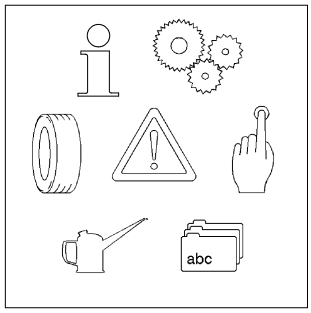
Operating Instructions

for machine operator and maintenance staff

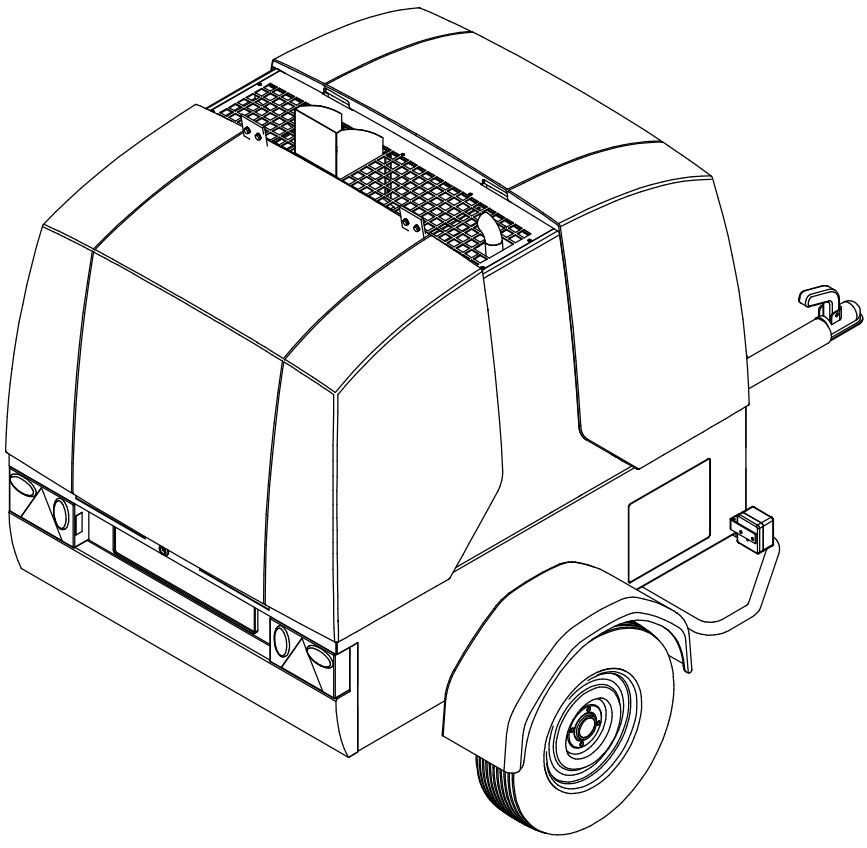
always keep by the machine



High-Pressure Cleaner Dynajet 350 th

Art. no. 111480010 / 040 / 050

Machine no.



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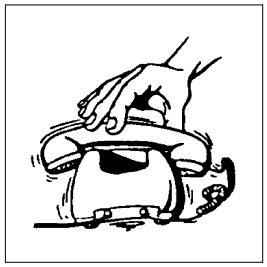

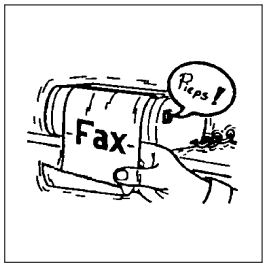

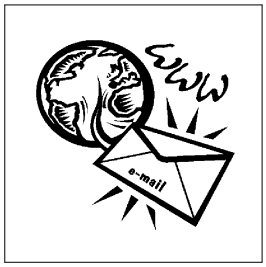

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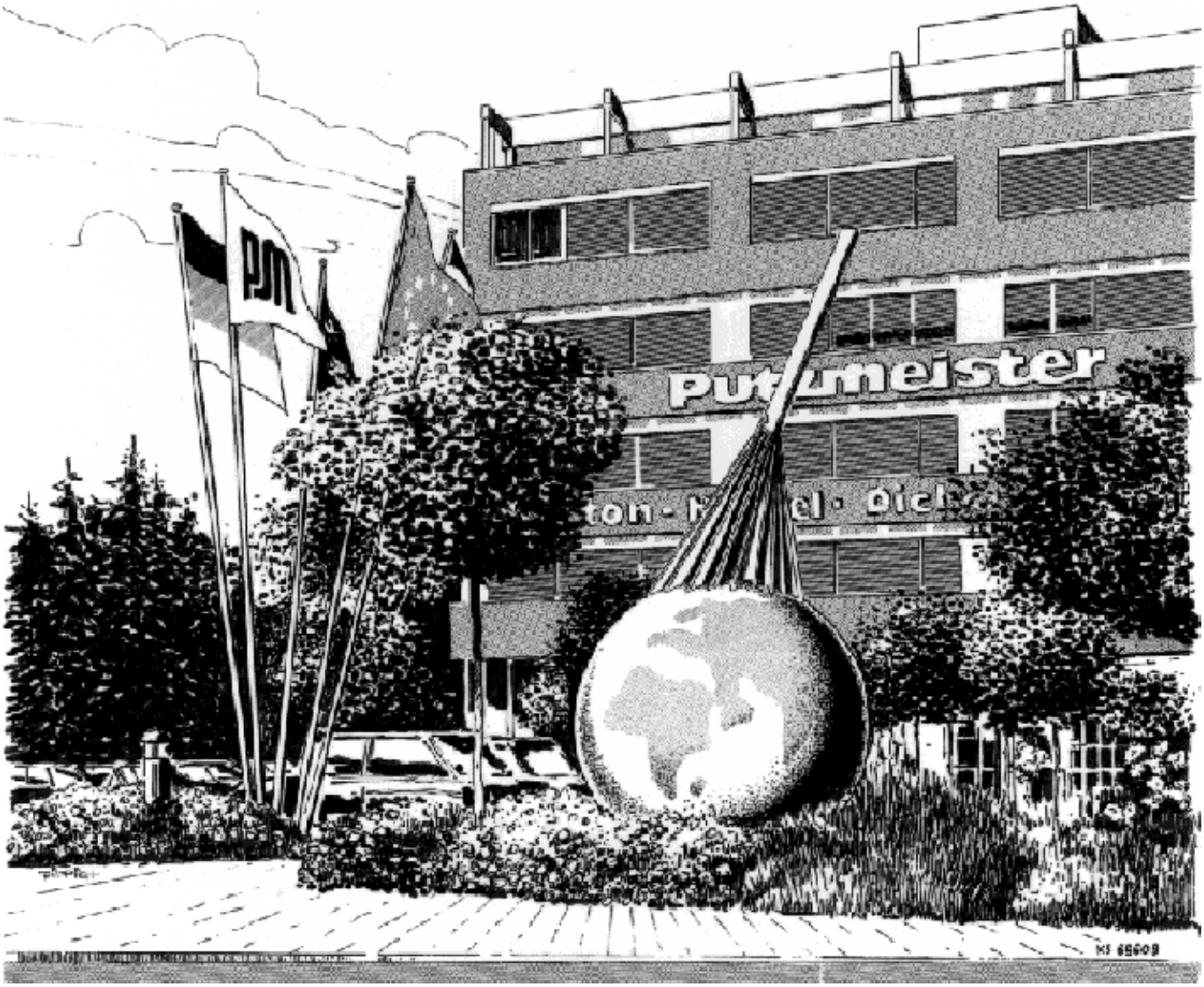

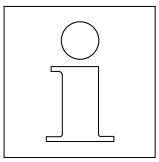

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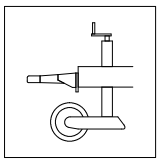
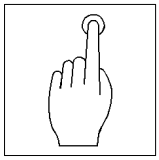


4 Transport, Set-up and Connection

5 Starting up



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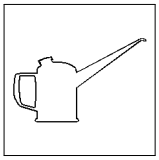

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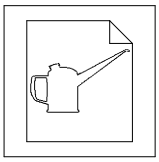

Maintenance Chart

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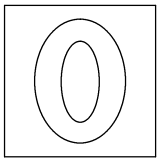

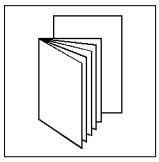

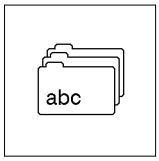

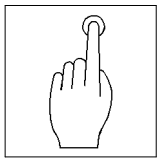

1 About these Operating Instructions

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

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E-mail: pmm@pmw.de

or the branch or services agent responsible for you.

Address: _____

_____

_____

Telephone: _____

Fax: _____

E-mail: _____

1.1 Foreword

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

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

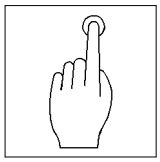
The Operating Instructions must be supplemented by the relevant national rules and regulations for accident prevention and environmental protection.

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

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

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

Continuation next side



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

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

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

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

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

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

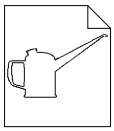
Example: Page 3-2
Chapter 3
Page 2

1.2 Icons and symbols

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

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

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



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

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

Environmental protection

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

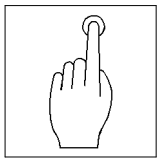
Notes

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

Caution

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

Continuation next side



Danger

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

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

Suspended Load

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

Danger of crushing

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

Heavy current

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

2 Safety Regulations

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

Notes

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

The following safety instructions should be regarded as a supplement to already existing valid national accident prevention regulations and laws.

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

2.1 Principle

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

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

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

If defects or faults are found or suspected during operation, operation must cease immediately. Eliminate the defect or fault before restarting.

Onwards sale

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

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

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

2.2 Designated use

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

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

The machine is only designed for cleaning with pressurised water.

The machine supplies heated pressurised water at a maximum temperature of 95 °C.

The machine supplies pressurised water at the pressure specified in the technical data, depending on the model.

The machine must be supplied with clean, cold mains water via the low-pressure hose as described in the chapter "General technical description" - section: "Water quality requirements". Other materials should not be used.

The operator must provide personal protective equipment which should be used by the operating personnel.
Personal protective equipment includes:
- Protective helmet
- Ear defenders
- Protective goggles
- Face protection visor
- Protective suit
- Protective gloves
- Protective boots

Only qualified personnel may work on the burner.

All items of the machine's protective panelling must be fitted or connected up during operation.

Continued on following page

The machine must be operated only with the safety equipment fitted.

Specified maintenance work should 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.

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

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

2.3 Use contrary to the designated use

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

Modifications

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

The values quoted on the rating plate, in the Technical Data and on the machine card are the maximum permissible values.

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

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

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

2.4 Liability

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

The safety and accident prevention regulations from the following institutions must be observed:
- Industrial Employers' Liability Insurance Association,
- the responsible corporate liability insurance company.
- the legal authorities in your country.

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

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

Exclusion of liability

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

2.5 Personnel selection and qualifications

The machine may only be operated or serviced independently by persons who
- have reached the minimum legal age;
- are physically capable (rested and not under the influence of alcohol, drugs or medication);
- have been instructed in the operation and maintenance of the machine;
- can be expected reliably to execute the tasks they are charged with.

Training

The machine must only be operated, serviced or maintained by persons who are trained to carry out such tasks and have been commissioned to do so.
The 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 who have not yet completed training or instruction,
- untrained personnel,
- uninstructed personnel,
- personnel taking a general training course.

Qualified electrician

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

2.6 Sources of danger

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

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

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

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

Never release or tighten threaded unions that are under pressure.

Hot machine components

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

2.7 Safety equipment

Never remove or modify safety devices on the machine.

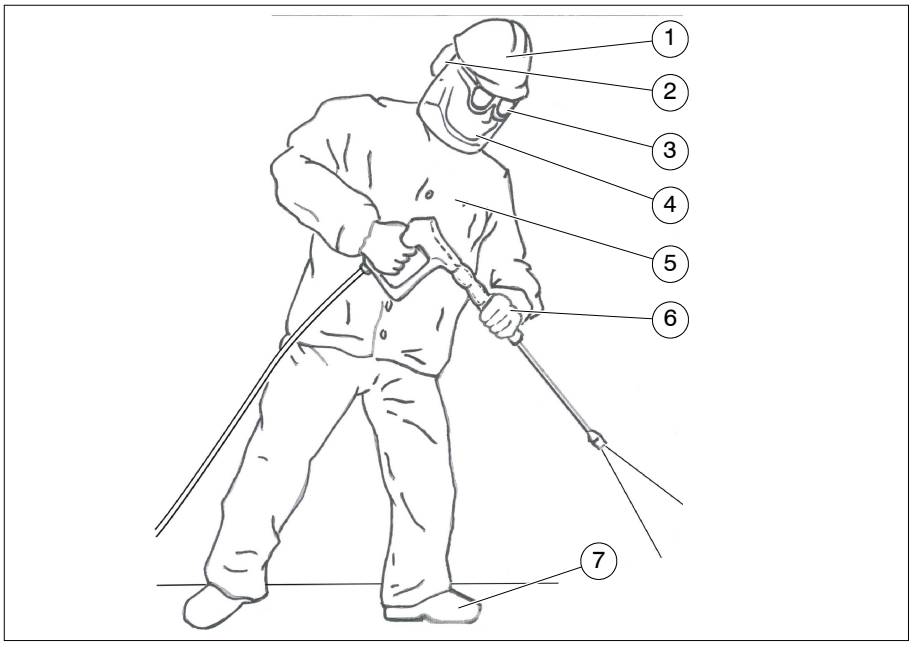
Any safety devices removed for set-up, maintenance or repair purposes must be refitted and checked immediately upon completion of the maintenance and repair work.

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

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

2.8 Protective equipment

The following protective equipment is compulsory throughout the machine working area to limit the risk of injury to personnel.



Item	Designation
1	Protective helmet
2	Ear defenders
3	Protective goggles
4	Face protection visor
5	Protective suit
6	Protective gloves
7	Protective boots

Danger

The machine operator must be informed that waterproof protective clothing only provides protection from spray water and splash particles.
In the case of direct contact with the high-pressure water jet, protective equipment does not guarantee protection against injuries caused by the high-pressure water jet.
Never direct the high-pressure water jet to clean dirty protective equipment still being worn by personnel.

2.9 Risk of injury - residual risk

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

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

- Risk of crushing and knocking when moving and setting up the machine.
- High-pressure injection at the high-pressure water pump, high-pressure hose and high-pressure gun.
- Electric contact (in some circumstances with fatal consequences) with the electrical equipment. If the connection has not been made correctly or electric subassemblies are damaged.
- Risk of burning on hot machine components. This includes e.g. drive motor, burner and frame.
- Noise pollution is a danger for persons working continuously near the machine without hearing protection.
- Injuries through unauthorised starting or use of the machine.
- Injuries caused by tripping over cables, hoses or reinforcing steel.

2.10 Risk of crushing and bumping

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

there is a risk of injury through crushing or bumping.

Transporting the machine

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

If your machine is fitted with attachment points, these will be located on the top of the machine and are marked in colour.

Danger of crushing

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

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

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

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

Continued on following page

Suspended Load

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

2.11 High-pressure injection

The high-pressure water pump, high-pressure hose and high-pressure gun pose a risk of high-pressure injection during the following operating modes:

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

Work with high-pressure water jets produces very high pressure that acts over a relatively small surface area. This concentration of energy can cause serious injuries.

Danger

If a high-pressure water jet makes contact with the skin, it can penetrate the surface of the skin and damage the tissue underneath. The water may inject foreign matter deep into the body and cause dangerous infections. With injuries caused by high-pressure water jets, it is not possible to assess the extent of damage to the tissue from the outside.
Treat any injuries caused by high-pressure water jets as an acute surgical emergency. Injuries of this kind require treatment from a qualified orthopaedic surgeon. Inform the acting doctor that the accident was caused by a high-pressure water jet.

Always inspect the machine for defects before starting work. Should you identify any defects during operation, shut down the machine immediately, depressurise and have the defect repaired by a qualified technician. Depressurise the machine before decommissioning.

Continued on following page

High-pressure hoses

It is essential that correct high-pressure hoses be carefully selected and handled correctly to maintain the operational safety of the machine.

Observe the following rules when handling high-pressure hoses:

- Only use high-pressure hoses approved to withstand the maximum operating overpressure and maximum operating temperature.
- High-pressure hoses should only be connected by qualified personnel.
- High-pressure hoses must be laid and secured in such a way as to minimise any dangers.
- High-pressure hoses must consist of functioning hoses and connections that are compatible with one another.
- High-pressure hoses must not be painted.
- Depressurise the high-pressure hoses after operating the machine.
- Do not crush high-pressure hoses or guide them over sharp edges. Avoid tensile and bending stress.
- High-pressure hoses must be stored free of kinks and tension.

High-pressure hoses are wear parts with a limited service life. They should therefore be replaced at appropriate intervals according to the operating conditions, even if there are no obvious visible external defects.

High-pressure hoses must be replaced should the following defects occur:

- Scuff marks, cuts or cracks that pierce the outer layer and reach through to the wire infill.
- Embrittlement of the outer layer (crack formation) due to improper storage.
- Storage time and usable service life have expired. As a guide value, DIN specifies 6 years plus a maximum of 4 years previous storage time for an unconnected hose.
- Leaks in the hose and at the connection point.

Continued on following page

Danger

Never search for leaks in high-pressure hoses with your bare hands. Water escaping under high pressure may not be visible but can cause serious injury.

High-pressure gun

Correct handling of the high-pressure gun is essential to ensure the operational reliability of high-pressure cleaners.
Observe the following rules when handling high-pressure guns:

- Only use high-pressure guns that are designed to withstand the permitted operating overpressure.
- Always use the high-pressure gun with a nozzle approved for the relevant pressure and temperature range.
- Never direct the water jet at people or animals.
- Pay attention to the confines of the danger area when performing work involving high-pressure water jets. No personnel should stand within a 10 m radius of the high-pressure gun, apart from the operator.
- When operating the high-pressure gun, always hold firmly with both hands.
- The high-pressure gun produces recoil and torque when actuated. Ensure equipment is secure and stable.
- Use suitable means to support the high-pressure gun, depending on the model.
- Depressurise the high-pressure gun after operating the machine.

Danger

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

Wear all the necessary personal protective equipment. This also applies to all personnel standing within the working area around the machine (for their own safety).

2.12 Electrical contact

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

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

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

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

Heavy current

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

2.13 Risk of burns and scalding

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

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

Risk of burns.

Danger

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

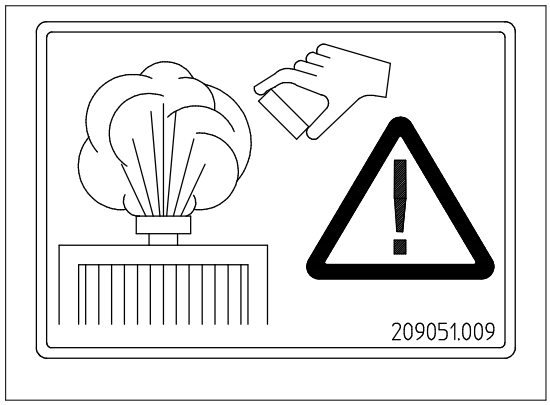
Danger

In addition to high-pressure injection, bear in mind the risk of burns and scalding posed by the high-pressure hose and the high-pressure gun.

Continued on following page

Coolant

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



Danger

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

2.14 Place of work

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

Machine operator

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

High-pressure gun operator

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

Danger

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

2.15 Working area

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

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

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

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

2.16 Conduct in an emergency

Switch off the machine immediately in an emergency situation.

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

Caution

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

2.17 Sound emissions

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

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

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

Wear your personal ear defenders.

Operator

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

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

2.18 Spare parts

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

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

2.19 Accessories

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

Notes

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

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

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

2.20 Storing the machine

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

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

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

2.21 Injuries through unauthorised starting or use of the machine

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

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

Always secure the machine against unauthorised starting before leaving the work area. This means:
- Switch the main switch to OFF.
- Close the hoods.

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

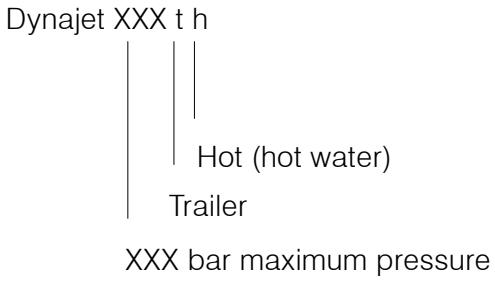
3 General Technical Description

This section describes the components and assemblies on this machine and describes how they function. Please note that possible options are also described. Please see the machine card to find out whether a particular option is fitted.

3.1 Designation of machine

Your machine is a Dynajet from Putzmeister Mörtelmaschinen GmbH. You will make it much easier for us to answer any questions or respond to orders if you can give us the details of the machine model and the machine number.

The type plate is attached to the frame at the front right, viewed in direction of travel.
The machine number is stamped on the frame at the front right, viewed in direction of travel, and is marked in red.



3.2 Machine versions

These operating instructions are valid for subsequent versions of the machine.

Model	Type	Material no.
Dynajet 350	th	111480010
Dynajet 350	th	111480040
Dynajet 350	th	111480050

The following data can be found on the accompanying machine card and on the rating plate:
- Machine type
- Machine number

Note

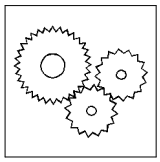
The machine number is allocated by Putzmeister Mörtelmaschinen GmbH. Each machine number is only allocated once. This means that the machine number identifies each individual machine.

3.3 Scope of supply

The scope of supply includes:
- the Dynajet high-pressure cleaner,
- a 50 m high-pressure hose,
- a 25 m low-pressure hose,
- a high-pressure gun with high-pressure pipe and fan jet nozzle,
- standard accessories,
- Operating Instructions,
- a spare parts list,
- a document folder.

Note

The specifications relate to the series machine and may deviate if special equipment is fitted. Please refer to the supplied machine card for details.



