Instruction manual

Tandem roller / Combination roller
RD24 / RD27

Vehicle type	RD24 / RD27
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Manufacturer:

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Manufactured for:

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Original instruction manual

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This instruction manual is valid for the following roller types:

TANDEM ROLLER	RD24-100 RD24-100o RD27-120 RD27-120o
COMBINATION ROLLER	RD24-100c RD27-100c

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EC DECLARATION OF CONFORMITY

Manufacturer: HAMM AG - Hammstraße 1 - D-95643 Tirschenreuth

CE

EC DECLARATION OF CONFORMITY

according to EC Machinery Directive 2006/42/EC, Annex II A

We hereby declare that the

Designation of the machinery:

Type:

Serial no.:

complies with the following provisions:

- EC Machinery directive 2006/42/EC
- EMC Directive 2014/30/EU
- EC Sound directive 2000/14/EC

with evaluation form:	Annex VIII
Notified Body:	Notified Body Number: 0515 [1]
measured L_{WA} [dB(A)]:	
guaranteed L_{WA} [dB(A)]:	
Power [kW/min^{-1}]:	

- Emissions standard EU/USA:
- Exhaust gas after-treatment:

Original EC Declaration of Conformity (en)

Applied harmonised standards, in particular:

- EN 500-1:2006+A1:2009:	Mobile road construction machinery - Safety Part 1: Common requirements
- EN 500-4:2011:	Mobile road construction machinery - Safety Part 4: Specific requirements for compaction machines
- EN ISO 3744:2010:	Allocation of the sound capacity level of sound sources

Authorised agent for the composition of the relevant technical documents:

Mr. Matthias Löb, HAMM AG (CE representative)

Tirschenreuth, _____
Date

_____
Dr. Axel Römer
Head of Research and Development

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1 PREFACE

When working at the machine please always adhere to the instructions given in your Safety instructions!

This instruction manual contains information and procedures for the safe operation and maintenance of your Wacker Neuson machine. In the interests of your own safety and to prevent injuries, you should carefully read through the safety instructions, familiarise yourself with them and observe them at all times.

This instruction manual is not a manual for extensive maintenance and repair work. Such work should be carried out by Wacker Neuson Service or authorised specialists.

The safety of the operator was one of the most important aspects taken into consideration when this machine was designed. Nevertheless, incorrect operation or improper maintenance may present risks. Please operate and maintain your Wacker Neuson machine as described in this instruction manual. Doing so will ensure smooth operation and high system availability.

Defective machine parts must be replaced immediately.

Please contact your Wacker Neuson representative if you have any questions concerning operation or maintenance.

We expressly reserve the right to make technical modifications – even without special notice – which aim at further improving our machines or their safety standards.

1.00 Preface

1.00.01 Preface to the instruction manual

This chapter contains important instructions for the operating personnel on how to operate the machine and to use this instruction manual.

Read the instruction manual carefully and get to know the machine.

Following the instruction manual:

- Helps to avoid risks.
- Helps to avoid malfunctions due to improper use.
- Increases the reliability when working on the construction site.
- Increases the service life.
- Reduces maintenance costs and downtimes.

Please note:

- the instruction manual.
- the safety manual.
- supplementary information.
- regulations and provisions applying at the building site (e.g. accident prevention regulations).

Maintain and care the diesel engine according to the instructions for the motor. Observe the safety instructions.

1.00.02 Product information

You have received a quality product. All the components of this machine have been carefully inspected and tested. Therefore they comply with the quality that you expect.

The reliability of the machine is preserved through correct use and careful maintenance. Only use the specified operating supply items and the original HAMM spare parts of the machine manufacturer.

Our representations will help you to keep your roller in perfect operating condition.

After the warranty period, our representatives will also assist you with advice and service. They will supply you with our original spare parts which do not only meet the technical requirements but also ensure exchangeability and quality.

The instruction manual contains

- safety instructions,
- operating instructions and
- maintenance instructions.

They are intended to be used by the operating personnel. Thus, keep the instruction manual always at hand!

1.00.03 Guarantee

Warranty claims can only be accepted:

- if you operate the machine correctly.
- if you use original spare parts.
- if you use the specified operating supply items.

- if you install the accessory equipment that the manufacturer has approved.
- if you maintain the machine as prescribed.
- if you use the machine how described in the instruction manual.

In all other cases, the warranty is excluded.

1.00.04 Modifications/reservations

The instruction manual describes the current version of the machine. But we may not exclude errors completely. We can modify the product and its operation so that we do not lose our technological lead. We assume no liability for malfunctions, downtimes and resulting damage.

1.00.05 Packaging and storage

We pack the machine carefully for shipment. Please check both packaging and the machine for any damage to the machine upon receipt of the goods. The machines must not be operated if they are damaged. Only use undamaged cables and plug connections.

Please contact your supplier if the machine damaged.

After unpacking, protect the machine from moisture and contamination if it is not going to be brought into operation immediately.

1.00.06 Signs and symbols

The signs and symbols used in this instruction manual are to help you use this instruction manual and the machine in a safe and fast manner.

Note

Informs about application hints and useful information.

Enumeration

- Unordered lists list various possibilities.

Operating step

▶ Action steps describe the activities required to use the machine correctly and safely.

Result

✔ Describes the result of a sequence of action steps.

Directions

Information on directions always describe to the directions of the machine driving forwards. Possible is information on directions like:

- left or right
- front or rear

Cross-references

Cross-references help you to find quickly sections in this instruction manual which supply you with additional important information. The cross-reference shows you the page of the relevant section. The abbreviation sqq. means "and the following pages".

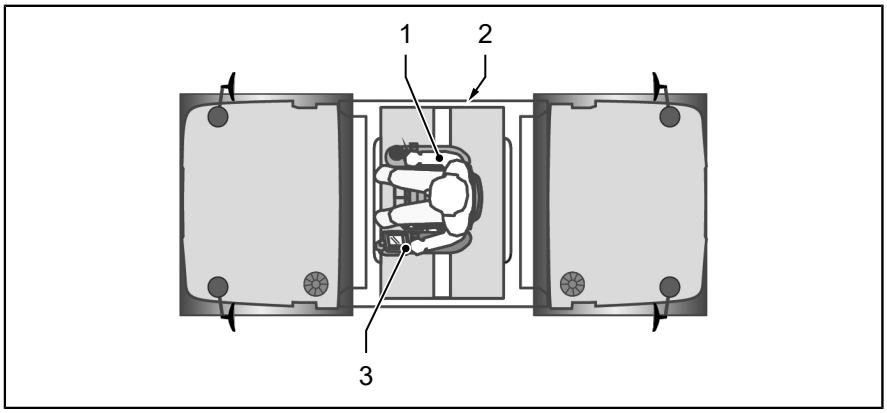
Example: (see "Hydraulic oil supply", page 176)

Positioning in illustrations

Figures are labelled with numbers.
Item lines connect the correct items in the figure with the numbers. The numbers only annotate the items for the text section to which the figure belongs. The numbering starts anew for each figure.
In descriptive text, these numbers are in square brackets. So you can obtain important and additional information quickly.
The end of the item line is a point or an arrow. A point marks a visible element in the figure. An arrow marks an invisible element, which lies in the direction of the arrow.

If necessary, figures have legends to provide the information required.

Example



[1] Driver
[2] Engine compartment
[3] Drive lever

Descriptive text

You use the drive lever [3] to determine the direction of travel and driving speed.

1.00.07 Explanation of abbreviations

Abbreviations are used for machine elements and processes in this instruction manual.

Abbreviations that are not in this list are explained the first time they appear in the instruction manual.

Abbreviation	Meaning
DPF	Diesel Particulate Filter *Exhaust gas after-treatment system*
FOPS	Falling Object Protective Structure *Structure for the driver's cab and driver's platform to protect against falling objects*
KAG	Edge pressing and cutting device *Edge forming device*
RMV	Resonance Measurement Value *Measured value for the resonance behaviour of the compaction system*
ROPS	Roll Over Protective Structure *Structure for the driver's cab and driver's platform to protect against rolling over*

Abbreviation	Meaning
SCR	Selective Catalytic Reduction *Exhaust gas after-treatment system*

1.00.08 Warning notes

Warning notices inform about sources of danger, and state risks and how to avoid them.
Always follow the instructions to avoid risks!

Warning notices always apply to the complete section of the instruction manual that they precede.

Signal words

The signal word indicates the particular seriousness of the danger to persons and machines, objects and the environment.

⚠ DANGER

Indicates an immediate danger to persons.
If the danger is not averted, death or the most serious, irreversible injuries will ensue.

⚠ WARNING

Indicates a possible danger to persons.
If it is not averted, death or the most serious, irreversible injuries could ensue.

⚠ CAUTION

Indicates a possible danger to persons.
If this situation is not avoided, minor or light injuries may be caused.

NOTICE

Indicates a danger to machines, objects or the environment.
If it is not averted, material damage will ensue.

1.01 Documentation

This instruction manual is intended to make the operating personnel familiar with the basic work and activities on and with the machine.

The entire instruction manual consists of:

- Safety manual
- Instruction manual of the machine
- Instruction manual of the diesel engine
- If necessary, additional information (e. g. QR code)

This instruction manual must be kept on the machine at all times. Read this instruction manual carefully. Let someone explain to you the things that you do not understand. Until this has been done, do not carry out any work with or on the machine.

1.02 Use

1.02.01 Intended use

The machine represents state-of-the-art technology and complies with all valid safety regulations concerning its intended use at the time the machine was launched on the market.

When designing the machine it was not possible to avoid all possible foreseeable misuse or residual risks without restricting the machine's intended functionality.

The machine's intended use is:

- To pave roads and traffic areas.
- To ram and smooth loose earth, road bedding, pavement or similar ramable subgrade in layers.

Use the machine only on load-bearing soil.

Not capable of bearing are e.g. high fillings, batters, roadside ditches.

The machine may not be used in explosive areas, on landfill sites and in mining.

The machine is only used for commercial applications within fenced construction sites.

The machine must only be operated by authorized operating personnel and only if in proper technical condition and in accordance with this instruction manual.

All unintended use and/or all machine-related activities not described in this instruction manual is to be deemed as unauthorised misuse outside the legal limits of indemnity of the manufacturer.

1.02.02 Abnormal use

Any abnormal use or any misuse of the machine can cause serious personal injury and/or death and will void the manufacturer's warranty obligation, and the owner will bear the sole responsibility in this case.

Abnormal uses shall be deemed to include:

- Non-compliance with this instruction manual.
- Operating errors by operating personnel not qualified or not instructed.
- Conveyance of passengers.
- Leaving the driver's position during operation.
- Starting, using the machine outside the driver's position.
- Errors due to reflexive behaviour and/or choosing the easiest way.
- Operating the machine if it is not in a proper technical condition.
- Using the machine with improper ambient conditions (e.g. temperature, gradient, transverse gradient).
- Using the machine with the protective equipment removed.
- Spraying with high-pressure cleaners or fire extinguishing equipment.
- Towing trailing loads.
- Non-compliance with maintenance intervals.
- Omission of measurements and tests to detect damages early.
- Omission of replacing wear parts.

- In the case the spare parts used are no original spare parts.
- Omission of maintenance and repair work.
- Improper maintenance and repair work.
- Unauthorized modifications of the machine.

1.02.03 Residual risks

Residual risks have been analysed and evaluated prior to starting the construction and planning the machine. Existing residual risks are referred to in the documentation. However, the manufacturer cannot foresee all situations that may pose a risk in practice.

You can avoid existing residual risks if you comply with and implement the following instructions:

- Special warnings at the machine.
- General safety instructions in this instruction manual and in the safety instructions.
- Special warnings in this instruction manual.
- Instructions contained in the safety instructions.
- Operating instructions of the operator.

Danger of life/risk of personal injury when operating the machine due to:

- Misuse.
- Improper operation.
- Transport.
- Missing protective equipment.
- Defective and/or damaged components.
- Operation/usage by personnel not trained and/or instructed.

The machine may cause risk to the environment e.g. with:

- Improper operation.
- Operating supply items (lubricants etc.).
- Noise emission.

Property damage may occur at the machine e.g. with:

- Improper operation.
- Non-compliance with operating and maintenance instructions.
- Improper operating supply items.

Property damage may occur at further assets within the machine's operating area e.g. with:

- Improper operation.

Reduction in performance and/or the machine's functionality may occur at the machine e.g. with:

- Improper operation.
- Improper maintenance and/or repair work.
- Improper operating supply items.

1.02.04 Climatic conditions

The permissible ambient temperature range for using the machine is –20 °C (–4 °F) up to 55 °C (130 °F) .

Operation outside this temperature range requires the express authorization of the manufacturer. Use under extreme climatic conditions places special demands on equipment and fuel.

⚠ WARNING

Explosion!

Severe injury and death due to burns and moving parts.

- Do not use aerosol start-up aid (e.g. ether).
- Do not use any liquids as start-up aid (e.g. alcohol).
- Adapt operating materials, such as oils and coolant, to the ambient temperature.
- Observe the instruction manuals for the battery and diesel engine.

Low ambient temperature

The diesel engine's starting behaviour and the machine's operation depend on:

- The fuel used.
- The viscosity of the motor, gear and hydraulic oil.
- The battery's charge state.

Please note:

The acceleration and braking behaviour of the machine are influenced by viscous hydraulic oil. Before starting operation at a low ambient temperature, adapt the operating materials (coolant, oils etc.) to the low temperatures.

Please use fuels suitable in winter with temperatures below 0 °C (32 °F) (page 167 sqq.). Do not charge batteries with temperatures below 0 °C (32 °F).

Extensive ambient temperature, extensive height

At high ambient temperature and/or use of the machine at high altitudes:

- Do not completely fill the fuel and operating liquid tanks/reservoirs.
- Adjust the control system to reduce the amount of fuel injected quality fuel engine.

Observe the instruction manual for the diesel engine.

1.03 Environmental protection

Send packaging, cleaning materials and used or residual operating materials for recycling. Observe the environmental protection regulations applicable at the place of use.

When operating the machine, observe the notes in this instruction manual in order to avoid unnecessary impact on the environment.

1.04 Disposal

Conservation of nature is one of our major tasks. Properly disposed devices avoid negative impacts on human beings and the environment and allows re-using our precious resources.

Operating supply items

Please dispose all operating supply items according to relevant specifications and local regulations of the relevant country.

Materials (metal, plastics)

To be able to dispose materials professionally, these materials need to be correctly sorted. Cleanse materials of adhesive impurities.

Please dispose all materials as demanded by local provisions of the relevant country.

Electrical/electronic system/battery

Electrical/electronical components are not subject to Directive 2012/19/EC and relevant national regulations (in Germany e.g. ElektroG).

Dispose electrical/electronic components directly at a specialised recycling company.

1.05 Type plate

The type plate as a whole has an official value and must not be altered or effaced.

The pictogram represents the machine's conformity.

If the machine type plate does not bear a CE pictograph, the machine does not correspond to the applicable EU Directives. Any operation of this machine in the European Economic Area (EEA), in Switzerland and in Turkey is inadmissible.

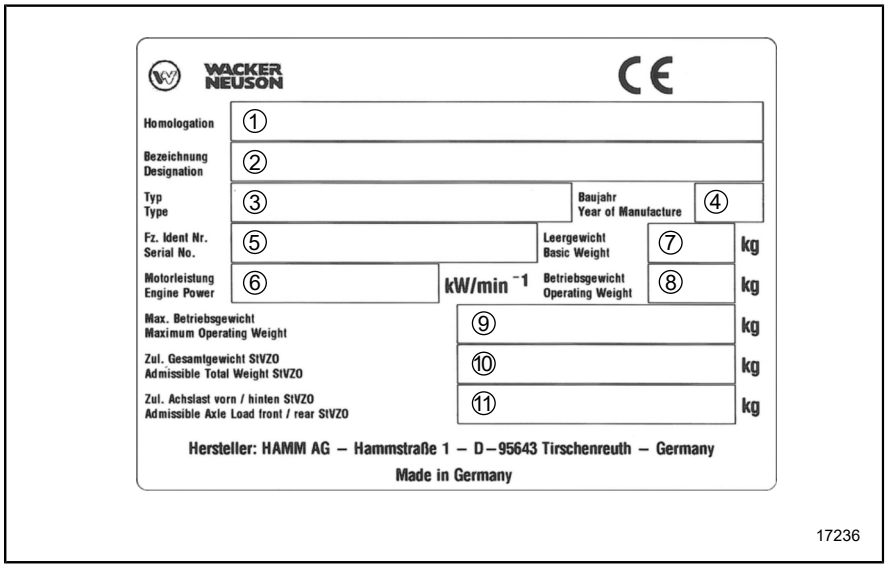
For machines without EC Conformity, neither an EC Declaration of Conformity nor a CE type plate can be issued. This is the case if, for example, the machine does not have a drum drive, drum brake or ROPS.

The EAC (Eurasian Conformity) pictogram confirms the conformity of the machine with the requirements of the Eurasian Customs Union

Please state the vehicle identification number (VIN) and the type of your machine when ordering spare parts.

Machine type plate

The type plate is attached to the machine frame ("Chassis/safety devices", page 37).



[1]	Homologation (for example the registration number for driving on public roads)	**[2]**	Designation
[3]	Type	**[4]**	Year of manufacture
[5]	Vehicle identification number (VIN/PIN)	**[6]**	Engine power/nominal speed
[7]	Unladen weight	**[8]**	Operating weight
[9]	Maximum operating weight	**[10]**	Permissible total weight in accordance with the StVZO (German Road Traffic Licensing Regulations) (only valid for transport on public roads)
[11]	Permissible axle load at the front/rear in accordance with the StVZO (German Road Traffic Licensing Regulations) (only valid for transport on public roads)		

The vehicle identification number [5] indicates the series and the serial number of the machine e.g. WNCxxxxxxxxxxxxx.

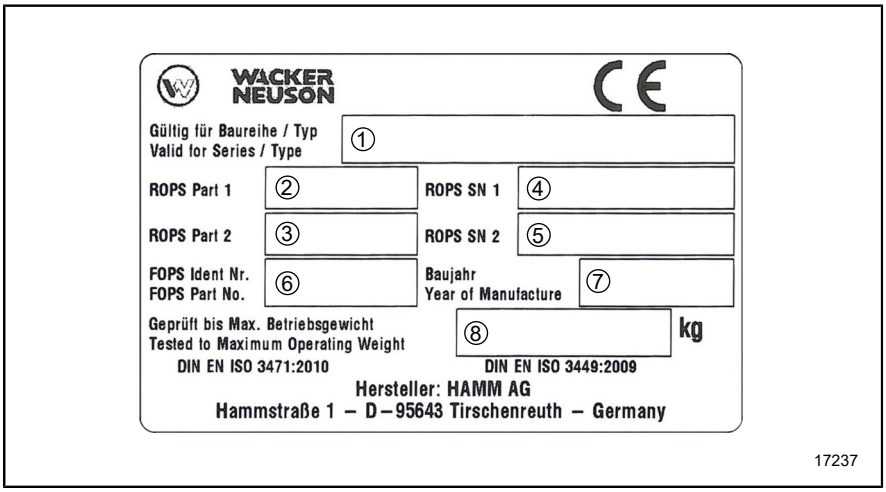
The maximum operating weight [9] is the static weight of the machine including:

- Working substances and lubricants
- 100 % fuel tank contents × 0.84 specific weight
- 100 % water & additive tank contents
- 75 kg for the driver
- the static weight of all options or attachments manufacturer the same time and approved by manufacturer (e.g., chip spreader).

No additional ballasting is allowed.

ROPS/FOPS type plate

The ROPS (cab, roll-over bar) and/or FOPS (falling-object protective structure) approved for this machine by the manufacturer are/is identified by a type plate that is attached to the cab/roll-over bar ("Control stand", page 44).



[1] Series/type (part of the VIN/ PIN)

[2] Cab/ROPS identification number 1

[3] Cab/ROPS identification number 2

[4] Cab/ROPS serial number (if available) 1

[5] Cab/ROPS serial number (if available) 2

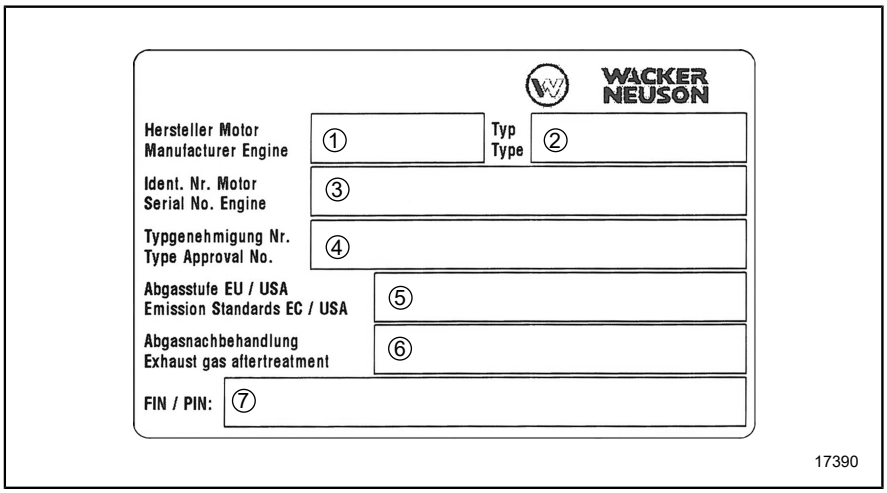
[6] FOPS identification number (if installed)

[7] Year of manufacture

[8] Tested up to the maximum operating weight

Engine type plate

The engine approved by the manufacturer for this machine is also indicated by a specially produced type plate. It is located on the side of the machine type plate (in the engine compartment).



[1] Engine manufacturer
[2] Type
[3] Engine identification number
[4] Number of the type approval
[5] EU/USA exhaust emissions standard
[6] Exhaust gas after-treatment
[7] VIN/PIN

1.06 Noise and vibration requirements

The sound emission of the machine was measured according to the CE Sound Emission Directive in the version 2000/14/EC.

The sound and vibration indications on the driver's seat correspond to the requirements of the CE Machinery Directive in the version 2006/42/EC.

Sound power level

Sound indication of the machine

The guaranteed sound power level is specified in the machine's technical data (see "Technical data" sqq.).

Sound pressure level

Sound indication on operator panel

The sound intensity level on the driver's seat is specified in the machine's technical data (see "Technical data" sqq.) (measurement inaccuracy according to DIN EN ISO 11201).

When working in the immediate vicinity of the machine, values may exceed 85 dB(A). In this case, please always wear personal protective equipment (ear protection).

Vibration indication on the operator panel

Whole body vibration

The weighted rms values of the acceleration with whole body vibrations on the operator's seat have been accessed in accordance with DIN EN 1032 and do not exceed a_w = 0.5 m/s².

Hand arm vibrations

The weighted rms values of the acceleration with hand arm vibrations have been accessed in accordance with DIN EN 1032 and do not exceed a_{hw} = 2.5 m/s².

1.07 Personnel

1.07.01 Qualification and duties

Operating personnel

All activities at the machine must be carried out by authorised operating personnel only. For the purpose of this instruction manual, operating personnel shall be deemed to include every authorized person entrusted with operating, maintaining, installing, setting, cleaning or transporting the machine.

This comprises the following persons:

- Machine operator
- Maintenance personnel

Persons are deemed as authorised that have been trained, qualified and instructed for carrying out relevant activities at the machine and that have proven their skills to the operating organization. The operating personnel must be authorized by the operating organization for those activities at the machine.

In addition to the qualifications specified in the safety instructions, the operating personnel must:

- Have read and understood the instruction manual.
- Be trained and instructed according to the rules of action in case of trouble.

Please adhere to the following instructions:

- Please drive the machine only if you are entirely familiarized with the operating and control elements and the method of operation.
- Please use this machine only according to its intended purpose.
- In case you detect any defects, such as at the safety equipment, that may affect the safe operation of the machine, please immediately notify the supervising body.
- With defects that may endanger persons, please stop operating the machine immediately.
- Please ensure that the machine is compliant with all requirements concerning traffic law.

Banksman/Spotter

Only such persons are allowed to instruct others in machines independently who also:

- Have been trained in instructing others (the machine).
- Have successfully proven their participation in such a course.
- Have proven their skills to the operating organization.
- Fulfil their tasks in a reliable manner.
- Have been appointed by the operating organization as a banksman/ spotter.

The meaning of signals must be unambiguous between driver and banksman/spotter.

To avoid ambiguities, clarify hand signal, such as specified by the German BG Directive "Safety and Health Protection Signals at Work", must be used.

Please adhere to the following instructions:

- Please make yourself familiar with the machine's and the loading vehicle's dimensions.
- Wear reflective clothing.
- For instructing please use voice radio (e.g when loading with a crane) or via hand signals (e.g. when reversing the machine).

1.08 General safety instructions

Safety manual

The safety manual is part of the instruction manual. Please make yourself familiar with these safety instructions prior to working with the machine.

Warning notes

Observe and follow the warning notes in this instruction manual and on the machine (warning signs) without fail.

Regulations and Provisions

In addition to this instruction manual, it is also necessary to adhere to all laws, standards, regulations and provisions applicable in the country of use and at the building site.

Additional information

If you obtain additional technical and/or safety-relevant information for the machine, they also must be adhered to and need to be attached to the instruction manual.

Electrical system

During working at the electrical system, the machine must be de-energised at the battery isolation switch (if available) or by disconnecting the negative terminal (ground strap) at the battery.

ROPS/FOPS protective structures

The machine frame in way of the ROPS or/and FOPS mounting may not be distorted, bent or torn (deformed). The reinforcement elements of the cab/roll-over bar (ROPS)/protective roof (FOPS) must not present any rust, damage, fissure or open fracture. All screwed connections of the reinforcement elements must comply with the given specifications and must be screwed tightly to each other. Observe starting torque values! Bolts and nuts must not be damaged, bent or deformed. It is absolutely forbidden to modify or repair/level the reinforcement elements in any way (see section on "auxiliary equipment" et seq.).

It is absolutely necessary to use a safety belt in proper working condition to be protected by the protective structures of the machine.

Safety belt

The condition and function of the machine's safety belt must not show any damage or unacceptable wear such as to make the safety belt non-functional. It is absolutely necessary to use a safety belt in proper working condition. It is absolutely necessary to use a safety belt in proper working condition.

1.09 Driving on public roads

The following is applicable in Germany (StVZO – German Road Traffic Type Approval Law)

The government of Upper Palatinate grants an exception permit (see the details indicated on the original) for this machine pursuant to section 70, subsections 1 and 2 of the German Road Traffic Type Approval Law (StVZO).

Notes:

- This exemption permit may be revoked at any time and applies to This corresponding vehicle owner only.
- A corresponding driving licence is required for operating this vehicle on public roads.
- The exemption may not be used unless an insurance cover is available.
- Both the original exemption permit and the original proof of insurance must be carried when driving the machine.

Increasing road safety

Before driving on public roads, remove the protective grille from the lighting package and/or the protective bar from the water tank.

The following is applicable outside

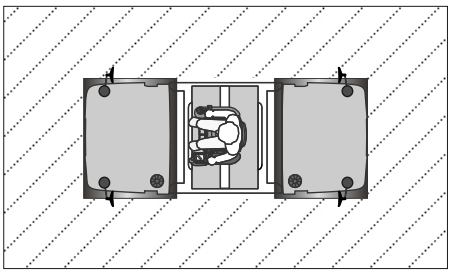
The laws, regulations, guidelines and standards applicable at the place of use must be observed (for example those concerning the lighting and warning systems).

1.10 Danger zone

The machine's danger zone is divided into two sub-zones: "inactive" and "moving".

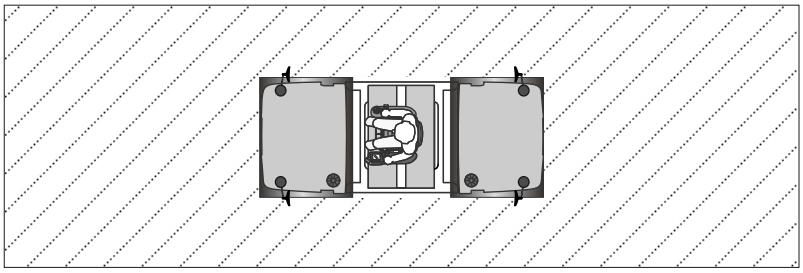
There are other danger zones when the machine is loaded by crane and transported. Also observe the operating manuals and instructions for the loading and transporting machines.

"Inactive" zone



With the machine stationary and the diesel engine switched off, the area 1 metre around the machine is defined as the danger zone. Only operating personnel are allowed to enter the danger zone.

"Moving" zone



For a moving machine, the danger zone is defined as follows:

13 metres	In front of and behind the machine
3 metres	To the left and right of the machine

Make sure there is nobody in the danger zone during compacting work and transport operations.

2 DESCRIPTION

2.00 Information on the machine

When working at the machine please always adhere to the instructions given in your Safety instructions!

2.00.01 Technical characteristics

Drive unit

Hydrostatic all-wheel drive
- infinitely variable
- Single lever operation

Dynamic compaction system

Direct hydrostatic drive

Steering

Hydrostatic assisted steering via articulated pendulum centre pivot steering
- Large steering angle to both sides
- Pendulum compensation upwards and downwards

Track offset

Mechanical track offset
- infinitely variable
- Track offset to the right

Service brake

During operation, the machine is braked with the hydrostatic drive.
- Wear-free brakes

Parking brake

Spring-operated brake acting upon each hydromotor of the drive.
- Manually and automatically

EMERGENCY STOP

Machine is braked with spring-operated brakes and hydrostatic drive.

Water sprinkling

Pressure sprinkling
- Manual actuation
- Interval automatic

Additive sprinkling

Pressure sprinkling
- Manual actuation

Electrical system

Operating voltage 12 V

Drive system

Diesel engine

2.00.02 List of auxiliary equipment

The following list shows possible (optional) special attachments. This operating manual also describes special attachments that may not be present on your machine. Please contact your customer service if you have any questions about availability.

Special attachments are not specifically marked in the operating manual. Please observe chapter 6. You will find more detailed information about special attachments here.

Auxiliary devices may change the sequence of action steps or events. This is indicated by an additional note in the text, for example: **For versions with an air conditioning system**.

- ROPS (roll-over bar), rigid or folding
- Seat heating
- Mechanical seat adjustment
- Edge pressing and cutting device
- Track indicator
- Precision spreader
- Antifreeze filling system for the sprinkling system
- HAMM compaction meter
- HAMM temperature meter
- Automatic engine stop
- Reversing alarm
- Lighting equipment for driving on public roads
- Working spotlight
- Rotating beacon
- Drum edge lighting
- Drum lighting
- Battery isolating switch with mechanical remote control
- Version with German approval for road use (TÜV)
- Fire extinguisher
- Lockable water tank cover
- Bypass filter system
- Lockable dashboard cover
- Seat belt buckle monitoring device
- Smooth drum scraper
- Trailer hitch
- Protective roof/sunroof
- Rear-view mirror

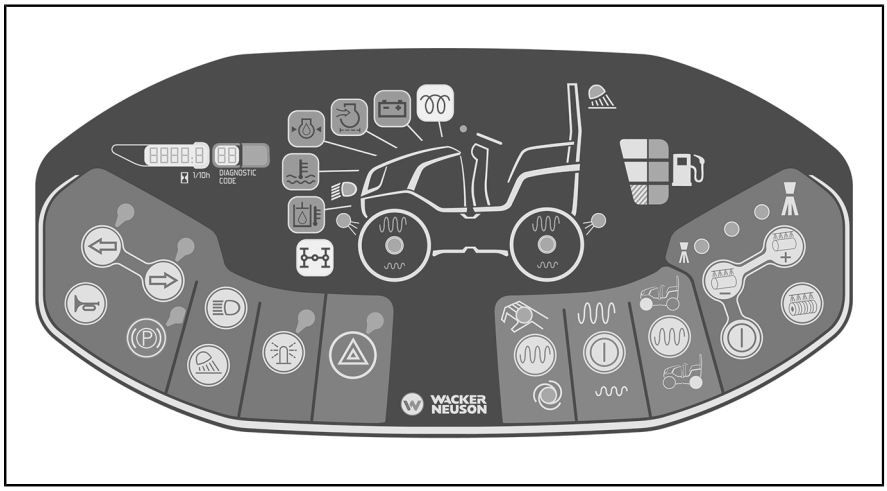
2.00.03 Control panel versions

The original operator control panel of the series has been adapted and enlarged in part in order to improve operator control and functional checks for different pieces of add-on equipment,

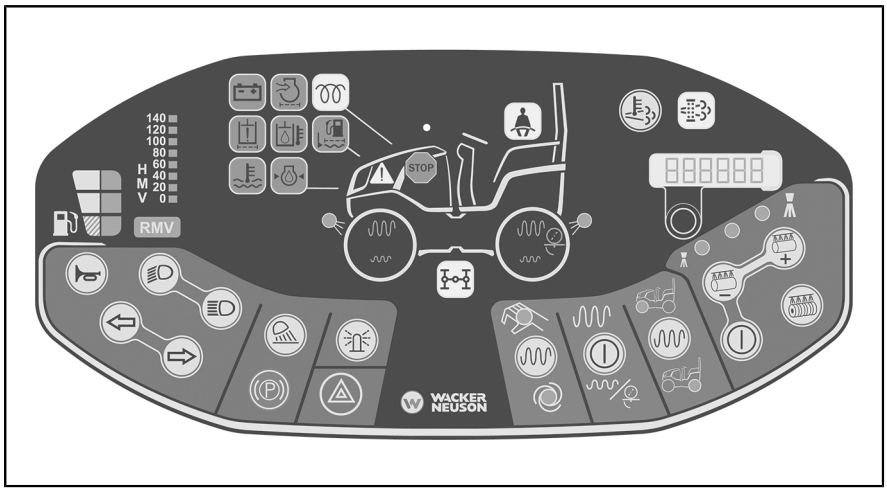
In some cases, this may lead to changes in operator control sequences and procedures. They are described in the instructions.

Please check which operator control panel is installed in your machine.

Standard version



Version with auxiliary equipment

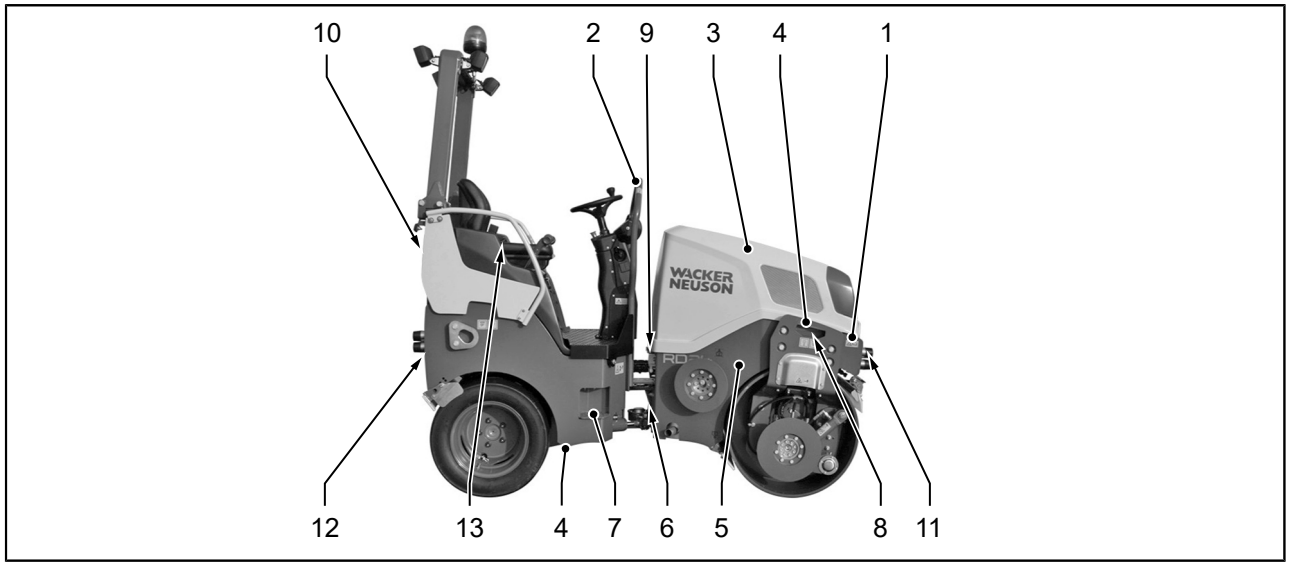


The control panel in the version with auxiliary equipment is used, for example, in machines with:

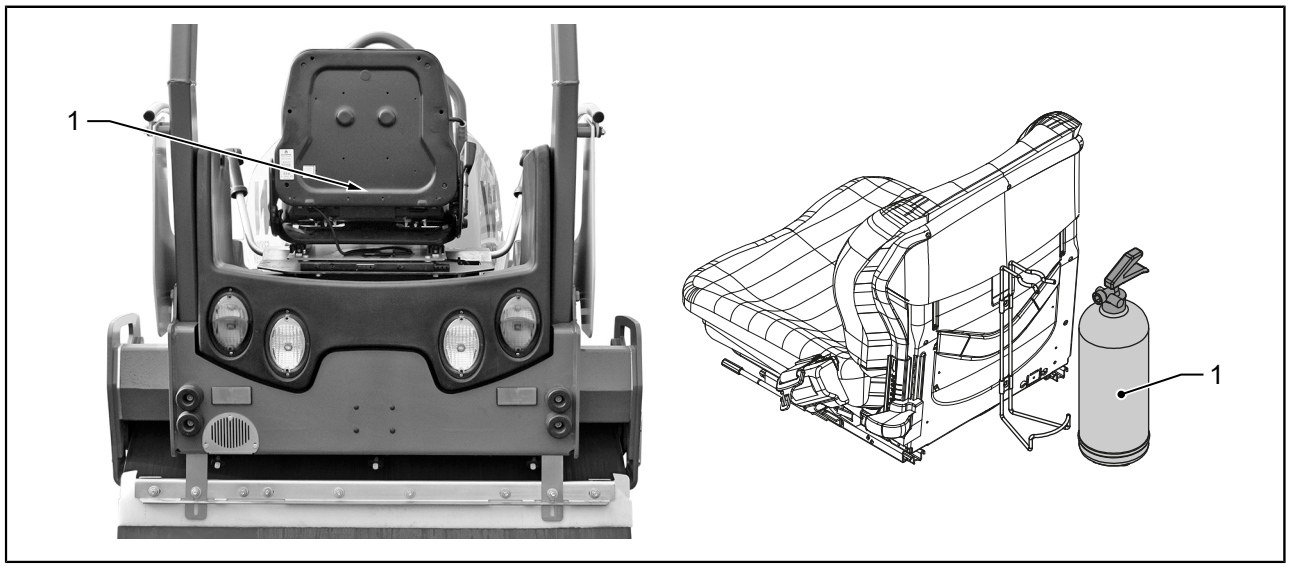
- HAMM compaction meter
- HAMM temperature meter
- Seat belt buckle monitoring device
- Oscillation drum.

2.01 General view of machine

2.01.01 Chassis/safety devices



[1] Stickers indicating dangers
[2] Lifting lug for crane loading
[3] Bonnet
[4] Lashing point
[5] Chassis
[6] Safety strut
[7] Steps
[8] VIN
[9] Machine type plate
[10] Position for fire extinguisher (optional)
[11] Lifting lug (optional)
[12] Trailer hitch (optional)
[13] Seat belt



[1] Fire extinguisher (optional)

2.01.02 Stickers on the machine

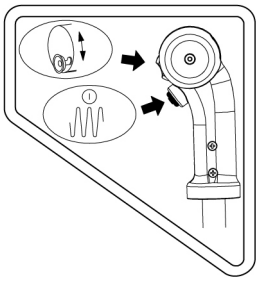
Below please find a list of warning signs and information signs affixed to the machine. The images and values may vary according to the type of machine.

For the detailed arrangement of warning and information signs, please refer to the spare parts catalogue.

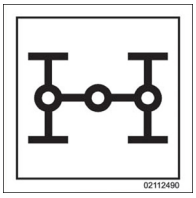
Be sure to observe the warning signs and information signs affixed to the machine and strictly follow their instructions.

Information signs

Below is a list of examples of the information signs. The images and values may vary according to the machine type.

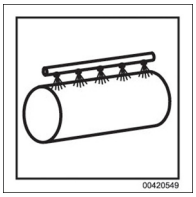


Driving lever function



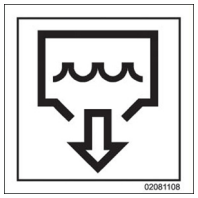
All-wheel lock

Engine speed

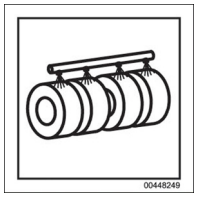


Water sprinkling system

Water tank inlet



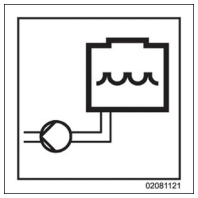
Water tank outlet



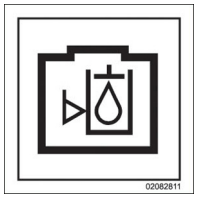
Additive sprinkling system

Water tank inlet for additive sprinkling

Water tank outlet for additive sprinkling

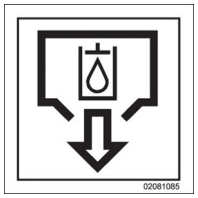


Water pump

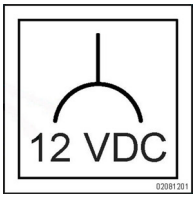


Hydraulic oil fill level

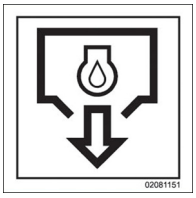
Hydraulic oil reservoir inlet



Hydraulic oil reservoir outlet

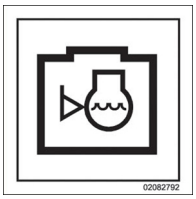


12 V socket

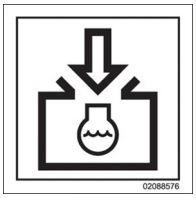


Engine oil outlet

Fuel filter water sump outlet



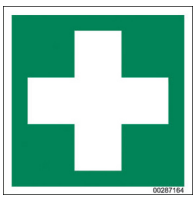
Coolant fill level



Coolant inlet

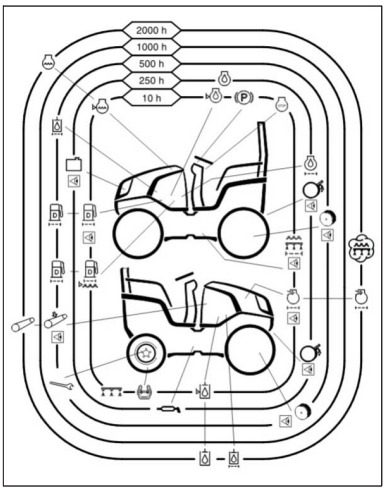
Tyre pressure

Guaranteed sound power level



First aid

Expert inspection test badge



Maintenance overview

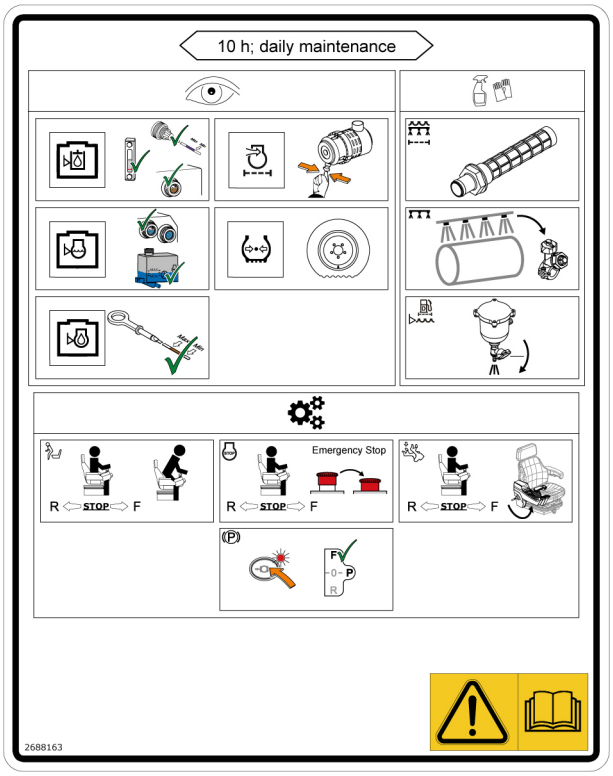
10 hrs; daily maintenance

The activities that are shown on the sign must be carried out on a daily basis before starting up the machine – at least every 10 hours.

The check and maintenance work that is to be carried out may deviate from what is shown, depending on the model and equipment of the machine.

This is not an exhaustive representation of the activities. The sections "Functional checks before starting work" and "Maintenance overview" in this operating manual are binding and must be followed.

The sign is for informational purposes only. It should not and cannot replace instructions/training from the operator on how to handle the machine.



Check:

- Hydraulic oil fill level (top up if required)
- Coolant fill level (top up if required)
- Engine oil fill level (top up if required)
- Dust valve at the air filter (clean if required)
- Tyre pressure (correct if required)

Clean:

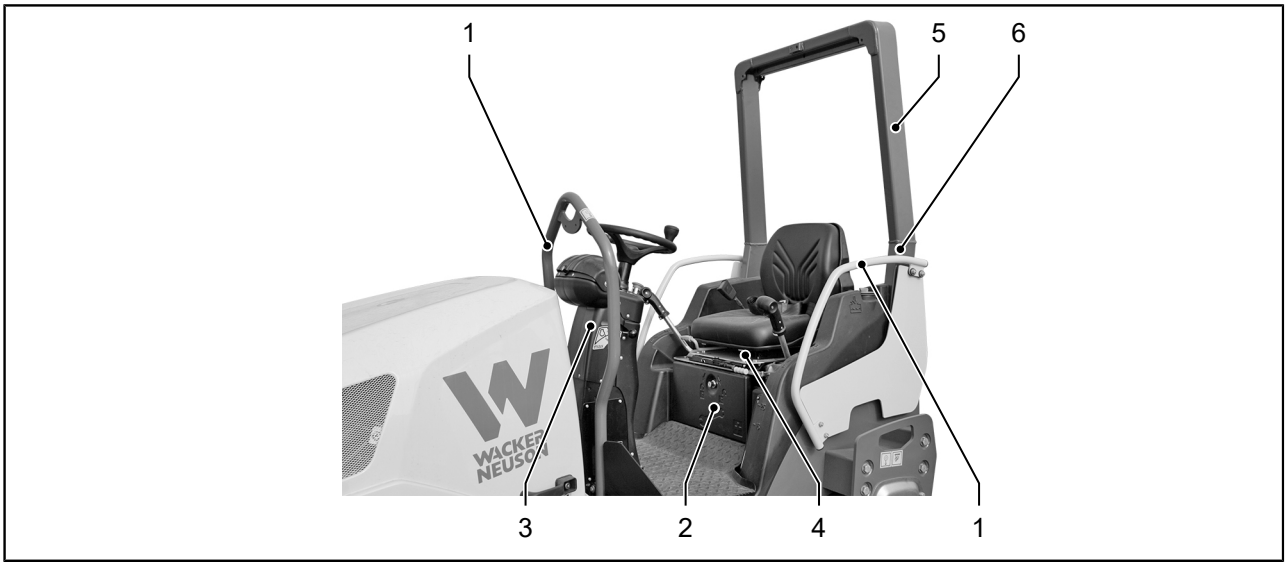
- Filter for the water-sprinkling system
- Sprinkler nozzles
- Drain the water sump on the water separator

Functional check in the case of an existing machine:

- Seat contact switch
- EMERGENCY STOP
- Safety switch for multifunction armrest
- Parking brake

2.01.03 ROPS

Version with rigid ROPS roll-over bar



[1] Handrails

[2] Storage compartment for instruction manual/first aid kit

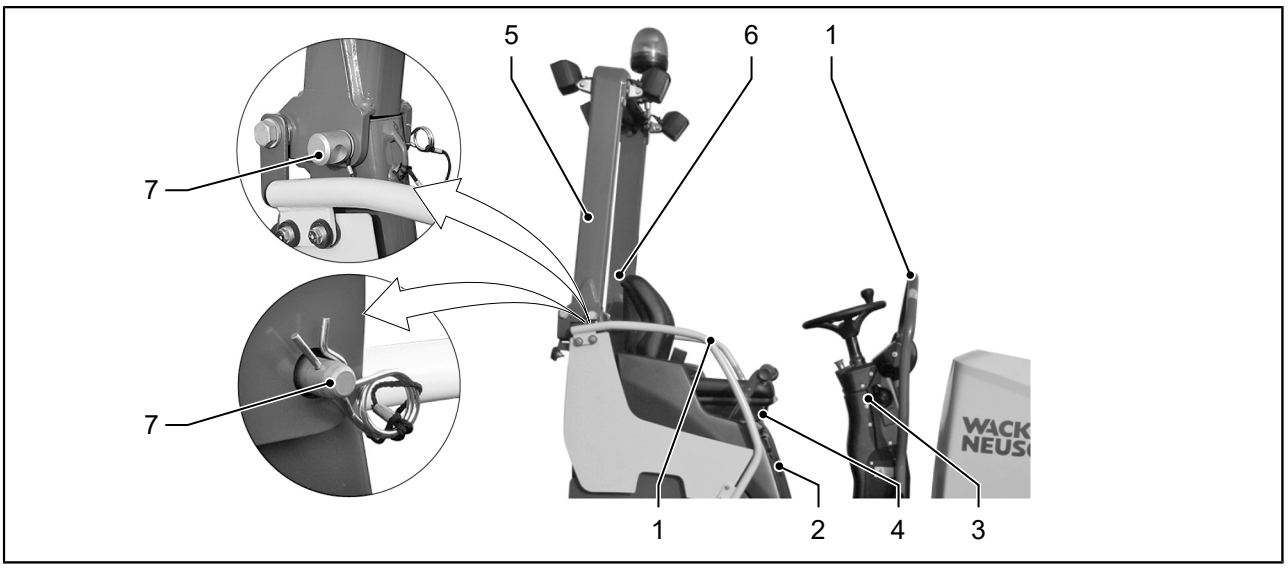
[3] Steering column

[4] Driver's seat console

[5] Roll-over bar

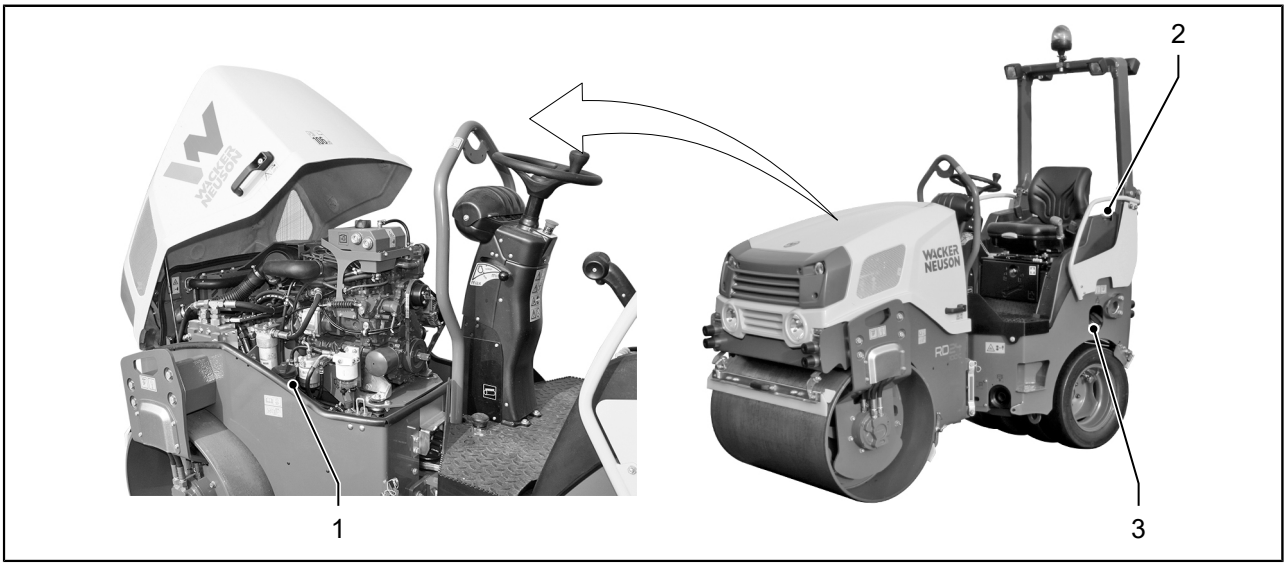
[6] ROPS roll-over bar type plate

Version with folding ROPS roll-over bar



[1] Handrails
[2] Storage compartment for instruction manual/first aid kit
[3] Steering column
[4] Driver's seat console
[5] Roll-over bar
[6] ROPS roll-over bar type plate
[7] Locking pin

