Linde Forklift Truck

Linde Material Handling

Linde

Original instructions

H120-1200, H140-1200,
H160, H160-1200

3588011601 EN – 12/11

Linde - Your partner

Linde, an enterprise operating worldwide in the investment and service sector, is one of the large industrial enterprises in the EC with its three business segments and six divisions.

The Linde Material Handling division is a leading manufacturer of industrial trucks and hydraulics. It includes eight manufacturing plants in the Federal Republic of Germany, France and Great Britain, as well as subsidiaries and branches in all economically important countries.

Linde industrial trucks enjoy a worldwide reputation - thanks to their high quality in engineering, performance and service.

Wishing you satisfactory operation,

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Annex

1

Introduction

Your Linde truck

Linde lift trucks offer the best in economy, safety and driving convenience. Therefore it is mainly in the hands of the operator to preserve the qualities of the trucks for a long and profitable service life and to make full use of their benefits on the job. For attachments, the proprietary operating instructions supplied with them are applicable. Follow all hints for operating the lift truck and carry out the maintenance and care prescribed in the inspection and maintenance schedule regularly, on time and with the specified lubricants. This manual tells you all you need to know about starting, running, servicing and maintaining your lift truck. The terms “front”, “rear”, “left” and “right” refer to the position in which the item concerned is installed in the truck, looking forward in the travel direction.

Approved applications Linde lift trucks are designed for transporting and lifting the loads stated in the load capacity diagram. In particular, we refer to the attached VDMA booklet "Safety rules for industrial trucks" and accident prevention rules of your trade association and the special measures required for driving on public roads in accordance with the traffic regulations. The safety rules for the use of industrial trucks must be followed under all circumstances by the responsible persons, especially by the operator and service personnel. The user, and not Linde, is responsible for any danger arising from applications not authorised by the manufacturer. If you desire to use the truck for applications not mentioned in the manual and convert or supplement it for this purpose, please first contact your authorised dealer. No changes, especially conversions or modifications, may be made on your truck without the prior permission of the manufacturer. Only qualified persons authorised by Linde are allowed to service the trucks. To keep your warranty valid, keep a record of all maintenance services.

 Linde pursues a policy of continuous progress in the design and construction of its products. As a result, the illustrations and technical details referring to design, fittings and engineering of lift trucks are subject to change if progress warrants it. Therefore, the manufacturer will not accept any claims based on the specifications, illustrations and descriptions contained in this operating manual. Please submit all enquiries concerning your truck and all orders for spare parts to your authorized distributor, making sure to state your correct shipping address. For repairs, use only genuine Linde spare parts to ensure that your Linde truck will maintain its original technical standard.

- Lift truck model:.....
- Serial no./year built:.....
- Handing-over date:.....

When ordering parts for the engine, mast, drive motors, drive pumps, steer axle, hydraulic pump and transmission, also state the serial number of the assembly. When taking over the lift truck, transfer the details from the assembly type plates into this operating manual.

Truck takeover Every truck undergoes careful inspection before leaving the factory in order to make sure that it will be in satisfactory condition and fully equipped as ordered when delivered to the customer. Authorised distributors are under obligation to re-inspect the truck before delivery and to hand it over in good order. In order to avoid later complaints and inconvenience to customers, you are requested to ascertain that the truck is in satisfactory condition and fully equipped at the time of delivery and to acknowledge orderly handing/taking over of the truck in the manufacturer’s certificate of conformity.

The following technical documents are supplied with each truck:

- 1 Operating instructions
- 1 EC certificate of conformity (The manufacturer certifies that the industrial truck conforms to EC guidelines for machines)
- 1 Safety rules for the use of industrial trucks (VDMA)

We wish you satisfactory operation.

Linde Material Handling

Technical Description

General

Series 358 fork lift trucks are designed for loading and stacking loads up to: 12.0 tonnes with the H120, 14 tonnes with the H140 and 16.0 tonnes with the H160 at 1200 mm load centre. The low centre of gravity and optimum weight distribution ensure maximum stability in all operating conditions.

Engine

A 6 cylinder, turbo charged, direct injection diesel engine, providing 129.5 kW at 2200 rpm, as a power unit. The engine drives an automatic electrically controlled three speed power shift transmission. Transmission inching is activated when either of the brake pedals are depressed. When either pedal is depressed, it gives a controlled disconnection of the transmission enabling the operator to manoeuvre while maintaining high engine speed for stacking operations. When the direction of travel is selected, the truck automatically starts in 1st gear. A switch installed within the transmission electrical circuit prevents automatic up shifting of the transmission when driving down a slope. The engine is cooled by a closed-loop coolant circuit. The lubrication system is a forced feed type lubrication with the oil pump in the oil sump. The lubrication system is a forced feed type lubrication with the oil pump in the oil sump. A dry air filter with a paper cartridge cleans the combustion air.

Diesel engines with state-of-the-art engine technology are used for:

- high torque,

- low fuel consumption,

- low exhaust gas emissions,

- low soot emissions,

- low noise values.

Axles

The front axle is driven from the transmission by a propshaft. The wide track drive axle designed for heavy duty is of the double reduction type. The rugged cast steer axle body is mounted on spherelastic bushes, which allows sufficient wheel movement for stability over uneven ground.

Steering

The steering is a hydrostatic power system, which operates the rear wheels with the steering wheel via the steering cylinder.

Brake System

The truck braking system is hydraulically operated. It is designed as fail safe and will not be released unless hydraulic pressure in the system is correct. Warnings of low pressure in the brake hydraulic system is given by an audible warning signal in the drivers cab. The service brake is controlled by foot plates, fitted on either side of the steering column and parking brake by an electrical push button fitted on the drivers control centre.

Hydraulic system

A twin hydraulic gear type pump is mounted directly to the transmission. The front pump drives the steering circuit and the rear pump drives the main hydraulic circuit. The rear

pump also supplies pressure to the spreader system. Pressure relief valves fitted in the hydraulic circuits prevent overloading of the circuits.

Operation

A central system warning light is mounted in the steering column cover behind the steering wheel. Further warning lights, instrument gauges and switches for optional equipment are located on panels mounted on both sides of the steering column.

A central control lever (joystick) for the working hydraulics and the button for the parking brake are mounted on the control centre to the right of the drivers seat.

The combined gear change and directional lever and the controls for the standard electric equipment are mounted on the steering column.

Lift mast

The standard mast is a double open centre, non-free lift type with twin lift cylinders, twin tilt cylinders and chains mounted on each side. Movement of the inner mast section along the outer section is on heavy duty bearings and sliding pads. The whole mast assembly is mounted on two pivot pins to the final drive unit casting.

The fork carriage runs on heavy duty main bearings and sliding pads in the inner mast section. Quick-release pin mounted forks are standard, hydraulic sideshift and fork positioning is optional.

Electrical system

The electrical system is 24 volts direct current, supplied by the alternator which is fitted with a solid state rectifier and charge control unit. Two 12 v 110 AH heavy duty batteries connected in series, are fitted.

Electronic/electrical installation

Linde Truck Control (LTC) The truck control electronics allow:

- sensitive, smooth driving and reversing,

- automatic engine speed control to match the hydraulic power requirements,

- fast service due to self-diagnostics,

- greatest possible operational reliability.

Driving cab

The driving cab frame forms the load guard; it conforms to International safety standards with cab glazing as an option.

Entry is on the both sides of the cabin. The large opening window on the right can be used to exit the cab in an emergency.

The cab and doors have large glazed areas to allow the driver maximum visibility during operations.

Screen wiper and washers are fitted to the front, top and rear screens with screen demist functions as part of the cab heater or climate control system.

An optional passenger seat can be fitted in the left rear corner of the cab.

Intended use

The lift truck is designed for transporting and stacking the loads stated in the load capacity diagram. In particular;

- we refer to the VDMA Guidelines for the normal and proper use of industrial trucks (or BITA for UK market),
- the safety rules of your trade association,
- the special measures required for driving on public roads in accordance with the C.U.R.,
- other local regulations.

The rules for the intended and approved use of industrial trucks must be followed under all circumstances by the responsible

persons, especially by the operator and service personnel.

The user, and not Linde, is responsible for any danger arising from applications not authorised by the manufacturer.

If you want to use the truck for applications not mentioned in this manual, please first contact your authorised dealer.

No changes, particularly no modifications and additions, may be made to the truck without the approval of the manufacturer.

Improper use

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

⚠ WARNING

One of the major causes of accidents involving lift trucks is the operator ignoring, or being unaware of basic safe operating practices.

In order to ensure the safety of the operator and others, a few basic safe operating practices outlined below must be followed.

Never operate the truck in a potentially explosive atmosphere.

Never carry passengers (unless a 'buddy seat' is fitted).

Do not overload the truck beyond it's rated capacity as stated on the capacity plate.

Do not carry off centre loads.

Do not turn or stack loads on a slope.

Do not operate the truck on loose or greasy surfaces.

Do not travel on uneven or obstructed ground.

Do not park the truck in front of fire extinguishers, emergency exits or gangways where it can cause an obstruction.

Never alight from a moving truck.

Never leave the truck unattended with a raised load.

Operating Procedures

Always adapt your driving style to the conditions of the roadway, particularly hazardous work areas and the load being transported.

Prior to, and whilst travelling, ALWAYS look in the direction of travel.

Be aware of pedestrians, and avoid situations where they could become trapped between the truck and a fixed object.

When approaching blind corners, always sound the horn.

Only use the truck and any attachments for authorised applications.

When transporting a load, follow the directions in the user manual.

On a ramp or incline: • Ensure the truck has adequate ground clearance to clear the camber • Raise the load sufficiently to clear the camber

Travel uphill with the load leading

Travel downhill with the load trailing

When raising the load lift device, ensure there is adequate clearance.

When working near overhead electric cables, observe the safe distance established by the responsible authorities.

Make sure the surface on which you are travelling is capable of supporting the combined weight of the truck and load.

Before leaving the operator's driving position, always turn the ignition off and ensure the park brake is applied.

Summary

A safe, competent operator is one who takes pride in the way they operate their truck, respects the goods they handle, and follows

Symbols Used

the correct operating procedures. **NEVER TAKE CHANCES**.

Symbols Used

The precautions WARNING, CAUTION, ATTENTION and NOTE in this manual are provided to indicate special dangers or unusual information requiring special identification:

⚠ DANGER

indicates hazards that may result in personal injury or death and/or substantial damage to the product.

⚠ WARNING

indicates hazards that may result in personal injury and/or substantial damage to the product.

⚠ CAUTION

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

NOTE

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

ENVIRONMENT NOTE

The information contained herein must be observed, otherwise environmental damage may occur.

Commissioning

- Check the engine oil level
- Check coolant level in expansion reservoir
- Refuel the truck
- Check the condition of the battery
- Check the tyre inflation pressure
- Tighten the wheel nuts
- Working hydraulic system: Check the oil level
- Check the braking system
- Check the steering system
- Check the lifting device and attachments
- Regenerate the soot filter (option)

The truck can be operated at full speed immediately. Avoid sustained high loads on the working hydraulic system and transmission system in the first 50 hours of operation. Re-tighten wheel nuts daily prior to starting operation until they are seated firmly, i.e. until no further tightening is possible.

- Tighten opposite wheel nuts to a torque of 680 Nm.

Truck takeover

Every container handler undergoes careful inspection before leaving the factory in order to make sure that it will be in satisfactory condition and fully equipped as ordered when delivered to the customer. Authorised distributors are under obligation to reinspect the truck before delivery and to hand it over in good order.

In order to avoid later complaints and inconvenience to customers, you are requested to ascertain that the truck is in satisfactory condition and fully equipped at the time of delivery

and to acknowledge orderly handing/taking over of the truck in the manufacturer's certificate of conformity.

Linde pursues a policy of continuous improvement in the design and manufacture of its products. The illustrations and technical details referring to design, fittings and engineering of lift trucks are subject to change or modification as a result of technological progress by Linde.

Linde is therefore unable to consider any claims based on the specifications, illustrations and descriptions contained in this Operating Instructions manual.

Please submit all enquiries concerning Linde container handling truck orders for spare parts to your local Linde representative, making sure to give the correct delivery address.

For repairs use only original Linde spare parts. Only in this way can it be guaranteed that your Linde truck maintains its original technical standard.

These operating instructions or excerpts thereof may only be copied, translated or transmitted to third parties after prior written approval by the manufacturer.

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

- Truck model:
- Serial number/year of manufacture:
- Hand over date:

Additionally, specify the serial number of the engine, mast, hydrostatic hydraulic pump, drive pump and drive motors when ordering parts for these assemblies.

- Engine number:
- Mast / Boom number:
- Mast lift:
- Hydraulic pump number:
- Drive pump number:
- Drive motor number:
- Spreader serial number:

This information can be found on the type plates on the truck. We recommend that you transfer this information to this manual for ease of future reference.

The following technical documents are supplied with each fork truck:

- 1 Operating Instructions
- 1 EC certificate of conformity (The manufacturer certifies that the industrial truck conforms to EC guidelines for machines)
- Safety rules for the use of industrial trucks (VDMA)

We wish you satisfactory operation.

Linde Material Handling

EC declaration of conformity

The manufacturer declares that the truck complies with the requirements of the EC directives valid at the time of marketing. This is confirmed by the EC declaration of conformity and by the CE labelling on the nameplate. See also the following explanation.

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

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

Declaration

Linde Heavy Truck Division Limited
Linde Industrial Park

Merthyr Tydfil, CF40 4LA, Wales, UK

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 declaration of conformity

Linde Heavy Truck Division Limited

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Safety

Safety Rules

The responsible persons, particularly the truck operator and servicing personnel, must be instructed in the safety rules for the normal and proper use of the trucks included with these operating instructions.

The employer must ensure that the operator has understood all safety information.

Please observe the guidelines and safety rules therein for example:

- information on the operation of fork lift trucks
- rules for roadways and work areas
- rights, duties and safety rules for the operator
- operation in special areas
- information related to starting, driving and braking
- service and repair information
- recurrent inspections, accident prevention check
- disposal of grease, oil and batteries
- remaining risks

The operator (employer) or the responsible person must ensure that all the guidelines and safety rules applicable for your truck are observed. When instructing a trained operator, acquaint him with the:

- special features of the forklift truck
- optional attachments
- special operating and working area characteristics, by training and practice driving, shifting and steering operations until they are completely mastered.

Only then start to train for stacking operations. The stability of the truck in the work is ensured if employed properly. Should the truck tip over during unauthorised application or due to incorrect operation. always follow the instructions depicted.

➢ Always follow the instructions depicted.

Safety Precautions

The precautions WARNING, CAUTION, ATTENTION and NOTE in this manual are provided to indicate special dangers or unusual information requiring special identification:

⚠ DANGER

Indicates hazards that may result in personal injury or death and/or substantial damage to the product

Follow DANGER directions, as described.

⚠ WARNING

Indicates hazards that may result in personal injury and/or substantial damage to the product

Follow WARNING directions, as described.

⚠ CAUTION

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

Follow CAUTION directions, as described.

⚠ CAUTION

This note is found on various positions of the truck where special attention is required.

Read the appropriate section of your operating instructions.

NOTE

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

Handling Fuel, Lubricants and Coolant

Always handle fuel, lubricants and coolant as required and as specified by the manufacturer. Only store fluids and lubricants in approved containers at specified storage places, as they could be inflammable. Do not allow them to come into contact with hot objects or naked flame.

Only use clean containers when replenishing fluids and lubricants.

Follow the manufacturer's safety and disposal instructions when using fluids, lubricants and cleaning compounds. Avoid spilling fluids and lubricants.

Remove any spillage immediately with a suitable binding agent and dispose of as specified. Also dispose of used or contaminated fluids and lubricants as specified.

Follow laws and regulations.

Clean the area surrounding the part in question before lubrication, filter renewal or repairs in the hydraulic system. Discard parts in an environmentally friendly way.

⚠ CAUTION

Do not allow hydraulic oil under pressure, for example at a leak, to penetrate the skin. Medical aid is required if such an injury occurs.

Always handle fuel, lubricants and coolant as required and as specified by the manufacturer.

⚠ CAUTION

Improper handling of coolant and coolant additives puts your health and the environment at risk.

Always handle fuel, lubricants and coolant as required and as specified by the manufacturer.

Accident prevention check

The accident prevention rules in some countries prescribe that the forklift truck must be checked at least once a year for proper working condition by trained personnel. Please contact your authorised dealer in this regard.

Operation of forklift trucks in the plant area

⚠ WARNING

Many plant areas are so-called limited public traffic areas. We advise you to check if your company liability insurance covers any damages occurring with your fork truck against third parties on "limited" public traffic areas.
Consult your Linde dealer for further advice.

Noise emission data

Determined in the test cycle according to EN 12053 from the weighted data in the operating modes DRIVING, LIFTING, IDLE.

Measured Sound power level.....103dB
Guaranteed Sound Power level.....108dB

Frequency characteristic for human body vibrations

The values are determined in conformance with EN 13059 on trucks with standard equipment according to the technical data sheet (driving over test course with bumps).

Frequency characteristics acc. to EN 12096

Measured frequency characteristic aw,ZS = 0.5 m/s² Uncertainty K = 0.2 m/s²

Frequency characteristic for hand arm vibrations

Frequency characteristic <2.5 m/s²

NOTE

The frequency characteristic for the human body cannot be used to determine the actual frequency load during operation. This load depends on the working conditions (conditions of roadway, type of operation, etc) and must therefore be determined at the site, if necessary. The specification of hand and arm vibration is required by law, even if the values, as in this case, do not indicate any danger.

Runni

The truck can be operated at full speed immediately. Avoid sustained high loads on the working hydraulic system and transmission system in the first 50 hours of operation. Re-tighten wheel nuts daily prior to starting operation until they are seated firmly, i.e. until no further tightening is possible.

➢ Tighten opposite wheel nuts to a torque of 680 Nm.

Do not operate with guards removed

Tighten wheel nuts of wheel - mounting

- prior to starting operation of the truck
- then every 10 hrs until wheel nuts are settled
- after that every 100 hrs

(For torque see operating manual)

NOTE

Observe the tightening instructions on the tag attached to the steering column.

Checks prior to first operation*

- Coolant level in reservoir
- Engine oil level
- Fuel level
- Working hydraulic system oil level
- Tyre pressures and tightness of wheel nuts — refer to Wheel and Tyre removal and fitting procedures.
- Drive motors oil volume
- Battery terminals
- Mast and attachments
- Function of braking system
- Function of steering system
- Regenerate the soot filter (option)

Daily checks*

- Coolant level in reservoir
- Engine oil level
- Hydraulic system oil level
- Tyre pressures — refer to Wheel and Tyre removal and fitting procedures.
- Windscreen washer fluid level
- Clean, check and adjust mirrors

*A description of the services can also be located in the alphabetical index.

Do not operate with guards removed

CAUTION

Do not operate the truck with guards removed

Danger of injury.

NOTE

Guards and covers are fitted to prevent injury, and should only be removed for maintenance purposes. They should be refitted before returning the truck to service.

Park Brake

⚠ CAUTION

Always check that the park brake (manual and automatic), is applied before leaving the truck.

Automatic park brake - option.

Malfunctions

In the event of a malfunction park the truck in a safe condition, lower the load and shut off the engine.

If fitted the truck override system may be used to make the truck safe and in some cases a 'limp home' mode is available to allow the truck to be moved to a safe location for investigation into the malfunction.

⚠ CAUTION

Some safety features are disabled when the override function is activated. Exercise extreme caution.

Do not continue to operate the truck.

Handling Fuel, Lubricants and Coolant

Always handle fuel, lubricants and coolant as required and as specified by the manufacturer.

Only store fluids and lubricants in approved containers at specified storage places, as they could be inflammable. Do not allow them to come into contact with hot objects or naked flame.

Only use clean containers when replenishing fluids and lubricants. Follow the manufacturer's safety and disposal instructions when using fluids, lubricants and cleaning compounds.

Avoid spilling fluids and lubricants. Remove any spillage immediately with a suitable binding agent and dispose of as specified. Also dispose of used or contaminated fluids and lubricants as specified.

Follow laws and regulations.

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

Discard parts in an environmentally friendly way.

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The accident prevention rules in some countries prescribe that the forklift truck must be checked at least once a year for proper working condition by trained personnel. Please contact your authorised dealer in this regard.

Operation of forklift trucks in the plant area

⚠ CAUTION

Many plant areas are so-called limited public traffic areas. We advise you to check if your company liability insurance covers any damages occurring with your fork truck against third parties on “limited” public traffic areas.

Diesel engine emissions

In Germany, fork trucks equipped with diesel engines must conform to TRGS 554. According to this regulation, diesel emissions are carcinogenic and they should, if at all possible, not permeate the air of work places. If trucks equipped with diesel engines are used in totally or partially enclosed spaces, the labour protection authority must first be notified. Appropriate notices must be posted in the work areas (refer to TRGS 554 for an example).

Noise emission levels as determined by EN 12053 and DIN EN ISO 4751

- Measured Sound power level 103dB
- Guaranteed Sound Power level 108dB

Higher noise emissions can exist during operation of the truck, e.g. different operation, influence of the surroundings and additional noise emission sources.

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.

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.

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.

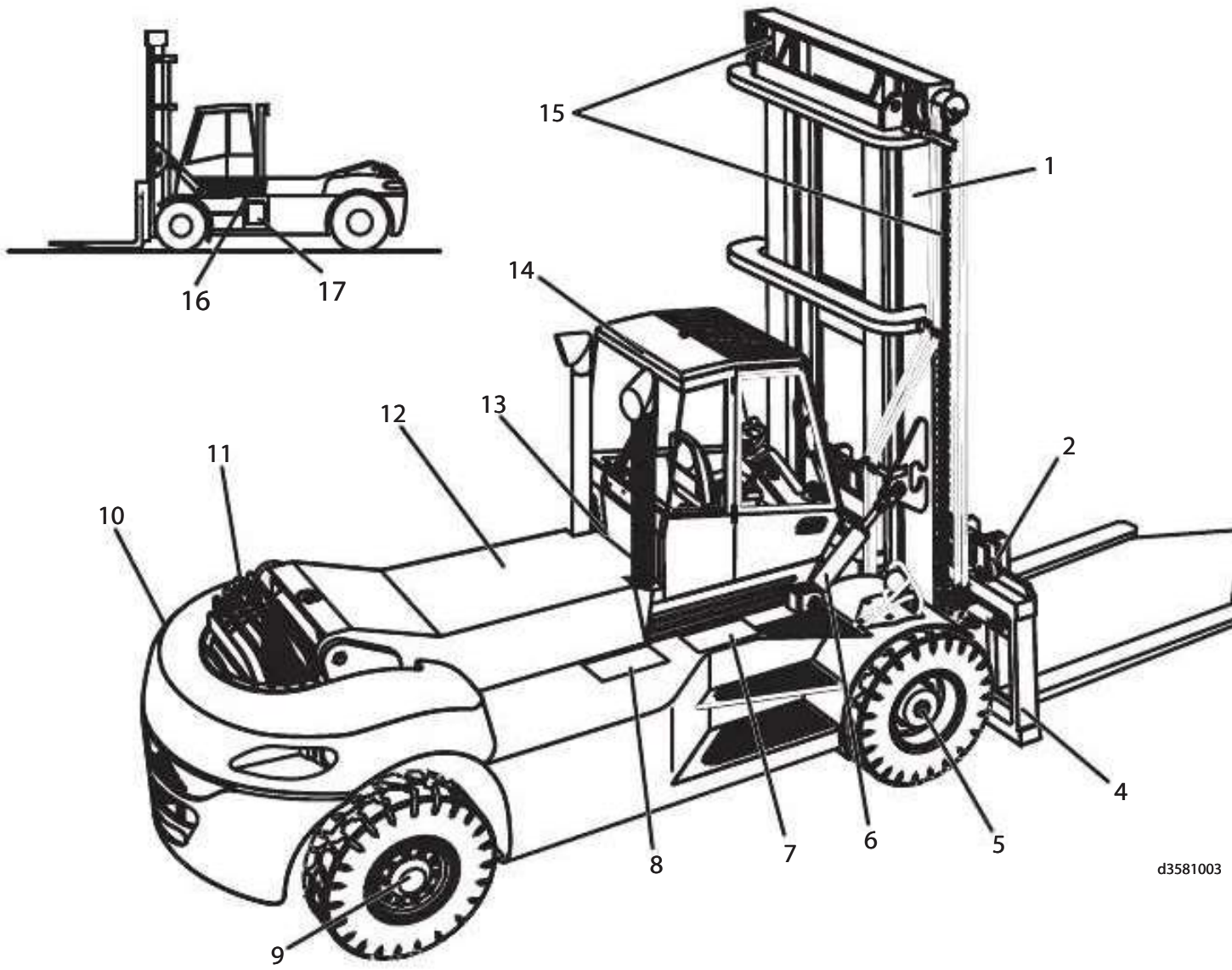
Stability will not be guaranteed in the event of:

- 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.

3

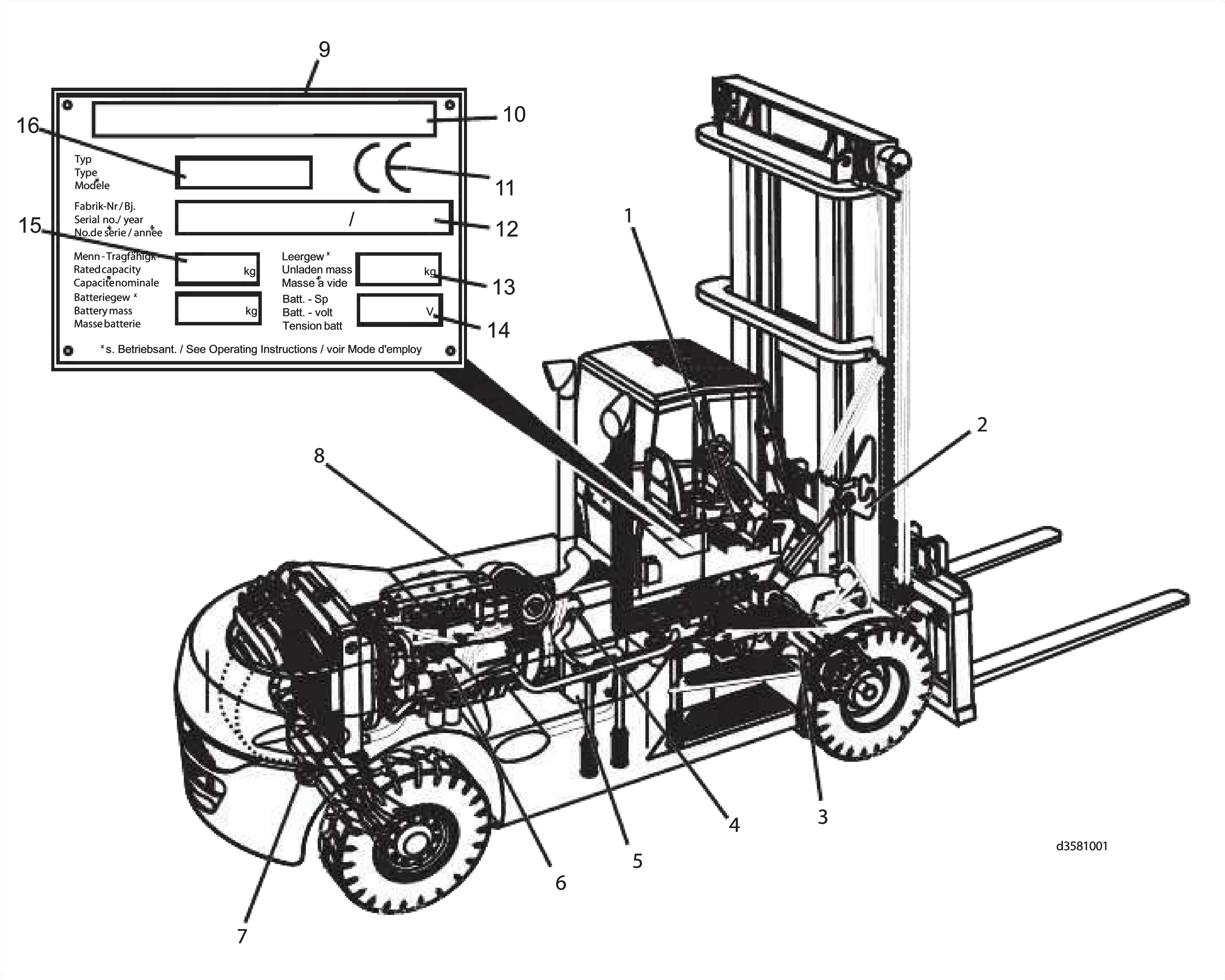
Overview

General view of Truck



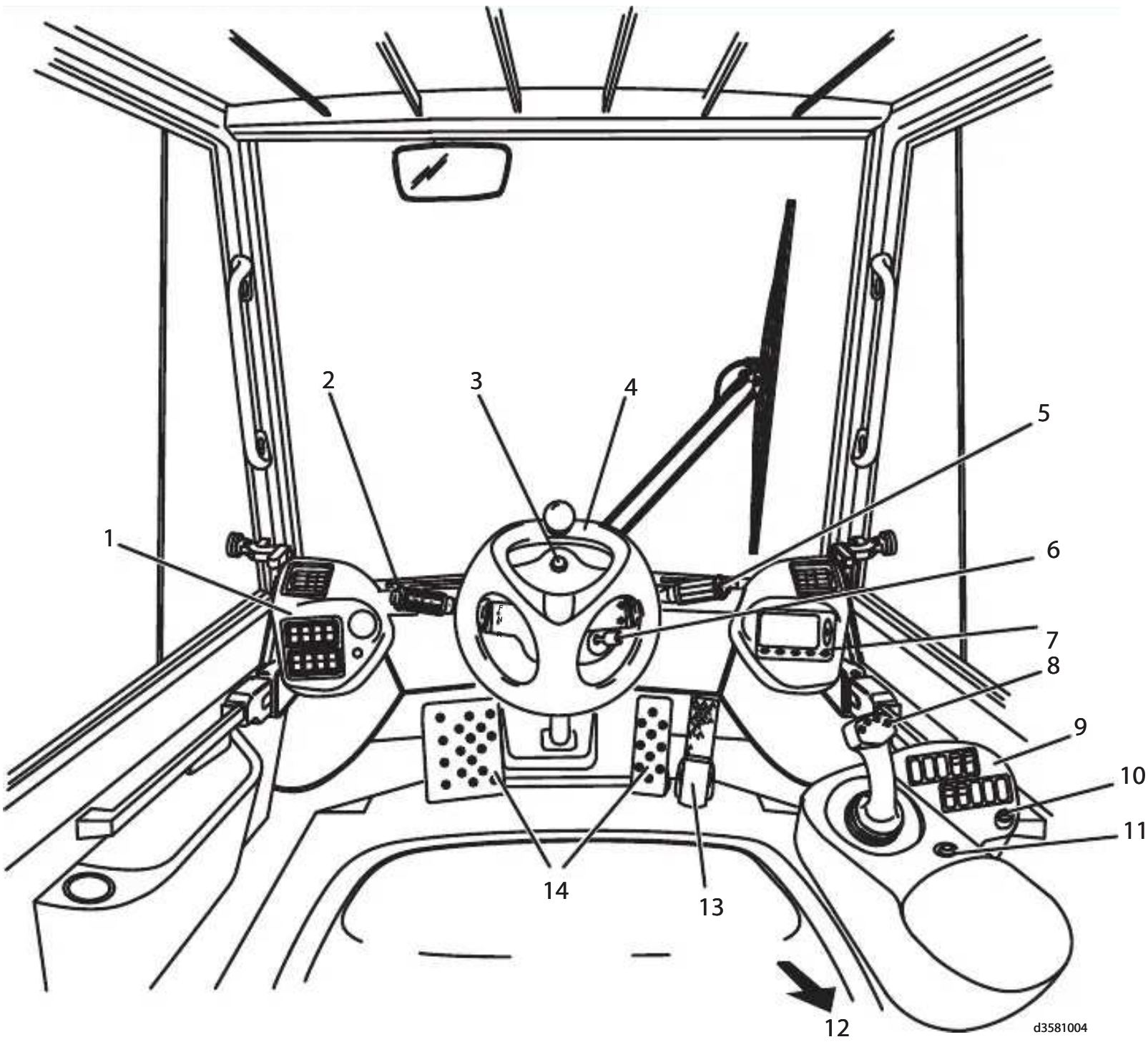
1	Lift mast	9	Steer axle
2	Fork carrier	10	Counterweight
3	Forks	11	Radiator grille
4	Fork carriage	12	Engine cover
5	Drive Axle	13	Rear cab compartment
6	Tilt cylinder	14	Cab
7	Hydraulic brake tank cover (filler and dipstick)	15	Lift chains
		16	Battery cover
8	Hydraulic working system cover (filler and dipstick)	17	Fuse box cover

Type plates



1 Load capacity plate
2 Lift mast number
3 Drive Axle
4 Hydraulic pump
5 Transmission number
6 Engine number
7 Steer axle number
8 Chassis number (stamped)
9 Lift truck type plate (on the left side of the seat)
10 Manufacturer
11 CE Symbol (The symbol certifies that EC guide lines for machines and all applicable guidelines are fulfilled)
12 Serial number
13 Unladen mass
14 Battery voltage
15 Rated capacity
16 Type

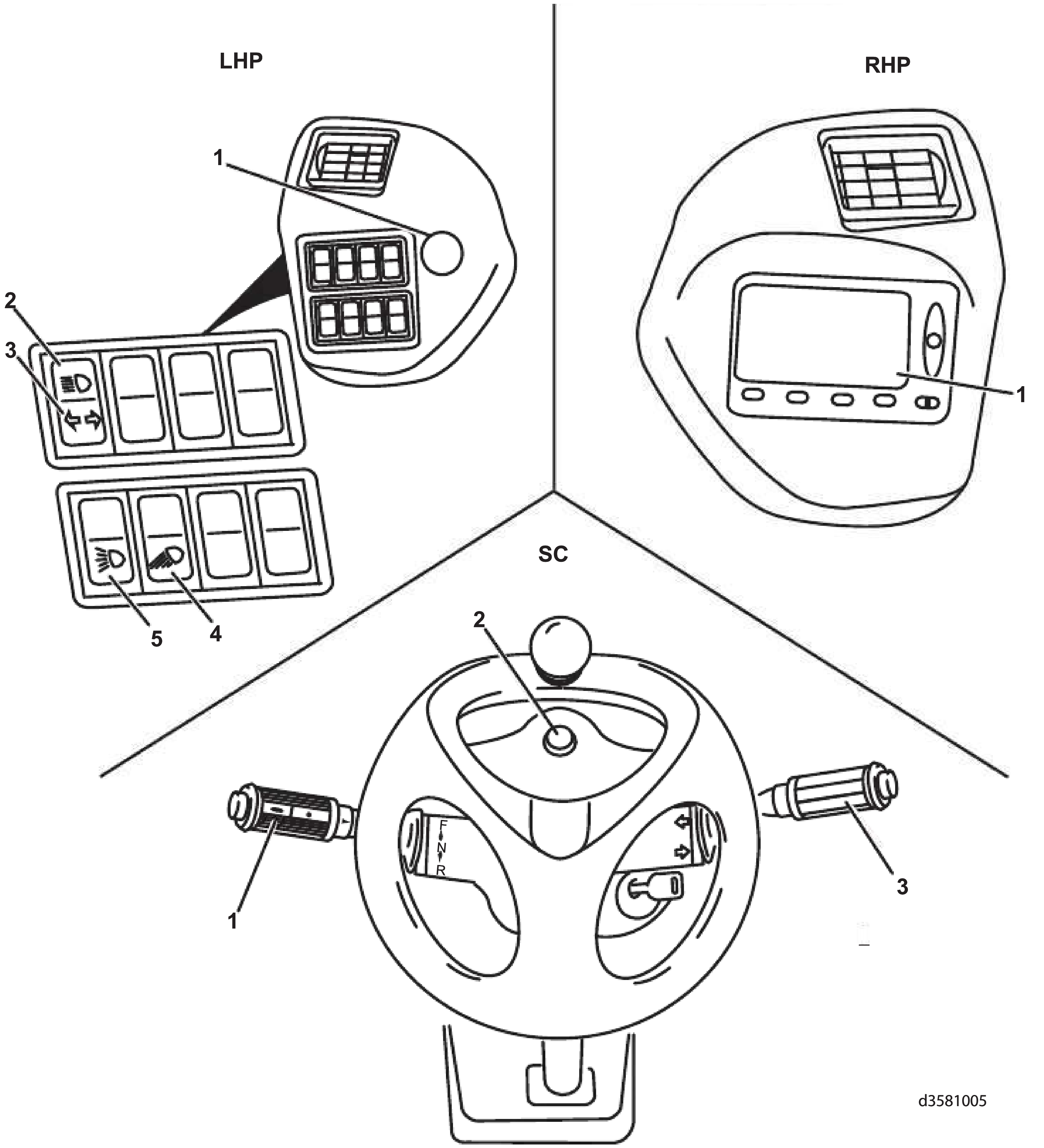
Controls and indicators



1	Left-hand panel (LHP)	9	Driver control centre
2	Electronic gearshift control lever	10	Parking brake switch
3	Central system fault warning lamp	11	Hazard warning light switch
4	Steering wheel	12	Heater control (Climate Control*)
5	Multiple function electrical control lever	13	Accelerator pedal
6	Ignition key switch	14	Service brake pedal
7	Right-hand panel (RHP)	*	option
8	Central control lever (joystick)		

Gauges, switches and warning lights

Gauges, switches and warning lights



Left hand panel (LHP)

1 Blank.
2 Headlight main beam and warning light.
3 Turn indicator light.
4 Light switch.
5 Light switch.

Right hand panel (RHP)

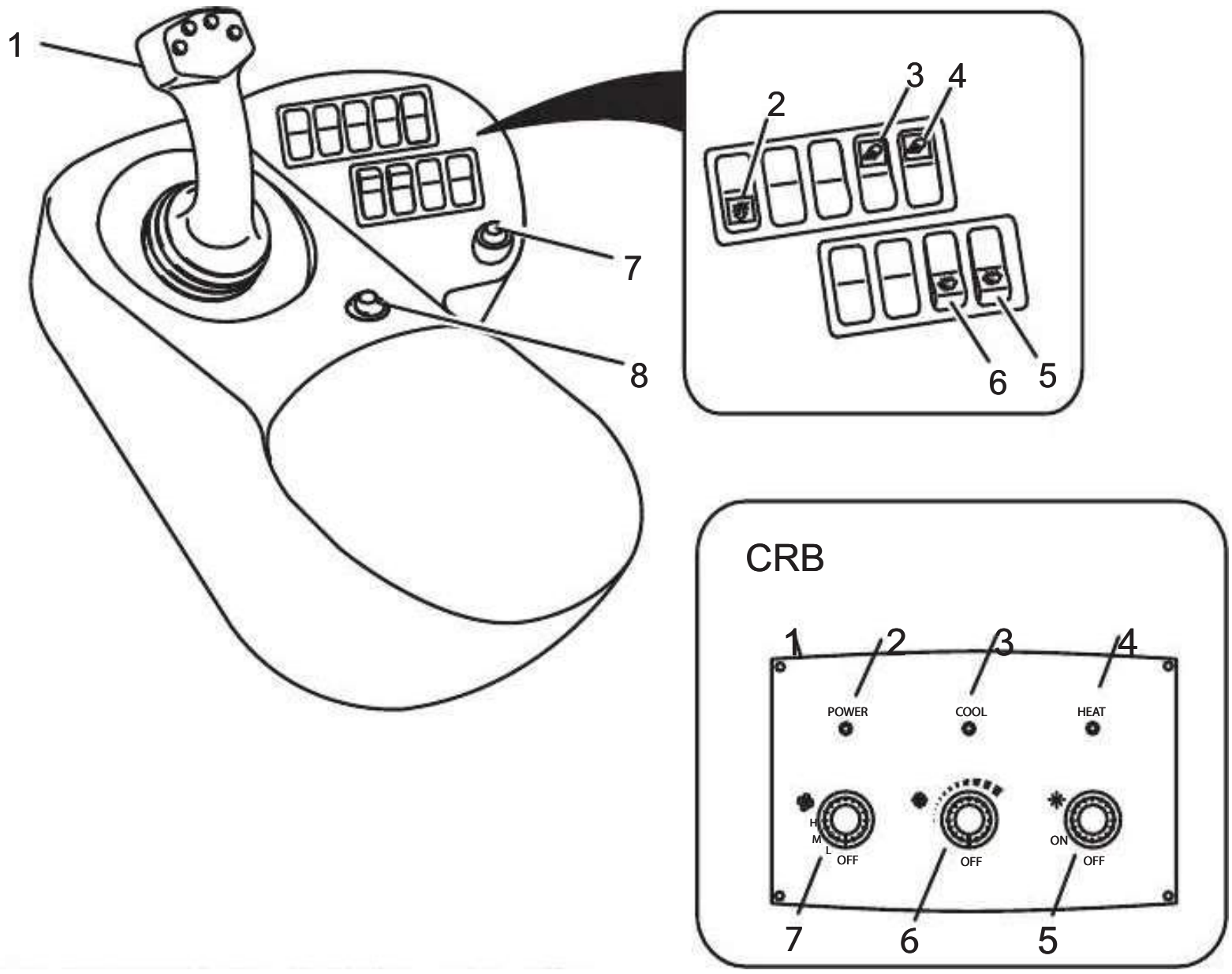
1 Truck status display unit.

Steering column (SC)

1 Gear change and directional lever.
2 Central system fault warning light.
3 Multiple function electrical control lever.

Gauges, switches and warning lights

Driver control centre (DCC)



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Driver control centre (DCC)

1 Central control lever (joystick).
2 Blank
3 Working light switch option
4 Working light switch option
5 Top screen wiper and washer switch.
6 Rear screen wiper and washer switch.
7 Parking brake button.
8 Hazard warning indicator light switch.

Cab rear bulkhead (CRB)*

1 Climate control unit.
2 Power light.
3 Cooling light.
4 Heat light.
5 Heater switch.
6 Cooler switch.
7 Fan speed switch.

Description

LHP Indicator	Purpose	Possible cause (s)
Fuel level gauge (LHP, 1).	Indicates the fuel level in the fuel tank.	
Low fuel level indicator (LHP, 2).	Indicates low fuel.	

Battery charge indicator light (LHP, 3).	Indicates a fault in the electrical system.	Drive belt broken or slack. Cable(s) broken. Alternator faulty. Regulator or relay faulty
Brake filter and low pressure indicator (LHP, 4).	Indicates brake filter is blocked.	
Lamp and alarm test button (LHP, 5).		
ECM indicator light (LHP, 6).	Indicates engine status.	Refer to workshop manual.
ECM indicator light (LHP, 7).	Indicates engine status.	Refer to workshop manual.
Turn indicator light (LHP, 8).		
Headlight main beam and warning light (LHP, 9).		
Main beam indicator light (LHP, 10).	Indicates main beam is on.	
Hydraulic oil temperature warning light (LHP, 11).	Indicates hydraulic oil temperature is too high.	Refer to workshop manual.
Parking brake indicator and warning light (LHP, 12).	Indicates parking brake is ON.	

RHP Indicator	Purpose	Possible cause (s)
Truck status display unit. (RHP, 1).	Indicates gear selected, fuel level, elapsed hours, etc.	

SC Indicator	Purpose	Possible cause (s)
Electronic gear shift control lever (SC, 1).	For shifting gears and selecting the driving direction.	
Central system fault warning light (SC, 2).	Illuminates when a fault occurs in the main system.	When illuminated, check warning light in question on the instrument panel.
Multiple function electrical control lever (SC, 3).	For switching on horn, lighting, turn indicator light, front wiper / washer.	

DCC Indicator	Purpose	Possible cause (s)
Central control lever (joystick) (DCC, 1).		
Blank		
Working lights switch option (DCC, 3).		

Gauges, switches and warning lights

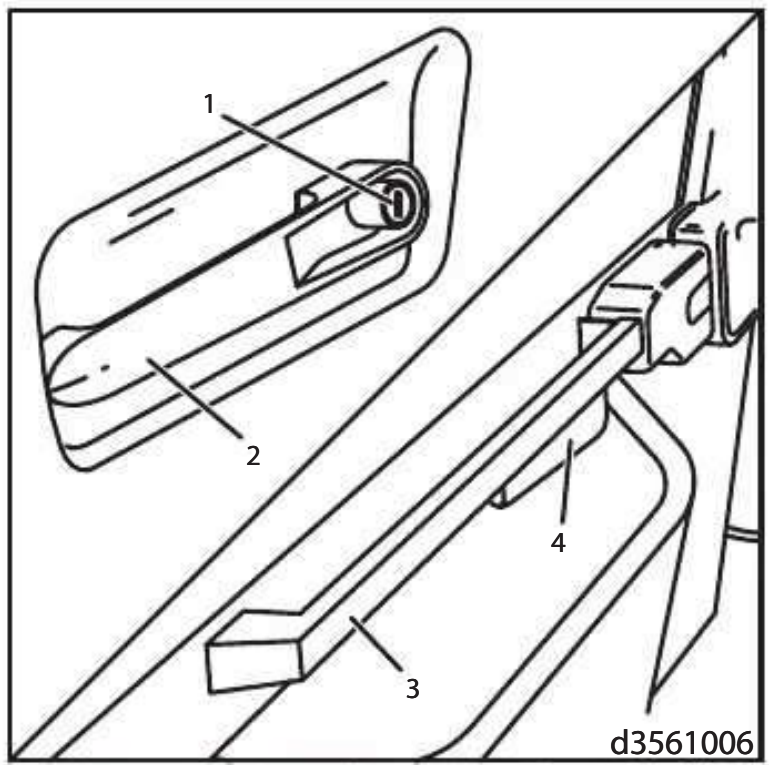
Working lights switch option (DCC, 4).		
Top screen wiper and washer switch (DCC, 5).	1st position on, 2nd sprung position hold for washer.	
Rear screen wiper and washer switch (DCC, 6).	1st position on, 2nd sprung position for washer.	
Parking brake switch (DCC, 7).	Push button, on (no light) / off (light on).	
Hazard warning light switch and warning light (DCC, 8).	For turning on the hazard warning flashers.	

CRB Indicator	Purpose	Possible cause (s)
Climate control unit (CRB, 1).		
Power light(CRB, 2).	Indicates on / off.	
Cooling light(CRB, 3).	Indicates cooling on / off.	
Heat light(CRB, 4).	Indicates heat on / off.	
Heater switch(CRB, 5).	Select cab heater function.	
Cooler switch (CRB, 6).	Press switch to activate air conditioning/deselect heater.	

4

Operation

Cab door opening and closing ▷



➢ Press button (1) on handle (2) and pull the door.

Opening the cabin door from the inside

➢ Hold handle (3) and press lever (4) and push the door.

Cabin door - closing

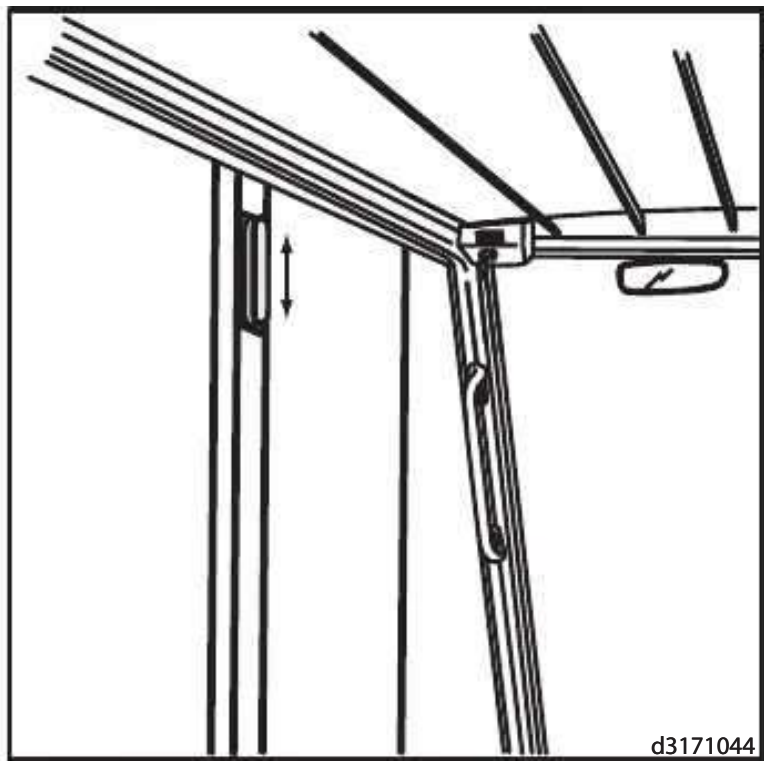
➢ Lift lever (4).

➢ Close the door.

NOTE

Lock the cabin door with the key when leaving the truck unattended.

Cab interior light ▷



The cab interior lamp is fitted to the left hand door pillar.

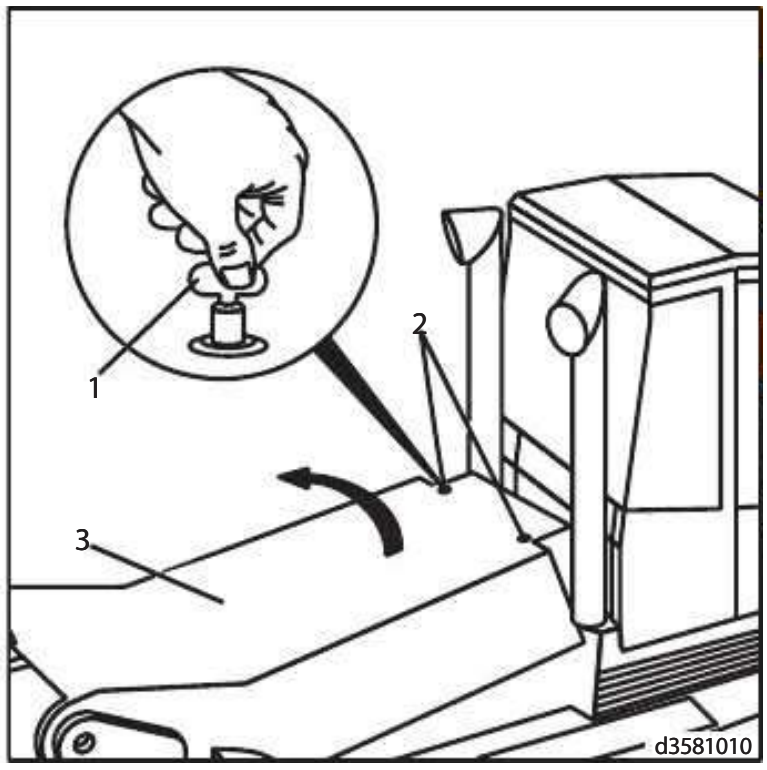
To illuminate

➢ Pull the lamp lens downwards.

To extinguish

➢ Push the lamp lens upwards.

Opening the engine cover



⚠ WARNING

The engine cover is raised by gas struts which operate as it is released. When opening, the engine cover passes close to the cab support frame with possibility of trap injury.

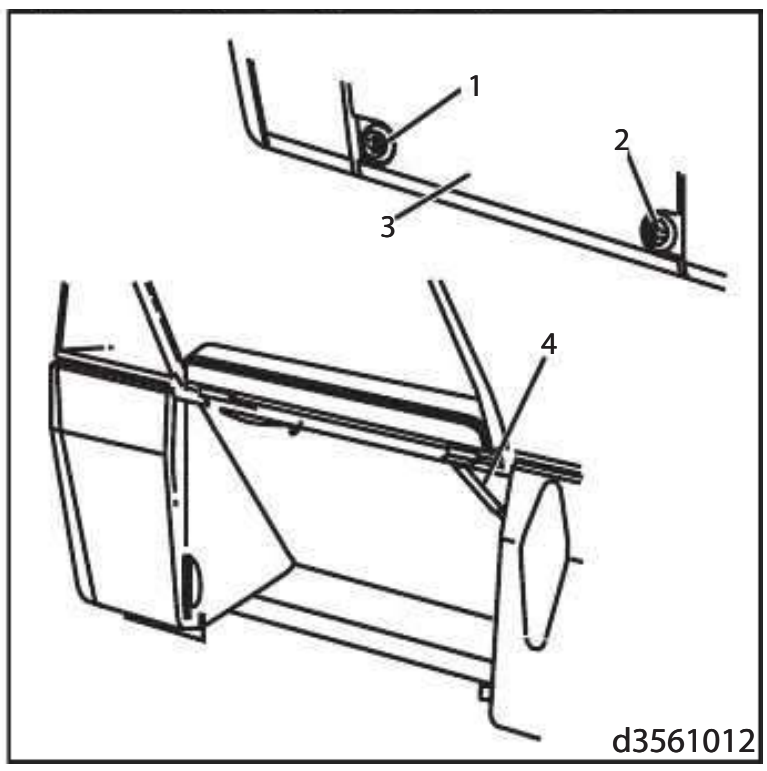
Do not hold the front edge of the engine cover as it rises.

- Check that engine cover (3) is free from obstruction.
- Insert key (1) into locks (2) and turn fully anticlockwise
- Engine cover (3) opens when released.

Closing the engine cover

- Push engine cover (3) down against gas strut pressure.
- Insert key (1) into locks (2) and turn fully clockwise.

Opening the cabin rear compartment door



- Release catches (1&2) on door (3).
- Open the door under control until the strut (4) engages.

Closing the cabin rear compartment door

- Raise door (3) to unlock strut (4) and then lower the door to the closed position.
- Push door inward until the catches (1&2) engage.

⚠ WARNING

Danger of injury due to trapped fingers

Take care when closing door (2).

