylinders	✓					*(Cleaning the hopper, transfer tube and delivery cylinder P. 6 — 17)*
Check delivery cylinders for leak tightness and wear, have replaced if necessary		✓	✓			Service
Check drive cylinders for leak tightness, have replaced if necessary	✓	✓	✓			Service
Check piston rods for leak tightness and wear, have replaced if necessary	✓	✓	✓			Service
Check switching shaft bearings and seals, have replaced if necessary	✓		✓		✓ as required	No cement-coloured oil-grease mixture or grout must emerge.



Core pump						
Action	every ... operating hours					Comments
	daily	once after 100	500	1000	other intervals	Reference
Switch lever: Check that the clamping bolts are seated correctly, tighten if necessary		✓	✓		✓ as required	
S transfer tube: Check gap, adjust if necessary	✓	✓	✓			
S transfer tube: Check wall thickness, replace if necessary		✓	✓		✓ as required	*(Checking the delivery line and measuring the wall thickness P. 8 — 61)*
S transfer tube: Check switching overlap, adjust if necessary		✓	✓		✓ as required	
Clean the S transfer tube	✓					*(Cleaning the machine P. 6 — 16)*

Hydraulic system						
Action	every ... operating hours					Comments
	daily	once after 100	500	1000	other intervals	Reference
Hydraulic hose lines: Visual inspection for ageing, leak tightness (leaks) and damage.	✓	✓	✓		✓ annually	Do not repair, replace immediately if damaged *(Checking and replacing the hydraulic hose lines P. 8 — 54)*
Replace the hydraulic hose lines					✓ 6 years (incl. 2 years storage time)	
Check the flared screwed joints, replace if necessary	✓				✓ as required	*(Checking the flared screwed joints P. 8 — 56)*

Hydraulic system						
Action	every ... operating hours					Comments
	daily	once after 100	500	1000	other intervals	Reference
Check the hydraulic fluid level, top up if necessary	✓					See the “Maintenance work” section *(Changing the hydraulic fluid P. 8 — 45)* Ask the After Sales department about our analysis set for hydraulic fluids (257260004).
Change the hydraulic fluid		✓	✓		✓ as required (regular hydraulic fluid analysis recommended)	
Check hydraulic fluid reservoir, drain any condensation if necessary	✓					
Check the radiator and clean if necessary	✓	✓	✓			
Reverse fine filter: Check contamination indicator, replace if necessary	✓					
Replace the hydraulic filter		✓	✓		✓ as required	*(Changing the hydraulic filter P. 8 — 48)*
Have service engineers check for defects		✓	✓		✓ at least annually	Service

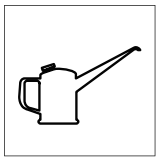


Highpressure cleaner (option)						
Action	every ... operating hours					Comments
	daily	once after 50	500	1000	other intervals	Reference
Check the highpressure cleaner fluid level, top up if necessary					✓ every 200 h	See the “Maintenance work” section
Highpressure cleaner anti-freeze protection					✓ if there is a risk of freezing	

Flushing water pump (option)						
Action	every ... operating hours					Comments
	daily	once after 50	500	1000	other intervals	Reference
Flushing water pump anti-freeze protection					✓ if there is a risk of freezing	See the “Maintenance work” section

Axle and wheels				
Action	After 500 km, at the latest	Every 5000 km/at least annually	Other interval	Reference
Check or, if necessary, correct inflation pressure			Before every journey	See “Technical data” even after a wheel change
Tighten wheel nuts/bolts with the specified tightening torque			✓ once after 50 km	

Axle and wheels Action	After 500 km, at the latest	Every 5000 km/at least annually	Other interval	Reference
Check brakes	✓			After the first journey under load
Check wheel bearing play	✓			
Tighten threaded unions	✓			
Brakes – check brake pad		✓		
Brakes – check brake mechanism		✓		
Brakes – grease sliding points		✓		
Brakes – check brake drums		✓		
Brakes – check and grease brake cables and linkage		✓		
Brakes – lubricate overrunning brake equipment and adjust brakes		✓		
Wheel bearings – check Simmerring/seal, dust caps		✓		
Wheel bearings – check, grease		✓		
Axles – check and lubricate mounting		✓		
Axles – check whether shock absorbers are tight and secure		✓		
Tyres/wheels – check tyre pressure and profile		✓		
Tyres/wheels – check for ageing and damage		✓		
Frame – tighten threaded unions		✓		
Frame – tighten cracks and damage		✓		
Trailer coupling – check for function and play		✓		
Support wheel – check fastening and function		✓		



Axle and wheels Action	After 500 km, at the latest	Every 5000 km/at least annually	Other interval	Reference
Support wheel – grease spindle		✓		
Electrical system – check connector, cable and lamps for damage and function		✓		

The operational safety of the machine must be inspected by a subject expert after 500 operating hours or at least once a year.

8.4 Maintenance work

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

8.4.1 Lubricating the machine

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

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

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

The following special tools are required:

- Grease gun

All the lubrication nipples have a red protective cap. There may be further lubrication nipples at the positions marked in the figure. At some points, the lubrication nipples are located on the opposite side of the machine or inside the machine.

If there is an integrated centralised lubrication system (option), the switch cylinder, mixer shaft bearing and S transfer tube bearing are automatically lubricated by the centralised lubrication system.

If there is not an integrated centralised lubrication system, lubricate all lubrication points once per pumping.

Perform the following tasks before lubricating:

1. Start up the drive motor.
2. Switch on the agitator.

Lubricate the mixer shaft bearings only when the agitator is running.

3. Switch the pump on.

Lubricate parts of the core pump only when the pump is switched on.

4. Remove the protective cap from the lubrication point.
5. Carefully clean the lubrication nipple before attaching the grease gun to prevent dirt from entering the lubrication system.

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

6. Lubricate all lubrication nipples on the machine with the grease gun until grease visibly escapes from the lubrication point.
7. Remove the excess grease from the lubrication nipple.
8. Place the protective caps on the lubrication points again.

8.4.1.1 Position of the lubrication points

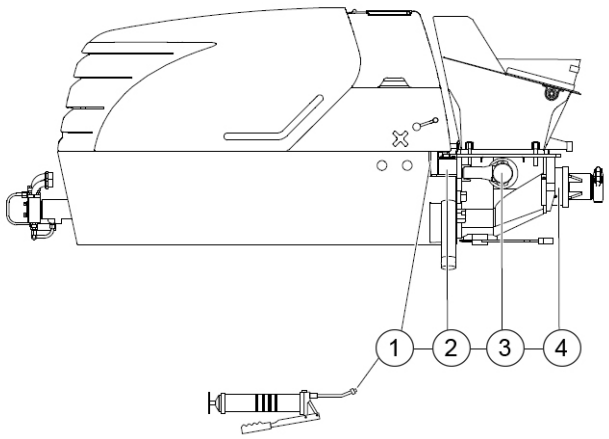
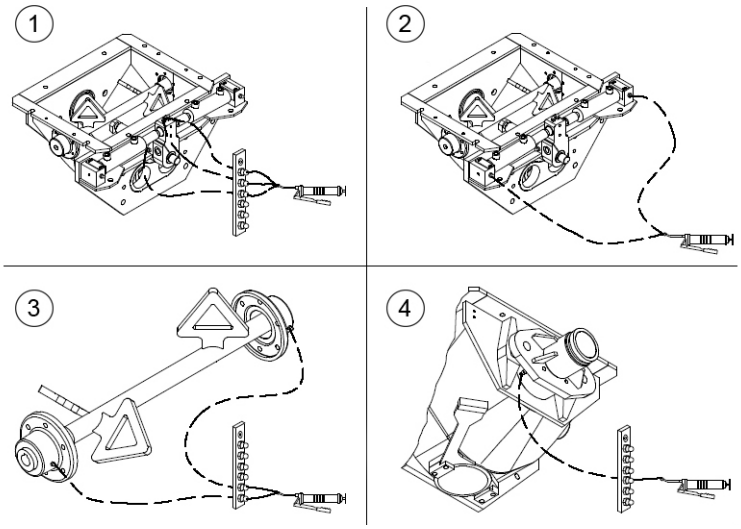


Figure 48: Overview of the lubrication points



Item	Designation
1	Piston rod switch cylinder, left Piston rod switch cylinder, right S transfer tube bearing switching shaft
2	Switch cylinder housing, left Switch cylinder housing, right (opposite)
3	Mixer shaft bearing, left Mixer shaft bearing, right
4	S transfer tube bearing pressure connection

8.4.2 Lubricate axle and wheels

This section describes the position of the lubrication nipples on the axle and wheels (depending on the model) for lubricating the machine with the grease gun.

Lubricate the axle and wheels in accordance with the lubricant recommendation at least once a year.

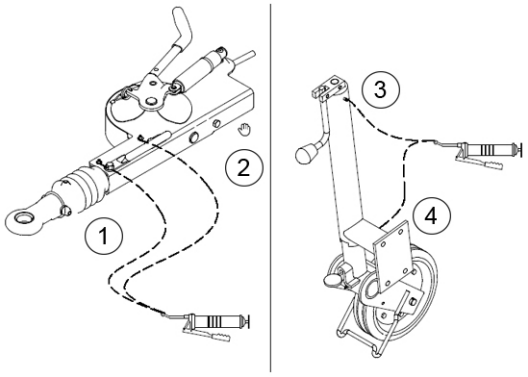
Use only lubricants specified in the lubricant recommendation (see the “Appendix” chapter).

