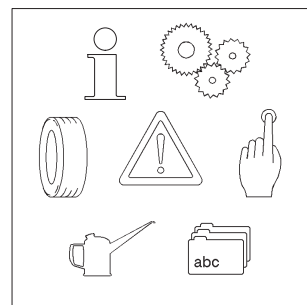


Operating Instructions

for machine operator and maintenance staff

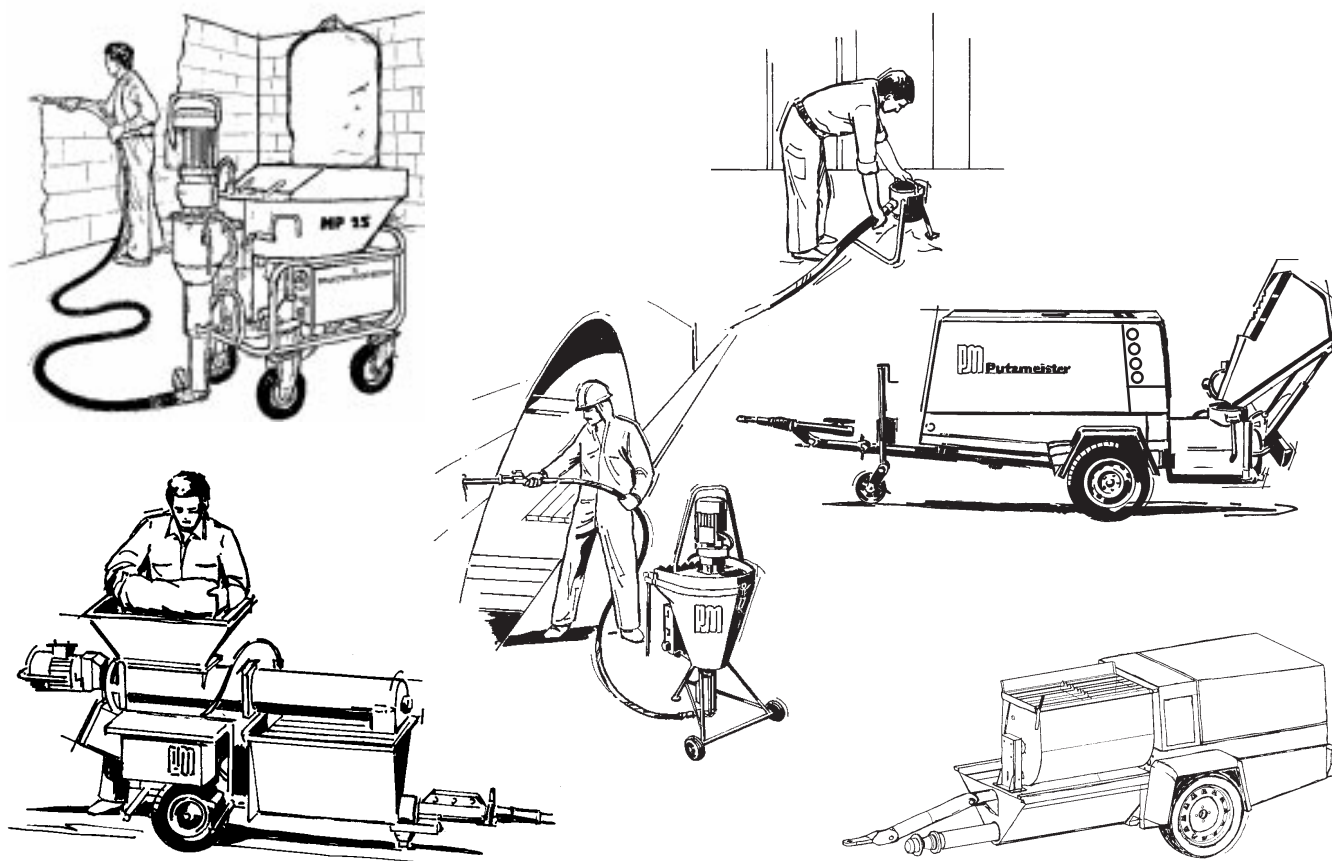
always keep by the machine



Motar machine

SP11 DMR/DMB

Machine no.

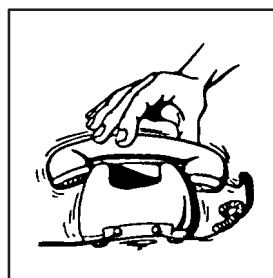




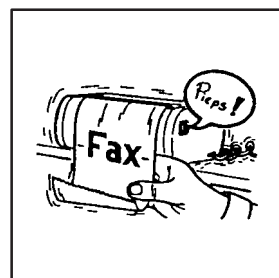
Putzmeister
Mörtelmaschinen GmbH
Max-Eyth-Str. 10
D-72631 Aichtal



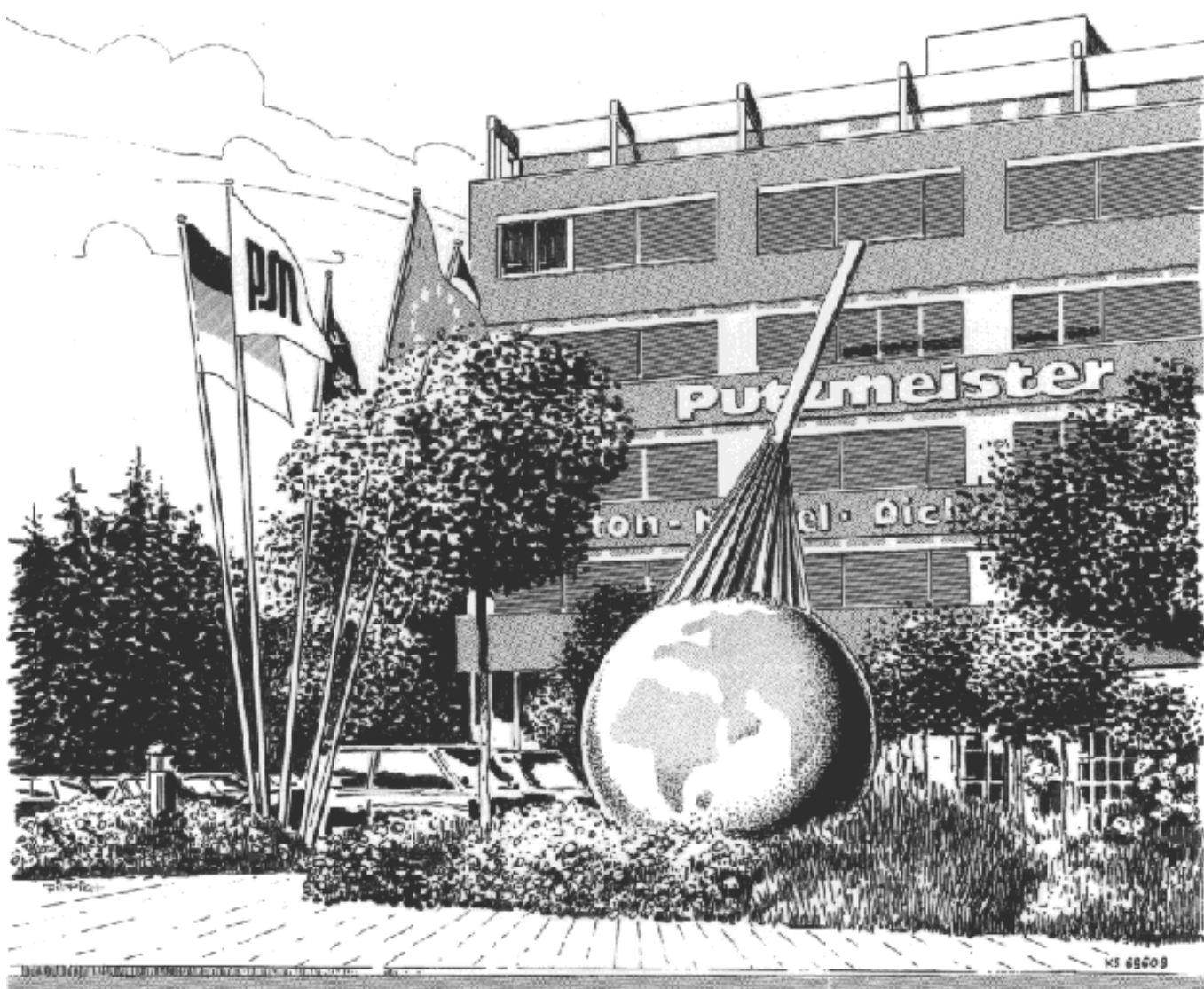
P.O. Box 2152
D-72629 Aichtal

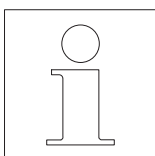
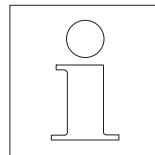


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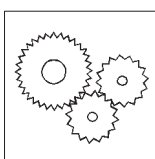
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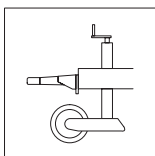
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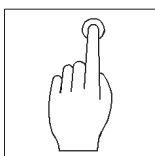
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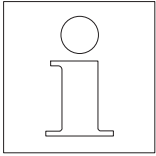
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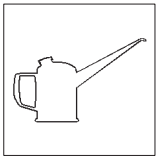
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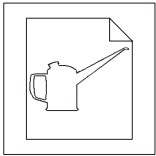
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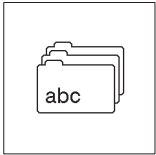
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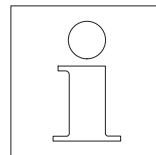


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Index of Key Words



1 About these Operating Instructions

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

Putzmeister Mörtelmaschinen GmbH
Postfach 2152
D-72629 Aichtal
Germany
Telephone +49 (0)7127 599-0
Telefax +49 (0)7127 599-743
Telex 7 266 113

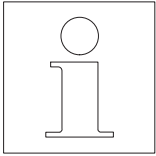
or the Branch or Works Agency that looks after you.

Address: _____

Telephone: _____

Fax: _____

Telex: _____



1.1 Foreword

These Operating Instructions are intended to familiarize 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. Observing these instructions helps to avoid danger, to reduce repair costs and downtimes, and to increase the reliability and service life of the machine.

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

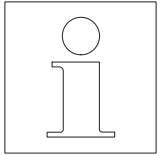
The Operating Instructions must always be available wherever the machine is in use.

These Operating Instructions must be read and applied by any person in charge of carrying out work with and on the machine e.g.

- in operation, including setting up, fault rectification in the course of work, removal of production waste, care and disposal of fuels and consumables;
- in service (maintenance, inspection, repair), and/or
- transport.

The generally-recognized 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.

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.

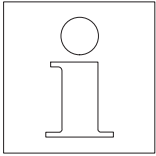


You will make it much easier for us to answer any questions if you can give us the details of the machine model and the machine number.

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.

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About these Operating Instructions



1.2 Icons and symbols

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

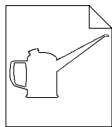


Action symbol

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



Text following 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 cards required, possibly as a supplement to the maintenance card 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. commercially-available tools or tools carried in the vehicle, are not specially listed.



Environmental protection

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



Note

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



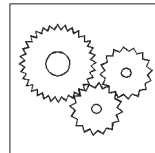
Caution

Particular specifications or instructions and prohibitions regarding 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.



Danger

Particular specifications or instructions and prohibitions regarding 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.



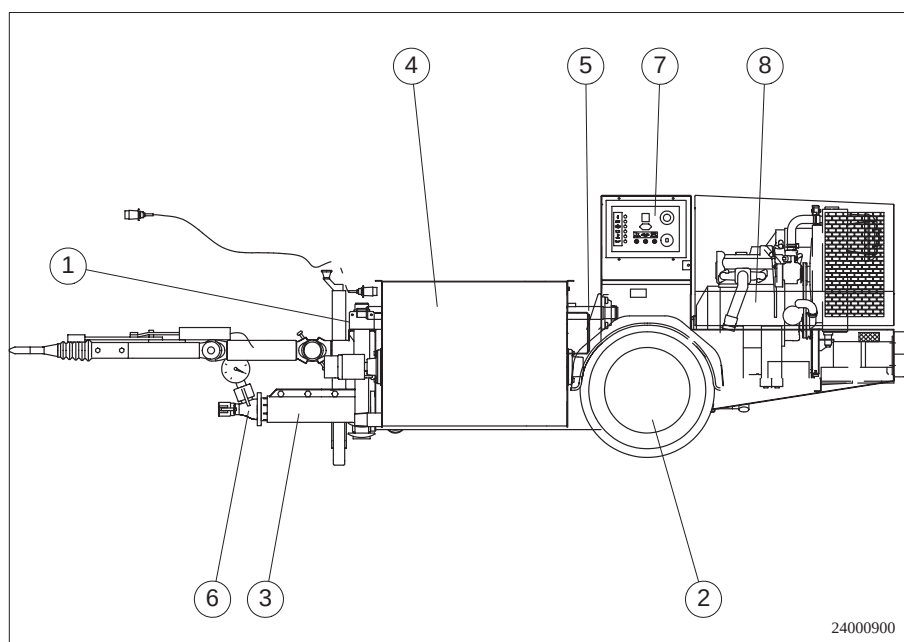
2 General Technical Description

This section describes the components and assemblies on this machine and describes how they function.

2.1 Overview

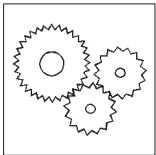
Below you will find an overview of the most important components; these will then be described on the following pages.

Lifting mixer



- 1 Rating plate
- 2 Axle
- 3 Auger pump
- 4 Lifting unit
- 5 Hopper
- 6 Pressure connection
- 7 Control panel
- 8 Diesel engine

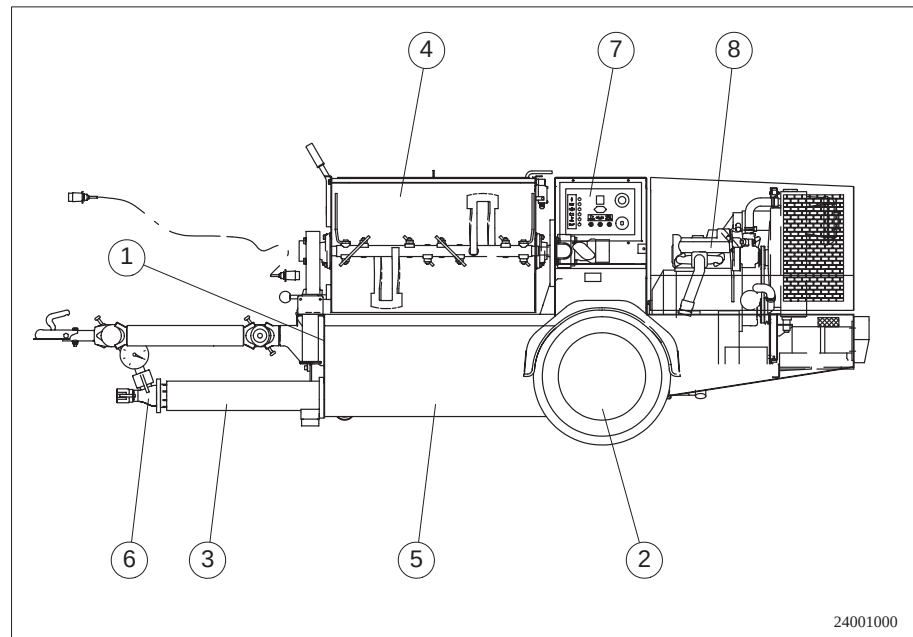
24000900



General Technical Description

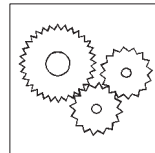


Tipping mixer



- 1 Rating plate
- 2 Axle
- 3 Auger pump
- 4 Tipping mixer
- 5 Hopper
- 6 Pressure connection
- 7 Control panel
- 8 Diesel engine

24001000



2.2 Description of the functions

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

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

Dry mortar, water and concrete admixtures are mixed in the mixer and poured into the hopper. The mixed material is conveyed from the hopper by an auger pump.

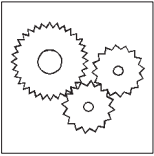
A spray gun is fitted to the end of the hose. Air is introduced from the compressor and the mortar applied at the desired coat thickness.

Hydraulic control

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

The variable output auger pump, mixer and the mixer lifting unit are driven by two separate hydraulic circuits.

The mixer switches off automatically during the lifting process.



General Technical Description



Hydraulic control block

The SP11 has a hydraulic control block with valves for the auger pump and the mixer. The output is infinitely variable using the rotary switch below the control cabinet.