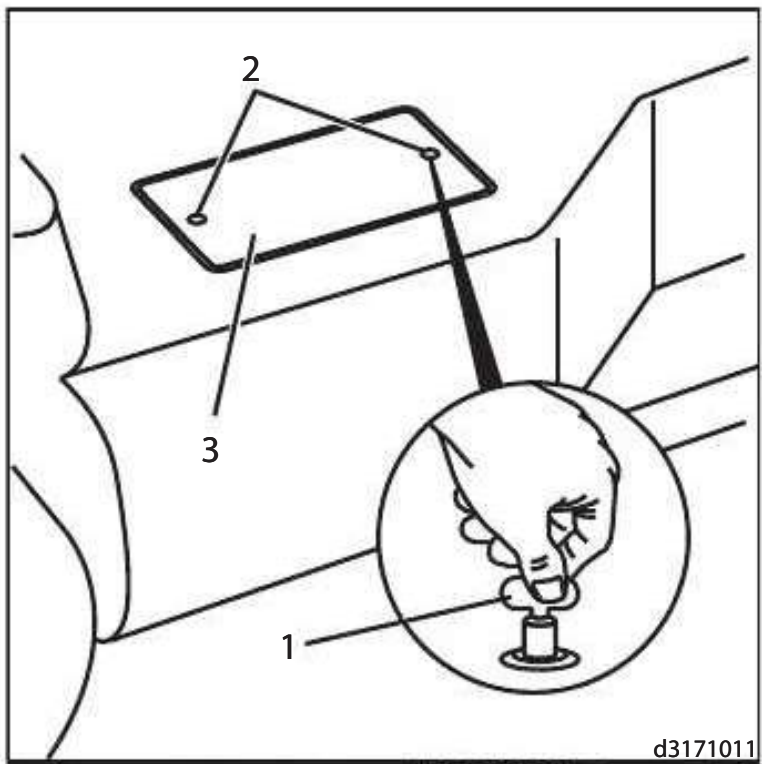
Working hydraulic filter panel

To open the working hydraulic system oil tank cover

- Check cover (3) is free from obstruction.
- Fit key (1) into each lock (2) and turn anticlockwise to unlock.
- Raise cover (3).

To close the working hydraulic system oil tank cover

- Check all tank covers and fillers are closed.
- Lower cover (3).
- Fit key (1) into locks (2) and turn clockwise to lock.



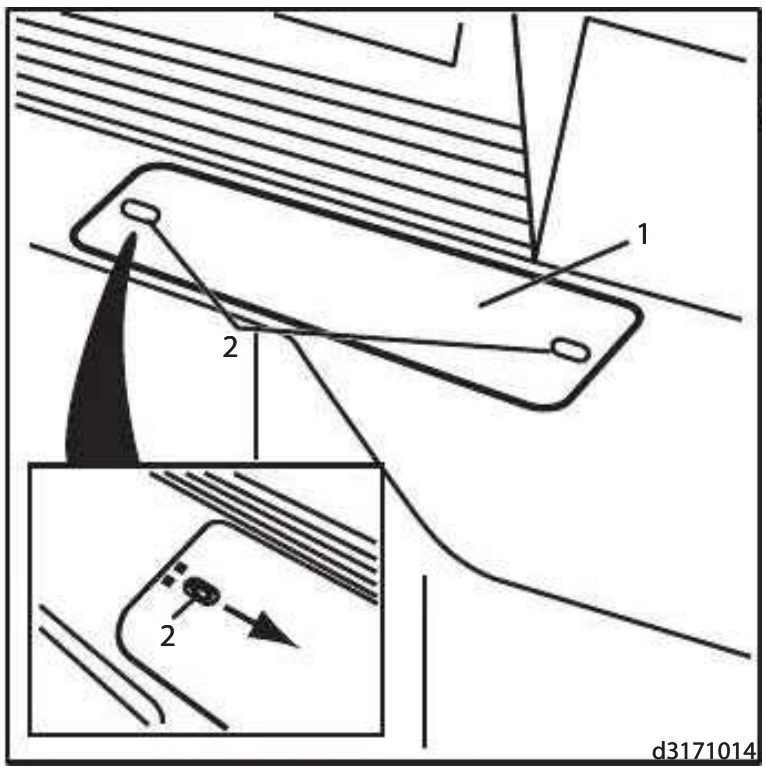
Battery access

Battery cover - removal

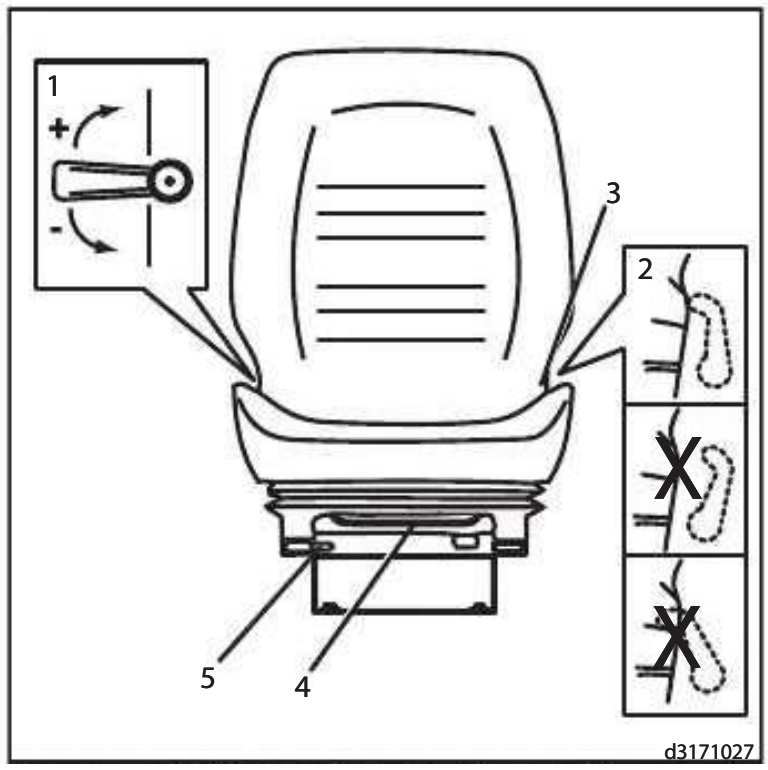
- Pull locking pins (2) of the panel (1), towards the centre of panel (1).
- Lift panel (1) clear.

Battery cover - fitting

- Pull locking pins (2) of panel (1), towards the centre of panel (1).
- Place panel (1) in position.
- Release locking pins (2).



Adjusting the drivers seat



NOTE

Maximum driving comfort is obtained and vibrations are reduced by setting the seat to the correct weight of the driver.

Setting the drivers weight

- Sit on the driver's seat.
- Set the cushioning to the weight of the driver with adjusting lever (1).
- Allow grip to engage in notch.
- Pull the adjusting lever grip out and turn it in the direction on the label either to + or -, depending upon the weight of the driver.
- Turn adjusting lever (1) up or down until blue indicator (2) reaches the seat plate on the side.

Adjusting the seat backrest angle

- Push latch (3) down.
- Push the backrest into one of two possible positions and release the latch.

NOTE

Long sitting puts excessive strain on the spinal column. Prevent strain with regular, light exercising.

Adjusting the seat height

- Pull up bar (4). Release the bar when the desired height is reached.
- To adjust the rear part of the upholstery, lift the upholstery slightly, slide it back and engage it in one of the three notches.
- Adjust the backrest again.

Adjusting the seat position

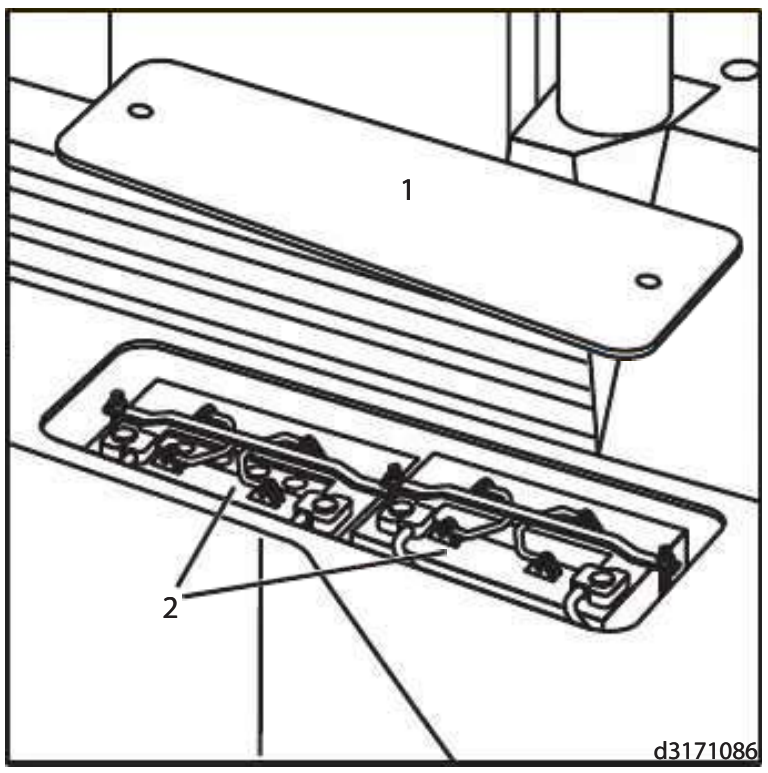
- For a horizontal adjustment of the seat pull lever (5) up.

- Slide the seat forward or back until the desired position to the steering wheel, pedals and control levers is obtained.
- Re-engage lever (5).

Check battery condition

Batteries (2) are fitted in the left hand chassis compartment (1).

- Check batteries (2), for cracks in the casing and leakage of electrolyte.
- Remove corrosion on battery terminals and check the connections are tight.
- Smear the terminals with non acid grease.

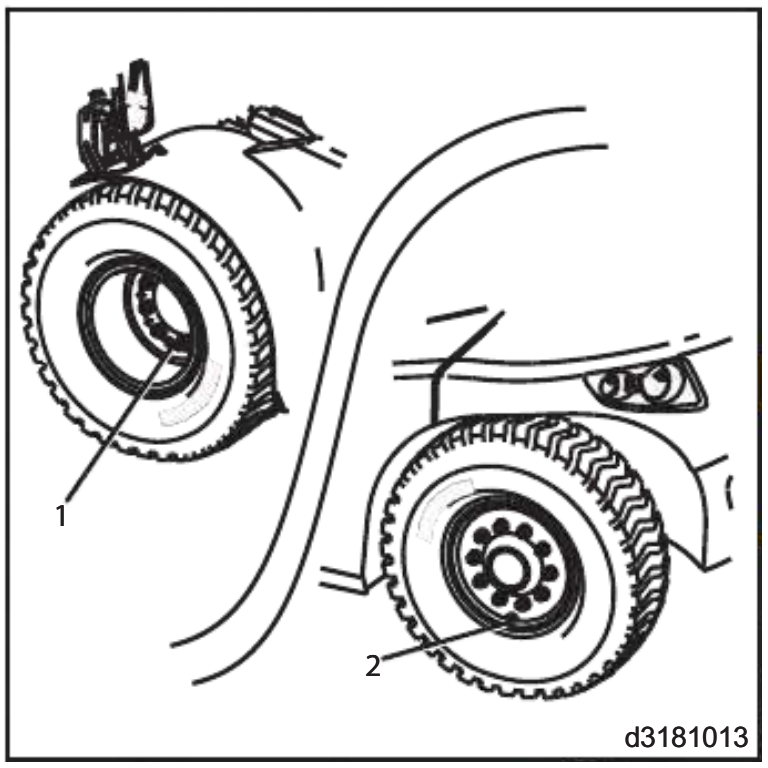


Tyres - check condition and pressure

⚠ CAUTION

Low tyre inflation pressure reduces tyre service life and the stability of the truck.

- Check tyres for damage and excessive wear.
- Remove any foreign objects from the treads.
- Check the tyres for specified pressure.
- Inflate tyres according to stickers on the chassis.
- If necessary, add air at filler valves for drive axle (1) and steer axle (2).



Tyre specification:
Drive axle:
Front ..... 10.0 bar
Steer axle:
Rear ..... 10.0 bar

Tighten the wheel nuts

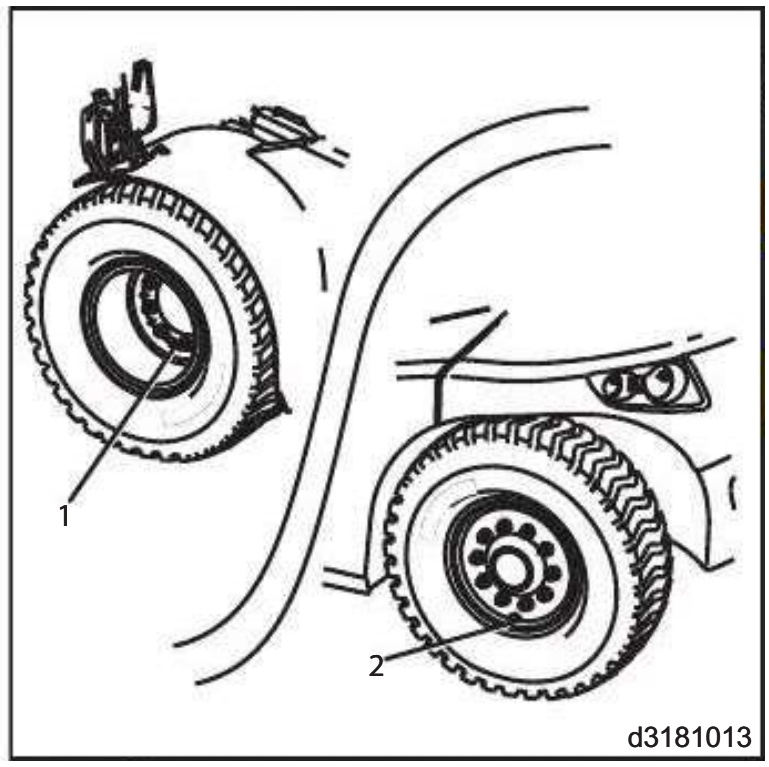
⚠ CAUTION

During initial operation and after each wheel change, the wheel fasteners must be tightened before starting work and thereafter every 10 service hours until they have settled, i.e. until no further tightening is possible.

Thereafter check wheel nuts (1) every 100 hours.

Torque all wheel nuts to 680 Nm.

A socket with an extension bar is needed to tighten the front wheel nuts.



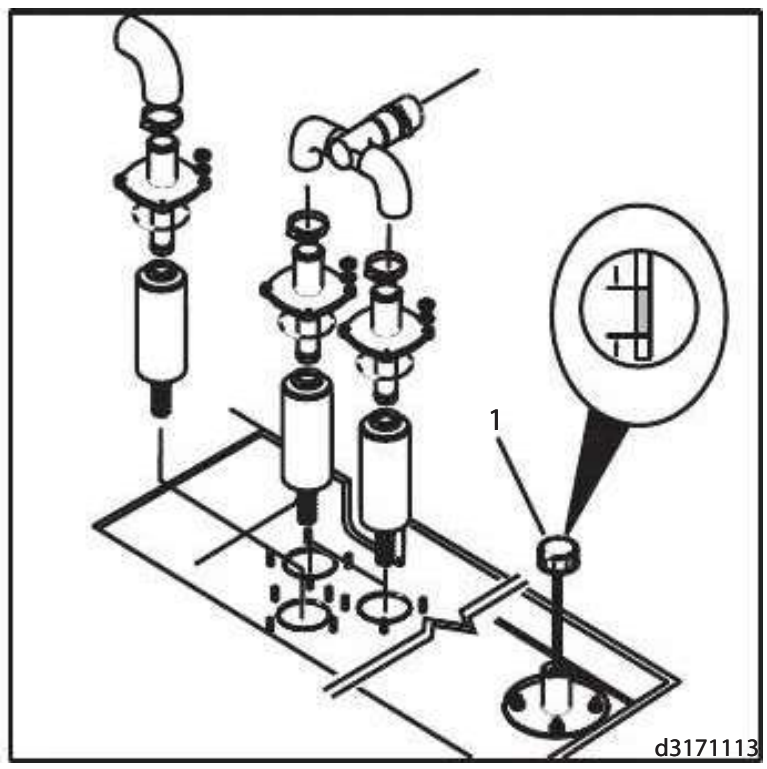
Hydraulic system oil level check

⚠ CAUTION

Follow the instructions for handling fluids and lubricants. Oil may be hot.

Wear protective clothing.

- Lower the fork carriage and then put the mast upright.
- Open the filler/filter cover.
- Remove the breather filter with dipstick (1) attached.
- Wipe dipstick with a clean cloth.
- Refit the breather filter with dipstick fully and remove it once more.
- Oil level should be between Min/Max markings on the dipstick.
- If necessary, add hydraulic oil up to the Max mark.



➢ Refit the breather filter and oil dipstick.

➢ Close the filler/filter cover.

NOTE

Maximum hydraulic capacity: 350 L.

Engine oil level check

CAUTION

Follow the precautions for handling fluids and lubricants.

Wear protective clothing.

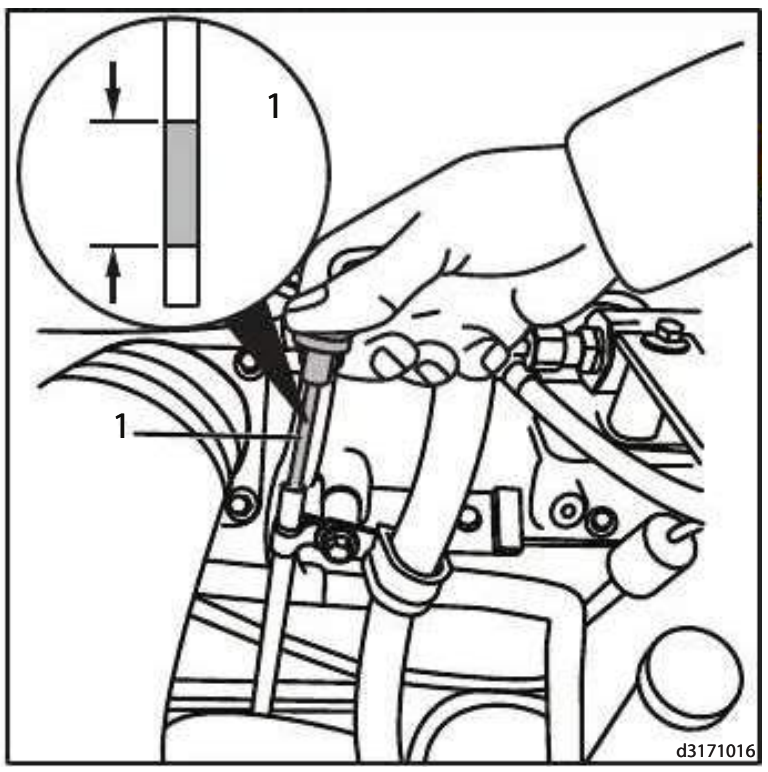
➢ With the engine stopped, open the engine cover.

➢ Remove dipstick (1) and wipe with a clean cloth.

The dipstick is located on the right side of the engine.

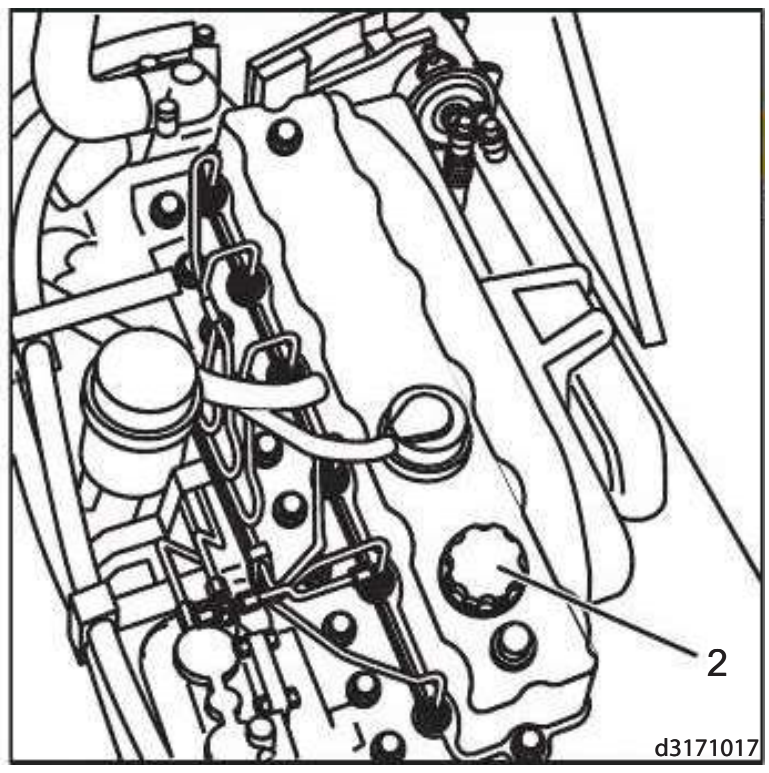
➢ Fully re-insert dipstick and remove it again.

The oil level should be between the Min and Max markings.



➢ If necessary, remove filler cap (2) and add oil to the Max mark on dipstick.

Maximum oil capacity - 17.5 L



Checking the fuel level

➢ Turn ignition key to position II.

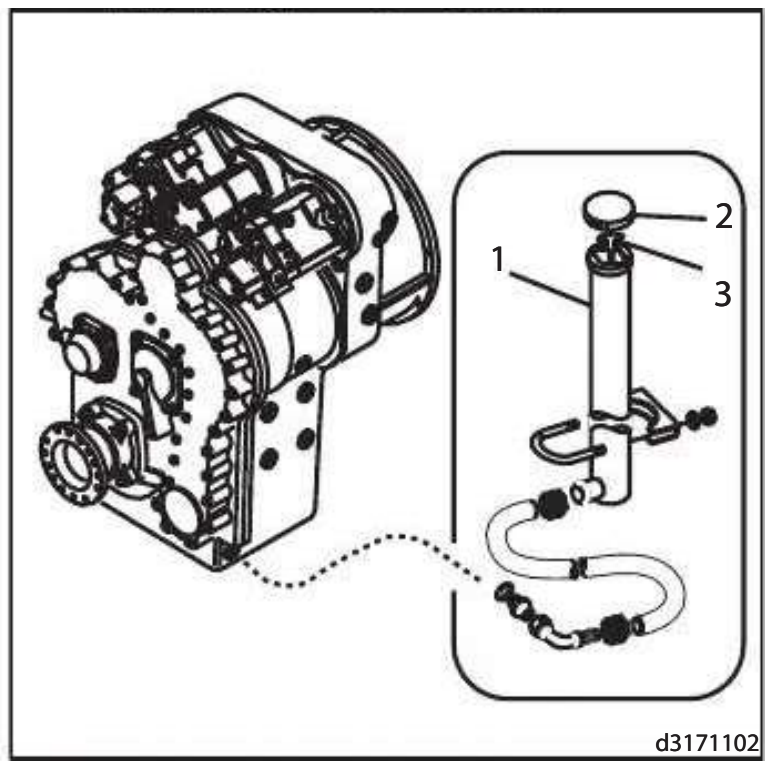
➢ Check the fuel level displayed on truck status display unit.

➢ If necessary, fill the tank with diesel fuel.

Transmission oil level check

⚠ CAUTION

Follow the instructions for handling fluids and lubricants. Perform the check with the engine running.
Wear protective clothing.



➢ Start the engine and ensure the oil is at operating temperature.

➢ Open the engine cover.

➢ Locate remote filler tube (1) situated to the rear left of the transmission.

➢ Unscrew transmission filler cap (2) and remove dipstick (3) and wipe with a clean cloth.

➢ Replace the clean dipstick and remove it again.

- The oil level should be between the Min and Max markings.
- If necessary, add oil through the dipstick tube (1) up to the Max mark on the dipstick.
- Replace dipstick (3) and filler cap (2).
- Switch off engine.
- Close the engine cover.

NOTE

Maximum capacity: - 30 L

Coolant level check

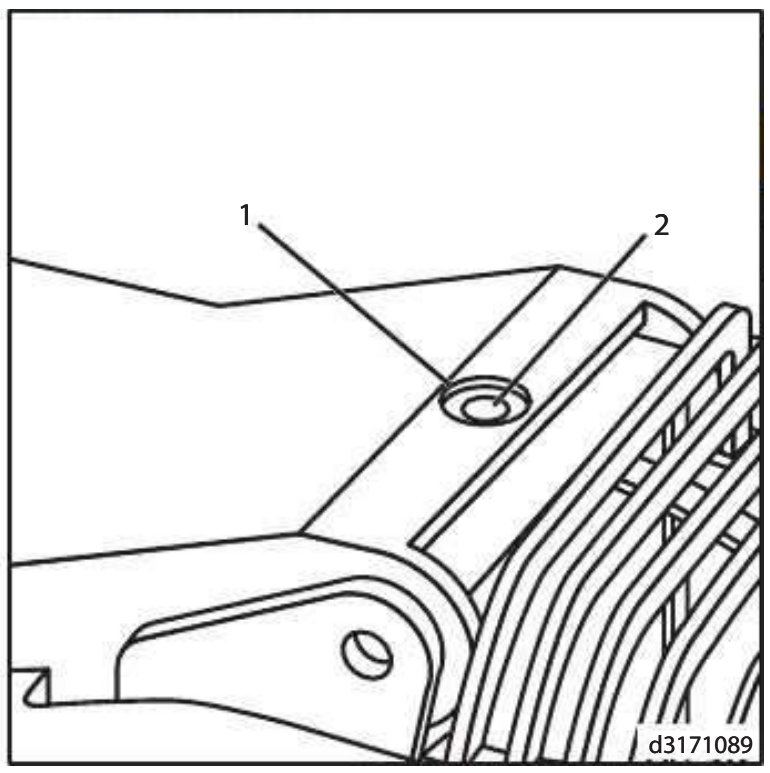
CAUTION

Follow the instructions for handling fluids and lubricants.
Do not remove the filler cap if the reservoir is hot or when the engine is running. Risk of scalding!

- Reach through cutout (1) and remove filler cap (2).
- The coolant level must reach to just under the filler neck.
- Fill coolant if necessary.

Max. coolant capacity 30L

- Refit filler cap (2).



NOTE

During high ambient temperatures, check the coolant level twice a day.

Normal start

NOTE

The engine is equipped with a start-stop system controlled by the engine oil pressure. When the engine does not reach or hold operating pressure when starting or during

operation, the engine is shut off. Please contact your authorised dealer.

⚠ CAUTION

Danger of possible damage to the engine and starter.

If this start-stop system is activated, discontinue the starting procedure.

⚠ WARNING

Danger of carbon monoxide poisoning!

Do not let the engine run in unventilated enclosed spaces.

⚠ CAUTION

Danger of possible damage to the engine and starter.

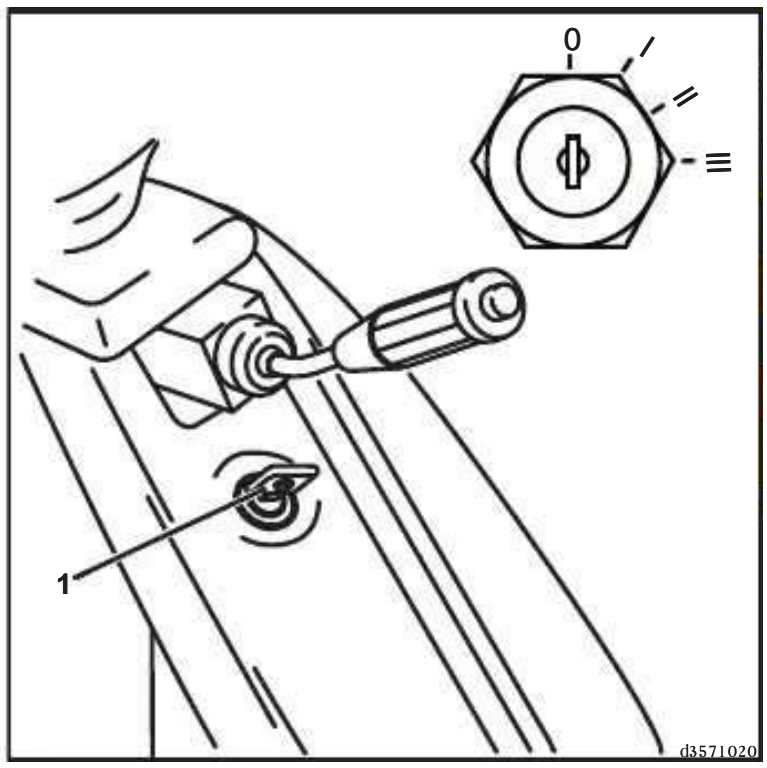
Do not operate the starter with the engine running.

Starting the engine

NOTE

The directional lever to the left of the steering column must be in the neutral position.

- Sit on the drivers seat.
- Insert ignition key (1).
- Turn the key clockwise to position I. The electrical system is now energised, and an audible buzzer sounds until brake pressure is reaches 110 bar.
- The battery charge warning light on the truck status display and the truck display unit comes on.
- After the buzzer has stopped, turn the key clockwise to position III.
- As soon as the engine starts, release the ignition key.
- The battery charge warning light extin-guishes.



NOTE

If the engine does not start after 20 seconds, wait at least 1 minute before repeating the

starting procedure. If the engine fails to start after the third attempt or the engine oil pressure warning light does not extinguish, check the viscosity of the lubricating oil, the fluidity of the diesel fuel and the battery charge levels against the recommended values.

Cold Start

➢ Turn ignition key clockwise to position II.

NOTE

The ECM detects temperatures of engine coolant and engine air intake and determines whether the glow plug is required to start the engine. If the glow plug is required, hold the ignition key in position II until the glow plug indicator light extinguishes.

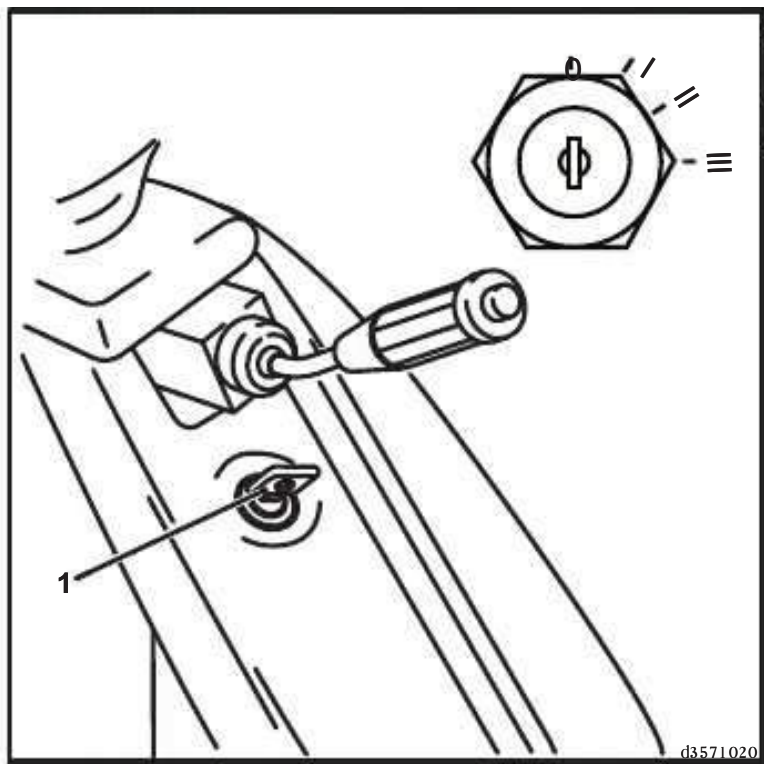
➢ Turn ignition key clockwise to position III.

➢ As soon as the engine starts, release the accelerator pedal and return the key to position II.

➢ Maintain the key in position II until the engine oil pressure warning light extinguishes.

➢ The battery charge warning light on display extinguishes.

➢ Release ignition key.



NOTE

Do not warm up the engine at idle speed. Always allow time for the engine to warm up before using maximum speed, especially in cold climates. The engine will attain its operating temperature after running briefly with a moderate load and at various revs.

Stopping the engine

NOTE

Do not stop the engine at full speed, allow to idle for a short while before shutting off.

➢ Release accelerator pedal.

➢ Bring the truck to a controlled stop.

➢ Apply parking brake.

➢ Shift the electronic gear shift control lever to neutral and let the engine idle for two minutes to achieve a temperature balance

⚠ CAUTION

With engines fitted with a turbocharger there is also the danger of the shaft bearing running dry and becoming damaged due to the high speed of the turbocharger shaft (approx. 100,000 rpm at full speed).

Do not stop the engine at full rpm.

➢ Turn ignition key (1) anti-clockwise to the zero position.

➢ Remove the ignition key when leaving the truck.

Truck status display

During operation

During operation of the truck the truck status display screen will be as shown.

➢ To access other information available through the display, follow the instructions below:

1	Alarm status indicators
2	Engine RPM
3	Truck speed
4	Engine oil pressure
5	Weight on the forks
6	Fuel level indicator
7	Reverse direction indicator
8	Selected gear
9	Forward direction indicator

Truck status display

- To view the system voltage press the up key.

- To view the transmission oil temperature, press the up key again.

- To view the hydraulic oil temperature press the up key again.

➢ To view truck running hours, press the up key again.

▷

➢ To view total fuel used, press the up key again.

▷

➢ To view fuel rate, press the up key again.

▷

Truck status display

- To view coolant temperature, press the up key again.
- To go back a screen at any time, press the back arrow once.

Engine menu

- Press (F1) to display the Engine information.
- Press (F1) again to go back to the main page.

Transmission menu

- Press (F2) to display the Transmission information.
- Press (F2) again to go back to the main page.

Hydraulics menu

➢ Press (F3) to display the Hydraulics menu

Items displayed on this screen:

- Main valve pressure for engine speed up - 1200 RPM.
- Lift Pressure: For weight calculation and load limit.
- Main brake pressure: For brake system pressure detection. if the pressure drops to 100 bar the truck speed will be restricted to 5 Km/h.
- Service brake pressure.

➢ Press (F3) again to go back to the main page.

Fork menu

➢ Press (F4) to display the Fork menu

Items displayed on the screen:

- Lift allow: Signal from mast.
- Lower allow: Signal from mast.
- Lift enable: XS2 signal to solenoid valve.
- Lower enable: XS2 signal to solenoid valve.

➢ Press (F3) again to go back to the main page.

➢ Press (F4) to reset the audible alarm for 1 minute only, the alarm will resound.

NOTE

When the lamp under the steering column illuminates this indicates a fault which cannot be reset.

Information menu

➢ Press (8) to go to the **Information** menu.

1 Time.
2 Trip fuel.
3 Trip distance.
4 Active hours.
5 Trip weight.
12 Total weight.
13 Running hours.
14 Total distance.
15 Total fuel.
16 Date.

Truck display unit settings

NOTE

Active alarm/warning/messages will be indicated by icon (1).

➢ Press (F1) to go to the **Adjust** menu.

➢ Press (F1) to return.

NOTE

Some settings in the main menu are not adjustable by the operator.

- Press (F2) to go to the **Measure** menu.
- Press (F1) to return.

- Press (F3) to go to the **Preferences** menu.

- Press (F1) to go to the **Display** menu.
- Press (F2) and go to **Backlight** group.
- Press (up key) or (down key) to adjust the backlight settings.
- Press (OK) to return.
- Press (F3) to go to the **Screen saver** group.
- Press (up key) or (down key) to adjust the screensaver settings.
- Press (OK) to return.
- Press (F2) to go to the **Dimmed** group.
- Press (up key) or (down key) to adjust the Dimmed settings.
- Press (OK) to return.

Truck status display

- Press (F2) to go to the **Date/Time** group.
- Press the (up key) and (down key) to adjust.
- Press (OK) to return.

- Press (F3) to go to the **Language** group.
- Press the (up key) and (down key) to adjust.
- Press (OK) to return.
- Press (F1) to return to **Main** screen.

- Press (F4) to select **Info**, the software version and truck serial numbers are displayed.

- Press (F1) to select **Modules**.
- Press (OK) to show details.
- Press (x) to return.

- Press (F2) to select **Modem**.
- Press (x) to return.

- Press (F3) to select **Logs**.
- Press (x) to return.

Malfunctions

Malfunctions during operation

⚠ WARNING

If a warning message is displayed and the buzzer sounds during operation, the engine must be stopped immediately and the fault rectified.

Do not operate the truck with any warning messages displayed.

Error messages can be displayed for many reasons, for example:

- Hydraulic oil temperature
- Battery charge
- Engine oil pressure
- Coolant temperature
- Hydraulic filter
- Air filter
- Water in fuel
- Low fuel

Gearbox block alarm

As shown: Gearbox SPN520293/FM1 or APC200 CODE(20.60) , this identifies a gearbox fault.

➢ Check the Alarm code list and rectify accordingly.

Engine block alarm

As shown: Engine SPN97/FM3 or Water in fuelsensor, this identifies an engine fault.

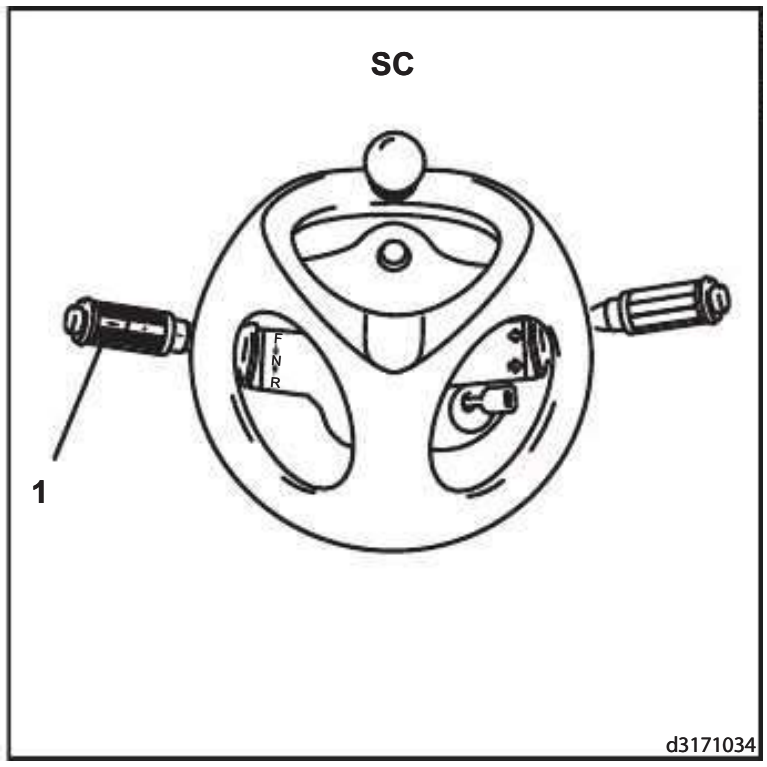
➢ Check the alarm code list and rectify accordingly.

Gear shift control

The gear control (APC 200) is an electronically controlled system which detects truck speed through the transmission and selects the appropriate gear for a driving condition.

The system will default to first gear start as factory setting. The anti-reverse facility prevents the transmission from engaging reverse direction drive until the truck is stopped. The operating lever is fitted to the left of the steering column and has a dual function control lever (1), (direction and gear selector).

The control lever has three movements, two of which select the drive direction (fore / aft), with the third selecting gears (rotate).



Selecting the travel direction

Forward travel

➢ Push electronic gear shift control lever (1) forward and gently apply the accelerator. The transmission will shift into 1st forward gear.

Reversing

➢ Pull electronic control lever (1) back.

Moving off

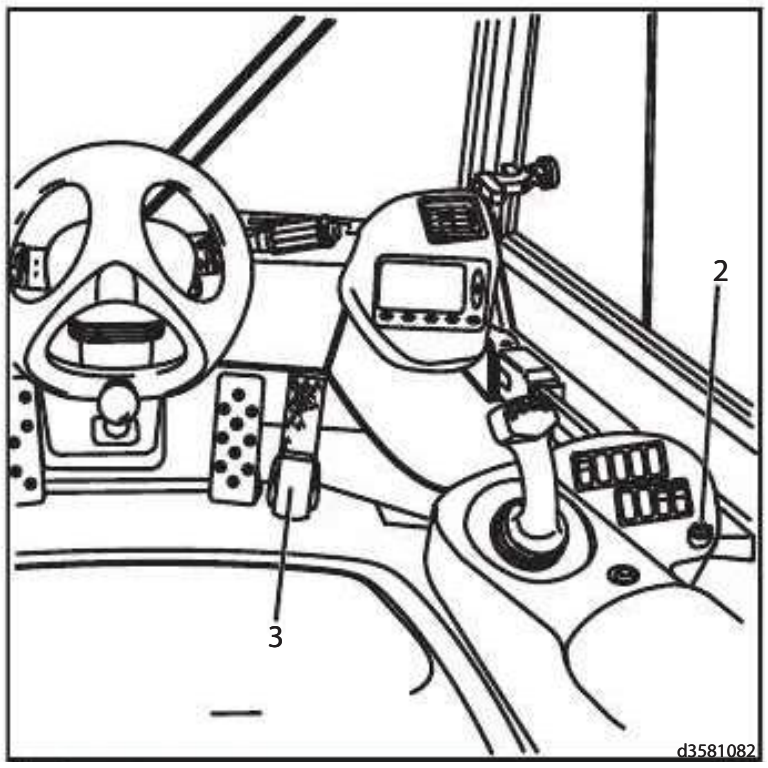
➢ Gently depress accelerator pedal (3) to prevent jerky starting.

NOTE

The parking brake will release automatically.

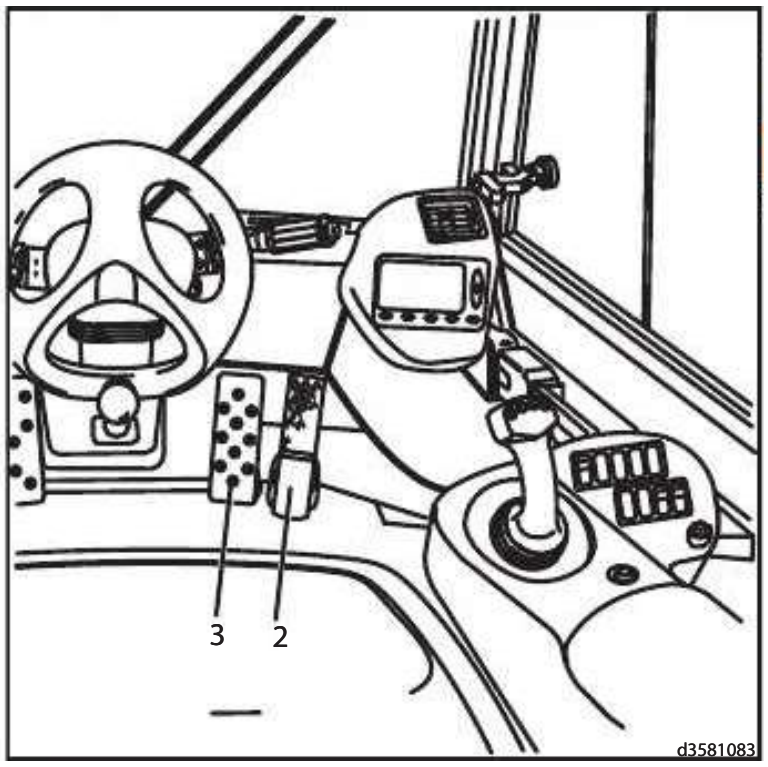
The truck will move in the selected direction of travel.

At the preset speed the transmission will automatically select 3rd gear. Also, at the preset speed the transmission will automatically select 4th gear.



Slowing down and stopping

➢ Release accelerator pedal (2).
➢ Operate brake pedal (3).
➢ Controlled transmission inching will take place during the depression of brake pedal (4). This allows controlled slow movements of the truck with high engine r.p.m.
➢ Transmission drive is re-engaged upon depression of accelerator pedal (3).



Driving

WARNING

Exercise care when operating your machine in wind velocities of 24 knots / 28 mph or 45 km/h or greater, handling characteristics may be affected, specifically, high lifting and lowering operations. Further information should be sought from the manufacturer, your authorised distributor, or local statutory authorities

⚠ CAUTION

Travel on slopes over 15% is not allowed as a rule due to the prescribed minimum brake applications and truck stability characteristics. Before driving on steeper slopes you should contact your dealer. The climbing ability rates given in the data sheet were derived from the tractive force of the truck and they apply only for crossing obstacles and for small differences in level.

Always accommodate your driving style to suit the conditions of the roadway (rough surfaces etc.) especially hazardous work areas and the load.

⚠ CAUTION

Always look in the direction of travel and have an adequate overview of the road ahead, including to the sides when steering. When driving, ensure that the road ahead is clear. If goods obstructing vision are being transported, drive the truck with the load trailing. If this is not possible, a second person shall walk in front of the truck as a guide. The truck should then only be driven at walking speed with particular caution being exercised. If visibility aids are required (e.g. mirrors, camera/monitor), to ensure adequate sight, then training should be given for driving with these aids. Reversing with a mirror for example, shall be exercised with particular care.

Steering

➢ Start the engine and drive off.

➢ Turn the steering wheel to the left and right to full lock.

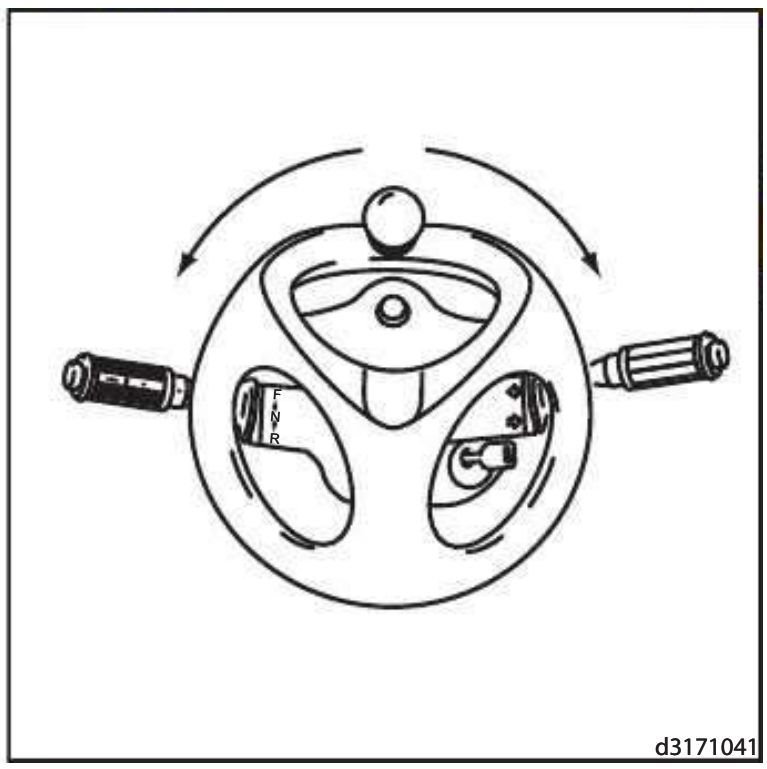
NOTE

Very little effort is required to turn the steering wheel due to the power-assisted steering system. This is especially advantageous when operating in narrow aisles. To avoid unnecessary tyre wear, turn the steering only when the truck is moving.

Turning Radii:

SWB: 4190 mm

LWB: 5150 mm

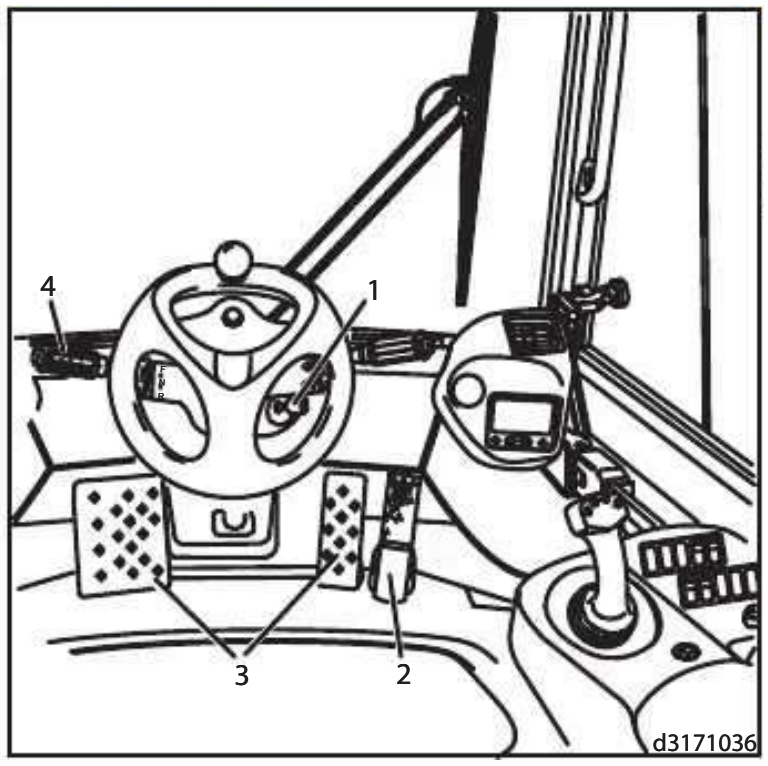


⚠ WARNING

Contact your authorized dealer if steering requires too much effort or there is excess play in the steering.

Do not drive the truck if the steering is defective.

Stopping the truck



- Release accelerator pedal (2).
- Depress brake pedal (3) to slowly brake the truck to a standstill.
- Press parking brake button before releasing brake pedal (3).
- Move electronic gear shift control lever (4) to neutral.

NOTE

The transmission will automatically disengage gear when brake pedal (3) is depressed.

- Lower the handler and ground any load.
- Allow the engine to idle for at least 3 minutes to stabilise the turbocharger, lubricating oil and coolant temperatures.
- Stop the engine.
- Remove ignition key (1).

Transmission inching

Operating either brake pedal activates the inching function which controls brake pressure supplied to the truck braking system.

Between 0% & 7% of brake pedal travel: Inching is disabled.

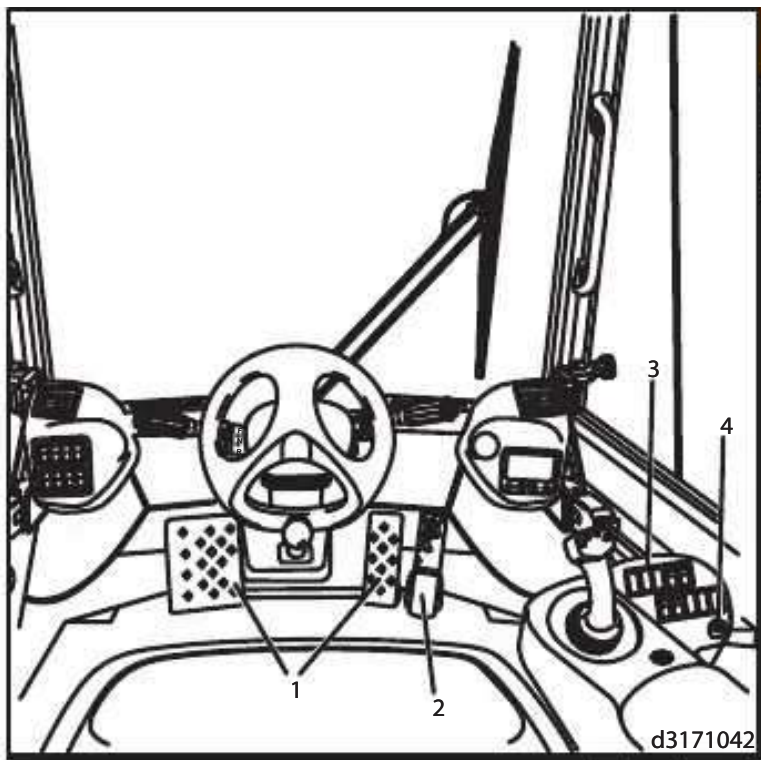
Between 8% & 35% of brake pedal travel: Engine braking will slow the truck gradually. Press the pedal harder to stop quicker.

Between 35% & 70% of brake pedal movement: Inching speed is controlled - 0.3 km/h.

Between 35% & 70% of brake pedal movement: Stops the truck quickly or holds the truck stationary. Transmission is disconnected.

Braking system

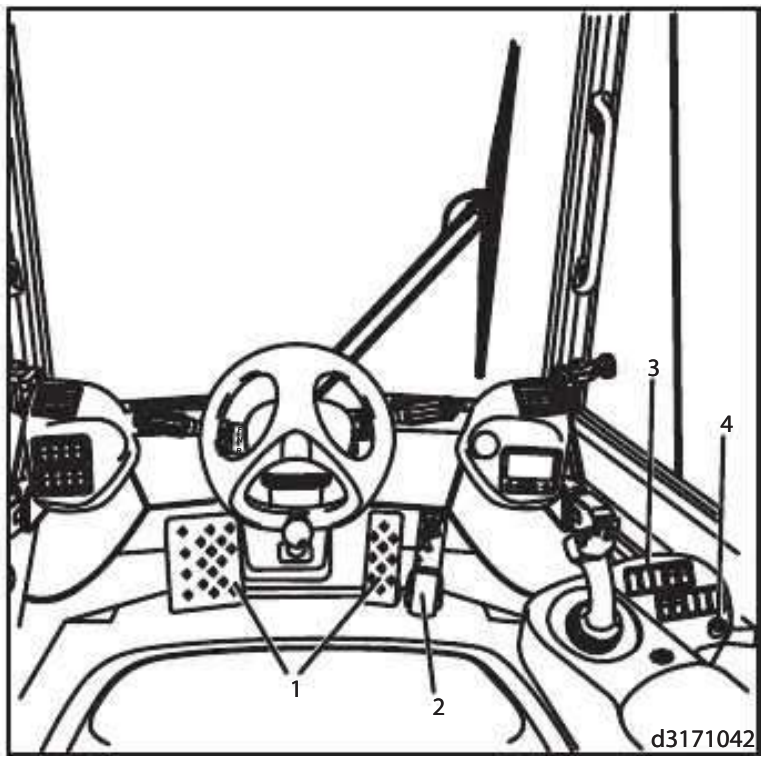
Service brake



To operate the service brake:

- ➢ Release accelerator pedal (2) and allow it to return to its rest position.
- ➢ Depress (service) brake pedal (1).

Parking brake



The parking brake button (4) for applying the parking brake is located on the right-hand seat console (3).

- ➢ To release the parking brake, push the parking brake button down. Parking brake warning light (5) in the left-hand instrument and switch panel will flash at 0.5s intervals until forward or reverse gear is selected and the throttle pedal is depressed. The parking brake light will the extinguish..
- ➢ To apply the parking brake, push button (4) again. Parking brake warning light (5) in the left-hand instrument and switch panel will illuminate.

⚠ WARNING

If the braking system is faulty or worn, contact your authorised dealer.

Do not drive your truck with faulty brakes.

Automatic Parking brake operation

When stationary, with the footbrake applied and in gear, following a period of 3 seconds * the handbrake will automatically engage.