3.4 Summary

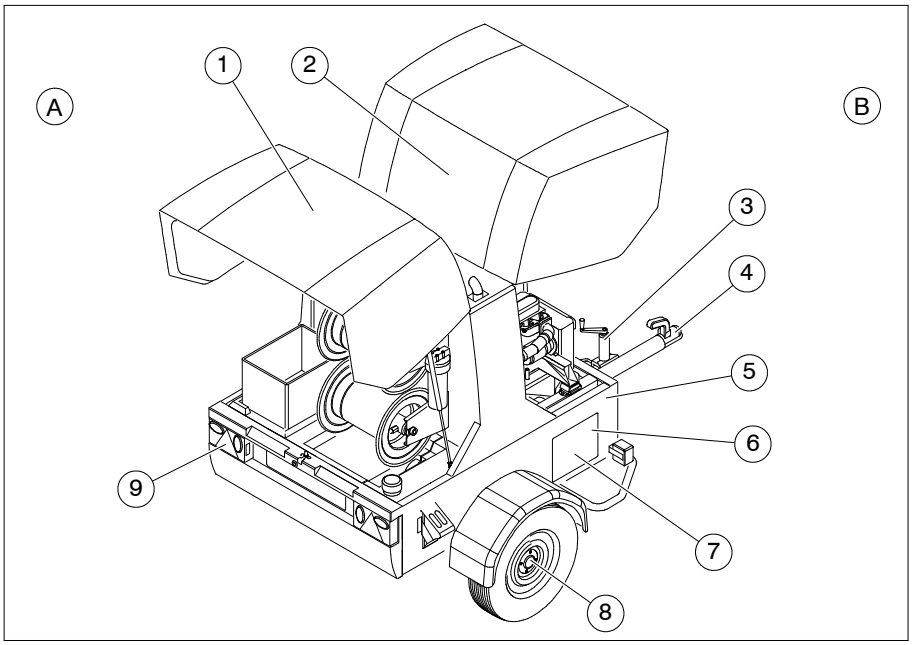
Below you will find a summary of the most important components; these will then be described on the following pages.

Note

The machine is divided into two areas; the control area and the service area. Each of the two areas is covered by a hood.
The service area should not be opened during operation.
All operation-related functions are activated in the control area.
The service area accommodates e.g. the engine and high-pressure water pump. The control cabinet and hose drum, for example, are located in the control area.

Continued on following page

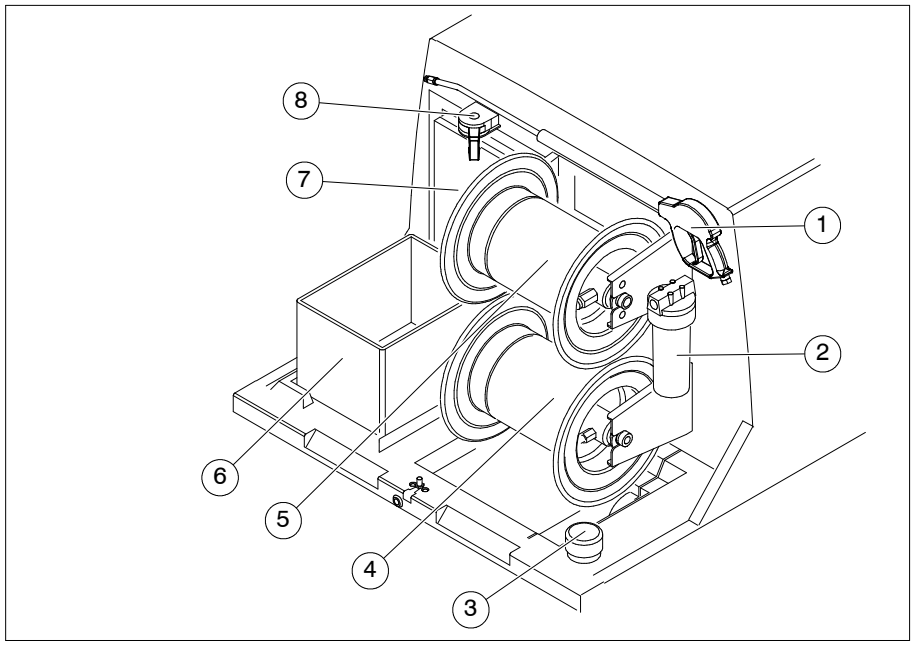
Dynajet 350 th



Item	Designation
A	Control area
B	Service area
1	Hood, control area
2	Hood, service area
3	Support wheel
4	Towing gear
5	Rating plate
6	Burner fuel filter (covered)
7	High-pressure water pump (covered)
8	Axle and wheels
9	Lighting equipment

Continued on following page

Control area

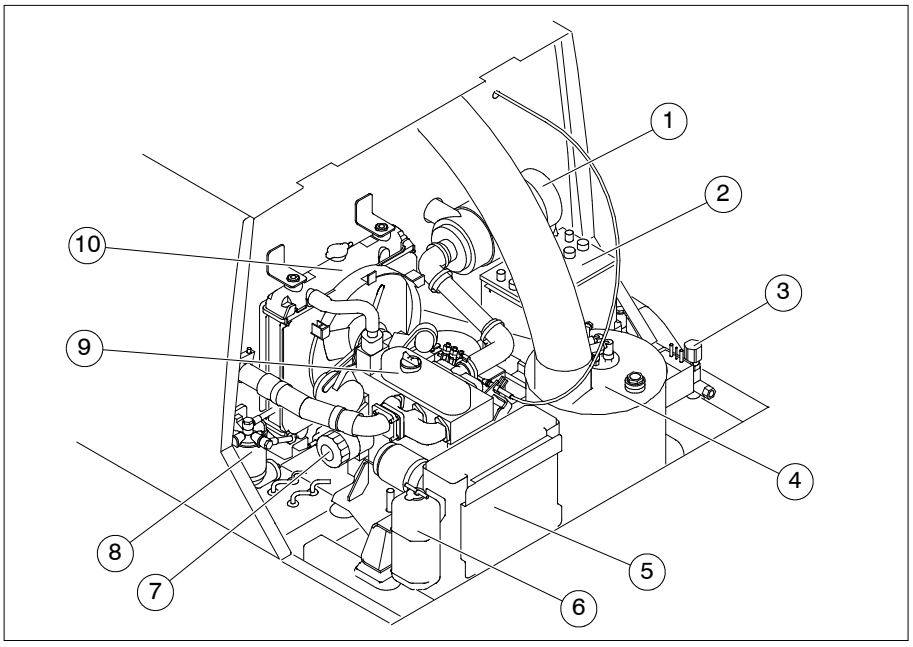


Control area viewed in the direction of travel

Item	Designation
1	High-pressure gun
2	Water filter
3	Fuel filler neck
4	High-pressure hose drum
5	Low-pressure hose drum
6	Toolbox
7	Control cabinet
8	Pressure gauge (covered)
9	Throttle lever

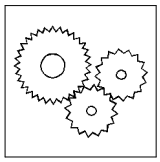
Continued on following page

Service area



Service area viewed against the direction of travel

Item	Designation
1	Dry air filter
2	Battery
3	Unloader valve
4	Burner
5	Bracket
6	Expansion tank for coolant
7	Engine oil filter
8	Fuel filter
9	Engine
10	Radiator



3.5 Technical data

The technical data and features listed below relate to the Dynajet 350 th.

	350 bar	300 bar
Dimensions		
Length:	2903 mm	
Width:	1720 mm	
Height:	1761 mm	
Weights		
Permissible gross weight:	1260 kg	
Weight (empty):	765 kg	
Permitted drawbar load:	max. 100 kg	
Chassis		
Permitted driving speed:	In accordance with regulations in the country of use.	
Trailer coupling ring:	In accordance with DIN 74054 Part 1	

Caution

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

	350 bar	300 bar
Tyres		
Tyre size:	175/80 R 13	
Rim size:	4 1/2JX13H2 ET 30	
Inflation pressure:	2.4 bar	
Tightening torque of wheel nuts:	Ball-collar screws 90 Nm	

Danger

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

Continued on following page

	350 bar	300 bar
Performance data		
Engine:	3-cylinder diesel engine 12 kW at 3000 rpm	
High-pressure water pump:	High-pressure water pump 20 l/min	
Working pressure:	up to 350 bar	up to 300 bar
Pumping rate:	up to 15 l/min	up to 19 l/min
Heating output of burner:	115 kW	
Max. water temperature:	95 °C	
Sound pressure level:	87 dB (A)	
Inclination angle in longitudinal direction:	10°	
Inclination angle in transverse direction:	10°	
Control voltage:	12 V	
Temperature range:	0 °C to +45 °C	
Installation height (without reduction in performance):	up to 1000 m above sea level	
Water connection		
Low-pressure hose connection:	GEKA 3/4”	
Pipe diameter:	3/4”	
Water pressure:	min. 2 bar, max. 6 bar	
Fan jet nozzle		
Designation:	Form B 15 034	Form B 15 045
Spray angle:	15°	15°
Nozzle size:	∅ 1.30 mm	∅ 1.46 mm
PM item no.:	414016	421132

Danger

Other fan jet nozzles should only be used after consultation with Putzmeister Mörtelmaschinen GmbH. Please note that the use of other fan jet nozzles could lead to increased recoil force.

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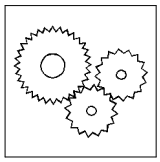


	350 bar	300 bar
Fluid capacities		
Engine oil:	Engine oil volume 3.8 l with filter change SAE 10W-40 or SAE 10W-30 Refer also to the documentation provided by the engine manufacturer.	
Fuel:	Diesel fuel Capacity approx. 70 l	
Expansion tank:	Coolant Capacity approx. 3.1 l Refer also to the documentation provided by the engine manufacturer.	
Water tank:	Clean mains water Capacity approx. 300 l	
High-pressure water pump:	Gear-lubricant oil SAE 30 Capacity approx. 1.12 l	

Caution

The capacities are only approximate values. These may vary according to the design and depend on the quantity of oil remaining. The upper mark on the oil dipstick always takes precedence.

3.6 Water quality requirements

Observing the water quality requirements will extend the life of the high-pressure water pump and ensure it functions correctly.

Pressure-dependent parameters				
Parameter		**Pressure range**		
		max. 500 bar	**> 500 bar to 1200 bar**	**> 1200 bar**
Solids concentration	(mg/l)	max. 100	max. 50	max. 10
Particle size	(μm)	max. 80	max. 50	max. 10
Temperature	(°C)	max. 60	max. 50	max. 30
Overall hardness	(mmol/l)	0.5–5	0.5–5	0.5–3.5
(Ca^{2+} + Mg^{2+})	(°d), (°dH)	3–25	3–20	3–15
(Ca^{2+} + Mg^{2+})	(mg/l)	20–200	20–200	20–145

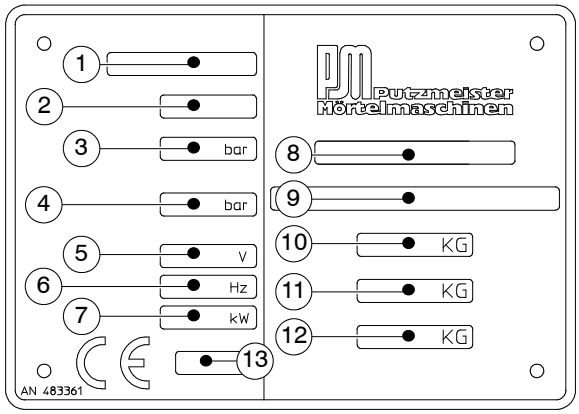
Pressure-independent parameters			
pH value			6,5–8,0
Conductivity		(μS/cm)	max. 2000 at 20 °C
Dissolved oxygen		(mg/l)	min. 5
Organic materials		(mg/l)	max. 12
Aluminium	Al	(mg/l)	max. 0,2
Ammonium	NH^{+}	(mg/l)	max. 0.5
Calcium	Ca^{2+}	(mg/l)	max. 100
Chlorine	Cl^{2}	(mg/l)	max. 0.5
Chloride	Cl	(mg/l)	max. 100
Iron	FE^{2+}	(mg/l)	max. 0.3
Silicon dioxode	SiO^{2}	(mg/l)	max. 20
Copper	Cu^{2+}	(mg/l)	max. 1
Magnesium	Mg^{2+}	(mg/l)	max. 50
Manganese	Mn^{2+}	(mg/l)	max. 0.1
Sulphate	SO^{2}	(mg/l)	max. 250
Nitrate	NO 3	(mg/l)	max. 50
Nitrite	NO^{2}	(mg/l)	max. 0.1

Note

All other parameters must correspond to standard drinking water values and regulations.
Deviations from the values listed above are only permitted after consulting Putzmeister Mörtelmaschinen GmbH

3.7 Rating plate

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

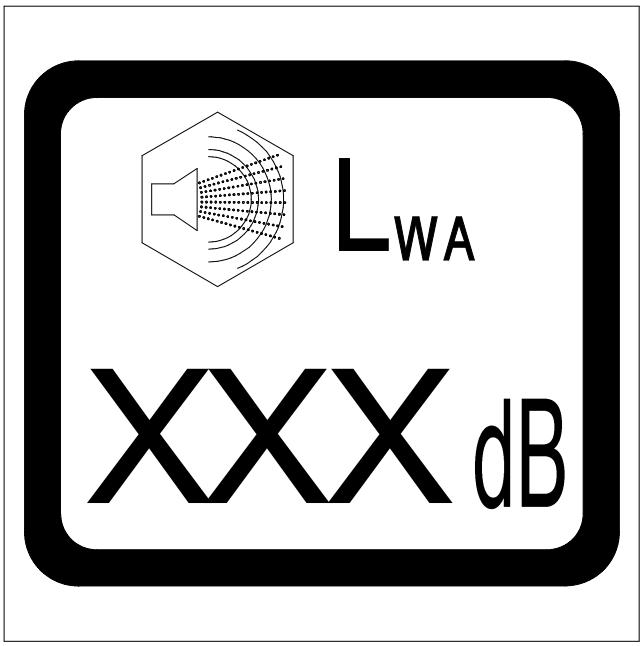


Item	Designation
1	Model (machine model)
2	Year of manufacture
3	Maximum delivery pressure [bar]
4	Hydraulic pressure [bar] (maximum fluid pressure in the hydraulic system)
5	Voltage [V]
6	Frequency [Hz]
7	Power [kW]
8	Licence number
9	Chassis number no.
10	Permitted gross weight [kg]
11	Permitted axle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

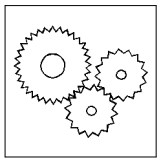
3.8 Sound power level

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

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



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



3.9 Options

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

The following options can be installed on your machine:
- 12V / 50W halogen working light
- Cable remote control with EMERGENCY STOP
- Spark catcher
- Support foot

Note

Refer to the current "Dynajet" catalogue from Putzmeister Mörtelmaschinen GmbH for information on other options and accessories.

3.10 Safety equipment

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

EMERGENCY STOP button

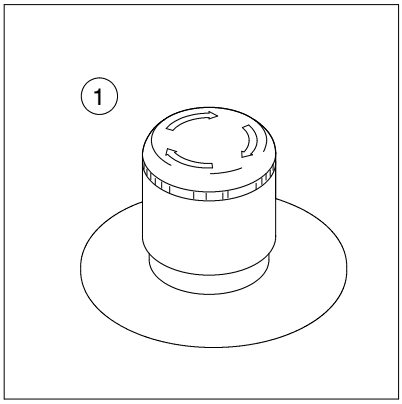
The control cabinet of the machine accommodates an EMERGENCY STOP button.

Danger

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

Caution

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



Item	Designation
1	EMERGENCY STOP button

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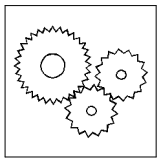


Pressing the EMERGENCY STOP button triggers the following activities:

- The motor control switches off.
  ⇒ As a result, the engine, burner, high-pressure water pump and hydraulic pump (optional) switch off.
- The solenoid valve, which controls the supply of diesel to the burner, closes.
- If the burner has been activated, ignition sparks are no longer generated at the burner electrodes.
- All control and switch boxes are electrically disabled.
- The indicator lamp "EMERGENCY STOP activated" lights up on the control cabinet.

Danger

If the EMERGENCY STOP button is pressed while the high-pressure gun is closed, the high-pressure line remains pressurised.

Note

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

To reactivate the machine, you have to switch the master switch off once and then back on.

Hood safety device

The high-pressure cleaner is equipped with a hood safety device. If the hood is opened during operation, a safety switch is actuated and the engine switches off immediately.

Note

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

Water deficiency monitor

The water tank is equipped with a float switch to protect against low water supply. As soon as a water shortage is detected, the machine shuts down.

Overpressure safety device in the high-pressure circuit

The unloader limits the water pressure. The additional relief valve protects the entire system.

If the working pressure exceeds the maximum working pressure, the unloader depressurises the water, which then drains into the tank. Refer to the chapter: "General Technical Description" - section: "Technical data" for information on maximum operating pressures for the high-pressure cleaner.

The pipes from the unloader and the relief valve are combined and lead back into the tank via one pipe.

Personal protective equipment

Personal protective equipment is not included in the scope of supply delivered with the machine, it is supplied by Putzmeister and can be purchased through Parts Sales.

Danger

Wear all the necessary personal protective equipment. This also applies to all personnel standing within the working area around the machine (for their own safety).
Replace any damaged components from your personal protective equipment immediately!

Note

Personal protective equipment can be purchased through the Parts Sales department at Putzmeister Mörtelmaschinen GmbH.

3.11 Functional description

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

General description of the machine

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

The Dynajet is a mobile high-pressure cleaner.

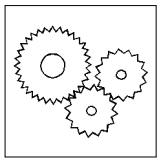
The high-pressure water pump is powered by a diesel engine to generate pressurised water.
Refer to the chapter: "General Technical Description" – section: "Technical data" for information on maximum operating pressures for the high-pressure cleaner.

A diesel-operated burner heats the water to max. 95 °C.

Fresh water is supplied via a low-pressure hose stored on an integral hose drum.
A high-pressure hose with hose drum and a high-pressure gun are attached at the high-pressure end.

The high-pressure cleaner is controlled via a control cabinet with throttle lever and a pressure gauge.
The water pressure is controlled by the speed of the engine.
When the high-pressure gun is actuated, the burner heats the water to the preset temperature.

The high-pressure cleaner must be operated at maximum speed to generate maximum water flow and pressure. If a lower water flow rate or pressure level (with same nozzle size) is required, the speed of the engine can be regulated via the throttle lever.
Engine performance is adapted to the required cleaning performance to assure maximum functionality, convenient handling and maximum efficiency.



3.12 Water system

The high-pressure cleaner is connected to a water supply (min. 2, max. 6 bar) via the low-pressure hose and the water filter to fill the water tank. A float valve prevents the water tank from overfilling.

The water tank is integrated into the machine chassis.
The installed water deficiency monitor switches off the machine if water is no longer available.

The task of the water filter installed in the control area is to filter impurities from the water supply.

The high-pressure water pump is powered by a diesel engine to generate pressurised water.
Refer to the chapter: ”General Technical Description” – section: ”Technical data” for information on maximum operating pressures for the high-pressure cleaner.

The pump system ”draws” the water from the water tank.
The pressurised water then flows through the relief valve and the unloader.
The unloader valve limits the system pressure to the maximum operating pressure.
An automatic unloader valve may be fitted depending on the model. This valve reduces the pressure in the high-pressure hose after the high-pressure gun closes.

The parallel-connected relief valve protects the entire high-pressure system against unauthorised excess pressure. The excess water is depressurised and flows through the bypass hose back into the water tank.

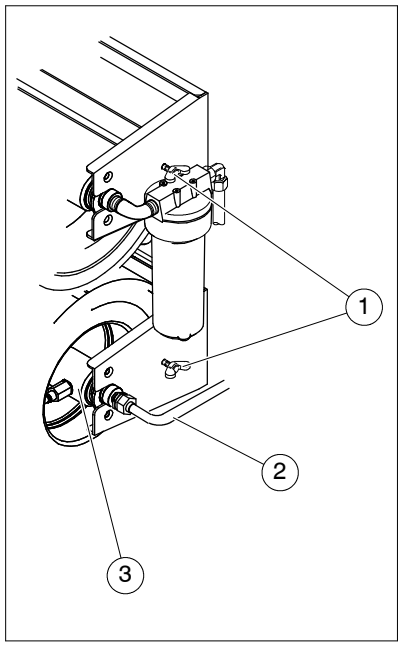
Continued on following page

The pressurised water continues, flowing through the flow meter into the burner. After the burner has been switched on manually, the pressure in the system is sufficient to begin heating the water. The flow meter monitors the water flow. The burner can only start if water is flowing.
In the burner, the water is heated by the heating coil. The temperature controller at the burner outlet measures the water temperature. The burner shuts down once the preselected temperature is reached.
An additional temperature-sensing switch is fitted to the burner outlet for safety. When the water temperature exceeds 150 °C, the burner switches off automatically.
The flame monitor in the burner exhaust pipe monitors the temperature of the exhaust flow. If the temperature of the exhaust flow does not increase after 30 seconds, a burner fault is reported.

The pressurised water is directed through the high-pressure line to the rotary transmission on the high-pressure hose drum and from there, flows though the high-pressure hose to the high-pressure gun.

Hose drums

High-pressure hose and low-pressure hose are each rolled onto a hose drum. The hose drums are operated using crank handles.



Item	Designation
1	Wing nut with lock
2	High-pressure line
3	Rotary transmission on the high-pressure end

There are wing nuts located on the right side of the hose drums.
These can be used to secure the hose drums.
The water is supplied to the tank via the low-pressure hose.
The pressurised water flows out of the high-pressure line and via the rotary transmission on the high-pressure hose.

