



KRAMER
on the safe side

Operator's Manual Wheel Loader

5045 5045L



Vehicle Model	W03-01/02
Material Number	1000490089
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KRAMER

UK Declaration of Conformity

Manufacturer

Kramer-Werke GmbH, Wacker Neuson Straße 1, D-88630 Pfullendorf

Produkt

Vehicle type	Wheel loader
Type	W03
Design	W03-01/-02
Trade name	5045 / 5045L
Chassis number	WNKW03__xx000 ____
Output kW	18,5 / 33,3
Measured sound power level dB(A)	96,9 / 98,1
Guaranteed sound power level dB(A)	101

Conformity assessment procedure

In accordance with SI 2001 No.1701 Schedule 9

UK recognized approved body for conformity assessment

For certification assessment of Noise

AnP Certification Limited, Issue No.: 8500

2 Parkfield Street, Manchester, M14 4PN

Directives and standards applied

We hereby declare that this product complies with the relevant provisions of these regulations and standards
SI 2008 No. 1597 (Supply of Machinery) ; SI 2001 No. 1701 (Noise Emission) ; SI 2016 No. 1091 (EMC); EN 474-1 and EN 474-3

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Original Declaration of Conformity

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1 Foreword

1.1 Operator's manual

1.1.1 Information on this operator's manual

- The operator's manual provides information on the use, settings, operation and maintenance of the vehicle, including different attachments approved for the vehicle. The operator's manual is therefore intended for the operator and the operating company.
- This operator's manual also includes descriptions of additional equipment and options. These sections are not marked separately. The scope of description in the operator's manual can therefore deviate from the actual equipment present on your vehicle without a claim for retrofitting being able to be derived from this.
- The operator's manual and any amendments form part of the vehicle and must always be available at the place of use of the vehicle.
- Store this operator's manual in the place provided for this in or on the vehicle.
- Immediately replace an incomplete or illegible operator's manual with a new one.
- In addition to the operator's manual, observe statutory, generally applicable and other binding regulations on accident prevention and environmental protection.
- The manufacturer constantly keeps abreast of the latest technical developments and constantly improve its products. For this reason, we may from time to time need to make changes to figures and descriptions in this documentation that do not reflect products that have already been delivered and that will not be implemented on these vehicles.
- The units of measurement used in this operator's manual are specified according to the ISO standard.
- Technical specifications, dimensions and weights are not binding and correspond to the state at the time of printing. Error excepted.
- The specifications "left" and "right" in the descriptions always refer to the vehicle in the travel direction.
- For further questions about the vehicle and the operator's manual, please contact your service partner at any time.

1.1.2 Understanding These Instructions

This section helps to understand the operator's manual and the illustrations used therein.

Target group

On the one hand, this operator's manual is intended for the operating personnel of the vehicle. It describes the safe and efficient operation of the vehicle.

On the other hand, this operator's manual is intended for the operating company of the vehicle. It gives the information needed to take protective measures for the operating personnel, if necessary, and enable safe use of the vehicle. An operator can also be the operator of the vehicle at the same time.

This operator's manual is also intended for the maintenance personnel of the vehicle. Only maintenance work that may be carried out by the operator is described. Work that is not described must not be carried out. For all other activities, contact the service partner or an authorized service center.

Explanation of symbols

Symbol	Explanation
1., 2., 3...	Indicates an activity. The sequence of the steps must be observed.
⇒	Indicates a result or an intermediate result of an action.
✓	Indicates prerequisites that must be established for the activity.
•	Indicates a list, e.g. if several components are named one after the other.
-	Indicates a sub-list, e.g. if components consist of further components
Ⓢ	Identifies a position, usually a component or control element, in a graphic. The numbering may be sequential or in Roman numerals.
1; A	Indicates the naming of components in explanatory texts. It is identical with the adjacent positions in the illustrations.
 	Indicates a direction of movement or different positions for switches.
▶	Indicates the avoidance of hazards in warning notices.
[▶52]	Indicates a cross-reference in tables. Here e.g. reference to page 52

1.1.2.1 Explanation of symbols

The symbols used in the operator's manual are explained below. The symbols are used exclusively in warning or environmental instructions or information. Warnings must always be observed to protect the operator and third parties from personal injury and damage to property.



Symbol for warnings

This symbol marks general warnings. It is used to alert you of possible hazards, e.g. risks of injury or accidents.



Symbol for explosions

This symbol is a warning symbol that indicates an explosion hazard. It is used to indicate special situations where there is an explosion hazard.



Symbol for crushing

This symbol is a warning symbol that indicates a hazard of crushing. It is used to indicate special situations where there is a hazard of crushing body parts. The hand symbol is used to represent all body parts.

**Symbol for burns**

This symbol is a warning symbol that indicates a hazard of burning. It is used to indicate special situations where there is a risk of burns due to hot surfaces, hot vapors or hot liquids.

**Symbol for electrical voltage**

This symbol is a warning symbol that indicates a hazard as a result electrical voltage. It is used to indicate special situations where there is a risk of injury due to electrical voltage.

**Symbol for indications of technical damage**

This symbol is a warning symbol that indicates a danger of technical damage. It is used to indicate situations where damage to the vehicle or third-party property may occur.

**Symbol for environmental information**

This symbol indicates environmental information. It is used to warn of possible environmental hazards.

**Symbol for information**

This symbol indicates information. This information can include tips on operation, for example. It helps to better understand and use the machine.

1.1.2.2 Abbreviations

Abbreviations that may be used in the instructions are listed below. When an abbreviation is used for the first time, it is first written out in full and the abbreviation is placed in brackets. Common abbreviations (e.g., etc.) are not explained. If necessary, a brief explanation is placed in brackets.

Abbreviation	Meaning
Fig.	Number of the figure beneath an illustration
ABE	National Type Approval (Germany)
GTC	General terms and conditions
ATF	Automatic Transmission Fluid (lubricating oil in the axles)
AVCU	Additional Vehicle Control Unit
OO	Operating hours
CSD	Constant Speed Drive (slow driving device with controlled constant speed)
DGUV	German statutory accident insurance
DOC	Diesel Oxidation Catalyst (component in the system for exhaust gas aftertreatment)
DPF	Diesel particulate filter (component in the system for exhaust gas aftertreatment)
EBE	Authorization for stand-alone operation
ECS	Emission Control System (control of exhaust gas aftertreatment)
ECU	Electronic Control Unit (electronic control unit in the vehicle)
EC	European Community
EGR	Exhaust Gas Recirculation
FOPS	Falling Object Protective Structure
HMI	Human Machine Interface
LED	Light-emitting diode

Abbreviation	Meaning
LWA	Sound power level
LPA	Sound pressure level
MVCU	Multi Variable Control Unit (electronic control unit in the vehicle)
NHN	Normalhöhennull (in Germany the term for the specification of heights above sea level)
ROPS	Roll Over Protection Structure
SAE	Society of Automotive Engineers (viscosity class of oils)
SCR	Selective Catalyst Reduction (exhaust gas aftertreatment with urea solution)
StVZO	Road Traffic Licensing Regulations

1.1.3 Storing the operator's manual

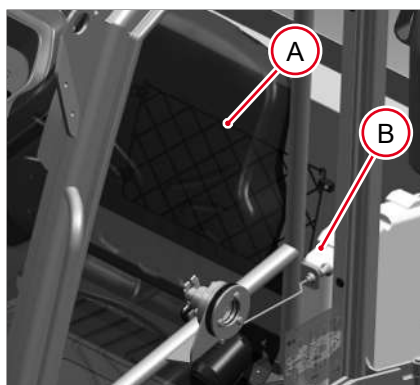


Fig. 1: Storage location for the operator's manual

The operator's manual and supplementary data, if any, form part of the vehicle and must be readily available to the operator at all times. The vehicle is equipped with a storage location for the operator's manual.

The storage location is at position **A** on the driver's cab.

For vehicles with document box **B**, the operator's manual is kept in it.

1.1.4 Information for the buyer and operating company

- The buyer or operating company is responsible for the user's/ operators' training in safe working on and with the vehicle.
 - We recommend repeating training at regular intervals.
- The buyer or operating company is responsible for ensuring that any additional safety regulations applicable in the country of use of the vehicle are followed.
- The operator in the Federal Republic of Germany is obliged to check regularly the vehicle and associated attachments to ensure they are in proper condition and safe to use.
 - In other countries, observe the relevant national regulations.

1.1.5 Information for the operator

- You must always obey the safety regulations in this operator's manual and the safety rules applicable in each case for operating the vehicle.
- The vehicle may only be operated by persons who are physically, mentally and professionally suited for this work.
- Persons under the influence of alcohol or drugs may not use the vehicle.
- The operator is the person operating and/or driving the vehicle.
- Before using the vehicle for the first time, the operator must receive the vehicle instructions.
- The operator must carefully read and understand the operator's manual before the first drive or the first operation. In particular, the chapter on safety [see Safety on page 17](#).
- Before working with the vehicle, operators must familiarize themselves with all the control elements and their functions, and with the handling of the vehicle.
- Before commissioning the vehicle, the operator of the vehicle must ensure that it is in a perfect condition, and during operation, the operator must observe the regulations regarding operation.
- The operator is responsible for ensuring that the vehicle and its use do not pose a risk.
- Work on the vehicle may only be performed by instructed technically trained personnel that has been authorized by the operating company. Any person involved in operation, care, maintenance, servicing, repair work or transport of the vehicle must read, understand and follow the complete instructions in the operator's manual and in particular the safety instructions.
- Observe and follow the legal regulations of your country.

1.2 Warranty and liability

1.2.1 Warranty

Warranty claims can be made only if the conditions of warranty have been observed. They are included in the General Conditions of Sales and Delivery for new vehicles and spare parts sold by the dealers. Furthermore, the instructions of this operator's manual are to be observed.

1.2.2 Limitation of liability

In the event of the following infringements, the manufacturer disclaims any liability for personal injury and damage to property:

- Actions contrary to this operator's manual.
- Non-designated use
- Deployment of untrained personnel.
- Use non-approved spare parts and accessories.
- Improper handling.
- Structural changes of any kind.
- Non-observance of the General Terms and Conditions (GTC).

2 Usage

2.1 Use of the vehicle

2.1.1 Designated use

The following section describes the area of application of the vehicle. The listed works were classified by the manufacturer as intended and thus as safe.

Read this operator's manual carefully prior to the first drive.

Always work carefully and cautiously with the vehicle. This effectively prevents accidents.

The vehicle has been designed and built in accordance with state-of-the-art standards and the recognized safety regulations. Nevertheless, its use can pose a hazard to life and limb of the operator or of third parties, or cause damage to the vehicle and to other material property.

The vehicle may only be operated in accordance with its intended purpose, safety and danger-consciously, taking into account the operator's manual and in a technically perfect condition. In particular, faults which could impair safety must be rectified immediately.

The vehicle is used to carry out work cycles. A work cycle consists of picking up, raising, transporting and unloading material. The material must correspond to the use of the attachment, e.g. move solid earth with only one earth bucket. The safety instructions, warning notices and regulations listed in this operator's manual must be observed for each work cycle.

Approved attachments can change the intended use of the vehicle (e.g. Work platform). The designated use of the vehicle therefore depends on the attachments available. Ensure that only attachments approved for the vehicle are used with any necessary additional equipment.

The vehicle is approved for lifting gear applications if the equipment required for this purpose is available. No hooks, eyelets or other lifting equipment may be attached to the attachment tools or the loader unit. If this is not observed, the vehicle loses its warranty and registration.

Designated use also includes observing all notes and safety instructions in this manual as well as observing the prescribed care and maintenance instructions.

Any use that exceeds or is not in accordance with the intended purpose is considered improper.

2.1.2 Unintended use

Not using the vehicle according to its designated use means that it is used for an application that is not specified by the manufacturer. Therefore, this is misuse in the terms of the Machinery Directive.

Alone the operator and owner, and not the manufacturer, shall be liable for damage resulting from this.

The following operations may constitute misuse of the vehicle.

E.g.:

- The use of areas and rooms that are not described as work or maintenance areas in this operator's manual.
- Operating the vehicle although the operator is not seated.
- Vehicle and attachment modifications without proper authority.
- The installation of additional equipment that has not been authorized or released.
- Use as carrier vehicle for attachments not authorized or approved by the manufacturer.
- Lifting and transporting people.
- Use as demolition machine.
- Use for spraying or sprinkling.
- Use for forestry applications.
- Use in waters or floodplains.
- Use for below-ground or mining applications.
- Use in enclosed areas.
- Use in contaminated areas.
- Use in potentially explosive areas.
- Vehicle travel with liquid material in the bucket.
- Raising heavy loads (overload).
- Carrying out operating, adjustment, cleaning or maintenance work contrary to the information given in operator's manual.
- Carrying out maintenance work or troubleshooting while drives or diesel engines are running.
- Non-observance of safety and warning notices in this operator's manual or on the vehicle (safety labels).
- Maintenance and repair work by untrained personnel.
- Use of non-approved or non-original spare parts.

If necessary, a hazard analysis of the intended use by the operator can provide clarification.

2.1.3 Driving license

Vehicles may only be driven on public roads if the operator is in possession of a driving license as defined by national traffic laws.

In the Federal Republic of Germany, there are the following driving license classes in accordance with Section 6 of the German Driving License Ordinance (FeV):

- Driving license category L
 - Self-propelled work machines up to 25 km/h
 - Agricultural or forestry tractors up to 40 km/h (with trailer 25 km/h)
- Driving license category C
 - Motor vehicles with over 3500 kg gross weight rating (with trailers up to 750 kg)
- Driving license category C1
 - Motor vehicles between 3500 kg and 7500 kg gross weight rating (with trailers up to 750 kg)
- Driving license category CE
 - Motor vehicles with over 3500 kg gross weight rating (with trailers over 750 kg)
- Driving license category T
 - Self-propelled work machines for agriculture and forestry up to 40 km/h
 - Tractors and agricultural or forestry machinery up to 60 km/h

In other countries, observe the relevant national regulations.

2.1.4 License and identification

2.1.4.1 Vehicle registration



Information

If non-approved attachments are fitted or if parts of the quick-change system, attachments whose condition is prescribed or whose operation poses a risk to persons are subsequently changed or replaced, this may affect the operating permit and warranty.

The vehicle can be registered in the EU member states as a self-propelled work machine. For approval in other countries, the relevant national regulations of the country must be obtained and observed.

If the machine is operated as a “self-propelled work machine”, please refer to the National Type Approval (Germany) or the Data Confirmation for the equipment items (attachments) and specific requirements!

When using attachments that are not listed in this operator's manual, compliance (stability check) according to the EC machinery directive or the standard EN 474-3 must be checked and documented by an authorized service center. Furthermore, the requirements for operation on public roads must be ensured, such as field of vision, lighting, dimensions and weights.

Refer to the information in this operator's manual for the stability test.

2.1.4.2 On-board documents

German traffic regulations (StVZO) require to have the following documentation on board:

- German ABE (Allgemeine Betriebserlaubnis = general operating license) or data confirmation
- Or registration certificate I, if applicable
- Driving license
- Test report according to DGUV regulation 70 section 57 clause 2 of the accident prevention regulation "vehicles"
- Operator's manual

Observe the legal regulations of your country.

2.1.4.3 On-board equipment

In Germany, § 53 StVZO requires that the following equipment be supplied by the operating company and fitted on the vehicle:

- one warning triangle with design certification
- one warning light with design certification
- one wheel chock that matches the wheels of the vehicle (§41 (14) StVZO)
- one safety vest made of yellow or orange fluorescent material with reflecting strips
- one first-aid kit in compliance with DIN 13 164. 1

Observe the legal regulations of your country.

2.1.4.4 Identification of the vehicle

In the Germany, self-propelled work machines capable of speeds of more than 20 km/h are required, pursuant to § 3 FZV (German vehicle licensing ordinance), to be fitted with their own registration plates in accordance with § 8 FZV.

§ 4b of FZV (German vehicle licensing ordinance) requires owners of self-propelled work machines with maximum speeds below 20 km/h to affix their first name, surname and place of residence (company and registered office) in indelible print on the left side of their machines.

Observe the legal regulations of your country.

2.1.4.5 Warning identification

In the Germany, according to § 52 clause 4.1 of StVZO (*Road Traffic Licensing Regulations*), machines that are used on public roads for the construction and maintenance of roads, and for the cleaning of roads or facilities, must be fitted with the red and white warning identification as per DIN 30 710, in connection with a yellow rotating beacon.

Observe the legal regulations of your country.

2.1.4.6 Vehicle inspections

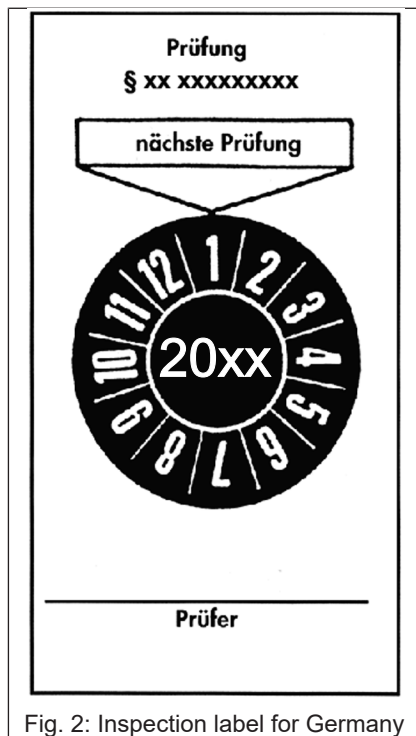


Fig. 2: Inspection label for Germany

In the Federal Republic of Germany the safety regulations, e.g. the accident prevention regulations "Deutsche Prüfstelle für Land- und Forsttechnik" (DPLF) and the accident prevention regulations "Vehicles" (DGUV regulation 70 § 57 Abs. 1) must be observed for the operation of the vehicle.

In Germany, legislation, supplemented by the technical rules for operational safety (TRBS) 1201 and the accident prevention regulations (DGUV regulation 1), requires all machine operators to have all machines and equipment inspected regularly (BetrSichV § 10).

Inspections must be performed as required, but at least once a year, by an expert and must be documented in written form.

Subsequent inspections of detected defects must be performed, too.

The competent inspection authority may require the inspection report to be available at the place where the vehicle is used.

As evidence of the inspection, affix an inspection label on the vehicle for evidence (see example on the left). The inspection label can be acquired from the relevant inspection authorities.

Bear in mind that all work equipment is inspected, not only the vehicle but also all technical auxiliary means, tools and attachments. (Definition: Work equipment is defined as all tools, attachments, machines or systems.)

This requirement is met, for example, if the results are documented in a test logbook, a test log file or in a test report; see also policy of German employers' liability insurance association for construction engineering "Inspection of vehicles by experts" (BGG 916).

Failure to observe this results in loss of warranty, liability and certification for the vehicle.

Observe the legal regulations of your country.

2.2 Limits of the vehicle

2.2.1 Climatic limits of the vehicle

The operating and storage temperature range for the vehicle is between -15 °C and +40 °C.

Operating temperatures below -15 °C or above +40 °C require special equipment or vehicle fluids (fuel, engine oil and hydraulic oil).

The service partner is available at any time to answer any further questions regarding use in extreme temperature ranges.

3 Safety

3.1 Safety symbols and signal words

The following symbol indicates safety information. It is used to warn of possible personal dangers.



⚠ DANGER

DANGER indicates a situation that leads to death or serious injury if it is not avoided.

Consequences of non-compliance.

- ▶ Preventing injury or death.



⚠ WARNING

WARNING indicates a situation that can lead to death or serious injury if not avoided.

Consequences of non-compliance.

- ▶ Preventing injury or death.



⚠ CAUTION

CAUTION indicates a situation that can lead to injury if not avoided.

Consequences of non-compliance.

- ▶ Preventing injuries.



NOTICE

NOTE indicates a situation that leads to material damage if not observed.

Consequences of non-compliance.

- ▶ Preventing property damage.

3.2 Qualification of operating personnel

3.2.1 Owner's duties

- Only allow specifically authorized, trained and experienced persons to operate, drive and perform maintenance on the vehicle.
- Do not allow persons to be trained or instructed by anyone other than an authorized and experienced person.
- Have persons to be trained or instructed practice under supervision until they are familiar with the vehicle and its behavior (for example with the steering and braking behavior).
- Access to the vehicle or vehicle operation is prohibited for children and persons under the influence of alcohol, drugs or medicine.
- Clearly and unequivocally define the responsibilities of the operating and maintenance personnel.
- Clearly and unequivocally define the responsibilities on the work area, also in view of traffic regulations.
- Give the operator the authority to refuse safety instructions from third parties.
- Have the vehicle serviced and repaired only by an authorized service center.

3.2.2 Required knowledge of the operator

- The operator is responsible for third parties.
- Avoid any operational mode that might pose a risk to safety.
- The specific national driving license is required.
- The vehicle may only be operated by authorized and safety-conscious persons.
- The operator and owner are obligated to operate the vehicle only in a safe and working condition.
- All persons working on or with the vehicle must have read and understood the safety instructions in this operator's manual before starting work.
- Follow, and instruct the operator in, legal and other mandatory regulations relevant to accident prevention.
- Observe and instruct the operator in regulations regarding road traffic and environmental protection.
- Use only the defined accesses for getting on and off the vehicle.
- Be familiar with the emergency exit of the vehicle.

3.2.3 Preparatory measures for the operator

- Before starting, check the vehicle whether it can be driven and operated safely.
- Increased caution if the driver has untied, long hair or wears jewelry.
- Wear close-fitting work clothes that do not hinder movement.

3.3 Conduct

Prerequisites for operation

- The vehicle has been designed and built in accordance with state-of-the-art standards and the recognized safety regulations. Nevertheless its use can cause danger to the operator or third parties, or damage to the vehicle.
- Store this operator's manual in the place provided for this in or on the vehicle. Immediately replace a damaged or illegible operator's manual and any supplements to it.
- The vehicle must only be operated in accordance with its designated use and the instructions set forth in this operator's manual.
- The operator and owner are obligated to operate the vehicle only in a safe and working condition.
 - If a damage or malfunction occurs during operation, put the vehicle out of operation immediately and secure it against restart.
 - Have all malfunctions jeopardizing the safety of the operator or third parties immediately repaired by an authorized service center.
- Do not put the vehicle into operation or operate it after an accident; have it inspected for damage by an authorized service center.
 - Have the seat belt replaced by an authorized service center after an accident, even if there is no visible damage.
 - Pay particular attention to damage to the cab and protective structures.
- Keep climbing aids (handholds and footholds) free from dirt, snow and ice.
- The owner is responsible for requiring the operating and maintenance personnel to wear protective equipment as required by the circumstances.



3.4 Operating

3.4.1 Preparative measures

- Operation is only allowed with correctly installed and intact protective structures.
- Keep the vehicle clean. This reduces injury, accident and fire hazards.
- Safely store objects you carry with you in the places provided for this (for example in the storage compartment, drinks holder).
- Do not carry objects with you that protrude into the operator's work space. They can create another danger in case of an accident.
- Observe all safety and information labels.
- Start and operate the vehicle only with the seat belt fastened and only from the place provided for this.
- Check the condition and the fastening of the seat belt. Have malfunctioning seat belts and mounting hardware replaced by an authorized service center.
- Before starting work, adjust the seating position so that all control elements can be reached and fully operated.
- Only make personal settings when the vehicle is at a standstill (e.g. seat, steering column).
- Ensure that all safety devices are properly installed and functional before starting work.
- Before starting work or after interrupting work, ensure that the brake, steering, signaling and light systems are functional.
- Before commissioning the vehicle, ensure that nobody is in the danger zone.

3.4.2 Job site

- The operator is responsible for third parties.
- Before starting work, familiarize yourself with the job site. This applies to, for example:
 - Obstacles in the work area and vehicle travel area.
 - Any barriers separating the job site from public roads.
 - Load-bearing capacity of the soil.
 - Existing overhead and underground lines.
 - Special operating conditions (e.g. dust, steam, smoke, asbestos).
- The operator must know the maximum dimensions of the vehicle and the attachment.
- Maintain a safe distance (e.g. from buildings, edges of building pits).
- When working in buildings or in enclosed areas, pay attention to:
 - Ceiling heights and passage heights.
 - Width of the entrances and passages.
 - Maximum ceiling load and maximum ground load.
 - Sufficient room ventilation (e.g. danger of carbon monoxide poisoning).
- Use existing visual aids to stay aware of the danger zone.
- In conditions of darkness and poor visibility, switch on existing work lights and ensure that motorists are not blinded by these lights.
- If the existing lights of the vehicle are not sufficient for performing work safely, ensure additional lighting of the job site.
- Hot vehicle parts and exhaust gases increase the risk of fire.

3.4.3 Danger zone

- The danger zone is the area in which persons are at risk by the movements of the vehicle, the attachment or the load.
- The danger zone also includes the area that can be reached by falling load, a falling device or ejected parts.
- Extend the danger zone sufficiently in the immediate vicinity of buildings, scaffolds or other elements of construction.
- Seal off the danger zone should it not be possible to keep a sufficient safety distance.
- When persons are in the danger zone, stop work immediately.

3.4.4 Transporting passengers

- Transporting passengers with the vehicle is not allowed.
- Transporting persons on and in attachments is not permitted.
- Transporting persons on and in trailers is not permitted.

3.4.5 Mechanical integrity

- The operator and owner are obligated to operate the vehicle only in a safe and working condition.
- Only operate the vehicle if all protective and safety-related equipment (e.g. protective structures such as cab or roll bar, detachable protective devices) are installed and functional.
- Check the vehicle for visible damage and defects.
- If a damage or malfunction occurs during operation, put the vehicle out of operation immediately and secure it against restart.
- Have all malfunctions jeopardizing the safety of the operator or third parties immediately repaired by an authorized service center.

3.4.6 Starting the engine of the vehicle

- Start the engine only according to the operator's manual.
- Observe all warning lights and control lights.
- Do not use any liquid or gaseous starting aids (e.g. ether or starting fuel).

3.4.7 Vehicle operation

- Start and operate the vehicle only with the seat belt fastened and only from the place provided for this.
- Put the vehicle into operation only if visibility is sufficient (have another person guide you if necessary).
- When parking on slopes:
 - Travel or work only uphill or downhill.
 - Avoid vehicle travel across a slope, observe the vehicle's permissible inclination (and of the trailer if necessary).
 - Keep loads on the uphill side of the vehicle and as close as possible to it.
 - Keep attachments close to the ground.
- Adapt the travel speed to the circumstances (e.g. the ground conditions, weather conditions).
- There is increased danger during backward vehicle travel. Persons in the blind spot of the vehicle cannot be seen by the operator.
 - Ensure that nobody is in the danger zone when you change the travel direction.
- Never get on a moving vehicle and never jump off the vehicle.

3.4.8 Vehicle travel on public roads and sites

- The specific national driving license is required.
- When driving on public roads or sites, observe the national regulations (e.g. road traffic regulations).
- Ensure that the vehicle is in compliance with the national regulations.
- In order not to blind other motorists, using the existing work lights during vehicle travel on public roads or sites is prohibited.
- When crossing underpasses, bridges, tunnels, e.g. ensure that the clearance height and width is sufficient.
- The mounted attachment must be approved for driving on public roads or sites (see the registration papers).
- When transferring the vehicle on public roads, the attachment must be brought into transport position and emptied.
- The prescribed lighting and protective devices must be mounted on the attachment.
- Take measures against unintentional operation of the working hydraulics.
- If the vehicle has different steering modes, ensure that the mandatory steering mode is selected.

3.4.9 Parking the vehicle

Stopping the engine of the vehicle

- Stop the engine only according to the operator's manual.
- Before stopping the engine, lower the attachment to the ground.

3.4.10 Securing the vehicle

- Unbuckle the seat belt only after stopping the engine.
- Secure the vehicle from rolling away before leaving the vehicle (e.g. parking brake, suitable chocks).
- Remove the starting key and secure the vehicle against unauthorized operation.

3.5 Lifting gear applications

3.5.1 Requirements

- Have loads fastened and the operator guided by a qualified person who has specific knowledge of lifting gear applications and the usual hand signals.
- The person giving instructions to the operator must stay in visual contact with the operator when fastening, guiding or removing the load (maintain visual contact).
- If this not be possible, ask one more person with the same qualifications to guide.
- The operator may not leave his seat as long as the load is raised.

3.5.2 Fastening, guiding and removing loads

- Follow the applicable specific regulations for fastening, guiding and removing a load.
- Wear protective equipment when fastening, guiding and removing loads (e.g. a hard hat, safety glasses, protective gloves, safety shoes).
- Do not place lifting and fastening gear over sharp edges or rotating parts. Loads must be fastened so as to prevent them from slipping or falling.
- Move loads only on horizontal, level and firm ground.
- Move loads close to the ground.
- In order to avoid oscillating movements of loads:
 - Perform smooth, slow movements with the vehicle.
 - Use cables to guide the load (do not use hands to guide).
 - Bear in mind the weather conditions (for example the wind force).
 - Keep a minimum safety distance from objects.
- The operator may allow the load to be fastened and removed only if the vehicle and its attachment are not being moved.
- Danger zones must not overlap with the work zones of other vehicles.

3.5.3 Lifting gear applications

- The vehicle and the attachment must be certified for lifting gear applications.
- Observe the national regulations for lifting gear applications.
- Lifting gear applications are procedures involving raising, transporting and lowering loads with the help of lifting and fastening gear.
- The help of an accompanying person is necessary for fastening, guiding and removing the load.
- There must be nobody under the load.
- Stop the vehicle immediately and stop the engine if persons enter the danger zone.
- Only operate the vehicle in lifting gear applications if the prescribed lifting gear (e.g. joint rod linkage and load hook) and safety equipment are present and functional (e.g. visual and audible warning equipment, line break protection, stability table).
- Use only lifting and fastening gear certified by a test or certification body, observe the inspection intervals. Adhere to the inspection intervals .
- Only use undamaged attachments and shackles. No belts, slings or cables.
- Do not use any lifting and fastening gear that is dirty, damaged or not of sufficient size.
- Do not interrupt the work process with a load attached.

3.6 Trailer operation

- The vehicle must be certified for trailer operation.
- Observe the national regulations for trailer operation.
- The specific national driving license is required.
- Transporting persons on and in trailers is not permitted.
- Observe the maximum permissible drawbar load and trailer load.
- Do not exceed the permissible trailer speed.
- Trailer operation with the towing gear of the vehicle is prohibited.
- Trailer operation changes the vehicle's operating behavior; the operator must be familiar with this and act accordingly.
- Bear in mind the vehicle's steering mode and the trailer's turning circle.
- Before coupling/uncoupling the trailer, secure it to prevent it from rolling away (e.g. with the parking brake, suitable wheel chocks).
- There must be nobody between the vehicle and the trailer when hitching a trailer.
- Couple the trailer onto the vehicle correctly.
- Ensure that all equipment works correctly (for example the brakes, lights).
- Before starting vehicle travel, ensure that nobody is between the vehicle and the trailer.

3.7 Operation of attachments

3.7.1 Attachments

- Only use attachments that are certified for the vehicle or its protective equipment (for example splinter protection).
- All other attachments require the vehicle manufacturer's release.
- The danger zone and the work area depend on the attachment used.
 - See charger operator's manual.
- Secure the load.
- Do not overload the attachment - observe the permitted vehicle payloads.
- Check the correct position of the lock.



3.7.2 Operating

- Transporting persons on/in an attachment is prohibited.
- Installing a work platform is prohibited.
 - Exception: The vehicle is certified and equipped with the necessary safety equipment.
- Attachments and counterweights modify handling, as well as the steering behavior and brake capability of the vehicle.
- The operator must be familiar with these modifications and act accordingly.
- Before starting work, operate the attachment to check that it works correctly.
- Before putting the attachment into operation, ensure that nobody is at risk
- Lower the attachment to the ground before leaving the seat.

3.7.3 Removing and fitting attachments

- Before coupling or uncoupling hydraulic connections:
 - Stop the engine.
 - Releasing the pressure from the working hydraulics.
- Picking up and lowering attachments to the ground requires special care:
 - Pick up and safely lock the attachment in accordance with the operator's manual,
 - Lower the attachment only to firm, level ground and secure it to prevent it from tipping over or rolling away.
- Put the vehicle and the attachment into operation only if:
 - The protective equipment has been installed and is functional.
 - The connections for the lights and the hydraulic system have been established and are functional.
- Carry out a visual inspection of the locking mechanism. Work must not be carried out before correct locking has been clearly established.
- There must be nobody between the vehicle and the equipment when picking up or lowering an attachment to the ground.

3.8 Towing, recovery, loading and transporting

3.8.1 Towing

- Seal off the danger zone.
- Ensure that no one is near the towing bar or cable. The safety distance is equal to 1.5 times the length of the towing equipment.
- Observe the mandatory transport position, permissible speed and itinerary.
- Do not use the towing bore to tow the vehicle.
- A vehicle of at least the same weight category must be used as the tractor vehicle. Furthermore, the tractor vehicle must be equipped with a safe braking system and sufficient tractive power.
- Only use towing bars or cables approved by a testing or certification body. Adhere to the inspection intervals .
- Do not use any towing bars or cables that are dirty, damaged or not of sufficient size.
- Fasten towing bars or cables only at the defined points.
- Tow away only in accordance with this operator's manual to avoid damage to the vehicle.
- When towing on public roads or sites, observe the national regulations (e.g. lighting regulations).

3.8.2 Recovery

- Seal off the danger zone.
- For recovery, hire a towing service or an authorized service center.
- No persons are allowed to be in the area of the recovery equipment. The safety distance is 1.5 times the length of the recovery equipment.
- Do not use the towing device to recover the vehicle.
- Check the recovery equipment for damage before recovery.
- Only use recovery equipment approved by a testing laboratory or certification body. Adhere to the inspection intervals .
- Fasten recovery equipment only at the defined points.
- A vehicle of at least the same weight category must be used as the tractor vehicle. Furthermore, the tractor vehicle must be equipped with a safe braking system and sufficient tractive power.
- After recovery, tow the vehicle only in accordance with this operator's manual in order to avoid damage to the vehicle.

3.8.3 Crane-lifting

- Seal off the danger zone.
- The crane and the lifting gear must have suitable dimensions.
- Take into account the vehicle's overall weight.
- Wear protective clothing and equipment when fastening, guiding and removing the vehicle (for example a hard hat, safety glasses, safety boots).
- Use only lifting and fastening gear certified by a test or certification body, observe the inspection intervals.
- Do not use any lifting and fastening gear that is dirty, damaged or not of sufficient size.
- Visually inspect to ensure that all attachment points are not damaged or worn (e.g. no widening, no sharp edges, no cracks).
- Have loads fastened and crane operators only guided by experienced persons.
- The person guiding the crane operator must be within sight or sound of him.
- Observe all movements of the vehicle and lifting gear.
- Secure the vehicle against unintentional movement.
- Raise the vehicle only after it is safely attached and the signalman has given his approval.
- Use only the slinging points provided for fastening the lifting gear (for example cables, belts).
- Do not attach the vehicle by twining the lifting gear (for example cables, belts) around it.
- Ensure an even load distribution when fastening the lifting gear.
- Ensure that no one is in, on or under the vehicle when loading the vehicle.
- Observe the national regulations.
- Load the vehicle only in accordance with this operator's manual to avoid damage to the vehicle.
- Do not raise a vehicle that is stuck or frozen onto the ground, for example.
- Bear in mind the weather conditions (for example the wind force).

3.8.4 Transporting

- For the safe transportation of the vehicle:
 - The transport vehicle must have a sufficient bearing load and loading surface.
 - The maximum weight rating of the transport vehicle must not be exceeded.
- Use only lifting and fastening gear certified by a test or certification body, observe the inspection intervals. Adhere to the inspection intervals .
- Do not use any lifting and fastening gear that is dirty, damaged or not of sufficient size.
- In order to secure the vehicle on the loading surface, use only the fastening points provided for this purpose.
- Ensure that nobody is in or on the vehicle during transporting.
- Observe the national regulations.
- Bear in mind the weather conditions (e.g. ice, snow).
- Ensure the minimum load on the steering axle(s) of the transport vehicle, and ensure an even load distribution.

3.9 Maintenance

3.9.1 Maintenance

- Observe the intervals prescribed by law and those specified in this operator's manual for routine checks/inspections and maintenance.
- For maintenance activities, ensure that all tools and service center equipment are adapted to the performance of the task described in this operator's manual.
- Do not use any damaged or malfunctioning tools.
- The vehicle and the engine must be stopped during maintenance.
- Once maintenance is over, correctly install safety equipment again that has been removed.
- Wait for the vehicle to cool down before touching components.

3.9.2 Personal safety measures

- Avoid any operational mode that might pose a risk to safety.
- Wear protective equipment (for example hard hat, protective gloves, safety shoes).
- Tie back long hair and remove all jewelry.
- If maintenance on a running engine cannot be avoided:
 - only work in groups of two.
 - Both persons must be authorized and trained for the operation of the vehicle.
 - One person must be seated on the seat and stay in contact with the second person.
 - Keep a safe distance from rotating parts (e.g. from fan blades, belts).
 - Keep a sufficient distance to hot parts (e.g. exhaust system).
 - Perform maintenance only in well-ventilated rooms or rooms with an exhaust-gas suction system.
- Safely lock or support vehicle components before starting work.
- Take special care when working on the fuel system due to the increased risk of fire.

3.9.3 Preparative measures

- Attach a warning label to the control elements (e.g. "Vehicle being serviced, do not start").
- Before performing assembly work on the vehicle, support the areas to be serviced and use suitable lifting and supporting equipment for the replacement of parts over 9 kg.
- Perform maintenance only if:
 - the vehicle is positioned on firm and level ground.
 - the vehicle is secured against rolling away (e.g. parking brake, chocks) and the attachment is placed on the ground.
 - The engine is stopped.
 - the starting key has been removed.
 - the pressure in the working hydraulics has been released.
- If maintenance has to be performed under a raised vehicle or attachment, support the vehicle or attachment (e.g. with a lift platform, trestles) to ensure safety and stability.
- Hydraulic cylinders or jacks alone do not sufficiently secure a raised vehicle or attachment.

3.9.4 Measures for performing maintenance

- Perform only the maintenance described in this operator's manual.
- All work that is not described in this operator's manual must be performed by qualified and authorized technically trained personnel.
- Follow the maintenance plan.
- Always use specially designed or otherwise safety-oriented ladders and working platforms to perform overhead maintenance. Do not use vehicle parts or attachments as a climbing aid.
- Do not use attachments as a lift platform for persons.
- Keep climbing aids (handholds and footholds) free from dirt, snow and ice.
- Disconnect the negative terminal of the battery before working on the electrical system.

3.9.5 Modifications and spare parts

- Do not modify the vehicle and the attachment (e.g. the safety devices, lighting, tires, straightening and welding work).
- Modifications must be approved by the manufacturer and performed by an authorized service center.
- Use only original spare parts.

3.9.6 Protective structures

- The cab, roll bar and protective screen are tested protective structures and may not be changed (e.g. no drilling, bending, welding).
- Perform a visual check according to the maintenance plan (for example check fastenings for damage).
- If damage or defects are detected, have them immediately checked and repaired by an authorized service center.
- Only have protective structures retrofitted or replaced by an authorized specialist workshop.
- Replace self-locking fasteners (for example self-locking nuts) by new ones after removing them.

3.10 Measures for avoiding risks

3.10.1 Tires

- Have repair work on the tires only performed by trained technical personnel.
- Check the tires for correct pressure and visible damage (for example cracks, cuts).
- Check the wheel nuts for tightness.
- Use only approved tires.
- The vehicle must have uniform tires (e.g. tire type, profile, rolling circumference).

3.10.2 Hydraulic and compressed-air system

- Check all lines, hoses and screw connections regularly for leaks and visible damage.
- Splashed oil can cause injury and fire.
- Leaking hydraulic and compressed-air lines can cause the full loss of the braking effect.
- Have damage and leaks immediately repaired by an authorized service center.
- Check the hydraulic hoses at the recommended intervals and have them replaced.

3.10.3 Electrical system

- Use only fuses with the specified current rating.
- In case of damage or malfunction in the electrical system:
 - Put the vehicle out of operation immediately and secure it against restart.
 - Actuate the battery master switch.
 - Disconnect the battery.
 - Have the fault repaired.
- Ensure that work on the electrical system is only performed by technically trained personnel.
- Regularly check the electrical system. Have malfunctions repaired immediately (for example loose connections, scorched cables).
- The operating voltage of the vehicle, the attachment and the trailer must coincide (e.g. 12 V).

3.10.4 Battery

- Batteries contain caustic substances (for example sulfuric acid). When handling the battery observe the specific safety instructions and regulations relevant to accident prevention.
- A volatile oxyhydrogen mixture forms in batteries during normal operation and especially during charging. Always wear gloves and eye protection when working with batteries.
- Do not perform battery maintenance near open flames.
- Perform battery maintenance only in well-ventilated areas (e.g. due to vapors harmful to health, explosion hazard).
- Starting the vehicle with battery jumper cables is dangerous if performed improperly. Observe the safety instructions regarding the battery.

3.10.5 Safety instructions regarding internal combustion engines

- Internal combustion engines present special hazards during operation and fueling.
- Failure to follow the warnings and safety instructions can cause serious injury or death.
- Keep the area around the exhaust system free of flammable materials.
- Check the engine and fuel system for leaks (e.g. loose fuel lines). Don't start or let the engine run in case of leaks.
- Breathing the exhaust fumes causes death very quickly.
- Engine exhaust fumes contain invisible and odorless gases (e.g. carbon monoxide and carbon dioxide).
 - Operate the vehicle only on appropriately ventilated areas.
- The respective safety instructions must be observed when using the vehicle in areas where there may be explosion hazards.
- Do not touch the engine, exhaust system and cooling system as long as the engine is still running or has not cooled down yet.
- Do not remove the filler cap of the radiator when the engine is running or hot.
- The coolant is hot, under pressure and can cause serious burns.

3.10.6 Bleeding the fuel system and refueling

- Do not bleed the fuel system or refuel near open flames.
- Bleed the fuel system and refuel only in well-ventilated areas (e.g. due to vapors harmful to health, explosion hazard).
- Wipe away fuel spills immediately (e.g. due to fire hazard, slipping hazard).
- Firmly close the fuel tank cap; replace a malfunctioning fuel tank cap.

3.10.7 Handling oil, grease and other substances

- Observe the safety data sheet when handling oils, greases and other chemical substances (e.g. battery acid, coolant, urea solution).
- Wear appropriate protective equipment (e.g. protective gloves, safety glasses).
- Be careful when handling hot vehicle fluids and consumables – there is a risk of burning and scalding.
- Only work with corresponding personal protective equipment, e.g. respiratory protection in exposed areas (e.g. dust, steam, smoke, asbestos).
- Do not operate the vehicle in radioactively, biologically or chemically contaminated areas.

3.10.8 Fire hazard

- Fuel, lubricants, grease and coolants are flammable.
- Do not use flammable detergents.
- Keep the area around the exhaust system free of flammable materials.
- Hot vehicle parts and exhaust gases increase the risk of fire.
 - Stop and park the vehicle only in safe areas.
- If the vehicle is equipped with a fire extinguisher, have it installed in its specific location.
- Keep the vehicle clean. This reduces fire hazards.

3.10.9 Working near electric supply lines

- Before performing any work, the operator must check whether there are any electrical supply lines in the designated work area.
- If there are electrical supply lines, only a vehicle with cab may be used (Faraday cage).
- Keep a safe distance from existing electric supply lines.
- If this is not possible, the operator must initiate other safety measures in agreement with the owner or operating company of the supply lines (e.g. shutdown the power).
- If supply lines are exposed, they must be fastened, supported and secured accordingly.
- If live supply lines are touched nevertheless:
 - do not leave or touch the cab (Faraday cage).
 - If possible, drive the vehicle out of the danger zone.
 - Warn others against approaching and touching the vehicle.
 - Have the live wire de-energized.
 - Do not leave the vehicle until the supply lines that have been touched or damaged have been safely de-energized.

3.10.10 Working near non-electric supply lines

- Before performing any work, the operator must check whether there are any non-electrical supply lines in the designated work area.
- If non-electrical supply lines exist, the operator must initiate safety measures in agreement with the owner or operating company of the supply lines (e.g. shutdown the supply line).
- If supply lines are exposed, they must be fastened, supported and secured accordingly.

3.10.11 Behavior during thunderstorms

- Stop vehicle operation if a thunderstorm is gathering.
 - Stop the vehicle, secure and leave it, and avoid being near it.

3.10.12 Noise

- Observe the noise regulations (for example during applications in enclosed premises).
- Bear in mind external sources of noise (compressed-air hammer, concrete saw).
- Do not remove the sound baffles of the vehicle and attachment.
- Have damaged sound baffles immediately replaced (e.g. an insulating mat, muffler).
- Before starting work with the vehicle or attachment, find out about its noise level (e.g. label) - wear hearing protection.
- Do not wear ear protectors during vehicle travel on public roads or sites.

3.10.13 Cleaning

- Risk of injury from compressed air and high-pressure cleaners.
 - Wear appropriate protective equipment.
- Do not use any dangerous and aggressive detergents.
 - Wear appropriate protective equipment.
- Operate the vehicle only in a clean condition.
 - Keep climbing aids (handholds and footholds) free from dirt, snow and ice.
 - Keep the cab windcreens and visual aids clean.
 - Keep the headlights and work lights clean.
 - Keep the control elements and control lights clean.
 - Keep the safety and information labels clean, and replace damaged and missing labels by new ones.
- Perform cleaning work only if the engine is stopped and cooled down.
- Bear in mind sensitive components and protect them accordingly (e.g. electronic control units, relays).



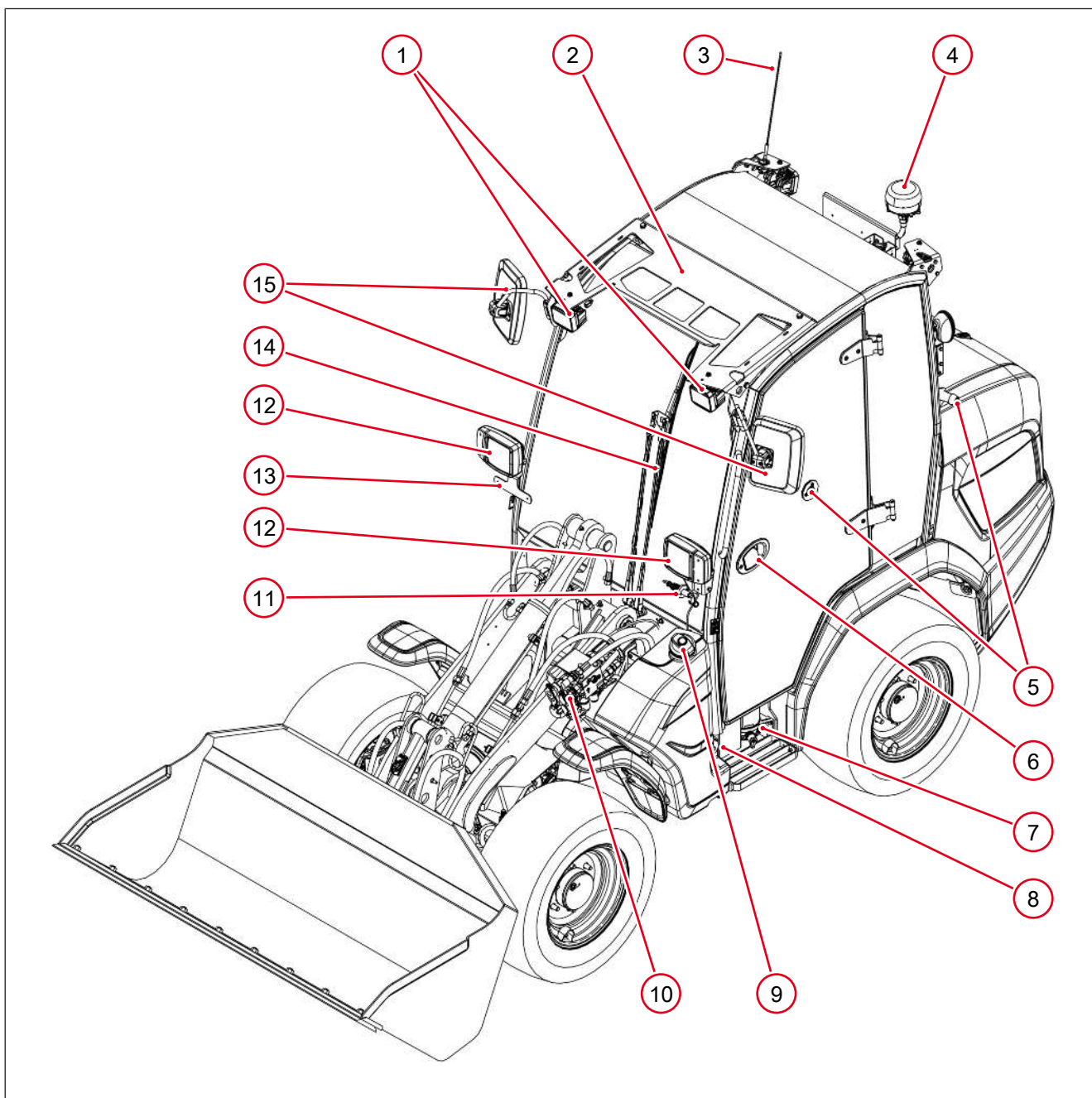
4 Vehicle Description

4.1 Vehicle view

4.1.1 Vehicle views

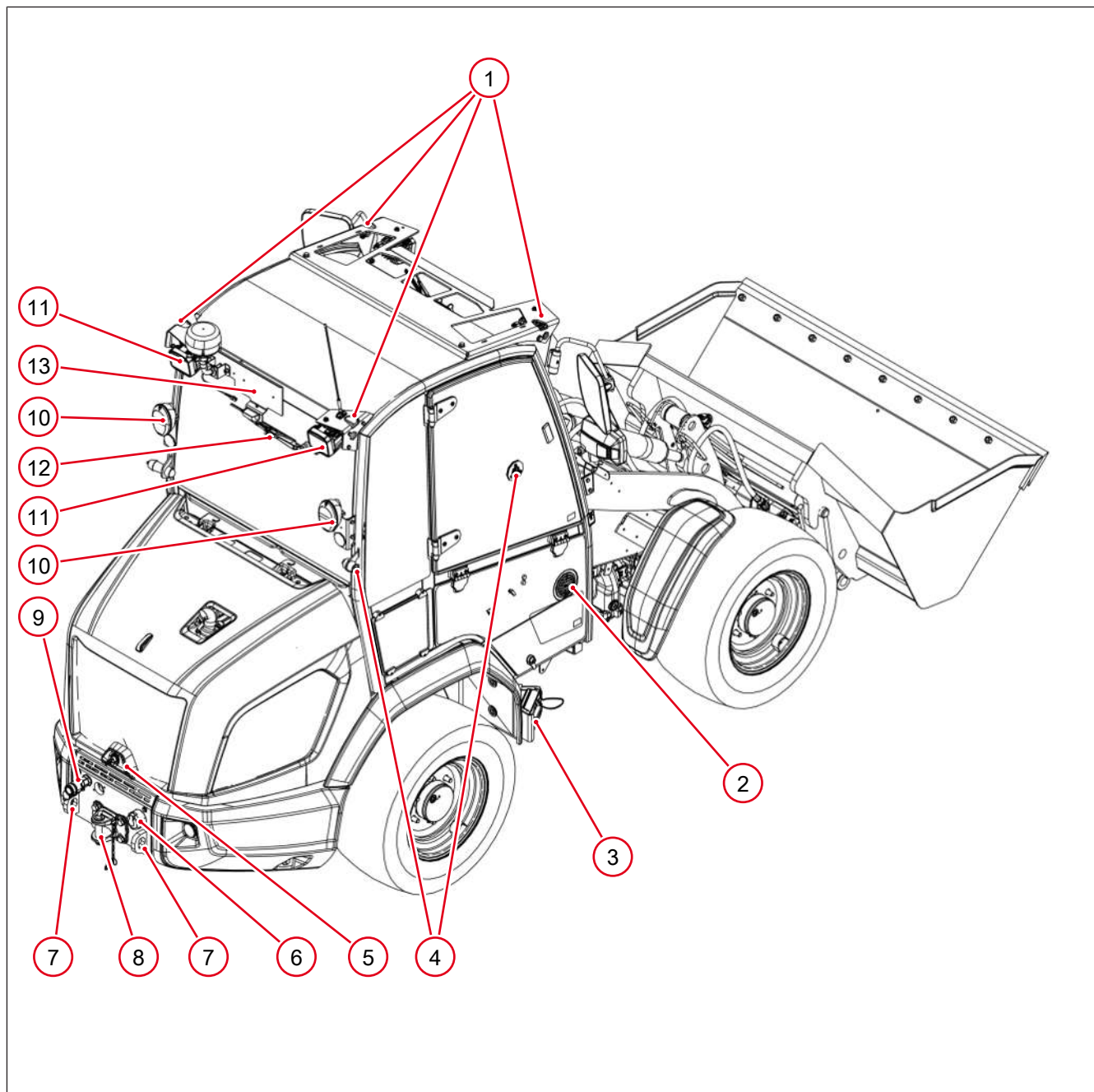
The following vehicle views contain all components that may be mounted on the outside of the vehicle.

Vehicle view from the front



1 Work light left/right front	2 FOPS protective screen
3 Antenna	4 Rotating beacon
5 Door-stay (cab door)	6 Door handle with lock (cab door)
7 Central lubrication system or grease nipple	8 Socket for hydraulic lock oil preheating
9 Filler fuel tank	10 Hydraulic connections load system
11 Battery disconnect switch positively separated in not installed in the engine compartment	12 Headlights left/right with turn signal
13 License plate holder	14 Window wiper
15 Rearview mirror left/right	

Vehicle view from the rear



1 Loading eye

2 Air filter

3 Wheel chock

4 Side window retainer

5 Lock engine cover

6 Socket

7 Rear lashing eyes (left/right), rear towing gear

8 Towing gear

9 Compressed air connection

10 Brake light, tail light, turn signal with reflector

11 Work light left/right rear

12 Window wiper

13 Bracket with lighting for license plate

4.2 Brief description

4.2.1 Variant and trade name

The vehicle is identified by two designations.

Variant designation	Trade name
The variant designation is printed on the type plate.	The trade name is affixed to the vehicle.
W03-01	5045
W03-02	5045L

4.2.2 Main components of the vehicle

- Three cylinder diesel engine, water-cooled
- Maximum speed depending on the model 20 km/h or 30 km/h.
- Hydraulic power steering with emergency steering features
- Load system with power coupler

The vehicle can be equipped with the "Telematic" function (transmission of operational data, location, etc. via satellite)! Please contact your sales partner if you require information on the "Telematic" function.

- ROPS/FOPS certified cab
 - ROPS is the abbreviation of the English term: Roll Over Protective Structure.
 - FOPS is the abbreviation of the English term: Falling Object Protective Structure (protective structure against falling objects)

4.2.3 Cooling system

In the engine compartment, there is a combined water/hydraulic oil cooler that cools the diesel engine and hydraulic oil. The 33-kW engine has an additional intercooler that cools the combustion air of the engine.

Control lights and control displays in the instrument panel of the vehicle ensure that the engine and hydraulic oil temperature can be constantly monitored.

4.2.4 Hydraulics

The hydraulic system can be equipped with control devices, pressure relief valves, pipe rupture protection devices, filters and coolers. Depending on the vehicle equipment, various plug-in couplings are fitted at the front and rear of the vehicle for connecting hydraulically operated attachments.

The vehicle has various hydraulic systems that are fed from a hydraulic oil tank:

- Hydrostatic drive system
- Working hydraulics and steering hydraulics with gear pump

Hydrostatic drive system

Adjustment is automatic and continuous, but depends on engine speed and load. The travel speed is aligned with the speed of the engine and the load of the vehicle.

Depending on the load of the vehicle, the variable displacement pump is automatically regulated back so that the most favorable torque is always maintained. The higher the load on the vehicle (for example during loading work or uphill vehicle travel), the more the achieved maximum speed is reduced. This type of vehicle regulation makes the best possible use of the entire power range.

Working and steering hydraulics

The flange-mounted gear pump for working hydraulics and hydrostatic four-wheel steering is also driven via the variable displacement pump (drive shaft). The flow rates of this pump depend on the rpm of the diesel engine.

During work operation, the diesel engine power can be output solely to the gear pump for the working hydraulics and the steering system. This is enabled by a so-called inch valve, which activates upon actuating the brake/inching pedal and reduces or shuts down the power consumption of the drive system. The full engine power is thereby available to the loader unit by pressing the accelerator pedal while simultaneously actuating the brake/inching pedal.

4.2.5 Steering system

The steering is designed as a kingpin steering system on the front and rear axles. It is operated hydraulically via a steering orbitrol and double-acting hydraulic cylinders.

There are different steering modes available for the steering system.

- Front axle steering
- Four-wheel steering
- Diagonal steering

Emergency steering feature

The steering system is only operational when the engine is running normally.

The vehicle can still be steered if the diesel engine or the pump drive breaks down. However, operating the steering system then requires greater strength and the steering will only respond slowly. Take this into account especially when towing the vehicle. Adjust the towing speed to the changed steering behavior (walking pace)!

4.2.6 Loader unit

The loader unit consists of a lifting frame and the power coupler system for attachments.

The hydraulic functions of the loader unit are carried out with various hydraulic cylinders. Various hydraulic connections for attachments with hydraulic functions are located on the loader unit. The loader unit also includes the attached attachment.

4.2.7 Cab

The cab is tested with category 1 ROPS/FOPS protection.

- ROPS is the abbreviation for: Roll Over Protective Structure.
- FOPS is the abbreviation for Falling Object Protective Structure.

The cab contains the seat for the operator and the operating and control elements.

Important information about the cab:

- The cab offers no protection against hazardous substances.
- Keep climbing aids (handholds, footholds) free from dirt, snow and ice.
- The cab does not provide sufficient standard protection against falling trees and branches or objects entering or protruding into the cab. The use of the vehicle for forest work is therefore not permitted.
- If the driver's cab is damaged in an accident (deformation), it must not be repaired but replaced by an authorized service center.
- It is forbidden to pierce, weld or cut elements of the cab, as these operations alter the cab and it therefore no longer corresponds to the officially approved type ROPS / FOPS.
- The driver's view is restricted by attaching an additional protective screen to the front window. For this reason, the protective screen must be dismantled before driving on public roads.

4.2.7.1 Fire extinguisher



Fig. 3: Installation site for the fire extinguisher

The fire extinguisher is not included in the vehicle's standard equipment. Only have the fire extinguisher retrofitted by an authorized specialist service center. Operate the fire extinguisher according to the instructions printed on the fire extinguisher.

To maintain the functionality of the fire extinguisher, follow the instructions below:

- Have fire extinguishers checked regularly or refilled. A corresponding test badge is located on the container.
- Only use fire extinguishers in an emergency.
- If the fire extinguisher has been used, have it checked immediately by an authorized service center and refilled. It may be necessary to replace it with a new fire extinguisher.

4.2.8 Electrical system

The electrical system operates at a voltage of 12 V. Consumers and their supply circuits are protected with fuses.

4.3 Operating elements at the operator station

4.3.1 Information on the operating elements



⚠ WARNING

Risk of accidents due to damaged control elements and non-functioning warning lights and control lights!

Damaged control elements, control lights and warning lights cannot function properly. This may result in accidents that could result in serious injury or death.

- ▶ Have defective operating elements repaired immediately by an authorized service center.
- ▶ Defective warning lights and control lights must be repaired immediately by an authorized service center.

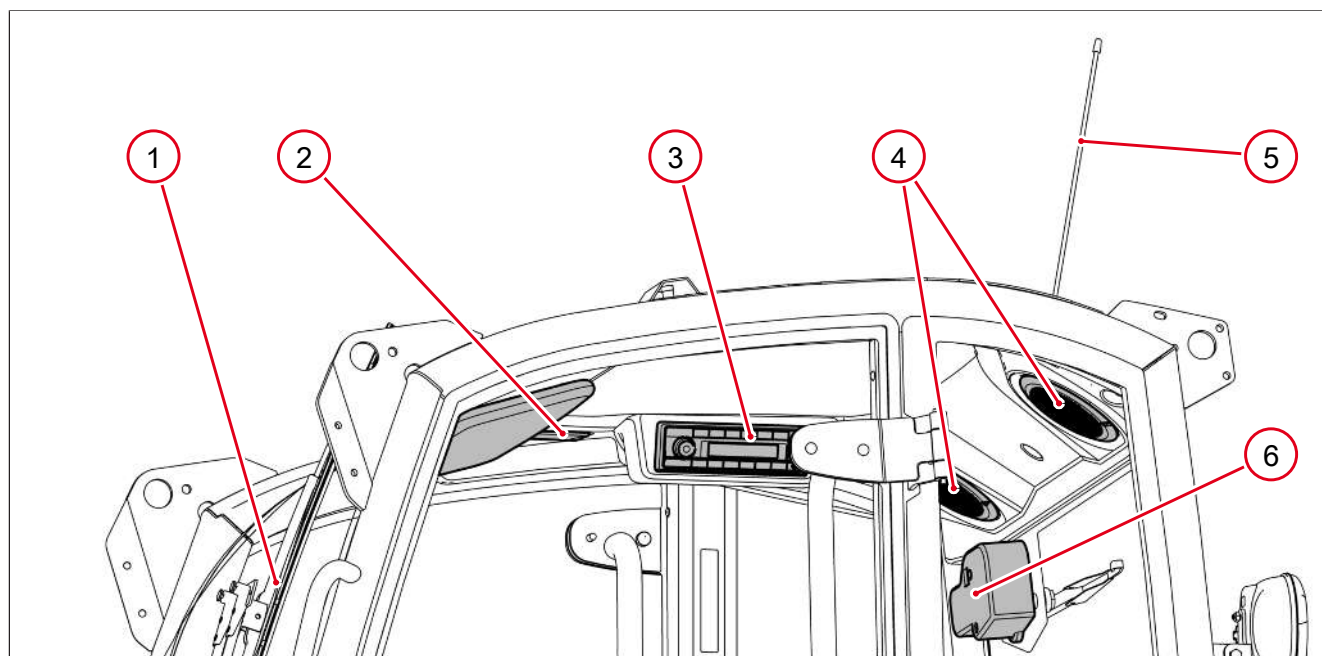
The description contains information about the functions of the warning and control lights and the control elements in the cab.

The vehicle is not equipped with all options described in this operator's manual.

The options described in this operator's manual are not available in all countries.

The configuration of the switch panels/keypads may vary depending on the equipment of the vehicle.

4.3.2 General overview of control elements



1 Front window wiper

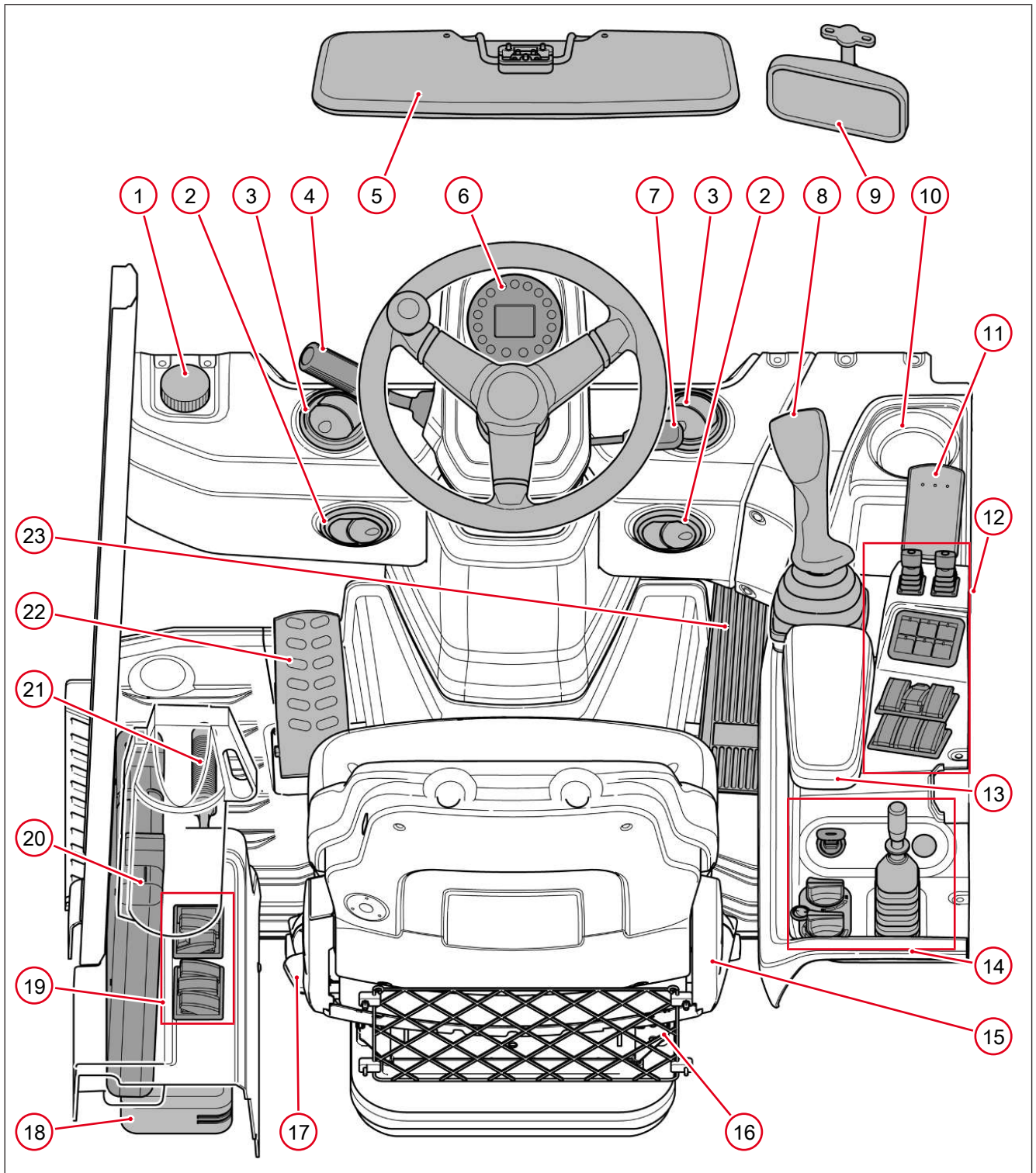
2 Interior light

3 Radio

4 Speaker for radio left/right

5 Radio aerial

6 Wiper motor with switch for rear window wiper



4.3 Operating elements at the operator station

1 Window wiper tank	2 Cab air nozzle to the lower left/right
3 Cab air nozzle to the front left/right	4 Steering column switch for the turn signal, window wiper, horn
5 Sun visor	6 Display instrument with digital display
7 Steering column adjustment	8 Joystick
9 Inside mirror	10 Beverage holder
11 Equipcare Dual ID keypad	12 Switch console right
13 Relays and fuses	14 Operation of heating/fan, steering system, starting key
15 Operator seat	16 Storage net for operator's manual
17 Seat belt on the driver's seat	18 Storage compartment, tool box, first-aid kit
19 Switch console left	20 Document box
21 Parking brake	22 Brake/inching pedal
23 Gas pedal	

4.3.3 Switch console right

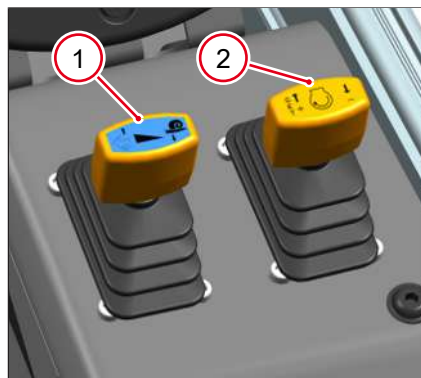


Fig. 4: Switches for cruise control and manual throttle

- | | |
|-----------------------------|-----------------------------|
| 1 Lever for cruise control. | 2 Lever for manual throttle |
|-----------------------------|-----------------------------|

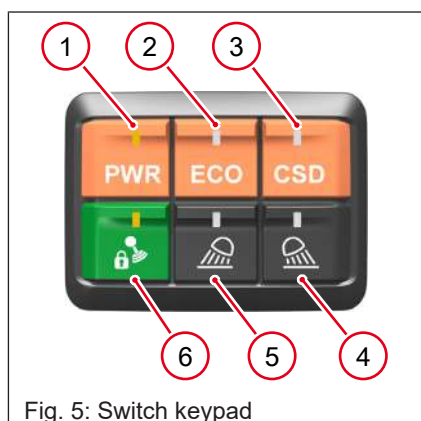


Fig. 5: Switch keypad

- | | |
|------------------------|---------------------------------|
| 1 Power mode | 2 Eco mode |
| 3 Constant-speed drive | 4 Working light rear |
| 5 Working light front | 6 Lock working hydraulics total |

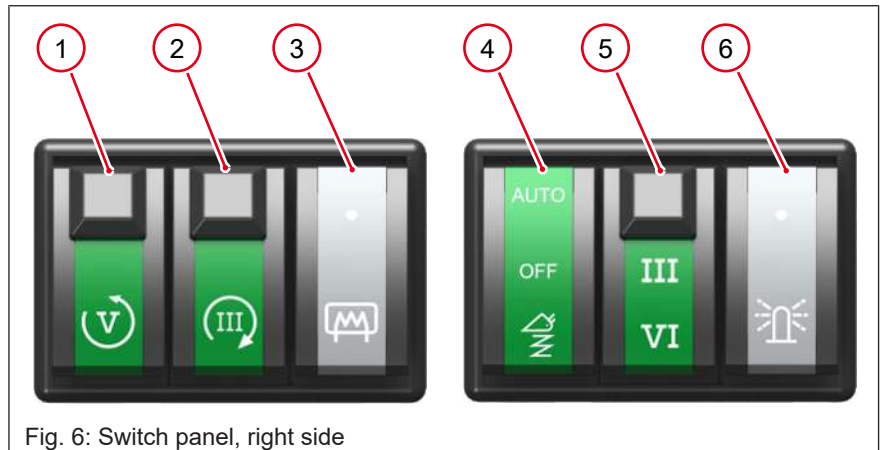


Fig. 6: Switch panel, right side

- | | |
|--|--|
| 1 Continuous operation 5th control circuit | 2 Continuous operation 3rd control circuit |
| 3 Rear window heating | 4 Load stabilizer |
| 5 Changeover between 3rd and 6th control circuit | 6 Rotating beacon |

4.3.4 Switch console left

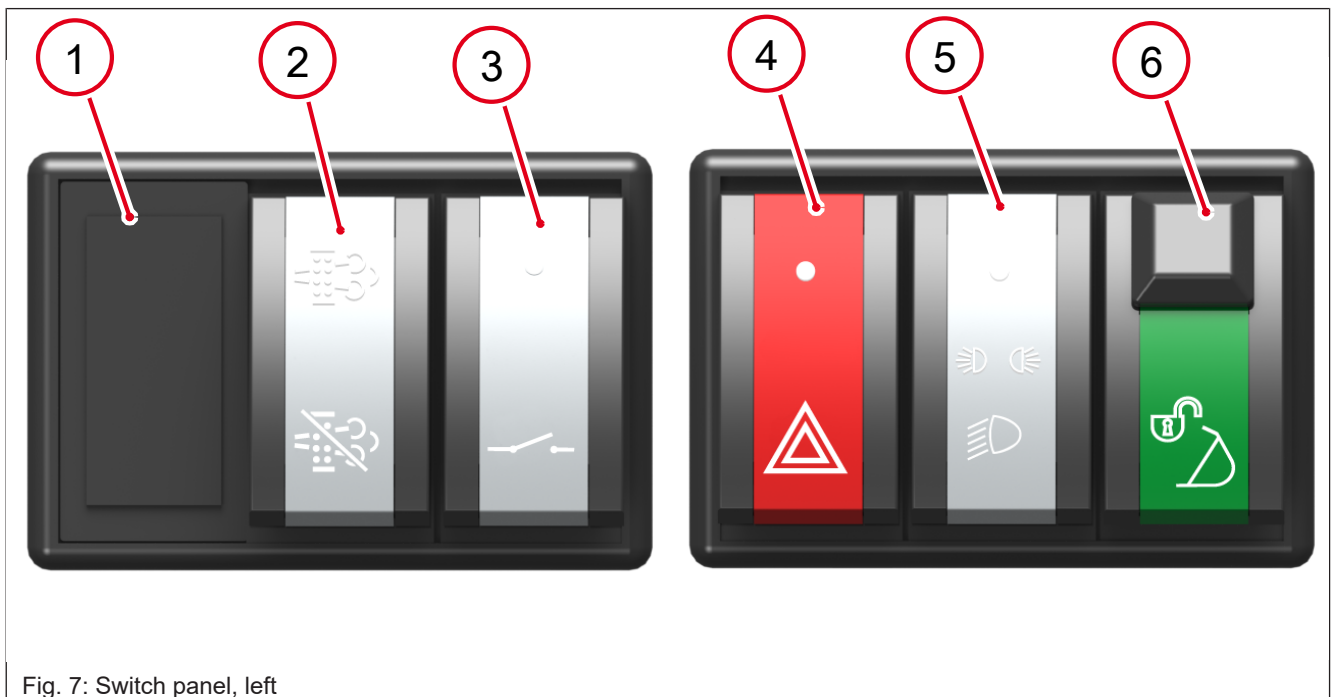


Fig. 7: Switch panel, left

- | | |
|-------------------------|-------------------------------------|
| 1 Not assigned | 2 Manual regeneration |
| 3 Front plug receptacle | 4 Hazard warning system |
| 5 Vehicle headlight | 6 Release latch quick change device |

4.3.5 Overview joystick

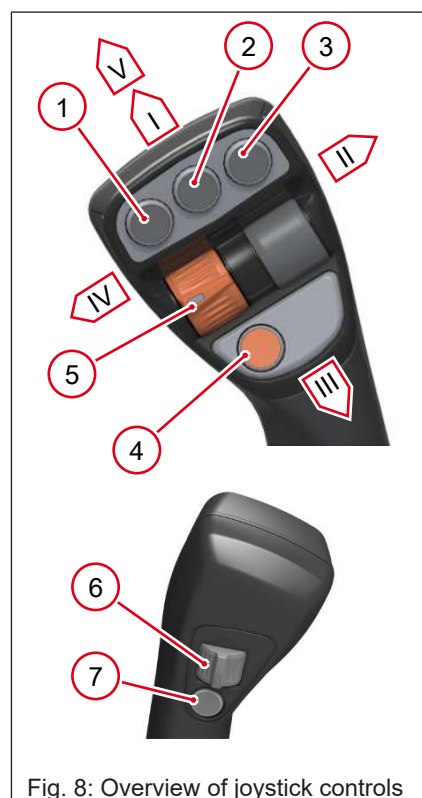


Fig. 8: Overview of joystick controls

I	Push the joystick forward.	Lower the loader unit.
II	Push the joystick to the right.	Tilt out the attachment.
III	Pull the joystick back.	Raise the loader unit.
IV	Push the joystick to the left.	Unlock the attachment.
V	Push the joystick forward beyond the resistance.	Lower the loader unit to floating position.
1	Press switch.	Select the speed range (turtle/rabbit)
2	Press switch.	Electro-function 1 operation
3	Press switch.	Electro-function 2 operation
4	Press switch.	Drive direction deactivated (neutral position)
5	Switch	Drive direction forward/reverse
6	Push the rocker switch to the left.	Operation of third control circuit and lock for attachments
	Push the rocker switch to the right	Operation of third control circuit and unlocking for attachments
7	Press switch.	Activate differential lock

4.4 Type plates and stickers

4.4.1 Type labels

Type labels are attached to the vehicle and individual components.

