

Linde Material Handling

Linde



Electric forklift trucks

Original instructions

Series 388-01

E35 / 40 / 45 / 50

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Linde – Your Partner



With over 100,000 fork lift trucks and warehouse machines sold annually, Linde is one of the world's leading manufacturers of material handling equipment. There are many reasons for this success: Linde products are renowned not only for their innovative, cutting-edge technology, but also for their low energy and operating costs, which are up to 40 per cent lower than those of their competitors.

The high quality of Linde products is also matched by the quality of our service. With ten production plants worldwide and an extensive network of sales partners, we are at your service round the clock and around the world.

Your local Linde partner can offer you a complete package from a single source; ranging from expert advice on all aspects of sales and service through, of course, to appropriate finance options. Our leasing, hire or lease-purchase agreements provide you with the flexibility to tailor decision-making to your individual business requirements.

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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

By entering the address **www.linde-mh.com/VDMA** in a web browser or by scanning the QR code, information can be accessed at any time.



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1

Introduction

1 Introduction

Your industrial truck

Your industrial truck

offers optimum economic efficiency, safety and driving comfort. It is primarily down to you to maintain these characteristics for a long time and take advantage of the resulting benefits.

During manufacture:

- all safety requirements of the relevant EC directives were observed
- all conformity assessment procedures stipulated in the applicable directives were carried out

This is attested by the CE mark shown on the nameplate.

These operating instructions contain everything you need to know about commissioning, driving and maintenance.

A number of items of special equipment have their own operating instructions, which are supplied along with these devices.

Observe the operating instructions for the industrial truck version in question.

Carry out the specified work regularly, at the due times and using the consumables envisaged for this purpose in accordance with the inspection and maintenance overview.

The designations used in the text: front - rear - left - right - always refer to the installation position of the parts described, with forwards as the drive direction (fork arms forwards) for the industrial truck.

Servicing work not described here will require specialist knowledge, measuring devices and frequently also special tools.

Contact the service partner for more information.

Servicing should only be carried out by qualified personnel approved by the manufacturer (specialists).

With orders for parts, please specify the following along with the parts numbers:

Industrial truck model:	
Production number / year of manufacture:	
Handover date:	

The production number should also be specified for parts from the following units: lift mast, drive axle and steering axle.

Lift mast number:	
Lift mast lift:	
Drive axle number:	
Steering axle number	

When you receive the industrial truck, copy this data from the identification plates of the units into these operating instructions.

 **NOTE**

In the event of repairs, only use genuine spare parts from the manufacturer. This is the only way to guarantee that the industrial truck will remain in the same technical condition as when it was received.

Please address all queries relating to the industrial truck and orders for spare parts to your service partner only, stating your mailing address.

The company, i.e. the manufacturer, is constantly engaged in the further development of its products.

We ask for your understanding that, in the interest of progress, illustrations and technical data are subject to technical modifications in terms of form, equipment and expertise.

For this reason, no claims can be asserted on the basis of the following data, figures and descriptions in these operating instructions.

These operating instructions must not be reproduced, translated or made accessible to third parties—including as excerpts—except with the express written approval of the manufacturer.

Intended use

The industrial truck may only be used as permitted.

The industrial truck is used for moving and lifting the loads indicated on the capacity rating plate.

Damages and defects

Damages and other defects to industrial trucks or to attachments must be reported to the Supervisor immediately. Industrial trucks and attachments which are not safe to operate may not be used until they have been properly repaired.

Safety installations and switches may not be removed or rendered unusable. Specified settings may only be changed with the approval of the manufacturer.

Danger areas

Danger areas are those areas in which persons are in danger as a result of the movements of industrial trucks, their operating equipment, their load carrying devices (e.g. their attachments) or the loaded goods. This also includes the area which can be reached by falling goods or lowering or falling operating equipment and devices.

People must not stand in the danger area of an industrial truck.

Working areas

Only the areas approved by the operating company or its representative may be used for transportation purposes. Loads may only be deposited or stored at the intended places.

In operating areas with magnetic fields that have a magnetic flux density greater than 5 mT, unintentional truck and lift mast movements cannot be entirely excluded under unfavourable circumstances. In this case components developed especially for this purpose must be used.

Driving routes

Driving routes shall be sufficiently paved, level and free of objects. Drain channels and railway crossings, etc., shall be levelled and, if necessary, covered with ramps in such a way that they can be driven over without bumps as far as possible.

Industrial trucks shall only be used on routes without sharp curves, excessive slopes and gates which are too narrow or too low.

Inclines used by industrial trucks shall not exceed the limits specified by the manufacturer and must have an adequately rough surface. Level and smooth transitions at the upper and lower end shall prevent the load from touching the floor or causing damages to the chassis.

The admissible area and point load of driving lanes or routes may not be exceeded. There shall be an adequate clearance between the highest parts of industrial trucks or the load and the fixed parts of the surrounding areas.

The EU Directive 89/654/EEC (Minimum Regulations for Health and Safety at Work) shall be observed. The respective national regulations apply for non-EU countries.

Danger points on driving lanes or routes shall be secured or marked by the customary road traffic signs and by additional warning signs, if necessary.

When driving on public roads, the corresponding regulations must be observed, as well as country-specific restrictions for winter road conditions.

Fire protection

The operating company is responsible for adequate fire protection in the vicinity of the industrial truck. Depending on the form of use, it is responsible for additional fire protection on the industrial truck. Enquiries should be directed to the responsible supervisory authority in case of doubt.

1 Introduction

Impermissible use

Attachments

Attachments shall only be used as permitted. The driver shall be instructed in the handling of attachments.

The attachment operating instructions are enclosed for trucks that are delivered from the factory with an attachment. Before commissioning a truck with an attachment, you must check that loads are handled securely. Depending on the type of attachment, it may be necessary to make adjustments, e.g. pressure settings or adjusting stops and operating speeds. See the attachment operating instructions for the corresponding instructions.

If attachments are not supplied with the industrial truck, the specifications of the industrial truck manufacturer and the attachment manufacturer must be observed.

The attachments and the connection of power supplies for powered attachments may only be made by specialists in accordance with the specifications of the manufacturer. The proper functioning of the attachments shall be checked after each installation before initial use.

The permissible carrying capacity of the attachments and the permitted load of the industrial truck (carrying capacity and load moment) combined with the attachments shall not be exceeded., refer to additional capacity rating plate.

Modifications, in particular attachments or conversions, are not permitted to be made to the industrial truck without the manufacturer's approval.

Trailers

Industrial trucks may only be used to tow trailers if they are intended for this purpose by the manufacturer and if they are fitted with the appropriate trailer coupling. The maximum towed load specified in the operating instructions for unbraked or braked trailers must not be exceeded.

The towing industrial truck must be operated in such away that safe driving and braking of the towed vehicle is ensured for all driving movements.

Impermissible use

DANGER

High risk of property damage, injury and death.

Avoid impermissible use.

The operating company or driver, and not the manufacturer, is liable if the truck is used in a manner that is not permitted.

The following list is exemplary and is not intended to be exhaustive.

It is not permitted:

- To use the truck to transport people (if the truck is not designed for this purpose)
- in areas where there is a risk of fire or explosion

- for stacking/unstacking operations on slopes
- To stand on the fork arms when raised
- To exceed the truck's maximum load capacity
- To increase the truck's load capacity, e.g. by attaching an additional weight.

Description of use and climatic conditions

Normal use

- Indoor and outdoor use
- Ambient temperature in tropical and Nordic regions ranging from -10 °C to 40 °C
- Use at up to 2000 metres above sea level.

Special use (partly with special measures)

- Ambient temperature in tropical regions to 40 °C
- Cold store version to -32 °C

Symbols used

The terms DANGER, WARNING, CAUTION, NOTE and ENVIRONMENT NOTE are used in these operating instructions for notes on particular hazards or for unusual information that needs to be highlighted:

DANGER

Means that failure to comply can cause risk to life and/or major damage to property.

WARNING

Means that failure to comply can cause risk of serious injury and/or major damage to property.

CAUTION

Means that failure to comply can cause risk of material damage or destruction.

NOTE

Means that particular attention is drawn to combinations of technical factors which may not be evident even to a specialist.

ENVIRONMENT NOTE

The instructions listed here must be complied with as otherwise environmental damage may result.



CAUTION

This label is found on the truck in the areas where particular care and attention are required.

You should refer to the appropriate section in these operating instructions.

For your safety, additional symbols are also used. Please heed the various symbols.

1 Introduction

Technical description

Technical description

The electric trucks from series 388 enable loading and palletising for loads of up to 3.5 tonnes with the E 35, up to 4 tonnes with the E 40, up to 4.5 tonnes with the E 45 and up to 5 tonnes with the E 50.

 **NOTE**

Please refer to each load capacity diagram for the load centre of gravity data.

A driver's compartment with the most up-to-date ergonomic design and the energy-saving digital controller (LDC) included as standard makes this industrial truck a valuable piece of equipment.

The truck features a compact design, good visibility, maximum stability against overturning and cornering stability thanks to its variable wheelbase.

There is an electric forklift truck in this version:

Combined axle
E 35, E 40, E 45, E 50

If you require further information on the different versions, please contact your authorised dealer.

The combined axle ensures a large movement range for the steering axle, good ground contact and reliable handling for both inside and outside operations, even when used on poor road surfaces.

The truck has an electric drive unit and an electric motor with a hydraulic pump for the steering and working hydraulics.

Drive

Front-wheel drive via two electric traction motors combined in one compact axle with automatic corner shift, which drive the right and left-hand drive wheel via the respective wheel gear.

The power required is supplied by the battery installed in the truck.

Thanks to the twin pedal system, forwards and reverse travel is controlled steplessly via the digital controller.

Steering

Kickback-free steering of the truck, which is sensitive and virtually free of play, is performed manually using the small steering wheel of the hydrostatic steering on the steering axle steering cylinder.

Hydraulic system

The hydraulic system consists of an electric motor with a hydraulic pump for the steering and for the lift mast lift and tilt cylinders, a hydraulic oil tank with a breather filter and an oil dipstick, as well as a suction filter and pressure filter.

Operation

With one accelerator pedal each for forwards travel and reverse travel, the traction motors are controlled steplessly from a standstill to maximum speed in both drive directions.

The driver always has both hands free for steering and controlling operational movements.

This results in fast reversing and efficient stacking.

A joystick is used to control the lifting, lowering and tilting operational movements.

There is also another joystick for operating the additional attachments.

If desired, all operational movements (lifting, lowering and tilting) can also be controlled with single lever operation.

Brakes

The truck is equipped with three independent brake systems that act on the front axle:

- The hydraulic service brake, which is actuated by using the stop pedal.
- The electrohydraulic parking brake, which is activated manually by using the parking brake switch.
- The electric regenerative brake, or LBC (Linde Brake Control) for energy recovery, which is automatically actuated when the accelerator pedal is released or when the drive direction is changed. On request, the LBC braking effect can be changed using the diagnostic program.

In addition, the truck has an automatic brake, which is activated after a short delay when the accelerator pedal is released.

Electrical system

The well-protected electrical system is positioned at the front, under the right-hand truck console.

The required energy is supplied by the 80-V battery built into the chassis.

A hinged side access panel allows the battery to be changed quickly and easily.

Receiving the industrial truck

Receiving the industrial truck

Before the industrial truck leaves our factory, it undergoes a thorough inspection process in order to guarantee that it is in perfect condition and that it contains all of the equipment specified in the order.

In order to prevent complaints from occurring further down the line, the exact condition of the industrial truck and the integrity of the equipment are checked and the proper handover/acceptance of the truck is confirmed by the dealer.

Customised options

There are separate operating instructions for the customised options.

NOTE

These separate operating instructions can be found at the back of the technical information folder.

CAUTION

Risk of overload on battery female connector.

For trucks that are supplied from the factory without batteries, a battery female connector is also required in the MRC version for increased current-carrying capacity.

Contact your Service-partner.

The following technical documents belong to each industrial truck:

- Operating instructions for the truck
- Operating instructions for the attachment (only applies to trucks delivered from the factory with an attachment)
- EC/EU declaration of conformity

Legal requirements for marketing

Declaration

Linde Material Handling GmbH
Carl-von-Linde-Platz
D-63743 Aschaffenburg, Germany

We declare that the machine

Industrial truck **according to these operating instructions**

Model **according to these operating instructions**

complies with the most recent version of machinery directive 2006/42/EC.

Personnel authorised to compile the technical documents:

See EC/EU declaration of conformity

Linde Material Handling GmbH

EC/EU declaration of conformity

The manufacturer declares that the industrial truck complies with the provisions of the EC machinery directive, and other EC/EU directives if applicable, that are valid at the time of marketing. This is confirmed by the EC/EU declaration of conformity and by the CE labelling on the nameplate.

The EC/EU declaration of conformity document is supplied with the industrial truck. The declaration shown explains the conformity

with the provisions of the EC machinery directive.

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

The EC/EU declaration of conformity must be carefully stored and made available to the responsible authorities if necessary. It must also be handed over to the new owner if the industrial truck is sold on.

Disposing of components and batteries

Disposing of components and batteries

The truck is composed of different materials. If components or batteries need to be replaced and disposed of, the national regulations must be observed with regard to:

- Disposal
- Treatment
- Recycling

 **NOTE**

The documentation provided by the battery manufacturer must be observed when disposing of batteries.

 **ENVIRONMENT NOTE**

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

2

Safety

2 Safety

Safety guidelines

Safety guidelines

The operating company or the person it has commissioned must ensure that the driver understands all safety information and that all guidelines and safety regulations are observed.

During training, drivers must familiarise themselves with the following:

- The operating conditions of the working area
- The specific technical characteristics of the industrial truck
- The operation of attachments

Driving, control and steering operations should be practised with an unloaded industrial truck until they are completely mastered. Only then may a loaded industrial truck be used for practice.

Safety information

DANGER

The industrial truck must not be used by unauthorised persons.

Only persons who are trained and authorised to operate the industrial truck may have access to the industrial truck.

DANGER

In operating areas with magnetic fields that have a magnetic flux density greater than 5 mT, unintentional truck and lift mast movements cannot be entirely excluded under unfavourable circumstances.

For magnetic fields with magnetic flux densities greater than 5 mT, components developed especially for this purpose must be used.

Contact your service partner.

DANGER

Safety systems (e.g. the seat switch) are in place to ensure safety.

Under no circumstances may any safety systems be disabled.

⚠ DANGER

Any additional bores or welding on the overhead guard will compromise its rigidity.

It is therefore strictly prohibited to drill holes in the overhead guard or to perform welding work on it.

⚠ CAUTION

Risk of overloading the battery female connector.

This means that only the embedded battery female connector (MRC socket) that has been approved by the manufacturer may be used.

Make sure that the correct battery female connector is connected, especially after changing the battery.

Contact your service partner.

⚠ CAUTION

Welding operations on other parts of the truck can cause damage to the electronics.

Therefore, always disconnect the battery and all connections to the electronic controls before performing any welding work.

⚠ CAUTION

Various functions are supported by gas springs. Gas springs are subjected to a high internal pressure of up to 300 bar.

Gas springs may only be removed when they are not under pressure, and must never be opened without prior instruction. Any kind of damage, lateral forces, buckling, temperatures in excess of 80°C and heavy contamination must be avoided under all circumstances.

Damaged or defective gas springs must be replaced immediately.

Contact your service partner.

⚠ WARNING

In trucks with an accumulator, serious injuries may occur if the accumulator is not handled properly.

Before starting work on the accumulator, it must be depressurised.

Contact your service partner.

2 Safety

Safety guidelines



⚠ WARNING

Depending on the duration of use and the operating time, components carrying exhaust air may become hot. Protective equipment must therefore be worn.

⚠ WARNING

The truck working area must be sufficiently lit. If it is not sufficiently lit, working spotlights must be installed to ensure that the driver can see properly.

⚠ WARNING

Health risk due to non-ionising radiation from retrofitted devices (e.g. radio transmitter).

Always ensure that the manufacturer's instructions are observed and that no persons with active or non-active implantable medical devices are harmed.

If non-ionising radiation is present, affix a warning sign within the driver's field of vision.

⚠ CAUTION

Various pieces of special equipment are connected to the "speed reduction" special function. This is purely an assistance function, and the driver must not rely solely on this function during operation.

The driver is always responsible for safe operation.

⚠ CAUTION

If the driver relies on active medical equipment, e.g. pace makers or hearing aids, the functionality of these devices may be impaired when driving.

Check with a doctor or the manufacturer of the medical equipment whether the equipment is sufficiently protected against electromagnetic interference.



NOTE

If your truck is equipped with a fire extinguisher, make sure that you familiarise yourself with how to use it in case of an emergency. Information on its use is provided on the fire extinguisher.

Safety guidelines for the load-dependant assistance system (load weight indicator "plus")

The load-dependant assistance system reduces the risk of tipping and increases the stability of the truck.

- This is achieved by actively intervening in the lifting and tilting movements. In addition, there is the option to intervene in the driving speed.
- The load centre of gravity is not taken into account. Consult the load capacity diagram.

To ensure that the system functions reliably, the following safety guidelines must be observed.

Assistance system

The load-dependant assistance system (load weight indicator "plus") provides information to help the driver and reduces the risk of tipping in line with defined limit values. To reduce the risk caused by certain impermissible load states, the load-dependant assistance system actively intervenes in the controller. This only applies where the truck is being used for its intended purpose.

NOTE

Assistance systems are only designed to offer a supporting function and do not guarantee safety. The responsibility for operating the truck in a safe manner always lies with the driver. Even in the event of a potential malfunction, the driver must have full control of the truck at all times.

Residual risks

Despite careful work and compliance with all applicable standards and regulations, the possibility of other dangers when using the industrial truck cannot be entirely excluded.

Hazard assessment

The load-dependant assistance system changes the driving characteristics and operation of the truck and therefore influences the hazard assessment. It is therefore necessary to adapt the hazard assessment in line with national health and safety directives, and to train the driver on how to operate the truck with the load-dependant assistance system. It is imperative that drivers familiarise themselves with how to operate the truck with the load-dependant assistance system.

Application conditions

The load-dependant assistance system is not suitable for applications in which the system components may be damaged by exposure to dirt, chemicals or bulky loads. This applies to the sensors of the assistance system in particular.

If a limit value is approached or reached, a visual and audible signal is provided via the display unit. At the same time, the assistance system intervenes in the movements of the truck. In this case, the driver must leave the critical area.

Service plan

NOTE

When changing tyres, calibrate the tilt angle potentiometer Contact service partner.

Service work may only be carried out by competent persons. See the section entitled "Competent person".

The industrial truck and its possible attachments comply with current safety regulations. Nevertheless, even when the truck is used for its proper purpose and all instructions are followed, some residual risk cannot be excluded.

2 Safety

Stability

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

DANGER

Persons in the vicinity of the industrial truck must be instructed with regard to the dangers that arise through use of the truck.

These operating instructions also contain additional safety regulations.

Residual dangers can include:

- Escape of consumables due to leakages or the rupture of lines, hoses or containers,
- Risk of accident when driving over difficult ground such as gradients, smooth or irregular surfaces, or with poor visibility,
- Risk of falling, tripping, slipping etc. during movement of the industrial truck, especially in the wet, with leaking consumables or on icy surfaces,
- Risk of fire and explosion due to the battery and electrical voltages,
- Human error,
- Disregarding the safety regulations,
- Risk caused by unrepaired damage,
- Risk caused by insufficient maintenance or testing,
- Risk caused by using the wrong consumables.

Stability

Stability is guaranteed if your industrial truck is used according to its intended purpose.

Stability will not be guaranteed in the event of:

- cornering at excessive speeds,
- moving with the load raised,
- moving with a load that is protruding to the side (e.g. sideshift),
- turning and driving diagonally across descents or ascents,
- driving on descents or ascents with the load on the downhill side,
- loads that are too wide,
- driving with a swinging load,
- ramp edges or steps.

In the case of tip-over



d3921101

- Stay buckled up
- Don't jump
- Hold on tight
- Brace feet
- Lean away

The stability of your industrial truck is ensured if used properly and as intended. Should the industrial truck tip over during an unapproved application or due to incorrect operation, always follow the instructions depicted above.

Handling consumables



ENVIRONMENT NOTE

Consumables must be handled properly and in accordance with the manufacturer's instructions.

- Consumables should only be stored in containers complying with applicable regulations and at the locations stipulated.
- Do not bring flammable consumables into contact with hot objects or a naked flame.
- When topping up consumables, use only clean containers.
- Observe the manufacturer's instructions relating to safety and disposal.
- Avoid spilling.
- Remove any spilled fluid immediately with a suitable binder and dispose of it according to applicable regulations.
- Old and contaminated operating materials should be disposed of according to the regulations.

- Comply with the statutory provisions.
- Before performing greasing, filter changes or any work on the hydraulic system, carefully clean the area around the part involved.
- Dispose of used spare parts in an environmentally friendly manner.

WARNING

The penetration of pressurised hydraulic fluid into the skin, e.g. due to leakage, is hazardous. If an injury of this type occurs, always consult a doctor. Protective equipment must be worn.

WARNING

The improper handling of coolant and coolant additives presents a risk to health and the environment. Observe the manufacturer's instructions without fail.

Competent person

A competent person is a specialist in the field of industrial trucks who has:

- Successfully completed training, as at least a service engineer for industrial trucks
- Many years of professional experience with industrial trucks

- Knowledge of the accident prevention regulations
- Knowledge of the relevant national technical regulations

The competent person is able to assess the condition of industrial trucks in terms of health and safety.

Periodic safety inspection

Periodic safety inspections are required in order to maintain the function and security of the industrial truck.

The national regulations must be observed without fail.

In Europe, the national laws are based on the directives 95/63/EC, 99/92/EC and 2001/45/EC. These stipulate that periodic safety inspections of the industrial truck must

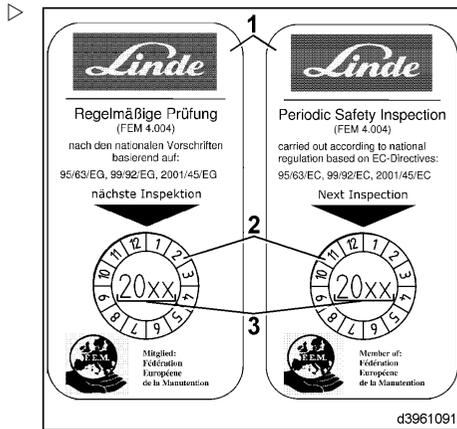
2 Safety

Fit attachments

be carried out by competent personnel, in order to ensure proper condition.

There is a recommendation setting out the scope of the periodic safety inspection —FEM 4.004 of the European Industrial Truck Association— which defines a test log to document the current safety inspection and an inspection sticker for the next safety inspection. The next safety inspection date is shown by the year number (3) on an adhesive label (2), which changes colour every year and is found on a label (1).

The scope of the testing is added by the manufacturer in accordance with the specific truck type. Please contact your service partner to carry out this work.

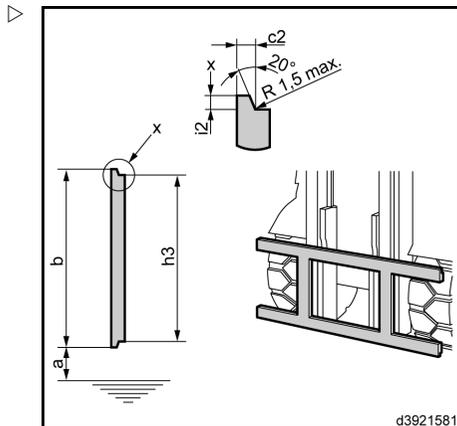


Fit attachments

Only specialists are permitted to fit the attachment and connect the energy supply for power-driven attachments.

Mechanical connection

For **hung** attachments, the attachment and fork carriage must be of the same class.



Class As per ISO 2328	Load capacity Truck kg	Load centre of gravity mm	Design	a mm	b mm	c2 mm	i2 mm	h3 mm
1	0 - 999	400 and 600	A	76	331	16	13	305
			B	114				
2	1000 - 2500	500 and 600	A	76	407	16	13	381
			B	152				
3	2501 - 4999	500 and 600	A	76	508	21.5	16	476
			B	203				
4	5000 - 8000	600	A	127	635	25.5	19	597
			B	254				
5	8001 - 10999	600	A	127	728	34	25	678
			B	257				

Integrated attachments are made to match the installed lift mast. When fitting attachments retroactively, the correct attachment and all necessary parts from the industrial truck manufacturer—especially lift mast rollers and chain holders—must be available.

Contact your Service-partner.

Hydraulic connection

WARNING

Hydraulic system is under pressure. Risk of injury.
Wear protective equipment.

CAUTION

Damage to the hydraulic system through contamination.

When connecting hydraulic lines, ensure they are clean.

Before connecting hydraulic lines or hydraulic couplings, the hydraulic system must be depressurised.

Without depressurisation:

- Place a collection container underneath.
- Carefully release connection of the hydraulic lines.

2 Safety

Fit attachments

When the pressure is reduced, hydraulic oil escapes.

- Disconnect hydraulic lines.
- Connect hydraulic lines to attachment.

With depressurisation: (special equipment)

- Depressurise the hydraulic lines as described in section "Depressurisation".
- Disconnect hydraulic lines.
- Connect hydraulic lines to attachment.

Additional capacity rating plate

Attachments alter the load capacity and stability of the truck. For each attachment, an additional capacity rating plate must be mounted where the driver can see it that indicates the load capacity of the truck with attachment; see section "Additional capacity rating plate for attachments".

A symbol sticker for the relevant attachment must be affixed behind the actuating lever.

Emergency exit with attached rear window

NOTE

Industrial trucks with a built-in front window and rear window:

If an industrial truck breaks down in a narrow aisle, it may no longer be possible to exit the truck at the side.

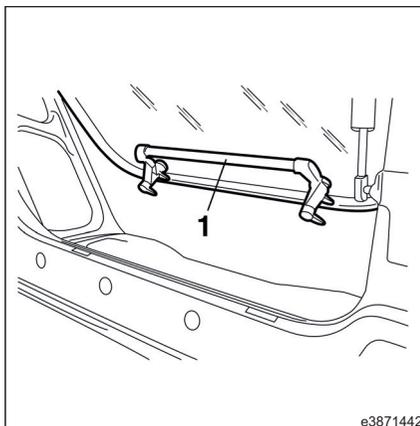
In the event of acute danger, the driver can exit the industrial truck via the rear window.

➤ Actuate linkage (1) to the left.

Both interlocks on the rear window are unlocked simultaneously via the linkage.

➤ Push the rear window outwards until it reaches the top position.

➤ Climb out carefully towards the rear.



2 Safety

Emergency lowering

Emergency lowering

If there is a malfunction, the fork carriage can be lowered manually.

The control valve (3), which is located under the bottom plate for the pedals on the right-hand side of the truck, is equipped with an emergency lowering screw (1). This is secured and sealed with a self-locking nut (2).

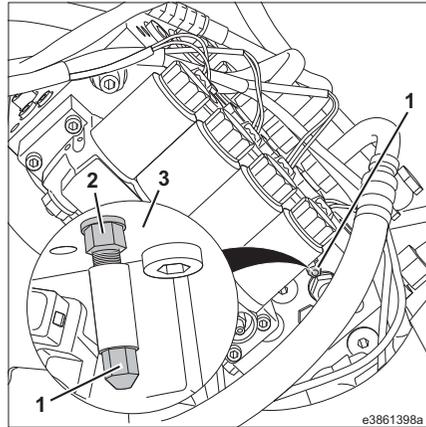


⚠ DANGER

Risk of accident or danger to life when lowering the fork carriage with fork arms.

People must not stand near the fork arms when they are being lowered.

Leave the socket wrench on the screw (1) of the control valve (3) during the lowering process to ensure that lowering can be interrupted at any time.



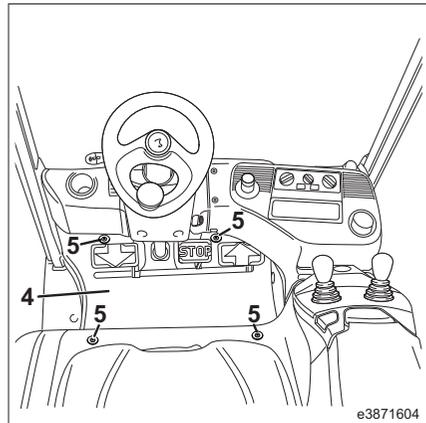
e3861398a

- Remove the rubber mat from the floor plate.
- Remove the bottom plate (4) by unscrewing ▸ the four fastening screws (5).
- Remove the bottom plate (4) entirely

i NOTE

When doing so, make sure beforehand that the plug connector is detached from the accelerator and the brake pedal switch.

- Slowly turn the emergency lowering screw (1) about 3 turns anti-clockwise using an 8-mm AF socket wrench until the fork carriage has been completely lowered.



e3871604

Emergency lowering for trucks with an elevated driver's compartment

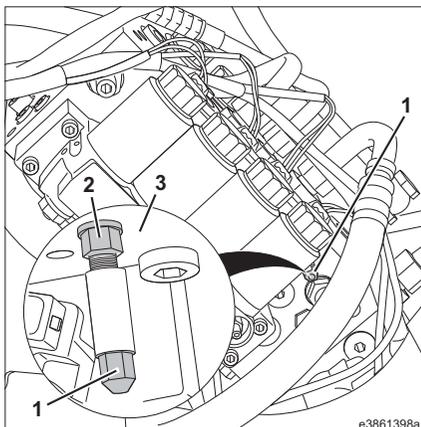
- After lowering, turn the emergency lowering screw (1) in a clockwise direction (tightening torque 10 Nm). Otherwise it will not be possible to operate the fork carriage lift function using the joystick
- Retighten the self-locking nut (2).

Tightening torque: 9.5 Nm.

NOTE

After emergency lowering has been performed three times, a new threaded stud with self-locking nut must be used.

- Refit floor plate.
- Place rubber mat back on floor plate.

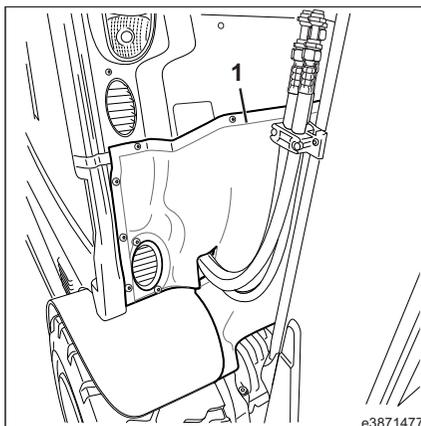


Emergency lowering for trucks with an elevated driver's compartment

On trucks with an elevated driver's compartment, emergency lowering is performed using a threaded rod. Controlled via a lever, this threaded rod releases the emergency lowering screw with self-locking nut on the control valve.

- Release the rubber panelling (1) on the right-hand side and fold it out to the left.

The threaded rod can be accessed via the opening.



2 Safety

Emergency lowering for trucks with an elevated driver's compartment

- Turn the knurled nut (4) under the support bracket (3) downwards by about 20 mm.
- Remove the bottom plate.



DANGER

Risk of accident when lowering the fork carriage.

People must not stand near the fork arms when they are being lowered. Leave the socket wrench on the nut (2) to enable lowering to be interrupted at any time.

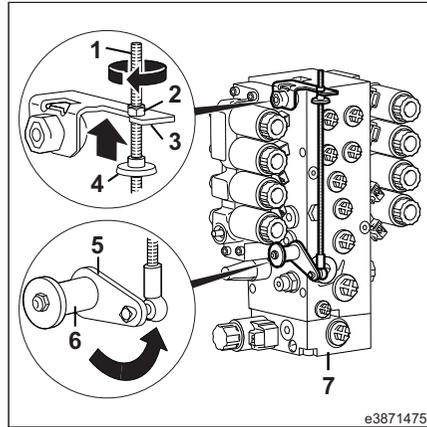
- Using the socket wrench, slowly turn the nut (2) clockwise until the fork carriage is lowered fully.
- After lowering, turn the nut (2) anticlockwise, and push the threaded rod (1) downwards until the lever (5) has returned to the 5 o'clock position.
- Tighten the knurled nut (4) by turning it clockwise to the stop on the support bracket (3).

NOTE

After emergency lowering has been performed three times, a new threaded stud with self-locking nut must be used.

Contact your service partner.

- Install the bottom plate.



e3871475

Towing

If the truck ever has to be towed in an emergency, the multi-disc brake on the drive axle can be released for this purpose.

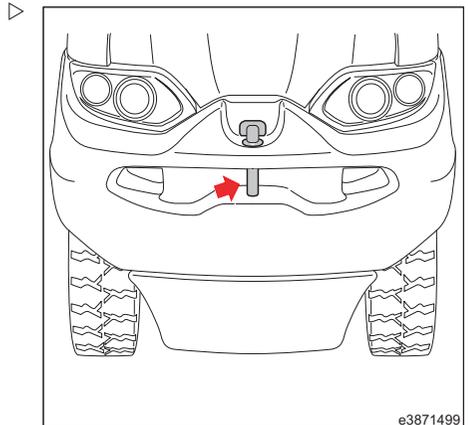
⚠ WARNING

Risk of accident and risk of fatal injury! When the multi-disc brake is released, the truck can no longer be braked. The parking brake will not function either.

To tow the truck, a towing vehicle with sufficient tractive force and braking force for the unbraked towed load is required. The truck may only be towed using a fixed connection (towing bar).

Towing procedure

- Lower the load to a height at which the fork arms will not scrape along the ground while towing.
- Remove the load.
- Attach a towing vehicle (with sufficient tractive force and braking force) to the towing pin (see arrow) on the truck using the tow bar.



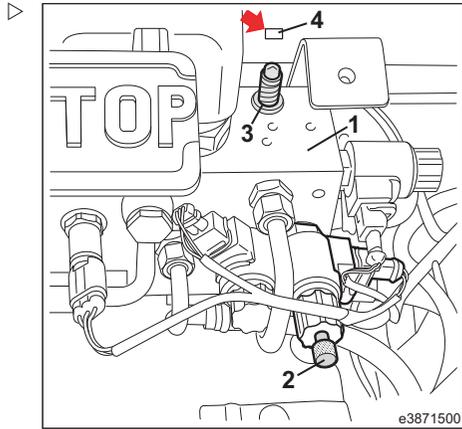
2 Safety

Towing

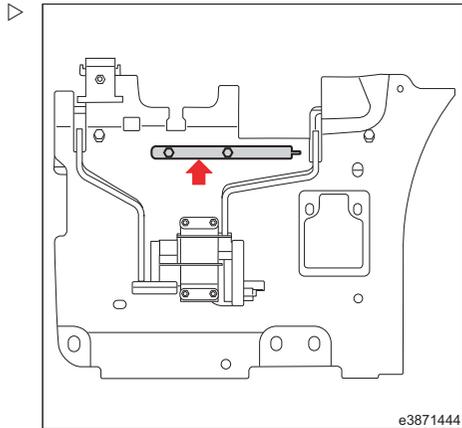
Releasing the multi-disc brake

The brake valve (1) is located under the bottom plate.

- Remove the bottom plate.
- Tighten the screw (2) clockwise to the stop.



- Remove the lever (see arrow) from the bottom plate.



- Insert the lever (5) into the opening (4) provided in the front wall and place the lever on the tappet (3).
- Move the lever downwards approx. 20 times (pump the lever).

This results in a build-up of pressure and releases the multi-disc brake.

i NOTE

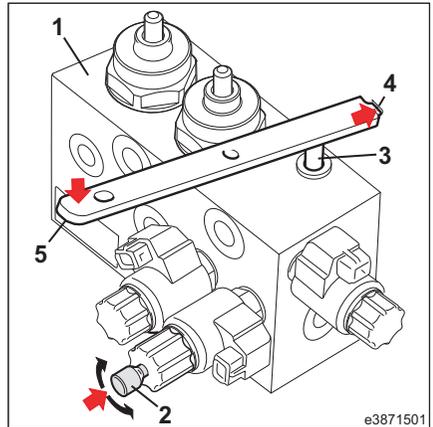
To release the multi-disc brake in the drive wheel units, an accumulator is also used to supply the brake valve.

⚠ DANGER

Acute risk of injury when working on accumulator. Improper handling may lead to serious accidents.

Before starting repair work on the accumulator or on any pressurised hydraulic pipework, the accumulator must be depressurised.

Appropriate specialist knowledge is required for this task. Contact your service partner.



Towing

- Tow the truck. If possible, steer the truck while it is being towed.

After towing

- Use wheel chocks on the side of the truck facing downhill.
- Shut down the truck.

2 Safety

Towing

Restoring braking readiness

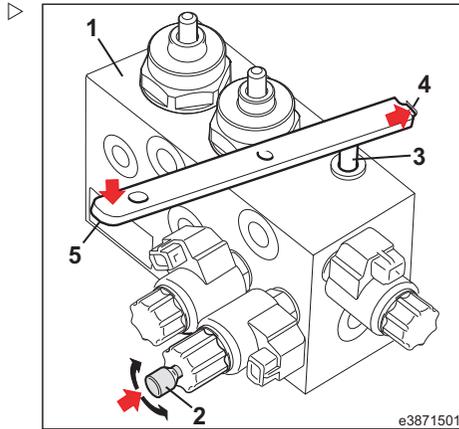
Once the towing procedure has been performed, braking readiness must be restored.

- Unscrew the screw (2) again, rotating it in an anti-clockwise direction to the stop.
- Pull out the lever (5) from the opening (4) again and place the lever back in the bottom plate.
- Fit the bottom plate.

⚠ DANGER

The truck must not be driven if the brake system is defective.

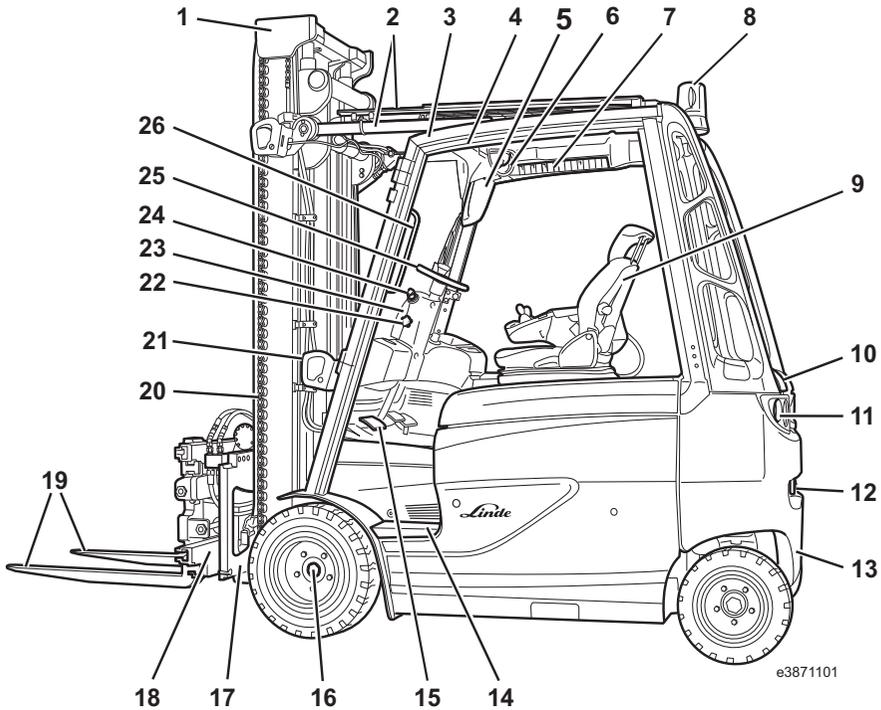
After working on the brake system, check for correct function. If there are any defects in the brake system, contact your service partner.



3

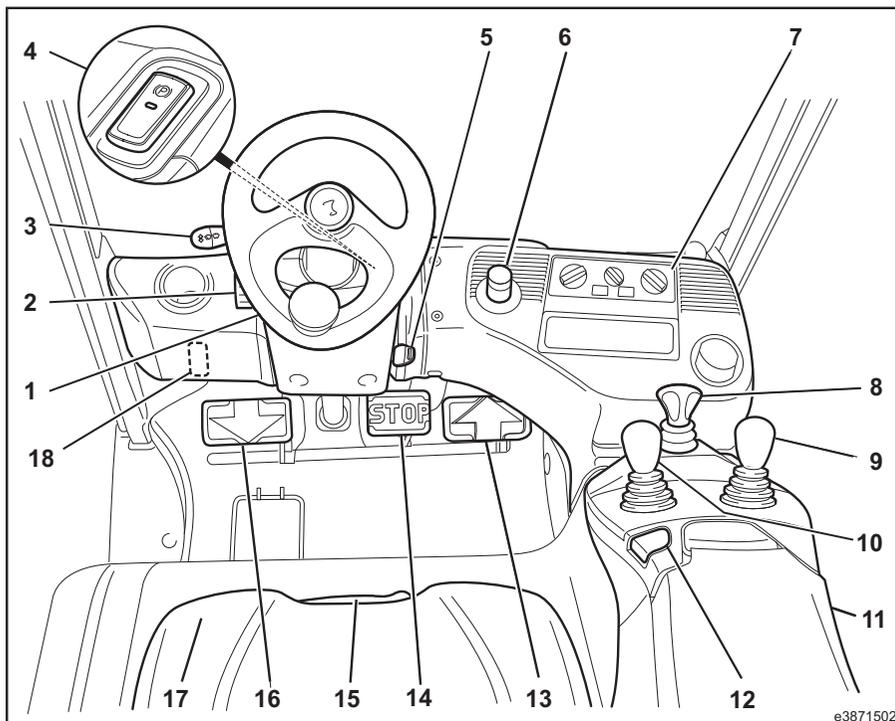
Overview

Truck overview



- | | | | |
|----|--|----|--|
| 1 | Lift mast | 13 | Counterweight |
| 2 | Tilt cylinder | 14 | Step |
| 3 | Overhead guard | 15 | Pedal group/reverse accelerator pedal |
| 4 | Load capacity diagram
(on the inside of the overhead guard) | 16 | Left wheel gear |
| 5 | Display unit | 17 | Fork carriage |
| 6 | Rear-view mirror | 18 | Sideshift |
| 7 | Switch panel | 19 | Fork arms |
| 8 | Toggle switch for special equipment | 20 | Lift mast chain |
| 9 | Rotating beacon/flashing beacon | 21 | Front left working spotlight |
| 10 | Driver's seat with armrest and operating console | 22 | Steering column adjusting knob |
| 11 | Rear flap | 23 | Steering column |
| 12 | Left tail light (LED) | 24 | Flasher unit / windshield wiper switch |
| 13 | Towing pin | 25 | Steering wheel |
| | | 26 | Handhold |

Operating devices



- | | | | |
|---|--|----|--|
| 1 | Steering wheel | 10 | Joystick for working hydraulics |
| 2 | Steering column adjusting knob | 11 | Armrest |
| 3 | Turn indicator switch | 12 | Horn signal button |
| 4 | Parking brake switch | 13 | Forward travel accelerator pedal |
| 5 | Key switch | 14 | Stop pedal |
| 6 | Emergency off switch | 15 | Lever for adjusting the driver's seat |
| 7 | Control panel for the heating system (special equipment) | 16 | Reverse travel accelerator pedal |
| 8 | Drive direction switch, single-pedal version (special equipment) | 17 | Driver's seat with seat switch |
| 9 | Joystick for attachments (special equipment) | 18 | "Truck configuration" label (for a description, see "Truck configuration label") |

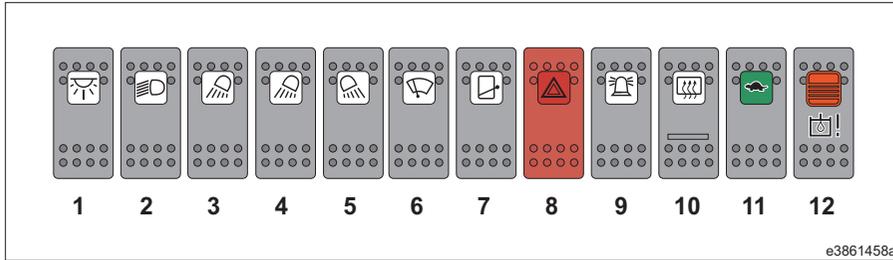
NOTE

The switches for the lighting, the windscreen wipers and the heating system (special equipment) can be found in a switch panel located on the top right-hand side of the overhead guard, level with the display unit.

3 Overview

Switch panel

Switch panel

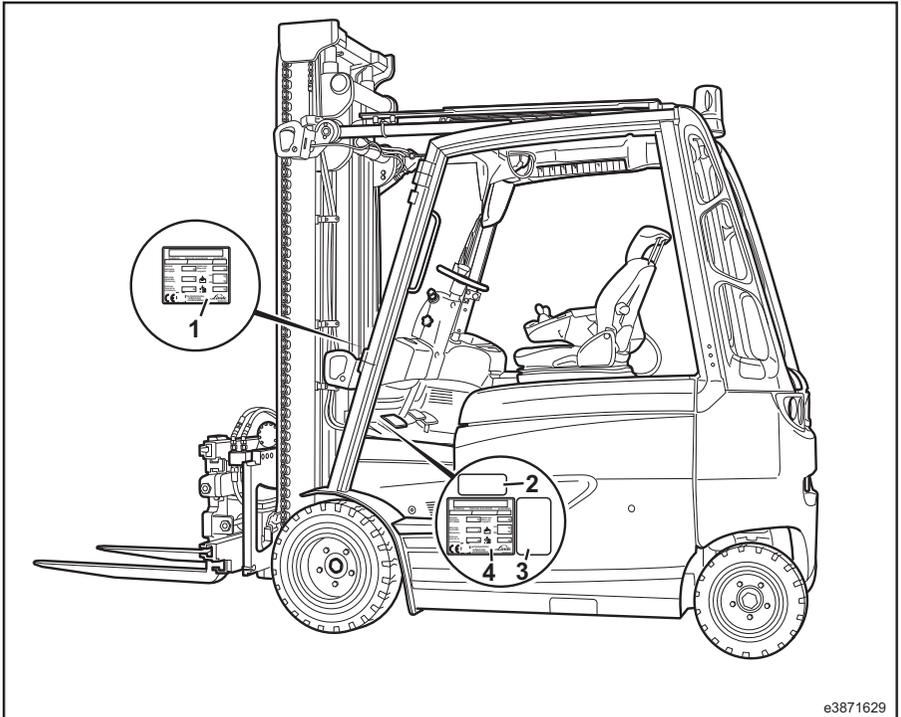


- | | | | |
|---|--|----|---|
| 1 | Clipboard light and interior lighting | 7 | Roof panel wiper - intermittent mode or continuous operation on/off (the washer system is always activated) |
| 2 | Standard lighting or higher lighting | 8 | Hazard warning light |
| 3 | Working spotlight, position 1/2 | 9 | Rotating beacon, flashing beacon or BlueSpot |
| 4 | Working spotlight, position 3/4 or working spotlight, position 5/6 | 10 | Rear window heating |
| 5 | Working spotlight, position 7/8 | 11 | Driving speed reduction |
| 6 | Front windscreen wiper and rear window wiper - continuous operation on/off (intermittent mode depending on the drive direction; the washer system is always activated) | 12 | Depressurisation of working hydraulics |

NOTE

The switch panel is mounted at the top right of the overhead guard. The configuration and arrangement of individual switches may vary, depending on the version. Observe the switch symbols.

Labelling nameplate



- 1 Position of nameplate until 04/2017
- 2 Additional adhesive label for lift mast number
- 3 Adhesive label for truck configuration
- 4 Adhesive label for nameplate from 05/2017

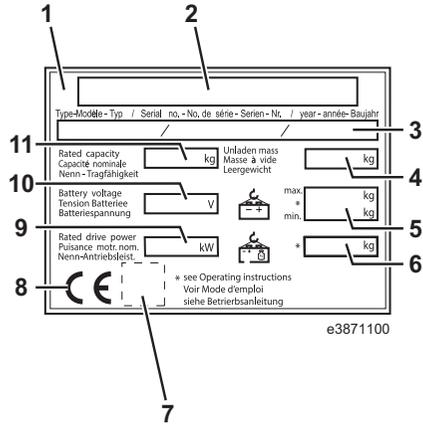
3 Overview

Labelling



NOTE

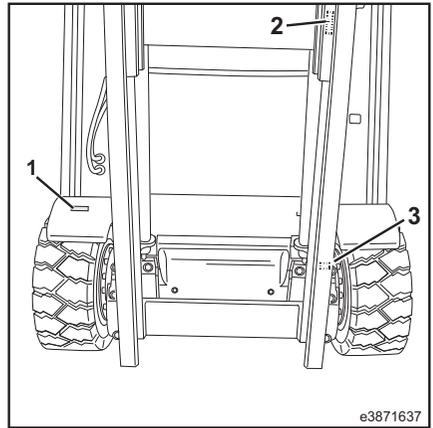
The CE mark confirms compliance with the EC machinery directive and with all regulations applicable to the truck.



- 1 Nameplate
- 2 Manufacturer
- 3 Model / Production no. / Year of manufacture
- 4 Tare weight
- 5 Max. battery weight / min. battery weight
- 6 Ballast weight
- 7 Placeholder for data matrix code
- 8 CE mark
- 9 Nominal driving power
- 10 Battery voltage
- 11 Rated capacity

Truck numbers and identification plates

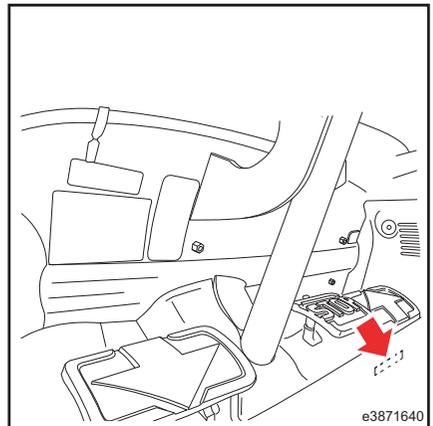
- 1 Serial number (stamped)
- 2 Lift mast number (adhesive label)
- 3 Identification plate for the drive axle



Serial number stamp location

The stamp location for the serial number is being moved from the right-hand mudguard to the footwell. The new stamp position is on the front of the battery wall (see arrow).

From serial number **H2X387H00467**

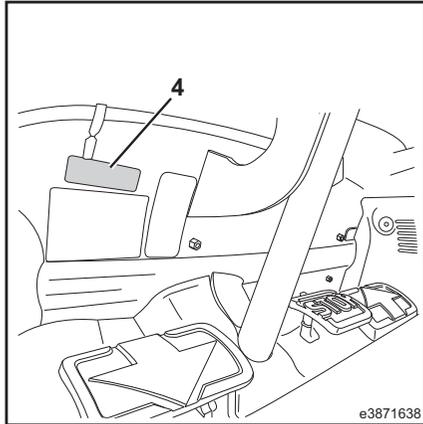


3 Overview

Labelling

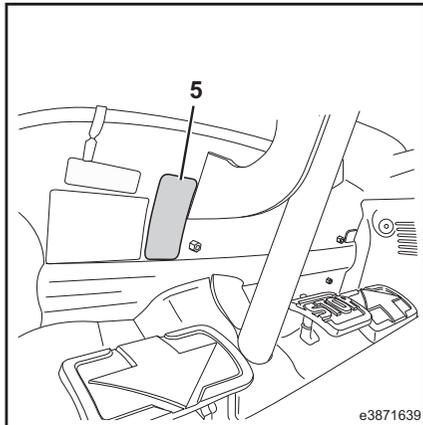
Additional lift mast number

- 4 Additional label for the lift mast number (from 05/2017)



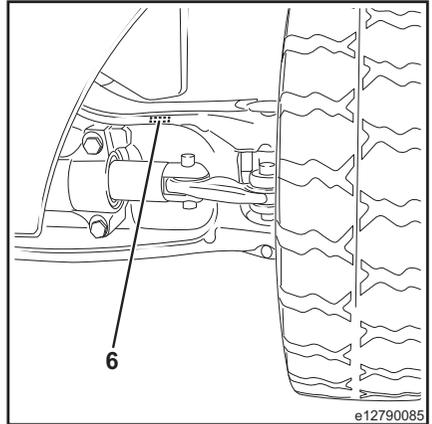
"Truck configuration" label

- 5 "Truck configuration" label (for a description, see "Truck configuration label")



Identification plate for the steering axle ▷

6 Identification plate for the steering axle



3 Overview

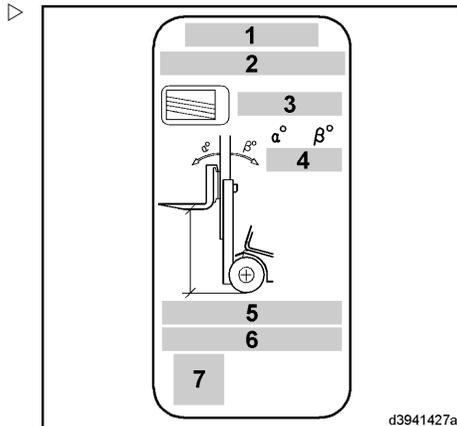
Labelling

Truck configuration

"Truck configuration" sign

 **NOTE**

If attachments and conversions are required, please contact your service partner. A new "truck configuration" label must then be created and attached to the truck by the service partner.



