



**KRAMER**  
*on the safe side*

# Operator's Manual

## Wheel loader

**8155/8155L**  
**8180/8180L**



Type / Variant  
Material number  
Version  
Date  
Language

355-02/-04/-05/-06  
1000380530  
3.0  
11/2019  
[en]



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# KRAMER

## EC / EU Declaration of Conformity

### Manufacturer

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

### Product

Vehicle designation	Wheel Loader
Type/Variant	355 / 355-02,-04,-05,-06
Trade name	8155/8155L 8180/8180L
Chassis number	WNK355 __ _xxxxx _ _ _ _
Power kW	100-115
Measured sound power level dB(A)	101,1
Guaranteed sound power level dB(A)	102

### Conformity assessment procedure

according to directive 2000/14/EC, EU official register L162 from 7/3/2000

### Office named in the procedure

Europäisch notifizierte Stelle, Kenn-Nr. 0515 DGUV Test, Prüf- und Zertifizierungsstelle,  
Fachbereich Bauwesen  
Am Knie 6, 81241 München, Germany

### Directives and standards applied

We hereby declare that this product satisfies the relevant provisions of these Directives:

according to directive 2006/42/EC, EU official register L157 from June 09, 2006  
according to directive 2014/30/EU, EU official register L96 from March 29, 2014  
EN 474-1:2006+A5:2018, EN 474-3:2006+A1:2009, EN 13309:2010  
ISO/TR 25398:2006

### Authorised representative for the compilation of the technical file

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

Pfullendorf, \_\_. \_\_. \_\_\_\_

T. Tilly  
Director





# KRAMER

## Declaration of manufacturer

Owing to the exhaust emission values, this vehicle is not licensed for use inside the European Union (EU).

### Manufacturer

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

### Product

Machine designation	Wheel loader
Type / version	355 / 355-02,-04,-05,-06
Trade name	8155/8155L 8180/8180L
Serial number	WNK355 __xxxxx __ _ _
Output in kW (Exhaust fume values do not correspond to the EU standards for low-emission engines)	100-115

The following standards and/or technical specifications have been used for the proper application of the requirements regarding safety and health stated in the EC Directives:

2006/42/EG, 2000/14/EG, 2014/30/EU,  
EN 474-1:2006+A5:2018, EN 474-3:2006+A1:2009, EN 13309:2010

### Authorized representative for the compilation of technical documentation

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T. Tilly  
Managing director



## **3 Preface**

### **3.1 Operator's manual**

#### **3.1.1 Information on this operator's manual**

- This operator's manual is only valid for the vehicles listed on the title page.
- 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.
- Technical specifications, dimensions and weights are not binding and correspond to the state at the time of printing. Responsibility for errors or omissions not accepted.
- 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.

### 3.1.2 Storing the operator's manual

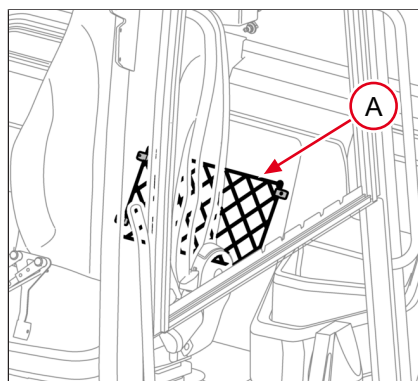


Fig. 1: Storage location for the operator's manual

The operator's manual and any supplements are part of the vehicle and must be available to the operator at all times. The vehicle is equipped with a storage location for the operator's manual.

The storage location is a position **A** in the cab.

### 3.1.3 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 operating activities that must be read in order to operate the vehicle safely and efficiently.

On the other hand, this operator's manual is intended for the operating company of the vehicle. It provides him with the necessary information to ensure safe working conditions for the personnel deployed and, if necessary, to take measures to protect the operating personnel.

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
①	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.

Symbol	Explanation
[▶ 52]	Indicates a cross-reference in tables. Here e.g. reference to page 52

## Explanation of symbols



### Symbol for warning notices

This symbol is a warning symbol. It is used to alert you to potential hazards. The safety symbol is always followed by a signal word, which indicates the hazard. These warnings are to be observed in particular. This protects the operator and third parties from personal injury and damage to property.



### 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.



### Symbol for compliance with EC directives

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

## 3.1.3.1 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)
o/h	Operating hours
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
LED	Light-emitting diode
LWA	Sound power level
MVCU	Multi Variable Control Unit (electronic control unit in the vehicle)

Abbreviation	Meaning
ROPS	Roll Over Protection Structure
SAE	Society of Automotive Engineers (viscosity class of engine oil)
SCR	Selective Catalyst Reduction (exhaust gas aftertreatment with urea)

### 3.1.4 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.
- In Germany, the Operational Safety Ordinance (BGV A1/Be-trSichV §10) requires the buyer or operating company to have the vehicles and attachments inspected regularly.
  - In other countries, observe the relevant national regulations.

### 3.1.5 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.
- The operator must have received instruction on the vehicle before the first journey or the first operation.
- 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 22](#).
- 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.

## **3.2 Warranty and liability**

### **3.2.1 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.

### **3.2.2 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).

## 4 Usage

### 4.1 Use of the vehicle

#### 4.1.1 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 danger 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.



#### Information

The vehicle can be used as a self-propelled work machine if registered accordingly (EC agricultural or forestry registration).

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. working 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.

### 4.1.2 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 not the manufacturer, shall be liable for damage resulting from this.

Such misapplications of the vehicle are, for example:

- The use of areas and rooms that are not described as work or maintenance areas in these 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 of the vehicle for demolition work.
- The use of the vehicle for spraying or sprinkling.
- Use for forestry applications.
- The use of the vehicle 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.
- The use of non-approved or non-original spare parts.

### 4.1.3 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, one of the following driving licenses is required to drive a vehicle in accordance with § 6 of the 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.

### 4.1.4 License and identification

#### 4.1.4.1 Vehicle registration

The vehicle can be registered in the EU member states as a self-propelled work machine tractor (EC tractor approval). 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!

No attachments are listed in the certificate of approval if the machine is operated as a tractor (EC tractor approval). Only those attachments, with the corresponding conditions, that are listed in this operator's manual are permitted.

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.

Refer to the information in this operator's manual for the stability test [see Use third-party attachments on page 256](#).



## Information

Warranty and the operation license become void if non-approved attachments are installed, or if parts of the quickhitch facility or attachment (with a prescribed condition or quality, or the operation of which can put persons at risk) are subsequently modified or replaced.

**4**

### 4.1.4.2 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.

### 4.1.4.3 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
- 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.

### 4.1.4.4 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.

#### 4.1.4.5 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.

#### 4.1.4.6 Vehicle inspections

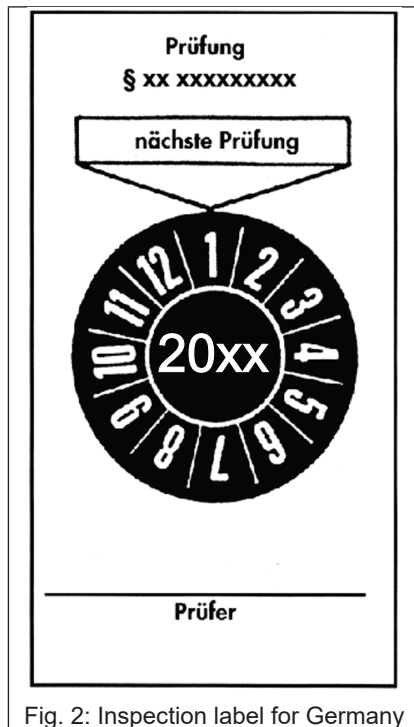


Fig. 2: Inspection label for Germany

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.

## **4.2 Limits of the vehicle**

### **4.2.1 Spatial limits of the vehicle**

The use outside the spatial limits is an application not intended by the manufacturer of the vehicle and thus constitutes a misuse within the meaning of the Machinery Directive. The operator is solely liable for any resulting personal injury or damage to property.

The vehicle is intended for the following applications:

- Agriculture
- Construction industry
- Industry
- Local authorities
- Gardening and landscaping

The vehicle is not to be used in the following areas:

- Partial or complete operation under water
- Below-ground or mining applications
- Operation in enclosed areas
- Operation in potentially explosive areas
- Operation in contaminated areas

### **4.2.2 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.

## 5 Safety

### 5.1 Safety symbols and signal words

The following symbol identifies safety instructions. It is used for warning against potential personal risk or danger.



#### **DANGER**

**DANGER** identifies a situation causing death or serious injury if it is not avoided.

Consequences in case of non-observance.

- Avoidance of injury or death.



#### **WARNING**

**WARNING** identifies a situation that can cause death or serious injury if it is not avoided.

Consequences in case of non-observance.

- Avoidance of injury or death.



#### **CAUTION**

**CAUTION** identifies a situation that can cause injury if it is not avoided.

Consequences in case of non-observance.

- Avoidance of injury.



#### **NOTICE**

**INFORMATION** identifies a situation that causes damage if it is not observed.

Consequences in case of non-observance

- Avoidance of damage to property.

## **5.2 Qualification of operating personnel**

### **5.2.1 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.

### **5.2.2 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 operators who are fully aware of the risks involved in operating the vehicle.
- 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.

### **5.2.3 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.

## 5.3 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.

## 5.4 Operating

### 5.4.1 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.

**5.4.2 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.

**5.4.3 Danger zone**

- The danger zone is the area in which persons are endangered 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.

**5.4.4 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.

### **5.4.5 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.

### **5.4.6 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).

### **5.4.7 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.

### **5.4.8 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 if necessary.
- The attachment fitted onto the vehicle must be equipped with the mandatory lights and protective equipment.
- Take measures against unintentional operation of the working hydraulics.
- If the vehicle has different steering modes, ensure that the mandatory steering mode is selected.

### **5.4.9 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.

### **5.4.10 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.

## **5.5 Lifting gear applications**

### **5.5.1 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.

### **5.5.2 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.

### **5.5.3 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.

## **5.6 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.

## **5.7 Operation of attachments**

### **5.7.1 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 the operator's manual of the attachment.
- Secure the load.
- Do not overload attachment.
- Check the correct position of the lock.

## **5.7.2 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 commissioning the attachment, ensure that nobody is in danger.
- Lower the attachment to the ground before leaving the seat.

## **5.7.3 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.
- Perform a visual check of the lock after locking the attachment.
- There must be nobody between the vehicle and the equipment when picking up or lowering an attachment to the ground.

## **5.8 Towing, recovery, loading and transporting**

### **5.8.1 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 tractor vehicle of the same weight category must be used as a minimum. 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).

### **5.8.2 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 tractor vehicle of the same weight category must be used as a minimum. 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.

### **5.8.3 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).

**5.8.4 Transportation**

- 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 transportation.
- 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.

**5.9 Maintenance****5.9.1 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.

## **5.9.2 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.

## **5.9.3 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.

**5.9.4 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.

**5.9.5 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.

**5.9.6 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.
- Have retrofitting work only performed by an authorized service center.
- Replace self-locking fasteners (for example self-locking nuts) by new ones after removing them.

**5.10 Measures for avoiding risks****5.10.1 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 identical tires (for example profile, revolutions per mile).

### **5.10.2 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.

### **5.10.3 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 malfunction 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).

### **5.10.4 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.

**5.10.5 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.

**5.10.6 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.

**5.10.7 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.

### **5.10.8 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.

### **5.10.9 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.

### **5.10.10 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.

### **5.10.11 Behavior during thunderstorms**

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

**5.10.12 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, get informed on the noise level of the Vehicle/attachment (e.g. on the label).
  - Wear ear protectors.
- Do not wear ear protectors during vehicle travel on public roads or sites.

**5.10.13 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 windscreens 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).

## 6 Vehicle description

### 6.1 Vehicle view

#### 6.1.1 Vehicle view

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

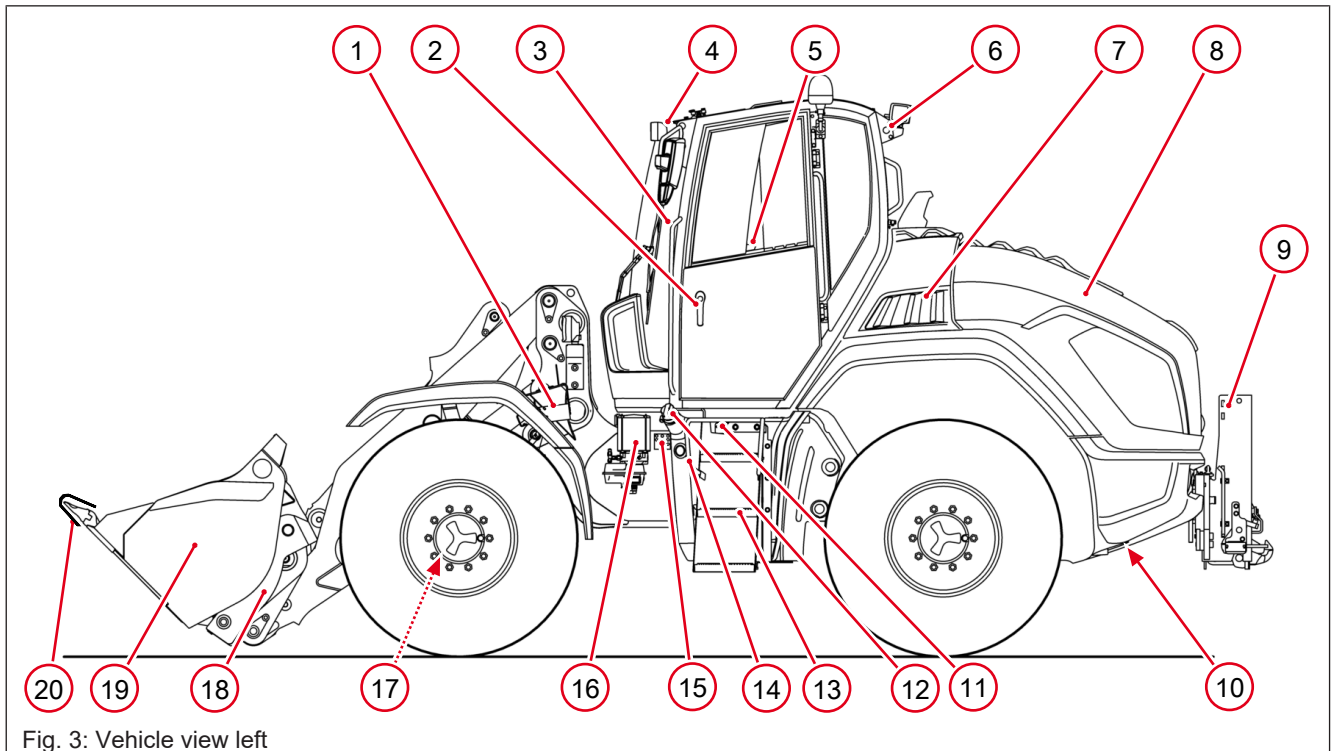


Fig. 3: Vehicle view left

- |  |                                    |
|--|------------------------------------|
| 1 Wheel chock  | 2 Door lock outside                |
| 3 Handle for access  | 4 Lifting eye for front cab        |
| 5 Lock for side window   | 6 Lifting eye for cab rear         |
| 7 Engine compartment ventilation   | 8 Engine cover                     |
| 9 Towing device or ball hitch or automatic ball hitch (depending on model) | 10 Rear tie-down point             |
| 11 Battery master switch   | 12 Fill opening: Hydraulic oil     |
| 13 Access left   | 14 Oil sight glass: Hydraulic oil  |
| 15 Test ports  | 16 Central lubrication system      |
| 17 Front tie-down point  | 18 Power coupler for attachments   |
| 19 Attachments   | 20 Protective device on attachment |

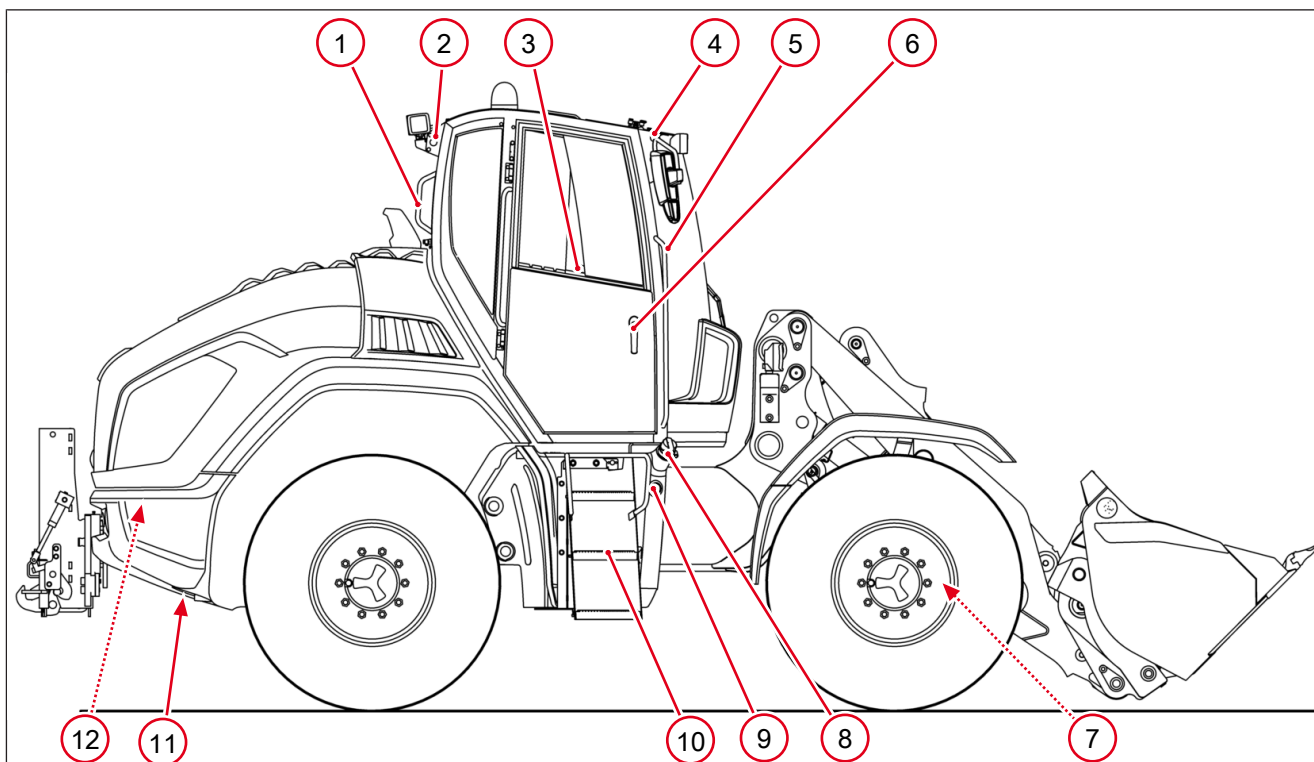


Fig. 4: Vehicle view right

- |                               |                                  |
|-------------------------------|----------------------------------|
| 1 Maintenance access          | 2 Lifting eye for cab rear       |
| 3 Lock for side window        | 4 Lifting eye for front cab      |
| 5 Handle for access           | 6 Door lock outside              |
| 7 Front tie-down point        | 8 Fill opening: Fuel             |
| 9 Fill opening: Urea solution | 10 Access right, steps removable |
| 11 Rear tie-down point        | 12 Backup warning system         |

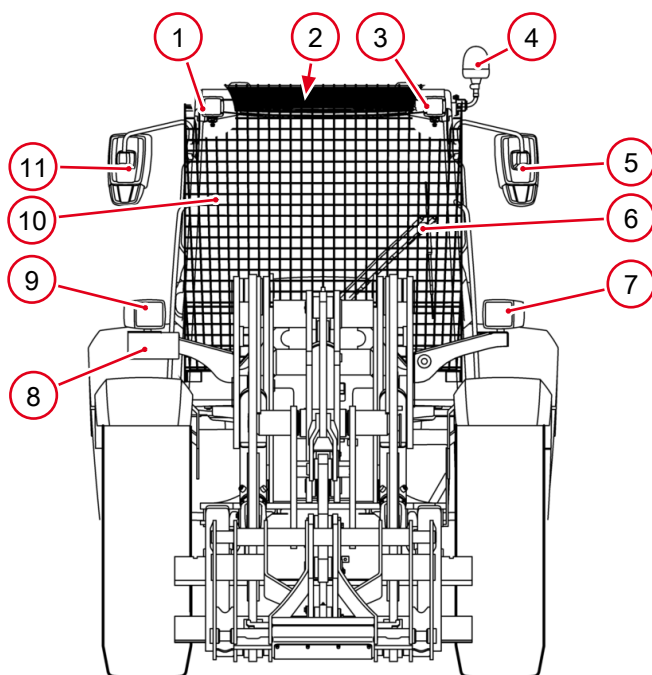


Fig. 5: Vehicle view front

- |   |                                       |
|---|---------------------------------------|
| 1 Front right work light                | 2 Roof window wiper                   |
| 3 Front left work light                 | 4 Rotating beacon                     |
| 5 Rearview mirror left                  | 6 Front window wiper                  |
| 7 Front left headlight with turn signal | 8 License plate holder front          |
| 9 Headlight with turn signal right      | 10 Protective screen for front window |
| 11 Rearview mirror right                |                                       |

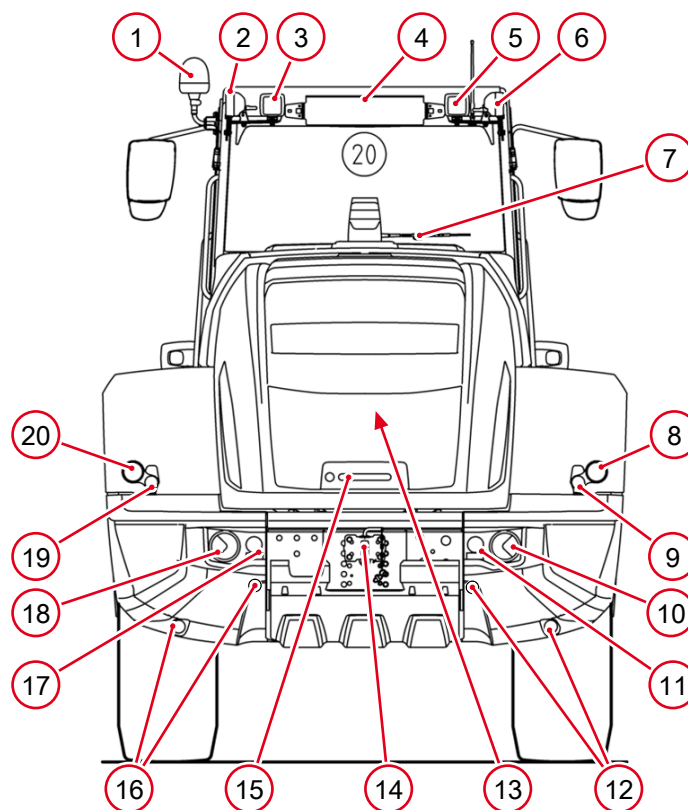
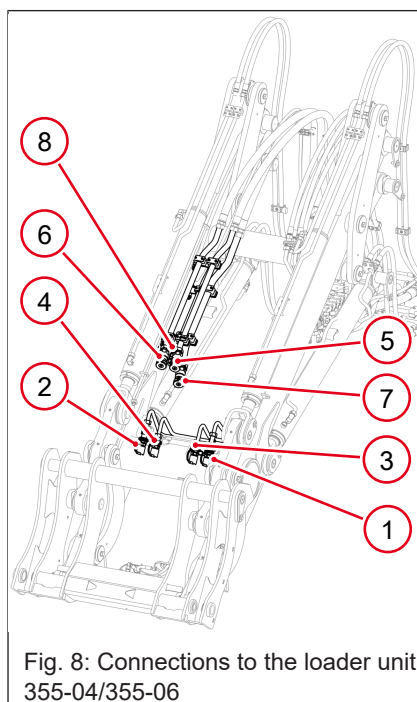
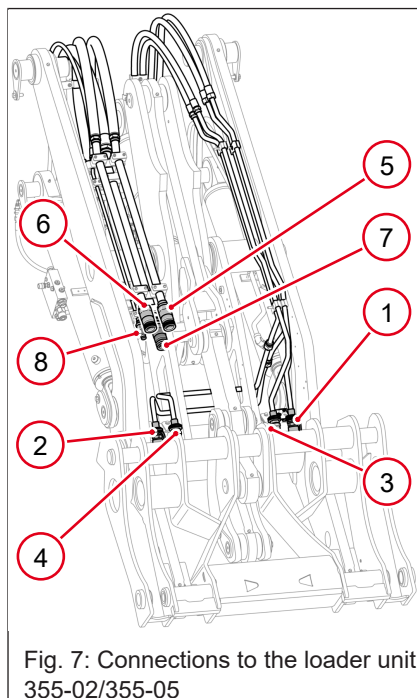


Fig. 6: Vehicle view rear

- |                              |   |
|------------------------------|---|
| 1 Rotating beacon            | 2 Side left work light                                |
| 3 Rear left work light       | 4 License plate holder rear                           |
| 5 Rear right work light      | 6 Side right work light                               |
| 7 Rear window wiper          | 8 Right clearance light                               |
| 9 Reflector rear left        | 10 Rear light with turn signal right                  |
| 11 Right reversing light     | 12 Reflector rear right (alternatively top or bottom) |
| 13 Rear camera               | 14 Towing gear  |
| 15 Lock for the engine cover | 16 Reflector rear left (alternatively top or bottom)  |
| 17 Left reversing light      | 18 Rear light with turn signal left                   |
| 19 Reflector rear left       | 20 Left clearance light                               |

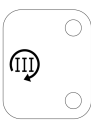
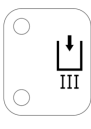


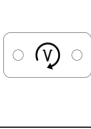
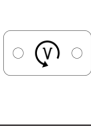
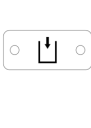
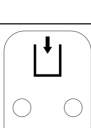
## 6.1.2 Connections on the vehicle

### 6.1.2.1 Front hydraulic connections on the vehicle

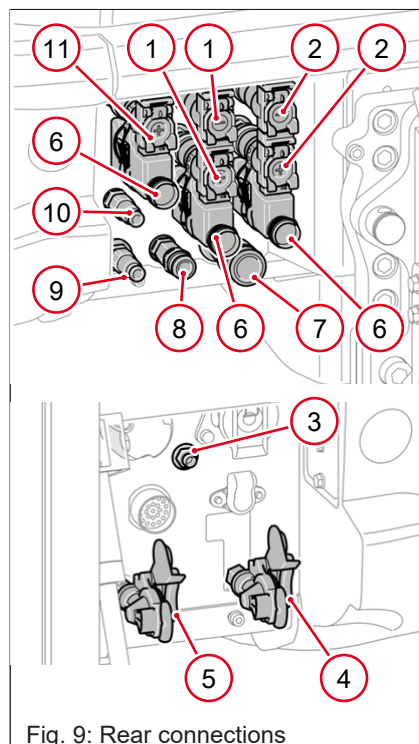


The following sections show the maximum number of connections that can be fitted to the vehicle.

The front connections are marked as follows:

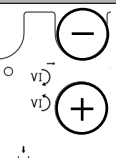
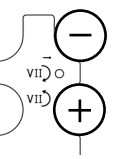
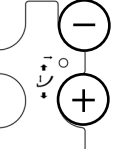
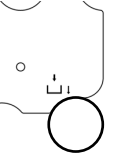
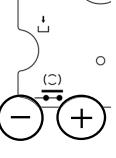
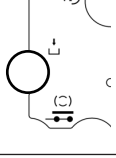
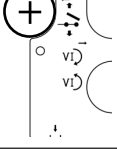
Item		Hydraulic connections	Operation on side
1		Hydraulic plug coupling – Standard hydraulic connection Supply line	<a href="#">see Operating standard hydraulic connections on page 222</a>
2		Hydraulic plug coupling – Standard hydraulic connection Return line	
3		Hydraulic plug coupling – Additional hydraulic connection Supply line	<a href="#">see Operating additional hydraulic connections on page 224</a>
4		Hydraulic plug coupling – Additional hydraulic connection Return line	
5		Hydraulic plug coupling – Hydraulic connection High-Flow Supply line - double acting	<a href="#">see Operating the additional control circuit (V – high flow) on page 226</a>
6		Hydraulic plug coupling – Hydraulic connection High-Flow Return line - double acting	
7		Hydraulic plug coupling – Return without pressure	<a href="#">see Hydraulic connections Unpressurized return flow, leak oil line on page 221</a>
8		Hydraulic plug coupling - Leak oil line	<a href="#">see Hydraulic connections Unpressurized return flow, leak oil line on page 221</a>

### 6.1.2.2 Rear hydraulic connections on the vehicle



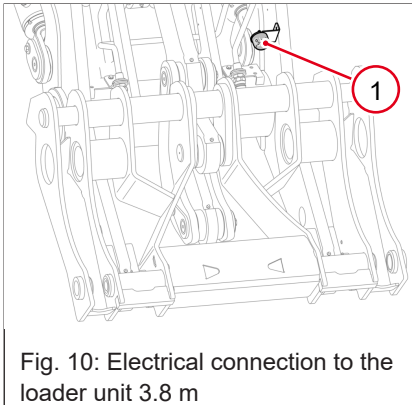
The following sections show the maximum number of connections that can be fitted to the vehicle.

The rear connections are marked as follows:

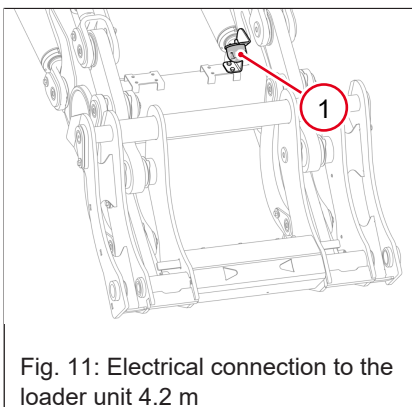
Item		Hydraulic connections	Operation on side
1		Hydraulic plug coupling – Hydraulic connections rear - double acting	<a href="#">see Rear hydraulic connections on page 227</a>
2		Hydraulic plug coupling – Hydraulic connections rear - double acting	
2 + 3		Hydraulic connections – Auto-ball hitch	<a href="#">see Operating the hitch trailer coupling on page 168</a>
4 + 5	-	Pneumatic connections - Compressed-air brake	<a href="#">see Connect trailer to compressed air-brake system on page 174</a>
6	-	Leak oil receptacle	-
7		Hydraulic plug coupling – Return without pressure rear	<a href="#">see Return without pressure at the rear on page 228</a>
8 + 9		Hydraulic connections – Trailer brake	<a href="#">see Connect trailer to hydraulic braking system on page 177</a>
10		Hydraulic plug coupling – Leak oil line	<a href="#">see Leak oil line at the rear on page 229</a>
11		Hydraulic plug coupling – Tipping trailer connection	<a href="#">see Operating the 6th control circuit on page 229</a>

### 6.1.2.3 Front electrical connections on the vehicle

The following section shows the maximum number of connections that can be fitted to the vehicle.



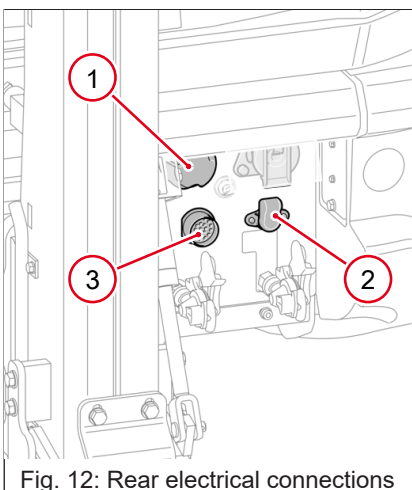
1 Electrical plug receptacle front



1 Electrical plug receptacle front

#### 6.1.2.4 Rear electrical connections on the vehicle

The following section shows the maximum number of connections that can be fitted to the vehicle.



- 1 7-Pole plug receptacle
- 2 3-Pole plug receptacle
- 3 Plug receptacle salt spreader

## 6.2 Brief description

### 6.2.1 Models and trade names

The vehicle is identified by two designations.

Type designation	Trade name
The type designation is stamped on the type label.	The trade name is affixed to the vehicle.
355-02	8155
355-04	8155L
355-05	8180
355-06	8180L

### 6.2.2 Main components of the vehicle

- Sturdy steel sheet chassis, rigid model
- ROPS/TOPS tested cab
  - ROPS is the abbreviation for Roll Over Protective Structure
  - FOPS is the abbreviation for Falling Object Protective Structure
- Four-cylinder diesel engine, water-cooled equipped with system for exhaust gas aftertreatment, on suspension elements
- Automotive drive system, progressive hydrostatic axial-piston gear-box
- Maximum speed:
  - Standard: 20 km/h
  - Option 30 or 40 km/h
- Hydraulic power steering with emergency steering features
- Front and rear planetary steering axles, rigid front axle, rear axle with oscillation
- Service brake
  - for 20 km/h vehicles: Multi-disc brake in front axle
  - for vehicles braked to 30 km/h, 40 km/h or 20 km/h: Dual-circuit braking system for front axle and rear axle
- Secondary brake
  - for 20 km/h multi-disc brake in the front axle (spring-loaded brake)
  - for 30 or 40 km/h single circuits of the dual-circuit braking system (front/rear axle)
- Parking brake
  - Multi-disc brake in front axle (spring-loaded brake)
- Loader unit 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.

### 6.2.3 Diesel engine

The diesel engine is a water-cooled four-cylinder in-line engine with turbocharging, cooled external exhaust gas recirculation and charge air cooling.

The engine is equipped with a system for exhaust gas aftertreatment.

The exhaust gas values of the engine comply at least with EU Stage IIIA (Directive 97/68/EC or successor directives).

For vehicles delivered to EU member states and Switzerland, the exhaust emissions comply with EU Stage V (Directive 2016/1628/EU).

The exhaust gas aftertreatment system is a closed system consisting of a diesel oxidation catalyst (DOC) and an SCR catalyst (SCR = Selective Catalytic Reduction) with injection of a urea solution. As an option, the system is also equipped with a diesel particulate filter (DPF).

### 6.2.4 Cooling system

In the engine compartment there is a combined water-hydraulic oil and charge air cooler, which cools the diesel engine, the hydraulic oil and the combustion air of the engine. The fan is driven hydraulically.

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

### 6.2.5 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.

Depending on the vehicle equipment, up to three steering modes can be selected 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)!

#### 6.2.6 Brakes

The service brake is activated via the brake/inching pedal. The service brake acts on the multi-disc brakes in the front axle (20 km/h version) or on the multi-disc brakes in the front axle and rear axle (30 or 40 km/h version) in the dual-circuit braking system (30 or 40 km/h version).

The requirements for an secondary brake are met by the individual circuits of the respective service brake system. For vehicles with a maximum speed of 20 km/h, this is the multi-disc brake in the front axle (spring-loaded); for vehicles with a maximum speed of 30 or 40 km/h, this is each individual circuit of the service brake.

The parking brake has a mechanical braking effect on the front axle.

#### 6.2.7 Hydraulics

The hydraulic system is equipped with control units, pressure relief valves, pipe rupture safety devices, filters and a radiator. 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 three hydraulic systems that are fed from a hydraulic oil tank:

- Hydrostatic drive system
- Working hydraulics and steering hydraulics with priority valve
- Fan for cooling (engine and hydraulic oil)

##### Hydrostatic drive system

The diesel engine permanently drives a variable displacement pump, whose oil flow is sent to a hydraulic motor flanged on the gearbox. The torque of the hydraulic motor is transmitted to the front and rear axles via the transfer gearbox and the drive shafts.

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.

By actuating the brake/inching pedal (inching = deceleration; left foot pedal), the control can also be influenced. When the inching function of the brake/inching pedal is actuated, the so-called inch valve responds and the vehicle brakes in fine doses to a standstill, regardless of the engine speed. Therefore, engine output is fully available for the working hydraulics by pressing the accelerator pedal and the brake/inching pedal at the same time.

##### Working and steering hydraulics

The working and steering hydraulics with priority valve are supplied with oil by an axial piston variable displacement pump. The pump is flanged to the variable displacement pump of the drive system.

### Fan for cooling

The fan on the combined water, hydraulic oil and charge air cooler is operated hydraulically via a gear pump and a fan motor.

## 6.2.8 Electrical system

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

## 6.2.9 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 is mounted on vibrating elements. The cab contains the seat for the operator and the operating and control elements.

### 6.2.9.1 Front window protective screen

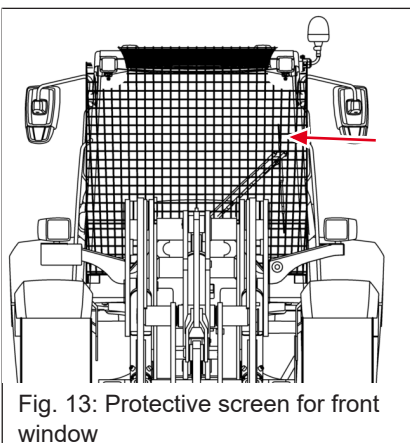


#### **WARNING**

**Risk of accident due to restricted field of vision when operating the vehicle!**

A restricted field of vision can cause people and objects to be overlooked.

- ▶ Remove the protective screen before performing vehicle travel on public roads.
- ▶ Only operate the vehicle with the protective screen attached at the place of operation if special measures have been taken. These special measures can consist, for example, of assigning a guide or locking down the work area for persons.



The protective screen is an additional protection for the operator against falling objects, and against objects that could penetrate into the driver's cab from the front. The protective screen is removable.

#### **Prepare assembly / disassembly of protective screen**

- ✓ Only install the protective screen with the help of a second person.
- Park the vehicle on a stable, level and dry surface.

#### **Installing protective screen**

- ✓ Preparations for assembly carried out.
1. Place the protective screen on the cab.
  2. Screw the protective screen to the provided brackets using the screws supplied.

### Removing the protective screen

- ✓ Preparations for disassembly completed.
- 1. Loosen the fastening screws of the protective screen.
- 2. Remove protective screen.
- 3. Refasten the screws on the protective screen so that they do not get lost.

#### 6.2.9.2 Fire extinguisher

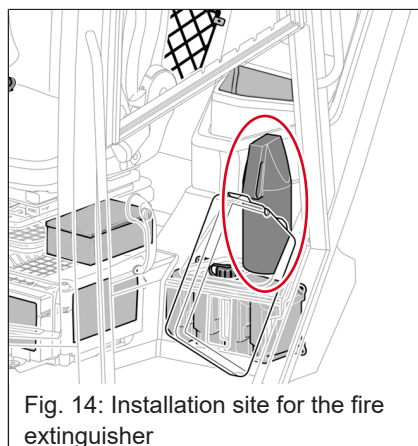


Fig. 14: Installation site for the fire extinguisher

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.

#### 6.2.10 Loader unit

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

The lock of the power coupler is operated hydraulically.

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.

## 6.3 Operating elements at the operator station

### 6.3.1 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.



### **NOTICE**

**Defective warning lights and control lights cannot correctly indicate operating states.**

Warning lights and control lights indicate the operating status of the vehicle. If these lights are defective, possible faults, e.g. in the motor control, cannot be detected.

- 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.

### 6.3.2 General overview of the control elements

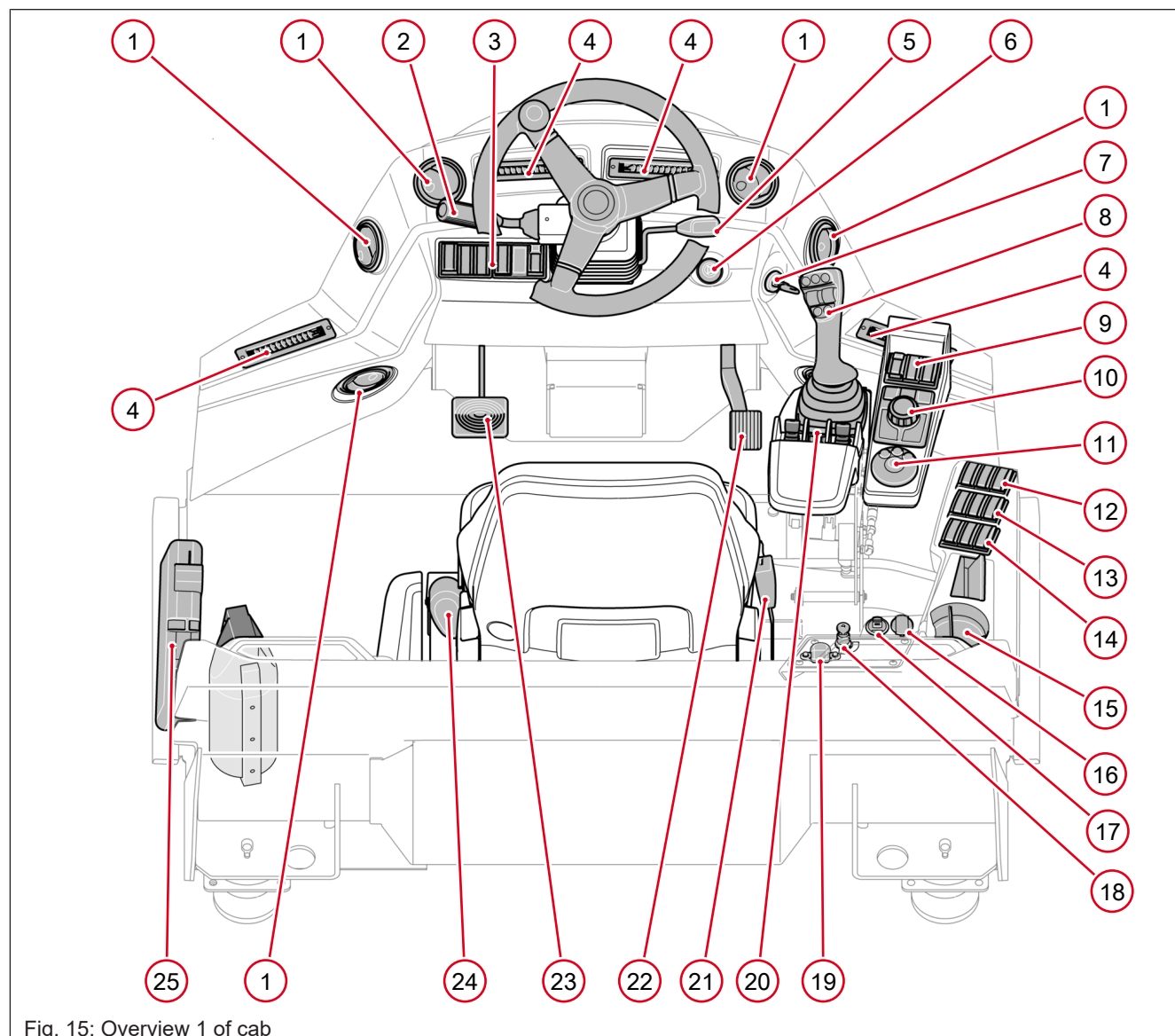


Fig. 15: Overview 1 of cab

- |   |                                     |
|---|-------------------------------------|
| 1 Air vent nozzles for the interior               | 2 Steering column switch            |
| 3 Switch panel instrument panel                   | 4 Air-vent nozzles for front window |
| 5 Release adjusting lever for the steering column | 6 Switch for hazard warning system  |
| 7 Ignition lock                                   | 8 Joystick                          |
| 9 Switch panel joystick console                   | 10 Jog dial                         |
| 11 Switch for steering modes                      | 12 Switch panel 1 side console      |
| 13 Switch panel 2 side console                    | 14 Switch panel 3 side console      |
| 15 Cup holder                                     | 16 12 V plug receptacle             |
| 17 USB port                                       | 18 Switch for tilt ram lock         |
| 19 Electrical plug receptacle 3 pole              | 20 Switch panel arm rest            |
| 21 Seat belt buckle                               | 22 Accelerator pedal                |
| 23 Brake/inching pedal                            | 24 Seat belt                        |
| 25 Document box                                   |                                     |

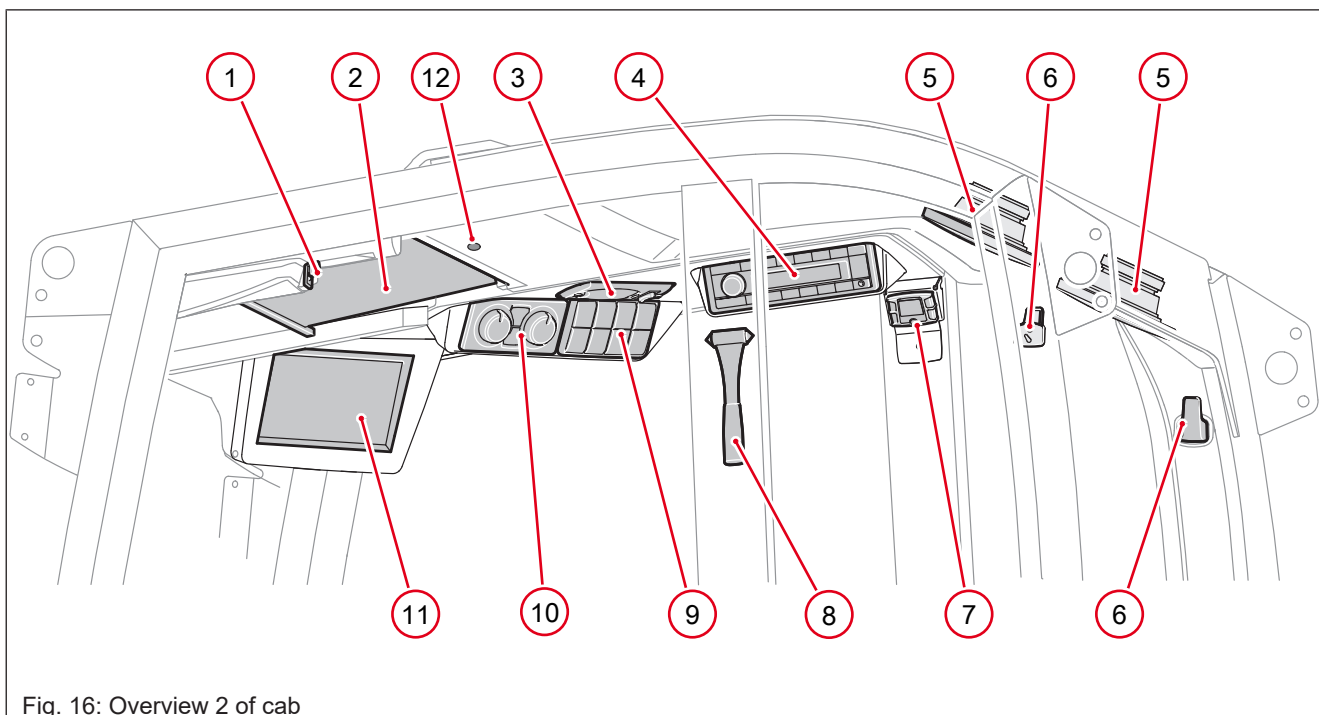


Fig. 16: Overview 2 of cab

- |  |   |
|--|---|
| <b>1</b> Electrical adjustment for the exterior rearview mirrors | <b>2</b> Sunblind roof window and front window    |
| <b>3</b> Interior light  | <b>4</b> Radio                                    |
| <b>5</b> Loudspeaker   | <b>6</b> Hook                                     |
| <b>7</b> Control element auxiliary heating                       | <b>8</b> Emergency hammer                         |
| <b>9</b> Keypad  | <b>10</b> Control element air-conditioning system |
| <b>11</b> Display  | <b>12</b> Switch for roof window wiper            |

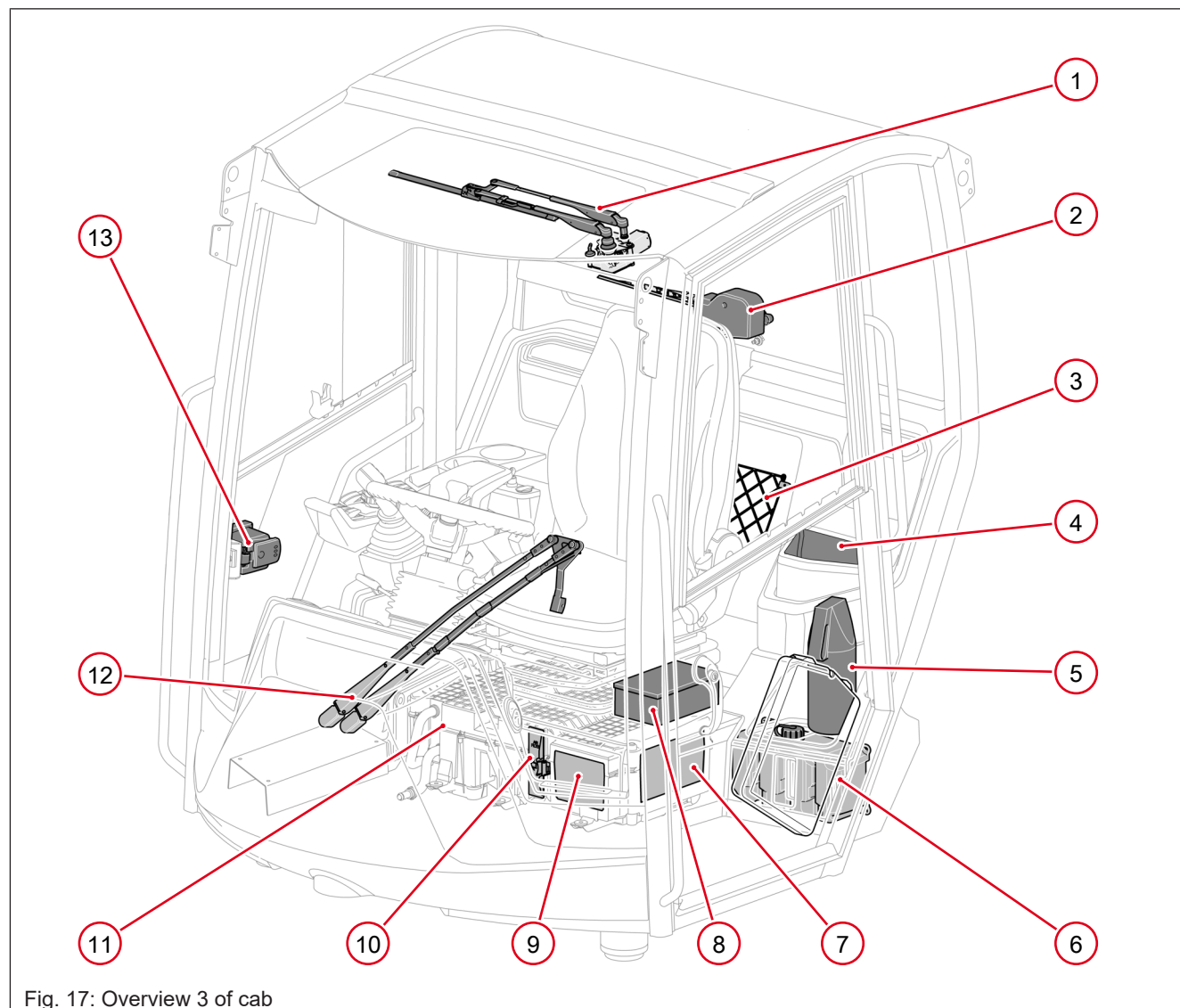


Fig. 17: Overview 3 of cab

- |  |  |
|--|--|
| 1 Window wiper for roof window                       | 2 Window wiper for the rear window.            |
| 3 Storage net for documents                          | 4 Storage compartment                          |
| 5 Fire extinguisher                                  | 6 Tank for washer system                       |
| 7 Fresh air filter of the air conditioning system    | 8 Holder for first-aid kit                     |
| 9 Recirculated-air filter of air conditioning system | 10 Micro-filter of the air conditioning system |
| 11 Air conditioning system                           | 12 Window wiper arm for front window           |
| 13 Door lock   |  |

### 6.3.3 Overview: Joystick

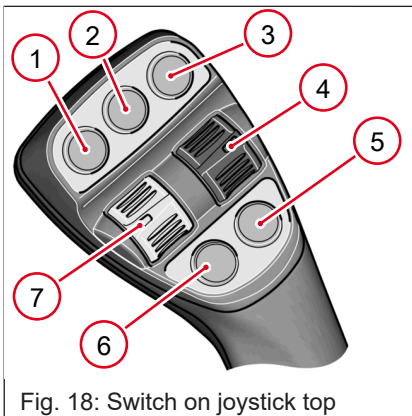


Fig. 18: Switch on joystick top

- 1 Switch for drive mode reduction
- 2 Switch for drive mode increase
- 3 Switch for electrical connection switch front
- 4 Switch for operation of additional hydraulic connections front (4th control circuit)
- 5 Switch for bucket repositioning
- 6 Switch for setting drive to neutral position
- 7 Switch for drive direction

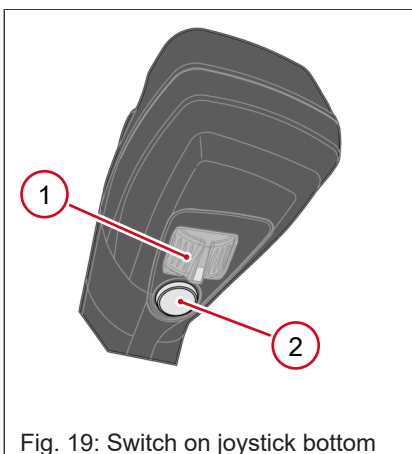
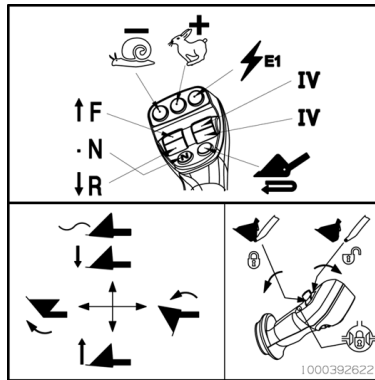


Fig. 19: Switch on joystick bottom

- 1 Switch for operation of standard hydraulic connections front (3rd control circuit)
- 2 Switch for the operation of the differential lock



The label shows the assignment of the joystick. The assignment of the joystick varies depending on the equipment of the vehicle. The label for the joystick also changes according to the equipment.

### 6.3.4 Overview: Steering column switch

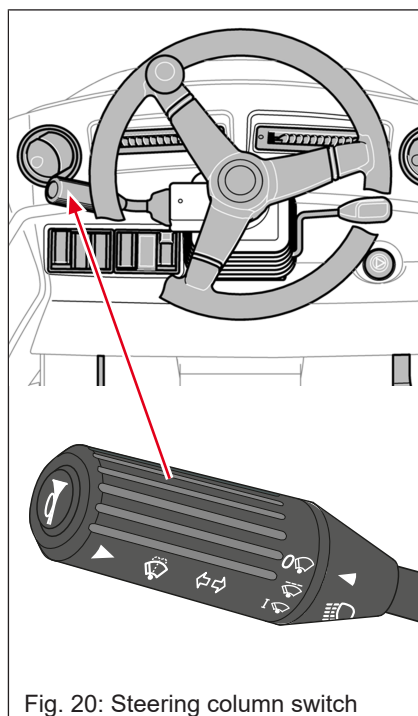



Fig. 20: Steering column switch

The steering column switch is located on the left of the steering column. The following functions can be operated with the steering column switch:

- By turning/pressing: Window wiper/washer system of the front window.
- Moving upward through the resistance: change-over between high beam/low beam.
- By moving forward: Right turn signal
- By moving backward: Left turn signal
- By pressing the symbol  : Horn.

### 6.3.5 Overview: Jog Dial

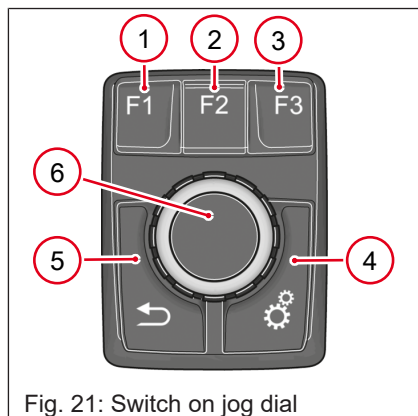


Fig. 21: Switch on jog dial

- 1 Button F1 – Selection menu
- 2 Button F2 – Selection menu
- 3 Button F3 – Selection menu
- 4 Button settings – Selection menu
- 5 Back button
- 6 Setting wheel

### 6.3.5.1 Button functions

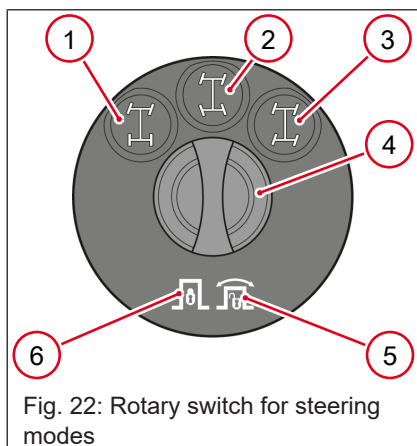
Buttons 1 to 4 can be used to call various displays.

- Button F1:
  - Time
  - Operating hours
  - Consumption
  - On-board voltage
  - Operating hours until maintenance
- Button F2:
  - Settings of the response behavior of the hydraulics
  - Speed for automated switch-on of load stabilizer
  - Maintenance display and maintenance reminder
- Button F3
  - Oil volume settings for the hydraulic control circuits
- Settings button:
  - Main menu

The Back button can be used to undo an operating step. The previous setting is not saved.

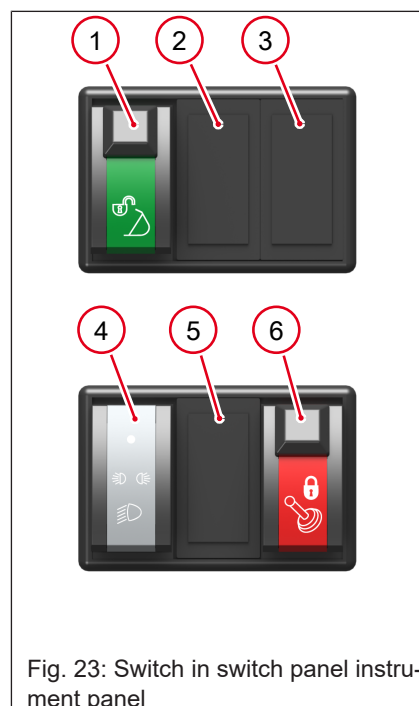
Turn the setting wheel to select or change displays. Press the setting wheel to recall the selection or confirm the change.

### 6.3.6 Overview: Switch for steering modes



- 1 Control light for front axle steering
- 2 Control light for four-wheel steering
- 3 Control light for diagonal steering
- 4 Switch for selecting steering mode
- 5 Symbol switch pressed – Steering mode adjustment possible
- 6 Symbol switch not pressed – Steering mode adjustment block

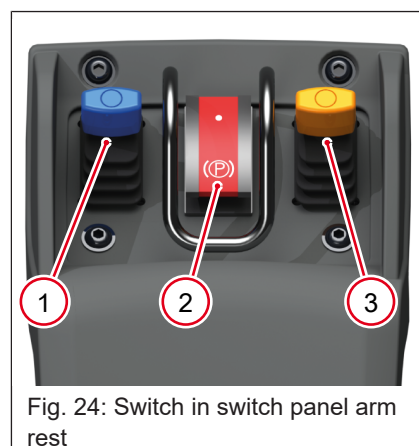
### 6.3.7 Overview: Switch panel instrument panel



- 1 Switch for unlocking the quick-change lock
- 2 Not assigned
- 3 Not assigned
- 4 Switch for lighting (parking light/low beam)
- 5 Not assigned
- 6 Switch for locking the working hydraulics during road travel

Fig. 23: Switch in switch panel instrument panel

### 6.3.8 Overview: Switch panel arm rest



- 1 Lever for the low-speed control.
- 2 Switch for parking brake
- 3 Lever for manual throttle

Fig. 24: Switch in switch panel arm rest

### 6.3.9 Overview: Switch panel joystick console

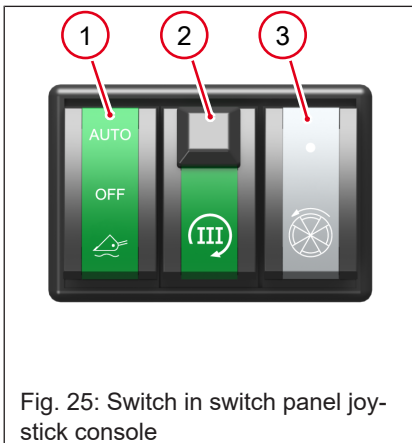


Fig. 25: Switch in switch panel joystick console

- 1 Switch for load stabilizer
- 2 Switch for continuous operation 3rd control circuit
- 3 Switch for reversing operation of the radiator

### 6.3.10 Overview: Switch panel side console

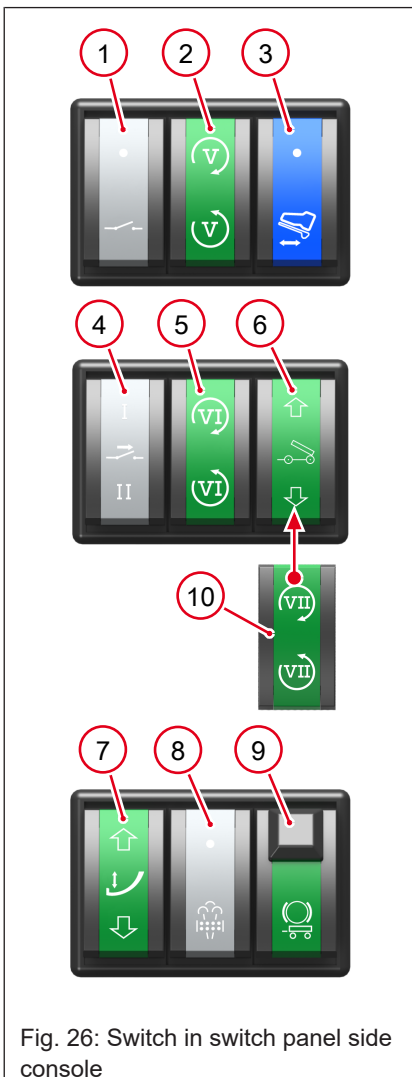


Fig. 26: Switch in switch panel side console

- 1 Switch for plug receptacle on loader unit
- 2 Switch for High Flow on loader unit
- 3 Switch for accelerator pedal mode
- 4 Switch for plug receptacle on the rear
- 5 Switch for rear hydraulic connections
- 6 Switch for rear tipping trailer connection
- 7 Switch for automatic ball hitch
- 8 Switch for manual regeneration of the system for exhaust gas aftertreatment
- 9 Switch for testing the parking brake with hitched trailer
- 10 Switch for rear hydraulic connections (alternative)

### 6.3.11 Overview: Switch panel Keypad

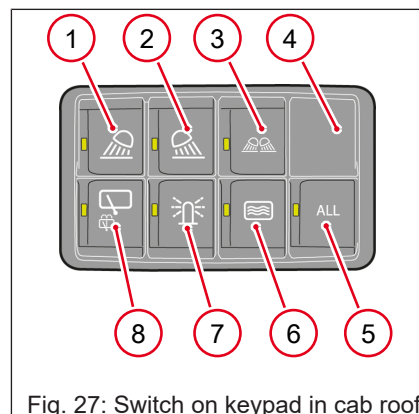


Fig. 27: Switch on keypad in cab roof

- 1 Switch for work light front
- 2 Switch for work light rear
- 3 Switch for work light side
- 4 Not assigned
- 5 Switch for deactivation of all work lights
- 6 Switch for rear window heating and heated rearview mirrors, if necessary
- 7 Switch for rotating beacon
- 8 Switch for window wiper and rear window washer system

### 6.3.12 Overview: Control elements of the air conditioning system

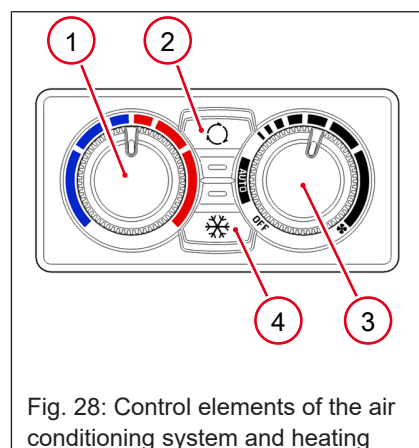


Fig. 28: Control elements of the air conditioning system and heating

- 1 Control for temperature
- 2 Switch for recirculated air
- 3 Control for fan intensity
- 4 Switch for the air conditioning system

## 6.4 Type plates and stickers

### 6.4.1 Type labels

Type labels are attached to the vehicle and individual components.

#### Type label 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 barcode shown on the type label or by the identification number stamped on the vehicle frame.

## Description of the type label

Fig. 29: 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	Permissible total weight
5	Permissible axle load front
6	Permissible axle load rear
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
7	Gross drawbar load rating
8	Vehicle designation
9	Vehicle model
10	Variant
11	Output in kW
12	Transport weight
13	Maximum payload
14	Gross operating weight
15	Year of construction
16	Barcode
17	Manufacturer

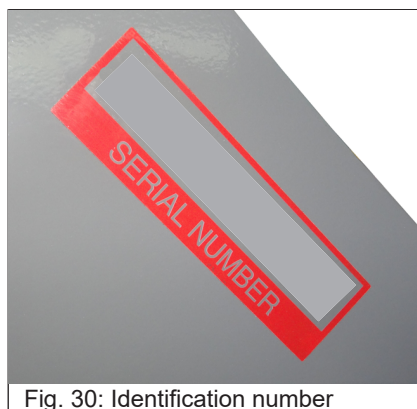


Fig. 30: Identification number

### Identification number

The identification number is stamped on the vehicle chassis and the type label. The specified identification number

	*XXX	XXXXX	X	XXXX	XXXX*
	1	2	3	4	5
1	*XXX	Manufacturer/works			
2	XXXXX	Vehicle model with version			
3	X	Standard specific check digit			
4	XXXX	Factory coding			
5	XXXX*	Sequential number			

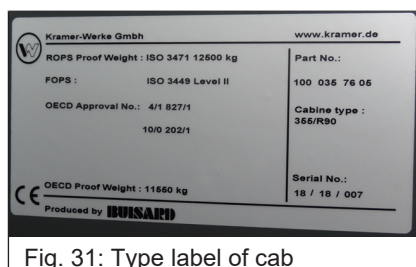


Fig. 31: Type label of cab

### Type label of cab

The type label of the cab is located on the console in front of the seat under the cover of the air conditioning system.

- Vehicles registered as tractors (EC tractor registration) destined for the European Community shall have an OECD number, which shall appear on the type label.

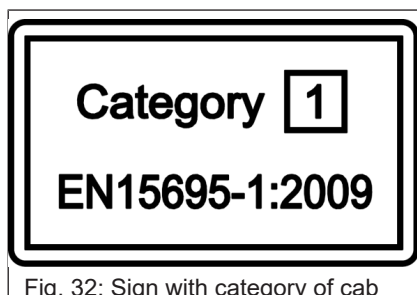


Fig. 32: Sign with category of cab

### Category of cab

The identification establishes proof that the cab is in compliance with the EN 15695-1 standard.

The information label indicates that the cab does not offer any protection against hazardous substances and that the vehicle is therefore not approved for working with sprays. The marking is located at the top right of the beam.

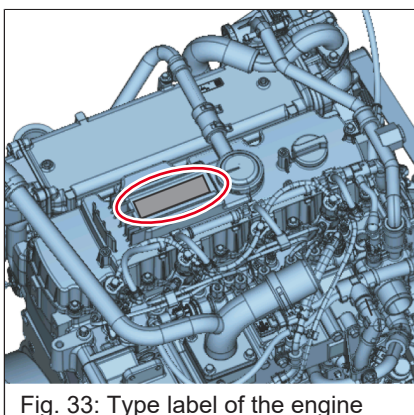
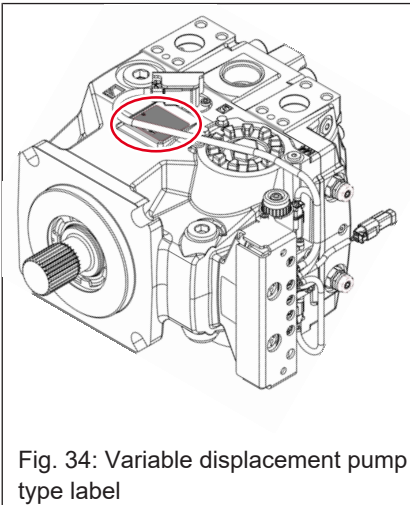


Fig. 33: Type label of the engine

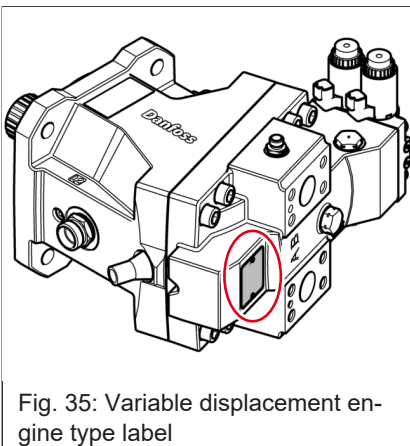
### Type label of the engine

The type label of the engine is located on the valve cover. The engine number is stamped on the engine type label and on the side of the crankcase.



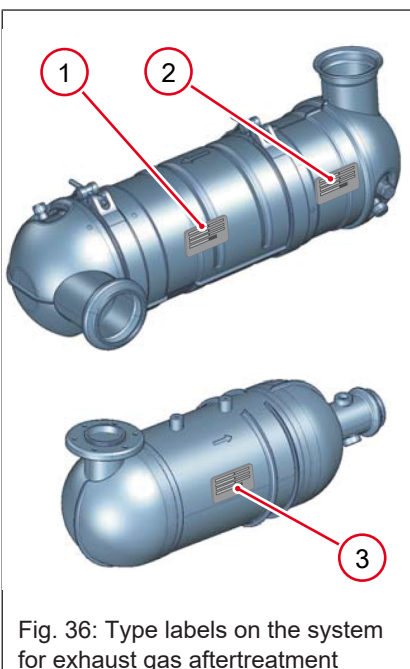
### Variable displacement pump type label

The type label of the variable displacement pump is located on the housing. The illustration shows the installation position of the variable displacement pump in the front engine compartment in the direction of travel.



### Variable displacement engine type label

The type label of the variable displacement engine is located on the right-hand side of the variable displacement engine in the direction of travel. The variable displacement engine is located on the rear axle.



### Type label of the system for exhaust gas aftertreatment

The type label of the exhaust gas aftertreatment system is attached to the catalytic converter.

- 1 Diesel particulate filter (DPF)
- 2 Diesel oxidation catalyst (DOC)
- 3 Selective Catalyst Reduction Catalyst (SCR Catalyst)

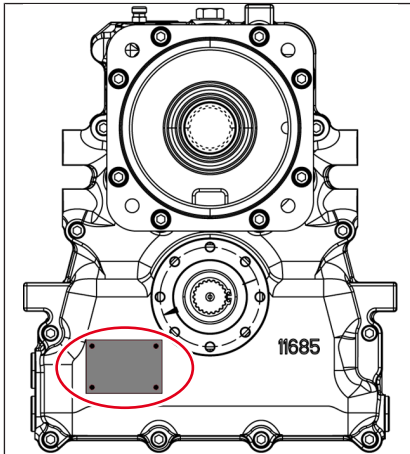


Fig. 37: Transfer gearbox type label  
20 km/h version

#### Type label of the transfer gearbox

The type label of the transfer gearbox for the 20 km/h version is located on the front of the housing in the direction of travel.

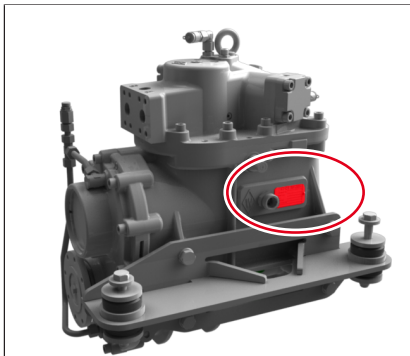


Fig. 38: Type label of transfer gear-  
box 30 and 40 km/h version

The type label of the transfer gearbox for the 30 or 40 km/h versions is located on the right-hand side of the housing in the direction of travel.

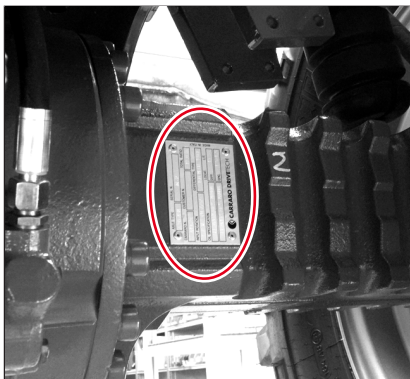


Fig. 39: Type label of the rear axle

#### Type label of the rear axle

The type label of the rear axle is located next to the differential housing in the rear driving direction.

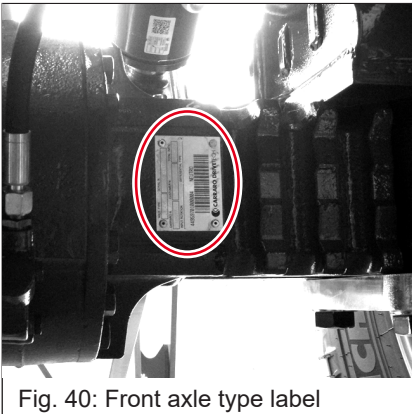


Fig. 40: Front axle type label

### Front axle type label

The type label of the front axle is located next to the differential housing in the front driving direction.

#### 6.4.2 Safety label and information labels

### 6.4.2.1 Overview of labels

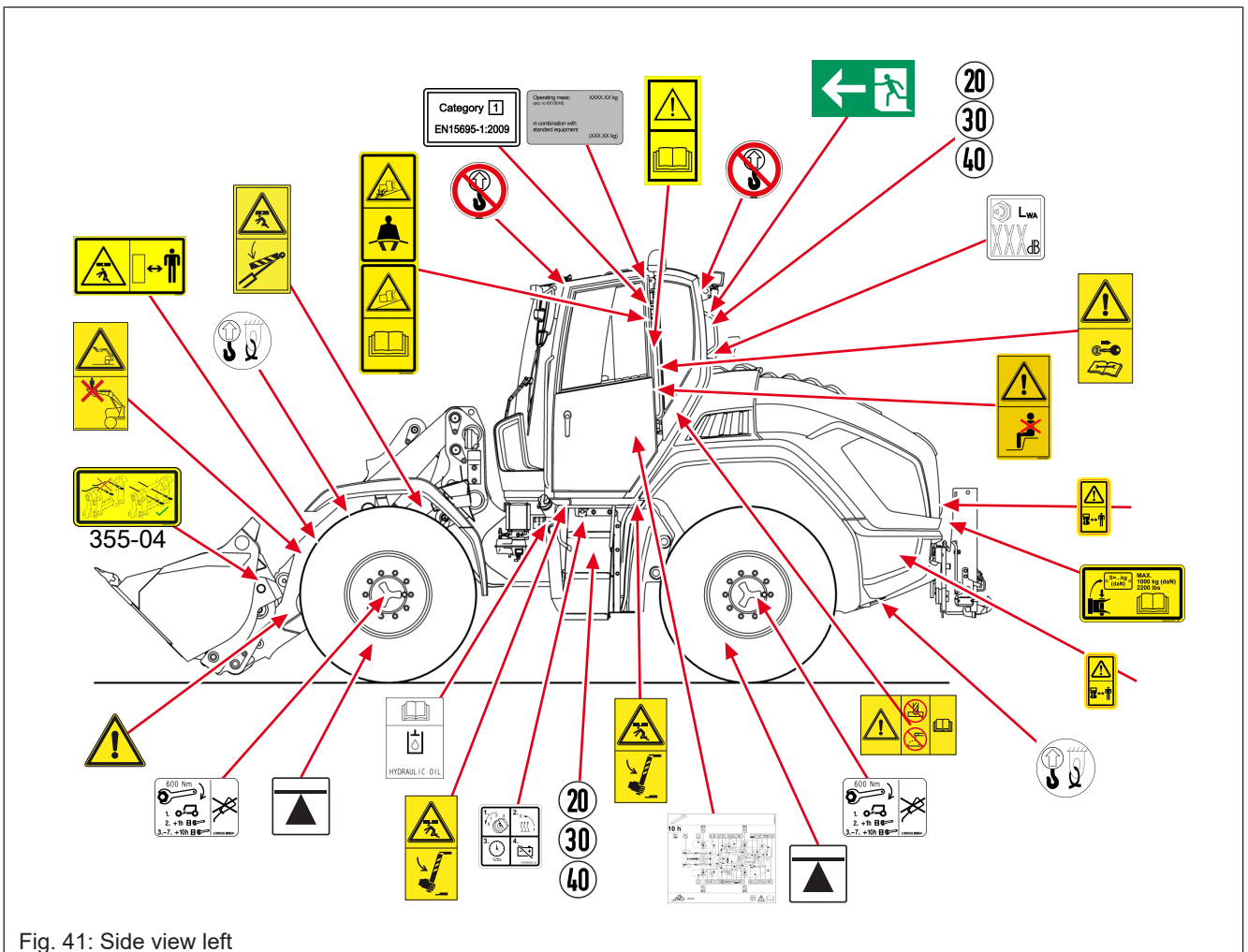


Fig. 41: Side view left

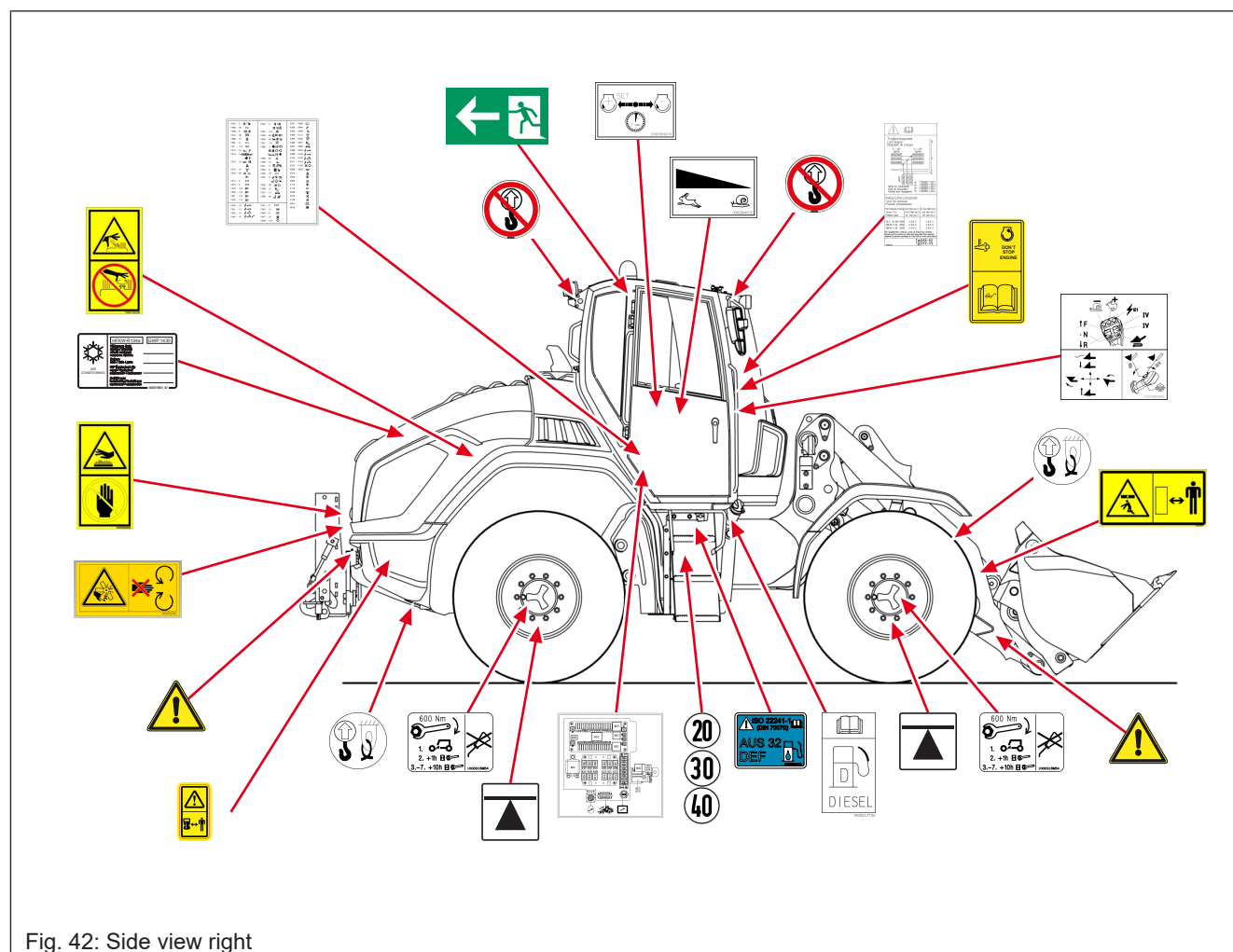


Fig. 42: Side view right

#### 6.4.2.2 Safety labels



**⚠ WARNING**

**Injury hazard due to missing or damaged labels!**

A missing, incomplete or poor indication of danger can cause serious injury or death.