4.4.1.1 Type labels and identification number of the vehicle

The type label is attached to the front right of the vehicle frame.

The CE mark documents that the vehicle complies with the valid EC directives.

The vehicle can be identified by the QR code shown on the type label or by the identification number stamped on the vehicle frame.

Symbols on the type label

Various symbols and markings for national and international approvals can be shown on or next to the nameplate.

Symbol for compliance with EC directives

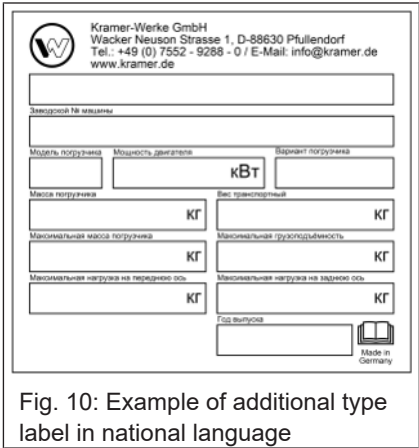


The CE mark documents that the machine corresponds to the applicable statutory safety regulations of the European Union.

Fig. 9: Type label for Europe

Description of the type label for Europe

Pos	Description
1	Vehicle class (only for vehicles with EC tractor approval)
2	EU type approval number
3	Identification number
4	Manufacturer
5	Permissible total weight
6	Permissible axle load front
7	Permissible rear axle load
B-1	Permissible trailer load, unbraked trailer
	T-1 drawbar trailer
	T-2 rigid drawbar trailer
	T-3 central axle trailer
B-2	Permissible trailer load, overrun braked trailer
	T-1 drawbar trailer
	T-2 rigid drawbar trailer
	T-3 central axle trailer
B-3	Permissible trailer load, hydraulically braked trailer
	T-1 drawbar trailer
	T-2 rigid drawbar trailer
	T-3 central axle trailer
B-4	Permissible trailer load, pneumatically braked trailer
	T-1 drawbar trailer
	T-2 rigid drawbar trailer
	T-3 central axle trailer
8	Gross drawbar load rating
9	Vehicle designation
10	Vehicle type
11	Variant
12	Output in kW
13	Transport weight
14	Maximum payload
15	Gross operating weight
16	QR code
17	Year of construction



Description of the additional type label

This is affixed next to the original type label in different Non-EU countries. It clarifies the most important values in national language.

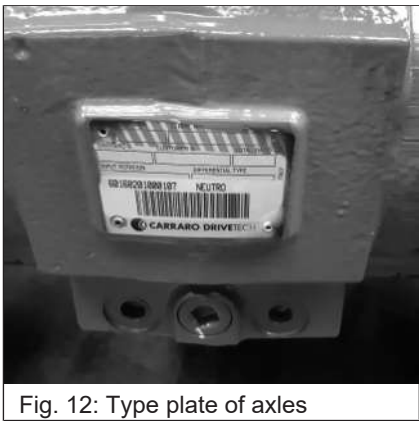


Identification number

The identification number is stamped on the vehicle chassis and the type label. The identification number given is an example and does not match the real identification number.

	XXX	XXXXX	X	X	XXXXXXXX
	1	2	3	4	5
1	*XXX	Manufacturer/works			
2	XXXXX	Vehicle model with version			
3	X	Standard specific check digit			
4	X	Production year			
5	XXXXXXXX*	Sequential number			

4.4.1.2 Type labels on components



Type plate of axles

The type plate is located in the middle of the axle. On the front axle it is located at the front, on the rear axle it is located at the rear.

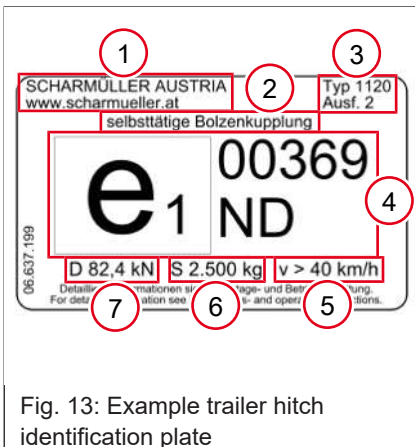


Fig. 13: Example trailer hitch identification plate

Trailer hitch identification plate

Pos	Description
1	Manufacturer
2	Coupling type
3	Type and version
4	EU type approval mark
5	Permitted speed
6	Gross drawbar load rating
7	Horizontal force component

4



Fig. 14: Type label cab

Type plate of cab

The type plate of the driver's cab is located on the rear wall. The type plate confirms ROPS/FOPS testing according to ISO 3471.

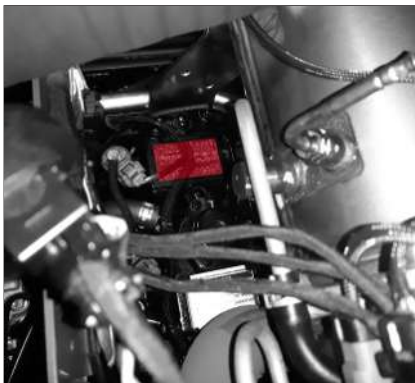


Fig. 15: Type plate of engine

Type plate of engine

The type plate of the engine is located on the valve cover.

4.4.2 Safety label and information labels

5 Putting into operation

5.1 Boarding and disembarking

5.1.1 Entering the vehicle



CAUTION

Risk of falling when entering or exiting!

Entering or exiting incorrectly can cause injuries.

- ▶ Keep the mandatory climbing aids clean.
- ▶ Use prescribed climbing aids for entering and exiting.
- ▶ Face the vehicle as you enter and leave it.
- ▶ Have damaged climbing aids replaced.



NOTICE

Damage to the steering column due to entering and exiting!

Holding onto the steering wheel when getting on and off the vehicle can cause damage to the steering column.

- ▶ Only use the climbing aids.
- ▶ The steering wheel and steering column are not suitable climbing aids.

Locks are located on the following components of the vehicle:

- Starter
- Engine hood
- Tanks (tanks for hydraulic oil and fuel)
- The maintenance flap on the right in the door is opened with a separate key.
- Cab door

Climbing aids are attached to the vehicle. The climbing aids are firmly connected to the vehicle. Before leaving the vehicle, check that the doors and windows of the cab are closed.

5.1.2 Open the door



CAUTION

Crushing hazard due to unlocked doors!

Crushing can be caused by the doors slamming shut.

- ▶ Always lock doors.
- ▶ Use provided handles for closing.

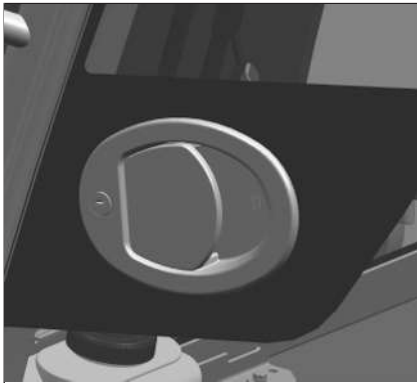


Fig. 16: Open the door from the outside

- Unlock the lock with the starting key.
- ⇒ Open the door.

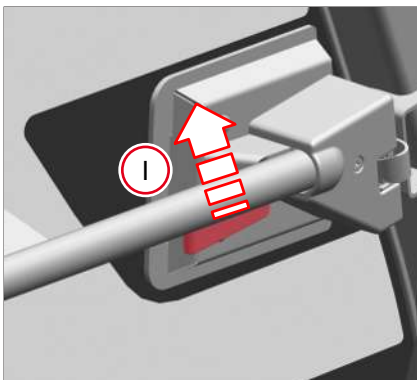


Fig. 17: Open the door from the inside

1. Press lever I.
2. Open the door.

Lock and unlock the cabin door

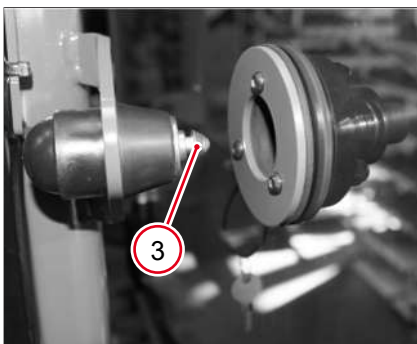


Fig. 18: Engage the door in locking device

1. Open the cab door fully.
2. Engage the locking device **3**.

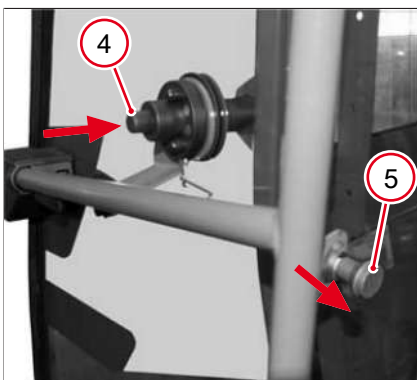


Fig. 19: Unlock the door

3. Push knob **4** to unlock cab door or pull knob **5** to unlock cab door.
4. Close cab door.

5.1.3 Opening and closing window

**Information****Open window only at standstill**

If the window is opened while driving, persons can be injured or the vehicle damaged. Therefore only open and close the window when the vehicle is stationary.

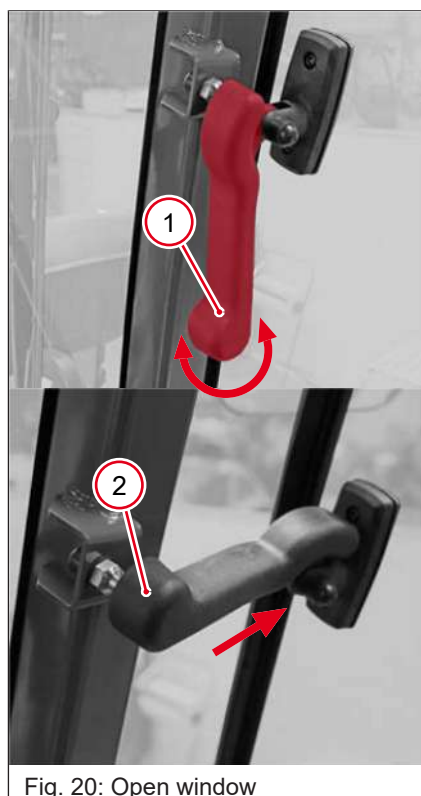


Fig. 20: Open window

1. Slide lever **1** upward.
2. Push the window pane outwards and press the lever end in bolt **2** downwards.

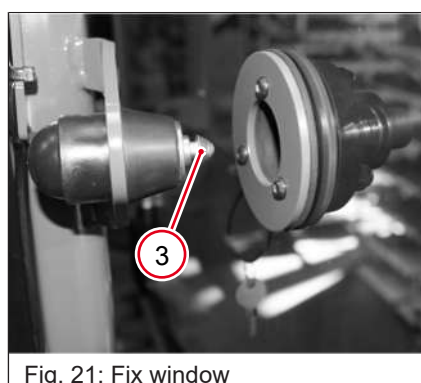


Fig. 21: Fix window

3. Push lever **1** upwards and pull it out of bolt **2**.
4. Swing the side window all the way out and engage in the locking device **3**.

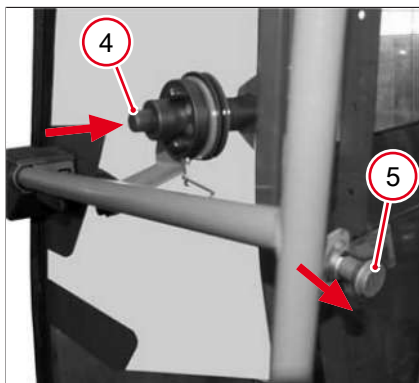


Fig. 22: Close window

5. Press button **4** and swing the side window back or pull button **5** and swing the side window back.
6. Guide lever **1** into bolt **2**.
7. Close the side window and push lever **1** downwards.

5.1.4 Emergency exit



⚠ CAUTION

There is a risk of injury from getting caught or falling during emergency exit!

The emergency exit has neither treads nor grab handles for a safe exit from the cab. Exiting the cab can cause serious injuries.

- ▶ Exit the cab with particular care when using the emergency exit.

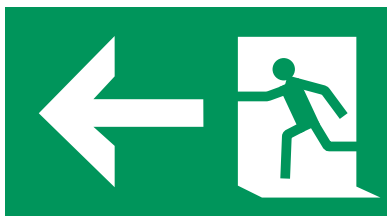


Fig. 23: Emergency exit identification

In an emergency, the right side window can be used to exit if the cab entry cannot be used.

Exiting in an emergency

1. Switch off the diesel engine.
2. Switch off all electric consumers and remove the starting key.
3. If possible, request outside assistance.
4. Open right side window completely.
5. Carefully climb out of the driver's cab.

5.2 Setting up the operator station

5.2.1 Adjusting the seat



⚠ WARNING

Risk of accident when adjusting the seat during operation!

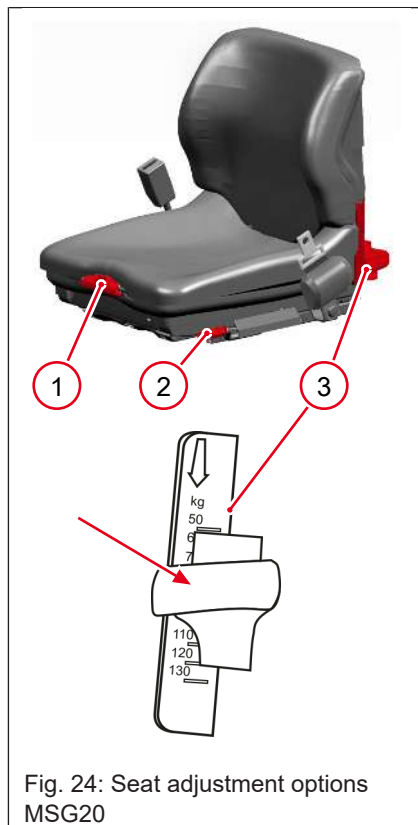
Adjusting the seat during operation may result in an accident, serious injury or death.

- ▶ Adjust the seat before commissioning the vehicle.
- ▶ Ensure that the levers for seat adjustment are locked into place.

Always adjust the seat to individual needs, e.g. height and posture. These settings prevent tension and fatigue when working.

Adjust the seat so that all control levers, pedals and switches are easily accessible while your back is resting against the backrest.

5.2.1.1 Seat MSG20



Sit on the seat to adjust.

Adjusting the backrest

1. Pull lever **1** upward and hold.
2. Then slide the seat forward or backward until the backrest is at the required angle.
3. Release lever **1**.

After adjustment, lever **1** must engage in the desired position. Once it is locked in place the backrest must no longer move.

Adjusting longitudinal direction

1. Pull lever **2** upward and hold.
2. Push the seat forwards or backwards into the desired position.
3. Release lever **2**.

After adjustment, lever **2** must engage in the desired position. It shall not be possible to move the seat after it has been locked.

Adjusting the suspension

1. Push lever **3** down until the operator weight (e.g. 80 kg) is set on the scale.
 - ⇒ The suspension is correctly adjusted when the weight set on the scale matches the operator's weight.
2. Release lever **3**.
 - ⇒ Lever **3** engages.
- ⇒ The suspension is adjusted to the operator weight.

If the suspension is to be changed to a lower operator weight than set on the scale, proceed as follows:

1. Push lever **3** all the way down.
 - ⇒ Lever **3** goes up to the lowest weight (50 kg).
2. Repeat the procedure as described above.

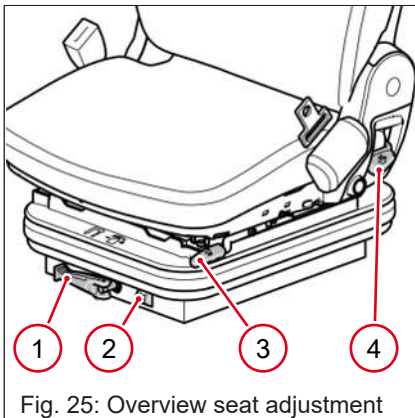
5.2.1.2 Seat MSG85

Important notes

A well functioning and correctly adjusted driver's seat increases driving comfort and prevents back injury. Therefore, always adjust the weight setting to the individual weight of the driver before starting the vehicle and each time the driver is changed.

1. In order to prevent injuries, do not store any objects in the oscillation area of the seat.
2. Do not make any modifications to the production state of the driver's seat (e.g. by retrofitting non-original spare parts). Functions of the driver's seat can be negatively influenced, endangering your safety. Warranty and liability claims for personal and material injury are then excluded as a result.
3. If irregularities in the functions of the seat are found (e.g. when cushioning the seat), immediately consult an authorized service center to resolve the cause.

5



Overview seat adjustment

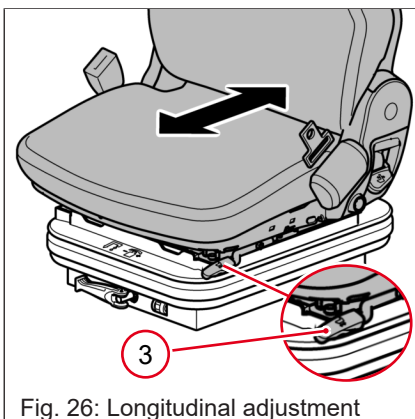
Sit on the seat to adjust.

The following settings can be made on the seat:

Longitudinal adjustment **3**

Suspension setting **1** with weight display **2**

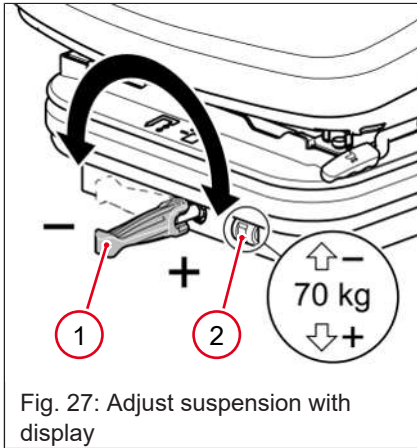
Backrest adjustment **4**



Adjusting longitudinal direction

1. Pull lever **3** upward and hold.
2. Push the seat forwards or backwards into the desired position.
3. Release lever **3**.

After adjustment, lever **3** must engage in the desired position. It shall not be possible to move the seat after it has been locked.

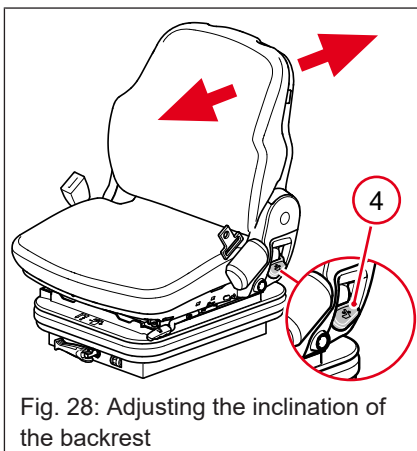


Adjusting the suspension

To adjust the suspension, leave the seat so the currently set operator weight in kg can be read in the viewing window 2.

- Turn lever 1 counterclockwise. (View of the backrest)
 - ⇒ The weight displayed in viewing window 2 decreases.
- ⇒ Spring tension is reduced - suspension becomes softer.
- Turn lever 1 clockwise.
 - ⇒ The weight displayed in viewing window 2 increases.
- ⇒ Spring tension is increased- suspension becomes harder.

The suspension is correctly adjusted when the weight displayed in viewing window 2 matches the operator's weight.



Adjusting the backrest

1. Pull lever 4 upward and hold.
2. Move the backrest forwards or backwards until the backrest is at the desired angle.
3. Release lever 4.

After adjustment, lever 4 must engage in the desired position. Once it is locked in place the backrest must no longer move.

5.2.1.3 Seat MSG75GL

Important notes

A well functioning and correctly adjusted driver's seat increases driving comfort and prevents back injury. Therefore, always adjust the weight setting to the individual weight of the driver before starting the vehicle and each time the driver is changed.

1. In order to prevent injuries, do not store any objects in the oscillation area of the seat.
2. Do not make any modifications to the production state of the driver's seat (e.g. by retrofitting non-original spare parts). Functions of the driver's seat can be negatively influenced, endangering your safety. Warranty and liability claims for personal and material injury are then excluded as a result.
3. If irregularities in the functions of the seat are found (e.g. when cushioning the seat), immediately consult an authorized service center to resolve the cause.

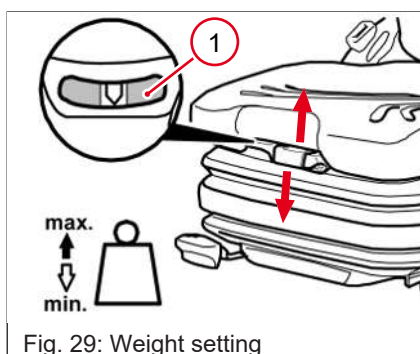


Fig. 29: Weight setting

Weight setting

The respective driver weight is adjusted while the driver's seat is occupied by pulling or pushing the weight adjustment lever.

Adjust as follows:

1. Handle 1 pull up – high weight
2. Handle 1 push down – low weight
 - ⇒ The correct driver weight is set when the arrow is located in the center region of the sight glass.
 - ⇒ Within this visual range, the individual height can be adjusted up to a minimum spring travel.
 - ⇒ The minimum or maximum weight setting is indicated by reaching the audible upper or lower stop.

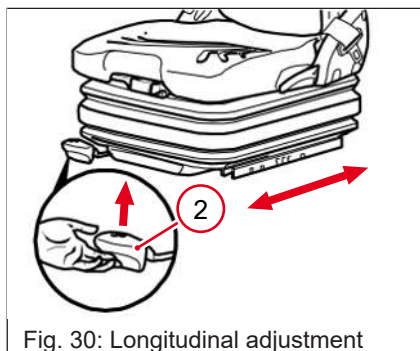


Fig. 30: Longitudinal adjustment

Longitudinal adjustment

The longitudinal adjustment is enabled by actuating the locking lever 2 upward.

Adjust as follows:

1. Sit down on the driver's seat
2. Pull lever 2 upwards and simultaneously slide driver's seat forward or backward
 - ⇒ Once adjusted, the lever must latch into the desired position and the driver's seat may no longer slide into a different position.

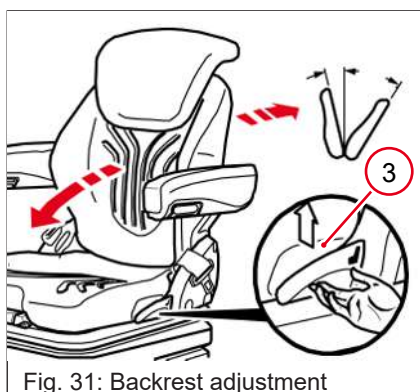


Fig. 31: Backrest adjustment

Backrest inclination adjustment

1. Adjust inclination as follows:
2. Sit down on the driver's seat
3. Pull up to release the handle 3.
 - ⇒ The desired position is reached by simultaneously loading and unloading the backrest
4. To lock, release the handle 3.

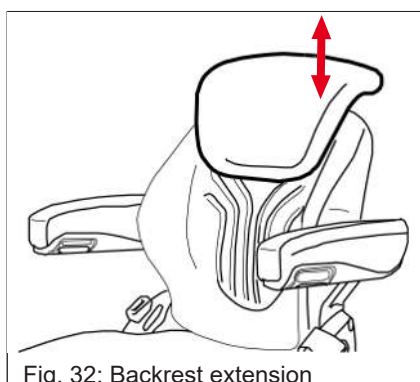


Fig. 32: Backrest extension

Backrest extension

1. Adjust the backrest extension as follows:
2. Pull the backrest extension out or push it in via the perceptible latching.
 - ⇒ The backrest extension can be individually adjusted up to the end stop
3. To remove the backrest extension, pull it upward past the stop.

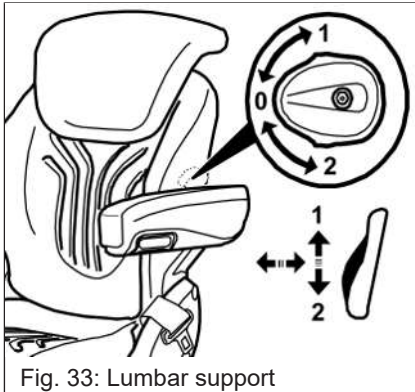


Fig. 33: Lumbar support

Lumbar support

1. Adjust the curvature in the backrest as follows:
2. Rotating the wheel upward adjusts the curvature in the upper region of the backrest cushion and rotating it downward adjusts the lower region of the backrest cushion
 - ⇒ 0 = No curvature
 - ⇒ 1 = Maximum curvature, top
 - ⇒ 2 = Maximum curvature, bottom

5.2.1.4 Heated seat

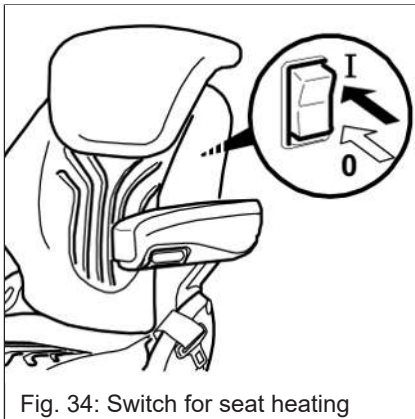


Fig. 34: Switch for seat heating

- Move rocker switch to position **I**.
 - ⇒ The heated seat is switched on.
- Move rocker switch to position **0**.
 - ⇒ The heated seat is switched off.

5.2.2 Seat belt



⚠ WARNING

Injury hazard if the seat belt is not fastened correctly or not at all!

Fastening the seat belt incorrectly, or not at all, can cause serious injury or death.

- ▶ Fasten the seat belt before operation.
- ▶ Do not fasten a twisted seat belt.
- ▶ Do not place the seat belt over hard, edged or fragile items in your clothes.
- ▶ Firmly fasten your seat belt over your hips.



⚠ WARNING

Risk of injury due to damaged or contaminated seat belt

A damaged or dirty seat belt can cause serious injury or death.

- ▶ Keep the seat belt and buckle clean.
- ▶ Check the seat belt and buckle for damage.
- ▶ Have a damaged seat belt and buckle immediately replaced by an authorized service center.
- ▶ Have the seat belt replaced by an authorized service center after an accident, even if there is no visible damage. Have the seat fastening and anchoring points checked for further load-bearing capacity.



⚠ WARNING

Risk of accident from adjusting the seat belt while driving!

The operator is distracted by adjusting the seat belt while driving. This can cause accidents with serious injuries or death.

- ▶ Adjust the seat belt before commissioning the vehicle.
- ▶ Check by tensile test that the belt buckle is engaged.

5

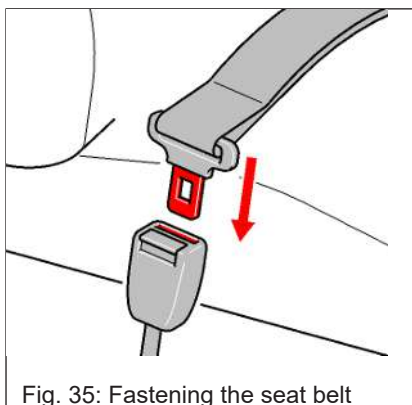


Fig. 35: Fastening the seat belt

Fastening the seat belt

1. Sit down on the operator seat.
 2. Guide the seat belt over the pelvis to the buckle.
 - ⇒ There must be no twists in the belt.
 3. Insert the buckle latch into the belt buckle until it audibly engages.
 - ⇒ Check correct locking with tension test.
 4. Pull the end of the belt to tighten the seat belt.
- ⇒ Seat belt is fastened.

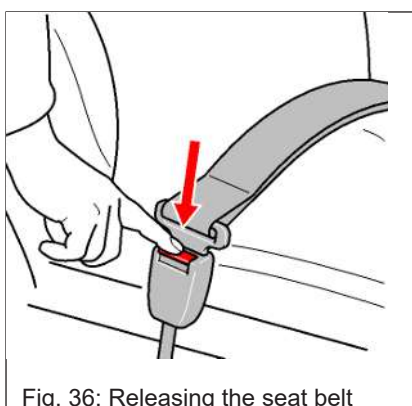


Fig. 36: Releasing the seat belt

Releasing the seat belt

1. Hold the seat belt.
2. Press the button on the buckle.
 - ⇒ The latch is released from the buckle.
3. Slowly return the seat belt to the retractor.

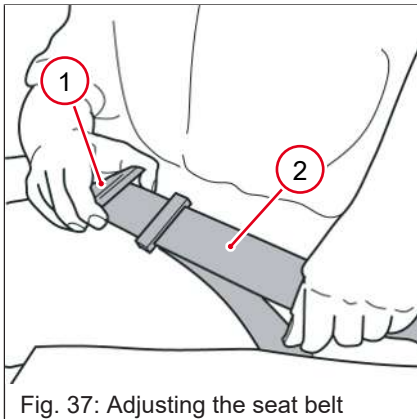


Fig. 37: Adjusting the seat belt

Extending/shortening the seat belt

1. Hold the belt tongue **1** at a right angle to the belt strap and pull the belt strap through to the required length.
2. To shorten the lap belt, simply pull on the free end **2** of the belt.
 - ⇒ The automatic seat belt ensures full freedom of movement when pulled slowly. However, it will lock in the event of sudden braking.
 - ⇒ The automatic seat belt may also lock when driving through potholes or other unevenness.

5.2.3 Adjusting the steering wheel



⚠ WARNING

Danger of accident when adjusting the steering wheel during operation!

Adjusting the steering wheel during operation may result in an accident, serious injury or death.

- ▶ Adjust the steering wheel before commissioning the vehicle.
- ▶ Make sure that the lever for adjusting the steering wheel is engaged.

Depending on the vehicle equipment, the vehicle has a steering column tilt adjustment.

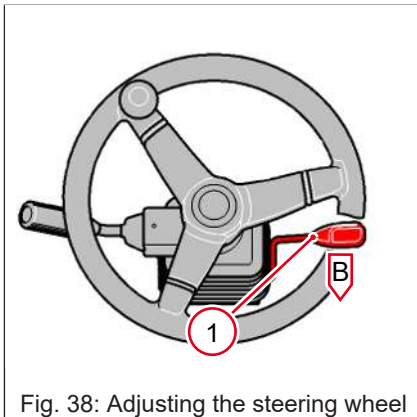


Fig. 38: Adjusting the steering wheel

1. Stop the vehicle.
2. Apply the parking brake.
 - Push lever **1** down in direction **B**.
 - ⇒ Adjust the steering wheel to the correct angle.

5.2.4 Adjusting the mirrors



⚠ WARNING

Risk of accident from adjusting the seat belt while driving!

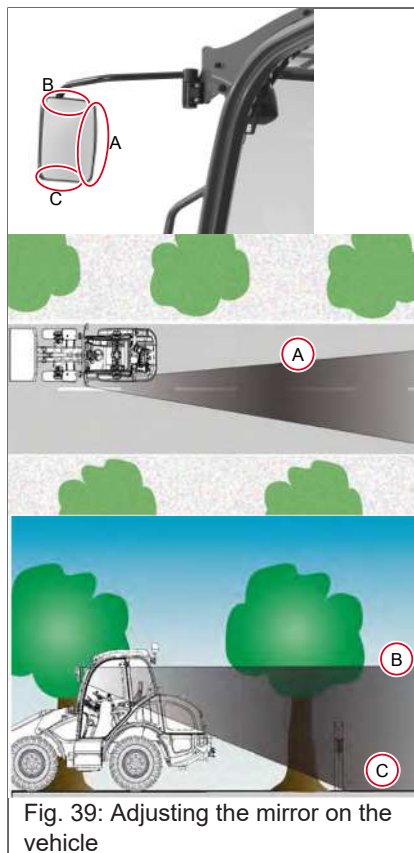
The operator is distracted by adjusting the seat belt while driving. This can cause accidents with serious injuries or death.

- ▶ Do not adjust the mirror while driving.
- ▶ Adjust the mirror before commissioning the vehicle.

The setting for the mirror on the left side is described below. The right mirror must be adjusted in the same way.

Adjusting the rearview mirrors

1. Adjust the rearview mirrors as shown.
⇒ In order to prevent the mirror from touching the door, turn the mirror bracket sufficiently forward (about 90°).
2. Adjust the rearview mirrors.
 - The outer edge of the vehicle must be visible on the inside **A**.
 - The horizon must be visible at the upper edge **B**.
 - At the lower edge **C**, the visible area must be as close as possible to the vehicle.



Adjusting the inside mirror

Adjust the inside mirrors so that the mirror area covers as much of the area behind the vehicle as possible and is not covered by the driver.

5.2.5 Field of vision during work operation



⚠ WARNING

Risk of accident due to restricted field of vision!

The operator may fail to see persons and objects due to the limited field of vision.

- ▶ Check visual aids (e.g. mirrors, camera) for cleanliness, damage and function before putting into operation.
 - ▶ Adjust visual aids (e.g. mirror, camera) before commissioning.
 - ▶ Check field of vision before putting into operation.
 - ▶ Only use the attachments approved for the vehicle.
 - ▶ Remove obstacles within the work area.
 - ▶ Move the loader unit to the transport position when moving loads.
 - ▶ Ensure a clear field of vision using suitable measures (e.g. guide or camera).
- ⇒ If the field of vision is restricted more than permissible, the vehicle must not be put into operation! If this area extends beyond the 12 m mark, special measures are required. These special measures can consist, for example, of assigning a guide or locking down the work area for persons.



⚠ WARNING

Accident hazard due to persons in the risk zone!

Persons who are in the risk zone of the vehicle or suddenly enter it can be injured by working movement or the moving vehicle. This may result in accidents that could result in serious injury or death.

- ▶ Interrupt work immediately if persons enter the risk zone.
- ▶ Adjust the mirror correctly. Use visual aids such as, e.g. a camera.
- ▶ Observe extreme caution when reversing.

The field of view describes the visible area that the operator can see from the seat, also with the help of mirrors (Adjusting the outer mirror) and camera (Adjusting the rear camera). Field of vision is restricted by vehicle components, front screen and attachments.

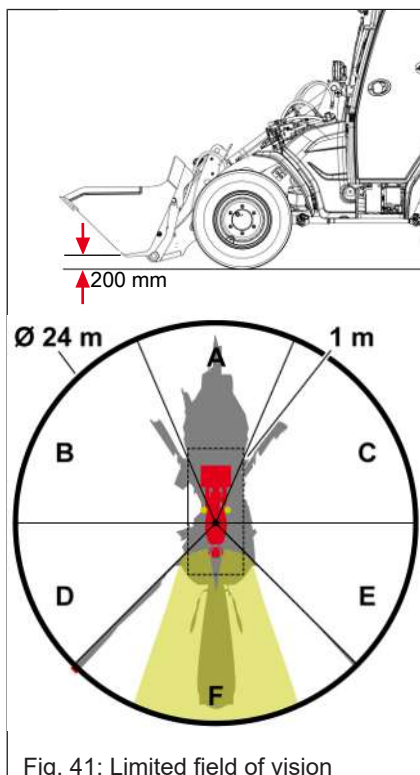


Fig. 41: Limited field of vision

The adjacent graphic shows the field of view restrictions.

The field of vision was determined according to ISO 5006:2017 under the following conditions:

- Attachment lifted into transport position (approx. 200 mm).
- In a radius of 12 m (diameter 24 m) the visibility is measured at ground level.
- At a distance of 1 m the visibility is measured at 1.2 m height.

The gray areas indicated the areas in which visibility may be restricted. If this range exceeds the 12 m mark (red line), special measures are required. For attachments not approved for use on roads.

The dotted 1 m line indicates the areas at a height of 1.2 m where visibility may be restricted.

Hazards due to restricted field of vision can occur during work operation, especially when the load system is raised and when reversing. Additional field of vision may be restricted by frontal protection screens and load.

A corresponding risk assessment must be carried out by the operations management.

5

5.2.6 Field of vision during road travel



⚠ WARNING

Risk of accident due to restricted field of vision!

The operator may fail to see persons and objects due to the limited field of vision.

- ▶ Before driving on public roads, check visual aids (e.g. mirrors, camera) for cleanliness, damage and function.
- ▶ Adjust visual aids (e.g. mirrors, camera) before driving on public roads.
- ▶ Check your field of vision before driving on public roads.
- ▶ Do not move the vehicle on public roads if the field of vision is more restricted than permitted.
- ▶ Only use attachments approved for use on public roads.
- ▶ Remove attachments not approved for use on public roads and transport them to the place of use on a transport vehicle.



⚠ WARNING

Accident hazard due to persons in the risk zone!

Persons who are in the risk zone of the vehicle or suddenly enter it can be injured by working movement or the moving vehicle. This may result in accidents that could result in serious injury or death.

- ▶ Interrupt work immediately if persons enter the risk zone.
- ▶ Adjust the mirror correctly. Use visual aids such as, e.g. a camera.
- ▶ Observe extreme caution when reversing.

The field of view describes the visible area that the operator can see from the seat, also with the help of mirrors (Adjusting the outer mirror) and camera (Adjusting the rear camera). Field of vision restrictions are caused by vehicle components and attachments.

5.3 Display

5.3.1 Overview: Display instrument

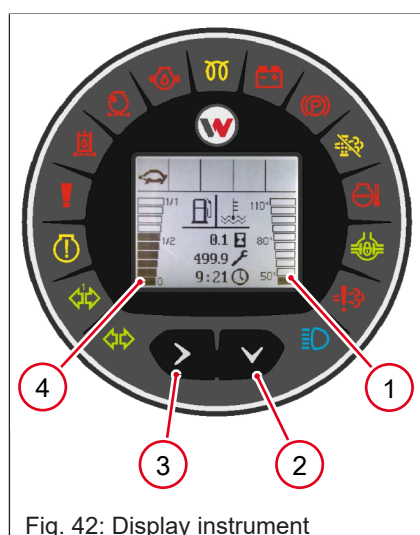


Fig. 42: Display instrument

- | | |
|---|--|
| 1 | Display |
| 2 | Switch for changing sides in a display level |
| 3 | Switch for changing to another display level |
| 4 | Control lights |

5.3.2 Description



Fig. 43: Display

The display 1 in the display instrument provides information on activated functions and current operating states. Service information, machine status and error codes can be called up via the display.

Two levels are assigned to the display. The displays of one level can contain several pages.

1st level	2nd level
Main view	Service view
Engine status display ECU	
Display status view	
Machine status display HMI	
Engine information display	Ash = Ash load and Soot = Soot load Ø l/h = Fuel consumption Amb. Temp. °C = outside temperature Charge. Temp. °C = charge air temperature
Error memory	
Settings of the digital display	

5.3.3 Navigation in the views on the display



⚠ WARNING

Risk of accident when operating the display during operation!

Operating the display during operation can lead to accidents with serious injuries or death.

- ▶ Stop the vehicle before operating the display.

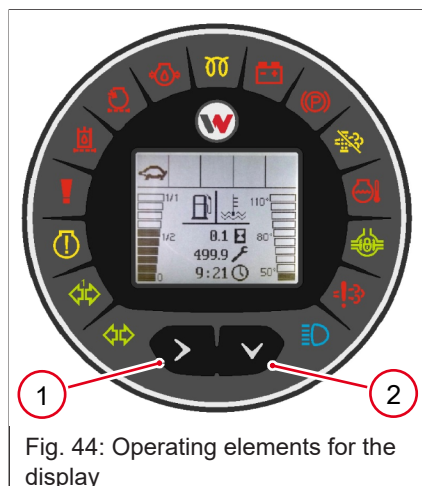


Fig. 44: Operating elements for the display

Changing from the main display to the service display

To go from the main display to the service display, proceed as follows:

- Press button **1** once.
- ⇒ The service display appears.
- Press button **2** once.
- ⇒ The main display appears.

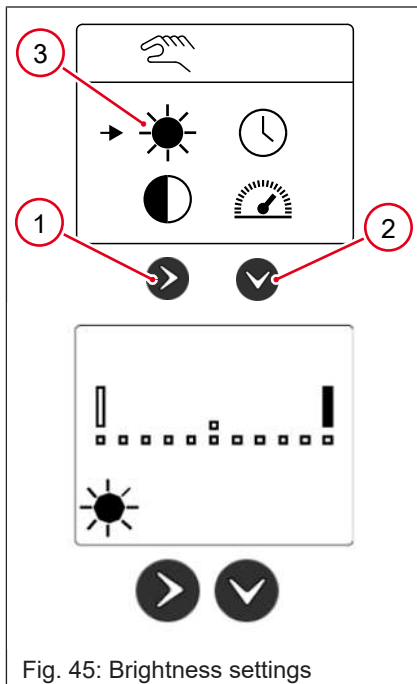


Fig. 45: Brightness settings

Brightness settings

1. Press push button **2** repeatedly until Settings is displayed.
2. Press push button **1** until symbol **3** is selected.
3. Press push button **2** to switch to the display.
4. Press push button **1** repeatedly until the desired brightness is reached.
5. Press push button **2** to exit the display.

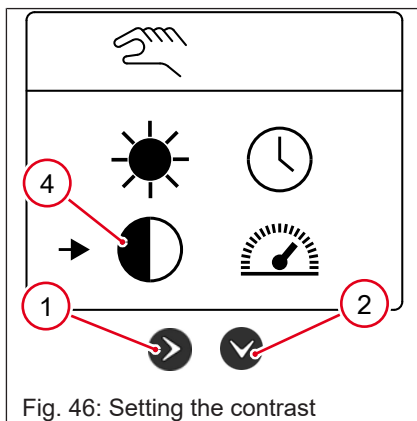


Fig. 46: Setting the contrast

Setting the contrast

1. Press push button **2** repeatedly until Settings is displayed.
2. Press push button **1** until symbol **4** is selected.
3. Press push button **2** to switch to the display.
4. Press push button **1** repeatedly until the desired contrast is reached.
5. Press push button **2** to exit the display.

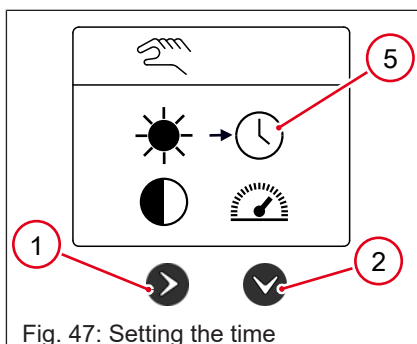


Fig. 47: Setting the time

Setting the time

1. Press push button **2** repeatedly until Settings is displayed.
2. Press push button **1** until symbol **5** is selected.
3. Press push button **2** to switch to the display.
⇒ The year flashes.
4. Press push button **1** repeatedly until the desired year is reached.
⇒ For month, day, hour and minute press push button **2** again and proceed in the same manner.
5. Press push button **2** to exit the display.

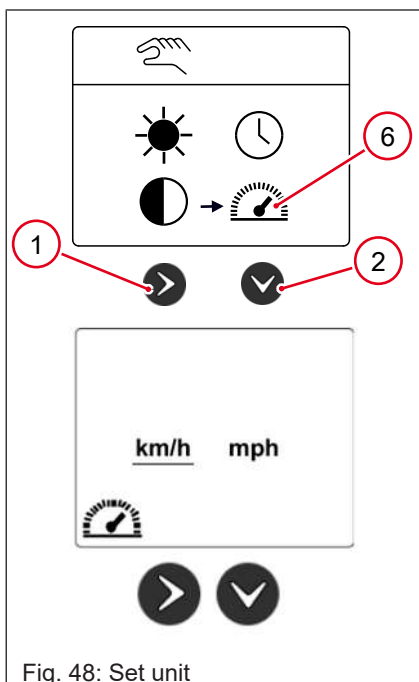


Fig. 48: Set unit

Set unit

1. Press push button **2** repeatedly until Settings is displayed.
2. Press push button **1** until symbol **6** is selected.
3. Press push button **2** to switch to the display.
4. Press push button **1** repeatedly until the desired setting is reached.
5. Press push button **2** to exit the display.

5.3.4 Overview 1. Level



Information

The notifications shown in the following are examples and document possible notifications. The data actually displayed in the vehicle may therefore differ from the displays shown here.

There may be several symbols in the display fields, which are displayed depending on the activated function or current operating status.

5.3.4.1 Main view 1

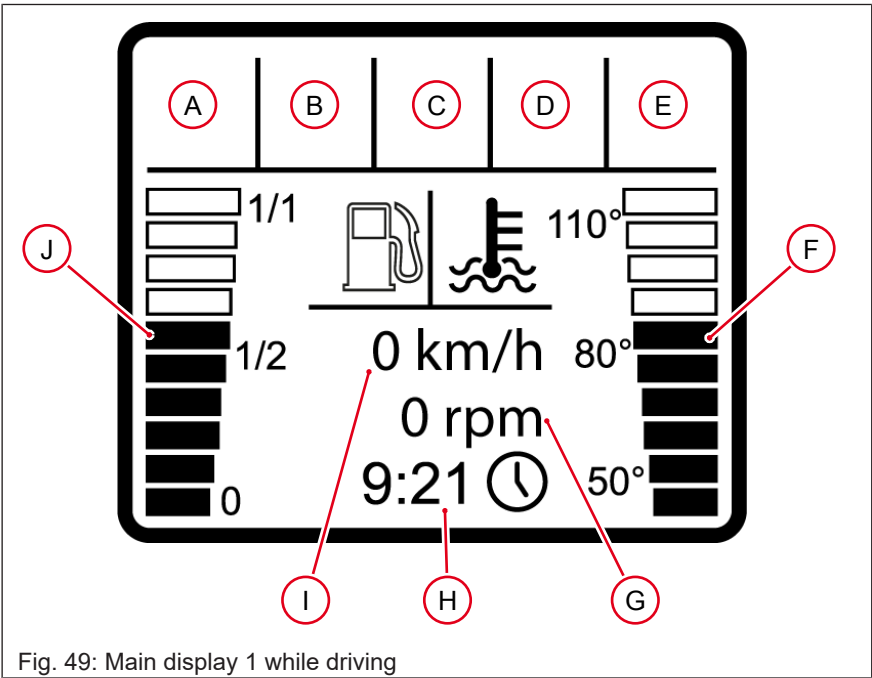
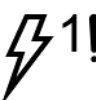


Fig. 49: Main display 1 while driving

To call up the contents of the main display, press the push button  repeatedly.

Field	Symbol	Display	Description, function
A		Direction of travel (drive system)	Symbol appears when driving in forward direction.
			Symbol appears when driving in reverse direction.
	N		Symbol appears neutral in direction of travel.
		Brake fluid level	Symbol appears when the brake fluid level is too low
		Belt contact switch	Symbol appears when the belt is not fastened
Field	Symbol	Display	Description, function
B		Speed range	Symbol appears when the slow speed is switched on. It is possible to reach the maximum speed for the speed range.
			Symbol appears when high speed is switched on. It is possible to reach the maximum speed.

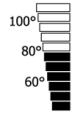
Field	Symbol	Display	Description, function
		Low-speed control	Symbol appears when low-speed control is switched on. When the symbol flashes, the low-speed control is in the rearmost position and the vehicle is not moving.
		Seat contact switch	Symbol flashes when seat is unoccupied.
		Accelerator position	Lights up continuously when the accelerator pedal is pressed after an ignition start or is stuck. The symbol only goes out if the accelerator pedal is not pressed after an ignition start. If the accelerator pedal is not depressed when starting the vehicle, the symbol is not displayed.

Field	Symbol	Display	Description, function
C		Circuit	Symbol appears when the "Circuit 1" operating mode is activated.
			The "Lightning" symbol appears or flashes, numbers 1 and ! flash in case of an error in the current circuit 1
			Symbol appears when the "Circuit 2" operating mode is activated.
			The "Lightning" symbol appears or flashes, numbers 2 and ! flash in case of an error in the current circuit 2
			Symbol appears when the operating mode "Circuit 1+2" is activated.
		Emergency steering	Symbol appears when the steering hydraulics on the vehicle have failed. Stop the engine immediately! Contact an authorized service center.
		Middle position rear axle	Symbol appears when the rear axle is in middle position. Is intended to assist in switching the steering mode.



Field	Symbol	Display	Description, function
D		3rd control circuit continuous operation	Symbol appears when the operating mode "3rd control circuit in continuous operation" is activated.
		Control circuit High Flow	Symbol appears when the operating mode "Control circuit high flow" is activated.
		Locking the working hydraulics	Symbol appears when the operating mode "Locking the working hydraulics for road travel" is activated.
			Symbol shows the locking status of the fully hydraulic quick-change system "Smart Attach"

Field	Symbol	Display	Description, function
E		Exhaust gas aftertreatment	Symbol appears when: - Manual regeneration is necessary and the engine is in the required temperature range. - Manual regeneration is running.
			Symbol appears when: Ongoing regeneration has been aborted.
			Symbol appears when: Exhaust gas temperature is in the elevated range.
			Symbol lights up permanently - Automatic regeneration is suppressed - Not suitable for continuous operation, as no automatic regeneration can take place.
		Load stabilizer	Symbol appears when: "Load stabilizer" operating mode is activated.

Field	Symbol	Display	Description, function
F		Temperature of coolant	Display of the coolant temperature When the maximum permissible coolant temperature is reached, the control light in the display instrument lights up and a warning tone sounds in addition.
G	rpm	RPM	The number in front of the symbol indicates the current rotational speed.
H		Time display	The number in front of the symbol indicates the current time.

Field	Symbol	Display	Description, function
I	km/h	Velocity	The number in front of the symbol indicates the vehicle's current speed.
J		Fuel tank fill level	Display for the fill level of the fuel tank If the fuel reserve is being used, fuel symbol  starts to flash and a warning tone sounds every 10 seconds.

5.3.4.2 Overview popup displays

The following indication will appear on the display:

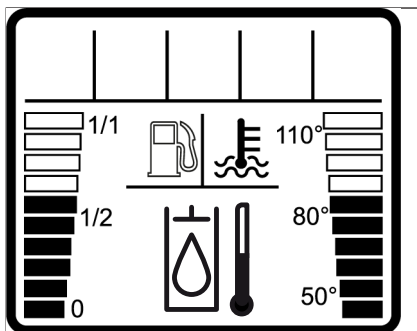


Fig. 50: Display pop-up hydraulic oil temperature

When the hydraulic oil temperature is elevated.

5

5.3.4.3 Machine status displays ECU/HMI

ECU identification

The display contains information and material numbers about the vehicle's software, hardware and parameters.

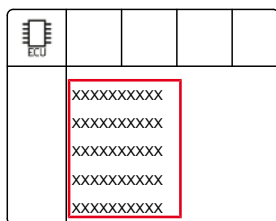


Fig. 51: ECU display

HMI information

The display contains information and material numbers about its software and hardware.

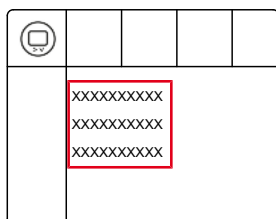


Fig. 52: HMI display

5.3 Display

5.3.4.4 Error memory

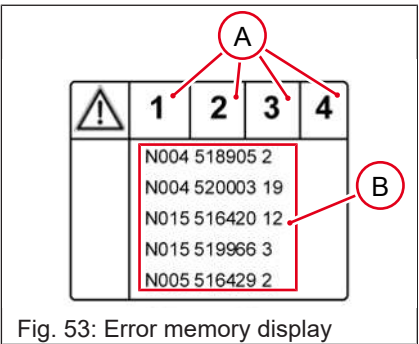


Fig. 53: Error memory display

If the vehicle electronics detect an error, a warning tone sounds and the fault is briefly shown in the main display.

In addition, the error is stored and can be viewed in the error memory until the next restart.

The error memory can hold up to 20 different error codes

- 4 pages **A** with maximum 5 error codes **B**

If an error code is displayed, first:

1. Lower the load to the transport position,
2. If possible, drive the vehicle out of the danger zone,
3. Switch off the engine, turn off the ignition,
4. Restart the engine

If an acoustic warning message is triggered again:

1. note the error code of the information display,
2. Determine the cause of the error,
3. Rectify the cause of the error or submit error code to the authorized service center.

5.3.4.5 Display settings display

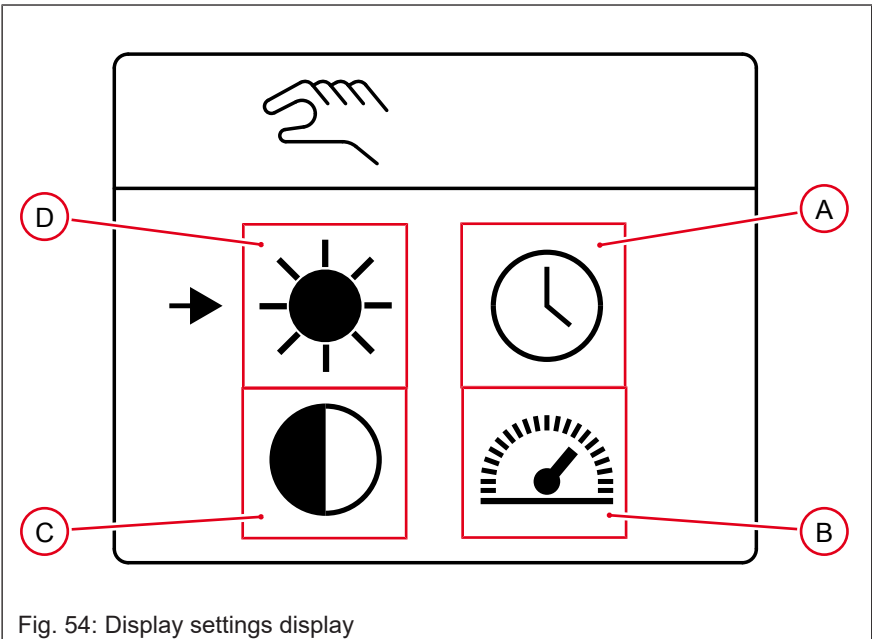


Fig. 54: Display settings display

Field	Symbol	Display	Description, function
A		Time	When the symbol is selected (arrow), the date (year, month day) and time (hours, minutes) of the display can be set.
B		Speed	When the symbol is selected (arrow), the speed shown on the display can be changed from km/h to mph.

Field	Symbol	Display	Description, function
C		Contrast	When the symbol is selected (arrow), the display contrast can be adjusted.
D		Brightness	When the symbol is selected (arrow), the brightness of the display can be adjusted.

To set see [Navigation in the views on the display on page 65](#).

5.3.5 Overview 2. Level

5.3.5.1 Service view

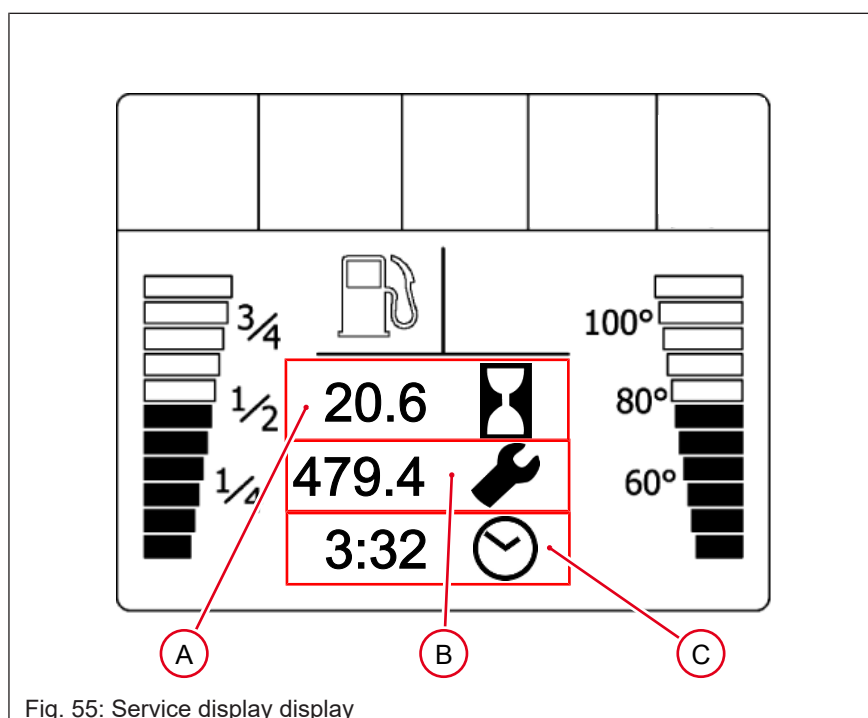


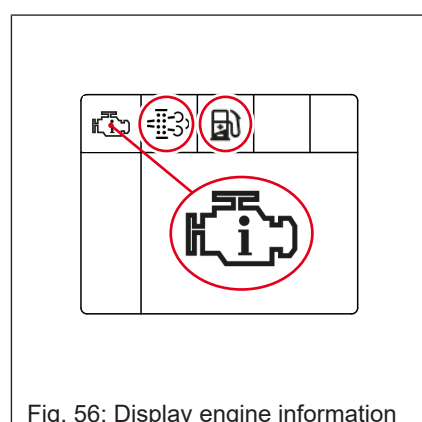
Fig. 55: Service display display

To call up the contents of the service display, press the push button until the main display appears, then press the push button repeatedly.

Field	Symbol	Display	Description, function
A		Operating hour meter	The number in front of the symbol indicates the number of operating hours since the vehicle was delivered.

Field	Symbol	Display	Description, function
B		Maintenance computer	The number in front of the symbol indicates the hours remaining until the next maintenance. If the next maintenance is less than 30 working hours away, the service symbol is displayed for 4 seconds 10 seconds after the diesel engine has been started. The hours until the next maintenance are displayed in the following order: • 100 operating hour meter (1st maintenance interval) • 400 operating hours (no maintenance interval) • 500 operating hour meter (2nd maintenance interval) • and every further 500 operating hours The service indicator can only be reset by an authorized service center. The reset has no effect on the display of the next interval.
C		Time	The number before the symbol indicates the current time.

5.3.5.2 Machine status display engine information



The display contains information about the engine control unit and has several subsequent views.

Use the button  to access the following views.

Use the button  to switch between the views using.

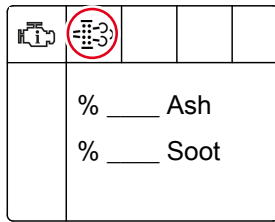


Fig. 57: Display engine info DPF

Display DPF information

Display shows:

Ash = ash load in %

Soot = soot load in %

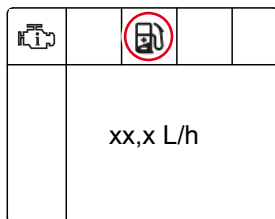


Fig. 58: Display engine info fuel consumption

Fuel consumption display

Display shows the current fuel consumption in liters / hour.

5.4 Warning lights and control lights

5.4.1 Meaning of the warning lights and control lights

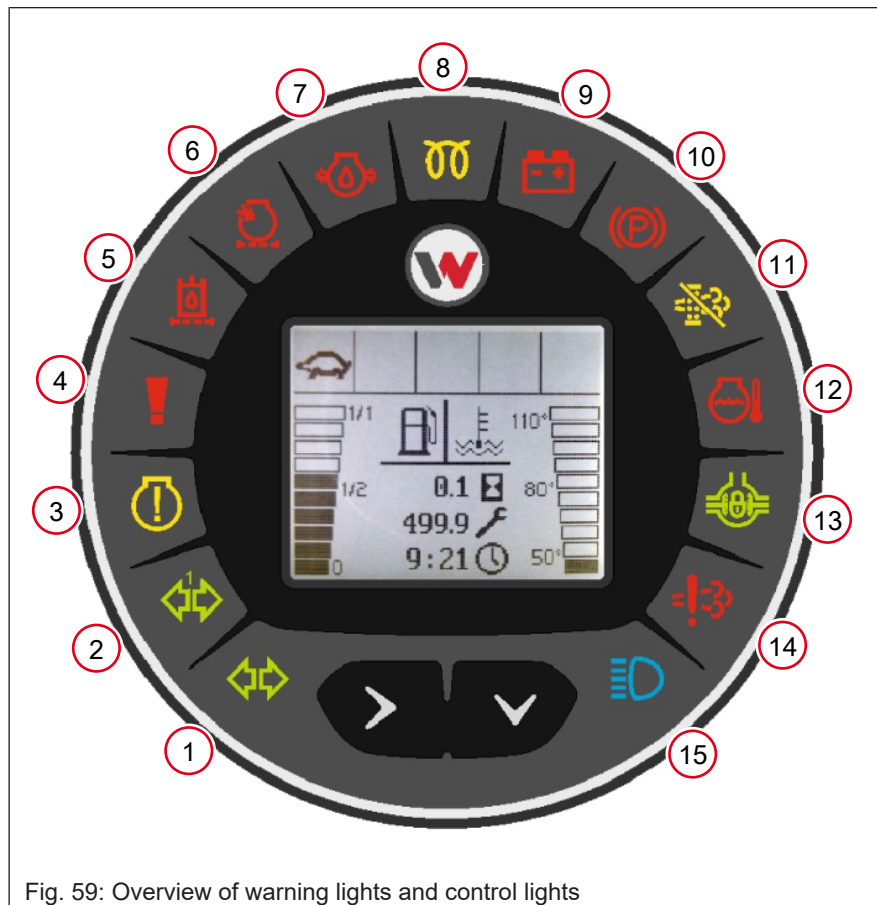


Fig. 59: Overview of warning lights and control lights

Overview of warning lights and control lights

1	"Turn signal" control light Flashes intermittently when the direction indicator lamp is used.
2	Control light "Turn signal on rear attachment or trailer" Flashes intermittently when the direction indicator lamp is activated if there is an electrical connection.
3	"Engine" control light Lights up if there is an error in the engine control unit.
4	"Critical error in vehicle electronics" warning light Lights up if there is a fault in the vehicle electronics ▪ Stop the engine immediately
5	"Hydraulic oil return filter" warning light Lights up when the resistance of the oil flow in the return filter becomes too high. ▪ Have an authorized service center replace the return filter.

6	“Air filter dirty” warning light Lights when the air filter is dirty. ▪ Clean the air filter.
7	“Engine oil pressure” warning light Lights up when the ignition is turned on and goes out as soon as the engine is running. Lights when the engine is running to indicate low engine oil pressure. 1. Stop the vehicle. 2. Stop the engine and check the oil level.
8	“Preheating” control light Lights up when the engine automatically preheats.
9	Warning light “Generator charge function” Lights up when the ignition is turned on and goes out as soon as the engine is running. Indicates when the engine is running: • Defect in the generator V-belt or alternator charging circuit. The battery is no longer charging. ▪ Check the V-belt/toothed belt.
10	“Parking brake” warning light Lights up when the parking brake is applied. The drive system is locked when the parking brake is applied.
11	Warning light “Abort/suppression of regeneration DPF” Lights up when the regeneration of the diesel particulate filter is interrupted or suppressed.
12	“Coolant level” indicator light Lights up when the coolant level is too low. ▪ Check cooling system.
13	“Differential lock” indicator lamp Lights when the differential lock is activated.
14	“Error in exhaust system” warning light Lights up when there is an error in the exhaust system.
15	“High beam” control light Lights up when the high beams are switched on or when flashing the headlights.

5.4.2 Acoustic warnings



NOTICE

Damage to the vehicle

Non-observance of warnings can lead to damage to the vehicle.

A fault that generates a continuous warning tone is displayed again and again after 10 seconds for about 4 seconds each time the diesel engine is restarted until it is reset or repaired by an authorized service center.

If a warning tone sounds in the vehicle, there is a fault in the vehicle electronics. The warning tones can be of different lengths .

Short warning tone

A short warning tone indicates a serious error. A short warning tone is automatically acknowledged. The error is saved.

Continuous warning tone

A continuous warning tone indicates a critical error. A continuous warning tone remains until it is acknowledged or reset. The error is saved.

Confirmation is made by pressing the buttons  or  on the display instrument.

Examples:

- The engine oil pressure drops below 2 bar.
- In the event of dangerous overload.
- If the engine speed is too high (over 2800 rpm) when driving downhill on steep slopes.
- If there is too much soot load on the system for exhaust gas aftertreatment.
- When the ignition is switched off, the low beam is switched on.
- The driver's seat is relieved of load when driving at speeds above 7 km/h.

Backup warning system

The signal generator generates a warning signal when reverse gear is engaged.

5.5 Putting the vehicle into operation

5.5.1 Before commissioning



Information

Operation not possible when operator is not seated!

For safety reasons, the vehicle is equipped with a start interlock (seat contact switch).

The vehicle can only be started and operated when the operator of the vehicle is seated in the seat.

- ▶ If the driver's seat is relieved when the vehicle is stationary and the handbrake is released, after 3-5 seconds the drive system goes into neutral, a continuous warning tone sounds and the work functions are blocked
- ▶ If the driver's seat is relieved when the seat is relieving at a driving speed of more than 7 km/h, a continuous warning tone sounds, the drive system goes into neutral and the work functions are blocked.

Before commissioning, the following requirements must be met:

- Read and understand the operator's manual.
- Learn and understand fault indications on the display.
- Operate the vehicle only from the operator seat.
- Have technically trained personnel instruct you before using the vehicle for the first time. Carry out driving tests on spacious terrain.
- Check the condition of the vehicle to ensure that it is safe and that the protective devices are intact.
- Ensure that all maintenance has been carried out in accordance with the maintenance schedule.
- If necessary, remove dirt and ice from the windows before driving.
- Have the vehicle checked by technically trained personnel before putting it into operation again after it has been out of operation over a longer period of time.
- Switch on the battery master switch.

Additional note: [see Preparative measures on page 20](#).

Set up control stand:

1. Adjust the seat.
 2. Adjust the steering wheel.
 3. Adjust the mirrors.
 4. Fasten the seat belt.
 5. Deactivate drive interlock if necessary.
 6. Release parking brake.
- ⇒ Start the vehicle.

5.5.2 Information on avoiding engine damage



NOTICE

Engine damage due to incorrect diesel engine

- ▶ If other fuels are used, warranty rights shall not apply in case of damage (warranty)!
- ▶ If additives (additives or auxiliary materials) are added to the diesel, use only those approved by the engine manufacturer.



NOTICE

The starting motor may be damaged!

- ▶ Do not start the engine again immediately after stopping it. Wait at least 15 seconds.
- ▶ Abort the start attempt after a maximum of 15 seconds if the engine does not start.
- ▶ Wait one minute between two start attempts.

To avoid engine damage, follow the instructions in this section.

Fuel, engine and hydraulic oil preheating recommended for operation at outside temperatures below -10°C.

Running-in period

The engine must be used gently during the first 100 operating hours. Follow the instructions below.

- Drive and work gently with the vehicle.
- Avoid loading the engine at idling speed.
- Do not run the engine continuously at maximum speed.
- Increase load gradually while varying the engine speed.
- Observe the prescribed maintenance intervals and have the maintenance carried out accordingly.

5.5.3 Checklist for starting the vehicle

The checklist makes no claim to completeness. It is only intended to assist in the fulfillment of the duty of care. If questions are answered with "NO", the cause of the fault must first be rectified before work can be started.

Activity	Result
Enough fuel in the tank?	
Engine oil level OK?	
Coolant level OK?	
Oil level in hydraulic oil tank OK?	
Water in washer system reservoir OK?	
V-belt condition and pre-tension OK?	
Loader unit lubricated?	
Braking system (incl. parking brake) OK?	
Tire condition and tire pressure OK?	

Activity	Result
Are the wheel nuts tight (especially after a tire change)?	
Pedal area kept clean?	
Lighting system, signal, warning and control lamps OK?	
Are the windows, mirrors, lighting equipment and treads clean?	
Is the attachment securely locked to the loader unit?	
Is the engine cover locked?	
After cleaning, maintenance or repair work: Rags, tools or other loose objects removed?	
Type-approved warning triangle, warning light, warning vest and first aid kit available in the vehicle?	
Seating position and mirrors correctly adjusted?	
Seat belt worn?	
All additional control circuits deactivated?	

5.5.4 Starting the engine



NOTICE

Do not start in a cold state!

To prevent damage to the engine, do **not** run up to full gas operation when starting from a cold state.

- ▶ Allow diesel engine to run for approx. 3 minutes, then slowly increase engine speed.
- ▶ Do not activate working hydraulics or drive system until all control lights have gone out.

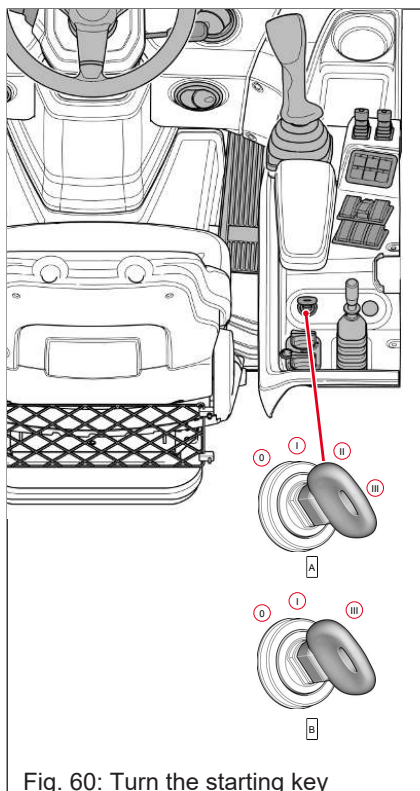


Fig. 60: Turn the starting key

The ignition lock is located in the instrument panel to the right of the driver's seat.

Start the engine as follows:

- ✓ Parking brake of the vehicle is activated.
- 1. Insert the starting key in the ignition lock.
 - ⇒ Position **0** – no operating voltage.
- 2. Turn the starting key to position **I**.
 - ⇒ All warning lights and control lights illuminate for self-test.
 - ⇒ The two warning lights do not go out after the self-test.

A engine 18.5 kW

- 1. Turn the starting key via the resistor to position **II**.
 - ⇒ The vehicle preheats.
 - ⇒ Wait until vehicle preheats, otherwise errors may occur in the vehicle electronics.
- 2. Turn the starting key to position **III**.
 - ⇒ Starter is actuated - the engine starts.
- 3. Release the starting key as soon as the engine starts.
 - ⇒ The starting key returns to position **I**.

B engine 33.3 kW

1. Turn the starting key to position **III**.
⇒ Starter is actuated - the engine starts.
2. Release the starting key as soon as the engine starts.
⇒ The starting key returns to position **I**.

If one of the warning lights or indicator lights does not go out during starting (except for the parking brake), stop the engine immediately and have the cause checked by an authorized service center.



Fig. 61: Drive interlock key

Setting the drive interlock with the key system

The drive interlock is integrated in the ignition lock and can be disabled only with the blue starting keys.

The equipment of the vehicle with drive interlock is included in the scope of delivery:

- Drive interlock installed in the vehicle.
- Two coded blue starting keys.
- One red master key.

Coding new starting keys

New personal starting keys can be coded with the red master key. Store the red master key carefully and separately from the vehicle. Up to ten blue starting keys can be coded.

The drive interlock has only one master key. If the master key is lost, the complete drive interlock must be replaced by an authorized service center.

The master key can only be used to code new starting keys. The drive interlock cannot be deactivated with the master key.

- ✓ Blue starting keys and master keys to be coded are available.
- ✓ Switch on the parking light to code new blue starting keys.

1. Insert the master key into the ignition lock.
2. Switch ignition to position **I** for a maximum of five seconds.
3. Switch ignition to position **0** and remove master key.
⇒ The electronics system expects a starting key to be coded within the next 15 seconds.
4. Insert the blue starting key and switch the ignition to position **I** for at least one second.
⇒ The new blue starting key has been taught/coded.

If several starting keys are to be coded, the starting keys to be coded can be coded one after the other without having to reinsert the master key into the starter. However, no more than 15 seconds must elapse between the removal of the master key or the starting key that has been coded and the next starting key to be coded. Repeat the procedure from step **1** if more than 15 seconds have elapsed.

Store the master key outside the cab to avoid incorrect information from the electronics system, e.g. the signal from the master key and an additional signal from a coded starting key.

Enabling the drive interlock

Always remove the starting key when the drive interlock is to be switched on. If the starting key is left inserted, the drive interlock is not activated.