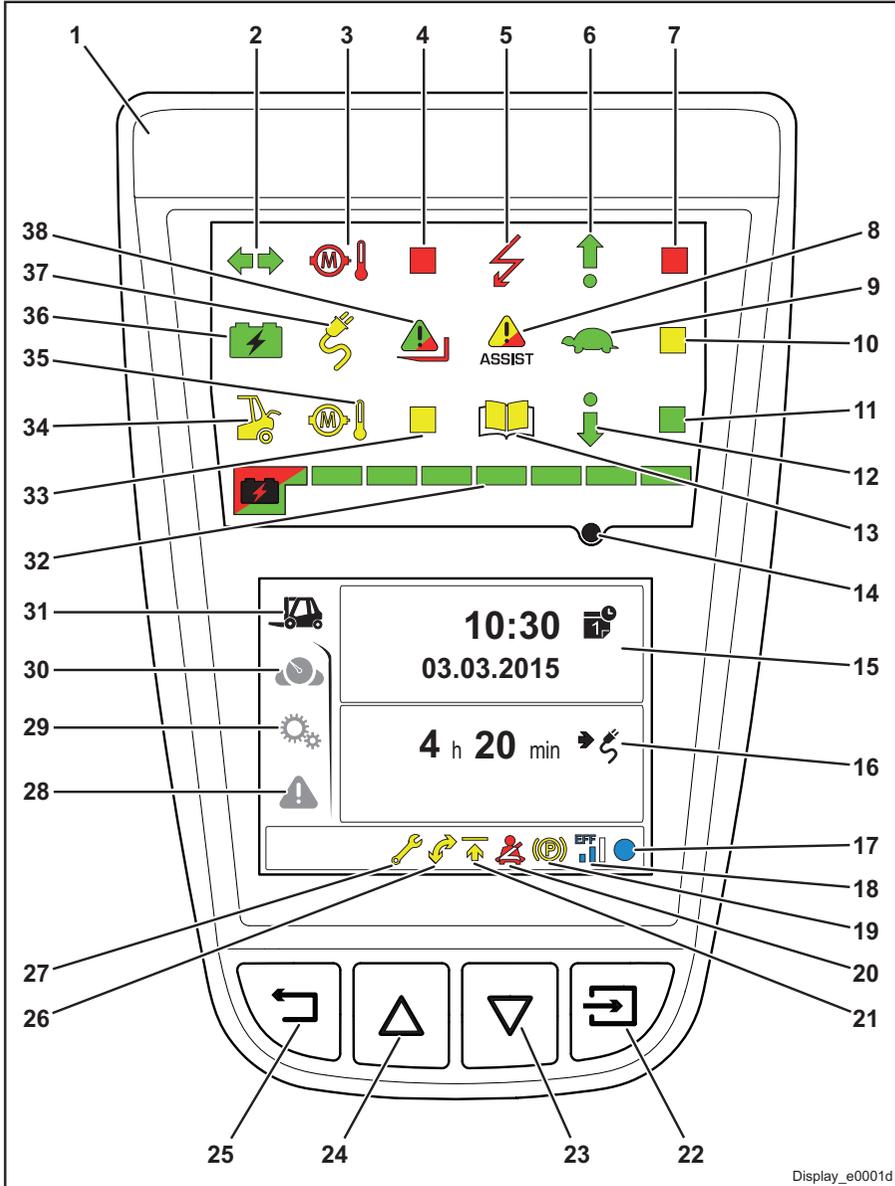
- 1 **Chassis serial number**
- 2 **Identification plate designation for lift mast** with:
 Lift mast series – lift mast version – lift height in cm or
 Identification: "ohne / CO"*
Lift mast version — variants:
 "S" means standard lift mast
 "D" means duplex lift mast
 "T" means triplex lift mast
- 3 **Number of capacity rating plate**
- 4 Maximum permissible forwards/backwards **tilt angle**
- 5 **Drive axle tyres:**
 "SE" means solid rubber tyres
 "Luft" means pneumatic tyres
 "ZW" means twin tyres
 "Band" means bandage tyres
- 6 **Attachment:**
 "GTR" means fork carriage
 "ISS" means integrated sideshift
 "IZVG" means integrated fork prong positioner
 "ohne / CO" means customer-specific option
- 7 Placeholder for **"data matrix code"**

"ohne / CO"* means customer-specific option (without lift mast or with released non-original lift mast)

3 Overview

Display unit

Display unit



Display_e0001d

1	Display unit		
2	Indicator light for direction indicator system/hazard warning system (green)	22	Control buttons
3	Motor temperature at upper limit (red)	23	"Confirm" button
4	Neutral warning light (red)	24	"Down" button
5	Error in electrical controllers or integrated battery charger (red)	25	"Up" button
6	Forwards drive direction (single-pedal operation) (green)	26	"Back" button
7	Reserve (red)		
8	Warning light for assistance system (yellow/red)	27	Display
9	Speed reduction activated (green)	28	Symbol for "Mast positioning active" (special equipment)
10	Reserve (yellow)	29	Symbol for "Service interval exceeded"
11	Reserve (green)	30	"Malfunctions" menu
12	Reverse drive direction (single-pedal operation) (green)	31	"Settings" menu
13	Observe the operating instructions (yellow)	32	"Favourites display" menu
14	Light sensor	33	"Status display" menu
	Display	34	
15	"Time/date" display	35	Battery discharge indicator (green/red)
16	"Remaining travel time" display	36	Neutral warning light (yellow)
17	"Function display"	37	Monitoring of rear cover/charger cover (yellow)
18	"Drive mode" symbol	38	Prewarning: motor temperature increasing (yellow)
19	Symbol for "Parking brake applied"		Battery charging via battery charger finished (green)
20	Symbol for "Seat belt not fastened" (special equipment)		Battery charger in charging mode (yellow) (special equipment)
21	Symbol for "Lift height restriction active" (special equipment)		Electronic joystick unlocked (green) or lift height restriction (green when functioning/red for warning) (special equipment)

The display unit (1) is located within the driver's field of vision and is the central information point for all truck functions. A self-test of the display unit takes place after the key switch has been switched on. During the self-test, all indicator lights and the displays are activated.

The display unit includes a buzzer to reiterate the visual warning messages.

Press the  button to confirm pop-up messages.

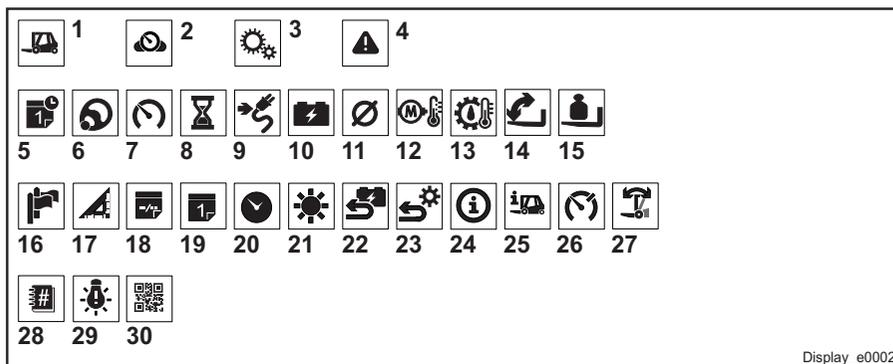
 **NOTE**

If a faulty display unit is replaced, the operating hours that have been incurred up to that point must be recorded. Add the information to an embossed strip affixed near the display unit. It is also possible to update new display units during the first 10 operating hours.

3 Overview

Display unit: Symbols on the display

Display unit: Symbols on the display



Display_e0002

	Symbol	Function
1		Displays the status
2		Displays favourites
3		Displays settings
4		Displays malfunctions
5		Time and date display.
6		Bar display of current steering angle (central position $\hat{=}$ straight line)
7		Displays the current driving speed. The speed is always displayed as a positive value regardless of the direction of travel.
8		Indicates "operating hours active" (flashing symbol when the hour meter is active).
9		Displays the remaining travel time depending on battery capacity.
10		Displays the current consumption (accurate to within 0.5 kWh/h).
11		Displays the average consumption (rounded to the nearest 0.1 kWh/h). Can be reset in the "Settings" menu or using the diagnostic program.
12		Bar display of the current temperature of the drive unit.
13		Bar display of the current temperature of the pump motor.
14		Displays the current tilt angle
15		Display the weight of the load being carried.
16		Select the language.
17		
18		
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28		
29		
30		

Display unit: Symbols on the display

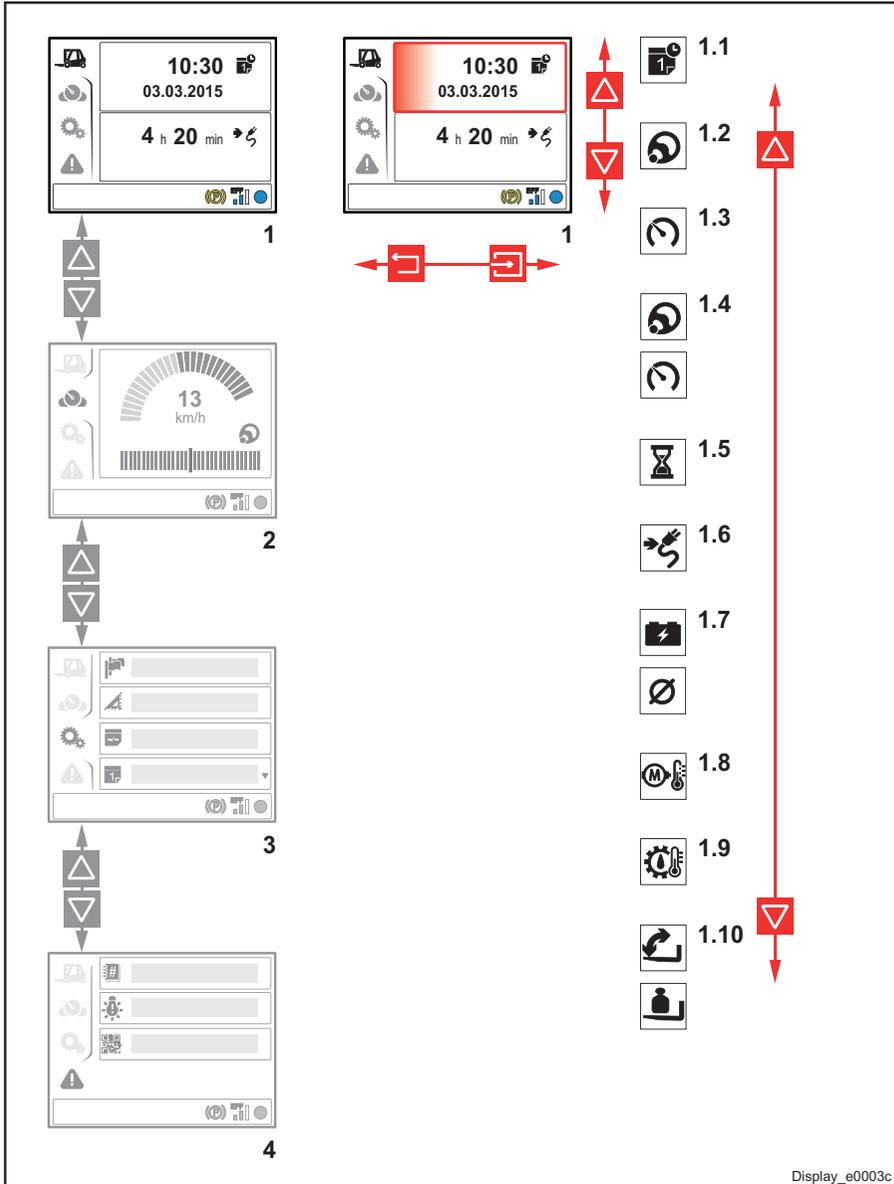
	Symbol	Function
17	Units	Displays units. Setting: metric (ISO) units (kg km/h m) or imperial units (lbs mph ft).
18	Date format	Date format and 12/24-hour format selection. Setting: mm/dd/yyyy/12-hr or dd/mm/yyyy/24-hr Clock display: am = morning/pm = afternoon.
19	Date	Set the date.
20	Time	Set the time.
21	Brightness	Set the brightness of the display.
22	Resetting consumption	Reset the average consumption.
23	Restoring factory settings	Restore factory settings.
24	System information	Display system information.
25	Drive mode	Display the activated "driving dynamics mode". The mode is set using the diagnostic program.
26	Speed limit	Display the "Reduction in the driving speed" for forwards and reverse travel. The values are set using the diagnostic program.
27	Mast vertical	Set the vertical position of the mast.
28	Error codes	Display of all malfunctions. If no malfunctions are pending, this symbol is hidden.
29	Error lights	Description of all malfunctions (LEDs). If no malfunctions are pending, this symbol is hidden.
30	QR code	The "QR code" display is a collection of all malfunctions and contains additional truck-specific information.

3 Overview

Display unit: Menu structure on the display

Display unit: Menu structure on the display

Status display menu



1	Status display menu
1.1	Time/date (factory setting)
1.2	Steering angle
1.3	Driving speed
1.4	Steering angle/driving speed
1.5	Operating hours
1.6	Remaining travel time (factory setting)
1.7	Consumption/average consumption
1.8	Drive unit temperature
1.9	Pump motor temperature
1.10	Tilt angle/load weight (special equipment)
2	Favourites display menu
3	Settings menu
4	Malfunctions menu

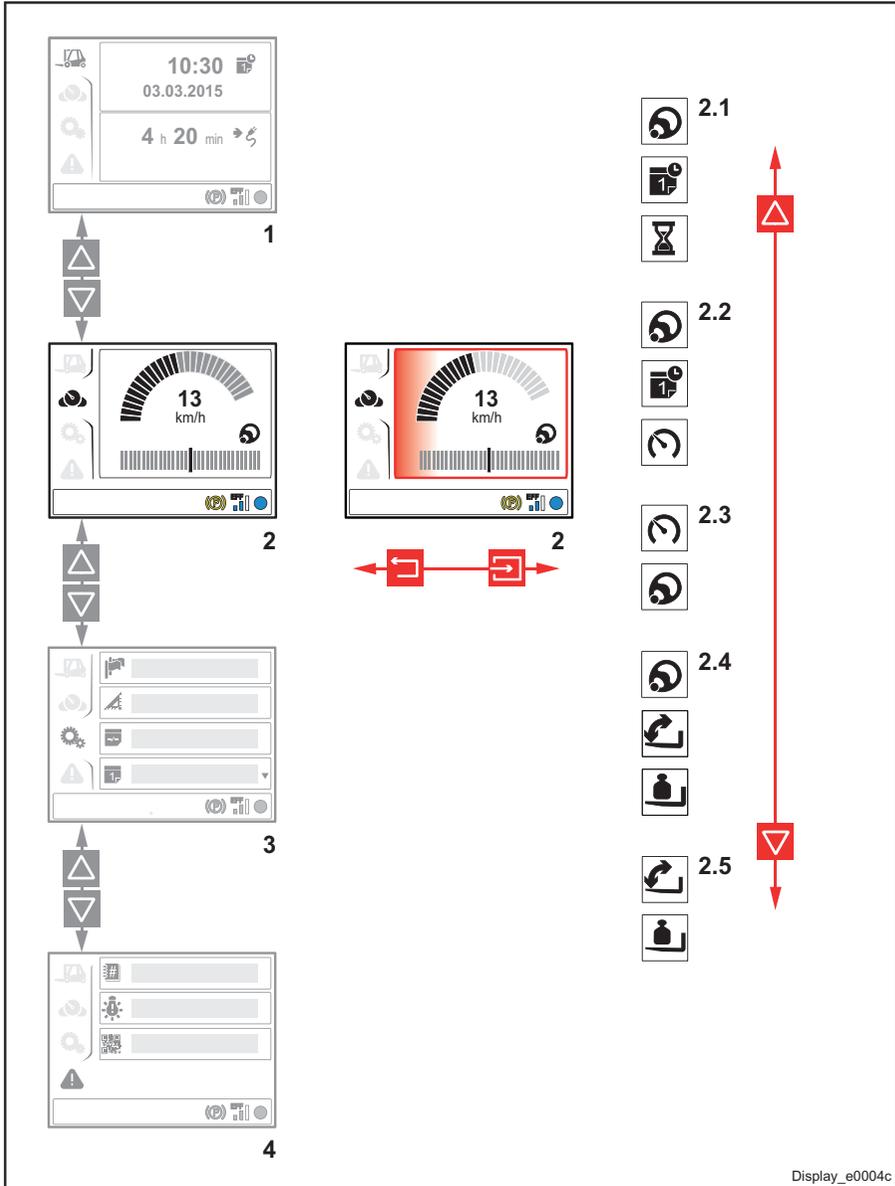
 **NOTE**

*The **status display** saves the most recently displayed views and displays these views again after the electrical system has been switched back on.*

3 Overview

Display unit: Menu structure on the display

Favourites display menu



1	Status display menu
2	Favourites display menu
2.1	Steering angle/time/operating hours
2.2	Steering angle/time/driving speed
2.3	Driving speed/steering angle
2.4	Steering angle/tilt angle (factory setting)/load weight (special equipment)
2.5	Tilt angle (factory setting)/load weight (special equipment)
3	Settings menu
4	Malfunctions menu

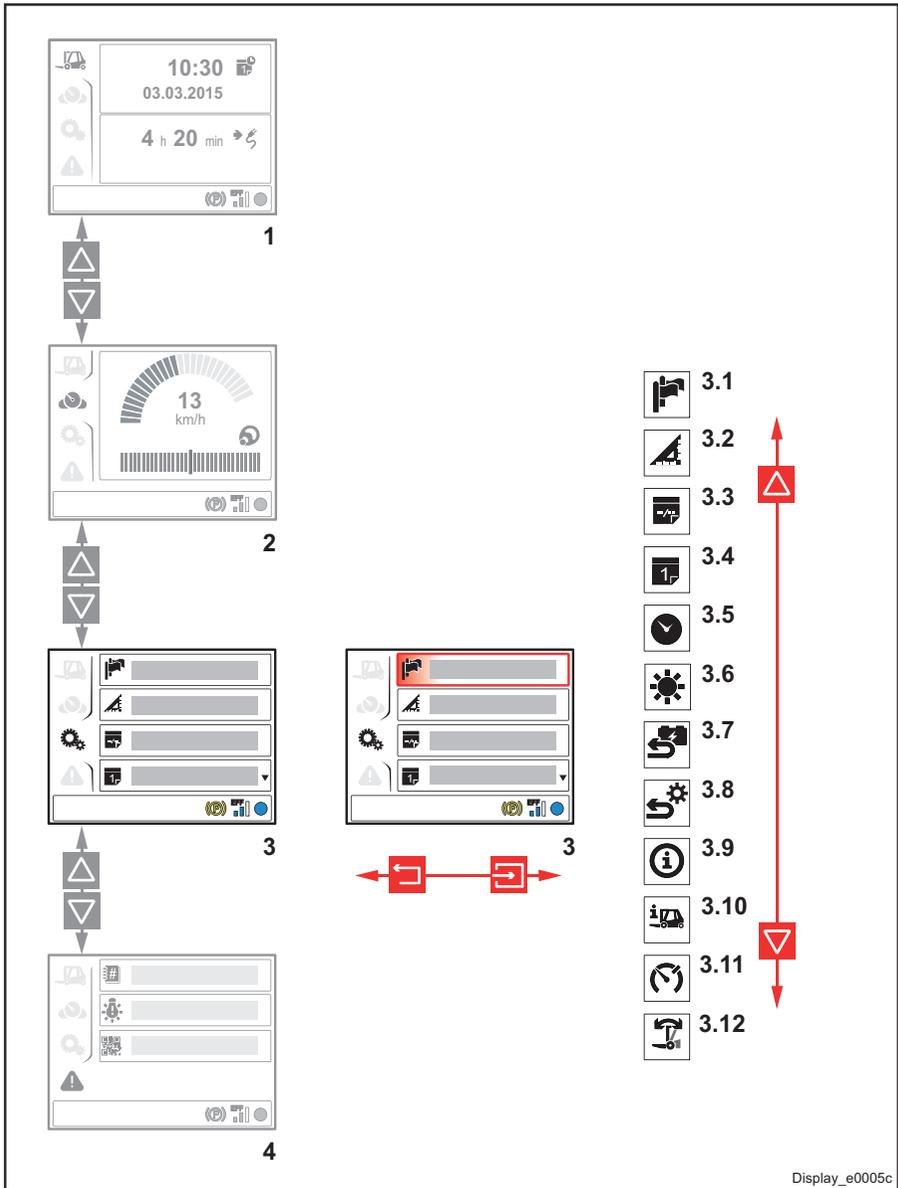
 **NOTE**

*The **Favourites display** saves the last displayed view and displays this again after the electrical system has been switched back on.*

3 Overview

Display unit: Menu structure on the display

Settings menu



1	Status display menu
2	Favourites display menu

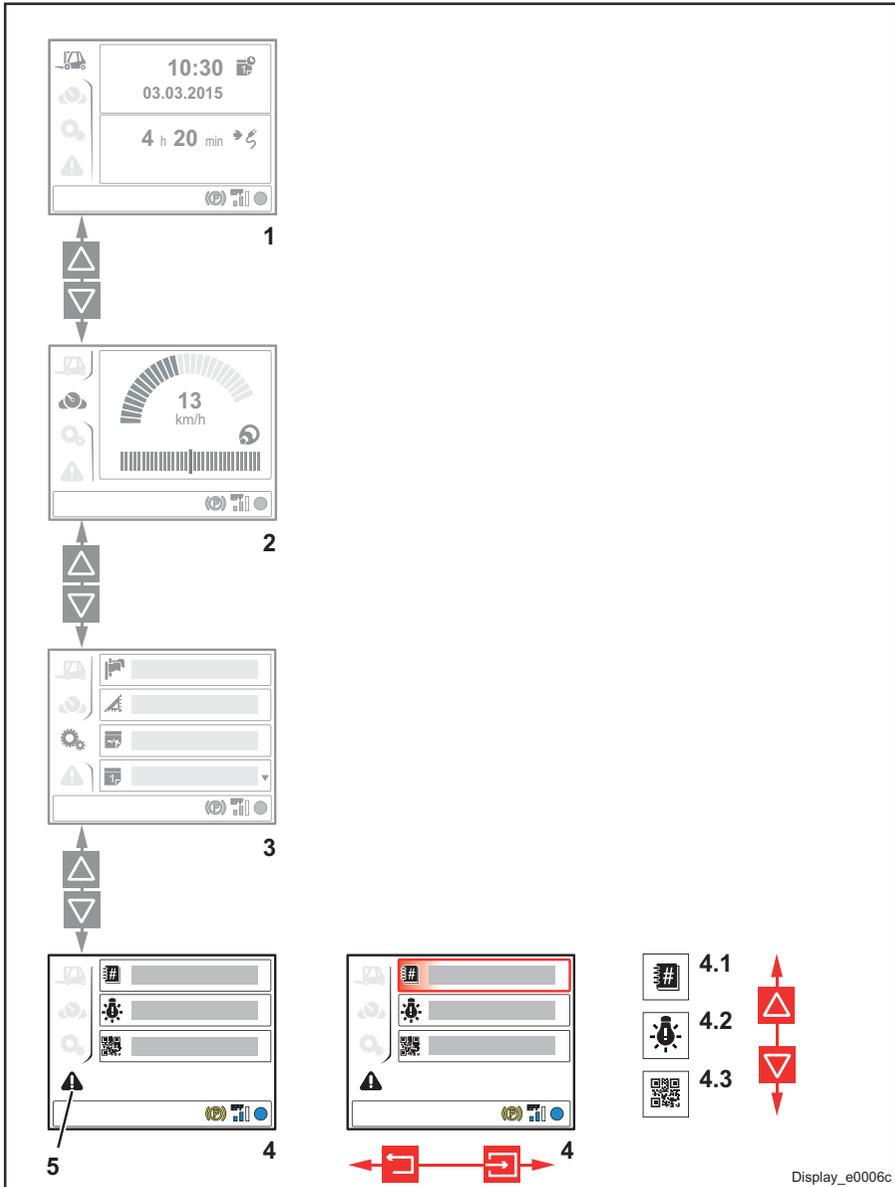
3	Settings menu
3.1	Language
3.2	Units
3.3	Date format and "12/24-hour format"
3.4	Date
3.5	Time
3.6	Brightness
3.7	Resetting consumption
3.8	Restoring factory settings
3.9	System information
3.10	Drive mode
3.11	Speed limit
3.12	Mast vertical

4	Malfunctions menu
---	-------------------

3 Overview

Display unit: Menu structure on the display

Malfunctions menu



1	Status display menu
2	Favourites display menu
3	Settings menu

4	Malfunctions menu
4.1	Error codes
4.2	Error lights
4.3	QR code

 **NOTE**

The "malfunctions" symbol (5) is displayed in the following colours depending on the status of the truck:

- *"Yellow" means: malfunction*
- *"Red" means: critical malfunction*
- *"+" next to the symbol means: multiple malfunctions*

3 Overview

Display unit: Menu structure on the display

4

Operation

4 Operation

Service plan before initial commissioning

Service plan before initial commissioning

Gearboxes
Check the oil level in the planetary transmission and check for leaks.
Chassis frame
Check the wheel fastenings and tighten.
Check the tyre pressure.
Check the brake system.
Check the steering system.
Electrics
Check the condition of the drive battery.
Check the emergency off switch.
Hydraulics
Hydraulic system: Check the oil level.
Check the lifting system and the attachments.

Instructions for running-in

The industrial truck can immediately be driven at a brisk speed. However, in the first 50 operating hours avoid subjecting either the working hydraulics or the drive unit to high continuous loads.

The wheel fastenings must be tightened before the initial commissioning and whenever

the wheels are changed. This operation must also be performed at least every 100 operating hours.

The wheel fastenings must be tightened crosswise.

Tightening torque: See chapter 5, "Inspection and maintenance data"

Pre-shift checks

Chassis, bodywork and fittings
Check that the adjusting mechanism on the steering column is secure.
Driver's seat and seat belt: check condition (visual inspection).
Check the container in the washer system.
Roof panel (special equipment): check condition (visual inspection).
Chassis frame
Check the tyres and rims (tread, external damage, air pressure).
Check the condition of the antistatic belt and check the ground contact (only when using tyres that are not antistatic).
Brake system: test the service brake and parking brake.
Check the steering.
Electrics
Check the condition of the drive battery.
Check the electrical system (e.g. lighting, warning units, assistance systems).
Hydraulics
Hydraulic system: check the oil level.
Check the truck for leaks (visual inspection).
Load lift system
Check the fork arms and arm safety devices.

Regular maintenance

Performing the maintenance tasks listed will increase the availability of the truck and help maintain its value.

Carry out this work as frequently as possible in accordance with the application conditions.

- Clean the truck.
- Lubricate the steering axle.
- Tighten the wheel fastenings (after each maintenance or repair, and after 100 operating hours at the latest).
- Clean the lift mast chain and apply chain spray.
- Clean and lubricate the sideshift (special equipment).
- Clean and lubricate the fork prong positioner (special equipment).

4 Operation

Driver's compartment

Driver's compartment

Entering and exiting the truck

WARNING

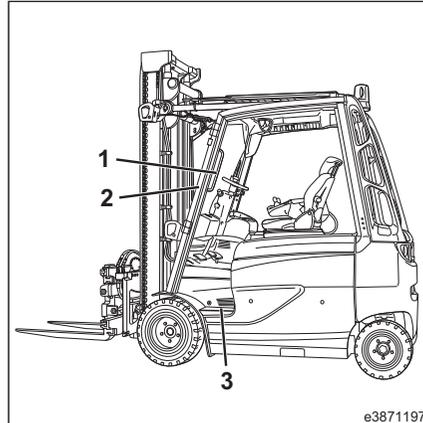
Entering and exiting the truck can result in injuries to the feet or back.

Always face the truck when climbing in and out.

NOTE

Do not use the steering wheel or the joysticks as an aid to get in or out of the cab.

- Use the handle (1) or the vertical bar (2) and step (3).



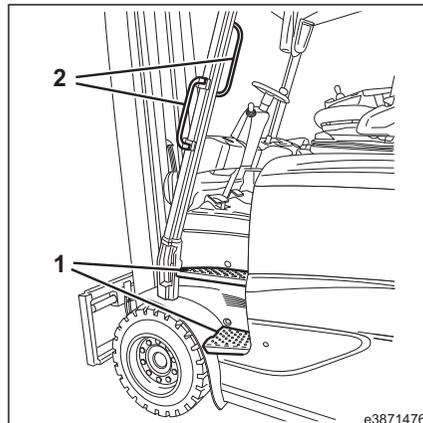
Truck with elevated driver's compartment ➤

In the "truck with elevated driver's compartment" version, two steps (1) and two handles (2) serve as a safe mounting aid for climbing into and out of the truck.

WARNING

Risk of accident and injury if you climb into or out of the truck incorrectly.

Climb into or out of the truck carefully using the two steps (1) together with the two handles (2). Never jump off the truck.



Minimum distance between head and overhead guard

Certain versions (e.g. those with a rotary seat or container roof) have a reduced clearance between the seat and overhead guard.

WARNING

Risk of head injuries.

The truck may only be used by persons whose normal operating posture is such that there is a minimum distance of 30 mm between their head and the overhead guard.

Standard seat and comfort driver's seat

WARNING

If the seat is not adjusted correctly, this may cause injury to the driver's back. The setting devices for the driver's seat must not be used during operation of the truck.

Before commissioning the truck each time and whenever changing drivers, adjust the seat to correspond to the driver's weight and make sure that the settings have all engaged properly. Do not place any objects in the driver's rotation range.

NOTE

Sitting for long periods of time puts a lot of pressure on the spine. This can be prevented by performing simple therapeutic exercises at regular intervals.

4 Operation

Driver's compartment

Longitudinal adjustment

WARNING

There is a risk of crushing if the lever is grasped fully.

Only grasp the lever by the trough provided for this purpose.

- Pull the lever (1) upwards.

Choose the most comfortable position in relation to the steering wheel and the accelerator pedals.

- Move the driver's seat forwards or backwards.
- Allow the lever (1) to snap into place.



Adjusting the seat backrest

- Push the lever (2) upwards and hold it in place.
- Move the seat backrest forwards or backwards until a comfortable seat position for the driver is found.
- Release the lever (2).

Setting the driver's weight

NOTE

The individual driver's weight must be set when the driver's seat is under load.

- Check the weight adjustment in the inspection window (4).

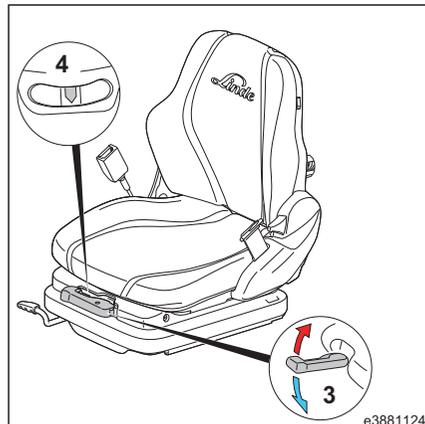
The correct driver's weight has been selected when the arrow is in the middle of the inspection window (4).

If necessary, adjust the driver's weight.

- Pull out the lever (3).

Move the lever to set the driver's weight for the suspension.

- Move the lever (3) upwards for a heavier weight.
- Move the lever (3) downwards for a lighter weight.



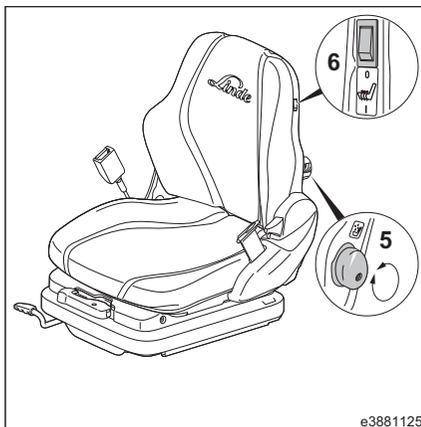
Adjusting the lumbar support (only on a comfort driver's seat)

i NOTE

The lumbar support enables the seat backrest contour to be optimally adapted to the driver's body.

- Turn the knob (5) to the left or right.

The extent to which the lower and upper areas of the backrest are curved is adjusted individually.

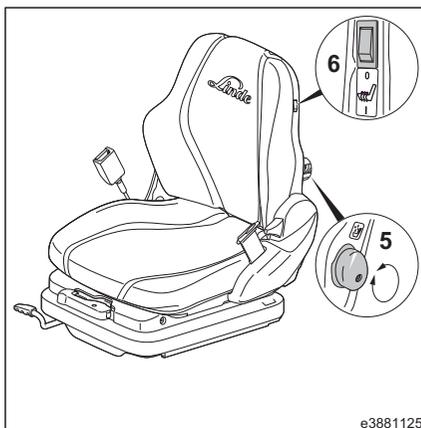


Activating the seat heater (only on a comfort driver's seat)

- Push the switch (6) downwards to activate the seat heater.
- Push the switch (6) upwards to deactivate the seat heater.

i NOTE

The maximum temperature is predefined.



4 Operation

Driver's compartment

Adjusting the driver's seat with rotating device

CAUTION

The driver's seat must not swivel while the industrial truck is in use.

It should therefore be ensured that the rotating device is locked.

The driver's seat with rotating device offers better rear visibility during reverse travel over long distances. This allows the driver to maintain an ergonomic seating position.

When driving forwards for long distances, it is recommended that you return the seat to the straight-ahead position.

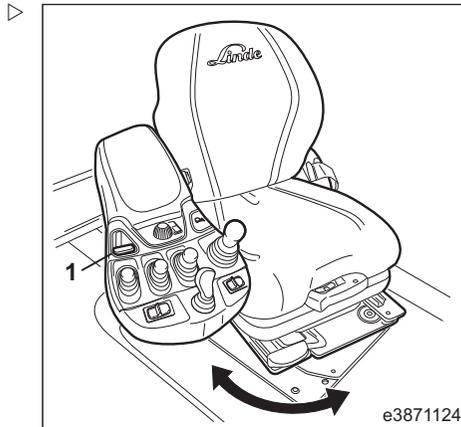
The rotating device is maintenance free.

➤ Pull locking lever (1) backwards.

The rotating device is enabled and allows the seat to be swivelled, either by:

- 10° to the right, lockable at 0° and 10°
or
- 17° to the right, lockable at 0° and 17°

➤ Turn the driver's seat to the right and allow the locking bolt to engage audibly in the interlock.



Comfort driver's seat with air suspension

WARNING

If the seat is not adjusted correctly, this may cause injury to the driver's back. The setting devices for the driver's seat must not be used during operation of the truck.

Before commissioning the truck each time and whenever changing drivers, adjust the seat to correspond to the driver's weight and make sure that the settings have all engaged properly. Do not place any objects in the driver's rotation range.

NOTE

Sitting for long periods of time puts a lot of pressure on the spine. This can be prevented by performing simple therapeutic exercises at regular intervals.

Longitudinal adjustment

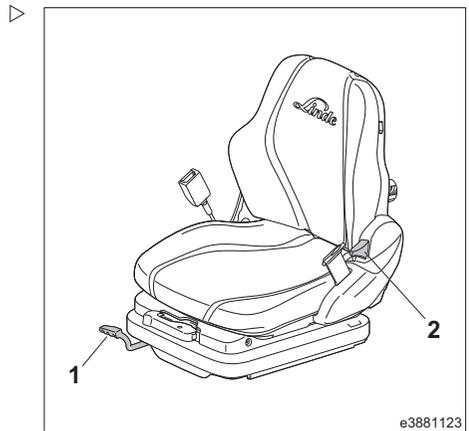
- Pull the lever (1) upwards.

Choose the most comfortable position in relation to the steering wheel and the accelerator pedals.

- Move the driver's seat forwards or backwards in the rails.
- Allow the lever (1) to snap into place.

Adjusting the seat backrest

- Push the lever (2) upwards and hold it in place.
- Move the seat backrest forwards or backwards until a comfortable seat position for the driver is found.
- Release the lever (2).



4 Operation

Driver's compartment

Setting the driver's weight

NOTE

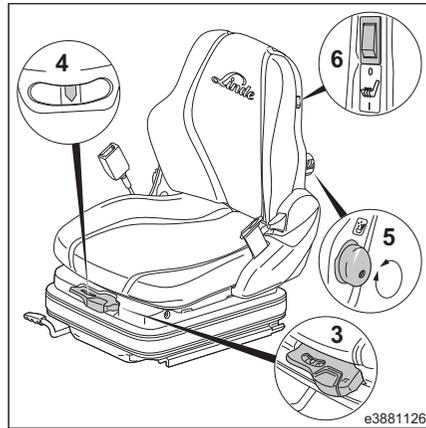
The individual driver's weight must be set when the driver's seat is under load.

- Check the weight adjustment in the inspection window (4).

The correct driver's weight has been selected when the arrow is in the middle of the inspection window (4).

If necessary, adjust the driver's weight.

- Pull the lever (3) upwards for a higher weight.
- Push the lever (3) downwards for a lower weight.



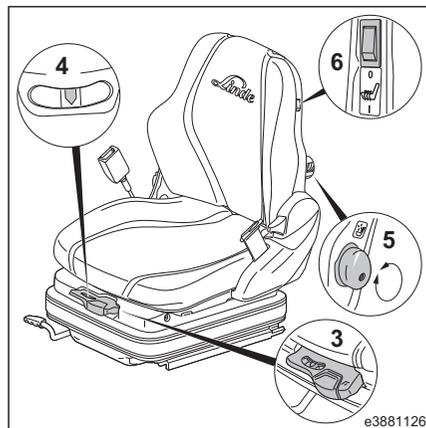
Adjusting the seat height

If necessary, adjust the seat height.

- Pull the lever (3) upwards to move the driver's seat upwards.
- Push the lever (3) downwards to move the driver's seat downwards.

NOTE

After making the adjustment, the arrow in the inspection window (4) may deviate from the centre position.



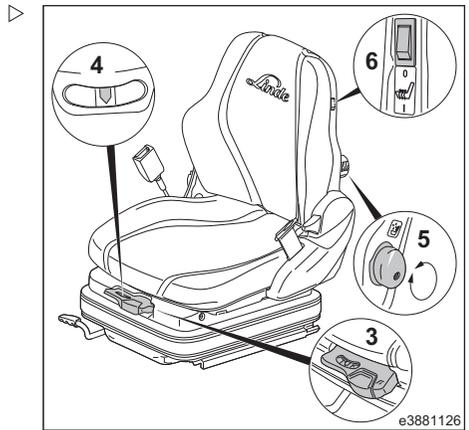
Adjusting the lumbar support

i NOTE

The lumbar support enables the seat backrest contour to be optimally adapted to the driver's body.

- Turn the knob (5) to the left or right.

The extent to which the lower and upper areas of the backrest are curved is adjusted individually.

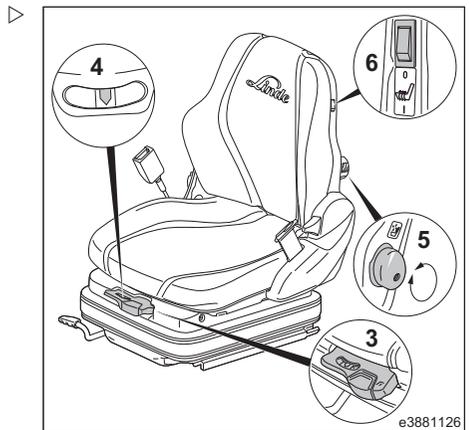


Activating the seat heater

- Push the switch (6) downwards to activate the seat heater.
- Push the switch (6) upwards to deactivate the seat heater.

i NOTE

The maximum temperature is predefined.



4 Operation

Driver's compartment

Luxury driver's seat with manual weight setting

⚠ WARNING

If the seat is not adjusted correctly, this may cause injury to the driver's back. The setting devices for the driver's seat must not be used during operation of the truck.

Before commissioning the truck each time and whenever changing drivers, adjust the seat to correspond to the driver's weight and make sure that the settings have all engaged properly. Do not place any objects in the driver's rotation range.

i NOTE

Sitting for long periods of time puts a lot of pressure on the spine. This can be prevented by performing simple therapeutic exercises at regular intervals.

Longitudinal adjustment

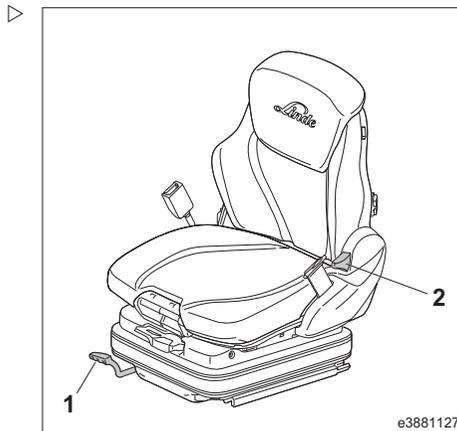
- Pull the lever (1) upwards.

Choose the most comfortable position in relation to the steering wheel and the accelerator pedals.

- Move the driver's seat forwards or backwards in the rails.
- Allow the lever (1) to snap into place.

Adjusting the seat backrest

- Push the lever (2) upwards and hold it in place.
- Move the seat backrest forwards or backwards until a comfortable seat position for the driver is found.
- Release the lever (2).



Setting the driver's weight

i NOTE

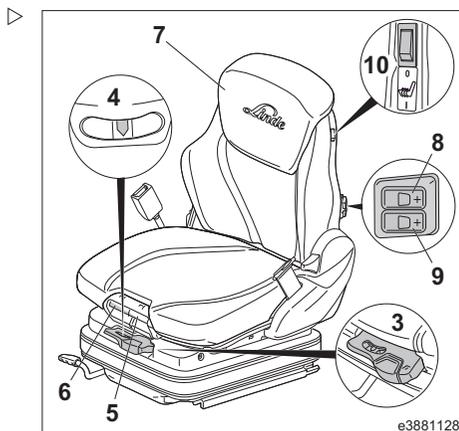
The individual driver's weight must be set when the driver's seat is under load.

- Check the weight adjustment in the inspection window (4).

The correct driver's weight has been selected when the arrow is in the middle of the inspection window (4).

If necessary, adjust the driver's weight.

- Pull the lever (3) upwards for a higher weight.
- Push the lever (3) downwards for a lower weight.



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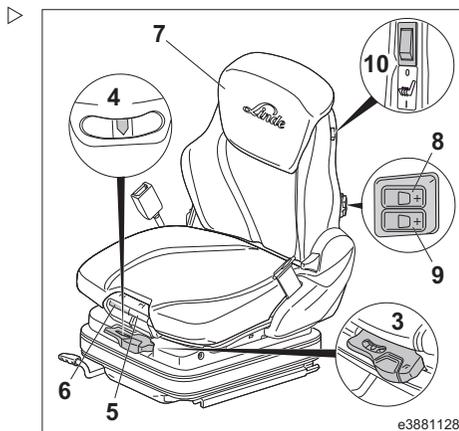
Adjusting the seat height

If necessary, adjust the seat height.

- Pull the lever (3) upwards to move the driver's seat upwards.
- Push the lever (3) downwards to move the driver's seat downwards.

i NOTE

After making the adjustment, the arrow in the inspection window (4) may deviate from the centre position.



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4 Operation

Driver's compartment

Adjusting the seat angle

- Pull the lever (5) upwards.

The seat base is moved to the desired position by applying pressure to the seat base or removing pressure from it.

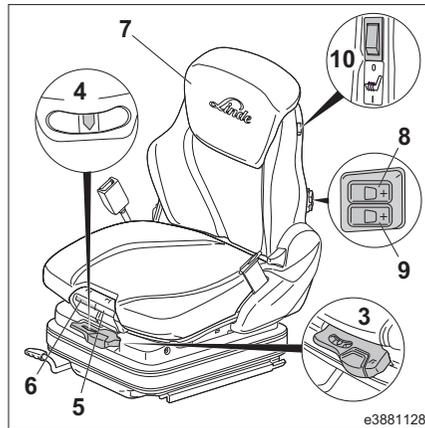
Adjusting the seat depth

- Pull the lever (6) upwards.

Move the seat base to the desired position by simultaneously sliding the seat base forwards or backwards.

Adjusting the backrest extension

- Push in or pull out the backrest extension (7).
- Adjust to suit individual driver.



Adjusting the lumbar support

NOTE

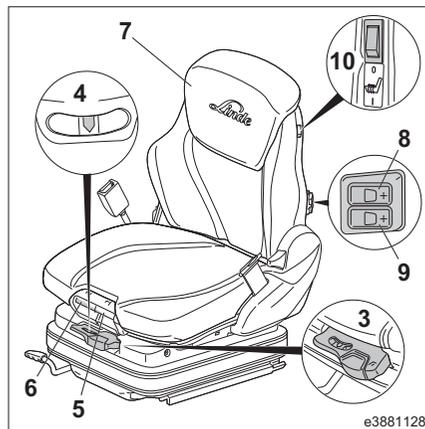
The lumbar support enables the seat backrest contour to be optimally adapted to the driver's body.

- Press button (8).

The extent to which the upper area of the backrest is curved is adjusted individually.

- Press button (9).

The extent to which the lower area of the backrest is curved is adjusted individually.



Activating the seat heater (luxury driver's seat)

- Push the switch (10) downwards to activate the seat heater.
- Push the switch (10) upwards to deactivate the seat heater.

NOTE

The maximum temperature is predefined.

Luxury active driver's seat with manual weight setting

The luxury active driver's seat is operated in the same way as the luxury driver's seat. The only difference is the way in which the seat heater is activated.

Activating the seat heater (luxury active driver's seat)

- Push the switch (11) upwards to activate the seat heater.
- Push the switch (11) to the centre position to deactivate the seat heater.

Activating the seat air conditioning (luxury active driver's seat)

- Push the switch (11) downwards to activate the seat air conditioning.
- Push the switch (11) to the centre position to deactivate the seat air conditioning.

 **NOTE**

The maximum temperature is predefined.

Luxury driver's seat with automatic weight setting

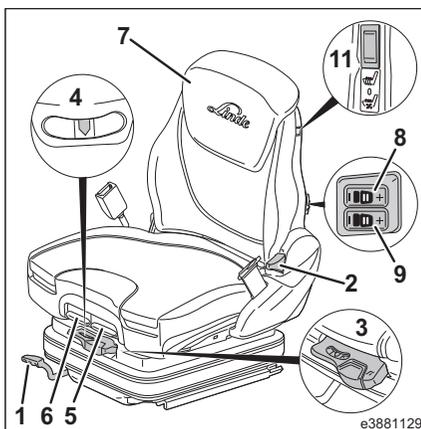
 **WARNING**

If the seat is not adjusted correctly, this may cause injury to the driver's back. The setting devices for the driver's seat must not be used during operation of the truck.

Before commissioning the truck each time and whenever changing drivers, adjust the seat to correspond to the driver's weight and make sure that the settings have all engaged properly. Do not place any objects in the driver's rotation range.

 **NOTE**

Sitting for long periods of time puts a lot of pressure on the spine. This can be prevented by performing simple therapeutic exercises at regular intervals.



4 Operation

Driver's compartment

Longitudinal adjustment

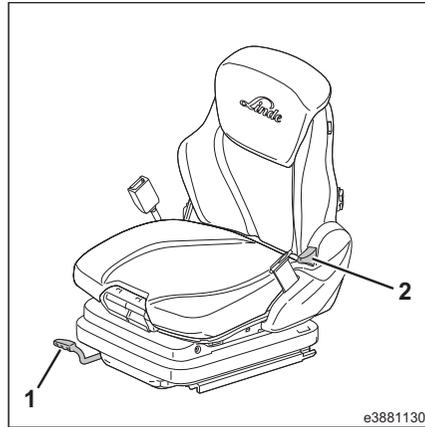
- Pull the lever (1) upwards.

Choose the most comfortable position in relation to the steering wheel and the accelerator pedals.

- Move the driver's seat forwards or backwards in the rails.
- Allow the lever (1) to snap into place.

Adjusting the seat backrest

- Push the lever (2) upwards and hold it in place.
- Move the seat backrest forwards or backwards until a comfortable seat position for the driver is found.
- Release the lever (2).



Setting the driver's weight

When the key switch is switched on and the driver's seat is occupied, the correct driver's weight is automatically set.

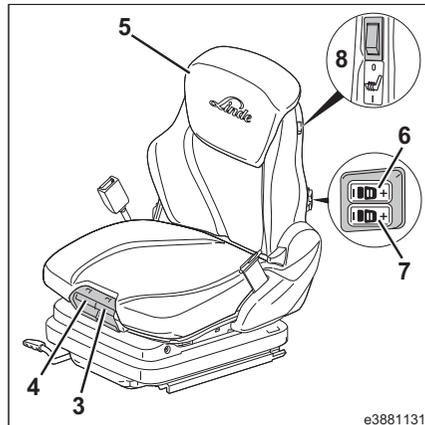
Adjusting the seat angle

- Pull the lever (3) upwards.

The seat base is moved to the desired position by applying pressure to the seat base or removing pressure from it.

Adjusting the seat depth

- Pull the lever (4) upwards.
- Move the seat base to the desired position by simultaneously sliding the seat base forwards or backwards.



Adjusting the backrest extension

- Push in or pull out the backrest extension (5).
- Adjust to suit individual driver.

Adjusting the lumbar support

NOTE

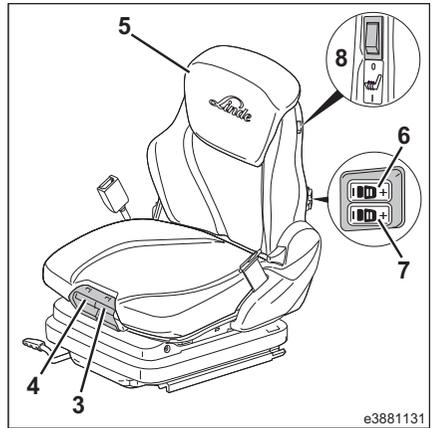
The lumbar support enables the seat backrest contour to be optimally adapted to the driver's body.

- Press button (6).

The extent to which the upper area of the backrest is curved is adjusted individually.

- Press button (7).

The extent to which the lower area of the backrest is curved is adjusted individually.



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Activating the seat heater (luxury driver's seat)

- Push the switch (8) downwards to activate the seat heater.
- Push the switch (8) upwards to deactivate the seat heater.

NOTE

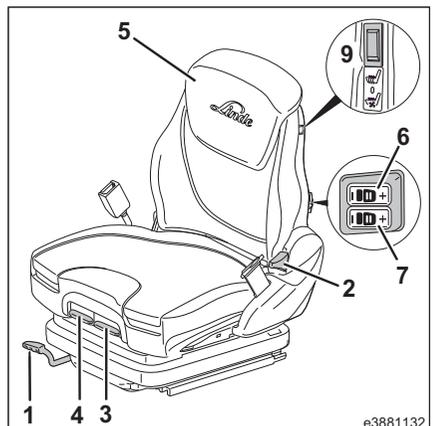
The maximum temperature is predefined.

Luxury active driver's seat with automatic weight setting

The luxury active driver's seat is operated in the same way as the luxury driver's seat. The only difference is the way in which the seat heater is activated.

Activating the seat heater (luxury active driver's seat)

- Push the switch (9) upwards to activate the seat heater.
- Push the switch (9) to the centre position to deactivate the seat heater.



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Activating the seat air conditioning (luxury active driver's seat)

- Push the switch (9) downwards to activate the seat air conditioning.

4 Operation

Driver's compartment

- Push the switch (9) to the centre position to deactivate the seat air conditioning.

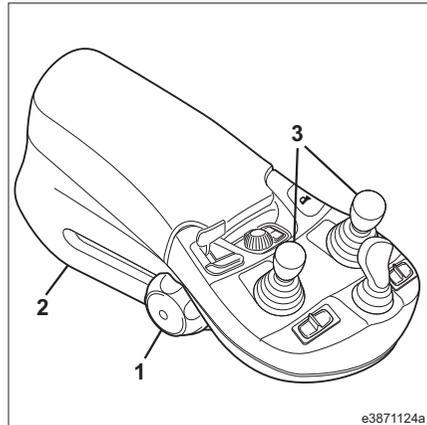


NOTE

The maximum temperature is predefined.

Adjusting the driver's seat armrest

- Sit on the driver's seat and release clamping screw (1).
- Release clamping screw (1) and move armrest (2) forwards or backwards until the arm is comfortably supported and the actuating levers (3) can easily be reached.
- Tighten clamping screw (1).



Adjusting the steering column

⚠ DANGER

It is not possible to drive safely when the clamping screw is open.

Only adjust the steering column when the truck is stationary.

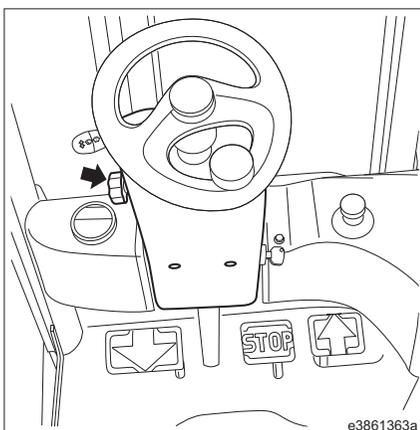
Before attempting to drive the truck, ensure that the steering column is locked.

Angle adjustment

- Undo the clamping screw (see arrow) by turning it in an anticlockwise direction.
- Move the steering wheel into the required position.
- Tighten the clamping screw by turning it in a clockwise direction.

Height adjustment (special equipment)

- Undo the clamping screw (see arrow) by turning it in an anticlockwise direction.
- Move the steering wheel into the required position by pulling it upwards or pushing it downwards.
- Tighten the clamping screw by turning it in a clockwise direction.



4 Operation

Driver's compartment

Seat belt

Fastening the seat belt



⚠ DANGER

There is a risk to life if the driver leaves the vehicle in an uncontrolled manner.

For this reason, the seat belt must always be worn when operating the truck!

The seat belt should only be worn by one person.

⚠ WARNING

The seat belt must function perfectly.

For this reason, the belt should not become twisted, trapped or tangled.

The belt buckle and belt retractor should be protected from foreign bodies, damage and dirt.



NOTE

Driver's cabs with fixed closed doors or bracket doors meet the safety requirements for driver restraint systems. The seat belt can also be used. It must, however, be fastened when driving with doors that are open or have been removed, or if there aren't any doors. PVC doors are not deemed to constitute driver restraint systems.

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

To release the automatic blocking mechanism, carefully move the industrial truck so that it is no longer positioned on a slope.

While using the truck (e.g. driving, operating the lift mast etc.), the driver should adopt a seat position as far back as possible so that his or her back rests against the seat backrest.

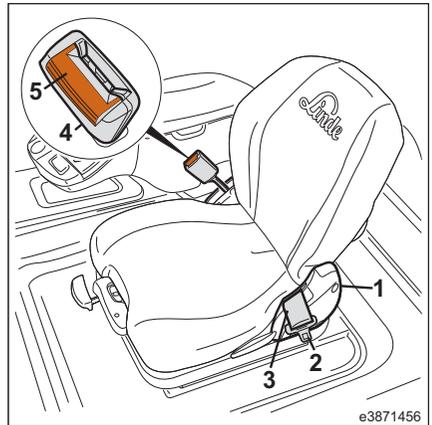
The automatic blocking mechanism of the belt retractor offers sufficient freedom of movement on the seat for normal use of the truck.

- Pull the seat belt (3) smoothly out of the belt retractor (1) to the left.
- Position belt over the lap, not over the stomach.
- Allow the latch plate (2) to snap into place in the buckle (4).
- Check seat belt tension.

The belt must fit close to the body.

Unfastening the seat belt

- Push the red button (5) on the buckle (4).
- Manually return the buckle guide (2) to the belt retractor (1).



NOTE

The automatic blocking mechanism may be triggered if the web belt runs in too quickly and the buckle guide strikes the housing. The web belt cannot be pulled out with normal force.

4 Operation

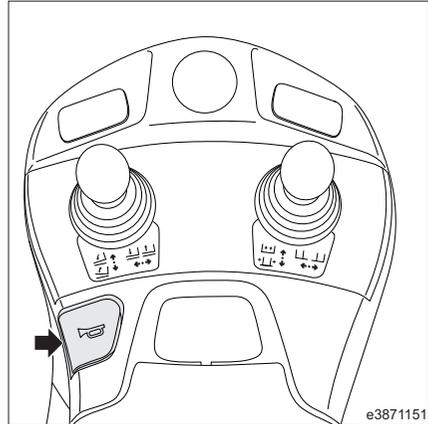
Driver's compartment

Horn

The horn is used as a warning signal, e.g. at blind spots and junctions.

The horn knob is easily accessible in the armrest area.

- Push in the horn knob on the armrest (see arrow) to sound the horn.



Lighting

NOTE

The arrangement of the individual switches on the overhead console may vary depending on the version. Observe the switch symbols.

Switching on the clipboard light

- Move the toggle switch (1) to the centre position (setting 1).

Switching on the interior lighting

- Press the toggle switch (1) into the end position (setting 2).

NOTE

The clipboard light remains in switch setting 2 and is also switched on.

Switching on the sidelights, dipped beams and licence plate lamp

NOTE

The sidelights, dipped beams and the direction indicator are incorporated in the front headlights.