- ▶ Never remove safety labels and information labels.
- ▶ Immediately replace damaged safety labels and information labels.



Fig. 43: Label general danger zone

### Safety label: General hazards

**CAUTION! Injury hazard in the work area of the vehicle.**

- During operation, no persons may be in the danger zone of the vehicle.



Fig. 44: Safety label Rotating parts

### Safety label: Rotating parts

**CAUTION! Injury hazard - Shear hazard due to rotating parts.**

- Do not touch any moving or turning parts.
- Perform inspections and maintenance work only when the engine is at standstill.



Fig. 45: Label Hot parts

### Safety label: Hot parts!

**CAUTION! After stopping the engine, some parts of the vehicle are very hot.**

- Allow the vehicle parts to cool down.
- Wear protective clothing when performing maintenance.



Fig. 46: Label Risk of scalding

#### **Safety label Risk of scalding; bin is under pressure**

**CAUTION! Risk of injury due to liquids that are hot and under high pressure in the bin.**

1. Allow the liquid to cool, then open the container.
2. Carefully open the lid on the first notch and allow the pressure to escape.
3. Wear protective clothes.



Fig. 47: Label starting key

#### **Safety label: Remove the starting key**

**CAUTION! Risk of injury from maintenance work.**

- Remove starting key before performing inspections and maintenance on the vehicle.
- Read and observe the operator's manual prior to performing maintenance.



Fig. 48: Read the operator's manual

#### **Safety label: Read the operator's manual**

**CAUTION! Risk of injury due to incorrectly performed activities.**

- Read the Operator's Manual before starting the vehicle and before repair work!



Fig. 49: Safety label Put on seat belt and observe stability

**Safety label: Attach the seat belt and ensure the vehicle's stability!**

**CAUTION! Risk of injury if the seat belt is not fastened or if the stability of the vehicle is not observed.**

1. Operate the vehicle only from the operator seat.
2. Fasten seat belt before operating the vehicle.
3. Observe the stability and tipping resistance of the vehicle.



Fig. 50: Safety label Passenger transport

**Safety label: Do not lift or transport persons**

**CAUTION! Injury hazard due to falling from loader unit.**

- Do not lift or transport persons with the loader unit.



Fig. 51: Label safety prop

**Safety label: Insert safety prop**

**CAUTION! Risk of injury due to lowering of the raised loader unit.**

- Before working under the raised loader unit, the support must be inserted.



Fig. 52: Label Eye hooks Cab

#### Safety label: Eye hooks of cab

**CAUTION!** Risk of injury due to incorrectly fitted lifting gear when loading the vehicle.

1. Use eye hooks on the cab only for mounting and dismounting the cab.
2. Do not use the eye hooks on the cab for loading the entire vehicle.



Fig. 53: Label Distance to swivel area

#### Safety label: Maintain a safe distance from the rear of the vehicle

**Attention!** Risk of injury from swiveling out the rear of the vehicle when steering.

- During operation, no persons may be in the danger zone of the vehicle.
- Stop driving immediately if persons enter the danger zone.



Fig. 54: Label distance to loader unit

#### Safety label: Maintain a safe distance from the loader unit

**CAUTION!** Risk of injury due to lowering of the raised loader unit.

- During operation, no persons may be in the danger zone of the vehicle.
- Do not step under the raised loader unit.



Fig. 55: Label safety prop

**Safety label: Insert safety prop**

**CAUTION! Risk of injury due to lowering of the tilted cab.**

- Insert the prop before working under a tilted cab.



Fig. 56: Label Accompanying persons

**Safety label: Do not allow any persons to ride along**

**CAUTION! Risk of injury, additional persons riding on the vehicle can fall off and be injured.**

- Never transport persons with the vehicle.



Fig. 57: Label Protective ROPS/FOPS structure

**Safety label: Do not damage ROPS/FOPS protective structure**

**CAUTION! Damaged protective ROPS/FOPS structures cannot serve their protective function.**

- Never drill or weld protective ROPS/FOPS structures.
- Follow the operator's manual.

### 6.4.2.3 Information label

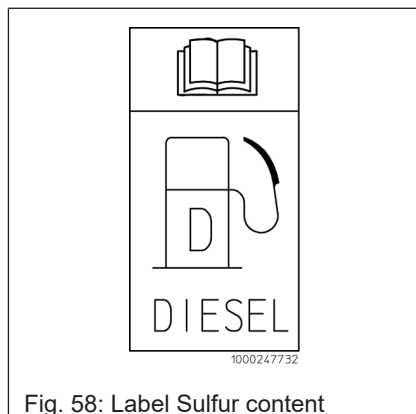


Fig. 58: Label Sulfur content

#### Sulfur content in diesel

The label indicates the specification of the diesel engine to be used for the vehicle. The engine may be damaged by incorrect fuel. Only use diesel with very low sulfur content ( $S \leq 15 \text{ mg/kg}$ )!

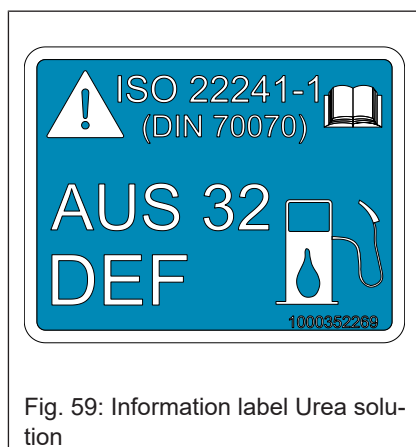


Fig. 59: Information label Urea solution

#### Urea solution

Urea solution is required for vehicles with an SCR system for exhaust gas aftertreatment. The label indicates the specification of the urea solution to be used for the vehicle.

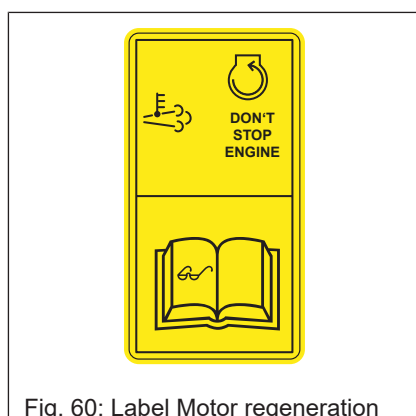


Fig. 60: Label Motor regeneration

#### Do not stop the engine - Regeneration is running

The vehicle is equipped with a system for exhaust gas aftertreatment. The label indicates that the engine should not be switched off while the system for exhaust gas aftertreatment is being regenerated. The exhaust gas aftertreatment system may otherwise be damaged.

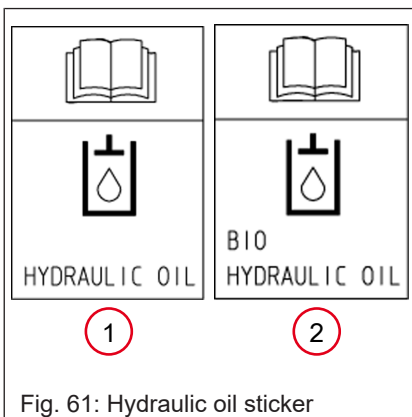


Fig. 61: Hydraulic oil sticker

### Hydraulic oil!

The label provides information about the used fluids, lubricants and materials used.

- 1) Hydraulic oil
- 2) Biodegradable hydraulic oil

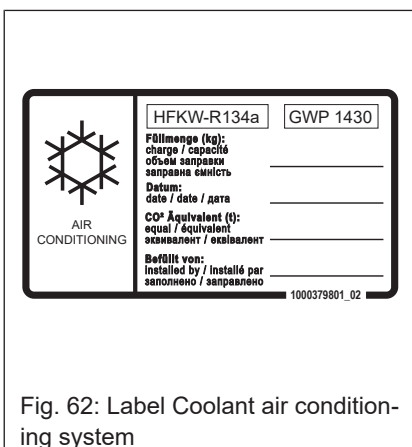


Fig. 62: Label Coolant air conditioning system

### Coolant of the air conditioning system

There is coolant in the air conditioning systems. The label contains information about the coolant used in the air conditioning system. The label is located near the condenser on vehicles with air conditioning system.

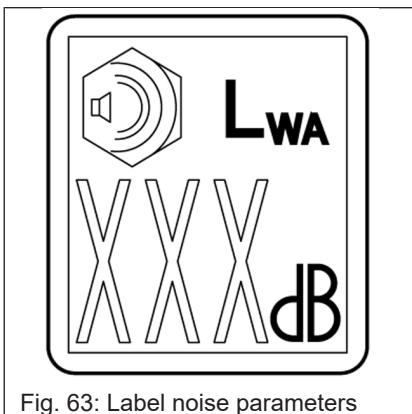


Fig. 63: Label noise parameters

### Maximum sound power level

The adhesive label identifies the maximum sound power level of the vehicle. The value indicated on the adhesive label is not exceeded during vehicle operation.

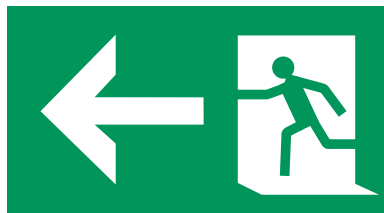


Fig. 64: Emergency exit label

### Emergency exit

The adhesive label identifies the emergency exit.

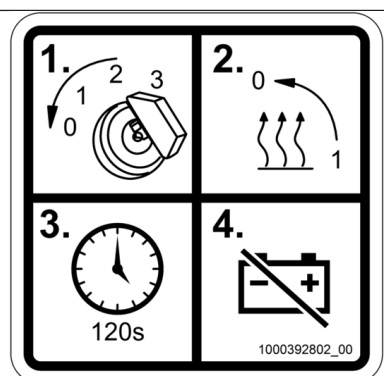


Fig. 65: Label Battery master switch

### Battery master switch

The vehicle is equipped with a battery master switch. The battery master switch can be used to disconnect the battery supply to the vehicle electrical system. This adhesive label identifies the position of the battery master switch.

1. Switch off the ignition.
2. Switch off the auxiliary heating.
3. Wait 120 seconds.
4. Actuate battery master switch and remove if necessary.

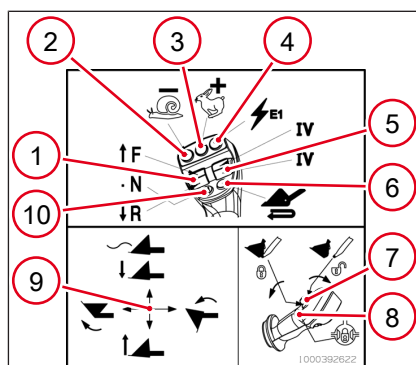


Fig. 66: Label Assignment joystick

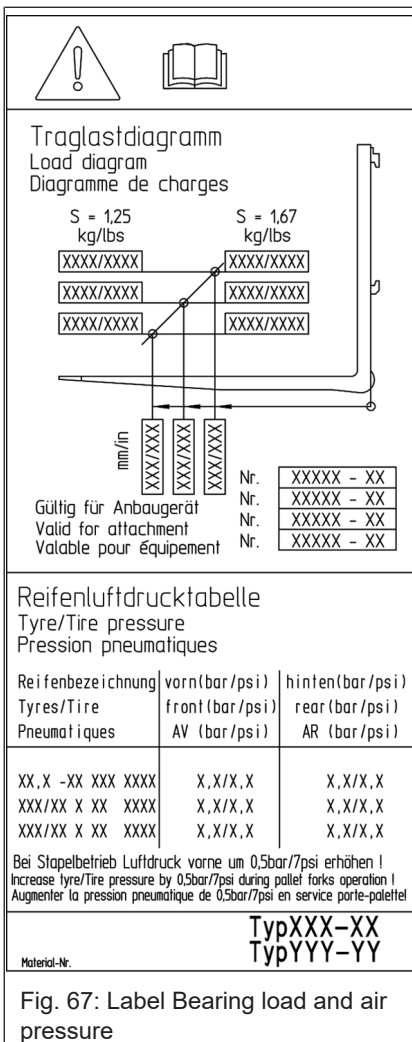
### Functions of the joystick

- 1 Control wheel for the direction of travel:
  - F = Forward
  - R = Reverse
- 2 Button to reduce drive mode
- 3 Button to increase drive mode
- 4 Control knob for electrical functions or changeover to fourth control circuit
- 5 Scroll wheel for operating the fourth control circuit
- 6 Button for automatic bucket repositioning
- 7 Control wheel for locking and unlocking the quick-change device and for operating the third control circuit
- 8 Button for differential lock
- 9 Operating scheme for the loader unit
  - Raise
  - Lower
  - Dump in
  - Tilt out
  - Floating position

## 10 Button for electrical functions

The label shows the functions of the joystick. Depending on the selected options the assignment of the joystick can be different. The label is then adapted to the functions.

A detailed description of how to operate the loader unit: [see Operating the loader unit with a joystick on page 195](#).



## Load diagram and air pressure table

### Load diagram

The load diagram shows the maximum payloads for the use of the pallet fork or crane jib.

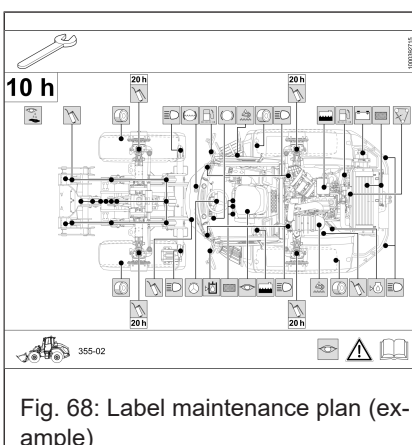
The load diagram applies exclusively to the use of the pallet forks indicated on the label.

If the contents and bulk density of the approved blades are maintained, the blades are also covered by the load diagram.

When using other attachments, their specific load diagrams must be observed. If no load diagram is available for the attachment, contact the service partner.

### Tire pressure table

The label indicates the tires approved for the vehicle. The tires may only be filled with the air pressure also prescribed on the sticker.



## Maintenance plan

The maintenance plan label provides an overview of the care and maintenance work to be carried out by the operator .

Additional information: [see Maintenance on page 269](#).

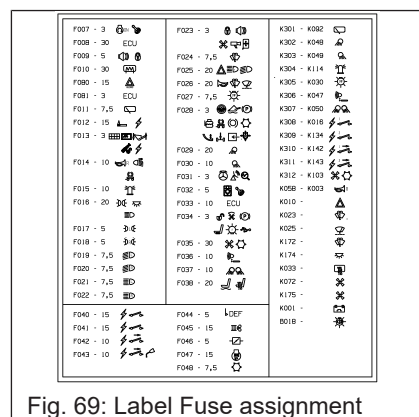


Fig. 69: Label Fuse assignment

### Fuse assignment

The label shows the fuse assignment in the fuse box in the cab with symbols. There are further fuses in the engine compartment and in the cab.

Additional information: [see Cab fuse box on page 397](#).

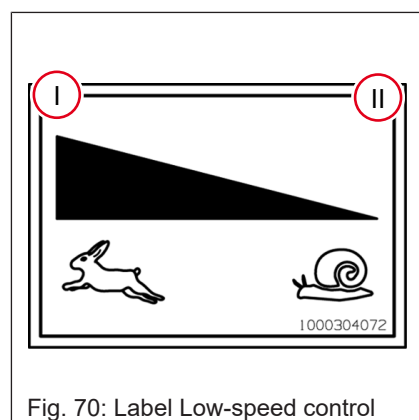


Fig. 70: Label Low-speed control

### Low-speed control

The label shows how the low-speed control is operated.

1. Maximum speed (I)
2. Standstill (II)

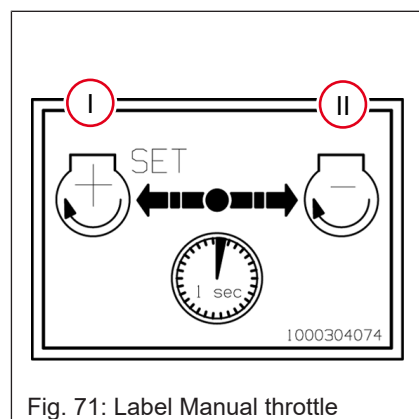


Fig. 71: Label Manual throttle

### Manual throttle

The label shows how the manual throttle is operated.

Increase engine speed (I)

Reduce engine speed (II)

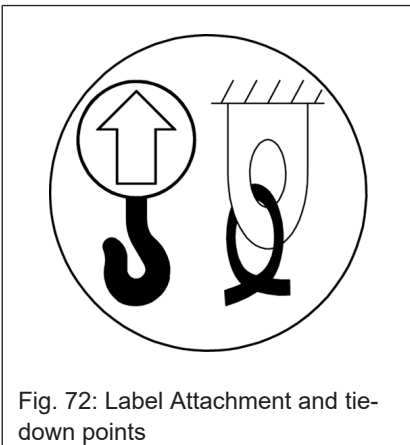


Fig. 72: Label Attachment and tie-down points

### Attachment points and tie-down points

The label identifies the attachment points and the tie-down points on the vehicle.

Lifting gear can be attached to the attachment points so that the vehicle can be loaded with a crane.

Fastening gear can be attached to the tie-down points so that the vehicle can be secured for transport.

The symbols for the attachments points and tie-down points may also appear separately on their own labels.

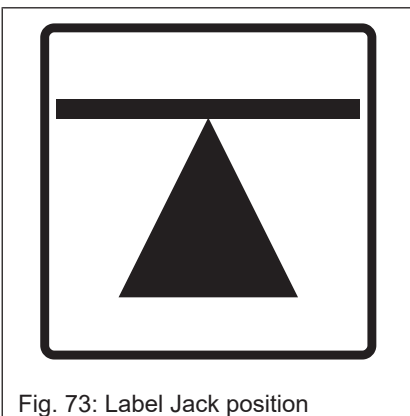


Fig. 73: Label Jack position

### Jack position

The label indicates the points on the vehicle where the jack must be positioned when a wheel is to be lifted.

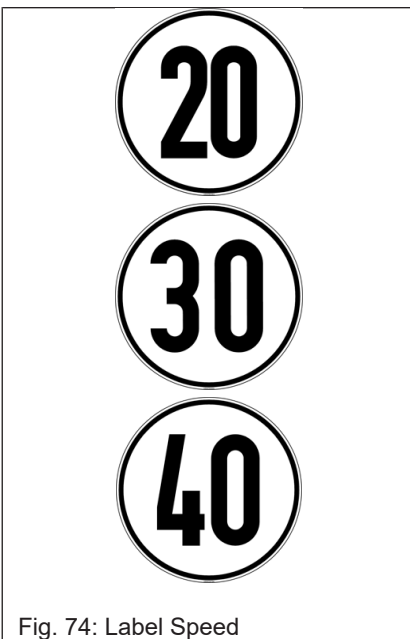


Fig. 74: Label Speed

### Maximum speed

The label indicates the maximum design-specific speed of the vehicle. The label shall be affixed only to vehicles destined for the European Community.

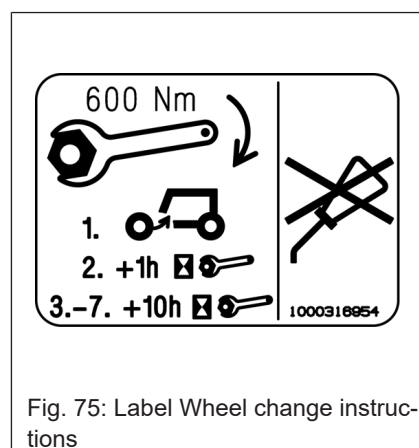


Fig. 75: Label Wheel change instructions

### Wheel nuts

The label contains instructions for changing the wheel:

1. Do not oil lug nuts and bolts. Tighten the wheels to the specified tightening torque.
2. Tighten the wheel nuts to the specified tightening torque after one hour of operation.
3. Tighten the wheel nuts to the specified tightening torque every ten hours of operation. Repeat a total of five times after a wheel change until 50 operating hours have been reached.

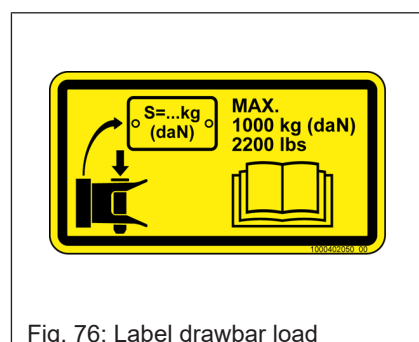


Fig. 76: Label drawbar load

### Drawbar load

The label indicates the maximum drawbar load (1000 kg) of the trailer coupling.

In order to comply with the required minimum axle loads on the front axle during trailer operation, the vehicle requires front ballasting depending on the drawbar load. Information on the maximum permissible drawbar load [see Trailer loads and drawbar loads on page 391](#).

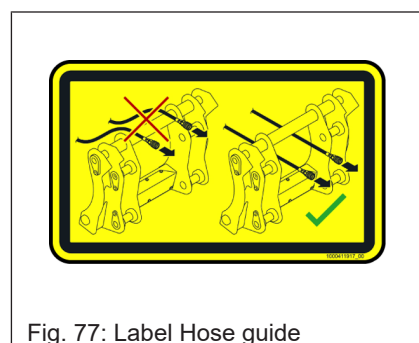


Fig. 77: Label Hose guide

### Hose guide

The label indicates that the hydraulic hoses of the attachment have been laid on the quick-release plate.

This label is only used for the vehicle variant 355-04/06.

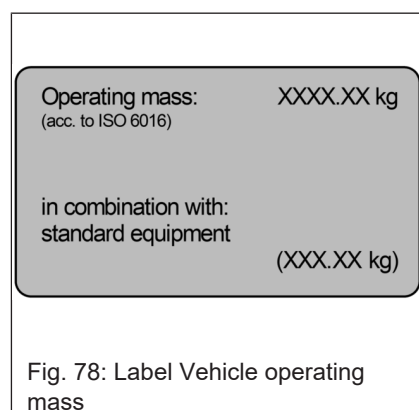


Fig. 78: Label Vehicle operating mass

### Operating mass

The label indicates the operating mass of the vehicle. The operating mass includes the unladen weight, the mass of the bucket indicated at the bottom of the label, 75 kg for the weight of the driver and a full fuel tank.

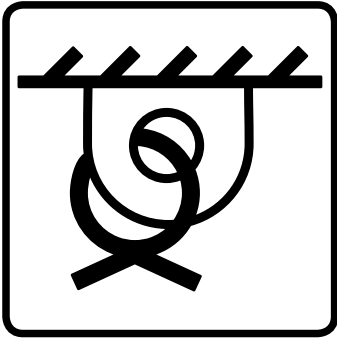


Fig. 79: Label tie-down point

### **Tie-down points**

The label identifies the tie-down points on the vehicle.

Lashing gear can be attached to the tie-down points so that the vehicle can be secured for transport.

## 7 Commissioning

### 7.1 Boarding and disembarking

#### 7.1.1 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.

All locks on the vehicle can be opened and closed with the starting key.

Locks are located on the following components of the vehicle:

- Cab doors
- Ignition lock
- Engine cover
- Tanks (tanks for urea solution, hydraulic oil and fuel)
- Lockable shelves in the cab.

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.

#### 7.1.1.1 Open the doors



#### **CAUTION**

##### **Crushing hazard due to unlocked doors!**

Crushing can be caused by the doors slamming shut.

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

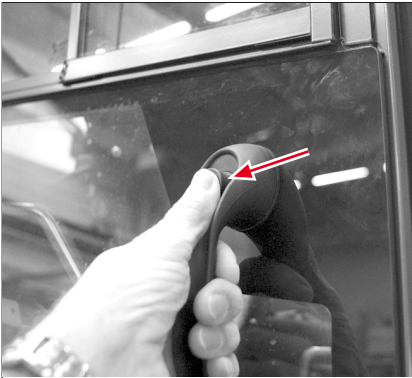


Fig. 80: Open the door from the outside

1. Unlock the lock with the starting key.
2. Press the button and pull the door handle.  
⇒ Open the door.

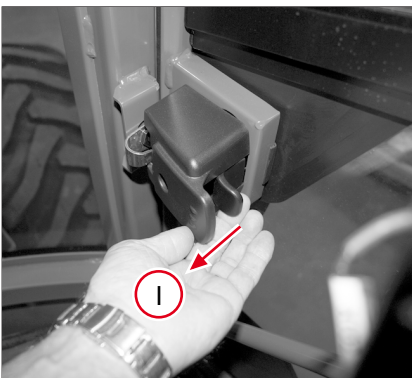
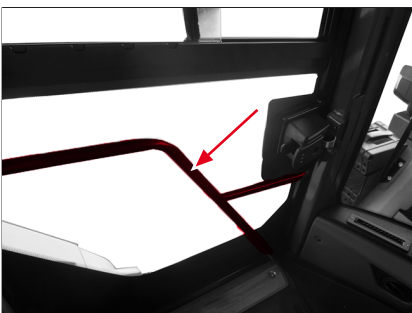


Fig. 81: Opening the door from the inside

- Pull the lever in the direction I.  
⇒ Open the door.

### 7.1.1.2 Closing the doors



On the inside of the door there is a bracket which serves as a boarding aid. On the other hand, the cab door can be closed from the inside.

1. Pull the bracket inwards when the door is open.
2. Door locks into the door lock.  
⇒ Door is closed.

#### Close door from outside

To prevent third parties from using the vehicle, always lock both doors after getting out and lock them with the starting key.

1. Close the door against the spring pressure.
2. Door locks into the door lock.  
⇒ Door is closed.
3. Lock the door with the starting key.

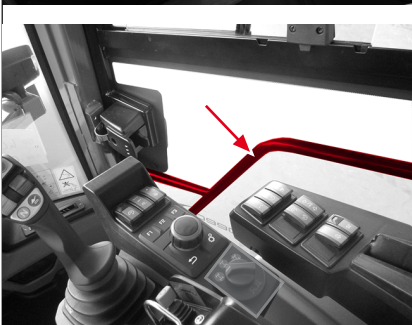


Fig. 82: Close the door from the inside

#### 7.1.1.3 Opening and closing the side window

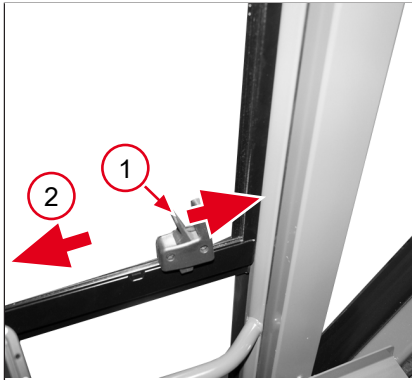


Fig. 83: Opening the side window

##### Open

1. Push lever **1** of the window lock to the rear and hold it.
2. Push window **2** forward in the direction of the arrow.  
⇒ Lock the window in the desired position.

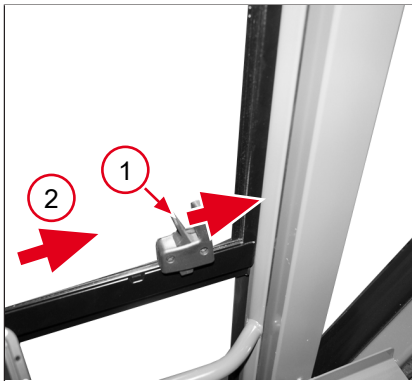


Fig. 84: Close side window

##### Close

1. Push lever **1** of the window lock to the rear and hold it.
2. Push window **2** backwards in the direction of the arrow.  
⇒ Close the window completely.

#### 7.1.2 Fold up joystick carrier



##### **WARNING**

##### **Risk of accident by folding up the joystick carrier during operation!**

By folding up the joystick carrier during operation, the vehicle and the loader unit can make unwanted movements. This may result in accidents that could result in serious injury or death.

- Fold up the joystick carrier only with the engine switched off and the starting key removed.



## NOTICE

### Damage to the joystick carrier due to entering and exiting!

Holding on to the handle of the joystick carrier when entering or exiting can cause damage to the joystick carrier.

- ▶ Only use the climbing aids.
- ▶ The joystick carrier is not a suitable climbing aid.

Always enter and exit the vehicle through the left cab door. The right door is only intended as an emergency exit. If it is necessary to use the right door as an emergency exit, first fold up the joystick carrier.

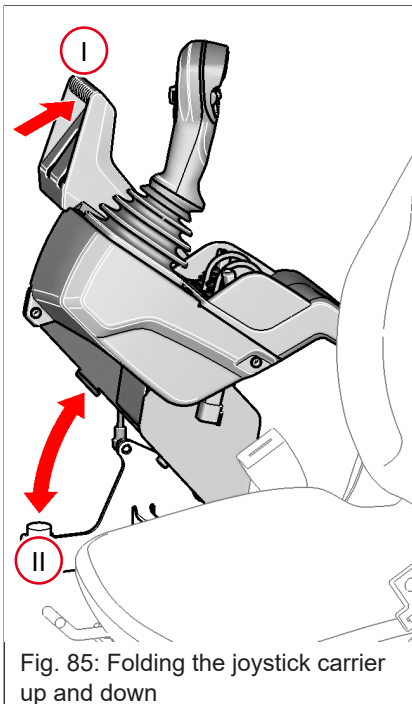


Fig. 85: Folding the joystick carrier up and down

1. Stop the vehicle and move the drive system to the neutral position.
2. Lower the loader unit to the ground.
3. Apply the parking brake.
4. Relieve the pressure on the working hydraulics and lock the joystick.
5. Switch off the engine of the vehicle.
6. Remove the starting key.
7. Pull the joystick carrier completely upwards by the handle.  
⇒ The joystick carrier is held in the position I by a gas spring.

### Folding back joystick carrier

- Press the joystick carrier against the gas spring all the way down.  
⇒ Joystick carrier remains in position II and can be operated.

7

## 7.1.3 Emergency exit

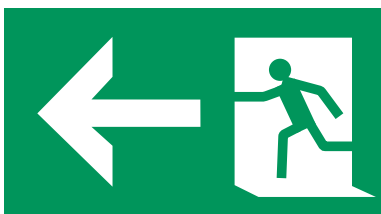


Fig. 86: Emergency exit identification

The right door of the cab is provided as an emergency exit if the left door is blocked. The right door is marked with the label shown.

## 7.2 Setting up the operator station

### 7.2.1 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.

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 operator leaves the seat while driving, the drive system is deactivated at a speed up to 7 km/h. At a speed of more than 7 km/h, a warning tone sounds continuously.

#### 7.2.1.1 Seat MSG85

Sit on the seat to adjust.

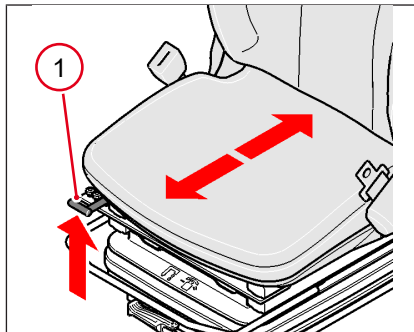


Fig. 87: Longitudinal adjustment (without side console)

##### **Adjusting longitudinal direction separately from the side console**

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

After adjustment, lever **1** must engage in the desired position. It shall not be possible to move the seat after it has been locked.

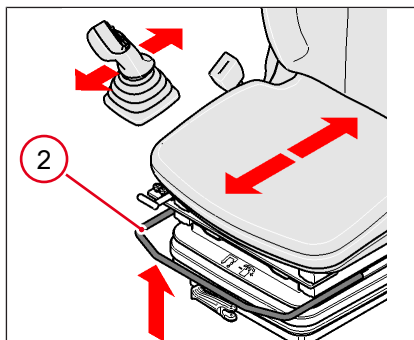
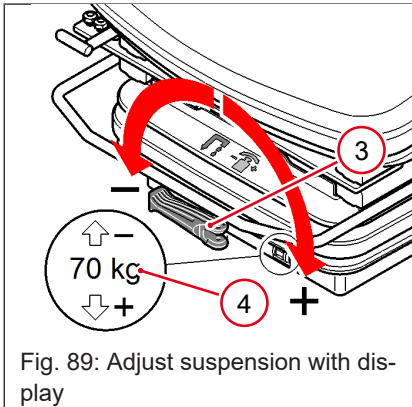


Fig. 88: Longitudinal adjustment (with side console)

##### **Adjusting longitudinal direction together with the side console**

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.

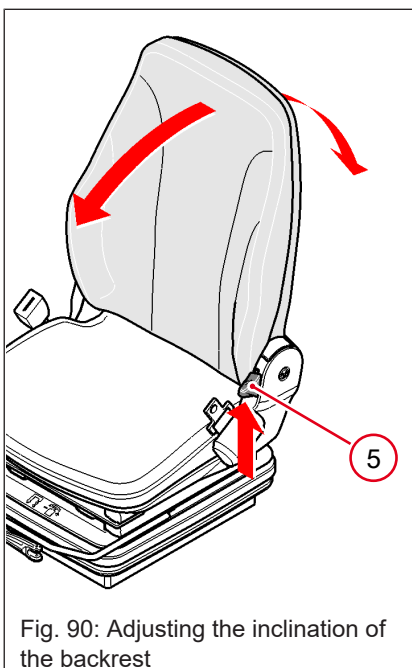


### Adjusting the suspension

The currently set operator weight in kg can be read off in the viewing window 4.

- Turn lever 3 clockwise.
  - ⇒ The weight displayed in viewing window 4 decreases.
  - ⇒ Spring tension is reduced - suspension becomes softer.
- Turn lever 3 counterclockwise.
  - ⇒ The weight displayed in viewing window 4 increases.
  - ⇒ Spring tension is increased- suspension becomes harder.

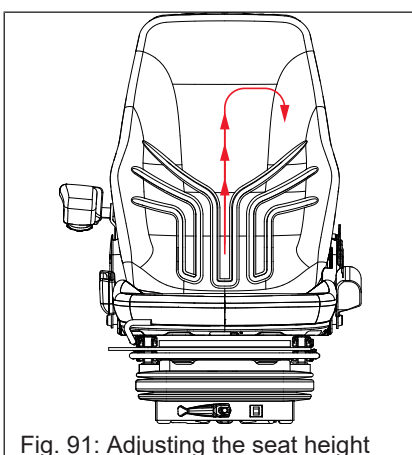
The suspension is correctly adjusted when the weight displayed in viewing window 4 matches the operator's weight.



### Adjusting the backrest

1. Pull lever 5 upward and hold.
2. Move the backrest forwards or backwards until the backrest is at the desired angle.
3. Release lever 5.

After adjustment, lever 5 must engage in the desired position. Once it is locked in place the backrest must no longer move.



### Height adjustment

The seat height can be adjusted in three different steps.

- ✓ Stand up to adjust the seat.
- Raise the seat until it snaps into the next higher step.
  - ⇒ The seat snaps into the next higher step.
  - ⇒ The height of the seat is adjusted.

To move the seat from the highest step back to the lowest step, proceed as follows:

- Lift the seat up to the upper stop.
  - ⇒ The seat moves to the lowest position.
  - ⇒ To adjust the height of the seat again, repeat the procedure as described above.

## 7.2.1.2 Seat MSG95

Sit on the seat to adjust.

### Adjusting longitudinal direction separately from the side console

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

After adjustment, lever **1** must engage in the desired position. It shall not be possible to move the seat after it has been locked.

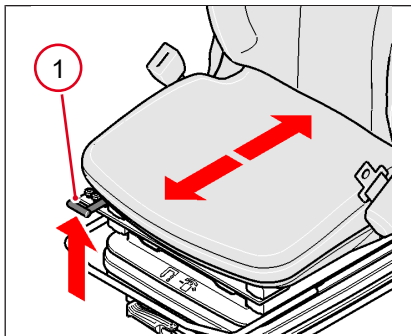


Fig. 92: Longitudinal adjustment (without side console)

### Adjusting longitudinal direction together with the side console

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.

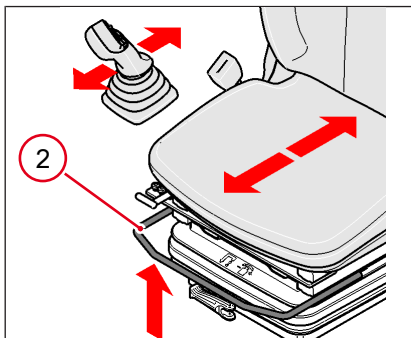


Fig. 93: Longitudinal adjustment (with side console)

### Adjusting the backrest

1. Pull lever **5** upward and hold.
2. Move the backrest forwards or backwards until the backrest is at the desired angle.
3. Release lever **5**.

After adjustment, lever **5** must engage in the desired position. Once it is locked in place the backrest must no longer move.

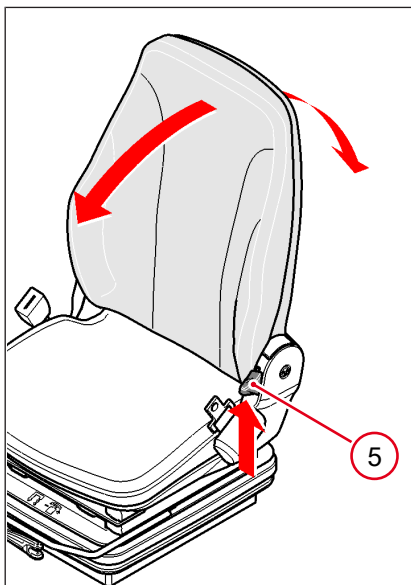
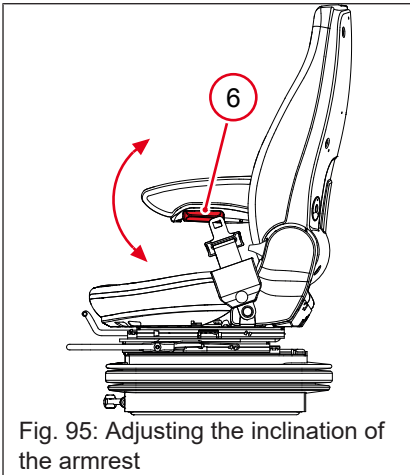


Fig. 94: Adjusting the inclination of the backrest

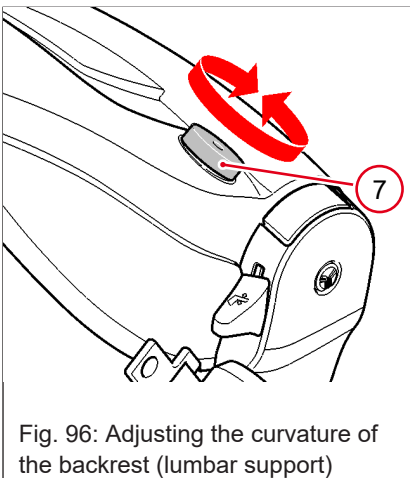


### Adjusting the armrest

Turn the setting wheel **6** on the underside of the armrest to set the desired inclination of the armrest.

✓ To adjust, relieve the armrest.

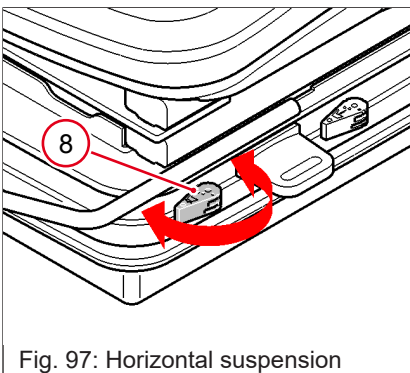
1. Turn setting wheel **6** clockwise.  
⇒ The armrest lowers.
  2. Turn setting wheel **6** counterclockwise.  
⇒ The armrest is raised.
- ⇒ The inclination of the armrest is adjusted.



### Adjusting the curvature of the backrest

Turn the setting wheel **7** on the back of the backrest to set the desired curvature of the backrest.

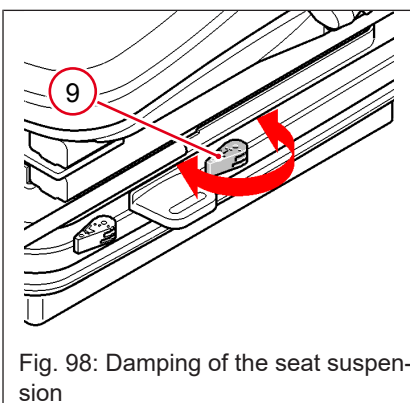
1. Turn setting wheel **7** clockwise.  
⇒ Curvature of the backrest is increased.
  2. Turn setting wheel **7** counterclockwise.  
⇒ The curvature of the backrest is reduced.
- ⇒ The curvature of the backrest is adjusted.



### Activating/deactivating horizontal suspension

Specific operating conditions may require switching on the horizontal suspension. The horizontal suspension absorbs shocks that can occur during braking and acceleration of the vehicle.

- Lever **8** forward.  
⇒ Horizontal suspension is switched on.
- Lever **8** to the rear.  
⇒ Horizontal suspension is switched off.



### Adjusting the damping hardness of the suspension

Four levels are adjustable. Lever **9** engages in each step.

- Move lever **9** to the front.  
⇒ Spring tension is reduced - suspension becomes softer.
- Move lever **9** to the back.  
⇒ Spring tension is increased- suspension becomes harder.

## Adjusting suspension and height with air suspension

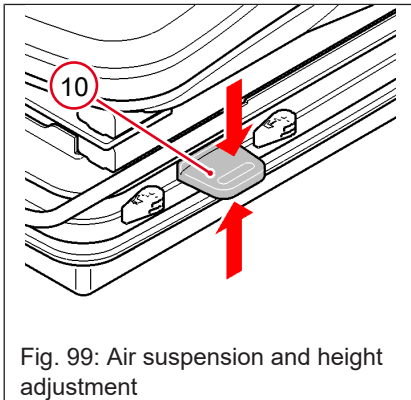


### NOTICE

#### Damage to the compressor.

Too long operation of the suspension adjustment can cause damage to the compressor.

- Do not operate the suspension adjustment for more than one minute.



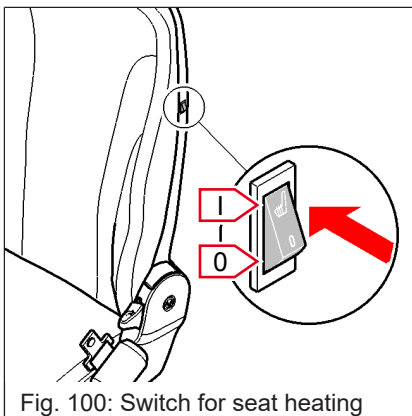
The suspension and height of the seat can be continuously adjusted with lever **10** via a compressor. The lower and upper ends of the suspension adjustment are indicated by an audible upper or lower end stop.

The individually desired height can be adjusted up to a minimum spring travel.

- ✓ The ignition must be switched on.

1. Pull lever **10** upward.  
⇒ The seat moves upwards and the suspension travel increases.
2. Push lever **10** down.  
⇒ The seat moves downwards, the suspension travel becomes smaller.
3. Release lever **10** when the seat has reached the desired position.  
⇒ Suspension and height are adjusted.

### 7.2.1.3 Heated seat



If the seat has a seat heater, this is operated via the rocker switch on the left-hand side of the backrest.

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

### 7.2.2 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.

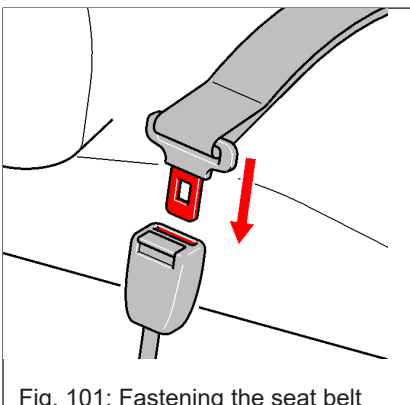
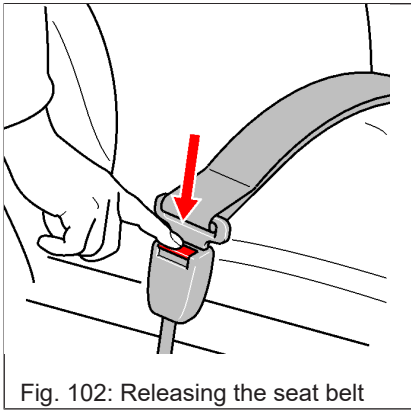


Fig. 101: Fastening the seat belt

#### **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.



### 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.

### 7.2.3 Adjusting the steering wheel

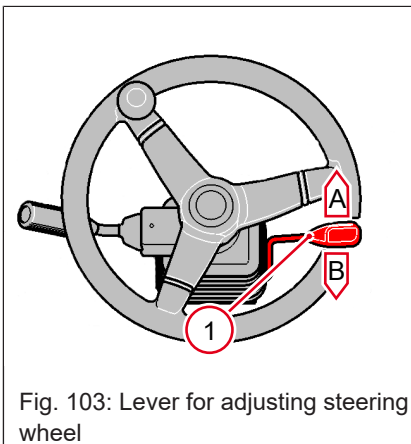


#### **WARNING**

**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.



The height and tilt of the steering column can be individually adjusted according to body size.

#### Adjusting height of steering wheel

1. Pull lever **1** upward (**A**) and hold.  
⇒ The steering wheel is unlocked.
2. Pull/push steering wheel to the desired height.
3. Release lever **1**.  
⇒ Steering wheel locked- height of steering wheel is set.

#### Adjusting tilt of steering wheel

1. Push lever **1** downward (**B**) and hold.  
⇒ The steering wheel is unlocked.
2. Pull/push steering wheel to the desired angle.
3. Release lever **1**.  
⇒ Steering wheel locked - inclination of steering wheel is set.



### Information

When driving on public roads with an approved loading bucket, the steering column must be brought into the foremost position.

### 7.2.4 Field of vision during road travel



#### **WARNING**

##### **Accident hazard 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.
- ▶ Remove existing protective screen.
- ▶ 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 danger zone!**

Persons who are in the danger 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 danger 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 aid of mirrors ([see Adjusting the outer mirror on page 95](#)) and camera ([see Adjusting the rear camera on page 99](#)). Field of vision restrictions are caused by vehicle components and attachments.

### 7.2.5 Field of vision during work operation



#### **WARNING**

##### **Accident hazard 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 commissioning.
- ▶ Adjust visual aids (e.g. mirror, camera) before commissioning.
- ▶ Check field of vision before commissioning.
- ▶ 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!



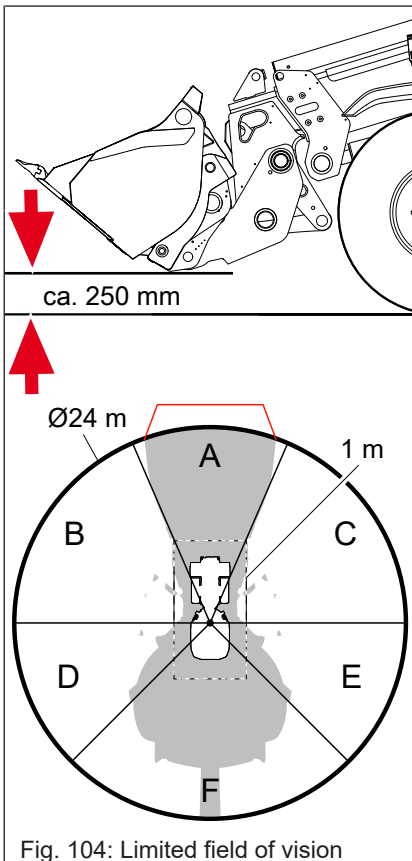
#### **WARNING**

##### **Accident hazard due to persons in the danger zone!**

Persons who are in the danger 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 danger 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 aid of mirrors ([see Adjusting the outer mirror on page 95](#)) and camera ([see Adjusting the rear camera on page 99](#)). Field of vision restrictions are caused by vehicle components, protective screen and attachments.



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. 250 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 grey areas indicate the areas where 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 loader unit system is raised and when reversing. Additional field of vision restrictions may be caused by protective screens and loads.

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

7

## 7.2.6 Adjusting the outer mirror



### **⚠ WARNING**

#### **Risk of accident due to reduced visibility!**

Dirty windows and visual aids (e.g. mirrors and cameras) can lead to a restricted view of the surroundings and thus to accidents with serious injuries or death.

- Before starting work, check windows and visual aids for cleanliness and clean if necessary.

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

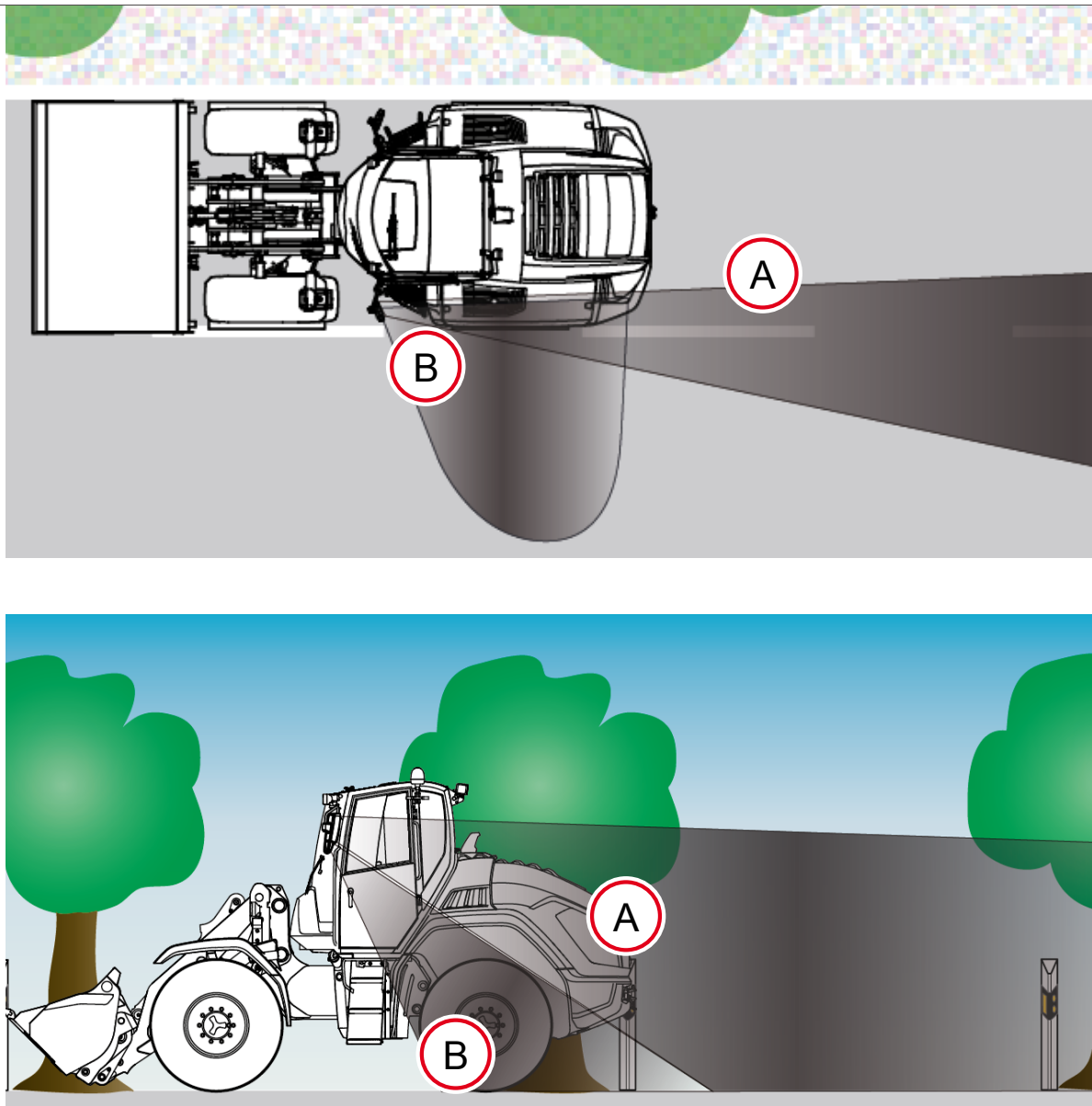
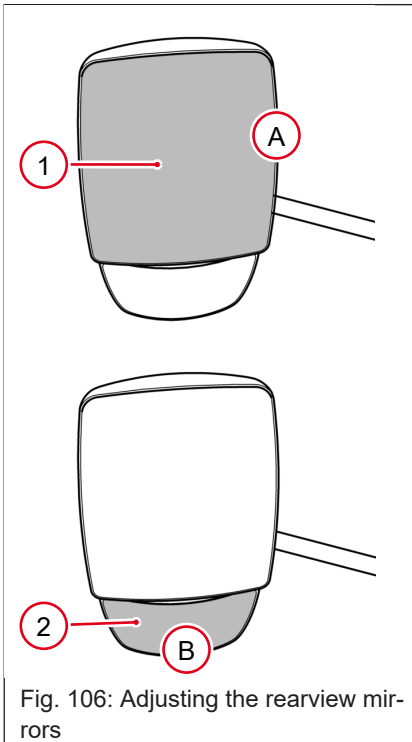
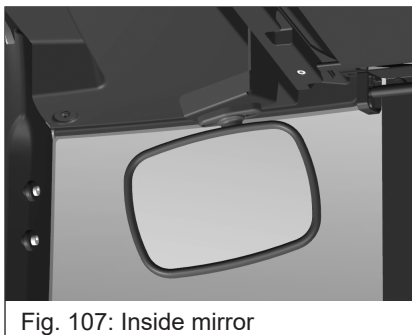


Fig. 105: Fields of vision rearview mirrors

The wide-angle mirror 2 can only be adjusted together with the side mirror 1.



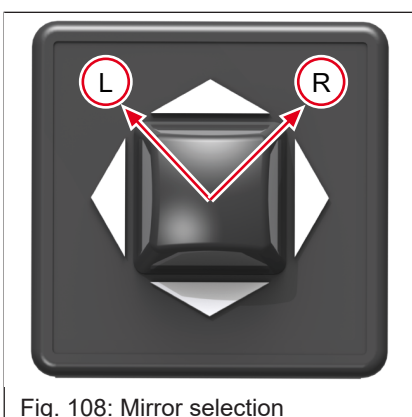
1. Adjust the rearview mirrors as shown.  
⇒ In order to prevent the mirror from touching the door, turn the mirror bracket sufficiently forward (about 45°).
2. Adjust the rearview mirrors.
  - The inner edge **A** of side mirror **1** must show the outer edge of the vehicle and the rear of the vehicle.
  - At the lower edge **B** of the wide-angle mirror **2** the visible area shall be as close as possible to the vehicle and the area behind the front wheel must be visible.



#### 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.

### 7.2.7 Adjusting the outer mirrors electronically



The outer mirrors can be electrically adjusted via a control element. The control element is located in the top left roof console.

1. Select mirror.
  - ⇒ Turn the switch to position **R** for the right mirror.
  - ⇒ Turn the switch to position **L** for the left mirror.

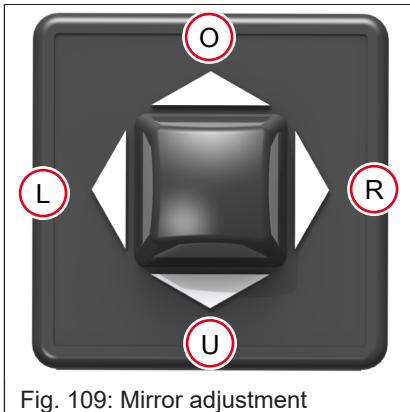


Fig. 109: Mirror adjustment

2. Press the switch in the desired direction in which the mirror is to rotate.
  - ⇒ **O** - mirror moves upward
  - ⇒ **U** - mirror moves downward
  - ⇒ **L** - mirror moves to the left
  - ⇒ **R** - mirror moves to the right

### 7.2.8 Exterior mirror heating

If the vehicle has heatable exterior mirrors, the exterior mirror heating can be used to prevent the exterior mirrors from fogging up in cold weather. The exterior mirror heating can also be used to defrost the exterior mirrors. The exterior mirror heating is equipped with an overheating protection. The exterior mirror heating switches off automatically after approx. five minutes.

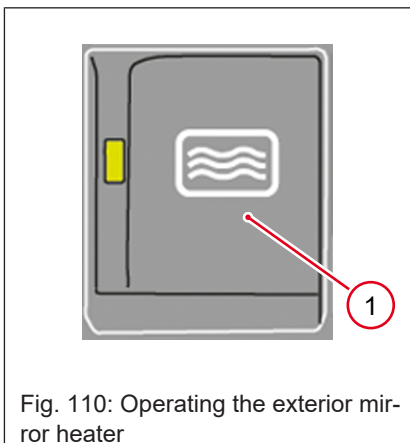


Fig. 110: Operating the exterior mirror heater

Exterior mirror heating is operated via the keypad in the cab roof.

1. Press switch **1**.
  - ⇒ Exterior mirror heating is switched on.
  - ⇒ The LED in the switch illuminates.
2. Press switch **1** again.
  - ⇒ Exterior mirror heating is switched off.
  - ⇒ The LED in the switch is off.



### Information

If the exterior mirror heating is switched on via the switch in the keypad, the rear window heating is also automatically activated if the vehicle is equipped with it.

## 7.2.9 Adjusting the mirror for the hitch trailer coupling



Fig. 111: Mirror for hitch trailer coupling

The mirror is mandatory in conjunction with a hitch trailer coupling and must be observed when attaching and removing a trailer.

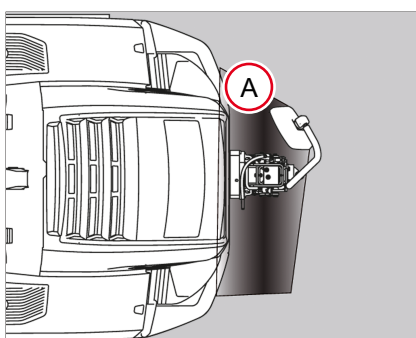


Fig. 112: Field of vision mirror for hitch trailer coupling

- Position the mirror so that in mirror area **A** the rear of the vehicle with the trailer coupling is visible.

7

## 7.2.10 Adjusting the rear camera

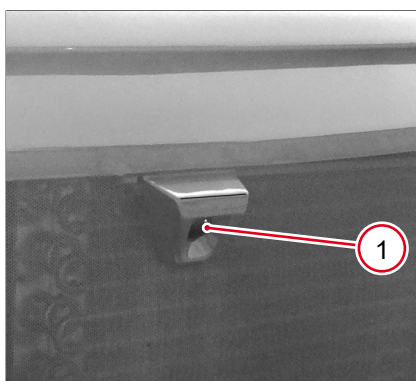
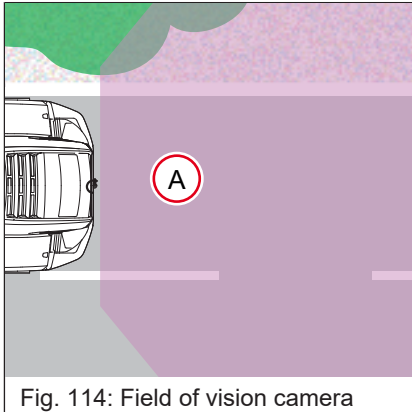


Fig. 113: Camera for rear view

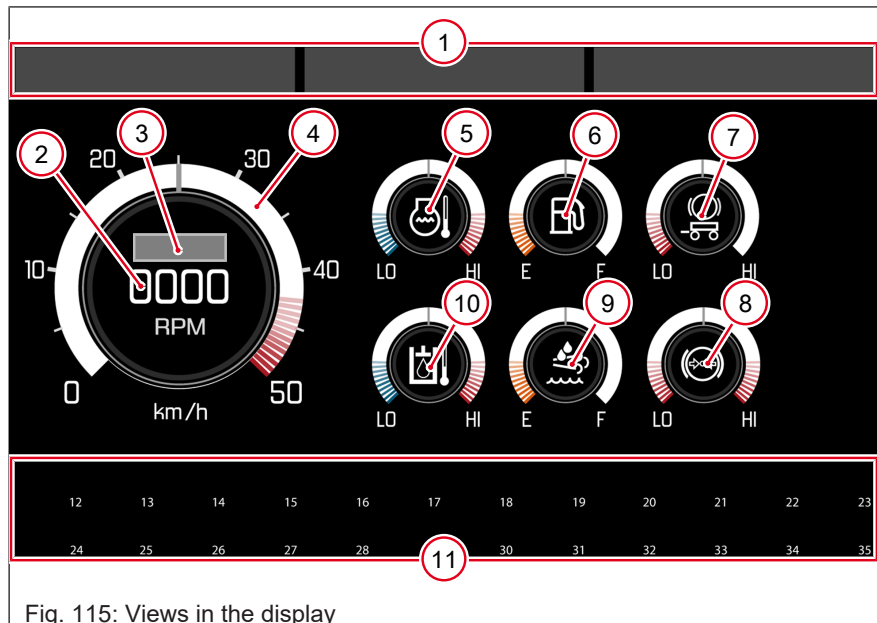
Camera **1** is necessary to achieve the prescribed rear view and must be observed when operating the vehicle. The vehicle must not be operated without a functioning and correctly adjusted camera.



- The camera must be set so that the display shows area **A** behind the vehicle.
- ⇒ Only have the camera adjusted by an authorized service center.

## 7.3 Display

### 7.3.1 Overview: Display



- |  |        |
|--|--------|
| 1 Drop-down menus  | ▶ 101] |
| 2 Display for the current engine speed (numeric)                   |        |
| 3 Display of the stored speed (memory value)                       |        |
| 4 Display for the current driving speed (round scale)              |        |
| 5 Display for coolant temperature                                  | ▶ 118] |
| 6 Display for the fill level of the fuel tank                      | ▶ 119] |
| 7 Display for the pressure of the pneumatic trailer braking system | ▶ 174] |
| 8 Vehicle brake pressure indicator                                 | ▶ 132] |
| 9 Indication of the filling level of the urea solution tank        | ▶ 119] |
| 10 Display for the temperature of the hydraulic oil                | ▶ 120] |

## 11 Display panels for control lights and warning lights

Warning lights and control lights

### 7.3.2 Overview: Drop-down menus



Fig. 116: Jog Dial

The individual drop-down menus are called up via the "F" keys on the jog dial.



### Information

The notifications shown in the following are examples and document possible notifications. The drop-down menus and notifications actually shown in the vehicle therefore deviate from the notifications shown here.

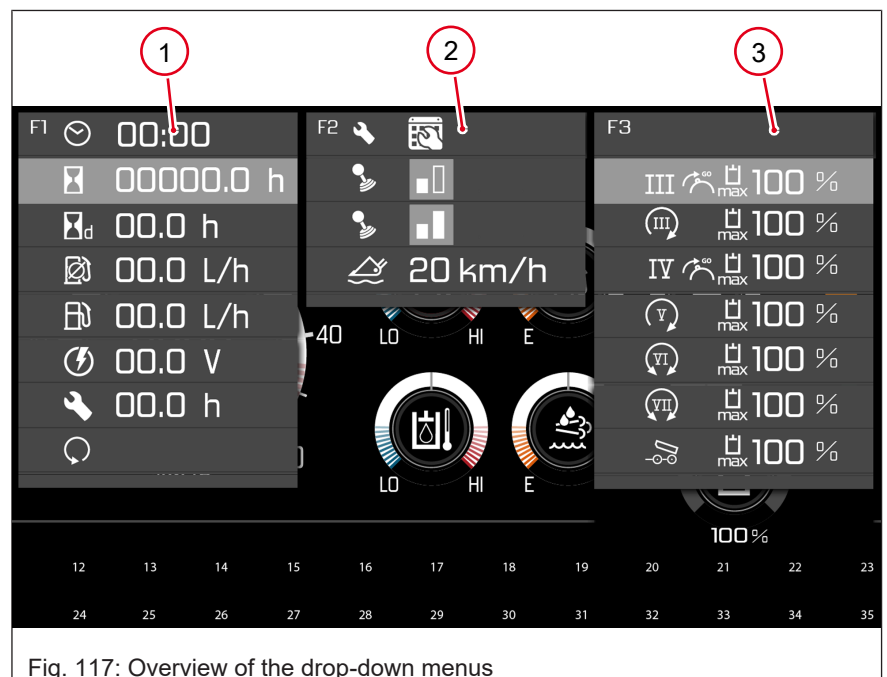


Fig. 117: Overview of the drop-down menus









- 1 General information
- 2 Specifications hydraulics, maintenance reminder
- 3 Oil volumes hydraulic control circuits

### Displays General information

By pressing the **F1** button on the jog dial, a menu for querying general data appears.

A value can be selected by turning the dial on the jog dial and set to the first position by pressing it.




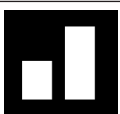

By pressing the Back button or the **F1** key, the old value is retained and the drop-down menu is closed.

Symbol	Display	Description, function
	Time, outdoor temperature	Time display in hours:minutes format
	Total operating hours	Display of the total operating hours of the vehicle in hours
	Operating hours per day	Display of operating hours per day in hours
	Average consumption	Average fuel consumption display in liters per hour
	Daily consumption	Display for fuel consumption per day in liters per hour
	On-board voltage	Display for on-board voltage in Volt
	Operating hours until maintenance	Display for remaining operating hours until next maintenance in hours
	Reset values	Different values, e.g. operating hours per day, can be reset. Selecting this field and pressing the jog dial opens a popup menu with the resettable values. After selecting the corresponding value, it can be reset to "0" by pressing the setting wheel again.

### Displays Specifications hydraulics system and maintenance reminder

By pressing the **F2** button on the jog dial, a menu appears for preselecting the response behavior of the working hydraulics and the speed at which the load stabilizer automatically switches on.




A field can be selected by turning the dial on the jog dial. If an adjustment is possible, the corresponding pop-up menu can be opened, the desired setting selected and saved by pressing and turning the dial.

Symbol	Display	Description, function
	Maintenance reminder	If no maintenance has been carried out in the last 12 months or the maintenance computer has not been reset, the symbol appears in the F1 menu.
	Working hydraulics	
	One bar	slow response behavior
	Two bars	quick response behavior
	AUTO speed load stabilizer	Shows the speed at which the load stabilizer automatically switches on.

### Displays oil volumes of hydraulic control circuits

By pressing the **F3** button on the jog dial, a menu with the display of the set oil volumes appears.

A control circuit can be selected by turning the control dial on the jog dial. If it is possible to adjust the oil volume, the pop-up menu "Oil volume setting" can be opened, the desired setting selected and saved by pressing the control dial.

Symbol	Display	Description, function
	Control circuit (example)	Selected control circuit
	Current GO value	Status – Current setting of the GO value of the hydraulic valve
	Current oil volume setting	Status – Current maximum power output

### 7.3.3 Overview popup displays

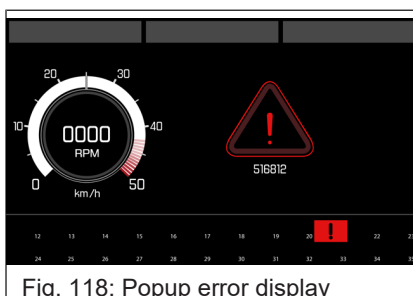


Fig. 118: Popup error display

#### Error display

If an error occurs, a corresponding message is briefly shown on the display. A warning will sound simultaneously.

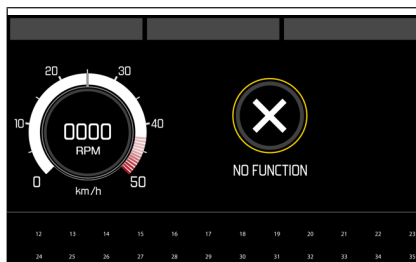


Fig. 119: Pop up No function

### No Function

If a function is selected that is not activated on the vehicle, the corresponding "NO FUNCTION" message appears on the display.

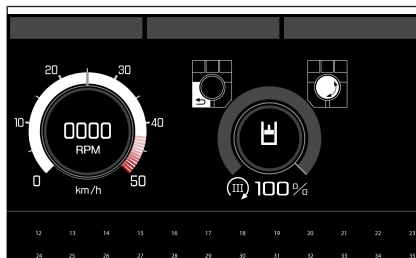


Fig. 120: Pop up oil volume setting

### Oil volume setting

The display appears as soon as the oil volume setting of a control circuit is called up via the drop-down menu or a control circuit is called up for the first time via the corresponding switch. The oil volume can be changed and stored by turning and pressing the dial on the jog dial. The display remains active until the oil volume is stored (automatically or manually) - [see Operating the oil volume setting on page 203](#).

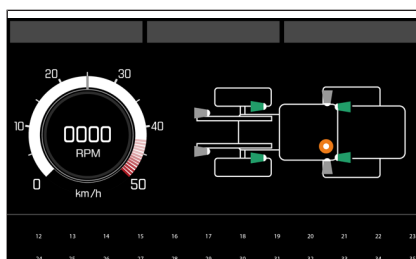


Fig. 121: Pop up work lights

### Work lights

The display appears as soon as a work light or the rotating beacon is switched on. The lights that are switched on are highlighted.

The display remains active for a maximum of ten seconds.

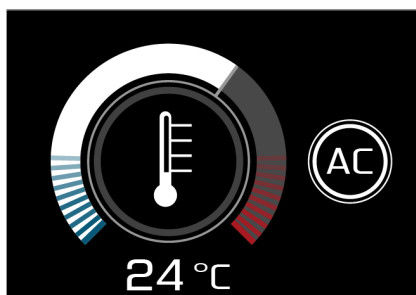


Fig. 122: Pop up Temperature

### Heating/air conditioning system

The temperature or cooling mode indicators appear when one of these functions is activated on the heating and air conditioning system control panel.

The fan intensity or recirculation mode indicators appear when one of these functions is activated on the heating and air conditioning system control panel.

The display remains active for approx. five seconds.

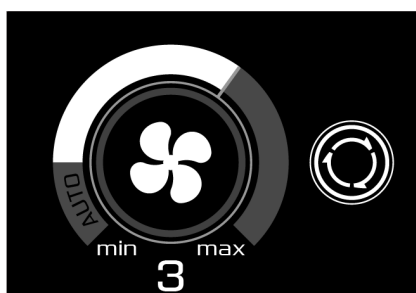
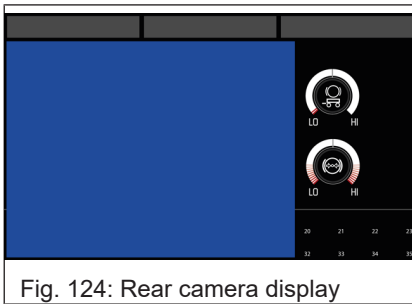


Fig. 123: Pop up fan

### 7.3.4 Rear camera display

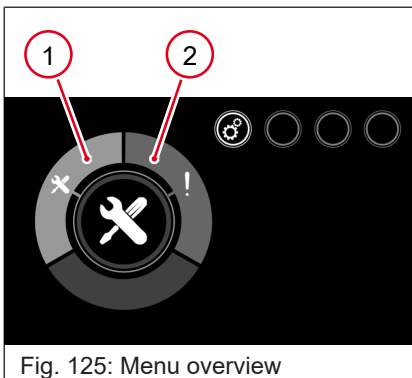


A rear camera is installed as standard. When the "Reverse" direction is selected, the camera image is automatically shown on the display. If this is not the case, have the camera checked by an authorized service center.

### 7.3.5 Menu overview and menu navigation

#### 7.3.5.1 Menu overview

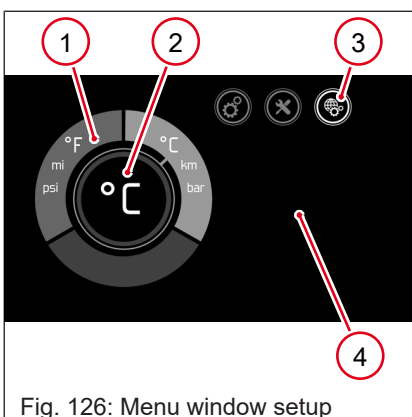
The menus listed below can be called up from the main display view:



- 1 Query of the machine status
- 2 Settings system

#### 7.3.5.2 Menu window setup

Every notification in the individual menus has the following setup:



- 1 Display of the selection options
- 2 Symbol of the selection made
- 3 Sequence of the previous menu steps
- 4 Field of the listings

### 7.3.5.3 Navigation in the menus



#### **WARNING**

##### **Risk of accident when operating the jog dial during operation!**

Operating the jog dial during operation may result in an accident, serious injury or death.

- Stop the vehicle before operating the jog dial.

Using the jog dial, menus and menu pages can be called up on the display, selection options marked and parameters changed and saved. The operating keys always have the following functions:

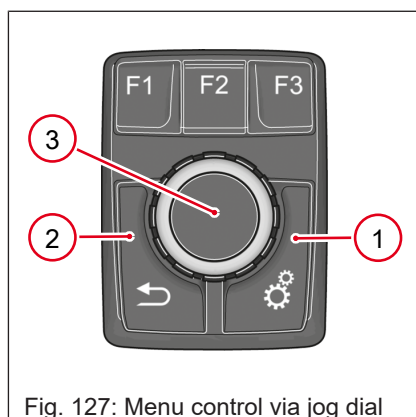
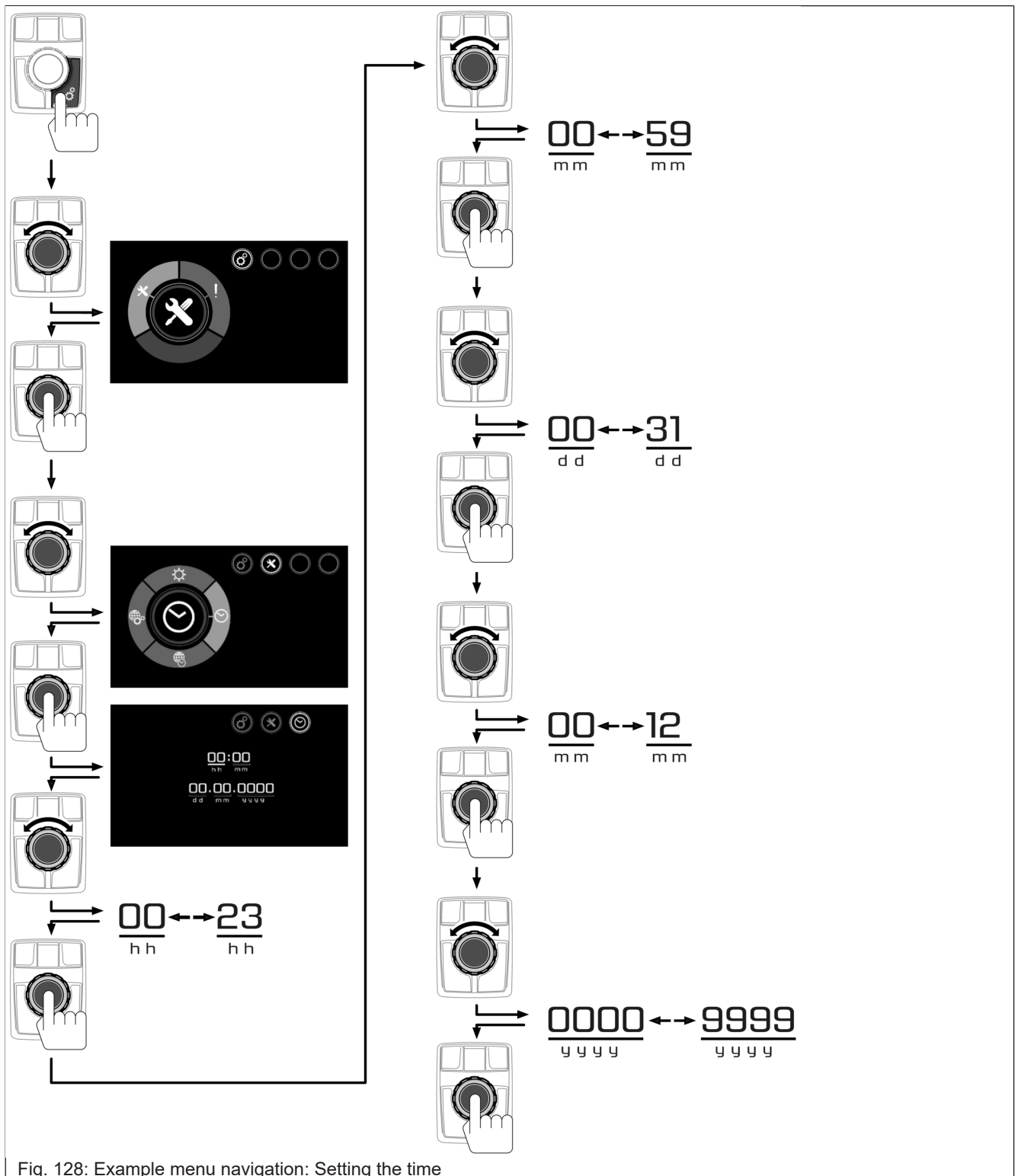


Fig. 127: Menu control via jog dial

- 1 Settings / Selection menu button - Switch from main view to menu view
- 2 Back button - takes a step back without saving
- 3 Setting wheel - highlight a selection or change a parameter (Rotate) and recall or save a selection (Press)





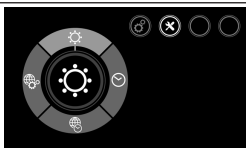

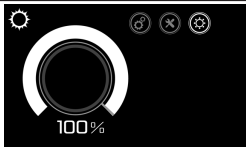

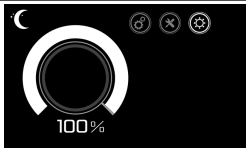

### 7.3.5.4 Example: Setting the time





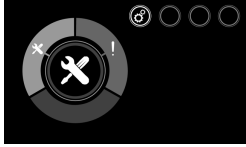

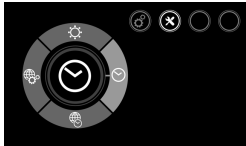
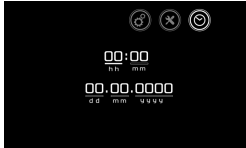
### 7.3.6 System settings


The display brightness, the time, the form of date display as well as the format of the units can be set in this menu.

