en **Operator's manual**

Telescopic handler

## Document ID

ORIGINAL OPERATOR'S MANUAL

**Order number:** 93517492
**Issued:** 01.08.2019
**Version:** 02
**Author:** LWT / Technical Documentation Department

## Product ID

**Manufacturer:** Liebherr-Werk Telfs GmbH
**Type:** T 55-7 3AS
**Type no.:** 1708
**From Serial no.:** 16195

## Contact

Liebherr-Werk Telfs GmbH
Hans Liebherr-Straße 35
A – 6410 Telfs

LWT/93517492/02/01.08.2019/en

If a larger support is used instead of standard tyres, then the following formula is valid for the calculation of support surface:

Length (cm) x width (cm) x 0.8

Take the support load of installed working attachment from the respective load chart.

## 1.2.5 Trailer loads and support loads

To pull a trailer, the permissible trailer loads and support loads must be observed.

| Permissible trailer load | Agricultural or forestry towing machine | Self-propelled machine | Maximum permissible support load |
|---|---|---|---|
| **Trailer without brake** | 1000 kg | 1000 kg | 1000 kg |
| **Trailer with overrun brake** | 8000 kg | 8000 kg | 1000 kg |
| **Trailer with pneumatic or hydraulic brake including trailer brake overfeed** | 16000 kg | 12000 kg | 1000 kg[1)] |
| **Towing device rear and front (maximum permissible pull force in kN** | 45 | 45 | not permissible |

*Tab. 4: Permissible trailer loads*

1. Taking account of permissible axle loads and maximum operating weight, a maximum of 1500 kg is permissible.
2. Deviating regulations may apply on a country-specific basis. However, the values stated here must not be exceeded!

## 1.2.6 Load charts

**Note**
The load charts are valid exclusively for stationary machines on level and solid ground, horizontally positioned, which are equipped with an approved working attachment and approved tyres.

If other working attachments are used:
▶ Contact Liebherr customer service.

The weight of the working attachment and the load carried must not exceed the values specified in the load curve for the respective area!

**DANGER**
Machine tipping!
Danger to life.

▶ Make sure there are no unauthorised persons in danger area.

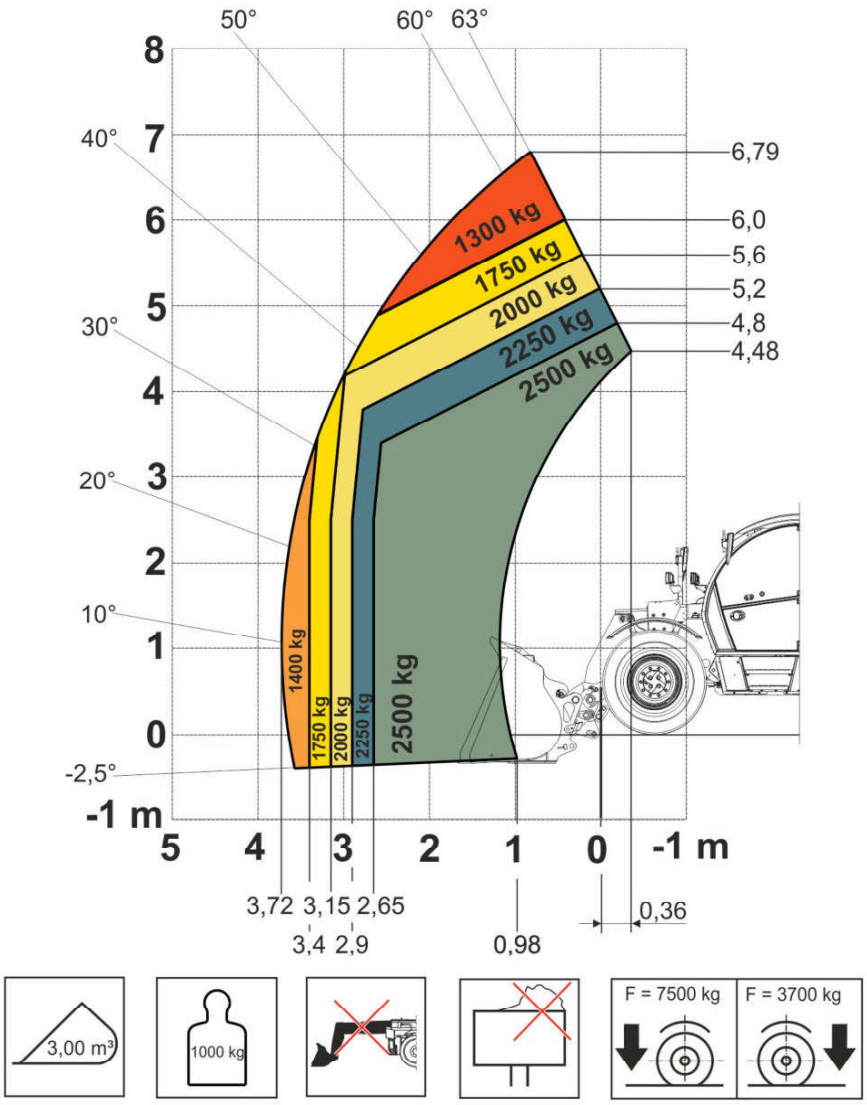
▶ Note appropriate load curve for the working attachment.

▶ Tyres are in good condition and filled with the prescribed pressure.

LWT/93517492/02/01.08.2019/en

## Load curve of lightweight bucket up to 3.00 m³ for T55-7

Load curve: Id. No. 12812667




*Tab. 13: Load curve of lightweight bucket for T55-7*

Load curve applies to buckets up to a maximum of 3.00 m³, maximum own weight of 1000 kg and width of 2.5 m.

Example: when using a 2.00 m³ bucket, material with a maximum density of 1250 kg/m³ may be used.

LWT/93517492/02/01.08.2019/en

## Performance
Impressive High-flyer –
the Jack of all Trades of Recycling

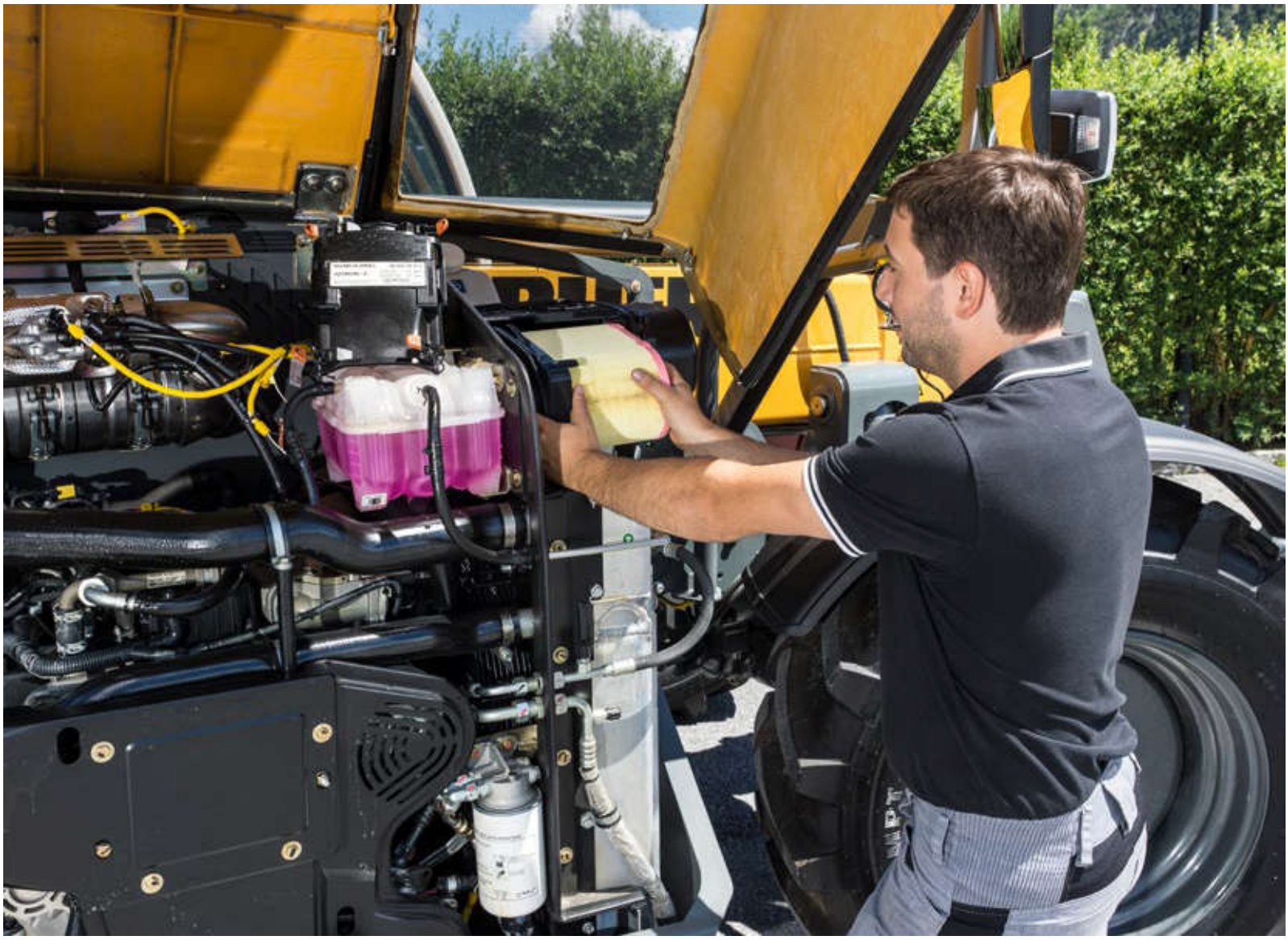
## Efficiency
Make the Right Choice –
Sustainable and Economical

**T 46-7s**
**Lifting Height** 7.0 m / 23' ft in
**Lifting Capacity** 4.6 t
**Engine Power** 100 kW / 136 HP
**Hydraulics** 200 l / min. / 35.2 Imp.gpm
Pump flow max.

**T 55-7s**
**Lifting Height** 7.0 m / 23' ft in
**Lifting Capacity** 5.5 t
**Engine Power** 115 kW / 156 HP
**Hydraulics** 200 l / min. / 35.2 Imp.gpm
Pump flow max.

**T 60-9s**
**Lifting Height** 9.0 m / 26'6" ft in
**Lifting Capacity** 6.0 t
**Engine Power** 115 kW / 156 HP
**Hydraulics** 200 l / min. / 35.2 Imp.gpm
Pump flow max.

# Maintainability



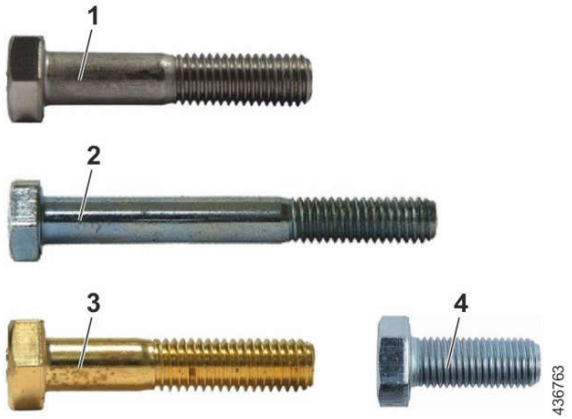
## Don’t Settle for the Right Spare Part

When it comes to “service quality” Liebherr customers think short paths and quick response. This is why 98 per cent of our spare parts are not only stored in a central location but are dispatched in the shortest possible time. Our dense international service network, modern service stations as well as outstandingly trained technicians guarantee swift on-site support.

The prestressing forces and the tightening torques noted in the chart have been taken from the VDI (Association of German Engineers) guidelines 2230 of February 2003.