- Move the toggle switch (2) to the centre position (setting 1).

The sidelights and licence plate lamp are switched on.

- Press the toggle switch (2) into the end position (setting 2).

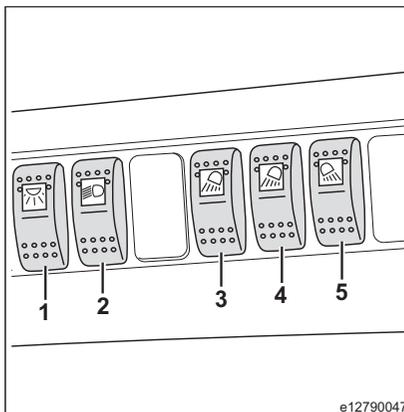
The dipped beams, sidelights and licence plate lamp are switched on.

Switching on the front working spotlights

- Activate the toggle switch (3).

The lower front working spotlights are switched on.

- Activate the toggle switch (4).



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4 Operation

Driver's compartment

The upper front working spotlights are switched on.

Switching on the rear working spotlights ▷

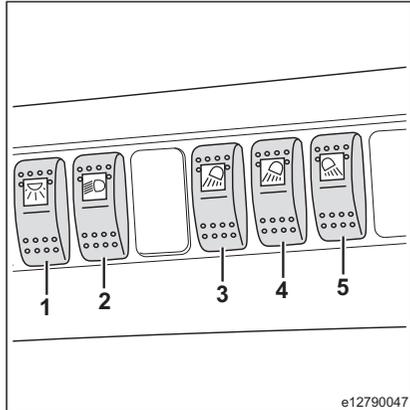
- Press the toggle switch (5) to the end position (setting 2).

The rear working spotlights are switched on.

Switching on the working spotlights for reverse travel

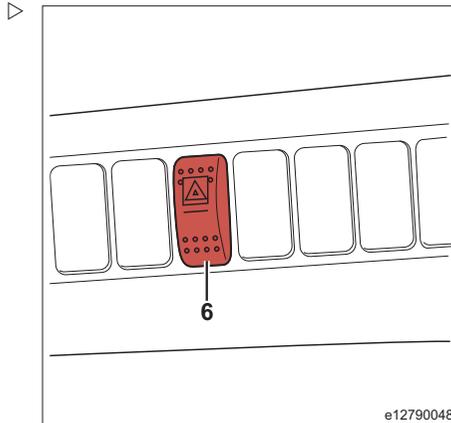
- Move the toggle switch (5) to the centre position (setting 1).

For reverse travel, the rear working spotlights will turn on.



Switching on the hazard warning light

- Press the toggle switch (6).



Switching on the rotating beacon/flash- ing beacon

Depending on the equipment there are three different versions.

Version 1:

- Press the toggle switch (7).

Set the toggle switch (7):

- Setting 0: light "OFF"
- Setting 1: light "ON" for reverse travel
- Setting 2: light in continuous operation

Version 2:

- Switch on the truck.

The light is in operation.

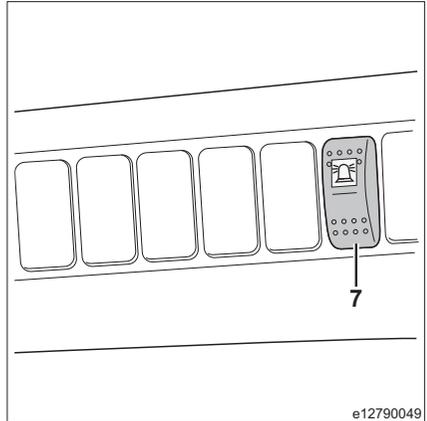
Version 3:

- Switch on the truck and actuate the reverse pedal.

The light is in operation for reverse travel only.

NOTE

If the truck is to be operated on public roads, the rotating beacon/flashing beacon must be switched off.

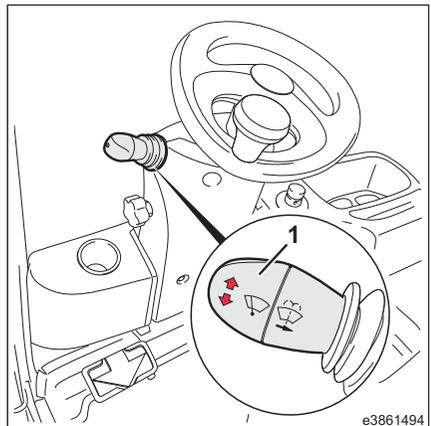


Switching on flashing lights

- Switch the flasher unit (1) on the steering wheel upwards.

The direction indicators on the truck flash on the right.

The right-hand indicator light on the display unit (see arrow) flashes.



4 Operation

Driver's compartment

- Switch the flasher unit (1) on the steering wheel downwards. ▷

The direction indicators on the truck flash on the left.

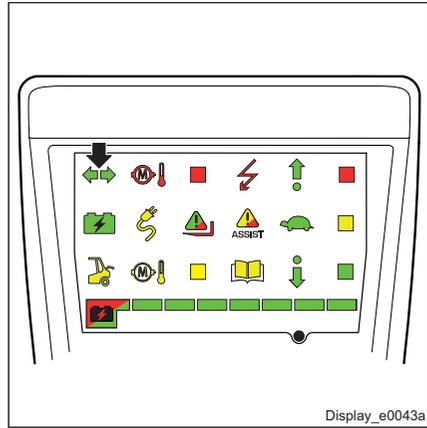
The left-hand indicator light on the display unit (see arrow) flashes.

Rear lights



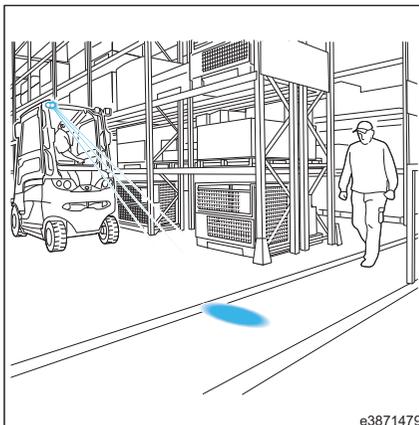
NOTE

The two rear light clusters contain the stop light, the rear light and the direction indicator.



BlueSpot™

The BlueSpot™ comprises a visual warning unit that enables the early detection of industrial trucks in driving areas with low visibility (such as drive lanes and high racks), as well as at blind junctions.



The BlueSpot™ is mounted on a support on top of the overhead guard and projects a high-power dot of light (LED technology) or arrow onto the ground. It is not affected by jolts and vibrations. The system allows pedestrians to notice an approaching industrial truck at an early stage.

"BlueSpot™" is assigned to risk group 2 in accordance with DIN EN 62471.

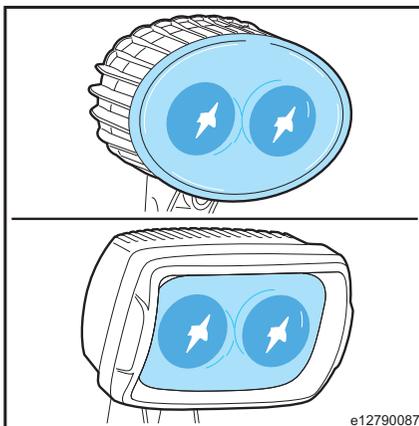
NOTE

The BlueSpot™ can be installed for forwards and reverse travel.



WARNING

Eye irritation
 Do not look directly into the BlueSpot™.



4 Operation

Driver's compartment

Switching on the BlueSpot™

Depending on the equipment fitted, there are three different ways to activate the BlueSpot.

Variant 1:

➤ Press the toggle switch (7).

Switch settings for the toggle switch:

- Level 0: BlueSpot™ "OFF"
- Level 1: BlueSpot™ "ON" for reverse travel
- Level 2: BlueSpot™ in continuous operation

Variant 2:

➤ Use the key switch.

The BlueSpot™ is always in operation.

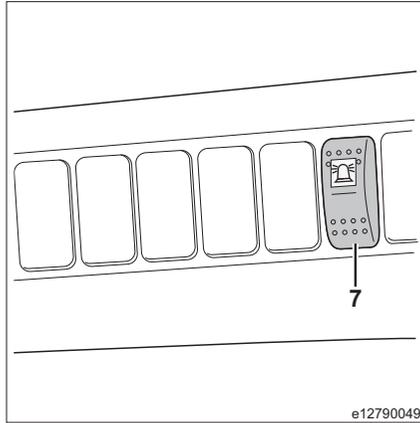
Variant 3:

➤ Turn the key switch and press the reverse pedal.

The BlueSpot™ is in operation for reverse travel only.

NOTE

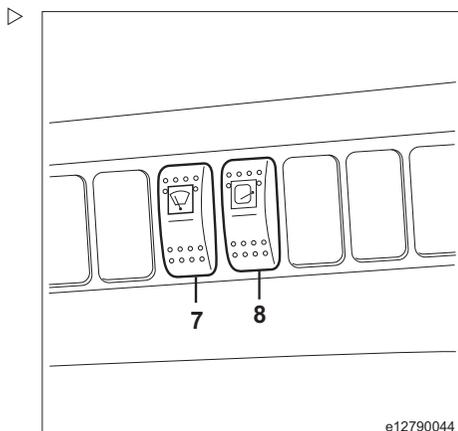
If the truck is to be operated on public roads, the BlueSpot™ must be switched off.



Windscreen wipers

NOTE

Depending on what has been preselected using the toggle switches (7, 8), the various wiper functions can be switched on and off using the central multifunction lever (6). The wiper functions differ for forwards and reverse travel.



Turning on the front windscreen wiper

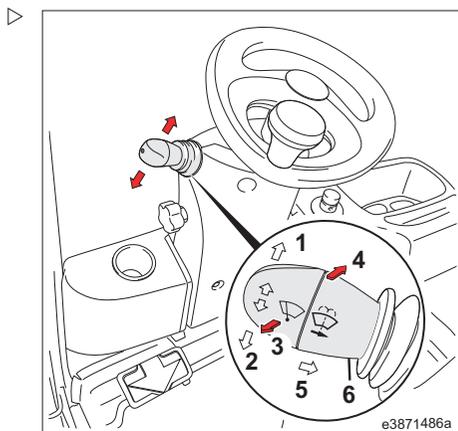
Truck at a standstill or in forwards travel:

- Switch toggle switches (7) and (8) to the zero position.
- Pull the multifunction lever (6) on the steering wheel upwards (3) from the centre position.

The front windscreen wiper remains in intermittent mode as long as the lever is actuated.

- Press the multifunction lever (6) on the steering wheel downwards (4) from the centre position.

The front windscreen wiper is in intermittent mode.



4 Operation

Driver's compartment

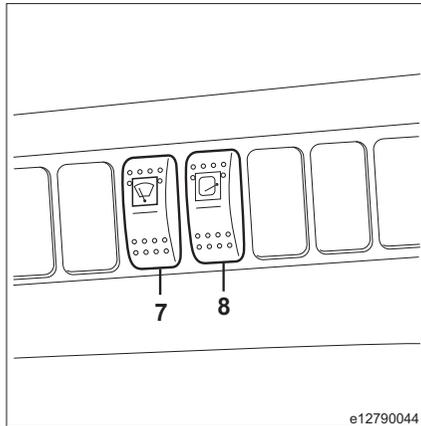
Turning on the rear windscreen wiper

Truck in reverse travel:

- Switch toggle switches (7) and (8) to the zero position.
- Pull the multifunction lever (6) on the steering wheel upwards (3) from the centre position.

The rear window wiper remains in intermittent mode as long as the lever is actuated.

- Press the multifunction lever (6) on the steering wheel downwards (4) from the centre position.
- The rear window wiper is in intermittent mode.



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Switching on the front windscreen wiper and rear window wiper

- Move the toggle switch (2) to the centre position.

Truck at a standstill or in forwards travel:

- Pull the multifunction lever (6) on the steering wheel upwards (3) from the centre position.

As long as the lever is actuated, the front windscreen wiper remains in continuous mode and the rear window wiper remains in intermittent mode.

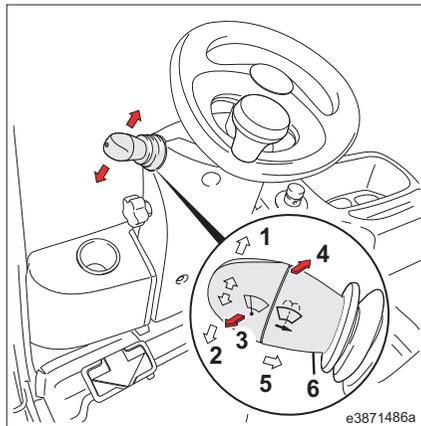
- Press the multifunction lever (6) on the steering wheel downwards (4) from the centre position.

The front windscreen wiper is in continuous mode and the rear window wiper is in intermittent mode.

Truck in reverse travel:

- Pull the multifunction lever (6) on the steering wheel upwards (3) from the centre position.

As long as the lever is actuated, the front windscreen wiper remains in intermittent mode and the rear window wiper remains in continuous mode.



e3871486a

- Press the multifunction lever (6) on the steering wheel downwards (4) from the centre position.

The front windscreen wiper is in intermittent mode and the rear window wiper is in continuous mode.

Truck at a standstill or in forwards or reverse travel:

- Switch the toggle switch (7) as far as it will go.
- Pull the multifunction lever (6) on the steering wheel upwards (3) from the centre position.

As long as the lever is actuated, the front windscreen wiper and rear window wiper remain in continuous mode.

- Press the multifunction lever (6) on the steering wheel downwards (4) from the centre position.

The front windscreen wiper and rear window wiper are in continuous mode.

Switching on the front windscreen wiper and roof panel wiper ▷

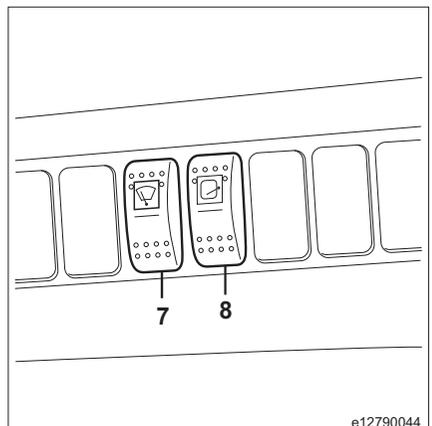
- Move the toggle switch (8) to the centre position.
- Pull the multifunction lever (6) on the steering wheel upwards (3) from the centre position.

As long as the lever is actuated, the front windscreen wiper and roof panel wiper remain in intermittent mode.

- Press the multifunction lever (6) on the steering wheel downwards (4) from the centre position.

The front windscreen wiper and roof panel wiper are in intermittent mode.

- Switch the toggle switch (8) as far as it will go.



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4 Operation

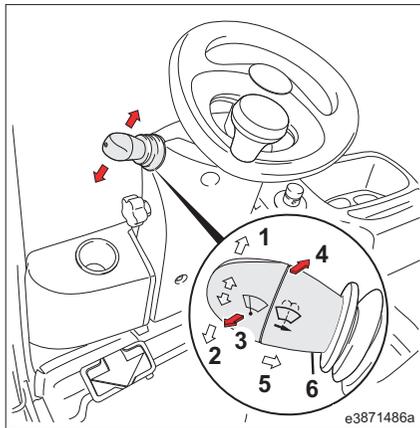
Driver's compartment

- Pull the multifunction lever (6) on the steering wheel upwards (3) from the centre position.

As long as the lever is actuated, the front windscreen wiper remains in intermittent mode and the roof panel wiper remains in continuous mode.

- Press the multifunction lever (6) on the steering wheel downwards (4) from the centre position.

The front windscreen wiper is in intermittent mode and the roof panel wiper is in continuous mode.



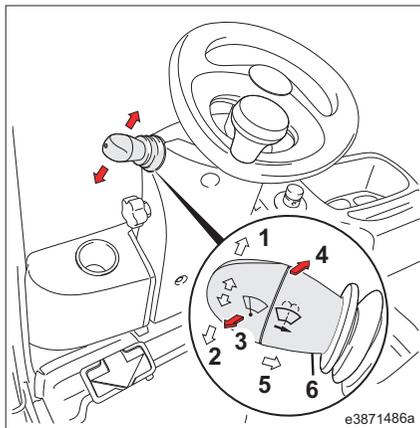
Switching on the wiper/washer system

- Push in the multifunction lever (6) as far as it will go in direction (5).

The wiper/washer system is activated for the windscreen and rear window as long as the lever is pressed.

- Switch on the toggle switch (8).

The wiper/washer system is activated for the windscreen, rear window and roof panel as long as the lever is pressed.



Window heater

Switching on the rear window heating

- Press push button (1).

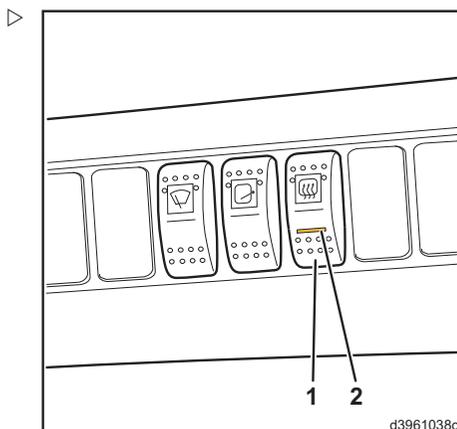
Dummy (2) test.

- Dummy (1) test.

The rear window heating is switched off.

- Dummy (1) test.

The rear window heating is in operation for a further 15 minutes.

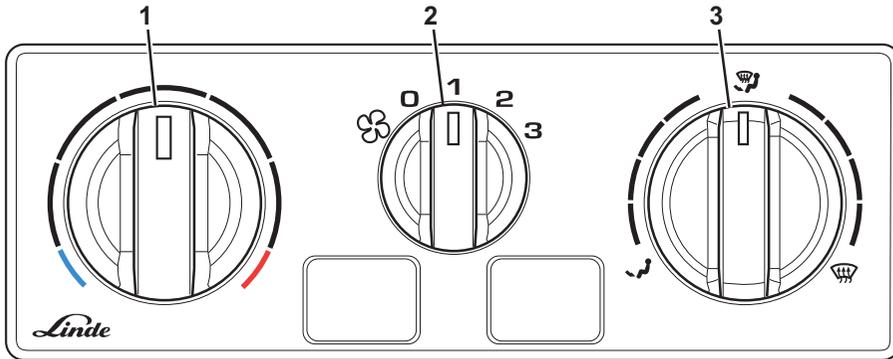


4 Operation

Driver's compartment

Heating system

Heating system operating devices



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- | | |
|--|---|
| <p>1 Rotary switch for adjusting the temperature</p> <p>2 Rotary switch for adjusting the blower positions</p> | <p>3 Rotary switch for adjusting the flap positions for windscreen defrosting/footwell ventilation</p> <p>4 Cab air nozzles</p> |
|--|---|

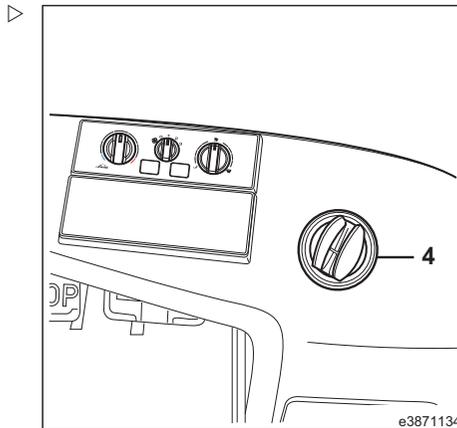
Switching on the heating system

- Turn the rotary switch (2) clockwise.

The blower is switched on and one of three air flow levels is preselected.

Demisting the windows

- To demist the windows, the following settings are made:
 - Rotary switch (1) turned to the far right position
 - Rotary switch (2) set to level 3
 - Rotary switch (3) turned to the windscreen defrosting position (far right position)
 - Nozzles (4) opened, fins positioned forwards



e3871134

For normal heating operation:

- Set the temperature via rotary switches (1) and (2).
- Set the temperature distribution via the rotary switch (3) and the nozzles (4).

Radio

NOTE

You will find the description for the radio in the attached manufacturer's operating instructions.

Buckle monitoring on seat belt



DANGER

There is a risk of fatal injury if the truck is vacated in an uncontrolled manner.

The seat belt must always be fastened when operating the truck! The seat belt must only be worn by one person. National regulations must also be observed.

WARNING

The seat belt must function perfectly.

The belt must not become twisted, trapped or tangled. The belt buckle and belt retractor must be protected against foreign bodies, damage and dirt.

The automatic blocking mechanism prevents the belt from extending when the truck is on a steep slope. It is then no longer possible to pull the belt any further out of the retractor. To release the automatic blocking mechanism, carefully move the truck so that it is no longer positioned on a slope.

While using the truck (e.g. driving, operating the lift mast etc.), the driver must adopt a seat position as far back as possible so that his or her back rests against the seat backrest. The automatic blocking mechanism for the belt retractor offers sufficient freedom of movement on the driver's seat when using the truck under normal circumstances.

Fastening the seat belt

NOTE

In trucks with buckle monitoring, the system not only monitors whether the belt buckle is

4 Operation

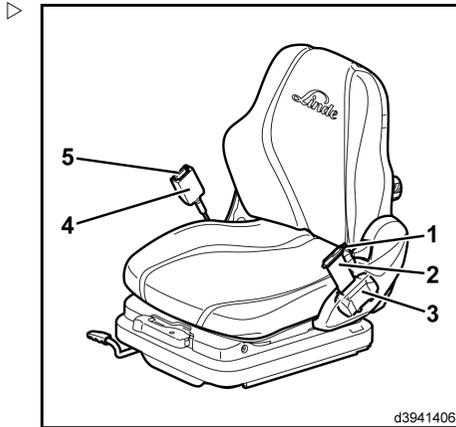
Driver's compartment

in use, but also the actuation sequence of the seat switch and belt buckle.

- Sit on the driver's seat.

The seat switch is actuated.

- Pull the seat belt (2) smoothly out of the retractor to the left.
- Position the belt over the lap, not over the stomach.
- Snap the buckle guide (1) into place in the buckle (4).



Buckle monitoring is activated. The "Safety belt not fastened" symbol (6) goes out.

- Check the seat belt tension.

The belt must sit close to the body.

NOTE

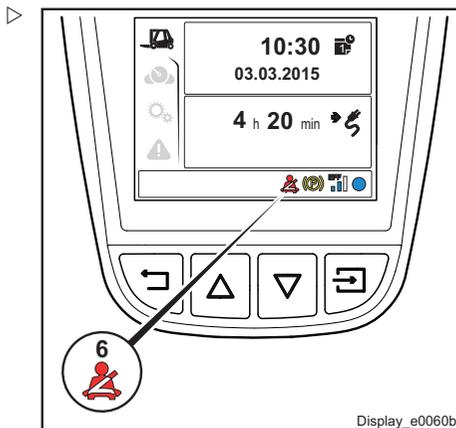
If the seat switch is not actuated and the seat belt is not fastened, the truck will not move at all or will only move at creep speed. The symbol (6) lights up.

Releasing the seat belt

- Push the red button (5) on the buckle (4).
- Manually feed the buckle guide (1) back into the retractor (3).

NOTE

The automatic blocking mechanism may be triggered if the web belt runs in too quickly and the buckle guide strikes the housing. The web belt cannot be pulled out with the usual force.



Settings

The following settings can be configured by your service partner:

- Truck response: movement prevented or travel at creep speed
- Switch off buckle monitoring

Contact your service partner.

Overhead guard with optimised visibility

On overhead guards with optimised visibility, bracing struts as protection for a falling load are not fitted across the viewing range in the roof panel. For this reason, a roof panel made of safety glass (1) is installed.

⚠ DANGER

Risk of fatal injury in the event of a damaged roof panel.

If the roof panel becomes damaged in any way (cracks, splintering), the truck must be taken out of service immediately. The roof panel must then be replaced (component that is relevant to safety).

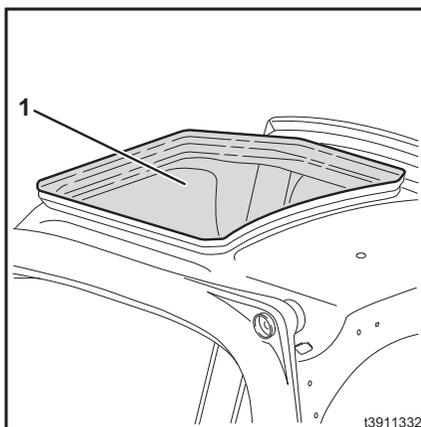
Roof panel repairs:

⚠ WARNING

A special tool and specialist knowledge is required for this work.

Contact your service partner.

- Check the roof panel (1) for damage every day before starting work.



4 Operation

Display unit

Display unit

Starting up the system

Switching on the display unit

After the electrical system is switched on, the display unit (1) performs the following actions: ▷

- Self-testing of the lights: All displays (2) light up for approx. 2 seconds.
- Displays (3) the number of operating hours (example: 1074.0 hrs) for approx. 5 seconds.
- Displays (4) the remaining operating hours (example: 1000 h) and operating days (example: 365 d) until the next service for approx. 5 seconds.

NOTE

The displays (3) and (4) can be changed using the diagnostic program:

- *Displayed time period between 3 and 10 seconds.*
- *Only displayed when a service is required.*
- *Display deactivated.*

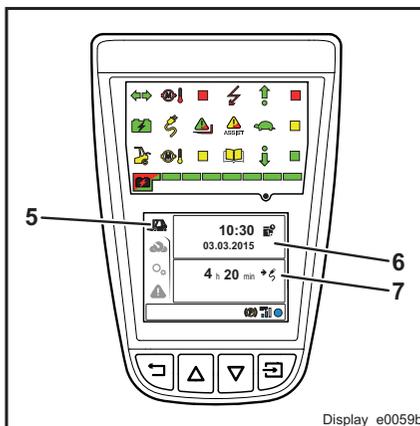
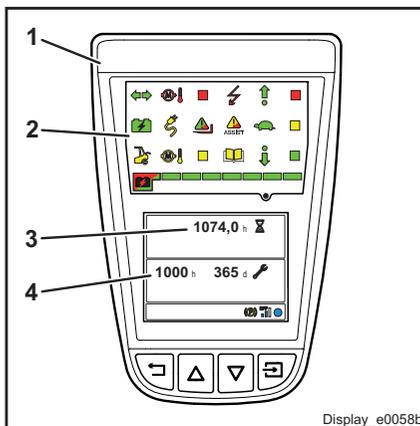
The display then switches to the status display (5) (factory setting). ▷

Status display (5):

- Time/date (6) (factory setting)
- Remaining operating time (7) (factory setting)

NOTE

The display saves the last displayed view and displays this again after the electrical system has been switched back on.



"Service interval" indicator

When a service is imminent, the symbol (8) flashes for about 10 seconds after the electrical system is switched on.

After this time the symbol (8) lights up.

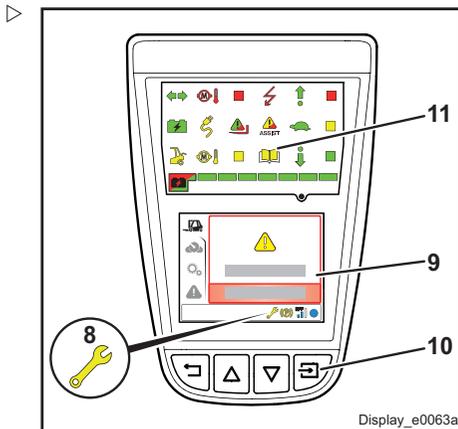
"Service interval exceeded" message

If the "Service required" message (9) is displayed, the preset service interval has been exceeded.

- To switch off the "Service required" message, press the "Confirm" button (10).

In addition the "Observe the operating instructions" symbol (11) lights up.

The due service work must be performed.
 Contact your service partner.



Display_e0063a

4 Operation

Display unit

Control buttons

The display unit has four control buttons.

Back button (1)

Briefly press the "Back" button to perform the following action:

- Move back one level.

Press and hold down the "Back button" to perform the following action:

- Move back to the top level

Up button (2)

Briefly press the "Up arrow button" to perform the following action:

- Move up by one row.

Down button (3)

Briefly press the "Down" button to perform the following action:

- Move down by one row.

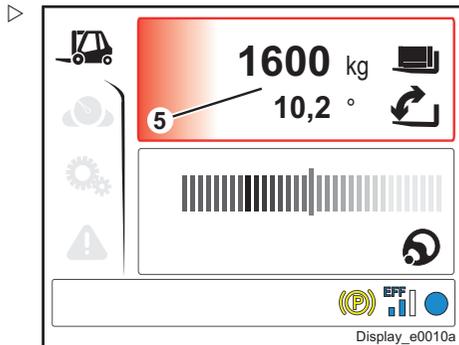
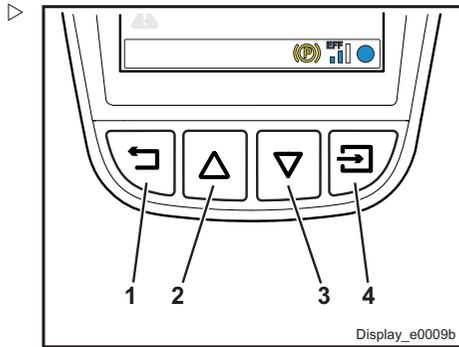
Confirm button (4)

Briefly press the "Confirm" button to perform the following actions:

- Activate the menu point shown on the display (5) (marked in red).
- Confirm entry.
- Confirm the message.

NOTE

Button tones are deactivated as default in the factory settings. They can be activated using the diagnostic program.



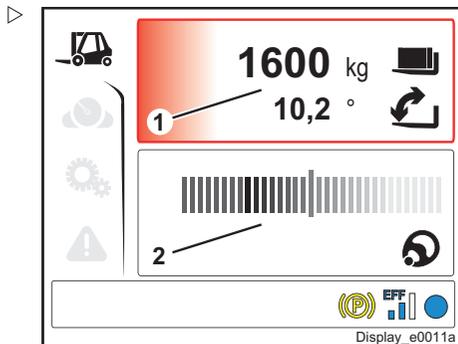
Status display menu

NOTE

The status display menu can be individually configured.

Press the  button.

- Use the  or  buttons to select the desired display area (1) or (2).
- Press the  button to confirm.
- Use the  or  buttons to select the desired status display.
- Press the  button to confirm.
- To return to the top level, press the  button.



The following status displays can be selected:

- Time/date (factory setting)
- Steering angle
- Driving speed
- Steering angle/driving speed
- Operating hours
- Remaining travel time (factory setting)
- Consumption/average consumption
- Drive unit temperature
- Pump motor temperature
- Tilt angle/load weight (special equipment)

NOTE

*The **status display** saves the most recently displayed views and displays these views again after the electrical system has been switched back on.*

NOTE

*If a value of 0° is displayed for the **tilt angle**, the fork arms are not necessarily horizontal. Deviations may occur due to uneven ground, use of the truck on slopes, bends in the lift mast and fork arms caused by heavy loads, tyre wear or the tyre deflection.*

4 Operation

Display unit

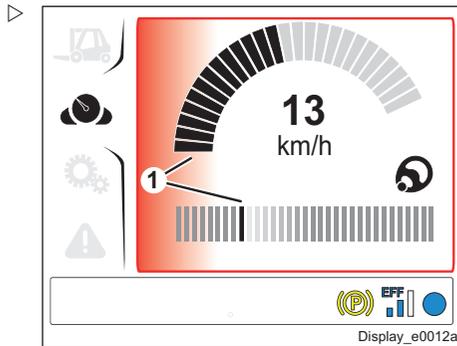
Favourites display menu

Press the  button.

- Use the  or  buttons to select the desired favourites display (1).
- Press the  button to confirm.

The following favourites can be selected:

- Steering angle/time/operating hours
- Steering angle/time/driving speed
- Driving speed/steering angle
- Steering angle/tilt angle/load weight (special equipment)
- Tilt angle (factory setting)/load weight (special equipment)



NOTE

The **Favourites display** saves the last displayed view and displays this view again after the electrical system has been switched back on.

NOTE

If a value of 0° is displayed for the **tilt angle**, the fork arms are not necessarily horizontal. Deviations may occur due to uneven ground, use of the truck on slopes, bends in the lift mast and fork arms caused by heavy loads, tyre wear or the tyre deflection.

Settings menu

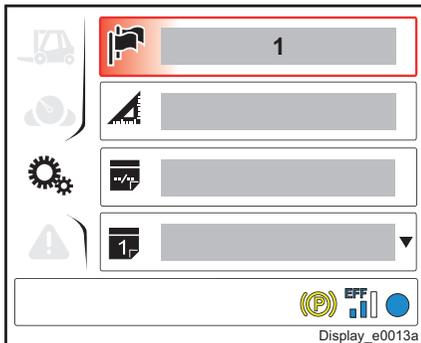
Setting the language

Press the  button. The "Language"(1) menu item is selected. ▷

➤ Press the  button.

NOTE

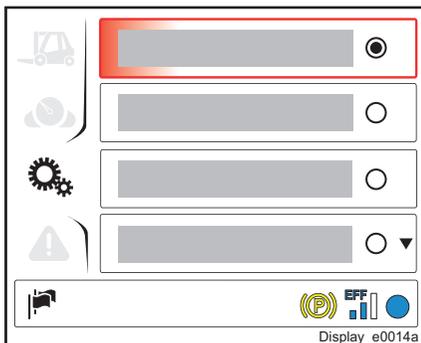
The "Language" symbol appears at the bottom left of the display.



➤ Use the  or  buttons to select the desired language. ▷

➤ Press the  button to confirm.

➤ To return to the top level, press the  button.



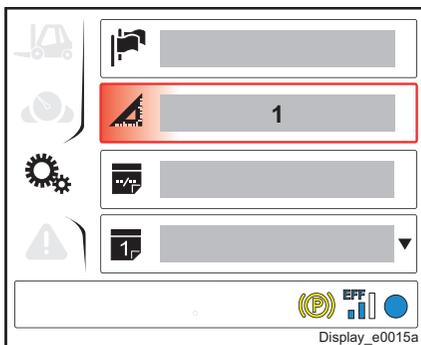
Setting the units

Press the  button then press the  button to select the "Units" (1) menu item. ▷

➤ Press the  button.

NOTE

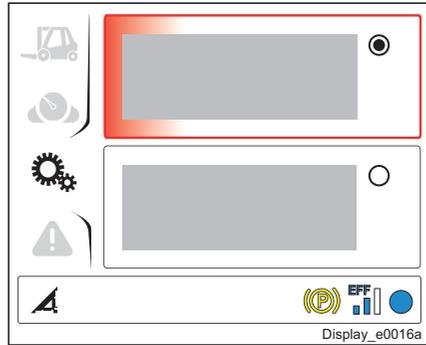
The "Units" symbol appears at the bottom left of the display.



4 Operation

Display unit

- Use the  or  buttons to select the desired units.
- Press the  button to confirm.
- To return to the top level, press the  button.



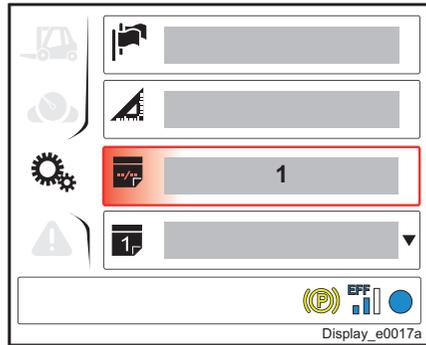
Setting the date format and hour format

Press the  button then press the  button to select the "Date format" (1) menu item.

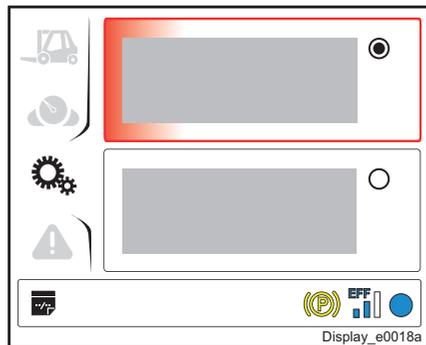
- Press the  button.

NOTE

The "Date format" symbol appears at the bottom left of the display.



- Use the  or  buttons to select the desired date format and hour format.
- Press the  button to confirm.
- To return to the top level, press the  button.



Setting the date

Press the  button then press the  button to access the "Date" (1) menu item.

➤ Press the  button.

NOTE

The "Date" symbol appears at the bottom left of the display.

➤ Use the  or  buttons to select the desired day.

➤ Press the  button.

➤ Use the  or  buttons to select the desired month.

➤ Press the  button.

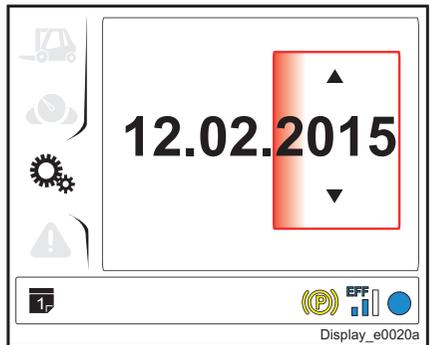
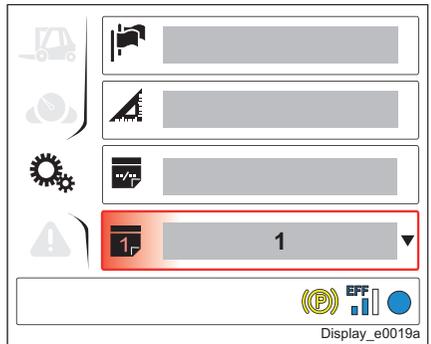
➤ Use the  or  buttons to select the desired year.

➤ Press the  button to confirm.

➤ To return to the top level, press the  button.

NOTE

To toggle between year, month and day, press the  or  button.



Adjusting the time

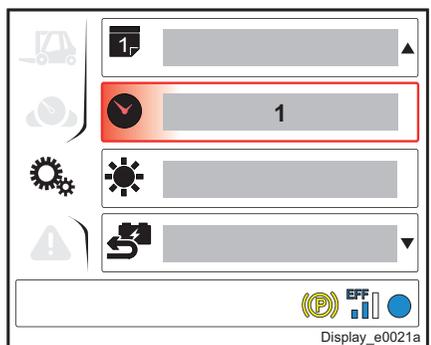
Press the  button then press the  button to select the "Time" (1) menu item.

➤ Press the  button.

NOTE

The "Time" symbol appears at the bottom left of the display.

➤ Use the  or  buttons to select the desired hour.



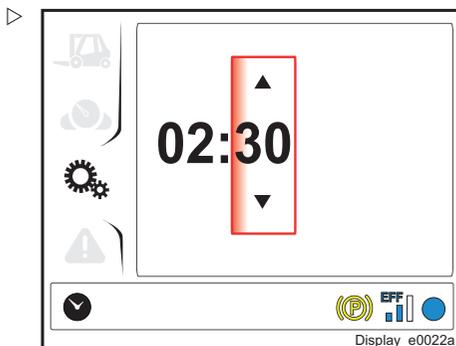
4 Operation

Display unit

- Press the  button.
- Use the  or  buttons to select the desired minutes.
- Press the  button to confirm.
- To return to the top level, press the  button.

NOTE

To toggle between minutes and hours, press the  or  button.



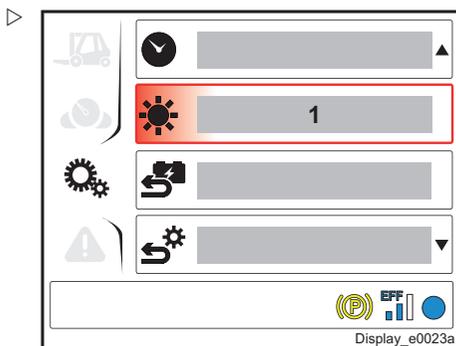
Setting the display brightness

Press the  button then press the  button to select the "Brightness" (1) menu item.

- Press the  button.

NOTE

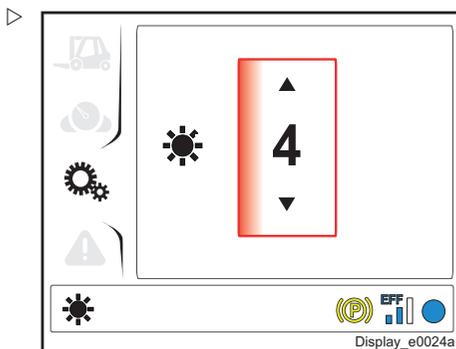
The "Brightness" symbol appears at the bottom left of the display.



- Use the  or  buttons to select the desired brightness.
- Press the  button to confirm.
- To return to the top level, press the  button.

NOTE

A light sensor also regulates the brightness of the display. This means that the display remains at a level of brightness comfortable for the human eye even under pronounced changes in lighting (e.g. when driving into the hall).



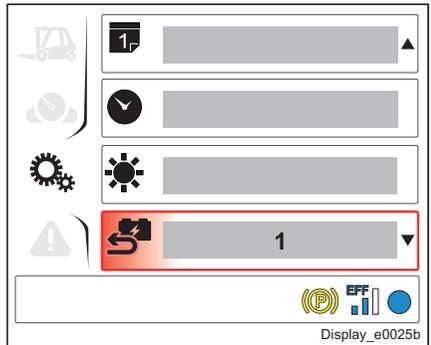
Resetting consumption

Press the  button then press the  button to select the "Reset consumption" (1) menu item.

➤ Press the  button.

NOTE

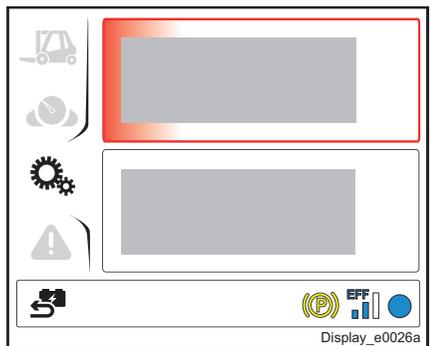
The "Reset consumption" symbol appears at the bottom left of the display.



➤ Use the  and  buttons to choose between "Reset consumption" or "Back" (cancel the process).

➤ Press the  button to confirm your selection.

➤ To return to the top level, press the  button.



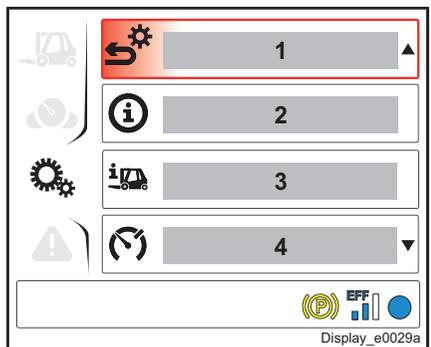
Restoring factory settings

Press the  button then press the  button to select the "Restore factory settings" (1) menu item.

➤ Press the  button.

NOTE

The "Reset factory settings" symbol appears at the bottom left of the display.



4 Operation

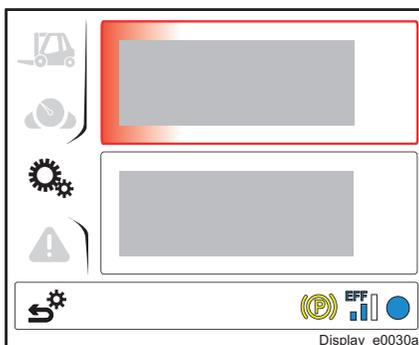
Display unit

- Use the  and  buttons to choose between "Reset factory settings" or "Back" (cancel the process).
- Press the  button to confirm your selection.
- To return to the top level, press the  button.

NOTE

The "Factory settings" are:

- Units: kg | km/h | m
- Date format: dd/mm/yy/24 hrs
- Language: German
- Brightness: 4



System information

Press the  button then press the  button to select the "System information" (2) menu item.

- Press the  button.

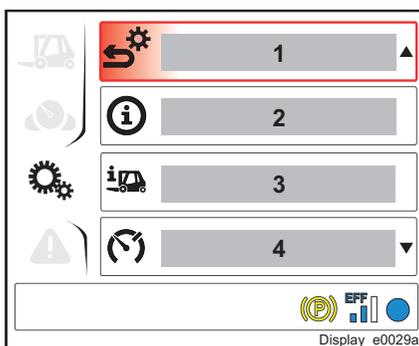
NOTE

The "System information" symbol appears at the bottom left of the display.

The "System information"(2) menu item displays the following information:

- Part no.
- Software version
- Operating system version
- Hardware version
- Serial number
- Licensing

- To finish, press the  button.
- To return to the top level, press the  button.



Drive mode

Press the  button then press the  button to select the "Drive mode" (3) menu item.

➤ Press the  button.

NOTE

The "Drive mode" symbol appears at the bottom left of the display.

The "Drive mode" menu item displays the following information:

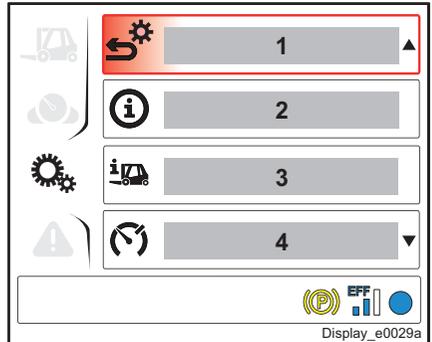
- Currently activated driving dynamics

NOTE

The "Drive mode" is set using the diagnostic program.

➤ To finish, press the  button.

➤ To return to the top level, press the  button.



Speed limit

Press the  button then press the  button to select the "Speed limit" (3) menu item.

➤ Press the  button.

NOTE

The "Speed limit" symbol appears at the bottom left of the display.

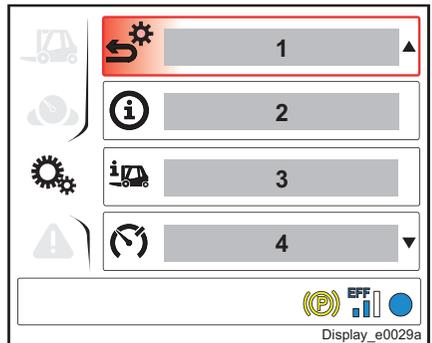
The set "Reduction in the driving speed" for forwards and reverse travel is displayed here.

NOTE

The "Speed limit" is set using the diagnostic program.

➤ To finish, press the  button.

➤ To return to the top level, press the  button.



4 Operation

Display unit

Mast vertical position (special equipment)

NOTE

This menu item can only be selected in conjunction with the load-dependent assistance system (special equipment).

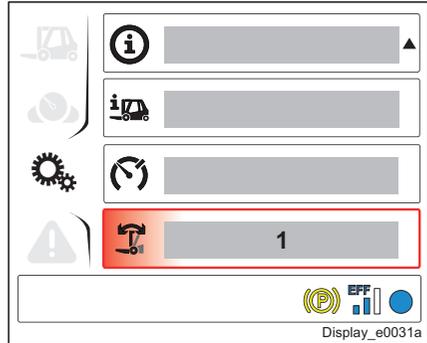
Press the  button then press the  button to select the "Mast vertical" (1) menu item.

➤ Press the  button.

NOTE

The "Mast vertical" symbol appears at the bottom left of the display.

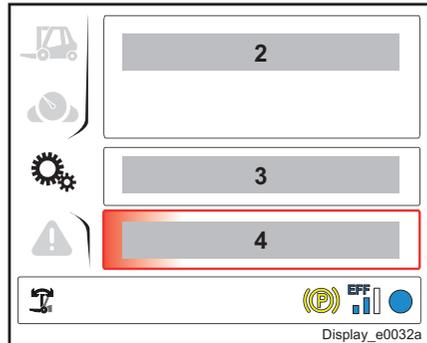
The current value (2) is shown in the display.



➤ Use the  and  buttons to select an action.

➤ Press the  button to confirm "Back" (3) (cancel the process) or "Calibrate" (4).

➤ To return to the top level, press the  button.

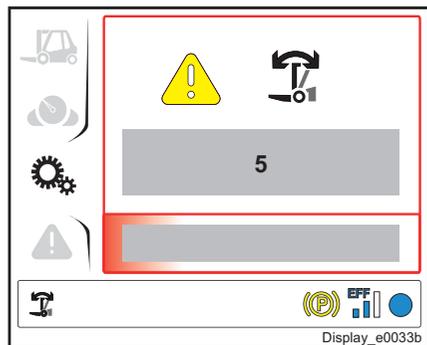


Performing the calibration procedure

➤ Select the option (4) to start the calibration procedure.

"Calibration active" appears in the display (5). 

The calibration procedure can be aborted using the  button.

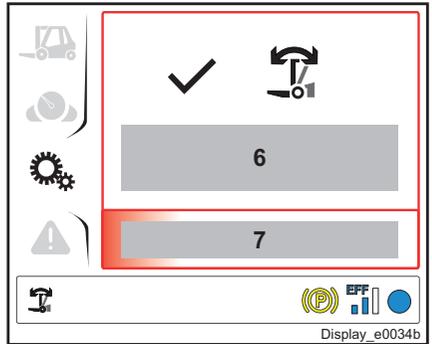


After calibration has been performed, "Calibration successful" appears in the display (6).
 The calibrated value (7) is displayed.

 **NOTE**

If calibration was not successful, repeat.

- To finish, press the  button.
- To return to the top level, press the  button.



4 Operation

Display unit

Malfunctions menu

Press the  button.

- Select the desired menu item using the  and  buttons.

The following menu items can be selected: ▷

- Error code (1)
- Error lights (2)
- QR code (3)

NOTE

The symbol for the selected menu item is shown at the bottom left of the display.

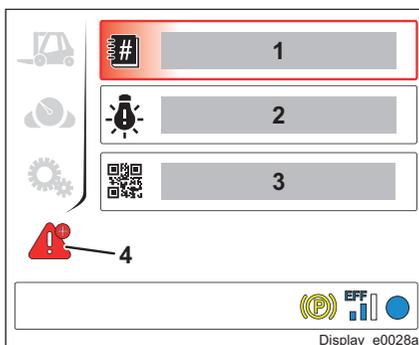
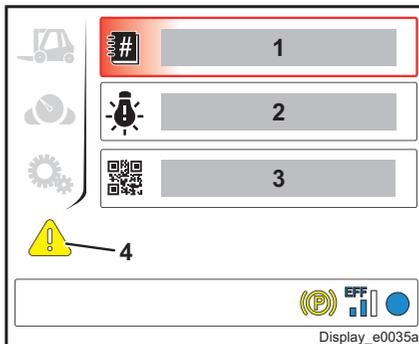
- Press the  button to confirm.
- To return to the top level, press the  button.

The symbol (4) is displayed in the following colours depending on the status of the truck: ▷

- "Yellow" means: malfunction
- "Red" means: critical malfunction
- "+" next to the symbol (4) means: multiple malfunctions

NOTE

Invalid values or error values are displayed as "—".



Operation

Switching the truck on and off

Switching on the truck

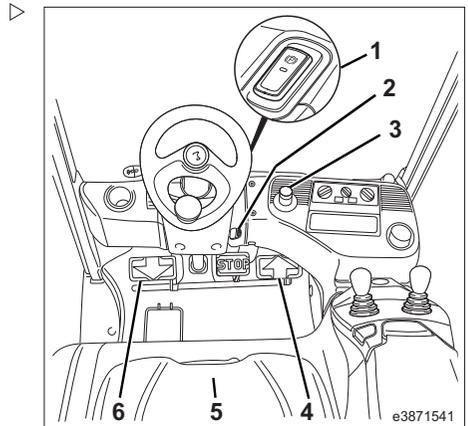
- Sit on the driver's seat (5).
- Fasten the seat belt.

NOTE

Accelerator pedals and joysticks must be in the neutral position.

- Pull the emergency off switch (3) if necessary.
- Insert the key (2) into the key switch. Turn the key clockwise from the zero position to switch setting "I".

The electrical system is switched on and the truck is ready for operation.



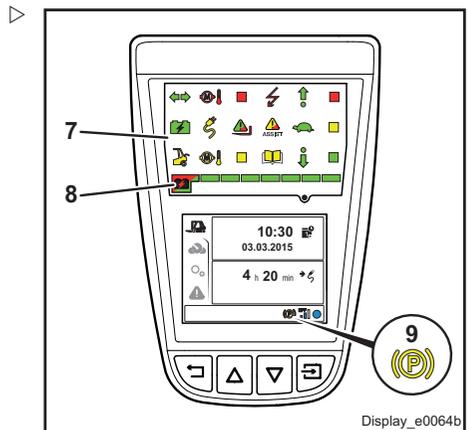
- Observe the display unit (7).

After the electrical system is switched on, the display unit (7) performs the following actions:

- Self-test of the lights as described in the "system start-up" section of the chapter on the "display unit".
- Display of the remaining operating time until the next service, as described in the "system start-up" section of the chapter on the "display unit".

The following displays remain visible after self-testing has been performed:

- "Battery discharge indicator" (8)
- "Parking brake applied" (9)



NOTE

The accelerator pedals and joysticks must not be actuated until all indicator lights apart from "Parking brake applied" (9) have gone out. Otherwise, the truck will not function. To recommission, switch off the truck. Switch the truck on again.

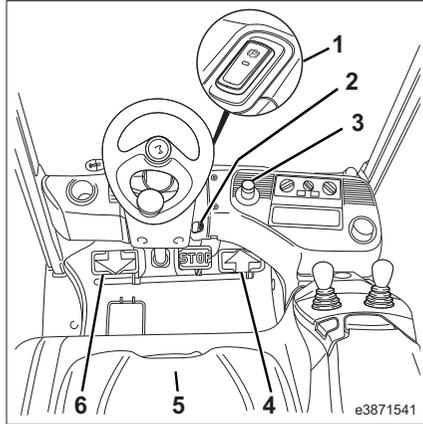
4 Operation

Operation

Switching off the truck

- Take your feet off accelerator pedals (4) and (6).
- Turn the switch key (2) anti-clockwise to the zero position.

The electrical system is switched off. The automatic brake is activated.



Access system connect: (LFM)

The access system **connect**: enables the truck to be commissioned via the input unit (keypad or transponder) and monitors operating statuses and usage.

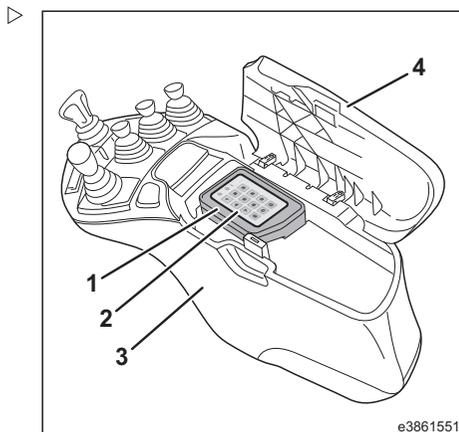
Keypad input

The input device (1) is located in the armrest console (3) and has a 12-digit keypad (2).

With the standard setting, a 5-digit PIN is allocated to the respective driver to ensure that the truck can be operated only by authorised personnel. The truck can be started only after entering this PIN and possibly a status code (depending on the setting).

NOTE

The fleet manager can extend the PIN from 5 to 8 digits. The fleet manager can also activate a 1-digit status code (Pre-operational check). This code indicates the status of the truck.



Logging in and switching on the truck

- Fold up the armrest support (4).
- Press the **Reset** button (8) (or any other button) to activate the input unit from standby mode.

