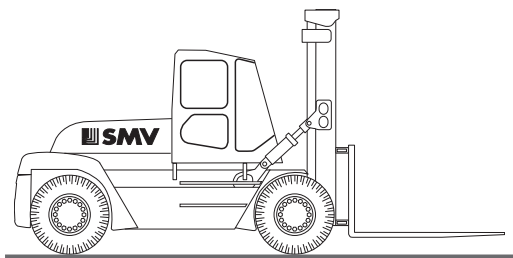
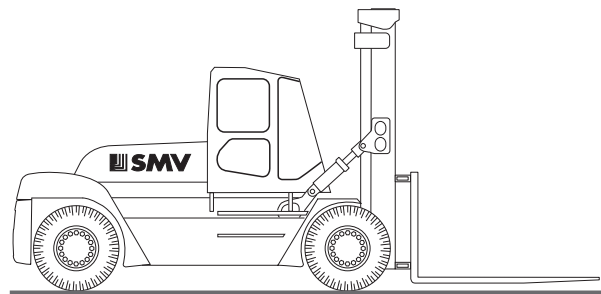


Model range forklift trucks

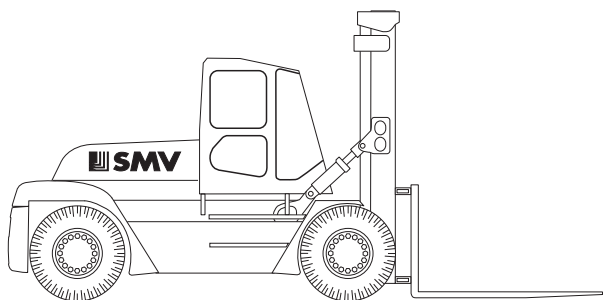
SMV 10-600 B – SMV 16-1200 B



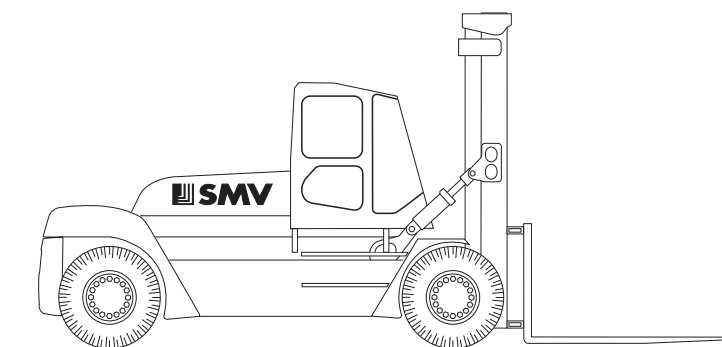
SMV 10-1200 B



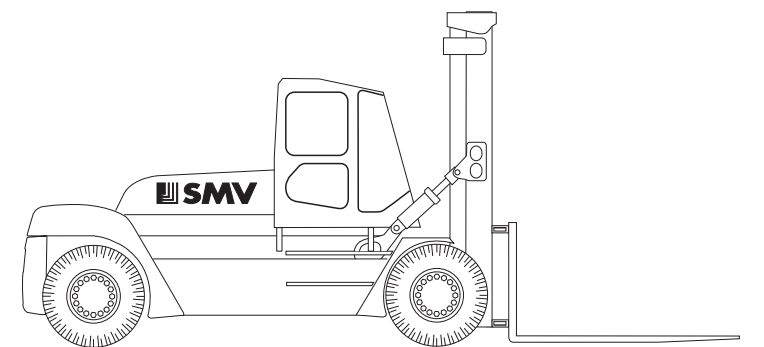
SMV 12-1200 B



SMV 13,6-600 B



SMV 15-1200 B



SMV 16-1200 B

This user manual provides you with the information you need to know about starting, driving, servicing and maintaining your SMV forklift truck.

Using and attending to the truck properly will preserve its qualities for a long and profitable working life, and will make full use of its applications.

The expressions "front", "back", "right" and "left" indicate the position in which the relevant component is installed in the truck as seen from the driving compartment.

Follow all instructions in the manual on using the fork-lift truck and carry out maintenance and inspection as described in the maintenance table on a regular basis and at the correct time, using the specified lubricant.

Maintenance must be carried out only by qualified staff.

Above all, we would like to emphasise the importance of following both the general traffic regulations and the guidelines in force for the use of trucks and the prevention of accidents at work.

The regulations in force for normal and regular use of commercial trucks must be strictly adhered to by management, commercial operators and service staff.

The user, not Konecranes Lifttrucks, is responsible for any dangers that may arise when the truck is being used for applications not approved by the manufacturer.

Trucks manufactured by Konecranes Lifttrucks are designed for the transport and lifting of loads indicated on the load-bearing capacity plate.

No alterations and, above all, no additions or conversions may be made to the fork-lift truck without the permission of the manufacturer.

The user instructions for additional parts issued by the manufacturer apply to those additional parts.

Technical remarks

Konecranes Lifttrucks is constantly developing both the design and manufacture of its products. Illustrations and technical details concerning the design, parts and performance of the truck are subject to alteration as a result of this technological development.

Konecranes Lifttrucks therefore assumes no responsibility on the basis of those specifications, illustrations and descriptions found in the user manual.

If you have any questions concerning trucks manufactured by Konecranes trucks and ordering spares, contact your nearest authorised dealer. Take care to supply the correct address for delivery.

If any repairs are needed, use only Konecranes Lifttrucks original spares. This is necessary in order for your truck manufactured by Konecranes Lifttrucks to retain its original technical standard.

When ordering spares, it is important to indicate the item number found in the spares list as well as the following information:

Truck's model denomination:

Serial number/year of manufacture:

Delivery date:

When ordering spares for the following units, you must indicate their individual manufacturing numbers:

Engine no.:

Mast no.:

The lift height of the mast:

Hydraulic pump no.:

Transmission no.:

Drive shaft no.:

When the fork-lift truck is delivered, the details on the type plate should be written in this user manual.

Delivery inspection

Every Konecranes Lifttrucks fork-lift truck is carefully inspected before it leaves the factory to ensure that it is fully in order and is fully equipped in accordance with the order. Authorised Konecranes Lifttrucks dealers are then required to re-inspect the truck before it is delivered to the customer.

In order to avoid later complaints and problems, the customer should also check that the truck is in full working order and is fully equipped when it is delivered, with a receipt of the acceptance/handover of the truck from the dealer.

Always perform Lubrication, Checking, Maintenance and Daily Maintenance according to the instructions in this book.

Prior to start-up of the truck the check points according to the Warranty/Delivery report are to be checked.

The Warranty/Delivery report must be filled in and returned to Konecranes Lifttrucks within one week after start-up thus to be considered as first day of Warranty.

If the Warranty/Delivery report is not returned within one week from start-up, delivery date will count as first warranty date.

The following technical manuals accompany every truck:

- 1 Spares catalogue for the truck
- 1 User manual for the truck
- 1 Machine card

When contacting your authorised dealer, always indicate:

- 1. Truck designation
- 2. Truck serial number
- 3. Year of manufacture.

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SAFETY REGULATIONS

- * Follow national safety regulations
- * The truck must only be driven by those trained to do so and who have the permission of the management
- * Remember: The national and state laws on driving licences and driving regulations always apply!
- * Before starting up, ensure that no person(s) or other obstacles are in the way of the truck or its equipment.
- * Do not block doors and/or emergency exits.
- * The truck must not be used if it has faulty brakes, steering, lifting or other important functions
- * Passengers are not allowed
- * Lifting a person or persons is forbidden unless the truck is equipped with an approved lift age for this purpose.
- * Never exceed the lifting capacity of the truck - see type plate and load diagram
- * The load should always be transported in a lowered position
- * Always report damage and wear and tear affecting the safety/function and life of the truck
- * The hydraulics of the truck are equipped with a high-pressure hydraulic accumulator. Take great care when working with the hydraulic system. Only service staff with knowledge of the hydraulics may intervene here.
- * Use protective equipment – helmet, gloves, eye- and ear protection when working on the reach-stacker.

WARNINGS AND IMPORTANT INFORMATION

In the instruction book there are three types of warning texts. These are divided into different levels of hazardous situations. Warning texts are preceded by a warning symbol.



This symbol indicates a potential personal injury hazard. Whenever you see this symbol, take care to read the following instructions:



DANGER
Indicates an immediately hazardous situation which, if not avoided, will result in death or serious injury.



WARNING
Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



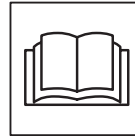
CAUTION
Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

Always read the instructions that follow the safety alert symbol or the signal word.

Important information is indicated by the indicator word **NOTE**. The information is not necessarily safety related; it can also touch on issues that will facilitate handling, or clarify information.

NOTE

Used to draw attention to important information that facilitates work processes or handling.



Read the instruction book carefully before you start using the truck.

Incorrect handling may cause serious injury or damage to persons, products, or property.

The instruction book contains important information on handling and safety and should always be available in the truck. Never use a truck that does not have an instruction book.

BEFORE OPERATION

Persons responsible, particularly truck- drivers and service staff, must be instructed on the regulations for normal and safe use of commercial trucks which accompany this manual. Follow the guidelines and safety regulations applicable to:

- use of commercial trucks
- roads and work places
- drivers (rights, obligations and regulations for implementation)
- any extra equipment
- different types of vehicle
- service (maintenance and inspection)
- annual inspection for the prevention of accidents.

The driver (/owner) or other persons in positions of responsibility must ensure that the above guidelines and safety regulations are adhered to.

When a trained driver is about to operate the truck, instruct him on:

- special functions of the truck from Konecranes Lifttrucks
- extra equipment
- special operating applications.

Driving, manoeuvring and steering should be practised until the driver is fully acquainted with all these operations.

Only after that stage can training in stacking manoeuvres begin.

The stability of the truck in the working area can only be guaranteed if the correct procedures are followed. Should the truck start to roll due to unapproved manoeuvres or incorrect driving, the full instructions supplied must be followed.

Prevention of accidents

In some countries, trucks must be inspected once a year by trained staff in accordance with the prevention of accidents regulations. Authorised Konecranes Lifttrucks dealers can supply information on these.

We reserve the right to modify our design and material specifications without prior notice.

ENVIRONMENTAL ASPECTS

1. Driving the lift truck

Exhaust emissions, noise, leakage (oil, fuel, fluids) are influenced negatively by incorrect driving and handling of the truck.

2. Remainings from servicing

Oil, fuel, filters and filter deposit, cleaning fluids have to be disposed of or recovered according to local legislation.

3. Remainings from repairs

Metall, batteries, electronics, rubber (tires, hoses, seals), solutions, chemicals have to be disposed of or recovered according to local legislation.

Norms

This machine is built regarding the following norms according to

Health and safety	2006/42/EC
	EN 1726 (SMV 10 1200 B)
	EN 1551 (SMV 12-16 1200 B)
Noise	2005/88/EC
Vibrations	EN 13059
Emissions	2004/26/EC
EMC	2004/108/EC

TECHNICAL DESCRIPTION

Specification SMV 10-16 1200 B means:

SMV = Product name
16 = 16 tonnes lifting capacity
1200 = 1.200 mm load centre
B = series designation

The engine is a water-cooled, turbo-charged 6-cylinder diesel engine. The engine drives a three speed transmission using a torque converter. The gear selector is electrical with three gears for driving front/back. The torque converter is equipped with an oil cooler which lies underneath the radiator. The gearbox has a disengaging valve controlled by the brake pedal in the cab. This valve disengages the gearbox so that the operator can control the brakes whilst maintaining a high engine speed during stacking manoeuvres.

The front axle is driven by the gearbox via an universally jointed drive shaft. The axle is of the heavy duty double reduction type. The primary reduction is through the hypoid crown wheel and pinion gear set, the differential gears are carried within the centre of the crown wheel. The secondary reduction is achieved by a planetary gear set within the wheel hub. The wheel hubs are carried on taper roller bearings, thus relieving the half shaft of any loading other than driving torque.

The steer axle is mounted in "spherelastic" bushes which allow sufficient wheel movements for stability on uneven ground. The parallel tie-rods are between the steering cylinder and the wheel axles.

The brakes are operated by an oil-cooled wet disc-braking system. The foot brakes are controlled by the foot brake valve which activates the drive axle.

The parking brake is controlled electrically and activates a hydraulic cylinder on the drive shaft.

The hydraulic pump in combination with a gear pump is mounted directly on the gearbox. The gear pump pressurizes the accumulators for the service and parking brake. The piston-pump brings pressure to the steering system and the different lifting functions. The system is load sensitive.

The steering is fully servo-assisted. If the engine should stall, it is still possible to steer the truck without servo assistance, although it is heavy going.

Two control valves, mounted on the chassis, are controlled from the cab by servo-assisted control levers on the right of the driver. These regulates the functions for lifting, tilting, sideshifting, spreading the forks, and any extra functions.

The mast consists of an outer and an inner upright, a lifting carriage, two lifting cylinders and two tilt cylinders. The inner upright section moves along the outer upright with support wheels and support backing rollers. The mast is mounted on two axles in the chassis.

The forks are of a rolling type with sideshift movement and fork positioning. The forks roll on the lifting carriage.

The driver's cab fulfils international safety standards, and is rubbermounted to protect the driver from vibrations. Entrance to the cab is on the left side via the steps on the truck. When the driver's seat is rotated through 90°, it is also possible to exit the cab from the right side.

All hydraulic controls for the lifting functions are grouped on the console to the right of the driver's seat. The parking brake and the switch for selecting additional electrical equipment instruments, gauges and warning lights together with the switches for the direction indicators and windscreen wipers are located on the front mounted instrument panel.

The gear control lever, switches for front screen wipers and directionals are mounted on the steer shaft.

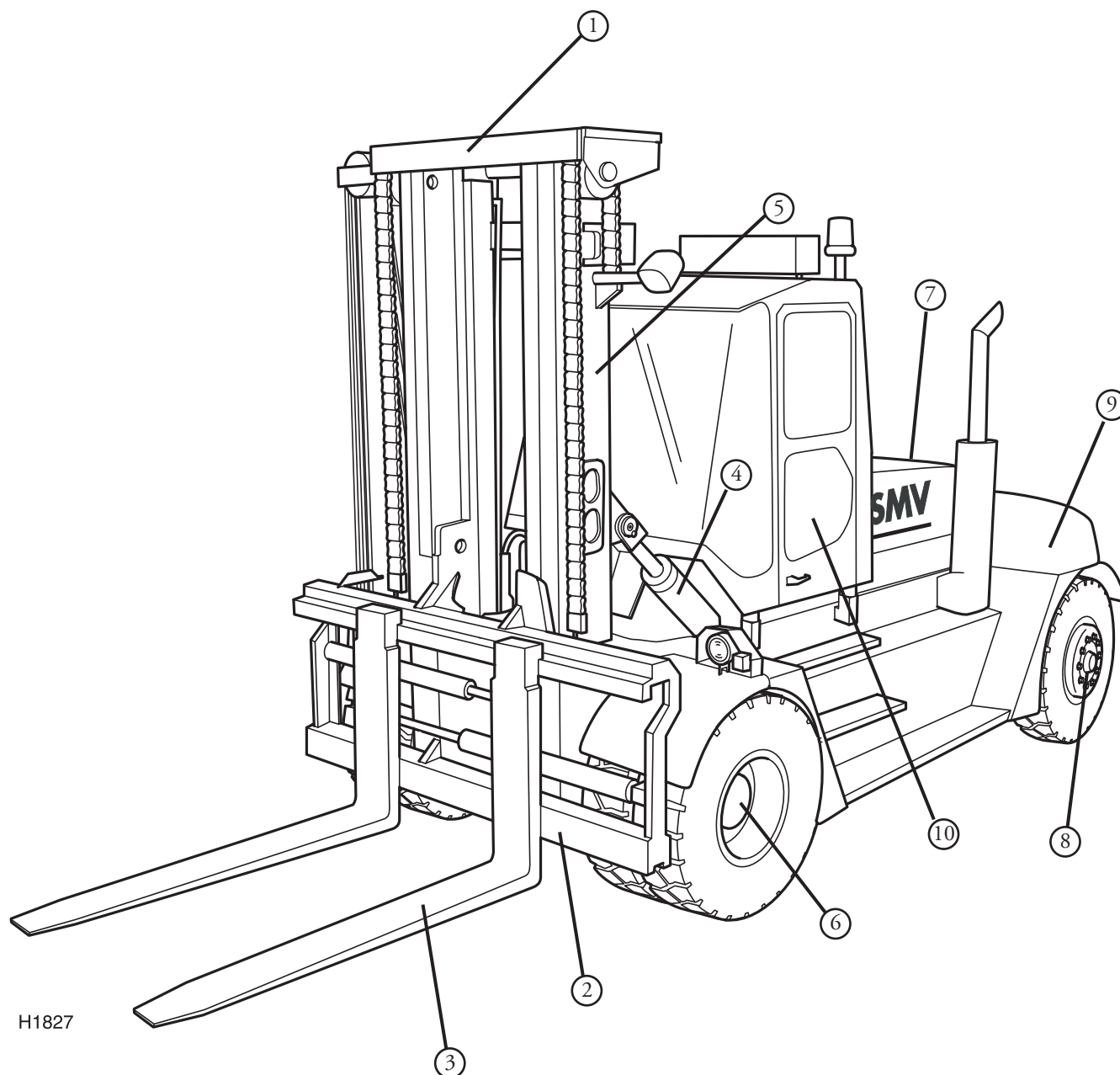
The electrical system is 24 V and has two serial-connected 88 Ah heavy duty batteries.