1. Apply the parking brake.
2. Switch off engine, move ignition to position **0**.
3. Remove the starting key.
⇒ The drive interlock is activated after 30 seconds.

Disabling the drive interlock

1. Insert the starting key in the ignition lock.
⇒ The drive interlock is deactivated after five seconds.
2. Start the engine.
⇒ The drive interlock is permanently deactivated when the engine is running.

Deleting a taught key

If a coded blue starting key is lost or falls into unauthorized hands, all coded keys can be deleted and the existing keys can be reprogrammed/coded. The master key code is not deleted during the deletion process.

1. Switch on the parking lights.
2. Insert the master key into the ignition lock.
3. Switch ignition to position **I** for at least 20 seconds.
⇒ Coding for the blue starting key is deleted.
⇒ Blue starting keys can be recoded.

Safety functions

1. If more than 5 keys with different invalid codes are operated in the starter within 1 minute, the drive interlock remains activated for 15 minutes and does not accept any valid keys during this time.
2. This procedure prevents the "trying out" of different keys and the accidental finding of the correct key.
3. Accepting valid keys only takes place after the 15 minutes and the recognition of position **I** of the starter. This prevents keys from being tested without actuating the mechanical starter lock, e.g. if the starter lock has been forcibly moved to position **I**.
4. Interruption of the supply line or other control lines does not lead to deactivation of the drive interlock or deletion of data (e.g. data codes).
5. All relevant data are stored in a non-volatile memory

5.5.5 EquipCare Dual ID Key Pad for starting lock

A PIN for unlocking the vehicle is entered via the keypad. Vehicle can only be started after entering a PIN via the keypad.



Fig. 62: Entry of PIN via keypad

Use PIN

The user can set the PIN in EquipCare Manager at the following link equipcare.wackerneuson.com. As long as no PIN has been set and stored via EquipCare Manager, the vehicle can also be started without a PIN.

1. LED 1 lights orange.
 2. Enter the PIN using the keypad.
 3. Confirm entry with button 4.
- ⇒ LED 3 lights up green if the entry is correct.
- ⇒ If a wrong PIN was entered, LED 3 is not lit.
- ⇒ The vehicle cannot be started.

If a wrong PIN is already noticed during the input, the input can be canceled via button 5.

5.5.6 Stopping the engine



NOTICE

Damages to the engine!

If the engine is switched off directly from full load operation, the engine may be damaged due to an excessively high operating temperature.

- ▶ Allow the engine to idle for approx. three minutes.
- ▶ Then switch off the engine.



NOTICE

Immediate starting of the engine after shutdown can cause damage to the starting motor.

- ▶ Wait approx. 15 seconds before restarting the engine.

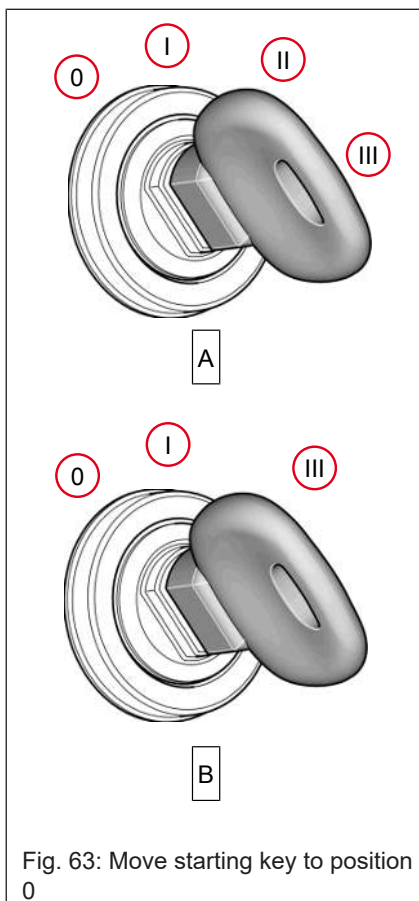


Fig. 63: Move starting key to position 0

A Engine 18.5 kW

B Engine 33.3 kW

1. Lower the loader unit to the ground.
2. Secure the vehicle with the parking brake.
3. Switch off all electric consumers.
4. Allow the engine to idle for approx. three minutes.
5. Move starting key to position 0.
6. Remove the starting key.

5.5.7 Jump-starting the engine



⚠ WARNING

Connecting the jumper cable to the negative terminal of the discharged battery can lead to accidents.

Batteries can release oxyhydrogen gas, which can easily ignite if sparks form and cause serious injury.

- Do not connect the jumper cable to the negative terminal of the discharged battery.



NOTICE

The electrical system can be damaged by a short-circuit when starting from another source.

- ▶ Make sure that both vehicles do not touch each other.
- ▶ Do not jump-start the vehicle if the battery is malfunctioning or frozen.
- ▶ Do not connect two batteries in series.
- ▶ Use starting aid batteries with the same voltage.
- ▶ Use tested jumper cables with sufficient cross-section and insulated terminal clamps.
- ▶ Route jumper cable so that they cannot be caught by starting or rotating parts in the engine compartment.

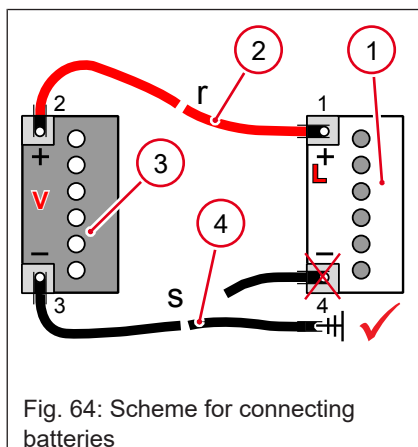
An undercharged battery cannot provide the starting motor with sufficient power to prevent the engine from starting. Jump-starting the engine is possible. Follow these instructions:

Before jump starting, check whether the battery of the vehicle works properly.

1. Move starting key to position **I**.
 - ⇒ The control lights in the display must be on.
 - ⇒ If the control lights are not on, there is a fault in the vehicle's electrical system or the battery is defective.
2. If the control lights are not on, do not jump start. Contact an authorized service center

Preparation for jump-starting

- ✓ All control levers and switches of the vehicle receiving power are in zero position.
1. Move starting key to position **0**.
 2. The electrical system is voltage-free after an afterlap period.
 3. Move jump-starting vehicle (charged battery) up to the vehicle receiving power (battery to be charged).
 - ⇒ Make sure that both vehicle do not come in contact, but the jumper cables can be connected.
 4. Move all control levers and switches on the jump-starting vehicle to zero position.
 5. Switch off ignition of the jump-starting vehicle, since voltage spikes can damage the vehicle's electronics during jump starting.
- ⇒ Jumper cable can be connected.



Item	Designation
1	Discharged vehicle battery
2	Red jumper cable (positive terminal)
3	Charged, current-generating vehicle battery; external power pack
4	Black jumper cable (ground point)
L	Discharged vehicle
V	Fully charged vehicle

Connect jumper cable

Use jumper cables of sufficient length and sufficient cable cross-section.

✓ Battery terminal covers are removed.

1. Connect the red jumper cable **2** to the positive terminal of the discharged battery **1**.
2. Connect the other end of the red jumper cable **2** to the positive terminal of the battery supplying power **3**.
3. Connect the black jumper cable **4** to the negative terminal of the battery supplying power **3**.
4. Connect the other end of the black jumper cable **4** to an electrically conducting point on the engine block of the vehicle receiving power.
 - ⇒ Do not connect the jumper cable to the negative terminal of the discharged battery, since explosive vapors may ignite in case of sparking. Maintain a distance of 30 cm at least to the battery.
5. Start the engine of the vehicle with the empty battery.
 - ⇒ If the vehicle's engine does not start after 15 seconds, wait one minute and repeat the process.

Once the engine has started

1. Disconnect the black jumper cable **4** from the engine block of the vehicle receiving power.
2. Disconnect the black jumper cable **4** from the negative terminal of the battery supplying power.
3. Disconnect the red jumper cable **2** from the positive terminal of the battery supplying power.
4. Disconnect the red jumper cable **2** from the positive terminal of the discharged battery.
5. Replace battery terminal covers again.

5.5.8 Do not operate the engine at low load

Running performance can be negatively affected if the vehicle is operated at high engine speed and at less than 20% of the load. Possible consequences of low-load operation:

- Operating temperature is too low.
- Lube-oil consumption rises.
- Engine contamination due to lubricating oil in exhaust system.
 - This contamination is recognizable by bluish exhaust gases; lubricating oil is burnt.

Operate the engine at a load greater than 20 %.

5.5.9 Battery master switch



NOTICE

Premature interruption of the electric circuit can lead to damage to the engine and the engine preheating.

- ▶ Do not operate the battery master switch while the engine is running.
- ▶ Wait 120 seconds after the engine has been switched off before operating the battery master switch.



Fig. 65: Position of the battery master switch

The complete electrical system can quickly separated from the battery in an emergency by means of the battery master switch. Switch off the battery overnight to avoid discharging the battery or to prevent other possible damage. The battery master switch can also be used as an additional anti-theft device when the battery master switch is removed.

Operating the battery master switch

Switching off the battery master switch

1. Stop the engine.
 2. Wait 120 seconds for the electronics to shut down.
 3. Operate and remove the battery master switch.
- ⇒ The battery is disconnected from the electrical system.

Switching on the battery master switch

- Insert and operate the battery master switch.
- ⇒ The battery is connected to the electrical system.

If the vehicle is equipped with an external parking heater, it cannot be operated as long as the battery master switch is switched off.

5.5.10 Operating the hydraulic oil and cooling water preheating system



⚠ WARNING

Danger due to electric tension!

Damaged cables and power sources can cause serious injury or death if touched.

- ▶ In the Federal Republic of Germany, connection cables and plug receptacles must be checked regularly by a qualified electrician in accordance with VDE 0701.
- ▶ Get informed on and follow the legal regulations of your country.

The hydraulic oil and cooling water preheating serves as a cold start aid for temperatures below -5 °C. Heating elements are installed in the cooling water circuit and in the hydraulic oil tank.

The hydraulic oil and coolant preheater reduces pollutant emissions during the warm-up phase and saves fuel at the same time.

The hydraulic oil or coolant circuit can only be thoroughly warmed up if the preheating is connected over a longer period of time.

5

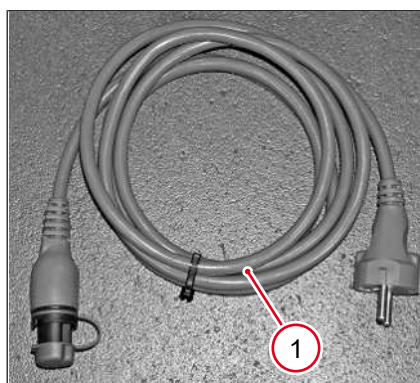


Fig. 66: Power cable

The electrical connection cable **1** is included in the accessories.

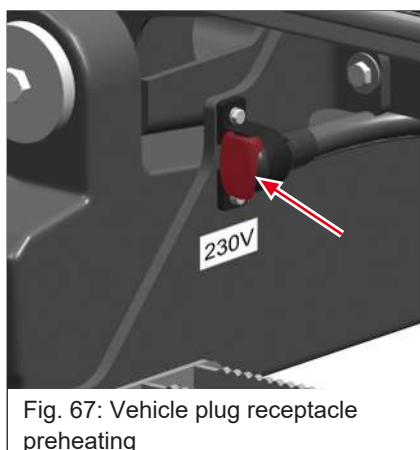


Fig. 67: Vehicle plug receptacle preheating

The plug receptacle socket **2** (230 V or 110 V) for the heating element is located on the left side of the entrance.

1. Park the vehicle near a mains socket.
 2. First connect the supplied connection cable to the vehicle plug receptacle.
 3. Then plug the plug into the mains plug receptacle.
- ⇒ Hydraulic oil and cooling water preheating is connected.

Before starting the diesel engine:

1. First unplug the connection cable from the mains plug receptacle, then from the vehicle plug receptacle.
2. Close the vehicle plug receptacle with the protective cap.



5.5.11 Fuel preheating

Fuel preheating prevents the formation of paraffin crystals that clog the fuel filter at low temperatures.

A heating element in the fuel line between tank and fuel prefilter is automatically switched on by a temperature sensor below +10 °C.

Fuel preheating is automatically activated when the ignition is switched on.

6 Operation

6.1 Brakes

6.1.1 Operating the service brake



⚠ WARNING

Accident hazard due to blocked or dirty pedals!

Loose objects in the cab or dirty pedals can impair the function of the pedal and lead to accidents with serious injuries or death.

- ▶ Keep pedals clean.
- ▶ Do not place any objects in the area of the pedals.



⚠ WARNING

Risk of accident due to excessive speed when descending!

Depending on the gradient, the braking effect of the travel drive may not be sufficient to maintain the speed. The vehicle accelerates to higher speeds. This may result in accidents that could cause serious injury or death.

- ▶ Reduce engine speed. Take your foot off the accelerator pedal.
- ▶ Use the brake/inching pedal to reduce speed when driving downhill and before bends. Press the pedal down quickly until the braking effect sets in.
- ▶ Select small speed range.



⚠ WARNING

Risk of injury from loose safety supports in the cabin!

A safety support lying loose in the cab can fly through the cab and injure the operator while driving and especially when braking.

- ▶ Before starting work, remove the safety support from the cabin and bring it separately to the work site.

The brake/inching pedal is located in the footwell on the left side. Two functions can be operated with the brake/inching pedal.

Inching

The inching function proportionally regulates the supply of the drive with hydraulic oil. If the brake/inching pedal is not actuated, the drive system has the full engine output available. The more the brake/inching pedal is actuated, the more engine power is made available to the working hydraulics. If the brake/inching pedal is actuated so that the service brake of the vehicle is enabled, the working hydraulics have the full engine output available.

Brakes

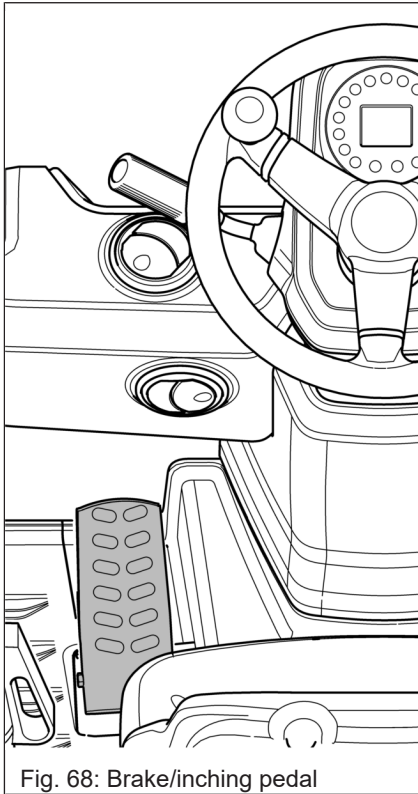


Fig. 68: Brake/inching pedal

Inching with the brake/inching pedal

- Press the brake/inching pedal lightly.
- ⇒ The pedal works like the clutch pedal of a passenger car. The drive system is controlled back and the engine power released is available to the working hydraulics as required. Lifting operations with the load system can be carried out more quickly.
- ⇒ Brake lights light up when a certain inch value is reached.

Braking with the brake/inching pedal

- ✓ Accelerator pedal fully released.
- ✓ Eliminate hazard to others by looking in the rearview mirror.
- Continue depressing the brake/inching pedal after the inching range.
- ⇒ The brake lights are on.

Check brakes

- ✓ Eliminate hazard to others by looking in the rearview mirror.
- Set the vehicle in motion and check the braking effect.
- ⇒ The brake lights must illuminate.

6.1.2 Operating the parking brake (mechanical)

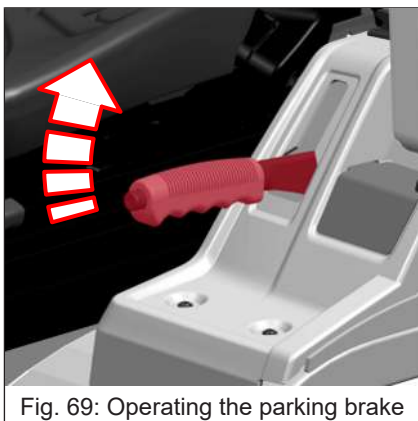


Fig. 69: Operating the parking brake

The vehicle can be secured against unintentional rolling away with the parking brake.

The parking brake control lever is located to the left of the seat.

Apply the parking brake

- Pull the lever in the direction of the arrow.
 - ⇒ Lever engages – control light lights up in the display.
 - ⇒ Parking brake is applied.

When the parking brake is released, the control light goes out and the drive system is active again – driving is possible again.

Drive interlock

When the parking brake is applied, the vehicle's drive system is deactivated.

- The direction of travel (forwards / backwards) is automatically canceled.
- The neutral position is activated.

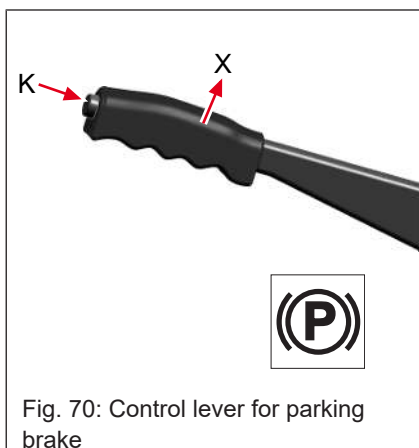


Fig. 70: Control lever for parking brake

Release the parking brake

1. Secure the vehicle against unintentional rolling away with the brake/ inching pedal.
2. Pull the lever slightly upwards towards **X** and press button **K** with your thumb.
 - ⇒ Latch from lever is released.
3. Push the lever down completely.
 - ⇒ The control light goes out.
 - ⇒ Parking brake is released.

6.2 Steering

6.2.1 Steering column height and/or tilt adjustment



⚠ WARNING

Risk of accident when adjusting the steering column during operation!

Adjusting the steering column during operation can lead to serious injury or death.

- ▶ Adjust the steering column before commissioning the vehicle.
- ▶ Ensure that the steering column adjustment lever is engaged.



Information

Adjust the height and inclination of the steering column to suit your height.

When driving on public roads with an approved bucket, the steering column must be moved to the foremost position and the driver's seat must be adjusted according to body height.

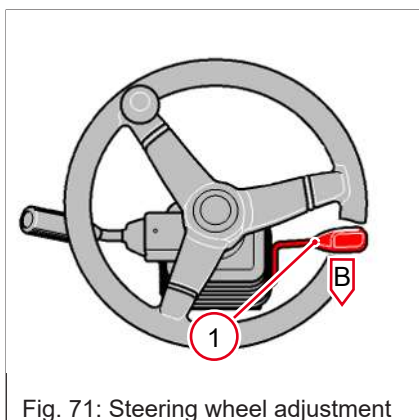


Fig. 71: Steering wheel adjustment

The steering column can be individually adjusted in height and/or tilt according to body height.

- Tilt adjustment
 - ⇒ Push lever **1** downwards **A** and pull the steering column into the correct position.
 - ⇒ Release lever **1**, the steering column is engaged.

6.2.2 Changing steering mode



⚠ WARNING

Risk of accident when changing the steering mode while driving!

Changing the steering mode while driving changes the steering characteristics of the vehicle. This may result in accidents that could result in serious injury or death.

- ▶ Do not change the steering mode when driving on public roads.
- ▶ Only change the steering mode when the vehicle is stationary or at walking speed.

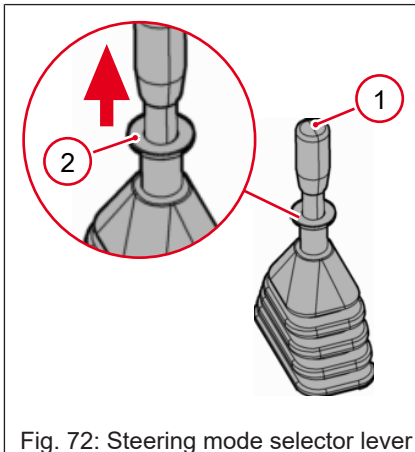


Fig. 72: Steering mode selector lever

The control lever **1** for selecting the steering mode is secured with a lock **2** to prevent any inadvertent operation.

To select the steering mode, pull the lock **2** upwards on the control lever **1**.

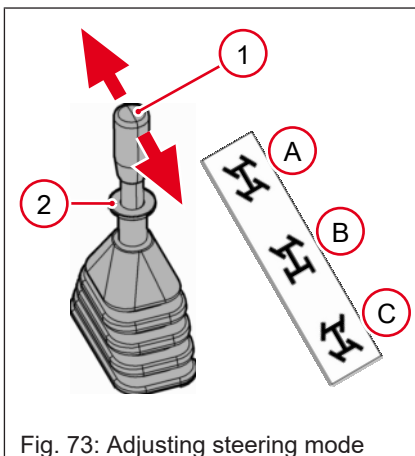


Fig. 73: Adjusting steering mode

Changing steering mode

To change the steering mode, proceed as follows:

1. Stop the vehicle.
2. Synchronizing steering [see Synchronizing steering system on page 98](#)
3. Straighten the wheels.
4. Pull lock **2** upwards and move control lever **1** to the desired position:
 - ⇒ **A** Diagonal steering (crab steering) (Use crawler gear drive mode only!)
 - ⇒ **B** Front axle steering
 - ⇒ **C** Four-wheel steering
5. Release the safety catch **2** and engage the control lever **1**.
 - ⇒ Steering mode has been changed.

Notes on crab steering



⚠ WARNING

Risk of accidents when driving with crab steering on public roads!

When the crab steering is switched on, the vehicle moves diagonally to the direction of travel in the corresponding direction. This may result in accidents that could result in serious injury or death.

- Before driving on public roads, synchronize the steering system and switch the steering mode to front axle steering.



⚠ WARNING

Risk of accident by using the manual throttle function when crab steering!

With the manual throttle function, the vehicle is kept at a constant speed. During steering movements, the vehicle moves diagonally to the direction of travel according to this speed. This may result in accidents that could result in serious injury or death.

- Deactivate the manual throttle function before the crab steering is switched on.

6

6.2.3 Driving with four-wheel steering

Choose four-wheel steering for loading work in confined spaces where small turning circles are required.

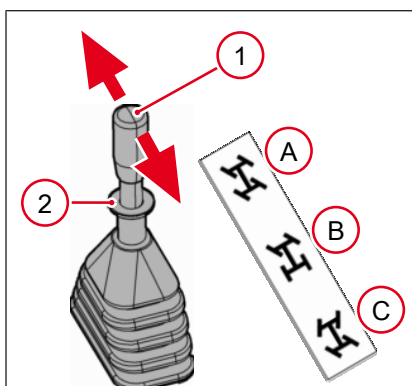


Fig. 74: Switch positions steering lever

1. Stop the vehicle.
2. Put the front and rear axle wheels in straight-ahead position.
 - ⇒ First select the steering mode four-wheel steering and synchronize.
 - ⇒ When the rear axle is in middle position, the symbol  lights.
3. Pull up the lock **2** at lever **1** from its locking position.
4. Move lever **1** to position **C**.
5. Release lock **2**.
6. Check that lever **1** is engaged.

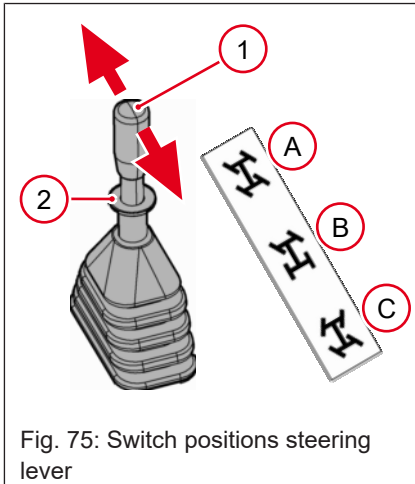


Fig. 75: Switch positions steering lever

1. Stop the vehicle.
2. Put the front and rear axle wheels in straight-ahead position.
3. Pull up the lock **2** at lever **1** from its locking position.
4. Move lever **1** to position **C**.
5. Release lock **2**.
6. Check that lever **1** is engaged.
7. Synchronizing steering system

6.2.4 Driving with front axle steering

Select front axle steering if the vehicle is to be used on the road or if fast transport journeys are to be made.

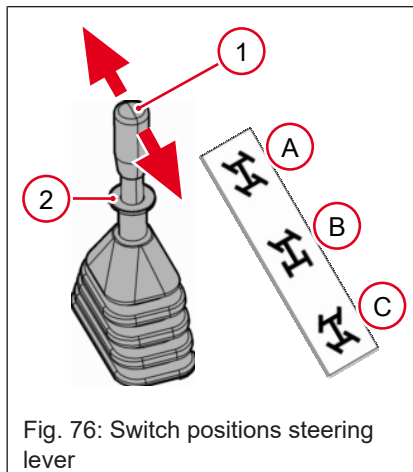


Fig. 76: Switch positions steering lever

1. Stop the vehicle.
2. Put the front and rear axle wheels in straight-ahead position.
 - ⇒ First select the steering mode four-wheel steering and synchronize.
 - ⇒ When the rear axle is in middle position, the symbol  lights.
3. Pull up the lock **2** at lever **1** from its locking position.
4. Move lever **1** to position **B**.
5. Release lock **2**.
6. Check that lever **1** is engaged.

6.2.5 Driving with crab steering



WARNING

Risk of accidents when driving with crab steering on public roads!

When the crab steering is switched on, the vehicle moves diagonally to the direction of travel in the corresponding direction. This may result in accidents that could result in serious injury or death.

- Before driving on public roads, synchronize the steering system and switch the steering mode to front axle steering.



⚠ WARNING

Risk of accident by using the manual throttle function when crab steering!

With the manual throttle function, the vehicle is kept at a constant speed. During steering movements, the vehicle moves diagonally to the direction of travel according to this speed. This may result in accidents that could result in serious injury or death.

- ▶ Deactivate the manual throttle function before the crab steering is switched on.

In crab steering, both steering axles are turned in the same direction. Therefore, choose crab steering if the vehicle has to be moved sideways, e.g. away from a wall.

The crab steering is only:

1. intended for short travel distances.
2. permissible in the Tortoise speed range.
3. permissible in the Snail speed range.

Changing from front axle steering to crab steering

If crab steering is selected directly from the front axle steering and the vehicle drives at high speed, the vehicle brakes automatically. In addition, the indicator lights for crab steering and front axle steering in the switch flash until the factory-set speed is reached and crab steering is activated.

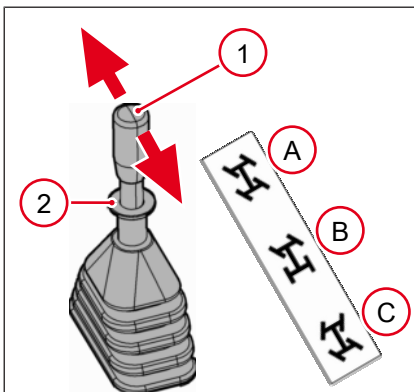


Fig. 77: Switch positions steering lever

1. Stop the vehicle.
2. Put the front and rear axle wheels in straight-ahead position.
 - ⇒ First select the steering mode four-wheel steering and synchronize.
 - ⇒ When the rear axle is in middle position, the symbol  lights.
3. Pull up the lock **2** at lever **1** from its locking position.
4. Move lever **1** to position **A**.
5. Release lock **2**.
6. Check that lever **1** is engaged.

6.2.6 Checking the steering system



⚠ WARNING

Hazard of accident due to leaking, incorrectly functioning steering system!

A defective steering system can lead to serious injury or death.

- ▶ A leaking and incorrectly functioning steering system must be repaired immediately by an authorized service center.

Before starting work, always check the steering system for proper function.

1. Move the steering wheel to the left and right with the engine running and at walking speed.
2. Check whether the wheels turn in accordance with the steering wheel movement.

6.2.7 Synchronizing steering system



⚠ WARNING

Accident hazard when synchronizing the steering system during vehicle travel!

Unwanted steering movements may occur during synchronization. This may result in accidents that could result in serious injury or death.

- ▶ Synchronize the steering system only at a standstill or at walking speed.
- ▶ Synchronize the steering system before traveling on public roads.



NOTICE

Problems with automatic steering synchronization due to tension!

- ▶ Do not stop the engine with the steering system fully engaged.
- ▶ Position the wheels in a straight line before switching off the engine.
 - ⇒ At the start of the journey, a fully engaged steering system can lead to tensions and malfunctions in the automatic steering synchronization.

Due to internal leaks in the steering hydraulics, the position of the wheels on the front and rear axle can change relative to each other when the vehicle is operated for a long period. For instance, the wheels on the front and rear axles no longer run in a straight line when driving straight ahead. In such case, it is necessary to synchronize the steering system.

Steering synchronization for four-wheel steering

1. Stop the vehicle.
2. Select a travel direction.
3. At low driving speed, turn the steering wheel to the left or right to the stop and try to turn further against the pressure for a short time in the end position.
4. Turn the steering system quickly back to straight-ahead position.
5. During a test drive, check whether the wheels on the front and rear axles are in line when driving straight ahead.

If you are no longer able to synchronize the steering system, contact an authorized service center to have it checked.

Steering synchronization for front axle or diagonal steering



Information

Engaging the lock in the four-wheel position

Lock 2 is preloaded with a spring. When lock 2 is released in lever position C, it engages automatically!

- The engagement must be checked. If it is not in order, have it repaired by an authorized service center.

Steering synchronization is only possible in the steering mode "four wheel"! Change steering type [see Changing steering mode on page 94](#)

6

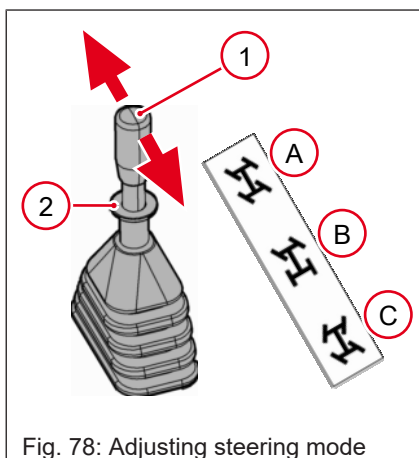


Fig. 78: Adjusting steering mode

1. Pull up the lock 2 at lever 1 from its locking position.
 2. Pull lever 1 to the rear to position (C = four-wheel steering).
 3. Release lock 2.
 4. Check that lever 1 is engaged.
- ⇒ Carry out steering synchronization with four-wheel steering.

6.3 Drive

6.3.1 Checklist for operating the vehicle

The checklist makes no claim to completeness. It is only intended to assist in the fulfillment of the duty of care. If questions are answered with "NO", the cause of the fault must first be rectified before work can be started.

Activity	Result
Control light for engine oil pressure and alternator extinguished?	
Braking effect sufficient?	

Activity	Result
Temperature indicator for engine coolant in normal range?	
Does the steering system function properly?	
Is nobody in the danger zone of the vehicle?	
Attachment locked in quick-change system?	

Particular attention should be paid to this when driving on public roads

Activity	Result
Bucket and attachments in transport position?	
Transport safety devices attached?	
Working hydraulics locked?	
Is the tooth guard attached to the bucket?	
Have the requirements in the vehicle documents (data confirmation, general operating permit) been observed?	

6.3.2 Checklist for parking the vehicle

The checklist makes no claim to completeness. It is only intended to assist in the fulfillment of the duty of care. If questions are answered with "NO", the cause of the fault must first be rectified before work can be ended.

Activity	Result
Attachments set down on the ground?	
All additional control circuits deactivated?	
Parking brake applied?	
Diesel engine switched off?	
Vehicle cab locked; especially if the vehicle cannot be supervised?	
Parking on public roads:	
Vehicle sufficiently secured?	
Parking on inclines or declines:	
Vehicle additionally secured against rolling away with suitable wheel chocks on the wheels?	

6.3.3 Information on driving



⚠ WARNING

Risk of accident due to excessive speed when descending!

Depending on the gradient, the braking effect of the travel drive may not be sufficient to maintain the speed. The vehicle accelerates to higher speeds. This may result in accidents that could cause serious injury or death.

- ▶ Reduce engine speed. Take your foot off the accelerator pedal.
- ▶ Use the brake/inching pedal to reduce speed when driving downhill and before bends. Press the pedal down quickly until the braking effect sets in.
- ▶ Select small speed range.



⚠ WARNING

Accident hazard due to persons in the risk zone!

Persons who are in the risk zone of the vehicle or suddenly enter it can be injured by working movement or the moving vehicle. This may result in accidents that could result in serious injury or death.

- ▶ Interrupt work immediately if persons enter the risk zone.
- ▶ Adjust the mirror correctly. Use visual aids such as, e.g. a camera.
- ▶ Observe extreme caution when reversing.



⚠ WARNING

Risk of accident due to restricted field of vision!

People and objects can be overlooked due to a limited field of vision.

- ▶ Check field of vision before putting into operation.
- ▶ Adjust the mirrors before commissioning the vehicle.
- ▶ Remove obstacles within the work area.
- ▶ Move the loader unit to the transport position when moving loads.
- ▶ Ensure a clear field of vision using suitable measures (e.g. guide or camera).



⚠ WARNING

Risk of injury from loose safety supports in the cabin!

A safety support lying loose in the cab can fly through the cab and injure the operator while driving and especially when braking.

- ▶ Before starting work, remove the safety support from the cabin and bring it separately to the work site.

6.3.4 Selecting a drive mode

The vehicle has several speed ranges. The speed range is indicated in the display with the corresponding symbol.

Depending on the vehicle design, different maximum speeds can be achieved in the individual drive stages. The maximum speed is reached only when the traveling drive has reached the operating temperature. In addition, the full maximum speed can only be reached on level asphalt terrain, with an empty bucket and without a trailer.

The last speed range is stored when the ignition is switched off and is activated when the engine is restarted.

Vehicle models 20 km/h				
Symbol	Speed range	Steering modes	Maximum speed	Recommended application conditions
	Tortoise	Four-wheel steering front wheel steering diagonal steering (crab steering)	0-7 km/h	For work with fast sequence of material intake and material settling.
	Rabbit	Four-wheel steering Front axle steering	0-20 km/h	For long transport paths.
		Diagonal steering (crab steering)	0-15 km/h	

Vehicle models 30 km/h				
Symbol	Speed range	Steering modes	Maximum speed	Recommended application conditions
	Tortoise	Four-wheel steering front wheel steering diagonal steering (crab steering)	0-10 km/h	For work with fast sequence of material intake and material settling.
	Rabbit	Four-wheel steering Front axle steering	0-30 km/h	For long transport paths.
		Diagonal steering (crab steering)	0-15 km/h	

Changing the "Turtle" speed range

1. Brake the vehicle with the brake/inching pedal.
2. Press the push button with the "Turtle" symbol in the joystick.
 - ⇒ Symbol  appears in the digital display.
 - ⇒ The "Turtle" speed range is activated.

Changing "Rabbit" speed range

- Press the push button with the "rabbit" symbol in the joystick.
 - ⇒ The symbol  appears permanently in the digital display.
 - ⇒ Speed range "Rabbit" is activated.

6.3.5 Accelerating the vehicle with pedal



⚠ WARNING

Accident hazard due to blocked or dirty pedals!

Loose objects in the cab or dirty pedals can impair the function of the pedal and lead to accidents with serious injuries or death.

- ▶ Keep pedals clean.
- ▶ Do not place any objects in the area of the pedals.

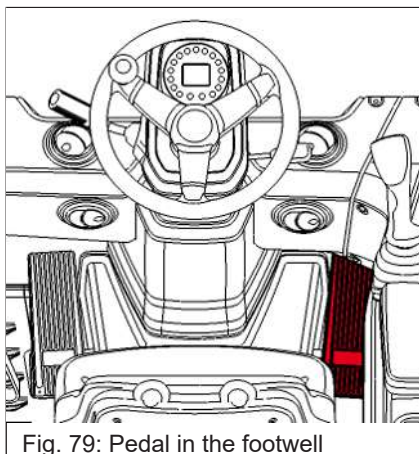


Fig. 79: Pedal in the footwell

The pedal controls the engine speed variably.

The accelerator pedal is located in the footwell on the right-hand side.
 The attainable speed depends on the choice of the speed range.

6.3.6 Operating the manual throttle in PWR and ECO mode



⚠ WARNING

Risk of accident when driving on public roads with manual throttle!

Failure to observe this can cause serious injury or death.

- ▶ Deactivate manual throttle before driving on public roads.
- ▶ Only use manual throttle when working!



⚠ WARNING

Risk of accident by using the manual throttle function when crab steering!

This may result in accidents that could result in serious injury or death.

- ▶ Do not use the manual throttle when diagonal steering is activated (crab steering)!
- ▶ Deactivate the manual throttle before switching to diagonal steering.

Using this function, a certain speed of the diesel engine can be set and saved.

If necessary, the stored engine speed of the manual throttle function can be overridden with the accelerator pedal. As long as the accelerator pedal sets a speed higher than the engine speed set via the manual throttle function, the higher speed is adopted. If the accelerator pedal is no longer operated, the engine speed is reset to the last stored value of the manual throttle function.

The manual throttle function can also be combined with the slow-speed drive function for optimization.

Setting and saving the engine speed

1. Release parking brake.
2. Select the drive mode and desired steering mode.
3. Select the direction of travel with the rocker switch on the joystick.
4. Select the desired engine speed and speed with the accelerator pedal.
⇒ The current rpm will be indicated on the display.
5. Press the manual throttle control forward briefly
⇒ Rotational speed is saved
6. Engine speed and speed can be adjusted by touching the manual throttle again.



Fig. 80: Increasing engine speed

Increasing engine speed

- Press the manual throttle control briefly forward in direction **I** several times or keep it pressed slightly forward until the desired speed is reached.



Fig. 81: Reducing engine speed

Reducing engine speed

- Press the manual throttle control briefly back in direction **II** several times or keep it pressed back slightly until the desired speed is reached.

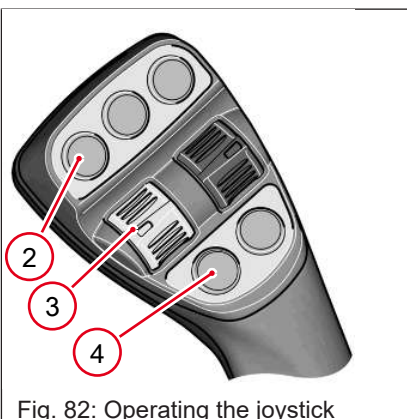
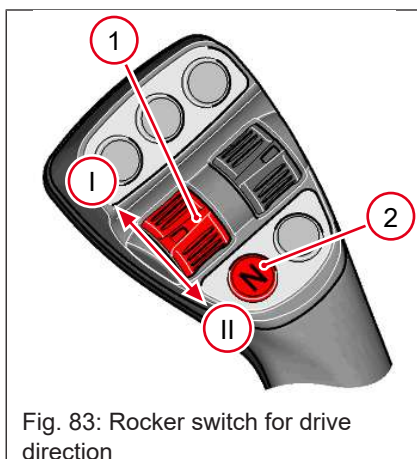


Fig. 82: Operating the joystick

Deactivating the manual throttle

Speed setting via the manual throttle is cleared with the:

1. The inching pedal
2. By pressing the push button Neutral position **4** in the joystick
3. Using the rocker switch **3** for the drive direction
4. By pressing the button for drive modes **2**



Memory function

If push button **2** in the joystick, the inching pedal or the push button for the drive modes is pressed when the manual throttle is activated, the hand throttle function is interrupted and the vehicle brakes evenly. The stored engine speed can be called again.

Recall stored engine speed:

1. Select the direction of travel with rocker switch **1** on the joystick.
2. Tap the manual throttle briefly to the front or rear.
 ⇒ The diesel engine accelerates to the stored rotational speed.

The stored rotational speed is deleted in the following cases and **cannot** be recalled:

1. After deactivating the manual throttle function in the "rabbit" drive mode,
2. or if the parking brake is applied when the manual throttle is activated.

6.3.7 Operating the manual throttle in CSD mode



⚠ WARNING

Risk of accident when driving on public roads with manual throttle!

Failure to observe this can cause serious injury or death.

- ▶ Deactivate manual throttle before driving on public roads.
- ▶ Only use manual throttle when working!



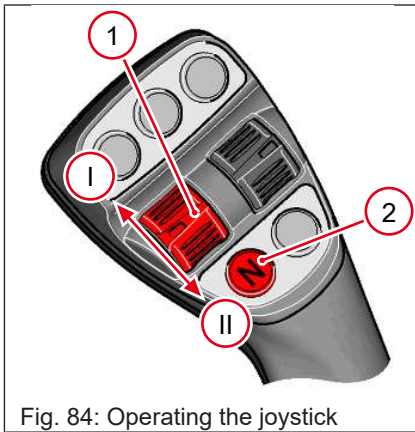
⚠ WARNING

Risk of accident by using the manual throttle function when crab steering!

This may result in accidents that could result in serious injury or death.

- ▶ Do not use the manual throttle when diagonal steering is activated (crab steering)!
- ▶ Deactivate the manual throttle before switching to diagonal steering.

Using this function, a certain speed of the diesel engine can be set and saved. This ensures a more even delivery of hydraulic oil to the attachment when operating hydraulically driven attachments.



Setting and saving the engine speed

1. Release parking brake.
2. Select the speed range and desired steering mode.
3. Set the driving direction to neutral by pressing push button **2** on the joystick.
⇒ Symbol **N** appears in the digital display.
4. Preselect the desired engine speed with the manual throttle.
⇒ The current rpm will be indicated on the display.
5. Engine speed can be adjusted by touching the manual throttle again.
6. Press the brake/inching pedal
7. Select the driving direction with the rocker switch **1** on the joystick
8. Specify the desired speed with the accelerator pedal



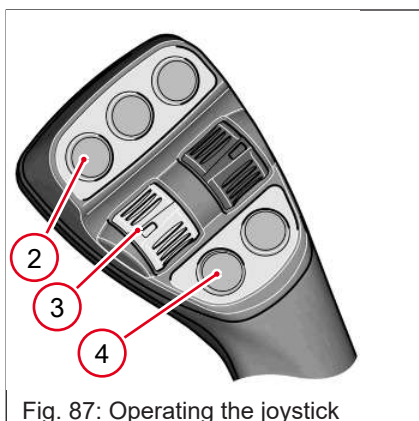
Increasing engine speed

- Press the manual throttle control briefly forward in direction **I** several times or keep it pressed slightly forward until the desired speed is reached.



Reducing engine speed

- Press the manual throttle control briefly back in direction **II** several times or keep it pressed back slightly until the desired speed is reached.



Deactivating the manual throttle

Speed setting via the manual throttle is cleared with the:

- By pressing the push button Neutral position **4** in the joystick

Memory function

If push button **4** on the joystick or push button **2** for speed range or change of speed range is pressed when the manual throttle is activated, the manual throttle function is interrupted and the vehicle brakes evenly. The stored engine speed can be called again.

Recall stored engine speed:

1. Select the direction of travel with rocker switch **3** on the joystick.
2. Tap the manual throttle briefly to the front or rear.
⇒ The diesel engine accelerates to the stored rotational speed.

The stored rotational speed is deleted in the following cases and **cannot** be recalled:

1. After deactivating the manual throttle function in the "rabbit" speed range,
2. or if the parking brake is applied when the manual throttle is activated.

6

6.3.8 Operating the low-speed control in PWR and ECO mode



! WARNING

Risk of accidents for persons and traffic

Activate the low-speed control when the vehicle is stationary, otherwise the vehicle will decelerate abruptly.

Important information on the low-speed control

The low-speed range function can be used in the "Turtle" and "Rabbit" speed range.

If the low-speed control has been deactivated, the function must be reactivated and adjusted.

This function can be used to limit the maximum driving speed.



Fig. 88: Set the controller low-speed control

Controller settings

Position	Explanation
Position I, front slide control	Position for normal operation Low-speed control deactivated / no function
Position between I and II	Speed limitation to a set driving speed
Position II, rear slide control	Low-speed control activated, speed is 0 km/h

Activation of low-speed control

1. Pull the controller all the way back to position II. If the controller is already in position II, first push the controller in the direction of position I and then pull it all the way back to position II.
 - ⇒ Low-speed system is enabled.
 - ⇒ Symbol  and  flash alternately in the display.
2. Push the controller all the way forward in direction I until the desired speed is reached.
 - ⇒ The symbol  in the display is permanently lit.
 - ⇒ In position I symbol  in the display is off.
 - ⇒ In the middle position, the symbol  is lit permanently.

The speed limit can be increased or decreased continuously using the slider.



Fig. 89: Increasing speed

Increasing speed

- Slowly push the controller forward in direction I.
 - ⇒ The speed limit is increased continuously.



Fig. 90: Reducing speed

Reducing the speed limit

- Slowly pull the controller back in direction II.
- ⇒ The speed limit is continuously reduced.

Deactivating the low-speed control

1. Switch off the ignition
2. Switch to CSD mode.
3. Low-speed controller knob pushed all the way forward (active, but without function)

6.3.9 Operating the low-speed control in CSD mode

Important information on the low-speed control

If the low-speed control has been deactivated, the function must be reactivated and adjusted.

With the help of this function a basic speed can be set, which can be overridden with the accelerator pedal.



Fig. 91: Set the controller low-speed control

Controller settings

With controller 1, the speed is infinitely variable, independent of the engine speed. The prerequisite is that a sufficiently high engine speed has been selected.

Position	Explanation
Position I, front slide control	1. Low-speed control disabled 2. If the low-speed control is activated, the vehicle drives at the maximum possible speed.
Position between I and II	Presetting of a basic speed. This can be overridden with the accelerator pedal.

Position	Explanation
Position II, rear slide control	Low-speed control activated, speed is 0 km/h

1. Activate CSD mode with neutral travel direction.
2. The "Turtle" speed range is recommended.
3. Pull the controller all the way back to position II. If the controller is already in position II, first push the controller in the direction of position I and then pull it all the way back to position II.
 - ⇒ Low-speed system is enabled.
 - ⇒ Symbol  and  or  flash alternately in the display.
4. Push the controller all the way forward in direction I until the desired speed is reached.
 - ⇒ The symbol  in the display is permanently lit.
 - ⇒ In position I symbol  in the display is off.
 - ⇒ In the middle position, the symbol  is lit permanently.

The speed can be steplessly increased or decreased via the slide control.



Fig. 92: Increasing speed

Increasing speed

- Slowly push the controller forward in direction I.
- ⇒ The speed increases continuously.



Fig. 93: Reducing speed

Reducing speed

- Slowly pull the controller back in direction II.
- ⇒ The speed is reduced steplessly.

Deactivating the low-speed control

1. Switch off the ignition
2. Change to PWR or ECO mode.

6.3.10 Selecting a travel direction



⚠ WARNING

Accident hazard when changing drive direction during vehicle travel!

Changing the direction of travel while driving means that the vehicle immediately travels in the opposite direction. This may result in accidents that could result in serious injury or death.

- ▶ Do not change the drive direction while driving.
- ▶ First stop the vehicle completely, then select the drive direction.

The vehicle has forward and reverse direction of travel. In addition, the vehicle can be switched to the neutral position.

If the direction of travel is not accepted, either the Neutral position has been accidentally activated or the parking brake is still activated.

- Repeat the direction of travel selection.

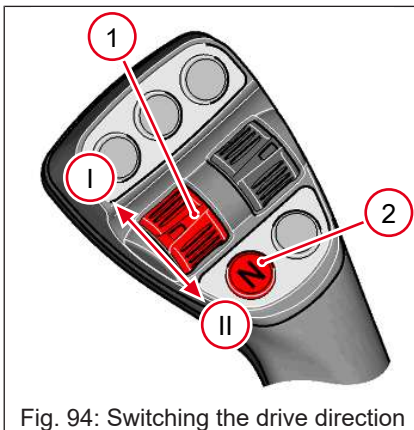


Fig. 94: Switching the drive direction

Symbol	Meaning
	Direction of travel Forward I Activated when switch 1 is pushed forward.
N	Neutral position Activated when switch 2 is pressed.
	Direction of travel Reverse II Activated when switch 1 is pushed backwards.

6

6.3.11 Reversing operation

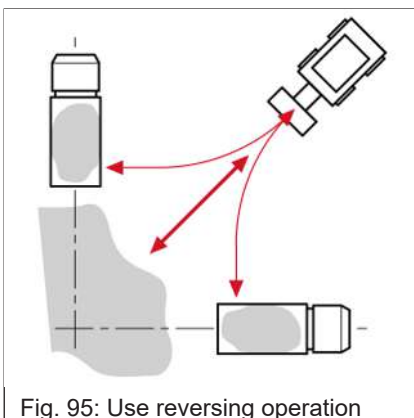


Fig. 95: Use reversing operation

Reversing operation (changing the direction of travel without stopping) is a special form of changing the direction of travel. Reverse operation is only permitted in a secured work area for fast loading work at low travel speeds and low lifting heights.

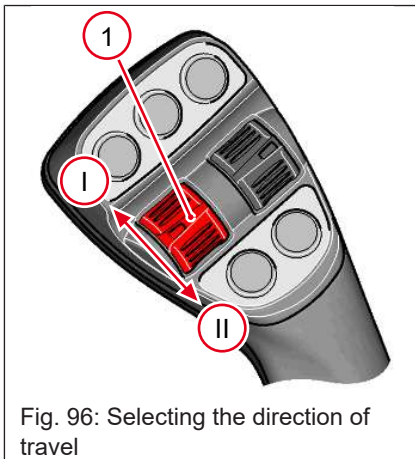


Fig. 96: Selecting the direction of travel

1. Press switch 1 in direction I.
 - ⇒ Control light illuminates in the display.
 - ⇒ Direction of travel changes to forward.
2. Press switch 1 in direction II.
 - ⇒ Control light illuminates in the display.
 - ⇒ Direction of travel changes to reverse.
3. Apply the accelerator pedal.
 - ⇒ The vehicle moves in the new direction.

6.3.12 Stopping the vehicle



Fig. 97: Select driving direction Neutral

1. Reduce engine speed. Take foot off accelerator pedal.
2. Stop the vehicle with the service brake.
3. Press switch 1.
 - ⇒ Control light **N** illuminates in the display.
 - ⇒ Direction of travel changes to Neutral.
4. Activate parking brake.
 - ⇒ The vehicle is at a standstill.

6.3.13 Parking and securing vehicles



WARNING

Hazard of accident from a parked vehicle without wheel chocks!

On uphill and downhill gradients, the parking brake may not be sufficient to secure the vehicle sufficiently. This may cause the vehicle to roll away and cause an accident, serious injury or death.

- ▶ Secure vehicle with parking brake against rolling away.
- ▶ Secure the vehicle additionally with suitable wheel chocks on the wheels pointing downhill.



NOTICE

Damages to the engine!

If the engine is switched off directly from full load operation, the engine may be damaged due to an excessively high operating temperature.

- ▶ Allow the engine to idle for approx. three minutes.
- ▶ Then switch off the engine.



NOTICE

Damage to the starting motor!

If the engine is restarted immediately after switching off, the starting motor may be damaged.

- ▶ Wait at least 10 seconds before starting again.



NOTICE

Problems with automatic steering synchronization due to tension!

- ▶ Do not stop the engine with the steering system fully engaged.
 - ▶ Position the wheels in a straight line before switching off the engine.
- ⇒ At the start of the journey, a fully engaged steering system can lead to tensions and malfunctions in the automatic steering synchronization.

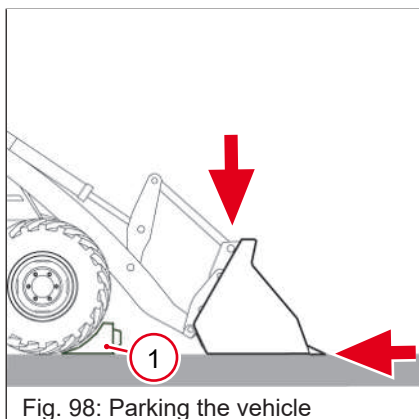


Fig. 98: Parking the vehicle

1. Stop the vehicle on a stable, level and dry surface.
2. Activate parking brake.
3. Set the attachment horizontally to the ground.
4. Lower the load system completely to the ground.
5. Switch off all hydraulic control circuits and all electrical consumers.
6. Switch off the engine of the vehicle. Remove the starting key.
 - ⇒ If present, the drive interlock is activated.
7. Close and lock windows and doors.
8. Turn the key on the battery master switch out of the locking mechanism and remove it.
 - ⇒ The entire electrical system is out of operation.
9. If necessary, additionally secure the vehicle on the wheels pointing downhill with wheel chocks **1**.
 - ⇒ On vehicles with approval as self-propelled machines, the wheel chock must always be carried along.

6.3.14 Vehicle travel on public roads



⚠ WARNING

Risk of accident due to restricted field of vision!

The operator may fail to see persons and objects due to the limited field of vision.

- ▶ Before driving on public roads, check visual aids (e.g. mirrors, camera) for cleanliness, damage and function.
- ▶ Adjust visual aids (e.g. mirrors, camera) before driving on public roads.
- ▶ Check your field of vision before driving on public roads.
- ▶ Do not move the vehicle on public roads if the field of vision is more restricted than permitted.
- ▶ Only use attachments approved for use on public roads.
- ▶ Remove attachments not approved for use on public roads and transport them to the place of use on a transport vehicle.



⚠ WARNING

Accident hazard from the pallet fork tines!

The fork tines of the pallet fork can cause serious injury or death during operation.

- ▶ Remove the pallet forks before performing vehicle travel on public roads and transport them separately.
- ▶ In the case of a stacking unit with folding forks, fold them up before driving on public roads.
- ▶ Bent, torn or otherwise damaged forks must not be used.
- ▶ Before starting work, ensure that the fork tines on the fork carriage are safely locked.
- ▶ Lower the stacking units to the ground before leaving the vehicle.



⚠ WARNING

Accident hazard due to blinded motorists!

With work lights switched on, other road users can be blinded. This may result in accidents that could result in serious injury or death.

- ▶ Switch off the work lights when driving on public roads.
- ▶ Pay attention to national regulations on construction site lighting.



⚠ WARNING

Risk of accidents when driving with crab steering on public roads!

When the crab steering is switched on, the vehicle moves diagonally to the direction of travel in the corresponding direction. This may result in accidents that could result in serious injury or death.

- Before driving on public roads, synchronize the steering system and switch the steering mode to front axle steering.

Before starting to drive, ensure that the vehicle complies with the relevant local regulations and has a valid type-approval or registration. Vehicles may only be driven on public roads if the operator is in possession of a driving license as defined by national traffic laws. Only use attachments on public roads that are approved for this purpose. Follow the instructions below when driving on public roads.

1. Remove attachments not approved for use on public roads.
2. Secure attachments approved for use on public roads:
3. Check the lighting system and, if necessary, rotating beacon function.
4. Check and if necessary adjust the rearview mirrors.
5. Switch off the work lights.
6. Fasten the seat belt.
7. Start vehicle travel ensuring safety.

6

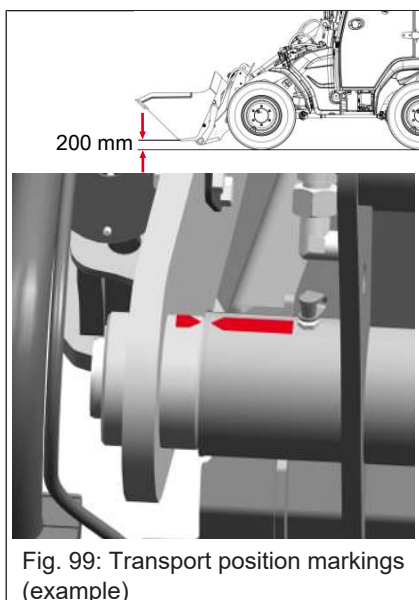


Fig. 99: Transport position markings (example)

6.3.15 PWR operating mode

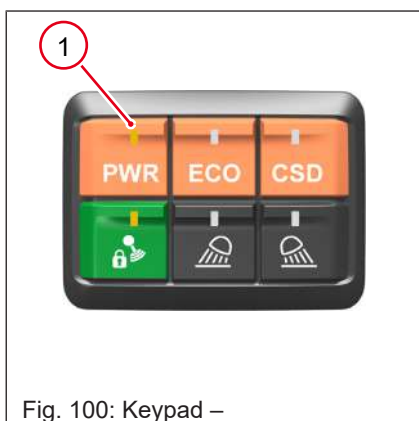
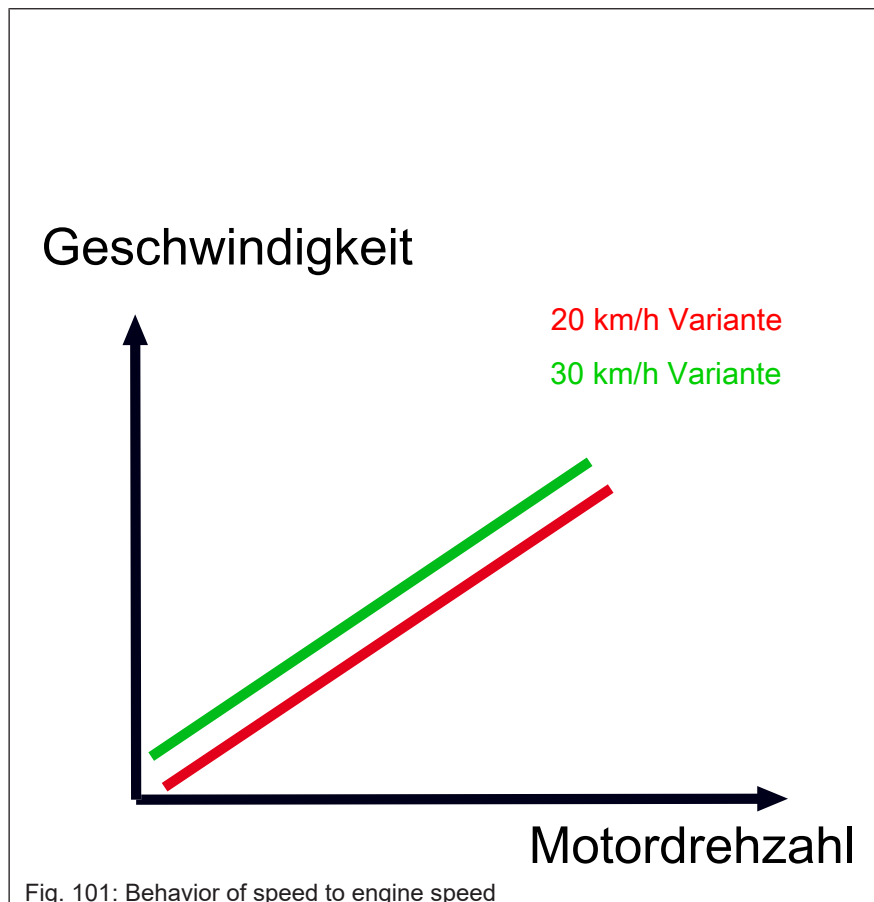


Fig. 100: Keypad –

The operating mode PWR (Power) 1 is the standard mode for load-dependent and powerful driving.

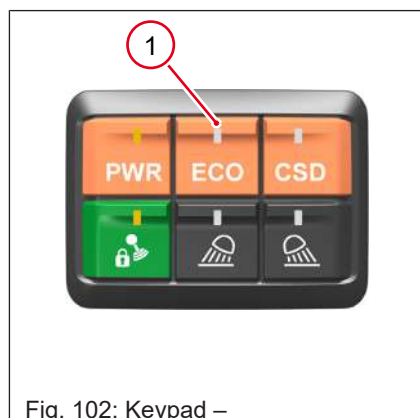
1. Maximum driving speed depends on the speed range (rabbit/turtle) and the position of the slider of the low-speed control [see Operating the low-speed control in PWR and ECO mode on page 107](#).
2. Diesel engine speed and corresponding driving speed are determined by the manual throttle or accelerator pedal.
3. Speed and engine speed are proportional to each other.
 - ⇒ This mode is particularly suitable for bucket work and stacking work.



4. The advantage of this mode is that the full hydraulic power is available at full engine power.

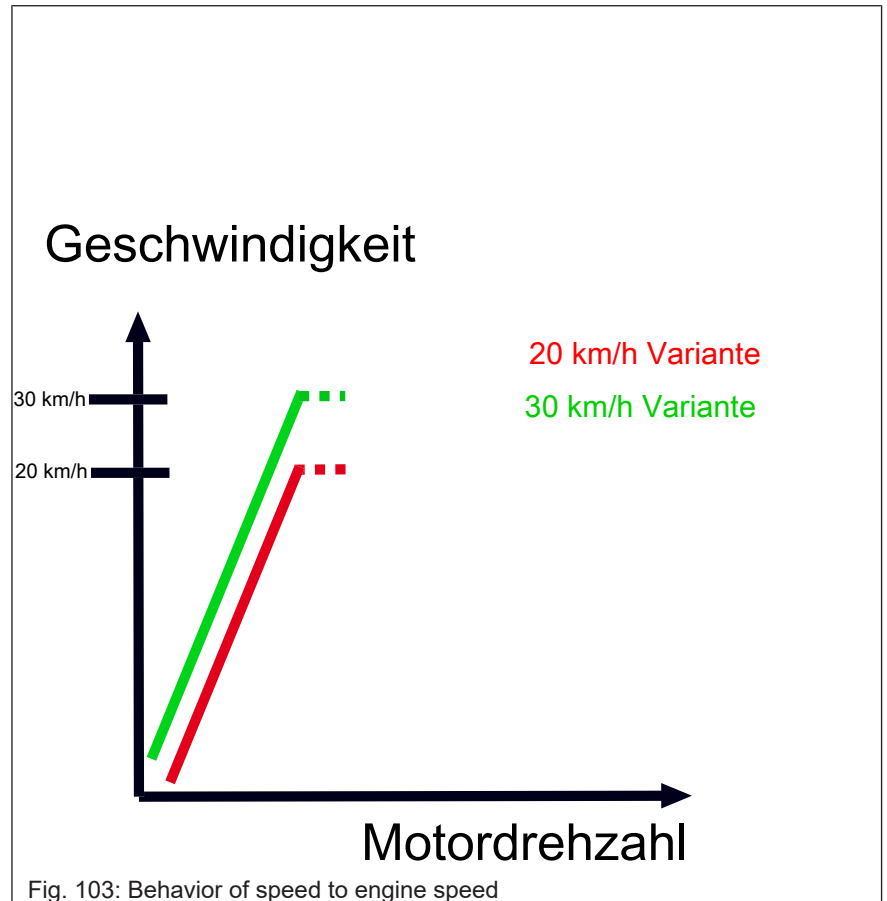
Speed range		20 km/h	30 km/h
Tortoise		0 – 10 km/h	0 – 10 km/h
Hare	for front-wheel steering, four-wheel steering	0 – 20 km/h	0 – 30 km/h
	for diagonal steering (crab steering)	0 – 15 km/h	0 – 15 km/h

6.3.16 ECO operating mode



In the operating mode ECO (Economy) **1**, the desired speed is already reached at a lower engine speed with correspondingly lower power requirements.

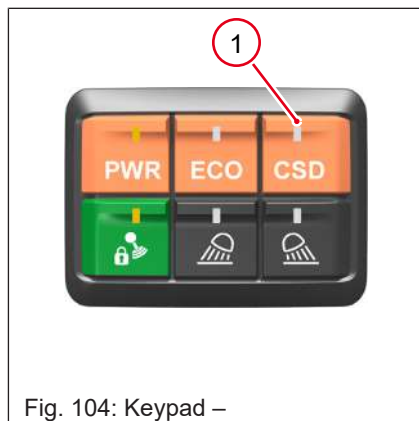
- Maximum driving speed depends on the speed range (rabbit/turtle) and the position of the slider of the low-speed control [see Operating the low-speed control in PWR and ECO mode on page 107](#).
- Diesel engine speed and corresponding driving speed are determined by the manual throttle or accelerator pedal.
- Vehicle speed increases, engine speed remains constant.
⇒ This mode is particularly suitable for road travel.



4. When the vehicle reaches a speed of 30km/h, the engine speed decreases. This is to save fuel and minimize noise.

Speed range		20 km/h	30 km/h
Tortoise		0 – 10 km/h	0 – 10 km/h
Hare	for front-wheel steering, four-wheel steering	0 – 20 km/h	0 – 30 km/h
	for diagonal steering (crab steering)	0 – 15 km/h	0 – 15 km/h

6.3.17 CSD operating mode



In the operating mode CSD (Constant-Speed-Drive) **1**, the engine speed is set with the manual throttle and the speed is controlled via the gas pedal or the slider of the low-speed control [see Operating the low-speed control in CSD mode on page 109](#).

1. This mode is particularly suitable for hydraulic attachments, e.g. sweeper, snow blower, etc.
2. The diesel engine speed is only determined via the manual throttle.
3. Speed is controlled via the gas pedal.
 - ⇒ Rabbit 0 - 15 km/h
 - ⇒ Turtle 0 - 10 km/h
4. As an alternative to the gas pedal, the basic speed can be set using the slider of the low-speed control.
 - ⇒ Turtle and rabbit 0 – 10 km/h
5. The gas pedal can be used to override the slider of the low-speed control.
6. It is possible to interrupt the work process by applying the parking brake. Depending on the vehicle equipment (software-dependent), the rocker switch can be used to activate one drive direction without having to press the inching pedal again.

6.4 Driving with a trailer

6.4.1 Safety instructions for trailer operation

Observe the safety instructions in the chapter [see Trailer operation on page 25](#).

In addition, the following safety instructions apply:

- Trailer operation is only permitted with a type-approved, authorized trailer coupling.
- Trailer operation with the towing device of the vehicle is prohibited.
- Observe the maximum permissible drawbar load and trailer load, [see Trailer loads and drawbar loads on page 297](#)
- Trailer operation changes the vehicle's operating behavior; the operator must be familiar with this and act accordingly.
- Bear in mind the vehicle's steering mode and the trailer's turning circle.
- Before downhill vehicle travel, reduce travel speed or adapt it to the circumstances.

6.4.2 Requirements for driving with a trailer



NOTICE

Requirements trailer coupling

- ▶ Only towbars with EC acceptance or EC test mark are approved for road traffic in the Federal Republic of Germany (StVZO).
- ▶ Additional requirements can be found in the General Operating Permit or in the data confirmation and must be observed!
- ▶ Observe the legal regulations of your country.

The transport of other trailers or goods is only permitted with tractor registration. Refer to the operation license for the specific requirements on trailer operation.

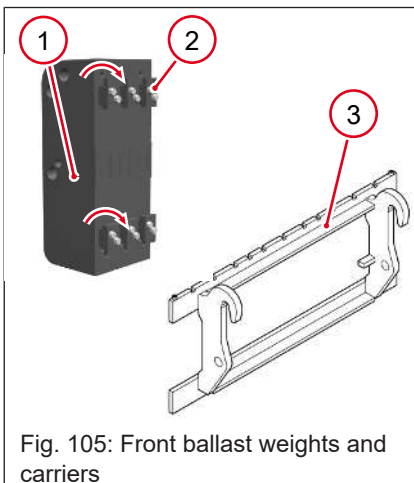
The relevant national regulations must be observed and applied.

Also note the following points:

- Observe the permissible trailer loads and drawbar loads.
- Observe any front ballasting that may be necessary [see Trailer loads and drawbar loads on page 297](#).
- Ensure the rotatability of the trailer coupling.
- Carry out or have carried out regular maintenance work on the trailer coupling.

6

6.4.3 Front ballast trailer operation



In order to comply with the required minimum front axle loads in trailer operation, the vehicle requires front ballasting.

The front ballast consists of cast weights **1**, which are attached by means of brackets **2** to the fork carriage of the standard stacking device **3**. The front ballasting weight can be found in the technical data.

6.4.4 Trailer couplings



⚠ WARNING

Risk of injury to persons in the danger zone!

Persons in the area between vehicle and trailer may be overlooked by the operator when coupling and uncoupling and may be seriously or fatally injured.

- ▶ Ensure that there are no persons in the danger zone.

**⚠ WARNING****Accident hazard due to a damaged trailer coupling!**

If the trailer coupling is damaged, the trailer may break off. This can cause accidents with serious injuries or death.

- ▶ Check the trailer coupling for damage before using it.
- ▶ Have a damaged or malfunctioning trailer coupling immediately repaired by an authorized service center.

**⚠ WARNING****Risk of accident due to excessive speed when descending!**

Depending on the gradient, the braking effect of the travel drive may not be sufficient to maintain the speed. The vehicle accelerates to higher speeds. This may result in accidents that could cause serious injury or death.

- ▶ Reduce engine speed. Take your foot off the accelerator pedal.
- ▶ Use the brake/inching pedal to reduce speed when driving downhill and before bends. Press the pedal down quickly until the braking effect sets in.
- ▶ Select small speed range.

Several trailer couplings are available for the vehicle. The trailer coupling is permanently installed on the vehicle.

This operator's manual describes the use and operation of the following trailer couplings.

- Automatic trailer coupling
- Ball coupling

The requirements for operating a trailer coupling can be found in the chapter Requirements for driving with a trailer [see Requirements for driving with a trailer on page 119](#). The permissible drawbar loads, trailer loads, permissible total weight and permissible axle loads must be observed and can be found in the chapter "Weights".

6.4.4.1 Operating the automatic trailer coupling

**⚠ WARNING****Danger of crushing due to unintentional actuation of the trailer coupling!**

When the trailer coupling lock is actuated, the trailer pin closes abruptly. Limbs within the range of the trailer pin can be crushed and severely injured.

- ▶ Keep all parts of the body away from the range of action of the automatic trailer coupling.
- ▶ Always keep the trailer coupling closed when it is not in use.



⚠ CAUTION

Risk of accident due to unlocked coupling pins!

Non-observance can lead to injuries.

- After each coupling operation check whether the coupling pin is safely coupled into the towing eye.

To ensure the prescribed swivel angle when coupled, the trailer coupling may only be used in combination with towing eyes to DIN 11026 (ISO 5692-2), DIN 11043 or DIN 74054-1/-2 (ISO 8755).

The maximum permissible drawbar load and trailer load, the permissible total weight and the permissible axle load must be observed.

The identification plate on the trailer hitch lists the standard specifications for the permissible towing eyes.

Hitching the trailer to the vehicle

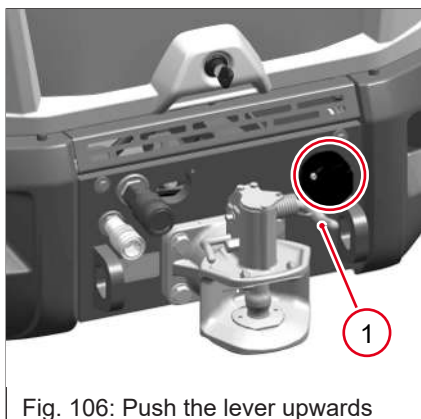


Fig. 106: Push the lever upwards

1. Press lever **1** all the way upward until the coupling pin audibly engages in the open position.
2. Adjust the trailer drawbar to the correct height.
3. Slowly reverse the vehicle toward the trailer drawbar until the drawbar eye touches and sets off the trigger mechanism.
 - ⇒ When the trigger is touched by the drawbar eye, the coupling pin with the lever **1** quickly moves downwards.
 - ⇒ The trailer is locked in the coupling jaw.
4. Apply the parking brake.

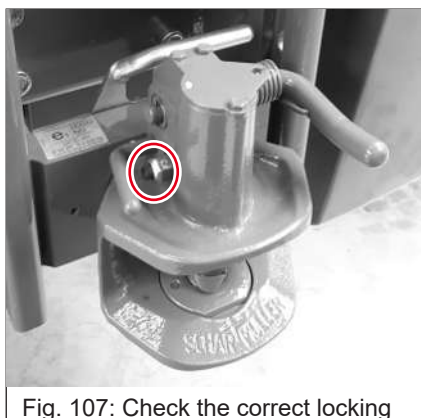


Fig. 107: Check the correct locking

5. Check the correct locking.
6. Connect the trailer supply lines to the vehicle.
7. Remove the equipment (e.g. chocks, support wheel) used for securing the trailer.
 - ⇒ The trailer is coupled and connected.

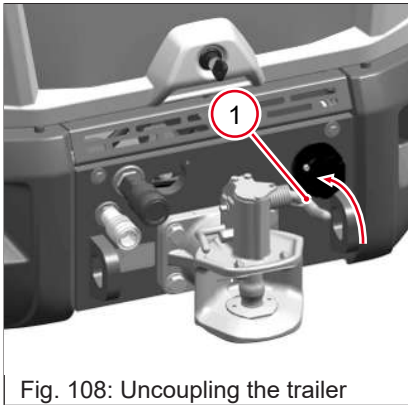


Fig. 108: Uncoupling the trailer

Uncoupling the trailer from the vehicle

1. Park the trailer on a stable, level and dry surface.
2. Apply parking brake and secure trailer (e.g. with wheel chock, support wheel, etc.).
3. Remove the trailer supply lines from the vehicle.
4. Seal connections with protective caps.
5. Press lever **1** all the way upward until the coupling pin audibly engages in the open position.
6. Slowly move the vehicle away from the trailer.

Close trailer coupling by hand



WARNING

Danger of crushing due to the trailer coupling pins falling down!

The sudden falling of the coupling pin can lead to injuries.

- ▶ Do not touch the coupling pin with your hands.
- ▶ Wear protective gloves.



Information

Avoid soiling!

To prevent soiling on the trailer coupling, close it again after uncoupling the trailer.

The trailer coupling can be closed manually without a trailer drawbar touching the trigger. This may be necessary, for example, if a tow rope is to be hooked into the trailer coupling.