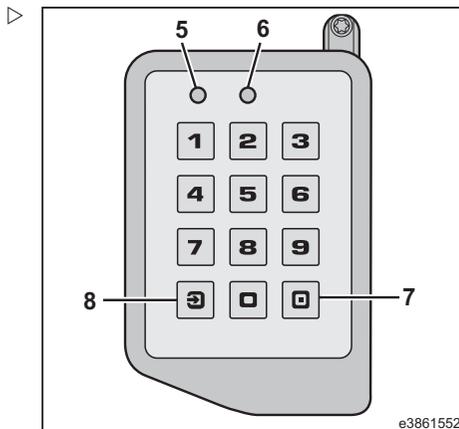
NOTE

If a number button is pressed to activate the input unit, this number is registered as the first digit of the PIN.

LED (5) and LED (6) flash green alternately.

NOTE

If there is no further input, the input unit returns to standby mode after 60 seconds (factory setting). The fleet manager can change the delay time.



4 Operation

Operation

- Enter PIN (factory setting = 0 0 0 0 0).

LED (5) and LED (6) both illuminate green and the truck is switched on.

NOTE

*If an incorrect PIN is entered, LED (5) and LED (6) flash red. After a delay time, the input unit reverts to login mode and both LEDs alternately flash green. The delay time increases each time an incorrect PIN is entered. If you make a mistake when entering the PIN, press the **Reset button** (8). The PIN entry process is aborted.*

NOTE

If LED (5) illuminates red and LED (6) illuminates green, the data must be read out by the fleet manager.

- Close the armrest support (4).

Switch off the truck and log out:

CAUTION

Unwarranted use by unauthorised personnel.

When parking and leaving the truck, the driver must log out.

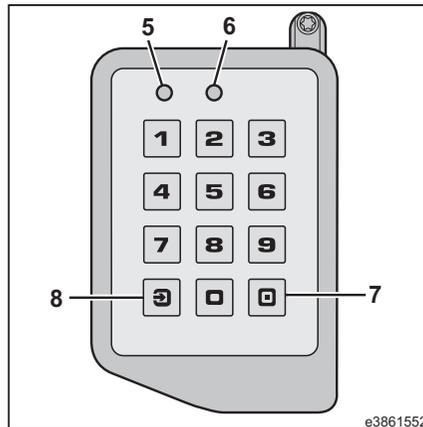
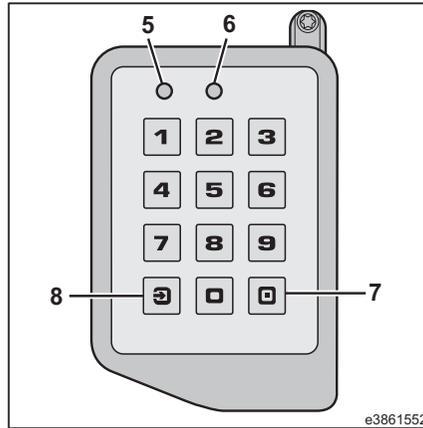
- Actuate the parking brake.
- Fold up the armrest support (4).
- Push the **Log IN/OUT** (7) button.

The truck is switched off and LEDs (5) and (6) go out.

- Close the armrest support (4).

NOTE

If the driver leaves the driver's seat, the truck is switched off after a delay time. If the seat switch is activated during the delay time, the truck can be operated without having to re-enter the PIN. The fleet manager can change the delay time.



Activating the power supply:

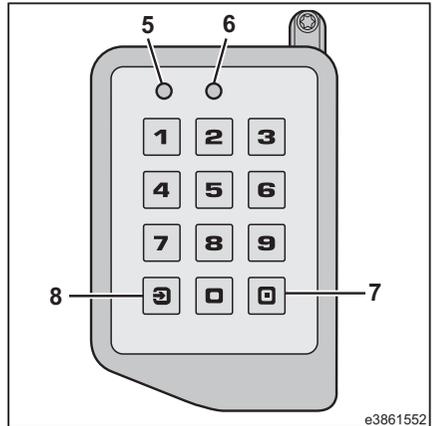
- Press and hold the **Log IN/OUT** button (7) for longer than 2 seconds.

LED (5) lights up yellow and LED (6) flashes green.

NOTE

Depending on the software version, the colours of LEDs (5) and (6) may vary.

The power supply remains switched on for approx. 60 seconds (e.g. for lighting).



Input via transponder (chip or chip card)

The input unit (1) is located in the armrest console (3) and features a reading area (2) onto which the corresponding transponder (chip or chip card) must be placed.

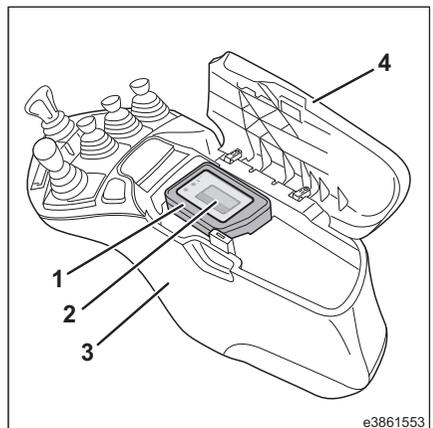
The driver logs in by placing a transponder on the reading area (2).

The truck can be switched on only once the transponder has been placed onto the reading area.

This ensures that the truck can be used only by authorised staff.

NOTE

A status check (Pre-operational check) can be performed using a valid transponder. The fleet manager can activate this status check.



4 Operation

Operation

Log in and switch on the truck:

- Actuate the parking brake.
- Fold up the armrest support (4).
- Place a valid transponder on the reading area (2).

Data is read in, and LED (5) and LED (6) both illuminate green. The truck is switched on.

- Remove the transponder.

NOTE

If LED (5) and LED (6) flash red, the transponder was invalid or there was a reading error. After a delay time, the input unit reverts to login mode and both LEDs alternately flash green. The delay time increases each time an invalid transponder is used. Placing a valid transponder on the reading area automatically reactivates the input unit. LED (5) and LED (6) both illuminate green.

NOTE

If LED (5) illuminates red and LED (6) illuminates green, the data must be read out by the fleet manager.

- Close the armrest support (4).

Switch off the truck and log out:

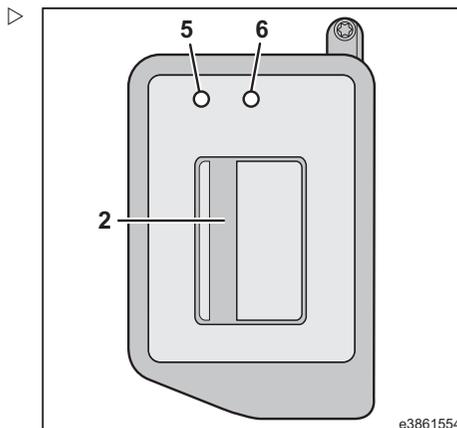
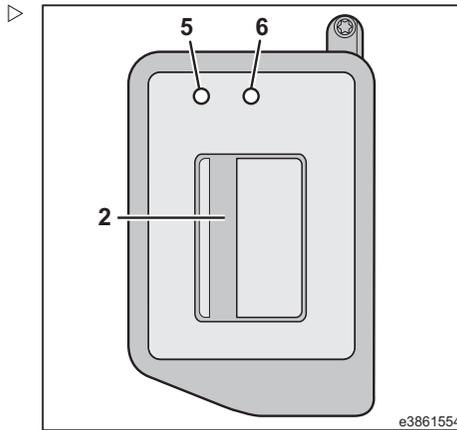
CAUTION

Unwarranted use by unauthorised personnel.
 When parking and leaving the truck, the driver must log out.

- Actuate the parking brake.
- Fold up the armrest support (4).
- Place a valid transponder on the reading area (2).

The truck is switched off and LEDs (5) and (6) go out.

- Remove the transponder.
- Close the armrest support.



i NOTE

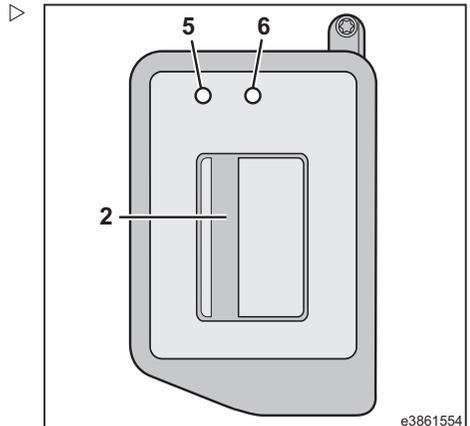
If the driver leaves the driver's seat, the truck is switched off after a delay time. If the seat switch is activated during the delay time, the truck can be operated without having to re-enter the PIN. The fleet manager can change the delay time.

Activating the power supply:

- Place a valid transponder on the reading area (2) and hold it there for longer than 2 seconds.

LED (5) lights up yellow and LED (6) flashes green.

The power supply remains switched on for approx. 60 seconds (e.g. for lighting).



i NOTE

If another valid transponder is placed on the reading area within 60 seconds, the truck can be operated again.

Status checking via smartphone

After logging in via a keypad or transponder, a status check (Pre-operational check) can be performed via smartphone.

The truck can only be switched on after a successful check.

i NOTE

The status check can be activated by the fleet manager.

LED condition display

Function:	LED (5)	LED (6)
Standby mode	Off	Off
Input prompt: PIN/transponder	Flashes green Alternately with LED (6)	Flashes green Alternately with LED (5)
No error when reading in PIN/transponder: truck can be started	Illuminates green	Illuminates green
Error when reading in PIN/transponder: truck cannot be started	Flashes red	Flashes red

4 Operation

Operation

Function:	LED (5)	LED (6)
Transition to standby mode	Illuminates red once	Illuminates green once
Data read-out required - memory 90% full	Flashes red	Illuminates green
Data read-out required - memory 100% full	Illuminates red	Illuminates green
Power supply active for 60 seconds *)	Illuminates yellow	Flashes green

*) Depending on the software version, the colours of the LEDs may vary. These LED colours and additional LED status displays can be checked with the fleet manager.

Emergency off switch

The emergency off switch is used to bring the truck into a safe condition in the event of a malfunction or a dangerous situation.

Emergency off switch in normal operation

- Pull the actuation knob of the emergency off switch (1) upwards.

The emergency off switch is unlocked. The truck is ready for operation.

Actuating the emergency off switch

WARNING

After the emergency off switch has been actuated, battery voltage is still present at the components in the electrical system.

To switch off the power supply to the truck completely (e.g. for service work), the battery male connector must be disconnected from the battery female connector.

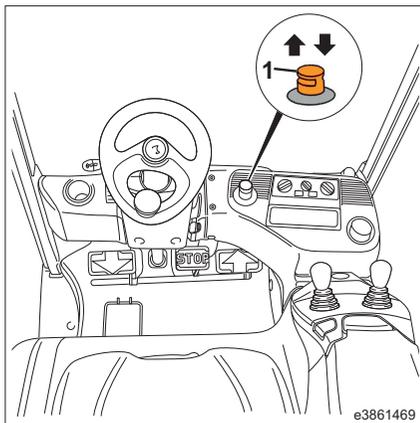
- Push the actuation knob (1) of the emergency off switch downwards.

The electrical system of the truck is switched off.

The driving, steering and lifting functions of the truck are deactivated. The brake remains active.

NOTE

If the emergency off switch is actuated during travel, the truck is braked immediately. In order to minimise the risk of the load falling off, the brakes are applied with reduced braking torque.



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4 Operation

Operation

Driving - Single-pedal operation

WARNING

It is generally not permitted to drive on longer gradients greater than 15% due to the specified minimum braking distance and stability values. Please contact your service partner before negotiating steeper gradients. The climbing capability values given in the type sheet have been determined from the tractive force and only apply when overcoming obstacles on the roadway and for small height differences.

You should always adapt your driving to the conditions on the route used (unevenness etc.), paying particular regard to hazardous work areas and your load.

WARNING

Risk of accident and injury as a result of drivers being distracted.

The use of electrical devices (such as mobile phones) is prohibited while the truck is in motion.

WARNING

Rear-view mirrors should not be used for reverse travel.

Reverse travel is therefore only permitted when looking directly behind you.

CAUTION

Any side doors attached must be protected from damage when driving.

Please therefore ensure that both side doors are closed and locked before setting off.



NOTE

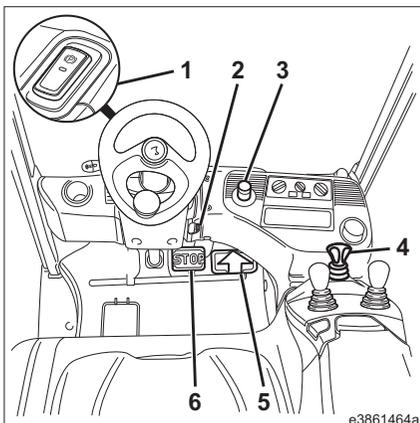
The truck can only be driven when the driver's seat is occupied.

- Pull the emergency off switch (3) if necessary.
- Switch on the truck.
- Raise the fork arms slightly and tilt the lift mast backwards.

i NOTE

If the red LED in the switch (1) lights up, the manual parking brake is actuated. Driving is possible only when the manual parking brake is released.

- If necessary, release the manual parking brake using the switch (1).



Forward travel

- Move the direction selection lever (4) forwards.

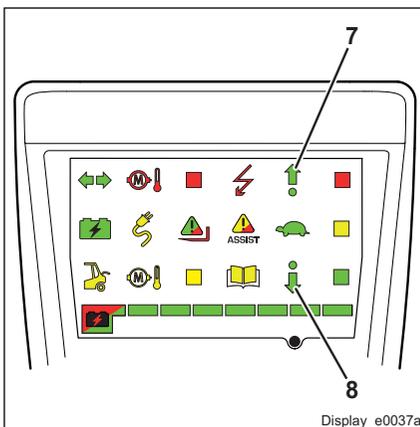
The indicator light (7) lights up.

- Press the accelerator pedal (5) carefully.

The automatic brake is released and the driving speed of the truck increases as the actuation distance of the pedal increases.

i NOTE

Pressing down the accelerator pedal hard is to no advantage as the maximum acceleration rate is controlled automatically.



Reverse travel

- Move direction selection lever (4) backwards.

The indicator light (8) lights up.

- Press the accelerator pedal (5) gently.

The automatic brake is released and the driving speed of the truck increases as the actuation distance of the pedal increases.

Changing the drive direction

- Operate direction selection lever (4) for the opposite drive direction.

4 Operation

Operation

The truck will be electrically braked until it comes to a standstill and then accelerated in the drive direction specified.

Driving - Dual-pedal operation

WARNING

It is generally not permitted to drive on long inclines with a gradient greater than 15% due to the specified minimum braking and stability values. Please contact your service partner before negotiating steeper gradients. The climbing capability values specified in the type sheet have been determined from the pulling force. The values apply only when overcoming obstacles on the roadway and for small height differences.

Adapt your driving style to allow for the conditions on the route in use (unevenness etc.), any hazardous work areas and the load.

WARNING

Risk of accident and injury as a result of drivers being distracted.

The use of electrical devices (such as mobile phones) is prohibited while the truck is in motion.

WARNING

Rear-view mirrors should not be used for reverse travel.

Reverse travel is therefore only permitted when looking directly behind you.

CAUTION

Any side doors attached must be protected from damage when driving.

Please therefore ensure that both side doors are closed and locked before setting off.

NOTE

The truck can only be driven when the driver's seat is under load.

4 Operation

Operation

- Pull the emergency off switch (3) if necessary. ▷
- Switch on the truck.
- Lift the fork arms slightly. Tilt the lift mast backwards.

NOTE

If the red LED in the switch (1) lights up, the manual parking brake is actuated.

- Release the manual parking brake using the switch (1).

Forward travel

- Carefully press the right-hand accelerator pedal (4).

The automatic brake is released. The driving speed of the truck increases as the actuation distance of the pedal increases.

NOTE

There is no advantage in pressing down hard on the accelerator pedal, as the maximum acceleration rate is controlled automatically.

Reverse travel

- Carefully operate the left accelerator pedal (6).

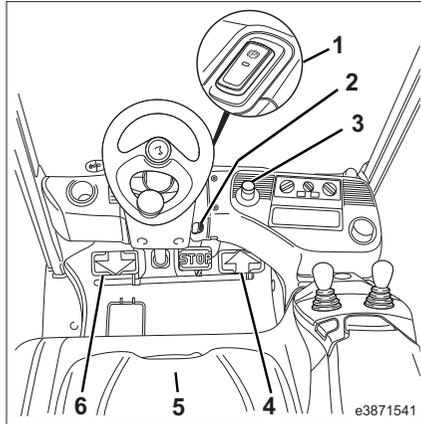
The automatic brake is released. The driving speed of the truck increases as the actuation distance of the pedal increases.

Changing the drive direction

- Release the actuated accelerator pedal.
- Operate the accelerator pedal for the opposite drive direction.

The truck is electrically braked until it comes to a standstill and then accelerated in the drive direction specified.

- To ensure that the truck can be easily controlled in both directions, both feet must be placed on the accelerator pedals.



Briefly leaving the truck

If you briefly leave the truck when it is switched on in order to carry out minor jobs in the direct vicinity, e.g. picking work, opening doors or coupling trailers, the following must be observed:

- Lower the fork carriage.



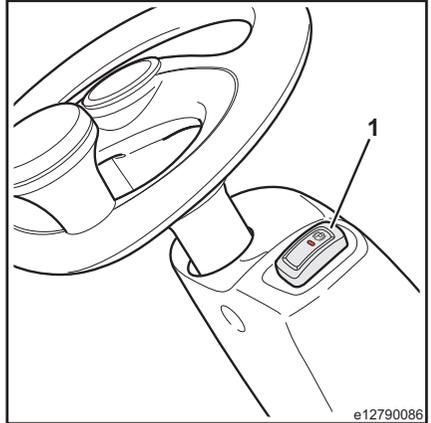
⚠ CAUTION

The truck must not be allowed to roll away.

- Actuate the parking brake (1).

i NOTE

When leaving the truck briefly, the truck must always be supervised.



Surround view system

i NOTE

The surround view system supports the driver in handling the truck. The responsibility and control for operating the truck in a safe manner always lies with the driver.

The surround view system is used to detect other trucks, people, and objects.

The driver must familiarise themselves with the surround view system before starting work.

The cameras are set to a 360° circumferential view ex works.

i NOTE

The national regulations must be observed without fail.

4 Operation

Operation

DANGER

Risk of accident!

If a camera position is changed or if a camera is damaged, the circumferential view is no longer guaranteed.

The driver must always verify the area shown on the monitor by making direct visual contact.

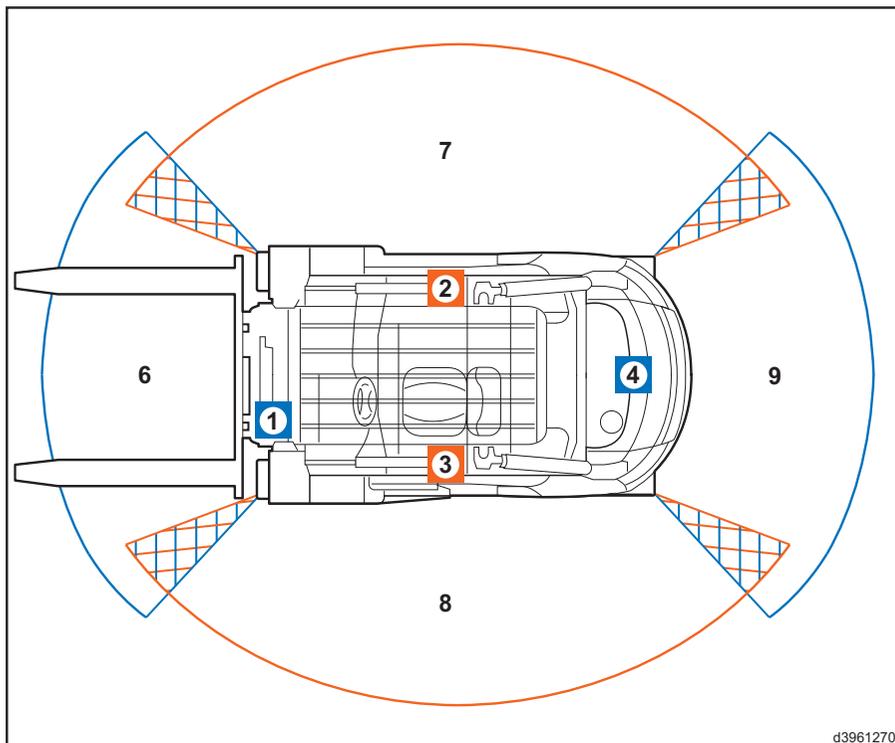
WARNING

Operating error!

The monitor cover protects the system against operating error. The components of the surround view system must not be opened.

Service work and installation must only be performed by qualified technicians. Contact your service partner.

Camera



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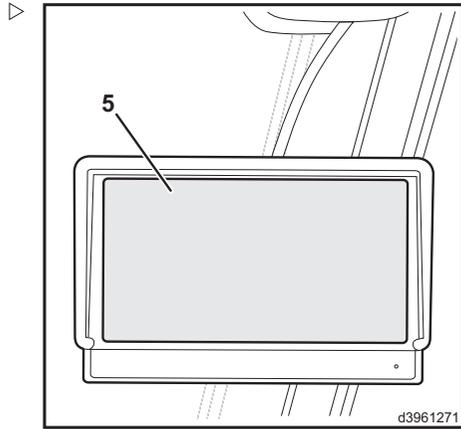
- | | | | |
|---|-------------------|---|----------------------------|
| 1 | Front camera | 6 | Front field of vision |
| 2 | Right-hand camera | 7 | Right-hand field of vision |
| 3 | Left-hand camera | 8 | Left-hand field of vision |
| 4 | Rear camera | 9 | Rear field of vision |

4 Operation

Operation

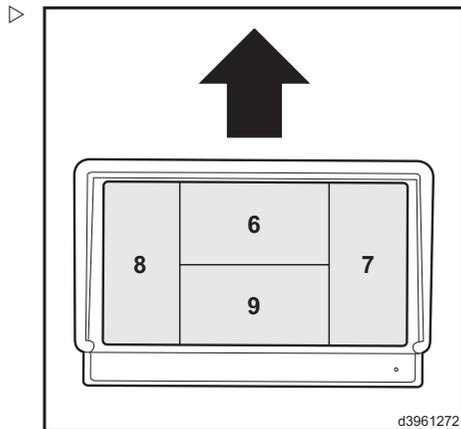
Monitor

- 5 Monitor



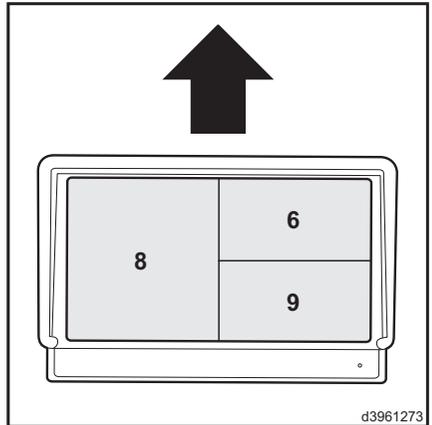
Display during forward travel

- 6 Front field of vision
 7 Right-hand field of vision
 8 Left-hand field of vision
 9 Rear field of vision



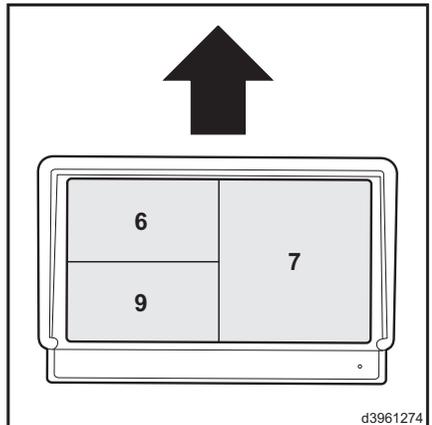
Display during forward travel with the left-hand turn indicator activated ▷

- 6 Front field of vision
- 8 Left-hand field of vision
- 9 Rear field of vision



Display during forward travel with the right-hand turn indicator activated ▷

- 6 Front field of vision
- 7 Right-hand field of vision
- 9 Rear field of vision



4 Operation

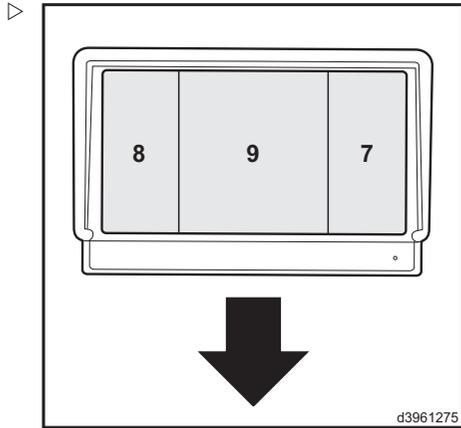
Operation

Display "1" during reverse travel

- 7 Right-hand field of vision
- 8 Left-hand field of vision
- 9 Rear field of vision

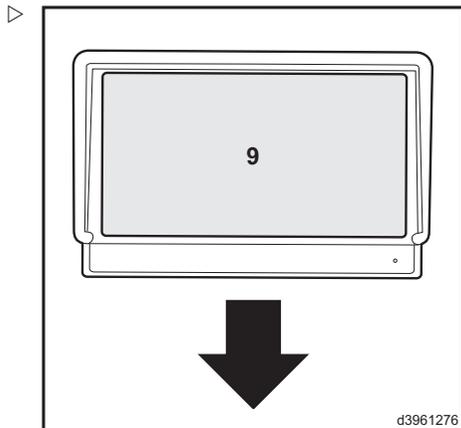
The preset display "1" can be switched to display "2".

➤ Contact your service partner.



Display "2" during reverse travel

- 9 Rear field of vision



Steering system

The hydrostatic steering system means that very little effort is required for the steering wheel turning movement.

This is particularly advantageous when palletising in narrow aisles.

- Start up and drive the industrial truck.
- Turn the steering wheel to the left and right to the stop.

The steering wheel can be moved beyond the stop if sufficient force is applied, without the position of the wheels changing on the steering axle.

DANGER

The industrial truck must not be driven if the steering system is defective.

If the steering is stiff or has too much play, contact your service partner.

Brake system

DANGER

Risk of accident or death if the brake system is faulty.

Your industrial truck must not be used under any circumstances if the brake system is faulty.

If you notice any defects on the brake system, please contact your service partner immediately.

DANGER

The truck's braking characteristics are influenced by factors such as the viscosity of the oil. Using a different oil (with a different level of viscosity) to that prescribed by the manufacturer will affect the braking characteristics and increase the risk of accidents and risk to life.

Therefore, use only the oil prescribed by the manufacturer (see information on consumables).

Contact your service partner.

Actuating the service brake via the stop pedal

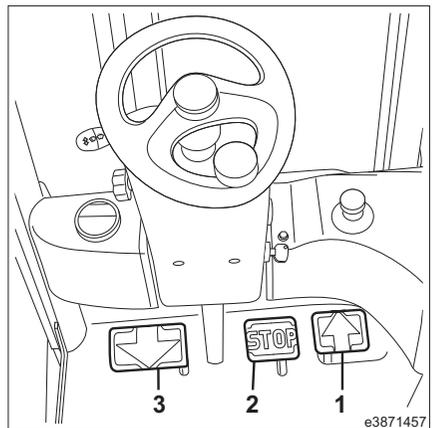
When the stop pedal (2) is pressed, the multi-disc brake is actuated hydraulically.

NOTE

It is recommended that drivers familiarise themselves with the function and effect of this brake when there is no load on the industrial truck. For this purpose, drivers must choose a route with no other traffic and drive at a low speed.

➤ Actuate the stop pedal (2).

The braking effect will be greater or lesser depending on how hard the stop pedal is pressed.



4 Operation

Operation

Electrical reverse current braking

Slowly or quickly releasing the accelerator pedals to the neutral position allows the braking effect to be sensitively controlled, from gentle to hard braking.

- Allow the accelerator pedals (1) or (3) to move to the neutral position.

The LBC electronics brake the truck.

- Actuate the accelerator pedal for the opposite drive direction.

This will increase the reverse current braking.

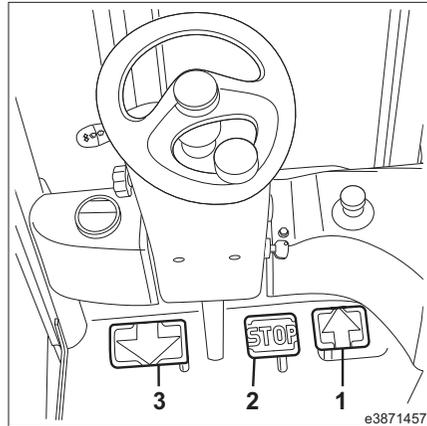
NOTE

If required, this function can be adjusted using the diagnostic program so that the effect is greater or smaller. Contact your service partner.

WARNING

Risk of accident

Depending on the charging state of the battery, electrical reverse current braking may be insufficient, meaning that the maximum permissible speed of the truck is exceeded. For this reason, the driving speed must be adapted to the respective environmental conditions.



Automatic brake

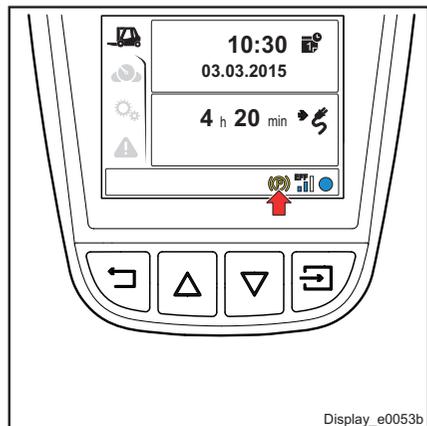
If the truck is braked to a standstill, the automatic brake is activated.

The "Parking brake activated" symbol (see arrow) flashes in the display unit.

When stopping on gradients, the truck is held electrically until the automatic brake becomes active.

- Actuate the accelerator pedal again.

The brake is automatically released.



Activating the parking brake manually

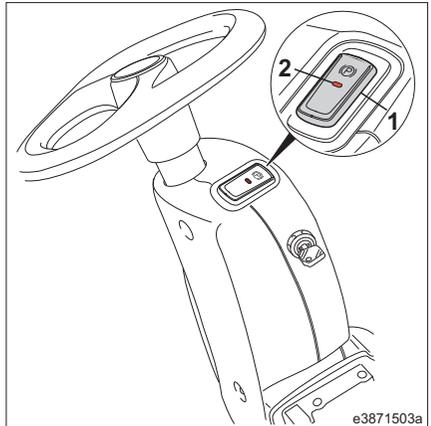
The parking brake can be activated manually using the switch (1) when the truck is switched on.

NOTE

In safety-critical situations (e.g. when a worker is in a raised workshop hoist), the parking brake must be activated manually using the switch (1). This will result in all of the driving functions being blocked.

➤ Actuate the switch (1).

The red LED (2) in the switch (1) lights up.



The "Parking brake activated" symbol (see arrow) lights up continuously in the display unit.

The manual parking brake is active.

The driving functions are blocked.

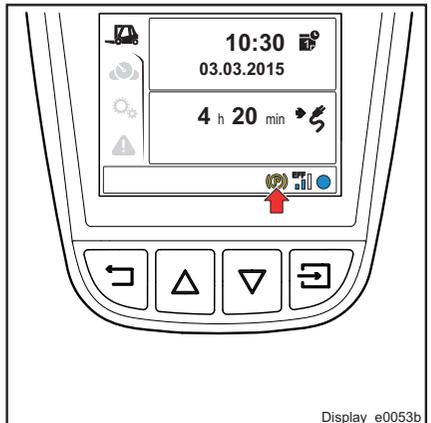
DANGER

Risk of accident and injury

Do not actuate the switch (1) for the parking brake while the truck is in motion.

In some circumstances, the load can slip from the fork arms if the parking brake is applied too sharply.

Only actuate the switch (1) while the truck is in motion if emergency braking via the stop pedal is not sufficient.



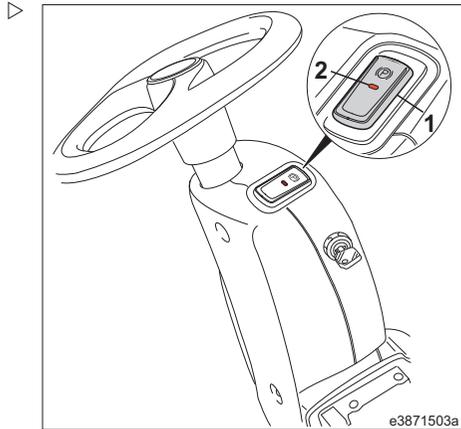
4 Operation

Operation

Switching off the manual parking brake

➤ Actuate the switch (1).

The red LED (2) in the switch (1) goes out.



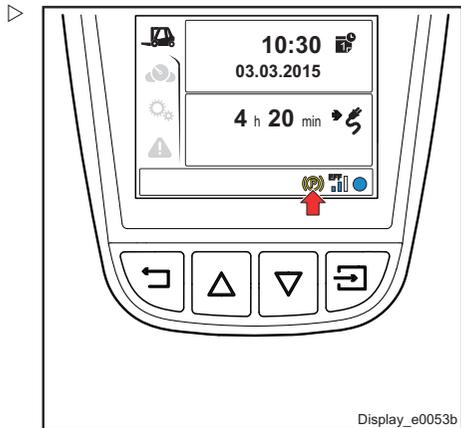
The "Parking brake activated" symbol (see arrow) flashes in the display unit (automatic brake active).

The manual parking brake is deactivated.

The truck is ready for operation.

NOTE

When the parking brake is activated manually, the parking brake must also be switched off manually before the truck can be driven again.



Joystick — Central-lever operation



⚠ WARNING

There is a risk of becoming trapped between parts due to the moving lift mast or the attachment.

Therefore, never reach into or enter the lift mast or the area between the lift mast and the truck.

The lifting system and attachments should only ever be used for their proper purpose.

Drivers must be instructed in the handling of the lifting system and attachments.

Take note of the maximum lift height.

Operating the lifting and tilting equipment ▷

i NOTE

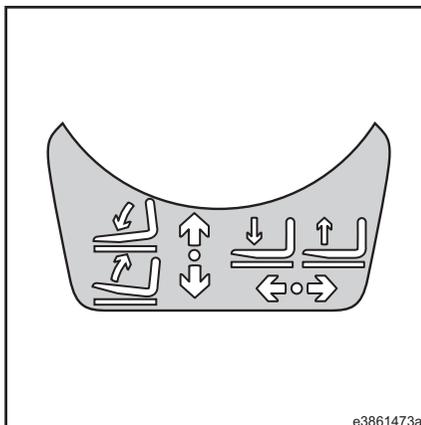
On the version with central lever operation, moving the joystick to an intermediate position (approx. 45°) will activate both functions at the same time (e.g. lifting and tilting).

- Take note of the switching symbols with arrows.

The joystick must always be operated gently, never jerkily. Moving the joystick determines the lifting, lowering and tilt speed. After the joystick is released, it automatically returns to its initial position.

i NOTE

Joysticks only function when the truck is switched on and the driver is sitting in the driver's seat.



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Operation

Lifting the fork carriage

⚠ DANGER

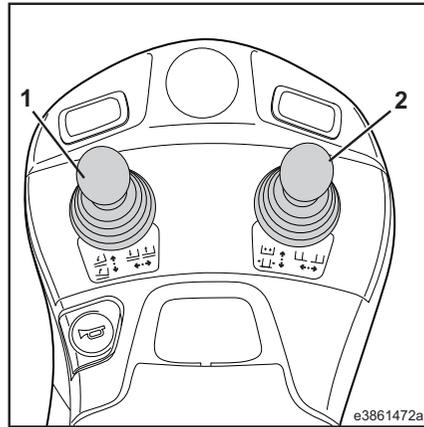
When lifting the fork arms, there is an increased risk of falling and crushing.

For this reason, it is not permitted to step onto the raised fork arms.

- Push joystick (1) to the right.

Lowering the fork carriage

- Push joystick (1) to the left.

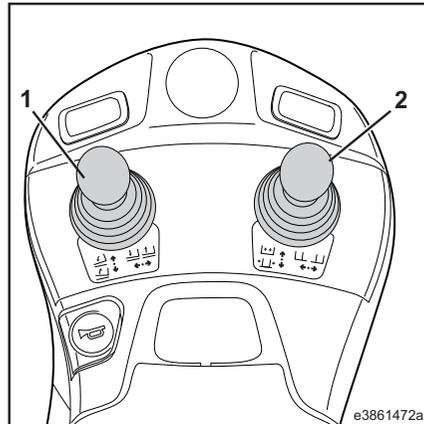


Tilting the lift mast forwards

- Push the joystick (1) forwards.

Tilting the lift mast back

- Pull the joystick (1) backwards.



Operating the attachments

Attachments can be fitted to the truck as special equipment (sideshift, fork prong positioner, clamp etc.). Observe the working pressure and operating instructions for the attachment. An additional joystick (cross lever) is fitted for operating these attachments.

⚠ CAUTION

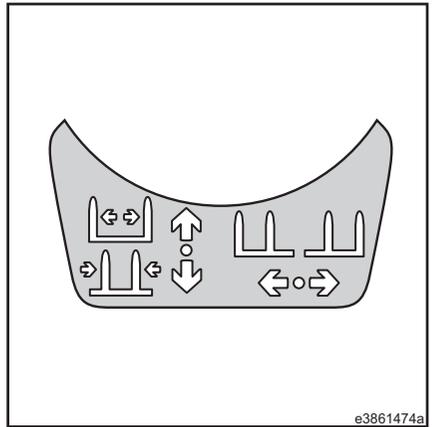
Attachments alter the load capacity and stability of the truck.

Attachments that are not supplied with the truck may only be used if the service partner has confirmed that the arrangement in terms of load capacity and stability ensures safe operation.

i NOTE

The methods of operating the attachments described here are examples. The configuration of the joystick may vary depending on your truck's equipment.

- Take note of the switching symbols with arrows.

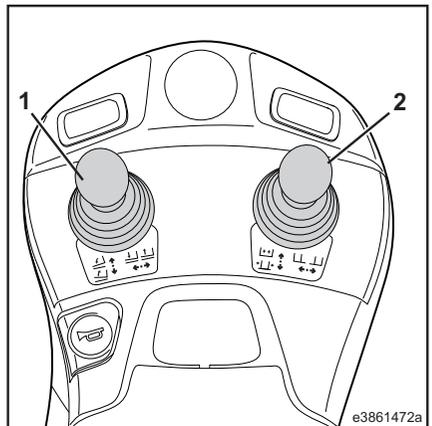


Operating the sideshift

 **NOTE**

In order to prevent damage, do not activate the sideshift when the fork arms are on the ground.

- Push joystick (2) to the left.
Sideshift moves to the left.
- Push joystick (2) to the right.
Sideshift moves to the right.



4 Operation

Operation

Operating the fork positioner

NOTE

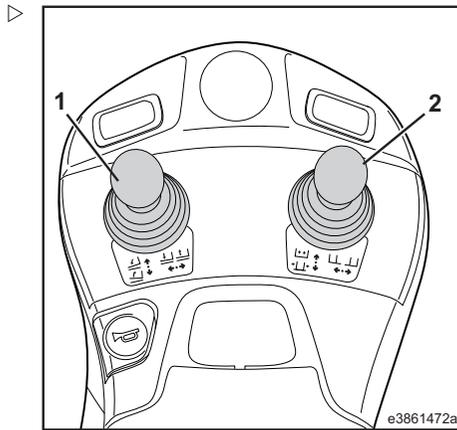
In order to prevent damage, do not activate the fork prong positioner with a load, or with the fork arms on the ground. Do not use the fork prong positioner as a clamp.

➤ Push the joystick (2) forwards.

Fork arms move outwards.

➤ Pull the joystick (2) backwards.

Fork arms move inwards.



Operating the rotator

DANGER

Stability jeopardised.

Only pick up loads such that they can be turned in the load centre of gravity.

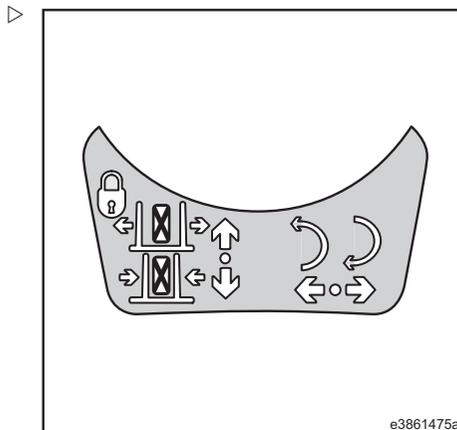
If loads are picked up off-centre, the residual load capacity may be exceeded when making a turning movement.

When turning, the actual centre of gravity of the load must therefore not be more than 100 mm (truck rated capacity below 6300 kg) or 150 mm (truck rated capacity between 6300 kg and 10,000 kg) outside the pivot point!

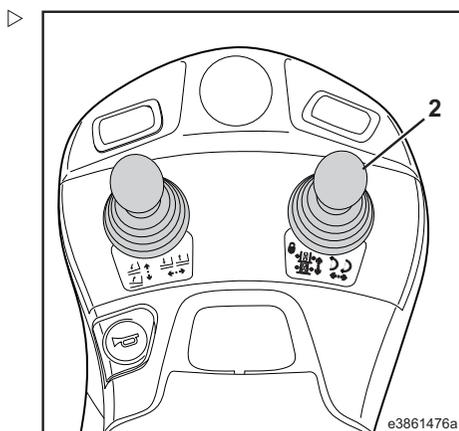
NOTE

Ensure that there is sufficient distance when turning to prevent damage.

➤ Take note of the switching symbols with arrows.



- Push joystick (2) to the left.
 The rotator moves anti-clockwise.
- Push joystick (2) to the right.
 The rotator moves clockwise.



Operating the clamp

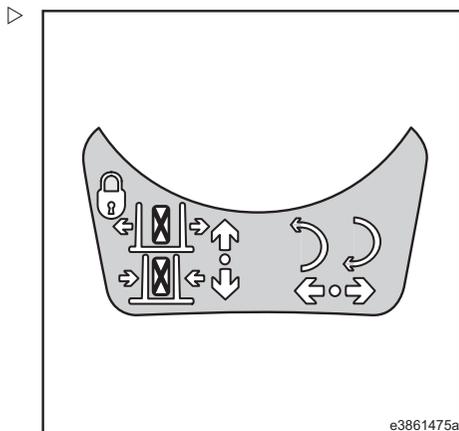
⚠ DANGER

Increased risk of accident from a falling load.

For attachments that hold a load by exerting pressure on it (e.g. a bale clamp), a lockable joystick must be used.

If your truck is not fitted with this equipment, please contact your service partner.

- Take note of the switching symbols with arrows.

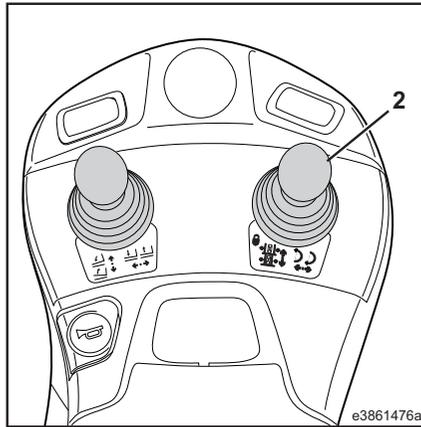


4 Operation

Operation

Electronically locked

- Push joystick (2) forwards by at least 40% and then move to the zero position.



The joystick is unlocked for approximately one second and the display (1) lights up in green in the display unit. ▷

NOTE

If the joystick is not moved forwards within this time period, it is locked again.

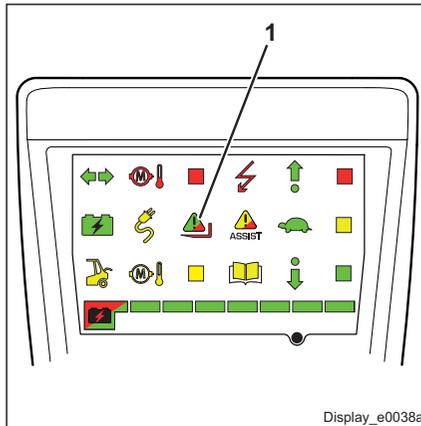
- Push the joystick (2) forwards.

Clamp opens.

Once the joystick has been released, it is locked again within one second.

- Pull the joystick (2) backwards.

Clamp closes.



Joystick — Single-lever operation



WARNING

There is a risk of becoming trapped between parts due to the moving lift mast or the attachment.

Therefore, never reach into or enter the lift mast or the area between the lift mast and the truck.

The lifting system and attachments must only ever be used for their intended purpose.

Drivers must be instructed in the handling of the lifting system and attachments.

Take note of the maximum lift height.

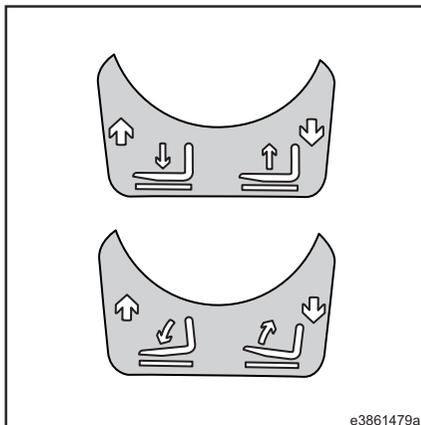
Operating the lifting and tilting equipment ▷

- Take note of the switching symbols with arrows.

The joystick must always be operated gently, and never in a jerking motion. The deflection of the joystick is used to determine the lifting/lowering and tilting speed. Once the joystick is released, it automatically returns to its initial position.

NOTE

Joysticks only function when the truck is switched on and the driver is sitting in the driver's seat.



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4 Operation

Operation

Lifting the fork carriage

⚠ DANGER

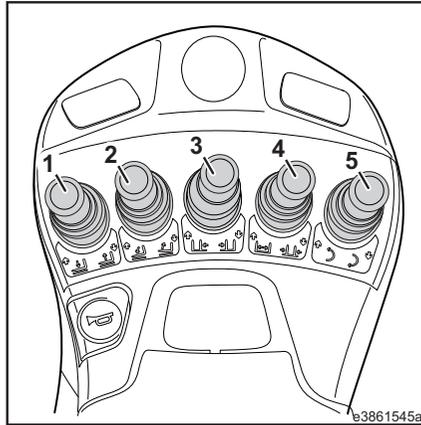
When lifting the fork arms, there is an increased risk of falling and crushing.

For this reason, do not step onto the raised fork arms.

- Pull the joystick (1) backwards.

Lowering the fork carriage

- Push the joystick (1) forwards.

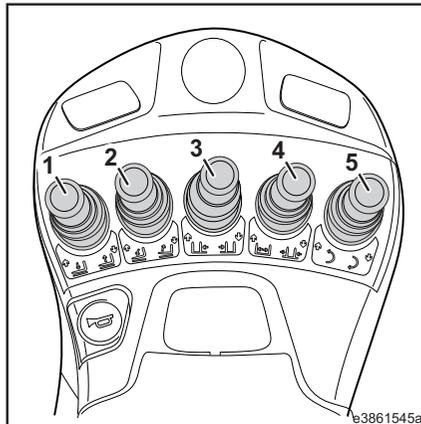


Tilting the lift mast forwards

- Push the joystick (2) forwards.

Tilting the lift mast back

- Pull the joystick (2) backwards.



Operating the attachments

Attachments can be fitted to the truck as special equipment (sideshift, fork prong positioner, rotator, clamp etc.). Observe the working pressure and operating instructions for the attachment. Additional joysticks are fitted for operating these attachments.

⚠ CAUTION

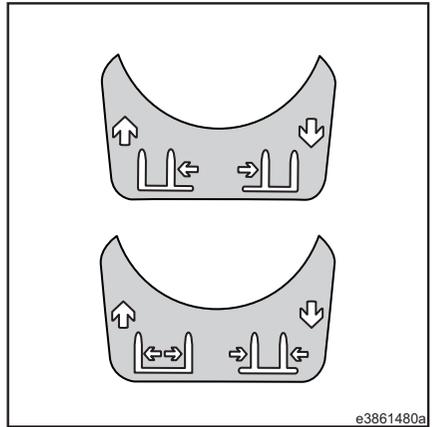
Attachments alter the load capacity and stability of the truck.

Attachments that are not supplied with the truck may only be used if the service partner has confirmed that the arrangement in terms of load capacity and stability ensures safe operation.

i NOTE

The methods of attachment operation described here are examples. The configuration of the joystick may vary depending on your truck's equipment.

- Take note of the switching symbols with arrows.



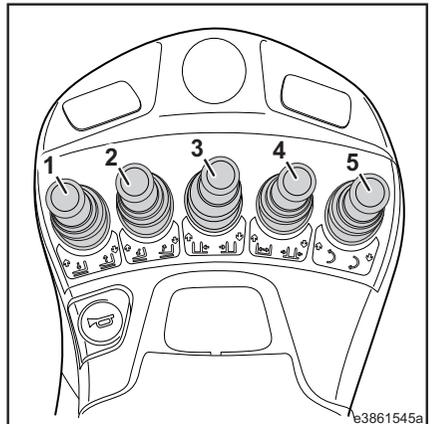
Operating the sideshift



NOTE

In order to prevent damage, do not activate the sideshift when the fork arms are on the ground.

- Push the joystick (3) forwards.
Sideshift moves to the left.
- Pull the joystick (3) backwards.
Sideshift moves to the right.



4 Operation

Operation

Operating the fork prong positioner

NOTE

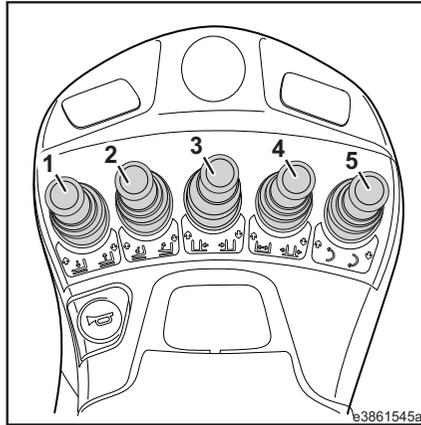
In order to prevent damage, do not activate the fork prong positioner with a load, or with the fork arms on the ground. Do not use the fork prong positioner as a clamp.

➤ Push the joystick (4) forwards.

Fork arms move outwards.

➤ Pull the joystick (4) backwards.

Fork arms move inwards.



Operating the rotator

DANGER

Stability jeopardised.

Only pick up loads such that they can be turned in the load centre of gravity.

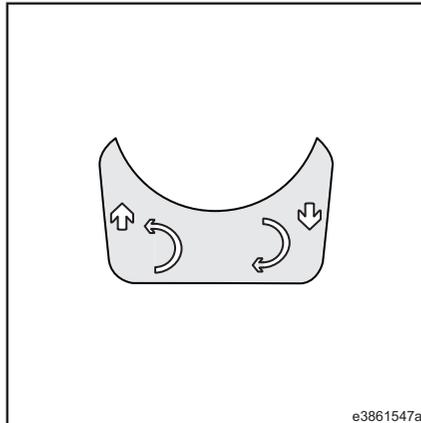
If loads are picked up off-centre, the residual load capacity may be exceeded when making a turning movement.

When turning, the actual centre of gravity of the load must therefore not be more than 100 mm (truck rated capacity below 6300 kg) or 150 mm (truck rated capacity between 6300 kg and 10,000 kg) outside the pivot point!

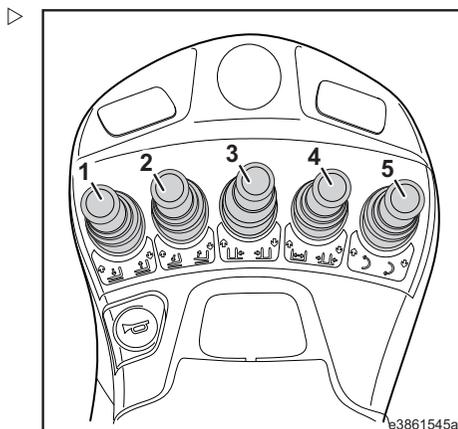
NOTE

Ensure that there is sufficient distance when turning to prevent damage.

➤ Take note of the switching symbols with arrows.



- Push the joystick (5) forwards.
The rotator moves anti-clockwise.
- Pull the joystick (5) backwards.
The rotator moves clockwise.



Operating the clamp

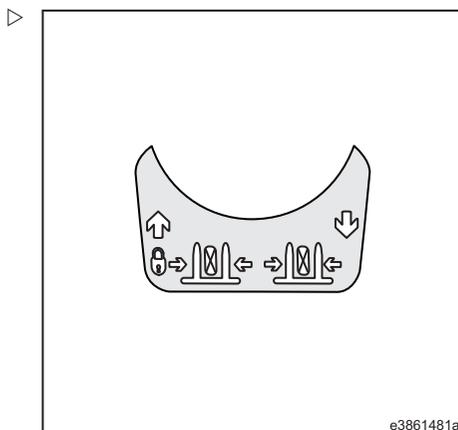
⚠ DANGER

Increased risk of accident from a falling load.

For attachments that hold a load by exerting pressure on it (e.g. a bale clamp), a lockable joystick must be used.

If your truck is not fitted with this equipment, please contact your service partner.

- Take note of the switching symbols with arrows.

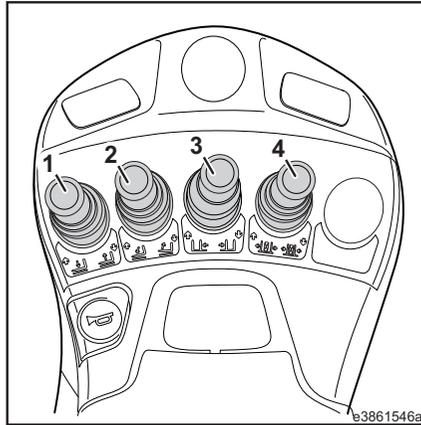


4 Operation

Operation

Electronically locked

- Push the joystick (4) forwards by at least 40% (depending on the configuration) and then move it to the zero position.



- The joystick is unlocked for approximately one second and the display (6) lights up in green in the display unit.



NOTE

If the joystick is not moved forwards within this time period, it is locked again.

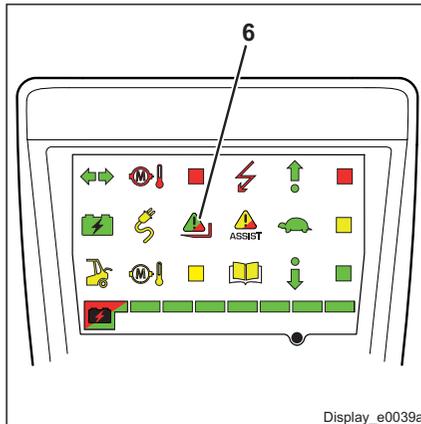
- Push the joystick (4) forwards.

Clamp opens.

Once the joystick has been released, it is locked again within one second.

- Pull the joystick (4) backwards.

Clamp closes.



Load-dependent assistance system (load weight indicator "plus")

The load-dependent assistance system reduces the risk of tipping and increases the stability of the truck.