NOTE

During this time the working hydraulics speed is regulated by the throttle pedal.

Upon releasing the footbrake, engine revs falling below 950 r.p.m. and activation of the throttle pedal the handbrake will disengage and selected travel direction will recommence.

(* variable 0.5 - 5 seconds)

Malfunctions during operation

CAUTION

If a fault is detected and displayed on the LHP indicators or the truck status display screen, stop the engine immediately and eliminate the malfunction.

Examples of faults detected;

- Low Battery voltage
- Low Battery charge
- Engine coolant temperature
- Air cleaner restriction
- Hydraulic oil temperature
- Brake oil temperature
- Engine oil pressure
- Coolant temperature
- Low oil pressure in brake system

Truck lighting

Light switch (8) is located on the left-hand panel (1).

To illuminate the side marker lights:

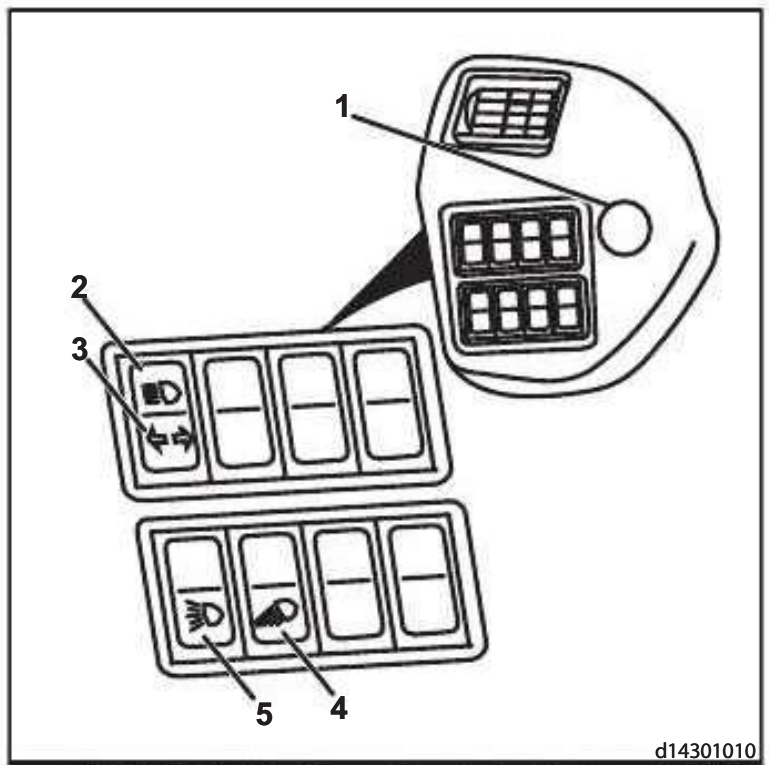
➢ Push light switch (8) to the first position.

To illuminate the side marker lights and dip beam headlights:

➢ Push light switch (8) to the second position.

The side marker lights and dip beam headlights are on.

The indicator lamp in the light switch will illuminate when the side marker and dip beam headlights are illuminated.



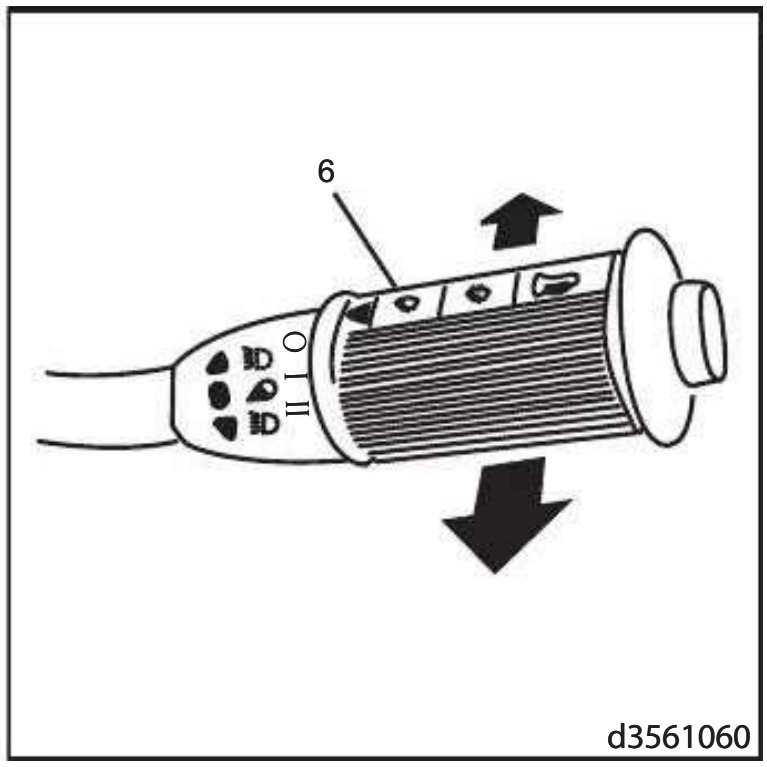
Turning on the main beam headlights

➢ Push multiple function electrical lever (6) away from the steering wheel to illuminate the main beam headlights permanently. Headlight main beam indicator light (5) will be illuminated.

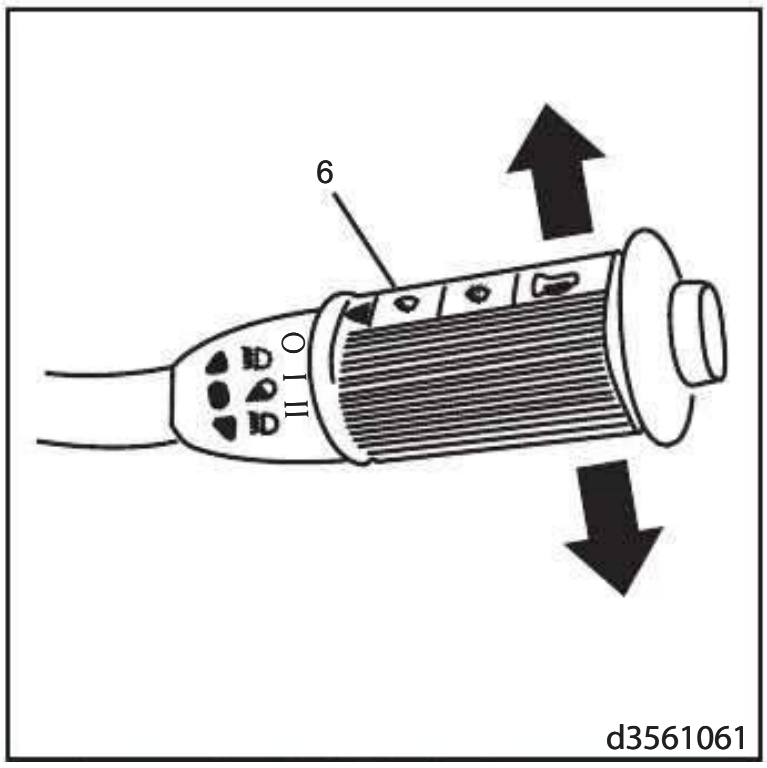
➢ Pull multiple function electrical lever (6) towards the steering wheel to flash the headlights.

NOTE

The main beam headlight can only be turned on permanently when switch (2) is turned on.



Turning on the turn indicator lights

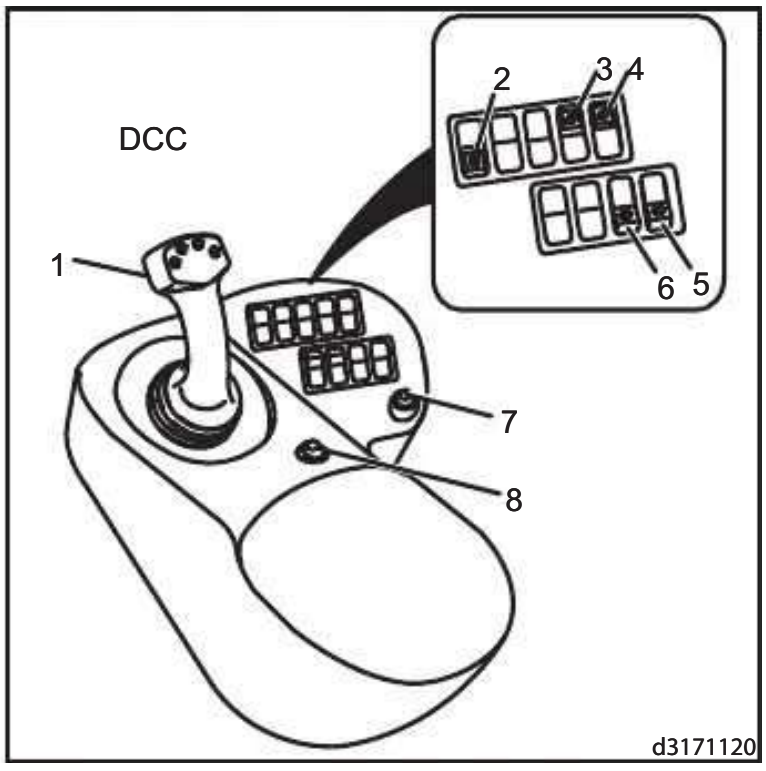


- For left turn indication push the multiple function electrical control lever (6) on the right-hand side of the steering column forward. Turn indicator warning light (4) will flash.
- For right turn indication pull the multiple function electrical control lever (6) on the right-hand side of the steering column to the rear. Turn indicator warning light (4) will flash.

NOTE

To stop turn indicator lights flashing multiple function electrical lever must be returned to its central position manually.

Turning on the working lights*



- To illuminate the working lights on the load lift device:
- On the armrest (DCC) depress light switches (3 & 4) fully.

* option

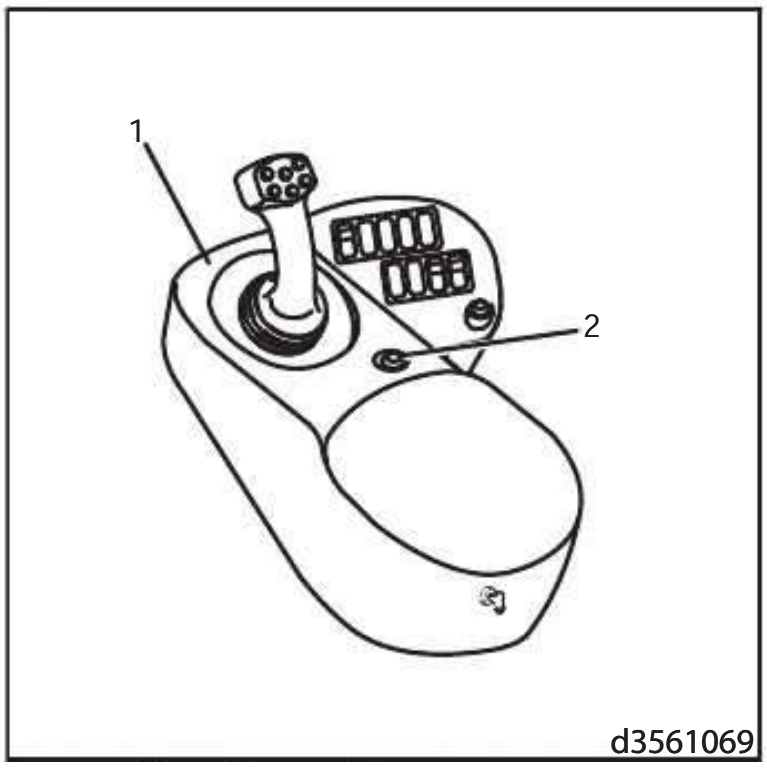
Operating the hazard warning lights ▷

The hazard warning light switch (2) is located in the driver's central control panel (1).

- ➢ Push button (2) to operate the hazard warning lights.
- ➢ Push button (2) again to turn the hazard warning lights off.

NOTE

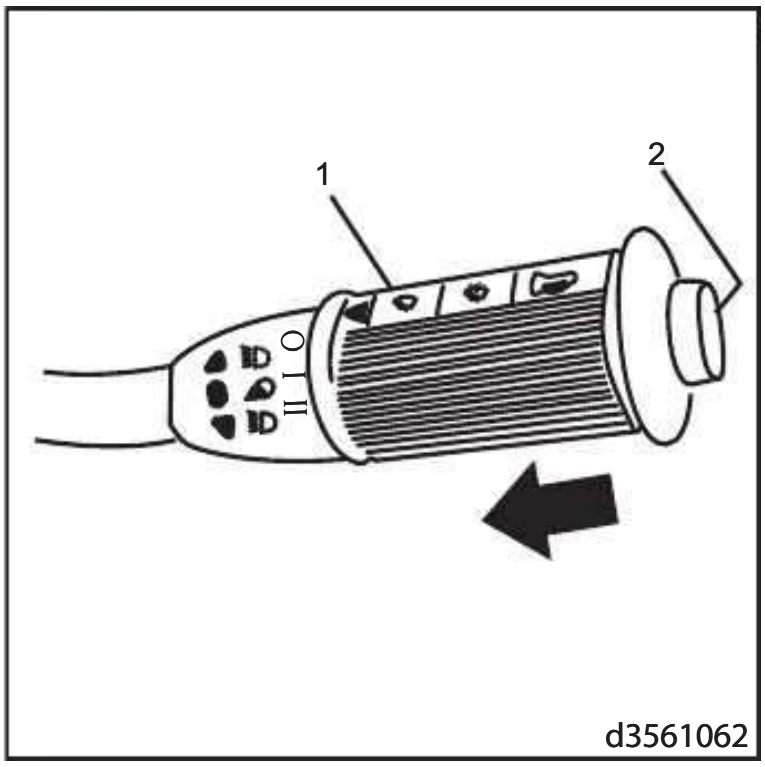
The indicator light in RHP illuminates.



Operating the horn ▷

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

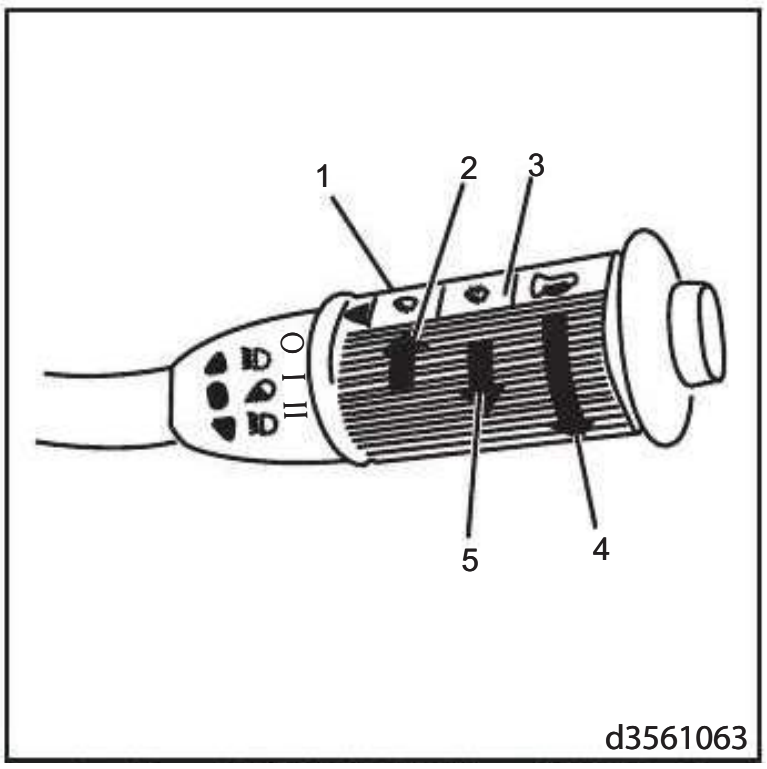
- ➢ To sound the horn, press horn button (2) at the end of multiple function electrical control lever (1).



Windscreen wipers and washers ▷

The front windscreen wiper switch (3) is part of multiple function electrical control lever (1).

- For slow wiping: Turn switch (3) from the zero position one step back to position (5).
- For fast wiping: Turn switch (3) from the zero position back two steps to position (4).
- For intermittent wiping turn switch (3) from the zero position one step forward to position (2).



NOTE

The wiper motor is fitted with a thermal cut-out which, during operation, will switch off the wipers to prevent overheating of the motor, when the windscreen is dry.

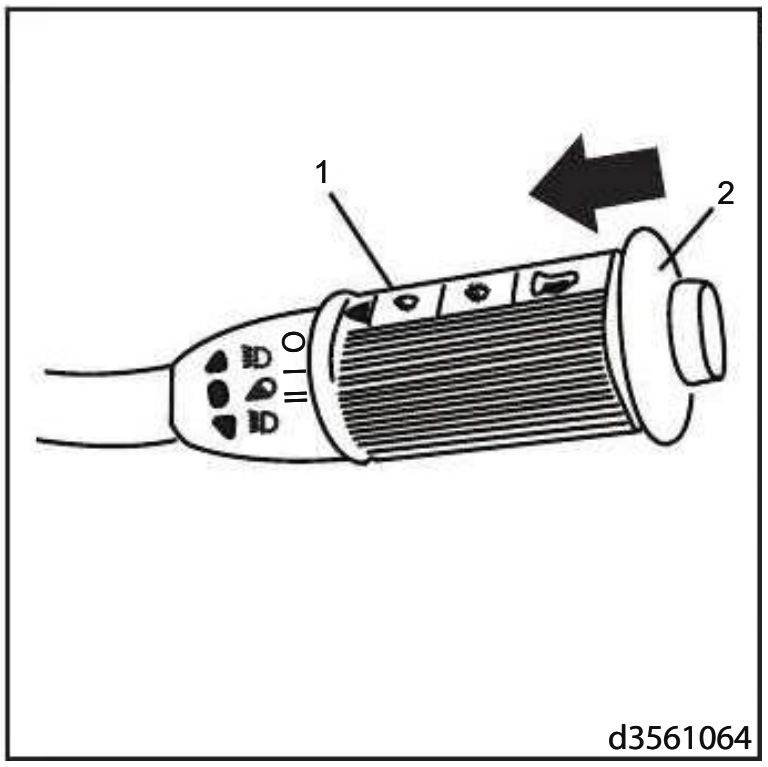
Turning on the front windscreen washer ▷

The windscreen washer switch (2) is located on the end of multiple function electrical control lever (1) . It is the collar surrounding the horn button.

- Push switch (2).

NOTE

The washer stops automatically when the switch is released.



To operate rear screen wiper and washer ▷

The rear screen wiper/washer switch (2) is fitted in the drivers central control panel (1).

To operate the wiper.

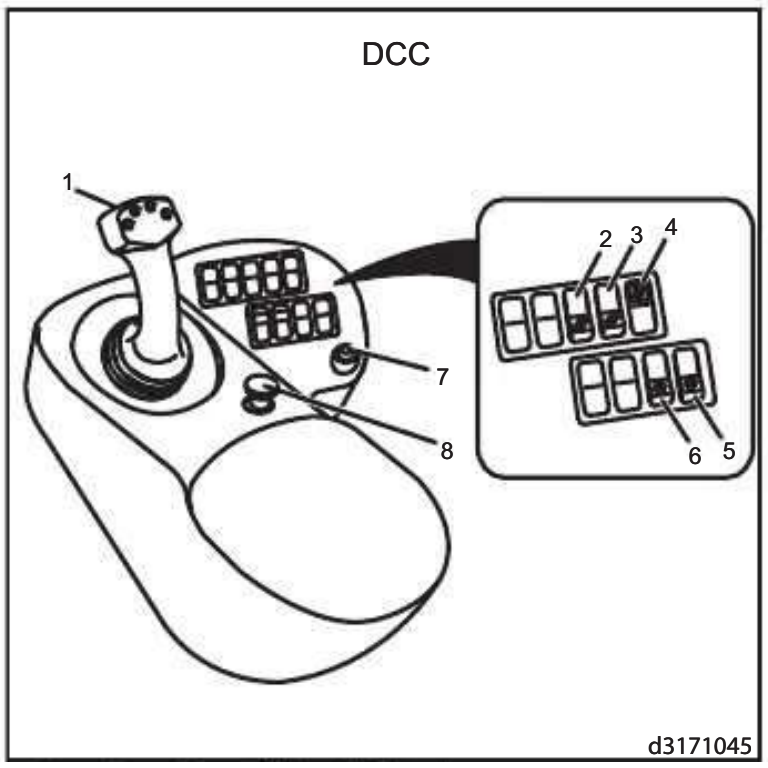
➢ Push switch (2) to the first position.

To operate the wiper and washer.

➢ Push switch (2) all the way down and hold.

NOTE

The washer stops automatically when switch is released. The wiper continues to operate until the switch is returned to the starting position.



NOTE

The wiper motor is fitted with a thermal cut-out which, during operation, will switch off the wipers to prevent overheating of the motor, when the windscreen is dry.

To operate top screen wiper and washer

The top screen wiper/washer switch (3) is fitted in the drivers central control panel (1).

To operate the wiper.

➢ Push switch (3) to the first position.

To operate the wiper and washer.

➢ Push switch (3) all the way down and hold.

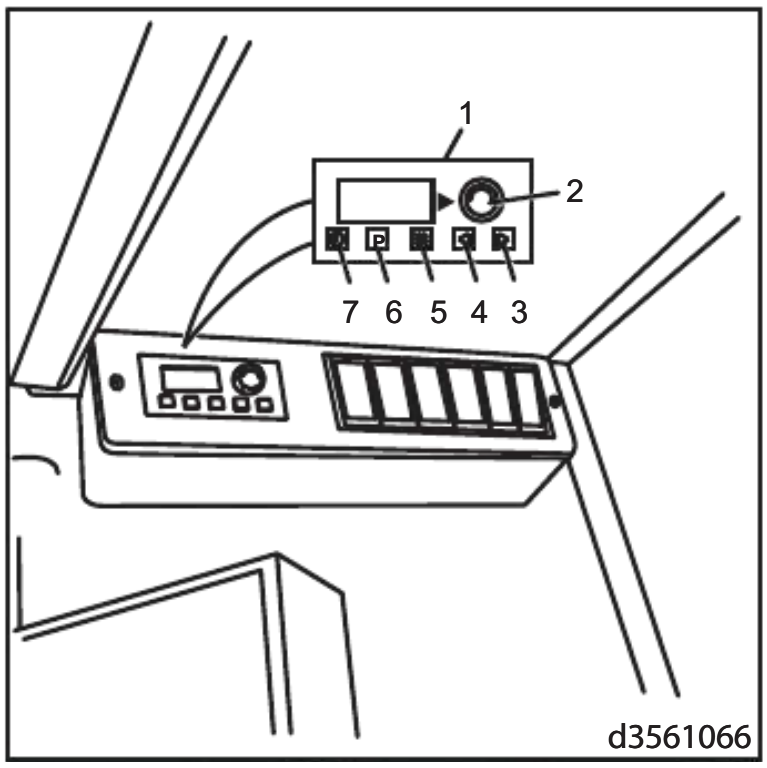
NOTE

The washer stops automatically when switch is released. The wiper continues to operate until the switch is returned to the starting position.

NOTE

The wiper motor is fitted with a thermal cut-out which, during operation, will switch off the wipers to prevent overheating of the motor, when the windscreen is dry.

To operate the cab pre-heater system * ▷



The cab pre-heater (1) is fitted in the cab rear right corner. The heater operates for 120 minutes (default setting).

- (1) Cab pre-heater
- (2) Temperature controller (rotate to increase / decrease cab temperature)
- (3) Forward
- (4) Backward
- (5) Heating (depress to activate / deactivate heating)
- (6) Preselection
- (7) Clock time

NOTE

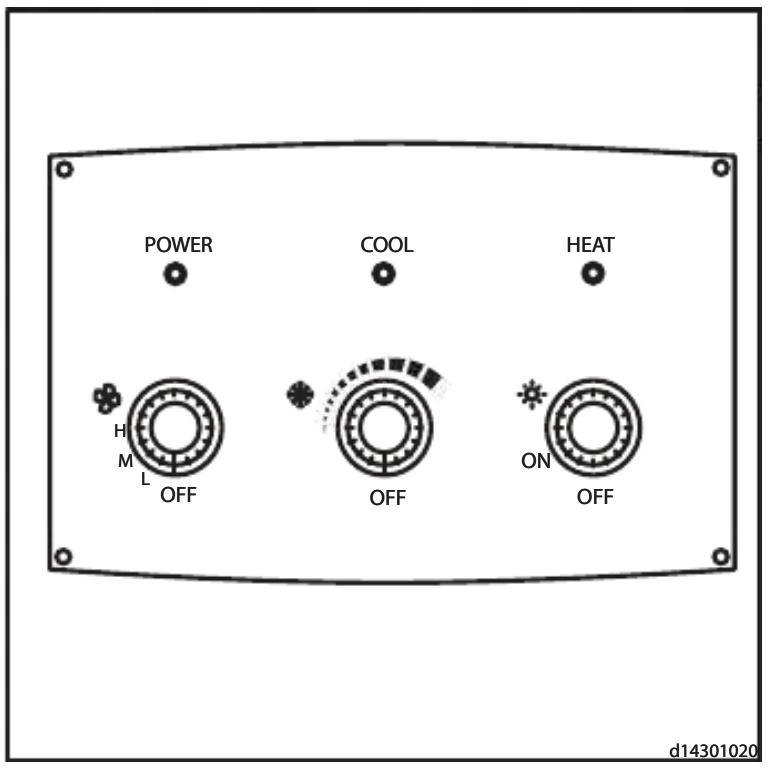
The cab pre-heater must not be used indoors.

NOTE

Always shut off the heater when refuelling the truck.

* Option

To operate climate control * ▷



NOTE

Do not operate the system with all vents closed. Heating and cooling systems will operate only while the engine is running and the batteries are charging.

➢ Switch the fan on and select required fan speed by turning **Power** switch and turn it to the required speed (L, M or H).

NOTE

*When the **Power** switch is turned, the yellow indicator lights up.*

➢ Select temperature by turning **Cooling** switch, turn it further for cooler airflow.

NOTE

*When the **Cooling** switch is operated the green light lights up.*

- When **Heating** switch is turned additional heating is obtained.
- When the **Heating** switch is turned the red light will light up.

NOTE

*Do not operate **Cooling** and **Heating** at the same time.*

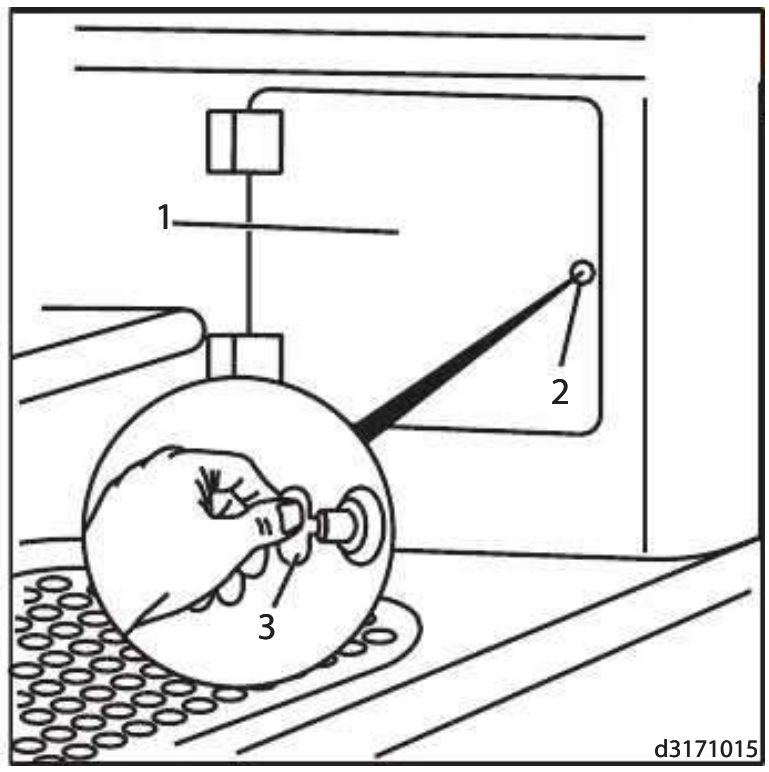
Fuses

The truck and handler electrical circuits are protected by fuses in the fuse box located on the left side of the truck.

WARNING

Danger of fire and severe damage to equipment.

Do not continue to operate with faulty electrical circuits. If fuses fail continuously, stop the truck, ground the load and stop the engine.



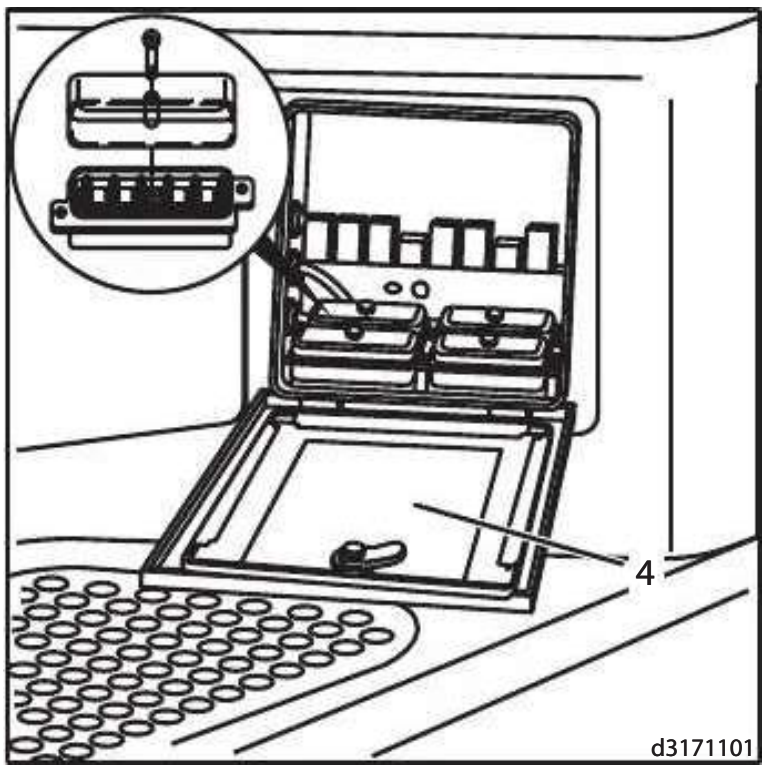
Fuses

➢ To check the fuses, insert key (3) into lock (2) of fuse box cover (1). Turn key anticlockwise to open.

NOTE

The fuse box door is hinged on the left side. A layout panel (4) is provided for identification of fuses and relays.

Fuses in the fuse box protect the following circuits:



Fuse list	
F1	5A Ignition switch/relay
F2	5A Reverse lights relay
F3	3A Interior light
F4	5A Brake lights
F5	10A Hazard switch
F6	15A Multi-function switch
F7	APC 200
F8	30A Hydraulic oil cooler
F9	5A Engine ECM
F10	5A Gearshift
F11	10A Front wiper
F12	10A Flasher
F13	10A Rear wiper
F14	10A Top wiper
F15	3A GEM (truck status display unit)
F16	5A Beacon
F17	15A Mast lights

F18	15A Cab working lights
F19	3A Handbrake
F20	15A Head/side lights
F21	3A Cab warning light
F22	10A Attachment power
F23	10A Alternator
F24	3A 12V radio
F25	20A ECM power
F26	Blank
F27	50A Cold start heater
F28	3A Cold start relay

Load lift controls

The standard control for mast and handler is the central control lever (1) (joystick) on the drivers control centre (DCC).

NOTE

The symbol of the control lever movements are shown on a label attached to the wind-screen pane to the right of the driver. Observe the symbols with direction arrows.

CAUTION

Attachments affect the load capacity and stability of the truck.

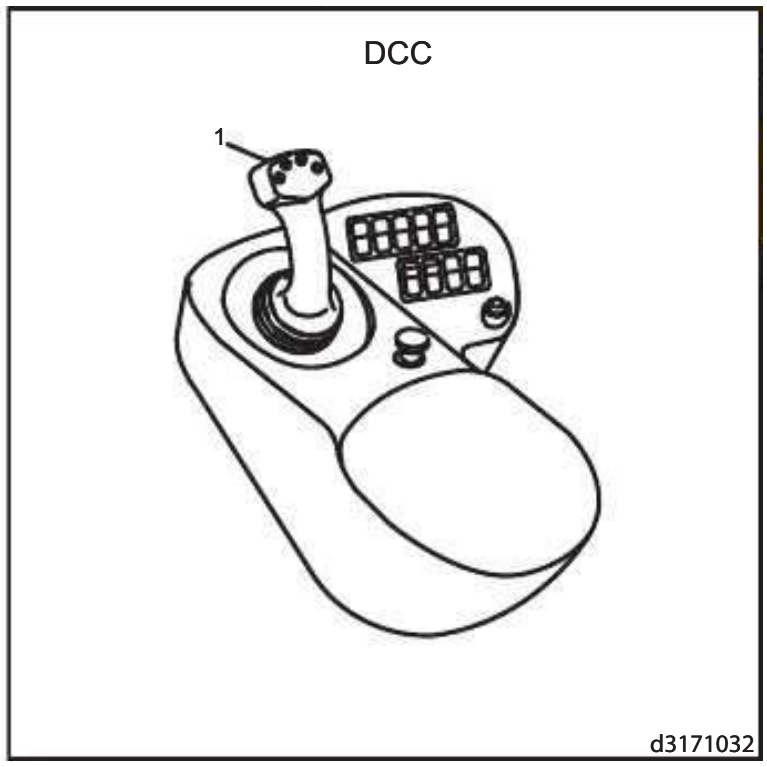
Attachments not supplied with the truck may only be employed if an authorised dealer ascertains that safe operation is assured in respect of load capacity and stability.

Central control lever (joystick)

CAUTION

Use the lifting device only for authorised applica-tions. The operator must be trained in lifting and stacking operations.

Do not operate this machine if you are not trained.



4 Operation

Load lift controls

NOTE

The central control lever has been calibrated to allow 5% movement in all directions before function is activated.

The central control lever (1) is mounted on the driver's control centre to the right of the seat. Always shift the control lever gently and slowly. The control lever returns to its initial position automatically when released.

NOTE

When operating central control lever (1), the engine speed will increase automatically up to 1200 rpm to prevent the engine stalling.

The central control lever (1) is provided for lifting and lowering the load lift device and for tilting the mast forwards and backwards.

WARNING

Handling characteristics may be affected in high winds, specifically, high lifting and lowering operations. Further information should be sought from the manufacturer, your authorised distributor, or local statutory authorities.

Exercise care when operating your machine in wind velocities of 24 knots/28 mph or 45 km/ h or greater.

To lift the fork carriage

➢ Pull central control lever (1) back.

To lower the fork carriage

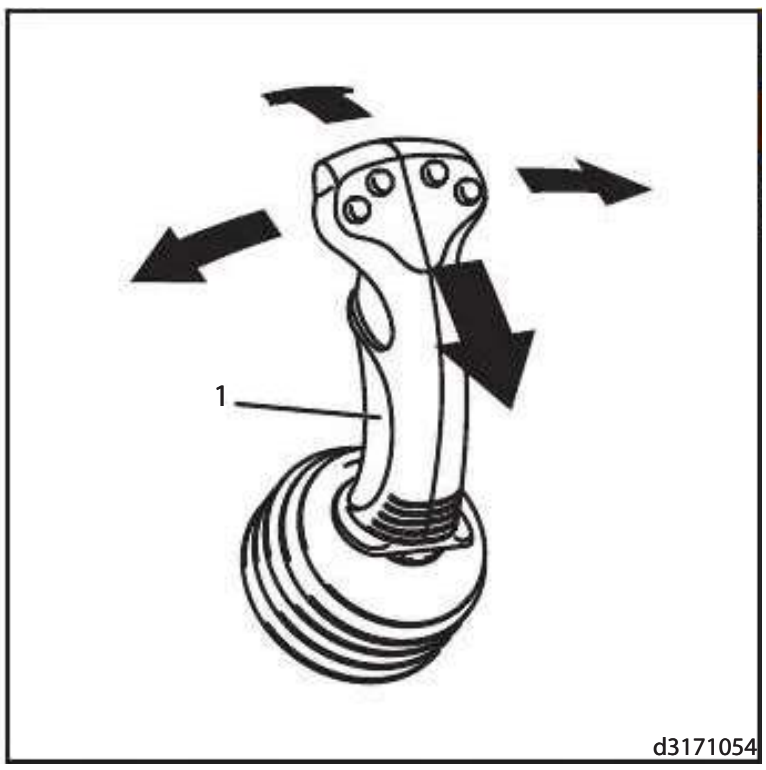
➢ Push central control lever (1) forward.

To tilt the mast back

➢ Pull control lever (1) back.

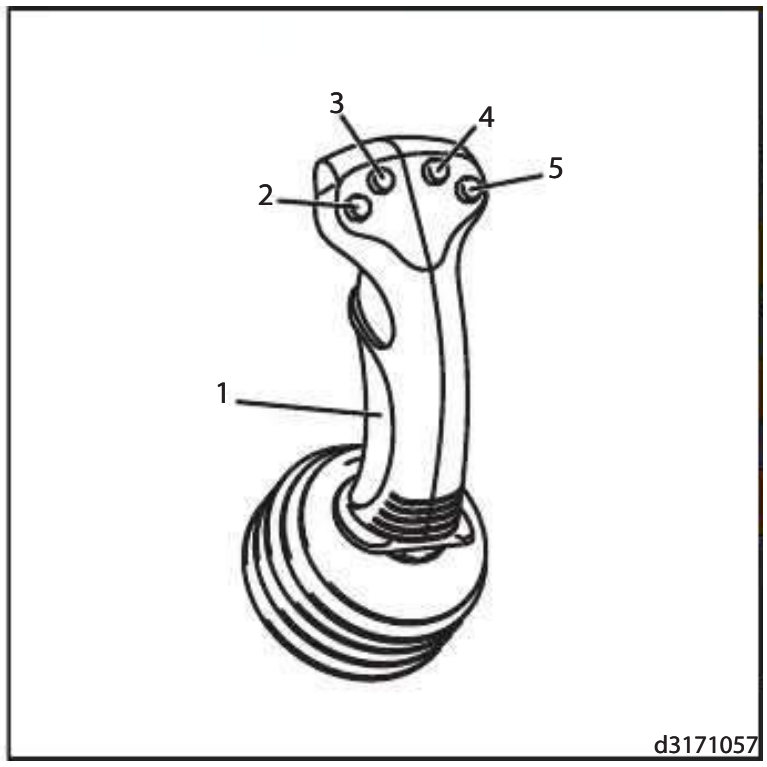
To tilt the mast forward

➢ Push control lever (1) forward.



Operating the sideshift

▷



⚠ CAUTION

Do not operate the sideshift with a load on the forks and the forks grounded.

Danger of severe damage to the equipment.

➢ Lift the load clear of the ground and then move the sideshift.

To sideshift left

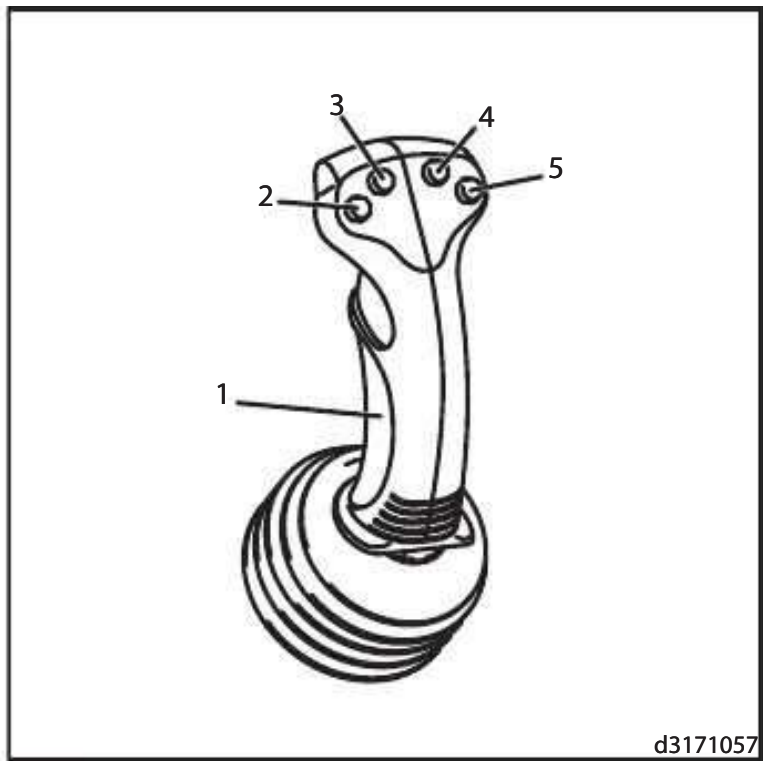
Press and hold (2) on control lever (1).

To sideshift right

Press and hold (5) on centralcontrol lever (1).

Adjusting forkspread

▷



⚠ CAUTION

The operation of the fork spreader changes if additional attachments are fitted.

Refer to the label on the cab windscreen.

⚠ WARNING

Do not spread or close forks with a load or when lowered on the ground.

Heavy damage to the equipment may result.

➢ Raise the fork carriage slightly.

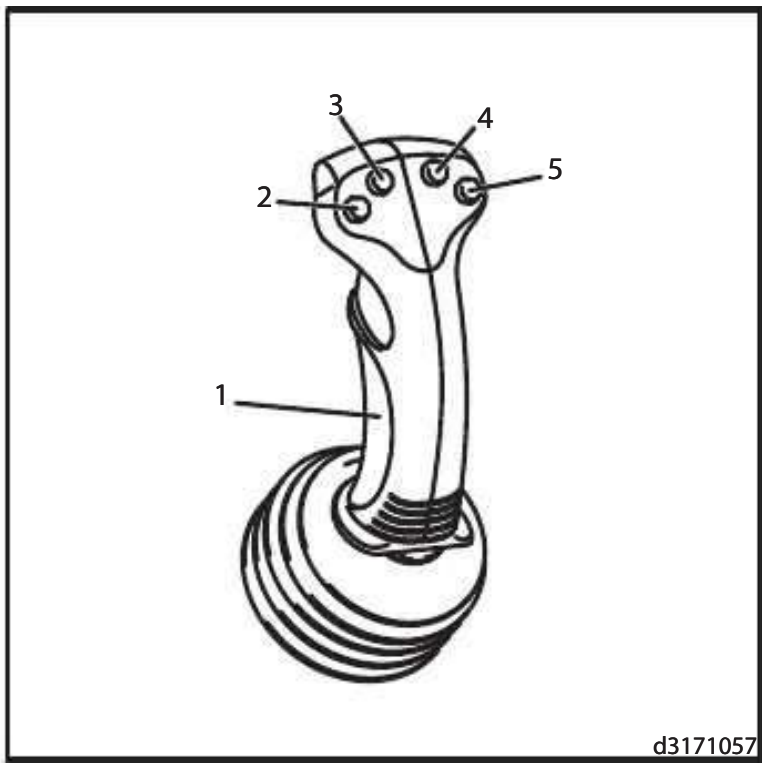
Increasing the fork spread

Before lifting a load

➢ Depress and hold yellow button (3) on control lever (1).

Decreasing the fork spread

➢ Depress and hold yellow button (2) on control lever (1).



Before lifting a load

➢ Before lifting a load observe the capacity diagram (1).

⚠ WARNING

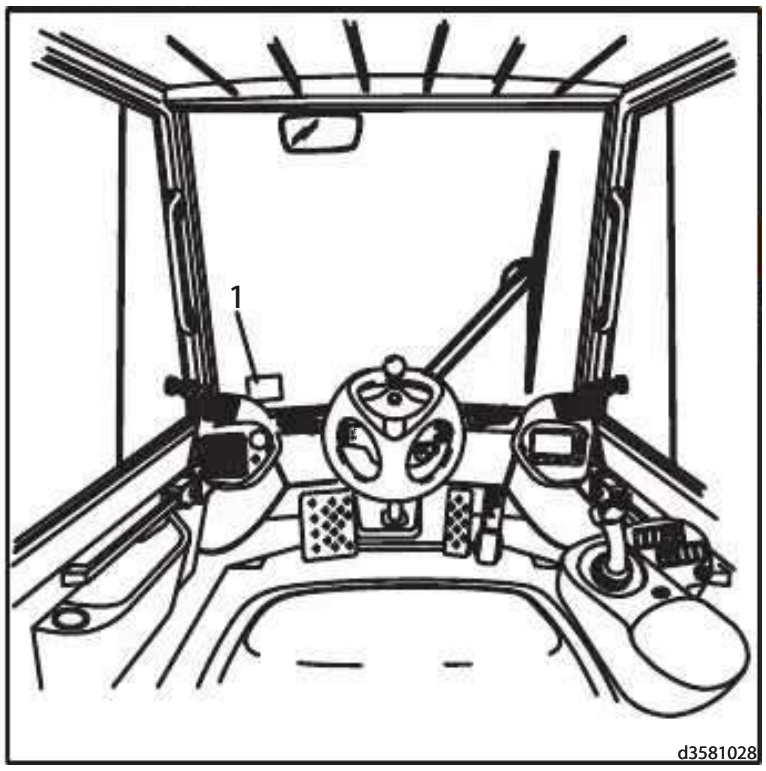
If attachments are fitted, observe the appropriate load capacity plate in each case.

Figures stated in the capacity diagram or plate apply to compact and regular loads and must not be exceeded, as this will impair stability of the fork truck and the strength of the forks and mast. Maximum capacity is governed by the height of lift and the load centre distance.

NOTE

*Check the load limit and contact your authorised dealer **before:***

- *Transporting off centre or swinging loads.*
- *Transporting loads with the mast tilted forward or the load not near the ground.*
- *Transporting loads with a centre of gravity which is extended more than usual.*
- *Operating attachments and accessories.*



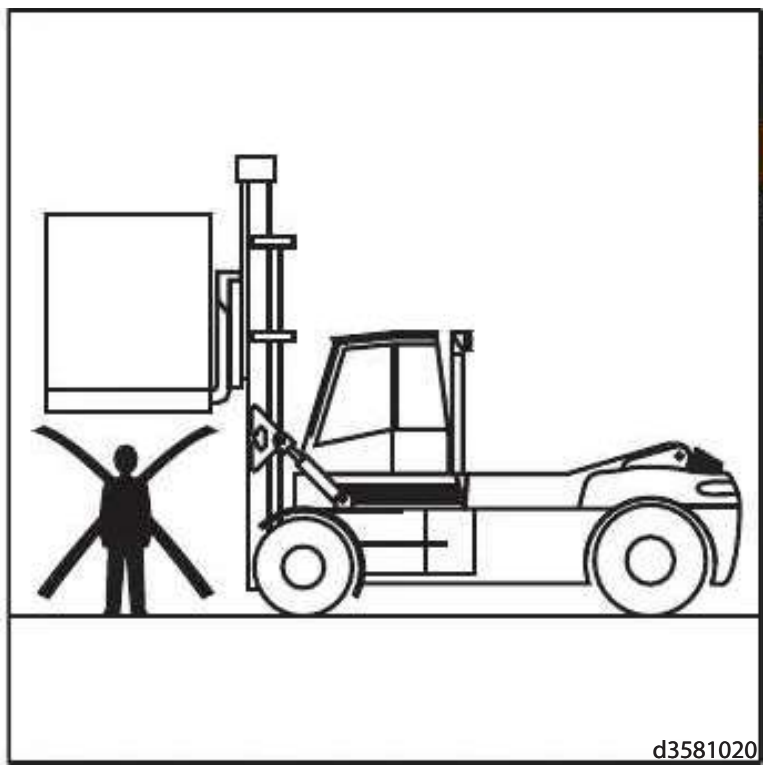
Lifting a load

⚠ WARNING

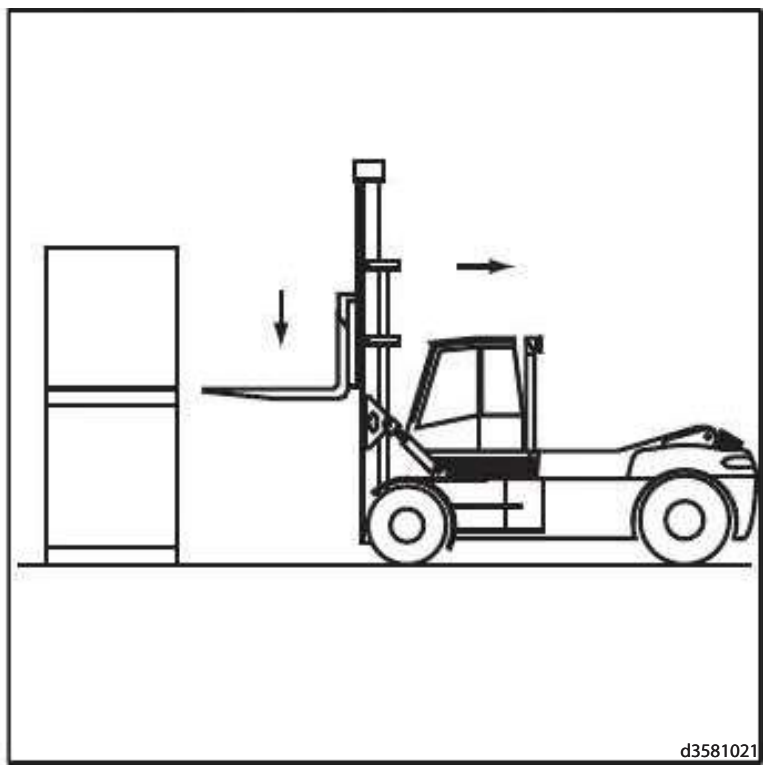
Drive the truck with the load at travelling height and with the mast tilted back.

No person is allowed to stand under an elevated load.

- Approach the load to be lifted as carefully and accurately as possible.
- Put the mast in the vertical position.
- Lift or lower the fork carriage to the correct height.
- If necessary, adjust the fork spread.
- Carefully insert the forks under the load so that load is centred and contacts the fork face, if possible. Do not touch adjacent loads.



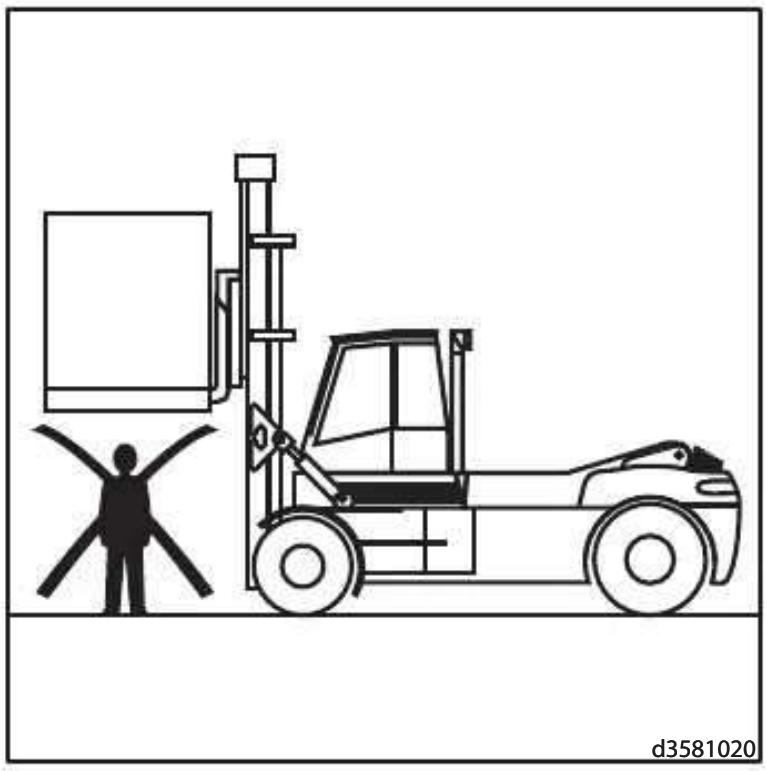
- Apply the parking brake.
- Elevate the mast until the load rests on the forks.
- Tilt the mast back slightly.
- Release the parking brake.
- Operate the lift truck in reverse until the load is clear.
- Tilt the mast fully back.
- Lower the mast to the travelling position.



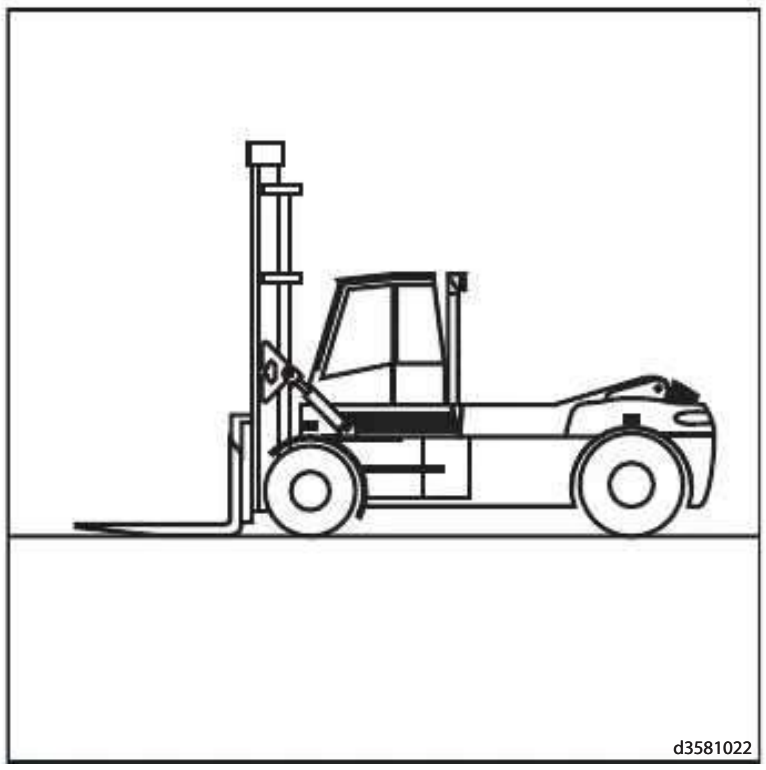
Travelling with load

⚠ WARNING

Drive the truck only with the load at the driving



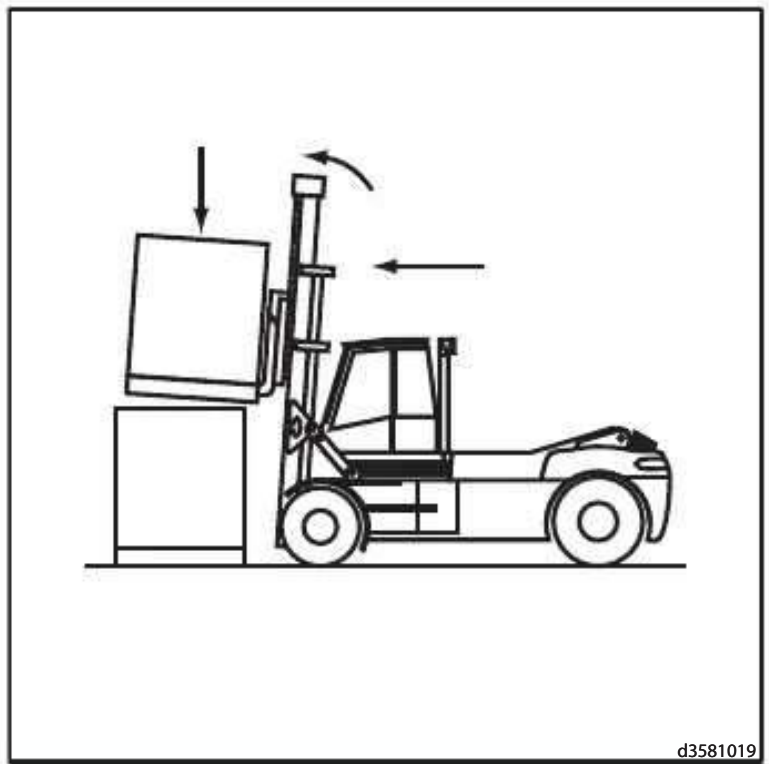
- Do not travel with the load laterally displaced (e.g. with a sideshift).
- Transport the load near the ground.
- Always travel with the load uphill on upgrades and down grades, never travel or turn across a slope.
- If visibility is reduced work with a guide.
- Operate the truck in reverse if the load being transported is stacked so high as to obstruct forward vision.