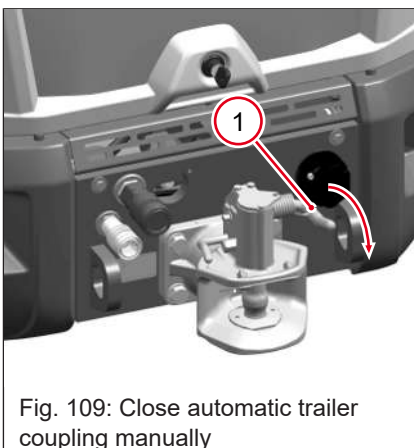


Fig. 109: Close automatic trailer coupling manually

1. Press lever **1** down slowly.
⇒ Only touch the lever with your hands, do not touch any other components when operating it.
2. The trigger is activated manually. The trailer coupling pin closes automatically.

6.4.4.2 Operating the ball coupling



⚠ WARNING

Accident hazard due to a damaged trailer coupling!

If the trailer coupling is damaged, the trailer may break off. This can cause accidents with serious injuries or death.

- ▶ Check the trailer coupling for damage before using it.
- ▶ Have a damaged or malfunctioning trailer coupling immediately repaired by an authorized service center.



⚠ CAUTION

Risk of accident due to unlocked coupling pins!

Non-observance can lead to injuries.

- ▶ After each coupling operation check whether the coupling pin is safely coupled into the towing eye.

The ball coupling is designed for use on tractors and self-propelled machines. Observe the following regulations for ball couplings:

- Only trailers equipped with ball couplings may be towed.
- Do not hitch trailers with positive steering.
- When coupling and uncoupling, the regulations of the employer's liability insurance association must be observed.
- Observe the maximum permissible drawbar load and trailer load.
- Have damaged or defective trailer couplings replaced or repaired immediately by an authorized service center.

6

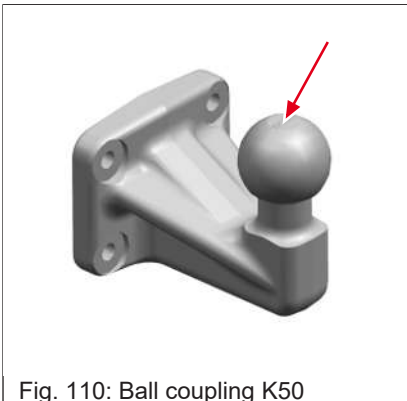


Fig. 110: Ball coupling K50

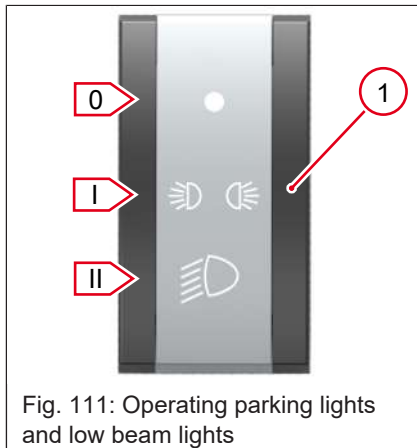
A description of the operation is not necessary for the ball coupling K50. Refer to the operating manual of the trailer for the operation of the trailer's trailer device.

The specification K50 refers to the diameter of the ball head.

6.5 Lighting and signaling system

6.5.1 Parking lights, low beam and clearance lights

The switch panel with the switch for vehicle lighting is located in the dashboard to the left of the steering wheel. If the ignition is switched off with the low beam switched on, the parking lights and the clearance lights light up permanently and a warning tone sounds.



Switch **1** has three switch positions.

1. Move the switch to position **I**.
⇒ Parking lights and clearance lights are switched on.
⇒ LED in the switch illuminates.
2. Move the switch to position **II**.
⇒ Low beam is switched on.
⇒ LED in the switch illuminates.
3. Move the switch to position **0**.
⇒ Lights are switched off.
⇒ LED in the switch is not illuminated.

6.5.2 High beam

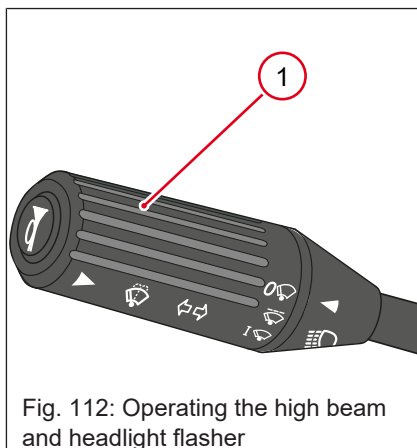


⚠ WARNING

Accident hazard due to blinded motorists!

When the high beam is switched on or the headlight flasher is activated, other road users may be blinded. This may result in accidents that could result in serious injury or death.

- ▶ Dim down in good time with oncoming or preceding road users.
- ▶ Observe the national regulations.



The high beam and headlight flasher are operated via the steering column switch **1** on the left-hand side of the steering wheel.

- ✓ The low beam must be switched on [see Parking light, low beam and clearance lights on page 123](#).

1. Pull the steering column switch **1** just beyond the resistance in the direction of the steering wheel.
⇒ High beam is switched on.
⇒ Control light  in the display lights up.
2. Pull the steering column switch **1** again briefly beyond the resistance in the direction of the steering wheel.
⇒ High beam is switched off.
3. Pull the steering column switch **1** briefly in the direction of the steering wheel, but do not exceed the resistance.
⇒ The headlight flasher is on as long as the steering column switch is held in this position.
⇒ Control light  in the display lights up during this time.

6.5.3 Work lights



⚠ WARNING

Accident hazard due to blinded motorists!

With work lights switched on, other road users can be blinded. This may result in accidents that could result in serious injury or death.

- ▶ Switch off the work lights when driving on public roads.
- ▶ Pay attention to national regulations on construction site lighting.

Depending on the vehicle equipment, various work lights are available for illuminating the work area.

The following work lights may be fitted to the vehicle.

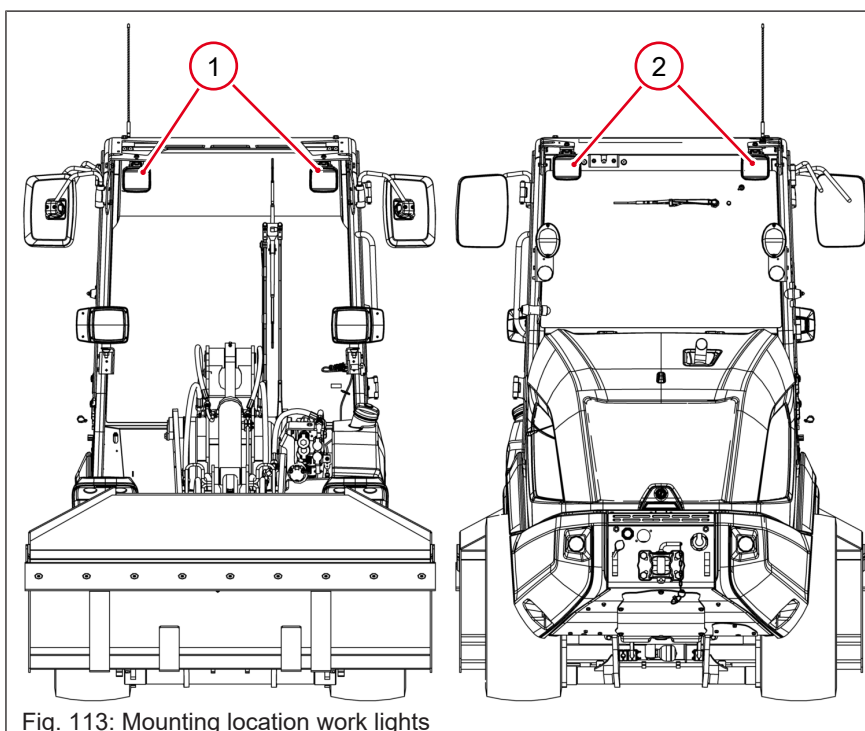


Fig. 113: Mounting location work lights

- 1 Work lights on cab roof front left and right
- 2 Work lights on rear cab roof left and right

6

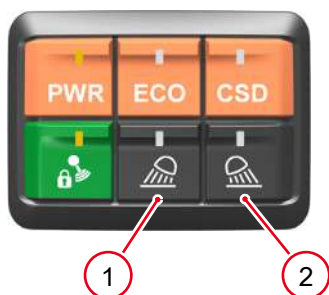


Fig. 114: Switch the work lights on and off

The work lights are operated via the cab keypad.

Operating the front work lights

The front left and right work lights are operated simultaneously with switch 1.

1. Briefly press switch 1.
 - ⇒ The work lights are switched on.
 - ⇒ LED in switch 1 lights up.
2. Briefly press switch 1 again.
 - ⇒ Work lights are switched off.
 - ⇒ LED in switch 1 is off.

Operating the rear work lights

The work lights at the rear left and right are operated simultaneously with switch **2**.

1. Briefly press switch **2**.
 - ⇒ The work lights are switched on.
 - ⇒ LED in switch **2** lights up.
2. Briefly press switch **2** again.
 - ⇒ Work lights are switched off.
 - ⇒ LED in switch **2** is off.

6.5.4 Rotating beacon



NOTICE

Vehicle damage due to the rotating beacon turned upwards!

A rotating beacon turned upwards can be damaged in low passages.

- After use, turn the rotating beacon downwards again and lock it in place.

Depending on the vehicle equipment, a rotating beacon may be fitted at the top of the cab on the left-hand side of the vehicle. When driving on public roads, the rotating beacon may only be switched on in accordance with national regulations!

Possible examples are:

- the work area of the vehicle is located in the traffic area of the road,
- the vehicle is an obstacle to normal traffic during working operation,
- the vehicle is registered with a registration number,
- the vehicle has a safety marking at the front and rear according to DIN 30710.
- The rotating beacon is switched on and off in the switch console.

The rotating beacon remains illuminated when the ignition is switched off. This places a heavy load on the battery. Switch off the rotating beacon before switching off the engine and ignition.

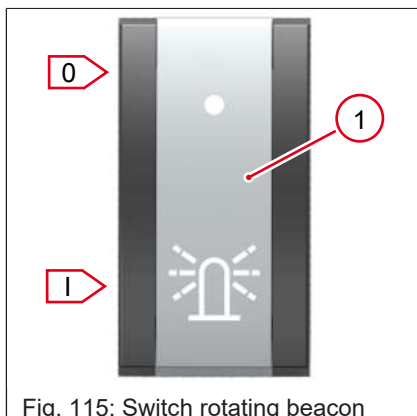


Fig. 115: Switch rotating beacon

Operating the rotating beacon

1. Push switch **1** to position **I**.
 - ⇒ Rotating beacon is switched on.
2. Push switch **1** to position **0**.
 - ⇒ Rotating beacon is switched off.

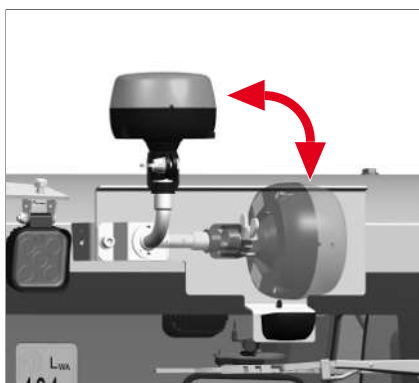


Fig. 116: Pay attention to the rotating beacon!

Locking the rotating beacon

Before use, turn the rotating beacon vertically upwards and lock it into place.

After use, turn the rotating beacon horizontally downwards and lock it in place.

6.5.5 Operating the cab interior light

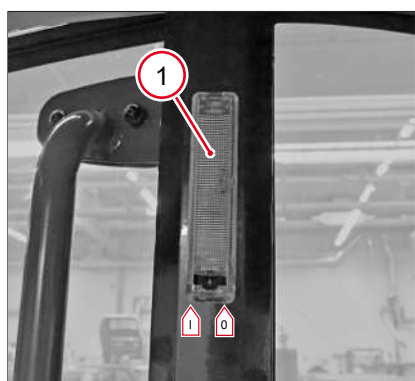


Fig. 117: Operating the interior light

The interior light of the cab is operated with switch on the interior light.

- ⇒ Interior light is switched on.
- Move the switch to position **0**.
- ⇒ The interior light goes out.

6

6.5.6 Turn signal

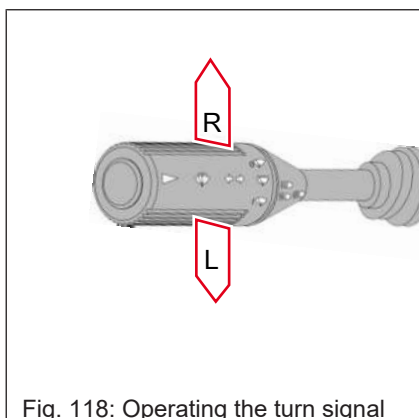


Fig. 118: Operating the turn signal

The turn signal is operated with the steering column switch.

1. Push the lever in direction **R**.
 - ⇒ Right turn signals are on.
 - ⇒ Control light and / or in the display flashes.
2. Push the lever in the direction of **L**.
 - ⇒ Left turn signals are on.
 - ⇒ Control light and / or in the display flashes.

If no trailer is connected and the control light flashes approx. twice as fast as normal, there is a defect in the vehicle's turn signal system.

If the control light does not flash when the trailer is connected, but only the control light, there is a defect in the turn signal system.

In case of a defect, check the turn signal system and have it repaired.

6.5.7 Operating the horn

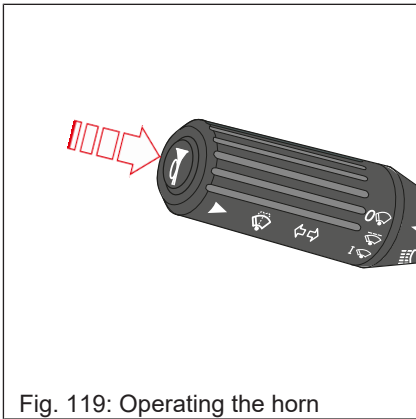


Fig. 119: Operating the horn

The horn is operated with steering column switch.

- Press the switch on the steering column switch.
- ⇒ The horn sounds.
- Release the switch on the steering column switch.
- ⇒ The horn no longer sounds.

6.6 Washer system

6.6.1 Reservoir

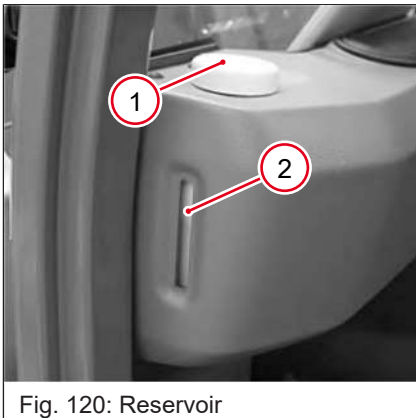


Fig. 120: Reservoir

The reservoir **1** is located in the driver's cab to the left of the entrance. Fill level **2** can be seen when the door is open.

Add only clean tap water. Add a suitable window cleaner if necessary.

If there is a risk of frost:

Mix water with antifreeze for washer system. Information on the mixing ratio can be found in the instructions for use for the antifreeze.

6.6.2 Window wiper and washer system

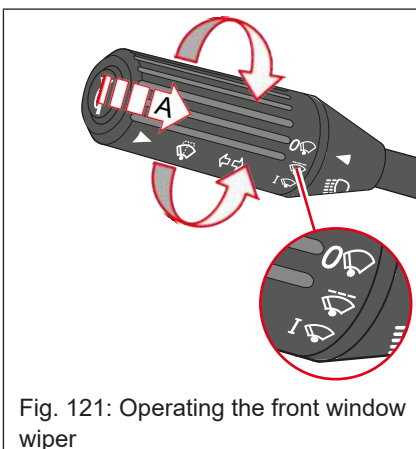


Fig. 121: Operating the front window wiper

Operating the windshield wiper

The windshield wiper and washer system is operated by using the steering column switch.

1. Turn the rotary switch on the steering column switch to the front.
 - ⇒ Intermittent wipers.
2. Turn the rotary switch on the steering column switch forwards to the next step.
 - ⇒ Continuous wipers.
3. Turn the rotary switch on the steering column switch back completely.
 - ⇒ The windshield wipers return to their starting position and are then switched off.

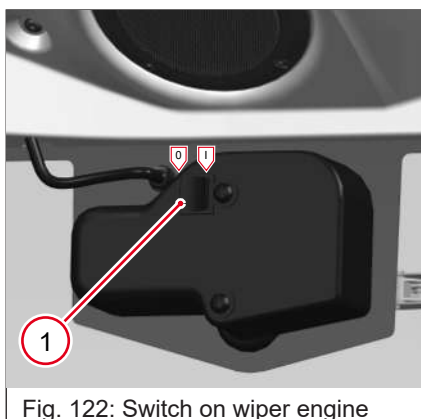


Fig. 122: Switch on wiper engine

Operating the rear window wiper

Switch **1** for the rear windshield washer system can be found on the wiper motor of the rear window.

1. Move the switch to position **I** .
⇒ Rear window wiper is switched on.
2. Set the switch to position **0** .
⇒ Window wiper for the rear window is switched off.

Operating the windscreen washer system

The front window is sprayed with the washer system.

1. Press and hold the rotary switch on the steering column switch in direction **A**.
⇒ The washer system is switched on.
⇒ Window wiper wipes three times.
2. Release the rotary switch on the steering column switch.
⇒ The washer system is switched off.

6

6.7 Heating, ventilation and air conditioning system

6.7.1 Information on heating and air conditioning system

The air conditioning system can be used to cool, heat or ventilate the cab. The air conditioning system directs dehumidified and cleaned air into the cab. The air flow is distributed through air vents in the cab. Each air vent can be adjusted and closed separately

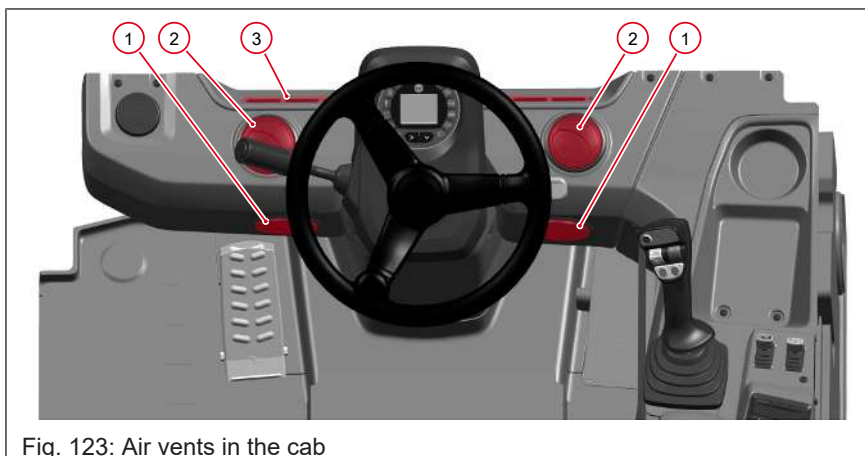


Fig. 123: Air vents in the cab

Air vent	directs air onto/into
1	Front window
2	Interior
3	Footwell

Observe the following points in order to achieve optimum cooling by the air conditioning system.

- If the vehicle has been parked in a sunny location unused for an extended period of time with doors and windows closed, ventilate the cab well before operating the air conditioning system.
- Close the windows and doors.
- Set the fan to maximum power to quickly cool the cab. Then adjust cooling and fan.
- Switch off the air conditioning approx. five minutes before switching off the engine. This prevents condensation from forming on the evaporator.
- Have the fresh air filter of the air conditioning system replaced after the prescribed maintenance intervals.

In order to avoid malfunctions, loss of refrigerant and drying out of the seals, observe the following points:

- Run the air conditioning system at least once a month (always leave it switched on if possible).
- Check V-belts regularly for tension and cracks.
- Clean the condenser regularly. If the vehicle is operated in a dusty or dirty environment, cleaning should be carried out daily.
- Have the air conditioning checked at least once a year by an authorized service center.

The air conditioning system is filled with the refrigerant R134a (DIN 9860). Maintenance work on the air conditioning system may only be carried out by technically trained personnel at an authorized service center.

6.7.2 Operating the front and rear window heating

The vehicle has heated front and rear windows. In cold weather, the front and rear windows can be prevented from fogging up. The front and rear window heating can also be used to defrost the windows. It switches off automatically after approx. 5 minutes.

- Press switch 1.
- ⇒ Front and rear window heating are switched on.
- To switch off the windscreen and rear window heating prematurely, press switch 1 again.

If the windows are still fogged up or frosted after 5 minutes, switch on the front and rear window heating again.

6.7.3 Switching heating and ventilation on and off

The air flow is directed via air nozzles to the front window and into the footwell of the driver's cab.

Each nozzle can be closed, opened and aligned separately.

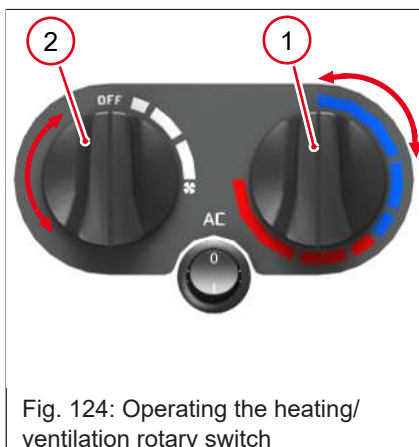


Fig. 124: Operating the heating/ventilation rotary switch

Ventilation

- Turn switch **2** clockwise to the desired fan speed.
- ⇒ Fresh air is blown into the cab.

Heating

1. Turn switch **1** clockwise to the desired range.
 2. Turn switch **2** clockwise to the desired fan speed.
- ⇒ Warm air is blown into the cab.

6.7.4 Using the air conditioning system



NOTICE

Damage to the air conditioning system!

If the air conditioning system is not used for too long, malfunctions may occur.

- In order to avoid malfunctions and possible loss of refrigerant, put the air conditioning system into operation at least once a month.

Observe the following points in order to achieve optimum performance of the air conditioning system:

- If there is accumulated heat in the cab, ventilate with the doors and windows before commissioning the air conditioning system.
- Then close the windows and doors.
- At the beginning, set the air conditioning system to the highest level and open all vents, then dose.
- To prevent condensation from forming on the condenser, switch off the air conditioning system five minutes before the end of the journey or work.
- If the windows are fogged, aim the vents of the air conditioning system at the windows.

Heating output is reduced when using the air conditioning system!

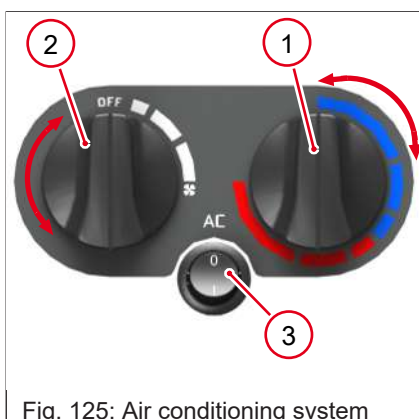


Fig. 125: Air conditioning system

Using the air conditioning system

Switch the air conditioning system on and off with rocker switch **3**. The rotary switch **2** must not be in the off position.

1. Move switch **3** to position **I**.
⇒ The air conditioning system is switched on.
2. Set switch **3** to position **0**.
⇒ The air conditioning system is switched off.
3. If necessary, set the heating with the rotary switch **1**.
4. Infinitely regulate the blower fan speed with the rotary switch **2**.

6.8 Working with the vehicle

6.8.1 Warnings regarding work



⚠ DANGER

Danger to life if approaching electric overhead lines!

Approaching overhead electric lines causes electric arcs to form. Improper behavior in this situation will result in serious injury or death.

- ▶ Keep away from electrical overhead lines.
- ▶ Do not attempt to leave the cab in the event of electric arcs.
- ▶ Before working under electric overhead lines, contact the energy supplier and cause the current to be switched off.

Distances to electrical overhead lines

A VDE recommendation specifies the following minimum distances to electrical overhead lines.

Rated voltage	Safety distance
Up to 1000 volts	1 m
Over 1000 volts to 110 kilovolts	3 m
Over 110 kilovolts to 220 kilovolts	4 m
Over 220 kilovolts	5 m
Unknown rated voltage	5 m

If in doubt about the rated voltage, maintain the minimum distance of five meters.



⚠ WARNING

Accident hazard due to persons in the risk zone!

Persons who are in the risk zone of the vehicle or suddenly enter it can be injured by working movement or the moving vehicle. This may result in accidents that could result in serious injury or death.

- ▶ Interrupt work immediately if persons enter the risk zone.
- ▶ Adjust the mirror correctly. Use visual aids such as, e.g. a camera.
- ▶ Observe extreme caution when reversing.

Falling objects



⚠ WARNING

Risk of injury from falling load when the loader unit is raised and extended!

Falling load (e.g. large bales or bale stacks) can lead to serious injury or death.

- ▶ Never lift or transport several large bales or crates at the same time.
- ▶ Do not step under the raised loader unit.
- ▶ Do not tilt the attachment up to the stop when the loader unit is raised.

6.8.2 Coupling the attachment

6.8.2.1 Warnings for conversion



⚠ WARNING

Accident hazard due to persons in the risk zone!

Persons who are in the risk zone of the vehicle or suddenly enter it can be injured by working movement or the moving vehicle. This may result in accidents that could result in serious injury or death.

- ▶ Interrupt work immediately if persons enter the risk zone.
- ▶ Adjust the mirror correctly. Use visual aids such as, e.g. a camera.
- ▶ Observe extreme caution when reversing.



⚠ WARNING

Risk of accident due to unintentional release of the attachment lock!

The locking of incorrectly locked attachments can disengage unintentionally. This may result in accidents that could result in serious injury or death.

- ▶ Always check for correct locking after attaching attachments.



⚠ WARNING

Risk of injury due to pressure!

A fine jet of hydraulic oil under high pressure can penetrate through the skin. This can cause serious injury.

- ▶ Seek medical attention immediately if hydraulic oil penetrates the skin or eyes.
- ▶ Only open hydraulic systems after the pressure in them has been released.
- ▶ Wear protective gloves and safety glasses.



⚠ CAUTION

Injuries due to tipping over of removed attachments!

Attachments that tip over can cause injury to persons.

- ▶ Ensure that no one is in the danger zone.
- ▶ Only park the attachments on firm and level ground.
- ▶ Close attachments with moving parts (e.g. grab bucket).
- ▶ Ensure the safe and stable position of the attachment, if necessary use supports provided for this purpose.

6.8.2.2 Check parts of the lock

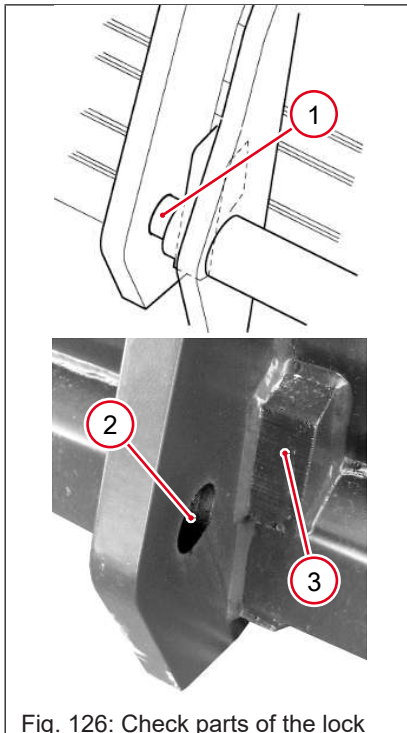


Fig. 126: Check parts of the lock

To prevent damage to the lock of the attachment, parts of the lock must be checked regularly.

Damage can occur if the attachment is locked or unlocked loaded or if a locking bolt is bent.

1. Check that the locking bolts **1** on both sides are aligned with the mounting hole **2** of the attachment.
 2. Check whether the stop **3** of the attachment is worn out.
- ⇒ If damage is found, have the locking device repaired by an authorized service center.

Setting the bucket display

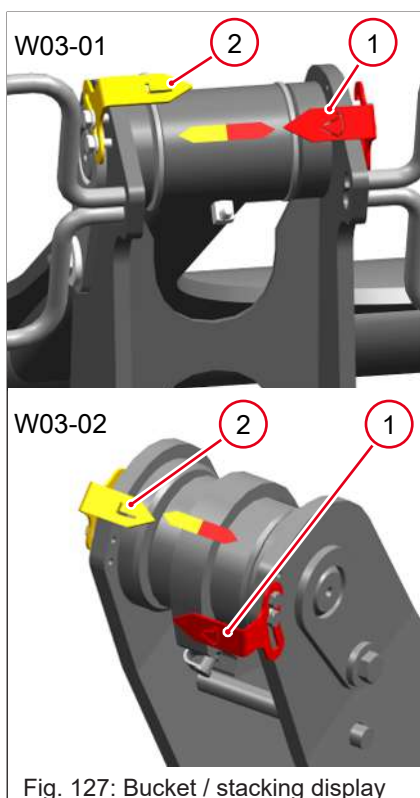


Fig. 127: Bucket / stacking display

Colored arrows **1** and **2** are attached to the rocker arm of the load system to show the horizontal position of the attachment at ground level.

1. Red arrow **1**: For buckets
2. Yellow arrow **2**: for stacking unit

When mounting or changing the attachment for the first time:

1. Pick up attachment and lock it securely
2. Lower the loading system to the ground.
3. Ensure that the attachment is absolutely horizontal on the ground.
4. Apply the parking brake.
5. Switch off the engine.
6. Check the arrow position or loosen the side screws on the rocker arm and adjust the arrow according to the attachment.
7. Tighten the screws and check the arrow position from the driver's seat.

6

6.8.2.3 Pick up attachments

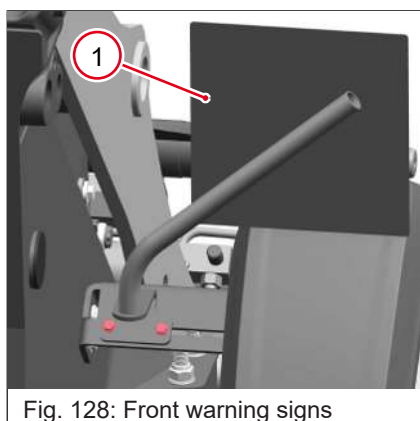


Fig. 128: Front warning signs

Move the warning signs

In vehicles with warning signs equipment variant:

Warning sign 1 can be moved to get a better view of the attachment and the quick-release plate.

- W03-01: only the right warning sign can be moved
- W03-02: both warning signs can be moved

1. Loosen screws
2. Push the warning sign 1 outward.
3. Tighten the screws.

Bring the warning sign 1 back to the inner position before road travel.

Notes

In order to avoid damage to the power coupler, the operating sequence of the unlocking device must be observed.

The power coupler can only be unlocked with two hands.



KRAMER power coupler

Picking up and locking attachment

1. Drive the vehicle towards the attachment.
2. Lower the loader unit. To do this, push the joystick forward.
3. Tilt the power coupler forwards. To do this, press the joystick to the right.
4. Drive the vehicle forward until the power coupler mounts are located directly under the mounting hooks of the attachment.
5. Raise the loader unit until the power coupler holder engages in the holder on the attachment. To do this, pull the joystick backward.
6. Tilt the power coupler completely. Press the joystick to the left.
7. Lock the attachment. Press switch **2** in position **A**.
⇒ Locking bolts move into the mounting holes of the attachment and are automatically secured against unlocking.
8. Make sure that the locking bolts **3** are visible on both sides of the attachment.



Fig. 129: Pick up attachments

KRAMER fully hydraulic power coupler



NOTICE

Problem in the Smart Attach quick hitch system.

The attachment cannot be locked properly and/or the lock indication on the display does not go off.

- ▶ Check the mounting end stops of the attachment.
- ▶ Clean the mounting holes and centering bushes and remove corrosion, if any.
- ▶ Check the centering bush of the attachment for ease of movement. If it is difficult to move, get it moved through deploying technically trained personnel / authorized service center.



Information

No mounting of attachments when the locking bolts are slightly extended!

After some time of use without an attachment, the locking bolts may be slightly extended.

- ▶ Before picking up an attachment, check that the locking bolts are fully retracted.
- ▶ Retract the extended locking bolts completely.

To avoid damage to the attachment pickup lock, the lock/unlock sequence must be followed.

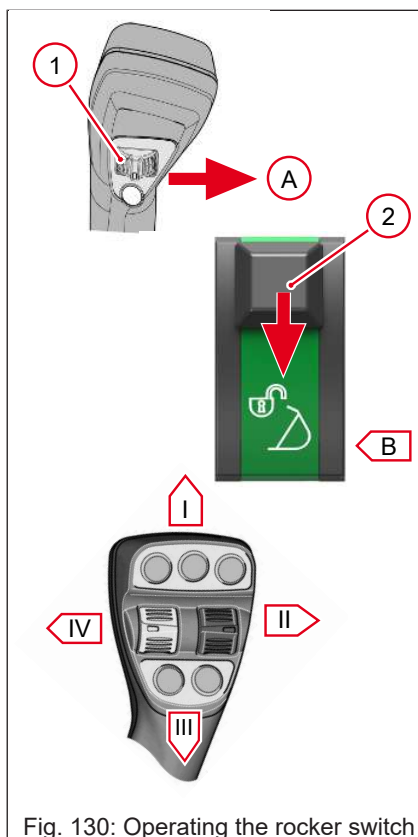


Fig. 130: Operating the rocker switch

Picking up and locking attachment

1. Lower the loader unit by pushing the joystick forward into position **I**.
2. Move the vehicle up to the attachment.
3. Tilt the power coupler forwards by pressing the joystick to the right in position **II**.
4. Drive the vehicle forward until the power coupler mounting is directly under the attachment's mounting hook.
5. Raise the loader unit until the power coupler engages in the attachment connection; to do this, pull the joystick back to position **III**.
6. Tilt the power coupler completely in, to do this push the joystick to the left in position **IV**.

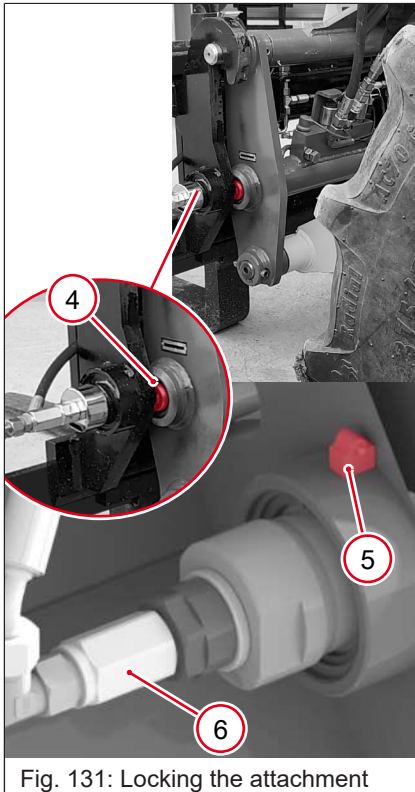


Fig. 131: Locking the attachment

7. Lock the attachment by pressing the rocker switch **1** in the joystick to the left **A** in the direction of travel. Lock bolts **4** extend until the locking indicators **5** are visible on the left and right.
 - ⇒ The control lamp  lights up continuously as long as it is not completely locked.
 - ⇒ The control lamp  goes out as soon as the coupling process has been completed.
 - ⇒ The control lamp  flashes if only one of the lock bolts has locked. To fix the flashing, the power coupler must be completely unlocked once. The locking process, extending the locking bolts, must be repeated again.
8. Release rocker switch **1** in the joystick.
 - ⇒ The third control circuit is thus connected and can be used in accordance with the vehicle operator's manual.
 - ⇒ Only move the vehicle when the control lamp in the display is no longer lit and both lock displays **5** are visible on the left and right.
9. The attachment is automatically supplied with hydraulic oil via attachment connector **6**.

6.8.3 Uncoupling the attachment

6.8.3.1 Warnings for conversion



CAUTION

Injuries due to tipping over of removed attachments!

Attachments that tip over can cause injury to persons.

- ▶ Ensure that no one is in the danger zone.
- ▶ Only park the attachments on firm and level ground.
- ▶ Close attachments with moving parts (e.g. grab bucket).
- ▶ Ensure the safe and stable position of the attachment, if necessary use supports provided for this purpose.



Information

More difficult connection of the hydraulic lines!

If the attachment is exposed to direct sunlight for a longer period after setting down, the oil in the hydraulic cylinders heats up. This builds up pressure in the hydraulic cylinders, which makes later connection of the hydraulic lines to the hydraulic connections of the power coupler considerably more difficult.

- ▶ Park the attachment in a shady area.



Information

The hydraulic connections can be released, however they cannot be reconnected if the pressure in the hydraulic lines has not been released.

- ▶ The hydraulic system of the vehicle is under pressure even when the engine is at a standstill!
- ▶ Before connecting or disconnecting a hydraulic line, depressurize the system sections and pressure lines to be opened.

6.8.3.2 Lowering the attachment

In order to avoid damage to the mounting holes of the attachment, the operating sequence of the unlocking device must be observed.

The attachment can only be unlocked with two hands.

KRAMER power coupler



Fig. 132: Lowering the attachment

Unlocking and setting down the attachment

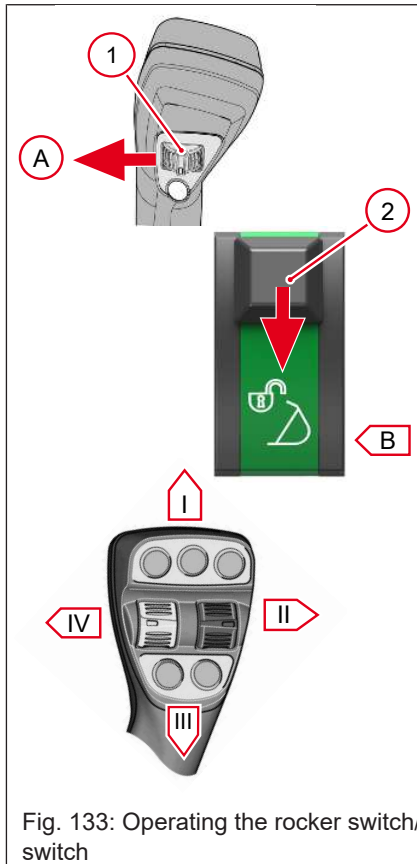
✓ Attachment is emptied.

1. Drive the vehicle to the set-down position.
 2. Set the attachment parallel to the ground.
 3. Lower the load system until the attachment is approx. 5 - 10 cm above the ground. To do this, press the joystick forward.
 4. If necessary, disconnect hydraulic lines [see Disconnecting hydraulic connection vehicle - attachment. on page 144](#)
 5. Unlock the attachment. For this, press switch **1** to position **I** and hold. Simultaneously press switch **2** in the joystick in direction **B** (to the right as seen in the travel direction).
 6. After unlocking, first release switch **2** then switch **1**.
 7. Tilt the power coupler forwards. To do this, press the joystick to the right.
 8. Carefully reverse the vehicle away from the attachment.
 9. Tilt the power coupler completely. Press the joystick to the left.
- ⇒ The attachment is lowered.

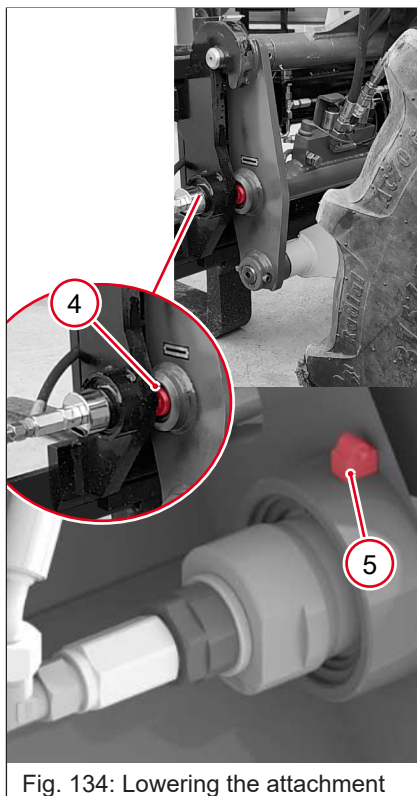
KRAMER fully hydraulic power coupler

Lowering the attachment

1. Empty the attachment and drive to the set-down position.
2. Set the attachment parallel to the ground. To do this, press the joystick to the left in position **IV**.
3. Lower the load system until the attachment is approximately 5 - 10 cm above the ground. To do this, push the joystick forward to position **I**.



4. Unlock the attachment. Pull lock **2** in the push button down in the direction of the arrow and at the same time press and hold it in position **B**. Press rocker switch **1** in the joystick in the direct **A**, to the right seen in the direction of travel, until lock bolts **4** have moved completely out of the attachment's mounting holes or locking indicator **5** is no longer visible on the left and right.
 - ⇒ Indicator light  comes on immediately as soon as unlocking/uncoupling the attachment is started.
5. Release rocker switch **1** in the joystick.
6. Release push button **2**.
7. Tip the attachment slightly forward. To do this, press the joystick to the right in position **II**.
8. Lower the load system. To do this, press the joystick forwards into position **I** until the attachment rests firmly on the ground.
9. Drive the vehicle backwards away from the attachment.



6.8.4 Operating the differential lock



⚠ WARNING

Risk of accident due to locked differential!

An engaged differential lock can lead to accidents in curves. The differential can still be locked even though the symbol of the differential lock has disappeared from the display .

- ▶ Only switch on the differential lock during straight ahead vehicle travel.
- ▶ Ensure that the differential lock is released before driving in a curve.
- ▶ Turn the steering wheel slightly to the left and right, or change the travel direction to disengage the differential lock.



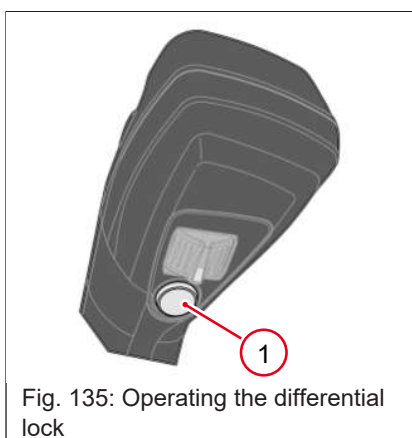
NOTICE

Damage to the gearbox due to locked differential!

- ▶ Only switch on the differential lock when the wheels are at a standstill.
- ▶ Only switch on the differential lock for loading work on loose or slippery ground.

The driving power is evenly distributed hydraulically to all 4 wheels.

6



Switching on the differential lock

The differential lock is operated with switch 1 on the joystick.

1. Depress brake/inching pedal.
2. Press and hold switch
 - ⇒ The differential lock is switched on.
 - ⇒ The control light  in the display lights up.
3. Release the brake/inching pedal.
4. Carefully move off the vehicle with switch pressed.

Switching off the differential lock

Depending on the load on the power train, the differential lock can still be active for a short time even after releasing the switch. The differential lock is disabled only after the control light goes out!.

1. First reduce travel speed and engine speed.
2. Release switch 1.
 - ⇒ The differential lock is disabled.
 - ⇒ The control light  in the display goes out.

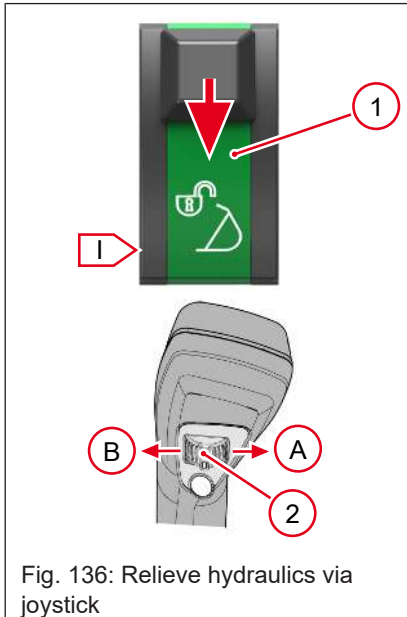
6.8.5 Release the pressure in the hydraulic lines



Information

The hydraulic connections can be released, however they cannot be reconnected if the pressure in the hydraulic lines has not been released.

- ▶ The hydraulic system of the vehicle is under pressure even when the engine is at a standstill!
- ▶ Before connecting or disconnecting a hydraulic line, depressurize the system sections and pressure lines to be opened.



Pressure relief with switch on joystick

1. If the joystick was locked for road travel, unlock [see Using the lock function for the joystick on page 150](#).
 2. Lower the loader unit and activate the parking brake.
 3. Relieve the pressure on attachments with hydraulic functions (e.g. close multipurpose bucket, but do not press).
 4. Stop the engine and switch on ignition again.
 5. Unlock switch **1** (arrow), press in position **I** and hold.
 6. At the same time hold switch **2** (3rd control circuit) on the joystick in the direction of A and B.
 - ⇒ Pressure in hydraulic lines is released.
 7. Switch off the starter and remove the starting key.
- ⇒ Hydraulic connections on the power coupler can be connected or disconnected [see Hydraulic connection between vehicle and attachment on page 142](#) or [see Disconnecting hydraulic connection between vehicle and attachment. on page 144](#)

6.8.6 Establishing a hydraulic connection vehicle - attachment

6.8.6.1 Warnings for connection



⚠ WARNING

Malfunctions and/or uncontrolled movements of the attachment due to incorrectly connected hose lines!

Incorrectly connected hose assemblies can lead to serious injury or death.

- ▶ Ensure that the hose lines of the attachment are correctly connected to the vehicle.
- ▶ Observe the operator's manual of the attachment manufacturer.
- ▶ Before using the attachment, check the operating direction of the control elements or the functional direction of the attachment.



NOTICE

Crushing of incorrectly connected hose lines!

If hydraulic hoses are cross-connected, the operating functions can be reversed and the hose lines can be crushed when tipping in or out.

- ▶ After connecting the hose lines, carefully check the function of the attachment.



NOTICE

Soiled hydraulic connections can cause dirt to penetrate into the hydraulic system and cause damage!

- ▶ Clean hydraulic connections before connecting or disconnecting.
- ▶ Seal unused hydraulic connections with protective caps.
- ▶ Replace missing protective caps.



Information

The hydraulic connections can be released, however they cannot be reconnected if the pressure in the hydraulic lines has not been released.

- ▶ The hydraulic system of the vehicle is under pressure even when the engine is at a standstill!
- ▶ Before connecting or disconnecting a hydraulic line, depressurize the system sections and pressure lines to be opened.



Information

More difficult connection of the hydraulic lines!

If the attachment is exposed to direct sunlight for a longer period after setting down, the oil in the hydraulic cylinders heats up. This builds up pressure in the hydraulic cylinders, which makes later connection of the hydraulic lines to the hydraulic connections of the power coupler considerably more difficult.

- ▶ Park the attachment in a shady area.

6.8.6.2 Establishing the hydraulic connections

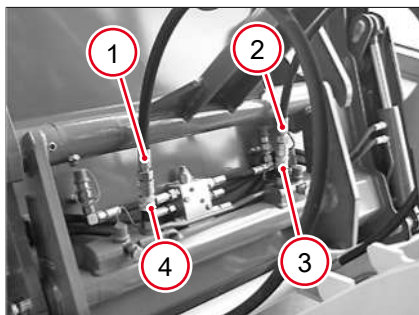


Fig. 137: Establishing the hydraulic connections

- ✓ Attachment is mounted and securely locked [see Attaching the attachment on page 133](#).
 - ✓ Pressure in the hydraulic lines is released [see Releasing pressure in the hydraulic lines on page 142](#).
1. Clean the hydraulic plug-and-socket connections.
 2. Remove the protective caps from the connections.
 3. Connect the hose lines. To do this, plug the hose lines of attachments **1** and **2** into quick-change system connections **3** and **4**.
 4. Close exposed connections with protective caps.
 5. Check attachment for function and operating direction.

6.8.7 Connecting hydraulic connection vehicle - attachment

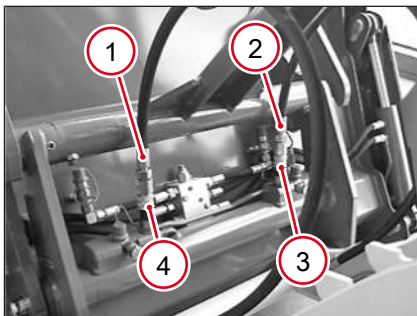


Fig. 138: Removing the hydraulic connections

1. Empty the attachment.
2. Switch off the engine and do not switch on the ignition again.
3. Apply the parking brake.
4. Release pressure in the hydraulic lines [see Releasing pressure in the hydraulic lines on page 142](#).
5. Clean the hydraulic plug-and-socket connections.
6. Disconnect the hose lines. To do this, unplug the hose lines of attachments **1** and **2** from quick-change system connections **3** and **4**.
7. Close exposed connections with protective caps.
8. Start engine and set attachment down.

6.8.8 Pipe breakage protection



Environment

Environmental damage due to leaking hydraulic oil!

Leaking hydraulic oil can get into the soil or water and poison the soil or water. Severe environmental damage can result.

- ▶ If there is no risk of hydraulic oil leaking, collect it with a suitable container and dispose of it in an environmentally friendly manner.
- ▶ Inform the fire brigade or the authorities in charge of cleaning up the oil.

Depending on the vehicle equipment, the vehicle is equipped with a pipe rupture protection on the lifting cylinder and tipping cylinder. The pipe rupture safety device prevents the unbraked lowering or tipping of the loader unit if a hydraulic hose bursts.

After activation of the pipe break safety device, the lift or tilt rams are locked and can no longer be operated via the joystick.

A raised load system that has been blocked by a hose rupture can only be lowered via the emergency lowering.

1. Stop the machine immediately.
2. Stop the engine and remove the starting key.
3. Secure the danger zone.
4. If safe, perform emergency lowering, [see Lower the loader unit in the event of a hose rupture on page 145](#).
5. Have a burst hose or pipe and the hose burst valve immediately repaired by an authorized service center.

6.8.9 Lower the loader unit in the event of a hose rupture



⚠ WARNING

Risk of accident due to emergency lowering of the loader unit!

A hose rupture can cause unpredictable movements. This may result in accidents that could result in serious injury or death.

- ▶ Seal off the danger zone.
- ▶ Do not attempt repairs under lifted loads.
- ▶ Only carry out emergency lowering with extreme caution.



Environment

Environmental damage due to leaking hydraulic oil!

Leaking hydraulic oil can get into the soil or water and poison the soil or water. Severe environmental damage can result.

- ▶ If there is no risk of hydraulic oil leaking, collect it with a suitable container and dispose of it in an environmentally friendly manner.
- ▶ Inform the fire brigade or the authorities in charge of cleaning up the oil.

Due to the pipe break safety device, the emergency lowering of the loader unit is only possible when the ignition is switched on if the diesel engine fails.

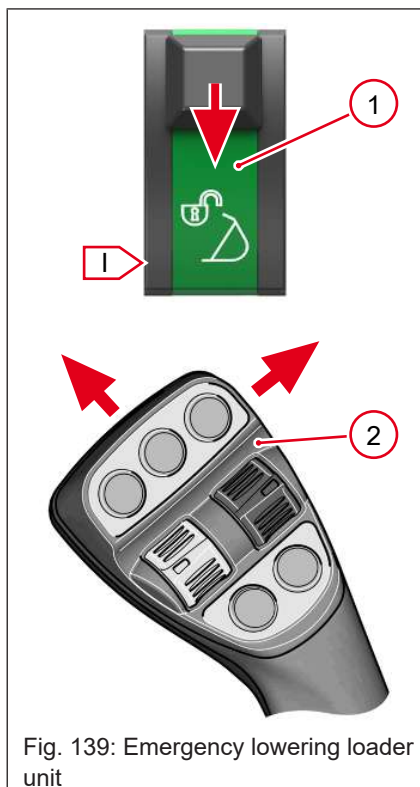
6


Fig. 139: Emergency lowering loader unit

- ✓ The engine is switched off.
- 1. Ensure that no one is in the danger zone of the vehicle.
- 2. Sit on the seat - seat switch
- 3. Switch on ignition.
- 4. If road safety is activated for the joystick, deactivate it [see Use the joystick locking function on page 150](#).
- 5. Unlock switch **1** (arrow), press in position **I** and hold.
- 6. Switch off the load stabilizer.
- 7. At the same time (two-hand operation) press joystick **2** briefly to the right to relieve the pressure on the tilting cylinder, then press forward slowly until the loader unit is completely lowered.
- 8. Switch off the ignition.
- 9. Leave and lock the vehicle.
- 10. Secure the danger zone.
- 11. Have the vehicle immediately repaired by an authorized service center.

6.8.10 Emergency lowering of the loading system when the engine is at a standstill



⚠ WARNING

Danger from unexpected lowering of the loader unit

Emergency lowering is only possible with the load stabilizer switched on

- ▶ If the load stabilizer is switched off, it must be switched on for an emergency shutdown.
- ▶ For vehicles without a load stabilizer, visit an authorized service center.



NOTICE

Diesel engine failure

Have the diesel engine failure checked and repaired by an authorized specialist company.



NOTICE

Observe the transport position when raising

The transport position in combination with the standard bucket and series tires is

- ▶ 200 mm

Joystick operation is analog [see Operating the loader unit with a joystick on page 148](#)

Carry out loader unit lowering as follows

1. Ensure that no one is in the danger zone of the vehicle.
2. Apply the parking brake.
3. Switch on ignition.
4. Slowly push the joystick forward until the loading system is completely lowered.
5. **Release joystick.**
6. Switch off the engine and remove the ignition key.
7. Have the vehicle checked and repaired immediately by an authorized specialist company.

Raise the loader unit as follows

1. Attach lifting equipment (crane) to the loading system.
2. **Pull the joystick back and hold it.**
3. Raise the loading system to transport position using a hoist.
4. Release joystick.
5. Have the vehicle checked and repaired immediately by an authorized specialist company.

6.8.11 Operating the load stabilizer



⚠ WARNING

Risk of accident due to the vehicle swaying!

Swaying the vehicle when driving on public roads may result in an accident, serious injury or death.

- ▶ Always switch on the load stabilizer during vehicle travel on public roads.
- ▶ Lower the loader unit to the transport position.



NOTICE

Danger of technical damage to the hydraulic system!

- ▶ Switch on load stabilizer only for transport journeys.
- ▶ Switch off the load stabilizer during loading work.

When the load stabilizer is switched on, shocks which are transmitted to the vehicle at higher speeds via the load system due to uneven ground are damped. This prevents the vehicle from swaying. When the load stabilizer is activated, the load system can easily move upwards or downwards due to pressure equalization and load condition. This makes the load stabilizer function suitable for lighter work, as well as for off-road driving or driving on public roads without a load. Switch off the load stabilizer when carrying out heavy loading work.

The load stabilizer function can be restricted if the tilt ram is tilted in to the limit in transport position. After tilting in, briefly relieve the pressure in the tilt ram.

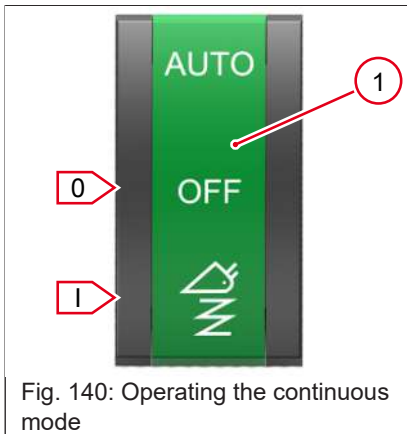


Information

When the load stabilizer is switched on, the loading system is flexible and precise operation of the lifting movements is made more difficult.

The load stabilizer can be used in automatic or continuous mode.

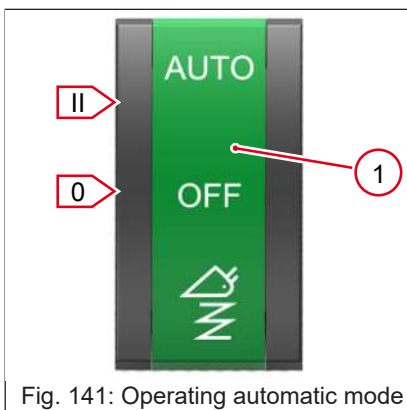
- Automatic mode is suitable for off-road driving, public roads and light off-road work. The automatic mode is switched on and off via a cruise control.
- Continuous mode is suitable for longer off-road trips as well as on public roads.



Switching the continuous mode on and off

The load stabilizer is operated with switch **1** on the joystick console's switch panel.

1. Raise the load system approximately 250 mm above the ground.
 - ⇒ Sufficient distance to the ground as suspension travel is ensured.
2. Press switch **1** to position **I**.
 - ⇒ Load stabilizer is switched on.
 - ⇒ The control light  in the display lights up.
3. Set switch **1** to position **0**.
 - ⇒ Load stabilizer is switched off.
 - ⇒ The control light  in the display is off.



Switching automatic mode on and off

The load stabilizer is operated with switch **1** in the joystick console switch strip.

The load stabilizer is automatically switched on and off at the preset speeds when the switch is in position **II**.

1. Raise the load system approximately 250 mm above the ground.
 - ⇒ Sufficient distance to the ground as suspension travel is ensured.
2. Push switch **1** into position **II** again.
 - ⇒ Load stabilizer in automatic mode is turned on.
 - ⇒ Load stabilizer switches on automatically at the preset speed. The control light  in the display then lights up.
 - ⇒ The load stabilizer switches off automatically below the preset speed. The control light  in the display then goes out.
3. Press the switch to position **0**.
 - ⇒ Load stabilizer is switched off.

6.8.12 Operating the loader unit with a joystick



⚠ WARNING

Risk of accident due to unintentional operation of the joystick when driving on the road!

Unintentional operation of the joystick can lead to unintentional movements of the loader unit. This can cause accidents that lead to injuries.

- ▶ Always lock the loader unit when driving on the road.
- ▶ Always lock the loader unit before leaving the vehicle.
- ▶ First take a seat on the seat, then unlock the joystick.



⚠ WARNING

Crushing hazard due to tipping over of vehicle!

There is an increased risk of tipping when driving in curves. This may cause crushing which may result in serious injury or death.

- ▶ Keep the loader unit lowered during vehicle travel.
- ▶ Adapt the driving speed to the ambient conditions.
- ▶ Adapt the driving speed to the material loaded.
- ▶ Pay attention to persons and obstacles.
- ▶ Observe tipping limit of the vehicle.
- ▶ Reduce speed before downhill travel.
- ▶ Always fasten your seat belt.
- ▶ Ensure that no parts of the body protrude outside the vehicle.
- ▶ Carefully steer the vehicle if the loader unit is raised.
- ▶ Do not exceed the permissible payload.



NOTICE

High component loads lead in the long term to damage to the loader unit and system failures.

By lifting and lowering the attachments to the limit stop.

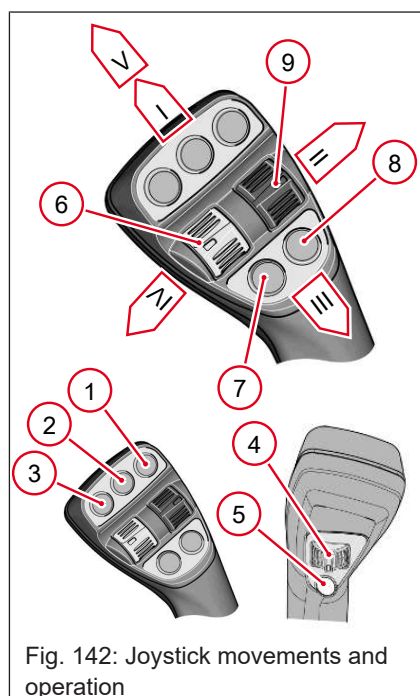
- ▶ When lifting and lowering the loader unit, do not tilt the tilt ram completely to the stop.
- ▶ The manufacturer accepts no liability for damage caused by misuse.

The working hydraulics can only be operated when the engine is running and the working hydraulics lock is deactivated.

The vehicle may be equipped with a floating position. Use the floating position when working with a sweeper or snow blade, or when removing bulk material in reverse travel.

For safety reasons, the loader unit with pipe rupture protection cannot be lowered with the engine switched off and the ignition switched off.

Overview of the control elements for working hydraulics



I	Push the joystick forward.	Lower the loader unit.
II	Push the joystick to the right.	Tilt out the attachment.
III	Pull the joystick back.	Raise the loader unit.
IV	Push the joystick to the left.	Unlock the attachment.
V	Push the joystick forward beyond the resistance.	Lower the loader unit to floating position.
1	Press switch.	Select the speed range (turtle/rabbit)
2	Press switch.	Electro-function 1 operation
3	Press switch.	Electro-function 2 operation
4	Press switch.	Drive direction deactivated (neutral position)
5	Switch	Drive direction forward/reverse
6	Push the rocker switch to the left.	Operation of third control circuit and lock for attachments
	Push the rocker switch to the right	Operation of third control circuit and unlocking for attachments
7	Press switch.	Activate differential lock

6.8.13 Using the joystick lock function

**⚠ WARNING****Risk of accident due to unintentional operation of the joystick when driving on the road!**

Unintentional operation of the joystick can lead to unintentional movements of the loader unit. This can cause accidents that lead to injuries.

- ▶ Always lock the loader unit when driving on the road.
- ▶ Always lock the loader unit before leaving the vehicle.
- ▶ First take a seat on the seat, then unlock the joystick.

Using locking function



The joystick for the loader unit can be secured against unintentional actuation with the locking function. When the locking function is activated, it is not possible to operate the loader unit.

The lock function is operated with switch **1** on the keypad.

When the locking function is switched on, the display shows the indication and the control lamp **2** in the switch lights up.

The locking function can be used to lock the following hydraulic functions against unintentional actuation:

- Raise and lower the loader unit
- Third control circuit
- All additional control circuits

Enable locking function

- Press switch **1**.
 - ⇒ The indication in the display  appears and control light **2** in the switch lights up.
- ⇒ Operation of the loader unit and the working hydraulics is no longer possible.

Disable locking function

- Press switch **1** again.
 - ⇒ The display  and control light **2** in the switch go out.
- ⇒ Operation of the loader unit and the working hydraulics is possible.

6.8.14 Switching on the floating position



⚠ WARNING

Injury hazard due to uncontrolled movements of the loader unit!

Sudden lowering of the loader unit can lead to a loss of control over the vehicle. This may result in accidents that could result in serious injury or death.

- ▶ Do not switch on the floating position when the loader unit is raised.
- ▶ Only switch on the floating position when the loader unit is on the ground.

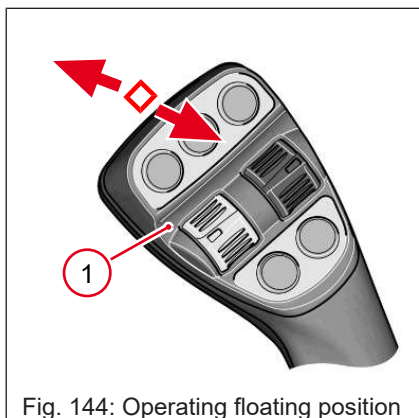
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Fig. 144: Operating floating position

The floating position of the loader unit is located on the lower loader unit function.

1. Lower the loader unit to the ground.
2. Press joystick **1** forward beyond the resistor (arrow).
 - ⇒ Joystick stops in this position.
 - ⇒ The floating position is switched on.
3. Pull joystick **1** over the resistor back to the middle position (arrow).
 - ⇒ The floating position is switched off.

6.9 Operating the front hydraulic connections

6.9.1 Hydraulic connections on the loader unit



NOTICE

Soiled hydraulic connections can cause dirt to penetrate into the hydraulic system and cause damage!

- ▶ Clean hydraulic connections before connecting or disconnecting.
- ▶ Seal unused hydraulic connections with protective caps.
- ▶ Replace missing protective caps.

Depending on the vehicle equipment, the following hydraulic connections are available on the vehicle. The operation of the associated control circuits is listed below in the order shown in the table.

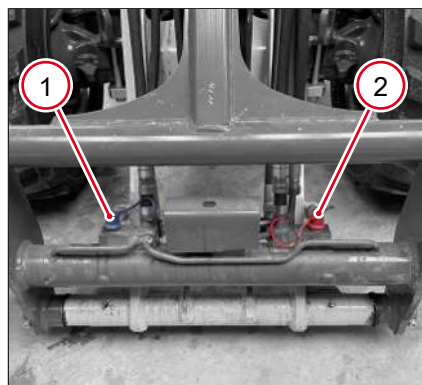


Fig. 145: Hydraulic connections
Kramer SWS

Hydraulic connections KRAMER power coupler

Hydraulic connections	Control circuit button	Operation
1	3rd control circuit continuous operation	[153]
2	3rd control circuit	[152]

6.9.2 Operating standard hydraulic connections



⚠ WARNING

Malfunctions and/or uncontrolled movements of the attachment due to incorrectly connected hose lines!

Incorrectly connected hose assemblies can lead to serious injury or death.

- ▶ Ensure that the hose lines of the attachment are correctly connected to the vehicle.
- ▶ Observe the operator's manual of the attachment manufacturer.
- ▶ Before using the attachment, check the operating direction of the control elements or the functional direction of the attachment.



NOTICE

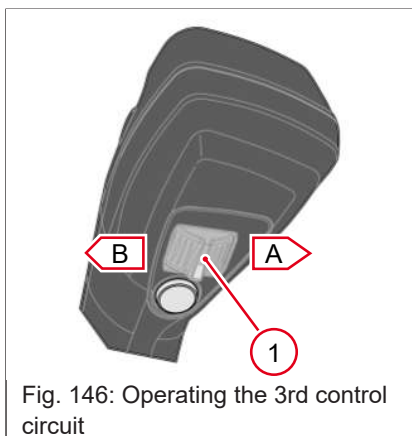
Soiled hydraulic connections can cause dirt to penetrate into the hydraulic system and cause damage!

- ▶ Clean hydraulic connections before connecting or disconnecting.
- ▶ Seal unused hydraulic connections with protective caps.
- ▶ Replace missing protective caps.

The 3rd control circuit has two functions.

On the one hand, the attachment in the power coupler is hydraulically locked with the 3rd control circuit and secured against accidental unlocking [see Attaching the attachment on page 133](#).

On the other hand, by connecting the hose lines to an attachment with hydraulic function (e.g. Multipurpose bucket), it can be operated via the 3rd control circuit.



Operate the attachment

The switch **1** is operated proportionally.

- ✓ Attachment is attached to the power coupler and securely locked [see Attaching the Attachment on page 133](#).
 - ✓ Hydraulic hose lines of the attachment are coupled to the plug couplings [see Establishing a hydraulic connection vehicle - attachment on page 142](#).
1. Start the engine.
 2. Press rocker switch **1** in direction **I**.
 - ⇒ Pressure is applied to the left hydraulic connection, e.g. open the multipurpose bucket.
 3. Move rocker switch **1** in direction **B**.
 - ⇒ Pressure is applied to the right-hand hydraulic connection, e.g. closing the multipurpose bucket.

6

6.9.3 Operating standard hydraulic connections in continuous operation



⚠ WARNING

Malfunctions and/or uncontrolled movements of the attachment due to incorrectly connected hose lines!

Incorrectly connected hose assemblies can lead to serious injury or death.

- ▶ Ensure that the hose lines of the attachment are correctly connected to the vehicle.
- ▶ Observe the operator's manual of the attachment manufacturer.
- ▶ Before using the attachment, check the operating direction of the control elements or the functional direction of the attachment.

**NOTICE**

Soiled hydraulic connections can cause dirt to penetrate into the hydraulic system and cause damage!

- ▶ Clean hydraulic connections before connecting or disconnecting.
- ▶ Seal unused hydraulic connections with protective caps.
- ▶ Replace missing protective caps.

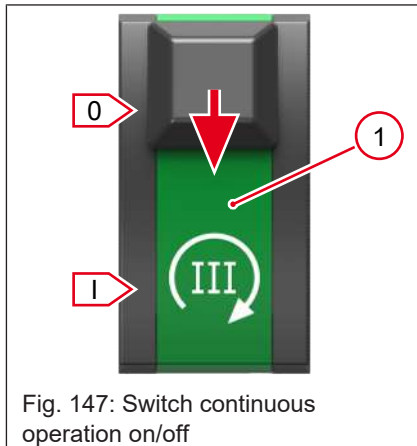


Fig. 147: Switch continuous operation on/off

Continuous operation is used to carry out long pressure operations and operate hydraulic motors (e.g. sweeper) or to operate attachments with an integrated control valve that is adjusted to maximum flow rate and has a pressureless return flow.

Switching on continuous operation

- ✓ Attachment is mounted and securely locked [see Attaching the attachment on page 133](#).
- ✓ Hydraulic hose lines of the attachment are coupled to the plug couplings [see Establishing a hydraulic connection between vehicle and attachment. on page 142](#)

1. Start the engine.
2. If road safety is activated for the joystick, deactivate it [see Using the joystick lock function on page 150](#).
3. Slide the fuse in switch 1 in the direction of the arrow and push the switch to position I.
 - ⇒ Control light  in the display lights up.
 - ⇒ Continuous operation is switched on.

Switching off continuous operation

- Release the lock in switch 1 from position I.
 - ⇒ Control light  in the display goes out.
 - ⇒ Continuous operation is switched off.
 - ⇒ To avoid loss of performance, switch off continuous operation when it is no longer required.

6.9.4 Operating the additional control circuit (V – high flow)**⚠ WARNING**

Malfunctions and/or uncontrolled movements of the attachment due to incorrectly connected hose lines!

Incorrectly connected hose assemblies can lead to serious injury or death.

- ▶ Ensure that the hose lines of the attachment are correctly connected to the vehicle.
- ▶ Observe the operator's manual of the attachment manufacturer.
- ▶ Before using the attachment, check the operating direction of the control elements or the functional direction of the attachment.



NOTICE

Soiled hydraulic connections can cause dirt to penetrate into the hydraulic system and cause damage!

- ▶ Clean hydraulic connections before connecting or disconnecting.
- ▶ Seal unused hydraulic connections with protective caps.
- ▶ Replace missing protective caps.



NOTICE

Restart interlock in continuous operation!

If the ignition is switched off and on again, the additional control circuit / high flow is automatically deactivated for safety reasons!

When starting the continuous operation again, it must be reactivated with switch 1 and/or switch 2.



Information

Switch off high-flow when not in use

For the operation of attachments with additional hydraulic functions, plug-in couplings are mounted on the front side (loader unit).

6

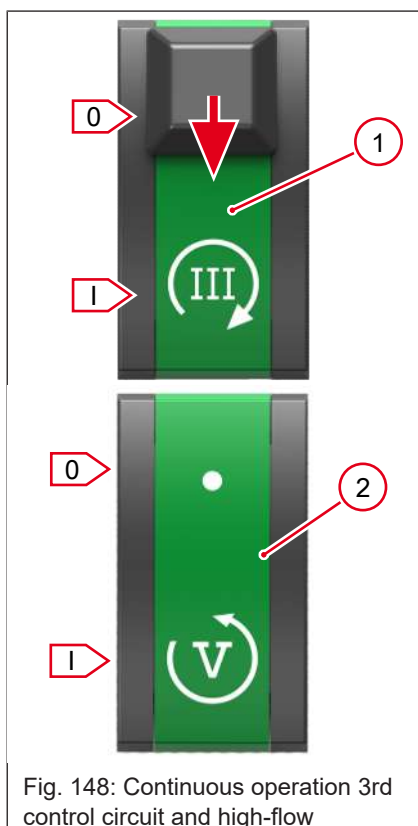


Fig. 148: Continuous operation 3rd control circuit and high-flow

Additional control circuit with 30 l/min

The operation is done by continuous operation 3rd control circuit with switch 1 or with operation by high-flow switch 2.

High Flow with 30+35 l/min

The operation is carried out via the continuous operation 3rd control circuit with switch 1 and **additionally** via the high-flow switch 2.

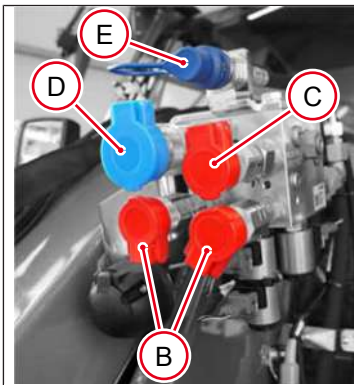


Fig. 149: Rocker switch/ push button in joystick

Connections B:

Plug-in coupling red – pressure line double-acting (e.g. swiveling ejection of the snow blower)

Connections **B** can be used only if a consumer is connected to connection **C**.

1. Direction of rotation left/right
2. Additional control circuit 10 to 15 l/min
 - ⇒ Activation of the additional control circuit via switch **1** and/or switch **2** or
 - ⇒ Operation via rocker switch **3** in the joystick

Connection C:

Red plug-in coupling - single-acting pressure line (e.g. oil motor of snow blower or sweeper machine)

- Additional control circuit 30 or 65 l/min
 - ⇒ Activation of the additional control circuit via switch **1** and/or switch **2**

Connection D:

- Plug coupling blue – Pressureless return flow to tank

Connection E:

- Blue plug – leakage oil line for hydraulic motor

To guarantee the function and tightness of the plug-in couplings, they must be cleaned clean before connecting an attachment!

The use of the plug couplings can be found in the operator's manual of the attachment.

Preparing the attachment for the additional control circuit / high-flow

Continuous operation is used to carry out long pressure operations or to operate hydraulic motors (e.g. sweeper) or to operate attachments with an integrated control valve that is adjusted to maximum flow rate and has a pressureless return flow.

1. Pick up attachment and lock it securely
2. Lower the loader unit and apply the parking brake.
3. Switch off the engine, do **not** switch off the ignition.
4. Relieve the pressure from the plug couplings
5. Switch off the engine and remove the ignition key.
6. Connect the hose lines of the attachment to the plug couplings.



Fig. 150: Road safety button

Activate hydraulics

1. Sit down on the operator seat.
2. Start diesel engine.
3. If the road safety device for the 3rd control circuit is activated, deactivate it by pressing push button 5.
 - ⇒ The symbol  disappears from the digital display.
 - ⇒ The LED in the push button goes out.