### 7.3.6.1 Adjusting brightness

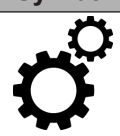



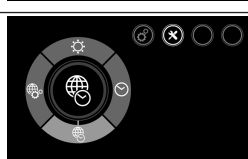
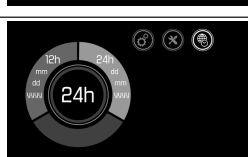
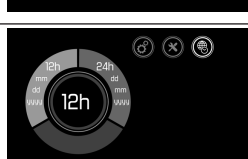

Step	Activity	Symbol	Display
1	Press the Settings/Selection Menu button for more than two seconds.		
2	Select and call up "System settings" with the setting wheel		
3	Use the setting wheel to select and access the "brightness."		
4	Use the setting wheel to adjust and confirm the desired brightness.		
			
5	Press the Back button multiple times to return to the main display.		

### 7.3.6.2 Setting the time



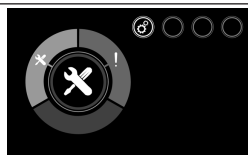
Step	Activity	Symbol	Display
1	Press the Settings/Selection Menu button for more than two seconds.		
2	Select and call up "System settings" with the setting wheel		
3	Use the setting wheel to select and access the "time".		
4	<p>If the corresponding menu page lights up, the hour display (hh) has already been selected.</p> <p>Depending on the setting in the "date format" menu, the information is shown in metric (hh, mm dd, mm, yyyy) or imperial (hh, mm, mm, dd, yyyy) order .</p> <p>Use the setting wheel to adjust and confirm the desired hour.</p>		



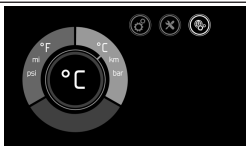
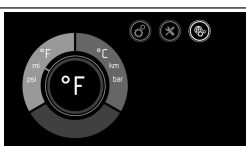

Step	Activity	Symbol	Display
5	Jump to the next input field (mm) by pressing the setting wheel and set and save this with the setting wheel.		
6	Access, adjust and save all other input fields in the same way.		
7	Press the Back button multiple times to return to the main display.		

### 7.3.6.3 Adjusting the date format

Step	Activity	Symbol	Display
1	Press the Settings/Selection Menu button for more than two seconds.		
2	Select and call up "System settings" with the setting wheel		
3	Use the setting wheel to select and access the "date format".		
4	Use the setting wheel to adjust and confirm the desired format.	metric	
		imperial	
5	Press the Back button multiple times to return to the main display.		

### 7.3.6.4 Adjusting the unit format

Step	Activity	Symbol	Display
1	Press the Settings/Selection Menu button for more than two seconds.		
2	Select and call up "System settings" with the setting wheel		

Step	Activity	Symbol	Display
3	Use the setting wheel to select and access the "unit format".		
4	Use the setting wheel to adjust and confirm the desired unit format.	metric	
		imperial	
5	Press the Back button multiple times to return to the main display.		

### 7.3.7 Query of the vehicle status



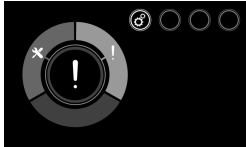

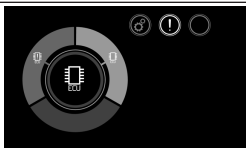
The machine data and error messages can be accessed in this menu.

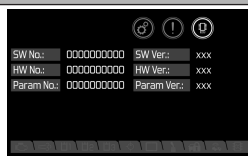

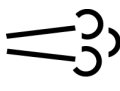



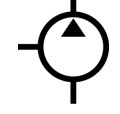




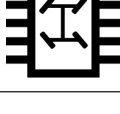

Information about the software, hardware and parameters is specified with the corresponding material numbers and SAP version numbers on the info pages of the menu under each tab on the lower edge of the display (electronic control circuits).



#### Information

The tab for the exhaust gas aftertreatment is an exception. The status of the exhaust gas aftertreatment can be accessed under this tab.

Step	Activity / meaning	Symbol	Display
1	Press the Settings/Selection Menu button on the jog dial for more than two seconds.		
2	Use the setting wheel to select and access the "vehicle status".		
3	Use the setting wheel to select and access the "vehicle data".	 ECU	

Step	Activity / meaning	Symbol	Display
4	Use the setting wheel on the jog dial to select the desired vehicle area from the tab list on the lower edge of the screen. The corresponding informational page automatically appears on the display.	-	
	Diesel engine		
	Exhaust gas aftertreatment		
	Cab		
	Frame 1		
	Frame 2/options		
	Drive system		
	Notifications/display		
	Joystick		
	Drive interlock		
	Telematics		
	Steering system		
5	Press the Back button on the jog dial multiple times to return to the main display.		

### 7.3.8 Meaning of the warning lights and control lights

Control lights serve as a source of information. As a rule, control lights are green, blue and yellow.

Warning lights warn of damage to the vehicle. If a warning light illuminates during operation, immediately shut down the vehicle and contact an authorized service center. As a rule, warning lights are red.

The warning lights and control lights illuminate for self-testing when the ignition is switched on. If not all warning lights and control lights light up during the self-test, have the display or the function on the vehicle checked and, if necessary, repaired by an authorized service center.

The display informs about:

- Activated functions
- Current operating states
- Service information
- Machine status
- Error codes

The warning lights and control lights and their meaning are explained below. The lower part of the display contains two rows of twelve positions each for warning lights and control lights. Some of these positions are occupied several times by different warning lights and control lights.

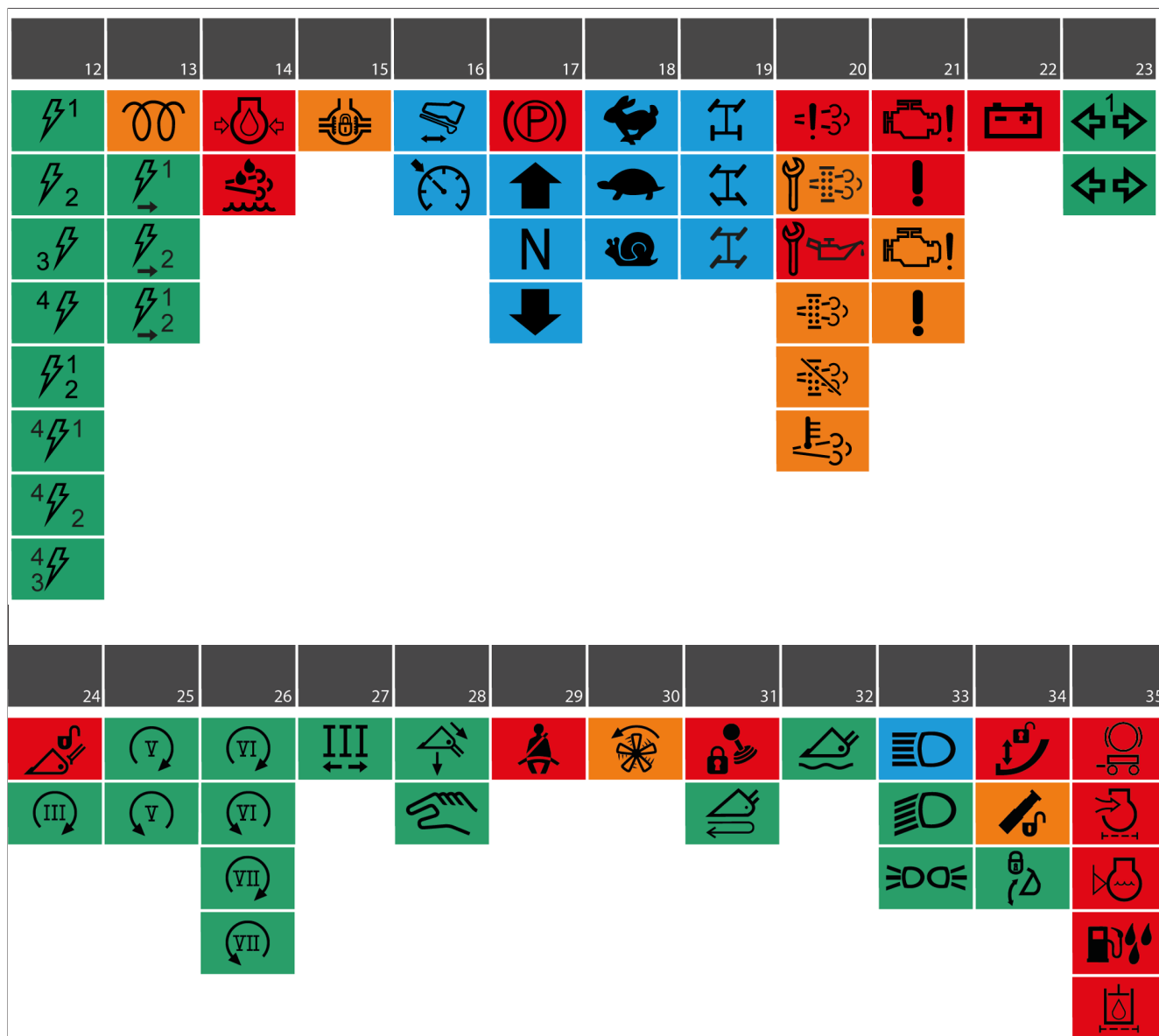









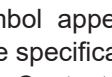
















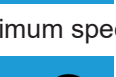



























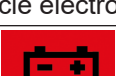



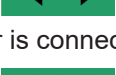
























Fig. 129: Overview of warning lights and control lights

Symbol	Designation	Function
	Circuits of the plug receptacle at the loader unit	Symbol  appears when circuit 1 is switched on.
		Symbol  appears when circuit 2 is switched on.
		Symbol  appears when circuit 3 is switched on.
		Symbol  appears when circuit 4 is switched on.
		Symbol  appears when circuit 5 is switched on.
		Symbol  appears when circuit 6 is switched on.
		Symbol  appears when circuit 7 is switched on.
		Symbol  appears when circuit 8 is switched on.
	Preheats the engine	The symbol  appears if the starting key in the ignition lock is in the position 1. Lights up as long as the intake air is preheated.
	Rear plug receptacle outlet circuits	Symbol  appears when circuit 1 at the rear has been selected.
		Symbol  appears when circuit 1 at the rear has been selected.
		Symbol  appears when both circuits at the rear are active.
	Engine oil pressure from diesel engine	Symbol  appears when the engine is running if the engine oil pressure is too low. Stop the vehicle immediately and stop the engine.
	Control DEF quality	The symbol  appears when the engine is running if the quality of the urea does not meet the specifications or an incorrect liquid has been added. Power is gradually reduced. Contact an authorized service center.
	Differential lock	Symbol  appears when the differential lock is engaged.
	Accelerator pedal mode	Symbol  appears when the accelerator mode is activated.
	Low-speed control	Symbol  appears when the low-speed control is activated. When the vehicle is at a standstill (rear slider), the control light flashes. When the low-speed control is deactivated (slide control at the front), the control light is off.

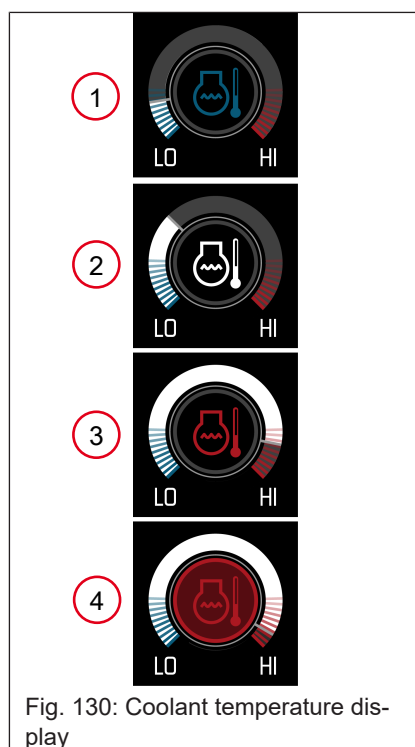
Symbol	Designation	Function
	Parking brake	Symbol  appears when the parking brake is switched on. The functions of the gearshift for direction of travel and drive mode are disabled when the parking brake is switched on.
  	Direction of travel (drive system)	Symbol  appears when driving in forward direction. Symbol  appears neutral in direction of travel. Symbol  appears when driving in reverse direction.
  	Driving speed	Symbol  appears when high speed is switched on. It is possible to reach the maximum speed. Symbol  appears when slow speed is switched on. It is possible to reach the maximum speed for the drive mode. Symbol  appears when crawler gear is switched on. The maximum speed of X km/h can be reached.
  	Steering modes	Symbol  appears when front axle steering is switched on. Symbol  appears when four-wheel steering is switched on. Symbol  appears when crab steering is switched on.
	Error in exhaust gas aftertreatment	Symbol  appears when the ash load is too high. The engine speed is limited to 1200 rpm. The power is reduced by 30 %. Manual regeneration is no longer possible. The diesel particulate filter has to be replaced by an authorized service center.
	Exchange DPF filter	Symbol  appears when the DPF filter has to be exchanged. If the control light flashes, no performance is reduced. If the control light is lit permanently, the engine speed is limited to 1200 rpm and the power is reduced by 30 %.
	Oil change	Symbol  appears when an oil change is required.

Symbol	Designation	Function
  	Symbols for exhaust gas aftertreatment	<p>Symbol  appears during automatic regeneration.</p> <p>Symbol  appears when regeneration is suppressed. Carry out manual regeneration at the next opportunity.</p> <p>Symbol  appears if the exhaust gas temperature is too high. The engine speed is limited to 1200 rpm. The power is reduced by 30 %. Carry out manual regeneration immediately.</p>
	Critical error in the engine electronics	Symbol  appears when a critical error has occurred in the engine control system. Stop the engine immediately!
	Critical error in vehicle electronics	Symbol  appears if a critical error has occurred in the vehicle electronics. Stop the engine immediately.
	Error in the engine electronics	Symbol  appears if an error has occurred in the engine control system. Have the engine inspected as soon as possible.
	Error in the vehicle electronics	Symbol  appears if an error has occurred in the vehicle electronics. Have the vehicle electronics checked as quickly as possible.
	Charge indicator light alternator	Symbol  appears during operation when the battery is no longer being charged. There is either a defect in the V-belt or in the charging circuit.
 	Turn signals, warning lights	<p>Symbol  flashes when the turn signal is switched on and the attachment or trailer is connected.</p> <p>Symbol  flashes when the turn signal is switched on.</p>
	Unlocking the power coupler	Symbol  appears when the power coupler is unlocked.
	Hydraulic control circuit III	Symbol  appears if the third control circuit is activated in continuous operation. Direction of rotation is right.
 	Hydraulic control circuit V	The  or  symbol appears when the fifth control circuit has been activated.
 	Hydraulic control circuit VI	The  or  symbol appears when the sixth control circuit has been activated.

Symbol	Designation	Function
	Hydraulic control circuit VII	The  or  symbol appears when the seventh control circuit has been activated.
	Changeover valve third control circuit	Symbol  appears when the changeover valve in the third control circuit is activated.
	Operating mode Smart Handling	Symbol  appears when the operating mode "Bucket mode" is activated.
		Symbol  appears when the "manual mode" operating mode is activated.
	Seat belt	Symbol  appears when the seat belt is not fastened.
	Fan reversing	The symbol  appears if the fan reversing is enabled.
	Locking the working hydraulics	Symbol  appears when the joystick is locked for road travel.
	Bucket repositioning	Symbol  appears when automatic bucket repositioning is activated.
	Load stabilizer	Symbol  appears when the load stabilizer is activated.
	Vehicle lights	Symbol  appears when parking lights are switched on.
		Symbol  appears when the low beam is switched on.
		Symbol  appears when the high beam is switched on.
	Auto-ball hitch	Symbol  appears when the auto-ball hitch is unlocked.
	Safe load indicator	Symbol  appears when the safe load indicator is deactivated.
	Tilt ram lock	Symbol  appears when the tilt ram lock is activated.

Symbol	Designation	Function
	Warning lights	Symbol  appears when the parking brake test switch is actuated with the trailer attached.
		Symbol  appears if the air filter is too dirty.
		Symbol  appears if the coolant level is too low.
		Symbol  appears when there is too much water in the fuel filter water separator.
		Symbol  appears if the resistance of the oil flow in the return filter of the hydraulic system is too high.

### 7.3.9 Display: Temperature of coolant



- 1 The temperature of the coolant is less than 60 °C. The symbol lights up blue.
- 2 The temperature of the coolant is between 60 °C and 105 °C.
- 3 The temperature of the coolant is between 105 °C and 110 °C. The symbol lights up red.
- 4 The temperature of the coolant is over 110 °C. The background of the symbol flashes.

The display shows the temperature of the coolant or engine. Depending on the workload, the symbol lights up in the display in different colors.

Interrupt the work from position **3** at the latest. This allows the coolant to cool sufficiently. If you operate the vehicle for an extended period of time with coolant temperatures above 105 °C, there is a risk of damage to the engine.

If the vehicle reaches temperatures above 110 °C, the background of the symbol flashes red and a warning tone sounds.

1. Immediately stop work.
2. Drive the vehicle into a safe area.
3. Stop the engine and let it cool down.

If the vehicle heats up to 105 °C unusually quickly, there may already be engine damage.

1. Clean the cooling system.
2. Contact the service immediately.

### 7.3.10 Display: Fill level of the fuel

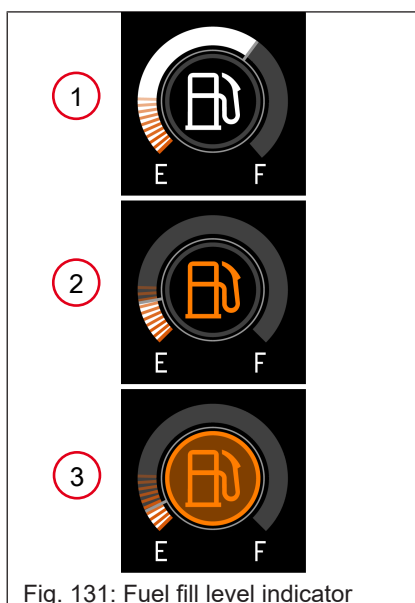


Fig. 131: Fuel fill level indicator

- 1 If the display is above the red range, the tank is filled with at least 10 % fuel according to the display.
- 2 The tank is filled between 5 % and 10 % with fuel. The symbol lights orange.
- 3 The tank is filled with less than 5 % fuel. The background of the symbol flashes.

The display shows the contents of the fuel tank. Depending on the fill level, the symbol in the display either lights up or flashes in different colors.

Refill fuel from position **2** at the latest.

### 7.3.11 Display: Fill level of the urea solution

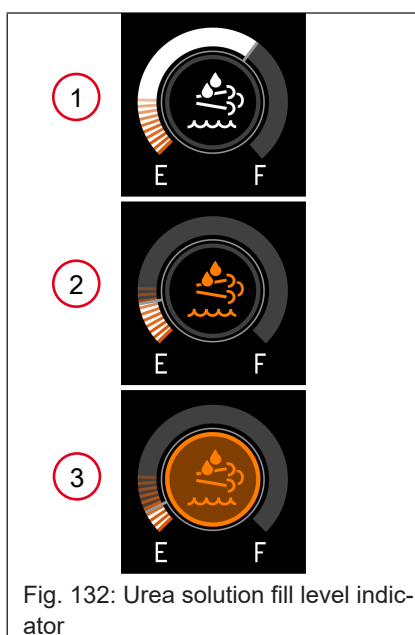


Fig. 132: Urea solution fill level indicator

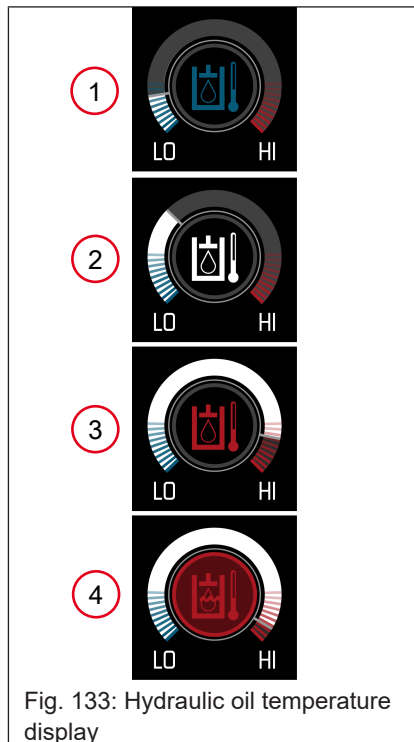
- 1 If the display is above the red range, the tank is filled with at least 15 % urea solution according to the display.
- 2 The tank is filled with less than 15 % urea solution. The symbol lights orange.
- 3 The tank is filled with less than 10 % urea solution. The background of the symbol flashes.

The urea solution is a liquid solution made of 32.5% urea and 67.5% demineralized water. Make sure that there is always sufficient urea solution in the tank. If the fill level is less than 5%, the engine output and the rpm are reduced.

The display shows the fill level of the urea solution in the tank permanently. As the fill level decreases, the display of the symbol changes.

Refill with urea solution from position **2** at the latest.

### 7.3.12 Display: Temperature of hydraulic oil



- 1 The temperature of the hydraulic oil is less than 30 °C. The symbol lights up blue.
- 2 The temperature of the hydraulic oil is between 30 °C and 90 °C.
- 3 The temperature of the hydraulic oil is between 90 °C and 100 °C. The symbol lights up red.
- 4 The temperature of the hydraulic oil is over 100 °C. The background of the symbol flashes.

The display shows the temperature of the hydraulic oil. Depending on the workload, the gauge lights up in different colors.

At the latest from position **3** reduce the load on the vehicle and observe the temperature. This allows the hydraulic oil to cool down. If the vehicle is operated for an extended period at temperatures above 90 °C, there is a risk of damage to the hydraulic system.

If the vehicle reaches temperatures above 100 °C, the background of the symbol flashes red.

1. If possible, interrupt work, drive the vehicle into a safe environment, allow the engine to cool down when idling and then switch off if necessary.
2. If it is not possible to interrupt work, reduce the load on the vehicle until the temperature has fallen below the critical range.

If the hydraulic oil heats up unusually quickly to over 90 °C under normal operating conditions, the hydraulic system may be damaged.

1. Clean the cooling system.
2. Contact the service immediately.

## 7.4 Commissioning the vehicle

### 7.4.1 Before commissioning

Before commissioning, the following requirements must be met:

- Read and understand the operator's manual.
- 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 before starting vehicle travel.
- Have the vehicle checked by technically trained personnel before commissioning it again after it has been out of operation over a longer period of time.
- Switch on the battery master switch.

Set up control stand:

1. Adjust the seat.
  2. Adjust the steering wheel.
  3. Adjust the mirrors.
  4. Fasten your seat belt.
  5. Turn off all switches and control elements.
  6. Apply the parking brake.
  7. Deactivate drive interlock if necessary.
- ⇒ Start the vehicle.

### 7.4.2 Information on avoiding engine damage



#### **NOTICE**

##### **The engine may be damaged!**

- ▶ Do not put full load on the engine immediately after starting.
- ▶ Allow the engine to idle for approx. three minutes. Then slowly increase the speed.
- ▶ Do not fully load the engine during the first 100 operating hours.
- ▶ Do not use any additional starting aids (e.g. start pilot).
- ▶ Contact an authorized service center if the engine does not start.



## 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.

Due to the hydrostatic drive system, the engine cannot be started by towing the vehicle.

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.
  - The maximum speed is reached when the drive system has reached a temperature between 20 and 30 °C.
- Observe the prescribed maintenance intervals and have the maintenance carried out accordingly.

### Automatic engine protection

The vehicle is equipped with automatic thermal protection for the engine, drive hydraulics and working hydraulics. The thermal protection prevents the vehicle from being operated at high speed when cold.

- At temperatures below -10 °C, the maximum speed is automatically limited to 1500 rpm.
- At temperatures up to 10 °C, the engine idling speed is slightly increased until 10 °C is reached.
- At temperatures above 10 °C, the speed of the engine is no longer limited.

To protect the drive hydraulics against damage, the travel speed is automatically reduced by 50 % at oil temperatures above 105 °C until the oil temperature is below 105 °C. In this case, check the radiator and clean it if necessary. If temperatures above 105 °C continue to be reached despite cleaning the radiator, a technical defect may be present which must be remedied by an authorized service center.

### 7.4.3 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.

7

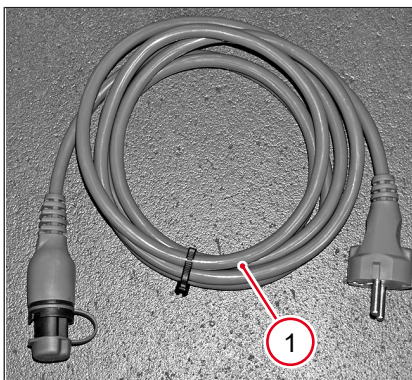


Fig. 134: Power cable

The electrical connection cable 1 is included in the accessories.

The vehicle plug receptacle (230 V or 110 V) for the heating element is located on the front of the frame in front of the hydraulic oil tank at the measuring connections for service.

1. Park the vehicle near a plug receptacle (230 or 110 V).
  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.

### 7.4.4 Starting the engine

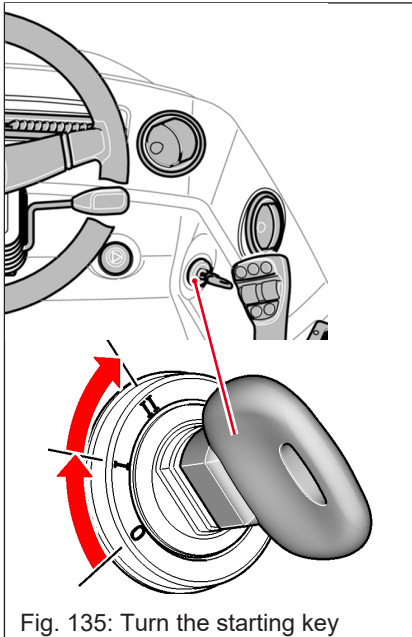







Fig. 135: Turn the starting key

The ignition lock is located on the right of the steering wheel.

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   and the control light  do not go out after the self-test.
3. Wait until the preheating control light  has gone out.
4. Turn the starting key via the resistor to position **II**.  
⇒ The starting motor is actuated - the engine starts.
5. Release the starting key as soon as the engine starts.  
⇒ The starting key returns to position **I**.  
⇒ The alternator charge indicator light  goes out.

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

#### If the engine does not start

1. Actuate the starting motor continuously for a maximum of 20 seconds.
2. Wait one minute.
3. Repeat the start procedure.  
⇒ If the engine does not start after trying twice, search for the cause with the troubleshooting table or contact an authorized service center.

#### 7.4.4.1 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 starting key and switch the ignition to position **I** for at least one second.
  - ⇒ New starting key is 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 ignition lock. 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 **I** 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 coded keys

If a coded blue starting key is lost, all other coded keys must also be deleted. The master key code is not deleted during the deletion process.

After the deletion process, the remaining starting keys can be coded anew.

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.

### 7.4.5 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 %.

### 7.4.6 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.

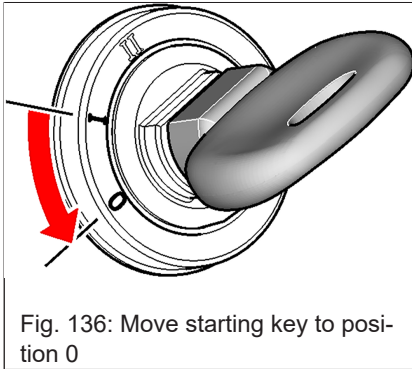
- ▶ Allow the engine to idle for approx. three minutes.
- ▶ Then switch off the engine.



#### NOTICE

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

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



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.

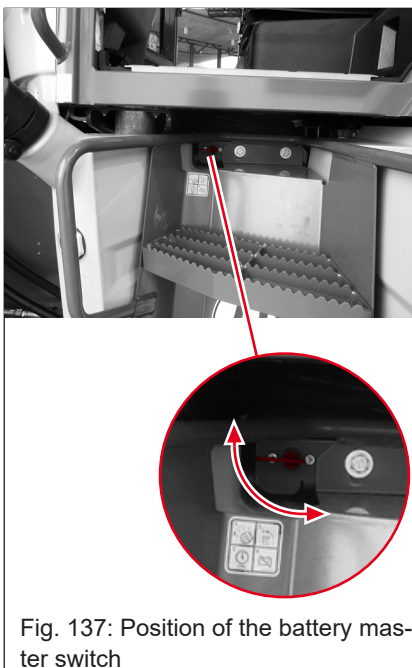
### 7.4.7 Battery master switch



#### 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.



The complete electrical system can quickly be 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

The battery master switch is located on the left in the entry area.

#### Switching off the battery master switch

1. Stop the engine.
2. Wait 120 seconds for the controllers 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.

### 7.4.8 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:

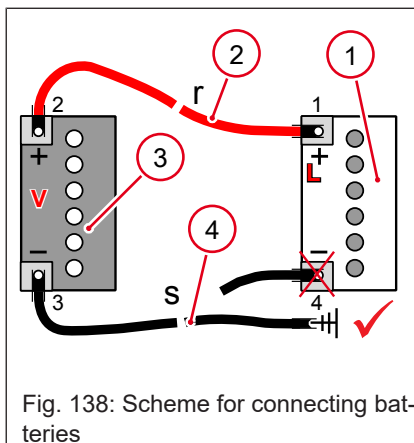
Before jump starting, check whether the battery of the vehicle works properly.

- ✓ All control levers and switches are in zero position.
  - ✓ Battery master switch is switched on.
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.
  3. If the control lights are not on, look for the fault in the vehicle's electrical system or, if necessary, install a fully functional battery.

### 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. Switch off the battery disconnect relay.  
⇒ Electrical system is de-energized.
- 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.
- 6. Open the battery cover, [see Battery on page 274](#).  
⇒ Jumper cable can be connected.

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- 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)

### 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. Switch on the battery master switch.
- 6. 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.

## 8 Operation

### 8.1 Brakes

#### 8.1.1 Operating the parking brake

##### Activating the automatic parking brake

The vehicle is equipped with an automatic parking brake. When the parking brake is activated, the control light  lights up in the display.


The automatic parking brake is activated immediately if one of the following conditions is met:

- The diesel engine is switched off, starting key in position **0**.
- The operator leaves the seat at a travel speed of less than 0.5 km/h.

The automatic parking brake is activated with a delay if the following condition is fulfilled:

- The operator leaves the seat at a travel speed of between 1 and 7 km/h.
  - The automatic parking brake is activated after a warning tone sounds for 10 seconds.

##### Deactivating the automatic parking brake

The automatic parking brake is released when the following conditions are met. When the parking brake is deactivated, the control light  in the display goes out.

- The operator has taken a seat on the seat.
- The brake/inching pedal was depressed strongly.
- A direction of travel is selected.
- The brake/inching pedal is released slowly.

##### Activating the parking brake manually



##### **CAUTION**

##### **Risk of accidents when activating the parking brake while driving!**


The parking brake may only be used while driving in an emergency and when the service brake has failed. Danger of injury.

- ▶ In normal operation, use the brake/inching pedal for braking.
- ▶ Only activate the parking brake while driving in an emergency.




Fig. 139: Activating the parking brake manually

The switch for operating the parking brake is located to the right of the seat in the joystick carrier.

1. Sit down on the operator seat.
2. Press the switch briefly.
  - ⇒ The parking brake is activated.
  - ⇒ The LEDs in the switch and the control light  in the display light up.

### Deactivating the parking brake manually

1. Sit down on the operator seat.
2. Depress brake/inching pedal vigorously.
3. Press the switch briefly.
  - ⇒ Parking brake is released.
  - ⇒ The LED in the switch and the control light  in the display go out.

### 8.1.2 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 brake failure!**

The reservoir pressure in the brake accumulator may be too low. This may result in an accident which, if not avoided, could result in serious injury or death.

- ▶ Do not start the vehicle until the brake reservoir pressure indicator in the display is no longer in the red range and the symbol in the middle of the brake reservoir pressure indicator has gone out.
- ▶ If, while driving, the brake reservoir pressure indicator goes into the red zone and the symbol in the center of the control lights up, stop the vehicle immediately and have the fault rectified by an authorized service center.

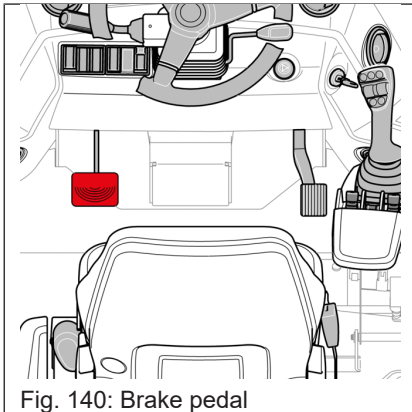


Fig. 140: Brake pedal

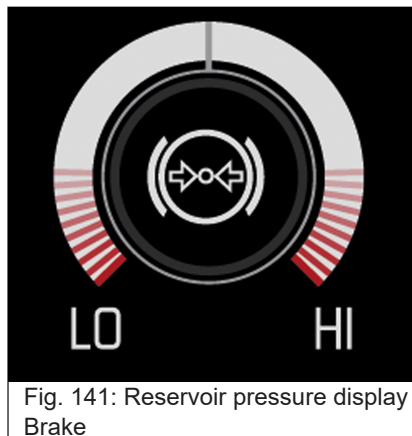


Fig. 141: Reservoir pressure display  
Brake

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

The vehicle's braking function is already achieved with the inching of the vehicle. In some situations it is nevertheless necessary to brake the vehicle with the brake function.

The display shows the round scale in the red area and the symbol in the middle of the display lights up red if the reservoir pressure in the external power brake system is below 60 bar or above 180 bar or if the service brake fails. In this case:

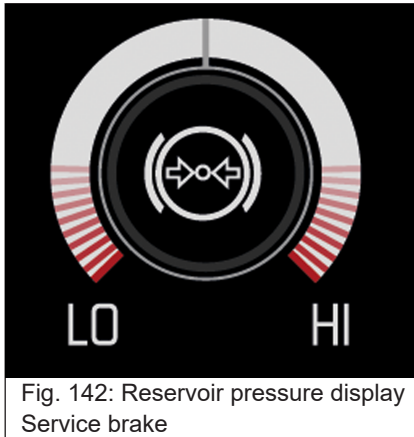
- Do not start the vehicle until the display has gone out of the red area and the symbol in the middle of the display has gone out.
- If the display goes into the red area while driving and the symbol in the center of the display lights up, stop the vehicle immediately and have the fault repaired by an authorized specialist service center.

### 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 loader unit can be carried out more quickly.
  - ⇒ The brake lights light up with a delay during inching.

### Braking with the brake/inching pedal

- ✓ Accelerator pedal fully released.
- ✓ By looking into the rear-view mirror danger for others excluded.
- Continue depressing the brake/inching pedal after the inching range.
  - ⇒ The brake lights are on.

**Check brakes**

- ✓ Brake pressure in the round scale in the display is in the operating range.
- ✓ By looking into the rear-view mirror danger for others excluded.
- Set the vehicle in motion and check the braking effect.
  - ⇒ After half the pedal travel, a fixed resistance must be noticeable on the brake/inching pedal.
  - ⇒ The brake lights must illuminate.

## 8.2 Steering

### 8.2.1 Selecting 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.



#### **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.

The vehicle has a hydraulic kingpin steering system on the front axle and rear axle. The vehicle is equipped as standard with an four-wheel steering system. As an option, the vehicle can also be equipped with front axle steering and diagonal steering (crab steering).

### Overview of steering modes

The different steering modes are suited for different applications:

#### A All-wheel steering

- Suited for all loading, shunting and moving work.

#### B Front axle steering

- Suitable for fast travel, journeys on public roads, long routes and journeys with trailers.

#### C Diagonal steering (crab steering)

- Suitable for loading and maneuvering in confined spaces. Select crab steering only at the lowest speeds.

### 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)!

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## 8.2.2 Driving with four-wheel steering

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

If the vehicle is equipped with the high-speed option (40 km/h), the driving speed is automatically reduced to 30 km/h when four-wheel steering is selected.

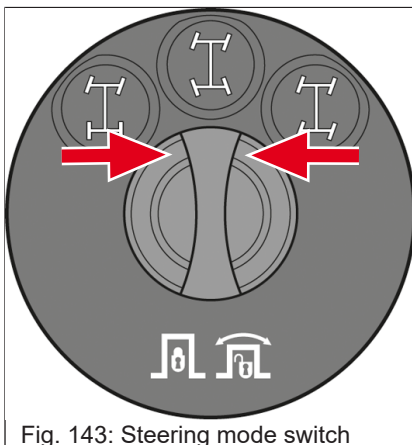




Fig. 143: Steering mode switch

### Switch to four-wheel steering

1. Reduce speed of vehicle down to walking speed.
2. Press the switch and turn it to the four-wheel steering (central) position.  
⇒ Control lights  in the switch and in the display flash.
3. Turn the steering wheel slowly to the left or right until the front and rear axle wheels have reached or exceeded the straight-ahead position.  
⇒ Control lights  in the switch and in the display light up permanently.  
⇒ Four-wheel steering is engaged.

## 8.2.3 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.

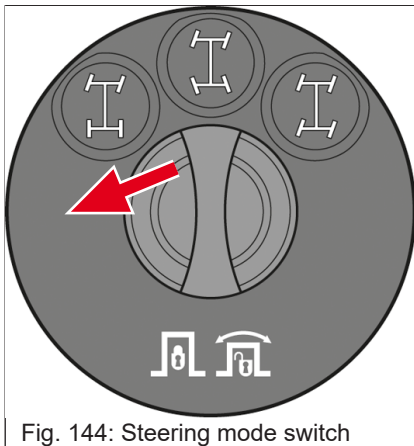




Fig. 144: Steering mode switch

**Change to front axle steering**

1. Reduce speed of vehicle down to walking speed.
2. Press the switch and turn it to the left to the front axle steering position.  
⇒ Control lights  in the switch and in the display flash.
3. Turn the steering wheel slowly to the left or right until the front and rear axle wheels have reached or exceeded the straight-ahead position.  
⇒ Control lights  in the switch and in the display light up permanently.  
⇒ Front axle steering is switched on.

**8.2.4 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. Crab steering is only permitted for a short distance and only in the speed steps turtle or snail.

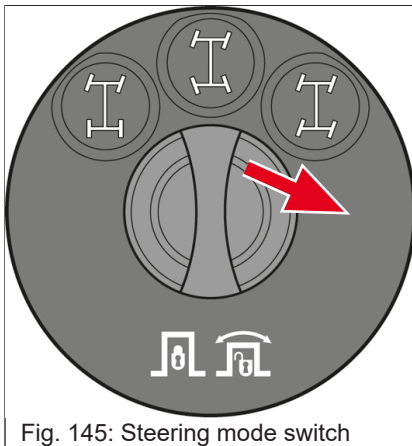




Fig. 145: Steering mode switch

### Changing from four-wheel steering to crab steering

1. Reduce speed of vehicle down to walking speed.
2. Press the switch and turn it to the right to the crab steering position.  
⇒ Control lights  in the switch and in the display flash.
3. Turn the steering wheel slowly to the left or right until the front and rear axle wheels have reached or exceeded the straight-ahead position.  
⇒ Control lights  in the switch and in the display light up permanently.  
⇒ Crab steering is on.

### 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 control lights for crab steering and front axle steering in the switch flash until the factory-set speed is reached and crab steering is activated.

## 8.2.5 Synchronizing the 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.

Due to internal leaks in the steering hydraulics, the wheels of the front axle and rear axle no longer run in the same lane when driving straight ahead after prolonged use. If this steering behavior is noticed, the steering system must be synchronized.

The synchronization of the steering system is only possible in the turtle drive mode. During synchronization, the rabbit speed level can be selected, but the speed level is not activated until synchronization has been completed.

Error-free synchronization is only possible if the following conditions are met:

- The front wheels were brought into straight position before stopping the engine.
- The steering wheel is slowly turned to the left and right during synchronization.
- The parking brake is not applied during synchronization.

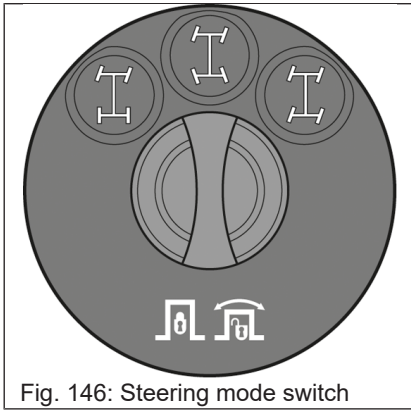


Fig. 146: Steering mode switch

### Synchronizing the steering system after restarting the engine

1. When the engine is switched off, select the steering mode to be synchronized.
  2. Start the engine of the vehicle.
    - ⇒ Control lights in the switch and in the display light up depending on the preselected steering mode.
  3. Turn the steering wheel slowly to the left or right until the front and rear axle wheels have reached or exceeded the straight-ahead position.
    - ⇒ The wheels of the front axle and rear axle are automatically aligned to each other.
    - ⇒ The control lights for the selected steering mode in the switch and in the display light up permanently. The other two control lights in the switch do not light up.
- ⇒ The selected steering mode is synchronized.

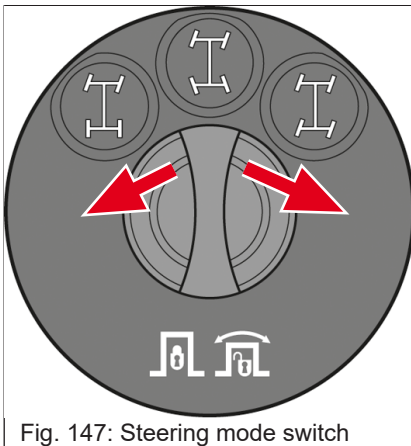
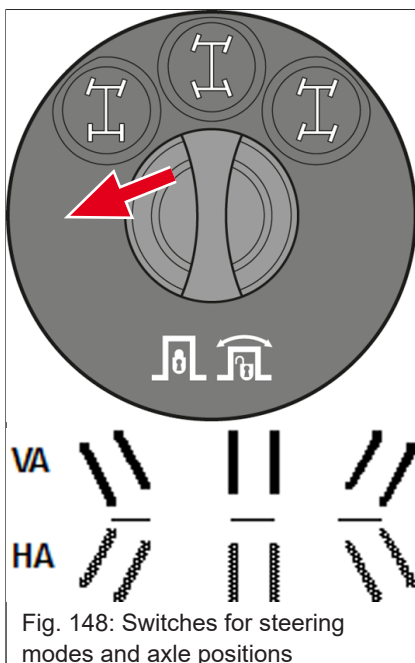


Fig. 147: Steering mode switch

### Synchronizing the steering system after changing the steering mode

1. Press the switch and select steering mode.
    - ⇒ The control light for the selected steering mode flashes in the display.
  2. Turn the steering wheel slowly to the left or right until the front and rear axle wheels have reached or exceeded the straight-ahead position.
    - ⇒ The control lights for the selected steering mode in the switch and in the display light up permanently. The other two control lights in the switch do not light up.
- ⇒ The selected steering mode is synchronized.



### Synchronizing steering system in manual mode

Use this synchronization mode only if the synchronization described before cannot be performed correctly.

This is the case, for example, if the steering system has not been brought into a straight position before the diesel engine is switched off and a tension is thus created during automatic synchronization.

1. Press the switch and turn it to the left to the front axle steering position.
2. Switch off the engine of the vehicle.
3. Start the diesel engine after approx. 30 seconds.
4. Quickly press the switch 5 times in succession.
5. Slowly rotate the steering wheel to align the front axle wheels (FA) with the rear axle wheels (RA).  
⇒ Front axle steering mode steering control light flashes.
6. Press the switch and turn it to the four-wheel steering (central) position.  
⇒ Four-wheel steering steering mode control light flashes.
7. At higher walking speeds, turn the steering wheel slowly to the left or right until the front and rear axle wheels have reached or exceeded the straight-ahead position.  
⇒ The control light for the four-wheel steering steering mode in the switch lights up permanently.  
⇒ Steering system is synchronized.

## 8.3 Driving

### 8.3.1 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 result in serious injury or death.

- Use the brake/inching pedal to reduce speed when driving downhill and before bends.
- Reduce the engine speed. Take your foot off the accelerator pedal.
- Select small drive mode.



### NOTICE

#### Damage to the drive hydraulics due to high oil temperature!

In order to prevent damage to the drive hydraulics, the travel speed (driving dynamics) is automatically reduced by 50 % until the oil temperature is below 105 °C if the oil temperature of the drive hydraulics exceeds 105 °C.

- The cause of the excessive oil temperature must be checked or repaired by an authorized specialist service center.



### NOTICE

#### Damage to the engine due to increased speed at low load!

If the engine is operated at increased speed and less than 20 % load, the running behavior of the engine may be impaired!

- ✓ Effects:
  - Insufficient operating temperature,
  - Increase lubricating oil consumption,
  - Lubricating oil in the exhaust system and thus contamination of the engine,
  - Increased soot load of the exhaust gas aftertreatment system,
  - Blue smoke in the exhaust gas.
- Run the engine in regular operation at engine loads of over 20 %.

## 8.3.2 Selecting a drive mode


The vehicle has several drive modes. The drive mode is indicated in the display with the corresponding symbol.



The possible drive modes depend on the selected steering mode. Before changing the drive mode, the appropriate steering mode must be selected, [see Selecting steering mode on page 135](#).

Depending on the vehicle design, different maximum speeds can be achieved in the individual drive stages. The maximum speed is reached when the drive system has reached a temperature between 20 and 30 °C. In addition, the full maximum speed can only be reached on level asphalt terrain, with an empty bucket and without a trailer.




The last drive mode is stored when the ignition is switched off and is activated when the engine is restarted.

#### Vehicle models 20 km/h


Sym- bol	Drive mode	Maximum speed	Steering mode	Recommended applica- tion conditions
	Snail	7 km/h	Four-wheel steering  Front axle steering  Diagonal steering	For work requiring precise speed adjustment



Sym- bol	Drive mode	Maximum speed	Steering mode	Recommended applica- tion conditions
	Turtle	15 km/h	Four-wheel steering  Front axle steering  Diagonal steering	For work with fast se- quence of material intake and material settling.
	Rabbit	20 km/h	Four-wheel steering  Front axle steering  Diagonal steering	For long transport paths.

**Vehicle models 30 km/h**

Sym- bol	Drive mode	Maximum speed	Steering mode	Recommended applica- tion conditions
	Snail	7 km/h	Four-wheel steering  Front axle steering  Diagonal steering	For work requiring precise speed adjustment
	Turtle	20 km/h	Four-wheel steering  Front axle steering  Diagonal steering	For work with fast se- quence of material intake and material settling.
	Rabbit	30 km/h	Four-wheel steering  Front axle steering	For long transport paths.

**Vehicle models 40 km/h**

Sym- bol	Drive mode	Maximum speed	Steering mode	Recommended applica- tion conditions
	Snail	7 km/h	Four-wheel steering  Front axle steering  Diagonal steering	For work requiring precise speed adjustment

Sym- bol	Drive mode	Maximum speed	Steering mode	Recommended applica- tion conditions
	Turtle	20 km/h	Four-wheel steering Front axle steering Diagonal steering	For work with fast se- quence of material intake and material settling.
	Rabbit	30 km/h	Four-wheel steering Front axle steering	For long transport paths.
		40 km/h	Front axle steering	

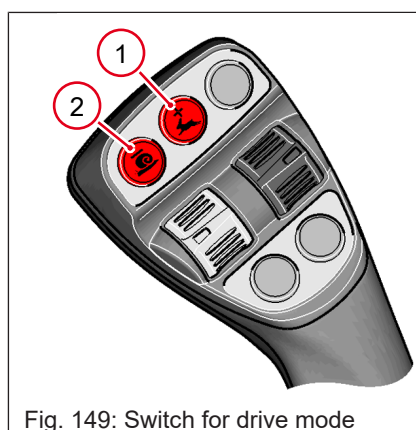








Fig. 149: Switch for drive mode

1. Select a travel direction [see Selecting a travel direction on page 142](#).
2. Select the steering mode according to the intended driving speed and operating conditions, [see Selecting steering mode on page 135](#).
3. Increase drive mode: Press switch **1** repeatedly until the desired drive mode is reached.
  - ⇒ The current drive mode is indicated by a control light with the corresponding symbol , ,  on the display.
4. Reduce drive mode: Press switch **2** repeatedly until the desired drive mode is reached.
  - ⇒ The current drive mode is indicated by a control light with the corresponding symbol , ,  on the display.

If the corresponding control light flashes, the speed for the selected drive mode is too high.

### 8.3.3 Selecting a travel direction



#### **WARNING**

**Accident hazard when changing drive direction during vehicle travel!**

Changing the drive direction while driving for the vehicle immediately changes the drive direction to 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.



## Information

If the vehicle is equipped with a Backup warning system, a warning tone sounds after the "reverse" direction has been selected. This tone warns persons near the vehicle during reverse travel.

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.

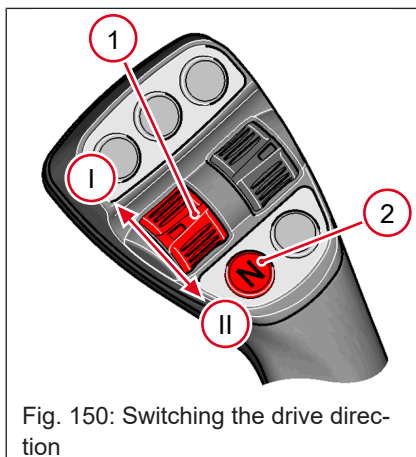


Fig. 150: Switching the drive direction

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

8

### 8.3.3.1 Backup warning system



#### **WARNING**

##### **Accident hazard due to persons in the danger zone!**

Persons who are in the danger 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 danger zone.
- ▶ Adjust the mirror correctly. Use visual aids such as, e.g. a camera.
- ▶ Observe extreme caution when reversing.



Fig. 151: Backup warning system

The Backup warning system consists of a warning sound generator mounted on the right-hand side of the vehicle behind the ballast weight. The warning beeper generates an interrupted warning tone when the reverse direction is selected.

The volume at a distance of one meter is approx. 103 dBA at a frequency of 2800 Hz.

### 8.3.4 Starting vehicle travel



#### **WARNING**

##### **Accident hazard due to persons in the danger zone!**

Persons who are in the danger 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 danger 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 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 result in serious injury or death.

- ▶ Use the brake/inching pedal to reduce speed when driving downhill and before bends.
- ▶ Reduce the engine speed. Take your foot off the accelerator pedal.
- ▶ Select small drive mode.

The vehicle is equipped with automatic thermal protection for the engine, traction hydraulics and working hydraulics. The vehicle can only be put into operation when the operator is on the seat. If the seat is unloaded during travel, the drive system switches to the Neutral position at a speed of less than 7 km/h. The seat is then released from its load. At a speed of more than 7 km/h, a warning tone sounds continuously.

Drive the vehicle as follows:

1. Depress and hold the brake/inching pedal firmly.
2. Select steering mode.
3. Select a drive mode.
4. Select a travel direction.
5. Release the brake/inching pedal and press the accelerator pedal.
  - ⇒ If this sequence is observed, the parking brake releases automatically.
  - ⇒ The vehicle moves.

### 8.3.5 Accelerating the vehicle with pedal

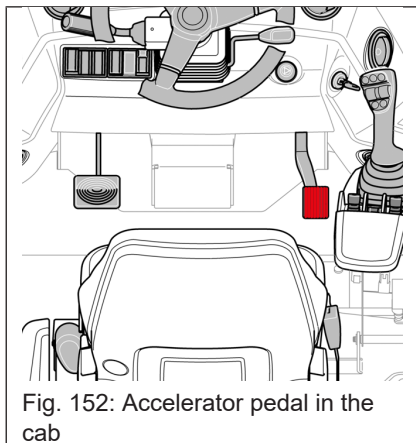


#### **CAUTION**

##### **Risk of accident through malfunctions of the accelerator pedal!**

Dirt accumulation and objects in the area of the accelerator pedal can result in malfunctions and accidents.

- ▶ Do not place any loose objects in the cab.
- ▶ Keep cab clean.



The pedal controls the engine speed variably. The engine speed affects:

- the work movements of the loader unit,
- the work movements of the attachment,
- the hydraulic functions of the attachment,
- the travel speed.

The further the pedal is pressed, the more the engine speed increases.

The attainable speed depends on the travel mode.

### 8.3.6 Accelerating vehicle with manual throttle

#### **Important instructions for use**



#### **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!**

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.

The manual throttle function can be used at any drive mode.

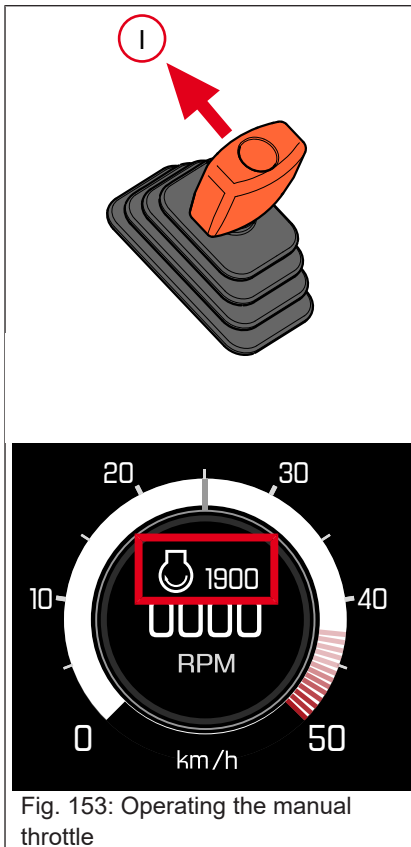
Using this function, a certain speed of the diesel engine can be set and saved. This ensures a more even delivery of hydraulic oil to the attachment when operating hydraulically driven attachments.

The set engine speed is stored as a memory value when the manual throttle function is deactivated. The stored engine speed (memory value) can be recalled in the "Snail" drive mode. The stored engine speed cannot be recalled in the "Turtle" and "Rabbit" drive mode.

If the starting key is switched to position **0**, the stored memory value is deleted. The engine speed must be reset after a restart.

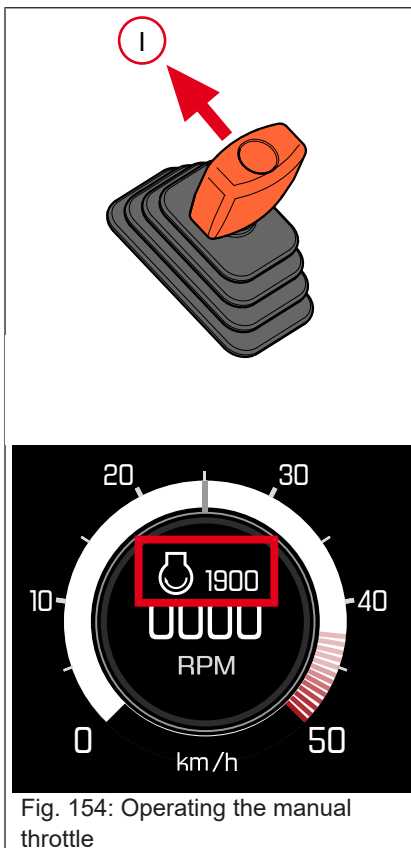
If necessary, the stored engine speed of the manual throttle function can be overridden with the accelerator pedal. As long as the accelerator pedal sets a speed higher than the engine speed set via the manual throttle function, the higher speed is adopted. If the accelerator pedal is no longer operated, 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. Preselect the desired engine speed with the accelerator pedal.  
⇒ The current rpm will be indicated on the display.
2. Press the manual throttle control fully forward in direction I for at least one second.  
⇒ The preselected speed is stored.  
⇒ The set speed is shown in the display.
3. Release the accelerator pedal.  
⇒ Preset speed is maintained.



### Set the engine speed and drive off in the "Snail" drive mode.

- ✓ Vehicle stopped (engine not switched off).
  - ✓ Drive mode and desired steering mode are selected.
  - ✓ Direction of travel is set to Neutral.
1. Preselect the desired engine speed with the accelerator pedal.  
⇒ The current rpm will be indicated on the display.
  2. Press the manual throttle control fully forward in direction I for at least one second.  
⇒ The preselected speed is stored.  
⇒ The set speed is shown in the display.
  3. Actuate the brake/inching pedal or pull the controller of the low-speed control all the way back.
  4. Release the accelerator pedal.
  5. Select a travel direction.  
⇒ The preselected speed is retained.
  6. Release the brake/inching pedal or push the controller of the low-speed control forwards.  
⇒ The vehicle accelerates up to the speed which corresponds to the preselected speed or which is set via the low-speed control.

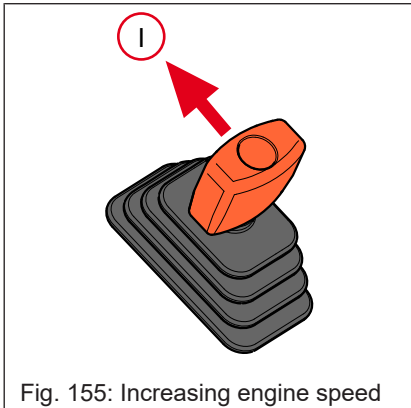


Fig. 155: Increasing engine speed

#### 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.
  - ⇒ The engine speed is gradually increased by 100 rpm.

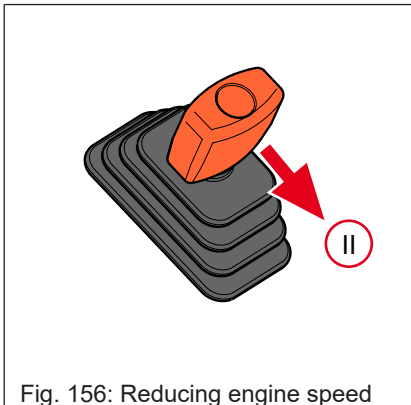


Fig. 156: Reducing engine speed

#### 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.
  - ⇒ The engine speed is gradually reduced by 100 rpm to idling speed.

#### Deactivate manual throttle function in the speed steps "Turtle" and "Rabbit"

To deactivate the manual throttle function:

1. Change drive mode,
2. Change direction,
3. Switch the direction of travel to the "Neutral" position or
4. Press the brake/inching pedal.
  - ⇒ The speed of the diesel engine falls to the lower idling speed.
  - ⇒ The manual throttle function is deactivated and the engine speed must be reset.

#### Deactivating the manual throttle function in the "snail" drive mode

To deactivate the manual throttle function:

1. Change drive mode or
2. switch the direction of travel to the "Neutral" position.
  - ⇒ The speed of the diesel engine falls to the lower idling speed.
  - ⇒ The manual throttle function is deactivated.
  - ⇒ The set speed is stored as a memory value.

The stored engine speed can be reactivated.

## Reactivating the stored engine speed



### **WARNING**

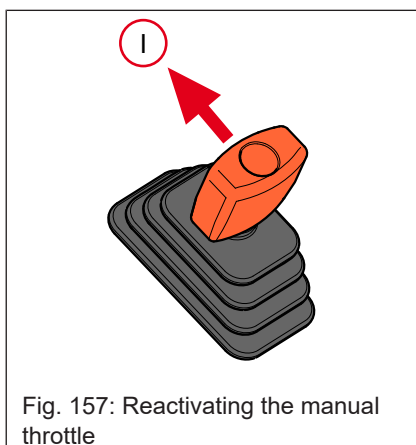
#### **Risk of accident due to increased engine speed!**

When the manual throttle is reactivated, the vehicle starts moving immediately after actuating the direction switch and releasing the brake at increased engine speed. This can cause accidents with serious injuries or death.

- When starting with reactivated manual throttle, make sure that there are no persons or objects in the danger zone.

The reactivation of the stored engine speed (memory value) is only possible in the "snail" drive mode and in the "Neutral" direction of travel.

If the direction of travel is selected before the diesel engine speed is reactivated, the controller will not increase the engine speed to the stored value.



- ✓ Speed has been set and is still stored.
- ✓ Ignition was not turned off.
- ✓ The direction of travel is in the "Neutral" position.

1. Briefly tap the manual throttle in direction I.  
⇒ The manual throttle function is reactivated with the last stored engine speed.
2. Actuate the brake/inching pedal or pull the controller of the low-speed control all the way back.
3. Select a travel direction.
4. Release the brake/inching pedal or push the controller of the low-speed control forwards.  
⇒ The vehicle accelerates up to the speed which corresponds to the preselected engine speed or which is set via the low-speed control.

8

### 8.3.7 Operating the low-speed control



### **WARNING**

#### **Risk of accident due to increased engine speed!**

When the manual throttle is reactivated, the vehicle starts moving immediately after actuating the direction switch and releasing the brake at increased engine speed. This can cause accidents with serious injuries or death.

- When starting with reactivated manual throttle, make sure that there are no persons or objects in the danger zone.

### Important information on the low-speed control

The low-speed control can only be used in the "snail" drive mode. In the speed levels "turtle" and "rabbit", the low-speed control is not effective and is automatically deactivated when switching to these speed levels for safety reasons.

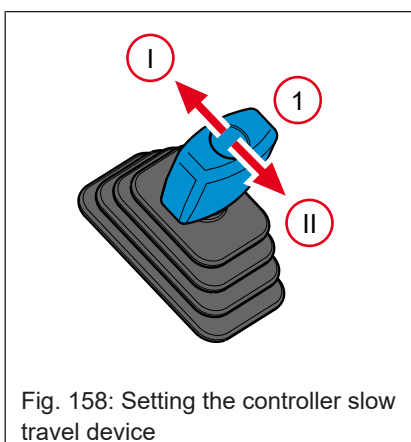
This function can be used to limit the maximum driving speed. This enables a more even travel speed when operating hydraulically operated attachments (e.g. sweeper or rotary tiller) and, in conjunction with the manual throttle function, slow starting at high engine speed from a standstill.

The normal maximum speed in normal working conditions can only be reached if the low-speed control is deactivated.

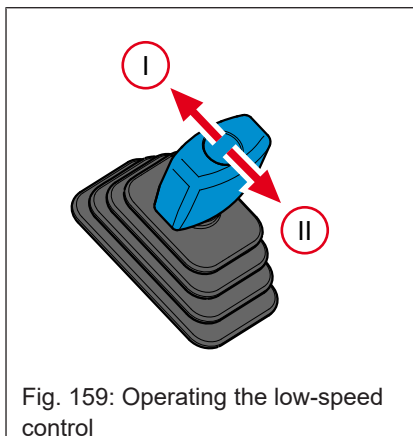
The speed limited with the low-speed control cannot be overridden with the accelerator pedal.

### Controller settings



With controller **1**, the speed is infinitely variable, depending on the engine speed.



Position	Explanation
Position I, front slide control	Position for normal working Low-speed system deactivated
Position II, rear slide control	Standstill of the vehicle Slow-speed system activated Position to start from standstill with hydraulic attachments (e.g. a milling cutter) at high engine speed

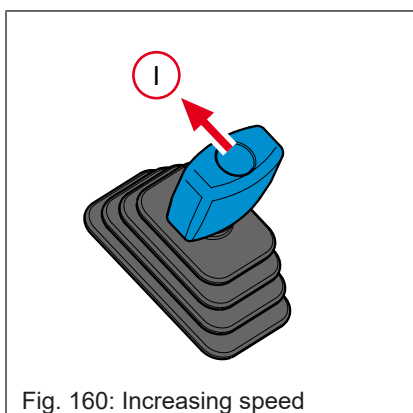


### Activating / operating the low-speed control

1. Depress brake/inching pedal.
2. Select lowest drive mode.
3. Pull the controller all the way back to position II.  
 ⇒ The control light  flashes.  
 ⇒ Low-speed system is enabled.
4. Set the engine speed to the speed required for the attachment using the manual throttle control. [see Accelerating vehicle with manual throttle on page 145](#).  
 ⇒ The rpm is shown in the display.
5. The control light  lights up
6. Select a travel direction.
7. Release the brake/inching pedal.
8. Slowly push the controller forward in direction I until the desired speed is reached.  
 ⇒ The driving speed increases steplessly.  
 ⇒ The speed is shown in the display.

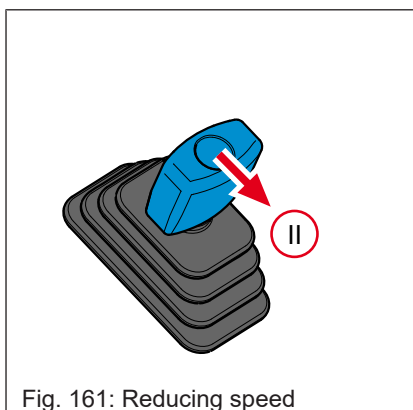
The speed can vary depending on the driving resistance.

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



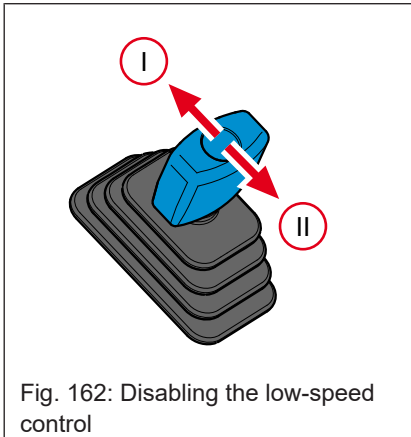
### Increasing speed

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





### Reducing speed

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



### Disabling the low-speed control

1. Pull the controller all the way back to position II.
    - ⇒ The control light  flashes.
    - ⇒ Speed is reduced to 0 km/h.
    - ⇒ The engine speed stored via the manual throttle is retained.
  2. Select "Neutral" drive mode.
    - ⇒ The speed of the diesel engine falls to the lower idling speed.
    - ⇒ The manual throttle is disabled.
  3. For normal operation, push the slider fully forward to position I.
    - ⇒ The control light  goes out.
    - ⇒ Low-speed control is disabled.
    - ⇒ The maximum speed of the drive modes is available again.
- ⇒ The speed is regulated via the accelerator pedal.

### 8.3.8 Operating the accelerator pedal mode

#### Important information on accelerator pedal mode

This function enables speed control with the accelerator pedal in manual throttle mode.

In the Neutral position the function can be activated and deactivated.

The accelerator pedal mode can only be used in the "snail" drive mode. Switching to the "Turtle" and "Rabbit" drive modes is only possible from the Neutral position.

The normal maximum speed in normal working conditions can only be reached if the accelerator pedal mode is deactivated.

After an ignition change, the accelerator pedal mode is deactivated.

## Activating and operating the accelerator pedal mode

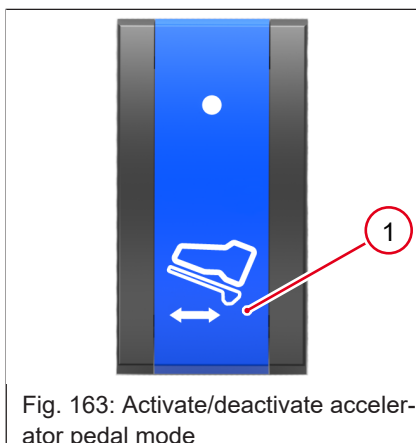




Fig. 163: Activate/deactivate accelerator pedal mode

1. Select "Neutral" drive mode
  2. Select "Snail" drive mode.
  3. Press switch 1.
    - ⇒ The control light  illuminates in the display.
    - ⇒ Accelerator pedal mode is activated.
  4. Set the engine speed to the speed required for the attachment using the manual throttle control, [see Accelerating vehicle with manual throttle on page 145](#).
    - ⇒ The rpm is shown in the display.
  5. Select a travel direction.
  6. Slowly press the accelerator pedal until the desired speed is reached.
    - ⇒ The driving speed increases steplessly.
    - ⇒ The speed is shown in the display.
- The speed can vary depending on the driving resistance.  
The speed can be steplessly increased or decreased.

## Deactivating the accelerator pedal mode

1. Select "Neutral" drive mode.
  - ⇒ The speed of the diesel engine falls to the lower idling speed.
  - ⇒ The manual throttle is disabled.
2. Press switch 1.
  - ⇒ The control light  goes out.
  - ⇒ Accelerator pedal mode deactivated.
  - ⇒ The maximum speed of the drive modes is available again.
  - ⇒ The speed is regulated via the accelerator pedal.

### 8.3.9 Changing the travel direction



#### **WARNING**

#### **Accident hazard when changing drive direction during vehicle travel!**

Changing the drive direction while driving for the vehicle immediately changes the drive direction to 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.



## ⚠ WARNING

### Accident hazard due to persons in the danger zone!

Persons who are in the danger 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 danger zone.
- ▶ Adjust the mirror correctly. Use visual aids such as, e.g. a camera.
- ▶ Observe extreme caution when reversing.





## Information

If the vehicle is equipped with a Backup warning system, a warning tone sounds after the "reverse" direction has been selected. This tone warns persons near the vehicle during reverse travel.

When the "Reverse" direction is selected, the camera image is automatically shown on the display. When reversing, always observe the mirrors and the camera image.

The direction of travel can be changed at any speed. For safety reasons, however, the new direction of travel is only activated if the speed is below 15 km/h.

If the direction of travel is changed at a speed above 15 km/h, the respective control light for the current direction of travel  or  flashes.

If the change of driving direction is not switched, because the speed was above 15 km/h, the change of driving direction must be carried out again at a speed below 15 km/h.

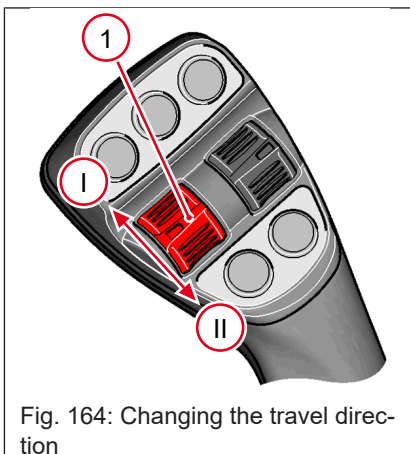




Fig. 164: Changing the travel direction

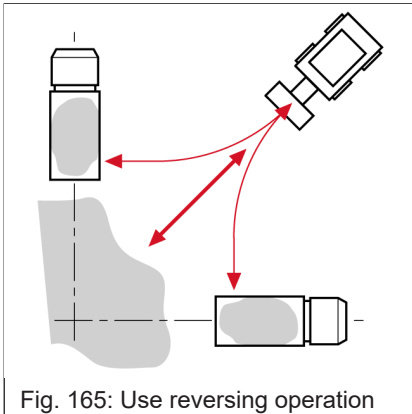
1. Reduce the engine speed. Remove your foot from the accelerator pedal.
2. Reduce the travel speed until the vehicle comes to a standstill.
3. Press switch **1** in direction **I**.
  - ⇒ Control light  illuminates in the display.
  - ⇒ Direction of travel changes to forward.
4. Press switch **1** in direction **II**.
  - ⇒ Control light  illuminates in the display.
  - ⇒ Direction of travel changes to reverse.
  - ⇒ The camera image appears on the display.
5. Press accelerator pedal slowly.
  - ⇒ The vehicle moves in the new direction.



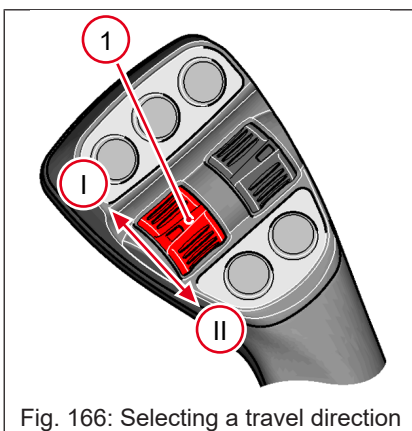
## Information



The brake/inching pedal does not have to be pressed before changing travel direction.

### 8.3.9.1 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.



1. Reduce driving speed 0 – 15 km/h.
2. Press switch **1** in direction I.  
⇒ Control light  illuminates in the display.  
⇒ Direction of travel changes to forward.
3. Press switch **1** in direction II.  
⇒ Control light  illuminates in the display.  
⇒ Direction of travel changes to reverse.
4. Press the accelerator pedal.  
⇒ The vehicle moves in the new direction.

### 8.3.10 Stopping the vehicle



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

### 8.3.11 Parking and securing vehicles



#### **WARNING**

##### **Risk 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 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.

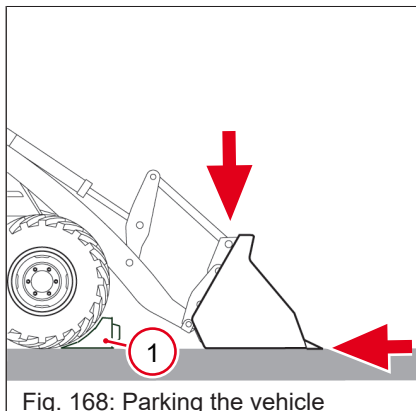
- ▶ Wait at least 10 seconds before starting again.



#### **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.



1. Stop the vehicle on a stable, level and dry surface.
2. Apply the parking brake.
3. Align the attachment horizontally to the ground.
4. Lower the loader unit 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. Close the engine cover and all fill openings.
9. Turn the key on the battery master switch out of the locking mechanism and remove it.  
⇒ The entire electrical system is out of operation.
10. If necessary, additionally secure the vehicle on the wheels pointing downhill with wheel chocks **1**.  
⇒ The wheel chock is located on the left front side of the vehicle frame.

### 8.3.12 Vehicle travel on public roads



#### **WARNING**

##### **Accident hazard 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.
- ▶ Remove existing protective screen.
- ▶ 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. 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:
  - The bucket is emptied and attached to the power coupler on the cover.
  - The folding stacking device is folded up and secured.

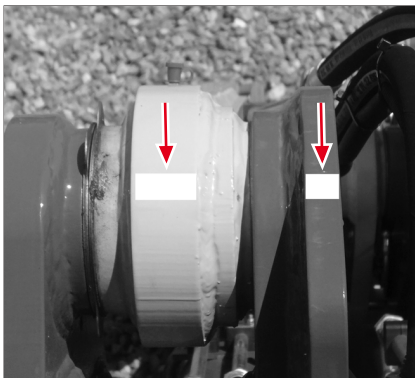


Fig. 169: Transport position markings (example)

- 3) Lift the loader unit to transport position (approx. 200 mm above the ground). The markings on the loader unit and the vehicle frame serve as orientation.
- 4) If necessary, dismantle protective screen.
- 5) Check the lighting system and, if necessary, the function of the rotating beacon.
- 6) Check and if necessary adjust the rearview mirrors.
- 7) Move steering column to foremost position.
- 8) Close driver's door and window.
- 9) Switch off the work lights.
- 10) Change over to front-wheel steering in the high gear drive mode.
- 11) Switch on the load stabilizer.
- 12) Lock the working hydraulics [see Using the joystick lock function on page 197](#).
- 13) If a trailer is attached, check that the trailer is securely locked in the trailer coupling, that the lines are correctly connected and that the loads on the trailer are secured against slipping.
- 14) Wear your seat belt.
- 15) Start vehicle travel ensuring safety.

## 8.4 Driving with a trailer

### 8.4.1 Safety instructions for trailer operation

Observe the safety instructions in the chapter [see Trailer operation on page 30](#).

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 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, trailer loads and drawbar loads.
- Do not exceed the permissible trailer speed.
- 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.
- Check whether the brakes and lights work correctly.
- Before starting vehicle travel, ensure that nobody is between the vehicle and the trailer.
- 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.

### 8.4.2 Requirements for driving with a trailer

Trailer operation is only allowed with a model -approved trailer coupling. In Germany, only trailers with agricultural or forestry consumables or with the vehicle's attachments may be transported on public roads.

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.

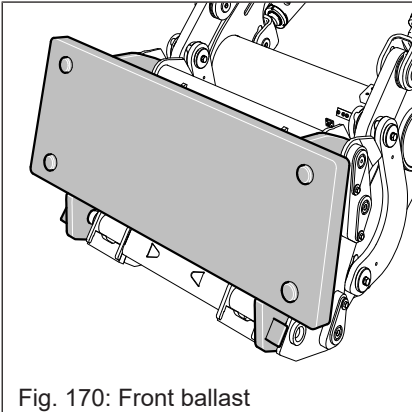


Fig. 170: Front ballast

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 391](#).
- Ensure the rotatability of the trailer coupling.
- Carry out or have carried out regular maintenance work on the trailer coupling.

### 8.4.3 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.

Several trailer couplings are available for the vehicle. The trailer coupling can be fixed or attached to the vehicle via an adjustable hitch block.

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

- Automatic trailer coupling
- Ball coupling
- Trailer coupling PF-Piton
- Hitch trailer coupling

The prerequisites for the operation of a trailer coupling can be found in the chapter on [see Requirements for driving with a trailer on page 160](#). The permissible vertical and trailer loads must be observed and taken from the chapter Weights [see Trailer loads and drawbar loads on page 391](#).

### 8.4.3.1 Towing bracket

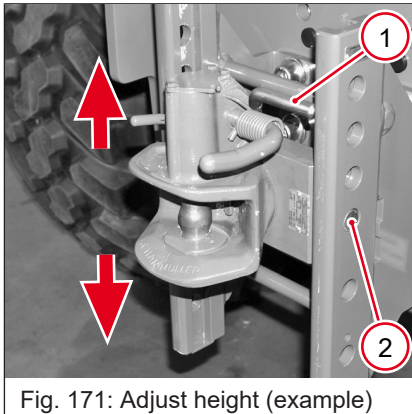


Fig. 171: Adjust height (example)

The vehicle may be equipped with a towing bracket. The towing bracket enables the height adjustment of the individual trailer couplings. Before coupling a trailer, adjust the trailer coupling to the corresponding drawbar height.

The trailer couplings can be removed completely if required. To do this, unlock the trailer coupling with lever **1** and remove it upwards.

1. Put the trailer drawbar in a horizontal position.
  2. Pull lever **1** upward.
  3. Move the trailer coupling upwards or downwards to the height of the towing eye on the trailer.
  4. Release lever **1**.
- ⇒ Locking bolts **2** must be securely engaged on both sides.

### 8.4.3.2 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.

To ensure the prescribed swivel angle when coupled, the trailer coupling may only be used in conjunction with drawbar lugs in accordance with DIN 11026 (ISO 5692), DIN 74053 (ISO 1102) or DIN 74054 (ISO 8755).

Observe the maximum permissible drawbar load and trailer load Payload, bearing load and lifting force.

The automatic trailer coupling can be height adjustable [see Towing bracket on page 162](#).

The permissible lugs are listed on the type label on the trailer coupling.

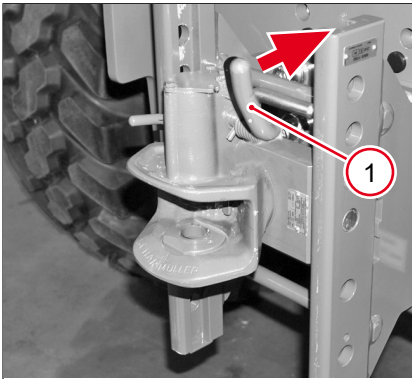


Fig. 172: Push the lever upwards

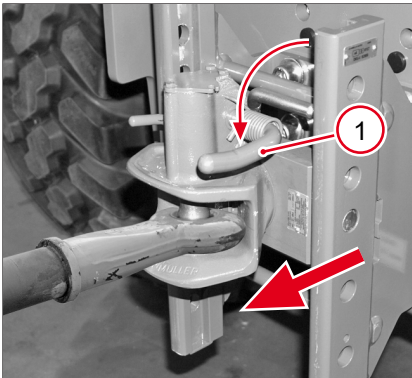


Fig. 173: Lever is automatically pushed down

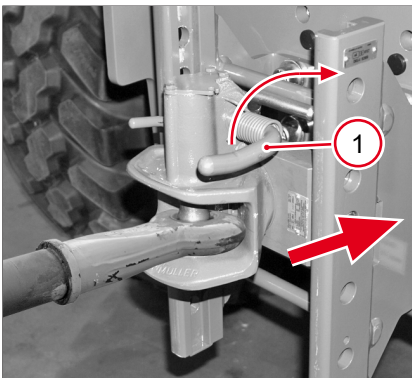


Fig. 174: Uncoupling the trailer

### Hitching the trailer to the vehicle

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.
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.