3.13 Control cabinet

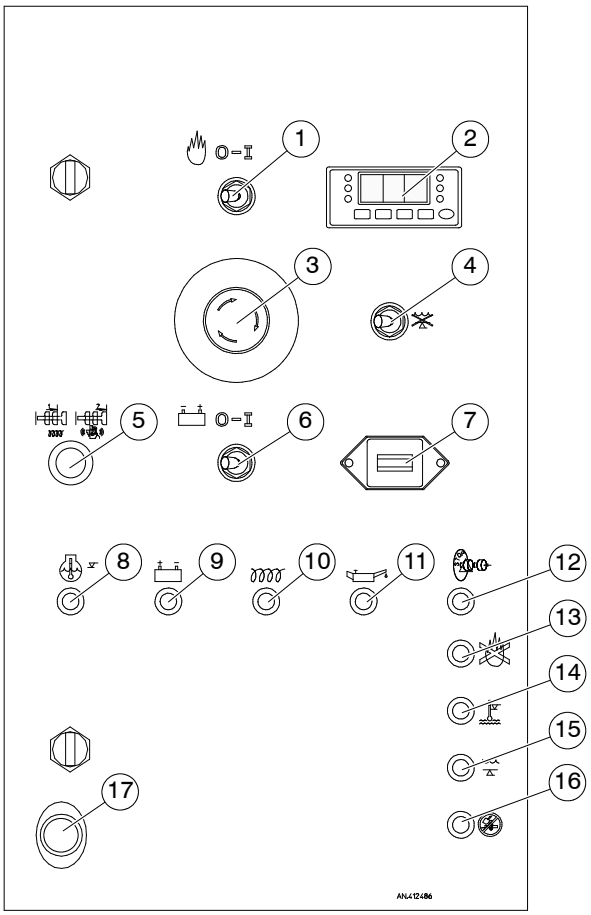
The machine is controlled and operated via the control cabinet.

High voltage

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

The control cabinet's wiring, earthing and connections comply with VDE codes of practice.

Use only original fuses with the specified amperage! The electrical system can be destroyed by over-rated fuses or bridging.



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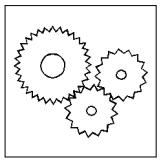
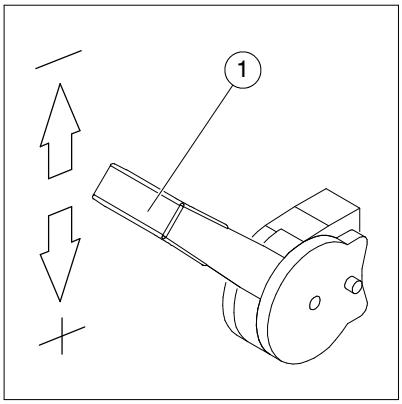


Item	Operating and control elements	Function/display
1	Selector switch	Burner On / Off
2	Temperature controller	Regulation of burner temperature
3	EMERGENCY STOP button	Switches off the machine in an emergency.
4	Button	Bypass button on water tank level switch
5	Preheating start pull switch	Preheats and starts the engine
6	Master switch	Power supply ON/OFF
7	Operating hours meter	Analogue readout of number of operating hours
8	Indicator lamp	Engine temperature
9	Indicator lamp	Charge monitor
10	Indicator lamp	Preheat
11	Indicator lamp	Oil pressure
12	Indicator lamp	EMERGENCY STOP activated
13	Indicator lamp	Burner Off
14	Indicator lamp	Burner fault
15	Indicator lamp	Water shortage
16	Indicator lamp	Hood safety device – hood open
17	Socket 12V DC	Connection for 12V devices

3.14 Throttle lever

The high-pressure water pump is powered by the engine. The high-pressure water pump generates the required water pressure according to the speed of the engine. The pressure gauge indicates the water pressure.

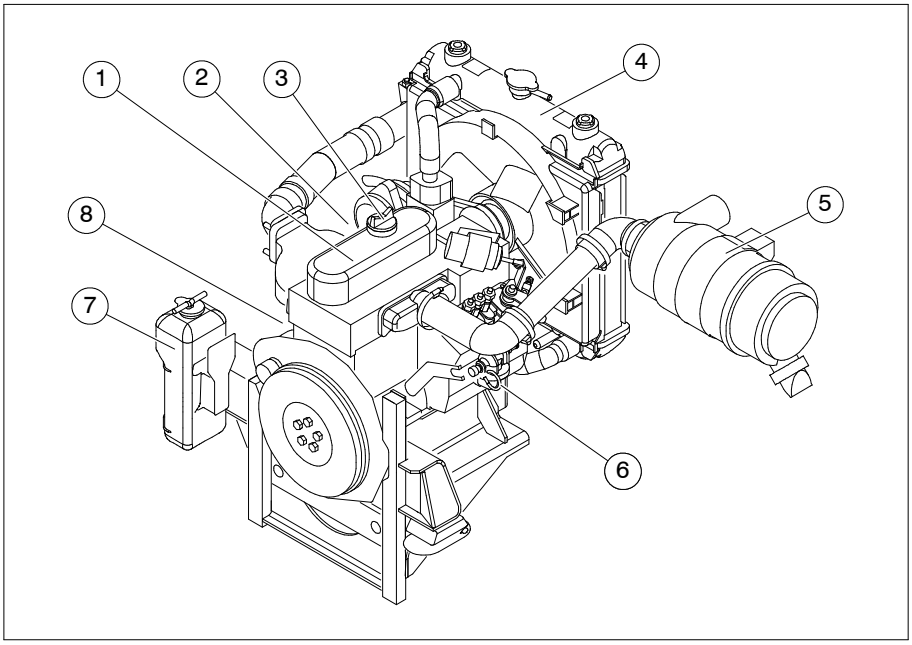
The throttle lever regulates the speed of the engine and the water pressure varies as a result.



Item	Designation
1	Throttle lever

3.15 Engine

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



Item	Designation
1	Engine
2	Engine oil filter (covered)
3	Oil filler
4	Radiator
5	Dry air filter
6	Oil dipstick
7	Expansion tank
8	Oil drain plug

The engine (1) has different performance values, depending on the model.
Please refer to the rating plate, the machine card or the "General Technical Description" chapter in the "Technical data" section for the values for your machine.

Note

Refer also to the documentation provided by the engine manufacturer for further information on the engine.

Cooling system

The engine is cooled by coolant, which flows through the radiator. The coolant is topped up and tested for antifreeze content at the expansion tank.

Note

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

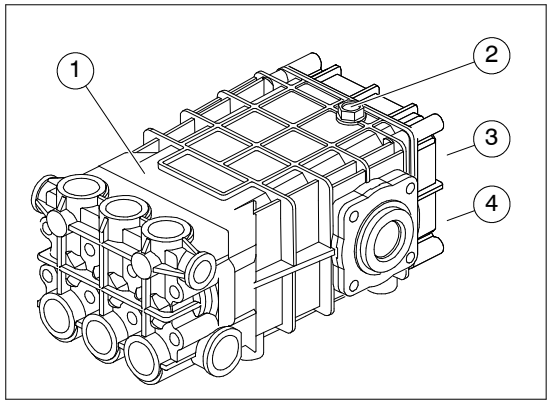
If there is a danger of frost, you should check that there is sufficient antifreeze in the coolant and top up if necessary.

Caution

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

3.16 High-pressure water pump

The high-pressure water pump generates the pressurised water.



Item	Designation
1	High-pressure water pump
2	Oil filler plug with vent valve
3	Inspection glass (covered)
4	Oil drain plug (covered)

The performance values of the high-pressure water pump (1) are different, depending on the model.
Please refer to the rating plate, the machine card or the "General Technical Description" chapter in the "Technical data" section for the values for your machine.

Note

Refer also to the documentation provided by the high-pressure water pump manufacturer for further information on the high-pressure water pump.

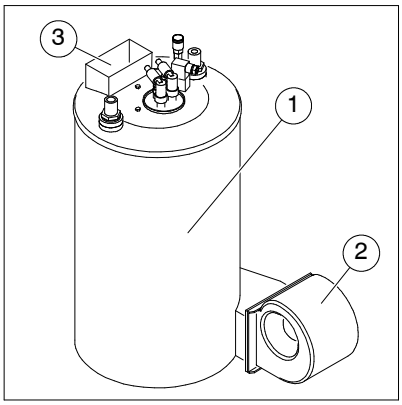
3.17 Burner

The burner is powered via the 12V on-board power supply.

Several burners may be integrated, depending on the model.
One temperature controller is fitted for each burner.

Danger

When working with hot water, there is a risk of burns from hot parts of the burner, the high-pressure hose and the high-pressure gun. After working with hot water, allow the machine, the high-pressure hose and the high-pressure gun to cool down.



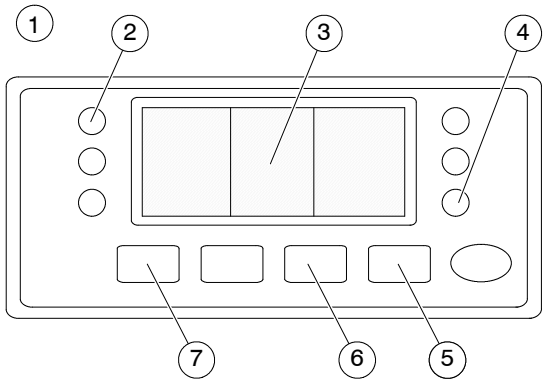
Item	Designation
1	Burner
2	Fan
3	Connection for exhaust pipe

The heating capacity of the burner depends on the model.
Please refer to the machine card or the "General Technical Description" chapter in the "Technical data" section for the burner output specifications.

Heating the pressurised water results in:
- an improved cleaning performance
- higher efficiency

Temperature controller

There are temperature controllers on the control cabinet for adjusting the working temperature to suit the relevant cleaning task.
The current water temperature appears on the display.



Item	Designation
1	Temperature controller TS 400
2	LED display ”Burner on”
3	Display
4	LED display in °C
5	”Raise temperature” arrow button
6	”Lower temperature” arrow button
7	SET button

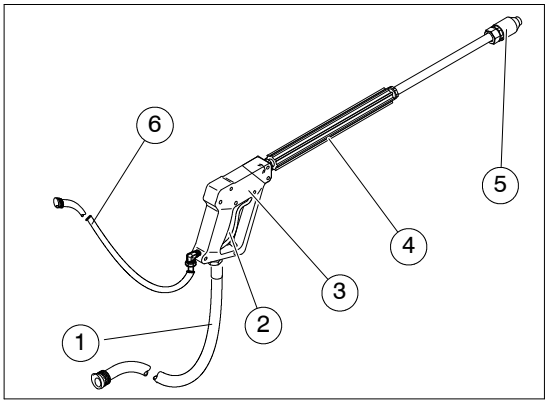
Note

Refer also to chapter: ”Operation” - section: ”Temperature settings” for more information on adjusting the maximum working temperature.

3.18 High-pressure gun with fan jet nozzle

The high-pressure gun controls the high-pressure water jet and is connected to the high-pressure hose.

Your high-pressure gun may be fitted with a control line, depending on the model.



Item	Designation
1	High-pressure hose
2	High-pressure gun trigger with safety lock
3	High-pressure gun
4	High-pressure pipe with insulation
5	Fan jet nozzle
6	Control line (depending on the model)

Refer to the chapter: "General Technical Description" – section: "Technical data" for information on maximum operating pressures for the high-pressure gun.

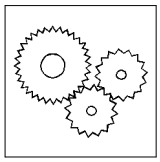
When operating the high-pressure gun, always hold firmly with both hands. Place one hand on the high-pressure gun trigger and the other hand on the insulated section of the high-pressure pipe.

Always wear protective equipment when operating the machine, see chapter "Safety Regulations".

Danger

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

Continued on following page



Trigger lock

There is a trigger safety device on the high-pressure gun trigger that prevents the high-pressure gun from triggering accidentally and prevent personnel from actuating the gun trigger by mistake.
The design of the trigger lock depends on the gun model.

One version has a red securing lever that flips back and locks in place to and prevents personnel from actuating the high-pressure gun trigger by mistake.

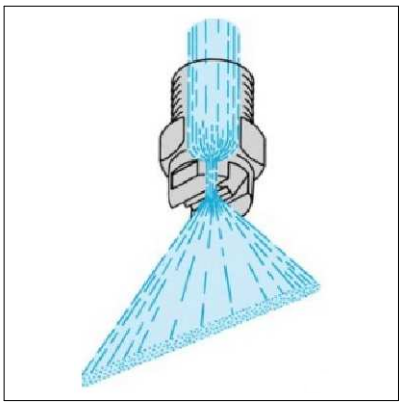
Second version.
The safety device engages automatically when the high-pressure gun is closed and prevents personnel from actuating the high-pressure gun trigger by mistake. Press the securing lever upwards and then the trigger to actuate the high-pressure gun.

Control line

Before working with the high-pressure gun, connect this nozzle to the machine via the control line. Attach the control line to the connection sockets on the control cabinet and the high-pressure gun. If the control line is not connected correctly, pressure does not build in the machine. A fault message appears on the control cabinet display.

Fan jet nozzle

The high-pressure gun, high-pressure hose and fan jet nozzle must be assembled prior to operation.
Fan jet nozzles are characterised by a uniform liquid and pressure distribution. The flow geometry of the nozzles creates a compact, controlled jet. They can be used universally and are not sensitive to pressure fluctuations.



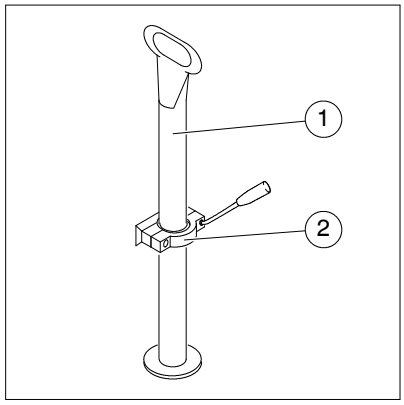
Refer to chapter: "General Technical Description" - paragraph: "Technical data" for data relating to the fan jet nozzle included in the scope of supply.

Note

Bear in mind that the nozzles have an influence on the water pressure. Incorrect water pressure may accelerate wear on the high-pressure cleaner.
If the nozzle used is too small, the pressure may increase, which could trigger the overpressure safety device in the high-pressure circuit and limit the system pressure.
If the nozzle used is too large, the high-pressure water pump may not be able to attain maximum pressure at the full output.
The working pressure decreases as the nozzle wears.
Always keep a sufficient number of replacement nozzles in stock.

3.19 Support foot (optional)

A support foot can be fitted as an option.



Item	Designation
1	Support foot
2	Bracket

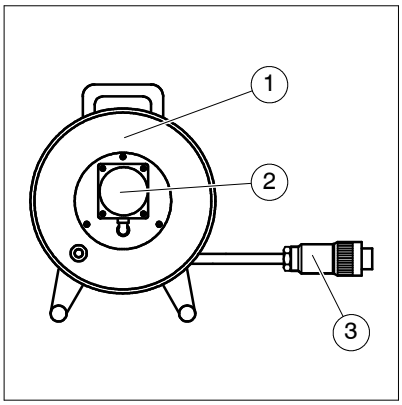
The foot provides extra support to prevent the machine from tipping.

Caution

After hitching the trailer to the towing vehicle, wind the support foot back to its transport position.

3.20 Cable remote control (option)

A cable remote control system is available as an option. Its socket is located in the control cabinet.



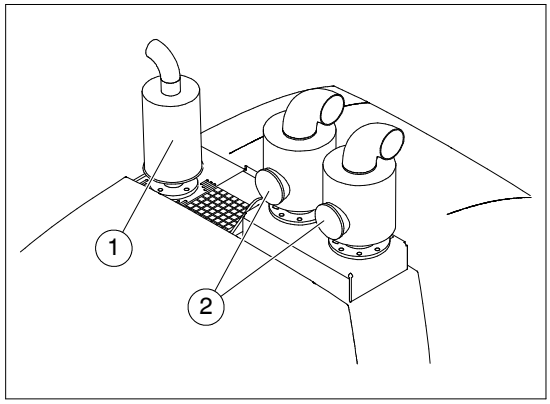
Item	Designation
1	Remote control cable
2	EMERGENCY STOP button
3	Connector

The EMERGENCY STOP can be activated using the cable remote control.

3.21 Spark catcher (option)

A spark catcher can be fitted as an option.

The spark catcher is designed to protect against explosions when the machine is operated in potentially explosive areas.



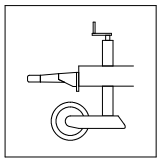
Different models available

Item	Designation
1	Engine spark catcher
2	Spark catcher on the burner

The position and number of spark catchers may vary depending on the model.

Check the spark catcher regularly and clean if necessary.

Maintenance chart: *Cleaning the spark catcher*



4 Transport, Set-up and Connection

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

4.1 Transport and driving

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

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

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

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

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

4.2 Transporting the machine

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

Danger of crushing

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

Suspended Load

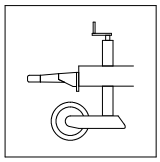
Make sure personnel do not walk under suspended loads.
Only use an auxiliary loading device with a loadbearing capacity designed to support the gross weight of the machine!

Danger

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

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

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



4.3 Before a journey

Observe the following points before moving the machine on the open road using a towing vehicle:

- The machine is now shut down correctly. Refer also to chapter: “Shutting down”.
- The machine is in transport position.
- The machine is correctly coupled.
- The brake safety cable (if fitted) is secured to the towing vehicle.
- The support wheel (if fitted) is raised and secured once the trailer has been attached.
- All support feet (if fitted) are raised and secured once the trailer has been attached.
- The chocks must be removed from the wheels and stowed safely in the holder.

Notes

Observe the permitted towed load for the towing vehicle and the overall towing weight.

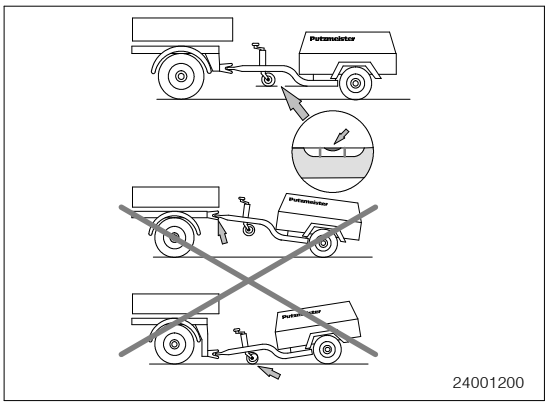
Additional loads on the machine are not permitted. Observe the maximum gross weight on the rating plate.

4.4 Towing gear

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

Ground clearance

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



Attaching the machine horizontally

Caution

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

The trailer coupling ring / ball hitch must be inserted / attached horizontally to the trailer coupling on the towing vehicle.

Ball hitch / Trailer coupling ring

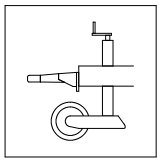
The chassis is designed for transportation via a ball hitch or trailer coupling ring.

A ball hitch and a trailer coupling ring included in the scope of supply delivered with the machine can be mounted as required.

Danger

The hitch and coupling must be mounted exactly as described in the maintenance card otherwise the machine operating licence will no longer be valid.

Maintenance card: WK49_014



4.5 Parking brake

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

The axle and wheels are fitted with a gas-filled spring, depending on the version. The gas-filled spring assists the braking force. When the automatic reversing device engages (the machine rolls backwards), the gas-filled spring automatically clamps the wheel brake.

Caution

Always pull the brake lever over the dead centre position with force! The machine must be secured additionally with chocks.

To apply the parking brake, pull the brake lever over the dead centre position with force.

To release the parking brake, push the brake lever over the dead centre position (can be felt easily), and back into zero position.

Danger

The parking brake must be released before driving off.

Brake safety cable

The brake safety cable connects the trigger mechanism on the lokking brake lever with the towing vehicle and acts as the trailer's emergency brake, should it become disconnected from the towing vehicle for whatever reason.

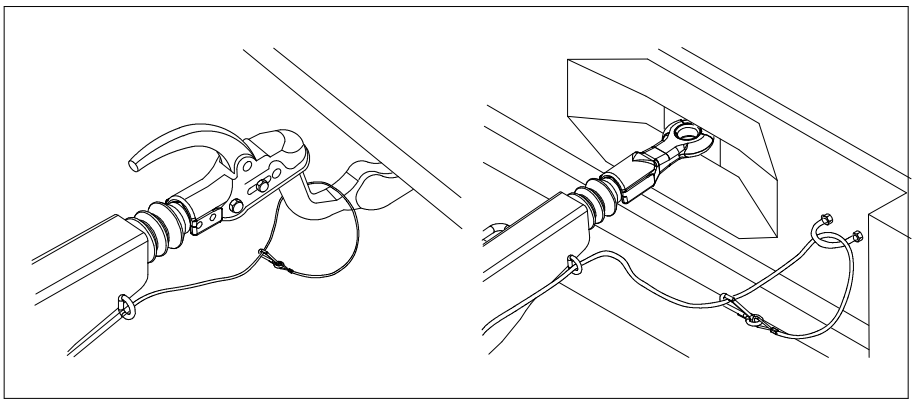
The brake safety cable is designed such that it cannot pull the trailer when the trailer coupling has been released. It tears off at a defined tensile force, but triggers the parking brake beforehand and the trailer brakes automatically.

Caution

In normal driving mode, under no circumstances must there be tension on the brake safety cable when the trailer is attached.
The brake safety cable must not be completely taut even when travelling around a corner.
Never stretch the brake safety cable on a frame section of the towing vehicle.

Secure the brake safety cable so that the cable does not tighten and trigger the trailer's parking brake, even during tight cornering or when the team is compressed.

The machine is fitted with a ball hitch or a trailer coupling ring, depending on the axle and wheel configuration.

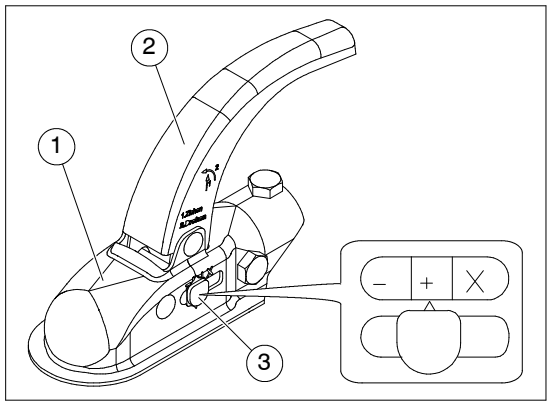


Different versions and attachment options.