Assembly prestressing forces $F_M$ and tightening torques $M_A$ at 90% utilisation of the yield strength for shank bolts with standard or fine metric threads as per DIN ISO 262 (and DIN ISO 965-2); wrench sizes for hex head screw in accordance with DIN EN ISO 4014 to 4018, screws with external hexalobular driving feature according to DIN 34800 or socket head bolts according to DIN EN ISO 4762 and hole “middle” according to DIN EN 20273.

Note:
- Any tightening values noted in Liebherr service documentation drawings or documents must be adhered to and given preference over factory standards.
- For important screw connections, angle-controlled tightening can be advantageous. In this case, the necessary tightening values (joining moment, angle) must be determined by the technical customer service department for the individual case.
- When tightening in aluminium, with or without Helicoil insert and for weld nuts, the values for class 8.8 must be used. Any tightening values noted in Liebherr service documentation drawings or documents are binding, paramount and must be adhered to.

| Metric standard thread and fine thread | Metric standard thread and fine thread |
|---|---|
| **At least one element of the screwed connection (screws, washers, nuts, ...) with following surface: flZn = zinc coating (LH standard 10021432, LH standard 10215295 flZnnc-480h-L valid ≥M6)** | **All elements of the screwed connection (screws, washers, nuts, ...) with following surface: black oxide or phosphated zinc plated (LH standard 10215295 Fe// ZnNi(12)5//Cn//T2)** |
|  **1**: Zinc coating |  **1**: Black oxide, phosphated, burnished<br>**2**: Thick film passivation<br>**3**: Yellow chromated<br>**4**: Zinc plated Fe//ZnNi(12)5//Cn//T2 |

*Tab. 23: Screw types*

LWT/93517492/02/01.08.2019/en

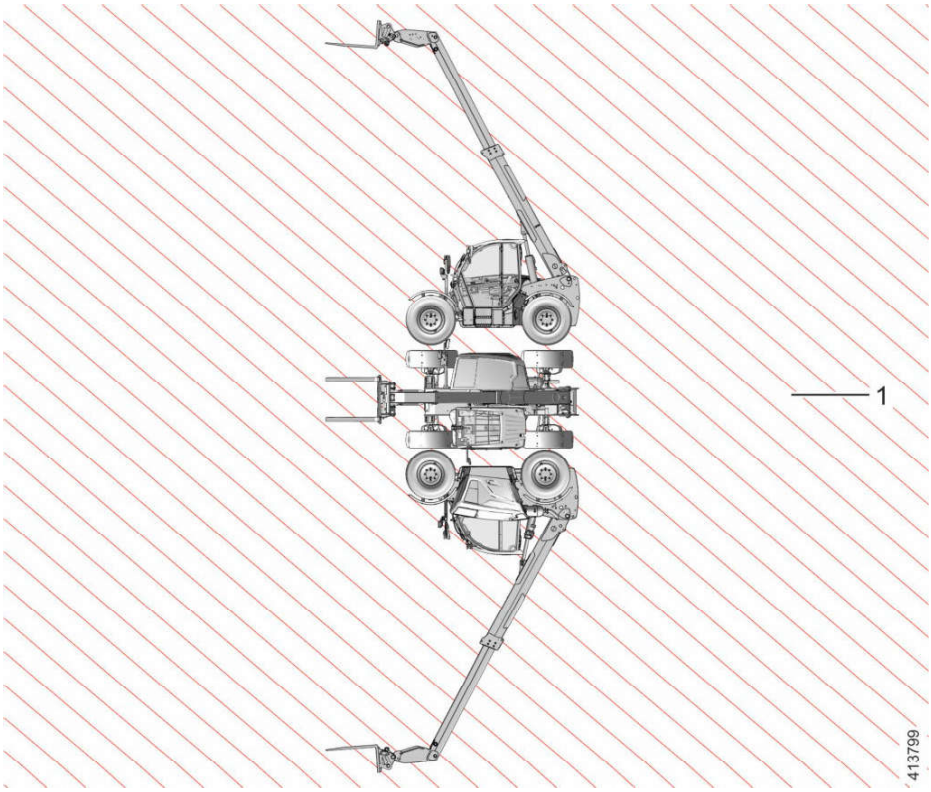



*Fig. 51: Danger area of the machine*

**1** Danger area

Make sure that there are no persons within the danger area **1** of the telescopic handler.

The operator may only carry out work with the telescopic handler if there are no persons in the danger area.

In the event of danger to persons, the operator must stop the dangerous movement and give warning signs.

The operator must give warning signs (e.g. sounding the horn, light signals) in the event of danger to persons.

The operator must suspend operation if persons do not leave the danger area despite the warning.

The operator may only swing the work equipment over occupied operator platforms, operating stations and work stations of other equipment if these areas are secured against work equipment or loads falling by means of resistant protective roofs.

## 2.3.5 Operating conditions

| | |
|---|---|
| Temperature range (ambient temperature) | -20 °C to +45 °C |

*Tab. 28: Operating conditions*

LWT/93517492/02/01.08.2019/en

## *Safety belt* sign

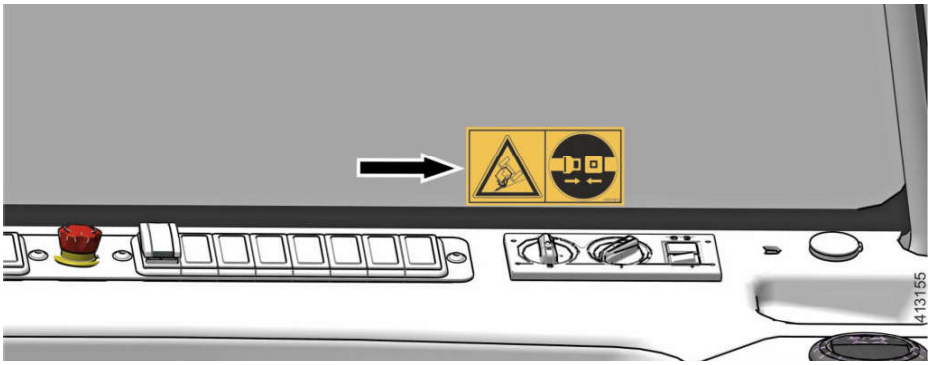



*Fig. 57: Safety belt sign*

The sign is located on the right-hand window in the operator's cab.

Indicates the importance of wearing the safety belt.

Meaning: **Always close the safety belt before putting the machine into service!**

## *ROPS/FOPS* warning sign

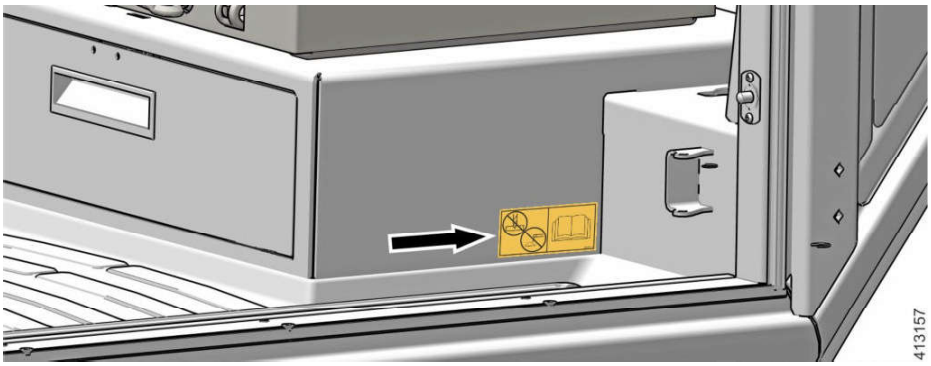



*Fig. 58: ROPS/FOPS sign*

The sign is located on the left below the operator's seat.

Warns of risk of accidents potentially leading to death or very severe injuries.

Meaning: **Structural modifications (e.g. welding, drilling) on the ROPS/FOPS operator's cab without consulting with Liebherr customer service are not permitted!**

LWT/93517492/02/01.08.2019/en

## *Tyre inflation pressure* sign

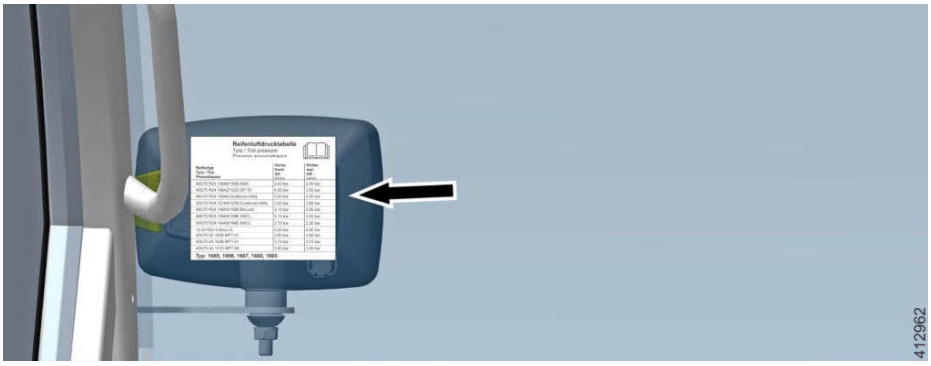



*Fig. 77: Tyre inflation pressure sign*

The sign is located on the front window in the operator's cab.

Denotes the permissible inflation pressure for the tyres.

## *Brake oil* sign

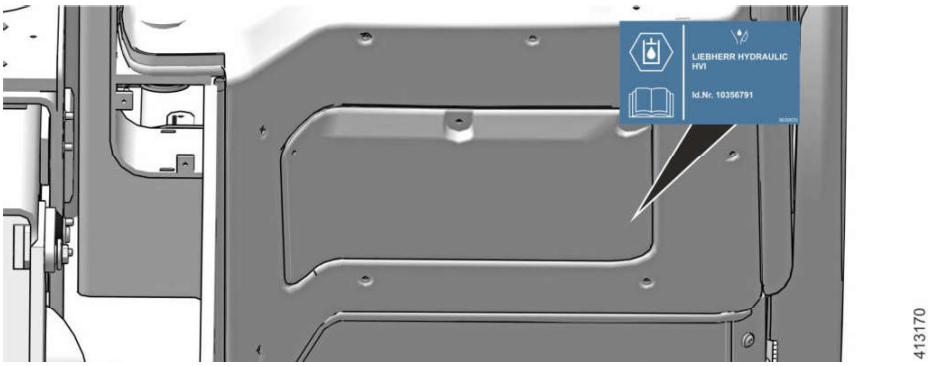



*Fig. 78: Brake oil sign*

The sign is located inside on the front console of operator's cab.

Denotes the brake oil specifications.

## *Load chart* sign

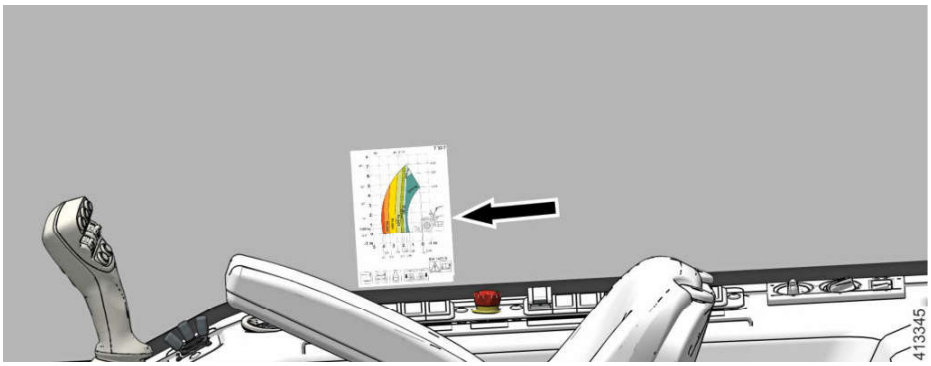



*Fig. 79: Load chart sign*

41. The machine must be utilized, driven and operated in such way that the stability is ensured and that there is no danger of tipping over.
42. Avoid any working movements which could cause the machine to tip over. However, if the machine does begin to tip or slide, retract the telescopic boom while simultaneously lowering the working attachment and turn the machine uphill. If possible, always work downhill or uphill, never sideways on a slope.
43. Always move slowly and carefully on rocky or slippery ground or on a slope.
44. Always adapt the travel speed to the working conditions.
45. Never travel on slopes which exceed the maximum permissible gradeability.
46. Only travel downhill at the permitted speed or you could loose control over the machine.
47. When loading a truck, make sure that the truck driver leaves the truck, even if the cab is FOPS protected.
48. For terrain which is difficult to gain an overview of and whenever necessary, ask for the assistance of a guide. Have only one person signal you.
49. Only permit experienced personnel to secure loads and signal the machine operators. The signaller must position himself within the view of the operator or be in voice contact with him.