Outline picture of the forklift truck

KONECRANES®

DESCRIPTION

- | | | |
|-------------------|-------------------|------------------|
| 1. Mast | 5. Lift cylinders | 8. Steer axle |
| 2. Fork carriage | 6. Drive axle | 9. Counterweight |
| 3. Forks | 7. Engine casing | 10. Driver's cab |
| 4. Tilt cylinders | | |



H1827

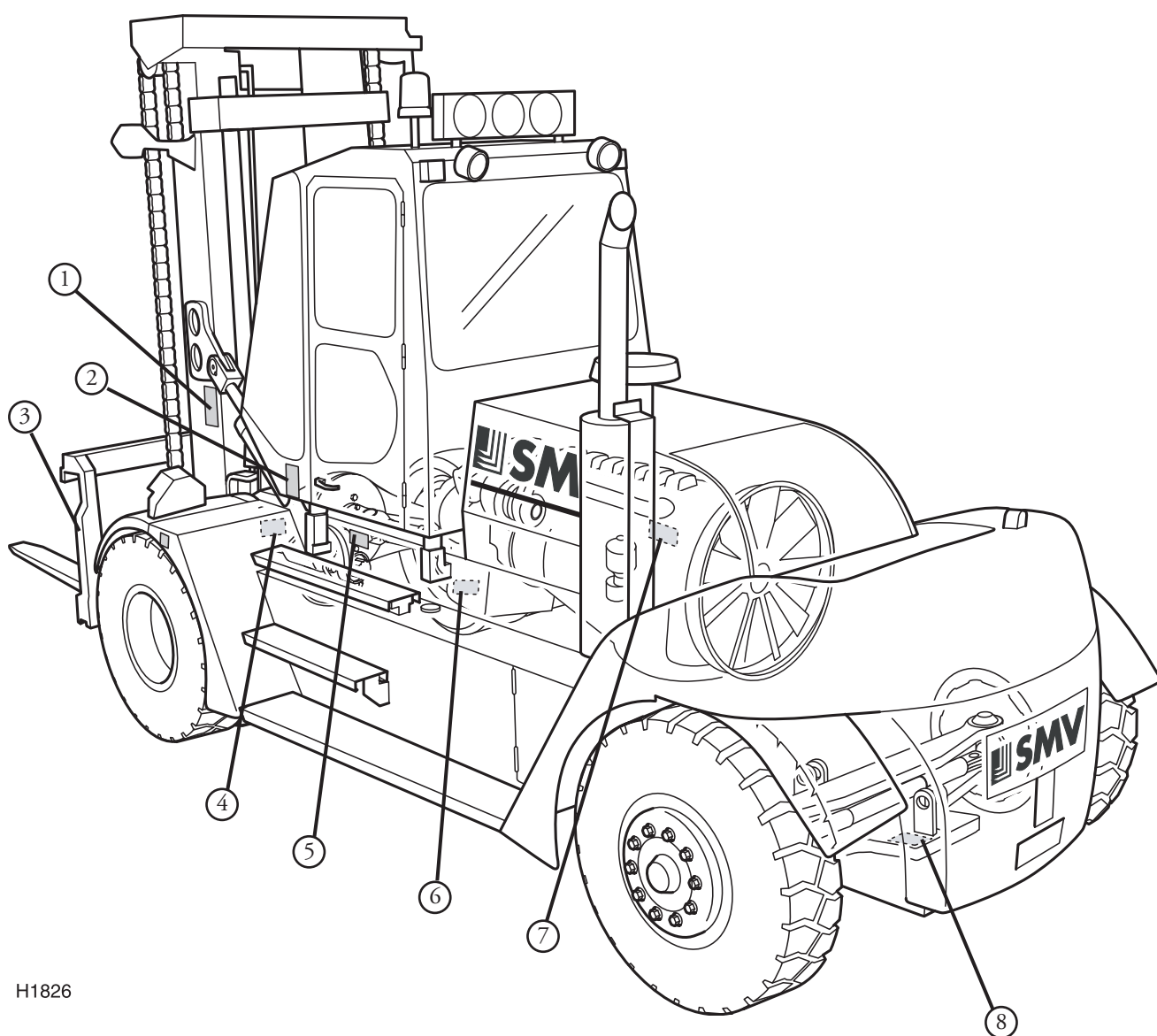
ID-plates and serial numbers

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- 1. Mast number
- 2. Load capacity plate
- 3. Fork carriage number

- 4. Drive axle number
- 5. Chassi number
- 6. Transmission number

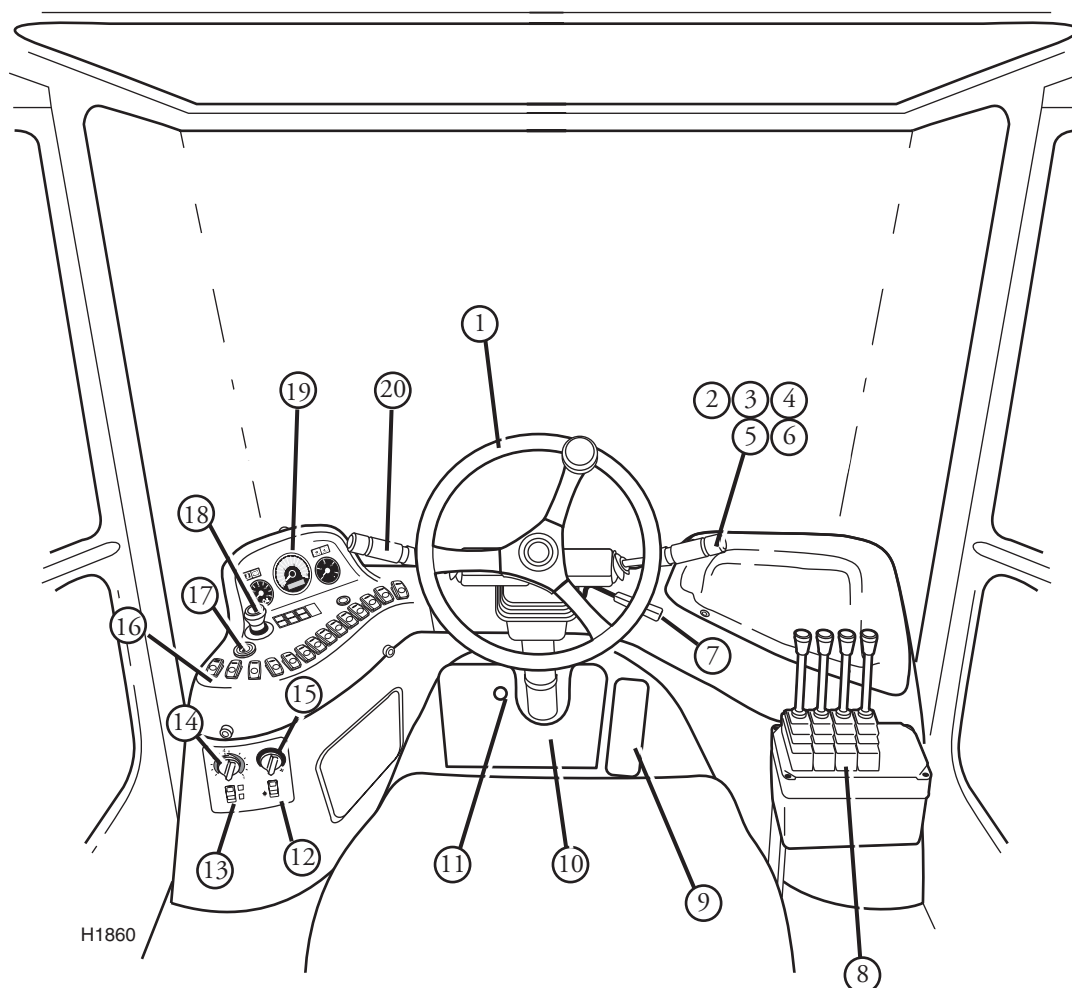
- 7. Engine number
- 8. Steer axle number



H1826

Controls and indicators in the cab

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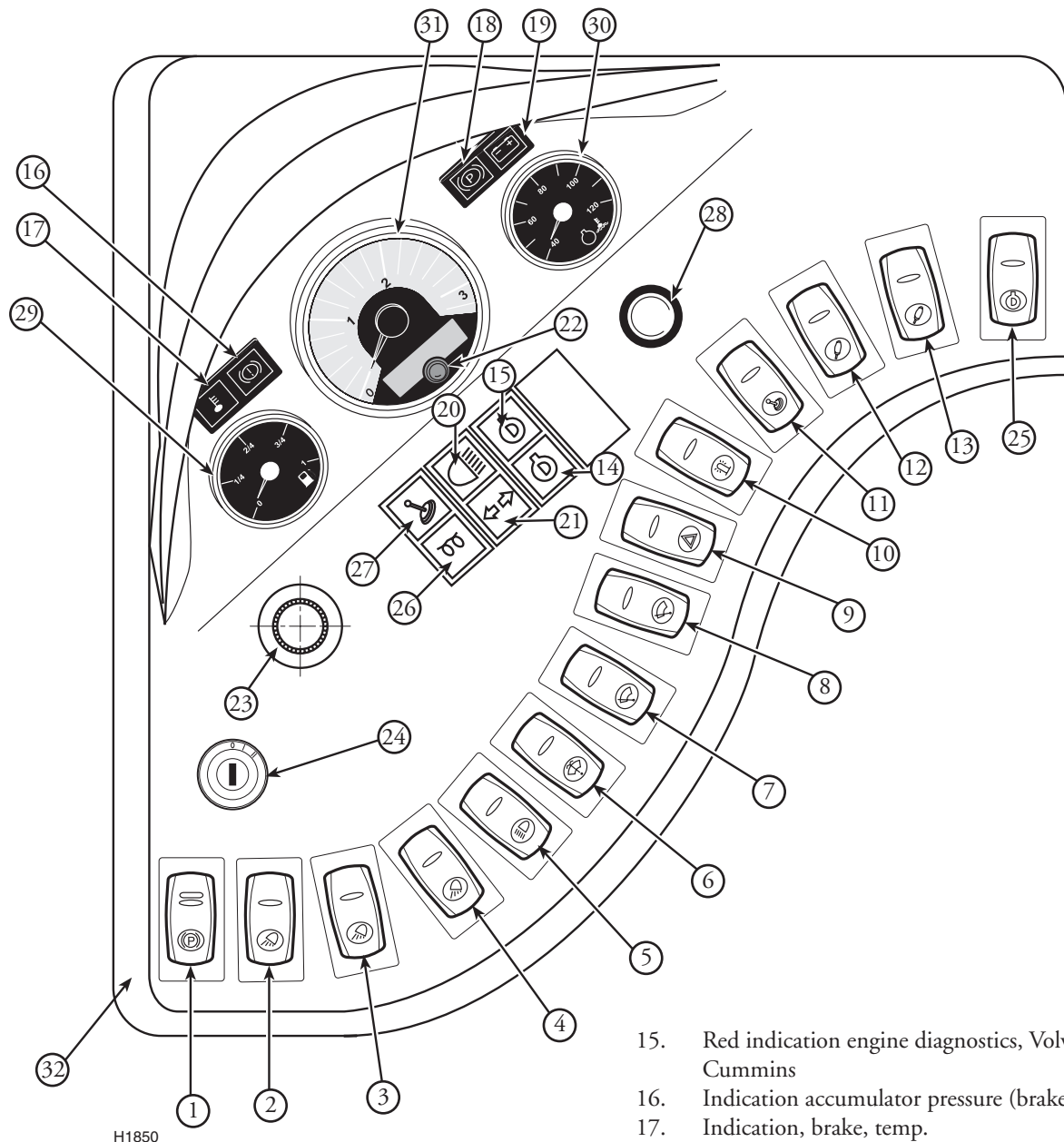
DESCRIPTION

- | | |
|------------------------------|---------------------------------|
| 1. Steering wheel | 11. Disengaging switch |
| 2. Wiper front screen | 12. Cooler (AC) |
| 3. High/low beam | 13. Recirculation |
| 4. Horn | 14. Heater |
| 5. Directional switch | 15. Fan |
| 6. Front screen washer | 16. Instrument panel and gauges |
| 7. Steering wheel adjustment | 17. Ignition switch |
| 8. Hydraulic controls | 18. Emergency stop |
| 9. Accelerator | 19. Display for EMC / Gauges |
| 10. Brake pedal | 20. Direction and gear selector |

Position of controls may vary from truck to truck depending on customer order.

Warning lights and gauges

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H1850

1. Parking brake
2. Working lights, mast
3. Working lights, roof
4. Working lights, extra
5. Road lights
6. Screen washer, roof/rear
7. Intermittent wiper, rear (optional)
8. Intermittent wiper, roof (optional)
9. Hazard
10. Rotating beacon
11. Joy stick steering (optional)
12. Central lubrication (optional)
13. Central lubrication (optional)
14. Yellow diagnostics indication: Scania engine coordinator and Cummins engine

15. Red indication engine diagnostics, Volvo, Scania, Cummins
16. Indication accumulator pressure (brake pressure)
17. Indication, brake, temp.
18. Indication, parking brake
19. Indication, battery charge
20. Indication, high beam
21. Indication, direction R/L
22. CAN-COCKPIT-display
23. Emergency stop
24. Ignition switch
25. Activation engine diagnostics
26. Indication, engine preheater
27. Indication joystick steering
28. Warning light
29. Fuel level
30. Temp. gearbox
31. Rev. counter
32. Buzzer (internal)

Position of controls may vary from truck to truck depending on customer order.

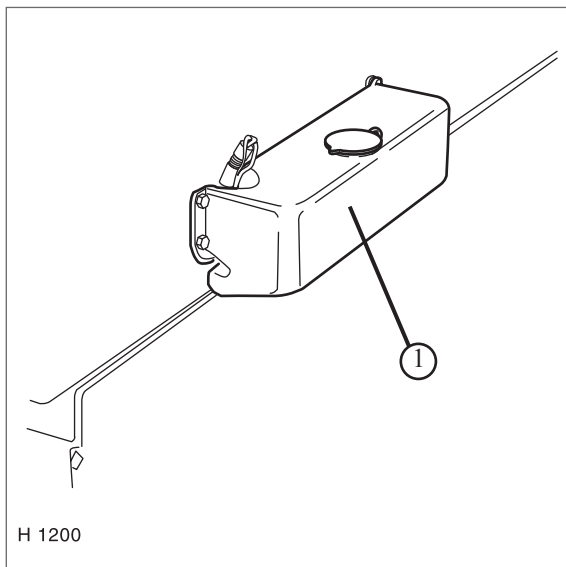
DAILY MAINTENANCE AND SERVICE BEFORE OPERATION

Points to check:

- Main circuit switch
- Water level of the radiator
- Washer level
- The fuel level
- The level of the engine oil
- The air filter indicator (the engine's air filter)
- The gear box oil level
- The oil level of the hydraulic system
- Tyre pressure, condition and wheel nuts
- Function of brake system
- Function of steering system
- Function of hydraulic system
- Lighting/horn

Check the washer level

The washer tank (1) is placed on the right side of the truck, under the bonnet. Fill when necessary.

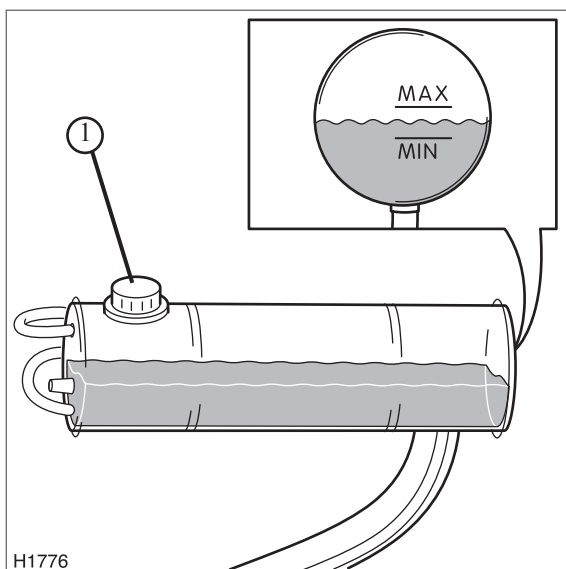


Coolant level



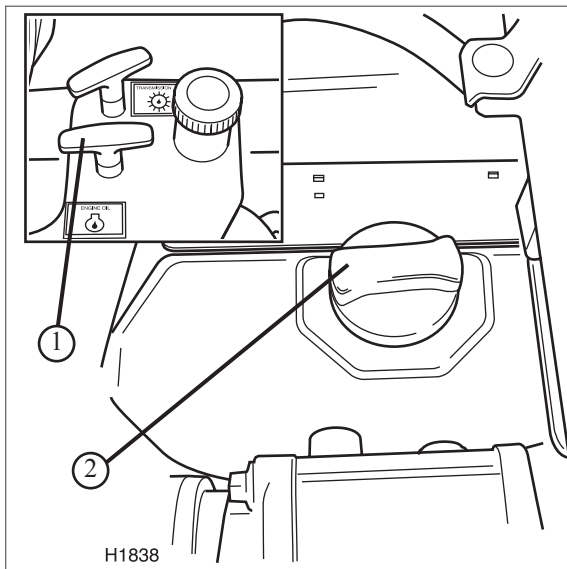
WARNING
The system is pressurised.

- Open the cap of the expansion tank (1).
First a 1/4 of a turn to ensure that the system is not under pressure.
- The level should be up to the MAX-indication of the expansion tank.



Before driving

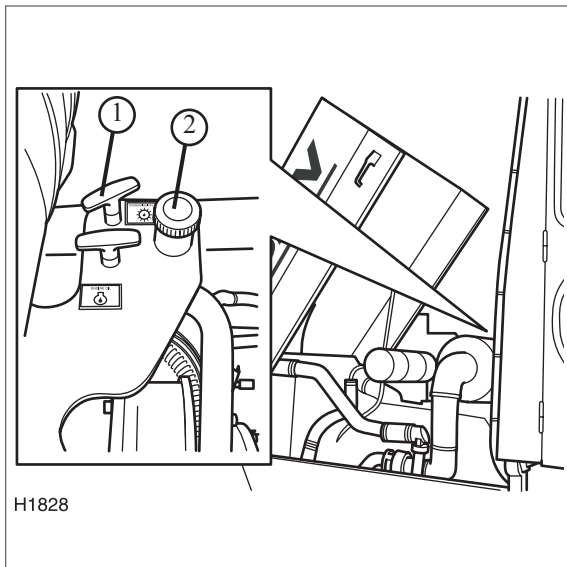
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Check the engine oil

- Lift the engine casing.
- The dip stick (1) is on the right-hand side of the engine.
- Remove the dip stick (1) completely and dry it off with a clean cloth.
- Dip the stick back in fully and remove again.
- The oil level should be between the minimum and maximum level indicators.
- If necessary, remove the filler cap (2) and top up the oil.
- Fill with oil to the maximum level indicator on the dip stick.

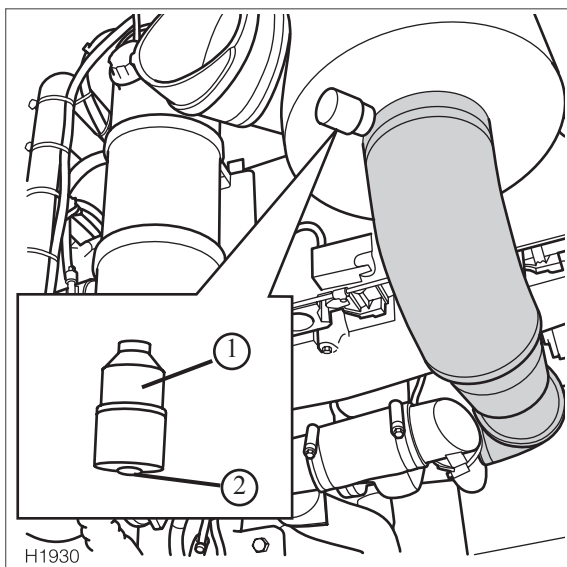
See Maintenance Data for volume.



Check the oil level in the gearbox

- Start the engine and run until the oil has reached operating temperature.
- Remove the dip stick (1) and dry it off with a clean cloth.
- Dip the stick back in fully and remove again.
- The oil level should be between the minimum and maximum level indicators.
- If necessary, remove the filler cap (2) and top up the oil.
- Fill with oil to the maximum level indicator on the dip stick.
- Turn off the engine.

See Maintenance Data for volume.

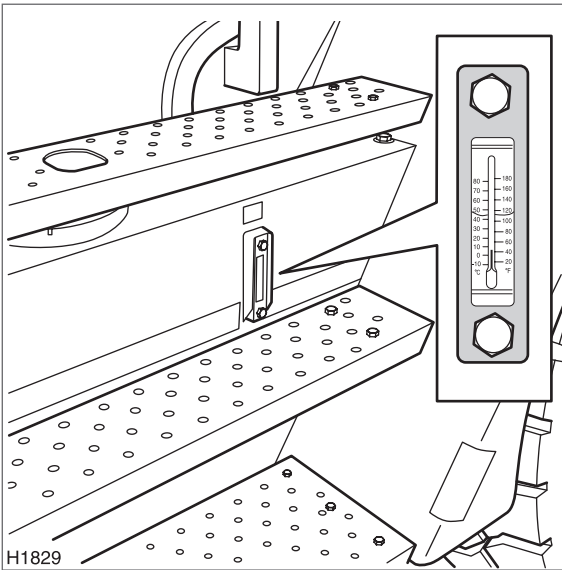


Air filter indicator

- Check the indicator (1).
- If the indicator shows RED, reset the indicator by pressing the knob (2) under the unit.
- Start the engine. If the indicator still shows red, stop the engine and clean or replace the air filter.

Before driving

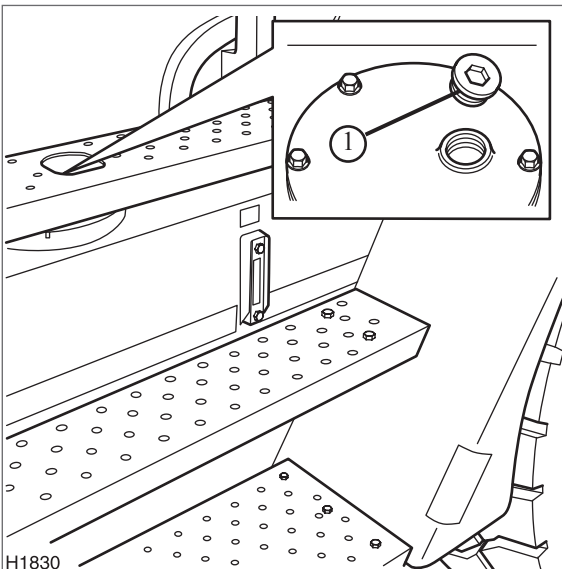
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HYDRAULIC SYSTEM

Checking the hydraulic oil level

- Check that the oil level is between the MIN and MAX - marks on the indicator at the side of the hydraulic oil tank (the lifting frame should be lowered).