- This is achieved by actively intervening in the lifting and tilting movements. In addition, there is the option to intervene in the driving speed.
- The load centre of gravity is not taken into account. Consult the load capacity diagram.

⚠ DANGER

Risk of tipping.

After the warning light of the assistance system (3) has been triggered, leave the critical area.

i NOTE

Assistance systems are only designed to offer a supporting function and do not guarantee safety. The responsibility for operating the truck in a safe manner always lies with the driver. Even in the event of a potential malfunction, the driver must have full control of the truck at all times.

Variants of the assistance functions

- **"Load weight indicator" assistance function**

The weight of the load being carried is shown on the display unit.

- **"Overload protection" assistance function**

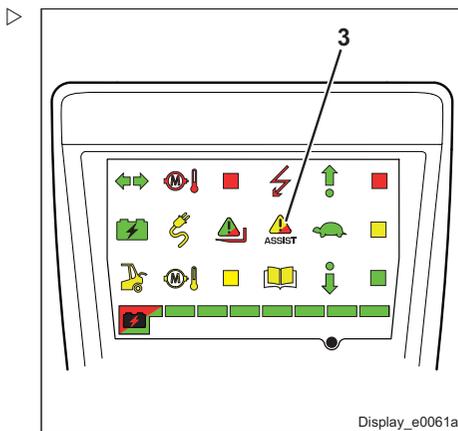
If the truck is overloaded by lifting too heavy a load, the assistance system reduces the lifting speed to the extent of stopping the movement if necessary. In addition, the driver receives a visual and audible warning via the warning light of the assistance system (3).

- **"Lifting and tilting limitation" assistance function**

At significant lift heights and depending on the load in question, the lifting and tilting speed is reduced to the extent of stopping the movement if necessary. At the same time, the forwards tilt angle is restricted at significant lift heights, depending on the load. In addition, the driver receives a visual and audible warning via the warning light of the assistance system (3).

- **"Load-dependent reduction of driving speed" assistance function**

The driving speed is limited depending on the load. In addition, the driver receives a visual and audible warning via the warning light of the assistance system (3). This assistance function can be activated using the diagnostic program.



4 Operation

Operation

"Load weight indicator" assistance function

The weight of the load being carried is shown on the display unit.

To ensure an accurate measurement, the following requirements must be met:

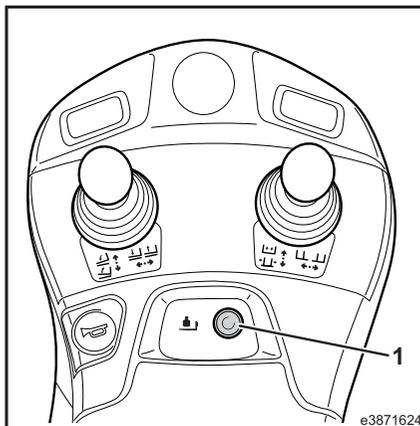
- The truck must be on a flat, level surface and must be at a standstill
- The lift mast must be in a vertical position
- The fork carriage must not be raised more than 1.70 m above the ground. The load weight indicator does not show reliable values at heights above 1.70 m
- Before the measurement, the load must be lowered by 10 cm.
- The raised load must be stationary

➤ Lift the load.

➤ Lower the load by 10 cm.

➤ Select the load weight indicator  on the display.

➤ Briefly press push button (1) in the armrest. ▷



The load weight (example: **450 kg**) is shown for a duration of five seconds on the display (2).

 **NOTE**

Reliable display of the load weight cannot be guaranteed for light loads of less than 100 kg.

Zero adjustment:

Using the zero adjustment feature, the currently determined load weight can be set to zero.

- Lift the load.
- Lower the load by 10 cm.
- Select the load weight indicator on the display.
- Press push button (1) on the armrest and hold for three seconds.

The zero value is saved. In addition, the buzzer sounds.

The load weight indicator shows a value of **0 kg**.

 **NOTE**

The zero value remains saved even when the truck is switched off and switched back on.

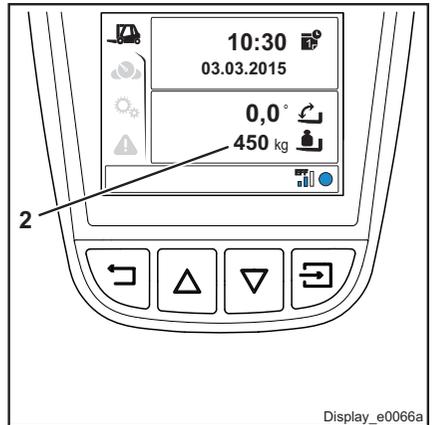
"Overload protection" assistance function

The "overload protection" assistance function reduces the lifting speed in critical load situations, to the extent of stopping the movement if necessary. The function is active throughout the entire lift range.

Effect on the truck:

To prevent the truck from tipping over, the function intervenes in the lifting movement if the load is too great. The lifting movement will be reduced or stopped regardless of the lift height and tilt angle.

For a multi-stage lift mast, the assistance function intervenes above the first stage of the



4 Operation

Operation

lift mast so that an excessive load cannot be raised beyond this first stage.

During the intervention, the red warning light for the assistance system (3) flashes. In addition, the buzzer sounds. ▷

The intervention will persist until the load is reduced.

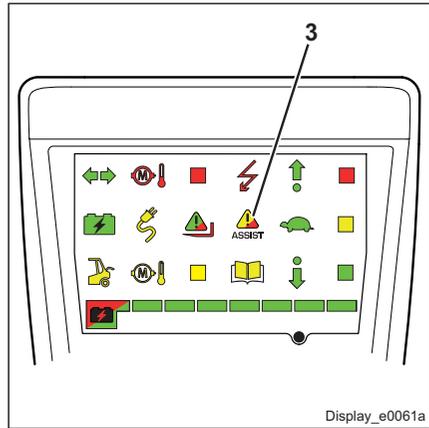
Operation after triggering:

Lowering is possible at any time without restriction.

▷ Lower the fork carriage.

The red warning light for the assistance system (3) goes out.

▷ Reduce the load in accordance with the load capacity diagram.



NOTE

If lifting was stopped by the assistance function, the load can be raised out of a critical area for approx. one second. To do this, move the joystick to the neutral position. Repeat the process as many times as necessary.

"Lifting and tilting limitation" assistance function

The "lifting and tilting limitation" assistance function reduces the lifting and tilting speed in critical situations that could lead to the truck tipping over. For a standard lift mast, the assistance function is active above a preset lift height (between 1.80 m and 2.20 m). For duplex or triplex lift masts, the assistance function is active above the first stage of the lift mast.

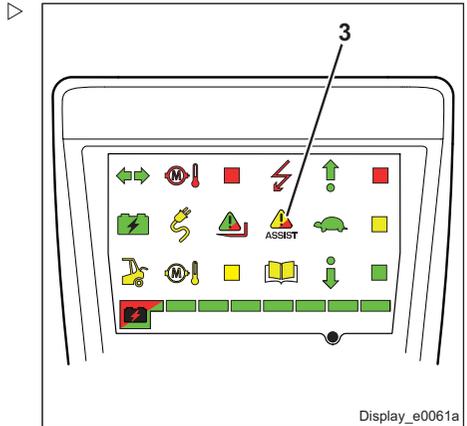
NOTE

If the truck is switched off immediately after the assistance function has intervened (switch key turned to the zero position, emergency off switch actuated), the load-dependant assistance system can fail when the truck is switched back on. Therefore, after switching the truck on, perform a lifting procedure

without any load to above the preset lift height or to above the first stage of the lift mast.

Effect on the truck:

To prevent the truck from tipping over, the assistance function intervenes in the lifting and tilting speed if the load is too great. Depending on the raised load, the lift height and the tilt angle, the lifting and tilting speed is reduced or stopped.



Loading:	Functions
Level I	<ul style="list-style-type: none"> - Yellow warning light for the assistance system (3) flashes. - Reduction in the lifting speed. - Reduction in the tilting speed. - The buzzer sounds briefly.
Level II	<ul style="list-style-type: none"> - The red warning light for the assistance system (3) flashes. - Reduction in the lifting speed. - Creep speed when tilting forwards. - The buzzer sounds at short intervals.
Level III	<ul style="list-style-type: none"> - The red warning light for the assistance system (3) flashes. - Creep speed when lifting. - The forwards tilting speed stops. - The buzzer sounds at short intervals.

4 Operation

Operation

Operation after triggering:

After the assistance function has been triggered, leave the critical area:

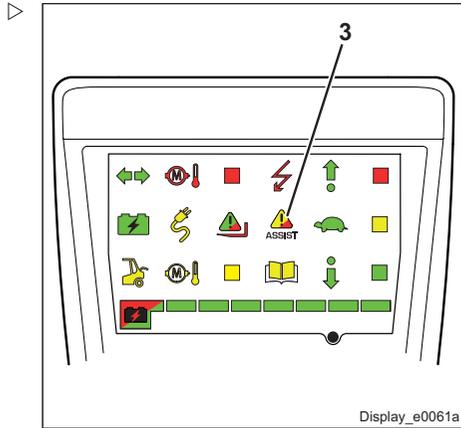
- Move the joystick to the neutral position.

The buzzer is silenced. The warning light for the assistance system (3) continues to flash.

- Leave the critical area by slowly tilting backwards and lowering the load.

The warning light for the assistance system (3) goes out.

- Move the joystick to the neutral position.
- Reduce the load in accordance with the load capacity diagram.



"Load-dependent reduction of driving speed" assistance function

The "load-dependent reduction of driving speed" assistance function reduces the driving speed in critical situations that could lead to the truck tipping over.

This assistance function can be activated by the service partner using the diagnostic program and adjusted according to the type of application.

Effect on the truck:

The driving speed of the truck is reduced depending on the raised load. While this function is active, the warning light for the assistance system (3) flashes yellow.

NOTE

Only the driving speed of the truck is reduced. The acceleration and deceleration properties remain unchanged.

Operation after triggering:

The truck can still be operated at a reduced driving speed according to the specifications that are saved in the controller.

NOTE

If the assistance function fails, the driving speed is permanently limited to the lowest value. Contact your service partner.

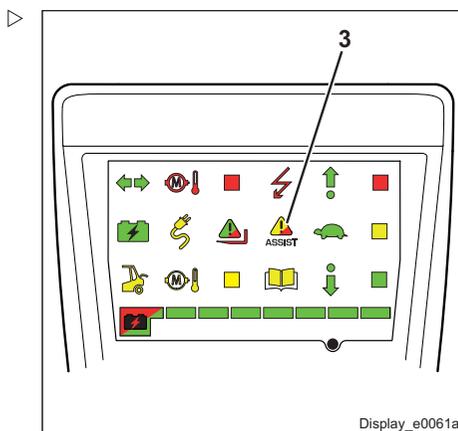
Malfunctions

Possible malfunctions are described in the section entitled "Malfunction displays for the load-dependant assistance system".

Linde Safety Pilot (LSP) assistance system

NOTE

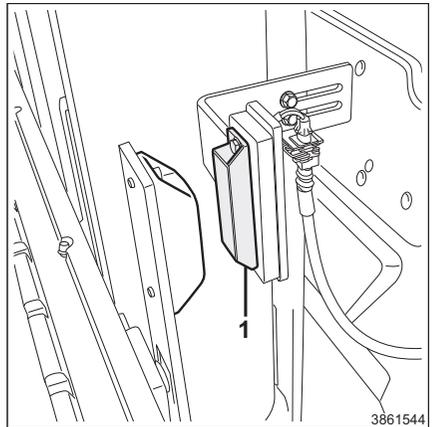
The description of the assistance system can be found in the separate accompanying operating instructions.



Reducing the driving speed using a lift sensor

The reduction in the driving speed is linked to a defined lift height. When the preset lift height is exceeded, the driving speed is limited by the lift sensor (1) to a set value. In such instances, the green indicator light with the tortoise symbol illuminates in the display unit.

- Check the lift sensor (1) for correct function.



Reducing the driving speed using a radar sensor (SpeedAssist)

The radar sensor is used to automatically reduce the maximum speed when the truck moves from an outdoor area to an indoor area.

Before the truck is used, the operating company must perform a risk assessment.

Function

The radar sensor monitors the area above the truck using a club-shaped radar beam.

If an object such as the ceiling of a hall is detected, the maximum speed is reduced to a set value.

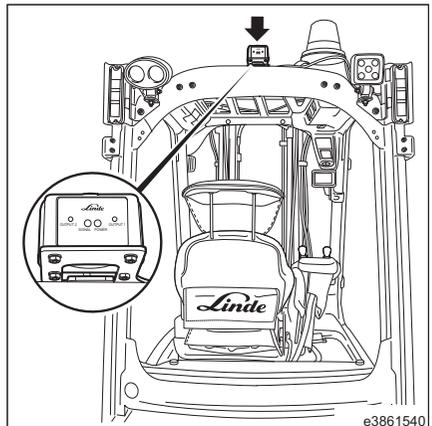
As soon as no objects are detected, the reduction in the driving speed is cancelled.

Reflections on walls may also lead to a reduction in the driving speed.

If the distance between an object and the sensor is less than 1 m, the function of the sensor may be restricted under certain circumstances.

- Before starting each shift, check the function of the sensor.

In the event of a fault, the maximum speed of the truck remains reduced until the fault is rectified.



4 Operation

Operation

➤ Contact your service partner.

The following parameters can be programmed:

- Range of the sensor between 2 m and 24 m
- Sensitivity of the sensor: At a higher sensitivity, smaller objects are detected.
- Delay time (entry: up to 3 s; exit: up to 0.75 s)

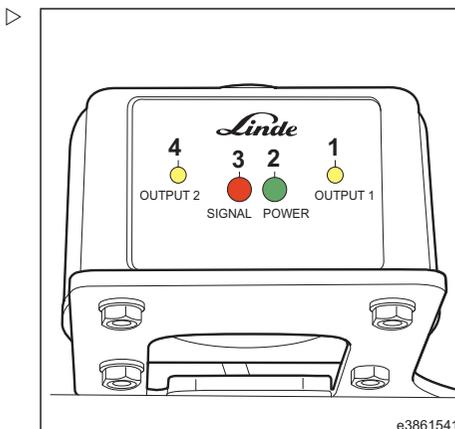
➤ Contact your service partner.

LED indicators on the radar sensor

If the supply voltage is present, the green "Power" LED (2) illuminates.

If an object is detected by the sensor, the red "Signal" LED (3) flashes depending on the signal strength of the radar beam.

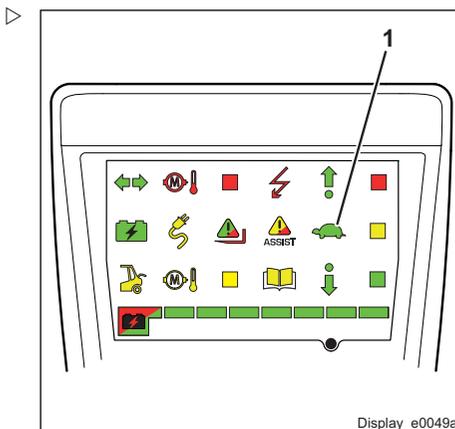
If no object is detected by the sensor, the yellow "Output" LEDs (1, 4) illuminate.



e3861541

Indicator light in display unit

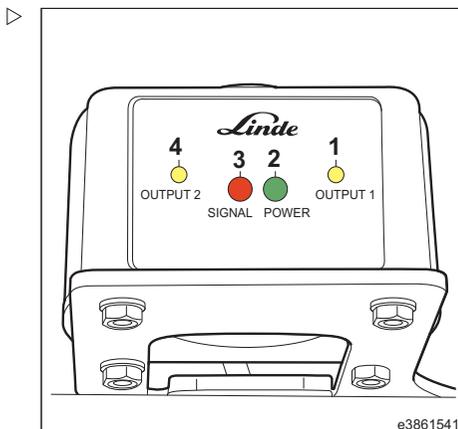
When a reduction in the driving speed is activated, the green indicator light (1) is illuminated in the display unit.



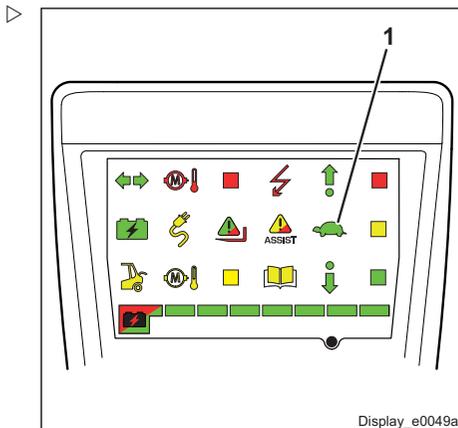
Display_e0049a

Regular maintenance

- Before starting each shift, check the sensor housing. Remove contamination and deposits. Have the sensor replaced if damaged.
- Contact your service partner.
- Check the radar sensor for correct function: When driving from an outdoor area into an indoor area, the driving speed must be reduced.



The green indicator light (1) with the tortoise symbol in the display unit illuminates.



4 Operation

Operation

Depressurisation

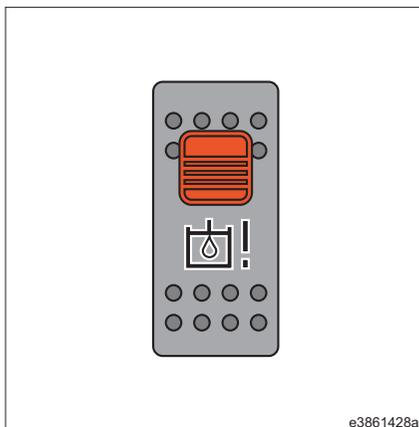
When changing hydraulic components or connecting operating equipment to the quick-release couplings of the working hydraulics, the hydraulic system must be depressurised.

Depressurisation takes place via a push button in the overhead console. This releases the pressure from the hydraulic system without activating the pump motor.

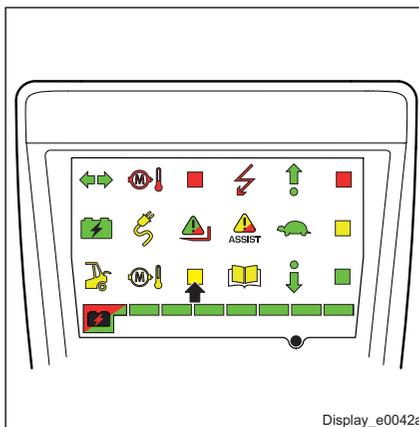
For activation of depressurisation, the following conditions must be fulfilled:

- Seat switch activated
- Truck stopped.
- Parking brake applied
- No movement of steering wheel
- Joysticks in neutral position

To depressurise the auxiliary hydraulics, the push button must be unlocked and pressed.



The neutral yellow warning light (see arrow) flashes in the display unit.



The joystick for the corresponding auxiliary hydraulics must be actuated at the same time.

The current depressurisation status is shown by the neutral yellow warning light (see arrow) in the display unit.

- Flash — ready for depressurisation via the joysticks
- Steady light — pressure reduction in the auxiliary hydraulics
- Flash — auxiliary hydraulics are depressurised

If the push button for depressurisation is pressed and the accumulator is emptied, the accumulator is charged once to make pilot pressure for valve activation available in the valve block.

After the truck has been switched off and back on again, the pump is activated again for accumulator charging as normal and the neutral yellow warning light goes out in the display unit.

 **NOTE**

In trucks with quick-release couplings for the auxiliary hydraulics, the depressurisation push button is installed in the truck as a standard feature. Depressurisation via the truck diagnostics is also possible. Contact your service partner.

4 Operation

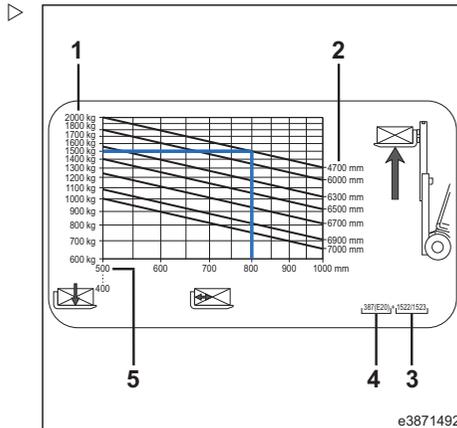
Working with a load

Working with a load

Load capacity diagram

Before picking up the load, observe the load capacity diagram.

- 1 Maximum weight of permissible loads in kg
- 2 Lift height in mm
- 3 Lift mast series
- 4 Series designation of the truck with maximum load capacity
- 5 Distance between load centre of gravity and the fork back in mm



⚠ DANGER

Risk to stability

The values specified in the load capacity diagram apply to compact, homogeneous loads. These values must not be exceeded because this impairs the stability of the truck and the rigidity of the fork arms and lift mast.

When using attachments, observe the additional capacity rating plate provided for each attachment (for an explanation, refer to the section entitled "Additional capacity rating plate for attachments").

The load capacity of a truck is determined by:

- The type of lift mast (standard, duplex, triplex)
- The lift height of the installed lift mast
- The tyres on the front axle
- The use of attachments or additional equipment
- The backwards tilt restriction

If one of these parameters is changed, this can have a considerable effect on the load capacity.

i NOTE

The load capacity is also limited when:

- *Transporting off-centre or swinging loads*
- *Transporting loads with the lift mast tilted forwards or with the load not close to the ground*

- Working with loads with a large centre of gravity distance
- Transporting loads in a wind force of 6 or more

In the case of conversions, the new load capacity of the truck must be determined and the load capacity diagram must be changed as necessary.

Contact your service partner.

The maximum permissible load is determined by the distance between the load centre of gravity and the back of the fork arms, and the lift height.

Example:

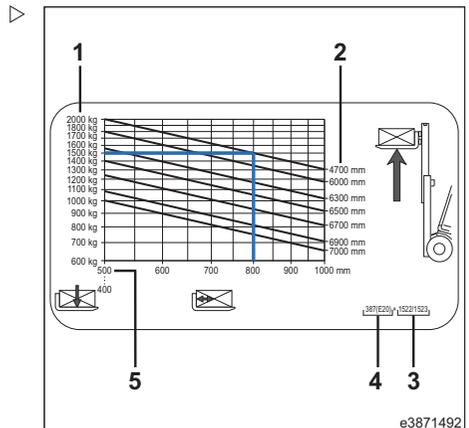
Load centre of gravity distance: 800 mm

Load height to be lifted: 4700 mm

- Trace a vertical line from a load distance of 800 mm to its point of intersection with the line for a lift height of 4700 mm.
- Read off the maximum permissible load to the left of the point of intersection with the horizontal line.

The maximum load in this example is 1500 kg.

Other lift heights and centre of gravity distances must be handled accordingly. The determined values refer to both fork arms and to evenly distributed loads.



4 Operation

Working with a load

Adjusting the fork arm distance



⚠ WARNING

Risk of injury from heavy fork arms.
Use supporting equipment.



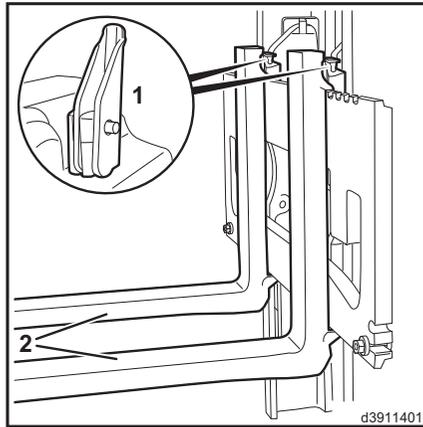
NOTE

The load centre of gravity must be midway between the fork arms.

- Raise the fork quick-release levers(1).
- Adjust the fork arms (2) inwards or outwards according to the load to be lifted.

Make sure that both forks are equally distant from the truck centre.

- Allow the stopping lever (1) to snap into place in a groove on the fork carriage.



Load pick up



⚠ DANGER

Risk of falling and crushing.

Never lift persons on the forks or using a pallet on the forks.

If the truck is to be used for lifting persons, it must be fitted with a specially designed working platform. The working platform, its mountings and interlocks must be approved for the truck.

Contact your service partner.



⚠ DANGER

Danger of a falling load. Standing or walking in the vicinity of an elevated mast is extremely dangerous.

During stacking and de-stacking operations do not allow people to stand or walk in the working area of the truck.

Trucks should only be driven with the load lowered and tilted back. Look out for people.

⚠ DANGER

Danger of falling load when load is picked up incorrectly

Loads must be arranged so that they do not protrude beyond the truck loading area and cannot slip, topple over or fall off. If necessary, use a load backrest (special equipment).

⚠ DANGER

Risk of tipping

Before picking up the load, observe the load capacity diagram (for a description, see the section entitled "Load capacity diagram").

⚠ CAUTION

Cold hydraulic oil can cause variations in the extension sequence for duplex and triplex lift masts. This increases the truck height at the lift mast.

Ensure that there is sufficient space above the lift mast.

- Approach the load to be taken up carefully and as accurately as possible.
- Set the lift mast to vertical.
- Lift or lower the fork carriage to the necessary height.
- Carefully steer the truck forks beneath the centre of the load to be taken up, where possible so the load touches the fork back, taking account of adjacent loads.
- Lift fork carriage until the load is no longer in contact with the supporting surface.
- Reverse the industrial truck to release the load.
- Tilt the lift mast backwards.

Driving under load

i NOTE

When transporting cargo, the dispatcher must ensure that the goods are safely loaded for transportation and secured as necessary. Please therefore make sure that goods are properly stacked and there is no damage to packaging, pallets etc. The carrier must ensure safe loading.

- Do not transport loads if they have slipped to the side (e. g. with sideshift).

- Transport loads close to the floor.
- On ascents/descents, always transport loads facing uphill; never travel across the slope or turn around.
- If visibility is poor, instructions should be provided by a second person.
- If the load to be transported is stacked so high as to obstruct visibility in the drive direction, the industrial truck must only be driven in reverse.

4 Operation

Working with a load

Setting down loads

DANGER

Danger caused by a falling load

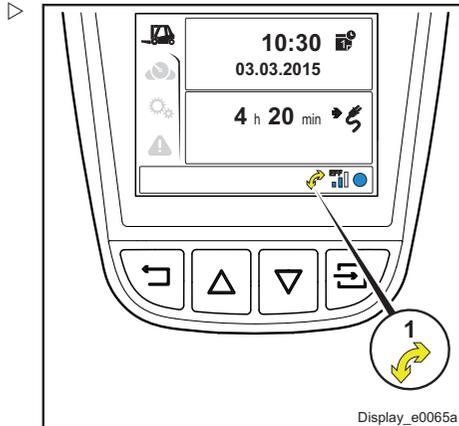
Never park the truck and leave it with a raised load.

- Carefully drive the industrial truck up to the load storage area.
- Position the lift mast vertically (load horizontal).

When the symbol (1) on the display unit lights up, the mast positioning function can be activated.

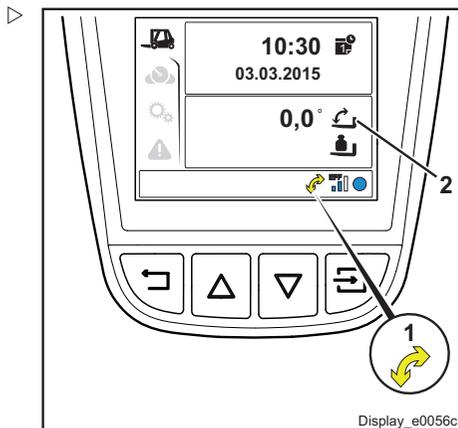
For a description, see the section entitled "Mast positioning".

- Lift the fork carriage to the necessary height.
- Carefully move the load over the load storage area.
- Carefully lower the load until the fork arms are clear.
- Back up the truck.



Mast positioning

When the symbol (1) on the display unit lights up, the mast positioning function can be activated.



Programming

The tilt angle sensor system allows a specific lift mast tilt to be programmed.

- Use the joystick (3) to tilt the lift mast to the required angle.

NOTE

The "Tilt angle" display (2) can also be selected for the required angle.

- Press the push button (4) for longer than two seconds.

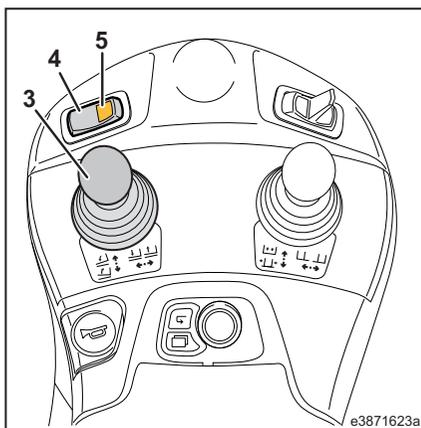
The tilt angle is stored and the LED (5) flashes twice. In addition, the buzzer sounds.

NOTE

The mast tilt angle is stored in relation to the truck.

The tilt angle of the lift mast in relation to the ground depends on the following influencing factors:

- Load and load distribution
- Unevenness and gradient of the route being driven
- Tyre wear
- Tyre pressure with pneumatic tyres



4 Operation

Working with a load

Operation

NOTE

The mast positioning function is designed to aid the driver and is purely a comfort feature. The responsibility and control for activating the required lift mast position always lie with the driver.

- Briefly press the push button (4).

The green LED (5) lights up continuously. The mast positioning function is switched on.

- Operate the joystick (3) and activate the stored tilt angle.

NOTE

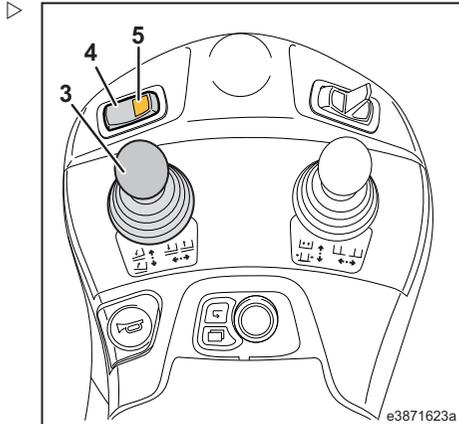
For safety reasons, tilting is possible only in the direction of the stored tilt angle, and must be reactivated for each mast positioning operation.

Once it reaches the stored mast position, the lift mast remains stationary and the buzzer sounds.

- Release the joystick (3) or briefly press the push button (4) again.

The LED (5) goes out and mast positioning is switched off.

- The lift mast can now be operated normally using the joystick (3).
- Briefly press the push button (4) again. The mast positioning function is switched on again.



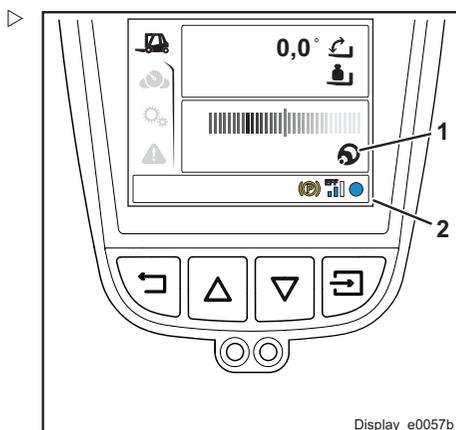
Steering angle display

The steering angle display must be activated using the diagnostic program.

Contact your service partner.

When this function is enabled, the symbol (1) lights up in the display unit.

The steering angle is shown as a bar display across segments in the second line of the text display (2).

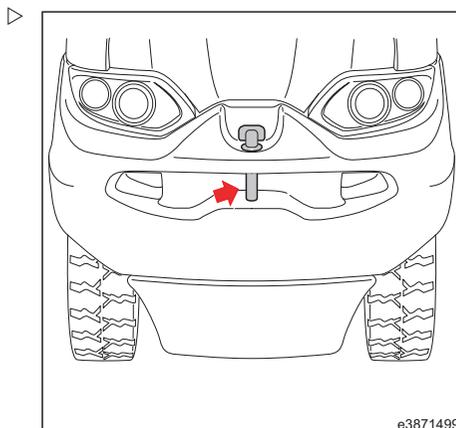


Towing device

 **NOTE**

The towing device is only used for on-site towing operations. The national regulations for the use of unbraked trailers on industrial trucks must be observed.

- Turn the towing pin (see arrow) in an anti-clockwise direction by 90° and lift the towing pin.
- Insert the towing jaws into the clutch release sleeve.
- Push the towing pin down against the spring pressure, turn the towing pin in a clockwise direction by 90° and allow it to engage into place in the catch.



4 Operation

Working with a load

Push-pull function

NOTE

Observe the operating instructions from the attachment manufacturer.

When using the "push-pull"(1) attachment, a pushing mechanism (2) pushes the load off a plate (3) or off the load fork of the industrial truck for storage.

If the driver's line of sight is obscured, there is a danger that the pushing mechanism may push the goods against the edge of the rack or against the side panel of a truck, thereby damaging the goods.

In certain applications, it may therefore be desirable for the truck to roll backwards without the accelerator pedal being actuated when the load is pushed off.

NOTE

In order to activate the push-pull function, a special diagnostic program is required. When commissioning this function, the driver must also be instructed on its use. Contact your service partner.

When the relevant joystick is actuated, the parking brake that usually engages is deactivated.

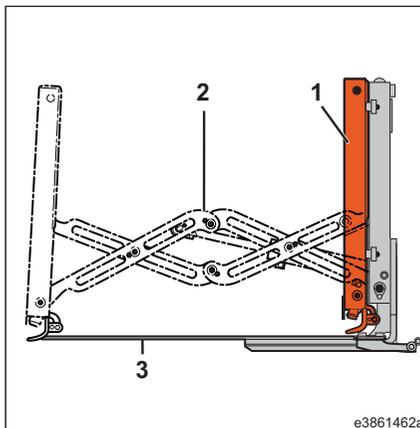
When pushing the load against the edge of a rack, the truck will slowly roll back (at creep speed, < 2 km/h).

The parking brake is activated again as soon as the joystick returns to the neutral position.

DANGER

Risk of accident on ramps! If the push-pull function is activated on a ramp, the truck will no longer be held in position by the parking brake that usually engages. The truck will slowly roll down the ramp.

If you do not want the truck to roll backwards, it must be secured against rolling away.



Leaving the truck

DANGER

Risk of fatal injury.

Parking and leaving the truck with a raised load or with a raised lifting accessory poses a risk of fatal injury and is strictly forbidden.

- Set down the load and lower the fork carriage.
- Tilt the lift mast forwards slightly.

The fork arms must touch the ground.

CAUTION

The truck must not be allowed to roll away.

- Turn off the truck using the switch key.

The automatic brake is activated.

CAUTION

Battery discharge possible. After the truck has been switched off, battery voltage is still present at the components in the electrical system.

To de-energise additional components, the emergency off switch must be actuated, e.g. when leaving the truck for several days.

- Pull out the switch key.

NOTE

Switch off the truck and log off using the "access system connect."; see the section entitled "Access system connect."

Drive batteries

Drive batteries

Checking the charging state of the battery

General

The battery's discharge status is shown by an LED bar display (2) in the display unit (1).

The seven green LEDs go out one after another as the battery discharges.

When the battery is 75% discharged, the red LED (3) with the battery symbol illuminates.

At a discharge level of 80% (20% residual capacity), the lifting speed of the truck is reduced.

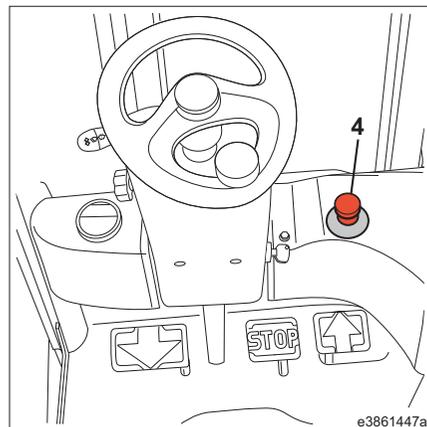
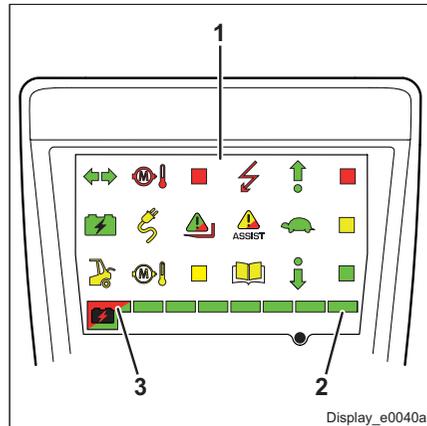
As the battery discharges further (residual battery capacity < 20%), the red LED (3) flashes and the buzzer sounds.

CAUTION

Repeated deep discharging of the battery can cause irreparable damage.

If the red LED flashes, the battery must be charged immediately.

- Pull the emergency off switch (4) if necessary.
- Switch on the truck.
- Check the battery's charge status at the discharge indicator (2) in the display unit (1).



Battery hood Opening - Closing

The battery hood must be opened in the following circumstances:

- Replace the battery
- Performing battery maintenance
- Opening the hinged battery door
- Changing fuses

CAUTION

Possible damage to the joysticks in the battery hood end position.

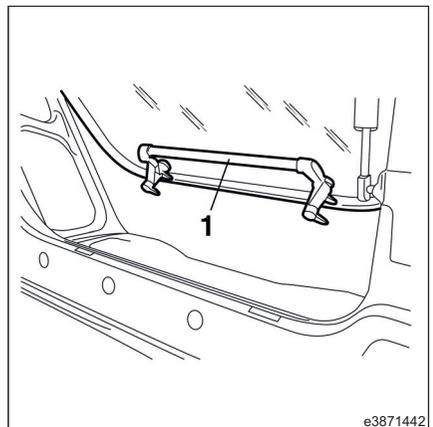
Adjust the driver's seat, armrest and steering column so that the joysticks do not touch the roof of the truck frame when the battery hood is folded up to its end position.

Opening the battery hood

NOTE

Remove any loose items from the battery hood or from under the driver's seat prior to opening.

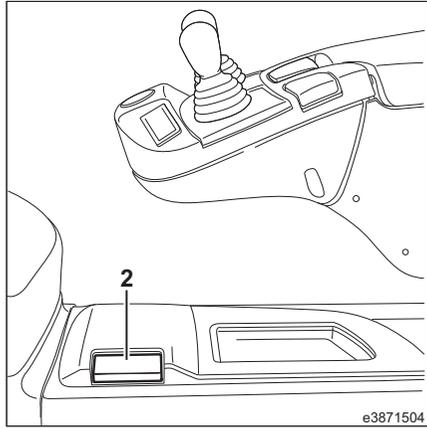
- Use the lever (1) to release the interlocks for the rear window (special equipment) and fold up the window to the rear as far as the end stop.
- Move the steering column all the way forwards.
- Fold in the driver's seat backrest.
- Move the driver's seat and armrest backwards.



4 Operation

Drive batteries

- Actuate the release lever (2) on the right-hand truck console. ▷



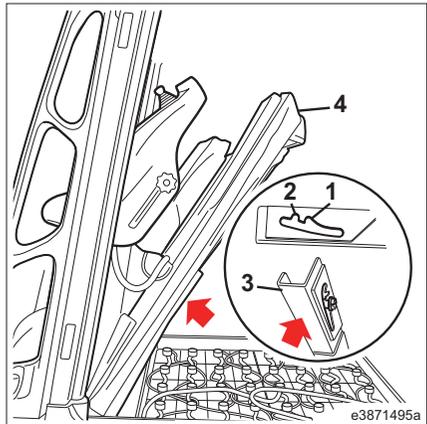
- Open the battery hood (4) slowly until it reaches the stop in position "1" (approx. 45° position). ▷

WARNING

Risk of injury and crushing. In this position, the battery hood falls shut if it is released.

Hold the battery hood securely.

- Check the position of the driver's seat and armrest so as to exclude the possibility of a collision between the joystick and the overhead guard when the hood is opened further.



- Push the lever (3) towards the gas spring and open the battery hood (4) further until it engages in position (2).

In this position, the battery hood is held open securely.

- To fully open the battery hood, push the lever (3) towards the gas spring again and open the battery hood further.

Closing the battery hood

WARNING

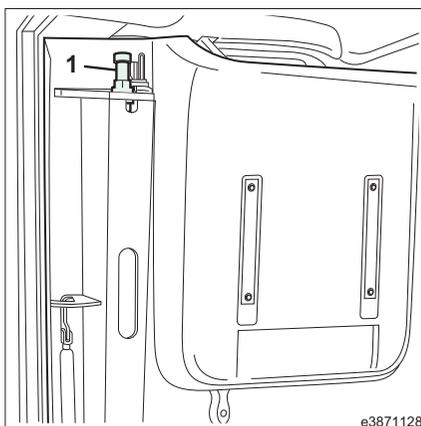
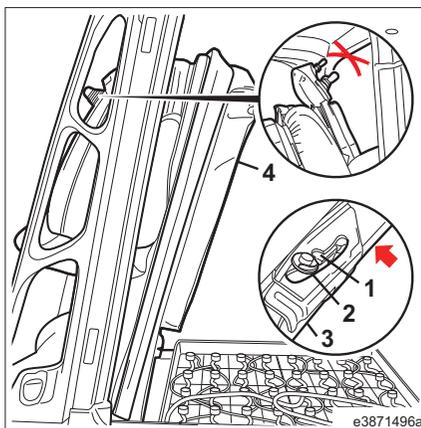
Do not lean on the battery hood: risk of injury! The battery hood only locks in the opening direction at approx. 45°, but will not lock in the closing direction.

Before closing the battery hood, ensure that there is no risk of injury to other persons in the vicinity of the truck.

NOTE

Before closing the battery hood, also check that the side battery door is correctly locked.

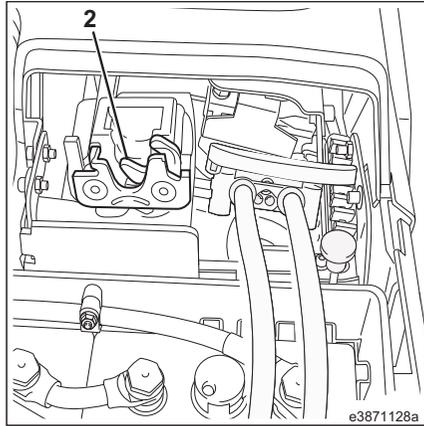
- From position (2), push the lever towards the gas spring and lower the battery hood downwards.
- Move the battery hood downwards against the pressure of the gas spring and push the battery hood closed until the bolt (1) audibly engages in the lock (2).



4 Operation

Drive batteries

Lock for battery hood (2)



Charging the battery using an external battery charger

When using external battery chargers, certain requirements must be observed without fail:

- Only use battery chargers and battery charger characteristic curves that are permitted for the battery size.
- The battery must be charged only with DC and following charging procedures in accordance with DIN 41773 and DIN 41774.
- The battery charger must comply with the limit values for charging current and charging voltage in accordance with DIN EN 60079-7, even in the event of a fault (safety shutdown).
- In the gassing area, limit currents in accordance with DIN EN 50272-3 must not be exceeded. Equalising charge with a maximum nominal capacity of 5 A/100 Ah.

➤ Fully lower the fork carriage.

The fork arms must be resting on the ground.

➤ Switch off the truck.

➤ Push the emergency off switch.

➤ Unlock the battery hood. Open fully.

4 Operation

Drive batteries

- Disconnect the battery female connector (see arrow) and the battery male connector. ▷
- Attach the connector plug on the external battery charger to the battery female connector.
- Switch on the external battery charger.

Interrupting charging

External factors may make it necessary to interrupt the charging process.

⚠ DANGER

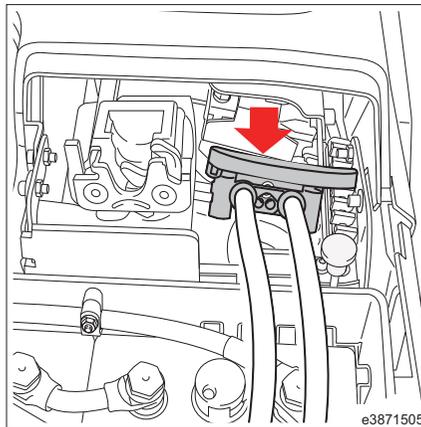
Interrupting the connection between the battery and the battery charger during the charging process poses the risk of serious personal injury and/or damage to property. The sparks generated by disconnecting the battery from the battery charger may ignite gases formed during the charging process.

Always end the charging process first by shutting off the external battery charger. Only then disconnect the connection between the battery and the battery charger.

- Switch off the external battery charger.
- Disconnect the battery from the battery charger.

i NOTE

During normal operation, the charging process must not be terminated before it is automatically switched off. Otherwise, the battery will be insufficiently charged and its available capacity will be reduced accordingly.



Charging the battery at the rear "with active ventilation" (Version up to 07/2017)

Active ventilation Version up to 7/2017

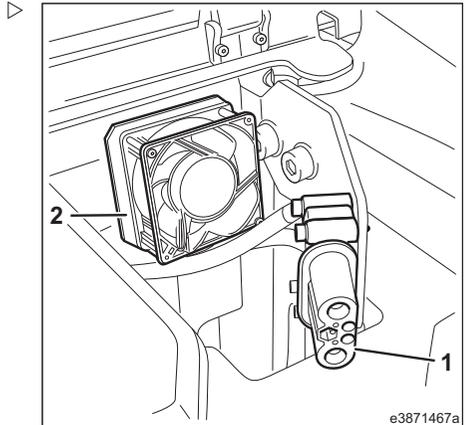
"Active ventilation" option: The drive battery can be charged using an external battery charger even when the battery hood is closed, via a battery female connector (1) and a venting device (2) fitted in the rear area.

Active ventilation ensures that the gases produced during the charging process when the battery hood is closed are extracted from the truck.

⚠ DANGER

Risk of explosion! The escaping gases are flammable.

Only charge the battery in well-ventilated areas. There must be no objects or obstructions in the immediate vicinity of the fans. During charging, ensure sufficient ventilation for the charge gases to escape.



⚠ CAUTION

Battery still releases gas once charging is complete. The rear cover must be kept open during the charging process and also during the fan run-on time to ensure that all remaining gases can escape from the battery compartment.

i NOTE

Check fan for contamination and clean as required. The function of the fan must be checked during each charging process. Malfunctioning or faulty fans must be replaced immediately. Contact your service partner.

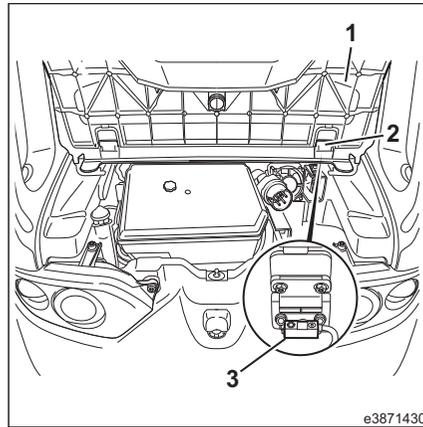
i NOTE

The plug for the external battery charger must be equipped with auxiliary contacts that are connected to each other via a jumper. This is required to start the charging process. Contact your service partner.

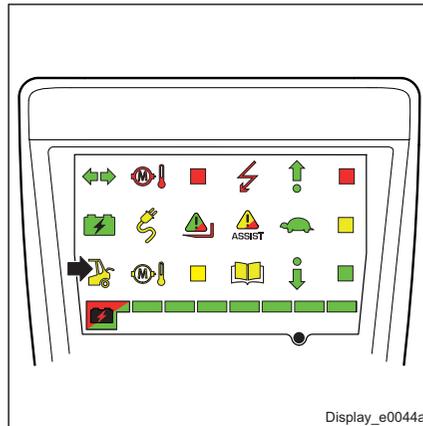
4 Operation

Drive batteries

On trucks with "active ventilation", the position of the rear cover (1) is monitored by a sensor (3) on the hinge (2). If the rear cover is opened, driving functions and lifting functions are deactivated. This prevents the truck from being put into operation during the charging process.



An open rear cover is indicated by the yellow "rear cover monitoring" indicator light in the display unit.



Starting the charging process

⚠ CAUTION

Damage to components.

The charging current of 180 A must not be exceeded under any circumstances. Observe the operating instructions for the battery charger.

NOTE

Charging the battery via the battery female connector (1) in the rear is only possible when the emergency off switch is actuated.

- Switch off the truck.
- Push the emergency off switch.
- Open the rear cover.
- Attach the connector plug on the external battery charger to the battery female connector (1).

The fan (2) for extracting the charge gases is activated.

NOTE

The fan runs until the emergency off switch is switched on again or the connection to the external battery charger is disconnected.

- Switch on the external battery charger.

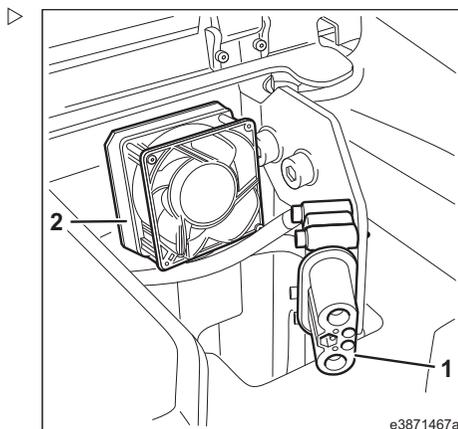
End of charging

The external battery charger automatically shuts off to end the charging process.

⚠ CAUTION

The battery still releases gas once charging is complete

Once charging is complete, allow the fan to continue running for 15 minutes with the rear cover open (emergency off switch actuated, connecting plug on the external battery charger connected to the battery female connector), to ensure that all remaining gases can escape from the battery compartment.



e3871467a

4 Operation

Drive batteries

Interruption of charging

In the event of a fan malfunction or defect, any charging process that is currently underway is interrupted.

CAUTION

The battery still releases gas following an interruption of charging.

Open the battery hood to allow the battery gases to escape from the battery compartment.

External factors may make it necessary to manually interrupt the charging process.

DANGER

Disconnecting the battery from the battery charger during an ongoing charging process poses the risk of serious personal injury and severe damage to property. The sparks generated by disconnecting the battery may ignite gases formed during the charging process.

Always end the charging process first by shutting off the external battery charger. Only then may the battery be disconnected from the battery charger.

- Switch off the external battery charger.
- Disconnect the battery from the battery charger.

NOTE

During normal operation, the charging process must not be terminated before it is automatically switched off. Otherwise, the battery will be insufficiently charged and its available capacity will be reduced accordingly.

Charging the battery at the rear with active ventilation (version from 08/2017)

Active ventilation

Active ventilation ensures that the gases produced during the charging process when the battery hood is closed are extracted from the truck.

DANGER

Risk of explosion! The escaping gases are flammable.

Only charge the battery in well-ventilated areas. There must be no objects or obstructions in the immediate vicinity of the fans. During charging, ensure that there is sufficient ventilation for the charge gases to escape.

CAUTION

The battery still releases gas once charging is complete

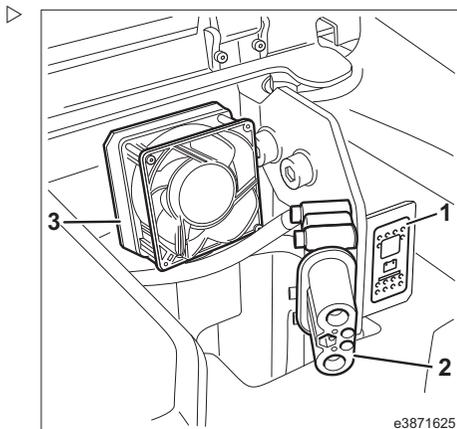
To ensure that all remaining gases can escape from the battery compartment, the rear cover must remain open during the charging process and also during the run-on time of the fan.

NOTE

Check the fan for contamination and clean as required. Check the function of the fan during each charging process. Malfunctioning or faulty fans must be replaced immediately. Contact your service partner.

NOTE

The charging plug for the external battery charger must be equipped with auxiliary contacts that are connected to each other via a jumper. This is required to start the charging process. Contact your service partner.

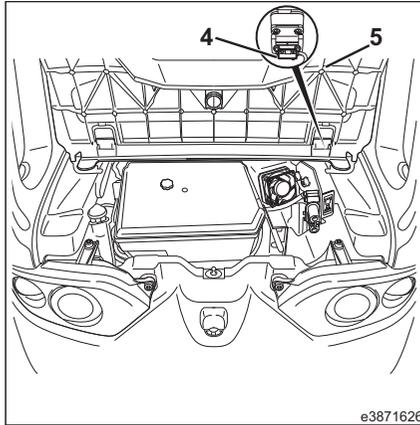


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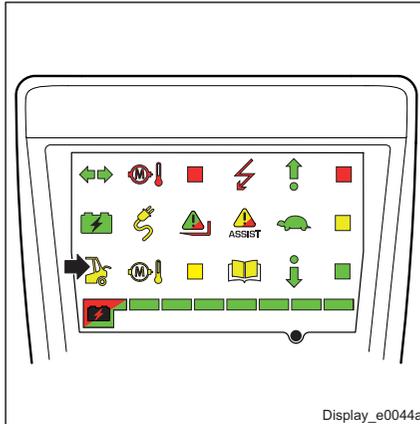
4 Operation

Drive batteries

On trucks with active ventilation, a sensor (4) on the hinge of the rear cover (5) monitors the position of the rear cover. If the rear cover (5) is opened, all driving functions and lifting functions are deactivated. This prevents the truck from being put into operation during the charging process.



The yellow "Rear cover monitoring" indicator light (see arrow) in the display unit indicates that the rear cover is open.



Start of charging

CAUTION

Damage to components.

The charging current of 180 A must not be exceeded under any circumstances. Observe the operating instructions for the battery charger.

NOTE

Charging the battery via the battery female connector (2) in the rear of the truck is only possible when the emergency off switch is depressed.

- Switch off the truck.
- Push the emergency off switch.
- Open the rear cover.
- Attach the connector plug on the external battery charger to the battery female connector (2).
- Press the push button (1).

After actuating the push button (1), the red and green LEDs illuminate simultaneously for 2 seconds. In this short period of time, the system performs a self-test. At the same time, the fan (3) for extracting the charge gases is activated.

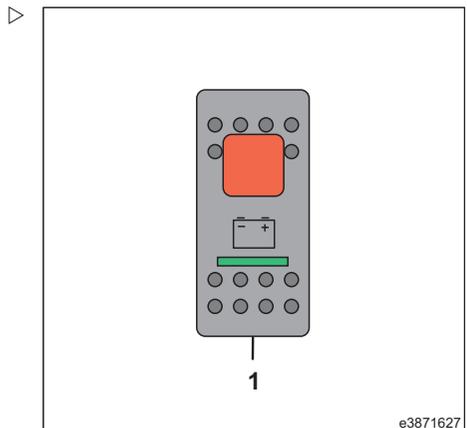
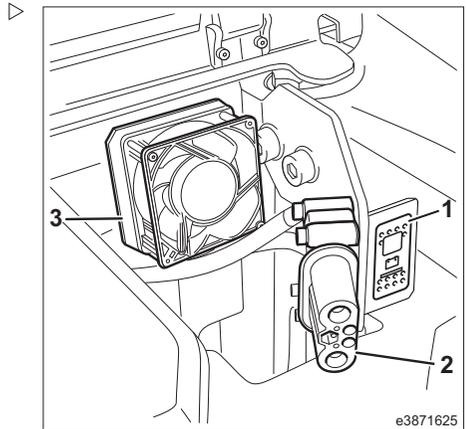
The charging process begins automatically and the green LED in the push button lights up. The battery charger directly activates the charging indicator lights in the display unit. If the fan (3) malfunctions, the charging process will not start or is immediately terminated.