### 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 chocks, support wheel, etc.).
3. Remove the trailer supply lines from the vehicle.
4. Press lever **1** all the way upward until the coupling pin audibly engages in the open position.
5. Slowly move the vehicle away from the trailer.
6. Close the trailer coupling by hand.
  - ⇒ The trailer is uncoupled. The automatic trailer coupling is secured.

### 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.

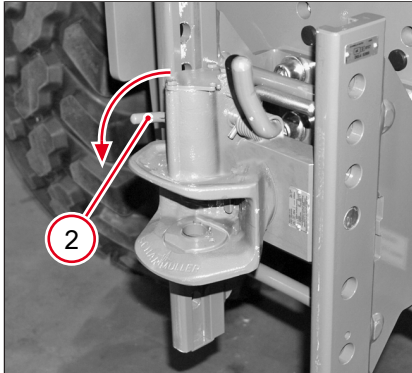


Fig. 175: Close automatic trailer coupling manually

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.

- Push lever **2** downwards.
- ⇒ The trigger is activated manually. The trailer coupling pin closes automatically.

### 8.4.3.3 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.

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, trailer loads and drawbar loads.
- Only use drawbar eyes according to ISO 24347:2005.
- Have damaged or defective trailer couplings replaced or repaired immediately by an authorized service center.

The ball coupling can be height-adjustable [see Towing bracket on page 162](#).

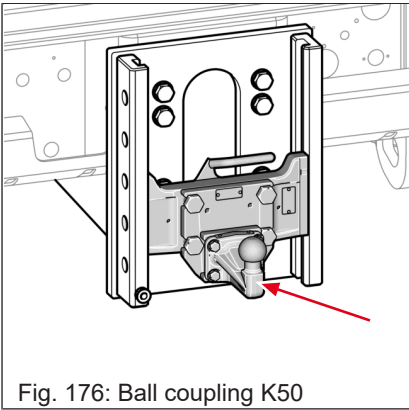


Fig. 176: Ball coupling K50

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.

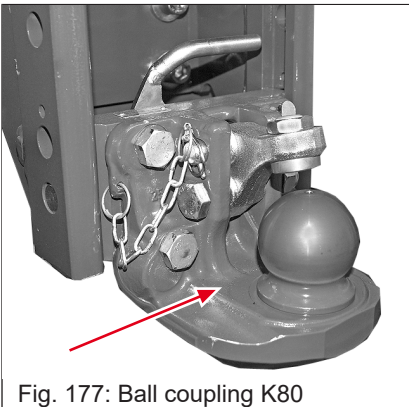


Fig. 177: Ball coupling K80

The use of the K80 ball coupling is described below.

The specification K80 refers to the diameter of the ball head.

8

### Hitching a trailer

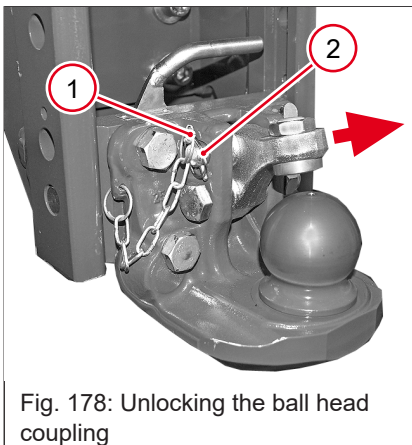


Fig. 178: Unlocking the ball head coupling

1. Adjust the height of the trailer coupling to the drawbar height of the trailer.
2. Remove the split pin 1.
3. Pull pin 2.

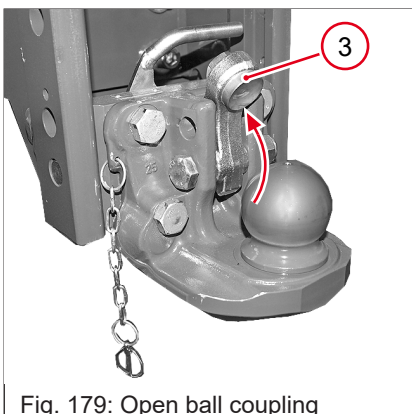


Fig. 179: Open ball coupling

4. Fold the hold-down clamp 3 upwards.

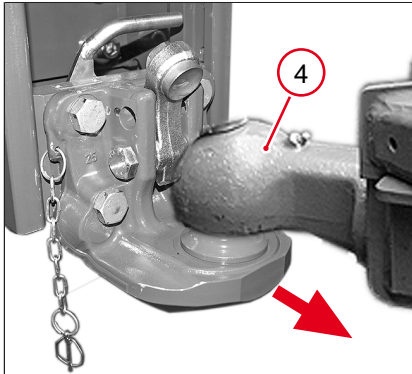


Fig. 180: Hitching a trailer

5. Slowly reverse the vehicle towards the trailer drawbar until the trailer cap 4 of the trailer is above the ball coupling.
6. Stop the engine.  
⇒ The parking brake is activated automatically.
7. Lower drawbar support of the trailer, fold into transport position and secure.
8. Make sure that the trailer cap 4 sits on the ball.

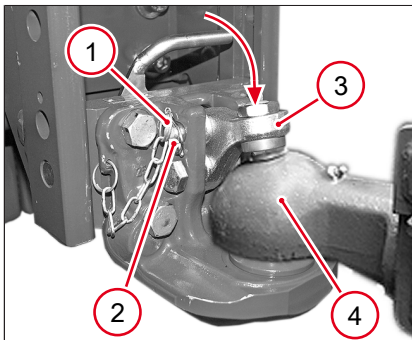


Fig. 181: Close and secure ball coupling

9. Fold the hold-down clamp 3 downwards.  
⇒ The hold-down device must not rest completely on trailer cap 4. Adjust the holding-down clamp 3 so that the distance remains approx. 1 mm.
10. Insert bolt 2 and secure with clip pin 1.
11. Connect the trailer supply lines to the vehicle.
12. Remove the equipment (e.g. chocks, support wheel) used for securing the trailer.  
⇒ The trailer is coupled and connected.

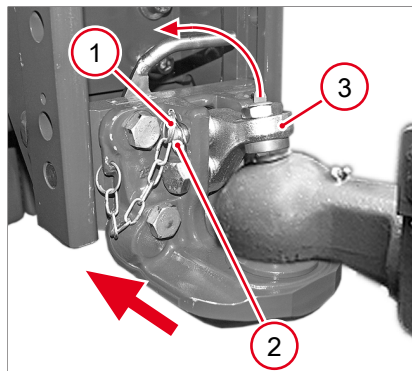


Fig. 182: Uncoupling the trailer

### Uncoupling the trailer

1. Park the trailer on a stable, level and dry surface.
2. Stop the engine.  
⇒ The parking brake is activated automatically.
3. Secure the trailer (e.g. with chocks, support wheel, etc.).
4. Apply the parking brake of the trailer.
5. Remove the trailer supply lines from the vehicle.
6. Seal the connections on the trailer and the vehicle with the protective caps.
7. Remove the split pin 1.
8. Pull pin 2.
9. Fold the hold-down clamp 3 upwards.
10. Slowly move the vehicle away from the trailer.
11. Close the trailer coupling.  
⇒ The trailer is uncoupled.

### 8.4.3.4 Operating the trailer coupling Piton

The Piton trailer coupling is used on tractors and self-propelled machines. Observe the following regulations for the Piton trailer coupling:

- Do not hitch trailers with positive steering.
- Observe the maximum permissible drawbar load and trailer load, trailer loads and drawbar loads.
- When coupling and uncoupling, the regulations of the employer's liability insurance association must be observed.
- Only use drawbar eyes according to ISO 5692-1:2004 or ISO 5692-3:2011.
- Have damaged or defective trailer couplings replaced or repaired immediately by an authorized service center.

The trailer coupling Piton can be height adjustable [see Towing bracket on page 162](#).

#### Hitching a trailer



Fig. 183: Opening the trailer coupling

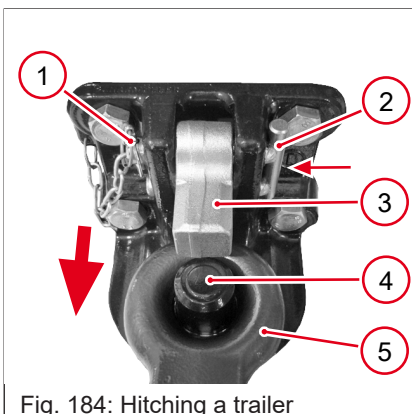


Fig. 184: Hitching a trailer

1. Adjust the height of the trailer coupling to the drawbar height of the trailer.
2. Pull the cotter pin **1** out of the locking bolt **2**.
3. Hold the hold-down **3** and remove the locking bolt **2** in the direction of the arrow.
4. Slowly reverse the vehicle towards the trailer drawbar until the towing eye of the trailer is above the tow pin.
5. Stop the engine.  
⇒ The parking brake is activated automatically.
6. Lower drawbar support of the trailer, fold into transport position and secure.
7. Make sure that the drawbar eye **5** is located above the drawbar pin **4**.
8. Position the hold-down clamp **3** in such a way that the hold-down clamp sits securely on the draw pin.
9. Insert locking bolt **2** (longer bolt at top).
10. Secure locking bolt with cotter pin **1**.
11. Connect the trailer supply lines to the vehicle.
12. Remove the equipment (e.g. chocks, support wheel) used for securing the trailer.  
⇒ The trailer is coupled and connected.

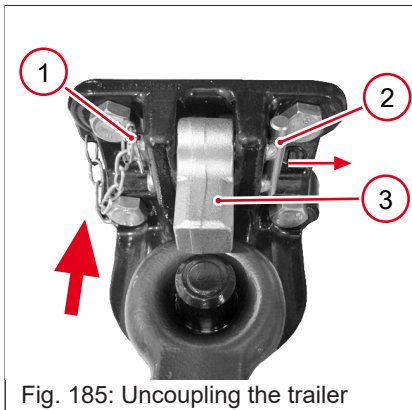


Fig. 185: Uncoupling the trailer

### Uncoupling the trailer

1. Park the trailer on a stable, level and dry surface.
2. Stop the engine.  
⇒ The parking brake is activated automatically.
3. Secure the trailer (e.g. with chocks, support wheel, etc.).
4. Apply the parking brake of the trailer.
5. Remove the trailer supply lines from the vehicle.
6. Seal the connections on the trailer and the vehicle with the protective caps.
7. Pull the cotter pin **1** out of the locking bolt **2**.
8. Hold the hold-down **3** and remove the locking bolt **2** in the direction of the arrow.
9. Slowly move the vehicle away from the trailer.
10. Insert locking bolt **2** (longer bolt at top).
11. Secure locking bolt with cotter pin **1**.  
⇒ The trailer is uncoupled.

#### 8.4.3.5 Operating the hitch trailer coupling

### Information for the hitch trailer coupling




#### NOTICE

##### Damage due to excessive oil flow!

Excessive oil flow and high oil temperature can damage the hydraulics of the hitch trailer coupling.

- Only open and close the trailer coupling in the lower drive mode of the diesel engine – max. approx. 1500 rpm.

For safety reasons, with the hitch trailer coupling unlocked (control light  lights up in the display), driving is only possible in the "snail" drive mode (max. 7 km/h)!

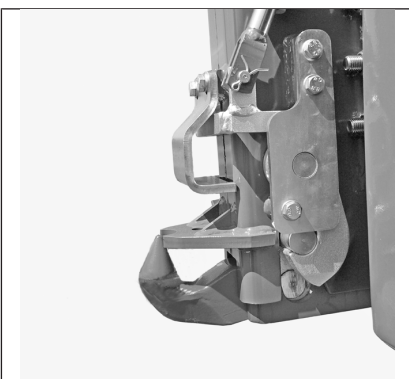


Fig. 186: Hitch trailer coupling

The hitch trailer coupling is designed for use on tractors and self-propelled machines. With the hitch trailer coupling it is possible to couple a trailer with a hitch towing eye to the vehicle from the seat. Observe the following regulations for the hitch trailer coupling:



Fig. 187: Mirror for hitch trailer coupling

- The hitch trailer coupling may only be used in conjunction with the rear mirror for the hitch trailer coupling. To adjust the mirror [see Adjusting the mirror for the hitch trailer coupling on page 99](#).
- Only trailers equipped with a hitch towing eye may be towed.
- Do not hitch trailers with positive steering.
- Observe the maximum permissible drawbar load and trailer load, trailer loads and drawbar loads.
- Only use drawbar eyes according to ISO 5692-1:2004, ISO 20019:2001 or ISO 5692-3:2011 (form Y only).
- Have damaged or defective trailer couplings replaced or repaired immediately by an authorized service center.

### Turning the trailer coupling

The hitch trailer coupling can be turned to open the engine cover.

1. Removing the circlip.
2. Pull out the retaining bolt **1**. Keep the trailer coupling in a vertical position.
3. Turn the trailer coupling counterclockwise by 90 °.
4. Insert retaining bolt **1** and secure with circlip.

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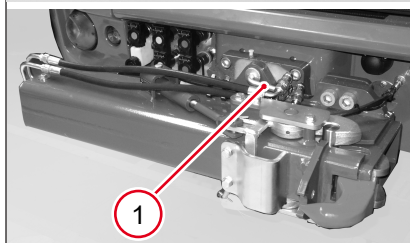
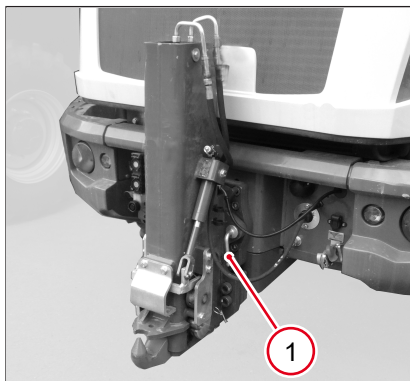



Fig. 188: Turning the trailer coupling

### Operating the ball hitch

The hitch trailer coupling is operated via switches **1** and **2** and monitored via the control light  in the display.

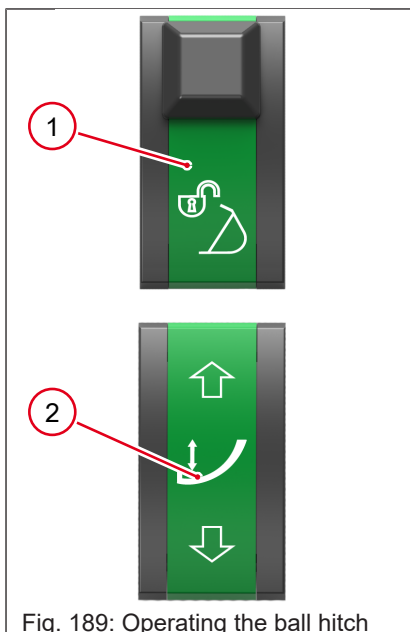


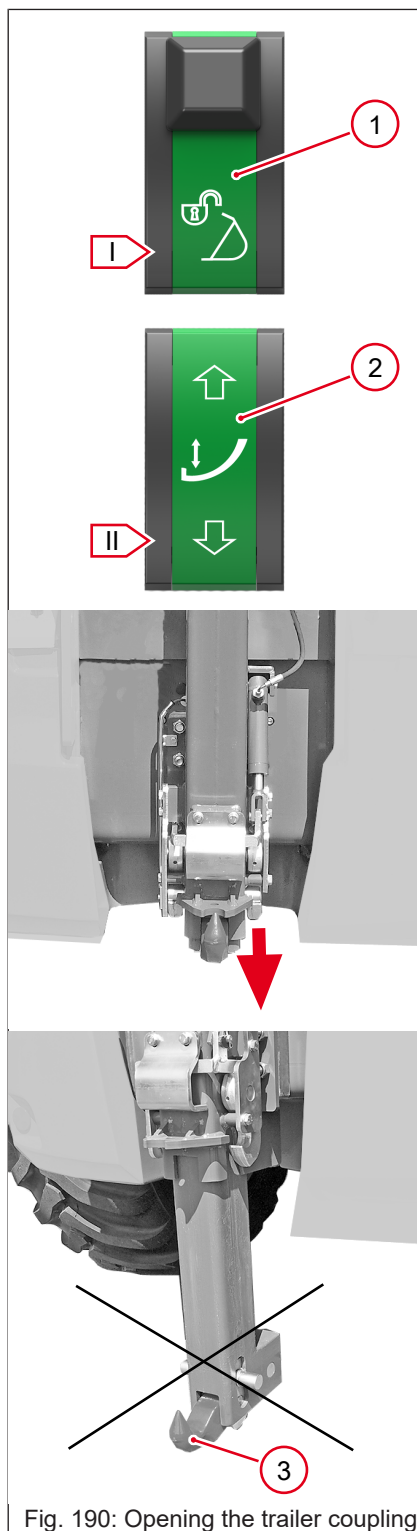
Fig. 189: Operating the ball hitch

## Opening the trailer coupling

**NOTICE****Damage to the trailer coupling due to ground contact!**

If the hitch trailer coupling is lowered to the ground, the hitch may be damaged.

► Do not lower the trailer coupling to the ground.




1. Start the engine.
2. Adjust the field of vision to the trailer coupling with the mirror for the hitch trailer coupling.
3. Press switch **2** in position **II** and keep it pressed. Simultaneously unlock switch **1** with the other hand and press it briefly in position **I** until the trailer pin has unlocked (two-hand operation).
  - ⇒ Control light  illuminates.
  - ⇒ The trailer hook moves downwards.
4. Release switch **2** before the trailer hook **3** has reached the ground.

Fig. 190: Opening the trailer coupling

## Hitching the trailer to the vehicle



### **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.

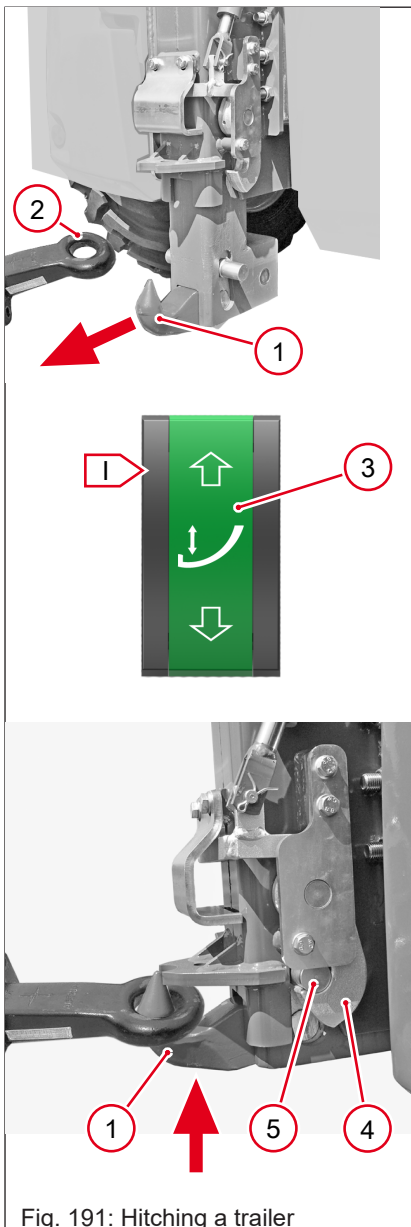




Fig. 191: Hitching a trailer

1. Looking at the rear mirror, slowly reverse the vehicle towards the trailer drawbar until the trailer hook **1** is under the towing eye **2** of the trailer drawbar.
2. Close the towing hook. Press switch **3** in position **I** and keep it pressed until the trailer coupling **audibly** drives under pressure and locks automatically.
  - ⇒ Trailer hook **1** moves upwards to end position (arrow).
  - ⇒ Control light  illuminates.
3. When the trailer hook is locked, release switch **3**.
  - ⇒ The control light  goes out.
4. Apply the parking brake.
5. Get out and check whether the bolt **5** is completely in the locking hook **4**.
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.

#### Preparing to uncouple the trailer

1. Park the trailer on a stable, level and dry surface.
2. Stop the engine.  
⇒ The parking brake is activated automatically.
3. Secure the trailer (e.g. with chocks, support wheel, etc.).
4. Remove the trailer supply lines from the vehicle.
5. Disconnect the trailer lighting cable from the vehicle.

#### Uncoupling the trailer from the vehicle



#### **NOTICE**

##### **Damage to the trailer coupling due to ground contact!**

If the hitch trailer coupling is lowered to the ground, the hitch may be damaged.

- Do not lower the trailer coupling to the ground.

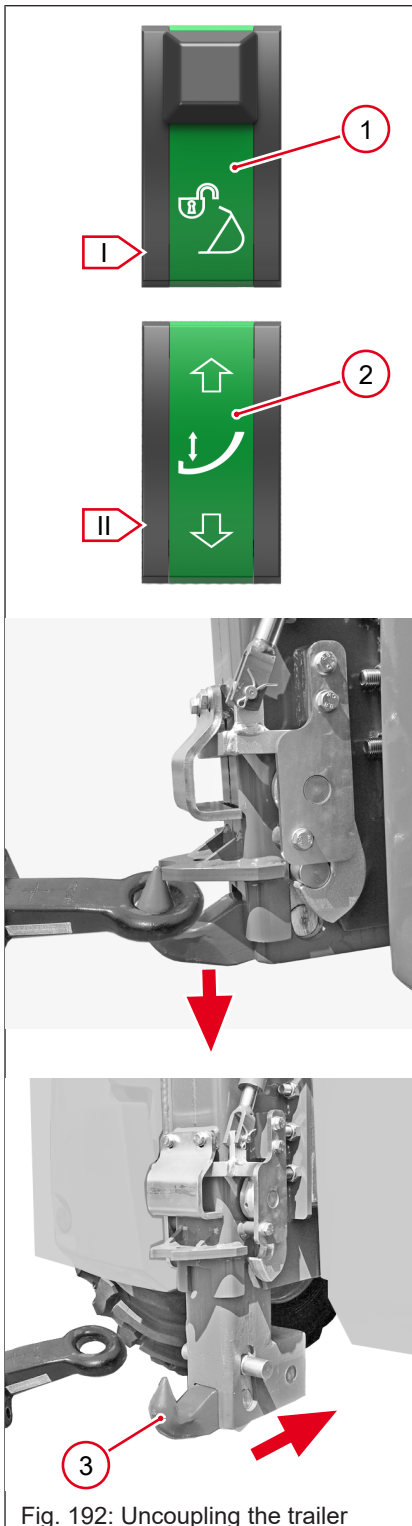

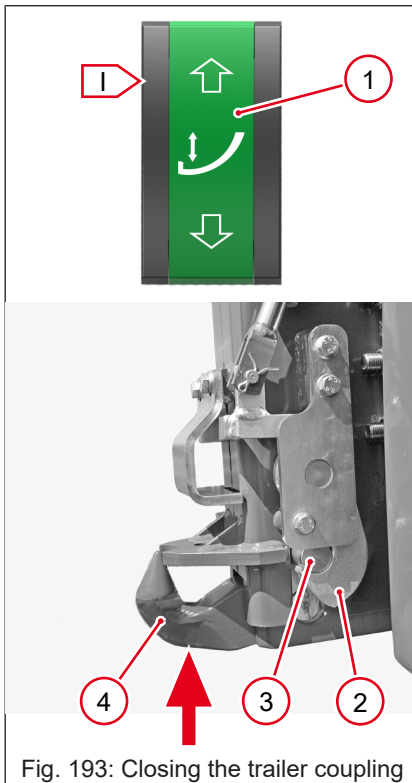




Fig. 192: Uncoupling the trailer

1. Start the engine.
2. Adjust the field of vision to the trailer coupling with the mirror for the hitch trailer coupling.
3. Press switch **2** in position **II** and keep it pressed.  
Simultaneously unlock switch **1** with the other hand and press it briefly in position **I** until the trailer pin has unlocked (two-hand operation).  
⇒ Control light  illuminates.  
⇒ The trailer hook **3** moves downwards.
4. Release switch **2** when the suspension position is reached.
5. Looking at the rear mirror, slowly drive the vehicle away from the trailer.  
⇒ The trailer is uncoupled.



### Closing the trailer coupling

1. Press switch **1** in position **I** and keep it pressed until the trailer coupling **audibly** drives under pressure and locks automatically.
  - ⇒ Trailer hook **4** moves upwards to end position (arrow).
  - ⇒ Control light  illuminates.
2. When the trailer hook is locked, release switch **1**.
  - ⇒ The control light  goes out.
3. Get out and check whether the bolt **3** is completely in the locking hook **2**.
  - ⇒ The trailer coupling is closed and locked.

### 8.4.4 Connect trailer to compressed air-brake system

#### Important information on the compressed air-brake system



#### **WARNING**

##### Too little pressure in the braking system!

At an air pressure below 5 bar, the braking effect of the compressed air brake system is not sufficient. Insufficient pressure can lead to accidents with serious injuries or death.

- ▶ Before starting any journey with the trailer coupled, check the compressed air indicator on the display.
  - ⇒ The display must be above the red LO range.
- ▶ If the air pressure falls into the red LO range while driving, immediately stop the vehicle and rectify (have rectified) the cause for the pressure loss.

**⚠ WARNING****Risk of accident due to incorrect brake pressure!**

Incorrect brake pressure can lead to accidents with serious injuries or death.

- ▶ Only use trailers with hydraulic brakes that are approved for emergency braking with a maximum brake pressure of 150 bar!
- ▶ The hydraulic brake of the trailer must be adapted to the braking system of the tractor vehicle.

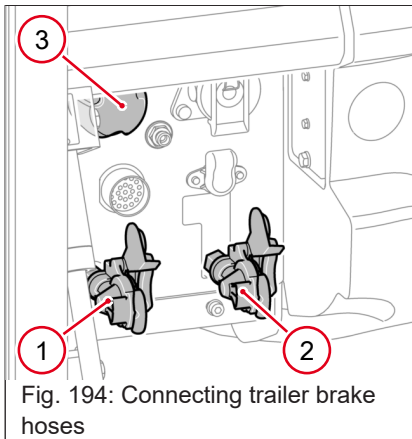
When the vehicle is braked with the brake/inching pedal, air pressure is fed into the trailer braking system and the trailer is braked.

If the travel speed is reduced with the brake/inching pedal, a pressure of approx. 2 bar is fed into the trailer braking system from a pedal travel of approx. 20 %. The trailer is slightly braked by the lead and the vehicle-trailer combination is kept stretched.

When the parking brake of the vehicle is activated, the parking brake of the trailer is also activated.

Observe the following regulations for the pneumatic trailer brake:

- Observe the applicable legal regulations for driving with a trailer braked with compressed air.
- Do not exceed the gross axle weight rating of the trailer, the axle loads, the drawbar load and the permissible gross combination weight rating.
- The driving speed of the entire vehicle/trailer combination must not exceed the maximum permissible speed of the slowest trailer on board.
- When driving without a trailer, the covers of the couplings on the tractor vehicle must be closed.
- If the trailer is not connected to the tractor vehicle, the couplings on the supply lines of the trailer must be closed or hooked into the existing empty coupling heads.
- Check the V-belt on the air compressor regularly for tension and damage.
- Have repair and adjustment work on the braking system performed by an authorized service center only.



### Connecting compressed air hoses (dual-circuit braking system)

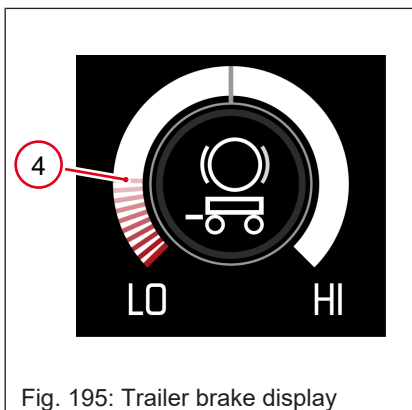
When connecting the supply lines, pay attention to the specified sequence:

**1.** = yellow coupling head **1** (brake)

**2.** = red coupling head **2** (supply)

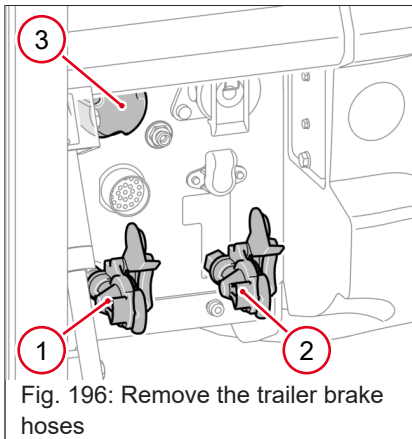
1. Attach the trailer to the trailer coupling - trailer couplings.
  2. Clean brake hoses and plug-in couplings.
  3. Before coupling the trailer, make sure that the sealing rings in the couplings are not damaged and/or dirty.
  4. First couple the compressed air hose to the yellow coupling head **1** (brake).
  5. Then connect the compressed air hose to the red coupling head **2** (supply).
  6. Make electrical connection **3** from the trailer to the tractor vehicle.
  7. Establish any additional electric and hydraulic connections between the trailer and the tractor vehicle.
  8. Before starting to drive, move the lever on the trailer brake force regulator to the position corresponding to the loading condition: Empty, 1/2 load, loaded (see operator's manual of the trailer).
- ⇒ Trailer with compressed air-brake system is connected to the vehicle.

Do not move off with the trailer coupled until the compressed air indicator on the display shows a pressure above the red range **4**.



### Checking the compressed-air supply

1. Run the engine at a standstill until the compressed air-brake system is filled.
2. Drive slowly and carry out a brake test.



### Remove compressed air hoses (dual-circuit brake system)

When removing the supply lines, pay attention to the specified sequence:

**1. = red** coupling head **2** (supply)

**2. = yellow** coupling head **1** (brake)

1. Park vehicle with trailer safely – trailer couplings.
  2. Clean brake hoses and plug-in couplings.
  3. Disconnect electrical connection **3** from trailer to the tractor vehicle.
  4. First uncouple the compressed air hose from the red coupling head **2** (supply).
  5. Then uncouple the compressed air hose from the yellow coupling head **1** (brake).
  6. If necessary, disconnect further electrical and hydraulic connections from the trailer to the tractor vehicle.
  7. Seal connections with protective caps.
- ⇒ Trailer with compressed air brake system is separated from the vehicle.

## 8.4.5 Connect trailer to hydraulic braking system

### Important notices regarding the hydraulic trailer brake



#### **⚠ 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 operating elements or the functional direction of the attachment.



#### **⚠ WARNING**

**Risk of accident due to incorrect brake pressure!**

Incorrect brake pressure can lead to accidents with serious injuries or death.

- ▶ Only use trailers with hydraulic brakes that are approved for emergency braking with a maximum brake pressure of 150 bar!
- ▶ The hydraulic brake of the trailer must be adapted to the braking system of the tractor vehicle.



## 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 re-connected 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.

Observe the following regulations for the hydraulic trailer brake:

1. Comply with the applicable regulations for driving with a hydraulically braked trailer.
2. Do not exceed the gross axle weight rating of the trailer, the axle loads, the drawbar load and the permissible gross combination weight rating.
3. For trailers, which may drive over 25 km/h according to their approval, the inspections according to STVZO §29, Annex VII apply in the Federal Republic of Germany.  
⇒ Observe the legal regulations of your country.
4. The driving speed of the entire vehicle/trailer combination must not exceed the maximum permissible speed of the slowest trailer on board.
5. When driving without a trailer, the covers of the couplings on the tractor vehicle must be closed.
6. If the trailer is not connected to the tractor vehicle, the couplings on the supply lines of the trailer must be closed or hooked into the existing empty coupling heads.
7. Have repair and adjustment work on the braking system performed by an authorized service center only.

## Traveling with the hydraulic trailer brake



### **⚠ 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 result in serious injury or death.

- ▶ Use the brake/inching pedal to reduce speed when driving downhill and before bends.
- ▶ Reduce the engine speed. Take your foot off the accelerator pedal.
- ▶ Select small drive mode.

When the vehicle is braked with the brake/inching pedal, oil pressure is fed into the hydraulic trailer braking system and the trailer is braked.

If the driving speed is reduced with the brake/inching pedal, oil pressure is fed into the trailer braking system from a pedal travel of approx. 20 %. The trailer is slightly braked by the lead and the vehicle-trailer combination is kept stretched.

When the parking brake of the vehicle is activated, the parking brake of the trailer is also activated for trailers with dual-circuit brake system.

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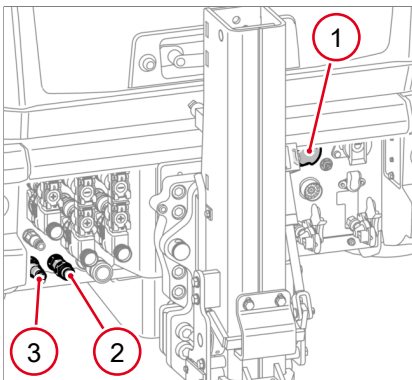


Fig. 197: Hydraulic trailer brake connections

The plug couplings **2** and **3** for the operation of the hydraulic trailer brake (dual-circuit brake system) and the plug receptacle for the electric lighting **1** are mounted at the rear.

Trailers with single-circuit brake systems can be connected to plug-in coupling **2** if permitted by law.

The hydraulic trailer brake is operated via the vehicle's brake/inching pedal!

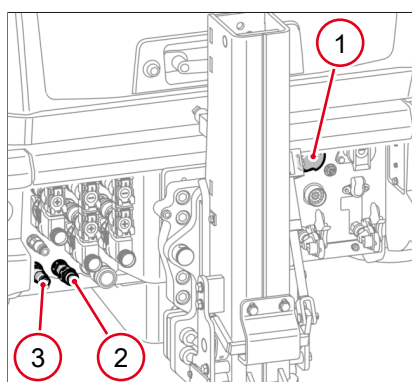
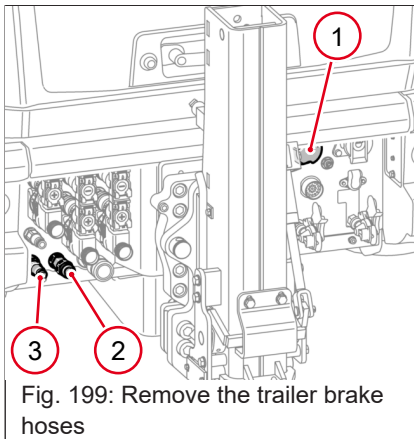


Fig. 198: Connecting trailer brake hoses

### **Connecting trailer brake hoses**

1. Attach the trailer to the trailer coupling – trailer couplings.
2. Clean brake hoses and plug-in couplings.
3. Couple brake hoses to plug-in couplings **2** and **3**.
4. Make electrical connection **1** from the trailer to the tractor vehicle.
5. Establish any additional electric and hydraulic connections between the trailer and the tractor vehicle.
6. Remove the equipment (e.g. chocks, support wheel) used for securing the trailer.

⇒ Trailer with hydraulic braking system is connected to the vehicle.



### Remove the trailer brake hoses

1. Park vehicle with trailer safely – trailer couplings.
  2. Apply the parking brake.
  3. Stop the engine.
  4. Switch off the starter and remove the starting key.
  5. Secure the trailer with wheel chocks.
  6. Apply the parking brake of the trailer.
  7. Clean brake hoses and plug-in couplings.
  8. Disconnect electrical connection **1** from trailer to the tractor vehicle.
  9. Remove brake hoses from plug-in couplings **2** and **3**.
  10. If necessary, disconnect further electrical and hydraulic connections **1** from the trailer to the tractor vehicle.
  11. Seal connections with protective caps.
- ⇒ The hydraulic braking system is separated from the vehicle.

### 8.4.6 Check parking brake with trailer attached



#### **WARNING**

#### **Rolling away of the vehicle on inclines or downhill stretches!**

The vehicle may roll away and result in an accident, serious injury or death.

- ▶ Only press the switch briefly during testing.
- ▶ Test only on inclines or declines not exceeding 12 %.
- ▶ As far as possible, avoid parking on slopes.

If the vehicle with trailer has to be parked on an uphill or downhill gradient, it can be checked whether the parking brake of the vehicle prevents the vehicle with trailer from rolling away or is defective.

The test may be carried out only on trailers equipped with a dual-circuit braking system.

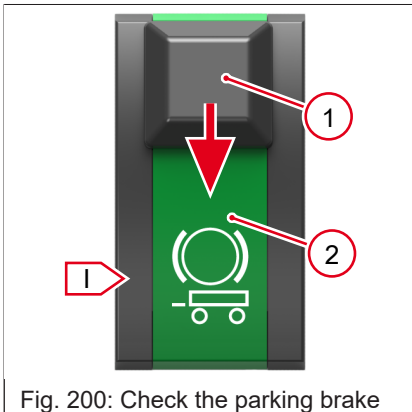





Fig. 200: Check the parking brake

1. Stop the vehicle with the trailer and activate the vehicle parking brake.  
⇒ Control light  lights up in the display.
2. Push fuse **1** in the direction of the arrow and simultaneously push switch **2** to position **I**.  
⇒ This releases the trailer brake.  
⇒ Control light  lights up in the display.  
⇒ The vehicle with trailer must be held by the parking brake of the vehicle.
3. Release switch **2**.  
⇒ This re-applies the trailer brake.  
⇒ Control light  in the display goes out.
4. If the set is held by the brake: Secure the vehicle additionally after parking.
5. If the brake does not hold the set: Park the vehicle in a safer place and, if necessary, have the brake checked and repaired by an authorized service center.

## 8.5 Lighting and signaling system

### 8.5.1 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.

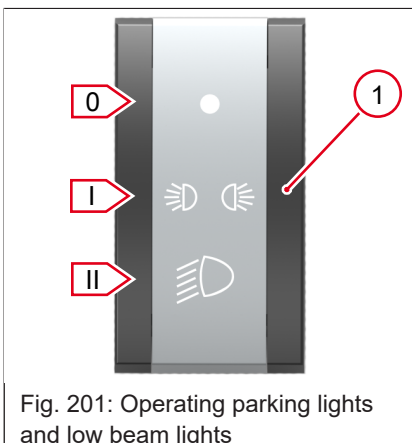




Fig. 201: Operating parking lights and low beam lights

Switch **1** has three switch positions.

1. Move the switch to position **I**.  
⇒ Parking lights and clearance lights are switched on.  
⇒ The LEDs in the switch and the control light  in the display light up.
2. Move the switch to position **II**.  
⇒ Low beam is switched on.  
⇒ The LEDs in the switch and the control light  in the display light up.
3. Move the switch to position **0**.  
⇒ Lights are switched off.  
⇒ The LED in the switch and control light in the display are not lit.



### Information

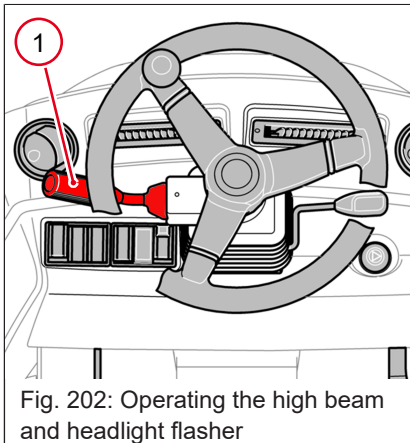
When the lighting is switched off, the clearance lights also light up when the service brake is applied.

## 8.5.2 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.



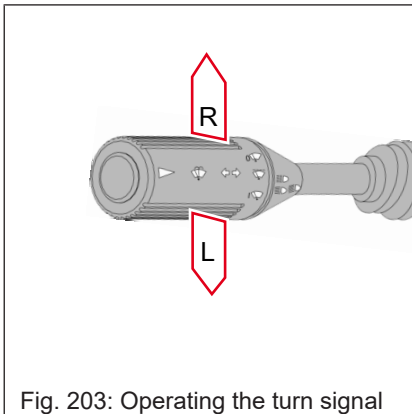
The high beam and headlight flasher are operated via the steering column switch **1** on the left-hand side of the steering wheel.

- ✓ The low beam must be switched on [see Parking light, low beam and clearance lights on page 181](#).





- ✓ Control light  lights up in the display.


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  light lights up in the display.
2. Pull the steering column switch **1** again briefly beyond the resistance in the direction of the steering wheel.
  - ⇒ High beam is switched off.
  - ⇒ Control light  lights up in the display.
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.



### 8.5.3 Turn signal



The turn signal is operated with the steering column switch.

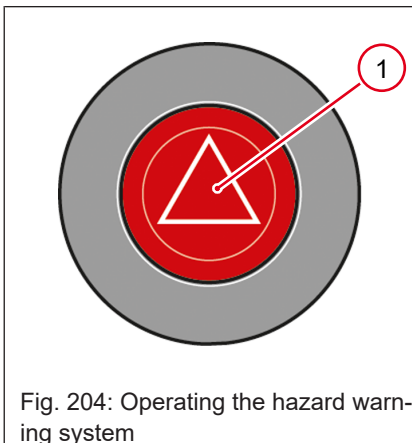
1. Push the lever in direction **R**.
  - ⇒ Right turn signals are on.
  - ⇒ Control light  or  flashes in the display.
2. Push the lever in the direction of **L**.
  - ⇒ Left turn signals are on.
  - ⇒ Control light  or  flashes in the display.

If no attachment or 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 attachment or 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.

### 8.5.4 Hazard warning system



The switch for the hazard warning system **1** is located at the front of the dashboard to the right of the steering wheel.

1. Press switch **1**.
  - ⇒ The hazard warning system is switched on.
  - ⇒ The LED  in the switch and the control light  or  in the display flash.
2. Press switch **1** again.
  - ⇒ The hazard warning system is switched off.
  - ⇒ The LED  in the switch and the control light  or  in the display are off.

### 8.5.5 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 vehicle is basically equipped with the work light at the rear left. The following work lights may be fitted to the vehicle.

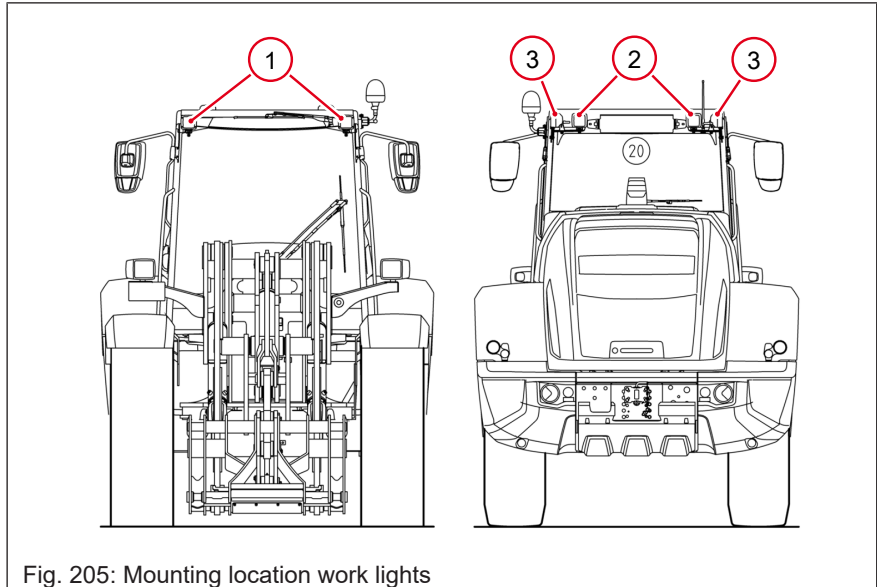


Fig. 205: Mounting location work lights

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

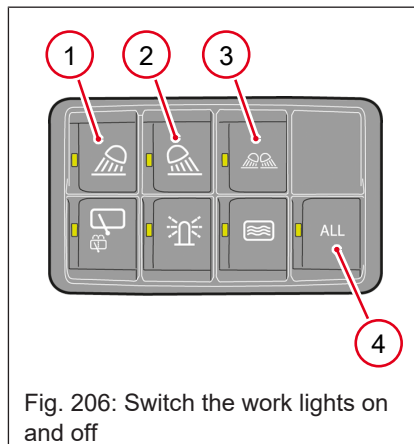


Fig. 206: Switch the work lights on and off

The work lights are operated via the keypad in the cab roof.

The work lights continue to light when the ignition is switched off. This places a heavy load on the battery. Switch off the work lights before switching off the engine and ignition.

Switch off all work lights simultaneously with switch 4.

### 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 or briefly press switch 4.
  - ⇒ The work lights go out.
  - ⇒ 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 or briefly press switch **4**.
  - ⇒ The work lights go out.
  - ⇒ LED in switch **2** is off.

### Side right work light

The work lights at the rear left and right are operated simultaneously with switch **3**.

1. Briefly press switch **3**.
  - ⇒ The work lights are switched on.
  - ⇒ LED in switch **3** lights up.
2. Briefly press switch **3** again or briefly press switch **4**.
  - ⇒ The work lights go out.
  - ⇒ LED in switch **3** is off.

**8**

## 8.5.6 Rotating beacon



### NOTICE

#### Vehicle damage due to the rotating beacon turned upwards!

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

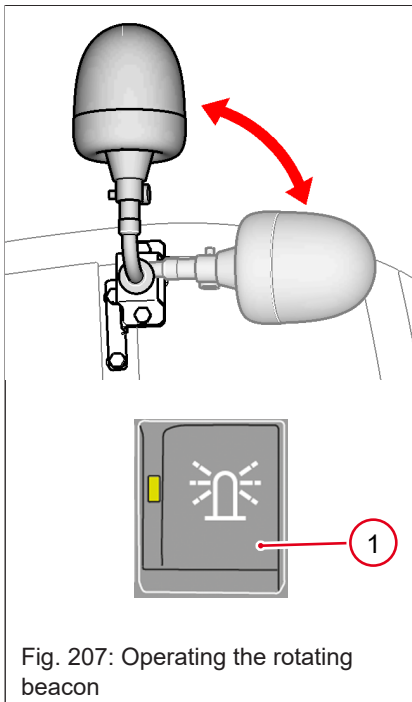
- After use, turn the rotating beacon downwards again and lock it in place.

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 working 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.

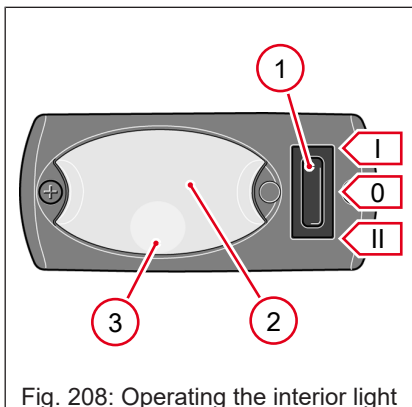
The rotating beacon is switched on and off via the keypad in the cab roof. The rotating beacon remains illuminated when the ignition is switched off. This places a heavy load on the battery. Switch off the rotating beacon before switching off the engine and ignition.



### Operating the rotating beacon

1. Before use, turn the rotating beacon vertically upwards and lock it into place.
2. Briefly press switch **1**.  
⇒ Rotating beacon is switched on.  
⇒ LED in switch **1** lights up.
3. Briefly press switch **1** again.  
⇒ Rotating beacon is switched off.  
⇒ LED in switch **1** is off.
4. After use, turn the rotating beacon horizontally downwards and lock it in place.

### 8.5.7 Operating the cab interior light



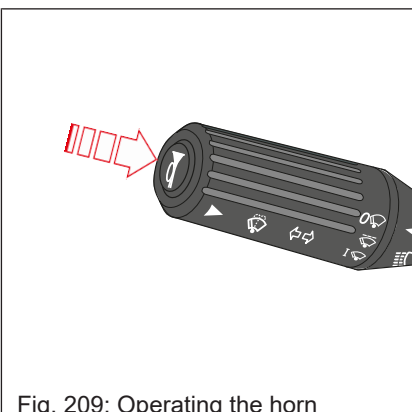
The interior light of the cab is operated with switch **1** on the interior light.

1. Move the switch to position **I**.  
⇒ Interior light is switched on.
2. Move the switch to position **0**.  
⇒ The interior light goes out.
3. Move the switch to position **II**.  
⇒ Door contact switch is activated.

If the vehicle lighting is not switched on, the interior light illuminates the entire lighting area **2**. The light is white.

When the vehicle lighting is switched on, the interior light only illuminates the spot area **3**. The light is red.

### 8.5.8 Operating the horn



The horn is operated with steering column switch.

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

## 8.6 Washer system

### 8.6.1 Window wiper

The vehicle is equipped with window wipers for the front window, rear window and roof window. All three window wipers have a windscreen washer system – see QVW washer. The front window wiper and the roof window wiper are operated via the steering column switch. The rear window wiper is operated via the keypad in the cab roof.

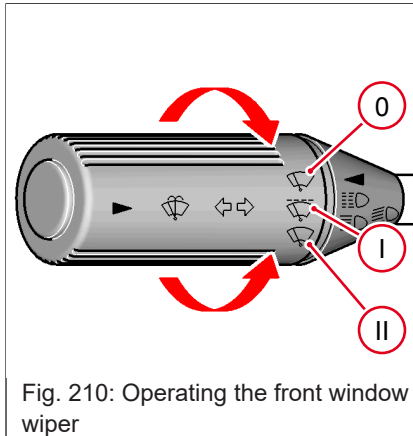


Fig. 210: Operating the front window wiper

#### Operating the window wipers for the window and roof

1. Turn switch to position **I**.  
⇒ Interval wiping is switched on.
2. Turn switch to position **II**.  
⇒ Continuous wiping is enabled.
3. Turn switch to position **0**.  
⇒ The window wiper is switched off.  
⇒ Window wipers return to starting position.

#### Operating the window wiper for roof window

As an alternative to using the steering column switch, the vehicle can be equipped with a switch in the roof liner. If the vehicle is equipped with this switch, the windscreen wiper cannot be operated via the steering column switch.

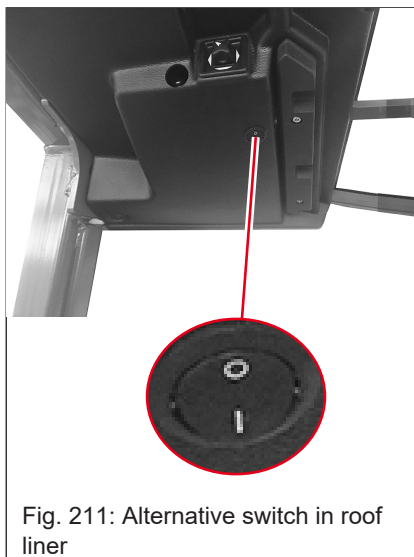
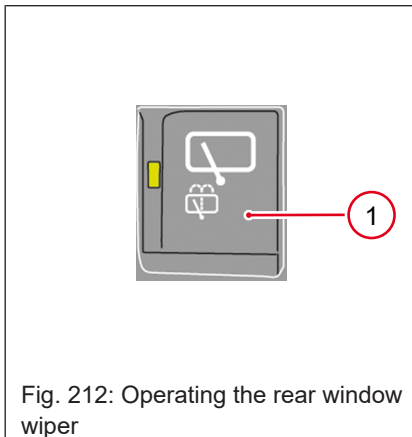


Fig. 211: Alternative switch in roof liner

1. Move the switch to position **I**.  
⇒ Window wiper is switched on.
2. Move the switch to position **0**.  
⇒ The window wiper is switched off.



### Operating the window wiper for the rear window

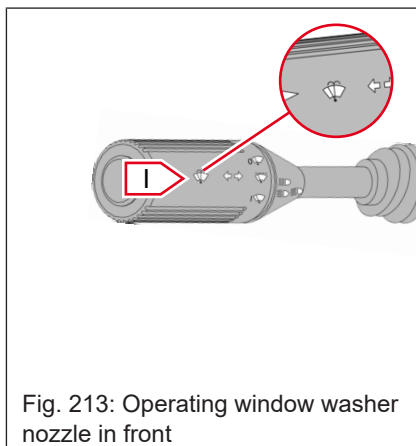
The rear window wiper is operated via the keypad in the cab roof.

1. Briefly press switch 1.
  - ⇒ Continuous wiping is enabled.
  - ⇒ The LED in the switch illuminates.
2. Press the switch briefly again.
  - ⇒ Window wiper at the rear is switched off.
  - ⇒ The LED in the switch is off.

## 8.6.2 Window washer nozzles

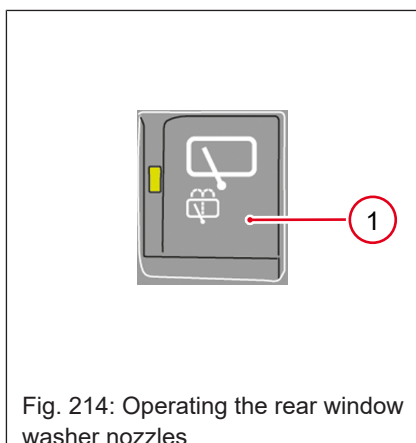
All three window wipers are equipped with a washer system.

### Operating the window washer nozzle of the front window and roof window



1. Push and hold the switch in the direction of steering column I.
  - ⇒ Wash nozzle and window wiper of the front wiper and roof window wiper are in operation.
2. Release switch.
  - ⇒ Washing nozzle is switched off.
  - ⇒ Window wipers for the front window and roof window wipe three times.

### Operating the rear window washer nozzle



1. Press and hold switch 1.
  - ⇒ Washing nozzle and window wiper for the rear window are in operation.
2. Release switch.
  - ⇒ Washing nozzle is switched off.
  - ⇒ Rear window wiper wipes three times.

## 8.7 Heating, ventilation and air conditioning system

### 8.7.1 Information on heating and air conditioning system

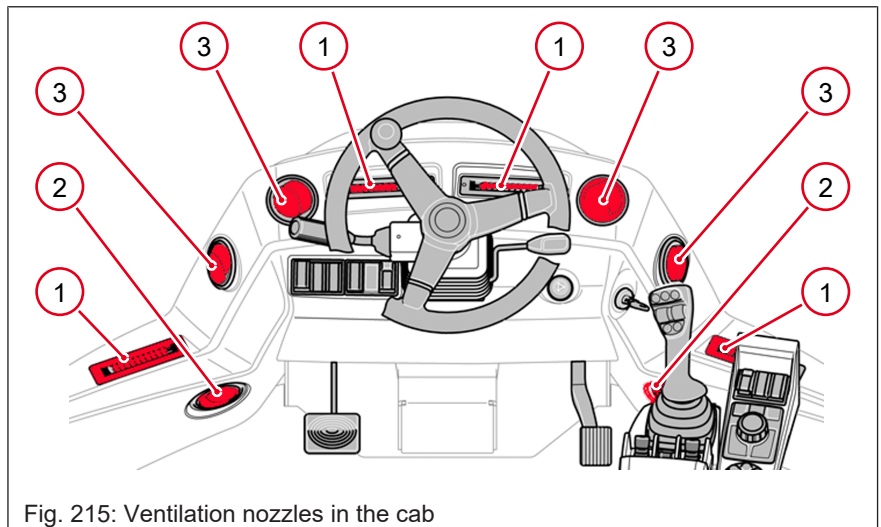


Fig. 215: Ventilation nozzles in the cab

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. Air is directed to the front window and side window via the air vents **1**. The air vents **3** direct air into the interior, and the air vents **2** direct air into the footwell. Each air vent can be adjusted and closed separately.

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.

### 8.7.2 Switching heating and air conditioning system on and off

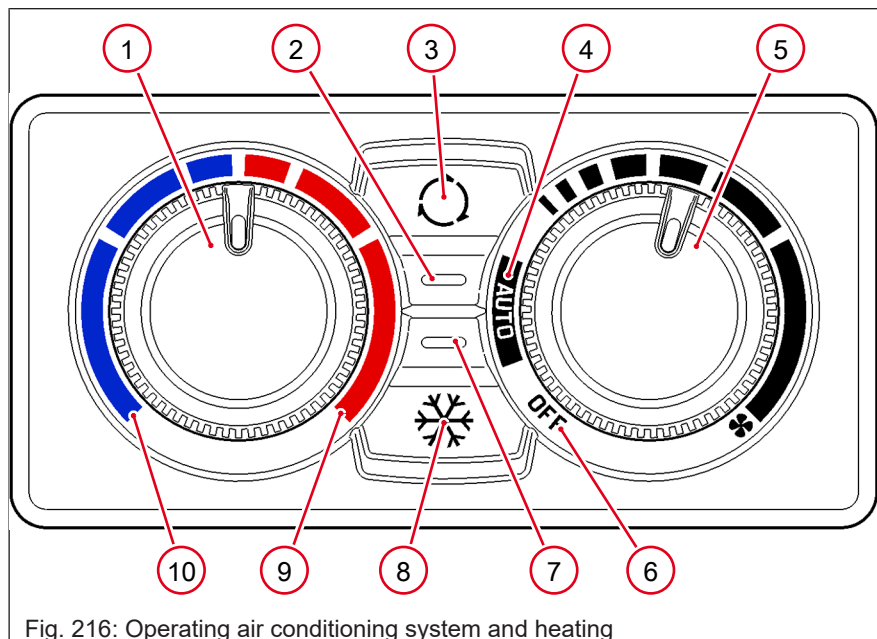


Fig. 216: Operating air conditioning system and heating

The control element of the heating and air conditioning system is located in the upper right corner of the cab roof.

The heating and air conditioning system can be operated manually or automatically via the AUTO position 4 on the fan 5 switch.

#### Automatic mode (AUTO)

The automatic mode automatically regulates the temperature supply and the power of the fan according to the temperature selected with temperature switch 1. If the set temperature is below the outdoor temperature, the control light 7 in switch 8 flashes. The air conditioning must then be switched on.

The temperature switch 1 has a LO mode 10 in the lowest temperature range. If the temperature switch is in this position, there is no automatic regulation of temperature and ventilation. Cooling and fans always run at full power. Air conditioning and recirculation are switched on automatically.

The temperature switch 1 has a HI mode 9 in the uppermost temperature range. If the temperature switch is in this position, there is no automatic regulation of temperature and ventilation in this case. Heating and fans always run at full power. Air conditioning and circulating air are automatically switched off.

## Manual operation

### Rapid cooling

1. Open the windows and doors so the hot air can escape.
2. Set the fan **5** switch to maximum power.
3. When the hot air has escaped, close the windows and doors.
4. Turn fan switch **5** to AUTO position **4**.
5. Turn switch **1** for temperature control counterclockwise until it stops (LO mode **10**).
  - ⇒ Air conditioning switches on.
  - ⇒ Control light **7** in the switch lights up.
  - ⇒ Recirculation mode switches on.
  - ⇒ Control light **2** in the switch lights up.
6. When the interior has reached a comfortable temperature, switch to fresh air mode and make the desired settings on the heating and air conditioning system.

### Ventilation

1. Turn switch **5** clockwise to the desired fan speed.
2. Turn switch **1** counterclockwise to the desired temperature (blue area).
  - ⇒ Fresh air is blown into the cab.

If the set temperature is below the outdoor temperature, the control light **7** in switch **8** flashes. The air conditioning must then be switched on.

### Heating

1. Turn switch **5** clockwise to the desired fan speed
2. Turn switch **1** clockwise to the desired temperature (red area).
  - ⇒ Warm air is blown into the cab.

### Cooling

1. Press switch **8**.
  - ⇒ Control light **7** in the switch lights up.
  - ⇒ Air conditioning is switched on.
2. Turn switch **5** clockwise to the desired fan speed.
3. Turn switch **1** to the desired temperature.
  - ⇒ Air-conditioned air is blown into the cab.
4. Press switch **8** again.
  - ⇒ Control light **7** in the switch is off.
  - ⇒ Air conditioning is switched off.

### Set to circulating air

Circulating air operation prevents pollutants from the ambient air from entering the cab. The air introduced into the cab is not sucked in from the surroundings of the vehicle but from the cab during recirculation operation.

In recirculated-air mode the windows and the doors must be closed.

If the circulating air operation is too long, the windows may fog up. Only use recirculation mode for a short period of time.

1. Press switch **3**.
  - ⇒ Control light **2** in the switch lights up.
  - ⇒ Recirculation mode is switched on.
2. Press switch **3** again.
  - ⇒ Control light **2** in the switch is off.
  - ⇒ Recirculation mode is switched off.

### Switch off the heating and air conditioning system.

- Turn fan switch **3** to AUTO position **6**.
  - ⇒ The heating and air conditioning system is switched off.

### 8.7.3 Auxiliary heater



#### **WARNING**

#### **Explosion hazard during operation of the auxiliary heater near flammable vapors or dust!**

The additional heating emits heat. This can cause explosions in dusty environments or environments with flammable vapors. These explosions can cause serious injury or death.

- ▶ Switch off auxiliary heater in dusty environments.
- ▶ Switch off the auxiliary heater of the vehicle before refueling.



#### **WARNING**

#### **Danger of suffocation when operating the auxiliary heater in closed rooms!**

The auxiliary heater emits exhaust gases containing carbon monoxide. This may cause suffocation!

- ▶ Do not operate the auxiliary heater in closed rooms.
- ▶ Ensure sufficient fresh air supply.



#### **NOTICE**

#### **The auxiliary heater can be damaged by loss of voltage!**

- ▶ After switching off, the auxiliary heater continues to cool for approx. two minutes. Do not switch off the battery master switch until the auxiliary heater has stopped running.



Fig. 217: Auxiliary heating control unit

The control unit of the auxiliary heater is located on the right in the cab roof. The auxiliary heater preheats the engine cooling water. The heat generated by the auxiliary heater can also be transferred to the cab via the air conditioning system.

The operation of the air conditioning system corresponds to the description in the following chapter [see Information on heating and air conditioning on page 189](#).

The engine preheating and auxiliary heating options can be operated independently of each other.

Separate operator's manual is supplied with the vehicle for the auxiliary heater.

#### 8.7.4 Rear window heating

The vehicle is equipped with rear window heating. With rear window heating, fogging of the rear window can be prevented in cold weather. Rear window heating can also be used to defrost the rear window. Rear window heating is equipped with an overheating protection. Rear window heating switches off automatically after approx. five minutes.

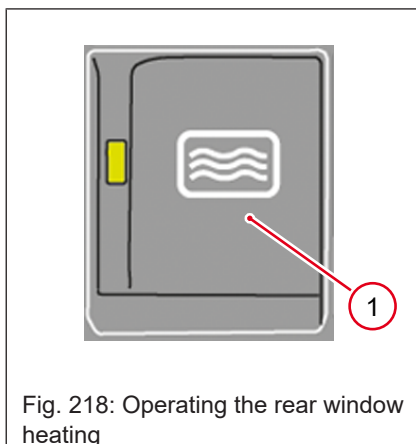


Fig. 218: Operating the rear window heating

The rear window heating is operated via the keypad in the cab roof.

1. Press switch 1.
  - ⇒ Rear window heating is switched on.
  - ⇒ The LED in the switch illuminates.
2. Press the switch again.
  - ⇒ Rear window heating is switched off.
  - ⇒ The LED in the switch is off.



#### Information

If the rear window heating is switched on via the switch in the keypad, the heating for the exterior mirrors is also activated automatically if the vehicle is equipped with it.

## 8.8 Working with the vehicle

### 8.8.1 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.

#### **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.
- ▶ The stacking of general cargo with vehicles without a driver's protective roof or cab is prohibited.
- ▶ Do not step under the raised loader unit.
- ▶ Do not tilt the attachment up to the stop when the loader unit is raised and extended.

## 8.8.2 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.



## Information

**For safety reasons, it is not possible to lower the telescopic system with the diesel engine switched off and the ignition switched off!**

The joystick can only be operated when:

- ▶ The operator has taken a seat in the driver's seat,
- ▶ The ignition is on,
- ▶ The diesel engine is running,
- ▶ The joystick's roadblock is deactivated.

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

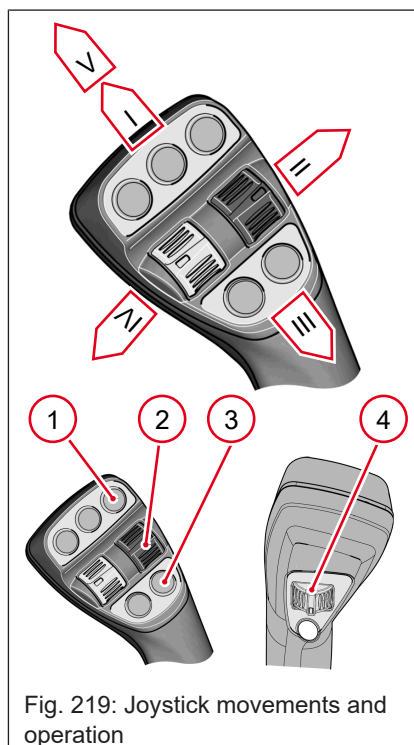


Fig. 219: Joystick movements and operation

- |  |   |
|--|---|
| I Push the joystick forward.                       | Lower the loader unit.  |
| II Push the joystick to the right.                 | Empty attachment.   |
| III Pull the joystick back.                        | Raise the loader unit.  |
| IV Push the joystick to the left.                  | Tilt in attachment.   |
| V Push the joystick forward beyond the resistance. | Lower the loader unit to floating position.                       |
| 1 Press switch 1.                                  | Operation plug receptacle at the loader unit                      |
| 2 Push switch 2 forward or backward.               | Operation of fourth control circuit (proportional control)        |
| 3 Press switch 3.                                  | Operation automatic bucket re-positioning                         |
| 4 Push switch 4 to the left.                       | Operation of third control circuit and lock for attachments.      |
| Push switch 4 to the right.                        | Operation of third control circuit and unlocking for attachments. |

### 8.8.3 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.

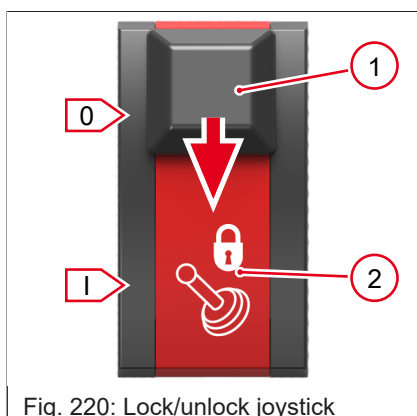



Fig. 220: Lock/unlock joystick


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. When the lock function is on, the control light  lights up in the display.

The lock function is operated with the switch in the switch strip on the dashboard. The switch has two switch positions and a lock.


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
- Trailer coupling Auto-Hitch

#### **Enable locking function**

1. Press lock **1** in switch **2** down and hold.
2. Move the switch to position **I**.  
⇒ Control light  lights up in the display.
3. Release lock **1**.  
⇒ Operation of the loader unit and the working hydraulics is no longer possible.

#### **Disable locking function**

1. Press lock **1** in switch **2** down and hold.
2. Move the switch to position **0**.  
⇒ Control light  in the display goes out.
3. Release lock **1**.  
⇒ Operation of the loader unit and the working hydraulics is possible.

### 8.8.4 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.

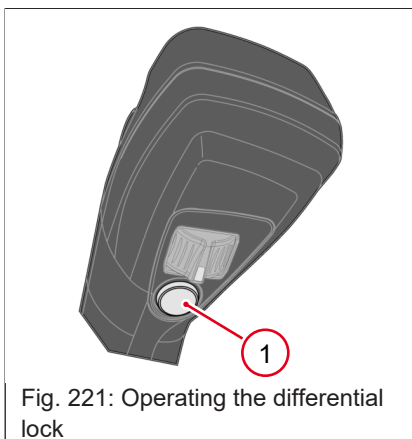
The differential is locked with the differential lock. This avoids uneven wheel spin. The 100 % differential lock in the front axle prevents the differential gear from having a compensating effect, i.e. the drive force acts evenly on both front wheels.

The differential lock can only be engaged when the brake/inching pedal is depressed.

#### **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 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.

### 8.8.5 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.

8

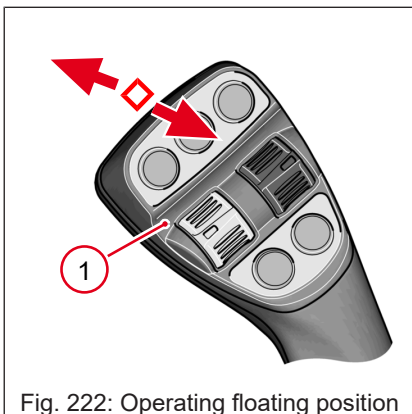


Fig. 222: Operating floating position

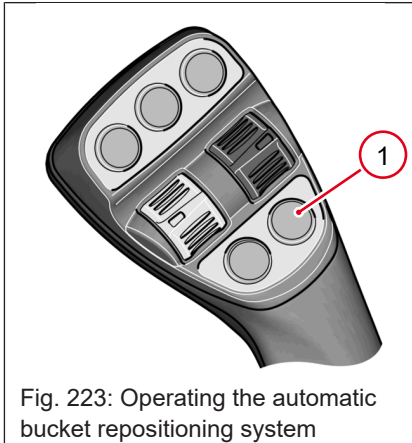
The floating position of the loader unit is located on the lower loader unit function.




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.

### 8.8.6 Operating the automatic bucket repositioning system

If the vehicle is equipped with this function, the automatic bucket repositioning system can be used to carry out cyclic work, such as loading a truck, efficiently and gently.

With the automatic bucket repositioning system, any tilting angle of the tilt ram can be stored and called up at the touch of a button (e.g. horizontal position of the bucket during loading work).



1. Adjust the position of the bucket manually.
2. Save tilt angle. Press and hold switch **1** for three seconds.
  - ⇒ A beep sounds.
  - ⇒ Control light  illuminates.
  - ⇒ The angle is saved.
1. Picking up a load.
  - ⇒ The control light  goes out.
2. Dump the load. To do this, lower the loader unit and press switch **1** briefly at the same time.
  - ⇒ The bucket automatically adjusts to the stored tilt angle.
  - ⇒ Control light  illuminates.

The tilt angle remains permanently as long as the bucket is not manually tilted in or emptied or the engine is shut off.

When the loading bucket is tilted in or out, the automatic bucket return is interrupted, but can be reactivated by pressing switch **1**.

The stored tilt angle can be overwritten with a new tilt angle at any time.

When the ignition is switched off, the stored tilt angle setting is deleted and must be reset and stored again after restarting the engine.

### 8.8.7 Operating the vibration function



#### NOTICE

##### Damage to the hydraulic system due to vibration function!

The vibration function can cause damage to the hydraulic system due to the short loads.

- Only use the vibration function briefly for filling or emptying the loading bucket.
- This function is not approved for use in other work (loss of warranty)!

If the vehicle is equipped with this function, the "vibration function" can be used to fill the loader bucket with the load more easily and also to empty it (e.g. sticky soil).

The vibration function can only be used if the loader bucket is not fully tilted in or out to the stop.

The vibration function is only possible in connection with the "automatic bucket repositioning" function.

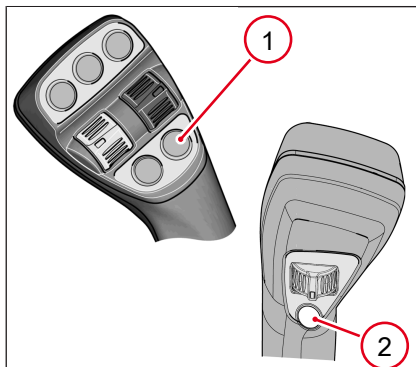


Fig. 224: Operating the vibration function

1. Pick up or empty the load.
2. Press and hold switch **1** in the joystick.
3. Press switch **2** additionally  
⇒ The vibration function is enabled.

Switch **1** can be released during the vibration function.

- Release switch **2**.  
⇒ The vibration function is ended.

### 8.8.8 Use locking function for tilt rams

The locking function is used to secure work during which the tilt ram must not be operated (e.g. when setting down on stacked goods in a high position). The "tilting in" and "tilting out" movements of the tilt ram are locked on the joystick.

The tilt ram lock is activated with key switch **1**. The key switch is mounted to the right of the seat on the console in front of the rear wall of the cab.

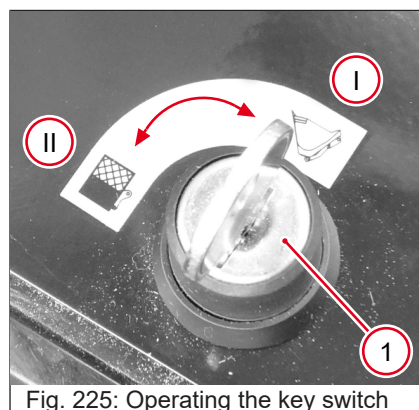




Fig. 225: Operating the key switch

#### Enable locking function

1. Set the loader unit to transport position.
2. Bring the load into the desired position with the tilt ram.
3. Turn key switch **1** to position **II**.  
⇒ Control light  lights up in the display.  
⇒ Tilt ram is locked and can no longer be adjusted from the set position.
- Set down the load.

#### Disable locking function

- Turn key switch **1** to position **I**.  
⇒ Control light  in the display is off.  
⇒ The tilt ram is unlocked and can be operated again via the joystick.

### 8.8.9 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 loader unit due to uneven ground are damped. This prevents the vehicle from swaying. When the load stabilizer is activated, the loader unit 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**

The loader unit yields easily with the load stabilizer switched on, making it difficult to perform any precise lifting movements.

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. For setting the switch-on threshold [see Overview of drop-down menus on page 101](#).
- Continuous mode is suitable for longer off-road trips as well as on public roads.

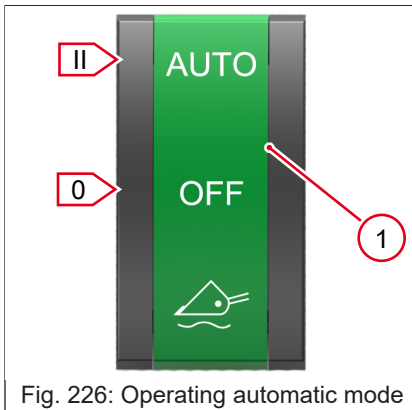




Fig. 226: Operating automatic mode

### 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. Lift the loader unit approx. 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 is activated.  
⇒ 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.

### 8.8.10 Operating the oil volume setting

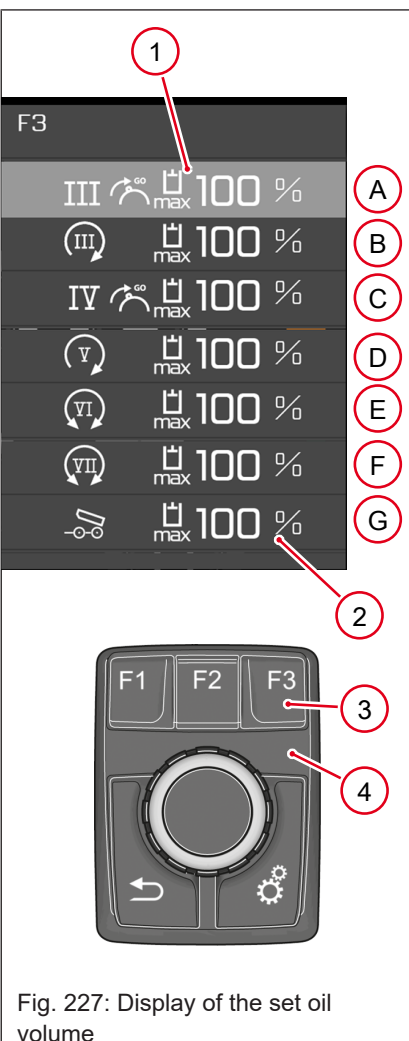


Fig. 227: Display of the set oil volume

If the vehicle is equipped with an oil volume setting, the hydraulic power can be individually adapted to the attached attachment with different control circuits.

The oil volume setting requires the following conditions to be fulfilled:

- Engine is in operation.
- Driver sits on the seat.
- Joystick lock is disabled [see Use lock function for joystick on page 197](#).

The adjustment of the oil volume<sup>1</sup> can be called up in two different ways. Either via the F3 button **3** on the jog dial **4** (for all control circuits **A - G**) or by activating a control circuit with the corresponding switch (only for control circuits with continuous operation **B, D - G**). The set values for the oil volume are shown in display **2** in percent (%).

For the control circuits with proportional control (3rd and 4th control circuit **A, C**), the GO value can also be set. The GO value determines the response behavior of the rocker switches on the joystick. A low value means a slow response, a high value a fast response of the pushbutton. The GO value is also displayed as a percentage.

The oil volumes of the individual control circuits are already pre-set ex works.

The stored values remain permanently stored until they are changed manually.

The oil volumes of the separate control circuits can be set only during machine operation to increase/reduce, for example, the number of revolutions of a rotary broom.

## Overview of control circuits with oil volume setting

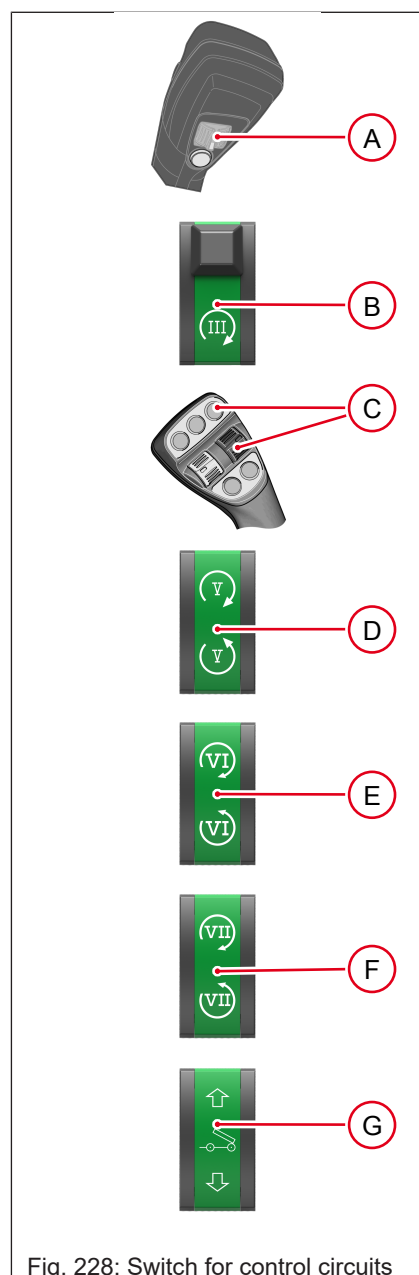









Fig. 228: Switch for control circuits

Position	Control circuit	Switch	Control light in the display
A	3rd control circuit; proportional; double-acting; front	Switch	-
B	3rd control circuit; continuous operation; front	Rocker switch	
C	4th control circuit; proportional; double-acting; front	Push Button (changeover) Switch (operation)	-
D	Auxiliary control circuit (V); continuous operation; high-flow; front	Rocker switch	 Alternative 
E	Auxiliary control circuit (VI); continuous operation; double acting; rear	Rocker switch	 Alternative 
F	Auxiliary control circuit (VII); continuous operation; double acting; rear	Rocker switch	 Alternative 
G	Rocker; single-acting; rear	Push button	-

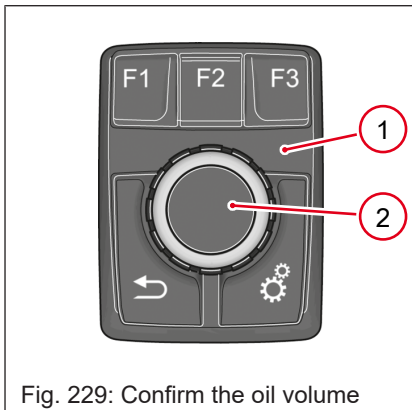


Fig. 229: Confirm the oil volume

### Confirm the oil volume

For safety reasons, the control circuits must be reactivated and the set oil volume confirmed each time the engine is restarted.