## 2.6.7 Working in the vicinity of electrical overhead lines

1. When working with telescopic handlers near electrical overhead lines and overhead contact lines, a safety distance depending on the nominal voltage of the overhead lines between them and the telescopic handlers and its working equipment must be observed to avoid current transfer.
   This also applies for the distance between lines and accessory equipment as well as attached loads.
2. When approaching electrical overhead wires, consider all working movements of the telescopic handler, such as boom position, oscillation of ropes and dimensions of attached loads. Also observe ground unevenness, which can incline the telescopic handler and therefore move it closer to the overhead wires.
3. In case of wind, overhead wires as well as working equipment can swing out and thereby reduce the distance.
4. If a sufficient distance from electrical overhead wires and contact wires cannot be retained, then the operator must carry out other safety measures in consultation with the owner or operator of the lines to avoid current transfer.
   Other safety measures against current transfer can include the following:
   - Turning the current off,
   - Rerouting the overhead wires,
   - Cabling,
   - Limitation of working range of telescopic handlers.
5. In case of a current transfer, the operator of the telescopic handler must try to move the telescopic handler from the electric danger zone by lifting or lowering the working equipment, by driving or swinging out.
   If this is not possible, the following rules apply for the operator:
   - Do not leave the machine;
   - Warn people in the vicinity not to approach or touch the machine;
   - Have the power turned off!

The following safety distances must be adhered to:

| Rated voltage | Safety distance |
|---|---|
| to 1000 V | 1.0 m |
| from 1 kV to 110 kV | 3.0 m |

LWT/93517492/02/01.08.2019/en

**WARNING**
Some installations and equipment can limit the visibility of the machine operator.
Danger of accident!

- ▶ Pay attention to limitations in the visibility field and to blind spots.
- ▶ Use the aid of a guide if necessary.

Observe national regulations regarding visibility in the operator's cab. For countries within the European Economic Area, the Standard EN 15830 describes the test and evaluation methods for the visibility field of machine operator. Visibility field is tested in this case with standard equipment. Changes to the machine, such as installation or modification of components may not impact the visibility field. When changes impact the visibility field, then a test according to EN 15830 or the regulations valid on the job site must be carried out. Appropriate measures are to be taken, depending on the test result. The machine operator must be informed about the changes.

## Field of vision

The field of vision describes the visible range the driver can see from the operator's seat.

The field of vision is determined according to EN 15830.

The figures below illustrate the field of vision in the near field and in the 12 m radius of driver from the operator's seat.

Not all areas of machine are located in the direct field of view.

**WARNING**
Danger of accident due to limited field of vision!
It can lead to severe injuries or death.

- ▶ Adjust the mirror.
- ▶ Adjust the visual aids {additional mirror (option) and/or camera (option)}.
- ▶ When working attachments are used that limit the field of view, measures must be taken to make sure that the machine is operated safely.
- ▶ Remove any obstacles in the work area.
- ▶ Make sure that no persons are within the danger zone.
- ▶ Do not move a load with raised telescopic boom.
- ▶ Move a load exclusively in transport position.

The machine operator and construction site management must take measures to ensure that the obscured field of vision does not cause a safety hazard during operation.

### Restriction of field of vision for T46-7 and T55-7

### Restriction of field of vision with load

The graphic describes the existing visual shadows with forklift device at retracted and raised telescopic boom of A = 450 mm and load in the field of vision radius of 12 metres.

LWT/93517492/02/01.08.2019/en

### 52 *Tipping cylinder lock* switch (option)


412383

Press top part of switch: *Tipping cylinder lock* function is deactivated.

Press bottom part of switch: *Tipping cylinder lock* function is activated.

*Tipping cylinder lock* indicator light lights up on the display unit.

### 54 *Auto Power* switch (option)

412385

Press top part of switch: *Auto Power* function is deactivated.

Press bottom part of switch: *Auto Power* function is activated.

*Auto Power* symbol is shown on the display.

### 56 *Side window windscreen washer system* switch (option)


413225

Press top part of switch: *Side window windscreen wiper* is deactivated.

Press bottom part of switch: *Side window windscreen wiper* is activated.

Press bottom part of switch and hold (touch function): Side window windscreen washer system is activated.

### 57 *Trailer brake* button (option)


412505

*Parking brake* switch is activated.

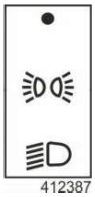
Press button down and hold it: Trailer brake is released.

Release button: Trailer brake is activated.

## Control elements - roof console right


*Fig. 117: Control elements - roof console right*

### 60 *Parking light and driving light* switch


412387

Press top part of switch: Parking light, driving light and side marker lights are switched off.

Switch in centre position: Parking light and side marker lights are switched on.

Press bottom part of switch: Driving light and side marker lights are switched on.

LWT/93517492/02/01.08.2019/en

| Status symbols | Name |
|---|---|
|  413640 | Maintenance display<br>Contact Liebherr customer service |
|  412233 | Forward travel direction (For more information see: Forward travel, page 172) |
|  412234 | Reverse travel direction (For more information see: Reverse travel, page 173) |
|  412227 | Neutral position (For more information see: Before travel, page 172) |
|  412238 | Front wheel steering (For more information see: Selecting front wheel steering mode, page 178) |
|  412240 | All wheel steering (For more information see: Selecting all-wheel steering mode, page 179) |
|  412239 | Crab steering (For more information see: Selecting crab steering mode, page 179) |
|  412237 | One-sided crab steering (For more information see: Selecting one-sided crab steering mode, page 180) |
|  412244 | Hoist gear suspension[A)] (For more information see: Hoist gear suspension (option), page 209) |
|   412245 | Auto hoist gear suspension[A)] (For more information see: Hoist gear suspension (option), page 209) |
|  412268 | Slow travel stage (For more information see: Travel speed ranges, page 174) |
|  412270 | Middle travel stage (For more information see: Travel speed ranges, page 174) |
|  412269 | Fast travel stage (For more information see: Travel speed ranges, page 174) |

LWT/93517492/02/01.08.2019/en

- ▶ Unlock door lock **2** with ignition key.
- ▶ Open cab door **1** with door handle **3**.
- ▶ Enter operator's cab.
- ▶ Before putting machine into service, close the cab door.
  ▷ The cab door engages in the door lock.

## 3.2.2 Emergency exit

Enter and leave the operator's cab always through the cab door.

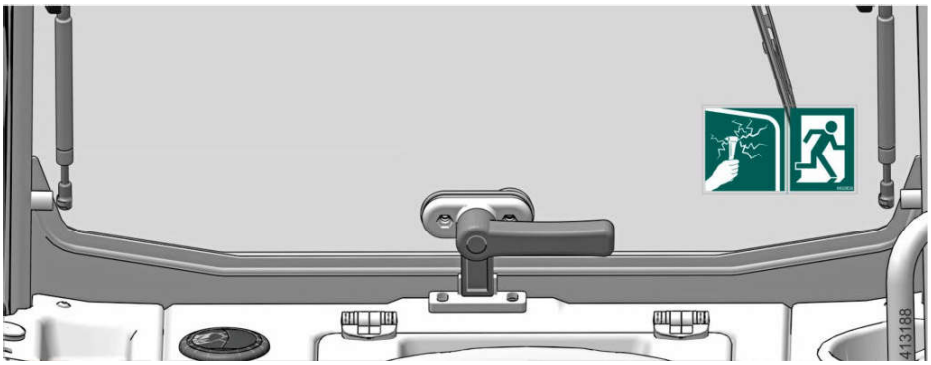



*Fig. 153: Emergency exit*

Use the rear cab window as an emergency exit.

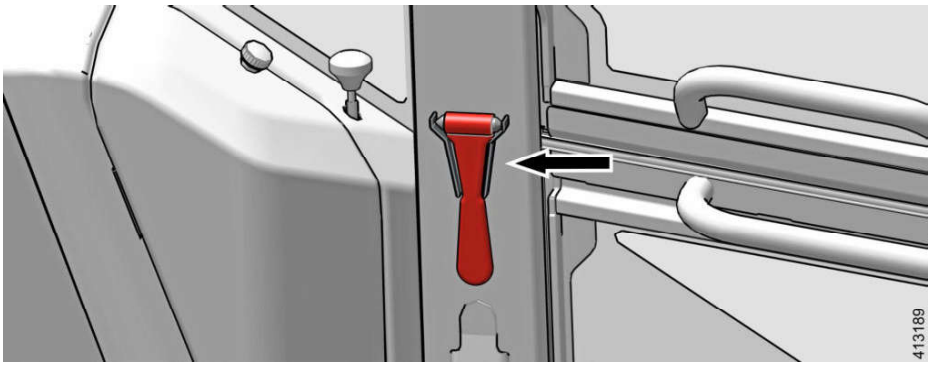



*Fig. 154: Emergency hammer*

The emergency hammer is located in the operator’s cab on the centre left window rail.

- ▶ In emergency situations, use the emergency hammer to break the rear cab window or another cab window, depending on the situation!

LWT/93517492/02/01.08.2019/en

### Adjusting backrest incline

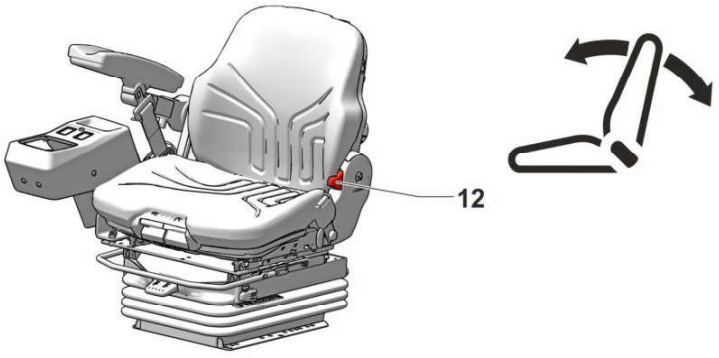



*Fig. 173: Adjusting backrest incline*

**12** *Backrest inclination* handle

▶ Pull *Backrest inclination* handle **12** up.

▶ Adjust backrest to desired incline.

▶ Release *Backrest inclination* handle **12**.

### Adjusting horizontal suspension

Impact loads in travel direction can be absorbed better through the horizontal suspension.

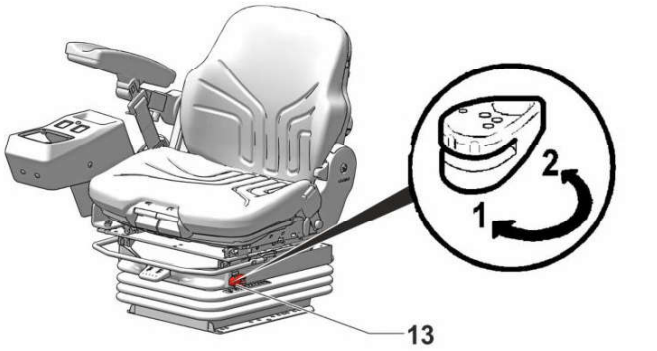



*Fig. 174: Adjusting horizontal suspension*

**1** Horizontal suspension OFF
**2** Horizontal suspension ON
**13** *Horizontal suspension* handle

▶ Move *Horizontal suspension* handle **13** to Horizontal suspension ON **2**.
▷ Horizontal suspension is activated.