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

The following special tools are required:

- Grease gun

All the lubrication nipples have a red protective cap.



Item	Designation
1	Guide bearing, front
2	Guide bearing, rear
3	Support wheel bearing bushing, upper (if available)
4	Support wheel bearing bushing, lower (if available)

▶ Lubricate continuously with the grease gun until grease visibly escapes from the lubrication point.

8.4.3 Centralised lubrication system – checking the fill level

If there is an integrated centralised lubrication system (option), the switch cylinder, mixer shaft bearing and S transfer tube bearing are automatically lubricated by the centralised lubrication system.

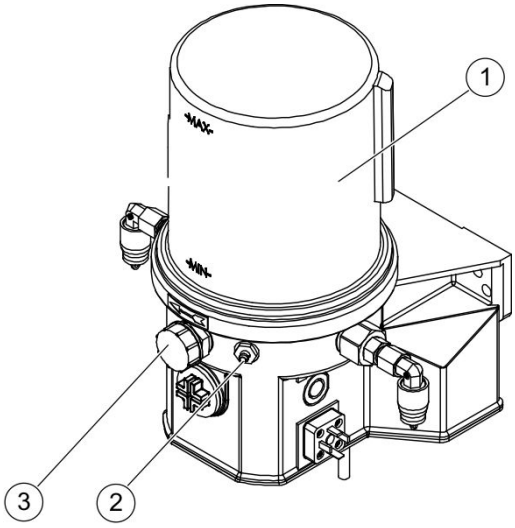


Figure 49: Centralised lubrication system

Item	Designation
1	Lubricant reservoir
2	Lubrication nipple
3	Lubricant reservoir filling point

Always use benzine or petroleum to clean the centralised lubrication system. Other solvents must not be used.

8.4.3.1 Checking the fluid level

Fill with clean lubricant at regular intervals. Use only the grease specified in the lubricant recommendation. When carrying out work, pay particular attention to cleanliness of the centralised lubrication system and avoid air pockets.

1. Check the fill level on the lubricant reservoir from the centralised lubrication system. The lubricant must be below the “MAX” marking.

NOTICE

Risk of the lubricant reservoir bursting due to overfilling

- Do not fill the lubricant reservoir above the “MAX” marking.

The indicator lamp signals an empty message (depending on the model) by flashing with brief intervals.

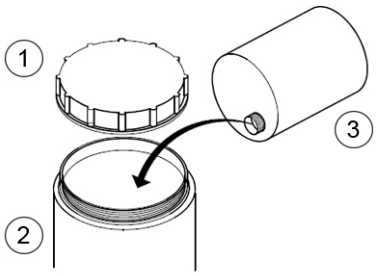
Flashing with long intervals indicates a fault in the lubrication circuit.

The lubricant reservoir is filled differently depending on the model.

2. If the fill level of the lubricant reservoir falls to or below the “MIN” marking, top up the lubricant reservoir to the “MAX” marking.

8.4.3.2 Fill the lubricant reservoir through the drum lid

1. Switch off the machine.



Item	Designation
1	Drum lid
2	Lubricant reservoir
3	Lubricant

⚠ WARNING

Risk of crushing

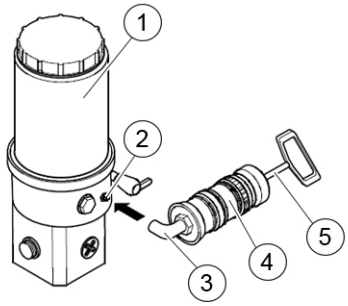
There is a risk of crushing if you fill the lubricant reservoir over the drum lid.

- Never reach into the open lubricant reservoir while the centralized lubrication pump is running.

2. Unscrew the drum lid from the lubricant reservoir.
3. Fill the lubricant reservoir up to the “MAX” marking.
4. Screw the drum lid back onto the lubricant reservoir.
5. Check all lubrication lines and lubrication points. Replace them if damaged.

8.4.3.3 Fill lubricant reservoir with cartridge

1. Switch off the machine

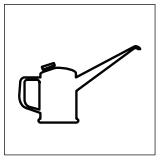


Item	Designation
1	Lubricant reservoir
2	Filling nipple
3	Filler connection
4	Cartridge
5	Piston rod

2. Remove the protective cap if necessary.
3. Assemble the cartridge if necessary.
4. Clean the filling nipple and the cartridge filler connection thoroughly with a clean cloth.

Before attaching the cartridge, check that the filler connection is filled flush with grease to prevent air bubbles in the lubricant reservoir.

5. Push in the cartridge's piston rod until grease escapes from the filler connection.
6. Mount the filler connection to the cartridge on the filling nipple.
7. Push grease into the lubricant reservoir to be filled using the piston rod.
8. Fill the lubricant reservoir up to the “MAX” marking.
9. Remove the filler connection on the cartridge from the filling nipple.
10. If previously removed, put all protective caps back on.
11. Check all lubrication lines and lubrication points. Replace them if damaged.



8.4.3.4 Concluding tasks

Operating elements are also integrated in the control cabinet, depending on the model of the centralised lubrication system. When the maintenance task is completed, the following tasks must be carried out:

1. Start up the drive motor.
2. Press the “centralised lubrication system” button (< 1 second).
   ⇒ The fault is acknowledged.
   ⇒ The “centralised lubrication system” indicator lamp goes out.
3. Press the “centralised lubrication system” button (> 2 seconds)
   ⇒ The centralised lubrication system switches on again.
   ⇒ An additional lubrication procedure is activated.

When a fault is rectified, the centralised lubrication system does not start again automatically. The fault must be acknowledged first.

8.4.4 Checking the battery acid level

This section describes how to check the battery acid level.

DANGER

Risk of explosion due to formation of gas

- Avoid sparking or naked flames near the battery.

DANGER

Risk of chemical burns due to battery acid

1. Always wear suitable protective goggles and protective gloves when working on the battery.
2. Do not allow battery acid to come into contact with skin or clothing.
3. If acid comes into contact with skin, immediately rinse off thoroughly with water.

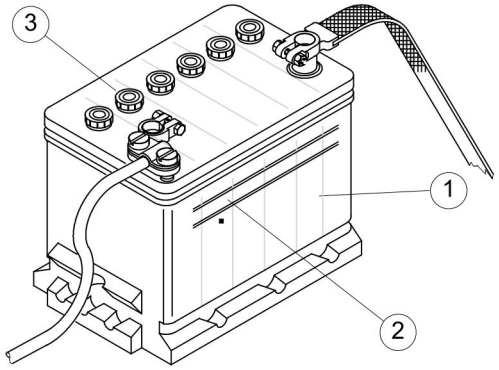


Figure 50: Overview of the battery

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

1. Check the acid level at the minimum/maximum marking.

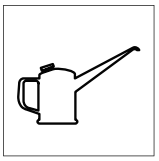
To fill with distilled water, proceed as follows:

2. Open the individual battery cells and carefully fill with distilled water. The plates in the cells must be submerged in acid up to their upper edge.
3. Ensure that you close all the cells correctly.

8.4.5 Replacing the engine oil filter and changing the engine oil

This section describes the engine oil and the engine oil filter.

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



The following special tools are required:

- Oil filter wrench
- Oil drain hose

NOTICE

Risk of engine damage due to impurities in the oil system

▶ Prevent dirt or other impurities from entering the fluid system of the engine.

Replace the engine oil filter when you change the engine oil. Change the engine oil when the engine is warm after operation.

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

Further information on replacing the engine oil filter and changing the engine oil can be found in the documentation from the engine manufacturer.

NOTICE

Environmental pollution due to engine oil escaping

1. Collect the used engine oil.
2. Avoid spilling the used engine oil.
3. Separate the used engine oil and old engine oil filter from other waste.
4. Dispose of these in line with the relevant national and regional regulations.
5. Only work with waste disposal companies who are approved by the responsible authorities. Ensure that different oils are never mixed.

8.4.5.1 Change the engine oil filter

The engine oil filter is located on the same side as the engine. The following steps describe how to replace the engine oil filter:

⚠ CAUTION

Risk of burning due to hot engine oil filter

- Work with protective gloves.

1. Place a sufficiently large oil sump pan under the engine oil filter.
2. Carefully collect any escaping engine oil.
3. Change the oil filter.
4. Dispose of the engine oil in the filter and the oil filter cartridge according to regulations.

8.4.5.2 Changing the engine oil

The oil drain plug for changing the engine oil is located underneath on the drive motor.

Change the engine oil with the machine horizontal and supported.

⚠ CAUTION

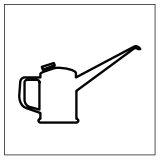
Risk of burning due to hot engine oil

1. Work with protective gloves.
2. Use the oil drain hose.

1. Place a sufficiently large oil drain pan under the machine.
2. Guide the oil drain hose through the opening at the bottom.
3. Change the engine oil.

Refer to the documentation from the motor manufacturer for details of the tightening torques, the permissible lubricants and the necessary fill volumes.

4. Remove the oil drain hose again.
5. Dispose of the used oil in line with regulations.



8.4.5.3 Checking the leak tightness of the engine oil system

After changing the engine oil and engine oil filter, always check the leak tightness of the engine oil system.

1. Start the engine.
2. Allow the engine to run for approximately two minutes while checking the leak tightness of the oil drain plug and engine oil filter.
3. Check the engine oil pressure at the “Engine oil pressure” indicator light.
4. Switch off the engine and check the engine oil level using the oil dipstick.
5. Top up the engine oil as required.
6. Check the leak tightness of the oil filter element.
7. Repair any leaks that may have developed.