Depositing the load

➢ Approach the stack or device receiving the load as carefully and as accurately as possible.

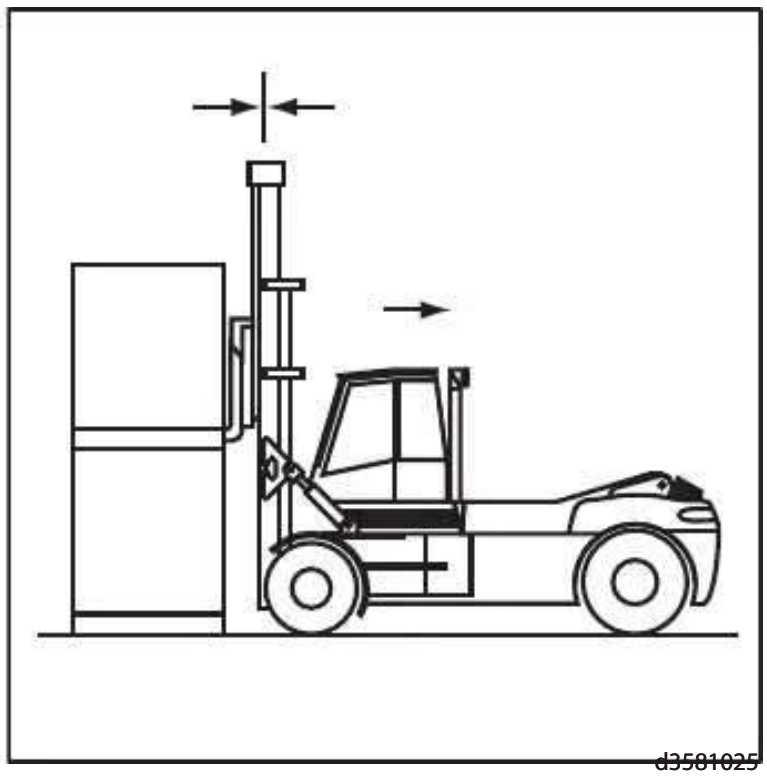
➢ Elevate the fork carriage to the correct height.



➢ Put the mast in the vertical position.

➢ Carefully move into the stack.

➢ Lower the load on to the stack, until the forks are clear of the load.



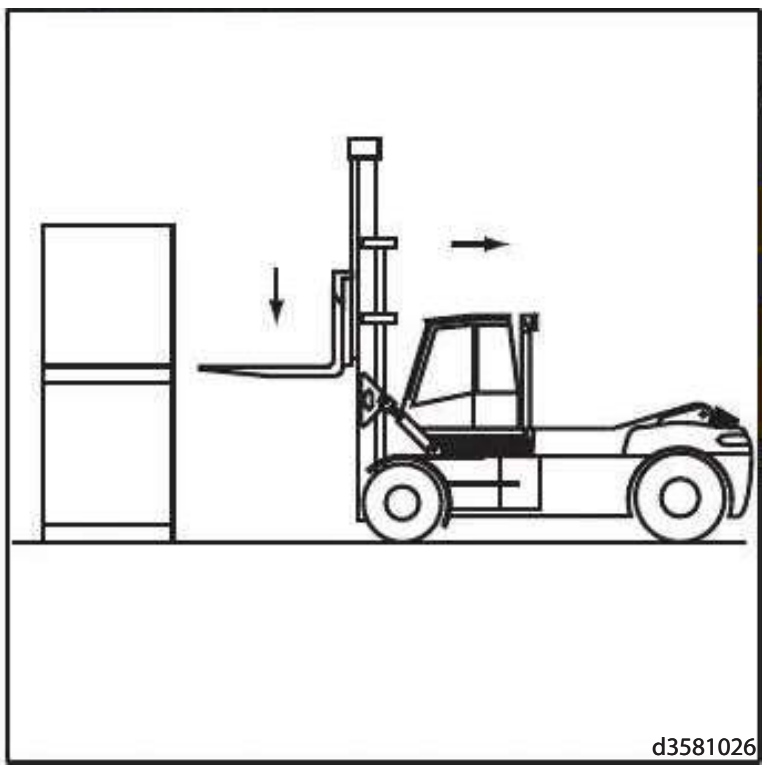
Parking the truck

➢ Reverse the truck away from the stack until clear.

➢ Lower the mast to the travel position.

⚠ WARNING

Always park the truck safely.
Never leave the truck unattended with the load elevated.



Parking the truck

➢ Lower the mast and ground the load.

➢ Apply the parking brake.

➢ Select neutral.

➢ Stop the engine and remove the ignition key from the key switch.

➢ Lock the cabin door and remove the door key.

Locations for jacks when changing wheels

⚠ CAUTION

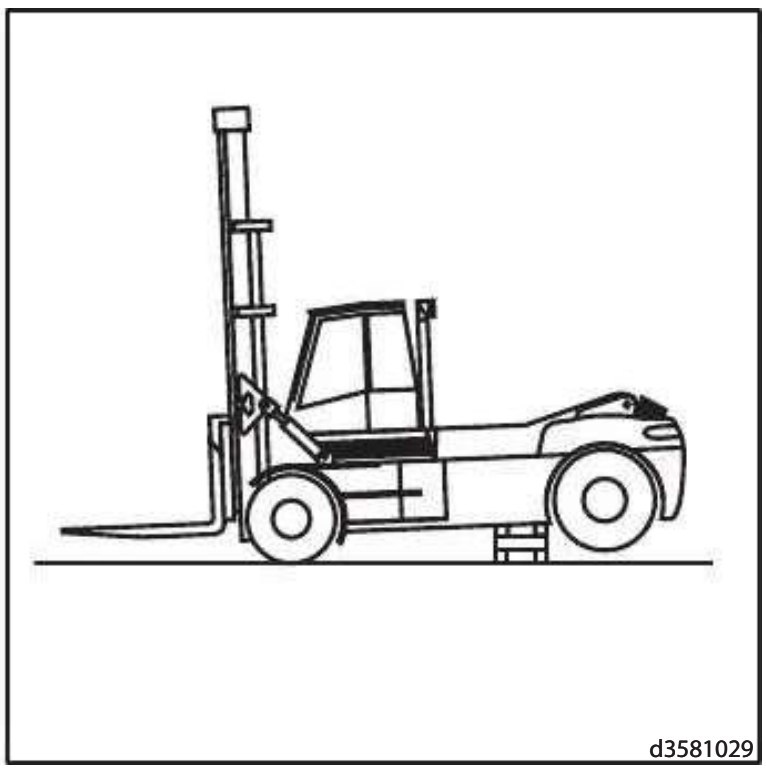
Only use a jack with sufficient lifting capacity.

The capacity of the jack should be 25,000 kg minimum.

⚠ CAUTION

The truck should only be jacked up at jacking points (1&2). When jacking up the front of the truck, chock the rear wheels.

When working under the truck secure the chassis with wooden blocks, do not rely just on the jack.



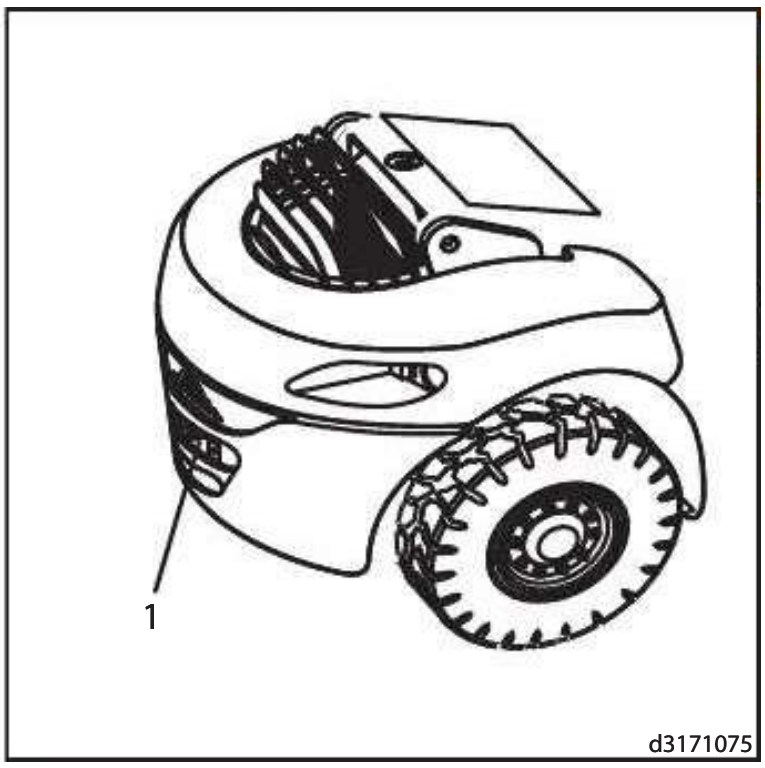
- To jack up front of truck, place jack under drive axle mounting plate (1).
- To jack up rear of truck, place jack under main plate of steer axle (2).

Trailer coupling

NOTE

The trailer coupling should be used only for towing light trailers inside the plant working area (refer to the technical data for nominal towing capacity).

- Lift tow pin (1).
- Place the tow bar in coupling recess in the lower retaining hole.
- Push tow pin (1) down to engage the drawbar.



Towing

If the truck must be towed, first release the hydraulic parking brake and remove the propeller shaft.

NOTE

Disconnect the propshaft at the drive axle end only.

WARNING

Care must be taken to ensure the propshaft is suspended clear of the roadway.

Danger of damage to the truck.

CAUTION

The truck must only be towed with a rigid towbar and by a vehicle with sufficient tractive braking power to stop both vehicles.

Danger of damage to the truck.

4 Operation

Towing

NOTE

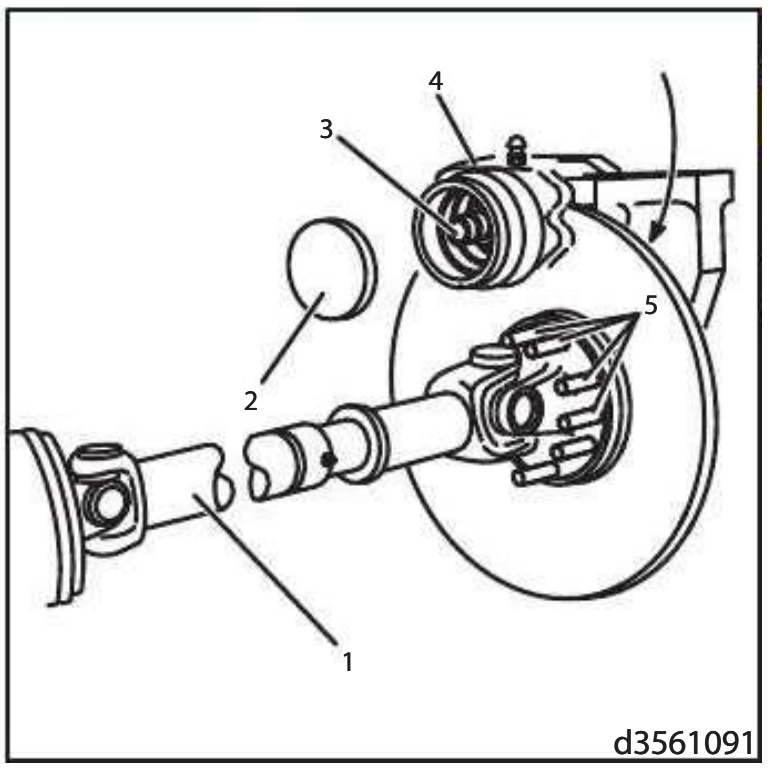
With the engine stopped, the truck can still be steered, although with much increased effort at the steering wheel.

Towing procedure

- Lower and release the load.
- Attach the towing vehicle to the towing pin with a rigid tow bar (tractive and braking power are sufficient).
- Chock the drive axle wheels.

Releasing the parking brake

- Chock the wheels of the truck.
- Remove cover (2) from brake calliper (4).
- Turn bolt (3) anti-clockwise to release the brake until the brake disc is clear.



Removing the propeller shaft

- Remove bolts, nuts and spacers (5) on the coupling joints at the drive axle end.
- Take off propeller shaft (1) and suspend it with a chain, for example, to prevent it from touching the ground during towing.

CAUTION

Because of a lack of hydraulic power during towing, increased effort is required when steering.

Tow the truck only with great caution and at a speed of not over 3-5 kph.

After towing and repair

- Chock the wheels.
- Reset the parking brake.

Resetting the parking brake

- Turn bolt (3) clockwise to reset the brake until the brake disc is tight again.
- Fit cover (2) to brake calliper (4).

Refitting the propeller shaft

- Detach the propeller shaft, position it and fit the axle.
- Fit bolts, nuts and spacers (5) on the coupling joints.
- Tighten the bolts.

Torque: Front bolts approx ..... 73Nm, Rear bolts approx. .....110 Nm.

⚠ CAUTION

Bolts may be used 2 times maximum

Do not re-use bolts more than twice.

- Remove the chocks.

Check the function of the brakes after carrying out repairs.

Hoisting the truck

⚠ WARNING

When loading the truck by crane make sure no persons are within the working range of the crane!

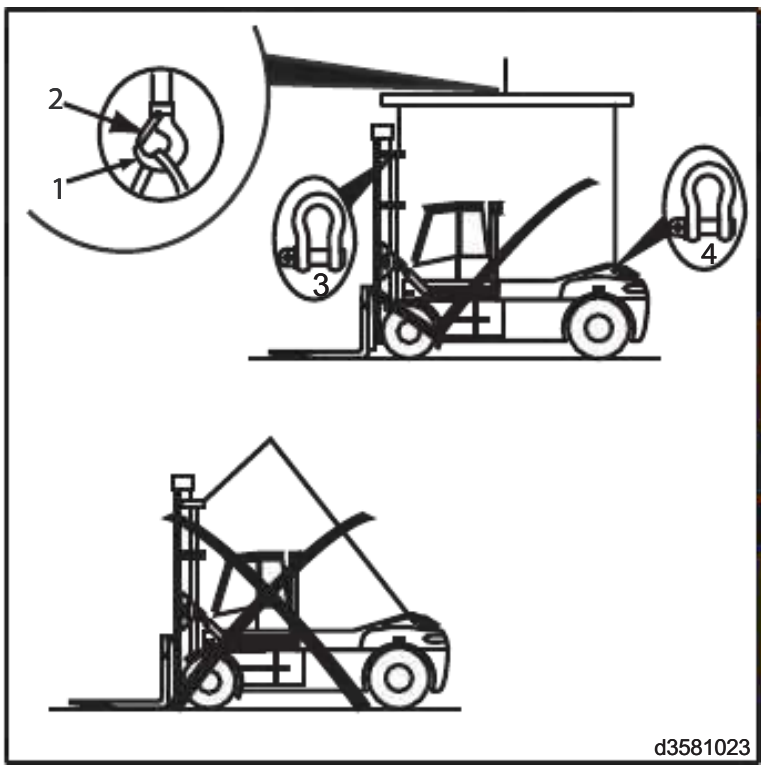
Do not step under the elevated load!

⚠ CAUTION

Only use hoisting gear and loading crane with sufficient lifting capacity. For the truck weight see the manufacturer's plate.

Attach the lifting slings at the four points shown.

- Attach two appropriate load rings to lifting points (3).
- Attach two appropriate lifting shackles to the front lifting points (5).
- Attach the slings to crane hook (1).



⚠ CAUTION

After attaching slings to the lifting hook, safety lock (2) must close.

When the truck is hoisted the slings must not foul the cabin or any attachments fitted.

4 Operation

Hoisting the truck

5

Maintenance

General remarks

Wheel removal — drive axle

Refer to your Local / National authority guidelines.

For example: OSHA (Occupational Safety & Health Administration)/ EUWA (Association of European Wheel Manufacturers/ HSE (Health & Safety Executive).

⚠ CAUTION

Wear personal protective equipment (PPE).

Do not carry out these procedures without PPE.

⚠ DANGER

Risk of death due to explosive force.

Always ensure that the multi-piece rim wheel has been raised off the ground by methods of hydraulically raising the vehicle before deflating/inflating the multi-piece rim wheel. Secure the raised truck with an axle support device.

⚠ DANGER

Risk of death due to explosive force.

Before demounting a multi-piece rim wheel from a vehicle the operator must completely deflate the tyre by removing the valve core. Always check that the tyre is fully deflated using a tyre pressure gauge. NOTE: the valve may become blocked with ice. Check that the valve stem has not frozen.

⚠ DANGER

Risk of death due to explosive force.

Always use a restraining device during tyre deflation/inflation on multi-piece rim wheels. If a restraining device is not being used then tyres must be deflated/inflated using remote control inflation equipment and no employees shall remain in the wheel rim separation trajectory zone — refer to illustration Fig 1.

⚠ DANGER

Risk of death due to explosive force.

Fully deflate the tyre before carrying out a thorough examination of suspected damage to any wheel or tyre.

Removing an outer drive wheel

- Park the truck on level ground in a safe working area.
- Chock the wheels.
- Isolate the ignition/batteries.
- Jack up the truck at the jack points and secure with an axle support device. DO NOT RELY ON JUST THE JACK.
- Place a protection device around the wheel assembly being removed.

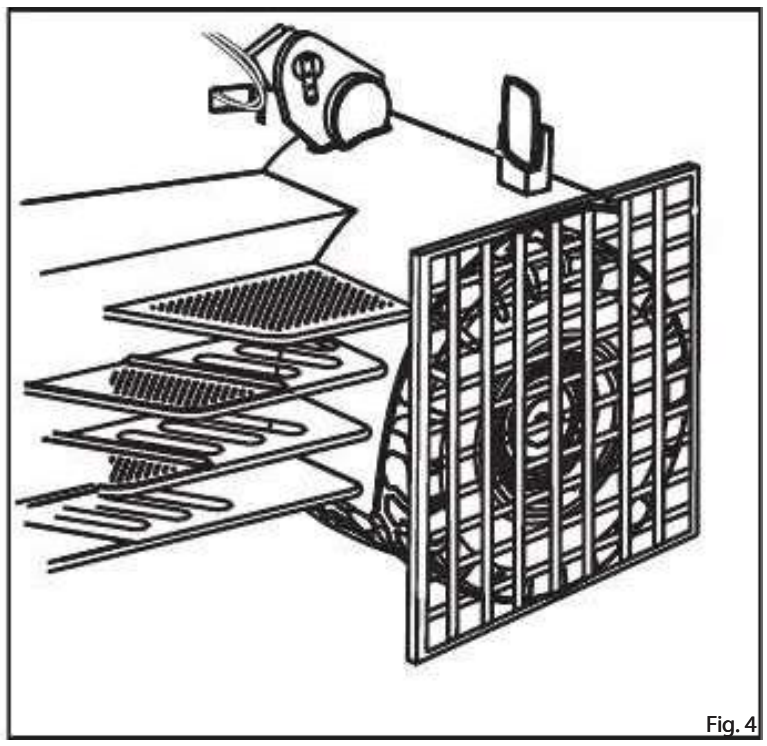


Fig. 4

- Remove the valve cores and fully deflate the tyres (see warnings).

⚠ DANGER

Risk of death due to explosive force.

Do not allow anyone to enter the area shown in Fig 2 during deflation of the tyre.

⚠ CAUTION

Ensure the valve stem has not frozen during deflation.

If necessary use antifreeze to prevent the valve stem freezing.

- Use a tyre pressure gauge to ensure the tyres are fully deflated.
- Remove the protection device.

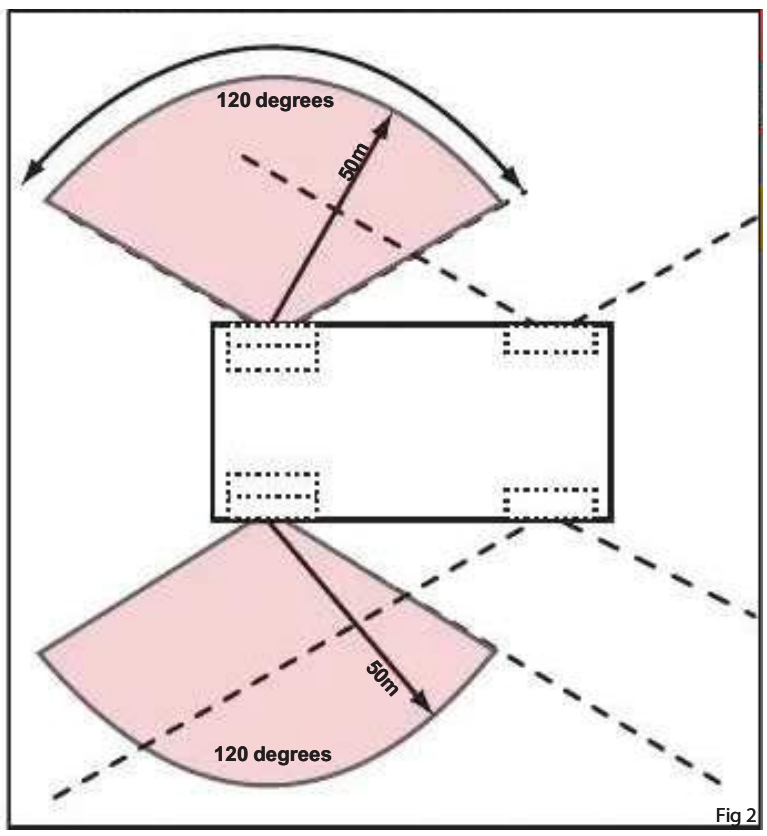
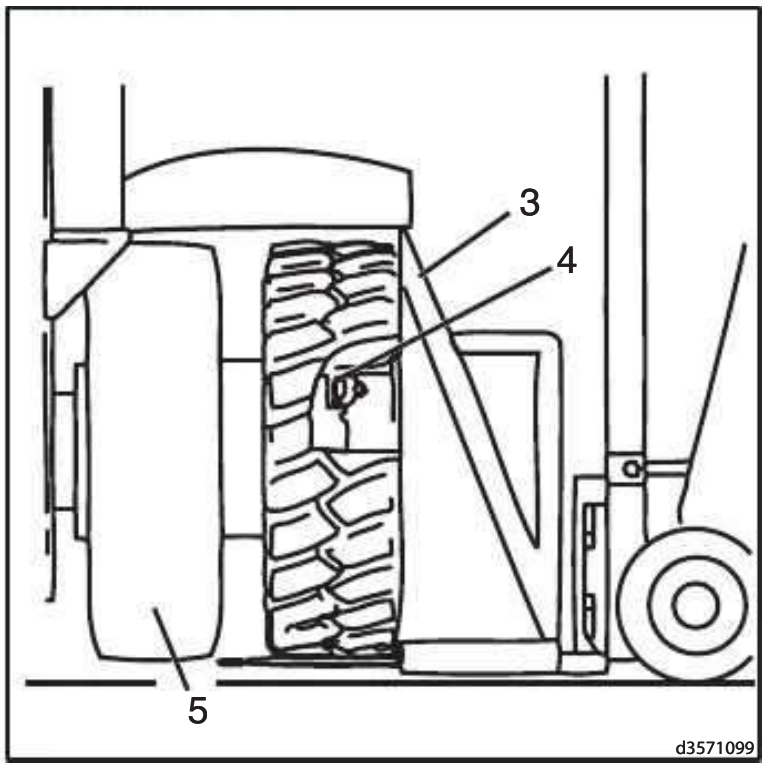


Fig 2

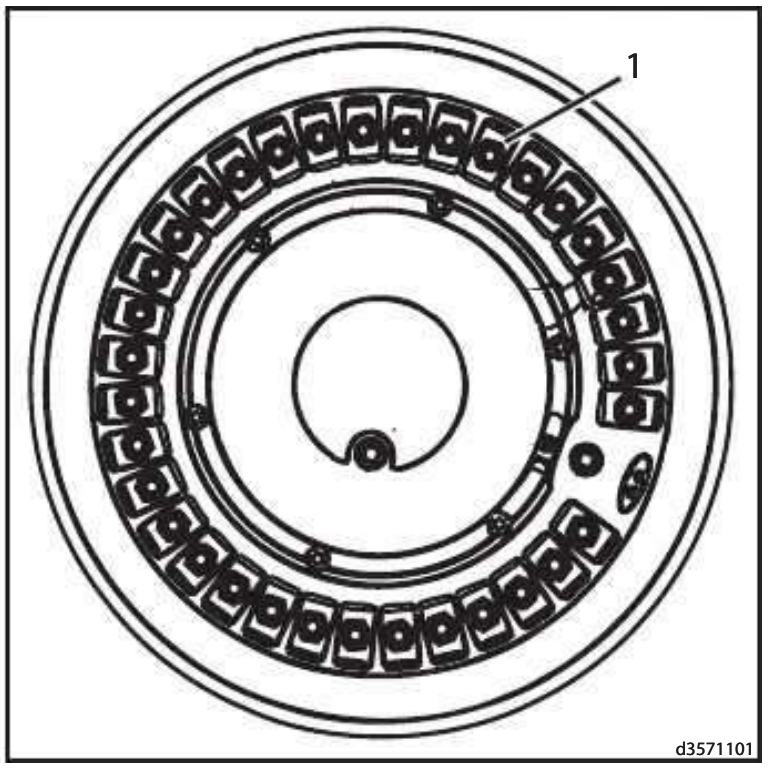
5 Maintenance

General remarks

- Carefully drive the forks of a second fork truck with holder (3) under the outer drive wheel.
- Slowly lift the forks until the wheel rests on them. (Do not touch the inner drive wheel (5)).

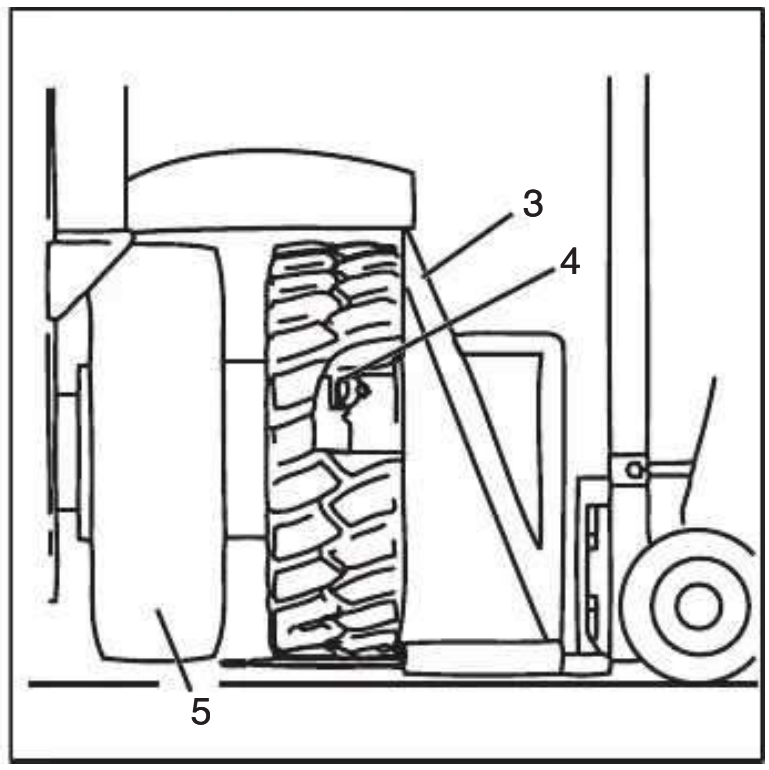


- Remove all wheel fasteners (1).



➢ Tilt outer wheel (4) against holder (3) and secure it.

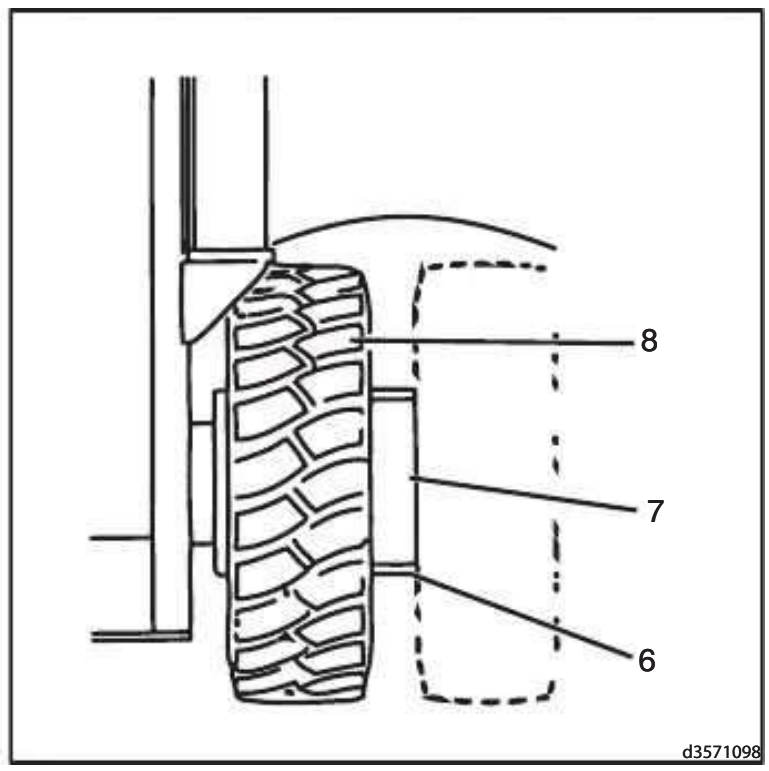
➢ Carefully reverse the truck with the tyre and deposit it.



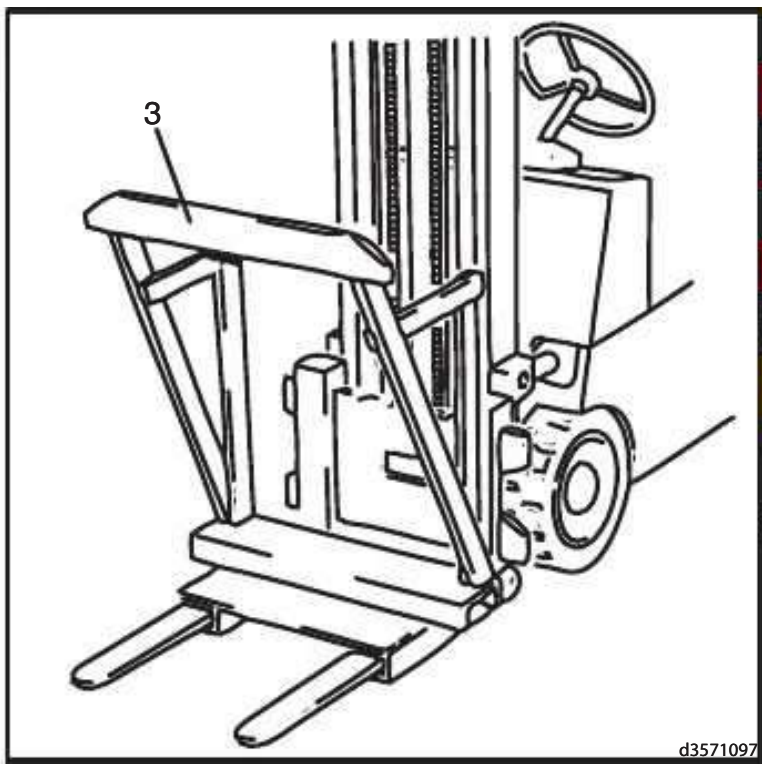
Removing an inner drive wheel

➢ Remove the outer drive wheel.

➢ Remove spacer ring (6).



- Carefully drive the forks of a second fork truck with a holder (3) under the inner drive wheel (5).
- Slowly lift the forks until the wheel rests on them.
- Tilt the inner wheel against the holder and secure it.
- Carefully reverse the truck with the tyre clear of the truck.



Wheel removal — steer axle

Refer to your Local / National authority guide-lines.

For example: OSHA (Occupational Safety & Health Administration)/ EUWA (Association of European Wheel Manufacturers/ HSE (Health & Safety Executive).

⚠ CAUTION

Wear personal protective equipment (PPE).

Do not carry out these procedures without PPE.

⚠ DANGER

Risk of death due to explosive force.

Always ensure that the multi-piece rim wheel has been raised off the ground by methods of hydraulically raising the vehicle before deflating/inflating the multi-piece rim wheel. Secure the raised truck with an axle support device.

⚠ DANGER

Risk of death due to explosive force.

Before demounting a multi-piece rim wheel from a vehicle the operator must completely deflate the tyre by removing the valve core. Always check that the tyre is fully deflated using a tyre pressure gauge. NOTE: the valve may become blocked with ice. Check that the valve stem has not frozen.

⚠ DANGER

Risk of death due to explosive force.

Always use a restraining device during tyre deflation/inflation on multi-piece rim wheels. If a restraining device is not being used then tyres must be deflated/inflated using remote control inflation equipment and no employees shall remain in the wheel rim separation trajectory zone — refer to illustration Fig 1.

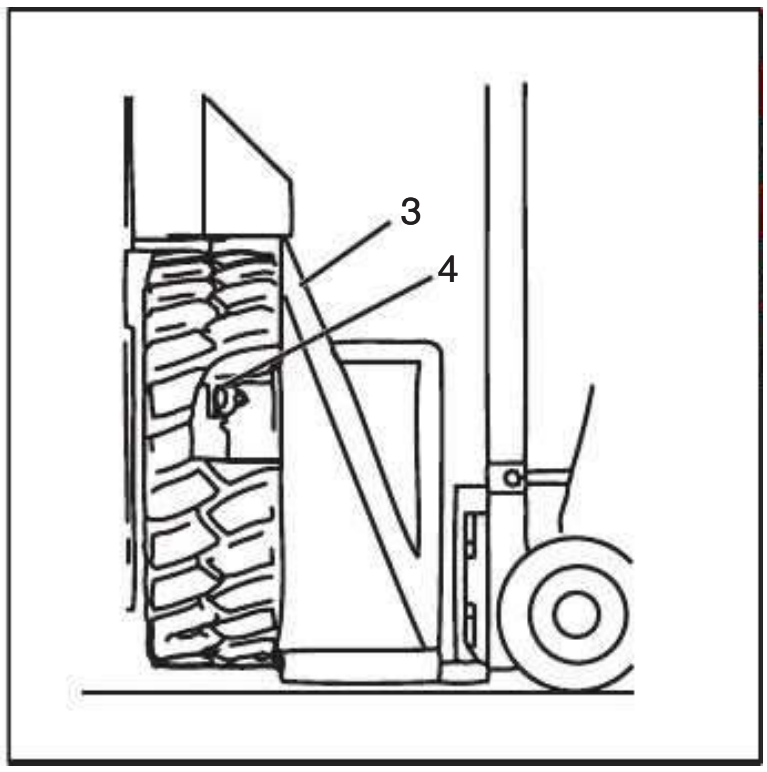
⚠ DANGER

Risk of death due to explosive force.

Fully deflate the tyre before carrying out a thorough examination of suspected damage to any wheel or tyre.

Removing a steer wheel

➢ Park the truck on level ground in a safe working area.
➢ Chock the wheels.
➢ Isolate the ignition/batteries.
➢ Jack up the truck at the jack points and secure with an axle support device. DO NOT RELY ON JUST THE JACK.
➢ Place a protection device around the wheel assembly being removed. ▷



5 Maintenance

General remarks

➢ Remove the valve core and fully deflate the tyre (see warnings).

⚠ DANGER

Risk of death due to explosive force.

Do not allow anyone to enter the area shown in Fig 2 during deflation of the tyre.

⚠ CAUTION

Ensure the valve stem has not frozen during deflation.

If necessary use antifreeze to prevent the valve stem freezing.

➢ Use a tyre pressure gauge to ensure the tyre is fully deflated.

➢ Remove the protection device.

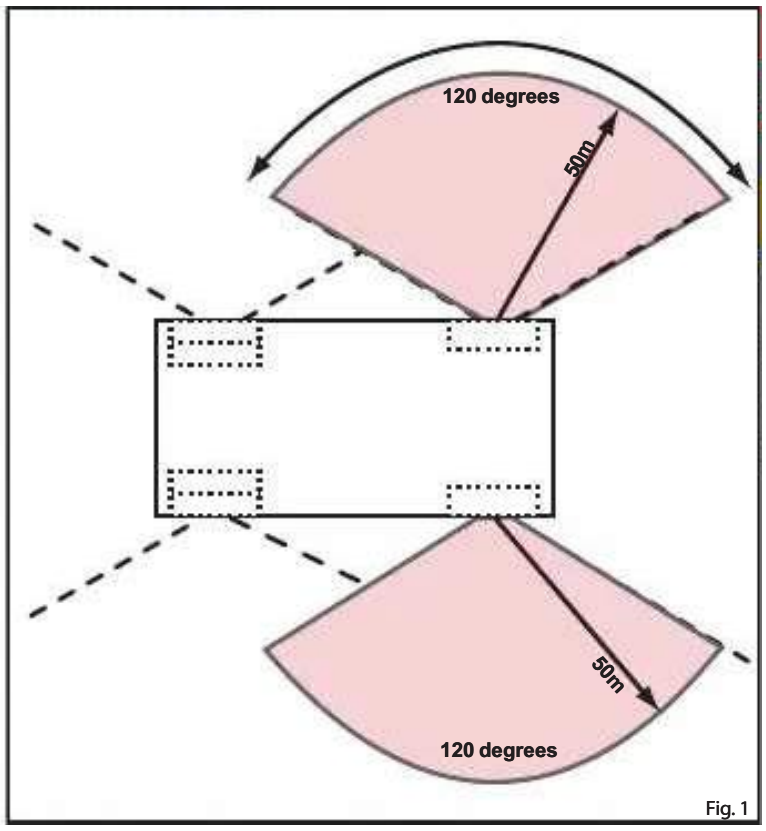
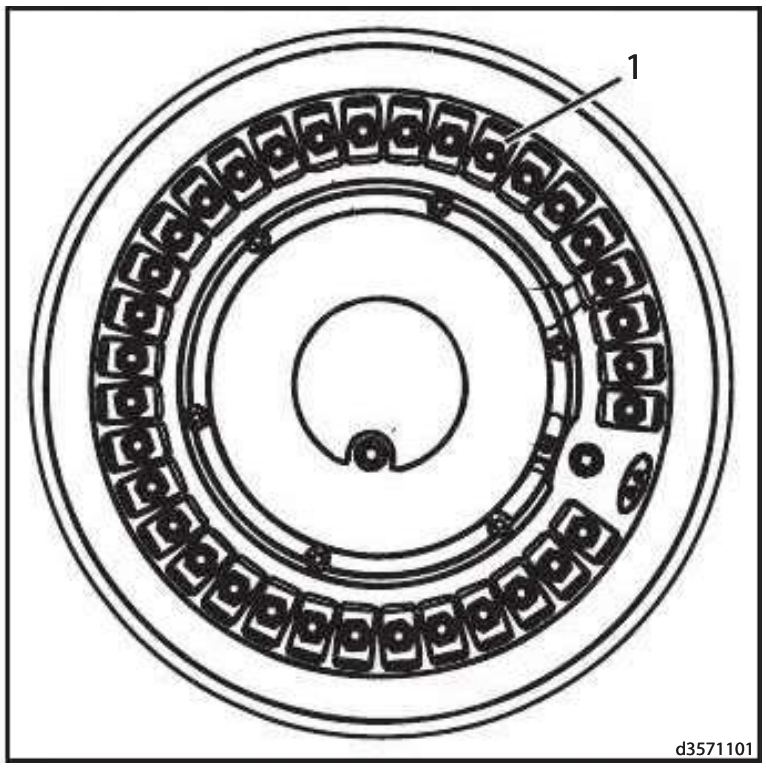


Fig. 1

➢ Remove all wheel fasteners (1).

➢ Remove the wheel and tyre assembly.



Wheel assembly inspection

Comment

Refer to you Local / National authority guidelines.

For example: OSHA (Occupational Safety & Health Administration)/ EUWA (Association of European Wheel Manufacturers/ HSE (Health & Safety Executive).

Inspection of the rim wheel

- Clean the wheel.
- Carry out a visual inspection of all parts of the rim wheel.

DANGER

Risk of death due to explosive force.

Fully deflate the tyre before carrying out a thorough examination of suspected damage to any wheel or tyre.

NOTE

If damage deterioration or fatigue is detected on any rim wheel component, remove all paint and carry out a non-destructive investigation test. If in doubt, replace suspect components.

CAUTION

Mismatched or wrong rings mounted on a multi-piece rim can cause serious mounting or service accidents or, at the least, the wheel failure, without any prior warning.

Never interchange rim wheel parts.

Wheel refitting — drive axle

Refer to you Local / National authority guide-lines.

For example: OSHA (Occupational Safety & Health Administration)/ EUWA (Association of European Wheel Manufacturers/ HSE (Health & Safety Executive).

CAUTION

Wear personal protective equipment (PPE).

Do not carry out these procedures without PPE.

DANGER

Risk of death due to explosive force.

Always ensure that the multi-piece rim wheel has been raised off the ground by methods of hydraulically raising the vehicle before deflating/inflating the multi-piece rim wheel. Secure the raised truck with an axle support device.

5 Maintenance

General remarks

⚠ DANGER

Risk of death due to explosive force.

Always use a restraining device during tyre deflation/inflation on multi-piece rim wheels. If a restraining device is not being used then tyres must be deflated/inflated using remote control inflation equipment and no employees shall remain in the wheel rim separation trajectory zone — refer to illustration Fig 1.

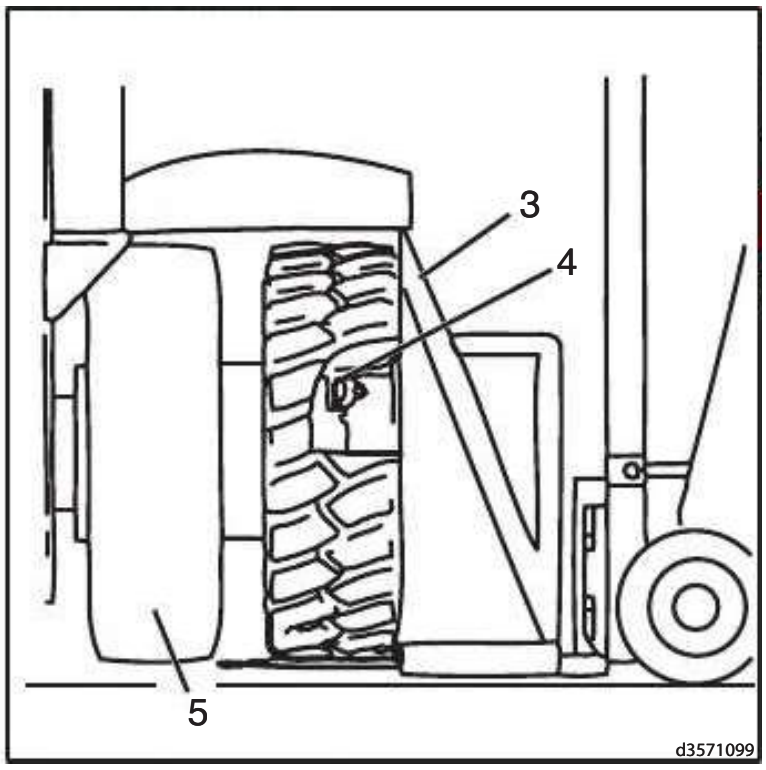
Mounting an inner drive wheel

NOTE

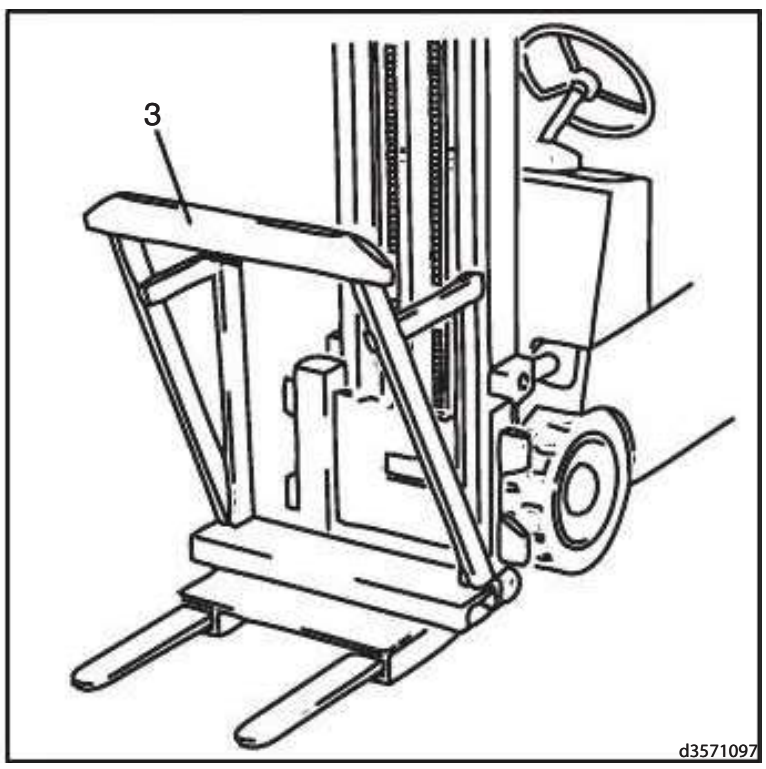
Only use tyres approved by the manufacturer.

➢ Put the inner wheel (5) on the forks of a second truck and secure it on the holder (3).

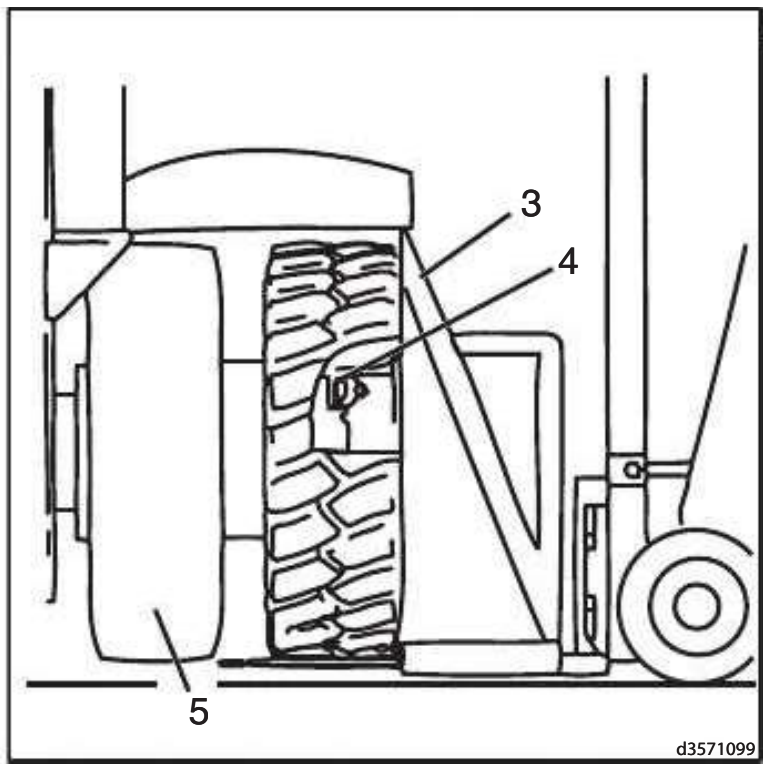
➢ Clean the mating surface on the hub and rim.



➢ Carefully drive the truck with the wheel (5) to the wheel hub and align it.

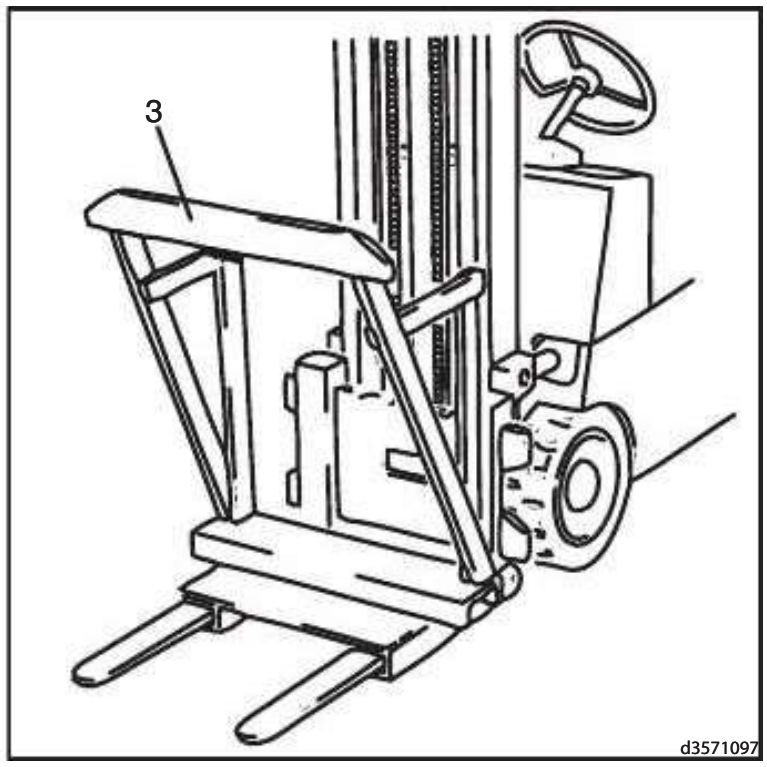


- Align the wheel (5) on the hub.
- Slowly lower the forks until the drive wheel sits on the hub.
- Carefully reverse the second truck.
- Install the spacer ring.



Mounting an outer drive wheel

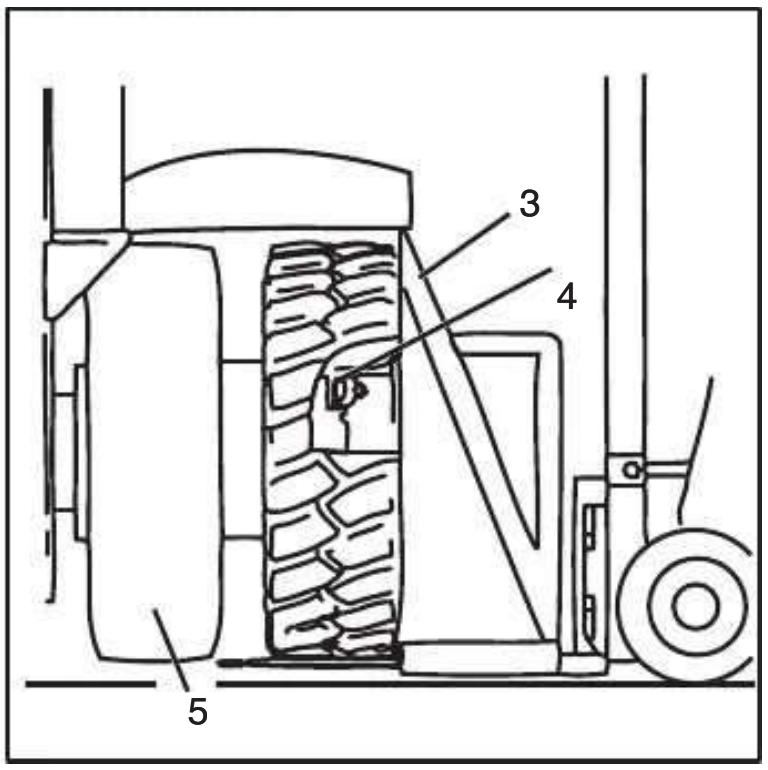
- Put the outer wheel on the forks of a second truck and secure it in place.
- Clean the mating surface on the hub and rim.