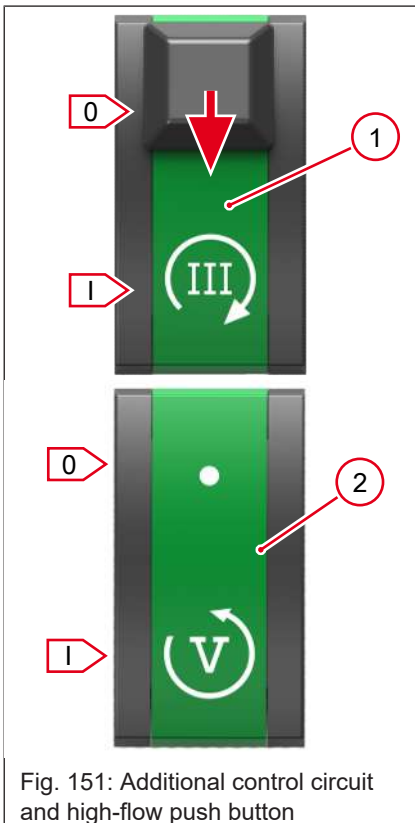


Fig. 151: Additional control circuit and high-flow push button

Putting additional control circuit with continuous operation 3rd control circuit into operation

1. Push the lock of switch 1 down to position I.
2. Push switch 1 into position I.
 - ⇒ The LED in the switch illuminates.
 - ⇒ Symbol  appears in the digital display.
 - ⇒ Oil pressure is built up – additional control circuit is in operation.

Starting up the additional control circuit with high-flow switch

- Press switch 2 to position I .
 - ⇒ The LED in the switch illuminates.
 - ⇒ Symbol  appears in the digital display.
 - ⇒ Oil pressure is built up – additional control circuit is in operation.

Start up high-flow with maximum oil volume (65l/min)

1. Push the lock of switch 1 down to position I.
2. Push switch 1 into position I.
 - ⇒ Symbol  appears in the digital display.
 - ⇒ Oil pressure is built up – additional control circuit is in operation.
3. Press switch 2 to position I .
 - ⇒ LED in the push button lights up.
 - ⇒ Symbol  appears in the digital display.
 - ⇒ Oil pressure is built up – additional control circuit is in operation.

Additional function (swiveling ejection of the snow blower)

- Operation via rocker switch 3 in the joystick
 - ⇒ Additional function (left/right rotation in operation)

Deactivating hydraulics/ taking additional control circuit out of operation

1. Release the lock of switch **1** from position **I**.
 - ⇒ Symbol  disappears in the digital display
 - ⇒ Continuous operation is disabled.
2. Press switch **2** to position **0**.
 - ⇒ Symbol  disappears in the digital display
3. High-flow is deactivated

6.9.5 Hydraulic connections Unpressurized return flow, leak oil line

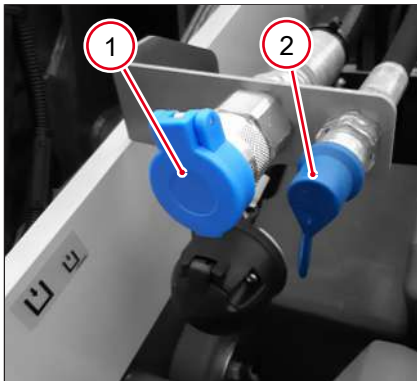


Fig. 152: Hydraulic connections: unpressurized return, leak oil line

The hydraulic connections for unpressurized return flow and leakage oil line are located on the load system. The hydraulic connections are designed such that it is not possible to confuse them with other hydraulic connections.

- | | |
|----------|--------------------------|
| 1 | Pressureless return flow |
| 2 | Leak oil line |

For certain attachments on which components are driven by a hydraulic oil engine, a pressureless return flow is required. This connection directs the return oil from the hydraulic oil engine of an attachment to the vehicle's hydraulic oil tank via the return line filter. The connection for the pressureless return flow is located at position **1** at the front of the charging system.

For coupling and uncoupling of pressureless return flow and leak oil line: Coupling hydraulic connections. These hydraulic connections do not have to be relieved of pressure for coupling.

6.10 Operating the rear hydraulic connections

6.10.1 Operating the tipper

Turn on the tipper

If the vehicle is equipped with a switchover valve of rear 3rd control circuit, tippers can be operated with a single-acting tilting cylinder.

Refer to the operator's manual of the trailer for information on the oil volume. Make sure that the vehicle can provide the tipper's cylinder with a maximum of 6 l hydraulic oil.

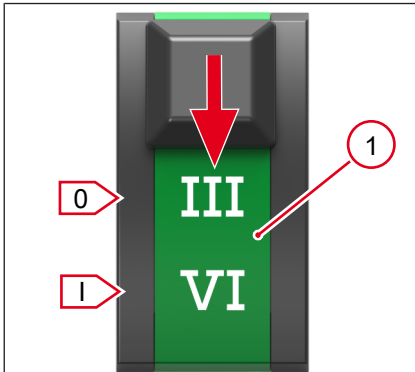


Fig. 153: 6th control circuit switch

1. Slide the fuse in switch **1** in the direction of the arrow and push the switch to position **I**.
⇒ Rear hydraulic connections are activated.
2. Attach trailer.
3. Switch off the engine, but do **not** switch off the ignition.
4. Release the pressure from the hydraulic connection.
⇒ Pressure in the hydraulic line is reduced.
1. Switch off the engine and remove the ignition key.

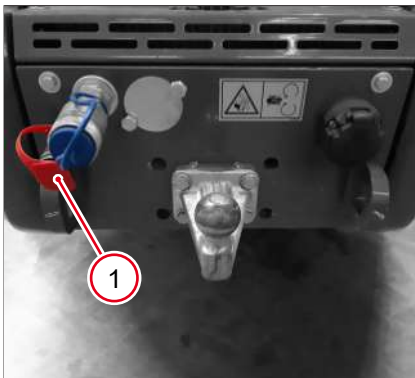


Fig. 154: Rear tipper connection

2. Attach the tipper hose line to coupling connection **1**.
3. Start the engine.

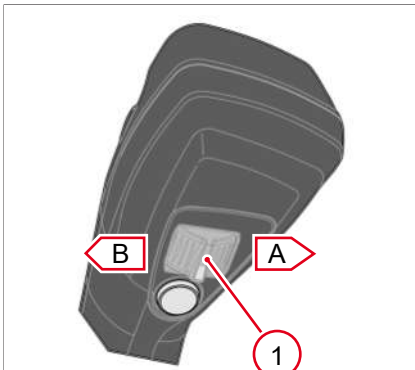


Fig. 155: Rear tipper switch

4. Lift the tipper: Press rocker switch **1** in direction **A** till the desired tipping position is achieved.
5. Lower the tipper: Press rocker switch **1** in direction **B** till the desired tipping position is achieved.

Turn off the tipper

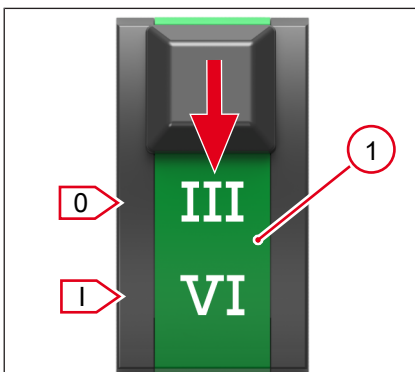
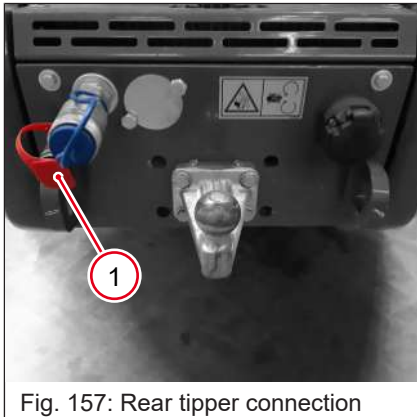


Fig. 156: 6th control circuit switch

1. Push the fuse in switch **1** in the direction of the arrow and push the switch to position **0**.
2. Rear hydraulic connections are activated.
3. Switch off the engine, but do **not** switch off the ignition.
4. Release the pressure from the hydraulic connection.
5. Switch off the engine and remove the ignition key.



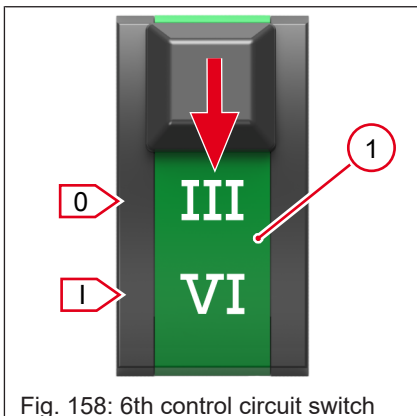
6. Remove the tipper hose line from coupling connection 1 .
7. Uncouple trailer.

6.10.2 Operating control circuit VI

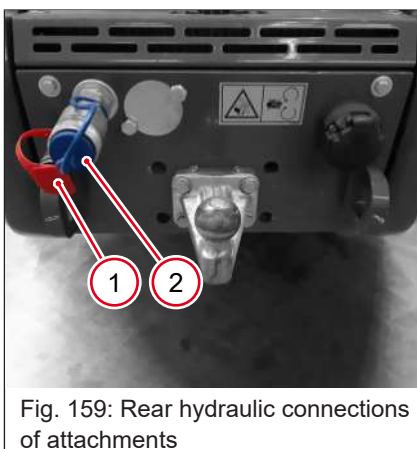
If the vehicle is equipped with a switchover valve of rear 3rd control circuit, attachments with a hydraulic function can be operated at the vehicle rear.

Refer to the operator's manual of the attachment for information on the oil volume.

6th control circuit switching on



- Slide the fuse in switch 1 in the direction of the arrow and push the switch to position I.
⇒ Rear hydraulic connections are activated.
- ✓ Attachment picked up and securely locked.
- ✓ Loading system at the bottom and parking brake applied/activated.
- 1. Switch off the engine, but do **not** switch off the ignition.
- 2. Release the pressure from the hydraulic connection.
- ⇒ Pressure in the hydraulic line is reduced.
- 1. Switch off the engine and remove the ignition key.



2. Attach the attachment hose line to hydraulic connections 1 and 2.
3. Start the engine.

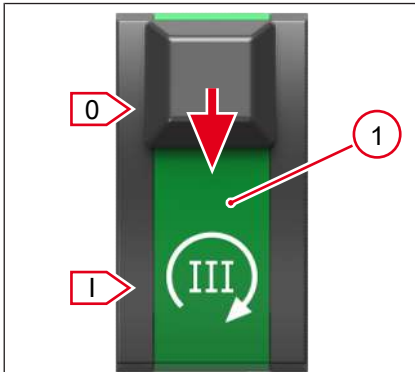


Fig. 160: Continuous operation III.
Activate control circuit

4. Slide the fuse in switch **1** in the direction of the arrow and push the switch to position **I**.

⇒ 6th control circuit is activated

6th control circuit

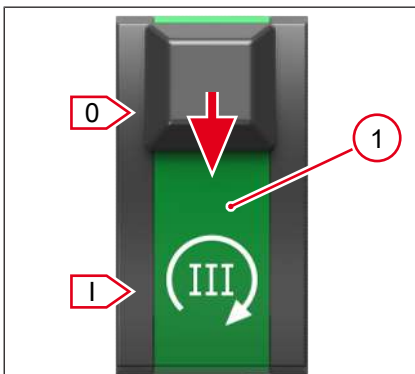


Fig. 161: Continuous operation III.
Deactivate control circuit

1. Push the fuse in switch **1** in the direction of the arrow and push the switch to position **0**.

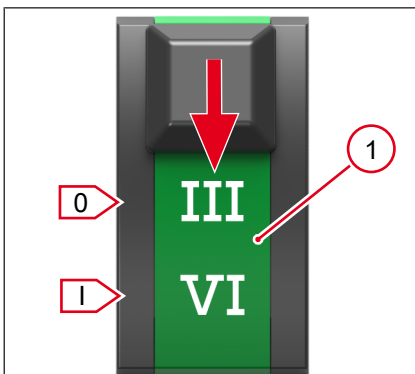


Fig. 162: 6th control circuit switch

2. Slide the fuse in switch **1** in the direction of the arrow and push the switch to position **I**.

⇒ VI. The control circuit is deactivated.

1. Switch off the engine, but do **not** switch off the ignition.
2. Release the pressure from the hydraulic connection.
3. Switch off the engine and remove the ignition key.

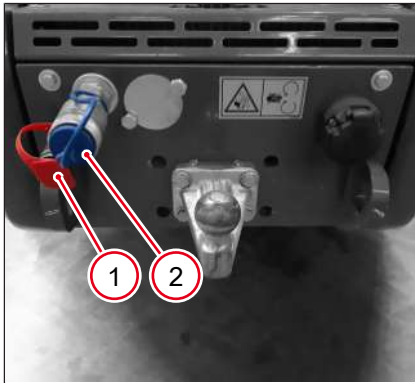


Fig. 163: Rear hydraulic connections of attachments

4. Remove the attachment hose line from hydraulic connections 1 and 2

6.11 Operating electrical functions

6.11.1 7-pin plug receptacle at the loader unit



NOTICE

Damage to the attachment due to incorrect assignment of the circuits!

In order to avoid faulty operation and/or damage to the attachment, the assignment of the individual circuits in the electrical plug connection of the attachment and the assignment and operation of the plug receptacle on the vehicle must be checked before the attachment is put into operation.

- ▶ The assignment of the power circuits (pins) in the plug receptacle are listed in the circuit diagram (see system manual of the vehicle).
- ▶ Have troubleshooting only performed by an authorized service center.

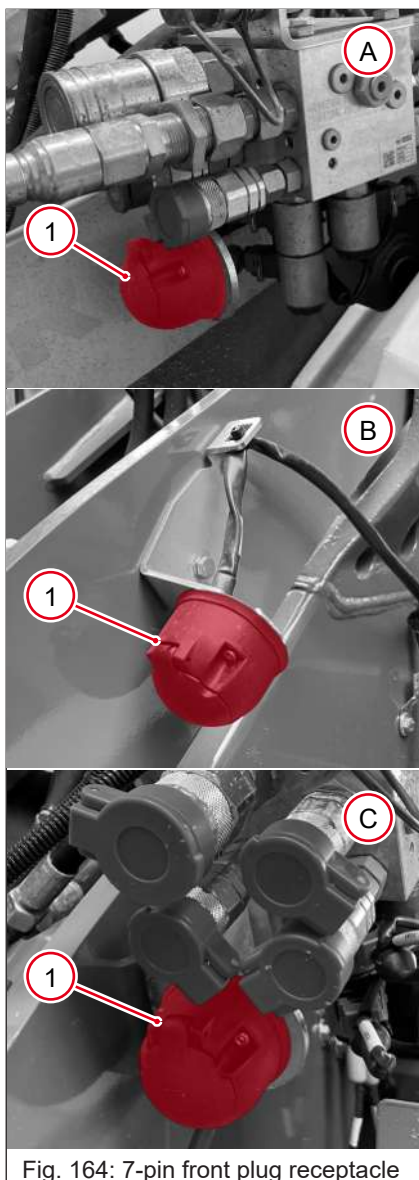


Fig. 164: 7-pin front plug receptacle

A W03-01 with HighFlow

B W03-01/W03-02

C W03-02 with HighFlow

If the vehicle is equipped with a 7-pin plug receptacle **1** on the loader unit, attachments with lighting and/or additional electrical function, e.g. sweeper with lighting and electrical water pump, can be connected electrically.

The display can show which circuit is activated:

- ⇒ Symbol I^1 appears, current circuit 1 is active.
- ⇒ Symbol I^2 appears, current circuit 2 is active.

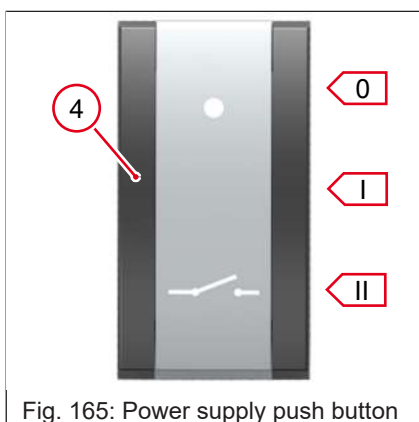


Fig. 165: Power supply push button

Jog mode

1. Set switch **4** in position **0**
 - ⇒ Current circuit I^1 is active as long as pushbutton **1** in the joystick is pressed.
 - ⇒ Current circuit I^2 is active as long as pushbutton **2** in the joystick is pressed.
2. If the joystick push button is released, the circuits are no longer active.

Continuous operation

1. Set switch **4** to position **I**
 - ⇒ Current circuit β_1 is permanently active when pushbutton **1** in the joystick is pressed.
 - ⇒ Current circuit β_2 is permanently active when pushbutton **2** in the joystick is pressed.
2. Circuits remain active until the pressed pushbutton in the joystick is pressed again.
3. Both circuits can be switched simultaneously.

Jog mode and continuous operation

- Set switch **4** to position **II**
 - ⇒ Current circuit β_1 is active as long as pushbutton **1** in the joystick is pressed.
 - ⇒ Current circuit β_2 is permanently active when pushbutton **2** in the joystick is pressed.

6.12 Working with attachments**6.12.1 Using third-party attachments****General instructions****⚠ WARNING****Risk of accident due to unintentional release of the attachment lock!**

The locking of incorrectly locked attachments can disengage unintentionally. This may result in accidents that could result in serious injury or death.

- ▶ Always check for correct locking after attaching attachments.

The following power coupler technologies can be obtained from your sales partner on request and attached by an authorized service center:

- Power coupler for attachment – KRAMER
- Power coupler for attachment – EURO
- Quick hitch system for attachment – WEIDEMANN

Only attachments that are approved for this purpose and that have been assigned appropriate load capacities or bulk material densities may be attached to the power coupler.

When attaching and using non-approved or third-party attachments, the conformity (stability test) according to the EC Machinery Directive or the DIN EN 474-3 standard must be checked and documented by an

authorized service center. Furthermore, the requirements for operation on public roads must be ensured, such as field of vision, lighting, dimensions and weights.

In the case of non-EU countries, follow and apply the national regulations of these countries.

If non-approved attachments are fitted or if parts of the quick-change system, attachments whose condition is prescribed or whose operation poses a risk to persons are subsequently changed or replaced, this may affect the operating permit and warranty.

The following information sheets can be used for the stability test.

Stability calculation for third-party attachments

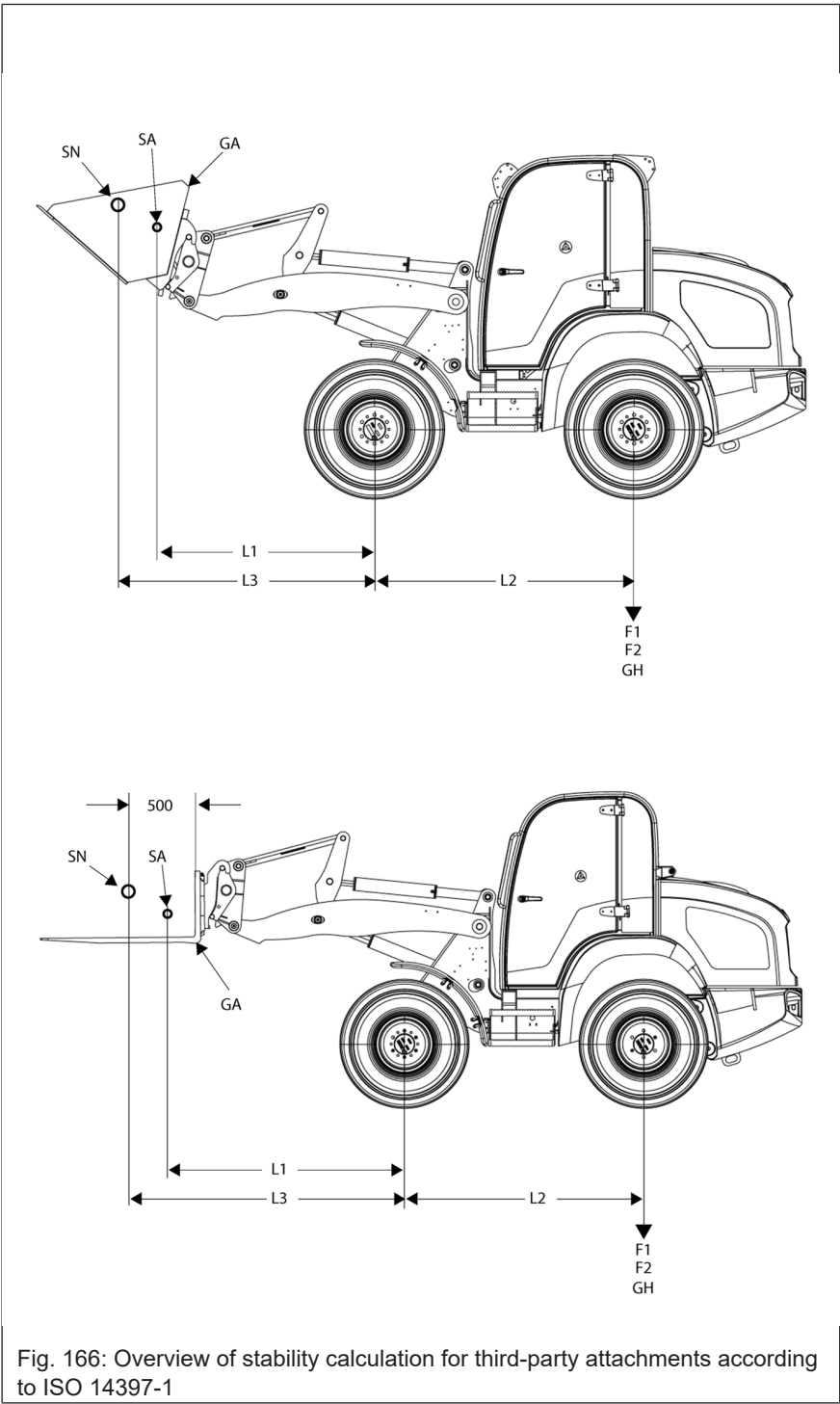


Table for values that have been determined

Enter the determined values in the Entry column.

Designation		Measure/determine	Entry	
GN	Maximum authorized payload	Enter the calculated values in the load diagram - see "Calculation formula for stability (load diagram)" on the following pages.		kg

Designation		Measure/determine	Entry	
SN	Position of the load's center of gravity: Stacking device	Values entered in load diagram according to ISO 14397-1.	400 500 600 700	mm
SN	Load center position: Bucket or other attachments			mm
S	Stability factor	Take the values from the table "Required safety factors (S)".		-
L1	Distance: Front axle center to attachment center of gravity	Measure		mm
L2	Wheelbase: Front axle center to rear axle center			mm
L3	Distance: Load center (payload) to front axle center			mm
GH	Load on rear axle (without load on load system)	Calculated.		kg
F1	Measured load on the rear axle (without attachment with extended load system)	Determination on a scale without an attachment.		kg
F2	Rear axle relief through attached stacking unit / attachment	Calculated or measured if scale and attachment are available.		kg
GA	Weight of stacking unit/attachment	Ask the manufacturer of the attachment.		kg
SA	Center of gravity of the stacking unit/attachment			-
P _{max}	Material density of load	Will be calculated: Depending on the material picked up by the bucket.		t/m ³
V	Bucket capacity (ISO 7546)	Ask the manufacturer of the attachment.		m ³
M	Payload mass	Calculated.		kg

Required safety factors (S)

Stacking device		DIN EN 474-3
Ground conditions:		
Rough terrain	60 %	S = 0.6
Firm and level ground	80 %	S = 0.8

Bucket	ISO 14397-1	
-	0.5	S = 0.5

Calculation formula for stability (load diagram)

$$F2 = \frac{GA \times L1}{L2}$$

$$GH = F1 - F2$$

$$GN = S \times \frac{GH \times L2}{L3}$$

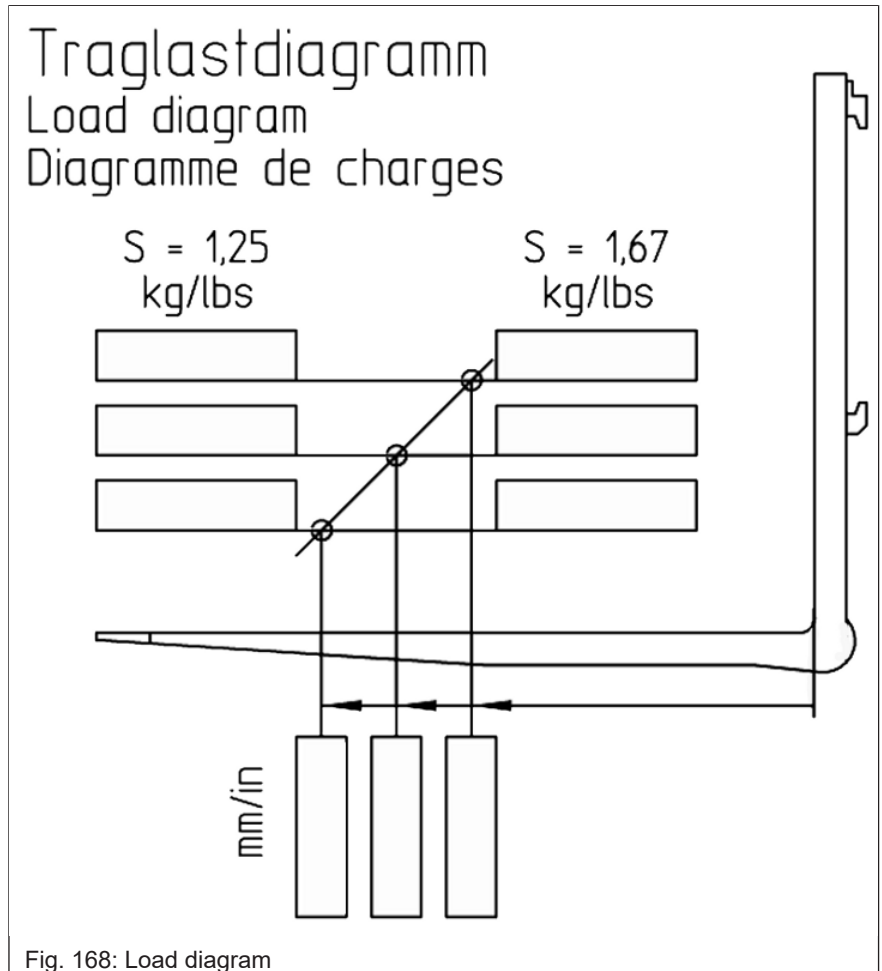
$$P_{max} = \frac{GN}{V}$$

Fig. 167: Calculation formula for stability

Load diagram (sample)

Enter the calculated values "**GN**" into the load diagram.

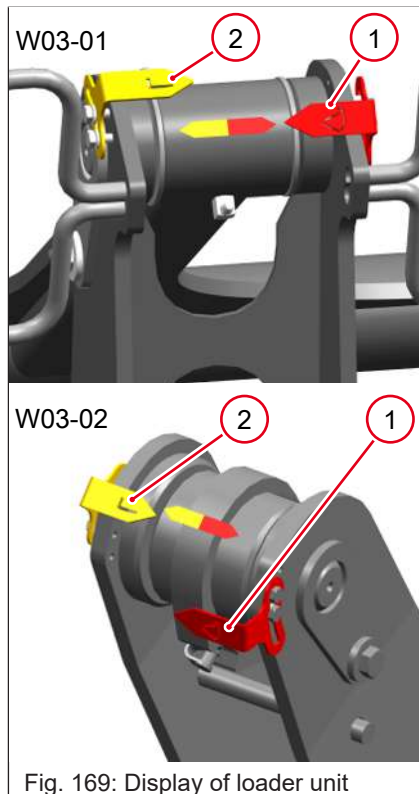
The completed load diagram must be placed in the cab so that it is visible to the operator.



6.12.2 Indicator for the position of the loader unit

Configuring bucket level display

Colored arrows **1** and **2** that are intended to show the horizontal position of the attachment at ground level are affixed to the tilt lever of the loader unit.



Arrow	Attachment
Red arrow	For buckets
Yellow arrow	For stacking device

When using or changing the attachment for the first time

1. Pick up attachment and lock it securely
2. Lower the loading system to the ground.
3. Ensure that the attachment is absolutely horizontal on the ground.
4. Apply the parking brake.
5. Switch off the engine.
6. Check the arrow position or loosen the side screws on the rocker arm and adjust the arrow according to the attachment.
7. Tighten the screws and check the arrow position from the driver's seat.

6.12.3 Using the multipurpose bucket

Observe the instructions for working with a bucket Information on working with a bucket.

Area of application of multipurpose bucket

The application area of the grab bucket is mainly in earthworks for loosening, picking up, transporting and loading loose or solid materials.

Vehicle travel on public roads with a full bucket is prohibited in Germany. Observe and follow the legal regulations of your country.

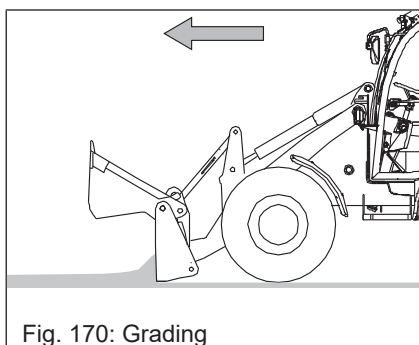
Also observe the applicable regulations for accident prevention of your country.

Pick up and set down a multipurpose bucket

The pick-up and set-down of the bucket is described in the following sections:

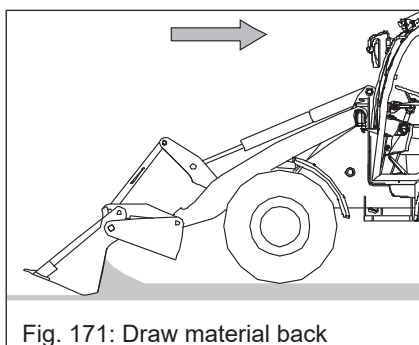
Attachment [see Mounting the attachment on page 133.](#)

Attachment [see Dismounting the attachment on page 138.](#)



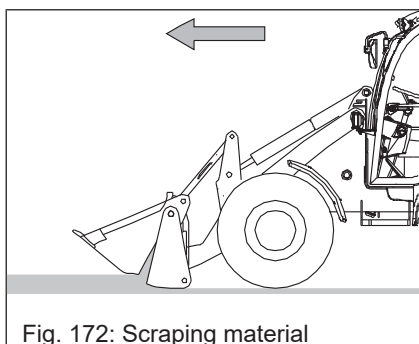
Grading

1. Fold up the front half of the bucket.
 2. Set the depth of the layer you want to remove with the lift hydraulics.
 3. Set the angle of the rear cutting edge.
 4. Travel forward.
- ⇒ Surface is leveled in forward motion.



Draw material back

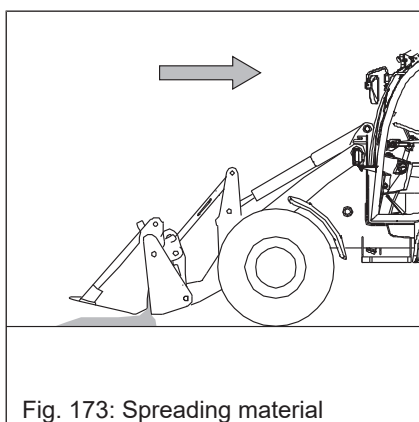
1. Tilt out the multipurpose bucket.
 2. Raise the bucket with the lift hydraulics.
 3. Fold up the front half of the bucket.
 4. Lower the multipurpose bucket to the ground.
 5. Set the angle of the front cutting edge.
 6. Perform reverse travel.
- ⇒ Surface is removed in reverse.



Scraping material

1. Set a flat digging angle.
 2. Fold up the front half of the bucket by about 10 to 15 cm.
 3. Drive the vehicle forward.
- ⇒ The material rolls into the bucket and is picked up at the same time.

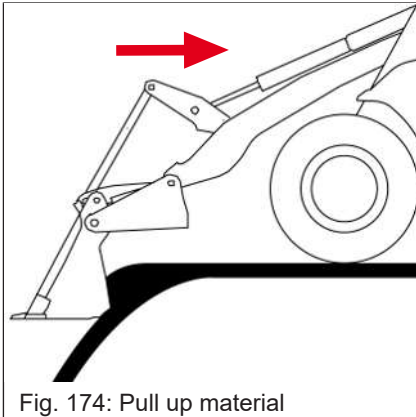
This position allows to strip grass turf, e.g. down to a thickness of about 8 cm



Spreading material

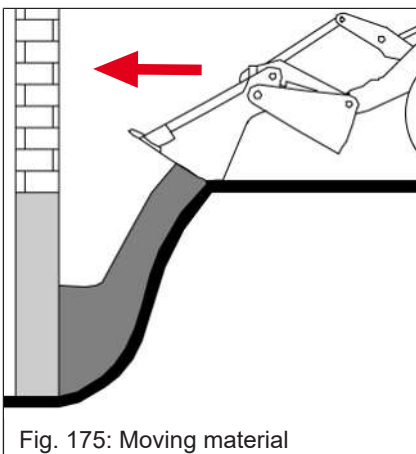
1. Set the rear cutting edge parallel to the ground.
 2. Fold up the front half of the bucket until the required quantity of material is emptied onto the ground.
 3. Move off the vehicle.
 4. Lower the multipurpose bucket to the ground.
- ⇒ The rear cutting edge grades the material as it is emptied by opening the front half of the bucket.

This position allows to spread material without performing vehicle travel on the lower layer.



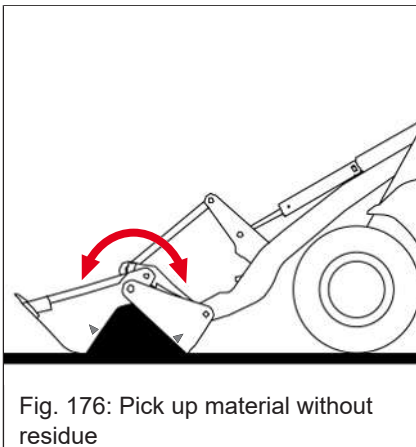
Pull up material

This position allows to pull material out of slopes or roadside ditches with maximum safety and to spread it as required.



Moving material with longer reach

In this position, material can be moved or backfilled without destroying embankments or structures.



Residual material can be picked up without residue

1. Fold up the front half of the bucket.
2. Tilt out the bucket.
3. Lower the bucket to the ground. Ensure that both bucket halves touch the ground.
4. Close and tilt in the multipurpose bucket at the same time.
5. Raise the bucket with the lift hydraulics.

Both bucket halves must touch the ground so that all the material is picked up.

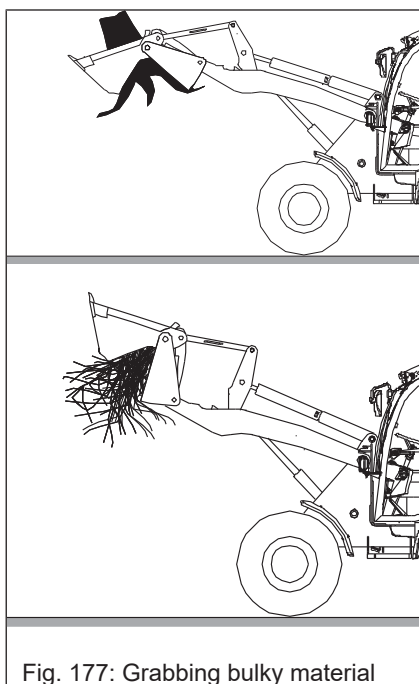


Fig. 177: Grabbing bulky material

Grabbing bulky material

1. The multipurpose bucket can be used to grab building timber, reinforcement bars, packaging bands, wire, etc. This enables them to be picked up and transported safely
2. Large objects can also be gripped with the multipurpose bucket. This ensures safe loading and transport.

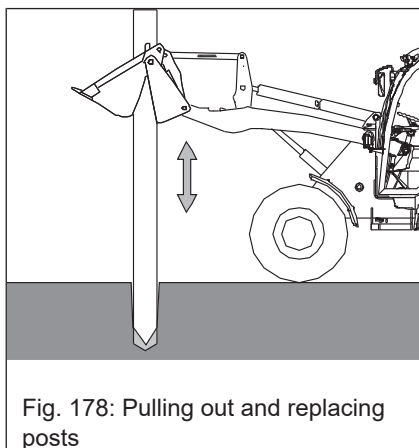
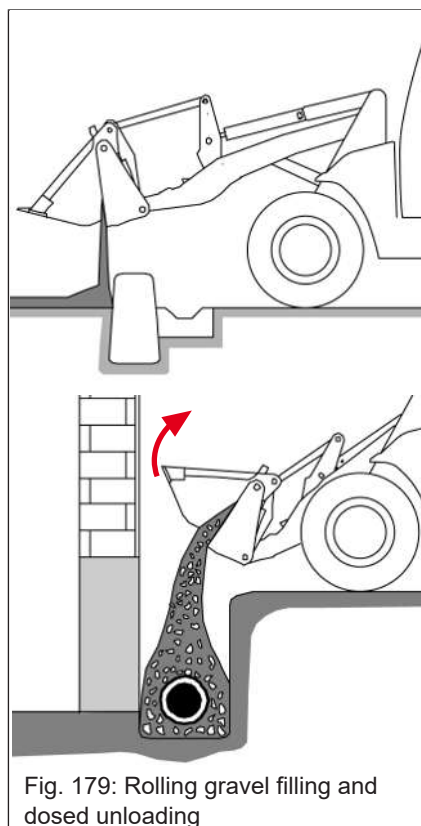


Fig. 178: Pulling out and replacing posts

Pulling out and replacing posts

1. Open the power grab bucket and lower it over the post. Close the bucket to grip the post firmly.
 2. Carefully move the grab bucket up and down to pull it out.
- ⇒ Stakes are loosened.

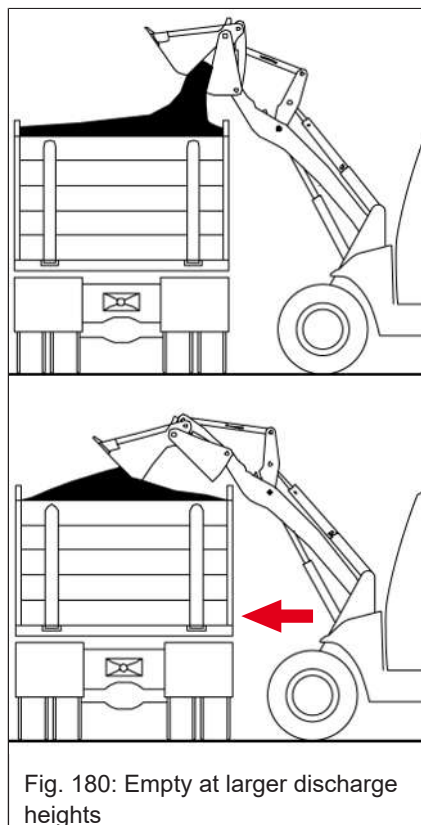


Rolling gravel filling and dosed unloading

Precise dosing and placement of pourable material.

Advantage of working method:

Teeth move back from the wall as the bucket opens.



Empty at larger discharge heights

Advantage of working method:

Increasing the dumping height compared to dumping with a standard bucket.

Material can be pushed with the open multipurpose bucket.

6.12.4 Using the standard bucket

Observe the instructions for working with a bucket. Information on working with a bucket.

Area of application of standard bucket

The standard bucket is mainly used for digging earth, and for loosening, picking up, transporting and loading loose or solid materials.

Vehicle travel on public roads with a full bucket is prohibited in Germany. Observe and follow the legal regulations of your country.

Also observe the applicable regulations for accident prevention of your country.

Pick up and set down a standard bucket

The pick-up and set-down of the bucket is described in the following sections:

Attachment [see Mounting the attachment on page 133](#).

Attachment [see Dismounting the attachment on page 138](#).

Load the bucket symmetrically

- Never load the bucket asymmetrically. If the bucket is loaded asymmetrically, the vehicle may tip over.
- Distribute the load evenly in the bucket.

6

Loading loose material

1. Align the blade parallel with the ground.
 2. Lower the loader unit to the ground. Push the joystick forward.
 3. Drive forward into the material.
 4. When the diesel engine speed is reduced due to too much material: Raise the loader unit a little. Pull the joystick back.
 5. When the bucket is full: Tilt in the bucket. Press the joystick to the left.
 6. Reverse out of the material.
 7. Raise the bucket to transport position.
- ⇒ Material is loaded.

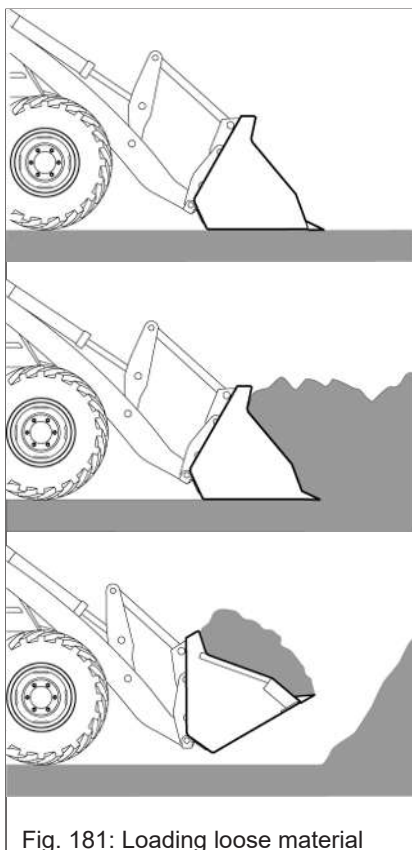


Fig. 181: Loading loose material

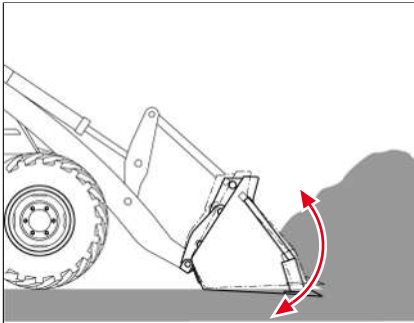


Fig. 182: Loading heavy material

Loading if the material is hard to penetrate

Load as for loading loose material, but in addition:

- Slightly tilt the bucket in and out. To do this, move the joystick to the left and right.
- ⇒ Material is loaded.

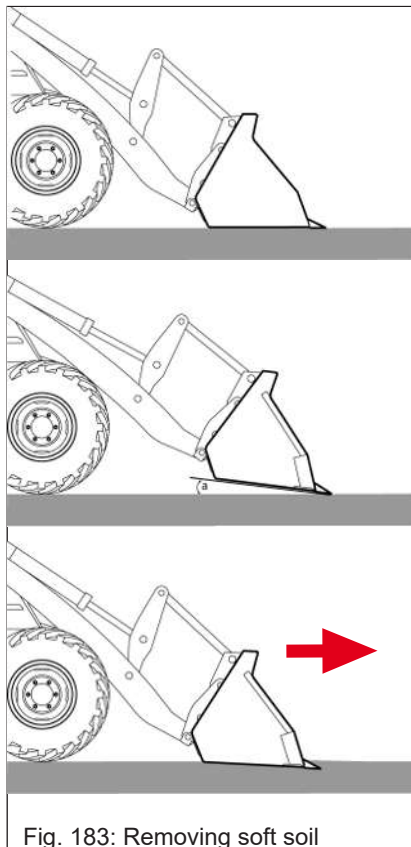


Fig. 183: Removing soft soil

Removing material/digging in soft soil

1. Align the blade parallel with the ground.
 2. Lower the loader unit to the ground. Push the joystick forward.
 3. Setting the digging angle. To do this, press the joystick to the right.
 4. Travel forward.
 5. Once the bucket has penetrated the soil: Set the digging angle slightly flatter. Press the joystick to the left to remove as even a layer as possible and to reduce wheel slip.
- ⇒ Proceed as for loading loose material.

Removing material/digging in hard soil

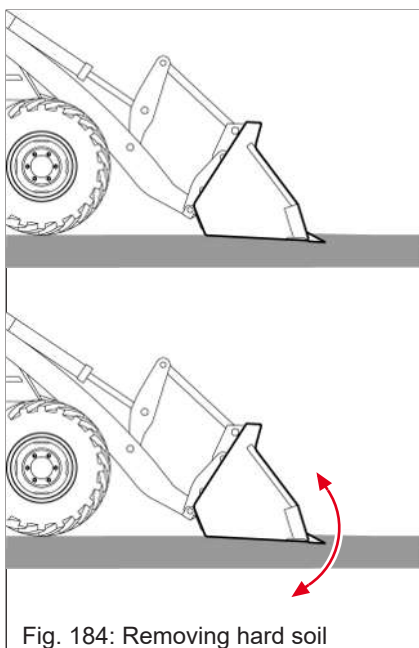


Fig. 184: Removing hard soil

1. Place the bucket horizontally on the ground. Push the joystick forward.
 2. Set a slightly flatter digging angle than for digging in soft soil. Press the joystick to the left.
 3. Drive forward and push the bucket down slightly. Press the joystick slightly forward.
 4. Once the bucket has penetrated the soil: Set the digging angle slightly flatter. Press the joystick to the left to remove as even a layer as possible and to reduce wheel slip.
 5. Move the joystick left and right to release the material.
- ⇒ Proceed as for loading material hard to penetrate.

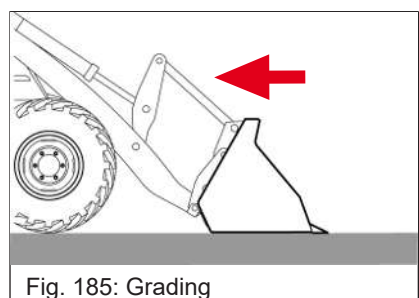


Fig. 185: Grading

Grading

1. Lower the loader unit horizontally to the ground.
 2. Reverse across the surface to be graded.
- ⇒ Surface is levelled.

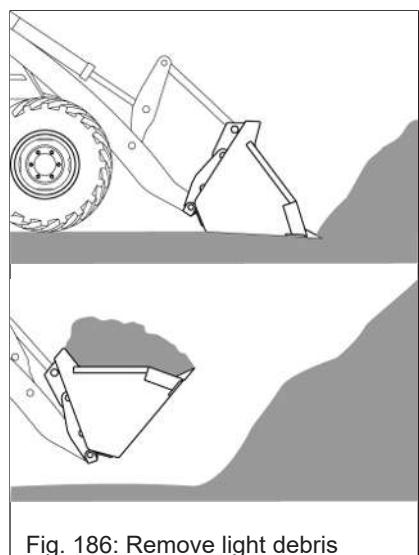


Fig. 186: Remove light debris

Loading heaped material (non-compacted material)

1. Align the blade parallel with the ground. To do this, move the joystick to the left or right.
 2. Place the bucket horizontally on the ground. Push the joystick forward.
 3. Travel forward.
 4. After entering the heaped material: lift the load system evenly. To do this, pull the joystick backward.
 5. Tilt in the bucket. Press the joystick to the left.
 6. Reverse out of the material.
 7. Lower the load system to the transport position.
- ⇒ Material is loaded.

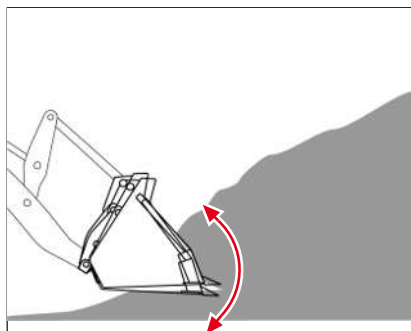


Fig. 187: Removing heavy debris

Loading heaped material (compacted material)

Proceed as for non-compacted material.

- Slightly tilt the bucket in and out when raising the load system in the excavated material. To do this, move the joystick alternately to the left and right.

⇒ The material is loosened.

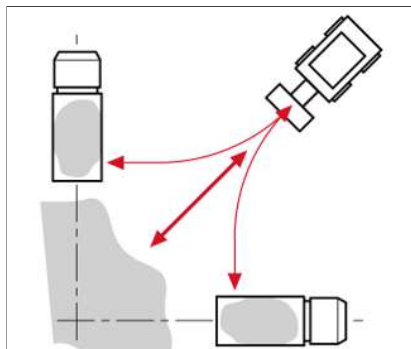


Fig. 188: Loading vehicles

Loading vehicles

1. The truck and the working direction of the loader should form an angle of 45° as far as possible.
2. Only lift the filled bucket to the unloading height when the vehicle is approaching the truck in a straight direction.
3. If the load is dusty, load it as far as possible in the wind direction so that the dust is kept away from the eyes, air filter and fans.

Transport with filled bucket

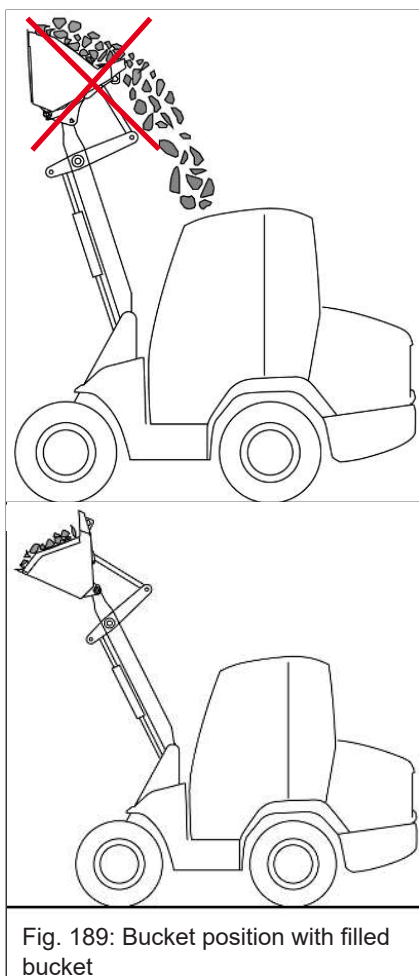


Fig. 189: Bucket position with filled bucket

The tilted bucket is guided in parallel when the loader unit is lifted and extended. A "spirit level" prevents the bucket from being tilted accidentally against the stop and the load from falling over the back of the bucket.

1. Do not tilt the bucket
2. Lifting arm only

6.12.5 Information on working with a stacking unit/pallet fork



⚠ WARNING

Accident hazard from the pallet fork tines!

The fork tines of the pallet fork can cause serious injury or death during operation.

- ▶ Remove the pallet forks before performing vehicle travel on public roads and transport them separately.
- ▶ In the case of a stacking unit with folding forks, fold them up before driving on public roads.
- ▶ Bent, torn or otherwise damaged forks must not be used.
- ▶ Before starting work, ensure that the fork tines on the fork carriage are safely locked.
- ▶ Lower the stacking units to the ground before leaving the vehicle.

**⚠ WARNING****Crushing hazard due to tipping over of vehicle!**

There is an increased risk of tipping when driving in curves. This may cause crushing which may result in serious injury or death.

- ▶ Keep the loader unit lowered during vehicle travel.
- ▶ Adapt the driving speed to the ambient conditions.
- ▶ Adapt the driving speed to the material loaded.
- ▶ Pay attention to persons and obstacles.
- ▶ Observe tipping limit of the vehicle.
- ▶ Reduce speed before downhill travel.
- ▶ Always fasten your seat belt.
- ▶ Ensure that no parts of the body protrude outside the vehicle.
- ▶ Carefully steer the vehicle if the loader unit is raised.
- ▶ Do not exceed the permissible payload.

**⚠ WARNING****Risk of accident due to incorrect use of the attachment!**

Incorrect use of the attachment may result in an accident, serious injury or death.

- ▶ Do not transport any persons with or on the attachment.
- ▶ Ensure that there are no persons under lifted loads.

**⚠ WARNING****Accident hazard by attaching lifting gear to attachment!**

The transport of objects with the aid of lifting gear attached to the attachment may cause the lifting gear to slip and objects to fall off. Accidents with serious injuries or death can result.

- ▶ Do not attach any hooks, eyelets or other lifting gear to the attachment.

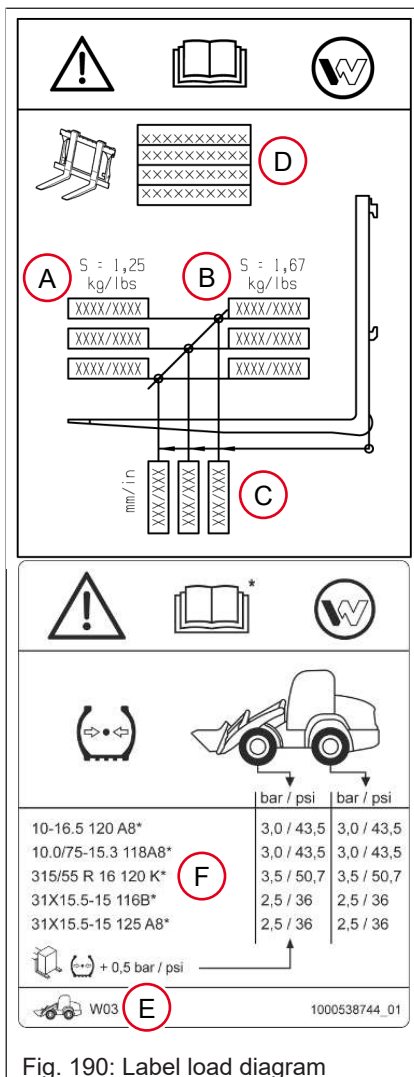
⇒ The attachment is not approved for use with lifting gear.

**⚠ CAUTION****Falling load during transport!**

If the loader unit is raised during transport, persons may be injured or objects damaged by falling loads.

- ▶ Always tilt the attachment slightly back towards the vehicle and keep it as close as possible to the ground. Observe the necessary ground clearance.
- ▶ Do not lift the loader unit with load until it is at the place of unloading and only when the vehicle is at a standstill.
- ▶ For bulky loads: Secure the load, equip the rear wall of the attachment with a protective device or use an attachment with a hydraulic gripper.

Description load diagram



The load capacity diagram fitted in the vehicle applies exclusively to the use of the approved stacking units **D** in combination with the correct tire air pressure in the specified tire types **F**.

Which vehicle is permissible for the respective attachment is indicated in line **E** of the load diagram.

The specified maximum loads **A** and **B** must not be exceeded, otherwise the stability of the vehicle is no longer guaranteed.

Column **A** shows the maximum loads when used on level ground (stability $s = 1.25$).

Column **B** shows the maximum loads for off-road applications (stability $s = 1.67$).

The maximum load depends on the distance (load distance) **C** between the load center and the fork carrier (lower row of numbers). Take this into account also when using fork arm extensions!

When using other attachments, their specific load diagrams must be observed.

If the load is to be picked up, switch off the load stabilizer, otherwise the loader unit will be very flexible and it will be difficult to operate the lifting movements accurately.

In addition, observe the safety instructions for restricting the field of vision.

Failure to observe the instructions specified above can cause serious damage to the vehicle. The manufacturer does not give any warranty for any such damage.

6

6.12.6 Using the stacking unit

Observe the information on working with a stacking unit

- [see Information on working with a stacking unit/pallet fork on page 179](#)

The stacking unit consists of the fork frame and the forks. Always use the forks tines in pairs.

Areas of application of pallet forks

The stacking unit is primarily used for lifting, transporting and depositing loads.

Driving on public roads with forks pointing forwards is not permitted in the Federal Republic of Germany. Observe and follow the legal regulations of your country. Remove the pallet forks before performing vehicle travel on public roads and transport them separately.

Also observe the applicable regulations for accident prevention of your country.

The operator must be specially trained to use the stacking unit.

Pick up and set down a stacking unit

**⚠ WARNING****Risk of accident due to concealed forks!**

Failure to observe this can cause serious injury or death.

- ▶ Always adjust the forks on the fork carriage so that the fork tips are within the operator's field of vision when picking up the load.

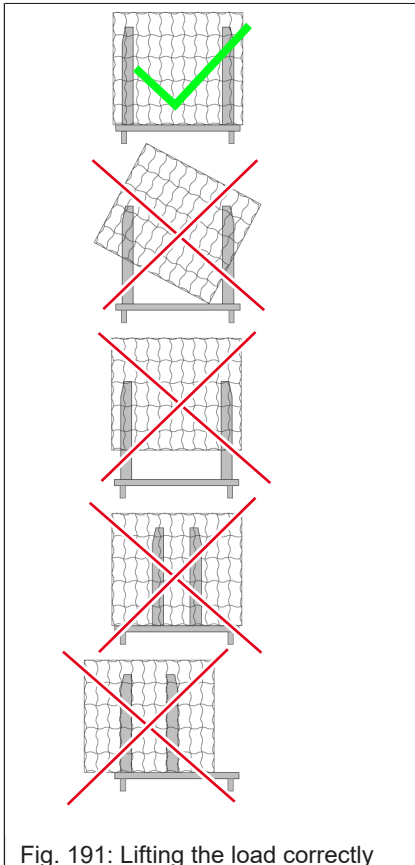


Fig. 191: Lifting the load correctly

1. Drive as close as possible to the load!
2. Always drive the vehicle up to the load with the wheels aligned straight!
3. Only carry out loading work on firm, level and sufficiently load-bearing ground!
4. Never lift a load with only one fork!
5. Drive the forks under the pallet carrier as far as possible so that the load can be picked up as close as possible to the fork carriage!
6. Move the forks as far apart as possible, straight and at the same distance from the left and right edges of the load under the load!

Adjusting the forks**⚠ WARNING****Tipping hazard due to incorrect adjustment of fork arms!**

A tipping vehicle can cause serious injury or death.

- ▶ Adjust the spacing of the fork arms so that they are symmetrical to the center line of the vehicle.
- ▶ Adjust the spacing of the fork arms so that they are as far apart as possible.



⚠ CAUTION

Danger of crushing when shifting the fork arms!

Fingers and hands can be crushed between the fork carriage and fork arms.

- ▶ Do not touch the sliding surface of the fork carriage when shifting the fork arms.
- ▶ Wear protective gloves.

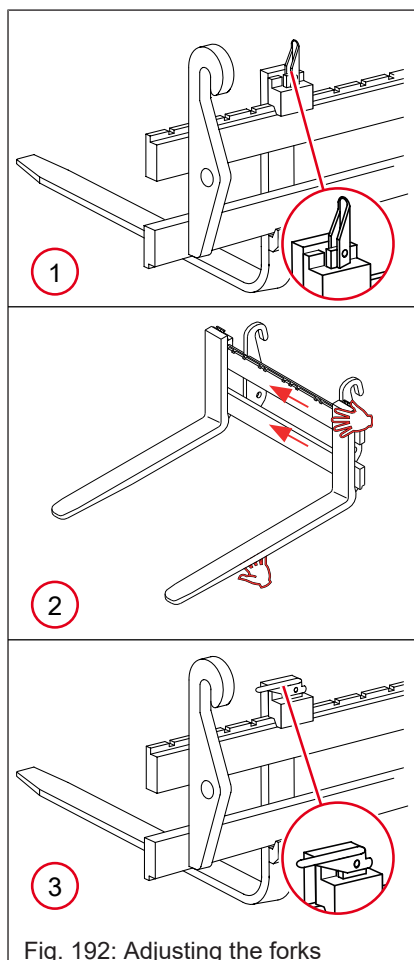


Fig. 192: Adjusting the forks

1. Raising the attachment.
⇒ Recommended height is approx. 10 to 30 cm.
2. Set the locking lever vertically upwards (position 1).
⇒ Locking is released.
3. Slide the fork arms to the required distance until the locking pin engages in a slot on the fork frame. Only hold the fork tines as shown in position 2.
4. Turn the locking lever again (position 3).
⇒ The upper edge of the locking levers must end with the edge of the fork carriage.
5. Check whether safety screws on either side on the upper slide rail of the fork frame are not damaged and whether they are firmly screwed.
⇒ The stacking unit is ready for operation.

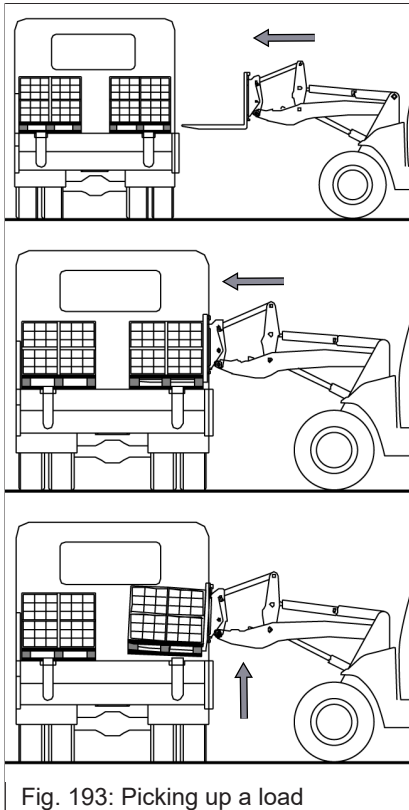


Fig. 193: Picking up a load

Picking up a load

Check whether the permissible bearing load of the vehicle and stacking unit is appropriate for the weight of the load.

- ✓ Fork tine spacing adjusted and forks locked.
- ✓ Load stabilizer switched off (refer to Operating the load stabilizer).

1. Approach the load in a straight line.
2. Bring the stacking unit to the required height and position it horizontally.
3. Travel forward until the load touches the fork frame.
4. Lift the stacking unit slightly and tilt it back.
5. Drive back until the load can be lowered to transport height.
6. Lower the load to transport height (approx. 250 mm).

⇒ Load can be transported.

Transporting a load



! WARNING

Unsecured load can tip backwards when the loader unit is raised!

Failure to observe this can cause serious injury or death.

- ▶ Do not carry out any transport work with the loader unit raised.
- ▶ Always tilt the attachments slightly back towards the vehicle and keep them as close as possible to the ground!
- ▶ Only carry out unloading work when the vehicle is stationary and do not tip the stacking device / bucket to the stop.
- ▶ For bulky loads: Secure the load.
- ▶ Provide the back of the stacking unit/bucket with a protective device.
- ▶ Mount the front guard screen to the driver's cab.
- ▶ Use attachments with hydraulic gripper.
- ▶ Ensure that there is a clear view of the load to be lifted and the travel distance.
- ▶ When turning or driving with a fully loaded stacker/bucket on a slope, the vehicle may tip over!
 - ⇒ Lower the loader unit to the transport position.
 - ⇒ Reverse if possible with the equipment loaded.
- ▶ In case of strong wind and poor visibility with the loader unit raised and the equipment loaded, the vehicle may tip over!
 - ⇒ Do not park a wind-sensitive load on a high load.
 - ⇒ Stop stacking work in poor conditions.

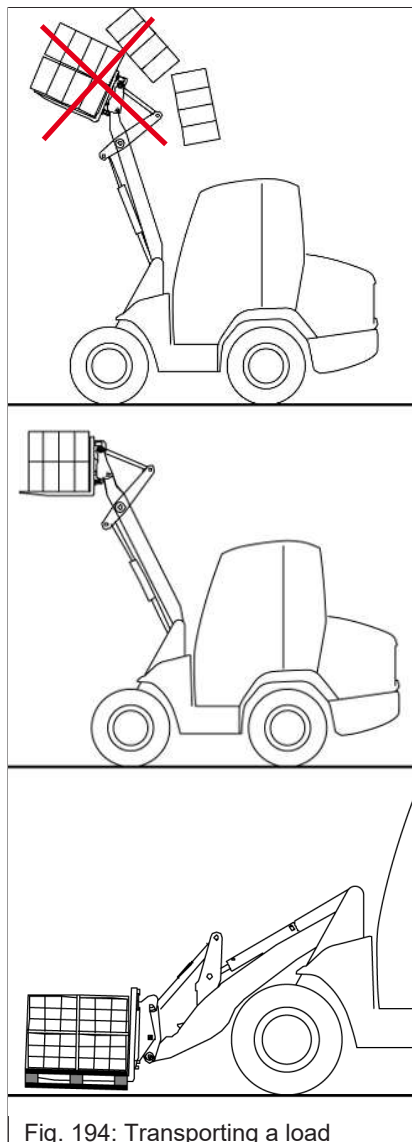


Fig. 194: Transporting a load

- Transport the load as close as possible to the ground.
- Select the transport height so that the stacking unit can be guided over any unevenness in the floor without touching down. Adjust the height during transportation if necessary.
- During vehicle travel up or down a slope the load must always be on the uphill side.
- Secure the load with straps if necessary.
- If necessary, transport large, bulky loads in reverse to ensure sufficient visibility.

6.12.7 Load hook



⚠ WARNING

Risk of injury when working with the load hook!

To avoid the risk of accidents, the following precautions must be observed!

- ▶ Read and observe the chapter on safety instructions "Lifting gear applications".
- ▶ Observe the bearing load diagram and observe the bearing load (attached to the front window).
- ▶ Move loads only on firm and level ground.
- ▶ When lifting the load, do not tilt the stacking device out or in.
- ▶ When attaching a load-bearing device (belts, rope, chain), ensure that the pawl in the hook closes securely.
- ▶ Only use approved, tested and undamaged load-bearing equipment.
- ▶ Never guide the load-bearing equipment over sharp edges.
- ▶ Only transport suspended loads at walking pace.
- ▶ Accompanying persons when driving the load must only be within the driver's field of vision.
- ▶ Suspended loads must not be transported on public roads.

With the load hook, shaft rings, containers, pipes, etc. can be transported with the aid of a suitable carrying device (belts, rope, chain).

6


W03-01



W03-02

Fig. 195: Load hook on tilt rod

Load hook on the tilt rod of the load system

1. Hook the load-bearing equipment into the suspension points (eyes, lugs) provided for the load to be transported.
2. Lift the load carefully and transport it close to the ground.
 - ⇒ For bearing loads, see also chapter Technical Data.

7 Transportation

7.1 Towing

7.1.1 Warnings for towing



⚠ WARNING

Risk of accident due to towing of the vehicle!

Towing the vehicle may cause situations that cannot be foreseen. This may result in accidents that could result in serious injury or death.

- ▶ Only tow the vehicle if the steering and braking systems are fully functional.
- ▶ Only tow the vehicle with towing gear of sufficient dimensions.
- ▶ No persons are allowed to stay in the range of action of the towing gear during towing.
- ▶ Secure the vehicle against unintentional movement and unauthorized use once towing is over.



NOTICE

Only tow the vehicle if the steering and brake are fully functional!

- ▶ Do not exceed a maximum speed of 5 km/h.
- ▶ For longer distances, use a transport vehicle or have the vehicle repaired on site.

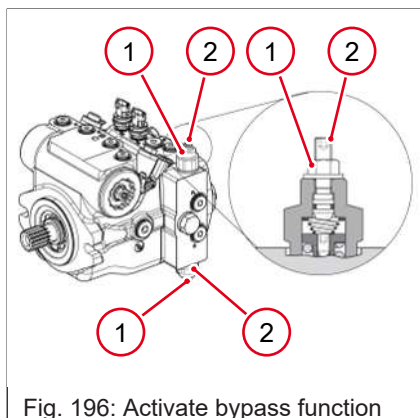
Emergency steering feature

The steering system is only operational when the engine is running normally.

The vehicle can still be steered if the diesel engine or the pump drive breaks down. However, operating the steering system then requires greater strength and the steering will only respond slowly. Take this into account especially when towing the vehicle. Adjust the towing speed to the changed steering behavior (walking pace)!

7.1.2 Towing the vehicle

The following steps should only be carried out by authorized technically trained personnel



Deactivate travelling drive pump

1. Lower the load system to the transport position.
2. Switch off the engine.
3. Secure vehicle against rolling away (e.g. with suitable wheel chocks). Activate parking brake.
4. Switch off the ignition and remove the key.
5. Loosen lock nut **2** to the left with half a revolution using a hex socket wrench (SW 13).
6. Turn in screw **1** to the right using an Allen wrench (SW 4) until screw **1** rests on the spring plate. This can be identified by the increased resistance. Then rotate screw **1** with another half a rotation to the right.
7. Tighten lock nut **2** to the right with a torque of 22 Nm.

Deactivate drive system pump

1. Loosen lock nut **2** with a hex socket wrench (SW 13), then turn the screw **1** with an Allen wrench (SW 4) to the left up to stop.
2. Retighten lock nut **2** to the right with a torque of 22 Nm.



NOTICE

Damage to the traveling drive pump due to an empty hydraulic circuit

While towing with deactivated traveling drive pump, the hydraulic circuit empties itself. While starting, this can lead to unintended functions.

- Start the traveling drive only after filling and venting the hydraulic circuit.

7.1.3 Recovering a vehicle



⚠ WARNING

Risk of accident when recovering the vehicle!

Failure to observe this can cause serious injury or death.

- ▶ Only use suitable recovery equipment to recover the vehicle
- ▶ No persons must be between the vehicles during recovery
- ▶ For recovery, hire a towing service or an authorized service center.

In order to rescue a fixed vehicle with a cable winch or a strong tractor vehicle, high tractive forces are required.

For recovering the vehicle, stable recovery devices are attached to the front of the frame.

1. Attach sufficiently dimensioned and tested recovery equipment to the vehicle's recovery devices.
2. Carry out preparations such those as for towing the vehicle
3. Carefully recovering and towing the vehicle

7.1.4 Towing gear



⚠ WARNING

Risk of accident by using the towing gear in trailer operation!

The towing gear is not designed to tow trailer loads, which may result in accidents with serious or fatal injuries.

- ▶ The towing gear is not approved for trailer operation.
- ▶ Use the towing gear only for towing the vehicle.
- ▶ Any other use is not permitted and may cause accidents.

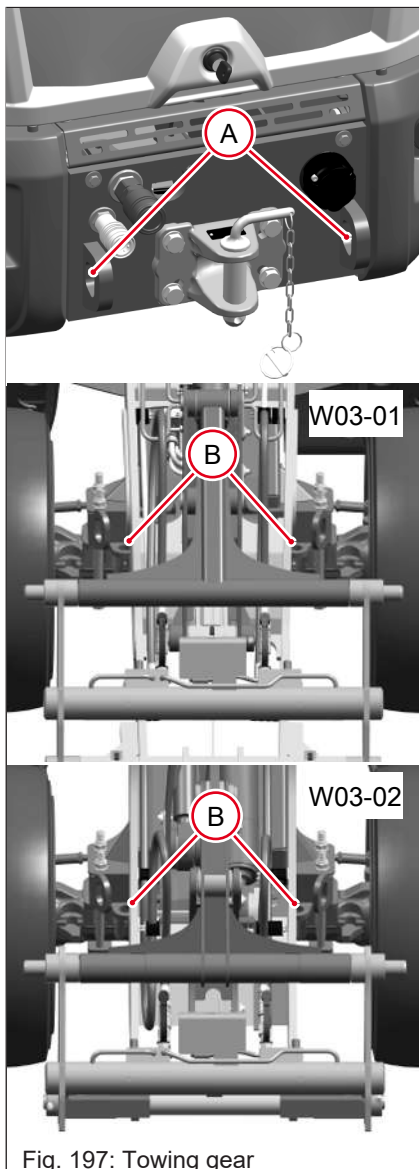


Fig. 197: Towing gear

Before using the towing gear for towing, the towing gear must be checked for damage. Damaged towing gear is sources of danger and must not be used. Replace defective towing gear immediately by an authorized service center or have it repaired.

Two towing devices are built on the vehicle:

- Rear towing device: **A**
- Front towing device: **B**

7.2 Loading

7.2.1 Information on loading the vehicle



⚠ WARNING

Accident hazard due to incorrect loading!

Incorrect loading can cause the vehicle to tip over, for example. This may result in accidents that could result in serious injury or death.

- ▶ Clean the vehicle before loading or transporting it.
- ▶ Use a transport vehicle with the appropriate load-bearing capacity.
- ▶ Pay attention to the vehicle's operating weight.
- ▶ Proceed with special care when loading the vehicle in conditions of snow and ice.



NOTICE

Damage to the diesel engine

During loading and driving on ramps, damage to the diesel engine can occur if the lubricating oil level is too low.

- ▶ Perform oil level check of diesel engine before loading
- ▶ The oil level must be visible at the MAX mark on the oil dipstick

In order to avoid injury or accidents, observe the following instructions when loading the vehicle.

- The transport vehicle must be of sufficient size. Do not exceed the permissible maximum height.
 - Refer to chapter for the weight and dimensions of the vehicle to be loaded [see Technical Data on page 292](#).
- Remove any mud, snow or ice from the tires so that the vehicle can be safely driven onto the ramps.
- The loading area must be clean and non-slip, use anti-slip mats if necessary.
- When positioning the vehicle on the loading surface, ensure that the center of gravity of the load is as low as possible and in the longitudinal center line of the transport vehicle if possible.
- The permitted total weight or the axle load of the transport vehicle must not be exceeded during loading or transportation.
- Place partial loads so as to ensure an even load on all axles of the transport vehicle.
- The vehicle must be secured with suitable measures so it cannot slip, roll away, fall over, fall or cause tipping, [see Tying down the vehicle on page 195](#).
 - After full braking, sharp evasive maneuvers or bumps on the road, vehicle loading must be checked.
 - Auxiliary means are e.g. anti-slip bases and linings, load-securing straps and chains, clamping beams, protective paddings, nets, edge protectors, etc.
- Always use the existing tie-down points when using load-securing straps and chains.
- Adjust travel speed of the transport vehicle.

7.2.2 Loading the vehicle

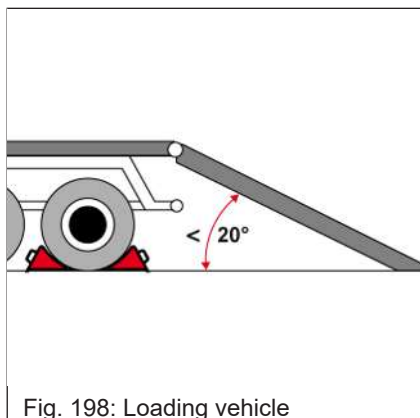


Fig. 198: Loading vehicle

The prerequisites for loading are listed in the following:

- Secure the transport vehicle with wheel chocks to prevent it from rolling away.
- Place the access ramps at the smallest possible angle.
 - Do not exceed the maximum slope.
 - Use access ramps only with an anti-skid surface.
- Ensure that the loading surface is clear and access to it is not obstructed, e.g. by superstructures.
- Ensure that the access ramps and the wheels of the vehicle are free of snow, ice, oil or grease.
- Check the engine oil level.
 - The oil level must be visible at the max. mark on the oil dipstick.