8.4.6 Cleaning and changing the dry air filter

This section describes how to clean the drive motor dry air filter and how to replace the filter element.

The filter element must be cleaned/replaced if the red area is visible in the window of the maintenance indicator or if the maintenance intervals have elapsed.

⚠ WARNING

Risk of burning from hot machine components

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

⚠ WARNING

Risk of injury due to breathing in dust particles

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

8.4.6.1 Cleaning and changing the filter element

⚠ WARNING

Risk of burning due to combustible liquids or solvents

- Never use oil, petrol or other combustible liquids or solvents for cleaning.

NOTICE

Risk of machine damage due to damaged or clogged filter element.

1. A damaged filter element must be replaced and must not be fitted again.
2. The blow-out pressure must not exceed 5 bar during cleaning.
3. An appropriate distance must be maintained between the hose nozzle and the filter element during cleaning.
4. Depending on the degree of contamination, the filter element must either be replaced annually or after being cleaned three times.

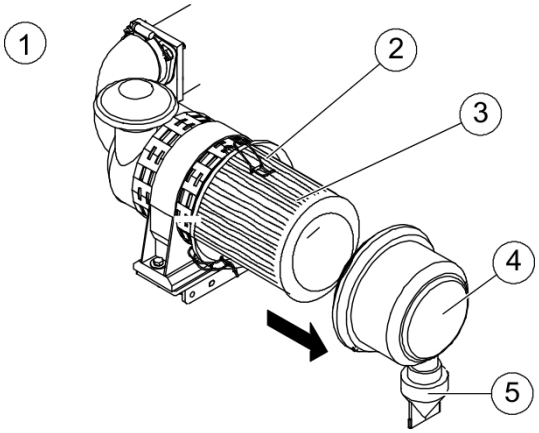


Figure 51: Cleaning or changing the dry air filter

Item	Designation
1	Dry air filter
2	Retaining clips
3	Filter element
4	Filter lid
5	Dust discharge valve

1. Open the retaining clips *(2)* and fold them out of the way.
2. Remove the filter lid *(4)*.
3. Carefully pull the filter element *(3)* out of the filter housing. Avoid dust falling out as much as possible while doing so.
4. Clean the inside of the filter housing and lid with a clean cloth. Pay particular attention to cleaning the sealing surfaces.
5. Check the filter element. If it is damaged, check all connections on the dry air filter and replace the damaged parts.
6. Place the filter lid back on the filter housing during cleaning to protect the air intake system.
7. Clean the filter element by blowing out dry air from the inside out along the folds.
8. Insert the cleaned or the new filter element into the filter housing.
9. Slide the filter lid back onto the housing. Make sure it is seated correctly.
10. Close the retaining clips. Make sure that these are also seated correctly.

11. Reset the maintenance indicator after cleaning or changing the filter element by pressing the reset button.

8.4.6.2 Cleaning the dust discharge valve

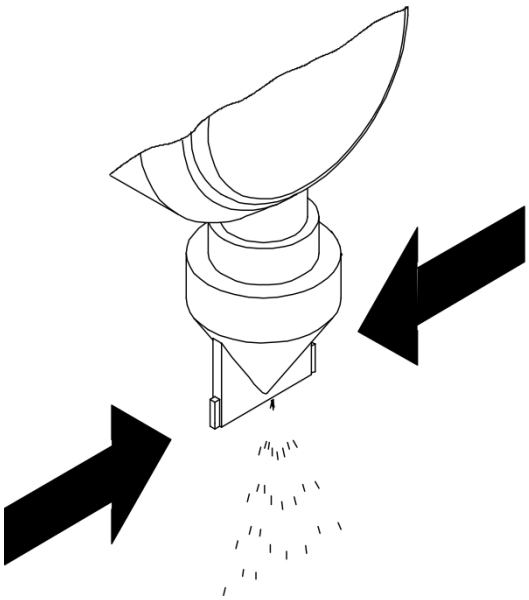


Figure 52: Cleaning the dust discharge valve

1. Empty the dust discharge valve by pressing the discharge slot in the direction of the arrow.
2. Clean the discharge slot.
3. Remove any caked-on dust by compressing the upper valve area.

8.4.6.3 Resetting the maintenance indicator

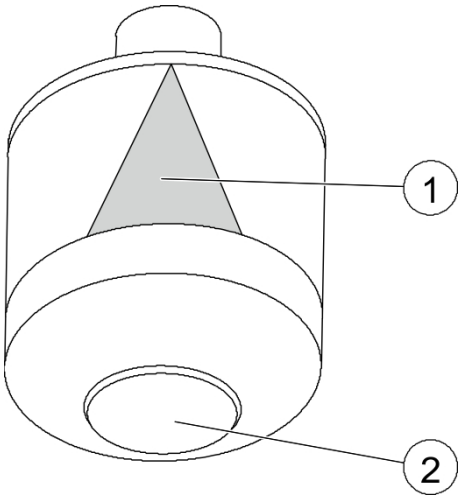


Figure 53: Resetting the maintenance indicator

Item	Designation
1	Maintenance indicator
2	Reset button for the maintenance indicator

- Reset the maintenance indicator *(1)* after cleaning or changing the filter element. Press the reset button *(2)* to do so.

8.4.7 Cleaning the radiator

This section describes how to clean the radiator. As the radiator can become dirty during operation in dusty environments, the cooling fins must be cleaned in regular intervals. The cleaning intervals can be found in the “Maintenance intervals” section.

⚠ CAUTION

Risk of burning due to hot radiator

- Always carry out cleaning operations when the machine is cold.

⚠ CAUTION

Risk of injury due to flying dust particles

- Work with respiratory protection and protective goggles.

NOTICE

Risk of damage to components

1. Do not use diesel fuel for cleaning. Diesel fuel corrodes rubber components and additionally promotes dust accumulation in the cooling fins.
2. Do not use a high-pressure cleaner, as the high pressure may bend the cooling fins.
3. Prior to cleaning with water or other cleaning agents, cover or seal all openings which water/cleaning agents must not penetrate for safety or operating reasons. Electric motors and control cabinets are particularly at risk.

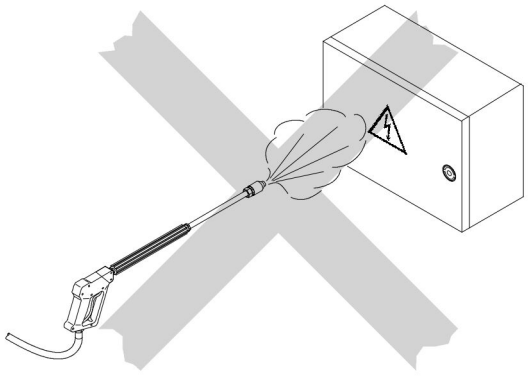


Figure 54: No water in the electrical system

- Brush off light contamination with a soft brush or paint brush on the air side.

8.4.7.1 Removing heavy contamination

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

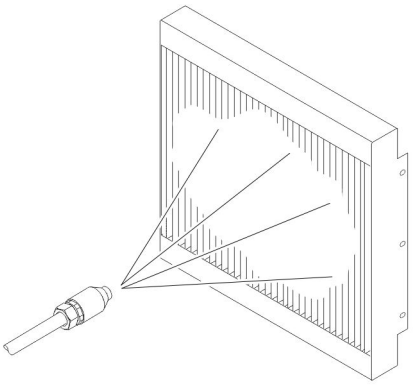


Figure 55: Cleaning the cooling fins with water

1. Remove all electrical components such as fans (if fitted).
2. Attach all necessary covers/seals.
3. In case of heavy contamination, wash out the cooling fins with water against the direction of the air flow.
4. Use a water hose with suitable nozzle and a water pressure of 4 bar. You can also use a cold cleaner.
5. Where possible, always direct the water jet in the direction of the cooling fins.
6. In addition to the water jet, you can use a paintbrush or a soft brush to remove stubborn dirt. Please also ensure that the cooling fins are not damaged while doing this.
7. Then dry the cooling fins with compressed air.
8. Completely remove all covers/seals after the cleaning process.
9. Refit all removed electrical components such as fans (if fitted).

8.4.8 Checking, tightening and replacing V-belts

This section describes how to check, tighten and replace the V-belt on the drive motor.

⚠ CAUTION

Risk of burning due to hot engine components

1. Allow the assemblies to cool down first.
2. Work with protective gloves and protective goggles.

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

NOTICE

Risk of damage to components

- Only have maintenance work on the engine performed by a service technician from the machine manufacturer or by an authorised specialist dealer.

Refer to the documentation provided by the engine manufacturer for more information on checking the Vbelt.

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

1. Switch off the machine.
2. Secure the machine against unauthorised starting.
3. Secure your working area and fix information plates to the locked controls and setting devices.