2.01.04 Consumable fill holes



[1] Fuel
[2] Water sprinkling system
[3] Additive sprinkling system

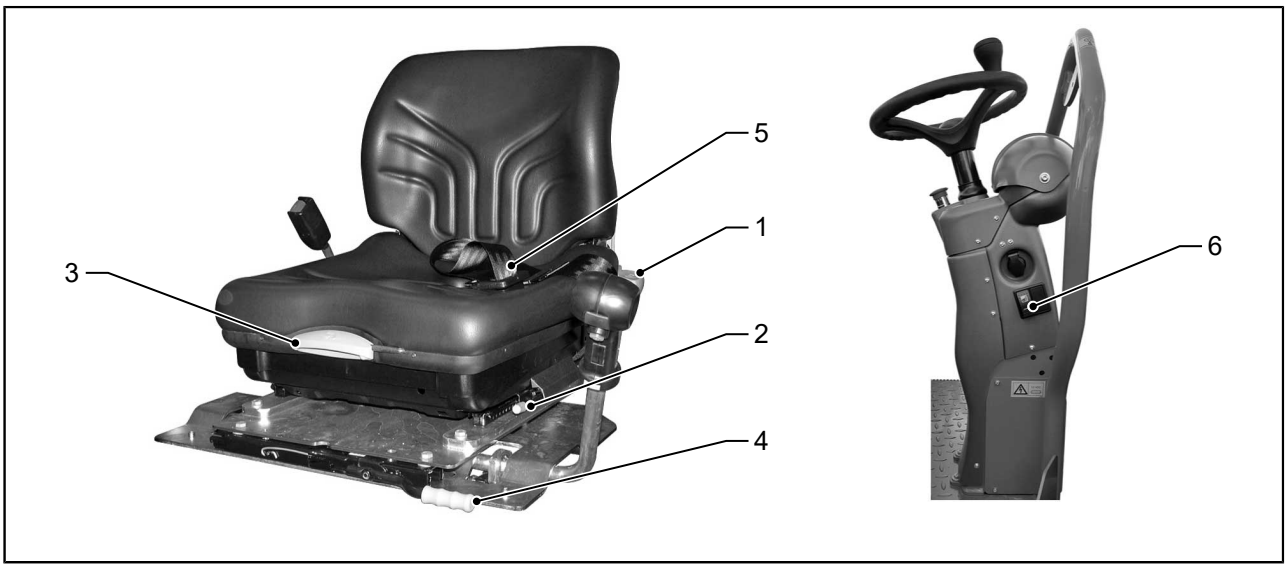
2.02 Control stand

2.02.01 Seat console

Driver's seat, model A

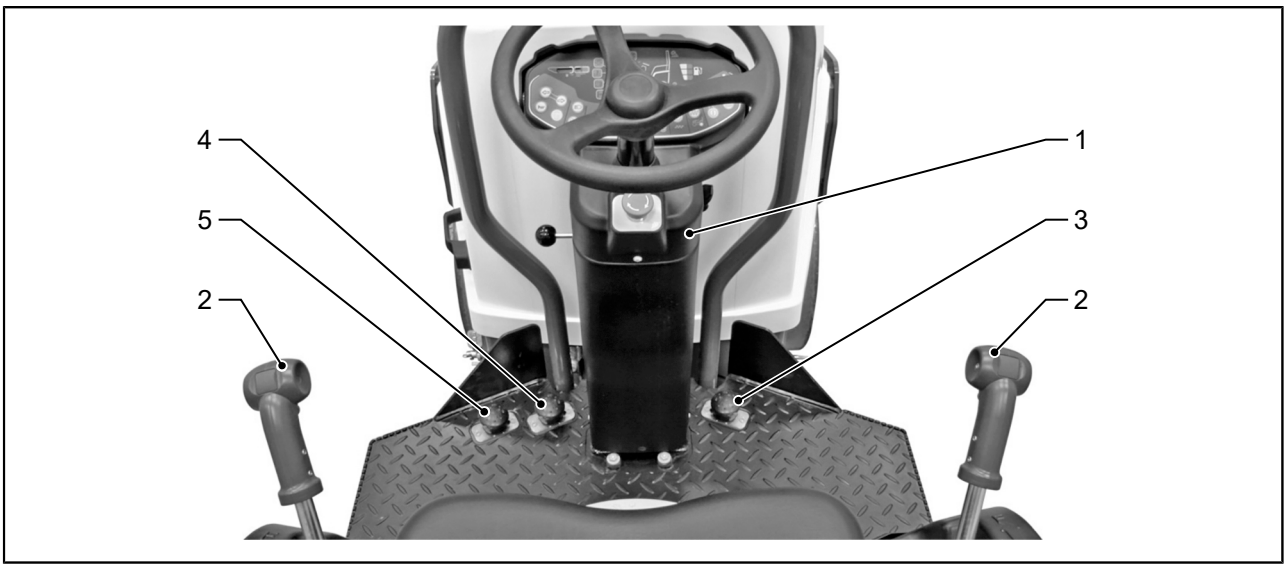
[1] Seat adjustment weight
[2] Seat adjustment forward/backward
[3] Seat adjustment backrest
[4] Seat adjustment left/right
[5] Safety belt

Driver's seat, model B



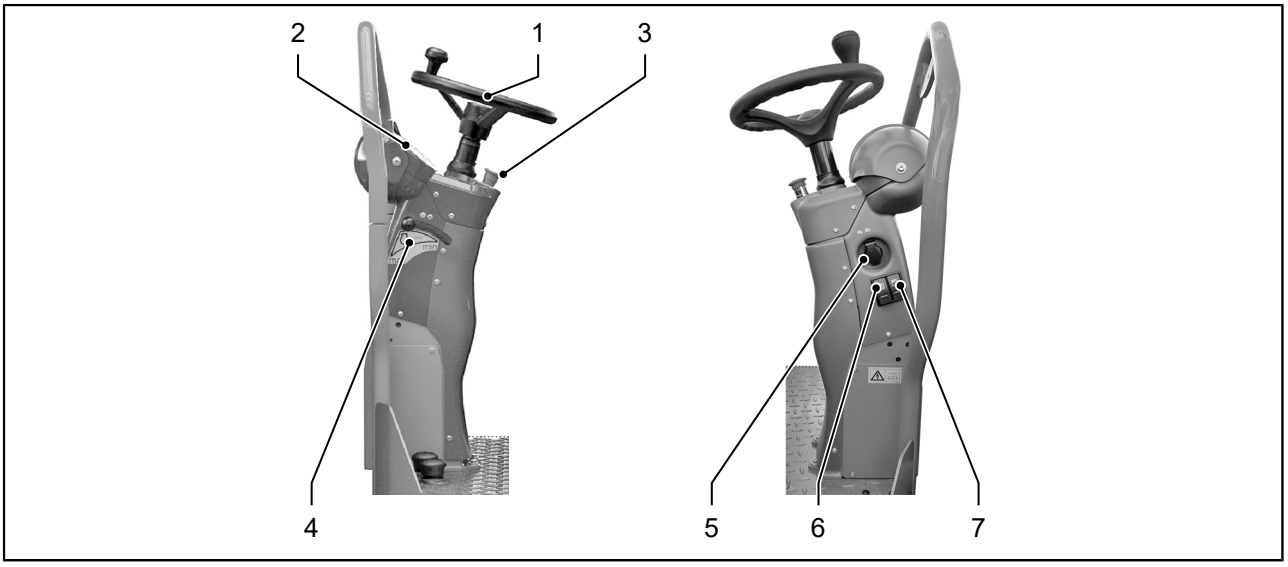
[1] Seat adjustment weight
[2] Seat adjustment forward/backward
[3] Seat adjustment backrest
[4] Seat adjustment left/right
[5] Safety belt
[6] Seat heating (option)

2.02.02 Operating station controls



[1] Steering column
[2] Driving lever
[3] Switch for all-wheel lock
[4] Switch for water sprinkling system
[5] Switch for additive sprinkling system

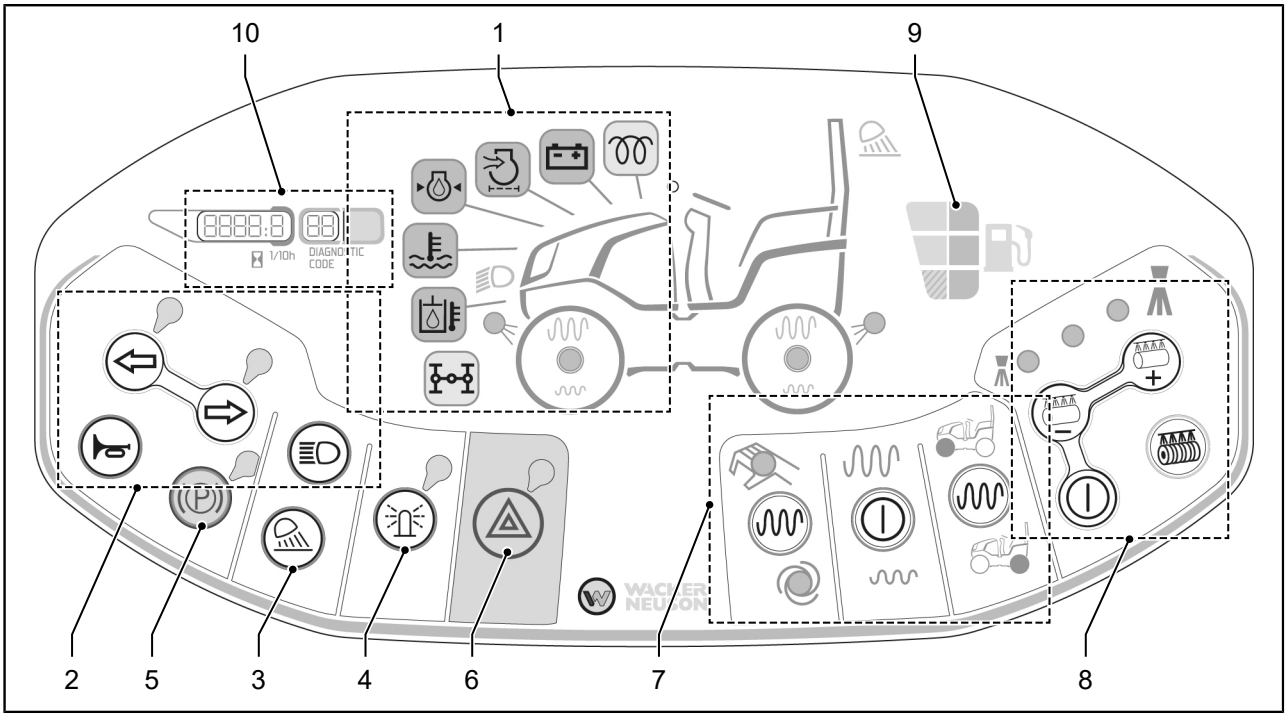
2.02.03 Steering column



[1] Steering wheel
[2] Control panel
[3] EMERGENCY STOP
[4] Preselection engine speed
[5] Electrical system/engine start switch
[6] Switch seat heating (option)
[7] KAG sprinkler switch (option)

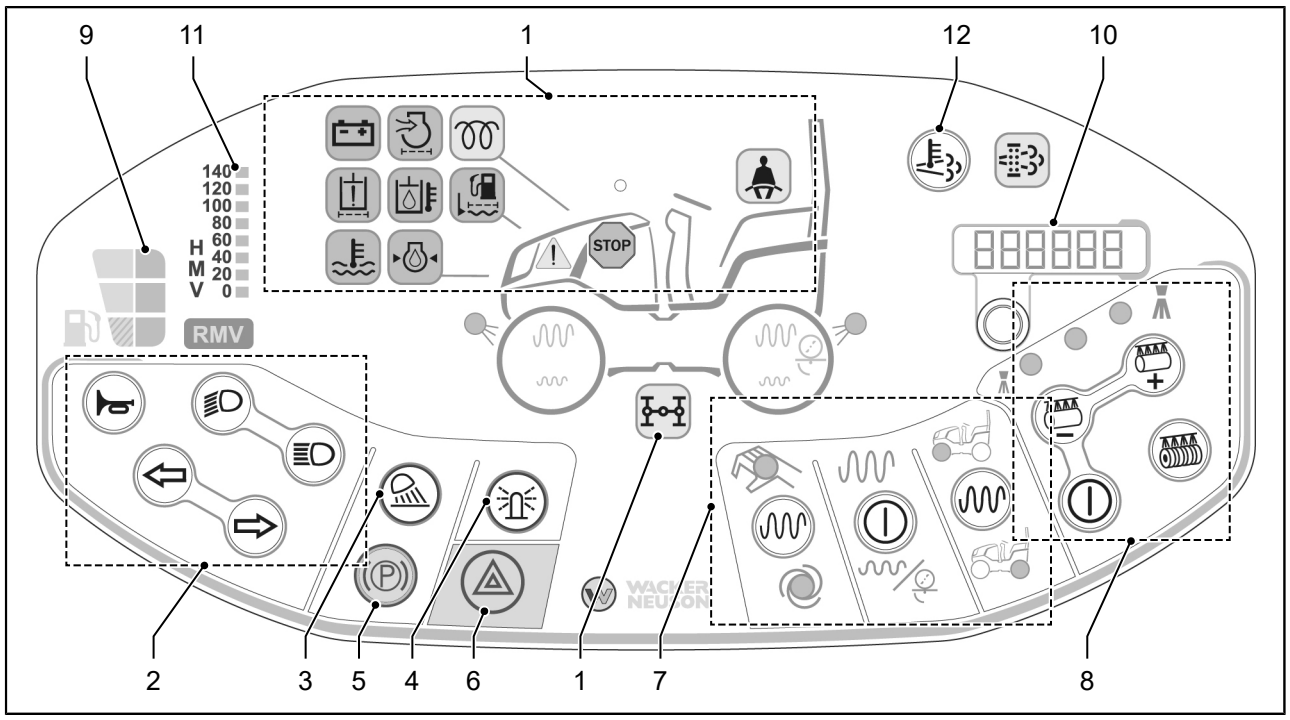
2.02.04 Control panel

Standard version



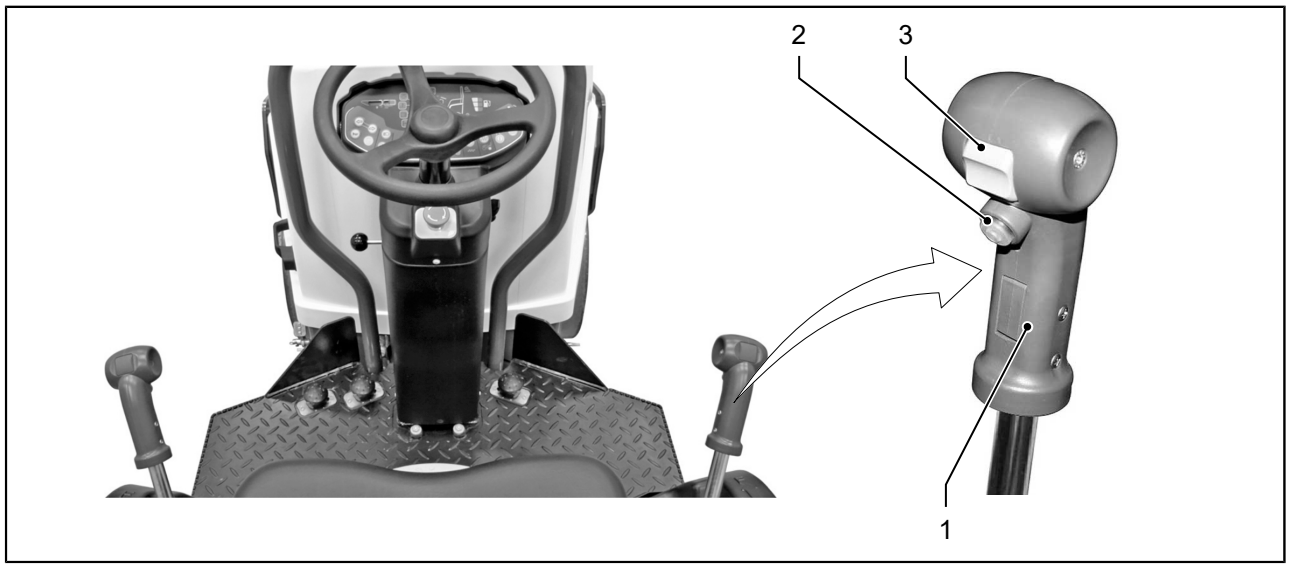
[1] Warning and pilot lights
[2] Driving light, turn signals, signal horn
[3] Work light
[4] Rotating beacon
[5] Parking brake
[6] Hazard warning light
[7] Dynamic compaction system
[8] Water sprinkling system control
[9] Tank content fill level
[10] Info display for system info/diagnostic codes

Version with auxiliary equipment



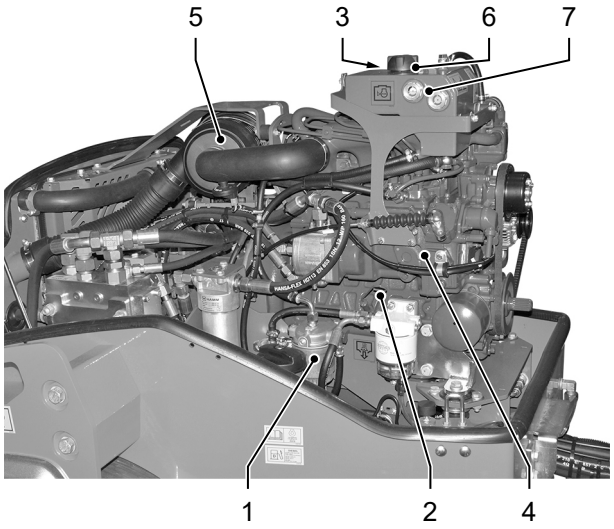
[1] Warning and pilot lights
[2] Driving light, turn signals, signal horn
[3] Work light
[4] Rotating beacon
[5] Parking brake
[6] Hazard warning light
[7] Dynamic compaction system
[8] Water sprinkling system control
[9] Tank content fill level
[10] Info display for system info/diagnostic codes
[11] Compaction display
[12] without function

2.02.05 Drive lever

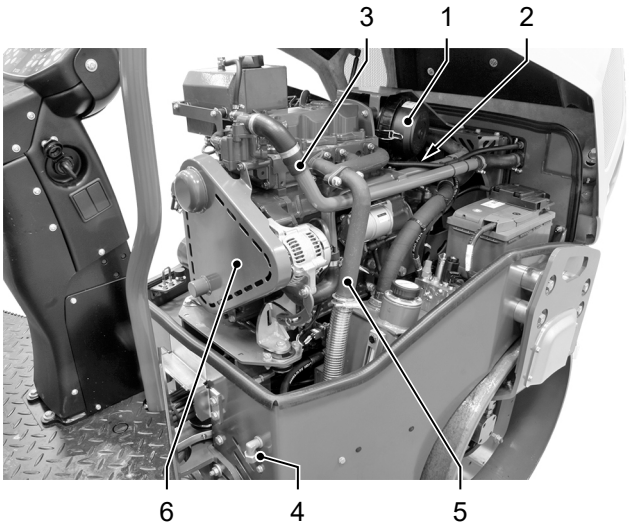


[1] Driving lever
[2] Dynamic compaction system/chip spreader ON/ OFF switch
[3] KAG lifting/lowering switch

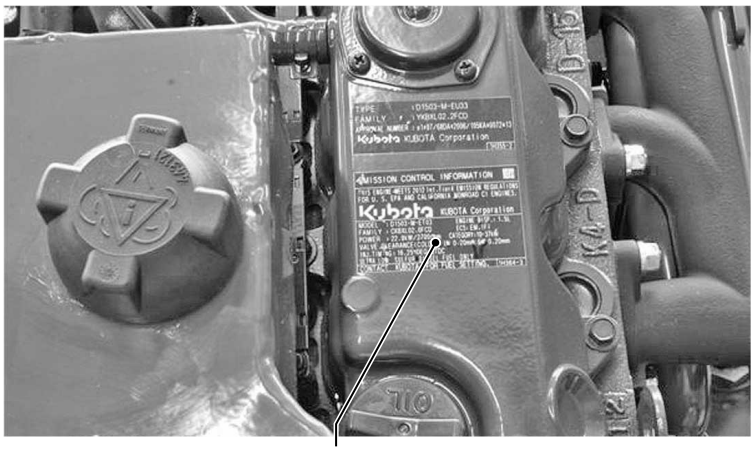
2.03 Drive unit/diesel engine



[1] Fuel system
[2] Oil dipstick
[3] Oil inlet
[4] Diesel engine with drive units
[5] Air filter
[6] Coolant inlet
[7] Coolant level indicator

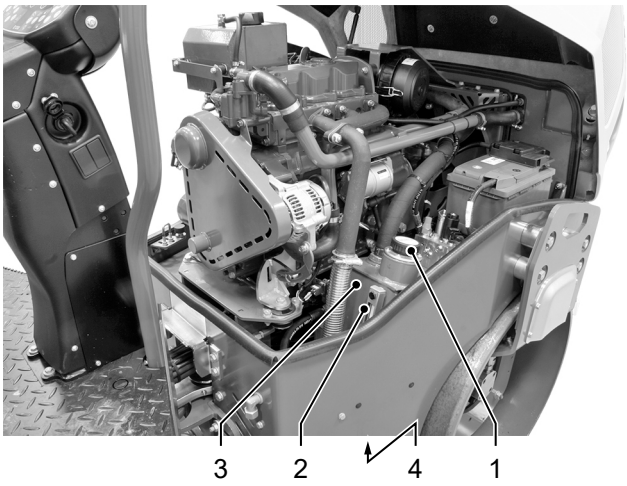


[1] Air filter
[2] Dust discharge valve
[3] Cooling system
[4] Diesel engine oil outlet
[5] Exhaust system
[6] V-belt protection

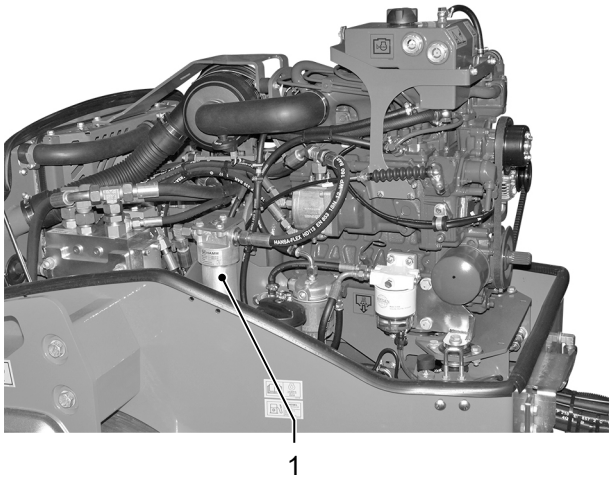


[1] Diesel engine type plate

2.04 Hydraulic oil supply



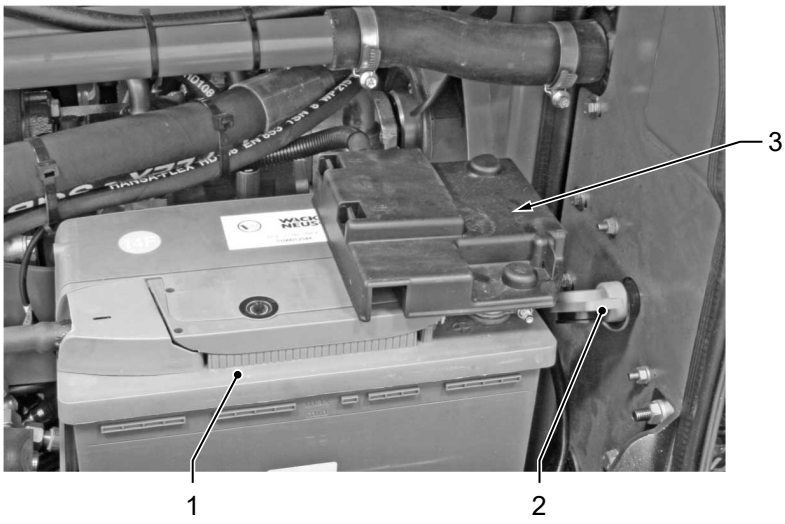
[1] Oil inlet
[2] Fill level indicator
[3] Hydraulic oil reservoir
[4] Oil outlet



[1] Hydraulic oil filter

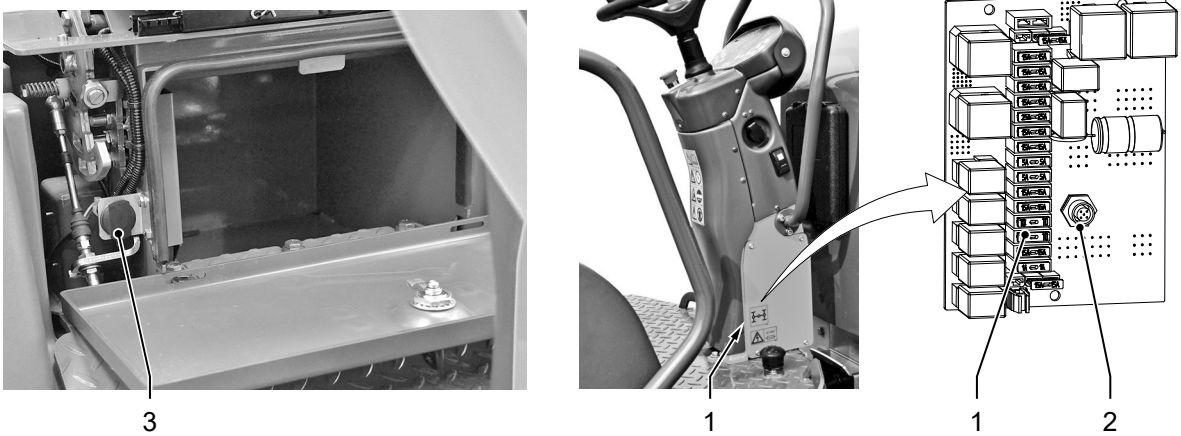
2.05 Electrical system

Engine compartment



[1] Battery
[2] Battery isolating switch
[3] Main fuse

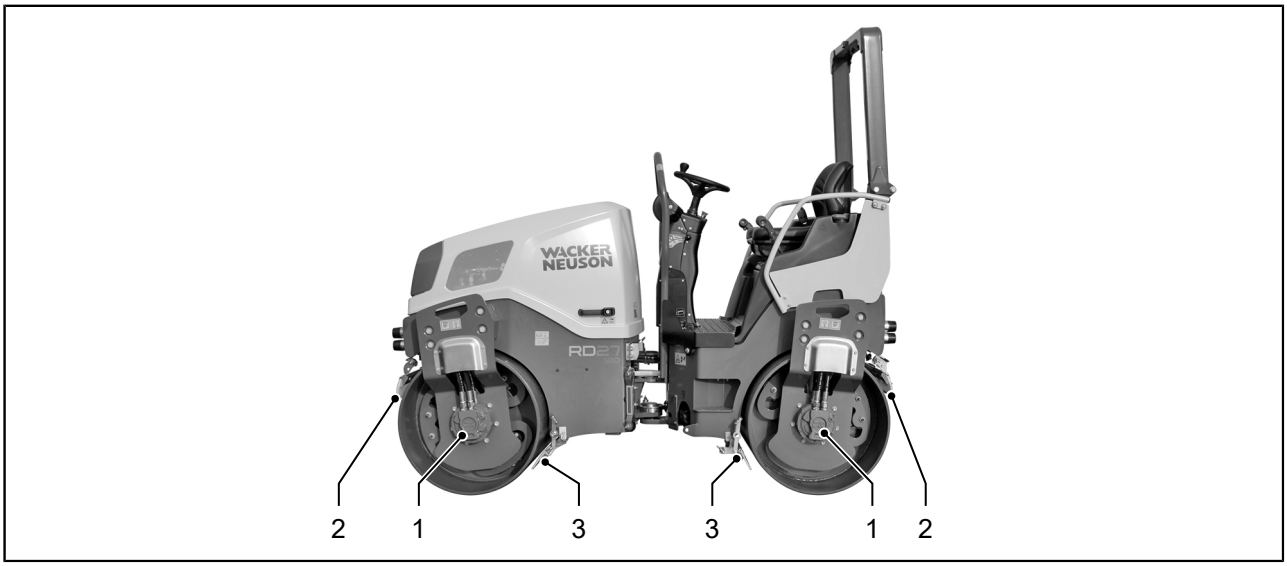
Control stand



[1] Fuses
[2] Machine diagnostic interface - for version with add-on equipment
[3] Socket 12 V

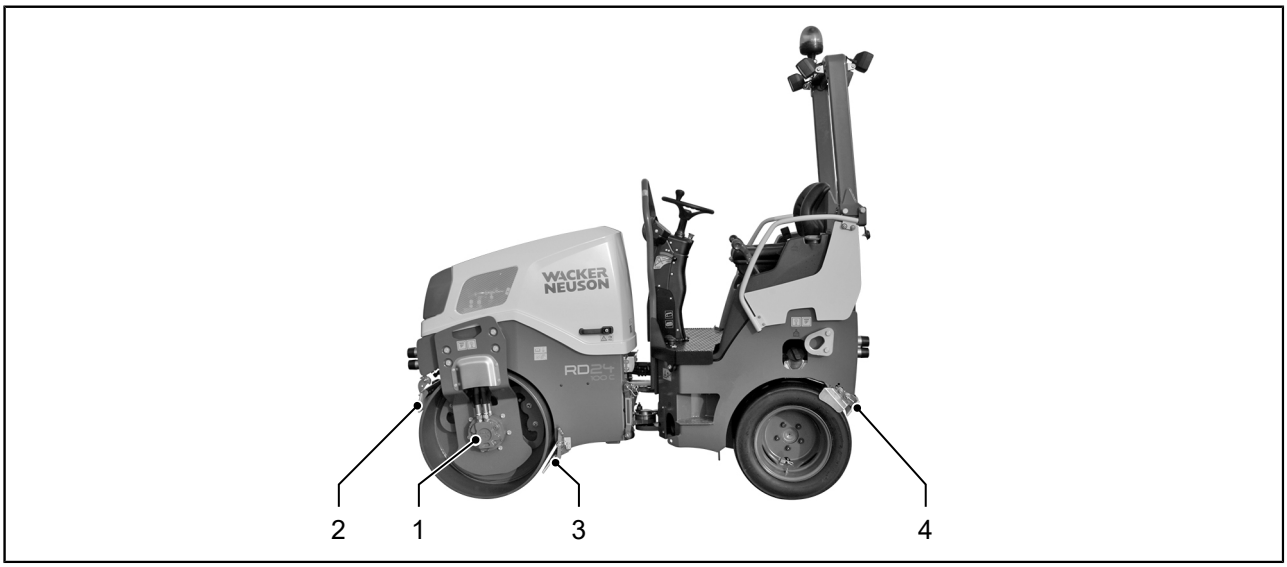
2.06 Transmission

Tandem roller



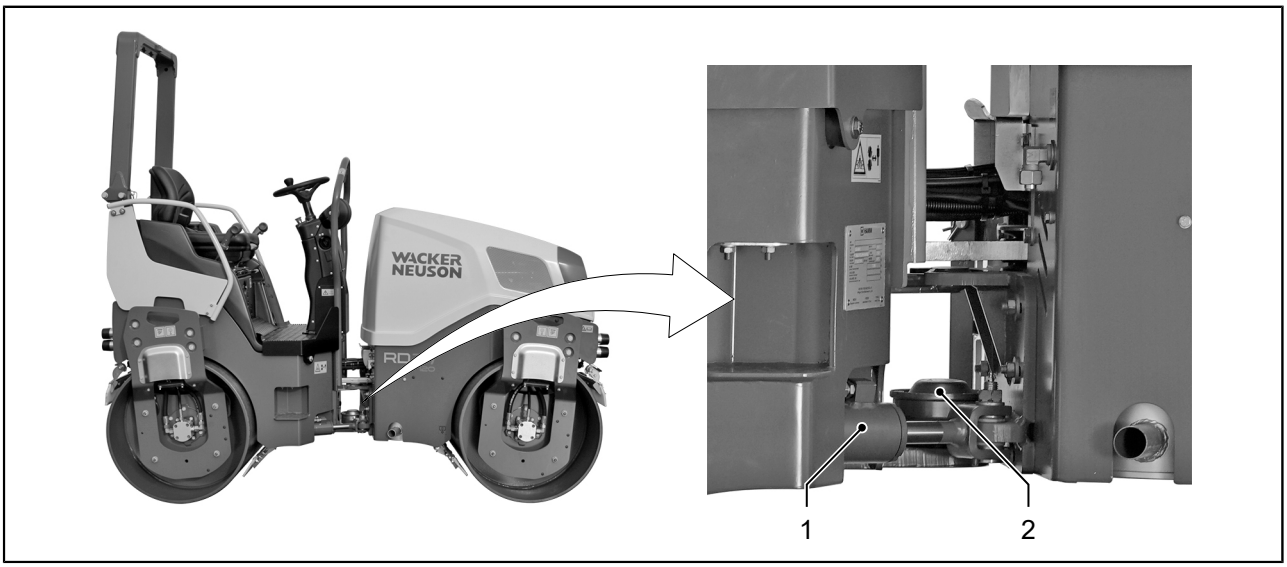
[1] Wheel hub motor
[2] Top drum scraper
[3] Bottom drum scraper

Combination roller



[1] Wheel hub motor
[2] Top drum scraper
[3] Bottom drum scraper
[4] Scrapper tyres

2.07 Steering system

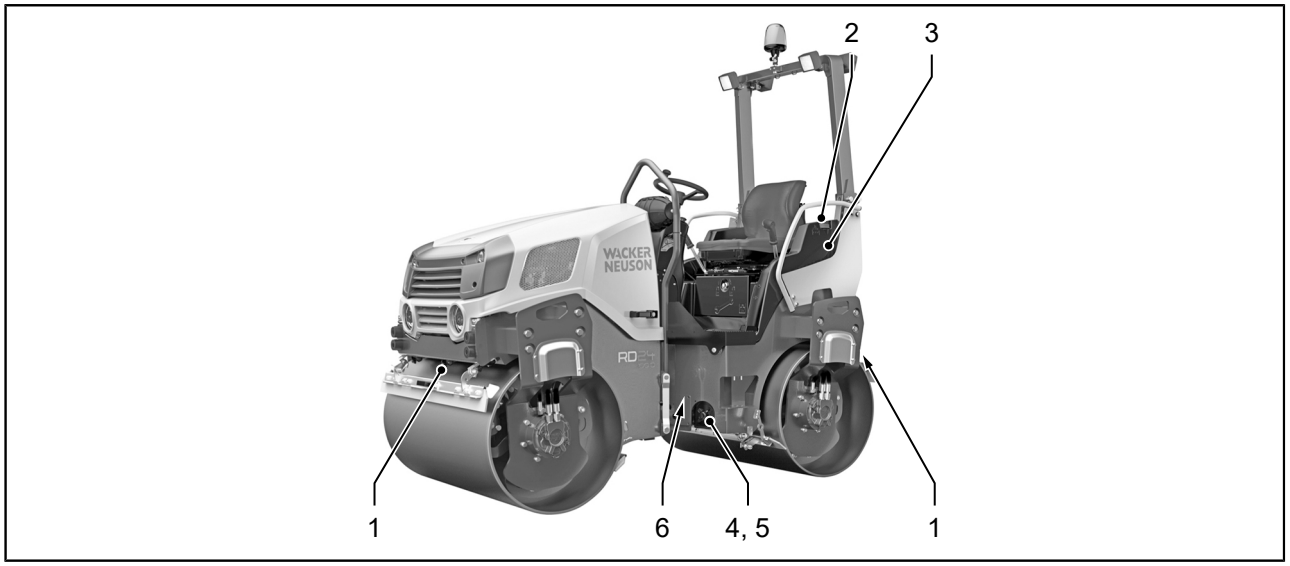


[1] Steering cylinder

[2] Articulated pendulum joint

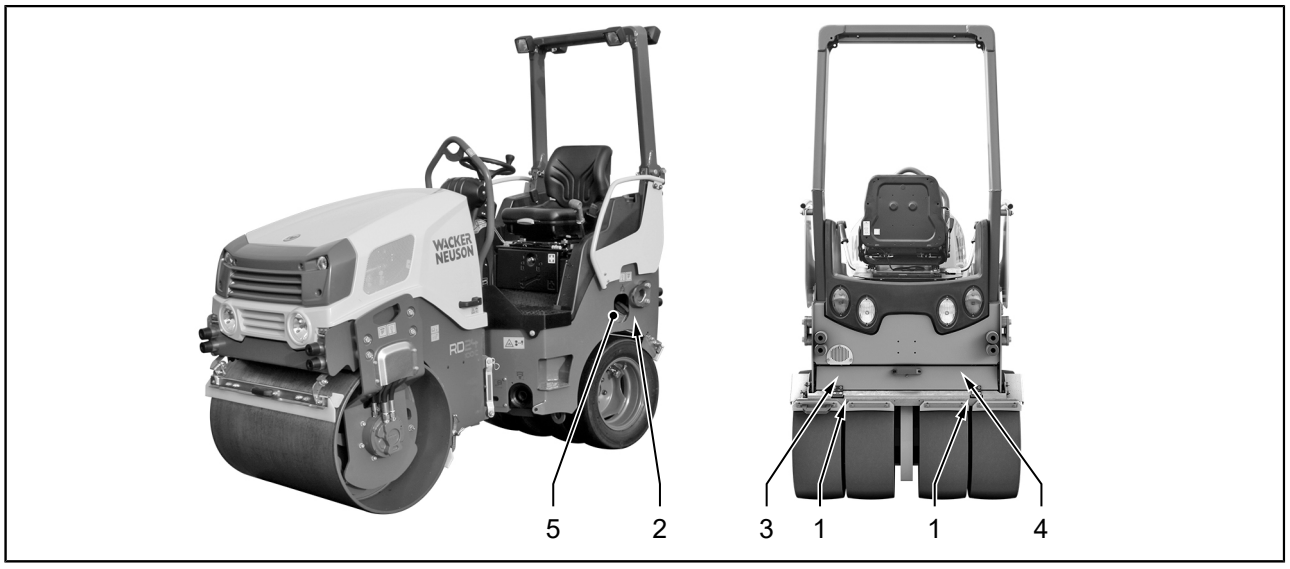
2.08 Water system

2.08.01 Water sprinkling system



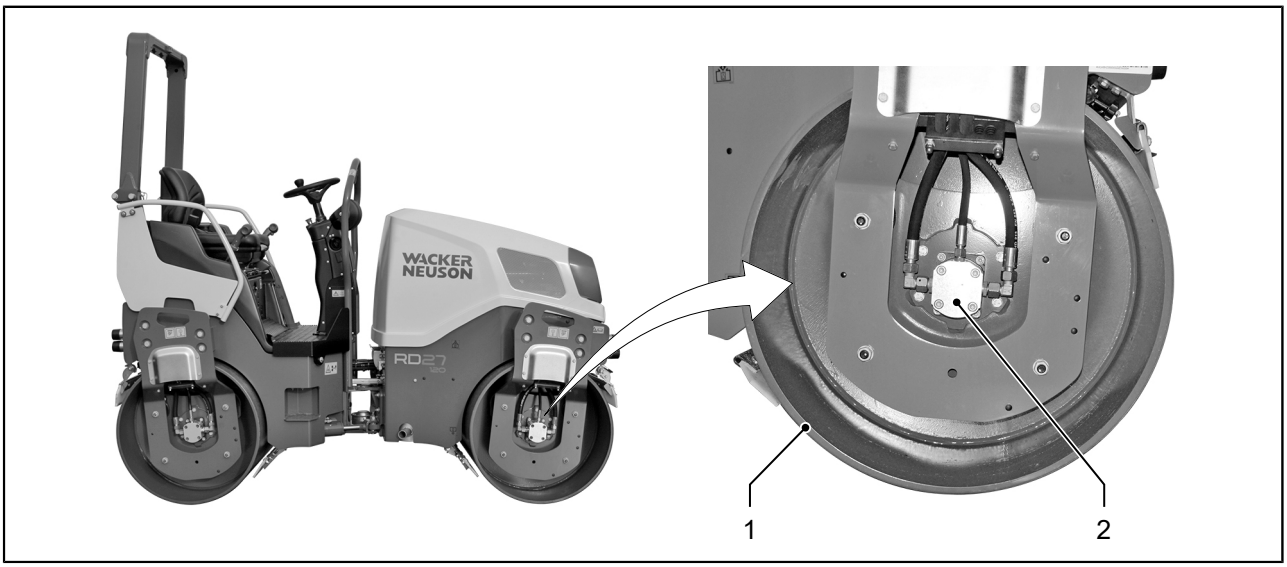
[1] Water sprinkler nozzles
[2] Water tank inlet
[3] Water tank
[4] Water outlet
[5] Water filter

2.08.02 Additive sprinkling



[1] Additive sprinkler nozzles
[2] Additive tank
[3] Additive sprinkling water pump
[4] Additive tank outlet
[5] Additive tank inlet

2.09 Dynamic compaction system



[1] Drum with vibrator/oscillator

[2] Vibration drive motor

3 OPERATION

3.00 Important information about operating the machine

Operating the machine requires specialist knowledge about driving construction machines. Only authorized operating personnel may operate the machine.

The following safety instructions apply to all operating activities machine.

⚠ DANGER

Operating errors!

Danger to life and limb and risk of injuries and material damage through improper operation of the machine.

- Check the machine for operational and traffic safety.
- Read and observe the instruction manual and the safety manual.
- Ensure that there are no persons or objects in the danger zone of the machine.

⚠ DANGER

Uncontrolled driving behavior!

Risk of fatal injury due to the machine's own driving movements or due to any uncontrolled movement.

- Do not continue to operate the machine in the event of error messages about safety-related components. Switch off the machine, park it in a safe place, and inform customer service.
- Allow only specially trained and authorized personnel to work on safety and control-relevant components.
- After work on control-relevant component, the control system must be reset by authorized service personnel.

⚠ WARNING

Exposed, rotating parts!

Risk of being trapped, pulled in, and injured by rotating engine parts.

- Operate the machine only with the engine bonnet and the engine compartment door closed.
- Do not perform any testing and adjusting work in the area of the engine unless the diesel engine has been switched off.
- Do not lay down any object or tool in the engine compartment.

⚠ WARNING

Unintended machine movement!

Serious injuries or death through unexpected movement of the machine during testing and setting work, and outside the operation.

- Do not carry out any testing and adjusting work unless the engine has been stopped and the ignition has been switched off.
- Park the machine on safe ground, i.e., flat and horizontal ground with sufficient bearing capacity.
- Secure machine against rolling away.

⚠ WARNING

Unintended engine start!

Severe injury and death caused in case of an unintended engine start during testing and adjusting work.

- Do not carry out any testing and adjusting work unless the engine has been stopped and the ignition has been switched off.
- Before starting testing and adjusting work, set the battery isolating switch to off in order to de-energize the electrical system. As an alternative, disconnect the earthing/grounding strip from the battery.
- To avoid any unintended engine start by any third person, affix a warning notice at the driver's position indicating that work is in progress on the machine.

NOTICE

High self-weight of machine!

Material damage under the heavy weight of the machine.

- When loading and transporting the machine use hoisting gear and means of transport suitable for the weight of the machine.
- Use the machine only on sufficient load-bearing soil.

NOTICE

Uncontrolled movements!

Damage to machine or environment by uncontrolled steering system movements and by consequent front or rear end swings.

- Applying safety strut before:
  - crane loading the machine.
  - transporting the machine.
  - maintenance and repair work.

3.01 Safety strut

⚠ WARNING

Unintentional movement of the machine!

Severe injury or death due to unexpected machine movement during setting work.

- Do not connect or disconnect the safety strut unless the engine is stopped and the ignition is set to off.
- Park the machine on safe ground, i.e., flat and horizontal ground with sufficient bearing capacity.
- Secure machine against rolling away.

The safety strut is used to prevent uncontrolled steering system movements. This helps to prevent, e.g., the machine's front end or rear ends from swinging out.

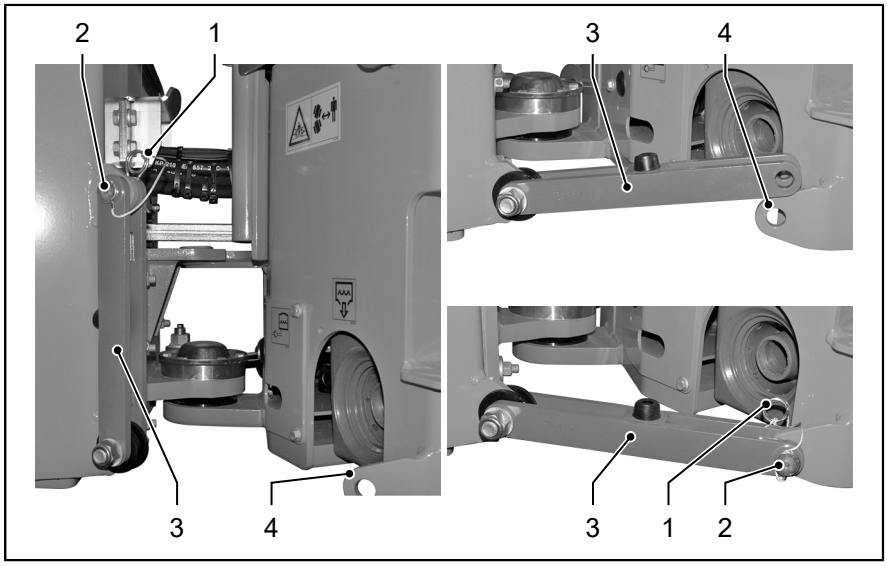
Applying safety strut **always** before:

- crane loading the machine.
- transporting the machine.
- maintenance and repair work.

Before inserting the safety strut, safely stop the machine

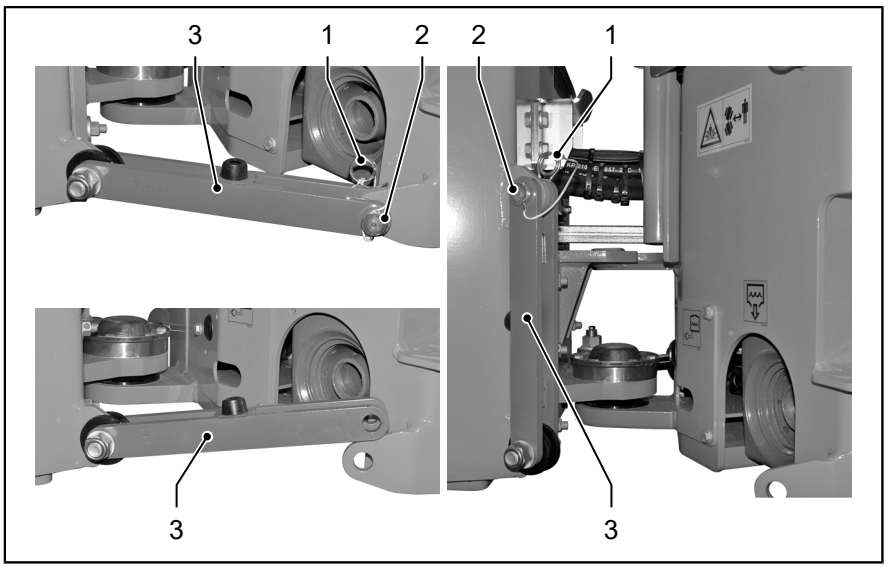
- Remove any steering angle (set the steering system to straight-line motion) and
- Remove any track offset.

Applying safety strut



- ▶ Pull the spring cotter pin [1] out of the bolt [2].
- ▶ Pull out the bolt [2].
- ▶ Release the coupling bar [3] and swing it to the holder [4] located opposite.
- ▶ Use the bolt [2] to lock the coupling bar [3] in the holder [4].
- ▶ Slide the spring cotter pin [1] into the bolt [2].
- ✔ The safety strut is now installed.

Releasing safety strut



- ▶ Pull the spring cotter pin [1] out of the bolt [2].
- ▶ Pull out the bolt [2].
- ▶ Swing the coupling bar [3] upwards and press it down.
- ▶ Use the bolt [2] to lock the coupling bar [3] in place.
- ▶ Slide the spring cotter pin [1] into the bolt [2].
- ✔ The safety strut is released.

3.02 Loading and transporting

Observe all regulations when loading and transporting the machine to and from its place of use!

Regulations and Provisions

When loading rollers onto trucks, trailers or semitrailers, it is essential to secure the machine properly on the carrying vehicle. The duty for tie-down on street vehicles arises from StVO § 22, StVO § 23, StVZO § 30, StVZO § 31, HGB § 412 as well as from VDI guideline 2700 or other national requirements. Loading and transporting the machine requires sufficient knowledge about the loading of vehicles and their behavior under load. The machine may only be loaded by trained loading personnel. The machine must be fixed or stowed in transport-safe way to the vehicle by an form-locked or friction-locked manner or by a combination with friction. The machine must not change its position on the vehicle during normal traffic loads. Typical transport stresses also include emergency braking, evasive manoeuvres and unevenness of the road. If it is impossible to secure the machine properly onto the vehicle, or if the loading vehicle shows visible defects which do not ensure safe transport, loading must not be performed. This condition or requirement also applies to too little or damaged lashing tackle.

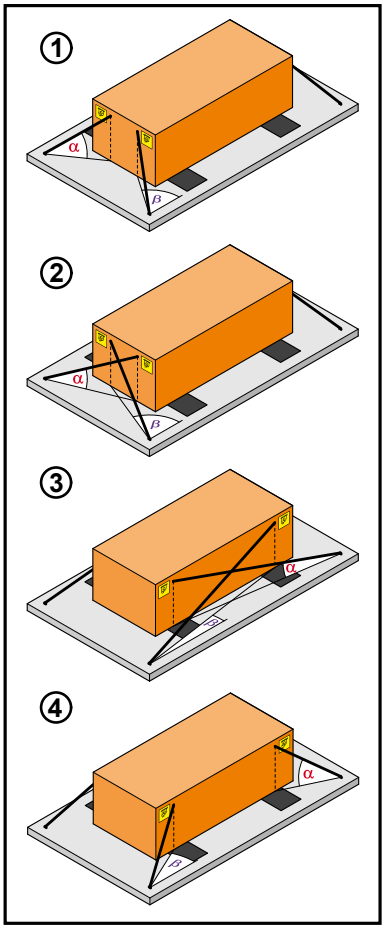
The transport company involved is always responsible for the safe transport of the machine and accessories.

Loading instructions

When loading please observe the following instructions:

- Adhere to section Transport as specified in the safety instructions.
- Observe weight and dimensions ("Technical data", page 175 sqq.).
- Observe the legally required maximum height.
- Only use approved gantries or planks that are provided with an antiskid coating.
- Never drive with metal on metal.
- Gantries, planks and loading areas must be swept clean and free of grease, dirt and ice etc.
- Clean roller drums and tyres prior to driving on the gantries.
- Please ensure a friction factor is $\mu \geq 0.6$, e.g. by use of anti-slide mats.
- In machines having an all-wheel lock, this lock needs to be set to on before driving on any ramp or uphill slope.
- Slowly drive the machine up/down with the speed set to 2/3 and the drive lever at the 1/4 position.
- Either remove every loose or movable part in or at the machine, or secure such parts separately.
- Lower attachments.
- In case of rollers with articulated steering, the safety strut must always be activated for transport.
- Remove wedges and lashing devices completely before unloading. Unblock steering system by unblocking the safety strut.

- Drive the roller slowly and carefully from the loading area.
- For crane loading, always attach appropriate sling equipment at the lifting lugs provided for them. The crane vehicle must be positioned on flat ground providing the bearing capacity required while observing all relevant safety regulations. In addition, take suitable precautions to block access to the lifting area in order to prevent any person from moving or staying within the danger zone. The crane's load table must correspond to the machine to be lifted. No crane loading must be performed unless all these items have been complied with.

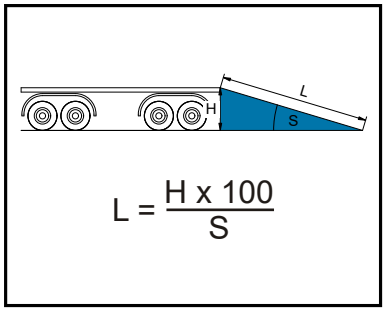


Load securing

Special notes

- Variant ① and variant ② may be combined. The lashing devices must not necessarily be arranged crosswise.
- Do not use any lashing device unless it is of sufficient dimension, bears the corresponding marking, and has been subjected to a valid inspection.
- Lash the machine with appropriate lashing devices onto the loading area, using only the marked lashing eyes.
- Observe the load for the lashing point(s) at the vehicle/load platform and at the load/roller. Do not overload the lashing points with a tensioning device (see the loading chart).
- To increase load safety, use additional precautions for securing the load including, e.g., wheel stop wedges, or a positive fit at the goose-neck.