▶ Secure the brake safety cable after attaching to the towing vehicle.

4.6 Ball hitch

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

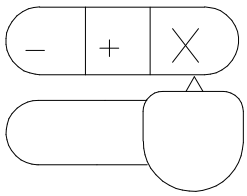


Item	Designation
1	Ball hitch
2	Hitch handle
3	Display

Danger

The trailer can only be driven if correctly coupled!

After the ball hitch opens, the pointer jumps to the red area of the marking, which is identified by an ”X”.



Red ”X” symbol:

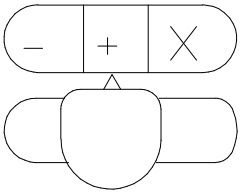
⇒ The ball hitch is open.

Continuation next side

Caution

Do not put your hands inside the coupling when it is open!
Even low pressure on the spherical cap can activate the spring-loaded closing mechanism and cause an injury.

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



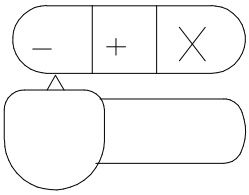
Green "+" symbol:

⇒ The ball hitch is locked correctly.

Notes

After connection, you should always check the indicator to see whether the ball hitch is engaged correctly on the ball. If the indicator is within the green area, the ball hitch is closed and locked correctly and the ball on the towing vehicle still shows signs of sufficient wear reserves.

If the ball hitch is not closed properly or worn, the pointer jumps to the red area of the marking, which is identified by an "X".



Red "-" symbol:

⇒ The ball hitch is not closed properly or worn.

Continuation next side

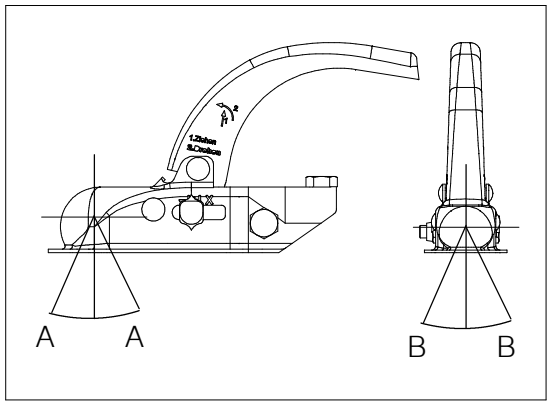
Danger

If the indicator is in the red "-" area, then the ball hitch is not connected properly and the trailer must not be driven under any circumstances.

The ball hitch can slip out - risk of accidents! Have worn parts replaced immediately.

Permitted slewing circle of the ball hitch

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



A slewing circle 20°

B slewing circle 25°

Caution

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

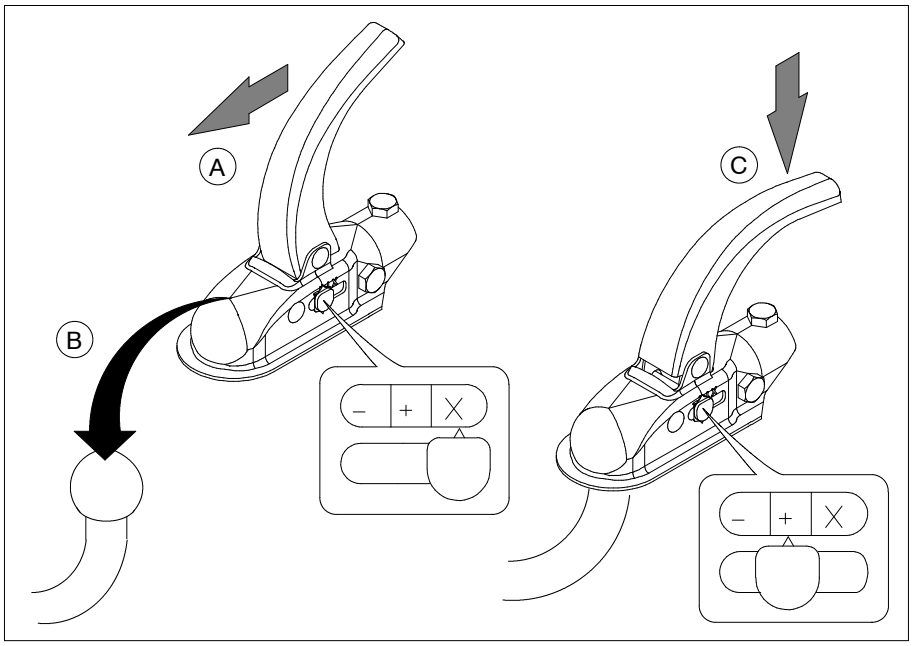
Coupling the ball hitch

To couple the trailer, proceed as follows:

▶ Drive the towing vehicle backwards close to the hitch handle on the trailer.

Danger of crushing

For safety reasons, make sure that nobody is standing between the towing vehicle and the trailer.

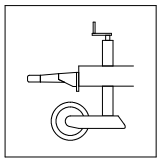


Coupling the ball hitch

▶ Open the ball hitch by pulling the hitch handle upwards(A).
⇒ The ball hitch stays in the ”open” position, in which the indicator points at the red area with the large ”X”.

▶ Place the open ball hitch on the ball of the towing vehicle and push on until it audibly engages(B).
⇒ The drawbar load causes the ball hitch to engage automatically and audibly.

Continuation next side



Notes

If the drawbar load is heavier, a support wheel can be used to raise and lower the trailer depending on the version.

▶ For safety reasons, press the hitch handle all the way down by hand. The coupling mechanism is correctly locked when the hitch handle can no longer be pressed down(C).
⇒ After correct engagement of the ball hitch, the pointer jumps to the green area of the marking, which is identified by a "+" sign.

Danger

If the ball hitch is not correctly coupled, the trailer can separate from the towing vehicle and cause an accident!

If the indicator is in the red "-" area, then the ball hitch is not connected properly and the trailer must not be driven under any circumstances.

▶ Check the indicator to see whether the ball hitch is closed and locked properly, and the ball on the towing vehicle still shows signs of sufficient wear reserves.

Danger

The trailer can only be driven if correctly coupled!
After disconnecting, always check the ball hitch for wear and correct seating.
Only in this manner can a secure connection be set up between your towing vehicle and the trailer/combination be made roadworthy.

▶ Remove the wheel chocks and stow in the holder provided.

Continuation next side

▶ Raise the existing support or support wheel to the top position.

Notes

Always raise and secure the support / support wheel completely before transporting.

Disconnecting ball hitch

To disconnect the trailer, proceed as follows.

▶ Secure the machine using the chocks.

▶ Support the machine using the existing support or support wheel.

▶ Open the ball hitch by pulling the hitch handle upwards.
⇒ The ball hitch stays in the ”open” position, in which the indicator points at the red area with the large ”X”.

Danger

The trailer must never be driven in this condition.

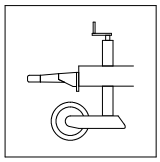
▶ Lift the open ball hitch from the ball of the tractor unit.

Notes

If the drawbar load is heavier, a support wheel can be used to raise and lower the trailer depending on the version.

Danger of crushing

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



4.7 Selecting the set-up site

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

Notes

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

4.8 Set-up site requirements

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

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

Caution

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

Supporting ground

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

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

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

Lighting

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

4.9 Setting up

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

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

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

Inclination angles

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

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

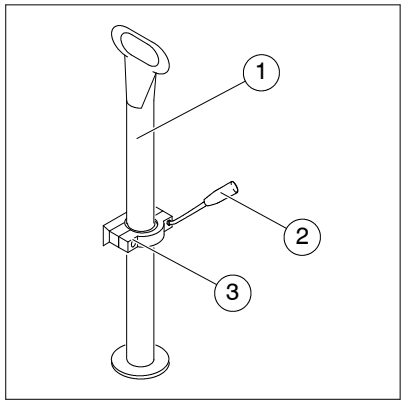
Danger

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

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

Aligning the machine

Align the machine horizontally.



Different models available

Item	Designation
1	Support foot
2	Lever
3	Bracket

- ▶ Wind the support wheel up or down using the crank handle until the machine is horizontal.
- ▶ Hold the support foot (1) firmly in position and release the level (2).
- ▶ Lower the support foot.
- ▶ Tighten the lever again.

Caution

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

4.10 Water connections

The following section describes how to connect the high-pressure cleaner to the water supply.

Please ensure that you check preconditions for connection to the water supply before beginning connection work.
- The pipe must be at least 3/4" in diameter.
- The available water pressure must be min. 2 bar and max. 6 bar.

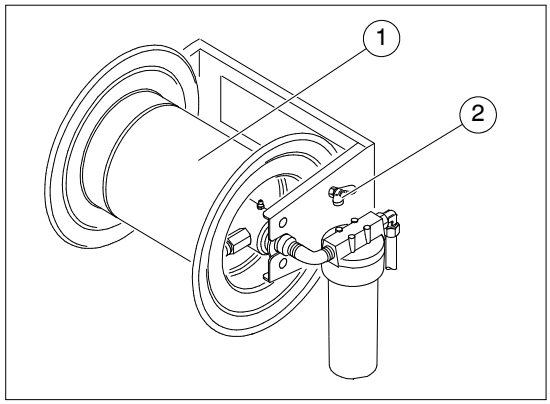
Water supply pipes must be laid visibly, taking local conditions into consideration, and protected against damage. They must not be allowed to obstruct operating personnel.

Caution

The water must comply with water quality regulations as described in chapter "General Technical Description" - section: "Water quality requirements".
The maximum water temperature is 60 °C.
Never use: salt water, sea water, completely desalted water or water with added chemicals.
Only add chemicals or cleaning agents after consulting Putzmeister Mörtelmaschinen GmbH.

The water tank must be filled via the water filter using the low-pressure hose.

Connecting the low-pressure hose



Item	Designation
1	Low-pressure hose drum
2	Lock with wing nut

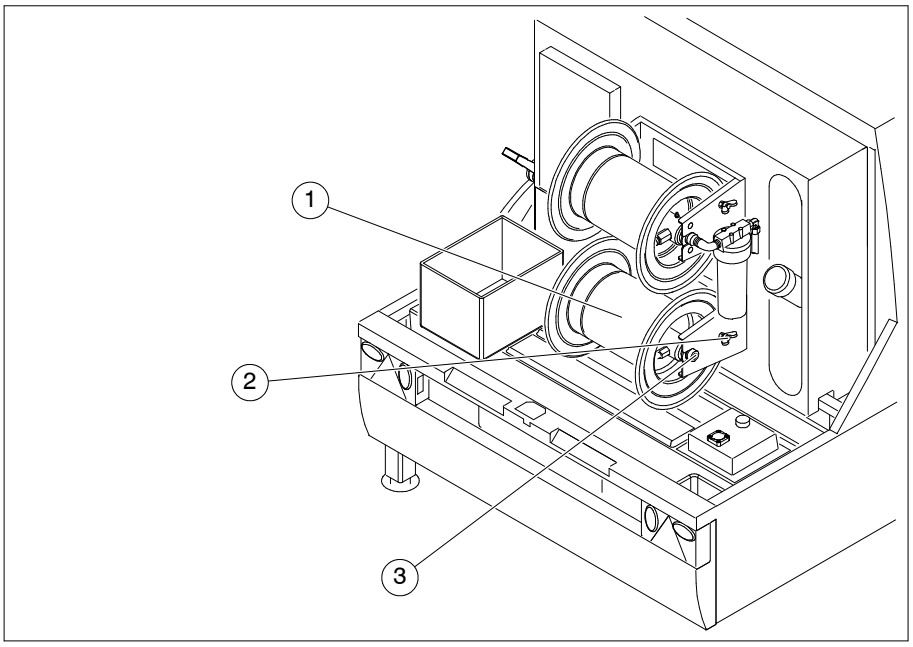
- ▶ Unscrew the wing nut (2) to release the lock on the hose drum.
- ▶ Unroll the required length of low-pressure hose from the low-pressure hose drum (1).
- ▶ Attach the low-pressure hose to the water connection.

Caution

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

Connecting the high-pressure hose

The following section describes how to connect the high-pressure line to the high-pressure cleaner.



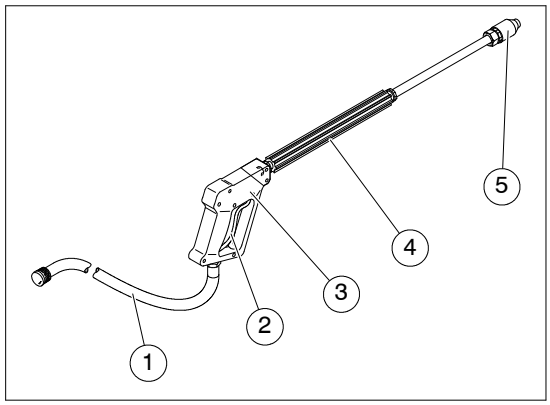
Control area viewed in the direction of travel

Item	Designation
1	High-pressure hose drum
2	Lock with wing nut
3	Connecting the high-pressure hose

- ▶ Unscrew the wing nut (2) to release the lock on the hose drum.
- ▶ Unroll the high-pressure hose completely.
- ▶ Connect the high-pressure hose to the high-pressure hose connection (3).

Assembling the high-pressure gun

When using the high-pressure gun for the first time or after maintenance work and cleaning, assemble as described below.



Item	Designation
1	High-pressure hose
2	High-pressure gun trigger with safety lock
3	High-pressure gun
4	High-pressure pipe with insulation
5	Fan jet nozzle

▶ Attach the high-pressure pipe with insulation(4) and fan jet nozzle(5) to the high-pressure gun(3).

▶ Connect the high-pressure gun(3) and the high-pressure hose(1) to the threaded coupling.

5 Starting up

In this chapter you will find information on starting up the machine. The work steps for initial operation of the machine are described as well as how to prepare the machine for operation after a long break. There is also a description on how to check the condition of your machine and how to carry out a test run with function checks.

Notes

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

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

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

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

5.1 Checks

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

Visual checks

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

- ▶ Always check the machine thoroughly for apparent defects before starting work.
- ▶ Check all machine parts for leaks and damaged seals.
- ▶ Open up the hood to do this.
- ▶ Check that all safety equipment is fitted and fully functional.
- ▶ Check the fill levels of the operating materials. Refer also to section: ”Operating materials”.
- ▶ Check the water filter for contamination.
- ▶ Check whether the machine has been correctly erected. Refer also to chapter: ”Transport, Set-up and Connection” - section: ”Set-up”.
- ▶ Check that the water supply is connected to the machine correctly. Refer also to chapter: ”Transport, Set-up and Connection” - section: ”Water connections”.

Danger

Replace any damaged components on the high-pressure hose or high-pressure gun immediately.

- ▶ Check the high-pressure hose for damage.
- ▶ Check the high-pressure gun for damage.

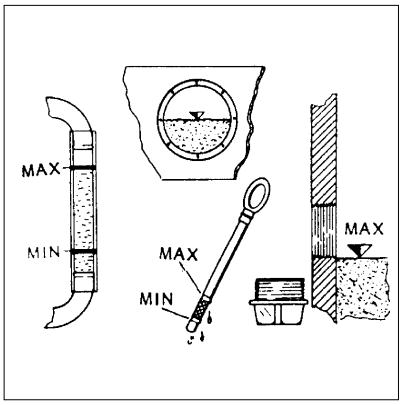
Continued on following page

- ▶ Check that the high-pressure hose is connected correctly. Refer also to chapter: ”Transport, Set-up and Connection” - section: ”Connecting the high-pressure hose”.
- ▶ Check that the high-pressure pipe, fan jet nozzle and high-pressure hose are fitted to the high-pressure gun correctly.
- ▶ Observe the warning and information signs on the machine.

Note

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

Operating materials



Water, oil and fuel levels

Danger

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

Caution

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

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

Note

The machine must be level when you check the operating materials.
Inspect the operating materials only when the machine is cold.
After checking and topping up (if necessary), all filler lids must again be sealed tightly.

Continued on following page

Fuel level

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

- ▶ Check the fuel level at the level indicator.
- ▶ Top up the fuel if necessary.

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

Refer also to section: "Filling the machine with fuel" for further details.

Engine oil level

Check the engine oil level of the engine as follows:

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

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

Note

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

- ▶ Insert the oil dipstick again.

Inspecting the dry air filter

Check the dry air filter.

▶ Clean the dry air filter if necessary.

Maintenance chart: *Cleaning and changing the dry air filter*

Coolant level

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

Note

The coolant level must be as close as possible to the "Max" marking. Refer also to the documentation of the engine manufacturer.

▶ Top up the coolant if necessary.

Inspecting the cooling fins on the radiator

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

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

Maintenance chart: *Cleaning the radiator*

Oil level in the high-pressure water pump

Check the oil level in the high-pressure water pump as follows:

- ▶ Unscrew the cap with oil dipstick on the oil filler.
- ▶ Withdraw the oil dipstick, wipe off with a lint-free cloth and insert again.
- ▶ Pull out the dipstick again to check. You can read off the oil level at the dipstick marking.
- ▶ Top up the oil if necessary.

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

Note

The oil level is correct when it reaches the upper oil dipstick marking. Refer also to the documentation provided by the high-pressure water pump manufacturer.

- ▶ Insert the oil dipstick again.
- ▶ Screw the cap with oil dipstick onto the oil filler.

Inspecting the water filter

A contaminated water filter may damage the high-pressure water pump. The filter system cleans the supplied water, thus safeguarding the high-pressure water pump.

Caution

Use only clean mains water.

If the water filter is contaminated, the integral water deficiency monitor switches the machine off or prevents the machine from being started.
The filter element may discolour when dirty. Always clean or replace a dirty filter element.

- ▶ Inspect the water filter.
- ▶ Insert a clean element in the water filter, if necessary.

Maintenance chart: *Cleaning the water filter*

Environmental protection

Observe all applicable local waste disposal regulations when changing the filter.

5.2 Refuelling the machine

Before starting up, check that there is sufficient fuel in the tank and if necessary, top up with fuel via the filler neck. Shut down the machine and then fill with fuel via the filler neck.

Note

The diesel engine and burner are supplied from a single tank.
Use summer or winter diesel fuel depending on outside temperature!

Caution

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

When filling with fuel, pay particular attention to cleanness!

Danger

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

Never allow the fuel tank to run completely empty
otherwise the burner pump will be damaged.

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

5.3 Test run

Carry out a test run before operating the machine.

Switch-on conditions

The following switch-on conditions must be met before the engine is started:

- The machine should be in a horizontal position.
- The machine must be connected to a suitable water supply (min. 2 bar, max. 6 bar). Read the "*Water connection*" section in the chapter "*Transport, Set-up and Connection*".
- The water filter must be clean (water deficiency monitor).

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

Note

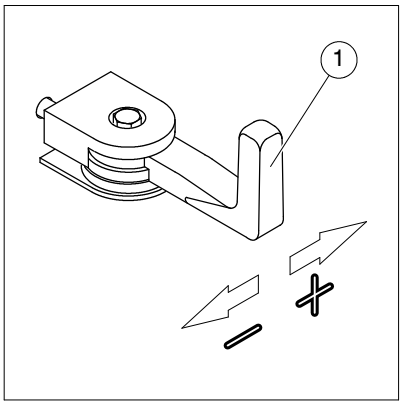
Any defects found during these tests must be rectified immediately. A fresh inspection is necessary after every repair. The machine may only be put into operation once all the inspections described below have been concluded satisfactorily.

Starting the engine

Proceed as follows to start the engine:

Caution

Make sure that all operating elements are in zero position before starting the engine.



Item	Designation
1	Throttle lever

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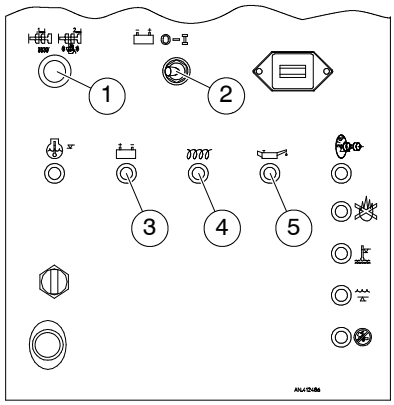
▶ Turn the throttle lever (1) clockwise approx. 1/4 of the adjustment range.



Item	Designation
1	Preheating start pull switch
2	"Power supply ON / OFF" main switch
3	"Charge monitor" indicator lamp
4	"Preheat" indicator lamp
5	"Oil pressure" indicator lamp

▶ Switch the main switch on.
⇒ Voltage is supplied to the machine.
⇒ The "Charge monitor" indicator lamp lights up.
⇒ The "Oil pressure" indicator lamp lights up.

▶ Pull the preheating start pull switch to stage 1.
⇒ The "Preheat" signal lamp lights up and the preheating process commences.
⇒ The "Preheat" indicator lamp will go out after approximately 9 seconds.

Caution

Preheat the engine no longer than necessary (max. 20 s)!
Otherwise the spark plugs and starting solenoid could be damaged!
Preheat the engine even when ambient temperatures are high.

Continued next page

Caution

The delivery side must be fully open when the engine is started, i.e. press the high-pressure gun trigger.

- ▶ Press the high-pressure gun trigger to relieve the pressure.
- ▶ Now start the engine by pulling the preheating start pull switch further onto stage 2.
  - ⇒ The "Oil pressure" indicator lamp goes out.
  - ⇒ The "Charge monitor" indicator lamp goes out.

Caution

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

- ▶ Release the preheating start pull switch when the engine starts.
- ▶ Now turn the throttle lever fully to the left.
  - ⇒ The engine runs at idling speed.

Caution

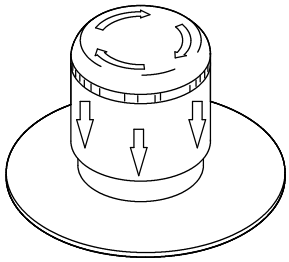
Leave the engine to run under no load for approximately 10 minutes before working with the machine.
Refer also to the documentation provided by the engine manufacturer.