Topping up the hydraulic oil



WARNING

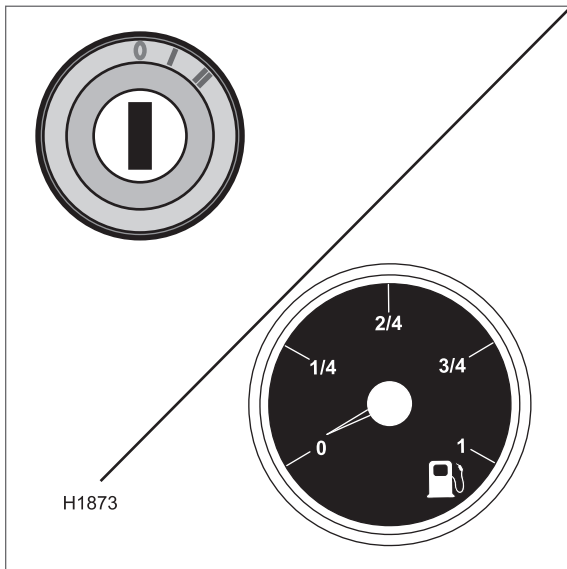
Hot hydraulic oil can emerge from the filling hole. Serious risk of injury!

Do not open the filling plug whilst the engine is in running.

- Unscrew the filling plug (1).
- Fill with hydraulic oil up to the upper mark on the indicator.
- Screw the filling plug back on.

Before driving

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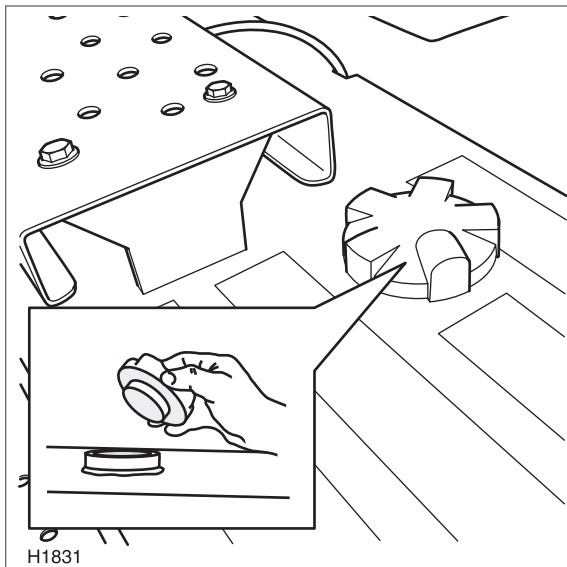
Checking the fuel level

- Turn the ignition key to position 1.
- Wait until the fuel indicator on the dashboard (2) has stabilised.
- If necessary, fill.
- Turn off the ignition key.
- Fill up according to instructions below.



CAUTION

To avoid air being sucked into the fuel injection system, the fuel tank should never be run completely empty. If air enters the fuel system, the engine will stop and the system must be deaired.



Filling with fuel

- Open the cap located on the left-hand side of the truck and fill with the recommended fuel.
- Screw on the cap.
- To avoid that air is sucked into the fuel system, the fuel tank should never be entirely emptied.

See Maintenance data for volume.

Main circuit switch



WARNING

The main disconnect does not cut the power to the alternator. Always disconnect the ground (minus) cable at the battery when working near or on the alternator.

To reduce the risks of electrical shock and personal injury always remove jewelry and conductive material prior to working on the electrical system.

Unless in an emergency situation, do not turn off the main circuit switch while the engine is running.

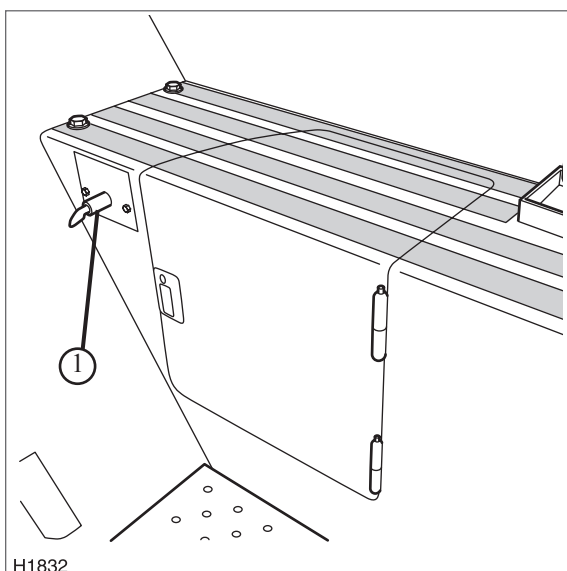
Beware of short-circuiting the battery, which may cause fire or explosion.

Risk for serious injury or death.

The battery contains corrosive acid. Always use the necessary protective equipment.

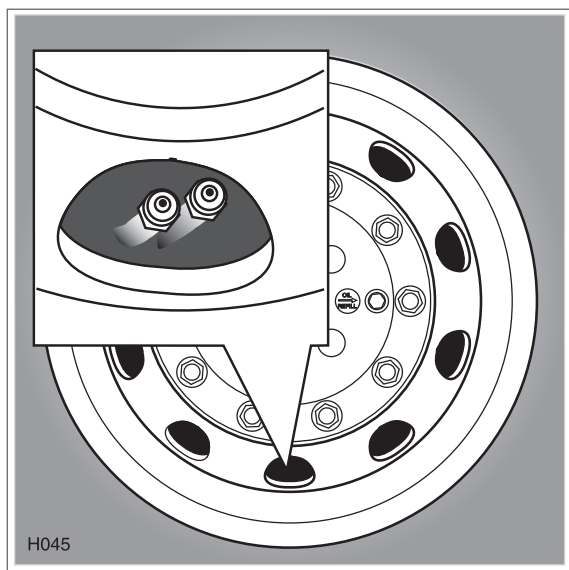
Batteries generate explosive hydrogen when charged. Ensure that there is good ventilation and avoid sparking.

- The circuit switch (1) is located on the right-hand side of the truck.
- Turn the cut-out switch clockwise to turn it on.
- Turn the switch anti-clockwise to turn it off and remove the key.



Before driving

KONECRANES®



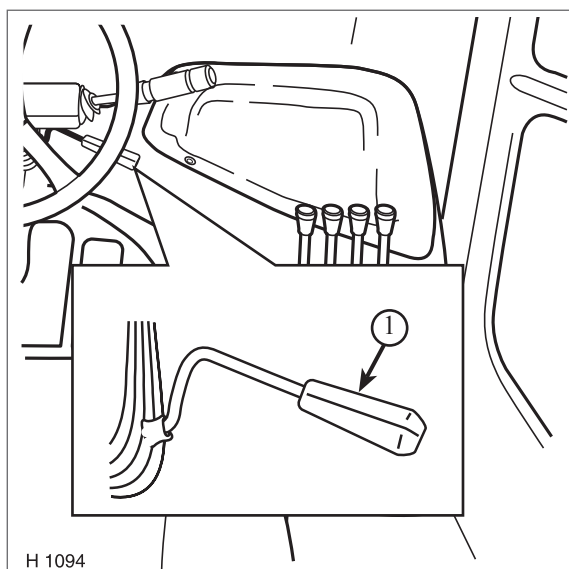
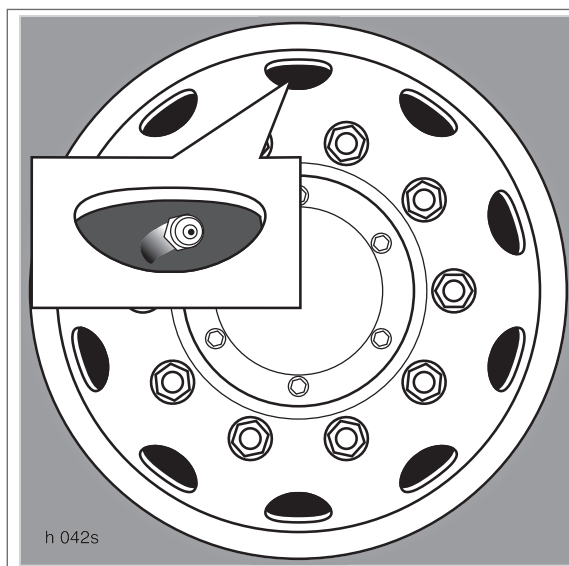
Checking the condition and pressure of the tyres

- Check that the tyres have not been damaged or become too worn
- Remove any foreign objects from the tread
- Check that the tyres have the correct pressure according to the manufacturers recommendations.
- Pump the tyres according to the relevant regulations.



WARNING

When changing tyres, only use tyres which are approved by the manufacturer



Adjustment lever of steering wheel and panel

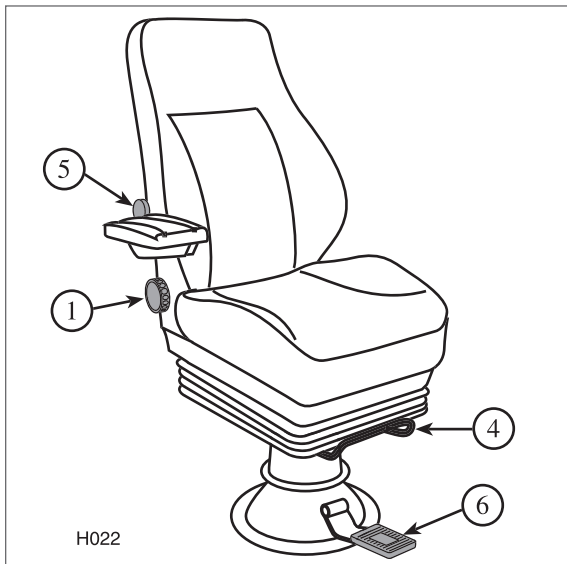
When positioning the steering wheel and the panel:

- Pull lever (1) downward to adjust the tilt
- Pull lever (1) upward to adjust the height



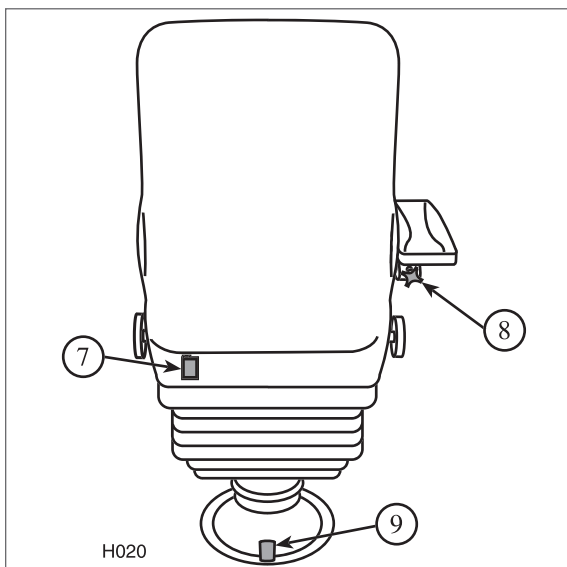
Adjusting the driver's seat

- To elevate the seat, turn the hand wheel (3) clockwise. Weight adjustment is automatic.
- Adjust tilting of the seat cushion, by the hand wheel (2).
- Adjust tilting of the backrest with hand wheel (1).



H022

- Lift the clamp (4), to adjust the seat forward/backwards.
- Adjust the armrest support with hand wheel (5).
- Rotate the seat by pressing pedal (6) Option.



H020

- Adjust the height stroke limiter with handle (7).
Lever to the right - full stroke.
Lever one step to left - stroke limited partially.
Lever to the left - stroke fully limited.
- Adjust the armrest with the hand wheel (8).
- To remove seat press pedal (9) Option.



WARNING

Never operate a machine without having fastened the seat belt properly.
Risk of serious injury or death.
The safety belt should always be used when driving.



WARNING

Never drive the truck unless the seat is locked in position.
Risk of serious injury or death.
A seat that is not locked in position may cause the driver to make uncontrolled movements, which may cause the machine to be handled incorrectly.

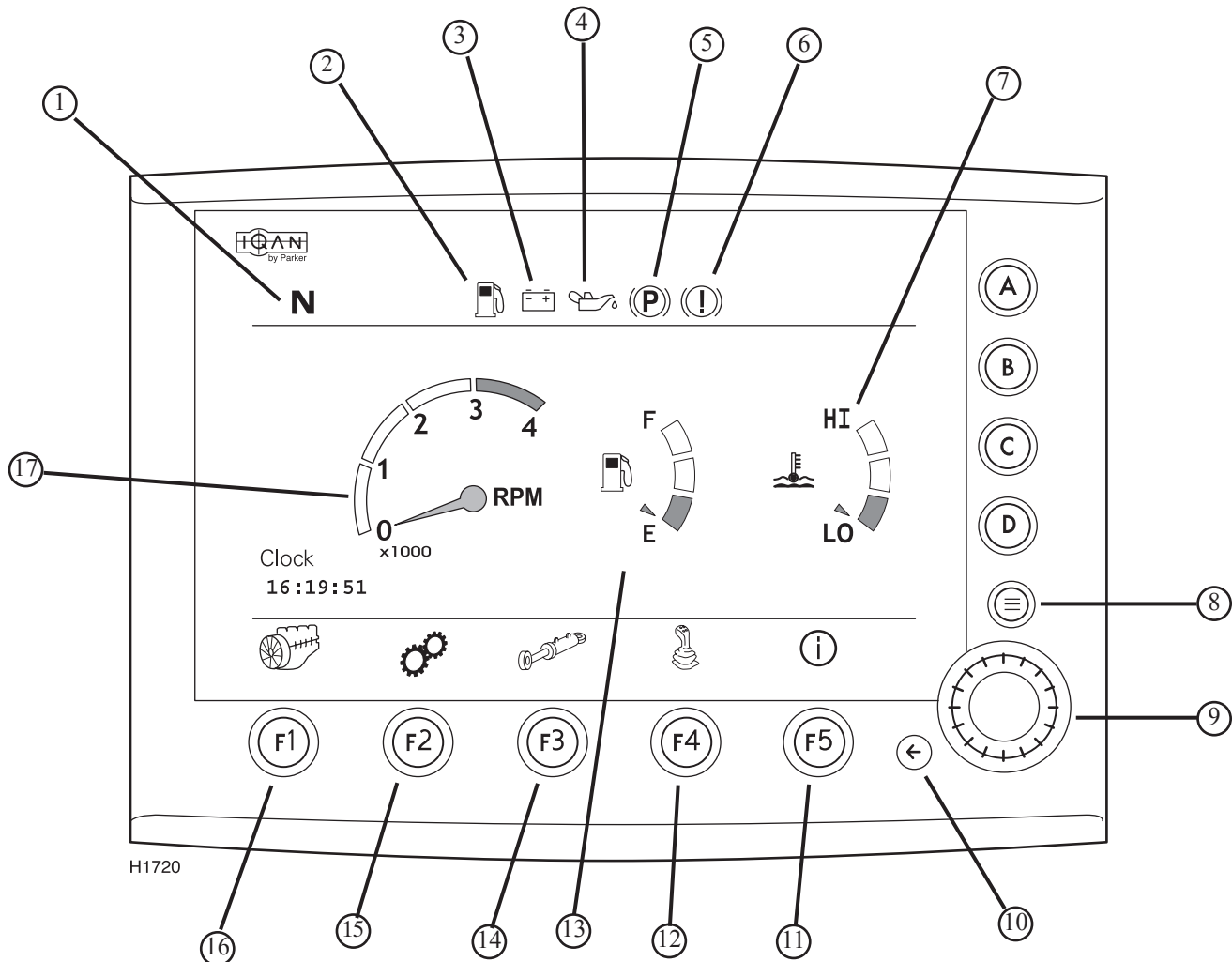
Before driving

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DESCRIPTION OF THE EMC DRIVE MONITOR TYPE IQAN

The drive monitor's purpose is to efficiently control the reach stacker's hydraulic system and drive line by utilising both analog and digital information from various sensors. This will give the driver a complete overview of the truck's activities during operation.

START-UP MENU



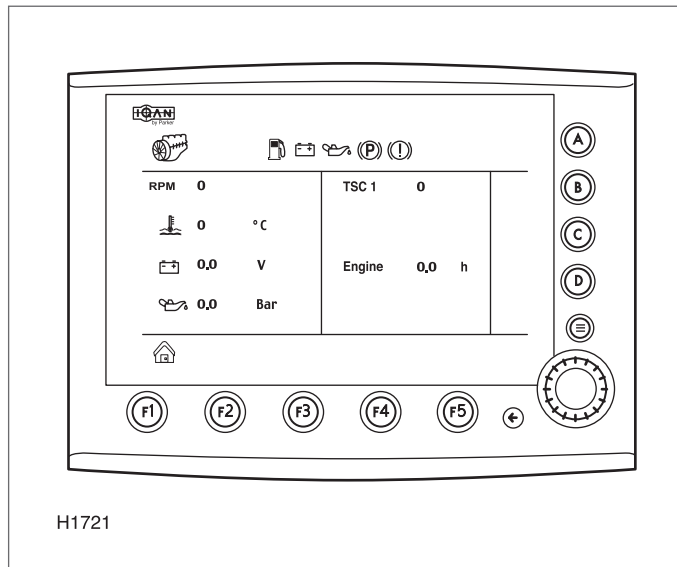
Description of the keys

- | | |
|---------------------------------|----------------------------|
| 1. Gear position | 10. Previous menu |
| 2. Warning, low fuel level | 11. Information main menu |
| 3. Alternator | 12. Attachment main menu |
| 4. Oil pressure, engine | 13. Fuel level |
| 5. Parking brake | 14. Hydraulics main menu |
| 6. Low brake pressure | 15. Transmission main menu |
| 7. Engine temperature | 16. Engine main menu |
| 8. Measure and adjustment menus | 17. Engine RPM |
| 9. Scroller and selector | |

The scroller knob

By turning the scroller knob you can step up/down in the menu. The selected function is presented in black marking. By pressing the scroller knob the selected function will be activated.

Before driving

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Engine main menu

- Press button F1 on the main menu.

The menu displays:

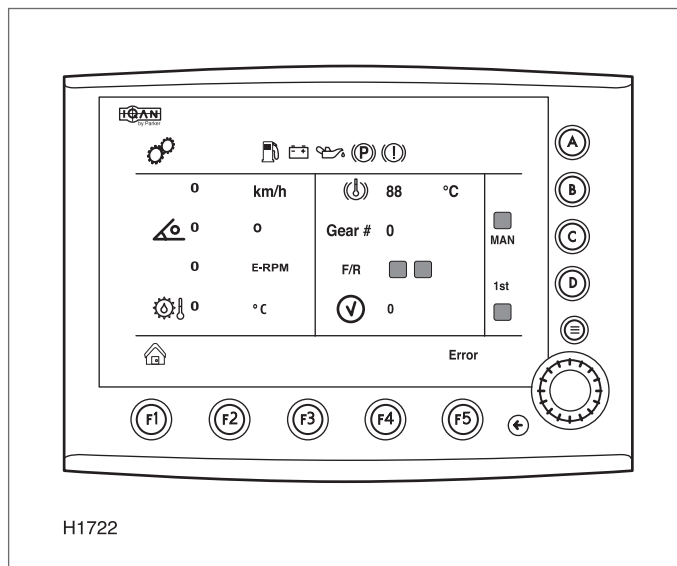
- current engine RPM
- current engine temperature
- battery voltage
- engine oil pressure
- transmission required engine RPM
- required engine RPM in percent of E-gas max.value
- engine operating hours
- engine diagnostics, warning and indicator lamp (warning and indicator lamp is used in combination with Scania-eng ines only).

Stop the engine by pressing button F4 (not used on Cummins-engines).

Error codes are displayed when pressing button F5, used in combination with Scania-engines only.

Button  takes you to the Adjust & measure menu.

- Press button F1 to return to the Start-up menu.



Transmission main menu

- Press button F2 on the Start-up menu.

The transmission main menu displays:

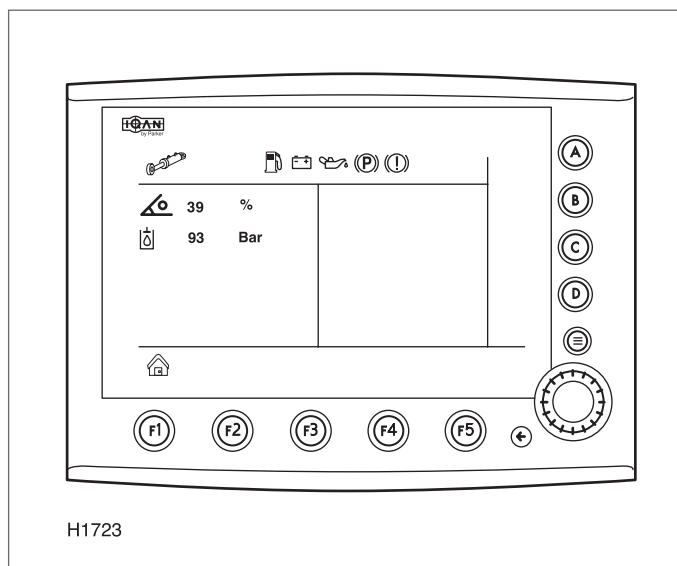
- driving speed
- transmission (gear box) temperature
- accelerator position (angle)
- input transmission RPM
- brake temperature, drive axle
- currently selected gear, 0-4th
- driving direction F/R
- transmission diagnostics, warning and error code "0" or error code missing = no error detected

Button C activates manual gear shifting. Default: automatic gear shifting.

