Original instructions

Platform tractors and tow tractors

R 07-25, R 08-20

CE

0736 0737 0809 0810

first in intralogistics

172780 EN - 06/2017

Address of manufacturer and contact details

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Rules for the operating company of industrial trucks

In addition to these operating instructions, a code of practice containing additional information for the operating companies of industrial trucks is also available.

This guide provides information for handling industrial trucks:

- Information on how to select suitable industrial trucks for a particular area of application
- Prerequisites for the safe operation of industrial trucks
- Information on the use of industrial trucks
- Information on transport, initial commissioning and storage of industrial trucks

Internet address and QR code

The information can be accessed at any time by pasting the address **https://m.still.de/vdma** in a web browser or by scanning the QR code.

1

Foreword

Your industrial truck

General

The truck described in these operating instructions conforms with the applicable standards and safety regulations.

If the truck is to be operated on public roads, it must conform with the existing national regulations for the country in which it is being used. The driving permit must be obtained from the appropriate office.

The trucks have been fitted with state-of-the-art technology. Now all that remains is to handle the trucks safely and maintain their functionality.

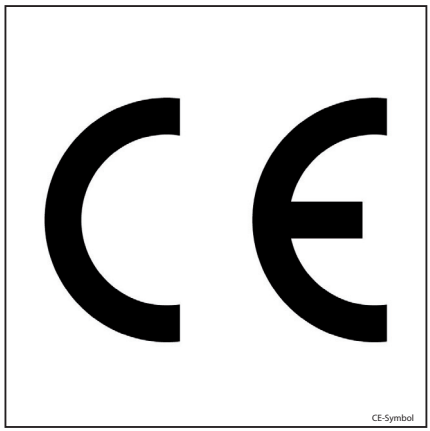
These operating instructions provide the necessary information to do this. Read and observe the information provided before commissioning the truck. This will prevent accidents and ensure that the warranty remains valid.

CE labelling

The manufacturer uses CE labelling to indicate that the truck complies with the standards and regulations valid at the time of marketing. This is confirmed by the issued EC declaration of conformity. The CE labelling is attached to the nameplate.

An independent structural change or addition to the truck can compromise safety, thus invalidating the EC declaration of conformity.

The EC declaration of conformity must be carefully stored and made available to the relevant authorities.



Information about the documentation

Scope of the documentation

- Operating instructions
- Operating instructions for attachments (variant)
- Spare parts list
- VDMA rules for proper use

These operating instructions describe all measures necessary for the safe operation and proper maintenance of the truck in all possible variants at the time of printing. Special versions to meet customer requirements are documented in separate operating instructions. If you have any questions, please contact your service centre.

The production number and year of manufacture can be found on the nameplate; see the chapter "Truck description".

Production number .....

Year of manufacture.....

Please quote the production number during all technical enquiries.

Operating instructions are provided with every truck. These instructions must be stored carefully and must be available to the driver and operating company at any time.

If the operating instructions are lost, the operating company must obtain a replacement from the manufacturer immediately.

The operating instructions are included in the spare parts list and can be reordered as a spare part.

The personnel responsible for operating and maintaining the equipment must be familiar with these operating instructions.

The operating company must ensure that all users have received, read and understood these instructions.

Thank you for reading and complying with these instructions. If you have any questions or suggestions for improvements, or if you

have found any faults, please contact your service centre.

Information symbols used

In order to reduce the risk of physical injuries, injuries to third parties and potential damage to the truck, information symbols on warning signs indicate specific dangers, special information or procedures.

⚠ DANGER

Indicates hazards that may result in bodily injury or death and/or severe product damage.

⚠ WARNING

Indicates hazards that may result in bodily injury and/or severe product damage.

⚠ CAUTION

Indicates hazards that may result in damage to, or destruction of the product.

ENVIRONMENT NOTE

Indicates hazards that may be harmful to the environment.

NOTE

Identifies technical information requiring special attention because the connection may not be obvious even to skilled personnel.

Issue date and topicality

The issue date of these operating instructions can be found on the title page.

STILL makes continuous efforts to enhance and improve its trucks. These operating instructions are subject to change, and any claims based on the information and/or illustrations contained in them cannot be asserted.

If you require technical support for the vehicle, please contact the authorised service centre.

Have a good trip, your partner

STILL GmbH

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22113 Hamburg, Germany

Copyright and trademark rights

Explanation of the cross-references

Cross-references refer to the respective chapter.

Example:

- Refer to a chapter: See chapter entitled "Definition of terms used for responsible persons"

Environmental considerations

Packaging

When the truck is delivered, certain parts are packaged to provide protection during transport. This packaging must be completely removed prior to commissioning.

ENVIRONMENT NOTE

The packaging material must be disposed of properly after delivery of the truck.

Disposing of components and batteries

The truck consists of different materials. Replaced components or batteries must be

- disposed of,
- treated or
- recycled in accordance with the regional or national regulations of the country of use.

NOTE

Observe the battery manufacturer documentation when disposing of batteries.

ENVIRONMENT NOTE

We recommend working with a waste management company for disposal purposes.

2

Introduction

Use of the truck

Intended purpose

Your truck is designed for transporting and towing stable loads as stated on the capacity plate within a temperature range of -20°C to +40°C.

Please pay particular attention to the VDMA booklet accompanying these operating instructions concerning safe and accident-free operation of industrial trucks, and read the safety regulations for gas vehicles and the regulations for use of the tow tractor when driving on public roads.

It is imperative that operating and service staff follow the VDMA booklet for users of industrial trucks.

The user, and not the manufacturer, is responsible for any injury or damage arising as a result of misuse, neglect, abuse, alterations, incorrect maintenance or repairs and applications not authorised by the manufacturer.

Should you want to use the truck for applications not covered in these operating instructions, please contact your local distributor. No modifications or conversions may be made, or additional equipment fitted to your tractor, without prior permission of the manufacturer.

For attachments, the operating instructions supplied by the attachment manufacturer apply.

⚠ DANGER

Risk of serious injury or death from use in potentially explosive areas!

Never use standard trucks in areas in which there is a risk of explosion due to gases, vapours or combustible and explosive powders.

Trucks that are required for operation in such environments must be specially protected. They must also be accompanied by a specific EC declaration of conformity and the appropriate operating instructions.

Inadmissible use

The operating company or driver, and not the manufacturer, is liable for any hazards caused by inadmissible use; see the chapter "Definition of terms used for responsible persons".

Use for purposes other than those described in these operating instructions is prohibited.

The truck may not be operated in areas where there is a risk of fire, explosion or corrosion, or in areas that are particularly dusty.

Never carry passengers on a trailer unless it has been specifically designed for such purpose.

Parking in temperatures below -10°C

⚠ CAUTION

Batteries may freeze!

If the truck is parked in an ambient temperature of below -10°C for an extended period, the batteries will cool down. The electrolyte may freeze and damage the batteries. Do not operate the truck in such instances.

– When the ambient temperature is below -10°C, only park the truck for short periods of time.

Place of use

The truck can be used both outside and in buildings. Operation on public roads is only permitted if the "StVZO" (German Road Traffic Licensing Regulations) equipment variant is installed.

If the truck is to be operated on public roads, it must conform to the existing national regulations for the country in which it is being used.

The ground must have an adequate load capacity (concrete, asphalt) and a rough surface. The driveways, work areas and aisle widths must correspond with the specifications in these operating instructions.

Driving on upward and downward slopes is permitted provided the specified data and

specifications are observed, see. The truck is suitable for indoor and outdoor use in countries ranging from the Tropics to Nordic regions (temperature range: -20°C to +40°C).

If the truck is to be used in a cold store, it must be configured accordingly and, if necessary, approved for such an environment.

⚠ CAUTION

Material damage due to cooling batteries!

If the truck is parked in an ambient temperature of below -10°C for an extended period, the batteries will cool down. The electrolyte may freeze and damage the batteries. Do not operate the truck in such instances.

– When the ambient temperature is below -10°C, only park the truck for short periods of time.

The operating company, see chapter entitled "Definition of terms used for responsible persons" must provide sufficient fire protection in the area surrounding the truck in accordance with its use. Depending on the application, additional fire protection must be provided on the truck. If in doubt, contact the relevant authorities.

Residual risk

Residual dangers, residual risks

Despite careful working and compliance with standards and regulations, the possibility of other risks occurring when using the truck cannot be entirely excluded.

The truck complies with the safety regulations currently in force. Nevertheless, there remains a degree of residual risk, even when the truck is used for its intended purpose and all instructions are followed.

Even beyond the narrow danger areas of the truck itself, a residual risk cannot be excluded. Persons in this area around the truck must exercise a heightened degree of awareness, so that they can react immediately in the event of any malfunction, incident or breakdown etc.

⚠ WARNING

Risk of accident due to non-observation of safety information!

All personnel working in the vicinity of the truck must be instructed regarding the hazards that can arise through use of the truck.

– Observe safety regulations in these operating instructions.

Risks can include:

- Escape of consumables due to leakages, rupture of lines and containers
- Risk of accident when driving over difficult ground such as gradients, smooth or irregular surfaces, or with poor visibility
- Falling, tripping etc. when moving on the truck, especially in wet weather, with leaking consumables or on icy surfaces
- Fire and explosion risks due to batteries and electrical voltages
- Human error resulting from failure to observe the safety regulations
- Unrepaired damage, defective and worn components
- Insufficient maintenance and testing
- Use of incorrect consumables
- Exceeding test intervals

The manufacturer will not be held responsible for accidents involving the truck caused by the failure of the operating company to comply with these regulations either intentionally or due to lack of care.

Danger to employees

In accordance with the operating safety ordinance (BetrSichVO) and labour protection law (ArbSchG) (see chapter "Definition of terms used for responsible persons"), the operating company must determine and assess hazards during operation, and establish what occupational health and safety measures are required in respect of employees (BetrSichVO). The operating company must therefore draw up appropriate operating instructions (§ 6 ArbSchG) and make them available to the driver. A responsible person must be appointed.

Construction and equipment of the truck correspond with the Machinery Directive 2006/42/EC and are therefore identified with the CE symbol. They are therefore not included in the hazard assessment, and neither are the attachments on account of their own CE labelling. The operating company must, however, select the type and equipment of the trucks so as to comply with the local provisions for deployment.

The result must be documented (§ 6 ArbSchG). In the case of truck deployment involving similar hazardous situations, the results can be summarised. For this overview, see chapter "Overview of hazards and countermeasures", which provides help on complying with this regulation. The overview specifies the main hazards that are the most frequent cause of accidents in the event of non-compliance. If other major operational hazards are involved, they must also be taken into consideration.

The conditions of use for trucks are broadly similar in many plants, so the hazards can be summarised in one overview. Observe the information provided by the relevant employers' liability insurance association on this subject.

Overview of hazards and countermeasures

NOTE

This table is intended to help evaluate the hazards in your facility and applies to all drive types. It does not claim to be complete.

NOTE

Observe the national regulations for your country!

Hazard	Course of action	Check note √ done - not applicable	Notes
Tow tractor equipment does not comply with local regulations	Testing	O	If in doubt, consult the responsible factory inspectorate or employers' liability insurance association
Driver's lack of skills or qualifications	Driver training (sit-on and stand-on)	O	BGG 925 (Guidelines of the Employer's Liability Insurance Association) VDI 3313 driver's licence
Usage by unauthorised persons	Access with key only for authorised persons	O	
Tow tractor not safe for operation	Periodic inspection and rectification of defects	O	BetrSichVO (Workplace Safety Ordinance)
Impaired visibility due to load	Application planning	O	BetrSichVO (Workplace Safety Ordinance)
Contamination of respiratory air	Assessment of diesel exhaust gases	O	TRGS 554 (Technical Regulations for Hazardous Substances) and BetrSichVO (Workplace Safety Ordinance)
	Assessment of LPG exhaust gases	O	MAK (Maximum Workplace Concentrations) list and BetrSichVO (Workplace Safety Ordinance)

Hazard	Course of action	Check note √ done - not applicable	Notes
Impermissible usage (improper usage)	Provide operating instructions	O	BetrSichVO (Workplace Safety Ordinance) and ArbSchG (Health and Safety at Work Act)
	Written notice of instruction to driver	O	BetrSichVO (Workplace Safety Ordinance) and ArbSchG (Health and Safety at Work Act)
	Observe BetrSichVO (Workplace Safety Ordinance), operating instructions and VDMA (German Engineering Federation) regulations	O	
When charging the drive battery	Observe BetrSichVO (Workplace Safety Ordinance), operating instructions and VDMA (German Engineering Federation) regulations	O	VDE (German Electrical Engineering Association) regulation 0510: In particular - Ensure adequate ventilation - Insulation value within permissible range
When using battery chargers	Observe BetrSichVO (Workplace Safety Ordinance), BGR (employers' liability insurance association regulation) 104 and operating instructions	O	BetrSichVO (Workplace Safety Ordinance) and BGR (employers' liability insurance association regulation) 104
With driverless transport systems			
Roadway quality inadequate	Clean/clear routes	O	BetrSichVO (Workplace Safety Ordinance)
Loading equipment incorrect/slipped	Reposition load on pallet	O	BetrSichVO (Workplace Safety Ordinance)
Unpredictable vehicle behaviour	Employee training	O	BetrSichVO (Workplace Safety Ordinance)
Routes blocked	Mark routes Keep routes clear	O	BetrSichVO (Workplace Safety Ordinance)

Hazard	Course of action	Check note √ done - not applicable	Notes
Routes intersect	Announce right-of-way rule	O	BetrSichVO (Workplace Safety Ordinance)
No person detection when handling goods	Employee training	O	BetrSichVO (Workplace Safety Ordinance)

Special risks associated with using the truck and attachments

Approval from the manufacturer and attachment manufacturer must be obtained each time the truck is used in a manner that falls outside the scope of normal use, and in cases where the driver is not certain that he can use the truck correctly and without the risk of accidents.

3

Safety

Definition of responsible persons

Driver

This truck may only be driven by suitable persons who are at least 18 years of age, have been trained in driving, have demonstrated their skills in driving and handling trucks to the operating company or an authorised representative, and have been specifically instructed to drive the truck. Specific knowledge of the truck to be operated is also required.

The training requirements under §3 of the Labour Protection Law and §9 of the Ordinance on Industrial Safety and Health are deemed to have been satisfied if the driver has been trained in accordance with BGG (General Employers' Liability Insurance Association Act) 925. Observe the national regulations for your country.

Driver rights, duties and rules of behaviour

The driver must be trained in his rights and duties.

The driver must be granted the required rights.

The driver must wear protective equipment (protection suit, safety footwear, safety helmet, industrial goggles and gloves) that are appropriate to the application conditions, the job and the load to be moved. Solid footwear should be worn to ensure safe driving and braking.

The driver must be familiar with the operating instructions and have access to them at all times.

The driver must:

– Read and understand the operating instructions
– Familiarise himself with safe operation of the truck
– Be physically and psychologically able to drive the truck safely

⚠ DANGER

Increased risk of accident if drugs, alcohol or medications are consumed!

Drugs, alcohol or medications that affect reactions impair the ability to drive the truck.

– Individuals under the influence of the aforementioned substances are not permitted to perform work of any kind on or with the truck.

Prohibition of use by unauthorised persons

The driver is responsible for the truck during working hours. He must not allow unauthorised persons to operate the truck.

When leaving the truck, the driver must secure it against unauthorised use.

Operating company

The operating company must ensure that the integrated attachment is only used for its intended purpose and in compliance with the safety regulations in these operating instructions.

The operating company must ensure that all users read and understand the safety information.

The operating company is responsible for the scheduling and correct performance of regular safety checks.

The operating company is the natural or legal person or group who uses the truck or on whose authority the truck is used.

We recommend that the national performance specifications are observed.

Specialist

A qualified person is defined as a service engineer or a person who fulfils the following requirements:

- A completed vocational qualification that demonstrably proves their professional expertise. This proof should consist of

a vocational qualification or a similar document.

- Professional experience indicating that the qualified person has gained practical experience of industrial trucks over a proven period during their career During this time, this person has become familiar with a wide range of symptoms that require checks to be carried out, such as based on the results of a hazard assessment or a daily inspection
- Recent professional involvement in the field of the industrial truck test in question and an appropriate further qualification are essential. The qualified person must have experience of carrying out the test in question or of carrying out similar tests. Moreover, this person must be aware of the latest technological developments regarding the industrial truck to be tested and the risk being assessed

Basic principles for safe operation

Tyres

⚠ DANGER

Risk of accident if different tyres are used!

Different tyres adversely affect the track behaviour and the stability of the truck.

Only fit one type of tyre onto the truck, e.g. only pneumatic tyres or only solid tyres (SE). A mixture of pneumatic and SE tyres, for example, is prohibited.

– Make sure that only one type of tyre is fitted.

Tyre quality affects the track behaviour and the stability and handling of the truck. Changes must only be made in consultation with the manufacturer. When changing wheels or tyres, always ensure that the truck does not tilt to one side (e.g. always change left and right wheels at the same time).

Non-original parts

Original parts, attachments and accessories are specially designed for this truck. Please note that parts, attachments and accessories not supplied by the manufacturer have also not been tested or approved by the manufacturer.

⚠ CAUTION

Danger of damage to truck if non-original parts are used!

Installation and/or use of non-original parts may adversely affect the design features of the truck and thus impair active and/or passive driving safety.

– Only use products that have been tested and approved by the manufacturer.
– The approval of the manufacturer and, if necessary, the relevant regulatory authorities must be obtained before installing non-original parts.

The manufacturer accepts no liability for any damage caused by the installation and/or use of non-original parts and accessories without approval.

Gas spring and accumulator

⚠ WARNING

Danger of serious injury due to high gas spring pressure!

For ease of operation, various functions on the truck can be supported by gas springs. Gas springs are complex components that are subject to high internal pressures (up to 300 bar). They may under no circumstance be opened unless so directed, and may be installed only when not under compression. If required, the service centre will depressurise the gas spring in accordance with regulations before the removal. Gas springs must be depressurised before recycling.

– Avoid damage, lateral forces, buckling, temperatures over 80°C and heavy contamination.
– Damaged or defective gas springs must be changed immediately.
– Contact your service centre.

⚠ WARNING

Danger of serious injury from high accumulator pressure!

– Depressurise the accumulator before starting work on it.
– Contact your service centre.

Drivers with medical devices

If drivers use medical devices, e.g. pacemakers or hearing aids, their function may be impaired. Check with a doctor or the medical equipment manufacturer whether the equipment is sufficiently protected against electromagnetic interference.

Modifications and retrofitting

If the truck is used for work not listed in the directives or in these instructions and has to be converted or retrofitted accordingly, be aware that any modification to its structural state can affect the handling and stability of the truck, which in turn can cause accidents.

You should therefore contact your service centre beforehand.

Changes that will adversely affect stability, load capacity, safety systems etc. must not be made without the manufacturer's approval.

The truck may only be converted with the written approval of the manufacturer. Approval from the relevant authority must be obtained where applicable.

Changes to the brakes, steering, control elements, circumferential view, special equipment and attachments etc. must also not be made without prior written approval from the manufacturer.

For safety reasons, it is prohibited to drill holes into the driver's overhead guard or to perform welding on it.

When carrying out welding on other parts of the truck, it is essential that the battery and all connections to the electronic control cards are disconnected. Contact your service centre.

If the manufacturer goes into liquidation and the company is not taken over by another legal person, the operating company can make modifications to the truck.

To do so, the operating company must fulfil the following prerequisites:

Design documents, test documents and assembly instructions associated with the change must be archived and remain accessible at all times.

The capacity rating plate, decal information, hazard warnings and the operating instructions must be checked to ensure they are consistent with the changes and modified if required.

The modification must be designed, checked and implemented by a design office that specialises in industrial trucks in accordance with the standards and directives valid at the time the modification is made.

Decal information with the following data must be permanently affixed to the truck so that it is clearly visible:

– Type of modification
– Date of modification
– Name and address of the company implementing the modification

Insurance cover on company premises

In many cases, company premises are restricted public traffic areas.

NOTE

The business liability insurance should be reviewed to ensure that, in the event of any damage caused in restricted public traffic areas, there is insurance cover for the truck in respect of third parties.

Damage, defects and misuse of safety systems

Damage or other defects on the truck must be reported to the supervisor or responsible fleet manager immediately so that they can arrange for the defect to be rectified.

Trucks that are not safe for operation or for use on the road must not be used until they have been properly repaired.

Do not remove or deactivate safety systems and switches.

Fixed set values may only be changed with the approval of the manufacturer.

Work on the electrical system (e.g. connecting a radio, additional headlights etc.) is only permitted with the manufacturer's written approval. All work carried out on the electrical system must be documented.

Safety tests

Periodic safety inspection of the industrial truck

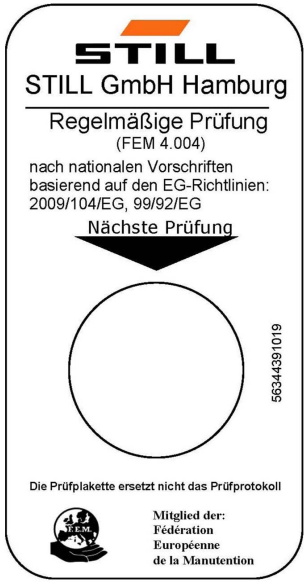
Periodic safety inspections and safety inspections after unusual incidents

The operating company must ensure that the industrial truck is checked by a specialist at least once a year or following unusual incidents.

As part of this inspection, a complete check of the technical condition of the industrial truck must be performed with regard to accident safety. Furthermore, the industrial truck must be thoroughly checked for damage that could have been caused by improper use. A test log must be created. The results of the inspection must be retained at least until a further two inspections have been carried out.

The inspection date is indicated by an adhesive label on the industrial truck.

– Arrange for the service centre to perform periodic safety inspections on the industrial truck.



– Observe the guidelines regarding inspection work on industrial trucks as specified by FEM 4.004.

The operating company is responsible for ensuring that any defects are remedied without delay.

– Contact your service centre.

NOTE

Observe the national regulations of your country!

Insulation testing

The insulation of the truck must have sufficient insulation resistance. For this reason, insulation testing in accordance with DIN EN 1175 and DIN 43539, VDE 0117 and VDE 0510 must be conducted at least once a year as part of the FEM testing.

The insulation testing results must be at least the test values given in the following two tables.

– For insulation testing, contact the authorised service centre.

The exact procedure for this insulation testing is described in the workshop manual for this truck.

NOTE

The truck's electrical system and drive batteries must be checked separately.

Test values for the drive battery

Component	Recommended test voltage	Measurements		Nominal voltage U_{Batt}	Test values
Battery	50 VDC	Batt+ Batt-	Battery tray	24 V	> 1200 Ω
	100 VDC			48 V	> 2400 Ω
	100 VDC			80 V	> 4000 Ω

Test values for the truck

Nominal voltage	Test voltage	Test values for new trucks	Minimum values over the duration of the service life
24 V	50 VDC	Min. 50 kΩ	> 24 kΩ
48 V	100 VDC	Min. 100 kΩ	> 48 kΩ
80 V	100 VDC	Min. 200 kΩ	> 80 kΩ

Safety regulations for handling consumables

Permissible consumables

⚠ DANGER

Risk of death or injury or damage to the environment due to disregard of safety regulations!

– Always observe safety regulations when handling consumables.

Refer to the maintenance data table for the permissible consumables that are necessary for operation (see the chapter "Recommended lubricants").

Battery

Battery acid

⚠ WARNING

Battery acid contains dissolved sulphuric acid. This is toxic.

– Avoid touching or swallowing the battery acid at all costs.
– In case of injury, seek medical advice immediately.

⚠ WARNING

Battery acid contains dissolved sulphuric acid. This is corrosive.

- When working with battery acid, always wear a protection suit and eye protection.
- When working with battery acid, never wear a watch or any jewellery.
- Do not allow any acid to get onto clothing or skin or into the eyes; if this does happen, rinse immediately with plenty of clean water.
- In case of injury, seek medical advice immediately.
- Immediately rinse away any spilled battery acid with plenty of water
- Follow the statutory regulations.

ENVIRONMENT NOTE

- Dispose of used battery acid in line with regulations.

Flammable gases

⚠ DANGER

Risk of explosion due to flammable gases!

During charging, the battery releases a mixture of oxygen and hydrogen (explosive gas). This gas mixture is explosive and must not be ignited.

- Make sure that there is always sufficient ventilation in working areas that are fully or partially enclosed
- Keep away from open flames and flying sparks
- Observe the safety regulations for handling the battery.

Oils

⚠ DANGER

Oils are flammable!

- Follow the statutory regulations.
- Do not allow oils to come into contact with hot engine parts.
- No smoking, fires or naked flames!

⚠ DANGER

Oils are toxic!

- Avoid contact and consumption.
- If vapour or fumes are inhaled, move to fresh air immediately.
- In the event of contact with the eyes, rinse thoroughly (for at least 10 minutes) with water and then consult an eye specialist.
- If swallowed, do not induce vomiting. Seek immediate medical attention.

⚠ WARNING

Prolonged intensive contact with the skin can result in dryness and irritate the skin!

- Avoid contact and consumption.
- Wear protective gloves.
- After any contact, wash the skin with soap and water, and then apply a skin care product.
- Immediately change soaked clothing and shoes.

⚠ WARNING

There is a risk of slipping on spilled oil, particularly when combined with water!

- Spilt oil should be removed immediately with oil-binding agents and disposed of according to the regulations.

ENVIRONMENT NOTE

Oil is a water-polluting substance!

- *Always store oil in containers that comply with the applicable regulations.*
- *Avoid spilling oils.*
- *Spilt oil should be removed immediately with oil-binding agents and disposed of according to the regulations.*
- *Dispose of old oils according to the regulations.*

Lubricants

ENVIRONMENT NOTE

Lubricants are water pollutants!

– Always store lubricants in containers that comply with regulations.

– Please dispose of used lubricants and empty containers via authorised specialist companies.

– Lubricants must not enter the sewage system, or come into contact with the ground or bodies of water.

Hydraulic fluid

⚠ WARNING

These fluids are pressurised during operation of the truck and are hazardous to your health.

– Do not spill the fluids.

– Follow the statutory regulations.

– Do not allow the fluids to come into contact with hot engine parts.

⚠ WARNING

These fluids are pressurised during operation of the truck and are hazardous to your health.

– Do not allow the fluids to come into contact with the skin.
– Avoid inhaling spray.
– Penetration of pressurised fluids into the skin is particularly dangerous if these fluids escape at high pressure due to leaks in the hydraulic system. In case of such injury, immediate medical assistance is required.
– To avoid injury, use appropriate personal protective equipment (e.g. protective gloves, industrial goggles, skin protection and skin care products).

ENVIRONMENT NOTE

Hydraulic fluid is a water-polluting substance.

- *Always store hydraulic fluid in containers that comply with regulations*
- *Avoid spills*
- *Spilt hydraulic fluid should be removed immediately with oil-binding agents and disposed of according to the regulations*
- *Dispose of old hydraulic fluid according to the regulations*

Substances that are damaging to health

⚠ WARNING

Risk to health from hazardous gases and highly reactive substances!

Hazardous gases can impair concentration and health while driving.

Highly reactive substances can damage electrical components (e.g. control units and plug connections) and this can lead to malfunctions, system failures or short circuits that may cause a fire.

Gases and fluids can escape even when containers are completely sealed.

– Do not store or transport highly reactive substances that are damaging to health in the cab.

Disposal of consumables

ENVIRONMENT NOTE

Materials that accumulate during repair, maintenance and cleaning must be collected properly and disposed of in accordance with the national regulations for the country in which the truck is being used. Work must only be carried out in areas designated for that purpose. Care must be taken to minimise any environmental pollution.

– Soak up any spilt fluids such as hydraulic oil or gearbox oil immediately using an oil-binding agent.

– Neutralise any spilt battery acid immediately.

– Always observe national regulations concerning the disposal of used oil.

Emissions

Vibration

The vibrations of the engine must be determined on a machine in accordance with the standard EN 13059 "Safety of industrial trucks — test methods for measuring vibration". The highest effective value of the weighted acceleration of whole-body vibration transmitted over the seat surface is:

Tow tractor (Michelin pneumatic tyres)	< 0.6 m/s^2
Tow tractor (Continental CSE tyres)	< 0.7 m/s^2
Platform version (Michelin pneumatic tyres)	< 0.6 m/s^2
Uncertainty	< 0.3 m/s^2

The individual vibration load on the driver over a working day is determined in accordance with **Directive 2002/44/EC** by the operating company (see chapter entitled "Responsible persons") at the actual place of use in order to consider all additional factors, such as the driving route, intensity of use etc.

Noise emissions

The values were determined on the basis of measuring procedures from the EN 12053 standard (noise measurement for industrial trucks based on EN 12001 and EN ISO 3744 and the requirements of EN ISO 4871).

This machine emits the following sound pressure levels:

The A-weighted averaged emission sound pressure level at the driver's position is as follows:

All models	L_{PAZ} = 69 dB(A)
Uncertainty	K_{PA} = 4 dB(A)

The values were determined in the test cycle on an identical machine from the weighted values for operating statuses and idling.

However, the specified noise levels in the truck cannot be used to determine the noise emissions occurring in workplaces in accordance with the most recent version of Directive 2003/10/EC (daily personal noise pollution).

If necessary, these values should be determined directly at the workplace in the actual conditions that are present there (additional noise sources, special application conditions, sound reflections).

NOTE

Due to environmental conditions, the above figures may vary during operation of the truck.

Diesel engine emissions (auxiliary heater)

Check the diesel engine emissions in accordance with the operating instructions of the engine manufacturer.

4

Overviews

Your truck

Information

Your truck offers the best in economy, safety and driving convenience. However, it is primarily down to the operator to maintain these characteristics for a long time and to take advantage of the resulting benefits.

These operating instructions contain everything you need to know about commissioning, driving, maintaining and repairing the truck.

Please follow the operating instructions and carry out the specified work regularly and at the due times, in accordance with the inspection and maintenance overview.

To keep your warranty valid, and to ensure safety, maintenance must only be carried out by qualified persons authorised by your local distributor.

Reference standards

This truck complies with standard EN ISO 3691-1, (Safety of industrial trucks — Self-propelled trucks up to and including 10,000 kg capacity and industrial tractors with a drawbar pull up to and including 20,000 N — Part 1: General requirements), which meets with the specific essential requirements of the EU Machinery Directive 2006/42/EC.

It also complies with standard EN 12895 for electromagnetic compatibility and subsequent amendments for power-driven industrial trucks in accordance with Directive 2004/108/EEC.

Sound level tests are performed in accordance with standard EN 12053.

Vibration level tests are performed in accordance with standards EN 13059 and EN 12096.

Technical notes

Please submit all enquiries concerning orders for spare parts to the service centre, making sure to give the correct delivery address.

For repairs use only genuine spare parts. This is the only way to guarantee that your truck maintains its original technical standard.

When ordering spare parts, please specify the part number and the following truck data:

Truck type:

Serial number/year of manufacture:

Delivery date:

When taking over the truck, transfer the data from the identification plates on the tow tractor into these operating instructions for future use. This information can be found on the identification plate on the operating console. We recommend that you transfer this information to this manual for ease of future reference.

Taking delivery of the truck

Each truck is subjected to a thorough inspection before leaving the factory. This guarantees that it is in a flawless condition and fully equipped at transfer.

A further inspection is carried out on the spot, directly before the truck is delivered. The inspection includes:

- Checking the drive wheel nuts for secure attachment
- Checking the level of the battery acid and the specific weight
- Checking the brake system for correct and safe operation
- Testing the steering system for correct and safe operation
- Checking the drive system for correct and safe operation
- Checking all controls for correct and safe operation

Your truck

To avoid subsequent complaints and defects, we ask that you carefully check the functional ability of the truck and the completeness of the equipment at the time of transfer.

The following technical documents come with every truck:

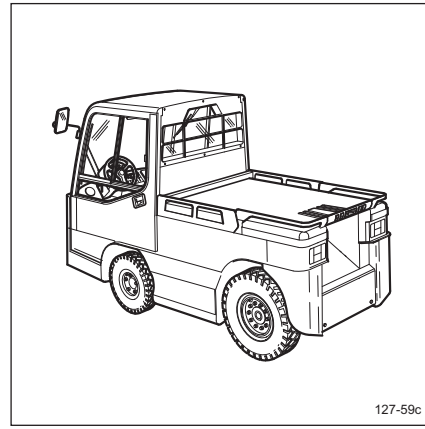
- Operating instructions
- EC declaration of conformity
- Spare parts catalogue (on CD)
- VDMA (German Engineering Federation) brochure

We pursue a policy of continuous improvement in design and manufacture of our products. The illustrations and technical details referring to design, assembly and engineering of trucks are subject to change or modification as a result of technological progress by the manufacturer.

Truck variants

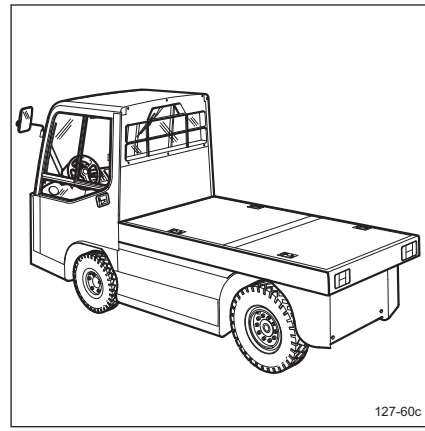
Tow tractor version

- Tow tractor (short wheelbase); see chapter "Technical data".
- Tow tractor (long wheelbase); see chapter "Technical data".



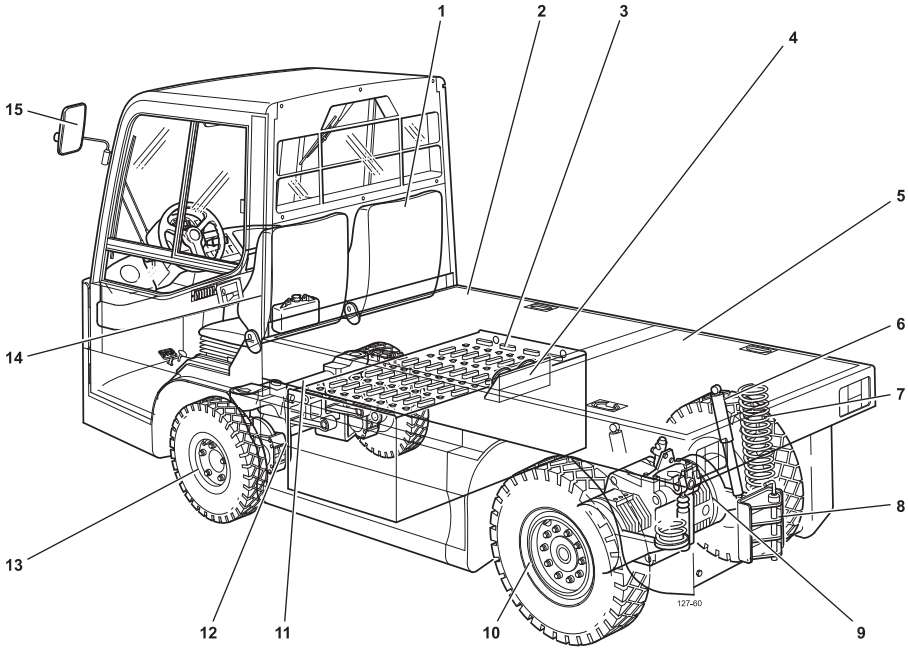
Platform version

- Platform truck 2200 (short loading platform); see chapter "Technical data".
- Platform truck 2600 (long loading platform); see chapter "Technical data".



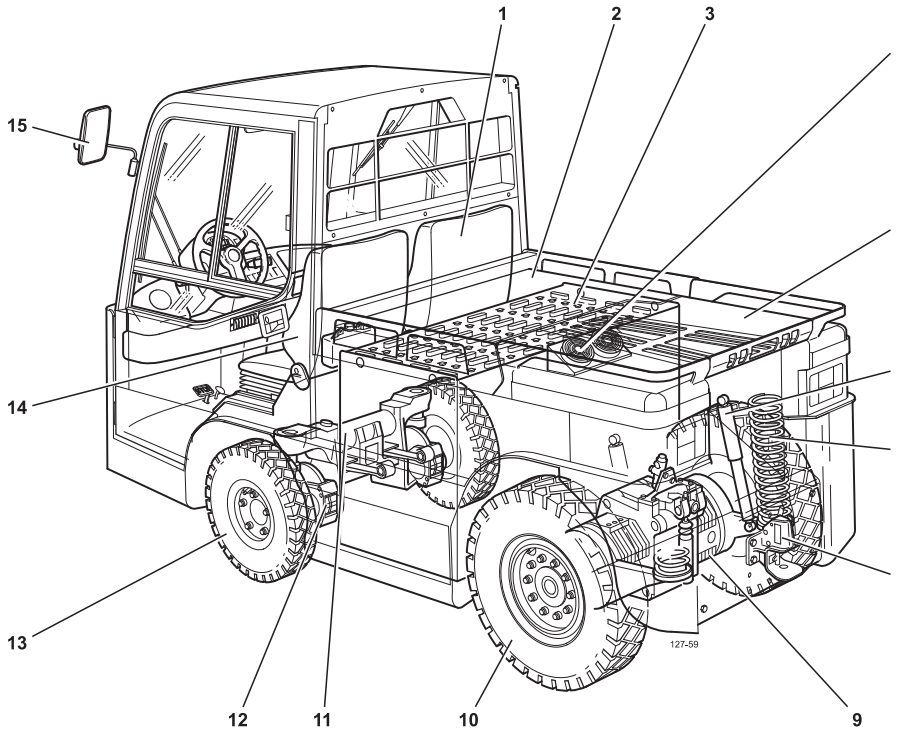
Truck view

Platform version



1	Passenger's seat	9	Drive axle
2	Battery cover	10	Rear wheel
3	Battery	11	Steer cylinder
4	Controller cooling fans	12	Brake calliper
5	Motor cover	13	Front wheel
6	Damper	14	Driver's seat
7	Spring	15	Rear view mirror
8	Rear tow coupling		

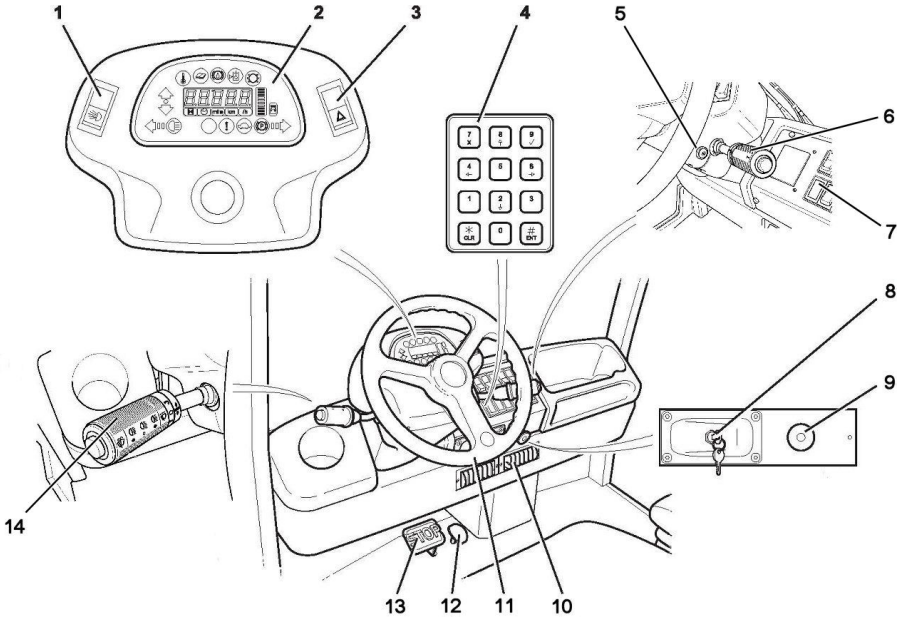
Tow tractor version



1	Passenger's seat	9	Drive axle
2	Battery cover	10	Rear wheel
3	Battery	11	Steering axle
4	Controller cooling fans	12	Brake calliper
5	Motor cover	13	Front wheel
6	Damper	14	Driver's seat
7	Spring	15	Rear-view mirror
8	Rear tow coupling		

Operating and display elements

View of the driver's compartment

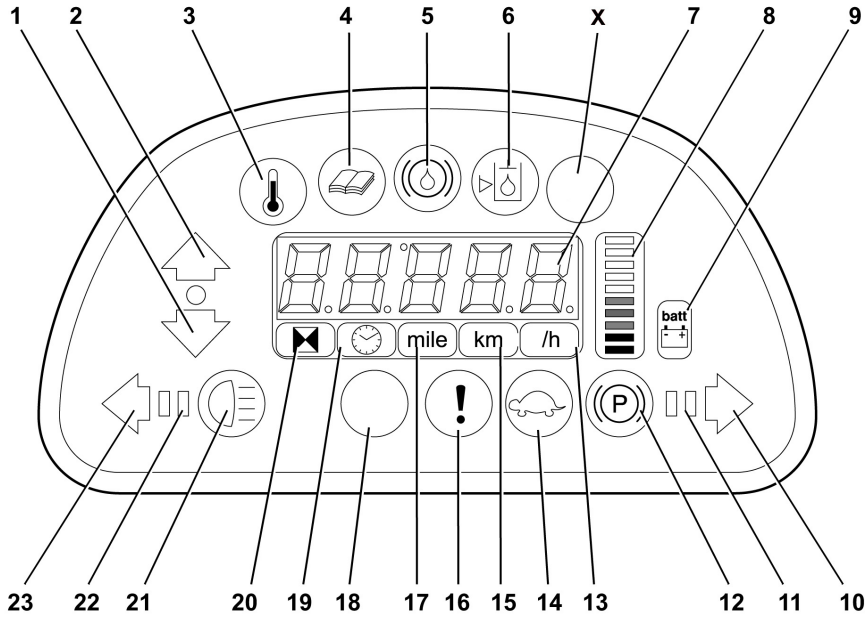


1	Parking light/dipped beam	8	Keyswitch
2	Display unit	9	Emergency off switch
3	Hazard warning light	10	Heating vents
4	Keypad (variant)	11	Steering wheel
5	Parking brake	12	Accelerator pedal
6	Operating levers: Drive programme selection Direction selection Horn button	13	Brake pedal
7	Switch panel	14	Operating levers: Turn indicators Main beam Front wash wipe

NOTE

The position of the operating levers (6) and (14) can be reversed as a variant.