5.4 Functional checks

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

Function check of the EMERGENCY STOP button

Check the operability of the EMERGENCY STOP button.



Press: Lock EMERGENCY STOP button
Turn: Unlock EMERGENCY STOP button

- ▶ Start the engine. Refer also to section "Starting engine".
- ▶ Press the EMERGENCY STOP button.
  ⇒ The machine switches off.
- ▶ Unlock the EMERGENCY STOP button by turning it.

Caution

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

Function check of hood safety device

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

Danger

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

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

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

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

Notes

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

Check that the hood safety device is fully functional.

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

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

5.5 Cleaning the high-pressure hose

The high-pressure hose and high-pressure gun must be cleaned each time they are used.

Clean the hose as follows:

- ▶ Fit the high-pressure hose. Refer also to section: "Connecting the high-pressure hose".
- ▶ Attach the high-pressure gun. Refer also to section: "High-pressure gun assembly".
- ▶ Detach the nozzle from the high-pressure gun.

Danger

Make sure that the nozzle is removed.
Risk of injury!

- ▶ Start the engine. Refer also to section "Starting engine".
- ▶ Actuate the high-pressure gun trigger.
  - ⇒ Water escapes from the high-pressure gun virtually depressurised.
  - ⇒ High-pressure hose and high-pressure gun are rinsed.

Caution

Cleaning is essential for removing dirt that has entered the system. Failure to clean the hose may block the nozzles and damage both the high-pressure gun and the nozzle as a result.

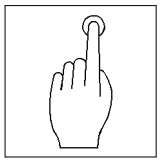
Clean for approx. 4 seconds for every 10 m of high-pressure hose.

- ▶ Release the high-pressure gun trigger slowly.
- ▶ Attach the nozzle to the high-pressure gun again.

5.6 Shutting down machine after initial operation

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

- ▶ Switch the main switch to OFF.
- ▶ Press the high-pressure gun lever to relieve the pressure.
  ⇒ The residual pressure in the hose and high-pressure gun is relieved.
- ▶ Secure the machine against unauthorised starting or use.



6 Operation

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

6.1 Requirements

Before starting work, you must carefully carry out the working steps for commissioning and installing the machine.

Note

If a malfunction occurs during the working process, refer to the Section "Faults, causes and remedies" first. If you are unable to rectify the fault yourself, consult a dealer authorised by Putzmeister Mörtelmaschinen GmbH.

6.2 Emergency shutdown procedures

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

Danger

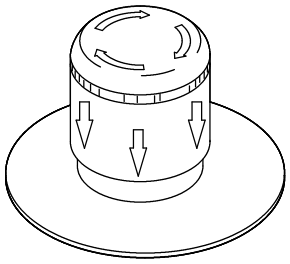
Proceed immediately as described below if an emergency occurs while you are operating the machine.

EMERGENCY STOP button

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

Caution

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



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

Danger

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

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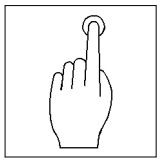


- ▶ Press the EMERGENCY STOP button.
  - ⇒ The motor control switches off. As a result, the engine, burner and high-pressure water pump switch off.
  - ⇒ The solenoid valve, which controls the supply of diesel to the burner, closes.
  - ⇒ All control and switch boxes are electrically disabled.
  - ⇒ The indicator lamp ”EMERGENCY STOP activated” lights up on the control cabinet.
- ▶ Take emergency measures, where necessary.
- ▶ Note the incident and report in accordance with company procedures.
- ▶ Look for the cause of the fault and rectify it completely.
- ▶ Start up the machine in accordance with the rules for starting up the machine.
- ▶ Unlock the EMERGENCY STOP button by turning it.

Danger

If the EMERGENCY STOP button is pressed while the high-pressure gun is closed, the high-pressure line remains pressurised.

Note

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

To reactivate the machine, you have to switch the master switch off once and then back on.

6.3 Setting values

The setting values depend on the tasks being carried out.

Notes

There are specific setting values for every type of cleaning task to help achieve the best cleaning results. Contact Putzmeister Mörtelmaschinen GmbH for advice on the correct setting values for your specific cleaning needs.

Cleaning surfaces

Do not direct the cleaning jet vertically onto the surfaces to be cleaned. Try to ”peel off” the dirt layer from the surfaces.

6.4 Setting the working pressure

You must set the working pressure before operating the high-pressure cleaner.

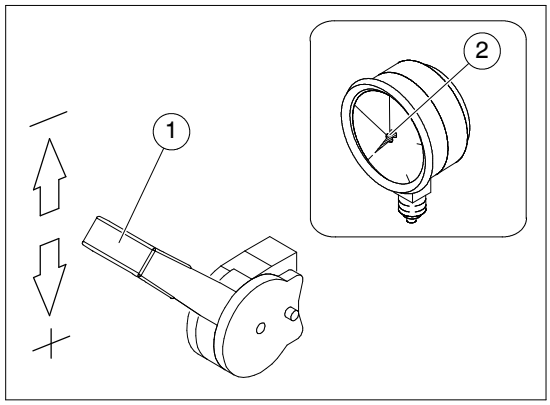
Danger

Observe the maximum operating pressure of the high-pressure gun used.
The maximum operating pressure must not be exceeded.

Refer to the chapter: ”General Technical Description” - section: ”Technical data” for information on maximum operating pressures for the high-pressure gun.

The working pressure is adjusted using the throttle lever.

The supply rate of the pressurised water pump can be regulated in infinite variables by adjusting the throttle using the throttle lever, providing the nozzle size remains the same.
You can read off the pressure at the pressure gauge when the high-pressure gun is actuated.



Item	Designation
1	Throttle lever
2	Pressure gauge

- ▶ Start the engine. Refer also to chapter: ”Starting up” - section: ”Starting the engine”.
- ▶ Adjust the throttle lever (1).
- ▶ Actuate the high-pressure gun trigger.
- ▶ Read the pressure on the pressure gauge (2).

6.5 High-pressure cleaning

For cleaning with cold water, proceed as follows:

Danger

Wear all necessary protective equipment. This also applies for all personnel standing within the operating area of the machine (for their own safety).

Never direct the water jet at people or animals.

Pay attention to the confines of the danger area 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.

When operating the high-pressure gun, always hold firmly with both hands.
Place one hand on the high-pressure gun trigger and the other hand on the insulated section of the high-pressure pipe.

The high-pressure gun produces recoil and torque when activated. Ensure equipment is secure and stable.

Do not crush high-pressure hoses or guide them over sharp edges. Avoid tensile and bending stress.

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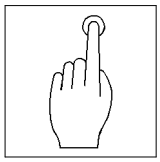


Perform high-pressure cleaning as follows:

- ▶ Start the engine. Refer also to chapter: ”Starting up” – section: ”Starting the engine”.
- ▶ Set the working pressure. Refer also to section: ”Setting the working pressure”.
- ▶ Direct the high-pressure gun towards the object that requires cleaning.
- ▶ Actuate the high-pressure gun trigger.
  ⇒ The pressurised water escapes from the nozzle at the preset working pressure.
- ▶ Clean the object.
- ▶ Check the working pressure at appropriate intervals. Correct the preset value if necessary.
- ▶ Then release the high-pressure gun trigger again.

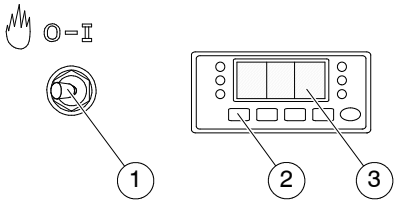
6.6 High-pressure cleaning with hot water

If your cleaning task requires the use of hot water, proceed as follows:

Danger

In addition to high-pressure injection, bear in mind the risk of burns and scalding posed by the high-pressure hose and the high-pressure gun.

Several burners may be integrated, depending on the model.
A temperature controller is fitted for each burner.



Item	Designation
1	Selector switch "Burner ON/OFF"
2	SET button
3	Temperature controller

▶ Start the engine. Refer also to chapter: "Starting up" - section: "Starting the engine".
⇒ The current water temperature is indicated on the temperature controller (3) display.

▶ Press the SET button (2) to check the preset working temperature.
⇒ The preset working temperature appears on the display for approx. 2 seconds.

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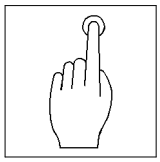


▶ Switch the burner at selector switch (1) to ON.
⇒ The burner switches on automatically when the high-pressure gun is actuated and heats the water until the preset working temperature is reached.

Note

When you press the high-pressure gun trigger, the burner switches on automatically and switches off when it is released.

The burner switches off again automatically when the maximum working temperature is reached.

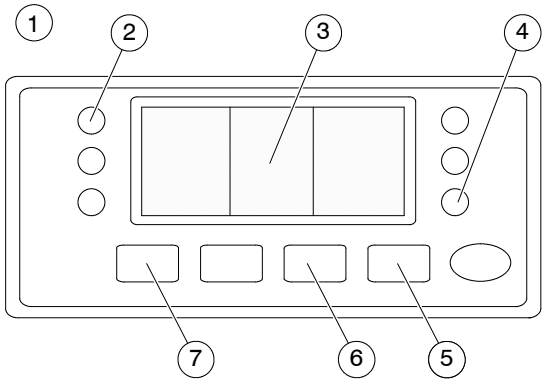
Caution

The message "Burner fault" appears if the fuel runs out while the burner is operating. The burner switches off and can not be started again.
Refer also to section: "Burner fault".

Temperature settings

Several burners may be integrated, depending on the model.
A temperature controller is fitted for each burner.
Adjust each temperature controller individually.

To set the maximum working temperature of the burner at the temperature controller, proceed as follows:



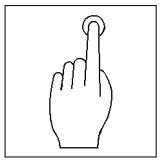
Item	Designation
1	Temperature controller TS 400
2	LED display ”Burner on”
3	Display
4	LED display in °C
5	”Raise temperature” arrow button
6	”Lower temperature” arrow button
7	SET button

▶ Press the SET button (7).
⇒ The preset working temperature appears on the display (3).

▶ Press one of the arrow buttons (5 or 6) within 2 seconds and set the required working temperature.

▶ After you have preset the desired temperature on the temperature controller, press the SET (7) button to store the setting.
⇒ The preset working temperature is stored.
⇒ The current temperature is shown on the display.

▶ The ”Burner on” (2) LED lights up while the burner is operating.



Shutting down after hot-water operation

Allow the burner to cool down after hot-water operation and prior to shutting down the machine.

- ▶ Release the high-pressure gun trigger.
- ▶ After about 10 to 15 seconds, switch the burner at the selector switch to OFF.
- ▶ Actuate the high-pressure gun trigger.
- ▶ Spray with cold water until the current water temperature falls below 60 °C.
- ▶ Release the high-pressure gun trigger again.

Caution

After operating with hot water, flush the machine through with cold water until the temperature falls below 60 °C.

- ▶ Switch the main switch to OFF.
- ▶ Press the high-pressure gun trigger to relieve the pressure.
  ⇒ The residual pressure in the hose and high-pressure gun is relieved.
- ▶ Release the high-pressure gun trigger again.

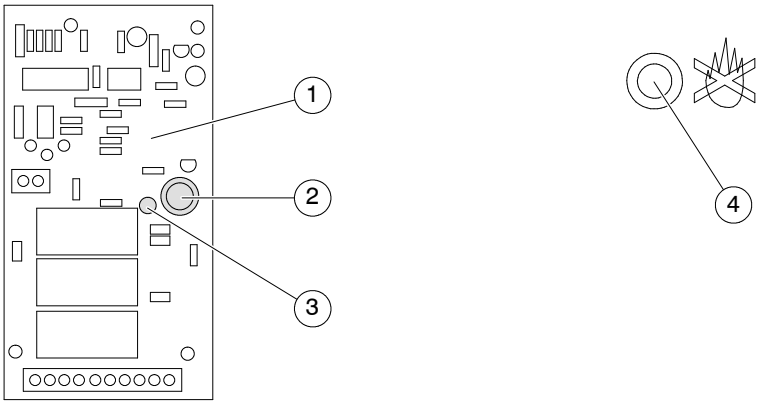
Danger

When working with hot water, there is a risk of burns from hot parts of the burner, the high-pressure hose and the high-pressure gun. After working with hot water, allow the machine, the high-pressure hose and the high-pressure gun to cool down.

6.7 Burner fault

If the burner does not begin to operate 30 seconds after the high-pressure gun is actuated, the ”Burner off” indicator lamp on the control cabinet lights up. There are many possible causes of this error.
To start the burner again, proceed as follows:

▶ Leave the burner switched on.



Item	Designation
1	Flame monitor module
2	”Reset” button
3	LED display ”Fault”
4	”Burner off” indicator lamp

▶ Open the control cabinet.
⇒ The LED (3) on the flame monitor module (1) in the control cabinet lights up indicating a fault.

▶ Press the ”Reset” button (2) on the circuit board.
⇒ The LED (3) goes out.
⇒ The ”Burner off” indicator lamp (4) goes out.

▶ Close the control cabinet.

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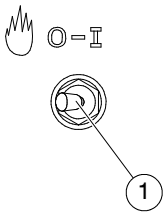


Item	Designation
1	Selector switch ”Burner ON/OFF”

- ▶ Switch the burner OFF at the selector switch (1).
- ▶ Switch the burner ON at the selector switch.
- ▶ Actuate the high-pressure gun trigger.
- ▶ If the ”Burner off” indicator lamp lights up again after 30 seconds, the control is defective.
  ⇒ Consult an After Sales service engineer from Putzmeister Mörtelmaschinen GmbH, or a dealer authorised by Putzmeister Mörtelmaschinen GmbH.
- ▶ Release the high-pressure gun trigger again.

Caution

Reset the flame monitor only once. Otherwise the burner may be damaged even further.

Operation with cold water is still possible.

6.8 Checking for calcification

When working with hot water, there is danger that the heating coils will calcify, depending on the water quality. To check whether the heating coils are calcified, proceed as follows:

- ▶ Switch the main switch to OFF.
- ▶ Press the high-pressure gun trigger to relieve the pressure.
  ⇒ The residual pressure in the hose and high-pressure gun is relieved.
- ▶ Detach the high-pressure gun from the high-pressure hose.
- ▶ Start the engine. Refer also to chapter: ”Starting up” - section: ”Starting the engine”.
- ▶ Leave the machine to run at full speed.
- ▶ If the pressure gauge indicates a pressure higher than 150 bar, the heating coils will need to be descaled.
- ▶ Switch off the machine. Refer also to chapter ”Starting up” - section ”Shutting down the machine after starting up”.
- ▶ Allow the machine to descale.

Note

Consult the relevant service department at Putzmeister Mörtelmaschinen GmbH.

6.9 Cleaning the machine

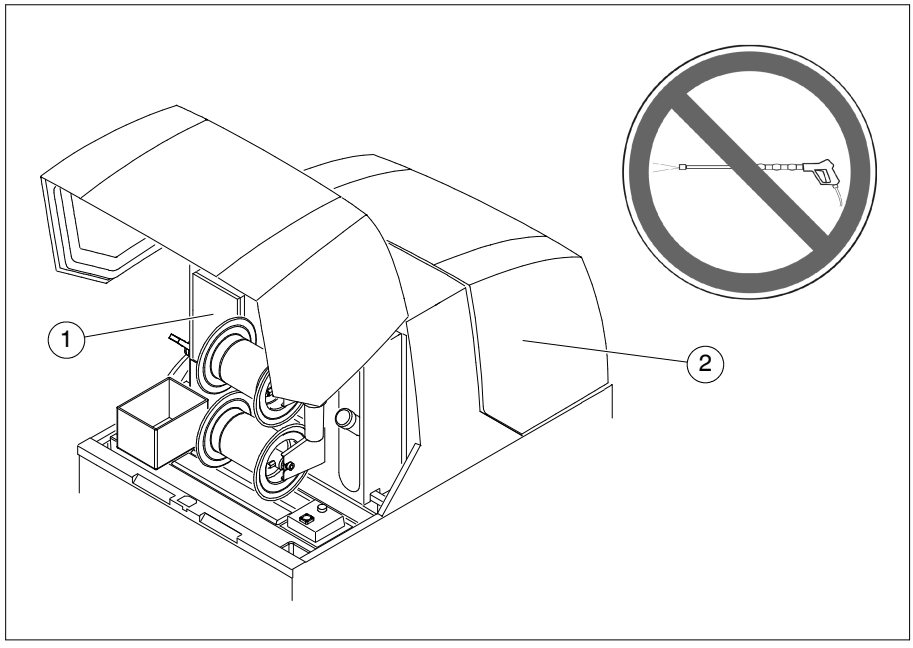
After completing your work, clean the machine, the high-pressure gun and the high-pressure hose. This ensures that the machine will function correctly the next time it is used.

Information on cleaning

Note

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

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



Item	Designation
1	Control cabinet
2	Engine (under hood)

Continued on following page

Caution

Do not clean the control cabinet or the engine with pressurised water.
Cover all openings prior to cleaning. For safety or operating reasons, moisture must not be allowed to enter these openings.

Environmental protection

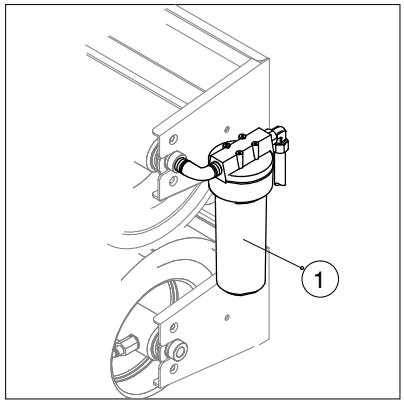
Observe all applicable local waste disposal regulations when performing cleaning work.
Do not allow cleaning additives to enter the sewerage system.

- ▶ Remove all covers after cleaning!
- ▶ Clean the low-pressure hose and the high-pressure hose with a suitable cleaning cloth and wind up the hoses.
- ▶ Clean the high-pressure gun with a suitable cleaning cloth. The high-pressure gun trigger must be easy to operate.

Continued on following page

Water filter

The amount of dirt on the water filter depends on the water quality. The filter element may discolour when dirty. Clean or replace the filter element if dirty or if the maintenance intervals have been reached. Read the *"Maintenance intervals" section* in the chapter *"Maintenance".*



Item	Designation
1	Water filter

- ▶ Cut off the water supply to the machine.
- ▶ Unscrew the union nut on the water filter (1) and remove the filter casing with the filter element.
- ▶ Remove the filter element and clean the casing and the element. Replace the element if extremely dirty.
- ▶ Replace the cleaned or new water filter (1).

Note

Ensure that the gasket is correctly seated.

7 Faults, Cause and Remedy

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

Heavy current

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

7.1 Machine, general

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

Caution

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

Note

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

Refer also to the documentation *provided by the engine manufacturer for more information on the causes of faults and remedies.*

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

Continued on following page

The operating pressure fluctuates.	
Cause	**Remedy**
Nozzle worn or blocked	Replace the nozzle
Water filter soiled	Clean water filter or replace
Engine speed fluctuates	Have repaired

The operating pressure is too low.	
Cause	**Remedy**
Nozzle too large	Use a smaller nozzle
Nozzle worn	Replace the nozzle
Engine speed too low	Increase the engine speed at the throttle lever
Drive belt not tightened correctly	Tighten or replace the drive belt
High-pressure water pump valves clogged or defective	Have repaired
High-pressure water pump gasket worn or defective	Inspect the leak quantity Have replaced
Other major leaks	Check machine and have repaired

The operating pressure is too high.	
Cause	**Remedy**
Nozzle too small	Use a larger nozzle
Nozzle dirty or blocked	Clean nozzle, replace if necessary

Continued on following page

The burner does not start.	
Cause	**Remedy**
Insufficient fuel in the tank	Add fuel
Burner fuel filter dirty or clogged	Clean the burner fuel filter, replace if necessary
Burner nozzle blocked	Have burner nozzle replaced

The burner starts up but switches off after a short time.	
Cause	**Remedy**
Thermosensor in burner exhaust pipe not plugged in correctly or dirty.	Have thermosensor replaced

Caution

When the "Burner fault" signal lamp on the control cabinet lights up, the burner can no longer be started.
Consult the relevant service department at Putzmeister Mörtelmaschinen GmbH.