- Press button D for start in 1st gear. Default: 2nd gear.

Button  takes you to the Adjust & measure menu.

- Press button F1 to return to the Start-up menu.



Hydraulics main menu

- Press F3 in Start-up menu.

These symbols are always displayed. Values are added if the truck is supplied with this option. The Hydraulics main menu displays:

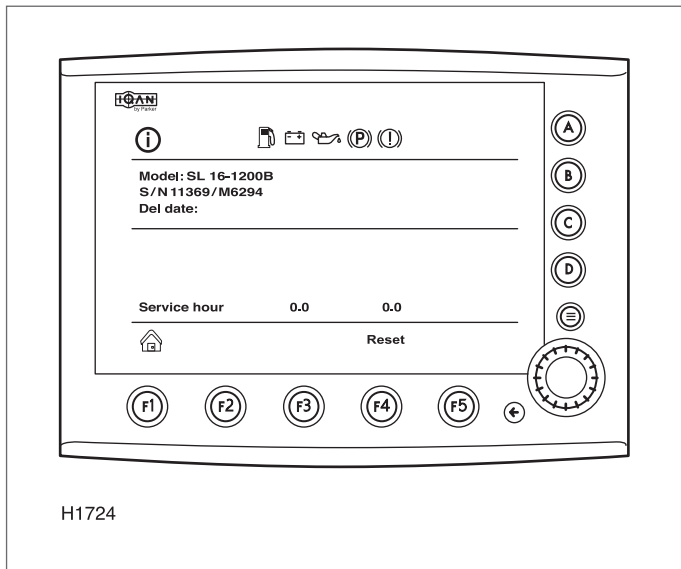
- Tilt angle
- Pressure (bar) piston rod side

Button  takes you to the Adjust & measure menu.

- Press button F1 to return to the Start-up menu.

Before driving

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Information main menu

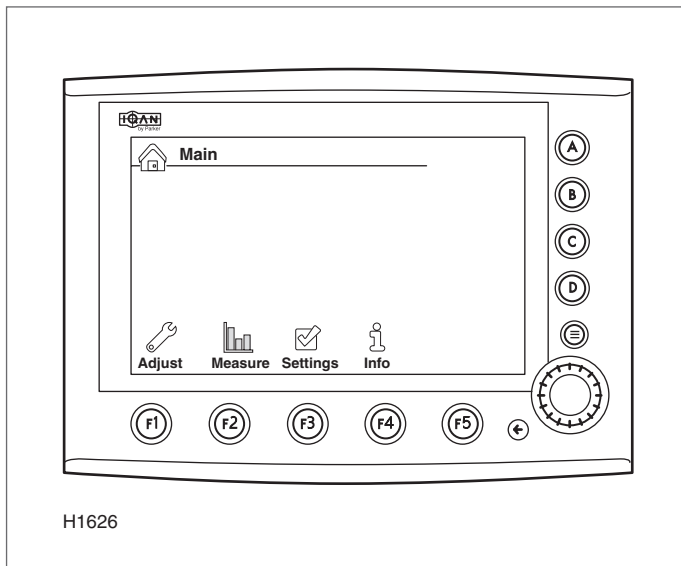
- Press button F5 in the start-up menu.

The Information main menu displays:

- Machine specifications
- Operating hour main counter. Can not be zeroed.
- Operating hours sub-counter. Press the F4-button to zero.

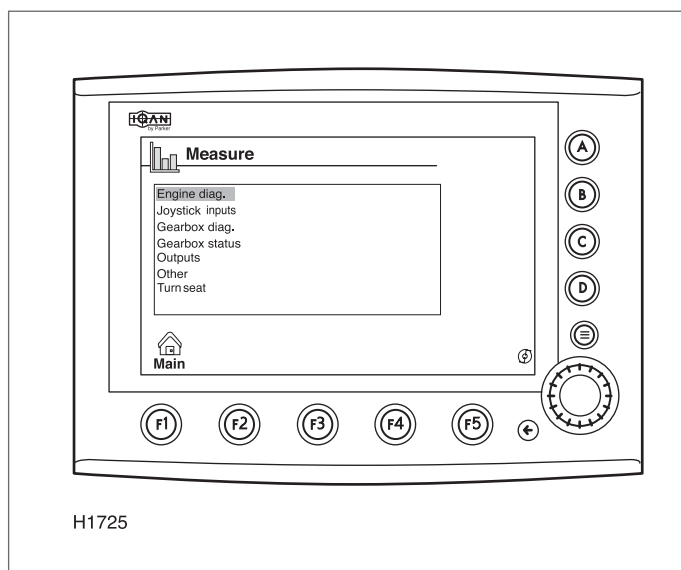
Button  takes you to the Adjust & measure menu.

- Press button F1 to return to the Start-up menu.



Adjust & measure main menu

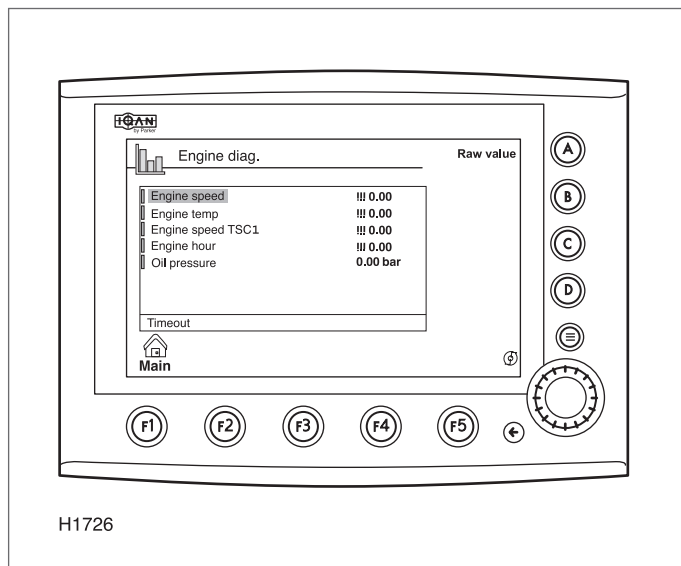
- Press button  in start-up menu.
- Press button F1 to go to sub-menu Adjust
- Press button F2 to go to sub-menu Measure
- Press button F3 to go to sub-menu Settings
- Press button F4 to go to sub-menu Info
- Press button  to return to the Start-up menu.



H1725

Submenu Adjust

- Step up/down by turning the scroller knob.
The selected function is marked black. Activate by pressing the scroller knob.
- Press the ← button to return to the previous menu.
- Press button F1 to go to sub-menu Adjust
- Press button ≡ to return to the Start-up menu.



H1726

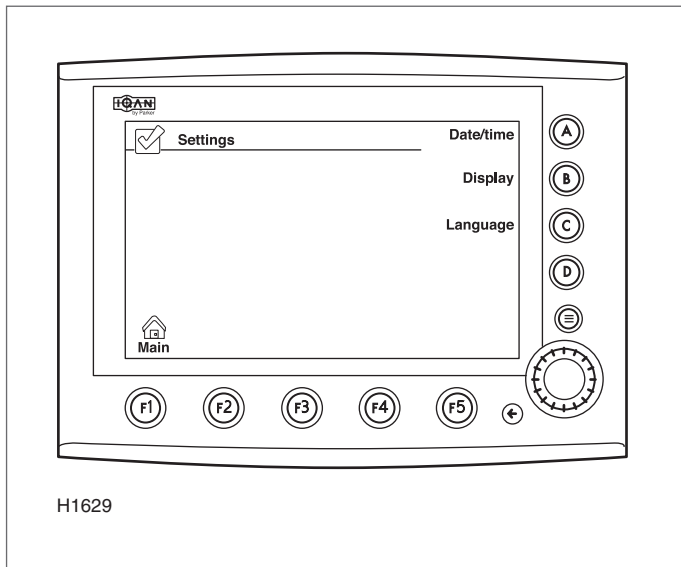
Third menu "Engine Diagnostics" (example)

The menu displays:

- rotation
 - temperature
 - rotation out
 - operation hours
 - oil pressure
- Press the ← to return to the previous menu.
 - Press button F1 to return to Adjust & measure main menu.
 - Press button ≡ to return to the Start-up menu.

Before driving

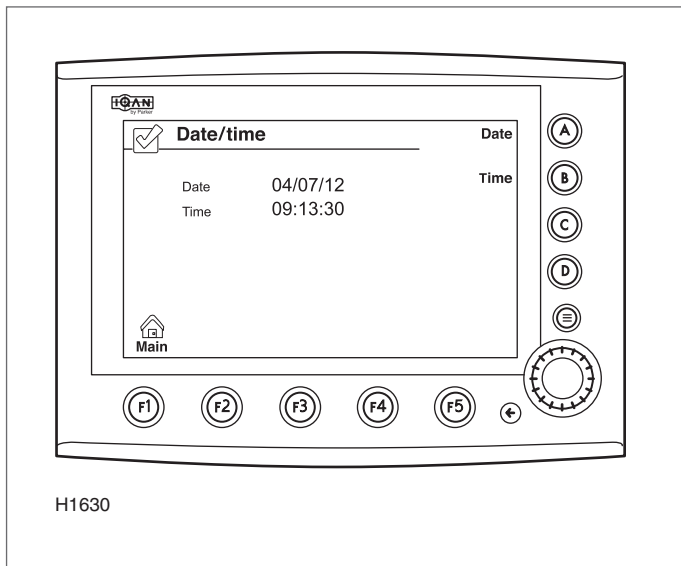
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H1629

Sub-menu Settings

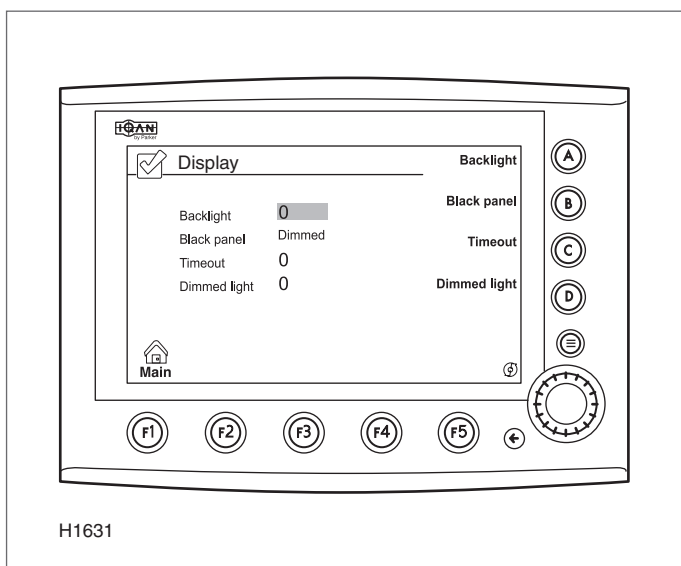
- Press button F3 in the main menu Adjust & measure.
- Press button A to set Date/time.
- Press button B to select Display settings.
- Press button C to select Language.
- Press the ← to return to the previous menu.
- Press button F1 to return to Adjust & measure main menu.
- Press button ≡ to return to the Start-up menu.



H1630

Third menu Date/time

- Press button A to set date.
- Press button B to set time.
- Select the required value by turning the scroller knob.
- Save the value by pressing the scroller knob.
- Press the ← to return to the previous menu.
- Press button F1 to return to Adjust & measure main menu.
- Press button ≡ to return to the Start-up menu.

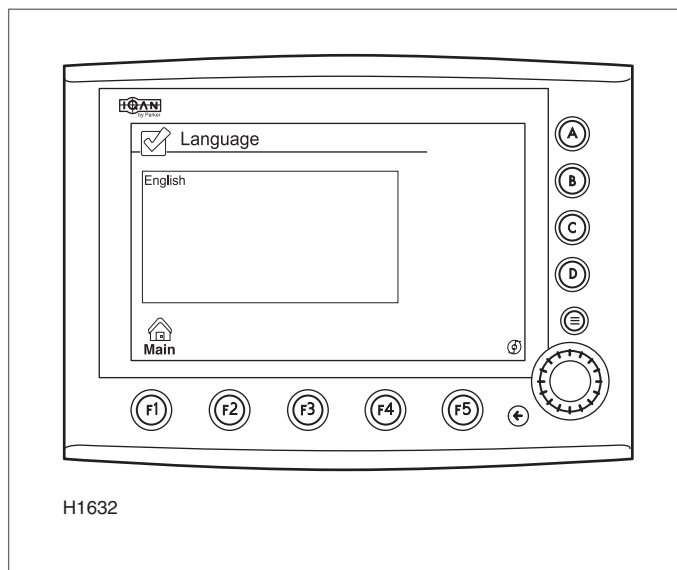


H1631

Third menu Display

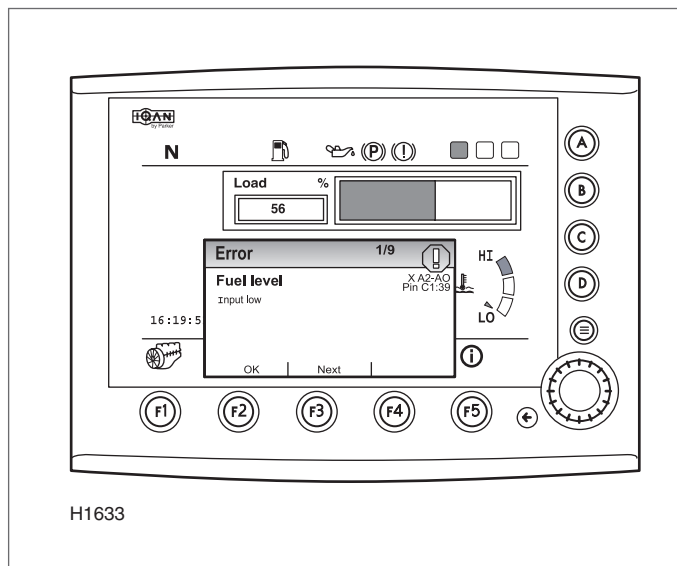
- Select settings by pressing buttons A-D.
- Change settings by turning the scroller knob.
- Save settings by pressing the scroller knob.
- Press the ← to return to the previous menu.
- Press button F1 to return to Adjust & measure main menu.
- Press button ≡ to return to the Start-up menu.

Before driving



Third menu Language

- Select a language by turning the scroller knob.
- Save settings by pressing the scroller knob.
- Press the ← to return to the previous menu.
- Press button F1 to return to Adjust & measure main menu.
- Press button ≡ to return to the Start-up menu.



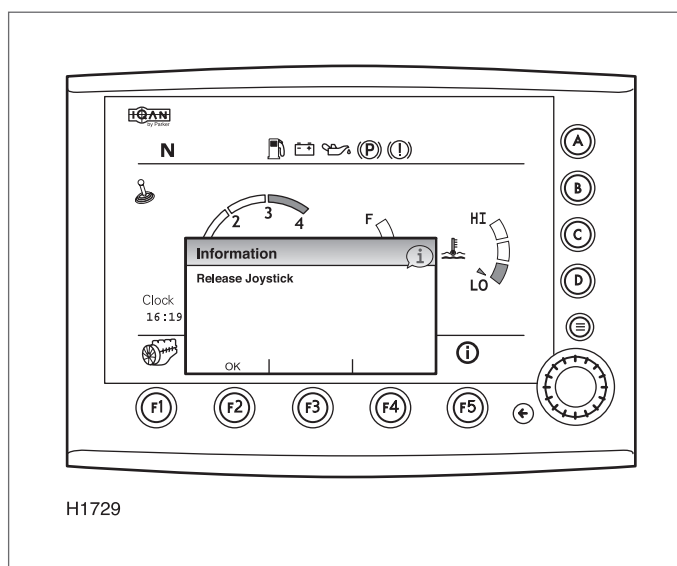
Error message display

This message is displayed if an input value, that is not within the preset limits, is registered.

The message will inform you about the digital input, error code and pin number. "Input high" or "Input low" is also displayed.

- Press F2 to acknowledge the message.
The message will disappear from the display, but the fault remains on the truck.
- Press F3 to display more than one error code.

Button ≡ takes you to the Adjust & measure menu.



Alarm and message display

The alarm message, due to anything abnormal, informs you about

- cause of alarm
- digital input causing the alarm
- pin number.

- Press F2 to acknowledge the message.
The message will disappear from the display, but the fault remains on the truck.

- Press F3 to display more than one error code.

Button ≡ takes you to the Adjust & measure menu.

Before driving

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Starting the engine



WARNING

Exhaust fumes are harmful. Never run the engine in unventilated places.

Risk of serious injury or death.

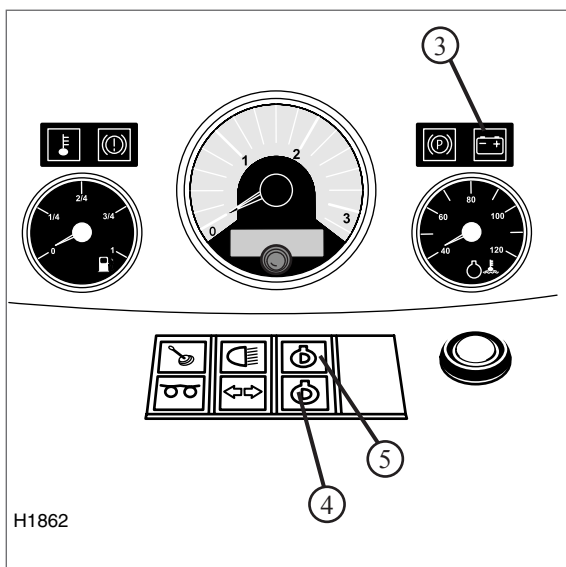
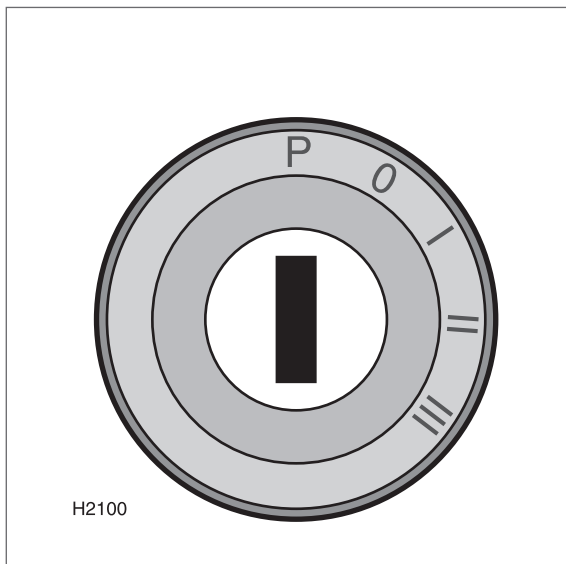
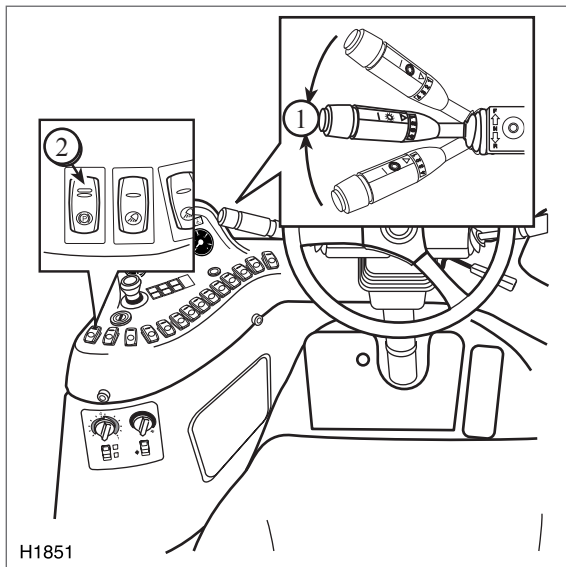
Use fume extraction.