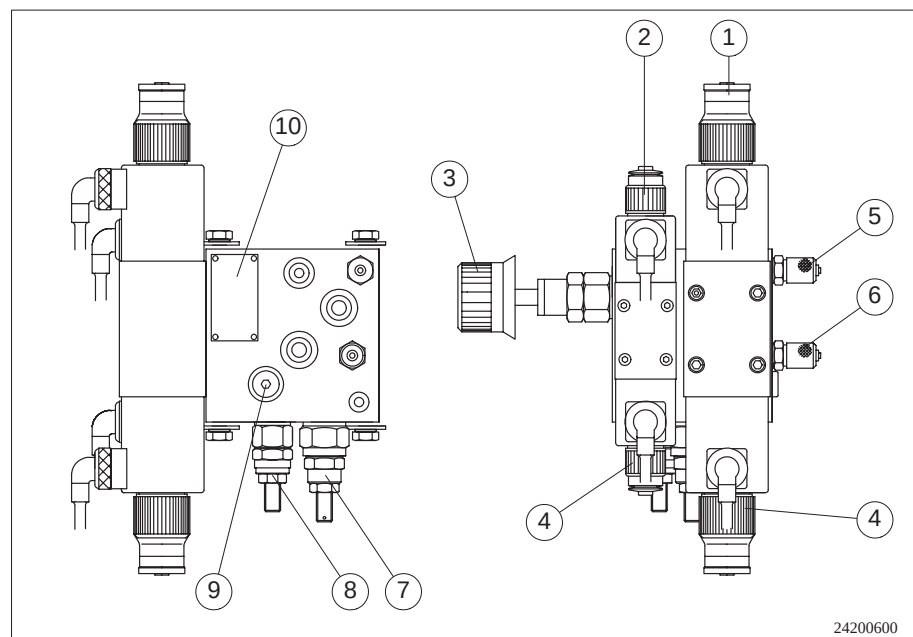


Note

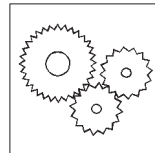
Reducing the output with the rotary switch will not reduce the diesel engine's power.

The diesel engine output can only be reduced by modifying the consistence and quality of the material or by fitting an auger pump with lower output volumes.

You can continue to operate the mixer or auger pump using the emergency manual operation switch if there is a power failure or a defect in the electromagnet.



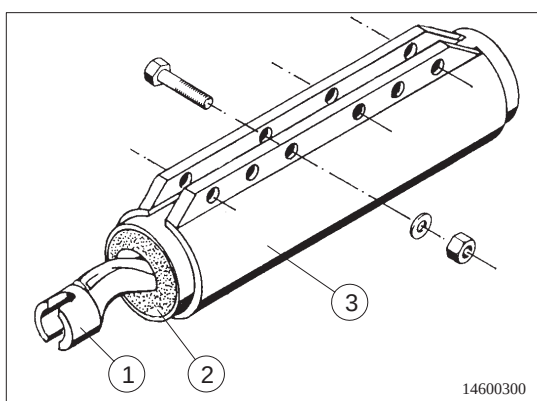
- 1 Auger pump valve
- 2 Mixer valve
- 3 Rotary output regulator switch
- 4 Emergency manual operation button
- 5 Auger pump measuring point
- 6 Mixer measuring point
- 7 Pressure limiting valve for the auger pump
- 8 Pressure limiting valve for the mixer
- 9 Thermal monitor connector
- 10 Rating plate with serial number



Auger pump

The SP11 is driven by a 3-cylinder diesel engine. A 4-cylinder diesel engine is also available on request.

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

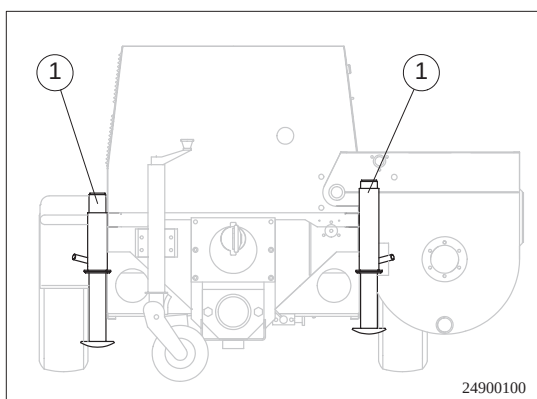


- 1 Auger
- 2 Auger barrel
- 3 Clamping sheath

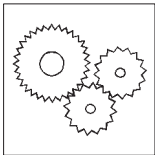
Support legs on the lifting mixer

The support legs on the frame are mechanically adjustable, thus giving the stability required.

Support legs can be obtained from the tipping mixer if required.



- 1 Support legs

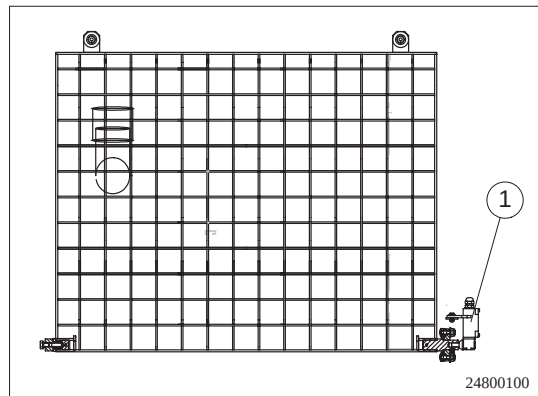


General Technical Description



Lifting mixer safety equipment

The grille in the lifting mixer unit is protected by an electrical switch which ensures that the mixer switches off automatically when the grille is opened.



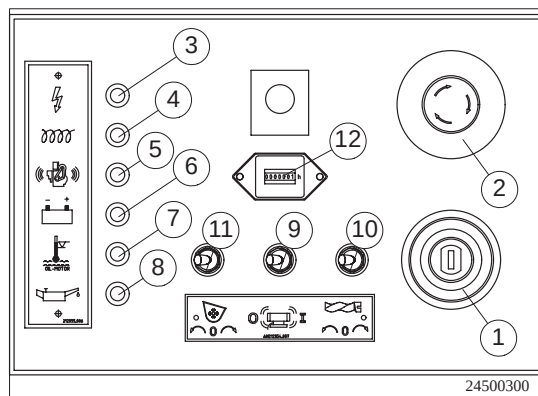
- 1 Electrical switch

Control cabinet

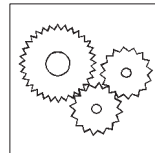
The system is controlled and operated through the control cabinet. The control and operating instruments are located here.

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

Lifting mixer and tipping mixer

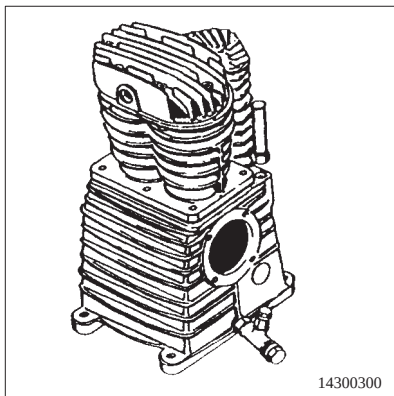


- 1 Ignition lock
- 2 EMERGENCY SHUT-DOWN impact switch
- 3 "Ready for service" lamp
- 4 "Glow" lamp
- 5 "Ready to start" lamp
- 6 Charge warning lamp
- 7 Fluid temperature lamp
- 8 Fluid pressure lamp
- 9 Vibrator On/Off switch
- 10 Forward/Reverse/Off auger pump switch
- 11 Forward/Reverse/Off mixer switch
- 12 Operating hours meter



Compressor

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



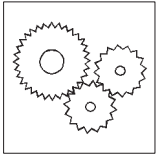
2-cylinder compressor

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



Caution

Check the oil level on the inspection glass of the compressor daily.



General Technical Description



2.3 Technical data

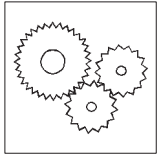
The technical data and properties given below apply for the SP11 DMR and DMB.

Power unit:	3-cylinder diesel engine 15.6 kW at 2800 rpm
Hopper:	220 l
Lifting mixer:	180 l
Tipping mixer:	
Auger pump:	2L6 35 l/min, max 28 bar 3L7 35 l/min, max 50 bar 2L88 45 l/min, max 28 bar 2L54 120 l/min, max 28 bar 2L74 200 l/min, max 28 bar
DMR running gear:	1200 kg braked with support wheel
DMB running gear:	1000 kg unbraked without support wheel
Axle:	maximum 130 km/h
Nose loading:	DMR 65 kg, DMB 30 kg
Compressor:	2 cylinder, 330 l/min
Max. delivery pressure:	40 bar
Max. particle size:	8 mm
Pumping rate:	10–40 l/min
DMR permitted gross weight:	1000 kg
DMB permitted gross weight:	750 kg
Noise level:	< 85 dB(A)
DMR tyre size:	175–80 R 13
DMB tyre size:	165–80 R 13
Tyre pressure:	2.4 bar

Noise emission measurement

Noise emission measurement on mortar machines gave a value of ≤ 85 dB(A).

Measurement was carried out in accordance with the German "Maschinenlärm Informations Verordnung — 3. Verordnung zum Gerätesicherheitsgesetz —" (Machine Noise Information Regulation — 3rd regulation relating to the German Equipment Safety Law —)



The most important data are shown in brief on the rating plate mounted on the machine.

Rating plate

Putzmeister

1

2

3

4

5

6

7

8

9

10

11

12

AN 212480.007

Putzmeister
Mörtelmaschinen GmbH
D-72629 Aichtal

CE

24001100

- 1 Model (machine model)
- 2 Machine no. (machine number)
- 3 Year of manufacture
- 4 Maximum concrete pressure [bar]
- 5 Maximum hydraulic pressure [bar] (max. fluid pressure in the hydraulic system)
- 6 Voltage [V]
- 7 Frequency [Hz]
- 8 Power [kW]
- 9 Sound level [dB(A)]
- 10 Minimum support load [kg]
- 11 Maximum support loading [kg]
- 12 Permissible axle loading [kg]



3 Safety Regulations

This chapter summarizes the most important safety regulations. This chapter is, therefore, particularly suitable for an initial basic instruction of new operators. Naturally, the various regulations are also repeated once more at the appropriate points in the Operating Instructions.



Note

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

We include here a listing of regulations and safety standards for your information:

- EN 12001, Delivery, spraying and distributing machines for concrete and mortar,
- EN 292, Safety of machinery,
- pr EN 12151,
- EN 60204–1, Electrical equipment of machines,
- EN 50081–1,
- EN 50082–1,
- EMC directives, 89/336/EEC,
- Low voltage directives, 73/ 23/EEC,
- Safety regulations for mortar delivery and spraying machines issued by the German Industrial Employers' Liability Insurance Association ZH 1/575.



3.1 Principle

Use the machine only 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.

Take care to ensure that:

- no safety equipment is removed, rendered inoperable or modified (EMERGENCY SHUT-DOWN button, grille on the pump filling hopper etc.);
- safety equipment removed for the purposes of maintenance work is refitted immediately the work is completed.

Check operational safety every time you start work. Any defects found or suspected must be repaired immediately. If necessary, inform the project supervisor. Cease work if defects that may jeopardize operational safety are found.

Use only perfect delivery lines, hoses, couplings etc. suitable for the delivery job and manufactured by the machine manufacturer. Delivery lines are subject to wear which varies according to the pressure and composition of the medium, the material from which the delivery line is made, etc.

3.2 Designated use

The machine is designed to mix and pump premixed dry mortar through 35/25 mm diameter hoses.

You must also observe the specified Operating Instructions and comply with the conditions and intervals for maintenance and inspection to operate the machine within the limits of its designated use.

3.3 Use contrary to the designated use

Use other than that above or going beyond such use, such transporting loads, for instance, is considered contrary to the designated use. Putzmeister Mörtelmaschinen accepts no liability for damage resulting from such use. The risk of such misuse lies entirely with the machine operator.

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.



3.4 Noise

High sound levels can cause permanent hearing damage.

Ear defenders

However, 85 dB(A) may be exceeded in the vicinity of the machine depending on operating conditions. A distance of less than 5 m from the machine is considered to be close.



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.

3.5 Sources of danger

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

Never remove safety equipment or render it inoperable by modifying the machine.

Safety equipment must only be repaired, adjusted or replaced by subject experts.

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

Safety equipment

All equipment required for safety and accident prevention (warning signs and information notices, cover grilles, covers, etc.) shall be in place. Such equipment may not be removed, modified or damaged.

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.

3.6 Place of work

The place of work is the operating panel at the front of the machine. Do not climb on the machine.



3.7 Selection and qualification of personnel

The machine may only be operated, maintained or serviced independently by persons (machine operators) who

- are aged 18 years and older;
- 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.

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.

Do not allow persons yet to complete training or instruction, or persons taking a general training course, to operate the machine unless under the constant supervision of an experienced person.

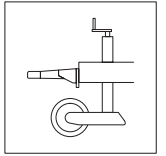
Couplings must only be fitted to hoses by persons having the necessary experience and possessing the equipment necessary for this task.

Qualified electricians

Work on the electrical system and equipment of the machine must be carried out only 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.

3.8 Procedure in an emergency situation

Switch off the machine at the EMERGENCY SHUT-DOWN button in an emergency situation.



4 Transport, Set-up and Connection

In this chapter you will find information concerning safe transport of the machine. In addition to this, you will find descriptions of the work required to assemble and connect the machine. Starting the machine will not be described until the “Operation” chapter.

4.1 Before moving off

In traffic, Putzmeister mortar machines are subject to German StZVO (Road Transport Licensing Order) regulations and may only be driven on public highways if they are licensed accordingly. They must not be used for the transport of goods.

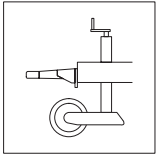
The machine is subject to the regulation which requires an individual registration plate and also, therefore, a TÜV inspection (inspection to ensure that vehicle is roadworthy) every two years. The registration can be obtained from the district authorities on production of the operating permission at the licensing office responsible. Outside Germany, the registration regulations applicable in the country of use shall always apply.

The running gear or vehicle complies with the regulations of the German StZVO (Road Transport Licensing Order) and is licensed in Germany for speeds up to a maximum of 80 km/h.

For countries where transport speeds of over 80 km/h are permissible (eg 130 km/h in France), special written approval must be obtained from Putzmeister. If you do not have this written approval you may only drive Putzmeister vehicles at speeds up to 80 km/h, even in those countries which permit speeds exceeding 80 km/h.

The maximum permissible speed shall apply in countries where permissible speeds are less than 80 km/h maximum.

Information relating to maximum speeds may be found in the report prepared in accordance with article 18 (5) of the German StZVO (Road Transport Licensing Order).



Maximum speeds of below 80 km/h for trailers must be noted under Figure 33 : Notes.

The machines are certified for roadworthiness in Germany. You will receive the operating permission upon delivery. The registration regulations applicable in the country of use shall always apply.

You may have to obtain an additional country-specific licence depending on the country of use and the relevant regulations. The operating permission must be carried with the machine during transport at all times and must be produced upon request from the police.

Before you join the public highway, you must carry out the following actions:

- ▶ Check that the vehicle is safe to drive. The lighting system must be fully functional and well secured.
- ▶ Check the brakes, tyre inflation pressures, etc.
- ▶ Check whether the support leg and the support wheel are secured for travel.
- ▶ Check that the accessories are secure.
- ▶ Observe the permissible gross laden weight.

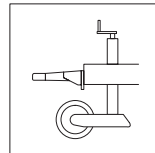


Note

The trailer-mounted machine is subject to the regulation which requires an individual registration plate (green) and also, therefore, a TÜV inspection every two years. The registration can be obtained from the district authorities on production of the operating permission at the licensing office responsible. Outside Germany, the registration regulations applicable in the country of use shall always apply.

Chocks

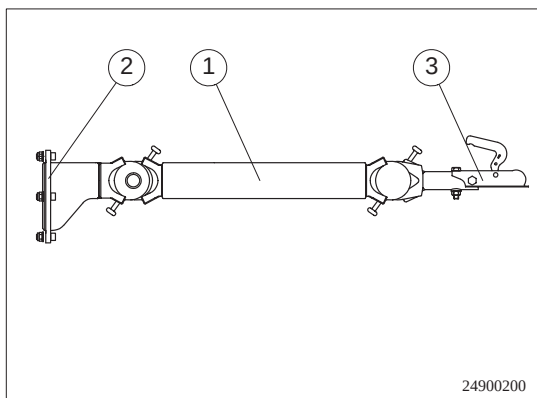
The chocks for securing the machine against rolling away are attached to the side of the frame.



Towing gear

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

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

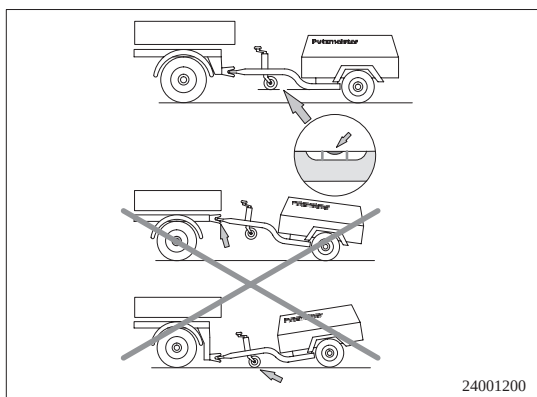


- 1 Adjustable drawbar
- 2 Bolted joint connection
- 3 Trailer coupling ring

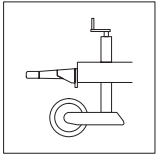


Caution

Special high strength bolts are used for the drawbar bracket connection. These may only be replaced with original spare parts. (Tightening torque = 125 Nm)



Attach the machine horizontally.