Store the machine on the load platform, placing two continuous and clean strips of anti-slide mats (grammage approx. 10 kg/m², loadable up to 630 t/m², 10 mm thick, friction factor μ ≥ 0.6) under every roller drum/tyre.



$$L = \frac{H \times 100}{S}$$

Maximum permissible ramp slope: See loading charts

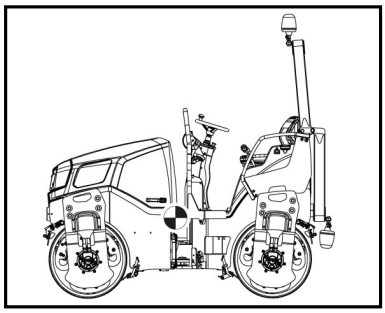
[L] Ramp length [mm]

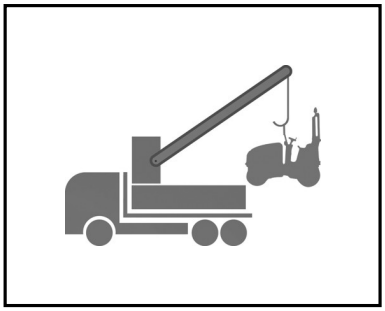
[H] Difference in height [mm]

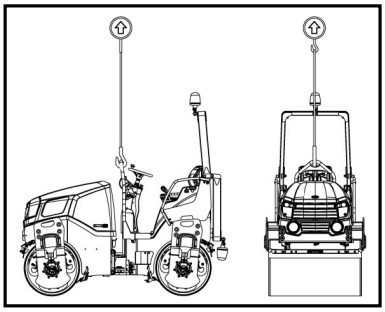
[S] Ramp slope [%]

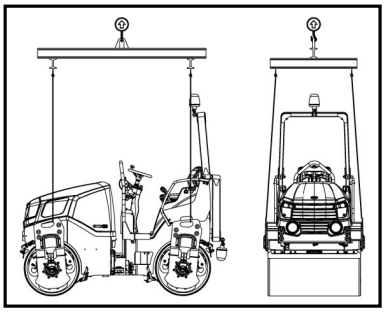
Always use the correct load distribution plan.

[◔] Centre of gravity









Crane loading

Special instructions

- Park the crane vehicle on flat ground that provides the necessary load-bearing capacity. Comply with all applicable safety regulations when doing so.
- The crane's load table must correspond to the weight and to the centre of gravity of the machine to be lifted.

If the weight of the machine is unknown, set the maximum operating weight (see type plate).

- Take suitable precautions to block access to the lifting area in order to prevent anybody entering the danger zone.
- Attach lifting tackle to the lifting lugs provided.
- Note the load-bearing capacity of the lifting tackle.
- Use lifting frames or spreader beams if necessary.
- Put the safety strut on the machine before crane loading.

Loading chart

Diagram of the transport position

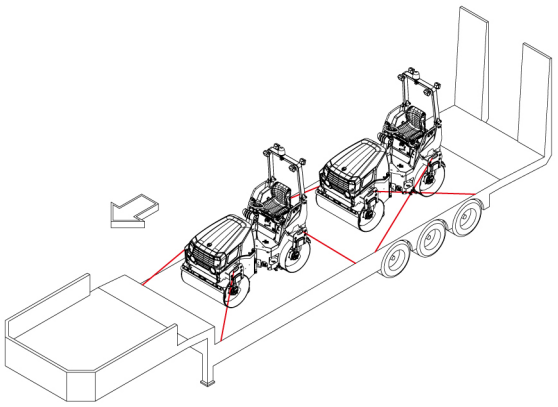
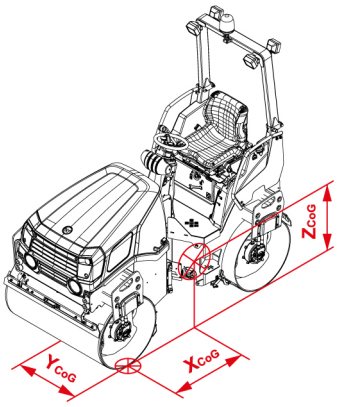
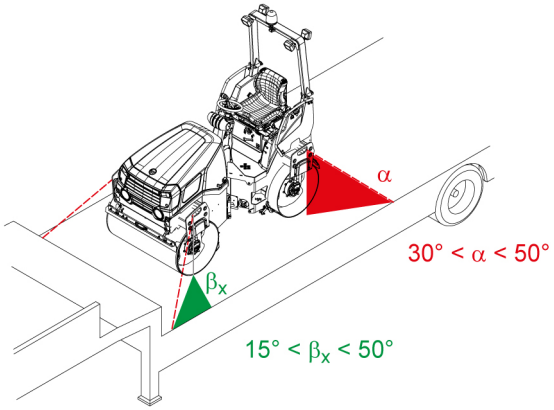


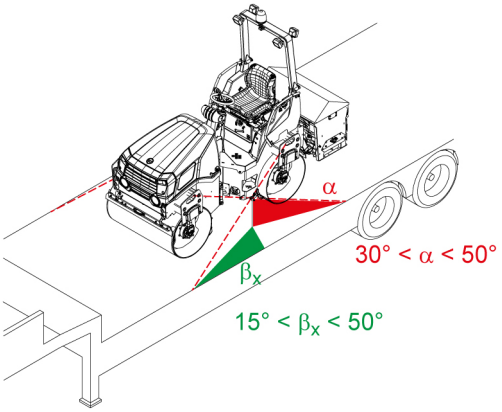
Diagram of the centre of gravity specifications





Lashing variant 1

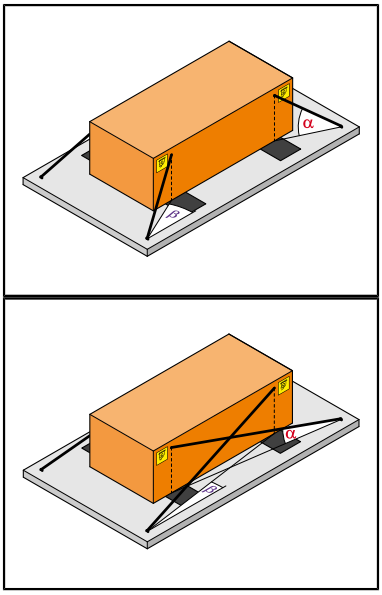
Weight class [t]	Lashing capacity LC (μ=0.6) [daN]
max. 5.7	2000



Lashing variant 2

Weight class [t]	Lashing capacity LC (μ=0.6) [daN]
max. 5.7	2000

Machine parameters	
Weight of machine [t]	1,5 t < m < 5,7 t
Area of centre of gravity [mm]	X_{CoG} = 778–1048 Y_{CoG} = 428–753 Z_{CoG} = 650–1030
Identification reference point:	Centre drum, front left
Interface parameters:	
Type of contact:	Anti-slip Material
Frictional force [µ]:	0.6
Heavy load capacity:	yes
Contact points:	under contact pair
Vertical lashing angle α:	30° < α < 50°
Longitudinal, horizontal angle β_x:	15° < β_x < 50°



Specification of attachment points on the load:			
Tensile capacity of lashing point [daN]:	2000		
Marking of lashing point:	Symbol ISO 6405-1		
Number of lashing points:	4		
Specification of lashing points on the means of transport:			
Tensile capacity of lashing point [daN]:	≥ 2000		
Number of lashing points:	4		
Load securing equipment:			
Wedge blocks:	no	Quantity: 0	Miscellaneous:
Other types of blocking:	Positive blocking longitudinally/transversely to the direction of travel		
Lashing equipment capacity [daN]:	10000	Quantity: 4	Miscellaneous:
Recommended type of lashing equipment:	Chain (6/8 2200 daN),		
	Belt (2000 daN) as an alternative		
Connecting pieces to the lashing point:	Hook with safety latch		

Specific safety instructions

- Slowly drive the machine up/down with the speed set to 2/3 and the drive lever at the 1/4 position.
- Do not exceed the maximum ramp slope (28.5 %, approx. 16°).
- Secure the clamping devices.
- On rubber wheeled rollers with tyre filling system, the tyre filling system must be set to 0.6 MPa (6 bar, 87 psi).
- Check the inflation pressure at least every 24 hours and, if refill the air, if necessary (see Technical data).

Miscellaneous

- Lock the seat console in position
- Put down the add-on equipment

3.03 Function tests before starting work

Check the following to ensure safe operation of the machine:

Test	Refer to
Can the machine be accessed safely?	see page 68
Has the driver's seat been adjusted?	see page 69
Has the seat belt been tested?	see page 72
Has the position of the seat been adjusted?	see page 69
Has the supply voltage been activated via the battery isolating switch?	see page 76
Are the turn signal and hazard warning lights working?	see page 80
Is the horn working?	see page 81
Are the lights working?	see page 78
Is the reversing warning system working?	see page 86
Is the rotating beacon working?	see page 81
Is the parking brake working?	see page 132
Is the EMERGENCY STOP working?	see page 131
Has the fuel tank fill level been checked?	see page 109
Has the coolant fill level been checked?	see page 142
Has the hydraulic oil reservoir fill level been checked?	see page 145
Has the water tank fill level been checked?	see page 159
Has the additive tank fill level been checked?	see page 159
Has the air pressure in the tyres been tested?	see page 154
Has the scraper been tested?	see page 151

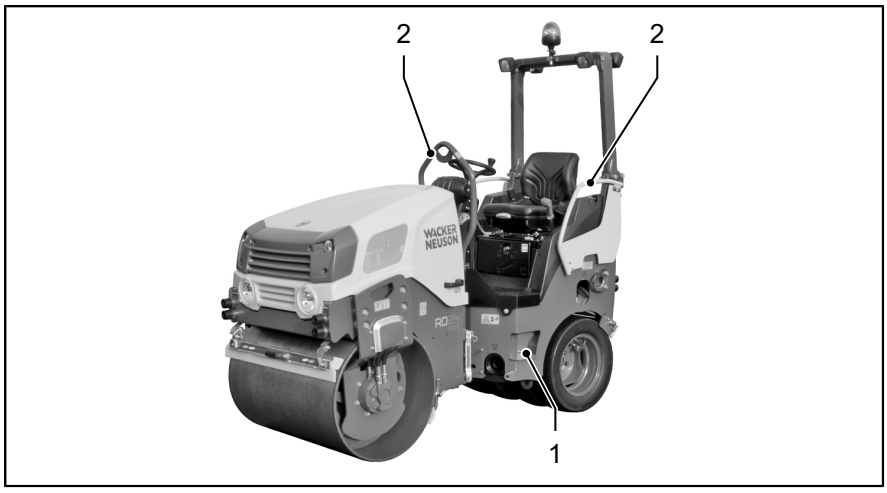
3.04 Access to the machine

⚠ WARNING

Danger of slipping when climbing up and down!

Risk of injury caused by slipping when climbing onto and off the machine.

- Use only the ladders, climbing handholds and steps provided.
- Only climb up and down on machines that are stationary and secured.
- When climbing up and down with hands and feet, maintain three points of contact with the machine at all times.
- Keep ladders and steps clean and free of frost.
- Repair or replace worn anti-slip surfaces of the steps.



[1] Step to the driver's platform **[2]** Handrail

3.04.01 Access to the operator’s platform

Access to the operator platform is possible from both sides of the machine.

Ladders and climbing handholds are arranged so that they are within easy reach and offer secure foot and handholds.

3.05 Adjust the operator's seat

⚠ WARNING

Uncontrolled motion!

Injuries due to uncontrolled movements when changing the driver's seat position when driving.

- Only drive with latched operator’s seat.
- Do not adjust the driver's seat during travel.
- Free access to bodywork and engine parts.

The seat is adjusted to suit the size of the driver's body with the various setting options.

Driver's seat, model A

Setting driver's weight

There is damping built into the driver's seat that compensates for shock-like machine movements. For this damping to function optimally, the seat must be adjust to the weight of the driver.

Only adjust the weight setting when the seat is unloaded.

▶ Turn the lever into the corresponding position:
- Light driver's weight (approx. 50 – 70 kg) – position I
- Medium driver's weight (approx. 70 – 100 kg) – position II
- Heavy driver's weight (approx. 100 – 130 kg) – position III

Setting the slope of the backrest

▶ Turn the hand wheel [2] in + (plus) direction.
✔ The seat back is inclining backwards.
▶ Turn the hand wheel [2] in – (minus) direction.
✔ The seat back is inclining forward.

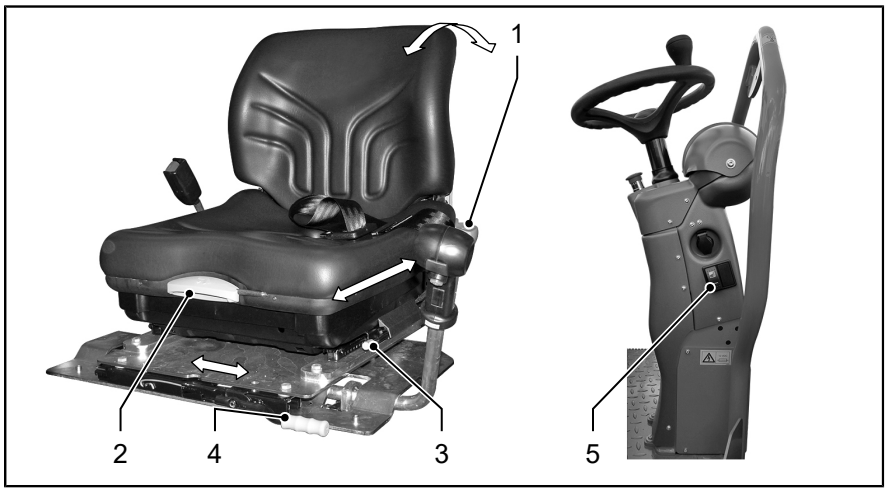
Seat adjustment forward/backward

▶ Lift the lever [3].
▶ Slide the seat forward or backward to reach the desired position.
▶ Release the lever [3] and let the seat pedestal snap in place.

Seat adjustment left/right

- Lift the lever [4].
- Slide the seat pedestal to the desired position to the left or right.
- Release the lever [4] and let the seat pedestal snap in place.

Driver's seat, model B



Set driver's weight

There is damping built into the driver's seat that compensates for shock-like machine movements. For this damping to function optimally, the seat must be adjust to the weight of the driver.

The driver's weight can be adjusted in 9 steps between 50 kg and 130 kg.

The handle for setting the weight must only be pushed downwards from above.

- Push the handle [1] down hard towards the end stop.
- ✔ The weight setting is adjusted upwards to its 50 kg home position.
- Push the handle [1] downwards and set the driver's weight.

Setting the slope of the backrest

- Lift the lever [2].
- Move the seat face forwards.
- ✔ The seat back is inclining backwards.
- Move the seat face backwards.
- ✔ The seat back is inclining forward.
- Release lever [2].

Seat adjustment forward/backward

- Lift the lever [3].
- Slide the seat forward or backward to reach the desired position.
- Release the lever [3] and let the seat pedestal snap in place.

Seat adjustment left/right

- Lift the lever [4].
- Slide the seat pedestal to the desired position to the left or right.
- Release the lever [4] and let the seat pedestal snap in place.

Seat heating (option)

To allow heating the seat, the driver's seat for version B is equipped with an optional seat heater. The switch is located on the right-hand side of the steering column.

- ▶ Press switch [5].
- ✔ The seat heater is on.
- ▶ Press the switch [5] again.
- ✔ The seat heater is off.

3.06 Using safety belt

⚠ WARNING

Driving without safety belt!

Serious injuries or death can occur if the machine brakes suddenly or tips over and the seat belt is damaged or not worn correctly.

- Only drive the machine when wearing the seat belt.
- Put on the seat belt correctly and do not twist it.
- Make a visual examination of the seat belt when putting it on.
- Have the seat belt immediately replaced by an authorized service provider:
  - If it is worn or damaged
  - After an accident
  - As a general rule, every 3 years

When putting on and taking off the seat belt, avoid pulling it jerkily or tightening it excessively.

Putting on belt

- ▶ Pass the seat belt closely over the hips.
- ▶ Adapt the length of the safety belt to your body size so as to ensure that your freedom of movement is not restricted.
- ▶ Insert the locking plate [1] into the belt lock [2].
- ✔ Seat belt is applied and locked.

Loosing belt

- ▶ Press knob at the buckle [2].
- ✔ Seat belt is released.
- ▶ Place the seat belt on the driver's seat or allow it to roll into the belt retainer.

Seat belt buckle monitoring device (option)

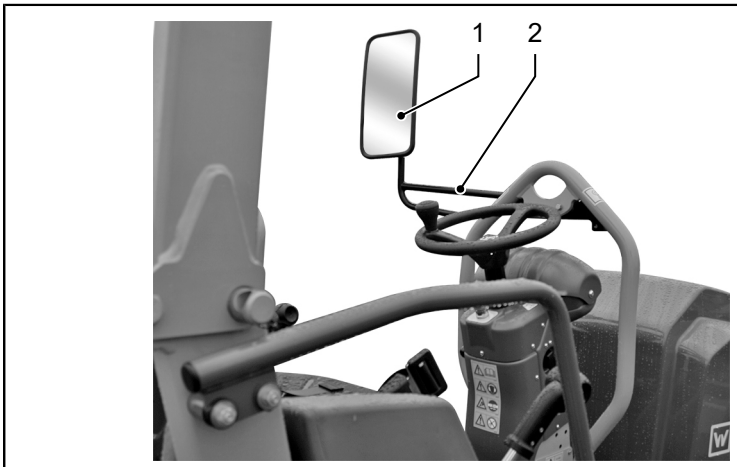
For versions with add-on equipment:

When the safety belt is not fastened, a warning lamp lights up on the operator control panel (see "Operator control panel - Warning and pilot lights") and an audible signal is heard.

3.07 Set operation and rear mirror

The operation and rear-view mirrors are an option.

They can be installed either on one side or on both sides.



Adjust the mirrors so that you can watch the traffic in the rear of the machine.

Clean mirrors at regular intervals.

Replace defective mirrors immediately.

Set operation and rear mirror

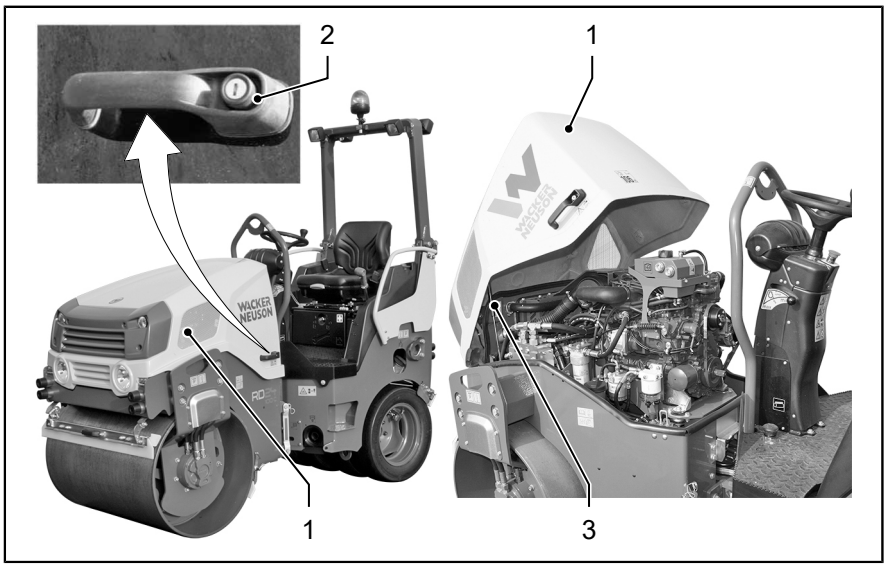
- Align the mirror [1] to the work edge of the roller drum/tyre.
- Adjust the mirrors [1] so as to ensure that you still see the machine at the inside of the mirrors. This is the only way of avoiding a blind spot.

Fold operation and rear mirror

- Turn the mirror mountings [2] forward.

Fold in and lock the operation mirror before transporting the machine on a lorry.

3.08 Opening and closing the bonnet



Opening the engine hood

- ▶ Use the ignition key in the lock on the handle [2] to unlock the engine hood [1].
- ▶ Press the push-button on the handle [2].
- ▶ Raise the engine hood [1].
- ✔ The engine hood is open.
- ✔ The engine hood is held in place by pneumatic springs [3].

Closing the engine hood

- ▶ Lower the engine hood [1] and push it into the lock.
- ▶ Use the ignition key in the lock on the handle [2] to lock the engine hood [1].
- ✔ The engine hood is closed.

The engine hood must be locked while the machine is operating.

3.09 On-board electrical system/battery isolation switch

NOTICE

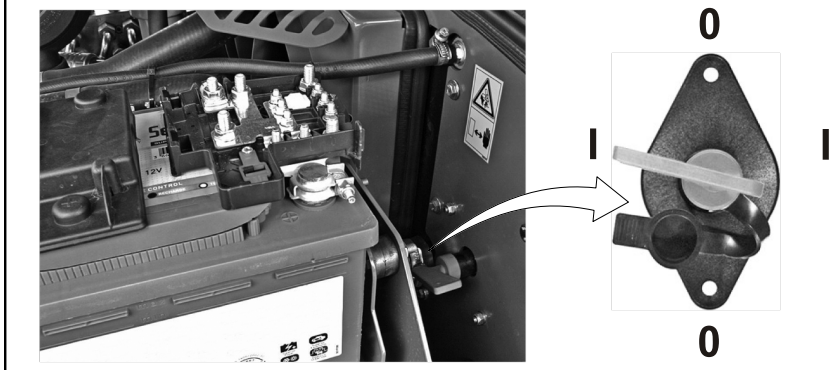
Voltage spikes!

Damage or destruction of electrical components.

- Only interrupt the electrical circuit at the battery main switch when the engine is at a standstill and the electrical system is switched off.

The circuit to the minus terminal of the battery is interrupted at the battery isolation switch. All electric components will be off.

Battery isolating switch positions



- Electrical circuit interupted, on-board electrical system OFF - position **0**
  (key free)
- Electrical circuit closed, on-board electrical system ON - position **I**
  (key engaged)

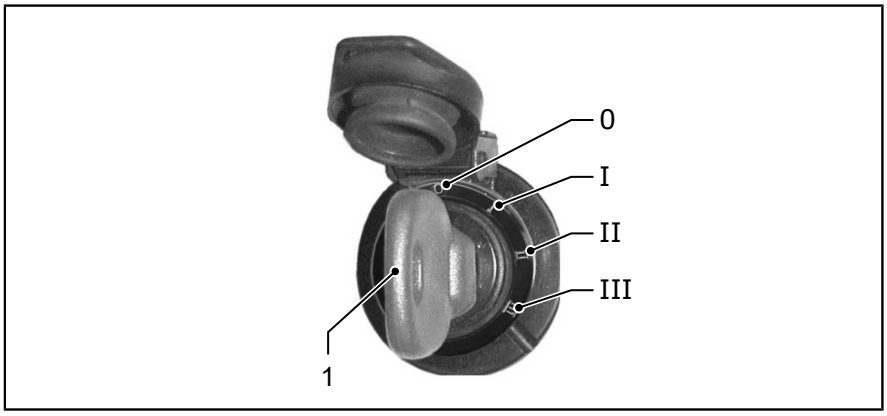
The battery isolating switch is located inside the engine compartment. To actuate the switch, the engine hood must be opened.

As an option, the battery isolating switch can be operated via a Bowden wire at the machine side. The on-board electrical system can then be switched off without opening the engine hood.

3.10 Switching the electrical system on/off

Ignition key

The electrical system is switched on and off and the diesel engine started and stopped with the ignition key.



Switching on electrical system

- ▶ Turn ignition key [1] to position I.
- ✔ The electrical system is switched on.
- ✔ Functional control of warning and pilot lights
- ✔ Diesel engine remains switched off.

Switching off the electrical system

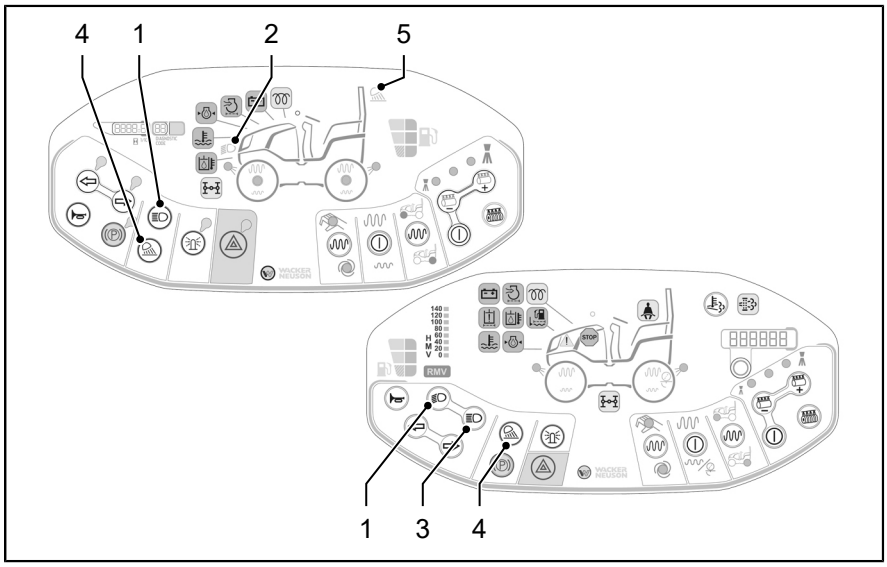
- ▶ Turn the ignition key [1] to position 0.
- ✔ The diesel engine is stopped.
- ✔ The electrical system is switched off.

3.11 Switching the parking light, driving light and work light on/off

To control parking light and driving light, use the operator control panel.

The parking light can still be switched on when the electrical system is switched off. To use driving light and working light, the electrical system must be set to on.

When the lights are set to on for a longer period of time although the engine is stopped, the battery will be discharged quickly.



Switching the parking light on/off

Requirement: Electrical system is OFF.

- ▶ Press switch [1].
- ✔ Indicator light [2] is on: Parking light lights.
- ✔ For versions with add-on equipment: Switch [1] lights up: Parking light lights.
- ▶ Press switch [1] again.
- ✔ Indicator light [2] is off: Parking light off.
- ✔ For versions with add-on equipment: Switch [1] unlit: Parking light off.

Switching the driving light on/off

Requirement: Electrical system is ON.

- ▶ Press switch [1].
- ✔ Indicator light [2] is on: The driving light is lit.
- ✔ For versions with add-on equipment: Switch [1] lights up: The driving light is lit.
- ▶ Press switch [1] again.
- ✔ Indicator light [2] is off: Driving light off.
- ✔ For versions with add-on equipment:

Switch [1] unlit: Driving light off.

When it is set to on, the parking light will automatically change to driving light as soon as the electrical system is set to on.

When it is set to on, the driving light will automatically change to parking light as soon as the electrical system is switched off.

Switching high beam on/off

For versions with add-on equipment

The high beam switch [3] is inoperative.

Switching the working light on/off

Depending on the machine's configuration, the working light can consist of various components, e.g.

- front and/or rear working spotlights.
- Drum edge lighting.

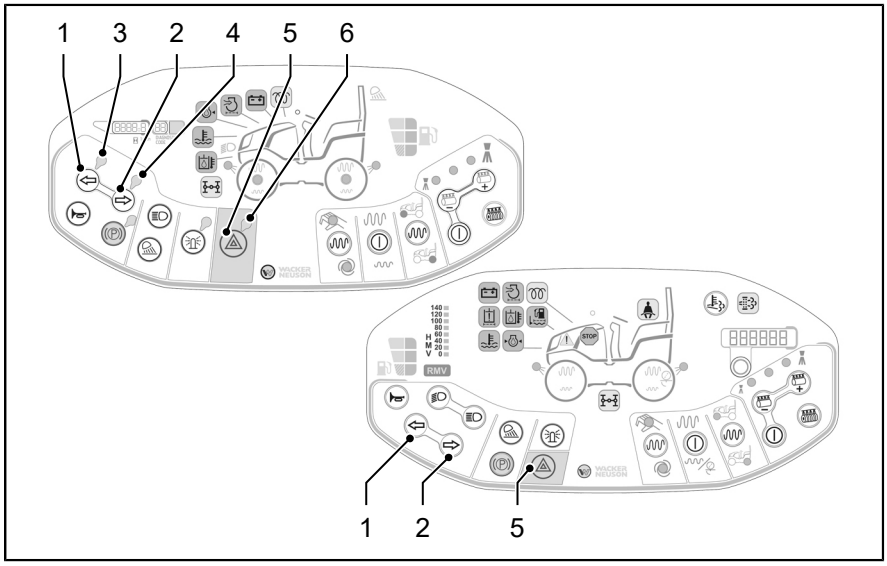
Requirement: Electrical system is ON.

- ▶ Press switch [4].
- ✔ Indicator light [5] is on: Work light lights.
- ✔ For versions with add-on equipment: Switch [4] lights up: Work light lights.
- ▶ Press switch [4] again.
- ✔ Indicator light [5] is off: Working light off.
- ✔ For versions with add-on equipment: Switch [4] unlit: Working light off.

3.12 Switching the turn signals/hazard warning lights on and off

To control the indicator lights and warning flashers, use the operator control panel.

The warning flashers can also be switched on when the electrical system is off. For the indicator lights, the electrical system needs to be on.



Left-hand/right-hand turn indicating

Requirement: Electrical system is ON.

- ▶ Press the switch [1] for left-hand indicating .
- ▶ Press the switch [2] for right-hand indicating.
- ✔ The corresponding indicator light [3/4] is flashing: Flashing light on.
- ✔ For versions with add-on equipment:
  The corresponding switch [1/2] is flashing: Flashing light on.
- ▶ Press the switch [1/2] again.
- ✔ Indicator lights [3/4] off: Flashing light off.
- ✔ For versions with add-on equipment:
  Switch [1/2] unlit: Flashing light off.

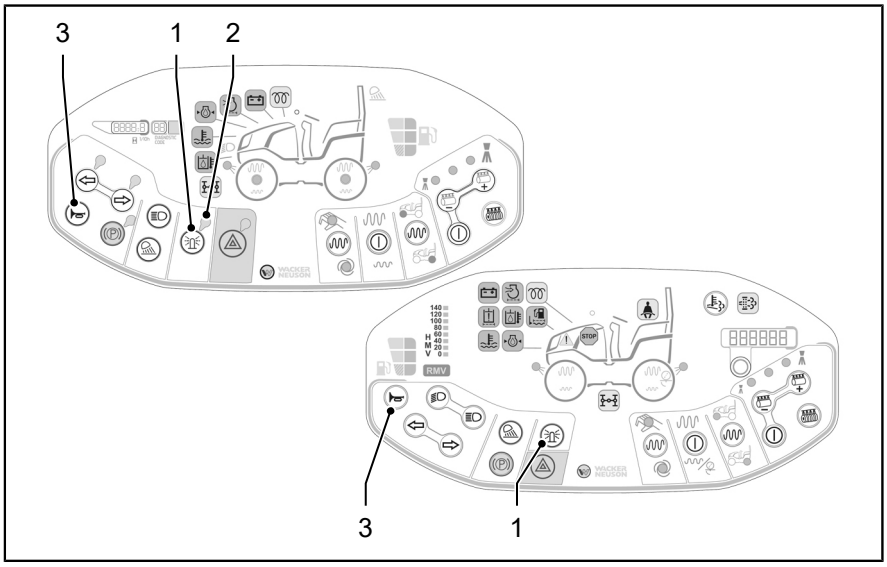
Switching the warning flashers on/off

- ▶ Press switch [5].
- ✔ Indicator light [6] flashing: Warning flashers on.
- ✔ For versions with add-on equipment:
  Switch [5] flashing: Warning flashers on.
- ▶ Press switch [5] again.
- ✔ Indicator light [6] is off: Warning flashers off.
- ✔ For versions with add-on equipment:
  Switch [5] unlit: Warning flashers off.

If the light bulb in one of the direction indicators is defective, the indicator lights/switches flash rapidly. To guarantee road safety, the defective light bulb must be replaced.

3.13 Switching the rotating beacon and signal horn on and off

The rotating beacon and signal horn are operated from the control panel.



Switching rotating light on/off

Requirement: Electrical system is ON.

- ▶ Press switch [1].
- ✔ Indicator light [2] is on: Rotating beacon lights.
- ✔ For versions with add-on equipment:
  Switch [1] lights up: Rotating beacon lights.
- ▶ Press switch [1] again.
- ✔ Indicator light [2] is off: Rotating beacon is switched off.
- ✔ For versions with add-on equipment:
  Switch [1] unlit: Rotating beacon is switched off.

Actuating signal horn

Requirement: Electrical system is ON.

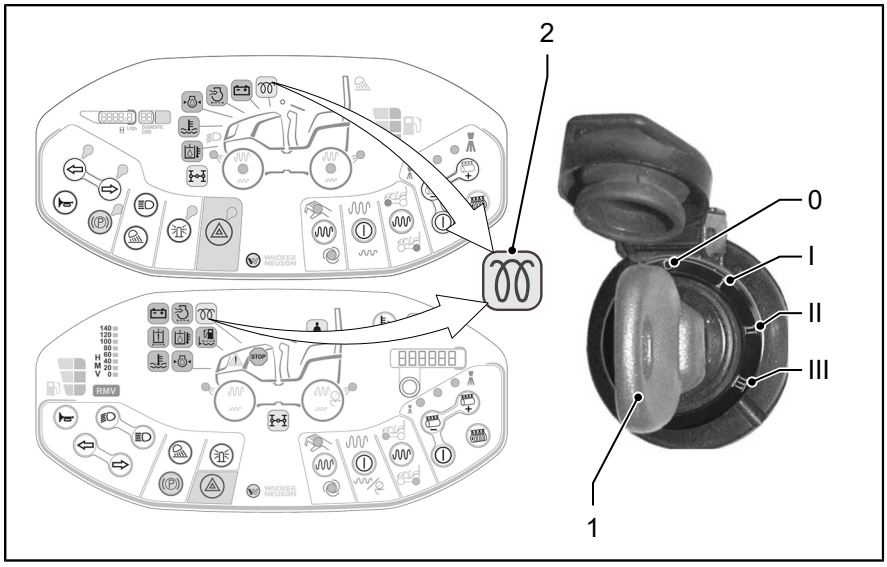
- ▶ Press the signal horn switch [3].
- ✔ A short acoustic signal sounds when a fault is detected.

3.14 Starting the machine

Requirement: Fill levels for the operating materials, for example fuel, water etc., are adequate.

Before starting the machine, check all functions and settings (see "Function tests before starting work").

The electrical system is switched on and off and the diesel engine started and stopped with the ignition key.



[1] Ignition key **[2]** Cold start assistance pilot lamp

When the engine is at a standstill and the electrical system is switched on for a longer period (position I), the battery discharges rapidly.

Switching on electrical system

- ▶ Turn ignition key [1] to position I.
- ✔ Electrical system is ON.
- ✔ Functional control of warning and pilot lights
- ✔ Diesel engine remains switched off.

Cold start assistance/preheating

The diesel engine needs to be preheated when it is cold.

This step can be omitted when the engine is at operating temperature.

- ▶ Turn and hold the ignition key [1] in position II.
- ✔ The cold start assistance [2] pilot lamp is lit.
- ✔ The cold start assistance [2] pilot lamp goes out after a few seconds.
- ✔ Ignition key turns back to position I after releasing.
- ✔ The engine is ready to start.

When the starting temperature is reached, the indicator light switches off. Do not start the diesel engine before this.

Preheating is time controlled only. When the temperature is low, preheat twice if necessary.

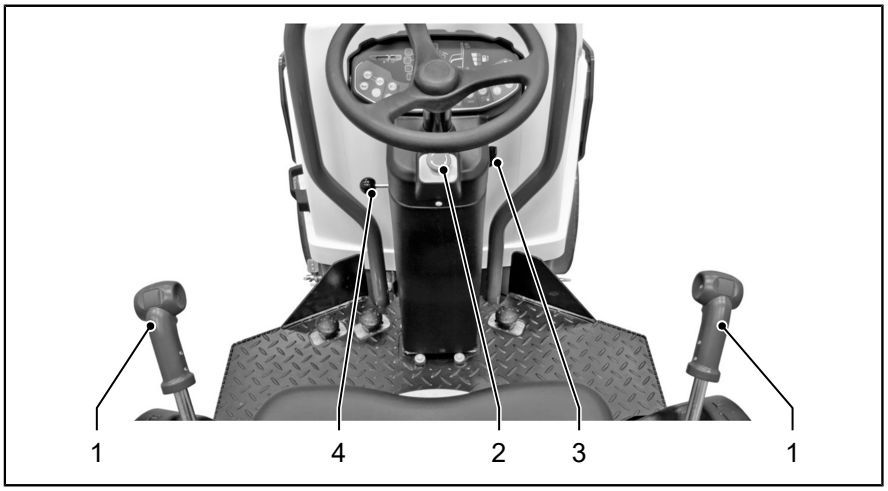
Starting the diesel engine

NOTICE

Damage of the starter!

Damage or destruction of the starter as a result of an excessively long start phase.

- Keep the ignition key not lonager than 5 seconds in position III.
- If a starting attempt fails, make a fault diagnosis.



The starter is not connected to the starting switch unless the drive lever is in 0 position. This is the only way to start the diesel engine.

Conditions for starting the engine:

- The drive lever [1] is latched into the position 0.
- The EMERGENCY STOP [2] button is released.
- Internal power supply and electrical system are switched on:
  - Battery isolating switch in position I (circuit closed).
  - Turn ignition key [3] to position I or II.
- Cold starting device pilot light is off.

Starting diesel engine:

- ▶ Set the motor speed [4] to MIN.
- ▶ Turn the ignition key [3] to position III and hold it there until the diesel engine starts.
- ✔ Diesel engine starts.
- ✔ Ignition key turns back to position I after releasing.

3.15 Driving

⚠ WARNING

Braking delay!

Severe injury or death due to a longer braking distance at a low operating temperature and especially when freezing.

- After starting the diesel engine, wait for a few minutes before driving off until the machine reaches the operating temperature.
- Drive the machine at moderate speed until the yellow hydraulic oil temperature warning light goes out.

⚠ WARNING

Full braking!

Severe injuries caused by a strong braking force.

- Drive with foresight and adjust your speed to the environmental and weather conditions.
- In case of visible obstacles reduce speed in good time.

NOTICE

Contamination!

Material damage to scrapers and other parts of the machine as a result of soiled drums or tires.

- Before driving off, ensure that there are no clumps of earth sticking to the drums or tyres.
- Park machine on boards or dry gravel if there is a risk of frost.

Operate the machine sitting on the operator's seat only!

Multiple safety systems prevent the machine from being driven further as soon as the driver stands up from his seat.

3.15.01 Seat contact switch

Machine may only be operated from the operator platform. In order to ensure this, the machine is equipped with a seat contact switch. If the driver rises from his seat while driving, the seat contact switch is activated and the machine is braked after a delay.

⚠ WARNING

Fast automatic braking!

Delayed, fast braking of the machine that starts automatically can lead to serious injuries or death.

- Only drive the machine when seated.
- Do not use the function of the safety switch to stop the machine.
- Brake and stop the machine with the driving lever.

Operator's seat monitoring

▶ If the operator does not remain seated while driving, an audible
✔ signal **is heard immediately**.

- ▶ If the driver fails to react,
- ✔ the machine will be braked until it stops after a total of **3 seconds**, and the working functions will be set to off.
- ✔ The diesel engine continues running.

Braking is not initiated if the driver returns to his seat within 2 seconds of leaving it.

If the machine is braked by the safety switch, the machine has to be returned to its home position before operation .

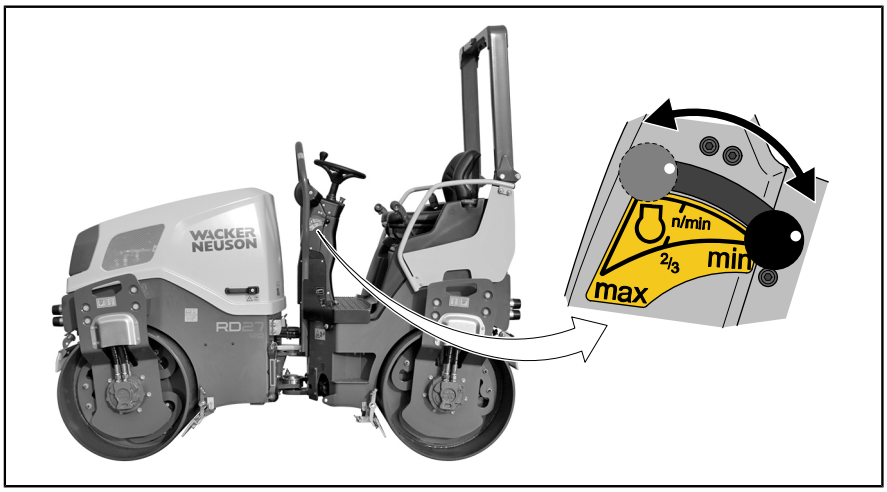
Bring the machine into the home position - drive on after the delayed braking.

Prerequisites:

- Machine at a standstill, after the delayed braking.
- Driver sitting on the seat again.
- Diesel engine is running.

- ▶ Move drive lever in position 0.
- ✔ The work functions are active again.

3.15.02 Adjusting the engine speed

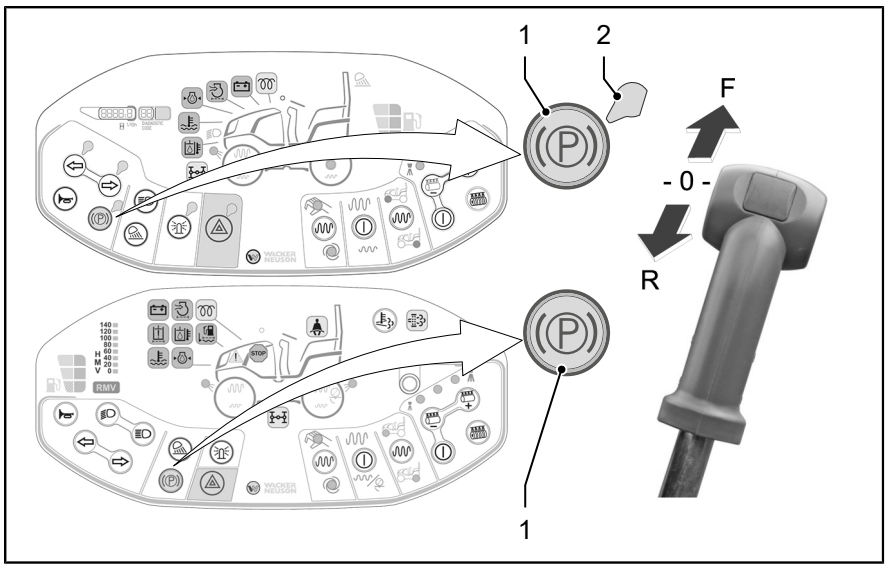


The speed of the diesel engine can be regulated between idling speed and maximum speed using the adjusting lever. The lever is locked in three notched positions. The lever can also be positioned between this positions.

- Idle speed - MIN
- 2/3 max. speed - 2/3 MAX
- Max. speed - MAX

The vibration frequency is coupled to the engine speed. The adjustment of the engine speed will elements in the vibration frequency (see Technical Data).

3.15.03 Driving in normal operation



Make ready to drive/release parking brake

Requirement: Diesel engine is running, drive lever in 0 position

- ▶ Press the parking brake [1] switsch.
- ✔ Parking brake indicator light [2] is out.
- ✔ For versions with add-on equipment: Parking brake switch [1] unlit.
- ✔ Machine is ready to start.

Driving forwards

- ▶ Preselect the motor speed.
- ▶ Move the drive lever in the F direction.
- ✔ The machine travels forwards. The final speed depends on the deflection of the drive lever and on the selected motor speed.

Driving backwards

- ▶ Preselect the motor speed.
- ▶ Move the drive lever in the R direction.
- ✔ The reversing lights are on.
- ✔ The machine travels backwards. The final speed depends on the deflection of the drive lever and on the selected motor speed.

For versions equipped with a back-up alarm, an audible signal is heard as soon as the drive lever is in position R.

Reversing

- ▶ While driving, slowly move the drive lever via the 0 position in the opposite direction.
- ✔ The machine brakes to a halt and accelerates in the opposite direction, depending on the deflection of the drive lever and on the motor speed selected.

All-wheel lock (optional)

The machine is equipped with a hydraulic four-wheel drive, which is driven by a variable displacement pump. The blower output is fed to both hub motors in the drum. The driving power of the machine is used for the locomotion according to the surface conditions and the corresponding drift. If the coefficient of friction between the ground and a drum drops to the extent that a drum starts slipping, the entire pump oil flow will empty across the hub motor of the turning drum, thereby substantially reducing the tractive force of the still-standing hub motor.

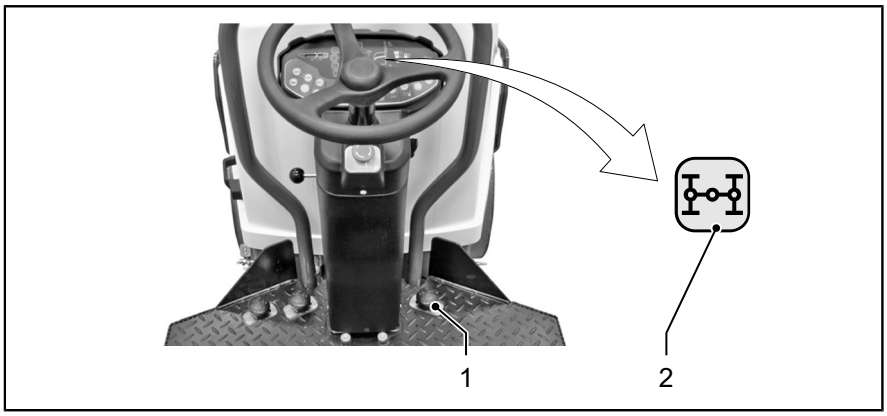
The switching on of the four-wheel blocking triggers the automatic division of the oil flow. Every gear hub motor is now provided with a separate oil flow, which ensures a constant traction force for each roller drum without pressure compensation.

The four-wheel blocking can be switched on when driving on difficult surfaces, as long as both drums are still turning.

If the machine is at a standstill while the drum is still turning, the drive lever should be placed in the 0 position before the four-wheel blocking is applied. To drive away, slowly move the drive lever until both roller drums are being propelled. Once the machine is driving, the four-wheel blocking can be switched off again.

When the machine is loaded, the all-wheel lock must be applied before driving onto the loading ramp.

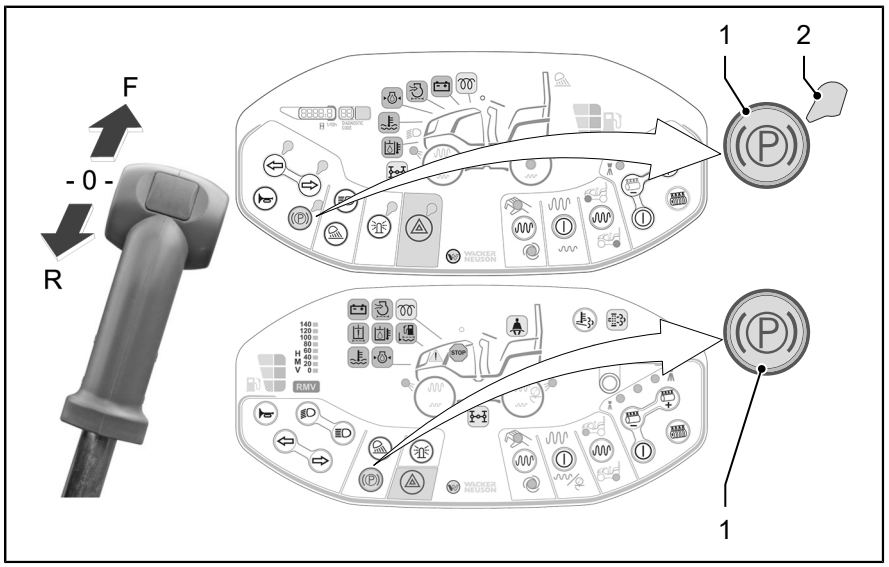
Switching on the all-wheel lock



- ▶ Step on the foot switch [1].
- ✔ The all-wheel lock is activated.
- ✔ The activated all-wheel lock is shown by indicator light [2] on the operator control panel.

The all-wheel lock is applied only as long as the switch is pressed.

3.16 Stopping the machine in normal operation



- ▶ Quietly and steadily move the drive lever to position 0 and stop it/let it click into place there.
- ▶ Set the motor speed to idle (MIN).
- ✔ The hydrostatic transmission brakes the machine to a standstill.
- ✔ The parking brake has not been activated.

Activating parking brake

- ▶ Press the parking brake [1] switsch.
- ✔ The parking brake is activated.
- ✔ The parking brake indicator light [2] lights.
- ✔ For versions with add-on equipment:
  The parking brake switch [1] is lit.

The parking brake cannot be released unless the drive lever is latched in the 0 position.

3.17 Stopping the machine in an emergency – EMERGENCY STOP

⚠ WARNING

Full braking!

Stopping the machine suddenly can lead to serious injuries or death.

- Only use the EMERGENCY STOP in the event of danger.
- Do not use the EMERGENCY STOP as the service brake.

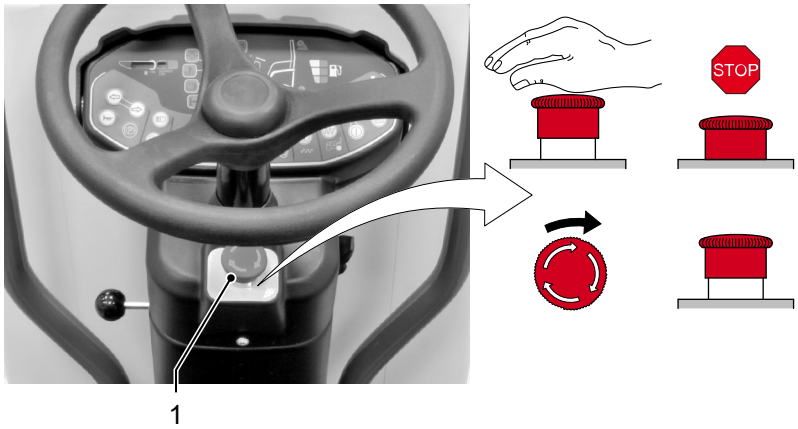
NOTICE

Incorrect performance of an EMERGENCY STOP!

Material damage to electronic or mechanical components of the machine as a result of incorrect performance of an EMERGENCY STOP.

- Always use the EMERGENCY STOP function to switch off the machine in the event of danger.

Performing an EMERGENCY STOP in the event of danger



In an emergency, the EMERGENCY STOP brings the machine to a controlled stop and switches it off.

Using the EMERGENCY STOP is the only way to guarantee that all work functions will be disabled immediately without causing any further danger to operator, the machine or the environment.

▶ Press down hard on the EMERGENCY STOP button [1].

✔ The machine will disable all work functions automatically and

- stop the transmission immediately.
- switch the diesel engine off.
- apply the brakes.

Restarting the machine after an EMERGENCY STOP

▶ Switch off the electrical system using the ignition key.

▶ Engage the driving lever in position 0.

- ▶ To release the EMERGENCY STOP button [1]: Turn the button clockwise until the lock is released.
- ▶ Switch on the electrical system using the ignition key.
- ✔ The diesel engine can be started.

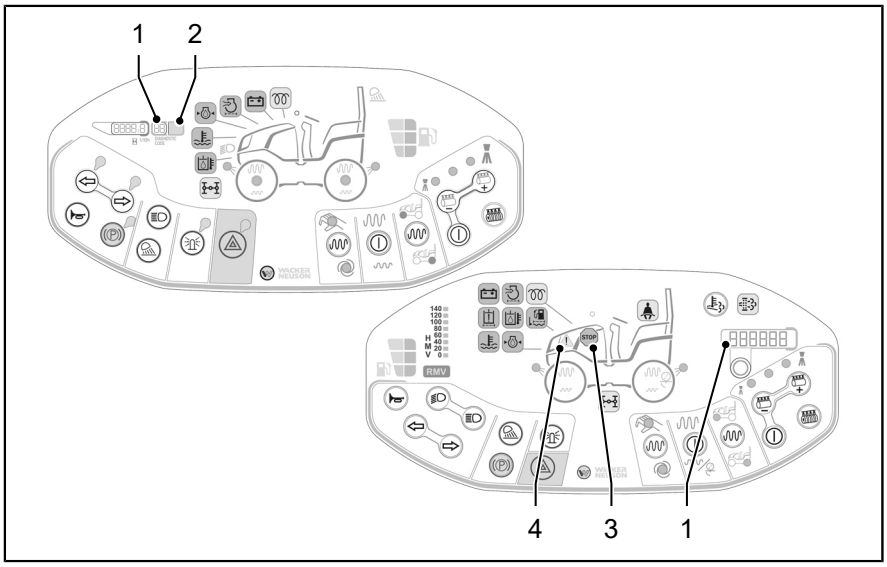
3.18 Stopping the machine because of a fault

NOTICE

Severe malfunctions!

Damage or destruction of machine components caused by continuing operation despite serious faults.

- When a serious fault is indicated, immediately stop the machine at a safe position outside the danger zone.
- Determine and remove the cause of the alfuction.
- Do not use the machine again until the fault has been rectified.



[1]	System info	**[2]**	Indicator for serious fault
[3]	Indicator for serious fault (STOP)	**[4]**	Fault notification

In case of a serious fault:

- ✔ A permanent audible signal is heard.
- ✔ At least one warning light is lit.
- ✔ The system information [1] indicates an error code.