If other control circuits are used while the engine is running, these need no longer be confirmed if they have already been used. The set oil volume is immediately available.

1. Start the engine.
  2. Activate the corresponding control circuit - see table above - with rocker switch or push-button (except 3rd control circuit). For control circuits with push-button operation, press and hold the push-button until the set oil volume is confirmed.
    - ⇒ Control light of the selected control circuit in the display flashes at long intervals.
    - ⇒ The Oil Volumes drop-down menu appears on the display.
  3. Confirm the preset oil volume. To do this, press dial **2** in jog dial **1**.
    - ⇒ The control light of the selected control circuit lights up permanently.
    - ⇒ The oil volumes drop-down menu in the display goes out.
    - ⇒ The pre-set oil volume of the active control circuit is automatically stored.
    - ⇒ The oil volume of the individual control circuits are already pre-set ex works.
    - ⇒ When the control circuit is selected, the oil volume is shown in the display **1** in percent (%) **2**.
1. The 3rd control circuit is factory set to 100 % oil volume.
  2. Each of the additional control circuits is set to an oil volume of 20 % at the factory.

### Change and confirm oil volume and GO value for control circuits with proportional control

The 3rd and 4th control circuit are not activated by a switch. Therefore, the GO value and the maximum oil volume can only be called up and adjusted via the jog dial.

The stored values remain permanently stored until they are changed manually.

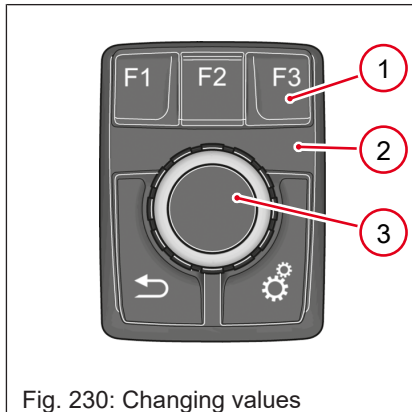


Fig. 230: Changing values

1. Start the engine.
2. Press F3 button **1** on the jog dial **2**.  
⇒ The Oil Volumes drop-down menu appears on the display.
3. Turn the setting wheel to select the control circuit.  
⇒ The control circuit is highlighted.
4. Press the setting wheel.  
⇒ The GO quantity setting appears on the display.
5. Set the GO value. Turn dial **3** in the jog dial **2** to the left (-) or right (+) within 10 seconds until the desired value appears in the display.
6. Press the setting wheel.
7. The GO value is stored.
8. The oil volume setting appears on the display.
9. Set the oil volume. Turn dial **3** in the jog dial **2** to the left (-) or right (+) within 10 seconds until the desired oil volume in % appears in the display.  
⇒ The oil volume is changed in steps of 5 %.
10. Save the selected oil volume. To do this, press the setting wheel **3** or wait 10 seconds. The preset oil volume of the active control circuit is then automatically stored.  
⇒ The control light of the selected control circuit lights up permanently in the display.  
⇒ The oil volume drop-down menu in the display goes out.  
⇒ The selected oil volume is available to the attachment.

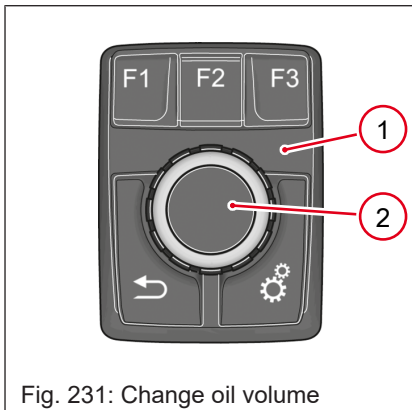


Fig. 231: Change oil volume

### Changing and confirming the oil volume for control circuits with continuous operation

The saved oil volume remains permanently saved until it is manually changed.

1. Start the engine.
  2. Activate the desired control circuit - see table above - with rocker switch or push-button (except 3rd control circuit). For control circuits with push-button operation, press and hold the push-button until the set oil volume is confirmed.
    - ⇒ The control light of the selected control circuit flashes at long intervals.
    - ⇒ The Oil Volumes drop-down menu appears on the display.
  3. Set the oil volume. Turn dial **2** in the jog dial **1** to the left (-) or right (+) within 10 seconds until the desired oil volume in % appears in the display.
    - ⇒ The oil volume is changed in steps of 5 %.
  4. Save the selected oil volume. To do this, press the setting wheel **2** or wait 10 seconds. The pre-set oil volume of the active control circuit is automatically stored.
    - ⇒ The control light of the selected control circuit lights up permanently in the display.
    - ⇒ The oil volume drop-down menu in the display goes out.
- ⇒ The selected oil volume is available to the attachment.

### 8.8.11 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.

The vehicle can be equipped with a pipe break safety device on lift and tilt rams. 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 loader unit 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 208](#).
5. Have a burst hose or pipe and the hose burst valve immediately repaired by an authorized service center.

### 8.8.12 Lower the loader unit in the event of a hose rupture



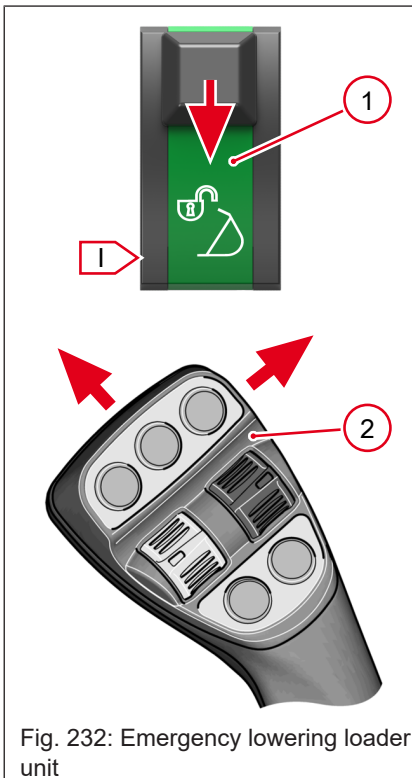
#### **WARNING**

##### 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.

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.



- ✓ The engine is switched off.
- 1. Ensure that no one is in the danger zone of the vehicle.
- 2. If road safety is activated for the joystick, deactivate it [see Use the joystick locking function on page 197](#).
- 3. Engage the ignition.
- 4. Unlock switch **1** (arrow), press in position **I** and hold.
- 5. At the same time (two-hand operation) press joystick **2** briefly to the right to relieve the pressure on the tilt ram, then press forward slowly until the loader unit is completely lowered.
  - ⇒ If the loader unit becomes overloaded, the overload control prevents further lowering.
- 6. Switch off the ignition.
- 7. Leave and lock the vehicle.
- 8. Secure the danger zone.
- 9. Have the vehicle immediately repaired by an authorized service center.

## 8.8.13 Coupling the attachment

### 8.8.13.1 Warnings for conversion



#### **⚠ WARNING**

##### **Accident hazard due to persons in the danger zone!**

Persons who are in the danger 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 danger 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.



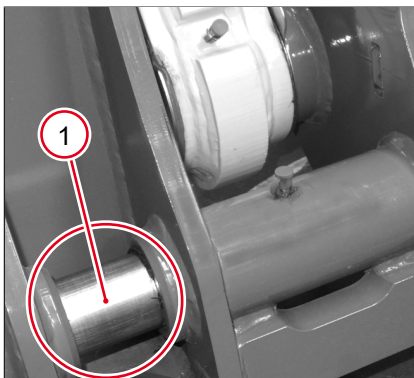
### **CAUTION**

#### **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.
- ▶ Only close attachments with movable parts (e.g. multipurpose bucket).
- ▶ Ensure the safe and stable position of the attachment, if necessary use supports provided for this purpose.

#### 8.8.13.2 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.

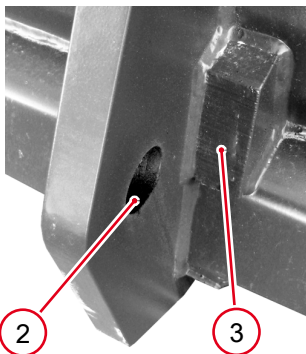


Fig. 233: Check parts of the lock

### 8.8.13.3 Picking up an attachment

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.

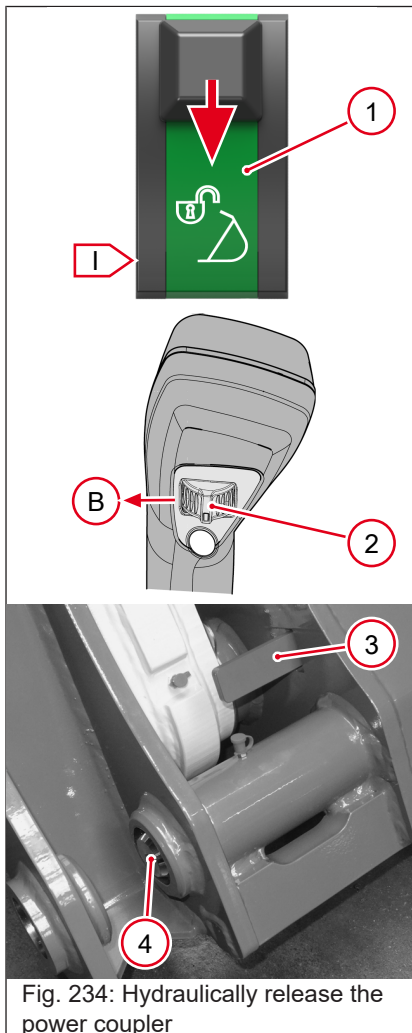



Fig. 234: Hydraulically release the power coupler

1. Unlock switch **1** (arrow), press in position **I** and hold.
2. At the same time, press switch **2** in the joystick in direction **B** (to the right as seen in the direction of travel) until the locking bolts are extended into the power coupler.  
⇒ The control light  in the display lights up.
3. First release switch **2** in the joystick.
4. Wait about 3 seconds.
5. Then release switch **1**.
6. Make sure that the locking bolts **4** on both sides of the power coupler are fully engaged.  
⇒ Display **3** must be completely out of the power coupler.  
⇒ The power coupler is unlocked.

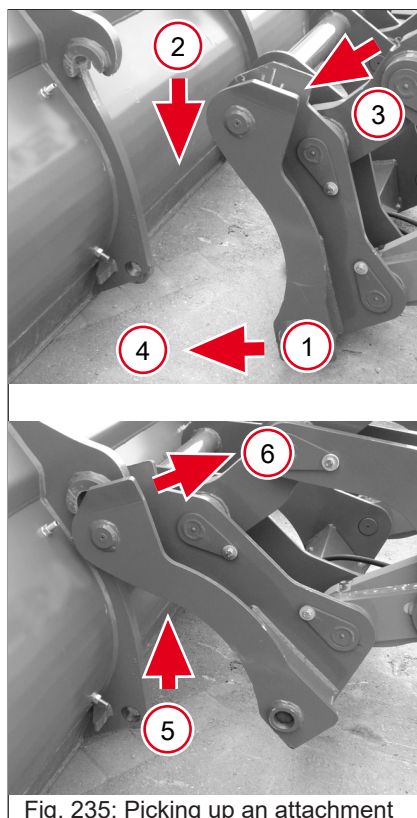


Fig. 235: Picking up an attachment

### Picking up an 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.

### Lock the attachment



#### **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.

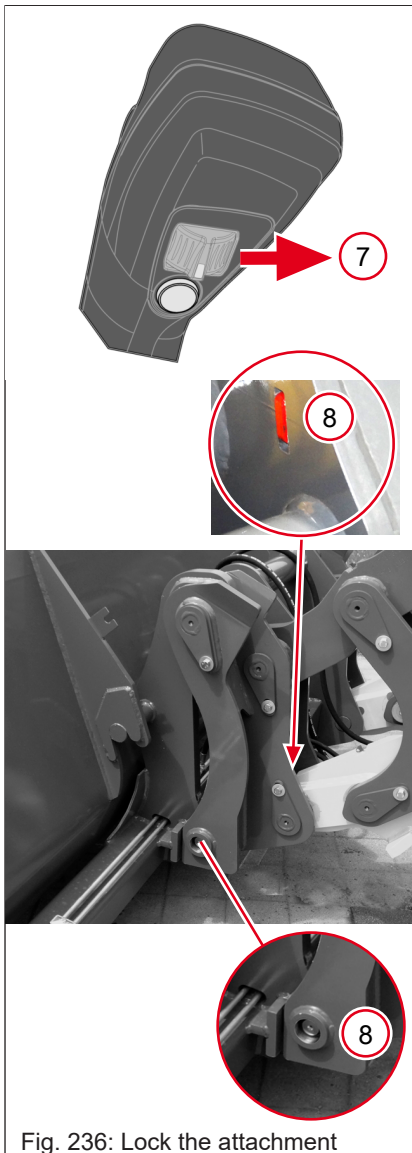



Fig. 236: Lock the attachment

1. Lock the attachment. To do this, press the switch in the joystick to the left (as seen in the direction of travel).
  - ⇒ Locking bolts move into the mounting holes of the attachment and are automatically secured against unlocking.
  - ⇒ Control light  in the display goes out.
2. Make sure that the locking bolts are visible on both sides of the attachment.
  - ⇒ The display must be fully retracted into the power coupler. For a better visual check, lift the loader unit accordingly if necessary.
3. To check, additionally press the attachment onto the ground.
4. If an attachment with hydraulic operation has been fitted, relieve the pressure in the hydraulic connections before connecting the hydraulic lines [see Relieving pressure in the hydraulic lines on page 213](#).
  - ⇒ The attachment is mounted and securely locked.

#### 8.8.14 Release the pressure in the hydraulic lines



#### **CAUTION**

##### **Risk of injury due to unclosed hydraulic functions!**

If attachments with hydraulic functions, e.g. the multipurpose bucket, are not closed before pressure relief, they can close uncontrolled during pressure relief and cause injuries.

- Always close attachments before relieving pressure.



## Information

The hydraulic connections can be released, however they cannot be re-connected 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.

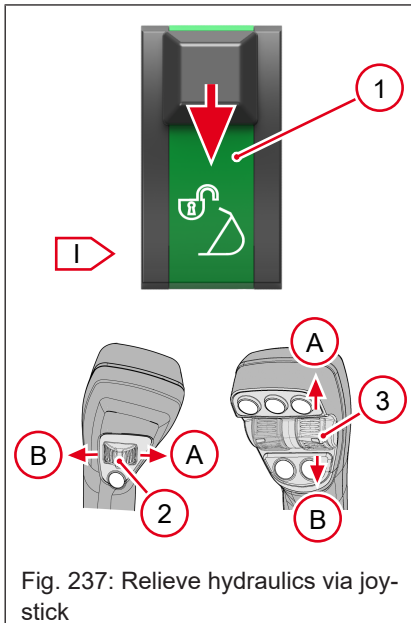



Fig. 237: Relieve hydraulics via joystick

### Pressure relief with switch on joystick

1. Lower the loader unit and activate the parking brake.
2. If the joystick was locked for road travel, unlock [see Using the lock function for the joystick on page 197](#).
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.
  - Unlock switch **1** (arrow), press in position **I** and hold.
1. Depending on the control circuit connected, switch **2** (3rd control circuit) or switch **3** (4th control circuit) in the joystick in direction **A** and **B**.
  - ⇒ Pressure in hydraulic lines is released.
  - ⇒ Control light  lights up in the display.
2. 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 215](#) or [see Disconnecting hydraulic connection between vehicle and attachment. on page 216](#)

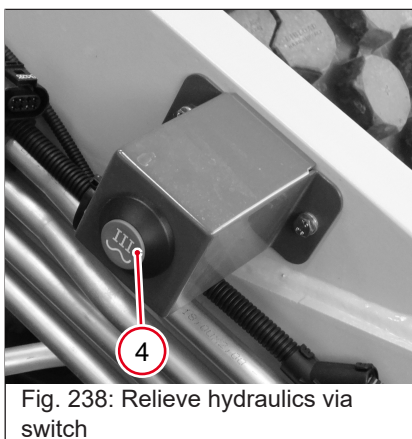


Fig. 238: Relieve hydraulics via switch

### Pressure relief with switch on the loader unit

With this function, the pressure can be relieved directly at the loader unit while the engine is running.

1. Lower the loader unit and activate the parking brake.
2. If the joystick was locked for road travel, unlock [see Using the lock function for the joystick on page 197](#).
3. attachments with hydraulic functions, e.g. closing the multipurpose bucket.
4. Activate the control circuit to be relieved.
5. Press switch **4** and keep it pressed for approx. five seconds.
  - ⇒ Pressure in hydraulic lines is released.
- ⇒ Hydraulic connections on the power coupler can be connected or disconnected [see Hydraulic connection between vehicle and attachment on page 215](#) or [see Disconnecting hydraulic connection between vehicle and attachment. on page 216](#)

## 8.8.15 Hydraulic connection vehicle - attachment

### 8.8.15.1 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 operating 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 re-connected 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.

## 8.8.15.2 Establishing the hydraulic connections

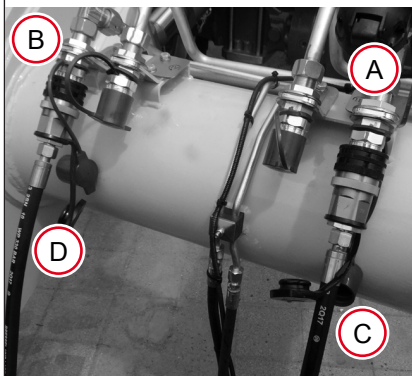
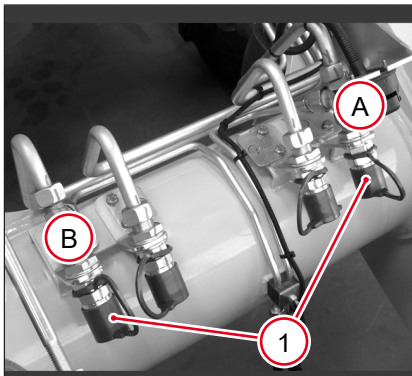


Fig. 239: Establishing the hydraulic connections

- ✓ Attachment is mounted and securely locked [see Attaching the attachment on page 209](#).

- ✓ Pressure in the hydraulic lines is released [see Releasing pressure in the hydraulic lines on page 213](#).

1. Clean the hydraulic plug-and-socket connections.
2. Remove the protective caps **1** from the connections.
3. Connect the hose lines. To do this, insert the hose lines of the attachment into the connections on the power coupler.  
⇒ Example: Hose line **C** on plug coupling **A**, hose line **D** on plug coupling **B**.
4. Close exposed connections with protective caps.
5. Check attachment for function and operating direction.

## 8.8.16 Disconnecting hydraulic connection vehicle - attachment



## Information

The hydraulic connections can be released, however they cannot be re-connected 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.

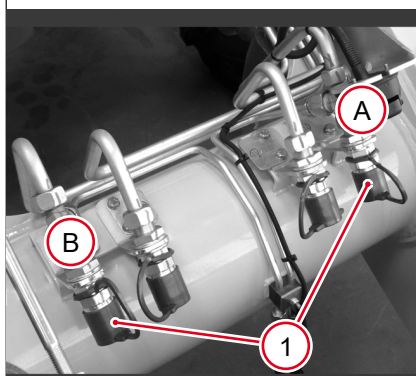
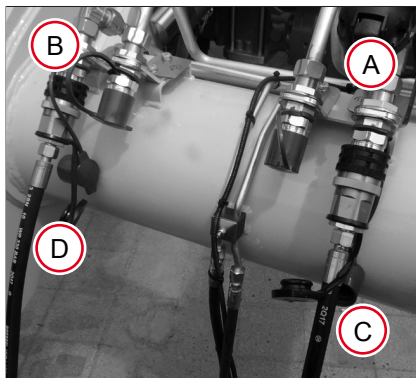


Fig. 240: Removing the hydraulic connections

1. Empty the attachment.
2. Stop the engine and switch on ignition again.
3. Release pressure in the hydraulic lines [see Releasing pressure in the hydraulic lines on page 213](#).
4. Disconnect the hose lines. To do this, disconnect the hose lines of the attachment from the connections on the power coupler.  
⇒ Example: Hose line **C** from plug coupling **A**, hose line **D** from plug coupling **B**.
5. Seal exposed connections with protective caps **1**.
6. Start engine and set attachment down.

## 8.8.17 Uncoupling the attachment hydraulically/mechanically

### 8.8.17.1 Notes on 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.
- ▶ Only close attachments with movable parts (e.g. multipurpose 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

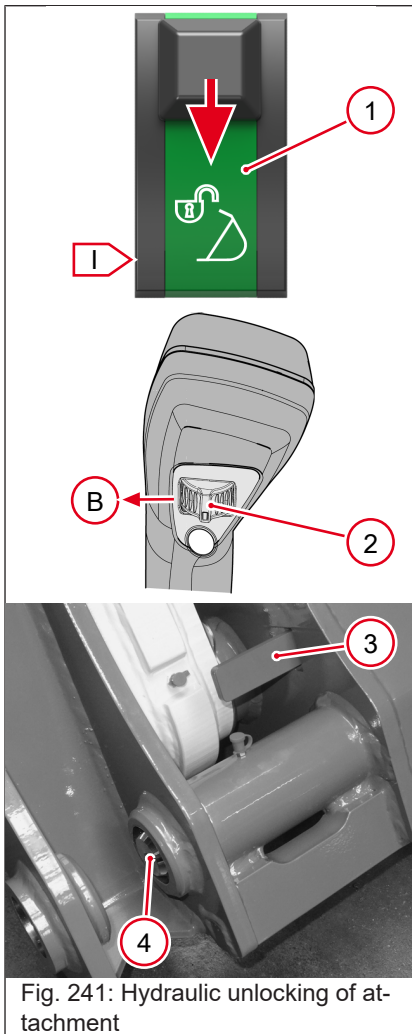
The hydraulic connections can be released, however they cannot be re-connected if the pressure in the hydraulic lines has not been released.

- ▶ 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.

#### 8.8.17.2 Removing the attachment



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

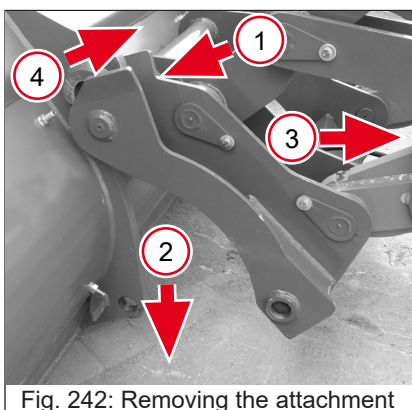
The attachment can only be unlocked with two hands.



### Hydraulic unlocking of attachment

✓ Attachment is emptied.

1. Drive the vehicle to the set-down position.
2. Set the attachment parallel to the ground. Press the joystick to the left.
3. Lower the loader unit 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 216](#)
5. Unlock switch **1** (arrow), press in position **I** and hold.
6. At the same time, press switch **2** in the joystick in direction **B** (to the right as seen in the direction of travel) until the locking bolts are fully extended from the mounting holes of the attachment.  
⇒ Control light  lights up in the display.
7. First release switch **2** in the joystick.
8. Wait about 3 seconds.
9. Then release switch **1**.
10. Make sure that the locking bolts **4** on both sides of the attachment are fully retracted.  
⇒ Display **3** must be completely out of the power coupler.  
⇒ Control light  lights up in the display.  
⇒ The attachment is unlocked.



### Removing the attachment

1. Tilt the power coupler forwards. To do this, press the joystick to the right.
2. Lower the loader unit until the attachment rests on the ground. To do this, push the joystick forward.
3. Carefully reverse the vehicle away from the attachment.
4. Tilt the power coupler completely. Press the joystick to the left.  
⇒ The attachment is removed.

## 8.9 Operating the front hydraulic connections

### 8.9.1 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.

#### Overview of the hydraulic connections on the loader unit

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

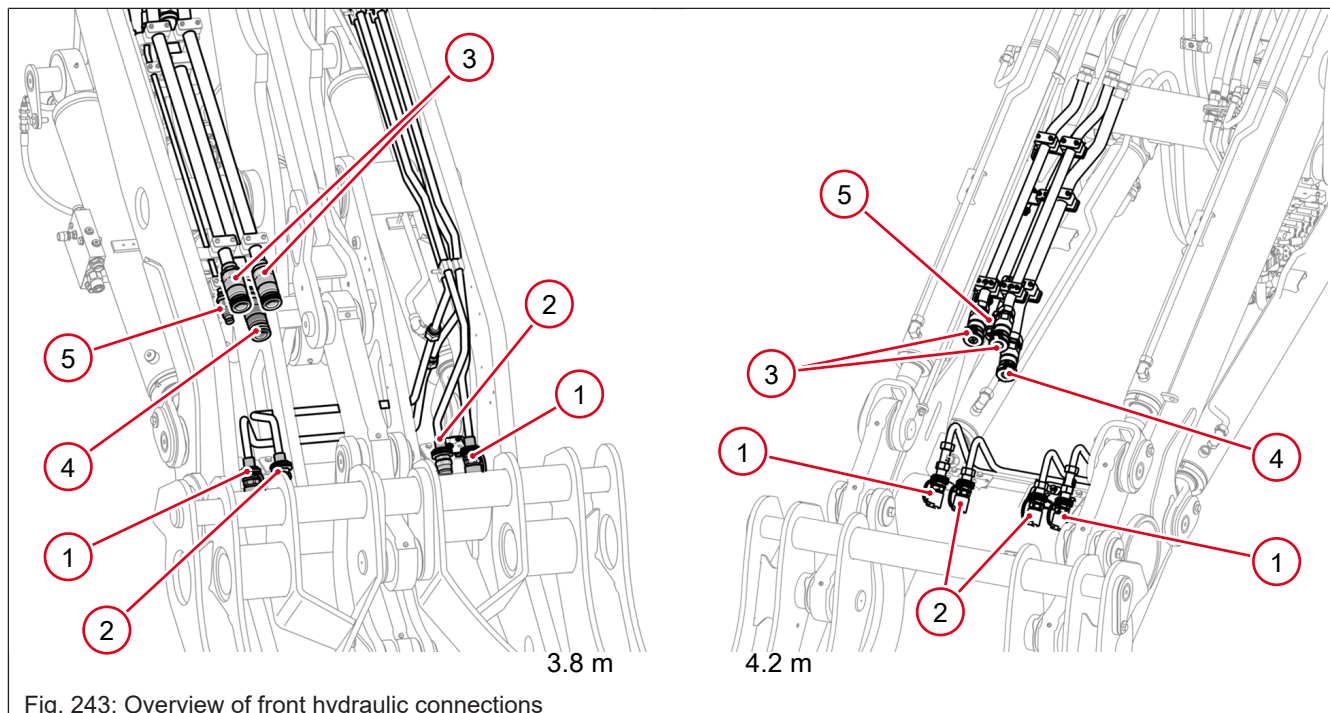


Fig. 243: Overview of front hydraulic connections

- 1 Third control circuit; double-acting
- 2 Fourth control circuit; double acting
- 3 Additional control circuit (V/High Flow); double-acting
- 4 Return without pressure
- 5 Leak oil line

## 8.9.2 Hydraulic connections Unpressurized return flow, leak oil line



### NOTICE

#### Technical damage to hydraulic components of attachments!

Excessive oil flow in the leakage oil line can lead to technical damage to hydraulic oil engines.

- Only connect leakage oil lines from attachments.
- Do not connect any hydraulic connections that lead to larger oil volumes.
- Changes to the hydraulic connections, e.g. from replacing couplings, are not allowed.

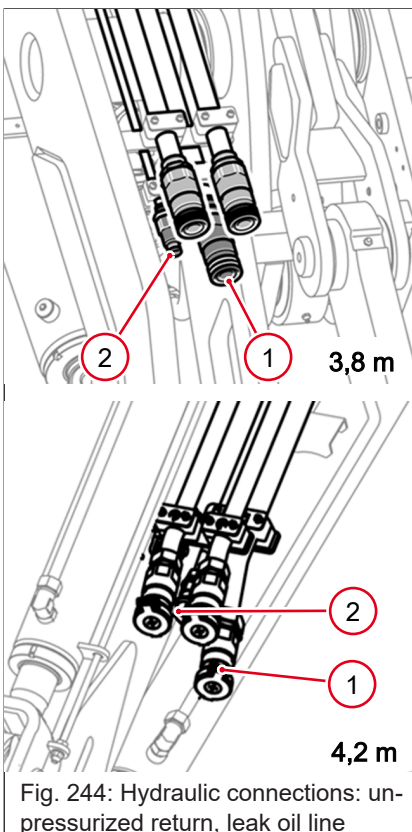


Fig. 244: Hydraulic connections: unpressurized return, leak oil line

- 1 Return without pressure
- 2 Leak oil line

The hydraulic connections for unpressurized return flow and leakage oil line are located on the loader unit. The hydraulic connections are designed in such a way that they cannot be confused with other hydraulic connections.

#### Return without pressure

For certain attachments on which components are driven by a hydraulic oil engine, a pressureless return flow is required. This connection returns the return oil of the hydraulic oil engine of an attachment directly to the hydraulic oil tank of the vehicle. The connection for the pressureless return flow is located at position **1** at the front of the loader unit.

#### Leak oil line

A leakage oil line is required for certain attachments on which components are driven by a hydraulic oil engine. This connection returns the leakage oil from the hydraulic oil engine of an attachment directly to the hydraulic oil tank of the vehicle. The connection for the leakage oil line is located at the front of the loader unit at position **2**.

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.

### 8.9.3 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 operating 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.

#### **Functions of the standard hydraulic connections**

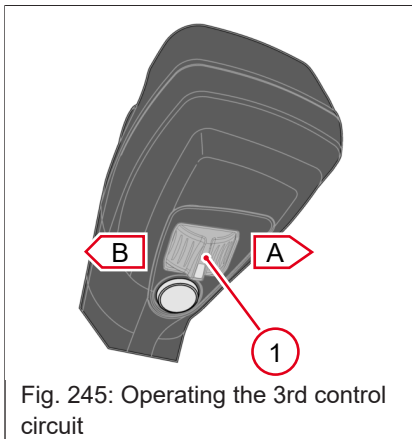
The 3rd control circuit has two functions.

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 209](#).

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.

If the vehicle is equipped with the function "continuous operation" 3rd control circuit, the 3rd control circuit can also be operated with this function [see 3rd and 4th control circuit in continuous operation on page 225](#).

Oil volume setting for the 3rd control circuit is possible both in normal operation and in continuous operation [see Operating oil volume setting on page 203](#).



### Operating the attachment

The switch **1** is operated proportionally.

- ✓ Attachment is attached to the power coupler and securely locked [see Attaching the attachment on page 209](#).
- ✓ Hydraulic hose lines of the attachment are coupled to the plug couplings [see Hydraulic connection vehicle - attachment on page 215](#).

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.

### 8.9.4 Operating additional 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 operating elements or the functional direction of the attachment.

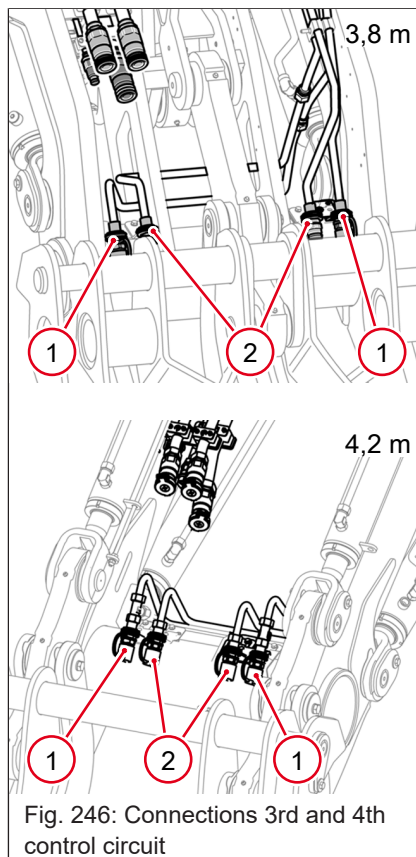


#### **NOTICE**

**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.

### Function Additional hydraulic connections

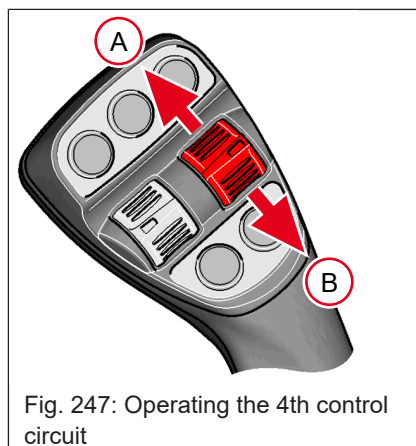


The hydraulic connections **2** are intended for the operation of hydraulically driven front attachments with additional hydraulic functions.

The oil volume of the 4th control circuit is factory preset to 100 %. If less oil volume is required, this can be adjusted [see Operating operating the oil volume setting on page 203](#).

The 4th control circuit on the hydraulic connections **2** can also be used in continuous operation Operating the [see 3rd and 4th control circuit in continuous operation on page 225](#).

### Operating the 4th control circuit



✓ Attachment is mounted and securely locked [see Attaching the attachment on page 209](#).

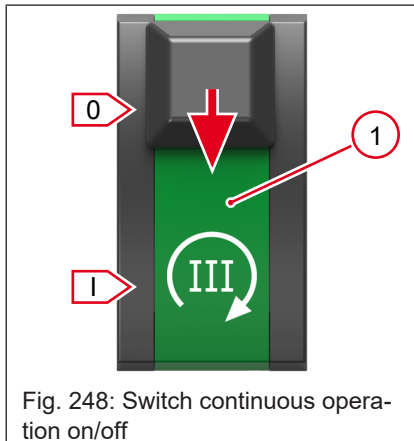
1. Release pressure in the hydraulic connections [see Releasing pressure in the hydraulic lines on page 213](#).
2. Connect the hose lines of the attachment to the hydraulic connections of the 4th control circuit **2** [see Establishing a hydraulic connection vehicle - attachment on page 215](#).
3. Start the engine.
4. Push the switch on the joystick upward **A**.  
⇒ Pressure is applied to the left hydraulic connection.
5. Push the switch on the joystick down **B**.  
⇒ Pressure is applied to the right-hand hydraulic connection.
6. Move switch to middle position.  
⇒ Control light in the display goes out.  
⇒ Hydraulic connections for 3rd control circuit **1** are ready for operation.


For mounting and operating the attachments, also refer to the operator's manual of the attachment manufacturers.

### 8.9.5 Operating hydraulic connections in continuous operation


The hydraulic connections of the 3rd control circuits can be used in continuous operation for attachments with hydraulic motors (e.g. sweeper). If the vehicle is equipped with the "oil volume setting" function, the preset oil quantity can also be changed during continuous operation.

#### Switching on continuous operation



- ✓ Attachment is mounted and securely locked [see Attaching the attachment on page 209](#).
  - ✓ Hydraulic hose lines of the attachment are coupled to the plug couplings [see Establishing a hydraulic connection between vehicle and attachment. on page 215](#)
1. Start the engine.
  2. Slide the fuse in switch **1** in the direction of the arrow and push the switch to position **I**.
    - ⇒ The pop-up menu "Oil volume setting" appears in the display the first time it is activated.
  3. Confirm oil volume, adjust if necessary [see Operating the oil volume setting on page 203](#).
    - ⇒ Control light  lights up in the display.
    - ⇒ Continuous operation is switched on.

#### Switching off continuous operation

- Push the fuse in switch **1** in the direction of the arrow and push the switch to position **0**.
  - ⇒ Control light  in the display goes out.
  - ⇒ Continuous operation is switched off.

### 8.9.6 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 operating 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.

If the vehicle is equipped with a front additional control circuit V – high flow, attachments requiring large quantities of oil can be operated. For this purpose, additional power couplers are mounted at the front of the loader unit [see Hydraulic connections on the vehicle on page 220](#).



The oil volume of the additional control circuit V - High Flow is preset at the factory to 20 %. If the vehicle is equipped with the oil volume setting function, the oil volume can be changed [see Operating the oil volume setting on page 203](#).

### Operating the additional control circuit V – high flow

The hydraulic couplings are unpressurized in switch position **0** of switch **1**.

Optionally the left or right hydraulic connection can be pressurized.

- ✓ Attachment is mounted and securely locked [see Attaching the attachment on page 209](#).
- ✓ Hose lines of the attachment are connected to the hydraulic connections of the 5th control circuit [see Establishing a hydraulic connection vehicle - attachment on page 215](#).
- ✓ Engine is started.

1. Press switch **1** to position **I**.
  - ⇒ Control light in switch illuminates.
  - ⇒ The pop-up menu "Oil volume setting" appears in the display the first time it is activated.
  - ⇒ Apply pressure to the left hydraulic connection.
2. Confirm oil volume, adjust if necessary [see Operating the oil volume setting on page 203](#).
  - ⇒ Control light  lights up in the display.
  - ⇒ Additional control circuit V - High flow front is switched on.
1. Move switch **1** to position **II**.
  - ⇒ Control light in switch illuminates.
  - ⇒ Apply pressure to the right hydraulic connection.
  - ⇒ The pop-up menu "Oil volume setting" appears in the display the first time it is activated.
2. Confirm oil volume, adjust if necessary [see Operating the oil volume setting on page 203](#).
  - ⇒ Control light  in the display illuminates.
  - ⇒ Additional control circuit V - High flow front is switched on.

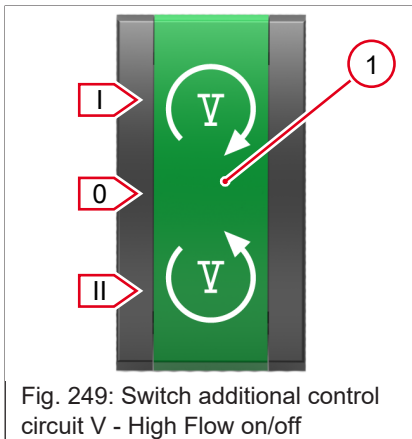


Fig. 249: Switch additional control circuit V - High Flow on/off

**Switch additional control circuit V - High Flow off**

- Press switch **1** to position **0**.
  - ⇒ Control lights in the switch and in the display are off.
  - ⇒ Additional control circuit V - High flow front is switched off.

## 8.10 Operating the rear hydraulic connections

### 8.10.1 Rear hydraulic connections

---

**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.
- 

**Overview of the hydraulic connections at the rear of the vehicle**

The following hydraulic connections are optionally available on the vehicle.

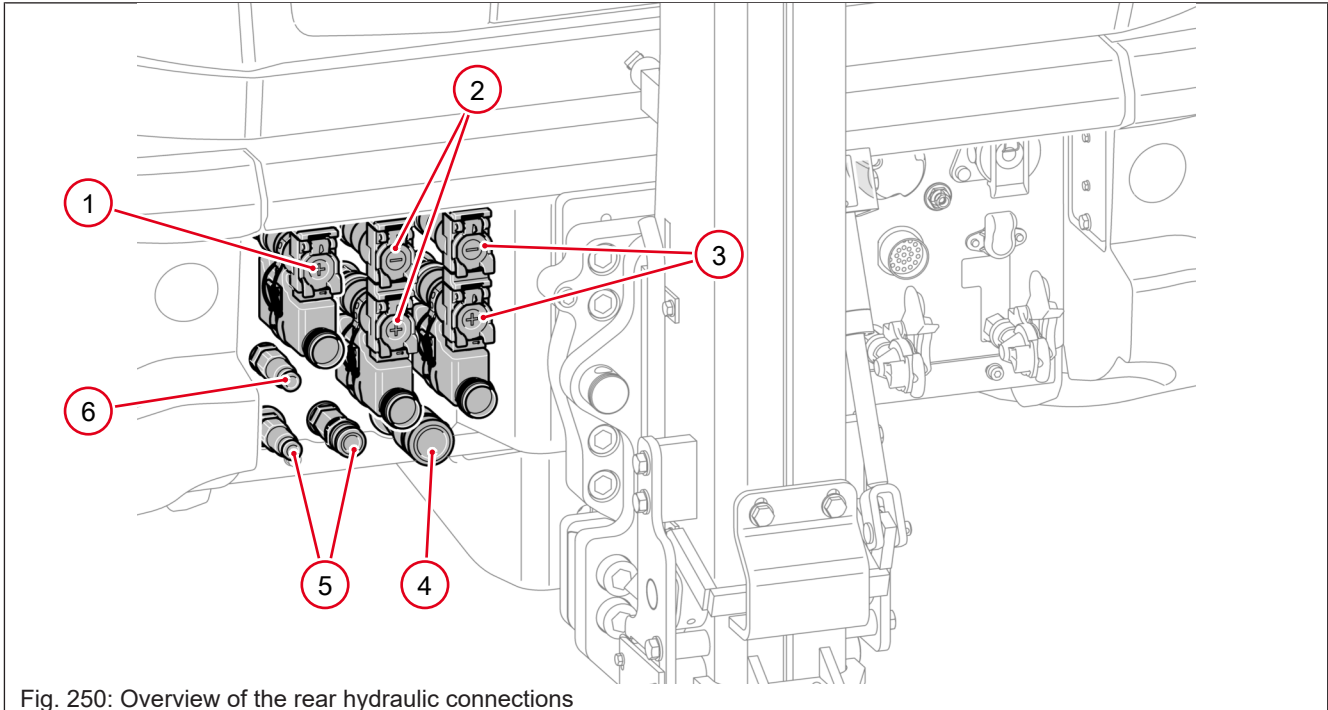


Fig. 250: Overview of the rear hydraulic connections

- 1 Tipping Trailer
- 2 Additional control circuit (2); double acting
- 3 Hitch trailer coupling; alternative additional control circuit (1); double-acting
- 4 Return without pressure
- 5 Hydraulic trailer brake
- 6 Leak oil line

### 8.10.2 Return without pressure at the rear

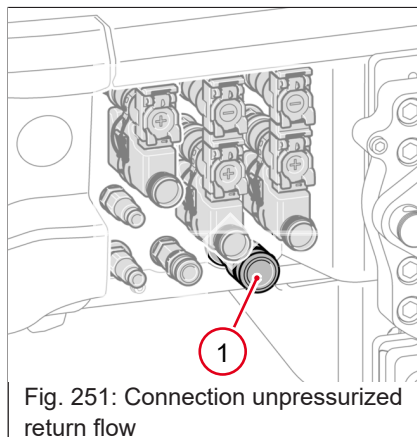


Fig. 251: Connection unpressurized return flow

#### Unpressurized return at the rear

For certain attachment on which components are driven by hydraulic oil motors, an unpressurized return flow is required. Connection **1** for the unpressurized return flow is located at the rear of the vehicle. The design of the connection makes it impossible to confuse it with other hydraulic connections.

### 8.10.3 Leak oil line at the rear



#### NOTICE

**Damage to the hydraulic oil motors of the attachments due to hydraulic oil backwater!**

- ▶ Only connect leakage oil lines from attachments.
- ▶ Do not connect any hydraulic connections that lead to larger oil volumes.
- ▶ Modifications to the hydraulic connections, e.g. exchanging couplings, are prohibited.

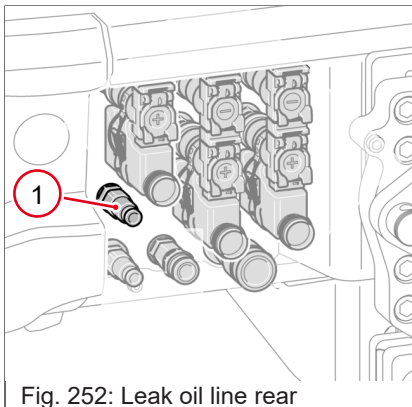


Fig. 252: Leak oil line rear

#### Leak oil line rear

A leakage oil line is required for certain attachments on which components are driven by hydraulic oil motors. This connection **1** returns the leakage oil from the oil motors of the attachment directly to the tank for the hydraulic oil. No lines may be connected which carry a larger oil volume - e.g. unpressurized return lines of attachments. The connection for the leak oil line is located at the rear of the vehicle. The design of the connection makes it impossible to confuse it with other hydraulic connections.

8

### 8.10.4 Operating the 6th control circuit

#### Information for rear 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 operating 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.



## Environment

### Hydraulic oil is harmful to the environment!

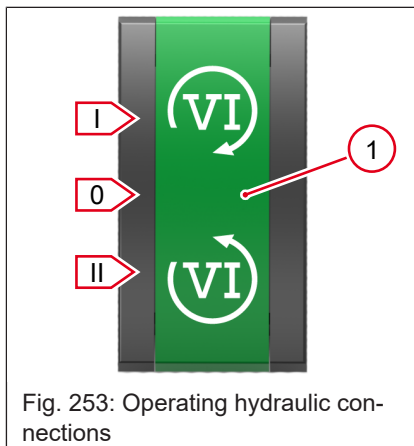
Hydraulic oil escaping during operation of the attachment is collected in the leak oil receptacle.

- Regularly dispose of oil from the leak oil receptacle in an environmentally friendly manner.

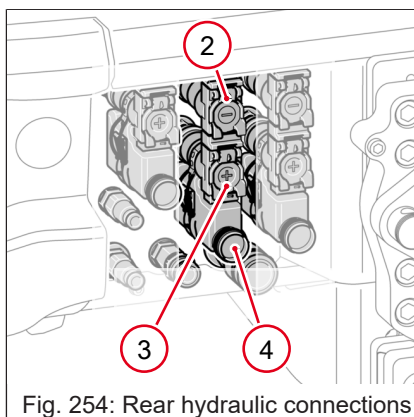
If the vehicle is equipped with this function, attachments with double-acting hydraulic function can be operated at the rear of the vehicle.

The oil volume of the control circuit is preset at the factory to 20 %. If the vehicle is equipped with the oil volume setting function, the oil volume in the control circuit can be changed [see Operating the oil volume setting on page 203](#).

## Connecting the hydraulic connections



- ✓ Attachment is attached.
- 1. Lower the loader unit and activate the parking brake.
- 2. Switch off the engine, but do not switch off the ignition.
- 3. Move the switch to position **I** or **II**.  
⇒ Pressure in hydraulic lines is released.
- 4. Switch off the starter and remove the starting key.





- 5. Check leak oil receptacle **4** and empty if necessary.
- 6. Depending on use, connect the attachment to the plug couplings **2** (-) or **3** (+).  
⇒ The attachment can be operated.

### Switching hydraulic connections on

Alternatively, the upper or lower hydraulic connection can be pressurized.

- ✓ Hose lines of the attachment are connected to the hydraulic connections.
- ✓ Engine is started.

1. Press switch **1** to position **I**.
2. Apply pressure to the hydraulic connection **2** (-).
  - ⇒ Control light in switch illuminates.
  - ⇒ The pop-up menu "Oil volume setting" appears in the display the first time it is activated.
3. If the vehicle is equipped with an oil volume setting, confirm the oil volume, if necessary [see Operating the oil volume setting on page 203](#).
  - ⇒ Control light  lights up in the display.
  - ⇒ Hydraulic connection **2** is activated.
1. Push switch **1** into position **II** again.
2. Apply pressure to hydraulic connection **3** (+).
  - ⇒ Control light in switch illuminates.
  - ⇒ The pop-up menu "Oil volume setting" appears in the display the first time it is activated.
3. If the vehicle is equipped with an oil volume setting, confirm the oil volume, if necessary [see Operating the oil volume setting on page 203](#).
  - ⇒ Control light  lights up in the display.
  - ⇒ Hydraulic connection **3** is activated.

### Switch hydraulic connections off

- Press the switch to position **0**.
  - ⇒ Control lights in the switch and in the display are off.
- ⇒ Rear hydraulic connections are switched off.

### 8.10.5 Operating the 7th control circuit

#### Information for rear 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 operating 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.



#### **Environment**

**Hydraulic oil is harmful to the environment!**

Hydraulic oil escaping during operation of the attachment is collected in the leak oil receptacle.

- ▶ Regularly dispose of oil from the leak oil receptacle in an environmentally friendly manner.

If the vehicle is equipped with this function, trailers with an additional hydraulic function (not the hydraulic trailer brake) can be operated via the hydraulic connections.

The oil volume of the 7th control circuit is preset at the factory to 20 %. If the vehicle is equipped with the oil volume setting function, the oil volume in the control circuit can be changed [see Operating the oil volume setting on page 203](#).

### Connecting the 7th control circuit

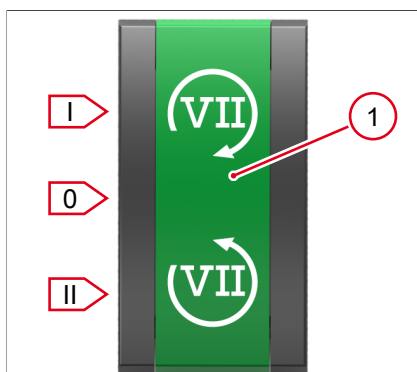


Fig. 255: Operating hydraulic connections

- ✓ Trailer is coupled [see Trailer couplings on page 161](#).
- 1. Lower the loader unit and activate the parking brake.
- 2. Switch off the engine, but do not switch off the ignition.
- 3. Press switch **1** in position **I** or position **II**.  
⇒ Pressure in hydraulic lines is released.
- 4. Switch off the starter and remove the starting key.

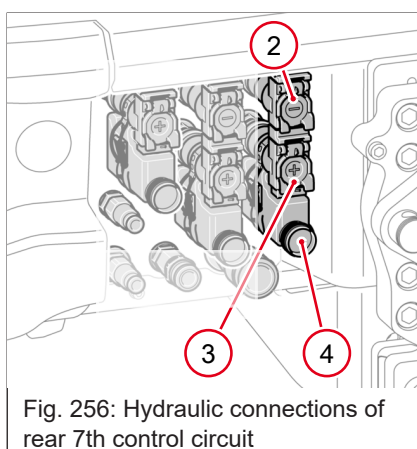




Fig. 256: Hydraulic connections of rear 7th control circuit

- 5. Check leak oil receptacle **4** and empty if necessary.
- 6. Connect the trailer to the plug-in couplings **2** (-) or **3** (+) depending on use.  
⇒ Hydraulic connections are connected.

### Switching hydraulic connections on

Alternatively, the upper or lower hydraulic connection can be pressurized.

- ✓ Hose lines of the trailer must be connected to the hydraulic connections of the 7th control circuit.
- ✓ Engine is started.
- 1. Press switch **1** to position **I**.
- 2. Apply pressure to the hydraulic connection **2** (-).  
⇒ Control light in switch illuminates.  
⇒ The pop-up menu "Oil volume setting" appears in the display the first time it is activated.
- 3. If the vehicle is equipped with an oil volume setting, confirm the oil volume, if necessary [see Operating the oil volume setting on page 203](#).  
⇒ Control light  light lights up in the display.  
⇒ Rear hydraulic connection **2** is switched on.
- 4. Push switch **1** into position **II** again.
- 5. Apply pressure to hydraulic connection **3** (+).  
⇒ Control light in switch illuminates.  
⇒ The pop-up menu "Oil volume setting" appears in the display the first time it is activated.
- 6. If the vehicle is equipped with an oil volume setting, confirm the oil volume, if necessary [see Operating the oil volume setting on page 203](#).  
⇒ Control light  light lights up in the display.  
⇒ Rear hydraulic connection **3** is switched on.

**Switch hydraulic connections off**

- Press switch **1** to position **0**.
  - ⇒ Control lights in the switch and in the display are off.
  - ⇒ Rear hydraulic connections are switched off.

**8.10.6 Operating the tipping trailer****Information for rear hydraulic connections****⚠ WARNING****Risk of overturning when tilting loads!**

The trailer may tip over when the load is dumped from a trailer on unpaved or uneven ground. This can cause accidents with serious injuries or death.

- ▶ Secure the unloading point against access from unauthorized people.
- ▶ Tip the trailer only on flat and solid ground.
- ▶ Always lower the tipping platform before driving away.
- ▶ Pay attention to and follow the instructions given in the Operator's Manual of the trailer.

**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****Oil volume setting**

- ▶ The oil volume of the tipping trailer can only be adjusted during operation.
- ▶ The set oil volume remains stored even after the diesel engine has been restarted, but for safety reasons it must be reactivated with the rocker switch **1** and confirmed again with the control knob.



### Environment

#### Hydraulic oil is harmful to the environment!

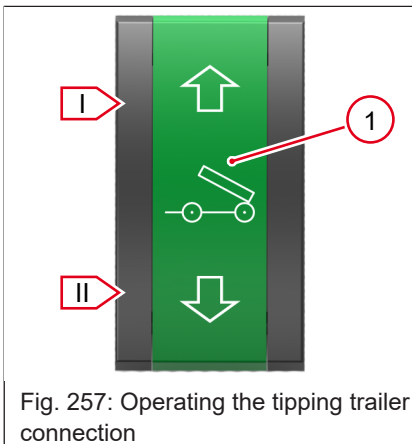
Hydraulic oil escaping during operation of the attachment is collected in the leak oil receptacle.

- Regularly dispose of oil from the leak oil receptacle in an environmentally friendly manner.

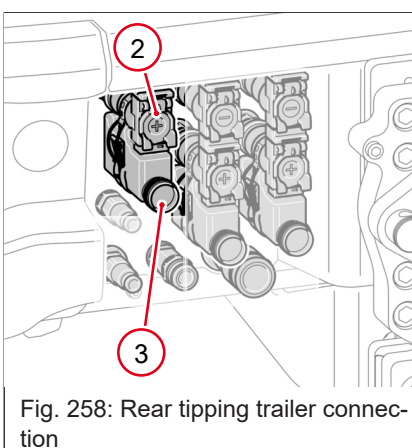
If the vehicle is equipped with a tipper connection, tipping trailers can be operated with a single-acting tilt ram.

The oil volume of the tipping trailer connection is preset at the factory to 20 %. If the vehicle is equipped with the oil volume setting function, the oil volume can be changed [see Operating the oil volume setting on page 203](#). In order to avoid damage to the tipping equipment of the trailer, do not set the oil volume too high. Refer to the operator's manual of the trailer for information on the oil volume.

### Connect tipping trailer





1. Attach the trailer [see Trailer couplings on page 161](#).
2. Switch off the engine, but do not switch off the ignition.
3. Release the pressure from the hydraulic connection. Press switch **1** in position **II**.
  - ⇒ Pressure in the hydraulic line is reduced.
4. Switch off the starter and remove the starting key.





5. Check leak oil receptacle **3** and empty if necessary.
6. Connect the trailer to the plug coupling **2**.

### Raise tipping trailer

- ✓ The trailer hose line is connected to the tipping trailer connection.
- ✓ Engine is started.

1. Press switch **1** in position **I** and keep it pressed until the desired tilt position is reached.
  - ⇒ Control light  in the switch lights up as long as the switch is operated.
  - ⇒ As long as the control light  of the hitch trailer coupling is lit, the driving speed is limited to max. 7 km/h for safety reasons.
2. If the vehicle is equipped with an oil volume setting, confirm the oil volume when using the vehicle for the first time after starting the engine, adjust the oil quantity adjustment if necessary [see Operating the oil volume setting on page 203](#).
  - ⇒ Loading surface moves upwards.

### Lower tipping trailer

- Press switch **1** in position **II** and keep it pressed until the desired tilt position is reached or the loading area is completely lowered.
  - ⇒ Control light  in the switch lights up as long as the switch is operated.
  - ⇒ The loading surface moves downwards.
  - ⇒ As long as the control light  of the hitch trailer coupling is lit, the driving speed is limited to max. 7 km/h for safety reasons.

## 8.11 Operating electrical functions

### 8.11.1 7-pole plug receptacle at the loader unit



#### NOTICE

##### Damage to the attachment due to incorrect assignment of the circuits!

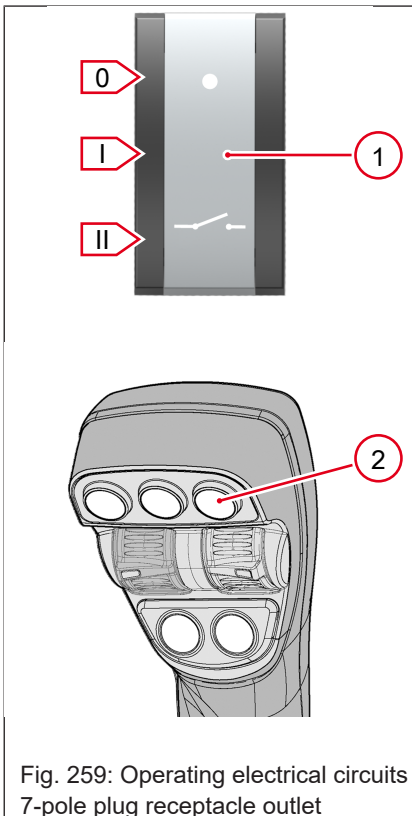
In order to avoid faulty operation and/or damage to the attachment, the assignment of the individual circuits in the electrical plug connection of the attachment and the assignment and operation of the plug receptacle on the vehicle must be checked before commissioning the attachment.

- ✓ 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.

If the vehicle is equipped with a 7-pole plug receptacle 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 front plug receptacle option is available in two variants:



- With one electrical circuit if the vehicle is equipped with the “Bucket repositioning” option.
- With two electrical circuits if the “Bucket repositioning” option is not installed.






With switch **1** in the side console the power supply can be set to push-button operation or continuous operation or switched off.

Switch **2** in the joystick can be used to switch between the two circuits (for electrically operated attachments, with two different electrical functions).

### Activating/deactivating push-button operation

1. Press switch **1** to position **I**.
  - ⇒ Control light in switch illuminates.
  - ⇒ Control light  lights up in the display.
  - ⇒ Electrical circuit 2 is enabled.
2. Press and hold switch **2**.
  - ⇒ Control light in switch illuminates.
  - ⇒ Control light  lights up in the display.
  - ⇒ Circuit 1 is active as long as switch **2** is pressed.
3. Press switch **1** to position **0**.
  - ⇒ The power supply is switched off.

### Switch continuous operation on/off

1. Push switch **1** into position **II** again.
  - ⇒ Control light in switch illuminates.
  - ⇒ Control light  lights up in the display.
  - ⇒ Electrical circuit 2 is enabled.
2. Press switch **2**.
  - ⇒ Control light in switch illuminates.
  - ⇒ Control light  lights up in the display.
  - ⇒ Electrical circuit 1 is enabled.
3. Press switch **2** again.
  - ⇒ Control light in switch illuminates.
  - ⇒ Control light  lights up in the display.
4. Circuit 2 is active again.
5. Press switch **1** to position **0**.
  - ⇒ The power supply is switched off.

### 8.11.2 7-pole plug receptacle at the rear

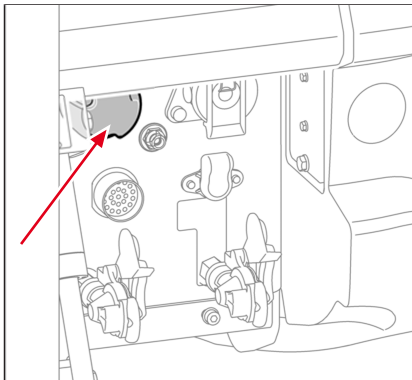


Fig. 260: 7-pole plug receptacle at the rear

This plug receptacle is used for connecting lights, turn signals and electrical devices on the trailer or attachment. Always install additional lights on an attachment if the rear lights and other lights are covered by the attachment.

## 8.12 Working with attachments

### 8.12.1 Warnings regarding work operation



#### **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.



#### **CAUTION**

##### **Accident hazard due to overload and sudden movements!**

Overload and sudden movements can cause accidents and injury.

- ▶ Take into account the vehicle's payloads.
- ▶ Actuate the control lever carefully.



## Information

Adjust the travel speed when driving into the material to be loaded according to its type and the given conditions.

Avoid too much wheel spin. Tire wear and fuel consumption increase unnecessarily and the vehicle's output is not fully utilized.

### 8.12.2 Described attachments



#### **WARNING**

##### **Accident hazard due to persons in the danger zone!**

Persons who are in the danger 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 danger zone.
- ▶ Adjust the mirror correctly. Use visual aids such as, e.g. a camera.
- ▶ Observe extreme caution when reversing.

This operator's manual describes exclusively the use of the following attachments.

- Standard bucket
- Multipurpose bucket
- Heavy duty bucket
- Stacking units

If other attachment are to be used with the vehicle, only use permissible attachments, Permissible attachments.

If other attachments are to be used, the operator's manual for the attachments must be observed. Specific operator's manuals can be ordered from your dealer.

### 8.12.3 Safety instructions regarding work with a bucket



#### **WARNING**

##### **Risk of accident 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.

**⚠ WARNING****Crushing hazard due to tipping over of vehicle!**

If the bucket is full and the loader unit is not lowered to the transport position while driving, the vehicle may tip over and cause an accident with serious injury or death.

- ▶ Before driving, lower the loader unit to the transport position and tilt it completely.
- ▶ Do not exceed the permissible payloads.

**⚠ 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.

A bucket is a bucket-like attachment used for loading work, e.g. standard bucket, multipurpose bucket, heavy duty bucket, etc.

The load diagram on the vehicle applies only to the use of the approved stacking equipment in conjunction with the correct tire pressure in the specified tire types.

The approved buckets are also covered by the load diagram of the stacking device, provided the specified contents and bulk density are adhered to.

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.

Observe the following chronological order for emptying the bucket:

- 1) Raise the loader unit.
- 2) Tilt out the bucket.

Observe the following chronological order after emptying the bucket:

- 1) Tilt in the bucket.
- 2) Lower the loader unit.

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.

## 8.12.4 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

#### Risk of accident 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.

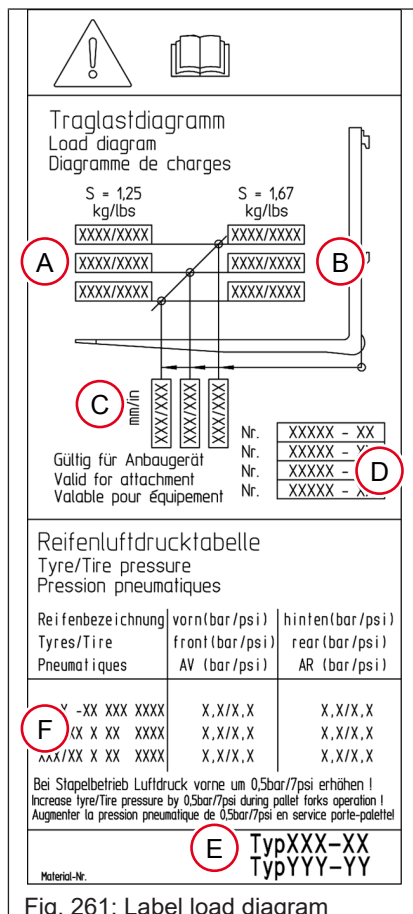


Fig. 261: Label load diagram

The load capacity diagram fitted in the vehicle applies exclusively to the use of the approved stacking units **D** in conjunction 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.

## 8.12.5 Using the standard bucket

Observe the instructions for working with a bucket [see Information on working with a bucket on page 239](#).

### 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:

Attaching [see Attaching the attachment on page 209](#).

Dismantling [see Dismantle the attachment on page 217](#).

### 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.

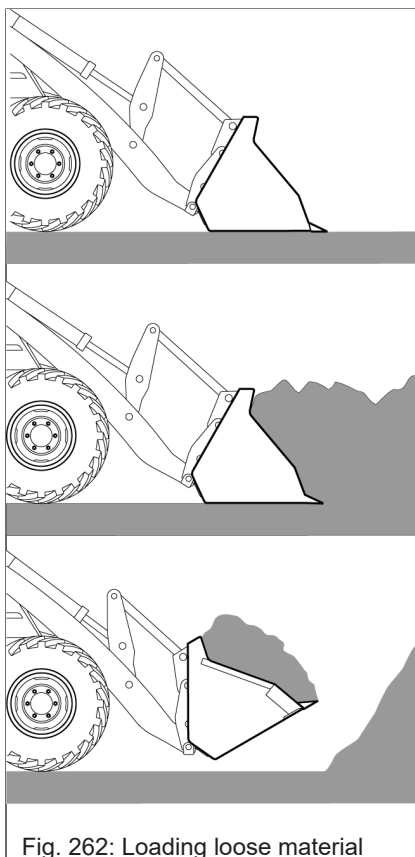


Fig. 262: Loading loose material

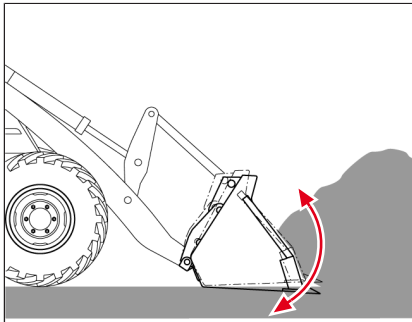


Fig. 263: Loading heavy material

### 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.

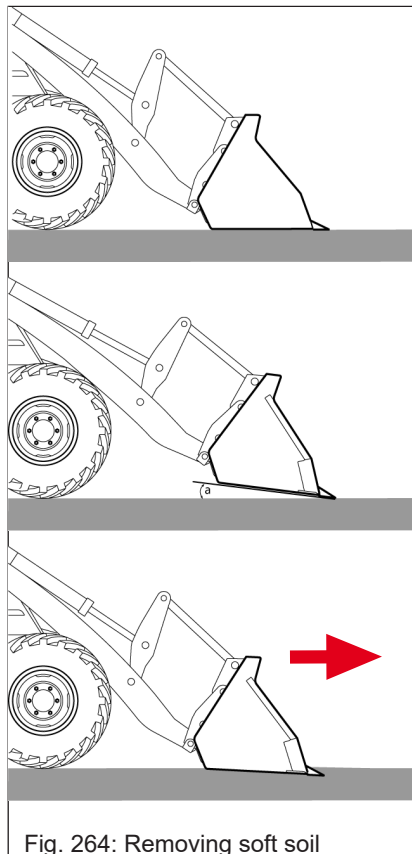


Fig. 264: Removing soft soil

### 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

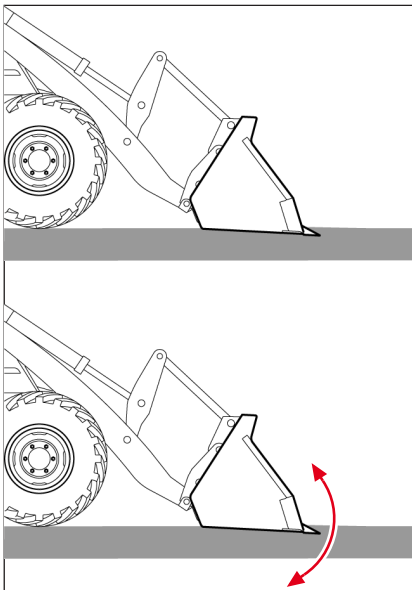


Fig. 265: Removing hard soil

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.

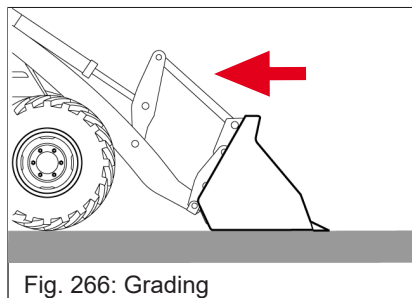


Fig. 266: Grading

### Grading

1. Lower the loader unit horizontally to the ground.
2. Reverse across the surface to be graded.  
⇒ Surface is levelled.

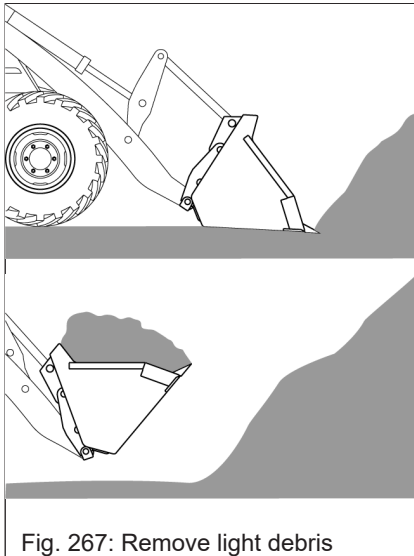


Fig. 267: Remove light debris

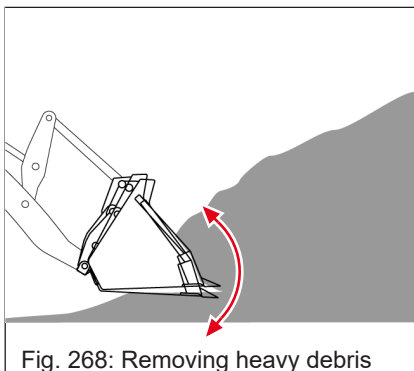


Fig. 268: Removing heavy debris

### 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 penetrating the heaped material: Raise the loader unit evenly. Pull the joystick back.
  5. Tilt in the bucket. Press the joystick to the left.
  6. Reverse out of the material.
  7. Lower the loader unit to the transport position.
- ⇒ Material is loaded.

### Loading heaped material (compacted material)

Proceed as for non-compacted material.

- Slightly tilt the bucket in and out when raising the loader unit in the excavated material. To do this, move the joystick alternately to the left and right.
- ⇒ The material is loosened.

### Transport with filled bucket

The tilted bucket is guided in parallel when the loader unit is lifted and extended. A "water trolley function" prevents the bucket from being tilted accidentally against the stop and the load from falling over the back of the bucket.

## 8.12.6 Using the multipurpose bucket

Observe the instructions for working with a bucket [see Information on working with a bucket on page 239](#).

### 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.

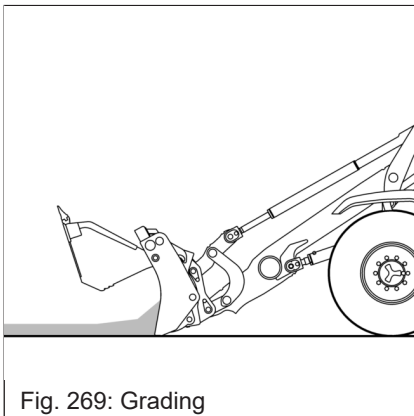
Also observe the applicable regulations for accident prevention of your country.

### Pick up and set down a multipurpose bucket

The pick-up and set-down of the bucket is described in the following sections:

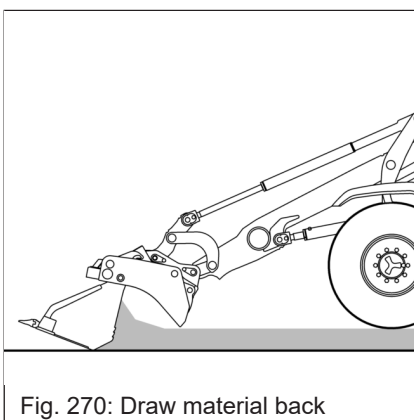
Attaching [see Attaching the attachment on page 209](#).

Dismantling [see Dismantle the attachment on page 217](#).



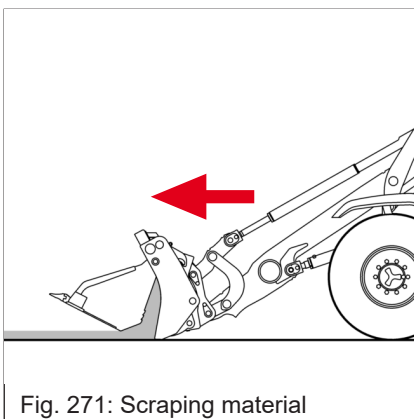
### Grading

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.



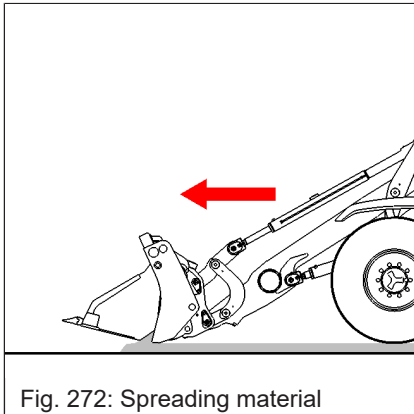
### Draw material back

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

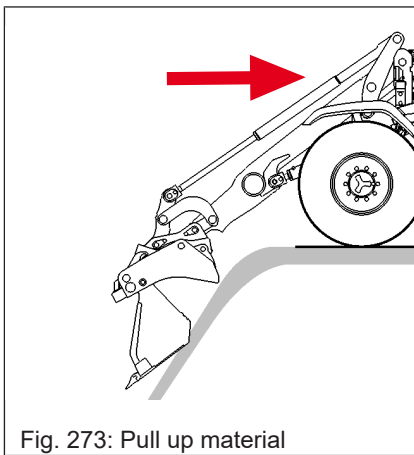
1. Set a flat digging angle.
  2. Fold up the front half of the bucket by about 10 to 15 cm.
  3. Drive the vehicle forward.
    - ⇒ The material rolls into the bucket and is picked up at the same time.
- In this position, e.g. grass vegetation with a thickness of up to about 8 cm can be removed.



### Spreading material

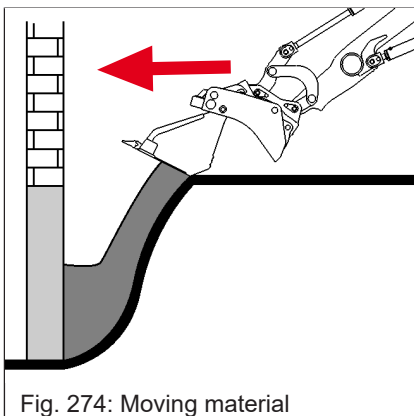
1. Set the rear cutting edge parallel to the ground.
2. Fold up the front half of the bucket until the required quantity of material is emptied onto the ground.
3. Move off the vehicle.
4. Lower the multipurpose bucket to the ground.
  - ⇒ The rear cutting edge grades the material as it is emptied by 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 on structures.

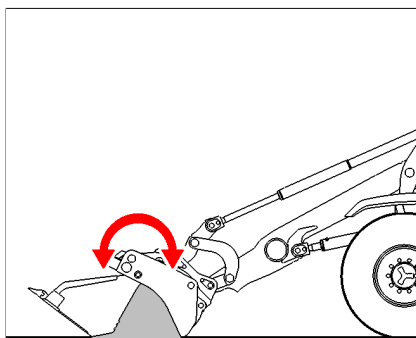


Fig. 275: Pick up material without residue

### 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.

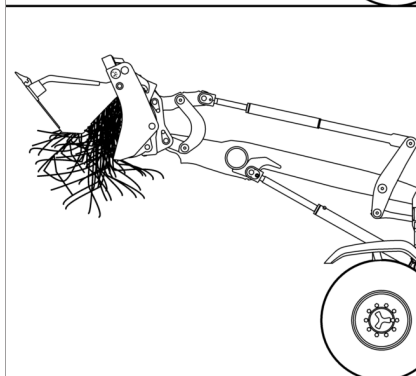
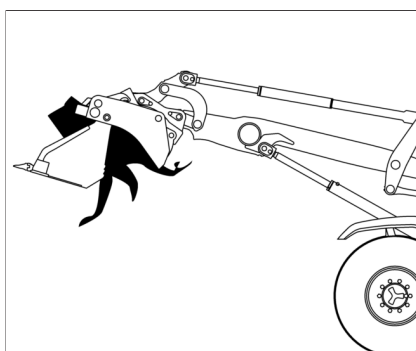


Fig. 276: Grabbing bulky material

### 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.

8

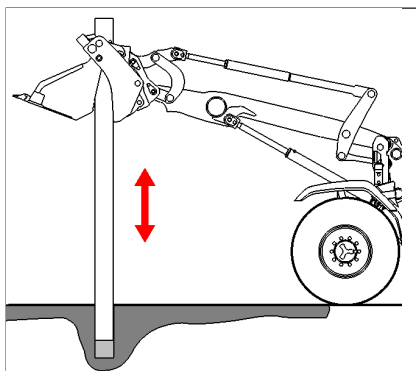


Fig. 277: Pulling out and replacing posts

### 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.

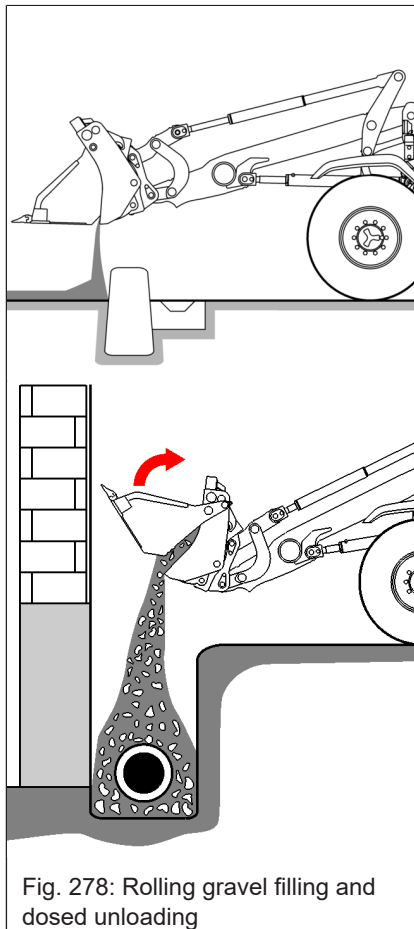


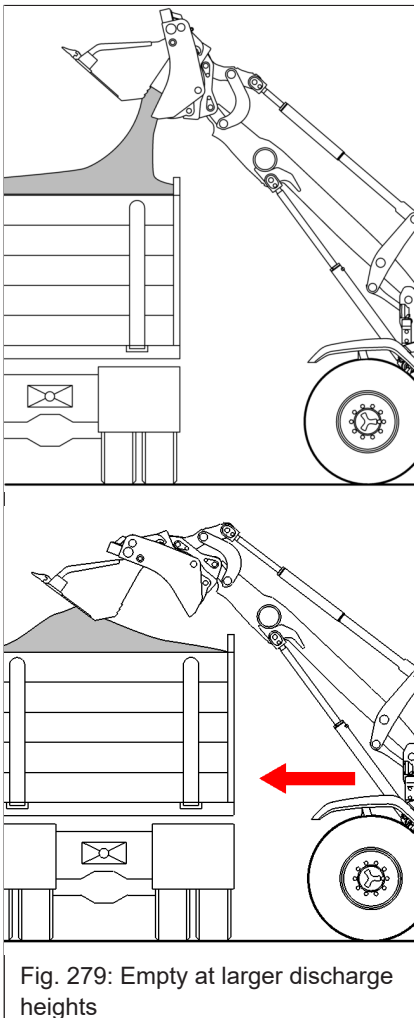
Fig. 278: Rolling gravel filling and dosed unloading

#### **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.

## 8.12.7 Use heavy duty bucket

Observe the instructions for working with a bucket [see Information on working with a bucket on page 239](#).

### Application area of the heavy duty bucket

The heavy duty bucket is primarily used for picking up, transporting and loading loose and bulky 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.

### Picking up and setting down a heavy duty bucket

The pick-up and set-down of the bucket is described in the following sections:

Attaching [see Attaching the attachment on page 209](#).

Dismantling [see Dismantle the attachment on page 217](#).