Ending the charging process

The automatic shut-off of the external battery charger stops the charging process.

Once the charging process is complete, the fan (3) remains active until either the push button (1) is actuated or the emergency off switch is pulled.

A run-on period of 15 minutes then starts in order to extract the remaining gases from the



4 Operation

Drive batteries

truck. During the run-on time, the green LED in the push button (1) flashes.

Interrupting charging

DANGER

Disconnecting the battery from the battery charger during an ongoing charging process poses the risk of serious personal injury and severe damage to property. The sparks this generates may ignite gases formed during the charging process.

Always end the charging process first by shutting off the external battery charger. Only then disconnect the connection between the battery and the battery charger.

In the event of a fan malfunction or fan defect, any charging process that is currently underway is automatically interrupted.

CAUTION

The battery still releases gas following an interruption of charging.

➤ Leave the battery hood open.

Battery gases in the battery compartment must be able to dissipate.

External influences may require the charging process to be manually interrupted.

➤ Switch off the external battery charger.

➤ Disconnect the battery from the battery charger.

NOTE

During normal operation, do not terminate the charging process before the process is automatically switched off. Early switch-off during charging results in an insufficiently charged battery. This diminishes the battery's capacity.

Battery replacement

WARNING

Risk of the truck tipping if the battery is replaced while the truck is carrying a load.

Battery replacement is prohibited whilst the truck is carrying a load.

The load must be set down. The fork arms must be resting fully on the ground.

For safety reasons, the battery must only be replaced on a level, smooth and clean surface.

- Park the truck in a level and safe location.
- Fully lower the fork carriage.
- Tilt the lift mast forwards.

The fork arms must touch the ground.

- Switch off the truck.
- Push the emergency off switch.
- Move the steering column all the way forwards.
- Move the armrest into the neutral position.
- Fold in the driver's seat backrest.

WARNING

Risk of crushing fingers and hands.

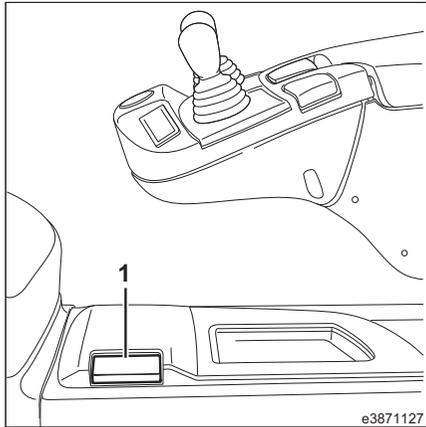
Before opening the battery hood, always slide the driver's seat and armrest all the way back. Otherwise, the battery hood may shut unintentionally.

- Move the driver's seat and the armrest backwards.
- Release the interlocks for the rear window (special equipment).
- Fold back the window to the end stop

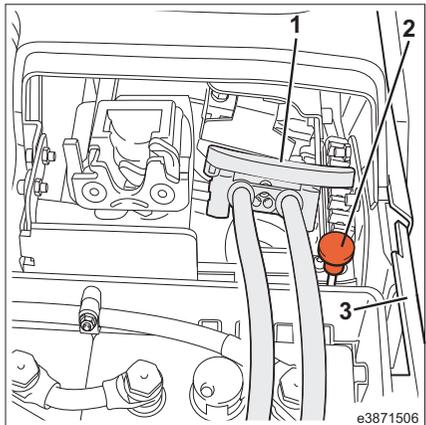
4 Operation

Drive batteries

- Unlock the battery hood using the lever (1) on the right-hand truck console and open the battery hood
- Secure the battery hood to prevent it from being accidentally closed.



- Disconnect the battery female connector (1) and the battery male connector.
- Check that the battery female connector and the battery cable are in good working order.
- Place the battery female connector and battery cable on the battery.
- Actuate the push-button (2) to unlock the side battery door (3).
- Open the battery door (3) as far as the stop.
- Secure the battery door to prevent it from swinging back.



The side stop (see arrow) is used to protect the battery. ▷

- Check the battery for damage and acid leaks.

⚠ WARNING

Risk of crushing and risk of accident when inserting the battery into the battery compartment.

Ensure that there is no-one in the area surrounding the battery compartment when inserting the battery.

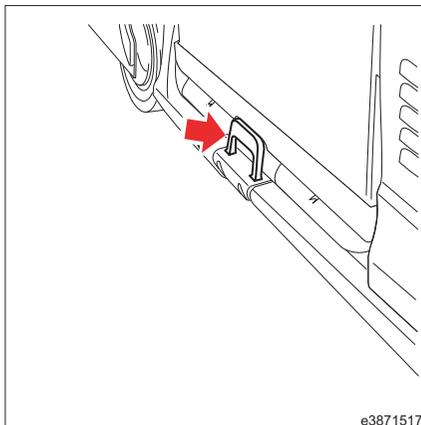
⚠ WARNING

Risk of truck tipping

Insert the new battery into the battery compartment correctly.

Secure the battery in place to prevent it slipping.

Ensure that the battery door is closed correctly.



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⚠ CAUTION

If the battery slips, this can result in damage to the battery and battery tray.

The new battery must correspond to the standard model in terms of size and weight.

- Balance out any variation in weight using ballast weights.
- Contact your service partner.

Replacing the battery using a crane and C hooks ▷

⚠ WARNING

Risk of accident

Only use a C hook approved by the manufacturer, and always with the appropriate lifting gear.

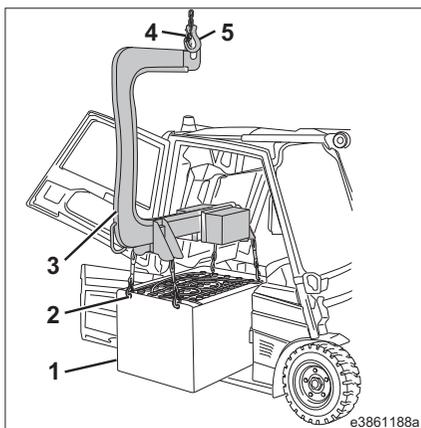
The crane, C hooks and lifting gear must have sufficient load-bearing capacity.

- Contact your service partner.

i NOTE

When picking up the C hook (3), ensure that the fastener (4) on the crane hook (5) is closed correctly.

- Drive the crane, C hooks and lifting gear over the battery.



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4 Operation

Drive batteries

- Insert the four hooks into the appropriate openings (2) in the battery tray.
- Lift the battery (1).
- Drive out of the battery compartment.
- Set down the battery in a suitable place.

Replacing the battery with the truck and a battery removal tool ▷

WARNING

Risk of accident

Only use trucks and battery removal tools with a sufficient load capacity.

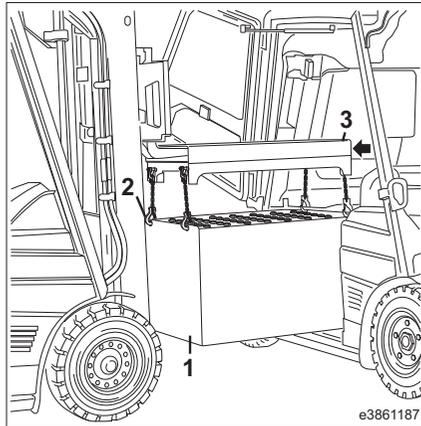
- Pick up the battery removal tool (3) using the fork arms of the truck.

CAUTION

Risk of tipping if the entire battery removal tool is not lifted.

When picking up the battery removal tool, ensure that the fork arms protrude from the other end of the battery removal tool (see arrow).

- Drive the truck and battery removal tool (3) into the battery compartment over the battery.
 - Insert the four hooks into the appropriate openings (2) in the battery tray.
- Lift the battery (1).
- Drive out of the battery compartment.
- Set down the battery in a suitable place.



Replacing the battery with the truck and a battery support (special equipment) ▷

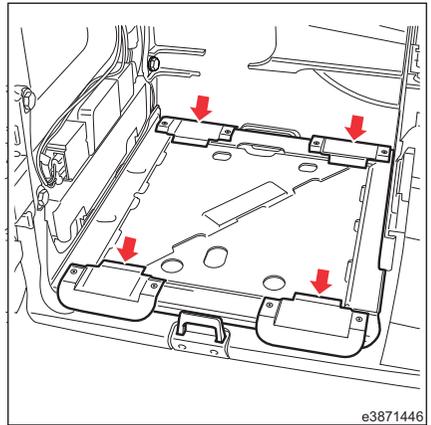
The battery support remains in the truck underneath the battery tray.

Four covers are fitted (see arrows) to protect the floor area when replacing the battery.

⚠ CAUTION

The truck floor may be damaged if the fork arms are not correctly positioned on the covers provided.

- Adjust the fork arm distance.



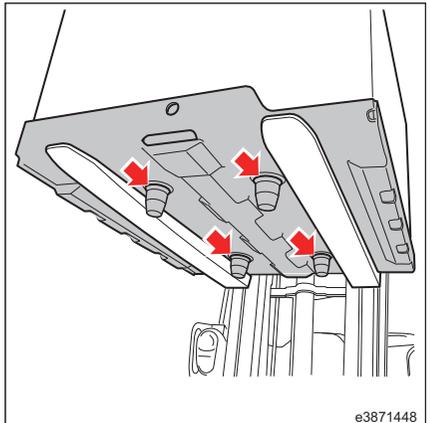
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The underside of the battery support has four feet (see arrows), which allow the battery support with the battery to be set down safely. ▷

⚠ CAUTION

The truck floor in the battery compartment may be damaged if the battery has not been lifted high enough.

- Raise the battery support to a sufficient height to ensure that the truck can be driven safely out of the battery compartment.

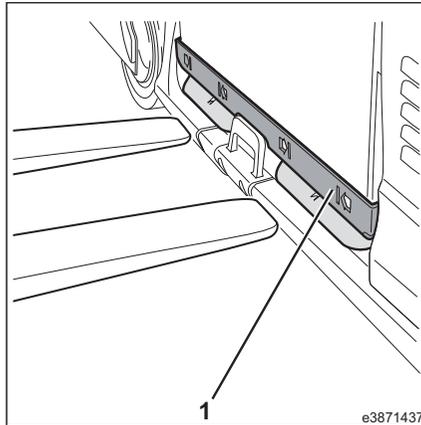


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4 Operation

Drive batteries

- Drive the truck until the fork arms are positioned underneath the battery support (1).
- Raise the battery until the battery support feet are off the floor.
- Drive out of the battery compartment to remove the battery.
- Set down the battery in a suitable place.



Replacing the battery using a lateral hydraulic battery carrier (special equipment)



WARNING

Risk of crushing and risk of accident when ejecting and retracting the battery.

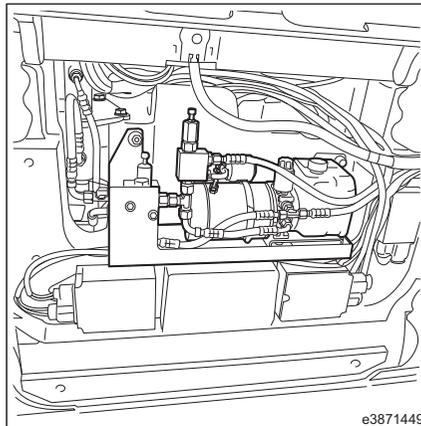
When ejecting and retracting the battery, ensure that no one is in the area surrounding the battery compartment (observe decal information (3) on the battery support).

The hydraulic power unit for the battery carrier is attached to the counterweight behind the battery compartment.

When a push button is actuated, the battery is ejected over halfway out (60%) by a reach cylinder.

NOTE

Trucks with a hydraulic battery carrier feature a steering axle fitted with a locking cylinder, which prevents the steering axle from tipping when the battery is ejected. When the push button is actuated, the locking cylinder extends first, then the battery is ejected.

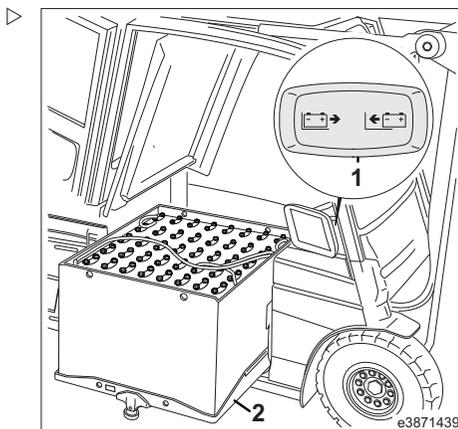


Ejecting the battery

- Move the steering axle to the straight-ahead position.
- Activate the battery carrier using a push button (1), which is located on the exterior of the truck console on the right-hand side.
- Press the push button (1) so the push button is in the "eject" position.

The locking cylinder extends. It blocks the steering axle. The battery is then ejected over halfway (approx. 60%).

- Disconnect the battery male connector from the battery female connector.
- Insert lifting gear into the openings provided in the battery tray.



⚠ WARNING

Risk of accident if unsuitable lifting gear is used.
 Only use suitable lifting gear and a crane with sufficient load capacity.

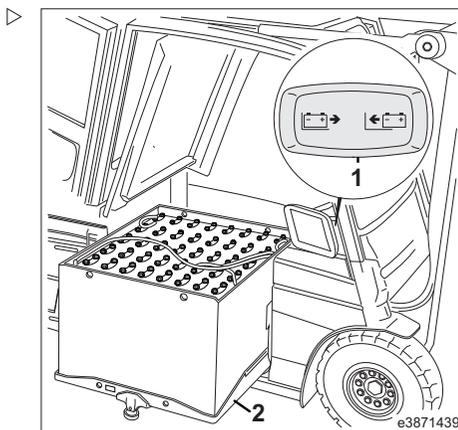
- Lift the battery and remove it.
- Set down the battery in a suitable place.

Inserting the battery

- Insert the battery into the battery support (2), ensuring that the battery is positioned correctly
- Remove the lifting gear.
- Connect the battery male connector and the battery female connector.
- Press the push button (1) so the push button is in the "retract" position.

The battery is retracted. Once the battery is completely retracted, the locking cylinder begins to retract. Once the locking cylinder is completely retracted, the steering axle is unlocked and the green symbol LED in the push button (1) lights up.

- Release the push button (1). The green LED goes out.
- Close the side battery door. Ensure that the side battery door is closed correctly.



4 Operation

Drive batteries

- Close the battery hood.

Checking the oil level of the hydraulic power unit

ENVIRONMENT NOTE

Observe information regarding working with consumables.

NOTE

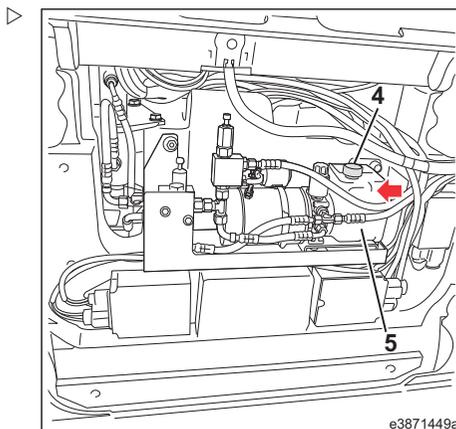
Only check the oil level when the battery is retracted.

WARNING

Risk of crushing fingers and hands.

Before opening the battery hood, always slide the driver's seat and armrest all the way back. Otherwise, the battery hood may shut unintentionally.

- Unlock the battery hood.
- Open the battery hood completely
- Check the oil level in the hydraulic tank (5).
Observe the oil level marking (see arrow).
- Unscrew the cap screw (4).
- If necessary, add hydraulic oil (standard oil; see the "Consumables" chapter) up to the corresponding oil level marking
- Screw the cap screw back onto the tank.
- Close the battery hood.

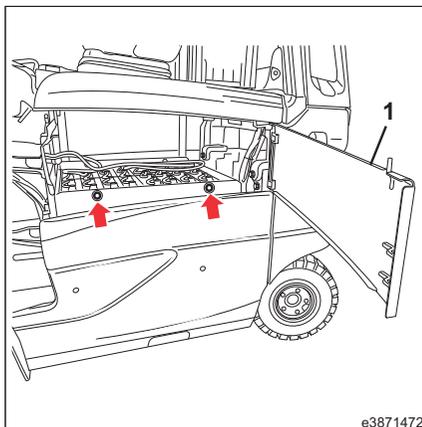


Technical data for hydraulic power unit

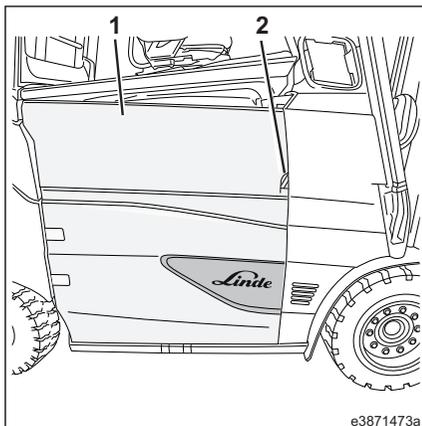
- Pump-motor power rating: 1.5 kW
- Filling quantity of hydraulic tank: 1.5 l of standard oil (see Recommendations for consumables)
- Main current fuse 100 A for pump motor
- Hydraulic power unit: set maximum pressure to 180 bar

▷ **Replacing the battery on a truck with an elevated driver's compartment**

For trucks with an elevated driver's compartment, when replacing a battery using a truck and a battery removal tool, the left-hand side door (1) on the truck must also be opened so that the hooks of the removal tool can be hooked into the corresponding openings (see arrows) in the battery tray.



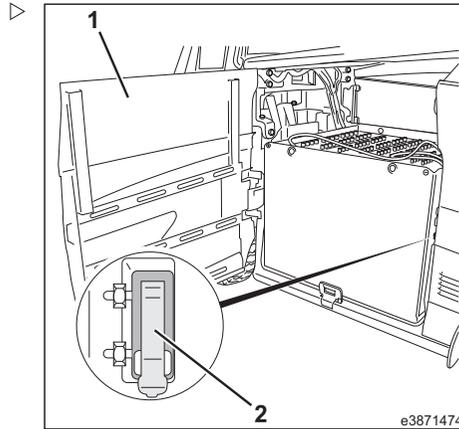
▷ On trucks with an elevated driver's compartment, the push-button to unlock the right-hand battery door (1) is actuated through the opening (2).



4 Operation

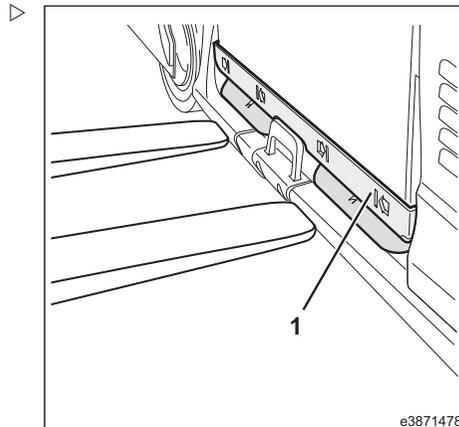
Drive batteries

On trucks with an elevated driver's compartment, the position of the right-hand battery door (1) is monitored by a microswitch (2). If the battery door is opened, driving functions and lifting functions are deactivated. This means that the truck cannot be operated if the battery door is not properly closed.



Battery replacement using a battery support (special equipment)

When replacing a battery using a truck and a battery support (1), the battery hood on trucks with an elevated driver's compartment can remain closed, depending on the overall height of the battery.



⚠ CAUTION

The truck floor may be damaged if the fork arms are not correctly positioned on the covers provided. Adjust the fork arm distance accordingly.

⚠ CAUTION

Damage to the battery hood if the battery is lifted too high.

Only raise the battery support to a sufficient height for it to be safely removed from the battery compartment.

⚠ CAUTION

The truck floor in the battery compartment may be damaged if the battery is not lifted high enough.

Raise the battery support to a sufficient height for it to be safely removed from the battery compartment.

Integrated charger (Linde Power Source)

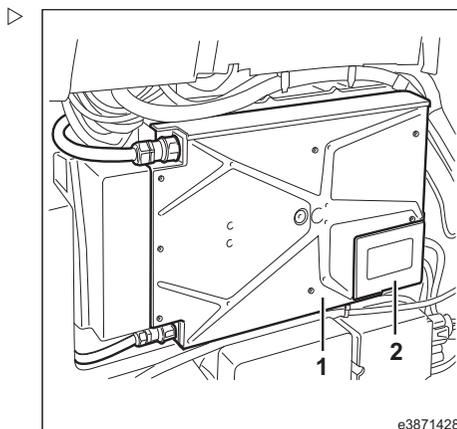
The integrated charger (1) is mounted to the counterweight behind the battery compartment and is used to charge the truck battery.

To protect the battery charger, there is an output fuse for the battery charging current located under the cover (2).

Battery charger types

The battery charger is available in the following design:

- LPS-80/75 (80 V/75 A)
 Three-phase, 400-volt AC mains supply



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NOTE

Battery charger LPS-80/75 (80 V/75 A) is a class-A device in accordance with EN 55011. The device may be operated in all areas that are directly connected to the low-voltage power supply and that supply domestic buildings, apart from living areas. Approval from the electricity supply authorities is required to also operate class A devices in living areas or in areas that are directly connected to a public low-voltage power supply. Contact your service partner.

NOTE

With a new battery, the battery charger must be set prior to its first commissioning using the diagnostic program (setting the charging characteristic curve). This step does not need to be carried out if the battery is supplied by the factory. Contact your service partner.

CAUTION

Incorrectly selected charging characteristic curves may destroy the battery.

Before initial charging, the correct charging characteristic curve must be programmed in the battery charger.

Contact your service partner.

4 Operation

Drive batteries

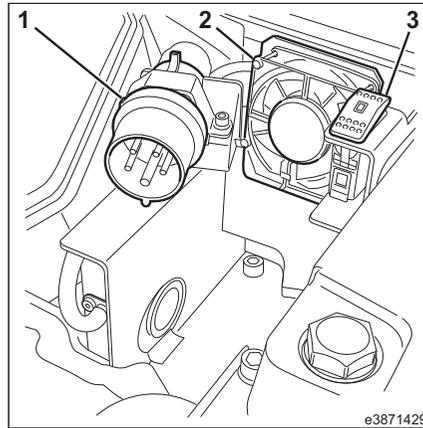
A 400 V/16 A CEE plug (1), a fan (2) and a push button (3) are located under the rear cover.

The battery charger directly activates the charging indicator lights in the display unit.

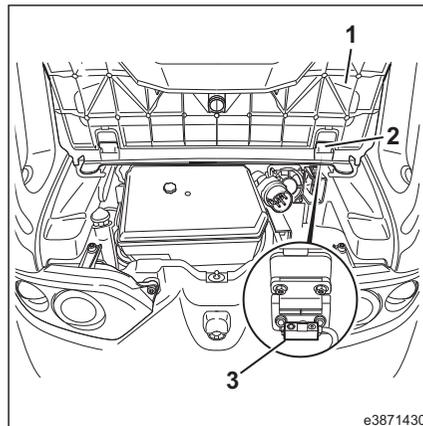
A further component of the integrated charger system is a temperature sensor in the battery tray.

The push button (3) functions as a start button for the charging process when batteries are deeply discharged.

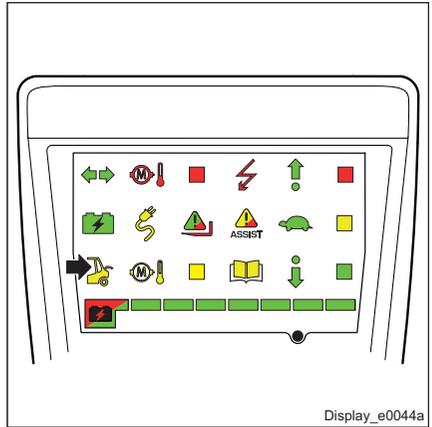
The push button (3) can also be used to interrupt the charging process if necessary.



A sensor (3) on the hinge (2) monitors the position of the rear cover (1). If the rear cover is opened, all driving functions and lifting functions are deactivated. This prevents the truck from being put into operation during the charging process.



The yellow "Rear cover monitoring" indicator light in the display unit (see arrow) signals an "open rear cover".



Active ventilation

"Active ventilation" enables the drive battery to be charged even when the battery hood is closed.

Active ventilation ensures that the gases produced during the charging process when the battery hood is closed are extracted from the truck.

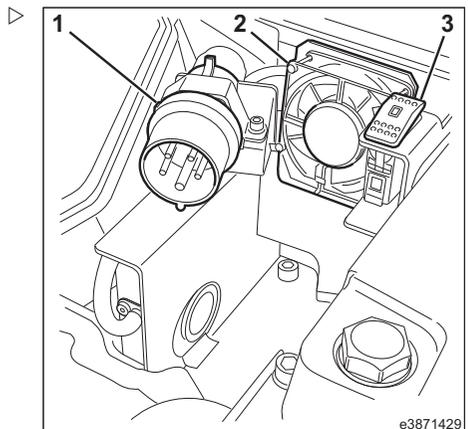
Trucks with an integrated charger have a fan (2) fitted for this purpose. The fan revolution speed is monitored.

NOTE

Check the fan and fan grille for contamination. Clean if necessary. Check the function of the fan during each charging process. Replace malfunctioning or faulty fans immediately. Contact your service partner.

NOTE

The charging process only starts once the required minimum speed is reached (70% $\hat{=}$ 4550 rpm).



4 Operation

Drive batteries

DANGER

Risk of explosion! The escaping gases are flammable.

Only charge the battery in well-ventilated areas. There must be no objects or obstructions in close proximity to the fan's ventilation area. During charging, ensure sufficient ventilation for the charge gases to escape.

CAUTION

The battery still releases gas once charging is complete

To ensure that all remaining gases can escape from the battery compartment, the rear cover must remain open during the charging process and also during the run-on time of the fan.

Charging

Mains supply for the battery charger

- To provide the power supply and start the charging process, connect the integrated battery charger to a mains socket (16-A/400-V CEE socket) via a mains line (helix cable).



NOTE

A CEE 16-A/400-V helix charging cable is supplied with the battery charger and is stored under the rear cover.

DANGER

Improper protection of the mains socket means that the mains cable is at risk of overheating.

The mains socket must be protected in accordance with regulations. This applies especially to the use of extension cords. Observe the notes for correct protection of mains sockets.

Contact an authorised technician.

DANGER

There is a risk of fatal electric shock from a damaged mains cable.

Only use mains cables in good condition that have been tested by an authorised technician. The helix cable must not be extended to a length of more than 2 m.

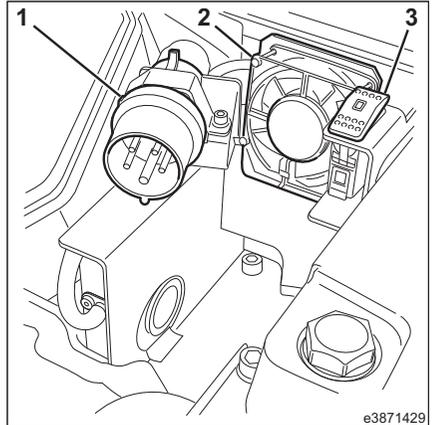
i NOTE

Observe the following procedure, otherwise, in some circumstances, error codes may be registered in the display unit.

- Switch off the truck.
- Push the emergency off switch.
- Open the rear cover.
- Insert the mains-line CEE coupling into the plug (1) of the battery charger. ▷

i NOTE

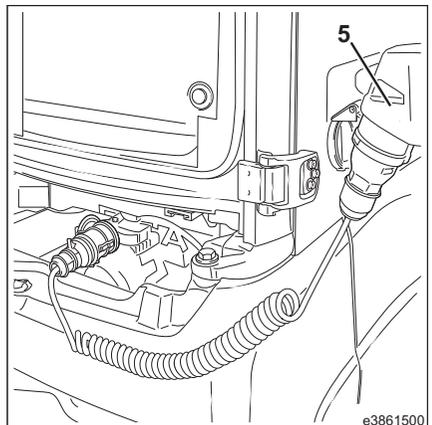
It is only possible to start the charging process after the emergency off switch has been actuated.



- Insert the mains-line CEE plug into the mains socket (5). ▷

i NOTE

The helix cable must not be extended to a length of more than 2 m.

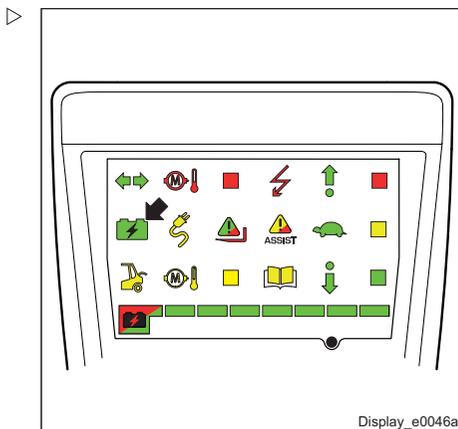


End of charging

The charging process is automatically ended when:

- The charging program is complete and the battery has been charged

After charging has finished, the green "battery symbol" indicator light in the display unit lights up. The battery has been charged to full capacity.



Interrupting charging

Operation of the battery charger requires that there are no interruptions during the charging process. However, external factors may make an interruption of the charging process necessary.

NOTE

If the fan is blocked or a specific minimum speed for the fan is not reached, the charging process is terminated automatically.

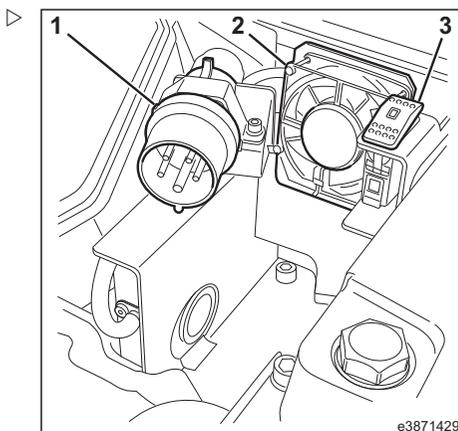
DANGER

There is a risk of serious injury to persons and damage to property if the mains plug or the battery male connector is disconnected during a charging process. The sparks generated as a result of disconnecting the battery from the battery charger may ignite gases formed during the charging process.

To end the charging process, always press the push button (3) (deep discharge start/charging interruption) first. Then disconnect the mains (remove the mains plug).

- Actuate push button (3).
- Disconnect the mains plug (1) from the mains socket.

The charging process will restart as soon as the mains plug is re-inserted into the mains



State	Description
1 Yellow	Charging
2 Flashing yellow	Charge start, equalising charge and recharging phase
3 Green	Charging ended
4 Flashing green	Maintenance charging
5 Flashing red	Battery is deeply discharged; charging can be started manually by pressing the charge start/charging interruption push button

4 Operation

Drive batteries

Electrolyte circulation

Charging batteries with an electrolyte circulation pump

Using batteries equipped with electrolyte circulation offers a number of key advantages:

- Shorter charging time
- Reduction in energy costs of approximately 15%
- Reduction in water consumption of up to 75%
- Longer battery maintenance intervals

An electrical pump (1) is also fitted under the rear cover of the truck for this purpose.

Programming

The truck diagnostics can be used to specify whether a battery with electrolyte circulation is installed in the truck.

Contact your service partner.

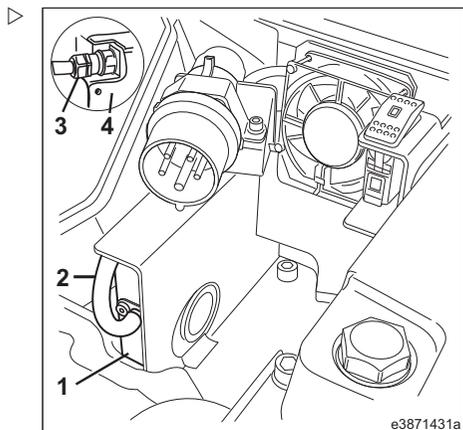
Functional description

The air is produced by a pump (1).

The pump (1) is activated directly by the integrated charger (4). The pump is connected to the charger by a 7-pin plug (3).

At the start of the charging process, the pump is switched on for 30 seconds in order to determine via the built-in pressure switch whether a suitable air pressure has been established in the system.

If a leak is found in the electrolyte circulation system, the programmed characteristic curve is switched to a characteristic curve with no electrolyte circulation.



- | | |
|---|--------------------|
| 1 | Pump |
| 2 | Hose |
| 3 | 7-pin plug |
| 4 | Integrated charger |

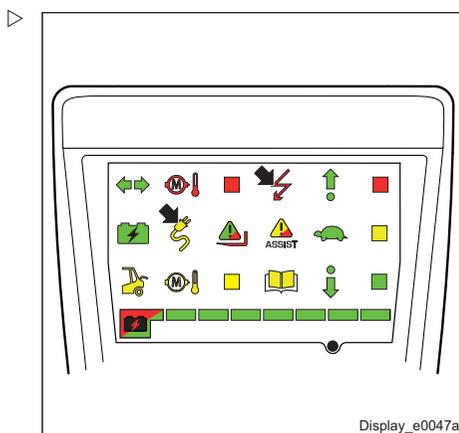
On the display unit, the yellow (plug symbol) and red (lightning bolt symbol) indicator lights flash alternately for the charging process.

In operating mode (towards the end of the main charging phase), the pump initially runs for 2 minutes and then switches to a pause mode for a duration of 13 minutes.

This cycle is continued until the end of the charging process as a whole. The pump is connected to the recirculated air system of the drive battery via the hose connection (3). The bubbles of air rising upwards cause circulation of the electrolyte and prevent acid stratification.

Pressure monitoring

The pump is equipped with a pressure switch that monitors the system pressure. In operating mode and during the associated 2-minute running time of the pump, the pressure switch is interrogated constantly.



Display_e0047a

Loading / transporting

Removing/attaching the lift mast

 **WARNING**

A special tool and specialist knowledge is required for this work.

Contact your service partner.

Driving without the lift mast

 **NOTE**

Driving the truck without a lift mast is permissible only for transfer purposes and the speed must be adjusted as appropriate.

Loading / transporting

Transporting the truck using a lorry or flat-bed trailer

NOTE

- The driver is responsible for his means of transport, the transportation safety device and for the transportation of the truck
- Observe the national regulations for your country

DANGER

Risk to life caused by overloading and material damage!

- Only load the truck if the load capacity of the means of transport, ramps and loading bridges is greater than the total actual weight of the truck.
- Note the loading weight on the nameplate.

Loading

DANGER

Risk of accident from the truck crashing!

To prevent the truck from tipping over the edge or corners, avoid steering movements on narrow loading bridges/ramps.

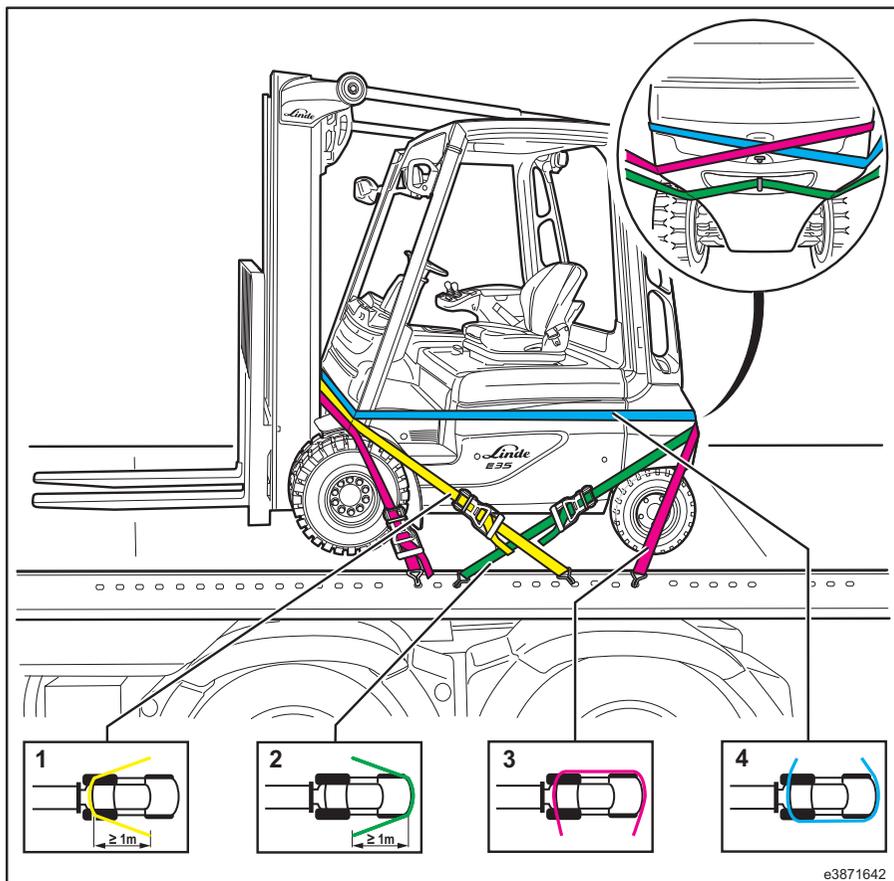
Requirements for loading:

- The loading surface of the transport vehicle must be dry and swept clean
- The tyres on the truck must be clean
- Before driving across a loading bridge, ensure that the loading bridge is properly attached and secured.
- Ensure that the transport vehicle onto which the truck is to be driven has been sufficiently secured against moving.
- Drive slowly and carefully onto the transport vehicle.
- Lower the lift mast and tilt the lift mast forwards.

The fork arms must be resting fully on the ground.

- Activate the manual parking brake.
- Switch off the truck.
- Push the emergency off switch.
- Remove the switch key.
- Place and secure wedges underneath the wheels, or drive the truck against a fixed stop so that the truck faces the fixed stop.

Lashing



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Requirements for lashing:

- The transport vehicle must be equipped with lashing points with a load capacity of at least 2000 daN
- 50-mm polyester lashing straps with a load capacity of at least 2500 daN must be used to secure the load

CAUTION

Damage to components

Components (e.g. lights, hose lines) must not be tensioned using the lashing straps.

- Lash the truck securely on the right-hand and left-hand side as shown in the image. Use edge and surface protection.
- For belt (1) and belt (2), select lashing points that are at least 1 m in front of or behind the point where the strap loops around the truck.

4 Operation

Loading / transporting

DANGER

The truck may slip if the lashing straps slip!

The truck must be lashed securely so that it cannot move during transportation.

- Make sure that the lashing straps are tightened securely and that the pads cannot slip off.

Crane loading

NOTE

Crane loading operations may be performed only by specially trained technicians.



DANGER

Risk of accident and risk to life

Do not walk under suspended loads!
When using a crane to load the truck, pay particular attention to ensure that nobody is in the working area of the crane!

- Use lifting gear and a loading crane with a sufficient load capacity.
- Note the loading weight on the nameplate.

WARNING

Risk of accident due to the tilt cylinders being damaged.

- Before lifting the truck, retract the tilt cylinders as far as they will go and fully lower the lift mast.

Crane loading with lifting eyes

DANGER

Risk of accident or danger to life due to the lifting eyes breaking off!

Crane loading using lifting eyes (1, 7) may be carried out only using the appropriate lifting gear (3), whereby the chains (2, 6) lead up vertically from the lifting eyes (1, 7).

To avoid an unequal load distribution, a compensating device on the lifting gear is essential, e.g. a levelling rocker.

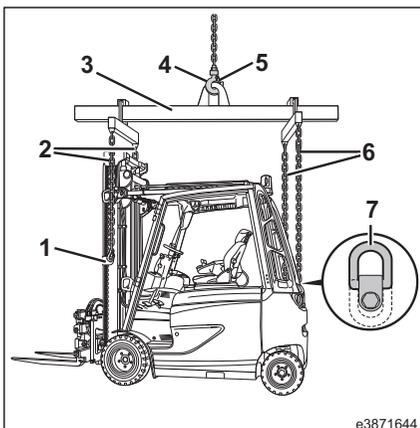
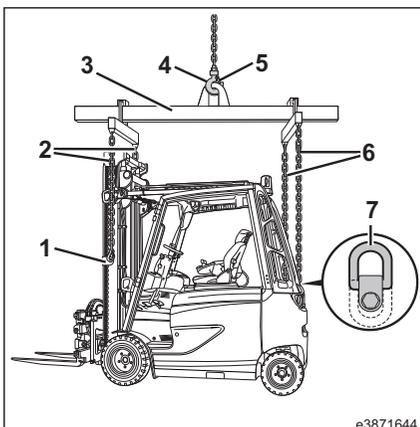
- Position the crane with lifting gear (3) above the truck.
- Attach chains (6) to the lifting eyes (7) on the counterweight.
- Attach chains (2) to the lifting eyes (1) on the lift mast.
- Make sure that the safety locks are closed, e.g. safety lock (5) on crane hook (4).

NOTE

*When lifting, the lifting gear must **not** come into contact with the overhead guard or any attachments.*

- Adjust the lifting gear (3) to the length and width of the truck and align the lifting gear above the centre of gravity of the truck.
- Perform a test lift with care.

The truck must be horizontal when suspended.



4 Operation

Loading / transporting

5

Service work

Safety information regarding servicing work

Safety information regarding servicing work

The industrial truck will only remain ready for operation at all times if the servicing and inspection tasks are performed at regular intervals and in accordance with the information in the operating instructions.

Maintenance work may be performed only by competent persons. You can agree to have this work performed on the basis of a service contract concluded with your service partner.

Whenever servicing work is performed, the industrial truck must be parked on a level surface and secured so that it cannot roll away.

The industrial truck must be switched off completely, and the battery male connector and switch key must be removed.

When working with the fork carriage and/or lift mast raised, make sure they are secured against accidental dropping.

Whenever work is carried out at the front of the industrial truck, the lift mast must be secured to prevent it tilting backwards.

Do not make any modifications, in particular attachments or conversions, to your industrial truck without the manufacturer's approval.

Following all servicing work, a function check and test run must be performed on the industrial truck.

WARNING

Any side doors fitted could fall shut during servicing work and trap personnel.

For this reason, both doors must be opened and secured in place during servicing.

CAUTION

The industrial truck must always be properly labelled.

Missing or damaged identification plates and/or adhesive labels must be replaced. For the warehouse or order number, please consult the spare parts catalogue.

ENVIRONMENT NOTE

Observe information regarding the use of consumables.

Service intervals

The specified service intervals are subject to the operating conditions and application conditions, as well as the consumables in use. In certain circumstances, the service intervals can be changed. **In all cases, the "Regular Service" must be performed once per year.**

In the case of operation in extreme conditions (e.g. heat, cold or dust), the service intervals must be reduced.

Contact your service partner.

Inspection data and maintenance data

Unit	Devices/consumables	Filling quantity/set values
Battery	Distilled water	As required
	Acid-free grease	
Traction motor/hydraulic motor	Electric cleaner	As required
Hydraulic system	Filter insert	Suction filter - degree of filtration: 15 µm
		Pressure filter - degree of filtration: 6 µm
	Hydraulic oil	Lift height up to 5165 mm: approx. 22 l
		Lift height of 5175 mm or higher: approx. 31 l
Wheel fastenings	Tighten	Front: 425 Nm
		Rear: 460 Nm
Planetary transmission	Gearbox oil	Single tyre Initial filling: 1.3 l Oil change: 1.15 l
		Twin tyres Initial filling: 1.4 l Oil change: 1.25 l
Steering axle	Lubricating grease	As required
Guide for the lift mast and chain guide	Linde chain spray	As required

Consumables

Consumables

Hydraulic oil

CAUTION

Damage to the hydraulic system due to unapproved hydraulic oil.

Use only approved hydraulic oils. Only the oils listed below have the manufacturer's approval. Do not mix hydraulic oils. If in doubt, contact the service partner. Recommendations made by representatives from the mineral oil industry must also be agreed in advance with your service partner.

Standard

(average constant oil temperature 40°C - 60°C)

ISO-L-HM 46 as per ISO 6743-4
or ISO VG46-HLP as per DIN 51524-2

Heavy duty

(average constant oil temperature above 60°C)

ISO-L-HM 68 as per ISO 6743-4
or ISO VG68-HLP as per DIN 51524-2

For cold store version only:

Light duty

(average constant oil temperature below 40°C)

ISO-L-HM 32 as per ISO 6743-4
or ISO VG32-HLP as per DIN 51524-2

Widely varying conditions of usage

NOTE

All of the applications specified above can be covered using a hydraulic oil with a high viscosity index (multigrade oil).

ISO-L-HV 46 as per ISO 6743-4
or ISO VG46-HVLP as per DIN 51524-3

Bio-hydraulic oil

Panolin HLP Synth 46 highly biodegradable hydraulic fluid

CAUTION

Damage to the hydraulic system due to mixing bio-hydraulic oil with mineral oil.

Bio-hydraulic oil must not be mixed with mineral oils. No recommendations for bio-hydraulic oils from other manufacturers can be made at the present time. Only use approved, pure bio-hydraulic oil.

Gearbox oil

Binding specification:

ARAL EP Plus SAE80W-90 API GL4
or GL5
or
BP Energear HT 80W-90
or
Castrol Syntrax Universal 80W-90

ENVIRONMENT NOTE

Used oil must be stored safely until it is disposed of according to the regulations. Oil must not be allowed to penetrate the sewage system or the ground. Due to the issue of disposal and the specialist knowledge required, gearbox oil changes may only be performed by the service partner.

Lubricating grease

Linde heavy-duty grease, lithium-saponified with EP agents and MOS₂
KPF2N-20 as per DIN 51825
Linde spare part no., see spare parts catalogue

Linde low-temperature grease
AeroShell
Linde spare part no., refer to the spare parts catalogue
Molycote paste
Linde spare part no., refer to the spare parts catalogue

 **NOTE**

Mixing with soap-based types of lubricating grease other than lithium-saponified is not permitted.

Chain spray for leaf chains

Linde standard chain spray
Lubricant A167
Linde spare part no., refer to the spare parts catalogue
Linde cold-store chain spray Synthesco
Linde spare part no., refer to the spare parts catalogue

Electric cleaner

Contact your service partner.

Screw-locking compound

Fast-drying nitrocellulose compound for securing and sealing screws – yellow.
Contact your service partner.

Battery grease

Acid-free lubricating grease (battery grease)
Contact your service partner.

5 Service work

Service plan

Service plan

Note regarding servicing work
Specialist knowledge and special tools are required for servicing work. Contact your service partner.
Preparatory tasks
Clean the truck.
Check that the labelling is complete and legible.
Read out and clear the error memory.
Calibrate the drive potentiometer and the joysticks.
Enter the next service interval.
Regular service, at least every 12 months
Gearbox
Check the oil level in the planetary transmission and check for leak tightness.
Chassis, bodywork and fittings
Check and lubricate the bearing points and joints.
Lubricate the bolts, hinges and interlocks on the battery door and the battery hood.
Check the battery side stop in the battery compartment.
Check the condition of the seat belt and check for correct operation.
Chassis frame
Check the wheels for damage, foreign objects and wear.
Check the condition of the antistatic belt.
Lubricate the steering axle.
Operating devices
Check that the brake system (service brake, parking brake) is working correctly
Check and lubricate the pedal group.
Electrical enclosure
Check the heat sinks on the power modules for contamination and clean the heat sinks.
Check the condition of the electrical components on the contactor carrier and clean the components.
Clean the fans.
Check the condition of the drive battery.

Regular service, at least every 12 months
Clean the integrated charger and check that the integrated charger is working correctly (the charging process starts).
Check the filter for the electrolyte circulation pump for the integrated charger and replace the filter as required.
Hydraulics
Check the oil level in the hydraulic system
Check the hydraulic system for leak tightness.
Clean the radiator.
Check the bleeder valve on the hydraulic tank for correct operation.
Check the pre-load of the hose lines.
Load lift system
Check the condition of the lift mast.
Clean and adjust the lift mast chain and apply chain spray.
Check and lubricate the sideshift.
Check and lubricate the fork prong positioner.
Servicing work every 1000 hours, but as a minimum every 3 years (exceptions in brackets)
Gearbox
Check the mounting of the drive axle (visual inspection).
Check the oil level in the planetary transmission and check for leak tightness.
Change the gearbox oil in the planetary transmission (once after 1000 hours, again at 3000 hours and then every 3000 hours).
Chassis, bodywork and fittings
Check and lubricate the bearing points and joints.
Lubricate the bolts, hinges and interlocks on the battery door and the battery hood.
Check the battery side stop in the battery compartment.
Check the condition of the seat belt and check for correct operation.
Check the mountings of the chassis/counterweight/ballast weight (visual inspection).
Check the mounting of the tilt-cylinder supports (visual inspection).
Service the heating system.
Chassis frame
Check the wheels for damage, foreign objects and wear.
Check the condition of the antistatic belt.

5 Service work

Service plan

Servicing work every 1000 hours, but as a minimum every 3 years (exceptions in brackets)
Lubricate the steering axle.
Check the steering axle mountings (Check once after 1000 hours, again at 3000 hours and then every 3000 hours)
Operating devices
Check that the brake system (service brake, parking brake) is working correctly
Check and lubricate the pedal group.
Electrical enclosure
Check the condition of the electric cables, connections and plug connectors, and check that they are securely attached (once after 1000 hours, again at 3000 hours and then every 3000 hours).
Check that the electrical connections on the power modules and the electric motors are securely attached (once after 1000 hours, again at 3000 hours and then every 3000 hours).
Check the heat sinks on the power modules for contamination and clean the heat sinks.
Check the condition of the electrical components on the contactor carrier and clean the components.
Clean the fans.
Check the condition of the drive battery.
Check the cables and the plugs on the drive battery (once after 1000 hours, again at 3000 hours and then every 3000 hours).
Clean the integrated charger and check that the integrated charger is working correctly (the charging process starts).
Check the filter for the electrolyte circulation pump for the integrated charger and replace the filter as required.
Check the axle load sensor.
Check the load pressure sensor.
Check the lift height sensor.
Hydraulics
Check the oil level in the hydraulic system
Check the hydraulic system for leak tightness.
Clean the radiator.
Check the bleeder valve on the hydraulic tank for correct operation.
Check the mounting of the tilt cylinders.
Check the pre-load of the hose lines.
Load lift system

Servicing work every 1000 hours, but as a minimum every 3 years (exceptions in brackets)
Check the condition, the mounting and the function of the lift mast, the lift mast chain, the lift cylinders and the end stops (once after 1000 hours, again at 3000 hours and then every 3000 hours).
Clean and adjust the lift mast chain and apply chain spray.
Check the fork arms and arm safety devices (Check once after 1000 hours, again at 3000 hours and then every 3000 hours)
Check and lubricate the sideshift.
Check and lubricate the fork prong positioner.

5 Service work

Service plan

Additional servicing work every 3000 hours, but as a minimum every 3 years (exceptions in brackets)
Gearbox
Check the mounting of the planetary transmission (only once after 3000 hours).
Change the gearbox oil in the planetary transmission.
Check the bearings of the drive axle for wear.
Chassis, bodywork and fittings
Check the interlocks on the battery door and the battery hood and adjust as required.
Chassis frame
Check the mountings of the steering axle
Electrical enclosure
Check the condition of the electric cables, connections and plug connectors, and check that they are securely attached
Check that the electrical connections on the power modules and the electric motors are securely attached.
Check the cables and plugs of the drive battery.
Calibrate the axle load sensor.
Calibrate the load pressure sensor.
Hydraulics
Change the breather filter, pressure filter and suction filter on the hydraulic system
Check the tilt-cylinder bearings for wear.
Load lift system
Check the condition of the lift mast, lift mast chain, lift cylinders and end stops and check that they are securely attached and working correctly.
Check the fork arms and the fork arm locking devices.
Check the sideshift for wear.
Check the fork prong positioner for wear.
Additional servicing work every 6000 hours, but as a minimum every 6 years
Hydraulics
Replace the hydraulic oil in the hydraulic system

Final tasks
Carry out a functional test, including a test drive.
Attach the servicing adhesive label.

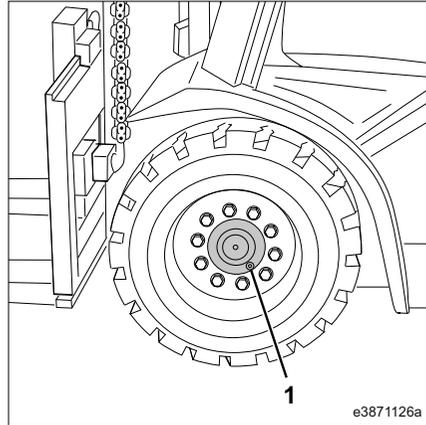
5 Service work

Gearbox

Gearbox

Checking the oil level in the planetary transmission ▷

- Position the truck so that the checking screw (1) is between the 5 o'clock position and the 6 o'clock position.
- Switch off the truck.
- Clean area around the filler plug (3).
- Unscrew the filler plug (3).
- For single tyres and twin tyres, fix the depth gauge (2) at 112.5 mm and insert it into the filling opening (4).



- Remove the depth gauge.
- Check the oil level.

At the minimum oil level, oil must be visible at the depth gauge measuring tip.

- Minimum oil level: 112.5-mm adjustment dimension on the depth gauge
- Maximum oil level: 110.5-mm adjustment dimension on the depth gauge

WARNING

Risk of accident. Topping up the gearbox oil using oil with the wrong viscosity may result in the brake malfunctioning.

Only use gearbox oil approved by the manufacturer. Refer to the chapter entitled "Consumables".

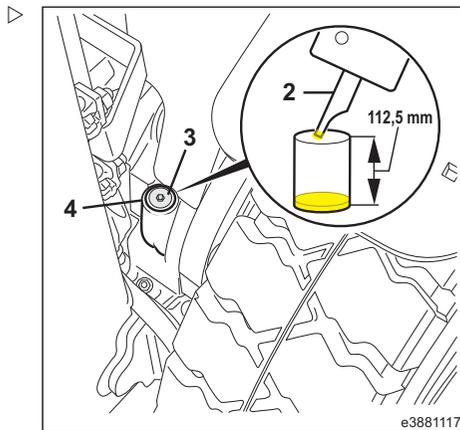
- Top up the gearbox oil if necessary.