8.4.8.1 Checking the Vbelt

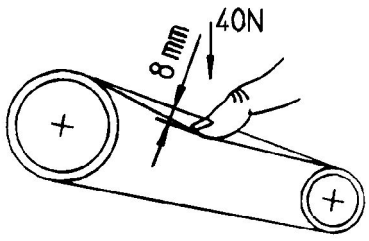
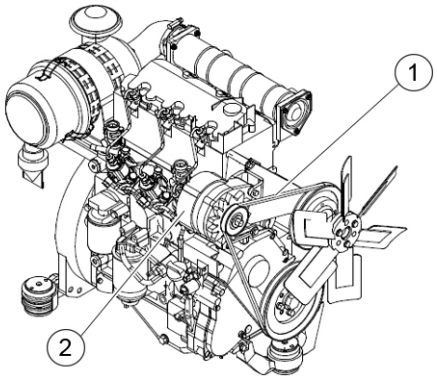


Figure 56: Checking the Vbelt tension

- Check the Vbelt tension by pressing with your thumb. The V-belt must be retightened if it can be pressed in more than 8 mm.

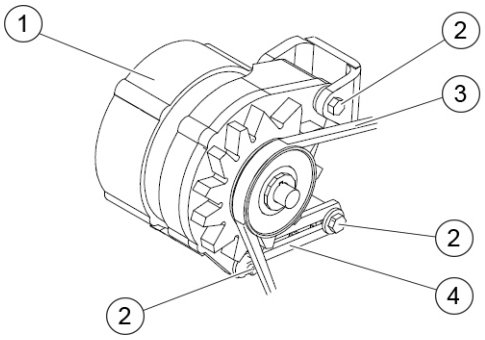
8.4.8.2 Retension V-belt

The following steps describe how to tighten the V-belt:



Item	Designation
1	Vbelt
2	Dynamo

1. Remove the V-belt cover.
2. Loosen the bolts.

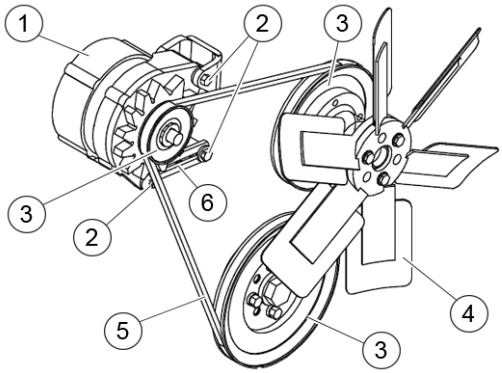


Item	Designation
1	Dynamo
2	Screws
3	Vbelt
4	Tensioning rail

3. Push the dynamo forwards using the tensioning rail until the V-belt is sufficiently taut.
4. Then firmly retighten all of the loosened bolts.
5. Attach the V-belt cover correctly again.

8.4.8.3 Change the V-belts

The following steps describe how to change the V-belt:



Item	Designation
1	Dynamo
2	Screws
3	V-belt pulley
4	Fan wheel
5	Vbelt
6	Tensioning rail

1. Remove the V-belt cover.
2. Loosen the bolts. *(2)*
3. Push the dynamo back using the tensioning rail until the V-belt is sufficiently loose.
4. Remove the V-belt from the V-belt pulleys.
5. Raise the V-belt over the fan wheel.
6. Correctly place the new V-belt onto the V-belt pulleys over the fan wheel.
7. Push the dynamo forwards using the tensioning rail until the V-belt is sufficiently taut.
8. Then firmly retighten all of the loosened bolts.
9. Attach the V-belt cover correctly again.

8.4.9 Venting the fuel line

This section describes how to vent the fuel line after the fuel tank has been run completely empty, after repair work on the fuel line and pump or after longer machine downtimes (one or more days).

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

⚠ CAUTION

Risk of burning from hot motor components

1. Allow the assemblies to cool down first
2. Work with protective gloves.

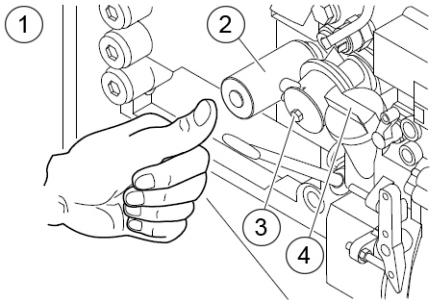


Figure 57: Venting the fuel line

Item	Designation
1	Drive motor
2	Hand pump
3	Fuel pump
4	Oil filler

1. Fill the machine with fuel. See section: “Filling the machine with fuel”. *(Filling the machine with fuel P. 5 — 10)*
2. Press the hand pump *(2)* approx. ten times
   ⇒ The fuel line and fuel filter are filled with fuel and vented.
3. Start up the drive motor.

8.4.10 Replacing and draining the fuel filter

This section describes how to change and drain the engine fuel filter.

The following special tools are required:

- Filter wrench

DANGER

Risk of fire, risk of explosion due to escaping fuel

1. Allow the assemblies to cool down first.
2. Refrain from working with naked flames and from smoking.
3. Avoid sparking.
4. Work with protective gloves and protective goggles.

NOTICE

Risk of motor damage due to impurities in the fuel system

- Prevent dirt or other impurities from entering the fuel system of the drive motor.

NOTICE

Environmental pollution caused by fuel escaping

1. Collect the escaping fuel.
2. Avoid fuel spillages.
3. Dispose of fuel and used filter elements according to regulations.
4. Comply with the relevant national and regional regulations.
5. Only work with waste disposal companies who are approved by the responsible authorities.

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

Further information on changing the fuel filter can be found in the documentation from the motor manufacturer.

8.4.10.1 Change the fuel filter

Different fuel filters may be fitted depending on the model.

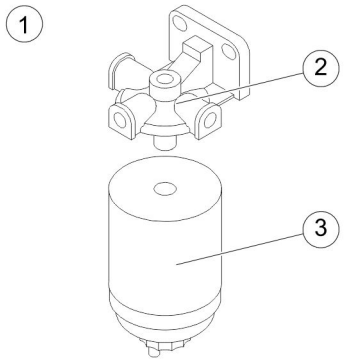


Figure 58: Fuel filter

Item	Designation
1	Fuel filter
2	Filter head
3	Filter cartridge

1. Close the fuel cock (if available).
2. Place a suitable oil sump pan under the fuel filter.
3. Remove the filter cartridge *(3)* with a filter wrench.
4. Collect the fuel from the filter and dispose of the filter element in accordance with regulations.
5. Clean the sealing surface on the filter head *(2)* with a lint-free cloth.
6. Lightly oil the sealing surface on the filter head and the seal on the new filter cartridge with engine oil.
7. Screw on the new filter element by hand until the seal is in position.
8. Tighten the filter element another half turn.
9. Open the fuel cock (if available).

8.4.10.2 Changing the fuel line filter

Depending on the model, the engine fuel supply line may contain a fuel line filter.

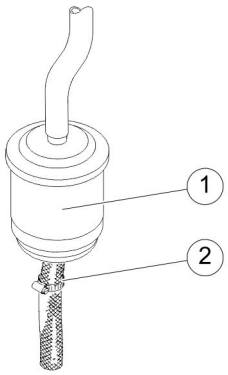


Figure 59: Fuel line filter

Item	Designation
1	Fuel line filter (depending on model)
2	Hose clamp

1. Close the fuel cock (if available).
2. Place a suitable oil sump pan under the fuel line filter.
3. Loosen the hose clamps *(2)* upstream and downstream of the fuel line filter *(1)*.
4. Pull the fuel line filter from the hoses. Dispose of the fuel line filter in line with regulations.
5. Raise the ends of the hoses to prevent fuel from escaping from the fuel line.
6. Attach the new fuel line filter to the hoses. Pay particular attention to the flow direction.
7. Retighten the hose clamps.
8. Open the fuel cock (if available).

8.4.10.3 Leakage check

The following checks are necessary after you have changed the fuel filter:

1. Leave the machine to run for approx. two minutes.
2. Then check the leak tightness of all new fuel filters and fuel systems.
3. Seal up any leaks that occur.

8.4.10.4 Draining the fuel filter

Different fuel filters may be fitted depending on the model.

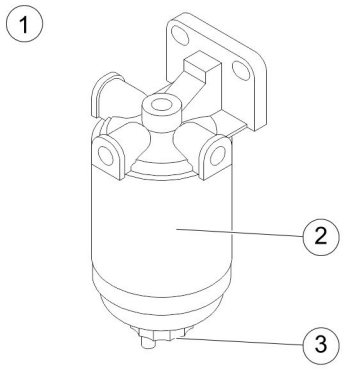
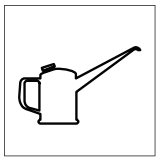


Figure 60: Drain the fuel filter

Item	Designation
1	Fuel filter
2	Filter cartridge
3	Drain plug

1. Hold a suitable container under the drain plug *(3)* on the fuel filter.
2. Open the drain plug and drain the water out until fuel escapes.
3. Close the drain plug again.
4. Dispose of the water and fuel mixture in line with regulations.



8.4.11 Changing the hydraulic fluid

This section describes how to change the hydraulic fluid and how to clean the oil sump in the hydraulic fluid reservoir. The fill volumes can be found in the “Technical data” section of the “General technical description” chapter.

The fill volumes are guide values only. They may vary depending on the model and quantity of fluid remaining. The upper fill level indicator must always be observed.

See also the *(Changing the hydraulic filter P. 8 — 48)* section and *(Checking and replacing the hydraulic hose lines P. 8 — 54)*

⚠ CAUTION

Risk of injury due to hot hydraulic fluid or hydraulic fluid spraying out

1. Only change the hydraulic fluid with the machine shut down.
2. Allow the hydraulic fluid to cool down before performing maintenance work.
3. Work with protective gloves and protective goggles.
4. Ensure that all pressures have fallen to 0 bar.
5. Only open the screw plug once the pressure has been fully dumped.