Display unit

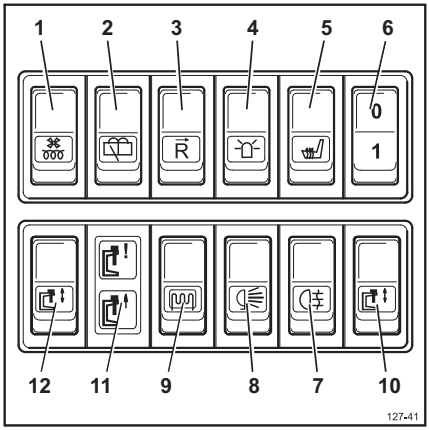


127-21a

1	Reverse travel indicator
2	Forward travel indicator
3	Overheating indicator
4	Error status indicator
5	Brake fluid indicator
6	Hydraulic fluid indicator
7	Display on the display unit
8	Battery charge display
9	Battery display
10	Right turn indicator display
11	Right turn indicator display for trailer
12	Parking brake indicator
13	km or miles, lights up with 15/17
14	Slow travel indicator
15	km display
16	Interlock malfunction display
17	Miles display
18	Not assigned
19	Time display
20	Hour meter display
21	Full beam indicator
22	Left turn indicator display for trailer
23	Left turn indicator display
X	No function

Switch panel

▷



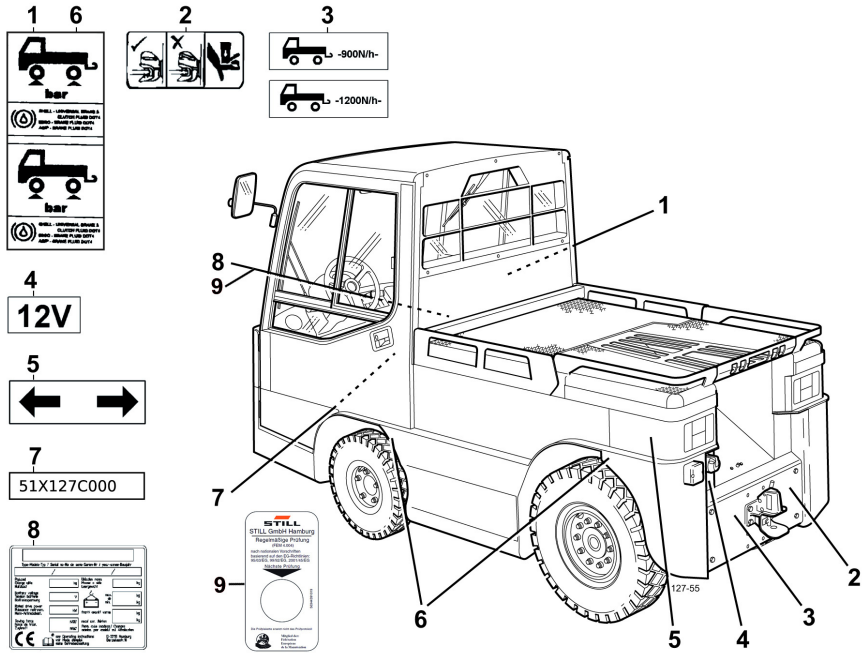
NOTE

The assignment shown here is an example and may differ on your truck. If you have any questions, please contact your service centre.

1 Heating system toggle switch
2 Rear window wiper/washer toggle switch (variant)
3 Back pedal toggle switch
4 Rotating beacon toggle switch (variant)
5 Heated seat toggle switch (variant)
6 Toggle switch for activating remote release of the tow coupling (variant) and overload indicator (red)
7 Fog lamp toggle switch (variant)
8 Work light toggle switch (variant)
9 Rear window heating toggle switch
10 Toggle switch for remote release of the tow coupling
11 Operating status display for remote release of the tow coupling
12 Toggle switch for remote release of the tow coupling

Labelling points

Data plates and adhesive labels

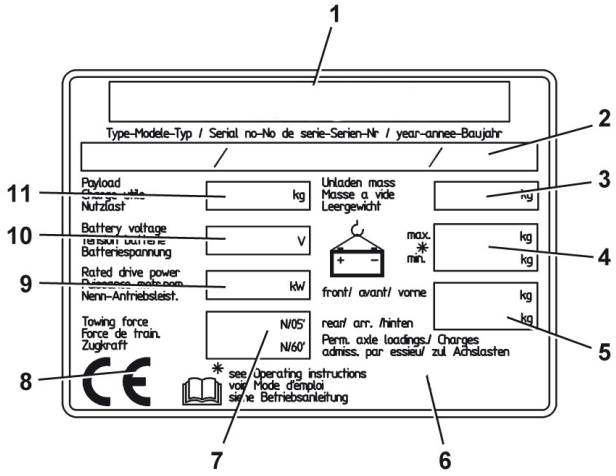


1	Tyre pressure adhesive label in the driver's cab on the rear wall	7	Truck serial number on the chassis, above the right cab post.
2	Warning label for automatic tow coupling	8	Type/capacity rating plate between the seats
3	Adhesive label for the pulling force	9	Sticker panel for regular testing in accordance with FEM 4.004 between the seats
4	Adhesive label for 12-V socket		
5	Adhesive label for reverse inching		
6	Tyre pressure labels		

NOTE

The driver must ensure that all data plates and adhesive labels are present and legible. If data plates or adhesive labels are damaged or missing, contact your authorised service centre for replacement signs and adhesive labels.

Identification plate



1	Manufacturer	7	Pulling force
2	Truck type/production number/year of manufacture	8	CE mark (this mark certifies that the truck complies with the relevant EC directives and all applicable guidelines)
3	Tare weight		
4	Battery weight	9	Rated drive power
5	Permissible axle loads	10	Battery voltage
6	Address of manufacturer	11	Payload

Equipment

Standard equipment and variants

Rear tow coupling

- Tow coupling that can be released remotely (Rockinger 244A)
- Automatic coupling (Rockinger 244A)
- 3-stage coupling

Front tow coupling

- Automatic coupling
- 3-stage coupling

Drive unit (2-engine drive)

- Platform version (2 x 2.5 kW/2 x 10 kW)
- Tow tractor version (2 x 10 kW)

Rear axle tyres

- Pneumatic, Continental
- Superelastic
- Superelastic, neutral-coloured, Continental

Front axle tyres

- Pneumatic, Continental
- Superelastic
- Superelastic, neutral-coloured, Continental

Brake system

- Service brake (electrical, hydraulic)
- Parking brake (mechanical with hydraulic ventilation)

Electrical equipment

- Lighting system (various versions)
- Single-pedal control with accelerator
- Back keying function
- 12-V on-board power supply
- Switch lock
- PIN code with access authorisation
- Heating system
- Trailer connector (12 V/7 pin)

Driver's seat

- MSG 65 synthetic leather cover and lumbar support
- Comfort MSG 65 textile cover and lumbar support
- Exclusive MSG 65 textile cover, lumbar support and seat heater
- Seat belts for driver's seat and passenger seat

Cab

- Driver's cab with doors
- Driver's cab with sliding doors
- Driver's cab with fabric panelling
- Mirror (inner, outer)
- Roof panel

Steering system

- Left-hand steering, right-hand steering

Pre-fitting for travelling on public roads

- 3 speed signs, front towing bracket, brake system in accordance with StVZO (German Road Traffic Licensing Regulations), 2x wheel chocks, lashing rings, holder and lighting for licence plate, truck weight identification included on the StVZO nameplate and TÜV approval

Accessories

- Key for key switch (two pieces)
- Release tool for bonnet
- Wheel chocks (two pieces)

5

Operation

Checks and tasks to be carried out prior to commissioning

Visual inspections

⚠ WARNING

Risk of accident due to damage or other defects on the truck!

Damage to the truck or the attachment (variant) can lead to unpredictable and dangerous situations. If damage or other defects are identified on the truck or attachment (variant) during the following inspections, the truck must not be used until it has been properly repaired.

– Do not remove or deactivate safety systems or switches.
– Do not change any predefined set values.
– Do not use the truck until it has been properly repaired.

⚠ WARNING

Risk of component damage!

A deformed or damaged battery male connector can cause overheating and related consequential damage.

– Check the battery male connector for damage.
– If necessary, have the battery male connector replaced by the authorised service centre.

- Check the area under the truck for leaking consumables.
- Attachments (variant) must be properly mounted and function according to the operating instructions
- All decal information must be in place and legible. Replace damaged or missing adhesive labels in accordance with the overview in the chapter entitled "Labelling points"
- Any warning units (e.g. signal horn) must be in perfect condition and function correctly
- Check the visible areas of the hydraulic system and hydraulic oil tank for damage and leaks Damaged hoses must be replaced by the authorised service centre.
- The battery must be securely locked in place
- Check the battery male connector for damage (e.g. cracks, breaks or deformation of the housing, bent or damaged contacts). If

necessary, have the battery male connector replaced by the authorised service centre

- The battery cover must be securely closed
- The latches on the battery cover must not be damaged or deformed.
- Any panes of glass must be clean and free of ice
- Any tow coupling must show no noticeable damage (e.g. coupling pin bent, cracks or breaks). Every removable coupling pin must be secured against loss with a securing device (e.g. a chain, a split pin or a rope)
- Damage or other defects on the truck or attachment (variant) must be reported to the supervisor or responsible fleet manager immediately so that arrangements can be made for the defect to be rectified

Before beginning your shift

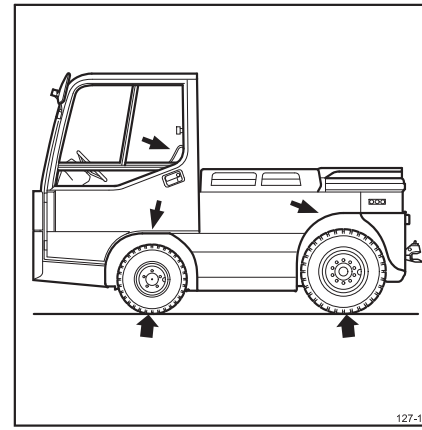
	Carried out	
	✓	✖
The following checks should be carried out at the beginning of every shift, before taking the tractor into service.		
Chassis, bodywork and fittings		
Check the truck for any loose panels or covers.		
Remove any loose items left on the truck.		
Check the function of the tow coupling (if the coupling is engaged and disengaged more than 2-3 times per shift, the coupling must be relubricated via the lubricating nipple).		
Undercarriage		
Check the function of the parking brake and foot brake.		
Check the function of the steering system.		
Check the tyre pressure.		
Check the tyres for damage and foreign objects.		
Controls		
Check the function of the traction system.		
Electrical/Electronic		
Check the battery male connector for damage (e.g. cracks, breaks or deformation of the housing, bent or damaged contacts). If necessary, have the battery male connector replaced by the authorised service centre.		
Check the charging state of the battery.		
Check the function of the display unit.		
Check the function of the key switch.		
Check the function of the emergency off switch.		
Check the function of the parking brake.		
Check the function of the seat switch.		
Check the function of the battery interlock switch (platform trucks only).		
Check the function of the automatic coupling (variant).		
Special equipment and accessories		
Fill the tank for the diesel auxiliary-heating system (variant).		

Checking tyre pressures

Tow tractor (short wheelbase)	FRONT 7.5 bar REAR 5.0 bar
Tow tractor (long wheelbase)	FRONT 9.0 bar REAR 5.0 bar
Platform trolley (short platform)	FRONT 7.5 bar REAR 6.5 bar
Platform trolley (long platform)	FRONT 7.5 bar REAR 6.5 bar

NOTE

Depending on the application, tyre pressures may differ from those stated above. Please refer to the tyre pressure labels on the truck.



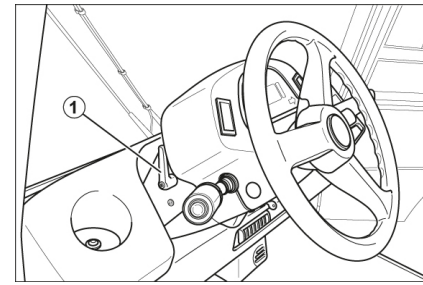
Adjusting the steering column

DANGER

Increased risk of accident from sudden adjustment of the steering column!

Adjustment while driving can lead to uncontrolled movements of the truck.

- Never make adjustments while driving.
- Always adjust the steering column so that all operating devices can be actuated safely.
- Ensure that the adjusted steering column is engaged.



NOTE

Adjustments must only be made while the seat is occupied.

- Loosen the adjustment lever (1) for the steering column.
- Position the steering wheel.
- Secure the adjustment lever.
- Ensure that the steering wheel is securely engaged.

Checking the condition of the wheels and tyres

⚠ WARNING

Risk of accident! Uneven wear reduces the stability of the truck and increases the braking distance.

– Worn or damaged tyres (left or right) must be replaced immediately.

NOTE

Only approved tyre types may be used; see chapter entitled "Technical data".

– Check the tyres for wear and damage.

Tyres must not be damaged or excessively worn. They must be worn evenly on both sides.

Adjusting the MSG 65/MSG 75 driver's seat

⚠ DANGER

There is a risk of accident if the seat or seat backrest shifts suddenly, which could cause the driver to move in an uncontrolled manner. This may result in unintentional actuation of the steering or operating devices and thus cause the truck or load to move in an uncontrolled fashion.

– Do not adjust the seat or seat backrest while driving.
– Adjust the seat and the seat backrest so that all operating devices can be actuated safely.
– Ensure that the seat and seat backrest are securely engaged.

⚠ WARNING

To obtain optimum seat cushioning, you must adjust the seat suspension to your own body weight. This is better for your back and protects your health.

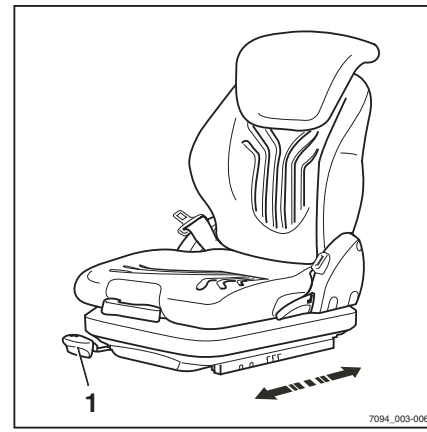
– To prevent injury, make sure that there are no objects within the swivel area of the seat.

NOTE

If there are separate operating instructions for the seat, they must be observed.

Moving the driver's seat

– Lift and hold the lever (1).
– Push the driver's seat into the desired position.
– Release the lever.
– Ensure that the driver's seat is securely engaged.



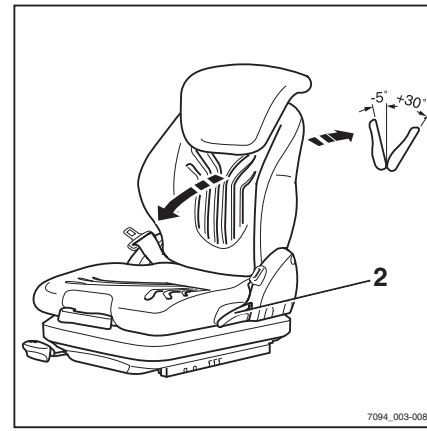
Adjusting the seat backrest

Do not put pressure on the seat backrest while disengaging it.

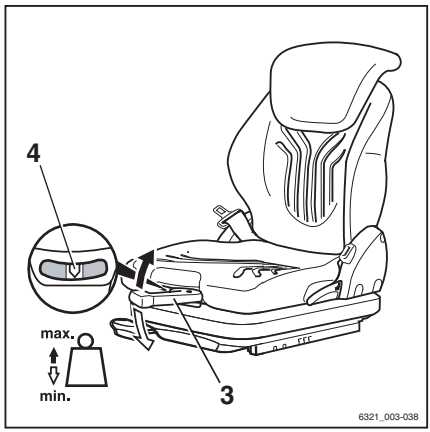
– Lift and hold the lever (2).
– Push the seat backrest into the desired position.
– Release the lever.
– Ensure that the seat backrest is securely engaged.

NOTE

The backwards tilt angle of the seat backrest can be restricted by the structure of the truck.



Adjusting the seat suspension



NOTE

The driver's seat can be adjusted to suit the weight of the individual driver. To obtain optimal settings for the seat suspension, the driver must perform the adjustment whilst sitting on the seat.

NOTE

The MSG 65/MSG 75 driver's seat is designed for people weighing between 45 kg and 170 kg.

NOTE

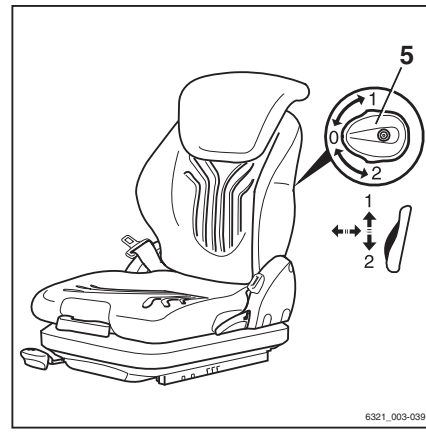
The MSG 75 seat is equipped with electric air suspension that is activated using an electric switch instead of the lever (3).

– Fully extend the weight-adjusting lever (3).
– Pump it up or down to set the driver's weight.
– Return the weight adjusting lever to the initial central position before each new lift (a click can be heard).
– Fully fold in the weight adjusting lever once adjustment is complete.

NOTE

The driver's weight has been selected correctly when the arrow (4) is in the centre of the inspection window. If the seat does not move any further when you pump the weight-adjusting lever, the minimum or maximum weight setting has been reached.

Adjusting the lumbar support (variant) ▷

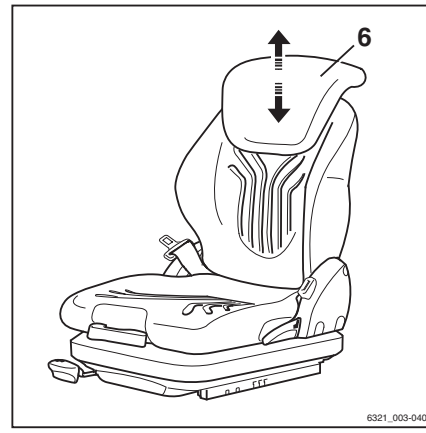


NOTE

The lumbar support can be adjusted to suit the contours of the individual driver's spine. Adjusting the lumbar support moves a convex support cushion into the upper or lower part of the backrest.

– Turn the turning knob (5) up or down until the lumbar support is in the desired position.

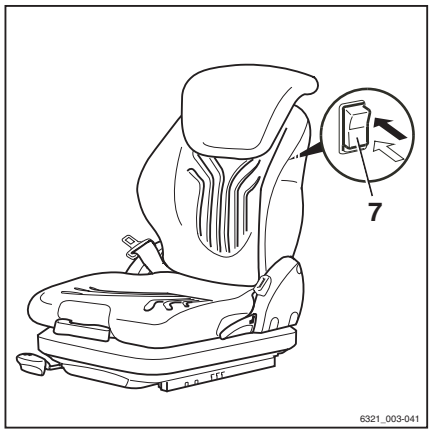
Adjusting the backrest extension (variant) ▷



– Adjust the backrest extension (6) by pulling it out or pushing it into the desired position.

To remove the backrest extension, move it past the end stop by jolting it upwards.

Switching the seat heater (variant) on and off

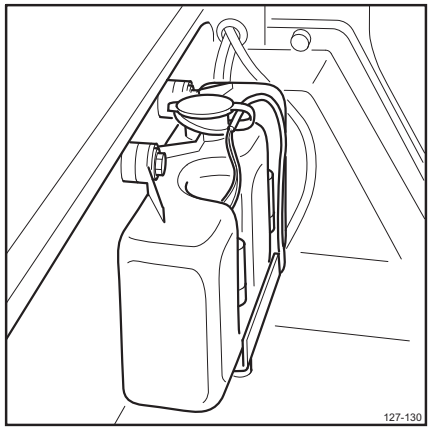


NOTE

The seat heater only functions if the seat contact switch is active, i.e. when the driver is sitting on the driver's seat.

– Switch the seat heater (7) on or off using the switch.

Top up the screen wash reservoir



CAUTION

The washer system can be damaged!

If there is no anti-freeze in the system, the washer system can be damaged.

– Always use washer fluid containing anti-freeze.

The reservoir for the front and rear screen wash fluid is location behind the seats.

– Fold the seat completely forwards.
– Open the filler cap on the screen wash reservoir.
– Top up the screen wash reservoir with washer fluid and anti-freeze according to manufacturer specifications.
– Close the filler cap on the screen wash reservoir.

Commissioning

Connecting the battery

Connecting the battery

⚠ CAUTION

Danger of damage to electrical and electronic components from short circuiting!

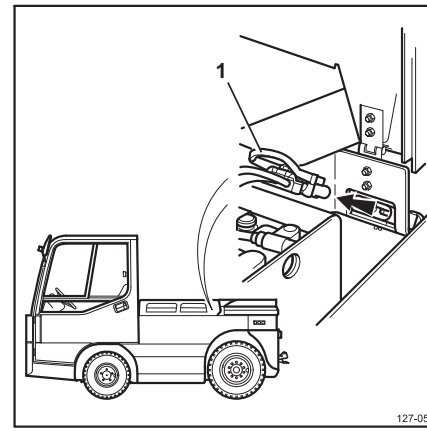
Connecting or disconnecting the battery with the truck switched on may cause damage to electrical and electronic components.

– Always turn off the key switch.

– Open the battery cover; see chapter entitled "Opening the battery cover and engine cover".

– Connect the battery male connector (1) to the battery connector.

– Close the battery cover.



Switching on the truck with the key switch

⚠ WARNING

Risk of accident as a result of improper commissioning!

Before switching on the key switch, all tests prior to commissioning must be performed without any defects being detected.

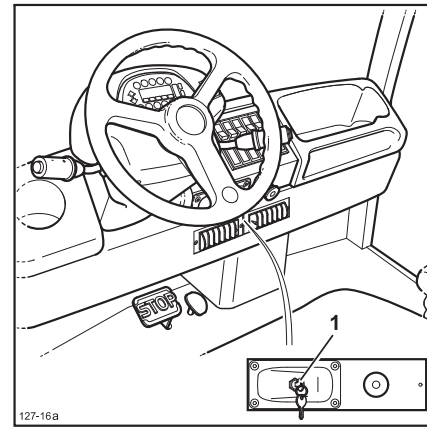
– Carry out tests before the commissioning, see the chapter "Checks and tasks to be carried out prior to commissioning".

– Do not commission the truck if defects have been identified.

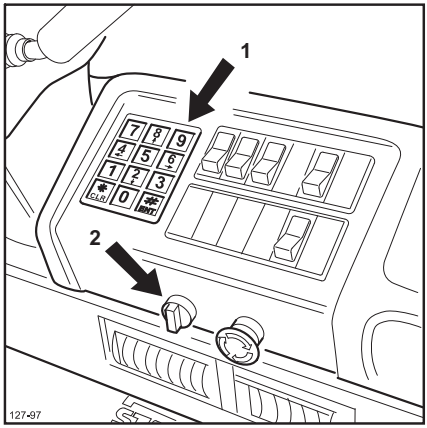
– Contact your service centre.

– Insert the switch key into the key switch (1) and switch on by turning clockwise.

All indicators on the display of the display unit light up briefly — the truck is ready for operation.



Switching on the truck with the driver code



The driver code* is entered using a twelve-key keypad (1) mounted on the dashboard and a rotary on/off switch (2).

The driver must enter a five-digit personal identification number (PIN) to start the truck, thereby preventing unauthorised use.

* Variant

Logging in

– Switch on the rotary switch (2) by turning it clockwise.

The display of the display unit will indicate that a PIN is required.

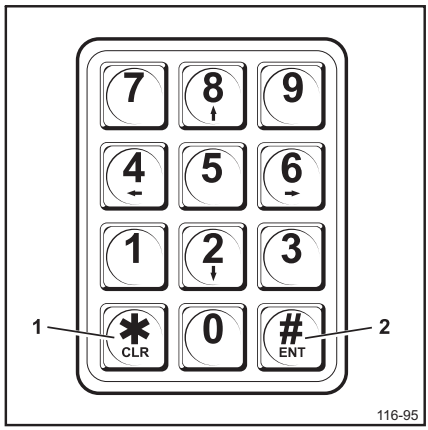
– Enter the five-digit PIN using the keypad.

NOTE

NOTE: The default driver PIN is 1 2 3 4 5.

– Press the ENT (2) button.

Logging out



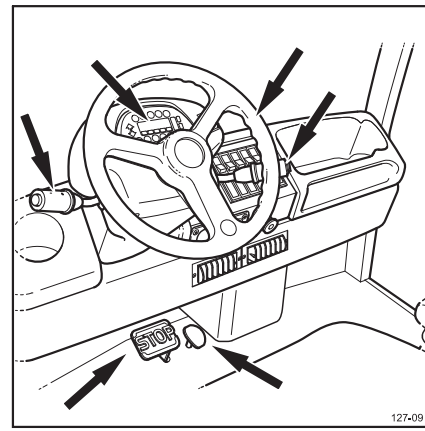
– Press and hold the CLR (1) button for a second.

– Switch off the device at the rotary switch.

NOTE

If the driver's seat is vacated, the truck will automatically log off immediately and the driver will have to re-enter their PIN in order to operate the truck.

Checking the operating devices and their function



Before the start of each shift or when taking the truck over from another person, the following operating devices must be checked to ensure they are operating correctly and safely:

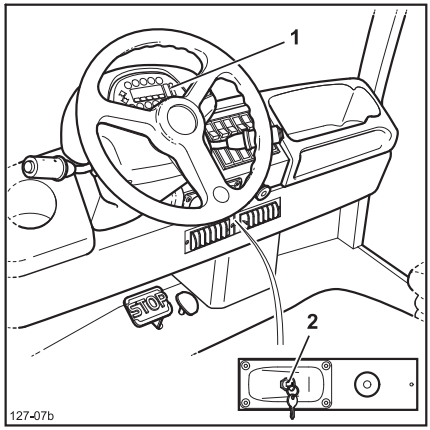
- Brake system
- Steering
- Drive system
- Display unit
- All additional operating devices

If one of the operating devices is not operating correctly or safely, inform the service centre.

NOTE

When the key switch is switched on, all indicators should light up briefly on the display of the display unit.

Checking the battery charge status



⚠ CAUTION

Risk of battery damage from deep discharge!

Deep discharge shortens the battery service life.

- Avoid deep discharges.
- Do not leave batteries in a discharged or partly discharged state.
- Charge a discharged or partly discharged battery.

– Switch on the key switch (2).

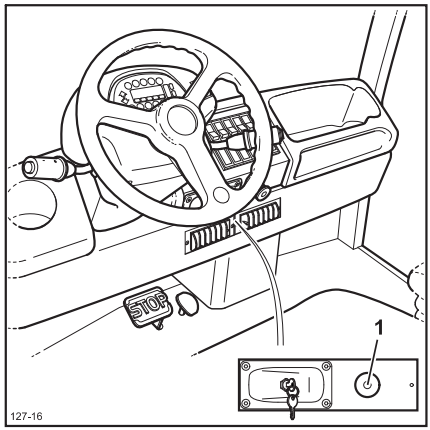
The display unit (1) indicates the battery charge status; see the chapter entitled "Battery discharge indicator".

– Charge the battery if necessary; see the chapter entitled "Charging the battery".

NOTE

If the battery is discharged to below 20% of the nominal capacity, the LED flashes red; this is considered to be a deep discharge of the battery.

Checking the emergency off switch



⚠ WARNING

There is no electric brake assistance when the emergency off switch is actuated!

- To brake, actuate the service brake.
- Do not actuate the emergency off switch to stop.
- Only actuate the emergency off switch in an emergency or to disconnect the power supply.

– Drive the truck slowly forwards.

– Press the emergency off switch (1).

The parking brake engages.

The ruck brakes to a standstill.

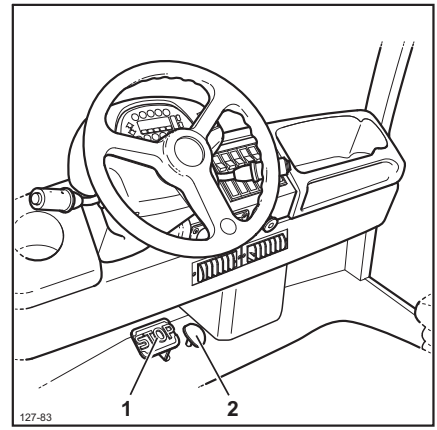
– Unlock the emergency off switch by turning it clockwise.

The warning light for the active parking brake in the display unit lights up.

– Release the parking brake; see chapter "Checking the parking brake".

The truck is ready for operation again.

Checking the foot brake



⚠ DANGER

Risk of accident!

The electrical brake may not be sufficient for emergency braking.

– Always actuate the brake pedal (1) for emergency braking.

– Accelerate the truck without a load, in a clear area; see chapter entitled "Driving".

– Release the actuated accelerator pedal (2).

– Press the brake pedal (1) firmly.

The truck must decelerate noticeably until it reaches a standstill.

NOTE

When you actuate the brake pedal, the brakes on both front wheels and on the drive axle are hydraulically actuated. It is recommended that before commissioning the truck, drivers acquaint themselves with the function and effect of this hydraulic brake while the truck is in an unladen condition.

Checking the parking brake

⚠ DANGER

Danger of death from being run over by a truck that is rolling away!

– The truck must not be parked on a slope.

– In emergencies, secure the truck with wedges on the side facing downhill.

– Always leave the truck with the parking brake applied.

–

Applying the parking brake

– Check the function of the parking brake at walking speed or on a steep gradient by actuating the parking brake button (1).

The parking brake engages and the warning light for the active parking brake lights up in the display unit.

Releasing the parking brake

– Press the parking brake button (1) with the parking brake active.

The parking brake is released and the warning light for the active parking brake in the display unit goes out.

NOTE

The parking brake engages when the seat is vacated.

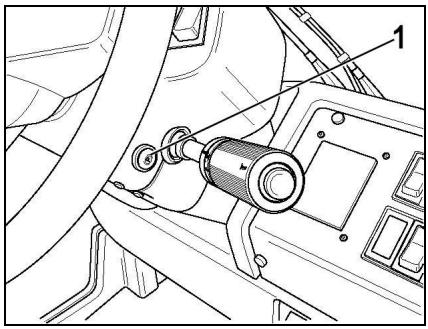
NOTE

The parking brake engages when the emergency off switch is pressed.

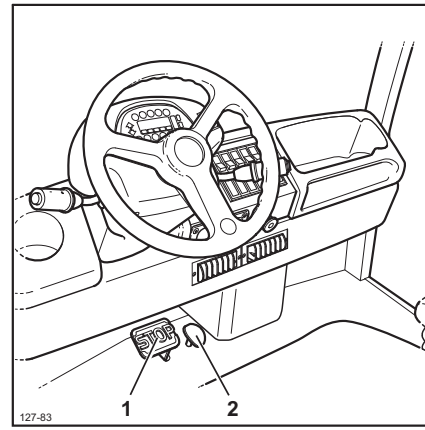
NOTE

As an option, the parking brake button can be fitted on the left-hand side of the steering column.

▷



Checking the electric brake



DANGER

Risk of accident!

Electric braking may be insufficient for emergency braking.

– Always actuate the brake pedal (1) for emergency braking.

WARNING

Risk of accident due to excessive speed!

Depending on the charging state of the battery, electric braking may be insufficient when driving downhill and results in the maximum permissible speed of the truck being exceeded.

In this case, an acoustic and a visual alarm in the display of the display unit indicates that the permissible maximum speed has been exceeded.

– Press the brake pedal (1).

The truck is braked electrically if the driving speed is lowered or the opposite drive direction is selected.

– Accelerate the truck without load, in a clear area; see chapter "Driving".

– Release the actuated accelerator pedal (2).

The truck must be braked to a standstill.

Checking the interlock switch

⚠ DANGER

Risk of accident in case of malfunction!

Interlock changes impair truck safety.

– Never make changes to interlocks.
– Always check that the interlock switch is functioning correctly before starting your shift or taking over a truck.

Before starting your shift or taking over a truck from someone else, a visual inspection and function check must be conducted on the following interlock switches:

- Key switch
- Emergency off switch
- Parking brake switch
- Seat switch
- Battery door interlock switch (only in platform version)
- Remotely unlockable tow coupling (variant)

If the truck is equipped with a remotely unlockable tow coupling (variant), the truck only moves with a fully opened or fully closed tow coupling.

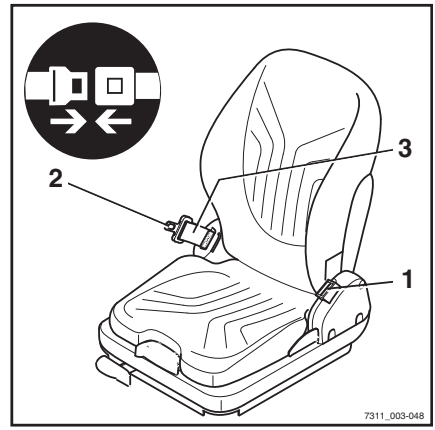
If one of the interlock switches does not function correctly or safely, report it to a superior or the responsible fleet manager immediately so that they can have the defect rectified.

NOTE

For any attachments, additional interlock switches may be fitted. These should be checked for correct and safe operation.

Fastening and releasing the seat belt (variant) ▷

Fastening the seat belt



NOTE

Sit as far back as possible so that your back is leaning against the seat backrest. The automatic blocking mechanism permits sufficient freedom of movement on the seat.

– Pull the seat belt (3) out of the belt retractor without jerking and fasten closely around the body over the thighs.

– Click the belt tongue (2) into the buckle (1).

– Check the tension of the seat belt. It should be close to your body.

* Variant

Fastening on a steep slope

The automatic blocking mechanism prevents the belt from being extended when the truck is on a steep slope. It is not possible to pull the seat belt any further out of the belt retractor.

– Move away carefully from the slope.

– Fasten the seat belt.

Thawing the buckle and belt retractor

⚠ CAUTION

Danger of material damage from overheating!

Do not subject the buckle or belt retractor to excessive heat when thawing.

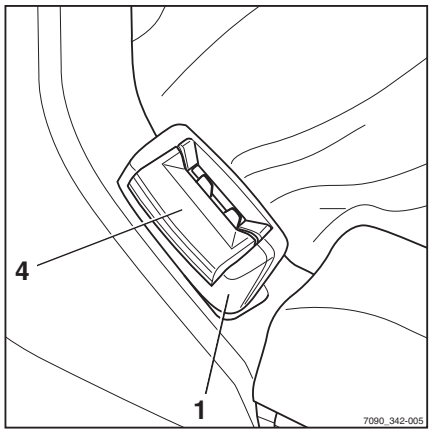
– Do not use air warmer than 60°C when thawing.

– Thaw the buckle and the belt retractor.

– Thaw slowly and carefully.

– Dry the parts to prevent them from refreezing.

Releasing the seat belt

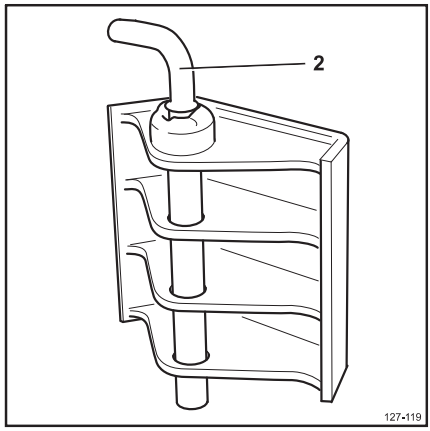


- Push the red button (4) on the buckle (1).
- Slowly guide the belt tongue back to the retractor by hand.
- Using increased force, pull the seat belt around 10-15 mm out of the retractor to disengage the blocking mechanism.
- Slowly allow the seat belt to retract again.
- Protect the seat belt from dirt (for example, by covering it).

NOTE

Do not allow the seat belt to retract too quickly. The automatic blocking mechanism may be triggered if the belt tongue strikes the housing. It will then no longer be possible to pull the seat belt out with the usual force.

Checking the manual tow coupling (variant)



WARNING

Risk of trapping or crushing!

- Do not reach into the open coupling.

NOTE

If the coupling is engaged and disengaged more than 2-3 times per shift, the coupling must be relubricated.

- Push the towing pin (2) downwards, turn the pin by 90° and pull the pin out.
- Check towing pin for damage.
- Clean any debris from the locating hole.
- Insert towing pin, push it downwards against the pressure of the locking spring, rotate 90° and lock it in place.