High voltage

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

Continued on following page

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 system dirty or blocked	Clean the fuel system
Fuel filter dirty or clogged	Clean the fuel filter, replace if necessary
Air in the fuel line	Bleed the fuel line
Empty or faulty battery	Check the electrolyte level, charge the battery and replace it if necessary
Engine oil with incorrect lubricant grade	Replace engine oil
Drive belt not tight enough or torn	Tighten or replace the drive belt
Injection nozzle dirty or worn	Clean injection nozzle, have replaced if necessary
Injection pump blocked	Have injection pump cleaned
Valve play incorrect	Have checked and adjusted
Valves worn or defective	Have replaced
Starter defective	Have replaced
Solenoid defective	Have replaced

Continued on following page

The engine does not reach full power.	
Cause	**Remedy**
Fuel filter dirty or clogged	Clean the fuel filter, replace if necessary
Air in the fuel line	Bleed the fuel line
Heat dissipation impeded	Remove objects and obstructions in the area where heat is dissipated Close the hood
The radiator is contaminated	Clean the cooling fins on the radiator
Dry air filter dirty	Clean filter element, replace if necessary
Drive belt not tight enough or torn	Tighten or replace the drive belt
Injection nozzle dirty or worn	Clean injection nozzle, have replaced if necessary
Injection pump dirty or worn	Have injection pump replaced
Injection pressure incorrect	Have checked and adjusted
Valve play incorrect	Have checked and adjusted
Valves worn or defective	Have replaced

Continued on following page

The engine stops suddenly.	
Cause	**Remedy**
Insufficient fuel in the tank	Add fuel
Fuel system dirty or blocked	Clean the fuel system
Fuel filter dirty or clogged	Clean the fuel filter, replace if necessary
The radiator is contaminated	Clean the cooling fins on the radiator
Coolant level too low	Add coolant
Dry air filter dirty	Clean filter element, replace if necessary
Engine oil level insufficient	Add engine oil
Engine oil filter dirty or clogged	Clean engine oil filter, replace if necessary
Injection nozzle dirty or worn	Clean injection nozzle, have replaced if necessary
Bearing defective	Have replaced

The engine is smouldering.	
Cause	**Remedy**
Incorrect fuel grade	Replace with the correct fuel
Fuel system dirty or blocked	Clean the fuel system
Dry air filter dirty	Clean filter element, replace if necessary
Injection nozzle dirty or worn	Clean injection nozzle, have replaced if necessary

Continued on following page

Engine temperature excessive.	
Cause	**Remedy**
Ambient temperature excessive	Switch off the machine
Incorrect fuel grade	Replace with the correct fuel
Heat dissipation impeded	Remove objects and obstructions in the area where heat is dissipated Close the hood
The radiator is contaminated	Clean the cooling fins on the radiator
Radiator defective	Have checked and repaired
Coolant level too low	Add coolant
Coolant concentration is too high	Always use the mixture ratio specified Add water
Dry air filter dirty	Clean filter element, replace if necessary
Engine oil level insufficient	Add engine oil
Engine overloaded	Reduce the engine load
Drive belt not tight enough or torn	Tighten or replace the drive belt
Injection valve defective	Have replaced
Thermostat defective	Have checked and repaired
Temperature sensor defective	Have checked and repaired
Head gasket defective	Have checked and repaired

7.2 Chassis

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

Braking effect too weak.	
Cause	**Remedy**
Excessive play in the braking system	Have checked/set/corrected by specialist workshop.
Brake linkage is jammed or bent	
Brake cable control is rusty or kinked	
Brake linings glazed, oily or damaged	
Overrunning brake equipment is sluggish	Grease overrunning brake equipment

Brakes jerk and jolt.	
Cause	**Remedy**
Excessive play in the braking system	Have checked/set/corrected by specialist workshop.
Shock absorber of overrunning brake equipment defective	

Continued on following page

One-sided braking effect.	
Cause	**Remedy**
Wheel brake operation is one-sided	Have checked/set/corrected by specialist workshop.

Trailer brakes when the accelerator is released on the tractor unit.	
Cause	**Remedy**
Shock absorber of overrunning brake equipment defective	Have checked/set/corrected by specialist workshop.

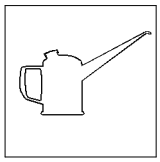
Reverse travel is sluggish or not possible.	
Cause	**Remedy**
Braking system set too tightly	Have checked/set/corrected by specialist workshop.
Bowden controls preloaded	

Handbraking effect too weak.	
Cause	**Remedy**
Incorrect setting of the braking system	Have checked/set/corrected by specialist workshop.

Continued on following page

Wheel brakes become too hot.	
Cause	**Remedy**
Incorrect setting of the braking system	Have checked/set/corrected by specialist workshop.
Wheel brake is contaminated	
Crank lever of overrunning brake equipment jams	
Spring brake is already preloaded in zero position	
Handbrake lever was not, or only partly, released	Move handbrake lever to zero position

Ball hitch does not engage after fitting to tractor unit.	
Cause	**Remedy**
Interior contaminated	Clean and grease
Ball on towing vehicle is too large	In new condition, the trailer coupling on the towing vehicle should be a maximum of 50 mm in diameter.
Ball on the towing vehicle heavily worn	The ball is so worn that the purchase on the ball hitch is insufficient. Even if the diameter of the ball only falls below 49.0 mm at certain points, it must be replaced. The ball must not be out of round.
Ball hitch heavily worn	Have replaced by a specialist workshop.



8 Maintenance

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

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

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

8.1 Maintenance intervals

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

Caution

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

Note

For the maintenance work intervals and performance, please also refer to the documentation of:
- *the engine manufacturer*
- *the high-pressure water pump manufacturer*

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

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

Have the initial after-sales service carried out by a Putzmeister Mörtelmaschinen GmbH service engineer, or by a dealer authorised by Putzmeister Mörtelmaschinen GmbH.
The machine personnel responsible for the machine should be present for this service.

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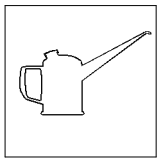
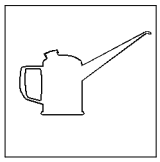


Criteria	Check ✓	Adjust ■	Replace ⇔	Clean ◇

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

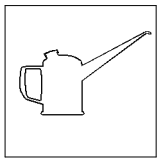
Action	daily	once after 50 h	every 50 h	every 100 h	every 150 h	every 300 h	every 400 h	every 500 h	every 1000 h	annually	every 2 years	other intervals	Reference
General machine													
Visual inspection: defects and leaks, rectify defects, seal leaks	✓	✓										✓ 200 h	
Check that the fastening bolts are seated correctly		✓								■		✓ 200 h	Section: General tightening torques
Electrical cabling: visual inspection, have repaired if necessary	✓	✓						✓					
Battery: check the acid levels		✓		✓									MC 41-011
Charge the battery											⇔	✓ Monthly	
Lubricate the machine	⇔												MC 40-049, Section: Operating materials
Have a qualified expert check for defects										✓			Service
Operational safety check (German Accident Prevention Regulation)										✓			Service

Action	daily	once after 50 h	every 50 h	every 100 h	every 150 h	every 300 h	every 400 h	every 500 h	every 1000 h	annually	every 2 years	other intervals	Reference
Safety equipment													
EMERGENCY STOP button fully functional, have repaired if necessary	✓												Section: Function check of the EMERGENCY STOP button
Hood safety device fully functional, have repaired if necessary	✓												Section: Function check of the hood safety device
Safety devices fitted and fully functional, replace if necessary	✓												Section: Safety equipment
Protective guards fitted, secured and fully functional, replace if necessary	✓												
Engine													
Visual check: leaks	✓	✓										✓ 200 h	
Check that hose and clip connections are fastened securely, tighten if necessary		✓								✓			Service
Check engine feet mounting, tighten if necessary		✓										✓ 200 h	Section: General tightening torques
Check fuel level, top up if necessary	✓												Section: Filling the machine with fuel
Fuel filter				◇			⇔						MC 44-140
Primary fuel filter				◇			⇔						MC 44-140
Drain water from the fuel filter				◇									MC 44-140
Check the fuel line, have replaced if necessary			✓										
Check the V-belt and tighten if necessary		✓		✓				⇔					MC 44-047



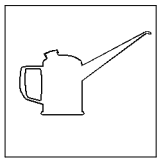
Action	daily	once after 50 h	every 50 h	every 100 h	every 150 h	every 300 h	every 400 h	every 500 h	every 1000 h	annually	every 2 years	other intervals	Reference
Engine													
Take antifreeze protection measures												✓ If there is a danger of freezing	MC 44-095
Check the antifreeze content in the coolant, add more if necessary												✓ If there is a danger of freezing	MC 44-090
Check coolant level, top up if necessary	✓											✓ 200 h	MC 44-095
Coolant											⇔		MC 44-090
Check radiator, clean cooling fins if necessary	✓											◇ 200 h	MC 44-137
Check the radiator hose, have replaced if necessary											⇔	✓ 200 h	Service
Check engine oil level, top up if necessary	✓												MC 44-110
Engine oil		⇔		⇔									MC 44-110
Engine oil filter		⇔										⇔ 200 h	MC 44-110
Check dry air filter and clean if necessary	✓			◇						⇔		⇔ During 6th cleaning session	MC 44-101
Clean the dry air filter dust discharge valve	✓			◇									MC 44-101
Have the intake air line replaced											⇔	✓ 200 h	Service

Action	daily	once after 50 h	every 50 h	every 100 h	every 150 h	every 300 h	every 400 h	every 500 h	every 1000 h	annually	every 2 years	other intervals	Reference
Engine													
Check the valve play and have adjusted												■ 800 h	Service
Check the fuel injection pressure and have adjusted												■ 1500 h	Service
Have the fuel injection pump checked												■ 3000 h	Service
Have the turbocharger checked												■ 3000 h	Service
Have the solenoid checked												✓ 200 h, ⇔ 2000 h	Service
Water system													
Take antifreeze protection measures												✓ If there is a danger of freezing	MC 44-124
Lubricate the hose drum												⇔ 200 h	MC 40-049, Section: Operating materials
Check the water filter and clean if necessary	✓												MC 44-129
Replace water filter, filter cartridge												⇔ 200 h	MC 44-129
Check high-pressure water pump oil level, top up if necessary	✓											✓ 200 h	MC 52-013
High-pressure water pump oil change		⇔						⇔					MC 52-013



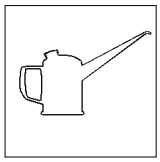
Action	daily	once after 50 h	every 50 h	every 100 h	every 150 h	every 300 h	every 400 h	every 500 h	every 1000 h	annually	every 2 years	other intervals	Reference
Water system													
Check the belt tension of the high-pressure water pump, tighten if necessary		✓							⇔			✓ 200 h	MC 44-131
Check the high-pressure water pump valves, have replaced if necessary		✓								✓			Service
Check the float valves, have repaired if necessary												✓ 200 h	Service
Check the relief valve, have repaired if necessary												✓ 200 h, ⇔ 3000 h	Service
Check the vent valve, have repaired if necessary												✓ 200 h	Service
Check the unloader valve, have repaired if necessary												✓ 200 h	Service
Check the nozzle, clean or replace if necessary												✓ 200 h	
High-pressure gun: check the condition, function and suitability, replace if necessary	✓												Section: High-pressure gun
High-pressure hose: visual inspection for ageing, leaks and damage, if necessary, mark as unusable and replace	✓											⇔ 6 years	Section: High-pressure hoses
Visual inspection: check connection for damage and leaks, rectify defects, repair any leaks	✓	✓											

Action	daily	once after 50 h	every 50 h	every 100 h	every 150 h	every 300 h	every 400 h	every 500 h	every 1000 h	annually	every 2 years	other intervals	Reference
Burner													
Check fuel level, top up if necessary	✓												Section: Filling the machine with fuel
Fuel filter				◇					⇔				MC 44-140
Drain water from the fuel filter				◇									MC 44-140
Check the calcification on the heating coils, descale if necessary												✓ 200 h	Section: Check for calcification
Check the burner nozzle, have replaced if necessary							✓						Service
Burner maintenance												✓ 6 months	Service
Heating coils												⇔ 2000 h	Service



Action	daily	once after 50 km after wheel change	every 1000 km	every 5000 km	every 10000 km	every 15000 km	annually	every 2 years	other intervals	Reference
Axle and wheels (depending on model)										
Lighting equipment fully functional, have repaired if necessary	✓									Section: Lighting equipment
Check the tyres for wear, replace if necessary	✓									
Check inflation pressure, correct if necessary	✓	✓								Section: Technical data
Check that wheel nuts/ bolts are seated correctly, tighten if necessary		■							■ after the first 500 km	Section: Technical data
Grease wheel bearings				⇔			⇔			Service
Check the wheel bearings, adjust the play if necessary				✓			✓		■ after the first 500 km	Service
Check that the fastening bolts are seated correctly, tighten if necessary				✓			✓		■ after the first 500 km	Section: General tightening torques
Check support wheel for ease of movement, have repaired if necessary	✓									
Check that the support wheel is fully functional / moves easily, repair if necessary				✓			✓			Service
Support wheel: check that the locking toggle is seated correctly, tighten if necessary	✓									Service
Support wheel: check mounting, bracket and locking toggle, repair if necessary				✓			✓			Service
Trailer coupling rings: check that the fastening bolts are seated correctly, tighten if necessary				✓			✓			Service
Ball hitch: check indicator, have replaced if necessary	✓									Section: Ball hitch

Action	daily	once after 50 km after wheel change	every 1000 km	every 5000 km	every 10000 km	every 15000 km	annually	every 2 years	other intervals	Reference
Axle and wheels (depending on the model)										
Ball hitch: check indicator, replace if necessary				✓			✓			Service
Grease ball hitch				⇔			⇔		⇔ 6 months / as required	
Check that the ball hitch is fully functional / moves easily, repair if necessary				✓			✓			Service
Ball hitch: check that the fastening bolts are seated correctly, tighten if necessary				✓			✓			Service
Ball hitch: check play, repair if necessary									✓ 20000 km	Service
Lubricate the towing gear									⇔ 6 months / as required	Section: Lubrication diagram
Clean the towing gear and lubricate				◇			◇			Service
Check the towing gear, repair if necessary				✓			✓			Service
Towing gear: check that the fastening bolts are seated correctly, tighten if necessary				✓			✓			Service
Towing gear: check that the locking toggle is seated correctly, tighten if necessary	✓								■ 50 km after height adjustment	
Towing gear: check the rubber gaiter, replace if necessary				✓					✓ 6 months	Service
Towing gear: check the dampers, replace if necessary				✓			✓		⇔ 20000 km, at least after 3 years	Service



Action	daily	once after 50 km after wheel change	every 1000 km	every 5000 km	every 10000 km	every 15000 km	annually	every 2 years	other intervals	Reference
Axle and wheels (depending on the model)										
Towing gear: check the play on the towing tube bearing, repair if necessary				✓			✓			Service
Towing gear: clean the spur gearing and lubricate							◇			Service
Check parking brake for ease of movement, have repaired if necessary	✓									
Check that the parking brake is fully functional / moves easily, adjust if necessary				✓			✓			Service
Parking brake: check gas-filled spring for leaks, have repaired if necessary	✓									
Parking brake: check gas-filled spring for leaks, check function, repair if necessary				✓			✓			Service
Brake safety cable: check mounting and cable guide, have repaired if necessary	✓									Section: Brake safety cable
Brake safety cable: check mounting, cable guide and functional capability, repair if necessary				✓			✓			Service
Brake pads: check for wear, replace if necessary				✓			✓			Service
Check the brake system settings, adjust if necessary				■			■		■ after the first 500 km	Service
Lubricate the moving gear				⇔			⇔			Service

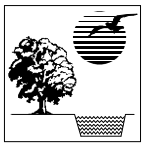
8.2 Operating materials

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

Caution

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

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



Environmental protection

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

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

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

Caution

The capacities are only approximate values. These may vary according to the design and depend on the quantity of oil remaining. The upper oil dipstick mark is always decisive.

Fuel

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

Caution

Fill the machine with fuel only when the motor is at a standstill!
When filling with fuel, pay particular attention to cleanness!

Danger

No smoking is allowed when you are filling up!
Never fill the fuel tank near naked flames or ignitable sparks.
Do not spill fuel!

High-pressure water pump

The high-pressure water pump is filled with SAE 30 W transmission fluid ex works.
The oil should only be changed at operating temperature.

Note

Please refer to the documentation provided by the high-pressure water pump manufacturer for specifications on approved operating materials and the necessary fluid capacities.
Refer also to the documentation provided by the high-pressure water pump manufacturer.

Engine

The engine requires a year-round high pressure multigrade SAE 10W-40 or SAE 10W-30 oil.

The specified oil grades ensure perfect operation at ambient temperatures between -15 °C and 40 °C.

If the engine is used at other ambient temperatures, a separate request regarding the required oil grade must be made.
The oil should only be changed at operating temperature.

Note

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

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

Caution

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

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

Antifreeze

If there is a risk of freezing, fill the water system with a standard anti-freeze. Select a mixture ratio that will protect the system up to the required freezing limit.

Usually, BP anti-frost (glycol-based) is used with a mixture ratio of 40% BP anti-frost and 60% potable water. This produces antifreeze protection up to 25 °C.

Caution

Always implement antifreeze protection measures because freezing temperatures may damage the water tank, the pressurised water pump and cause the hoses to burst.
Refer also to the documentation provided by the high-pressure water pump manufacturer.

Manual grease lubrication

Use a lithium soap based multipurpose grease marked DIN 51 502: K2K, NLGI Class 2.

Hose drums

Only silicone grease should be used to lubricate the rotary transmissions on the hose drums.

Maintenance chart: *Lubrication diagram*

Chassis

Grease the chassis with a standard lithium soap based multipurpose grease.

General maintenance work

This maintenance chart describes general maintenance tasks and contains notes that apply to all maintenance work using maintenance charts.

Caution

Maintenance work must only be carried out by authorised personnel with special knowledge and experience.

Preparation

The following tasks must be carried out prior to maintenance work:

- ▶ Set the machine up horizontally on level ground.

Danger

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

If it is necessary to start up the machine in the course of its maintenance, this is specially indicated in the maintenance charts.

- ▶ Switch off the machine.
- ▶ Secure the machine against unauthorised starting.
- ▶ Secure your working area and fix notices to the locked controls and setting devices.

Lubrication schedule

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

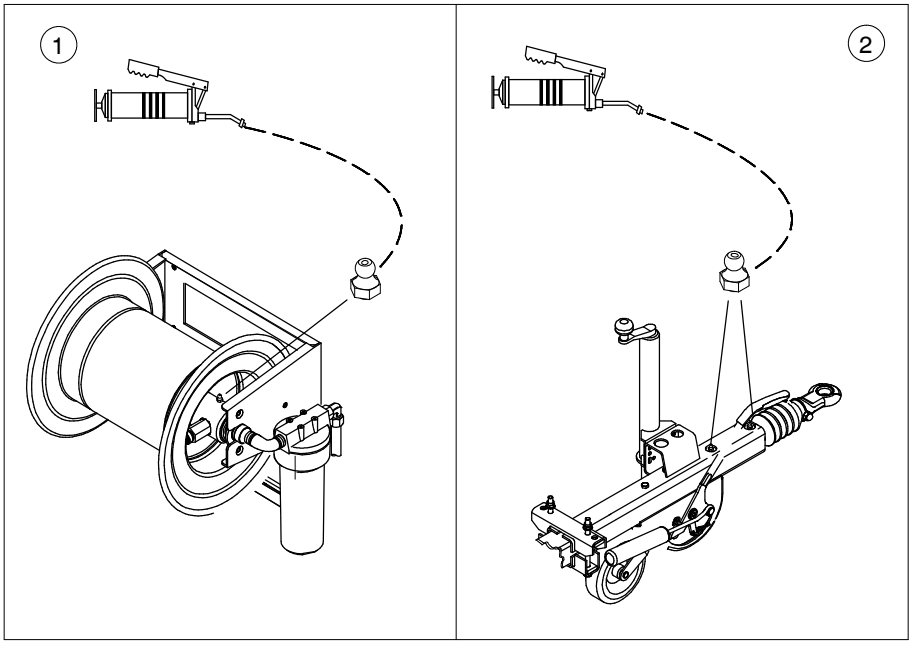
No further maintenance charts required.

The following special tool is required:
Grease gun

Note

All lubrication nipples have a red protective cap.

Use only silicone grease as a lubricant for the rotary transmission.

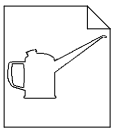


No.	**Designation**
1	Rotary transmission of hose drum
2	Guide bushing of the drawbar at the front and rear

Lubricate the overrunning brake equipment using a commercially available lubricant.

Cleaning the spark catcher

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



No further maintenance charts required.

The following special tool is required:
Wire brush

Danger

Wear a breathing mask and protective goggles to protect against particles of dust!

Never clean the spark catcher when at operating temperature!
There is a risk of burning.
Always carry out maintenance work when the machine is cold.

Work with protective gloves.

Environmental protection

Dispose of all components in accordance with current applicable regulations!
Observe the national and regional regulations applicable to your area.

Preparation

The following tasks must be carried out prior to maintenance work:

Danger

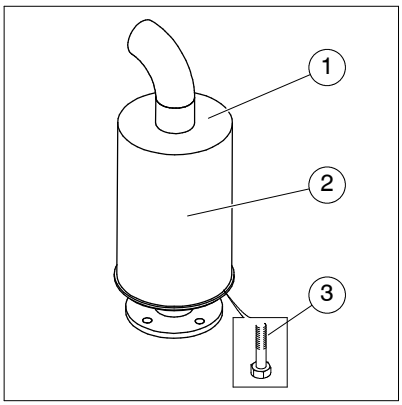
Shut down the machine before starting work and secure it against unauthorised or accidental starting.

Continuation next side

- ▶ Switch the high-pressure cleaner off.
- ▶ Secure the machine against unauthorised starting.

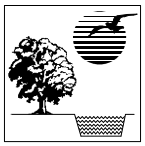
Spark catcher on the motor

The following steps explain how to clean the spark catcher on the motor properly:



1 Spark catcher on the motor
2 Upper part of the spark catcher
3 Fastening bolts

- ▶ Unscrew the fastening bolts(3) and remove the upper part of the spark catcher.
- ▶ Clean the inside of the upper part (2) thoroughly using a wire brush.
- ▶ Remove the carbon particles using an extraction cleaner.



Environmental protection

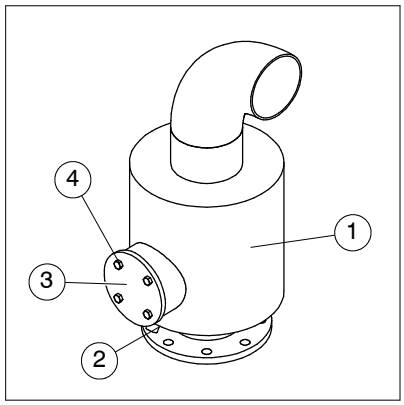
Dispose of the carbon particles in accordance with current applicable regulations!
Observe the national and regional regulations applicable to your area.

- ▶ Check the seals and replace if damaged.
- ▶ Screw the upper part back to the spark catcher using the fastening bolts.

Continuation next side

Spark catcher on the burner

The following steps explain how to clean the spark catcher on the burner properly:



1 Spark catcher on the burner
2 Drain opening
3 Sealing cap
4 Fastening bolts

- ▶ Unscrew the fastening bolts(3) and remove the sealing cap(2).
- ▶ Place a suitable container under the drain opening(2) on the spark catcher.
- ▶ Allow the condensate water to drain from the opening.
- ▶ Clean the inside of the spark catcher(1) thoroughly using a wire brush.
- ▶ Remove the carbon particles using an extraction cleaner.