Prepare for loading

1. Start the engine of the vehicle.
2. Lift the load system so that it is not possible to touch the ramps with the attachment.
3. Ensure that the attachment is securely locked.

Carry out loading

1. Carefully drive the vehicle onto the center of the transport vehicle.
2. Lower the load system completely. The attachment must rest on the loading area of the transport vehicle.
3. Bring the vehicle's drive system to zero position and switch off all electrical consumers.
4. Activate parking brake.
5. Switch off the ignition and remove the key.
 - ⇒ If the vehicle is equipped with a drive interlock, the drive interlock is activated.
6. Exit the cab, close doors, windows and engine hood, lock and unlock.
7. Lash down the vehicle [see Tying down the vehicle on page 195](#).
8. Observe total height.

7.2.3 Safety instructions regarding crane-lifting

Only use crane eyelets marked with the labels to attach the loading gear. In order to avoid injury or accidents, observe the following instructions when loading the vehicle.

- Seal off the danger zone.
- The crane and the lifting gear must have suitable dimensions.
- Take into account the vehicle's overall weight.
- Use only tested ropes, belts, hooks, shackles (screw and socket pins with lockable brackets) for fastening the vehicle.
- Have loads fastened and crane operators only guided by experienced persons.
- The person guiding the crane operator must be within sight or sound of him.
- The crane operator must observe all movements of the load and the lifting gear. Secure the vehicle against unintentional movement.
- The crane operator may move a load only after making sure that the load is safely fastened and nobody is within the danger zone, or after receiving a signal from the signalman.
- The load must not be fastened by winding the lifting rope or chain around it.
- Pay attention to load distribution when attaching the lifting gear. Note the center of gravity.
- The vehicle may only be loaded in transport position without attachment or in conjunction with an empty standard bucket.
- Ensure that no one is in or on the vehicle.
- Stay clear of a raised load.
- Observe the information in the notebook Earth-moving vehicles of the civil engineering employers' liability insurance association and the safety instructions in the operator's manual [see Towing, loading and transport on page 27](#).

7.2.4 Crane-lifting the vehicle



⚠ DANGER

Fatal hazard from falling objects or falling vehicle!

Unsecured objects or an incorrectly fastened vehicle may fall. If persons are hit by these parts or the vehicle, serious or fatal injuries may result.

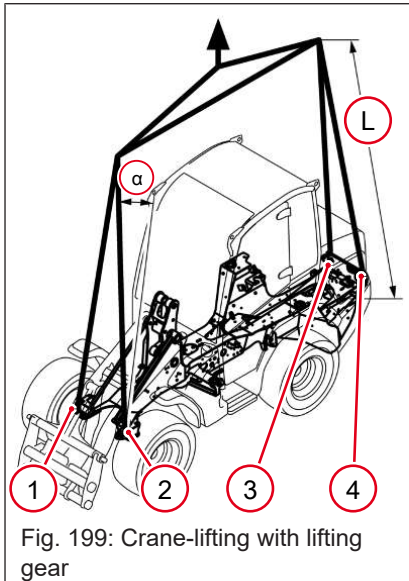
- ▶ Use tested, undamaged and sufficiently dimensioned lifting gear.
- ▶ Check that the lifting gear is safely fastened.
- ▶ Ensure that nobody remains under the raised vehicle.



NOTICE

The vehicle can be damaged when lifted with lifting gear!

- ▶ Use a suitable lifting traverse for lifting and place a suitable protection against damage between the lifting gear and the vehicle before lifting.



Preparation for loading with crane

1. Install and safely lock the standard bucket.
2. Empty standard bucket, tilt in and lower to transport position (approx. 30 cm above the ground).
3. Move all switches and levers to zero position.
4. Switch off the ignition and remove the key.
5. Exit the cab, close doors, windows and engine cover, lock and unlock.

		Lifting eyes 1 and 2	Lifting eyes 3 and 4	Remark
Angle α		0° - 10°	0° - 10°	—
Maximum lifting force	W03-01	22 kN	17 kN	—
	W03-02		16 kN	—
Minimum length L		2.4 m $\pm$ 0.2 m	2.3 m $\pm$ 0.2 m	When using a lifting beam, 3 m above the ground

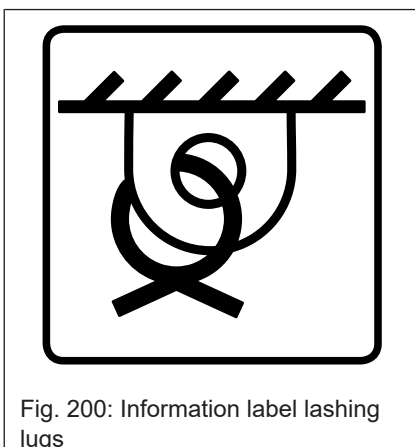
Loading with crane

1. Fasten the vehicle at the crane eyelets with lifting gear. Fasten the vehicle at the crane eyelets with tested lifting gear of sufficient dimensions.
2. Raise the vehicle carefully with a crane, slowly position it over the unloading position and lower it carefully.

7

7.3 Transportation

7.3.1 Tying down the vehicle



Only use lashing eyelets marked with the labels to attach the lashing straps or chains.

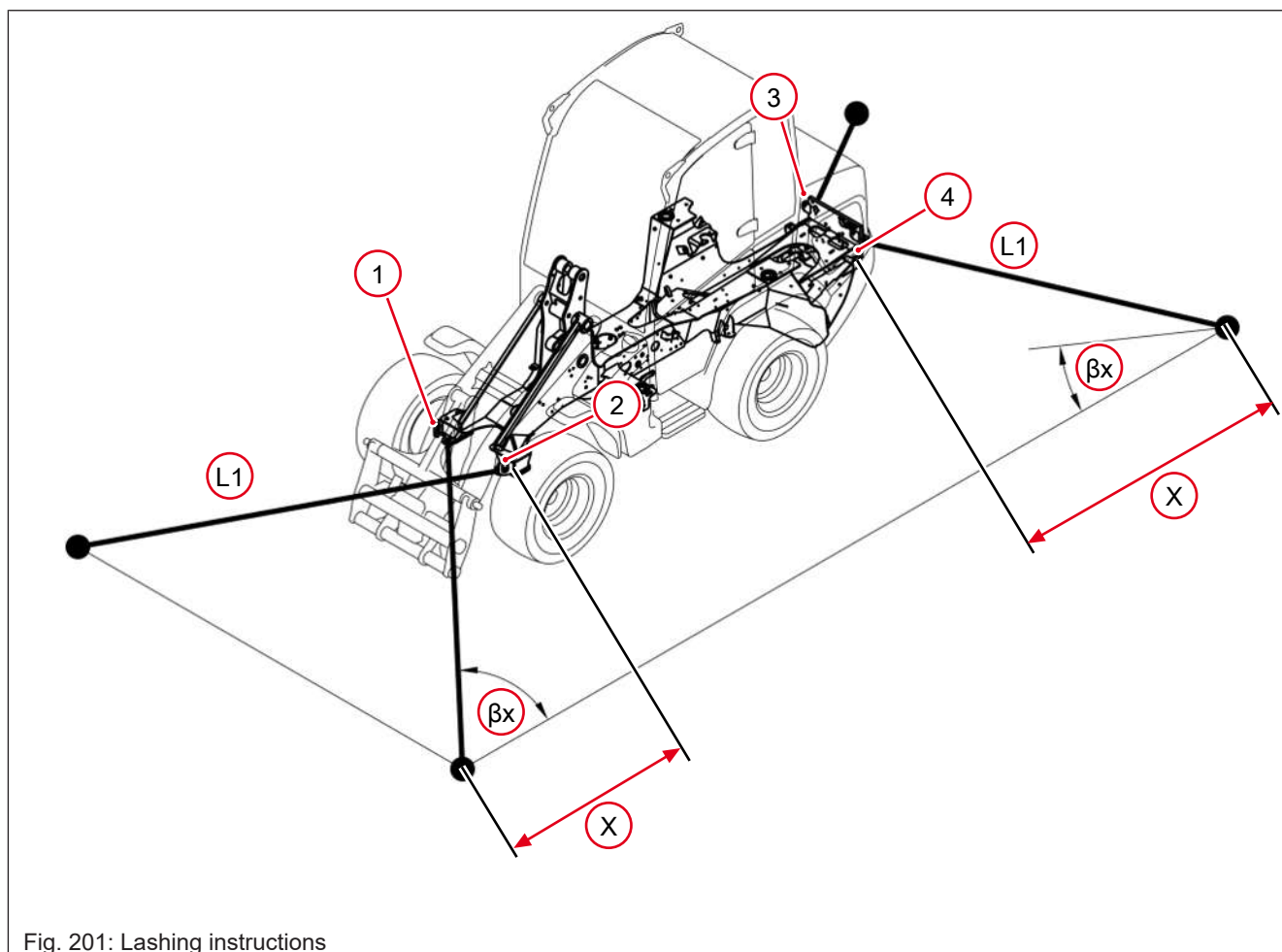


Fig. 201: Lashing instructions

Item	Designation	Lashing points 1 and 2	Lashing points 3 and 4	Remark
βx	Angle beta in °	$37^\circ \pm 5^\circ$	$37^\circ \pm 5^\circ$	Angle between the longitudinal edge of the loading surface and fastening gear
X	Spacing X in m	$2.0 \text{ m}^\circ \pm 0.2 \text{ m}$	$1.3 \text{ m}^\circ \pm 0.2 \text{ m}$	
L1	Minimum length L1 in m	$2.5 \text{ m}^\circ \pm 0.2 \text{ m}$	$1.8 \text{ m}^\circ \pm 0.2 \text{ m}$	Vehicle's lifting eye to loading surface's eye Lashing to the front over the cross
LC	Maximum tractive force in kN	19 kN	19 kN	

8 Maintenance

8.1 Information on maintenance

8.1.1 Safety instructions

Information on maintenance

- Only perform maintenance and inspection work after having read and understood the operator's manual.
- Pay attention to the basic safety instructions and to all the safety labels affixed on the vehicle.
- The operator's manual describes the work to be performed.
 - However, the descriptions of the work processes provide the required information only to experienced technically trained personnel having appropriate knowledge.
- Always store the operator's manual in the place provided for it on the vehicle.
- The work that is not specified in this operator's manual may only be performed by an authorized service center.

Information on the vehicle and the attachment

Only perform maintenance and inspection work if the vehicle is secured.

- A raised loader unit can fall suddenly and cause serious injury. If working under the raised loader unit is unavoidable, then the loader unit must be secured by a suitable support.
- Lower attachment on the ground ensuring that no movements can occur when releasing mechanical or hydraulic connections.
- Secure equipment or components that are to be attached or removed, or whose installation position is to be changed, with the aid of suitable lifting gear or with mounting or support devices to prevent unintentional movement, slipping or falling.
- Remove dirt from steps and handholds to keep them safe and ready for use.

Information on tools

- Only work with suitable and functional tools.

Information on cleaning work

- Clean units in the work area before starting work. The choice of the cleaning agents depends on the material of the parts to be cleaned.
- Rubber parts and electrical components must not be cleaned with solvents or steam. Water can cause short circuits in the electrical system and cause new hazards.
- Do not use solvents that give off harmful or flammable vapors.
- Avoid skin contact with cleaning agents!
- Wear protective equipment.

Information on handling flammable liquids

- Do not smoke and avoid open fire when handling flammable liquids.
- Do not use water to extinguish fires on the vehicle or burning liquids.
- Use suitable extinguishing agents, such as powder, carbon dioxide or foam fire extinguishers.
- Always call the fire department in the event of a fire.

Information on handling fuels, oils and greases

- Burn hazard due to hot lubricating oil or hydraulic oil.
- Avoid skin and eye contact with oil and grease.
- Wear protective equipment.
- Do not use fuel or solvents to clean your skin.
- Rectify any oil or fuel leaks immediately.
- Do not allow the oil and oily wastes to get into the ground or stretches of water.
- Absorb the escaping oil or fuel immediately with a binding agent, and dispose of it in an environmentally friendly manner and separately from other waste.
- Even biodegradable, “environmentally friendly” oil must be disposed of separately, just like every other type of oil.

Information on residual pressure in the hydraulic system

- A fine jet of hydraulic oil under high pressure can penetrate through the skin. Seek medical attention immediately if oil penetrates the skin or eyes.
- Only open hydraulic systems after the pressure in them has been released.
- Even if the vehicle is parked on level ground with its loader unit fully lowered and its engine stopped, there can still be considerable residual pressure in parts of the hydraulic system.
- Residual pressure is only slow to ease.
- If the hydraulic system is opened immediately after shutting down the vehicle, release the pressure in the hydraulic system first.
- On vehicles equipped with lowering brake valves on the lift and/or tilt cylinder, open the valves in order to lower the loader unit .

Information on screw connections, pipes, hydraulic hoses

- Have hydraulic hoses checked and replaced at the recommended intervals, even if they do not show any visible defects.
- Have any leaks in the line system rectified immediately.
- A fine jet of hydraulic oil under high pressure can penetrate through the skin. Seek medical attention immediately if oil penetrates the skin or eyes.
- Do not search for leaks with your hands.
- Search for leaks using cardboard or paper on which the escaping oil can be seen.
- Do not repair damaged pipe lines and hydraulic hoses, but replace them immediately by new ones.

Information on engine exhaust

- Engine exhaust is hazardous to your health. Do not breathe in engine exhaust.
- If maintenance and inspection work has to be performed in enclosed spaces with a running engine, extract the exhaust gases with an extraction system and ensure that the space is well ventilated.

Information on the electrical system

- Always follow the correct sequence when disconnecting the battery.
 - Disconnecting: First the negative terminal, and then the positive terminal.
 - Connecting: First the positive terminal, and then the negative terminal.
- Always disconnect the battery before performing work on the electrical system in which tools, spare parts, etc. can touch electrical components or contacts.
- Always disconnect the battery before performing welding work.

8.1.2 Responsibilities and prerequisites

- Operational readiness and life span of the vehicle are influenced to a high degree by care and maintenance.
- The care and maintenance work listed in the maintenance plan as “every 10 operating hours (daily)” and “every 20 operating hours” are to be performed by a trained operator.
 - The expertise required to carry out the care and maintenance work can be acquired during training courses provided by our service department.
- All other work listed in the maintenance schedule may only be carried out by an authorized specialist workshop in order to recognize warranty claims.
 - The maintenance and inspection personnel must have specialized knowledge about the maintenance and inspection work on the vehicle. The necessary expertise can be obtained at training sessions from our Service department.
- Respective intervals for inspection can be found in the maintenance schedule. The part numbers of the materials and consumables required for maintenance work, as well as the numbers of the maintenance packages “**A=100 operating hours,**” “**B= every 500 operating hours**” or “**C=1500 operating hours / annually**” can be found in the spare parts list.
- For the quantity and specification of the operating and lubricating materials refer to the table [see Vehicle fluids on page 212](#).
- Repairs may only be made using original replacement parts.
- If parts of the vehicle are subsequently modified or replaced whose condition is prescribed or whose operation poses a risk to persons, this may affect the operating permit and warranty.
- The manufacturer assumes no liability for damage or injury to persons originating from non-adherence.
- Perform maintenance and inspection work only with suitable protective equipment.
- Perform only the maintenance and inspection work described in this operator's manual.
- For questions concerning the maintenance and service work, please contact your service partner at any time.

8.2 Maintenance accesses

8.2.1 Engine cover



! WARNING

Injury hazard due to hot and rotating parts!

When the engine is running and for a short time thereafter, parts in the engine compartment may still be hot or rotate. This may cause crushing which may result in serious injury or death.

- ▶ Do not open the engine cover if the engine is running.
- ▶ Let the engine cool down.
- ▶ Wear protective equipment.



NOTICE

Damage to the engine caused by loose objects in the engine compartment!

- ▶ Remove all tools and objects from the engine compartment before closing the engine cover.

Open the engine hood

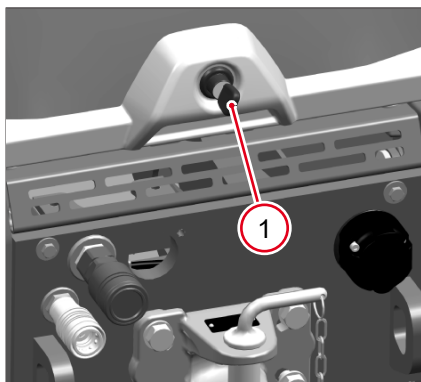


Fig. 202: Open the engine hood

- ✓ Switch off the ignition and remove the key.

1. Unlock lock 1 with key.
 2. Press lock 1.
- ⇒ The engine cover is pushed up by gas springs.

Close the engine hood

1. Push the engine cover downwards until the lock 1 audible latches.
2. Lock the lock 1 with the key.

8.2.2 Maintenance flap on the cab

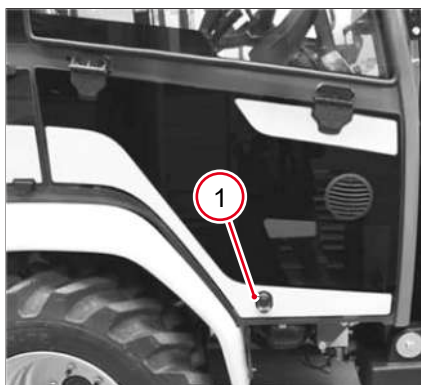


Fig. 203: Maintenance flap right

Open the maintenance flap

- ✓ Switch off the ignition and remove the key.
1. Unlock lock 1 with the key (the key is not the starting key).
 2. Press lock 1.
- ⇒ The maintenance flap is pushed up by a gas strut.

Closing the maintenance flap

1. Press the maintenance flap down firmly until lock 1 audibly engages.
2. Lock the lock 1 with the key.

8.2.3 Cab fuse box



NOTICE

Damage to the electrical system due to a short circuit

- ▶ Always disconnect the battery before performing work on the electrical system in which tools, spare parts, etc. can touch electrical components or contacts.
- ▶ Do not clean electrical components (instrument panel, alternator, compact connectors, joystick, etc.) with a high-pressure cleaner.
- ▶ Do not touch incandescent lamps and headlight reflectors with your fingers.

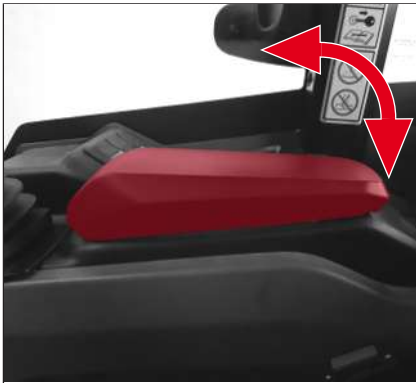


Fig. 204: Fold up/down the armrest

Fold up/down the armrest using the safety devices

1. Stop engine and remove starting key.
2. Fold up the armrest to the front
3. Fold down and engage the armrest to close it.

8.3 Visual check

8.3.1 Checking components

Check the following components weekly:

- Check all steel parts for damage and loose threaded fittings, in particular the protective ROPS/FOPS structure.
- Check the condition and function of the seat belt.
- Check the power coupler for the attachment.
- Check whether all pivot pins are in their correct positions and secured with their locks.
- Check the climbing aids and handholds for correct position.
- Check cab windows for breaks, cracks and stone chips.
- Check the condition of the lights and work lights.
- Check the tires for damage and penetration of sharp-edged objects.
- Check tires for wear.
- Check the condition of all safety labels and warning labels.

8.3.2 Leakage check



⚠ WARNING

Risk of injury due to pressure

A fine jet of hydraulic oil under high pressure can penetrate through the skin. This can cause serious injury.

- ▶ Wear protective gloves and safety glasses.
- ▶ Never search for leaks with your bare hands.
- ▶ Search for leaks using a piece of cardboard or paper on which the escaping oil can be seen.
- ▶ Seek medical attention immediately if hydraulic oil penetrates the skin or eyes.

Check the following components to see if they are tight:

- Check air intake line from air filter to engine.
- Check the hose pipes of the cooling system.
- Check engine oil filter.
- Check fuel lines.
- Check the hose pipes and hydraulic cylinders of the steering system.
- Check the hydraulic system, control valve, lowering brake valves, hydraulic hoses and hydraulic cylinders.
- Check hydraulic connections of all control circuits, auto-hitch trailer coupling, tipper connections.
- Check the hose pipes of the braking system and the tank for the brake fluid.
- Check front and rear axles.

Have defects and leaks repaired by an authorized service center.

8.4 Daily and weekly maintenance

Maintenance cycle	Personnel	For further information	
Daily	Operating personnel	[202]	Checking components
		[220]	Checking the engine oil level
		[223]	Check the coolant level
		[227]	Check the hydraulic oil level
		[237]	Cleaning the vehicle from the outside
		[238]	Cleaning the radiator
		[240]	Clean/change air filter
		[245]	Cleaning the condenser
		[250]	Checking braking system
		[251]	Checking steering system for function
		[254]	Regular checks and maintenance work of the electrical system
		[258]	Checking the hydraulic system for leaks
		[261]	Checking the V-belt
		[269]	Checking function of seat switch

Maintenance cycle	Personnel	For further information	
Every week	Operating personnel	[271]	Checking the tires
		[202]	Checking components
		[203]	Leakage check
		[226]	Window wiper water level
		[229]	Lubricating the rear axle oscillation-type bearing
		[229]	Lubricating doors
		[230]	Lubricating the loader unit
		[232]	Greasing the trailer coupling
		[237]	Cleaning the vehicle from the outside
		[240]	Clean/change air filter
		[245]	Cleaning the condenser
		[251]	Checking steering system for function
		[252]	Checking the steering column adjustment
		[254]	Regular checks and maintenance work of the electrical system
		[269]	Checking the seat
		[269]	Checking the seat belt for proper function
		[270]	Checking doors and windows
		[270]	Checking safety labels and information labels
		[270]	Checking heating, ventilation and air conditioning system
		[271]	Checking the tires

8.5 Maintenance intervals

Important information about the maintenance schedule



⚠ WARNING

Risk of injury to persons!

Failure to observe the footnotes may result in personal injury.

- Observe and adhere to the footnotes in the tables.



NOTICE

Damage to the vehicle!

If the footnotes are not observed, the vehicle may be damaged.

- Observe and adhere to the footnotes in the tables.

To recognize warranty claims, the following maintenance work must be carried out:

- **Handover inspection (must be carried out immediately before handover to the end customer).**

- **“A” = once for 100 operating hours**

- "B" = every 500 operating hours.

- "C" = every 1500 operating hours or annually, whichever comes first.

Respective maintenance kits are marked with the designations "A," "B" and "C."

Intervals for the inspections can be found in the maintenance schedule.

Depending on the vehicle equipment, maintenance intervals due are shown in the service display on the screen.

For care and maintenance work on the attachment, observe the manufacturer's instructions.

8.5.1 Maintenance plan

Work description (Bh = operating hours)	Service center	User/operator		Service center		
	Handover Inspection	Every 10 o/h (daily)	Every 20 o/h	Inspection "A"	Inspection "B"	Inspection "C"
Oil and filter change						
Change motor oil					•	•
Changing the motor oil filter					•	•
Replace fuel filter					•	•
Replace the fuel water separator					•	•
Air filter element					•	•
Air filter insert – safety cartridge ¹						•
Change the transmission oil in the transmission on the front axle					• ²	•
Transmission oil in front and rear axle differential				•		•
Transmission oil in front and rear axle planetary drives (left and right)				•		•
Hydraulic oil						•
Filter insert – Return line filter hydraulic oil reservoir				•		•
Breather filter ¹ – hydraulic oil reservoir						•
Fine dust filter ¹ (heater)					•	•
Collection dryer						•
Replace brake fluid						•
1. Depending on the type of work, the amount of dust and the acidic environment, it may be necessary to change the filters more frequently.						
2. Once at 500Bh, then every 1500 Bh.						

Work description (Bh = operating hours)	Service center	User/operator		Service center		
		Handover Inspection	Every 10 o/h (daily)	Every 20 o/h	Inspection "A"	Inspection "B"
Functional check, inspection work ()						
Service and parking brake						

Work description (Bh = operating hours)	Servic e center	User/operator		Service center		
	Hando ver Inspection	Every 10 o/h (daily)	Every 20 o/h	Inspection "A"	Inspection "B"	Inspection "C"
Functional check, inspection work ()						
Checking for correct function	•	•		•	•	•
Check pads				•	•	•
Check brake fluid fill level ¹	•	•		•	•	•
Accelerator pedal and brake inching pedal: check for dirt, clean if necessary, spray joints with spray oil	•	•		•	•	•
Steering system						
Steering column adjustment, synchronous wheel position	•	•		•	•	•
Electrical system						
Electrical and lighting system	•	•		•	•	•
Check battery charge condition, charge					•	•
Chafe marks on the wiring harness, battery poles, ground or cable connections	•		•	•	•	•
Drive interlock	•			•	•	•
Working hydraulics						
Joystick: fuse for road travel	•	•		•	•	•
Hydraulic oil: Check oil level	•	•		•	•	•
Check the hydraulic oil for condensation water ²					•	•
Clean suction filter - Clean hydraulics (sieve insert suction on hydraulic oil reservoir)						•
Clean the line filter (filter insert at control valve inlet)				•		•
Check the pressure accumulator, correct the pressure level if necessary					•	•
Load stabilizer: check function	•	•		•	•	•
Check all additional control circuits	•	•		•	•	•
Travel drive, axles and gearbox						
Variable displacement pump – variable motor: Check settings using the test report and correct if necessary				•	•	
Gearbox: check fill level	•				•	•
Differential front axle/rear axle: check fill level	•				•	•
Planetary gears front axle/rear axle (left/right): check fill level	•				•	•
Diesel engine						
Motor oil: check fill level	•	•		•	•	•
Fuel prefilter: drain water		•		•	•	•
Cooling water: check level, refill if necessary ^{4,5}		•		•	•	•
Clean cooling water level sensor					•	•
Water-oil cooler (engine hydraulic oil): check for contamination, clean if necessary ³		•		•	•	•
Intercooler: check for contamination, clean if necessary ²		•		•	•	•
Intercooler: drain condensation water						•

Work description (Bh = operating hours)	Service center	User/operator		Service center		
	Handover Inspection	Every 10 o/h (daily)	Every 20 o/h	Inspection "A"	Inspection "B"	Inspection "C"
Functional check, inspection work ()						
Clean the dust drain valve on the air filter housing	•	•		•	•	•
V-belt with tension pulley ⁶ (generator, water pump): check and retighten if necessary		•		•	•	•
Check valve setting (engine control), adjust				•		•
Check diesel particulate filter for ash load, replace if necessary ⁷				every 3,000 hrs.		
Cab/chassis						
Vehicle: clean exterior and interior	•	•				
Seat, seat belt	•	•		•	•	•
Window washer system: Check filling level of window washer water	•	•		•	•	•
Cab ventilation (air conditioning system, heating): Clean fine dust filters ^{3, 4}		•		•	•	•
Air conditioning: Check filling level, clean ⁸ condenser (heat exchanger ³)	•	•		•	•	•
Air conditioning: Check the V-belt condition and pretension and have it re-tightened or replaced if necessary	•				•	•
Warning and information signs: Check for damage, loss, replace if necessary	•		•	•	•	•
Condition of paint coating	•					
Condition of lifting and lashing points: Damage, wear				•	•	•
Aggressive media: Check corrosion protection, replace if necessary			•	•	•	•
Loader unit/tires						
Quick hitch system: Locking	•	•		•	•	•
Tires: Damage, air pressure, tread depth	•	•		•	•	•
Attachments						
Clean attachments and check for damage	•	•		•	•	•
Trailer couplings: Function, damage, wear and tear	•	•		•	•	•



Work description (Bh = operating hours)	Service center	User/operator		Service center		
	Handover inspection	Every 10 o/h (daily)	Every 20 o/h	Inspection "A"	Inspection "B"	Inspection "C"
Functional check, inspection work ()						
- To avoid failure of the braking system, only use ATF brake fluid. No miscibility. Observe data safety sheet. Renew after 2 years at the latest. - When using biodegradable oil in particular, check for condensation water (oil probe) and replace the hydraulic oil if necessary. - If used with a lot of dirt and dust, clean it more often and replace it if necessary. - Replace every 2 years. - Before refilling, clean the cooling system with clean water. - Replace every 3000 hours. - After checking or changing the diesel particulate filter, set the requirement on the display to zero. - The collection dryer must be replaced every 2 years or whenever there is any intervention in the refrigeration circuit.						

Work description (Bh = operating hours)	Service center	User/operator		Service center		
	Handover inspection	Every 10 o/h (daily)	Every 20 o/h	Inspection "A"	Inspection "B"	Inspection "C"
Leakage control ()						
Air intake line ¹ : Air filter, intercooler, turbocharger - engine	•	•		•	•	•
Engine lubrication: engine - filter	•	•		•	•	•
Fuel lines ²	•	•		•	•	•
Cooling system: engine – hydraulic oil, hose lines ³	•	•		•	•	•
Steering system: Hose lines ³ and cylinders	•	•		•	•	•
Hydraulic system/loading system: control unit, hose lines ³ , cylinder, pipe rupture protection	•	•		•	•	•
Quick couplings, plug-in couplings, additional control circuits, 3rd control circuit, tipper connection	•	•		•	•	•
Traveling drive: variable displacement pump, hose lines ³ and switch valves	•	•		•	•	•
Air conditioning: hose lines ³ , condenser, dehumidifier/evaporator	•	•		•	•	•
- Replace immediately air intake lines and cooling water hose lines that are cracked or chafed. - Change flexible fuel leak oil lines (plastic) every 2 years. - Replace hydraulic hoses and lines if defects are apparent.						

Work description (Bh = operating hours)	Service center	User/operator		Service center		
 Lubricate Lubricate more frequently during heavy use!	Handover Inspection	Every 10 o/h (daily)	Every 20 o/h	Inspection "A"	Inspection "B"	Inspection "C"
Rear axle oscillating bearing ¹	•		•	•	•	•
Planetary drive bearing, front and rear axle, left/right	•		•	•	•	•
Hinges, joints	•		•	•	•	•
Trailer coupling	•		•	•	•	•
Attachment ²	•		•	•	•	•
Load system¹						
Lift chassis bearing	•	•		•	•	•
Rocker lever bearing, rocker arm bearing	•	•		•	•	•
Lifting cylinder bearing	•	•		•	•	•
Tilting cylinder bearing	•	•		•	•	•
Quick-change system: Mounting on the lifting frame	•	•		•	•	•
1. A central lubrication system is recommended. 2. Lubricate attachment according to manufacturer's instructions!						

8.5.2 Maintenance label

Care and maintenance work on the vehicle

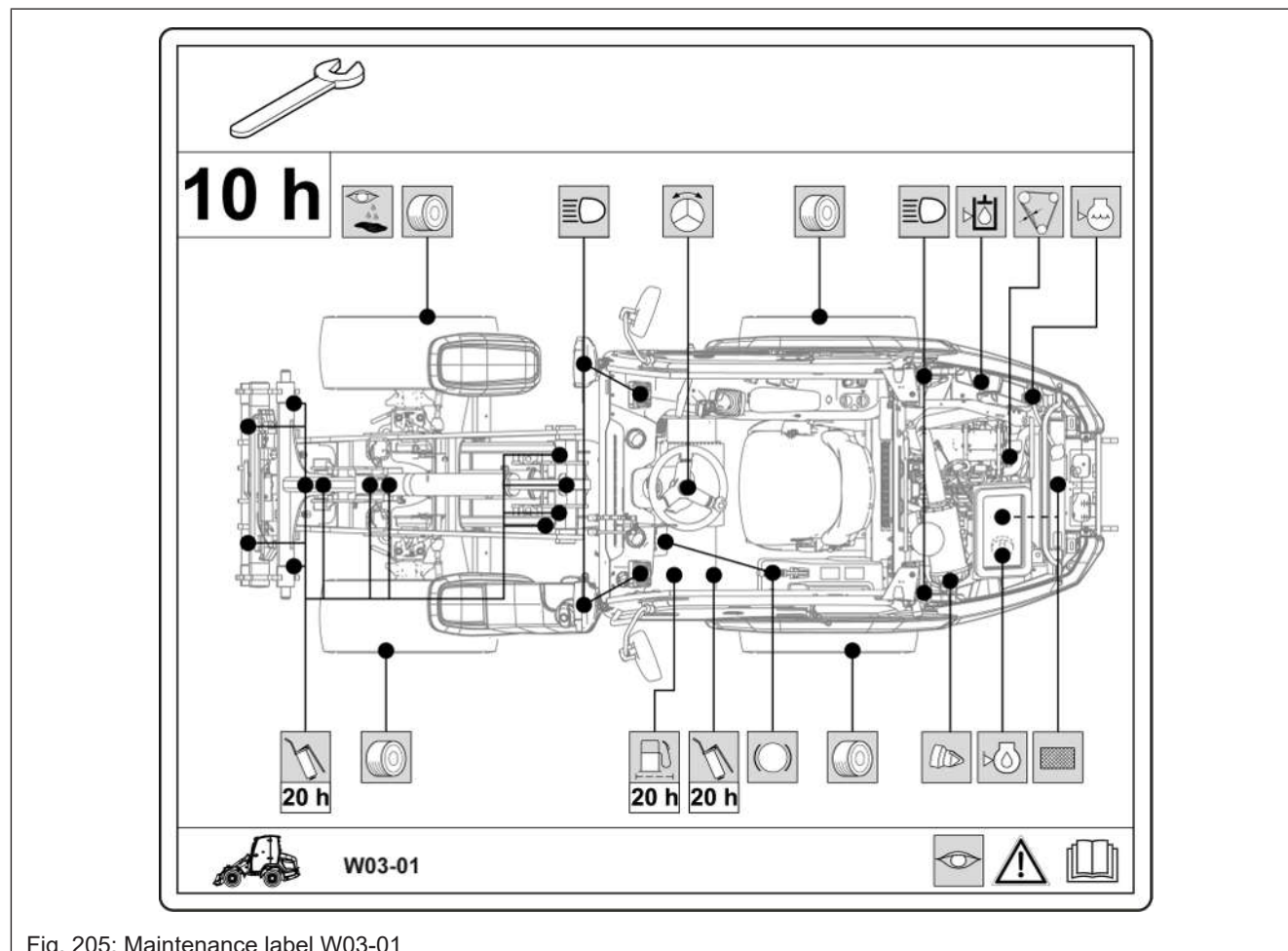


Fig. 205: Maintenance label W03-01

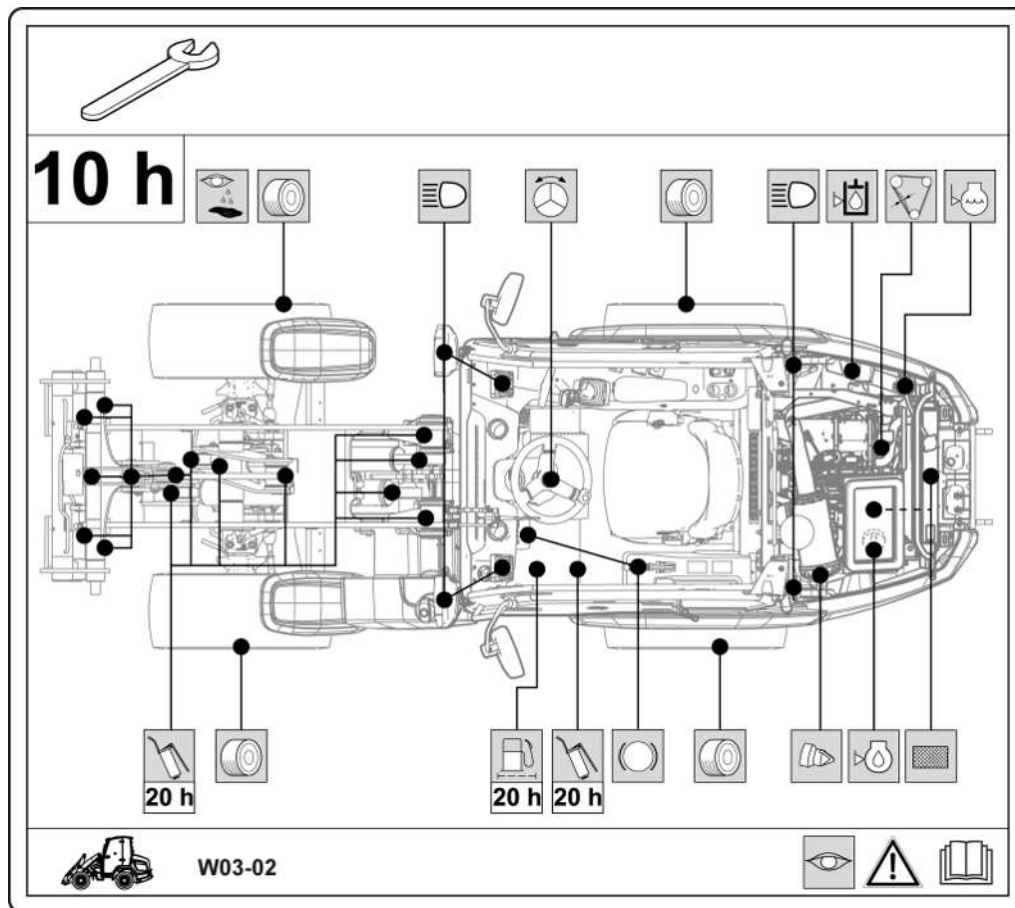
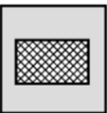
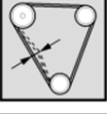


Fig. 206: Maintenance label W03-02

8.5.3 Explanation of symbols on the maintenance label

Symbol	Explanation
	Before starting maintenance, follow the safety instructions in the Operator's Manual!
	Before starting maintenance, read the "Maintenance" chapter in the Operator's Manual!
	Visual check! Check wear parts and threaded fittings at regular intervals. Loose connections must be immediately re-tightened and worn wear parts must be immediately replaced.
	Check tires for damage, inflation pressure and tread depth!
	Perform a functional check of the lighting system!

Symbol	Explanation
	Check radiator for engine coolant and hydraulic oil for dirt. Clean if necessary!
	Leakage check: Check for tightness, leaks and chafing: pipes, flexible lines and screw connections. Rectify if necessary!
	Check hydraulic oil level. Add oil if necessary!
	Lubrication service! Lubricate the assemblies concerned.
	Perform a functional check and synchronize the steering system!
	Check the coolant. Add coolant if necessary!
	Check condition and initial tension of V-belt. Retension or replace it if necessary!
	Check engine oil level. Add oil if necessary!
	Leakage check: Check the fuel/water separator. Drain water if necessary.

8.6 Vehicle fluids

8.6.1 Overview of vehicle fluids and filling quantities



⚠ WARNING

Risk of injury to persons!

Failure to observe the footnotes may result in personal injury.

- Observe and adhere to the footnotes in the tables.



NOTICE

Damage to the vehicle!

If the footnotes are not observed, the vehicle may be damaged.

- Observe and adhere to the footnotes in the tables.

Component/application ¹		Vehicle fluid	SAE Class/Specification/ Manufacturer designation	Temperature
Diesel engine	Approx. 5.5 l (18.5 kW engine)	Motor oil ² with filter	SAE 10W-40 (e.g. EUROLUB CARGO LSP SUPER, EVVA CLEANTRUCK)	Year-round
			PLUS - 50 II SAE 10W-30	-20 °C - +30 °C
			PLUS - 50 II SAE 5W-40	-20 °C - +40 °C
			Specification: API: CD, CF, CF-4, CI-4 ACEA: E-3, E-4, E-5 JASO DH-1	--
Diesel engine	Approx. 6.7 l (33.3 kW engine)	Motor oil ² with filter	SAE 10W-40 (e.g. EUROLUB CARGO LSP SUPER, EVVA CLEANTRUCK)	Year-round
			PLUS - 50 II SAE 10W-30	-20 °C - +30 °C
			PLUS - 50 II SAE 5W-40	-20 °C - +40 °C
			Specification: API: CJ-4, CK-4 ACEA: E6 JASO: DH-2	--
Air conditioning ³	About 0.65 kg	Coolant	R 134a	Year-round
Engine cooling ^{4, 5, 13}	Approx. 4.1 l (18.5 kW engine) Approx. 6.5 l (33.3 kW engine)	Antifreeze compound	60 % water + 40 % antifreeze according to specification ASTM D3306, JIS K-2234, SAE J814, SAE J1034 (z. B. GLYSANTIN® G30®, HAVOLINE XLC)	Year-round -28 °C
Hydraulic system, Hydraulic oil reservoir	approx. 37 l	Hydraulic oil ⁶	HVLPD 46 HVLPD 32 ³ HY – GARD Hydrau – GARD 46 Hydrau – GARD 46 Plus	± 30 °C
			KLEENOIL ECO HLP 46 AVIA Syntofluid 46 BIO – Hydrau – GARD 46	
			PANOLIN HLP Synth 46 ¹⁴ Shell PANOLIN S4 HLP Synth 46 ¹⁴	



Component/application ¹		Vehicle fluid	SAE Class/Specification/ Manufacturer designation	Temperature
Fuel system, fuel tank ⁷	approx. 56 l	Diesel ^{8,9}	DIN EN 590 (EU) ASTM D975-94 (USA) JIS K2204	Year-round -40 °C
			HVO according to DIN EN 15940	Year-round -25 °C
Gearbox on front axle	0.55 l	Gear oil ¹⁰	SAE 10W-30 (e.g. Hy-Gard) SAE 75W-80	Year-round
Planetary drives left/ right, Front or rear axle	4 x 0,5 l			
Differential gear: Front/rear axle	2 x 3,5 l			
Grease nipples ¹¹ , loader unit/axles	As needed	High pressure Multi-purpose grease	Lithium saponified brand name grease MPG-A3 Lithium grease L-X-CCHB 2 in accordance with ISO 6743-9 Lithium complex grease L-X-CDHB 2 Lithium saponified grease on mineral oil base Eurolub storage fit EP 2 LA Maximum pressure grease EVVA LT/SC EP 2	Year-round
Washer system	Approx. 1.25 l (1:2)	Cleaning solution	1 part water + 2 parts antifreeze compound	Year-round -20 °C
Aggressive media ¹²	As needed	Anti-corrosion protection	ELASKON 2000 ML, ELASKON UBS light ELASKON Aero 46 special, ELASKON Multi 80	Year-round

Component/application ¹	Vehicle fluid	SAE Class/Specification/ Manufacturer designation	Temperature
- The capacities indicated are approximate values; the oil level check alone is relevant for the correct oil level - Further information on the Yanmar website. - Maintenance work may only be carried out by technically trained personnel of an authorized service center. - When refilling, see coolant table (technical data) and the manufacturer's instructions on the packaging - The coolant must be changed every 2 years by an authorized specialist service center - DIN 51 524 / ISO 11158-HM. - The entire fuel system may be emptied, and the fuel tank may be cleaned only by an authorized service center. - To avoid engine damage, only additives (additives or auxiliary materials) approved by Yanmar may be added to the diesel fuel. - If other fuels are used which do not correspond to the given specifications, the liability and warranty claim expires in case of damage to the diesel engine. - Specification API-GL4 - Note: Oiled bolts and shafts (hard chrome plated or coated with Molycote 3400A) are used dry. After assembly, lubricate shafts and bolts with multi-purpose grease via grease nipples. - Have the sealing checked and repaired at least once a year by ELASKON – see the ELASKON servicing pass supplied with the vehicle. - To avoid engine damage and loss of warranty, do not mix antifreeze. - Only these two biodegradable oils can mix with each other			

8.6.2 Coolant

Only coolants may be used for the engine and hydraulic oil coolers which are listed in the sections "Overview of operating fluids and lubricants" and "Refilling coolant".

8.6.3 Operation with biodegradable oils



NOTICE

Damage to and faults in the hydraulic system due to mixing of hydraulic oils.

- ▶ Biodegradable hydraulic oils must not be mixed.
- ▶ Biodegradable hydraulic oils and mineral oils must not be mixed.



Information

Changing oil

Subsequent change from mineral oil to biodegradable oil must be performed by an authorized service center or by a service partner.

- Use only tried and tested biodegradable hydraulic fluids as [see operating/vehicle fluids and lubricants on page 212](#). Contact the manufacturer for the use of products other than those that have been recommended. In addition, ask the oil supplier for a written

declaration of guarantee. This guarantee is applicable to damage occurring on the hydraulic components that can be proved to be due to the hydraulic fluid.

- If biodegradable oil is topped off, only use biodegradable oil of the same variety. In order to avoid misunderstandings, a label providing clear information is located on the hydraulic oil reservoir (next to the filler inlet) regarding the type of oil currently used! Replace missing labels! The mixing of two different biodegradable oils can affect the quality of one of the oil types. Therefore, ensure that the remaining amount of initial hydraulic fluid in the hydraulic system does not exceed 8% when changing biodegradable oil (manufacturer indications).
- Do not add mineral oil. The content of mineral oil should not exceed 2% by weight in order to avoid foaming problems and to ensure biodegradability of the biodegradable oil.
- For operation with biodegradable oils, the same oil and filter replacement intervals apply as for mineral oils
- When using biodegradable oil, after every 500 operating hours an authorized service center must take an oil sample and carry out an inspection for condensation; in any case before the onset of winter. The water content must not exceed 0.1% by weight.
- The instructions in this Operator's Manual concerning environmental protection are also valid for the use of biodegradable oil.
- If additional hydraulic attachments are installed or operated, use the same biodegradable oil types for these attachments to avoid mixtures in the hydraulic system.

8.7 Levels

8.7.1 Fuel level



⚠ CAUTION

Health hazard due to fuel!

Fuel and its vapors are harmful to health.

- ▶ Avoid contact with the skin, eyes and mouth.
- ▶ Seek medical attention immediately in case of accidents with fuel.
- ▶ Wear protective equipment.



⚠ CAUTION

Fire hazard due to fuel!

Fuels form flammable vapors. This can cause fires that lead to injuries.

- ▶ Do not smoke, avoid fire and open flames.
- ▶ Gasoline admixtures for diesel are prohibited.
- ▶ Keep vehicle clean and wipe up spilled fuel immediately.



NOTICE

Damage due to excessive sulfur content in the fuel!

Low-grade fuel can cause damage to the engine.

- ▶ Only use low-sulfur diesel with specification EN590 (EU), BS2869:2010 class A2 (GB) or ASTM D975 class 2D S15 (USA).
- ▶ Do not use heating oil.
- ▶ Do not add gasoline.



NOTICE

Damage to vehicle due to diesel fuel

Contaminated and mixed diesel may damage the vehicle.

- ▶ The entire fuel system may be emptied, and the fuel tank may be cleaned only by an authorized service center.
- ▶ Perform maintenance on the fuel system in accordance with the intervals specified in this operator's manual.
- ▶ Only use clean, high-quality diesel.
- ▶ Do not add gasoline.
- ▶ After working on the fuel system, clean the engine and engine bearing from any adhering fuel.
- ▶ Use a fine filter in the filling line of the diesel engine.
- ▶ Observe the specification of the diesel.

8.7.1.1 Fuel dispensers

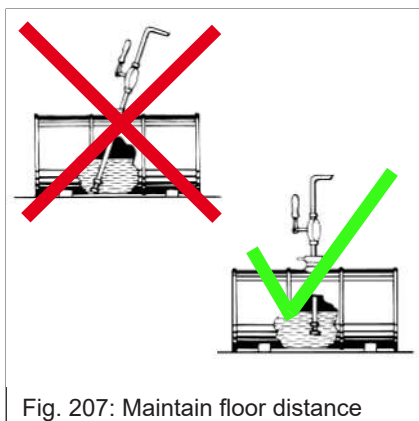


Fig. 207: Maintain floor distance

In order to avoid damage in the fuel system, only refuel from stationary fuel pumps.

Fuel from barrels or cans is usually dirty and leads to

- Increased engine wear,
- Faults in the fuel system,
- Reduced effectiveness of the fuel filters

If refueling from barrels cannot be avoided, note the following points.

- Barrels must neither be rolled nor tilted before refueling.
- Protect the suction pipe of the barrel pump with a fine-mesh strainer.
- Immerse the suction pipe of the barrel pump up to max. 15 cm from the bottom of the drum.
- Only fill the tank using refueling aids (funnels or filler pipes) with an integral microfilter.
- Keep all refueling containers clean at all times

8.7.1.2 Refueling

**⚠ WARNING****Fire and suffocation hazard due to refueling in closed rooms!**

Diesel emits vapors that can cause serious damage to health or death.

- ▶ Do not refuel in closed rooms.

**NOTICE****Engine damage due to incorrect fuel**

- ▶ Observe the specifications and fill quantities.

**Environment****Fuel is harmful to the environment!**

- ▶ Avoid releasing it into the environment.
- ▶ Immediately absorb diesel fuel leaks, spills or overflowing fuel with a binding agent.
- ▶ Dispose of fuel or binding agent in an environmentally friendly manner and separately from other waste.
- ▶ If larger quantities of fuel are released, notify the competent authorities (e.g. nature conservation authority, fire brigade, etc.).



Fig. 208: Fill opening for fuel tank

Refuel

The fill opening is located at position 1 on the vehicle.

1. Park the vehicle on level ground.
2. Lower the loader unit to the ground.
3. Apply the parking brake.
4. Stop the engine and remove the starting key.
5. Clean the area around the fill opening before opening the filler cap.
6. Open the fuel filler cap with key and fill the fuel tank.
7. Close the fill opening carefully after refueling.

8.7.2 Fill level engine oil

Preparation for maintenance In the engine compartment

1. Park the vehicle on a stable, level and dry surface.
2. Secure the vehicle with the parking brake.
3. Lower the loader unit to the ground.
4. Switch off the ignition and remove the starting key.
5. Remove the key from battery master switch.
6. Let the engine cool down.
7. Open the engine hood.

8.7.2.1 Information on the engine lubrication system



⚠ WARNING

Injury hazard due to hot and rotating parts!

When the engine is running and for a short time thereafter, parts in the engine compartment may still be hot or rotate. This may cause crushing which may result in serious injury or death.

- ▶ Do not open the engine cover if the engine is running.
- ▶ Let the engine cool down.
- ▶ Wear protective equipment.



⚠ WARNING

Burn hazard due to hot engine oil!

Splashes of hot oil can cause burns to the skin.

- ▶ Stop the engine and let it cool down.
- ▶ Wear protective gloves!



NOTICE

Loss of output and engine damage due to wrong engine-oil level, and wrong or used engine oil.

- ▶ Observe the intervals for engine oil and filter replacement.
- ▶ Check the engine-oil level regularly and add oil if necessary.
- ▶ If the engine oil (black) is used up, have the oil change carried out immediately by an authorized service center.
- ▶ Observe the specifications and fill quantities.

If the warning light lights up  in the display, immediately switch off the engine and check the engine oil level:

- Follow the safety instructions and country-specific regulations when handling lube oil!
- Dispose of drained lube oil correctly. Do not allow used oil to seep into the ground!
- Perform a test run every time work has been performed!
- Check for leaks and correct lube oil pressure, and then check the engine oil level!

8.7.2.2 Checking the engine oil level

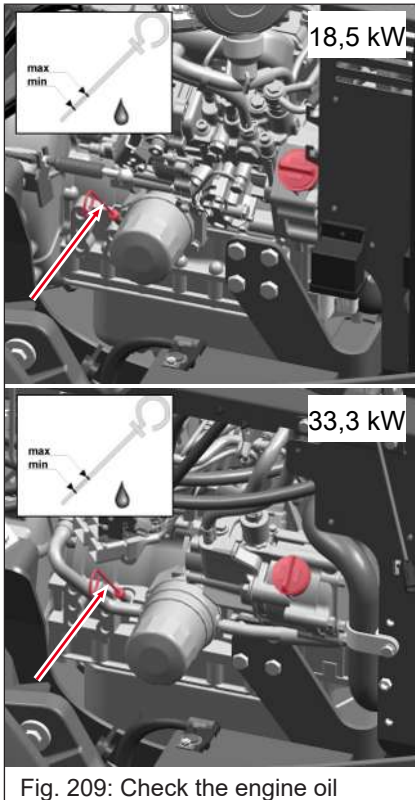
**NOTICE**

Loss of output and engine damage due to wrong engine-oil level, and wrong or used engine oil.

- ▶ Observe the intervals for engine oil and filter replacement.
- ▶ Check the engine-oil level regularly and add oil if necessary.
- ▶ If the engine oil (black) is used up, have the oil change carried out immediately by an authorized service center.
- ▶ Observe the specifications and fill quantities.

**Information**

- ▶ Observe maintenance intervals Maintenance plan
- ▶ Observe equipment specifications [see Overview of vehicle fluids and filling quantities on page 212](#)



1. Pull out oil dipstick.
2. Wipe the oil dipstick with a clean and fiber-free cloth.
3. Plug the oil dipstick back in.
4. Pull out the oil dipstick again.
5. Check the oil level.
6. Plug the oil dipstick back in.

8.7.2.3 Adding engine oil

**Information**

- ▶ Observe maintenance intervals Maintenance plan
- ▶ Observe equipment specifications [see Overview of vehicle fluids and filling quantities on page 212](#)

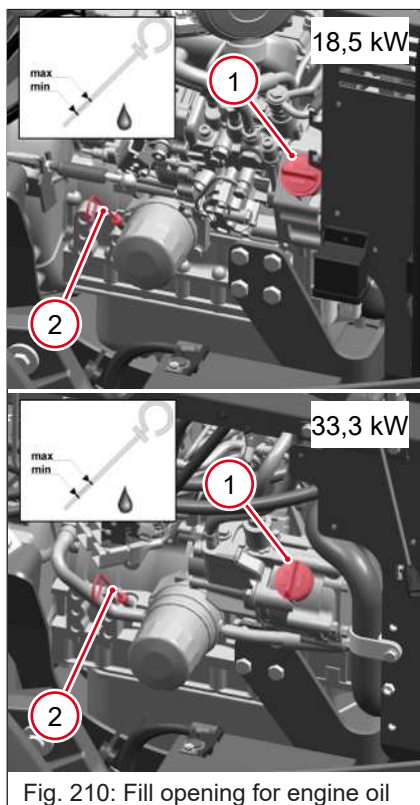


Fig. 210: Fill opening for engine oil

If the oil level is below the MIN mark, the engine oil must be refilled at the fill opening 1.

✓ Observe preparation for maintenance In the engine compartment!

1. Clean the area around the filler cap 1 with a lint-free cloth.
2. Open the filler cap 1.
3. Pull out oil dipstick 2 and wipe with a lint-free cloth.
4. Fill engine oil.
5. Wait a moment until the oil has completely run into the oil pan.
6. Check oil level with oil dipstick 2.
7. Refill if necessary and check oil level again.
8. Close the filler cap 1.
9. Remove spilled oil completely from the engine.

8.7.3 Level of coolant



⚠ WARNING

Caustic injury hazard! Risk of swallowing antifreeze when handling it!

Can cause serious injury or death

- ▶ Seek medical attention immediately if antifreeze has been swallowed.
- ▶ Keep antifreeze compound out of reach of children.



⚠ WARNING

Risk of scalding due to hot coolant!

The cooling system is under pressure after switching off the engine. The coolant has heated up and expanded. When the fill opening is opened, the pressure escapes and hot liquid can splash out. Severe scalding can occur.

- ▶ Never open the fill opening when the engine is hot or the cooling system is under pressure.
- ▶ Allow engine to cool sufficiently.
- ▶ Wear protective equipment.

**NOTICE****Technical damage due to incorrect or insufficient coolant!**

- ▶ Only use coolant with the correct specification. See tables for vehicle fluids and filling quantities.
- ▶ The coolant should consist of equal parts of water and antifreeze compound. This mixture ensures the best possible ratio between cooling performance and anti-corrosion protection.
- ▶ Do not fill coolant too quickly. Fill in a maximum of five liters per minute. If the coolant is added too quickly to the cooling system, air bubbles can be trapped in the cooling system and cause engine overheating.



Fig. 211: Danger of scalding, please note!

Preparation for maintenance In the engine compartment

1. Park the vehicle on a stable, level and dry surface.
2. Secure the vehicle with the parking brake.
3. Lower the loader unit to the ground.
4. Switch off the ignition and remove the starting key.
5. Remove the key from battery master switch.
6. Let the engine cool down.
7. Open the engine hood.

8.7.3.1 Notices on inspection and cleaning work on the cooling system**NOTICE****Possible engine damage due to sludge in the cooling system and mixing of radiator cleaning agent with antifreeze compound.**

- ▶ Do not use radiator cleaning agents if antifreeze compound has already been added to the cooling water!
- ▶ Have the coolant changed every two years or 3000 hours by an authorized service center.



Environment

Possible environmental damage.

- ▶ Avoid release of antifreeze compound and coolant.
- ▶ Collect antifreeze compound and coolant and dispose of in an environmentally friendly manner.

Dirt on the radiator fins reduces the radiator's cooling capacity! To avoid this:

- Clean the outside of the radiator at regular intervals. The cleaning intervals are listed in the maintenance plan.
- In dusty or dirty work conditions, clean more frequently than indicated in the maintenance plans.
- An insufficient coolant level reduces the cooling capacity as well and can cause engine damage! Therefore: Check the coolant level once a day.
- If the coolant must be replaced frequently, have the cooling system checked for leaks by an authorized service center!
- Never add cold water/coolant if the engine is warm!
- Perform an engine test run after filling the coolant. Then check the coolant level again when the engine is off.
- Use brand-name antifreeze compound as this already contains anti-corrosion agents [see Overview of lubricants on page 212](#).
- Add sufficient antifreeze compound to the coolant (see table below).

Outside temperature	Water proportion ¹⁾	Anti-freeze share ²
up to °C	% by volume	% by volume
4	100	-
-10	80	20
-22	65	35
-25	60	40
-35	55	45
-41	50	50

1. Water quality at 20 °C = 6.5 - 8.5 pH value / total hardness 3-20°dGH
2. To avoid engine damage and loss of possible warranty, use only an approved coolant, fill quantities are approximate.

8.7.3.2 Check the coolant level



Information

- ▶ Observe maintenance intervals Maintenance plan
- ▶ Observe equipment specifications [see Overview of vehicle fluids and filling quantities on page 212](#)

Preparation for maintenance In the engine compartment

1. Park the vehicle on level ground.
2. Apply the parking brake.
3. Stop the engine and remove the starting key.
4. Open the engine cover.

Check coolant level

1. Slowly unscrew filler cap **1** and let the pressure escape.
 2. Open the filler cap completely.
 3. Check coolant level in the radiator.
 4. Close the radiator with filler cap **1**.
 5. Check the coolant level on the transparent tank **2**.
- ⇒ Refill coolant

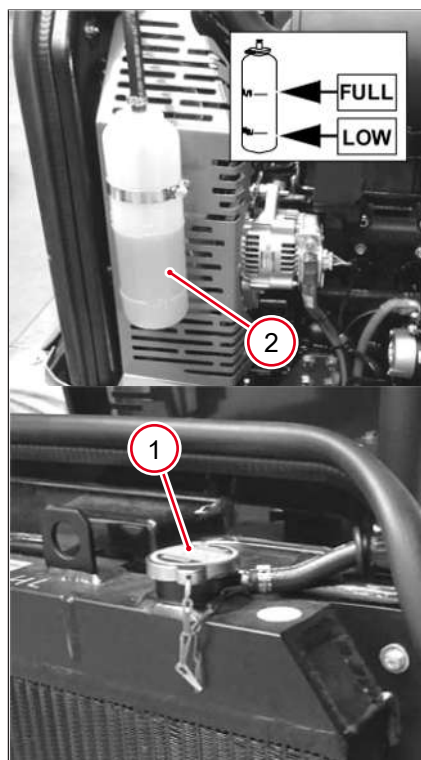


Fig. 212: Check cooling level

8.7.3.3 Adding coolant



⚠ WARNING

Risk of scalding due to hot coolant!

The cooling system is under pressure after switching off the engine. The coolant has heated up and expanded. When the fill opening is opened, the pressure escapes and hot liquid can splash out. Severe scalding can occur.

- ▶ Never open the fill opening when the engine is hot or the cooling system is under pressure.
- ▶ Allow engine to cool sufficiently.
- ▶ Wear protective equipment.

If the coolant level is below the MIN mark, the coolant must be refilled at the filler opening 1.

- ✓ Preparations for maintenance in the engine compartment were carried out.
 - ✓ Protective equipment is on.
1. Open the lid of the fill opening for coolant.
 2. Add coolant.
 3. Close fill opening for coolant.

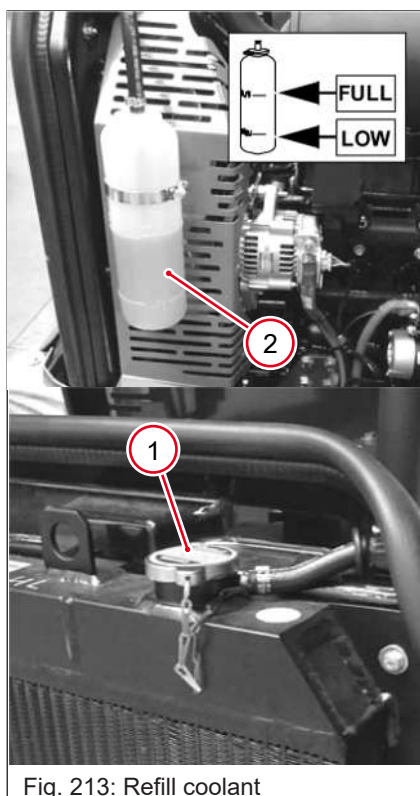


Fig. 213: Refill coolant

Refill coolant

1. Reduce excess pressure in the radiator. To do this, carefully unscrew the sealing cover 1 and allow the pressure to escape.
2. Open the sealing cover 1 completely.
 - ⇒ Use branded antifreeze.
3. Close the sealing cover 1.

Leakage check

- Start and warm up the engine.
 - Open heating circuit completely.
1. Stop the engine and remove the starting key.
 2. Check the cooling system and the heating water circuit for leaks.
 - ⇒ Have leaks immediately repaired by an authorized service center.
 3. Check the coolant level again.
 4. If necessary, refill coolant and repeat the procedure until reaching the correct coolant level.

8.7.4 Window wiper water level

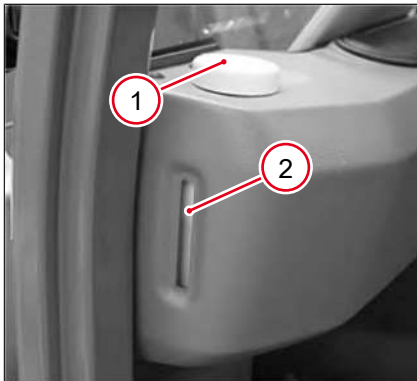


Fig. 214: Position of the tank for window wiper reservoir

The tank for the window wiper water is located in the cab to the left of the entrance.

The filling level can be checked via viewing area 2.

The window wiper tank is located on the left-hand side of the rear of the cab.

Add only clean tap water.

Add a suitable cleaning agent if necessary.

In case of danger of frost:

Mix water with antifreeze for washer system. Information on the mixing ratio can be found in the instructions for use for the antifreeze.

Checking/refilling windshield wiper water

Window wiper water must be visible in the field of vision.

Refilling window wiper water:

1. Open the fill opening on tank 1.
⇒ Use filling aid, e.g. hose, if necessary.
2. Fill with water, if necessary mixed with window cleaner or antifreeze compound.
3. Close the fill opening.

8.7.5 Fill level of hydraulic oil



NOTICE

Damage to the hydraulic system due to incorrect or contaminated hydraulic oil!

- ▶ Only use approved hydraulic oil.
- ▶ Oil turbidity means that there is water or air in the hydraulic system which can damage the hydraulic oil pump. Have the problem only rectified by an authorized service center.
- ▶ Do not use the vehicle until the fault has been rectified.

Preparation for maintenance In the engine compartment

1. Park the vehicle on a stable, level and dry surface.
2. Secure the vehicle with the parking brake.
3. Lower the loader unit to the ground.
4. Switch off the ignition and remove the starting key.
5. Remove the key from battery master switch.
6. Let the engine cool down.
7. Open the engine hood.

8.7.5.1 Monitoring hydraulic oil level and return filter



Information

Increased viscosity of the oil at low temperatures!

In cold weather the control light  can illuminate immediately when the engine is started. This is caused by increased oil viscosity.

- ▶ Adjust the engine speed so that the control light does not light up.
- ▶ Bear in mind the instructions concerning warmup.

If the control light  in the display lights up, the resistance of the oil flow in the return flow filter is too high.

- The filter element is dirty and must be replaced by an authorized service center!

8.7.5.2 Check the hydraulic oil level



⚠ WARNING

Burn hazard due to hot hydraulic oil!

Hot hydraulic oil can cause burns to the skin.

- ▶ Release the residual pressure in the hydraulic system.
- ▶ Let the engine cool down.
- ▶ Wear protective equipment.



NOTICE

Damage to the hydraulic system due to insufficient hydraulic oil level or contaminated hydraulic oil.

- ▶ The hydraulic oil level must be visible in the sight glass (in the middle or slightly above).
- ▶ The hydraulic oil may not be murky.



Information

- ▶ Observe maintenance intervals Maintenance plan
- ▶ Observe equipment specifications [see Overview of vehicle fluids and filling quantities on page 212](#)

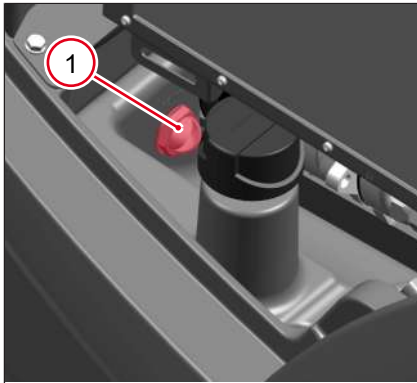


Fig. 215: Oil sight glass on the hydraulic oil tank

Sight glass **1** is visibly placed on the hydraulic oil tank.

✓ Preparations for maintenance in the engine compartment were carried out.

1. Clean sight glass and check oil level.

⇒ If the oil level is visible in the lower half of the sight glass: Oil level is OK.

⇒ If the oil level is no longer visible in the lower half of the sight glass: [see Top up hydraulic oil on page 228](#).

2. Check the cloudy oil.

⇒ Oil turbidity means that water or air has entered the plant. If the hydraulic oil is cloudy, have the fault in the hydraulic system rectified by an authorized service center. Do not use the vehicle unless the problem has been rectified.

8.7.5.3 Adding hydraulic oil



Information

- ▶ Observe maintenance intervals Maintenance plan
- ▶ Observe equipment specifications [see Overview of vehicle fluids and filling quantities on page 212](#)



Environment

Hydraulic oil is harmful to the environment!

Excess hydraulic oil is released via the breather filter during loader unit operation.

- ▶ Drain the oil into a suitable collecting container until the oil level is visible in the sight glass

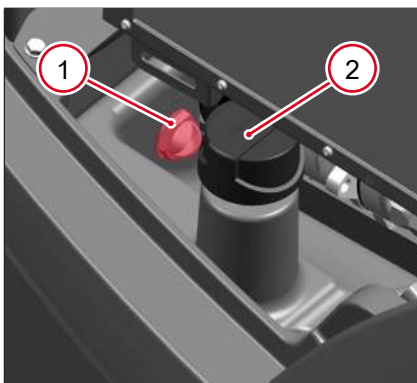


Fig. 216: Hydraulic oil reservoir.

If the level of hydraulic oil is below the MAX mark, the hydraulic oil must be refilled.

✓ Observe the instructions for the hydraulic system!

✓ Preparations for maintenance in the engine compartment were carried out.

✓ Hydraulic oil level was checked.

1. Clean the area around the filler opening **2**.

2. Place a container under the hydraulic oil reservoir to collect the oil.

3. Insert the starting key and unlock the breather filter.

4. Open the filler opening / breather filter **2** by hand.

5. Refill hydraulic oil with the filter insert in place.

6. Check oil level at sight glass **1**.

7. Refill oil if necessary and check the oil level again.

8. Tightly close the filler opening / breather filter **2** by hand.

9. Close the filler opening / breather filter with the starting key.

8.8 Lubricating the vehicle and attachment

8.8.1 Preparing lubrication



Information

- ▶ Observe maintenance intervals Maintenance plan
- ▶ Observe equipment specifications [see Overview of vehicle fluids and filling quantities on page 212](#)

1. Park the vehicle on level ground.
2. Apply the parking brake.
3. Secure the vehicle with a suitable wheel chock
4. Only raise the loader unit until all grease nipples can be accessed without any risk.
5. Stop engine and remove starting key.
6. Switch off the battery master switch.

8.8.2 Lubricating the rear axle oscillation-type bearing

The vehicle has an oscillation-type rear axle.

Lubricating nipple 1 is located on the side of the entrance

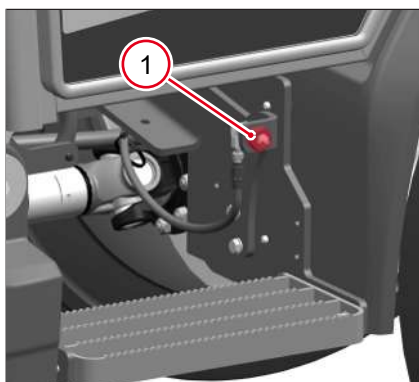


Fig. 217: Lubrication points oscillation-type bearings

8.8.3 Lubricating doors

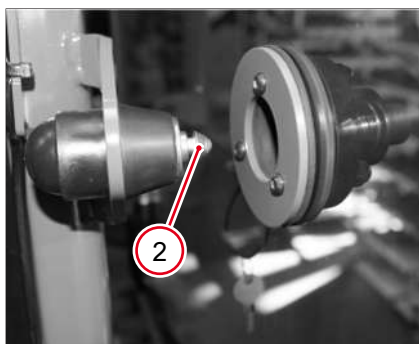


Fig. 218: Lubrication points doors

- ✓ Observe preparation for lubrication
 - Lubricate hinge 1.

8.8.4 Lubricating the loader unit

Lubrication

1. Position the power coupler horizontally.
2. Prepare lubrication [see Preparing lubrication on page 229](#).
3. Apply grease to the lubrication points with a grease gun.