Checking the automatic tow coupling (variant) ▷

⚠ WARNING

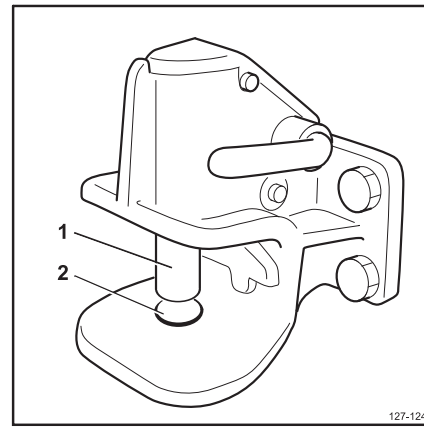
Risk of being trapped and crushed!

- Before carrying out any maintenance work on the coupling, ensure that the coupling is closed.
- Do not reach into the open coupling.

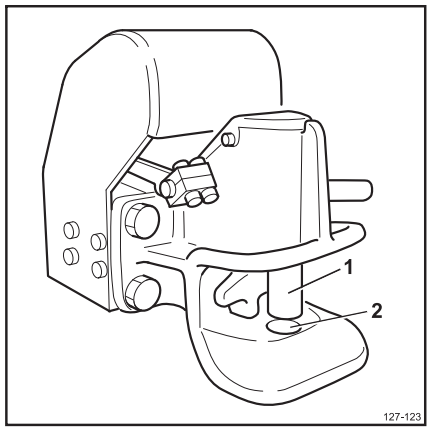
NOTE

If the coupling is engaged and disengaged more than 2-3 times per shift, the coupling must be relubricated on the lubricating nipple.

- Check the coupling pin (1) for damage.
- Clean any dirt from the coupling.
- Relubricate the coupling at the lubricating nipple.
- Ensure that the coupling pin engages in the locating hole (2).



Checking the remotely unlockable tow coupling (variant)



⚠ WARNING

Risk of trapping or crushing!

- Before carrying out any maintenance work on the coupling, ensure that the coupling is closed.
- Do not reach into the open coupling.

NOTE

If the coupling is engaged and disengaged more than 2-3 times per shift, the coupling must be relubricated on the lubricating nipple.

- Check coupling pin (1) for damage.
- Clean any debris from the locating hole.
- Relubricate the coupling at the lubricating nipple.
- Ensure that the coupling pin engages in the locating hole (2).

NOTE

Traction is only available when the coupling pin is either engaged or in a fully raised position.

Drive mode

Roadways

Condition of the roadways

Roadways must be sufficiently firm, even and free from dirt and fallen objects.

Drainage channels, level crossings and similar objects must be compensated for, and if necessary, ramps must be provided so that trucks can drive over these with as few bumps as possible.

Ensure sufficient load capacity for manholes and drain covers etc.

There must be sufficient distance between the highest points of the truck or the load and the

fixed points of the surroundings. The height is based on the overall height of the truck and the dimensions of the load.

Rules for roadways and the working area

It is only permitted to drive on routes authorised for traffic by the operating company (see chapter "Definition of terms used for responsible persons") or its representatives. Traffic routes must be free of obstacles. The load must only be set down and stored in the designated locations. The operating company and its representatives must ensure that unauthorised third parties keep away from the working area.

Hazard areas

Hazard areas on the roadways must be marked by standard traffic signs or, if necessary, by additional warning signs.

Safety guidelines

⚠ WARNING

Increased risk of accident due to a lack of attention!

Using multimedia and communication devices, as well as using these devices at an excessive volume, during travel or when handling loads can affect the operator's attention!

- Do not use devices during travel or when handling loads.
- Set the volume so that warning signals can still be heard.

⚠ WARNING

Increased risk of accident as a result of impermissible use of mobile phones and radio telephones!

In areas where the use of mobile phones is prohibited, use of a mobile phone or radio telephone is not permitted

- Switch off the devices.
- Please take note of the areas where the use of these devices is prohibited.

The driver must comply with the highway code when driving within the plant.

The speed must be appropriate to the local conditions.

For example, the driver must drive slowly around corners, in tight passageways, when driving through swing-doors, at blind spots or on uneven roadways.

The driver must always maintain a safe braking distance from vehicles and persons in front and always have the vehicle under control. He must avoid stopping suddenly, turning at speed and overtaking in dangerous places or in blind spots.

– Initial driving practice must be carried out in an empty space or on a clear roadway.

The following are forbidden when driving:

- Allowing arms and legs to hang outside the truck
- Leaning the body over the outer contour of the truck
- Climbing out of the truck
- Moving the driver's seat
- Adjusting the steering column
- Releasing the seat belt (variant)
- To disable the restraint system (variant)
- Using electronic devices, for example radios, mobile phones etc.

Visibility when driving

The driver must look in the drive direction and have a sufficient view of the driving lane.

The driver must be sure that the driving lane is clear, particularly for reverse travel.

If this is not possible, then a second person acting as a guide must walk in front of the truck.

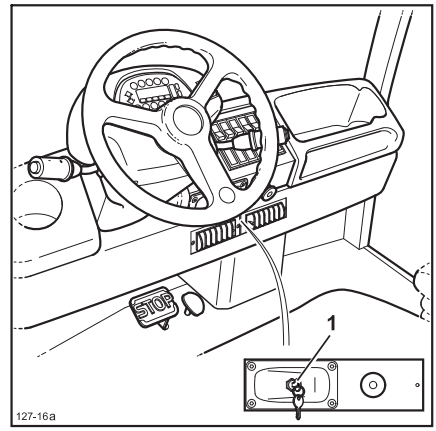
In this case, the driver must only move at walking pace and with extra care. The truck must be stopped immediately if eye contact with the guide is lost.

Rear-view mirrors are only to be used for observing the road area behind the truck and not for reverse travel. If visual aids (mirror, monitor) are required to achieve sufficient visibility, it is necessary to practise using them.

Extra care should be taken during reverse travel using visual aids.

Any glass and mirrors must always be clean and free of ice.

Switching on the truck with the key switch



⚠ WARNING

Risk of accident as a result of improper commissioning!

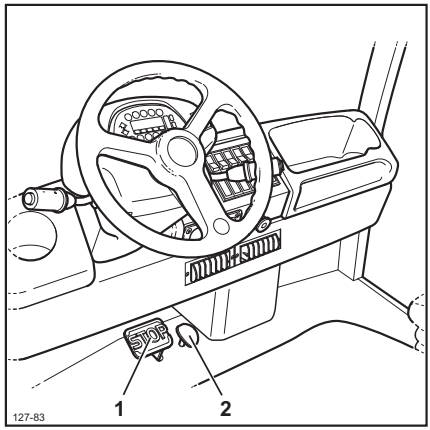
Before switching on the key switch, all tests prior to commissioning must be performed without any defects being detected.

- Carry out tests before the commissioning, see the chapter "Checks and tasks to be carried out prior to commissioning".
- Do not commission the truck if defects have been identified.
- Contact your service centre.

– Insert the switch key into the key switch (1) and switch on by turning clockwise.

All indicators on the display of the display unit light up briefly — the truck is ready for operation.

Stopping the truck with the service brake



The electric brake converts the acceleration energy of the truck into electrical energy. This causes the truck to slow. The truck can also be braked with the hydraulic brake by pressing the brake pedal (1).

⚠ DANGER

If the service brake fails, the truck cannot brake sufficiently. There is a risk of accident!

– Always use the brake pedal (1) for emergency braking.
– Do not operate the truck again until the service brake has been repaired.

⚠ DANGER

At speeds that are too high, there is a danger that the truck could skid!

The braking distance of the truck depends on the weather conditions and the level of contamination on the roadway.

– Adapt your driving and braking style to suit the weather conditions and the level of contamination on the roadway.
– Choose a driving speed such that the truck can always be safely braked.

– Brake the truck by releasing the accelerator pedal (2).
– If the braking effect is inadequate, apply the brake pedal (1) as well.

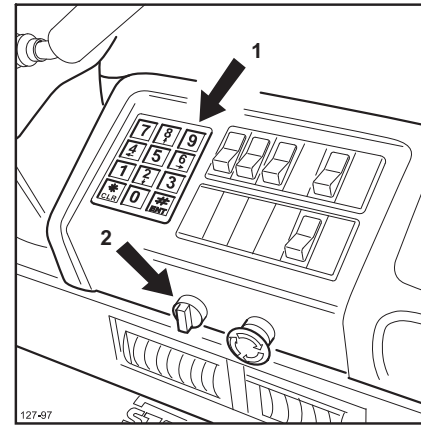
NOTE

When you actuate the brake pedal, the brakes on both front wheels and on the drive axle are hydraulically actuated. It is recommended that before commissioning the truck, drivers acquaint themselves with the function and effect of the hydraulic brake while the truck is unladen.

NOTE

The truck is electrically braked when the accelerator pedal is released or if the opposite drive direction is selected while driving.

Switching on the truck with the driver code



The driver code* is entered using a twelve-key keypad (1) mounted on the dashboard and a rotary on/off switch (2).

The driver must enter a five-digit personal identification number (PIN) to start the truck, thereby preventing unauthorised use.

* Variant

Logging in

– Switch on the rotary switch (2) by turning it clockwise.

The display of the display unit will indicate that a PIN is required.

– Enter the five-digit PIN using the keypad.

NOTE

NOTE: The default driver PIN is 1 2 3 4 5 *.*

– Press the ENT (2) button.

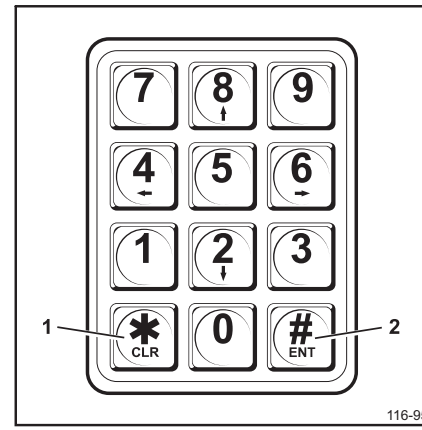
Logging out

– Press and hold the CLR (1) button for a second.

– Switch off the device at the rotary switch.

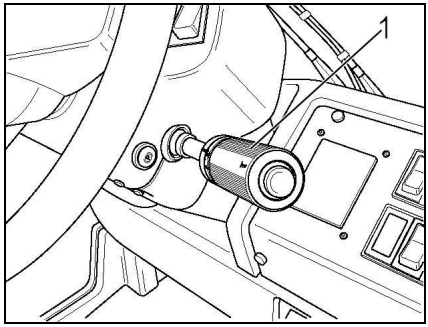
NOTE

If the driver's seat is vacated, the truck will automatically log off immediately and the driver will have to re-enter their PIN in order to operate the truck.



Operating the horn

– Press button at the end of the operating lever (1) on the right of the steering column.

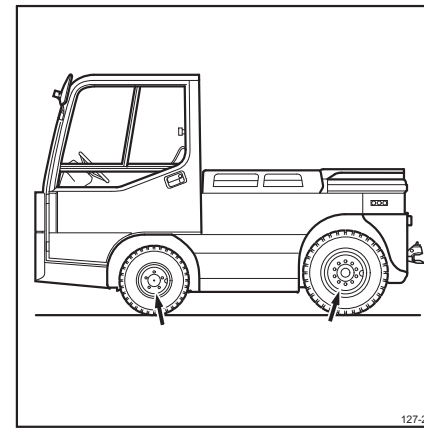


NOTE

As an option, the operating lever can be located on the left-hand side of the steering column.

Running the truck in

The truck can be operated at maximum speed immediately after delivery. However, avoid continuous high loads during the first 50 operating hours.



Checking the wheel nuts

⚠ WARNING

Risk of accident from loose wheel nuts!

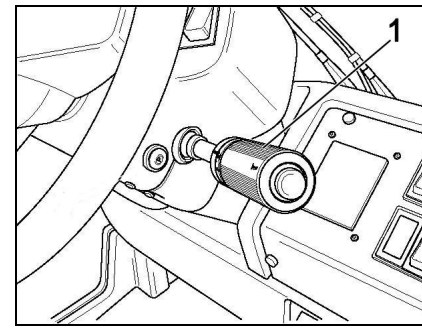
Within the first 50 operating hours of receiving the truck or after changing a wheel, it is IMPERATIVE to check the tightening torques of the wheel nuts and to check that they are complete and securely fitted.

- Check that the wheel nuts are complete and securely fitted.
- Check the wheel nuts for the correct tightening torques.
- Tighten the wheel nuts crosswise with a torque of 195 Nm.

NOTE

If it is found necessary to tighten the wheel bolts to the correct torque, then they must be checked again after 50 hours. Repeat the tightening procedure every 50 hours until the correct torque is consistently obtained.

Selecting the drive programme

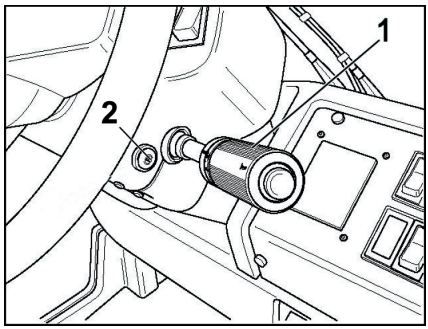


NOTE

As an option, the operating lever can be located on the left-hand side of the steering column

Operating stage	Operating lever
Normal speed	"Hare" position
Slow speed	"Tortoise" position

Starting drive mode



⚠ WARNING

Increased risk of accident due to a lack of attention!

Using multimedia and communication devices, as well as using these devices at an excessive volume, during travel impairs the attention of the driver.

– Do not use devices during travel or when handling loads.
– Set the volume so that warning signals can still be heard.

Prepare drive mode

Initial driving practice must be carried out in an empty space or on a clear roadway.

– Push the operating lever (1) on the right of the steering column upwards.

The forward-facing arrow symbol lights up in the display unit.

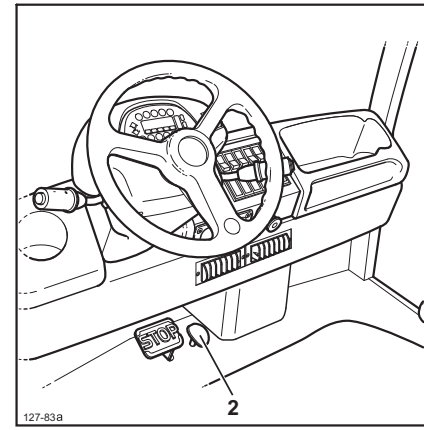
– Press the button (2) on the right of the steering column.

The parking brake is released. The indicator light for the parking brake in the display unit goes out.

NOTE

As an option, the operating lever can be arranged on the left-hand side of the steering column

Accelerating the truck



⚠ WARNING

Risk of accident as a result of excessive speed!

The truck may not exceed its permissible maximum speed when travelling on gradients.

– Actuate the foot brake to brake the truck.

– Gently actuate the accelerator pedal (2).

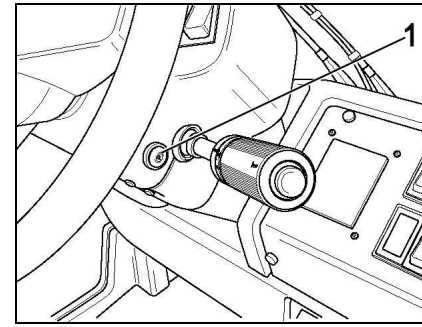
NOTE

Depressing the accelerator pedal fully will not increase the rate of acceleration, as maximum acceleration is controlled automatically.

NOTE

However, if the maximum speed is exceeded when travelling on a gradient, the speedometer flashes on the display of the display unit and an alarm tone sounds; see the chapter "Maximum speed warning indicator".

Applying the parking brake



⚠ CAUTION

Risk of material damage as a result of improper application of the parking brake!

– Do not actuate the parking brake in order to brake the truck while travelling.
– Only actuate the parking brake while the truck is stationary.

Applying the parking brake

– Press the button (1) on the right-hand side of the steering column.

The parking brake engages and the warning light for the applied parking brake lights up in the display of the display unit.

Releasing the parking brake

– Press the button (1) on the right of the steering column with the parking brake applied.

The parking brake is released and the warning light for the applied parking brake goes out on the display unit.

NOTE

The parking brake engages if the driver leaves the seat.

NOTE

The parking brake engages if the emergency stop switch is pressed.

NOTE

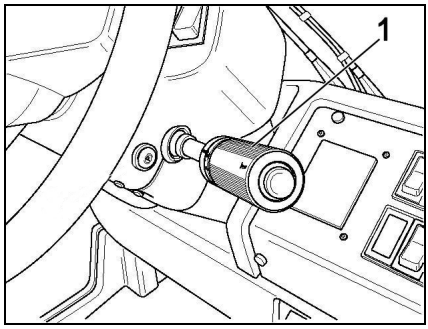
The truck brakes regeneratively if the parking brake button is pressed when travelling. The driver must also brake the truck hydraulically by operating the foot brake pedal - the parking brake is only applied once the vehicle is stationary.

NOTE

As an option, the button can be arranged on the left-hand side of the steering column

Driving the truck in reverse

– Pull down the operating lever (1) on the right-hand side of the steering column. ▷



The reverse arrow symbol illuminates on the display unit.

NOTE

As an option, the operating lever can be located on the left-hand side of the steering column

Parking and switching off the truck

⚠ DANGER

Increased risk of accident from unauthorised use!

Never leave the truck unattended.

– Always switch off the truck using the key switch and remove the switch key.

– Ensure the truck is parked so as not to cause a hazard or obstruction.

– Switch off the key switch and remove the switch key.

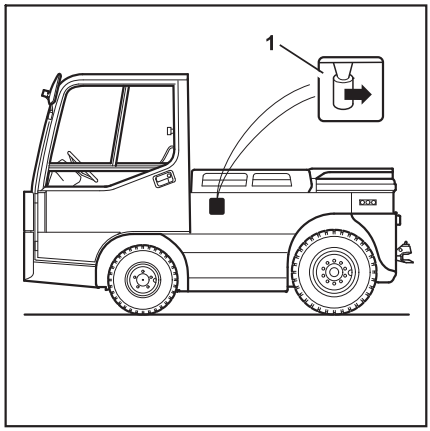
– If the truck is not being used for a prolonged period, remove battery male connector.

Battery

Providing access to maintenance points

Opening the battery cover

Open the battery cover. ▷



⚠ WARNING

Risk of crushing!

When lifting and closing, limbs could become trapped.

– Do not reach between covers and chassis.

NOTE

Before opening the battery cover, the engine cover must be closed.

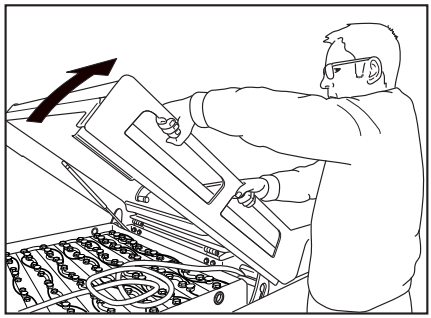
NOTE

On the cab version with sliding doors, the sliding doors must be closed.

Open the battery cover.

– To do this, pull the locking lever (1) towards the rear of the truck until the locking lever audibly unlocks (clicks).

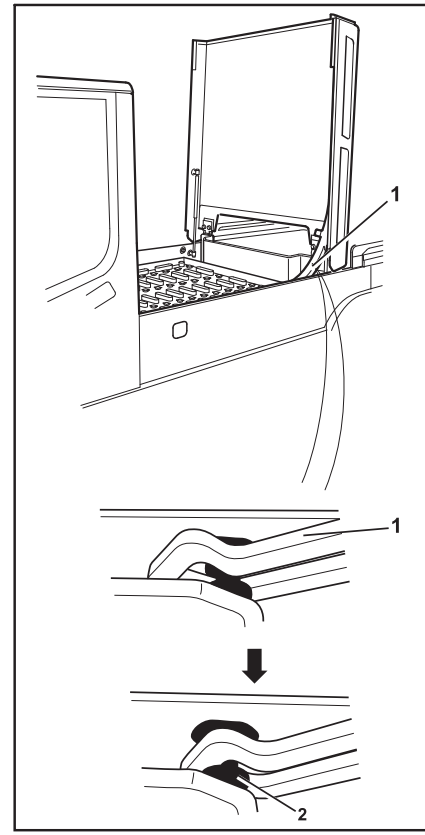
Lift the battery cover. ▷



– To do this, grasp the battery cover with both hands and pull the battery cover upwards - do not let go of the battery cover.

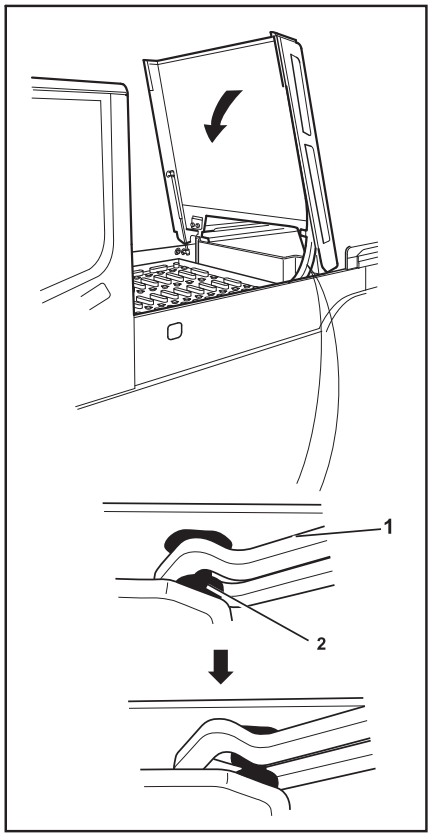
Secure the battery cover in the lifted position. ▷

– To do this, push the safety stay (1) over the security bolt (2) until the safety stay is hooked in place and secured.
– Ensure that the battery cover is secured against falling shut unintentionally.
– Ensure that no parts can fall into the battery compartment.



Closing the battery cover

Release the battery cover. ▷



⚠ WARNING

Risk of crushing!

When lifting and closing, limbs could become trapped.

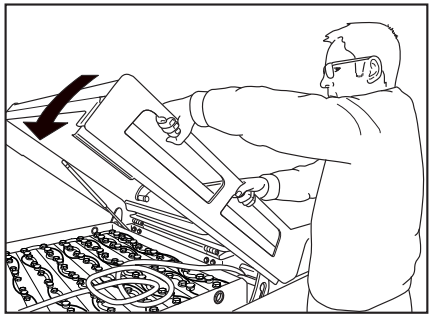
– Do not reach between covers and chassis.

Release the battery cover.

– To do this, push the safety stay (1) over the security bolt (2) until the safety stay is released.

– Slowly lower the battery cover; to do so, release the safety stay.

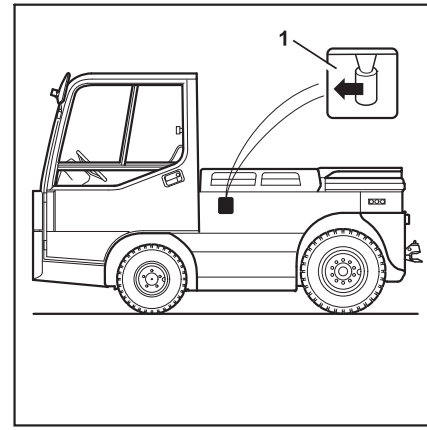
Lower the battery cover. ▷



– To do this, push down the battery cover with both hands.

Close the battery cover.

– To do this, push down the battery cover against the pressure of the gas spring until the locking lever (1) audibly locks (clicks).
– Ensure that the battery cover is closed correctly.



Opening the engine cover

Open the engine cover.

⚠ WARNING

Risk of crushing!

When lifting and closing, limbs could become trapped.

– Do not reach between covers and chassis.

NOTE

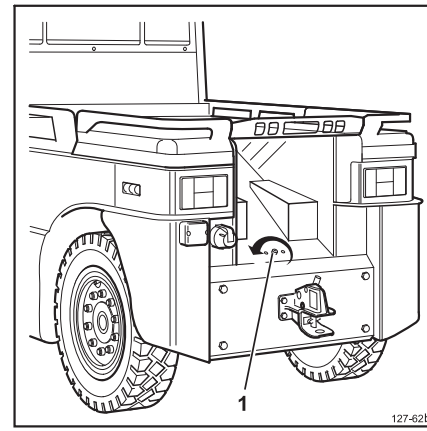
The battery cover must be closed before the engine cover can be opened.

NOTE

On the cab version with sliding doors, the sliding doors must be closed.

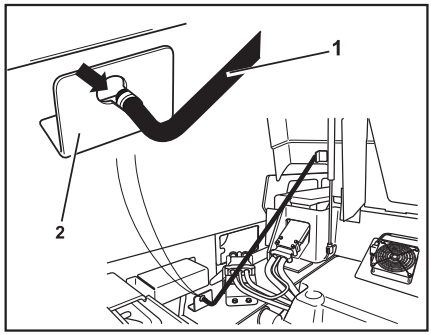
Open the engine cover.

– To do this, loosen the locking screw (1) by turning the screw anticlockwise.
– Grasp the bonnet with both hands and lift the bonnet upwards.



Secure the engine cover in the lifted position. ▷

- To do this, release the support rod (1) from the holder (in the engine cover).
- Latch the support rod in the safety plate (2) such that the support rod is locked in place and secured.
- Ensure that the engine cover is secured against falling shut unintentionally.



Closing the engine cover

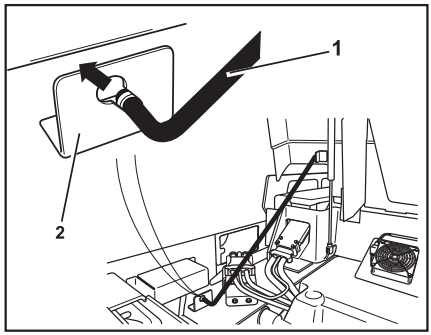
Release the engine cover. ▷

⚠ WARNING

Risk of crushing!

When lifting and closing, limbs could become trapped.

- Do not reach between covers and chassis.

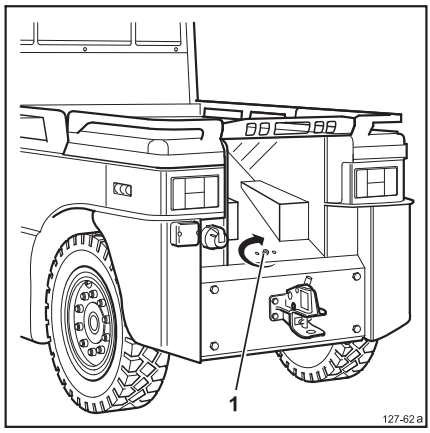


Release the engine cover.

- To do this, unlatch the support rod (1) from the safety plate (2) and position the support in the holder (in the engine cover).

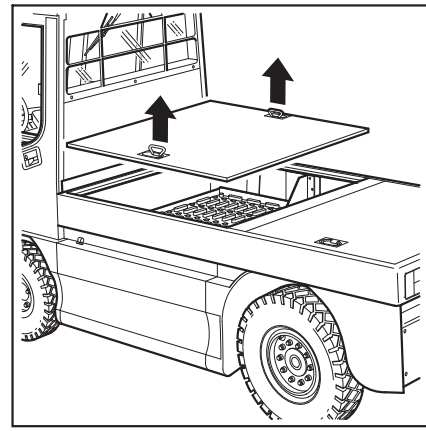
Close the engine cover. ▷

- To do this, press down the engine cover against the pressure of the gas spring and hold the engine cover closed.
- Tighten the locking screw (1) by turning the screw clockwise.
- Ensure that the engine cover is closed correctly.



Removing the battery cover (platform tractors)

Open and lift the battery cover. ▷



⚠ WARNING

Risk of crushing!

When lifting and closing, limbs could become trapped.

- Do not reach between covers and chassis.
- Only lift up and position the covers using two people.

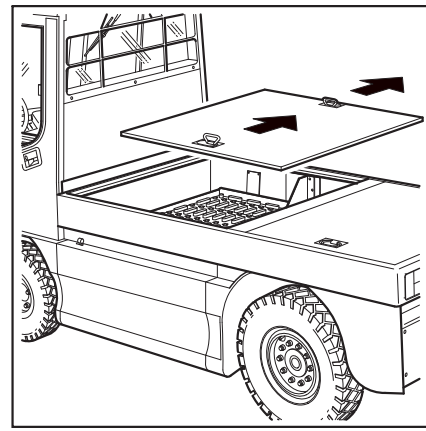
NOTE

On the cab version with sliding doors, the sliding doors must be closed.

Open and lift the battery cover.

- To do this, fold up the handles of the battery cover.
- Lift the battery cover with help from another person.

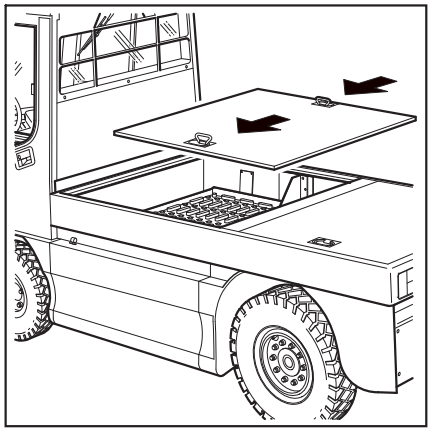
Lift out the battery cover. ▷



- To do this, remove the battery cover from the working area.
- Ensure that no parts can fall into the battery compartment.

Installing the battery cover (platform tractors)

Lift in the battery cover. ▷



⚠ WARNING

Risk of crushing!

When lifting and closing, limbs could become trapped.

– Do not reach between covers and chassis.
– Only lift up and position the covers using two people.

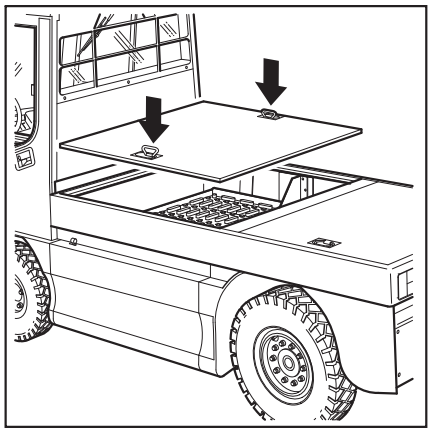
NOTE

On the cab version with sliding doors, the sliding doors must be closed.

Lift in the battery cover.

– To do this, fold up the handles of the battery cover.
– Lift in the battery cover with help from another person.

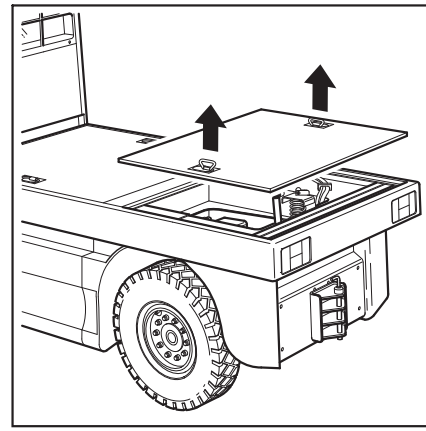
Position and close the battery cover. ▷



– To do this, align and position the battery cover.
– Fold in the handles.
– Ensure that the battery cover is closed correctly.

Removing the engine cover (platform tractors)

Open and lift the engine cover. ▷



⚠ WARNING

Risk of crushing!

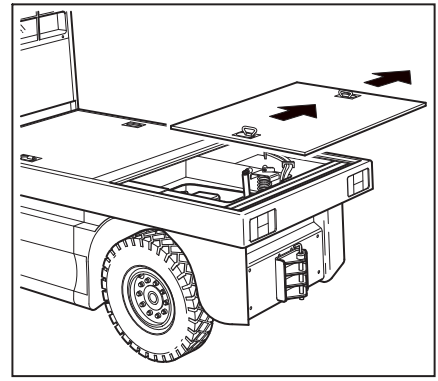
When lifting and closing, limbs could become trapped.

- Do not reach between covers and chassis.
- Only lift up and position the covers using two people.

Open and lift the engine cover.

- To do this, fold up the handles of the engine cover.
- Lift the engine cover with help from another person.

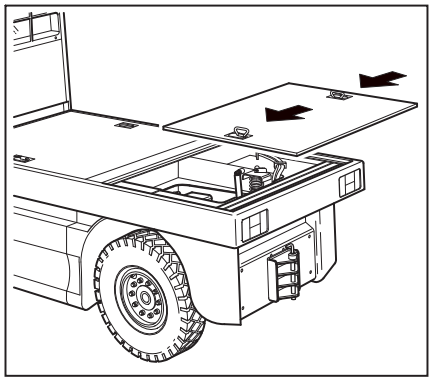
Lift out the engine cover. ▷



- To do this, lift out the engine cover with help from another second person.
- Remove the engine cover from the working area.
- Ensure that no parts can fall into the engine compartment.

Installing the engine cover

Lift in the engine cover. ▷



⚠ WARNING

Risk of crushing!

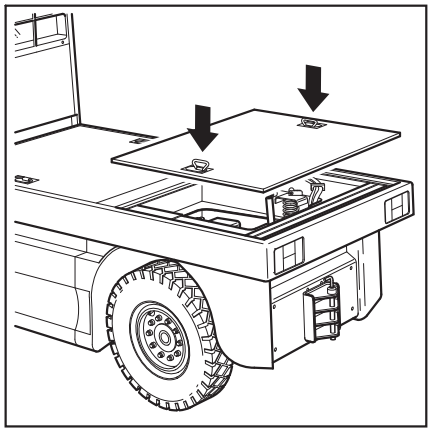
When lifting and closing, limbs could become trapped.

– Do not reach between covers and chassis.
– Only lift up and position the covers using two people.

Lift in the engine cover.

– To do this, fold up the handles of the engine cover.
– Lift in the battery cover with help from another person.

Position and close the engine cover. ▷



– To do this, align and position the engine cover.
– Fold in the handles.
– Ensure that the engine cover is closed correctly.

Battery cables

⚠ CAUTION

There is a possibility of damage to the battery cables during operation or transportation.

Regardless of whether the battery male connector is connected or disconnected, always route the battery cables in a way that ensures they cannot be crushed, abraded or cut.

Charging the battery

⚠ DANGER

Danger of death from electric shock!

- Never wear watches or jewellery when working on a battery.
- Never touch non-insulated cables.
- Never place metallic objects on the battery.
- Never touch damaged plugs.
- ALWAYS use insulated tools.
- Always wear a proper personal protection suit.

⚠ DANGER

Risk of explosion!

During charging, the battery releases a mixture of oxygen and hydrogen (explosive gas).

This gas mixture is explosive and must not be ignited.

- Do not expose the battery to sparks or naked flames.
- Only charge batteries in designated areas.
- Always ensure that battery charging and storage areas are well ventilated.
- Observe the operating instructions from the manufacturer of the battery and the battery charger.

If you do not have these instructions, please contact your service centre.

⚠ CAUTION

Risk of damage to electrical and electronic components due to short circuit!

Connecting or disconnecting the battery with the truck switched on may cause damage to electrical and electronic components.

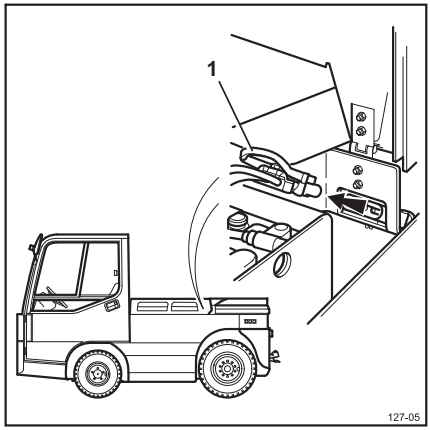
- Always turn off the key switch.

Preparation

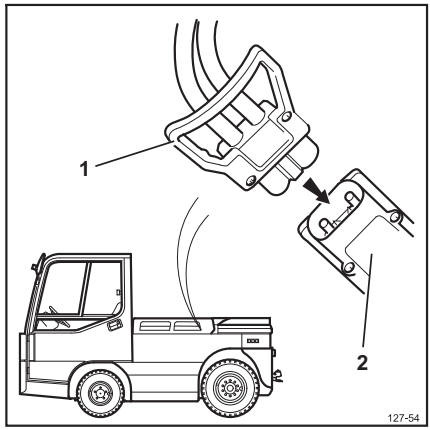
– Switch off the key switch.

– Open the battery cover; see chapter entitled "Opening the battery cover and motor cover".

– Disconnect the battery male connector (1).



– Attach the battery plug (1) to the battery charger connector (2).



Charging

– Switch on the battery charger (most battery chargers switch on automatically when connected to a battery).

– Start charging.

After the charging process

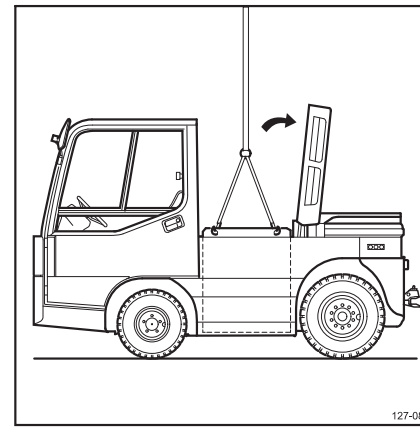
– Switch off the battery charger.

– Disconnect the battery male connector from the plug on the battery charger.

– Reconnect the battery male connector to the truck.

– Close the battery cover and snap it into place.

Changing the battery using a crane ▷



⚠ DANGER

Risk of death from suspended loads!

- Never walk or stand underneath suspended loads.
- The hoist must be designed to carry the weight of the battery (see battery plate or identification plate).

⚠ WARNING

Increased risk of crushing and shearing!

- Do not reach between the battery and chassis.

⚠ WARNING

Risk of truck damage due to uncontrolled swivelling movements!

- Position the crane directly above the battery.
- Prevent the battery from swivelling.

⚠ CAUTION

Risk of battery damage if original batteries are not used!

- The replacement battery MUST be identical in size and weight to the standard battery.
- If the size or weight is different, please contact your service centre.

⚠ CAUTION

Risk of damage to electrical and electronic components due to short circuit!

Connecting or disconnecting the battery with the truck switched on could cause damage to electrical and electronic components.

- Always turn off key switch.

Preparation

- Park truck on level ground.
- Apply the parking brake.
- Switch off the key switch.
- Open battery cover; see chapter "Opening the battery and engine covers".

– Disconnect the battery male connector; see chapter "Charging the battery".
– Batteries with open terminals or connectors must be covered with a rubber mat to prevent short circuits.

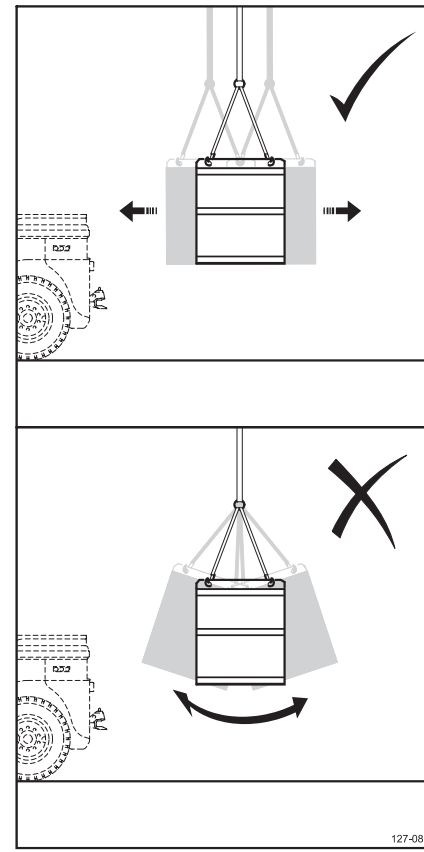
Disconnecting the battery

– Attach a suitable hoist to the battery.
– Adjust the length of the hoist so that it is vertically above the battery's centre of gravity.
– Lift the battery clear of the truck.
– Set the battery down carefully.