Environmental protection

Dispose of the carbon particles in accordance with current applicable regulations!
Observe the national and regional regulations applicable to your area.

- ▶ Check the seals and replace if damaged.
- ▶ Screw the sealing cap back to the spark catcher using the fastening bolts.

Checking acid level in the battery

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

Refer also to the maintenance charts:
General maintenance work

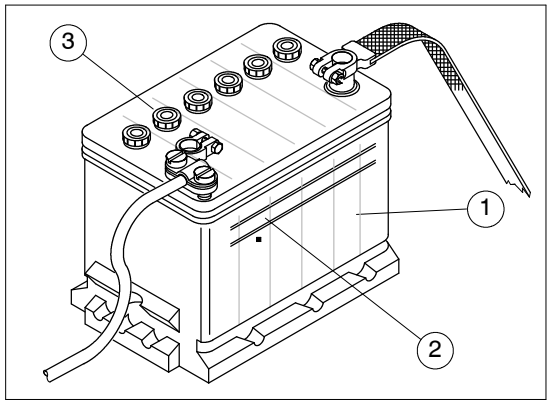
Danger

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

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

Continuation next side

Proceed as follows to check the acid level:



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

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

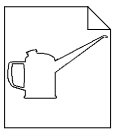
To fill with distilled water, proceed as follows:

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

▶ Ensure that you close all the cells correctly.

Checking/tensioning/changing

This maintenance card describes how to check, tension and change the V-belt.
You will find the maintenance intervals in the maintenance summary at the start of this chapter.



No further maintenance charts required.

No special tools required.

Notes

When checking, tensioning and changing the V-belt, refer also to the engine manufacturer's operating instructions.

Caution

Maintenance work must only be carried out by authorised personnel with special knowledge and experience.

Preparation

The following tasks must be carried out prior to maintenance work:

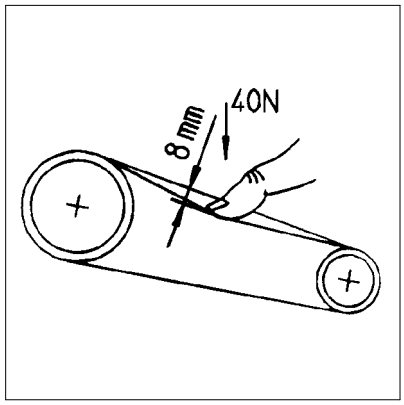
Danger

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

- ▶ Switch off the machine.
- ▶ Secure the machine against unauthorised starting.
- ▶ Secure your working area and fix notices to the locked controls and setting devices.

Continuation next side

Checking V-belt tension

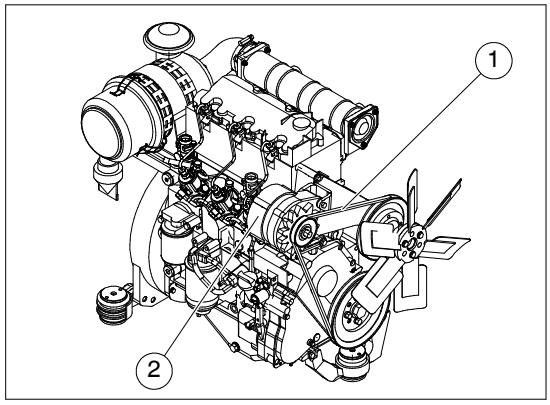


Check V-belt tension

▶ Check the V-belt tension by pressing with your thumb. The V-belt must be retightened if it can be pressed in more than 8 mm.

Retensioning V-belt

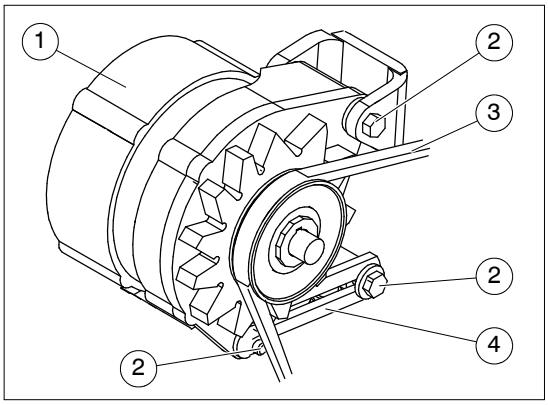
The following steps describe how to retension the V-belt:



Item	Designation
1	V-belt
2	Dynamo

▶ Remove the V-belt cover.

Continuation next side



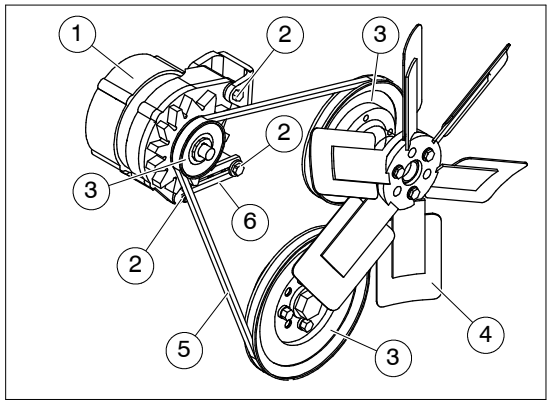
Item	Designation
1	Dynamo
2	Screws
3	V-belt
4	Clamping rail

- ▶ Release the screws (2).
- ▶ Push the dynamo (1) forward over the clamping rail (4) until the V-belt (3) is sufficiently tensioned.
- ▶ Then retighten all screws that were released.
- ▶ Re-attach the V-belt cover correctly.

Continuation next side

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	V-belt
6	Clamping rail

- ▶ Remove the V-belt cover.
- ▶ Release the screws (2).
- ▶ Push the dynamo (1) back over the clamping rail (6) until the V-belt (5) is loose.
- ▶ Remove the V-belt from the V-belt pulley (3).
- ▶ Lift the V-belt over the fan wheel (4).
- ▶ Place the new V-belt over the fan wheel onto the V-belt pulley, ensuring it is correctly positioned.
- ▶ Push the dynamo (1) forward over the clamping rail (6) until the V-belt is sufficiently tensioned.
- ▶ Then retighten all screws (2) that were released.
- ▶ Re-attach the V-belt cover correctly.

Changing the coolant

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

Refer also to the maintenance charts:
General maintenance work
Radiator antifreeze protection

Notes

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

Change the coolant with the machine horizontal and supported.

Caution

Use only coolants and antifreezes specified by the engine manufacturer.

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

Danger

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

Continuation next side

Environmental protection

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

The following steps describe how to change the coolant:

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

Maintenance chart: *Antifreeze protection for the highpressure cleaner*

For filling quantities, also refer to chapter: “General technical description” – section: “Technical data”.

Caution

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

- ▶ Dispose of the used coolant properly.

Check for leaks

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

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

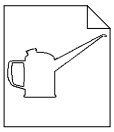
Maintenance chart: *Cleaning the cooling fins on the radiator*

Antifreeze protection for the radiator

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

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

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



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

The following special tool is required:
Antifreeze tester

Notes

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

Caution

Use only coolants and antifreezes specified by the engine manufacturer.

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

Continuation next side

Danger

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

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

The following steps describe the antifreeze protection measures:

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

Maintenance chart: *Changing the coolant*

Notes

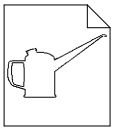
It is practical to add antifreeze when changing the coolant.

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

- ▶ Close the cap on the expansion tank again.

Cleaning and changing dry air filter

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



Refer also to the maintenance charts:
General maintenance work

Notes

See also the engine manufacturer's documentation for information on cleaning/changing the dry air filter.

Danger

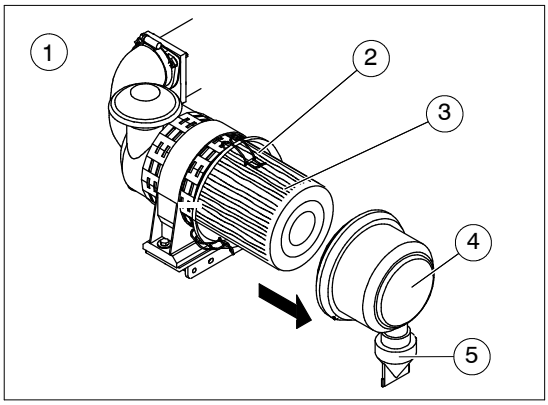
Wear a breathing mask and protective goggles to protect against particles of dust!

Risk of burning through hot components of the drive motor. Allow the subassemblies to cool down. Work with protective gloves.

Continuation next side

Cleaning and changing filter element

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



Item	Designation
1	Dry air filter
2	Retaining clips
3	Filter element
4	Filter cover
5	Dust discharge valve

- ▶ Open the retaining clips and fold them out of the way.
- ▶ Remove the filter cover.
- ▶ Pull the filter element carefully from the filter housing. Prevent dust from falling off where possible.

Notes

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

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

Continuation next side

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

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

Notes

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

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

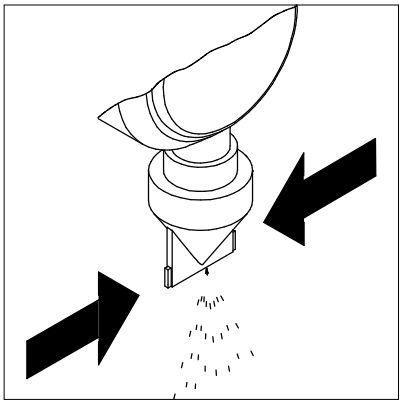
Notes

Filter elements should be replaced after the sixth cleaning, or annually, depending on the degree of contamination.

- ▶ Place the cleaned or new filter element in the filter casing.
- ▶ Slide the filter cover back onto the casing. Ensure that it is correctly seated.
- ▶ Close the retaining clips. Ensure that the clips are also correctly seated.

Cleaning dust discharge valve

The following steps describe how to clean the dust discharge valve:

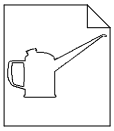


Cleaning dust discharge valve

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

Changing engine oil and engine oil filter

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



Refer also to the maintenance charts:
General maintenance work

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

Notes

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

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

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

Caution

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

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

Continuation next side

Environmental protection

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

Changing engine oil filter

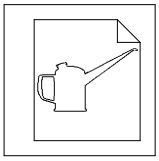
The engine oil filter is located on the side of the drive motor.
Change the engine oil filter as follows:

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

Danger

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

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



Changing engine oil

The oil drain plug for the engine oil change is down on the the drive motor.
Change the engine oil as follows:

Caution

Change the engine oil with the machine horizontal and supported.

- ▶ Place a sufficiently large oil catch pan under the machine.
- ▶ Guide the oil drain hose through the opening in the floor.

Danger

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

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

Notes

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

Caution

The capacities are only approximate values. These may vary according to the design and depend on the quantity of oil remaining. The upper mark on the oil dipstick is always decisive.

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

Checking for leaks

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

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

Antifreeze protection measures

This maintenance chart describes the implementation of antifreeze protection measures for the machine.
You will find the maintenance intervals in the maintenance summary at the start of this chapter.

Refer also to the maintenance charts:
General maintenance work

Refer also to the maintenance charts:

The following special tool is required:
Connecting piece (Putzmeister ref. no. 424479)

Caution

Always implement antifreeze protection measures because freezing temperatures may damage the water tank, the pressurised water pump and cause the hoses to burst.

When preparing antifreeze, observe the specifications regarding antifreeze protection. Always add antifreeze in the correct ratio.

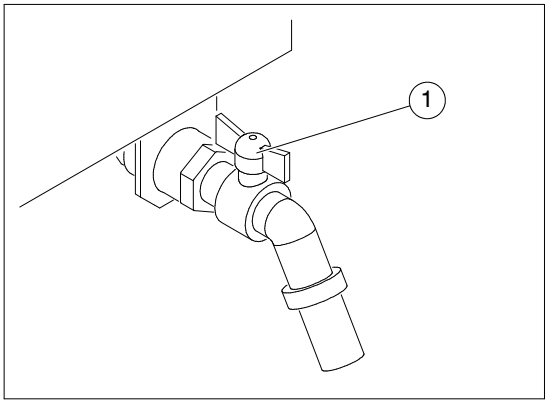
Environmental protection

Carefully collect escaping antifreeze and keep it separate from other waste.
Dispose of all fluids in accordance with current applicable regulations!
When using antifreeze, observe the waste disposal regulations that apply to your region.

Draining water from the low-pressure end

For protection against freezing, water should first be drained from the low-pressure end of the machine.

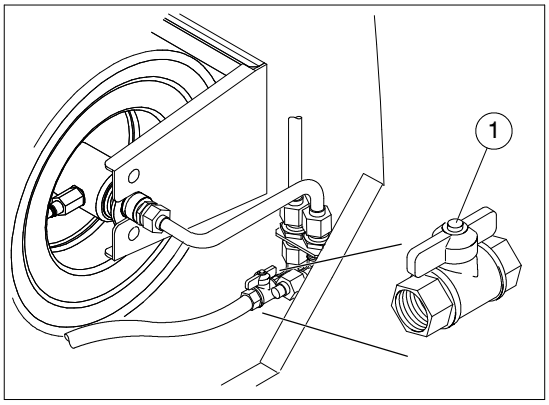
▶ Place the machine in a horizontal position.



Item	Designation
1	Drain cock on the water tank

▶ Open the drain cock (1) on the water tank and allow the water to drain.

▶ Drain the water from the high-pressure hose and the low-pressure hose as far as possible.



Item	Designation
1	Drain cock on low-pressure line

▶ Open the drain cock (1) on the low-pressure line under the water filter (if available).

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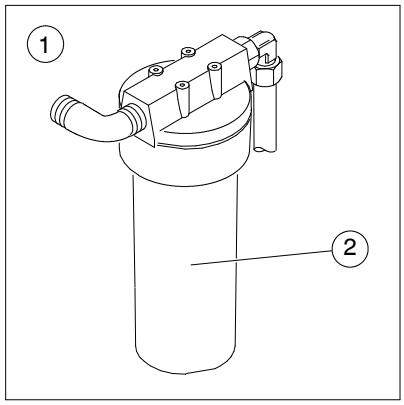

Item	Designation
1	Water filter
2	Filter housing with filter cartridge

▶ Remove the casing (2) from the water filter (1) and empty.

▶ Reassemble the filter housing.

Note

These measures drain the water from the entire water supply system and water tank.

Implement antifreeze protection measures

Take antifreeze protection measures as follows:

- ▶ Close the drain cock on the water tank.
- ▶ Have ready a bucket of sufficient size.
- ▶ Pour approx. 15 l of antifreeze (concentration as required) into the empty water tank.

Caution

Pouring antifreeze directly into the water tank bypasses the water filter. Please make absolutely sure that no impurities enter the water tank, otherwise the high-pressure water pump may be damaged Close the water tank again carefully.

- ▶ Connect the high-pressure hose and the low-pressure hose to the connecting piece provided.
- ▶ Press and hold the bypass button on the water tank level switch.
- ▶ Start the engine. Refer also to chapter: ”Starting up” – section: ”Starting the engine”.
- ▶ Allow the machine to operate until the antifreeze becomes visible in the water filter.
  ⇒ The antifreeze is distributed evenly throughout the water system.
- ▶ Allow the machine to continue operating for approx. 10 seconds.
- ▶ Release the bypass button on the water tank level switch.
  ⇒ The machine switches off.

Note

The integrated water deficiency monitor switches the machine off automatically as soon as the bypass button on the water tank level switch is released.
If there is so much antifreeze in the water tank that the water deficiency monitor does not trigger, you will have to switch off the machine manually. Refer also to chapter ”Starting up” - section ”Shutting down the machine after starting up”.

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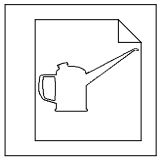


- ▶ Remove the connecting piece.
- ▶ Connect the high-pressure gun without a high-pressure pipe.
- ▶ Press and hold the bypass button on the water tank level switch.
- ▶ Start the engine. Refer also to chapter: "Starting up" - section: "Starting the engine".
- ▶ Hold the high-pressure gun over the bucket and briefly actuate the high-pressure gun trigger several times.
  ⇒ The bypass line between the unloader and water tank is filled with antifreeze.
- ▶ Release the bypass button on the water tank level switch.
  ⇒ The machine switches off.
- ▶ Press the high-pressure gun trigger to relieve the pressure.
  ⇒ The residual pressure in the high-pressure hose and high-pressure gun is relieved.
- ▶ Detach the high-pressure gun. Allow the water to drain by holding the high-pressure gun upright while pressing the trigger.
- ▶ Roll up the low-pressure hose again.
- ▶ Roll up the high-pressure hose again.
- ▶ Drain any excess antifreeze in the water tank into the bucket via the drain cock.
- ▶ Comply with regulations when disposing of any escaped antifreeze.
  ⇒ The machine is now protected against freezing temperatures.

Note

These measures ensure that antifreeze floods the entire high-pressure section.

Recommissioning the frost-protected machine

To recommission the protected machine, proceed as follows:

- ▶ Have ready a bucket of sufficient size.
- ▶ Close the drain cock on the water tank.
- ▶ Connect the high-pressure gun without a high-pressure pipe.
- ▶ Fill water into the empty water tank through the low-pressure hose.
- ▶ Hold the high-pressure gun over the bucket and actuate the high-pressure gun trigger.
- ▶ Start the engine. Refer also to chapter: "Starting up" - section: "Starting the engine".
  ⇒ The antifreeze in the water system flows into the bucket.
- ▶ Actuate the high-pressure gun trigger until antifreeze no longer escapes from the high-pressure gun.

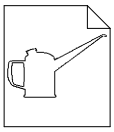
Note

Minimal amounts of antifreeze in the water tank and lines may discolour the water or cause foam to form after a longer operating period. This has no influence on the service life or wear characteristics of the high-pressure water pump.

- ▶ Switch off the machine. Refer also to chapter "Starting up" - section "Shutting down the machine after starting up".
- ▶ Press the high-pressure gun trigger to relieve the pressure.
  ⇒ The residual pressure in the high-pressure hose and high-pressure gun is relieved.
- ▶ Comply with regulations when disposing of any escaped antifreeze.

Cleaning the water filter

This maintenance card describes how to clean the cartridge in the water filter.



Refer also to the maintenance charts:
General maintenance work

Note

The filter cartridge must be changed in line with the degree of contamination in the water supply.
Dirt is visible on the filter housing.

Caution

Rapid, heavy contamination of the filter element indicates poor water quality.
We recommend using an additional primary water filter to guarantee the required water quality.

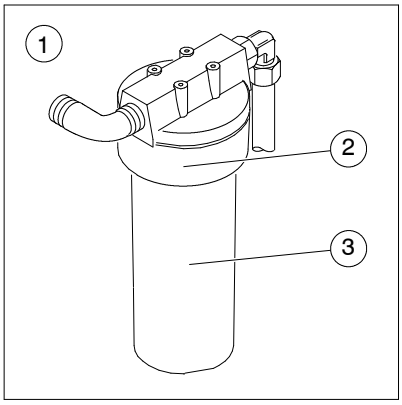
Do not use a high-pressure cleaner to clean the filter cartridge.
For cleaning work, always use clean mains water with a maximum temperature of 60 °C and a maximum water pressure of 6 bar.
On no account should salt water be used.

Environmental protection

When changing filters, observe the waste disposal regulations that apply to your region.

Continued on following page

To clean the filter cartridge, proceed as follows:



Item	Designation
1	Water filter
2	Union nut
3	Filter housing with filter cartridge

- ▶ Unscrew the union nut (2) on the water filter (1).
- ▶ Remove the filter housing with the filter cartridge (3).
- ▶ Remove the filter cartridge from the filter housing.
- ▶ Clean the filter cartridge thoroughly with water. Replace the filter cartridge if damaged or extremely dirty.
- ▶ Clean the filter housing thoroughly.

Note

Make sure that the filter cartridge, filter housing and gaskets are seated correctly.

- ▶ Insert a clean filter cartridge in the water filter.
- ▶ Reassemble the filter housing.
- ▶ Tighten the union nut on the water filter again.

High-pressure water pump belt tension

This maintenance card describes how to check and tighten the belt that drives the high-pressure water pump.
You will find the maintenance intervals in the maintenance summary at the start of this chapter.

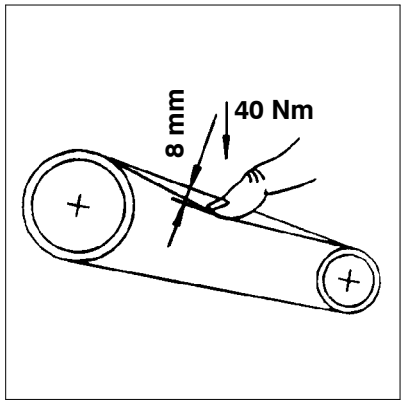
Refer also to the maintenance charts:
Maintenance tasks, general

The following special tool is required:
Torque wrench

Danger

Always carry out maintenance work when the machine is cold.