Transport

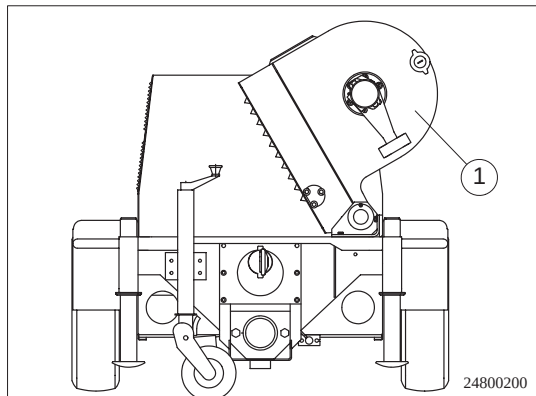
Please note the following before you transport the machine:



Note

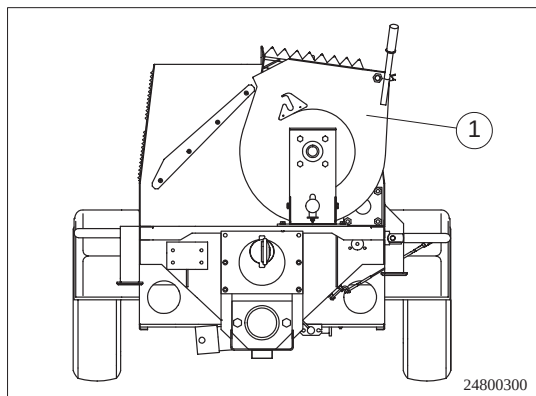
Mortar machines are considered to be industrial machines. Your machine requires an operating permission in accordance with article 18, paragraph 2 of the German StZVO (Road Transport Licensing Order). It requires its own licence number. For this reason, you are required to produce the General operating permission certificate you were given to the licensing office responsible. Only then may your machine be transported behind an appropriate tractor unit on public highways.

- ▶ Please ensure that the trailer hitch is functioning correctly.
- ▶ The lifting mixer unit must be raised into transport position before the lifting mixer can be transported.

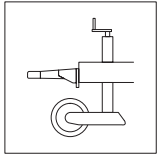


1 Lifting mixer unit in transport position

- ▶ The tipping mixer unit must be standing upright and be firmly secured before the lifting mixer can be transported.



1 Tipping mixer unit in the transport position



- ▶ Please ensure that the lighting equipment is functioning correctly and is secured.
- ▶ Observe the permitted towed load for the tractor unit.
- ▶ Additional loads on the machine are not permitted. Observe the maximum gross weight on the rating plate.



Caution

Since the support wheels of braked machines fold away automatically when cranked down, the machines could slump and damage the tractor unit.

4.2 Loading

You can also load your machine onto a suitable transport vehicle to transport it to the construction site.



Caution

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 loadbearing capacity is adequate.

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

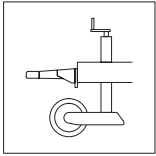


Danger

Hoisted loads may fall if they are not loaded properly or if the slings and eyes are damaged.

You should, therefore, never walk under suspended loads.

The machine may only be transported once secured to a suitable transport vehicle.



4.3 Set-up site

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

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

Requirements on the set-up site

The set-up site must:

- be large enough to ensure that there is sufficient clearance around the whole machine;
- ensure the accessibility of the machine from all sides for the purposes of servicing and repair.

Setting up

Make sure that the machine is standing as horizontally as possible to ensure the supply of fluid and lubrication.

Operations site

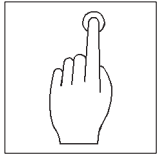
The machine's operations site should be selected in such a way that:

- no sharp pipe and hose bends are required;
- no hoses overlie one another.

Risk of chafing;

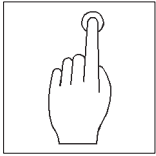
- the lines are kept as short as possible.

The diesel engine receives its fresh air from above the lighting equipment. Please ensure that the end of the machine is not located directly above a pile of sand or a particularly dusty area. Make sure that empty mortar sacks are not placed over the intake area. Please cover the ground with wooden boards or cardboard if you cannot avoid doing this. This is the only way to prevent the machine or air filter being contaminated.



5 Operation

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



5.1 Shutting down in an emergency situation

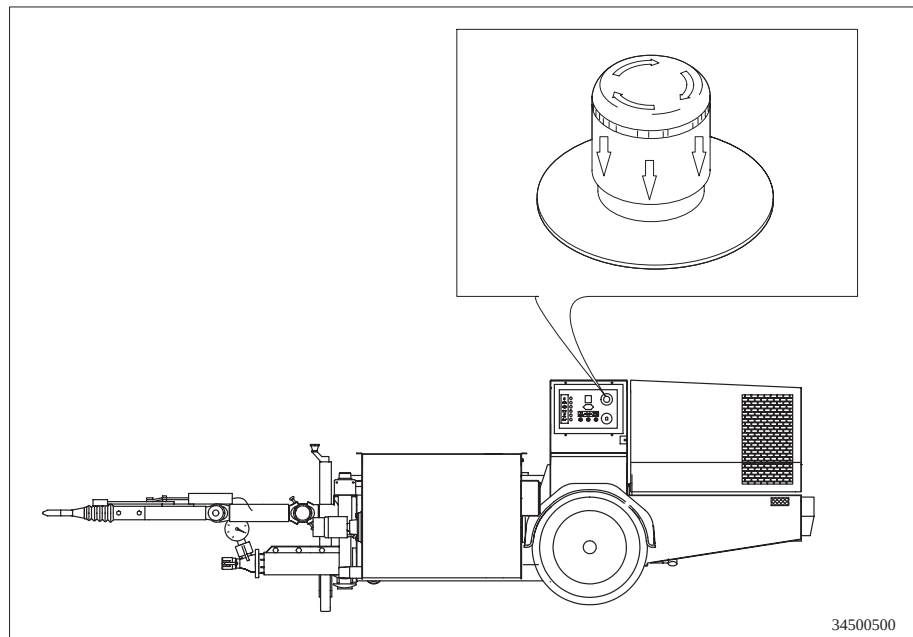
Make sure you are completely familiar with the procedures for shutting down the machine in an emergency situation before you start operating the machine.



EMERGENCY SHUT-DOWN button on the control panel

Danger

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



Press to lock EMERGENCY SHUT-DOWN

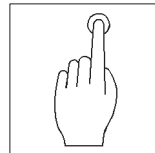
Turn to unlock EMERGENCY SHUT-DOWN

- ▶ Press the EMERGENCY SHUT-DOWN button.
⇒ The pump must come to a halt immediately.
- ▶ 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 SHUT-DOWN button by turning it.



Caution

The machine is no longer safe to operate if the EMERGENCY SHUT-DOWN button is defective, as you will no longer be able to switch off the machine quickly enough if danger threatens.



5.2 The correct mortar mixture

Today, premixed dry mortars are produced in such a way that they may be easily processed by mortar machines. Please also observe the advice of the material manufacturers.

Site mixes, however, are subject to particular laws which must be adhered to at all times.

While mortar for manual application needs only to be prepared to have good cured mortar characteristics and workability, mortar produced with mortar machines also has to be easy to pump and spray.

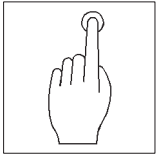
Although mortar which is too fat or sticky does not usually tend to cause blockages and separation, it will still cause high pump pressure. On the other hand, mortar which is too lean or short causes low delivery pressure which can easily cause separation and blockages in the pump or hose.

Consistence

Pumping mortar must be ductile, ie not too thick or thin. Mixtures which are too thin tend to allow the sand to settle and cause blockages. Mixtures which are too stiff cannot be sucked in.

Mortar pumps pump what is known as “trowel-quality consistence” mortar best.

You can improve mortar consistence and quality, save water and improve the pumping ability of the mortar with the use of certain additives.



Mortar sand

The type of sand (grading curve) and the type of sand grain both determine render quality and have a strong influence on the pumping characteristics of the mortar produced from it.

Good grading curves are important. The sand must contain coarse, medium and fine grains and should also possess so-called “consumable” constituents. “Single grain sand” types, as they are known, in which the proportion of a single grain size group is excessive are not conducive to pumping, although their use is often unavoidable. It is important, in such an event, to mix different types of sand to obtain a satisfactory grain grading.

Well-graded sand grains with grain sizes up to 4 mm are easier to pump than fine beach sand (single grain sand).

In general, grain size must not exceed 4 mm.

A good grain combination for plastering sand is as follows:

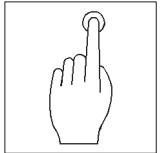
Grain size below 0.2 mm	=	5%
Grain size from 0.2 – 1.0 mm	=	60%
Grain size from 1.0 – 4.0 mm	=	35%

Binder

The choice of binder depends on the intended application of the mortar. The following points are of significance in obtaining good pumping characteristics:

Slaked lime always produces grainy and firm, non-segregated mortar. It has proved to be extremely useful for blockages and in particular for sand types which do not pump well. It is generally useful to add lime to improve the pumping characteristics of the mortar.

Pure cement mortar must be regarded as dangerous. In this case, you should obtain a pumpable mixture by including additives in the mix.



Additives

Take extra care when choosing an additive from the extensive range which is available. We are only able to give general guidelines which relate to chemical additives, eg:

It has always proved to be useful to add a concrete liquifier without air-entraining agents and this also saves on water and improves the quality of the mixture (please contact local representatives or building materials suppliers for more information).

The following materials have also proved to be useful in practice for avoiding blockages in the case of sharp mortar:

Stone dust, fly ash etc.

If you are unsure of which mixture to use, please contact our specialist staff who will be pleased to prepare it for you. Please also bear in mind that we can only make recommendations for mixtures. The user is responsible for the quality and workability of a particular mortar.

Site mixes

The following are our non-binding recommendations for common mortar compositions:

Cement mortar

This can be used to plaster pedestals, concrete elements etc. It is composed of river sand and cement.

Mix ratios:

approx. 1 quantity (by volume) of cement, 2 of river sand (0–4 mm) and additive.

Basic plastering mortar

This is used to plaster brickwork.

Mix ratios:

Different mixtures are possible in this case, depending on the region, method of operation and the available materials:

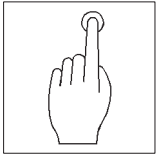
1 quantity (by volume) of slaked lime, 4 of river sand (0–4 mm) without the addition of mortar additive

or

1 quantity (by volume) of hydraulic powder chalk, 2 of river sand, 1 of pit sand (the sand quantities could be reversed if required, depending on the sand type

or

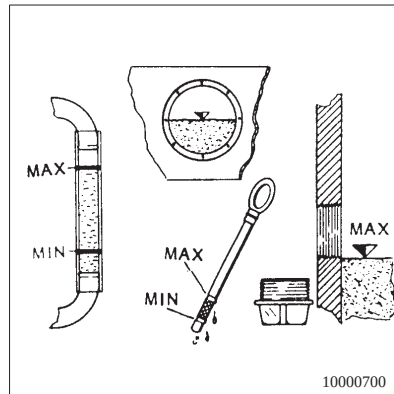
1 quantity (by volume) of cement, 0–5 of chalk, 3 of river sand, 1 of quarry sand (possibly with additives or air-entraining agents).



5.3 Starting up

When you accept the machines, you must make yourself so familiar with the equipment that damage and accidents cannot occur. Every time you use the machine, you accept full responsibility for the safety of anyone located in the machine's danger zone. You are therefore obliged to ensure the absolute operational safety of the equipment.

Functional fluids



Oil and fuel levels



Danger

Oils, fuel and other functional fluids may be injurious to health on contact with the skin etc.

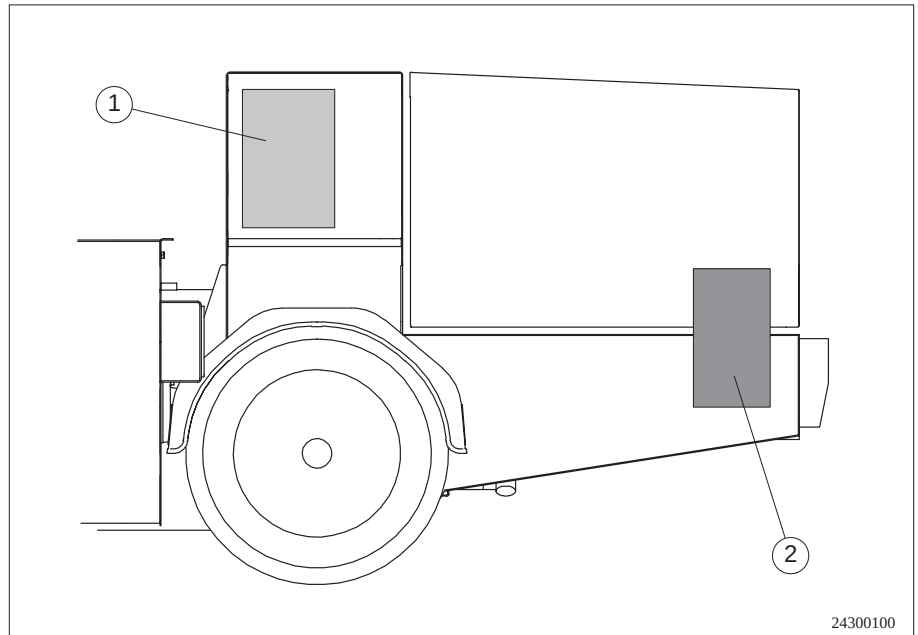
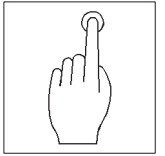
You must, therefore, always wear personal protective clothing and equipment when you are handling toxic, caustic or other functional fluids that are injurious to health and and always take note of the manufacturer's information.

Avoid naked flames near the machine and close the fuel tank when it has been topped up – risk of fire.



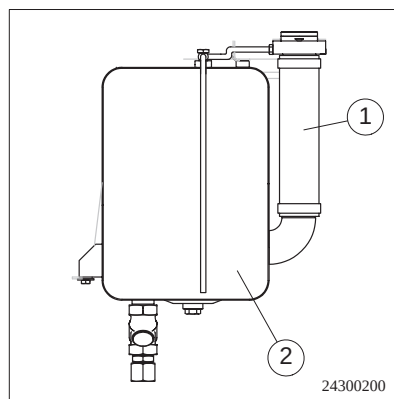
Note

The machine must be level when you check the functional fluids.

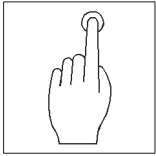


- 1 Hydraulic fluid level
- 2 Fuel tank

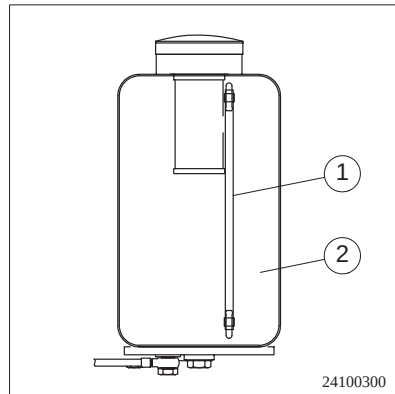
- Check the fuel level on the transparent hose located at the front end of the fuel tank.
- Check the hydraulic fluid level on the transparent hose on the hydraulic fluid reservoir.



- 1 Transparent hose
- 2 Hydraulic fluid reservoir

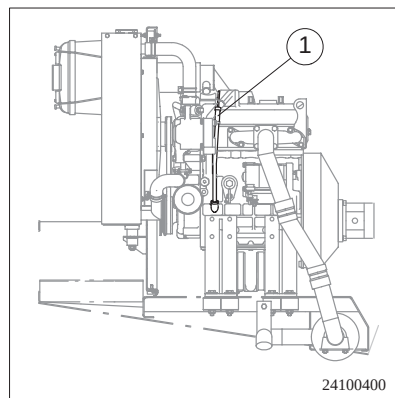


Fuel tank

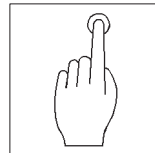


- 1 Transparent hose
- 2 Fuel tank

► Check the engine oil level using the engine oil dipstick.