Fig. 280: Grabbing bulky material

### Gripping and depositing bulky material

1. Open the clamp.
2. Pick up material.
3. Slightly raise the loader unit.
4. Close the clamp.
5. With the filled bucket in the transport position (fully tilted in), approach the unloading station, e.g. a truck.



Fig. 281: Depositing bulky material

6. Raise the loader unit as high as necessary.
7. Proceed until the bucket is located above the unloading area.
8. Open the clamp.
9. Tilt out the bucket.
10. Once the bucket has been emptied: Tilt in the bucket.
11. Close the clamp.
12. Drive back and lower the attachment to the transport position.

## 8.12.8 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 241](#)

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.

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!

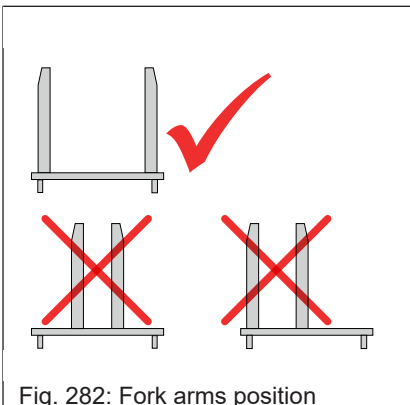


Fig. 282: Fork arms position

Before picking up the load, adjust the fork tines so that they are as far apart as possible, straight and at the same distance from the left and right edges of the load.

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## 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.

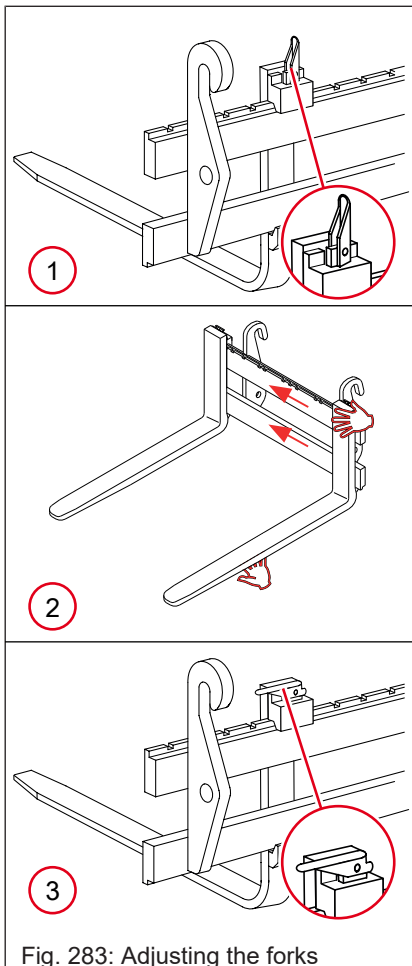


### ⚠ CAUTION

#### **Danger of crushing when shifting the fork arms!**

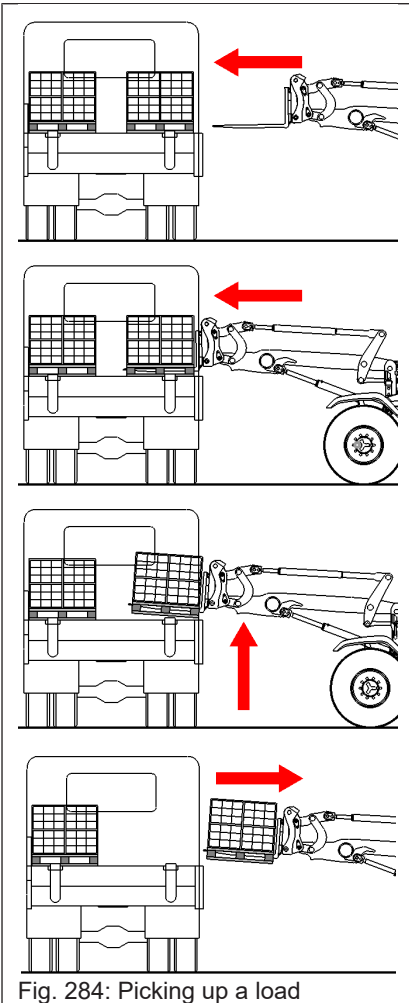
Fingers and hands can be crushed between the fork carriage and fork arms.

- ▶ Do not touch the sliding surface of the fork carriage when shifting the fork arms.
- ▶ Wear protective gloves.



1. Lift 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. 283: Adjusting the forks



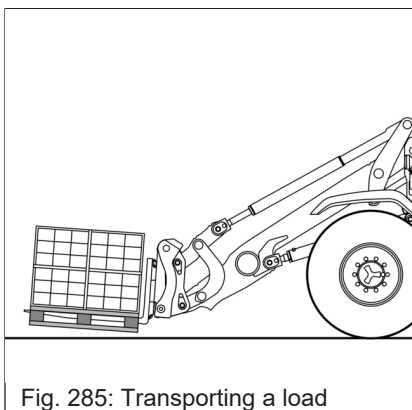
### Picking up a load

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 [see Operating the load stabilizer on page 202](#).

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.

8



### 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.

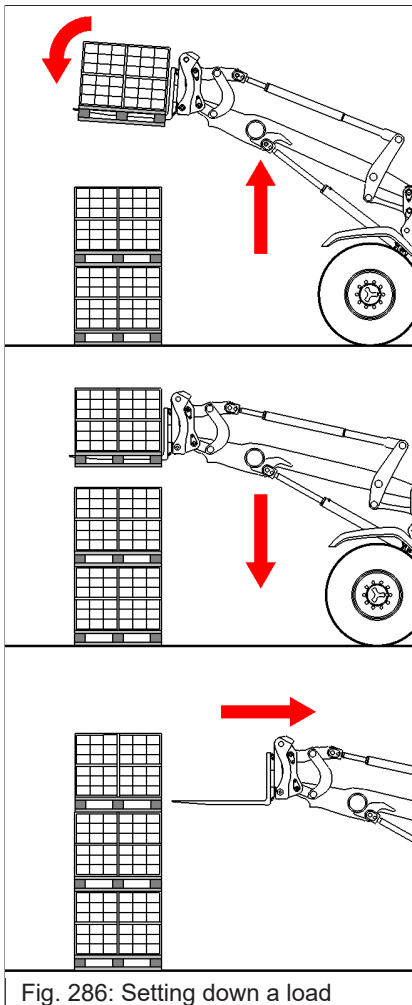


Fig. 286: Setting down a load

### Setting down a load

1. Travel to the unloading position in a straight line.
2. Do not lift the load to the required height until immediately in front of the unloading position.
3. Drive forward until the load is exactly above the drop-off point.  
⇒ Ensure that the limit values specified in the load diagram and safe load indicator are not exceeded
4. Position the stacking unit horizontally.
5. Slowly lower the loader unit until the forks are free of the load.
6. Retract until the stacking device can be lowered freely.
7. Lower stacking unit.
8. Reverse away from the unloading position.
9. Lower the load to transport height (approx. 250 mm).
10. Tilt in the fork carriage.  
⇒ Load can be transported.

### 8.12.9 Use third-party attachments

#### General instructions

Only attachments that are approved for this purpose and have a load diagram approved for the attachment may be attached to the power coupler.

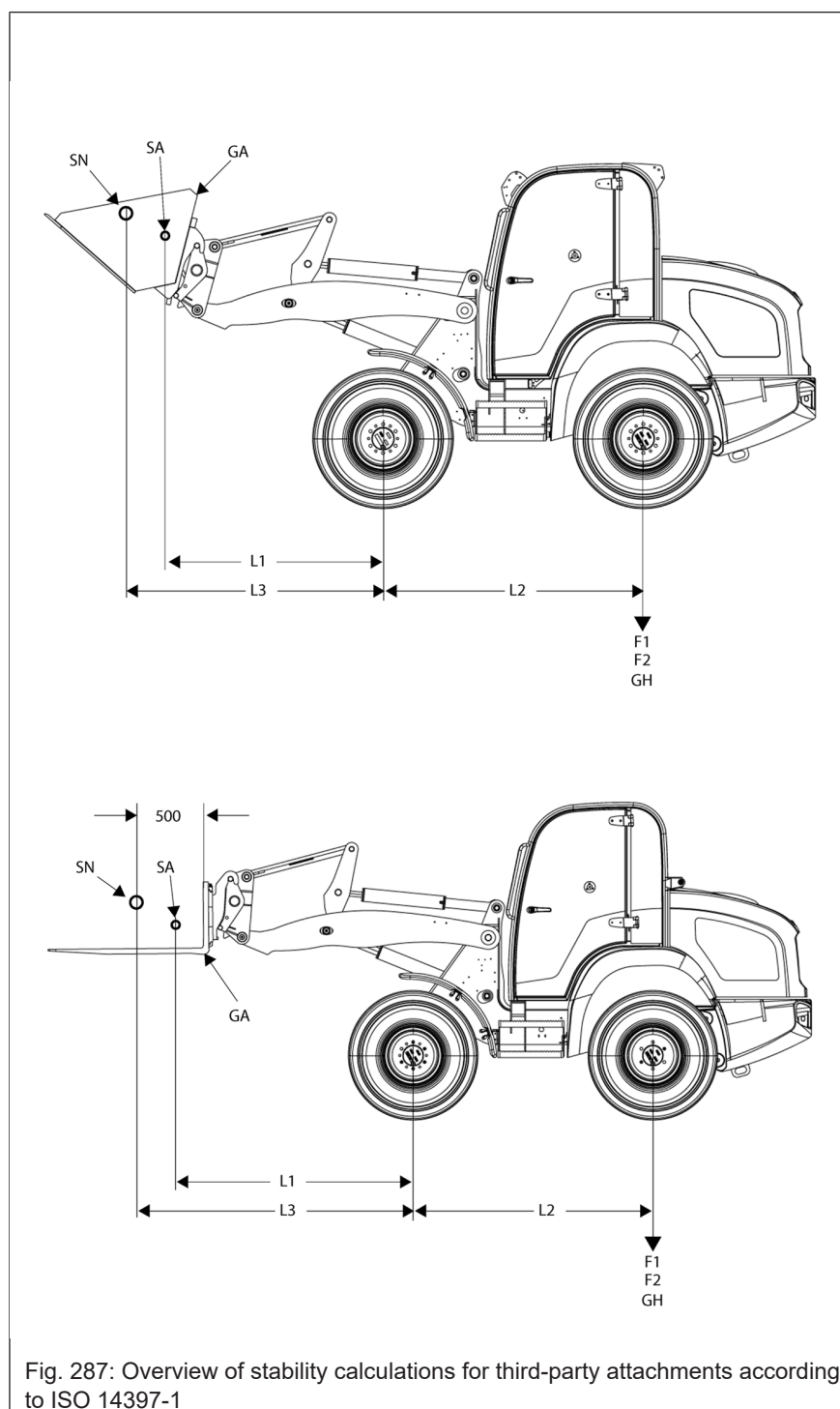
When mounting and using non-approved attachments or third-party attachments, the conformity (stability test) according to the EC Machinery Directive or the standard DIN EN 474-3 must be checked and documented by an authorized specialist service center in the EU.

In the case of non-EU countries, follow and apply the national regulations of these countries.

If attachments are not permitted or if parts of the power coupler or of the attachment are subsequently modified or replaced, if their condition is prescribed or if their operation could endanger persons, the operating permit and the warranty become null and void.

The following information sheets can be used for the stability test.

## Stability calculation for external 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 load center: Pallet forks	Values entered in load diagram according to ISO 14397-1.	500 600 700	mm
SN	Position of load center: Bucket or other attachment			mm
S	Stability factor	Take the values from the table "Required safety factors (S)".		-
L1	Distance: Center of the front axle to the center of gravity of the attachment	Measure		mm
L2	Center distance: Front axle center to rear axle center			mm
L3	Distance: Load center (payload) to the center of the front axle			mm
GH	Load on rear axle (without load on loader unit)	Calculated.		kg
F1	Measured load on the rear axle (without attachment with extended loader unit)	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 <sub>max</sub>	Material density of load	Calculated: Depending on the material which is picked up by the bucket.		t/m <sup>3</sup>
V	Bucket capacity (ISO 7546)	Ask the manufacturer of the attachment.		m <sup>3</sup>
M	Payload mass	Calculated.		kg

### Required safety factors (S)

Stacking units	DIN EN 474-3	
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)**

$$F2 = \frac{GA \times L1}{L2}$$

$$GH = F1 - F2$$

$$GN = S \times \frac{GH \times L2}{L3}$$

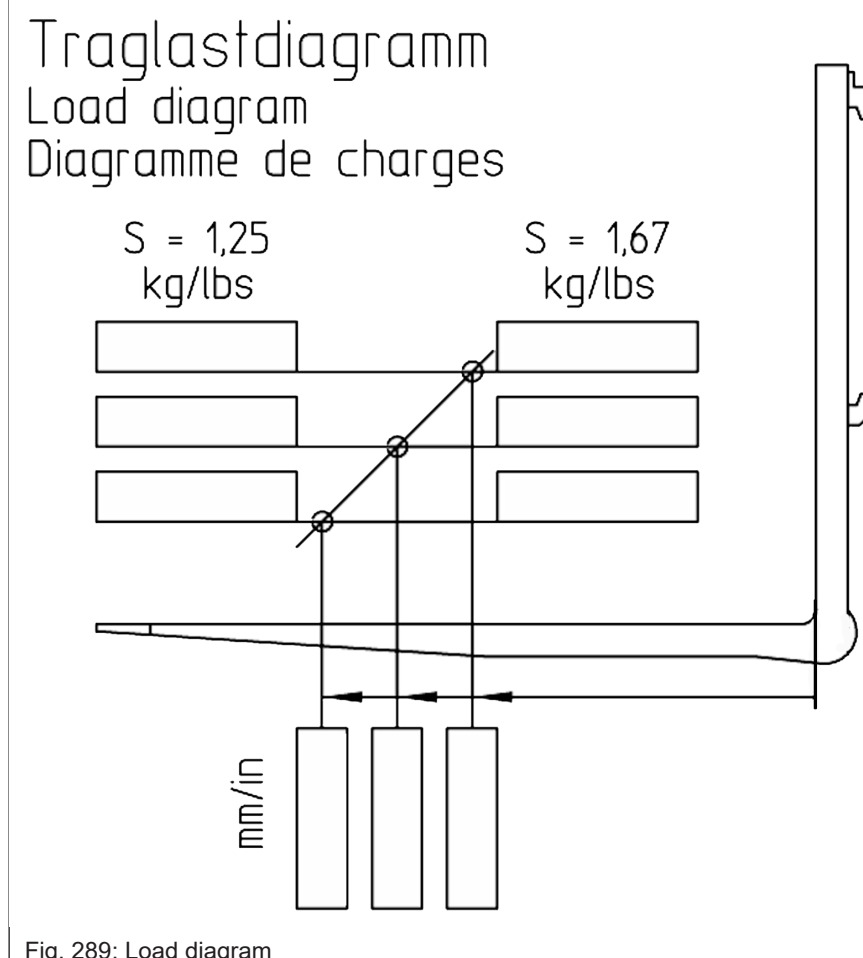
$$P_{max} = \frac{GN}{V}$$

Fig. 288: 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.



## 9 Transportation

### 9.1 Towing

#### 9.1.1 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!**

- ▶ Only tow the vehicle to the extent necessary for the towing operation, but not more than 300 meters.
- ▶ 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)!

### 9.1.2 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.

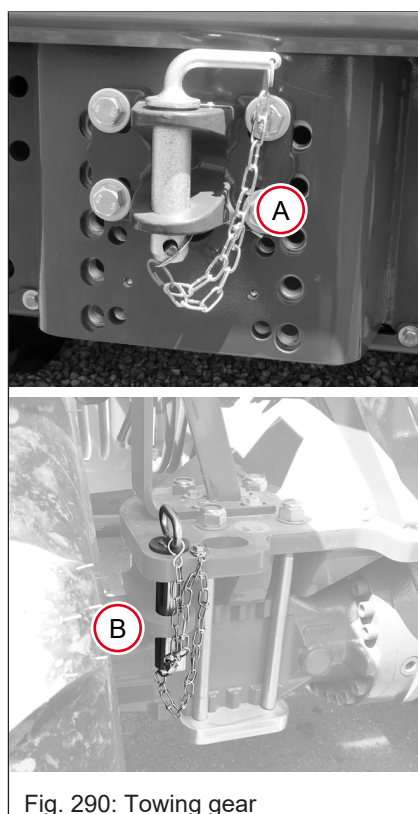


Fig. 290: Towing gear

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 gear: **A**
- Front towing gear: **B**

### 9.1.3 Recovery and towing of the vehicle

To tow and recover the vehicle, work must be carried out on the drive system and the service brake. These activities may only be carried out by an authorized service center.

If there is a defect in the vehicle and the vehicle must be towed, proceed as follows:

1. Close off the towing area as largely as possible.
2. Contact an authorized service center and a towing service.
3. Coordinate all further steps with the service center and the towing service.
4. Have the defect on the vehicle repaired by an authorized service center.

## 9.2 Loading

### 9.2.1 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.

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 387](#).
- Remove any mud, snow or ice from the tires so that the vehicle can be safely driven onto the ramps.
- 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.
- In order to avoid accidents and injuries, the following instructions must be observed when loading the vehicle.
  - Usual transportation conditions are conditions in the which the brakes are slammed on, evasive maneuvers are performed with the vehicle or in which uneven roadways are traveled on.
  - 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 anti-slip mats when transporting on ships.
- Always use the existing tie-down points when using load-securing straps and chains.
- Adjust travel speed of the transport vehicle.

### 9.2.2 Loading the vehicle

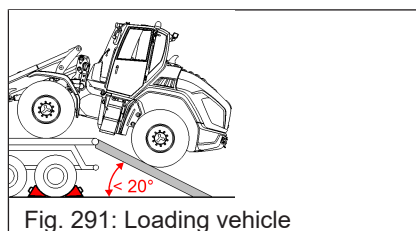


Fig. 291: Loading vehicle

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 oil level of the engine.
  - 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 loader unit 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 middle of the transport vehicle.
2. Lower the loader unit until the attachment rests on the loading surface of the transport vehicle.
3. Switch the drive system to neutral.
4. Apply the parking brake.
5. Switch off the ignition and remove the ignition key.
6. Exit the cab, close doors, windows and engine cover, lock and unlock.
7. Tie down the vehicle [see Tying down the vehicle on page 266](#).
8. Observe total height.

### 9.2.3 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.
- Load the vehicle only with the standard bucket empty and in transport position.
- 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 32](#).

**9**

### 9.2.4 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.

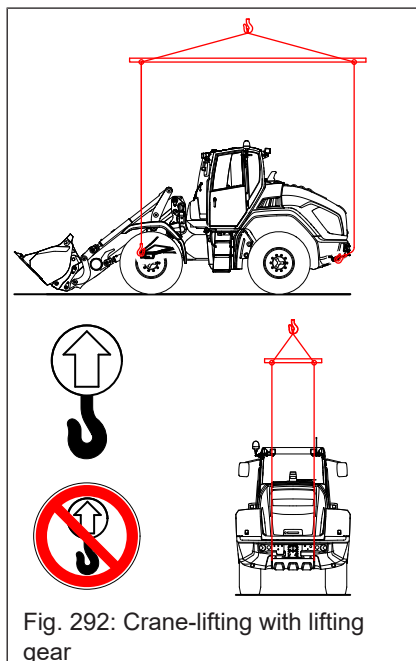
- ▶ Use tested, undamaged and sufficiently dimensioned lifting gear.
- ▶ Check that the lifting gear is safely fastened.
- ▶ Ensure that nobody remains under the raised vehicle.



#### 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 starting key.
5. Apply the parking brake.
6. Exit the cab, close doors, windows and engine cover, lock and unlock.

#### 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.

## 9.3 Transportation

### 9.3.1 Tying down the vehicle



Only use lashing eyelets marked with the labels to attach the lashing straps or chains.

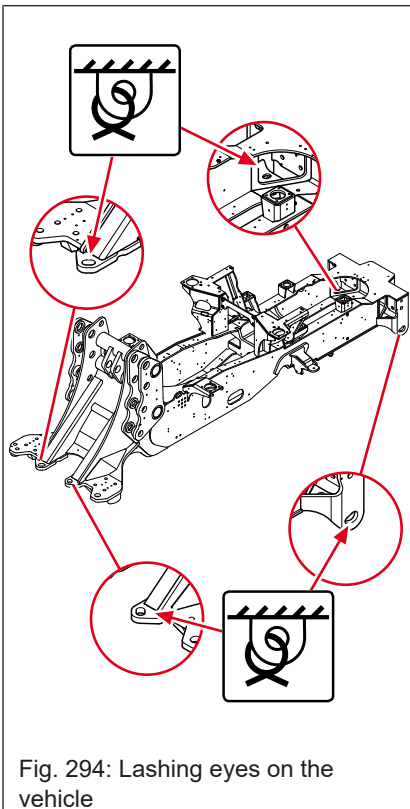


Fig. 294: Lashing eyes on the vehicle

### Safety instructions on tying down the vehicle

- The transport vehicle must have a sufficient bearing load and a suitable loading surface.
- The loading surface of the transport vehicle must be clean.
- The gross weight rating and the axle loads of the transport vehicle must not be exceeded.
- Only use certified lifting and fastening gear. 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 transportation.
- The load-securing regulations must be observed.
- Bear in mind the weather conditions (e.g. ice, snow).

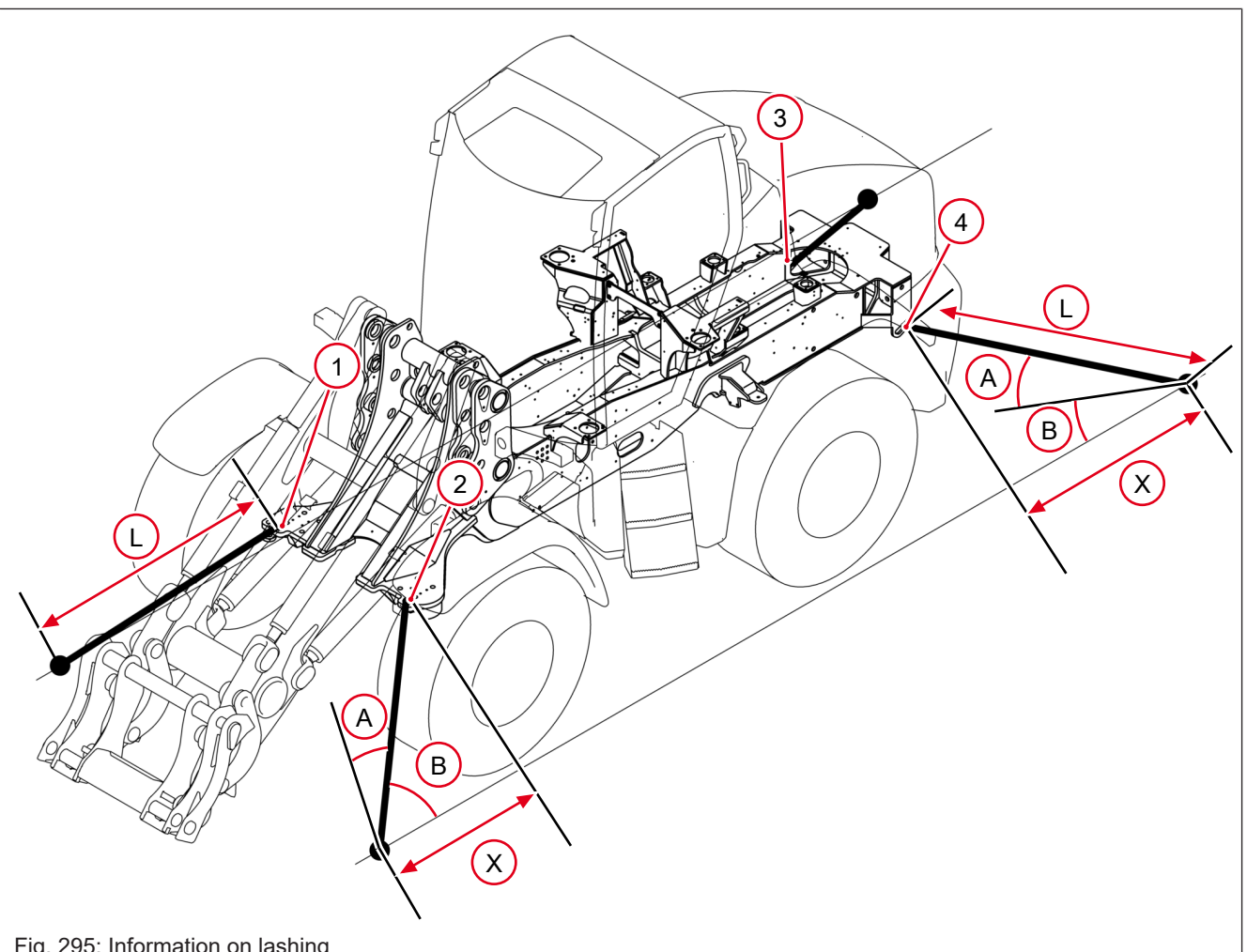


Fig. 295: Information on lashing

Item	Designation	Tie-down point 1 and 2	Tie-down point 3 and 4	Remark
A	Angle alpha in °	28	28	Angle between the loading area and fastening gear
B	Angle beta in °	39	30	Angle between the longitudinal edge of the loading area and fastening gear
X	Distance X in mm	1250	1400	
L	Minimum length L1 in mm	1800	1800	Vehicle eye hook to the loading area eye hook
LC	Maximum force in daN	6050	6050	

## 10 Maintenance

### 10.1 Information on maintenance

#### 10.1.1 Responsibilities and prerequisites

- The operational readiness and service life of the vehicle are greatly influenced by care and maintenance.
- The care and maintenance work listed in the maintenance plan "every 10 operating hours". (daily)" and "every 20 operating hours" must be carried out by a trained operator.
  - The necessary expertise for carrying out the care and maintenance work can be acquired during training courses by the KRAMER-WERKE service department.
- All other work listed in the maintenance plan (handover inspection and inspections **1**, **2** and **3**) may only be carried out by an authorized service center in order to comply with warranty claims.
  - The maintenance and inspection personnel must have specialized knowledge about the maintenance and inspection work on the vehicle. The necessary expert knowledge can be acquired during training courses by our KRAMER-WERKE service.
- The respective intervals for the inspection can be found in the service booklet. The part numbers of the tools and consumables necessary for the maintenance work as well as the numbers of the maintenance sets "**1**", "**2**" or "**3**" can be found in the spare parts list.
- The quantity and specification of the operating and lubricating materials in the table Vehicle fluids.
- For repairs, insist that only original spare parts are used.
- If parts of the vehicle are subsequently modified or replaced, if their condition is prescribed or if their operation could endanger persons, the operating permit expires!
- The manufacturer accepts no liability for damage or injury to persons resulting from non-compliance.
- Your service partner is available at all times to answer any further questions regarding maintenance and care work.
- Perform maintenance and inspection work only with suitable protective equipment.
- Perform only the maintenance and inspection work described in this operator's manual.

#### 10.1.2 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 attachments 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**

- Replace hydraulic hoses after a maximum six years.
- 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 batteries

- Batteries give off explosive gases.
  - Avoid smoking, fire or open flames near batteries.
- Do not place any tools on batteries. Short-circuiting the terminals produces sparks that ignite escaping battery acid vapors.
- Battery acid is caustic. Avoid contact with the skin, eyes, mouth and clothing.
  - Wear appropriate protective equipment (e.g. protective gloves, safety glasses).
  - In case of contact, immediately rinse the contaminated part of the body with plenty of water and seek medical attention.
- Always take off metal jewelry and watches before performing work on the battery or the electrical system.
- Dispose of old batteries in an environmentally friendly manner and separately from other waste.

#### 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.

#### 10.1.3 Work after maintenance

1. Once maintenance and inspection work is over, install all protections again correctly.
2. Only start the engine if no more work is performed on the vehicle and there are no more persons in the danger zone.
3. Once maintenance and inspection work is over, perform a functional check of the vehicle.

#### 10.1.4 Following maintenance intervals

In order to operate the vehicle safely, it is necessary to observe the maintenance intervals.

Have the vehicle serviced at the appropriate intervals by an authorized service center [see Maintenance plan on page 279](#).

## 10.2 Maintenance access covers

### 10.2.1 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.

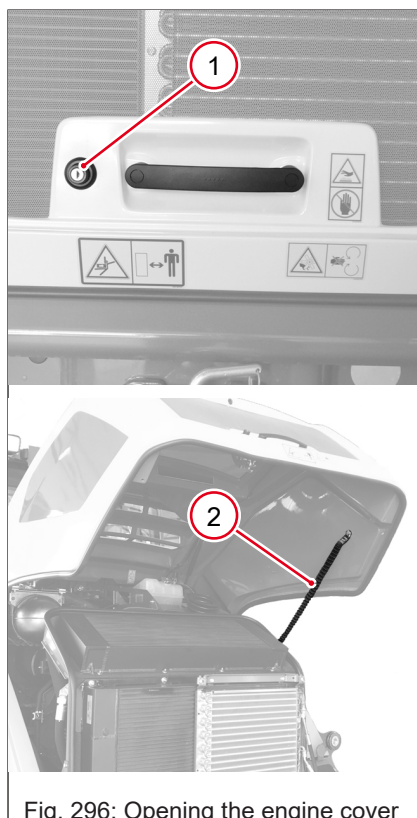


Fig. 296: Opening the engine cover

#### **Opening the engine cover**

Open the engine cover with the handle. The handle is lockable.

1. Unlock engine cover with key.
2. Open the engine cover by pressing button 1.  
⇒ The engine cover is unlocked.
3. Raise the engine cover by pulling the handle.

#### **Closing the engine cover**

1. Grasp the engine cover by the tension strap 2 and pull it downwards against the spring pressure.  
⇒ The engine cover is automatically locked and can only be opened again with the starting key.
2. Pull on the handle to check whether the engine cover is locked in place.

### 10.2.2 Climbing and treading surfaces

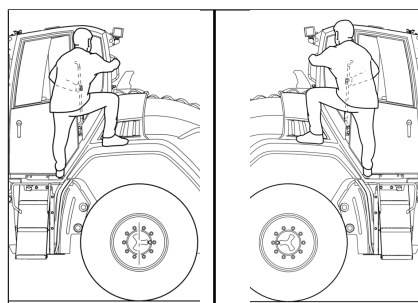


Fig. 297: Climbing and treading surfaces

To clean the rear window or to maintain the air filter, the vehicle has steps and treads over the rear wheels. Handles are attached to the B and C pillars of the cab and must be used to hold them in place.

1. Keep ladders and steps clean and free of ice at all times.
2. When carrying out maintenance work, always ensure that both feet and one hand are in contact with the vehicle.
3. Always move slowly and safely.

### 10.2.3 Air filter

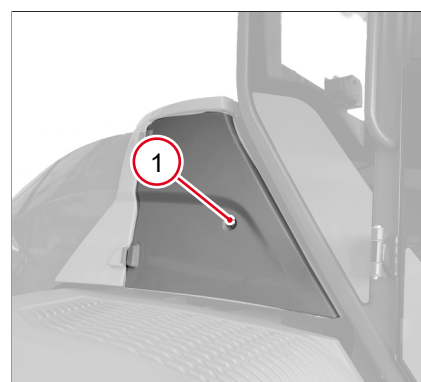


Fig. 298: Air filter access

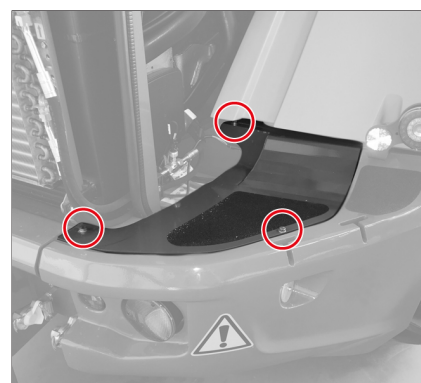
#### Open air filter door

1. Unlock and open door **1** with key.  
⇒ Access to the air filter is established.
2. Perform maintenance.

#### Close air filter door

1. Close the door and lock with the key.
2. Check whether the door is locked.
3. Remove the key.

### 10.2.4 Battery



#### Accessing the battery

Battery access

✓ Required tools: Wrench size 13

1. Unscrew the screws (three pieces).
2. Remove the cover plate.  
⇒ Battery is visible

### 10.2.5 Cab fuse box

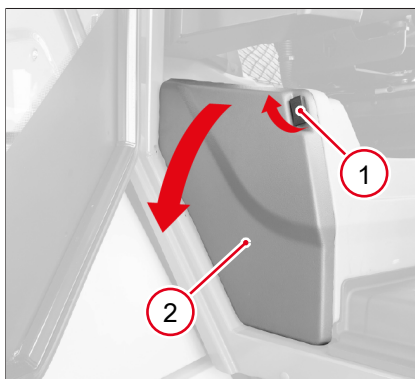


Fig. 299: Access fuse box cab

#### Opening the cover

1. Stop engine and remove starting key.
2. Tilt the quick fastener **1** upwards.
3. Tilt cover **2** backwards and remove  
⇒ Fuse box is visible

### 10.2.6 Engine compartment above maintenance ladder

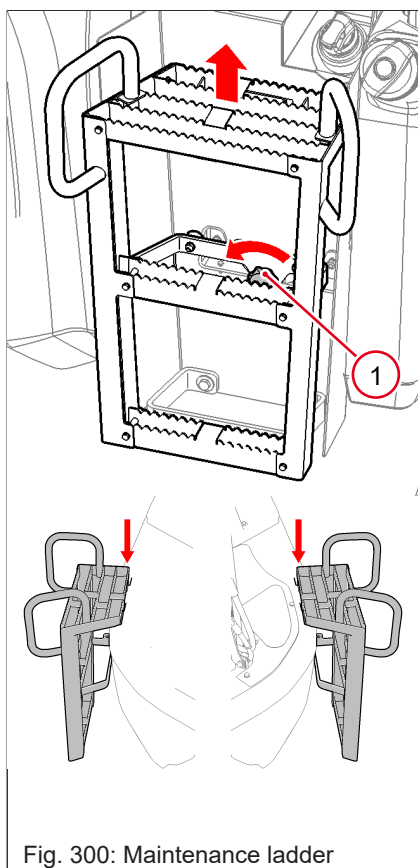


Fig. 300: Maintenance ladder

The maintenance ladder is located on the right side of the driver's cab.

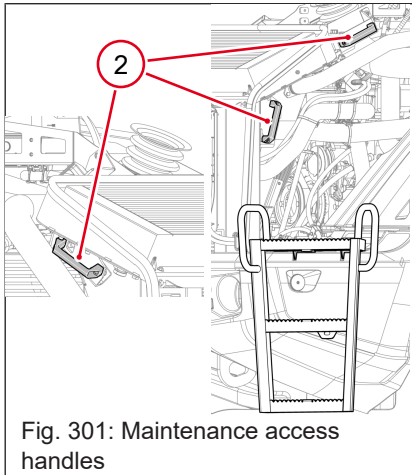


Fig. 301: Maintenance access handles

### Establish access to engine compartment with maintenance ladder

1. Turn star grip screw **1** counterclockwise and loosen.
2. Remove the maintenance ladder from the top of the bracket.
3. Attach the maintenance ladder to the suspension slots on the right or left of the rear bumper.
4. Open the engine cover.
5. Use handles **2** for safe access to the engine compartment.
6. After maintenance work in the engine compartment, remount the maintenance ladder on the right under the driver's cab and secure it with the star grip screw.

## 10.3 Visual check

### 10.3.1 Checking components

Check the following components daily:

- 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.

### 10.3.2 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 axle

Have defects and leaks repaired by an authorized service center.

10

### 10.3.3 Maintenance computer



#### **Information**

The value in the maintenance computer is only reset if resetting is permissible. Resetting is permissible if the preset values for the continuous display are not yet reached or maintenance has been carried out.

A maintenance computer is integrated in the vehicle. The result of the maintenance computer is shown on the display [see Overview drop-down menus on page 101](#)

#### **Reset display**

The display can be reset in three ways:

- via the service tool,
- via a CAN message,
- via a key combination.



Fig. 302: Jog Dial

**Reset key combination**

1. Access the main view in the display.
  2. Press F1 on the jog dial button and call up the drop-down menu.
  3. Press the F1, F2 and F3 buttons simultaneously and keep them pressed for approx. five seconds.
- ⇒ The value will be reset if it is permitted.

**10.4 Maintenance table**

Maintenance cycle	Personnel	For further information, please contact	
Daily	Operating personnel	[▶ 300]	Checking the engine oil level
		[▶ 304]	Check the coolant level
		[▶ 307]	Check the hydraulic oil level
		[▶ 324]	Clean the pedals
		[▶ 325]	Clean attachments
		[▶ 325]	Cleaning the radiator
		[▶ 328]	Cleaning the air filter
		[▶ 330]	Cleaning the condenser
		[▶ 331]	Check air conditioning system
		[▶ 335]	Checking braking system
		[▶ 338]	Regular checks and maintenance work of the electrical system
		[▶ 343]	Checking the hydraulic system for leaks
		[▶ 347]	Checking the V-belt
		[▶ 348]	Check flat belt
		[▶ 357]	Checking function of seat switch
		[▶ 359]	Checking the tires
Every week	Operating personnel	[▶ 276]	Checking components
		[▶ 277]	Leakage check
		[▶ 296]	Water separator maintenance
		[▶ 309]	Window wiper water level
		[▶ 310]	Fill level of urea
		[▶ 312]	Lubricating the planetary drive bearing
		[▶ 312]	Lubricating doors
		[▶ 312]	Lubricating the rear axle oscillation-type bearing
		[▶ 313]	Lubricating the loader unit
		[▶ 317]	Lubricating attachments
		[▶ 318]	Greasing the trailer coupling

Maintenance cycle	Personnel	For further information, please contact	
		[▶ 322]	Cleaning the vehicle from the outside
		[▶ 323]	Cleaning the cab
		[▶ 324]	Clean the pedals
		[▶ 324]	Clean engine and engine compartment
		[▶ 328]	Cleaning the air filter
		[▶ 330]	Cleaning the condenser
		[▶ 331]	Check air conditioning system
		[▶ 337]	Checking steering system for function
		[▶ 337]	Checking the steering column adjustment
		[▶ 338]	Regular checks and maintenance work of the electrical system
		[▶ 346]	Checking the locking function for the joystick
		[▶ 346]	Checking the function of the lock
		[▶ 346]	Checking the hydraulic control circuits for function
		[▶ 356]	Checking the seat
		[▶ 357]	Checking the seat belt for proper function
		[▶ 358]	Checking doors and windows
		[▶ 358]	Checking heating, ventilation and air conditioning system
		[▶ 358]	Checking safety labels and information labels
		[▶ 359]	Checking the tires

## 10.5 Maintenance plan

10

### Important information on the maintenance plan



#### **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 machine!

Failure to observe the footnotes may result in damage to the machine.

- Observe and adhere to the footnotes in the tables.


“A”, “B” and “C” refer to the respective maintenance kits.


The intervals for the inspections can be found in the service booklet.

For care and maintenance work on the attachment, observe the manufacturer's instructions.

The defined maintenance intervals are shown in the service display of the display.


Work description <sup>1</sup> (Bh = operating hours)	Service center	User/operator		Workshop <sup>2</sup>		
		Every 10 o/h (daily)	Every 20 o/h	Inspection "A"	Inspection "B"	Inspection "C"
<b>Check screws and nuts or screw connections for tightness. Retighten if necessary</b>	<b>Handover inspection</b>					
Visible screw connections	•		•	•	•	•
Fastening screws of engine and engine suspension	•			•	•	•
Fastening screws of the exhaust system	•			•	•	•
Fastening screws of steering system	•			•	•	•
Fastening screws hydraulic system	•			•	•	•
Loader unit fastening screws (bolt lock), power coupler locking device	•			•	•	•
Axle mounting, axle suspension	•			•	•	•
Counterweight fastening screws	•			•	•	•
Fastening screws of drive shafts	•			•	•	•
Cab fastening screws	•			•	•	•
Wheel nuts <sup>3</sup>	•			•	•	•
Electrical system: Chafe marks on the wiring harness, battery poles, ground or cable connections	•		•	•	•	•
1) Have maintenance and repairs only performed by an authorized service center (acknowledgment of warranty claims) 2) The maintenance work described here may only be performed by an authorized service center 3) After each wheel change, tighten/retighten the wheel nuts several times at the prescribed intervals and with the prescribed tightening torque. See the label on the rim.						


Work description <sup>1</sup> (Bh = operating hours)	Service center	User/operator		Workshop <sup>2</sup>		
		Every 10 o/h (daily)	Every 20 o/h	Inspection "A"	Inspection "B"	Inspection "C"
<b>Leakage control</b> (  )	<b>Handover inspection</b>					
Air intake line: Air filter, charge-air cooler, turbocharger - engine	•	•		•	•	•


Work description <sup>1</sup> (Bh = operating hours)	Service center	User/operator		Workshop <sup>2</sup>		
		Every 10 o/h (daily)	Every 20 o/h	Inspection "A"	Inspection "B"	Inspection "C"
<b>Leakage control</b> (  )	<b>Handover inspection</b>					
Engine lubrication: Engine filter	•	•		•	•	•
Fuel lines <sup>3</sup>	•	•		•	•	•
Urea tank, urea pipes	•	•		•	•	•
Cooling system: Engine - Hydraulic oil	•	•		•	•	•
Steering system: Flexible lines <sup>4</sup> and rams	•	•		•	•	•
Hydraulic system/loader unit: Flexible lines <sup>4</sup> and rams	•	•		•	•	•
Quick couplings, plug-in couplings, additional control circuits, 3rd control circuit, tip-per connection (Opt)	•	•		•	•	•
Braking system: Flexible lines <sup>4</sup> and rams	•	•		•	•	•
Compressed-air brake (option)	•	•		•	•	•
Air conditioning: Hose lines, condenser, dehumidifier/evaporator	•	•		•	•	•
1) Have maintenance and repairs only performed by an authorized service center (acknowledgment of warranty claims). 2) The maintenance work described here may only be performed by an authorized service center. 3) Have flexible fuel leakage oil lines on the engine (leakage oil lines) replaced every 2 years by an authorized service center. 4) Hose assemblies must be replaced every 6 years by an authorized service center (UVV, DIN 20066 T5).						


Work description <sup>1</sup> (Bh = operating hours)	Service center	User/operator		Workshop <sup>2</sup>		
		Every 10 o/h (daily)	Every 20 o/h	Inspection "A"	Inspection "B"	Inspection "C"
<b>Oil and filter change</b>	<b>Handover inspection</b>					
Engine oil					•	•
Engine oil filter					•	•
Fuel filter					•	•
Replace the fuel prefilter					•	•
Urea filter <sup>3, 4</sup> (on the pump)					•	•
Filling screen <sup>3</sup> (urea tank)					•	•
Breather filter <sup>3</sup> (urea tank)				•	•	•
Air filter insert <sup>5</sup>					•	•
Air filter insert – safety cartridge <sup>5</sup>						•
Transmission oil in front and rear axle differential				•		•
Transmission oil in high speed gearbox <sup>6</sup> (option)					•	•
Transmission oil in front and rear axle planetary drives (left and right)				•		•
Hydraulic oil					• <sup>7</sup>	• <sup>7</sup>

Work description <sup>1</sup> (Bh = operating hours)	Service center	User/operator		Workshop <sup>2</sup>		
Oil and filter change	Hand-over Inspection	Every 10 o/h (daily)	Every 20 o/h	Inspection "A"	Inspection "B"	Inspection "C"
Filter insert – Return line filter hydraulic oil tank				•	• <sup>7</sup>	•
Breather filter <sup>5</sup> – hydraulic oil tank					• <sup>7</sup>	•
Boost-pressure filter – drive system (variable displacement pump boost pressure)					•	•
Heating circulation filter <sup>5</sup> (inside driver's cab)					•	•
1) Have maintenance and repairs only performed by an authorized service center (acknowledgment of warranty claims) 2) The maintenance work described here may only be performed by an authorized service center 3) The urea system is only installed in the diesel engine with EU exhaust stage IV (EPA Tier 4f) with exhaust gas aftertreatment system (DOC and SCR catalytic converter). 4) Change after 2 years at the latest. 5) Depending on operation and dust conditions, and in an acidic environment it can be necessary to replace the filters more frequently 6) After 500 operating hours. Oil change after putting the vehicle into operation for the first time, then every 1500 o/h. 7) Performance-dependent. Every 2 years or 1500 operating hours.						

Work description <sup>1</sup> (Bh = operating hours)	Service center	User/operator		Workshop <sup>2</sup>		
Lubricate <sup>3</sup> (  )	Hand-over Inspection	Every 10 o/h (daily)	Every 20 o/h	Inspection "A"	Inspection "B"	Inspection "C"
Rear axle oscillating bearing	•		•	•	•	•
Planetary drive bearing, front and rear axle, left/right	•		•	•	•	•
Hinges, joints	•		•	•	•	•
Door hinges	•		•	•	•	•
Trailer coupling/hitch	•		•	•	•	•
Attachments	•		•	•	•	•
<b>Loader unit</b>						
Lift chassis bearing	•		•	•	•	•
Tilt lever bearing, tilt rod bearing	•		•	•	•	•
Lift ram bearing	•		•	•	•	•
Tilt ram storage	•		•	•	•	•
Power coupler: Storage on lifting frame	•		•	•	•	•
1) Have maintenance and repairs only performed by an authorized service center (acknowledgment of warranty claims). 2) The maintenance work described here may only be performed by an authorized service center 3) Lubricate attachment according to manufacturer's instructions!						

Work description <sup>1</sup> (Bh = operating hours)	Workshop	User/operator		Workshop <sup>2</sup>		
Functional check, inspection work (  )	Hand-over In-spec-tion	Every 10 o/h (daily)	Every 20 o/h	In-spec-tion "A"	In-spec-tion "B"	Inspection 'C'
<b>Service and parking brake</b>						
Checking for correct function	•	•		•	•	•
Check pads <sup>3</sup>				•	•	•
Accelerator pedal and brake/inching pedal: Check for soiling, clean if necessary, spray joints with spray oil	•	•		•	•	•
Compressed air brake (opt): Check tightness (air noise) and damage	•	•		•	•	•
<b>Steering system</b>						
Steering column adjustment, synchronous wheel position	•	•		•	•	•
<b>Electrical system</b>						
Electrical and lighting system	•	•		•	•	•
Battery: Check charge condition					•	•
Drive interlock (opt)	•			•	•	•
<b>Working hydraulics</b>						
Joystick: Safety device for road travel	•	•		•	•	•
Hydraulic oil: Check fill level	•	•		•	•	•
Check the hydraulic oil tank for condensation water <sup>4</sup>					•	•
Clean suction filter - Clean hydraulics (sieve insert suction on hydraulic oil tank)						•
Clean line filter (sieve insert LS line control unit)				•		•
Clean the line filter (filter insert at control valve inlet)				•		•
Check the pressure accumulator, correct the pressure level if necessary <sup>2</sup>					•	•
Load stabilizer (opt): Checking for correct function	•	•		•	•	•
<b>Axles and transmissions</b>						
Gearbox: Check fill level	•				•	•
Differential front axle/rear axle: Check fill level	•				•	•
Planetary drives front axle/rear axle (left/right): Check fill level	•				•	•
<b>Diesel engine</b>						
Engine oil: Check fill level	•	•		•	•	•
Fuel prefilter: Drain water		•		•	•	•
Cooling water: Check engine oil, fill if necessary <sup>5</sup>		•		•	•	•
Water oil cooler (engine hydraulic oil): Check level of contamination, clean if necessary <sup>6</sup>		•		•	•	•
Charge-air cooler: Check level of contamination, clean if necessary <sup>6</sup>		•		•	•	•
Charge-air cooler: Drain condensation water						•

Work description <sup>1</sup> (Bh = operating hours)	Work-shop	User/operator		Workshop <sup>2</sup>		
Functional check, inspection work (  )	Hand-over In-spec-tion	Every 10 o/h (daily)	Every 20 o/h	In-spec-tion "A"	In-spec-tion "B"	Inspec-tion 'C''
V-belt with tension pulley <sup>9</sup> (generator, water pump): check and retighten if necessary		•		•	•	•
Check flat belt, have it replaced if necessary <sup>10</sup>	•	•		•	•	•
Check the valve setting, adjust if necessary <sup>11</sup>						•
Check diesel particulate filter (opt) for ash load and re-place if necessary <sup>12</sup>				every 3000 operating hours •		
Cab/chassis						
Vehicle: exterior and interior cleaning	•	•				
Seat, seat belt	•	•		•	•	•
Windscreen washer system Check filling level of window washer water	•	•		•	•	•
Heating: Clean circulating air filter/fine dust filter (inside cab) <sup>13</sup>			•	•	•	•
Air conditioning: Check filling level, clean condenser <sup>6, 15</sup>			•	•	•	•
Warning and information signs: Check damage, loss and replace if necessary	•		•	•	•	•
Condition of paint coating	•					
Condition of the lifting and lashing points: Damage, wear				•	•	•
Loader unit/tires						
Power coupler: Lock	•	•		•	•	•
Tires: Damage, air pressure, tread depth	•	•		•	•	•
Options						
All additional control circuits	•	•		•	•	•
Trailer couplings/hitch: Function, damage, wear	•	•		•	•	•
Attachments						
Clean attachment and check for damage	•	•		•	•	•

Work description <sup>1</sup> (Bh = operating hours)	Workshop	User/operator		Workshop <sup>2</sup>		
Functional check, inspection work (  )	Handover In-spec- tion	Every 10 o/h (daily)	Every 20 o/h	In-spec- tion "A"	In-spec- tion "B"	Inspection 'C'
<ol style="list-style-type: none"> <li>1) Have maintenance and repairs only performed by an authorized service center (acknowledgment of warranty claims).</li> <li>2) The maintenance work described here may only be performed by an authorized service center.</li> <li>3) Brake pads may be replaced by an authorized service center only.</li> <li>4) When using biodegradable oil in particular, check for condensation water (oil probe) and replace the hydraulic oil if necessary.</li> <li>5) Have the coolant replaced every 2 years by an authorized service center. Rinse the cooling system with clean water before refilling it.</li> <li>6) Depending on work operation and dust conditions, it can be necessary to clean the radiator more frequently.</li> <li>7) Replace the filter insert as indicated by the maintenance display, and more frequently in an acidic environment.</li> <li>8) Automatically cleaned on vehicles equipped with the "Vacuum-operated preliminary separator" option.</li> <li>9) V-belt with tension pulley must be replaced: every 2000 h for engine TCD 3.6 and every 4500 h for engine TCD 4.1.</li> <li>10) Renew after 2 years at the latest.</li> <li>11) Only valid For engine TCD 4.1.</li> <li>12) After checking or changing the diesel particulate filter, reset the requirement in the display to zero.</li> <li>13) If used in dusty conditions, clean frequently and replace if necessary.</li> <li>14) Have the sliding and wear plates replaced by an authorized service center under minimum thickness, check the wear plates from the telescopic boom.</li> <li>15) The dehumidifier must be replaced by an authorized service center every 2 years or each time the refrigeration circuit is interfered with.</li> </ol>						

### 10.5.1 Maintenance label

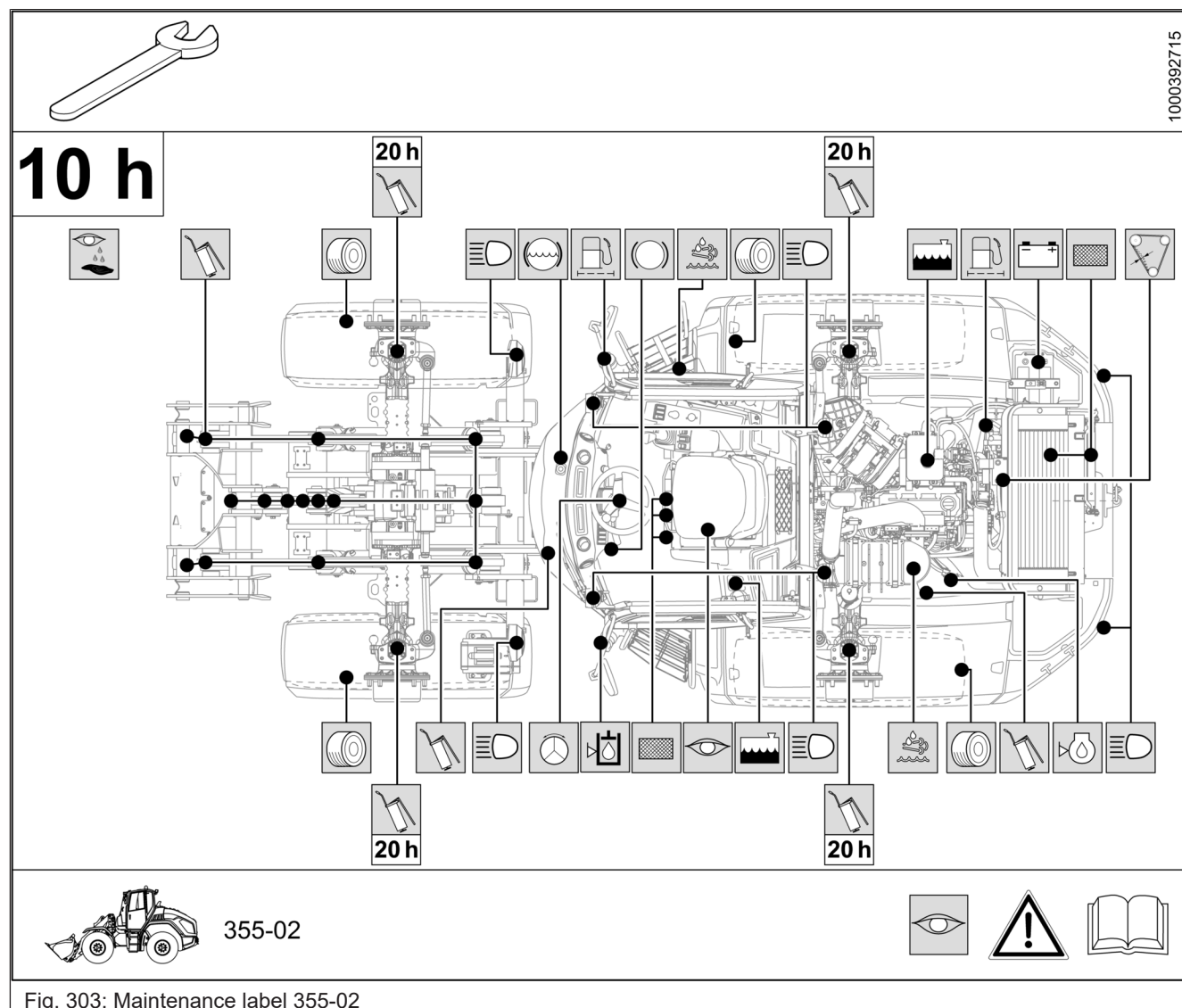


Fig. 303: Maintenance label 355-02

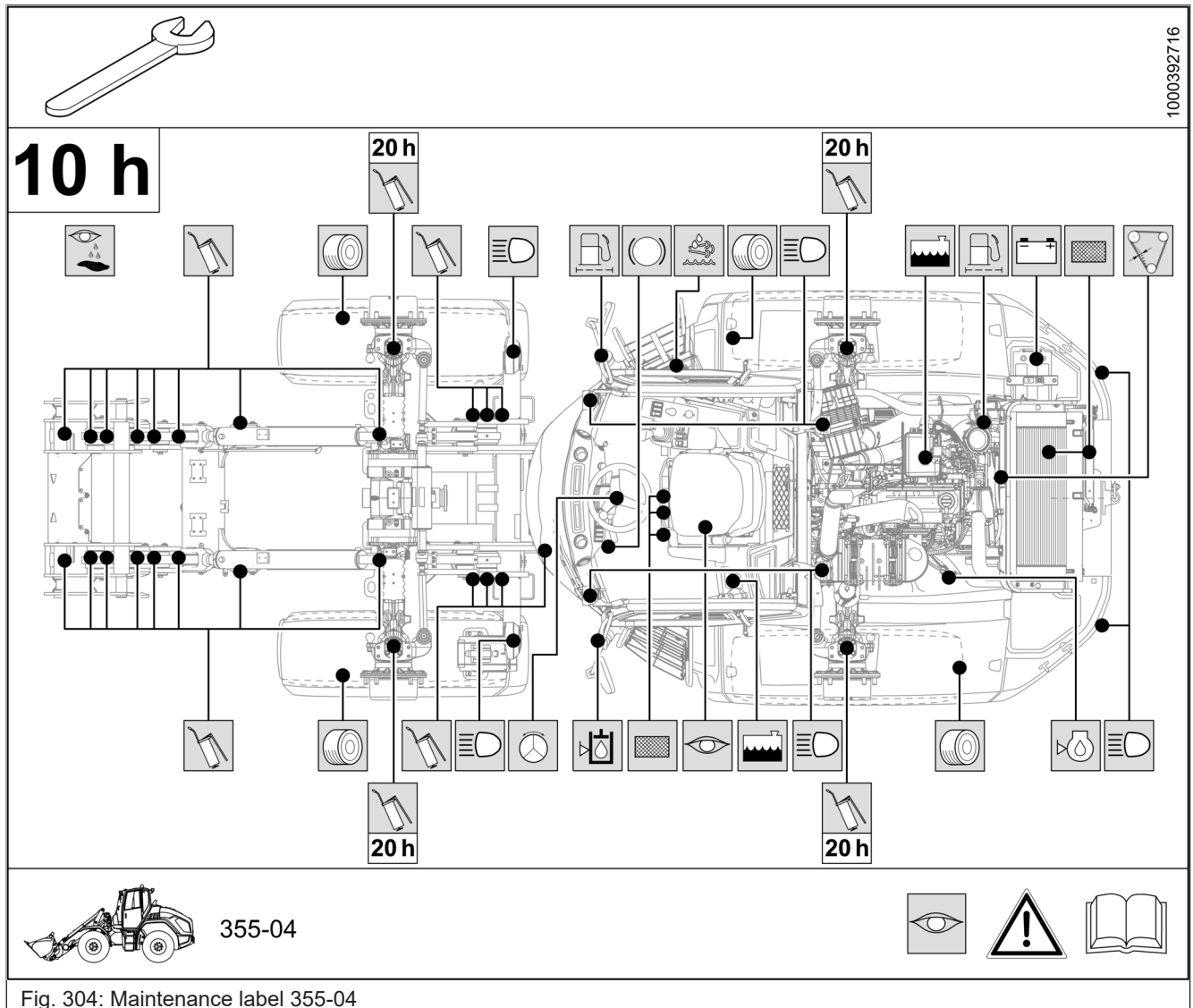

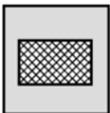


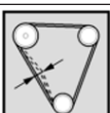





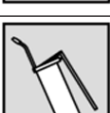

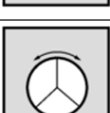


Fig. 304: Maintenance label 355-04

### 10.5.2 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!

Symbol	Explanation
	Perform a functional check of the lighting system!
	Check radiator for engine coolant and hydraulic oil for dirt. Clean if necessary!
	Check the coolant. Add coolant if necessary!
	Leakage check: Check for tightness, leaks and chafing: pipes, flexible lines and screw connections. Rectify 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.
	Check hydraulic oil level. Add oil if necessary!
	Perform a functional check of the braking system!
	Leakage check: Urea tank, urea pipes and filter! (Only for diesel engine with exhaust stage EU stage IV, EPA Tier 4f)
	Lubrication service! Lubricate the assemblies concerned.
	Check the charge condition and level of the battery.
	Perform a functional check and synchronize the steering system!

## 10.6 Vehicle fluids

### 10.6.1 Overview of vehicle fluids and filling quantities

Component/application		Vehicle fluid	SAE Class/Specification/Manufacturer designation	Temperature
Diesel engine	approx. 11 l	Engine oil <sup>1</sup> with filter	EUROLUB CARGO LSP SUPER SAE 10W-40	Year-round
			PLUS – 50 II 15W-30	-20 °C (-4 °F) – +30 °C (+86 °F)
			PLUS – 50 II 15W-40	-15 °C (+5 °F) – +40 °C (+104 °F)
Engine cooling <sup>2, 3, 4</sup>	Total approx. 23 l	Antifreeze compound <sup>5</sup>	12 l water (55 %) + 11 l (45 %) Antifreeze compound (HAVOLINE XLC)	Year-round -35 °C (-31 °F)
20 km/h gearbox	approx. 3.5 l	Transmission oil	SAE 85 W 90 EXTREME – GARD	Year-round
Transmission 30/40 km/h	approx. 3 l		SAE 90 API GL-5	
Planetary drives left/right, Front/rear axles	4 x 0.75 l		SAE 90 LS (hypoid gear oil) EXTREME – GARD LS 90	
Differential Front/rear axles	2 x 7.1 l			
Fuel system, fuel tank	approx. 140 l <sup>6</sup>	Diesel <sup>7</sup>	DIN EN 590 (EU) ASTM D975-94 (USA)	Year-round -44 °C (-47 °F)
Urea tank <sup>6, 8, 9</sup>	approx. 12 l	Urea solution <sup>10</sup> (SCR reducing agent)	DIN 70070 (DEU) ISO 22241-1 ASTM D7821 (USA)	Year-round -11 °C (12 °F)
Oil tank hydraulic system	approx. 125 l <sup>6, 11, 12</sup>	Hydraulic oil <sup>13</sup>	HVLP-D 46 HVLDP 46 (HYD0530) HY – GARD Hydrau – GARD 46 Hydrau – GARD 46 Plus Hydrau – GARD 46 Arctic	Year-round
		Biodegradable oil	AVIA Syntofluid 46 PANOLIN HLP Synth 46 BIO – Hydrau – GARD 46	

Component/application		Vehicle fluid	SAE Class/Specification/Manufacturer designation	Temperature
Grease nipples	As required	High pressure Multi-purpose grease	Lithium saponified Brand grease MPG-A3	Year-round
Mounting of pins, shafts <sup>14</sup>	As required	Special grease	Fuchs "gleitmo" 800	Year-round
Battery terminals	As required	Acid-proof grease	SP-B3	Year-round
Washer system	approx. 3.0 l	Cleaning solution <sup>15</sup>	1 l water (33%) + 2 l antifreeze compound (67%)	Year-round -20 °C (-4 °F)
Aggressive media <sup>16</sup>	As required	Anti-corrosion protection	ELASKON 2000 ML, ELASKON UBS light ELASKON Aero 46 special, ELASKON Multi 80	Year-round
Air conditioning <sup>17</sup>	About 1300 g	Refrigerant	R 134a	Year-round

- 1) Specification Deutz DQC III/IV LA
- 2) In order to avoid engine damage and possible loss of warranty, use only the coolant "DEUTZ cooling system protective agent" or as an alternative, an antifreeze released in compliance with DEUTZ DQC CA-14, CB-14, CC-14. Coolant may not be mixed with different specifications. Initial filling for vehicle delivery: CB-14.
- 3) Compound table Coolant compound table or manufacturer's indications on the packaging.
- 4) The coolants are continuously developed. For the current approved antifreeze agents, see: [http://www.deutz.com/service/betriebsstoffe\\_br\\_und\\_additive/kuehlsystemschutz.de.html](http://www.deutz.com/service/betriebsstoffe_br_und_additive/kuehlsystemschutz.de.html)
- 5) The antifreeze must be replaced every 2 years by an authorized service center
- 6) Deviations from the volume may be possible due to production tolerances.
- 7) If fuels that do not comply with DIN EN or ASTM (USA) are used, warranty rights shall not apply in case of diesel engine damage.
- 8) Refilling about 14 liters. Only an authorized service center may empty or clean the urea container.
- 9) To avoid damage and loss of any warranty on the system for exhaust gas aftertreatment, only the urea solutions released according to ISO 22241-1 (DIN 70070) may be used.
- 10) To avoid damage and loss of any warranty on the system for exhaust gas aftertreatment, only the urea solutions released according to ISO 22241-1 (DIN 70070) may be used. Only an authorized service center may empty or clean the urea container.
- 11) Total capacity of hydraulic system about 240 l.
- 12) Oil level in the middle of the sight glass
- 13) DIN 51 524
- 14) Before installing: lubricate the bolts, shafts and bearing with Fuchs "gleitmo" 800. After assembly: lubricate the shafts and bolts via grease nipples.
- 15) See manufacturer indications on the packaging. Pay attention to the antifreeze compound table.
- 16) Have the sealing checked and repaired at least once a year by ELASKON – see the ELASKON servicing pass supplied with the vehicle.
- 17) Maintenance work may only be carried out by an authorized service center.

## 10.6.2 Fuel specifications



### **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.



### **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 DEUTZ.
- ▶ Operation with RME/PME fuel (biodegradable diesel) or vegetable oils is prohibited!

The vehicle is equipped with a diesel engine with low exhaust emissions. In order to comply with the exhaust gas legislation, the diesel engine may only be operated with sulfur-free diesel.

In order to avoid damage to the diesel engine and the exhaust gas after-treatment, only the diesel engines listed in the table may be used!

Fuel specification	Cetane number	Use (°C)
DIN EN 590 (EU), ASTM D975-94 (USA)	Min. 49	Up to -44 °C (-47 °F) outside temperatures

Please contact your service partner if you require more information on fuel.

10

## 10.6.3 Urea solution specification (SCR reducing agent)



### **CAUTION**

#### **Health hazard due to urea solution!**

Urea solution may cause irritation in contact with the skin or eyes.

- ▶ Avoid contact with the skin, eyes and mouth.
- ▶ In the event of an accident, seek medical advice immediately.
- ▶ Ensure good ventilation.
- ▶ Wear protective equipment.



## NOTICE

### Damage caused by filling the urea tank with other media!

- ▶ Fill the urea tank only with urea solution.
- ▶ If the urea tank is filled incorrectly, empty and clean it.
- ▶ If a medium other than the urea solution has entered the line or the supply module, these must be replaced.



## Environment

### Urea is dangerous for the environment!

Collect the escaping urea solution with suitable containers and dispose of it in an environmentally friendly manner!

A high-purity, aqueous 32.5 % urea solution is used as the SCR reducing agent. This is known as DEF or AUS 32.

Labeling of SCR reducing agent	Standard	valid in
DEF or AUS 32	DIN 70070	Germany
	ISO 22241-1	worldwide
	ASTM D7821	USA

- The service life of urea solutions without quality loss is influenced by storage conditions. The urea solution crystallizes (freezes) at -11 °C (12.2 F°) and above +35 °C (95 F°) starts a hydrolysis reaction. This means it begins to break down slowly into ammonia and carbon dioxide.
- It is essential to avoid direct solar radiation on storage containers in unprotected conditions.
- Vessels containing urea must not be stored for longer than a year.
- Urea solution freezes from -11 °C (12.2 F°) ambient temperature. At ambient temperatures below -11 °C (12.2 F°), preheating of the SCR system is therefore necessary.
- The urea solution should remain in the tank for a maximum of four months. This must be documented.
- Empty and clean urea tank when shutting down.

## 10.6.4 Coolant



## Environment

### Disposable containers are harmful to the environment!

Dispose of throwaway containers according to national regulations.

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".

## 10.6.5 Operation with biodegradable oils



### 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 liquids [see – see "Operating/vehicle fluids and lubricants" on page 289](#). 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 tank (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 to mineral oils [see Maintenance plan on page 279](#).
- When using biodegradable oil, after every 500 hours of operation 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 type of biodegradable oil for these attachments to avoid mixtures in the hydraulic system.

## 10.7 Levels

### 10.7.1 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.

### 10.7.1.1 Fuel dispensers

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

### 10.7.1.2 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.

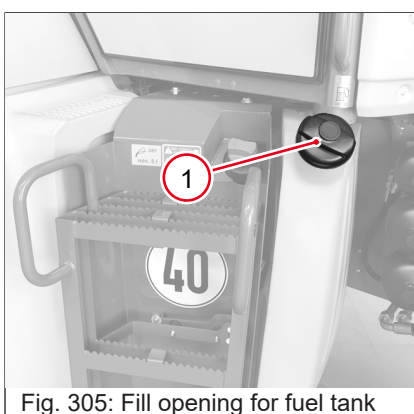


Fig. 305: Fill opening for fuel tank

#### **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 filler cap and refuel the fuel tank via the filling screen.
7. Close the fill opening carefully after refueling.

**10.7.1.3 Information on the fuel prefilter****⚠ 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.

**Information**

- ▶ Observe maintenance intervals [see Maintenance plan on page 279](#)
- ▶ Observe lubricant specifications [see Overview of lubricants on page 289](#)

**Environment**

- ▶ Collect condensation water/leaking fuel with a suitable container and dispose of in an environmentally friendly manner.

**Information**

- ▶ Have the fuel prefilter replaced by an authorized service center.

**10.7.1.4 Water separator maintenance****Environment****Collect condensation water**

Collect condensation water/leaking fuel with a suitable container and dispose of in an environmentally friendly manner.

**Information****Drain water!**

Drain water more often in frosty conditions, otherwise malfunctions may occur, even with winter diesel. Have the fuel prefilter replaced by an authorized service center.

### 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. Let the engine cool down.
6. Open the engine cover.

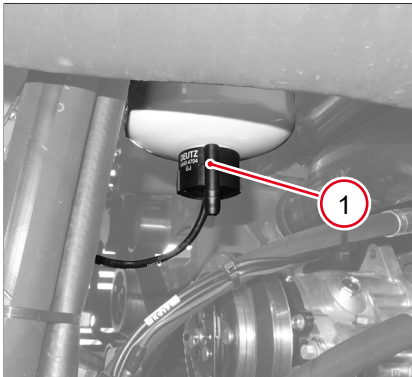



Fig. 306: Position of the water separator

The vehicle is equipped with a water separator on the fuel filter. Water in the fuel may cause functional disruptions and damage. The water separator on the fuel filter must be checked regularly.

If the symbol  appears on the display, check the fuel filter immediately. Collected water must be drained in the sight glass of the fuel filter.

### Drain water

1. Place a container under the water separator .
2. Remove the drain plug from the filter.
3. Remove the drain plug **1** from the filter.  
⇒ The collected water drains.
4. Firmly re-tighten the drain plug.
5. Bleed the fuel system.
6. Start the engine and check the fuel pre-filter for leaks.

#### 10.7.1.5 Bleeding the fuel system TCD 4.1



### **WARNING**

#### Explosion and fire hazard when handling fuel!

Can cause serious burns or death.

- ▶ Bleed the fuel system only if the engine is cold.
- ▶ Wear protective equipment.
- ▶ Never perform work on the fuel system near open flames or sparks.
- ▶ Do not smoke.
- ▶ Keep the maintenance area clean.



### **NOTICE**

#### Damage to the engine due to starting attempts during venting.

- ▶ Do not start the engine during the bleeding process.

If the fuel tank has been run empty or after maintenance work on the fuel system (e.g. changing the filter, cleaning the water separator, etc.), the fuel system must be bled. The bleed pump is located on the fuel pump.

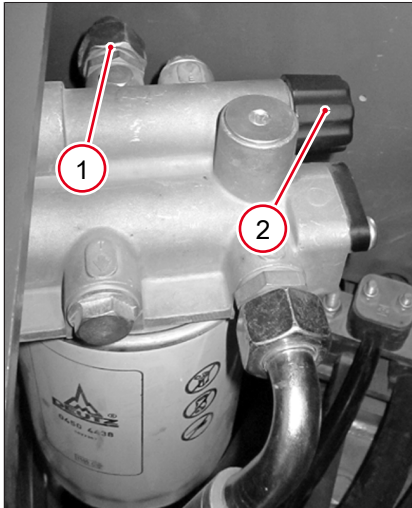


Fig. 307: Bleeding the fuel system

1. Place a container under the engine.
2. Fill up the fuel tank.
3. Loosen bleed screw 1.
4. Press the pump handle against the filter housing and turn it counter-clockwise.
  - ⇒ Bleed pump 2 is unlocked.
  - ⇒ The pump piston is pushed out by a spring.
5. Pump until no more air escapes at the bleed screw.
6. Tighten bleed screw 1.
  - ⇒ Tightening torque 6.5 Nm.
7. Keep pumping until a very strong resistance is felt and pumping is very slow.
8. Press the pump handle against the filter housing and turn it clockwise until it engages.
  - ⇒ Bleed pump 2 is locked.
9. Start the engine and run it for approx. five minutes at idling speed or at low load.
  - ⇒ Check the prefilter for leaks.
10. Close the engine cover.

#### 10.7.1.6 Bleeding the fuel system TCD 3.6



#### NOTICE

##### Damage to the engine due to starting attempts during venting.

- Do not start the engine during the bleeding process.

After running the fuel tank until empty or carrying out maintenance work on the fuel system (e.g. filter change, cleaning the water separator, etc.) the fuel system is bled automatically via the electrical fuel delivery pump as soon as the ignition is started.

#### Bleeding the fuel system

1. Engage the ignition.
  - ⇒ The electronic fuel pump is switched on for 20 seconds in order to bleed the fuel system and to build up the required fuel pressure.
2. Wait until the fuel pump has been switched off by the control unit.
3. Switch off the ignition.
  - ⇒ Repeat this procedure three more times until the fuel system is completely bled.
  - ⇒ The engine can be started.

## 10.7.2 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. Let the engine cool down.
6. Open the engine cover.

### 10.7.2.1 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.

When the control light  in the display lights up, check the engine oil level immediately.

- 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!

**10.7.2.2 Checking the engine oil level****⚠ 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**

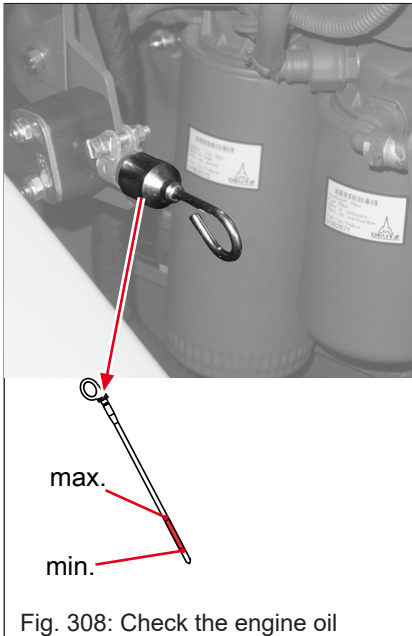
**Loss of output and engine damage due to wrong engine-oil level, and wrong or used engine oil.**

- ▶ 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 [see Maintenance plan on page 279](#)
- ▶ Observe lubricant specifications [see Overview of lubricants on page 289](#)



- ✓ Observe preparation for maintenance In the engine compartment!
- 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.
  - ⇒ The oil level must be between the minimum and maximum markings.
- 6. Plug the oil dipstick back in.

### 10.7.2.3 Adding engine oil



## NOTICE

**Using the wrong engine oil can damage the engine!**

- ▶ Only use engine oil with the correct specification.
- ▶ Use a funnel with a hose extension as a filling aid.



## Information

- ▶ Observe maintenance intervals [see Maintenance plan on page 279](#)
- ▶ Observe lubricant specifications [see Overview of lubricants on page 289](#)



## Environment

Use a suitable container to collect the engine oil as it drains and dispose of it in an environmentally friendly manner!

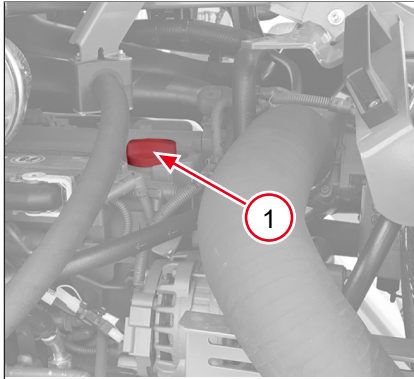


Fig. 309: Fill opening for engine oil

If the oil level is below the MAX mark, the engine oil must be refilled at the fill opening 1.

✓ Engine oil level was checked.

1. Open the cover of the fill opening for engine oil.
2. Add engine oil.
3. Check the engine oil level.
4. If necessary, continue filling with engine oil until the MAX mark is reached.
5. Close the fill opening.

### 10.7.3 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.

#### **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. Let the engine cool down.
6. Open the engine cover.

#### **10.7.3.1 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 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 289](#).
- Add sufficient antifreeze compound to the coolant (see table below).

Outside temperature	Water proportion <sup>1)</sup>	Anti-freeze share <sup>2)</sup>
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) In order to avoid engine damage and loss of warranty, only an approved coolant may be used, Filling quantities are approximate values..

### 10.7.3.2 Check the coolant level




## Information

- ▶ Observe maintenance intervals [see Maintenance plan on page 279](#)
- ▶ Observe lubricant specifications [see Overview of lubricants on page 289](#)



Fig. 310: Expansion tank for coolant

The cooling system is monitored via the temperature display in the digital display and via the control light  in the display.

Carry out the check before starting the engine.

At temperatures below +4 °C, check antifreeze compound.

The coolant level can be checked at the expansion tank in the engine compartment. Level must be between the MIN and MAX markings.

### 10.7.3.3 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.

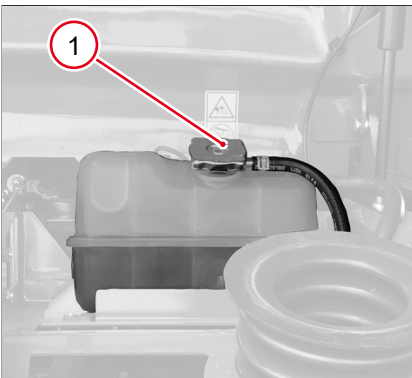


Fig. 311: Fill opening for cooling liquid

If the coolant level is below the MIN mark, the coolant must be refilled at the fill 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. If necessary, add coolant until the MAX mark is reached.
4. Close fill opening for coolant.

#### **Preparation**

1. Park the vehicle on level ground.
2. Lower the telescopic boom completely.
3. Apply the parking brake.
4. Stop the engine and remove the starting key.
5. Let the engine/cooling system cool down.

**Adding coolant**

1. Reduce excess pressure in the radiator. To do this, carefully unscrew the filler cap **1** and allow the pressure to escape.
2. Open the filler cap **1** completely.
3. Fill the coolant up to the middle of the sight glass **2**.  
⇒ Use branded antifreeze.
4. Close the filler cap **1**.

**Leakage check**

1. Start and warm up the engine.
2. Open heating circuit completely open [see Switch heating and air conditioning system on and off on page 190](#).
3. Stop the engine and remove the starting key.
4. Check the cooling system and the heating water circuit for leaks.  
⇒ Have leaks immediately repaired by an authorized service center.
5. Check the coolant level again.
6. If necessary, add coolant and repeat the procedure until reaching the correct coolant level.

**10.7.3.4 Checking the antifreeze compound**

The antifreeze compound prevents the coolant from freezing at sub-zero temperatures and protects the engine block and radiator from internal corrosion. Under normal conditions an antifreeze compound content of -20 °C to -30 °C is sufficient. The antifreeze concentration can be checked with an antifreeze tester.

**10.7.4 Fill level of hydraulic oil****NOTICE****Damage to hydraulic system due to incorrect fill level!**

- ▶ The hydraulic oil level must never fall below the MIN mark on the oil dipstick.
- ▶ When filling, never exceed the MAX mark on the oil dipstick.
- ▶ Check fill level regularly.
- ▶ Do not use the vehicle if the fill level is not correct.