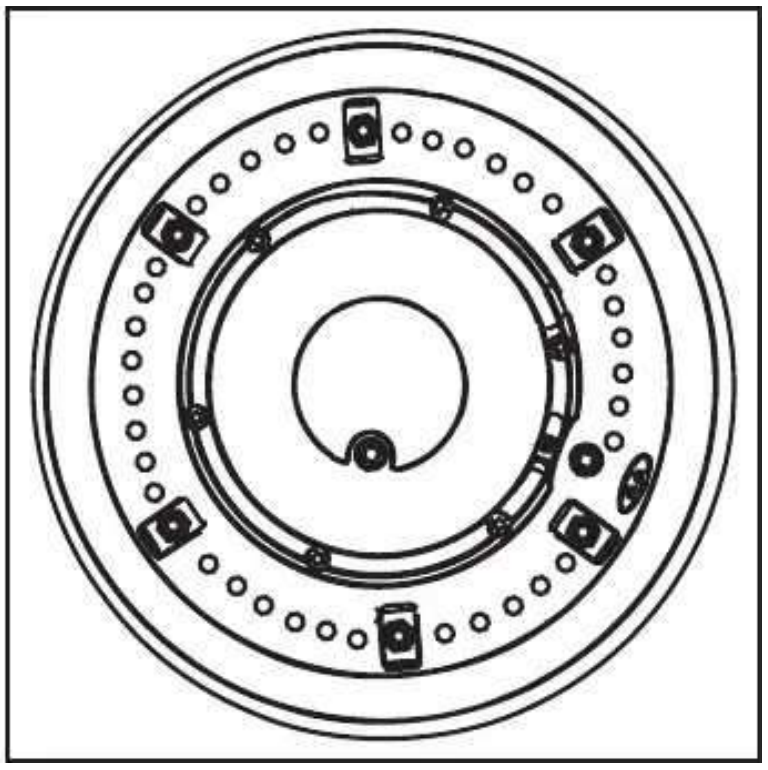
5 Maintenance

General remarks

- Carefully drive the truck with the wheel (4) to the wheel hub and align it.
- Slide the wheel (4) over the wheel hub.
- Remove the wheel retainer on the holder (3).
- Align the wheel (4) on the hub.



- Seat the wheel assembly onto the hub by tightening 6 wheel fasteners diametrically opposed to 50 Nm.
- Fit remaining wheel fasteners hand tight.
- Torque all wheel fasteners (refer to rated capacities in the user manual), in a diametrically opposed pattern.
- Slowly lower the forks.
- Carefully back off the second truck.
- Place protection device around the wheel assembly.



- Ensure the trajectory zone is kept clear refer to Fig.2.
- Inflate the tyres to 10 bar at the filler valves.
- Inspect the wheel assembly to ensure the lock ring is correctly seated.

⚠ DANGER

Risk of death due to explosive force.

Do not hammer any part of the rim wheel while the tyre is pressurised.

- Remove the protection device.
- Remove the axle support and jack.
- After a wheel has been refitted, check the torque every 10 hours until the torque setting remains constant. Check every 100 hours therefater.

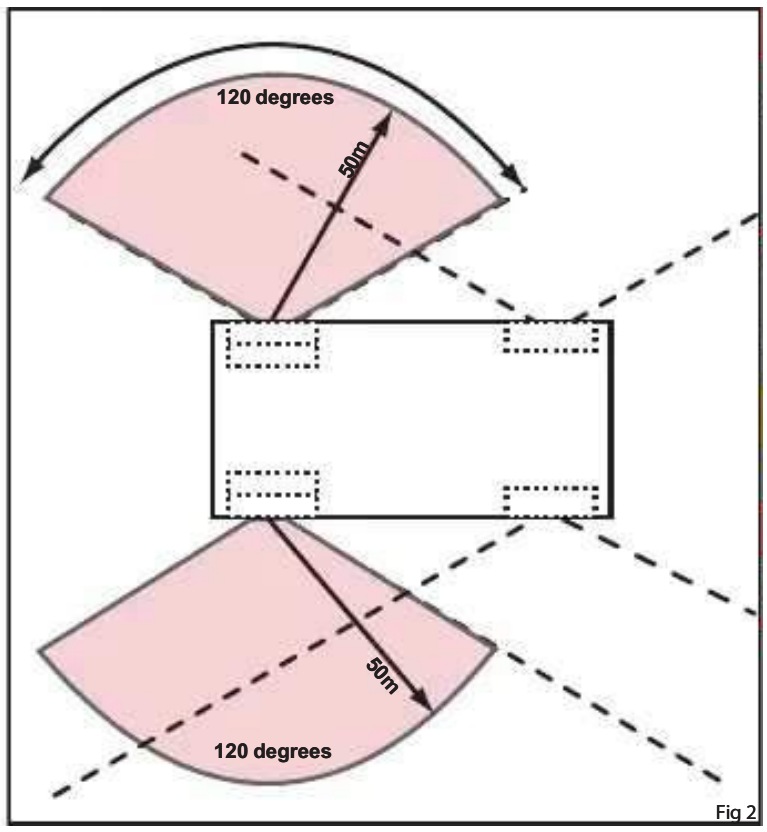


Fig 2

- Check tyres for defects every day.
- Check tyre pressures every week.

Wheel refitting — steer axle

Refer to local authority guidelines.

⚠ CAUTION

Wear personal protective equipment (PPE).

Do not carry out these procedures without PPE.

⚠ DANGER

Risk of death due to explosive force.

Always ensure that the multi-piece rim wheel has been raised off the ground by methods of hydraulically raising the vehicle before deflating/inflating the multi-piece rim wheel. Secure the raised truck with an axle support device.

5 Maintenance

General remarks

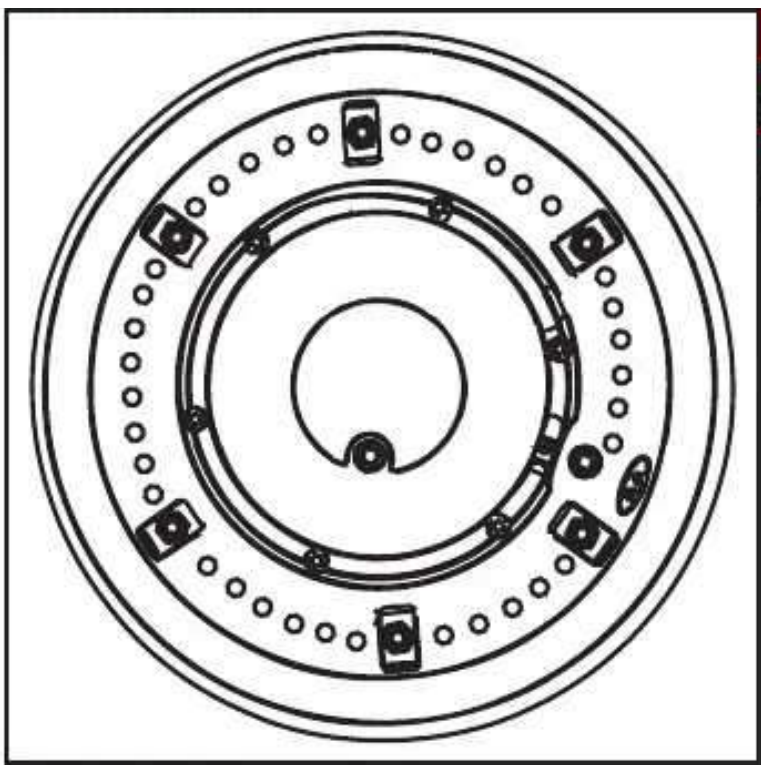
⚠ DANGER

Risk of death due to explosive force.

Always use a restraining device during tyre deflation/inflation on multi-piece rim wheels. If a restraining device is not being used then tyres must be deflated/inflated using remote control inflation equipment and no employees shall remain in the wheel rim separation trajectory zone — refer to illustration Fig 1.

Mounting the steer axle wheel

- Put the wheel on the forks of a second truck and secure it in place.
- Clean the mating surface on the hub and rim.
- Carefully drive the truck with the drive wheel to the wheel hub and align it.
- Slide the drive wheel over the wheel hub.
- Remove the wheel retainer on the holder .
- Align the wheel on the hub.
- Slowly lower the forks until the wheel sits on the hub.
- Seat the wheel assembly onto the hub by tightening 6 wheel fasteners diametrically opposed to 50 Nm.
- Fit remaining wheel fasteners hand tight.
- Torque all wheel fasteners (refer to rated capacities in the user manual), in a diametrically opposed pattern.
- Slowly lower the forks.
- Carefully back off the second truck.
- Place protection device around the wheel assembly.



- Ensure the trajectory zone is kept clear refer ▷ to Fig.1.
- Inflate the tyres to 10 bar at the filler valves.
- Inspect the wheel assembly to ensure the lock ring is correctly seated.

⚠ DANGER

Risk of death due to explosive force.

Do not hammer any part of the rim wheel while the tyre is pressurised.

- Remove the protection device.
- Remove the axle support and jack.
- After a wheel has been refitted, check the torque every 10 hours until the torque setting remains constant. Check every 100 hours therefater.

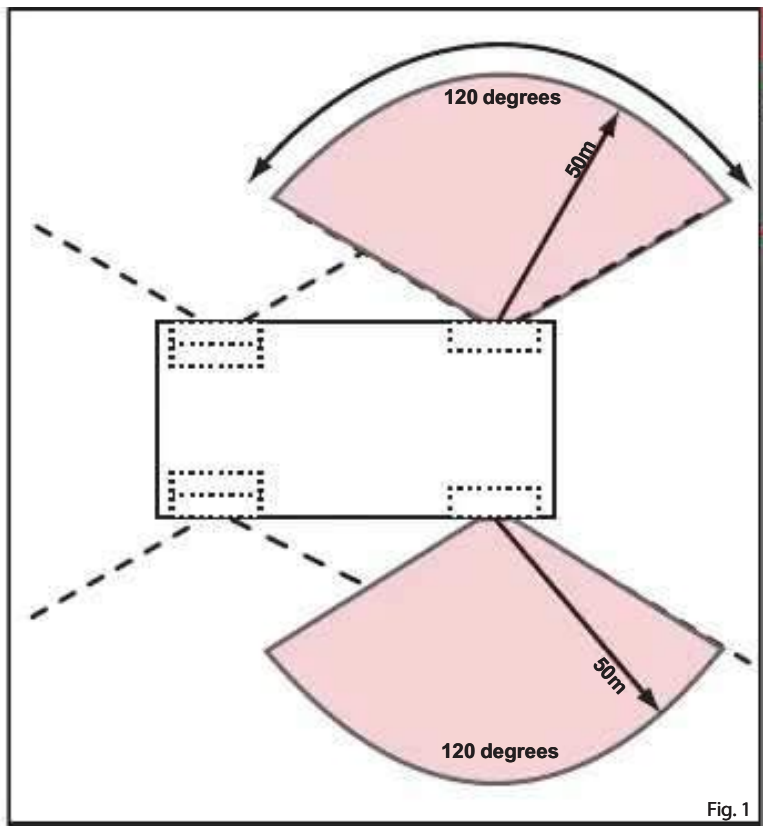


Fig. 1

- Check tyres for defects every day.
- Check tyre pressures every week.

Examples of restraining devices

Refer to you Local/National authority guidelines.

For example:

OSHA (Occupational Safety & Health Administration)/ EUWA (Association of European Wheel Manufacturers/ HSE (Health & Safety Executive).

Example of cage type restraining device.

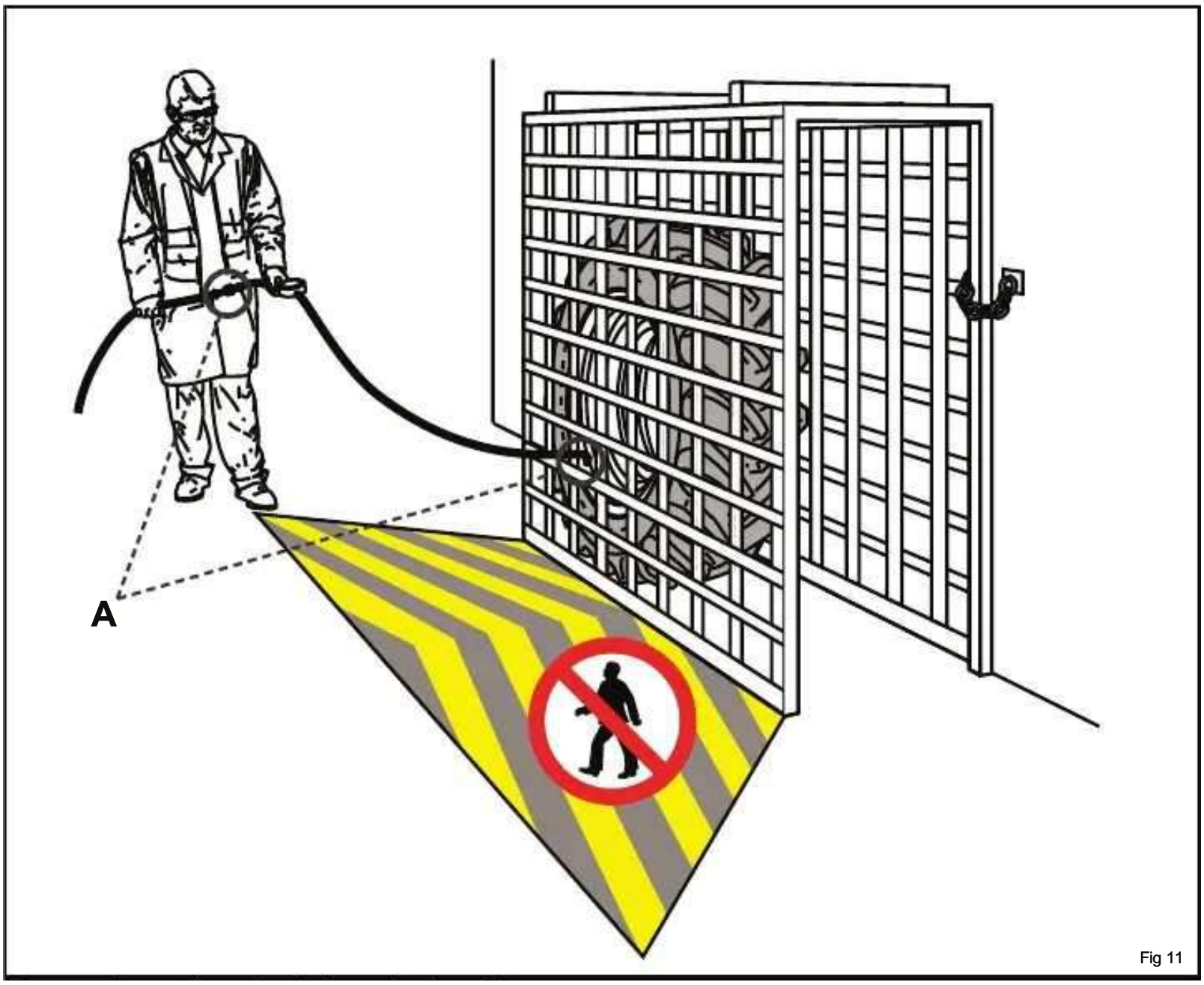


Fig 11

A Quick release couplings.

Example of clamp type restraining device.

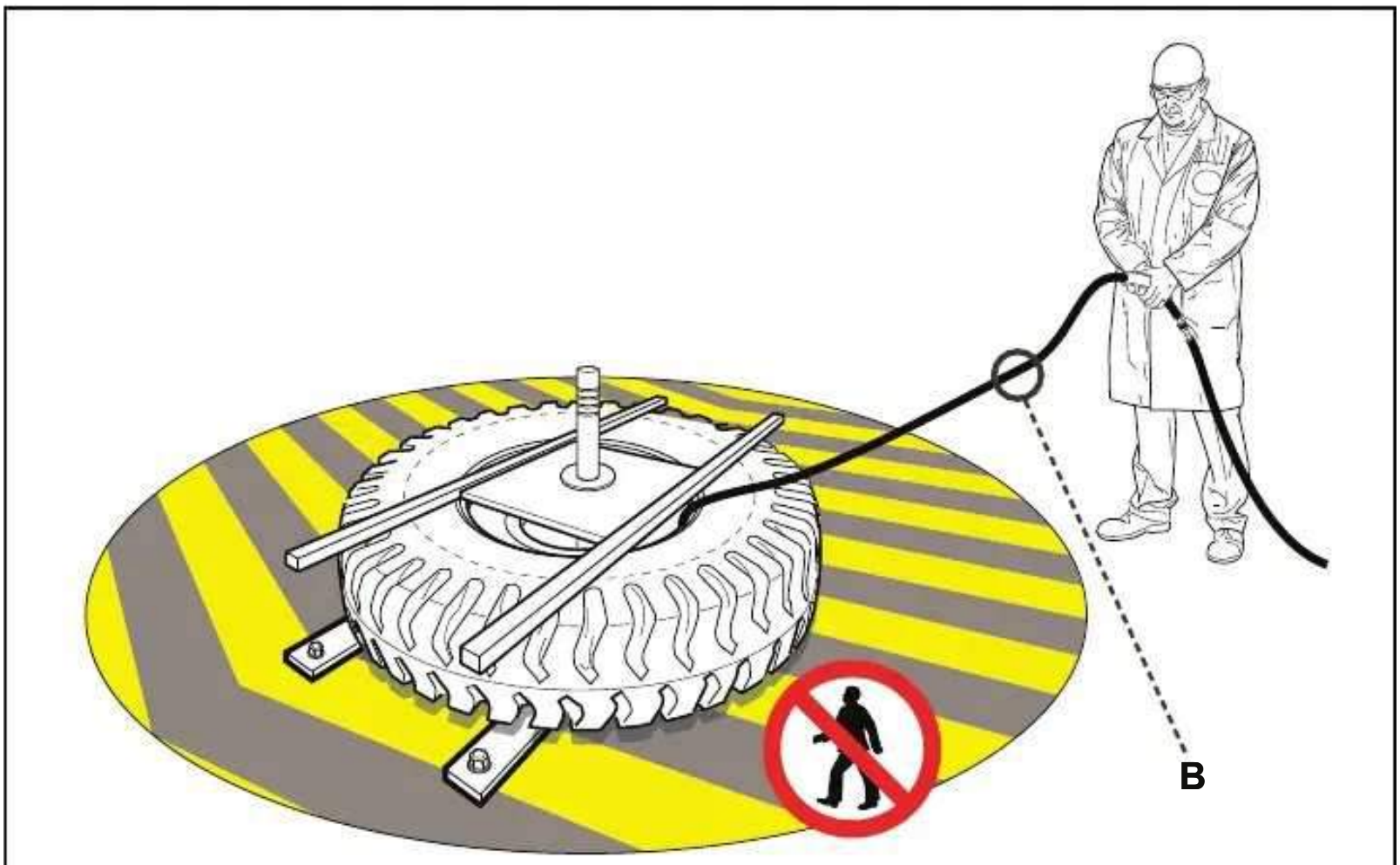


Fig 12

B Hose long enough for user to stand outside likely trajectory of explosion.

Mirrors

⚠ CAUTION

Rear view mirrors should be cleaned and adjusted to suit the operator before commencement of operation, and it should be noted that they are only provided for checking the vicinity of the truck before moving off, and to monitor the rear traffic area. Reversing is only allowed with a direct view in the reverse direction of travel.

Taking the truck out of operation

If the truck is taken out of operation for over 2 months, it must be parked in a well ventilated, frost-free, clean and dry room and the following measures must be carried out:

Measures before taking the truck out of operation

- Thoroughly clean the truck.
- Slew, inreach and outreach the handler.
- Raise, lower and tilt the mast several times through the full cycle.
- Check the hydraulic oil level and add oil if needed.
- Add diesel fuel.
- Apply a thin film of oil or grease on all unpainted mechanical parts.
- Lubricate the vehicle.
- Check the condition of the battery. Coat the battery terminals with non-acid grease (follow the instructions of the battery manufacturer).
- Spray all open electrical contacts with a suitable contact spray.

NOTE

Block up the truck so that all wheels are clear of the ground. This will prevent tyre deformation.

Do not use plastic foil to cover the trucks as this enhances the formation and collection of condensation water.

Putting the truck back into operation

- Thoroughly clean the truck.
- Lubricate the truck.
- Coat the battery terminals with non-acid grease.
- Check the condition and electrolytic level of the battery.
- Check the engine oil for condensation water and change the oil if necessary.
- Perform the same services as for commissioning.
- Take the truck into service.

If the vehicle is to be taken out of operation for over 6 months, contact your authorised dealer for further measures.

5 Maintenance

General remarks

Work on the mast and the front part of the truck

⚠ CAUTION

Danger of injury

Do not carry out any work on the mast or the front part of the truck with the mast or spreader raised without securing the mast as described below.

These safety precautions are only sufficient for the general servicing of the truck (inspections and lubrication).

When carrying out repairs (e.g. changing chains, cylinder removal), additional safety precautions are required. Please contact your authorised distributor.

Securing the mast against tilting back

- Apply the parking brake.
- Fully lower the mast.
- Stop the engine and remove the ignition key.
- Lock the cabin doors and remove the key.

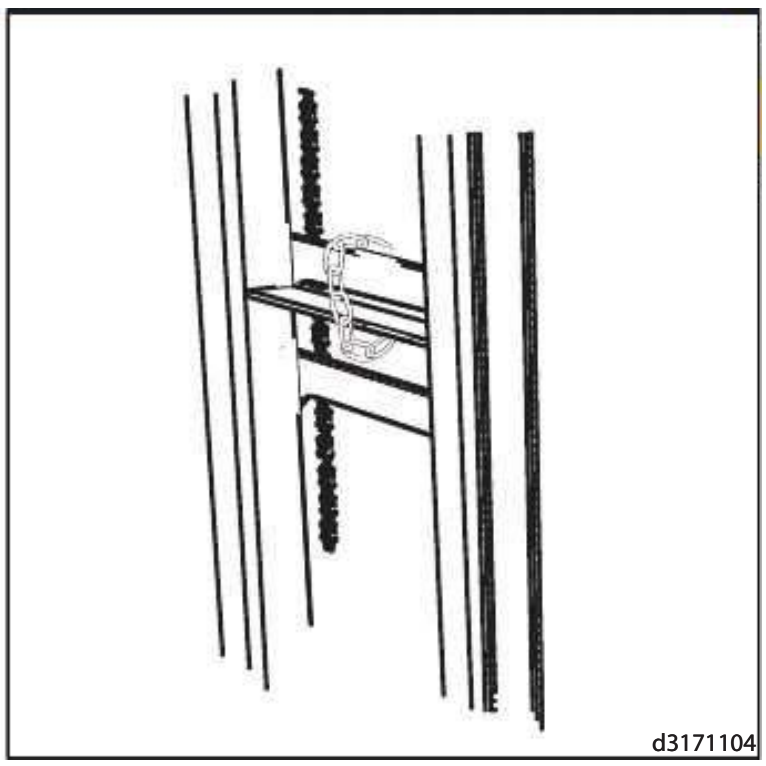
Securing the raised mast

⚠ CAUTION

Danger of injury

The mast and carriage must be secured with a suitable chain if working on the mast or the front of the truck with the carriage raised. Be sure not to exceed the maximum height of lift.

- Raise the load lift device fully.
- Fasten the chain around the cross member of the outer mast (1) and inner mast (2).
- Lower the inner mast until it is held by the chain.



Fuel and oil recommendations

Engine oil grades

Only use oils that meet API classification CH-4/EMA DHD-1 or ACEA E-3.

During engine operation, part of the oil serving as piston lubricant is burned (consumed). The products of combustion combined with the high temperatures lead to oil 'wear', especially of the chemical additives.

Since this oil wear depends on operating conditions and the quality of oil (productivity of oil) and fuel used, oil change intervals of different lengths result.

The longest possible oil change interval for lubricating oil in engines is one year, i.e. change oil at least once every year of operation independent of the oil change intervals.

Trucks equipped with a particle filter* system should only be filled with oils having a low ash content. Residues of oil additive combustion (ash) can not be regenerated and they clog the monolith in the long run.

*option

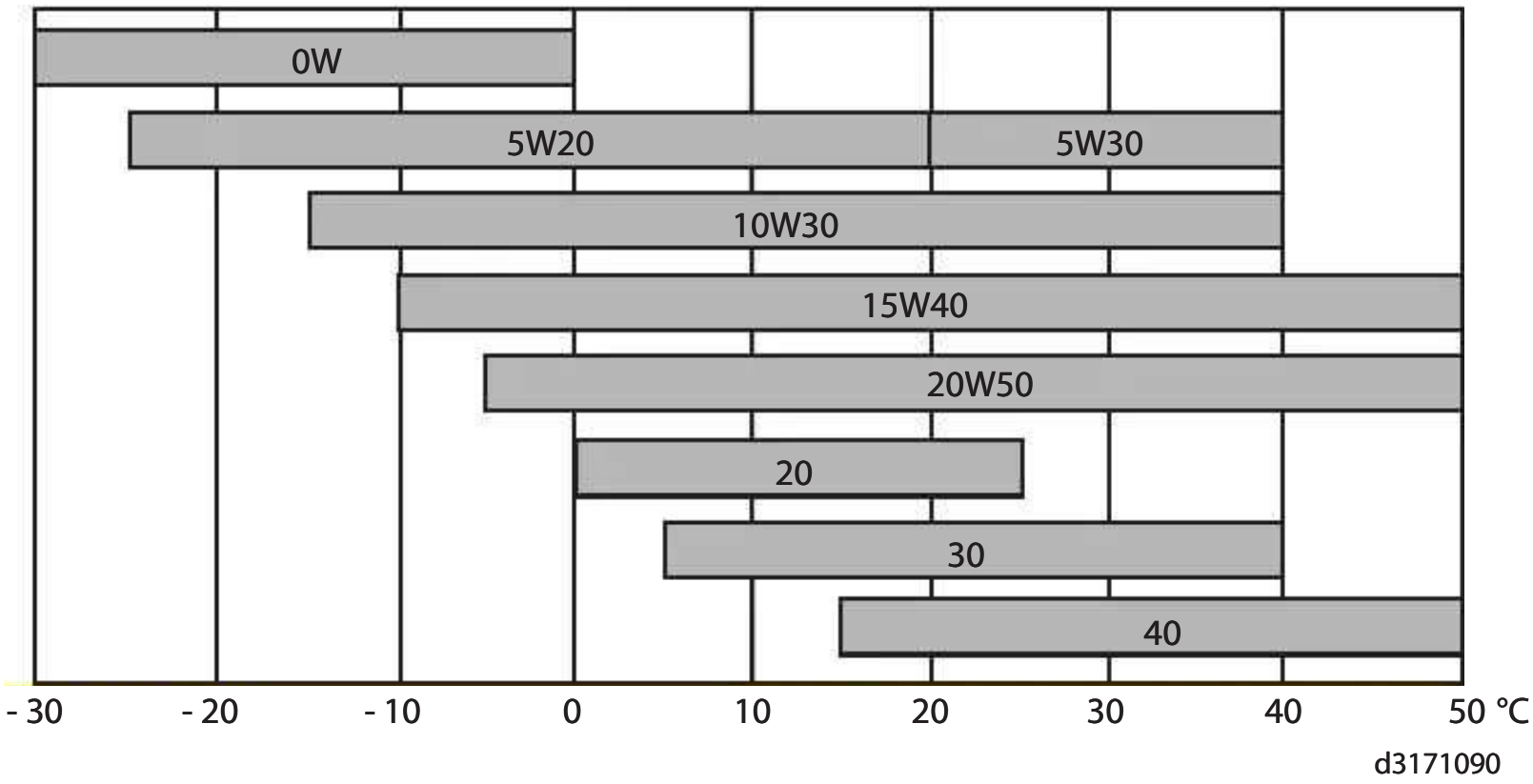
⚠ CAUTION

Used oil must be kept out of the reach of children until disposed of in accordance with local authority guidelines.

Do not allow oil to get into the sewage system or seep into the ground.

Due to the disposal problem, the required special tools and knowledge, the engine oil and filter change should be performed by your authorised dealer.

Viscosity of oil



Since the viscosity of lubricants varies with temperature, the ambient temperature at the locality of the trucks use is the determining factor in selection of the viscosity range (SAE class) of the engine oil (see diagram).

If the ambient temperature occasionally falls below the temperature limit (e.g. using SAE 15 W/40 down to -15 °C), the cold start capability of the engine is reduced, but no damage to the engine will result.

Too viscous oils lead to engine starting problems. Therefore ambient temperatures during engine starting determine the grade of oil used in winter. Seasonal oil changes can be avoided by using multigrade oils. The

specified oil change intervals also apply to multigrade oils.

NOTE

Oil additives of any kind must not be added to any of the above mentioned engine oils. Their use jeopardizes the warranty.

Mixing of different oil brands should be avoided.

Since the temperature changes of neighbouring SAE classifications overlap, the oil does not need to be changed when short-term changes in temperature occur.

NOTE

To ensure faultless cold starts, it is important to select the SAE classification of oil according to the ambient temperature when starting the engine.

For temperatures below -10 °C it is recommended using SAE 5W/30 oil for sure cold start performance.

Hydraulic oil

Recommendation for normal duty: Hydraulic oil HLP ISO VG 46 to DIN 51524, T.2, average continuous oil temperature 60 °C - 80 °C. Hydraulic oil recommendation for heavy duty:

Hydraulic oil HLP ISO VG 100 to DIN 51524, T.2 for heavy duty and multi-shift operation,

Operation in extreme climate zones or high ambient temperatures, average continuous oil temperature over 80 °C.

For normal and heavy duty: Hydraulic oil HVLP ISO VG 68 to DIN 51524 T.3 (multigrade oil).

If it is difficult to obtain hydraulic oils that must be imported, a SAE 20W/20 engine oil can be used instead of hydraulic oil HLP 68, and a SAE 30 engine oil can be used instead of HLP 100.

The above-mentioned recommendations are only approximate values. If in doubt, consult your authorized dealer. Recommendations of representatives of the oil industry should also be checked with your authorised dealer.

Only the above-mentioned mineral oils are approved by the manufacturer. If other hydraulic oils are used or mixed, costly damage can result.

Transmission oil

Dexron III, viscosity a 40° C (104° F): 33 - 38 cSt

Drive axle oil

HYPOID

MIL-L-2105B/API GL 5

Lubricating grease

Linde heavy duty grease with additives EP and MOS2. Designation acc. to DIN 51825-KPF 2K-20 (see the Parts Catalogue for the order number). Any mixing with grease types other than lithium-based greases is not allowed.

Coolant

Only use coolants with a monoethylene glycol base and containing a rust inhibitor. Do not mix with antifreeze containing ethanolamine.

Good-quality water is important for cooling system performance. Excessive levels of calcium and magnesium contribute to scaling problems, and excessive levels of chlorides and sulphates cause cooling system corrosion

Mixing ratio for lower temperature:		
Temperature	Antifreeze	Water
-25 °C	40 %	60 %
-30 °C	45 %	55 %
-35 °C	50 %	50 %

Battery grease

Non-acidic grease (pole grease).

Chain spray

Linde chain spray.

Electrical contact grease

For use on all electrical connections.

Diesel fuel

To get the correct power and performance from your engine, use good quality fuel. The recommended fuel specification is indicated below:

- Cetane number ..... 40 minimum
- Viscosity..... 1.4/4.5 centistrokes at 40 °C
- Density ..... 801 min to 876 max Kg/M³ at 15 °C
- Sulphur ..... 0.20% of mass, maximum
- Distillation ..... 10% at 282 °C, 90% at 360 °C

Cetane number indicates ignition performance. A fuel with a low cetane number can cause cold start problems and affect combustion

Viscosity is the resistance to flow and engine performance can be affected if it is outside the limits.

Density: A lower density reduces engine power, a higher density increases engine power and exhaust smoke.

Sulphur: A high amount of sulphur (not normally found in Europe, North America or Australasia) can cause engine wear.

Percentage of sulphur in the fuel (%)	Oil change interval
<0.5	Normal
0.5 - 1.0	0.75 of normal
>1.0	0.5 of normal

Distillation: This is an indication of the mixture of different hydrocarbons in the fuel. A high ratio of lightweight hydrocarbons can affect the combustion characteristics.

Low temperature fuels

Special winter fuels may be available for engine operation at temperatures below 0° C. These fuels have a lower viscosity and also limit the wax formation in the fuel at low temperatures. If wax formation occurs, this could stop the fuel flow through the filter.

Diesel fuel

To get the correct power and performance from your engine, use good quality fuel. The recommended fuel specification is indicated below:

- Cetane number ..... 45 minimum
- Viscosity ..... 2/4.5 centistrokes at 40 °C
- Density ..... 0.820/860 kg/litre at 15 °C
- Sulphur ..... 0.20% of mass, maximum
- Distillation ..... 85% at 350 °C

Cetane number indicates ignition performance. A fuel with a low cetane number can cause cold start problems and affect combustion

Viscosity is the resistance to flow and engine performance can be affected if it is outside the limits.

Density: A lower density reduces engine power, a higher density increases engine power and exhaust smoke.

Sulphur: A high amount of sulphur (not normally found in Europe, North America or Australasia) can cause engine wear.

Percentage of sulphur in the fuel (%)	Oil change interval
<0.5	Normal

5 Maintenance

General remarks

0.5 - 1.0	0.75 of normal
>1.0	0.5 of normal

Distillation: This is an indication of the mixture of different hydrocarbons in the fuel. A high ratio of lightweight hydrocarbons can affect the combustion characteristics.

Low temperature fuels

Special winter fuels may be available for engine operation at temperatures below 0°C. These fuels have a lower viscosity and also limit the wax formation in the fuel at low temperatures. If wax formation occurs, this could stop the fuel flow through the filter.

NOTE

The digital clock display must be reset whenever the battery isolator has been used for more than four days.

Truck welds inspection

NOTE

It is very important that these inspections are carried out as specified in daylight or with adequate artificial lighting, to allow close examination of the welds. Please follow the guidelines below:

CAUTION

These maintenance procedures may need to be carried out at heights of more than 2 metres. Use suitable access equipment.

Danger of fall injuries.

- Wash the truck thoroughly and allow to dry.
- Corrosion and/or deposits should be removed to facilitate the inspection.
- Carry out a detailed inspection of all welded joints on the chassis and load lifting device.
- If there is any visible abnormality which suggests that a crack is present, carry out a more detailed inspection using non destructive methods.

Please forward copies of any existing structural inspection reports (as advised in the service manual) to Linde HTO.

Reports including any photographs should be sent to emailed to Linde HTO as soon as they are available.

Check the condition of structured components

CAUTION

Work on the truck on level ground. Lower the carriage, stop the engine and put the parking brake on when working.

CAUTION

This maintenance procedure requires to be carried out at heights of more than 2 metres. Use suitable access equipment. Danger of fall injuries.

- Examine the structural components of the truck to assure their integrity. Inspection should cover all areas of the main structures and their connections. Attention should be given to welds and material adjoining welds, particularly at changes of section, bolted interfaces and sliding pad pressure points.
- Examine the mast, lift and tilt cylinders, anchor and bearing points for damage, wear, missing lock bolts, metal fatigue, etc.
- Examine the bearings for damage, missing retaining rings and abnormal wear.

Checks - various

Check the starter motor, alternator and injection pump

NOTE

Examination and service of these components must be left to your authorised dealer.

Check condition and mounting of mast and lifting chain

- Clean the mast channels and chains thoroughly.
- Check the chains for wear or damage, particularly in the area of the chain pulleys.
- Check the mounting of the chain at the chain anchor.
- Replace damaged chains.
- Check mast, guide surfaces and rollers for condition and secure attachment.
- Check that the mast pivot screws are secure.

Check and adjust the hub bearings

Correctly adjusted hub bearings must not allow any perceptible end float, but allow the wheel to rotate freely without binding. In the case of bearing play, contact your authorised dealer.

5 Maintenance

General remarks

General information

Your truck will remain operational only if the maintenance and checks are carried out regularly and according to the information and instructions in the operating manual.

This maintenance may only be performed by qualified authorised personnel. This work can be carried out by your authorised dealer under a service contract.

If you wish to do the work yourself, we recommend that the first three customer service checks be carried out by your distributor's mechanic in the presence of the responsible mechanic in your workshop, so that your staff can receive the appropriate instruction.

For all servicing, the truck must be placed on a level surface and the wheels secured. Stop the engine and remove the ignition key.

When working on the truck with the spreader and mast elevated, secure them against inadvertent lowering.

For work on the front end of the truck, secure the mast against tilting back.

⚠ CAUTION

No changes, particularly no modifications and additions, may be made to the truck without the approval of the manufacturer.

⚠ CAUTION

Missing or damaged plates and/or adhesives must be replaced. For location and or part number refer to the Parts Catalogue.

Perform a functional check and trial run after every servicing.

Maintenance inte

NOTE

When operating the truck under extreme conditions (i.e. extreme heat or cold, intensive dust concentration, etc.), the intervals given in the maintenance schedule should be reduced accordingly.

Use only the specified engine oil and coolant when servicing. The required qualities are described in the recommended lubricants section. The inspection and maintenance intervals depend on the operating and service conditions of the truck. For heavy duty conditions we recommend shorter intervals. Please contact your authorised dealer in this regard.

Inspection and maintenance schedule

As required service plan

At operating hours										Carried out	
As required										✓	✖
Depending on application, environmental conditions and driving style, the following procedures should be carried out at the intervals shown above.											
General											
Clean the truck (if necessary)											
Check and adjust mirrors											
Enter the next maintenance interval											
Engine											
Check the engine oil											
Check the engine oil filter											
Check the air filter											
Check the air filter safety element											
Check the crank case filter											
Clean the water separator pre-filter											
Check the coolant level											
Check the coolant concentration											
Check the valve clearances											
Check the drive belt											
Check the air condition drive belt (if fitted)											
Check engine mountings											
Examine intake and exhaust systems for tightness											
Transmission											
Check the transmission mountings											
Check the transmission oil											
Chassis, bodywork and fittings											
Clean and lubricate all pivots and joints											
Lubricate cab door hinges											
Check mounting of the steer axle, mast and drivers cabin											

5 Maintenance

Inspection and maintenance schedule

At operating hours										Carried out	
As required										✓	✖
Check the seat belt											
Check central lubrication lubricating points (option)											
Fill central lubrication canister with grease (option)											
Steering and wheels											
Check wheel nuts for correct torque											
Check tyre pressure											
Check tyres for corrosion, damage and foreign objects											
Check the steering											
Clean and lubricate the steer axle											
Check mounting of the steer cylinder											
Check steer axle link arms and swivel pins											
Check steer axle hub oil level											
Check and lubricate the drive shaft											
Controls											
Check the functionality of the control levers											
Check the functionality of the braking system (park brake and service brake)											
Check the functionality of the absent driver seat switch (if fitted)											
Electrical equipment											
Check the batteries											
Check the functionality of the electrical system											
Hydraulics											
Check hydraulic oil level											
Check brake oil level											
Check hydraulic system, transmission, pumps, valves and lines for leaks											
Clean the radiator and check for leaks											
Load lift system											
Clean and lubricate the lift chain											
~~Inspect load lifting device for proper operation~~											
Lubricate tilt cylinder bearings											

At operating hours									Carried out	
As required									✓	✗
Lubricate mast pivot bearings										
Clean, lubricate and check the proper operation of the side shift function										
Check and lubricate the fork carrier rollers										
Check fork carrier wear pads										
Check mast side thrust wear pads										
Check fork carrier side thrust wear pads										
Check the pre-tension of double hoses										
Subsequent tasks										
Attach maintenance sticker										

5 Maintenance

Inspection and maintenance schedule

First 50 hours service plan

At operating hours									Carried out	
After the first 50 hours									✓	✖
Depending on application, environmental conditions and driving style, the following procedures should be carried out at the intervals shown above.										
General										
Clean the truck (if necessary)										
Check and adjust mirrors										
Enter the next maintenance interval										
Engine										
Change the engine oil										
Change the engine oil filter										
Check the air filter										
Check the air filter safety element										
Check the crank case filter										
Change the fuel filter										
Change the water separator pre-filter										
Check the coolant level										
Check the coolant concentration										
Check the drive belt										
Check the air condition drive belt (if fitted)										
Check engine mountings										
Examine intake and exhaust systems for tightness										
Transmission										
Check the transmission mountings										
Check the transmission oil										
Change the transmission filters										
Chassis, bodywork and fittings										
Clean and lubricate all pivots and joints										
Lubricate cab door hinges										

At operating hours	Carried out	
After the first 50 hours	✓	✖
~~Check mounting of the steer axle, mast and drivers cabin~~		
Check the seat belt		
Check central lubrication lubricating points (option)		
Fill central lubrication canister with grease (option)		
Steering and wheels		
Check wheel nuts for correct torque		
Check tyre pressure		
Check tyres for corrosion, damage and foreign objects		
Check the steering		
Clean and lubricate the steer axle		
Check mounting of the steer cylinder		
Check steer axle link arms and swivel pins		
Check steer axle hub oil level		
Check and lubricate the drive shaft		
Controls		
Check the functionality of the control levers		
Check the functionality of the braking system (park brake and service brake)		
Check the functionality of the absent driver seat switch (if fitted)		
Check the functionality of the emergency shutdown switch		
Electrical equipment		
Check the batteries		
Check the functionality of the electrical system		
Hydraulics		
Check hydraulic oil level		
Check brake oil level		
Check hydraulic system, transmission, pumps, valves and lines for leaks		
Clean the radiator and check for leaks		
Replace pilot, suction, pressure and return line filters, and check hydraulic / braking system for leaks		

5 Maintenance

Inspection and maintenance schedule

At operating hours										Carried out	
After the first 50 hours										✓	×
Load lift system											
Clean and lubricate the lift chain											
Inspect load lifting device for proper operation											
Lubricate tilt cylinder bearings											
Lubricate mast pivot bearings											
Clean, lubricate and check the proper operation of the side shift function											
Check and lubricate the fork carrier rollers											
Check fork carrier wear pads											
Check mast side thrust wear pads											
Check fork carrier side thrust wear pads											
Check the pre-tension of double hoses											
Subsequent tasks											
Attach maintenance sticker											

500 h Service plan

At operating hours										Carried out	
500		1500		2500		3500		4500			
5500		6500		7500		8500		9500			
10500		11500		12500		13500		14500			
15500		16500		17500		18500		19500		✓	✖
Depending on application, environmental conditions and driving style, the following procedures should be carried out at the intervals shown above.											
General											
Clean the truck (if necessary)											
Check and adjust mirrors											
Read out error log and delete											
Enter the next maintenance interval											
Engine											
Change engine oil											
Change engine oil filter (at least every 12 months)											
Change the rocker cover breather											
Change the fuel filters											
Check engine mounting											
Check vacuum switch											
Check intake and exhaust system for leaks											
Check turbocharger											
Check condition and tension of drive belt											
Check the coolant concentration											
Transmission											
Check transmission mountings											
Check and lubricate the drive shaft and differential											
Change transmission oil filters											
Chassis											
Clean and lubricate all pivots and joints											
Lubricate cab door hinges											
Check the seat belt											

Check the seat belt	

5 Maintenance

Inspection and maintenance schedule

At operating hours										Carried out	
500		1500		2500		3500		4500			
5500		6500		7500		8500		9500			
10500		11500		12500		13500		14500			
15500		16500		17500		18500		19500		✓	✖
Check mounting of the steer cylinder											
Check mounting of the steer axle, mast and drivers cabin											
Check mounting of the steer axle link arms and swivel pins											
Check condition of the overhead guard frame											
Truck welds inspection											
Check central lubrication lubricating points (option)											
Fill central lubrication canister with grease (option)											
Steering and wheels											
Check wheel nuts for correct torque											
Check tyre pressure											
Check wheels and tyres for corrosion, damage and foreign objects											
Check the steering											
Check mounting of the steer cylinder											
Check and lubricate steer axle link arms and swivel pins											
Check the left and right drive axle mountings											
Check wheel hub bearing end float											
Lubricate the drive shaft											
Controls											
Check the functionality of the control levers											
Check the functionality of the braking system (park brake and service brake)											
Check the functionality of the absent driver seat switch											
Electrical equipment											
Check batteries											
Check electric cables, cable connectors and connections for condition and tightness											
Check the functionality of the electrical system											
Hydraulics											
Hydraulic system: Check the oil level.											

At operating hours										Carried out	
500		1500		2500		3500		4500			
5500		6500		7500		8500		9500			
10500		11500		12500		13500		14500			
15500		16500		17500		18500		19500		✓	✖
Check the hydraulic tank breather filter											
Check the hydraulic system, pumps, valves and lines for leaks											
Check condition of auxiliary hoses and replace if necessary											
Load lift device											
Clean and lubricate the lift chain											
Inspect load lifting device for proper operation											
Lubricate tilt cylinder bearings											
Lubricate mast pivot bearings											
Clean, lubricate and check for proper operation of the side shift function											
Check and lubricate the fork carrier rollers											
Check fork carrier wear pads											
Check mast side thrust wear pads											
Check fork carrier side thrust wear pads											
Check the pre-tension of double hoses											
Subsequent tasks											
Attach maintenance sticker											

1000 h Service plan

At operating hours										Carried out	
1000		7000		11000		13000		17000			
19000										✓	✖
Depending on application, environmental conditions and driving style, the following procedures should be carried out at the intervals shown above.											
General											
Clean the truck (if necessary)											
Check and adjust mirrors											

5 Maintenance

Inspection and maintenance schedule

At operating hours										Carried out	
1000		7000		11000		13000		17000			
19000										✓	✖
Read out error log and delete											
Enter the next maintenance interval											
Engine											
Change engine oil											
Change engine oil filter											
Change the rocker cover breather											
Change the fuel filter											
Change the water separator pre-filter											
Check condition and tension of drive belt											
Check the cooling fan belt tensioner											
Check the engine mounting											
Change the air filter element											
Check the vacuum switch											
Check the intake and exhaust pipes for leaks											
Check the coolant concentration											
Transmission											
Change transmission oil											
Change transmission oil filters											
Check transmission mountings											
Check and lubricate the drive shaft and differential											
Chassis											
Clean and lubricate all pivots and joints											
Lubricate cab door hinges											
Check the seat belt											
Check mounting of the steer axle, mast and drivers cabin											
Check the condition of the overhead guard frame											
Check central lubrication lubricating points (option)											
Fill central lubrication canister with grease (option)											
Steering and wheels											

At operating hours										Carried out	
1000		7000		11000		13000		17000			
19000										✓	✖
Check wheel nuts for correct torque											
Check tyre pressure											
Check tyres for damage and foreign objects											
Check the steering											
Check mounting of the steer cylinder											
Check and lubricate steer axle link arms and swivel pins											
Check steer axle hub oil level											
Check and lubricate the drive shaft											
Check security of the drive axle mounting and clamping plate											
Check wheel hub bearing end float											
Controls											
Check the functionality of the control levers											
Check the functionality of the braking system (park brake and service brake)											
Check the functionality of the absent driver seat switch (if fitted)											
Check the functionality of the emergency shutdown switch											
Electrical equipment											
Check electric cables, cable connectors and connections for condition and tightness											
Check the batteries											
Check the functionality of the electrical system											
Hydraulic equipment											
Working hydraulic system: Check the oil level - change the filter.											
Brake hydraulic system: Check the oil level - change the filter.											
Change the hydraulic tank breather filter											
Check the hydraulic system, drive motors, pumps, valves and lines for leaks											
Clean the radiator and hydraulic oil cooler											
Check the tension of double hoses											
Load lift device											
Inspect the load lift device for proper operation											
Check the condition of the tilt cylinders											

5 Maintenance

Linde Material Handling

Inspection and maintenance schedule

At operating hours										Carried out	
1000		7000		11000		13000		17000			
19000										✓	✖
Clean and lubricate the mast and tilt cylinder pivots											
Check the mast roller bearings											
Check and adjust the lift chain length, lubricate with chain spray											
Check the tension of double hoses											
Optional equipment											
Check the soot filter system (part 1)											
Subsequent tasks											
Attach maintenance sticker											

2000 h Service plan

At operating hours										Carried out	
2000		4000		8000		10000		14000			
16000		20000								✓	✖
Depending on application, environmental conditions and driving style, the following procedures should be carried out at the intervals shown above.											
General											
Clean the truck (if necessary)											
Check and adjust mirrors											
Read out error log and delete											
Enter the next maintenance interval											
Engine											
Change engine oil											
Change engine oil filter											
Change the rocker cover breather											
Change the fuel filter											
Change the water separator pre-filter											
Check condition and tension of drive belt											
Check the cooling fan belt tensioner											

At operating hours										Carried out	
2000		4000		8000		10000		14000			
16000		20000								✓	✖
Check the engine mounting											
Change the air filter element											
Change the air filter safety element											
Check the vacuum switch											
Check the intake and exhaust pipes for leaks											
Change the coolant											
Check the fuel injection nozzles											
Check the starter motor, alternator and injection pump											
Transmission											
Change transmission oil											
Change transmission oil filters											
Check transmission mountings											
Check and lubricate the drive shaft and differential											
Chassis											
Clean and lubricate all pivots and joints											
Lubricate cab door hinges											
Check the seat belt											
Check mounting of the steer axle, mast and drivers cabin											
Check the condition of the overhead guard frame											
Check central lubrication lubricating points (option)											
Fill central lubrication canister with grease (option)											
Steering and wheels											
Check wheel nuts for correct torque											
Check tyre pressure											
Check tyres for damage and foreign objects											
Check the steering											
Check mounting of the steer cylinder											
Check and lubricate steer axle link arms and swivel pins											
Check and lubricate the drive shaft											

5 Maintenance

Inspection and maintenance schedule

At operating hours										Carried out	
2000		4000		8000		10000		14000			
16000		20000								✓	✖
Check wheel hub bearing end float											
Change the drive axle oil											
Change the steer axle oil											
Controls											
Check the functionality of the control levers											
Check the functionality of the braking system (park brake and service brake)											
Check the functionality of the absent driver seat switch (if fitted)											
Electrical equipment											
Check electric cables, cable connectors and connections for condition and tightness											
Check the batteries											
Check the functionality of the electrical system											
Hydraulic equipment											
Working hydraulic system: Check the oil level - change the filter.											
Brake hydraulic system: Check the oil level - change the filter.											
Change the hydraulic tank breather filter											
Check the hydraulic system, drive motors, pumps, valves and lines for leaks											
Clean the radiator and hydraulic oil cooler											
Load lift device											
Inspect load lifting device for proper operation											
Lubricate tilt cylinder bearings											
Lubricate mast pivot bearings											
Clean, lubricate and check the proper operation of the side shift function											
Check and lubricate the fork carrier rollers											
Check fork carrier wear pads											
Check mast side thrust wear pads											
Check fork carrier side thrust wear pads											
Check the pre-tension of double hoses											
Check tilt cylinders											
Clean and lubricate the mast and tilt cylinder pivots											

At operating hours										Carried out	
2000		4000		8000		10000		14000			
16000		20000								✓	✖
Check mast roller bearings											
Check and adjust the side thrust wear blocks on the carriage and inner mast											
Check the forks											
Check and adjust the lift chain length, lubricate with chain spray											
Optional equipment											
Check the soot filter system (part 1)											
Subsequent tasks											
Attach maintenance sticker											

3000 h Service plan

At operating hours										Carried out	
3000		9000								✓	✖
Depending on application, environmental conditions and driving style, the following procedures should be carried out at the intervals shown above.											
General											
Clean the truck (if necessary)											
Check and adjust mirrors											
Read out error log and delete											
Enter the next maintenance interval											
Engine											
Change engine oil											
Change engine oil filter											
Change the fuel filter											
Change the fuel filter											
Check condition and tension of drive belt											
Check the cooling fan belt tensioner											
Check the engine mounting											
Change the air filter element											

5 Maintenance

Linde Material Handling

Inspection and maintenance schedule

At operating hours										Carried out	
3000		9000								✓	✖
Check the air filter safety element											
Check the vacuum switch											
Check the intake and exhaust pipes for leaks											
Transmission											
Change transmission oil											
Change transmission oil filters											
Check transmission mountings											
Check and lubricate the drive shaft and differential											
Chassis											
Clean and lubricate all pivots and joints											
Lubricate cab door hinges											
Check the seat belt											
Check mounting of the steer axle, mast and drivers cabin											
Check the condition of the overhead guard frame											
Check central lubrication lubricating points (option)											
Fill central lubrication canister with grease (option)											
Check condition of structural components											
Steering and wheels											
Check wheel nuts for correct torque											
Check tyre pressure											
Check tyres for damage and foreign objects											
Check the steering											
Check mounting of the steer cylinder											
Check and lubricate steer axle link arms and swivel pins											
Check steer axle hub oil level											
Check and lubricate the drive shaft											
Check security of the drive axle mounting and clamping plate											
Check wheel hub bearing end float											
Controls											
Check the functionality of the control levers											

Check the functionality of the control levers		

At operating hours										Carried out	
3000		9000								✓	✖
Check the functionality of the braking system (park brake and service brake)											
Check the functionality of the absent driver seat switch (if fitted)											
Electrical equipment											
Check electric cables, cable connectors and connections for condition and tightness											
Check the batteries											
Check the functionality of the electrical system											
Hydraulic equipment											
Working hydraulic system: Change the oil and filter.											
Brake hydraulic system: Change the oil and filter.											
Check the hydraulic tank breather filter											
Check the hydraulic system, drive motors, pumps, valves and lines for leaks											
Clean the radiator and hydraulic oil cooler											
Check the tension of double hoses											
Load lift device											
Clean and lubricate the lift chain											
Inspect the load lift device for proper operation											
Check the condition of the tilt cylinders											
Clean and lubricate the mast and tilt cylinder pivots											
Lubricate tilt cylinder bearings											
Lubricate mast pivot bearings											
Clean, lubricate and check the proper operation of the side shift function											
Check and lubricate the fork carrier rollers											
Check fork carrier wear pads											
Check mast side thrust wear pads											
Check fork carrier side thrust wear pads											
Optional equipment											
Check the soot filter system (part 1)											
Subsequent tasks											
Attach maintenance sticker											

5 Maintenance

Linde Material Handling

Inspection and maintenance schedule

5000 h Service plan

At operating hours										Carried out	
5000		10000		15000		20000				✓	✖
Depending on application, environmental conditions and driving style, the following procedures should be carried out at the intervals shown above.											
General											
Clean the truck (if necessary)											
Check and adjust mirrors											
Read out error log and delete											
Enter the next maintenance interval											
Engine											
Change engine oil											
Change engine oil filter											
Change the rocker cover breather											
Change the fuel filter											
Change the water separator pre-filter											
Check condition and tension of drive belt											
Check the cooling fan belt tensioner											
Check the engine mounting											
Change the air filter element											
Check the air filter safety element											
Check the vacuum switch											
Check the intake and exhaust pipes for leaks											
Check coolant concentration											
Check the valve clearance											
Transmission											
Change transmission oil											
Change transmission oil filters											
Check transmission mountings											
Check and lubricate the drive shaft and differential											
Chassis											

At operating hours										Carried out	
5000		10000		15000		20000				✓	✖
Clean and lubricate all pivots and joints											
Lubricate cab door hinges											
Check the seat belt											
Check mounting of the steer axle, mast and drivers cabin											
Check the condition of the overhead guard frame											
Check central lubrication lubricating points (option)											
Fill central lubrication canister with grease (option)											
Steering and wheels											
Check wheel nuts for correct torque											
Check tyre pressure											
Check tyres for damage and foreign objects											
Check the steering											
Check mounting of the steer cylinder											
Check and lubricate steer axle link arms and swivel pins											
Check and lubricate the drive shaft											
Check security of the drive axle mounting and clamping plate											
Check wheel hub bearing end float											
Controls											
Check the functionality of the control levers											
Check the functionality of the braking system (park brake and service brake)											
Check the functionality of the absent driver seat switch (if fitted)											
Electrical equipment											
Check electric cables, cable connectors and connections for condition and tightness											
Check the batteries											
Check the functionality of the electrical system											
Hydraulic equipment											
Working hydraulic system: Check the oil level											
Brake hydraulic system: Check the oil level											
Check the hydraulic tank breather filter											
Check the hydraulic system, drive motors, pumps, valves and lines for leaks											

Check the hydraulic system, drive motors, pumps, valves and lines for leaks		

Linde Material Handling

Inspection and maintenance schedule

At operating hours										Carried out	
5000		10000		15000		20000				✓	✖
Clean the radiator and hydraulic oil cooler											
Load lift device											
Clean and lubricate the lift chain											
Inspect the load lift device for proper operation											
Lubricate tilt cylinder bearings											
Lubricate mast pivot bearings											
Clean, lubricate and check the proper operation of the side shift function											
Check and lubricate the fork carrier rollers											
Check fork carrier wear pads											
Check mast side thrust wear pads											
Check fork carrier side thrust wear pads											
Check the pre-tension of double hoses											
Optional equipment											
Check the soot filter system (part 1)											
Subsequent tasks											
Attach maintenance sticker											

6000 h Service plan

At operating hours										Carried out	
6000		12000		18000						✓	✖
Depending on application, environmental conditions and driving style, the following procedures should be carried out at the intervals shown above.											
General											
Clean the truck (if necessary)											
Check and adjust mirrors											
Read out error log and delete											
Enter the next maintenance interval											
Engine											

Change engine oil		

At operating hours										Carried out	
6000		12000		18000						✓	✖
Change engine oil filter											
Change the fuel filter											
Change the water separator pre-filter											
Check condition and tension of drive belt											
Check the cooling fan belt tensioner											
Check the engine mounting											
Change the air filter element											
Change the air filter safety element											
Check the vacuum switch											
Check the intake and exhaust pipes for leaks											
Change the coolant											
Check viscous vibration damper											
Transmission											
Change transmission oil											
Change transmission oil filters											
Check transmission mountings											
Check and lubricate the drive shaft and differential											
Chassis											
Clean and lubricate all pivots and joints											
Lubricate cab door hinges											
Check the seat belt											
Check mounting of the steer axle, mast and drivers cabin											
Check the condition of the overhead guard frame											
Check central lubrication lubricating points (option)											
Fill central lubrication canister with grease (option)											
Clean the fuel tank breather											
Steering and wheels											
Check wheel nuts for correct torque											
Check tyre pressure											
Check tyres for damage and foreign objects											

Check tyres for damage and foreign objects		

5 Maintenance

Linde Material Handling

Inspection and maintenance schedule

At operating hours										Carried out	
6000		12000		18000						✓	✖
Check the steering											
Check mounting of the steer cylinder											
Check and lubricate steer axle link arms and swivel pins											
Check and lubricate the drive shaft											
Check security of the drive axle mounting and clamping plate											
Check drive and steer axle bearings											
Check wheel hub bearing end float											
Controls											
Check the functionality of the control levers											
Check the functionality of the braking system (park brake and service brake)											
Check the functionality of the absent driver seat switch (if fitted)											
Electrical equipment											
Check electric cables, cable connectors and connections for condition and tightness											
Check the batteries											
Check the functionality of the electrical system											
Hydraulic equipment											
Working hydraulic system: Change the oil											
Brake hydraulic system: Change the oil											
Change the hydraulic tank breather filter											
Check the hydraulic system, drive motors, pumps, valves and lines for leaks											
Clean the radiator and hydraulic oil cooler											
Check the tension of double hoses											
Check condition of auxiliary hoses and replace if necessary											
Check hydraulic pump mounting bolts											
Load lift device											
Inspect the load lift device for proper operation											
Check the condition of the tilt cylinders											
Clean and lubricate the mast and tilt cylinder pivots											
Check the mast roller bearings											

Check and adjust the side thrust wear blocks on the carriage and inner mast		

At operating hours										Carried out	
6000		12000		18000						✓	✖
Check and lubricate the fork carrier rollers											
Check fork carrier wear pads											
Check mast side thrust wear pads											
Check fork carrier side thrust wear pads											
Check tilt cylinders											
Check the forks											
Change the lift chains, lubricate with chain spray											
Optional equipment											
Check the soot filter system (part 1)											
Subsequent tasks											
Attach maintenance sticker											

5 Maintenance

Inspection and maintenance schedule

Rated capacity

No.	Assembly	Aids/oils and lubrication	Filling capacity/Rated values
1	Engine	Engine oil	approx. 17.5 lts.
2	Fuel tank	Diesel	approx. 125 lts.
3	Cooling system	Water and antifreeze mix	approx. 30 lts.
4	Working hydraulic system oil tank	Hydraulic oil	approx. 300 lts.
5	Transmission	Gear oil	approx. 30 lts.
6	Steer axle hub	Lubricating grease	as required
7	Batteries	Sealed for life	as required
8	Tyres	Air	10 bar
9	Wheel mounting nuts		680 Nm
10	Lubrication points on mast and spreader	Lubricating grease	as required
11	Temperature switch	Oil	Engine oil temperature 130 °C
12	Valve clearances		Inlet 0.35 mm Exhaust 0.35 mm
13	Drive belt tension, Fan, Alternator	Belt deflection	approx. 10 mm

Engine

Engine oil level check

⚠ CAUTION

Follow the precautions for handling fluids and lubricants.