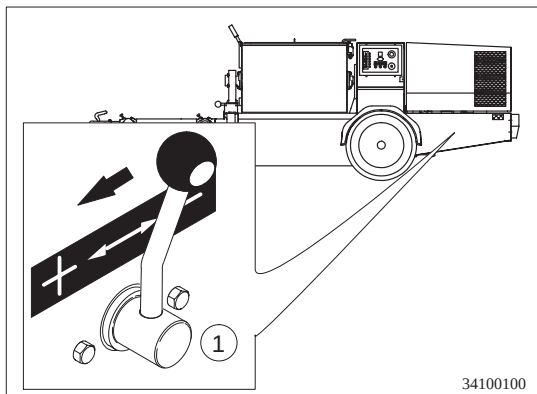
- 1 Engine oil level dipstick



Starting up

The starting up procedure is the same for a diesel car. The procedure is as follows:

- ▶ Shift the throttle lever to full throttle and open the air tap on the spray gun. The toggle switch for the agitator and the mixer must be set to 0 so that the diesel engine can start up on no-load.



1 Throttle lever

- ▶ Close the cover and lock it.
- ▶ Now turn the ignition key to the right to position 1. The Ready mode lamp will light up.
- ▶ Now turn the ignition key further to the right to position 2. The Glow lamp will light up and the preglow procedure begins. The Ready to start lamp will light up after approximately 9 seconds. Now start up the engine by turning the ignition key to the right.

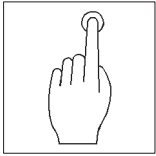


Caution

Do not allow the engine to preheat for longer than is necessary (20 seconds maximum) or the glow plugs and starter solenoid could be damaged!

Preheat the engine even when ambient temperatures are high.

- ▶ Now turn the throttle fully to the left. The engine is now running at idling speed.



5.4 Operation

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



Note

Should a malfunction occur when the pump is in operation, first consult the "Quick Troubleshooting Guide" chapter in these operating instructions. Call on the Putzmeister After Sales department if you are unable to rectify the fault yourself.

Mixing and starting to pump

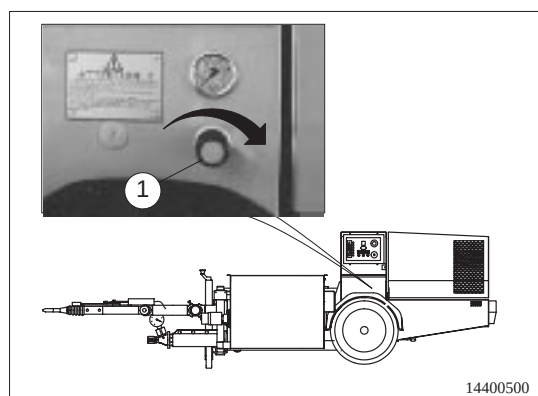
Pumping must generally be started with the aid of a cement grout.

Before you prepare the grout for lubricating the delivery line, you must check the mixer shaft and lifting device bearings to see if they are properly lubricated. Also, be sure to check the seals on the hose couplings.

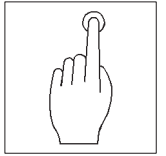
Rinse the delivery line out briefly with water before connecting it. Use one or two of the sponge balls provided as standard accessories soaked in water to do this.

Now mix in thin cement grout (approximately 20 litres) and add this to the hopper.

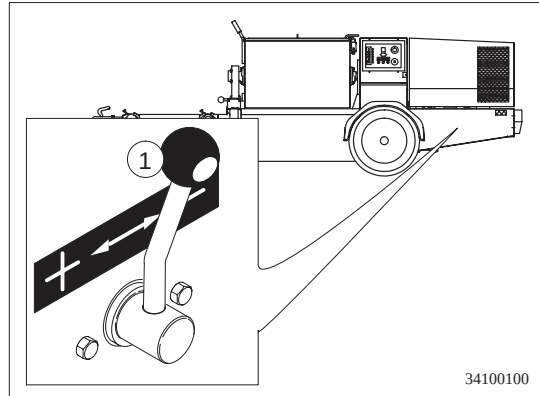
Check the output regulator to ensure that the rotary knob is turned completely to the right, ie is set at a very low level.



1 Rotary knob for the output regulator

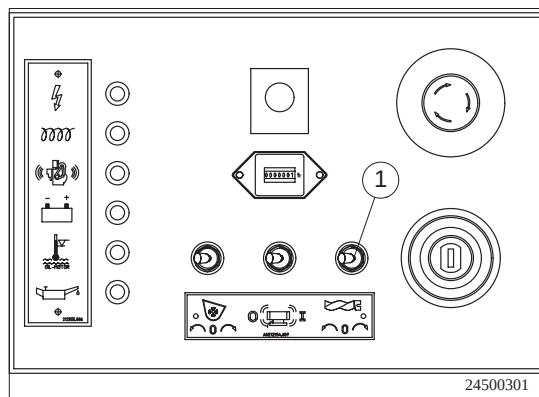


You may set the throttle lever to full power if this is the case.

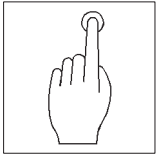


1 Throttle lever

Now switch the auger pump on at the switch on the control cabinet.



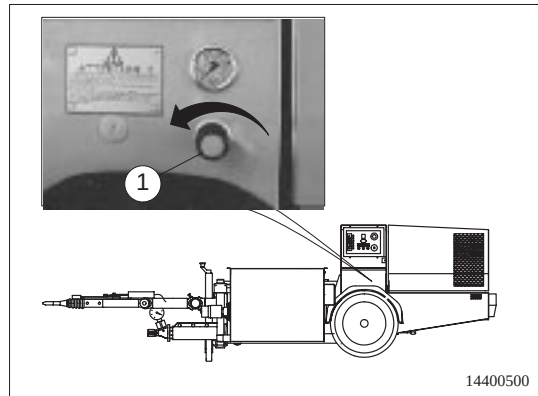
1 Pump on switch



Machine Operation



You may now start pumping by turning the output regulator slowly to the left.



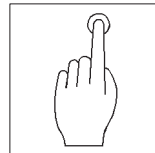
- 1 Turn the output regulator knob to the left



Caution

Make sure that you are completely familiar with the procedure for shutting down the system in the event of an emergency before you begin pumping operations.

You may change only the rate of output using the output regulator. This does not change the load on the diesel engine. Reducing the output will not improve the situation if the auger pump stops as the result of overloading. This will only be achieved if you reduce the load on the mortar pump (reduced hose length and larger hose diameter). The ideal pumping pressure is < 20 bar.

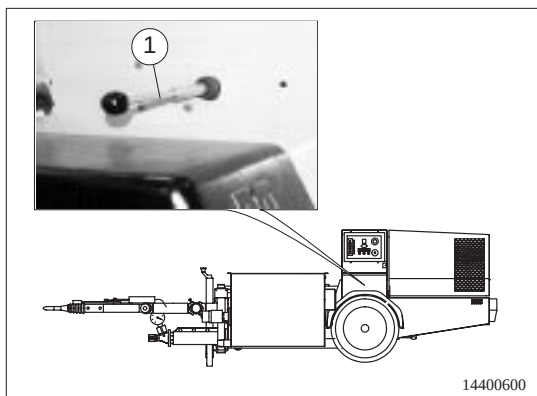


Mixing with the lifting mixer unit

The diesel engine should be on full power to mix the desired materials. This is particularly true in the case of materials which take a long time to mix or are extremely difficult to mix together.

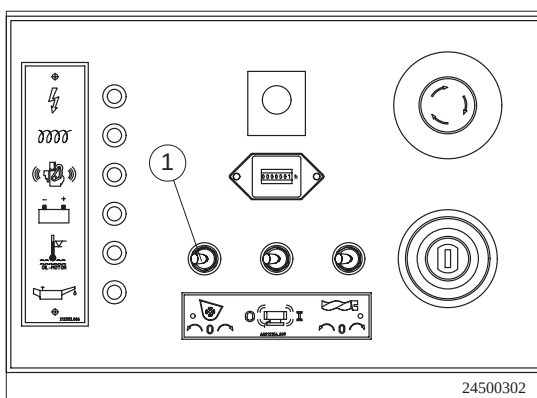
Easily-mixed materials use a mixer speed which allows the diesel engine to run at speeds reduced by approximately 15%. This, however, is only possible if the pump volume and the pump pressure are equally matched.

- Lower the mixer drum from the upper transport position. Use the hand lever valve located on the side of the frame to do this.

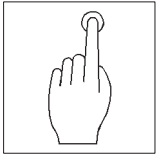


1 Hand lever valve for the mixer drum

- Now switch on the machine's mixing equipment by pressing the Mixer switch on the control panel.



1 Mixer switch



- Now mix the first mortar mixture in the mixer drum.

**Note**

First add water, then binder, then sand. Mix the first mortar mixture slightly fatter than normal. The mixture should be of trowel-quality.

Now empty the mixer drum into the hopper. Pump slowly until the material reaches the spray gun. You may now set the desired delivery rate.

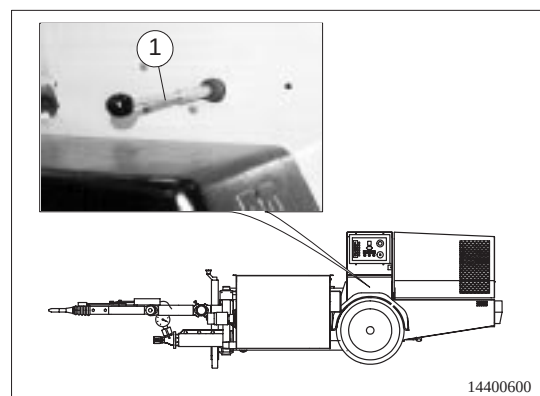
**Caution**

The mixer will switch off automatically during the lifting process.

Raising the mixer

You can lift the mixer using the hand lever valve on the side of the machine's frame.

The hand lever valve is always preset to zero position and is locked. Pull the hand lever out slightly to unlock it before operating it.

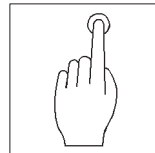


1 Hand lever valve

You must press the hand lever valve all the time when lifting or lowering the mixer drum. The reason for this is that the lifting device has a safety device which stops the mixer drum from lowering accidentally. This safety device is unlocked by retracting or extending the lifting cylinder.

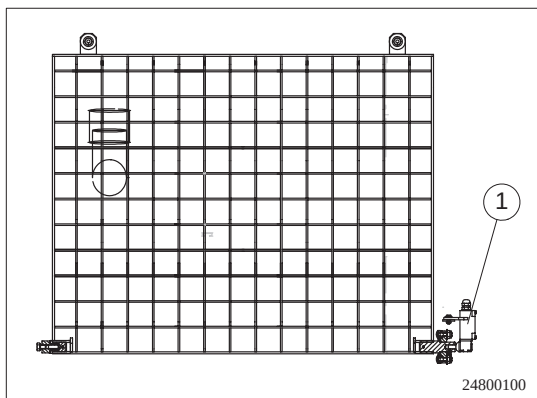
**Danger**

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



Mixer grille cut-out

The grille in the mixer drum is protected by an electrical switch which ensures that the mixer switches off automatically when the grille is opened and on again when the grille is closed.

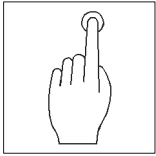


1 Safety switch



Caution

The grille must always remain locked when the mixer is raised. It could fall down and damage the machine if it is not locked.



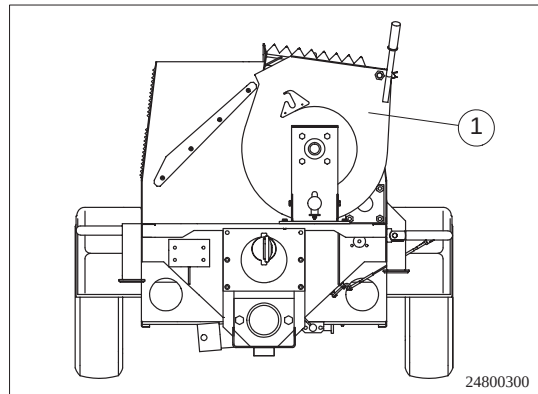
Machine Operation



Mixing with the tipping mixer unit

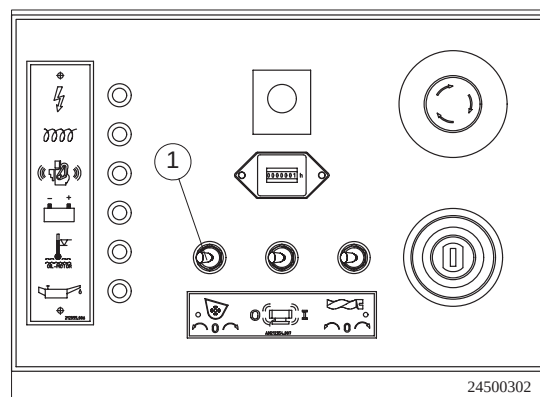
The diesel engine should be on full power to mix the desired materials. This is particularly true in the case of materials which take a long time to mix or are extremely difficult to mix together.

Make sure that the tipping mixer is in either the Fill or Transport position and is locked.

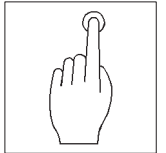


1 Tipping mixer unit in Fill position

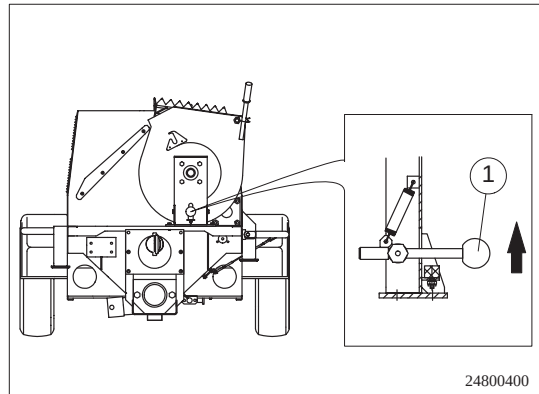
► Now switch the mixer on at the switch on the control cabinet.



1 Mixer on switch

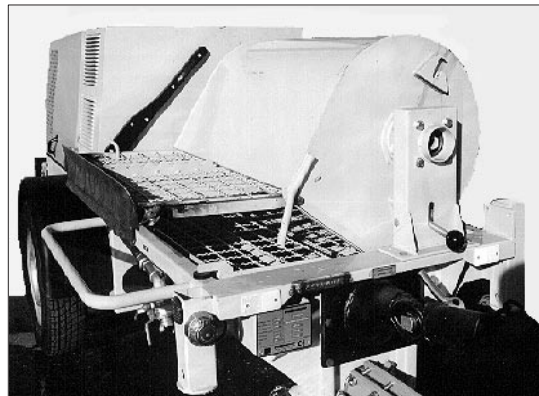


- Now hold the slewing mixer unit firmly by the handle and release the lock. To do this, push the locking handle on the spherical head upwards.



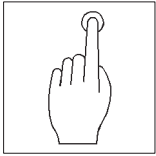
1 Locking handle

- Now rotate the mixer to the left in the direction of the hopper. The grille opens automatically and the mixer switches off. The mixer can now empty into the hopper and is automatically locked into the empty position once more.



The grille opens and the mixer switches off automatically when the mixer is rotated to the empty position.

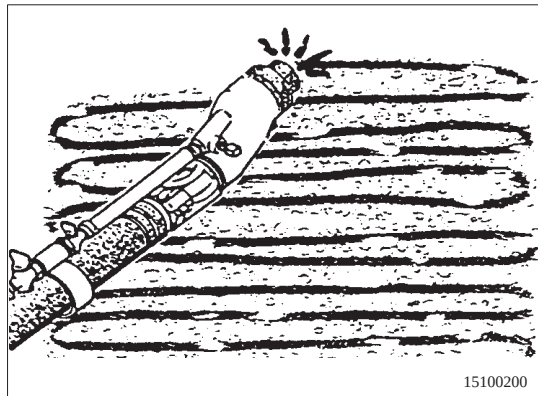
- Tip back to the Fill position once the tipping mixer unit has emptied. To do this, you must first lift the locking lever.



Mortar spraying

Once the pump is pumping you must empty the advance cement grout from the end of the delivery line, ie the spray gun, into a container. You may commence spraying as soon as the mortar appears.

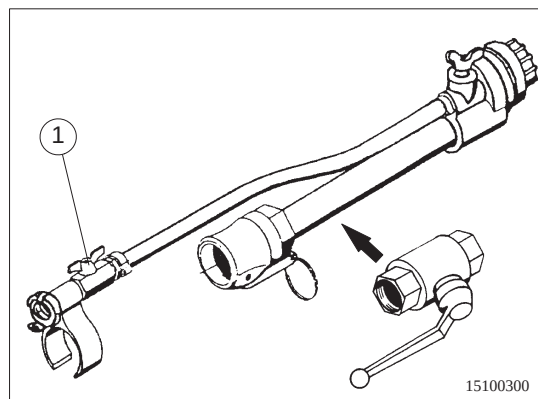
Guide the spray gun in smooth movements as close to the wall as possible. The ideal distance is around 20 cm. If possible, direct the mortar jet slightly upwards to cut mortar loss to a minimum.