Overview of the lubrication points on the loader unit W03-01

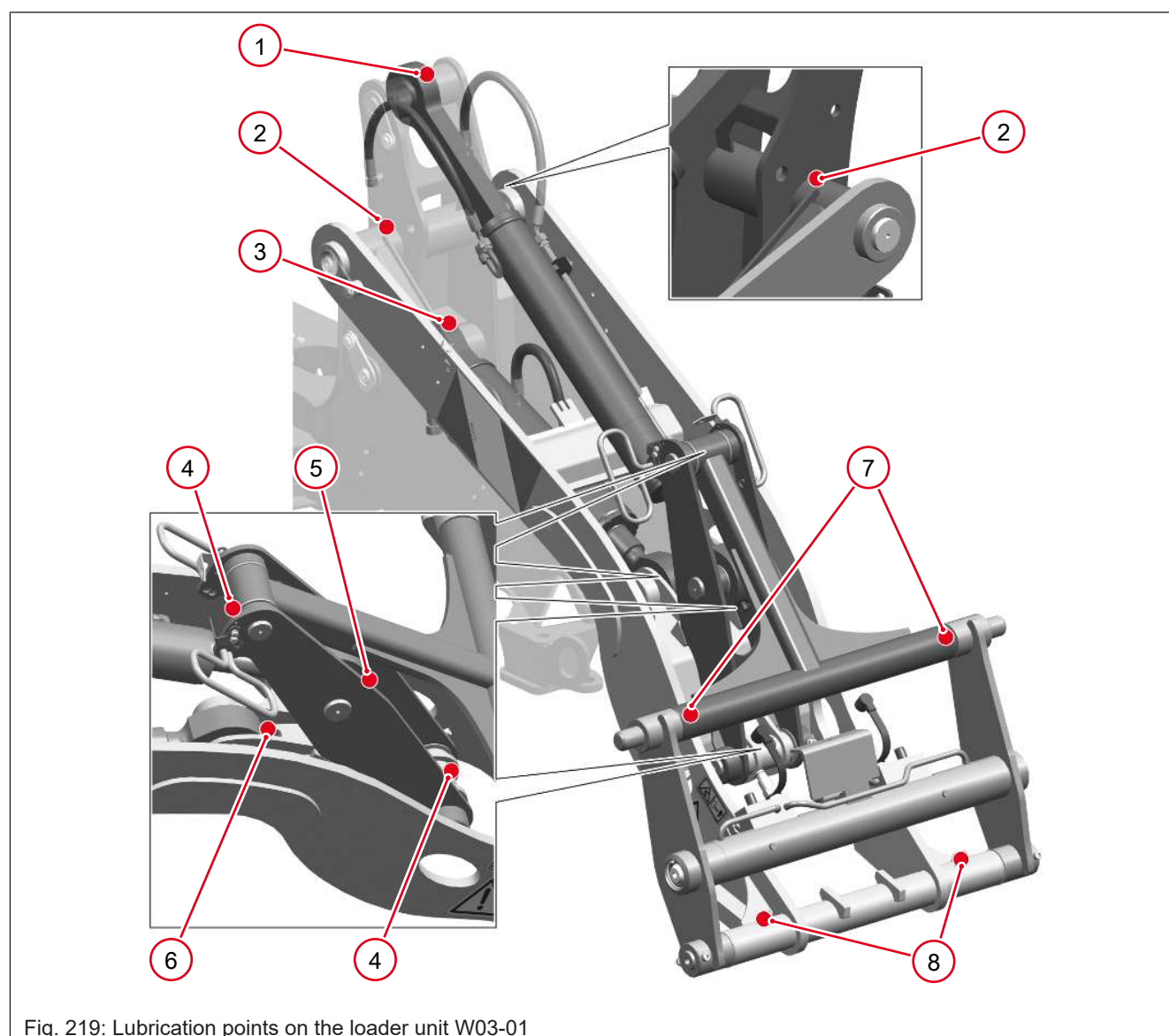


Fig. 219: Lubrication points on the loader unit W03-01

Item	Naming
1	Tilting cylinder bearing on the frame
2	Loader unit bearing
3	Lifting cylinder bearing on the frame
4	Rocker arm/rocker rod bearing
5	Tilting cylinder bearing / rocker arm
6	Lifting cylinder / rocker arm
7	Rocker rod bearing / power coupler

Item	Naming
8	Loader unit / power coupler

Overview of the lubrication points on the loader unit W03-02

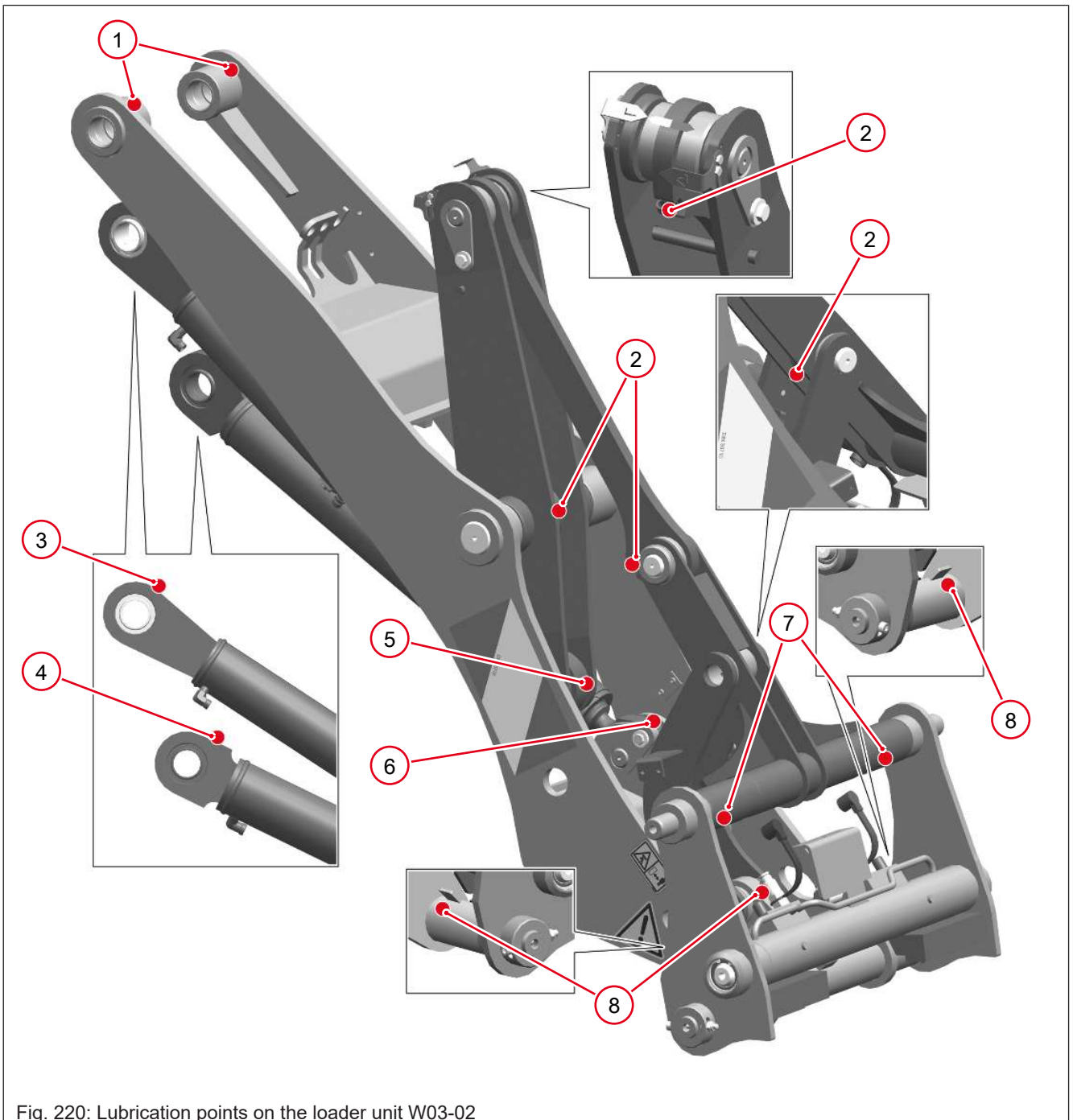


Fig. 220: Lubrication points on the loader unit W03-02

Item	Naming
1	Loader unit bearing
2	Rocker arm/rocker rod bearing
3	Tilting cylinder bearing on the frame
4	Lifting cylinder bearing on the frame
5	Tilting cylinder bearing / rocker arm

Item	Naming
6	Lifting cylinder / rocker arm
7	Rocker rod bearing / power coupler
8	Loader unit / power coupler

8.8.5 Greasing the trailer coupling

8.8.5.1 Automatic trailer coupling



⚠ WARNING

Risk of accident with worn coupling pins, too much play in bearing and worn bearing ring!

Failure to observe this can cause serious injury or death.

- ▶ Check the ball hitch once a day for wear and play.
- ▶ Apply grease to the base ring.
- ▶ Have a malfunctioning ball hitch replaced by an authorized service center.



⚠ CAUTION

Risk of injury due to falling bolts of the trailer coupling!

The sudden falling of the coupling pin can lead to injuries.

- ▶ Do not touch the coupling pin with your hands.
- ▶ Wear protective gloves.

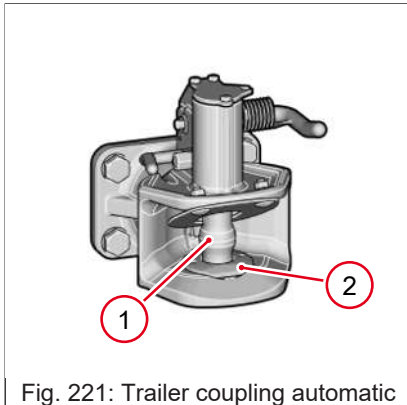
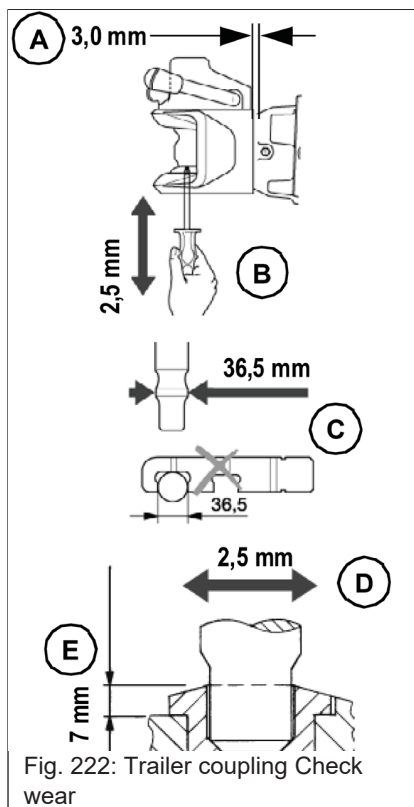


Fig. 221: Trailer coupling automatic

Cleaning and lubricating the trailer coupling

In order to ensure the full functionality of the ball hitch, close the coupling pin in the ball hitch before cleaning with high-pressure cleaning equipment!

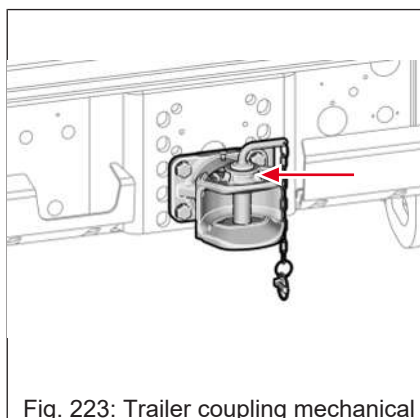
1. Close the trailer coupling.
2. After cleaning, lubricate the coupling pin **1**, the support ring **2** and the drawbar eye with tough, waterproof grease.
3. Apply tough water-proof grease to the lower bearing of the coupling jaw.
4. Apply grease to the grease zerk on the joint.
5. Lubricate all moving parts of the height adjustment.



Check the ball hitch for wear

1. Coupling head Bearing - Check longitudinal clearance **A** :
⇒ Move the uncoupled coupling head with force in travel direction.
2. Coupling head – Check height clearance:
⇒ Open the coupling.
⇒ Move the coupling head up and down with the appropriate tool (mounting iron).
⇒ Clearance **A** in the center axis - Coupling head = max. 3 mm
3. Coupling bolt – Check for wear:
⇒ Measure wear by means of a slide gage on the thickest section of the coupling pin **C**.
⇒ Diameter **C** may not drop below 36.5 mm.
⇒ Height clearance **B** max. 2.5 mm.
4. Support ring – Check bolt clearance and strength:
⇒ Bolt clearance **D** in support ring max. 2.5 mm.
⇒ Thickness **E** of the support ring min. 7 mm.

8.8.5.2 Mechanical trailer coupling



Cleaning and lubricating the trailer coupling

1. Clean the trailer coupling.
2. After cleaning, apply tough water-proof grease to the contact surface at the coupling point.
3. Lubricate all moving parts of the height adjustment.
4. Check the trailer coupling for wear every time it is coupled and uncoupled.

8.8.6 Central lubrication system

The central lubrication system automatically lubricates the vehicle's lubrication points periodically. The integrated electronic control unit has a data memory. for saving the times that have been set or that have elapsed. The time is taken and saved if the ignition is switched off during lubrication or during a break. The remaining lubrication time or break time is read from the memory upon switching the ignition on again, and lubrication is resumed where it was interrupted.

Lubrication time control

**NOTICE**

Water penetrating into the controls of the central lubrication system can destroy them!

- Always close the lid of the central lubrication system correctly.

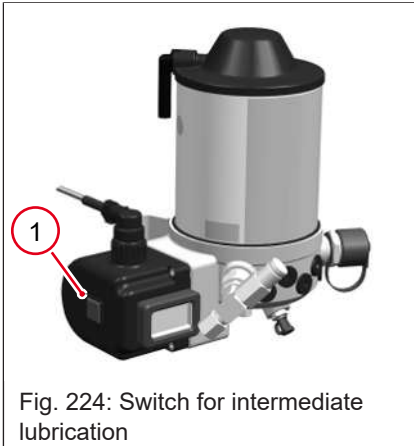


Fig. 224: Switch for intermediate lubrication

Break and lubrication times can be set with the time-dependent control of the central lubrication system. Break times are the periods between two lubrication times.

When the ignition is switched on, intermediate lubrication can be triggered at any time by actuating switch **1** on the side of the pump. This intermediate lubrication can also be used as a functional check.

The pump then immediately starts with a lubrication cycle. The lubrication or break time that has elapsed so far or that has been saved is reset and starts over again.

A fault in the central lubrication system can also be reset by pressing switch **1**. The pump restarts a lubrication cycle.

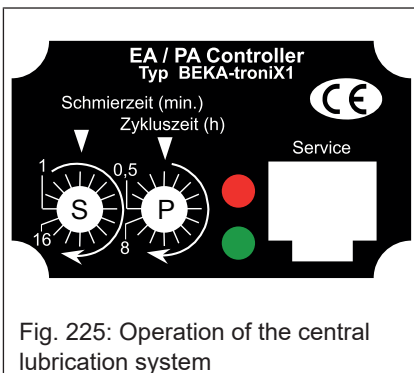


Fig. 225: Operation of the central lubrication system

Lubrication times and break times

The break time and the lubrication time are set by means of ratchet switches **S** and **P** in the control viewing window.

1. To set the time, remove the frame on the pump of the central lubrication system with a flat screwdriver.
2. Loosen exposed screws.
⇒ Remove the cover.
3. Set the pause time **P** and lubrication time **t S** with a flat screwdriver.
4. Reinstall the protective cover and frame.

Lubrication time **S** can be adjusted between one and 16 minutes. There are 16 detents of one minute each available for this purpose.

Break time **P** can be adjusted between 30 minutes and eight hours. There are 16 detents of 30 minutes each available for this purpose.

The LEDs signal different operating states of the central lubrication system.

- When the ignition is switched on, both self-test LEDs light up for 1.5 seconds.
- During the lubrication process, the green LED lights up permanently.
- If faults occur in the central lubrication system, the red LED flashes.

The original operator's manual for the central lubrication system must for the central lubrication system must be observed. This is included with the vehicle or can be downloaded via a QR code on the central lubrication system.

Repair work



NOTICE

Damage to the vehicle due to non-lubricated lubrication points!

If lubricant escapes at the central lubrication system, one or more lubrication points are not lubricated.

- Have the error repaired by an authorized service center.

Repair work on the central lubrication system may only be performed by authorized service centers!

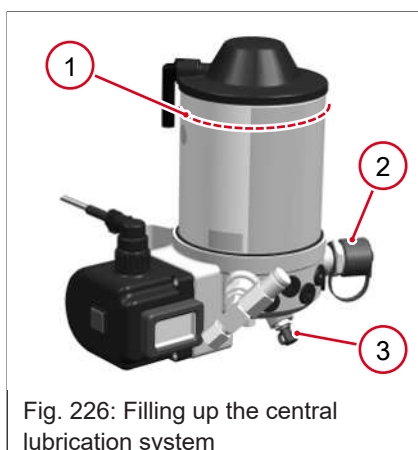


Fig. 226: Filling up the central lubrication system

Filling up the central lubrication system

The central lubrication system can be filled with a hydraulic grease gun via grease nipple **3** or via a filling coupling **2**.

For the multi-purpose grease specifications: [see Overview of operating materials and filling quantities on page 212](#).

To ensure ventilation of the central lubrication system, only fill the central lubrication system up to max. level **1**.

8.9 Cleaning and care

8.9.1 Information on cleaning and care



⚠ CAUTION

Health hazards from cleaning equipment and cleaning agents

The wrong choice of cleaning equipment and agents can endanger the health of the cleaning personnel. Follow the information below.

- Do not use solvents that give off harmful or flammable vapors.
- Avoid skin contact with cleaning agents.
- Wear protective clothes.

**NOTICE**

The wrong choice of cleaning equipment and agents can lead to damage to the vehicle and impair the operational safety of the vehicle. Follow the information below.

- ▶ The choice of the cleaning agents depends on the material of the parts to be cleaned. Rubber parts and electrical components must not be cleaned with solvents or steam. Water can cause short circuits in the electrical system.
- ▶ Do not point the water jet of the high-pressure cleaner at the seals of hydraulic cylinders.
- ▶ Do not clean electrical components (instrument panel, alternator, compact connectors, joystick, etc.) with a high-pressure cleaner.
- ▶ Do not damage the radiator fins when cleaning with a high-pressure cleaner.
- ▶ Always cover the intake connection of the air filter before washing the engine.

**Information****Separate cleaning for vehicles with anti-corrosion agent**

Vehicles with anti-corrosion agent ("aggressive media") must be cleaned separately! See "Vehicle Conservation".

**Environment**

In order to avoid damage to the environment, clean the vehicle only in wash bays and places provided to this effect.

Cleaning with washing solvents

- Ensure sufficient room ventilation.
- Do not use flammable liquids such as gasoline or diesel.

Cleaning with compressed air

- Work carefully.
- Wear eye protection and protective clothing.
- Do not point compressed air at the skin or at other persons.
- Do not use compressed air to clean clothing.

Cleaning with a high-pressure cleaner or steam jet

- Cover damping material and do not expose it directly to the jet.
- Cover the breather filter on the hydraulic oil tank and the filler caps for fuel, hydraulic oil, etc.
- Protect the following components from moisture:
 - Electric components such as the alternator, oil pressure switches, wiring, electric/electronic parts etc.
 - Control devices and seals
 - Air intake filters, etc.

Cleaning with flammable anticorrosion agents and sprays

- Ensure sufficient room ventilation.
- Do not use unprotected lights or open flames.
- Do not smoke.

Preparations for cleaning

1. Park the vehicle on firm and level ground.
2. Activate parking brake.
3. Switch off the engine and start the ignition.
4. Place the loader unit on the ground using the attachment without applying pressure.
5. Switch off the ignition and remove the key.

8.9.2 Cleaning the vehicle from the outside**NOTICE****Damage due to rusting on paintwork, joints, screwed connections, etc.**

A salty environment can promote rust formation on the paintwork, joints, screw connections, etc.

- Clean the vehicle thoroughly with water after any travel on saline ground conditions or roads and going to a different site!

The following aids are recommended for cleaning:

- High-pressure cleaner
- Steam jet
- Water with soap solution
- Sponge, brush
- Compressed air

Clean the vehicle from the outside

✓ Preparations for cleaning carried out

1. Clean the outside and underside of the vehicle with a high-pressure cleaner.
2. Clean the notice and warning label.
3. Ensure that the engine and gear unit are free of dirt.
4. Clean cab windows and mirrors.

8.9.3 Checking screw connections

1. Check all threaded fittings regularly, even if they are not listed in the maintenance plans.
2. Immediately tighten loose connections.

8.9.4 Checking pivots and hinges

1. Grease all mechanical pivot points on the vehicle (e.g. door hinges, joints, etc.) and fittings (e.g. door openers) regularly, even if they are not listed in the lubrication plan.
2. Check accelerator pedal and brake/inch pedal for dirt, clean if necessary.
3. Spray joints with spray oil.

8.9.5 Cleaning the radiator**⚠ WARNING****Injury hazard due to hot and rotating parts!**

When the engine is running and for a short time thereafter, parts in the engine compartment may still be hot or rotate. This may cause crushing which may result in serious injury or death.

- ▶ Do not open the engine cover if the engine is running.
- ▶ Let the engine cool down.
- ▶ Wear protective equipment.

**NOTICE****Damage to engine and hydraulics due to contaminated radiator**

Dirt on the radiator fins reduces the radiator's heat dissipation capacity and can cause damage to the engine and the hydraulic system!

- ▶ Check and clean the outside of the radiator once a day.
- ▶ Clean the radiator more frequently in dusty or dirty work conditions.
- ▶ Observe the maintenance intervals.



NOTICE

Damage to the radiator fins by compressed air

- In order to ensure the radiator's cooling capacity, pay attention not to damage the radiator fins as you clean them with a compressed-air gun!

Preparation for maintenance In the engine compartment

1. Park the vehicle on a stable, level and dry surface.
2. Secure the vehicle with the parking brake.
3. Lower the loader unit to the ground.
4. Switch off the ignition and remove the starting key.
5. Remove the key from battery master switch.
6. Let the engine cool down.
7. Open the engine hood.

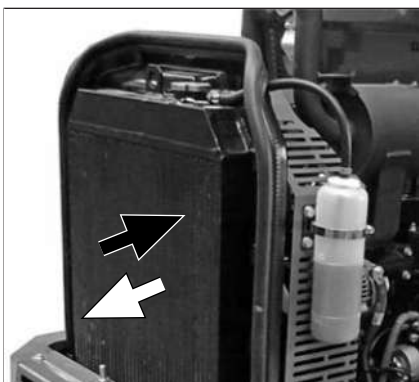


Fig. 227: Remove dirt deposits from the radiator

Cleaning the cooling fins

1. Clean the cooling fins by blowing compressed air from either side of the radiator.
2. Remove dirt in the intake area of the radiator.

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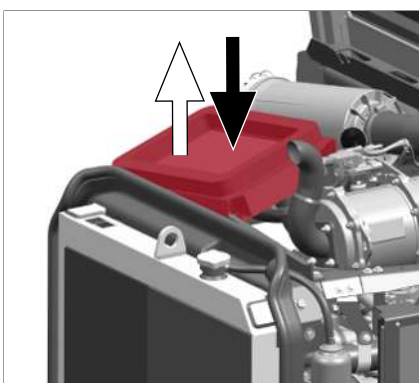


Fig. 228: Intercooler

Clean the cooling fins of the intercooler

Only for the 33.3 kW engine

1. Clean the cooling fins by blowing compressed air from either side of the radiator.
2. Remove dirt in the intake area of the radiator.

8.9.6 Clean/change air filter

**NOTICE****Damaged filter element and engine damage due to filter cleaning**

Clean the filter only on your own responsibility. If the air filter has been cleaned incorrectly or damaged during cleaning, the warranty is void. The manufacturer accepts no liability if the filter element or the engine is defective.

- ▶ Preferably always replace the filter

**NOTICE****Damage to the engine caused by a dirty air intake system!**

Engine damage can occur if the engine draws in dirty air.

- ▶ Perform maintenance on the air filter according to the maintenance intervals specified in this operator's manual.
- ▶ Do not let the engine run if parts of the air intake system are removed.
- ▶ Immediately replace damaged air filters.
- ▶ Do not operate the engine without an air filter element.

**Information****Premature damage due to acidic air**

Prolonged use of the air filter in acidic air (e.g. in acid production plants, steel, aluminum, chemical factories) will cause premature damage to the air filter.

- ▶ Change the air filter at shorter intervals instead of the specified intervals in the maintenance table.

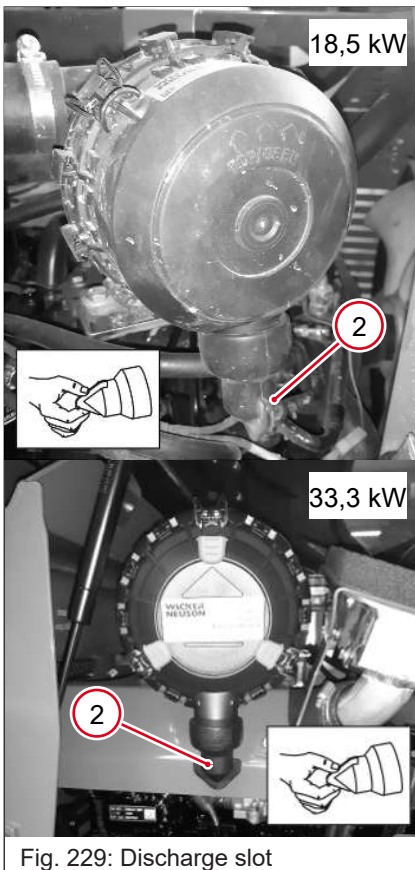
The vehicle is equipped with an engine air filter for filtering the engine intake air. The air filter consists of a main filter and a safety filter.

Replace the main filter in time. If it is allowed to get too dirty, exhaust gas emissions will increase.

To monitor the main filter, the warning light  is located in the display. If it lights up, replace the main filter immediately. With every 3rd filter change, the safety filter must be changed in addition to the main filter.

Preparation for maintenance In the engine compartment

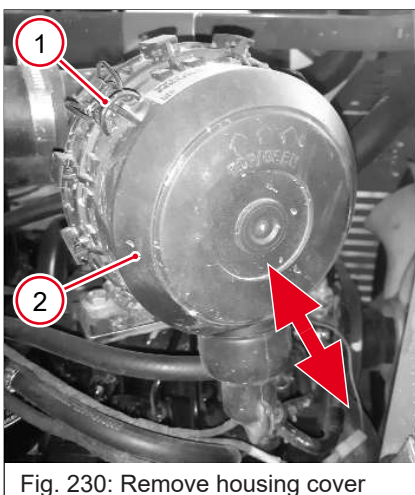
1. Park the vehicle on a stable, level and dry surface.
2. Secure the vehicle with the parking brake.
3. Lower the loader unit to the ground.
4. Switch off the ignition and remove the starting key.
5. Remove the key from battery master switch.
6. Let the engine cool down.
7. Open the engine hood.



Cleaning the dust drain valve

1. Press the discharge slot of the dust discharge valve **2** together several times.
2. Remove dust deposits by compressing the upper part of the valve.
3. If necessary, clean the discharge slot.

8.9.6.1 Change air filter of 18.5 kW engine



Change main filter

1. Fold back two locks **1** on the housing cover **2**.
2. Remove housing cover **2**.

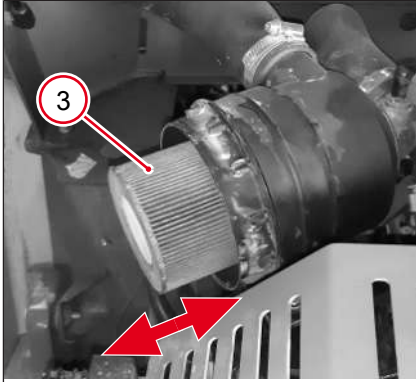


Fig. 231: Change main filter

3. Carefully remove the main filter **3** by slightly rotating it.
4. Insert new main filter **3** into the filter housing.
5. Replace housing cover **2**, making sure it is properly seated and close lock **1**.

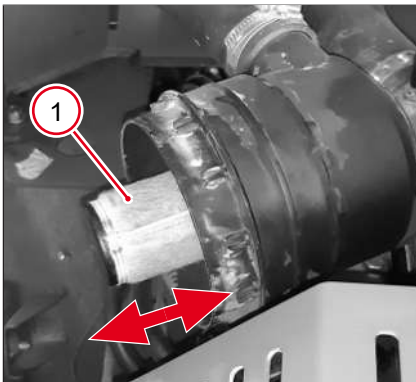


Fig. 232: Changing the safety filter

Changing the safety filter

To change the safety filter, the main filter must first be removed.

1. Carefully remove safety filter **1** while rotating it slightly.
2. Insert new safety filter **1** into the filter housing.

8.9.6.2 Change air filter of 33.3 kW engine

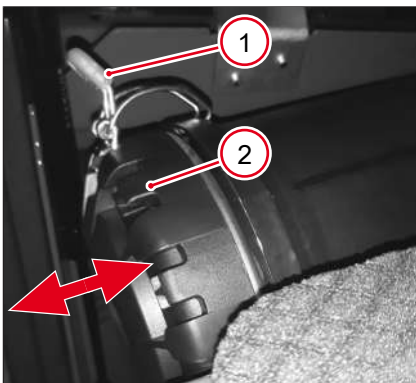


Fig. 233: Remove housing cover

Change main filter

1. Fold back three locks **1** on the housing cover **2**.
2. Remove housing cover **2**.

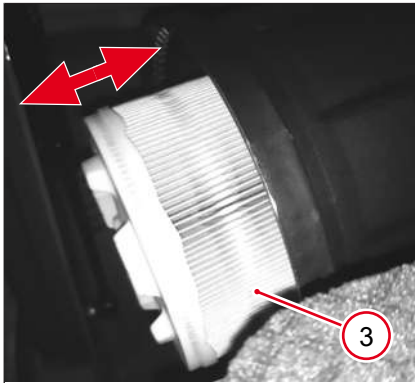


Fig. 234: Change main filter

3. Carefully remove the main filter **3** by slightly rotating it.
4. Insert new main filter **3** into the filter housing.
5. Replace housing cover **2**, making sure it is properly seated and close lock **1**.

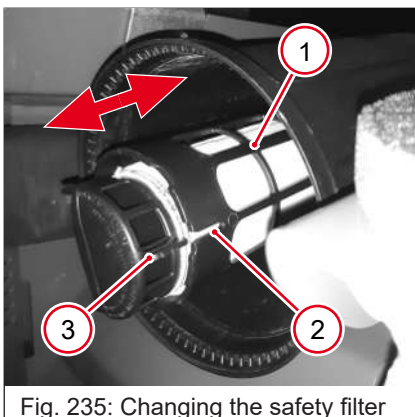


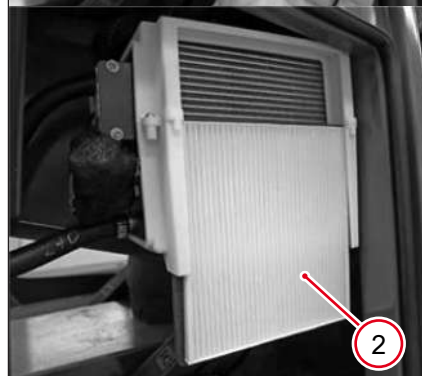
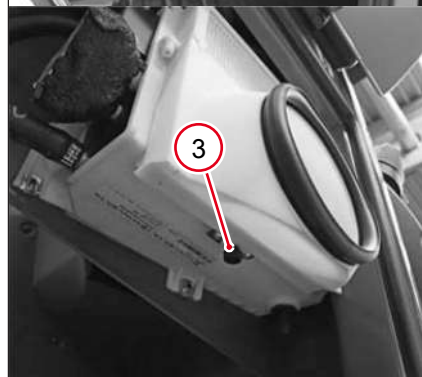
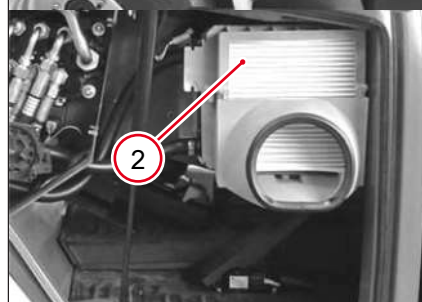
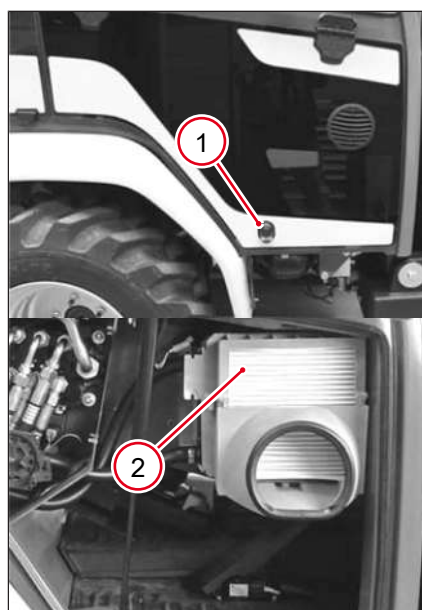
Fig. 235: Changing the safety filter

Changing the safety filter

To change the safety filter, the main filter must first be removed.

1. Carefully pull out the safety filter **1**.
2. Insert new safety filter **1** into the filter housing. Ensure that the guide **3** is pushed in the groove **2**.

8.9.7 Cleaning/changing cab ventilation filter



1. The driver's cab is equipped with a dust filter.
2. The dust filter **2** is located on the right behind the maintenance flap **1** in driving direction.
3. Open maintenance flap **1**.
4. Loosen knurled screw **3**.
5. Turn cover **4** outwards and remove.
6. Pull out dust filter **2** downwards.
7. Check dust filter **2** and seal for damage.
8. Blow out dust filter **2** on both sides.
9. Push in dust filter **2** from below.
10. Insert cover **4** into the hooks and press on.
11. Tighten knurled screw **3**.
12. Close maintenance flap **1**.

Fig. 236: Remove dust filter from cab door

8.9.8 Checking and cleaning the water separator



Information

- ▶ Observe maintenance intervals Maintenance plan
- ▶ Observe equipment specifications [see Overview of vehicle fluids and filling quantities on page 212](#)



Fig. 237: Drain water

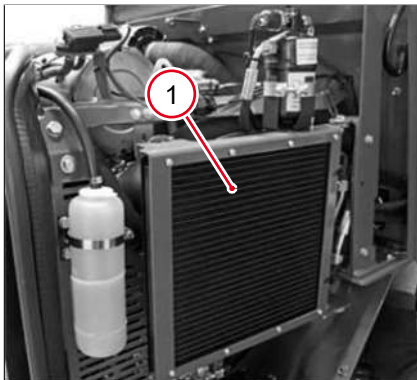
1. Switch off the engine.
2. Activate parking brake.
3. Switch off the ignition and remove the key.
4. Place the oil collecting tank underneath.
5. Close stopcock **1** on the water separator.
6. Open drain cock **2** and drain water at the drain cock.
7. Close drain cock **2**.
8. Open stopcock **1** on the water separator.
9. Start diesel engine and check water separator for leak tightness.

8.9.9 Cleaning the condenser

Preparation for maintenance In the engine compartment

1. Park the vehicle on a stable, level and dry surface.
2. Secure the vehicle with the parking brake.
3. Lower the loader unit to the ground.
4. Switch off the ignition and remove the starting key.
5. Remove the key from battery master switch.
6. Let the engine cool down.
7. Open the engine hood.

Cleaning heat exchanger (condenser)



Pull heat exchanger **1** out of the locking mechanism and fold out.

Spray out heat exchanger with water (do not use high-pressure cleaner or compressed air).

Fold in and lock heat exchanger **1**.

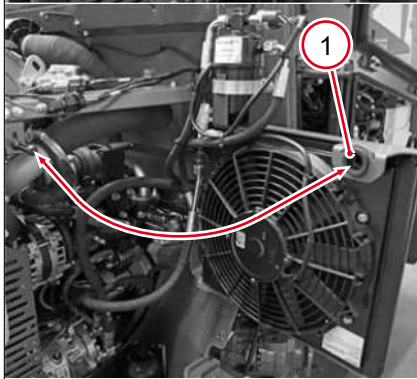


Fig. 238: Operating the condenser

Servicing the collection dryer

The collection dryer must be replaced every 2 years by an authorized service center

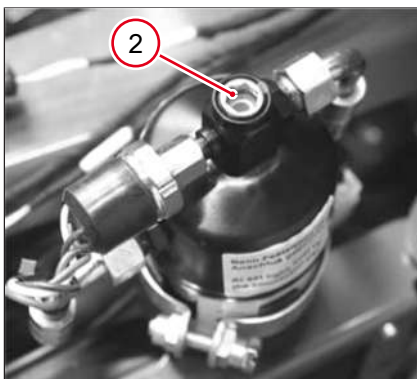


Fig. 239: Sight glass on collection dryer

Inspect coolant level on the sight glass **2** on the collection dryer in the engine compartment.

1. Activate the air conditioning system.
2. The set temperature must be below the actual temperature of the interior for the compressor to activate.
3. Formation of bubbles in the sight glass
 - ⇒ Coolant shortage, contact an authorized service center for inspection.
4. No bubble formation in sight glass
 - ⇒ Coolant is okay

8.9.10 Vehicle preservation

8.9.10.1 Important information on corrosion protection

For work in the area of "aggressive media" (e.g. salt use), the vehicle was protected ex works with a special protective wax against corrosion.

Since corrosion protection is constantly subject to external influences, e.g. dirt and cleaning, its effectiveness is only maintained if it is regularly checked and, if necessary, renewed or repaired.

If the vehicle is not yet equipped with corrosion protection agent, depending on its use (e.g. in salt areas), we recommend that the "Aggressive media" option be retrofitted by a sales partner.

The following anticorrosive wax has been used in the factory:

Designation:

- ELASKON 2000 ML, ELASKON UBS light;
- ELASKON Aero 46 Special, ELASKON Multi 80

Manufacturer:

- ELASKON Sachsen GmbH & Co. KG, Dresden (Germany)

Components coated with anticorrosive wax

Component	Remark
All electric plug connections, ground contacts and crimp connections	Before applying the wax: • Contact surfaces treated with contact spray and plug connection re-established. • The connecting parts of the fuel tank sensor must be provided with a particularly thick corrosion protection layer.
All vehicle parts e.g. Axles, gearbox, trim panels, servicing lids, loader unit, quickhitch	with the exception of: • Piston rods (chrome layer) • Driver's cab, cab bearing • Engine cover, engine bearing • Air filter • Ballast weight • Mounting surface for attachments on the frame • Radiator and insulating mat • Mudguards, rubber and plastic parts • Lighting components
Flange surfaces	for example axles, diesel engine and cab bearing: • Seal joints after assembly with anti-corrosion wax.

8.9.10.2 Measures for maintaining anticorrosive protection

**! WARNING****Special hazards during anti-corrosion protection!**

Failure to observe this can cause serious injury or death.

- ▶ When handling all chemical substances, such as solvents, waxes, etc., observe the special safety regulations applicable to the product (safety data sheet).
- ▶ Ensure sufficient room ventilation.
- ▶ Do not use unprotected lights or open flames.
- ▶ Do not smoke.
- ▶ Corrosion on electric connections or components can cause hazardous operating malfunctions.
- ▶ Perform work on the electrical system only with the battery disconnected and the diesel engine stopped!

**Information**

- ▶ Observe maintenance intervals Maintenance plan
- ▶ Observe equipment specifications [see Overview of vehicle fluids and filling quantities on page 212](#)

8.9.10.3 Cleaning

**NOTICE****Cleaning before applying corrosion protection**

Do not clean the vehicle with a root brush, steam jet or high-pressure cleaner!

- ▶ If cleaning the vehicle with these means cannot be avoided, check the wax coating very carefully and have it renewed or reapplied as required.
- ▶ If you replace components, check whether they are classified as in the table "Components coated with anti-corrosive wax" and whether they are subject to special treatment before assembly.
- ▶ Have the sealing checked and repaired at least once a year by ELASKON – see the Elaskon servicing pass supplied with the vehicle.

- If the vehicle is used in corrosive environment over a longer period of time, remove the floor mat in the cab. This will avoid a collection of corrosive moisture.
- Thoroughly clean vehicles that are put out of operation over a longer period of time.
- Clean the vehicle at least once a week. In particular, remove corrosive deposits such as salt crusts as quickly as possible.
- Clean the vehicle with cold running water preferably.

8.9.10.4 Application of anticorrosive wax

Bear in mind the following instructions as you apply the protective film:

- Cover all removed components and mounting surfaces cleanly.
- Apply ELASKON products with a brush or commercially available spray equipment.
- The protective ELASKON coating can be removed with an ELASKON cleanser if necessary.
- Spots are difficult to remove from clothing.
- Affix a "Wet paint!" or a similar sign to newly coated vehicles.

8.9.10.5 Treating oxidized surfaces

If in spite of all precautionary measures some components should be affected by corrosion (oxidized), treat the oxidized area follows:

Electric connections

- Remove the remaining protective wax at the oxidation site with ELASKON cleaner.
- Treat the affected area with an oxide solvent, e.g. ELASKON Multi 80.
- Treat contact surfaces of the plug connection e.g. with ELASKON Multi 80.
- Establish the connection.
- Apply/spray anticorrosion wax onto the electric connection from all sides.

For sheet metal parts

- Remove the remaining protective wax at the oxidized area with an ELASKON cleanser.
- "Brighten" the affected area, i.e. remove all rust or paint residues. Otherwise the protective coating will not adhere properly.
- Treat the affected area with cleaning thinner and paint the affected area with two-component primer and then with two-component top coat.
- Then preserve the area with anti-corrosion wax.

8.10 Braking system

8.10.1 Checking braking system



! WARNING

Accident hazard due to malfunctioning brakes!

The braking system is a safety device. Improper maintenance can lead to failure of the braking system. This may result in accidents that could result in serious injury or death.

All repair work on the braking system may only be carried out by trained personnel at an authorized service center.

- ▶ Check the brake function once a day.
- ▶ Do not operate the vehicle with malfunctioning brakes.
- ▶ Perform service according to the service intervals.

1. Check the brakes for proper function daily before starting the journey. For this purpose, carry out braking tests at low speed.
2. Check the brake lines for damage and leak-tightness.
3. Have defective brake lines replaced by an authorized service center immediately.

Check the brake fluid

Brake fluid

The label contains information about the brake fluid used for the vehicle.

1. Attention! Do not fill with water.
2. Only ATF brake fluids may be used.
See: Overview of operating fluids and filling quantities

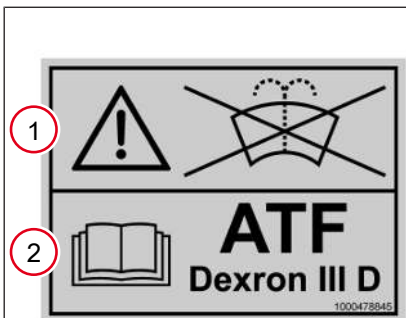


Fig. 240: Label Brake fluid

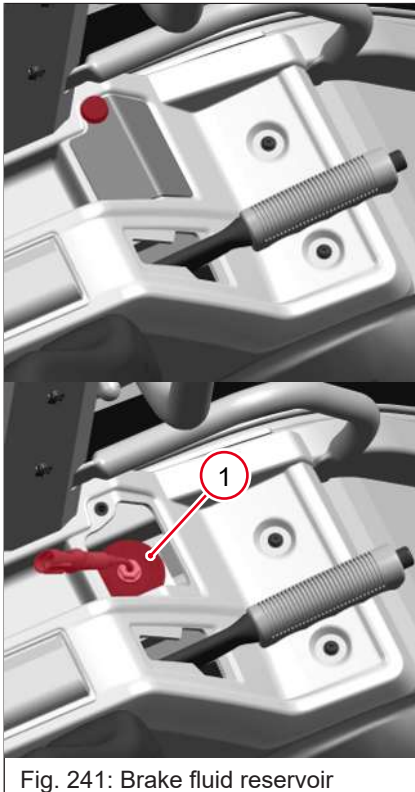


Fig. 241: Brake fluid reservoir

The brake fluid reservoir is located under a cover panel next to the parking brake.

If the liquid level in the brake fluid reservoir **1** is too low, the control light  lights up. The brake fluid must be topped up by an authorized specialist workshop and the brake system must be checked.

8.11 Steering system

8.11.1 Checking steering system for function



⚠ WARNING

Accident hazard due to steering system not working correctly!

Driving with a defective steering system can lead to accidents and injuries or death.

- ▶ Check that the steering system is working before starting a journey.
- ▶ Do not drive the vehicle if the steering system is defective.
- ▶ Have the steering system that is not working correctly repaired by a service center before continuing to drive the vehicle.

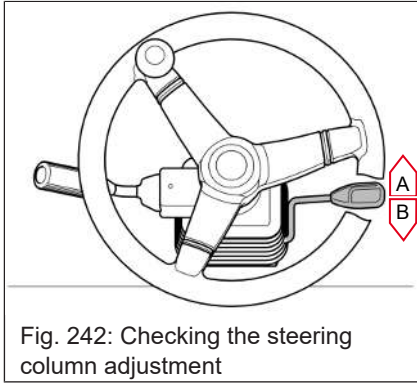
Daily before starting to drive, check the steering system for proper functioning. Proceed as follows:

1. Start the engine of the vehicle.
 2. Checking the steering mode adjustment.
 3. At walking pace, move the steering wheel left and right.
 4. When changing the steering mode, first move the rear axle to the middle position. The steering mode indicator light lights up in the display.
 5. Check the tracking (synchronization) of the front and rear axle wheels.
- ⇒ The steering system is operational.

Do not operate the vehicle if jerky movements or noises are detected or if the wheels do not move according to the steering mode. Contact an authorized service center immediately.

All maintenance work on the steering system must be carried out by trained personnel in an authorized specialist service center.

8.11.2 Checking the steering column adjustment



1. Operate lever and hold.
2. Move the steering wheel once in all possible directions.
3. Release the lever.
4. The steering wheel is locked. Check correct locking by gently jerking.

8.12 Electrical system

8.12.1 Qualification of maintenance personnel

Replacement and repair work on the electrical system may be performed only by an authorized service center!

Checks and service work, as well as the replacement of light bulbs, fuses and the battery, must be performed by a specifically trained operator.

8.12.2 Important notes on the battery



⚠ WARNING

Explosion hazard due to batteries!

Batteries give off explosive gases that can cause deflagrations if ignited.

- ▶ Do not smoke, avoid fire and open flames.
- ▶ Do not place any tools or other metallic objects on the battery that could cause a short circuit.



⚠ WARNING

Caustic injury hazard due to battery acid!

Battery acid can cause serious burns in case of skin contact.

- ▶ Avoid contact of the battery acid with the skin, eyes and mouth.
- ▶ In case of contact with battery acid, immediately rinse the affected parts of the body with plenty of clear water and seek medical attention at once.
- ▶ Wear protective equipment.

**NOTICE****Damage to vehicle electronics due to incorrect battery capacity**

- ▶ To avoid damage to the vehicle electronics, only use batteries with the specified capacity.

**NOTICE****Short-circuit in the electrical system due to incorrect sequence when connecting and disconnecting!**

- ▶ Disconnecting: First the negative terminal, and then the positive terminal.
- ▶ Connecting: First the positive terminal, and then the negative terminal.

**Information****Battery charger**

If the battery has to be charged due to an insufficient charging level, use a controlled battery charger with automatic shutdown.

- ▶ See charger operator's manual.

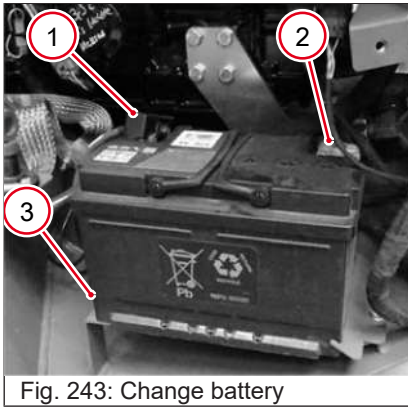
8.12.3 Checking/replacing the battery

The battery is located in the engine compartment

The battery is low in maintenance and no fluid needs to be refilled under normal operating conditions. Nevertheless, the liquid level should be checked at regular intervals.

Preparation for maintenance In the engine compartment

1. Park the vehicle on a stable, level and dry surface.
2. Secure the vehicle with the parking brake.
3. Lower the loader unit to the ground.
4. Switch off the ignition and remove the starting key.
5. Remove the key from battery master switch.
6. Let the engine cool down.
7. Open the engine hood.



Replace the battery

- ✓ Preparation of maintenance in the engine compartment has been carried out.
- ✓ Access to the battery is established.
- 1. First remove ground strap **1** from the negative terminal (-).
- 2. Remove the protective cover from the positive terminal (+).
- 3. Remove the red battery cable **2** from the positive terminal (+).
- 4. Disassemble the battery fastening **3**.
- 5. Replace the battery with a new one.
- 6. Mount the battery fastening **3**.
- 7. Mount the battery cable: first mount the red battery cable **2** to the positive terminal (+).
- 8. Mount the protective cover on the positive terminal (+).
- 9. Mount ground strap **1** to negative terminal (-).

8.12.4 Regular checks and maintenance work of the electrical system

Daily checks before operating the vehicle

1. Is the lighting system OK?
2. Is the signaling and warning system OK?

Weekly check

1. Electrical fuses:
 - ⇒ Replace defective fuses only with new ones with the specified rating (amperage).
 - ⇒ Blown fuses indicate overloading or short circuits. Therefore, the electrical system should be checked by an authorized service center before installing the new fuse.
2. Cable and ground connections: When carrying out maintenance work on the electrical system, pay particular attention to good contact of the connecting lines, plug couplings and fuses.
3. Check the battery charge condition and the condition of the battery terminals.
4. Check electrical cables for fastening and chafe marks and have them replaced by an authorized service center if necessary.

8.12.5 Checking the alternator

- Only test run the engine with the battery connected.
- When connecting the battery, ensure that the poles (+/-) are not inverted.
- Always disconnect the battery first when welding or before connecting a quick battery charger.
- Have malfunctioning control lights immediately replaced.

8.12.6 Check/maintain relays and fuses



NOTICE

Fuse replacement

Blown fuses indicate overloading or short circuits.

- ▶ Have the electrical system checked by an authorized service center before installing the new fuse!
- ▶ Only use fuses with the specified load capacity (amperage)

The circuits are protected by different types of fuses and main fuses. The fuses are located in different fuse boxes in the cab and in the engine compartment.

Check/change fuses and relays in main fuse box

- ✓ Preparation of maintenance in the engine compartment has been carried out.
- 1. Remove the cover from the fuse box.
- 2. Remove the defective fuse and/or relay from the relay bracket.
- 3. Insert the new fuse or relay into the corresponding relay bracket.
 - ⇒ Observe the designations and performance data of the fuses and relays.
- 4. Mount the cover to the fuse box.
- 5. Check the electrical system for correct function.

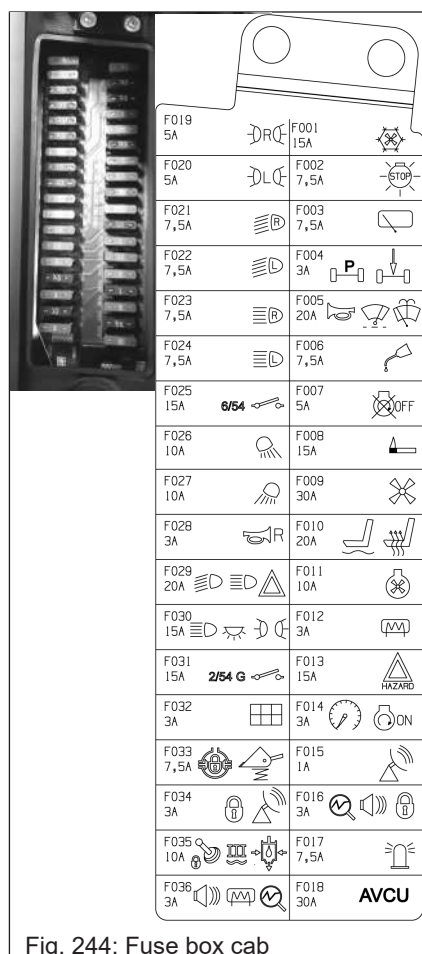


Fig. 244: Fuse box cab

Check / replace fuses and switching relays on circuit board

- ✓ The parking brake is applied.
 - ✓ The engine is switched off and the starting key has been removed.
 - ✓ Access to the fuses and switching relays in the cab has been established [see Fuse box cab on page 202](#).
1. Remove the defective fuse and/or relay from the relay bracket.
 2. Insert the new fuse or relay into the corresponding relay bracket.
 - ⇒ Observe the designations and performance data of the fuses and relays.
 3. Reinstall the cladding [see Fuse box Cab on page 202](#).
 4. Check the electrical system for correct function.

8.13 Working hydraulics**8.13.1 Important information on the hydraulic system****⚠ WARNING****Burn hazard due to hot hydraulic oil!**

Hot hydraulic oil can cause burns to the skin.

- ▶ Release the residual pressure in the hydraulic system.
- ▶ Let the engine cool down.
- ▶ Wear protective equipment.



⚠ CAUTION

Risk of injury due to maintenance work on the hydraulic system!

Hydraulic oil lines are under pressure and can cause serious injury from unsecured parts of the loader unit.

- ▶ Secure the raised loader unit on the lifting cylinder with the safety prop against unintentional lowering.
- ▶ Release the pressure in all lines carrying hydraulic oil prior to any maintenance and repair work.
- ▶ Only carry out work on the hydraulic system when the engine is switched off.



NOTICE

Damage to the hydraulic system due to contaminated hydraulic oil, lack of oil or incorrect hydraulic oil

- ▶ Take care to avoid dirt when working!
- ▶ Always add hydraulic oil using the filling screen!
- ▶ Only use authorized oils of the same type.
- ▶ Always add hydraulic oil before the level gets too low.
- ▶ If the hydraulic system is filled with biodegradable oil, only top up with biodegradable oil of the same type – note the label on the hydraulic oil tank.
- ▶ Have the hydraulic oil replaced by an authorized service center only.

8

Preparations for maintenance work on the hydraulic system

1. Lower the loader unit to the ground.
2. Lower all hydraulically controlled attachments to the ground.
3. Stop the engine and remove the starting key.
4. Switch off the battery master switch.
5. Secure the vehicle with the parking brake.
6. Depressurize the hydraulic system.
7. Wear protective clothes.
8. Collect drained hydraulic oil and biodegradable oil in a suitable container, and dispose of it in an environmentally friendly manner.

8.13.2 Checking the condition and age of hydraulic hoses

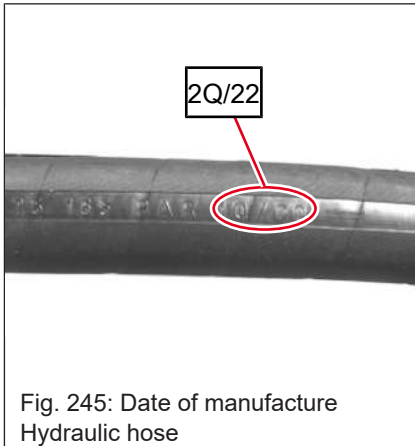


Information

- ▶ Follow the maintenance interval, refer to maintenance plan
- ▶ Follow the specifications of the vehicle fluid, refer to the Overview of vehicle fluids and filling quantities

Important information for the owner of the vehicle

The entrepreneur/owner of the vehicle must ensure that hose pipes are replaced in appropriate intervals, even if no safety-relevant malfunctions can be detected on the hose pipe.



- Have hose assemblies checked by an expert (qualified person) before they are put into operation for the first time and at least once a year thereafter for their safe working condition.
- Have leaks immediately repaired and damaged pressure lines replaced by an authorized service center.
- Have hydraulic hoses checked by authorized technically trained personnel at the recommended intervals.
- Observe the following inspection intervals.
 - With normal wear, every 12 months.
 - In case of increased wear (longer operating times, multi-shift operation, high outside temperatures etc.), every 6 months.
- In the event of visible defects, have hydraulic hoses and lines replaced by an authorized service center.

In this context, reference is also made to the "Safety regulations for hydraulic lines", issued by the central office for accident prevention and industrial medicine. As well as to relevant standards, such as DIN 20066, T1.

The date of manufacture (month or quarter and year) is indicated on the flexible line.

Example:

- "2Q/22" indicates production in the 2nd quarter of 2022.

8.13.3 Checking the hydraulic system for leaks



⚠ WARNING

Burn hazard due to hot hydraulic oil!

Hot hydraulic oil can cause burns to the skin.

- ▶ Release the residual pressure in the hydraulic system.
- ▶ Let the engine cool down.
- ▶ Wear protective equipment.



NOTICE

Fire hazard if hot hydraulic oil under high pressure escapes!

Hydraulic oil leaking under high pressure can ignite and cause damage to property.

- ▶ Do not operate the vehicle with leaky or damaged components of the hydraulic system.
- ▶ Never weld or solder damaged or leaking pressure lines and screw connections. Have damaged parts replaced with new ones by an authorized service center.
- ▶ Tighten leaking couplings and hose connections only when the hydraulic system is not under pressure. Release the pressure before working on pressurized lines.
- ▶ Do not check for leaks with an open flame due to explosive fire risk from vaporized oil mist.



Information

- ▶ Observe maintenance intervals Maintenance plan
 - ▶ Observe equipment specifications [see Overview of vehicle fluids and filling quantities on page 212](#)
-
- Never search for leaks with your bare hands. Wear protective gloves and clothing.
 - Wear safety glasses to protect the eyes. If hydraulic oil contacts the eye, flush immediately with clean water and seek emergency medical treatment.
 - Seek immediate medical attention if hydraulic oil penetrates the skin. Oil can cause serious infections.

8.13.4 Check the membrane accumulator



⚠ WARNING

Risk of suffocation through uncontrolled release of large quantities of gas and risk of injury due to entrained components.

Failure to observe this can cause serious injury or death.

- ▶ Immediately put vehicle out of operation in case of leaking or damaged membrane accumulators.
- ▶ Never search for leaks with your bare hands.
- ▶ Have the membrane accumulator checked only by an authorized service center in accordance with the maintenance plan intervals.
- ▶ Never weld or solder defective or leaky membrane accumulators.
- ▶ Damaged membrane accumulators may not be repaired and must be replaced by an authorized service center.

**⚠ WARNING****Danger of explosions by filling the membrane accumulator with non-permitted gas!**

Failure to observe this can cause serious injury or death.

- ▶ Have work on the membrane accumulator performed only by an authorized service center.

**Information**

- ▶ Observe maintenance intervals Maintenance plan
- ▶ Observe equipment specifications [see Overview of vehicle fluids and filling quantities on page 212](#)

Important information for the owner of the vehicle

The entrepreneur/owner of the vehicle must ensure that diaphragm pressure accumulators are replaced at appropriate intervals, even if no safety-related defects are apparent in the diaphragm pressure accumulator.

8.14 Engine**8.14.1 V-belt/toothed belt****⚠ WARNING****Injury hazard due to hot and rotating parts!**

When the engine is running and for a short time thereafter, parts in the engine compartment may still be hot or rotate. This may cause crushing which may result in serious injury or death.

- ▶ Do not open the engine cover if the engine is running.
- ▶ Let the engine cool down.
- ▶ Wear protective equipment.

**NOTICE****Cracked and stretched belts cause engine damage!**

- ▶ Service the belts according to the maintenance intervals in this operator's manual.
- ▶ Observe the operator's manual of the engine.
- ▶ Have the belts only replaced by an authorized service center.

**Information**

- ▶ Observe maintenance intervals Maintenance plan
- ▶ Observe equipment specifications [see Overview of vehicle fluids and filling quantities on page 212](#)

Preparation for maintenance In the engine compartment

1. Park the vehicle on a stable, level and dry surface.
2. Secure the vehicle with the parking brake.
3. Lower the loader unit to the ground.
4. Switch off the ignition and remove the starting key.
5. Remove the key from battery master switch.
6. Let the engine cool down.
7. Open the engine hood.

8.14.1.1 Checking the V-belt

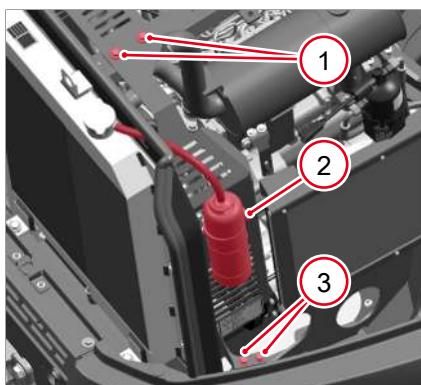


Fig. 246: Remove cover

Engine 18.5 kW

1. Loosen the clamp **2** of the coolant tank and the tank.
2. Remove both upper screws **1** of the protective cover.
3. Remove both lower screws **3** of the protective cover.
4. Remove the protective cover.

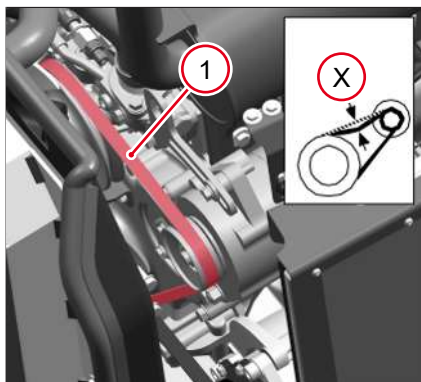


Fig. 247: Check V-belt

5. Check V-belt **1** for damage.
 6. Check V-belt **1** for tension. Press with your thumb to check whether the V-belt can be deflected between the pulleys by no more than **X** = about 10 mm.
- ⇒ Replace a damaged or extended V-belt or have it re-tensioned by an authorized service center.
- Mount the protective cover and the coolant tank again in the reverse order.

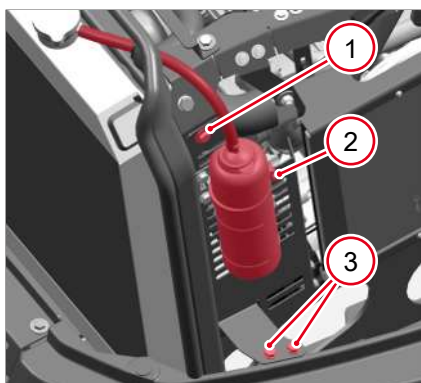


Fig. 248: Remove cover

Engine 33.3 kW

1. Loosen the clamp **2** of the coolant tank and the tank.
2. Remove upper screws **1** of the protective cover.
3. Remove both lower screws **3** of the protective cover.
4. Remove the protective cover.

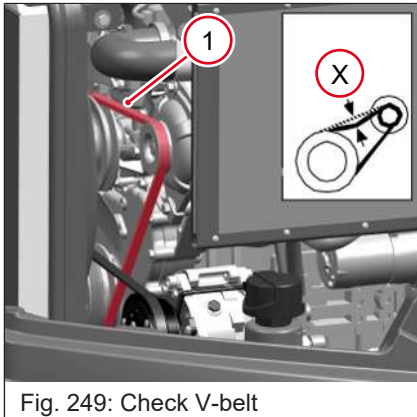


Fig. 249: Check V-belt

5. Check V-belt **1** for damage.
 6. Check V-belt **1** for tension. Press with your thumb to check whether the V-belt can be deflected between the pulleys by no more than **X** = about 10 mm.
- ⇒ Replace a damaged or extended V-belt or have it re-tensioned by an authorized service center.
- Mount the protective cover and the coolant tank again in the reverse order.

8.14.2 Check flat belt

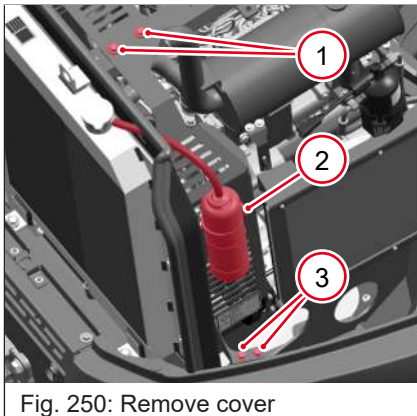


Fig. 250: Remove cover

Engine 18.5 kW

1. Loosen the clamp **2** of the coolant tank and the tank.
2. Remove both upper screws **1** of the protective cover.
3. Remove both lower screws **3** of the protective cover.
4. Remove the protective cover.

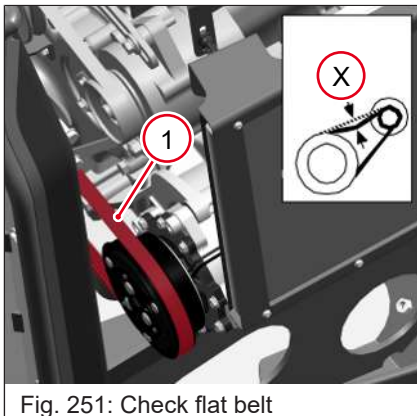


Fig. 251: Check flat belt

5. Check flat belt **1** for damage.
 6. Check flat belt **1** for tension. Press with your thumb to check whether the flat belt can be deflected between the pulleys by no more than **X** = about 10 mm.
- ⇒ Have a damaged or extended flat belt replaced or re-tensioned by an authorized service center.
- Mount the protective cover and the coolant tank again in the reverse order.

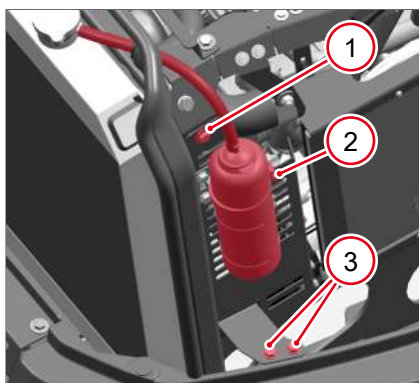


Fig. 252: Remove cover

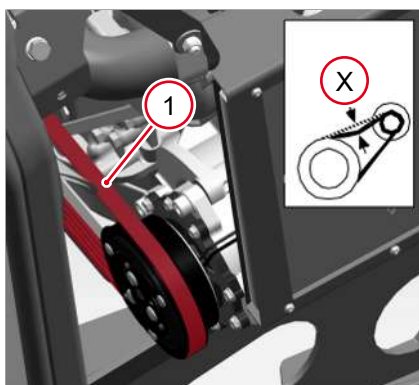


Fig. 253: Check flat belt

Engine 33.3 kW

1. Loosen the clamp **2** of the coolant tank and the tank.
 2. Remove upper screws **1** of the protective cover.
 3. Remove both lower screws **3** of the protective cover.
 4. Remove the protective cover.
 5. Check flat belt **1** for damage.
 6. Check flat belt **1** for tension. Press with your thumb to check whether the flat belt can be deflected between the pulleys by no more than **X** = about 10 mm.
- ⇒ Have a damaged or extended flat belt replaced or re-tensioned by an authorized service center.
- Mount the protective cover and the coolant tank again in the reverse order.

8.15 Exhaust gas aftertreatment

8.15.1 Diesel particulate filter

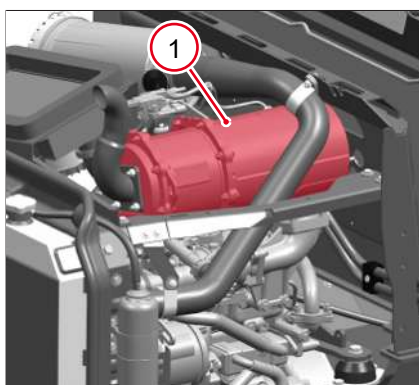


Fig. 254: Diesel particle filter

The diesel particulate filter **1** is a closed soot filter system. Soot produced during the combustion of diesel fuel is collected in the diesel particulate filter.

As the soot load increases, it is automatically regenerated during operation of the vehicle. This means that the soot is burnt in the diesel particulate filter.

Combustion (regeneration) is a continuous process that starts automatically as soon as the necessary conditions (soot load and exhaust gas temperature) are reached.

The filter loading is permanently monitored and controlled electronically.

If automatic regeneration is not possible for various reasons, the system signals that manual regeneration is necessary by means of symbols and warning lights in the display unit.

When burning soot, ash also accumulates, which is not removed by regeneration. This leads to shortened intervals of regeneration, which then makes it necessary to replace the diesel particulate filter as part of maintenance.

The ash and soot load is indicated by a query in the digital display in %.

8.15.2 Display exhaust gas aftertreatment

Only valid for vehicles with a system for exhaust gas aftertreatment in accordance with EU Regulation 2016/1628 or subsequent regulations.

Menu window overview for the exhaust gas aftertreatment status

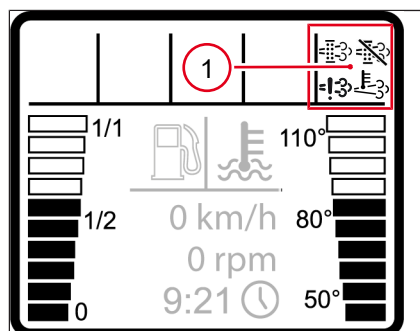
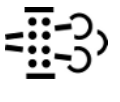
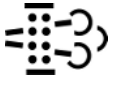


Fig. 255: Display exhaust gas aftertreatment

The symbols in field 1 have the following meaning:

Symbol	Description/meaning
No symbol	Normal operating conditions The soot load is within the permissible range.
 Symbol lights up permanently	Soot load in the elevated range - Exhaust gas temperature in the elevated range. - Automatic regeneration is in operation. - The vehicle can be continued to be used for further work.
 Symbol flashes	Attention! The soot load is in the high range (60%). - Engine controller wants to start an automatic regeneration. - Set the switch for regeneration to the middle position "0" [265]
 Symbol lights up	Attention! The soot load is in the high range. Start manual regeneration at the next opportunity [265]
	Manual regeneration Is necessary when the soot load is at 60% and automatic regeneration cannot be carried out. If the regeneration switch is set to position II, no automatic regeneration can be carried out as this is suppressed. [268]
 Symbol flashes	Attention! Error in the exhaust gas recirculation system, - Contact an authorized service center immediately! - Diesel engine is reduced by 25% power. - Diesel engine is reduced by 50% power and rotational speed by 60%. Subsequent engine standstill!

Display soot load

The soot load of the system for exhaust gas aftertreatment depends on the load of the diesel engine and can be indicated as follows:

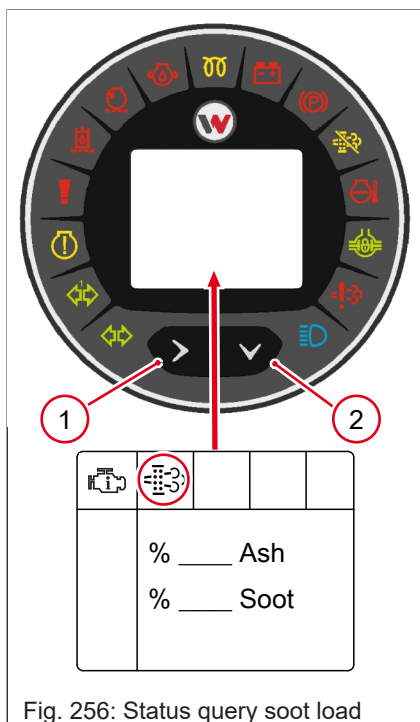


Fig. 256: Status query soot load

1. Press push button **2** on the display repeatedly until symbol  appears in the digital display.
2. Press push button **1** on the display repeatedly until symbol  appears in the digital display.
 - ⇒ **Ash** = Ash load in %
 - ⇒ **Soot** = Soot load in %

8.15.3 Manual regeneration



⚠ WARNING

The exhaust system becomes very hot. There is a risk of burning!

During regeneration, exhaust gas temperatures of approx. 650 °C can occur in the exhaust system, even when the engine is idling.

- ▶ Keep your hands clear of the exhaust outlet.
- ▶ Keep a safe distance from the exhaust system.
- ▶ Do not open engine cover during regeneration and shortly after.



⚠ WARNING

The exhaust system becomes very hot. There is a hazard of fire!

Hot exhaust gases or hot parts of the exhaust system can cause fires in environments with highly flammable materials.

Failure to do so may result in serious injury or death and significant property damage.

- ▶ During regeneration and also directly after regeneration, make sure that there are no easily inflammable or combustible materials (e.g. paper, dry grass, straw, wood, wooden ceilings, oil, fuels, etc.) in the direct vicinity of the exhaust system.
- ▶ Do **not** perform manual regeneration in environments with flammable or combustible materials.
- ▶ Only use exhaust gas systems that are suitable for the temperatures.



Information

In order to avoid an interruption in manual regeneration, the fuel stock and stock of urea solution (vehicle dependent) in the vehicle should be sufficient.

- ✓ Time window approx. 30 minutes. during which time the vehicle must not be moved.
- ✓ Engine coolant temperature at least 60° C.
- ✓ Park the vehicle on firm, non-flammable substrate.
- ✓ Loader unit lowered to the ground.
- ✓ Activated parking brake.
- ✓ Working hydraulics blocked.
- ✓ Electric consumers switched off.

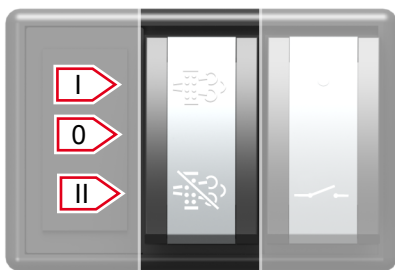


Fig. 257: Switch DPF regeneration

1. Warm up the vehicle (coolant temperature at least 60° C).
2. Do not switch off the diesel engine, allow it to idle.
3. Initiate regeneration by pressing the switch in position I for approx. 10 seconds.
4. Wait till the  and  symbols blink alternately and a honk sound is heard.
5. Start regeneration by pressing the switch in position I for approx. 3 seconds.
 - ⇒ Symbol  lights up
 - ⇒ Regeneration is in operation (regeneration time window approx. 30 minutes)
 - ⇒ The engine speed is automatically increased after a few seconds.
 - ⇒ When the idling speed of the diesel engine is reduced, the symbol in the display and the warning light goes out, the regeneration is successfully completed.

If the manual regeneration is cancelled for any reasons, for example, by pressing the switch in position II:

1. Repeat the entire regeneration as described above.
2. If manual regeneration is interrupted again, have the exhaust aftertreatment system checked or replaced by an authorized service center.

8.15.4 Automatic regeneration



⚠ WARNING

The exhaust system becomes very hot. There is a risk of burning!

During regeneration, exhaust gas temperatures of approx. 650 °C can occur in the exhaust system, even when the engine is idling.

- ▶ Keep your hands clear of the exhaust outlet.
- ▶ Keep a safe distance from the exhaust system.
- ▶ Do not open engine cover during regeneration and shortly after.



⚠ WARNING

The exhaust system becomes very hot. There is a hazard of fire!

Hot exhaust gases or hot parts of the exhaust system can cause fires in environments with highly flammable materials.

Failure to do so may result in serious injury or death and significant property damage.

- ▶ During regeneration and also directly after regeneration, make sure that there are no easily inflammable or combustible materials (e.g. paper, dry grass, straw, wood, wooden ceilings, oil, fuels, etc.) in the direct vicinity of the exhaust system.
- ▶ Do **not** perform manual regeneration in environments with flammable or combustible materials.
- ▶ Only use exhaust gas systems that are suitable for the temperatures.

The automatic regeneration is a continuous process that starts as soon the conditions required for it (soot load and exhaust-gas temperature) are fulfilled.

- Ash is also collected during the combustion of soot, however it is not eliminated from the system by regeneration. This ash loading results in shorter regeneration intervals requiring the replacement of the diesel particulate filter during maintenance.

The control light  lights up during regeneration.

The vehicle can be operated without any restriction during automatic regeneration as long as there is no easily flammable material in the direct vicinity of the vehicle.

If the ignition is set to position **0** during the regeneration phase, the regeneration stops and the control light  lights up.

After restarting the engine, a new automatic regeneration is triggered as soon as the required temperature is reached. The prior manual interruption means that the subsequent regeneration lasts longer due to the higher soot load.

If regeneration does not take place automatically (exhaust gas temperature too low due to short-distance or low-load operation), the system displays symbols and warning lights to indicate that manual regeneration is necessary [see Display exhaust gas aftertreatment on page 264](#).

The regeneration must then be initiated manually by the operator Manual regeneration [see Manual regeneration on page 265](#).

Consequences of an interruption

If a regeneration is interrupted manually or the ignition is switched off, the regeneration stops. This means that the soot load cannot be removed from the diesel particulate filter. The subsequent regeneration lasts longer due to the increased soot load.