NOTICE

Risk of machine damage by individuals not qualified for hydraulic work

- Only work on hydraulic equipment if you have special knowledge and experience in hydraulics and can produce corresponding certificates of competence (certificates of training).

NOTICE

Environmental pollution due to hydraulic fluid escaping

1. Collect the old hydraulic fluid.
2. Avoid spilling the old hydraulic fluid.
3. Separate the collected hydraulic fluid and the used filter elements from other waste.
4. Dispose of the collected hydraulic fluid and the used filter elements in line with the relevant national and regional regulations.
5. Only work with waste disposal companies who are approved by the responsible authorities.

NOTICE

Risk of damage to components due to contamination in the hydraulic system

Foreign bodies may cause valves to be damaged, pumps to seize and throttle and control bores to become blocked.

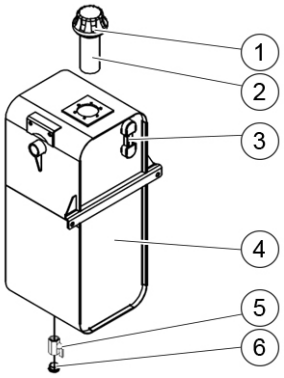
1. Prevent dirt or other impurities from entering the hydraulic system.
2. Never leave the hydraulic fluid reservoir open longer than strictly required.
3. Clean all bungs, filler lids and the area around them before performing a full fluid change.
4. Check all seals and replace them in case of damage.
5. Use only the hydraulic fluids specified in the lubricant recommendation.

Change the hydraulic fluid with the machine horizontal and supported.

Change the hydraulic fluid when the machine is warm after operation.

Change the hydraulic fluid and the hydraulic fluid filter at the same time.

The hydraulic fluid reservoir is on the right-hand side of the motor compartment in direction of travel. The following steps describe how to change the hydraulic fluid:



Item	Designation
1	Oil filler
2	Screen
3	Fill level indicator
4	Hydraulic fluid reservoir
5	Oil drain cock
6	Screw plug

1. Place a sufficiently large oil sump pan under the machine.
2. Unscrew the screw plug on the underside of the hydraulic fluid reservoir.
3. Carefully open the oil drain cock and allow the used oil to drain into the oil sump pan.
4. In addition, slightly unscrew the lid of the oil filler to make the hydraulic fluid drain faster.
5. Allow the hydraulic fluid to drain completely.
6. Close the oil drain cock again.
7. Dispose of the used oil in line with regulations.

Check the seal and replace it if damaged.

8. Insert the screw plug with seal back into the oil drain connection and tighten.
9. Replace all hydraulic filter elements, as described in section *(Changing the hydraulic filter P. 8 — 48)*.
10. Unscrew the screw plug from the dirt trap in the hydraulic line.

11. Remove the screen from the dirt trap and clean it thoroughly.
12. Reinsert the screen into the dirt trap.
13. Screw the screw plug back onto the dirt trap.
14. Check all lines and threaded unions and retighten them if necessary.
15. Replace defective hydraulic hose lines as described in the *(Checking and replacing the hydraulic hose lines P. 8 — 54)* section.
16. Check for firm seating at all flared screwed joints.

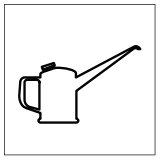
Use only the hydraulic fluids specified in the lubricant recommendation.

17. Fill the hydraulic fluid reservoir through the filler screen in the oil filler.

Only fill the hydraulic fluid reservoir to the “Maximum” marking on the fill level indicator.

18. Refit all the safety equipment, markings and information plates you have removed.
19. Bleed the hydraulic system.
20. Carry out all function checks.
21. Check the hydraulic functions in a series of test runs.
22. Check the hydraulic system for leak tightness.
23. Top up the hydraulic fluid level as required.

8.4.12 Changing the hydraulic filter



⚠ CAUTION

Risk of injury due to hot hydraulic fluid or hydraulic fluid spraying out

1. Only change the hydraulic filter when the machine is stationary.
2. Allow the hydraulic fluid to cool down before performing maintenance work.
3. Work with protective gloves and protective goggles.
4. Ensure that all pressures have fallen to 0 bar.

⚠ WARNING

Risk of burning due to hot engine and exhaust parts

- ▸ Allow the assemblies to cool down first.

NOTICE

Environmental pollution due to hydraulic fluid escaping

1. Collect the old hydraulic fluid.
2. Avoid spilling the old hydraulic fluid.
3. Separate the collected hydraulic fluid and the used filter elements from other waste.
4. Dispose of the collected hydraulic fluid and the used filter elements in line with the relevant national and regional regulations.
5. Only work with waste disposal companies who are approved by the responsible authorities.

NOTICE

Risk of damage to components due to contamination in the hydraulic system

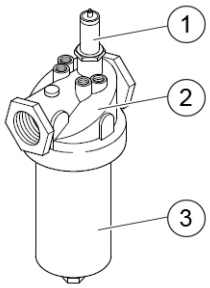
Foreign bodies may cause valves to be damaged, pumps to seize and throttle and control bores to become blocked.

1. Prevent dirt or other impurities from entering the hydraulic system.
2. Never leave the hydraulic fluid reservoir open longer than strictly required.
3. Clean all bungs, filler lids and the area around them before performing a full fluid change.
4. Check all seals and replace them in case of damage.
5. Use only the hydraulic fluids specified in the lubricant recommendation.

Commercially available filter elements have too low a flow rate. This is why you should only use original Putzmeister filter elements to avoid machine damage.

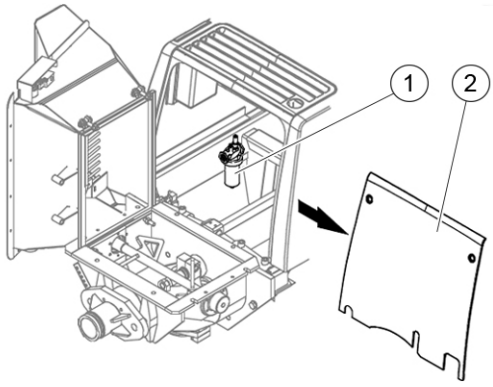
8.4.12.1 Changing reverse fine filters

The reverse fine filter is located behind the maintenance flap on the Targa. Replace the filter element on the reverse fine filter if the red button on the visual contamination indicator has popped out.



Item	Designation
1	Visual contamination indicator
2	Filter head
3	Filter housing with filter element

When switching on the machine, the red button on the visual contamination indicator can pop out if the motor is cold. Press the red button back in only when operating temperature has been reached.If it pops out again immediately, the filter insert must be replaced after the end of the shift.



Item	Designation
1	Reverse fine filter
2	Maintenance flap

1. Open the maintenance flap on the Targa using the sash fastener wrench.
2. Place an oil catch pan of sufficient size under the hydraulic filter.
3. Unscrew the filter housing by rotating anticlockwise. Drain the hydraulic fluid from the filter housing into the pan.
4. Remove the old filter insert by moving back and forth and in a downwards direction.
5. Dispose of the old filter element and the drained hydraulic fluid in accordance with local specifications.

Contamination particles are deposited in the filter housing by the filtering process. This is why you should thoroughly clean the filter housing before fitting the new filter element. Otherwise, the new filter element would be contaminated again within a very short space of time.

You must never attempt to clean filter inserts. These inserts must always be replaced.

6. Clean the filter housing thoroughly with a suitable medium (e.g. petroleum ether, paraffin).
7. Check all Orings and other seals. Replace them if damaged.
8. Check that the order number on the new filter insert matches the order number on the filter plate.
9. Open the plastic sleeve and slide the filter insert over the supporting piece in the filter head.
10. Remove the plastic sleeve.
11. Screw the filter housing back onto the filter head. Screw in the filter housing as far as the stop and then unscrew the filter housing again by 1/8 to 1/2 a turn.
12. Press the red button on the visual contamination indicator back in manually.
13. Carefully close the maintenance flap on the Targa using the sash fastener wrench.
14. Bleed the hydraulic system carefully.
15. Check the hydraulic functions in a series of test runs and check the hydraulic system for leaks.

8.4.12.2 Changing reverse coarse filters

The reverse coarse filter is located under the hood in the motor compartment.

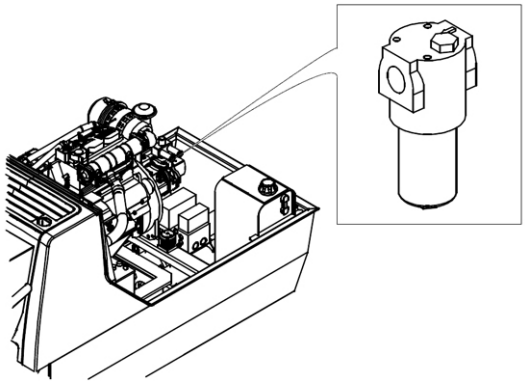
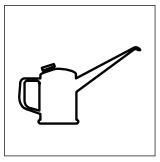
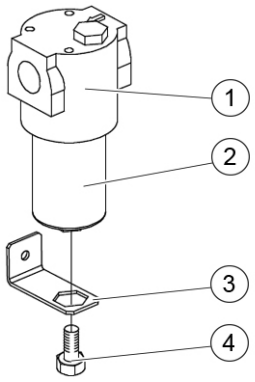


Figure 61: Reverse coarse filter in the motor compartment





Item	Designation
1	Filter head
2	Filter housing with filter element
3	Retaining bracket
4	Bolt

1. Place an oil catch pan of sufficient size under the hydraulic filter.
2. Unscrew the retaining bracket using a tool.
3. Drain the hydraulic fluid from the filter housing into the pan.
4. Remove the filter element.
5. Dispose of the old filter element and the drained hydraulic fluid in accordance with local specifications.