Guide the spray gun back and forth in smooth movements

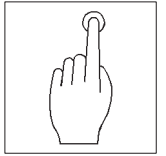
Interruption in work

You can interrupt the delivery process from the spray gun. Close the control tap on the air line. The pump will shut down after a short time. You can stop the flow of material immediately on a spray gun with isolator valve.



- 1 Control tap on the air line.
- 2 Isolator valve on the material line

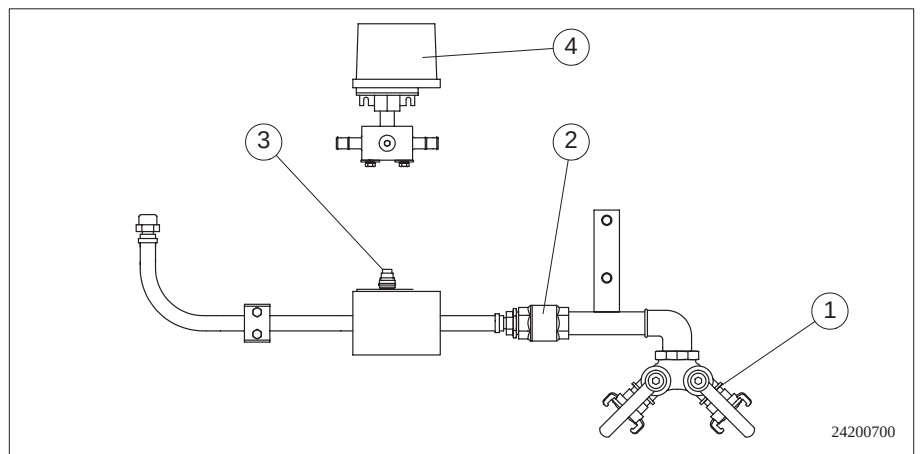
Switch off the machine during longer breaks. The agitator can also be switched off if you wish to continue mixing, thus avoiding segregation of critical materials.



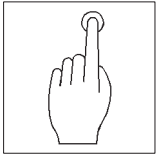
5.5 Pump control

Remote air control via the spraying apparatus is provided as standard equipment for pump control.

The air is pumped into the air battery from the compressor. From here, the air travels via a hose to the front of the machine. This is where the check valve and the double compressed air cock are located.



- 1 Double compressed air cock
- 2 Check valve
- 3 Pressure-relief valve
- 4 Pressure switch

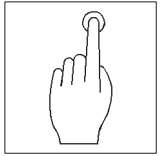


Controls and cut-outs in the diesel engine

The diesel engine has an electrical cut-out. It has one generator (18 ampere) and has an engine monitoring system.

This means that:

- ▶ Power is supplied by a 12 V, 70 Ah car battery.
- ▶ The diesel engine switches off automatically if the oil pressure drops or the cooling water overheats.
- ▶ The charge warning lamp lights up if the generator fails. The engine will not, however, switch off.
- ▶ The diesel engine runs at a speed of 2800 rpm under load and develops 15.6 KW of power.
- ▶ The 20 litre fuel tank is located behind the engine. The fuel is supplied via a fuel filter, a main fuel filter and the electrical fuel pump.
- ▶ You can get information on the diesel engine's performance from the operating hours meter on the control panel.



5.6 The mortar line

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



Note

Only Putzmeister couplings and fittings are guaranteed to comply with the values specified in the German "Unfallverhütungsvorschrift" (Accident Prevention Regulation).

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

Use 50 mm internal diameter hoses. We recommend the use of a 35 mm internal diameter end hose.



Caution

Only couple hose couplings which have been cleaned and have good condition. Soiled couplings are not properly sealed and allow water to leak out under pressure. This leads inevitably to blockages.

Well-graded sand with grain sizes up to 4 mm are easier to pump than fine beach sand (single grain sand).

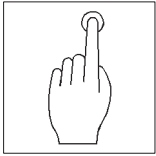
In general, grain size must not exceed 4 mm.

A good grain composition for plastering sand is as follows:

Grain size below 0.2 mm	=	5%
Grain size from 0.2 – 1.0 mm	=	60%
Grain size from 1.0 – 4.0 mm	=	35%

Binder

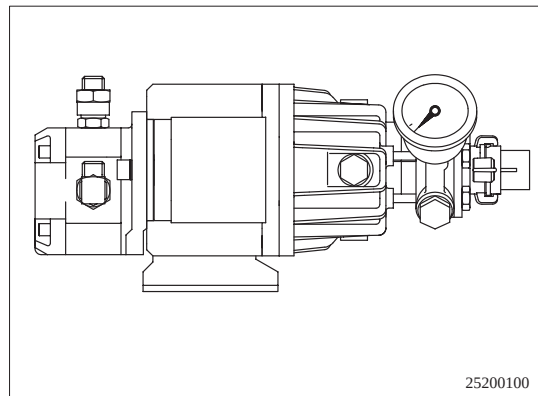
The choice of binder depends on the intended application the mortar. The following points are of significance in obtaining good pumping characteristics:



5.7 Cleaning

The machine and the delivery hose should be cleaned in the following sequence when the work is completed.

If required, a high-pressure water pump is available for the purpose.



High-pressure water pump

Machine

Clean the machine first, then the delivery line.

- ▶ Pump the hopper out and switch off the diesel engine.
- ▶ Allow the machine to pump in reverse for a short time and disconnect the delivery line.

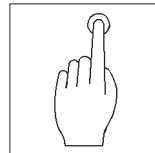


Danger

Before you disconnect the delivery line, check on the pressure gauge to ensure that the system is fully depressurized. You must wear protective goggles.

Turn your face away when opening the line coupling.

- ▶ Now wash the machine clean with water. Rinse out the hopper and mixer drum until it is clean.
- ▶ Now pump water from the hopper through the pump until the water begins to exit the the pressure connection cleanly once more. The machine is now fully cleaned out.
- ▶ Drain the leavings at the drainage connection and rinse the hopper out once more with water.
- ▶ Now clean the delivery line.



Delivery line

Use the sponge balls provided in the accessories to clean the delivery line.



Danger

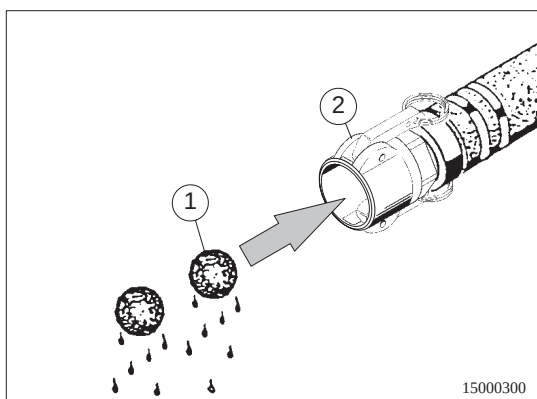
You clean the delivery line with compressed air at your own risk. Putzmeister accepts no liability for damage caused by compressed air cleaning.



Note

You will avoid wear on the auger pump if you use a water pump to clean the delivery line.

- Push a water-soaked sponge ball into the delivery line. Reconnect this to the machine. Then pump water from the hopper into the line so that the sponge balls and leavings are pushed forwards. Repeat this procedure until the delivery line is clean.

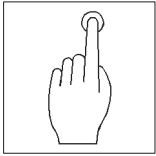


- 1 Sponge ball
- 2 Delivery hose



Caution

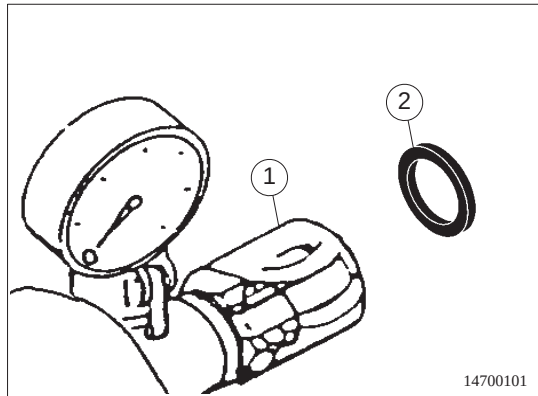
You should empty any residual water out of the delivery line to avoid the risk of the delivery line bursting.



Machine Operation



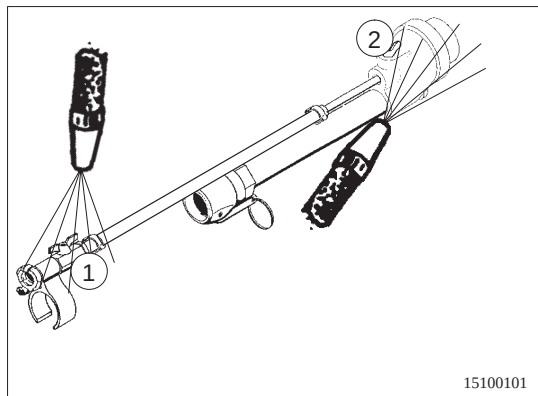
Clean all seals and the seal seats. Grease the seals before re-assembling them. Soiled couplings are not sealed and necessarily lead to blockages.



- 1 Pressure connection
- 2 Rubber seal

Spray gun

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



- 1 Air cock
- 2 Air nozzle tube



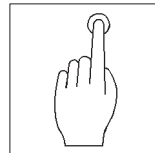
Caution

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



Note

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



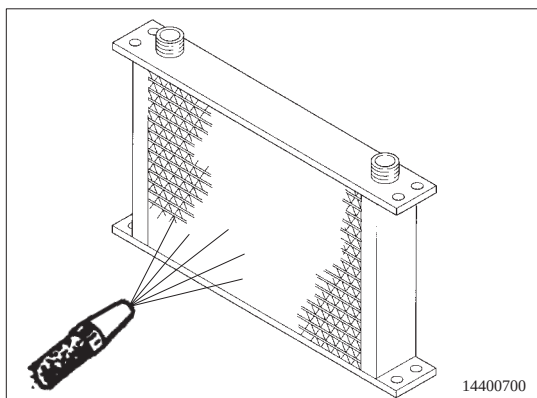
Diesel engine radiator

Switch off the diesel engine and spray the radiator inside and out with a water jet.



Caution

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



Spray the radiator down with a water jet



Caution

Do not use high-pressure cleaning apparatus. The fins in the radiator could be bent by the high pressure jet.

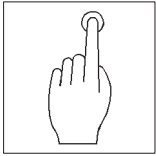


Note

Use a water hose with the correct nozzle to clean the radiator. A line pressure of 4 bar is sufficient for this purpose.

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 radiator fins are not damaged while doing this.



5.8 Blockages – causes/remedies

Blockages can occur inside the pump itself as well as in the delivery line. You can recognise this by the pump not delivering while the pressure on the pressure gauge increases. The engine stalls in the event of a blockage inside the pump.

Blockages can be avoided. However, they do still occur from time to time:

- as a result of insufficient lubrication of the delivery line,
- as a result of mortar which is hard to pump and segregates easily,
- as a result of leaks in the delivery line couplings.

Rectifying blockages

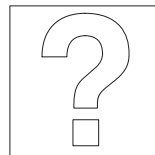
Rectify blockages as follows:

- ▶ Pump in reverse for a short time to decrease the pressure in the delivery line.
- ▶ Switch off the diesel engine.
- ▶ Uncouple the delivery line and clear the blockages in the line by shaking and tapping it.
- ▶ Rinse the line out with water if necessary.
- ▶ When you start the engine up again, add a cement grout to the delivery line.



Danger

You should only uncouple the delivery line when you have checked on the pressure gauge that the system is fully depressurized.



6 Quick Fault Assistance

This chapter gives you a summary of faults and their possible causes, and also ways in which you may rectify them.

6.1 SP11 in general

This chapter describes the possible causes of defects which may affect the SP11 and how to rectify them.

The diesel engine will not start.	
Cause	Remedy
No starting sound is audible or the starter is only rotating very slowly.	Check whether the battery still has a voltage. The switches for the auger pump and the mixer must be in the zero position.

The starter is turning quickly, but the engine is still not starting.	
Cause	Remedy
Too little fuel in the tank. Defective glow plugs. The fuel pump is defective.	Check whether there is sufficient fuel in the tank. Check on the diesel engine to see if the release magnet mounted on the fuel injection pump is switching. If it is not, please contact your specialist workshop.



Quick Fault Assistance



The diesel engine switches itself off during operation.

Cause	Remedy
Lack of fuel, lack of oil, lack of cooling water, thermal over-load.	Top up with fuel. Check the fuel lines for kinks and leaks. Check the engine oil level and top up with oil if necessary. Top up the cooling water. Check the cooling apparatus for contamination or foreign bodies.



Danger

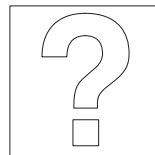
Allow the diesel engine and cooling apparatus to cool down before topping up the cooling water. Risk of scalding.

The diesel engine is not performing to full capacity, is emitting large amounts of soot and is stalling.

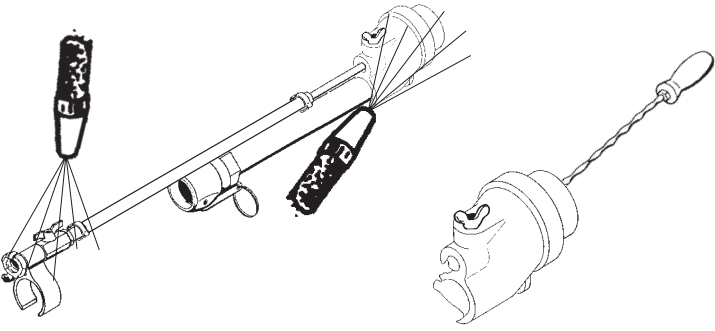
Cause	Remedy
The air filter is contaminated.	Replace the air filter cartridge.

The mixing unit in the mixer drum is not working.

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



The machine will not start up despite the compressor being switched on.

Cause	Remedy
A blocked air nozzle tube in the spraying device causing an insufficient drop in pressure in the remote control.	Clean the air nozzle tube and the air line. 

The mortar is discharging alternately thick and thin.

Cause	Remedy
The lack of water causes the mortar to thicken too much, thus increasing the pressure and reducing the delivery rate. The uniform addition of water results in the liquification of the material. This fault may be the first indication that the auger parts are worn.	Re-tighten or replace the auger parts.

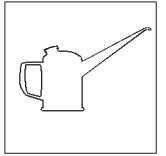


Quick Fault Assistance



Interrupted mortar flow.	
Cause	Remedy
The material is reaching the end of the hose irregularly and is spraying with force.	Check whether the hopper is nearly empty thus allowing air to be sucked in. For this reason, always ensure that there is sufficient material in the hopper.
The flow of material is being constantly interrupted without spraying.	Check whether the air tap on the spray gun is completely open. Check whether the delivery line is forming a loop or is kinked. Check on the spray gun to see if the air nozzle pipe is clear. It must be cleaned with the spike included in the accessories if this is the case.

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



7 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 emphasize 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.

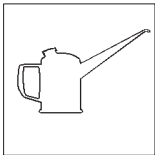
7.1 Maintenance intervals

The following table shows the intervals for the various maintenance tasks. The associated maintenance charts can be found further on in this chapter.



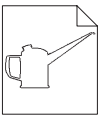
Note

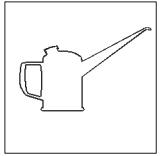
Have the initial after-sales service carried out after the first 100 operating hours by a Putzmeister Mörtelmaschinen GmbH After Sales service engineer, or by a dealer authorized by Putzmeister Mörtelmaschinen GmbH. The machine operator responsible for the machine should be present for this service.

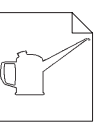


Maintenance



Assembly	Action	daily	weekly	annually	as required	other intervals	
General	Visual and function check on all safety equipment	•					40–001
	Check threaded unions against tightening torque table				•		—
	Visual inspection of electrical cabling	•					40–001
	Check all wear parts	•					—
	Check delivery line and couplings	•					—
Hydraulic system	Have the hydraulic components inspected by an authorized inspector from Putzmeister Mörtelmaschinen GmbH			•			—
	Check hydraulic fluid level	•					
	Change the hydraulic fluid					after 500 operating hours	44–005
	Change the hydraulic fluid filter				•	at initial after-sales service	44–003
Transmission	Change transmission oil					every 3 years	—
	Check mixer bearings for tightness		•				—
Auger pump	Auger wear check	•					46–003
Pressure connection	Pressure connection wear check				•	after 500 operating hours	—
Hopper	Grease agitator bearings	•					—
	Check agitator cut-out	•					—
Running gear	Check tyre pressures					before each journey	—
	Check brake function					before each journey	—
	Adjust overrunning brake				•		49–001
	Grease overrunning brake equipment and axle		•			after approx. 500 km	40–003
	Check wheel nuts					after the first 50 km or 50 km after every wheel change	—
	Check the play in the wheel bearings and adjust if required					after the first 100 km every 500 km	—
	Grease wheel bearings					after approx. 13000 km	—



Assembly	Action	daily	weekly	annually	as required	other intervals	
Drive motor	Check the oil level	•					—
	Check air filters	•					44-020
	Full oil change	In accordance with the engine manufacturer's maintenance specifications.					
	Changing the oil filter						
	Clean the solenoid					every 6 months	41-003
Spray gun	Clean and grease the spray gun	•					—
Compressor	Check the oil level	•					
	Full oil change	•					44-019

7.2 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.