For the standard version:

- ✔ The warning light by the side of the system information [2] is flashing.

For versions with add-on equipment:

- ✔ The STOP warning light [3] is flashing.

- ▶ Further operation is inadmissible!
- ▶ Park the machine out of the danger zone.
- ▶ Shut down the diesel engine immediately.
- ▶ Rectify the cause immediately.

Write down the error code indicated. If you cannot correct the error yourself, please contact the customer service.

A serious fault is indicated in the following events:

- Hydraulic oil temperature is too high
- Engine temperature is too high
- Water in diesel (water sump fuel prefilter)
- Missing charge current when the diesel engine is running.

Fault indication
(For versions with add-on equipment)

In case of deviation from the normal operating condition:

- ✔ The advisory lamp [4] is lit.
- ✔ A short audible signal is heard.
- ✔ At least one warning light is lit.
- ✔ The system information [1] indicates an error code.

- ▶ Further operation of the machine is admissible for a short period of time.
- ▶ Park the machine out of the danger zone.
- ▶ Promptly remove the cause, i.e., not later than after the end of your work shift.

No further operation of the machine is admissible unless the error messages indicated do not cause any immediate risk to the safety of people, machinery or environment.

3.19 Driving with dynamic compaction system

⚠ WARNING

Reduced road adhesion!

Serious injuries or death through the machine tipping over because of reduced ground adhesion.

- Never switch on the dynamic compaction system when traveling across a slope or on hard ground.

⚠ WARNING

Explosion!

Severe injury or death by gas explosion.

- Before switching on vibration, make certain that no gas line is buried in the ground you will be working on.

NOTICE

Vertical oscillations caused by vibration!

Collapse or damage at buildings or on lines laid in the underground.

- Do not switch on vibration system near buildings!
- Prior to switching on the vibration function, it must be ensured that there are no lines laid in the underground in the vibration area.

Vibration

In the vibration mode the roller drum is shifted to vertical oscillations. These hammering impacts produce a manifold increase in the compaction force of the machine.

Effect on the environment:

Vibration oscillations can spread in the ground over a wide area. They are generated in circles around the roller drum and effect also the deeper ground. This may cause a damage to buildings or pipe systems under the machine.

Amplitudes/frequency:

The vibration system uses an amplitude. The frequency depends on the preselected motor speed.

Oscillation

In the oscillation mode the roller drum is shifted to tangential oscillations. The compression of the material to be compacted is conducted by flexing movements.

Effect on the environment:

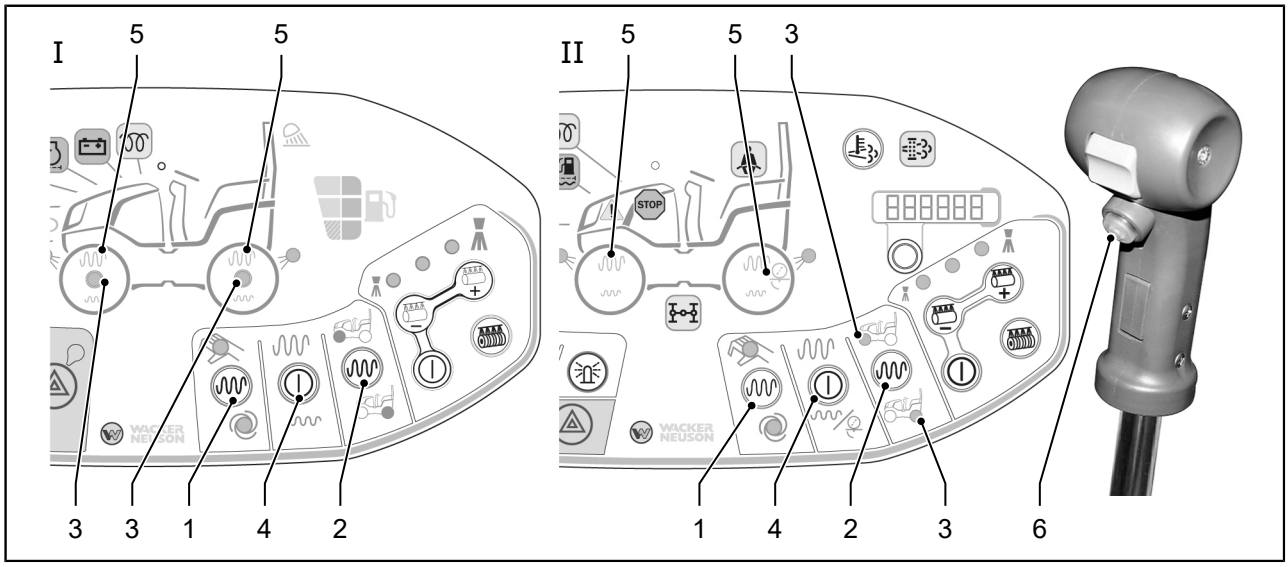
Oscillation vibrations are developed predominantly on the surface of the ground and spread only in front of the roller drum and on its rear. Thus the damaging force is reduced considerably.

Amplitudes/frequency:

Oscillation uses a tangential amplitude. The frequency depends on the preselected motor speed.

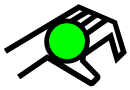
3.19.01 Switching the compaction system on and off

The dynamic compaction system is deactivated every time the engine is started.



[I] Standard version

[II] Version with auxiliary equipment

No.	Switch/symbol	Meaning
[1]		Operating mode switch
		Manual
		Automatic
[2]		Preselect the drum
[3]		Indicator LED for the preselected drum
[4]		Activate the drum
[5]		Vibration/oscillation symbols
[6]		Dynamic compaction system ON/OFF switch

Preparing for working with dynamic compaction system

Requirement: Electrical system ON

Selecting manual operating mode

- ▶ Press switch [1].
- ✔ LED *Manual* lights up green.
- ✔ Use the switch [6] at the drive lever to set the dynamic compaction system to ON or OFF.

Selecting automatic operating mode

- ▶ Press switch [1].
- ✔ LED *Automatic* lights up green.
- ✔ The dynamic compaction system is switched on/off automatically depending on the vehicle speed. The dynamic compaction system is

switched off when at low or high speed.

Always preset manual mode when restarting the machine.

Preselect the roller drum

The dynamic compression of the roller drums can be performed both in combination and single for every roller drum.

- ▶ Press switch [2].
- ✔ The pilot LEDs [3] of the preselected roller drums light up in green.

To select or unselect the roller drums either individually or in combination, repeatedly press the switch [2].

Activating/deactivating the compaction system

Activate the drum

- ▶ Press the switch [4].
- ✔ The vibration/oscillation symbol [5] lights up.
- ✔ The selected drum is ready for operation with vibration/oscillation.

The activation option depends on the configuration of your machine:

- Without additional designation: Vibration at the front and/or rear.
- O: Oscillation at the rear.
- C: Rear tyres (no dynamic compaction).

Setting drum in vibration

Requirement: Diesel engine is running.

- ▶ Press switch at drive lever [6].
- ✔ In accordance with the settings, the compaction system works immediately (manual) or when driving starts (automatic).

Switch off vibrations

- ▶ Press switch at drive lever [6] again.

3.19.02 Jump operation (RMV)

Display for versions with add-on equipment

RMV

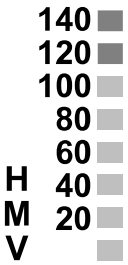
No even compaction measurement can be realised during jump operation. In this case, the compaction parameters (HM value) are not reliable any longer.

The vibrating drum must not be lifted from the ground (jump operation) during compaction in earth moving work.

- A slow flashing of the display indicates that the drum is immediately before jump operation.
- A fast flashing of the display indicates that the drum is in jump operation.

- ▶ Increasing or descreasing driving speed.
- ▶ Increase or reduce the motor speed.

3.19.03 Compaction (HMV)



Display on the version with auxiliary equipment

The HMV value indicates the currently achieved compaction. The driver can see whether the subgrade needs further compaction or where there is a weak point.

If the machine is not equipped with a computer unit for HMV, nothing will be displayed.

Pilot lights indicate the height of material compaction. The compaction value depends on the material to be compacted. When performing compaction work with the vibration switched on, increasing HMV values indicate increasing material compaction or load-bearing capacity. If the value remains the same at a precompacted place, no further compaction is possible there.

3.20 Driving with water sprinkling system

After each engine start water sprinkling system is deactivated.

The water sprinkling system wets the drums/tyres and the edge pressure and cutting device with water. The wetting prevents that bitumen sticks on roller drums/tyres when laying blacktops. This is the way to make a neat and even covering.

An electric water pump supplies the water sprinkling system with water. The built-in automatic sprinkling unit adjusts the water consumption to match the conditions of use optimally. A multilevel automatic interval system determines the minimum use of water for optimum moisturing, using a combination of spray quantity and pump pause time. The water pump can also be switched manually to continuous operation at any time.

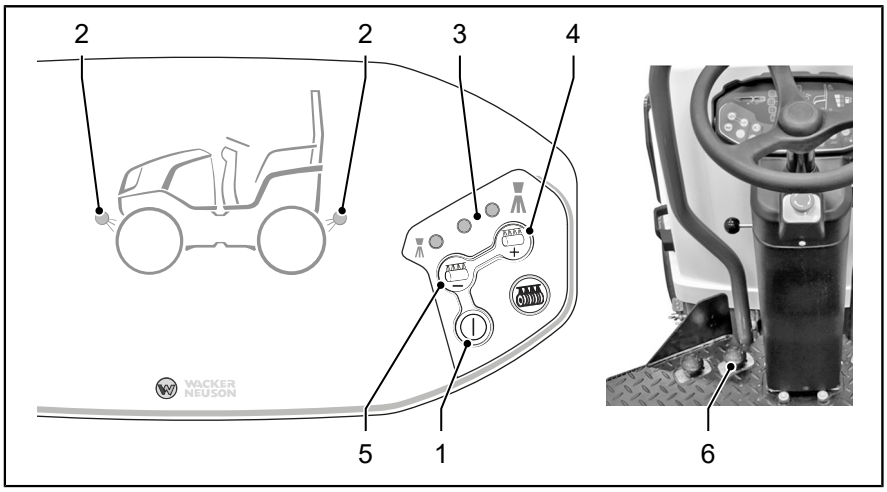
The sprinkling control is switched off at a road speed of less than 0.5 km/h (0.3 mph).

Continuous operation is still possible in this case.

Sprinkling the roller drum/tyres

Requirement: Diesel engine is running, water sprinkling system is activated.

- When the driving speed exceeds 0.5 km/h (0.3 mph) the sprinkling is switched on.
- When the machine is at a standstill, the sprinkling is switched off.



Setting the sprinkler to on or off

Activating water sprinkling system

Requirement: Electrical system ON

- Press switch [1].
- ✔ The luminous spots [3] show the current sprinkling stage.
- ✔ Pilot LED [2] is on when the sprinkler has been switched on via the automatic interval control.

Deactivating water sprinkling system

- Press switch [1] again.
- ✔ Water sprinkling system is deactivated.

- ✔ Luminous spots [3] are off.
- ✔ Pilot LED [2] is permanently off while driving.

Ensure that the drums/tyres are wetted evenly.

Selecting sprinkling stage

When the water sprinkling system is avtivated, the water consumption can be regulated areas using spinkling stages.

Requirement: Water sprinkling system is activated.

- ▶ Press switch [4] + (plus).
- ✔ Sprinkling increases by one stage.
- ✔ The luminous spots [3] show the current sprinkling stage.
- ▶ Press switch [5] – (minus).
- ✔ Sprinkling decreases by one stage.
- ✔ The luminous spots [3] show the current sprinkling stage.

Switching on and off continuous water sprinkling

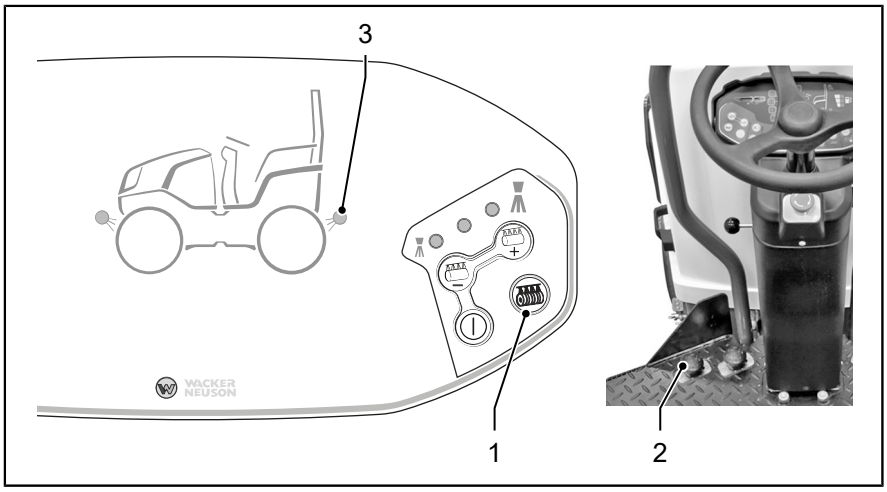
- ▶ Press and hold the foot switch [6].
- ✔ Sprinkling is on as long as the foot switch is being pressed.
- ✔ Sprinkling also is possible when the machine is at a standstill

3.21 Driving with additive sprinkling system

The additive sprinkling moistens the tyres with a separating compound. The wetting prevents that bitumen sticks on tyres when laying blacktops. This is the way to make a neat and even covering.

The frequency of sprinkling depends on the temperature of the tyres. Cold tyres must be moistened more often than warm ones. Prior to driving on hot blacktops take care that the running surfaces of the wheels are clean and sufficiently moistened.

The emulsion may only be mixed of parting agent concentrate and water according to the indications of the parting agent producer (Observe regulations for environment protection).



Switching on and off additive sprinkling

Prerequisites:

- Machine version as a combination roller
- Electrical system ON
- No grit spreader installed as add-on equipment.

▶ Press and hold switch [1] or foot switch [2].

✔ Additive sprinkling is active for as long as one of the switches is pressed

✔ When controlled by switch [1]: LED [3] on.

▶ Release switch [1] or foot switch [2].

✔ Additive sprinkling stops.

✔ LED [3] off.

3.22 Track offset

Compacting work along kerbs or similar borders cannot be carried out, or only in a limited way, without track movement of the drums.
A track adjustment especially developed for this problem enables the machine to drive very precisely along such problem areas.

Adjust track movement

⚠ WARNING

Unintentional movement of the machine!

Severe injury or death by unexpected machine movements during readjustment.

- Do not perform any readjusting work unless the engine is stopped and the ignition switched off.
- Park the machine on safe ground, i.e., Flat and horizontal ground with sufficient bearing capacity.
- Secure machine against rolling away.

NOTICE

Wrong performance of track offset readjustment!

Damage to the steering system due to wrong track offset readjustment.

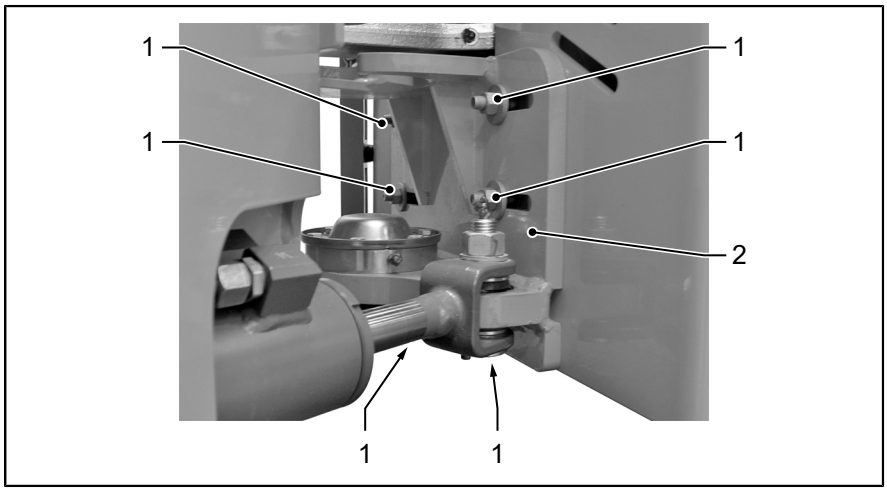
- Do not use any lever tool (e.g., erection bar, other bars) for readjusting the track offset.
- Always perform track offset adjustment exclusively at the console of the articulated pendulum joint and never on any other component of the steering system.

NOTICE

Sharp-edged tools!

Damage to paint work when using unsuitable tools.

- Do not apply any sharp-edged tool to a painted surface when readjusting the track offset.



- ▶ Remove any steering angle before parking the machine.
- ▶ Switch off diesel engine and remove ignition key.

- Loosen the 6x hexagon nuts [1] at the console of the articulated pendulum joint by a maximum of two turns.
- Apply a piece of squared timber to the side of the console [2].
- Readjust the track offset to the right or left by giving hammer blows.
- Tighten the 6x hexagon nuts [1].

When there is no track offset (roller drums/tyres in a straight line one behind the other), the screw joints are in contact with the elongated holes of the console on the left.

The front roller drum can be offset steplessly to the right by shifting.

3.23 Adjusting scrapers

The scrapers remove dirt adhering to the surfaces of the drums/tyres.

For transport driving, move the scrapers away from the drums/tyres. This prevents premature wear.

Rinse out dirt embedded between drums/tyres and scrapers with a water jet. Remove any extremely stubborn dirt with a spatula or similar tool.

⚠ CAUTION

Spring mechanism under tension!

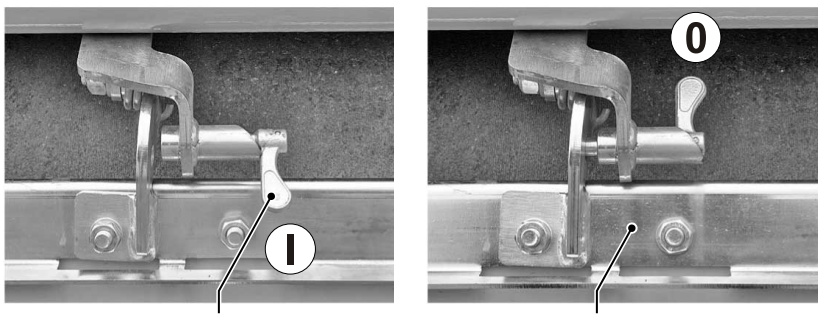
Injury when caught and pinched.

- Do not put your hands or fingers between scraper and roller drum/ tyre when applying or lifting off the scrapers.

3.23.01 Rigid roller drum scraper

The scrapers are constantly rubbing against the roller drums. They are pressed against the roller drums with spring force and cannot be lifted up.

3.23.02 Upper folding roller drum scraper



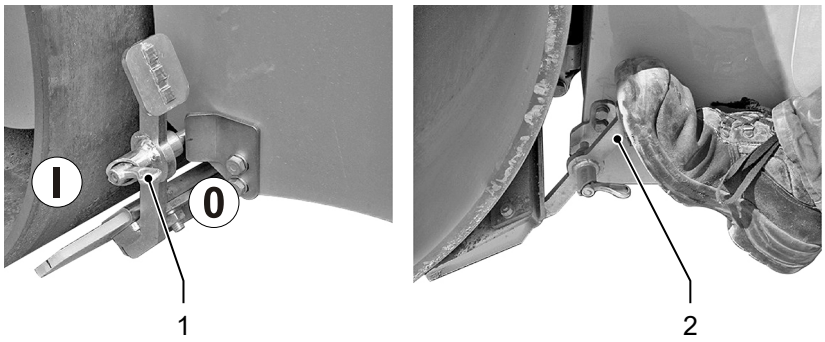
Attach scraper

- Switch off diesel engine and remove ignition key.
- Turn stop lever [1] to I position.
- ✔ The scraper folds down to the roller drum/tyre.

Moving the scraper away

- Switch off diesel engine and remove ignition key.
- Turn stop lever [1] to 0 position.
- Lift the scraper bracket [2] until the catch latches in.

3.23.03 Lower folding roller drum scraper



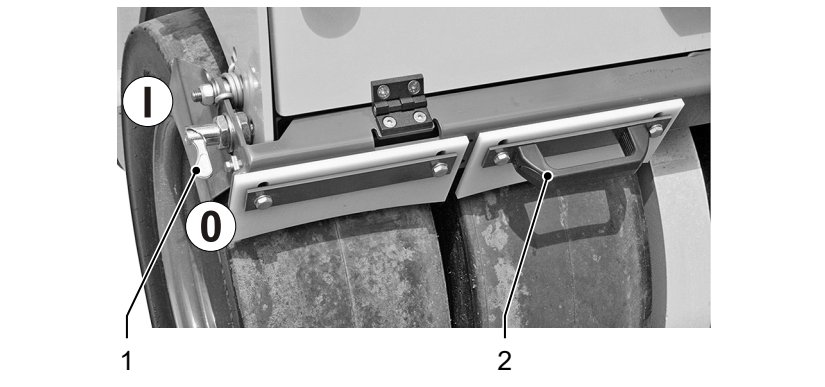
Attach scraper

- Switch off diesel engine and remove ignition key.
- Turn stop lever [1] to I position.
- ✔ The scraper folds up to the roller drum.

Moving the scraper away

- Switch off diesel engine and remove ignition key.
- Turn stop lever [1] to 0 position.
- Press the pedal [2] until the catch latches in.

3.23.04 Scraper tyres



Attach scraper

- ▶ Switch off diesel engine and remove ignition key.
- ▶ Turn stop lever [1] to I position.
- ✔ The scraper folds down to the roller drum/tyre.

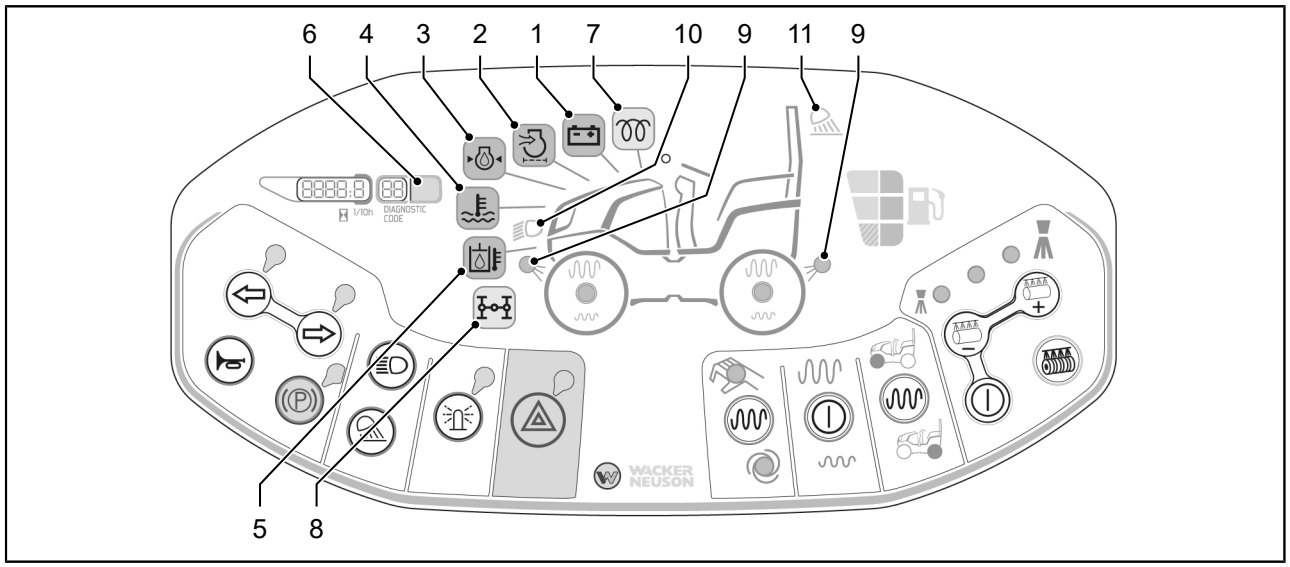
Moving the scraper away

- ▶ Switch off diesel engine and remove ignition key.
- ▶ Turn stop lever [1] to 0 position.
- ▶ Lift the scraper bracket [2] until the catch latches in.

3.24 Operation monitoring

3.24.01 Control panel – Warning and pilot lights

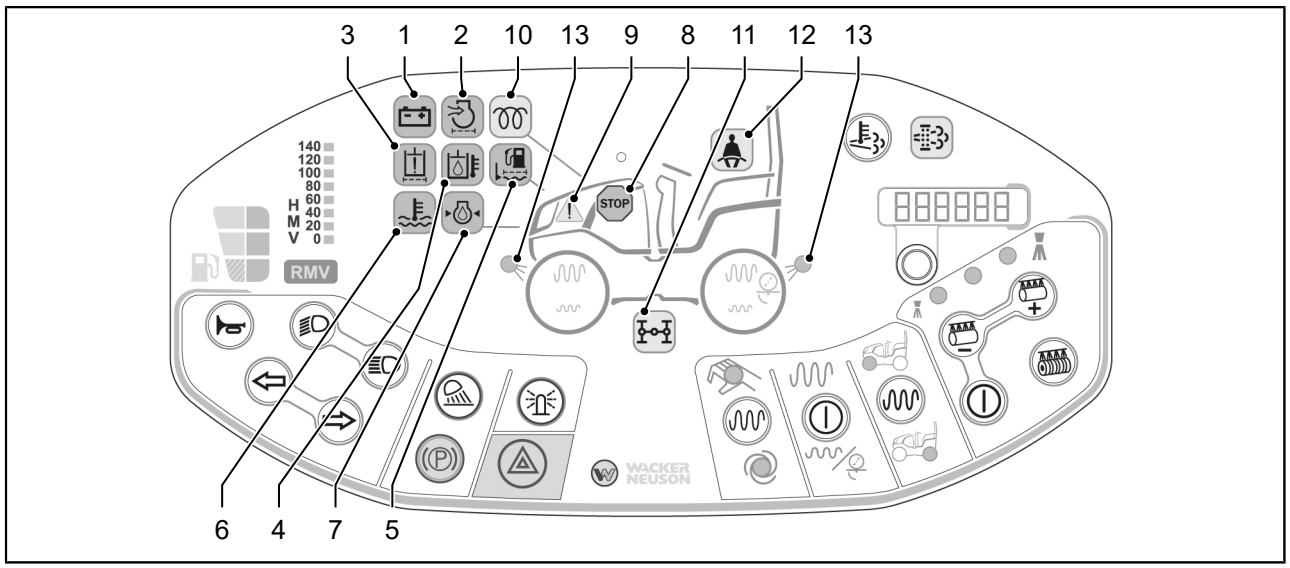
Standard version



No.	Symbol	Warning and pilot light	Status	Meaning/action
[1]		Charge current (battery)	flashing red	No charge current: Check the electrical system. Request assistance from customer service.
[2]		Air filter	flashing red	The air filter cartridge is contaminated. Check the air filter.
[3]		Engine oil pressure	flashing red	The engine oil pressure is too low. Check the engine oil fill level.
[4]		Engine temperature	flashing red	Engine temperature is high or the engine has overheated. Switch off the engine, check the coolant fill level, check the radiator.
[5]		Hydraulic oil temperature	flashing red	Hydraulic oil temperature is high or the hydraulic oil has overheated. Switch off the engine, request assistance from customer service if necessary.
[6]		Serious fault	flashing red	Indicates a serious fault. At least one warning light is flashing and an error code is displayed. Stop using the machine.
[7]		Cold start assistance	lit yellow	Lights up during preliminary annealing. Goes out once the start temperature has been reached.
[8]		All-wheel lock	lit yellow	Lights up when the all-wheel lock is switched on.
[9]		Water sprinkling system	lit yellow	Lights up when the water or additive sprinkling system is switched on.

No.	Symbol	Warning and pilot light	Status	Meaning/action
[10]		Driving light	lit yellow	Lights up when the parking light or driving light is switched on.
[11]		Work lighting	lit yellow	Lights up when the work light and/or drum light are/is switched on.

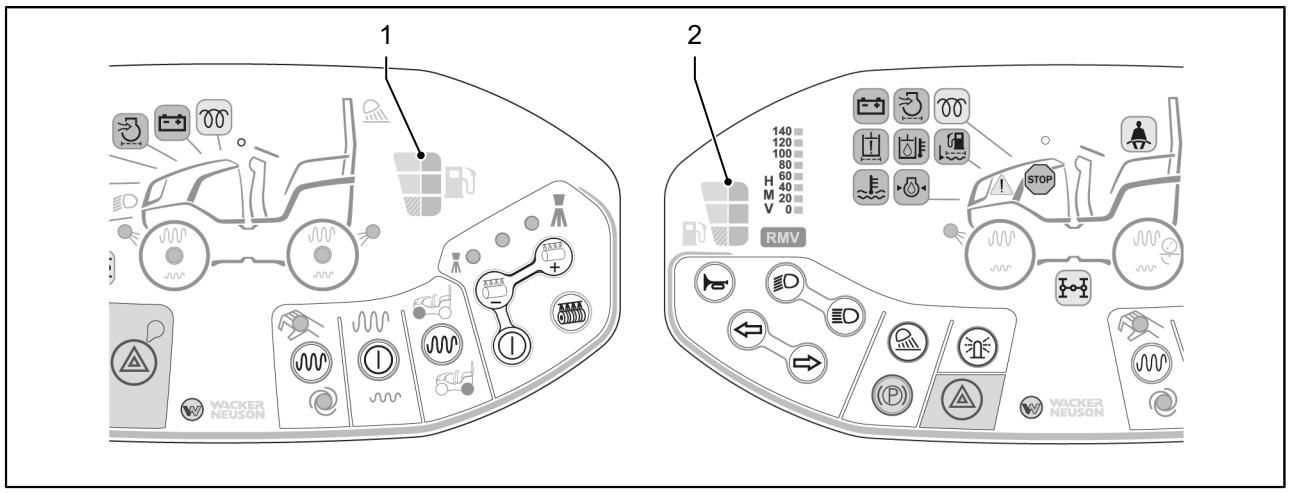
Version with auxiliary equipment



No.	Symbol	Warning and pilot light	Status	Meaning/action
[1]		Charge current (battery)	flashing red	No charge current: Check the electrical system. Request assistance from customer service.
[2]		Air filter	flashing red	The air filter cartridge is contaminated. Check the air filter.
[3]		without function	without function	
[4]		Hydraulic oil temperature	flashing red	Hydraulic oil temperature is high or the hydraulic oil has overheated. Switch off the engine, request assistance from customer service if necessary.
[5]		Water sump fuel prefilter	flashing red	Water sump in the fuel prefilter too high. Drain the filter cartridge in the fuel prefilter.
[6]		Engine temperature	flashing red	Engine temperature is high or the engine has overheated. Switch off the engine, check the coolant fill level, check the radiator.
[7]		Engine oil pressure	flashing red	The engine oil pressure is too low. Check the engine oil fill level.
[8]	STOP	Serious fault	flashing red	Indicates a serious fault. At least one warning light is flashing and an error code is displayed. Stop using the machine.
[9]		Warning, notification, fault	lit yellow	Deviation from the normal operating status. At least one warning light is flashing and an error code is displayed.
[10]		Cold start assistance	lit yellow	Lights up during preliminary annealing. Goes out once the start temperature has been reached.

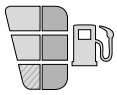
No.	Symbol	Warning and pilot light	Status	Meaning/action
[11]		All-wheel lock	lit yellow	Lights up when the all-wheel lock is switched on.
[12]		Seat belt monitoring device (optional)	lit yellow	Lights up when the seat belt is not being used. Put on the seat belt.
[13]		Water sprinkling system	lit yellow	Lights up when the water or additive sprinkling system is switched on.

3.24.02 Control panel – Fill level control indicator



The filling levels in the service fluid tanks are indicated by luminous spots. One or more luminous spots light up according to the filling level.

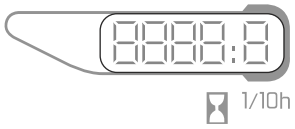
Standard version

No.	Symbol	Indicator	Status	Meaning/action
[1]		Fuel fill level	lit/flashing yellow	An illuminated dot moves between 2/3, 1/3 and 1/10 depending on the fill level. The illuminated dot flashes if the fill level drops below 1/10. Refuelling required.

Version with auxiliary equipment

No.	Symbol	Indicator	Status	Meaning/action
[2]		Fuel fill level	lit/flashing green or yellow	An illuminated dot moves between 2/3, 1/3 and 1/10 depending on the fill level. The illuminated dot flashes if the fill level drops below 1/10. Refuelling required.

3.24.03 Control panel – Info display/system info



Standard version

Operating hour meter

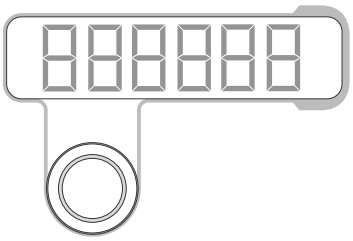
After the electrical system is switched on, the operating hours of the machine are shown in the display field.
Maintenance work has to be carried out according to the accumulated operating hours.

Diagnostic code

During operation, faults in the machine are indicated by flashing pilot lights. A number code in the display denotes the specific fault.

Table for diagnostic codes: see page 191

After switching on the electric system, an internal test code is displayed for 2 seconds.



Version with auxiliary equipment

The driver can used this further developed display unit to access information about the machine status, settings and system messages.

In the "System info" menu, you can choose between two levels by pressing and holding the switch.

Within the levels, you can change between various displays by briefly pressing the switch.

Level 1

- **Operating hours**
  After the electrical system is switched on, the operating hours of the machine are shown in the display field.
  Maintenance work has to be carried out according to the accumulated operating hours.
- **Engine speed**
  It is not possible to display the engine speed (display: RPM ----).
- **Asphalt temperature** (if a system for measuring the asphalt temperature is installed)
  Asphalt temperature display under the machine in °C or °F.
- **Diagnostic code**
  A short acoustic signal sounds when a fault is detected. The display shows all the existing faults one after the other in the form of diagnostic codes.

→ Press and hold the switch to change to level 2.

Level 2

- **Roller type** e.g. RD 24-100
- **Dashboard software version**
- **Compaction computer software version**

3.25 Switching diesel engine off

Requirement: Diesel engine is running.

- ▶ Latch driving lever in position 0.
- ▶ Fully lower attached accessory equipment.
- ▶ Switch off accessory equipment.
- ▶ Apply parking brake.
- ✔ Parking brake is applied.
- ✔ Diesel engine is running in idle speed.
- ▶ Allow the diesel engine to continue to idle for 1 to 2 minutes.
- ▶ Turn ignition key to position 0.
- ✔ Diesel engine is switched off.
- ✔ Electrical system is switched off.

3.26 Automatic engine stop

The automatic engine stop automatically sets the diesel engine to off during a longer halt. This is done after a preset period of inactivity when the following conditions are met:

- Diesel engine is running.
- Working functions set to off.
- The drive lever is latched into the position 0.
- The parking brake is activated.

The automatic engine stop system will react unless any of the above conditions changes during the period of inactivity:

- ✔ Diesel engine is switched off.
- ✔ Functions, such as parking light and warning flashers, function in this case as well.

The automatic engine stop system will not react whenever any of the above conditions required changes before the period of inactivity is over.

After activation of the engine stop automatic, a machine is **NOT** regarded as being switched off and safely parked.

Bringing the machine back into operation

After activation of the engine stop automatic, the machine has to be restarted in order to resume operation.

- ▶ Turn ignition key to position 0.
- ✔ Machine is switched off and can be restarted (see "Starting machine").

3.27 Shutting down and leaving the machine safely

⚠ WARNING

Unintended machine movement!

Severe injury or death due to unexpected machine movements.

- The driver may only leave the machine when it has been properly and safely shut down.
- Observe the road traffic regulations.
- Park the machine on safe ground, i.e., flat and horizontal ground with sufficient bearing capacity.
- Secure machine against rolling away.

Prior leaving the machine

- ▶ Switch off the diesel engine.
- ▶ Apply parking brake.
- ▶ Latch the seat console in the centre of the machine.
- ▶ Pull off the ignition key.
- ▶ Switch off the machine, using the main battery switch.
- ▶ Lock the instrument panel covering, as well as all cladding covers.
- ▶ Use suitable precautions (e.g., parking chock) to secure the machine against rolling away in addition when parking on an uphill or downhill gradient.

3.28 Towing the machine

An inoperable machine can be towed by another vehicle for short distances.

For distances longer than 500 m, the machine must be loaded for further transport.

⚠ WARNING

Spring-operated brake out of function!

Severe injury or death due to machine rolling away.

- Prevent the machine from rolling away with chocks before releasing the spring-operated brake.
- Do not attach the machine for towing unless at the points intended for this.
- Use a towing vehicle with enough pulling power.
- Tow machine only with low speed 1 km/h (0.6 mph).
- Only tow the machine for short distances (max. 500 m).

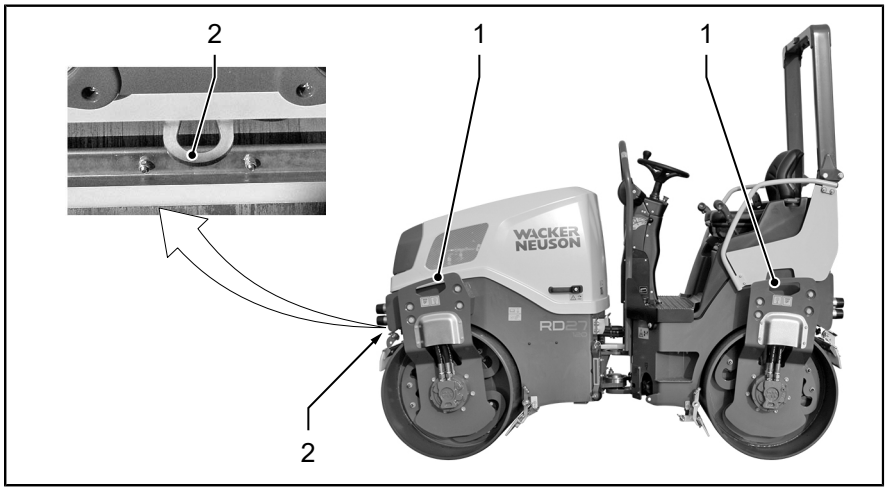
Towing of the machine requires sufficient knowledge of the functioning of the hydrostatic transmission and the operation of the spring-operated brake.

Only allow towing to be performed by persons with towing experience, who have been informed of the dangers.

Necessary towing tool

- **Tow bar (normal towing)**
  Use a towing bar with adequate pulling power (at least the operating weight of the machine) for a normal case of use on a flat surface with the spring-loaded brake released.
- **Hauling lines or hauling chains (for machine recovery from a dangerous situation)**
  Hauling lines or hauling chains with a sufficient tensile force (at least twice the operating weight of the machine) for recovering the machine uphill and/or when the spring-loaded brake is not released.

3.28.01 Preparing the machine for towing

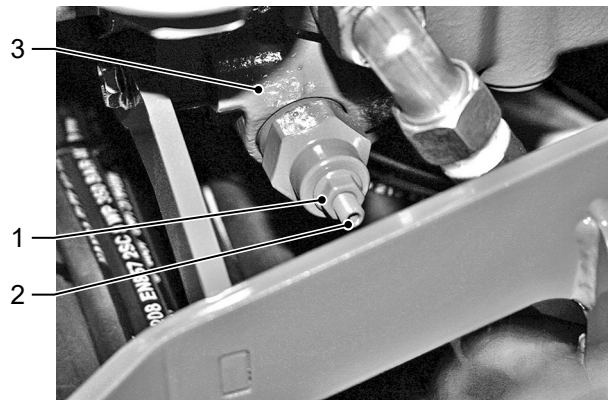


- ▶ Move the drive lever into the position.
- ▶ Press the parking brake switsch.
- ✔ The drive lever is blocked.
- ✔ Parking brake is active.
- ✔ The transmission is not active.
- ▶ Shut down the diesel engine, if still functional.
- ▶ Use parking chocks to secure machine against rolling away.
- ▶ Replace damaged pipes and hoses from which oil leaks before towing (environment protection).
- ▶ Attach towing tools to the lashing points [1] or to the towing eye [2] of the machine and the towing vehicle.
- ▶ Depressurize the hydraulic system. (see "Depressurize the hydraulic system").
- ▶ Releasing spring-operated brake (see "Release spring-operated brake").

3.28.02 Depressurize the hydraulic system.

The hydraulic system must be depressurized before towing starts.

Only if the oil flow can circulate without pressure in the hydraulic system, can the machine be towed.



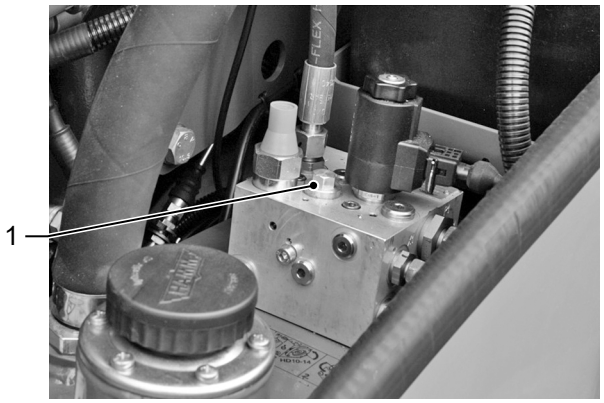
Separating the hydrostatic drive power train

- ▶ Loosen lock nut [1] at the drive pump [3].
- ▶ Screw in the locking screw [2] until the screw end flushes with the lock nut.
- ✔ Frictional connection is interrupted: Machine is ready to be towed.

Reconnecting the hydrostatic transmission

- ▶ Screw out the locking screw [1] until the stop.
- ▶ Tighten counternut [2].
- ✔ Frictional connection created: machine is ready to be repaired.

3.28.03 Releasing spring-operated brake



The spring-operated brake may only be disabled when:

- The engine is defective, or
- The hydraulic system is defective

Putting spring-powered brake out of operation

- ▶ Loosen the screw [1] at the parking brake valve block and unscrew it until you feel resistance (approx. 5 turns).
- ▶ Release the spring-operated brakes by turning the steering wheel to the left until increased turning power is required.
- ✔ Pretension force of the spring-operated brake is reduced.
- ✔ The parking brake is non-functional.
- ✔ The machine can be towed.
- ▶ During towing, the spring-operated brakes must be kept open by repeated releasing with the steering wheel due to interior leaks.

Enable the spring-operated brake again

- ▶ Screw in screw [1] down to the valve seat at the parking brake valve block (max. 30 Nm).
- ✔ Parking brake is applied again.
- ✔ The machine can be repaired.

3.28.04 After towing/before repair

Parking machine safely at the location to which it has been towed

- ▶ Prevent the machine from rolling away with suitable protective measures (e.g. chocks).
- ▶ Enable the parking brake again (see "Release spring-operated brake").
- ▶ Reconnect the hydrostatic transmission (see "Depressurize the hydraulic system").
- ▶ Remove towing tool.
- ✔ Machine safely shut down.
- ✔ The prerequisites for repair are fulfilled.

After the repair: The machine must not be brought back into use until a complete function test has been made.

3.29 Start with jump leads

Preparation for start assistance

- Observe precaution measures for handling batteries (see Safety instructions).
- A discharged battery can freeze already at 0 °C (32 °F). Thaw a frozen battery in a warm room. Remove the plug.
- Do not disconnect the battery from the vehicle's internal power supply.

Connecting jump leads

⚠ WARNING

Explosion and electric shock!

Severe injury and death due to moving parts, burns or electric shock.

- Charging vehicle and discharged vehicle may not come in contact with each other.
- The pole terminals of the jump leads must not be allowed to touch each other.
- Move the pole terminal on the vehicle ground of the unloaded vehicle as far as possible away from the negative pole of the discharged vehicle.
- Pay attention to the nominal voltage of the batteries.
- Use jump leads with an insulated terminal clamp and a cross section of at least 25 mm².

⚠ WARNING

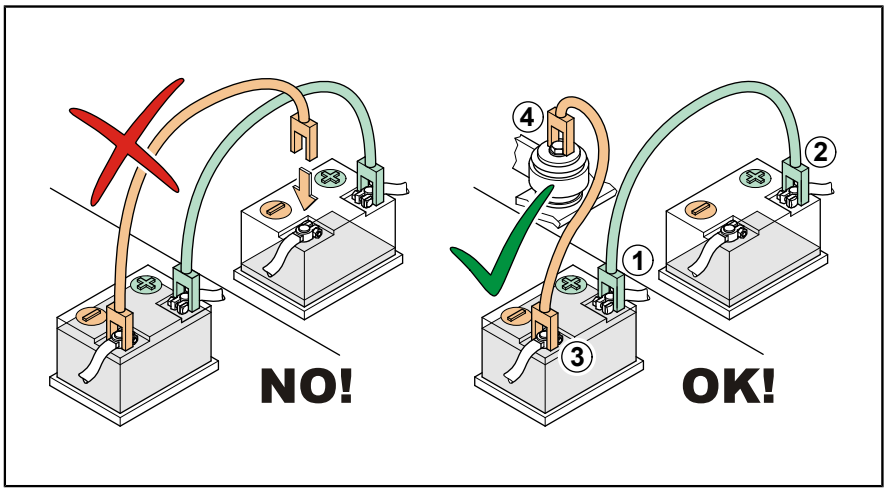
Exposed, rotating parts!

Risk of being trapped, pulled in, and injured by rotating engine parts.

- Ensure that no parts of the body or items of clothing can be drawn into rotating or moving engine parts.
- Do not reach into the engine compartment during the start assistance process.
- Route cables such that they cannot be drawn into rotating engine parts.
- Always lay the leads so that they can be removed safely even when the engine is running.

The positive pole of a battery is marked by a Plus (+) sign.
The negative pole of a battery is marked by a Minus (–) sign.

The vehicle ground is, for example, the engine block or the fastening screw of the engine mounting.



- Remove the terminal caps from the poles of the batteries.
- Connect the pole terminal [1] of the first lead to the positive pole of the charged battery.
- Connect the other terminal clamp [2] of the first lead to the positive terminal of the discharged battery.
- Connect one terminal clamp [3] of the second lead to the negative terminal of the charged battery.
- Connect the other terminal clamp [4] of the second lead with the ground of the discharged vehicle.

Starting process

- Start the engine of the charging vehicle and let it run with medium engine speed.
- Start the diesel engine of the discharged vehicle after approx. 5 min.
- For approx. 3 min let both engines run with medium engine speed and the jump leads connected.

Removing jump leads from the batteries

- Switch on an electric consumer on the discharged vehicle (e.g. driving light) in order to avoid overvoltages in the electrical system.
- Remove the jump leads in reverse order: Disconnect pole terminal [4], then [3], then [2], then [1].
- Put the terminal caps on the poles of the batteries.

3.30 Shutting down

3.30.01 Temporarily shutting down the machine and starting it up again

⚠ WARNING

Dangerous operating materials!

Risk to health and the environment caused by operating materials that have not been disposed of properly.

- Dispose of operating materials in accordance with the applicable safety and environmental regulations.
- Wear personal protective equipment when disposing of the materials.

If the machine will not be used for an extended period of time, it must be decommissioned and stored correctly.

After storage, the machine must be prepared for recommissioning before it is used again.

The work to temporarily shut down and to recommission the machine requires expert knowledge and may require special tools and equipment.

This work must only be carried out by trained specialists.

The work steps listed below are **NOT INSTRUCTIONS**. They are a non-exhaustive list of examples of work that must be carried out in order to temporarily shut down and/or recommission the machine.

For precise information or for carrying out the decommissioning and/or recommissioning process, contact customer service.

Decommissioning – temporarily shutting down

All activities that are carried out for the temporary shutdown must be documented. This is the only way to guarantee that the machine can be properly recommissioned following a temporary shutdown.

Catch all liquids in suitable containers and dispose of them properly in accordance with the relevant specifications and national regulations.

- ▶ Wear personal protective equipment:
  - Protective work wear
  - Safety goggles
  - Protective gloves
  - Safety shoes.
- ▶ Thoroughly clean the inside and outside of the machine.
- ▶ Preserve any sealing elements using acid-free grease.
- ▶ Check the drive unit, auxiliary units, hoses, hose connections and flange-mountings for leaks and/or escaping operating and auxiliary materials. If there are any anomalies, repair any affected components.
- ▶ Remove the batteries and store them in a frost-free environment. Follow the battery manufacturer's instruction manual.

- Drain and preserve the fuel system.
- Fill the AdBlue®/DEF reservoir to 25%.
- Check the coolant level and, if required, top it up.
- Drain the engine oil and preserve the engine using running-in preserving oil.
- Check the gear oil level and, if required, top it up.
- Drain the liquids from the tanks for water sprinkling, additive sprinkling and the windscreen washer system.

Storage

- Store the machine and machine components in well-ventilated, lockable, temperature-controlled and dry rooms.
- When storing outdoors, place the machine and machine components on suitable underlays in order to protect them against moisture and cover them using tarpaulins that open at the bottom. Secure the tarpaulins using suitable lashings.

Recommissioning

- Check the drive unit, auxiliary units, hoses, hose connections and flange-mountings for leaks and/or escaping operating and auxiliary materials. If there are any anomalies, repair or replace any affected components.
- Drain and dispose of the preserving liquids.
- Fill pipe systems with operating and auxiliary materials e.g.: engine coolant, engine oil, gear oil, AdBlue®/DEF, water sprinkling, additive sprinkling.
- Check and, if required, repair all of the components.

3.30.02 Permanently shutting down and disposing of the machine

⚠ WARNING

Dangerous operating materials!

Risk to health and the environment caused by operating materials that have not been disposed of properly.

- Dispose of operating materials in accordance with the applicable safety and environmental regulations.
- Wear personal protective equipment when disposing of the materials.

If the machine is no longer designated or suitable for the intended use, it must be decommissioned in accordance with the applicable regulations.

The work to permanently decommission the machine requires expert knowledge and may require special tools and equipment.

This work must only be carried out by trained specialists.

The work steps listed below are **NOT INSTRUCTIONS**. They are a non-exhaustive list of examples of work that must be carried out in order to permanently decommission the machine.

For precise information or for carrying out the decommissioning, contact customer service.

Disposing of operating materials

Catch all liquids in suitable containers and dispose of them properly in accordance with the relevant specifications and national regulations.

- Wear personal protective equipment:
  - Protective work wear
  - Safety goggles
  - Protective gloves
  - Safety shoes.
- Remove the batteries and dispose of them in accordance with the statutory provisions.
  Follow the battery manufacturer's instruction manual.
- Drain the fuel tank.
- Drain the AdBlue®/DEF reservoir.
- Drain the hydraulic oil tank.
- Drain the engine coolant circuit.
- Drain the engine oil circuit.
- Evacuate the air-conditioning system.
- Drain the gear oil.
- Drain the tanks for water sprinkling, additive sprinkling and the windscreen washer system.

Disposing of the machine

- Hand over any electrical/electronic components to a specialised recycling company.
- Hand over the machine to an approved recycling company so that it can be destroyed and disposed of.
- Observe any national and, if required, regional disposal regulations.

4 MAINTENANCE

When working at the machine please always adhere to the instructions given in your Safety instructions!

Also pay attention to chapter 6, which contains a description of the auxiliary equipment and explains how to operate and service it.

4.00 General maintenance instructions

This section describes the work on the machine required for its care and to maintain operational safety.

The extent and the frequency of the maintenance work depends on the operating and deployment conditions, which may differ in many cases. In case of more difficult operating conditions, the machine must have maintenance in shorter intervals as scheduled for normal operation.

The maintenance intervals are based on the operating time indicated by operating hours meter.

Various warning and pilot lights make the driver aware of essential interventions during operation.

Additional maintenance work must be carried out in the running-in time.They are described in the running-in regulations.

The running-in regulations, servicing intervals and care measures for diesel engine muast be adhered as specified in the instruction manual of the diesel engine manufacturer.

4.00.01 Important information about maintenance works

Testing and maintenance work require expert knowledge. Only trained, specialist personnel may perform the maintenance work.

The warning notices indicated below apply to all maintenance work:

⚠ WARNING

Unintended machine movement!

Severe injury or death due to unexpected machine movements during maintenance work.

- Park the machine on safe ground, i.e., flat and horizontal ground with sufficient bearing capacity.
- Secure machine against rolling away.
- Do not carry out any maintenance work unless the engine has been stopped and the ignition has been switched off.
- On machines with safety strut, apply the safety strut before maintenance work.

⚠ WARNING

Unintended engine start!

Severe injury and death caused in case of an unintended engine start during maintenance work.

- Do not carry out any maintenance work unless the engine has been stopped and the ignition has been switched off.
- Before starting maintenance work, set the battery isolating switch to off in order to de-energize the electrical system. As an alternative, disconnect the earthing/grounding strip from the battery.
- To avoid any unintended engine start by any third person, affix a warning notice at the driver's position indicating that work is in progress on the machine.

⚠ WARNING

Exposed, rotating parts!

Risk of being trapped, pulled in, and injured by rotating engine parts.

- Do not perform any testing, adjusting or maintenance work in the area of the engine unless the diesel engine has been switched off.
- Do not reach with your hands into the area of the engine unless after every part has come to a standstill.
- Do not lay down any object or tool in the engine compartment.
- Keep a safety distance when making a visual inspection while the diesel engine is running.