Contamination particles are deposited in the filter housing by the filtering process. This is why you should thoroughly clean the filter housing before fitting the new filter element. Otherwise, the new filter element would be contaminated again within a very short space of time.

You must never attempt to clean filter inserts. These inserts must always be replaced.

6. Clean the filter housing thoroughly using a cleaning rag.
7. Check all Orings and other seals. Replace them if damaged.
8. Check that the order number on the new filter insert matches the order number on the filter plate.
9. Insert the new filter element.
10. Screw the filter housing back onto the filter head by hand.

11. Use the tool again to screw the retaining bracket back onto the filter housing.
12. Bleed the hydraulic system carefully.
13. Check the hydraulic functions in a series of test runs and check the hydraulic system for leaks.

8.4.13 Checking and replacing the hydraulic hose lines

This section describes how to check and replace the hydraulic hose lines. The inspection intervals can be found in the “Maintenance intervals” section.

The following special tools are required:

- Torque wrench

NOTICE

Risk of machine damage by individuals not qualified for hydraulic work

- Only work on hydraulic equipment if you have special knowledge and experience in hydraulics and can produce corresponding certificates of competence (certificates of training).

⚠ WARNING

Risk of injury due to old hydraulic hose assemblies

Old hydraulic hose assembles could leak or burst.

- Hydraulic hose assemblies should not be more than six years old, including a storage time of two years. Please note the date of manufacture on the hydraulic hose assemblies.

⚠ WARNING

Risk of injury from hydraulic fluid spraying out

1. Shut down the machine before commencing work and secure it against unauthorised or accidental start-up.
2. Check whether the pressure in the hydraulic system has dropped to 0 bar before you start the work.
3. Wear a face mask and gloves whenever you work on the hydraulic system. Escaping hydraulic fluid is toxic and can penetrate the skin.

⚠ WARNING

Risk of burning from hot machine components

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

8.4.13.1 Checking the leak tightness of the hydraulic hose lines

1. Switch off the machine.
2. Check whether all pressures in the hydraulic system and in the delivery line have fallen to 0 bar before commencing the work.

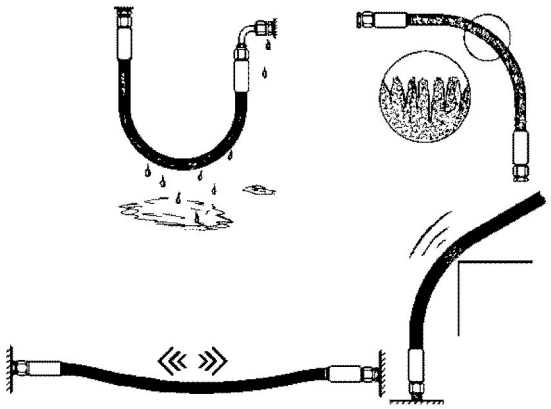


Figure 62: Damage to hydraulic hose assemblies

3. Check the hydraulic hose lines for kinks, cracks or porous surfaces.
4. Check all hydraulic fittings. Dark and moist patches on the fitting are external signs of incipient damage.

5. Check whether the hydraulic hose lines are installed freely.

8.4.13.2 Checking the flared screwed joints

1. Switch off the machine.
2. Check whether the pressure in the hydraulic system has fallen to 0 bar before commencing the work.
3. Check whether the flared screwed joints are tight.

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 the leaks persist.

Tightening torques for flared screwed joints					
PED	Type	MT [Nm]	PED	Type	MT [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

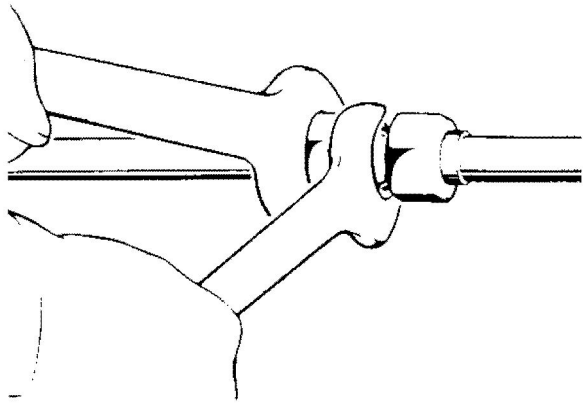


Figure 63: Tightening the flared screwed joints

4. Tighten leaking flared screwed joints with the torque wrench. The tightening torques can be found in the table.

8.4.13.3 Replacing hydraulic hose assemblies

⚠ CAUTION

Risk of injury from being struck by hydraulic hose assemblies

Hydraulic hose assemblies may be mechanically prestressed.

- Check for any prestressed lines.

1. Switch off the machine.
2. Check whether the pressure in the hydraulic system has dropped to 0 bar before you start the work.
3. Provide an oil sump pan. Collect the escaping hydraulic fluid and dispose of it in accordance with regulations.
4. Mark all hydraulic hose assemblies and the corresponding connection points for re-assembly.
5. Take care when loosening the connections of the hydraulic hose assemblies.

NOTICE

Risk of machine damage from impurities in the hydraulic circuit

Small foreign bodies may cause valves to be damaged, pumps to seize and throttle and control bores to become blocked.

1. Prevent dirt and other impurities from entering the hydraulic circuit.
2. Never leave the tank lid open longer than necessary.

6. Seal the connection points immediately using a plug, if you have removed the old hydraulic hose assemblies. No dirt may enter the hydraulic circuit and the hydraulic circuit must not run empty.
7. Dispose of the hydraulic fluid collected in a proper manner.
8. Install the new hydraulic hose assemblies so that they are free from kinks and abrasion. Keep the hydraulic hose assemblies clean.
9. Tighten all connections to the permissible tightening torque.
10. Vent the hydraulic system.
11. Check the hydraulic functions in several test runs. Check the leak tightness of the hydraulic system and top up with hydraulic fluid as required.
12. Check all hydraulic hose assemblies again.
13. Refit all the safety equipment, markings and information plates you have removed.

8.4.14 Changing the drawgear

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

The following special tools are required:

- Torque wrench

8.4.14.1 Preparation

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

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

8.4.14.2 Drawgear disassembly

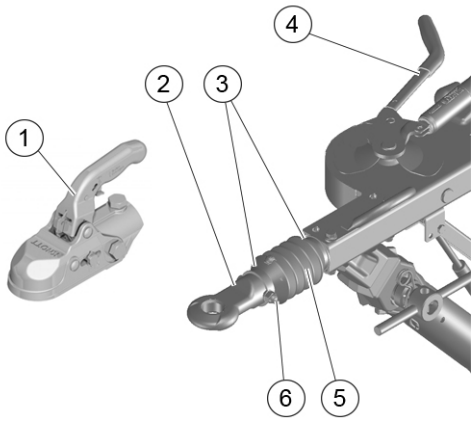


Figure 64: Different models available

Item	Designation
1	Ball hitch
2	Towing ring
3	Cable ties
4	Handbrake
5	Rubber gaiter
6	Fastening bolt

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

DANGER

Risk of injury due to threaded unions coming undone

- Do not reuse self-locking nuts.

4. Drive out the fastening bolts.
5. Remove the drawgear.

8.4.14.3 Drawgear assembly

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

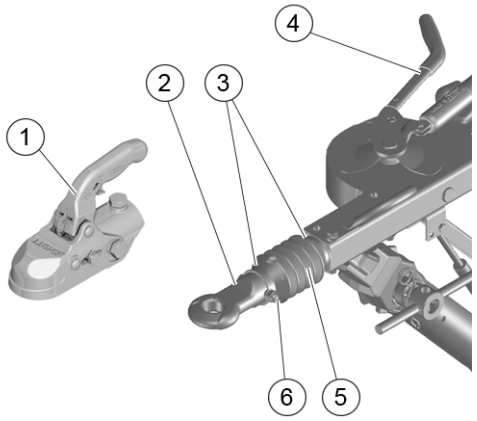
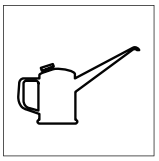


Figure 65: Different models available

Item	Designation
1	Ball hitch
2	Towing ring
3	Cable ties
4	Handbrake
5	Rubber gaiter
6	Fastening bolt

2. Insert the fastening bolts in the correct position.



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

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

Towing ring tightening torque				
Type	Version	Number of bolts	Bolt dimensions	Tightening torque
KR 30 HV	D = 40 mm DIN 74054	2	M14 10.9	115 Nm

Ball hitch tightening torque				
Type	Version	Number of bolts	Bolt dimensions	Tightening torque
K 35	A N3	2	M14 10.9	125 Nm

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

8.4.15 Checking the delivery line and measuring the wall thickness

This section describes how to check the delivery line and how to measure the wall thickness of the delivery pipes and the S transfer tube.

⚠ WARNING

Risk of injury due to delivery line bursting

The delivery line can burst once it reaches the right delivery pressure if the wall thickness of the delivery line has decreased below the minimum required, particularly if a blockage has built up.

1. Measure the wall thickness on a regular basis.
2. If the thickness is below the minimum wall thickness, operation of the machine is not permitted.
3. Replace damaged or worn delivery lines, line components or couplings.