The ground must be capable of bearing the weight of the battery.

– Do not place the lifting gear on the battery cells or allow it to fall on them.
– Transport the battery to the intended storage space.
– Set down the battery.

Transporting and setting down the battery



DANGER

If the battery swings in an uncontrolled manner, it can crush people. There is a risk of fatality!!

- Never walk or stand underneath suspended loads.
- Do not allow the battery to bump into anything whilst it is being lifted or allow it to move in an uncontrolled manner.
- If necessary, hold the battery using guide ropes.
- The hoist must be designed for the weight of the battery (see battery identification plate or identification plate).

CAUTION

Risk of damage to property due to the battery colliding with other objects!

- Always take particular care when transporting the battery, i.e. low lifting speed, slow swivel movement and careful braking.

- Transport the battery to the intended storage space.
- Carefully remove the battery - the surface must be able to carry the weight of the battery.
- Do not place the lifting gear on the battery cells or allow it to fall on them.

Charging the battery with the side battery connector

This charging variant does not require the battery cover to be opened

⚠ DANGER

Danger of death from electric shock!

- Never wear watches or jewellery when working on a battery.
- Do not place metallic objects on the battery.
- Never touch non-insulated cables.
- Never touch damaged plugs.
- ALWAYS use an insulated tool.
- Always wear a proper personal protection suit.

⚠ DANGER

Risk of explosion!

Risk of explosion due to flammable gases!

During charging, the battery releases a mixture of oxygen and hydrogen (oxyhydrogen gas).

This gas mixture is explosive and must not be ignited.

- Do not expose the battery to sparks or naked flames.
- Only charge batteries in designated areas.
- Always ensure that battery charging and storage areas are well ventilated.
- Observe the operating instructions from the manufacturer of the battery and the battery charger.

If you do not have these instructions, please contact your service centre.

⚠ CAUTION

Risk of damage to electrical and electronic components from short circuiting!

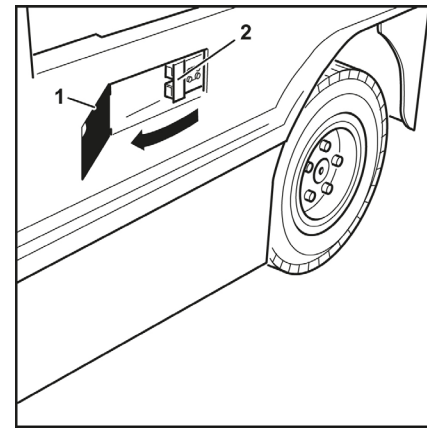
Connecting or disconnecting the battery with the truck switched on may cause damage to electrical and electronic components.

- Always turn off the key switch.

Preparation

Switch off the key switch.

- Open the lid (1) of the side battery connector.
- Insert the charger plug into the battery connector (2).



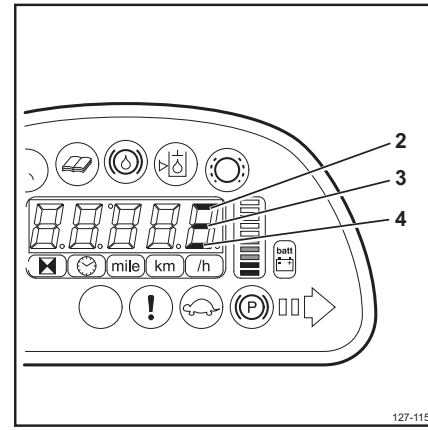
Charging

The lower LED (4) in the display of the display unit lights up for up to 5 minutes before the charging process begins.

Once charging has commenced, LEDs (2), (3) and (4) will light up in sequence.

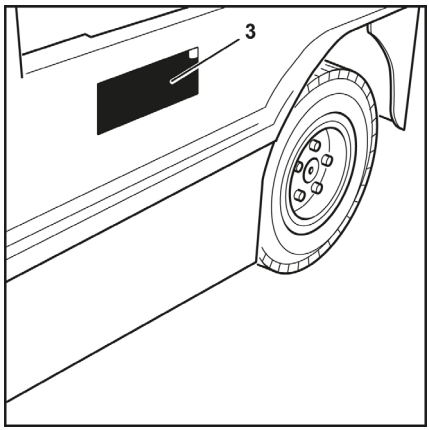
After the charging process

- The upper LED (2) flashes.
- Turn off the battery charger.



Unplug the battery charger from the battery connector.

– Close the cover plate (3) of the battery connector.



Equalising charge to prevent a deep discharge of the battery

Lead-acid batteries must be charged at least once per week for equalisation purposes. This is to ensure that all battery cells are evenly charged. This prevents a deep discharge of the battery and extends its life span.

NOTE

Dependent on the battery charger used, the equalising charge may not begin until 24 hours have elapsed. A period when no shifts are running, such as the weekend, is therefore ideal for performing the equalising charge.

– Observe the information in the operating instructions of the battery charger regarding how to perform an equalising charge.

Starting the equalising charge

– Charge the battery.

– After charging, leave the battery in the battery charger.

The battery charger remains switched on. Depending on the battery charger used, the equalising charge starts after between 6 and 24 hours. The equalising charge takes up to 2 hours.

– Please refer to the operating instructions from the manufacturer of the battery charger.

Ending the equalising charge

The equalising charge ends automatically. If the battery is required during this process, you can interrupt the equalising charge by pressing the "stop button" on the battery charger.

– Please refer to the operating instructions from the manufacturer of the battery charger.

⚠ CAUTION

Risk of component damage!

If the plug for the battery charger is disconnected from the battery male connector while the battery charger is switched on, an arc is produced. This can lead to erosion at the contacts, which considerably shortens their service life.

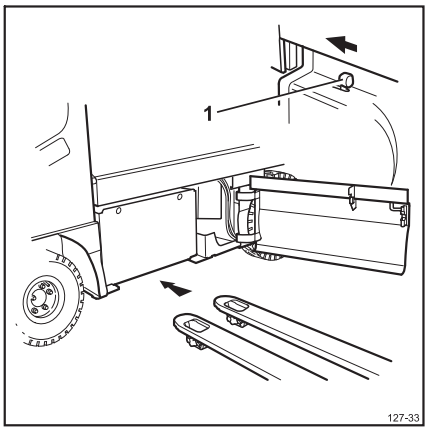
– Switch off the battery charger before disconnecting the charging cable.

– Switch off the battery charger.

– Disconnect the battery male connector from the plug for the battery charger.

– Insert the battery male connector fully into the plug connection on the truck.

Replacing the battery using a hand pallet truck (variant for platform tractors)



⚠ CAUTION

Danger of truck damage if original batteries are not used!

– The replacement battery MUST be identical in size and weight to the standard battery.
– If the size or weight is different, please contact your service centre.

⚠ CAUTION

Risk of damage to electrical and electronic components due to short circuit!

Connecting or disconnecting the battery with the truck switched on could cause damage to electrical and electronic components.

– Always turn off key switch.

Preparing for removal using a hand pallet truck*

– Park truck on level ground.
– Switch off the key switch.
– Open the battery cover.
– Remove the battery male connector.
– Open interlock (1) on the side door.
– Open side door

Disconnecting the battery

⚠ WARNING

Risk of accident due to improper means of transport!

The load capacity of the hand pallet truck in use must at least match the battery weight (see battery identification plate).

⚠ CAUTION

Risk of battery damage from battery tipping over!

- Only store the battery on a suitable beam support or on suitable racking.
- Do not store the battery on a wooden beam or similar.

- Carefully drive the hand pallet stacker truck under the battery.
- Raise the battery sufficiently to clear the locating blocks on the chassis.
- Carefully remove the battery from the battery compartment.

Transporting and setting down the battery

⚠ WARNING

Risk of accident due to improper means of transport!

The load capacity of the hand pallet truck in use must at least match the battery weight (see battery identification plate).

⚠ WARNING

Increased risk of accident when transporting with lack of care!

- If the battery is to be replaced using a hand pallet truck, this must only be done on level ground.
- Always drive at low speed.
- Do not traverse slopes with a battery placed on the hand pallet truck truck.
- Always avoid sharp corners.

- Slowly remove battery from battery compartment.
- Carefully transport battery to the intended storage space.

Installing the battery

⚠ DANGER

Increased risk of crushing and shearing between battery and chassis!

- Do not reach between the battery and chassis.

⚠ WARNING

Increased risk of accident when transporting with lack of care!

– Always transport batteries carefully.
– Always drive at low speed.
– Always avoid sharp corners.

⚠ WARNING

Risk of accident due to improper means of transport!

The load capacity of the hand pallet truck in use must at least match the battery weight (see battery identification plate).

– Carefully drive the hand pallet stacker truck under the battery.
– Carefully transport the battery to the truck.
– Carefully insert the battery into the battery compartment.
– Carefully lower the battery onto the chassis.
– Plug in the battery male connector.
– Close battery cover.
– Close interlock on the side door.

Lighting

Switching the road lights on and off

Driving light

– Press the bottom toggle switch (1).

The headlights and rear lights are switched on.

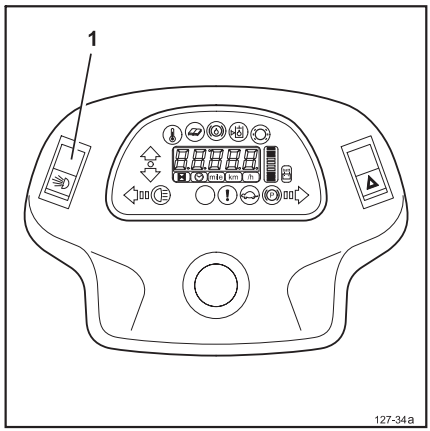
– Press the top toggle switch.

The headlights and rear lights are switched off.

Parking light

– Push the toggle switch (1) to the middle position.

The parking light, headlights and rear lights are switched on.

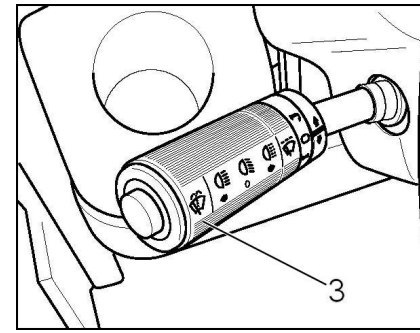


– Press the top toggle switch.

The parking light, headlights and rear lights are switched off.

Main beam

– Press forward and engage operating lever (3) on the left of the steering column with the driving light switched on. ▷



The blue main beam indicator light illuminates on the display unit - the main beam is switched on.

– Pull operating lever back.

Main beam is switched off.

NOTE

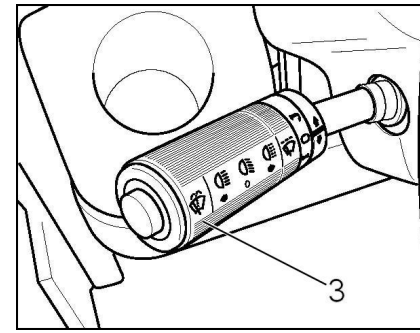
To operate the headlight flasher, briefly pull the operating lever back.

NOTE

As an option, the operating lever can be located on the right-hand side.

Switching the direction indicators on and off ▷

– Pull the operating lever (3) on the left of the steering column upwards.

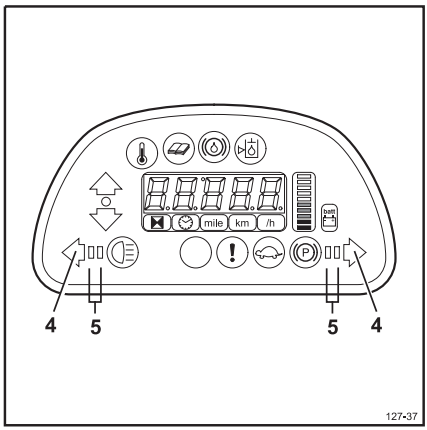


The right-hand direction indicator is switched on and the right-hand direction indicator light (4) in the display unit is flashing.

– Push the operating lever downwards.

The left-hand direction indicator is switched on and the left-hand direction indicator light (4) in the display of the display unit is flashing.

If a trailer equipped with lighting is coupled, the direction indicator light for the trailer (5) also flashes. ▷



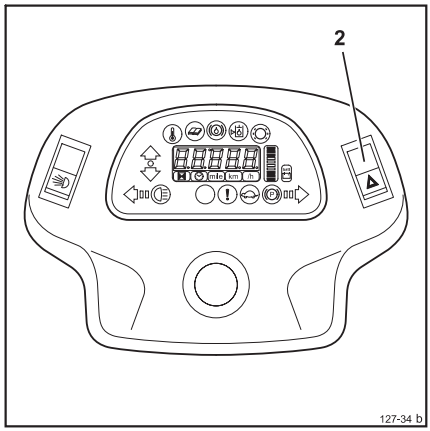
NOTE

The direction indicators are not self-cancelling, ensure that the direction indicators are cancelled after manoeuvring.

NOTE

As an option, the operating lever can be located on the right hand side. If the operating lever is on the right-hand side, the operation of the turn indicators is reversed.

Turning the hazard warning system on and off ▷



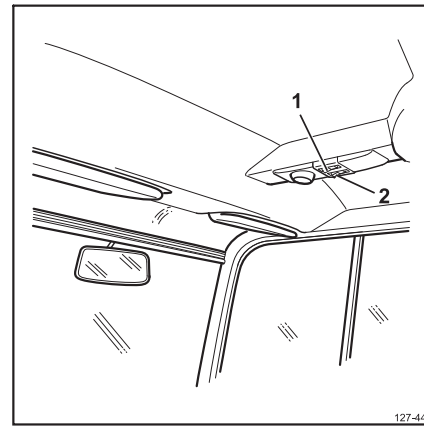
– Push toggle switch (2) down.

Hazard warning system is switched on.

– Push the toggle switch up.

Hazard warning system is switched off.

Switching the interior illumination on and off ▷



Cab illumination

– Press the toggle switch (1) on the cab ceiling.

Cab illumination is switched on.

– Actuate the toggle switch on the cab ceiling in the opposite direction.

Cab illumination is switched off.

Reading light

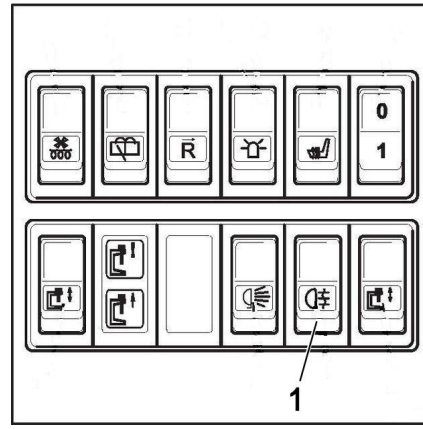
– Press the toggle switch (2) on the cab roof.

Reading lamp is switched on.

– Press the toggle switch on the cab ceiling in the opposite direction.

Reading lamp is switched off.

Switching the fog lamp (variant) on and off ▷



– Push the toggle switch (1) downwards.

Fog lamp is switched on.

– Push the toggle switch upwards.

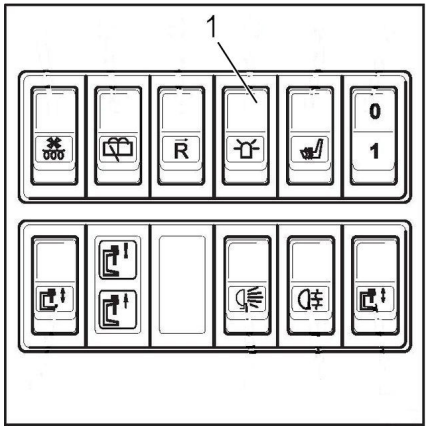
Fog lamp is switched off.

NOTE

The other switches shown here are only examples and may not correspond to the equipment on your truck.

Switching the rotating beacon (variant) on and off

▷



– Push the toggle switch (1) downwards.

The rotating beacon is switched on.

– Push the toggle switch upwards.

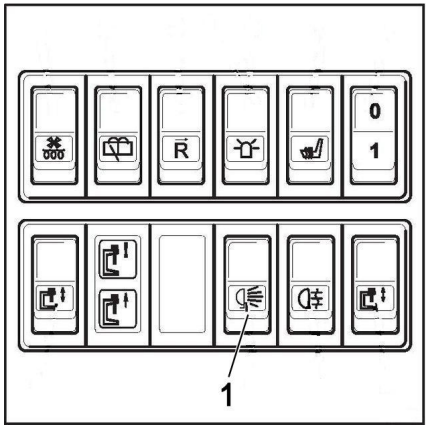
The rotating beacon is switched off.

NOTE

The other switches shown here are only examples and may not correspond to the equipment on your truck.

Switching the working spotlights (variant) on and off

▷



– Push the toggle switch (1) downwards.

The working spotlight* is switched on.

– Push the toggle switch upwards.

The working spotlight is turned off.

NOTE

The other switches shown here are only examples and may not correspond to the equipment on your truck.

* Variant

STILL SafetyLight (variant)

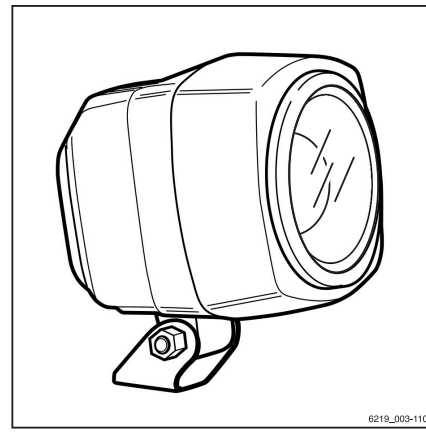
The STILL SafetyLight is a visual warning unit to enable early detection of trucks in driving areas with low visibility (such as drive lanes, high racks), as well as at blind junctions.

The STILL SafetyLight is mounted on a support on the overhead guard such that it is not affected by jolts and vibrations. It projects one or more light blue light spots approximately 5 meters in front of or behind the truck and thus warns others about the approaching truck.

⚠ WARNING

Danger of damage to eyes when looking into the STILL SafetyLight.

Do not look into the STILL SafetyLight.



NOTE

If the truck is to be operated on public roads, the STILL SafetyLight must be switched off.

Display unit

Warning indicator

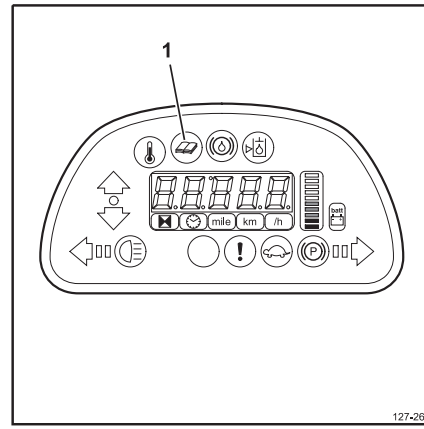
– Warning (1) illuminates in the display unit.

Fault occurs

– Inform the service centre.

NOTE

When the truck is switched on, the display unit can optionally show `serv!` *for a short time on the display unit in order to indicate that a service is due. If the service counter is not reset within a further specified period, a drive speed reduction can be activated. Please contact the service centre.*



Speedometer indicator

– Switch on the truck.

The speedometer indicator (1) illuminates in the display unit.

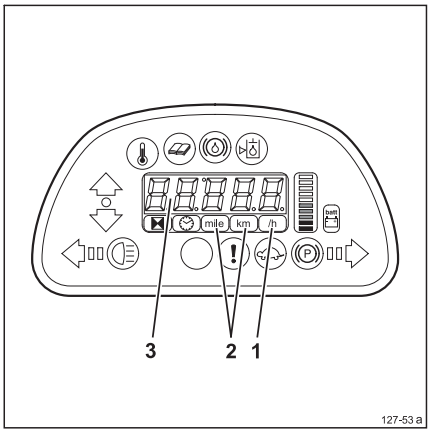
The mode indicator (2) for miles or km illuminates.

The display on the display unit (3) indicates the speed as soon as the truck starts moving.

The operating hours are displayed there when the truck is at a standstill.

NOTE

The speedometer can be programmed to display speed in either km/h or mph. Please contact the service centre about this matter.



Overheating indicator

– Overheating indicator (1) illuminates in the display unit.

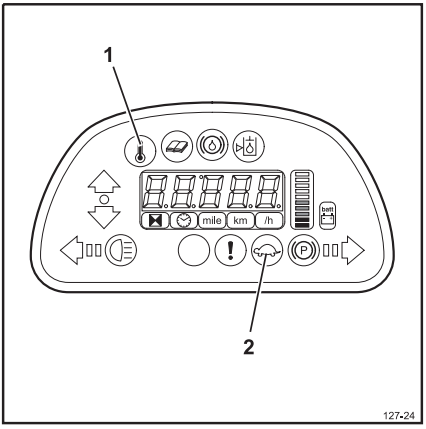
The truck has overheated.

– Truck performance is reduced.

– The yellow slow speed indicator (2) illuminates in the display unit.

NOTE

If a motor or a controller becomes too hot, then its performance will be reduced until it has cooled to normal operating temperature.



Hour meter

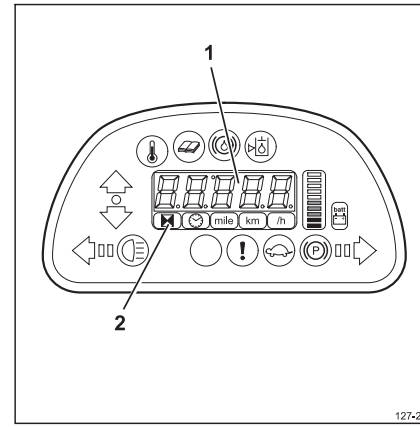
– Switch on the truck.

The hourglass mode indicator (2) illuminates.

The display on the display unit (1) shows the operating time of the truck in hours.

NOTE

Once the truck starts moving, the hour meter is replaced by the speed indicator. Once the truck is stationary, the hour meter re-appears.



Slow speed indicator

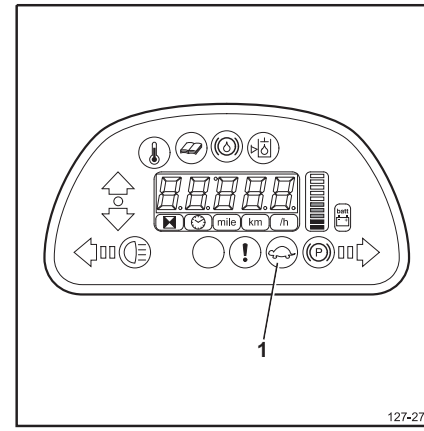
– Slow speed indicator (1) illuminates in the display unit.

Driving performance is reduced.

– Truck performance is reduced until the normal operating temperature is reached again.

NOTE

If a motor or a controller becomes too hot, then its performance will be reduced until it has cooled to normal operating temperature.



Distance indicator

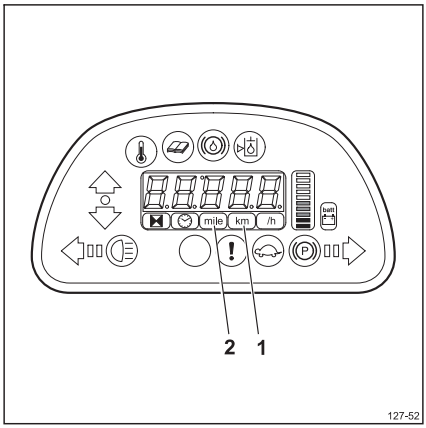
– Switch on the truck.

After ten seconds, the mode indicator for miles (2) or km (1) illuminates.

The display on the display unit indicates the distance driven in km or miles.

NOTE

The odometer can be programmed to display km or miles. Please contact the authorised service centre regarding this matter.



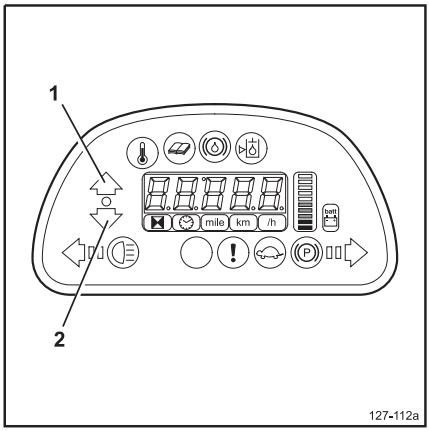
Drive direction indicator

– Forward-facing arrow symbol (1) illuminates in the display unit.

Forwards drive direction.

– Rear-facing arrow symbol (2) illuminates in the display unit.

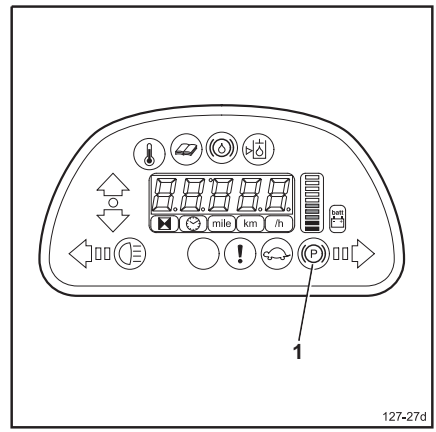
Reverse drive direction.



Parking brake indicator

– Parking brake indicator (1) illuminates in the display unit.

Parking brake is activated.



Display plain text messages

In the event of the driver making an operating error, plain text messages are shown on the display. Message texts are displayed in the set display language.

Plain text messages on the display	
Message text	Comment
Batt	Battery door open (truck not driving) **or** battery deeply discharged (truck in emergency operation). Only for platform tractors.
Dir	No drive direction signal with accelerator actuated and parking brake released
FBr	The drive direction was selected and the accelerator actuated with the foot brake pressed down
HBr	The drive direction was selected and the accelerator actuated with the parking brake actuated
HB1	The accelerator was actuated whilst the inching function was active
No Can	Can bus not active (truck not working)
Sit	The drive direction was selected and the accelerator actuated whilst the seat switch was not actuated

Hydraulic oil warning indicator

– Hydraulic oil warning indicator (2) illuminates in the display unit.

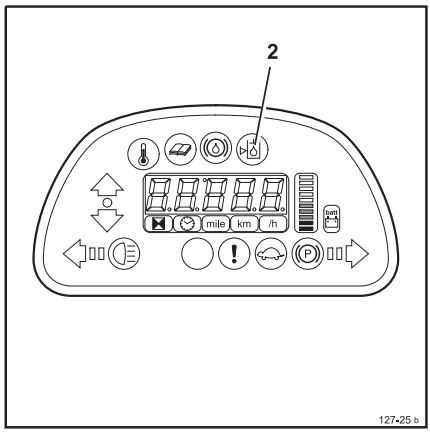
Low hydraulic oil level in the steering system.

– Bring the truck to a standstill.

– Ensure the truck is parked so as not to cause a danger or obstruction.

– Check hydraulic oil level and top up if required.

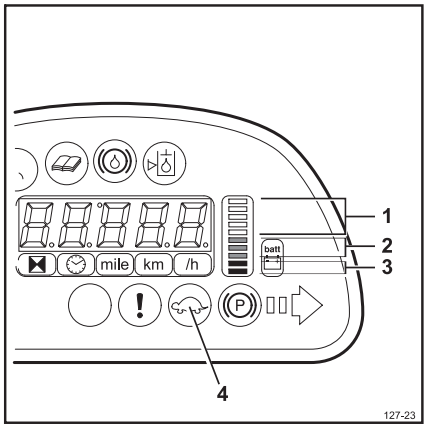
The procedure for this is described in the workshop manual of the truck



Battery discharge indicator

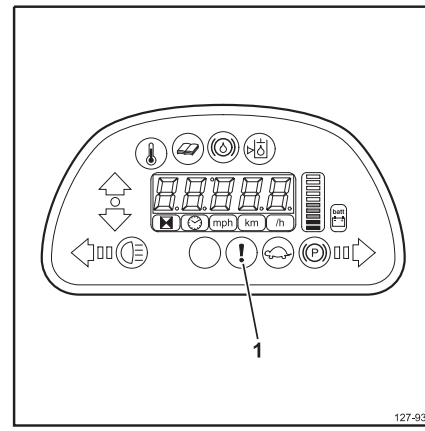
Battery charging is indicated in the display unit by LEDs.

- (1) five green LEDs
- (2) three yellow LEDs
- (3) two red LEDs
- (4) yellow slow speed indicator



Display	Operating status
One LED illuminates in green	The battery is fully charged
One LED lights up green and one LED lights up yellow (one after another, from top to bottom)	The battery is discharged
One LED lights up red	The residual charge is 28%
One LED flashes red	The residual charge is 20%
The yellow slow speed indicator (4) illuminates	Truck performance is reduced (charge or replace the battery)

Warning indicator for the interlock



– Interlock warning indicator (1) illuminates in the display unit.

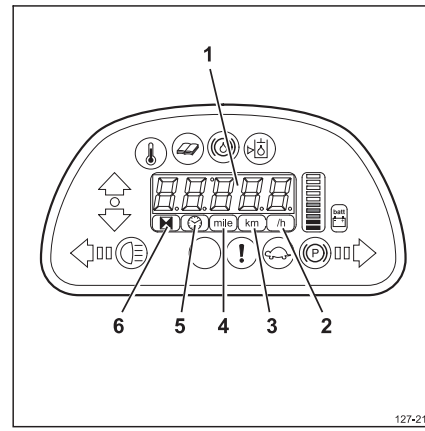
Interlocked or locked function is actuated.

– Check that the key switch is working correctly.
– Check that the emergency off switch is working correctly.
– Check that the parking brake is working correctly.
– Check that the back pedal is working correctly.
– Check that the seat switch is working correctly.
– Check that the interlock switch for the battery door (only on the platform version) is working correctly.
– Check that the remotely unlockable tow coupling (variant) is working correctly.

NOTE

Additional interlock switches may be fitted for any attachments. These switches must be checked for correct and safe operation.

Display unit screen



The screen of the display unit (1) displays operating states and values.

(2) Speed in miles/h or km/h (lights up simultaneously with (3) or (4) to display the speed in miles per hour or km per hour to display).

(3) Route travelled in kilometres.

(4) Route travelled in miles.

(5) Time *.

(6) Hour meter.

* Variant only in combination with data logger

Warning display for brake fluid

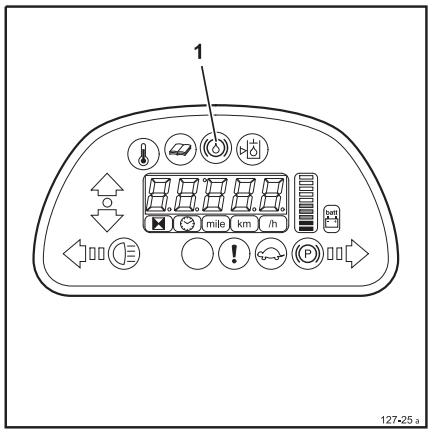
– The warning display for the brake fluid (1) illuminates on the display unit.

Low brake fluid level.

– Bring the truck to a standstill.

– Ensure the truck is parked so as not to cause a danger or obstruction.

– Check the brake fluid level and top up if necessary, see the workshop manual.



Maximum speed warning indicator

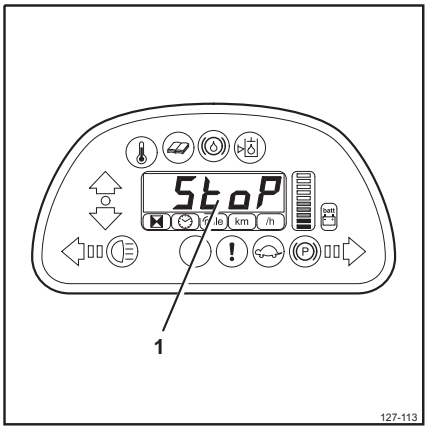
If the speedometer flashes in the display on the display unit and an alarm sounds, the maximum permissible speed of the truck has been exceeded.

– Reduce the speed of the truck.

If the message `Stop` appears in the display on the display unit (1), the drive switches off.

NOTE

To re-activate the drive, stop the truck.



Trailer and load

Towing guidelines

⚠ DANGER

Increased risk of accident if used under difficult operating conditions!

When towing trailers under difficult operating conditions, e.g. on gradients or icy, slippery surfaces, the maximum safe load is determined by braking performance and not the maximum towing capacity of the tractor.

⚠ CAUTION

Risk of damage from improper use!

- Do NOT use trucks to tow rail vehicles.
- Always operate the truck in a manner that ensures safe driving and guarantees that the trailer can be braked when performing any manoeuvre.
- Always couple the trailer firmly with the tow coupling.

Observe the nominal tractive force and weight before transporting loads. Refer to the identification plate. Never exceed the nominal capacity of the tow tractor. The maximum drawbar pull is the maximum pull the tow tractor can exert to overcome the starting resistance of the trailing load. (This being the combined weight of the tow tractor, trailer and load).

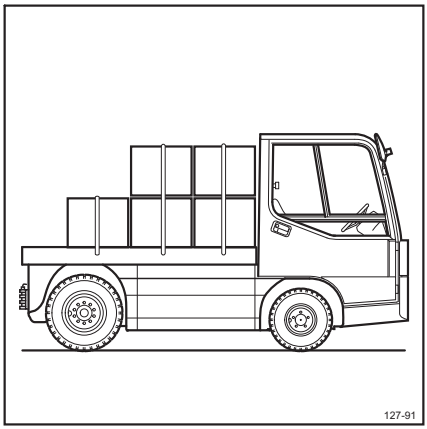
NOTE

Platform truck: The tow tractor must only be used with braked trailers.

NOTE

Tow tractor: Only braked trailers are permitted for loads exceeding 9 t and when travelling on downward slopes.

Loading a platform



DANGER

Increased risk of accidents due to unauthorised loads and improper use!

- Never exceed the maximum loads shown! These values apply to compact and homogeneous loads.
- Do not transport people on the loading surface.

- Always distribute platform loads evenly and secure safely.
- Place heavy loads at the bottom, light loads on top.
- The centre of gravity must be as low as possible.
- Never load platforms in the direction of a gradient or crosswise to a gradient.
- Do not exceed the payload of the truck.

Loading trailers

DANGER

There is increased risk of accidents due to unauthorised loads and improper use!

- Never exceed the maximum loads shown! These values apply to compact and homogenous loads.
- Do not transport people on the loading surface.

- Distribute trailer loads uniformly and ensure they are secure. Do not exceed the payload of the tiller.
- Load heavy loads on the bottom and lighter loads on top.
- The centre of gravity must be as low as possible.
- Never load trailers in the direction of a gradient or across a gradient.
- Do not exceed the payload of the trailer and the truck.

Towing trailers

DANGER

Risk of serious injury or death from tipping truck and trailer!

Truck and trailer may tip over when driving on steeply sloping terrain.

– Never negotiate gradients diagonally or cross-wise.

WARNING

Increased risk of accident due to trailers rolling away!

Using a trailer changes the truck handling characteristics.

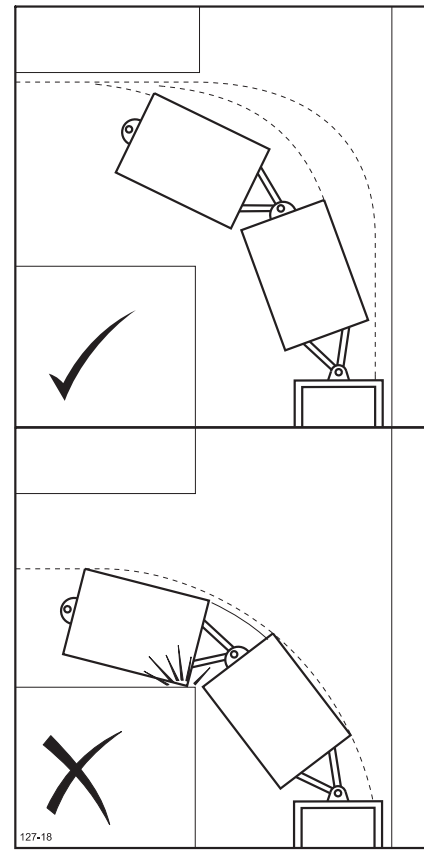
– When towing, drive in such a manner that the truck can always be braked safely.
– Note the clearance circle and turning circle off the trailer train.
– Note the tractrix of the trailer train.

NOTE

A trailer train with several trailers cannot be manoeuvred backwards. Only manoeuvre trailer trains with single trailers backwards.

– Ensure that the trailer load is securely lashed.
– Release trailer brake and remove all wheel chocks.
– Determine the width of the widest trailer or its load to ensure unobstructed passage.
– Adjust the mirror so that the driver can see the complete trailer train.
– Move the truck off slowly to equalise the play between the tow couplings.
– Accelerate gently.
– Reduce speed in good time when the destination is reached.
– Brake the truck with the trailers gently.

Sudden braking may cause the load to become displaced and the trailers could jack-knife.



Operating the manual coupling

⚠ DANGER

If the coupling pin drops out or is damaged during towing, the trailer will become loose and uncontrollable. This causes a risk of accident!

– Use only original coupling pins that have been checked for good condition.
– Ensure that the coupling pin is correctly inserted, secured and is in good working order.

⚠ WARNING

If you briefly leave the truck to couple or uncouple a coupling, there is a risk of fatal injury caused by the truck rolling away and running you over.

– Apply the parking brake.
– Turn off the key switch and remove the key.
– Activate the brake system on the trailer (variant). Otherwise, you must secure the wheels of the trailer against rolling away using wheel chocks.

Coupling the trailer

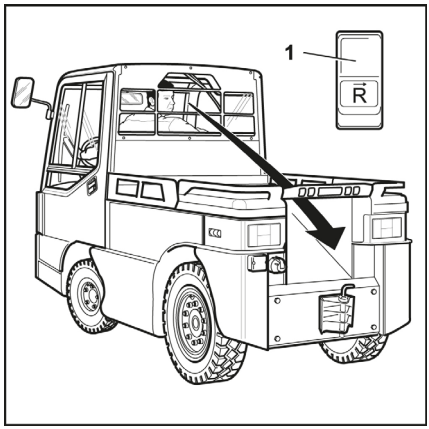
⚠ WARNING

Risk of injury due to components moving suddenly!

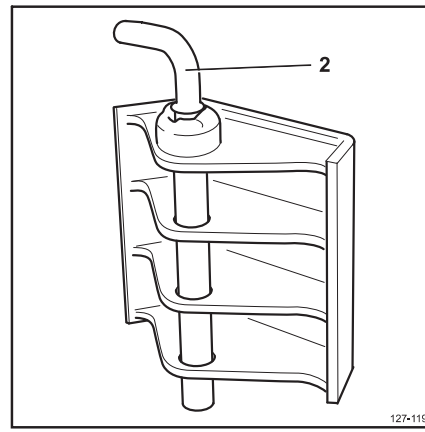
– Do not reach into the open coupling.

Take measures to prevent the trailer from rolling away, e.g. use wheel chocks. ▷

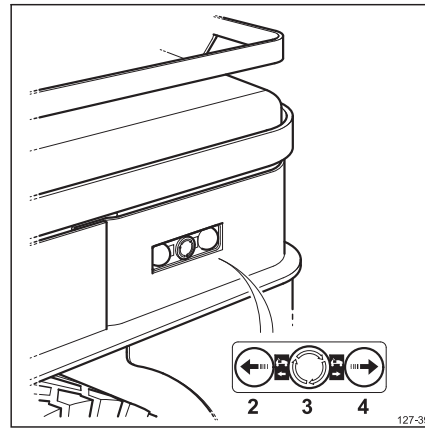
– Slowly move the truck backwards.
– Stop just in front of the drawbar.
– Apply the parking brake
– Actuate the remote control switch for reverse inching (1) in the switch panel.