Before starting up the engine, the driving direction control on the left-hand side of the instrument panel must be in neutral.

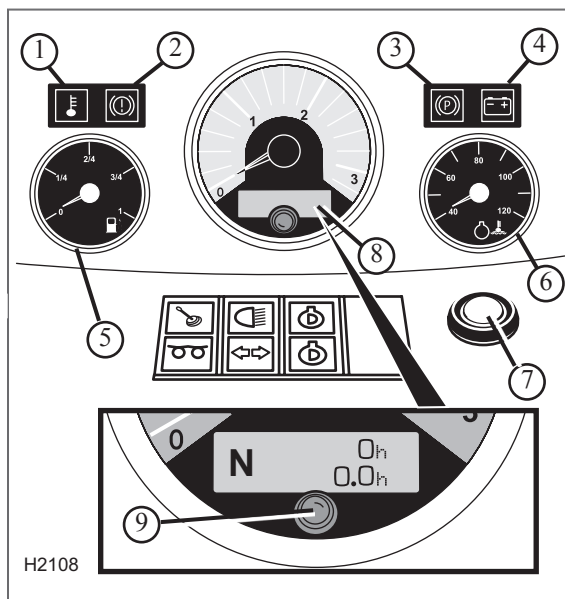
- Position yourself in the driver's seat.

- Insert the ignition key into the ignition lock, position (0).
- Turn the key into position (I). The electrical system is now turned on.

- Check that the generator charging lamp (3) is lit.
- Check that the engine diagnostics indication (5) is lit and then goes out.
- Check that the indication (4) for coordinator diagnostics (Scania) alternatively engine diagnostics (Cummins) and then goes out. The indication lamp is intended for use only in combination with Scania or Cummins engines.
- Turn the key into position (III). Release the key as soon as the engine has ignited.



Before driving



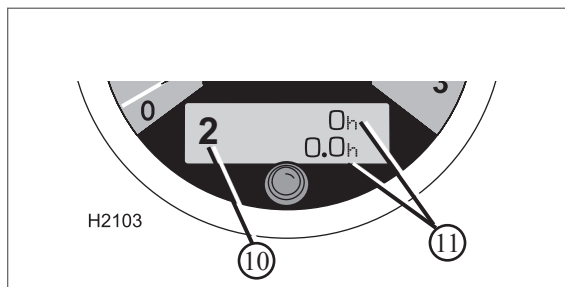
Warning indicators

- Indicator light (1) is lit when the brake temperature is too high. Max temp is 120 °C (248.00 °F).
- Indicator light (2) is lit when the accumulator pressure (brake pressure) is too low.
- Indicator light (3) is lit when the parking brake switch is activated.
- Charging light (4) goes out after start. If the light is lit during operation the generator does not charge.
- Gauge (5) displays fuel level. The gauge's warning light goes on when there is 12% fuel left in the fuel tank.
- Gauge (6) displays engine temperature. The gauge's warning light goes on at too high temperature.
- Warning light (7) is lit when there is alert for
 - Engine oil pressure too low
 - Engine temperature too high
 - Transmission temperature too high
 - Low fuel level

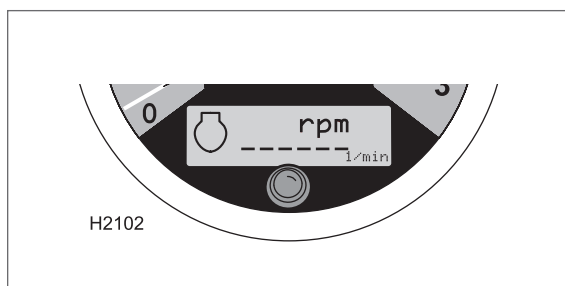


WARNING

If any of the following warninglights come on, or an indicator shows an abnormal reading during operation, the fault must be remedied immediately. Do not use the machine, in case the brake pressure light illuminates as brakes may not work.



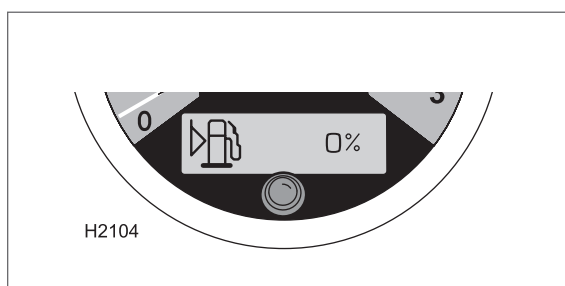
- The display (8) shows six different pages. Step through the pages by means of pressbutton (9).



The first page displays the selected gear (10) and two different hour meters (11).
Gears forward are indicated as 1-2-3. Neutral position is indicated as N. Gears reverted are indicated as R1-R2-R3.

One of the hour meters can be zeroed.

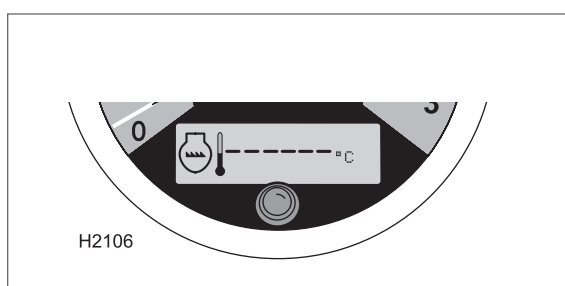
- Press the button (9) and keep it so for 3 sec in order to zero the meter.



The second page displays rotation speed (rpm).

The third page displays fuel quantity in percent (%).

- If the value blinks the fuel level is too low.

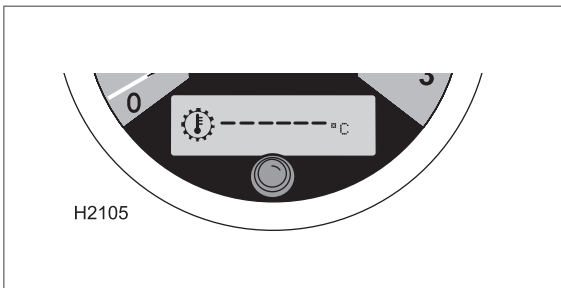


The fourth page displays the engine temperature.

- If the value blinks during operation the engine temperature is too high.

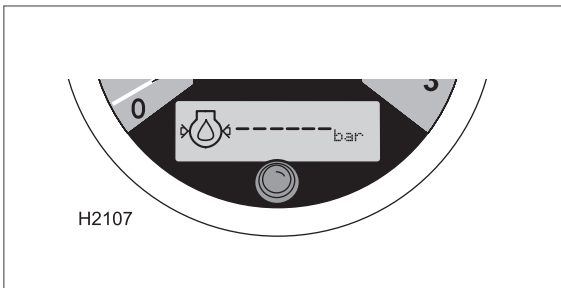
Before driving

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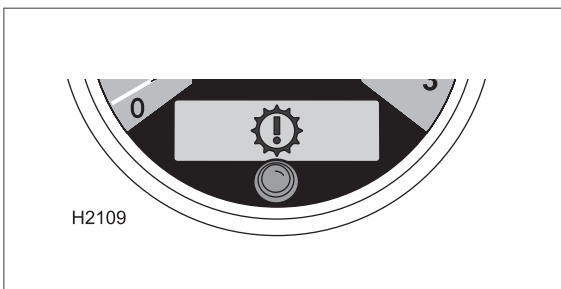
The fifth page displays the temperature of the gear box (transmission).

- If the value blinks during operation the temperature of the gear box oil is too high.



The sixth page displays the engine's oil pressure.

- If the value blinks during operation the oil pressure is too low.



Gear box alert

If a fault produces from the gear box (transmission), a gear box (transmission) symbol blinks on the display. This is purely a fault indication, for more information read off the error codes on APC200.

Engine diagnostics

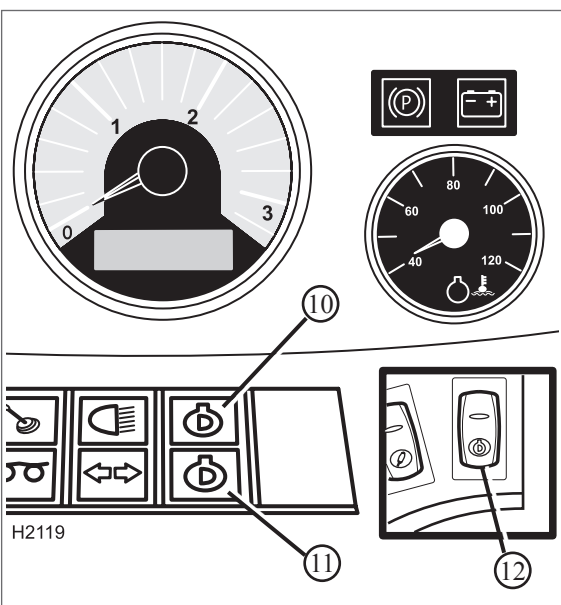
The red diagnostics light (10) is used to diagnose engines Volvo, Scania and Cummins.

The yellow diagnostics light is used to diagnose the coordinator for Scania or Cummins engines.

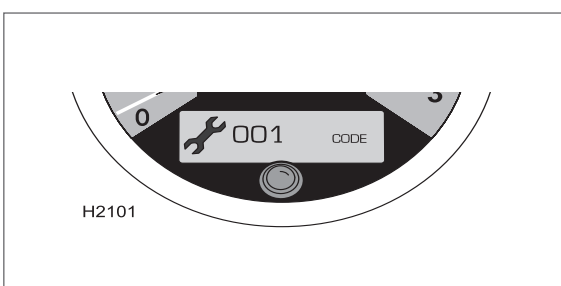
The diagnostics lights are lit when the ignition is switched on and go out after a few sec.

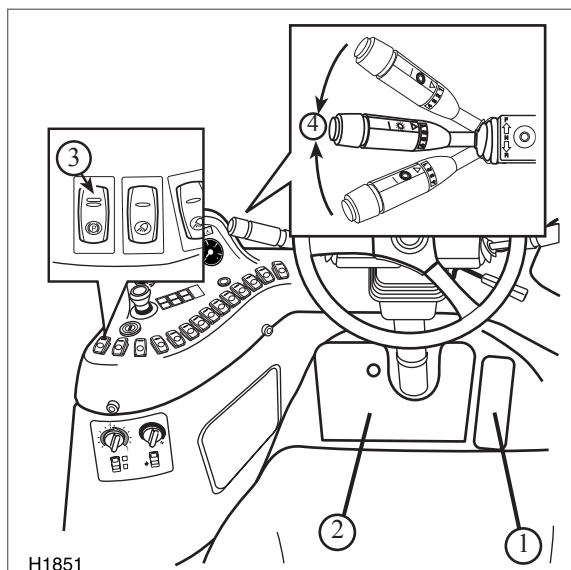
If the lights go on during operation, the engine's control system has discovered a engine fault. The system will reduce engine power in order to prevent serious damage to the engine.

- Press the engine diagnostics switch (12). The diagnostics light start blinking out fault codes.



- CODE 001 (service message) is displayed every 500 operation hours.





Stopping the engine

- Release the accelerator (1).
- Apply the brakes in a controlled manner (2).
- Engage the parking brake (3).
- Put the driving direction control (4) into neutral.

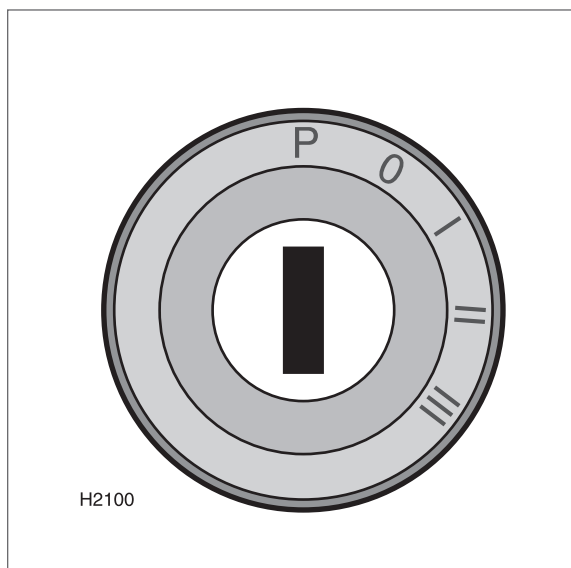
NOTE

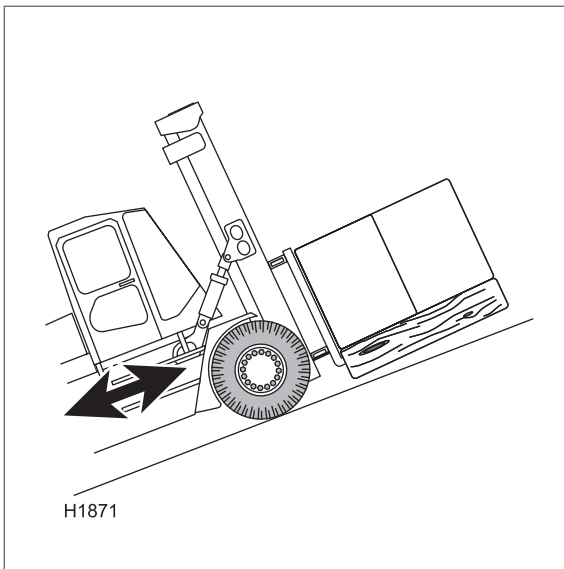
Allow the engine to idle for a few minutes if it has constantly been run hard this to avoid any turbo damages or overheating.

The current must not be interrupted before the engine has stopped.

- Turn the ignition key to position (P).
- Remove the key from the ignition switch when leaving the truck.
- Turn the electricity off as well at the main circuit switch if the truck is being left unsupervised.

Use the emergency stop only in an emergency situation.





Operating



WARNING

Driving on uneven terrain may cause damage to the machine.

Driving on surfaces with not enough support may cause the machine to roll or sink.

Risk of serious injury and damage to vehicle.

The truck is not intended for off-road driving. The truck is not equipped with wheel suspension and should therefore only be driven on level ground intended for the total weight and surface pressure of the truck.



WARNING

Risk of the brakes not stopping the machine.

Risk of the machine rolling.

Risk of serious injury and damage to vehicle.

Driving on slopes steeper than 15% is not permitted as a rule because of the minimum regulations for braking and the stabilising capabilities of the truck. If the truck has to be driven along steeper slopes, you should contact your SMV dealer. The hill-climbing capacity of the truck indicated in the data sheet is based on the pulling power of the truck, and applies only to driving over obstacles and minor irregularities in ground level.

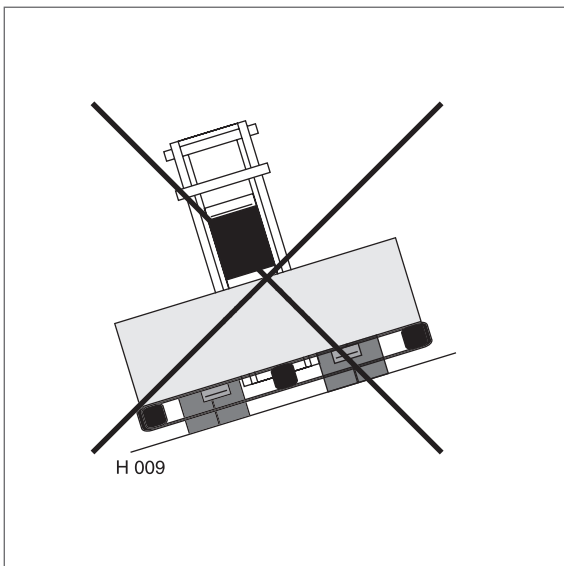


WARNING

Always adjust your method of driving to the condition of the road (undulations, etc.), to hazards within the working area and the load.

Risk of serious injury and damage to vehicle.

- Start the engine
- Tilt the lifting frame backwards a little
- Hold the steering wheel steady. Always use the whole of your hand to hold the wheel knob.



WARNING

The working range of the machine is large and visibility from the driver's cab is limited.

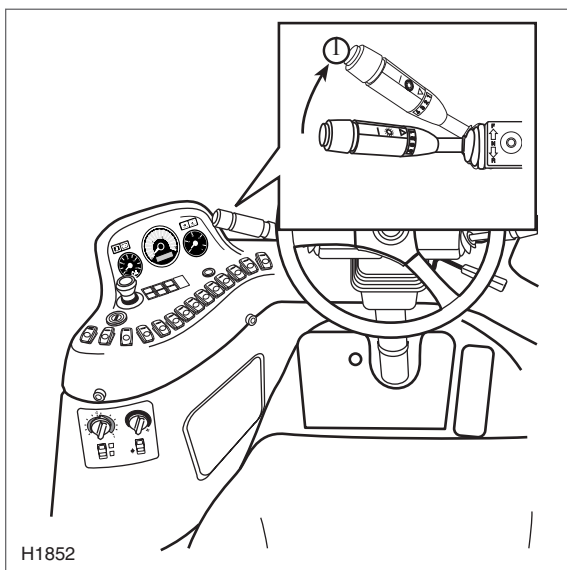
Risk of serious injury and damage to vehicle.

Before you start to move the truck, check that the road ahead is free and that you have a clear view.



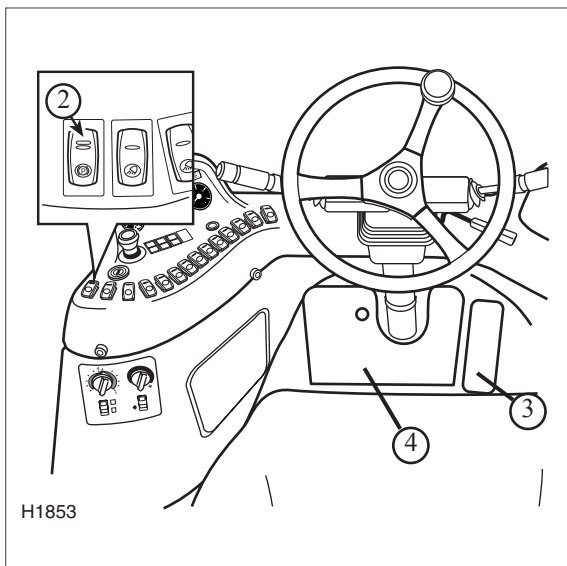
WARNING

Avoid driving on slopes or uneven ground when transporting a container. Never cross or turn on a slope.



Driving forwards

- Press brake pedal (4).
- Push the gear selector (1) forward.



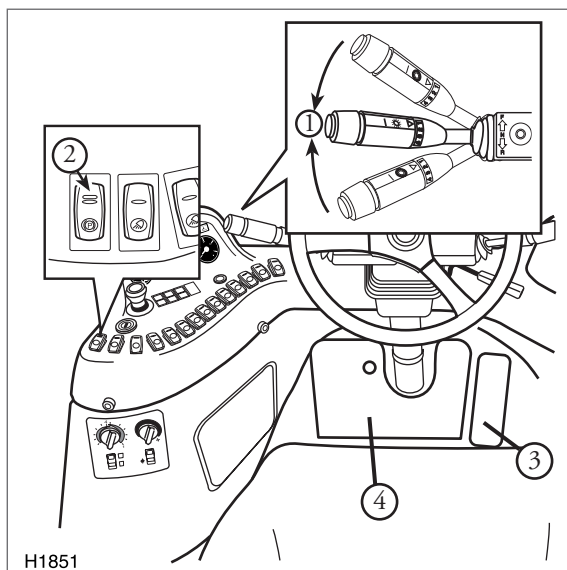
NOTE

Always start in first or second gear to avoid damage and prevent the gearbox from overheating.

- Push the driving direction control (1) forward
- Release the parking brake (2)
- Release the brake pedal (4).
- Depress the accelerator (3) slowly so that the truck starts off gently.

NOTE

When starting up a hill, hold the machine still using the brake pedal (4) until you have sufficient pulling power.



Stopping the truck

- Take your foot off the accelerator (3).
- Press the brake pedal (4) and stop the truck in a gentle, controlled manner.