## 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. Let the engine cool down.
6. Open the engine cover.

#### 10.7.4.1 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!

10

#### 10.7.4.2 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 [see Maintenance plan on page 279](#)
- ▶ Observe lubricant specifications [see Overview of lubricants on page 289](#)

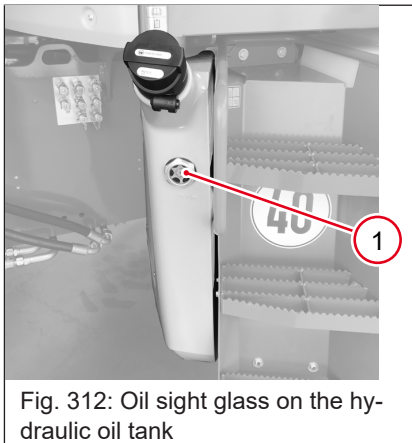


Fig. 312: Oil sight glass on the hydraulic oil tank

The sight glass 1 is visible on the hydraulic oil tank near the cab.

- ✓ Preparations for maintenance in the engine compartment were carried out.
- 1. Clean sight glass and check oil level.
  - ⇒ If the oil level in the sight glass is visible in the lower half: Oil level is OK.
  - ⇒ If the oil level in the sight glass is no longer visible in the lower half: Add hydraulic oil [see Adding hydraulic oil. on page 308](#)
- 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.

### 10.7.4.3 Adding hydraulic oil



## Information

- ▶ Observe maintenance intervals [see Maintenance plan on page 279](#)
- ▶ Observe lubricant specifications [see Overview of lubricants on page 289](#)



## 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

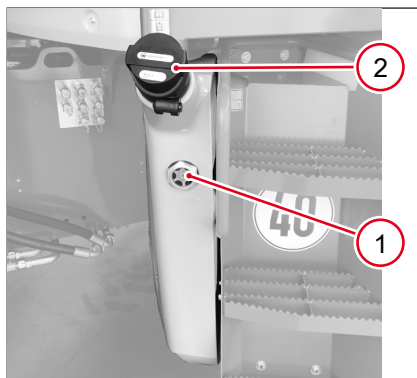


Fig. 313: Hydraulic oil tank

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 fill opening **2**.
2. Place a container under the hydraulic oil tank to collect the oil.
3. Insert the starting key and unlock the breather filter.
4. Open the fill opening / breather filter **2** by hand.
5. Top off hydraulic oil with the filter insert in place.
6. Check oil level at sight glass **1**.
7. Add oil if necessary and check the oil level again.
8. Tightly close the fill opening / breather filter **2** by hand.
9. Close the fill opening / breather filter with the starting key.

### 10.7.5 Window wiper water level

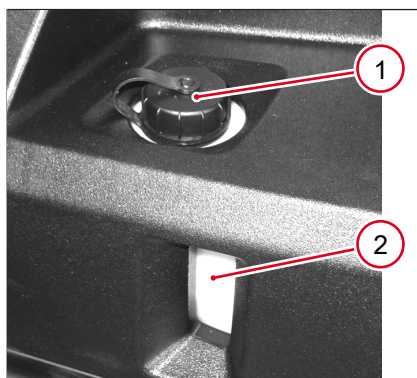


Fig. 314: Position of the window wiper tank

The tank **1** for the window wiper water is located in the cab to the left of the seat.

The fill level can be checked via the oil sight glass **2**.

The window wiper tank is located on the left-hand side of the rear of the cab. Add only clean faucet water. Add a suitable cleaning agent if necessary. Add antifreeze compound to the water in winter.

#### Checking the water for the window wiper system

Window wiper water must be between the MIN and MAX markings.

#### 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.

### 10.7.6 Fill level of urea



#### ⚠ CAUTION

##### Health hazard due to urea solution!

Urea solution may cause irritation in contact with the skin or eyes.

- ▶ Avoid contact with the skin, eyes and mouth.
- ▶ In the event of an accident, seek medical advice immediately.
- ▶ Ensure good ventilation.
- ▶ Wear protective equipment.



#### NOTICE

##### Damage to the exhaust gas aftertreatment system due to filling the urea tank with other media (e.g. diesel).

- ▶ Fill the urea tank only with urea solutions (SCR reducing agent).
- ▶ If the urea tank is incorrectly filled, have it emptied and cleaned by an authorized service center.
- ▶ If other media enter the lines or the transport module, these must be exchanged by an authorized service center.



#### Environment

##### Urea is dangerous for the environment!

Collect the escaping urea solution with suitable containers and dispose of it in an environmentally friendly manner!

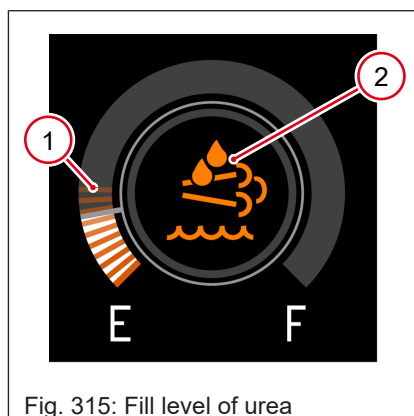


Fig. 315: Fill level of urea

If the urea solution level drops below 20 %, the level indicator **1** has reached the red range. At the same time, symbol **2** in the middle of the display lights up.

If the urea solution level drops below 10%, symbol **2** flashes and a warning tone sounds.

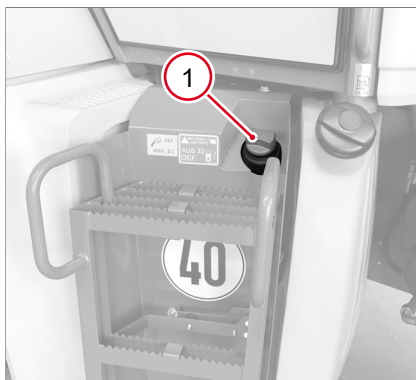


Fig. 316: Refuel with urea

The fill opening **1** is located at the entrance to the cab.

### Refuel with urea

1. Lower the loader unit to the ground.
2. Apply the parking brake.
3. Stop the engine and remove the starting key.
4. Clean the area around the fill opening.
5. Open the filler cap **1**.
6. Fill with urea solution.
7. Close the filler cap **1**.

Observe specification of urea solution [see Specification of SCR reducing agent \(urea solution\) on page 291](#).

## 10.8 Lubricating the vehicle and attachment

### 10.8.1 Preparing lubrication



#### Information

- Observe maintenance intervals [see Maintenance plan on page 279](#)
- Observe lubricant specifications [see Overview of lubricants on page 289](#)

1. Park the vehicle on level ground.
2. Apply the parking brake.
3. Secure the vehicle with a wheel chock.
4. Only raise the loader unit until all grease nipples can be accessed without any risk.
5. Turn the steering system for better access.
6. Stop engine and remove starting key.
7. Switch off the battery master switch.

### 10.8.2 Lubricating the planetary drive bearing

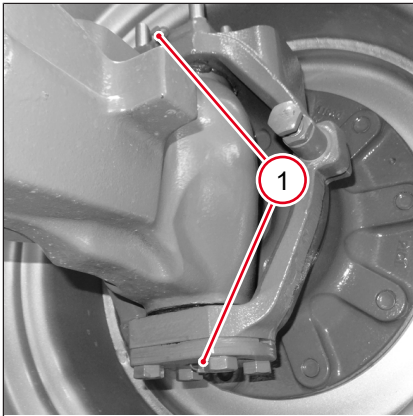
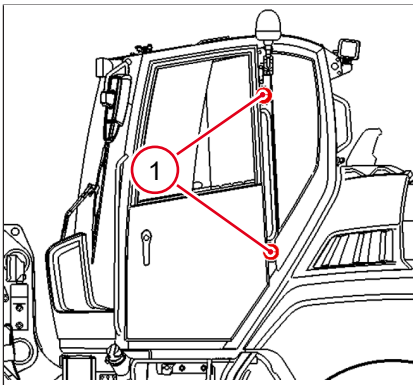


Fig. 317: Lubrication planetary gear

1. Preparing lubrication [see Preparing lubrication on page 311](#).
2. Lubricate grease nipple **1** (2x) per planetary drive bearing on the front and rear axle.

### 10.8.3 Lubricating doors



Lubrication points doors

1. Preparing lubrication [see Preparing lubrication on page 311](#).
2. Lubricate hinge **1**.

### 10.8.4 Lubricating the rear axle oscillation-type bearing

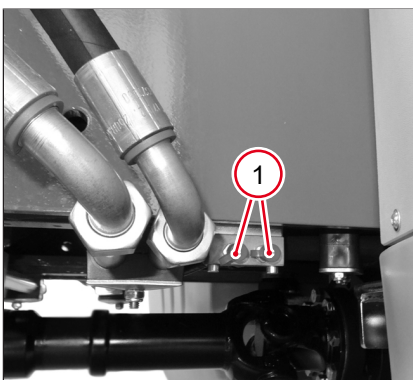


Fig. 318: Lubrication points oscillation-type bearings

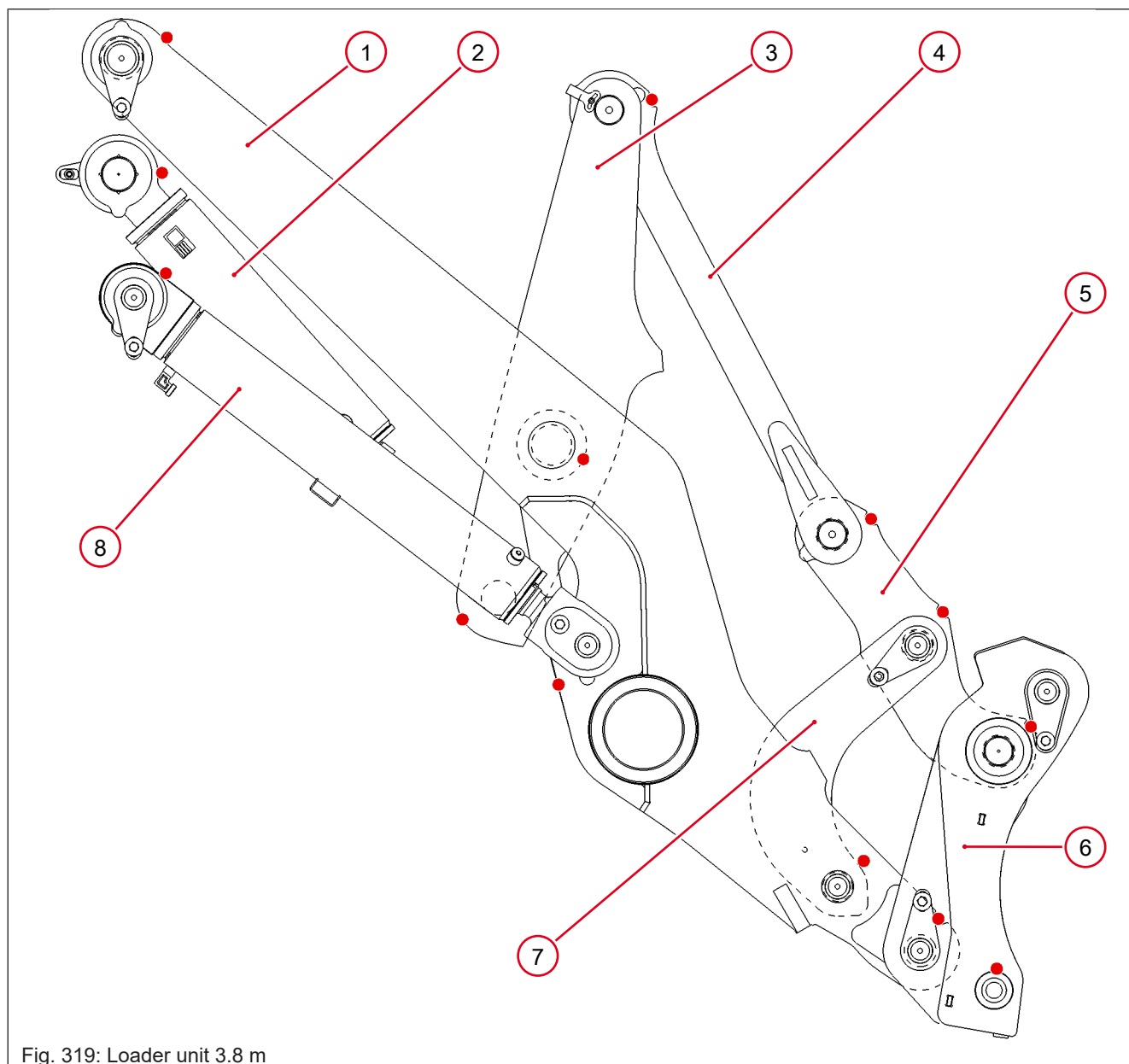
The vehicle has an oscillation-type rear axle.

- Observe preparation for lubrication

The grease nipples **1** are located on the side of the frame and are guided via hose lines to the axle bearing.

1. Prepare lubrication [see Preparing lubrication on page 311](#).
2. Lubricate the oscillation-type bearing grease nipple **1**.

### 10.8.5 Lubricating the loader unit



Lubrication point and number [x]		
1	Load arm	7
2	Tilt rams	2
3	Rear return lever	1
4	Rear traction bar	1
5	Front drawbar	3
6	Support	2
7	Front return lever	1
8	Lifting cylinder	2

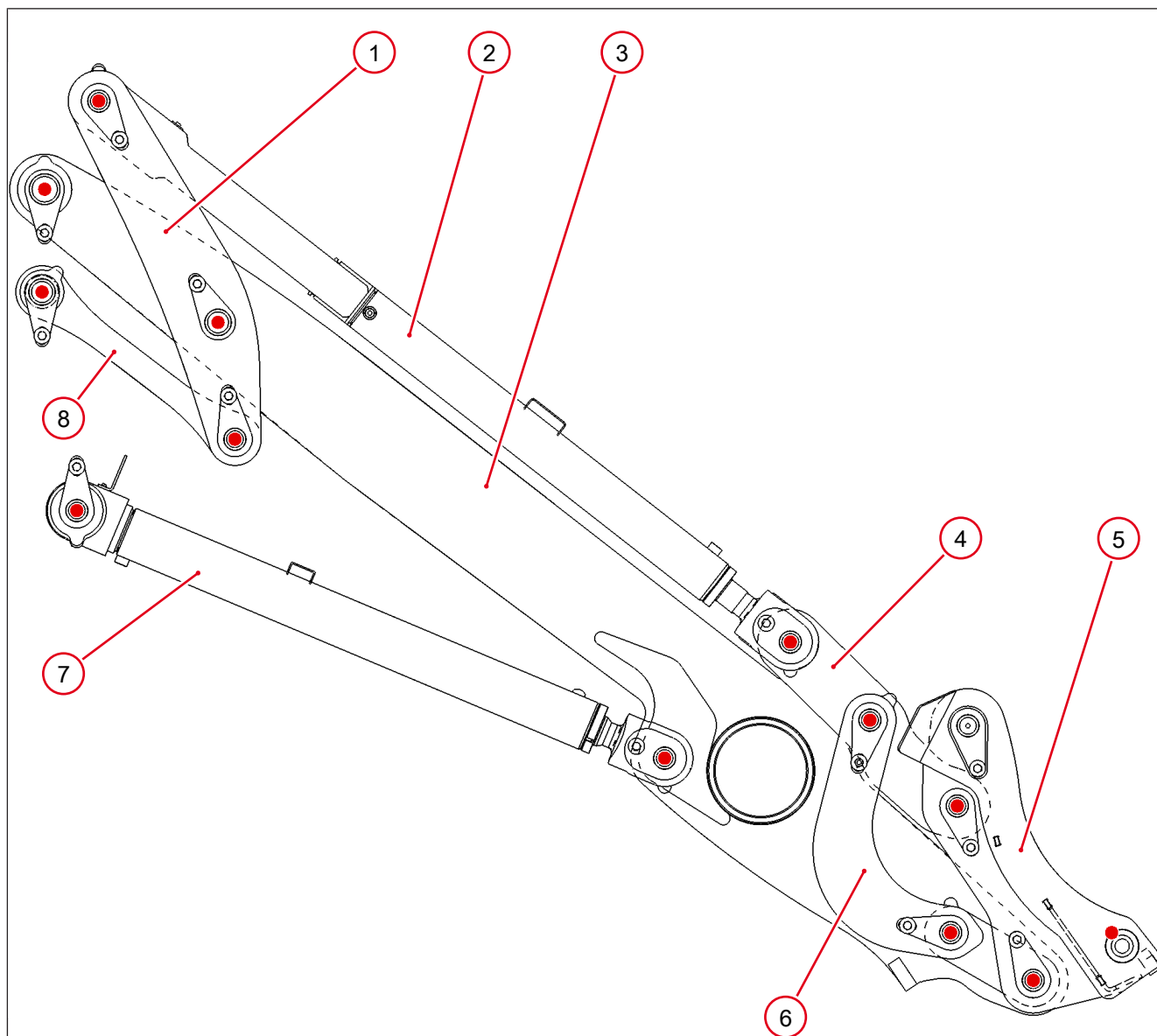


Fig. 320: Loader unit 4.2 m

Lubrication point and number [x]		
1	Rear return lever	6
2	Tilt rams	1
3	Load arm	12
4	Front drawbar	6
5	Support	10
6	Front return lever	4
7	Lifting cylinder	2
8	Rear traction bar	4

### Lubricate

1. Position the power coupler horizontally.
2. Prepare lubrication [see Preparing lubrication on page 311](#).
3. Apply grease to the lubrication points with a grease gun.

## 10.8.6 Central lubrication system



### NOTICE

#### Damage caused by non-lubricated, moving parts

Not all lubrication points on the vehicle are connected to the central lubrication system (e.g. the locking cylinders on the power coupler). This can cause damage to vehicle parts if they are not lubricated.

- Lubricate lubricating points not connected to the central lubrication system manually.

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.

10

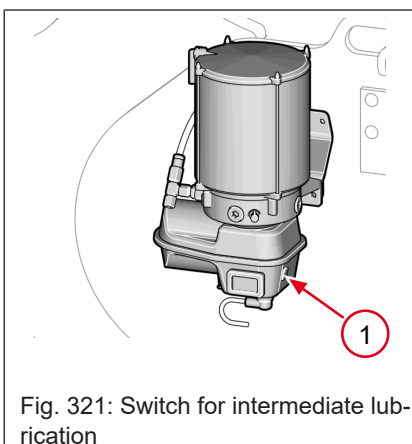


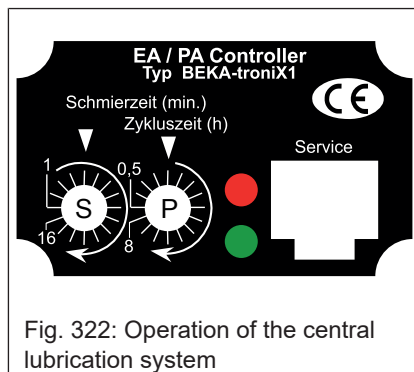
Fig. 321: Switch for intermediate lubrication

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.



### 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 **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.

### Repair work



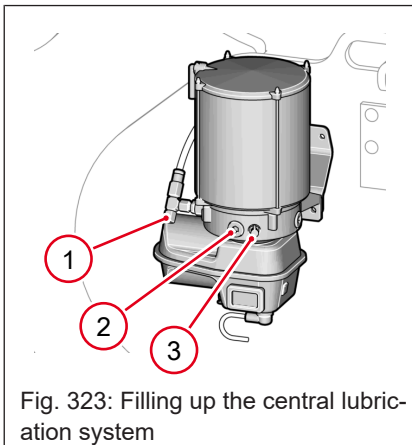
#### NOTICE

##### Damage to the vehicle due to non-lubricated lubrication points!

If lubricant escapes at the central lubrication system position **1**, 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!



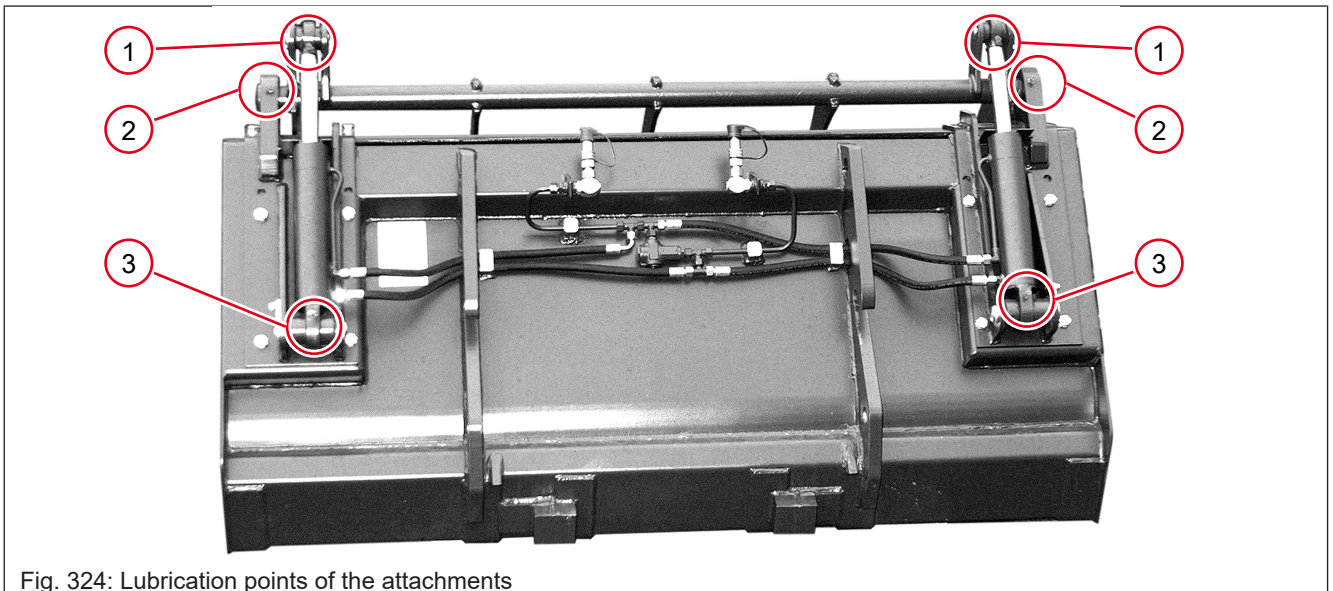
### Filling up the central lubrication system

The central lubrication system can be filled with a hydraulic grease gun via grease nipple **3** or via a filling coupling **2**.

For the specifications of the multi-purpose grease: Overview of vehicle fluids and fill quantities.

To ensure ventilation of the central lubrication system, only fill the central lubrication system up to max. level **1**.

## 10.8.7 Lubricating attachments



For the vehicle there are various attachments. However, the lubrication work is in principle the same for all attachments with hydraulically movable components. The figure therefore is only an example.

1. Preparing lubrication [see Preparing lubrication on page 311](#).
2. Grease the bearings of the moving part via grease nipple **2** (2x).
3. Grease the bearings of the hydraulic cylinder via the grease nipples **1** and **3** (4x).

## 10.8.8 Greasing the trailer coupling

### 10.8.8.1 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.

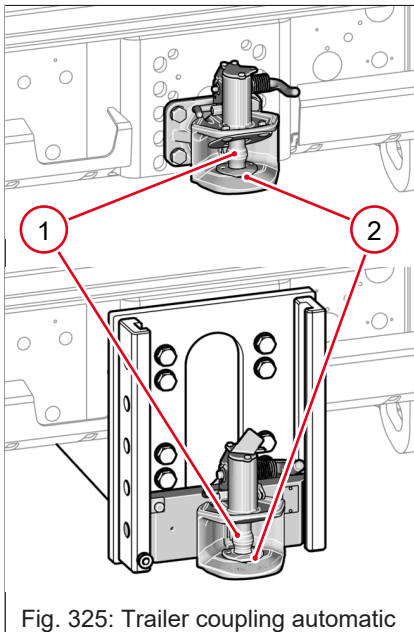
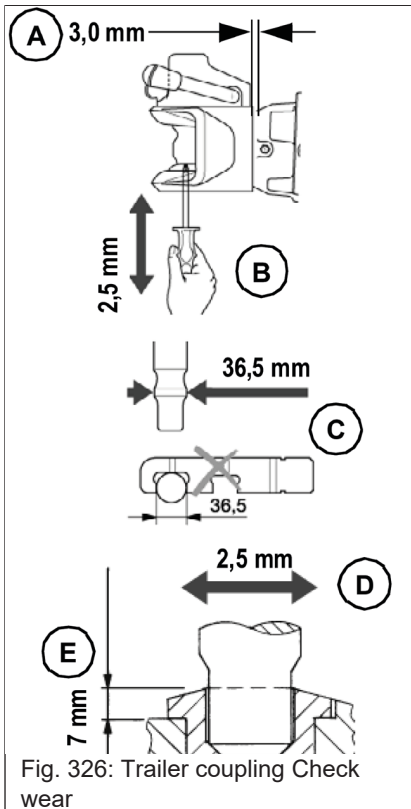


Fig. 325: Trailer coupling automatic

#### **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!

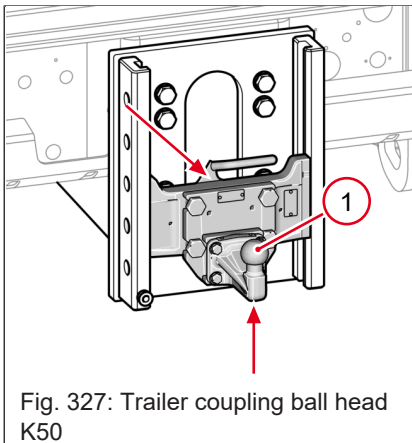
1. Close the trailer coupling.
2. After cleaning, lubricate the coupling pin **1**, the support ring **2** and the drawbar eye with tough, waterproof grease.
3. Apply tough water-proof grease to the lower bearing of the coupling jaw.
4. Apply grease to the grease zerk on the joint.
5. Lubricate all moving parts of the height adjustment.



### Check the ball hitch for wear

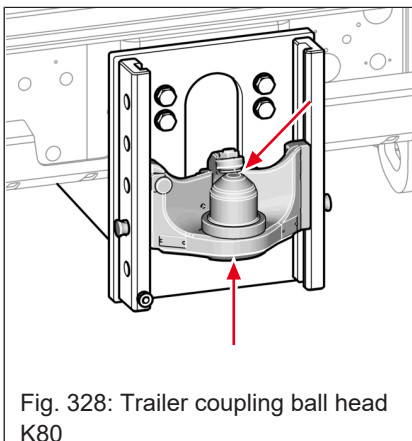
1. Coupling head Bearing - Check longitudinal clearance **A** :  
⇒ Move the uncoupled coupling head with force in travel direction.
2. Coupling head – Check height clearance:  
⇒ Open the coupling.  
⇒ Move the coupling head up and down with the appropriate tool (mounting iron).  
⇒ Clearance **A** 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.

#### 10.8.8.2 Ball head of the trailer coupling



### Cleaning and lubricating the trailer coupling

1. After cleaning, lubricate ball head **1** and dome with tough, water-proof grease.
2. Apply grease to the grease nipple under the trailer ball.
3. Lubricate all moving parts of the height adjustment.
4. Check all fastening screws of the towing gear regularly for a firm seat or have them retightened by an authorized service center to the specified tightening torque.



### 10.8.8.3 Piton trailer coupling

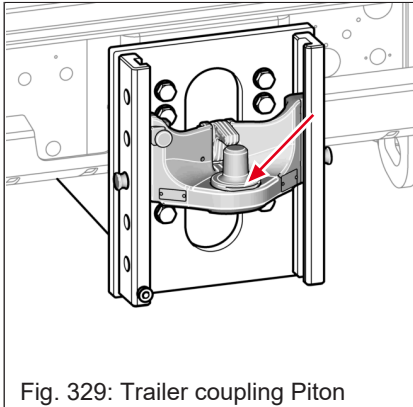


Fig. 329: Trailer coupling Piton

#### 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.

### 10.8.8.4 Mechanical trailer coupling

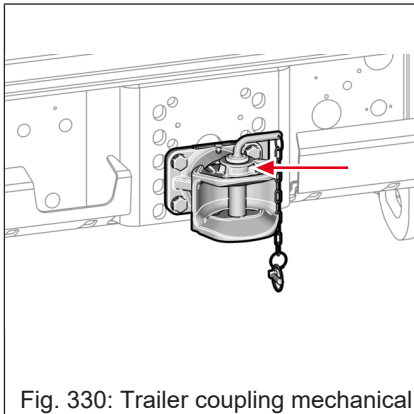


Fig. 330: Trailer coupling mechanical

#### 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.

### 10.8.8.5 Hitch trailer coupling

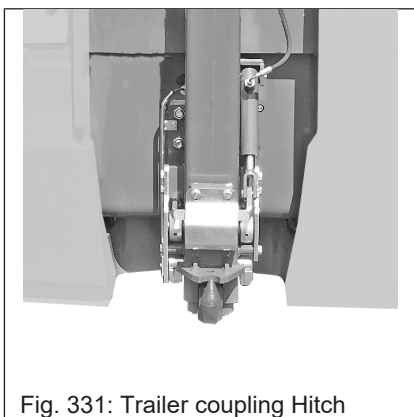


Fig. 331: Trailer coupling Hitch

#### Cleaning and lubricating the trailer coupling

1. Clean the trailer coupling.
2. Apply grease to the grease nipple.
3. Lubricate all moving parts (pad tracks) of the hitch trailer coupling.

## 10.9 Cleaning and care

### 10.9.1 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.



#### **NOTICE**

##### **Damage to vehicle due to cleaning work!**

- ▶ When cleaning the vehicle, pay particular attention to the underside of the vehicle. Do not allow dirt to collect on the engine or gearbox.
- ▶ Do not clean sensitive electrical components such as alternators, fuse boxes, control levers, etc. with a high-pressure cleaner.



#### **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 safety glasses and protective clothing.
- Do not aim the compressed air at the skin or at other people.
- Do not use compressed air for cleaning your 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.

## 10.9.2 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

### Clean the vehicle from the outside

1. Clean the outside and underside of the vehicle with a high-pressure cleaner.
2. Ensure that the engine and gear unit are free of dirt.

### 10.9.3 Cleaning the cab



#### **CAUTION**

##### **Risk of injury from dirty or defective automatic seat belts!**

Dirty or malfunctioning automatic seat belts can prevent them from rolling up properly and impair the operator's safety!

- ▶ Clean the seat belt with water and a mild soap solution.
- ▶ Only wind the seat belt when it is dry.
- ▶ Have a malfunctioning belt immediately replaced by an authorized service center.



#### **CAUTION**

##### **Risk of accident through malfunctions of the accelerator pedal!**

Dirt accumulation and objects in the area of the accelerator pedal can result in malfunctions and accidents.

- ▶ Do not place any loose objects in the cab.
- ▶ Keep cab clean.

### **The following aids are recommended for cleaning:**

- Broom
- Vacuum cleaner
- Damp cloth
- Bristle brush
- Water with mild soap solution

### **Cleaning the seat belt**

1. Check seat belt for dirt and damage.
2. Clean the seat belt when installed with mild soapy water. Do not clean chemically as this will destroy the tissue.
3. Have defective seat belts replaced immediately by an authorized service center.

**10.9.3.1 Clean the pedals**

1. Park the vehicle on firm and level ground.
2. Apply the 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 starting key.
  - ⇒ Clean pedals thoroughly.
  - ⇒ Clean the floor area under the pedals.
  - ⇒ Thoroughly clean the inside of the foot area.

**10.9.4 Clean engine and engine compartment****⚠ 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****<otor damage due to moisture in electronics after cleaning!**

When cleaning the engine with a water or steam jet, the moisture penetrating the electronics causes it to fail and leads to engine damage!

- ▶ Do not clean electrical transducers such as temperature and oil pressure switches or control units with a high-pressure cleaner.
- ▶ Protect electrical parts, e.g. three-phase generators, cable connectors, relays, etc. from moisture.

**The following aids are recommended for cleaning:**

- High-pressure cleaner
- Steam jet

**Clean engine and engine compartment**

- ✓ Engine is stopped and secured against starting.
  - ✓ Engine has cooled down.
  - ✓ Electrical components are protected from water.
1. Carefully clean the engine and engine compartment with a water or steam jet.
  2. If electronic components in the engine compartment have come into contact with water, then dry them with compressed air and spray them with contact spray.

**10.9.5 Clean attachments****The following aids are recommended for cleaning:**

- High-pressure cleaner
- Steam jet

**Clean attachments**

1. Clean the attachment at regular intervals.
2. Modify the cleaning intervals as required by the work conditions.

**10.9.6 Checking screw connections**

1. Check all threaded fittings regularly, even if they are not listed in the maintenance plans.
2. Immediately tighten loose connections, Technical data

**10.9.7 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.

**10.9.8 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. Let the engine cool down.
6. Open the engine cover.

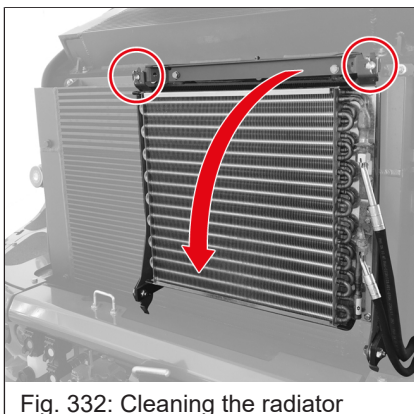
**10.9.8.1 Clean radiator with compressed air**

Fig. 332: Cleaning the radiator

- ✓ Preparation of the maintenance in the engine compartment is carried out.
1. Loosen the lock on the condenser and fold the condenser forward.
  2. Clean the radiator fins by blowing compressed air from either side of the radiator.
  3. Remove dirt in the intake area of the radiator.
  4. After cleaning, fold back the capacitor and lock it securely in the holder.
  5. Close the engine cover.
- ⇒ The vehicle is operational.

### 10.9.8.2 Clean radiator with reversing fan



#### **CAUTION**

##### **Respiratory irritation from dusty air!**

Ignoring this can cause injury to the respiratory tracts.

- ▶ Do not perform the radiator cleaning with the reversing fan in enclosed areas.
- ▶ Ensure that nobody is in the area of the vehicle.



#### **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.



#### **Information**

##### **Radiator cleaning with reversing fan**

- ▶ The blowing clear of the radiator can take place at a reasonable rpm (1000–1200 rpm) of the diesel engine and during the work operation!
- ▶ The radiator cleaning may not be done while driving on public roads.

The vehicle can be equipped with a reversing cooling fan (reversing fan).

After activation, the rotational direction of the radiator fan is reversed and the radiator is blown free of collected dirt.

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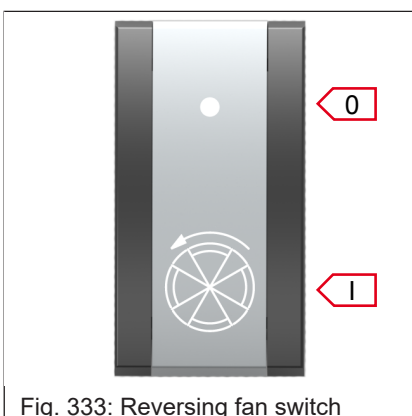




Fig. 333: Reversing fan switch

- While the motor is running, briefly press the reversing fan button in position I (engine speed approx. 1000 – 1200 rpm).
  - ⇒ The fan rotates the other way round with a certain delay.
  - ⇒ Control light  illuminates.
  - ⇒ The fan is in cleaning mode and dirt is removed from the radiator. This can be seen by the dust blown out from the intake screen on the engine cover.
  - ⇒ After approx. one minute, the radiator fan automatically switches back to normal cooling mode.
  - ⇒ The control light  goes out.

### 10.9.9 Cleaning the air 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.

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.

#### 10.9.9.1 Removing and cleaning the main filter

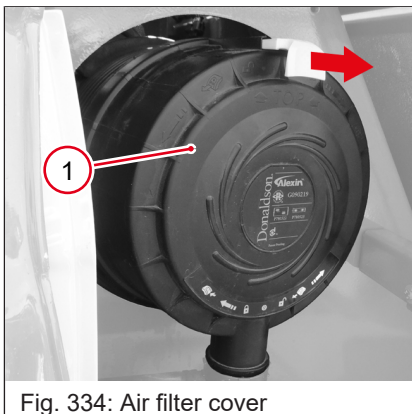


Fig. 334: Air filter cover

##### Removing the main filter

- ✓ Maintenance access to the air filter is open [see Maintenance access to the vehicle on page 274](#).

1. Loosen the fasteners on the cover **1**.
2. Remove the cover.

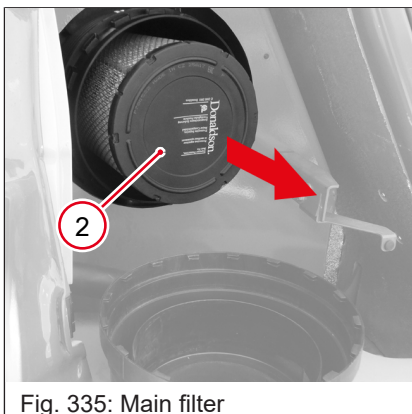


Fig. 335: Main filter

3. Pull out main filter **2**.  
⇒ The safety filter remains in the housing.
4. Clean the main filter by knocking it gently and blowing compressed air from inside toward outside.
5. Replace the main filter if it is too dirty.

After cleaning the main filter, the symbol on the display must not light up when the engine is running. If this is still the case, replace the main filter.

### 10.9.9.2 Checking and replacing the safety filter



#### NOTICE

**Technical damage from the incorrect assembly of the air filter!**

- ▶ The safety filter must be firmly seated in the housing.
- ▶ Do not force the main filter into the housing.

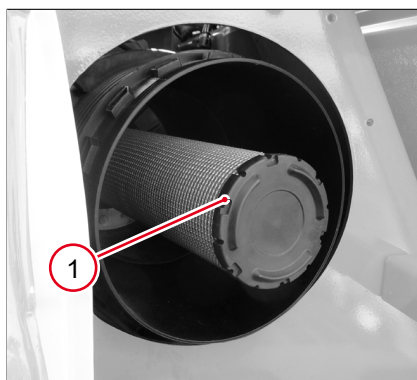


Fig. 336: Safety filter

#### Remove safety filter

1. Pull out the lug on the cover.
2. Remove the cover.
3. Pull out oil main filter.  
⇒ The safety filter can be seen now.
4. Pull out the safety filter at the lugs 1.
5. Install a new safety filter.

#### Installing the safety filter

The air filter is assembled in reverse order. Make sure that the air filter is firmly seated in the housing. If the main filter is difficult to install, the safety filter is not correctly seated in the housing. The main filter may be damaged.

1. Insert safety filter.
2. Insert the main filter into the housing.
3. Do not force the main filter into place.
4. Reapply cover. The dust valve must be pointing downwards.
5. Push in the lug.

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### 10.9.10 Cleaning/changing cab ventilation filter



#### Information

- ▶ Observe maintenance intervals [see Maintenance plan on page 279](#)
- ▶ Observe lubricant specifications [see Overview of lubricants on page 289](#)

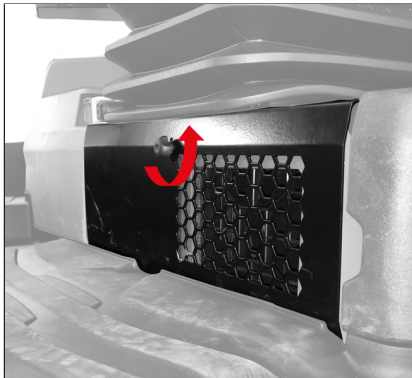


Fig. 337: Air conditioning system cover

The dust filter is located in the cab under the seat.

1. Turn the lock clockwise.
2. Loosen the cover.

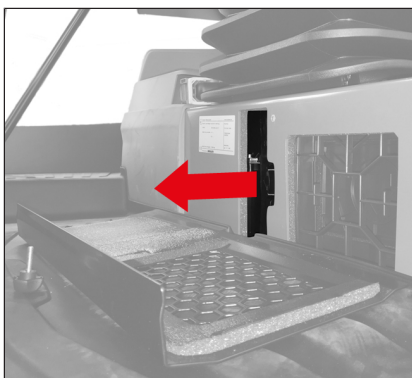


Fig. 338: Filter air conditioning system

3. Pull out the filter and check for damage.
4. Knock out filter element on both sides of a plate or blow out with compressed air from inside to outside or wash out with water and allow to dry.
5. Replace filter if necessary.
6. Clean the inside of the air cleaner (filter) housing.
7. Insert filter.
8. Install the cover.

### 10.9.11 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. Let the engine cool down.
6. Open the engine cover.

#### Cleaning the condenser

1. Loosen the lock on the condenser and fold the condenser forward.
  2. Clean the condenser with water by blowing or spraying (do not use a high-pressure cleaner).
  3. After cleaning, fold back the capacitor and lock it securely in the holder.
  4. Close the engine cover.
- ⇒ The vehicle is operational.

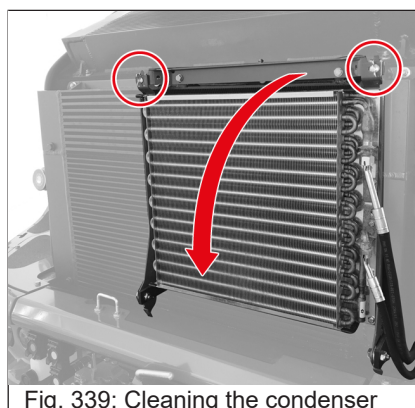


Fig. 339: Cleaning the condenser

## 10.9.12 Check air conditioning 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**

#### **Injury hazard due to damaged hoses!**

Escaping refrigerant can cause serious injury or death.

- ▶ Do not open pipes, hoses or other components containing refrigerant.
- ▶ Avoid all contact with the refrigerant.
- ▶ Do not weld onto parts of the refrigerant circuit and in the immediate vicinity of these parts.

- ✓ Functional and visual checks must be carried out by the driver/operator!
- ✓ All maintenance and repair work may only be performed by an authorized service center.

1. Switch off the battery master switch.
2. Carry out maintenance work only with the heating and air conditioning system switched off.

### **Check the filling of the air conditioning system**



### **Information**

#### **Air-conditioning system refill**

The initial filling of the air conditioning system is noted on the label. The label is attached to the side plate on the radiator. Use only the refrigerants for refilling the air-conditioning system that are indicated on the label.

The air conditioning system must be inspected and serviced at least once a year by an authorized service center.

### Carry out a visual inspection of the hoses and electric plug connections

1. Apply the parking brake.
2. Stop the engine and remove the starting key.
3. Check hoses for damage and chafing points.
4. Check the electric connections for correct condition and tightness.
5. Check belt tension [see V-belt/toothed belt on page 346](#).

## 10.9.13 Vehicle preservation

### 10.9.13.1 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	<p>Before applying the wax:</p> <ul style="list-style-type: none"> <li>• Contact surfaces treated with contact spray and plug connection re-established.</li> <li>• The connecting parts of the fuel tank sensor must be provided with a particularly thick corrosion protection layer.</li> </ul>
All vehicle parts e.g. Axles, gearbox, trim panels, servicing lids, loader unit, quickhitch	<p>with the exception of:</p> <ul style="list-style-type: none"> <li>• Piston rods (chrome layer)</li> <li>• Driver's cab, cab bearing</li> <li>• Engine cover, engine bearing</li> <li>• Air filter</li> <li>• Ballast weight</li> <li>• Mounting surface for attachments on the frame</li> <li>• Radiator and insulating mat</li> <li>• Mudguards, rubber and plastic parts</li> <li>• Lighting components</li> </ul>

Component	Remark
Flange surfaces	for example axles, diesel engine and cab bearing: • Seal joints after assembly with anti-corrosion wax.

### 10.9.13.2 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 [see Maintenance plan on page 279](#)
- ▶ Observe lubricant specifications [see Overview of lubricants on page 289](#)

**10.9.13.3 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.

**10.9.13.4 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.

**10.9.13.5 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.

## 10.10 Braking system

### 10.10.1 Checking braking system

#### Check service brake and parking brake



#### **WARNING**

##### **Accident hazard due to malfunctioning brakes!**

The braking system is a crucial safety component. 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.
  - ⇒ If the brake fluid level drops between two checks, there is a defect in the braking system.
- ▶ 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 leaks.
3. Have defective brake lines replaced by an authorized service center immediately.

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### Check compressed air braking system

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#### **WARNING**

##### **Too little pressure in the braking system!**

If the air pressure is less than five bar, the braking effect of the compressed air braking system is insufficient. Insufficient pressure can lead to accidents with serious injuries or death.

- ▶ Before starting any journey with the trailer coupled, check the compressed air indicator on the display.
  - ⇒ The display must be above the red LO range.
- ▶ If the air pressure falls into the red LO range while driving, immediately stop the vehicle and rectify (have rectified) the cause for the pressure loss.

---

The compressed-air brake is a safety part. Improper maintenance can lead to a failure.

1. Check brake lines daily for damage and tightness (air noise).
2. Check compressed air lines, container, compressor, valves and connection couplings for damage (visual check).
3. Have defective brake lines replaced by an authorized service center immediately.

## 10.11 Steering system

### 10.11.1 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. With the vehicle at a stand still, carry out uniform steering movements to the left and right up to the stop.  
⇒ There must be no jerky movements or noises.
3. Select steering mode.
4. Turn the steering wheel to the left and right with the engine running and at walking speed.  
⇒ Turn the wheels according to the selected steering mode.
5. Check the tracking (synchronization) of the front and rear axle wheels.
6. If necessary, synchronize the steering system Synchronizing the steering system.  
⇒ 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.

### 10.11.2 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.

## **10.12 Electrical system**

### **10.12.1 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.

### **10.12.2 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 performing maintenance on the electrical system, pay particular attention to ensuring good contact in leads 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.

### **10.12.3 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.

### 10.12.4 Checking/replacing 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**

##### **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.



#### **NOTICE**

##### **Damage to vehicle electronics due to incorrect battery capacity**

- ▶ To avoid damage to the vehicle electronics, only use batteries with the specified capacity.



#### **Information**

##### **Battery master switch**

The vehicle has an automatic battery master switch. 120 seconds after switching off the engine, the entire electrical system is disconnected from the battery. The relay is activated again if all electric consumers were not switched off prior to switching off the engine. The activated consumers are supplied with voltage from the battery and discharge the battery.

- ▶ Switch off all electric consumers before switching off the engine.



## 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.

The battery is located at the rear of the vehicle.

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. Let the engine cool down.
6. Open the engine cover.

### Check the battery

- ✓ Preparation of maintenance in the engine compartment has been carried out.
- ✓ Remove the cover plate.
- ✓ Access to battery is established [see Battery on page 274](#).
- Check the fluid level.
  - ⇒ The fluid level must be between the MIN **1** and MAX **2** markings.

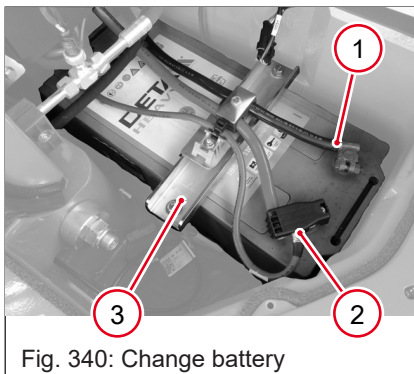


Fig. 340: Change battery

### Replace the battery

- ✓ Preparation of maintenance in the engine compartment has been carried out.
  - ✓ Remove the cover plate.
  - ✓ Access to battery is established [see Battery on page 274](#).
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 (-).

## 10.12.5 Check/maintain relays and fuses



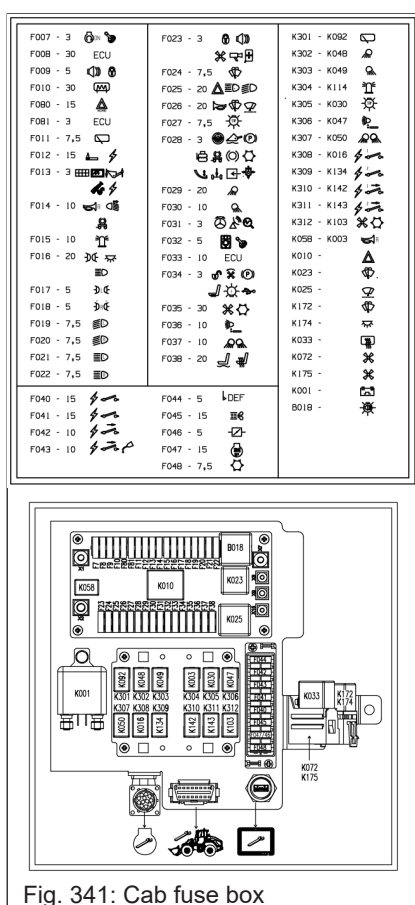
### NOTICE

#### 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 fuses of various ratings and main fuses. The fuses are located in different fuse boxes in the cab and in the engine compartment.



#### 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 275](#).
1. Remove the defective fuse and/or relay from the relay bracket.
  2. Insert the new fuse or relay into the corresponding relay bracket  
Technical data.  
⇒ Designations and performance data of the fuses and relays.
  3. Reinstall the cladding [see Fuse box Cab on page 275](#).
  4. Check the electrical system for correct function.

Fig. 341: Cab fuse box

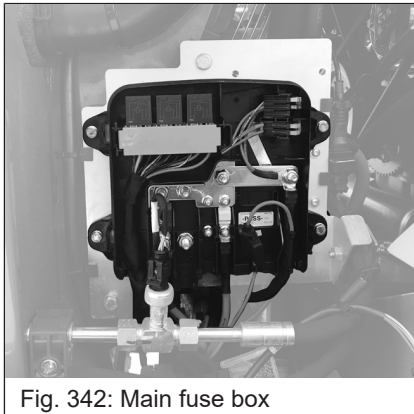


Fig. 342: Main fuse box

**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 Technical data.
- 4. Mount the cover to the fuse box.
- 5. Check the electrical system for correct function.

## 10.13 Working hydraulics

### 10.13.1 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 telescopic boom on the lift cylinder with a safety prop to prevent unintentional lowering.
- ▶ Release the pressure in all lines carrying hydraulic oil prior to any maintenance and repair work.
- ▶ Only 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.
- ▶ If the filter element is contaminated with metal splinters, notify an authorized service center immediately.
- ▶ Only top up the hydraulic oil when the engine is switched off.

#### **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.

**10**

### **10.13.2 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 [see Maintenance plan on page 279](#)
- ▶ Observe lubricant specifications [see Overview of lubricants on page 289](#)

- 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.

### 10.13.3 Check the membrane accumulator

#### Safety instructions for checking the membrane accumulators



## ⚠ 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 [see Maintenance plan on page 279](#)
- ▶ Observe lubricant specifications [see Overview of lubricants on page 289](#)

### 10.13.4 Checking the condition and age of hydraulic hoses



## Information

- ▶ Observe maintenance intervals [see Maintenance plan on page 279](#)
- ▶ Observe lubricant specifications [see Overview of lubricants on page 289](#)

## 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.



Fig. 343: Date of manufacture Hydraulic hose

- 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.
- Replace hydraulic hoses every 6 years from the date of manufacture, even if they do not seem to be damaged.

In this context, reference is also made to the "Safety rules for hydraulic lines" issued by the Central Office for Accident Prevention and Occupational Medicine and to DIN 20066, TI. 5.

The date of manufacture (month or quarter and year) is indicated on the flexible line.

Example:

- "2Q/19" indicates production in the 2nd quarter of 2019.

### 10.13.5 Checking the locking function for the joystick

Check the locking function of the joystick regularly. Carry out the function test only when the vehicle is at a standstill.

When the locking function is switched on, the loader unit must not move when the joystick is operated. If the loader unit does move, there is a technical defect which must be repaired by an authorized service center. Do not put the vehicle back into operation

To operate the joystick lock function, [see Using the joystick lock function on page 197](#).

### 10.13.6 Checking the function of the lock

Check the mechanical and/or hydraulic locking mechanism for attachments regularly. Carry out the function test only when the vehicle is at a standstill. If a fault is detected in the hydraulic locking system, do not operate the vehicle and contact an authorized service center.

To operate the lock [see Coupling the attachment on page 209](#) and [see Uncoupling the attachment hydraulically/mechanically on page 217](#).

### 10.13.7 Checking the hydraulic control circuits for function

A hydraulically operated attachment is required to control the hydraulic control circuits.

The following functions must be checked and functional.

- All functions of the front hydraulic connections, if present, [see operate front hydraulic connections on page 220](#).
- All functions of the rear hydraulic connections, if present, [see operate rear hydraulic connections on page 227](#).

## 10.14 Engine

### 10.14.1 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.



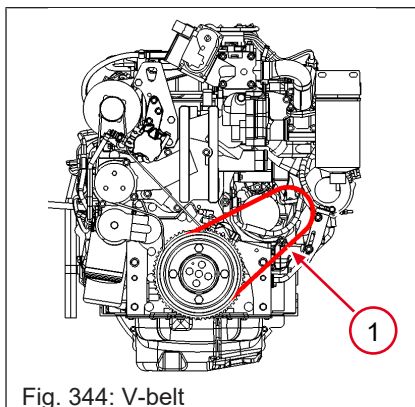
## Information

- ▶ Observe maintenance intervals [see Maintenance plan on page 279](#)
- ▶ Observe lubricant specifications [see Overview of lubricants on page 289](#)

### 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. Let the engine cool down.
6. Open the engine cover.

#### 10.14.1.1 Checking the V-belt



#### Check V-belt (alternator/water pump)

- ✓ Preparations for maintenance in the engine compartment were carried out.
- Check V-belt **1** for tension and damage.
- ⇒ Replace a damaged or extended V-belt or have it re-tensioned by an authorized service center.

### 10.14.1.2 Check flat belt

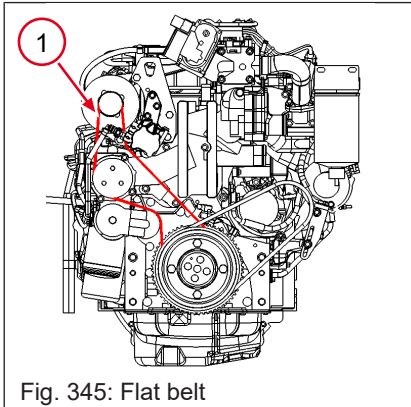


Fig. 345: Flat belt

The flat belt is tensioned automatically.

- ✓ Preparations for maintenance in the engine compartment were carried out.
- Check flat belt 1 carefully for damage.
- ⇒ Have a damaged flat belt replaced by an authorized service center.

## 10.15 Exhaust gas aftertreatment

### 10.15.1 Information on exhaust gas aftertreatment

The vehicle may be fitted with a system for exhaust gas aftertreatment. The system may vary depending on the engine option, the system.

Engines without exhaust gas aftertreatment:

- Deutz engine TCD 3.6 L4 (100 kW)

Engines with diesel oxidation catalyst (DOC) and SCR:

- Engine Deutz TCD 3.6 L4 (100 kW) [see Diesel Oxidation Catalytic Converter \(DOC\) and SCR catalytic converter on page 349](#)

Engines with diesel oxidation catalytic converter (DOC), diesel particulate filter (DPF) and SCR:

- Engine Deutz TCD 3.6 L4 (100 kW) [see Diesel Oxidation Catalytic Converter \(DOC\) with DPF and SCR catalytic converter on page 349](#)
- Engine Deutz TCD 4.1 L4 (115 kW) [see Diesel Oxidation Catalytic Converter \(DOC\) with DPF and SCR catalytic converter on page 349](#)

The display shows the soot load of the exhaust gas aftertreatment system via the exhaust gas aftertreatment display [see Display exhaust gas after treatment on page 349](#).

### 10.15.2 Diesel Oxidation Catalyst (DOC) and SCR Catalyst

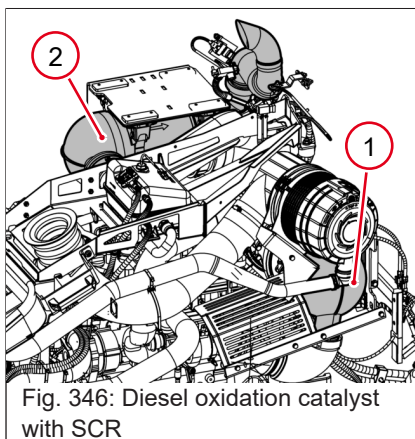


Fig. 346: Diesel oxidation catalyst with SCR

#### Description

This exhaust gas aftertreatment is a closed system consisting of the diesel oxidation catalyst **1** (DOC) and the SCR catalyst **2** (SCR = Selective Catalytic Reduction) with urea solution.

#### Function

The diesel oxidation catalyst has a catalyzing surface, through which harmful substances in the exhaust gas are converted into non-harmful substances. In the process, carbon monoxides and unburned hydrocarbons are brought to react with oxygen and converted into carbon dioxide and water. In addition, the nitrogen monoxides are converted into nitrogen dioxides.

Temperatures > 250 °C are required for high efficiency.

A urea solution injected into the SCR catalytic converter reacts with the NOx emissions contained in the exhaust gas and reduces these to nitrogen (N<sub>2</sub>) and water (H<sub>2</sub>O).

The engine electronics control the urea injection volume.

### 10.15.3 Diesel Oxidation Catalyst (DOC) with Diesel Particulate Filter (DPF) and SCR Catalyst

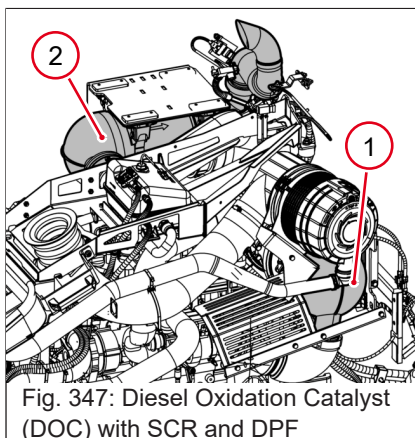


Fig. 347: Diesel Oxidation Catalyst (DOC) with SCR and DPF

#### Description

This exhaust gas aftertreatment is a closed system consisting of the diesel oxidation catalyst (DOC) with diesel particulate filter (DPF) **1** and the SCR catalyst **2** (SCR = selective catalytic reduction) with urea solution.

#### Function

The diesel oxidation catalyst has a catalyzing surface, through which harmful substances in the exhaust gas are converted into non-harmful substances. In the process, carbon monoxides and unburned hydrocarbons are brought to react with oxygen and converted into carbon dioxide and water. In addition, the nitrogen monoxides are converted into nitrogen dioxides.

With the diesel particulate filter, the soot produced during the combustion of diesel is additionally collected in the diesel particulate filter.

The soot load of the diesel particulate filter is monitored electronically.

As the soot load increases, it is then automatically regenerated (burned) in the diesel particulate filter during engine operation.

Temperatures > 250 °C are required for high efficiency.

A urea solution injected into the SCR catalytic converter reacts with the NOx emissions contained in the exhaust gas and reduces these to nitrogen (N<sub>2</sub>) and water (H<sub>2</sub>O).

The engine electronics control the urea injection volume.

### 10.15.4 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

If the "Exhaust gas aftertreatment" tab is selected in the "Machine status query" menu on the "Machine data" menu page (see [Vehicle status query on page 110](#)), the "Exhaust gas aftertreatment status" window opens.

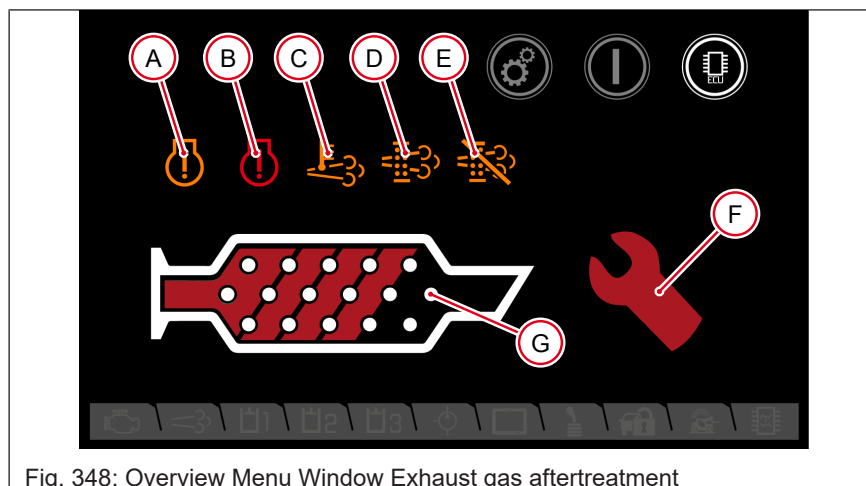












Fig. 348: Overview Menu Window Exhaust gas aftertreatment

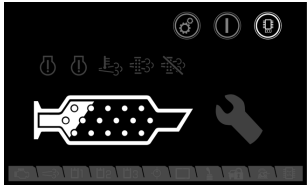
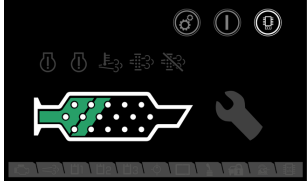

The following control displays are located on the menu page:



Item	Symbol	Description/meaning
A		<b>Control light (orange)</b> The soot load has reached the maximum permissible level.
B		<b>Warning light (red)</b> The soot load has exceeded the maximum permissible level.
C		<b>Increased exhaust gas temperature (orange)</b> The exhaust gas temperature is increased, e.g. during regeneration or after regeneration.
D		<b>Regeneration required/active (orange)</b> A regeneration must be carried out or is being carried out.
E		<b>Regeneration interrupted (orange)</b> The ongoing regeneration was interrupted. Carry out a manual regeneration [► 355].
F		<b>Perform manual regeneration (red)</b> A manual regeneration must be performed.

Item	Symbol	Description/meaning
<b>G</b>		<b>Low soot load (white)</b> The soot load for the exhaust gas aftertreatment is just low.
		<b>Low soot load (green)</b> The soot load for the exhaust gas aftertreatment is in the normal range.
		<b>Soot load increased (orange)</b> The soot load for the exhaust gas aftertreatment is increasing.
		<b>Soot load high (red)</b> The soot load for the exhaust gas aftertreatment is too high.

### Display soot load

The soot load of the exhaust gas aftertreatment depends on the load on the diesel engine and is indicated in the following stages:

Level	Display	Description	Measure
<b>1</b>		<b>Low soot load (white)</b>	No regeneration necessary.
<b>2</b>		<b>Low soot load (green)</b>	No regeneration necessary.
<b>3</b>		<b>Soot load increasing (orange)</b> An increased soot load can be caused by: <ul style="list-style-type: none"> <li>• Long operation at idling speed (low-load operation)</li> <li>• Several starts (short-distance operation)</li> <li>• Low operating temperatures</li> </ul>	A regeneration must be performed. Increase engine load, e.g. drive longer on roads at high engine speed to trigger your automatic regeneration. If the vehicle does not carry out automatic regeneration or the control light flashes, carry out manual regeneration.

Level	Display	Description	Measure
4		<p><b>Soot load high (red)</b></p> <p>The maximum permissible soot load is reached.</p> <p>A power reduction of the engine by about 25 % occurs.</p> <p>The maximum permissible soot load can be caused by:</p> <ul style="list-style-type: none"> <li>• Non-observance of warning "Increased soot load"</li> <li>• Long operation at idling speed (low-load operation)</li> <li>• Several starts, (short distance operation)</li> <li>• Low operating temperatures</li> </ul>	An automatic regeneration is no longer possible. A manual regeneration must be carried out immediately.
5		<p><b>Soot load too high (red + warning light)</b></p> <p>The maximum permissible soot load has been exceeded.</p> <p>A power reduction of the engine by 50 % occurs.</p> <p>Speed reduction of the motor to approx. 60 % of the maximum speed.</p> <p>Excessive soot load can be caused by:</p> <ul style="list-style-type: none"> <li>• Non-observance of warning "High soot load"</li> <li>• Exhaust gas aftertreatment was not regenerated in time.</li> </ul>	<p>Engine damage may occur in the event of excessively high soot loads!</p> <p>Stop the vehicle immediately.</p> <p>Stop the diesel engine.</p> <p>Contact an authorized service center.</p> <p>A regeneration can only be performed by an authorized service center.</p>

### 10.15.5 Safety instructions for regeneration



#### **WARNING**

**The exhaust system becomes very hot. There is a risk of burning!**

During regeneration, exhaust gas temperatures of approx. 600 °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.



### NOTICE

#### The exhaust system becomes very hot. There is a risk of fire!

Hot exhaust gases can cause fires in environments with highly flammable materials and cause significant property damage.

- ▶ When regenerating the diesel particulate filter, make sure that there are no easily inflammable materials in the direct vicinity of the exhaust system, e.g. paper, dry grass, wood, wooden ceilings, oil, fuels, etc.
- ▶ Do not park the vehicle with the engine running in direct proximity to easily flammable materials.
- ▶ Do not use corrosion-protection agents for the exhaust system. These can ignite at the exhaust system.
- ▶ In environments with easily flammable material, disable the "automatic regeneration" mode.
- ▶ Do not start "manual regeneration" in environments with flammable materials.



### NOTICE

#### Manual regeneration

Possible damage to parts of the exhaust gas aftertreatment system (e.g. diesel particulate filter).

- ▶ Perform the regeneration as early as possible (or have someone do it for you).
- ▶ The soot load displays light up.
- ▶ During manual regeneration, switch off all electrical consumers on the vehicle (e.g. lighting or radio), as otherwise the current regeneration can be interrupted.
- ▶ Do not move the vehicle during manual regeneration.
- ▶ Always finish manual regeneration whenever possible.

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.

Every manual regeneration dilutes the engine oil to a small degree with fuel. The number of manual regenerations is therefore electronically monitored and registered.

If the manual regeneration is not carried out, the engine controller activates the specified engine protection functions:

- Position 1: Torque reduction of the diesel engine
- Position 2: Torque reduction + motor speed limitation

### 10.15.6 Automatic regeneration



#### **WARNING**

**The exhaust system becomes very hot. There is a risk of burning!**

During regeneration, exhaust gas temperatures of approx. 600 °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.

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 349](#).

The regeneration must then be initiated manually by the operator Manual regeneration [see Manual regeneration on page 355](#).

#### **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.

### 10.15.7 Manual regeneration



#### **WARNING**

**The exhaust system becomes very hot. There is a risk of burning!**

During regeneration, exhaust gas temperatures of approx. 600 °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.



#### **NOTICE**

**Damage to the exhaust gas aftertreatment system (e.g. diesel particulate filter)**

- ▶ Perform the regeneration as early as possible (or have someone do it for you).
- ▶ The soot load displays light up.
- ▶ During manual regeneration, switch off all electrical consumers on the vehicle (e.g. lighting or radio), as otherwise the current regeneration can be interrupted.
- ▶ Do not move the vehicle during manual regeneration.
- ▶ Always finish manual regeneration whenever possible.



#### **Information**

If the manual regeneration is interrupted for any reason (e.g. releasing the parking brake), the control light  lights up.

- ▶ Repeat the entire regeneration as described above.
- ▶ If manual regeneration is interrupted again, have the exhaust gas aftertreatment system checked or replaced by an authorized service center.

10

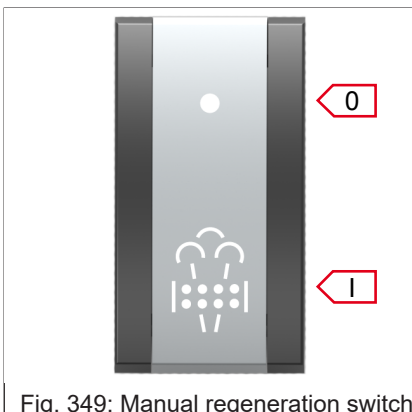





Fig. 349: Manual regeneration switch

#### **Description**




Manual regeneration is a process that starts as soon as the button  in position I is pressed and the conditions necessary for regeneration are fulfilled.

Regeneration takes about 30 minutes. The control light  lights up during regeneration.


The vehicle may not be operated during manual regeneration.

The orange control light  goes out as soon as regeneration is completed.

### Perform manual regeneration

- ✓ Control light  must illuminate.
  - ✓ Time window approx. 30 minutes. during which time the vehicle must not be moved.
  - ✓ Engine coolant at least 70° C.
  - ✓ Park the vehicle on firm, non-flammable ground.
  - ✓ Loader unit lowered to the ground.
  - ✓ Activated parking brake.
  - ✓ Working hydraulics locked [see Lock working hydraulics on page 197/](#) activate joystick lock.
  - ✓ Electric consumers switched off.
1. Warm up the vehicle (engine temperature at least 70 °C).
  2. Do not switch off the diesel engine, allow it to idle.
  3. Initiate regeneration. To do this, press the push button  in position I.
    - ⇒ Regeneration is in operation (regeneration time window approx. 30 minutes).
    - ⇒ Control light  lights up during the entire regeneration.
    - ⇒ The engine speed is automatically increased after a few seconds.

Regeneration has finished successfully if:

- Engine speed is reduced to idling speed,
- the control light  goes out.

## 10.16 Cab

### 10.16.1 Checking the seat

- 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.

## 10.16.2 Checking the seat belt for proper function



### **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.

- 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.

Defective belts can no longer fulfill their protective function and must be replaced.

## 10.16.3 Checking function of seat switch

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

If the operator leaves the seat while driving, the drive system is deactivated at a speed below 1 km/h. At speeds up to 7 km/h, a warning tone sounds after five seconds and the drive system is deactivated after approx. ten seconds. At a speed of more than 7 km/h, the warning tone sounds continuously.

✓ Carry out check on open and safe terrain:

1. Sit down on the operator seat.
2. Start the engine.
3. Drive slowly (under 1 km/h).
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.

### 10.16.4 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.

### 10.16.5 Checking heating, ventilation and air conditioning system

- Start the engine and put the heater, ventilation, air conditioning system in operation [see Heating, ventilation and air conditioning system on page 189](#).
  - ⇒ All functions must function correctly.

If damage or defects are found, they must be repaired by an authorized service center.

### 10.16.6 Checking safety labels and information labels



#### **WARNING**

##### **Injury hazard due to missing or damaged labels!**

A missing, incomplete or poor indication of danger can cause serious injury or death.

- ▶ Never remove safety labels and information labels.
- ▶ Immediately replace damaged safety labels and information labels.

- Check safety labels and information labels Safety label and information labels.
  - ⇒ The labels must be legible and complete.
- If necessary, remove dirt.

If labels are no longer legible, damaged or missing, they must be replaced.

## 10.17 Tires

### 10.17.1 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.

#### 10.17.1.1 Checking the tires

##### **Inspection to be carried out by the driver/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 wheel nuts for correct seating and tighten if necessary.
- Remove traces of oil and grease from the tires.
- Check for foreign bodies on the treads.

Contact a Wacker Neuson service center in case of doubt.

### 10.17.2 Inflating the tires



#### **WARNING**

##### **Injury hazard due to bursting tires!**

Inflating the wheels can cause accidents resulting in serious injury or death.

- ▶ Use only filling devices with calibrated pressure gauges to inflate the tires.
- ▶ When inflating the tires, ensure that no one is in the danger zone.
- ▶ Fill the tires only with the filling pressure from the air pressure table.

These instructions refer to inflating tires after loss of pressure. Observe the air pressure prescribed for the tires of the vehicle Tires.

If there is a complete loss of pressure, this work may only be carried out by an authorized service center.

##### **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.

##### **Inflating the tires**

- ✓ When inflating water-filled tires, the wheels must be turned so that the tire valve is at the top.
1. Unscrew the protective cap from the tire valve.
  2. Position the valve connection of the filling device on the tire valve so that it securely remains in place.
  3. Pump up the tire to the prescribed pressure.
  4. Remove the valve connection of the filling device from the tire valve.
  5. Screw the protective cap onto the tire valve.

### 10.17.3 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 403](#).
- ▶ 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.

10

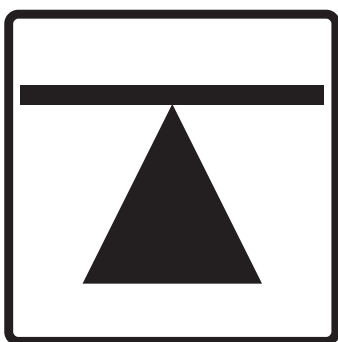


Fig. 350: Label Jack position

## **Removing the wheels**

1. Position the jack underneath the axle, next to the wheel to be changed.
  - ⇒ The position at which the jack must be positioned is marked with the label next to it.
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.



Fig. 351: Label Tightening torque

### 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).

## 11 Malfunctions

### 11.1 Faults, causes, remedy

#### 11.1.1 Information on malfunctions



#### **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: [see Fault indications on page 369](#).

#### 11.1.2 Possible faults and remedies on the engine

Repair work on the engine may only be carried out by authorized service center and trained personnel.

Malfunction	Possible cause	Remedial action/avoidance
Engine does not start or is not easy to start	Empty fuel tank	Bleeding the fuel system
	Insufficient fuel supply	Contact an authorized service center
	Engine starting temperature too low	
	Cold starter	
	Wrong SAE viscosity class of engine lubrication oil	
	Fuel grade does not comply with Operator's Manual	Observe fuel specification when adding fuel
	Malfunctioning or empty battery	Check the battery
	Loose or oxidized cable connections to starting motor	Contact an authorized service center
	Malfunctioning starting motor, or pinion does not engage	
	Dirty air filter/exhaust gas turbocharger	Checking/replacing [► 328]
	Air in fuel system	Bleeding the fuel system
	Compression pressure too low	Contact an authorized service center
	Exhaust gas back pressure too high	
	Injection line leaks	
	Defective high pressure pump	
	Seat switch does not release	Sit down on the operator seat.
Engine does not start and diagnostic lamp flashes	Engine electronics preventing start	Contact an authorized service center
Engine starts, but does not run smoothly or faultless	V-belt / V-ribbed belts (fuel pump in the belt drive)	Check whether torn or loose [► 346]
	Compression pressure too low	Contact an authorized service center
	Cold starter	
	Air in fuel system	
	Dirty fuel prefilter	
	Fuel grade does not comply with Operator's Manual	Observe fuel specification when adding fuel
	Malfunctioning injector	Contact an authorized service center
	Injection line leaks	
	Defective engine wiring harness	
Engine changes are possible and the diagnostic light illuminates	Engine electronics detect a system error and activate a replacement speed	Contact an authorized service center

Malfunction	Possible cause	Remedial action/avoidance
Engine overheats. Temperature warning system responds	Vent line to the expansion tank for cooling liquid is clogged	Contact an authorized service center
	Malfunctioning injector	
	Coolant heat exchanger dirty	Cleaning [▶ 325]
	Defective coolant pump (V-belt torn or loose)	Check whether torn or loose [▶ 346]
	Not enough coolant	Filling [▶ 302]
	Resistance in cooling system too high, flow capacity too low	Contact an authorized service center
	Fan/viscocouple defective, V-belt torn or loose	
	Dirty charge air cooler	Check/clean [▶ 325]
	Dirty air filter/exhaust gas turbocharger	Contact an authorized service center
	Defective throttle valve	
	Coolant temperature sensor	
	Defective coolant thermostat	
	Defective coolant cover	
Insufficient engine power	Lube oil level too high	Contact an authorized service center
	Defective throttle valve	
	Exhaust gas recirculation, defective actuator	
	Fuel intake temperature too high	
	Fuel grade does not comply with Operator's Manual	
	Dirty air filter/exhaust gas turbocharger	
	Defective air filter maintenance switch/maintenance display	
	Defective fan/torn or loose V-belt	Check the fan/V-belt/replace if necessary [▶ 346]
	Leaking charge-air line	Contact an authorized service center
	Dirty charge air cooler	
	Exhaust gas back pressure too high	
	Injection line leaks	
	Malfunctioning injector	
	Defective exhaust turbocharger	
Engine has lost output and the diagnosis lamp illuminates	The engine electronics reduces the output	Contact an authorized service center
Engine does not run on all cylinders	Injection line leaks	Contact an authorized service center
	Malfunctioning injector	
	Compression pressure too low	
	Defective engine wiring harness	

Malfunction	Possible cause	Remedial action/avoidance
Insufficient or no engine oil pressure	Lube oil level too low	Top off the lube oil [► 299]
	Engine inclination too high	Contact an authorized service center
	Wrong SAE viscosity class of engine lubrication oil	
	Defective lube oil pressure sensor	
	Jammed lube oil control valve	
	Clogged lube oil intake pipe	
Engine oil consumption too high	Lube oil level too high	Check the lube oil level, drain if necessary [► 299]
	Engine inclination too high	Contact an authorized service center
	Crankcase ventilation	
	Wrong SAE viscosity class of engine lubrication oil	
	Defective valve shaft seals	
	Worn piston rings	
	Defective exhaust turbocharger	
Lube oil in exhaust system	Engine is permanently operated with too low a load (< 20 - 30 %)	Contact an authorized service center
	Defective valve shaft seals	
	Defective exhaust turbocharger	
Engine has blue smoke	Lube oil level too high	Check the lube oil level, drain if necessary [► 299]
	Engine inclination too high	Contact an authorized service center
	Crankcase ventilation	
	Wrong SAE viscosity class of engine lubrication oil	
	Defective valve shaft seals	
	Worn piston rings	
	Defective exhaust turbocharger	
Engine has white smoke	Coolant in the exhaust gas	Contact an authorized service center
	Condensate	
Engine has black smoke	Defective diesel particulate filter	Contact an authorized service center
Error in the SCR system	Urea tank empty/indicator shows full	Contact an authorized service center
	SCR not working	

Malfunction	Possible cause	Remedial action/avoidance
Frequent standstill re-generations	Dirty air filter/exhaust gas turbocharger	Checking/replacing [▶ 328]
	Leaking charge-air line	Contact an authorized service center
	Malfunctioning injector	
	Defective differential pressure of the flow meter	
	Nox sensor is defective	
	Differential pressure sensor of the diesel particulate filter provides implausible signal	
	Differential pressure line clogged	

### 11.1.3 Possible faults and remedies on the drive 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.

To call up the error messages [see Fault indications on the display on page 369](#).

### 11.1.4 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.

To call up the error messages [see Fault indications on the display on page 369](#).

### 11.1.5 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!

Malfunction	Possible cause	Remedial action/avoidance
Fan does not run	Malfunctioning or loose fuse	Replace fuses [► 341] 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
	Undersized electric lines	
	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
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	

Malfunction	Possible cause	Remedial action/avoidance
Very loud system	Loose or excessively worn V-belt	Checking the V-belt [▶ 346]
	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	

### 11.1.6 Monitoring the DEF quality

If the urea injection is impaired by a system fault, the performance of the diesel engine is reduced.

Symbol	Message/system error	Result
	<ul style="list-style-type: none"> <li>• Symbol appears continuously.</li> <li>• An acoustic signal sounds.</li> </ul>	<b>Attention! Critical state</b> <ul style="list-style-type: none"> <li>• Diesel engine goes into emergency mode.</li> <li>• Contact an authorized service center.</li> </ul>

## 11.2 Fault indications

### 11.2.1 Fault indications on the display

Faults and errors are shown on the display. A distinction is made between three error categories.