⚠ WARNING

Hot surfaces, hot fluids!

Injury by burns on hot surfaces or by hot fluids.

- Before starting any work on the diesel engine, the cooling system, the exhaust system, or the hydraulic system: Allow machine to cool down less than 30 °C (86 °F).
- Do not touch hot machine parts.
- Do not check the filling level, do not drain or top up any fluid unless the machine has cooled down.

⚠ WARNING

Fluids under pressure!

Serious injury can be caused by liquids escaping under high pressure.

- Do not perform any maintenance work on the hydraulic system, the cooling system, the fuel system, or the air conditioning system unless the lines have turned off.
- Lower raised devices to the ground.
- After switching off the diesel engine, wait at least 1 minute until the pressure has been reduced.
- Wear personal protective equipment.

⚠ WARNING

Work above floor level!

Injury caused by falling.

- Do not perform any maintenance or repair work above ground level unless using a stable ladder or a maintenance scaffold.
- To reach the maintenance points on the machine, use the steps indicated. Do not step on any other machine element or add-on part.

⚠ CAUTION

Electrical voltage!

Risk of injury due to electric shock.

- Before starting maintenance work, set the battery isolating switch to off in order to de-energize the electrical system. As an alternative, disconnect the earthing/grounding strip from the battery.
- Wear personal protective equipment.
- When working on the electrical system, be sure to only use suitable and approved tools.

NOTICE

Short-circuits on electrical components!

Destruction or damage of machine parts by a short-circuit.

- Before starting maintenance work, set the battery isolating switch to off in order to de-energize the electrical system. As an alternative, disconnect the earthing/grounding strip from the battery.
- Observe the operating instructions when using a jumper cable.
- Do not lay any tool or machine element on the battery.

NOTICE

Engine hood swinging range!

Material damage when opening the engine hood.

- Keep a sufficient distance to other objects located either above or at the rear.

NOTICE

Uncontrolled movements!

Damage to machine or environment by uncontrolled steering system movements and by consequent front or rear end swings.

- Applying safety strut before:
  - crane loading the machine.
  - transporting the machine.
  - maintenance and repair work.

Note on the environment:

Catch and properly dispose of any liquid escaping or drained during any maintenance work.

4.00.02 Running-in instructions

For engine maintenance, see the instruction manual for the diesel engine.

After 50 operating hours

Diesel engine maintenance

- Change the engine oil (see page 136).
- Replace the lubricating oil filter (see page 136).
- Replace the fuel filter (see page 136).
- Replace the preliminary fuel filter (see page 137).

Hydraulic system maintenance

- Replace the filter insert of the pressure filter for the hydraulic system (see page 147).

Axle maintenance

- Check that wheel nuts/wheel bolts are secure (see page 153).

4.00.03 Maintenance overview

For engine maintenance, see instruction manual for diesel engine.

Every 10 operating hours

10 h

Check that the parking brake is working properly	see page 132
Checking that the seat contact switch is working properly	see page 132
Test the EMERGENCY STOP function with the machine stationary	see page 131
Check the hydraulic oil fill level	see page 145
Clean the sprinkler nozzles	see page 160
Check the air pressure in the tyres	see page 154
Check the engine oil level	see the instruction manual Diesel engine
Check the coolant level	see page 142
Check/clean the air filter/dust valve	see page 139 see page 139
Clean the filter for the water sprinkling system	see page 160
Drain the water separator	see page 138

Every 250 operating hours

250 h

Checking the scraper/lubricating the scraper	see page 151
Change the engine oil	see the diesel engine instruction manual
Replace the lubrication oil filter in the diesel engine	see the diesel engine instruction manual
Check the V-belt tension	see the diesel engine instruction manual
Lubricate the pivoted bearings	see page 157
Lubricate the steering cylinder pin	see page 157
Check the radiator	see page 141

Every 500 operating hours, at least once a year

500 h

Replace the filter insert in the pressure filter for the hydraulic system	see page 147
Check the damping elements	see page 164
Checking the wheel nuts/wheel bolts for tightness	see page 153
Replace the valve cover seal	see the instruction manual Diesel engine

Replace the filter cartridge in the fuel filter	see page 136
Replace the preliminary fuel filter	see page 137
Replace the air filter cartridge	see page 140
Check that the driving lever is working properly	see page 134
Check the starter battery	see page 149

Every 1000 operating hours, at least once a year

1000 h

Checking the EMERGENCY STOP function when driving	see page 131

Every 2000 operating hours, at least every two years

2000 h

Clean the water sprinkling system	see page 160
Change the hydraulic oil	see page 146
Replace the V-belt	see the instruction manual Diesel engine
Change the coolant	see page 143
Change the safety cartridge	see page 140
Replace the ventilation filter in the hydraulic oil reservoir	see page 146
Replace the toothed belt	see page 164

4.00.04 Welding work on the machine

Welding work on the machine may only be performed by specifically trained and authorized personnel.

Welding work on the machine may change the characteristics of the machine, and are only permissible with the agreement of the manufacturer.

Welding work on safety-related components may only be performed by the authorized customer service of the manufacturer.

⚠ WARNING

Fire and explosion!

Serious injuries or death as a result of ignition or explosion of combustible materials (fuels, oil, gases).

- Make sure that there are no flammable or explosive materials in the vicinity of the welding work.
- Put down welding covers.
- Wear personal protective equipment.

NOTICE

Overvoltage and heat!

Material damage to electric/electronic components of the machine caused by electric current or the effects of heat.

- Before starting electrical welding work, remove all connection plugs from electronic components of the machine.
- Connect negative terminal of the welding appliance at the component to be welded in the vicinity of the weld.
- Remove insulating layers of paint before starting welding work.
- Keep welding leads away from the electrical leads of the machine. If not possible, the welding leads cross the machine leads.
- Touch only the welds with live electrodes.
- Prior to welding work remove components which may get damaged by heat or welding work.
- Observe the instruction manual of the diesel engine.

Procedure

- ▶ Switch off diesel engine and remove ignition key.
- ▶ Wait for the 2 minutes after-running time of the machine to pass.
- ▶ Disconnect battery, first negative then positive terminal.
- ▶ Remove plug of the control devices of the machine.
- ▶ Connect negative terminal of the welding appliance in the vicinity of the weld.
- ▶ Do not get too close to other components when welding.
- ▶ Reconnect all connection plugs after welding.
- ▶ Attach battery.

4.01 Chassis/safety devices

⚠ WARNING

Uncontrolled driving behaviour!

Severe injury or death due to separate machine movements.

- Ensure that there are no persons or objects in the danger zone of the machine (moved).
- Do not check functioning of safety devices in case there is not enough space.

The machine must not be used if the safety devices do not work.

Call the customer service!

4.01.01 Basic maintenance work

- Check operating and safety instructions on the machine: Replace damaged and/or non-readable signs.
- Ensure that hinges and links move easily and lubricate lightly.
- Check the function of the warning systems (e.g. signal horn, reflectors, back-up alarm, blinker and warning flasher). Repair/change defective alarm devices/defective parts of the alarm devices.
- Check the function of the lighting. Replace defective lamps.
- Check the firm fit of the screw connections which are subjected to high loads, e.g. articulated joint, tie rod, drum suspension, wheel suspension, drum drive, wheel drive.
- Check that the air filter system is undamaged (e.g. no cracks in hoses or enclosures). Replace defective parts.

4.01.02 Checking and replacing steps/slip-resistant surface

Regularly check the non-slip property of the surfaces of the steps and in the driver's cab (e.g. sand-coated foil).

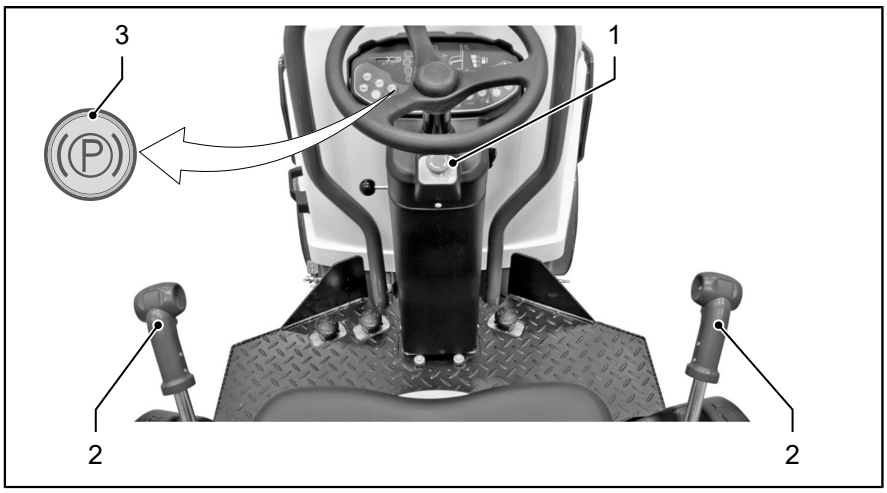
For steps:

▶ Replace or regrind non-slip profiles with a minimum height of 1 mm.

For sand-coated foils:

▶ Replace ineffective or worn foils.

4.01.03 Testing the EMERGENCY STOP function



Checking function with machine at standstill (daily)

- ▶ Engage drive lever [2] in the 0-position.
- ▶ Start the diesel engine.
- ▶ Press the parking brake [3] switch.
- ▶ Press EMERGENCY STOP [1] when engine at standstill.

The machine:

- ✔ switches off the working functions.
- ✔ Shuts down the diesel engine.

Checking function during machine operation (annually)

Perform the functional test while the diesel engine is running.

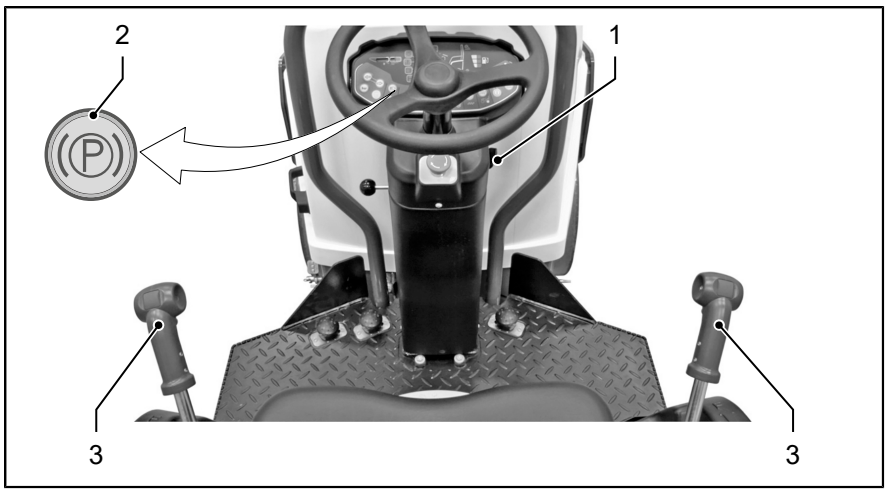
- ▶ Press EMERGENCY STOP [1] with low speed 0.5 km/h (0.3 mph).

The machine:

- ✔ Stops immediately.
- ✔ Shuts down the diesel engine.

If the machine reacts other than as described above or if the EMERGENCY STOP does not work, it must be tested and repaired without delay. The machine must not be used until this has been done. Request assistance from customer services!

4.01.04 Checking that the parking brake is working properly



Checking the parking brake when the machine is stationary

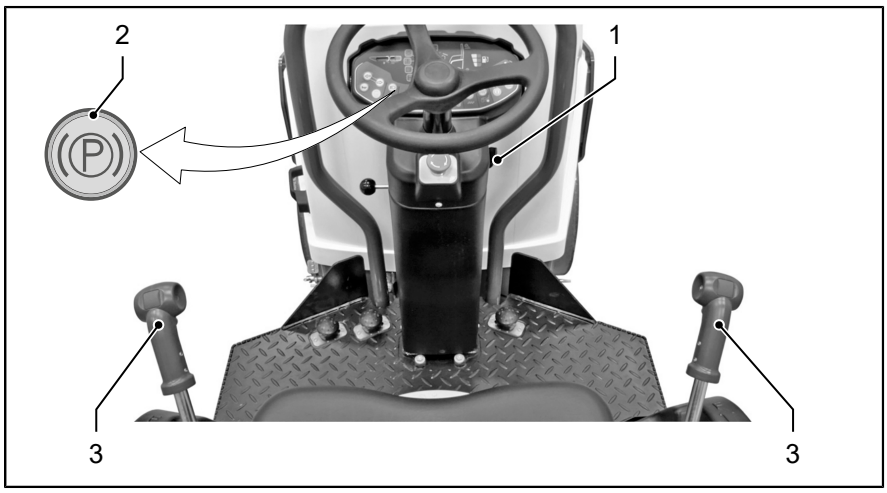
Requirement: The driving lever is locked in the 0 position.

- ▶ Start the diesel engine [1].
- ▶ To apply the parking brake: Press the parking brake switch [2].
- ▶ Briefly push the driving lever [3] forwards.
- ✔ The parking brake is working properly if the transmission is disabled when the parking brake is applied.
- ▶ After the check: Return the driving lever [3] to the 0 position and release the parking brake [2].
- ✔ Machine is ready to start.

If the parking brake is worn to such an extent that driving off is possible even when the switch [2] is pressed, the parking brake must be inspected or replaced. The machine must not be operated until this has been completed.

Request assistance from customer service.

4.01.05 Checking that the seat contact switch is working properly



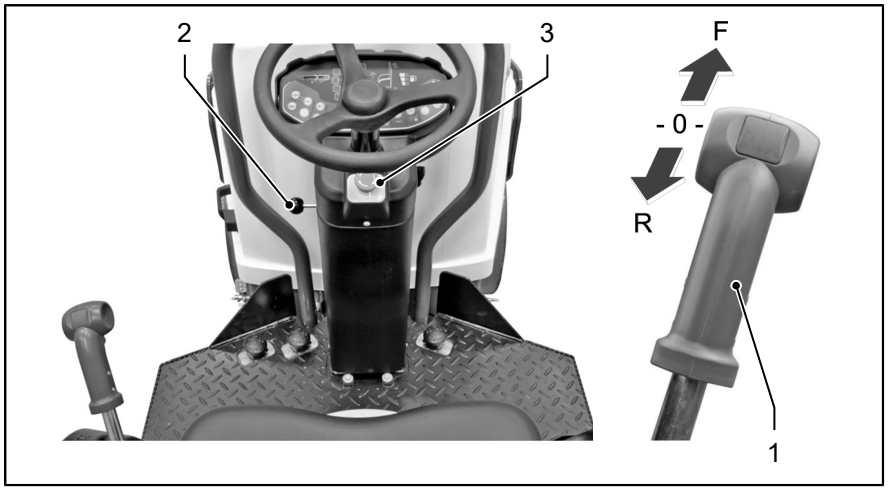
Checking the seat contact switch when the machine is stationary

- ▶ Start the diesel engine [1].
- ▶ Stand up from the driver's seat (looking forwards). Be sure of your footing and hold on tight.
- ▶ To release the parking brake: Press the parking brake switch [2].
- ▶ Briefly push the driving lever [3] forwards.
- ✔ The machine does not start moving: The seat contact switch is working properly.
- ✔ The machine starts moving: The seat contact switch is not working properly.
- ▶ After the check: Return the driving lever [3] to the 0 position and apply the parking brake [2].

If the seat contact switch does not work, it must be tested and repaired without delay. The machine must not be operated until this has been completed. Contact customer service!

4.02 Control stand

4.02.01 Checking that the driving lever is working properly



Before making the functional check, set the controls to their home positions:

- Engage drive lever [1] in the 0-position.
- Set the motor speed [2] to MIN.
- Unlock the emergency stop [3].

Functional test

- ▶ Switch off diesel engine and remove ignition key.
- ▶ Move the drive lever [1] fully forward and fully backward.
- ✔ The drive lever must allow even movement in both directions without using excessive force.
- ▶ Lock the drive lever [1] in its 0 position after the functional check.

No machine operation is permitted if the drive lever binds or is sluggish.

Request assistance from customer services!

4.03 Drive unit/diesel engine

⚠ WARNING

Inflammable fuel!

Severe injury and death due to fire, explosion and moving parts.

- Do not smoke. No open fire!
- Do not inhale fuel fumes.
- Catch spilling fuel or water sump, do not allow to seep away into the ground!

⚠ WARNING

Fuel is under very high pressure!

Serious injury can be caused by liquids escaping under very high pressure.

- Carry out maintenance works only with depressurized fuel system.
- Wait 1 minute after you switched off the diesel engine until the pressure is relieved.
- Work on the high-pressure lines of the fuel injection system may be carried out by trained specialised personnel only.
- Wear personal protective equipment.

NOTICE

Inadmissible fuel or inadmissible lubricating oil for the diesel engine!

Property damage to the diesel engine or to the system for exhaust treatment.

- Only use the fuel specified in the operating instructions.
- Only use the engine oil specified in the operating instructions.
- Observe the indicating labels affixed at the filler necks for fuel and engine oil.

NOTICE

Dirt in the fuel system!

Material damage to the diesel engine as a result of contamination in the fuel system.

- Ensure that no dirt or dust can get into the fuel system (cover dirty areas with foil).
- Thoroughly clean and dry components and the surrounding areas (e.g. with a high-pressure cleaner).

NOTICE

Contaminated inlet air

When it is defective, clogged, or contaminated, the air filter can damage the engine.

- Inspect all lines, flexible tubes and the casing of the air filter for tightness and integrity on a regular basis (at least once per year).
- Immediately replace any damaged part. Further operation is inadmissible.
- Check the operating readiness of the air filter on a regular basis.
- Regularly clean the air filter casing.
- Do not clean but always replace the air filter cartridge and the safety cartridge.
- Never run the diesel engine without an air filter cartridge and a safety cartridge in the air filter.

The fuel system must be bled after all work on an open fuel system or if the fuel tank has been run empty.

Check the fuel system for leaks with a trial run!

Adhere to running-in regulations, servicing intervals and care measures for diesel engine as specified in the instruction manual of the engine manufacturer.

4.03.01 Lubricating oil change intervals

These intervals depend, e.g., on:

- Lubricating oil quality
- Fuel sulphur content
- The mode in which the diesel engine is used

Change lubricating oil after half the interval indicated, e.g., when at least one of the following conditions is true:

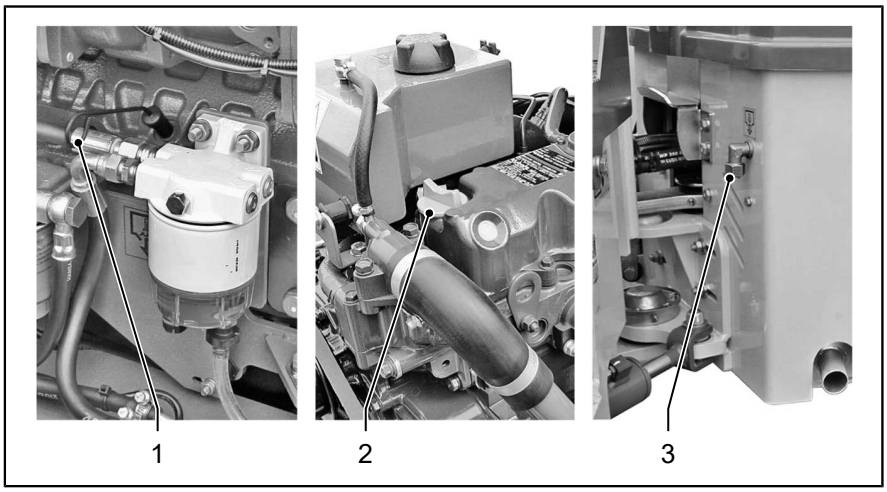
- Continuous ambient temperature below –10 °C (14 °F) or lubricating oil temperature below 60 °C (140 °F)
- Operation using biodiesel fuel

Change the lubricating oil at least once per year if the lubricating oil change intervals are not reached before the year ends.

4.03.02 Maintenance points at the diesel engine when changing oil

For engine maintenance see instruction manual for diesel engine!

☐ Lubricant only admissible if containing this marking ("Technical data", page 165 sqq.).



[1] Oil dipstick
[2] Oil filler
[3] Oil drain screw

4.03.03 Fuel prefilter

Changing filter cartridge for the fuel pre-filter

- Switch off diesel engine and remove ignition key.
- Allow machine to cool down under a temperature of 30 °C (86 °F).
- Open the drain valve [1] (screw conical nipple into housing).
- Open the vent screw [4].
- Drain fuel and waste sump from the filter.
- Unscrew filter cartridge [3].
- Unscrew the drain housing [2] from the filter cartridge and clean it.
- Remove contamination from drain valve [1] (check function).
- Screw the drain housing [2] with a new gasket ring to the filter cartridge [3] and tighten by hand. Close drain valve [1] (unscrew the conical nipple from the housing until the stop).
- Prior to assembly apply a thin coat of oil to the rubber seal and screw the new filter cartridge [1] to the filter head until the seal makes contact. Tighten the filter cartridge by hand further by half a turn.
- Screw in and tighten the vent screw [4].
- Open the purge screw [5] at the fuel filter cartridge [6] by one turn.

- Switch on the electrical system until fuel runs out of the vent hole [5] of the fuel filter cartridge.
- Screw in and tighten the vent screw [5].
- Check for tightness after assembly.

Air in the fuel system is fully vented when starting the diesel engine. For this, several starting attempts may be necessary. The start process can be activated for a maximum of 20 seconds at a time; otherwise, the starter winding will overheat and be destroyed. There must be pauses of at least 1 minute between the individual starting processes in order to allow the starter to cool down.

Draining water separator

NOTICE

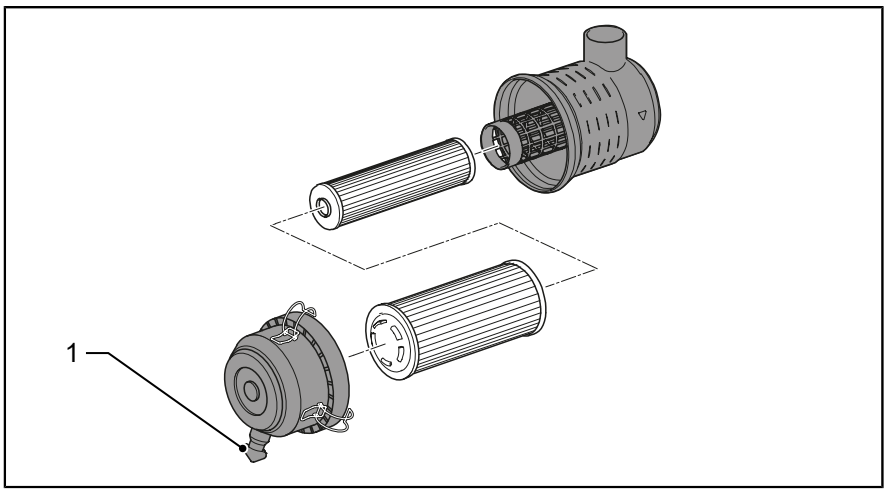
Water sump in the fuel!

Property damage to the diesel engine by water sump in the fuel system.

- Dewater the fuel prefilter/water trap regularly according to the water content of the fuel.
- If the fuel has a high water content, dewatering must be performed more frequently.

- Switch off diesel engine and remove ignition key.
- Allow machine to cool down under a temperature of 30 °C (86 °F).
- Open the vent screw [1].
- Open drain valve [2].
- Allow water sump to drain off.
- Close drain valve [2].
- Close the venting plug [1].

4.03.04 Check and clean the dust discharge valve at the air filter



Before starting work, check the proper passage through the dust discharge valve:

- ▶ Switch off diesel engine and remove ignition key.
- ▶ Squeeze the dust discharge valve [1] and clean the discharge slot.

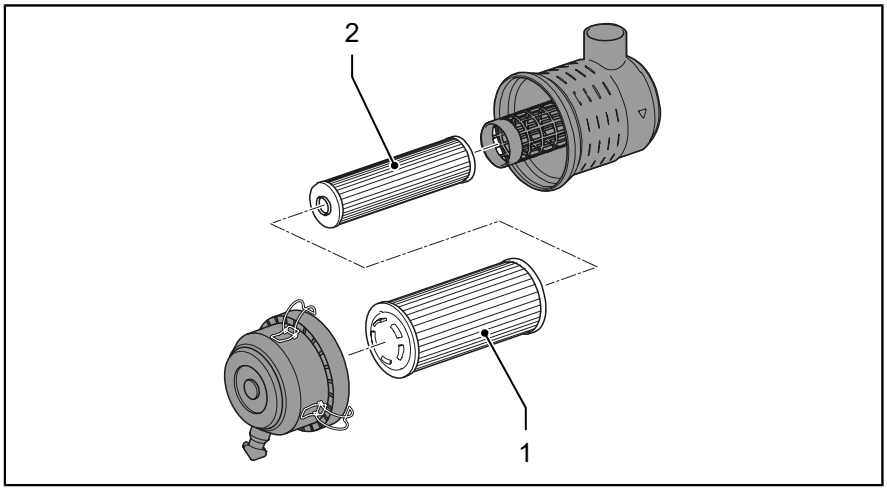
4.03.05 Check the air filter

NOTICE

High pressure by high-pressure cleaner!

Damage of the air filter by power washer.

- Never use compressed air or a high-pressure cleaner for cleaning any casing part.
- Clean the interior parts of the casing only with a moist, fibre-free cloth.



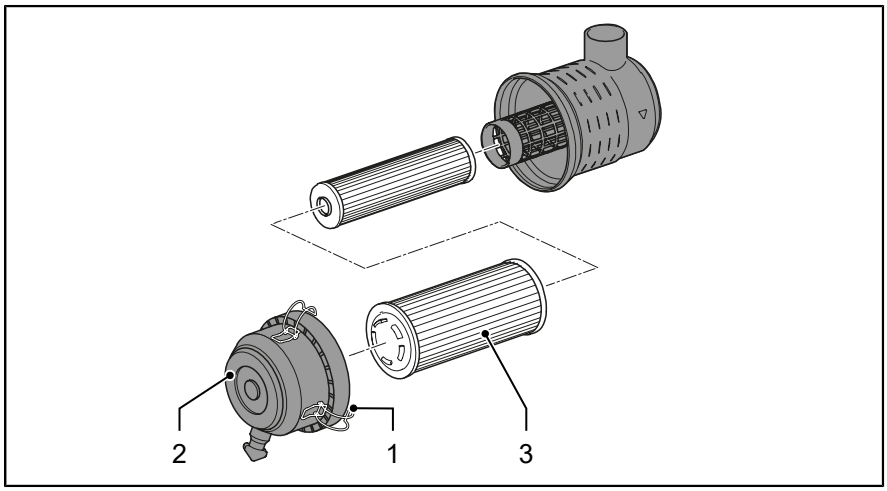
Check the operating readiness of the air filter while the diesel engine is running:

- ▶ Start diesel engine and shortly rev up to maximum speed.
- ✔ The air filter pilot light is not flashing on the information display: Air

filter cartridge [1] and the safety cartridge [2] are ready for operation.

✔ Air filter pilot light flashing on the information display: Replace the air filter cartridge [1] and/or the safety cartridge [2].

4.03.06 Replacing air filter cartridge

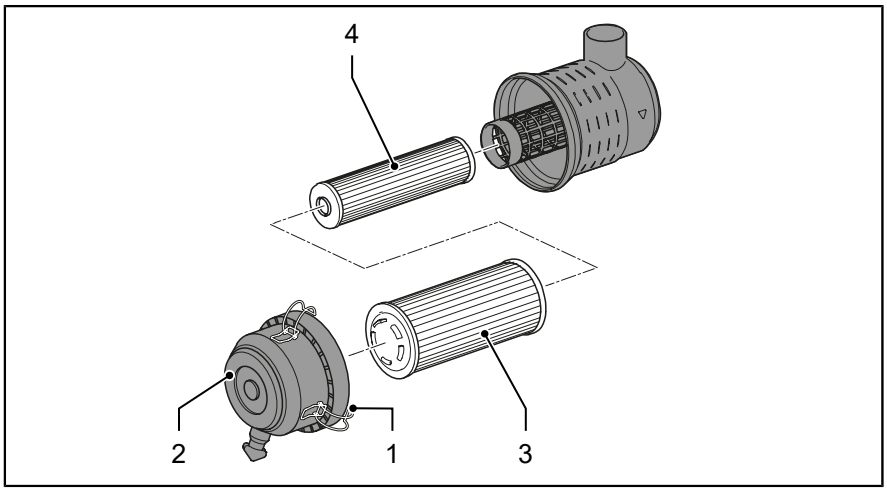


- Switch off diesel engine and remove ignition key.
- Allow machine to cool down less than 30 °C (86 °F).
- Fold up the clips [1].
- Remove dust collection container [2].
- Clean the inside of the dust collectors.
- Pull out the air filter cartridge [3].
- Insert a new air filter cartridge.
- Put on the dust receiver bin [2].
- Snap shut the clips [1].
- Check the operating readiness of the air filter.

4.03.07 Replacing the safety cartridge at the air filter

Replace the safety cartridge:

- after having changed the air filter cartridge five times.
- After 2000 operating hours at the latest.
- If the air filter pilot light is flashing on the information display after having replaced the air filter cartridge.
- If the air filter cartridge is defective.



Changing safety cartridge

- Switch off diesel engine and remove ignition key.
- Allow machine to cool down less than 30 °C (86 °F).
- Fold up the clips [1].
- Remove dust container [2].
- Clean the inside of the dust container.
- Pull the air filter cartridge [3] out of the air filter.
- Pull out safety filter cartridge [4].
- Slide in a new safety cartridge.
- Slide a new air filter cartridge [3] into the air filter.
- Put on the dust receiver bin [2].
- Snap shut the clips [1].
- Check the operating readiness of the air filter.

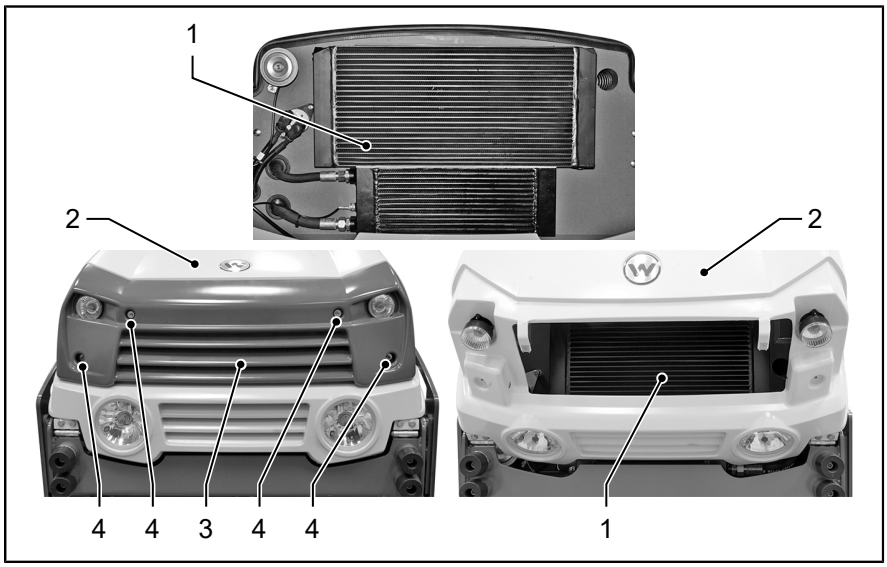
4.03.08 Checking/cleaning the radiator

NOTICE

High water pressure by high-pressure cleaner!

Damage of radiator when cleaning with high-pressure cleaner.

- Maintain a safe distance between the lance of the high-pressure cleaner and the radiator.
- Use a directed spray.
- Guide the directed spray parallel (not at an angle) to the cooling fins of the radiator.



Check the radiator

- ▶ Check the cooling fins of the radiator for fouling.
- ✔ Cooling fins not soiled: The machine is ready for operation.
- ✔ Cooling fins contaminated: Clean the cooling fins thoroughly and without delay.

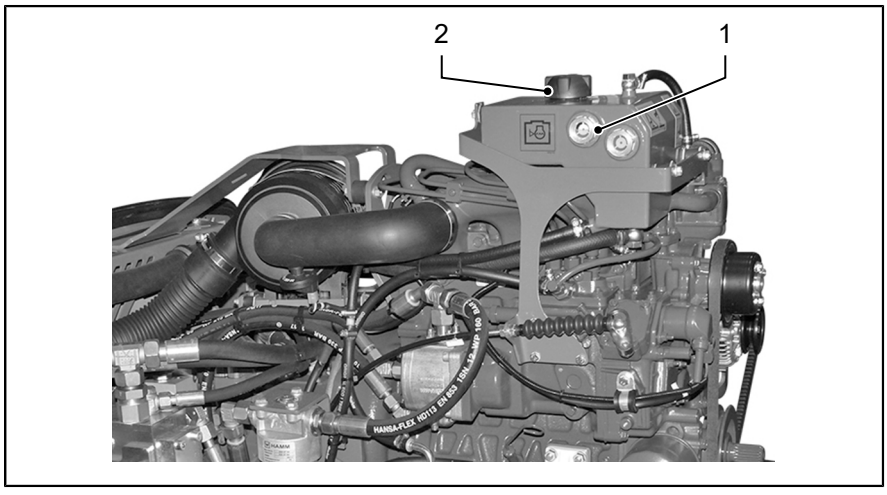
Cleaning the radiator

- ▶ Switch off the diesel engine and remove the ignition key.
- ▶ Allow the machine to cool down to less than 30 °C (86 °F).
- ▶ Open the bonnet [2].
- ▶ Clean the radiator [1] carefully from all sides using a pressure washer.
- ▶ Close the bonnet [2].

If necessary, remove the panel [3] from the bonnet [2] by undoing four screw connections [4].

4.03.09 Checking coolant level

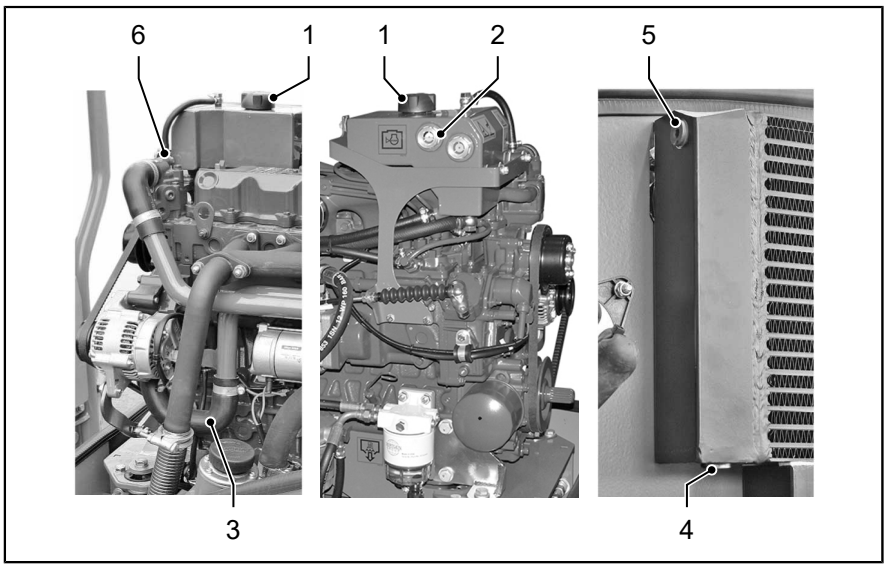
○ Lubricant only admissible if containing this marking ("Technical data", page 165 sqq.).



- Switch off diesel engine and remove ignition key.
- Only check the coolant level when the diesel engine is cold.
- Correct coolant level: Centre of inspection glass [2] on compensator tank. Do not exceed this level!
- In case of a lack of coolant, only fill up coolant in the specified concentration through filling opening [1] at the compensator tank.
- In case of bigger coolant losses, find out and eliminate the cause.

4.03.10 Changing coolant

○ Lubricant only admissible if containing this marking ("Technical data", page 165 sqq.).



- Switch off diesel engine and remove ignition key.
- Open the sealing cap [1] at the compensation tank.
- Remove the drain plug [4] from the radiator and discharge the coolant in a provided receptacle.
- Dismount lower coolant hose [3] and discharge coolant into a provided receptacle.
- Screw in again and tighten drain plug [4] and install coolant hose [3] to the connection piece.
- Loosen vent screw [5] on the radiator in 2 turns (do not remove!).
- Open the hollow-core screw [6] of the bleed pipe at the engine block by 2 turns (do not remove!).
- Fill in coolant in the compensator tank [1] until coolant runs out of the vent screw [5].
- Tighten vent screw [5] at the radiator.
- Fill in coolant in the compensator tank until it runs out of the hollow-core screw [6] on the engine block.
- Tighten the hollow screw [6].
- Fill coolant up to the centre of the inspection glass [2].
- Close the filling opening with the sealing cap [1].
- Start the diesel engine and bring it to operating temperature (thermostat opens).
- Switch off diesel engine and remove ignition key.

- Check coolant level when the diesel motor is cold, fill up as necessary.
- Correct coolant level: Centre of inspection glass [2] on compensator tank.

4.04 Hydraulic oil supply

⚠ WARNING

Leaks in hydraulic hoses!

Injuries or fire as a result of oil squirting out of a leaking hydraulic system.

- All lines, hoses and screwed connections of the hydraulic system must be checked for leaks and visible damage (at least once per year).
- Immediately replace any damaged part. Further operation of the machine is inadmissible.

NOTICE

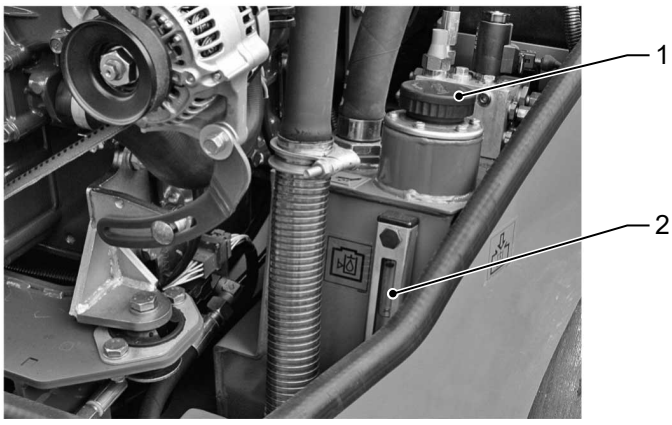
Foreign objects in the hydraulic system!

Consequential damage to the hydraulic system caused by foreign objects in the hydraulic system as a result of earlier damage.

- After a each damage to the hydraulic system, with a foreign object having entered the oil circuit, the entire hydraulic system must be cleaned.
- After cleaning, replace all suction, return and pressure filters in the hydraulic system after 50 hours and again after 125 operating hours.
- This work may only be performed by trained specialised personnel. Call the customer service!

4.04.01 Checking hydraulic oil level

▭ Lubricant only admissible if containing this marking ("Technical data", page 165 sqq.).

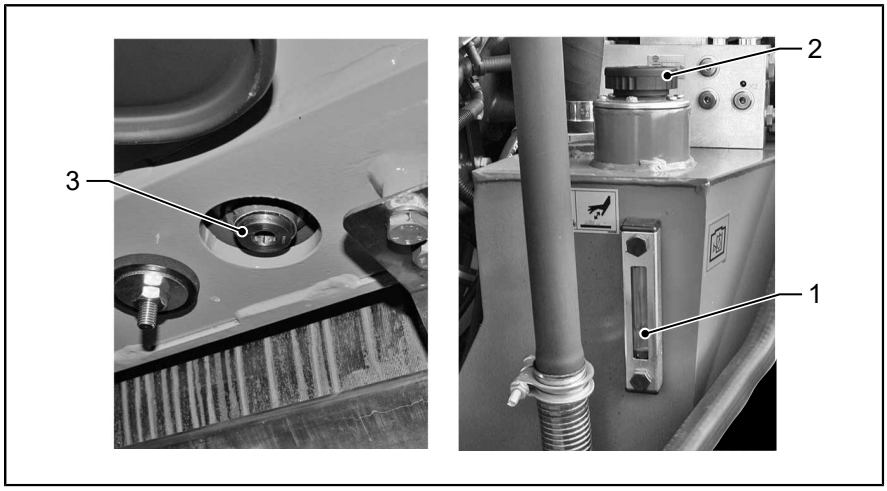


- ▶ Switch off diesel engine and remove ignition key.
- ▶ Allow machine to cool down less than 30 °C (86 °F).
- ▶ Correct oil level: centre of sight glass [2].
- ▶ If the oil level is too low, fill in appropriate oil through fill opening [1].
- ▶ In case of bigger oil losses, find out and eliminate the cause.

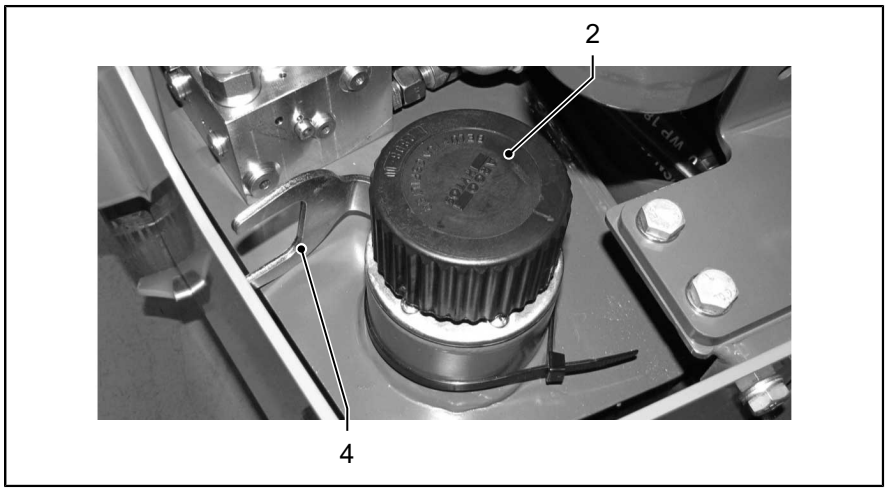
4.04.02 Changing hydraulic oil and ventilation filter

▭ Lubricant only admissible if containing this marking ("Technical data", page 165 sqq.).

Variant 1
Standard design



Variant 2
Vandalism proof version

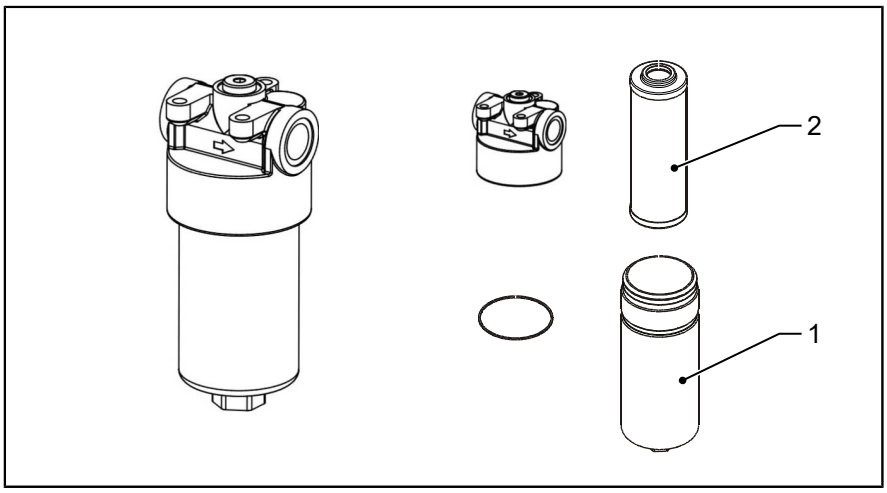


- Switch off diesel engine and remove ignition key.
- Allow machine to cool down less than 30 °C (86 °F).
- Unscrew oil drain screw [3] down on the oil tank and discharge the used oil drain into a provided receptacle.
- Remove the ventilation filter [2] (for variant 2, use a special key [4] to loosen it before) and replace it with a new filter.
- Screw in oil drain screw [3] and tighten.
- Fill up specified oil through filling spout [2].
- Correct oil level: Centre of sight glass [1].
- Tighten ventilation filter [2].
- Start the diesel engine.
- Actuate drive lever with low engine speed until the transmission activates.

- ▶ Also actuate the steering.
- ✔ The pipes and hose lines will be filled with oil and vented.
- ▶ Check oil level with the diesel engine at a standstill. Top up oil if necessary.
- ▶ Check hydraulic system for leaks.

4.04.03 Replacing the filter insert in the pressure filter for the hydraulic system

▭ Only lubricant with this marking is permitted ("Technical data", page 165 ff.).



- ▶ Switch off the diesel engine and remove the ignition key.
- ▶ Allow the machine to cool down to less than 30 °C (86 °F).
- ▶ Unscrew the barrel casing [1].
- ▶ Version 1: Pull the filter insert [2] from the filter head and replace with a new one.
  Version 2: Unscrew the filter insert [2] from the filter head and replace with a new one.
- ▶ Clean the inside of the barrel casing [1].
- ▶ Screw the barrel casing [1] back into the filter head and tighten.
- ▶ Check that the hydraulic system is leak-tight.

4.05 Electrical system

4.05.01 Starter battery

⚠ WARNING

Explosion!

Serious injuries or burns caused by exploding gases.

- Naked flames and smoking are prohibited when handling any battery. Be sure to avoid any sparking.
- Do not store or charge the battery unless in a well ventilated room.
- Do not store or charge the battery unless at a temperature of between –15 °C and 45 °C (5 °F and 113 °F).
- Avoid exposure to direct sunlight.
- When charging the battery, be sure to follow the manufacturer's instructions and the operating manual.
- To charge the battery, use direct current only.

⚠ WARNING

Toxic and caustic electrolytic liquid!

Serious injuries as a result of poisoning or chemical burning by contact with electrolytic liquid.

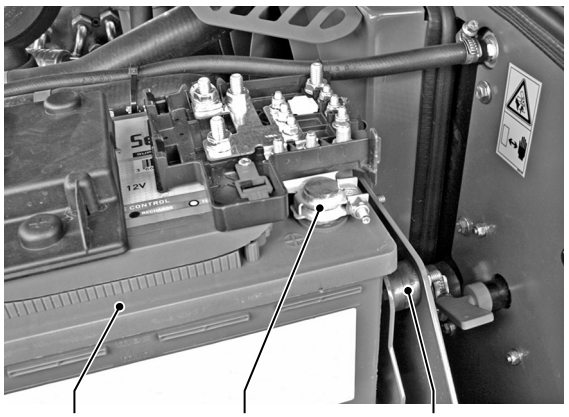
- Wear personal protective equipment when working on or handling any battery, i.e., protective clothing, glasses, face mask, acid-proof rubber gloves.
- Do not tip the battery.
- Use suitable means for binding and disposing of any spilled liquid.
- In case of contact with electrolyte fluid, rinse the area affected with clear water, and consult a physician.
- In case of having inhaled or swallowed any electrolyte fluid, initiate emergency medical aid immediately.

Perform maintenance work only in adequately ventilated rooms.

The electrical power supply is ensured by a generator and by a starter battery.

All cabels, fastenings and screwed connections must be checked for visible damage (at least once per year).

Damaged parts must be replaced immediately. Damaged cables may cause injuries and fire.



[1] Battery case

[2] Battery terminals and terminal clamps

[3] Battery mounting and fastening

Maintenance

These intervals depend on:

- Storage and ambient temperatures
- Acid level and acid concentration
- Service conditions

Do not open batteries without plugs, or VRLA batteries!

The battery must be replaced if the electrolyte level or the acid concentration falls below the minimum.

Never top up already filled batteries with acid or enhancing agents!

Top up only with distilled water.

- ▶ Switch off diesel engine and remove ignition key.
- ▶ Wear personal protective equipment.
- ▶ If preset: Remove the terminal caps from the battery.
- ▶ Check the battery casing [1] for external damage.
- ▶ Check the battery mounting and storage [3].
- ▶ Clean the battery terminals and terminal clamps [2] and treat with battery terminal grease.
- ▶ Replace the terminal caps on the battery.
- ✔ Battery securely positioned, sealed, undamaged and with its connectors preserved.
- ▶ Check the electrolyte level at the inner or outer casing mark or as indicated in the closing plug (see battery instructions).
- ▶ Top up distilled water or replace the battery as necessary.
- ▶ If possible, check the acid concentration. (1.28 kg/l ±0.1).
- ▶ Clean the battery casing [1] with a damp or antistatic cloth.
- ✔ Correct acid concentration.
- ✔ Correct electrolyte level.

- ▶ Check the battery open-circuit voltage (must be at least 11.9 V) with suitable means, and recharge if necessary.
- ✔ Full starter power.

External charging

Deeply discharged batteries must be removed from the machine for recharging.

Observe the manufacturer's specifications for charger and battery during every charging work step.

Do not charge the battery unless in a well ventilated room.

- ▶ Remove the battery from the machine.
- ▶ Before recharging, ensure that the battery degassing is intact.
- ▶ If possible, check the electrolyte level before charging and correct if necessary (see battery instructions).
- ▶ Connect the battery charger according to the manufacturer's specifications, and then start recharging.
- ▶ Always watch the charging process and stop charging when the acid temperature exceeds 55 °C or in case of acid spill.
- ✔ Battery charged.
- ▶ Switch off and disconnect the charger from the battery.
- ▶ If necessary, remount the battery.
- ✔ Battery is ready for use.

4.06 Transmission

4.06.01 Checking roller drum/tyre scraper

Only scrapers in correct condition ensure a clean roller drum/type surface.

- Check scraper for cleanliness. Clean soiled scrapers.
- Check the condition of the scrapers. Replace worn scrapers in good time.
- Check setting of the scrapers. Adjust preset scrapers.

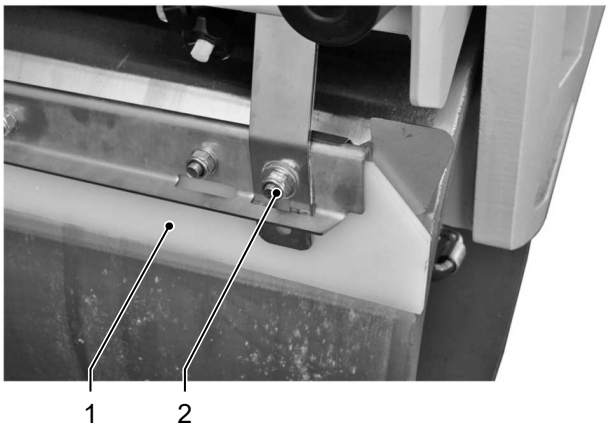
4.06.02 Cleaning roller drum/tyre scraper

- Rinse out dirt embedded between scrapers and roller drums/tyres with water jet.
- Remove strongly adhesive dirt with spatula or similar tool.

4.06.03 Replacing/adjusting the roller drum scraper

If they are worn-out to such an extent that sticking dirt is not removed from the roller drums/tyres during work any longer, the scrapers must be readjusted or replaced.

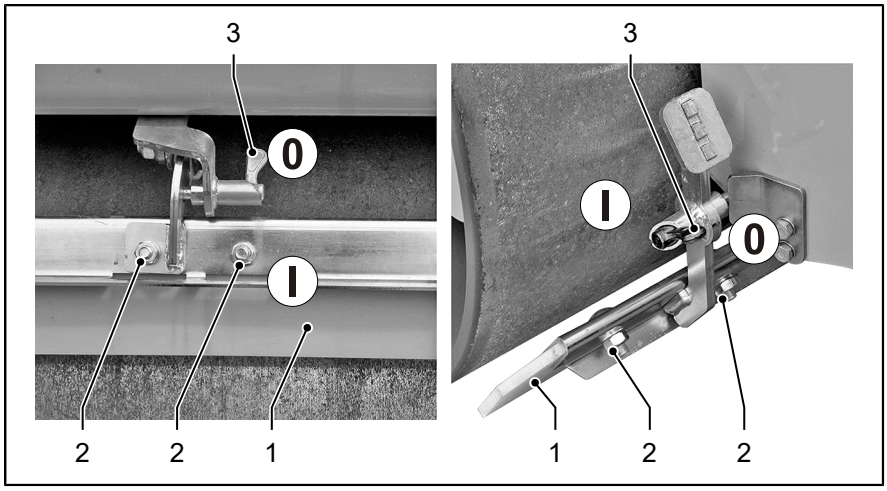
Rigid scraper



Readjusting/replacing scrapers

- Switch off diesel engine and remove ignition key.
- Loosen clamp connection [2].
- Replace the scraper [1] by a new one if necessary.
- Push scraper [1] to the roller drum.
- Tighten clamp connection [2].