WARNING

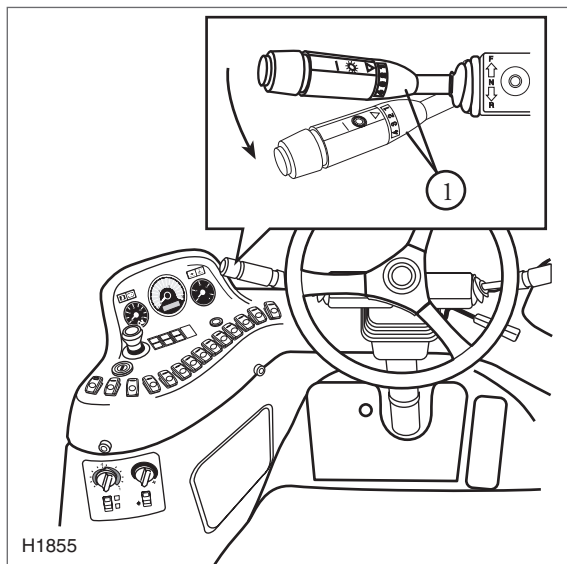
Sudden braking and acceleration may cause the machine to roll or tip.
Risk of serious injury and damage to vehicle.
Avoid violent acceleration and braking.



CAUTION

Do not use the gearbox as a brake.

- When the truck has stopped completely, engage the parking brake (2) before releasing the brake pedal.
- Put the driving direction control (1) into neutral.



Driving backwards

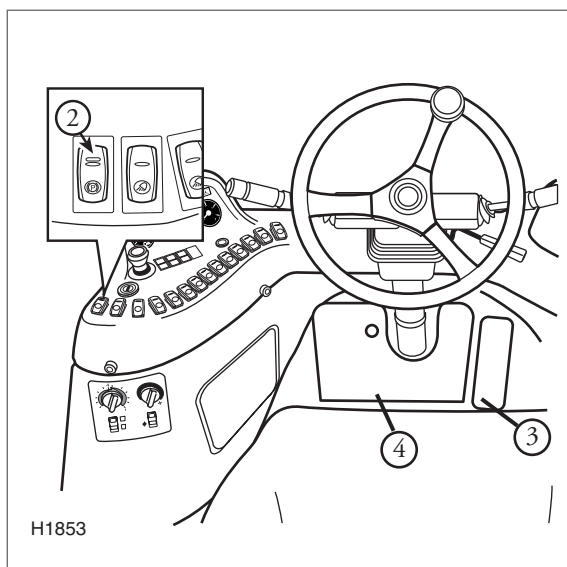
Changing the direction of driving



WARNING

The truck must be completely stopped before changing the direction of driving.

- Pull the driving direction control (1) backwards.

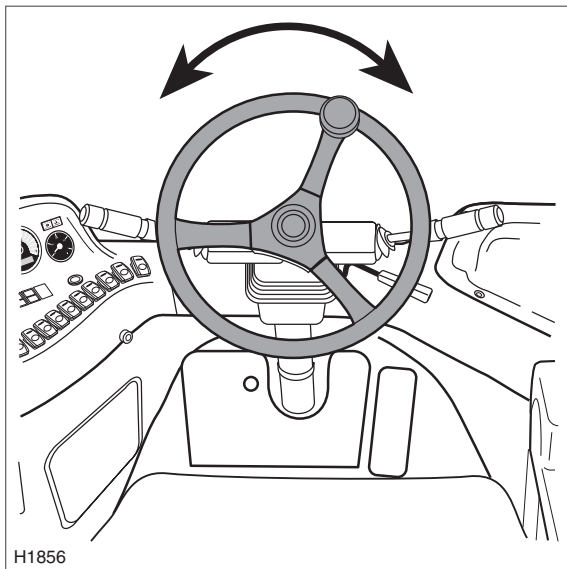


- Release the parking brake (2).
- Depress the accelerator (3) slowly so that the truck starts gently.

NOTE

When starting uphill, hold the machine stationary with brakepedal (4) until you have obtained sufficient pulling power.

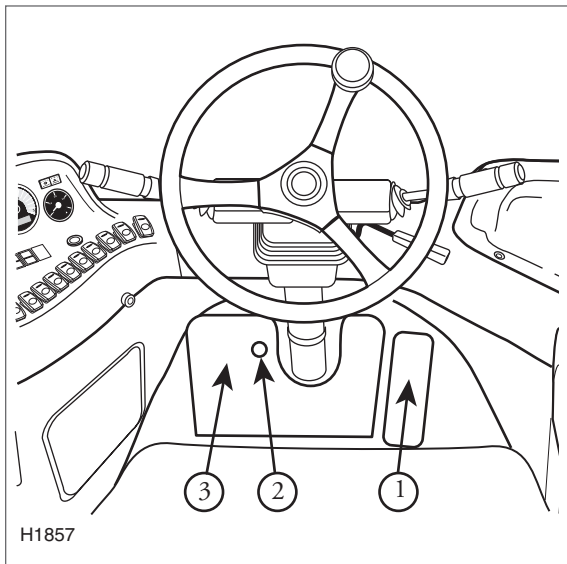
Steering and braking



Steering

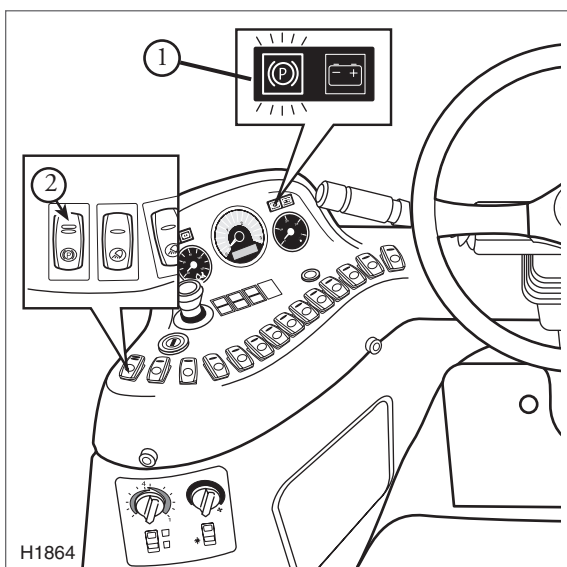
Very little effort is needed to turn the steering wheel thanks to the servo-assisted steering system.

To minimise unnecessary wear and tear to the tyres, the steering wheel should, if possible, be turned only when the truck is moving.



Declutch

- Release the accelerator (1).
- Activate the clutch using the disengaging switch (2).
- If the parking brake switch is pressed at the same time as the brake (3) pedal, the brakes are applied.
- When braking, using only the brake pedal (3), the disengaging function is activated only after the brakes have been applied.

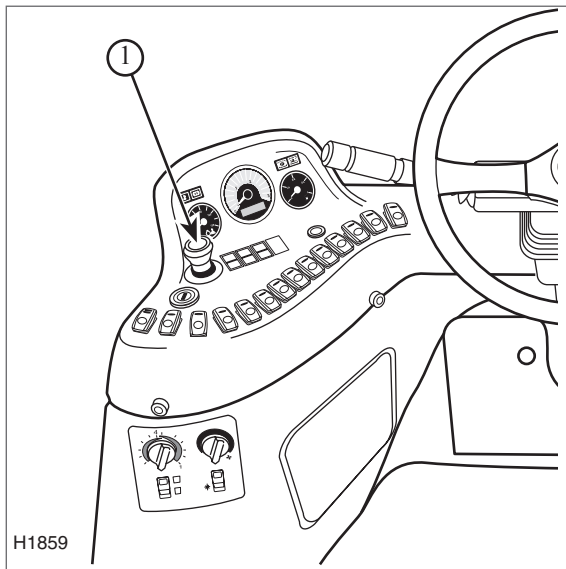


Parking brake

- The parking brake (2) is to the left of the steering wheel.
- The parking brake **should not** be used to bring the truck to a halt unless in an emergency.
- When the parking brake is applied, the warning light (1) is illuminated.
- If the driver is leaving the seat with parking brake not activated, a audio signal is sounding.

Emergency switch

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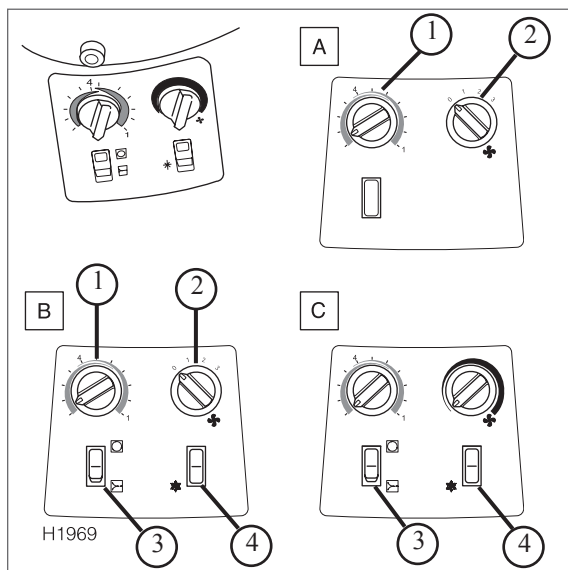
Emergency stop

- When using the emergency stop (press button (1) down wards), all functions are cut out, the parking brake is activated and the engine stops.



WARNING

There is a risk of tipping over if the emergency stop is used when the truck is moving.
Risk of serious injury and damage to the vehicle.



Ventilation

A = Heating;

- (1) heating
- (2) fan

B = AC;

- (1) heating
- (2) fan
- (3) recirculation
- (4) cooling

C = ACC;

- (1) heating
- (2) fan (variable)
- (3) recirculation
- (4) cooling

Settings for different weather conditions

Hot weather and normal atmospheric humidity

- Open the fresh air intake.
- Turn off the heating.
- Turn on the cooling system and set the cooling thermostat at desired temperature.

Very hot weather and high atmospheric humidity

- Close the fresh air intake.
- Turn off the heating.
- Turn on the cooling system and set the cooling thermostat at desired temperature.

Fall or early winter and high atmospheric humidity caused by rain and sleet; steamy windows

- Turn on the cooling system.
- Open the fresh air intake.
- Open a window to provide air circulation.

Decrease heat if necessary.

Cold weather during winter time

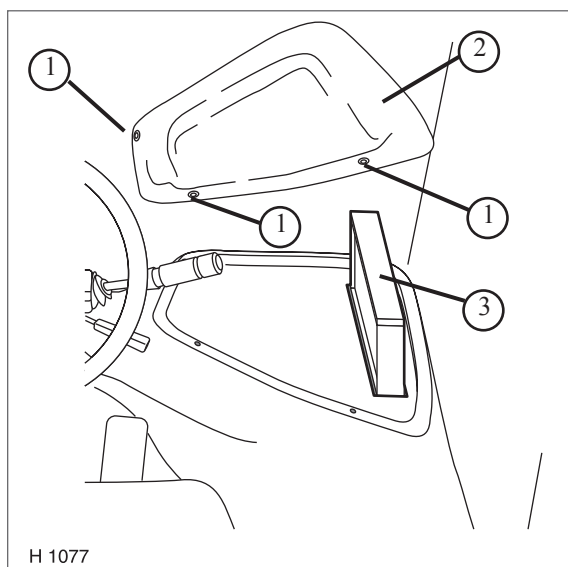
- Open the fresh air intake, turn off the cooling system.
- Set the temperature as desired.

Very cold weather and low atmospheric humidity

- Close the fresh air intake.
- Turn off the cooling system.
- Adjust the temperature.

Cold and dry periods during winter time and little usage

- Turn on the cooling system, operate the compressor for a few minutes, so that couplings, gaskets etc are lubricated.

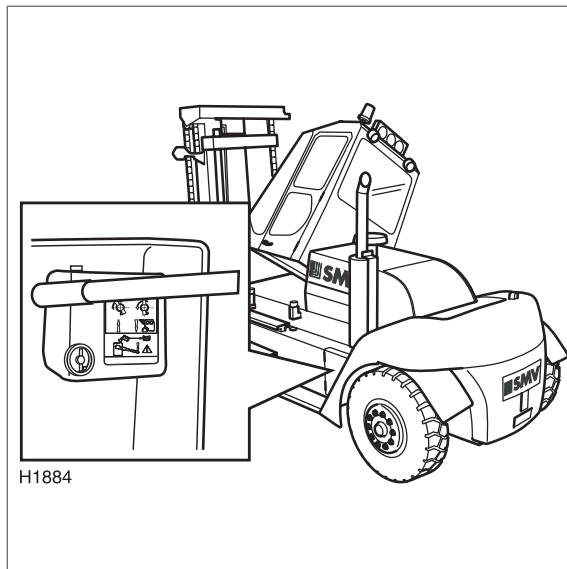


Cab filter

A filter for cab air intake is located on the right hand dashboard.

- loosen the screws (1)
- disassemble the cover (2)
- pull up the filter cassette (3) gently to avoid dust in the climate unit and cabin.

Replace the filter insert, Part No. 2050000143.



Cab tilting

All standard machines are equipped with a manually operated hydraulic cab tilting device. (Electro-hydraulic tilting can be fitted as optional equipment.)



WARNING

Loose objects might fall out of the cab and the doors can fall off the hinges.
Risk of serious injury and damage to vehicle.
Before the cab is tilted, both doors must be shut.
Loose objects inside the cab should be removed.
The mast must be in vertical and the carriage in lowered position.

Open the hatch (using the special tool) on the right of the fuel tank, located on the vehicle's left side. This compartment contains the tilt pump and the pump handle.

When tilting upwards, the valve is rotated clockwise and for tilting downwards it is rotated anti-clockwise, using the pump handle's lower end. Insert the pump handle into the attachment and start pumping.

When the vehicle is on the move, the cab shall always be in the fully lowered position.



WARNING

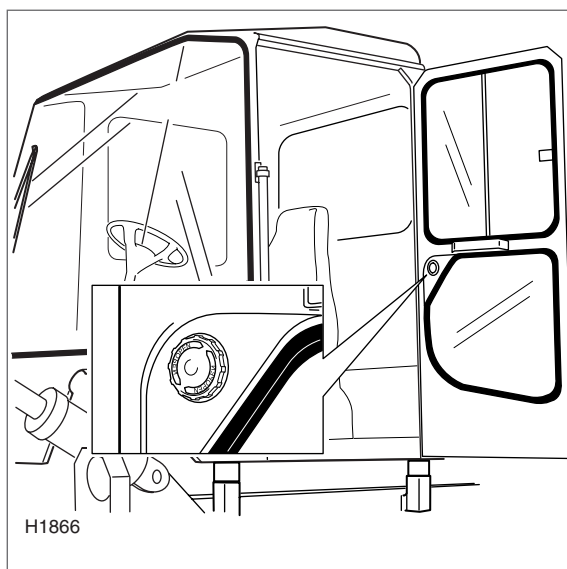
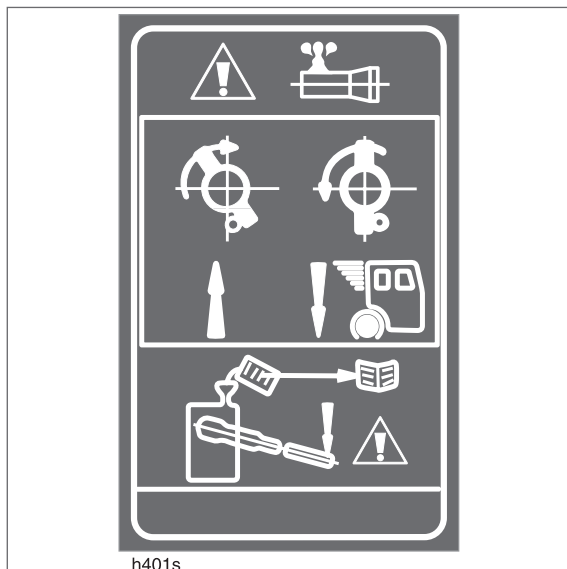
Always tilt the cab to its end position.
Risk of serious injury.
Do not allow anyone to stand or walk under or near-by a tilted cab.

A simple graphic sign is attached to the pump.



WARNING

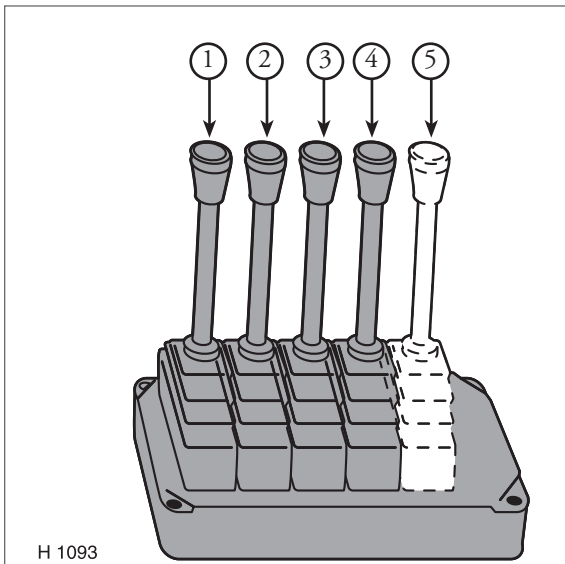
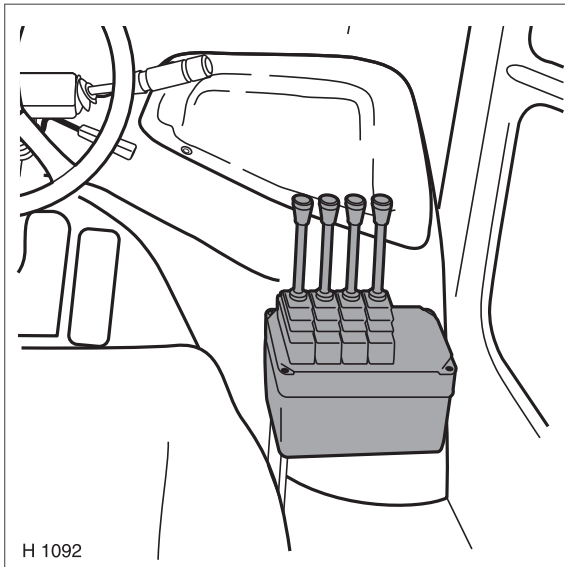
A tilted cab allows only limited operations.
Risk of serious injury.
The machine must never be driven if the cab is partly or fully tilted.



Locking open door

The cab door can be locked in open position.

- Open the door until it locks in position.
- Turn the knob clockwise to unlock.



MANOEUVRING THE MAST

Manoeuvring levers



WARNING

Use the frame and its attachments only for approved applications.
Risk of serious injury and damage to vehicle.
The use of the machine beyond its designed purposes may cause capacity and stability to be exceeded.
The driver must be trained to handle the truck and its equipment.

Always operate the control gently and slowly.

The speed of the hydraulic functions is determined by the control lever's position.

The control automatically slips into its initial position when released.

All hydraulic controls sit on the console to the right of the driver's seat.

Note

Observe the operating symbols and directional arrows.

Raising the fork carriage.

- Pull lever control (1) backwards.

Lowering the fork carriage.

- Push lever control (1) forwards.

Tilting the fork carriage backwards.

- Pull lever control (2) backwards.

Tilting the fork carriage forwards.

- Push lever control (2) forwards.

Sideshifting

- Push lever control (3) forwards to move the forks to the left.
- Pull lever control (3) backwards to move the forks to the right.

Manoeuvring the fork positioning

- Push lever control (4) forwards to increase the distance between the forks.
- Pull lever control (4) backwards to decrease the distance between the forks.
- Extra function (5) is optional.

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Before lifting loads

Capacity plate

Before lifting a load, read the lifting capacity plate on the left side of the cab.

If an accessory has been fitted, read the capacity plate for this.

The values indicated on the capacity plate are valid for compact and regular loads, and if they are exceeded, there is a risk to the stability of the truck and the tensile strength of the forks/lifting frame.

Maximum capacity depends on the height of the lift and the distance to the centre of the load, "LC". "LC" is the distance between the front face of the vertical fork arm and the gravity center of the load.

Read the capacity plate according to the following example;

Main lifting capacity

Lifting capacity of 10 000 kg at lifting height 4000 mm and center of load 600 mm (related to model).