Status	Display	Description	Effect	Confirmation
Red	Warning light, Indication in the display, short warning tone. Display as critical error.	Critical error. Symbol is displayed until the display is acknowledged by pressing the jog dial on the jog dial.	Restricted or no function. Residual risk.	necessary
Yellow	Control light, Indication in the display, short warning tone. Displayed as a serious error.	Serious error. Symbol is displayed for about four seconds.	Restricted or no function. No residual risk.	Not necessary
White	None	Error detected. Error saved.	None	Not necessary

#### Display of a critical error



#### **NOTICE**

##### **Critical error**

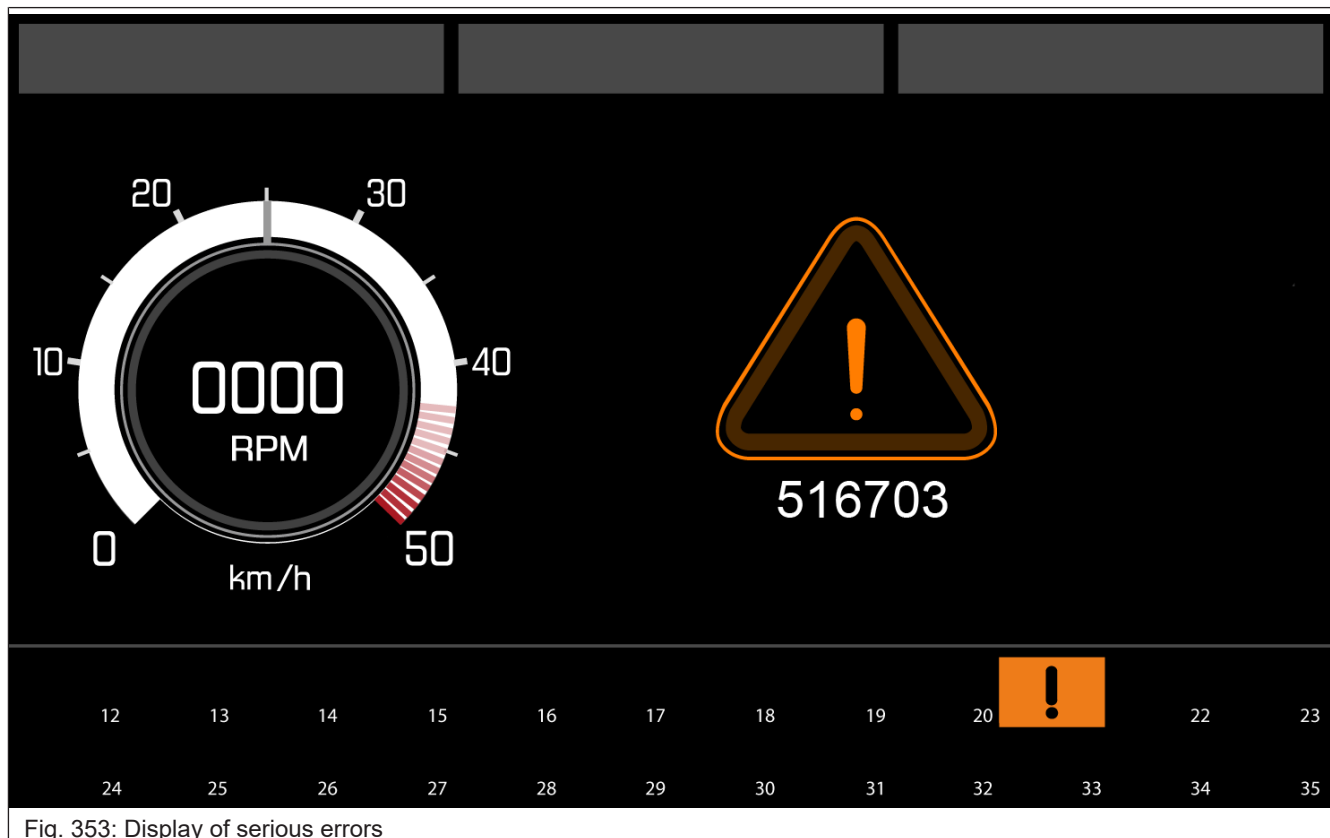
A critical error can lead to severe damage to the vehicle. To avoid damage to the vehicle, observe the following:

- ▶ Lower the load into the transport position.
- ▶ If possible, drive the vehicle out of the danger zone.
- ▶ Stop the engine and remove the starting key.
- ▶ Get in touch with an authorized service center and have the error rectified.



Fig. 352: Display of critical errors

## Display of a serious error

**Possible causes of an error message**

- Open wiring, interruption
- Overvoltage, undervoltage
- Grounding error
- Malfunctioning component
- Exceeding / falling short of permissible values (temperature, pressure, speed, etc.)
- Sensor error due to dirt

**Behavior when an error message is displayed**

1. Lower the load into the transport position.
2. If possible, drive the vehicle out of the danger zone.
3. Stop the engine and switch off the ignition.
4. Restart the engine.




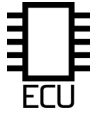
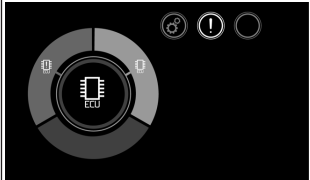
If the error is issued again:

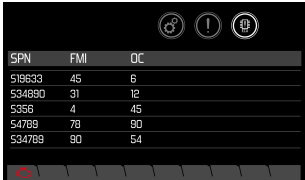












1. Note the error code from the display.
2. Stop the engine and remove the starting key.
3. Inform the authorized service center of the error code and have the cause of the error rectified.

### Calling a stored error message

An error code is output and stored for the error messages of a vehicle component. The stored error codes can be called in the display.

On the error pages of the menu, under each tab at the bottom of the display (electronic control circuits) are the stored errors of the respective control unit.

Step	Activity/meaning	Symbol	Display
1	Press button on the jog dial for longer than 2 seconds.		
2	Select "Machine status" with the setting wheel on the jog dial and call it up.		
3	Select "Error display" with the setting wheel on the jog dial and call it up.		

Step	Activity/meaning	Symbol	Display
4	Select the desired vehicle area from the tab bar at the bottom of the screen using the setting wheel on the jog dial. The corresponding informational page automatically appears on the display.	-	
	Diesel engine		
	Exhaust gas aftertreatment		
	Cab		
	Frame 1		
	Frame 2/options		
	Drive system		
	Notifications/display		
	Joystick		
	Drive interlock		
	Telematics		
	Steering system		
5	Press the Back button on the jog dial multiple times to return to the main display.		

### Description of the menu page Error memory

The display shown is an example. The actual displays can vary depending on the selected control circuit and machine type.

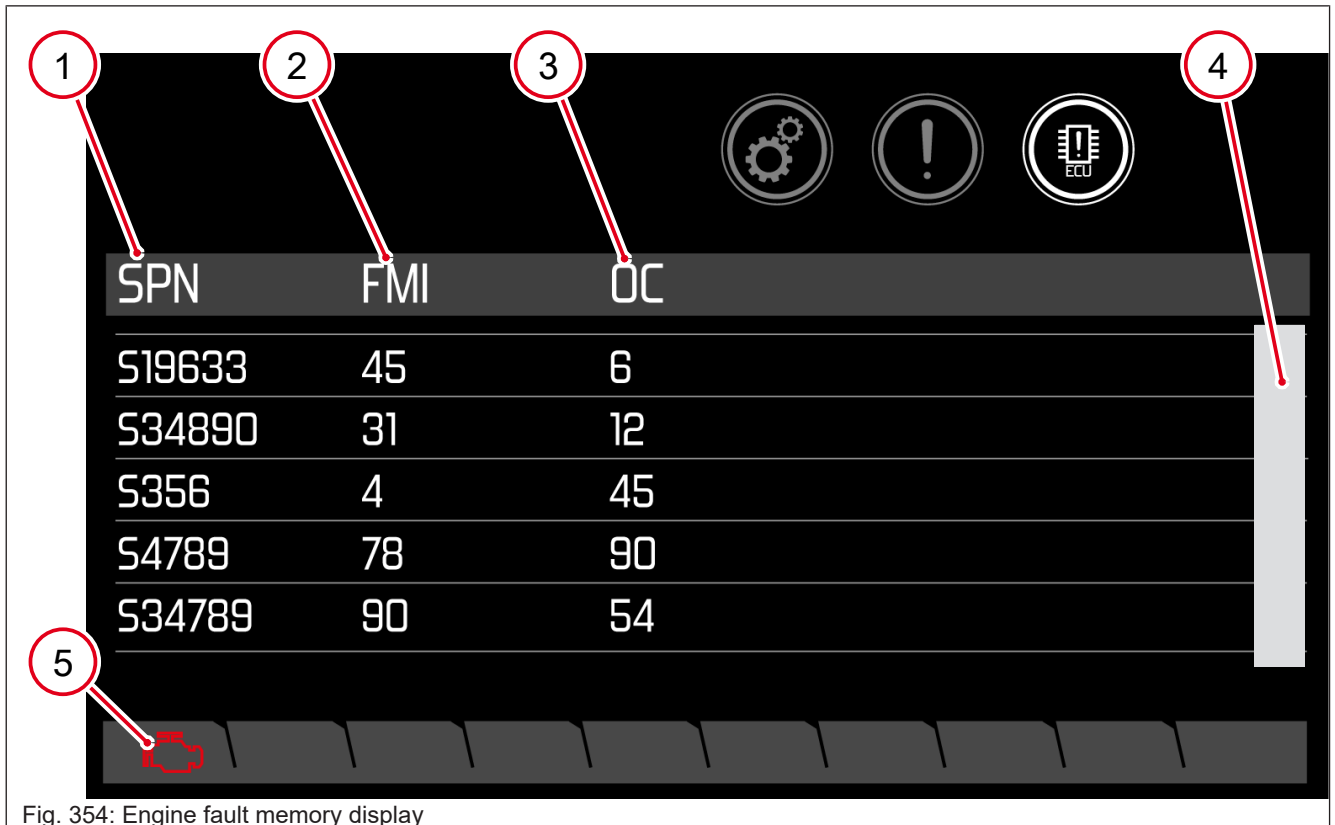


Fig. 354: Engine fault memory display

Pos.	Description	Meaning
1	SPN number (Suspect Parameter Number)	Error number
2	FMI number (Failure Mode Identifier)	Type of error
3	OC (Occurrence Count)	Frequency of the occurrence of the error
4	Scroll bar	You can scroll within the error list by pressing the dial on the jog dial and turning the dial.
5	Strip with tabs	Symbols for the control circuits

## 12 Decommissioning

### 12.1 Temporary decommissioning

#### 12.1.1 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.

#### 12.1.2 Preserving the engine

Also observe the operator's manual of the engine!

- Clean the engine with a high-pressure cleaner in a suitable place.
- Bring engine up to operating temperature.
- Drain the engine oil and dispose of it in an environmentally friendly manner.
- Fill anti-corrosion oil into the engine.
- Drain the fuel from the tank.
- Create a mixture of 90% fuel and 10% anti-corrosive oil and fill the fuel tank with it.
- Let the engine run ten minutes at idling speed and then stop it.
- Crank the engine several times by hand to preserve the cylinders and combustion chambers.
- Remove the fan belt and wrap it for storage protecting it from air and light.
- Spray an anti-corrosion agent onto the running surfaces of the pulleys.
- Close the intake and exhaust openings of the engine.

#### 12.1.3 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.

### **12.1.4 Removing engine preservation**

- Remove the covers from the intake and exhaust openings of the engine.
- Remove the anti-corrosion agent from the pulleys.
- Install the fan belt.
- Drain the preservation oil and add engine oil.
- Start up the engine.
- Check the belt tension after the first two hours of operation.

### **12.1.5 Putting the vehicle back into operation**

- Install the battery.
- Check tire inflation pressure.
- Remove the preservation from the piston rods of the hydraulic cylinders.
- Set the vehicle on its wheels.
- Check the operation of the electrical system.
- Bleed the hydraulic system.
- Check the operation of the steering system and brakes.
- Carry out maintenance work as before initial commissioning.

## **12.2 Permanent decommissioning**

### **12.2.1 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!

### **12.2.2 Prior to disposal**

- All applicable safety regulations relating to the decommissioning of 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 cover) and secure the vehicle.
- Install all protective devices.
- Repair leaks in engine, tanks and hydraulic system.
- Remove the battery.
- Store the vehicle in a place that is protected against unauthorized access.

#### 12.2.3 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.

## 13 Accessories

### 13.1 Attachments

#### 13.1.1 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.

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,
- Heavy duty 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.

### 13.1.2 For attachments approved for use on roads



#### **WARNING**

##### **Accident hazard 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.
- ▶ Remove existing protective screen.
- ▶ 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.

#### **Variant: 355-02**

Attachments	Material number	Width	Heaped capacity	Use	Material density
Standard bucket with teeth	1000354131	2500 mm	1.55 m <sup>3</sup>	Loosening, picking up, transporting and loading of loose or solid material	≤ 1.8 t/m <sup>3</sup>
Standard bucket without teeth	1000388728	2500 mm	1.6 m <sup>3</sup>		≤ 1.7 t/m <sup>3</sup>
Front ballast	1000395943	1500 mm		for trailer operation	Mass 620 kg

#### **Variant: 355-05**

Attachments	Material number	Width	Heaped capacity	Use	Material density
Standard bucket with teeth	1000427551	2500 mm	1.8 m <sup>3</sup>	Loosening, picking up, transporting and loading of loose or solid material	≤ 1.8 t/m <sup>3</sup>
Standard bucket without teeth	1000427557	2500 mm	1.9 m <sup>3</sup>		≤ 1.6 t/m <sup>3</sup>
Front ballast	1000395943	1500 mm		for trailer operation	Mass 620 kg

#### **Variant: 355-04**

Attachments	Material number	Width	Heaped capacity	Use	Mass
Front ballast	1000395943	1500 mm		for trailer operation	620 kg

**Variant: 355-06**

Attachments	Material number	Width	Heaped capacity	Use	Mass
Front ballast	1000395943	1500 mm		for trailer operation	620 kg

When driving on public roads, the approved attachment may only be used in conjunction with the load diagram valid for the vehicle and the attachment.

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 on the cover.

**13.1.3 For attachments not approved for use on roads**

**⚠ WARNING**
**Accident hazard due to restricted field of vision!**

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

- ▶ Check field of vision before commissioning.
- ▶ 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).

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. For this reason, 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

## Variant: 355-02

Attachments	Material number	Width	Heaped capacity	Use	Material density
Lightweight materials bucket, screwed-on bucket blade (without teeth)	1000392447	2500 mm	2.05 m <sup>3</sup>	Picking up, transporting and loading lightweight material	≤ 1.3 t/m <sup>3</sup>
	1000345922	2500 mm	2.9 m <sup>3</sup>		≤ 0.75 t/m <sup>3</sup>
Multipurpose bucket (with teeth)	1000357264	2500 mm	1.45 m <sup>3</sup>	Grading, removing and scraping vegetation, e.g., picking up and evenly spreading bulk material; grabbing bulky objects	≤ 1.8 t/m <sup>3</sup>
Multipurpose bucket (without teeth)	1000397124	2500 mm	1.45 m <sup>3</sup>	Grading, removing and scraping vegetation, e.g., picking up and evenly spreading bulk material; grabbing bulky objects	≤ 1.3 t/m <sup>3</sup>
	1000397126	2500 mm	1.5 m <sup>3</sup>		
Silage bucket	1000345942	2600 mm	1.89 m <sup>3</sup>	Picking up, transporting and loading silage	≤ 1.3 t/m <sup>3</sup>
Feed distributing bucket <sup>1)</sup>	1000357592	2600 mm	3.4 m <sup>3</sup>	Picking up, transporting and loading material	≤ 1.3 t/m <sup>3</sup>
Silage bucket with hydraulic clamp	1000357570	2400 mm	1.89 m <sup>3</sup>	Picking up, transporting and loading silage and re-cycling material.	≤ 1.3 t/m <sup>3</sup>
Silage cutter	1000345939	2560 mm	1.64 m <sup>3</sup>	Picking up, transporting and loading silage.	≤ 0.8 t/m <sup>3</sup>
Bale spike 5 tines <sup>1)</sup> , 1280 mm long	1000357599	1808 mm	-	Picking up, transporting and loading hay, straw and silage bales	-
Bale gripper <sup>1)</sup> , clamping width 800 – 1800 mm	1000345930	-	-		-
Bale gripper <sup>1)</sup> , clamping width 900 – 1800 mm	1000357600	1200 mm	-		-
	1000357601	1200 mm	-		-
Multipurpose forks	1000357596 <sup>1)</sup>	2980 mm	-	Picking up, transporting and loading manure and silage	-
	1000357598	2500 mm	-		-
Material pusher <sup>1)</sup> Length 4680 mm	1000358628	2500 mm	-		-
Stacking unit/pallet fork	1000347693	Length 1200 mm	-	Picking up, transporting and loading pallets	-
Stacking unit/pallet fork	1000347694	Length 1800 mm	-		-
Crane jib	1000423656	Length 800 mm	-	Picking up and transporting loads with slings	-
Rotary sweeper BEMA 35 <sup>1)</sup>	1000345924	2600 mm	-		-
Snow plow <sup>1)</sup>	1000345923	2750 mm	-	Winter service	-
Snow cutter <sup>1)</sup>	1000357603	2500 mm	-		-
Work platform <sup>1)</sup>	1000369137	1600 mm	-	Working safely at a height	Mass 310 kg

Attachments	Material number	Width	Heaped capacity	Use	Material density
1) When using this attachment, special measures are required due to excessive field of vision restrictions. These special measures can consist, for example, of assigning a guide or locking down the work area for persons.					

**Variant: 355-05**

Attachments	Material number	Width	Heaped capacity	Use	Material density
Lightweight materials bucket, screwed-on bucket blade (without teeth)	1000428313	2500 mm	2.50 m <sup>3</sup>	Picking up, transporting and loading lightweight material	≤ 1.2 t/m <sup>3</sup>
	1000429095	2500 mm	3.5 m <sup>3</sup>		≤ 0.8 t/m <sup>3</sup>
Multipurpose bucket (with teeth)	1000431650	2525 mm	1.7 m <sup>3</sup>	Grading, removing and scraping vegetation, e.g., picking up and evenly spreading bulk material; grabbing bulky objects	≤ 1.8 t/m <sup>3</sup>
Multipurpose bucket (without teeth)	1000397124	2500 mm	1.45 m <sup>3</sup>	Grading, removing and scraping vegetation, e.g., picking up and evenly spreading bulk material; grabbing bulky objects	≤ 1.3 t/m <sup>3</sup>
	1000397126	2500 mm	1.5 m <sup>3</sup>		
Silage bucket	1000345942	2600 mm	1.89 m <sup>3</sup>	Picking up, transporting and loading silage	≤ 1.3 t/m <sup>3</sup>
Feed distributing bucket <sup>1)</sup>	1000357592	2600 mm	3.4 m <sup>3</sup>	Picking up, transporting and loading material	≤ 1.3 t/m <sup>3</sup>
Silage bucket with hydraulic clamp	1000357570	2400 mm	1.89 m <sup>3</sup>	Picking up, transporting and loading silage and recycling material.	≤ 1.3 t/m <sup>3</sup>
Silage cutter	1000345939	2560 mm	1.64 m <sup>3</sup>	Picking up, transporting and loading silage.	≤ 0.8 t/m <sup>3</sup>
Bale spike 5 tines <sup>1)</sup> , 1280 mm long	1000357599	1808 mm	-	Picking up, transporting and loading hay, straw and silage bales	-
Bale gripper <sup>1)</sup> , clamping width 800 – 1800 mm	1000345930	-	-		-
Bale gripper <sup>1)</sup> , clamping width 900 – 1800 mm	1000357600	1200 mm	-		-
	1000357601	1200 mm	-		-
Multipurpose forks	1000357596 <sup>1)</sup>	2980 mm	-	Picking up, transporting and loading manure and silage	-
	1000357598	2500 mm	-		-
Material pusher <sup>1)</sup> Length 4680 mm	1000358628	2500 mm	-		-
Stacking unit/pallet fork	1000347693	Length 1200 mm	-	Picking up, transporting and loading pallets	-
Stacking unit/pallet fork	1000347694	Length 1800 mm	-		-

Attachments	Material number	Width	Heaped capacity	Use	Material density
Crane jib	1000423656	Length 800 mm	-	Picking up and transporting loads with slings	-
Rotary sweeper BEMA 35 <sup>1)</sup>	1000345924	2600 mm	-		-
Snow plow <sup>1)</sup>	1000345923	2750 mm	-	Winter service	-
Snow cutter <sup>1)</sup>	1000357603	2500 mm	-		-
Work platform <sup>1)</sup>	1000369137	1600 mm	-	Working safely at a height	Mass 310 kg

1) When using this attachment, special measures are required due to excessive field of vision restrictions. These special measures can consist, for example, of assigning a guide or locking down the work area for persons.

## Variant: 355-04

Attachments	Material number	Width	Heaped capacity	Use	Material density
Standard bucket with teeth	1000357263	2500 mm	1.45 m <sup>3</sup>	Loosening, picking up, transporting and loading of loose or solid material.	≤ 1.8 t/m <sup>3</sup>
Standard bucket without teeth	1000391906	2500 mm	1.4 m <sup>3</sup>		
Lightweight materials bucket, screwed-on bucket blade (without teeth)	1000396927	2500 mm	1.75 m <sup>3</sup>	Picking up, transporting and loading lightweight material	≤ 1.3 t/m <sup>3</sup>
	1000389934	2500 mm	2.45 m <sup>3</sup>		≤ 0.9 t/m <sup>3</sup>
Feed distributing bucket <sup>1)</sup>	1000357591	2400 mm	3.0 m <sup>3</sup>	Picking up, transporting and loading material	≤ 1.3 t/m <sup>3</sup>
Multipurpose bucket (with teeth)	1000396423	2525 mm	1.25 m <sup>3</sup>	Grading, removing and scraping vegetation, e.g., picking up and evenly spreading bulk material; grabbing bulky objects	≤ 1.8 t/m <sup>3</sup>
Multipurpose bucket (without teeth)	1000397027	2500 mm	1.25 m <sup>3</sup>	Grading, removing and scraping vegetation, e.g., picking up and evenly spreading bulk material; grabbing bulky objects	≤ 1.3 t/m <sup>3</sup>
	1000397026	2500 mm	1.3 m <sup>3</sup>		
Silage bucket	1000356258	2600 mm	2.05 m <sup>3</sup>	Picking up, transporting and loading silage and re-cycling material	≤ 1.3 t/m <sup>3</sup>
Silage cutter	1000345939	2560 mm	1.64 m <sup>3</sup>	Picking up, transporting and loading silage	≤ 0.8 t/m <sup>3</sup>
Bale spike 5 tines <sup>1)</sup> , 1280 mm long	1000357599	1808 mm	-	Picking up, transporting and loading hay, straw and silage bales	-
Bale gripper <sup>1)</sup> , clamping width 800 – 1800 mm	1000345930	-	-		-
Bale gripper <sup>1)</sup> , clamping width 900 – 1800 mm	1000357600	1200 mm	-		-
	1000357601	1200 mm	-		-

Attachments	Material number	Width	Heaped capacity	Use	Material density
Multipurpose forks	1000357596 <sup>1)</sup>	2980 mm	-	Picking up, transporting and loading manure and silage	-
	1000357598	2500 mm	-		-
Material pusher <sup>1)</sup> , length 4680 mm	1000358628	2500 mm	-		-
Stacking units	1000347693	Length 1200 mm	-	Picking up, transporting and loading pallets	-
	1000347694	Length 1200 mm			
Crane jib	1000423656	Length 800 mm	-	Picking up and transporting loads with slings	-
Rotary sweeper <sup>1)</sup> BEMA 35	1000345924	2600 mm	-		-
Snow plow <sup>1)</sup>	1000345923	2750 mm	-	Winter service	-
Snow cutter <sup>1)</sup>	1000357603	2500 mm	-		-
Work platform <sup>1)</sup>	1000369137	1600 mm	-	Working safely at a height	Mass 310 kg
1) When using this attachment, special measures are required due to excessive field of vision restrictions. These special measures can consist, for example, of assigning a guide or locking down the work area for persons.					

**Variant: 355-06**

Attachments	Material number	Width	Heaped capacity	Use	Material density
Standard bucket with teeth	1000354131	2500 mm	1.55 m <sup>3</sup>	Loosening, picking up, transporting and loading of loose or solid material.	≤ 1.8 t/m <sup>3</sup>
Standard bucket without teeth	1000388728	2500 mm	1.6 m <sup>3</sup>		≤ 1.6 t/m <sup>3</sup>
Lightweight materials bucket, screwed-on bucket blade (without teeth)	1000428314	2500 mm	2.1 m <sup>3</sup>	Picking up, transporting and loading lightweight material	≤ 1.2 t/m <sup>3</sup>
	1000428312	2500 mm	3.0 m <sup>3</sup>		≤ 0.8 t/m <sup>3</sup>
Feed distributing bucket <sup>1)</sup>	1000357591	2400 mm	3.0 m <sup>3</sup>	Picking up, transporting and loading material	≤ 1.3 t/m <sup>3</sup>
Multipurpose bucket (with teeth)	1000357264	2525 mm	1.45 m <sup>3</sup>	Grading, removing and scraping vegetation, e.g., picking up and evenly spreading bulk material; grabbing bulky objects	≤ 1.8 t/m <sup>3</sup>
Multipurpose bucket (without teeth)	1000397027	2525 mm	1.25 m <sup>3</sup>	Grading, removing and scraping vegetation, e.g., picking up and evenly spreading bulk material; grabbing bulky objects	≤ 1.3 t/m <sup>3</sup>
	1000397026	2525 mm	1.3 m <sup>3</sup>		

Attachments	Material number	Width	Heaped capacity	Use	Material density
Silage bucket	1000356258	2600 mm	2.05 m <sup>3</sup>	Picking up, transporting and loading silage and re-cycling material	≤ 1.3 t/m <sup>3</sup>
Silage cutter	1000345939	2560 mm	1.64 m <sup>3</sup>	Picking up, transporting and loading silage	≤ 0.8 t/m <sup>3</sup>
Bale spike 5 tines <sup>1)</sup> , 1280 mm long	1000357599	1808 mm	-	Picking up, transporting and loading hay, straw and silage bales	-
Bale gripper <sup>1)</sup> , clamping width 800 – 1800 mm	1000345930	-	-		-
Bale gripper <sup>1)</sup> , clamping width 900 – 1800 mm	1000357600	1200 mm	-		-
	1000357601	1200 mm	-		-
Multipurpose forks	1000357596 <sup>1)</sup>	2980 mm	-	Picking up, transporting and loading manure and silage	-
	1000357598	2500 mm	-		-
Material pusher <sup>1)</sup> , length 4680 mm	1000358628	2500 mm	-		-
Stacking units	1000347693	Length 1200 mm	-	Picking up, transporting and loading pallets	-
	1000347694	Length 1200 mm			
Crane jib	1000423656	Length 800 mm	-	Picking up and transporting loads with slings	-
Rotary sweeper <sup>1)</sup> BEMA 35	1000345924	2600 mm	-		-
Snow plow <sup>1)</sup>	1000345923	2750 mm	-	Winter service	-
Snow cutter <sup>1)</sup>	1000357603	2500 mm	-		-
Work platform <sup>1)</sup>	1000369137	1600 mm	-	Working safely at a height	Mass 310 kg
1) When using this attachment, special measures are required due to excessive field of vision restrictions. These special measures can consist, for example, of assigning a guide or locking down the work area for persons.					

The attachments may only be used in conjunction with the load diagram valid for the vehicle and the attachment.

If the commissioning and use of attachments are not described in this operator's manual, refer to the operator's manual of the attachment.

## 14 Technical data

### 14.1 Dimensions

#### 14.1.1 Dimensions with standard bucket

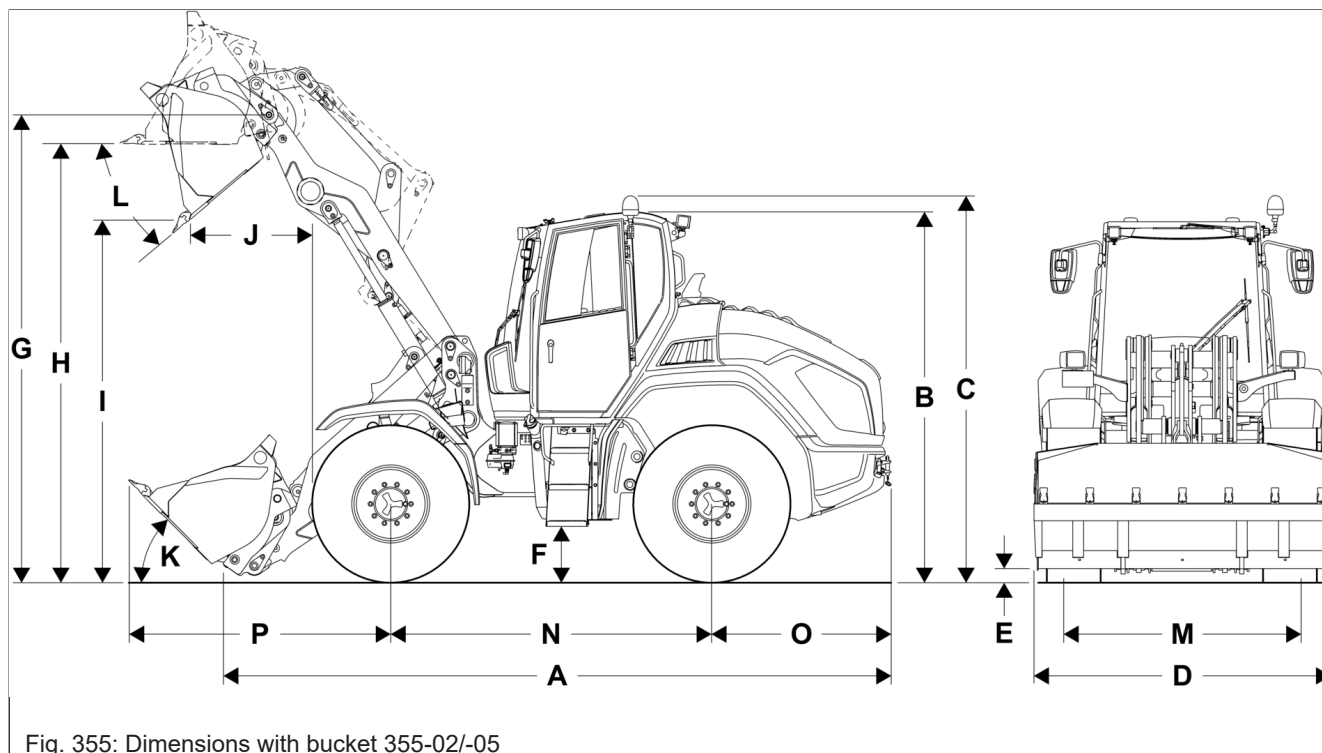
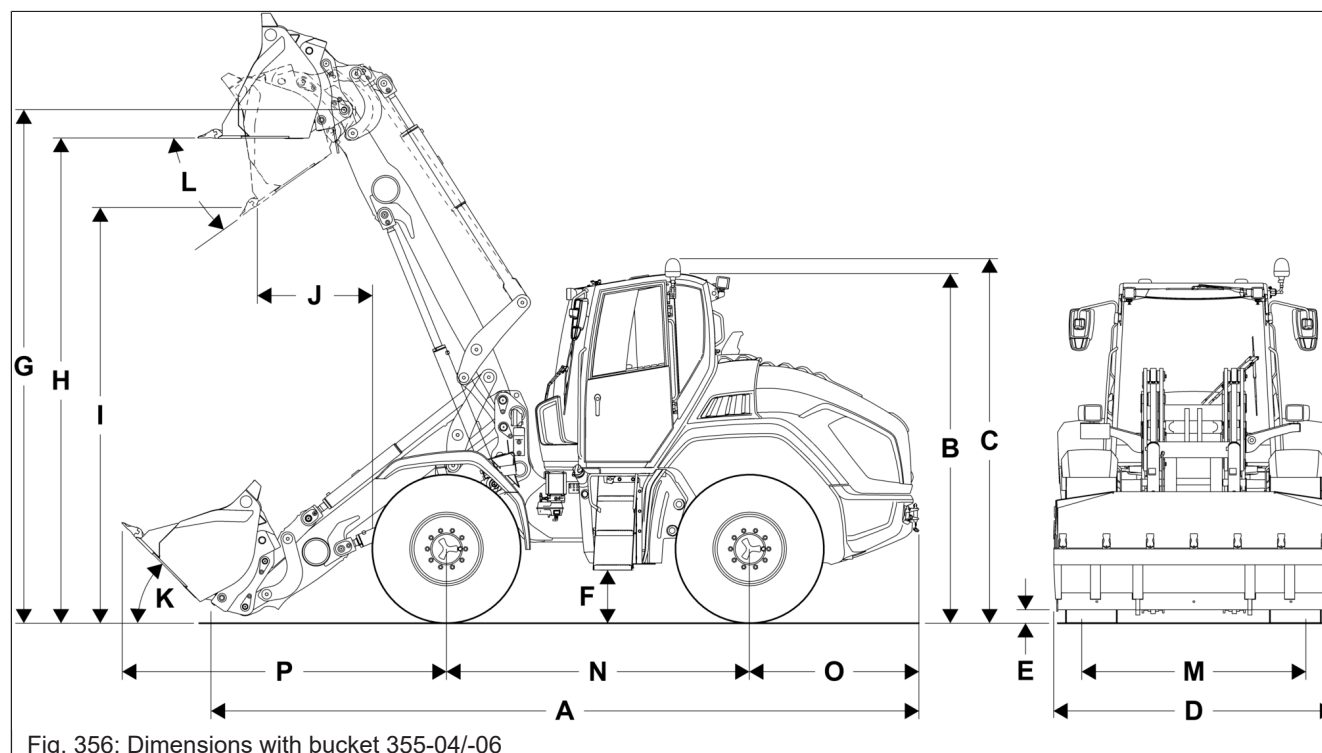


Fig. 355: Dimensions with bucket 355-02/-05

Item	Designation	Dimension in mm	
		355-02	355-05
A	Overall length without attachment	6420	6550
B	Overall height (with standard tires)	3010	
C	Overall height with rotating beacon	3175	
D	Overall width with bucket	2500	
E	Ground clearance in transport position of loader unit	Approx. 250	
F	Ground clearance	445	
G	Pin height	3760	
H	Load-over height	3520	
I	Tilt-out height	2725	2695
Y	Tilt reach	1085	1172
K	Tilt-in angle	45 °	41.5 °
L	Tilt-out angle	45 °	
M	Track width front/rear	1955/1955	
N	Wheelbase	2620	
O	Center of rear axle up to rear end of vehicle	1520, max. 1900 <sup>1</sup>	
P	Center front axle to tip of bucket	2310	2410

Item	Designation	Dimension in mm 355-02	Dimension in mm 355-05
	Turning radius at the outer edge of the wheel	3865	
	Turning radius at the outer edge of the bucket	4955	5028

1) depending on trailer coupling



Item	Designation	Dimension in mm 355-04	Dimension in mm 355-06
A	Overall length without attachment	6720	7040
B	Overall height (with standard tires)	3010	
C	Overall height with rotating beacon	3175	
D	Overall width with bucket	2500	
E	Ground clearance in transport position of loader unit	Approx. 250	
F	Ground clearance	445	
G	Pin height	4200	
H	Load-over height	3950	
I	Tilt-out height	3165	3210
Y	Tilt reach	1275	1300
K	Tilt-in angle	45 °	
L	Tilt-out angle	45 °	
M	Track width front/rear	1955/1955	
N	Wheelbase	2620	
O	Center of rear axle up to rear end of vehicle	1520, max. 1900 <sup>1</sup>	
P	Center front axle to tip of bucket	2900	

Item	Designation	Dimension in mm	
		355-04	355-06
	Turning radius at the outer edge of the wheel	3865	
	Turning radius at the outer edge of the bucket	5340	5410
depending on trailer coupling			

### 14.1.2 Dimensions with pallet forks

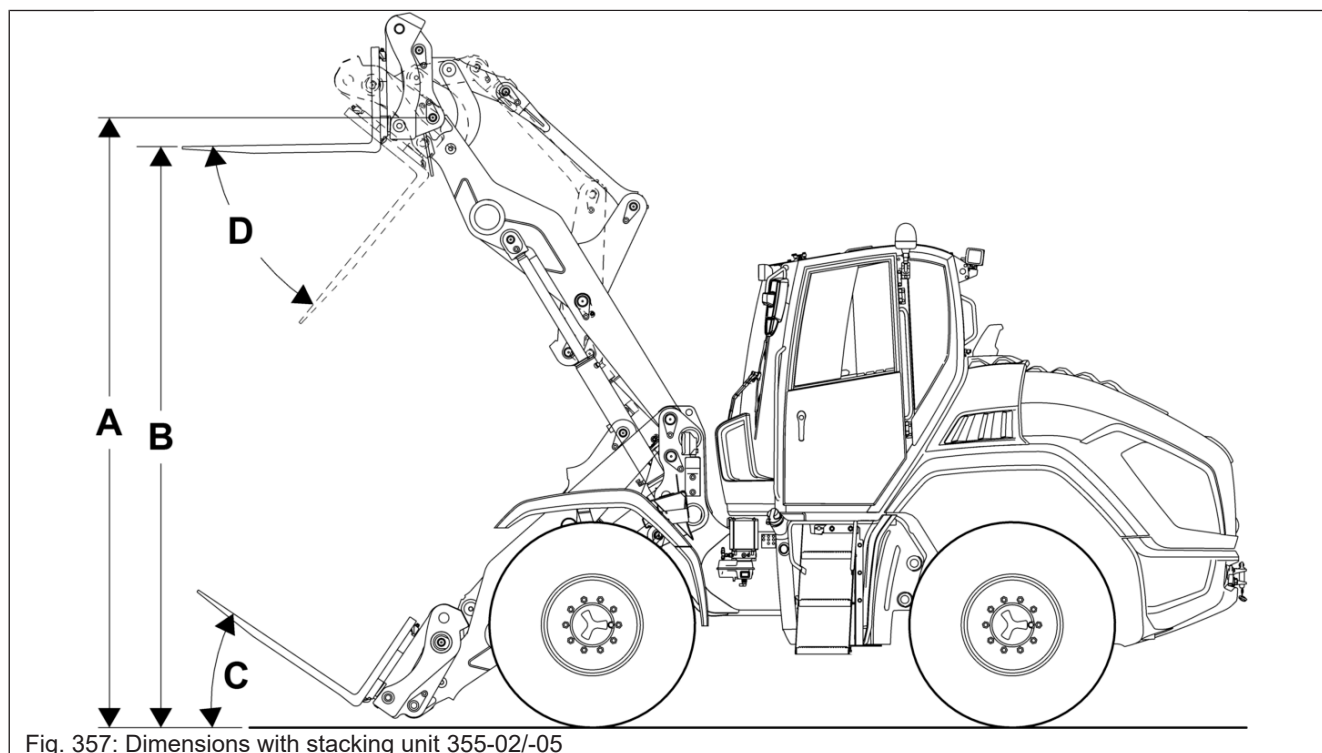
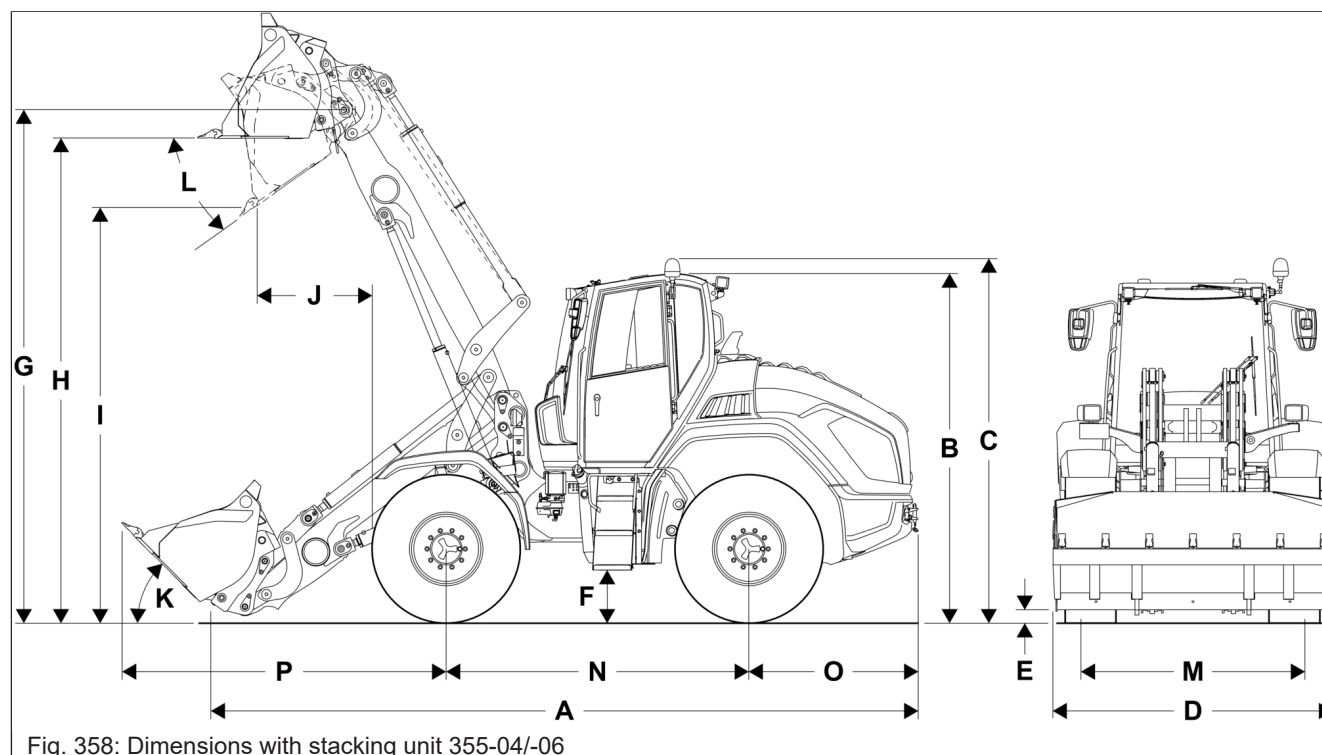


Fig. 357: Dimensions with stacking unit 355-02/-05

Item	Designation	Dimension in mm
<b>A</b>	Pivot height	3760
<b>B</b>	Pallet height	3605
<b>C</b>	Tilt-in angle in transport position	30.5°
<b>D</b>	Tilt-out angle	56°
-	Width of fork carriage	1500
-	Length of fork arms	1200
Further specifications ► 387]		



Item	Designation	Dimension in mm
A	Pivot height	4200
B	Pallet height	4055
C	Tilt-in angle in transport position	34°
D	Tilt-out angle	56°
-	Width of fork carriage	1500
-	Length of fork arms	1200

Further specifications Dimensions with standard bucket (-04).

## 14.2 Weights

### 14.2.1 Weight of the vehicle

The weight of the vehicle may vary due to different equipment (e.g. when the tires are filled with water).

The operating weight of the vehicle is printed on an information label in the cab (see Fig. 78 on page 80).

Weights		Details ABE / EG tractor			
		Values in kg			
		355-02	355-04	355-05	355-06
Empty weight <sup>1,2</sup>	maximum	11550			
	minimum	8750	9250	9500	10000
Operating weight with attachment <sup>3</sup>		9850	10250	11050	11220

Weights	Details ABE / EG tractor			
	Values in kg			
	355-02	355-04	355-05	355-06
Permissible total weight	12500			
Permissible axle loads per axle	7500			
1) Machine without attachment , with full tank, with driver. The empty weight can vary according to equipment and options.				
2) The operating mass of the vehicle is shown on the label in the cab.				
3) Machine with standard bucket, full tank, without driver (basic version).				

## 14.2.2 Trailer loads and drawbar loads

### Trailer loads

Braking system (trailer)	Trailer load in kg
Without brake	1000
one axle braked	3500
All axles braked	8000
Hydraulic or pneumatic brake	18000
Recovery equipment	16000
Maximum total mass	

### Maximum permissible drawbar loads

The drawbar loads are listed with and without front ballast weight. The ballast weight has the same receptacles as an attachment and is mounted as an attachment [see Mounting attachment on page 209](#).

With a height-adjustable trailer coupling, the drawbar load depends on the position and must be observed accordingly.

Trailer loads	
Braking system (trailer)	Trailer load in kg
without brakes	1000
One axle braked	3500
All axles braked	8000
Hydraulic or pneumatic brakes	18000
Recovery equipment	16000
Maximum total mass	

### Maximum permissible drawbar loads

The drawbar loads are listed with and without front ballast weight. The ballast weight has the same fixtures as an attachment and is mounted in the same manner as an attachment [see Connecting an attachment on page 209](#).

In case of a height-adjustable trailer coupling, the drawbar load depends on the position and must be taken into account accordingly.

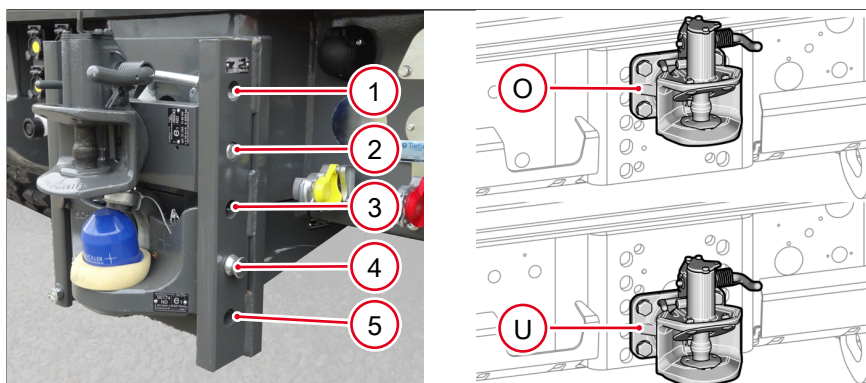


Fig. 359: Positions of a height adjustable and rigid trailer hitch

Loader unit	Front ballast	AutoHitch	Trailer hitch rigid	Height-adjustable trailer hitch	
	in kg <sup>1)</sup>	Drawbar load in kg	Drawbar load in kg	Position	Drawbar load in kg
355-02	620	550 to max. 1000 <sup>2)</sup>	Mounted above (O): 700 to max. 1000 <sup>2)</sup>	1	700 to 1000 <sup>2)</sup>
				2	700 to 1000 <sup>2)</sup>
			Mounted below (U): 700 to max. 1000 <sup>2)</sup>	3	700 to 1000 <sup>2)</sup>
				4	700 to 1000 <sup>2)</sup>
				5	700 to 1000 <sup>2)</sup>
355-04	620	350 to max. 850 <sup>2)</sup>	Mounted above (O): 500 to max. 900 <sup>2)</sup>	1	500 to 900 <sup>2)</sup>
				2	500 to 900 <sup>2)</sup>
			Mounted below (U): 500 max. 900 <sup>2)</sup>	3	500 to 900 <sup>2)</sup>
				4	500 to 900 <sup>2)</sup>
				5	500 to 900 <sup>2)</sup>
355-02	None	350 to max. 700 <sup>2)</sup>	Mounted above (O): not permitted	1	not permitted
				2	Max. 100 <sup>2)</sup>
			Mounted below (U): 50 to max. 200 <sup>2)</sup>	3	Max. 300 <sup>2)</sup>
				4	Max. 500 <sup>2)</sup>
				5	Max. 700 <sup>2)</sup>
355-04	None	50 to max. 550 <sup>2)</sup>	Mounted above (O): not permitted	1	not permitted
				2	not permitted
			Mounted below (U): 50 to max. 150 <sup>2)</sup>	3	150 to 300 <sup>2)</sup>
				4	200 to 500 <sup>2)</sup>
				5	200 to 600 <sup>2)</sup>

Loader unit	Front ballast	AutoHitch	Trailer hitch rigid	Height-adjustable trailer hitch	
	in kg <sup>1)</sup>	Drawbar load in kg	Drawbar load in kg	Position	Drawbar load in kg
355-05	620	Max. 400 <sup>2)</sup>	Mounted above ( <b>O</b> ): 200 to max. 500 <sup>2)</sup>	<b>1</b>	up to 450 <sup>2)</sup>
				<b>2</b>	50 to 450 <sup>2)</sup>
			Mounted below ( <b>U</b> ): 200 to max. 500 <sup>2)</sup>	<b>3</b>	50 to 450 <sup>2)</sup>
				<b>4</b>	50 to 450 <sup>2)</sup>
				<b>5</b>	50 to 450 <sup>2)</sup>
355-05	None	Max. 200 <sup>2)</sup>	Mounted above ( <b>O</b> ): not permitted	<b>1</b>	not permitted
				<b>2</b>	not permitted
			Mounted below ( <b>U</b> ): not permitted	<b>3</b>	not permitted
				<b>4</b>	not permitted
				<b>5</b>	Max. 100 <sup>2)</sup>
355-06	620	100 to max. 550 <sup>2)</sup>	Mounted above ( <b>O</b> ): 200 to max. 600	<b>1</b>	Max. 600 <sup>2)</sup>
				<b>2</b>	200 to 600 <sup>2)</sup>
			Mounted below ( <b>U</b> ): 200 to max. 600	<b>3</b>	200 to 600 <sup>2)</sup>
				<b>4</b>	200 to 600 <sup>2)</sup>
				<b>5</b>	200 to 600 <sup>2)</sup>
355-06	None	Max. 250 <sup>2)</sup>	Mounted above ( <b>O</b> ): not permitted	<b>1</b>	not permitted
				<b>2</b>	not permitted
			Mounted below ( <b>U</b> ): not permitted	<b>3</b>	not permitted
				<b>4</b>	Max. 200 <sup>2)</sup>
				<b>5</b>	Max. 300 <sup>2)</sup>

1) Material number 1000395943

2) With basic variant. Value may be lower due to the equipment due to the permissible axle load or total permissible mass.



## Information

### Alternative front ballast

An alternative front ballast with a comparable mass is permissible if the distance from the front edge of the front ballast to the center of the steering wheel does not exceed 3500 mm.



## Information

### Alternative front ballast

An alternative front ballast of comparable mass is allowed if the dimension from the front edge of the front ballast to the center of the steering wheel does not exceed 3500 mm.

## 14.3 Engine

### 14.3.1 Engine data

Deutz TCD 3.6 L4 DOC SCR / Deutz 3.6 L4 DOC/DPF SCR <sup>1</sup>	
Exhaust-emission level	EU Stage IV / US EPA Tier 4f
Design	Series turbo diesel engine with charge air cooler
Number of cylinders	4
Type designation	TCD 3.6
Displacement	3621 cm <sup>3</sup>
Power at rated speed	100 kW
Maximum rated speed	2300 rpm
Maximum torque	500 Nm at 1600 rpm
Idling speed	800 rpm
Minimum specific fuel consumption	208 g/kWh
Fuel injection system	Common rail direct injection
Firing order	1-3-4-2
Starting aid	Glow plug
Injection system	30° in all directions
1)Up to December 31, 2021, vehicles with this type of engine may be marketed according to EU Regulation 2016/1628 as machine equipped with transition engine.	

Deutz TCD 3.6 L4 DOC SCR / Deutz 3.6 L4 DOC/DPF SCR	
Exhaust-emission level	EU level V
Design	Series turbo diesel engine with charge air cooler
Number of cylinders	4
Type designation	TCD 3.6
Displacement	3621 cm <sup>3</sup>
Power at rated speed	100 kW
Maximum rated speed	2300 rpm
Maximum torque	500 Nm at 1600 rpm
Idling speed	800 rpm
Minimum specific fuel consumption	208 g/kWh
Fuel injection system	Common rail direct injection
Firing order	1-3-4-2
Starting aid	Glow plug
Injection system	30° in all directions

Deutz TCD 4.1 L4 DOC/DPF SCR <sup>1</sup>	
Exhaust-emission level	EU Stage IV / US EPA Tier4f
Design	Series turbo diesel engine with charge air cooler
Number of cylinders	4
Type designation	TCD 4.1
Displacement	4038 cm <sup>3</sup>
Power at rated speed	115 kW

<b>Deutz TCD 4.1 L4 DOC/DPF SCR<sup>1</sup></b>	
Maximum rated speed	2300 rpm
Maximum torque	609 Nm at 1600 rpm
Idling speed	800 rpm
Minimum specific fuel consumption	212 g/kWh
Fuel injection system	Common rail direct injection
Firing order	1-3-4-2
Starting aid	Heating flange
Injection system	30 ° in all directions
1)Up to December 31, 2021, vehicles with this type of engine may be marketed according to EU Regulation 2016/1628 as machine equipped with transition engine .	

<b>Deutz TCD 4.1 L4 DOC/DPF SCR</b>	
Exhaust-emission level	EU level V
Design	Series turbo diesel engine with charge air cooler
Number of cylinders	4
Type designation	TCD 4.1
Displacement	4038 cm <sup>3</sup>
Power at rated speed	115 kW
Maximum rated speed	2300 rpm
Maximum torque	609 Nm at 1600 rpm
Idling speed	800 rpm
Minimum specific fuel consumption	212 g/kWh
Fuel injection system	Common rail direct injection
Firing order	1-3-4-2
Starting aid	Heating flange
Injection system	30 ° in all directions

### 14.3.2 Radiator technical data

<b>Unit</b>	<b>Data</b>
Hydraulic pump	Gear pump
Displacement	22 cm <sup>3</sup> /rev
Fan motor (capacity)	17 cm <sup>3</sup> /U

## 14.4 Emissions

### 14.4.1 Exhaust emissions

To the exhaust emissions [see Engine data on page 394](#).

## 14.4.2 Noise values



### Information

The values do not apply to EDG engines.

Sound power level (exterior noise)	Value
Measured value L <sub>WA</sub>	100.7 dBA
Guaranteed value L <sub>WA</sub>	102 dBA

Sound pressure level (internal noise)	Value
Noise level at the driver's ear	70 dBA

These measurements were carried out in accordance with the requirements of EN 474 and the Directive 2000/14 EC, as amended by Directive 2005/88 EC!

Sound power level (external noise)	Value
Standing noise	71 dBA
Driving noise	89 dBA

Sound pressure level (internal noise)	Value
Noise level at the driver's ear	
Openings closed	66 dBA
Openings open	69 dBA

These measurements were carried out in accordance with the requirements of the Delegated Regulation (EU) 2015/96!

All values are only valid for EU member states. In other countries, the relevant national regulations are to be observed and complied with .

## 14.4.3 Vibration

Vibrations <sup>1) 2)</sup>	
Total vibration value of the upper limbs	< 2.5 m/s <sup>2</sup>
Maximum effective value of weighted acceleration for body	< 0.5 m/s <sup>2</sup> <sup>3)</sup> < 1.28 m/s <sup>2</sup> <sup>4)</sup>

- 1) Inform or instruct operators on the hazards of vibrations
- 2) Uncertainty of measurement of the vibration measurement according to DIN EN 474-1:2014-03 and EN 12096:1997.
- 3) On level and firm ground with appropriate driving style.
- 4) Use for extraction under harsh environmental conditions.

## 14.5 Electrical system

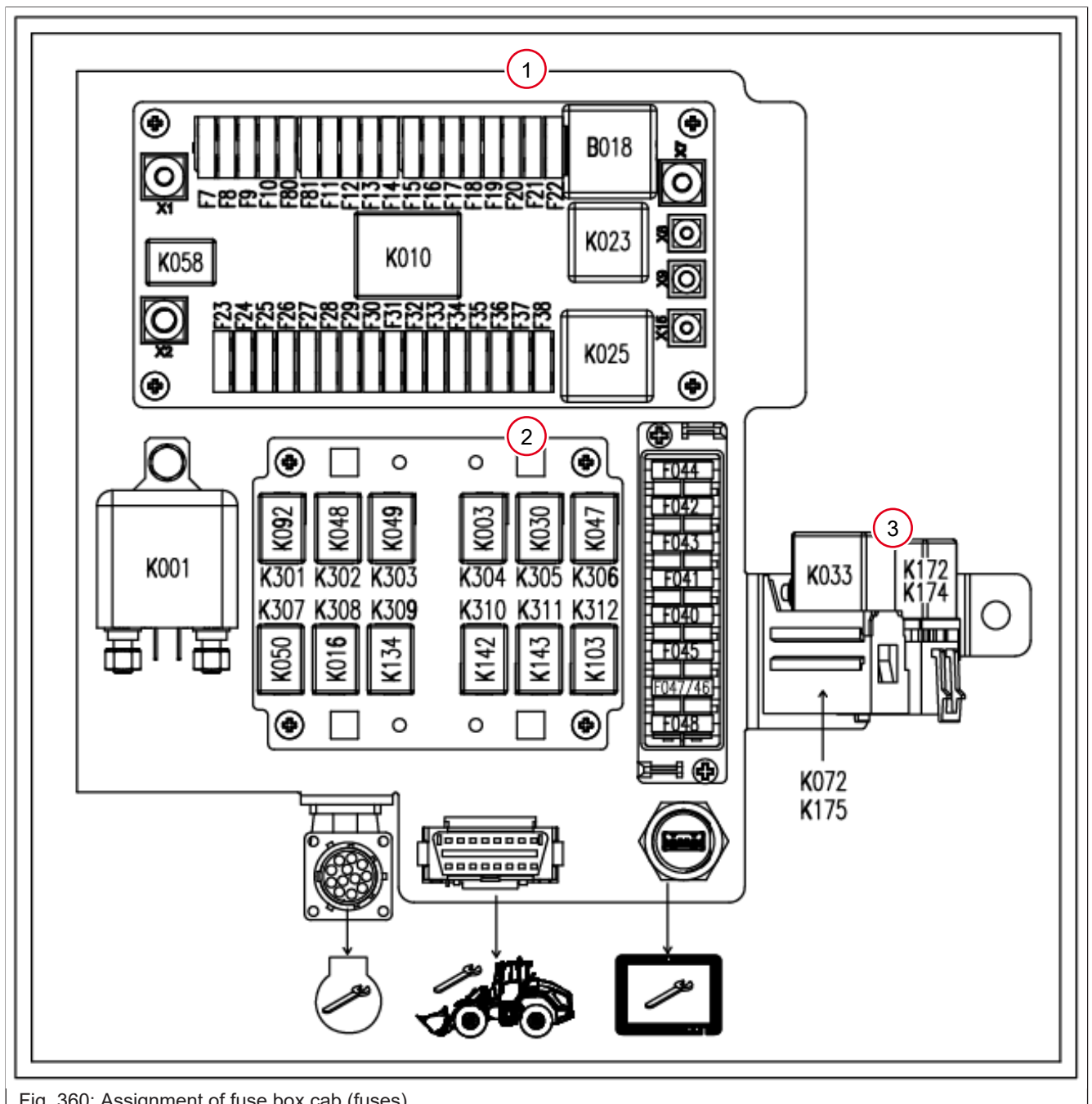
### 14.5.1 Fuses and relays

#### 14.5.1.1 Cab fuse box

The fuse box is located under the side fairing on the right side of the cab. After opening the right door and removing the cover, the fuse box is accessible from the outside.

#### Fuses

The specifications refer to the maximum possible occupancy.



No.	(A)	Protected circuit
<b>Upper row 1</b>		
F7	3	Starting key, joystick, telematics, seat switch
F8	30	Cab controller
F9	5	Radio, drive interlock
F10	30	Window heating
F80	15	Hazard warning system
F81	3	Controller
F11	7.5	Rear window wiper
F12	15	Cigarette lighter, plug receptacle cab
F13	3	Keypad, display, safe load indicator, hydraulic cut-off, cab plug receptacle, buzzer
F14	10	Reversing alarm, reversing light, rear plug receptacle, hydraulic trailer brake
F15	10	Rotating beacon
F16	20	Parking light, tail light, headlight flasher, interior light, instrument lighting, switch lighting, rear plug receptacle outlet, front plug receptacle outlet
F17	5	Side marker lights (left)
F18	5	Side marker lights (right)
F19	7.5	Low beam (left)
F20	7.5	Low beam (right)
F21	7.5	High beam (left)
F22	7.5	High beam (right)
<b>lower row 2</b>		
F23	3	Drive interlock, radio, air conditioning system control, reversing camera, mirror adjustment, salt spreader
F24	7.5	Additional front wiper
F25	20	Turn signal, high beam, low beam
F26	20	Horn, front window wiper, wiper-washer system front
F27	7.5	Brake lights
F28	3	Switch for differential lock, hydraulic oil return filter, load stabilizer, parking brake, hydraulic trailer brake, compressed air brake, air conditioning system, auto hitch,
F29	20	Front work lights
F30	10	Rear work lights
F31	3	Steering system, telematics
F32	5	Jog dial, joystick
F33	10	Pump vehicle electronics
F34	3	Release button, reverse fan, handbrake switch, seat switch, function lighting, USB charger
F35	30	Heating, heating blower
F36	10	Telescopic boom work lights
F37	10	Side work light
F38	20	Air-sprung seat, heated seat
<b>Right row 3</b>		
F044	5	Sensors level and temperature
F042	10	Rear plug receptacle signal 1
F043	10	Rear plug receptacle Signal 2, central lubrication system
F041	15	Front plug receptacle signal 2

No.	(A)	Protected circuit
F040	15	Front plug receptacle signal 1
F045	15	NOx sensor
F046	5	Throttle valve
F047	15	Exhaust gas recirculation
F048	7.5	Air conditioning compressor

### Relays

The specifications refer to the maximum possible occupancy.

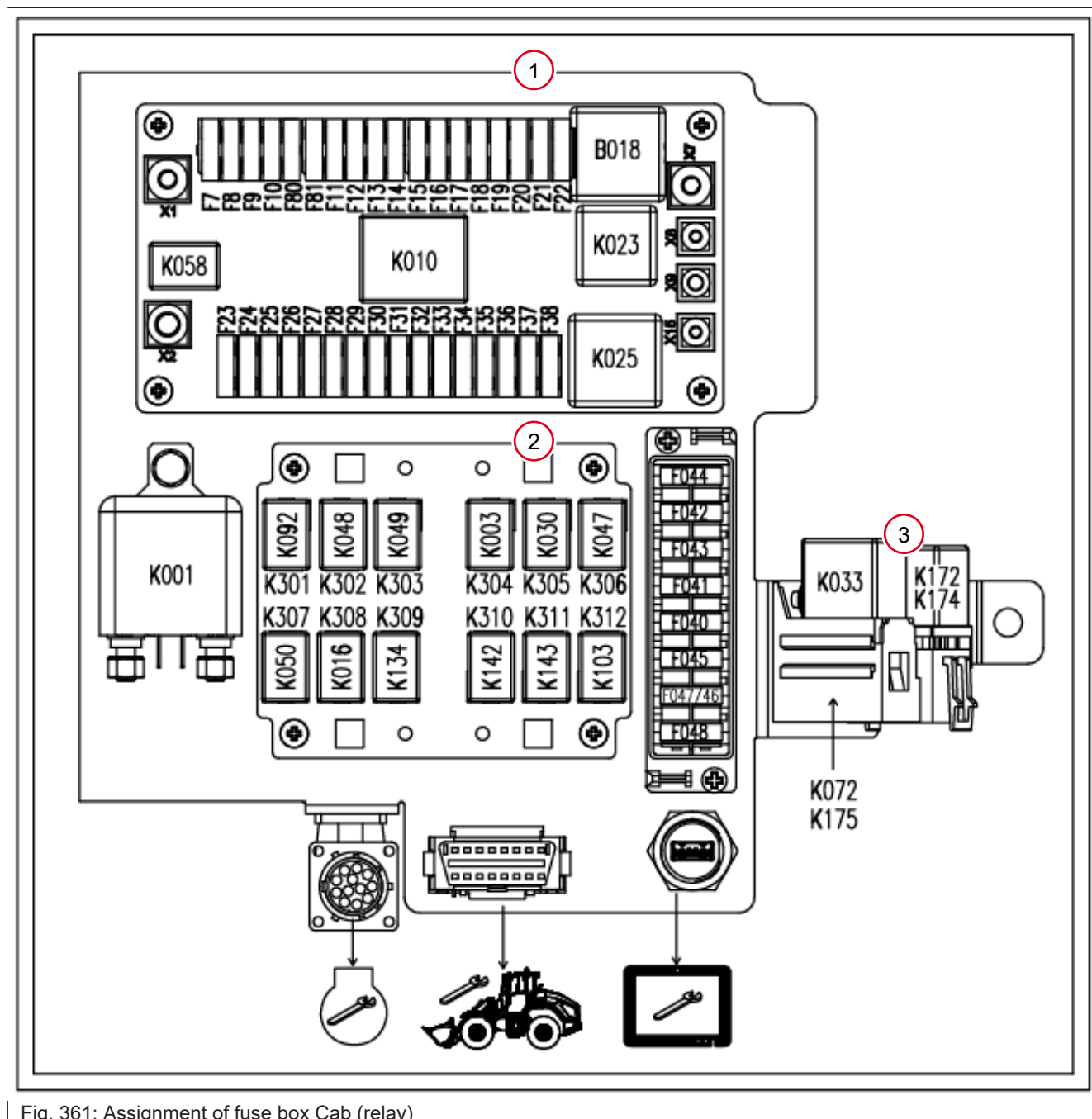


Fig. 361: Assignment of fuse box Cab (relay)

Designation		Protected circuit
Printed circuit board	BMK	
Upper range 1		
	K058	Reversing light
	K010	Turn indicator relay
	K023	Front wiper
	K025	Intermittent-wipe relay
Middle range 1		
K001		Switch terminal 15
K301	K092	Rear window wiper
K302	K048	Front work lights
K303	K049	Rear work lights
K304	K003	Rotating beacon
K305	K030	Brake lights
K306	K047	Telescopic boom work lights
K307	K050	Side work light
K308	K016	Front plug receptacle signal 1
K309	K134	Front plug receptacle signal 2
K310	K142	Rear plug receptacle signal 1
K311	K143	Rear plug receptacle signal 2
K312	K103	Air conditioning compressor
Lower range 1		
	K033	Window heating
	K172	Roof window wiper
	K174	Interior/ambient lighting
	K072	Auxiliary heater
	K175	Auxiliary heater

### 14.5.1.2 Fuse box Engine compartment

The fuse box is located under the engine cover on the right side of the engine. After opening the engine cover and removing the cover, the fuse box is accessible.

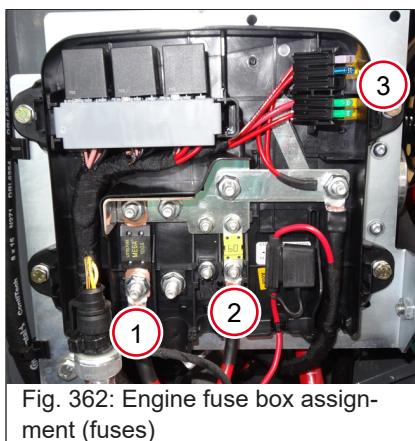


Fig. 362: Engine fuse box assignment (fuses)

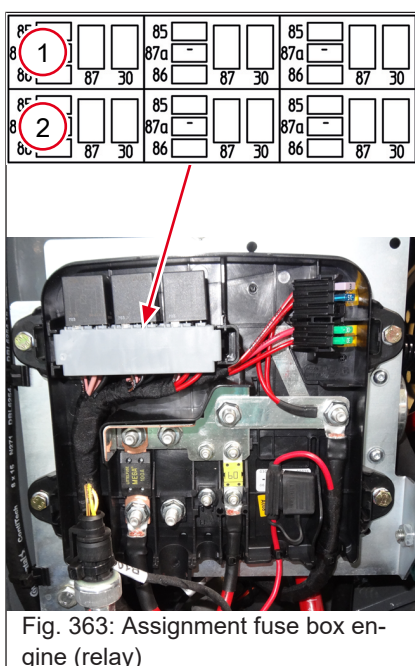


Fig. 363: Assignment fuse box engine (relay)

## Fuses

The specifications refer to the maximum possible occupancy.

No.	(A)	Protected circuit
<b>Main fuse cab 1</b>		
F002	100	Cab
<b>Main fuse cab 2</b>		
F039	60	Engine
<b>Fuses right 3</b>		
F006	3	Engine management
F053	15	Hydraulic trailer brake
F003	30	Relay heating elements
F005	30	Engine electronics

## Relays

The specifications refer to the maximum possible occupancy. The relays are arranged in double rows.

Relays	Protected circuit
<b>Front row 1</b>	
K088	Fuel pump
K128	Heating element pressure line
K127	Heating element choke line
<b>Rear row 1</b>	
K129	SCR control
K125	Heating element feed module
K126	Heating element suction line

### 14.5.1.3 Separate fuses and relays

## Fuses

The fuses are not centrally grouped and are usually located in the cab, in the engine compartment or on the respective device. The data refers to a maximum possible assembly.

No.	(A)	Protected circuit
F001	150	Preheating system
F049	15	Fuel preheating
F050		Lehner spreader
F051	5	Control unit Parking heater Eberspächer
F052	23	Parking heater Eberspächer / Kugelmann spreader
F054	3	Control instrument Kugelmann spreader
F055	3	Battery master relay / Battery master switch

No.	(A)	Protected circuit
F056	30	Parking heater Eberspächer / Webasto blower

### Relays

The relays are not centrally grouped and are located in the engine compartment. The specifications refer to the maximum possible load.

Relays	Protected circuit
K005	Preheating
K031	Fuel preheating

## 14.5.2 Electric aggregate/incandescent lamps

Electric units	
Designation	Power
Battery voltage	12 V
Battery	185 Ah
Alternator (engine 3.6)	120 A
Alternator (engine 4.1)	150 A
Starting motor (engine 3.6)	3.2 kW
Starting motor (engine 4.1)	4.0 kW

Light bulb	
Designation	Power
Light bulb – high beam (left/right)	12 V 55 W/H3
Light bulb – low beam (left/right)	12 V 55 W/H7
Light bulb – parking light (left/right)	12 V 4 W
Light bulb – front and rear turn indicators (left/right)	12 V 21 W
Light bulb – brake/rear lights (left/right)	12 V 21/5 W
Incandescent lamp - work light optional LED 12 V/30 W	12 V 55 W/H3
Light bulb – rotating beacon	12 V 55 W/H1

## 14.6 Drive system

### 14.6.1 Axles

Front axle	
Designation	Value
Design	Planetary steering axle, mounted rigidly on the frame
Differential lock	100 %
King-pin inclination	0 °
Camber	0 °
Articulation angle	max. 40 °
Toe-in	0 mm

Front axle	
Designation	Value
Track <sup>1)</sup>	1975 – 2015 mm

1) depending on tires

Rear axle	
Designation	Value
Design	Planetary steering axle, pendulum mounted on frame
Differential lock	100 %
King-pin inclination	0 °
Camber	0 °
Oscillation angle	+/- 12 °
Articulation angle	max. 40 °
Toe-in	0 mm
Track <sup>1)</sup>	1975 – 2015 mm

1) depending on tires

## 14.6.2 Braking system

### Service brake

- 20 km/h version
  - Hydraulic single-circuit power brake on the front axle.
  - Multi-disc brake via drive shaft also acting on the rear axle.
- 30 km/h and 40 km/h version:
  - Hydraulic dual-circuit power brake on the front axle and rear axle as multi-disc brake.

### Parking brake

- Electro-hydraulic multi-disc brake with spring mechanism on the front axle.
- Multi-disc brake via drive shaft also acting on the rear axle.

## 14.6.3 Tires

Tires for EC tractor-approved vehicles				
Tire size	Tire pressure		Rim	
	Front	Rear	Size	Wheel offset
500/70 R24 164A8/164B XMCL	4.0	4.0	DW16Lx24	40 mm
500/70 R24 164A8/164B BIB-LOAD	4.0	4.0		40 mm
500/70 R24 164A8/R159D COSS-GRIP	4.0	4.0		40 mm
540/70 R24 168A8/168B XMCL	4.0	4.0		40 mm
540/70 R24 168A8/168B BIB-LOAD	4.0	4.0		40 mm

Tires for EC tractor-approved vehicles				
Tire size	Tire pressure		Rim	
	Front	Rear	Size	Wheel offset
600/55-26.5 159A8 Alliance 331 <sup>1</sup>	3.0	3.0	26.5xAG20.00	30 mm
1) Vehicle width 2700 mm, only permissible in conjunction with optional warning plates.				

Tires for vehicles with ABE approval				
Tire size	Tire pressure		Rim	
	Front	Rear	Size	Wheel offset
500/70 R24 164A8/164B XMCL	4.0	4.0	DW16Lx24	40 mm
500/70 R24 164A8/164B BIB-LOAD	4.0	4.0		40 mm
500/70 R24 164A8/R159D COSS-GRIP	4.0	4.0		40 mm
540/70 R24 168A8/168B XMCL	4.0	4.0		40 mm
540/70 R24 168A8/168B BIB-LOAD	4.0	4.0		40 mm

Tires with supports				
Tire size <sup>1</sup>	Tire pressure		Rim	
	Front	Rear	Size	Wheel offset
17.5R25 Michelin X-Mine D2 L5 TL <sup>1</sup>	Under preparation	Under preparation	25-14.00/1.5	50 mm
600/55-26.5 159A8 Alliance 331 <sup>2</sup>	3.0	3.0	26.5xAG20.00	30 mm
1) These tire sizes are only permitted with a single inspection (depending on the authorities).				
2) Vehicle width 2700 mm, only permissible in conjunction with optional warning plates.				

### 14.6.3.1 Tightening torques for wheels

Designation		Tightening torque
Wheel nuts	M22x1.5	600 ±20 Nm

## 14.7 Hydraulics

### 14.7.1 Drive hydraulics data

Variable displacement pump			
Designation	35 km/h LRC	20 km/h	30 km/h and 40 km/h 20 km/h reduced
Design	automotive continuously variable hydrostatic axial piston pump		
Control	Electronic		
Travel direction	Electro-hydraulic control		
Inching	Electric (potentiometer)		
Displacement with Engine Deutz TCD 3.6	115 cm <sup>3</sup> /rev	100 cm <sup>3</sup> /rev	115 cm <sup>3</sup> /rev

Variable displacement pump			
Designation	35 km/h LRC	20 km/h	30 km/h and 40 km/h 20 km/h reduced
Displacement with Engine Deutz TCD 4.1	-	100 cm <sup>3</sup> /rev	130 cm <sup>3</sup> /rev
Max. working pressure	450 <sup>+30</sup> bar		
Starting speed	1050 rpm		

Boost pump		
Designation	20 km/h	30 km/h and 40 km/h 20 km/h reduced
Design	Gear pump	
Displacement	24 cm <sup>3</sup> /rev	26 cm <sup>3</sup> /rev
Charging/boost pressure	30 bar at 2300 rpm max.	

Variable displacement motor		
Designation	20 km/h	30 km/h and 40 km/h 20 km/h reduced
Design	hydrostatic inclined axes variable speed engine	stepless hydrostatic inclined axis transmission (P370)
Capacity	210 cm <sup>3</sup> /rev	370 cm <sup>3</sup> /rev
Speeds	[▶ 140]	
Tractive force <sup>1)</sup>	86.1 kN	82.4 kN

1) tire-dependent; with standard tires

## 14.7.2 Data of steering hydraulics

Description and data of steering system	
Design	Hydrostatic 4 wheel steering with emergency steering features
Steering mode	Four-wheel steering, front wheel steering, optional diagonal steering (crab steering)
Assemblies	Hydraulic pump, priority valve, servostat with safety valve, one steering cylinder per axle, electronically synchronizing
Displacement	72 cm <sup>3</sup> /rev optionally 85 cm <sup>3</sup> /rev
Max. pump pressure	180 – 200 bar
Max. steering pressure <sup>1)</sup>	180 – 190 bar

1) measured at the servostat

### 14.7.3 Data of working hydraulics

Hydraulic pump	
Designation	Values
Design	Variable displacement pump (LS)
Displacement (pump 72 cm <sup>3</sup> /R) <sup>1)</sup>	150 l/min at 2300 min <sup>-1</sup>
Displacement (pump 85 cm <sup>3</sup> /r) <sup>2)</sup>	180 l/min at 2300 min <sup>-1</sup>
Max. operating pressure	250 bar
Location	on the drive shaft of the variable displacement pump (drive system)
Control valve	3 - 5-fold electric/hydraulic pilot operated
Hydraulic oil filter	Return flow filter

1) Series with 355-02/-04

2) Series with 355-05/-06 and option with 355-02/-04

#### Hydraulic cylinder protection

Designation	Value in bar
Max. operating pressure <sup>1)</sup>	225
Tilt rams (secondary protection) rod side	270
floor side	300
Lift ram (secondary protection) floor side	300
Quick-change cylinder (3rd control circuit) Max. operating pressure	225

1) measured at the control unit

#### Speeds lift and tilt rams

Designation	Z linkage	P linkage
Lift ram		
Raise	6.3 sec	6.6 sec
Lower	5.7 sec	4.1 sec
Tilt ram tilting (upper/lower position of loader unit)	2.4 sec/1.9 sec	2.7 sec / 1.2 sec
tilting (upper/lower position of loader unit)	4.0 sec/0.8 sec	2.7 sec / 1.4 sec

The values apply to movements without load. With load the times can be longer for safety reasons.

Electrohydraulic pilot control	
Pilot pump = feed pump for drive hydraulics	
Charging/boost pressure	30 bar at 2300 rpm max.
Pilot control unit	

Electrohydraulic pilot control	
Joystick (control lever)	<ul style="list-style-type: none"> <li>• Cross lever for operation of lift and tilt rams, change of travel direction, 3rd control circuit and differential lock</li> <li>• Locking cylinder or attachment electronically operated via roller (potentiometer)</li> </ul>
Lock against unintentional operation (for long-haul travel and transport)	<ul style="list-style-type: none"> <li>• Rocker switch for joystick lock when driving on the road</li> </ul>

### Usable consumer performance

Control circuit	Engine speed 1/min	Usable consumer differential pressure <sup>1</sup> bar	Max. possible liter performance <sup>1</sup> l/min
3rd and 4th double-acting control circuit	Starting from 1500	200	100
3rd and 4th control circuit large return flow	Starting from 1500	200	100
Additional control circuit V front external Return pump 70 ccm	at 1500	200	100
	at 1900	200	130
	at 2300	200	160
Additional control circuit V front external Return pump 85 ccm	at 1500	200	120
	at 1900	190	155
	at 2300	140	190
Rear tipping trailer connection	at 1500	190	25
	at 1900	175	33
	at 2300	160	40
Additional control circuit VI and VII rear double-acting	at 1500	190	25
	at 1900	175	33
	at 2300	160	40

1) Depending on the application, the pressure can rise to max. 250 bar. This reduces the specified max. possible liter line. It is therefore recommended to keep the engine speed as low as possible.

## 14.8 Bearing load

### 14.8.1 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.

### 14.8.1.1 Loads and forces

With standard bucket				
Designation	355-02	355-04	355-05	355-06
Design	Z-Kinematics	P-Kinematics	Z-Kinematics	P-Kinematics
Bucket capacity <sup>1,2</sup>	1.25/1.55 m <sup>3</sup>	1.14/1.45 m <sup>3</sup>	1.45 m <sup>3</sup>	1.25/1.55 m <sup>3</sup>
Payload	3050 kg	2650 kg	3450 kg	2800 kg
Tipping load	6100 kg	5500 kg	6900 kg	5600 kg
Lift capacity	65 kN	68 kN	65 kN	68.5 kN
Tear-out/breakaway force	61.9 kN	69.7 kN	54.1 kN	60.9 kN
Scraping depth <sup>3</sup>	150 mm	160 mm	150 mm	160 mm
1) Capacity struck according to ISO 7546/capacity heaped 2) Material numbers of buckets: 1000354131 (355-02, 355-06), 1000357262 (355-04), 1000427551 (355-05) 3) with standard tires 500/70 R 24				

With stacker				
Designation	355-02	355-04	355-05	355-06
Design	Z-Kinematics	P-Kinematics	Z-Kinematics	P-Kinematics
Payload S = 1.25	4200 kg	3800 kg	4800 kg	4000 kg
Payload S = 1.67	3140 kg	2850 kg	3600 kg	3000 kg

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