– Push the coupling pin (2) down, turn the pin by 90° and pull the pin out. ▷



– Using reverse inching (at the rear of the truck), drive the truck towards the drawbar until the drawbar is in the coupling jaw of the tow coupling; see the chapter "Actuating reverse inching". ▷
– Insert the towing pin (2) into the coupling jaw, push down against the pressure of the safety spring, rotate by 90° and lock into place.
– Connect the trailer lighting (variant) to the truck via the trailer socket.
– Check that the trailer lights are operating correctly.
– Remove any securing devices used to prevent the trailer from rolling away.



Uncoupling the trailer

⚠ WARNING

Risk of injury due to components moving suddenly!

– Do not reach into the open coupling.

– Take measures to prevent the trailer from rolling away, e.g. use wheel chocks.
– Apply the truck parking brake.
– Disconnect trailer lighting (if available) from the trailer socket.
– Push the coupling pin (2) down, turn the pin by 90° and pull the pin out.

– Using reverse inching, drive the truck slowly forwards and guide the drawbar completely out of the coupling.
– Carefully set down the drawbar.
– Insert the coupling pin. Push down against the pressure of the retaining spring, turn by 90° and lock into place.

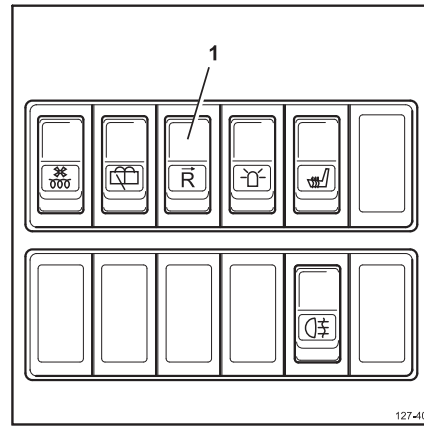
Actuating reverse inching (variant) ▷

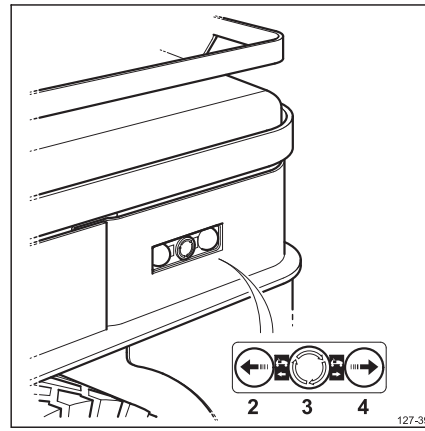
⚠ DANGER

Risk of serious or fatal injury from being hit by tiller!

- Never stand between the truck and trailer while the back keying is being operated.
- Stand to the side and stand clear of the truck wheels.

- Park the truck on level ground.
- Ensure that the truck is stationary and that the parking brake is activated.





Operating stage	Button actuation
Reverse inching active	Press the toggle switch (1) downwards (toggle switch lights up green)
Reverse travel	Press the button (4)
Forward travel	Press the button (2)
Emergency stop	Press the emergency off switch (3)

NOTE

When buttons (2) or (4) are pressed, the truck travels along a certain path/for a certain period of time. To make a new movement, press the buttons again.

Opening and closing the side panel

⚠ WARNING

Risk of crushing!

– Do not reach between the side panel and the chassis.

⚠ WARNING

Risk of crushing!

– Do not attempt to open the side panel when a load is resting against the side panel.

⚠ CAUTION

Risk of component damage!

– Hold the side panel in place when opening and closing it.

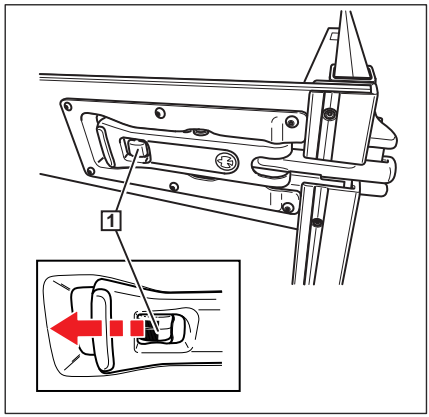
⚠ CAUTION

Risk of component damage!

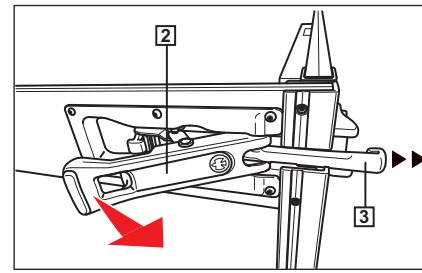
– Do not drive with the side panel open.

Opening the side panel at the right-hand side ▷

Push the safety button (1) towards the centre of the side panel until the lever is released.

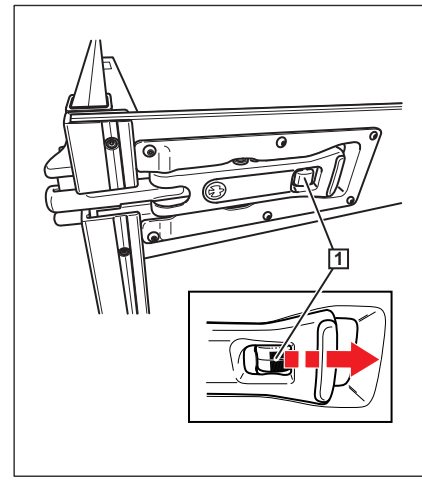


Pull the lever (2) until the lock (3) is unlocked. ▷

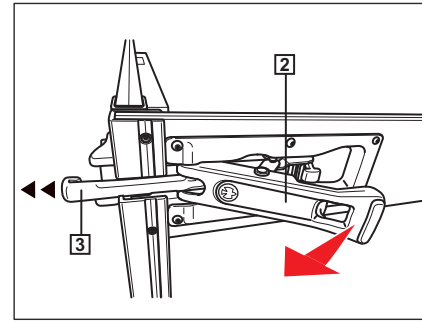


Opening the side panel at the left-hand side ▷

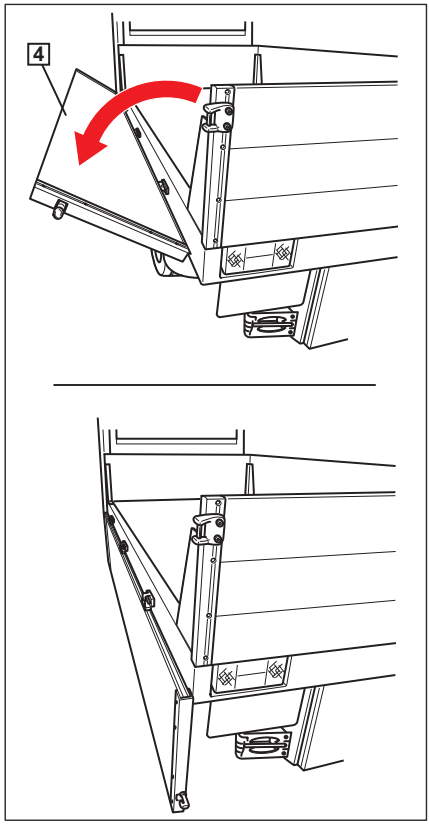
Push the safety button (1) towards the centre of the side panel until the lever is released.



Pull the lever (2) until the lock (3) is unlocked. Hold the side panel in place while doing this. ▷

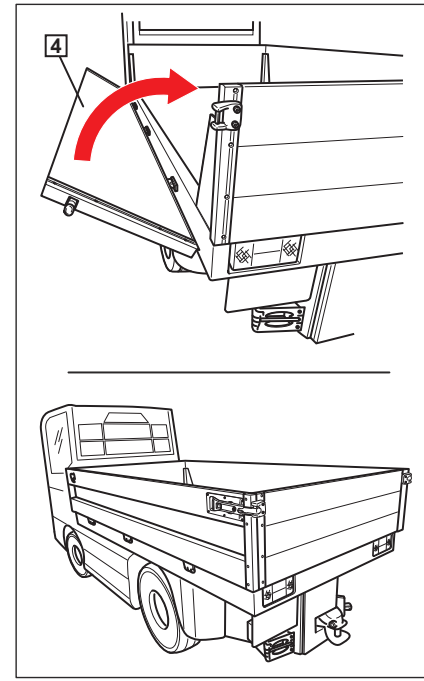


Fold down the side panel (4) using both hands. ▷



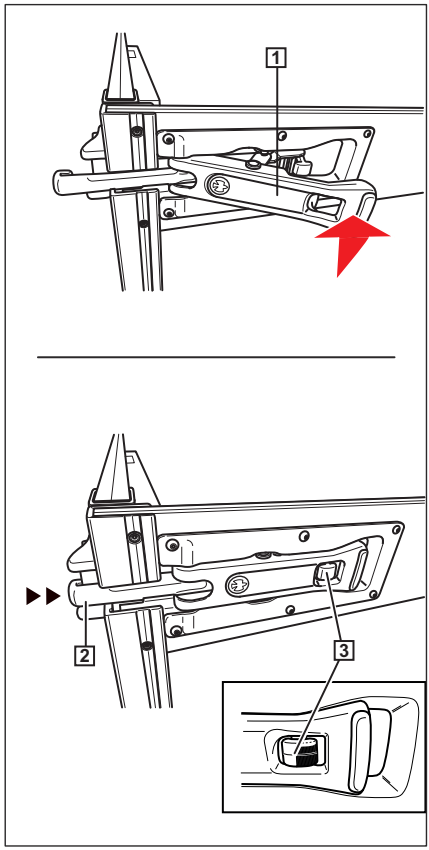
Closing the side panel

Fold up the side panel (4) using both hands and hold it in place.



Closing the side panel at the left-hand side

Push down the lever (1) until the lock (2) is locked and the safety button (3) is secured.



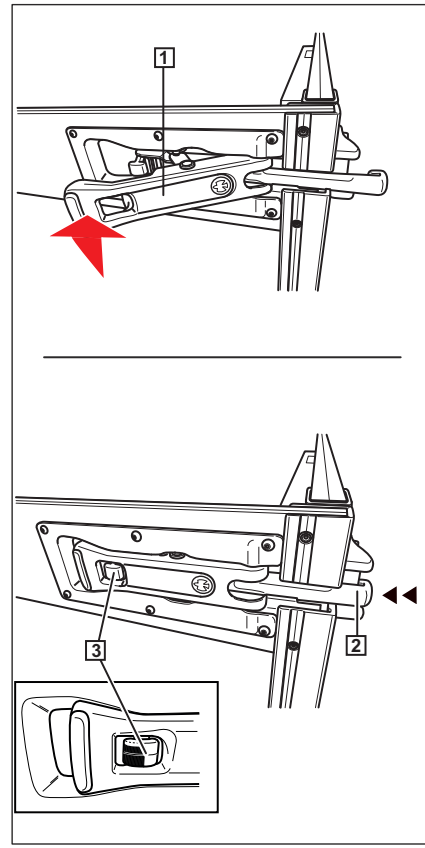
Closing the side panel at the right-hand side

Push down the lever (1) until the lock (2) is locked and the safety button (3) is secured.

Before attempting to drive

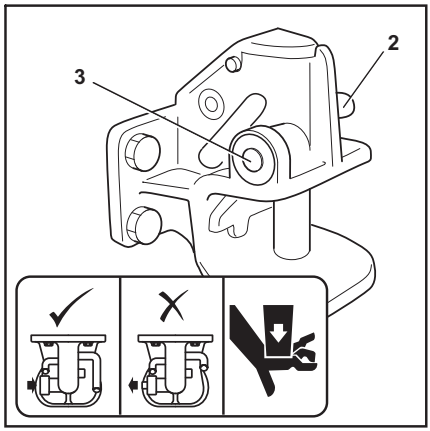
Make sure that the side panel is closed and securely locked.

Make sure that the safety buttons on the locking lever are secured.



Operating the automatic coupling

Coupling the trailer



DANGER

Increased risk of accident due to improper operation of the coupling!

The safety of the coupling can only be verified by noting the position of the coupling pin (3).

The coupling pin must not project beyond its guide after a trailer has been coupled (see decal information).

– Never tow a trailer if the coupling pin (3) projects beyond its guide.

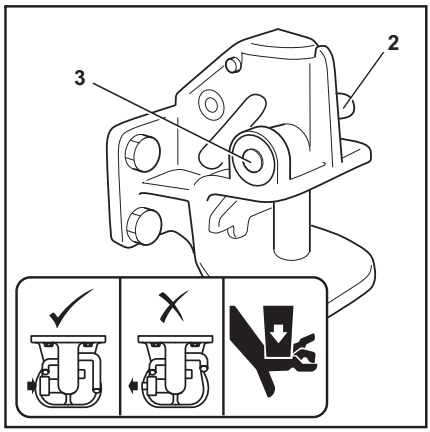
It is the responsibility of the driver to ensure that the coupling pin is fully engaged before towing a trailer.

WARNING

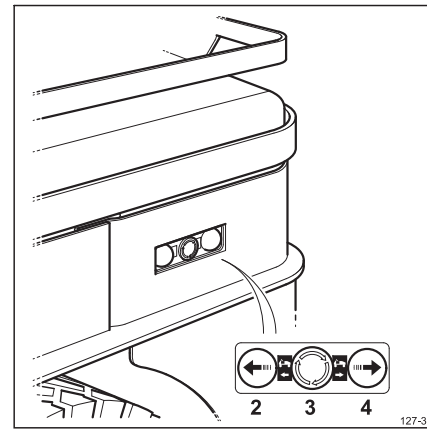
Risk of injury due to improper operation!

– Do not reach into the open coupling.

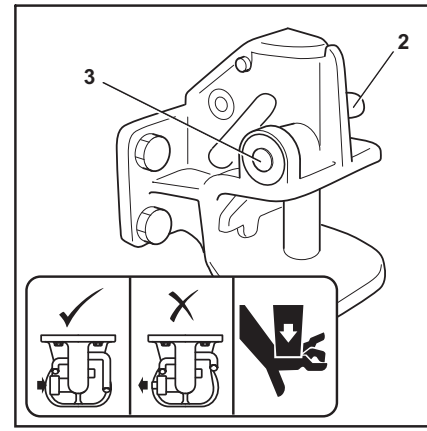
– Take measures to prevent the trailer from rolling away, e.g. use wheel chocks.
– Slowly move the truck backwards.
– Stop just in front of the drawbar.
– Apply the parking brake
– Actuate the remote control switch for reverse inching in the switch panel.
– Pull the hand lever (2) on the coupling upwards until the coupling clicks and the coupling pin (3) does not protrude out.



– Using reverse inching, carefully drive the truck towards the drawbar until the drawbar is in the coupling jaw of the tow coupling; see the chapter "Actuating reverse inching". ▷



The coupling closes on contact and the lever (2) on the coupling snaps down. The coupling pin (3) must be fully retracted. ▷



– Connect the trailer lighting (if present) to the truck via the trailer socket.
– Check that the trailer lights are operating correctly.
– Remove any securing devices used to prevent the trailer from rolling away.
– Release the trailer brake (if present).

Uncoupling the trailer

⚠ WARNING

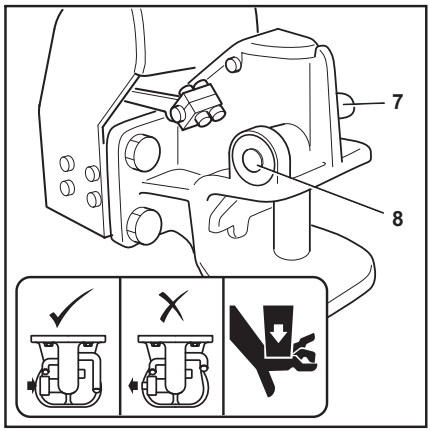
Risk of injury due to improper operation!

– Do not reach into the open coupling.

– Take precautions, such as using wheel chocks, to prevent the load that is to be disconnected from rolling away.
– Apply the truck parking brake.
– Actuate the remote control switch for reverse inching in the switch panel.
– Disconnect the trailer lighting (variant) from the trailer socket.
– Push the hand lever (2) on the coupling upwards.

– Using reverse inching, drive the truck slowly forwards and guide the drawbar completely out of the coupling.

Operating the remotely unlockable coupling



DANGER

Increased risk of accident due to improper operation of the coupling!

If the tow coupling pin (8) is not fully engaged, the trailer can become separated from the truck inadvertently.

Before setting off, always ensure:

– The coupling pin must not project beyond its guide (see decal information).
– Make sure that the hand lever (7) engages.
– The indicator light in the switch (6) must light up (coupling pin is fully engaged).

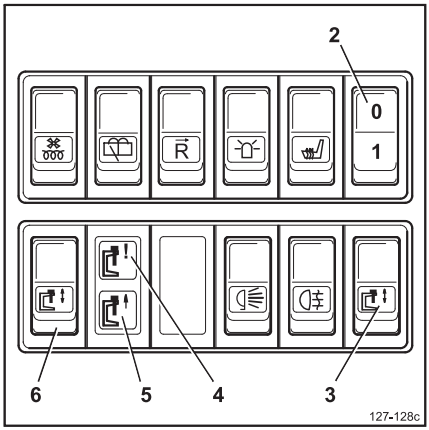
It is the responsibility of the driver to ensure that the coupling pin is fully engaged before towing a trailer.

WARNING

Risk of trapping or crushing!

– Do not reach into the open coupling.

Coupling the trailer



– Take measures to prevent the trailer from rolling away, e.g. use wheel chocks.
– Activate the remotely unlockable coupling; to do this press switch (2) to position 1.

The remotely unlockable coupling is activated.

– Briefly press switch (3) and (6) simultaneously.

The coupling pin is raised completely.

The yellow indicator light (5) must light up.

– Carefully drive the truck into the drawbar until the drawbar is in the coupling jaw of the tow coupling; the coupling closes on contact.
– Apply the parking brake

– Connect the trailer lighting (variant) to the truck via the trailer socket.
– Check that the trailer lights are operating correctly.
– Remove the equipment used to prevent the coupled load from rolling away.
– Release the trailer brake (if present).

NOTE

If the coupling pin is not completely lowered, the red indicator light (4) lights up. The drive mode is then deactivated and the truck does not drive.

Uncoupling the trailer

DANGER

Increased risk of accident as a result of the trailer rolling away!

– The driver must ensure that the trailer does not roll away when the coupling pin is raised.
– Park the trailer on a level surface.
– Secure the trailer against rolling away with wheel chocks or actuate the trailer brake (if present).

WARNING

Danger of injuries due to components moving suddenly!

– Do not reach into the open coupling.

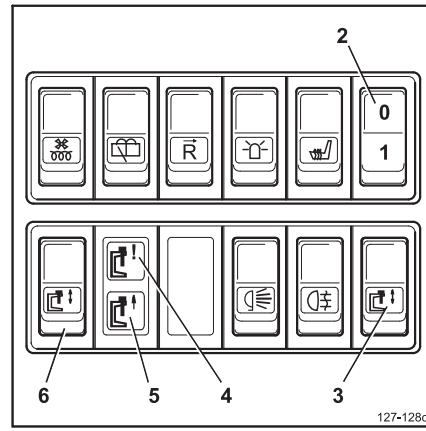
– Take measures to prevent the trailer from rolling away, e.g. use wheel chocks.
– Activate the remotely unlockable coupling; to do this press switch (2) to position 1.

The remotely unlockable coupling is activated.

The indicator light in the switch (6) lights up and indicates that the release mechanism is activated.

– Briefly press switches (3) and (6) simultaneously.

The coupling pin is raised (when the coupling pin is raised, the indicator lights of both switches go out and the red indicator light (4) lights up permanently).



When the coupling pin is fully raised, the yellow indicator light (5) lights up.

– Carefully drive the truck forwards until the drawbar and coupling are disconnected.

NOTE

If the coupling pin is not completely raised, the red indicator light (4) lights up. The drive mode is then deactivated and the truck does not drive.

NOTE

If the coupling pin becomes jammed, the circuit breaker (2) opens and its indicator light lights up. Investigate and clear the jam before resetting the circuit breaker (2). If the circuit breaker opens, then allow 30 seconds before attempting to reset it.

Auxiliary equipment

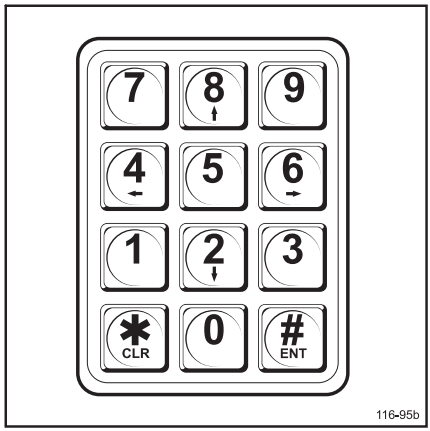
Driver code keypad

The keypad (data logger*) comprises a keypad with twelve keys mounted on the dashboard and a rotary on/off switch in place of the key switch.

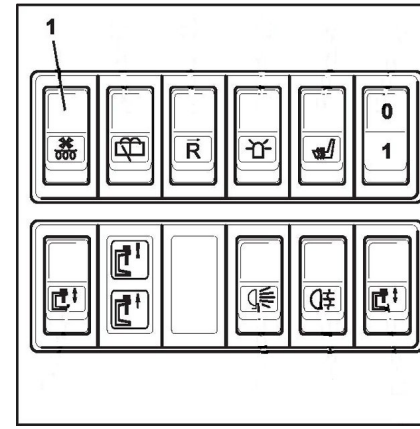
The driver must input a five digit personal identification number (PIN) in order to be able to start the truck. This prevents unauthorised use.

Once logged in, the system records the type of application and the operating functions.

* Variant



Switching the heating system on and off



– Push toggle switch (1) down.

The heating system is switched on.

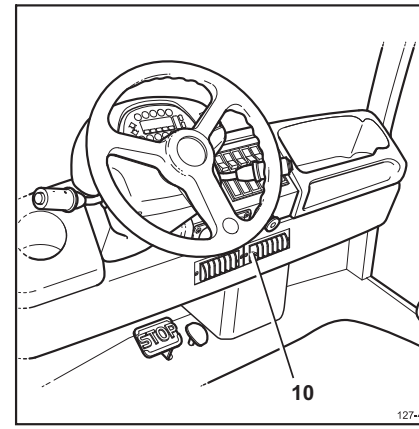
– Push the toggle switch up.

The heating system is turned off.

– Push toggle switch to middle position.

Only the fan is running.

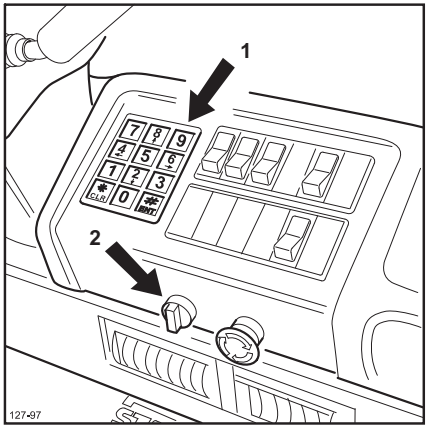
Adjustable vents (10) are used to control air flow.



NOTE

The other switches shown here are only examples and may not correspond to the equipment on your truck.

Logging the driver code in and out



The driver code* is entered using a twelve-key keypad (1) mounted on the dashboard and a rotary on/off switch (2).

The unit requires the driver to enter a five digit personal identification number (PIN) in order to operate the tractor, thus preventing unauthorised use.

* Variant

Logging in

– Switch on the rotary switch (2) by turning it clockwise.

The screen of the display unit will indicate that a PIN is required.

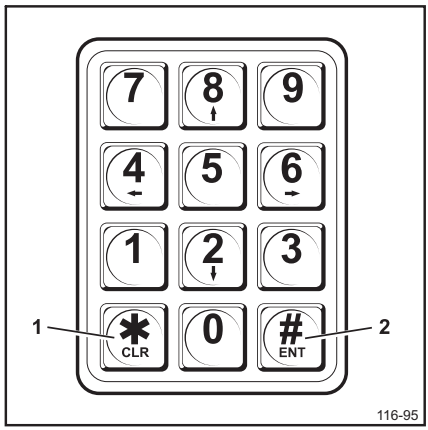
– Enter the five-digit PIN using the keypad.

NOTE

NOTE: The default driver PIN is 1 2 3 4 5*.*

– Press the ENT (2) button.

Logging off



– Press and hold the CLR (1) button for a second.

– Switch off the device at the rotary switch.

NOTE

If the driver's seat is vacated for any length of time the tractor will automatically log off and the driver will have to re-enter their PIN in order to operate the tractor.

Accessing fleet manager menus

– Switch on the device at the rotary switch (2).

The screen on the display unit prompts you to enter the PIN.

– Enter the five-digit fleet manager PIN followed by 0 via the keypad.

NOTE

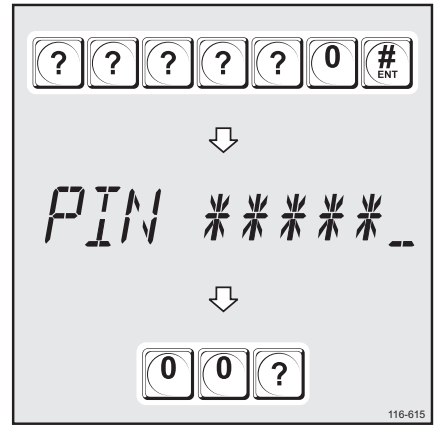
The pre-set fleet manager PIN is 9 8 7 6 5. The fleet manager is advised to change the PIN after delivery of the truck.

– Press the ENT button.

Now the fleet manager can enter a valid command.

Valid supervisor commands are:

0 0 1	Changing the fleet manager PIN
0 0 2	Enable/disable the tractor
0 0 4	Add/delete driver PINs
0 0 5	List driver PINs
0 0 6	Set/reset learner driver



Changing the fleet manager PIN

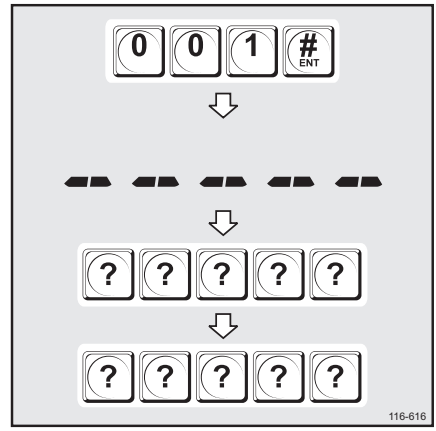
– Log on as the fleet manager and open the fleet manager command menus.

– Enter 0 0 1 via the keypad.

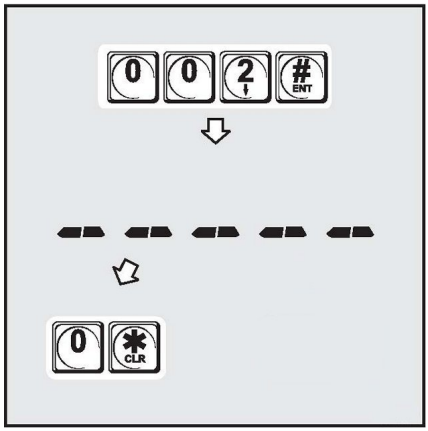
– Press the ENT button.

– Enter new fleet manager PIN

– Enter new fleet manager PIN once more for confirmation.



Fleet manager truck deactivation



– Log in as the fleet manager and open the fleet manager command menu.
– Enter 0 0 2 via the keypad.
– Press the ENT button.
– Enter 0 to deactivate the truck.

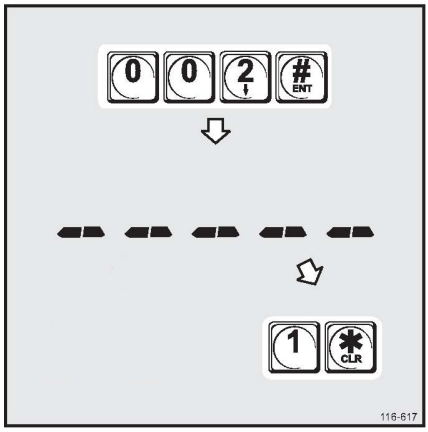
All driver PINs become invalid and the truck can no longer be started.

NOTE

The fleet manager PIN remains valid.

– Press CLR to log off.

Fleet manager truck activation

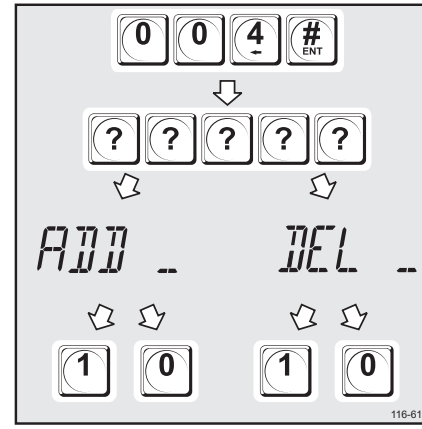


– Log in as the fleet manager and open the fleet manager command menu.
– Enter 0 0 2 via the keypad.
– Press the ENT button.
– Enter 1 to activate the truck.

All driver PINs become valid and the truck can be operated as normal.

– Press CLR to log off.

Add/delete driver PINs



– Log in as the fleet manager and open the fleet manager command menu.
– Enter 0 0 4 via the keypad.
– Press the ENT button.

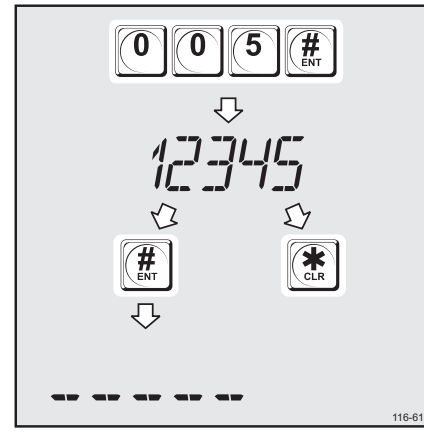
To delete an existing driver PIN:

– Enter driver PIN.
– Enter 1 to confirm deletion, or 0 to cancel.

To add a new driver PIN:

– Enter new PIN.
– Enter 1 to confirm the new PIN, or 0 to cancel.

List driver PINs



– Log in as the fleet manager and open the fleet manager command menu.
– Enter 0 0 5 via the keypad.
– Press ENT.

The screen of the display unit displays the first driver PIN.

– Use the ENT button to scroll through all driver PINs.

NOTE

The screen of the display unit will show five dashes to indicate the end of list.

– Press the CLR button to close the menu.

Set/reset learner operation (reduced power)

– Log in as the fleet manager and open the fleet manager command menu.

– Enter 0 0 6 via the keypad.

– Press the ENT button.

To set/reset learner operation:

– Enter driver PIN.

NOTE

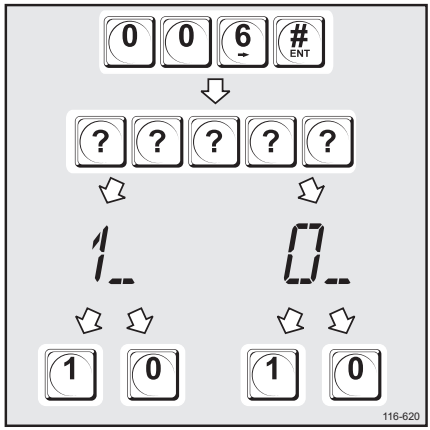
The display will show "1" *if the selected driver is already a learner, or* "0" *if not a learner.*

– Enter 1 to register the driver as a learner.

Truck performance will be reduced for this driver.

– Enter 0 to register the driver as a non-learner.

Full truck performance will be available for this driver.



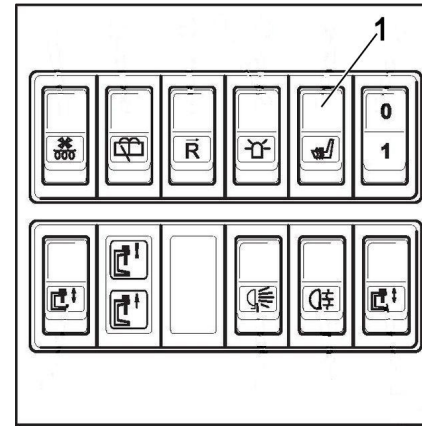
FleetManager — logging in and logging off

The FleetManager* can be fitted to the truck in different versions. The description and operating information can be found in the separate operating instructions for the corresponding FleetManager versions.

* Variant

Switching the seat heater (variant) on and off

▷



– Push the toggle switch (1) downwards.

The seat heater is switched on.

– Push the toggle switch upwards.

Seat heater is switched off.

NOTE

The switch in the seat backrest switches the seat heater for the driver seat or for the passenger seat on and off.

NOTE

The other switches shown here are only examples and may not correspond to the equipment on your truck.

Switching the diesel auxiliary-heating system (variant) on and off

DANGER

Danger of death from carbon monoxide!

Danger of carbon monoxide poisoning in enclosed areas.

– Never operate the auxiliary heating system in enclosed areas such as a garage.

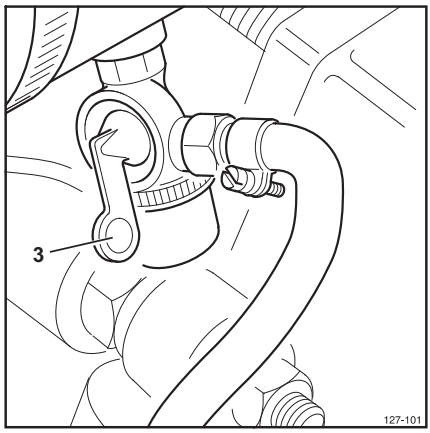
Preparation

– Open or remove the engine cover; see the chapter entitled "Opening the battery cover and engine cover".

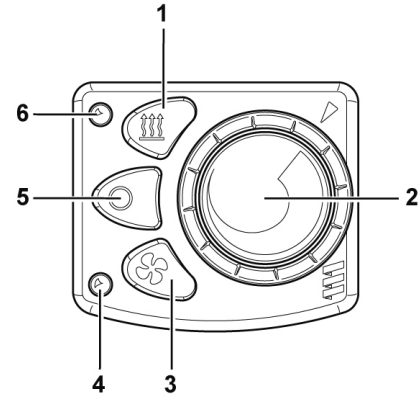
– Ensure that the fuel tank is filled. To fill the fuel tank, see the chapter entitled "Filling the tank for the auxiliary heating system".

– Unscrew the fuel valve (3).

– Close the engine cover.



Operating unit for the auxiliary heating system ▷



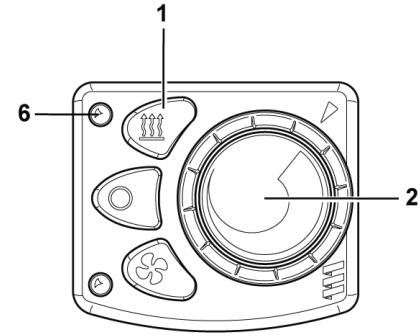
1	Button for heating **ON**
2	Temperature control dial
3	Button for blower **ON**
4	Indicator light for blower
5	**OFF** button
6	Indicator light for heating

Switching on the auxiliary heating system

– Press the button (1). ▷

The heating system is switched on and the indicator light (6) illuminates.

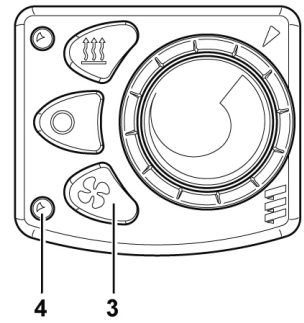
– Adjust the required temperature using the control dial (2).



Switching on the blower

– Press the button (3). ▷

The blower is switched on and the indicator light (4) illuminates.



Switching off the auxiliary heating system and blower

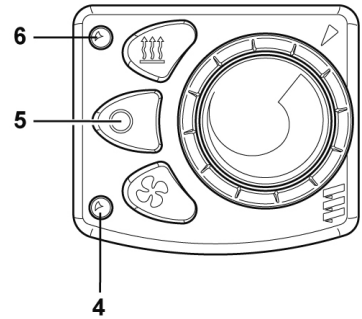
– Press the button (5). ▷

The heating system and blower switch off and the indicator lights (4/6) go out.

* optional

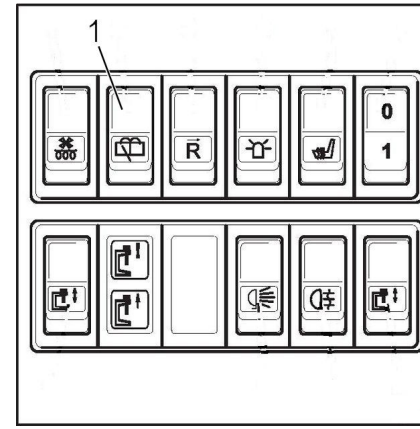
NOTE

Close the fuel valve if the auxiliary heating system is not in use!



Switching the rear window wiper/washer on and off

▷



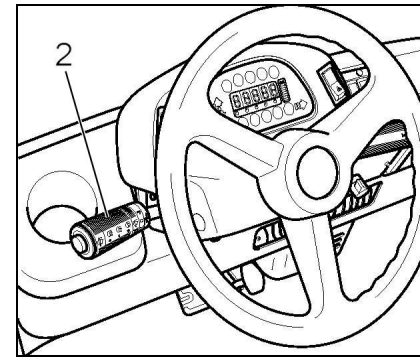
Operating stage	Position of the toggle switch (2)
Rear window wiper **ON**	Centre position
Rear window wiper **OFF**	Up
Washer and wiper function **ON**	Down

NOTE

The other switches shown here are only examples and may not correspond to the equipment on your truck.

Switching the front windscreen wiper/washer on and off

▷



Operating stage	Operating lever (2)
Slow	Position "I"
Fast	Position "II"
Interval	Position "J"
Off	Position "O"
Wiper and washer function (automatically wipes 4x)	Press the knob on the end of the operating lever

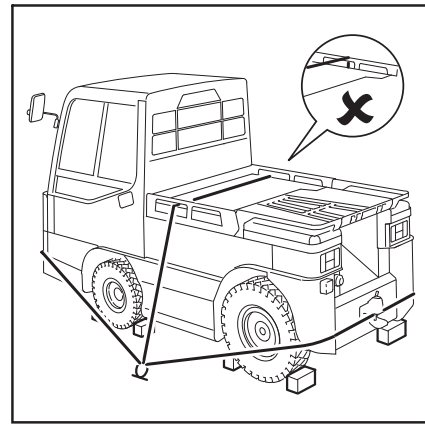
NOTE

As an option, the operating lever can be fitted on the right-hand side of the steering column (optional).

Special operating situations

Securing the truck for transportation

Trucks with a front tow coupling



⚠ CAUTION

Risk of truck damage if the truck breaks free!

- Only use the lashing points provided.
- Only use harnesses with a sufficient load capacity.
- Only use harnesses with sufficient tensile strength.

⚠ CAUTION

Risk of truck damage due to harness breaking!

- Do not tighten the harness over the top of the side rail.
- Tighten the harness under the side rails.

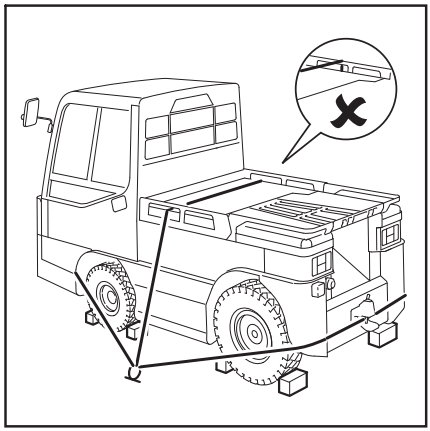
⚠ CAUTION

Risk of damage from the harness cutting in!