Wear protective clothing.

➢ With the engine stopped, open the engine cover.

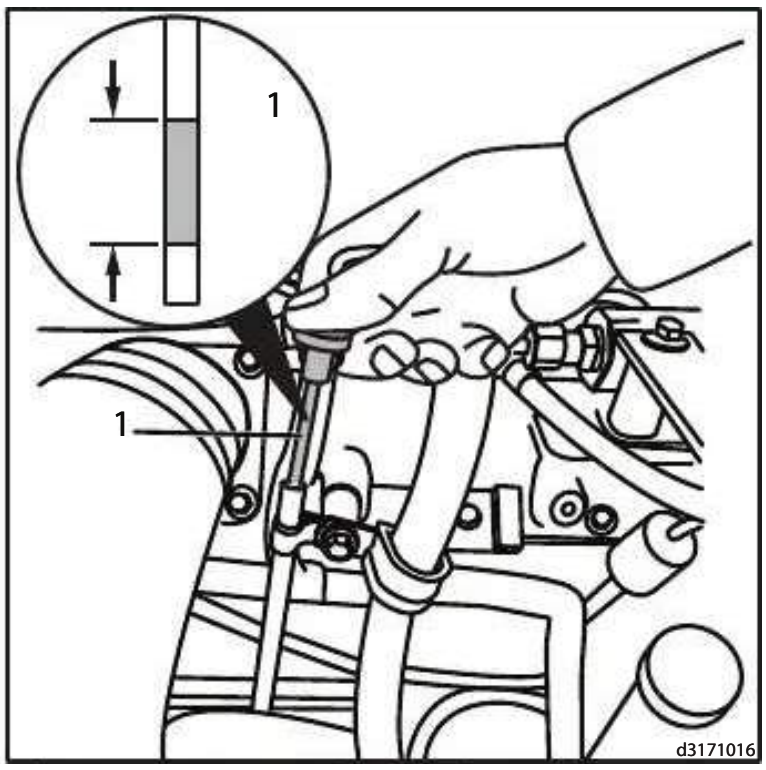
5 Maintenance

Engine

➢ Remove dipstick (1) and wipe with a clean cloth.

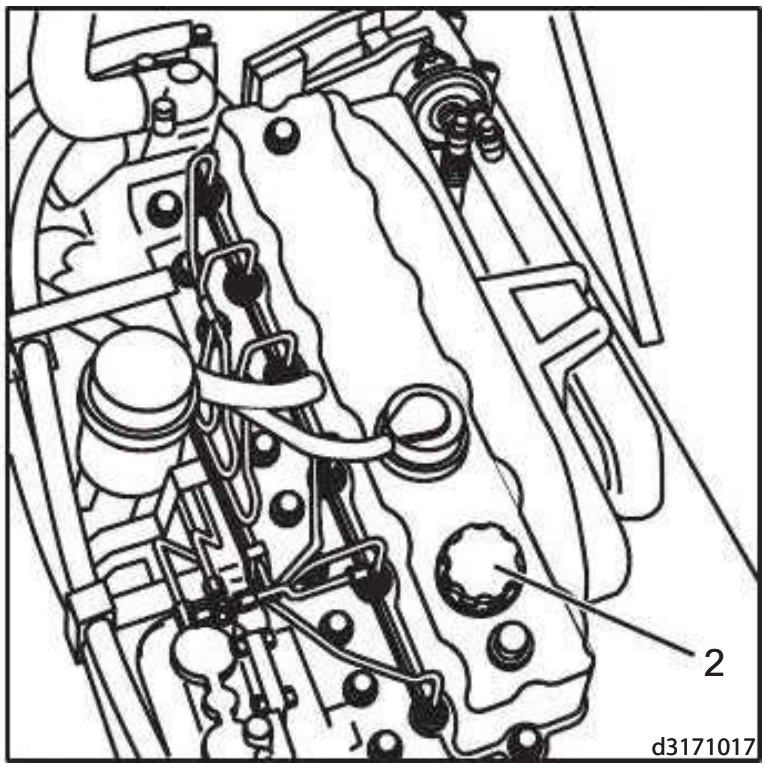
The dipstick is located on the right side of the engine.

➢ Fully re-insert dipstick and remove it again. The oil level should be between the Min and Max markings.



➢ If necessary, remove filler cap (2) and add oil to the Max mark on dipstick.

Maximum oil capacity - 17.5 L



Change the engine oil (every 12 months minimum)

⚠ CAUTION

Please observe lubricant recommendations. (Different types of oil/different maintenance intervals.)

Only use recommended lubricants.

Drain the engine oil ▷

⚠ CAUTION

Follow precautions for handling fuels and lubricants.

Wear protective clothing.

⚠ DANGER

Risk of scalding when draining hot engine oil.

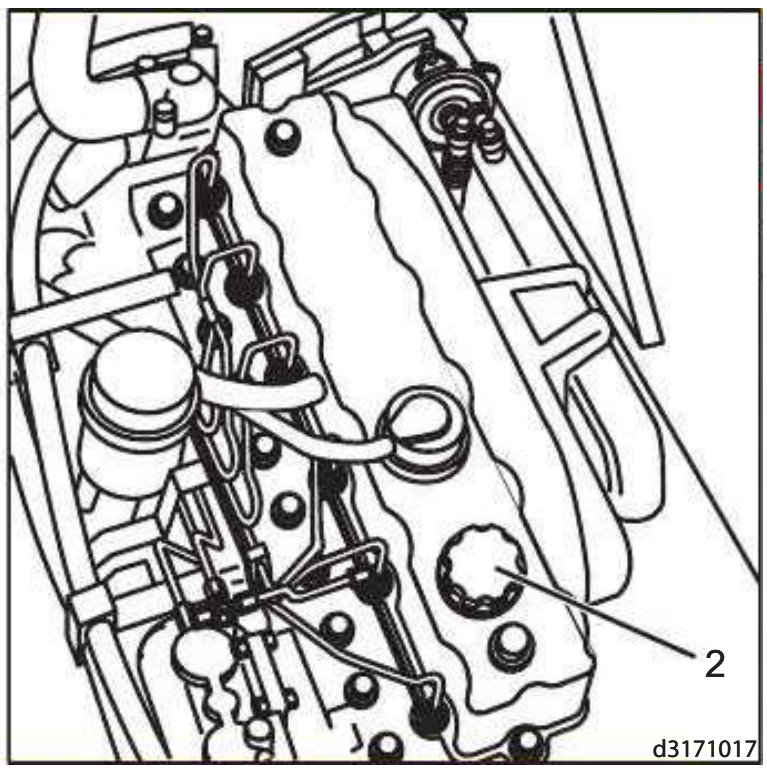
Wear protective clothing.

NOTE

Change oil only when the engine is at operating temperature.

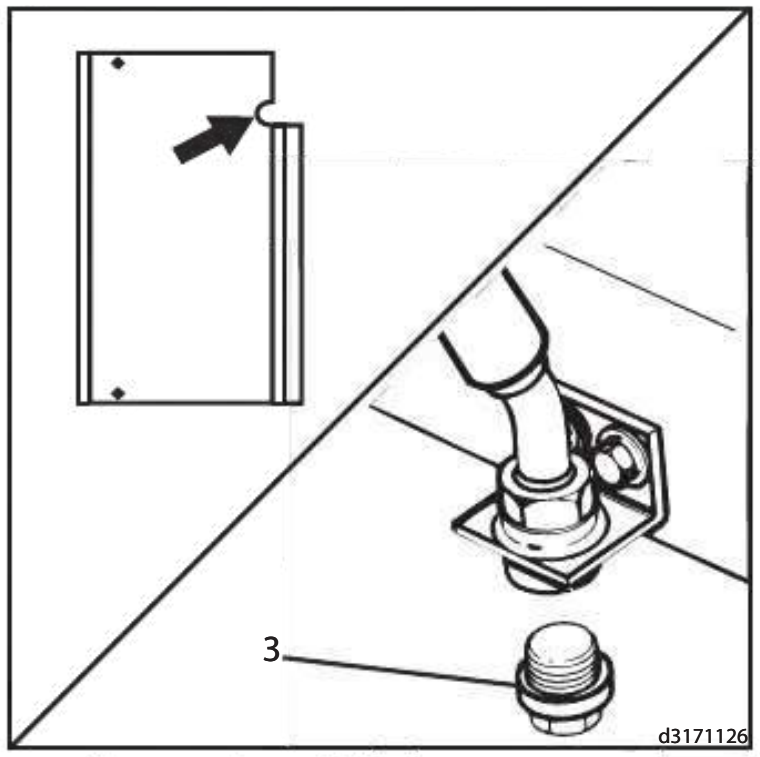
➢ Place a suitable container under the sump.

➢ Remove filler cap (2) at the filler opening. ▷



Engine

- Remove engine oil drain plug (3) on the sump. Access is through the floor pan.
- Allow oil to drain completely into the container.
- Refit drain plug (3) with a new sealing ring. Torque plug (3) to 22 Nm (cast iron pan) or 34 Nm (aluminium pan)



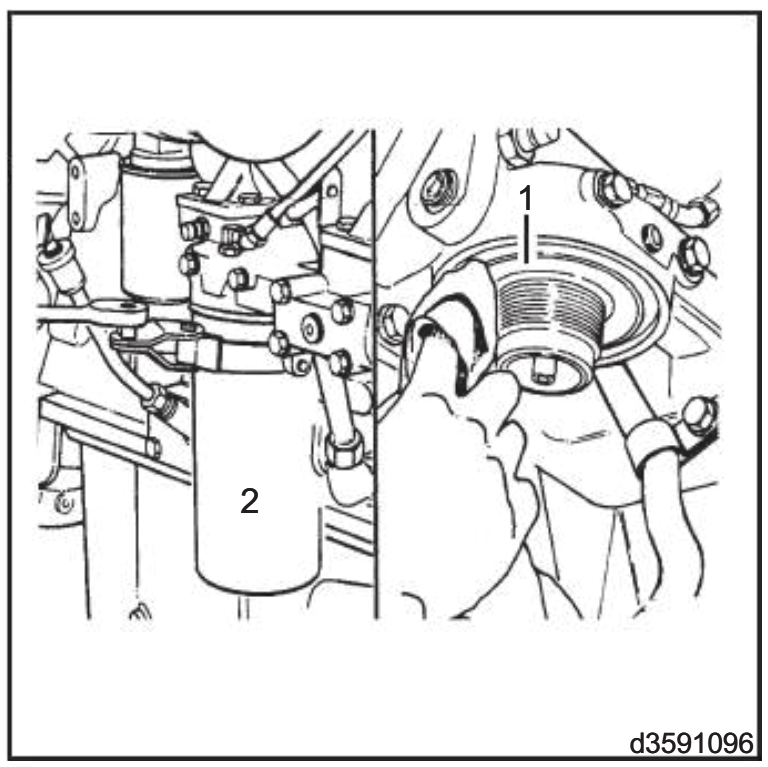
Renew the engine oil filter

DANGER

Risk of scalding when draining hot engine oil.

Wear protective clothing.

- Place a catch tray with a capacity of at least 10 litres under filter (2).
- Loosen filter (2) with a filter wrench and remove it by hand.
- Catch any oil flowing out and dispose of in an environment friendly way.
- Renew the O-ring on the cap.
- Clean filter housing (1).



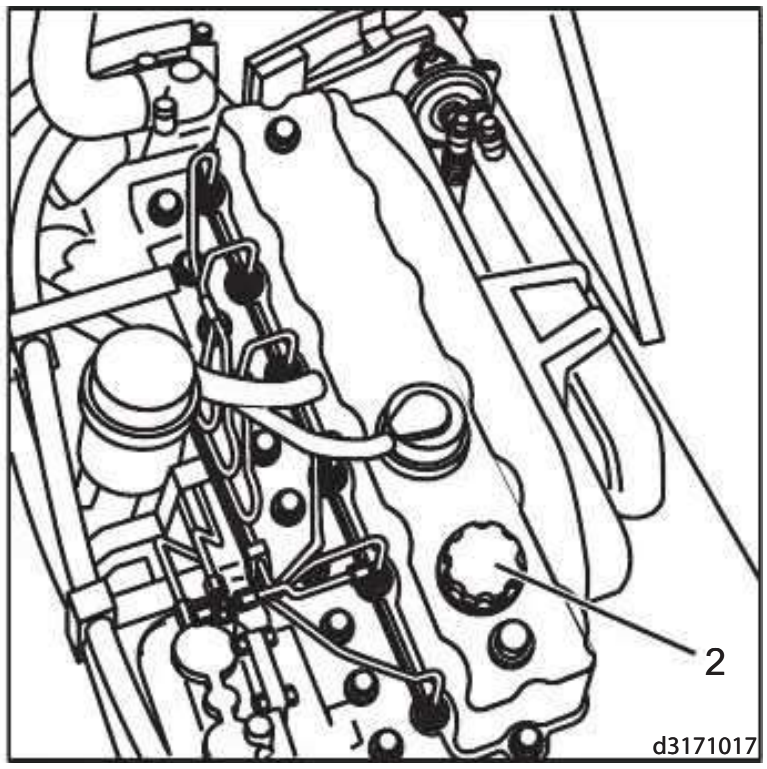
- Check filter seal rings (3) in new engine oil filter (2), for proper seating.
- Fill new filter (2), slowly with oil.
- Lubricate seal rings (3) of new filter (2) with engine oil.
- Install filter (2), hand tightening only.
- Start the engine and check the seal faces for leakage.
- Stop the engine and wait for at least 5 minutes for the engine oil level to stabilise.
- Check the engine oil level and replenish engine oil if necessary.

Top up the engine oil

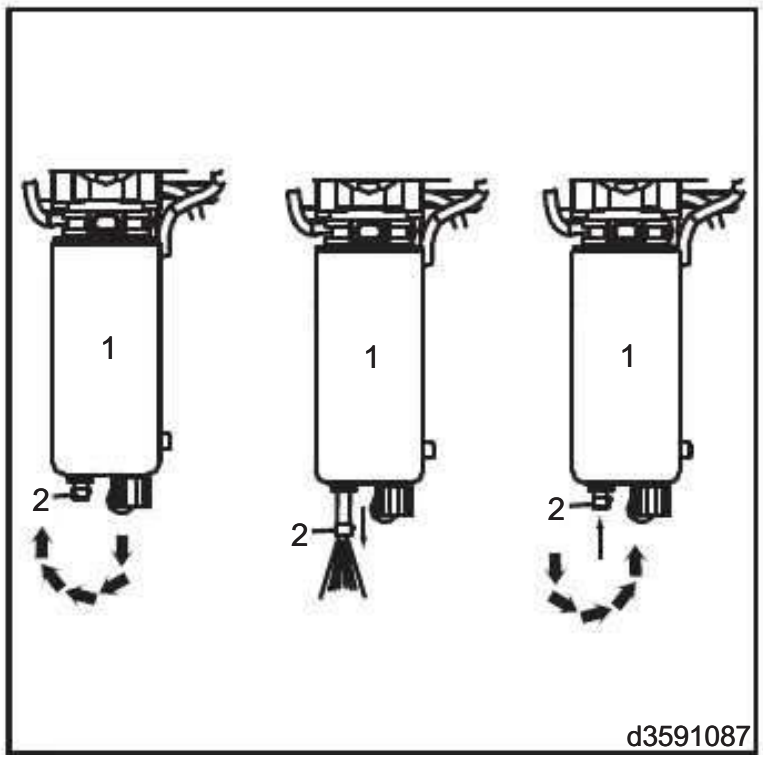
- Remove cap (2) on the filler opening.
- Fill new engine oil as specified in the lubricant recommendations through the filler opening.

Filling capacity with filter renewal: max. 17.5 L

- After refilling, check the engine oil level with the dipstick and add oil to the maximum mark, if necessary.
- Install and tighten engine oil cap (2).



Clean the fuel filter



⚠ CAUTION

Follow the instructions for handling fluids and lubricants.

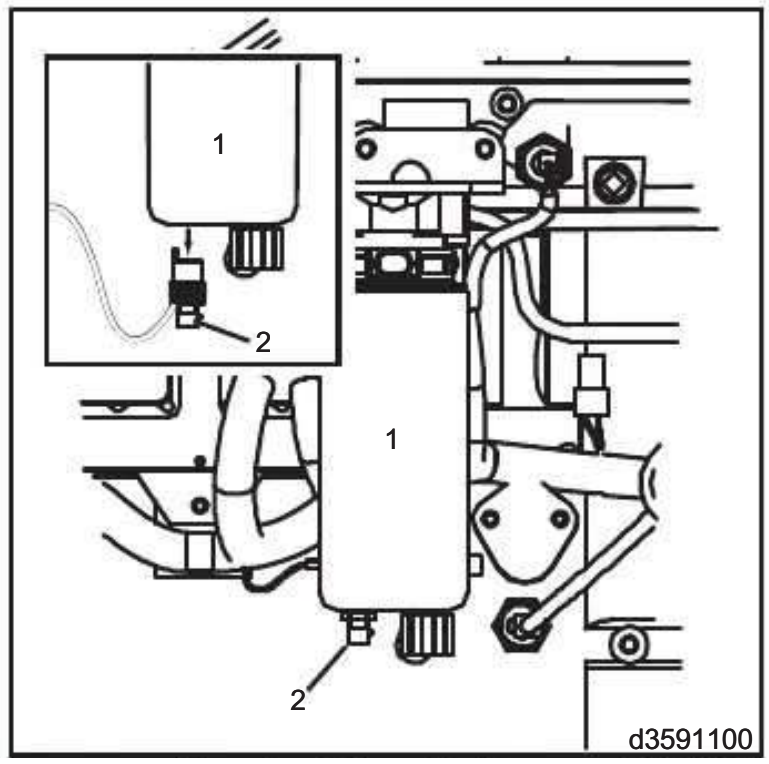
- ➢ Place a container underneath filter (1) to catch any fluid running out.
- ➢ Open drain valve (2) by turning it anti-clockwise approximately 3½ turns until valve (2) drops down 25 mm (1 inch), and draining occurs.
- ➢ Allow fuel to drain until clear fuel emerges.
- ➢ Close drain valve (2), hand tight only, as soon as clean fuel emerges.

⚠ CAUTION

When closing drain valve (2), do not over tighten. Overtightening can damage the threads.

- ➢ Dispose of drained fuel in a way that is friendly to the environment.

Change the fuel pre-filter with water monitor ▷



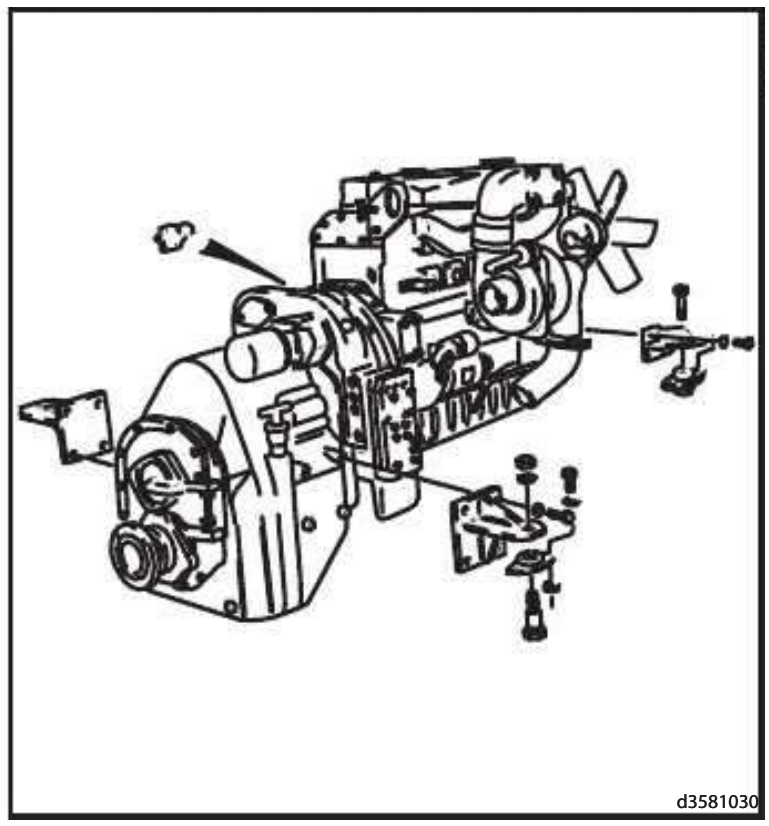
- Clean the area around fuel filter (1).
- Disconnect water monitor (2), check for damage. Replace if necessary.
- Drain fuel filter (1) see ”Fuel system, draining”.
- Remove fuel filter (1) using an appropriate filter wrench.

NOTE

If the entire filter unit with water separator is not going to be changed the water monitor should be moved to the new fuel filter.

- Clean the filter’s sealing surface on the filter housing.
- Spread a thin layer of oil on the sealing ring and mount the new fuel filter according to the instructions on the filter.
- Connect water monitor (2).
- Start the engine and check for leaks.

Check the engine mounting for condition and security ▷



The engine rubber mounts are subject to great stresses. Depending on the operating conditions, their service life is limited.

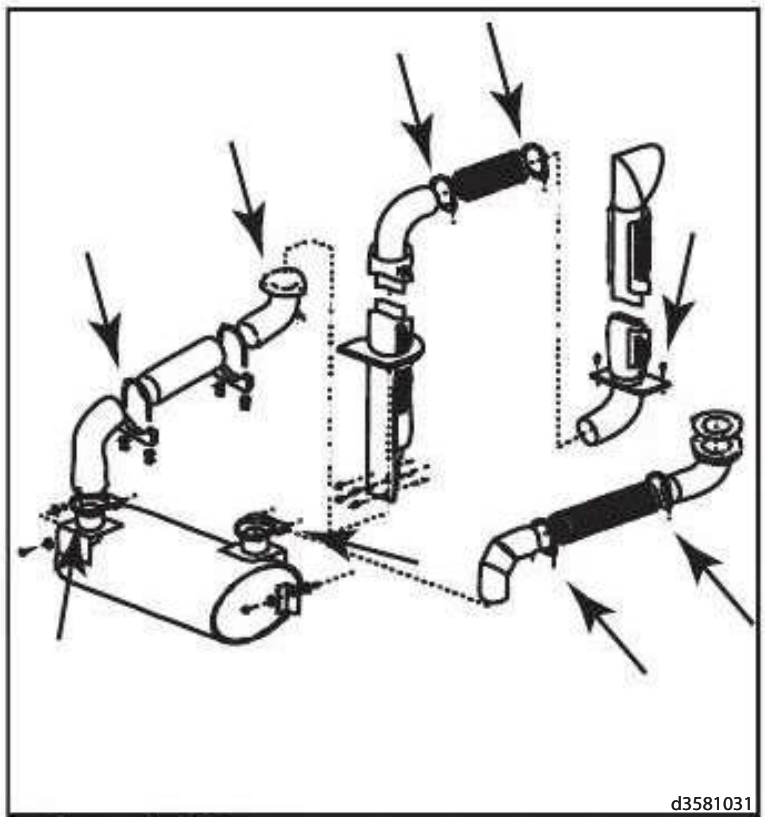
- Check the rubber mounts for cracks and deformation, and replace if necessary.

NOTE

Please contact your authorised dealer for this service.

- Check all bolts on engine mounts and bearings for security and damage.

Check intake and exhaust systems for leaks and security ▷



- Inspect air intake hoses for leaks. If leaking, renew the hoses.
- Check that hose clamps are secure, renew if necessary.

⚠ CAUTION

Hot surface, danger of burns.

Ensure the exhaust system is cool before servicing.

- Check the overall condition of the exhaust system, replace any pipes or the silencer if badly corroded.
- Check exhaust mounting flange nuts.
- Check that exhaust clamps are secure.
- Check that silencer mountings are secure.

Torque ..... 56 Nm

- Check tail pipe mounting bolts are secure.

Check the air filter

⚠ WARNING

Stop the engine before servicing the air intake system.

Do not start the engine with the filter element removed.

Wear a protective mask for all services on the air intake system.

⚠ CAUTION

Clean the filter casing (1) with a damp cloth.

Do not clean the filter element (5).

The use of wet cleaning agents will destroy filter element (5). Follow the precautions for handling fluids and lubricants. If a warning message is displayed on the truck status display unit stating the air filter is blocked, stop the engine at once and renew the air filter.

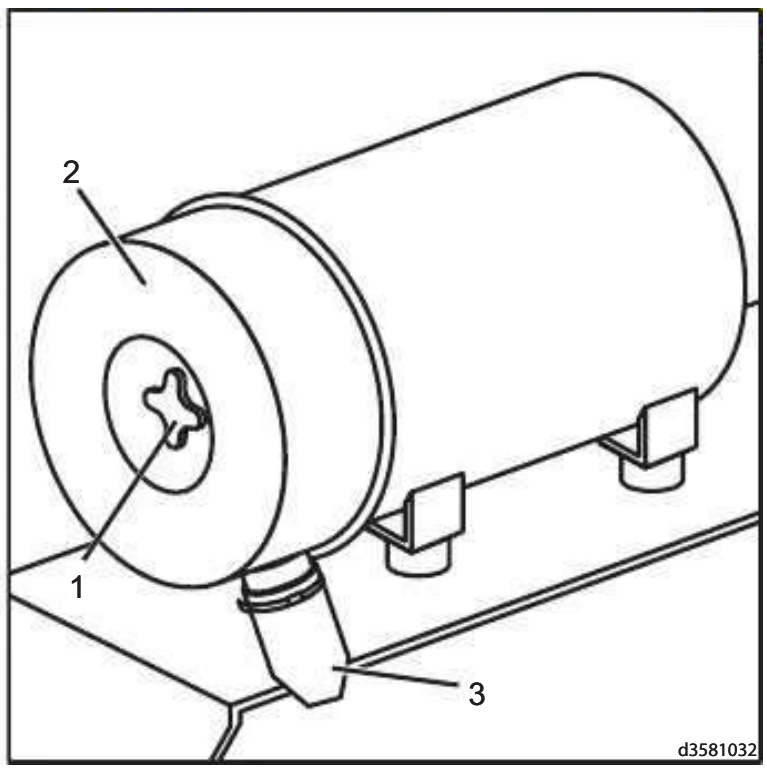
⚠ CAUTION

A dirty filter element (5) decreases engine performance.

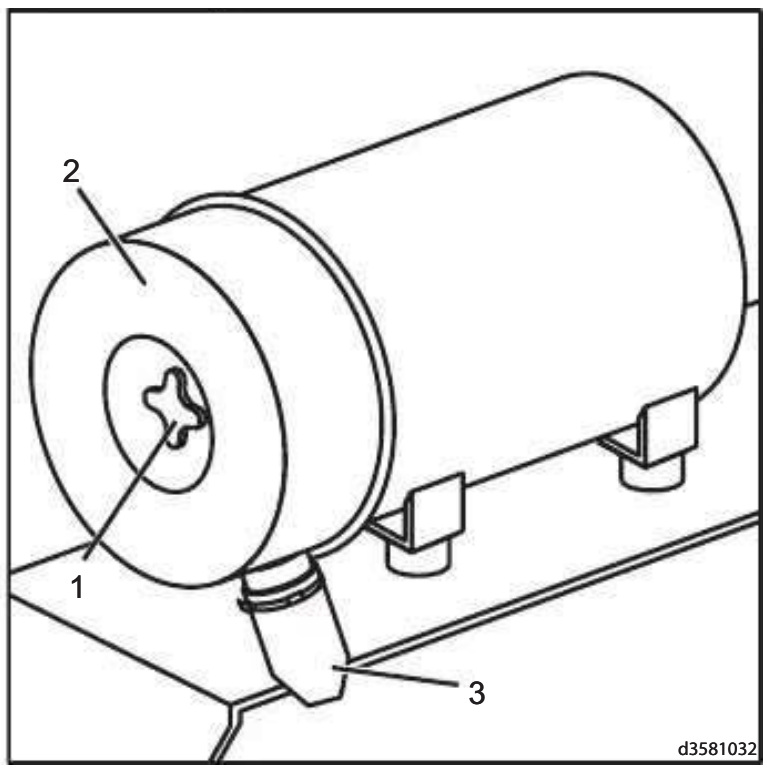
Regular filter servicing is essential for the engine.

If a problem is detected, an error message will be displayed on the truck status display unit.

- ➢ Locate the air filter underneath the cabin.
- ➢ Unscrew nut (1) and remove filter end cover (2).
- ➢ Empty dust collected in cover (2), and wipe it with a clean damp cloth.



- ➢ Remove nut (4) and pull out air filter element (5).
- ➢ Check air filter element (5). Replace if necessary.
- ➢ Clean dust valve (3) to remove any collected dust. If necessary use a damp cloth.
- ➢ Replace dust valve (3) if split or torn.



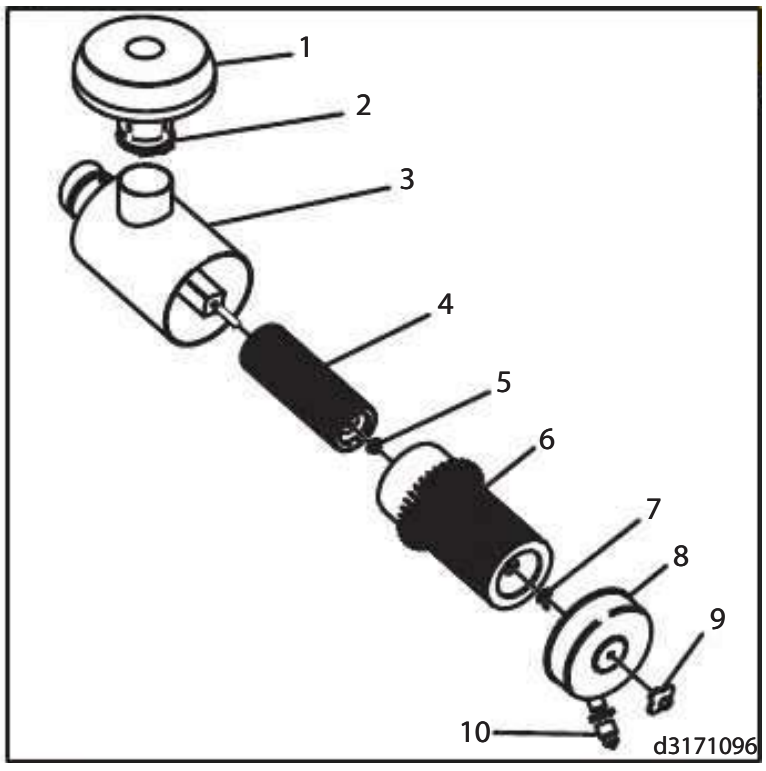
Renew the safety element

The safety element (4) must be changed:

After 2000 hours of service.

If the element is defective.

- Remove nut (9) cover (8) and nut (7).
- Withdraw filter element (6).
- Remove nut (5), and withdraw safety element (4).



NOTE

Before installing a new safety element, ensure it is not damaged.

CAUTION

A dirty filter may reduce the service life of the engine and affect the performance.

Do not clean or reuse the safety element.

- Install new filter element (4) in filter housing (3). Take care not to damage filter element (4) when installing it and be sure that the seal sits correctly in the filter casing.
- Fit retaining nut (5).
- Fit new air filter (6) and secure with nut (7).
- Refit cover (8) and secure with nut (9).
- The dust ejection valve (10) must point downward.
- Close the access door.

NOTE

Use only genuine parts as incorrect parts may reduce the service life of the engine and affect its performance.

Check coolant strength

⚠ CAUTION

Risk of scalding.

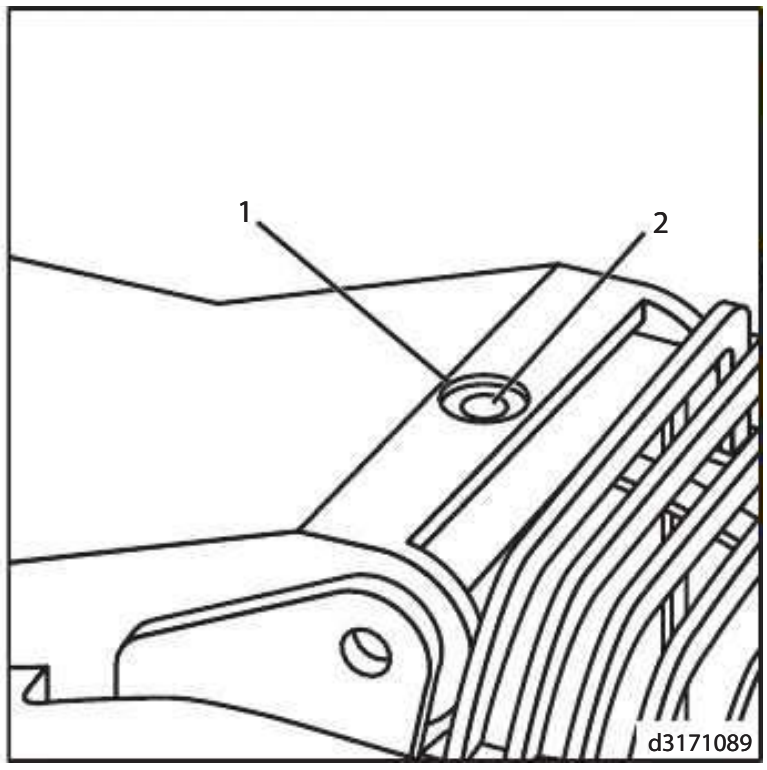
Do not open the reservoir cap when the engine is hot.

⚠ CAUTION

Follow the precautions for handling fuels and lubricants.

⚠ CAUTION

Too much antifreeze or use of high silicate anti-freeze can cause damage to the engine.



- Check the concentration of antifreeze. Use a mixture of 50% water and 50% ethylene glycol or propylene glycol base antifreeze to protect the engine to -32°C (-25°F), all year round.
- Use a refractometer to accurately measure freezing point protection and concentration level.

Renew engine coolant

ENVIRONMENT NOTE

Be careful when handling consumables.

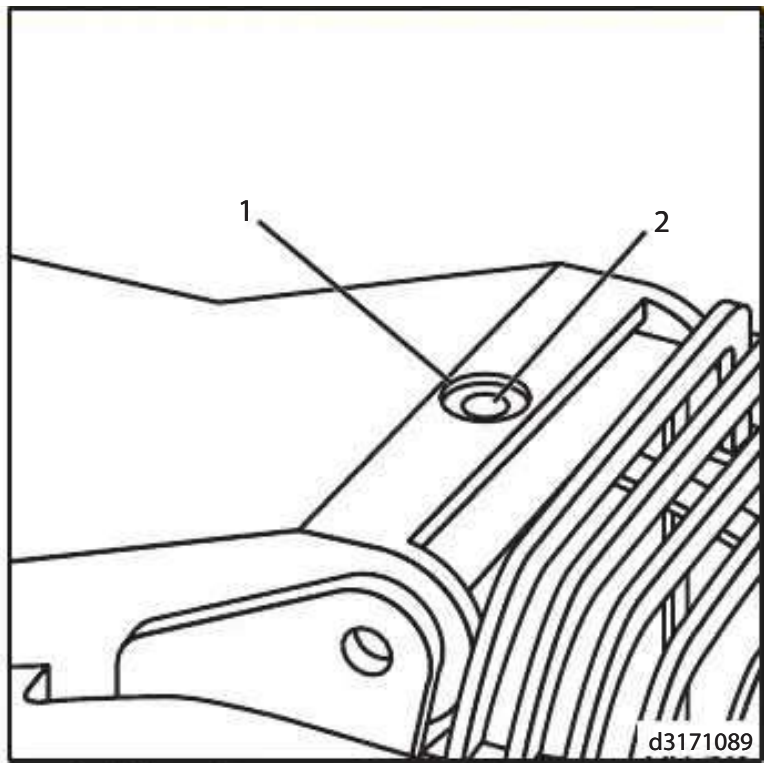
⚠ CAUTION

Danger of scalds and burns.

Do not remove the radiator cap or drain plugs when the radiator is hot or with the engine running.

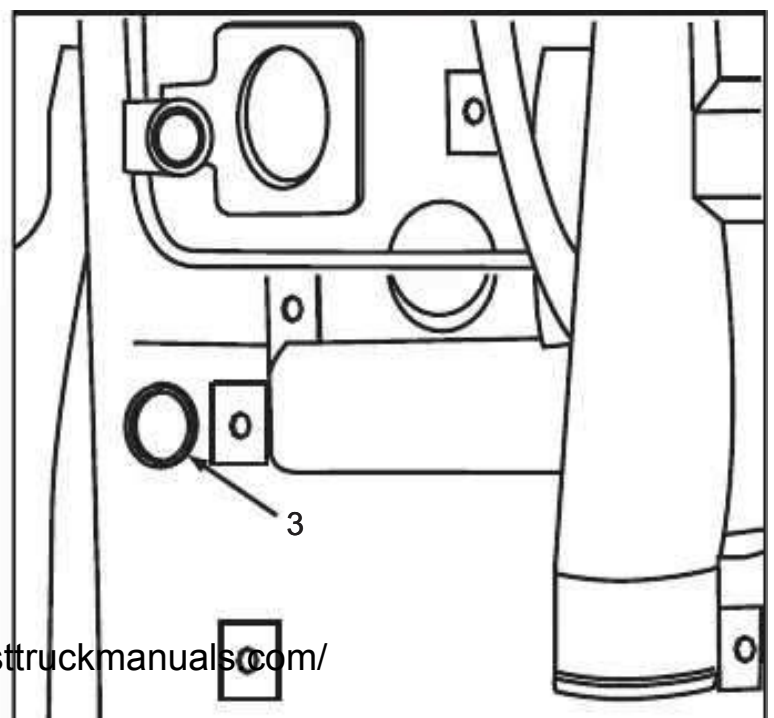
The radiator drain plug is fitted at the base of the radiator. It is reached from under the truck through an access hole immediately in front of the steer axle.

➢ Remove radiator cap (2).



➢ Place a container of at least 30 L capacity under engine drain plug (3).

➢ Remove drain plug (3), and allow the coolant to drain.



NOTE

Protect the starter motor and alternator against coolant.

➢ Flush out the radiator through the filler cap aperture.

➢ Refit engine drain plug (3).

➢ Fill the cooling system with a 50:50 water-antifreeze mixture.

➢ Refit radiator cap (2).

➢ Run the engine for 5 minutes.

➢ Check the coolant level, replenishing coolant if required.

➢ Check the cooling system for leaks, top up if necessary.

NOTE

Capacity of cooling system ..... 30 L

Clean the radiator and oil cooler, check for leaks

⚠ CAUTION

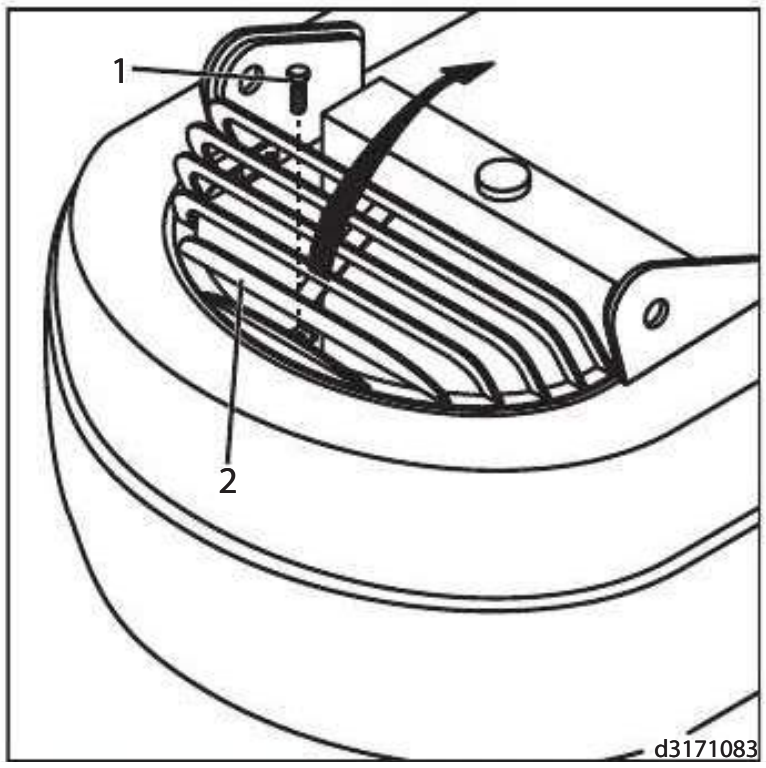
Clean the radiator only when the engine is stopped and cool.

Do not touch the hot radiator.

NOTE

Do not open the engine cover.

- Remove bolt (1).
- Lift up grille (2) and swing up over centre.
- Secure the grille if required.
- Clean radiator and cooler fins with compressed air.
- A cold cleaner or steam jet can be used if the accumulation of dirt is excessive.
- If a cold cleaner is used, allow sufficient time for the cleaner to soak in before spraying clean with a water jet.



NOTE

On trucks with a particle filter system clean the exhaust duct thoroughly.*

- Run the engine warm to evaporate any residual water and to prevent the formation of corrosion.

- Check all fittings, hoses and pipes at the radiator and oil cooler for leaks.
- Change porous hoses, tighten the hose clamps if required.
- Inspect for leaks in the cooling system with the engine running and at operating temperature.

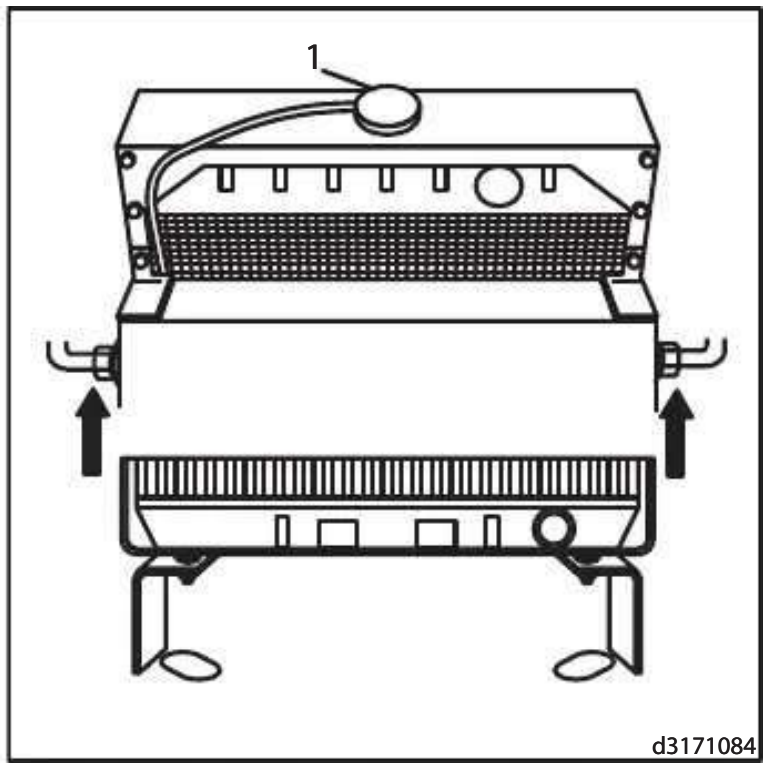
⚠ CAUTION

Danger of injury

When using compressed air, observe the safety precautions.

- Lower grille (2).
- Refit bolt (1).

* option

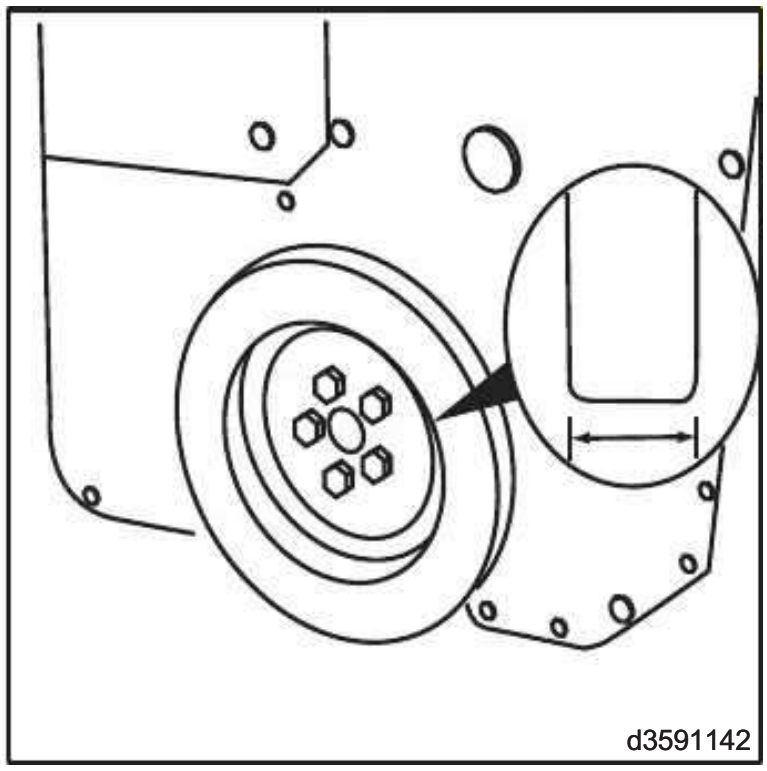


Check the vibration damper

NOTE

Silicone fluid inside the vibration damper will become solid after extensive service, which makes the vibration damper inoperative. This could cause major engine or driveline problems.

- Check the vibration damper for evidence of loss of fluid, dents, and wobble.
- Inspect the vibration damper thickness for any deformation or raising of the damper front cover plate.
- If any deformations or variations are detected, please contact your authorised dealer.



5 Maintenance

Engine

Replace the toothed belt and idler pulley

NOTE

Technical skill and knowledge are required for this replacement. Please contact your authorised dealer.

Check Valve Clearances

CAUTION

Lower the load lift device, stop the engine and put the parking brake on when working.

Danger of injury.

CAUTION

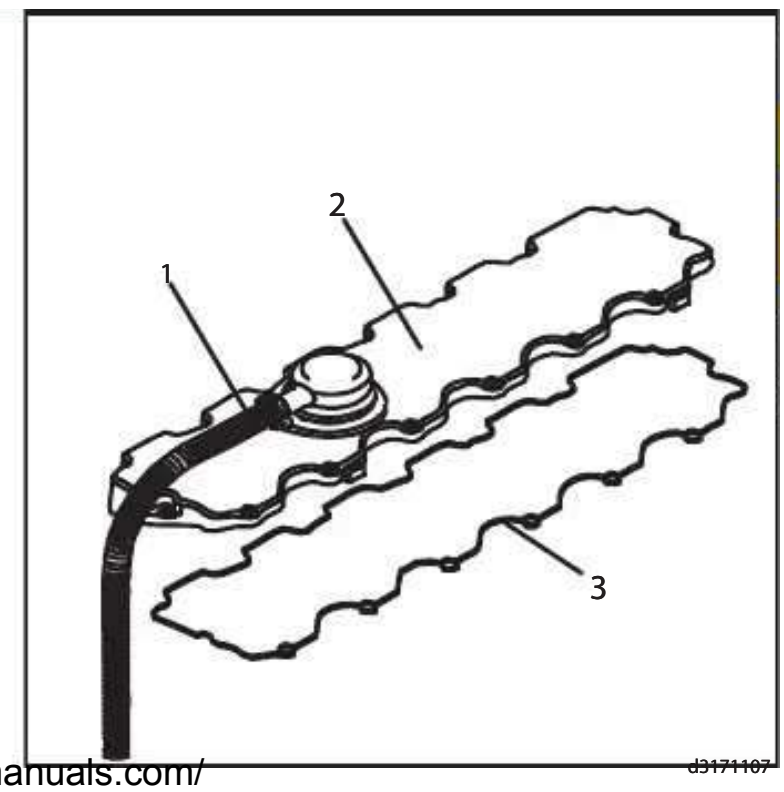
Danger of scalds and burns.

Engine and radiator may be at operating temperature.

NOTE

Technical skill and knowledge are required for this adjustment. Please contact your authorised dealer.

- Open the engine cover.
- Disconnect the breather pipe (1).
- Remove and retain rocker cover, seal rings, capscrews and gasket.
- Turn the crankshaft in the normal direction of rotation until the inlet valve of cylinder 6 is just open and the exhaust valve has not yet fully closed.



NOTE

Number 1 cylinder is at the front end of the engine.

Clearances with the engine warm or cold:

Intake Clearance: 0.35 mm (0.013 inch).