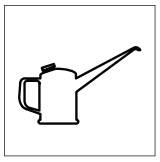
There are specific risks of accidents associated with maintenance, inspection and repair work. You should particularly observe the “Safety regulations” chapter and the description of “Residual risks during maintenance work” at the beginning of this chapter.

The following special tools are required:

- Wall thickness measuring device

Delivery lines are subject to constant wear. It is particularly important to measure the wall thickness prior to starting major contracts. You will obtain reliable results for your measurements if you carry out the test with the measuring device recommended by Putzmeister.

Putzmeister accepts no liability if the wall thickness falls below the minimum wall thickness.



8.4.15.1 Preparation

⚠ WARNING

Risk of injury due to pressurised delivery line

Risk of extremely serious injuries due to bursting delivery line or conveyed material shooting out.

1. Do not open the delivery line while it is pressurised.
2. Relieve the pressure in the delivery line by reverse pumping.
3. Check the pressure gauge indicator to ensure that the system is fully depressurised before disconnecting the delivery line.
4. Always wear personal protective equipment.
5. Turn your face away when opening the line coupling.

1. Eliminate any blockages that exist.
2. Clean the delivery line thoroughly.
3. Switch off the machine.
4. Secure the machine against unauthorised starting.
5. Secure your working area and fix information plates to the locked controls and setting devices.

8.4.15.2 Checking delivery line

The following steps describe how to check the delivery line. Perform a visual inspection first of all. Pay particular attention to:

- escaping conveyed material,
- Damage, kinks, cracks or porous surfaces on the delivery hoses,
- damage to the delivery pipes,
- loosened or defective couplings,
- loosened or defective fastenings,
- bent or damaged brackets.

8.4.15.3 Measuring the wall thickness of the S transfer tube

Measure the wall thickness of the S transfer tube with the wall thickness measuring device. Follow the operating instructions supplied with the measuring device when carrying out measurements. Measure the wall thickness of the S transfer tube particularly at the stress points.

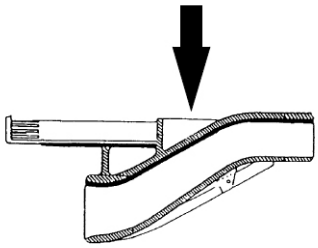


Figure 66: Area of increased load

The minimum wall thickness for the S transfer tube depends on the maximum possible operating pressure. The S transfer tube is subject to greater stress in the torque absorption range (switching shaft – S transfer tube).

Maximum possible operating pressure	Guide value for wall thickness
70 bar	approx. 3 mm

- Replace the pipes and bends as soon as the wall is as thick as the minimum wall thickness value.

We must emphasis the fact that the S transfer tube is subject to variable degrees of loading as a consequence of the dynamic forces generated during pumping. There is no general method for calculating the minimum wall thickness for this load, which depends on the individual circumstances, and so the S transfer tube can also burst at an operating pressure which is assumed still to be permissible.

You should also note that the operating pressure can rise to the maximum pressure in the event of a blockage, and in this case the wall thickness may no longer be adequate.

8.4.15.4 Measuring wall thickness of the delivery line

⚠ WARNING

Risk of injury due to the conveyed material spraying out

If cracks form in the delivery line and the wall is thinner than the minimum wall thickness, conveyed material may spray out.

1. Check the delivery line on a regular basis
2. Measure the wall thickness on a regular basis.
3. If the thickness is below the minimum wall thickness, operation of the machine is not permitted.
4. Replace damaged or worn delivery lines, line components or couplings.

Measure the wall thickness of the delivery line with the wall thickness measuring device. Follow the operating instructions supplied with the measuring device when carrying out measurements.

1. Do not measure the wall thickness of the delivery pipe at just one point, but around the entire circumference of the delivery line.

The wear on the external radius of a bend is greater than that on the internal radius or on straight pipes. You should, therefore, take special care when measuring the wall thickness of the external radius of a bend.

2. Regularly turn straight delivery pipes by 120° to ensure even wear.
3. Regularly turn the pipe bends by 180° to ensure even wear.

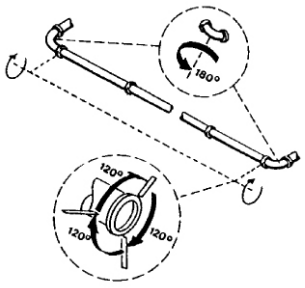


Figure 67: Regularly turn delivery pipes and bends

4. You can find the minimum wall thickness for straight delivery pipes using the following graph for wall thickness.

5. Replace the pipes and bends as soon as the wall is as thick as the minimum wall thickness value.

8.4.15.5 Graph for minimum wall thickness

Minimum wall thickness as a function of delivery pressure

As a rule it is possible to continue pumping with a delivery pressure lower than that shown in the graph. We should, however, draw your attention to the fact that the delivery line is subject to varying loads as a result of the dynamic load during pumping. There is no general method for calculating the minimum wall thickness for this load, which depends on the individual circumstances, and so the delivery line can also burst at a delivery pressure which is assumed still to be permissible.

Furthermore, the delivery pressure can rise to 70 bar in the event of blockages, meaning that the wall thickness will no longer be adequate and the delivery line will burst.

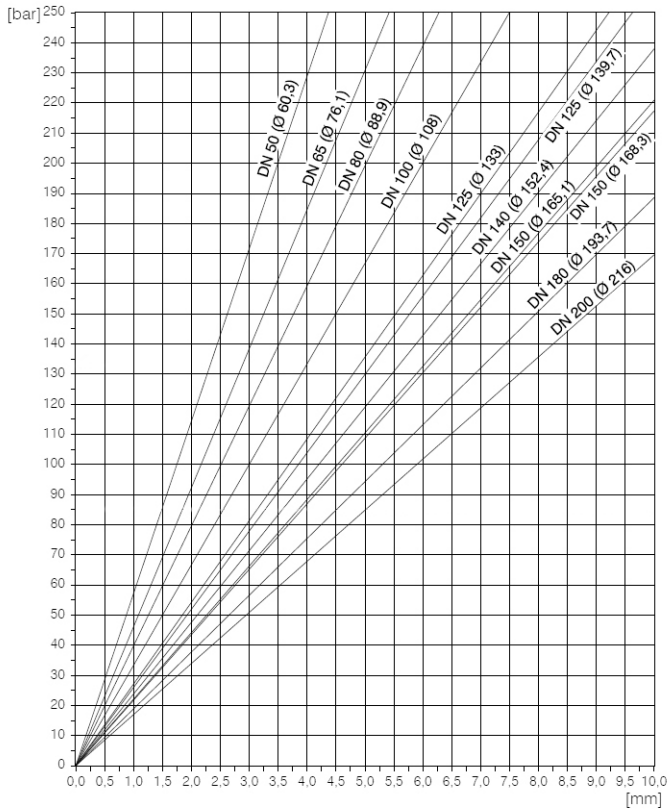


Figure 68: Graph for minimum wall thickness

8.4.16 Antifreeze protection of the flushing water pump

This section describes the antifreeze protection of the flushing water pump.

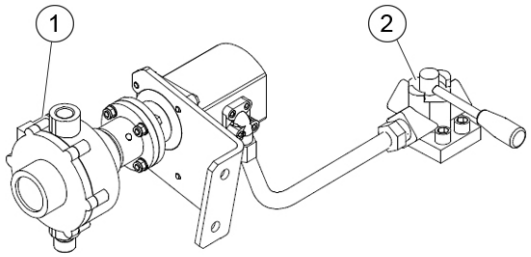
There are specific risks of accidents associated with maintenance, inspection and repair work. You should particularly observe the “Safety regulations” chapter and the description of “Residual risks during maintenance work” at the beginning of this chapter.

NOTICE

Damage to the machine caused by freezing water

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

Freezing temperatures can cause the water in the flushing water pump and lines to freeze and result in assembly components bursting.



Item	Designation
1	Flushing water pump
2	Change-over valve

The antifreeze protection measures consist of the following steps:

1. Set the lever on the change-over valve to the “Pumping” position.
   ⇒ The flushing water pump switches off.
2. Shut off the water supply.
3. Disconnect the water supply line.
4. Disconnect the pressurised water hose.

5. Allow the residual water to fully drain from the pressurised water hose connection.
6. Check the change-over valve. The lever must be in the “Delivery” position.

8.4.17 Highpressure cleaner – antifreeze protection

If there is a risk of freezing, the water in the highpressure cleaner and lines may freeze and cause assemblies to burst.

⚠ WARNING

Machine damage due to freezing water in the high-pressure pump

Freezing temperatures can cause the water in the highpressure cleaner and lines to freeze and result in assemblies bursting.

1. If there is a risk of freezing, drain the high-pressure pump and the lines fully of residual water.
2. Only operate and store the machine in frost-free locations.

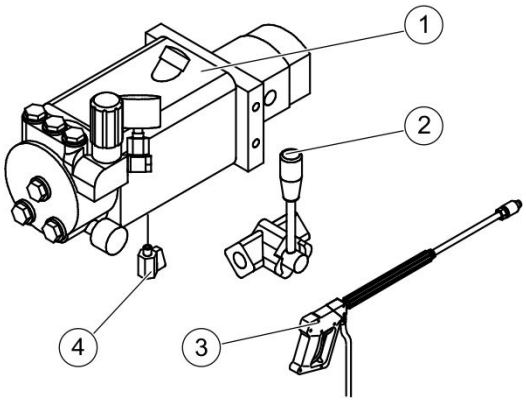


Figure 69: Highpressure cleaner

Item	Designation
1	Highpressure cleaner
2	Change-over valve
3	Cleaning gun
4	Ball valve

The antifreeze protection measures consist of the following steps:

1. Set the lever on the change-over valve to the “Pumping” position.
   ⇒ The highpressure cleaner is switched off.
2. Shut off the water supply.
3. Disconnect the water supply line.
4. Open the cleaning gun and leave it open.
5. Open the ball valve and drain the water completely.
6. Close the ball valve again once the residual water has completely drained from the highpressure cleaner and the lines.
7. Disconnect the highpressure hose.
8. Check the change-over valve. The lever must be in the “Delivery” position.