NOTE

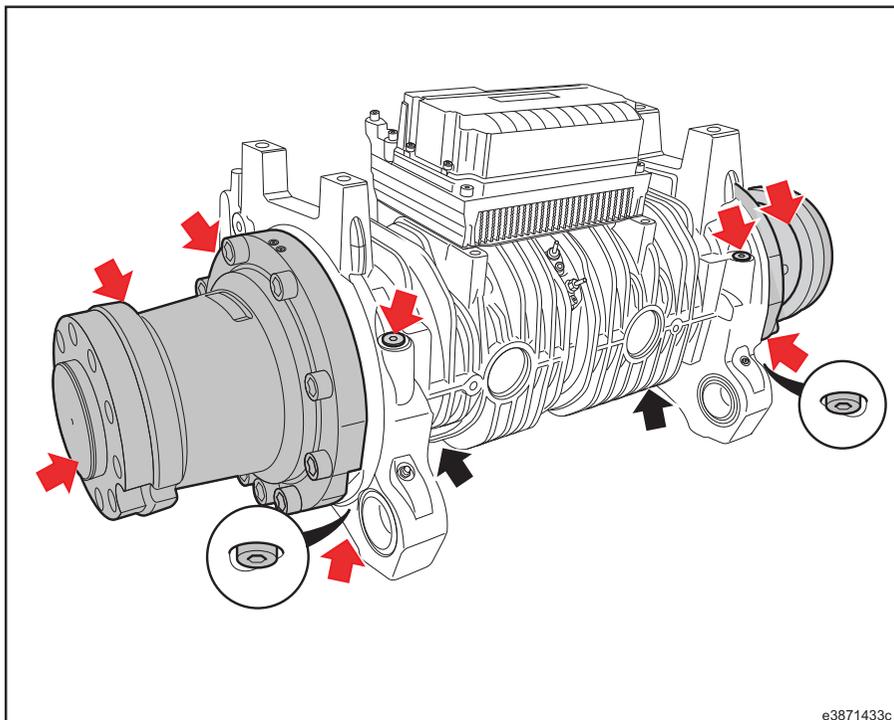
Drain off excess oil via the checking screw (1); tightening torque: 20 Nm

- Check the oil level again.
- Screw in and tighten the filler plug (3).

Tightening torque: 45 Nm



Checking the planetary transmission for leak tightness



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The planetary transmission is checked for leak tightness when the drive wheels are removed.

- Remove the drive wheels.

Check the left-hand side and right-hand side of the planetary transmission for leak tightness at the following points:

- Housing flange
- Wheel shaft
- Checking screw
- Drain plug

NOTE

There is a checking screw (torx screw) on both the left-hand side and right-hand side (black arrows) of the underside of the axle housing.

Check for leaks between the planetary transmission and the motor:

- Unscrew the checking screw.

No oil may escape from the opening.

- Re-insert and tighten the checking screw.

Tightening torque: 10 Nm

NOTE

In the event of a leak on a planetary transmission or oil leakage on one of the checking screws, contact the service partner.

Chassis, bodywork and fittings

Chassis, bodywork and fittings

Cleaning the industrial truck

The frequency with which cleaning is required depends on the application of the industrial truck. If highly abrasive materials, e.g. salt water, fertiliser, chemicals or cement are used, the industrial truck must be thoroughly cleaned after each assignment.

Deposits and accumulations of combustible materials on or in the vicinity of hot parts must be removed immediately.

Before performing service work, clean the oil filler openings and their surroundings, as well as the lubricating nipples.

When cleaning, note the following:

- Wear protective equipment
- Never wash the industrial truck when it is switched on.
- When using high-pressure cleaners, maintain a minimum distance of 300 mm between the spray pipe and the industrial truck
- Cleaning materials that contain strong solvents can permanently damage painted and plastic surfaces
- Hot steam or cleaning materials with a powerful degreasing effect must be used with extreme caution, because these will affect the grease filling of bearings with lifetime lubrication, causing them to leak. Relubrication is not possible. The bearing will be damaged.

When cleaning with compressed air, remove stubborn contamination with a cold cleaning solvent.

 **CAUTION**

Damage to or destruction of industrial truck components!

Water must not be used for cleaning in the area of the central electrical system or switch console. Only use a dry cloth or clean compressed air for cleaning in this area.

The following areas must also **not** be subjected to a direct water jet when cleaning (e.g. using high-pressure cleaning equipment or steam cleaners):

- Electrical and electronic components,
- The front axle,
- Plug connectors,
- Plastic pipes for the air duct,
- Hydraulic hoses and coolant hoses
- Hose clips
- Insulating material

 **NOTE**

If cleaning using a water jet cannot be avoided, the affected areas must be covered beforehand.

Checking and lubricating the bearing points and joints

 **ENVIRONMENT NOTE**

Observe information regarding working with consumables.

- Check and lubricate the following bearings and mountings:

- Driver's seat guide
- Door locks and hinges on the weather protection cab (special equipment)
- Windscreen wiper bearings (special equipment)

Only use approved lubricants recommended by the manufacturer when performing this work. See the chapter regarding consumables.

Battery door and battery hood: Lubricating the bolts, hinges and interlocks



ENVIRONMENT NOTE

Observe information regarding the use of consumables.

- Open the battery door and the battery hood fully and secure to prevent them from being accidentally closed.

- Lubricate the bolts, the hinges and the interlocks on the battery hood and the battery door.

Only use approved lubricants recommended by the manufacturer when performing this work. See the chapter regarding consumables.

5 Service work

Chassis, bodywork and fittings

Battery door and battery hood Checking and adjusting the inter-locks

In all cases, the truck must only be started up when the battery hood and battery door are closed.

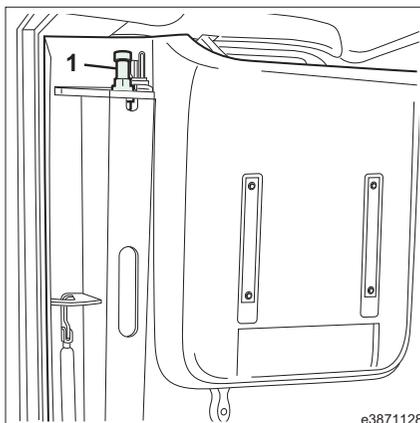
When closing the battery hood and battery door, the hood and door must audibly engage. For this reason, the relevant locking devices must be adjusted correctly, and subsequently readjusted if necessary.

⚠ WARNING

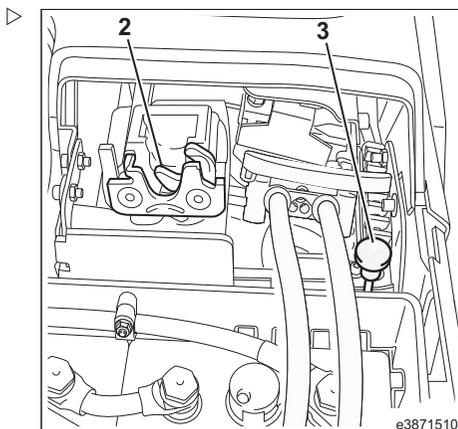
Risk of accident and injury.

It is essential that the truck is only operated or driven with the battery hood closed and the battery door closed.

Locking bolt (1) for the battery hood. ▶



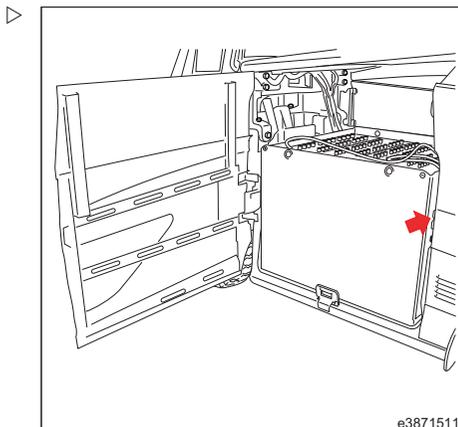
Lock (2) for the battery hood. Unlocking mechanism (3) for the side battery door.



Lock (see arrow) for the battery door.

- ▷ Check that the interlocks for the battery door and the battery hood are functioning correctly. Adjust the interlocks if necessary.

Specialist technical knowledge is necessary to do this. Contact your service partner.

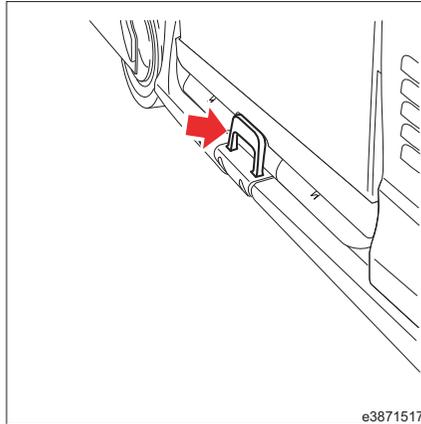


5 Service work

Chassis, bodywork and fittings

Battery compartment: Checking the battery side stop ▷

- Switch off the truck.
- Open the battery hood.
- Disconnect the battery male connector and the battery female connector.
- Unlock the battery door.
- Open the battery door to the stop and secure the battery door to prevent it from swinging back.
- Check the condition of the side battery stop (see arrow) and check for ease of movement; to do this, lift the battery stop and fold the battery stop downwards.
- Replace any damaged parts.



Checking the condition and function of the seat belt

⚠ DANGER

Risk of accident or danger to life if the restraint system is faulty

Do not operate the industrial truck if the restraint system is faulty.

i NOTE

For safety reasons, check the condition and function of the restraint system on a regular basis (once a month).

Screw connections must be checked on a regular basis to make sure that they are secure.

After an accident, the seat belt must be replaced.

The driver's seat and the driver's seat mounting must also be checked after an accident by an authorised technician.

If you notice any irregularities in the functioning of the seat (e.g. seat suspension) or the seat belt, contact your service partner immediately for help with eliminating the cause.

i NOTE

In extreme conditions, the function and condition of the restraint system must be checked on a daily basis prior to starting up the truck.

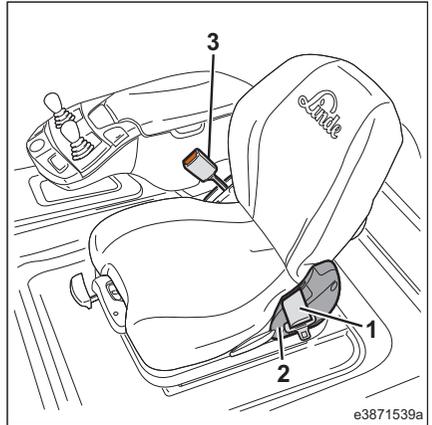
- Pull out the belt (1) completely and check for fraying and torn stitching.
- Check that the buckle (3) functions correctly and that the belt retracts properly.
- Check the covers and fixing points for damage.

Test the automatic blocking mechanism.

- Park the truck on level ground.
- Pull out the belt (1) with a jerk.

The automatic mechanism must stop the belt being extended out of the belt retractor (2).

- Push the driver's seat all the way forwards.
- Fold the seat backrest all the way forwards.



i NOTE

When opening the battery hood, remember that a rear window may have been installed.

- Unlock the battery hood and open it by approx. 30° with the driver's seat.

The automatic mechanism must stop the belt being extended out of the belt retractor (2).

- Close the battery hood.

5 Service work

Chassis, bodywork and fittings

Maintaining the heating system (special equipment)

The exterior air filter for the heating system is located on the outside of the truck console on the right-hand side.

- Switch off the truck.
- Open the right-hand driver's door fully and prevent it from closing.
- Remove the profile rubber.
- Remove the filter and then clean or replace the filter.
- Insert the filter.
- Fit the profile rubber.

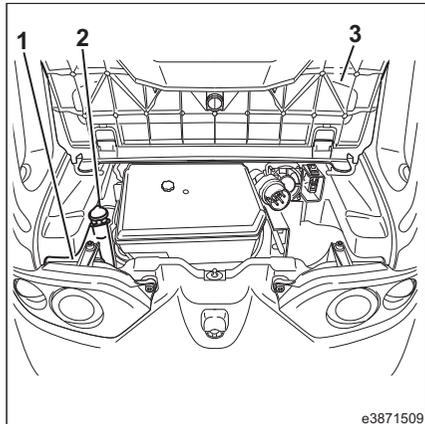
ENVIRONMENT NOTE

Dispose of the old filter in an environmentally friendly manner.

Washer system (special equipment): Topping up the container

The container (1) for the washer system is located under the rear cover (3) on the left-hand side of the truck.

- Open the rear cover (3).
- Remove the filler cap (2) from the filler neck of the container (1).
- Top up the container with washer fluid until the fluid is visible in the filling opening.
- Fit the filler cap (2) back onto the filler neck and seal the filler cap properly.
- Close the rear cover (3).



Chassis frame

Wheel change

DANGER

Risk of tipping.

All tyres on any one axle must be of the same dimensions, from the same manufacturer and of the same type and profile.

WARNING

Observe the tare weight of the truck.

Only use hydraulic jacks with a load capacity of at least 5000 kg.

CAUTION

Electrostatic charge.

When using non-marking tyres (light-coloured tyres), the electrical potential equalisation must be ensured with an antistatic belt

The antistatic belt must always be in contact with the ground.

- Only position the rear hydraulic jack centrally under the counterweight.
- Position the front hydraulic jack on the left or right-hand edge of the chassis or on the lift mast.

The truck may be jacked up only at these lifting points at the front left, front right and the rear middle.

- Loosen the wheel fastenings on the wheel in question.
- Lift the truck using a hydraulic jack until the wheels are off the ground.
- Support the truck securely using hardwood supports at the chassis or at the counterweight (to remove the load from the hydraulic jack).
- Unscrew the wheel fastenings.
- Change the wheel.
- Position the wheel fastenings and hand-tighten.
- Lower the truck.

5 Service work

Chassis frame

➤ Tighten the wheel fastenings.

Tightening torque:

Front	425 Nm
Rear	460 Nm

 **NOTE**

Tighten the wheel fastenings after no more than 100 operating hours.

Tightening the wheel fastenings

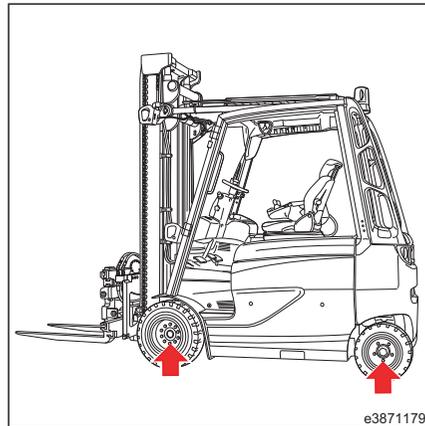
The wheel fastenings must be tightened before initial commissioning and whenever wheels are changed or repairs are made.

Afterwards, tightening must take place after 100 operating hours at the latest.

The wheel fastenings must be tightened crosswise.

Tightening torque:

Front	425 Nm
Rear	460 Nm



Checking the wheels for damage, foreign objects and wear

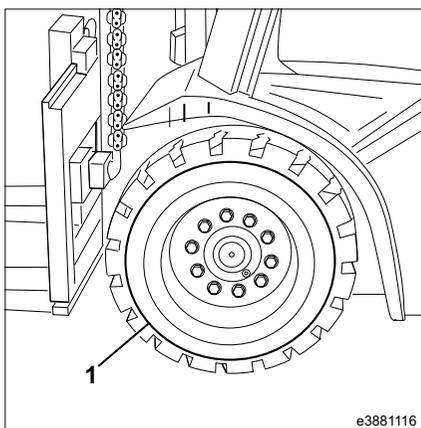
- Secure the truck to prevent it from rolling away.
- Place a wheel chock under a wheel that will not be lifted.
- Lift the truck using a hydraulic jack until the wheels are off the ground.
- Place a hardwood block underneath the truck.
- Check for free movement of the wheels and remove anything hindering their movement.

The upper edge of the 60 Joule indicator (1) is the maximum limit for wear and regrooving. The decision about whether to regroove the tyres should be based on the application conditions.

A minimum tread depth is not required with solid rubber tyres.

It must be ensured that the degree of wear on the tyres on one axle is the same.

- Change worn or damaged tyres.



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Chassis frame

Checking the condition of the antistatic belt

DANGER

Risk of fire and explosion possible with electrostatic discharging.

Safety warning: Tyres are not electrically conductive.

The truck must always be earthed using an antistatic belt.

The antistatic belt must be in permanent contact with the ground.

NOTE

Under certain circumstances, the truck may become electrostatically charged.

- *The charging level depends on a number of factors such as type of tyre, air humidity, floor covering etc.*
- *Excessive electrostatic charge is noticeable when the electrostatic charge is discharged to the ground via the body of a person who touches the truck (electric shock) or when*

a spark passes from the truck to an earthed part (e.g. a metal shelf)

- *With standard types of tyre (black pneumatic or solid rubber tyres), the high graphite content means that electrostatic charging is relatively rare.*
- *However, if non-marking tyres (light-coloured tyres) are used and the truck is driven in an area with a sealed floor, this electrostatic charge effect will frequently occur*
- *Non-scrubbing tyres are identified by the safety information on the tyre wall.*

For this scenario, an antistatic belt made from non-conducting plastic is fitted to the underside of the truck and is connected to the truck chassis.

- **Check that the antistatic belt is securely seated on the frame floor and check for wear.**
- **Change the antistatic belt if it is damaged.**

Lubricating the steering axle

To lubricate the steering axle, the axle stubs and the track rods each have two lubricating nipples (see arrows).



ENVIRONMENT NOTE

Observe information regarding the use of consumables.



NOTE

It is better to apply a little grease to the bearing points frequently than to apply a lot of grease infrequently.

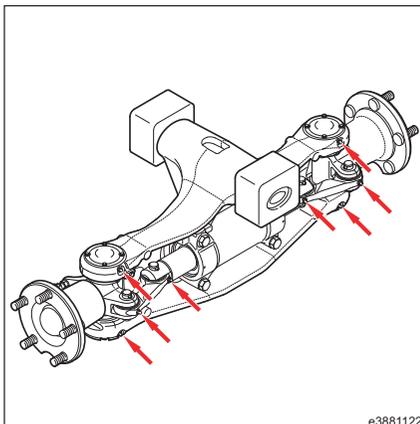
If used in areas with constant exposure to dust, dirt, water and, if applicable, road salt or chemicals, weekly lubrication will considerably lengthen the service life of the spherical bearings.



NOTE

For lubrication, use lubricating grease in accordance with the recommendation for consumables.

- Use a grease gun to lubricate the bearings of the axle stubs and the track rods at the lubricating nipples until fresh lubricating grease emerges at the bearing points.



5 Service work

Operating devices

Operating devices

Checking the brake system for correct function

⚠ DANGER

Risk of accident or death if the brake system is faulty.

Your industrial truck must not be used under any circumstances if the brake system is faulty.

If you notice any defects on the brake system, please contact your service partner immediately.

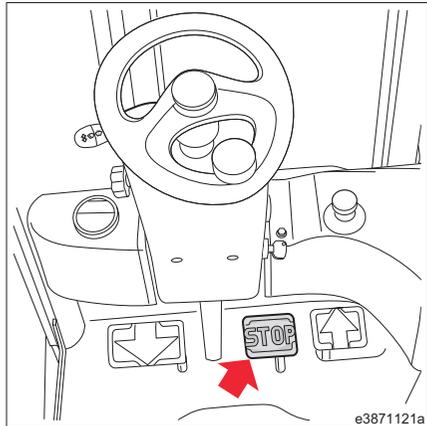
Using the stop pedal to check the hydraulic operating brake for correct function

- While driving, take your foot off the accelerator pedal and actuate the stop pedal.

The truck must immediately brake to a standstill when the stop pedal is actuated.

i NOTE

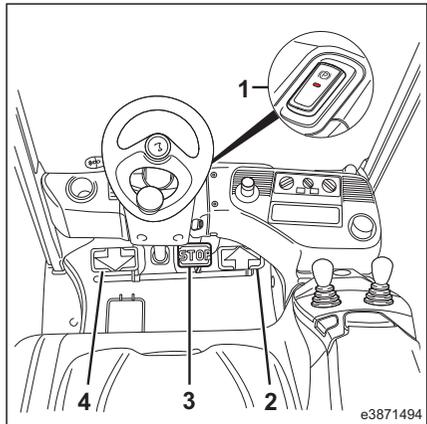
To ensure maximum braking force when the stop pedal is fully actuated, there must be a distance of at least 3 mm between the lower edge of the stop pedal and the rubber mat on the bottom plate. Contact your service partner.



Checking the LBC (Linde Brake Control) for correct function

- Release the accelerator pedal (2) or (4) while the truck is in motion.

The accelerator pedal automatically returns to the zero position and the LBC electronics brake the truck.



Checking the automatic brake for correct function ▷

In the quiescent state, the truck is braked by the automatic brake. As an indication that the truck has been braked by the automatic brake, the "Parking brake activated" symbol (see arrow) flashes in the display unit.

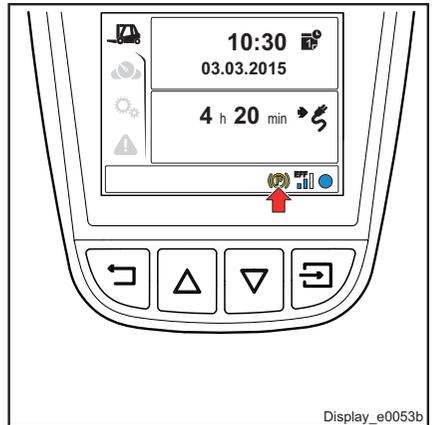
- Actuate the accelerator pedal (2).

The brake is released and the "Parking brake activated" symbol in the display unit goes out.

- Trucks carrying the maximum permissible lift load must not be driven on gradients above 10%.
- Remove your foot from the accelerator pedal (2).

If the truck is braked to a standstill, the automatic brake is activated.

The "Parking brake activated" symbol (see arrow) flashes in the display unit.



Checking the manual parking brake for correct function ▷

- Actuate the switch (1).

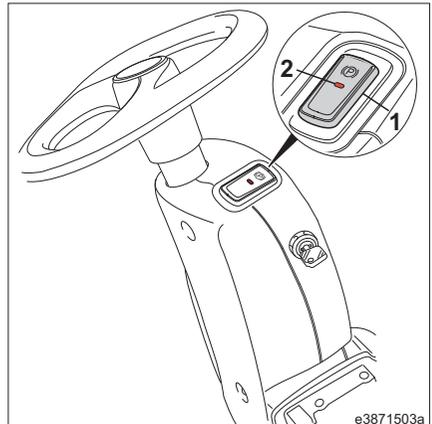
The red LED (2) in the switch (1) lights up.

The "Parking brake activated" symbol (see arrow) lights up continuously in the display unit.

The manual parking brake is activated and the driving functions are blocked.

- Deactivate the manual parking brake by actuating the switch (1).

The red LED (2) in the switch (1) goes out.

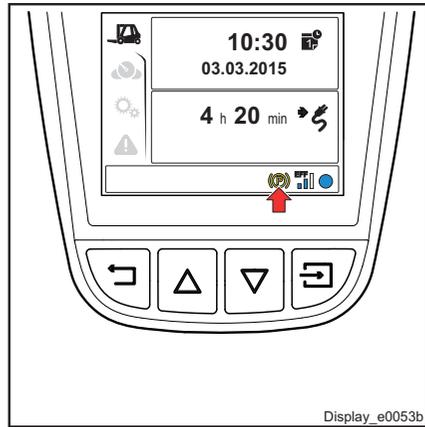


5 Service work

Operating devices

The "Parking brake activated" symbol (see arrow) flashes in the display unit (automatic brake active).

The manual parking brake is deactivated and the truck is ready for travel.



Checking and lubricating the pedal group and linkage

- Remove the rubber mat from the bottom plate.
- Remove the bottom plate.
- Check bolt and joint fastenings for secure positioning.
- If necessary, lightly grease the bearings.

Electrical enclosure

Checking the condition of the electric cables and connections

- Switch off the truck.
- Open the battery hood.
- Disconnect the battery male connector and the battery female connector.
- Remove the bottom plate.
- Check the electric cables and connection assemblies for damage, that they are

securely attached and check for oxidation residues.

 **NOTE**

Oxidised connections and brittle wires result in voltage drops and can cause malfunctions. Damaged wires must be replaced immediately. Contact your service partner.

Checking the condition of the drive battery



 **DANGER**

Risk of chemical burns due to electrolyte (diluted sulphuric acid) in the battery.

For this reason, always wear personal protective equipment (protective apron, protective gloves) and eye protection when working with battery acid. If clothing, skin or eyes come into contact with battery acid, the affected areas must be rinsed with water immediately. In the event of contact with the eyes, consult a doctor immediately! Any spilt battery acid must be neutralised immediately! It is essential that the regulations regarding hazardous materials and accident prevention are complied with.

Checking the condition

- Open the battery hood fully and secure to prevent it from being accidentally closed.
- Disconnect the battery male connector and the battery female connector.
- Check the cell connectors for damage and that they are securely attached.
- Check the water refill plugs for damage and that they are seated correctly.
- Check the hoses for electrolyte circulation for secure attachment and damage.
- Remove any oxidation residues on the battery terminals and then apply acid-free grease.
- Open the battery door.
- Check the battery tray for damage and acid leaks.

When handling drive batteries, the following instructions must be observed:

- Wear protection goggles and a protection suit
- Before touching the battery, first touch conductive parts of the chassis to discharge any static charge
- Avoid any spark formation

5 Service work

Electrical enclosure

Checking the cables and the plugs on the drive battery

- Open the battery hood fully and secure to prevent it from being accidentally closed.
- Disconnect the battery male connector and the battery female connector.
- Check the housing and the contacts of the battery male connector and the battery female connector for damage and check that these components are in good working order.
- Check the battery cables for damage and that the battery cables are securely attached.
- Replace any damaged parts.

Checking the heat sinks on the power modules for contamination and cleaning the heat sinks

⚠ DANGER

When working in the area of the lift mast, there is a risk of becoming trapped and/or the lift mast accidentally lowering.

If the lift mast or fork carriage is raised, no work may be performed at the front of the truck unless safety measures are put in place.

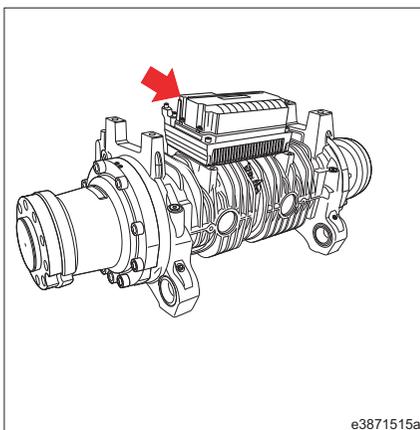
⚠ ENVIRONMENT NOTE

Observe information regarding working with consumables.

Cleaning the heat sink on the power module for the traction motors

The power module (see arrow) for the traction motors is mounted on the drive axle.

- Extend the lift mast.
- Activate the manual parking brake.

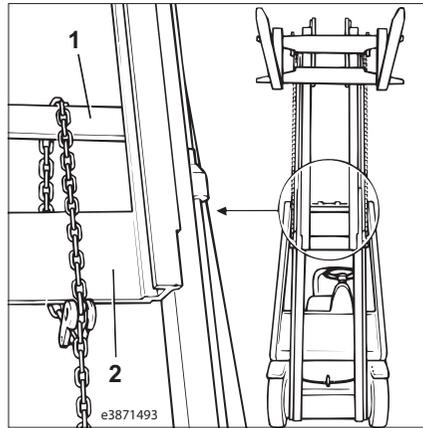


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5 Service work

Electrical enclosure

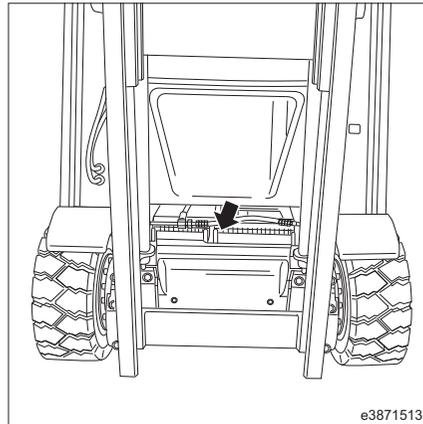
- Connect the chain over the cross beam of the outer mast (1) and under the cross beam of the inner mast (2).
- Lower the inner mast to the chain stop.
- Switch off the truck.
- Push the emergency off switch.
- Fold up the rubber mat at the front of the truck and remove the cover from the power module.



- Check the heat sink (see arrow) on the power module for the traction motors for contamination.
- If necessary, clean the heat sink with compressed air and/or cold cleaning solvent.

 **NOTE**

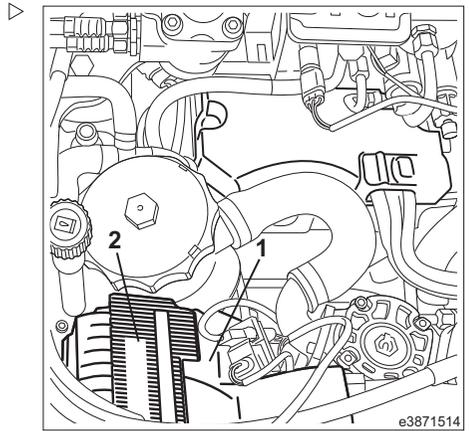
If the contamination is very heavy, additional covers must be removed in the control compartment. Contact your service partner.



Cleaning the heat sink on the power module for the pump motor

The power module (2) for the pump motor is located in the control compartment on the left-hand side of the truck.

- Remove the bottom plate.
- Remove the cover (1) and the air duct, including the fan.
- Check the heat sink on the power module (2) for the pump motor for contamination.
- If necessary, clean the heat sink with compressed air and/or cold cleaning solvent.



5 Service work

Electrical enclosure

Cleaning the fans

Description

Depending on the equipment fitted, there are several fans located in the truck:

- Two fans on the drive axle for cooling the power module for the traction motors and the drive axle
- A fan for cooling the power module for the pump motor
- A fan on the front right-hand side of the truck to dissipate hot air from the control compartment
- A fan on the oil cooler to cool the hydraulic oil
- A fan for "active ventilation"; only in trucks with special equipment in the form of an "integrated charger" or "charging the battery at the rear"

The best medium for cleaning the fans is oil-free compressed air and/or cold cleaning solvent.

Particular care must be taken to clean the spaces between the fan blades to ensure efficient cooling of the components.



NOTE

If contamination is too severe, the fans in the control compartment must be removed or replaced. Contact your service partner.



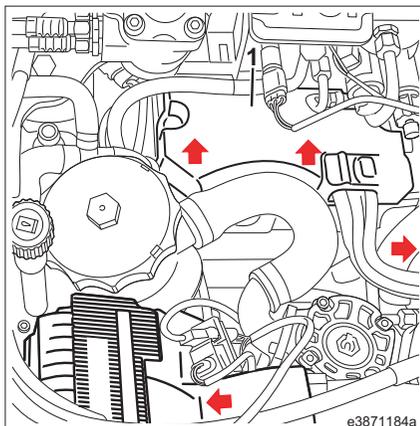
ENVIRONMENT NOTE

Observe information regarding the use of consumables.

Cleaning the fans for the traction-motors power module ▷

The fans for cooling the power module for the traction motors and the drive axle are located under the cover (1) at the front of the control compartment.

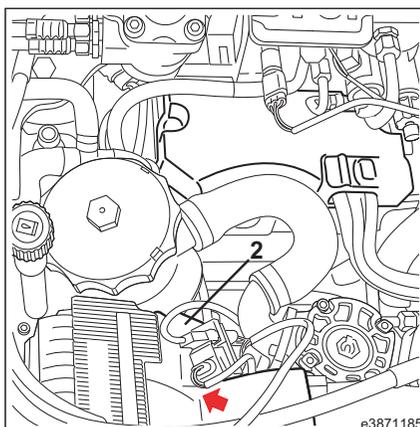
- Switch off the truck.
- Remove the rubber mat from the bottom plate.
- Unscrew the mounting screws from the bottom plate.
- Pull the plug out of the accelerator and put the bottom plate to one side.
- Remove cover (1).
- Clean the fans (see arrows for positions) with compressed air and/or cold cleaning solvent.



Cleaning the fan for the pump-motor power module ▷

The fan for cooling the power module for the pump motor is located under the cover (2) at the rear left-hand side of the control compartment.

- Remove cover (2).
- Clean the fan (see arrow for position) with compressed air and/or cold cleaning solvent.

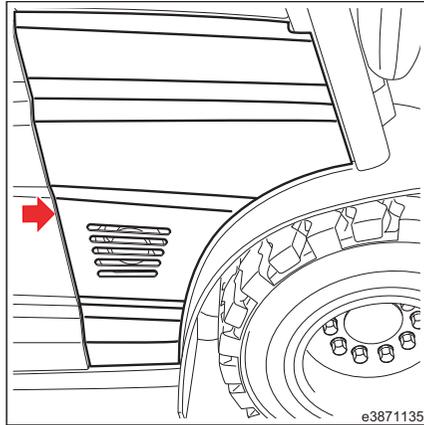


5 Service work

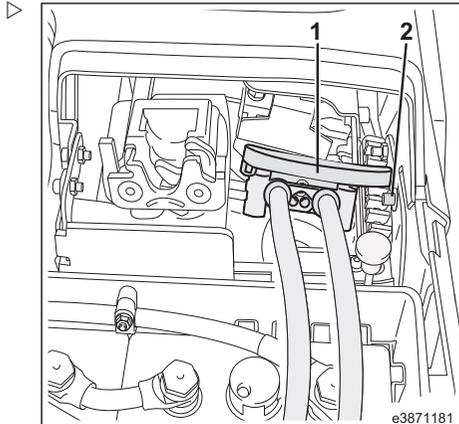
Electrical enclosure

Cleaning the fan for the control compartment ▷

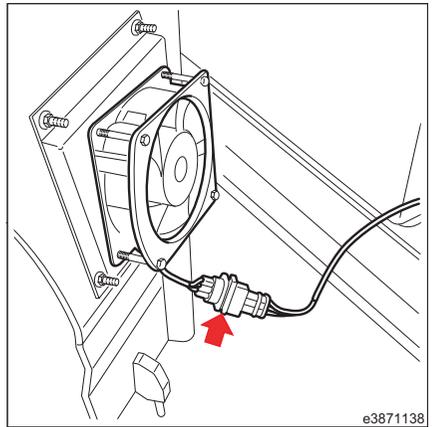
The fan for the control compartment is mounted on the front right-hand side panelling (see arrow).



- ▷ Unlock and fully open the battery hood.
- ▷ Disconnect the battery female connector (1) and the battery male connector.
- ▷ Loosen and unscrew the mounting screw (2) for the side panelling.
- ▷ Lift and remove the side panelling including the fan; when doing so, pay attention to the cable connection to the fan.

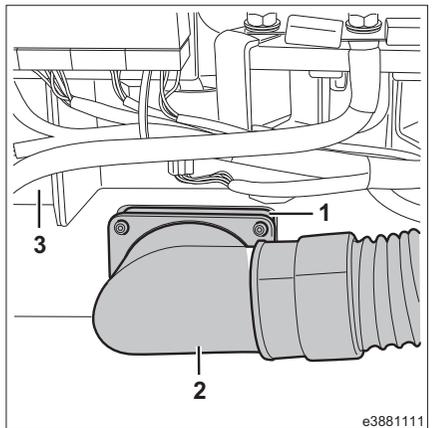


- Place the side panelling to one side and disconnect the plug connection (see arrow) to the fan.
- Clean the fan with compressed air and/or cold cleaning solvent.



Cleaning the fan on the oil cooler

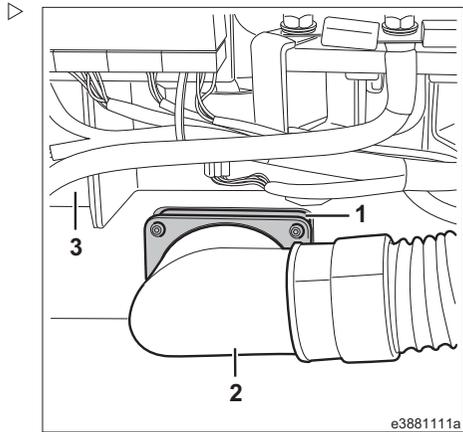
The fan (1) on the oil cooler (and the associated air duct (2)) is located beneath the contactor carrier (3) behind the front right-hand side panelling.



5 Service work

Electrical enclosure

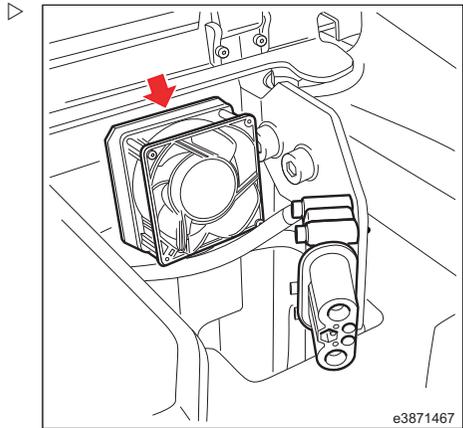
- Clean the fan, air hose and orifice (see arrows) with compressed air and/or cold cleaning solvent.



Cleaning the fan for "active ventilation"

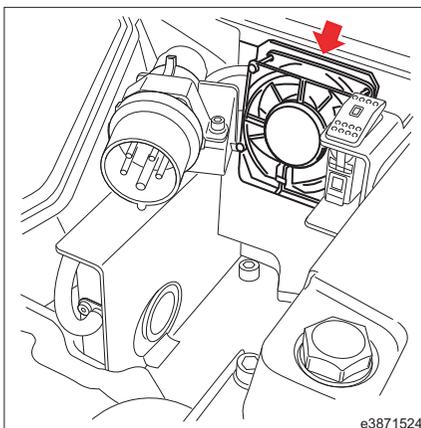
On trucks with the special equipment in the form of "charging the battery at the rear" or an "integrated charger", an additional fan for extracting the charge gases is located under the rear cover.

Fan for "active ventilation" (see arrow): charging the battery at the rear.



Fan for "active ventilation" (see arrow):
integrated charger.

- Open the rear cover.
- Clean the fan with compressed air and/or cold cleaning solvent.



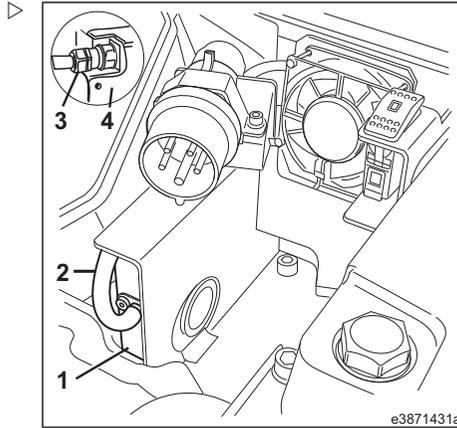
5 Service work

Electrical enclosure

Electrolyte circulation pump (special equipment) - Checking the filter

The electrolyte circulation pump is fitted in conjunction with the integrated charger (special equipment); both are fitted behind the rear cover on the counterweight.

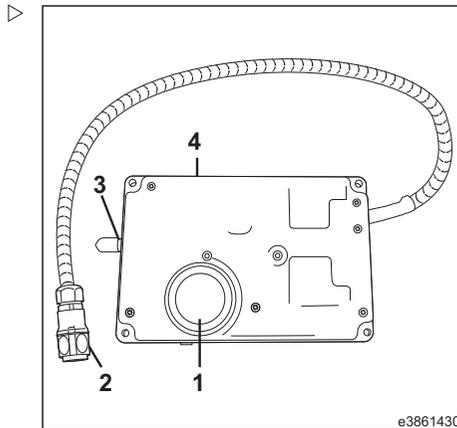
- 1 Pump
- 2 Hose
- 3 7-pin plug
- 4 Integrated charger



An integrated suction filter (1) is fitted at the bottom of the circulating pump (4).

- Check the suction filter for contamination and replace if necessary.
- Check the hose at the connection (3) for damage and replace if applicable.

- 1 Suction filter
- 2 7-pin plug
- 3 Hose connection
- 4 Pump



Hydraulics

Hydraulic system: Checking the oil level

ENVIRONMENT NOTE

Observe information regarding working with consumables

NOTE

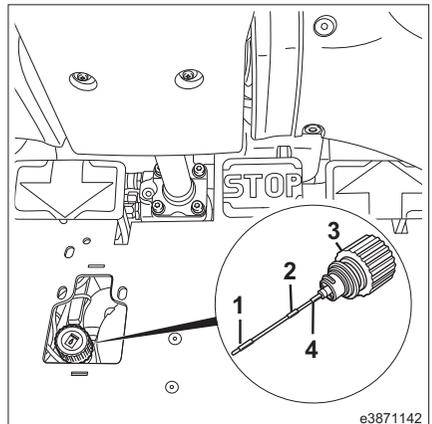
Oil specifications: Refer to the recommendations for consumables.

- Fully lower the fork carriage.
- Switch off the truck.
- Pull up the cut-out in the rubber mat on the bottom plate.

The oil dipstick (4) is located on the breather filter (3). ▷

- Through the opening in the bottom plate, loosen the breather filter (3) by turning it half a turn to the left and pull out the oil dipstick (4).
- Wipe the oil dipstick (4) with a clean cloth, reinsert the oil dipstick and lock the breather filter (3) in place by turning it half a turn to the right.
- Loosen the breather filter (3) again and pull out the oil dipstick.
- Check the oil level on the oil dipstick (4).

Markings (1, 2) for the different lift heights:



Mark	Filling quantity	Lift height
1	Approx. 22 l	Lift height up to 5165 mm
2	Approx. 31 l	Lift height of 5175 mm or higher

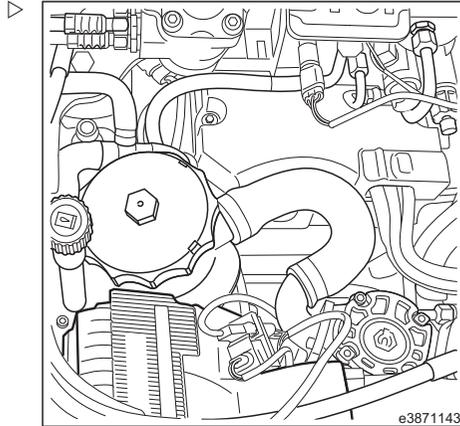
- Top up the hydraulic oil to the appropriate oil level marking (1) or (2) as required.
- Reinsert the breather filter (3) and turn it half a turn to the right to lock it in place.
- Close the cut-out in the rubber mat.

5 Service work

Hydraulics

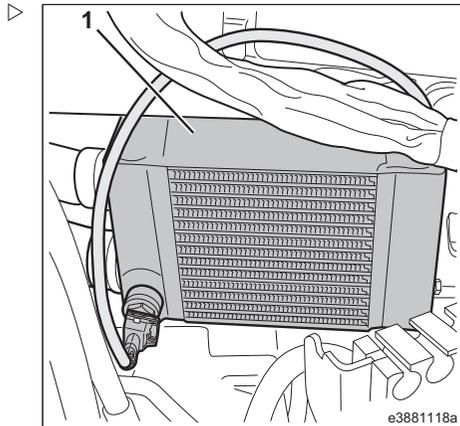
Hydraulic system: Checking for leak tightness

- Switch off the truck.
- Remove the bottom plate.
- Check the hydraulic pump, valves, hoses and lines in the control compartment for leaks.
- Check the connections for leaks. Tighten the connections as necessary.



The radiator (1) for the hydraulic oil is located in the control compartment, on the right-hand side of the truck above the control block.

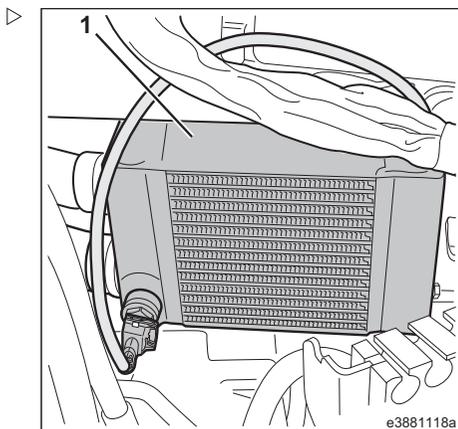
- Check the radiator for hydraulic oil for leak tightness.
- Check the lift cylinders, tilt cylinders and steering cylinder for leaks.
- Replace leaking, worn or porous parts.



Cleaning the radiator

To cool the hydraulic oil, an oil cooler (1) is installed above the control block in the control compartment on the right-hand side of the truck.

- Remove the rubber mat from the bottom plate.
- Unscrew the mounting screws from the bottom plate.
- Disconnect the plug connector from the accelerator.
- Remove the bottom plate and place the bottom plate to one side.
- Clean the radiator with compressed air and/or cold cleaning solvent for heat sinks.



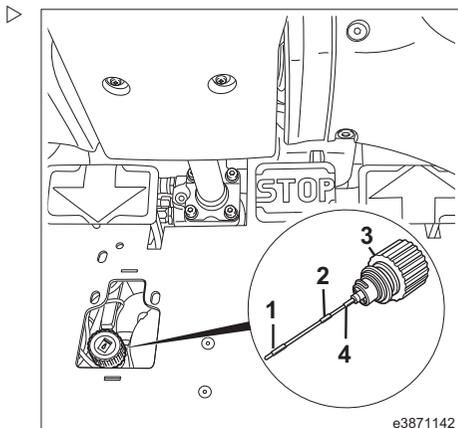
Checking that the bleeder valve on the breather filter is functioning correctly

The breather filter (3) is equipped with a bleeder valve that permits a slight over pressure in the tank.

- Switch on the truck.
- Extend the lift mast to the stop and lower it again; repeat this step several times.
- Switch off the truck.
- Release the breather filter (3) by slowly rotating it a half-turn anticlockwise.

It must be possible to hear air escaping from the tank.

- If air cannot be heard escaping, the breather filter (3) must be replaced.



ENVIRONMENT NOTE

Dispose of the old breather filter in an environmentally friendly manner.

5 Service work

Hydraulics

Hose lines:

Checking the pre-load

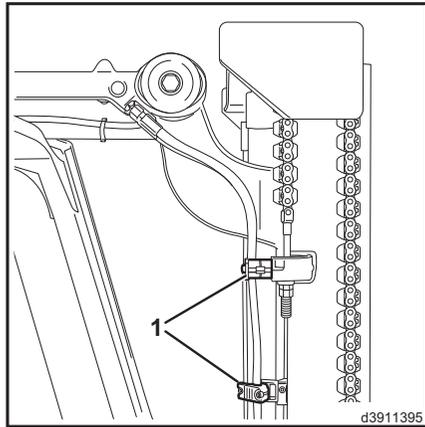


NOTE

For vehicles with the standard lift mast and auxiliary hydraulics attached, the pre-tension of the double hoses must be checked.

The pre-tension of the double hoses should be 5-10 mm per metre, according to the initial length.

- Adjust the pre-load by sliding the hoses in the retaining clips (1) to the specified point.



Load lift system

Working on the lift mast and at the front of the truck

⚠ DANGER

When working in the area of the lift mast, there is a risk of becoming trapped and/or the lift mast accidentally lowering.

If the lift mast or fork carriage is raised, no work may be performed on the lift mast or at the front of the forklift truck without observing the following safety measures!

These safety precautions are sufficient only for general maintenance work on the truck (testing and lubrication work).

For repair work (e.g. changing chains, dismantling lift cylinders), additional safety precautions must be taken.

Securing the lift mast against tilting backwards

The lift mast must be secured against accidentally tilting backwards.

- Tilt the lift mast all the way back.
- Actuate the manual parking brake.
- Switch off the truck.
- Push the emergency off switch.

The truck must be switched off completely.

- Remove the switch key from the key switch.

Standard lift mast

FUNCTION: When lifting the inner mast, the chain rollers are moved up with the chains. The fork carriage is therefore lifted with a transmission ratio of 2:1 as a result of the chain deflection.

5 Service work

Load lift system

Securing a raised standard lift mast

DANGER

Check the chain load!

Select a safety chain with sufficient load-bearing capacity for the lift mast in question. Observe the maximum lift height.

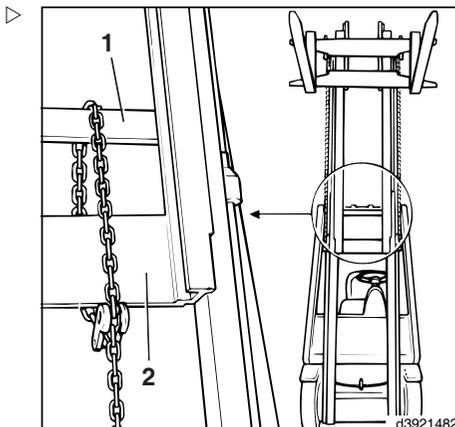
- Extend the lift mast.
- Connect the chain over the cross beam of the outer mast (1) and under the cross beam of the inner mast (2).
- Watch out for the hose lines on the cross beam of the outer mast.
- Lower the inner mast to the chain stop.

Duplex lift mast

NOTE

The benefit of this design is that full advantage is taken of the special free lift height even in very low rooms (cellars, wagons, ships).

FUNCTION: The fork carriage is raised to the special free lift height by the chain guide pulley of the centre cylinder. Here, it moves twice as fast as the centre cylinder. The inner mast is then lifted by the two outer cylinders, taking the fork carriage with it. The centre cylinder is positioned on the extendable inner mast.



Securing the raised duplex lift mast

DANGER

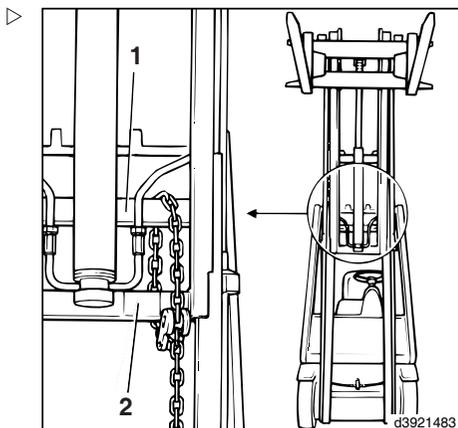
Check the chain load!

Select a safety chain with sufficient load-bearing capacity for the lift mast in question. Observe the maximum lift height.

- Extend the lift mast.
- Connect the chain over the cross beam of the outer mast (1) and under the cross beam of the inner mast (2).
- Watch out for the hose lines on the cross beam of the outer mast.
- Lower the lift mast to the chain stop.
- Lower the fork carriage to the stop.

Triplex lift mast

FUNCTION: The fork carriage is raised to the special free lift height by the chain guide pulley of the centre cylinder. Two lift cylinders then raise the inner mast. Once the inner mast is fully extended, two additional lift cylinders lift the middle mast, which is lifted together with the inner mast and the fork carriage. The centre cylinder is positioned on the extendable inner mast.



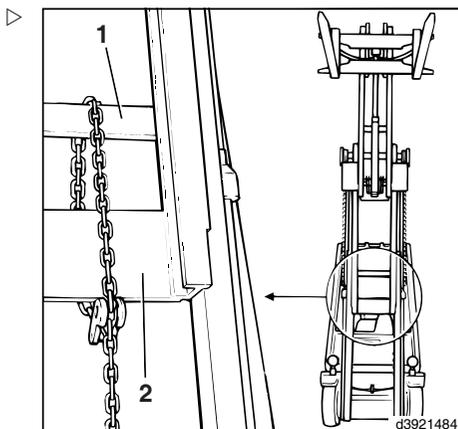
Securing the raised triplex lift mast

⚠ DANGER

Check the chain load!

Select a safety chain with sufficient load-bearing capacity for the lift mast in question. Observe the maximum lift height.

- Extend the lift mast.
- Connect the chain over the cross beam of the outer mast (1) and under the cross beam of the middle mast (2).
- Watch out for the hose lines on the cross beam of the outer mast.
- Lower the lift mast to the chain stop.
- Lower the fork carriage to the stop.



5 Service work

Load lift system

Checking the condition of the lift mast

- Switch off the truck.
- Check the condition of the lift mast, the guide surfaces, the rollers and the chains, and check for damage.
- Check the mounting of the chains on the chain anchor.
- Check the condition of the end stops.
- Check that the locking rings for the mountings of the piston rods at the top of the lift mast are seated correctly.

NOTE

Individual plastic links that are damaged or missing do not impair the function or service life.

NOTE

Change any damaged parts. Contact your service partner.

Cleaning and spraying the lift mast chain

DANGER

Lift mast chains are safety elements. Using the incorrect cleaning materials may damage the chains.

Do not use cleaner solvent, chemical cleaners, or fluids that are corrosive or contain acid or chlorine (see Consumables).

If the lift mast chain is so dusty that penetration of the lubricating oil cannot be guaranteed, the chain must be cleaned.

- Place a collection container under the lift mast.

- Clean the lift mast chain with paraffin derivatives, such as benzine.

Take note of the manufacturer's safety information. When cleaning with a steam jet, do not use additives.

- After cleaning, immediately use compressed air to remove any water remaining on the surface of the chain and in the chain joints.

The chain should be moved several times during this process.

- Immediately apply Linde chain spray to the chain, moving the chain while doing so.

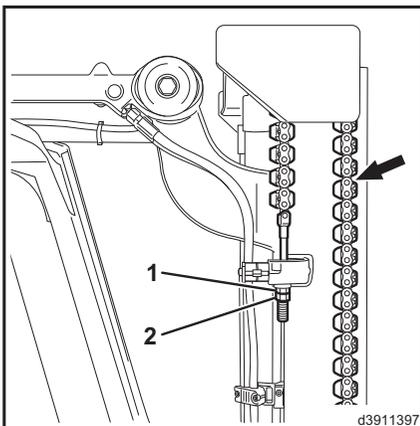
Lift mast — adjusting the chain

Securing the standard lift mast

i NOTE

The lift mast chain stretches during operation and therefore has to be readjusted on the right and left sides.

- Fully lower the lift mast
- Release counter nut (2).
- Adjust chain at adjusting nut (1) of chain anchor.



The lower guide roller of the fork carriage must not protrude beyond the guide rail of the inner lift mast by more than the specific **dimension X**.

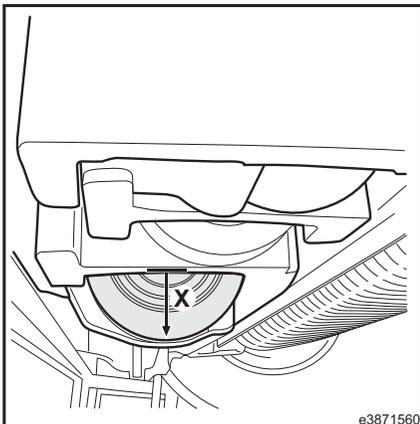
Lift mast model	Dimension X
1514 standard	27 mm
1515 standard	30 mm
1522 standard	11 mm
1523 standard	25 mm

- Tighten counter nut (2) securely.
- Also adjust second chain.

⚠ CAUTION

When extending the lift mast, it must not touch the end stops.

Fully extend the lift mast and check clearance to end stops.



5 Service work

Load lift system

Apply chain spray.

NOTE

In the case of industrial trucks that are used in the food production industry, chain spray must not be used. Instead, use a low-viscosity oil approved for use in the food industry.

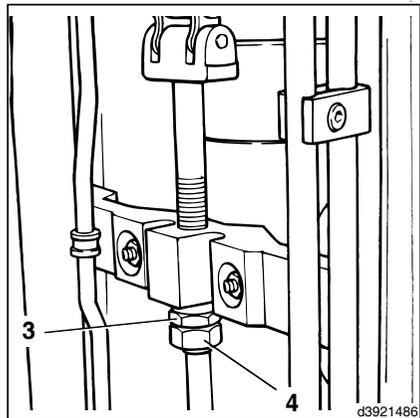
- Apply Linde chain spray to guide surfaces and chain.

Duplex lift mast or triplex lift mast

NOTE

The lift mast chain stretches during operation and therefore has to be readjusted.

- Lower the lift mast and fork carriage completely.
- Loosen the lock nut (4).
- Adjust the chain using the adjustment nut (3) of the chain anchor.



The lower guide roller of the fork carriage must not protrude beyond the guide rail of the inner lift mast by more than the specific **dimension X**.