Exhaust Clearance: 0.35 mm (0.013 inch)

➢ Turn the crankshaft in the normal direction of rotation until the inlet valve of no. 6

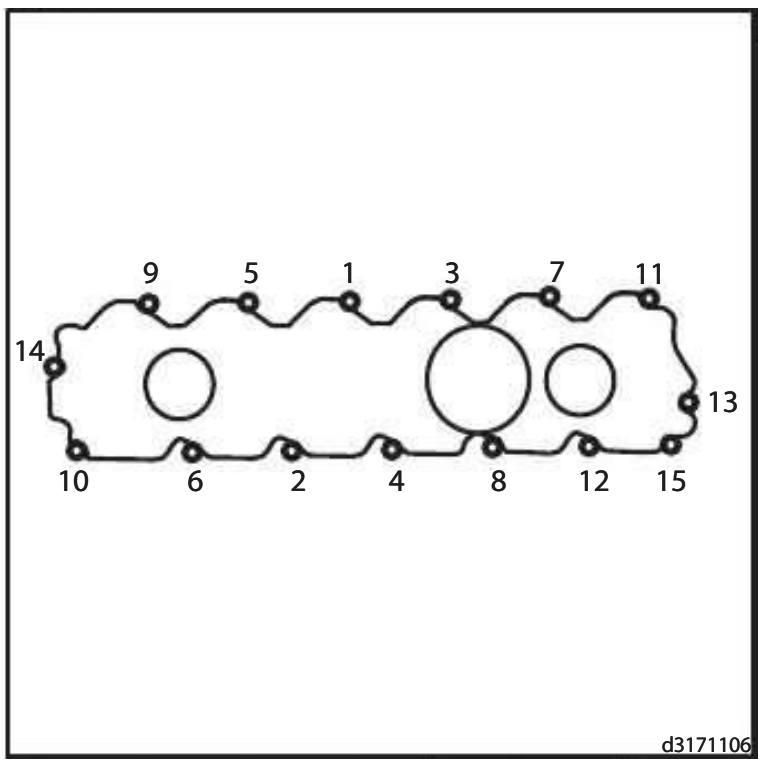
cylinder has just opened and the exhaust valve has not closed completely.

➢ Check the valve clearances of no. 1 cylinder, adjust if necessary.

➢ Repeat with the remaining cylinders.

➢ Refit rocker cover (2) a new gasket (3) in place.

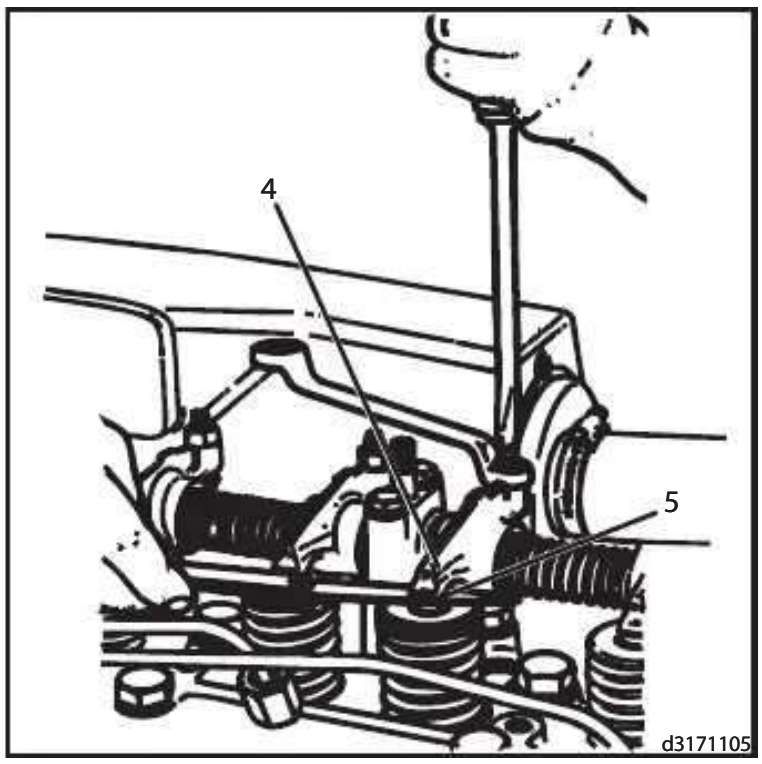
➢ Install seal rings, washers and capscrews according to this illustration, torque: 6 Nm.



➢ Close the engine cover.

NOTE

Valve clearance is the gap between rocker arm (4) and valves (5). Smooth engine running and full power rely upon correct adjustment.



Check the injection nozzles

Servicing of the injection nozzles before the normal interval is indicated if, for example, the engine is:

- Misfiring
- Knocking in one or more cylinders
- Overheating
- Losing power
- Emitting smoky black exhaust
- Using more fuel.

NOTE

Technical skill and knowledge are required for this adjustment. Please contact your authorised dealer.

Transmission

Check transmission mountings

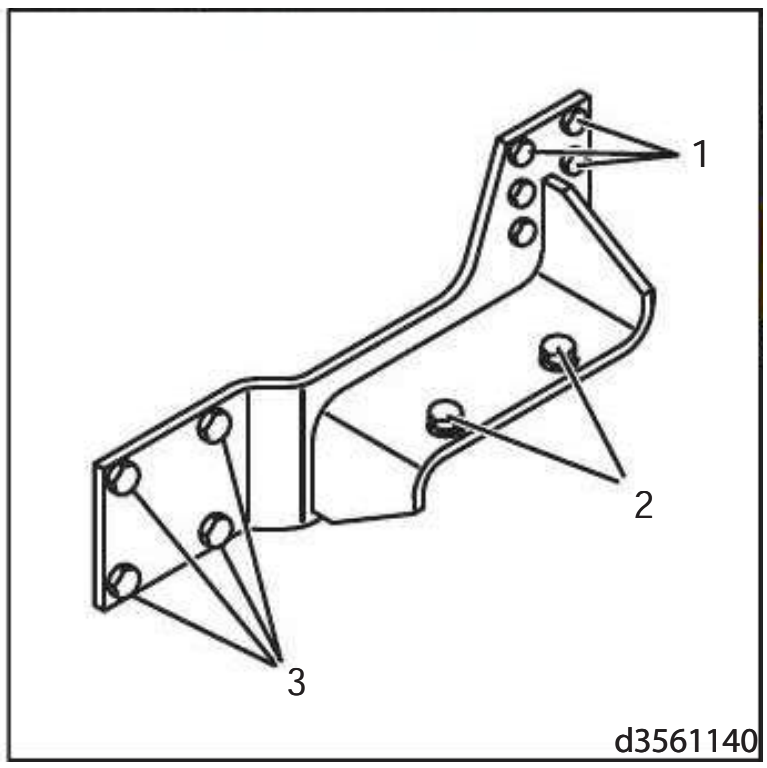
CAUTION

Work on the truck on level ground. Lower the mast and handler, stop the engine and put the parking brake on when working..

CAUTION

Engine and transmission may be at operating temperature. Danger of burns and scalding.

Check the condition of the rubber mounts. Renew the rubber mounts, if damaged.



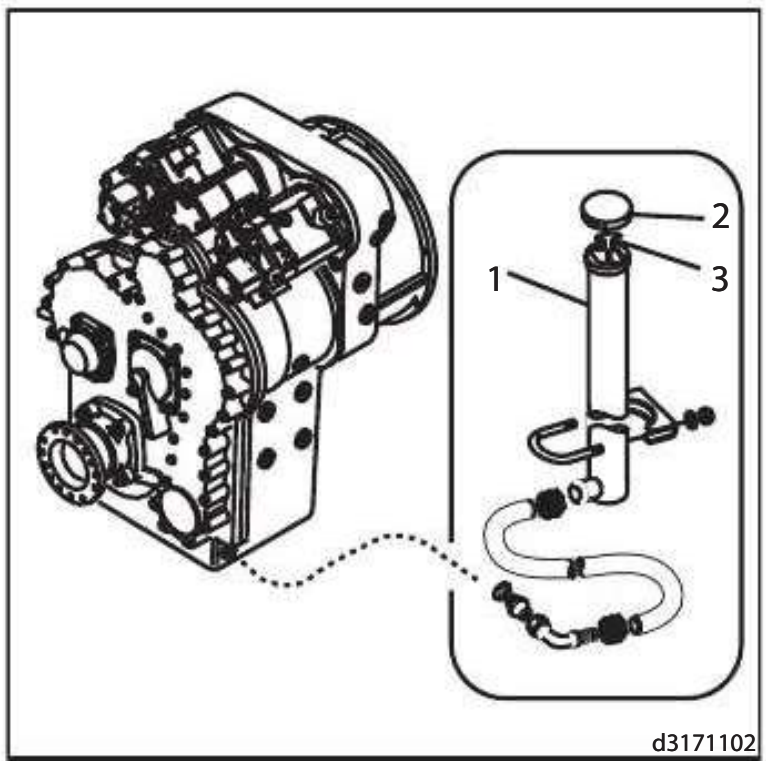
- ➢ Check mounting bolts (1).
- ➢ Torque ..... 175 Nm (129 lbf- ft.)
- ➢ Check mounting bolts (2).
- ➢ Torque ..... 195 Nm (145 lbf- ft.)
- ➢ Check mounting bolts (3).
- ➢ Torque ..... 100 Nm (75 lbf- ft.)
- ➢ Check mounting bolts (4).
- ➢ Torque ..... 250 Nm (185 lbf- ft.)

Transmission oil level check

⚠ CAUTION

Follow the instructions for handling fluids and lubricants. Perform the check with the engine running.

Wear protective clothing.



- Start the engine and ensure the oil is at operating temperature.
- Open the engine cover.
- Locate remote filler tube (1) situated to the rear left of the transmission.
- Unscrew transmission filler cap (2) and remove dipstick (3) and wipe with a clean cloth.
- Replace the clean dipstick and remove it again.
- The oil level should be between the Min and Max markings.
- If necessary, add oil through the dipstick tube (1) up to the Max mark on the dipstick.
- Replace dipstick (3) and filler cap (2).
- Switch off engine.
- Close the engine cover.

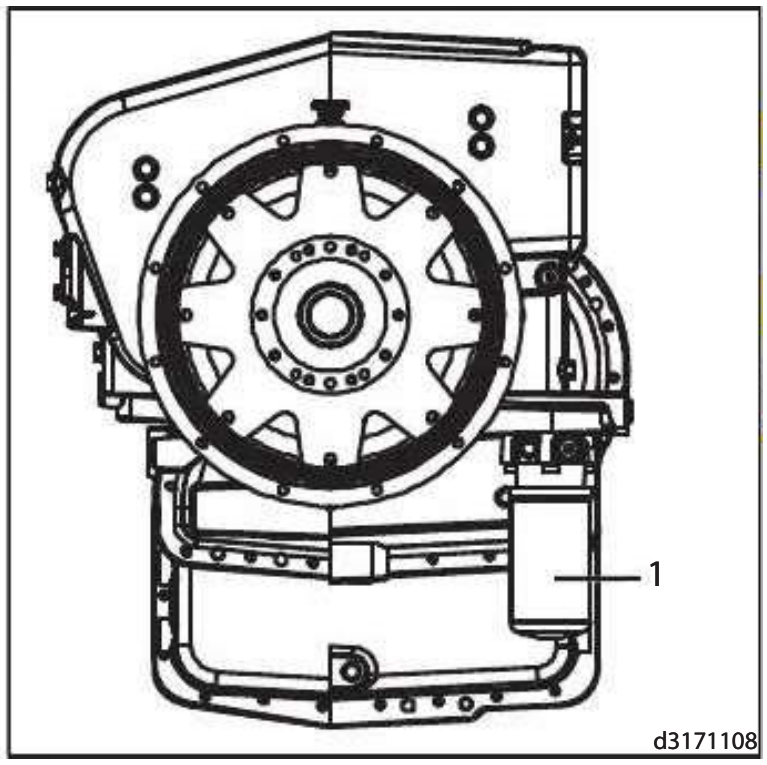
NOTE

Maximum capacity: - 30 L

Transmission filter - change

⚠ CAUTION

Follow the instructions for handling fluids and lubricants. Oil may be hot.
Wear protective clothing.



- Open the engine cover.
- Place a tray under filter (1).
- Loosen filter (1) using a filter wrench and remove by hand.
- Add oil to new filter (1).
- Lubricate filter flange with oil.
- Install new filter (1) and tighten it by hand only.
- Check the oil level and top up with transmission oil to the maximum mark, if necessary.
- Close the engine cover.
- Check for leaks after a test run.

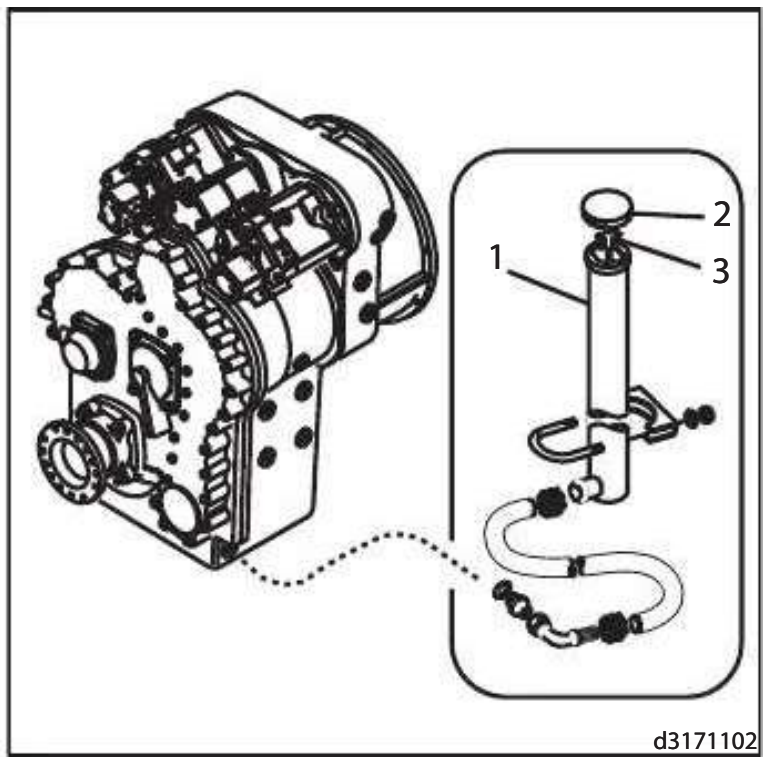
Transmission oil - change

⚠ CAUTION

Follow the instructions for handling fluids and lubricants. Oil may be hot.
Wear protective clothing.

NOTE

The transmission must be at operating temperature before changing the oil.

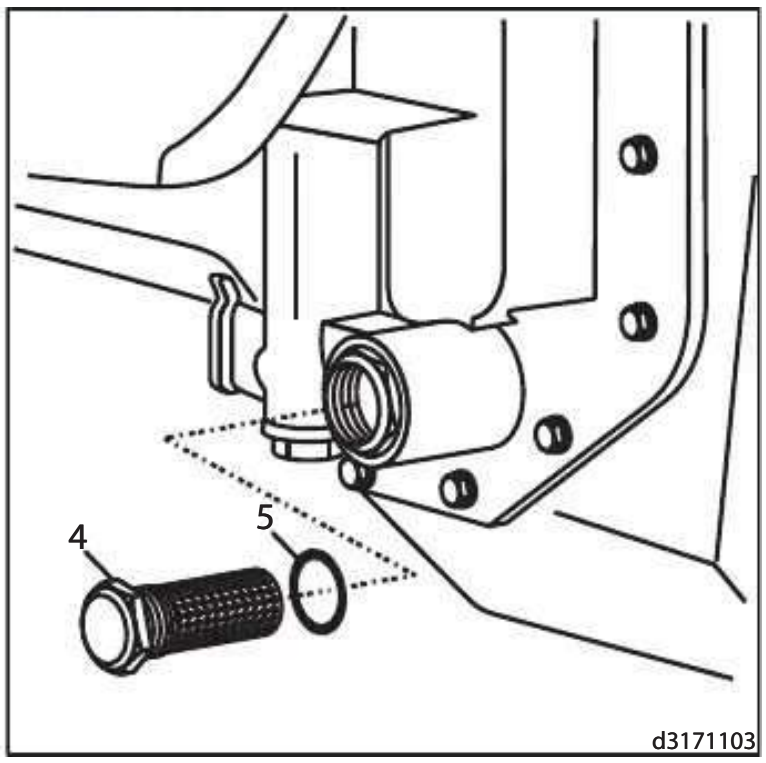


- Open the engine cover.
- Unscrew cap (2) on filler tube (2) and remove transmission oil dipstick (3).
- Place a suitable container under the drain plug.
- Remove drain plug, allow the oil to drain.

5 Maintenance

Transmission

- Place a tray under filter screen (1).
- Loosen sump screen (1) using a filter wrench and remove by hand.
- Check seal (2) replace if damaged.
- Clean sump screen using paraffin derivatives such as washing petrol. (Observe the manufacturer's safety notes.)
- Dry sump screen (2) with dry compressed air (max. 5 bar).
- Refit sump screen (1) and tighten it by hand only.
- Add transmission oil to the minimum mark.
- Run the engine at 500 to 600 RPM to prime the torque converter and lines.



- Check the oil level with the engine running at 500 to 600 RPM, add oil to bring the level to the Min mark.
- With the oil at working temperature (82 to 93° C), re-check the oil, bring up to the Max mark.
- Refit dipstick (2) and cap (3) and screw on finger tight.

Capacity: approx. 30 L

- Close the engine cover.
- Check for leaks after a test run.

Chassis bodywork and fittings

Clean the truck

NOTE

How often the truck needs cleaning depends on its use. If used with very aggressive media like salt water, fertilizer, chemicals, cement, etc., the truck should be cleaned carefully and more often.

⚠ WARNING

Hot steam or intensive degreasing solutions should be used with utmost care. The grease in sealed for life bearings may dissolve and leak out. Since re-greasing is notpossible, this will result in damage to the bearing.

⚠ CAUTION

Protect all electrical components and the air filter intake from the ingress of steam, water etc., when cleaning.

Protective clothing and eye protection must be worn.

Clean the cabin floor and ensure that no debris is allowed to obstruct the operation of the pedals.

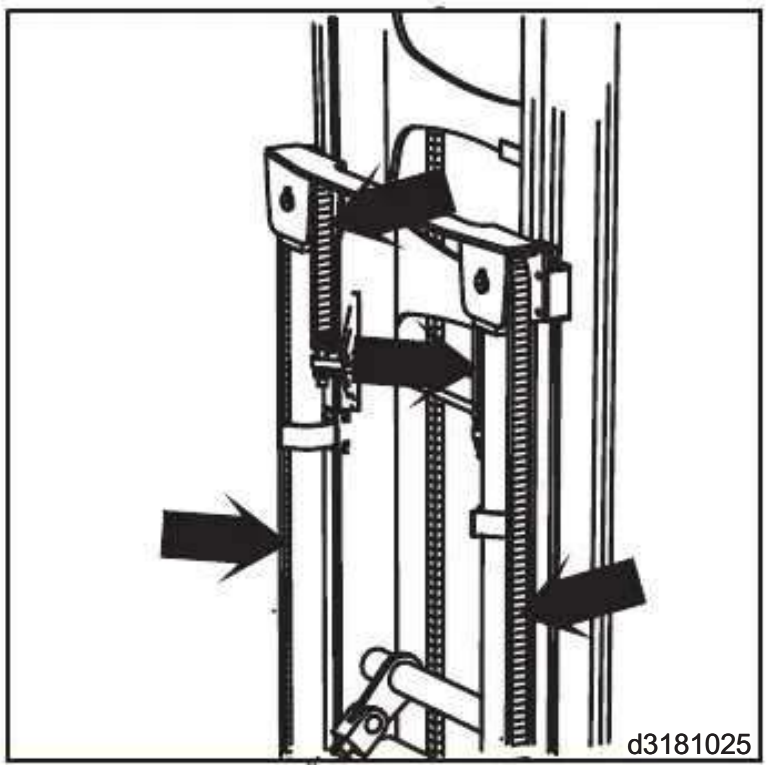
Clean especially the oil filler areas and the lubrication points prior to servicing.

When cleaning with compressed air, remove sticking dirt with a cold cleaner.

When cleaning the truck with de-greasing solutions, allow sufficient time for the cleaner to soak in, then flush off with a strong water jet.

After cleaning the engine, allow it to run warm to dry off and to ensure there are no malfunctions due to water ingress.

Clean and spray the lifting chains ▷



NOTE

The lifting chains must be cleaned if the dust covering the chain prevents penetration of the lubricant.

- Place a container under the mast.
- Clean the chain using paraffin derivatives such as washing petrol, wear protective clothing and observe the manufacturer's safety notes.
- When using a steam jet, use without using additives.
- After cleaning, blow dry the chain at once to remove any water in the chain links and on the surface. During this procedure the chain should be moved several times.
- Spray Linde chain spray immediately, move the chain while spraying by raising and lowering the fork carriage.

⚠ CAUTION

Lifting chains are safety components. The use of cold cleaners, chemical cleaning agents and caustic or acidic and chlorinated fluids can be a direct cause of damage to the chain.

NOTE

Trucks in service in the food industry must be lubricated with an oil approved for the food industry instead of chain spray.

Check seat belt for condition and correct operation*

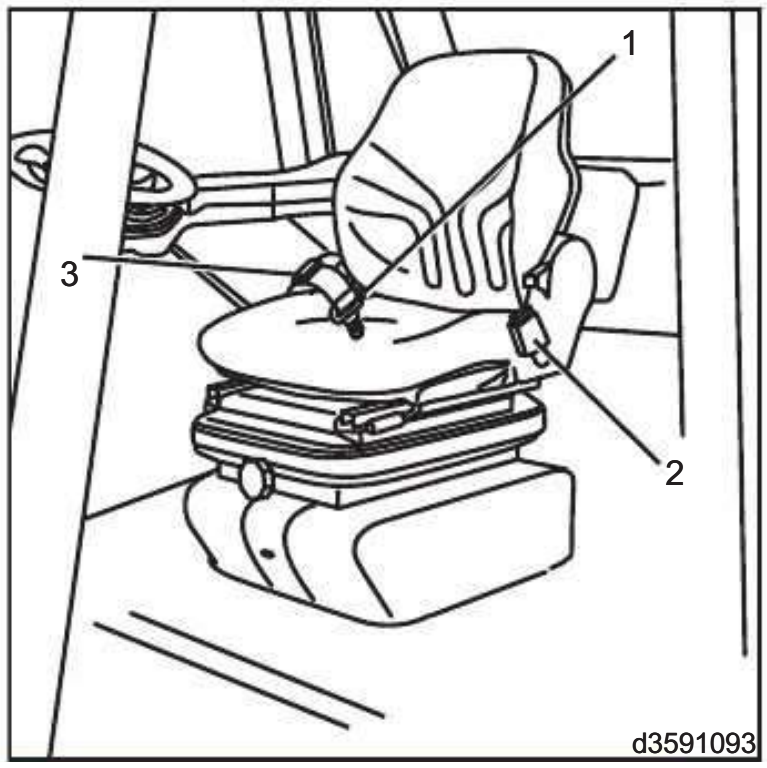
NOTE

For safety reasons the condition and proper operation of the retention system should be inspected regularly (monthly).

Under extreme operating conditions this check is required daily before taking the truck into operation.

- Pull belt (1) out fully and inspect for fraying.
- Check lock (2) for correct operation and the retractor for proper return of the belt.
- Check covers for damage.
- Check the automatic lock.
- Park the truck on level ground.
- Pull out the belt with a jerk. The automatic lock should prevent the belt from unrolling from retractor (3).
- Slide the seat fully forward.
- Tilt the backrest fully forward.

* option



CAUTION

Do not operate the truck with a faulty seat belt. Have a defective seat belt replaced immediately by your authorised dealer.

To prevent accidents, check that all adjustments are properly engaged before operating the truck.

Do not operate the seat adjusting devices while operating the truck.

Seat belts must be applied before operation of the truck.

After an accident, the seat belt must be renewed. In the case of seat belts attached to the operator seat, the seat and mounting of the seat must also be inspected by qualified personnel.

Nuts and bolts should be checked regularly for tightness.

An unstable seat can indicate loose bolts or other faults.

If malfunctions in the operation of the seat are detected (eg seat cushioning), contact your authorised dealer immediately to eliminate the cause.

If the seat belt is not checked, you put your health in danger and there is a higher risk of accidents.

Mirrors

⚠ CAUTION

Rear view mirrors should be cleaned and adjusted to suit the operator before commencement of operation, and it should be noted that they are only provided for checking the vicinity of the truck before moving off, and to monitor the rear traffic area. Reversing is only allowed with a direct view in the reverse direction of travel.

Tyres - check condition and pressure

⚠ CAUTION

Risk of death due to explosive force.

Refer to Wheel and Tyre removal and fitting procedures.

- ➢ Secure the truck against rolling (apply parking brake).
- ➢ Chock a wheel that will not be raised.
- ➢ Raise the truck with a jack at the locating points until the wheels are just clear of the ground.

➢ Secure the truck with blocks.

NOTE

Do not rely on just the jack.

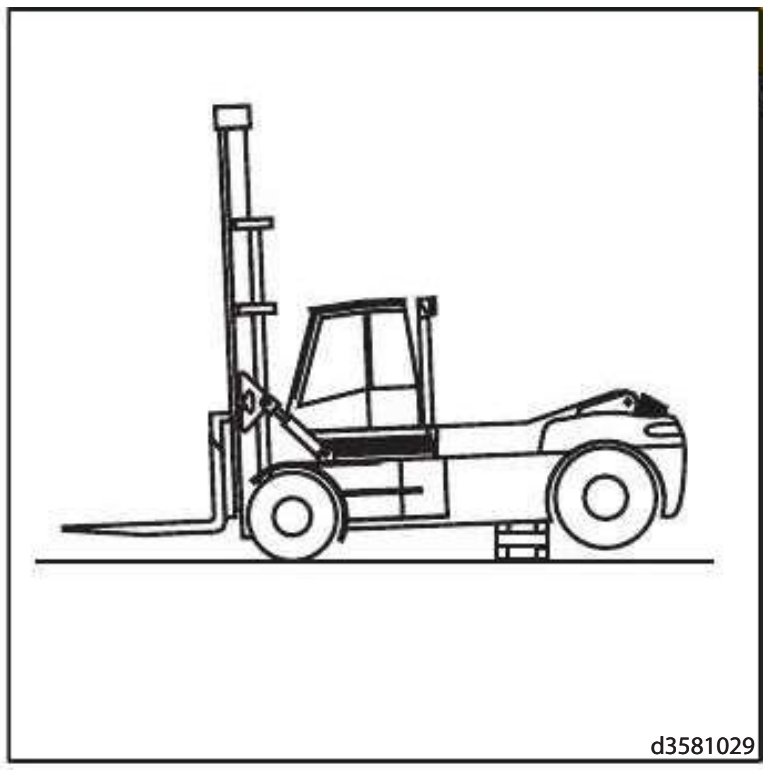
➢ Check the wheels for ease of movement and remove any debris hindering their free rotation.

➢ Replace worn or damaged tyres.

CAUTION

Low tyre inflation pressure reduces tyre service life and the stability of the truck.

Check tyre pressures regularly.



➢ Check tyres for damage and excessive wear.

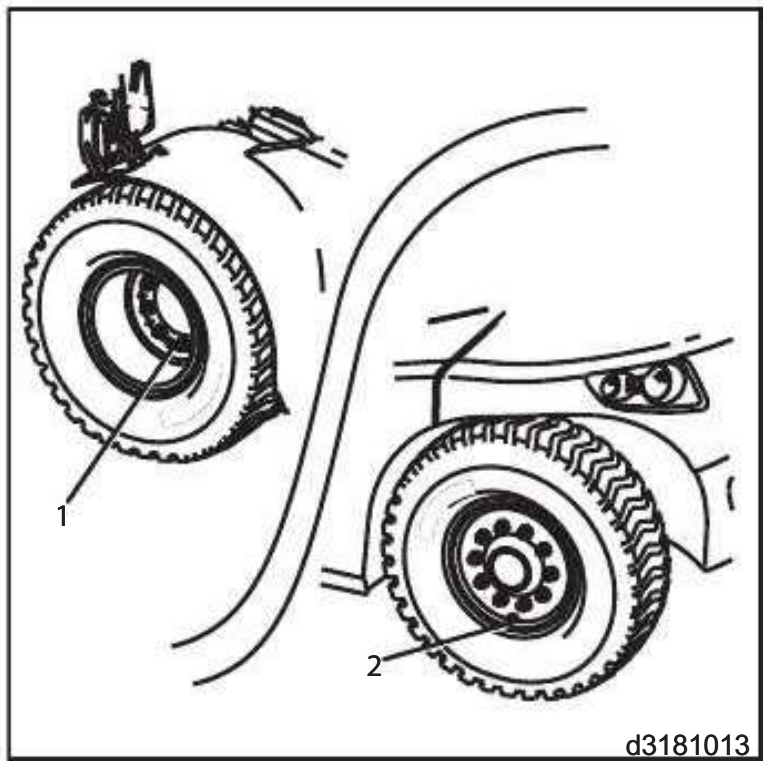
➢ Remove any foreign objects from the treads.

➢ Check the tyres for specified pressure.

➢ Inflate tyres according to stickers on the chassis.

➢ If necessary, add air at filler valves for drive axle (1) and steer axle (2).

Tyre specification:
Drive axle:
Front ..... 10.0 bar
Steer axle:
Rear ..... 10.0 bar



Tighten the wheel nuts

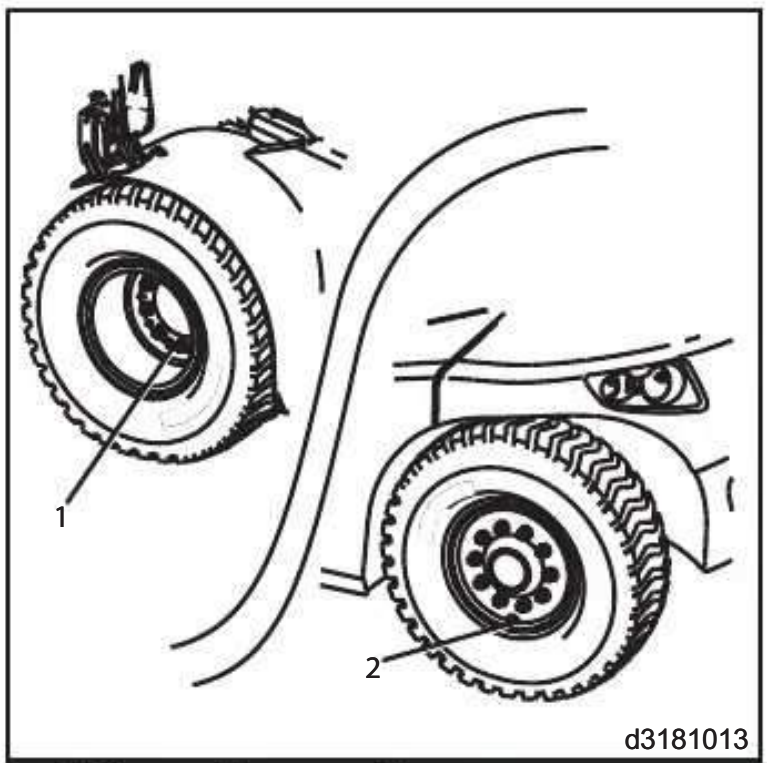
⚠ CAUTION

During initial operation and after each wheel change, the wheel fasteners must be tightened before starting work and thereafter every 10 service hours until they have settled, i.e. until no further tightening is possible.

Thereafter check wheel nuts (1) every 100 hours.

Torque all wheel nuts to 680 Nm.

A socket with an extension bar is needed to tighten the front wheel nuts.



Check the cab mountings

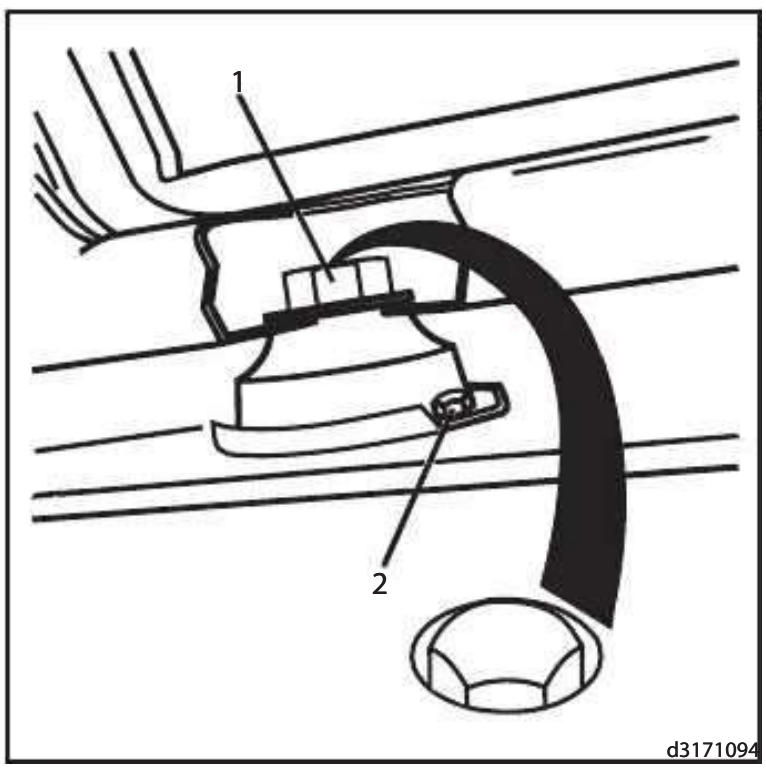
Front cab mountings

➢ Check that cab mounting bolts (1) are secure. Torque 115 Nm

Access to the front mounting bolts (1) is from under the cab floor mat

➢ Check that front cab mounting bracket bolts (2) are secure. Torque 56 Nm

Access to bolts (2) is from the outside.

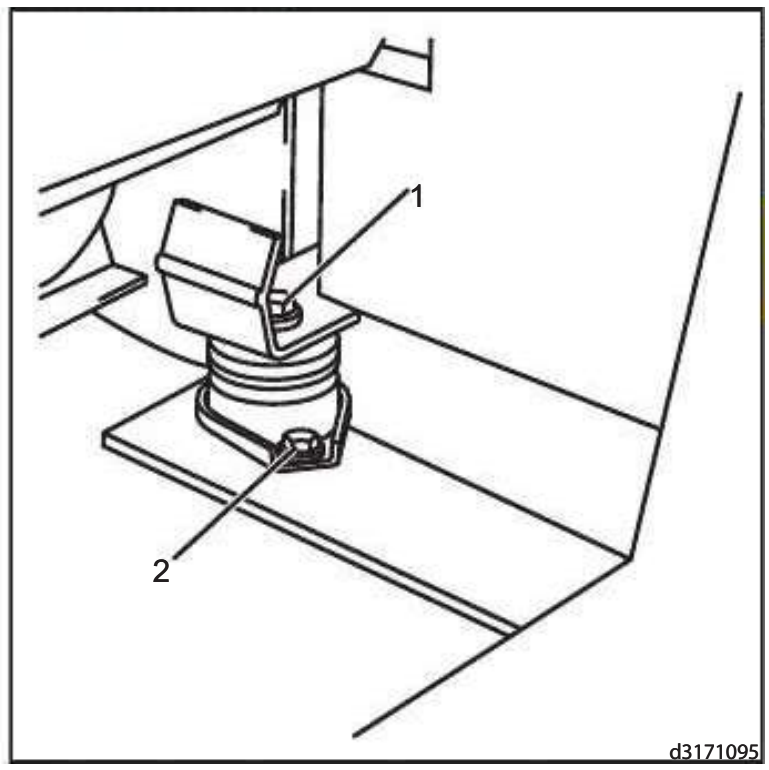


Rear cab mountings

➢ Check that cab mounting bolts (1) are secure. Torque 115 Nm

Access to the rear bracket mounting bolts (1 & 2) is from behind the cab rear compartment door.

➢ Tighten front cab mounting bracket bolts (2). Torque 56 Nm



Chassis frame

Check and lubricate the drive shaft

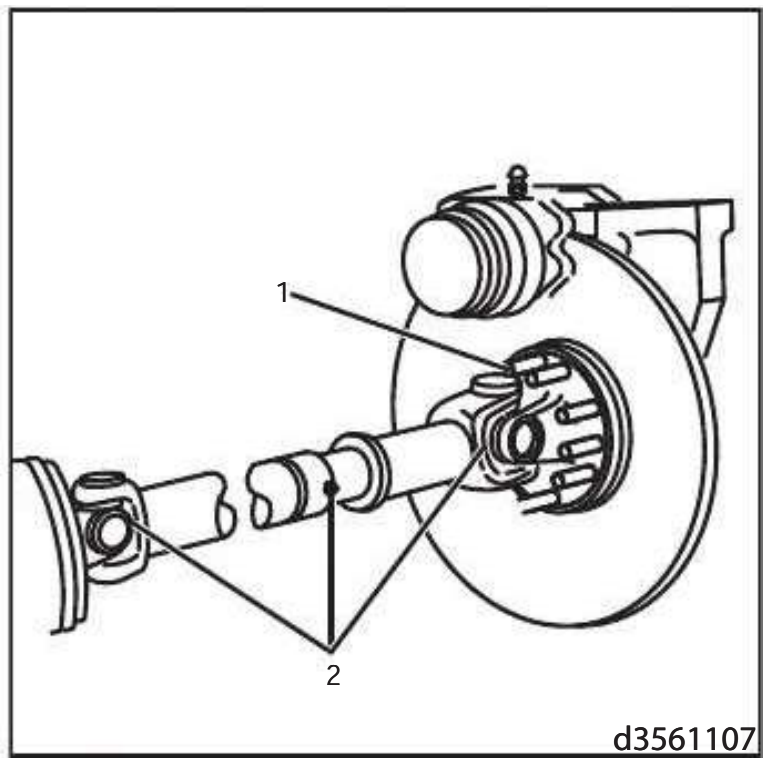
⚠ CAUTION

Work on the truck on level ground. Lower the mast and handler, stop the engine and put the parking brake on when working.

⚠ CAUTION

Danger of scalds and burns.

Engine and transmission may be at operating temperature.



➢ Open the engine compartment front cover.

➢ Examine drive shaft coupling bolts (1) for damage or signs of fretting.

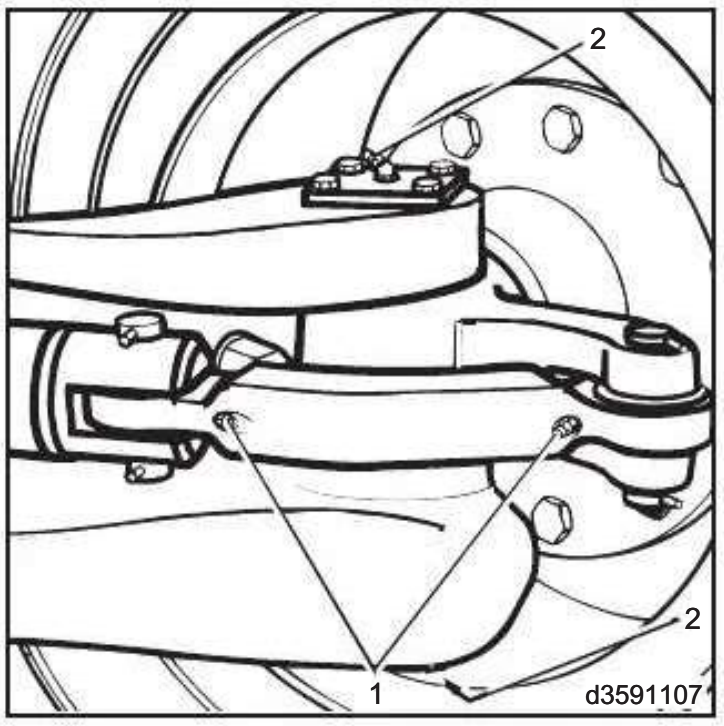
➢ Check bolt torque loading.

Torque.....80 Nm (60 lb. ft)

➢ Lubricate drive shaft grease points (2) (3 points)

➢ Press the grease gun until clean lubricating grease emerges at the bearings.

Clean and lubricate the steer axle

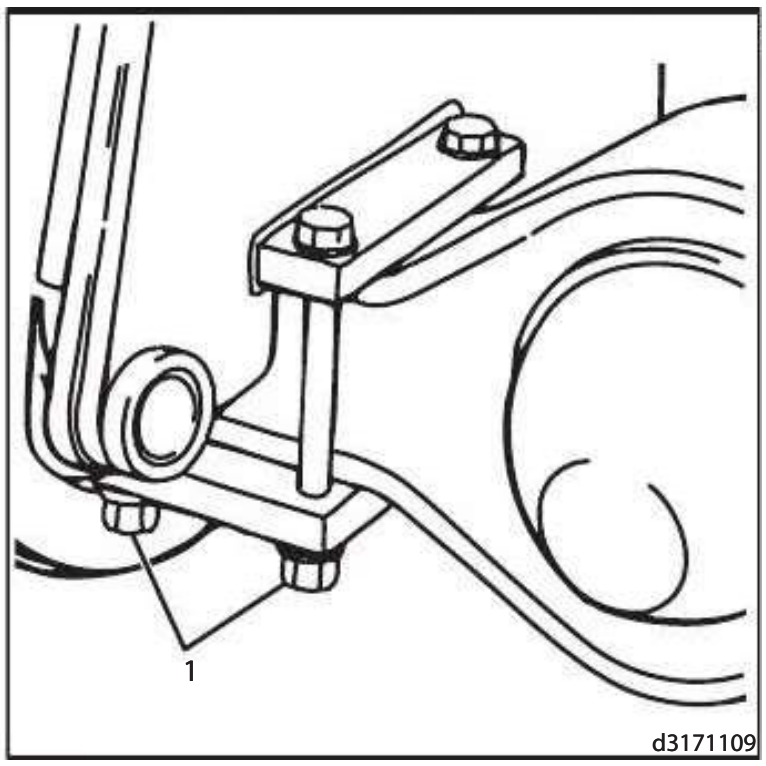


NOTE

Lubricate with grease according to the lubricant recommendations.

- Stop the engine.
- Thoroughly clean the steering axle with water or cold cleaner.
- Jack up the rear of the truck.
- Turn the steering wheel half a turn. This will relieve the pressure on the bearings and allow grease to flow more easily.
- Grease the track rod at grease nipples (1) (2 points on each side of axle).
- Grease the swivel pins at grease nipples (2) (2 points on each side of axle).
- Apply grease until clean grease emerges at the roller bearings.
- Lower the rear of the truck to the ground.

Drive axle mountings - check



- Tighten drive axle mounting nuts (1).

Torque: 700 Nm (8.8 grade), 900 Nm (10.9 grade).

Drive axle oil level check

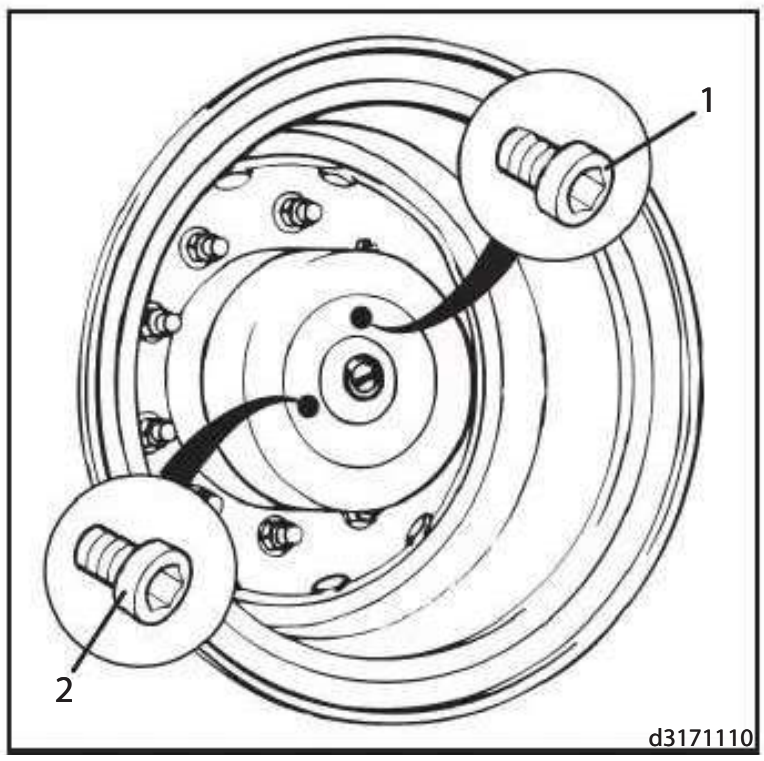
Wheel drives

▷

⚠ CAUTION

Follow the precautions for handling fluids and lubricants.

Wear protective clothing.



- Park the truck on level ground and secure against rolling.
- Lower the load lift device.
- Position the truck so the drive axle hub level plug (2) is horizontal below filler plug (1).
- Clean the area surrounding the level plug.
- Carefully unscrew level plug (2) at the hub.
- The oil must reach the lower edge of the bore.
- If necessary, add gear oil through filler plug (1) bore up to the lower edge of the level plug bore.
- Tighten level plug (2) and filler plug (1).
- Repeat for the other hub.

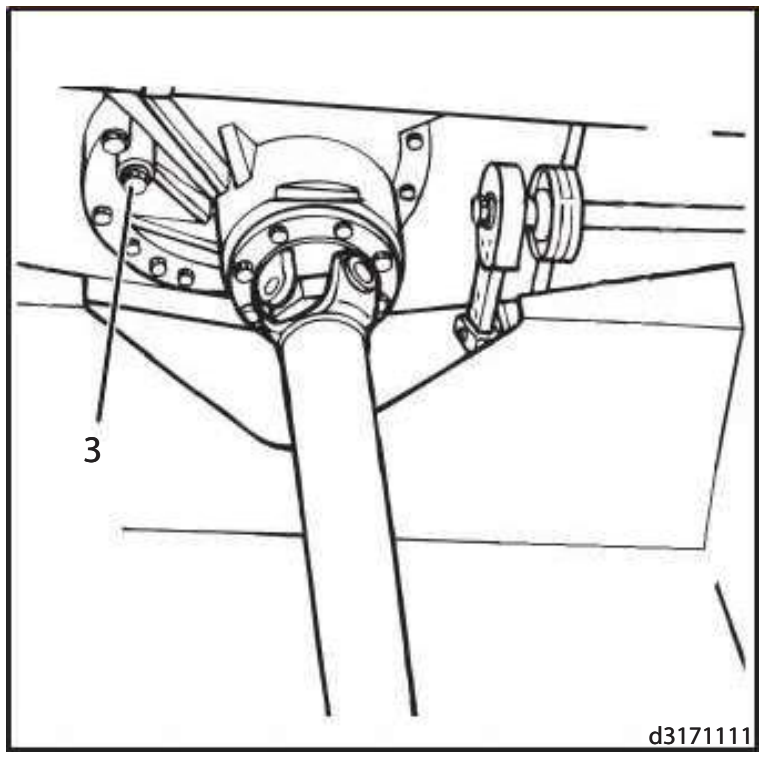
Differential

▷

⚠ CAUTION

Follow the precautions for handling fluids and lubricants.

Wear protective clothing.



- Open the engine cover.
- Remove differential level plug (3).
- The oil must be level with the lower edge of the bore.
- Add gear oil as necessary up to the lower edge of the bore.
- Allow time for the oil to settle and check the level again.
- Refit and tighten level plug (3).

NOTE

Maximum differential oil capacity: 24 5 L

Controls

Check the parking brake for proper operation

- Drive the lift truck with the maximum load onto a 15 % slope.
- Apply the parking brake. The truck should not move.
- Release the parking brake.
- Stop the engine. The lift truck should not move.

NOTE

If the parking brake is not operating correctly, contact your authorised dealer.

Electrics

Check the batteries.

⚠ CAUTION

Battery electrolyte is very caustic. If electrolyte comes into contact with clothing, skin or eyes, flush the areas in question immediately with water. In case of eyecontactsee a doctor at once! Neutralize any spilled battery acid immediately!

Avoid any contact with battery electrolyte.

- Check the batteries for cracks in the cas-ings, and leaked electrolyte.
- Remove any corrosion on battery terminals and check the connections for tight seating.
- Tighten the terminals and coat with non-acidic grease.

Check electric cables, connectors and connections for condition and tightness

- Examine cable connections for looseness and corrosion.
- Inspect the earth lead for loose connection.

NOTE

Corroded connections and cracked cables

- Examine the electrical wiring for chaffing and loose connections.

lead to a drop in voltages, which may cause starting difficulties.

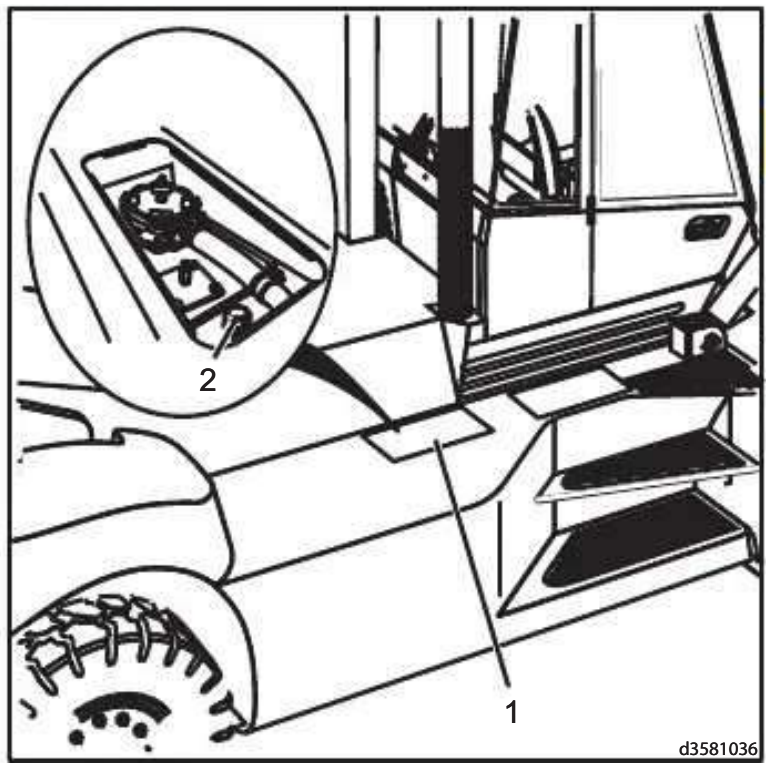
- Remove corrosion and replace cracked cables.

Hydraulics

Check the hydraulic tank breather filter

NOTE

The truck should be at normal operating temperature, and the oil level should be correct. Raise and lower the mast twice in quick succession before performing this check.



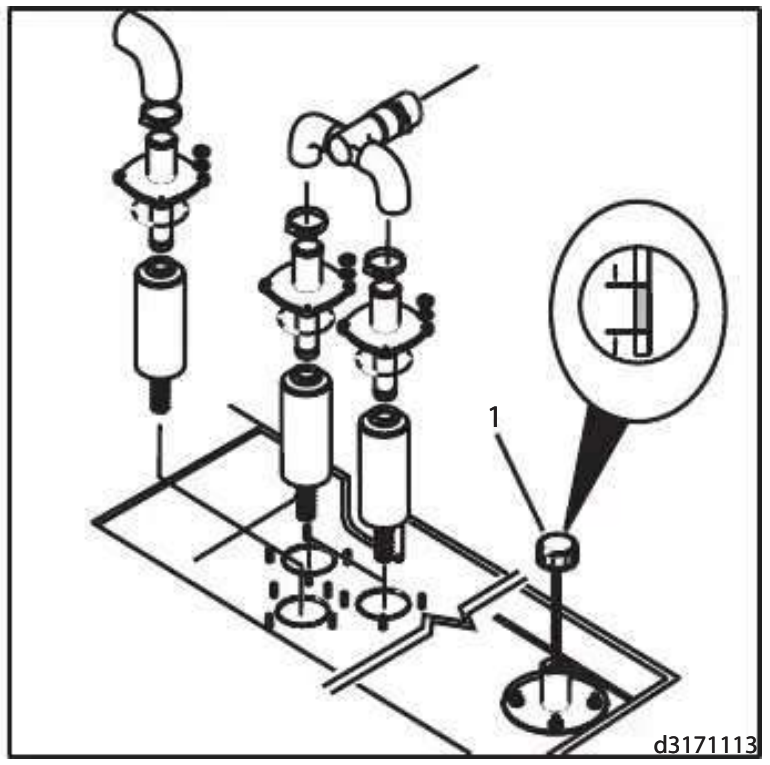
- Remove cover (1).
- Slowly unscrew breather filter (2) located on the top of the hydraulic oil tank, allowing the air to escape before removing fully.
- If air is not heard to escape, replace breather filter (2).

Hydraulic system oil level check

CAUTION

Follow the instructions for handling fluids and lubricants. Oil may be hot.

Wear protective clothing.



- Lower the fork carriage and then put the mast upright.
- Open the filler/filter cover.
- Remove the breather filter with dipstick (1) attached.
- Wipe dipstick with a clean cloth.
- Refit the breather filter with dipstick fully and remove it once more.
- Oil level should be between Min/Max markings on the dipstick.
- If necessary, add hydraulic oil up to the Max mark.
- Refit the breather filter and oil dipstick.
- Close the filler/filter cover.

NOTE

Maximum hydraulic capacity: 350 L.

5 Maintenance

Hydraulics

Renew hydraulic oil of working hydraulic system

⚠ CAUTION

Follow the precautions for handling fluids and lubricants.

⚠ CAUTION

Hydraulic oil and oil tank may be at operating temperature. Danger of scalds and burns.

⚠ CAUTION

Work on the truck on level ground. Lower the carriage, stop the engine and put the parking brake on when working.

NOTE

The operator can have the hydraulic oil analysed after about 2750 service hours to determine if the hydraulic oil must be changed at 3000 service hours.

NOTE

Technical skill and knowledge are required for this procedure. Please contact your authorised dealer.