8.4.18 High-pressure cleaner – checking the fluid level

8.4.18.1 Checking the fluid level

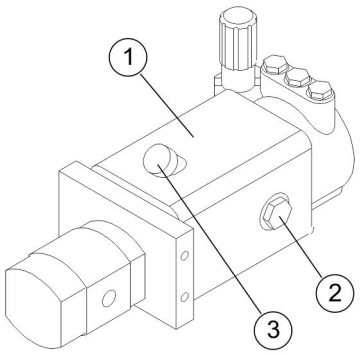


Figure 70: Example illustration of the high-pressure cleaner

Item	Designation
1	Highpressure cleaner
2	Inspection glass
3	Vent connection

1. Check the fluid level of the high-pressure cleaner *(1)* on the inspection glass *(2)*.
2. If necessary, top up the fluid as described in the following section.

8.4.18.2 Topping up the fluid

NOTICE

Damage to the high-pressure cleaner due to contamination in the fluid system

- Prevent dirt or other impurities from entering the fluid system of the high-pressure cleaner.

1. Open the vent connection.
2. Pour new fluid into the filler pipe up to the middle of the inspection glass.
3. Close the vent connection securely.

8.5 Functional fluids

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

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

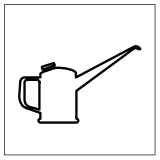
NOTICE

Environmental pollution caused by incorrect disposal of functional fluids

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

The fill volumes can be found in the “Technical data” section of the “General technical description” chapter *(Technical data P. 3 — 5)*.

You can find the “Lubricant recommendation” in the appendix *(Lubricant recommendation P. 10 — 3)*.



8.5.1 Fuel

⚠ WARNING

Risk of injury due to fuel igniting

Smoking is absolutely prohibited when fuelling.

1. Fill the machine with fuel only when the engine is switched off.
2. Keep a fire extinguisher readily available while fuelling.
3. Never fill the fuel tank near naked flames or ignitable sparks.
4. Do not spill fuel on hot machine components when fuelling.
5. Avoid naked flames at the machine and close the fuel tank after fuelling.
6. Use an auxiliary device such as a funnel to ensure that no fuel is spilled.

NOTICE

Risk of machine damage due to using the wrong fuel

1. Only fill the fuel tank with standard commercially available branded fuel, as the diesel engine may otherwise become damaged.
2. Use summer or winter diesel fuel depending on the outside temperature.

8.5.2 Engine oil

NOTICE

Risk of machine damage due to incorrect engine oil

1. Only use an engine oil in accordance with the requirements standard specified in the lubricant recommendation for topping up or performing a full oil change. Observe the manufacturer's information in doing so.
2. Do not mix the specified oil with other oils.

If the machine is used at other ambient temperatures, the required oil grade must be requested separately. A full oil change should only be carried out when the machine is warm after operation. The first engine oil change is due during the first After Sales service.

8.5.3 Hydraulic fluid

The hydraulic system is filled with an HLP 46 mineral hydraulic fluid.

NOTICE

Risk of machine damage due to incorrect hydraulic fluid

1. Only use hydraulic fluid in accordance with the requirements standard specified in the lubricant recommendation for topping up or performing a full fluid change. Observe the manufacturer's information in doing so.
2. Never mix hydraulic fluids with different characteristics, i.e. do not mix biologically degradable hydraulic fluids with mineral hydraulic fluids, etc.

8.5.4 Manual grease lubrication

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

8.5.5 Centralised lubrication system

To top up the centralised lubrication system, use a highquality multipurpose grease with a lithium soap base in accordance with the lubricant recommendation.

8.5.6 Axle and wheels

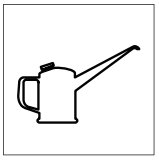
Lubricate the axle and wheels using a highquality multipurpose grease in accordance with the lubricant recommendation.

8.5.7 High-pressure cleaner oil

The highpressure cleaner requires a yearround highpressure class SAE 20W30 multigrade oil.

8.6 General tightening torques for bolts

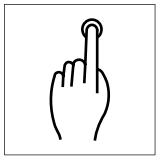
See the spare parts list for an overview of general tightening torques.



NOTICE

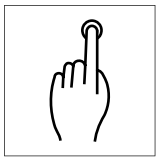
Risk of damage to components caused by incorrect bolts

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



9 Decommissioning

This chapter contains information on decommissioning the machine.



9.1 Temporary decommissioning

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

1. Stop the material feed
2. Run the material hopper until it is empty.
3. Switch off the pump using the “Pump ON – 0 – Reverse pumping ON” toggle switch.
4. Clean the machine.
5. Switch off the machine and secure it against unauthorised starting or use.
6. Refill the fuel tank to prevent condensation from building up in the tank. Observe the information about “Filling the machine with fuel” *(Filling the machine with fuel P. 5 — 10)*.

NOTICE

Damage to the machine caused by freezing water

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

7. If there is risk of freezing, allow the water in the water box to drain completely.

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

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

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

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

11. If the machine is to be stored for a long time you must remove the battery and charge it regularly.

⚠ WARNING

Risk of fuel vapours igniting

There is a risk of fuel vapours building up and igniting if the machine is stored in a poorly ventilated area.

- Make sure that there is good ventilation.

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

9.2 Final decommissioning and disposal

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

⚠ CAUTION

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

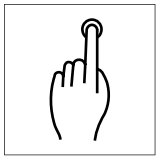
- Always wear personal protective equipment.

NOTICE

Environmental pollution caused by functional fluids escaping

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

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



NOTICE

Environmental pollution caused by incorrect disposal of the machine

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

9.2.1 Materials used

The main materials used for machine construction were:

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

9.2.2 Parts requiring separate disposal

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

Designation	Applies for
Electronic scrap	Electrical supply
	PCBs with electrical components

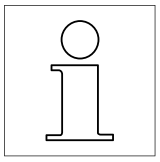
Designation	Applies for
Oil	Highpressure cleaner
	Hydraulic pump
	Hydraulic motor
	Drive motor

10 Appendix

This chapter contains the following topics:

- Lubricant recommendation
- Sample of the EC Declaration of Conformity

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



10.1 Lubricant recommendation

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

NOTICE

Risk of machine damage caused by mixing oils

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

NOTICE

Risk of machine damage caused by unauthorised functional fluids

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

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

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

NOTICE

Risk of machine damage

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

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

Hydraulic fluid	
Type	HLP 46
Classification as per DIN	51524 Part 2
Characteristics	mineral
Viscosity as per DIN	51519/ISO VG 46
Temperature range	-10 °C to +90 °C
Part number	000171007

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

Greases	Lubrication (manual)	Centralised lubrication system
Marking as per DIN 51502	K2K–20	K1K–20
Requirements standard	DIN 51825	DIN 51825
Characteristics	mineral, lithium soap	mineral, lithium soap
Viscosity grade, NLGI Class	NLGI Class 2 DIN 51818	NLGI Class 1 DIN 51818
Part number	360000009	360001008

Axle and wheels (if available)	
Type	High-quality multipurpose grease
Marking	DIN 51 818 NLGI Class 2

10.2 Sample EC Declaration of Conformity

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

Local Template

EG Konformitätserklärung

2006/42/EG, II 1.A.

Putzmeister

LT-170050-031

1 de **EG-Konformitätserklärung im Sinne der Richtlinie 2006/42/EG, Anhang II 1.A des Europäischen Parlaments und des Rates vom 17. Mai 2006 über Maschinen**
en **EC Declaration of Conformity as per directive 2006/42/EC, appendix II 1.A of the European Parliament and of the Council of 17 May 2006 on machinery**

2 de **Hiermit erklären wir, dass die Maschine - Bezeichnung / Typ / Maschinennummer** — Betonpumpe
en Herewith we declare that the machine –Designation / Model / Serial No. — P 718

3 de **allen einschlägigen Bestimmungen der Richtlinie entspricht:** — 2006/42/EG
en **meets all relevant provisions of the directive:**

4 de Darüber hinaus entspricht die Maschine den einschlägigen Bestimmungen folgender weiterer Richtlinien: — 2014/35/EU, 2014/30/EU, 2000/14/EG
en Moreover, the machine meets the relevant provisions of the other directives below:

5 de **Angewendete harmonisierte Normen, insbesondere** — EN 12001
en complies with the following provisions applying to it

6 de Angewandte sonstige technische Normen und Spezifikationen, insbesondere
en Other, related technical standards and specifications, in particular:

7 de **Angaben zum Dokumentationsbevollmächtigten**
en Party authorized to produce documentation — Putzmeister Mörtelmaschinen GmbH Max-Eyth-Straße 10 D-72631 Aichtal

8 de **Angaben zum Unterzeichner / Datum / Unterschrift**
en Signer / Date / Signature

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

9 de **Geschäftsführer**
den
en Managing Director

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