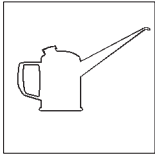
Bolts with adhesive in the locking threads and self-locking nuts must always be replaced after removal.

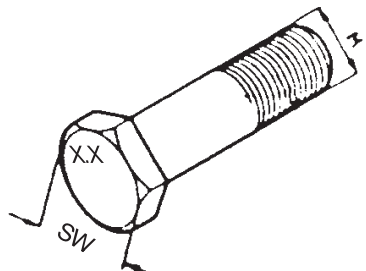
The tables below give the maximum tightening torques (maximum torque) in Nm for a friction factor of $\mu_{\text{total}} = 0.14$, with the thread lightly-oiled or lightly-greased.

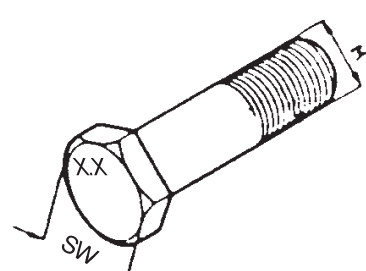


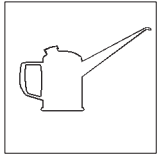
Note

All tightening torques $\times 1.1$ apply for bolts with cement in the thread.



Set screws – metric triangular thread, DIN 13, Part 13					
	Dimensions [mm]		Tightening torque Md [Nm]		
	M	SW	8.8	10.9	12.9
 10000900 SW = Width across flats X.X = Grade 8.8, 10.9, 12.9	M 4	7	3.0	4.4	5.1
	M 5	8	5.9	8.7	10
	M 6	10	10	15	18
	M 8	13	25	36	43
	M 10	17	49	72	84
	M 12	19	85	125	145
	M 14	22	135	200	235
	M 16	24	210	310	365
	M 18	27	300	430	500
	M 20	30	425	610	710
	M 22	32	580	820	960
	M 24	36	730	1050	1220
	M 27	41	1100	1550	1800
	M 30	46	1450	2100	2450

Set screws – metric precision thread DIN 13, Part 13					
	Dimensions [mm]		Tightening torque Md [Nm]		
	M	SW	8.8	10.9	12.9
 10000900 SW = Width across flats X.X = Grade 8.8, 10.9, 12.9	M 8 × 1	13	27	39	46
	M 10 × 1.25	17	52	76	90
	M 12 × 1.25	19	93	135	160
	M 12 × 1.5	19	89	130	155
	M 14 × 1.5	22	145	215	255
	M 16 × 1.5	24	225	330	390
	M 18 × 1.5	27	340	485	570
	M 20 × 1.5	30	475	680	790
	M 22 × 1.5	32	630	900	1050
	M 24 × 2	36	800	1150	1350
	M 27 × 2	41	1150	1650	1950
	M 30 × 2	46	1650	2350	2750



7.3 Lubricant recommendation

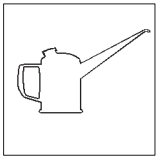
We have listed the suitable lubricants in the table below. Putzmeister accepts no liability for the quality of the lubricants listed or for changes in quality made by the lubricant producer without changing the grade designation.



Note

Putzmeister accepts no liability for damaged caused by mixing oils from different producers.

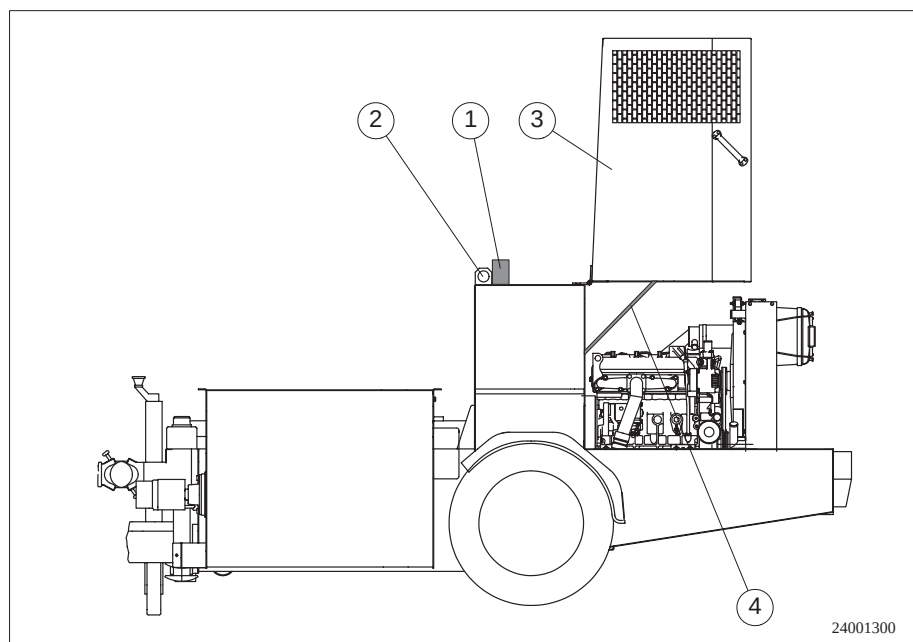
	Engine oil	Transmission oil		Lubrication (manual)	Centralized lubrication system
Marking in accordance with DIN 51502	HD	HYP		K2K-20	K1K-20
Requirements standard	API CD/SF	API GL4		DIN 51 825	DIN 51 825
Characteristics	mineral			mineral, lithium soap	
Viscosity grade, NLGI Class	SAE 15W-40 DIN 51511	SAE 90 DIN 51512 standard	SAE 80 DIN 51512 winter	NLGI Class 2 DIN 51818	NLGI Class 1 DIN 51818
	Part no. 000173005	Part no. 000101006	—	Part no. 360000009	Part no. 360001008
	Aral Multi Turbol engine oil SAE 15W-40	Aral transmission oil HYP SAE 85W-90	Aral transmission oil HYP SAE 80W	Aral Aralub HL 2 Aral multipurpose grease	—
	BP Vanellus Multigrade	BP Energear EP 90	BP Energear EP 80W	BP Energear LS 2 BP multipurpose grease L2	BP Energear LS-EP 1
	DEA Cronos Super DX SAE 15W-40	Deagear EP-A SAE 85W-90	Deagear EP-A SAE 80W	Glissando 20	Paragon EP 1
	ELF PERFORMANCE XC 15W-40	TRANSELF EP SAE 80W-90	TRANSELF EP SAE 80W	ELF MULTI 2	ELF ROLEXA 1
	ESSOLUBE MHX 15W-40	ESSO GEAR OIL GP-D 85W-90	ESSO GEAR OIL GP D 80W	BEACON 2	BEACON EP 1
	Mobil Delvac Super 1300	Mobilube GX 85W-90A	Mobilube GX 80W-A	Mobilux 2	—
	Shell Rimula TX	Shell Spirax EP 90	Shell Spirax MA 80 W	Shell Retinax A	Shell Alvania EP grease 1
	Wintershall Multi-Rekord	Violin Multipurpose trans- mission oil 85W-90	Violin Multipurpose trans- mission oil 80W	Wiolub LFK 2	Wiolub LFM 1



7.4 Maintenance work in the engine compartment

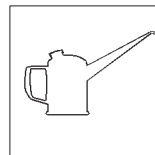
You must proceed as follows in opening the engine cover before you carry out any maintenance work in the engine compartment:

- ▶ Place a timber block on the Targa frame between the lifting eye and the engine cover.
⇒ This ensures that the engine cover is not damaged by the lifting eye when it is folded open.
- ▶ Raise the engine cover as far as the stop.



- 1 Timber block
- 2 Lifting eye
- 3 Engine cover
- 4 Gas-filled spring

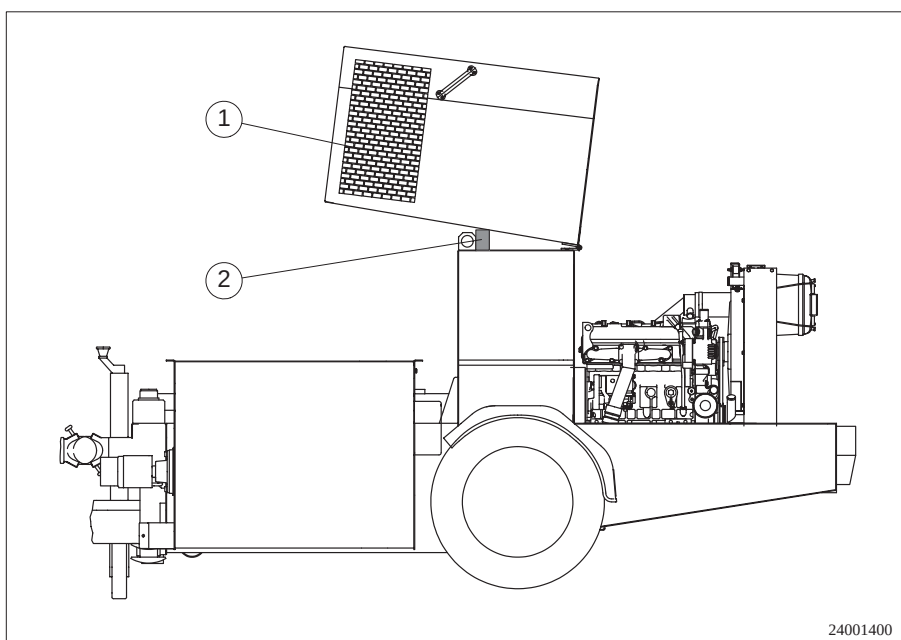
- ▶ Now use a screwdriver to lift the retaining strap for the pivot joint at the head of the gas-filled spring slightly or remove it (keep in a safe place).
- ▶ Lift the engine cover slightly and detach the gas-filled spring device moving it to one side.
- ▶ Now repeat the same procedure on the opposite side of the machine.



Danger

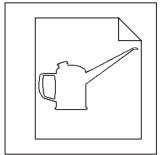
The engine cover could fall once both gas-filled springs have been detached – risk of injury.

For this reason, rest the engine cover back on the timber block as soon as the gas-filled springs have been detached.



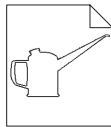
- 1 Engine cover
- 2 Timber block

The engine compartment is now freely accessible.



Visual checks

This maintenance chart describes visual checks which you must carry out before each maintenance task. 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.



Danger

Inspect the electrical cables particularly closely and carefully. There is a danger of flash over from damaged cables, particularly when there is high air or ambient humidity.

General

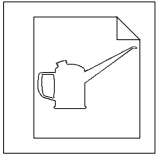
The general visual inspections which follow should be carried out before each job as well as before all maintenance work.

- ▶ Check that all safety equipment is available and in a fully functioning condition.

Electrical system

Should you locate any damage to the electrical system, you must have the damage rectified immediately by a qualified electrician.

- ▶ Check that all electrical connections are secure and free from corrosion.
- ▶ Check that the electrical cables have no breaks.
- ▶ Check the insulation on the electrical cables.



Maintenance Chart

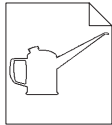
40-006

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Lubrication diagram

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

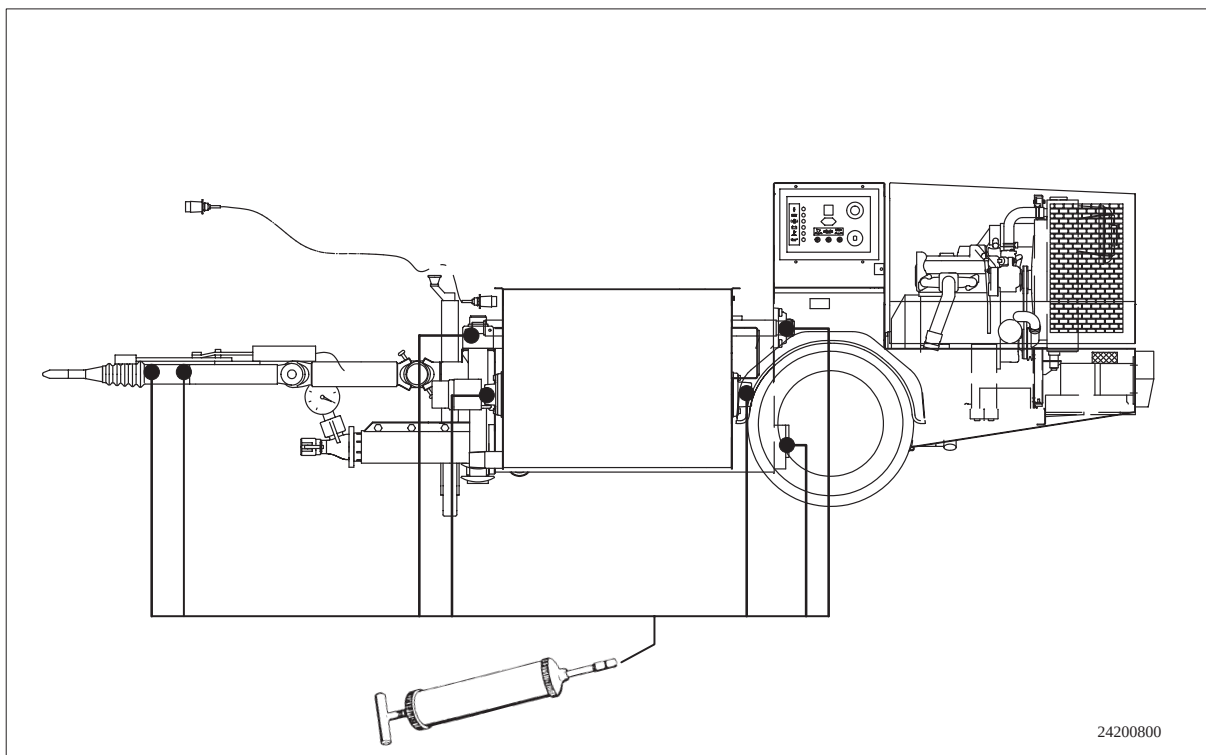


No further maintenance charts required.

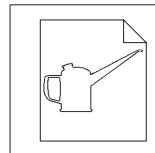


The following special tool is required:
Grease gun

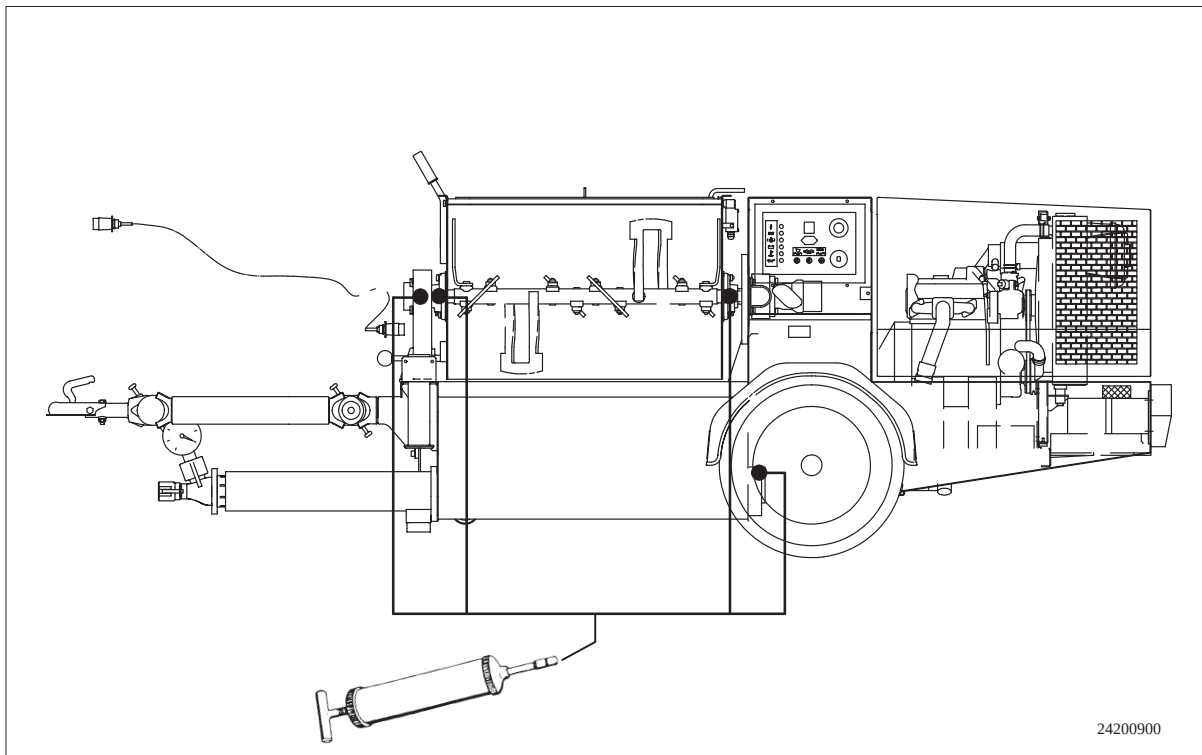
Lifting mixer



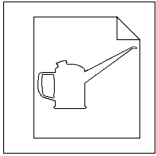
Lubricate the machine at the lubricant nipples using the grease gun.