Alternative lifting capacities

Worked sample

Lifting capacity is decreased by prolonged "LC" or lifting height according to the following examples;

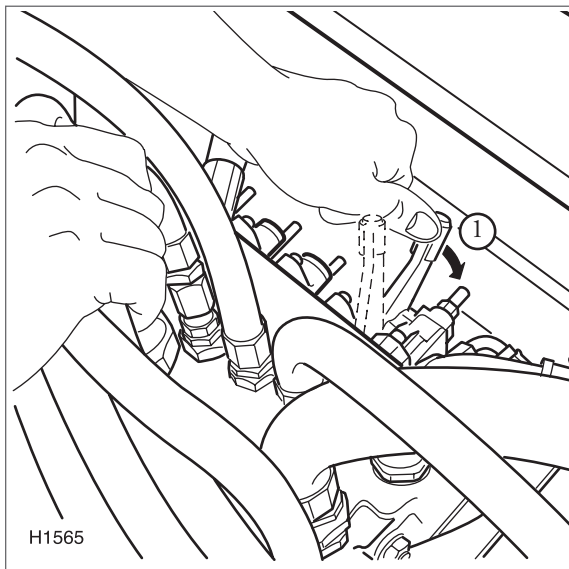
Lifting capacity of 7800 kg at lifting height 4000 mm and center of load 900 mm.

Lifting capacity of 5800 kg at lifting height 4000 mm and center of load 1200 mm.

Lifting capacity of 4800 kg at lifting height 4000 mm and center of load 1500 mm.

Emergency lowering

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Emergency lowering

The truck is equipped with a hydraulic servo (option electro/hydraulic servo). If the engine or the hydraulic system should failure, it is impossible to lower the load by means of the hydraulic controls.

The directional valve is equipped with a mechanical lever, that makes emergency lowering possible.



DANGER

Make sure that the carriage and the mast can be lowered without obstruction.

Make sure that no person or object is below or nearby the load.

Risk of serious injury and damage to vehicle.

- Tilt the cab.
- Push the lever (1) forward.

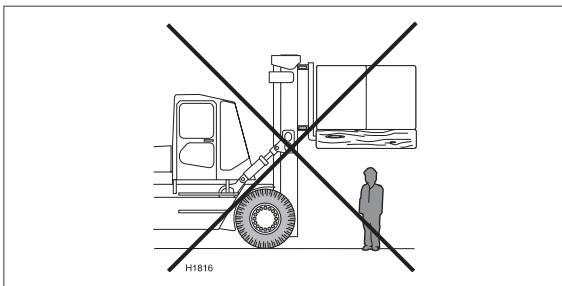


CAUTION

When the mast has been lowered it is not possible to rise it until the engine and hydraulics operate properly.

Lifting and driving with loads

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Lifting of loads



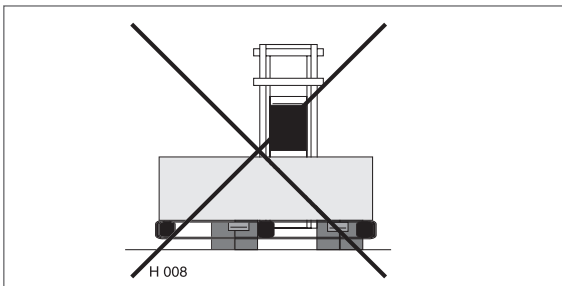
DANGER

Load and attachment may drop down.
Risk of serious injury or death.
Do not allow anyone to stand or walk under the elevated portion of the truck whether it empty or loaded.



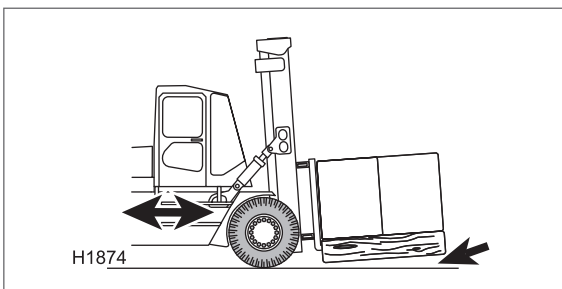
WARNING

Load and attachment may drop down.
Risk of serious injury or death.
Never park and leave the truck unattended with the load lifted.



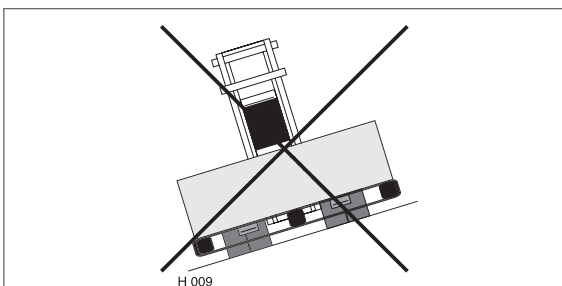
Driving with loads

- Do not drive with the load in a non central position (e.g. sideshifting) .
- Transport the load as close as possible to the ground.

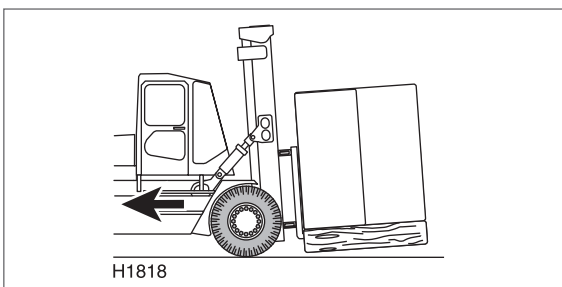
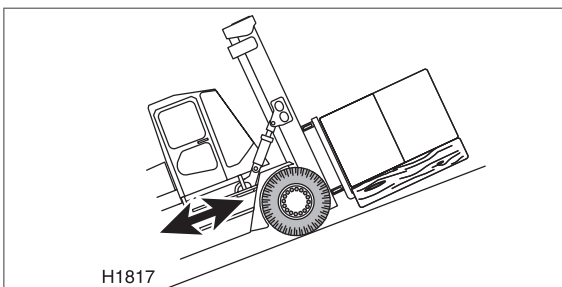


WARNING

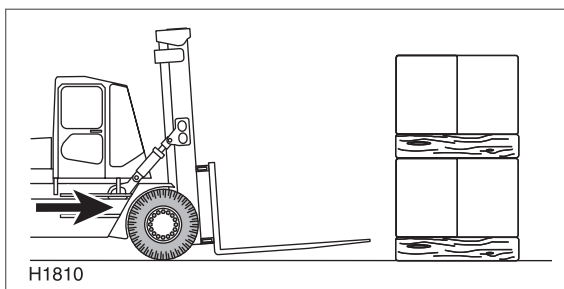
Avoid driving on slopes or uneven ground when driving with load.
Always drive with the load up-hill when driving up or down a slope. Never drive or turn across a slope.
Never drive with forks or load in raised position.



- Work with a guide, if your view is obscured.
- Drive the truck backwards if the transported load is stacked so high that it obscures the front view.

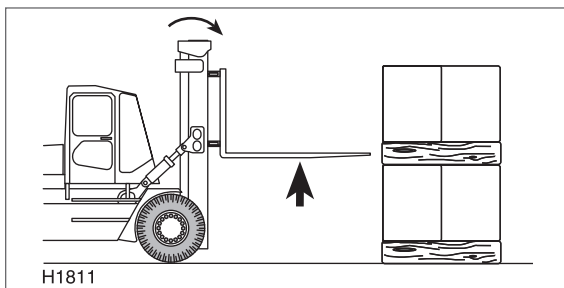


Lifting and driving with loads

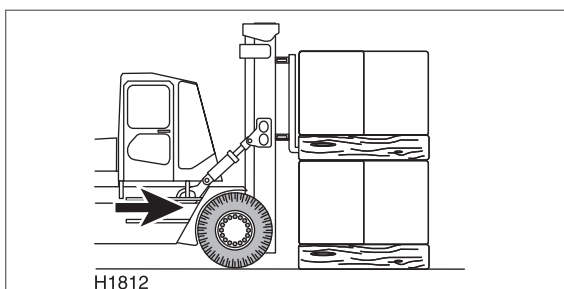


Lifting loads

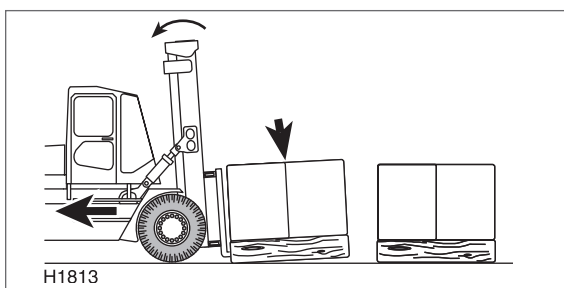
- Drive forward towards the load which must be lifted as carefully and as precisely as possible.



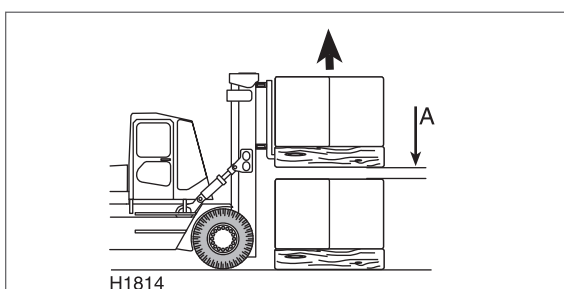
- Move the frame into a vertical position.
- Raise or lower the fork carriage to the correct height.



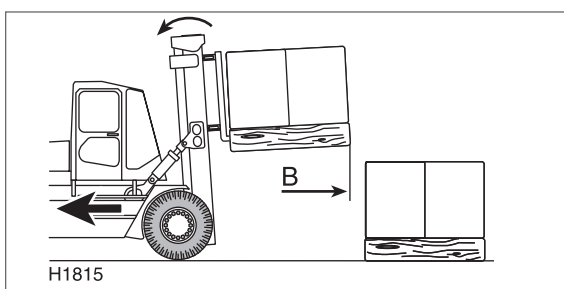
- Carefully push the forks underneath the load until the forks touch the load.



- Ensure that the point of balance of the load is between the forks.



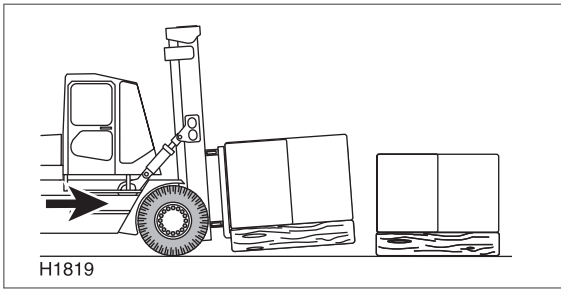
- Raise the mast until the loads rests on the forks, but only as much as needed to ensure clearance from the stack; 'A' = 20-40 cm.
- Tilt the mast slightly.



- Reverse the truck only as much as needed to ensure clearance from front of the stack; 'B' = 20-40 cm.
- Tilt the frame backwards.
- Lower the load to the transit position.

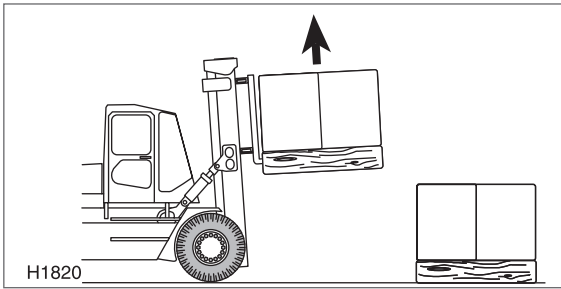
Lifting and driving with loads

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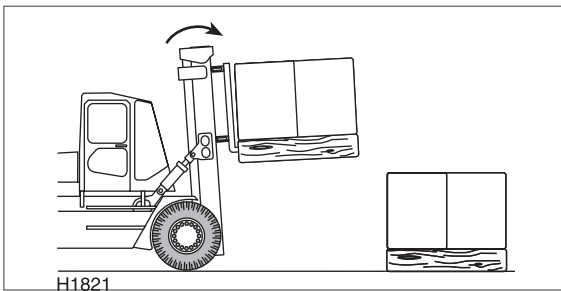


Unloading loads

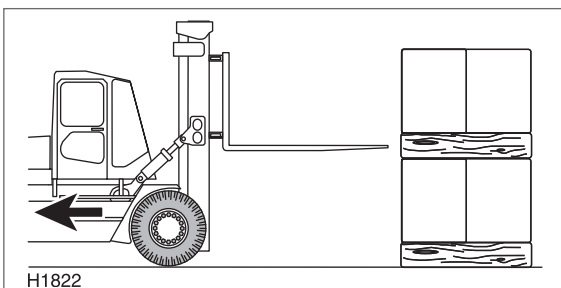
- Drive forwards as carefully and precisely as possible to the stack or arrangement where you are to deposit the load.



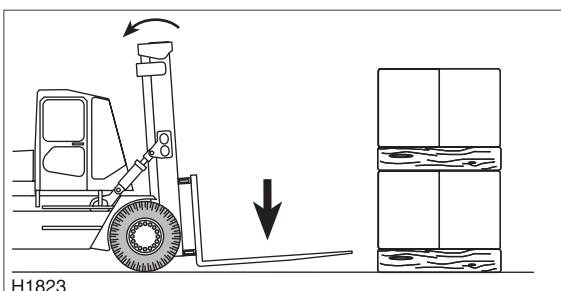
- Raise the fork carriage to the correct height.



- Place the frame in a vertical position.
- Drive carefully in towards the stack.
- Lower the load.



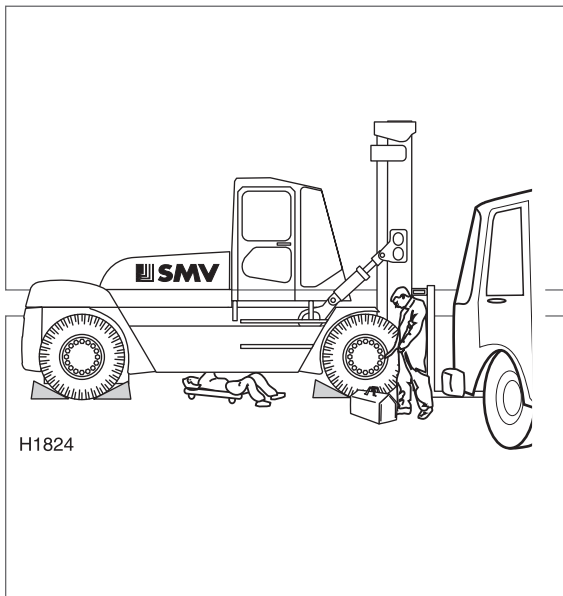
- Reverse slowly from the stack. Make sure there is clearance between the stack and the forks.



- Lower the forks into transport position. Tilt the mast slightly backwards.



WARNING
Never drive with forks or load in raised position.



General information



Warning

The truck contains several chemical substances, which may cause skin irritation and allergies. Risk of personal injury when in prolonged contact with skin!

When handling chemical substances such as oils, hydraulic oils, fuel, greases, etc avoid direct contact with the skin. Use protective gloves. Immediately wash skin that comes in contact with chemical substances.

Preventive maintenance and maintenance must be carried out regularly and in accordance with the regulations supplied in the inspection table so that the truck will work as well as possible.

Maintenance must only be carried out by trained staff or an authorised Konecranes Lifttrucks- dealer in accordance with a service agreement. If you wish to service the machine yourself, we recommend that you carry out the first three customer service checks in the presence of Konecranes Lifttrucks' authorised staff who can check that you are following the maintenance instructions.

Before any service work, check that:

- the machine is parked on firm, level ground.
- the machine is blocked so that it cannot roll.
- the engine is turned off and the ignition key removed.
- the accumulator pressure is released.
- the fork carriage and the mast have been secured if they are in raised position
- the machine is firmly chocked if work is to be carried out underneath when the machine is lifted up.

After every service, carry out a test drive and an operational test on the truck.

NOTE

If the machine is used in extremely warm, cold or dusty environments or in other unfavourable conditions, the service should be carried out more frequent compared to the inspection table.

Clean the area around each component before lubricating, changing filters or repairing the hydraulic system. Use only clean containers when topping up lubricants.

Electric welding



CAUTION

It is important to follow these instructions when electric-welding on the machine. Risk of serious damage to the machine. Battery cabling and all control units must be disconnected.

1. Remove the battery leads and the leads to the alternator.
2. **Important!** Disconnect **all** control units in and on the machine.
3. Connect the weld clamp to the component to be welded and close to the welding point, never to the engine or in such a manner that the current can pass over to a bearing.

When you have finished welding, connect the leads to the alternator and control unit before connecting the batteries.

Jump-starts



CAUTION

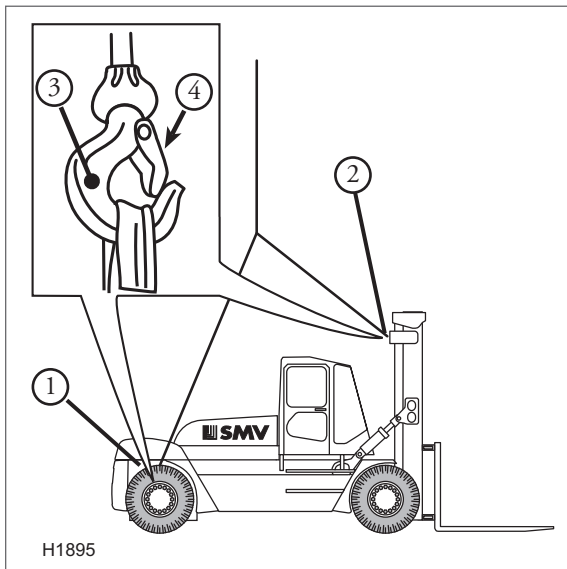
It is forbidden to jump-start the machine by means of a quick-charger, a booster, a power-pack or similar. It can cause current-rushing and serious damage to the control units.

1. Connect the first cable from the + contact of the auxiliary battery to the + contact of the starter motor.
2. Then connect the second cable from the contact of the fully charged battery to the chassis, e.g. the starter motor fixing bolt, or a nearby side-member.
3. When the engine starts, remove the cables in the reverse order.

Running in/servicing after the first 150 hours of operation

The machine may be driven at full speed right from the start. However, prolonged maximum loading of the hydraulic system and transmission should be avoided during the first 50 hours of operation.

After the first 150 hours, carry out first service according to Maintenance Table.



Lifting the truck

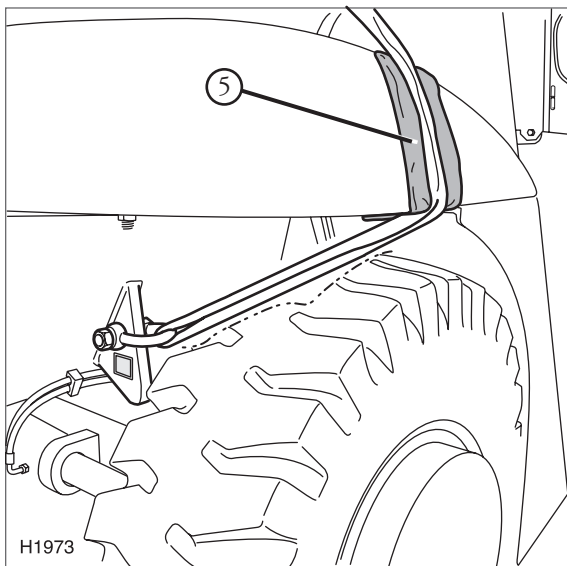


CAUTION

Use only lifting equipment and cranes which have sufficient lifting capacity. See the manufacturer's type plate for the weight of the truck.

Attach lift chains to the four points shown:

- Attach two lift slings to the lifting eyes placed on each side of the rear counterweight (1).
- Attach two lift slings to the lifting eyes on the top mast yoke (2).
- Attach the lift slings to the lift hook of the crane (3).

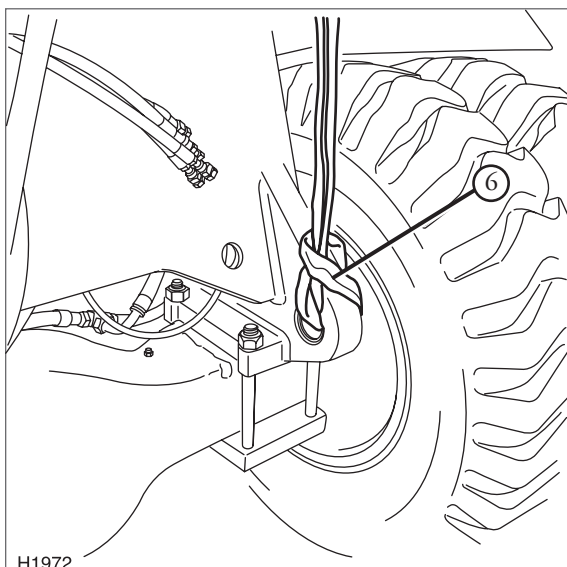


CAUTION

After attaching the lift slings to the lift hook, the safety lock (4) must be closed. When the truck is lifted, the lift slings must not rub against any part of the truck. Use a protective cushion(5).