▶ Move *Horizontal suspension* handle **13** to Horizontal suspension OFF **1**.
▷ Horizontal suspension is deactivated.

**Troubleshooting**
Can operator's seat be moved to a different position when horizontal suspension is deactivated?

▶ Contact Liebherr customer service.

LWT/93517492/02/01.08.2019/en

## Armrest: horizontal adjustment

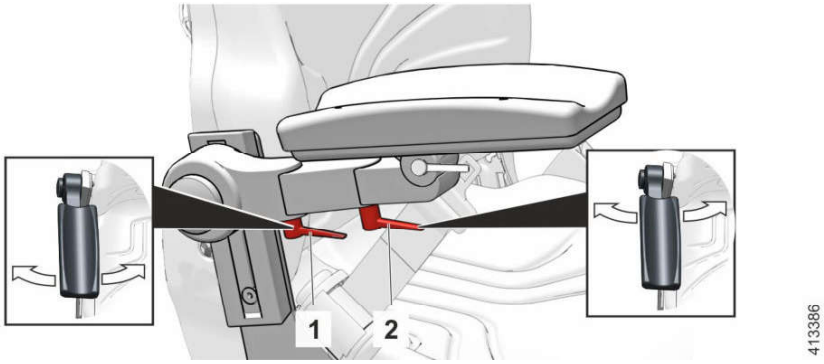



*Fig. 193: Horizontal adjustment*

- ▶ Loosen lever **1** or lever **2**.
- ▶ Adjust the armrest horizontally.
- ▶ Tighten lever **1** or lever **2** again.

## Armrest: adjusting the incline and depth

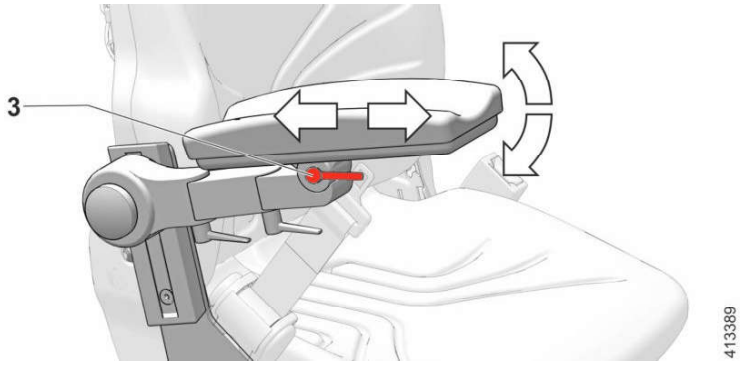



*Fig. 194: Adjusting the incline and depth*

- ▶ Loosen lever **3**.
- ▶ Adjust the incline and depth.
- ▶ Tighten lever **3** again.

## 3.2.7 Steering column and steering wheel

By changing the steering column, the steering wheel distance to the body, the steering wheel height and the steering wheel incline can be changed. The adjustments are infinitely variable.

**WARNING**
Improper steering mode change!
Injury.

- ▶ Set steering mode exclusively when machine is at a standstill.

LWT/93517492/02/01.08.2019/en

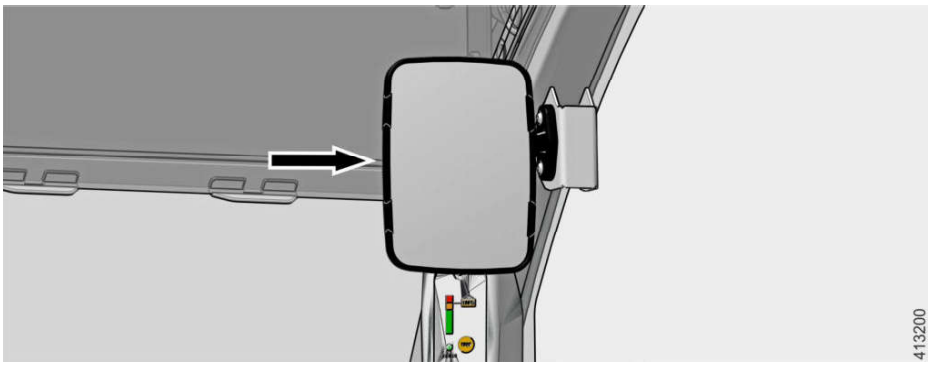



*Fig. 214: Interior mirror*

▶ Adjust the interior mirror before starting to work.

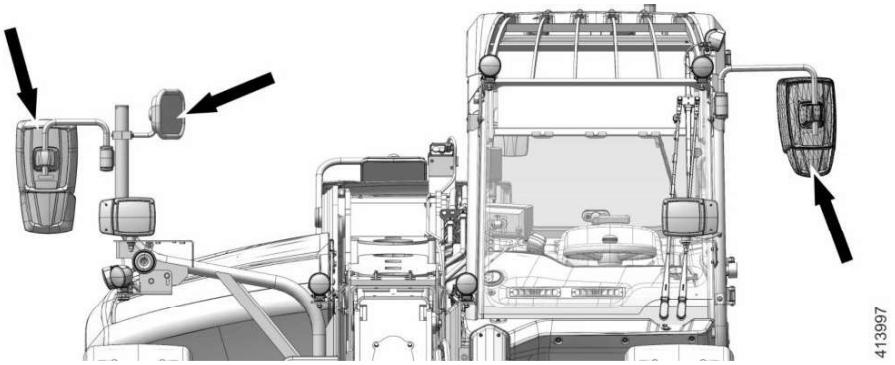



*Fig. 215: Exterior mirror, front*

▶ Adjust the exterior mirror at the front before starting to work.

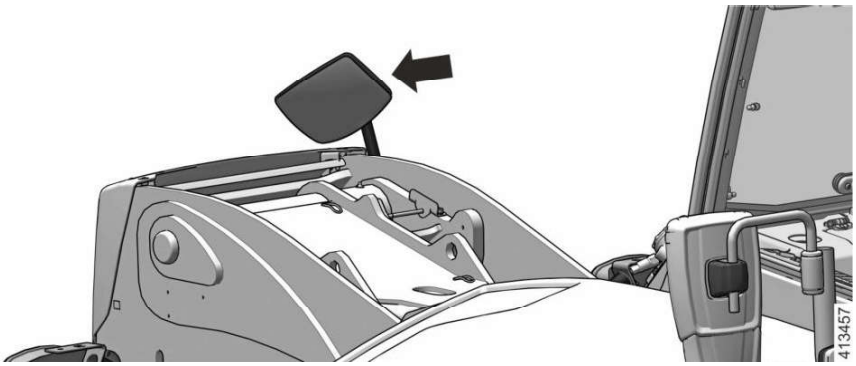



*Fig. 216: Outside mirror, rear*

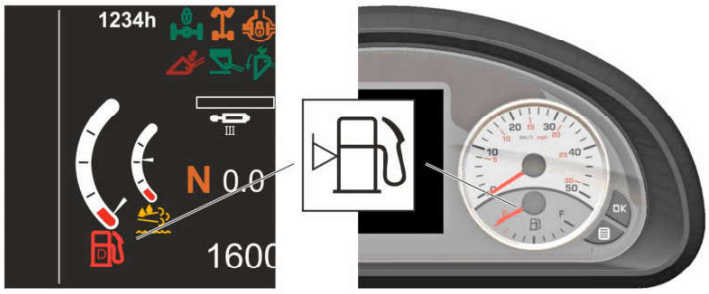
▶ Adjust the outside mirror on the rear before starting to work.

## 3.2.14 Trailer mirror (option)

The trailer mirror needs to be installed if using a trailer coupling.

LWT/93517492/02/01.08.2019/en

## Refuelling with diesel




413838

*Fig. 235: Fuel display*

- ▶ Set starting switch to contact position.
- ▶ Check whether there is enough diesel fuel in the fuel tank on the fuel display.


406952

*Fig. 236: Safety when refuelling*

**DANGER**
Highly flammable fuel and operating fluids!
Danger to life.

- ▶ Smoking, naked lights and fire are prohibited.
- ▶ Exclusively refuel when diesel engine is switched off.

- ▶ Adhere to the safety regulations for refuelling. (For more information see: 2.6.3 Safety guidelines for fire and explosion prevention, page 78)

LWT/93517492/02/01.08.2019/en

## Preparing for travel mode

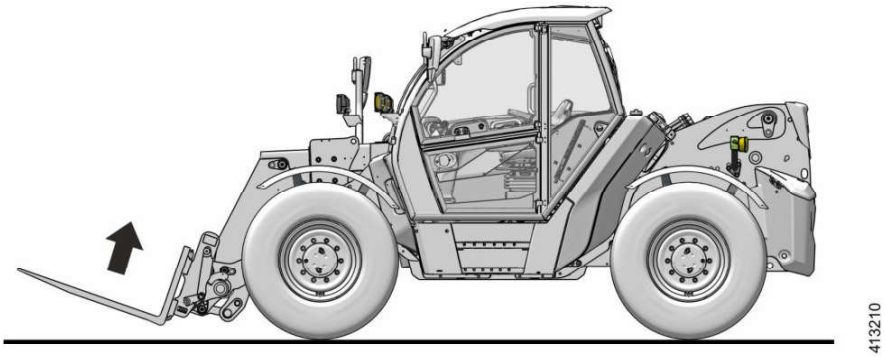



*Fig. 255: Raising working attachment*

▶ Raise working attachment so that no obstacles are touched.

## Releasing parking brake

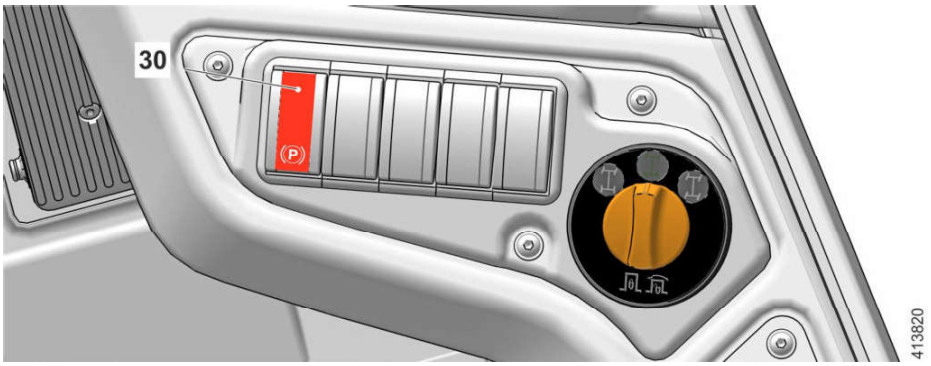



*Fig. 256: Releasing parking brake*

▶ Press *parking brake* switch **30** up.
  ▷ After the machine starts to travel, the *parking brake* symbol goes out on the monitor.

## Bringing machine to operating temperature

If hydraulic oil is too cold, the machine will react sluggishly.

▶ Repeatedly actuate working hydraulic cylinder against stop.
  ▷ The hydraulic oil is thereby brought to operating temperature.

# 3.3.5 Driving

The machine's travel speed should be adapted to suit driving conditions and the load in question.

When driving with a load, drive at low travel speed to retain the manoeuvrability and avoid excessive strain.

When driving with a load, match the travel speed to the respective conditions.

LWT/93517492/02/01.08.2019/en

Prior to commencing on-road travel, make sure you are informed about:
– Whether the necessary conditions for permission to drive on public roads have been met (by the vehicle owner).
– The operating permit.
– Working attachments subsequently mounted to the machine, which may require a separate operating permit.
– The validity of vehicle documentation.
– Special authorisations and resulting requirements and conditions for operation on public roads.
– The relevant safety regulations.
– Instructions for safe travel.
– The road traffic regulations applicable in the country of use.