- Do not tighten the harness over the seat.

- Switch off the key switch.
- Press emergency stop switch and disconnect battery.
- Secure all four wheels with wheel chocks.
- Pull harness through the front tow coupling to prevent the truck from rolling forwards.
- Pull harness through the rear tow coupling to prevent the truck from rolling backwards.
- Pull harness over the battery compartment.

Trucks without front tow coupling



⚠ CAUTION

Risk of truck damage if the truck breaks free!

- Only use the lashing points provided.
- Only use harnesses with a sufficient load capacity.
- Only use harnesses with sufficient tensile strength.

⚠ CAUTION

Risk of truck damage due to harness breaking!

- Do not tighten the harness over the top of the side rail.
- Tighten the harness under the side rails.

⚠ CAUTION

Risk of damage from the harness cutting in!

- Do not tighten the harness over the seat.
- Tighten the harness over the cab floor

- Switch off the key switch.
- Press emergency stop switch and disconnect battery.
- Secure all four wheels with wheel chocks.
- Open the cab doors.
- Insert harness through the cab to prevent the truck from rolling forwards.
- Close cab doors.
- Pull harness through the rear tow coupling to prevent the truck from rolling backwards.
- Pull harness over the battery compartment.

Towing the truck

⚠ DANGER

The brake system on the towing vehicle may fail. There is a risk of accident!

If the brake system of the towing vehicle is not adequately sized, the truck may not brake securely or the brakes may fail. The towing vehicle must be able to absorb the pulling and braking forces for the unbraked towed load (total actual weight of the truck).

– Check the pulling and braking forces of the towing vehicle.

⚠ DANGER

The truck can drive into the towing vehicle when braking. There is a risk of accident!

If a rigid connection has not been used for force transmission in two directions during towing, the truck may drive into the towing vehicle when the towing vehicle brakes. For safety reasons, only a tested tow bar may be used.

– Always use a tested tow bar.

⚠ DANGER

People can be crushed between the truck and the towing vehicle when manoeuvring. There is danger of death!

The towing vehicle may only be manoeuvred and the tow bar may only be attached using a second person as a guide. This ensures that the driver of the towing vehicle and the mechanic attaching the tow bar are aware of possible risks.

– Only manoeuvre with a guide.

⚠ CAUTION

The steering is stiff. There is no power steering if the hydraulics fail!

– The selected towing speed must allow for braking and control of the truck and towing vehicle at all times.

⚠ CAUTION

Increased risk of accident due to reduced braking power!

Considerably reduced braking power.

– Tow the immobile truck carefully.

⚠ CAUTION

If the truck being towed is not steered, it may veer out in an uncontrolled manner!

- The truck to be towed must also be steered by a driver.
- Where possible, activate the restraint systems provided.

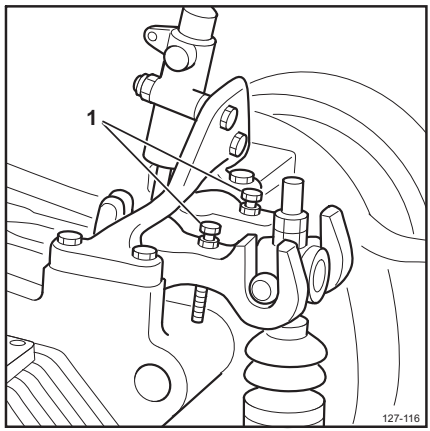
NOTE

If the truck being towed does not have a trailer coupling fitted at the front, a towing eye (1274203312) or a lifting eye bolt (0009031704) must be used.

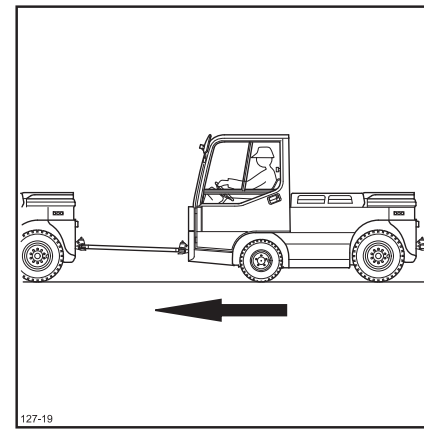
Preparation

In order to tow an immobile truck, first release the spring-loaded parking brake:

- Connect the tow tractor (with sufficient driving and braking force) to the tow hook with a RIGID tow bar.
- Disconnect the battery.
- Open the motor cover.
- Screw in two screws (1) for the spring-loaded parking brake until they touch the axle.
- Continue to turn the screws until the brakes are released.
- Affix the decal information **Parking brake out of order** to the cab within the driver's field of vision.



Towing



Someone must sit in the truck to be towed in order to steer it and brake it.

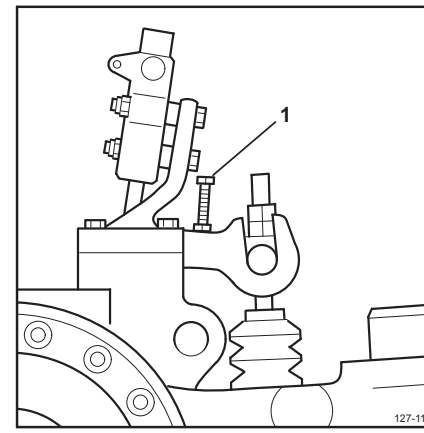
Agree clear communication signs with the driver of the tow tractor before towing.

– Always use a tow bar for towing.
– Do NOT tow the truck at a speed greater than the recommended MAXIMUM SPEED of 10 km/h.

Towing a truck out if it has become stuck

– If the drive wheels have buried themselves in loose or muddy ground, exercise extreme caution when towing the truck out — especially if it is loaded.
– Do not pull the truck out at an angle of in lurches. Otherwise, the chassis frame may be damaged.
– Do not tow the truck out when a trailer is connected.
– If possible, pull the truck out backwards along the track already created.

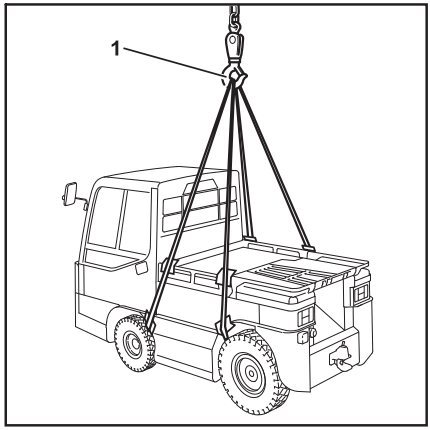
Switching off



Take measures—e.g. use wheel chocks—to prevent the truck from rolling away.

– Turn two screws of the parking brake release (1) back into their original position and tighten.
– Loosen both screws until the end of the screws is flush with the underside of the actuating lever.

Crane loading the truck



Crane loading is only intended for transporting the complete truck for its initial commissioning. For application conditions that require frequent loading or that are not presented here, please contact the service centre with regard to particular variants.

Trucks may only be laden by persons with sufficient experience in the suitable harnesses and hoists.

⚠ DANGER

Risk to life due to suspended loads!

– Never step under an elevated load.

⚠ DANGER

Risk to life due to the harnesses snapping!

Sharp edges can damage harnesses — protect harnesses against sharp edges.

Harnesses must be designed for a load capacity that is at least the weight of the truck.

Only use harnesses with a sufficient load capacity.

⚠ DANGER

Risk of death from falling vehicles!

– Never jack up or crane load the truck at the tow coupling.
– Use the tow coupling only for towing.
– Crane loading and jacking up only at the corresponding connection points.

⚠ CAUTION

Truck damage due to incorrectly fitted harnesses!

Pressure from the harnesses can damage or destroy attachment parts when the truck is lifted.

– Secure harnesses in such a way that they do not touch any attachment parts.

⚠ CAUTION

Harnesses may damage the truck's paintwork!

Harnesses may damage paintwork by chafing and pressing on the surface of the truck. Hard or sharp-edged harnesses, such as wires or chains, damage the surface.

– Use textile harnesses, e.g. lifting straps, with edge protectors or similar protective devices if necessary.

– Remove the battery. See the chapter entitled "Removing the battery."

– Pass the harnesses under the truck in the position shown in the illustration.

– Adjust the length of the harnesses so that the lifting eye (1) is vertically above the centre of gravity of the truck.

– Ensure that the truck hangs level when lifted.

Decommissioning

Taking the truck out of operation

If the tractor is taken out of operation for over two months, it must be parked in a well ventilated, frost free, clean and dry room and the following measures must be carried out.

Measures before taking the tractor out of operation

- Thoroughly clean the tractor.
- Check the filling level of the hydraulic oil for the steering system and top up the oil if necessary.
- Fully charge the battery.
- Follow the battery manufacturer's instructions for storing the battery.
- Apply a thin film of oil or grease on all unpainted mechanical parts.
- Lubricate the tractor.
- Spray all open electrical contacts with a suitable contact spray.
- Top up the heater fuel tank (if applicable).
- Cover the tractor with a cotton sheet to protect it against dust.

NOTE

Do not use a polythene sheet to cover the tractor as this encourages the formation of condensation.

Putting the tractor back into operation

- Thoroughly clean the tractor.
- Lubricate the tractor.
- Follow the battery manufacturer's instructions for putting the battery into service.
- Check the hydraulic oil for condensation water and change the oil if necessary.
- Perform the same services as for commissioning.
- Check the heater fuel tank for condensation water, and change the fuel if necessary (if applicable).
- Take the tractor into service.

If the truck is to be taken out of operation for over six months, contact your qualified service centre for further measures.

Decommissioning the truck

We recommend that this work is carried out by an approved dismantler. However, if you wish to carry out the work yourself, then the following should be observed:

- Dismantle as many parts of the tractor as possible and separate them according to material for recycling.
- Check the legal requirements for disposing of toxic substances such as hydraulic oil, batteries etc. and proceed as instructed.
- Follow the battery manufacturer's instructions with regard to the disposal of old batteries.
- Dispose of the parts in accordance with the applicable legal regulations.

NOTE

The operating company is responsible for any breach of the legal regulations before, during and after the dismantling and disposal of truck parts.

6

Maintenance

Safety regulations for maintenance

Personnel qualifications

Only qualified and authorised personnel are allowed to perform maintenance work. The annual testing must be carried out by a qualified person. The examination and assessment of the qualified person must be unaffected by operational and economic conditions and must be conducted solely from a safety perspective. The qualified person must have sufficient knowledge and experience to be able to assess the condition of a truck and the effectiveness of the protective devices in accordance with technical conventions and the principles for testing trucks.

Maintenance personnel for batteries

Batteries must only be charged, maintained or changed by properly trained personnel in accordance with the instructions from the manufacturers of the battery, battery charger and truck. The handling instructions for the battery and the operating instructions for the battery charger must be followed.

Maintenance work without special qualifications

Simple maintenance work, such as checking the hydraulic oil level, may be carried out by untrained personnel. A qualification, like that of a specialist, is not required to carry out this work. The required operations are described in sufficient detail in the corresponding places in these operating instructions.

Safety guidelines

No changes, modifications or additions may be made to the tractor without approval from the manufacturer.

⚠ DANGER

Incorrect inspection and maintenance procedures can result in the malfunction of safety-critical components.

Only carry out inspection and maintenance routines if you have been trained, and are authorised to do so.

⚠ DANGER

Do not make modifications to the drive or braking parameters without informing the tractor drivers.

If modifications are made to the drive or braking parameters, then it is imperative that drivers are informed of such changes so that they are able to familiarise themselves with the new operating characteristics before taking the tractor into service.

⚠ DANGER

The majority of accidents and injuries that occur in workshops are caused by the failure to observe some basic rules of care and safety, and for this reason, in most cases they can be avoided.

Follow the safety guidelines below, anticipate potential hazards, and act with the necessary care and caution to reduce the risk to a minimum.

An alert, cautious mechanic is a safe one.

- Tighten the parking brake before repair work.
- Switch off the key switch.
- Disconnect the battery.
- Secure the front and rear wheels with wheel chocks.
- Before electrical maintenance work or checks, raise the drive wheels from the ground and secure the truck with wheel chocks.
- Always wear protective equipment (industrial goggles and gloves) when working on a battery.
- Always observe the required fire protection measures when working on batteries.
- Always handle, charge and maintain batteries according to the manufacturer's instructions supplied with the battery.
- Always ensure that the lifting equipment used has the required load capacity and is certified accordingly. All blocks, jacks, chains etc. are subject to regular checks and must only be used for the purpose intended.
- Only use marked lifting points for towing or lifting. Attach the connections carefully. Check that the pins/bolts provided are secure before loading. Never stand close to drawbars, slings or chains.
- Before releasing hydraulic connections, ensure that the system is depressurised.
- Do not allow hydraulic oil under pressure, for example at a leak, to penetrate the skin. Medical aid is required if such an injury occurs.

⚠ WARNING

Before working on or disconnecting any part of the brake force booster system, the system must first be depressurised.

Do this by actuating the foot brake twenty times with the key switch turned off.

- Never wear rings, wrist watches, jewellery, loose or dangling items of clothing such as ties, torn clothing, scarves, unbuttoned jackets or overalls with open zip fasteners that could get caught up in moving parts. Always wear approved safety clothing.
- Never carry out maintenance or servicing operations on the tractor with anyone sat on the seat, unless that person is fully trained and involved in the operation being carried out.
- Never switch on the tractor from any position other than the driver's seat.
- The design of service steps or platforms used for maintenance in the workshop or on site must comply with current regulations.

– Label all controls to indicate a service or repair operation is being carried out.
– Protective equipment, i.e. safety footwear, industrial goggles, protective masks, protective gloves etc. must be worn at all times when working with cleaning equipment that uses compressed air or steam.
– Perform a functional check and trial run after every service.

Handling lubricants

Always handle lubricants safely and as specified by the manufacturer.

Only store lubricants in approved containers at specified storage locations. As they could be flammable, do not let them come in contact with hot objects or naked flames.

Clean the area surrounding the part in question before lubrication, filter renewal or repairs in the hydraulic system.

Set values

The device-dependent set values must be observed when making repairs and when changing hydraulic and electrical components. These are listed in the appropriate sections.

Safety devices

After maintenance and repair work, all safety devices must be reinstalled and tested for operational reliability.

Working on the electrical equipment

Work may only be performed on the truck's electrical equipment when it has been de-energised. Function checks, inspections and adjustments on energised parts must only be performed by trained and authorised persons, taking the necessary precautions into account. Rings, metal bracelets etc. must be

Only use clean containers when replenishing fuels and lubricants.

ENVIRONMENT NOTE

Lubricants and compounds used during maintenance procedures can be harmful to the environment. Please observe the following:

- *Follow the manufacturer's safety and disposal instructions when using lubricants and cleaning compounds*
- *Avoid spilling lubricants. Remove any spillage immediately with a suitable absorbent, and dispose of as per local legislative requirements*
- *Always dispose of used or contaminated lubricants as specified. Follow laws and regulations*
- *Dispose of used parts, empty containers, filters etc. as per local legislative requirements*

removed before working on electric components.

To prevent damage to electronic systems with electronic components, such as an electronic driving regulator, these components must be removed from the truck before starting electric welding work.

Work on the electrical system (e.g. connecting a radio, additional headlights etc.) is only permitted with written approval from the STILL service centre.

Working on the hydraulic equipment

Hydraulic equipment must be depressurised prior to all work.

Working in potentially explosive areas

⚠ DANGER

Risk of serious injury or death from working in potentially explosive areas!

Working on a truck within potentially explosive areas can lead to explosions in the surrounding atmosphere. No work must be performed on the truck in potentially explosive areas. Inform the safety officer if necessary!

- Trucks must only be maintained or repaired outside potentially explosive areas.
- Ask the safety officer to allocate a safe working area if necessary.

To prevent accidents during maintenance and repair work, all necessary safety measures must be taken, e.g.:

Ensure the truck cannot move unintentionally or start up inadvertently

- Push the emergency off switch
- Turn the switch key to the left and remove it
- Apply the parking brake
- Take measures—e.g. use wheel chocks—to prevent the truck from rolling away

– Disconnect the battery

General maintenance information

Ordering spare parts and wearing parts

Spare parts are provided by our spare parts service department. The information required for ordering parts can be found in the spare parts list.

Only use spare parts as per the manufacturer's instructions. The use of unapproved spare parts can result in an increased risk of accidents due to insufficient quality or incorrect assignment. Anyone using unapproved spare parts shall assume unlimited liability in the event of damage or harm.

Inspection and maintenance data

Unit	Material/Lubricant	Capacity/Adjustment value	
Steering fluid tank	Hydraulic fluid		10 litres
	Oil		2 x 450 cc
Wheel bolts		Front	195 Nm
		Rear	195 Nm
Tyres Short wheel base tow tractor		Front	7.5 bar
		Rear	5.0 bar
Tyres Long wheel base tow tractor		Front	9.0 bar
		Rear	5.0 bar
Tyres Platform tractor		Front	7.5 bar
		Rear	6.5 bar
Braking system	Brake fluid		As required
Tow coupling	If the coupling is engaged and disengaged more than 2-3 times per shift, the coupling must be relubricated on the lubricating nipple.		
Electrical system			
Steering pump motor	Fuse		1 x 50 Amp
Main circuit	Fuse		1 x 500 A 250 A on 5-kW platform truck
Ancillary circuits	Fuses		6 x 10 Amp
Heater circuit	Fuse		1 x 30 Amp
Lighting circuit	Fuses		18 x 10 Amp
Battery	Distilled water		As required
	Non acidic grease		As required
Steering linkages	Multipurpose grease		As required
Latches and hinges	General purpose oil		As required
Diesel Heater	Diesel *		4 litres
* When the temperature is above 0°C, regular diesel can be used. If the temperature drops below 0°C winter diesel must be used.			

Recommended lubricants

Power steering hydraulic oil

STANDARD

Anti wear hydraulic oil
Grade ISO VG 22-32
Viscosity index ≥ 300
e.g Shell Tellus Arctic 32

NOTE

The above specification is an oil with a high viscosity index that allows the use of hydraulics in ambient temperatures of between -20°C and +40°C (oil temperatures between -20°C and +80°C).

Multi-purpose grease

Lithium-based grease in accordance with DIN51825, KP2K-20

NOTE

Do not mix with non-lithium-based greases.

Gearbox oil

Shell DONAX TX

General purpose oil

Engine oil SAE 20W/50

Brake fluid

DOT 4 brake fluid in accordance with SAE J 1703

NOTE

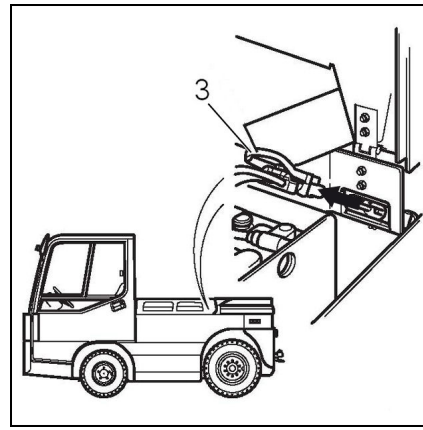
Further information can be obtained from your qualified service engineer.

Cleaning

Preparing the truck for cleaning

– Park the truck securely.

– Turn the switch key to the left and remove it.
– Open the battery cover; see the chapter entitled "Opening the battery cover".
– Disconnect the battery male connector (3). ▷



Cleaning the truck

⚠ WARNING

There is a risk of injury due to falling when climbing onto the truck!

When climbing onto the truck, it is possible to get stuck or slip on components and fall. Higher points on the truck must only be accessed using the appropriate equipment.

– Strictly adhere to the following steps.

– Use only the steps provided for this purpose to climb onto the truck.
– Use devices such as stepladders or platforms to reach inaccessible areas.

Washing the outside of the truck

⚠ CAUTION

If water penetrates the electrical system, there is a risk of short circuit!

– Strictly adhere to the following steps.

– Switch off the electrical system before cleaning.
– Do not spray electrical components and the covers on these components directly with water.

⚠ WARNING

Failure to follow these instructions could result in damaged components!

The engine must be switched off during washing. Do not use water to clean the area around the central electrical system; instead, only clean with a dry cloth or clean compressed air.

⚠ WARNING

Excessive water pressure or water and steam that are too hot can damage truck components.

– Strictly adhere to the following steps.

– Only use high-pressure cleaners with a maximum output power of 50 bar and at a maximum temperature of 85°C.
– When using high-pressure cleaners, make sure there is a distance of at least 20 cm between the nozzle and the object being cleaned.
– Do not aim the cleaning jet directly at adhesive labels or information decals.

⚠ DANGER

Risk of fire! Deposits/accumulations of combustible materials may ignite in the vicinity of hot components (e.g. exhaust pipes).

– Strictly adhere to the following steps.

– Regularly remove all deposits/accumulations of foreign materials in the vicinity of hot components.
– Do not place combustible materials in the engine compartment.

⚠ DANGER

Risk of fire! Flammable fluids can be ignited by hot components on the truck.

– Strictly adhere to the following steps.

– Do not use flammable fluids for cleaning.

– Observe the manufacturer's guidelines for working with cleaning materials.

⚠ CAUTION

Abrasive cleaning materials can damage component surfaces!

Using abrasive cleaning materials that are unsuitable for plastics may dissolve plastic parts or make them brittle. The screen on the display and operating unit may become cloudy.

– The procedures outlined below must be observed in all cases.

– Clean plastic parts only with cleaning materials intended for plastic parts.

– Observe the manufacturer's guidelines for working with cleaning materials.

⚠ CAUTION

Excessive water pressure or water and steam that are too hot can damage truck components.

– The procedures outlined below must be observed in all cases.

– Clean the truck on the outside with water-soluble cleaning agents and water (water jet, sponge, cloth).

– Clean all accessible areas, the oil filling openings and their surroundings, and clean the lubricating nipples before lubricating.

NOTE

The more often the truck is cleaned, the more frequently it must be lubricated.

Cleaning the windows

Any panes of glass, e.g. cab windows (variant), must always be kept clean and free of ice.

This is the only means of guaranteeing good visibility.

⚠ CAUTION

Do not damage the rear window heating (inside)!

Take great care when cleaning the rear window and do not use any objects with sharp edges.

– Clean the windows.

NOTE

Cleaning can be done using a commercially available glass cleaner.

After washing

⚠ CAUTION

Risk of short circuit

If any moisture has penetrated the electrical system despite the precautionary measures taken, first dry the electrical system using compressed air.

The truck must then be started up to prevent any corrosion damage.

– Carefully dry the truck (e.g. with compressed air).
– Sit on the driver's seat and start up the truck in line with applicable regulations.

Cleaning the electrical system

⚠ CAUTION

Cleaning electrical system parts with water can damage the electrical system.

– Cleaning electrical system parts with water is forbidden!
– Use dry cleaning materials in accordance with the manufacturer's specifications.
– Do not remove covers etc.

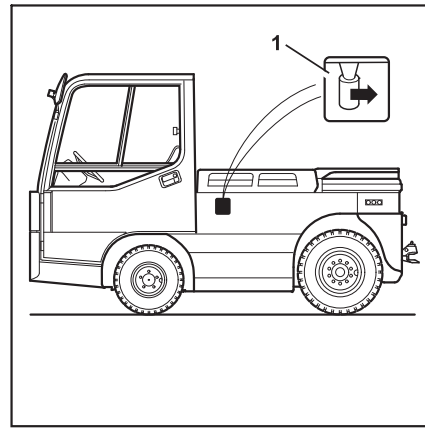
– Clean the electrical system parts with a metal-free brush and blow the dust off with low-pressure compressed air.

Providing access to maintenance points

Providing access to maintenance points

Opening the battery cover

Open the battery cover. ▷



⚠ WARNING

Risk of crushing!

When lifting and closing, limbs could become trapped.

– Do not reach between covers and chassis.

NOTE

Before opening the battery cover, the engine cover must be closed.

NOTE

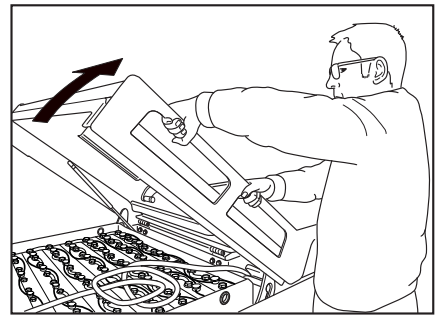
On the cab version with sliding doors, the sliding doors must be closed.

Open the battery cover.

– To do this, pull the locking lever (1) towards the rear of the truck until the locking lever audibly unlocks (clicks).

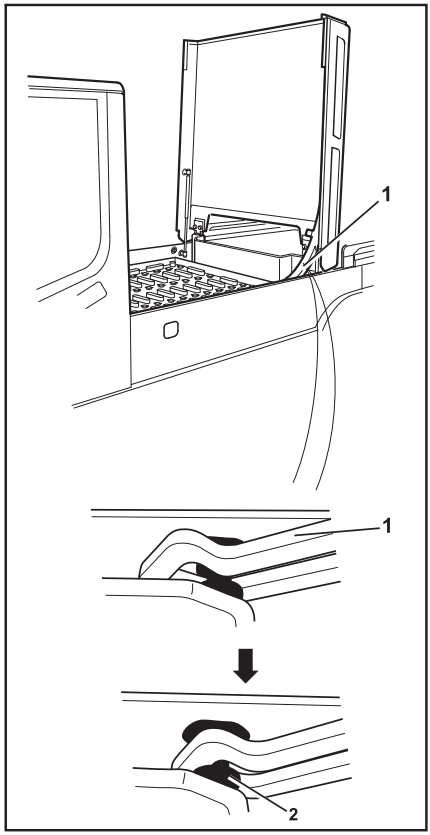
Lift the battery cover. ▷

– To do this, grasp the battery cover with both hands and pull the battery cover upwards - do not let go of the battery cover.



Secure the battery cover in the lifted position. ▷

– To do this, push the safety stay (1) over the security bolt (2) until the safety stay is hooked in place and secured.
– Ensure that the battery cover is secured against falling shut unintentionally.
– Ensure that no parts can fall into the battery compartment.



Closing the battery cover

Release the battery cover. ▷

⚠ WARNING

Risk of crushing!

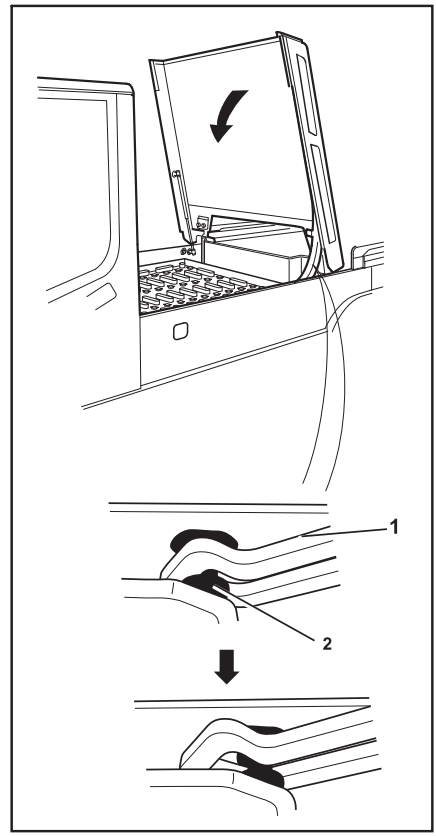
When lifting and closing, limbs could become trapped.

– Do not reach between covers and chassis.

Release the battery cover.

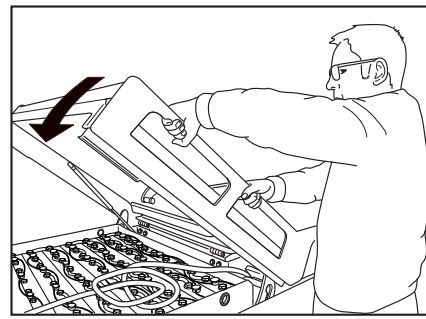
– To do this, push the safety stay (1) over the security bolt (2) until the safety stay is released.

– Slowly lower the battery cover; to do so, release the safety stay.



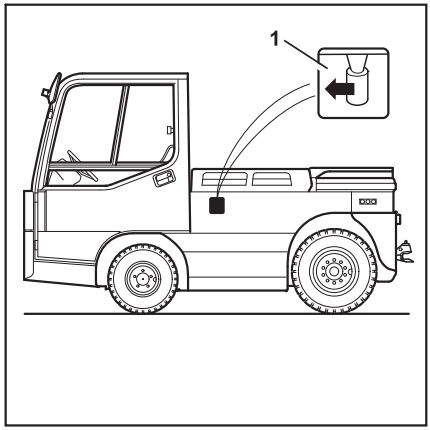
Lower the battery cover. ▷

– To do this, push down the battery cover with both hands.



Close the battery cover.

– To do this, push down the battery cover against the pressure of the gas spring until the locking lever (1) audibly locks (clicks).
– Ensure that the battery cover is closed correctly.



Opening the engine cover

Open the engine cover.

⚠ WARNING

Risk of crushing!

When lifting and closing, limbs could become trapped.

– Do not reach between covers and chassis.

NOTE

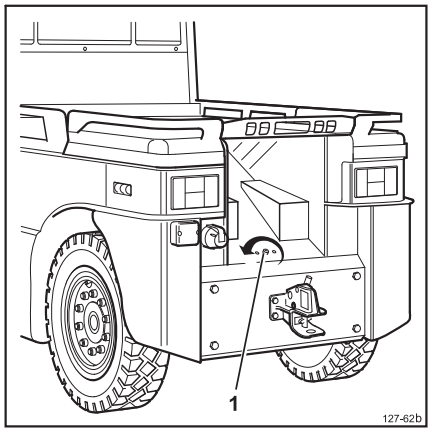
The battery cover must be closed before the engine cover can be opened.

NOTE

On the cab version with sliding doors, the sliding doors must be closed.

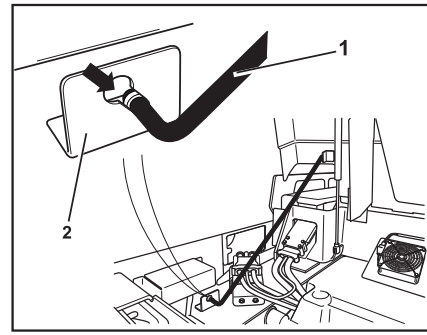
Open the engine cover.

– To do this, loosen the locking screw (1) by turning the screw anticlockwise.
– Grasp the bonnet with both hands and lift the bonnet upwards.



Secure the engine cover in the lifted position. ▷

– To do this, release the support rod (1) from the holder (in the engine cover).
– Latch the support rod in the safety plate (2) such that the support rod is locked in place and secured.
– Ensure that the engine cover is secured against falling shut unintentionally.



Closing the engine cover

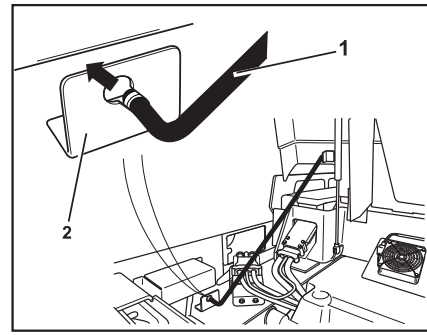
Release the engine cover. ▷

⚠ WARNING

Risk of crushing!

When lifting and closing, limbs could become trapped.

– Do not reach between covers and chassis.

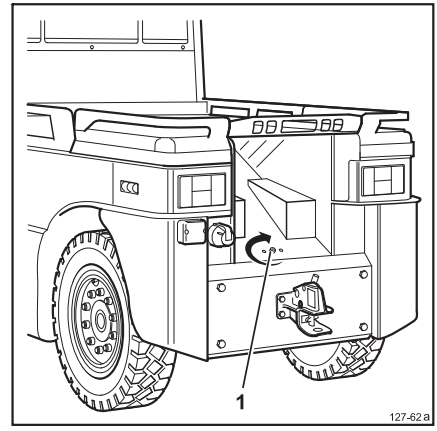


Release the engine cover.

– To do this, unlatch the support rod (1) from the safety plate (2) and position the support in the holder (in the engine cover).

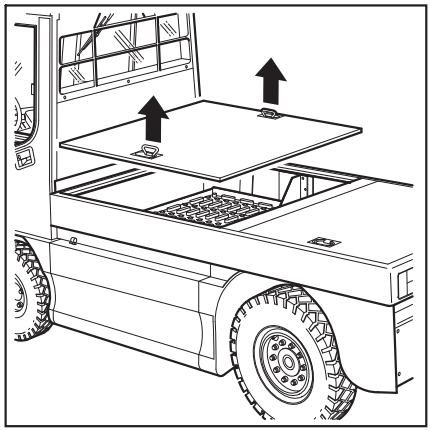
Close the engine cover. ▷

– To do this, press down the engine cover against the pressure of the gas spring and hold the engine cover closed.
– Tighten the locking screw (1) by turning the screw clockwise.
– Ensure that the engine cover is closed correctly.



Removing the battery cover (platform tractors)

Open and lift the battery cover. ▷



⚠ WARNING

Risk of crushing!

When lifting and closing, limbs could become trapped.

– Do not reach between covers and chassis.
– Only lift up and position the covers using two people.

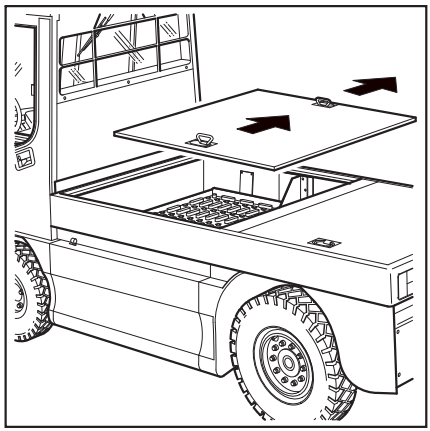
NOTE

On the cab version with sliding doors, the sliding doors must be closed.

Open and lift the battery cover.

– To do this, fold up the handles of the battery cover.
– Lift the battery cover with help from another person.

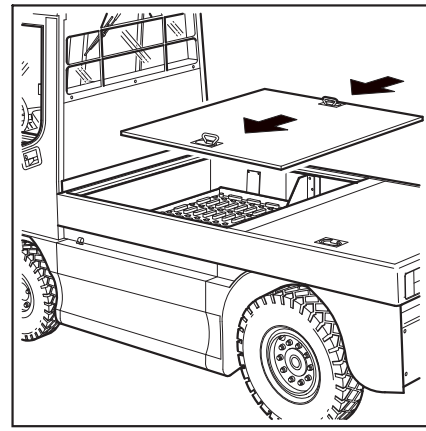
Lift out the battery cover. ▷



– To do this, remove the battery cover from the working area.
– Ensure that no parts can fall into the battery compartment.

Installing the battery cover (platform tractors)

Lift in the battery cover. ▷



⚠ WARNING

Risk of crushing!

When lifting and closing, limbs could become trapped.

- Do not reach between covers and chassis.
- Only lift up and position the covers using two people.

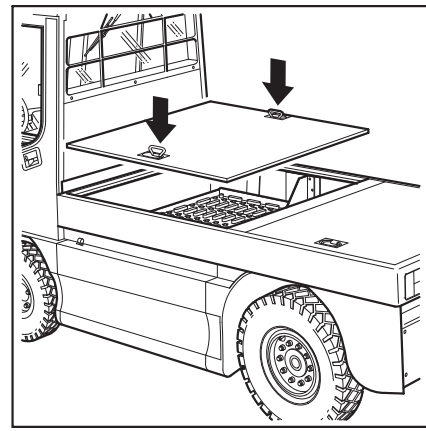
NOTE

On the cab version with sliding doors, the sliding doors must be closed.

Lift in the battery cover.

- To do this, fold up the handles of the battery cover.
- Lift in the battery cover with help from another person.

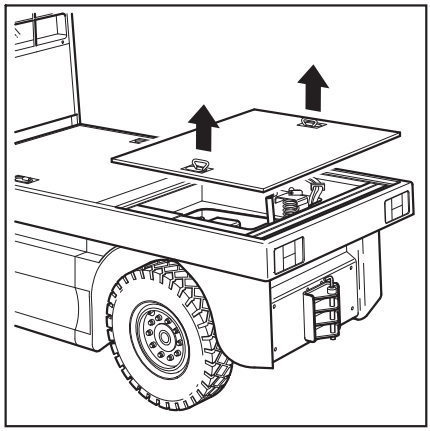
Position and close the battery cover. ▷



- To do this, align and position the battery cover.
- Fold in the handles.
- Ensure that the battery cover is closed correctly.

Removing the engine cover (platform tractors)

Open and lift the engine cover. ▷



⚠ WARNING

Risk of crushing!

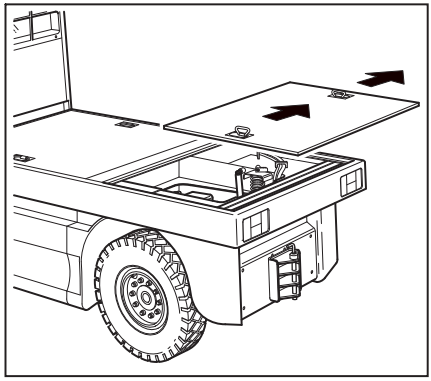
When lifting and closing, limbs could become trapped.

– Do not reach between covers and chassis.
– Only lift up and position the covers using two people.

Open and lift the engine cover.

– To do this, fold up the handles of the engine cover.
– Lift the engine cover with help from another person.

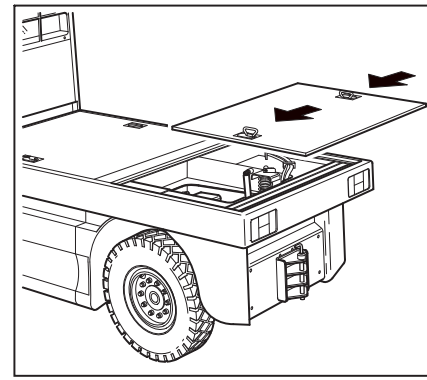
Lift out the engine cover. ▷



– To do this, lift out the engine cover with help from another second person.
– Remove the engine cover from the working area.
– Ensure that no parts can fall into the engine compartment.

Installing the engine cover

Lift in the engine cover. ▷



⚠ WARNING

Risk of crushing!

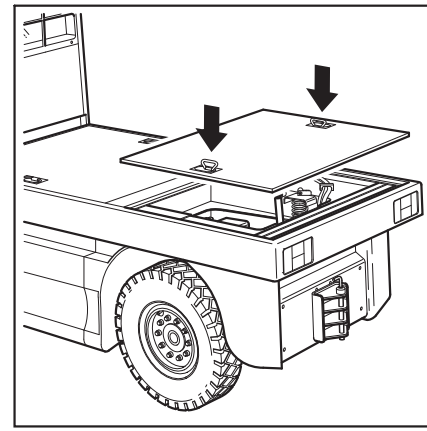
When lifting and closing, limbs could become trapped.

- Do not reach between covers and chassis.
- Only lift up and position the covers using two people.

Lift in the engine cover.

- To do this, fold up the handles of the engine cover.
- Lift in the battery cover with help from another person.