Renew the main hydraulic system oil return line filters ▷

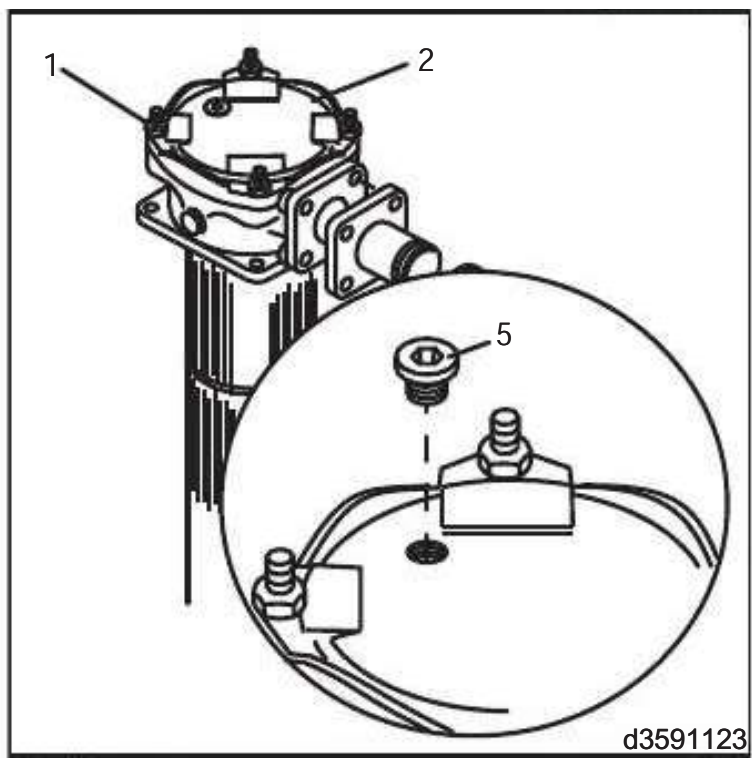
⚠ CAUTION

Danger of burns.

Follow the procedure for handling fluids and lubricants. The oil tank, filter and hydraulic oil may be at operating temperature.

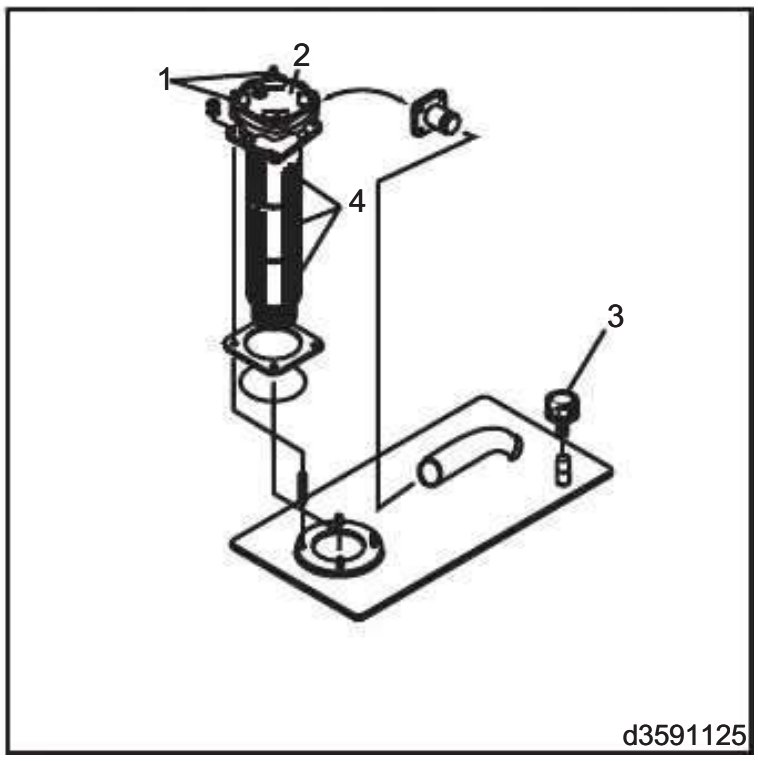
⚠ WARNING

The hydraulic tank accumulates stored pressure, take care when removing the filler cap.



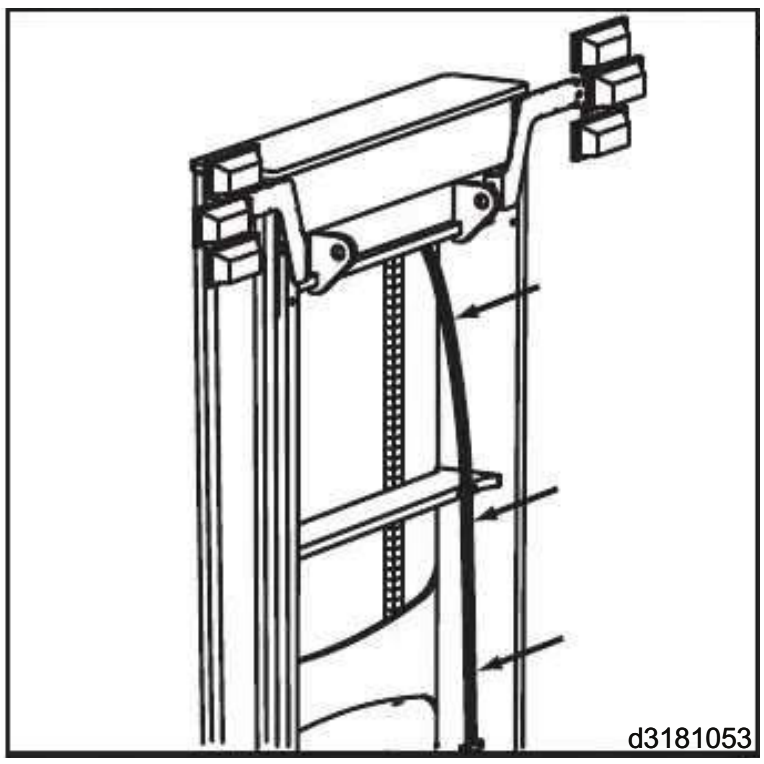
- ➢ Depressurise the tank by rotating filler cap (3) slowly until air is heard escaping from the tank, keep rotating the filler cap until no more air is heard.
- ➢ Remove nuts (1) from the top of housing (2), remove housing (2) to expose filter element retainer.
- ➢ Press retainer down, rotate through 90° and lift out to allow removal and replacement of filters (4).

- Lift out filters (4).
- Replace filters (4).
- Remove and retain cap (3), taking care to retain spring.
- Lift out filter.
- Replace filter and seals, re-fit spring and cap (3).
- Check oil level and replenish, if required.
- Remove plug (5) add oil, replace plug (5).
- Dispose of used filters according to local authority guidelines.



Check the tension of double hoses

- The tension of the double hoses should be 5-10 mm per meter, referred to initial length.
- Adjust the tension of the hoses to the specified dimension by sliding them in the clamps.



Load lift system

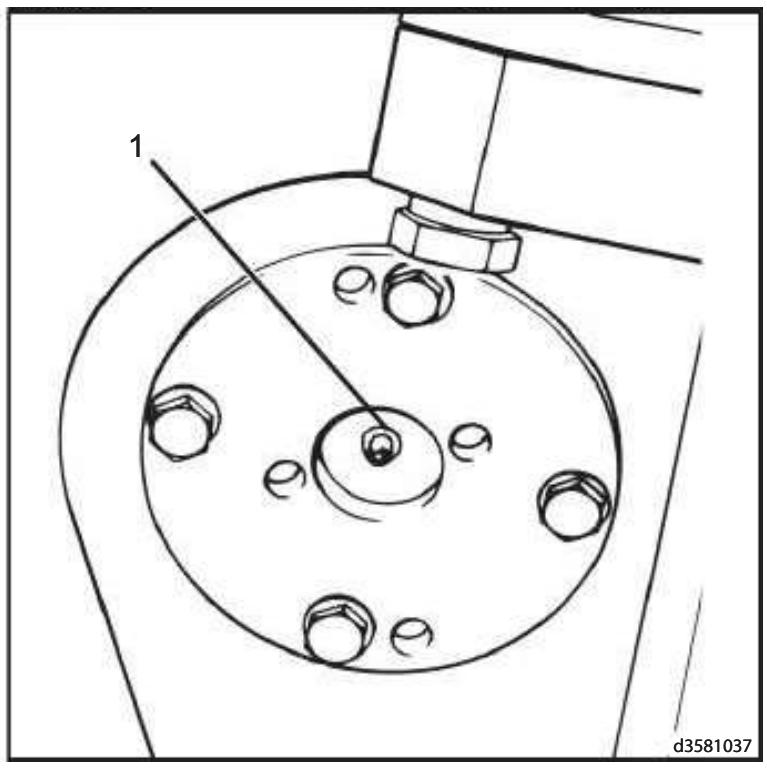
Lubricate the mast and tilt cylinder pivots

Lubricate the mast pivot pins

NOTE

Lubricate with grease according to the lubricant recommendations.

- Lubricate mast pivot pin (1) through the front of the mast.
- Lubricate with grease gun until new grease is visible at the bearing.



CAUTION

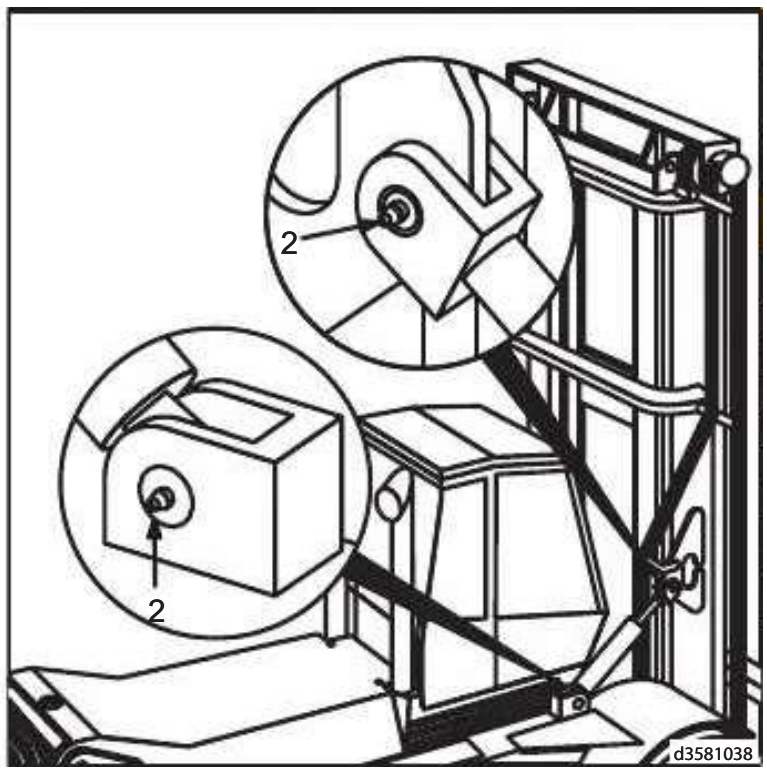
Refer to safety notes on securing the mast when working on the front of the machine.
Do not work under an elevated load.

Lubricate the tilt cylinder pivots

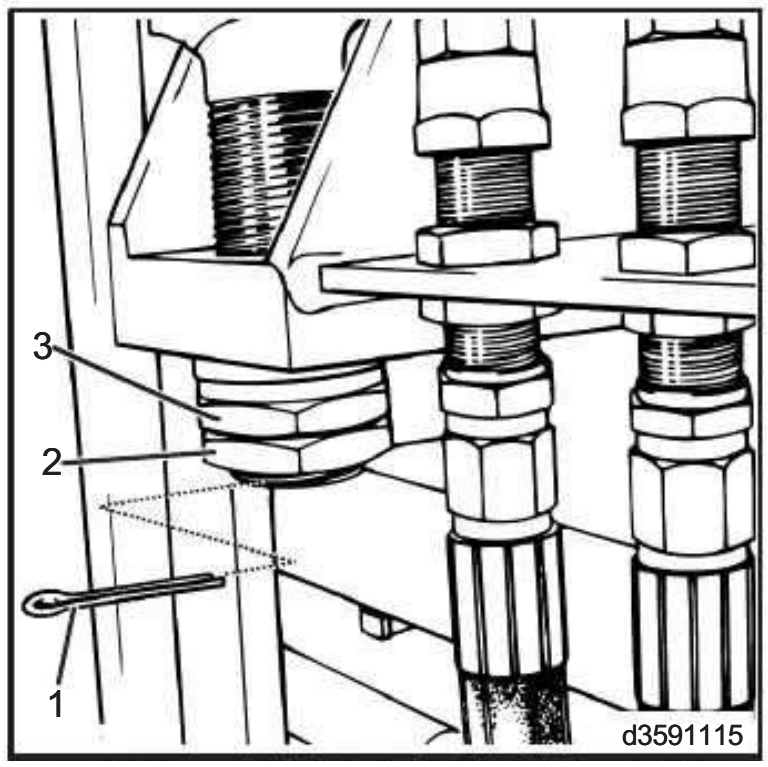
NOTE

Lubricate with grease according to the lubricant recommendations.

- Lubricate tilt cylinder pivots (2), two points.
- Access to the bottom two points is from the side of the tilt cylinder recess under the cab.
- Access to the top two points is on either side of the mast.
- Lubricate with grease gun until new grease is visible at the bearing.



Check and adjust mast chains, lubricate with chain spray



NOTE

After some time in service the lifting chains stretch and therefore must be checked and adjusted as necessary on the left and right sides of the mast.

- Clean the mast chains.
- Put the mast vertical.
- Remove split pin (1).
- Release locknuts (2).
- Using nuts (3), adjust the chains to allow a clearance of 12 mm (1/2 inch) between the fork heels and the floor.
- Tighten locknuts (2).
- Fit new split pin (1).

NOTE

Ensure both chains are adjusted equally.

- Spray channel surfaces, pulleys and chains with Linde chain spray.

NOTE

Trucks in service in the food industry must be lubricated with an oil approved for the food industry instead of chain spray.

Renewing the lift chains (at least every 6000h, 3 years and when 2 % stretch has been attained)

NOTE

Please contact your authorised dealer for renewal of the lift chains.

Troubleshooting

Troubleshooting guide (Diesel engine)

Trouble	Possible cause	Correction
Engine will not start	Fuel tank empty.	Refill the tank.
	Fuel filter clogged, in winter by paraffin deposit.	Renew the filter, use winter fuel.
	Water in fuel system prefilter.	Drain the prefilter.
	Fuel shut-off solenoid fails to open.	Check for electric current with test lamp. If there is no current, check fuse and switch.
	Fuel line leaking.	Check all pipe connections for leaks and tighten fittings.
	Discharge indicator light not illuminated although lamp is okay.	Tighten connecting clamps at battery, check cable connections.
	Preheating system defective.	Check the power supply.
	Fuel pump defective.	Check the cables and connections at the preheat/starting switch. If the fault can not be remedied, contact your authorised dealer.
	Injection nozzles defective.	These faults should always be checked and corrected by skilled staff. Please contact your authorised dealer.
	Injection pump defective.	
	Engine idling speed incorrect.	
Engine starting performance is poor	Battery power is too low. Battery terminal is poor loose or oxidized, causing the starter to turn only slowly.	Check battery, clean battery terminals, tighten clamps and cover with non-acidic grease. Check the air filter.
	Fuel supply insufficient. Restriction or air in fuel system due to paraffin deposits in winter.	Renew the fuel filter. Check the fuel line connections for leaks and tighten fittings. Renew the air filter. Use winter fuel in the cold season.
	Particularly in winter: Engine oil viscosity too high.	Use engine oil appropriate for the ambient temperature.

Engine running unevenly with poor performance	Fuel supply insufficient. Restriction or air in fuel system due to paraffin deposits in winter.	Renew the fuel filter. Check the fuel line connections for leaks and tighten fittings. Renew the air filter. Use winter fuel in the cold season.
	Injection pump overflow valve not functioning correctly.	Contact your authorised dealer. Adjust valve clearance.
	Valve clearance not as specified. Injection nozzles defective. Engine oil level too high.	Contact your authorised dealer. Drain oil to the top mark on the dipstick.
Excessive exhaust smoke	Poor compression due to burned-in or broken piston rings or incorrect valve clearance.	Adjust valve clearance. Contact your authorised dealer.
Idle running trouble	Fuel system not in order.	Clean and inspect fuel prefilter and fuel filter. Repair or replace leaky, fouled or bent fuel return lines and injection lines.
	Speed setting incorrect.	Should only be adjusted by skilled staff. Contact your authorised dealer.
Engine overheating, red warning light in composite instrument illuminated. Stop the engine immediately.	Coolant level low.	Check cooling system for leaks, seal if necessary. Add coolant.
	Drive belt either slack or broken.	Tighten or renew drive belt.
	Radiator fins restricted due to dirt or foreign objects.	Clean the radiator.
	Injection system setting incorrect.	Contact your authorised dealer.
Engine oil pressure too low. Stop the engine immediately.	Leaks in the lubricating system.	Contact your authorised dealer.
	Oil level too low.	Add lubricating oil.

Discharge indicator light illuminated during operation	Alternator RPM too low.	Check drive belt tension.
	Alternator not charging the battery because alternator or relay defective.	Contact your authorised dealer.

5 Maintenance

Troubleshooting

Troubleshooting guide (Hydraulic system)

Abnormal noise	Suction filter restricted.	Renew the filter.
	Suction hoses leaking, oil foaming.	Tighten lines. Replace suction hoses. Check oil level, top up if necessary.
	Hydraulic pump or motor failure, seals defective, causing air intake.	Have hydraulic unit inspected by your authorised dealer.
	Incorrect oil viscosity, low oil level in tank or in hydraulic pump.	Change oil, be sure to use the correct viscosity, top up oil.
No or too low pressure in system	Pump suction defective, noise.	Change oil, top up oil. Contact your authorised dealer.
	Pump failure, leakages, pressure valves do not close, valve seat damage.	Contact your authorised dealer.
	Pipe broken or leaky.	Replace or tighten line.
	Oil of low viscosity, causing high leakage losses.	Change oil, be sure to use oil of correct viscosity.
	Oil temperature warning lamp illuminated.	Check oil level, clean oil cooler.
Oil pressure fluctuating	Cause as under abnormal noise.	See abnormal noise.
	Pressure limiting valves or boost pressure valves sticking.	Contact your authorised dealer.
	Lift and tilt cylinders have tight spots.	Contact your authorised dealer.
	Mast does not extend completely or retracts slightly after being extended.	Top up hydraulic oil.
No oil flow or low oil flow	Filter restricted (if accompanied by noise).	Clean or replace filter.
	Pump failure, leakages, pressure limiting valves do not close, valve seat damaged.	Contact your authorised dealer.
	Pipe broken or leaking.	Tighten or replace line.
	Valves restricted.	Contact your authorised dealer.
	Hydraulic system overheating.	Check oil level, use specified oil, clean oil cooler, if needed.

Hydraulic oil temperature too high	Pump failure, valves leaking.	Contact your authorised dealer.
	Oil level too low or oil cooler defective.	Check oil level, if necessary top up oil. Clean cooler and check for leaks. If defective, contact your authorised dealer.

User manual feedback

User manual improvement record.

As part of Linde Heavy Truck Divisions commitment to continuous improvement please complete the form below to let us know if there are any discrepancies within this technical publication.

NOTE

Be aware that amendments will be assessed for validity, collated and updates will be made according to scheduled updates.

Page num-ber	Existing content	Proposed content amendment

NUMBERS AND SYMBOLS

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Linde Material Handling GmbH

3588011601 EN – 12/11

Linde Forklift Truck

Linde Material Handling

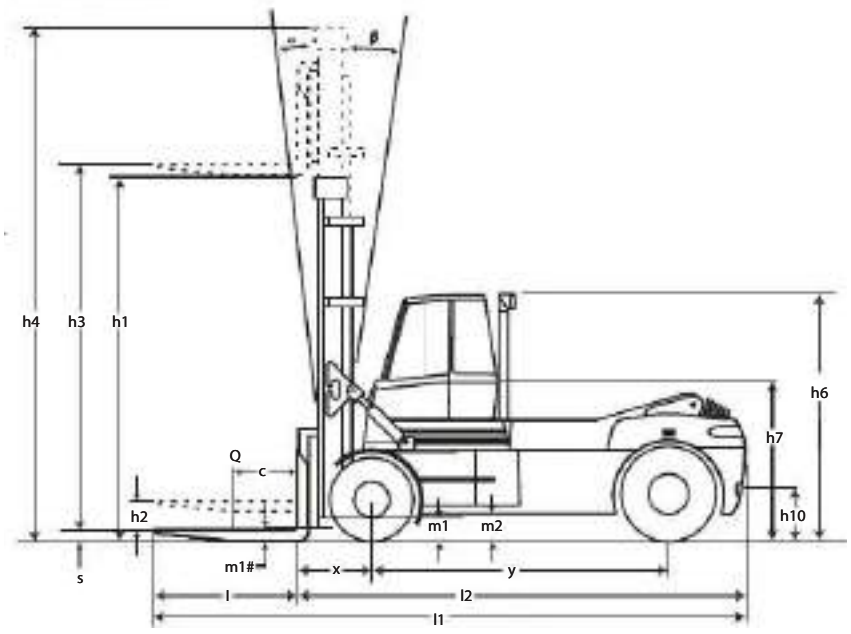
Original instructions

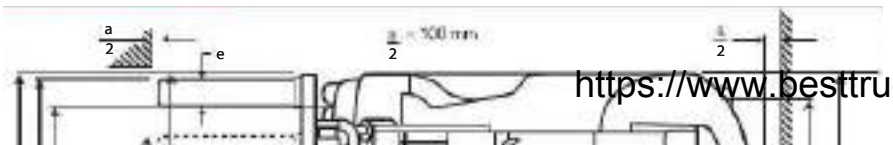
Annex

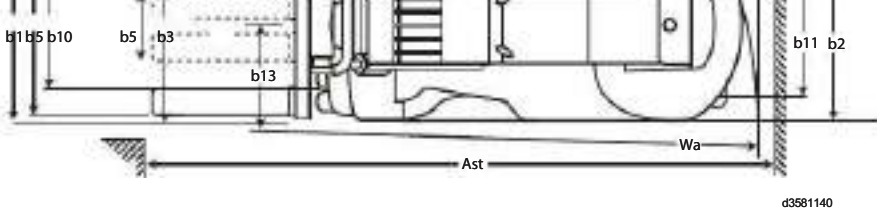
H120-1200, H140-1200,
H160, H160-1200

3588011601 EN – 12/11

Technical Data







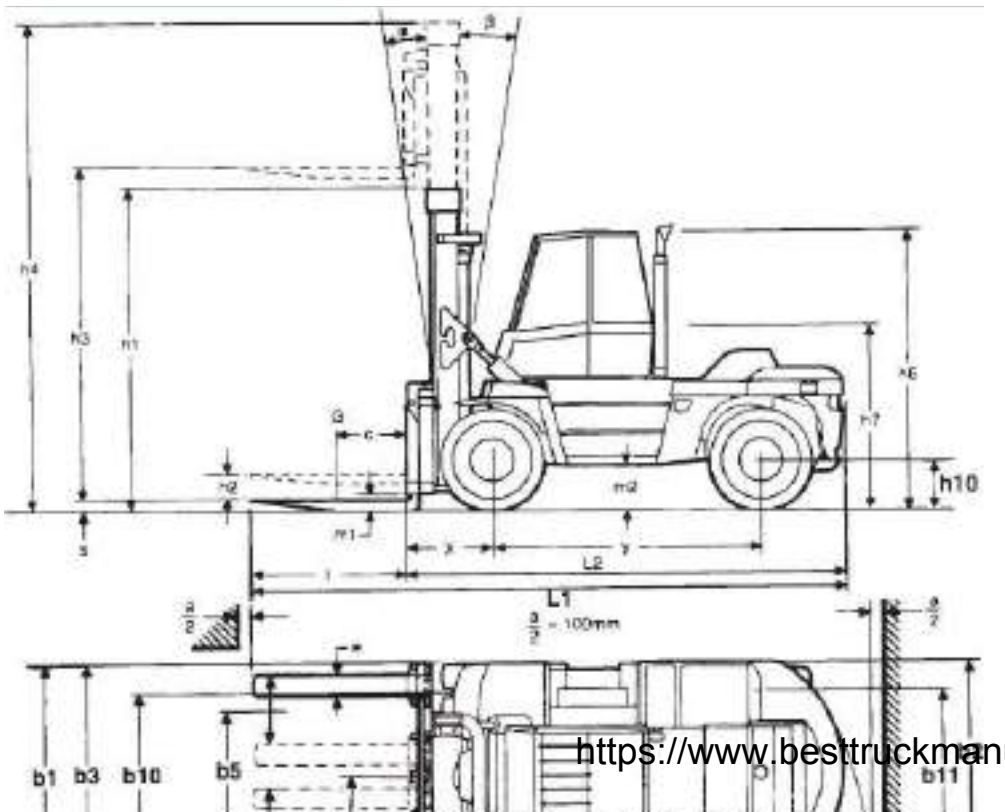
BR358 - H120, H140, H160			
Manufacturer		Linde	Linde
Model designation		H120/1200	H140/1200
Power unit: battery,diesel, LP gas, mains power		Diesel	Diesel
Operation: manual,pedestrian,stand-on,seated,order picker		Rider seated	Rider seated
Load capacity	Q (kg)	12000	12000
Load centre	c (mm)	1,200	1,200
Load centre distance	x (mm)	975	975
Wheelbase	y (mm)	3,670	3,670
Service weight	kg	21,997	22,597
Axle load with load, front/rear	kg	29,980 5,017	35,950 2,647
Axle load without load, front/rear	kg	9,869 12,128	10,482 12,115
Tyres, front/rear. SE = (superelastic), P = (pneumatic)		P/P	P/P
Tyre size, front		12.00 x 20/20 pr	12.00 x 20/20 pr
Tyre size, rear		12.00 x 20/20 pr	12.00 x 20/20 pr
Wheels, number, front/rear (x = driven)		4x / 2	4x / 2
Track width, front	b10 (mm)	1838	1838
Track width, rear	b11 (mm)	2067	2067
Mast/fork carriage/truck tilt, forward/backward	Grad	5/10	5/10
Height of mast lowered	h1 (mm)	3,875	3,875
Free lift	h3 (mm)	150	150
Lift	h3 (mm)	3,700	3,700
Height of mast extended	h4 (mm)	5,650	5,650
Height of overhead guard (cabin)	h6 (mm)	3,115	3,115
Height, operators seat/stand on platform	h7 (mm)	1,990	1,990
Towing coupling height	h10 (mm)	550	550
Overall length	l1 (mm)	8,045	8,045
Length to fork face	l2 (mm)	5,645	5,645

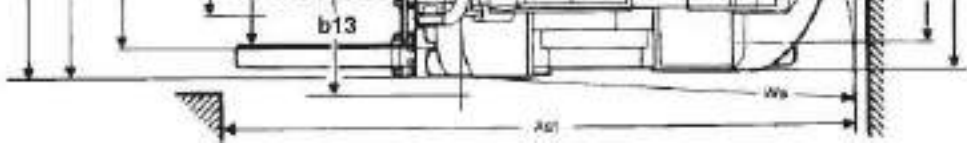
Overall width	b1/b2 (mm)	2620 2445	2620 2445
Fork dimensions	s/e/l (mm)	90x180x2400	100x250x2400
Fork carriage to ISO 2328, class A, B		Pin type / hydraulic assisted	Pin type / hydraulic assisted
Width of fork carriage	b3 (mm)	2500	2500
Ground clearance, mast	m1 (mm)	250	250
Ground clearance, centre of wheelbase	m2 (mm)	320	320
Aisle width with pallets 1000 x 1200 across forks	Ast (mm)	-	-
Aisle width with pallets 100 x 1200 along forks	Ast (mm)	8725	8725
Turning radius	Wa (mm)	5,510	5,510
Minimum pivoting point distance	b13 (mm)	1,475	1,475
Travel speed' with/without load	km/h	25/27	25/27
Lift speed' with/without load	m/s	0.40/0.40	0.40/0.40
Lowering speed' with/without load	m/s	0.51/0.53	0.51/0.53
Tractive force, with/without load	kN	94/-	94/-
Climbing ability, with/without load	%	23/-	23/-
Acceleration time, with/without load	s	8.5/7.5	8.5/7.5
Service brake		Wet disc	Wet disc
Battery voltage, rated capacity	V/aH	2x12/110	2x12/110
Engine manufacturer/type		Perkins 1106D	Perkins 1106D
Engine performance according to ISO 1585	kW	120	120
Rated speed	1/min	2,200	2,200

Number of cylinders/displacement	/ cm³	6/6600	6/6600
Fuel consumption - average	l/h	-	-
Type of drive control		Torque converter 3/3	Hydrostatic
Working pressure for attachments	bar	220	260
Oil flow for attachments	l min	95	95
Noise level, at operators ear, overhead guard/cab	dB(A)	76	76

Trailer coupling, design/type DIN	Ø (mm)	50	50

Technical Data





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BR358 - H120, H150			
Manufacturer		Linde	Linde

Model designation		H120	H150
Power unit: battery, diesel, LP gas, mains power		Diesel	Diesel
Operation: manual,pedestrian,stand-on,seated,order picker		Rider seated	Rider seated
Load capacity	Q (kg)	12000	15000
Load centre	c (mm)	600	600
Load centre distance	x (mm)	930	930
Wheelbase	y (mm)	2950	2950
Service weight	kg	20020	20020
Axle load with load, front/rear	kg	29,594 2,426	29,594 2,426
Axle load without load, front/rear	kg	9300 10720	9300 10720
Tyres, front/rear. SE = (superelastic), P = (pneumatic)		P/P	P/P
Tyre size, front		12.00 x 20/20 pr	12.00 x 20/20 pr
Tyre size, rear		12.00 x 20/20 pr	12.00 x 20/20 pr
Wheels, number, front/rear (x = driven)		4x / 2	4x / 2
Track width, front	b10 (mm)	1838	1838
Track width, rear	b11 (mm)	2067	2067
Mast/fork carriage/truck tilt, forward/backward	Grad	5/10	5/10
Height of mast lowered	h1 (mm)	3,695	3,695
Free lift	h3 (mm)	150	150
Lift	h3 (mm)	3,700	3,700
Height of mast extended	h4 (mm)	5,470	5,470
Height of overhead guard (cabin)	h6 (mm)	3,115	3,115
Height, operators seat/stand on platform	h7 (mm)	1,990	1,990
Towing coupling height	h10 (mm)	550	550
Overall length	l1 (mm)	6,000	6,000
Length to fork face	l2 (mm)	4,800	4,800
Overall width	b1/b2 (mm)	2,550	2550
Fork dimensions	s/e/l (mm)	90x180x1200	90x180x1200
Fork carriage to ISO 2328, class/type A, B		Pin type	Pin type

Width of fork carriage	b3 (mm)	2,500	2,500
Ground clearance, mast	m1 (mm)	285	285
Ground clearance, centre of wheelbase	m2 (mm)	330	330
Aisle width with pallets 1000 x 1200 across forks	Ast (mm)	6,530	6,530
Aisle width with pallets 800 x 1200 along forks	Ast (mm)	-	-
Turning radius	Wa (mm)	4,190	4,190
Minimum pivoting point distance	b13 (mm)	1,360	1,360
Travel speed' with/without load	km/h	24/26	24/26
Lift speed' with/without load	m/s	0.4/0.4	0.4/0.4
Lowering speed' with/without load	m/s	0.5/0.5	0.5/0.5
Tractive force, with/without load	N	74,600/-	74,600/-
Climbing ability, with/without load	%	20.6/-	20.6/-
Acceleration time, with/without load	s	6.0/-	6.0/-
Service brake		Wet disc	Wet disc
Battery voltage, rated capacity	V/aH	2x12/110	2x12/110
Engine manufacturer/type		Perkins 1106D	Perkins 1106D
Engine performance according to ISO 1585	kW	120	120
Rated speed	1/min	2,200	2,200
Number of cylinders/displacement	/ cm³	6/6600	6/6600
Fuel consumption - average	l/h	-	-

Type of drive control		Torque converter 3/3	Torque converter 3/3
Working pressure for attachments	bar	250	250
Oil flow for attachments	l min	95	95
Noise level, at operators ear, overhead guard/cab	dB(A)	76	76
Trailer coupling, design/type DIN	Ø (mm)	40	40

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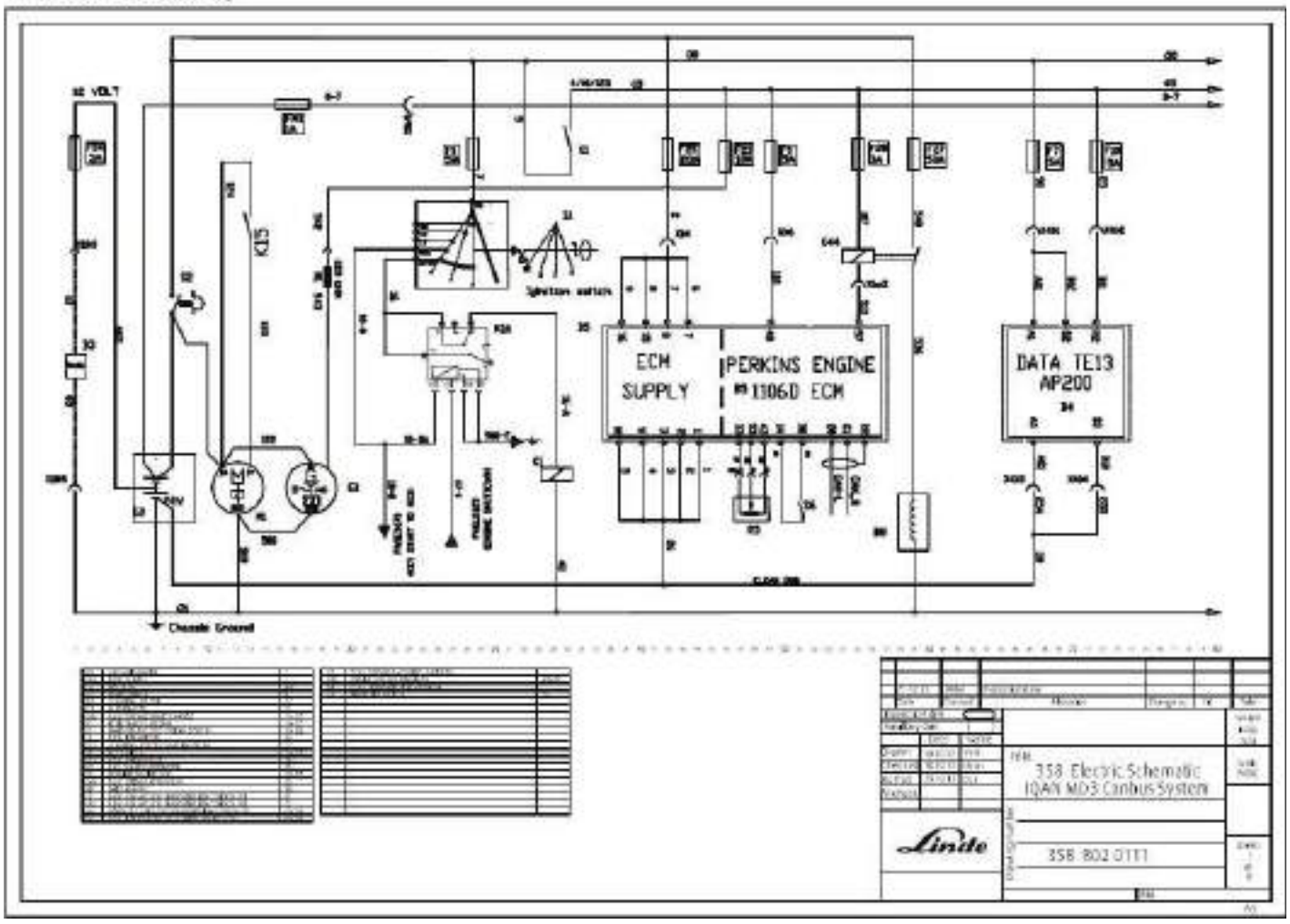
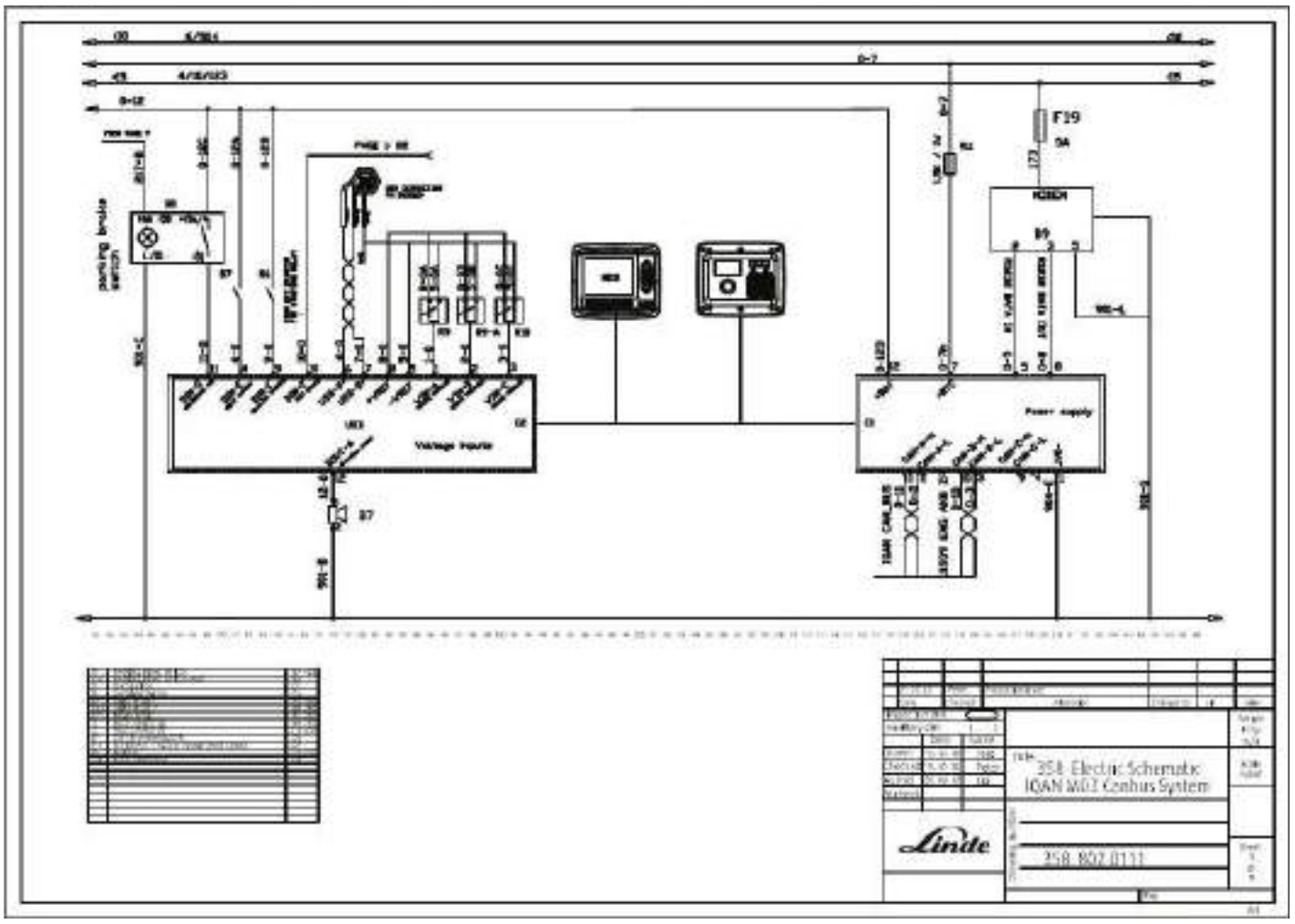
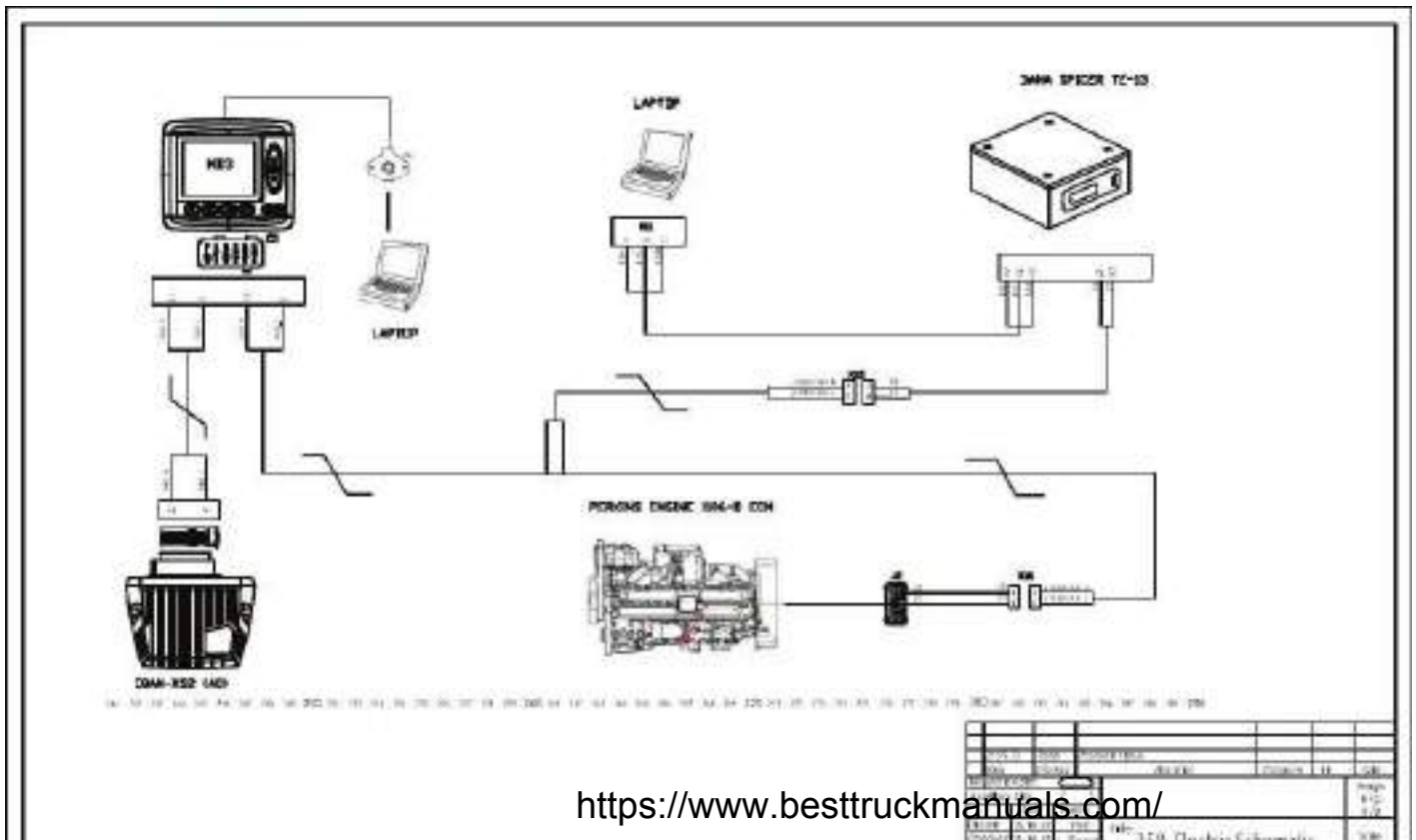
Circuit diagrams

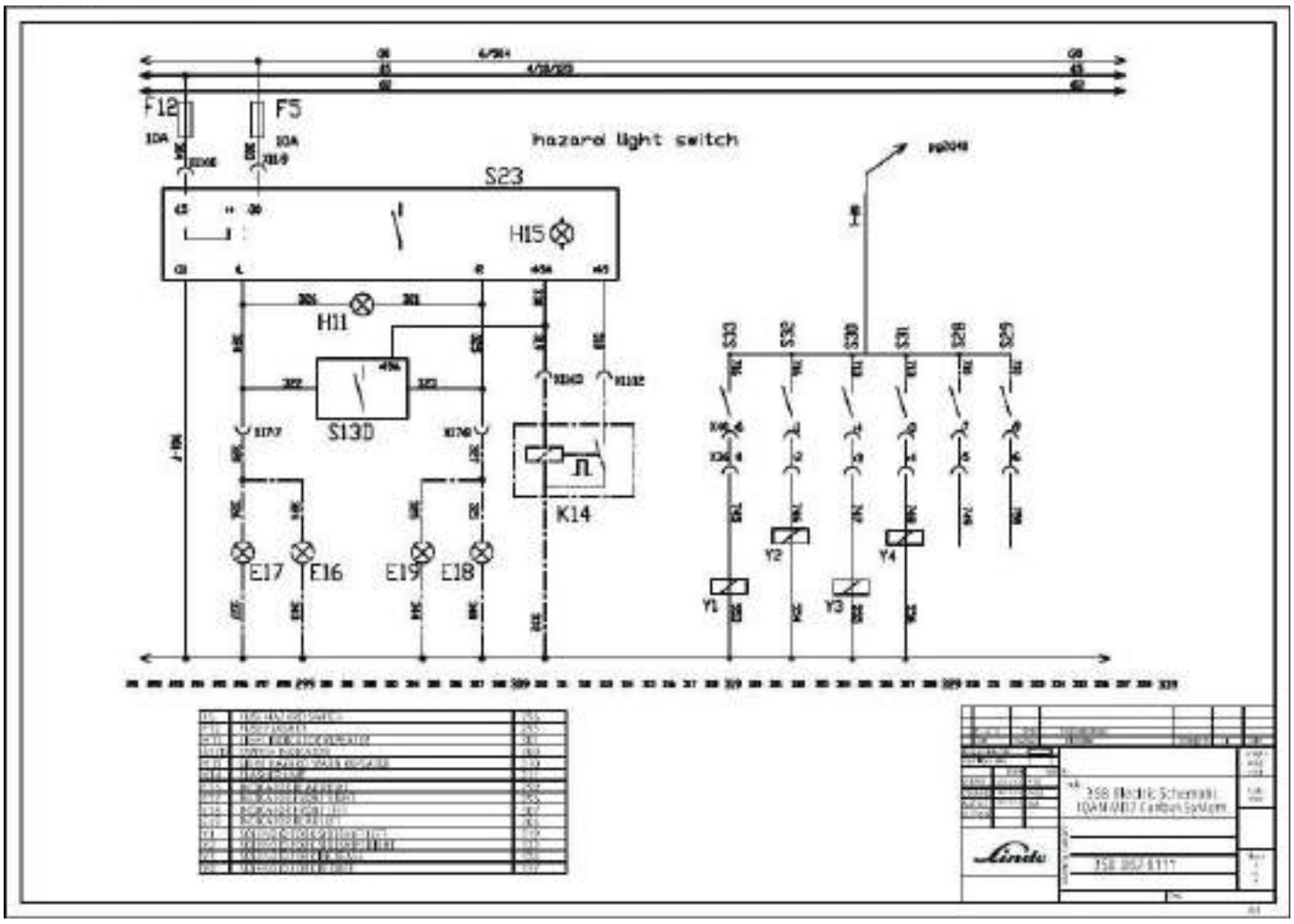
Electrical

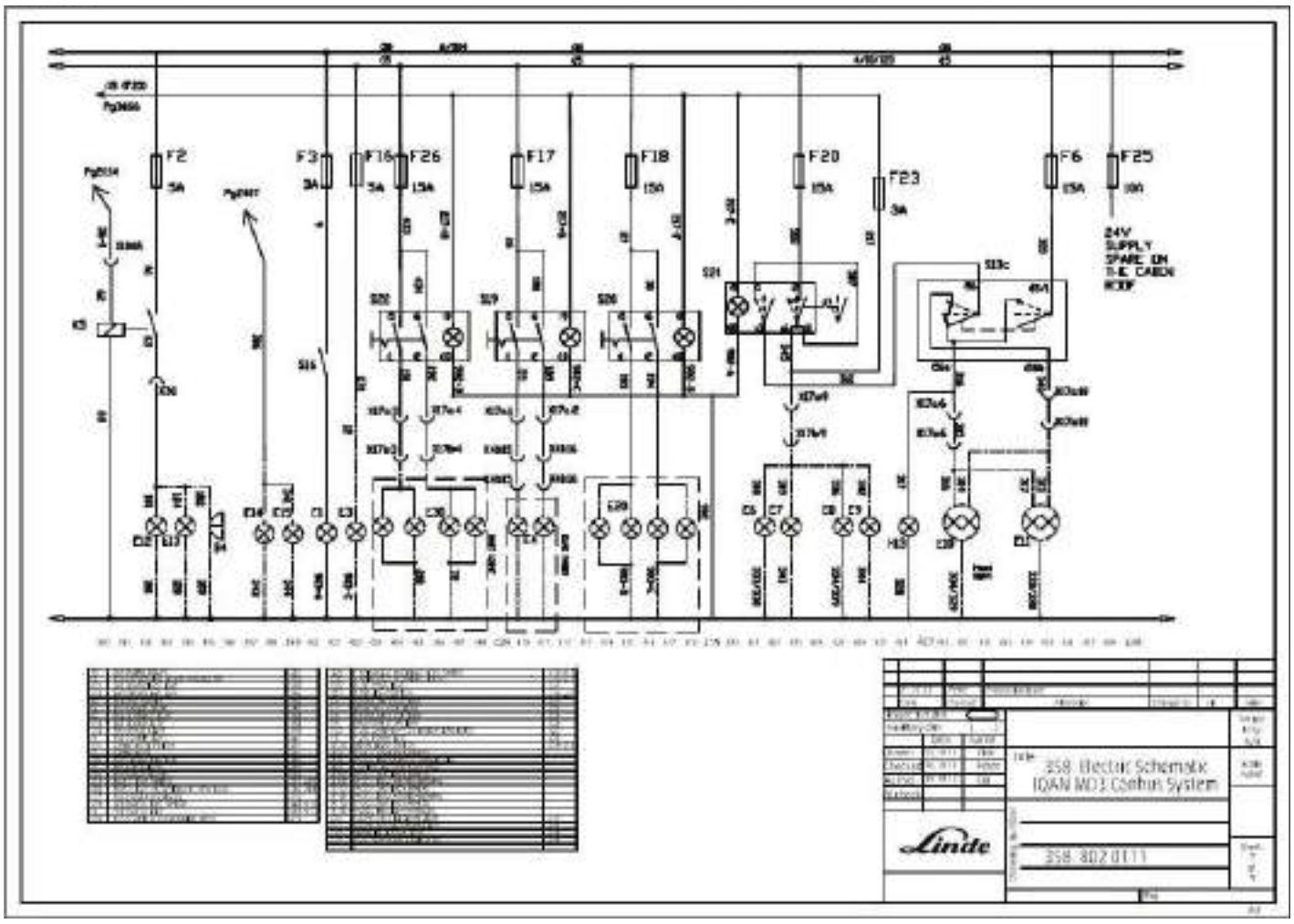
Electrical circuit drawing

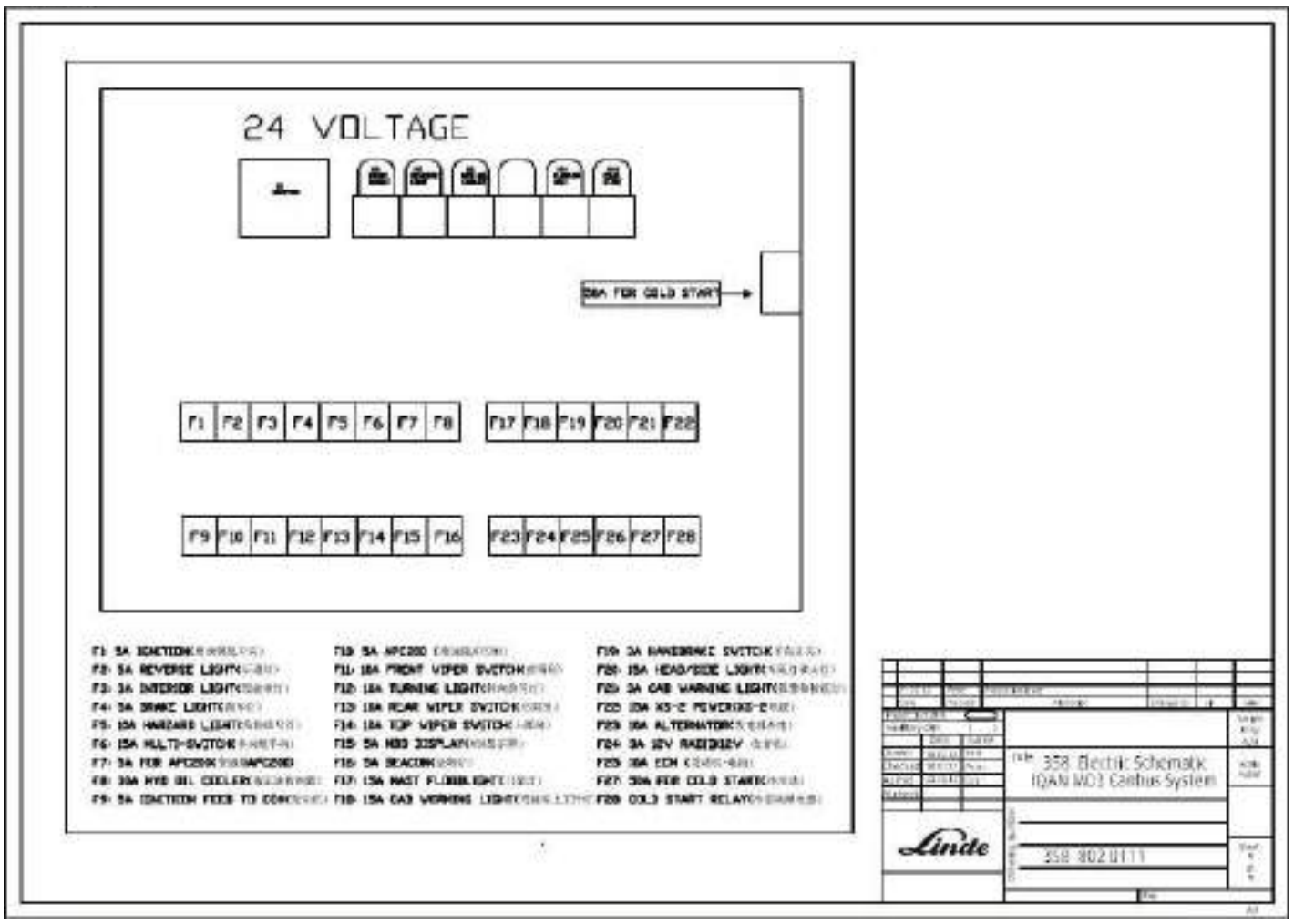












Hydraulic

Hydraulic circuit drawing