8.15.5 Aborting/preventing regeneration

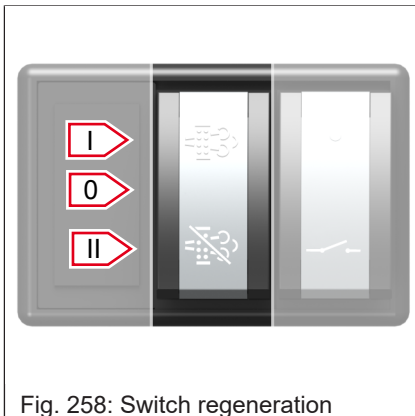


Fig. 258: Switch regeneration

In certain cases the current regeneration can/must be interrupted or the start of an automatic regeneration must be prevented:

- The vehicle is on combustible substrate and surroundings
- The vehicle must be refueled immediately

If the soot load of the diesel particulate filter is already over 90%, it is no longer possible to interrupt an ongoing regeneration or prevent the start of an automatic regeneration.

1. Press the push button to position **II**. Push button is latching.
 - ⇒ Regeneration is immediately aborted.
 - ⇒ The engine speed of the diesel engine is reduced.
 - ⇒ Symbol in the display goes out.
2. Start regeneration manually at the next possible opportunity.

The prevention of regeneration can be canceled by pressing the pushbutton again in position **0**.

8.16 Cab

8.16.1 Checking the seat

A loose or defective seat can lead to accidents.

- Check the correct fastening of the seat, check the fastening screws.
⇒ The seat must not wobble or be able to be lifted.
- Check all seat positions and their locks.
⇒ When the locks are engaged, the seat may no longer move.
- Check seat suspension.
⇒ Suspension adjustment and suspension must function.
- Check seat upholstery.
⇒ The seat upholstery must not be too worn or damaged.

If damage or defects are found, they must be repaired by an authorized service center before the vehicle is put into operation.

8.16.2 Checking the seat belt for proper function

Defective belts can no longer fulfill their protective function and must be replaced.

- Check seat belt for dirt and damage.
⇒ If necessary, remove dirt.
⇒ The seat belt must not be damaged.
- Check the function of the roll stop.
⇒ If the seat belt is pulled with a jerking movement, the unrolling must stop.
- Check the retraction function of the seat belt.
⇒ The seat belt must retract automatically.
- Have the seat belt replaced by an authorized service center after an accident, even if there is no visible damage. Have the seat fastening and anchoring points checked for further load-bearing capacity.

If damage or defects are found, they must be repaired by an authorized service center before the vehicle is put into operation.

8.16.3 Checking function of seat switch

The vehicle is equipped with a seat switch. The vehicle can only be started and operated when the operator of the vehicle is seated in the seat.

If the driver's seat is unloaded during travel, the diesel engine shuts down after 30 seconds or the drive direction is deactivated (neutral position).

✓ Carry out check on open and safe terrain:

1. Sit down on the operator seat.
2. Start the engine.
3. Drive slowly.
4. Get up from your seat.
5. Vehicle stops:
 - ⇒ Seat switch works correctly.
6. Vehicle does not stop:
 - ⇒ Seat switch is defective.

If there is a defect, it must be repaired by an authorized service center.

8.16.4 Checking doors and windows

- Check door and windows.
 - ⇒ The window panes must not be damaged.
 - ⇒ The windows must fit tightly and securely in the seals and fastenings.
 - ⇒ The window seals must not be damaged.
- Check door and window locks: Open, close and lock doors and windows.
 - ⇒ Doors and windows must engage and hold firmly and securely in the latches.

If damage or defects are found, they must be repaired by an authorized service center before the vehicle is put into operation.

8.16.5 Checking safety labels and information labels

- Check safety labels and information labels [see Safety label and information labels on page 49](#).
 - ⇒ The labels must be legible and complete.
- If necessary, remove dirt.

If labels are no longer legible, damaged or missing, they must be replaced.

8.16.6 Checking heating, ventilation and air conditioning system

- Start heating, ventilation and air conditioning system, [see Heating, ventilation and air conditioning system on page 129](#).
 - ⇒ All functions must function correctly.

If damage or defects are found, they must be repaired by an authorized service center.

8.17 Tires

8.17.1 Safety instructions for tires



! WARNING

Danger to life due to improper installation!

Improper installation of tires and rims can cause accidents which can lead to serious or fatal injuries.

- ▶ Have assembly work performed by an authorized service center only.
- ▶ Welding and cutting the rims is prohibited.
- ▶ Replace damaged rims by new ones.



! WARNING

Danger of crushing if the vehicle slips off the jack during a wheel change!

Getting squeezed under the vehicle causes serious injury or death.

- ▶ Park the vehicle on firm, level, and horizontal ground.
- ▶ Use only a safe and suitable jack with sufficient lift capacity.
- ▶ Secure the vehicle with trestles.



NOTICE

Damage to differentials due to different-sized wheels and tires!

- ▶ Only install wheels or tires on the vehicle from the same manufacturer, of the same size and that have the same wear condition.

8.17.1.1 Checking the tires

Checks that must be performed by the operator

Check the following conditions on the tires:

- Are there signs of damage to the tires or rim?
- Are the tires sufficiently and evenly filled with air on all four wheels?
- Is there sufficient profile on all four wheels?
- Check the lug nuts for correct seat and tighten if necessary.
- Remove any traces of oil or grease from the tires.
- Check for foreign bodies on the treads.

In case of doubt, contact an authorized service center.

8.17.2 Changing wheels



⚠ WARNING

Danger of crushing if the vehicle slips off the jack during a wheel change!

Getting squeezed under the vehicle causes serious injury or death.

- ▶ Park the vehicle on firm, level, and horizontal ground.
- ▶ Use only a safe and suitable jack with sufficient lift capacity.
- ▶ Secure the vehicle with trestles.



⚠ WARNING

Risk of accident when using non-approved tires!

Unauthorized tires can tear and lead to accidents with serious injuries or death!

- ▶ Only use approved tires [see Tires on page 305](#).
- ▶ Have the tires changed by an authorized service center.



NOTICE

Damage to the wheel bolts during assembly!

When mounting heavy wheels, the threads of the wheel bolts can be damaged.

- ▶ Use suitable mounting aids such as protective sleeves for wheel bolts.



Information

Changing to a different tire size

When fitting a new tire size to the vehicle, have the drive electronics software adapted by an authorized service center.

The tire size changes the maximum speed of the vehicle.

Preparations for work on tires and axles

1. Park the vehicle on a stable, level and dry surface.
2. Secure the vehicle with the parking brake.
3. Lower the loader unit to the ground.
4. Switch off the ignition and remove the starting key.

Removing the wheels

1. Position the jack underneath the axle, next to the wheel to be changed.
2. Ensure that the vehicle cannot slip off the jack. Secure the vehicle with additional supports if necessary.
3. Loosen the wheel bolts.
4. Lift the vehicle with the jack only until the wheel no longer touches the ground.
5. Unscrew the wheel bolts.
⇒ The wheel can be removed.

Mounting the wheels

1. Clean the flange surfaces of the wheels and axles.
2. Do not oil wheel nuts and bolts!
3. Place the covering sleeves onto the wheel bolts.
4. Place the wheel onto the wheel bolts with a suitable means.
5. Remove the covering sleeves.
6. Fit and hand-tighten all wheel nuts.
7. Lower the jack.
8. Alternately tighten the opposite wheel nuts to the prescribed torque.
9. Retighten the wheel nuts to the specified torque the first time after one operating hour.
10. Tighten the wheel nuts to the prescribed torque every ten operating hours (five to 50 operating hours since the last wheel change).

9 Troubleshooting

9.1 Faults, causes, remedy

9.1.1 Information on malfunctions



⚠ WARNING

Risk of injury from ignoring a fault or error message

Ignoring a fault or error message can lead to accidents and injuries.

- ▶ In the event of faults or error messages that concern safety, take the vehicle out of operation immediately and secure it against being put back into operation.
- ▶ Do not restart the vehicle until the fault has been rectified by an authorized workshop.



NOTICE

Ignoring a fault or error message

Ignoring a fault or an error message can result in damage to the vehicle.

- ▶ If the fault cannot be rectified by the measures described, contact an authorized service center and have the fault or error rectified.

Repair work on the electrical systems and hydraulics of the vehicle may only be carried out by an authorized service center.

If an error is to be reported to the authorized service center, have the following data ready:

- Control circuit
- SPN error code (Suspect Parameter Number)
- FMI error code (Failure Mode Identifier)

The data can be found in the error lists in the display.

9.1.2 Engine malfunctions

9.1.2.1 Possible faults and remedies on the engine

Repair work on the engine may only be carried out by authorized service center and trained personnel.

Fault	Possible cause	Remedial action/avoidance
Engine does not start or is not easy to start	Parking brake not applied	Apply the parking brake.
	3rd control circuit is activated	Protect 3rd control circuit.
	Wrong SAE class/oil quality of engine lubrication oil	Contact an authorized service center.
	Fuel grade does not correspond to specifications	Observe fuel specifications when adding fuel
	Insufficient fuel supply	Contact an authorized service center
	Malfunctioning or empty battery	Replace the battery with a new one.
	Loose or oxidized cable connections in starter circuit	Contact an authorized service center
	Malfunctioning starting motor, or pinion does not engage	
	Valve play not set correctly	
	Defective injection valve	
Engine starts, but runs unevenly or stalls	Fuel grade does not correspond to specifications	When fueling, observe the prescribed fuel specifications
	Incorrect valve clearance	Contact an authorized service center
	Injection line leaks	
	Defective injection valve	
Engine does not run on all cylinders	Injection line leaks	Contact an authorized service center
	Insufficient fuel supply	
	Defective injection valve	
Engine overheats. Temperature warning system responds	Oil level too low	Add engine oil; observe specifications for engine oil
	Oil level too high	Contact an authorized service center
	Dirty air filter	Replace air filter
	Air filter maintenance switch/indicator defective	Contact an authorized service center
	Dirty oil-water radiator fins	Cleaning the radiator
	Defective fan/torn or loose V-belt	Tighten the V-belt.
	Defective injection valve	Contact an authorized service center
Insufficient engine power	Oil level too high	Contact an authorized service center
	Fuel grade does not correspond to specifications	When fueling, observe the prescribed fuel specifications
	Dirty air filter	Replace air filter
	Defective air filter maintenance switch/indicator defective	Contact an authorized service center
	Incorrect valve clearance	
	Injection line leaks	
	Defective injection valve	
	Defective diesel particulate filter sensor	Regenerate diesel particulate filter
	The soot load of the diesel particulate filter is too high	



Fault		Possible cause	Remedial action/avoidance
Insufficient or no engine oil pressure		Oil level too low	Add engine oil; observe specifications for engine oil
		Engine inclination too high	Move the vehicle to an inclined position
		Wrong SAE class/oil quality of engine lubrication oil	Consult authorized service center Observe engine oil specifications
Engine oil consumption too high		Oil level too high	Contact an authorized service center
		Piston rings defective	
		Engine inclination too high	Move the vehicle to an inclined position
		Utilization rate of the engine too low	Avoid idling the engine for too long
Engine smokes	Blue	Oil level too high	Contact an authorized service center
		Engine inclination too high	Move the vehicle to an inclined position
	White	Engine starting temperature too low	Contact an authorized service center
		Fuel grade does not correspond to specifications	When fueling, observe the prescribed fuel specifications
		Incorrect valve clearance	Contact an authorized service center
		Defective injection valve	
	Black	Dirty air filter	Clean/change air filter
		Defective air filter maintenance switch/indicator	Contact an authorized service center
		Incorrect valve clearance	
		Defective injection valve	
		The soot load of the diesel particulate filter is too high	Regenerate diesel particulate filter

9.1.3 Malfunctions on the drive system

9.1.3.1 Possible faults and remedies on the drive system

Repair work on the drive system may only be carried out by authorized service center and trained personnel.

Malfunctions on the drive system	Possible causes	Remedial action/avoidance
The vehicle does not start	The parking brake is not disengaged	Release the parking brake
	Low-speed control lever in wrong position	Fully pull back low-speed control lever

9.1.4 Malfunctions in the hydraulic system

9.1.4.1 Possible faults and remedies on the hydraulic system

Error messages may appear on the display if the sequence of work steps and waiting times is not observed!

- Follow the order of the work steps under all circumstances when starting the engine.
- Observe the waiting times for starting the electronic control units.

In case of error messages on the display, abort the start procedure, switch off the ignition and repeat the start procedure, observing the sequence and all waiting times.

9.1.5 Possible faults and remedies in the air conditioning system

Only authorized service centers and trained personnel may perform repairs, and fill up and empty the air conditioning system!

Fault	Possible cause	Remedial action/avoidance
Fan does not run	Malfunctioning or loose fuse	Replace fuses [255] Contact an authorized service center
	Interrupted line	Contact an authorized service center
	Malfunctioning fan motor	
	Malfunctioning fan switch	
Fan cannot be switched off	Short circuit in cable or fan switch	Contact an authorized service center
Reduced fan output	Dirty contacts	Contact an authorized service center
	Very dirty heat exchanger	Clean the heat exchanger
	Coolant volume incorrect	Contact an authorized service center
Insufficient heating output or none at all	Flow temperature too low	Contact an authorized service center
	Malfunctioning thermostat	
	Dirty heat exchanger fins	Clean the heat exchanger
Loss of refrigerant on equipment	Loose hose connection	Contact an authorized service center
	Damaged hose	
	Damaged heat exchanger	
Compressor does not run	Interruption in solenoid coil of compressor	Contact an authorized service center
	Loose or torn V-belt	
	V-belt pulley does not turn even though magnetic clutch is applied	
	Compressor clutch slips	
	Malfunctioning controls	
Condenser overflow	Expansion valve is stuck in open position	Contact an authorized service center
Iced-up evaporator	Thermostat sensor in wrong position	Contact an authorized service center
	Malfunctioning expansion valve or thermostat	
Clogged condenser	Dirty radiator fins	Clean the condenser

Fault	Possible cause	Remedial action/avoidance
Loss of refrigerant	Interruption of refrigerant line	Contact an authorized service center
	System leak	
Insufficient refrigerating output	Clogged fan duct	Contact an authorized service center
	Refrigerant level too low	
	Humidity in system	
System cools with interruptions	Line interruption, insufficient ground connections or loose contacts in solenoid coil of compressor	Contact an authorized service center
	Malfunctioning fan motor	
Very loud system	Loose or excessively worn V-belt	Checking the V-belt
	Loose compressor bracket or worn inside parts of the compressor	Contact an authorized service center
	Excessive wear of fan motor	
	System overfill	
	Not enough refrigerant in the system	

9.2 Fault indications

9.2.1 Fault indications on the display

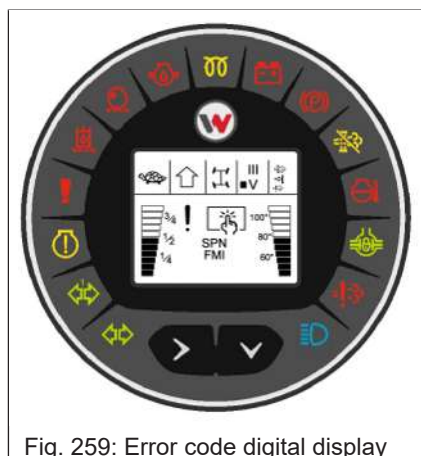


Fig. 259: Error code digital display

Error codes **3** are output in case of error messages of a vehicle component. These are shown in the main view **1** of the display.

In the event of faults in the diesel engine electronics, the indicator lamp Engine **2** also lights up.

Causes for a error code:

- Open wiring, interruption
- Overvoltage, undervoltage
- Grounding error
- Malfunctioning component
- Exceeding / falling below permissible values (temperature, pressure, speed, etc.)
- Sensor error due to dirt

If an error code and/or acoustic warning message is displayed:

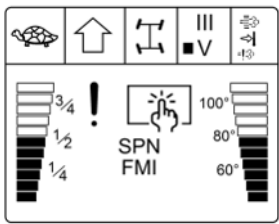
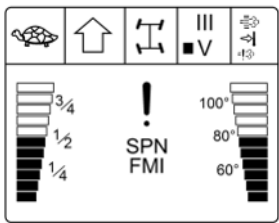
1. If possible, drive the vehicle out of the danger zone and turn it off.
2. Switch off the engine, turn off the ignition.
3. Restart the engine.

If the error codes are output again after restarting:

1. Have the fault rectified as quickly as possible by an authorized service center.

Error prioritization in the display

A distinction is made between 3 error categories

Status	Display	Description	Effect
Red		Control light (only in case of engine electronics fault), indication on the display, short warning tone.	Critical error. The symbol is displayed until the display is acknowledged by pressing the push buttons  or  on the display instrument. Residual hazards!
Yellow		Control light (only in case of engine electronics fault), indication on the display, short warning tone.	Uncritical error. The symbol is displayed for approx. 4 seconds Restricted or no function. No residual risk.
White	None	None	Error detected. Error saved. None

10 Shutdown

10.1 Temporary shutdown

10.1.1 Putting the vehicle out of operation

The measures indicated below refer to putting the vehicle out of operation and back into operation again after a longer period of time.

- Stopping and securing the vehicle.
- Jack up the vehicle so that the tires do not touch the ground any more.
- Release parking brake.
- Lower the loader unit fully.
- Reduce the residual pressure in the hydraulic system and bring the control levers to the zero position.
- Spray bare metal parts of the vehicle (e.g. the piston rods of the hydraulic cylinders, if not retracted) with anti-corrosion agent.
- Preserve the engine.

10.1.2 Preserving the engine



NOTICE

Conservation work

The conservation work may only be performed by an authorized service center.

Also observe the operator's manual of the engine!

10.1.3 Storing the battery

- Remove the battery.
- Clean the battery.
- Charge the battery.
- Store the battery in a dry and well-ventilated room at around 20 °C.
- Charge the battery again before installing it.

10.2 Permanent shutdown

10.2.1 Information on permanently putting the vehicle out of operation

If the vehicle is no longer used according to its designated use, ensure that it is put out of operation and disposed of according to applicable regulations.

Do not allow the oil and oily wastes to get into the ground and stretches of water! Dispose of different materials and consumables separately and in an environmentally friendly manner!

Dispose of batteries in an environmentally friendly manner and in accordance with the applicable regulations.

10.2.2 Prior to disposal

- All applicable safety regulations relating to decommissioning the vehicle must be complied with.
- Ensure that the vehicle cannot be operated from decommissioning until further disposal.
- Ensure that there is no leakage of environmentally hazardous fluids and consumables, and that the vehicle presents no other hazards at its storage place.
- Secure the vehicle against unauthorized use! Close all openings (doors, windows, engine hood) and secure the vehicle.
- Install all protective devices.
- Repair leaks in engine, tanks and hydraulic system.
- Store the vehicle in a place that is protected against unauthorized access.

10.2.3 Disposing of the vehicle

- Further recycling of the vehicle must be carried out in accordance with the state of the art valid at the time of recycling and in compliance with the accident prevention regulations.
- All parts must be disposed of in the correct waste disposal sites for the different materials.
- Separate the material as you recycle parts.
- Ensure environmentally compatible disposal of fluids and consumables.

11 Accessories

11.1 Attachments

11.1.1 Information on attachments



NOTICE

Technical damage to the loader unit due to incorrect attachments!

Incorrect attachments can overload the vehicle.

- ▶ Only mount attachments to the vehicle that are listed in this operator's manual.
- ▶ Observe the load diagram to avoid overloads.

Only mount attachments that are listed in this operator's manual, the ABE, the data confirmation or the registration certificate to the vehicle. If other attachments are mounted to the vehicle, an individual operating permit from the competent authorities is required. Please contact your service partner if you require more information.

Information: Use of approved attachments

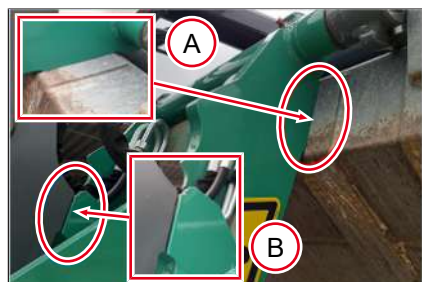


Fig. 260: Dumping and auxiliary stop on the loading system

Only when using the buckets approved in these operating instructions does the

- **A** tipping stop of the loading system rest fully against the back of the bucket.
- **B** Auxiliary stop has no contact.

If this is not the case, a bucket that is not approved for the vehicle will be used! This can lead to serious damage to the charging system.

The operator is solely responsible for any resulting damage. Warranty claims cannot be asserted.

Using the attachments on public roads

Not all attachments are approved for use on public roads. The attachments approved for driving on public roads, as well as the applicable requirements for self-propelled machines, can be found in the ABE, the data confirmation or the registration certificate.

Attachments that are not approved for use on public roads must be dismantled and transported to the place of use using a suitable transport vehicle.

This operator's manual contains descriptions of the following attachments:

- Standard bucket,
- Multipurpose bucket,
- Stacking units

Descriptions of other approved attachments can be found in the operator's manuals of the attachments.

The following tables only describe the attachments for the manufacturer's power coupler. When mounting third-party attachments, observe the instructions for mounting third-party attachments power couplers from third-party manufacturers.

Please contact your service partner if you require more information on the power coupler and the specific attachments.

Type label of the attachments

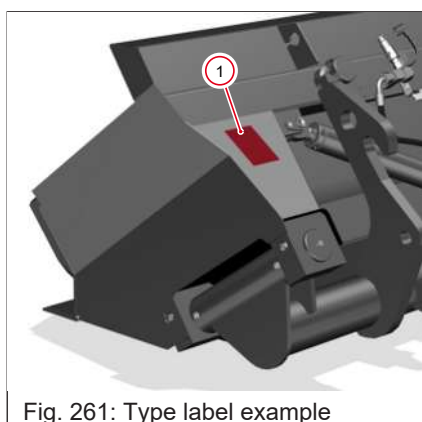
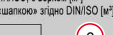
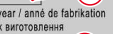
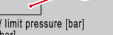


Fig. 261: Type label example

The type label 1 is attached to the rear of the attachment. The type label contains the values given in the table.

 **Wacker Neuson Group**
Kramer-Werke GmbH
Wacker Neuson Strasse 1, D-88630 Pfundlendorf
Tel.: +49 (0) 7552 - 9288 - 0 / info@kramer.de

1  2  3  4  5  6  7  8 

Gerätetyp / Model / Modèle
Тип устройства / Тип пристрою

Fabrik-Nr. / Idend. no. / No. fabr.
Заводской номер / Заводський номер

Tragfähigkeit max. [kg]
Max. load capacity [kg]
Charge limite max. [kg]
Макс. грузоподъемность [кг]
Макс. вантажопідйомність [кг]

Bei Lastschwerpunkt (mm)
load centre (mm)
Distance du centre de la charge (mm)
Растояние до центра нагрузки (мм)
Відстань до центру навантаження (мм)

Schaufeleinheit DIN/ISO gehäuft [m³]
Bucket capacity as per DIN/ISO [m³]
Capacité godet, norme DIN/ISO [m³]
Ємність ковша, DIN/ISO, с верхом [m³]
Ємність ковша з «шайкою» згідно DIN/ISO [m³]

Baujahr / Model year / année de fabrication
Год выпуска / Рік виготовлення

Gewicht [kg] / Weight [kg] / Poids [kg]
Вес [кг] / Maca [кг]

zul. Druck [bar] / limit pressure [bar]
Pression limite [bar]
допустимое давление (бар)
допустимий тиск (бар)

Standsicherheit des Fahrzeuges beachten / observe vehicle stability
Tenir compte de la stabilité du véhicule / Зберігати рівновагу транспортного засобу
Обращать внимание на устойчивость транспортного средства

Bezeichnung in Deutsch
English
Französisch
Russisch
Ukrainisch

verwendbar für Fahrzeugtyp bei Schüttdichte / utilisable pour véhicule modèle avec densité de matériaux en vrac
to use for vehicle model with bulk material density / применительно к типу транспортного средства при насыпной плотности
придатий для типу транспортного засобу з насипною щільністю вантажу

Q = 1,8 t/m³
Q = 1,6 t/m³
Q = 1,4 t/m³
Q = 1,2 t/m³
Q = 1,0 t/m³
Q = 0,8 t/m³
Q = 0,6 t/m³

Fig. 262: Type label

Pos	Naming	Pos	Naming
1	Device type	2	Factory no.
3	Load-bearing capacity	4	With load center in mm
5	Bucket capacity DIN/ISO heaped in m³	6	Year of construction
7	Weight in kg	8	Perm. pressure in bar



Fig. 263: Attachment material number example

In addition, the material number is stamped into the attachment.

11.1.2 Wheel chock



Fig. 264: Wheel chock on the vehicle

Depending of the model, the vehicle has a wheel chock.

- Additionally secure the vehicle on uphill and downhill gradients with a wheel chock on the wheels.
- The vehicle can be secured against unintentional rolling with the wheel chocks.

11.1.3 For attachments approved for use on roads



⚠ WARNING

Risk of accident due to restricted field of vision!

The operator may fail to see persons and objects due to the limited field of vision.

- ▶ Before driving on public roads, check visual aids (e.g. mirrors, camera) for cleanliness, damage and function.
- ▶ Adjust visual aids (e.g. mirrors, camera) before driving on public roads.
- ▶ Check your field of vision before driving on public roads.
- ▶ Do not move the vehicle on public roads if the field of vision is more restricted than permitted.
- ▶ Only use attachments approved for use on public roads.
- ▶ Remove attachments not approved for use on public roads and transport them to the place of use on a transport vehicle.



⚠ WARNING

Risk of injury to persons!

Failure to observe the footnotes may result in personal injury.

- ▶ Observe and adhere to the footnotes in the tables.

**NOTICE****Damage to the vehicle!**

If the footnotes are not observed, the vehicle may be damaged.

- Observe and adhere to the footnotes in the tables.

When driving on public roads (work assignments), use valid lift capacities or bulk material densities for the vehicle and attachment.

No payloads are permitted when traveling on public roads, therefore always have the bucket empty and in transport position.

The distance between the front edge of the attachment and the center of the steering wheel must not exceed 3500 mm for driving on public roads. To this end, it is necessary to move the steering column to the foremost position before driving on public roads.

When driving on public roads with an approved bucket, always make sure that the attachment is equipped with a teeth guard.

- The bucket is emptied and attached to the power coupler.

Attachments for KRAMER quick-change system
**Attachments for KRAMER and KRAMER SMART ATTACH
quick hitch system Variant W03-01**

Attachment	Material number		Width mm	Contents ¹ m ³ / payload kg		Material density ≤ t/m ³	Usage
	KRAMER	MATERIAL NUMBER KRAMER SMART ATTACH					
Stacking device ²	1000543861		1200	Security during		-	Picking up and transporting pallets
				1.25	1.67		
				1310	980		
Bucket without teeth	1000530834		1350	0.45		1.8	Loosening, picking up, transporting and loading of loose or solid material
	1000530835		1650				
	1000530802			0.55			
Bucket with teeth ³	1000530833		1350	0.45			
	1000530837		1650				
Gripper bucket with teeth ³	1000530840	1000530838	1350	0.35			
	1000530805	1000530803	1650				
Gripper bucket without teeth	1000530841	1000530844	1350				
	1000530806	1000530804	1650				

1. Contents heaped pursuant to DIN ISO 7546

2. When driving on public roads (Federal Republic of Germany), the forks must be folded up and secured.

3. Driving on public roads is only permitted when a tooth guard is fitted across the entire width of the bucket.

Attachments for KRAMER and KRAMER SMART ATTACH quick hitch system Variant W03-02							
Attachment	Material number		Width mm	Contents ¹ m ³ / payload kg		Material density ≤ t/m ³	Usage
	KRAMER	MATERIAL NUMBER KRAMER SMART ATTACH					
Stacking device ²	1000543861		1200	Security during		-	Picking up and transporting pallets
				1.25	1.67		
				1125	840		
Bucket without teeth	1000530834		1350	0.45		1.8	Loosening, picking up, transporting and loading of loose or solid material
	1000530835		1650				
	1000530802			0.55			
Bucket with teeth ³	1000530833		1350	0.75			
	1000530837		1650	0.85			
Gripper bucket with teeth ³	1000530840	1000530838	1350	0.35			Grading, removing and scraping vegetation, e.g., picking up and evenly spreading bulk material; grabbing bulky objects.
	1000530805	1000530803	1650				
Gripper bucket without teeth	1000530841	1000530844	1350				
	1000530806	1000530804	1650				
1. Contents heaped pursuant to DIN ISO 7546 2. When driving on public roads (Federal Republic of Germany), the forks must be folded up and secured. 3. Driving on public roads is only permitted when a tooth guard is fitted across the entire width of the bucket.							

Attachments for EURO quick-change system

No attachments have currently been approved by the vehicle manufacturer for this quick-change system.

Your service partner will be happy to provide you with the relevant attachments at any time.

Attachments for WEIDEMANN quick hitch system

No attachments have currently been approved by the vehicle manufacturer for this quick-change system.

Your service partner will be happy to provide you with the relevant attachments at any time.

11.1.4 For attachments not approved for use on roads

**! WARNING****Risk of accident due to restricted field of vision!**

The operator may fail to see persons and objects due to the limited field of vision.

- ▶ Check visual aids (e.g. mirrors, camera) for cleanliness, damage and function before putting into operation.
 - ▶ Adjust visual aids (e.g. mirror, camera) before commissioning.
 - ▶ Check field of vision before putting into operation.
 - ▶ Only use the attachments approved for the vehicle.
 - ▶ Remove obstacles within the work area.
 - ▶ Move the loader unit to the transport position when moving loads.
 - ▶ Ensure a clear field of vision using suitable measures (e.g. guide or camera).
- ⇒ If the field of vision is restricted more than permissible, the vehicle must not be put into operation! If this area extends beyond the 12 m mark, special measures are required. These special measures can consist, for example, of assigning a guide or locking down the work area for persons.

**! WARNING****Risk of injury to persons!**

Failure to observe the footnotes may result in personal injury.

- ▶ Observe and adhere to the footnotes in the tables.

**NOTICE****Damage to the vehicle!**

If the footnotes are not observed, the vehicle may be damaged.

- ▶ Observe and adhere to the footnotes in the tables.

For driving on public roads, the distance from the front edge of the attachment to the center of the steering wheel must not exceed 3500 mm or the field of vision must be restricted only within specified limits. For these reasons, the following attachments are not permitted for driving on public roads.

1. Dismantle the attachments when driving on public roads.
2. Load the attachment on a transport vehicle and transport it to the job site.
3. Observe national regulations regarding driving on public roads

Use loads or bulk material densities valid for the vehicle and the attachment.

For attachments approved for road traffic, if there is no description of putting the attachments into operation or for using them in this operator's manual, refer to the operator's manual of the attachment.

Attachments for KRAMER quick-change system

Attachments for KRAMER and KRAMER SMART ATTACH quick hitch system Variant W03-01							
Attachment	Material number		Width mm	Contents ¹ m³ / payload kg	Material density ≤ t/m³	Usage	
	KRAMER	MATERIAL NUMBER KRAMER SMART ATTACH					
Stacking device	1000536976		1000	Security during		-	Picking up and transporting pallets
				1.25	1.67		
				1310	980		
	1000540864		1200	Security during			
				1.25	1.67		
				1310	980		
Stacking device hydraulic	-	1000546060	Security during				
			1.25	1.67			
			1130	845			
	-	1000546061	Security during				
			1.25	1.67			
			1130	845			
Bucket without teeth	1000266449		1850	1.8		0.8	Loosening, picking up, transporting and loading of loose or solid material
Multiservice bucket	1000530808	1000530809	1650	1.2		0.75	Grading, removing and scraping vegetation, e.g., picking up and evenly spreading bulk material; grabbing bulky objects.
Multipurpose fork	1000535582	1000530839	1650	-		0.8	Picking up and transporting silage, straw and hay.
Bale spike	1000411833		1200	750		-	
Big bale spike, foldable	1000374315		1600	730		-	
Load hook	1000290193		-	790		-	Picking up and transporting loads with lifting tackle (rope, chain, belt)
1. Contents heaped pursuant to DIN ISO 7546.							

1. Contents heaped pursuant to DIN ISO 7546.



Attachments for KRAMER and KRAMER SMART ATTACH quick hitch system Variant W03-02							
Attachment	Material number		Width mm	Contents ¹ m³ / payload kg		Material density ≤ t/m³	Usage
	KRAMER	MATERIAL NUMBER KRAMER SMART ATTACH					
Stacking device	1000536976		1000	Security during		-	Picking up and transporting pallets
				1.25	1.67		
				1300	970		
	1000540864		1200	Security during			
				1.25	1.67		
				1300	970		
Stacking device hydraulic	-		1000546060	Security during			
				1.25	1.67		
				1125	840		
	-		1000546061	Security during			
				1.25	1.67		
				1125	840		
Bucket without teeth	1000266449		1850	1.8		0.8	Loosening, picking up, transporting and loading of loose or solid material
Multiservice bucket	1000530808	1000530809	1650	1.2		0.75	Grading, removing and scraping vegetation, e.g., picking up and evenly spreading bulk material; grabbing bulky objects.
Multipurpose fork	1000535582	1000530839	1650	-		0.8	Picking up and transporting silage, straw and hay.
Bale spike	1000411833		1200	760		-	
Big bale spike, foldable	1000374315		1600	740		-	
Round and rectangular bale tongs	1000177701	1000477601		540		-	
Load hook	1000290193		-	790		-	Picking up and transporting loads with lifting tackle (rope, chain, belt)
1. Contents heaped pursuant to DIN ISO 7546.							

Attachments for EURO quick-change system

Attachments for EURO quick hitch system Variant W03-01						
Attachment	Material number	Width mm	Contents ¹ m³ / payload kg		Material density ≤ t/m³	Usage
Stacking device	1000241148	1200	Security during		-	Picking up and transporting pallets
			1.25	1.67		
			1160	865		

Attachments for EURO quick hitch system Variant W03-02						
Attachment	Material number	Width mm	Contents ¹ m³ / payload kg		Material density ≤ t/m³	Usage
Stacking device	1000241148	1200	Security during		-	Picking up and transporting pallets
			1.25	1.67		
			1160	865		

Attachments for WEIDEMANN quick hitch system

No attachments have currently been approved by the vehicle manufacturer for this quick-change system.

Your service partner will be happy to provide you with the relevant attachments at any time.

12 Technical Data

12.1 Tightening torque

The following table shows the tightening torques for the common screw dimensions installed in the vehicle.

Screw dimensions	Tightening torque in Nm ¹		
	8.8	10.9	12.9
M4	3	4	5
M5	5.5	8	10
M6	10	14	16
M8	23	34	40
M10	46	67	79
M12	79	115	135
M14	125	185	220
M16	195	290	340
M18	280	400	470
M20	395	560	660
M22	540	760	890
M24	680	970	1150
M27	1000	1450	1700
M30	1350	1950	2300
1. These values apply to screws with untreated, unlubricated surfaces.			

12.2 Dimensions

12.2.1 Dimensions with standard bucket W03-01

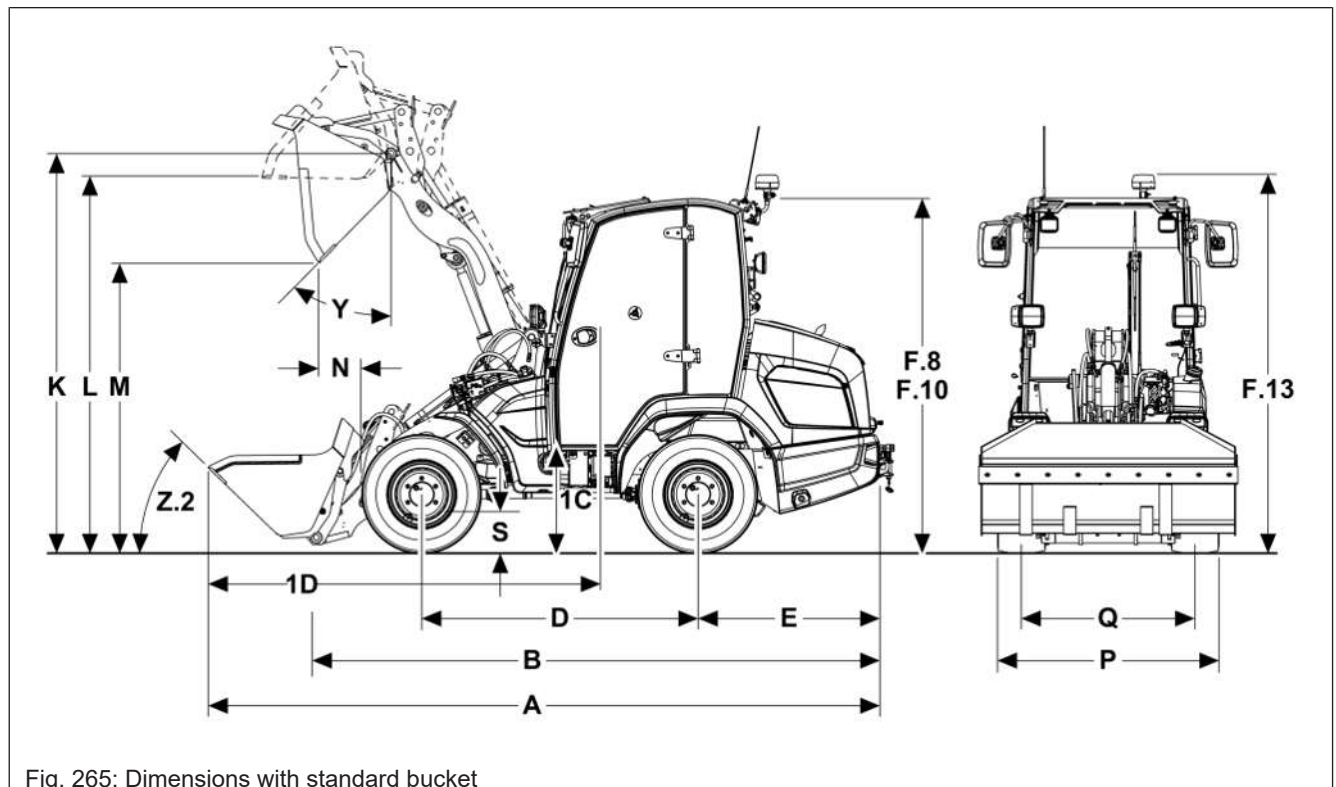
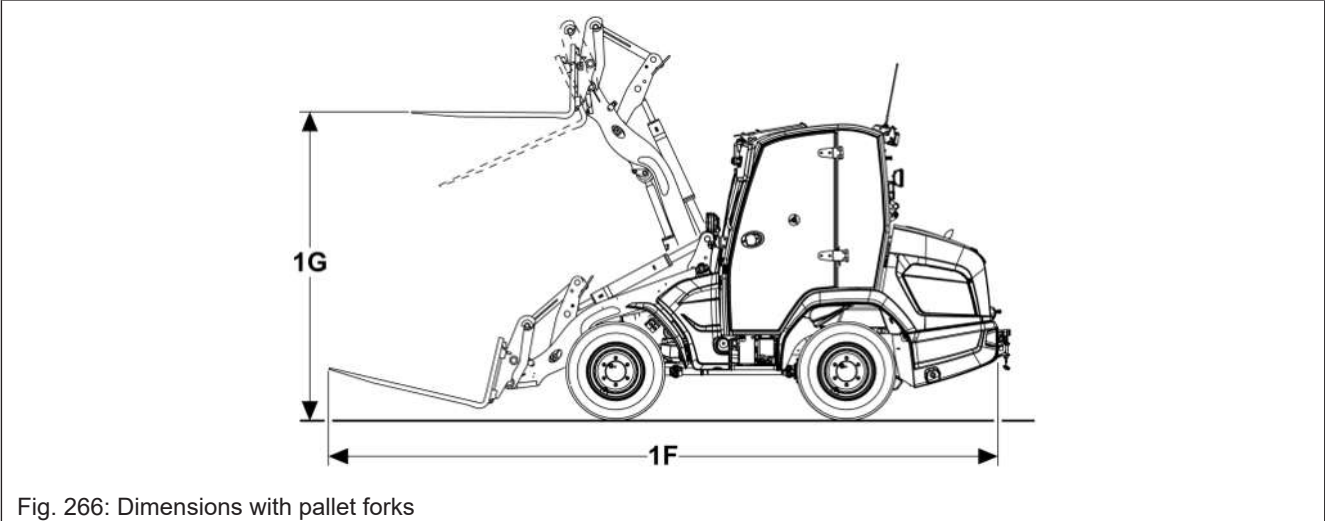


Fig. 265: Dimensions with standard bucket

	Naming		Low cab	High cab
A	Overall length with standard bucket ¹		4550 mm	
B	Overall length without bucket		3830 mm	
D	Wheelbase		1760 mm	
E	Rear overhang		1215 mm	
F.8	Height with cab ²		2110 mm	--
F.10			--	2260 mm
F.13	Total height with rotating beacon ²		2240 mm	2390 mm
K	Max. height of bucket turning point ²		2520 mm	
L	Overhead loading height ²		2350 mm	
M	Tipping/dump height ²		1830 mm	
N	Bulk range/reach at M		240 mm	
P	Overall width ³		1320 mm – 1595 mm	
Q	Track width ³		1055 mm – 1185 mm	
S	Ground clearance ²	Load system in transport position	200 mm	
		Raised load system	230 mm	
Y	Dumping angle at max. lift height		45°	
Z.2	Rollback angle in transport position		45°	
1C	Entrance height ²		690 mm	
1D	Front edge of bucket to center of steering wheel ⁴		2700 mm	

	Naming	Low cab	High cab
1.	With standard bucket and trailer coupling		
2.	Measured with standard tires: 10.0/75-15.3 Height with tires 31x15.5-15 +30 mm, 10.0-16.5 0 mm; 31x15.50-15 0 mm; 315/55R16 0 mm		
3.	Depending on the tires, with folded mirrors.		
4.	With standard bucket		

12.2.2 Dimensions with stacking device W03-01



	Naming	
1F	Total length of vehicle with stacking device	4960 mm
1G	Overhead loading height/stacking height	2420 mm

12.2.3 Dimensions with standard bucket W03-02

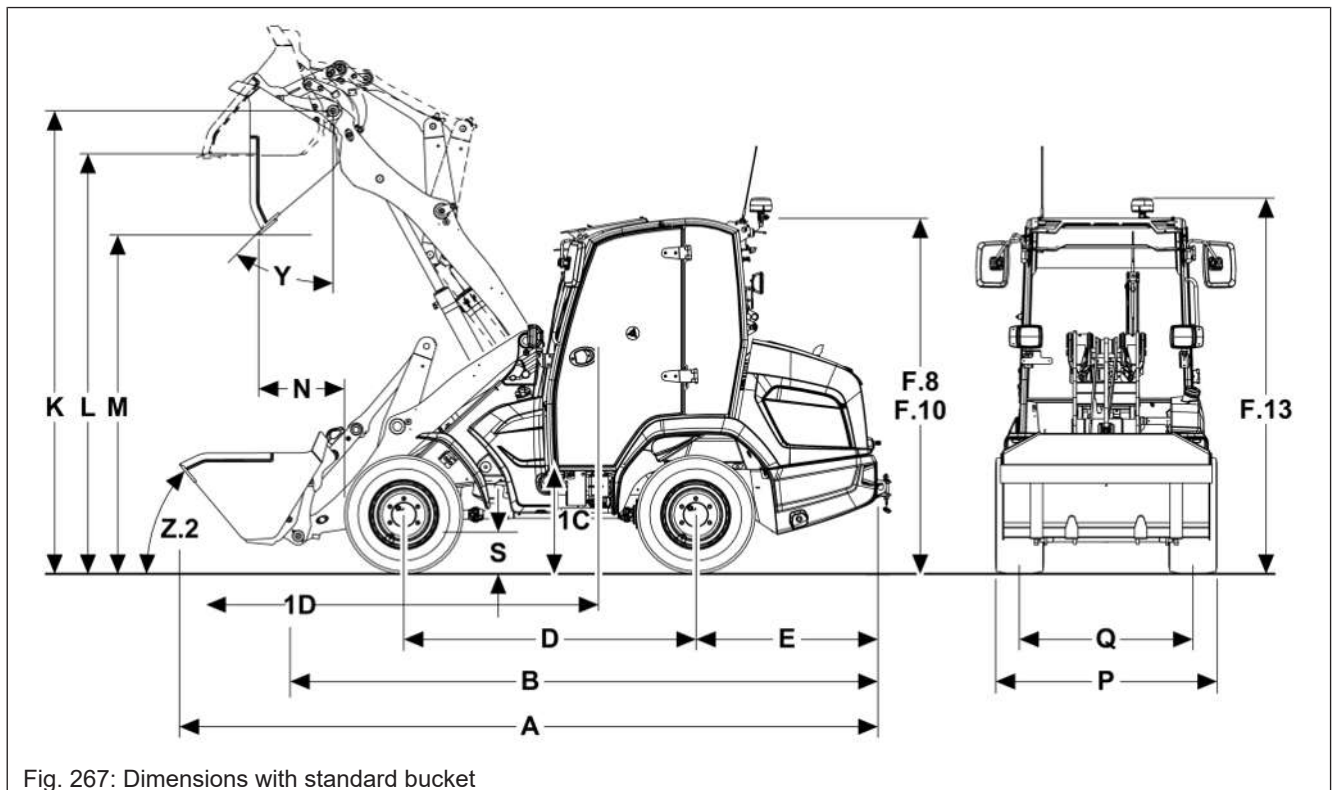


Fig. 267: Dimensions with standard bucket

	Naming		Low cab	High cab
A	Overall length with standard bucket ¹		4680 mm	
B	Overall length without bucket		3947 mm	
D	Wheelbase		1860 mm	
E	Rear overhang		1215 mm	
F.8	Height with cab ²		2110 mm	--
F.10			--	2260 mm
F.13	Total height with rotating beacon ²		2240 mm	2390 mm
K	Max. height of bucket turning point ²		2913 mm	
L	Overhead loading height ²		2620 mm	
M	Tipping/dump height ²		2120 mm	
N	Bulk range/reach at M		470 mm	
P	Overall width ³		1320 mm – 1595 mm	
Q	Track width ³		1055 mm – 1185 mm	
S	Ground clearance ²	Load system in transport position	200 mm	
		Raised load system	230 mm	
Y	Dumping angle at max. lift height		45 %	
Z.2	Rollback angle in transport position		50°	
1C	Entrance height ²		690 mm	
1D	Front edge of bucket to center of steering wheel ⁴		2730 mm	

	Naming	Low cab	High cab
1.	With standard bucket and trailer coupling		
2.	Measured with standard tires: 10.0/75-15.3 Height with tires 31x15.5-15 +30 mm, 10.0-16.5 0 mm; 31x15.50-15 0 mm; 315/55R16 0 mm		
3.	Depending on the tires, with folded mirrors.		
4.	With standard bucket		

12.2.4 Dimensions with stacking device W03-02

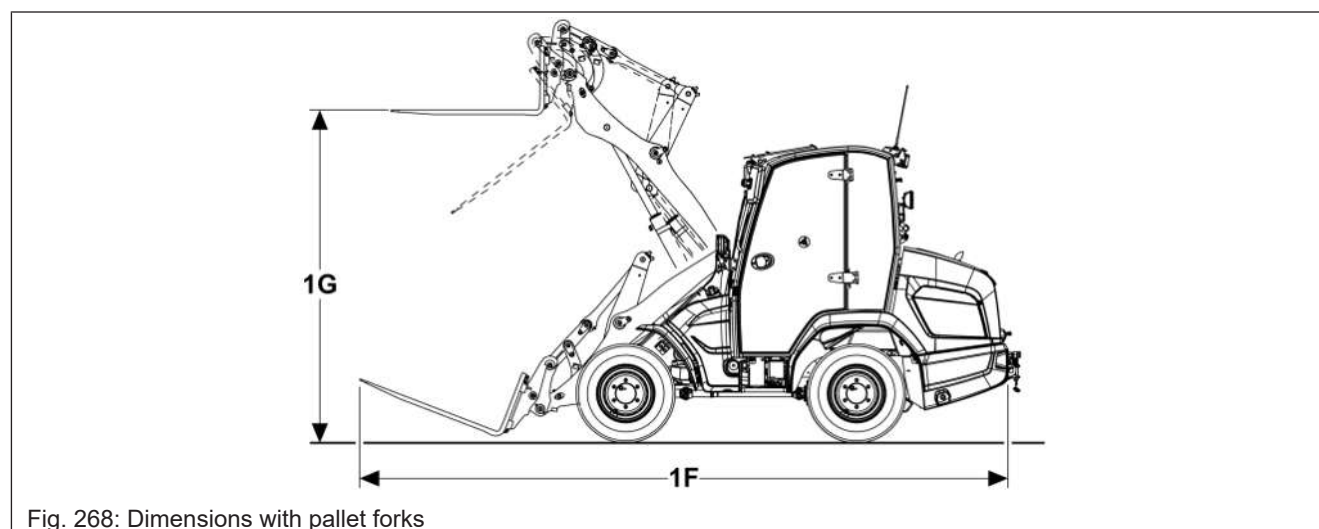


Fig. 268: Dimensions with pallet forks

	Naming	
1F	Total length of vehicle with stacking device	5170 mm
1G	Overhead loading height/stacking height	2720 mm

12.3 Weights

12.3.1 Weight of the vehicle

The operating weight of the vehicle is printed on an information label in the cab. Information label Operating mass.

	Variant W03-01	Variant W03-02
Wheel loader	Specifications in kg	
Tare weight ¹	2475	2725
minimal	2755	3005
maximal		
Transport weight with cab ²	2400	2650
Minimum equipment	2680	2930
Full equipment		
Permissible total weight	4000	
Permissible axle load	2640	
front	2640	
rear		

	Variant W03-01	Variant W03-02
Wheel loader	Specifications in kg	
1. Machine without attachment , with full diesel tank, with driver. The empty weight can vary according to equipment and options		
2. Machine without attachment, full tank, without driver.		

12.3.2 Trailer loads and drawbar loads

Permissible trailer load in kg		
Wheel loader	Variant W03-01	Variant W03-02
Trailer without brakes	750	
Trailer with brakes (1 axle braked)	3500	
Trailer with brakes (all axles braked)		

Overview front ballast mass ¹			
Wheel loader	Standard bucket in kg	Number of casting weights per set ¹	Total weight in kg per set with carrier ²
Variant W03-01	201	0	-
	-	1	210
		2	330
		3	450
Variant W03-02	201	0	-
	-	1	210
		2	330
		3	450

1. During trailer operation, the described front ballasting or a comparable balancing load must be attached.
2. Article number cast weight 1000389626
3. Article number carrier 10002373638

Maximum permissible drawbar loads in kg			
Trailer coupling type		Ball-type hitch	Automatic trailer coupling
Wheel loader	Front ballast in kg		
Variant W03-01	450	150	250
Variant W03-02	450	150	250

12.4 Engine

12.4.1 Radiator technical data

Outside temperature	Water proportion ¹⁾	Anti-freeze share ²⁾
up to °C	Vol. %	Vol. %
-28	60	40
-35	55	45
-41	50	50

1. Water quality at 20 °C = 6.5 - 8.5 pH value / total hardness 3-20°dGH

2. To avoid engine damage and loss of possible warranty, use only an approved coolant, fill quantities are approximate.

Unit	Data
Hydraulic pump	Gear pump
Displacement	16 cm³/rev

12.4.2 Engine data

Yanmar 3TNV82A-BNNBK ¹	
Exhaust-emission level ²	EU level V
Design	Water-cooled 4-stroke diesel engine
Number of cylinders	3
Displacement	1331 cm³
Power at rated speed	18.5 kW
Maximum rated speed	2500 rpm
Vehicle fluid	Diesel
Fuel injection system	Direct injection, mechanical
Maximum permissible inclination	30°
Max. tilting position (ensuring engine lubricating oil supply)	25° in all directions Consider tipping limit ³ (20° sideways) of the vehicle!

1. The exhaust gas values comply with the Regulation (EU) 2016-1628 and/or the successor directives/regulations.

2. Further information can be found on the engine nameplate

3. Loader unit in transport position.

Yanmar 3TNV86CHT-MNKR ¹	
Exhaust gas emission level ²	EU Stage V / US EPA Tier4f
Design	Water-cooled 4-stroke diesel engine
Number of cylinders	3
Displacement	1568 cm³
Power at rated speed	33.3 kW
Maximum rated speed	2600 rpm
Vehicle fluid	Diesel
Fuel injection system	Direct injection, Common Rail
Maximum permissible inclination	30°

Yanmar 3TNV86CHT-MNKR¹	
Max. tilting position (ensuring engine lubricating oil supply)	25° in all directions Consider tipping limit ³ (20° sideways) of the vehicle!
1. The exhaust gas values comply with the Regulation (EU) 2016-1628 and/or the successor directives/regulations. 2. Further information can be found on the engine nameplate 3. Loader unit in transport position.	

12.5 Emissions

12.5.1 Noise values

The actual noise emission may deviate from the specified values under certain operating conditions.



Information

The measurement is carried out according to the requirements of standard EN 474, directive 2000/14/EG and delegated regulation (EU) 2018/985.

Measurement site: Asphalted surface.

Noise level (self-propelled machine)

External noises			
Type	Diesel engine kW (hp)	Sound power level L_{WA}	dB(A)
W03	18.5 (25.1)	Measured value	96.9
		Guaranteed value	101
		Sound pressure level L_{pA}	dB(A)
		Standing noise	72
		Driving noise	78
	33.3 (45.3)	Measured value	99.1
		Guaranteed value	101
		Sound pressure level L_{pA}	dB(A)
		Standing noise	76
		Driving noise	81

Noise level at the driver's ear ¹			
Type	Diesel engine kW (hp)	Sound pressure level L_{pA}	dB(A)
W03	18.5 (25.1)	Measured value	76
	33.3 (45.3)	Measured value	77

¹ Closed cabin

12.5.2 Vibration

Vibrations ^{1,2}	
Total vibration value of the upper limbs ³	< 2.5 m/s ²
Maximum effective value of weighted acceleration for body ³	< 0.5 m/s ²
Maximum effective value of weighted acceleration for body ⁴	< 1.28 m/s ²
1. Inform and instruct operators regarding the dangers due to vibrations 2. The uncertainty of the vibration measurement is determined in accordance with the requirements of the DIN EN 474-1 and EN 12096 standards. 3. On level and firm ground with appropriate driving style. 4. Use in recovery under harsh environmental conditions with consideration of measurement uncertainty as specified in ISO/TR 25398:2006.	

12.6 Electrical system

12.6.1 Fuses and relays

12.6.1.1 Cab fuse box

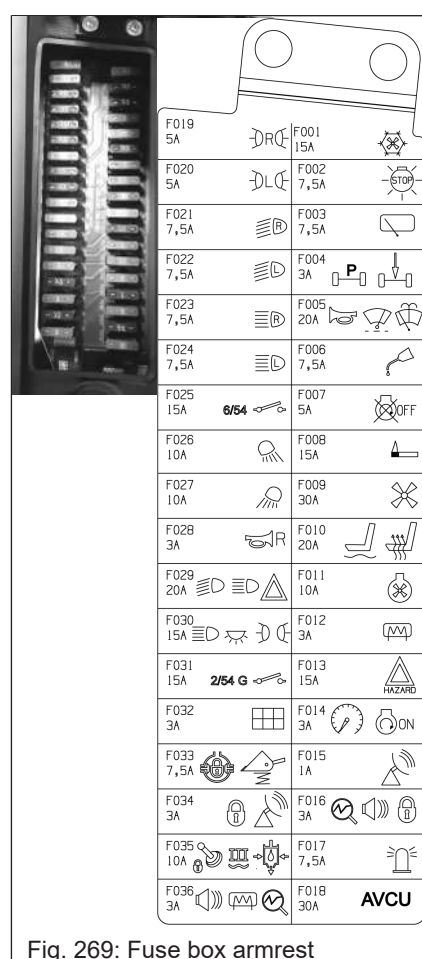


Fig. 269: Fuse box armrest

No.	Rated current (A)	Protected circuit
F001	15	Fan air conditioning system
F002	7.5	Brake light
F003	7.5	Rear window wiper
F004	3	Steering sensor on rear axle, rotational speed sensor on hydraulic engine, ECU engine control
F005	20	Signal horn, front window wiper, washer system
F006	7.5	Central lubrication system
F007	5	Fuel supply pump
F008	15	Cigarette lighter
F009	30	Heating
F010	20	Air-sprung seat, heated seat
F011	10	Fan Charge air
F012	3	Rear window heating
F013	15	Hazard warning system
F014	3	High current relay glow, high current relay start, buzzer
F015	1	Telematic
F016		Supply diagnostics, radio, drive interlock
F017	7.5	Rotating beacon
F018	30	AVCU

No.	Rated current (A)	Protected circuit
F019	5	Right turn signal indicator
F020	5	Left turn signal indicator
F021	7.5	Right low beam
F022	7.5	Left low beam
F023	7.5	Right high beam
F024	7.5	Left high beam
F025	15	Front plug receptacle signal 2
F026	10	Work light rear
F027	10	Work light front
F028	3	Backup warning system
F029	20	Turn signal indicator, light / low beam/high beam
F030	15	Flasher, interior lighting; parking light
F031	15	Front plug receptacle signal 1
F032	3	Diagnostic connector OBD
F033	7.5	Differential lock, load stabilizer
F034	3	Drive interlock, Telematic
F035	7.5	Pressure relief hydraulics, road block, joystick locking, 3rd control circuit
F036	3	Radio, diagnostics supply: Rear window heating, additional control circuit,

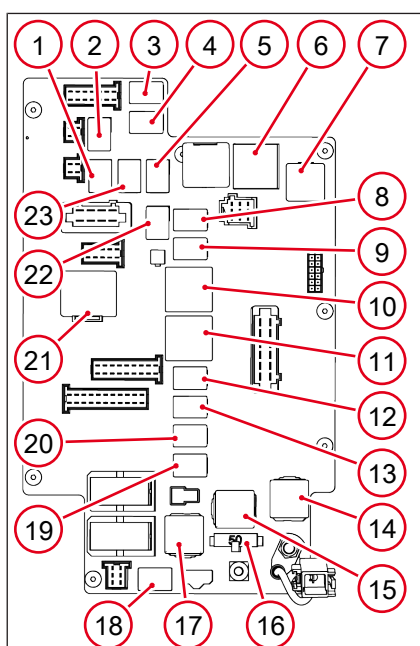


Fig. 270: Printed circuit board relay

Item	Naming	Rated current (A)	Protected circuit
1	K016	20/35	Front plug receptacle
2	K003	20/35	Drive reverse
3	K048	20/35	Work light
4	K049	20/35	Work light
5	K054	20/35	Pipe rupture protection
6	K025		Interval relay
7	K023	50/30	Wiper level 1
8	K053	20/35	Fans
9	K030	20/35	Brake light
10	K027	10/15	Time relay 5 min.
11	K087	30	Time relay (general)
12	K056	20/35	Load stabilizer
13	K021	20/35	Differential lock
14	K001	70	High current relay
15	K002	70	High current relay

Item	Naming	Rated current (A)	Protected circuit
16	F036	50	Window heater
17	K033	70	Printed circuit board
18	K196	20/35	EquipCare
19	K022	20/35	Load stabilizer
20	K041	20/35	Road travel
21	K010		Blink relay
22	K105	20/35	Hand brake switch
23	K134	20/35	Front plug receptacle

12.6.1.2 Fuse box Engine compartment 18.5 kW

The main fuse box is located in the engine compartment.

Main fuse box: Check/change fuses and relays

✓ Preparation for maintenance in the engine compartment

1. Remove cover from fuse box
2. Replace defective fuses and relays
3. Check the electrical system for correct function

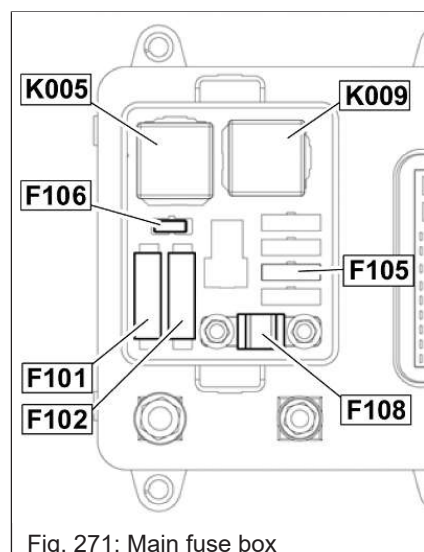


Fig. 271: Main fuse box

Fuses/relays	Rated current (A)	Protected circuit
F101	40	Pre-glowing
F102	40	Stopping solenoid, starter
F105	30	N001 Electronics traveling drive
F106	5	N001 Electronics traveling drive
F108	80	Main fuse
K005		High current relay annealing
K009		High-current relay stopping solenoid

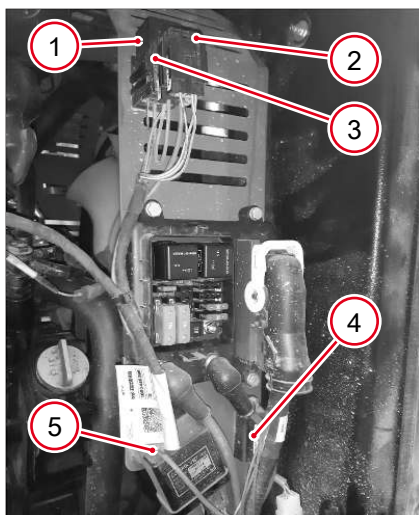


Fig. 272: Fuse box Engine compartment

	Fuses/relays	Rated current (A)	Protected circuit
1	K007		Start relay
2	F036	3	K001 Terminal 15
3	F037	50	Terminal 30
4	K031		Fuel preheating
5	K008		Time relay stop solenoid

12.6.1.3 Fuse box Engine compartment 33.3 kW

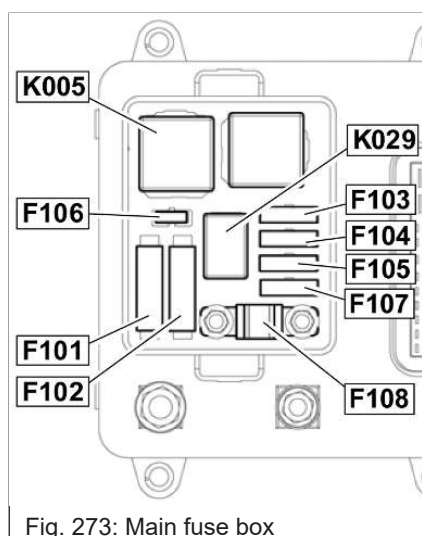


Fig. 273: Main fuse box

Fuses	Rated current (A)	Protected circuit
F101	40	Pre-glowing
F102	60	Start relay
F103	20	N005 Electronics engine control
F104	20	Relay EGR valve, throttle valve, EGR valve
F105	30	N001 Electronics traveling drive
F106	5	N001 Electronics traveling drive
F107	30	N016 Electronics add-on
F108	80	Main fuse
K005		High current relay annealing
K007		Start relay
K029		Relay EGR valve

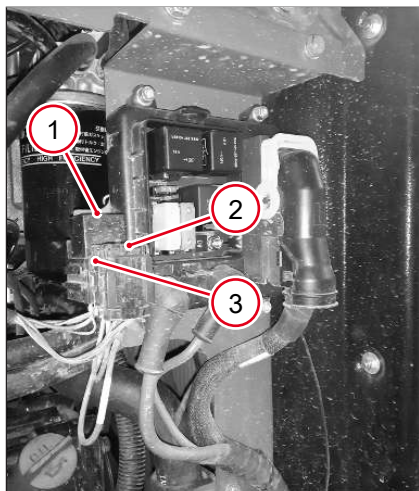


Fig. 274: Fuse box Engine compartment

	Fuses/ relays	Rated current (A)	Protected circuit
1	K031		Fuel preheating
2	F036	3	K001 Terminal 15
3	F037	50	Terminal 30

12.6.2 Electric aggregate/incandescent lamps

Electric units

Naming	Power	
	18.5 kW	33 kW
Three-phase generator	12 V 55 A	12 V 80 A
Starter	12 V 1.7 kW	
Battery	12 V / 74Ah 680A	

Light bulb	
Naming	Power
High beam (left/right)	12 V 55 W 1500 lm
Low beam (left/right)	
Parking light (left/right)	12 V 4 W
Front and rear turn indicators (left/right)	12 V 21 W
Brake tail light (left/right)	12 V 21/5 W
Working light	12 V 15 W 1000 lm
Alternative: LED – work light	12 V 30 W 2200 lm
Rotating beacon	12 V 17 W
Interior light	12 V 10 W

12.7 Drive system

12.7.1 Tires

Tires for vehicles with ABE approval

Tire size ¹	Tire pressure		Disc wheels	
	front in bar	rear in bar	Rim	Insertion depth in mm
BKT 10-16.5 120 A8 Skidpower	3.0	3.0	16.5x8.25	50
BKT 10.0/75-15.3 118 A8 AS 504 ^{2, 3}			15.3x9	55
Continental 315/55 R 16 120 K MPT81	3.5	3.5	16x10LB	30
BKT 31X15.5-15 120A6 TR313	2.5	2.5	15x13	-10
BKT 31X15.5-15 125 A8 Skidpower				-10
1. If the tire size is changed, a software adjustment by the authorized service center is required.				
2. Standard tires				
3. Attach snow chains to these tires of front wheels only.				

12.7.1.1 Tightening torques for wheels

Tightening torque for wheels

Naming	Tightening torque
Wheel nuts	390 ^{±10} Nm

12.8 Hydraulics

12.8.1 Data of working hydraulics

12.8.1.1 Hydraulic pump

Hydraulic pump, control device, hydraulic reservoir		
Engine	18.5 kW	33.3 kW
Hydraulic pump	Gear pump	
Installation location	Drive-through drive pump	
Displacement	39 l /min	40 l /min
Control valve	OC	
Filter	Return flow filter and feed pressure filter	
Functionality of working hydraulics	OC throttle control	

12.8.1.2 Hydraulic cylinder protection

Hydraulic cylinder protection in bar		
Wheel loader	Variant W03-01	Variant W03-02
Max. operating pressure ¹	240	
Tilting cylinders (secondary protection)		
rod side	270	270
floor side	180	270
Lifting cylinder (secondary protection)		
floor side	280	
1. Measured at the test connection control device		

12.8.1.3 Cylinder speeds

Speeds lift and tilting cylinder		
Wheel loader	Variant W03-01	Variant W03-02
Lifting cylinder ¹		
raise	4.4 s	6.1 s
lower	2.3 s	3.4 s
Tilting cylinder ¹		
tilt in	2.7 s	2.7 s
tilt out	3.5 s	1.5 s
1. With load or pipe burst protection, the times can be longer!		

12.8.1.4 Usable working pressure

3rd control circuit		
Engine	18.5 kW	33.3 kW
Rotational speed (l/min)	bar / l/min / kW	bar / l/min / kW
1500	230 / 18 / 4.0	230 / 19 / 4.2
1900	230 / 23 / 4.8	230 / 26 / 5.7
2600 ¹	230 / 33 / 6.9	230 / 38 / 8.0
1. Rated speed		

3rd control circuit - pressureless return		
Engine	18.5 kW	33.3 kW
Rotational speed (l/min)	bar / l/min / kW	bar / l/min / kW
1500	230 / 18 / 4.0	230 / 19 / 4.2
1900	230 / 23 / 4.8	230 / 26 / 5.7
2600 ¹	230 / 34 / 7	230 / 39 / 8.4
1. Rated speed		

Additional control circuit V front external Return pump 17 ccm		
Engine	18.5 kW	33.3 kW
Rotational speed (l/min)	bar / l/min / kW	bar / l/min / kW
1500	--	180 / 15 / 2.6
1900	--	180 / 20 / 3.4

Additional control circuit V front external Return pump 17 ccm		
2600 ¹	--	180 / 29 / 5.0
1. Rated speed		

Additional control circuit V front external Return pump 17 + 11 ccm		
Engine	18.5 kW	33.3 kW
Rotational speed (l/min)	bar / l/min / kW	bar / l/min / kW
1500	--	180 / 33 / 5.9
1900	--	180 / 44 / 7.6
2600 ¹	--	180 / 64 / 11.1
1. Rated speed		

Tipper connection		
Engine	18.5 kW	33.3 kW
Rotational speed (l/min)	bar / l/min / kW	bar / l/min / kW
1500	230 / 19 / 4.1	230 / 20 / 4.6
1900	230 / 25 / 5.2	230 / 27 / 6.0
2600 ¹	230 / 35 / 6.6	230 / 39 / 8.3
1. Rated speed		

12.8.2 Drive hydraulics data

Variable displacement pump	
Design	Infinitely variable axial piston pump
Control	Electrical-hydraulic, proportional delivery volume adjustment
Drive direction	Electrical-hydraulic adjustment through swiveling angle reversal
Inching	Electrically via proportional controller (rotary potentiometer)
Displacement	28 cm ³ /U
Max. operating pressure (Operating pressure dp)	410 bar
Starting rotational speed	1200 rpm/bar
Depression	2400 rpm/bar

Feed pump	
Design	Internal gear pump
Displacement	8.6 cm ³ /U
Charging/boost pressure	25 bar
Control	Constant pump, displacement depends on the rotational speed of drive

Variable displacement engine	
Design	Axial piston engine (swash plate design), electro-hydraulic, proportional displacement adjustment
Displacement	60.8 cm ³ /rev
Tensile force (static/dynamic)	20/21 kN

Driving speeds / speed limits ¹			
Speed range tortoise			
			
Steering modes	PWR	ECO	CSD
 Four-wheel	10 km/h	10 km/h	10 km/h
 Front axle	10 km/h	10 km/h	10 km/h
 Crab steering	10 km/h	10 km/h	10 km/h
1. Maximum speed forward and backward / with standard tires 10.0/75-15.3			

Driving speeds / speed limits ¹				
Speed range rabbit				
				
Steering modes	PWR	ECO	CSD via gas pedal	CSD via manual gas lever
 Four-wheel	18.5 kW engine: 20 km/h 33.3 kW engine: 20 or 30 km/h	33.3 kW engine: 20 or 30 km/h	15 km/h	15 km/h
 Front axle	18.5 kW engine: 20 km/h 33.3 kW engine: 20 or 30 km/h	33.3 kW engine: 20 or 30 km/h	15 km/h	15 km/h
 Crab steering	15 km/h	15 km/h	15 km/h	15 km/h
1. Maximum speed forward and backward / with standard tires 10.0/75-15.3				

12.9 Bearing load

12.9.1 Payload and bearing load

The payload and bearing load data refer to criteria in which the vehicle is located on level and load-bearing ground. If the vehicle is used under conditions which deviate from these criteria, e.g. on soft or uneven ground, on slopes or if loads can slip, these conditions must be observed by the operator.

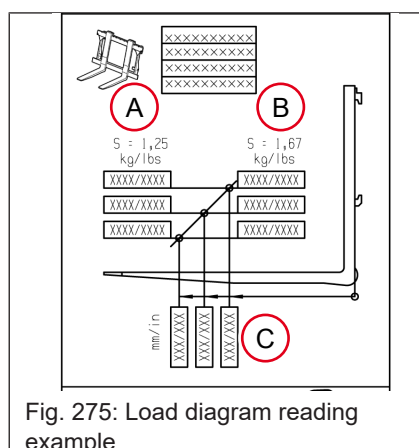
When the tires are filled with water, the payloads and bearing loads change.

12.9.1.1 Loads and forces

Payload with bucket

Payload with KRAMER quick hitch system and bucket		
Wheel loader	W03-01	W03-02
Bucket capacity ¹	0.45 m ³	
Tipping load	2270 kg	2115 kg
Payload	810 kg / 1130 kg	810 kg / 1055 kg
Breakaway force ² : lifting cylinder	23.5 kN	28.6 kN
Breakaway force: tilting cylinder	28.3 kN	33.1 kN
Scraping depth ³	50 mm	55 mm
1. Contents heaped (Material number bucket 1000530833) 2. Lifting cylinder breakaway force - hydraulic 3. Measured with standard tires: 10.0/75-15.3		

Payload with stacking device



Payload with KRAMER quick hitch system and stacking device ¹			
Payload	Load center (C)	W03-01	W03-02
Payload safety factor 1.25 (A)	500 mm	1310 kg	1300 kg
	600 mm	1240 kg	1235 kg
	700 mm	1170 kg	1175 kg

Payload with KRAMER quick hitch system and stacking device ¹			
Payload	Load center (C)	W03-01	W03-02
Payload safety factor 1.67 (B)	500 mm	980 kg	970 kg
	600 mm	920 kg	925 kg
	700 mm	870 kg	880 kg
Mobile payload ² transport position: safety factor 1.25 (A)	500 mm	1490 kg	1590 kg
Mobile payload ² transport position: safety factor 1.67 (B)	500 mm	1110 kg	1190 kg
1. Permissible lift capacity to stacking device 1000536976 2. The maneuverable payload is permissible only in the transport position of the loader unit and is not listed in the working load diagram.			

Payloads with load hooks on the tilt rod

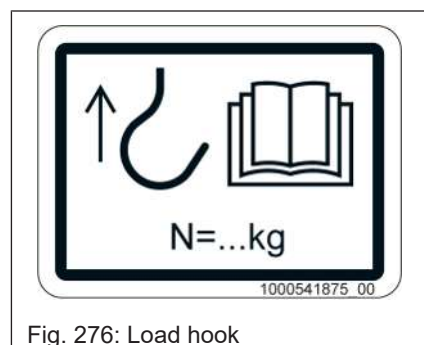


Fig. 276: Load hook

Payload with load hooks

Payload ¹ with KRAMER quick hitch system and load hooks	W03-01	W03-02
Payload with the loader unit stretched and the quick hitch system tipped out	980 kg	1070 kg
Payload with the loader unit stretched and the quick hitch system tilted	1410 kg	1330 kg
1. The payloads must be observed using lifting tackle (chains, rope, trailer hitch).		

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