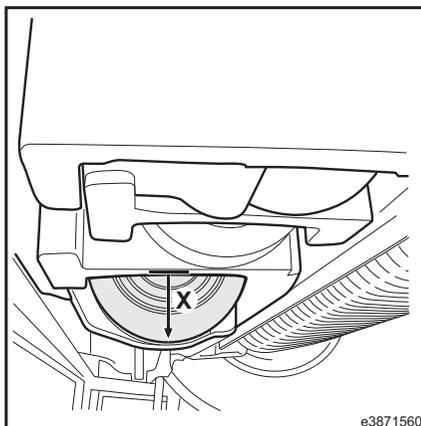
Lift mast model	Dimension X
1514 duplex/triplex	27 mm
1515 duplex/triplex	30 mm
1512 duplex/triplex	31 mm
1523 duplex/triplex	35 mm

➤ Tighten counter nut (4) securely.

⚠ CAUTION

When extending the lift mast, it must not touch the end stops.

Fully extend the lift mast and check clearance to end stops.



Apply chain spray.

i NOTE

In the case of industrial trucks that are used in the food production industry, chain spray must not be used. Instead, use a low-viscosity oil approved for use in the food industry.

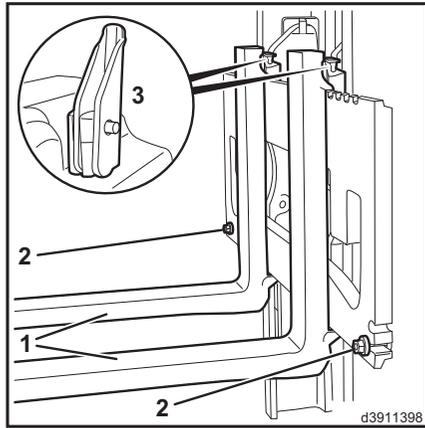
➤ Apply Linde chain spray to guide surfaces and chain.

5 Service work

Load lift system

Checking the fork arms and arm safety devices

- Check the fork arms (1) for visible deformation, wear and damage.
- Check that the screws (2) on the arm safety device and fork arm latch (3) are properly positioned and show no signs of damage.
- Replace faulty parts.



Checking and lubricating the sideshift (special equipment)

ENVIRONMENT NOTE

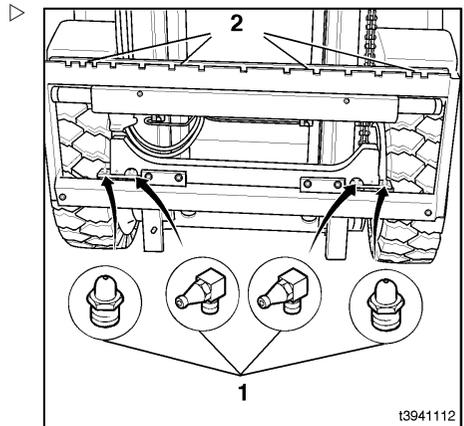
Observe information regarding the use of consumables.

- Check the hydraulic lines for abrasion spots and replace them if necessary.
- Check the hydraulic connections and mounting elements for secure attachment and wear. Tighten or replace them as necessary.
- Check the cylinder for damage and leak tightness.

NOTE

Grease the sideshift after cleaning each time it is cleaned. Use lubricating grease as set out in the recommendation for consumables. It is better to apply a little grease to the bearing points frequently than a lot of grease infrequently.

- Move the fork arms so that access can be gained to the 4 lubricating nipples (1).
- Lower the sideshift until the fork arms touch the ground.
- Apply lubricating grease to the lubricating nipples (1) for the support rollers on the fork carriage, until grease escapes at the side.
- Apply lubricating grease to the lubricating nipples (2) for the wear strips on the fork carriage at the top until grease escapes at the side.



5 Service work

Load lift system

Checking and lubricating the fork prong positioner (special equipment)

ENVIRONMENT NOTE

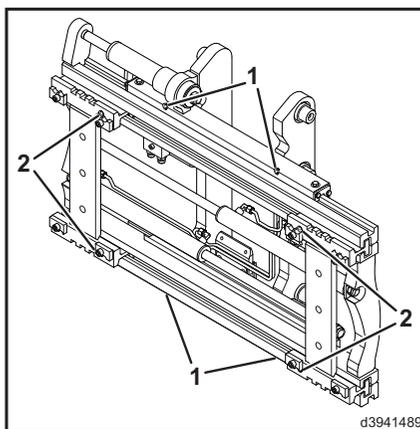
Observe information regarding the use of consumables.

- Check the hydraulic lines for abrasion spots and replace the lines if necessary.
- Check the hydraulic connections and mounting elements for secure attachment and wear. Tighten or replace them as necessary.
- Check the cylinder for damage and leak tightness.

NOTE

Grease the fork prong positioner after each cleaning procedure. Use lubricating grease as set out in the recommendation for consumables. It is better to apply a little grease to the sliding blocks frequently than to apply a lot of grease infrequently.

- Move the fork arms so that the lubricating nipples (1) can be accessed. 
- Lower the fork prong positioner until the fork arms touch the ground.
- Apply lubricating grease to the lubricating nipples (1) for the wear strips on the fork carriage at the top and bottom until grease escapes at the side.
- Apply lubricating grease to the lubricating nipples (2) for the wear strips on the guides at the top and bottom until grease escapes at the side.



Self-help

Diagnostic connector

The diagnostic connector (2) is located behind the driver's seat beneath the rear window.

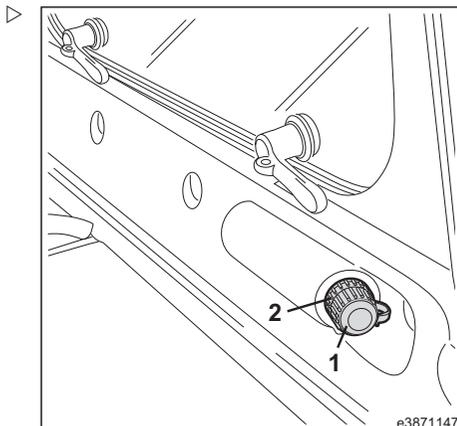
- Unscrew lid (1) in an anti-clockwise direction.
- Connect the laptop.

The diagnostic connector (2) can be used to input and read out truck data with a laptop and the diagnostic program, as well as to reset maintenance intervals.

NOTE

After completing the diagnostics, the lid (1) must be screwed back onto the diagnostic connector (2) to prevent moisture from entering.

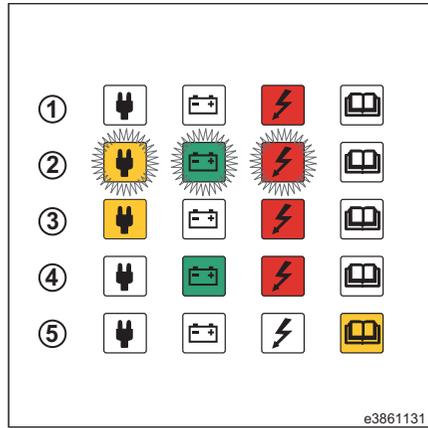
Contact your service partner.



5 Service work

Self-help

Integrated charger - Error messages



During charging			
Condition	Error code	Description	Fault correction
1	C100	The battery voltage is lower than 1.0 V/cell or greater than 3.0 V/cell	- Check the allocation of battery voltage to the battery charger
			- When the battery voltage is between 1.0 V/cell and 1.6 V/cell, start the deep discharge
			- Battery faulty Contact your service partner
	C101	Battery was disconnected during the charging process without first unplugging the mains plug.	- Before disconnecting the battery, first unplug the mains plug
			- Check the charging connector contacts
	C103	Pressure drop in the air system for electrolyte circulation System shut-off (depending on characteristic curve)	Contact your service partner
	C104	The maximum permissible charging time or the charging factor has been exceeded The safety shutdown has been activated	- Battery capacity too large for the battery charger
			- Battery faulty
	C108	Overtemperature at the battery charger power module	- Disconnect the battery charger from the mains and allow the charger to cool down
			- Clean the cooling fins and cooling air vents
- Fan faulty Contact your service partner			
C109	The system voltage is too low or has failed: < 207 VAC or < 360 VAC	- Check the mains fuse or replace the mains cable Contact your service partner	
C150	The power module of the battery charger has failed	Replace the battery charger Contact your service partner	
C153	Wrong battery charger installed in the truck	Replace the battery charger Contact your service partner	
C154	The charging process has been stopped: The fan speed (active ventilation) is less than 70% or has completely failed The red light (lightning bolt symbol) in the display unit is illuminated	- Check the fan Contact your service partner	
2	C110	Battery temperature too high (higher than 55°C)	Allow the battery to cool down; the charging process will resume automatically when the temperature falls below 45°C.

Self-help

During charging			
Condition	Error code	Description	Fault correction
3	C102	Pressure drop in the air system (electrolyte circulation); switch to charging program without electrolyte circulation	- Check the hose system for leaks
			- Check that the pump is functioning correctly
	C105	Forced switching to recharging; no shut-off	
	C106	Safety characteristic curve active	Set correct charging characteristic curve Contact your service partner
	C107	Overloading of the power module for the battery charger	- Disconnect the battery charger from the mains and allow the charger to cool down
			- Clean the cooling fins and cooling air vents
			- Fan faulty Contact your service partner
4	C102	Charging process complete (with switched charging program after pressure drop in the electrolyte circulation system)	- Check the hose system for leaks
			- Check that the pump is functioning correctly Contact your service partner
C106	Charging process complete (with activated safety characteristic curve)	Set correct charging characteristic curve Contact your service partner	
	C112	Manual charging start performed.	

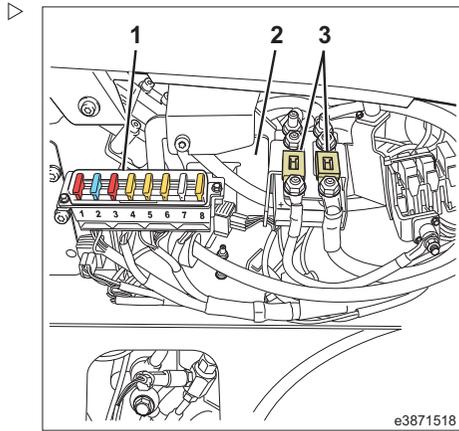
During discharging			
Condi- tion	Error code	Description	Fault correction
5	C150	The power module of the battery charger has failed	- Battery charger faulty Contact your service partner
	C152	Fault on the CAN bus.	Contact your service partner
	C153	Wrong battery charger in- stalled in the truck	- Replace the battery charger Contact your service partner
	C154	Fault with charging ventilation; fan not running, fan feedback faulty	- Check the fan Contact your service partner
	5T553 D170	System voltage from the battery charger is present The truck is switched on	- Disconnect the mains plug before switching on the truck

5 Service work

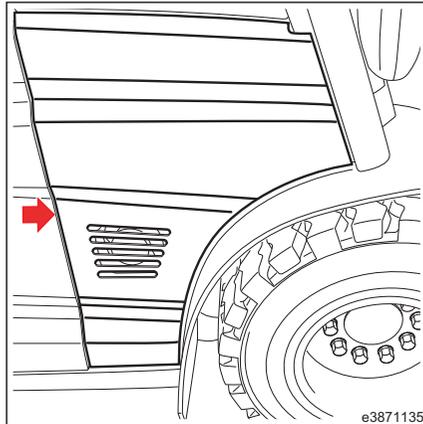
Self-help

Fuses - Basic equipment

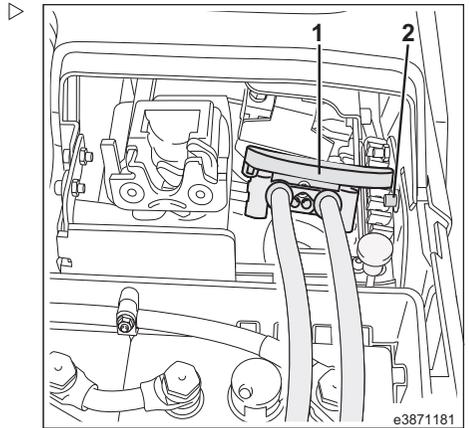
The main current fuses (3) and the fuse holder (1) with the plug-in fuses for the basic equipment are located on the contactor board (2) under the right-hand truck console.



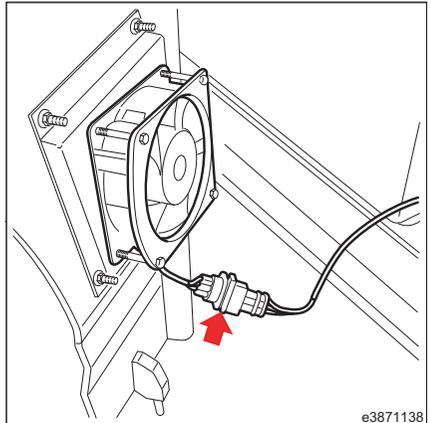
To access the fuses, the front right-hand side panelling (see arrow) must be removed.



- Unlock and fully open the battery hood.
- Disconnect the battery female connector (1) and the battery male connector.
- Loosen and unscrew the mounting screw (2) for the side panelling.



- Lift and remove the side panelling including the fan; when doing so, pay attention to the cable connection (see arrow) to the fan and disconnect if necessary.
- Place the side panelling to one side.



5 Service work

Self-help

Checking the fuses - Replacing as required

CAUTION

Risk of fire if automotive fuses are used.

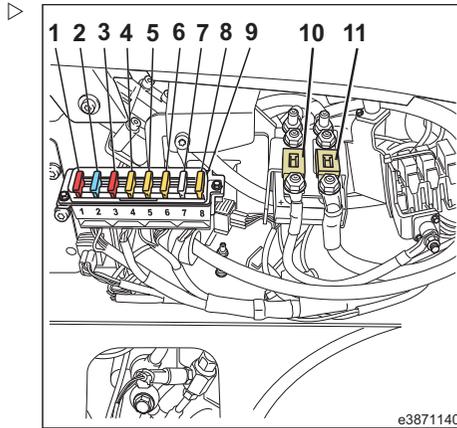
Only use genuine Linde spare fuses with a high voltage rating.

Automotive fuses must not be used under any circumstances.

The control current fuses are equipped with a special quartz sand filling and are designed for a higher voltage range.

Contact your service partner.

- Remove the cover (9) from the fuse holder.
- Replace the defective fuses.



- | | |
|----|--|
| 1 | Fuse 4F1, 10 A, horn |
| 2 | Control current fuse F2, 15 A |
| 3 | Fuse for discharge indicator F3, 10 A |
| 4 | Fuse F4, 5 A, voltage transformer (13 V) |
| 5 | Fuse 9F5, 5 A, fan (9M1-9M7) |
| 6 | Fuse 2F6, 5 A, discharge circuit |
| 7 | Fuse F7, 10 A, discharge circuit |
| 8 | Fuse 1F8, 5 A, discharge circuit |
| 9 | Clear cover for base plate |
| 10 | Fuse 2F1, 355 A, pump motor |
| 11 | Fuse 1F1, 355 A, traction motors |

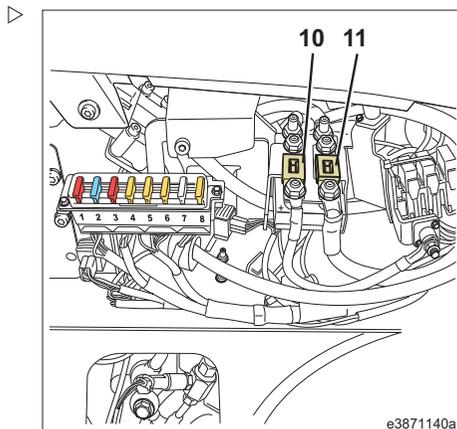
Checking the main current fuses - Replacing as required

The two main current fuses for the traction motors and the pump motor are located on the main contactor.

- Replace the defective fuses.

NOTE

*The fuse elements must be correctly fitted.
The assembly sequence for the individual components must be observed. Contact your service partner.*



- | | |
|----|-------------------------------------|
| 10 | 2F1 fuse for pump motor, 355 A |
| 11 | 1F1 fuse for traction motors, 355 A |

Fuses - Special equipment

The fuses and relays for the special equipment are located in a plastic housing (see arrow). This plastic housing is mounted under the rear cover on the counterweight.

Checking the fuses - Replacing if necessary

CAUTION

Risk of fire if automotive fuses are used.

Only use genuine Linde spare fuses with a higher voltage rating.

Do not use fuses designed for the automotive industry.

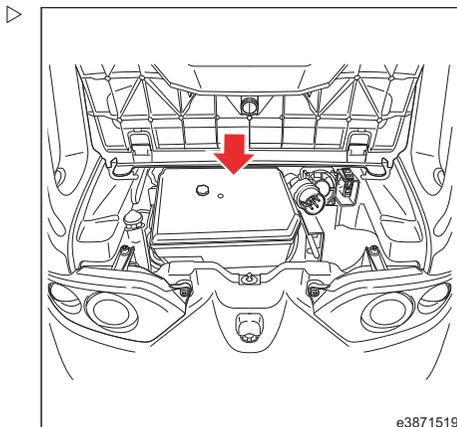
The control current fuses are equipped with a special quartz sand filling. They are designed for a higher voltage range.

Contact your service partner.

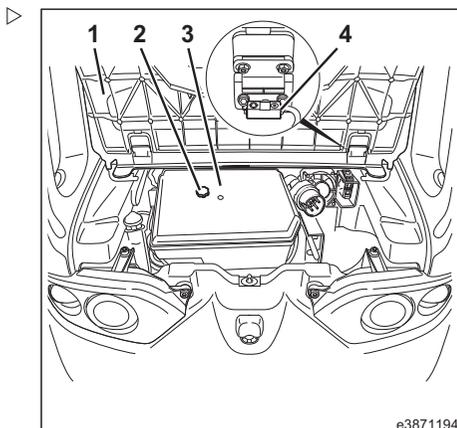
- Switch off the truck.
- Open the battery hood.
- Disconnect the battery male connector from the battery female connector.
- Open the rear cover (1).
- Turn the star handle (2) in an anti-clockwise direction to loosen it and undo it.
- Remove the cover (3) from the plastic housing.
- Check the fuses.
- Change the defective fuses.

NOTE

On trucks with an integrated charger or with "active ventilation", the position of the rear cover is monitored by a sensor (4). If the rear cover is opened, driving functions and lifting functions are deactivated.



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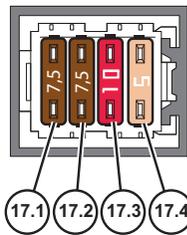
5 Service work

Self-help

Fuses Assignment of the slots



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Slot	Fuse	Value	Function
1.1	5F40	15 A / 32 V	Working spotlight positions 1+2
1.2	5F41	15 A / 32 V	Working spotlight positions 3+4
1.3	5F42	*	Working spotlight positions 5+6 or cross beam
1.4	5F43	*	Working spotlights positions 7+8
2.1	9F80	2 A / 32 V	Windscreen wiper (general)
2.2	9F81	10 A / 32 V	Wash pumps
2.3	9F82	10 A / 32 V	Front windscreen wiper
2.4	9F83	10 A / 32 V	Rear window and roof panel wipers
3.1	9F98	7.5 A / 32 V	Battery carrier
	9F102	5 A / 32 V	Fleet Management Interface 1.0 FMI (CO)
	9F105	10 A / 32 V	Reverse proximity alarm (CO)
3.2	9F99	10 A / 32 V	24-V supply (CO)
	9F108	1 A / 32 V	Additional horn button with handle, B-pillar (CO)
	9F83	30 A / 32 V	Air conditioning (CO)
3.3	9F73	15 A / 32 V	Seat heater
3.4	9F93	15 A / 32 V	12-V socket/Harting socket
8.1	9F94	1 A / 32 V	70-A relay coil for relay (U+ switched)/voltage transformer, position 1/2
8.2	9F106	5 A / 32 V	4 + 5 auxiliary hydraulics via special valve (CO)
	9F74	10 A / 80 V	Front windscreen heating (CO)
	7F1	1 A / 32 V	Oil filter monitoring (CO)
8.3	6F3	10 A / 32 V	12 V U+ terminal connection
	9F101	5 A / 32 V	Camera system (CO)
	4F52	7.5 A / 32 V	Warning lights ON when speed reduction is OFF (CO)
	9F72	10 A / 80 V	Rear window heating (CO)

5 Service work

Self-help

Slot	Fuse	Value	Function
8.4	6F90	5 A / 32 V	12 V U+ switched terminal connection
	5F29	5 A / 32 V	Centre rear sidelight (CO)
	9F75	10 A / 80 V	Roof panel heating (CO)
9.1	5F20	15 A / 32 V	Lighting
9.2	5F21	10 A / 32 V	Hazard warning system
	5F27	5 A / 32 V	Hazard warning system for reverse travel with stop light and without lighting (CO)
9.3	5F26	5 A / 32 V	Brake light lighting
9.4	5F22	7.5 A / 32 V	Left dipped beam
10.1	5F23	7.5 A / 32 V	Right dipped beam
10.2	5F24	5 A / 32 V	Left-hand sidelights
10.3	5F25	5 A / 32 V	Right-hand sidelights
10.4	5F28	2 A / 32 V	Interior lighting/terminal board light
17.1	4F50	7.5 A / 32 V	Rotating beacon / flashing light / BlueSpot via switch lock
17.2	4F51	7.5 A / 32 V	Switchable reversing signal (warning sound/rotating flashing light/BlueSpot)
17.3	9F95	10 A / 32 V	Radio, U+ switched
	9F95	1 A / 32 V	Screen heating, 80 V (CO)
17.4	9F96	5 A / 32 V	Radio, U+
	9F96	5 A / 80 V	Screen heating, 80 V (CO)
18.1	9F91	1 A / 32 V	Relay coil, 70-A relay (U+ switched/voltage transformer, position 3)
18.2	9F107	10 A / 32 V	Valve for four-stage pressure reduction (CO)
18.3	9F72	15 A / 32 V	Rear window heating
18.4	9F71	20 A / 32 V	Heater blower
* 7.5-A / 32-V fuse when there is one working spotlight * 15-A / 32-V fuse when there are two working spotlights			

Eight fuse holders, each with four slots, are provided for the fuses for the special electrical equipment. The slot identification is made up of the fuse holder number and the sequential fuse number, e.g. 17.3. A greater or lesser number of fuse holders can be assigned depending on the truck model.

Fuse colour coding

Fuse	Colour	Fuse	Colour
1 A / 32 V	Black	10 A / 80 V *	Red
2 A / 32 V	Grey	15 A / 32 V	Blue
5 A / 32 V	Light brown	15 A / 80 V *	Blue
5 A / 80 V *	Light brown	20 A / 32 V	Yellow
7.5 A / 32 V	Brown	30 A / 32 V	Green
10 A / 32 V	Red	* Note the voltage!	

5 Service work

Self-help

Additional fuses for special equipment

Up to six fuses are located on the contactor carrier to protect the special equipment:

CAUTION

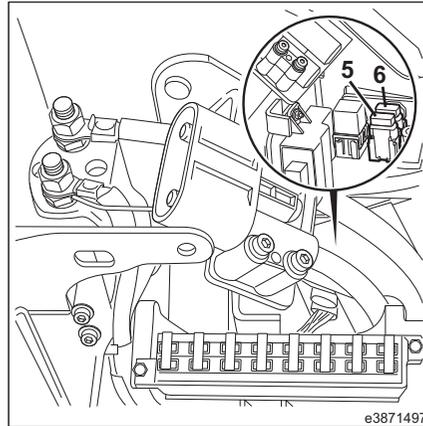
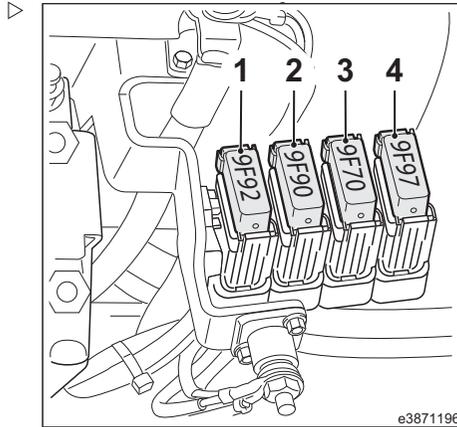
Risk of fire if automotive fuses are used.

Only use genuine Linde spare fuses with a higher voltage rating.

Do not use fuses designed for the automotive industry.

The control current fuses are equipped with a special quartz sand filling. They are designed for a higher voltage range.

Contact your service partner.



Assignment for additional fuses

	Fuse	Value	Function
1	9F92	30 A / 80 V	Voltage transformer, position 1/2
2	9F90	30 A / 80 V	Voltage transformer, position 3
3	9F70	40 A / 80 V	Heating system
4	9F97	50 A / 80 V	Battery carrier
5	9F100	5 A / 80 V	Active ventilation
6	F90	5 A / 80 V	Third auxiliary hydraulics / LSP display / input unit

Malfunction displays

⚠ CAUTION

Malfunction during operation. One of the following indicator lights on the display unit lights up. The buzzer also sounds.

The truck must be switched off immediately and the malfunction must be dealt with.

To scroll through error messages:

- Actuate the function key (12) or the push button (13).

To switch off the buzzer:

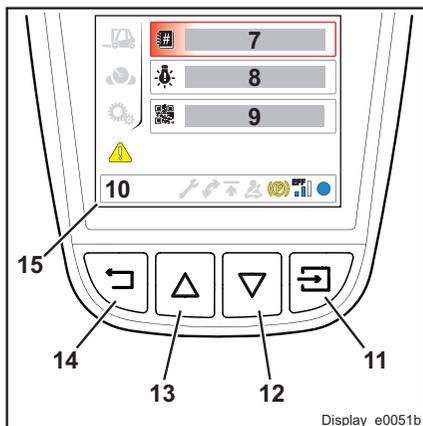
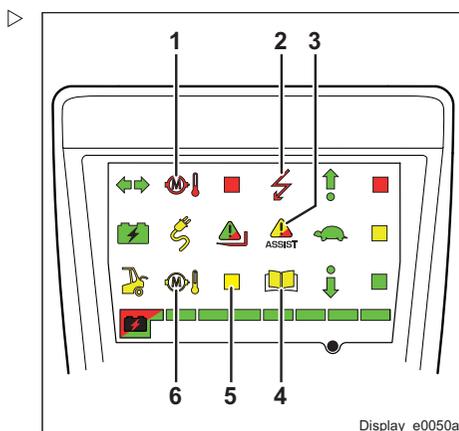
- Press the push button (11).

The display (15) shows either the error codes (7), a description of the fault lamps (8) or a collection of error numbers as a QR code (9).

i NOTE

The symbol for the selected menu item is shown at the bottom left of the display (10).

- Contact your service partner.



(1) Warning light for "Motor temperature at upper limit" (red)	
Possible cause	Remedy
Lights up if traction motors and/or pump motor are too hot.	Allow motors to cool down.

(2) Warning light for "Error in electrical controllers or battery charger operation" (red)	
Possible cause	Remedy
Lights up if an error occurs in the electrical controllers or during operation of the battery charger	Contact your service partner.

Self-help

(3) Warning light for "Error in the lift height switching" (yellow/red)	
Possible cause	Remedy
Lights up if an error occurs in the lift height switching	Contact your service partner.

(4) Warning light (yellow) lights up:	
Possible cause	Remedy
Consult the operating instructions for further information.	If the error cannot be remedied, contact your service partner.

(5) Warning light for "depressurisation" or "hydraulic-oil microfilter indicator" (yellow)	
Possible cause	Remedy
"Depressurisation"	Contact your service partner.
"Hydraulic oil microfilter indicator": Lights up when the pressure filter is excessively clogged	

(6) Warning light for "Prewarning: motor temperature at upper limit " (yellow)	
Possible cause	Remedy
Traction motors and/or pump motors have almost reached the temperature limit	Allow motors to cool down as soon as possible

Malfunctions, causes and remedies: Hydraulic system

Abnormal noise.	
Possible cause	Remedy
Leaking suction lines, oil foaming.	Seal the lines. Check the hydraulic oil level, top up if necessary.
Incorrect oil viscosity, too little oil in tank.	Observe the specified viscosity. Top up hydraulic oil. Have the hydraulic oil replaced. Contact your service partner.
Clogged suction filter.	Have the filter replaced. Contact your service partner.
Hydraulic pump damage or motor damage and faulty seals causing air intake.	Contact your service partner.
No pressure or too little pressure in the system.	
Possible cause	Remedy
Hose line or pipe line broken or leaking.	Replace the line or seal the line. Contact your service partner.
Oil temperature warning is displayed.	Check the hydraulic oil level, clean the hydraulic oil cooler. Contact your service partner.
Pump faulty, leakage loss, pressure valves do not close, valve seat damaged.	Contact your service partner.
Oil pressure fluctuation.	
Possible cause	Remedy
Lift mast does not extend completely.	Top up hydraulic oil.
For cause, see: Abnormal noise.	See: Abnormal noise.
Pressure relief valve or feed pressure valves seized up.	Contact your service partner.
Lift cylinders and tilt cylinders show friction points.	Contact your service partner.
No or too little supply flow.	
Possible cause	Remedy
Hose line or pipe line broken or leaking.	Replace the line or seal the line. Contact your service partner.
Hydraulic system overheating.	Check hydraulic oil level, use prescribed hydraulic oil if necessary, clean the hydraulic oil cooler. Contact your service partner.
Pump faulty, leakage loss, pressure valves do not close, valves damaged.	Contact your service partner.

5 Service work

Self-help

Hydraulic oil temperature too high.	
Possible cause	Remedy
Too little oil in the tank or oil cooler clogged.	Check the hydraulic oil level; top up the hydraulic oil if necessary. Clean the hydraulic oil cooler and check for leakages; if faults are found, contact your service partner. Contact your service partner.
Pump damage.	Contact your service partner.

Malfunction displays for the load-dependant assistance system (load weight indicator "plus")

CAUTION

Damage to or destruction of truck components!

If the red warning light for the assistance system (1) illuminates in the display unit during operation and the buzzer sounds at intervals, a malfunction has occurred.

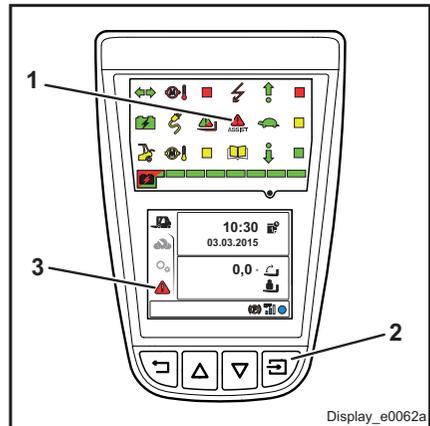
➤ The truck must be switched off immediately and the malfunction must be dealt with.

➤ To switch off the buzzer, press the "Confirm" button (2).

The failed component can be determined using an error code in the Malfunctions (3) menu. Contact your service partner.

NOTE

Lifting and tilting movements or the driving speed may be restricted in the event of a malfunction of the assistance system.



**Malfunctions, causes and remedies:
Charging at the rear, with "active ventilation"**

Possible malfunctions	Cause	Indicators	Remedy
Active ventilation does not start.	- Faulty fans. - Push button faulty or actuated for more than 20 seconds.	The red LED in the push button illuminates.	- Replace the fans. - Replace the push button. Contact your service partner.
Active ventilation starts briefly and then switches off again.	- Minimum fan speed (approx. 70%) is not reached.	The red LED in the push button illuminates.	Contact your service partner.
Fans run immediately at maximum speed (no activation).	- Contactor faulty.	The red LED in the push button illuminates.	Replace the contactor. Contact your service partner.
The charging process is interrupted.	- Active ventilation has failed: - Fans faulty or speed falls below minimum value.	The red LED in the push button flashes.	Replace the fans. Contact your service partner.
The charging process is interrupted.	- Contactor faulty (opens).	No error display. The green LED in the push button remains illuminated.	Replace the contactor. Contact your service partner.

Errors or malfunctions may be resolved by carrying out the following procedure:

- Remove the connection plug from the battery female connector and then insert the connection plug again (RESET).

If the error persists, contact your service partner.

Decommissioning**Decommissioning****Shutting down the industrial truck****Measures to be implemented before shutdown**

If the truck is to be shut down for a period longer than 2 months, e.g. for operational reasons, it must only be stored in a well-ventilated, clean and dry room that is free of frost. The following measures must be implemented:

- Thoroughly clean the industrial truck.
- Raise the fork carriage several times to the end stop.
- Tilt the lift mast forwards and backwards repeatedly and actuate the attachment repeatedly.
- Lower the fork carriage to a supporting surface until the chains are relieved of load.
- Check the hydraulic oil level and top up if necessary.
- Coat all unpainted mechanical components with a thin film of oil or grease.
- Grease vehicle.
- Disconnect the battery male connector.
- Check battery condition and density of acid.
- Lubricate battery terminals with acid-free grease. (Follow the battery manufacturer's instructions.)

- Jack up the truck so that all wheels are off the ground.

This will prevent permanent deformation of the tyres.

 NOTE

Do not cover with plastic film, as this will encourage water condensation to form and collect.

 NOTE

If the truck is to be shut down for more than six months, further measures must be agreed with your authorised dealer.

Recommissioning after shutdown

- Thoroughly clean the industrial truck.
- Grease vehicle.
- Clean the battery and lubricate battery terminals with acid-free grease
- Check battery condition and acid density; recharge if necessary.
- Check hydraulic oil for condensed water and change if necessary.
- Perform maintenance as before initial commissioning.
- Put the industrial truck into operation.

Disposal of old trucks

The disposal of old trucks is regulated in directive 2000/53/EC from the European Parliament and Council.

We therefore recommend having this work carried out in an approved recycling plant. If you would like to carry out this work yourself, you must obtain approval from the relevant authorities as per articles 9, 10 and 11 of directive 75/442/EEC.

In addition, the following minimum requirements must be observed:

- The locations in which old trucks are stored before treatment must be areas suited to this task with impervious surfaces. These areas are also to be equipped with collection devices and separators for leaking fluids and degreasing cleaning materials
- The locations for treatment must be areas suited to this task with impervious surfaces. These areas must also be equipped with collection devices and separators for leaking fluids and degreasing cleaning materials. Suitable storage areas must be

available for disassembled and partially oil-smeared parts, as well as for tyres including fire protection measures. Suitable storage tanks for fluids such as fuel, AdBlue® (urea solution), engine oil, hydraulic oil, cooling fluid and fluids from air conditioning systems must also be provided

- In order to dispose of harmful substances from the old trucks, the batteries and LPG container must be removed. The following must also be removed, collected and stored separately: fuel, AdBlue® (urea solution), engine oil, cooling fluid, hydraulic oil and fluids from air conditioning systems
- The following parts are to be collected separately and recycled: catalytic converters, metal components containing copper and aluminium, tyres, large plastic components (consoles, fluid containers) and glass

NOTE

The operating company is responsible for adherence to the directives as well as additional country-specific regulations.

5 Service work

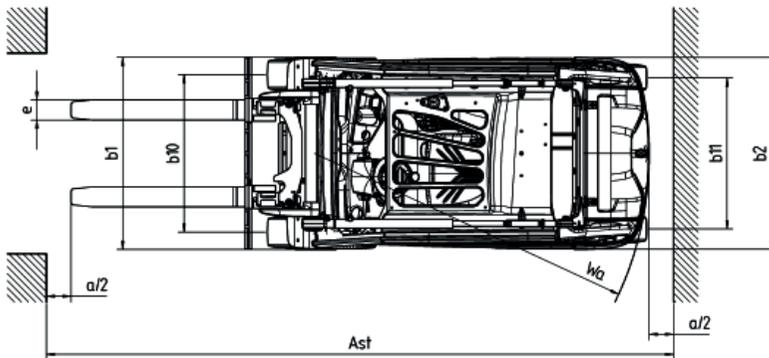
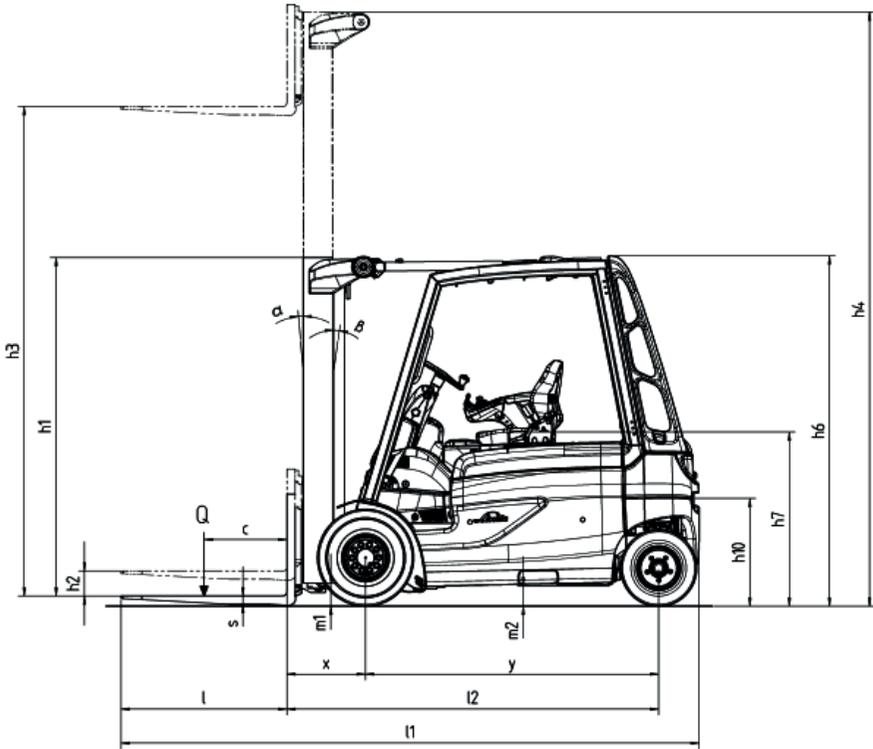
Decommissioning

Technical data

6 Technical data

Overview of dimensions

Overview of dimensions



e3871471

Overview of type sheets

All data refers to standard equipment with standard lift masts. This data must be observed without fail.					
1 Identification					
1.1	Manufacturer		Linde		
1.2	Manufacturer's type designation	E35	E35/600H		
		E40	E40/600H, E40/600HL		
		E45	E45/600H, E45/600HL		
		E50	E50/500HL, E50/600HL		
1.3	Drive		Electric		
1.4	Operation		Seated		
1.5	Load capacity/load	E35	Q [kg]	3500	
		E40	Q [kg]	4000	
		E45	Q [kg]	4500	
		E50	Q [kg]	4990	
1.6	Load centre of gravity	E35/600H E40/600H E45/600H E40/600HL E45/600HL E50/600HL	c [mm]	600	
		E50/500HL	c [mm]	500	
1.8	Load distance	E35/600H	x [mm]	538	
		E40/600H E45/600H E40/600HL E45/600HL E50/500HL E50/600HL	x [mm]	548	

6 Technical data

Overview of type sheets

1 Identification				
1.9	Wheelbase	E35/600H E40/600H E45/600H	y [mm]	1905
		E40/600HL E45/600HL E50/500HL E50/600HL	y [mm]	2050
2 Weight				
2.1	Net weight ¹	E35/600H	kg	6875
		E40/600H	kg	7360
		E45/600H	kg	7870
		E40/600HL	kg	7285
		E45/600HL	kg	7740
		E50/500HL	kg	7895
		E50/600HL	kg	8242
2.2	Front/rear axle load with load	E35/600H	kg	9351/1024
		E40/600H	kg	10,235/1125
		E45/600H	kg	11,057/1313
		E40/600HL	kg	10,230/1055
		E45/600HL	kg	11,025/1215
		E50/500HL	kg	11,551/1334
		E50/600HL	kg	11,823/1409
2.3	Front/rear axle load without load ²	E35/600H	kg	3760/3115
		E40/600H	kg	3825/3535
		E45/600H	kg	3845/4025
		E40/600HL	kg	3990/3295
		E45/600HL	kg	4005/3735
		E50/500HL	kg	4010/3885
		E50/600HL	kg	4039/4203

¹ Including battery, see row 6.4/6.5

² Including battery, see row 6.4/6.5

3 Wheels, chassis frame			
3.1	Tyres: solid rubber, superelastic, pneumatic		SE
3.2	Front tyre size		355/45-15 (28x12.5-15)
3.3	Rear tyre size		225/75-10 (23x9-10)
3.5	Number of wheels, front/rear (x = driven)		2x/2
3.6	Front track width	b ₁₀ [mm]	1149
3.7	Rear track width	b ₁₁ [mm]	932

4 Basic dimensions			
4.1	Lift mast/fork carriage tilt, for-wards/backwards		α/β (°) 5.0/8.0
4.2	Height with lift mast retracted	h ₁ [mm]	2404
4.3	Free lift	h ₂ [mm]	150
4.4	Lift	E35/600H E40/600H E45/600H E40/600HL E45/600HL E50/500HL	h ₃ [mm] 3100
		E50/600HL	h ₃ [mm] 2900
4.5	Height with lift mast extended	E35/600H E40/600H E45/600H E40/600HL E45/600HL E50/500HL	h ₄ [mm] 4000
		E50/600HL	h ₄ [mm] 3900

6 Technical data

Overview of type sheets

4 Basic dimensions				
4.7	Height above overhead guard (cab)		h ₆ [mm]	2360
4.8	Seat height/standing height		h ₇ [mm]	1230
4.12	Coupling height		h ₁₀ [mm]	722
4.19	Overall length	E35/600H	l ₁ [mm]	3712
		E40/600H E45/600H	l ₁ [mm]	3722
		E40/600HL E45/600HL E50/500HL E50/600HL	l ₁ [mm]	3867
4.20	Length including fork back	E35/600H	l ₂ [mm]	2712
		E40/600H E45/600H	l ₂ [mm]	2722
		E40/600HL E45/600HL E50/500HL E50/600HL	l ₂ [mm]	2867
4.21	Total width, front/rear		b ₁ /b ₂ [mm]	1440/1278
4.22	Fork arm dimensions	E35/600H	s/e/l [mm]	50 x 120 x 1000
		E40/600H E45/600H E40/600HL E45/600HL E50/500HL E50/600HL	s/e/l [mm]	60 x 130 x 1000
4.23	Fork carriage according to ISO 2328, class/form A, B			3 A
4.24	Fork carriage width		b ₃ [mm]	1350

4 Basic dimensions				
4.31	Ground clearance with load under lift mast	E35/600H	m ₁ [mm]	146
		E40/600H E40/600HL	m ₁ [mm]	145
		E45/600H E45/600HL	m ₁ [mm]	144
		E50/500HL E50/600HL	m ₁ [mm]	143
4.32	Ground clearance at middle of wheelbase		m ₂ [mm]	160
4.33	Aisle width for pallet 1000 x 1200 crosswise ³	E35/600H	A _{st} [mm]	3954
		E40/600H	A _{st} [mm]	3964
		E45/600H	A _{st} [mm]	3984
		E40/600HL E45/600HL E50/500HL E50/600HL	A _{st} [mm]	4109
4.34	Aisle width for pallet 800 x 1200 lengthwise ⁴	E35/600H	A _{st} [mm]	4154
		E40/600H	A _{st} [mm]	4164
		E45/600H	A _{st} [mm]	4184
		E40/600HL E45/600HL E50/500HL E50/600HL	A _{st} [mm]	4309
4.35	Turning radius	E35/600H E40/600H	W _a [mm]	2216
		E45/600H	W _a [mm]	2236
		E40/600HL E45/600HL E50/500HL E50/600HL	W _a [mm]	2361
		4.36	Smallest pivot point distance	

³ Including a = 200-mm safety distance

⁴ Including a = 200-mm safety distance

6 Technical data

Overview of type sheets

5 Performance data					
5.1	Driving speed with/without load		km/h	18/18	
5.2	Lifting speed with/without load	E35/600H	m/s	0.45/0.56	
		E40/600H E40/600HL	m/s	0.42/0.56	
		E45/600H E45/600HL	m/s	0.39/0.56	
		E50/500HL E50/600HL	m/s	0.35/0.50	
5.3	Lowering speed with/without load		m/s	0.55/0.55	
5.5	Pulling force with/without load		N	7000/7000	
5.6	Maximum pulling force with/without load		N	19,000/19,000	
5.7	Climbing capability with/without load	E35/600H	%	6.9/10.4	
		E40/600H	%	6.3/9.7	
		E45/600H	%	5.8/9.1	
		E40/600HL	%	6.3/9.8	
		E45/600HL	%	5.8/9.3	
		E50/500HL	%	5.5/9.1	
		E50/600HL	%	5.4/8.7	
5.8	Maximum climbing capability with/without load	E35/600H	%	19.0/29.4	
		E40/600H	%	17.3/27.3	
		E45/600H	%	15.9/25.4	
		E40/600HL	%	17.4/27.6	
		E45/600HL	%	16.0/25.8	
		E50/500HL	%	15.2/25.3	
		E50/600HL	%	14.8/24.2	

5 Performance data				
5.9	Acceleration time with/without load	E35/600H	s	4.5/3.7
		E40/600H E40/600HL	s	4.7/3.9
		E45/600H E45/600HL	s	4.9/4.1
		E50/500HL	s	5.2/4.3
		E50/600HL	s	5.3/4.4
5.10	Service brake			Hydraulic/me- chanical
6 Drive/motor				
6.1	Traction motor, power rating at S2: 60 min.		kW	2x 11.9
6.2	Lift motor, power rating at S3: 15%		kW	25
6.3	Battery in accordance with DIN 43531/35/36 A, B, C, no			43 536 / A
6.4	Battery voltage, nominal capacity K5	E35/600H E40/600H E45/600H	V/Ah	80/700-775
		E40/600HL E45/600HL E50/500HL E50/600HL	V/Ah	80/840
6.5	Battery weight (±5%)	E35/600H E40/600H E45/600H	kg	1863
		E40/600HL E45/600HL E50/500HL E50/600HL	kg	2180

6 Technical data

Overview of type sheets

6 Drive/motor				
6.6	Energy consumption in accordance with VDI cycle	E35/600H	kWh/h	11.9
		E40/600H	kWh/h	13.0
		E40/600HL	kWh/h	13.0
		E45/600H	kWh/h	14.2
		E45/600HL	kWh/h	14.0
		E50/500HL	kWh/h	14.8
		E50/600HL	kWh/h	15.2

8 Other				
8.1	Traction controller type			Digital controller/continuously variable
8.2	Working pressure for attachments		bar	170
8.3	Oil volume for attachments		l/min	55
8.4	Noise level at the driver's ear		dB(A)	50.0

Lift mast data

The lift mast data applies to the standard design with solid rubber tyres and a fork carriage.
This data must be observed without fail.

Standard Lift mast (in mm)		E35/600H E40/600H E45/600H E40/600HL E45/600HL E50/500HL					E50/600HL				
		Lift	h 3	3100	3700	4100	4400	5000	3200	3700	4100
Lift mast retracted	h 1	2404	2704	2904	3054	3354	2554	2804	3001	3154	3454
Lift mast extended	h 4	4000	4600	5000	5300	5900	-	-	-	-	-
Free lift	h 2	150	150	150	150	150	150	150	150	150	150

Triplex Lift mast (in mm)		E35/600H E40/600H E45/600H E40/600HL E45/600HL E50/500HL				E50/600HL			
		Lift	h 3	4675	5515	6015	4375	4615	5065
Lift mast retracted	h 1	2360	2660	2860	2360	2660	2860	2860	
Lift mast extended	h 4	5575	6415	6915	5575	6415	6915	6915	
Free lift	h 2	1460	1760	1960	1460	1760	1960	1960	

6 Technical data

Lift mast data 388 series elevated driver's compartment

Lift mast data 388 series elevated driver's compartment

Standard lift mast (in mm)		E40/600H E45/600HL				
Lift	h 3	3800	4100	4400	5000	5400
Lift mast retracted	h 1	2710	2860	3010	3310	3510
Lift mast extended	h 4	4700	5000	5300	5900	6300
Free lift	h 2	150	150	150	150	150

Triplex lift mast (in mm)		E40/600H E45/600HL		
Lift	h 3	5715		6015
Lift mast retracted	h 1	2760		2860
Lift mast extended	h 4	6615		6915
Free lift	h 2	1860		1960

Tyre variants and rim sizes

⚠ WARNING

Effect on load capacity.

Only the tyres and rims named here may be used.
The specified air pressure must be maintained in pneumatic tyres.

Tyre variants

Tyres on the drive axle		
	SE solid rubber tyres	
E35/600H E40/600H E45/600H E40/600HL E45/600HL E50/500HL E50/600HL	Single tyre 355/45-15 (28x12.5-15)	SE
	Twin tyres 225/75-15 (28x9-15) Caution! Other drive axle Contact your service partner.	

Steering axle tyres		
	SE solid rubber tyres	
E35/600H E40/600H E45/600H E40/600HL E45/600HL E50/500HL E50/600HL	225/75-10 (23x9-10)	SE

Rim sizes

Rim size	Tyre size
6.50F-10	225/75-10 (23x9-10)
7.0-15	225/75-15 (28x9-15)
9.75-15	355/45-15 (28x12.5-15)

6 Technical data

Additional capacity rating plate for attachments

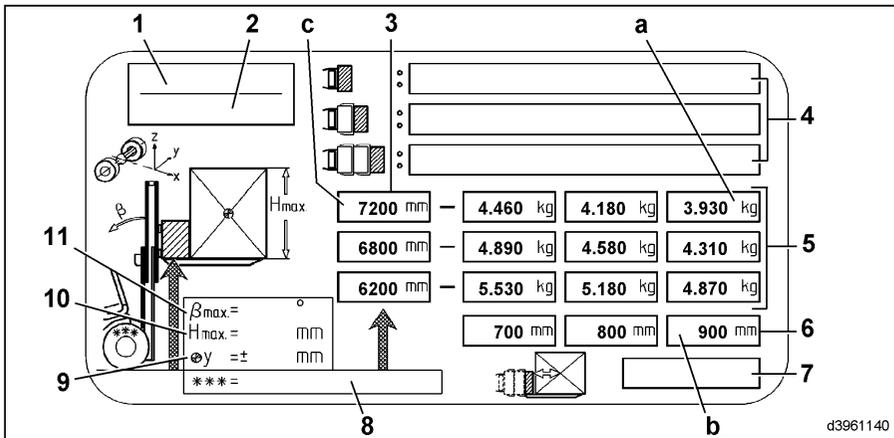
Additional capacity rating plate for attachments

⚠ DANGER

The entries in the following capacity rating plates are examples. The information will vary depending on the truck series, lift mast series, truck equipment and attachment. If an attachment is fitted, an additional capacity rating plate must be attached to your truck within the driver's field of vision.

If the label is missing or if the specified information about the truck equipment, attachments, load data etc. is not accurate, please contact your service partner, who will calculate the data using a program authorised by Linde.

Additional capacity rating plate for attachments with loads that are not clamped



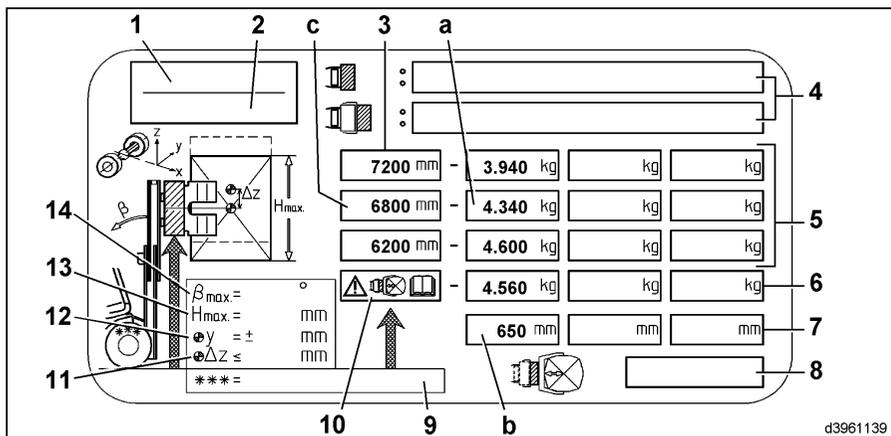
- | | | | |
|---|---|----|--|
| 1 | Truck series (year of manufacture, from - to) | 7 | Reference number and note about person calculating the load capacity |
| 2 | Lift mast type (series) | 8 | Front tyres |
| 3 | Lift heights | 9 | Maximum permissible centre offset of load |
| 4 | Attachments | 10 | Maximum permissible load height |
| 5 | Load capacities | 11 | Maximum permissible lift mast backwards tilt |
| 6 | Load centres of gravity | | |

i NOTE

Example for reading the load capacity:

- $a = 3930 \text{ kg}$ at load centre of gravity $b = 900 \text{ mm}$ to lift height $c = 7200 \text{ mm}$.

Additional capacity rating plate for attachments with loads that are fixed or clamped



- 1 Truck series (year of manufacture, from - to)
- 2 Lift mast type (series)
- 3 Lift heights
- 4 Attachments
- 5 Load capacities
- 6 Reduced load capacities
- 7 Load centres of gravity
- 8 Reference number and note about person calculating the load capacity
- 9 Front tyres
- 10 Note — If there is sufficient visibility for forwards travel when transporting loads, we recommend that the calculated residual load capacity based on the roller height / load height (value = maximum permissible load height (13)) is limited to the following in order to achieve a more dynamic driving

- 11 Specifies in mm how much the load centre of gravity is offset vertically upwards to the centre of the attachment (e.g. roller / bale taken off).
Also applicable for attachments with a rotate function: The actual centre of gravity of the load during rotation must not lie outside the pivot point by more than 100 mm (truck rated capacity ≤ 6300 kg) or 150 mm (truck rated capacity > 6300 kg and $\leq 10,000$ kg)!
- 12 Maximum permissible centre offset of load
- 13 Maximum permissible load height
- 14 Maximum permissible lift mast backwards tilt

NOTE

Example for reading the load capacity:

- a = 4340 kg at load centre of gravity b = 650 mm to lift height c = 6800 mm.

Noise emission values

Calculated in the test cycle in accordance with EN 12053 from the weighted values for the DRIVING, LIFTING and IDLING operating statuses.

Sound pressure level in the driver's compartment			
E 35 – E 50	LPAZ	=	67 dB (A)
Insecurity	KPA	=	2 dB (A)

6 Technical data

Vibration characteristics for body vibrations

 **NOTE**

Lower or higher noise emission values may occur when using industrial trucks, e.g. due to the method of operation, ambient factors and other sources of noise.

Vibration characteristics for body vibrations

The values were determined according to EN 13059 using trucks with standard equipment according to the type sheet (driving over test course with humps).

Specified vibration characteristic according to EN 13059			
Measured vibration characteristic	aw,ZS	=	< 0.5 m/s ²

Specified vibration characteristic for hand-arm vibrations	
Vibration characteristic	< 1.5 m/s ²

 **NOTE**

The vibration characteristic for body vibrations cannot be used to determine the actual vibration load during operation. This depends on the application conditions (state of roadway, method of operation etc.) and should therefore be determined on site where appropriate. It is mandatory to specify the hand-arm vibrations even where the values do not indicate any hazard, as in this case.

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Your industrial truck 2

Linde Material Handling GmbH

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