Tipping mixer



Lubricate the machine at the lubricant nipples using the grease gun.



Maintenance Chart

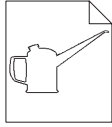
41–003

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Cleaning the solenoid

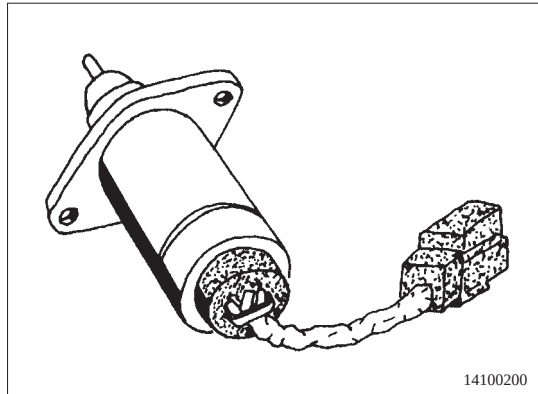
This maintenance chart describes how to clean the solenoid. The maintenance intervals are shown in the maintenance summary at the start of this chapter.



No further maintenance charts required.



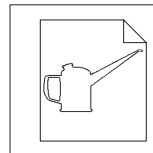
No special tools required.



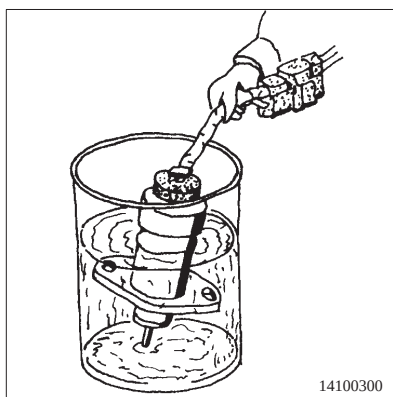
1 Diesel engine solenoid

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

- Connect the solenoid to a power source:
 - Black to negative
 - Blue/red and white to positive
 - Amperage 50 A
 - Cable size 2.5



- Then immerse the unconnected solenoid approximately half way into a container filled with paraffin.



Immerse the solenoid half way up in paraffin



Caution

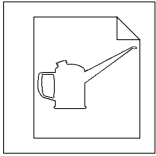
Never use petrol or water. Petrol attacks the rubber components and water can corrode.

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



Caution

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



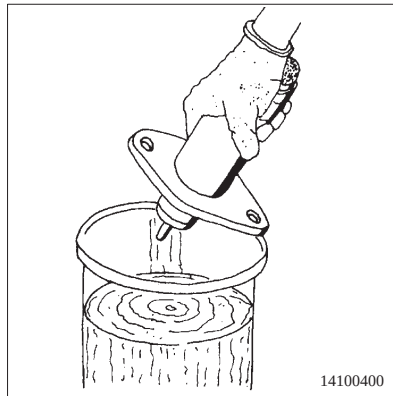
Maintenance Chart

41-003

Page 3 of 3



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



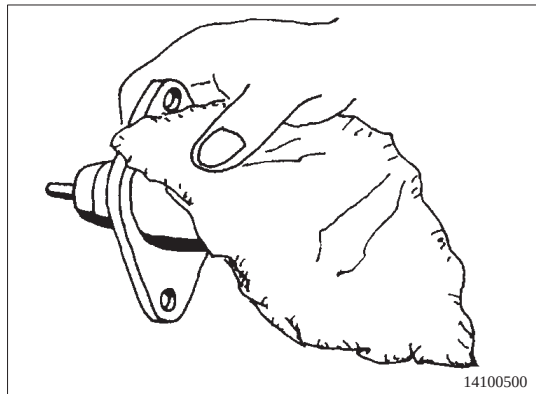
Remove the solenoid from the paraffin-filled container.



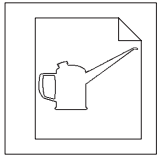
Caution

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

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

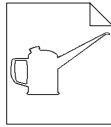


Rub down the solenoid with a cleaning cloth



Fitting the ribbed V-belt on the compressor

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



No further maintenance charts required.



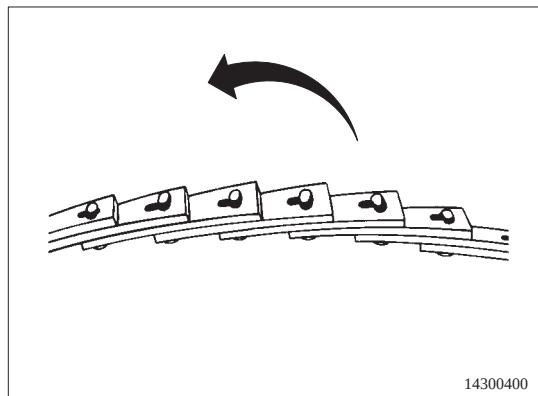
The following special tool is required:
Special spanner

The ribbed V-belt is distinguished from conventional V-belts by ease of maintenance and long service life.

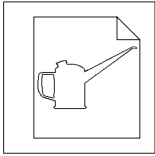
It has been fitted pretensioned and thus does not require a tension roller.

Direction of travel

The ribbed V-belts operate equally efficiently in both possible directions. The recommended direction of travel, however, is illustrated in the following picture.



Recommended direction of travel



Maintenance Chart

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Assembly

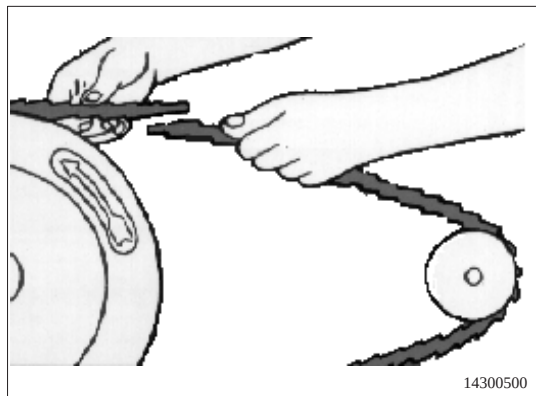
Proceed as follows if you do not know the length of the belt:

- Use the spanner included with the belt to remove an approximate length from the roll.

To remove: turn the rivet heads 90°. Insert the spanner and tilt it.

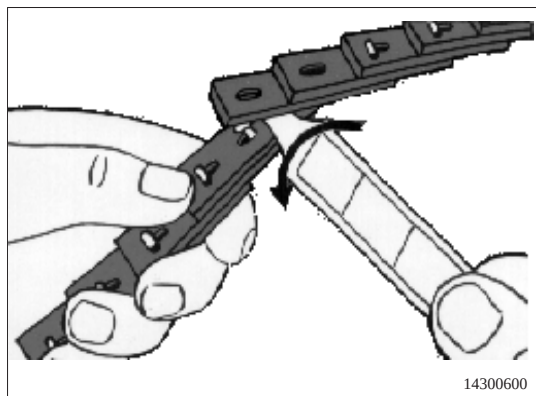
To fasten: push the rivets through the holes in the V-belt and turn the rivets 90° using the spanner.

- Place the belt around the V-belt pulley to determine the length.

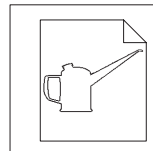


Determining the length of the belt.

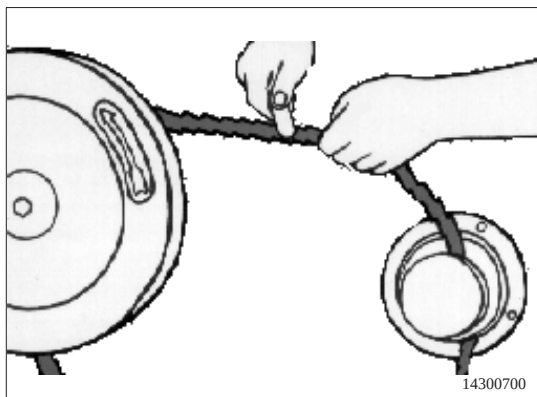
- Count the links and remove one link in 11 to obtain the required pretensioning.



Removing the ribs

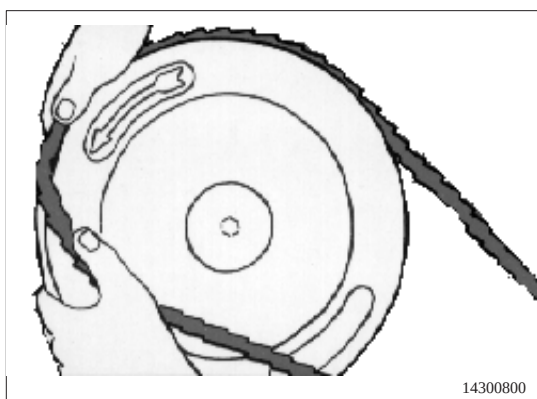


- Now place the belt around the V-belt pulley axles and join it up.



Joining up the V-belt

- Place the belt in the groove of the small V-belt pulley. Now rotate the large pulley slowly to allow the links to sit in the groove.

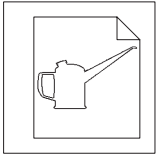


Allowing the V-belt to sit in the groove



Note

The ribbed V-belt pretension is approximately 2–3 times higher than that of conventional V-belts (8–9% of belt length).



Maintenance Chart

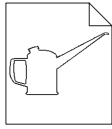
44-001

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Hoses

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



No further maintenance charts required.



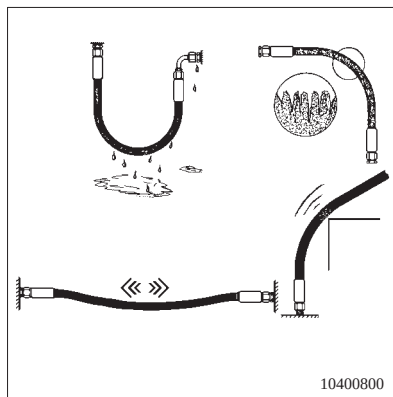
No special tools required.



Note

Check all hoses (including hose fittings) with the machine running. You must replace the hoses at the slightest sign of damage or even mere indications of threatened damage.

Leaking hoses



Check hydraulic hoses

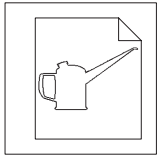
Dark and moist patches on the fitting are external signs of incipient damage. Check

- the hoses for kinks, cracks or a porous surface and
- whether the hoses have been laid without restrictions.

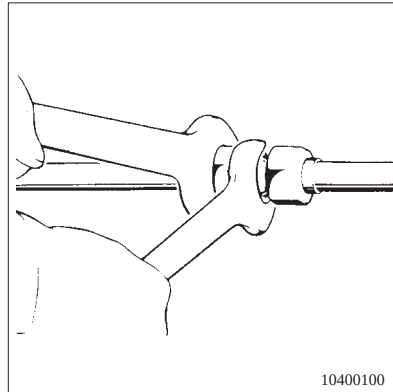


Note

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



Flared screwed joints



Tighten until there is a clearly perceptible increase in force

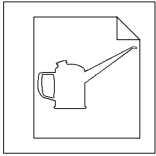
- Check whether the flared screwed joints are tight.



Note

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

Flared screwed joints					
External diameter	Model	Md [Nm]	External diameter	Model	Md [Nm]
6	L	20	18	L	120
8	L	40	20	S	250
12	L	55	25	S	400
	S	80	30	S	500
15	L	70	38	S	800
16	S	130			



Maintenance Chart

44-001

Page 3 of 3



Replacing hoses

The procedure for replacing hoses is as follows:

- ▶ Shut down the machine and secure against unauthorized starting.
- ▶ Dump fully any (residual) pressure in the hydraulic system.



Danger

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

- ▶ Take care when undoing the joints.
- ▶ Close the connection points with a plug immediately you have removed the old hoses. No dirt may enter the hydraulic circuit and the hydraulic circuit must not be drained.



Danger

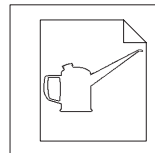
Hoses may not be more than six years old, including a storage period of two years. Take note of the date of manufacture on the hoses.

- ▶ Keep the hoses free from dirt.
- ▶ Fit the hoses to be free from bends or points of abrasion.
- ▶ Bleed the hydraulic system.
- ▶ Carry out a test run and inspect all hoses again after fitting new hoses.



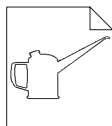
Environmental protection

Collect escaping fluid in a collector and dispose of it in an environmentally friendly manner.



Setting values for the water pressure and compressed air switches

This maintenance chart describes how to set the values for the water pressure and compressed air switches.



No further maintenance charts required.



No special tools required.

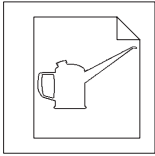
Preparation

You must remove the casing covers for the switches before you set the water pressure switch.

- ▶ Remove the central screw on the cover with a screwdriver.
- ▶ Pull the cover upwards to remove.

Setting values

Compressed air switch	On setting	1.8 bar
	Off setting	2.3 bar



Maintenance Chart

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To adjust

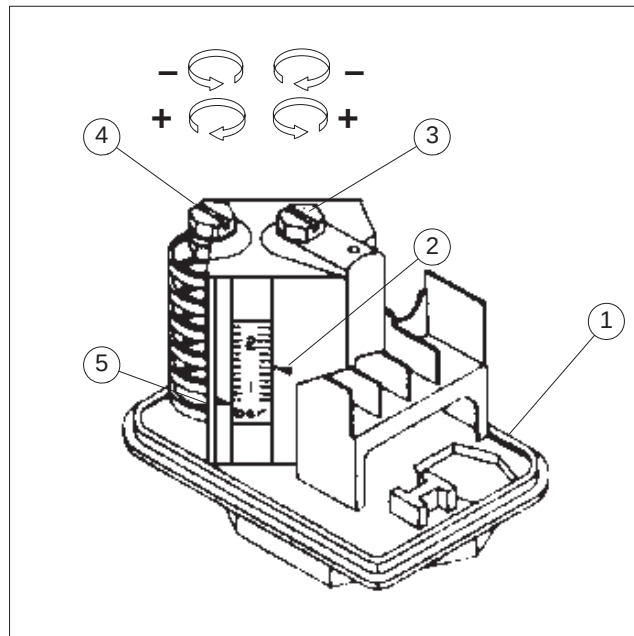
Use a suitable screwdriver and proceed as follows:

- ▶ Set the upper switching value you require using screw 3.
⇒ The setting value is displayed on scale 2.
- ▶ Set the lower switching value you require using screw 4.
⇒ The setting value is displayed on scale 5.



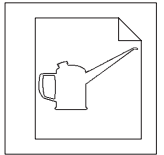
Note

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



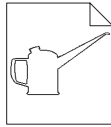
- 1 Pressure switch
- 2 Pressure display for the upper switching value
- 3 Adjusting screw for the upper switching value
- 4 Adjusting screw for the lower switching value
- 5 Pressure display for the lower switching value

- ▶ Refasten the cover to the casing with the bolt.



Changing the oil in the compressor

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



No further maintenance charts required.



No special tools required.



Note

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

Change the oil once the compressor has warmed up.



Note

Use engine oil graded SAE 15 W 40. Putzmeister Mörtelmaschinen GmbH recommends VEBA OEL Logenta Universal oil or Virada Longlife.

Preparation

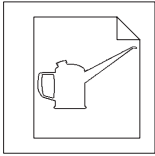
The following tasks must be completed before starting the full oil change:

- Switch off the machine.



Environmental protection

Always collect the old compressor oil. Guard against oil spillage. Comply with regulations when disposing of any oil caught.



Maintenance Chart

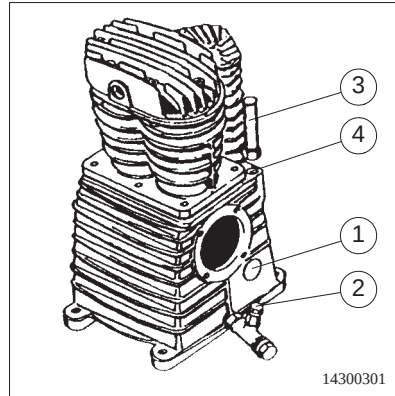
44-019

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Full oil change

Carry out the following steps for a full oil change:



- 1 Inspection glass
- 2 Drain plug
- 3 Oil filler cap
- 4 Oil filler

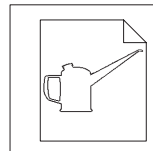
- ▶ Place an oil drain pan under drain plug (2).
- ▶ Slowly unscrew drain plug (2) and let the oil drain into the oil sump pan.
- ▶ Open the oil filler cap to speed the process of draining.
- ▶ Once the used oil has completely drained, screw the drain plug back into the drain opening and tighten it.
- ▶ Now add new oil through the filler pipe until the oil level is visible in the middle of the inspection glass.
- ▶ Close the oil filler cap securely.