Prior to commencing on-road travel, take the following precautions:
– Remove the mounted front guard.
– Remove the guard mounted on the front headlights.
– Switch off working headlights.
– Drive exclusively with air-filled tyres.
– Do not tow any trailers or working attachments with the rear coupling (towing coupling).
– Install country-specific packages.
– Unlock the floating axle lock[8)] prior to travel mode.

## Preparing for on-road travel

Stow the safety devices listed below on board, in accordance with the provisions of **German road traffic licensing regulations (STVZO)**.

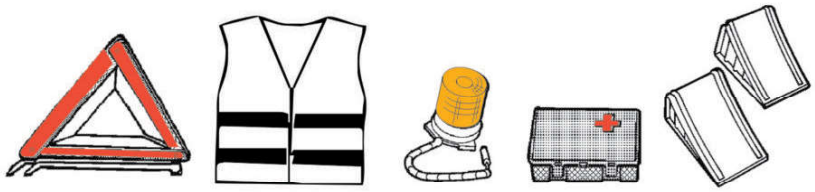



*Fig. 277: Safety equipment*

– Warning triangle
– Safety vest
– Beacon
– First aid kit
– Chock(s)
– Number plate

8) Option

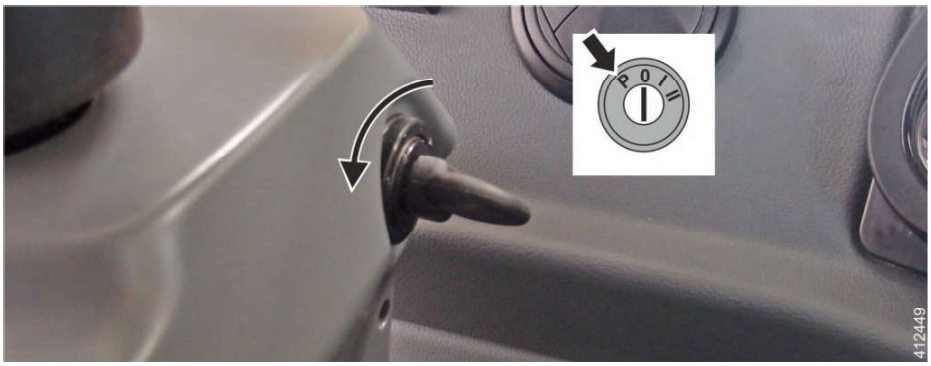



*Fig. 296: Starting switch - park position*

▶ Turn the starting switch to park position.
▷ The radio is operational.

**DANGER**
Unauthorised starting up of the machine!
Risk of fatal injury.

▶ Secured the machine against being started unauthorisedly.

When you leave the machine:
▶ Turn starting switch to zero position and pull ignition key out.

## 3.3.9 Working with the working attachment

### Preparations for working with the working attachment

When working with the working attachment, do not exceed the permitted load rating of the machine.

To ensure that the lifting process is safe, the load curve is binding.

Should the maximum permitted rated load of the working attachment exceed that of the machine, the rated load of the machine is always binding, taking into account possible differences in weight.

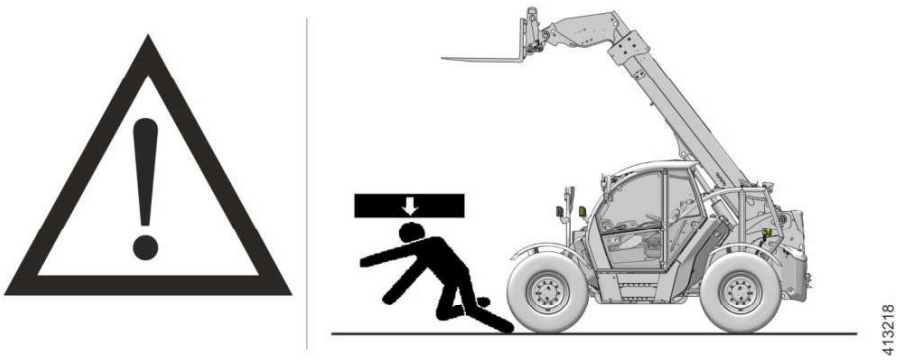



*Fig. 297: Hazardous situation*

LWT/93517492/02/01.08.2019/en

### Setting the flow volume

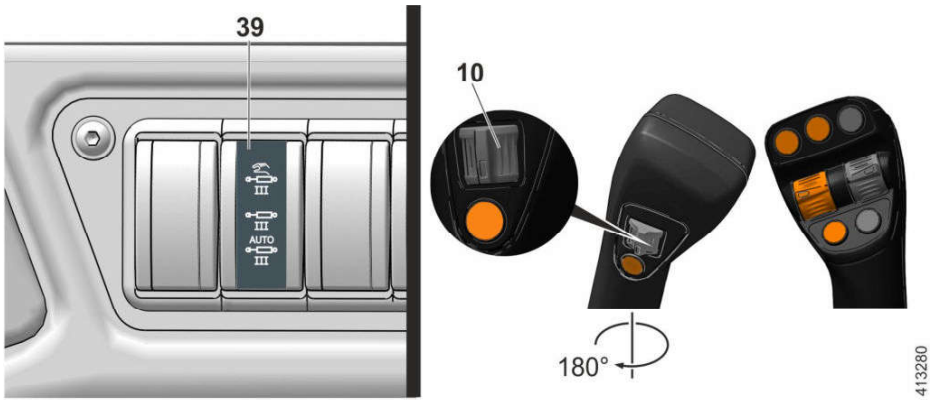



*Fig. 314: Setting control circuit III flow volume*

**10** *Control circuit III* rocker switch **39** *Control circuit III* switch

- ▶ Put *control circuit III* switch **39** into middle position.
  - ▷ *Control circuit III* symbol is shown on the display.
  - ▷ The preset flow volume is displayed and flashes on the display.
- ▶ Press *control circuit III* rocker switch **10** on control lever to the right (+) or left (-).
  - ▷ The flow volume changes in 1% increments.
  - ▷ The flow volume is displayed and flashes on the display.

### Saving and activating the flow volume

- ▶ Press *control circuit III* rocker switch **10** on control lever to the right or left.
- ▶ Press *Control circuit III* switch **39** downwards.
- ▶ Release *Control circuit III* rocker switch **10** on the control lever.
  - ▷ *Control circuit III AUTO* symbol is shown on the display.
  - ▷ The set flow volume is shown on the display.
  - ▷ The set flow volume is stored and archived.

### Deactivating the flow volume

- ▶ Press *Control circuit III* switch **39** again.
  - ▷ *Control circuit III* symbol is shown on the display.
  - ▷ The set flow volume is deactivated.
  - ▷ The set flow volume flashes on the display.
- ▶ Press *control circuit III* rocker switch **10** on control lever to the right or left.
  - ▷ *Control circuit III* symbol is shown on the display.
  - ▷ The set flow volume is deactivated.
  - ▷ The set flow volume flashes on the display.

## Control circuit III change over (option)

For working attachments with additional hydraulic functions.

LWT/93517492/02/01.08.2019/en

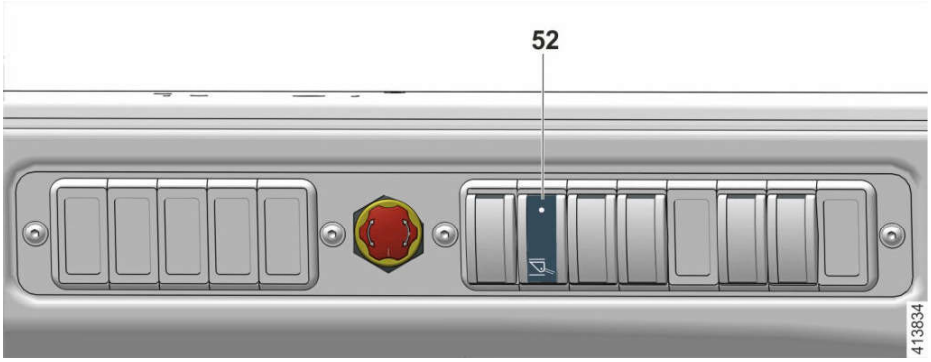



*Fig. 330: Tipping cylinder lock*

**52** *Tipping cylinder lock* switch

Activating the tipping cylinder lock
▶ Press *tipping cylinder lock* switch **52** down.
  ▷ The *tipping cylinder lock* symbol is shown on the display.
  ▷ Tilting the working attachment in and out is deactivated.

Deactivating the tipping cylinder lock
▶ Press *tipping cylinder lock* switch **52** up.
  ▷ *Tipping cylinder lock* symbol goes out on the display.
  ▷ Tilting the working attachment in and out is activated.

## Shake/vibrate function (option)

### Activating the shake/vibrate function

Ensure that following requirements are met:
❑ The working hydraulics are unlocked.
❑ The bucket is not in the end position.


*Fig. 331: Activating the shake/vibrate function*

▶ Deflect the joystick repeatedly to the left and to the right via the tilt axle.

▶ Keep the joystick deflected.
  ▷ The shake/vibrate function is activated.
  ▷ *Shake/vibrate function* symbol is shown on the display.

LWT/93517492/02/01.08.2019/en

▶ Lower the pull device.

▶ Swing hold-down device **1** back into travel direction.
▷ Hold-down device **1** is above the ball head **5**.

▶ Secure hold-down device **1** with pins **6** and locking pins **7**.

▶ Check whether the pull device of trailer is securely locked in the trailer coupling.

▶ Connect the hydraulic connections, compressed air connections and electrical connections.

### Disconnecting the trailer

Ensure that following requirements are met:
❑ Trailer is secured against rolling away.

▶ Loosen the hydraulic connections, compressed air connections and electrical connections.

▶ Loosen upper locking pin **7**.

▶ Pull out upper pin **6**.

▶ Swing hold-down device **1** to side by 90°.

▶ Raise pull device with a suitable device.

▶ Slowly move machine forward.

## Cuna trailer coupling, height adjustable

### Height adjustment of trailer coupling

Adjust the Cuna trailer coupling to height of trailer prior to attachment.

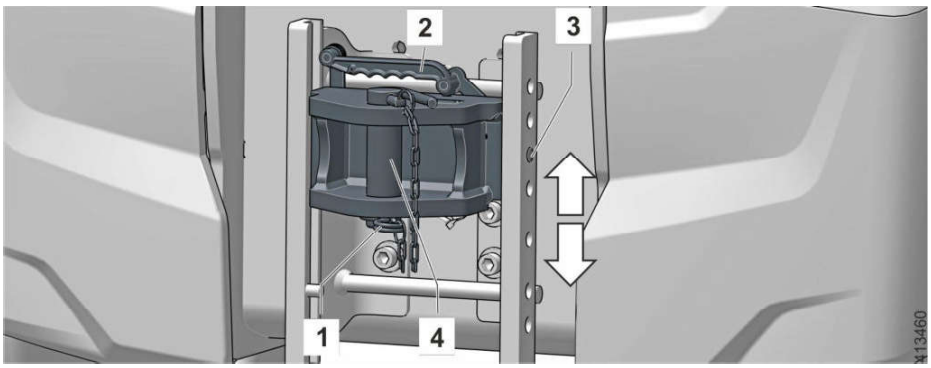



*Fig. 345: Cuna trailer coupling, height adjustable*

**1** Cotter pin
**2** Handle
**3** Locking pin
**4** Coupling pin

▶ Pull handle **2** up and to the right.
▷ Locking pins **3** are retracted.

▶ Move the trailer coupling up or down.

Once the desired height is reached:
▶ Let go of handle **2**.
▷ The locking pins **3** lock in place in the receptacle plate.