Folding scraper



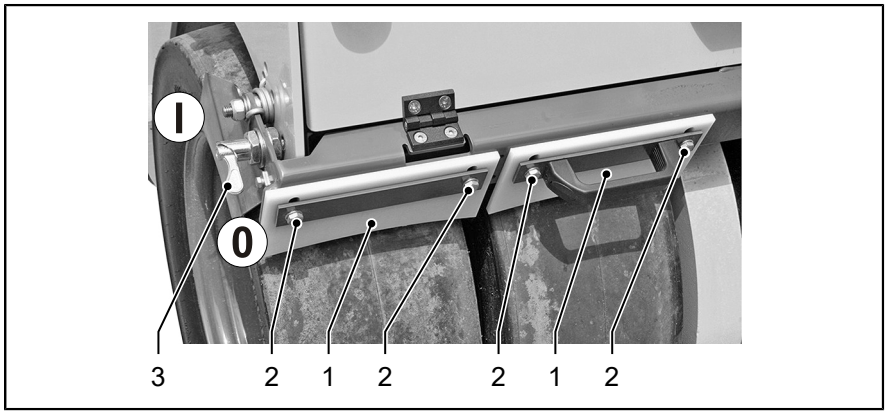
Exchanging the scraper

- Switch off diesel engine and remove ignition key.
- Turn stop lever [3] to 0 position.
- Move the scraper [1] away.
- Loosen clamp connection [2].
- Replace scraper [1] by a new one.
- Tighten clamp connection [2].

4.06.04 Replacing/adjusting type scrapers

If they are worn-out to such an extent that sticking dirt is not removed from the roller drums/tyres during work any longer, the scrapers must be readjusted or replaced.

To install a new scraper, be sure to place the screws for the clamp connection into the lowest positions of the elongated holes.

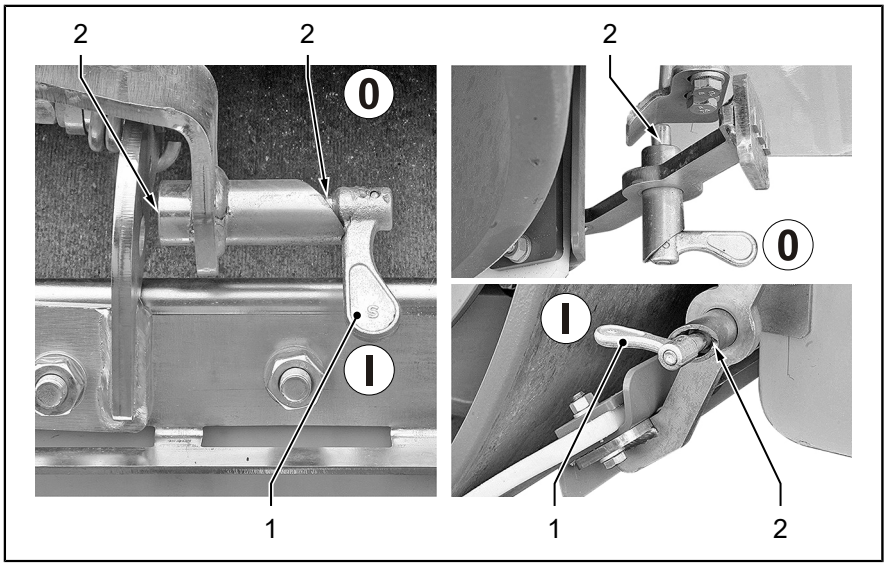


Readjusting/replacing scrapers

- Switch off diesel engine and remove ignition key.
- Turn stop lever [3] to 0 position.
- Move the scraper [1] away.

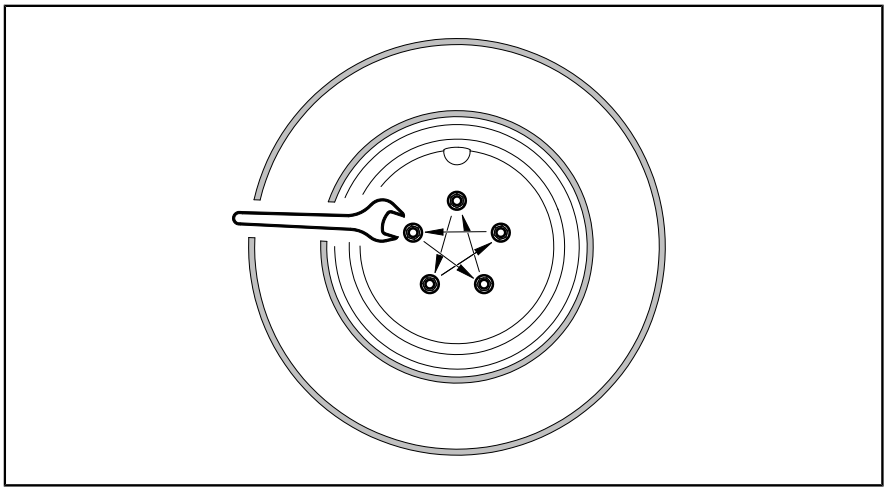
- Loosen clamp connection [2] (2 ×).
- Replace the scraper [1] by a new one if necessary.
- Push scraper [1] to the tyres.
- Establish a clearance of 10 mm between the tyres and the scrapers.
- Tighten clamp connection [2].

4.06.05 Lubricate the scraper stop lever



- Switch off diesel engine and remove ignition key.
- Clean off dirt adhering to the catch.
- Turn stop lever [1] to I position.
- Lubricate the guide bolt of the locking lever with oil at positions [2].
- Move the locking lever to and fro several times between positions 0 and I to distribute the lubricant in the guide.

4.06.06 Check that wheel nuts/wheel bolt connections are tight



- Switch off diesel engine and remove ignition key.
- Tighten the wheel nuts/wheel bolts crosswise. For tightening torque see Technical data (see page 175).

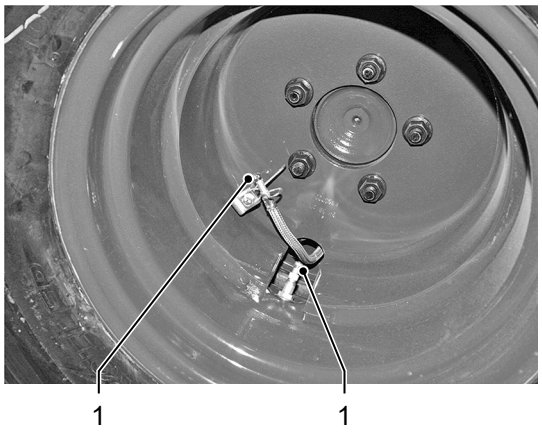
4.06.07 Checking air pressure in the tyres

⚠ WARNING

Explosion!

Severe injury and death due to explosion and moving parts.

- Change damaged tyres.
- When filling, do not exceed the values of the specified air pressure.
- Use only suitable filling devices with a pressure indicator.
- When filling the tyres, be always next to the tyre, not in front of it.
- Use a tyre cage.



▶ Visually inspect the tyre pressure daily.

✔ There is no visible air shortage: The machine is ready for operation.

✔ Visible air shortage: Obtain the specified air pressure with appropriate filling devices.

▶ Switch off diesel engine and remove ignition key.

▶ Fasten filling hose to the valve [1] and fill the tyre till it reaches the specified air pressure ("Technical data", page 175).

4.06.08 Changing the tyres

⚠ WARNING

Tipping over the machine!

Serious injuries or death through the machine tipping over sideways because of a shift in the center of gravity.

- On one axle, only mount and use tyres that are the same type and have the same design, profile and diameter.
- Always adjust the tyre pressures on one axle to the same value.

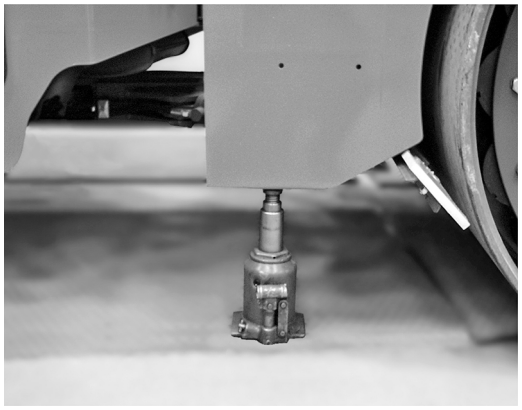
NOTICE

Increased material wear!

Material damage through increased wear on tyres, running gear and drive parts as a result of a combination of different tyres on each axle.

- On one axle, only mount and use tyres that are the same type and have the same design, profile and diameter.
- Always adjust the tyre pressures on one axle to the same value.

Preparation

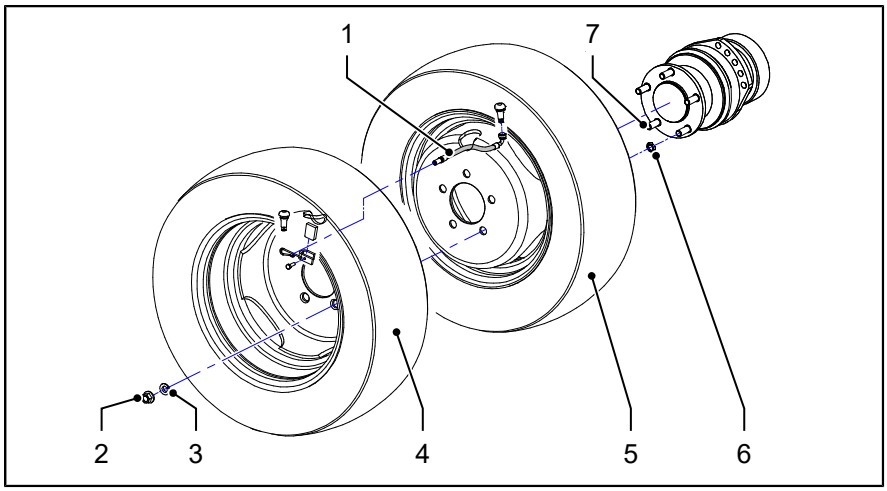


- ▶ Put machine on a safe surface (even, capable of bearing, horizontal) and secure against rolling away
- ▶ Switch off diesel engine and remove ignition key.
- ▶ Have hoisting gear ready that is appropriate for the weight of the machine and wheels.
- ▶ Lift the machine until the wheels leave the ground:
  - Apply a jack with sufficient lifting capacity to the marked lifting points on the chassis, or
  - Lift the machine only by the marked suspension points using suitable hoisting gear (crane with round sling/chain).
- ▶ Put/jack machine on the machine frame on liners capable of bearing (tyres may not be in contact with the ground).

Only persons familiar with changing tyres and aware of dangers are allowed to change the tyres.

When jacking up the machine, use only stable liners capable of bearing (e.g. support timber of sufficient size).

Perform the work with two fitters!



Disassembly

- Press the valve extension hose [1] out of the fixing device.
- Loosen and unscrew the wheel nuts [2].
- Remove the circlips [3].
- Remove the wheels [4, 5] from the wheel hub.
- Remove the centring rings [6] from the tyre bolt [7].

Assembly

- Clean/derust the contact surfaces between the wheel and hub.
- Clean/derust wheel nuts [2], retaining rings [3] and centring rings [6].
- Lead the valve extension hose [1] through the cutout of the rim outwards.
- Put the centring rings [6] on the tyre bolts [7].
- Put the inner wheel [5] to the tyre bolts [7] on the wheel hub.
- Put the outer wheel [4] on the tyre bolt [7] so that both valves align.
- Lead the valve extension hose [1] through the cutout of the rim outwards.
- Put the circlip [3] on the tyre bolt [7].
- Screw the wheel nuts [2] onto the tyre bolts [7] and tighten them by applying the specified torque.
- Press the valve extension hose [1] back in the fixing device.
- Lift the machine and remove the liners.
- Put machine down, so that wheels may be in contact with the ground.

4.07 Steering system

⚠ WARNING

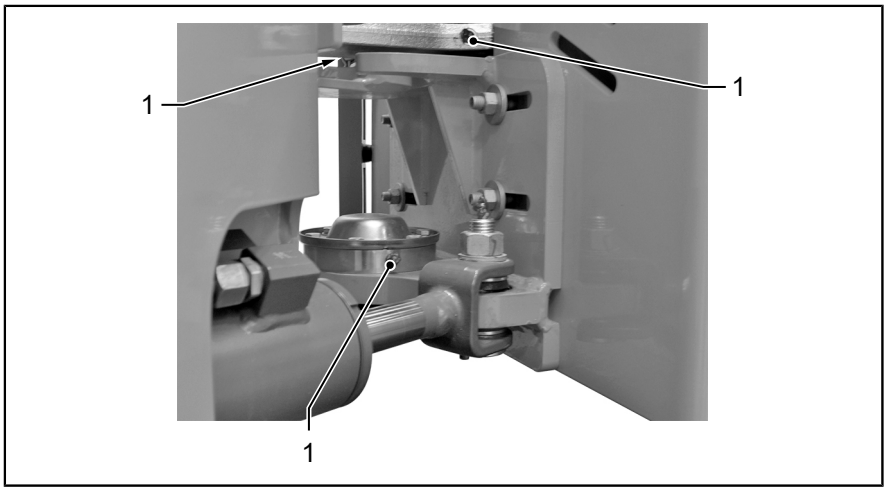
Uncontrolled movements!

Serious injuries or death caused by unexpected steering movements.

- Perform work on the steering system with the engine at rest and the electrical system switched off.
- On machines with safety strut, apply the safety strut before maintenance work.
- To avoid any unintended engine start by any third person: affix a warning notice at the driver's position indicating that work is in progress on the machine.

4.07.01 Lubricating pivoted bearing

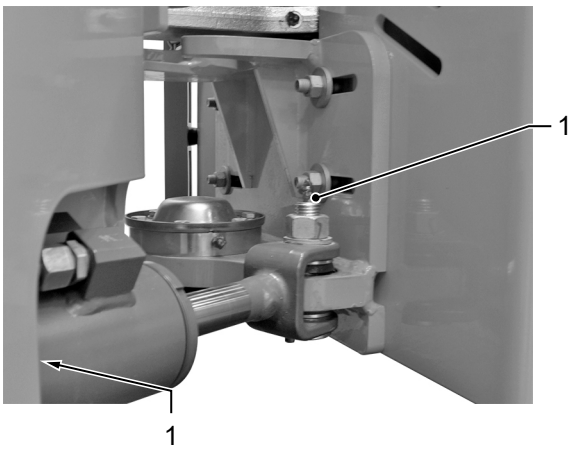
△ Lubricant only admissible if containing this marking ("Technical data", page 165 sqq.).



- ▶ Switch off diesel engine and remove ignition key.
- ▶ Apply the articulated frame steering blocking.
- ▶ Grease lubricating nipple [1].

4.07.02 Lubricating the steering cylinder bolts

△ Lubricant only admissible if containing this marking ("Technical data", page 165 sqq.).



- Switch off diesel engine and remove ignition key.
- Apply the articulated frame steering blocking.
- Grease lubricating nipple [1].

4.08 Water sprinkling

NOTICE

Corrosion and frost!

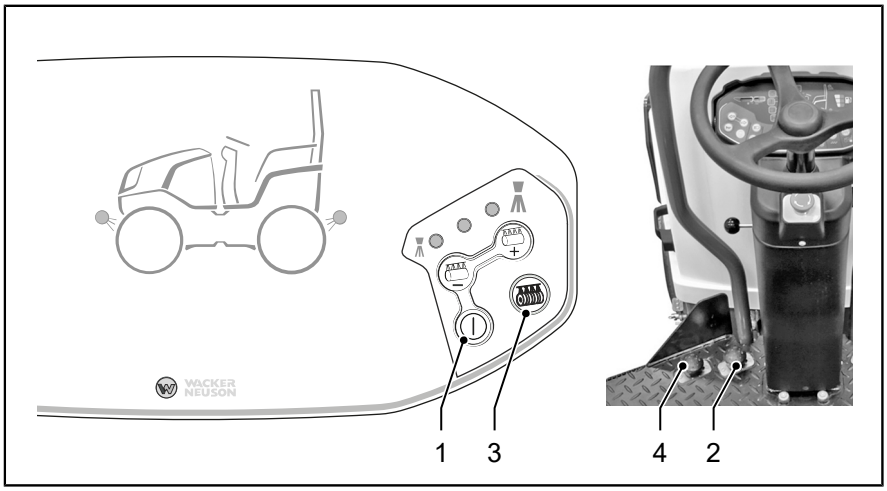
Material damage to sprinkler installations due to corrosion and frost.

While the machine is going to be parked for an extended period of time and/or in case of danger of freezing:

- Empty and clean the water sprinkling unit/additive sprinkling system.
- Remove and clean the sprinkler nozzles.
- Carry out antifreeze work, if available.

4.08.01 Sprinkler nozzle inspection

Check that an even sprinkling pattern is obtained on the roller drums/tyres.



Prerequisites

- Diesel engine off
- Electrical system on
- Parking brake activated
- For water sprinkling: Drive lever in F position (forward)

Sprinkler nozzle check for water sprinkling

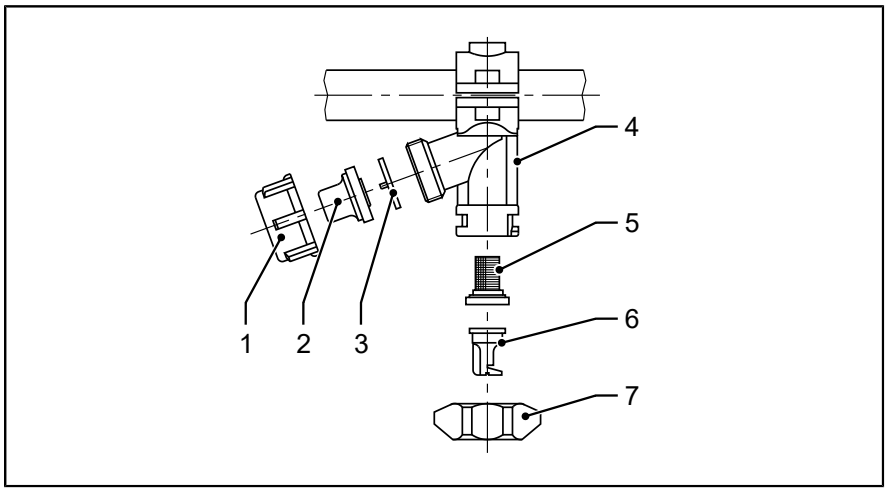
- ▶ Press switch [1].
- ✔ Water sprinkling is done by intermittent operation at the preset interval level.
- ▶ Press and hold the foot switch [2].
- ✔ The water sprinkler will be active as long as the foot switch is being pressed.
- ▶ Press the switch [1] once again or release the foot switch [2].
- ✔ Water sprinkling off.
- ▶ Latch driving lever in position 0.
- ▶ Switch off the electrical system.

Sprinkler nozzle check for additive sprinkling

- ▶ Press and hold the switch [3] or foot switch [4].
- ✔ The additive sprinkler will be active as long as one of the switches is pressed and held.
- ▶ Release switch [3] or [4].
- ✔ Additive sprinkling turned off.
- ▶ Latch driving lever in position 0.
- ▶ Switch off the electrical system.

If the sprinkler does not work or does not produce the desired sprinkling pattern, the sprinkler nozzles need to be cleaned.

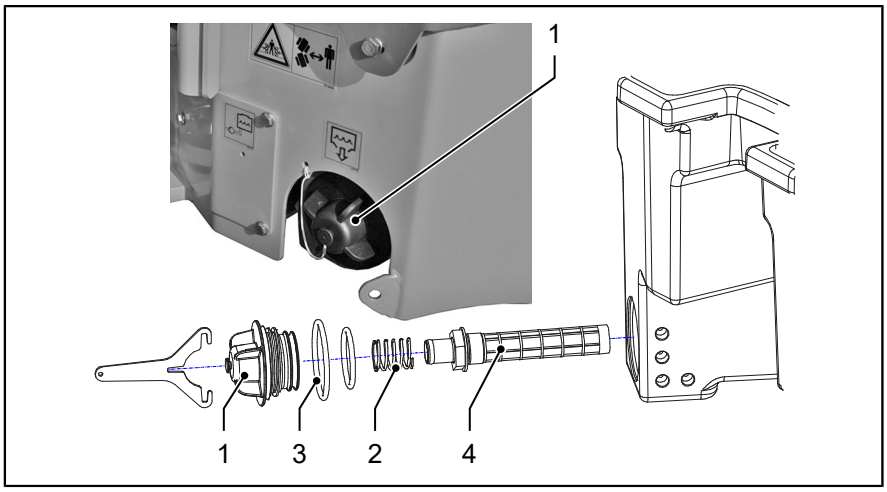
4.08.02 Cleaning sprinkler nozzles



- ▶ Switch off diesel engine and remove ignition key.
- ▶ Loosen the cap nut [7] and remove it together with sprinkler nozzle [6] and filter [5].
- ▶ Remove the filter and the sprinkler nozzle from the cap nut and clean them.
- ▶ Unscrew the cap nut [1].
- ▶ Remove valve insert [2] and membrane [3].
- ▶ Flush the housing [4] with the sprinkling system.
- ▶ Insert the valve core [2] and diaphragm [3] into the union nut [1].
- ▶ Screw the union nut [1] together with the valve core [2] and diaphragm [3] onto the enclosure [4].
- ▶ Insert the filter [5] and spray nozzle [6] into the union nut [7].
- ▶ Screw the union nut [7] together with the spray nozzle [6] and filter [5] onto the enclosure [4].

4.08.03 Cleaning filter for water sprinkling

A large, corrosion-free water filter is arranged upstream of the water pump. It prevents premature contamination of pump, lines and spraying nozzles, thus ensuring trouble-free operation. The maintenance of the water filter depends on the purity of the water used. Only use clean water!



- Switch off diesel engine and remove ignition key.
- Unscrew the filter head [1] from the water tank and remove it together with the pressure spring [2] (be careful with the sealing rings [3] on the filter head).
- Pull the filter insert [4] from the water tank.
- Clean filter insert and compression spring.

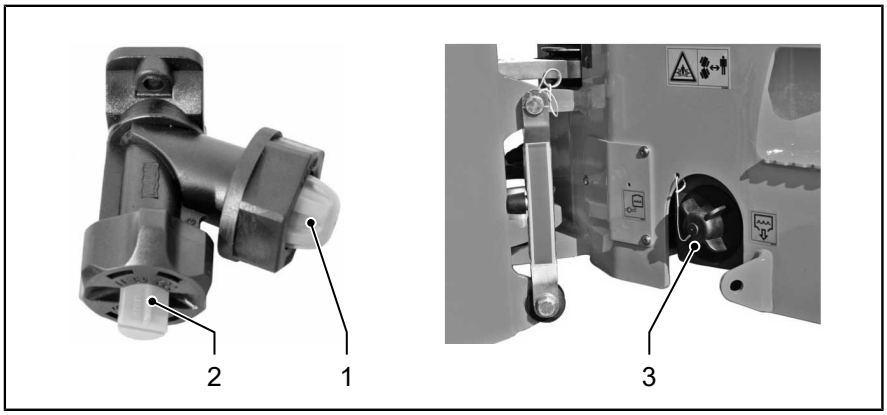
Empty the water tank when the filter has been removed.

- Place the filter insert [4] into the water tank.
- Screw the filter head [1] with the seal rings [3] together with the pressure spring [2] into the water tank.

The filter insert must be replaced by a new one when it is defective, worn out or cannot be cleaned.

For ordering, please contact the customer service.

4.08.04 Emptying and cleaning the water sprinkling system



- Switch off diesel engine and remove ignition key.
- Remove the valve insert [1] with membrane and the sprinkler nozzles [2] with filter from the sprinkler nozzle casing.

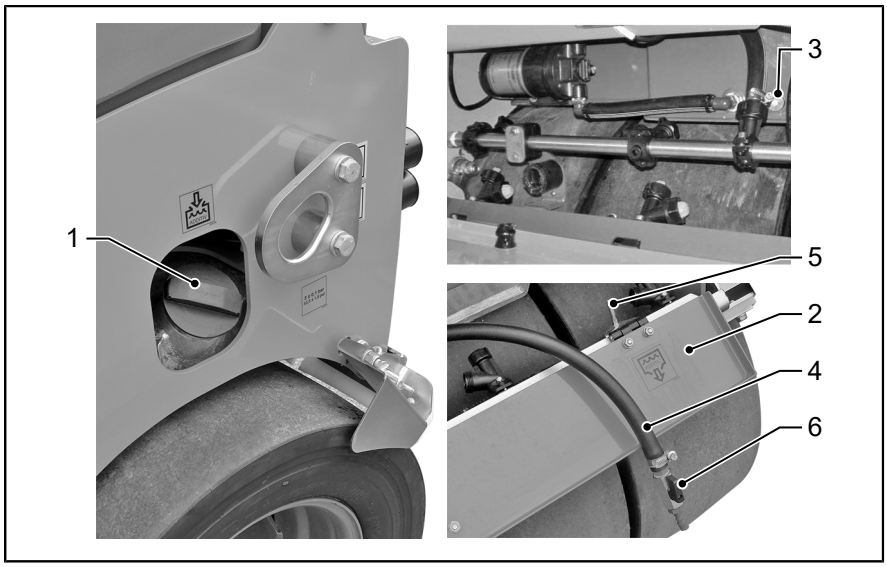
- Unscrew the filter head [3] from the water tank and remove it together with the pressure spring (be careful with the sealing rings on the filter head).
- Pull the filter insert from the water tank.

Empty the water tank when the filter has been removed.

Before cleaning the water tank, remove the filter screen from the fill hole.

- Thoroughly clean the water tank with a water jet.
- Flush the sprinkler nozzle housings and the hoses.
- Insert filter insert in the water tank.
- Screw the filter head [3] together with the compression spring into the water tank.
- Insert valve insert [1] with the membrane as well as the sprinkler nozzles [2] with filter from the sprinkler nozzle housing.

4.08.05 Emptying and cleaning the additive sprinkling system



- Switch off diesel engine and remove ignition key.
- Open the filler cap of the additive tank [1] for pressure compensation.
- Open the maintenance flap [2].
- Provide a suitable reservoir for catching the tank content.
- Drain the additive sprinkler system tank:

Variant 1:

- Unscrew the drain plug [3].

Variant 2:

- Remove the hose [4] from its support [5].
- Open the drain [6].

- Catch and dispose of the separating compound flowing out.

Observe the disposal regulations as specified by the additive manufacturer.

- After completing tank drainage, operate the additive sprinkling system until no more separating compound comes out of the sprinkler nozzles.
- Thoroughly clean the additive tank with a jet of water.
- Flush the sprinkler nozzle housings and the hoses.

Variant 1:

- Screw in the drain plug [3].

Variant 2:

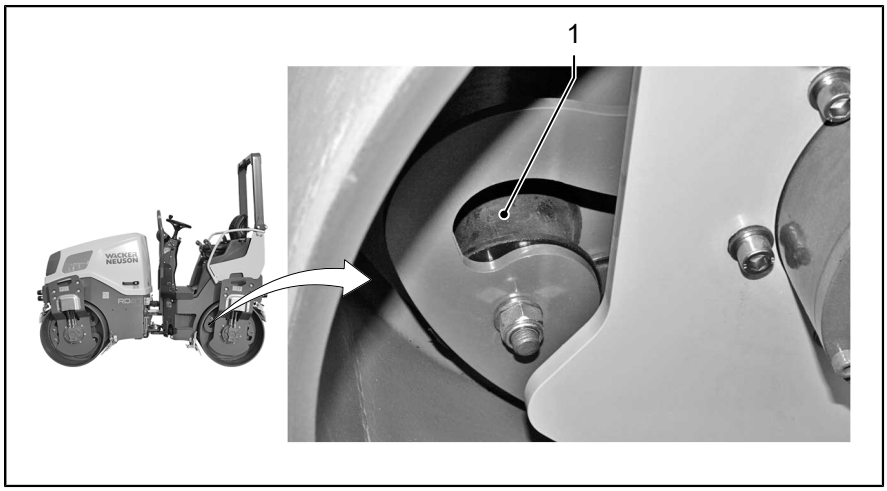
- Close the drain [6].
- Put the hose [4] on its holder [5].

- Shut the maintenance flap [2].
- Close the additive tank filler cap [1].

4.09 Dynamic compaction system

Prior to maintenance works clean roller drums thoroughly.

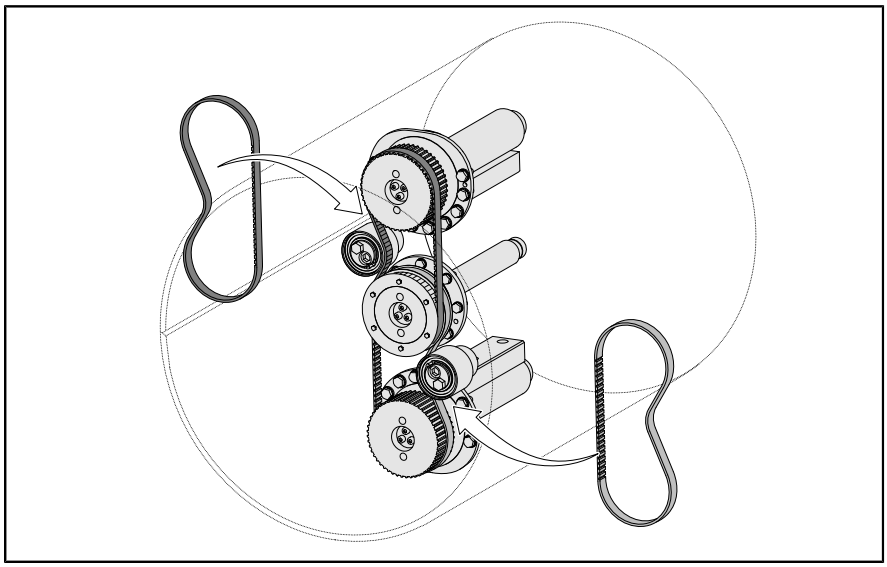
4.09.01 Checking the damping elements



- Switch off diesel engine and remove ignition key.
- Check the damping elements [1] of the roller drum suspension for cracks.
- Let replace damaged damping elements by new ones. Contact the customer service.

4.09.02 Replacing toothed belt for the oscillation drive

Only for roller drum with oscillation.



To avoid extended machine downtime, replace the toothed belts for the oscillation drive after 2000 operating hours or at least every 2 years.

This work may only be carried out by trained personnel.

Request assistance from customer services!

5 TABLES

When working at the machine please always adhere to the instructions given in your Safety instructions!

5.00 Technical data

5.00.01 Engine oil

NOTICE

Wrong engine oil!

Using the wrong engine oil damages the engine, increases wear, lowers operational reliability and shortens the service life of the engine.

- Use engine oil of the prescribed quality.
- Choose engine oil with a viscosity suitable for the operating temperature.
- Change the engine oil at the specified intervals!
- Do not mix different engine oils.

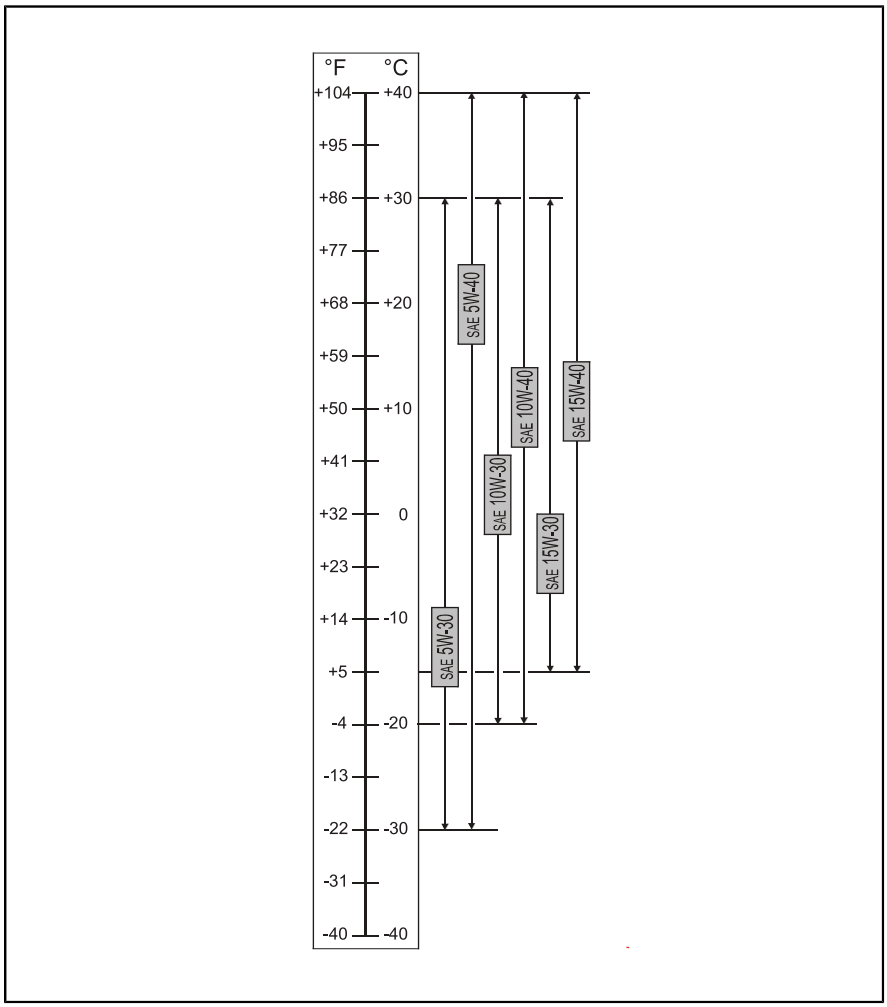
The lubricating oil quality (standard: API or ACEA) characterizes the properties of the lubricating oil. Lubricating oils below the prescribed quality limits must not be used.

In order to avoid damaging the engine, each lubricating oil must have the viscosity suitable for its intended use.

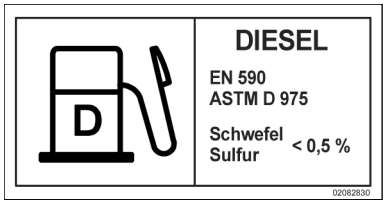
Lubricating oil viscosity is classified in SAE viscosity grades. The following diagram shows the SAE viscosity grades in relation to the operating temperature.

Select the engine oil suitable for your operating temperature. Take account of the SAE viscosity grades. Use multigrade oils for work in widely ranging temperatures.

The cold starting ability of the engine can suffer if the temperature falls below the limit for a short period.


°F
°C
+104
+95
+86
+77
+68
+59
+50
+41
+32
+23
+14
+5
-4
-13
-22
-31
-40
+40
+30
+20
+10
0
-10
-20
-30
-40
SAE 5W-30
SAE 5W-40
SAE 10W-30
SAE 10W-40
SAE 15W-30
SAE 15W-40

5.00.02 Fuel



Use only the diesel fuel commercially available which contains a sulphur content below 0.5 %. The engine oil replacement intervals specified here apply only for diesel fuel.

Approved diesel fuel specifications are:

- DIN EN 590
- ASTM D 975 Grade-No. 1-D and 2-D
- JIS K 2204 Grade 1 Fuel and Grade 2 Fuel, with lubricating properties corresponding to diesel fuel EN 590 (HFFR max. 460 micrometer in accordance with EN ISO 12156)

In case other fuels are used that do not comply with the afore mentioned requirements, we do not accept any guarantee.

With diesel fuels with a sulfur content over 0.5 % to 1.0 % or permanent ambient air temperatures below –10 °C (–14 °F) the change intervals of the motor oil need to be halved.

The certification measurements to measure the compliance with statutory emission limits are carried out using the test fuels specified by law. These test fuels correspond to the diesel fuels that comply with EN 590 and ASTM D 975, which are described in this operating manual. For all other fuels specified in this instruction manual we cannot guarantee any emission value.

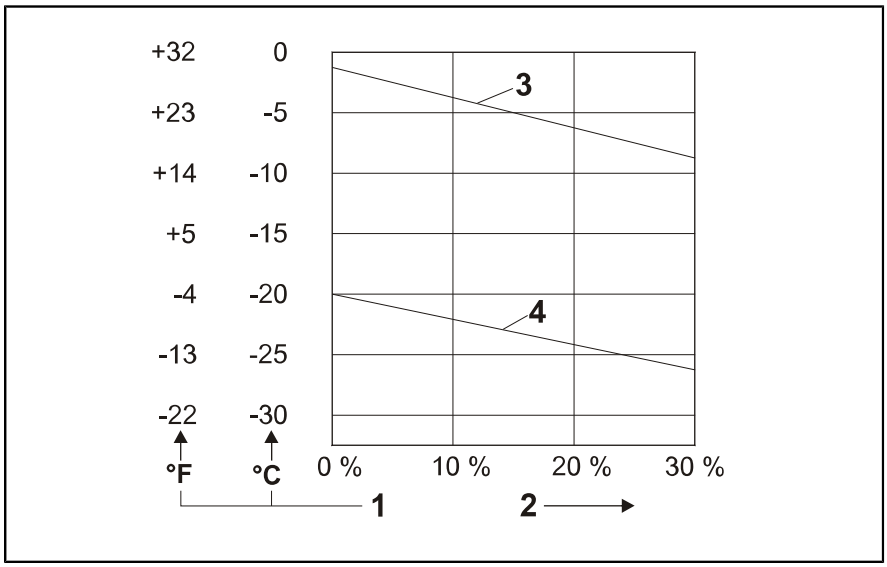
Winter operation with diesel fuel

NOTICE

Low operating temperature!

Congestions of the fuel system by paraffin excretions at low operating temperatures.

- Use winter diesel fuel for working at temperatures between 0 °C (32 °F) and –20 °C (–4 °F).
- For use below –20 °C (–4 °F) add petroleum according to manufacturer's instructions.
- Use special diesel fuels for working in arctic climatic zones with temperature down to –44 °C (–47 °F).



[1]	Exterior temperature	**[2]**	Admixture fraction engine petroleum
[3]	Summer diesel fuel	**[4]**	Winter diesel fuel

With lower ambient temperatures paraffin precipitations may result in congestions of the fuel system and, thus, in malfunctions.

- Below an ambient temperature of 0 °C (32 °F) it is necessary to use winter diesel fuel (up down –20 °C (–4 °F)) (gas stations provide them early enough prior to winter time).
- Below –20 °C (–4 °F) it is necessary to add engine petroleum. For the mixture ratios required please see diagram.
- For arctic climate zones up to –44 °C (–47 °F) it is possible to use special diesel fuels.

In case it is necessary to use summer diesel fuels below 0 °C (32 °F) , it is also possible to add engine petroleum up to 30 % as indicated in the diagram.

Sufficient cold resistance may be achieved by adding flow improver.

5.00.03 Cooling liquid (coolant)

NOTICE

Wrong coolant additives!

Using the wrong coolant additives damages or impairs the function of the cooling system.

- Only use coolant additives recommended by manufacturer.
- Only mix cooling system protecting agents/additives with the same specification.

If no coolant or the wrong coolant is used, liquid-cooled diesel engines may be damaged by corrosion, cavitation and freezing.

Continually check the coolant level and the concentration of the cooling system protecting agent in liquid-cooled diesel engines. Create the necessary concentration of cooling system protecting agent by adding a cooling system protecting agent to the cooling water. Check the

concentration of the cooling system protection agent with commercially available test devices (e.g. gefo glycomat®).

The concentration of the cooling system protection agent in the coolant must be as follows:

Crystallisation point	Cooling system protection agent	Water (distillate or completely demineralised)
–26 °C (–15 °F)	40 Vol.%	60 %
–37 °C (–34 °F)	50 Vol.%	50 %
–40 °C (–40 °F)	52 Vol.%	48 %

Wacker Neuson uses and recommends products that are free of nitrites, amines, silicates and phosphates. These are listed in the "Overview of service fluid specifications" section (see page 173). Wacker Neuson supplies all the machines filled with a coolant mixture of 50 parts cooling system protective agent and 50 parts water. This ensures frost protection down to –37 °C (–34 °F).

5.00.04 Hydraulic oil (mineral oil)

NOTICE

Wrong hydraulic oils!

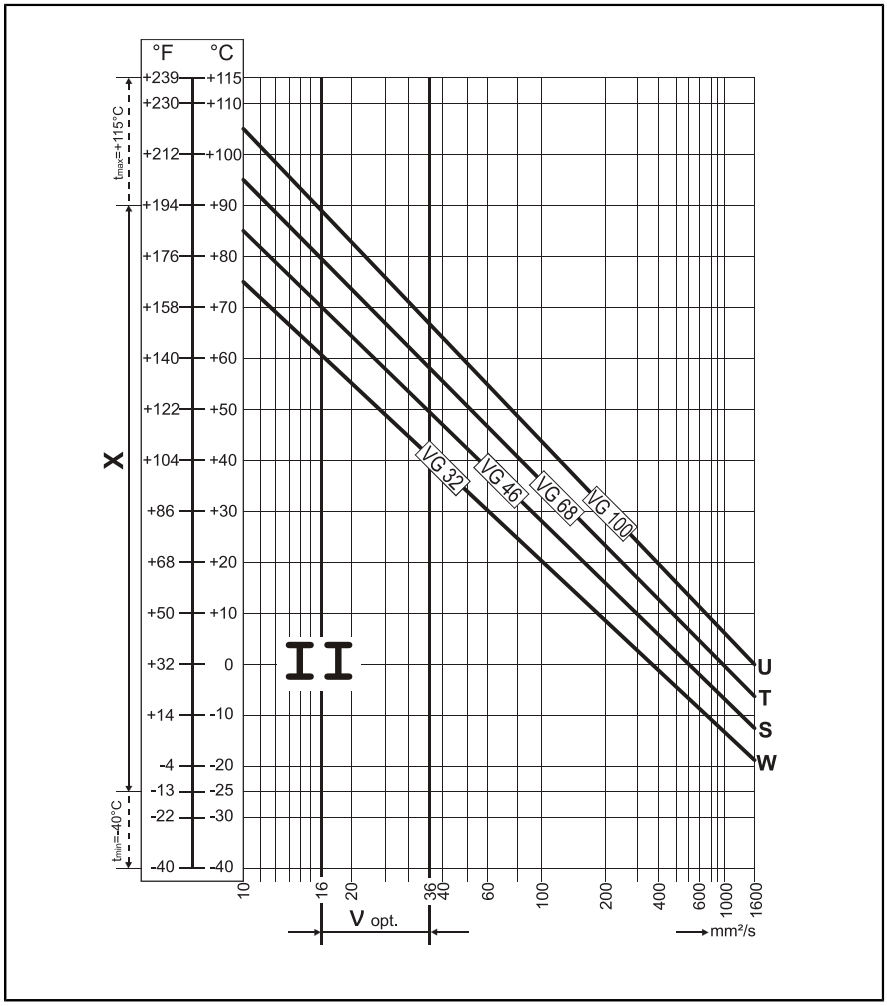
Using the wrong hydraulic oils can damage or impair the function of the hydraulic system.

- Only use hydraulic oils recommended by manufacturer.
- Use only hydraulic oil with a viscosity appropriate for the working temperature.
- Only mix hydraulic oils with the same specification.

In order to avoid damaging the hydraulic system, each hydraulic oil must have the viscosity appropriate for its intended use.

The viscosity of hydraulic oil is classified in viscosity grades. The following diagram shows the viscosity grades as a function of the ambient temperature.

Select the hydraulic oil suitable for your ambient temperature. Take account of the viscosity grades.



[W] Winter conditions in Central Europe
[S] Summer conditions in Central Europe or in enclosed premises
[T] Tropical conditions or in premises subject to high amounts of heat

[U]	Excessive amounts of heat (for example from combustion engines)
[X]	Pressure fluid temperature range
[V_{opt}]	Optimal operating viscosity range
[1000 =]	Maximum permissible (short-term) viscosity
[II =]	100 mm^2/s (t_{max} = +90 °C) ... 1000 mm^2/s (t_{min} = –25 °C)

5.00.05 Biodegradable hydraulic oil

NOTICE

Wrong hydraulic oils!

Using the wrong hydraulic oils can damage or impair the function of the hydraulic system.

- Only use hydraulic oils recommended by manufacturer.
- Use only hydraulic oil with a viscosity appropriate for the working temperature.
- Only mix hydraulic oils with the same specification.

The hydraulic system of the machine is supplied filled with mineral oil. All maintenance intervals in this maintenance manual relate to mineral oil.

Bio-hydraulic oil may be used under the following conditions:

- Use only bio-hydraulic oil based on special synthetic, saturated, complex esters. The products used and recommended by the manufacturer are listed in the "Overview of service fluid specifications" section (see page 173). Use other oils only if they meet the specifications of the oil mentioned above. The neutralisation value (oil acidity) must not exceed 2.
- When switching from bio-hydraulic oil to mineral oil or from mineral oil to bio-hydraulic oil, all filters in the oil circuit must be changed again after 50 operating hours.
  Then comply with the filter change intervals stated in this manual.
- Take old bio-oil and mineral oil to a reliable disposal centre.
- Bio-hydraulic fluid is easily biodegradable.

5.00.06 Overview of lubricant details

Lubricant details

Lubricant	Quality	Viscosity	Identification
Engine oil The oil quality must correspond to the API/ACEA classification.	API: CG-4 or higher ACEA: E5-02 or higher	See diagram	□
Hydraulic oil (mineral oil) The viscosity is defined in accordance with ISO 3448 (ISO-VG: Viscosity grade).	HVLP	**Conditions** ISO VG 22 arctic ISO VG 32 winter ISO VG 46 summer ISO VG 68 tropical ISO VG 100 extreme heat	▭
Hydraulic oil (bio-hydraulic oil) Synthetic saturated ester (ISO-VG: Viscosity grade).	HEES		
Special oil Use only Wacker Neuson special oil.			◇
Special oil Use only Wacker Neuson special oil.			☆
Transmission oil with limited slip additives. The oil quality must meet the API classification.	API GL-5	SAE 85W-90	⬡
Coolant for diesel engine, liquid-cooled (free of nitrite, amine and phosphate). Mixture: 40% coolant concentrate, 60% water.			○
Grease Lithium saponified multi-purpose grease with high-pressure additives. Temperature application range from –25 °C (–13 °F) to +120 °C (248 °F).			△

5.00.07 Starting torques

The starting torques indicated within the tables apply to

- nuts and screws with headrest according to ISO 4014, 4032, 4762... (frictional coefficient μ_{total}=0.095) unless otherwise specified.

Check the tightening torques of nuts and bolts at regular intervals. Tighten if necessary.

Starting torques for regular type screw threads

Threads (wrench size SW)	Starting torques MA (Nm)		
	8.8	**10.9**	**12.9**
M4 (SW7)	2.7	4.0	4.7
M5 (SW8)	5.5	8.1	9.5
M6 (SW10)	9.5	14	16.5
M8 (SW13)	21	30	36
M10 (SW16)	41	60	71
M12 (SW18)	71	104	122
M14 (SW21)	113	165	195
M16 (SW24)	175	255	300
M18 (SW27)	250	355	420
M20 (SW30)	350	500	580
M22 (SW34)	480	680	800
M24 (SW36)	600	860	1000
M27 (SW41)	880	1260	1470
M30 (SW46)	1200	1700	2000

Starting torques for fine threads

Threads (wrench size)	Starting torques MA (Nm)		
	8.8	**10.9**	**12.9**
M8x1 (SW13)	22	32	38
M10x1.25 (SW16)	43	63	74
M12x1.25 (SW18)	76	111	130
M12x1.5 (SW18)	73	108	126
M14x1.5 (SW21)	120	175	205
M16x1.5 (SW24)	183	265	315
M18x1.5 (SW27)	270	390	455
M20x1.5 (SW30)	380	540	630
M22x1.5 (SW34)	510	725	850
M24x2 (SW36)	640	910	1070
M27x2 (SW41)	930	1330	1550
M30x2 (SW46)	1300	1840	2150

5.01 Technical data

The version valid at the time the technical data was prepared for this version of the manual was used (see impressum: change date). Other values may apply if modifications are made to the machine in the course of its further development.