Note

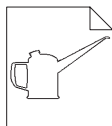
The oil filler cap (3) must be washed out once a month.

The filter in the oil filler cap must be washed out regularly with naphta, kerosene or similar. This is the only way to guarantee the flow of oil inside the compressor.



Changing and cleaning the dry air filter

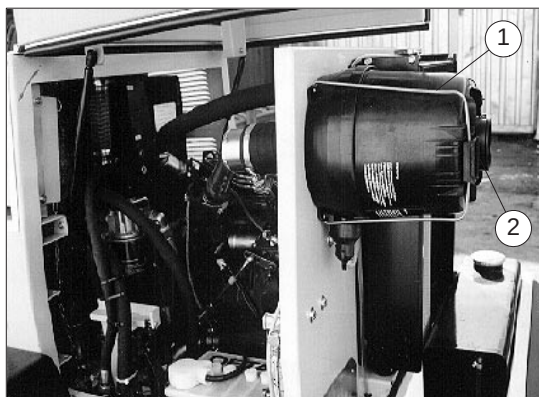
This maintenance chart describes how to clean the dry air filter. The maintenance intervals are shown in the maintenance summary at the start of this chapter.



No further maintenance charts required.

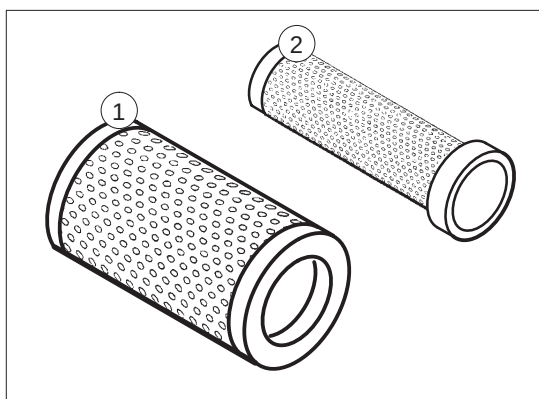


No special tools required.



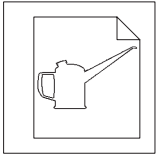
- 1 Retaining clips
- 2 Filter cover

► Open the retaining clips and carefully remove the filter cover.



- 1 Main filter element
- 2 Backup filter element

► Carefully remove the main filter element. Ensure that the dust is not removed from the filter while it is still in the casing.



Maintenance Chart

44-020

Page 2 of 2



Note

The main filter element should be replaced after the third cleaning, or annually. The backup filter element protects the engine from damage for a limited time if the main filter element is damaged.

The backup filter element must not be cleaned. It should be changed after either the third cleaning of the main filter element or at least once a year.

Be sure to replace the backup filter element as well if you notice that the main filter element is damaged when you check it.

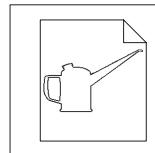
- ▶ Check the main filter element for damage and then clean it inside and out with compressed air. Change the filter element if the machine is very dirty or there are heavy oil deposits.



Face-mask and respiratory protector

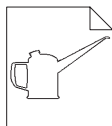
A face-mask and respiratory protector protect you against particles of dust entering your body through your respiratory passages.

- ▶ Clean the sealing surface and the inside of the outlet pipe.
- ▶ Reassemble the parts in reverse order.



Changing the hydraulic fluid

This maintenance chart describes how to carry out a full fluid change on the hydraulic system. You will find the maintenance intervals in the maintenance summary at the start of this chapter.



Refer also to the maintenance charts:

Function checks

Hydraulic filter change

Hoses



No special tools required.



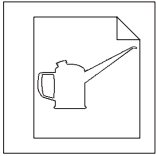
Note

Cleanliness is of the greatest possible importance in the maintenance of hydraulic systems. You must make it impossible for dirt or other impurities to enter the system. Even small particles may cause valves to be scored, pumps to seize and throttle and control bores to become blocked. Never leave the reservoir lid open longer than necessary.

Preparation

The following tasks must be completed before starting the full fluid change:

- ▶ Switch the pump off.
- ▶ Switch the power unit off.
- ▶ Secure the machine against unauthorized starting – switch off the ignition lock.
- ▶ Secure your working area and fix notices to the locked controls and setting devices.



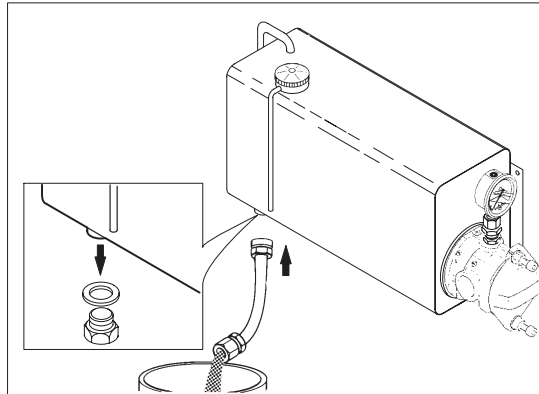
Maintenance Chart

44-021

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Full fluid change

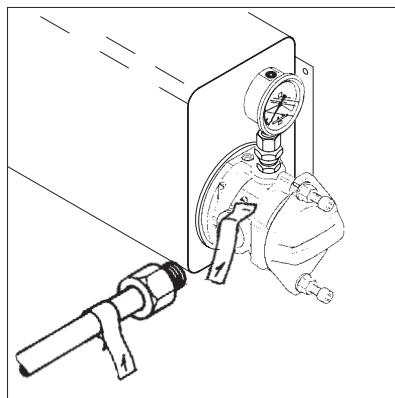


Draining off the fluid



Environmental protection

You must make sure you collect the old hydraulic fluid and dispose of it in accordance with the regulations. Biologically degradable hydraulic fluids must also be disposed of separately from other waste, just like mineral hydraulic fluids.



Marking the hoses



Note

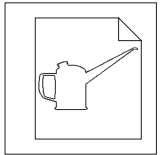
Mark the hoses and their connection points for re-assembly.

- ▶ Wipe out all the openings with a lint-free cloth. Wipe as far into the reservoir as possible when doing this. You should also remember that there may also be separate apertures intended for tank cleaning.

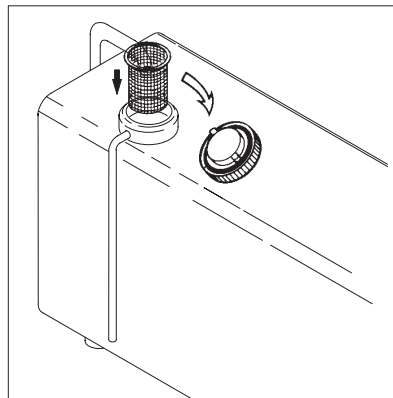
- ▶ Remove all filter elements.



Maintenance chart: *Hydraulic filter change.*



- ▶ Change all filters and refit the filter elements.
- ▶ Replace any defective hoses.
 Maintenance chart: *Hoses*.
- ▶ Check all lines and threaded unions, tightening where necessary. Check the flared screwed joints.
 Maintenance chart: *Hoses*.



Filling the reservoir

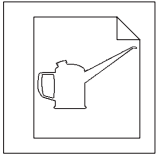
- ▶ Fill the reservoir with new fluid.



Note

Only fill the reservoir through the mesh in the filler pipe. Only fill the reservoir to the "Maximum" mark. Use only the hydraulic fluids specified in the lubricant recommendation.
Initial hydraulic fluid used by the manufacturers: HLP hydraulic fluid in accordance with DIN 51524, part 2, viscosity grade ISO-VG 46 in accordance with DIN 51519.

- ▶ Remove the dirt deposits from the radiator.
- ▶ Bleed hydraulic system.
- ▶ Carry out all function checks.
 Maintenance chart: *Function checks*
- ▶ Carry out several test runs.
- ▶ Refit safety equipment.



Maintenance Chart

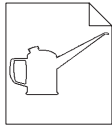
46-009

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Replacing the auger

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



Refer also to the maintenance charts:
Dismantling the pressure flange
Fitting the pressure flange



No special tools required.

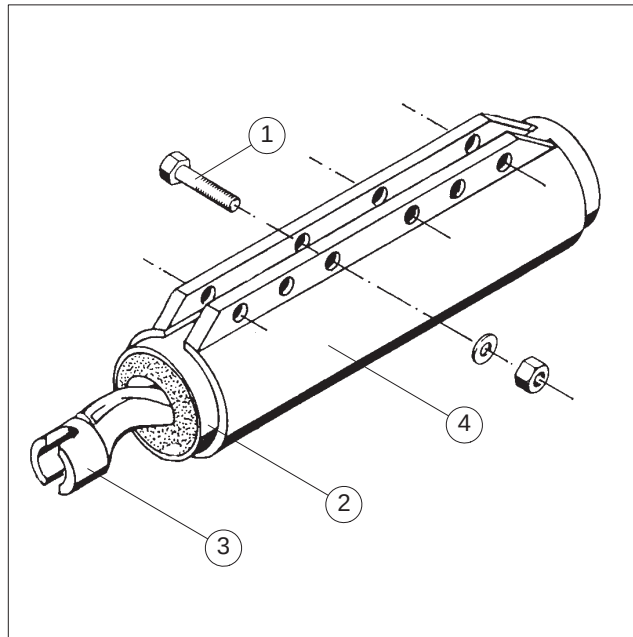
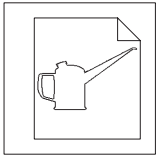


Note

Use only original Putzmeister spare parts.



Use original spare parts marked with the Putzmeister logo.



- 1 Clamping sheath bolts
- 2 Auger barrel
- 3 Auger
- 4 Clamping sheath

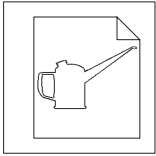
- Unscrew all clamping sheath bolts (1) and remove the auger barrel (2) and auger (3) from the clamping sheath (4).
- Clamp the auger barrel (2) and remove the auger (3) by rotating it anti-clockwise.
- Spray the new auger (3) with Putzmeister silicone spray.
- Insert the auger (3) into the clamped auger barrel (2), rotating it clockwise.
- Line up the end of the auger (1) and the auger barrel (2) flush.



Caution

The auger may only be treated with Putzmeister silicone spray before fitting. Do not use used oil.

Used oil attacks the rubber.



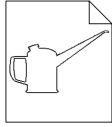
Maintenance Chart

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Page 1 of 4



Adjusting the overrunning brake This maintenance chart describes how to adjust the overrunning brake. 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.

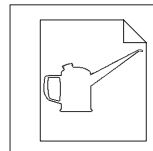
First, jack up the machine so that both wheels are clear of the ground.

- ▶ Use the stabilizing wheel to lower machine at the front.
- ▶ Extend and lock the rear support legs.
- ▶ Use the stabilizing wheel to raise machine at the front.
⇒ Both wheels lose contact with the ground.

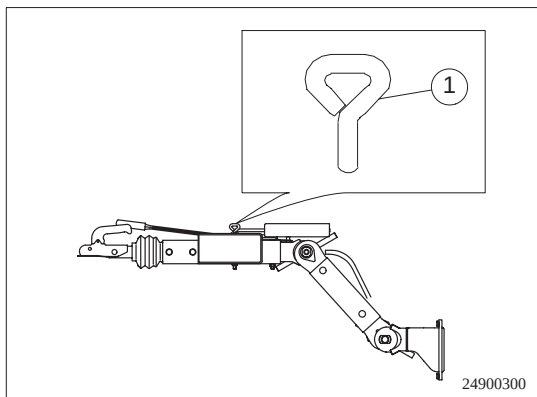


Caution

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



- Release the handbrake.



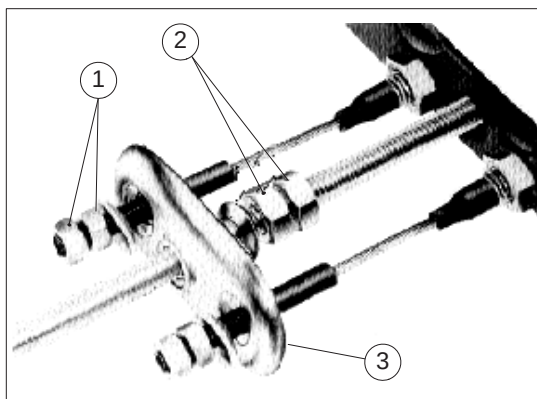
- 1 Safety bolt.

- Screw in the safety bolt(1).



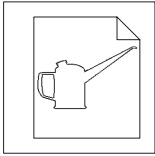
Caution

The handbrake lever is pretensioned. The safety bolt must always be inserted before carrying out maintenance work. Failure to observe this requirement can lead to injury, since the handbrake lever can be operated suddenly by the pretensioned spring.



- 1 Forward nuts
2 Rear nuts
3 Compensator

- Undo nuts (1+2).



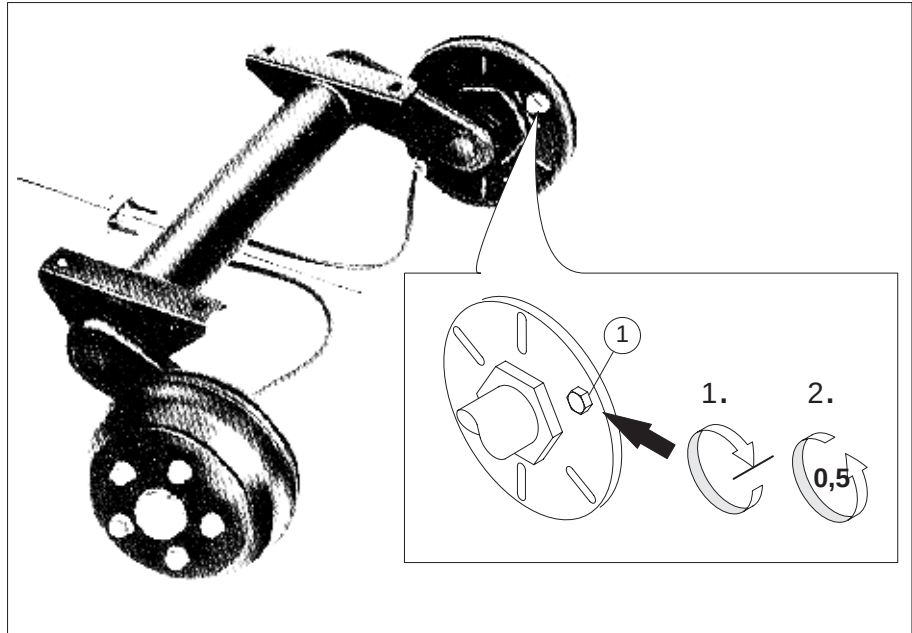
Maintenance Chart

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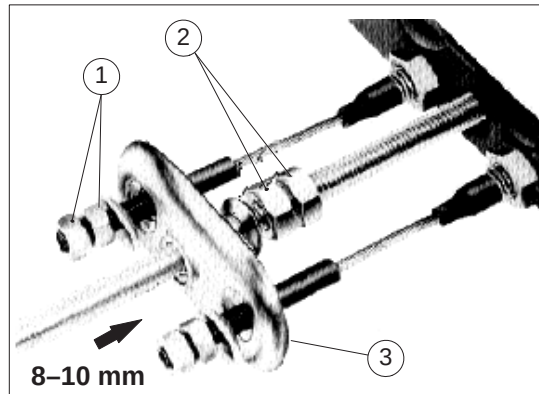
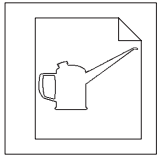
Begin by adjusting or readjusting the wheel brakes.



1 Adjusting nut

- ▶ To do this, turn each wheel in the direction of travel.
- ▶ Adjust the adjusting nut (1) by turning it clockwise until the brake-shoes catch on the brake drum.
⇒ The wheel becomes harder to turn.
- ▶ Undo the adjusting bolt (1) half a turn.
⇒ The wheel runs freely and the brake-shoes no longer catch on the brake drum.

Carry out the same adjustment on the opposite wheel.



- 1 Forward nuts
- 2 Rear nuts
- 3 Compensator

- Bring nuts (1+2) into contact with the compensator (3) and lock off on both sides.



Note

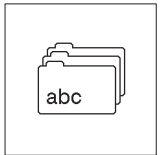
The nuts must be screwed approx. 8-10 mm onto the pull rods.

Centre the brake-shoes by applying the parking brake several times, check the adjustment and correct it as necessary. The braking action must engage approximately 10-15 mm past dead centre.

- Remove the safety bolt and keep it in a safe place.

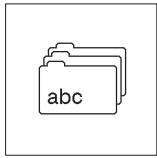
The reverse travel function will be adversely affected if the braking equipment is set too tightly.

- Carry out a test run by braking several times and eliminate any play.



Index of Key Words

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