Position and close the engine cover. ▷



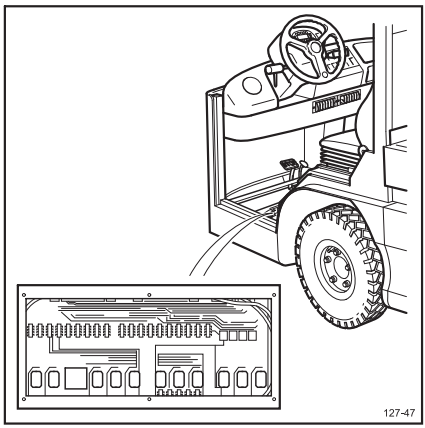
- To do this, align and position the engine cover.
- Fold in the handles.
- Ensure that the engine cover is closed correctly.

Servicing

Fuses

Fuses (generation 1)

Located under the bottom plate below the driver, accessible through a cutout.

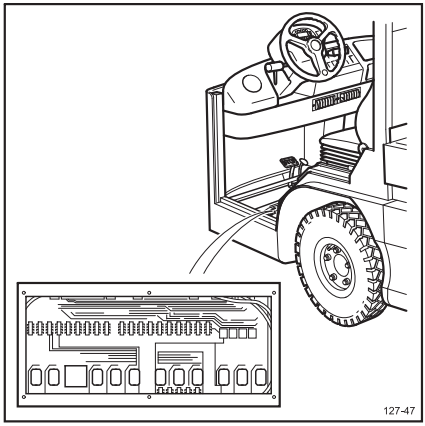


Signal horn	4F1	10 A
Switch relay for the sidelights/headlights	5F1	10 A
Left-hand sidelights	5F2	10 A
Right-hand sidelights	5F3	10 A
Main beam headlights	5F4	10 A
Dipped beam headlights	5F5	10 A
Brake lights	5F6	10 A
Rear fog lights	5F7	10 A
Reversing lights	5F8	10 A
Lever and relay for the direction indicator	5F9	10 A
Relay for the direction indicator and turn indicator	5F10	10 A
Rotating beacon	5F11	10 A
Interior light	5F12	10 A
Working spotlights	5F13	10 A
Front windscreen wiper/washer (resettable)	9F1	8 A
Rear window wiper/washer	9F2	10 A
Radio cassette	9F3	10 A
Heated seat	9F5	10 A
Relay module for the cab heater	9F6	10 A

Fuses (generation 2)

Located under the bottom plate below the driver, accessible through a cutout.

Signal horn	4F1	10 A
Switch relay for the sidelights/headlights	5F1	10 A
Left-hand sidelights	5F2	10 A
Right-hand sidelights	5F3	10 A
Main beam headlights	5F4	10 A
Dipped beam headlights	5F5	10 A
Brake lights	5F6	10 A
Rear fog lights	5F7	10 A
Reversing lights	5F8	10 A
Lever and relay for the direction indicator	5F9	10 A
Relay for the direction indicator and turn indicator	5F10	10 A
Rotating beacon	5F11	10 A
Interior light	5F12	10 A
Working spotlights	5F13	10 A
Lights in control switches	5F14	10 A
Front windscreen wiper/washer (resettable)	9F1	8 A
Rear window wiper/washer	9F2	10 A
Options	9F3	10 A
Seat heater	9F5	10 A
Options	9F7	10 A
Options	9F8	10 A



Check the braking system

⚠ DANGER

Increased risk of accident as a result of defective brake system!

- Never drive a truck with a defective brake system.
- If the brake system is defective, park the truck securely and immediately inform a superior or responsible fleet manager so that they can have the defect rectified.

⚠ DANGER

Increased risk of accident as a result of a failure of the brake system!

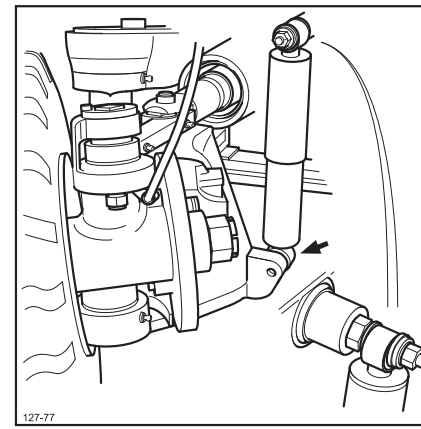
- Never operate the truck when the brake fluid level is low.
- Immediately fill the brake fluid reservoir and check the brake system for leaks.

- Check the brake pipes for corrosion and damage and check for leaks.
- Check the main cylinder for leaks.
- Check the front brake callipers for leaks.
- Check the slave cylinder on the rear axle for leaks.

NOTE

We strongly recommend that this and other testing procedures on the brake system be performed by your authorised service centre.

Checking the suspension shock absorbers



- Check the front and rear shock absorbers for corrosion and leakage.
- Check the rubber mounting bushes of the shock absorbers for wear or cracks.

Changing the brake fluid

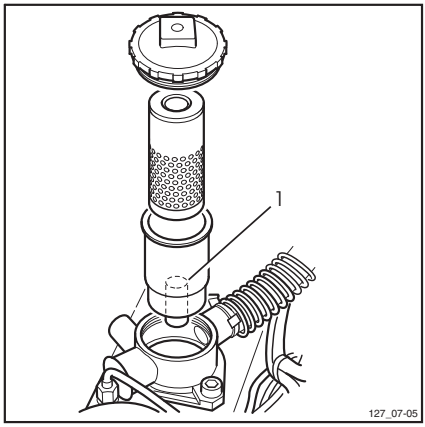
⚠ CAUTION

It is recommended the brake fluid be changed every 5000 hours or 5 years, whichever is earlier.

NOTE

We strongly recommend that this operation and other adjustments to the brake system be carried out by your service centre.

Checking the steering fluid level



DANGER

Hydraulic oil is toxic!

This fluid is hazardous to your health.

- Do not swallow the fluid.
- Do not allow the fluid to come into contact with the skin.
- Always use appropriate personal protective equipment (e.g. protective gloves, protection goggles, skin protection and skin care products).

DANGER

Risk of serious injury due to the steering failing!

- Never operate the truck when the hydraulic oil level is low.
- Immediately top up the steering fluid tank and check the steering system for leaks.

NOTE

A steering fluid level indicator is fitted, and will indicate when the steering fluid level is low. However it is advisable to check the steering fluid level every 1000 hours.

- Open and secure the engine cover.
- Open the filler cap of the steering fluid tank.
- Carefully remove the filter.
- Ensure the fluid level is up to the top of the filler neck (1).
- Top up fluid as required.
- Close the filler cap of the steering fluid tank.

Checking the brake fluid level

DANGER

Increased risk of accident as a result of a failure of the brake system!

- Never operate the truck when the brake fluid level is low.
- Immediately fill the brake fluid reservoir and check the brake system for leaks.

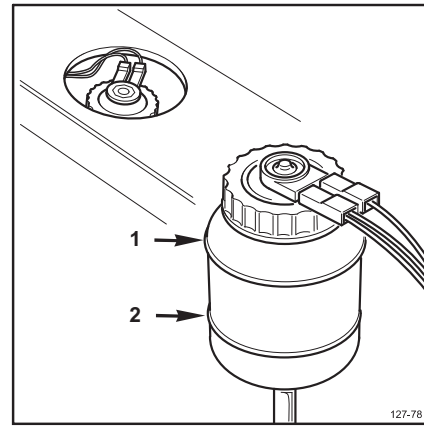
NOTE

A brake fluid indicator is fitted and will indicate when the brake fluid level is too low. However it is advisable to check the brake fluid level every 1000 operating hours.

- Remove the cover of the brake fluid reservoir between the seats.
- Unscrew the filler cap and make sure that the level reaches the maximum mark (1).

The level must never drop below the minimum mark (2).

- Fill up brake fluid as required and in accordance with the lubrication table.



Checking the auxiliary heating system (variant)

DANGER

Danger of death from carbon monoxide!

Danger of death from carbon monoxide poisoning in enclosed areas.

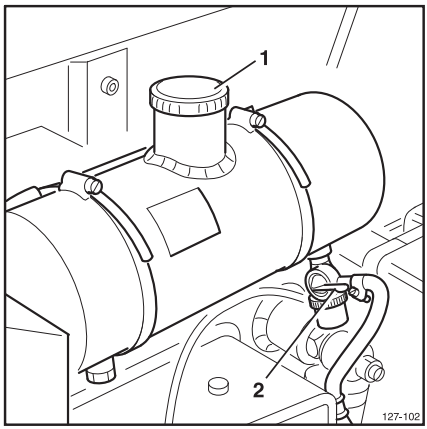
– Never operate the auxiliary heater in enclosed areas such as a garage.

The auxiliary heating system should be operated at least once a month when not in regular use.

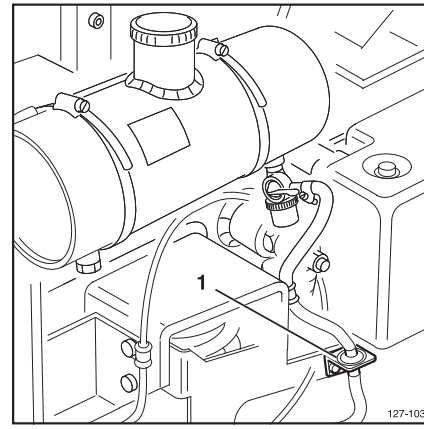
– Open or remove the engine cover; see chapter entitled "Opening and closing the battery cover and engine cover".
– Ensure that the fuel tank (1) is filled.
– Open the fuel tap (2).
– Briefly actuate the heating system.
– Close the fuel tap.
– Close the engine cover.

NOTE

The heater burner must be maintained according to the documentation of the heater manufacturer.



Checking the diesel auxiliary heater filter



ENVIRONMENT NOTE

Diesel fuel is harmful to the environment!

Improper handling of fuels poses a risk to people and the environment.

– Do not spill fuel.

– Make sure that no fuel gets into the sewage system, surface water, groundwater or onto the soil.

Check the diesel auxiliary heater filter*

– Open or remove the engine cover; see the chapter "Opening and closing the battery cover and engine cover".

– Perform a visual inspection on the fuel filter (1).

Change the filter if necessary.

– Close the fuel valve.

– Remove the two hose clips from the filter (1).

– Pull the hoses out of the old filter.

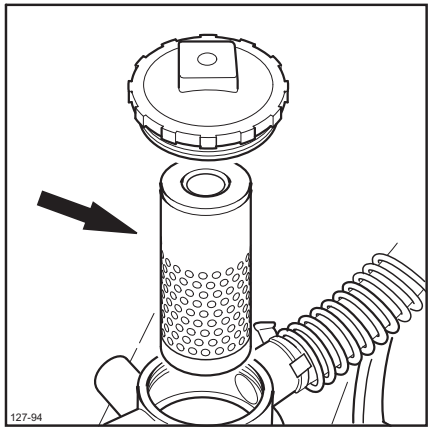
– Connect the new filter.

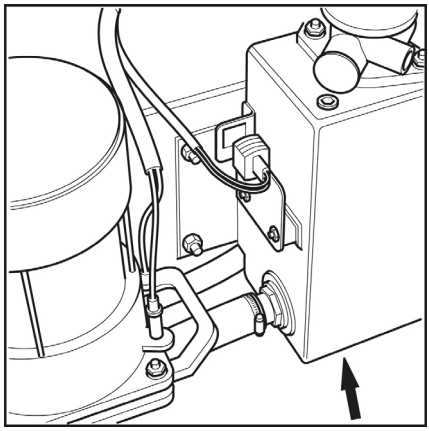
– Tighten the hose clips.

– Close the engine cover.

* Variant

Changing the steering fluid and filter ▷





⚠ DANGER

Risk of very serious injury due to steering failure!

– Never operate truck with a low hydraulic oil level.
– Immediately fill the steering fluid tank and check the steering system for leaks.

⚠ WARNING

These fluids are pressurised during operation of the truck and are hazardous to your health!

– Do not allow to come into contact with the skin.
– To avoid injury, use appropriate personal protective equipment (e.g. protective gloves, industrial goggles, skin protection and skin care products).
– Do not allow the fluid to come into contact with hot engine parts.
– Follow the statutory regulations.

– Open the engine cover.
– Open filler cap of the steering fluid tank.
– Remove and dispose of steering fluid filter.
– Place a suitable drip tray under the steering fluid tank.
– Remove the drain plug; see the arrow.
– Drain fluid.
– Refit drain plug.
– Fill up tank with fresh steering fluid. Pay attention to correct level.
– Use new steering fluid filter.
– Close filler cap of the steering fluid tank.
– Check the steering system for correct operation.

ENVIRONMENT NOTE

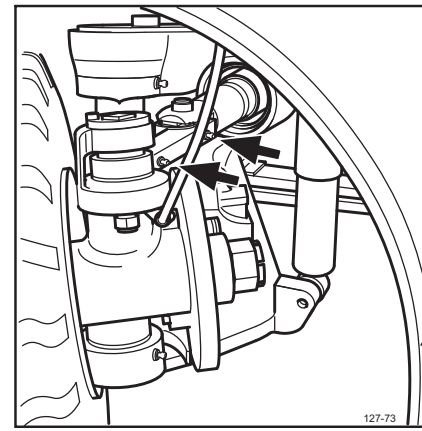
Hydraulic fluid is a water-polluting substance!

- *Always store hydraulic fluid in containers that comply with regulations.*
- *Avoid spills.*

- *Spilt hydraulic fluid should be removed immediately with oil-binding agents and disposed of according to the regulations.*
- *Dispose of old hydraulic fluid according to the regulations.*

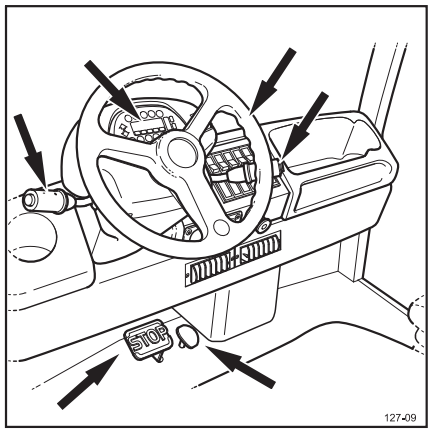
Lubricating the steering linkage bearings

– Using a grease gun, lubricate the steering linkage bearings until grease emerges from the bearings.



Checking operating devices and functions

- Check the function of the brake pedal.
- Check the function of the steering.
- Check the function of the accelerator pedal.
- Check the function of the switch for the parking brake.
- Check the function of the display unit.
- Check the functions of all additional operating devices.

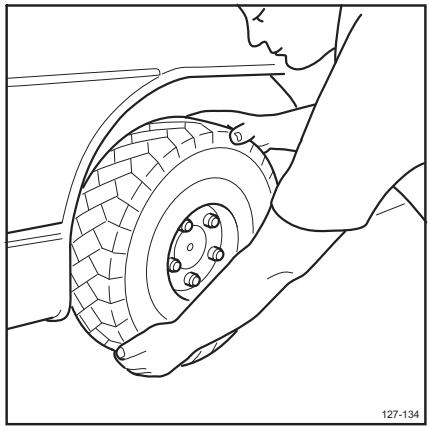


Checking the steering linkage for wear

- Jack up the truck.
- Check the steering linkage for wear.
- Check the steering pivot pin for wear.
- Check the ball bearing for wear.

NOTE

The total movement allowed at the wheel rim is 2 mm.



Special removal tool

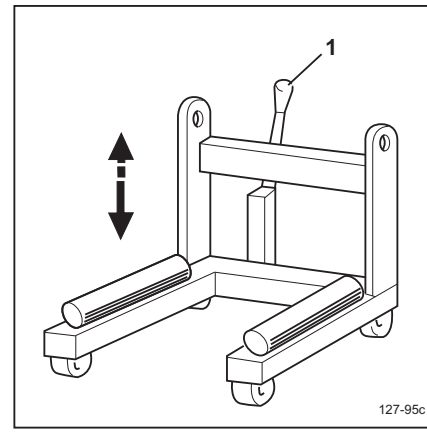
With large wheels, tyres should be changed using a trolley jack (1) or a tool (2) and a crane and/or a lifting device.

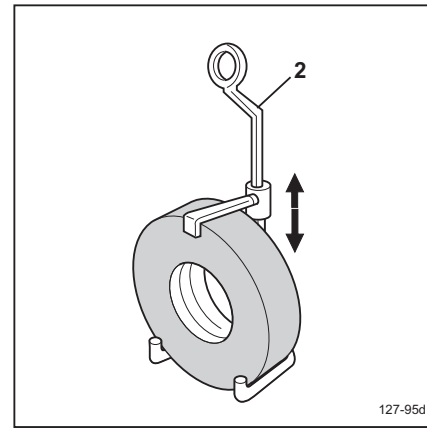
⚠ CAUTION

Risk of truck damage when working without aids!

The wheels are heavy.

– Work cautiously on removal.



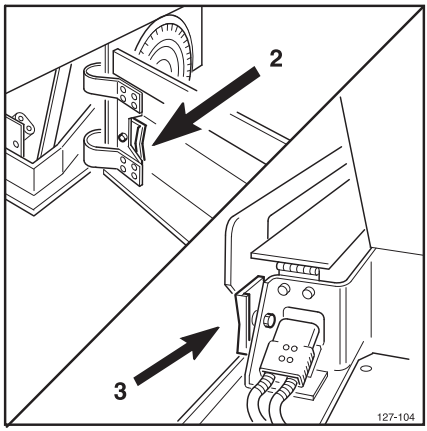


Removing and installing the front wheels

The special lifting block

The special lifting block for installation and removal is located:

- underneath the bonnet
- next to the battery connector (3) on the tow tractor
- on the inside of the battery door (2) on the platform truck

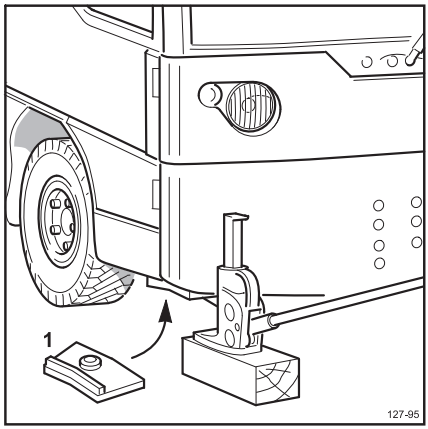


Removal

DANGER

Risk of serious or fatal injury from falling truck!

- Only use hydraulic jacks with sufficient load capacity (see Identification plate).
- The hydraulic jack must only be used to raise the truck for short periods of time, e.g. when changing wheels.
- The hydraulic jack platforms must be secure and level.
- Never change wheels on upward or downward gradients.
- Ensure that no-one is in the truck before lifting.
- When lifting the truck, always secure it with appropriate means (such as wedges or wooden blocks) to prevent it from rolling away or tipping over.
- Never start the electric motor when the truck is raised.
- Never work on a raised truck or leave a raised truck unattended when it is only supported by a hydraulic jack.
- Never work underneath the raised truck.
- Never lie underneath the raised truck.



⚠ WARNING

Risk of serious crush injuries from falling wheels!

The wheels are heavy.

– Work carefully when removing the wheels.
– Never place hands or feet underneath the raised wheel.
– Use moveable trolleys, lifting devices or cranes for assistance.

⚠ CAUTION

Risk of damage to truck when working without assistance!

The wheels are heavy.

– Work carefully when removing the wheels.
– Use moveable trolleys, lifting devices or cranes for assistance.

– Park the truck securely.
– Switch off the key switch.
– Disconnect the battery.
– Loosen the wheel bolts of the steering axle but do NOT remove them.
– Prevent the truck from rolling away using blocks at the front wheels.
– Place the special lifting block (1) at the location shown.
– Place the hydraulic jack in the centre, underneath the special lifting block.
– Raise the truck from the floor until the wheels are no longer in contact with the ground.
– Support the chassis with square timbers.
– Lower the truck until it rests on the square timbers.
– Unscrew the wheel bolts.
– Remove the wheel.

Installation

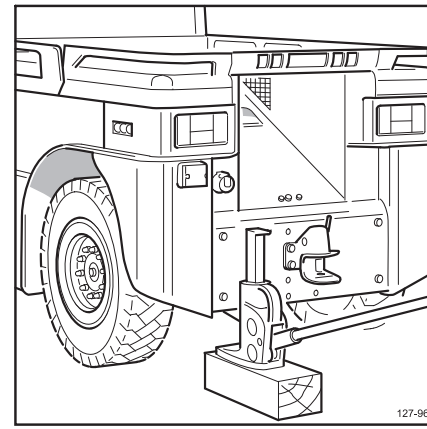
– Insert the wheel.
– Gently tighten the wheel bolts crosswise until the wheel is resting against the hub.

– Raise the truck from the floor until the wheels are no longer in contact with the ground.
– Remove the square timbers.
– Remove the hydraulic jack and the special lifting block.
– Lower the truck onto the ground.
– Tighten the wheel bolts crosswise with a torque of 195 Nm.
– In the interest of safety, the correct assembly of the wheel bolts MUST be checked after 50 hours of operation.

NOTE

If the wheel bolts need retightening to the correct torque, they must then be checked again after 50 hours. Repeat this procedure every 50 hours until the correct torque is consistently obtained.

Removing and installing the drive wheels



⚠ DANGER

Danger of serious injury or even death from falling truck!

- Only use hydraulic jacks with a sufficient load capacity (see Identification plate).
- The hydraulic jack must only be used to raise the truck for short periods of time, e.g. when changing wheels.
- The hydraulic jack platforms must be secure and level.
- Never change wheels on upward or downward gradients.
- Ensure that no-one is in the truck before lifting.
- When lifting the truck, always secure it with appropriate means (such as wedges or wooden blocks) to prevent it from rolling away or tipping over.
- Never start the electric motor when the truck is raised.
- Never work on a raised truck or leave a raised truck unattended when it is only supported by a hydraulic jack.
- Never work underneath the raised truck.
- Never lie underneath the raised truck.

⚠ WARNING

Risk of serious crush injuries from falling wheels!

The wheels are heavy.

- Work carefully when removing or installing equipment.
- Never place hands or feet underneath the raised wheel.
- Use moveable trolleys, lifting devices or cranes for assistance.

⚠ CAUTION

Risk of damage to truck when working without assistance!

The wheels are heavy.

- Work carefully when removing or installing equipment.
- Use moveable trolleys, lifting devices or cranes for assistance.

Removal

- Park the truck securely.
- Switch off the key switch.
- Disconnect the battery.
- Block the front wheels.
- Loosen the wheel bolts - DO NOT remove the wheel bolts.
- Place the hydraulic jack underneath the rear undercarriage plate at the locations shown.
- Raise the truck from the floor until the wheels are no longer in contact with the ground.
- Remove wheel bolts.
- Remove wheel.

Installation

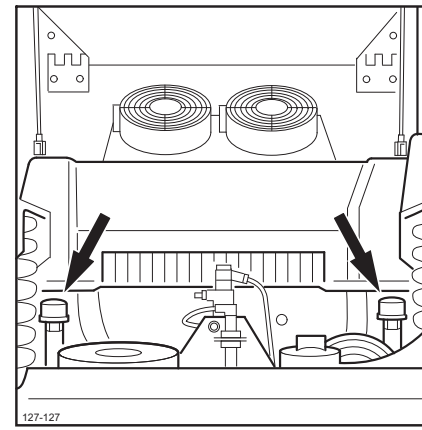
- Insert wheel.
- Tighten the wheel bolts crosswise.
- Carefully lower the truck.
- Remove the hydraulic jack.
- Tighten the wheel bolts crosswise with a torque of 195 Nm.
- For safety reasons, the correct assembly of the wheel bolts MUST be checked after 50 operating hours.

NOTE

If the wheel bolts need re-tightening to the correct torque, they must then be checked again after 50 operating hours.

Replacing the gearbox breather filter ▷

- Switch off the key switch.
- Open and secure the bonnet.
- Remove and dispose of both breather filters.
- Install new breather filters.



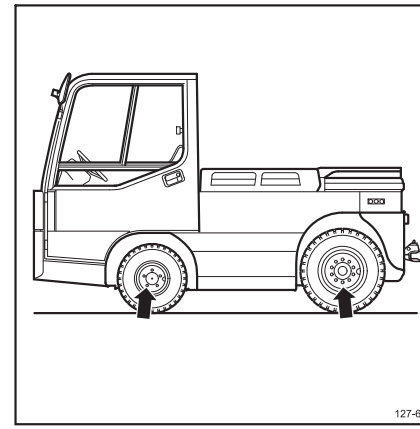
Check security of the wheel bolts ▷

- After removing a wheel, the security of the bolts **MUST** be checked within 50 hours of operation.

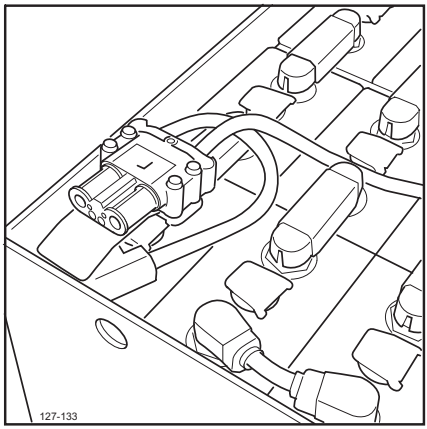
For effective wheel fixing, tighten the wheel bolts diametrically to 195 Nm

NOTE

If it is found necessary to tighten the wheel bolts to the correct torque, then they must be checked again after 50 hours. Repeat the tightening procedure every 50 hours until the correct torque is consistently obtained.



Checking battery and battery cable status



DANGER

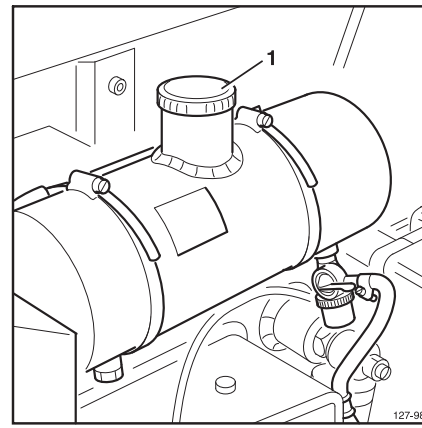
Risk of fatal electrical shock!

- Never wear watches or jewellery when working on a battery.
- Never place metallic objects on the battery.
- Never touch uninsulated cables.
- Never touch damaged plugs.
- Always use an insulated tool.
- Always wear a proper personal protection suit.

- Ensure that there are no cracked cells, deformed plates or that the electrolyte has evaporated.
- Check the condition of the connections and that they are securely positioned.
- Check cable insulation for wear and damage.
- Check battery/charger connectors and cables for damage and burnt contacts.
- Ensure that insulation is present on the cell connections and that it is undamaged.
- Check that the tops of the cells are clean and dry.
- Check lifting eyes for corrosion and wear.

Report any corrosion or wear on battery parts to a superior or the responsible fleet manager immediately so that they can have the defect rectified.

Filling the tank for the diesel auxiliary heater ▷



⚠ DANGER

Risk of fire as a result of flammable fuel!

- Before refuelling, switch off the auxiliary heater.
- When refuelling, smoking or the use of an open flame is strictly forbidden.
- Do not spill fuel.
- Always comply with legal regulations relating to the handling of diesel fuel.

⚠ WARNING

Risk of a health hazard due to harmful diesel fuel!

Fuels may contain solvent-like substances.

- Ensure that mineral oil products do not come into contact with the skin or eyes.
- When refuelling, wear personal protective equipment in accordance with regulations.

ENVIRONMENT NOTE

Diesel fuel is harmful to the environment!

Improper handling of fuels poses a risk to people and the environment.

- Do not spill fuel.
- Make sure that no fuel gets into the sewage system, surface water, groundwater or onto the soil.

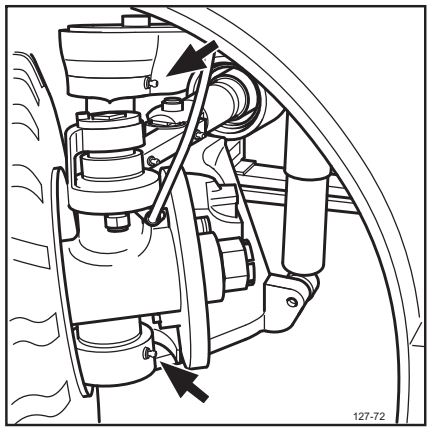
Filling the tank

- Switch off the key switch
- Switch off the auxiliary heater*, see the chapter "Operating the diesel auxiliary heater".
- Open and secure the engine cover.
- Remove the fuel tank cap (1).
- Fill the tank with clean diesel fuel to the lower edge of the filler neck (tank capacity: 4 litres).
- Replace the fuel tank cap.
- Close the engine cover.

* Variant

Lubricating the axle stub bearing of the steering system ▷

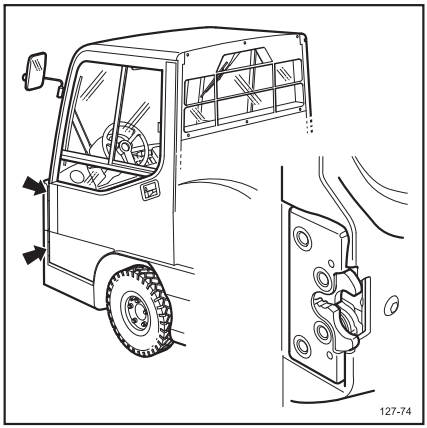
– Lubricate the upper and lower axle stub bearings using a grease gun until grease emerges from the bearings.



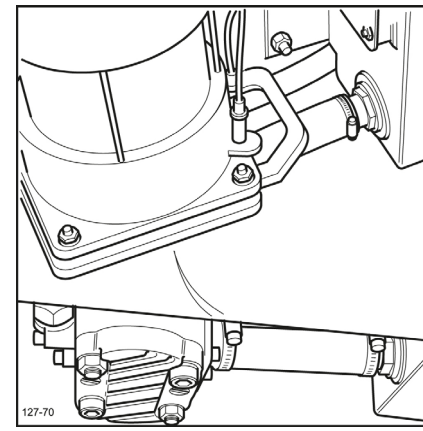
Checking and lubricating latches and hinges ▷

– Inspect and lubricate:

- Hinges and locking mechanisms
- Battery cover lock
- Battery door lock
- Engine cover lock
- Side panels
- Door hinges and locking mechanisms
- Sliding doors, door runners and the corresponding mechanisms as required



Checking steering fluid hoses for damage

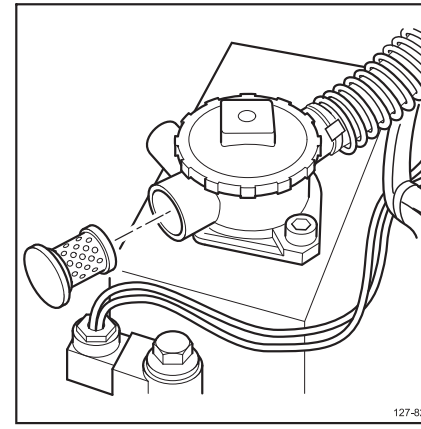


- Examine the outer cover of the hoses for signs of brittleness, tears, blisters, ballooning or cracks.
- Ensure that hoses are not twisted, kinked, bent, trapped or under tension.
- Replace all defective hoses.
- Ensure that all clips holding the hoses in place are attached.
- Ensure that all clips are replaced if worn or damaged.
- Inspect hoses for signs of fretting.
- Ensure that hoses are routed far away from very hot and moving parts.

NOTE

Should hoses be subject to acids, solvents, steam cleaning, salt water or ozone, the inspection period should be reduced.

Replacing the breather filter for the steering fluid tank



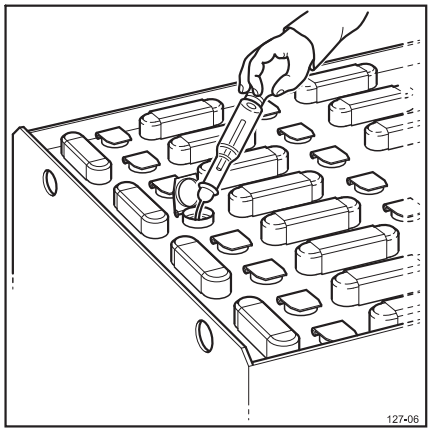
- Open or remove the engine cover.
- Pull out and dispose of the breather filter.
- Install a new breather filter.

Checking the battery acid level and specific gravity

⚠ WARNING

The electrolyte (diluted sulphuric acid) is poisonous and caustic!

- Observe safety regulations for handling battery acid; see the chapter entitled "Battery acid".
- Wear personal protective equipment (rubber gloves, apron and protection goggles).
- Never wear watches/jewellery when working with battery acid.
- Rinse away spilt battery acid immediately using plenty of water!



⚠ CAUTION

Risk of damage!

- Note the information in the operating instructions for the battery.

- Check the battery acid level and the specific gravity in accordance with the recommendations of the battery manufacturer.
- Inspect the battery for any cracks in the housing, raised plates and acid leaks.
- Have defective batteries repaired by the authorised service centre.
- The cell covers of the battery must be kept dry and clean.
- Any spilled battery acid must be neutralised immediately.

ENVIRONMENT NOTE

Dispose of used battery acid in line with regulations.

Checking the condition and safety of the electrical connections and cables

⚠ DANGER

Danger of death from electric shock!

- Never wear watches or jewellery when working on a battery.
- Never touch non-insulated cables.
- Never touch damaged plugs.
- ALWAYS use an insulated tool.
- Always wear a proper personal protection suit.

- Switch off the key switch.
- Disconnect the battery.
- Check the tightness of the connections.
- Ensure that the battery cables are undamaged and well insulated.
- Check the safety of the cable connections of the electric motor.
- Ensure that all motor cables are undamaged and well insulated.
- Remove all signs of corrosion and replace any damaged cables.

NOTE

Corroded connections and damaged cables cause voltage drops and overheating which can lead to operating problems.

Maintenance intervals

Routine inspection and maintenance

Your truck will remain operational only if the maintenance and checks are carried out regularly and according to the information and instructions in these operating instructions. The maintenance may only be carried out by qualified and authorised personnel. This work can be carried out by your authorised service centre under a service contract.

If you wish to do the work yourself, we recommend that the first three customer service checks be carried out by a service engineer from your authorised service centre in the presence of the responsible mechanic in your workshop, so that your staff can receive the appropriate instructions.

For all maintenance the tractor must be placed on a level surface and the wheels secured.

⚠ DANGER

Incorrect inspection and maintenance procedures can result in the malfunction of safety-critical components.

Only carry out inspection and maintenance routines if you have been trained, and are authorised to do so.

⚠ DANGER

The majority of accidents and injuries that occur in workshops are caused by the failure to observe some basic rules of care and safety, and for this reason, in most cases they can be avoided.

Always follow the maintenance safety guidelines when carrying out inspection and maintenance routines.

ENVIRONMENT NOTE

Some lubricants and compounds can be harmful to the environment. Always follow maintenance safety guidelines when handling lubricants and compounds during maintenance procedures.

Maintenance and lubrication intervals

If used in a clean, dry atmosphere, the maintenance and lubrication intervals outlined in this User Manual are sufficient. However, should the tractor be used in harsh environments, then more frequent maintenance and lubrication will substantially increase the service life of the tractor.

NOTE

It is preferable to use less lubricant more often, than a lot of lubricant less frequently.

Maintenance instructions

Maintenance work must be carried out in accordance with the following maintenance intervals. The intervals are designed for standard use. Depending on the application conditions of the truck, shorter maintenance intervals can be set, on agreement with the operating company.

These factors may call for shorter maintenance intervals:

- Contaminated, poor quality roads
- Dusty or salty air
- High air humidity
- Extremely high or low ambient temperatures, or extreme changes in temperature
- Multi-shift operation with a high duty cycle
- Specific national regulations for the truck or individual components

For maintenance tasks, only use original spare parts, and only use consumables that have been prescribed in the overview of consumables.

Maintenance - 50 hours

At operating hours										Carried out	
50										✓	✖
The following procedures should be carried out after the first 50 hours of operation.											
Before carrying out the procedures											
Check for error codes using diagnostic software											
Reset the service interval using diagnostic software											
Undercarriage											
Check that the wheel bolts are securely fitted. Tighten if necessary.											
Check the steering for play and check it is working correctly.											
Check the condition of all the mechanical parts of the service brake and the parking brake and check they are working correctly.											
Controls											
Check all controls and their operation											
General											
Check labelling for completeness											
Test drive the truck											

Maintenance — 1000 hours/year

At operating hours										Carried out	
1000		3000		7000		9000		11000			
13000		17000		19000						✓	✖
Depending on the application, environmental conditions and driving style, the following steps must be carried out at the intervals specified above, or more frequently if required.											
Before carrying out the procedures											
Check for error codes using diagnostic software											
Reset the service interval using diagnostic software											
Chassis bodywork and fittings											
Check and lubricate the automatic tow coupling (if fitted)											
Check and lubricate all doors, as well as the latches and hinges of the covers											
Undercarriage											
Check the condition of the wheels and tyres											
Check the parking brake											
Lubricate the upper and lower axle stub bearings of the steering axle											
Lubricate the steering linkage bearings											
Check the steering linkage for wear											
Check the brake fluid level. Top up if necessary											
Check the brake system for damage, corrosion and leaks											
Check the front and rear brake linings for wear. Replace if necessary											
Check the shock absorber for damage. Replace if necessary											
Electrical/Electronic											
Check that the battery and battery cable are properly positioned and in good condition											
Check that the electrical connections and cables are properly positioned and in good condition											
Hydraulic Installation											
Check the steering fluid level. Top up if necessary											
Check the steering fluid hoses for damage and leaks. Replace if necessary											
General											
Check labelling for completeness											
Test drive the truck											

Maintenance - 2000 hours/every 2 years

At operating hours										Carried out	
2000		4000		6000		8000		12000			
14000		16000		18000						✓	✖
Depending on the application, environmental conditions and driving style, the following procedures must be carried out at the intervals specified above, or if necessary more frequently.											
Before carrying out the procedures											
Check for error codes using diagnostic software											
Reset the service interval using diagnostic software											
Axles											
Drain and change gearbox oil											
Replace the gearbox breather filters											
Chassis bodywork and fittings											
Check and lubricate the automatic tow coupling (if fitted)											
Check and lubricate all doors as well as latches and hinges of the covers											
Undercarriage											
Checking the condition of the wheels and tyres											
Carry out brake test for the parking brake											
Lubricate the top and bottom steering swivel bearings											
Lubricate the steering linkage bearings											
Check steering linkage for wear											
Check the brake fluid level. Top up if necessary											
Check the brake system for damage, corrosion and leaks											
Check front and rear brake linings for wear. Replace if necessary											
Check the shock absorbers for damage. Replace if necessary											
Electrical/Electronic											
Check that the battery and battery cable are properly positioned and in good condition											
Check that the electrical connections and cables are properly positioned and in good condition											
Clean the control unit cooling fans and air ducts											
Hydraulic Installation											

Maintenance intervals

At operating hours										Carried out	
2000		4000		6000		8000		12000			
14000		16000		18000						✓	✖
Check the steering fluid level. Top up if necessary											
Check the steering fluid hoses for damage and leaks. Replace if necessary											
Special equipment and accessories											
Check diesel heater filter (if applicable)											
General											
Check labelling for completeness											
Test drive the truck											

Maintenance - 5000 hours/every 3 years

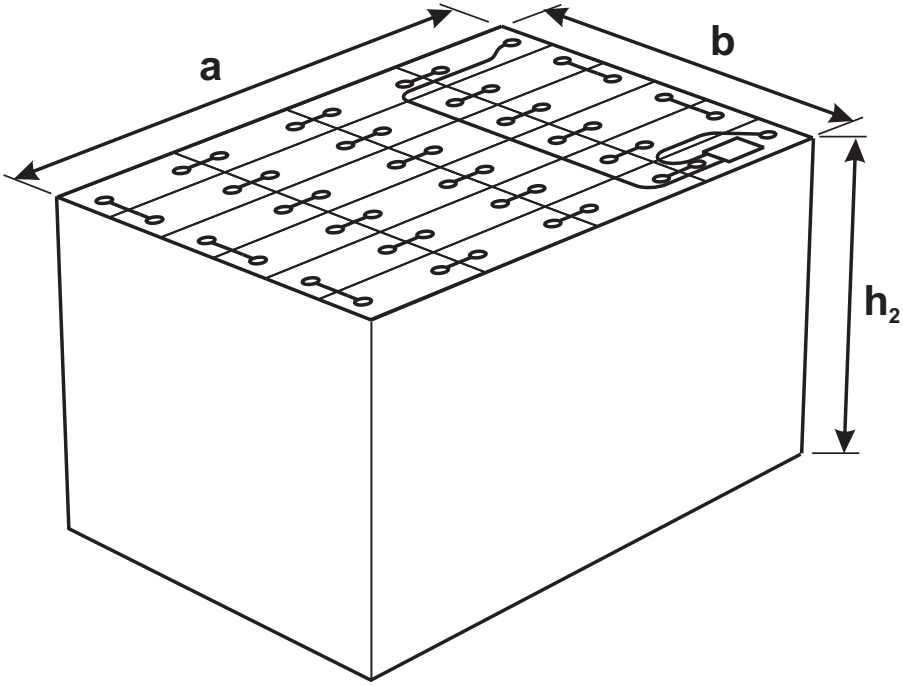
At operating hours										Carried out	
5000		10000		15000		20000				✓	✗
Depending on the application, environmental conditions and driving style, the following procedures must be carried out at the intervals specified above, or more frequently if required.											
Before carrying out the procedures											
Check for error codes using diagnostic software											
Reset the service interval using diagnostic software											
Chassis bodywork and fittings											
Check and lubricate the automatic tow coupling (if fitted)											
Check and lubricate all doors, as well as the latches and hinges of the covers											
Undercarriage											
Check the condition and security of the wheels and tyres											
Carry out a brake test on the parking brake											
Lubricate the top and bottom steering swivel bearings											
Lubricate the steering linkage bearings											
Check the steering linkage for wear											
Change the brake fluid											
Check the brake system for damage, corrosion and leaks											
Check the front and rear brake linings for wear. Replace if necessary											
Check the shock absorber for damage. Replace if necessary											
Controls											
Replace the return spring on the accelerator pedal											
Electrical/Electronic											
Check that the battery and battery cable are properly positioned and in good condition											
Check that the electrical connections and cables are properly positioned and in good condition											
Hydraulic Installation											
Change the steering fluid and filter											
Replace the steering fluid tank breather filter											
Check the steering fluid hoses for damage and leaks. Replace if necessary											

At operating hours										Carried out	
5000		10000		15000		20000				✓	✖
Special equipment and accessories											
Renew the diesel heater fuel filter (if applicable)											
General											
Check labelling for completeness											
Test drive the truck											

7

Technical data

Battery data



R 07-25 (short wheelbase)

Tray	Voltage (V)	Cell type	a [mm]	b [mm]	h_2 [mm]	Capacity (Ah)	Weight [kg]
203*	80	3PzS	1026	564	627	375	965
204	80	4PzS	1026	708	627	460	1210
204	80	4PzS	1026	708	627	500	1210
234	80	4PzS	1028	711	784	560	1558
234	80	4PzS	1028	711	784	620	1558

*Special design for truck chassis necessary.