5.01.01 RD24-100

Designation	Value	Unit
Dimensions and weights		
Unladen weight without ROPS roll-over bar	2234	kg
Operating weight with ROPS roll-over bar	2475	kg
Front/rear axle load	1205/1270	kg
Working width/max. working width	1000/1050	mm
Inside/outside turning radius	2470/3470	mm
Diesel engine		
Manufacturer	Kubota	
Type	D1503	
Number of cylinders	3	
Power (ISO 14396)/nominal speed	22.9/2700	kW/rpm
EU/USA exhaust emissions standard	III A/–	
Carbon dioxide emissions (CO_2)(1)	797	g/kWh
Transmission		
Working gear speed	0–12.0/(0–7.5)	km/h/(mph)
Hill climbing ability, vibration on/off	30/40	%
Max. longitudinal gradient allowed	20	°
Max. transverse gradient allowed	20	°
Vibration		
Vibration	front/rear	
Frequency/speed, max. engine speed	67/4020	Hz/rpm
Frequency/speed, max. engine speed 2/3	52/3120	Hz/rpm
Max. amplitude	0.45	mm
Steering		
Steering lock to both sides	32	°
Pendulum compensation upwards and downwards	8	°
Track offset		
Track offset to the right	50	mm
Filling quantities		
Fuel	42.00	l
Engine oil (for oil change)	7.00	l
Diesel engine coolant	8.00	l
Hydraulic oil	26.00	l

Designation	Value	Unit
Water sprinkling system	180.00	l
Sound power level		
Sound power level L_{WA}, guaranteed	106	dB(A)
Sound power level L_{WA}, representative measurement	104	dB(A)
Emissions sound pressure level at the driver's seat		
Sound pressure level L_{pA}, measured with cab, max.	Not available	
Sound pressure level L_{pA}, measured with ROPS, max.	90	dB(A)
Electrical system		
Operating voltage	12	V

5.01.02 RD24-100o

Designation	Value	Unit
Dimensions and weights		
Unladen weight without ROPS roll-over bar	2284	kg
Operating weight with ROPS roll-over bar	2525	kg
Front/rear axle load	1205/1320	kg
Working width/max. working width	1000/1050	mm
Inside/outside turning radius	2470/3470	mm
Diesel engine		
Manufacturer	Kubota	
Type	D1503	
Number of cylinders	3	
Power (ISO 14396)/nominal speed	22.9/2700	kW/rpm
EU/USA exhaust emissions standard	III A/-	
Carbon dioxide emissions (CO_2)[1]	797	g/kWh
Transmission		
Working gear speed	0–12.0/(0–7.5)	km/h/(mph)
Hill climbing ability with/without dynamic compaction system	30/40	%
Max. longitudinal gradient allowed	20	°
Max. transverse gradient allowed	20	°
Vibration		
Vibration	front	
Frequency/speed, max. engine speed	67/4020	Hz/rpm
Frequency/speed, max. engine speed 2/3	52/3120	Hz/rpm
Max. amplitude	0.45	mm
Oscillation		
Oscillation	rear	
Frequency/speed, max. engine speed	39/2340	Hz/rpm
Frequency/speed, max. engine speed 2/3	30/3000	Hz/rpm
Tangential amplitude	1.34	mm
Steering		
Steering lock to both sides	32	°
Pendulum compensation upwards and downwards	8	°
Track offset		
Track offset to the right	50	mm
Filling quantities		
Fuel	42.00	l
Engine oil (for oil change)	7.00	l
Diesel engine coolant	8.00	l
Hydraulic oil	26.00	l

Designation	Value	Unit
Water sprinkling system	180.00	l
Sound power level		
Sound power level L_{WA}, guaranteed	106	dB(A)
Sound power level L_{WA}, representative measurement	104	dB(A)
Emissions sound pressure level at the driver's seat		
Sound pressure level L_{pA}, measured with cab, max.	Not available	
Sound pressure level L_{pA}, measured with ROPS, max.	90	dB(A)
Electrical system		
Operating voltage	12	V

5.01.03 RD24-100C

Designation	Value	Unit
Dimensions and weights		
Unladen weight without ROPS roll-over bar	2134	kg
Operating weight with ROPS roll-over bar	2385	kg
Front/rear axle load	1210/1175	kg
Axle load per tyre	293.75	kg
Working width/max. working width	1000/1050	mm
Inside/outside turning radius	2470/3470	mm
Diesel engine		
Manufacturer	Kubota	
Type	D1503	
Number of cylinders	3	
Power (ISO 14396)/nominal speed	22.9/2700	kW/rpm
EU/USA exhaust emissions standard	III A/–	
Carbon dioxide emissions (CO_2)(1)	797	g/kWh
Transmission		
Working gear speed	0–12.0/(0–7.5)	km/h/(mph)
Hill climbing ability, vibration on/off	30/40	%
Max. longitudinal gradient allowed	20	°
Max. transverse gradient allowed	20	°
Tyres		
Tyre size	205/60-R15	
Number of tyres at rear	4	items
Tyre weight	30	kg
Air pressure	0.3/(3.0)/[44]	MPa/(bar)/[psi]
Wheel nut tightening torque	170	Nm
Vibration		
Vibration	front	
Frequency/speed, max. engine speed	67/4020	Hz/rpm
Frequency/speed, max. engine speed 2/3	52/3120	Hz/rpm
Max. amplitude	0.45	mm
Steering		
Steering lock to both sides	32	°
Pendulum compensation upwards and downwards	8	°
Track offset		
Track offset to the right	50	mm
Filling quantities		
Fuel	42.00	l
Engine oil (for oil change)	7.00	l

Designation	Value	Unit
Diesel engine coolant	8.00	l
Hydraulic oil	26.00	l
Water sprinkling system	180.00	l
Additive sprinkling system	18.00	l
Sound power level		
Sound power level L_{WA}, guaranteed	106	dB(A)
Sound power level L_{WA}, representative measurement	104	dB(A)
Emissions sound pressure level at the driver's seat		
Sound pressure level L_{pA}, measured with cab, max.	Not available	
Sound pressure level L_{pA}, measured with ROPS, max.	90	dB(A)
Electrical system		
Operating voltage	12	V

5.01.04 RD27-120

Designation	Value	Unit
Dimensions and weights		
Unladen weight without ROPS roll-over bar	2454	kg
Operating weight with ROPS roll-over bar	2695	kg
Front/rear axle load	1335/1360	kg
Working width/max. working width	1200/1250	mm
Inside/outside turning radius	2370/3570	mm
Diesel engine		
Manufacturer	Kubota	
Type	D1503	
Number of cylinders	3	
Power (ISO 14396)/nominal speed	22.9/2700	kW/rpm
EU/USA exhaust emissions standard	III A/–	
Carbon dioxide emissions (CO_2)[1]	797	g/kWh
Transmission		
Working gear speed	0–12.0/(0–7.5)	km/h/(mph)
Hill climbing ability, vibration on/off	30/40	%
Max. longitudinal gradient allowed	20	°
Max. transverse gradient allowed	20	°
Vibration		
Vibration	front/rear	
Frequency/speed, max. engine speed	67/4020	Hz/rpm
Frequency/speed, max. engine speed 2/3	52/3120	Hz/rpm
Max. amplitude	0.45	mm
Steering		
Steering lock to both sides	32	°
Pendulum compensation upwards and downwards	8	°
Track offset		
Track offset to the right	50	mm
Filling quantities		
Fuel	42.00	l
Engine oil (for oil change)	7.00	l
Diesel engine coolant	8.00	l
Hydraulic oil	26.00	l
Water sprinkling system	180.00	l
Sound power level		
Sound power level L_{WA}, guaranteed	106	dB(A)
Sound power level L_{WA}, representative measurement	104	dB(A)
Emissions sound pressure level at the driver's seat		

Designation	Value	Unit
Sound pressure level L_{pA}, measured with cab, max.	Not available	
Sound pressure level L_{pA}, measured with ROPS, max.	90	dB(A)
Electrical system		
Operating voltage	12	V

5.01.05 RD27-120o

Designation	Value	Unit
Dimensions and weights		
Unladen weight without ROPS roll-over bar	2514	kg
Operating weight with ROPS roll-over bar	2755	kg
Front/rear axle load	1335/1420	kg
Working width/max. working width	1200/1250	mm
Inside/outside turning radius	2370/3570	mm
Diesel engine		
Manufacturer	Kubota	
Type	D1503	
Number of cylinders	3	
Power (ISO 14396)/nominal speed	22.9/2700	kW/rpm
EU/USA exhaust emissions standard	III A/-	
Carbon dioxide emissions (CO_2)[1]	797	g/kWh
Transmission		
Working gear speed	0–12.0/(0–7.5)	km/h / (mph)
Hill climbing ability with/without dynamic compaction system	30/40	%
Max. longitudinal gradient allowed	20	°
Max. transverse gradient allowed	20	°
Vibration		
Vibration	front	
Frequency/speed, max. engine speed	67/4020	Hz/rpm
Frequency/speed, max. engine speed 2/3	52/3120	Hz/rpm
Max. amplitude	0.45	mm
Oscillation		
Oscillation	rear	
Frequency/speed, max. engine speed	39/2340	Hz/rpm
Frequency/speed, max. engine speed 2/3	30/3000	Hz/rpm
Tangential amplitude	1.14	mm
Steering		
Steering lock to both sides	32	°
Pendulum compensation upwards and downwards	8	°
Track offset		
Track offset to the right	50	mm
Filling quantities		
Fuel	42.00	l
Engine oil (for oil change)	7.00	l
Diesel engine coolant	8.00	l
Hydraulic oil	26.00	l

Designation	Value	Unit
Water sprinkling system	180.00	l
Sound power level		
Sound power level L_{WA}, guaranteed	106	dB(A)
Sound power level L_{WA}, representative measurement	104	dB(A)
Emissions sound pressure level at the driver's seat		
Sound pressure level L_{pA}, measured with cab, max.	Not available	
Sound pressure level L_{pA}, measured with ROPS, max.	90	dB(A)
Electrical system		
Operating voltage	12	V

5.01.06 RD27-120c

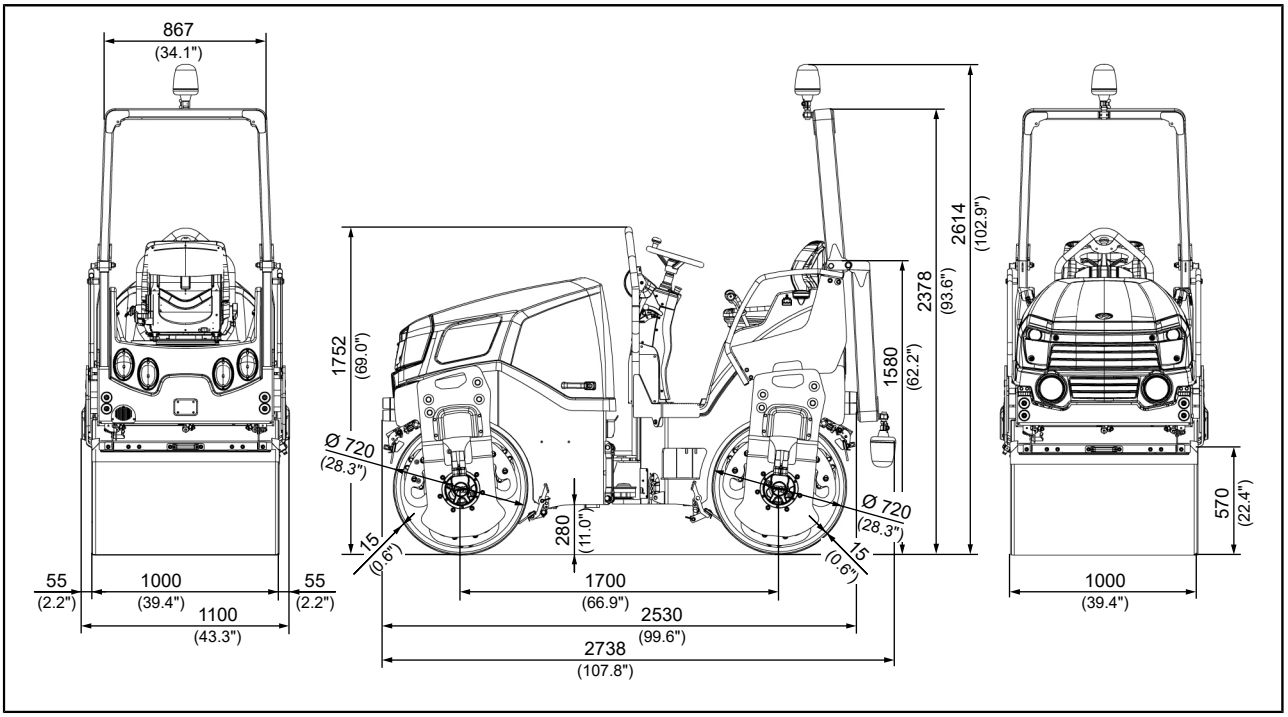
Designation	Value	Unit
Dimensions and weights		
Unladen weight without ROPS roll-over bar	2344	kg
Operating weight with ROPS roll-over bar	2595	kg
Front/rear axle load	1340/1255	kg
Axle load per tyre	313.75	kg
Working width/max. working width	1200/1220	mm
Inside/outside turning radius	2370/3570	mm
Diesel engine		
Manufacturer	Kubota	
Type	D1503	
Number of cylinders	3	
Power (ISO 14396)/nominal speed	22.9/2700	kW/rpm
EU/USA exhaust emissions standard	III A/-	
Carbon dioxide emissions (CO_2) (1)	797	g/kWh
Transmission		
Working gear speed	0–12.0/(0–7.5)	km/h / (mph)
Hill climbing ability, vibration on/off	30/40	%
Max. longitudinal gradient allowed	20	°
Max. transverse gradient allowed	20	°
Tyres		
Tyre size	9.5/65–15	
Number of tyres at rear	4	items
Tyre weight	45	kg
Air pressure	0.3/(3.0)/[44]	MPa/(bar)/[psi]
Wheel nut tightening torque	170	Nm
Vibration		
Vibration	front	
Frequency/speed, max. engine speed	67/4020	Hz/rpm
Frequency/speed, max. engine speed 2/3	52/3120	Hz/rpm
Max. amplitude	0.45	mm
Steering		
Steering lock to both sides	32	°
Pendulum compensation upwards and downwards	8	°
Track offset		
Track offset to the right	50	mm
Filling quantities		
Fuel	42.00	l
Engine oil (for oil change)	7.00	l

Designation	Value	Unit
Diesel engine coolant	8.00	l
Hydraulic oil	26.00	l
Water sprinkling system	180.00	l
Additive sprinkling system	18.00	l
Sound power level		
Sound power level L_{WA}, guaranteed	106	dB(A)
Sound power level L_{WA}, representative measurement	104	dB(A)
Emissions sound pressure level at the driver's seat		
Sound pressure level L_{pA}, measured with cab, max.	Not available	
Sound pressure level L_{pA}, measured with ROPS, max.	90	dB(A)
Electrical system		
Operating voltage	12	V

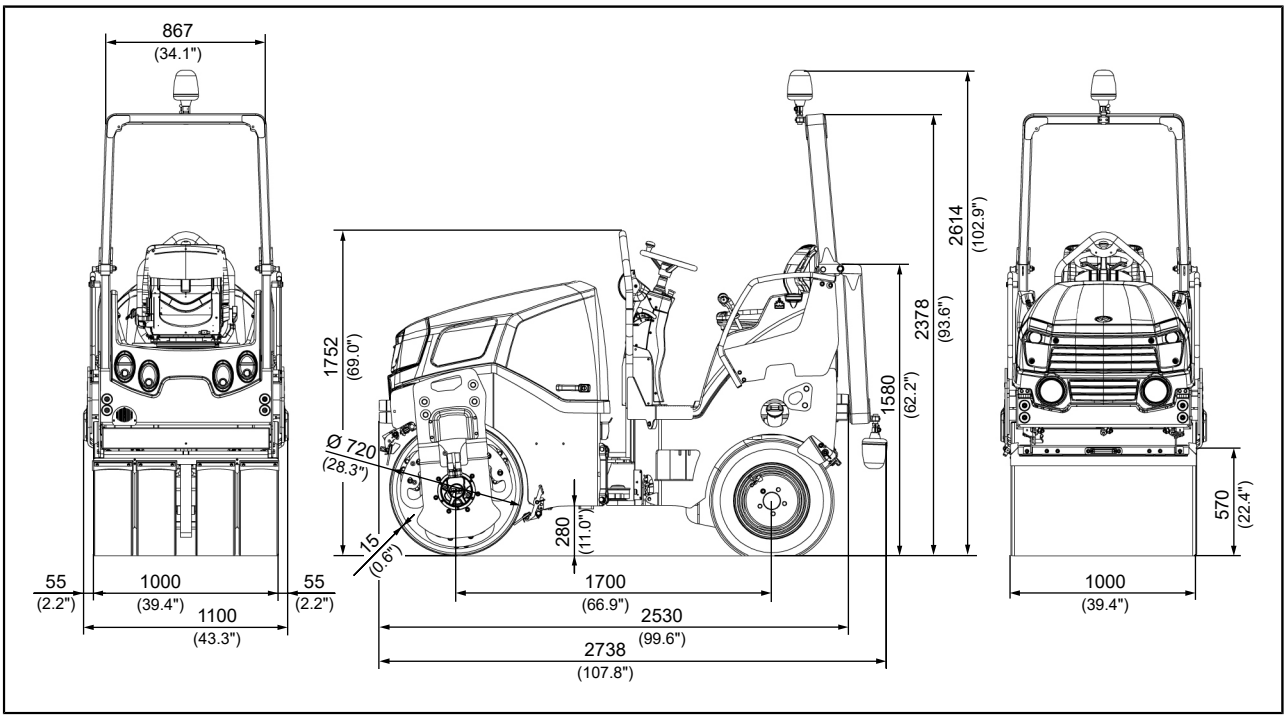
(1) This CO_2 measurement is the result of testing a (parent) engine that is representative of the engine type or the engine family in a fixed test cycle under laboratory conditions, and it does not represent an explicit or implicit guarantee for the performance of a specific engine.

5.02 Dimension sheet

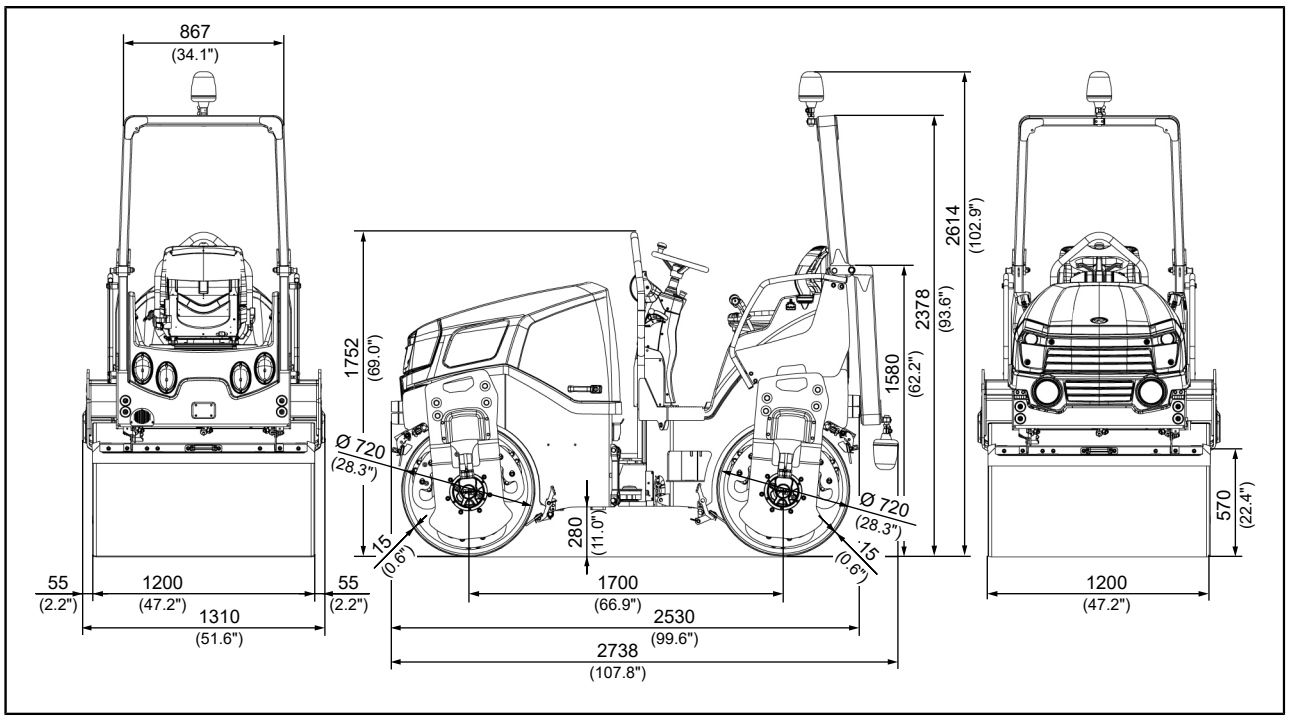
5.02.01 RD24-100, RD24-100o



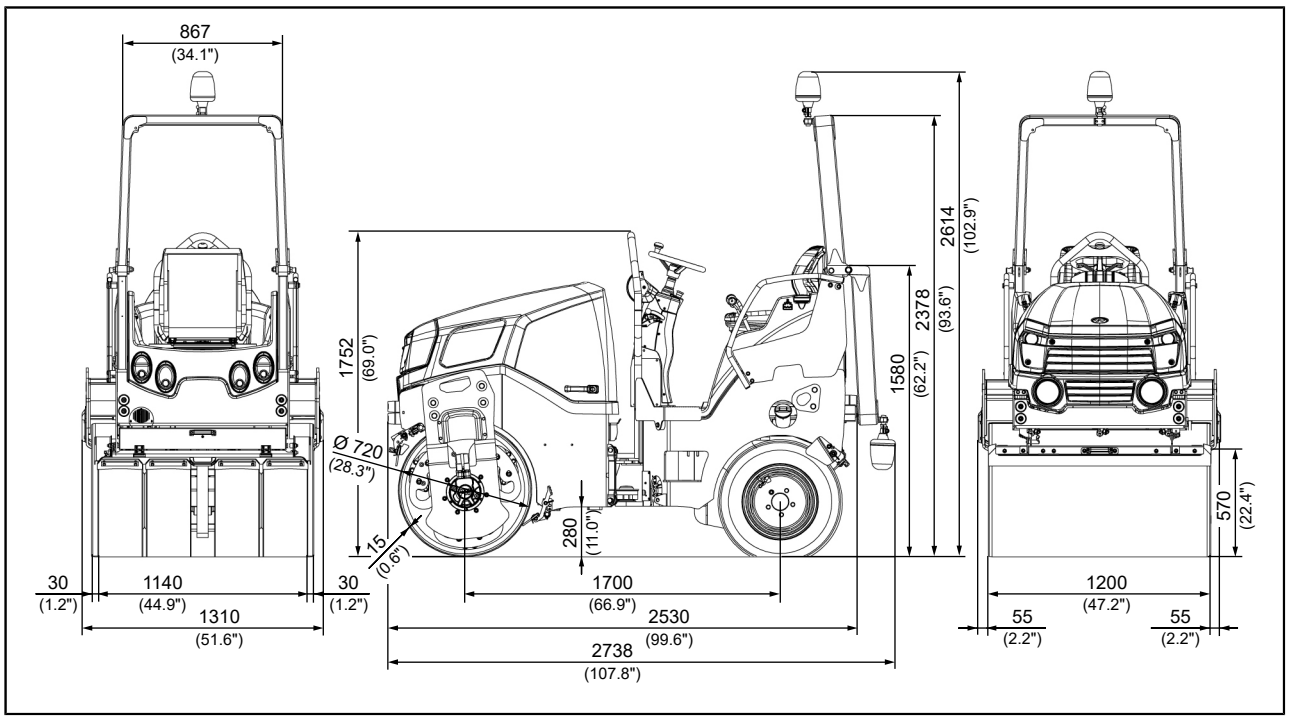
5.02.02 RD24-100c



5.02.03 RD27-120, RD27-120o



5.02.04 RD27-120c



5.03 Fuses

⚠ WARNING

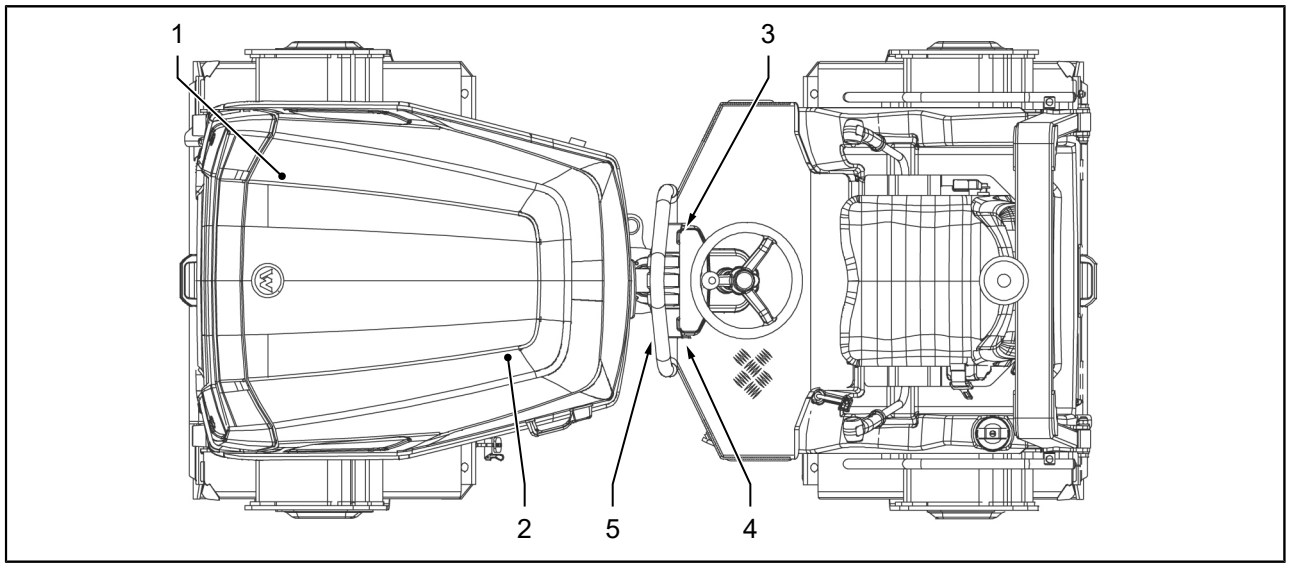
Fire in the machine electrical system!

Serious injuries or death or material damage as a result of fire caused by using fuses not meeting specifications.

- Only use fuses specified by the manufacturer (not fuses with a higher amperage).
- Do not bridge fuses.

The fuse assignment indicates a fully equipped machine. Depending on the machine configuration (special attachments), slots are correspondingly free or occupied by fuses.

Please follow the fuse assignment shown on the adhesive label in the engine compartment.



[1] Main fuses
[2] Option 1
[3] Central electrical system
[4] Central electrical system/option 2
[5] Option 3

5.03.01 Engine compartment

[1] Main fuses

Position	Fuse assignment	Fuse
F01	Internal power supply	80 A
F02	not used	
F03	not used	
F04	not used	

[2] Options 1

Position	Fuse assignment	Fuse
F200	Engine rpm counter|engine revolution counter	5 A

5.03.02 Steering column

[3] Central electrical system

Position	Fuse assignment	Fuse
F1	All-wheel lock	5 A
F2	Time relay cold start assistance	1 A
F3	Drum edge lighting	15 A
F4	Driving light, left	10 A
F5	Driving light, right	10 A
F6	Reversing lights	15 A
F7	Working spotlight	15 A
F8	Pilot light cold start assistance	5 A
F9	Edge pressing and cutting assembly (KAG), switching between left-hand and right-hand side	5 A
F10	Pedal switch sprinkling	15 A
F11	Pedal switch additive sprinkling, seat heating	15 A
F12	WIFMS Gateway	10 A
F13	Socket	15 A
F14	Signal horn	15 A
F15	Additive sprinkling pump	15 A
F16	Water sprinkling pump	15 A
F17	Rotary beacon	15 A
FT	Plug-in socket for fuse test	

You can use the fusible test receptacle to check a fuse.
The green light-emitted diode (LED) lights up when the fuse is functional.

[4] Central electrical system/options 2

Position	Fuse assignment	Fuse
F18	Reversing alarm	15 A
F19	Fuel pump, generator	7.5 A
F20	TCU (terminal 15)	7.5 A
F21	TCU (terminal 30)	7.5 A
F41	Diagnostic interface WIDIAG	7.5 A
F42	Seat belt buckle monitoring device	5 A

5.03.03 Dashboard/control panel

[5] Options 3

Position	Fuse assignment	Fuse
F40	HCM, HTM	7.5 A
F401	Track Unit (terminal 30)	7.5 A
F402	Track Unit (terminal 15)	7.5 A

5.04 Diagnostic Code

The original operator control panel of the series has been adapted and enlarged in part in order to improve operator control and functional checks for different pieces of add-on equipment,

In some cases, this may lead to changes in operator control sequences and procedures. They are described in the instructions.

Please check which operator control panel is installed in your machine.

5.04.01 Standard design

Code No	Component	Possible cause
00		No malfunction
01	Reverse light control	Short-circuit
02	Reverse light control	Open lines
03	Left working spotlights left control	Short-circuit
04	Left working spotlights left control	Defective
05	Right working spotlights right control	Short-circuit
06	Right working spotlights right control	Defective
07	Drum edge lighting control	Short-circuit
08	Drum edge lighting control	Defective
09	Pump additive irrigation control	Short-circuit
10	Pump additive irrigation control	Defective
11	Left driving light control	Short-circuit
12	Left driving light control	Defective
13	Right driving light control	Short-circuit
14	Right driving light control	Defective
15	Solenoid valve KAG up and solenoid valve KAG down control	Open lines, defective
16	Lift KAG solenoid valve activation	Short-circuit
17	Solenoid valve KAG down control	Short-circuit
18	Solenoid valve vibration rear or solenoid valve amplitude	Open lines, defective
19	Solenoid valve vibration rear	Short-circuit
20	Large solenoid valve amplitude	Short-circuit
21	Emergency stop solenoid valve or front vibration solenoid valve	Open lines, defective
22	Solenoid valve EMERGENCY STOP	Short-circuit
23	Solenoid valve vibration front	Short-circuit
24	Parking brake	Short-circuit, line break
25	Control rotating light	Open lines
26	Control rotating light	Short-circuit
27	Control Pump water irrigation	Open lines
28	Control Pump water irrigation	Short-circuit

Code No	Component	Possible cause
29	Generator exciter circuit	Short-circuit, line break
30	Parking light	Defective
31	Engine direction of travel monitoring	Diesel engine running/run in reverse

5.04.02 Version with add-on equipment

Code No	Component	Possible cause
100	Driving light	Open lines, short-circuit
102	Rotary beacon	Open lines, short-circuit
103	Additive sprinkling pump	Open lines, short-circuit
104	Drum edge lighting	Open lines, short-circuit
105	Reverse light	Open lines, short-circuit
106	Water sprinkling pump	Open lines, short-circuit
107	Signal horn	Open lines, short-circuit
110	Working spotlights left	Open lines, short-circuit
111	Working spotlights right	Open lines, short-circuit
112	Shut-down solenoid	Open lines, short-circuit
113	Starting relay	Open lines, short-circuit
114	Solenoid valve vibration rear	Open lines, short-circuit
116	Alert buzzer	Open lines, short-circuit
117	Drive pump	Open lines, short-circuit
118	Flashing lights left	Open lines, short-circuit
119	Parking light left	Open lines, short-circuit
120	Solenoid valve KAG down	Open lines, short-circuit
121	Solenoid valve KAG up	Open lines, short-circuit
122	Parking brake	Open lines, short-circuit
123	Solenoid valve vibration front	Open lines, short-circuit
124	Reversing alarm	Open lines, short-circuit
125	all-wheel lock	Open lines, short-circuit
126	Parking light, right	Open lines, short-circuit
127	Flashing lights right	Open lines, short-circuit
128	Water sprinkling	Internal plausibility error
129	Front or rear vibration solenoid valve	Internal plausibility error
160	Machine CAN bus	Internal plausibility error
161	Internal memory	Internal plausibility error
164	Hydraulic oil pressure or temperature sensor	Short-circuit, mechanical defect
165	Drive lever	Implausible signal
166	Start conditions	Implausible signal
600	HCM	Defective

6 AUXILIARY EQUIPMENT

The section describes the mounting and dismounting, operation and maintenance of special attachments.

Please consider the parts included in the scope of supply. They may be different from the parts list content indicated here due to further developments in the product.

Safety Instructions

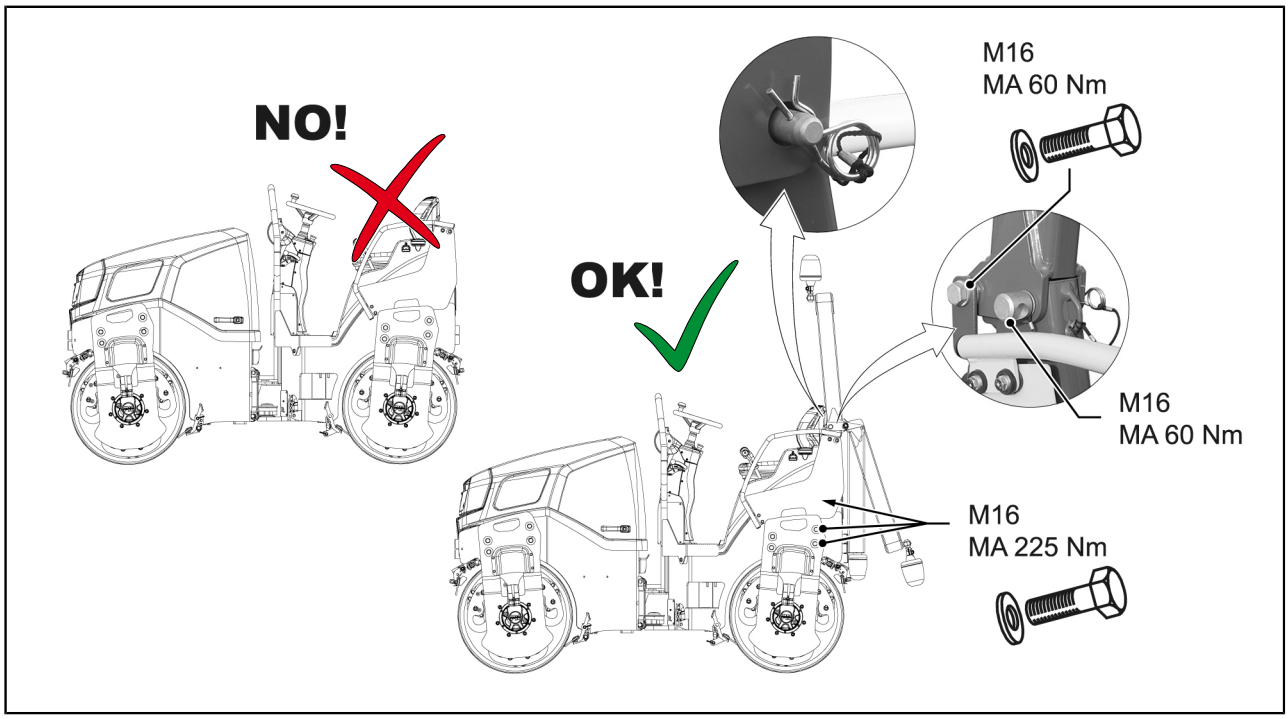
The "Special attachments" section describes components of the machine, that can be operated in addition to the equipment previously described in the manual.

For the special attachments, observe **ALL** the general warning and safety notices listed in the Operation and Maintenance chapter.

- "Important information about operating the machine"
- "Important information about maintenance works"

When working at the machine please always adhere to the instructions given in your Safety instructions!

6.00 Roll-over protection structure (ROPS)



The ROPS safety device (cab/roll-over bar) is a rollover protection structure in the case the machine tilts or rolls over. It avoids that the driver is crushed to death based on the high self-weight of the machine.

If the ROPS safety equipment is dismounted from the machine for transport or repair, it must be remounted according to specifications before the machine is used again.

⚠ WARNING

High self-weight of machine!

If the machine overturns backwards, forwards or sideways there is a danger of serious injuries or death.

- Operate machine only with the ROPS safety device installed according to instructions and while wearing the safety belt.
- With detectable defects of the ROPS safety device or of its fixation it is not allowed to operate the machine.

Installation

⚠ WARNING

High self-weight of ROPS safety device!

Serious injuries or death caused by crushing or getting caught during assembly.

- Perform installation work on firm ground (flat, stable, horizontal).
- Carry out fitting work only when the engine is stopped.
- Use suitable load suspension and hitching gear with an adequate loading capacity.
- Do not step underneath suspended loads.

Observe the service manual for mounting the ROPS safety equipment.

- Use appropriate lifting devices and hoisting equipment. Observe weight (see type plate of ROPS safety device).
- Lift ROPS safety device onto platform and align with fixing holes.
- Screw ROPS safety device with operator platform. Observe specified starting torque values.

With a ROPS design (hinged:

- Turn up and screw the upper frame part with threaded studs. Apply the specified tightening torque.
- Secure the threaded stud with a spring cotter pin.

Visual test

The machine frame must not be warped, bent or cracked in the ROPS fixing area (deformation).

The reinforcement elements of the ROPS safety device must not show rust, damage, fissures or open fractures.

All screw connections of the reinforcement elements must comply with the given specifications and must be screwed tightly to each other (observe starting torque values). Bolts and nuts must not be damaged, bent or deformed.

It is absolutely forbidden to modify or repair/level the reinforcement elements in any way.

6.01 Falling-object protective structure (FOPS)

The FOPS safety equipment is a design that prevents the driver from being injured by falling objects.

If available, the FOPS safety equipment is integrated into the cabin roof, sunroof or weather-protection roof, depending on the machine's equipment. The FOPS material number is then shown on the ROPS type plate.

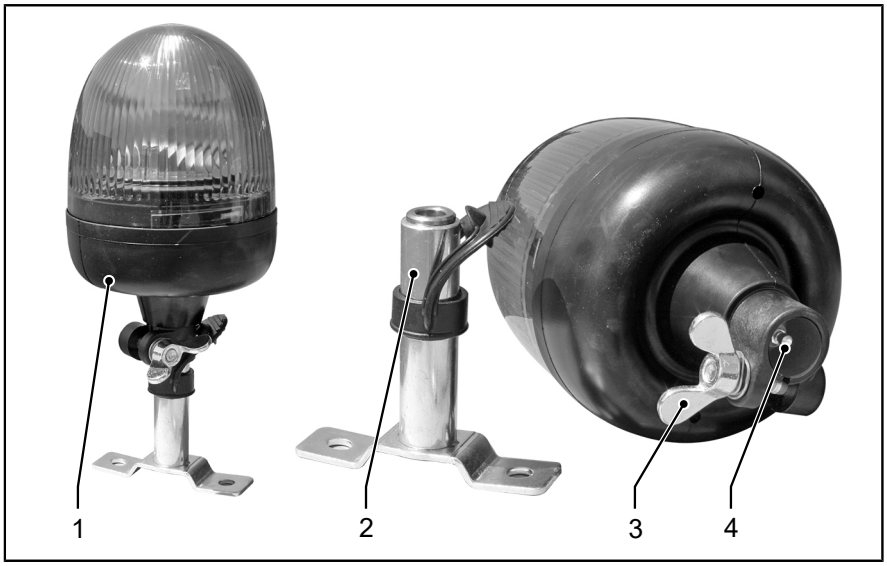
If a design with FOPS safety equipment is dismounted from the machine for transport or repair, it must be remounted according to specifications before the machine is used again.

Installation

A damaged FOPS component must only be installed or replaced by specialist personnel who are trained to do so. Inform customer service.

6.02 Rotating beacon

6.02.01 Overview



[1]	Rotating light mounted	**[2]**	Contact tube
[3]	Clamping screw	**[4]**	Plug contact

6.02.02 Description

The rotating beacon is an orange warning light that radiates light over a 360° area.

A switched on rotating beacon visual identifies, marks and safeguards danger areas.

6.02.03 Mounting/Dismounting

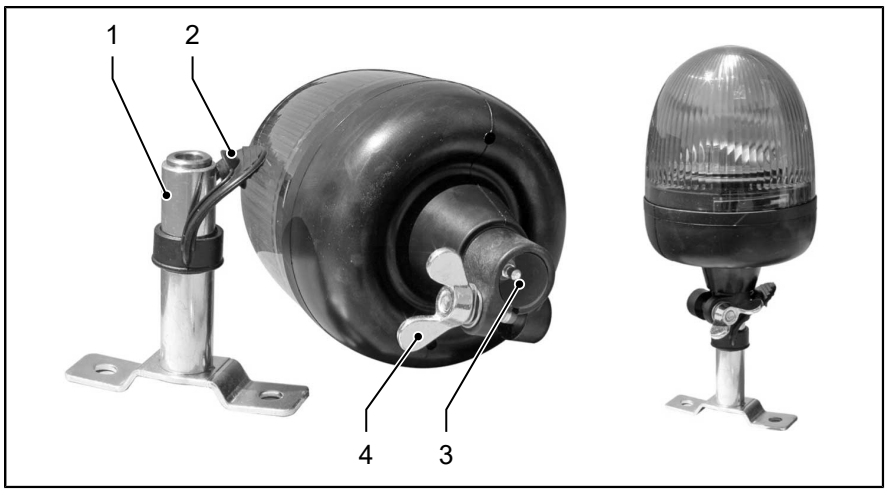
⚠ WARNING

Work above floor level!

Risk of injury caused by falling.

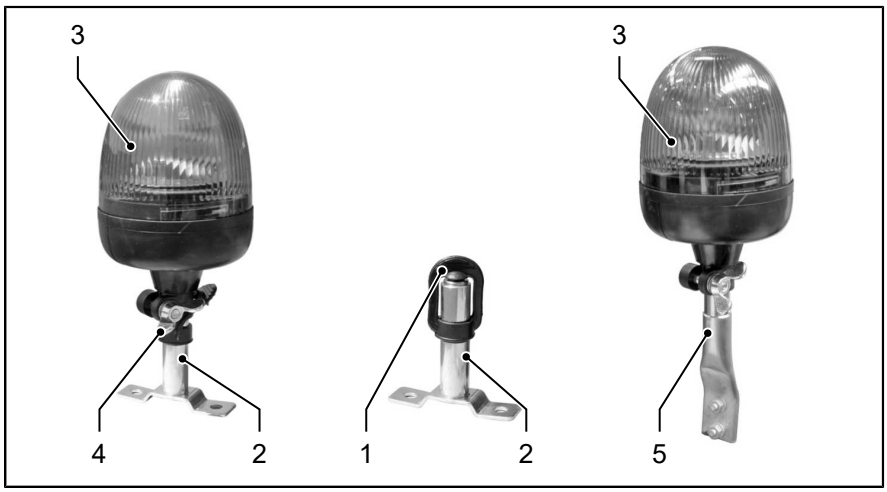
- All work above floor level must only be carried out using a stable ladder or on maintenance scaffolding.
- To reach the maintenance points on the machine, use the designated steps and treads. Do not step on any other machine element or add-on part.

Mounting rotating beacon



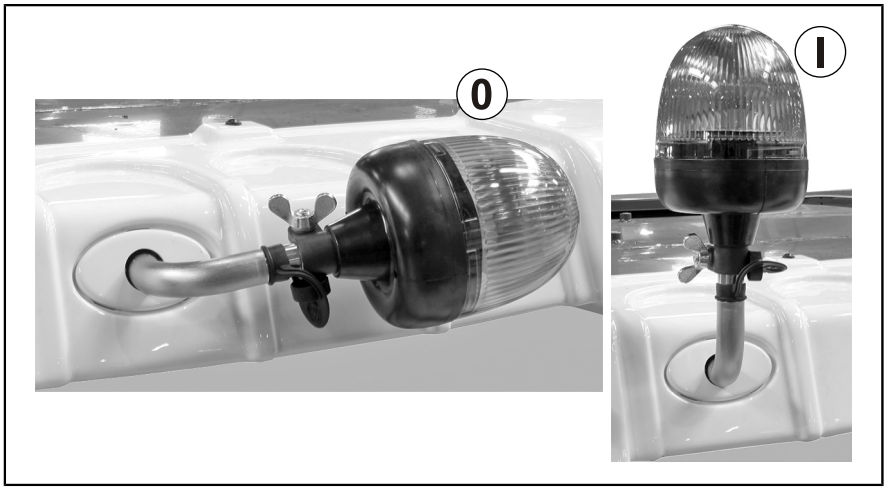
- ▶ Swivel the protective cap [2] to the side.
- ▶ Put the locating hole [3] of the rotating beacon on the contact tube [1] and slide it up to the stop.
- ✔ The electrical connection has been made.
- ▶ Tighten clamping screw [4].

Dismounting/removing rotating beacon



- ▶ Unscrew the clamping screw [4] and slide the rotating beacon [3] off the contact tube [2].
- ▶ Close the contact tube [2] with the protective cap [1].
- ▶ Stow the rotating beacon [3] on the holder [5] inside the cab.

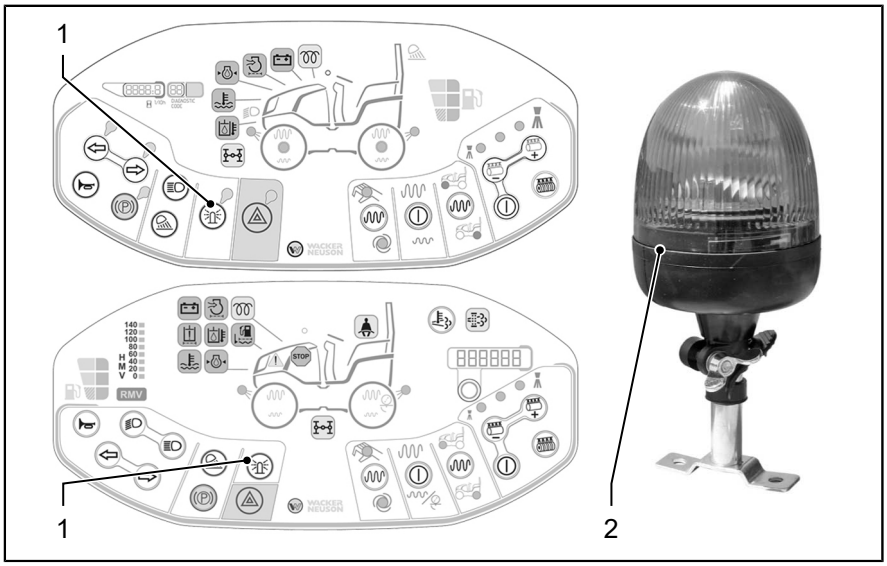
Rotating beacon, foldable



The rotating beacon can be turned through 90 degrees to reduce the height of the machine for transport on a low loader or truck.

- ▶ Move the rotating beacon to lock-in position 0 for transport.
- ▶ Move the rotating beacon to lock-in position I for work.

6.02.04 Operation



Switching on rotating beacon

- ▶ Press the rotating beacon switch [1] on the control panel.
- ✔ LED on: Rotating beacon [2] lights.

Switching off rotating beacon

- ▶ Press the rotating beacon switch [1] on the control panel again.
- ✔ LED off: Rotating beacon [2] off.

6.02.05 Maintenance

⚠ WARNING

Work above floor level!

Injury caused by falling.

- Do not perform any maintenance or repair work above ground level unless using a stable ladder or a maintenance scaffold.
- To reach the maintenance points on the machine, use the steps indicated. Do not step on any other machine element or add-on part.

Dust or sand can impair the function of the rotating beacon.

Cleaning

- ▶ Use a sponge and soap water to clean the rotating beacon.
- ▶ Do not clean the rotating beacon with a water jet or high-pressure cleaner.

Maintenance

- ▶ Spray electrical contacts using a contact spray.

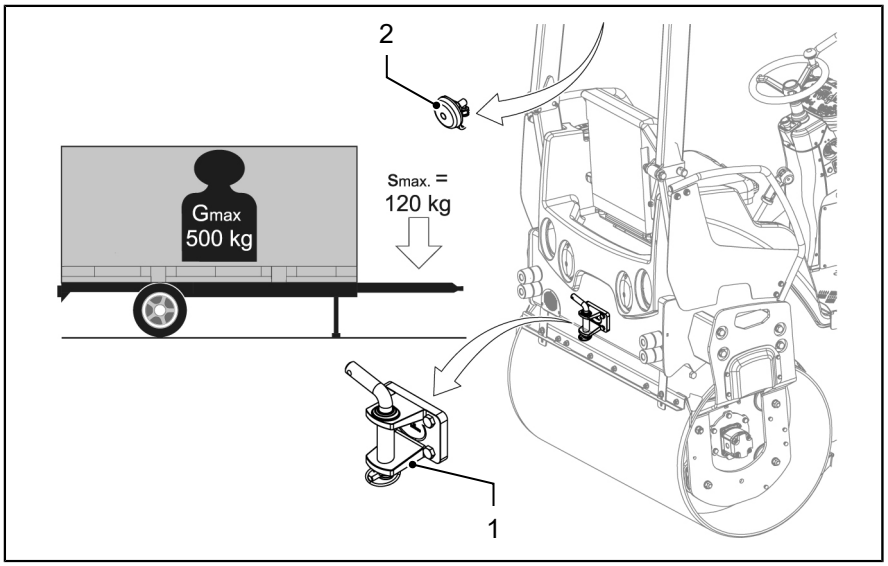
6.03 Towing coupling

Only use the trailer hitch [1] to tow trailers.

Permitted total weight of the trailer load $G_{max.}$ (Trailer with load) and permitted support load $S_{max.}$ must not be exceeded.

Do not use the trailer hitch for other purposes or with other loads.

For a folding ROPS, a bump stop [2] is installed to avoid damage to the ROPS and trailer hitch.



Regularly check the diameter of the bolt. Immediately replace a worn bolt.

6.04 Seven-pole electrical outlet for trailers

6.04.01 Overview

When driving on public roads, the trailer must also be equipped with functional lighting. A socket is provided for the electrical connection between machine and trailer.

[1] Socket 7 pole

[2] Towing coupling

6.04.02 Fuses

⚠ WARNING

Fire in the machine electrical system!

Serious injuries or death or material damage as a result of fire caused by using fuses not meeting specifications.

- Only use fuses specified by the manufacturer (not fuses with a higher amperage).
- Do not bridge fuses.

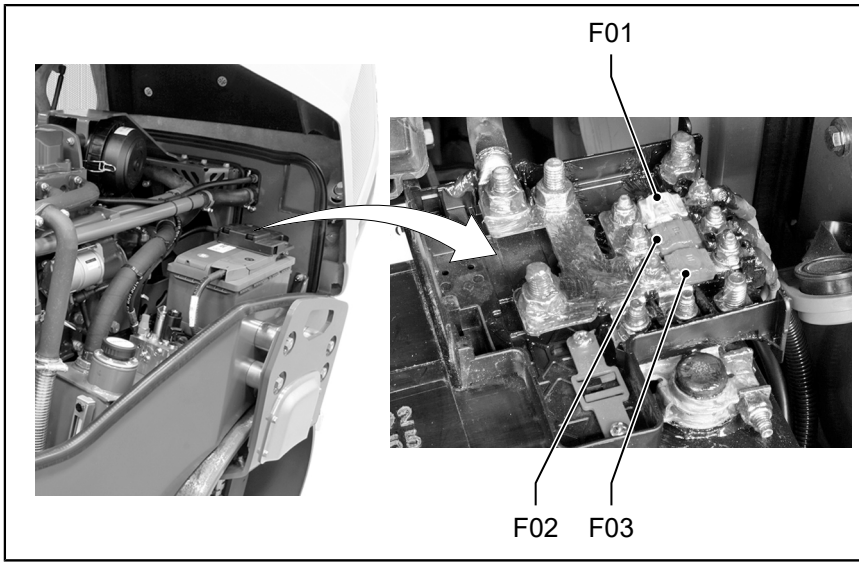
⚠ CAUTION

Electrical voltage!

Risk of injury due to electric shock.

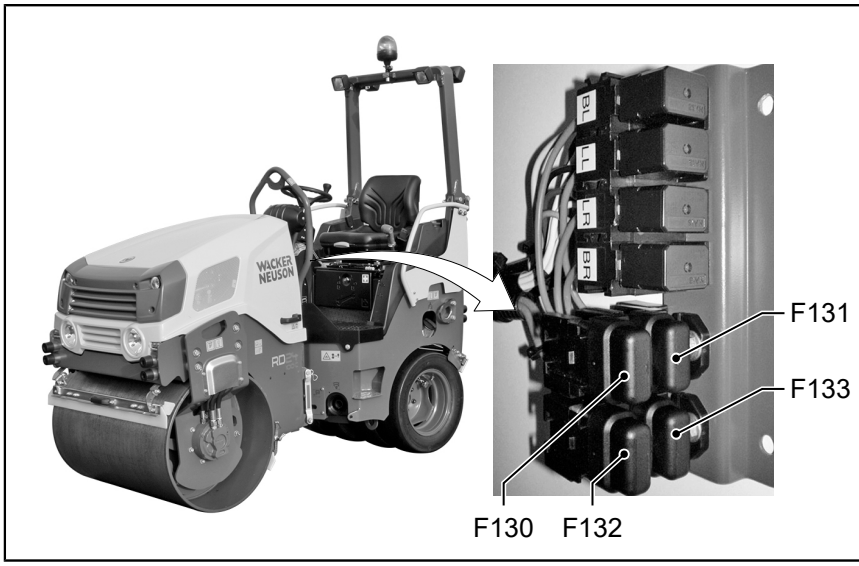
- Before starting maintenance work, set the battery isolating switch to off in order to de-energize the electrical system. As an alternative, disconnect the earthing/grounding strip from the battery.
- Wear personal protective equipment.
- When working on the electrical system, be sure to only use suitable and approved tools.

Main fuses in the engine compartment



Position	Fuse assignment	Fuse
F01	On-board electrical system (terminal 30)	80 A
F02	Left lighting	30 A
F03	Right lighting	30 A

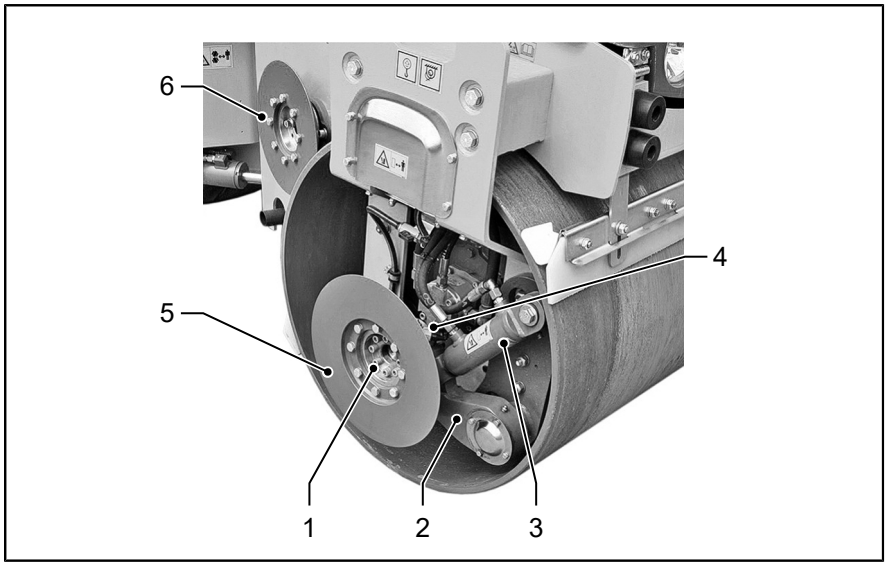
Control stand fuses



Position	Fuse assignment	Fuse
F130	Left turn signal	10 A
F131	Left light	10 A
F132	Right light	10 A
F133	Right turn signal	10 A

6.05 Edge pressing and cutting device (KAG)

6.05.01 Overview



[1]	Tool carrier	**[2]**	Lever
[3]	Hydraulic cylinder	**[4]**	Water spray nozzle
[5]	Cutting wheel	**[6]**	Pressure roller

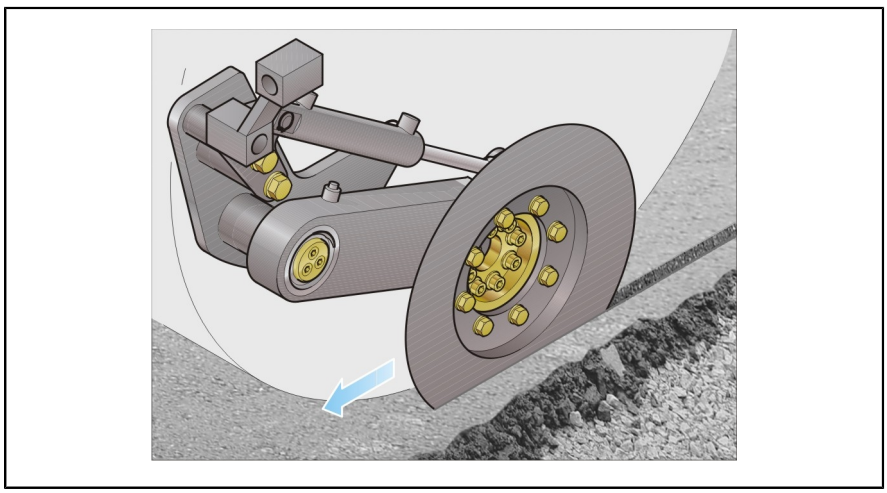
6.05.02 Description

The edge pressure and cutting device (KAG) cuts or forms the longitudinal edges of hot asphalt.

The tool is raised and lowered hydraulically. The water sprinkling prevents bitumen adhering to the tool.

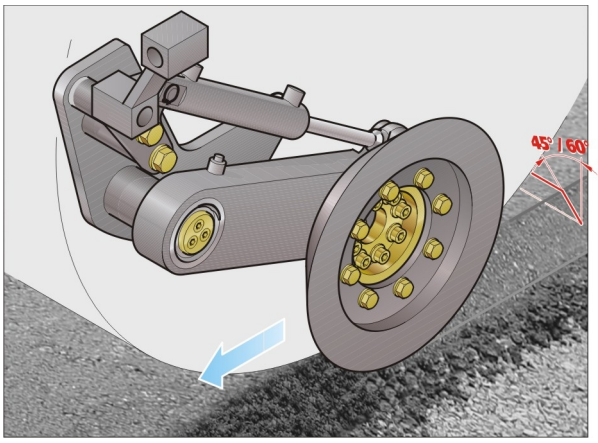
The cutting discs and pressing roll are exchangeable.