LWT/93517492/02/01.08.2019/en

## Connecting the compressed air hoses

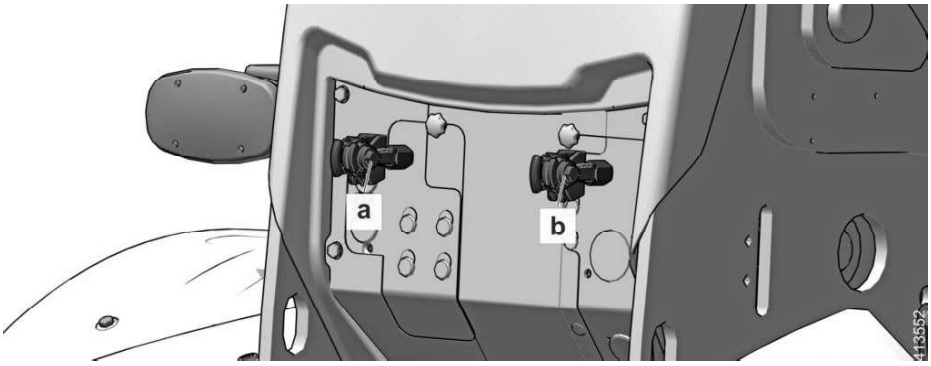



*Fig. 356: Coupling heads, air brake system*

- ▶ Attach the trailer to the trailer coupling .
- ▶ Clean the coupling heads on the compressed air hoses and compressed air connections.

**WARNING**
Incorrect connection of compressed air hoses!
Danger to life.

**Connection of compressed air hoses:**
- ▶ Always start by connecting to the yellow coupling head.

- ▶ First connect the compressed air hose to the yellow coupling head **a**.
- ▶ Then connect the compressed air hose to the red coupling head **b**.

## Pressure gauge for air brake system

The air brake system is not ready for use until an air pressure of between 6.5 and 8.5 bar is displayed.

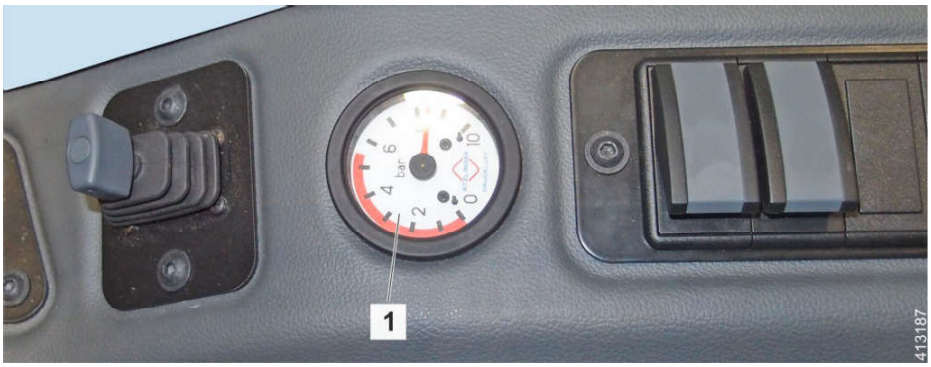



*Fig. 357: Air brake system pressure gauge*

- ▶ Allow the diesel engine to run at a standstill until the air brake system is filled.
- ▶ Read air pressure off of pressure gauge **1**.
  - ▷ Air pressure is reached: Put the air brake system into service.

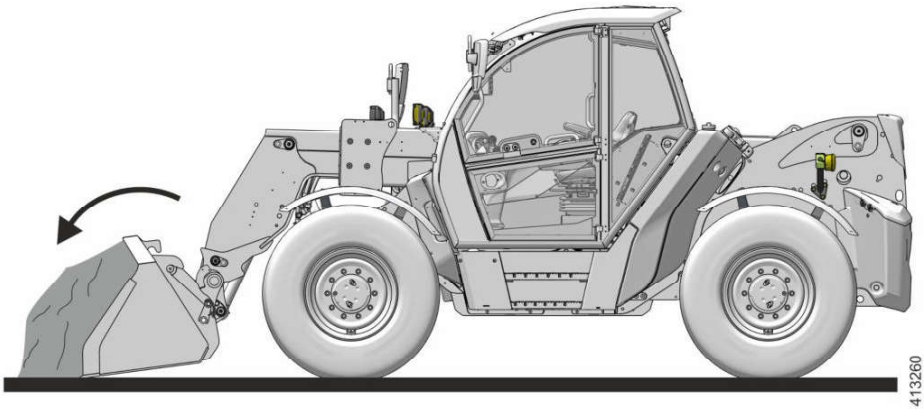



*Fig. 375: Empty the bucket*

▶ Tilt the bucket out.

**Troubleshooting**
If material sticks to the inside of the bucket:

▶ Tilt the bucket in and out quickly and retract and extend the tilt cylinder completely while doing so.

▶ Activate the shake/vibrate function.

## Grading work

During grading, hold the bottom of the bucket horizontally.

**NOTICE**
Incorrect use of working attachment!
Damage to machine.

▶ Do not grade in forward travel direction with working attachment tilted out.

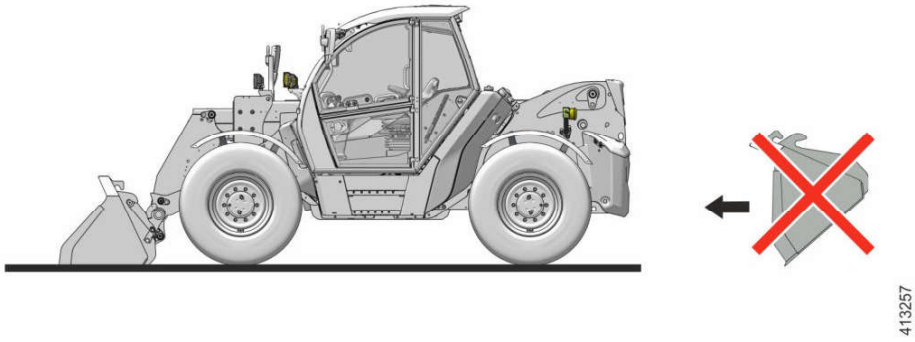



*Fig. 376: Grading*

▶ Align the bottom of the bucket again so that it is parallel to the ground.

▶ Drive forward.

LWT/93517492/02/01.08.2019/en

- ❑ The telescopic boom is completely retracted.
- ❑ The working attachment lies flat on the ground.

## Installing the working attachment

**WARNING**
Working attachment falling over!
Risk of injury.

▶ Make sure the working attachment is secured against falling over or rolling away.

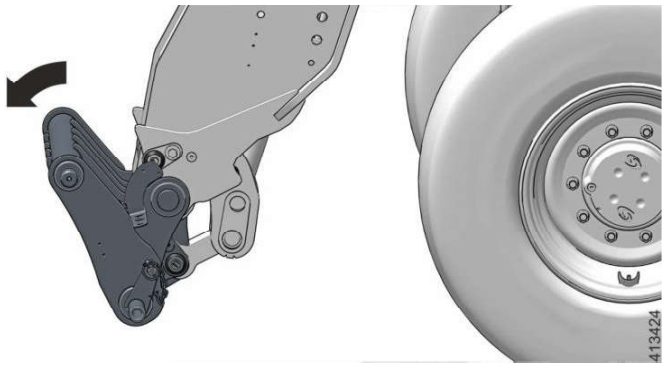



*Fig. 391: Tilt the mechanical quick coupler.*

▶ Tilt the mechanical quick coupler to the front.

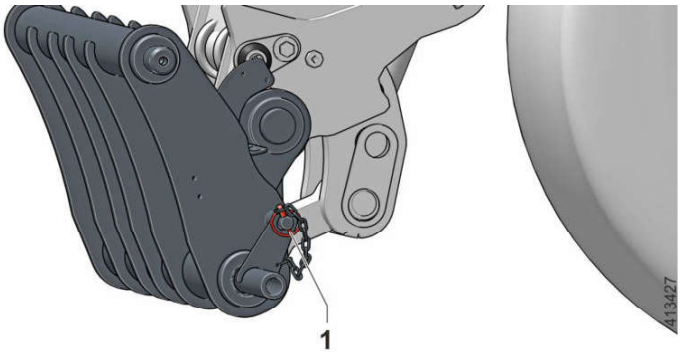



*Fig. 392: Release the lock*

**1** Cotter pin

▶ Pull the cotter pin **1** out of the locking mechanism.


*Fig. 412: Relieving hydraulic pressures*

**10** *Control circuit III* rocker switch

▶ Turn *Control circuit III* rocker switch **10** to the right and left.
▷ The pressure in the hydraulic lines is relieved.

## Control circuit III pressure relief (option)

For quickly relieving pressure in the control circuit III and control circuit III high flow hydraulic lines.

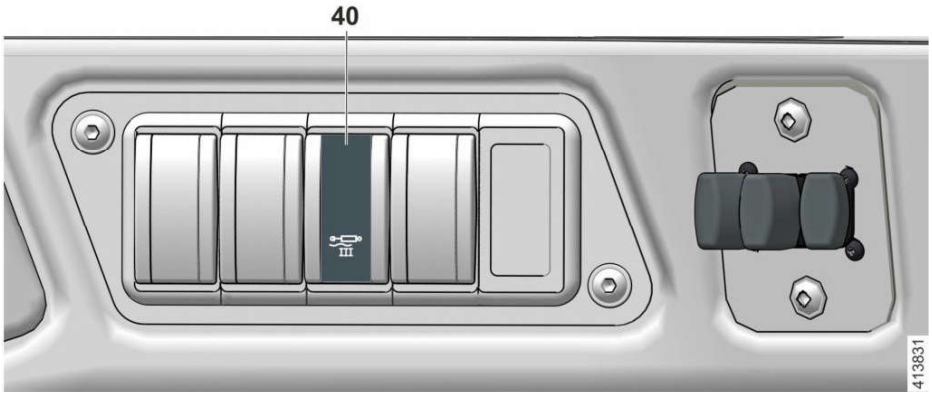



*Fig. 413: Pressure relief button*

**40** *Control circuit III pressure relief* button

▶ Press *Control circuit III pressure relief* button **40** for 5 to 10 seconds.
▷ *Control circuit III pressure relief* symbol is shown on the display.
▷ The pressure in the hydraulic lines is relieved.

**OR**

LWT/93517492/02/01.08.2019/en

**Front socket (option)**

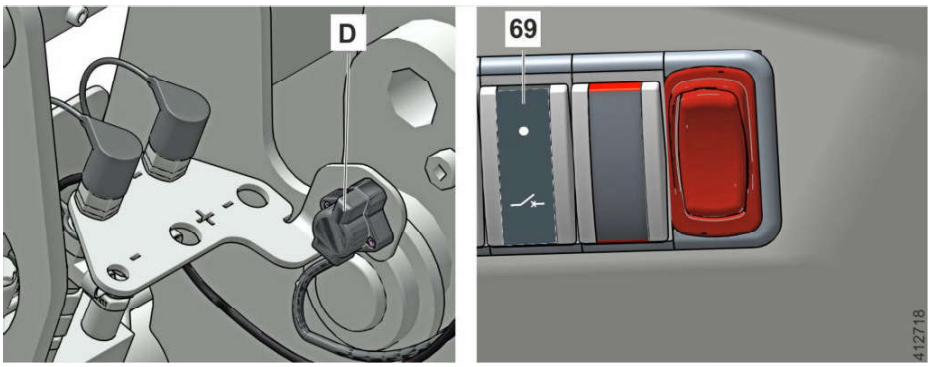



*Fig. 432: Location of front socket*

**D** Front socket

**69** *Front socket* switch

▶ Press *front socket* switch **69** up.
▷ The front socket **D** is without current.

▶ Disconnect cables for working attachment from front socket **D**.

## Unlocking and disconnecting working attachment

**WARNING**
Working attachment falling over!
Risk of injury.

▶ Make sure the working attachment is secured against falling over or rolling away.