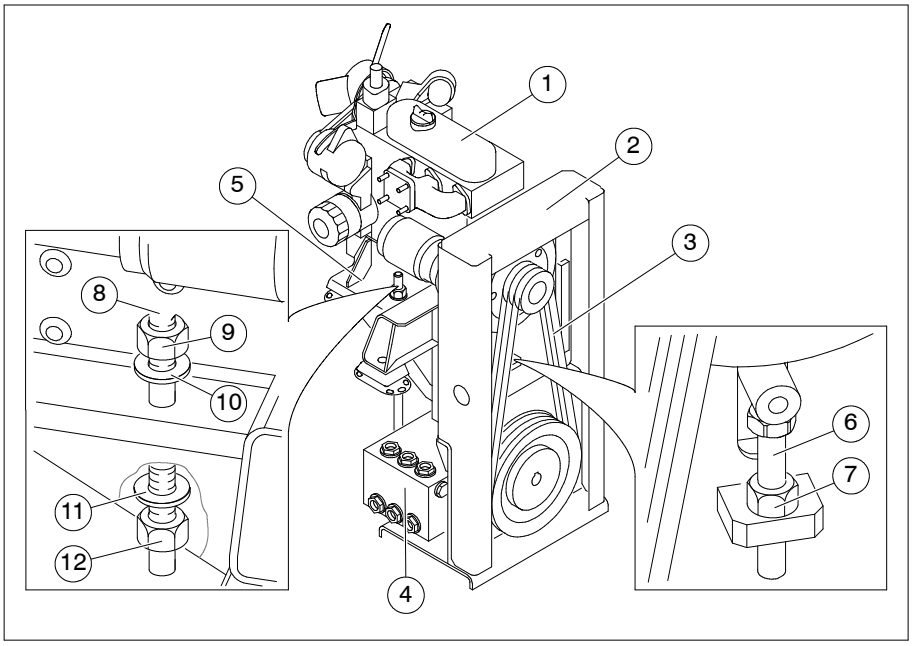
Check the belt tension



▶ Check the belt tension by pressing with your thumb. The belt must be retightened if it can be pressed in more than 8 mm.

Retightening

Tighten the belt as follows:



Item	Designation
1	Engine
2	Pump bracket
3	Belt
4	High-pressure water pump
5	Engine bracket
6	Pump bracket bolt
7	Pump bracket lock nut
8	Eyebolt
9	Hexagon nut, upper engine bracket
10	Washer, upper engine bracket
11	Washer, lower engine bracket
12	Hexagon nut, lower engine bracket

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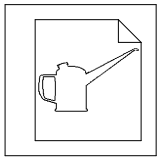


▶ Unscrew the upper and lower hexagon nuts (9+12) on the engine bracket (5).

Danger

Make sure that the hexagon nuts on the engine bracket are loose.
When tightening the belt, do not distort the pump bracket!
Any incorrect adjustments may cause the pump bracket to crack.

▶ Unscrew the lock nuts (7) on the pump bracket (2).

▶ Tighten the belt by adjusting the bolt (6).

▶ Check the belt tension by pressing with your thumb.

▶ Tighten the lock nut.

▶ Place the washer (11) and the hexagon nut (12) under the engine bracket.

▶ Screw on the hexagon nut loosely.

▶ Place the washer (10) and the hexagon nut (9) over the engine bracket.

▶ Tighten the hexagon nuts to 135 Nm.

▶ Tighten all other loose bolts and hexagon nuts.

Cleaning the radiator

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

Refer also to the maintenance charts:
General maintenance work

Caution

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

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

Danger

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

Wear a breathing mask and protective goggles to protect against particles of dust!

Continuation next side

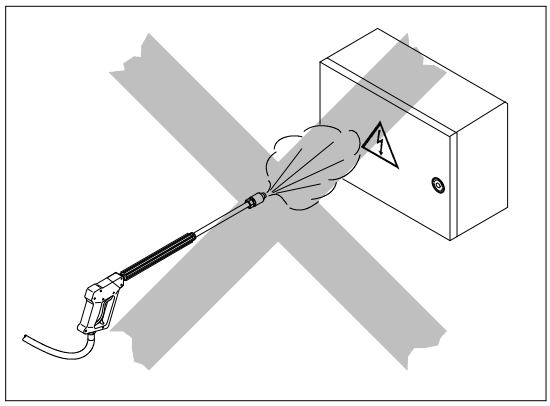
▶ Brush off light dirt with a soft brush or paint brush on the air side.

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

Caution

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

Completely remove the covers / seals after the cleaning process!



No water into electric systems

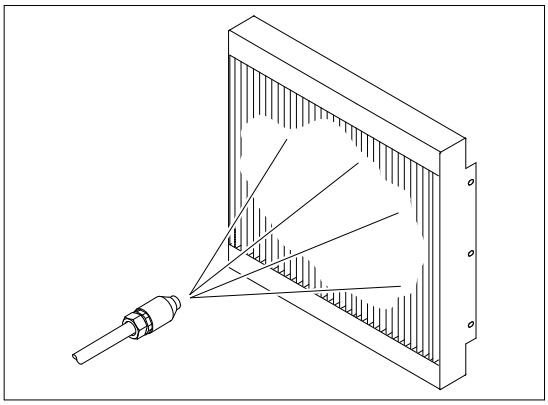
▶ Remove all electrical components such as fans (if fitted).

▶ Attach all necessary covers / seals.

Continuation next side

Notes

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

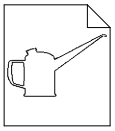


Spray the radiator down with a water jet

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

Fuel filter

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



Refer also to the maintenance charts:
General maintenance work

The following special tool is required:
Filter wrench

Notes

For changing the fuel filter, see also the engine manufacturer's documentation.

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

Caution

Ensure that dirt or other impurities cannot enter the fuel system.

Danger

Avoid fire and naked flame when changing the fuel filter. There is a danger of fire.

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

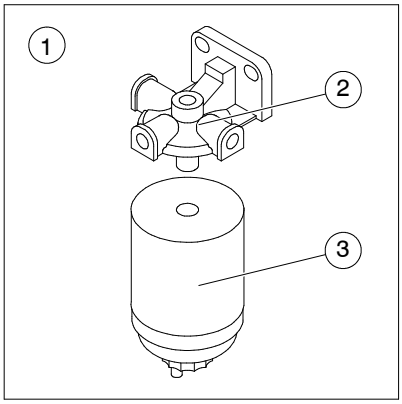
Continuation next side

Environmental protection

Collect escaping fuel and avoid the fuel spillage.
Dispose of fuel and used filter cartridges according to regulations. Observe the national and regional regulations applicable to your area. Only work with waste disposal companies who are approved by the responsible authorities.

Changing the fuel filter

Several fuel filters may be available depending on the design.



Different models available

Item	Designation
1	Fuel filter
2	Filter head
3	Filter cartridge

Change the fuel filter as follows:

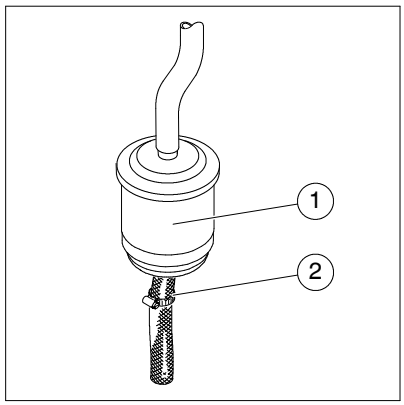
- ▶ Close the fuel cock (if available).
- ▶ Place a suitable oil sump pan under the fuel filter.
- ▶ Unscrew the filter cartridge(3) using a filter wrench.

Continuation next side

- ▶ Collect the fuel from the filter and dispose of the filter cartridge according to regulations.
- ▶ Clean the sealing surface on the filter head(2) with a lint-free cloth.
- ▶ Lightly oil the sealing surface on the filter head and the seal on the new filter cartridge with engine oil.
- ▶ Screw on the new oil filter cartridge by hand until the seal is in position.
- ▶ Tighten the filter cartridge by a further half rotation.
- ▶ Open the fuel cock (if available).

Changing the fuel line filter

There is one filter in the engine fuel line depending on the model.



Different models available

Item	Designation
1	Fuel line filter (depending on model)
2	Hose clamp

Continuation next side

Change the fuel filter as follows:

- ▶ Close the fuel cock (if available).
- ▶ Place a suitable oil sump pan under the fuel line filter.
- ▶ Loosen the hose clamps(2) upstream and downstream of the fuel line filter(1).

Notes

Raise the ends of the hoses to prevent fuel from running out.

- ▶ Pull the fuel line filter from the hoses.
- ▶ Collect the escaping fuel and dispose of the fuel line filter according to regulations.
- ▶ Attach the new fuel line filter to the hoses. Pay attention to the flow direction.
- ▶ Tighten the hose clamps again.
- ▶ Open the fuel cock (if available).

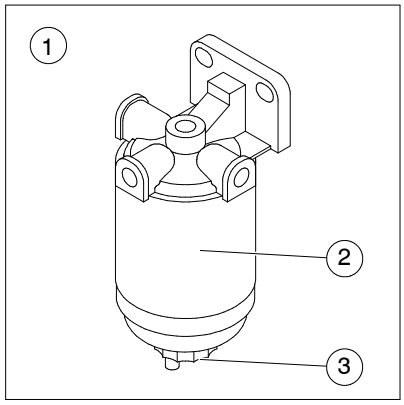
Checking for leaks

The following checks are necessary after you have changed the fuel filter:

- ▶ Start the drive motor. Refer also to chapter: ”Starting up” - section: ”Starting the drive motor”.
- ▶ Leave the machine to run for approx. 2 minutes.
- ▶ Then inspect all new fuel filters and fuel systems for leaks.
- ▶ Seal up any leaks that occur.

Draining water from the fuel filter

Several fuel filters may be available depending on the design.



Different models available

Item	Designation
1	Fuel filter
2	Filter cartridge
3	Drain plug

Drain water from the fuel filter as follows:

- ▶ Hold a suitable container under the drain plug on the fuel filter(3).
- ▶ Open the drain plug and drain the water out until fuel escapes.
- ▶ Close the drain plug again.
- ▶ Comply with regulations when disposing of the water and fuel mixture.

Checking the threaded connections

This maintenance chart describes how to inspect the threaded connections on the chassis.
You will find the maintenance intervals in the maintenance summary at the start of this chapter.

Refer also to the maintenance charts:
General maintenance work

The following special tool is required:
Torque wrench

Preparation

Carry out the following before checking the tightening torques:

First secure the machine so that the trailer cannot roll or tip over.

- ▶ Apply the handbrake firmly.
- ▶ Place the wheel chocks in position.

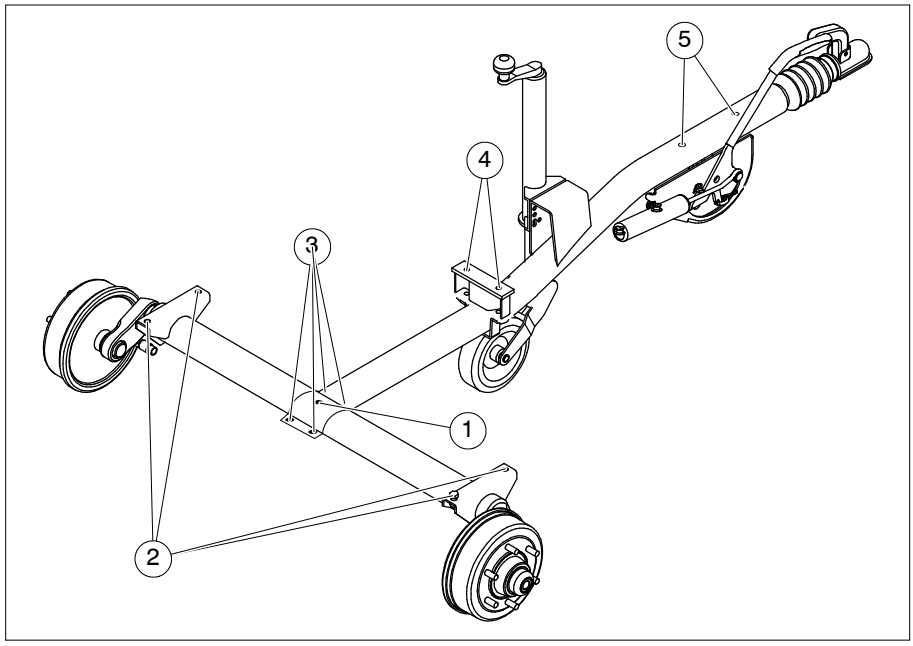
Caution

Secure the machine to achieve the necessary stability. Only carry out maintenance work on level ground.

Continued on following page

Inspecting

Check the following threaded connections using a torque wrench:



Item	Designation	
1	Connection drawbar - axle	77 Nm
2	Connection axle - subframe	85 Nm
3	Drawbar - axle clamp collar	80+5 Nm
4	Drawbar stem clamp	80+5 Nm
5	Guide bearing: Bolt with lubrication nipple	50+5 Nm

High-pressure water pump

This maintenance chart describes how to check the oil level and change the oil in the high-pressure water pump.
You will find the maintenance intervals in the maintenance summary at the start of this chapter.

Refer also to the maintenance charts:
Maintenance tasks, general

Note

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

Access the high-pressure water pump via the maintenance flap.

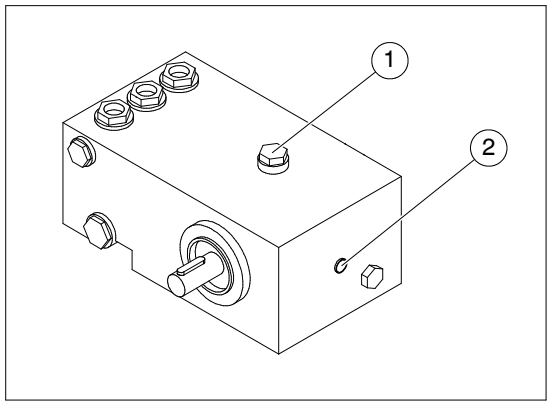
Refer also to the documentation provided by the high-pressure water pump manufacturer for further information on the high-pressure water pump.

Caution

Maintenance work must only be carried out by authorised personnel with special knowledge and experience.

Fluid level check

The high-pressure water pump is located in the engine compartment.
Check the oil level as follows:



Item	Designation
1	Oil filler plug with vent valve
2	Inspection glass

- ▶ Remove the maintenance flap.
- ▶ Check the oil level for the high-pressure water pumpat the inspection glass (2) and top up oil if necessary.
- ▶ Unscrew the oil filler plug (1) and top up with fresh oil until the required oil level is reached.
- ▶ Screw in the oil filler plug (1) again.
- ▶ Replace the maintenance flap correctly.

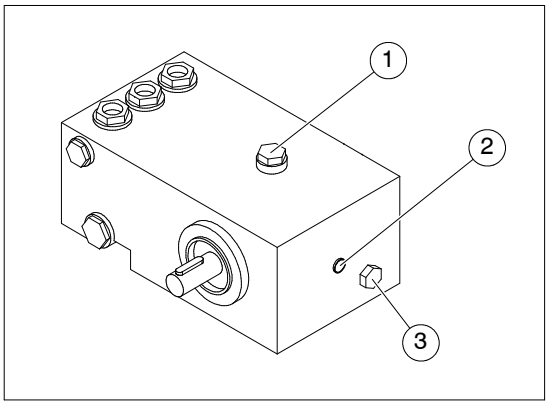
Note

Top up the oil level of the high-pressure water pump to the middle of the inspection glass.

The high-pressure water pump requires a high pressure oil SAE 30.

Oil change

The oil should only be changed at operating temperature.
Carry out the fluid change as follows:



Item	Designation
1	Oil filler plug with vent valve
2	Inspection glass
3	Oil drain plug

- ▶ Remove the maintenance flap.
- ▶ Place a sufficiently large oil catch pan under the machine.
- ▶ Unscrew the oil filler plug (1).
- ▶ Unscrew the oil drain plug (3).
- ▶ Dispose of the old oil in accordance with regulations.
- ▶ Screw in the oil drain plug (3) again.
- ▶ Now add fresh oil through the oil filler plug opening until the required oil level is reached.

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

Note

The high-pressure water pump requires a transmission fluid VG 220.

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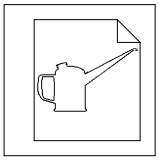


- Screw in the oil filler plug (1) again.
- Replace the maintenance flap correctly.

Environmental protection

Carefully collect the old oil and avoid oil spillage. Separate the collected oil from other waste.
Dispose of all components in accordance with current applicable regulations!
Observe the national and regional regulations applicable to your area. Only work with waste disposal companies who are approved by the responsible authorities.

Checking for leaks

The following checks are necessary after changing the oil:

- Start the engine. Refer also to chapter: "Starting up" - section: "Starting the engine".
- Leave the engine to run for approximately 2 minutes while actuating the high-pressure gun.
- Switch off the engine and check whether the oil drain plug is leaking.
- Seal up any leaks that occur.
- Inspect the oil level at the inspection glass.
- Top up with oil if required.

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.

- ▶ Switch off the machine.
- ▶ Cut off the water supply.
- ▶ Actuate the high-pressure gun until water no longer escapes and the machine is depressurised.

Antifreeze protection

Take antifreeze protection measures if there is a risk of freezing.

Maintenance chart: *Antifreeze protection measures*

Maintenance chart: *Antifreeze protection for the radiator*

9.2 Decommissioning

If the machine is to be taken out of service temporarily, the following measures must be carried out.

- ▶ Carry out work for temporary decommissioning.
- ▶ Before storing the machine, top it up with all the service fluids and grease it at the lubrication points.
- ▶ Read the documentation provided by the engine manufacturer.
- ▶ Protect the machine with a suitable agent.

Note

Preservation and greasing of the machine will protect it against corrosion and rapid ageing. It is necessary, if the machine:
- *is not used for longer periods;*
- *is exposed to corrosive atmospheres during storage or transportation.*

Location

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

Danger

There is a risk of fuel vapours building up and igniting if the machine is stored in a poorly ventilated area.

Storing the machine

Observe the following when placing the high-pressure cleaner in storage:

- ▶ Store the machine in a dry, frost-free location.
- ▶ Place the high-pressure cleaner in a horizontal position if you intend to store it for longer periods.
- ▶ If the high-pressure cleaner is to be stored for a long time you must remove the battery and charge it regularly.
- ▶ If there is a risk of freezing in the storage area, you must check the antifreeze content in the cooling water once it has cooled down and add more, if necessary.

Maintenance chart: *Antifreeze protection for the radiator*

Caution

Insufficient antifreeze can cause the motor, the cooler and the lines to burst.

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

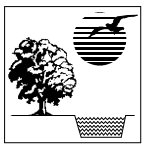
Maintenance chart: *Antifreeze protection measures*

Caution

Always implement antifreeze protection measures because freezing temperatures may damage the water tank, the pressurised water pump and cause the hoses to burst.

9.3 Final decommissioning, disposal

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



Environmental protection

Commission a qualified specialised company with final disposal of the machine.

Danger

During final decommissioning of the machine, escaping lubricants, solvents, preserving agents etc. represent a hazard.
They can cause chemical burns in the event of direct skin contact.
Risk of injury on sharp-edged machine components.

Material used

The main materials used for machine construction were:

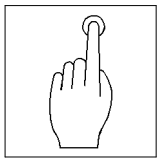
Material	**Use for / in**
Copper	- Cables
Steel	- Machine frame
	- Pump units
Plastic, rubber, PVC	- Gaskets
	- Hoses
	- Cables
	- Wheels
Tin	- PCBs
Polyester	- PCBs

Continued on following page

Parts requiring separate disposal

The following components and working materials must be separated prior to disposal:

Designation	Applies to ....
Electronic scrap	- Electrical supply
	- PCBs with electrical components
Oil	- Drive motor (D-version)
	- High-pressure water pump



10 Appendix

10.1 General tightening torques

Tightening torques depend on bolt grade, thread friction and bolt head bearing area. The values given in the following tables are for guidance. These values should only be used if no other values are specified in the relevant chapters of the Operating Instructions or in spare parts sheets.

Caution

Bolts must always be replaced with bolts of the same size and grade.

Bolts with adhesive in the locking threads and self-locking nuts must always be replaced after removal.

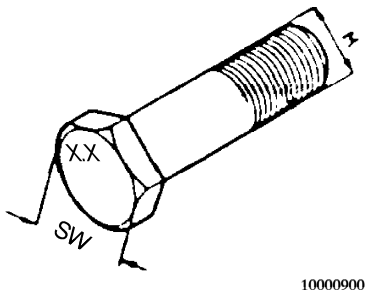
Continuation next side

The tables below give the maximum tightening torques (maximum torque) in Nm for a friction factor of mtotal = 0.14, with the thread lightly-oiled or lightly-greased.

Notes

All tightening torques X 1.1 apply for bolts with cement in the thread.

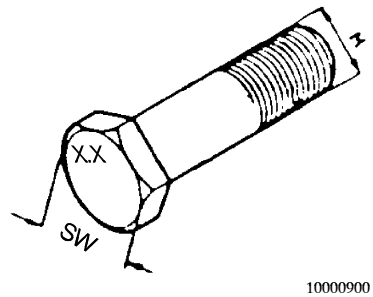
Set screws – metric triangular thread, DIN 13, Part 13



SW = Width across flats (A/F)
X.X = Grade 8.8, 10.9, 12.9

Dimensions [mm]		Tightening torque Md [Nm]		
M	SW	8.8	10.9	12.9
M 4	7	3.0	4.4	5.1
M 5	8	5.9	8.7	10
M 6	10	10	15	18
M 8	13	25	36	43
M 10	17	49	72	84
M 12	19	85	125	145
M 14	22	135	200	235
M 16	24	210	310	365
M 18	27	300	430	500
M 20	30	425	610	710
M 22	32	580	820	960
M 24	36	730	1050	1220
M 27	41	1100	1550	1800
M 30	46	1450	2100	2450

Set screws – metric precision thread, DIN 13, Part 13



SW = Width across flats (A/F)
X.X = Grade 8.8, 10.9, 12.9

Dimensions [mm]		Tightening torque Md [Nm]		
M	SW	8.8	10.9	12.9
M 8 × 1	13	27	39	46
M 10 × 1.25	17	52	76	90
M 12 × 1.25	19	93	135	160
M 12 × 1.5	19	89	130	155
M 14 × 1.5	22	145	215	255
M 16 × 1.5	24	225	330	390
M 18 × 1.5	27	340	485	570
M 20 × 1.5	30	475	680	790
M 22 × 1.5	32	630	900	1050
M 24 × 2	36	800	1150	1350
M 27 × 2	41	1150	1650	1950
M 30 × 2	46	1650	2350	2750

Index of Key Words

This chapter contains the main key words with the number of the page on which they are to be found as a header in the left-hand margin. This Index of key words is listed alphabetically by the main concepts. These are subdivided into associated sub-concepts, marked with a dash.

Index of Key Words

Index of Key Words

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