R 07-25 (long wheelbase)

Tray	Voltage (V)	Cell type	a [mm]	b [mm]	h_2 [mm]	Capacity (Ah)	Weight [kg]
235	80	5PzS	1028	855	784	700	1863

235	80	5PzS	1028	855	784	775	1863
236	80	6PzS	1028	999	784	840	2178
236	80	6PzS	1028	999	784	930	2178

R 08-20 (platform truck)

Tray	Voltage (V)	Cell type	a [mm]	b [mm]	h_2 [mm]	Capacity (Ah)	Weight [kg]
243	80	3PzS	1026	564	462	240	679
244	80	4PzS	1026	708	462	320	858
204	80	4PzS	1026	708	462	460	1210
204	80	4PzS	1026	708	462	500	1210

Wheel rim and tyre data

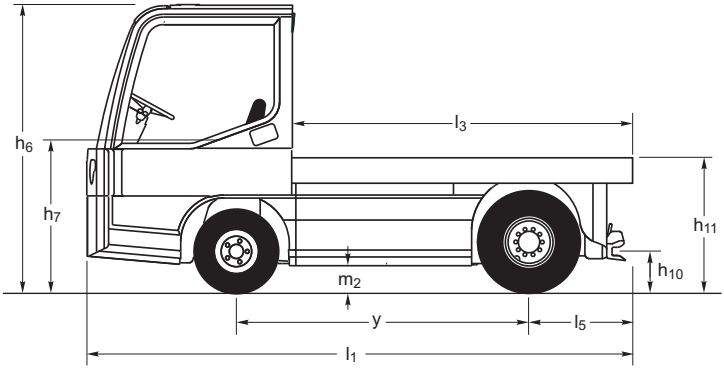
Front (steer) wheels

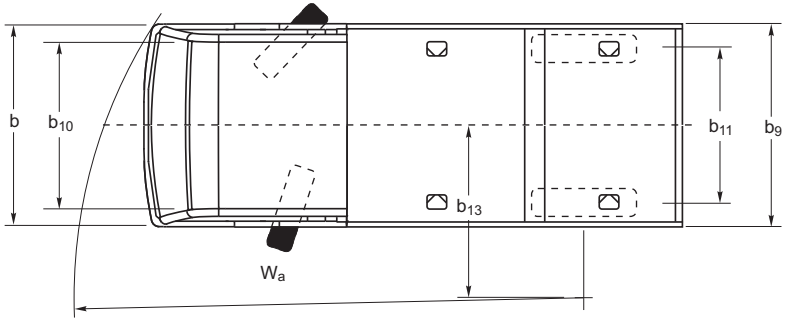
Tyre	Rim	Inner tube
Pneumatic 6.0 R9/12PR-IC70-TL	4.00E-9	6.00-9
SE 21 x 8-9	4.00E-9	-
SE non marking 21 x 8-9	4.00E-9	-

Rear (drive) wheels

Tyre	Rim	Inner tube
Pneumatic 7.00-12/16PR-IC70-TL	5.00S-12	7.00-12 75D
SE 7.00 R12	5.00S-12	-
SE non marking 7.00 R12	5.00S-12	-

Technical data - platform truck (2200)





Characteristics – platform tractor (2 200)				
1.3	Power unit: battery, diesel, petrol, LP gas, mains power			Battery
1.4	Operation: Manual, pedestrian, stand-on, seated, order picker			Seated
1.5	Load capacity	Q	(t)	2
1.7	Rated drawbar pull, with/without load on platform (Based on level, dry surface with rolling resistance of 200 N/t) Refer to towing capacity diagram for specific operating conditions and when the application involves inclines or ramps.	F	(N)	5kW = 500/900 20kW = 800/1200
1.9	Wheelbase	y	(mm)	1 900

Weights – platform tractor (2 200)				
2.1	Service weight		kg	3 100
2.2	Axle load with load, front/rear		kg	2 300/2 800
2.3	Axle load without load, front/rear		kg	1 800/1 300

Wheels and tyres – platform tractor (2 200)				
3.1	Tyres, front/rear (SE = CS superelastic, P = pneumatic) Contoured solid (superelastic) tyres are available			P/P
3.2	Tyre size, front			6.00 R 9
3.3	Tyre size, rear			7.00 R 12
3.5	Wheels, number front/rear (x = driven)			2/2x
3.6	Track width, front:			
	- Pneumatic tyres	b_{10}	(mm)	1102
	- SE tyres	b_{10}	(mm)	1112
3.7	Track width, rear:			
	- Pneumatic tyres	b_{11}	(mm)	1018
	- SE tyres	b_{11}	(mm)	1018

Dimensions – platform tractor (2 200)				
4.7	Height of overhead guard (cabin)	h_6	(mm)	1 820
4.8	Height of seat/stand on platform	h_7	(mm)	745
4.12	Towing coupling height	h_{10}	(mm)	240, 295, 350, 405
4.13	Platform height, without load	h_{11}	(mm)	840

Technical data - platform truck (2200)

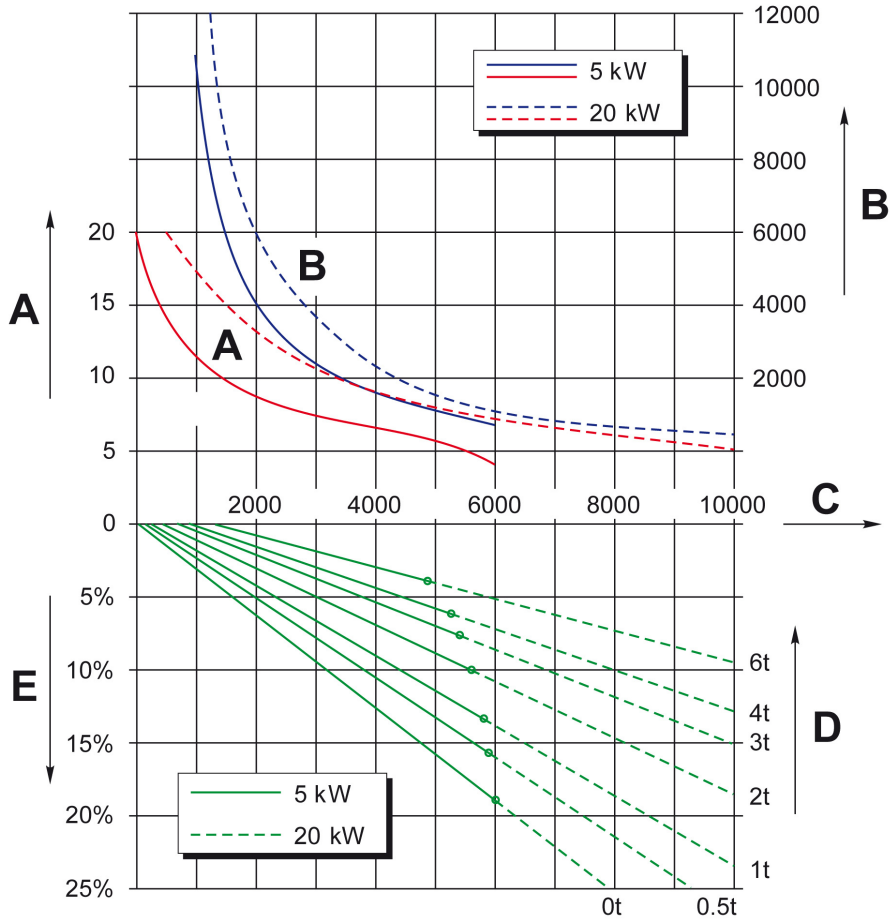
Dimensions – platform tractor (2 200)				
4.16	Loading platform, length	l_3	(mm)	2 200
4.17	Rear overhang	l_5	(mm)	730
4.18	Loading platform, width	b_9	(mm)	1 300
4.19	Overall length	l_1	(mm)	3 530
4.21	Overall width	b_1	(mm)	1 300
4.32	Ground clearance, centre of wheelbase	m_2	(mm)	150
4.35	Turning radius	W_a	(mm)	3 280
4.36	Minimum pivoting point distance	b_{13}	(mm)	1 095

Performance – platform tractor (2 200)				
5.1	Travel speed, with/without rated drawbar pull		km/h	5 kW = 15/20 20 kW = 20/20
5.5	Drawbar pull at 60 minute rating, with/without load on platform		N	5kW = 500/900 20kW = 800/1200
5.4	Maximum drawbar pull, with/without load on platform (Based on level, dry surface with rolling resistance of 200 N/t) Refer to towing capacity diagram for specific operating conditions and when the application involves inclines or ramps.		N	5kW = 5600/6000 20kW = 9600/10000
5.7	Climbing ability, with/without load, 30 minute rating		%	See graph
5.8	Maximum climbing ability, with/without load, 5 minute rating		%	See graph
5.10	Service brake			Hydraulic/electric

Drive – platform tractor (2 200)				
6.1	Drive motors, 60 minute rating 20 kW version is only available in conjunction with 320 Ah battery		kW	5kW = 2 x 2.5 20kW = 2 x 10
6.3	Battery according to DIN 43531/35/36 A, B, C, no			DIN 43536A
6.4	Battery voltage/rated capacity (5h) 20 kW version is only available in conjunction with 320 Ah battery		V/Ah	80/320
6.5	Battery weight (±5%)		kg	858
6.6	Power consumption according to VDI cycle		kW/h	Refer to manufacturer

Other – platform tractor (2 200)				
8.1	Type of drive control			AC - microprocessor
8.4	Noise level at operator's ear		dB (A)	69
8.5	Towing coupling, design/type, DIN/no			Rockinger 244

Towing diagram



A Speed (km/h)
B Permissible haul per hour (m)
C Drawbar pull (N)
D Combined weight trailed plus carried (t)
E Gradient (%)

Technical data - platform truck (2200)

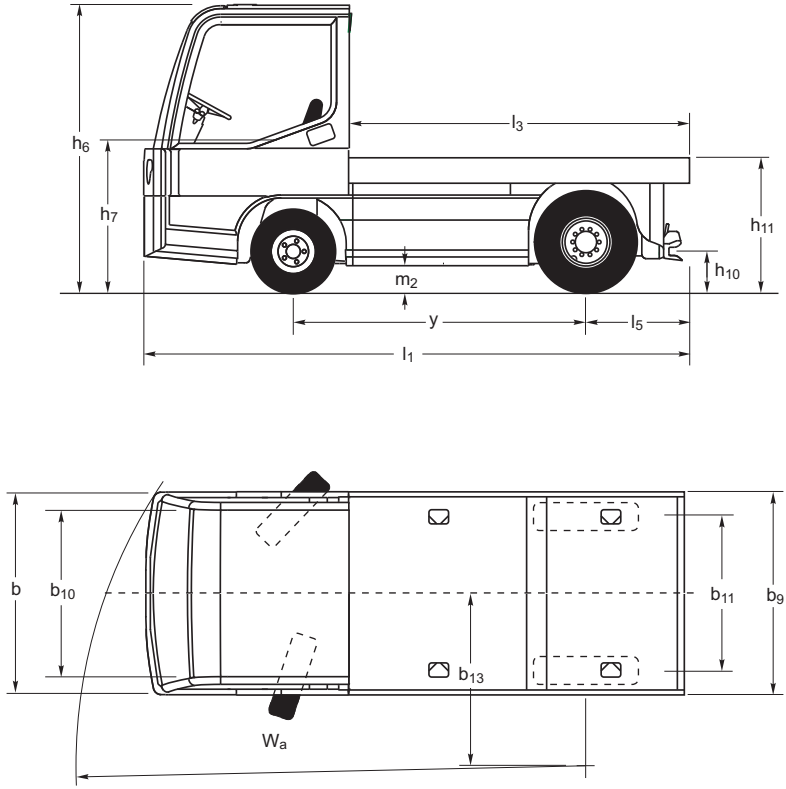
NOTE

The permissible haul per hour is the total distance travelled, including the return journey and any downhill gradients.

NOTE

The tow tractor must only be used with braked trailers.

Technical data — platform truck (2600)



Characteristics – platform tractor (2 600)				
1.3	Power unit: battery, diesel, petrol, LP gas, mains power			Battery
1.4	Operation: Manual, pedestrian, stand-on, seated, order picker			Seated
1.5	Load capacity	Q	(t)	2
1.7	Rated drawbar pull, with/without load on platform (Based on level, dry surface with rolling resistance of 200 N/t) Refer to towing capacity diagram for specific operating conditions and when the application involves inclines or ramps.	F	(N)	5kW = 500/900 20kW = 800/1200
1.9	Wheelbase	y	(mm)	1 900

Weights – platform tractor (2 600)				
2.1	Service weight		kg	3200
2.2	Axle load with load, front/rear		kg	2 100/3 100
2.3	Axle load without load, front/rear		kg	1 800/1 400

Wheels and tyres – platform tractor (2 600)				
3.1	Tyres, front/rear (SE = CS superelastic, P = pneumatic) Contoured solid (superelastic) tyres are available			P/P
3.2	Tyre size, front			6.00 R 9
3.3	Tyre size, rear			7.00 R 12
3.5	Wheels, number front/rear (x = driven)			2/2x
3.6	Track width, front:			
	- Pneumatic tyres	b_{10}	(mm)	1102
	- Superelastic tyres	b_{10}	(mm)	1112
3.7	Track width, rear:			
	- Pneumatic tyres	b_{11}	(mm)	1018
	- Superelastic tyres	b_{11}	(mm)	1018

Dimensions – platform tractor (2 600)				
4.7	Height of overhead guard (cabin)	h_6	(mm)	1 820
4.8	Height of seat/stand on platform	h_7	(mm)	745
4.12	Towing coupling height	h_{10}	(mm)	240, 295, 350, 405
4.13	Platform height, without load	h_{11}	(mm)	840

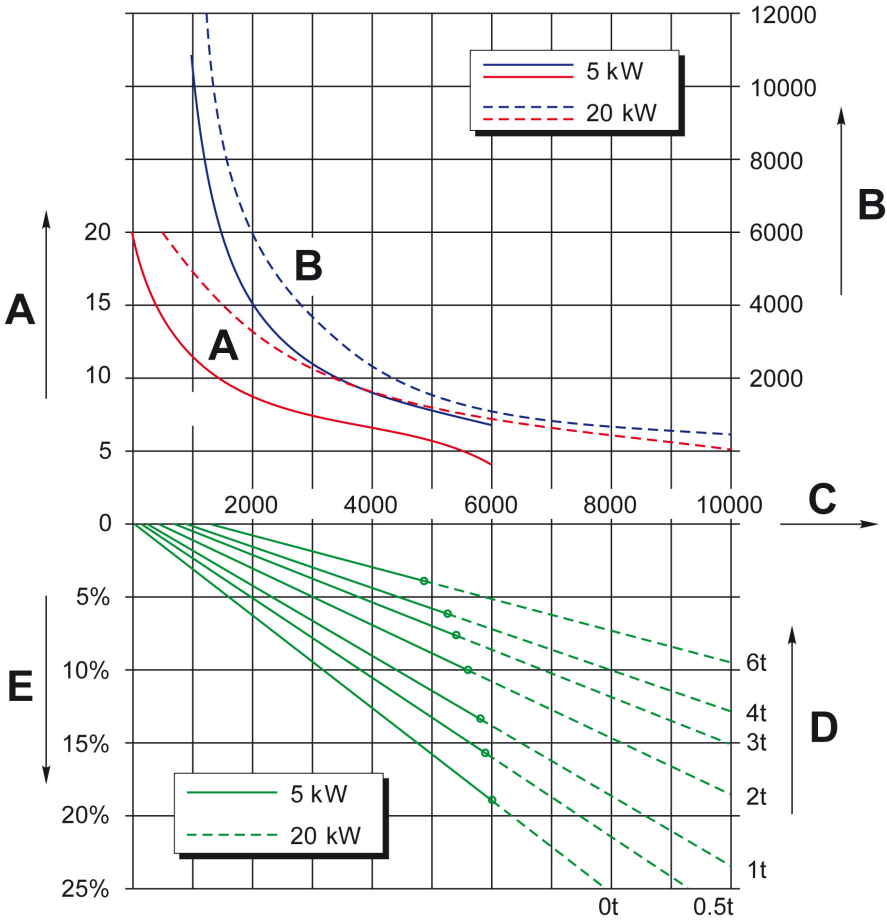
Dimensions – platform tractor (2 600)				
4.16	Loading platform, length	l_3	(mm)	2 600
4.17	Rear overhang	l_5	(mm)	1 130
4.18	Loading platform, width	b_9	(mm)	1 300
4.19	Overall length	l_1	(mm)	3 930
4.21	Overall width	b_1	(mm)	1 300
4.32	Ground clearance, centre of wheelbase	m_2	(mm)	150
4.35	Turning radius	W_a	(mm)	3 280
4.36	Minimum pivoting point distance	b_{13}	(mm)	1 095

Performance – platform tractor (2 600)				
5.1	Travel speed, with/without rated drawbar pull		km/h	5 kW = 15/20 20 kW = 20/20
5.5	Drawbar pull at 60 minute rating, with/without load on platform		N	5kW = 500/900 20kW = 800/1200
5.4	Maximum drawbar pull, with/without load on platform (Based on level, dry surface with rolling resistance of 200 N/t) Refer to towing capacity diagram for specific operating conditions and when the application involves inclines or ramps.		N	5kW = 5600/6000 20kW = 9600/10000
5.7	Climbing ability, with/without load, 30 minute rating		%	See graph
5.8	Maximum climbing ability, with/without load, 5 minute rating		%	See graph
5.10	Service brake			Hydraulic/electric

Drive – platform tractor (2 600)				
6.1	Drive motors, 60 minute rating 20 kW version is only available in conjunction with 320 Ah battery		kW	5kW = 2 x 2.5 20kW = 2 x 10
6.3	Battery according to DIN 43531/35/36 A, B, C, no			DIN 43536A
6.4	Battery voltage/rated capacity (5h) 20 kW version is only available in conjunction with 320 Ah battery		V/Ah	80/320
6.5	Battery weight (±5%)		kg	858
6.6	Power consumption according to VDI cycle		kW/h	Refer to manufacturer

Other – platform tractor (2 600)				
8.1	Type of drive control			AC - microprocessor
8.4	Noise level at operator's ear		dB (A)	69
8.5	Towing coupling, design/type, DIN/no			Rockinger 244

Towing diagram



A Speed (km/h)
B Permissible haul per hour (m)
C Drawbar pull (N)
D Combined weight trailed plus carried (t)
E Gradient (%)

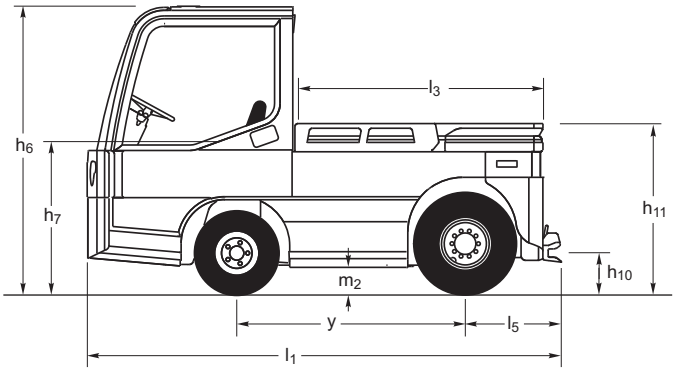
NOTE

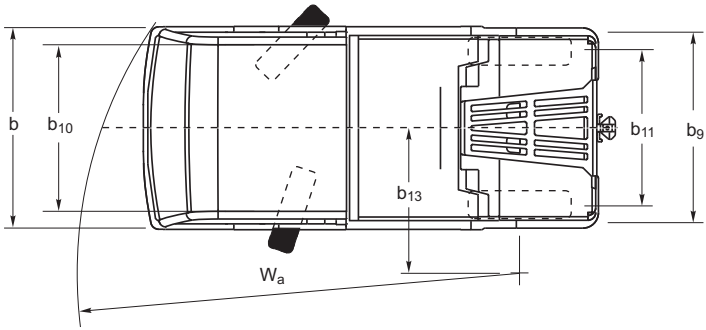
The permissible haul per hour is the total distance travelled, including the return journey and any downhill gradients.

NOTE

The tow tractor must only be used with braked trailers.

Technical data - long wheelbase tow tractor





Characteristics – long wheelbase tow tractor				
1.3	Power unit: battery, diesel, petrol, LP gas, mains power			Battery
1.4	Operation: Manual, pedestrian, stand-on, seated, order picker			Seated
1.5	Nominal towed load (Based on level, dry surface with rolling resistance of 200 N/t)	Q	(t)	25
1.7	Rated drawbar pull (Based on level, dry surface with rolling resistance of 200 N/t) Refer to towing capacity diagram for specific operating conditions and when the application involves inclines or ramps.	F	(N)	5 000
1.9	Wheelbase	y	(mm)	1 900

Weights – long wheelbase tow tractor				
2.1	Service weight		kg	4 800
2.2	Axle load with load, front/rear		kg	2 600/2 500
2.3	Axle load without load, front/rear		kg	2 500 2 300

Wheels and tyres – long wheelbase tow tractor				
3.1	Tyres, front/rear (SE = CS superelastic, P = pneumatic) Contoured solid (superelastic) tyres are available			P/P
3.2	Tyre size, front			6.00 R 9
3.3	Tyre size, rear			7.00 R 12
3.5	Wheels, number front/rear (x = driven)			2/2x
3.6	Track width, front:			
	- Pneumatic tyres	b_{10}	(mm)	1102
	- SE tyres	b_{10}	(mm)	1112
3.7	Track width, rear:			
	- Pneumatic tyres	b_{11}	(mm)	1018
	- SE tyres	b_{11}	(mm)	1018

Dimensions – long wheelbase tow tractor				
4.7	Height of overhead guard (cabin)	h_6	(mm)	1 820
4.8	Height of seat/stand on platform	h_7	(mm)	745
4.12	Towing coupling height	h_{10}	(mm)	240, 295, 350, 405

Technical data - long wheelbase tow tractor

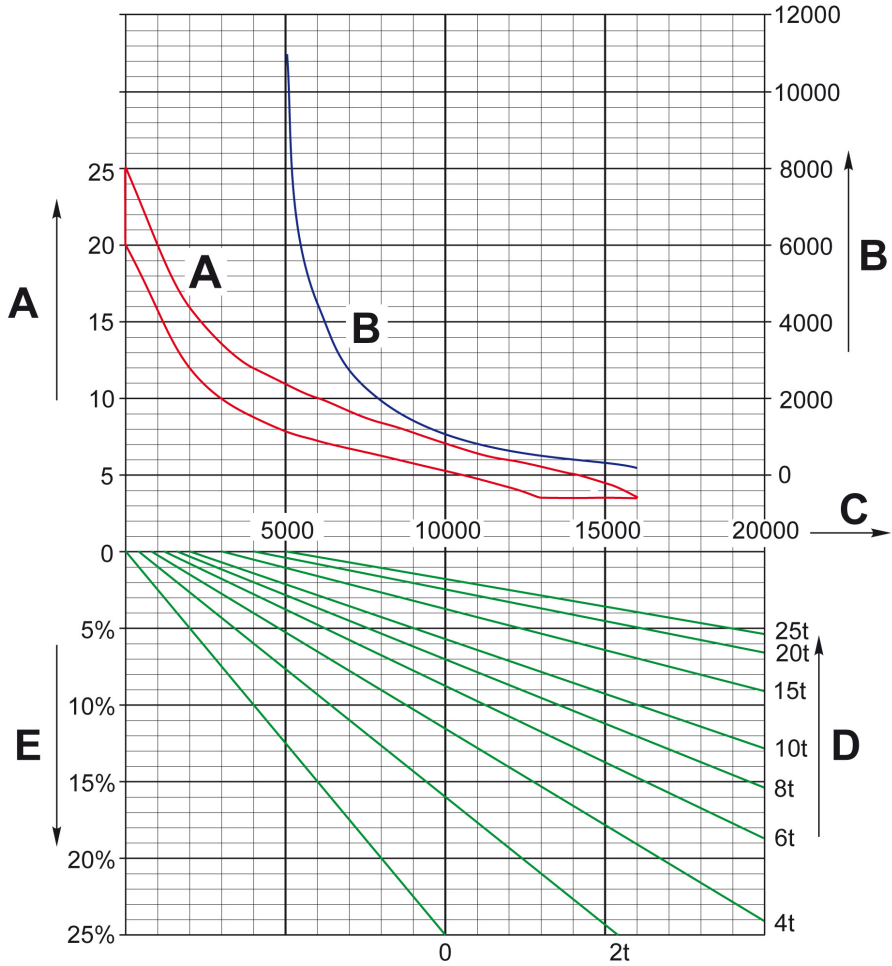
Dimensions – long wheelbase tow tractor				
4.13	Platform height, without load	h_{11}	(mm)	1 000
4.16	Loading platform, length	l_3	(mm)	1 955
4.17	Rear overhang	l_5	(mm)	615
4.18	Loading platform, width	b_9	(mm)	1 170 (1 120 at rear)
4.19	Overall length	l_1	(mm)	3 480
4.21	Overall width	b_1	(mm)	1 300
4.32	Ground clearance, centre of wheelbase	m_2	(mm)	150
4.35	Turning radius	W_a	(mm)	3 280
4.36	Minimum pivoting point distance	b_{13}	(mm)	1 095

Performance – long wheelbase tow tractor				
5.1	Travel speed, with/without rated drawbar pull		km/h	11/25
5.5	Drawbar pull at 60 minute rating		N	5 000
5.4	Maximum drawbar pull (Based on level, dry surface with rolling resistance of 200 N/t) Refer to towing capacity diagram for specific operating conditions and when the application involves inclines or ramps.		N	16 000
5.7	Climbing ability, with/without load, 30 minute rating		%	See graph
5.8	Maximum climbing ability, with/without load, 5 minute rating		%	See graph
5.10	Service brake			Hydraulic/electric

Drive – long wheelbase tow tractor				
6.1	Drive motors, 60 minute rating		kW	2 x 10
6.3	Battery according to DIN 43531/35/36 A, B, C, no			DIN 43536A
6.4	Battery voltage/rated capacity (5h)		V/Ah	80/840
6.5	Battery weight (±5%)		kg	2 178
6.6	Power consumption according to VDI cycle		kW/h	Refer to manufacturer

Other – long wheelbase tow tractor				
8.1	Type of drive control			AC - microprocessor
8.4	Noise level at operator's ear		dB (A)	Refer to manufacturer
8.5	Towing coupling, design/type, DIN/no			Refer to manufacturer

Towing diagram



A	Speed (km/h)	D	Trailer weight (t)
B	Permissible haul per hour (m)	E	Gradient (%)
C	Drawbar pull (N)		

NOTE

The speed / drawbar pull performance of the tractor can be programmed between the two limits shown to suit the application.

Technical data - long wheelbase tow tractor

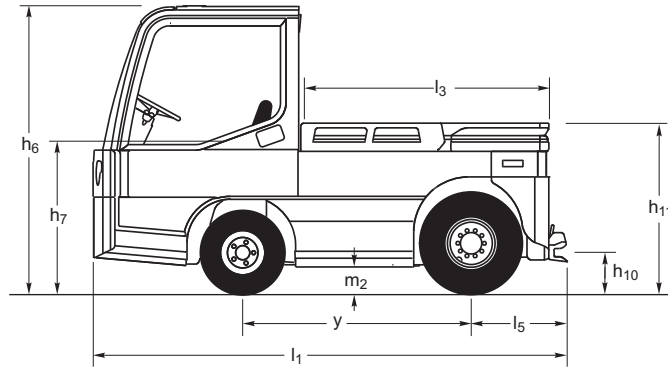
NOTE

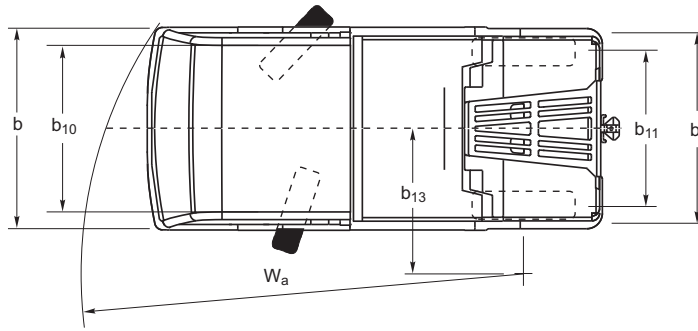
The permissible haul per hour is the total distance travelled, including the return journey and any downhill gradients.

NOTE

Only braked trailers are permitted for loads exceeding 9 t and when travelling on downward slopes.

Technical data - tow tractor with short wheelbase





Technical data - tow tractor with short wheelbase

Characteristics – short wheelbase tow tractor				
1.3	Power unit: battery, diesel, petrol, LP gas, mains power			Battery
1.4	Operation: Manual, pedestrian, stand-on, seated, order picker			Seated
1.5	Nominal towed load (Based on level, dry surface with rolling resistance of 200 N/t)	Q	(t)	25
1.7	Rated drawbar pull (Based on level, dry surface with rolling resistance of 200 N/t) Refer to towing capacity diagram for specific operating conditions and when the application involves inclines or ramps.	F	(N)	5 000
1.9	Wheelbase	y	(mm)	1 485

Weights – short wheelbase tow tractor				
2.1	Service weight		kg	3 800
2.2	Axle load with load, front/rear		kg	2 000/2 100
2.3	Axle load without load, front/rear		kg	1 900/1 900

Wheels and tyres – short wheelbase tow tractor				
3.1	Tyres, front/rear (SE = CS superelastic, P = pneumatic) Contoured solid (superelastic) tyres are available			P/P
3.2	Tyre size, front			6.00 R 9
3.3	Tyre size, rear			7.00 R 12
3.5	Wheels, number front/rear (x = driven)			2/2x
3.6	Track width, front:			
	- Pneumatic tyres	b_{10}	(mm)	1102
	- Superelastic tyres	b_{10}	(mm)	1112
3.7	Track width, rear			
	- Pneumatic tyres	b_{11}	(mm)	1018
	- Superelastic tyres	b_{11}	(mm)	1018

Dimensions – short wheelbase tow tractor				
4.7	Height of overhead guard (cabin)	h_6	(mm)	1 820
4.8	Height of seat/stand on platform	h_7	(mm)	745
4.12	Towing coupling height	h_{10}	(mm)	240, 295, 350, 405

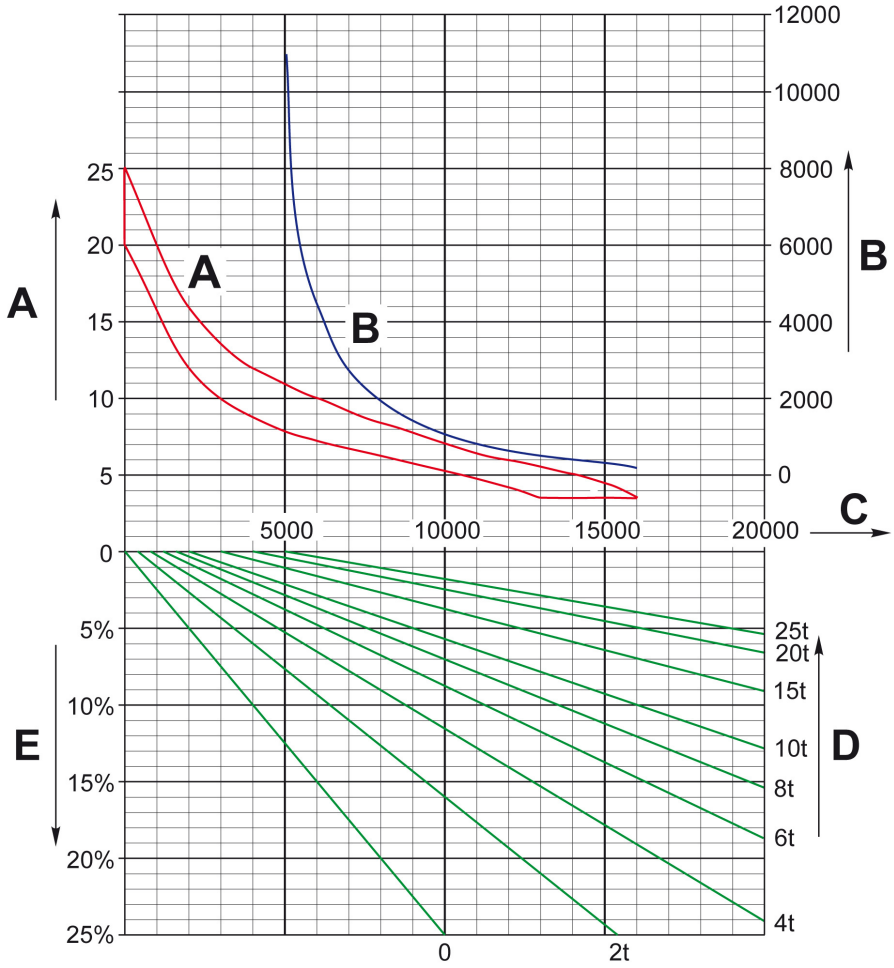
Dimensions – short wheelbase tow tractor				
4.13	Platform height, without load	h_{11}	(mm)	1 000
4.16	Loading platform, length	l_3	(mm)	1 520
4.17	Rear overhang	l_5	(mm)	615
4.18	Loading platform, width	b_9	(mm)	1 170 (1 120 at rear)
4.19	Overall length	l_1	(mm)	3 045
4.21	Overall width	b_1	(mm)	1 300
4.32	Ground clearance, centre of wheelbase	m_2	(mm)	150
4.35	Turning radius	W_a	(mm)	2 830
4.36	Minimum pivoting point distance	b_{13}	(mm)	935

Performance – short wheelbase tow tractor				
5.1	Travel speed, with/without rated drawbar pull		km/h	11/25
5.5	Drawbar pull at 60 minute rating		N	5 000
5.4	Maximum drawbar pull (Based on level, dry surface with rolling resistance of 200 N/t) Refer to towing capacity diagram for specific operating conditions and when the application involves inclines or ramps.		N	16 000
5.7	Climbing ability, with/without load, 30 minute rating		%	See graph
5.8	Maximum climbing ability, with/without load, 5 minute rating		%	See graph
5.10	Service brake			Hydraulic/electric

Drive – short wheelbase tow tractor				
6.1	Drive motors, 60 minute rating		kW	2 x 10
6.3	Battery according to DIN 43531/35/36 A, B, C, no			DIN 43536A
6.4	Battery voltage/rated capacity (5h)		V/Ah	80/560
6.5	Battery weight (±5%)		kg	1 558
6.6	Power consumption according to VDI cycle		kW/h	Refer to manufacturer

Other – short wheelbase tow tractor				
8.1	Type of drive control			AC - microprocessor
8.4	Noise level at operator's ear		dB (A)	Refer to manufacturer
8.5	Towing coupling, design/type, DIN/no			Refer to manufacturer

Towing diagram



A	Speed (km/h)	D	Trailer weight (t)
B	Permissible haul per hour (m)	E	Gradient (%)
C	Drawbar pull (N)		

NOTE

The speed / drawbar pull performance of the tractor can be programmed between the two limits shown to suit the application.

NOTE

The permissible haul per hour is the total distance travelled, including the return journey and any downhill gradients.

NOTE

Only braked trailers are permitted for loads exceeding 9 t and when travelling on downward slopes.

Towed load for the front coupling (tow tractors with short and long wheelbases)

The tow tractor can pull the same load at the front as at the rear.

NOTE

The towed load at the front is dependent on the coupling height (installation height of the front coupling). If the coupling height is lowered, the permissible towed load at the front of the tow tractor is also reduced; see the table.

NOTE

The towed load is dependent on the maximum pulling force of the tow coupling (see the identification plate for the tow coupling). The towed load must not exceed the permissible pulling force of the tow coupling and the permissible pulling force of the truck.

Towed load for the front coupling	
Coupling height (mm)	Max. pulling force (N)
700	16000
800	14700
900	13300
1000	12000

Towed load for the front coupling (tow tractors with short and long wheelbases)

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