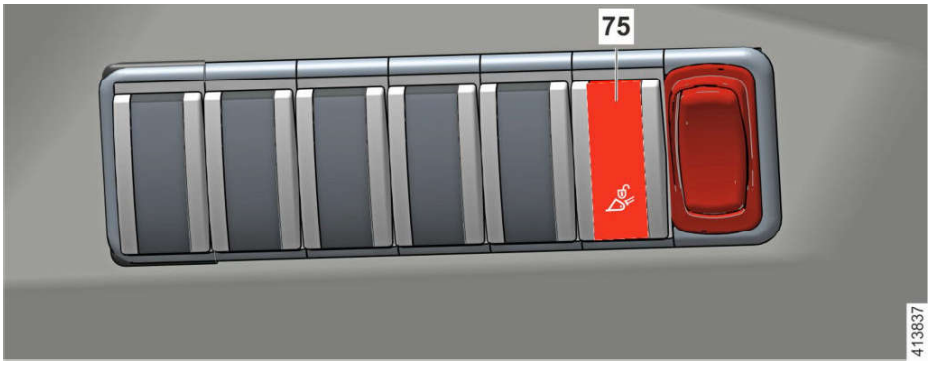



*Fig. 433: Hydraulic quick coupler button*

**75** *Hydraulic quick coupler* button

▶ Press and hold *Hydraulic quick coupler* button **75**.
▷ *Hydraulic quick coupler* indicator light **10** lights up on display unit.

LWT/93517492/02/01.08.2019/en

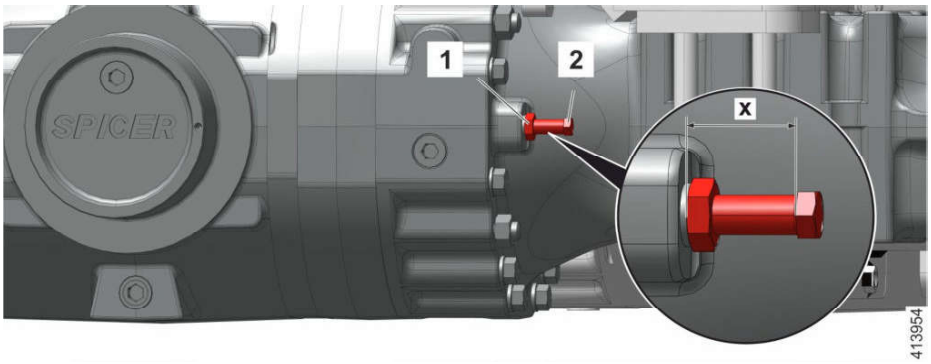



*Fig. 451: Loosening the counter nut*

- ▶ Loosen the locknut **1**.
- ▶ Screw in the counter nut **1** 8 mm in the direction of the screw head.

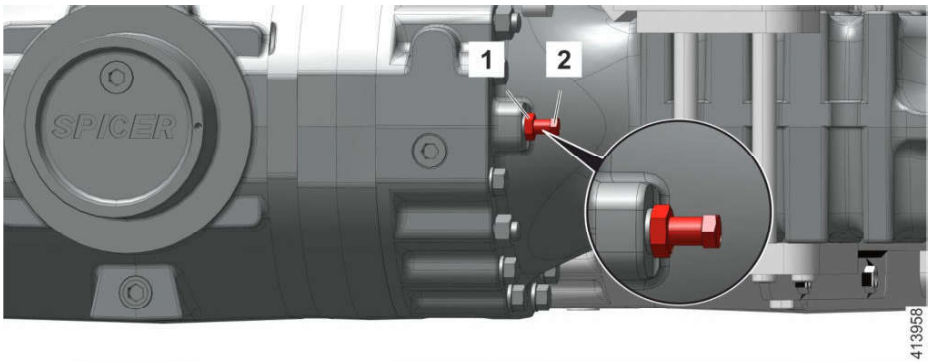



*Fig. 452: Releasing parking brake*

- ▶ Screw in the screw **2** until the counter nut **1** touches the attachment point.
- ▶ However, do not tighten the counter nut **1** by more than one turn.

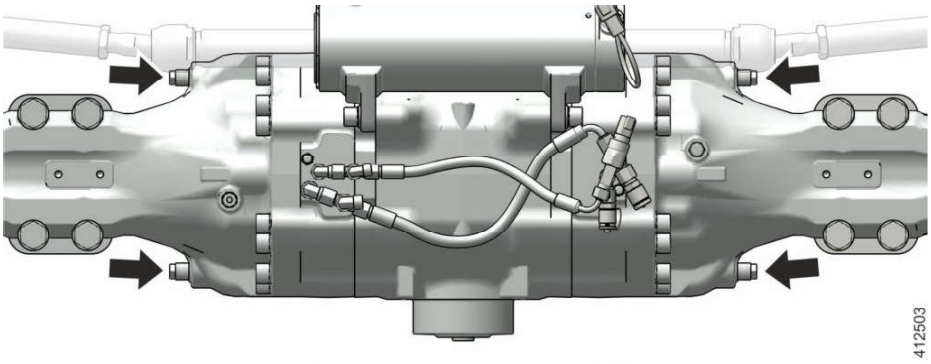



*Fig. 453: Hex head screws on the front axles*

- ▶ Carry out this procedure for all 4 hex head screws on the front axle.
  - ▷ The parking brake is released.
  - ▷ The machine is unbraked.

LWT/93517492/02/01.08.2019/en

| SPN | FMI | Component | Problem detected | Possible cause | Effect | Remedy |
|---|---|---|---|---|---|---|
| 001619 | 02 | Joystick travel direction switch | Value: measured travel direction signals are implausible (two directions simultaneously); Prof.: redundant CAN signal faulty | Value: travel direction switch defective; Prof.: faulty CAN communication | Machine response: limited mode | Contact Liebherr customer service. |
| 001619 | 11 | Travel stage adjustment joystick / CAN 1 - communication I | Error in corresponding CAN signal reported or redundant CAN signal faulty | Error detected on the joystick (joystick also sends error code); or communication error on CAN | Travel stage cannot be adjusted | Contact Liebherr customer service. |
| 001638 | 00 | Hydraulic oil temperature sensor | Calculated hydraulic oil temperature higher than safety threshold (95 °C) for 4000 ms | Hydraulic oil cooling defective; heat sink contaminated; excessive use of all sections simultaneously; | No machine response | Contact Liebherr customer service. |
| 001638 | 03 | Hydraulic oil temperature sensor | Measured resistance too high (>2420 Ohm) | Cable break; temperature higher than 200 °C | No machine response; temperature measurement not functioning; 214 °C is assumed; fan rotates at maximum speed | Contact Liebherr customer service. |
| 001638 | 04 | Hydraulic oil temperature sensor | Measured resistance too low (<730 Ohm) | Short circuit to ground; temperature lower than -50 °C | No machine response; temperature measurement not functioning; 214 °C is assumed; fan rotates at maximum speed | Contact Liebherr customer service. |
| 001638 | 16 | Hydraulic oil temperature sensor | Calculated hydraulic oil temperature higher than warning threshold (90 °C) for 4000 ms | Hydraulic oil cooling defective; heat sink contaminated; excessive use of all sections simultaneously; | No machine response | Contact Liebherr customer service. |
| 001815 | 02 | Relay, brake light | Measured output signal does not correspond to the command | Short circuit or broken cable | Brake light cannot be controlled | Contact Liebherr customer service. |

LWT/93517492/02/01.08.2019/en

| SPN | FMI | Component | Problem detected | Possible cause | Effect | Remedy |
|---|---|---|---|---|---|---|
| 520239 | 04 | Manual throttle, mini-joystick | Measured voltage too low: <300 mV | Broken cable; short circuit to ground | Manual throttle not available | Contact Liebherr customer service. |
| 520240 | 09 | CAN 1 / communication I | No communication between the display and work control | CAN line to work control disconnected; work control not supplied | No machine response; various displays not available | Contact Liebherr customer service. |
| 520241 | 02 | Resistance circuit | Resistance value not in defined range for more than 500 ms; defined ranges: 1.4 to 1.6 kOhm; 2.81 to 3.2 kOhm; 6 to 6.42 kOhm; 7.4 to 8.02 kOhm | One of the resistances faulty; temperature of the resistances outside of range -40 to +80 °C | Continuous function working circuit not available | Contact Liebherr customer service. |
| 520241 | 03 | Resistance circuit | Resistance value higher than 8020 Ohm for more than 500 ms | Cable break | Continuous function working circuit not available | Contact Liebherr customer service. |
| 520241 | 04 | Resistance circuit | Resistance value lower than 1400 Ohm for more than 500 ms | Short circuit to ground | Continuous function working circuit not available | Contact Liebherr customer service. |
| 520242 | 05 | Rear axle floating blocking solenoid valves | Measured current lower than 220 mA / overload detected at the control unit output for more than 2000 ms | Cable break / current load at the output too high | Rear axle floating blocking permanently active! | Contact Liebherr customer service. |
| 520242 | 06 | Rear axle floating blocking solenoid valves | Measured output signal does not correspond to the command for more than 2000 ms | Short circuit to supply | Rear axle floating blocking permanently active! | Contact Liebherr customer service. |
| 520242 | 14 | Rear axle floating blocking solenoid valves | Shut off detected in control unit safety circuit | Short circuit to supply; error in the control unit safety circuit; error in the output end stage; internal supply to the control unit output defective | Rear axle floating blocking permanently active! | Contact Liebherr customer service. |

LWT/93517492/02/01.08.2019/en

| SPN | FMI | Component | Problem detected | Possible cause | Effect | Remedy |
|---|---|---|---|---|---|---|
| 520263 B) | 05 | Fan reversing valve | Measured current lower than 220 mA / overload detected at the control unit output for more than 2000 ms | Cable break / current load at the output too high | Reverse fan not available | Contact Liebherr customer service. |
| 520263 A) | 05 | Fan reversing valve | Measured current too low for more than 2000 ms | Broken cable / short circuit to supply | Reverse fan not available | Contact Liebherr customer service. |
| 520263 B) | 06 | Fan reversing valve | Measured output signal does not correspond to the command for more than 2000 ms | Short circuit to supply | Reverse fan not available | Contact Liebherr customer service. |
| 520263 A) | 06 | Fan reversing valve | Measured overload at the control unit output: greater than 5 A | Current load at the output too high | Reverse fan not available | Contact Liebherr customer service. |
| 520263 | 14 | Fan reversing valve | Shut off detected in control unit safety circuit | Short circuit to supply; error in the control unit safety circuit; error in the output end stage; internal supply to the control unit output defective | Reverse fan not available | Contact Liebherr customer service. |
| 520264 | 02 | Additional control circuit 5 A proportional valve | Measured current too high or too low: by 100 mA (by 10 mA in idle state) too high/too low for 2000 ms | Broken cable; short circuit to ground | Additional control circuit 5 side A not available | Contact Liebherr customer service. |
| 520264 | 06 | Additional control circuit 5 A proportional valve | Overload detected at the control unit output: greater than 5 A | Current load at the output too high | Additional control circuit 5 side A not available | Contact Liebherr customer service. |
| 520264 | 14 | Additional control circuit 5 A proportional valve | Shut off detected in control unit safety circuit | Short circuit to supply; error in the control unit safety circuit; error in the output end stage; internal supply to the control unit output defective | Additional control circuit 5 side A not available | Contact Liebherr customer service. |

LWT/93517492/02/01.08.2019/en

| SPN | FMI | Component | Problem detected | Possible cause | Effect | Remedy |
|---|---|---|---|---|---|---|
| 521311 | 00 | Joystick | CAN (BJM) timeout error detected | | Joystick safe state | Contact Liebherr customer service. |
| 521312 | 00 | Joystick | CAN (EJM) timeout error detected | | Joystick safe state | Contact Liebherr customer service. |
| 521317 | 00 | Joystick | Stack overflow error detected | | Joystick safe state | Contact Liebherr customer service. |
| 521318 | 00 | Joystick | Logic program flow monitoring error detected | | Joystick safe state | Contact Liebherr customer service. |
| 521319 | 00 | Joystick | Temporal program flow monitoring error detected | | Joystick safe state | Contact Liebherr customer service. |
| 521320 | 00 | Joystick | Measured supply voltage 1 (5 V) too high or too low | | Joystick safe state | Contact Liebherr customer service. |
| 521322 | 00 | Joystick | Measured supply voltage 2 (5 V) too high or too low | | Joystick safe state | Contact Liebherr customer service. |