Cutting wheel



The cutting disc trims projections off the asphalt surfaces.

Pressure roller



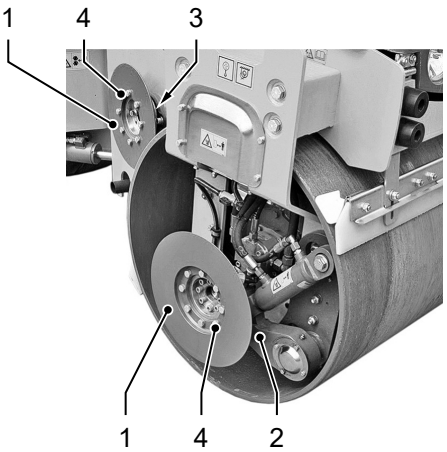
Conical pressing rolls chamfer the edges of asphalt surfaces. The pressing rolls can be changed to match different layer thicknesses and produce different chamferings.

Track indicator (option)

With the aid of the track indicator, the driver can align the tire track with a previously marked working line.

6.05.03 Mounting/Dismounting tools

Overview

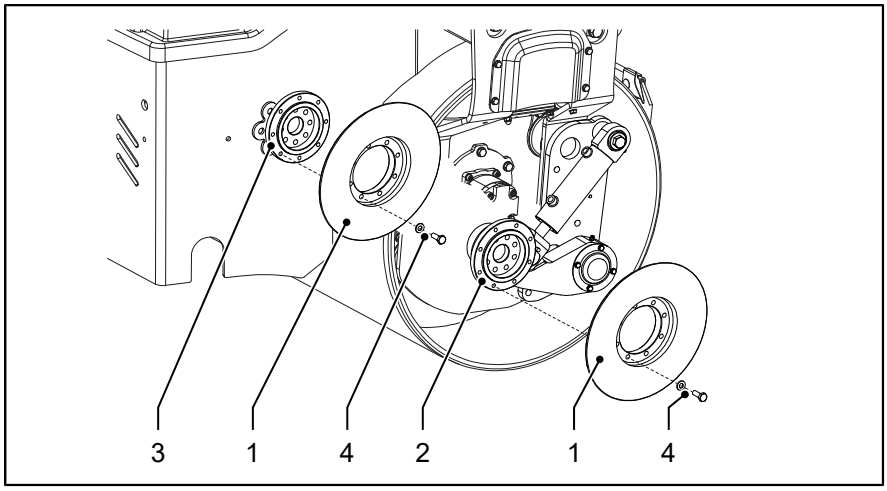


[1]	KAG tools	**[2]**	Lever arm with flange
[3]	Support with flange	**[4]**	Screws M10x30 (8 pcs.)

The tools [1] for the edge pressing and cutting device are attached to the flange at the lever arm [2].

Tools not used at the moment are attached at the flange of the holder [3] at the vehicle frame.

Dismounting/Mounting



Mounting tool

- Remove the tool [1] from the flange [3] at the holder. Loosen 8 screws and washers [4].
- Put the tool [1] on the flange [2] at the KAG lever arm.
- Fasten the tool [1] to the flange [2] using 8 screws and washers [4] (observe the tightening torque).

Dismounting tool

- Remove the tool [1] from the flange [2] at the KAG lever arm: Loosen 8 screws and washers [4].
- Put the tool [1] on the flange [3] at the holder.
- Fasten the tool [1] to the flange [3] using 8 screws and washers [4] (observe the tightening torque).

As an alternative, the tool can be removed from the lever arm or from the holder together with the flange.

In this case, the flange is put on the centring guide and fastened by 2 screws in order to install it at the holder.

8 screws are used for installation at the lever arm.

6.05.04 Operation

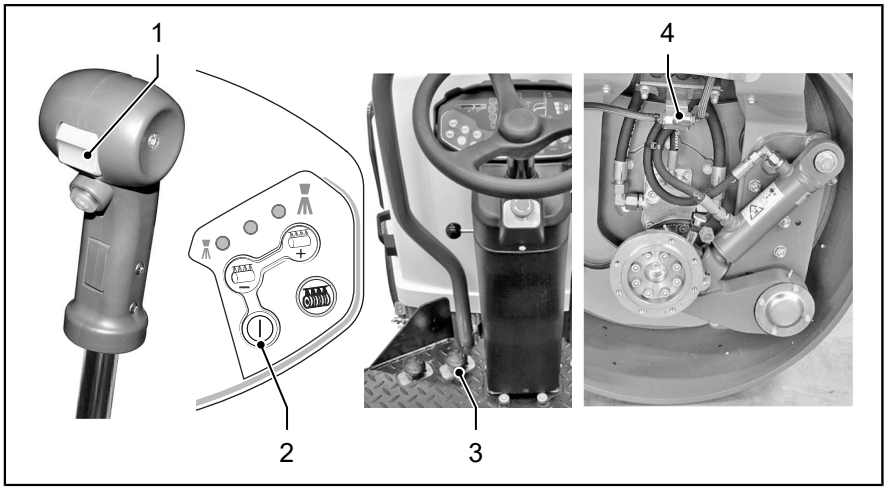
NOTICE

Unfavorable force transmission!

Material damage to the edge pressure and cutting device (CTR) as a result of unfavorable force transmission.

- Work with the KAG only when driving forwards.
- Use only to work on hot, malleable asphalt.

Overview of controls



[1]	KAG switch	**[2]**	Switch for water sprinkling system
[3]	Foot-operated switch for water sprinkling system	**[4]**	KAG sprinkler stop cock

The switch [1] on the driving lever controls lifting and lowering of the KAG.

On the version with KAG on both sides, the KAG is actuated using the switch on the lever on the relevant side.

Lifting and lowering the KAG

Lower KAG

- ▶ Press the switch [1] down at the drive lever until the desired position is reached.
- ✔ The KAG lowers and comes into operation.

Lift KAG

- ▶ Press the switch [1] up at the drive lever until the desired position is reached.
- ✔ The KAG raises from the asphalt surface.

Sprinkling system

KAG sprinkler

The KAG sprinkler is supplied via the roller drum sprinkling pump.

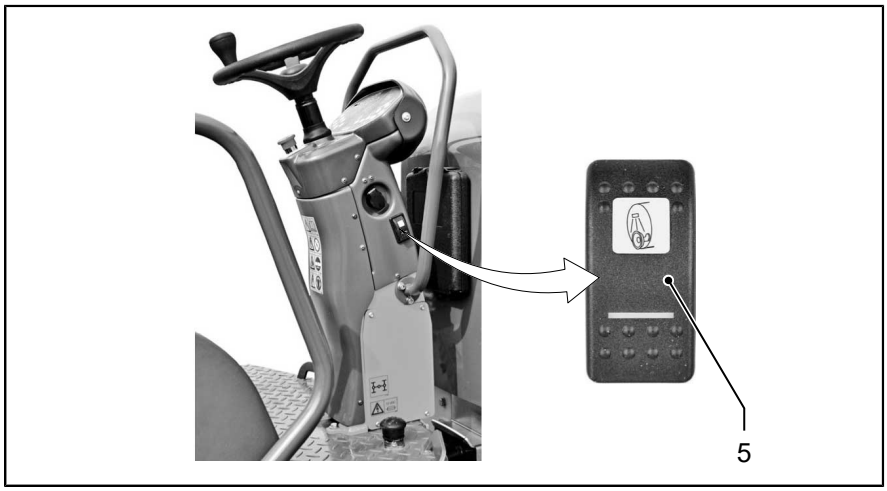
The KAG will only be sprinkled if water sprinkling is switched on for the roller drums.

- ▶ Open the stop cock [4].
- ✔ The KAG sprinkler is connected to the water sprinkler of the roller drums.
- ▶ Press switch [2].
- ✔ Interval sprinkling is on.
- ▶ Press switch [2] again.
- ✔ Interval sprinkling is off.

- ▶ Press and hold the switch [2] or foot switch [3] for water sprinkling.
- ✔ Roller drum and KAG sprinkling will be performed as long as the switches are being pressed.
- ▶ Close the stop cock [4].
- ✔ The KAG sprinkler is disconnected from the water sprinkler of the roller drums.

KAG sprinkler with switch

The optional switch allows to set KAG sprinkling to on or off.



Requirement: The stop cock [4] is open.

- ▶ Press the switch [5] at the top.
- ✔ The KAG sprinkler is connected to the water sprinkler of the roller drums.
- ▶ Press the switch [5] at the bottom.
- ✔ The KAG sprinkler is disconnected from the water sprinkling of the roller drums.

6.05.05 Maintenance

Basic maintenance tasks

- Remove dirt deposits.
- Replace damaged and/or non-readable warning signs.
- Check that the screw connections on console, levers, cutting disc and pressing roll are tight.

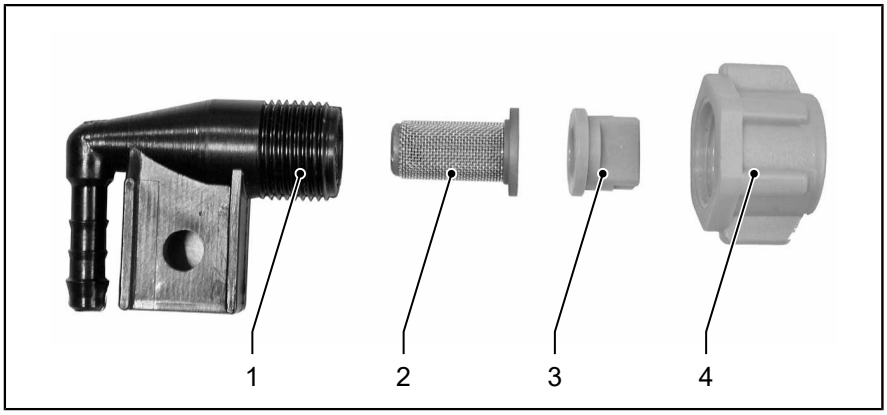
Maintenance overview

Every 250 operating hours

250 h

Cleaning sprinkler nozzles
Lubricating KAG cylinder bolts
Lubricate the KAG lever bearing

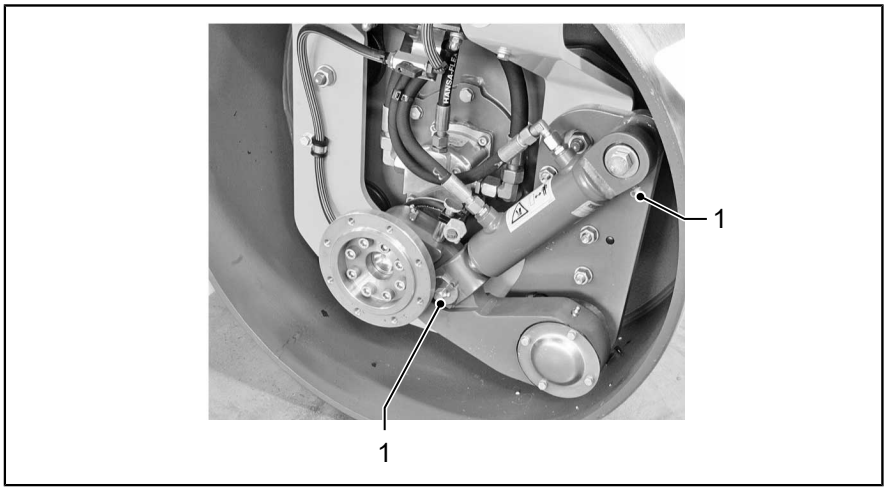
Cleaning sprinkler nozzles



- Switch off diesel engine and remove ignition key.
- Loosen the cap nut [4] and remove it together with spray nozzle [3] and filter [2] of casing [1].
- Loosen the cap nut [4] and remove it together with spray nozzle [3] and filter [2] of casing [1].
- Flush the pipeline and housing [1] with the water sprinkling system.
- Insert spray nozzle [3] and filter [2] in union nut [4] and screw them onto the casing [1] together.

Lubricating KAG cylinder bolts

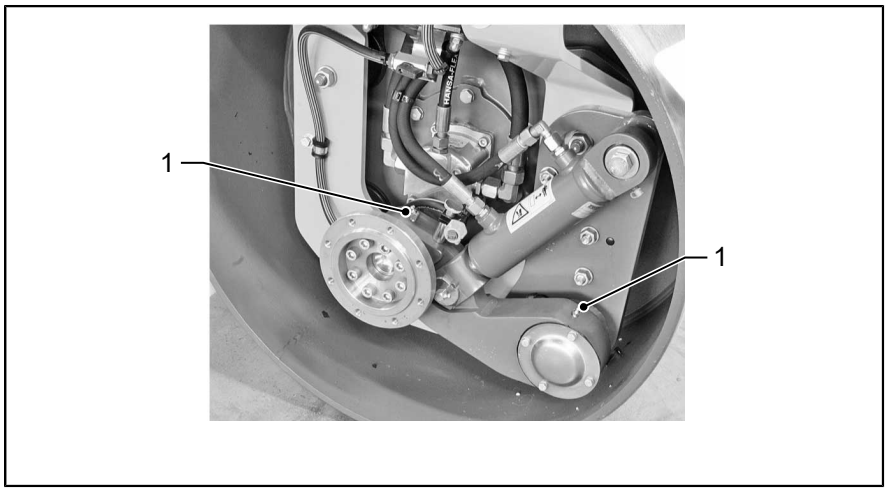
△ Lubricant only admissible if containing this marking ("Technical data", page 165 sqq.).



- Switch off diesel engine and remove ignition key.
- Lubricate lubrication nipple [1] (2 nipples).

Lubricate the KAG lever bearing

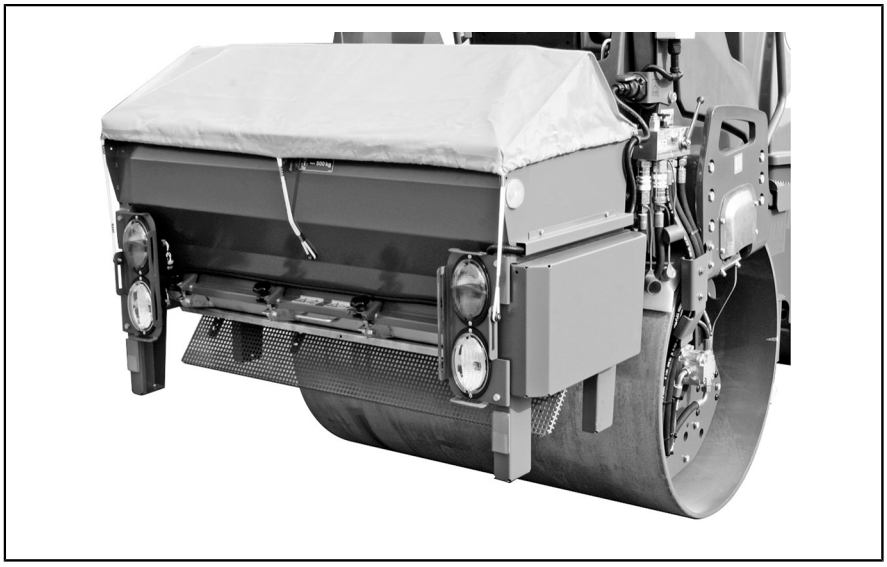
△ Lubricant only admissible if containing this marking ("Technical data", page 165 sqq.).



- Switch off diesel engine and remove ignition key.
- Lubricate lubrication nipple [1] (2 nipples).

6.06 HAMM line spreader

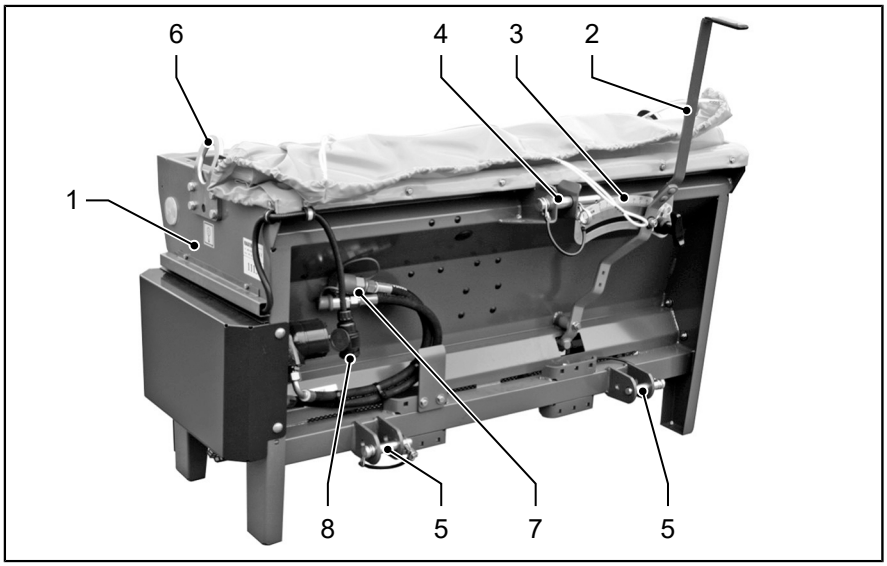
During all activities, also comply with the manufacturer's instruction manual for the chip spreader.



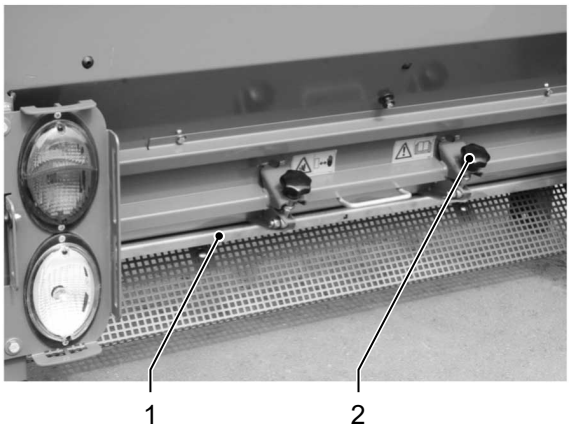
With the chip spreader as an additional device a regulated output of grit and simultaneous rolling in into the road surface is possible. An optimal output of the grit depends on an exact setting of the grit components.

6.06.01 Overview

Chip spreader



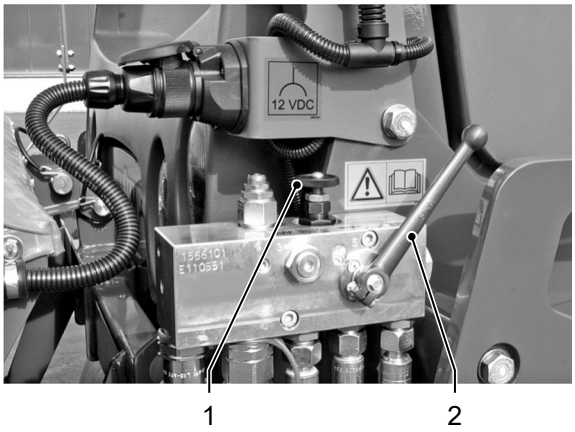
[1]	Storage reservoir	**[2]**	Stop valve
[3]	Sprinkle value scale	**[4]**	Coupling point for upper connecting rod
[5]	Coupling point for lower connecting rod	**[6]**	Towing eyes
[7]	Hydraulic connections	**[8]**	Lighting connection



[1] Spreader floor

[2] Fixing screw

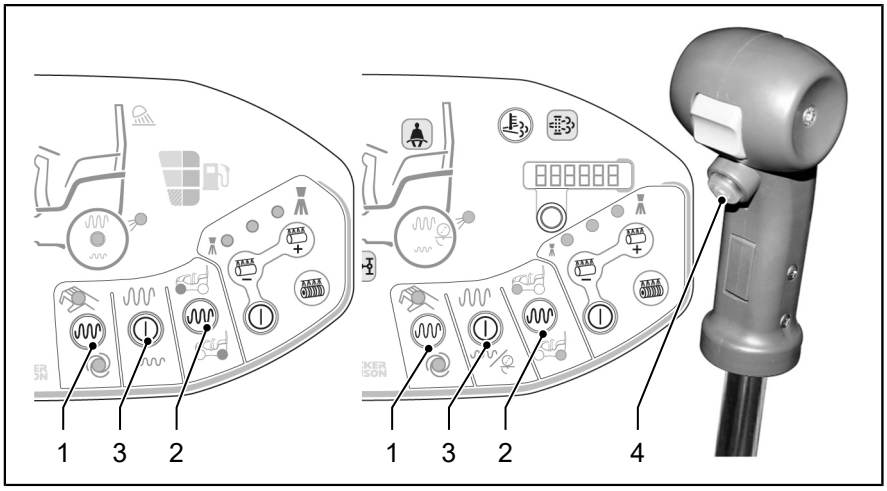
Operating levers and adjustment handles



[1] Speed of spreader shaft

[2] Vibration selection/chip spreader

Instruments and controls



[1] Operating mode switch
[2] Drum preselection switch
[3] Dynamic compaction system switch
[4] Compaction system/chip spreader switch

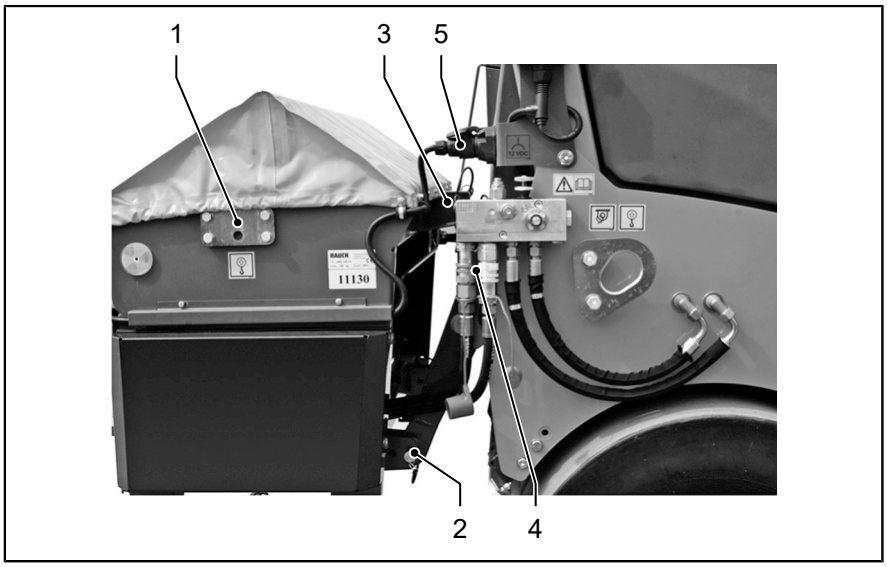
6.06.02 Mounting/Dismounting

⚠ WARNING

High own weight of the chip spreader!

Serious injuries or death caused by crushing or getting caught during assembly.

- Perform installation work on firm ground (flat, stable, horizontal).
- Carry out fitting work only when the engine is stopped.
- Use suitable load suspension and hitching gear with an adequate loading capacity.
- Do not step underneath suspended loads.
- Mount only when the storage tank is empty.



Use appropriate lifting devices and hoisting equipment. Observe weight (see type plate of chip spreader).

Mounting chip spreader

- Lift the chip spreader on to the suspension eyelets [1]
- Put the grit spreader on the holder at the machine frame and align it.
- Connect 2 x lower links [2] with socket pins and secure them with split pins.
- Connect the upper connecting rod [3] with cotter pins and secure with split-pins.
- Connect the hydraulic connectors [4].
- Connect the lighting connector [5].

Removing the chip spreader

- Empty the storage container.
- Disconnect the lighting [5] and hydraulic connectors [4].
- Close the hydraulic hoses [4].
- Attach the chip spreader to the suspension eyelets [1].
- Remove the securing elements and split-pins.
- Remove the socket pins from upper link [3] and lower links [2].
- Lift the chip spreader on the suspension eyes [1] off the machine frame.
- Park the chip spreader safely and secure against tipping.

6.06.03 Operation

⚠ WARNING

Exposed, rotating parts!

Risk of being trapped, pulled in, and injured by rotating chip spreader parts.

- Do not perform any testing, adjusting or maintenance work unless the diesel engine has been switched off.
- Do not reach with your hands into the chip spreader unless after every part has come to a standstill.
- Do not lay down any object or tool in the chip spreader.
- Keep a safety distance when making a visual inspection while the diesel engine is running.

NOTICE

Heavy weight, High line load!

Cracks and displacements of the asphalt caused by a high line load imposed by the drum.

- Do not drive over hot asphalt with a full storage container for the chip spreader.

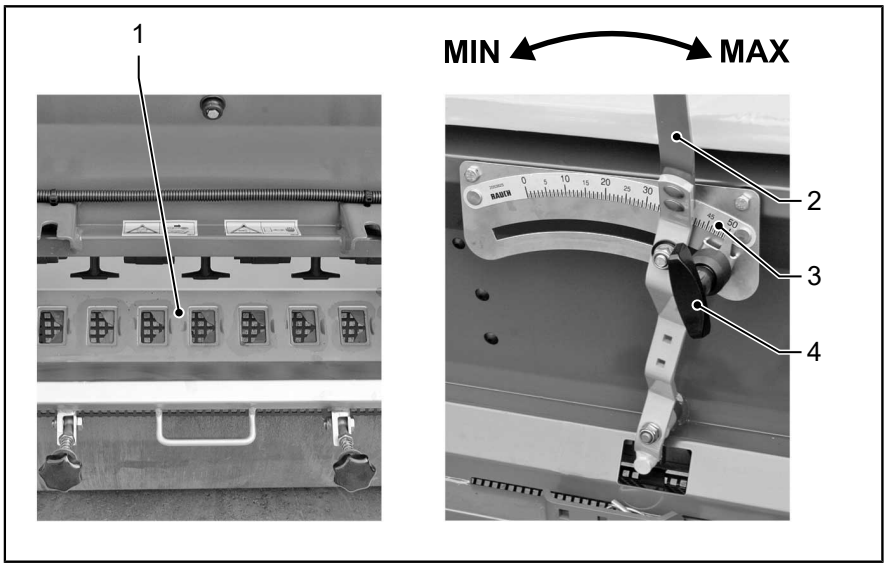
NOTICE

Sticking gritting material!

Blocked spreader shaft, material damage or destruction of the driving elements.

- Completely open the spreader apertures before switching on the spreader rotor.
- With the machine is at a standstill, only allow the spreader rotor to start with a low speed, and increase to working speed after a short time.
- Set the spreader apertures to the working cross-section.

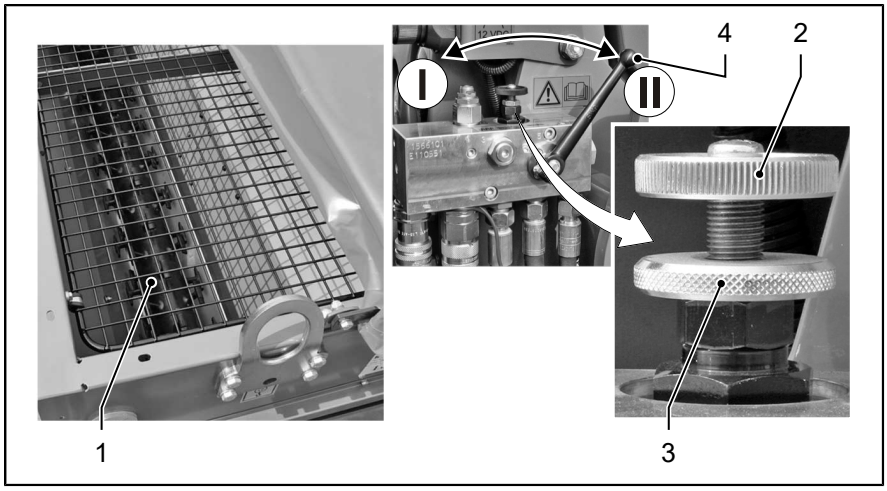
Adjusting the shut-off slider



Depending on the size of the spreader openings [1], more or less gritting material will flow out of the storage tank. Grit grain size and discharge quantity exert an influence on the opening cross-section to be selected. Use the shut-off slider [2] to adjust the openings in the gritting bottom.

- ▶ Set the shut-off slider [2] to the MIN position.
- ✔ The spreader openings [1] are closed.
- ▶ Gradually move the shut-off slider [2] towards the MAX position.
- ✔ The spreader openings [1] are opened gradually.
- ✔ Use the adjustable stop [4] at the scale [3] to repeat an opening setting already determined beforehand.
- ▶ When spreading operations are complete, close the spreader openings (shut-off slider to MIN position) to prevent more gritting material from flowing out.

Adjusting the spreader shaft speed



The spreader rotor [1] ensures that the chips are distributed equally to the spreader apertures. According on the speed setting, more or less chips are conveyed to the spreader apertures.

According on the speed setting, more or less chips are conveyed to the spreader apertures.

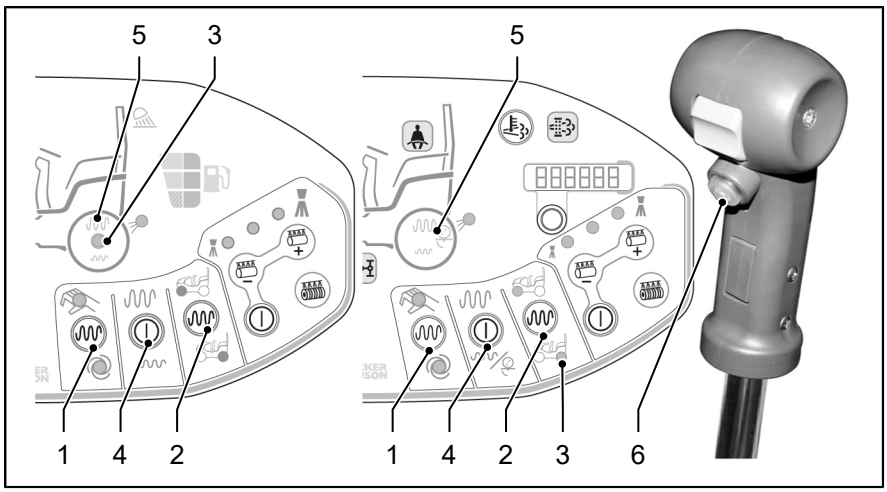
- ▶ Loosen counternut [3].
- ▶ Screw in the adjusting screw [2] up to the stop.
- ✔ The rotational speed of the spreader roller is set to the minimum.
- ▶ Screw out the adjusting screw [2] to the stop.
- ✔ The rotational speed of the spreader roller is set to the maximum.
- ▶ Lock the adjusting screw [2] with a check nut [3].

Preselecting the chip spreader

With tandem rollers, you can use the lever [4] to preselect vibration/ oscillation or chip spreader for the rear drum.

- ▶ Swivel lever [4] into position I.
- ✔ Vibration/oscillation is preselected.
- ▶ Swivel lever [4] into position II.
- ✔ Chip spreader is preselected.

Sprinkle operation



Selecting the operating mode

Prerequisite: Electrical system is ON.

- ▶ Press the switch [1].
- ✔ *Manual* indicator LED lights up.
- ✔ The chip spreader can only be switched on and off on the drive lever.

- ▶ Press the switch [1].
- ✔ *Automatic* indicator LED lights up.
- ✔ The chip spreader is switched on and off automatically depending on the driving speed. The chip spreader is switched off at a low or high speed.

Preselecting the chip spreader

Prerequisite: With tandem rollers (VV/VO), the preselection lever is set to chip spreader.

- ▶ Press switch [2] repeatedly until the indicator light for the rear drum [3] lights up.
- ✔ The chip spreader is preselected at the rear.
- ✔ The front drum can be operated in vibration mode.

Activating the chip spreader

- ▶ Press switch [4].
- ✔ The indicator light [5] lights up.
- ✔ The chip spreader is activated.

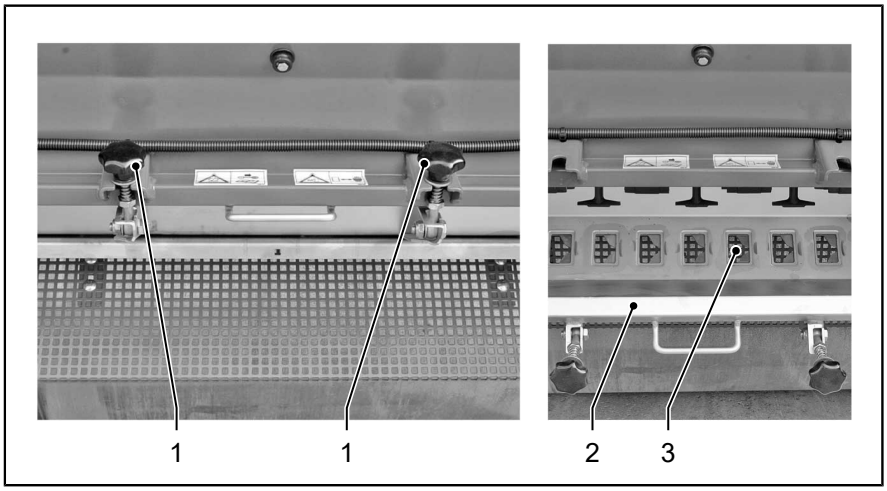
Spreading chips

- ▶ Press switch [6] on the drive lever.
- ✔ Depending on the settings, the chip spreader works immediately (manual) or when driving starts (automatic).

Deactivating chip spreading

- ▶ Press switch [6] on the drive lever again.

Emptying the storage container for the chip spreader



- At the end of the spreading work, with the machine at a standstill, empty most of the remaining chips out of the storage container.
- Switch off diesel engine and remove ignition key.
- Loosen the fixing screws [1] (from the outside to the inside), and swing down.
- After loosening the last fixing screw [1], the spreader floor [2] can be flapped down.
- Remove the rest of the chips, and lean the spreader apertures [3].
- Fold up the spreader bottom [2].
- Fold up and tighten the retaining screws [1] (from the inside to the outside).

Determine the quantity of chips

The exact setting for the quantity of chips is determined by tests conducted according to the following procedure:

- Open the shut-off slider: Set the lever to a scale value of 20.
- Set the spreader shaft speed to maximum rotational speed.
- Perform a sprinkle test by sprinkling a paper sheet 297 × 210 mm (DIN A4) (11.69 × 8.27").
- Weigh the chips from the paper sheet or fill it into a metering box (size 100 ml (0.26 US gal.)).
- Compare amount with tabular value.
- If the correct rate of spread is not reached, readjust the shut-off slider or the vehicle speed and repeat the test.

Rough estimate for the quantity of chips on a 297 × 210 mm sheet of paper at a chip density of about 1.6 kg/dm³.

Quantity of chips required kg/m²	Weight of chips on the sheet of paper g	Volume of chips on the sheet of paper ml (US gal.)	Part of the amount in the metering box
0.5	31	20	1/5
1.0	62	40	2/5
1.5	94	60	3/5
2.0	125	80	4/5
2.5	156	100	5/5

6.06.04 Maintenance

For all maintenance work on the chip spreader, you must observe the information listed in the chapter "Important information about maintenance work", see page 123. Replace wear parts according to the descriptions given in the manufacturer's operating manual.

- Check operating and safety notes on the chip spreader.
- Replace damaged and/or non-readable warning signs.
- Ensure that hinges and links move easily and lubricate lightly.
- Check that hydraulic and lighting connections are tight.
- Check lighting.
- Check screw connections which are heavily loaded and make sure they have a tight seat.

Maintenance overview

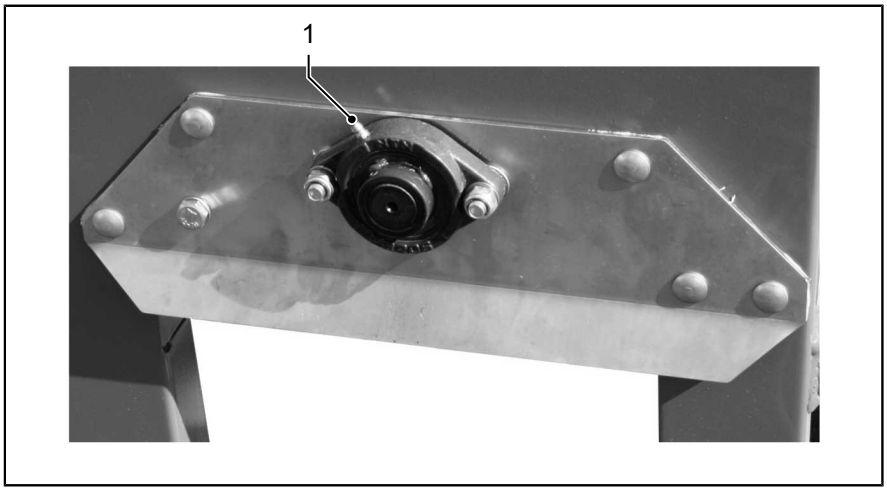
Every 250 operating hours

250 h

Grease bearings

Grease bearings

△ Lubricant only admissible if containing this marking ("Technical data", page 165 sqq.).

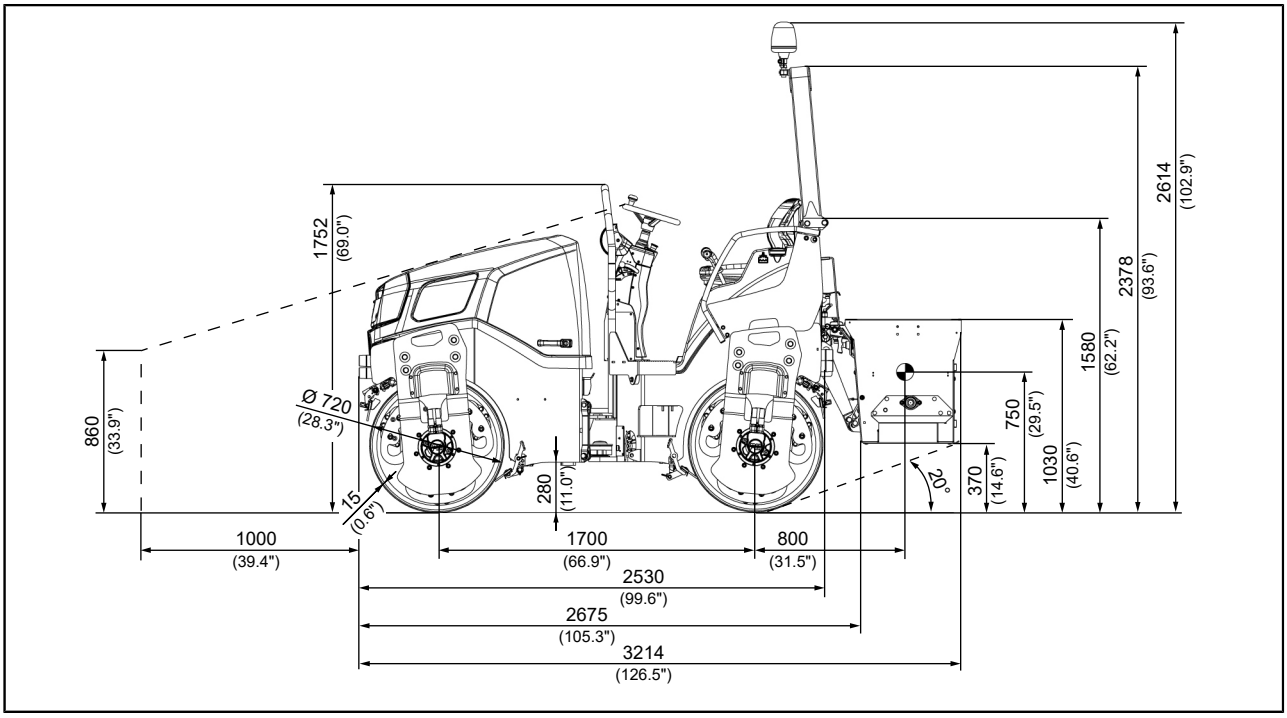


- Switch off diesel engine and remove ignition key.
- Grease lubricating nipple [1].

6.06.05 Technical Data

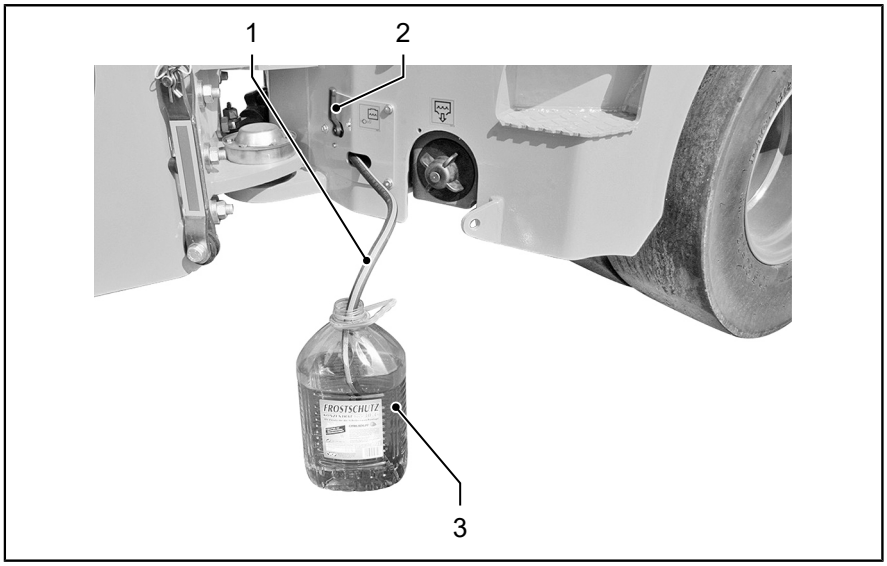
Description	Value	Unit
Basic weight of chip spreader	128	kg
Weight of the attachment device	22	kg
Operating weight with chips (calculated at a chip density of 1,600 kg/m³)	500	kg
Content, storage reservoir	200	l
Working width	1000	mm
Working speed	0–5.0 (0–3.1)	km/h (mph)

Dimension sheet



6.07 Anti-freeze filling system for water sprinkling

6.07.01 Overview



[1] Hose
[2] Change-over valve
[3] Vessel for antifreeze solution

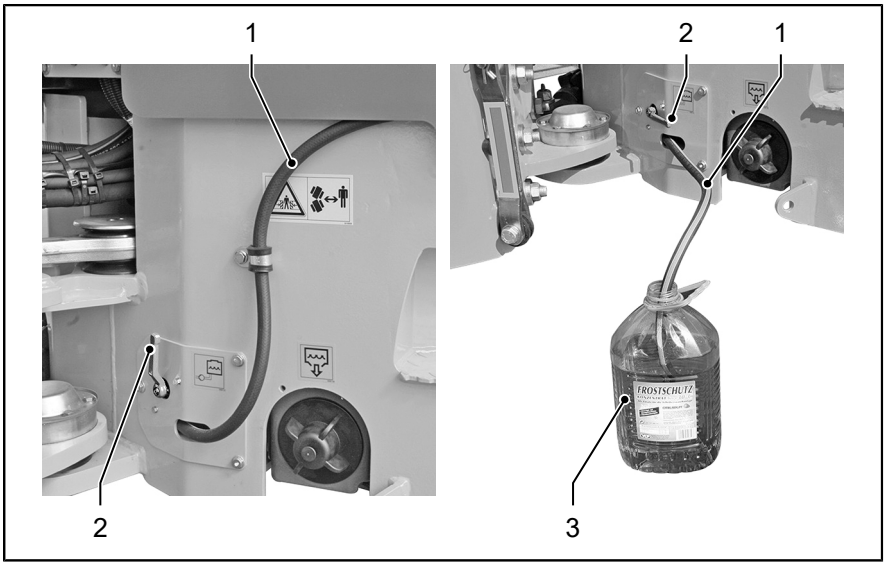
6.07.02 Description

The anti-freeze filling system fills the pipes of the water sprinkling unit with antifreeze. This helps to prevent the sprinkler system from freezing and thus the sprinkler nozzles from being destroyed when there is any risk of frost.

6.07.03 Operation

- Use a commercially available antifreeze solution for windscreen washing systems when filling the piping system.
- Match the mixing ratio with water to the expected temperatures.

Fill the piping system



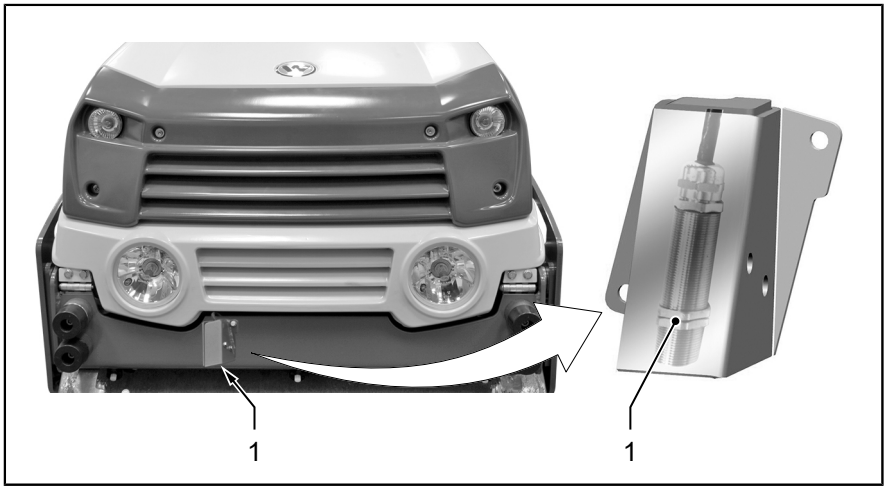
- Switch off the diesel engine.
- Water sprinkling system functional test: Switch the water sprinkling system on when the machine is at a standstill (see page 97).
- Take the hose [1] out of its holder.
- Clean the end of the hose if it is dirty.
- Insert the hose into the container [3] containing antifreeze solution.
- Set the change over valve [2] to the anti-freeze filling system position.
- Fill the piping system until the antifreeze solution exudes out of all the spray nozzles.
- Switch off the sprinkler.
- Switch off the electrical system, and remove the ignition key.
- Put the hose [1] back in its holder.
- Set the switchover valve [2] to sprinkle.

6.08 HAMM Temperature Meter

Only if equipped with such a thermometer are data about asphalt temperatures displayed on the indicators.

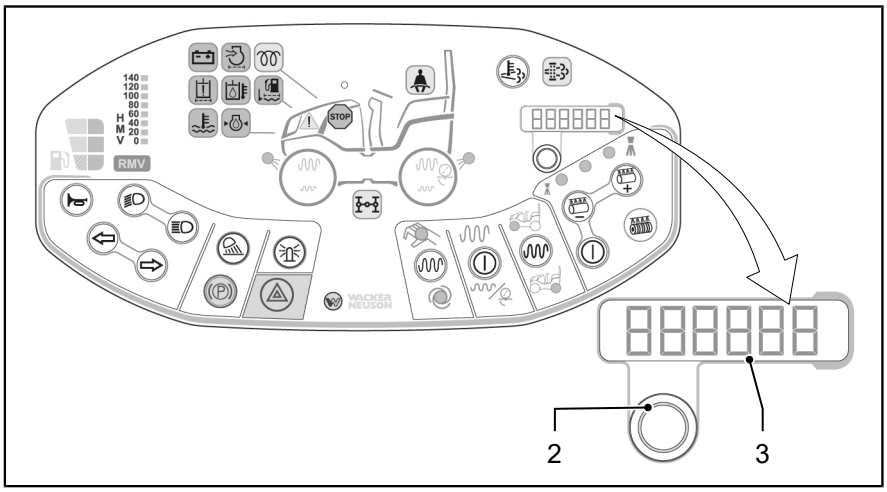
6.08.01 Overview

Temperature sensor



[1] Temperature sensor

Instruments and controls



[1] System info display **[2]** System info switch

6.08.02 Description

Asphalt compaction can only be done in a special temperature range.

With an unfavorable asphalt temperature, the following damage can occur:

- Damage caused by "pushing" the asphalt when the asphalt temperature is too high.
- Asphalt matrix destruction when compacting at an excessively low temperature.

The asphalt temperature measuring system (HAMM Temperature Meter) informs the driver of the surface temperature of the asphalt beneath the roller. This enables the driver to avoid the above-mentioned damage and achieve optimal compaction.

6.08.03 Operation

- ▶ Repeatedly press the switch [2] to set the display [3] to asphalt temperature.
- ✔ Asphalt temperature display under the machine in °C or °F.

Maintenance

The temperature sensor must have a clear view of the asphalt. Dirt in the measuring hole or projecting components impair the function of the sensor.

Do not use any dry cloth for cleaning the sensor. This will scratch and damage the optics.

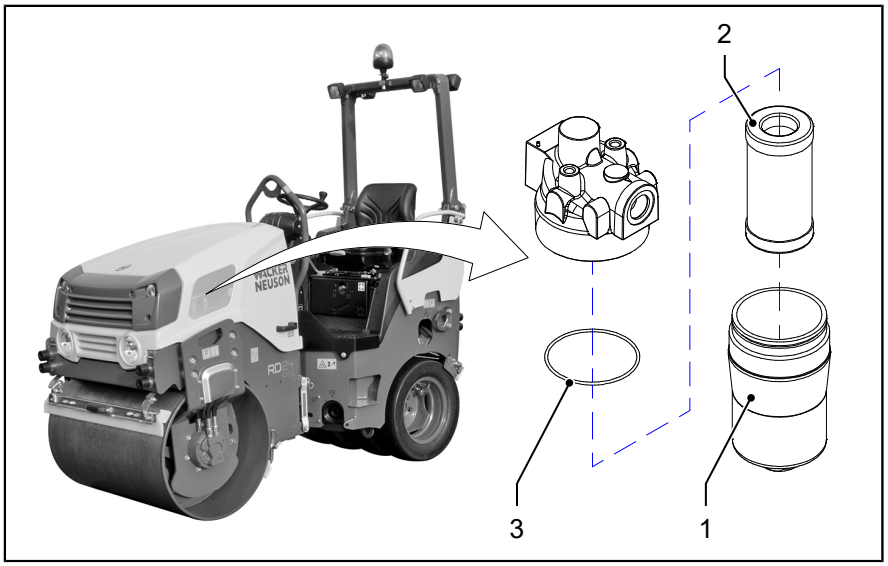
Do not use any ammonia or cleaning agent containing ammonia. They can cause permanent damage to the optics.

- ▶ Keep the senor's sensing head clean.
- ▶ Do not allow the measuring hole to become blocked.
- ▶ Use a brush or Compressed air to clean the measuring borehole.
- ▶ Do not spray a jet of water directly into the measuring hole.
- ▶ In case of harder dirt use Water, glass cleaner, alcohol or ethanediol to initially dissolve and then remove the dirt using a soft linen cloth soaked in liquid.

6.09 Bypass filter for hydraulic oil

6.09.01 Overview

Clean hydraulic oil is the most important prerequisite for trouble-free working of the hydraulic system. Additional fine filtering of the hydraulic oil retards the ageing process of the oil, and filters most of the contamination, such as particles and water, out of the oil. This reduces system malfunctions, wear and failures.



[1] Filter housing
[2] Filter insert
[3] Sealing ring

6.09.02 Maintenance

The instructions itemized in the "Important information about maintenance work" must always be followed during all maintenance work.

Maintenance overview

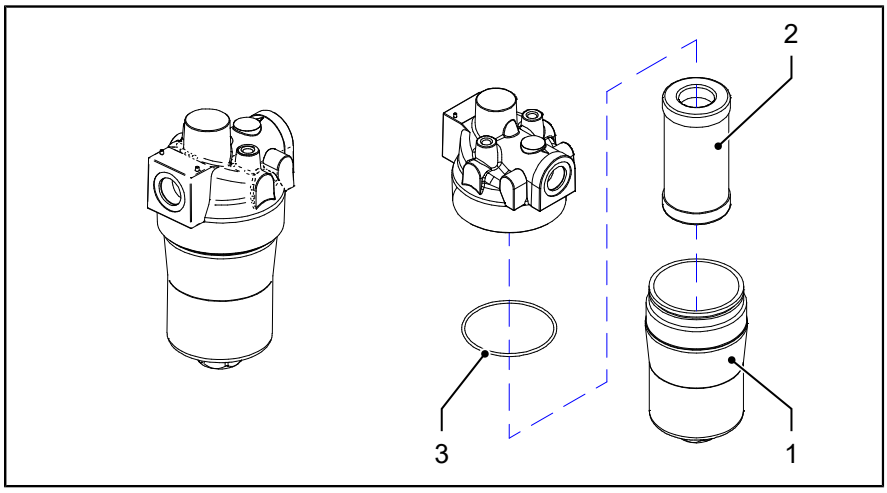
Every 500 operating hours

500 h

Replacing the filter cartridge in the bypass filter

Exchange the bypass filter for the hydraulic system

☐ Lubricant only admissible if containing this marking ("Technical data", page 165 sqq.).



- Switch off diesel engine and remove ignition key.
- Allow machine to cool down to a temperature under 30 °C (86 °F).
- Unscrew and remove the filter casing [1] together with the seal ring [3].
- Replace the gasket ring [3].
- Pull off the filter insert [2] and replace it by a new one.
- Inspect the inside of the filter casing [1] for dirt. Clean if necessary.
- Screw on and tighten the filter casing [1].
- Start the diesel engine; Check the filter for leaks.
- Check oil level of the hydraulic system with the diesel engine at a standstill. Top up the stipulated hydraulic oil if necessary.

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