*Tab. 35: Service codes*

A) T32-7S-T55-7S, T35-6S, T33-10S, T60-9S
B) T32-7-T41-7, T35-6, T33-10

LWT/93517492/02/01.08.2019/en

| Malfunction / error | Cause | Remedy |
|---|---|---|
| The function of the pump (pump operating time or cycle time) does not correspond to the values set in the protective window of the control system | The operating mode or adjustment range of the control system was changed but the sticker in the protective window was not replaced | Create a diagnostic analysis using the BEKA-DiSys diagnostics software |
| | | Adjust the setting according to the sticker in the protective window of the control system or replace the sticker |

LWT/93517492/02/01.08.2019/en

**Customer:**.....Machine type:.....Serial no.:.....Operating hours:.....Date:.....

| Maintenance / inspection after service hours | | | | | | | | Tasks to be performed | | |
|---|---|---|---|---|---|---|---|---|---|---|
| On handover | All 8-10 h | All 50 h | All 500 h | All 1000 h | All 2000 h | Other intervals | Additional labelling | **By maintenance staff**<br>■ Once-only activity<br>● Repeat interval<br>✦ If necessary<br>❄ Annually before the winter<br>**By authorised specialist staff**<br>☐ Once-only activity<br>❍ Repeat interval<br>✧ If necessary<br>**Additional labelling**<br>Assistance required<br>Have this task carried out exclusively by a certified electrician | Confirm tasks | See page |
| | | | ❍ | ❍ | ❍ | ✧ | | Fuel: change filter cartridges | | |
| | | | | | | ✦ | | Fuel tank: draining condensation and sediments | | 375 |
| | | | ❍ | ❍ | ❍ | | | Check the fuel system for leaks and condition | | |
| **Air filter system** | | | | | | | | | | |
| | | | ❍ | ❍ | ❍ | ✦ | | Change air filter main filter element (when the indicator light lights up, at least once a year) | | 376 |
| | | | | | | ✦ | | Change air filter safety element (after 3 exchanges of main element) | | 376 |
| | ● | ● | ❍ | ❍ | ❍ | | | Air filter: cleaning the service cover and dust discharge valve | | 379 |
| **Hydraulic system** | | | | | | | | | | |
| ☐ | ● | ● | ❍ | ❍ | ❍ | | | Checking the oil level in the hydraulic tank and topping up oil | | 381 |
| | | | | | ❍ | | | Changing the tank vent filter on the hydraulic tank | | |
| | | | ☐ | ❍ | ❍ | | | Change return filter insert (when the indicator light lights up with hydraulic oil at operating temperature) | | |
| | | | ❍ | ❍ | ❍ | | | Hydraulic system: change supply circuit filter | | |
| ☐ | | | ☐ | ❍ | ❍ | | | Check the hydraulic system for leaks | | |
| | | | | | | ❍3000 h | | Hydraulic tank - Change Liebherr hydraulic oil. Pay attention to the notes for oil analysis and dust intensive application! | | |
| | | | | | ❍ | | | Hydraulic tank - Change hydraulic oil of third party manufacturers. Pay attention to the notes for oil analysis and dust intensive application! | | |
| | | | ☐ | ❍ | ❍ | | | Hydraulic system: checking and adjusting hydraulic pressures according to adjustment check list | | |
| **Electrical system** | | | | | | | | | | |
| ☐ | ● | ● | ❍ | ❍ | ❍ | | | Check lighting | | 383 |
| | | | | ❍ | ❍ | | | Checking the battery connections for tight seating | | |
| | | | | ❍ | ❍ | ✧ | | Check battery fluid level (at least 1 x a year) | | |
| | | | ❍ | ❍ | ❍ | | | Battery: checking the condition and correct routing of the degassing hose | | |
| ☐ | ● | ● | ❍ | ❍ | ❍ | | | Electrical system: Checking function of load torque limitation | | 383 |
| | | | ☐ | ❍ | ❍ | | | Check control system of travel hydraulics and working hydraulic according to adjustment check list | | |

LWT/93517492/02/01.08.2019/en

| Ambient temperature | Mixing ratio |
|---|---|
| Up to -50 °C | 40 % Water / 60 % anti-freeze and corrosion protection agent |
| Up to -37 °C | 50 % Water / 50 % anti-freeze and corrosion protection agent |

*Tab. 50: Mixing ratio*

### Minimum quality requirement

| Specification |
|---|
| LH-01–COL3A |

*Tab. 51: Minimum quality requirement*

When using coolants of third party manufacturers, information about the change intervals is to be obtained from respective manufacturer or supplier.

## 5.3.5 Hydraulic oils

### Liebherr recommendation

| Ambient temperature | Name |
|---|---|
| | **Liebherr Mineral oil** |
| 15 to 55 °C | Liebherr Hydraulic Basic 100 |
| 10 to 45 °C | Liebherr Hydraulic Basic 68 |
| -20 to 40 °C | Liebherr Hydraulic HVI |
| | **Liebherr PAO[18] biodegradable** |
| -25 to 45 °C | Liebherr Hydraulic Plus |
| -40 to 30 °C | Liebherr Hydraulic Plus Arctic |

*Tab. 52: Liebherr recommendation*

### Minimum quality requirement

| Specification |
|---|
| EMT LH-00-Minimum-HYE |

*Tab. 53: Minimum quality requirement*

When using hydraulic oils or filters of third party manufacturers, information about the change intervals is to be obtained from the respective manufacturer or supplier.

[17] Premix = prepared mix (50 % water and 50 % anti-freeze and corrosion protection agent)
[18] PAO = Poly-alpha-olefin

LWT/93517492/02/01.08.2019/en


*Fig. 497: Opening engine bonnet*

▶ Unlock the lock with the key.

**WARNING**
Faulty gas cylinders!
Injury.

▶ Ensure that the open position is maintained by the gas cylinders.

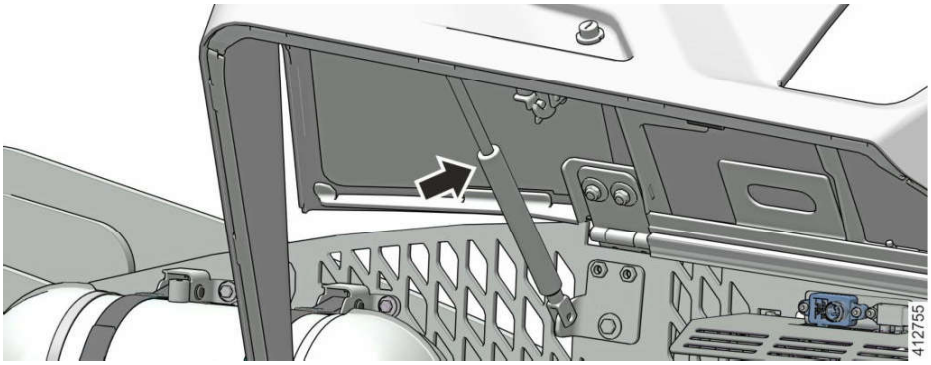



*Fig. 498: Gas cylinder*

▶ Open engine bonnet.
▷ Engine bonnet is held in this position by the gas cylinders.

**Troubleshooting**
Engine bonnet is not held?

▶ Replace the faulty gas cylinders.

**DANGER**
Hot exhaust system!
Beware of burns.

▶ Let the exhaust system cool down.

LWT/93517492/02/01.08.2019/en

# 5.7 Cooling system

## 5.7.1 Cooling system: checking the coolant level

### Checking the coolant level

Expansion tank with filler pipe is located in the engine compartment.

Ensure that following requirements are met:
- ❑ Engine bonnet is open.
- ❑ Diesel engine has cooled down.


*Fig. 510: Coolant container*

When the coolant is below the mark **MIN**:
▶ Top up the coolant.

### Topping up coolant

The coolant to be added must have the correct anti-freeze concentration.


*Fig. 511: Risk of scalding*

**CAUTION**
Hot. pressurised liquid!
Beware of burns.

▶ Let the engine cool down.

# 5.10 Hydraulic system

## 5.10.1 Checking the oil level in the hydraulic tank and topping up oil

### Checking the hydraulic oil level

Ensure that following requirements are met:
❑ The hydraulic oil is cold.

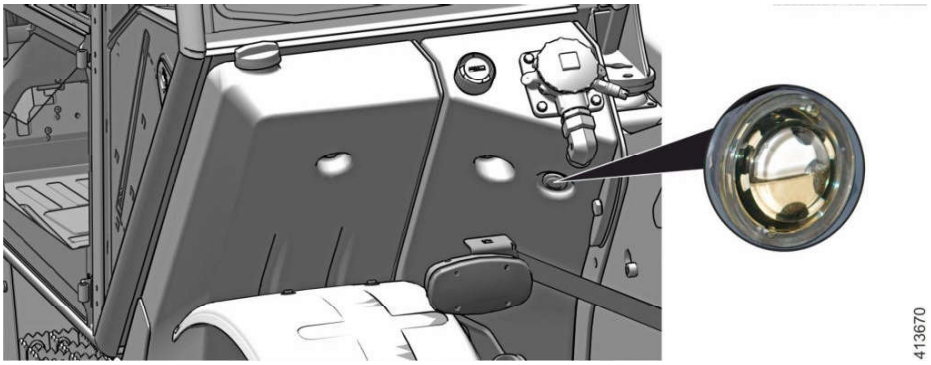



*Fig. 524: Sight gauge*

▶ Check the oil level on the sight gauge.

If the hydraulic oil is not visible in the sight gauge:
▶ Top up hydraulic oil.

### Topping up hydraulic oil

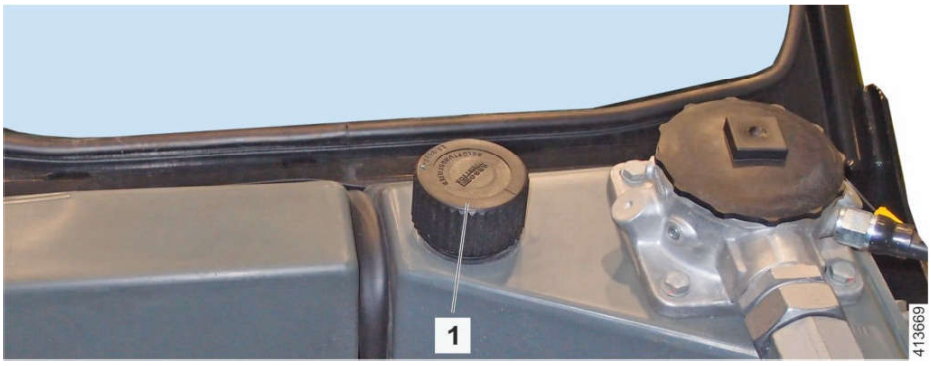



*Fig. 525: Tank vent filter*

▶ Unscrew the tank vent filter **1** on the hydraulic tank.

LWT/93517492/02/01.08.2019/en

# 5.15 Axles, tires

## 5.15.1 Wheels: checking mounting tightness of wheel lugs

Make sure that a torque wrench for a measuring range in excess of 630 Nm is to hand.

**Note**

▶ Carry out one-off intervals at 50, 100 and 250 operating hours after every wheel change as well!


*Fig. 537: Check the wheel lugs*

Tightening torque of wheel lugs = 630 Nm.

▶ Check all wheel lugs of all four wheels for the required tightening torque.

## 5.15.2 Tyres: checking and adjusting air pressure in tyres

The tyre pressure has a considerable influence on the overall operation of machine.

The air pressure of the tyres is dependent on the tyres, on how the machine is used and on the working attachment that is attached.

Ensure that following requirements are met:
- ❑ Machine is parked on level and solid ground.
- ❑ The correct specified values for the tyre air pressure are available.
- ❑ The tyres are cold.

LWT/93517492/02/01.08.2019/en