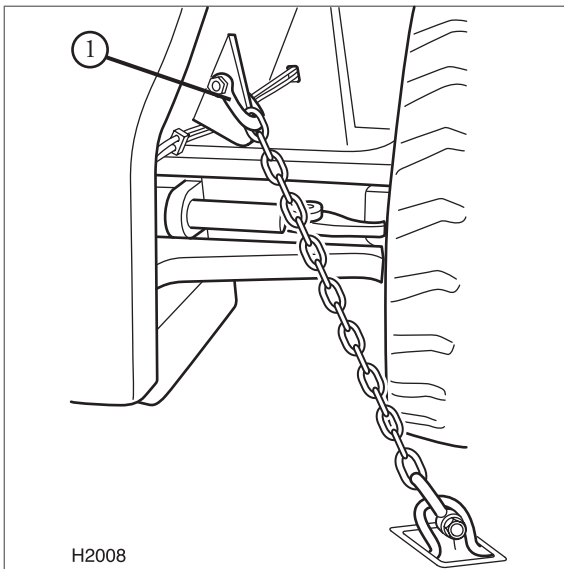
Lifting the truck without the mast

When the mast is dismantled it is possible to use the mast suspension ears as lifting devices.



CAUTION

Attach soft lift slings (6) to the mast suspension ears when the mast is dismantled. Shackles will damage the suspension ears and the bushings.



TRANSPORTATION

Do not exceed the the load limits of the transporting vehicle. See the manufacturer's type plate for the weight of the truck.

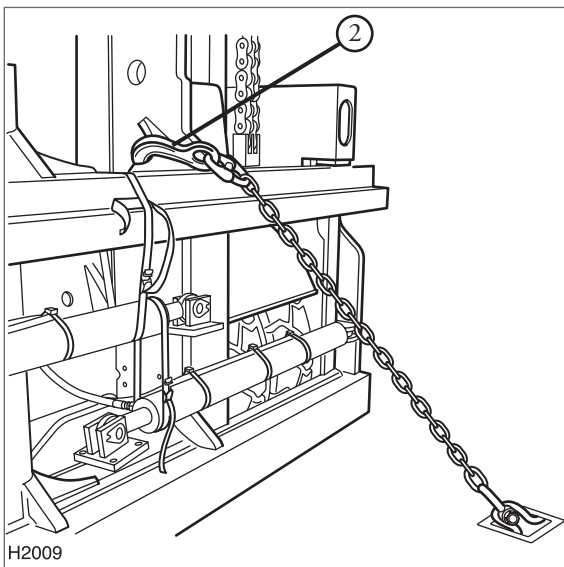


CAUTION

Check the total clearance height of the truck and the transport vehicle. There can be low overpasses along the transportation route.

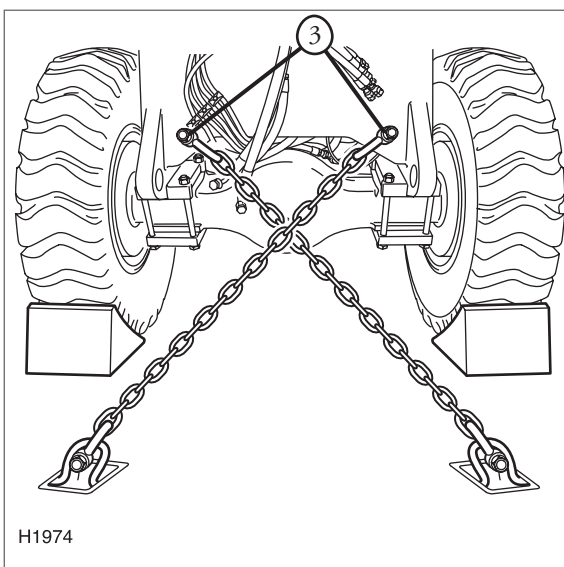
Secure the rear end

- Engage the parking brake.
- Place blocks before and behind each wheel to prevent movements in forward/backward direction.
- Hold the truck in place with 2 straps that are attached with shackles to the eyes (1) beneath the counter weight.



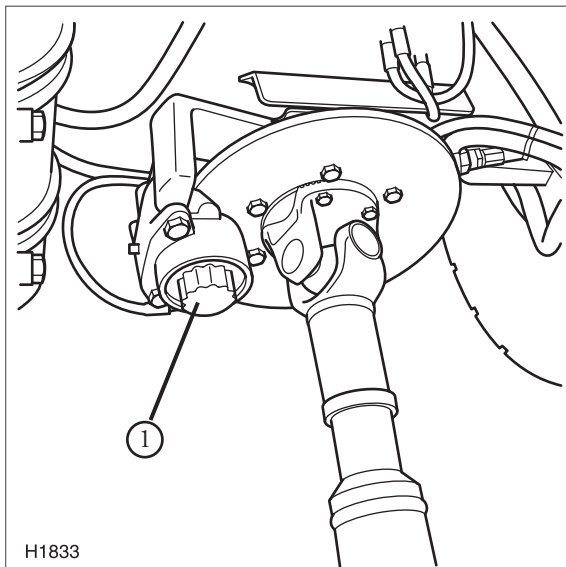
Secure the front end

- Lower and secure the mast and fork carriage.
- Attach 2 lifting hooks (2) to the fork carriage in order to hold the truck in place.



Secure the front end without mast

- Attach 2 shackles to the front lifting eyes (3) positioned on the chassi.



Towing



CAUTION

As the truck is equipped with a hydraulic braking system, servo-assisted steering and a hydraulic gearbox, the engine must be idling when being towed.

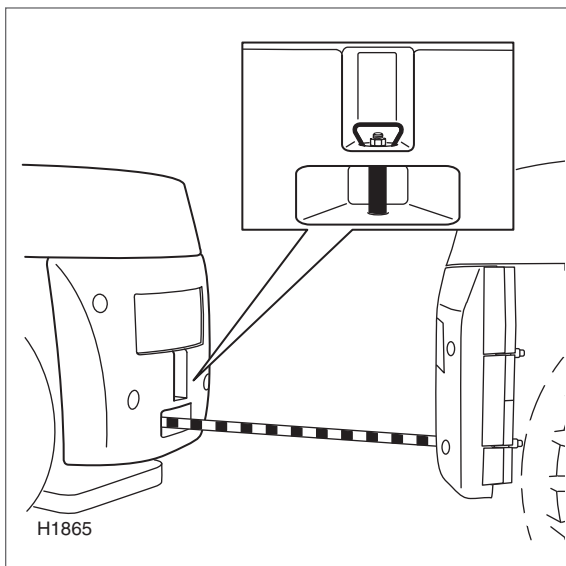
If this is not possible, the hydraulic parking brake (1) must be released, see page 76.

Remove the drive shaft, when towing longer distance.



WARNING

The truck will now have no brakes and must only be towed by a vehicle which has sufficient braking capacity to stop both vehicles.



- Use the rear towing pin to attach a steady towbar to the truck
- Attach the other end of the bar to the towing vehicle
- Place large blocks by the wheels
- Release the parking brake by tightening the bolt (1)
- The universal drive shaft must be disconnected before towing can begin
- Tow the truck very carefully at no more than 3 - 5 km/h
- The truck can still be steered, even if the steering is heavier with the loss of servo-assisted steering
- After being repaired, the brake function should be checked and the parking brake adjusted
- Reposition the universal drive shaft and tighten it.



Cleaning the truck

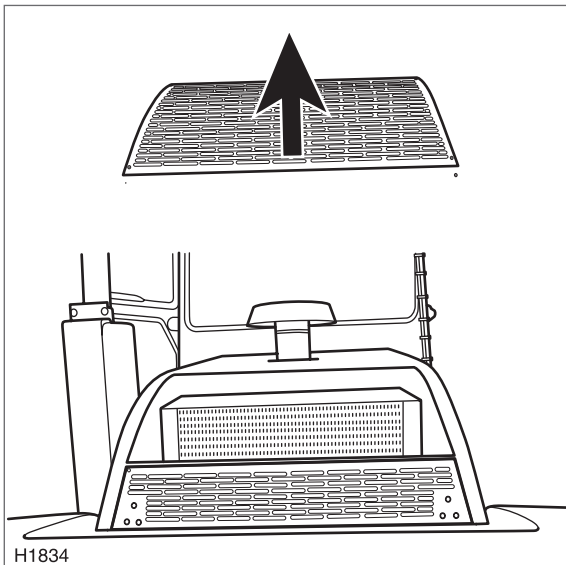
The length of time between cleaning sessions depends on the type of work carried out by the truck. If it is used in extremely aggressive environments where it is exposed to elements like salt water, fertilisers, chemicals, cement, etc., it should be thoroughly cleaned when the work is finished.



WARNING

Hot steam or aggressive degreasing agents should be used with great care. Protective clothing and eye protection must be worn.

- Protect all electrical components and the air intake filter from steam, water, etc., during cleaning.
- Clean particularly the areas around the oil top-up and lubrication places before servicing.
- If a degreasing agent is used in cleaning, allow sufficient time for it to penetrate and then rinse with a powerful jet of water.
- After cleaning the engine, it should be run warm so that it dries and to check that no water that has penetrated has caused any faults.
- All materials used in cleaning should be disposed in an environmentally-friendly manner.
- Always lubricate the truck after steam cleaning.



Cleaning the cooler

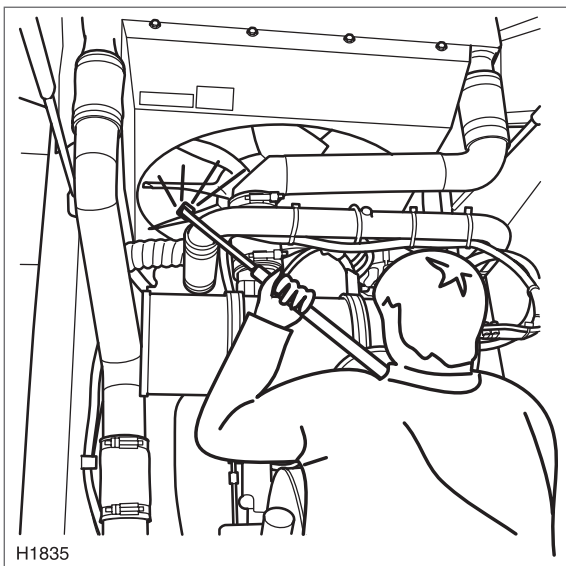


NOTE

The cooler must only be cleaned when the engine has been turned off and cooled down.

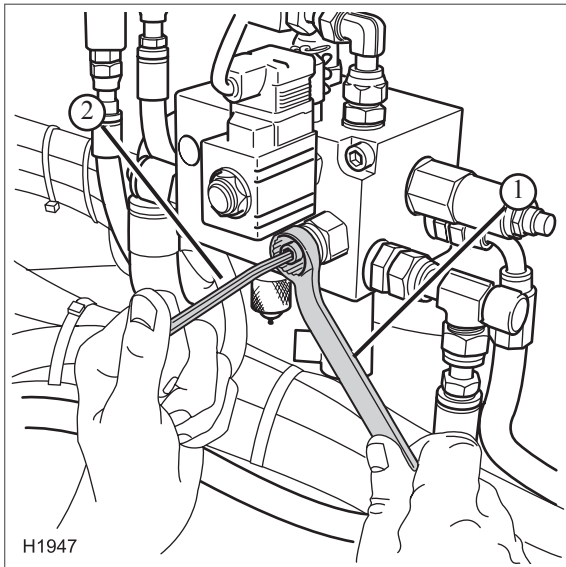
Do not use high pressure steam cleaner as it may damage the radiator fins.

- Loosen the four screws and lift the grating to clean the cooler from the outside.
- The most suitable way of cleaning the cooler is with dry compressed air.
- Blow against the direction of the fan.
- The cooler must not be cleaned with high-pressure water.
- In extreme cases, solvents or a jet of steam can also be used with great care.
- Allow the solvent time to penetrate. Rinse off with water.
- Run the engine warm so that surplus water evaporates and does not cause rusting.



Changing a wheel

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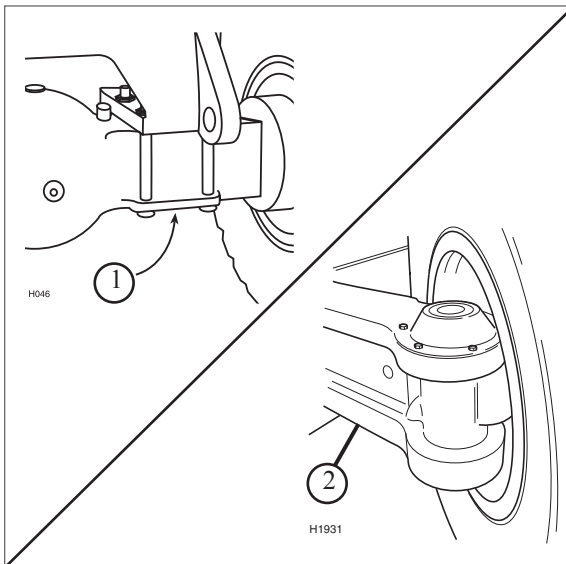
PRESSURE RELEASE



WARNING

Always release the brake pressure before maintaining or servicing the hydraulics of the truck. Never loosen any hydraulic hoses without ensuring that the brake pressure is released.

- Loosen the locknut using a 11/16" ring spanner (1).
- Loosen the drain screw using a 3/16" Allen-key (2).



CHANGING A WHEEL



WARNING

Observe the following regulations before lifting the truck. Use only a jack that has sufficient lifting capacity. See technical data sheet for axle pressure.

- To lift the truck drive axle, position the jack underneath the drive axle (1) and block the steer axle wheels.
- To lift the steer axle of the truck, position the jack underneath the main plate of the steer axle (2) and block the drive axle wheels.
- When working underneath the truck, support the underside of the chassis with suitable material. Do NOT simply rely on the jack.

Changing a wheel is a two-man operation.

- An ancillary truck fitted with an attachment for the wheel (1) facilitates the work.
- Position the truck on even ground.
- Lift the side of the truck and support the underside of the chassis in accordance with recommendations.

Specifications for drive axle and steer shaft tyres

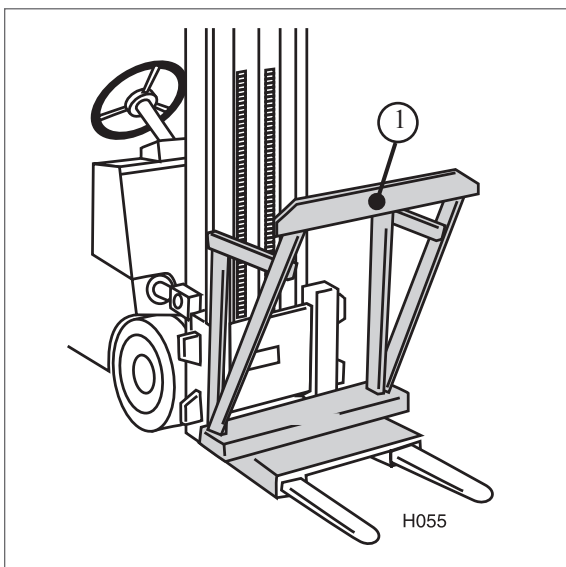
See machine card

Specifications for rims

Use only rims that are approved by the truck manufacturer.

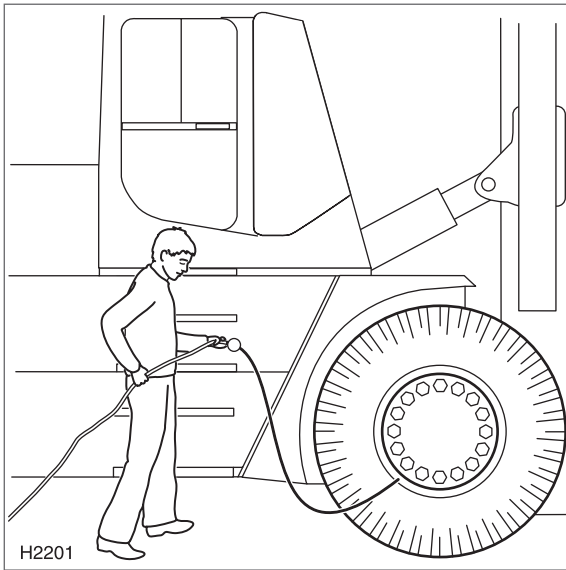
Other type of tyres

The truck is designed to use pneumatic tyres. Solid/cushion tyres are used only in consultation with the truck manufacturer.



Changing a wheel

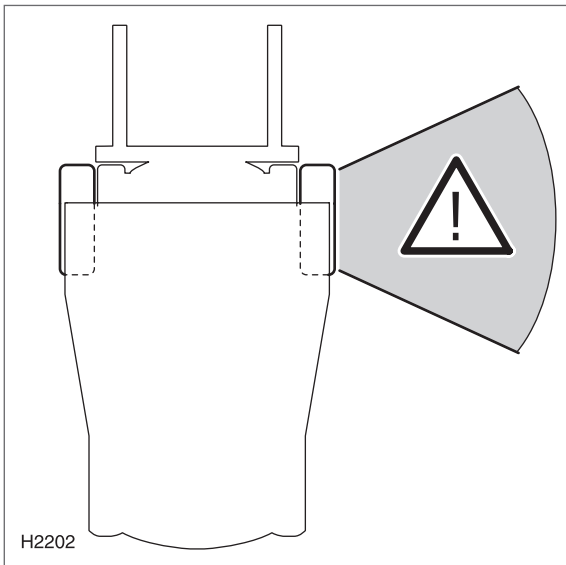
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DANGER
High-pressure tyres!
Risk for serious injury or death.
To avoid accidents - always follow these instructions when deflating or inflating tyres.

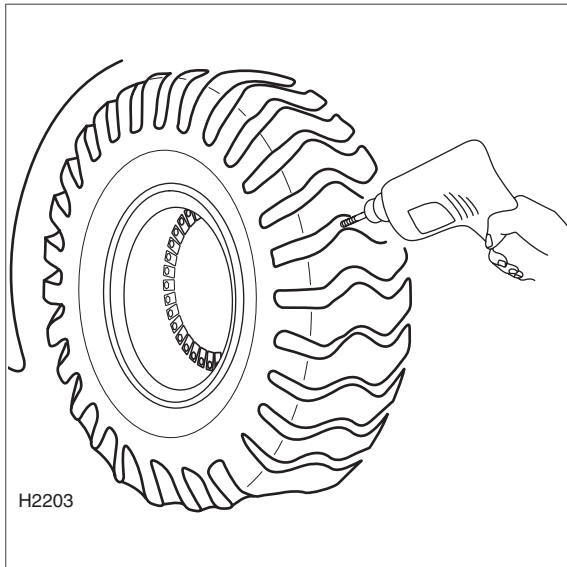


DANGER
High-pressure tyres!
Keep the face and body as far away from the inflation process as possible.



DANGER
High-pressure tyres!
Forbidden area when deflating or inflating tyres.

Changing a wheel



DEFLATING THE TYRE



WARNING

The valve can get damaged or plugged with ice when deflating the tyre. If air cannot be deflated through the valve or if there is any doubt on valve function a hole has to be drilled into the tread.



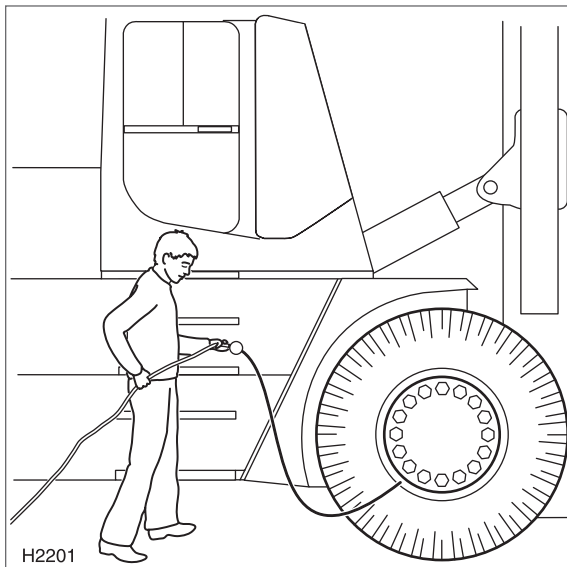
DANGER

High-pressure tyres

Keep the face and body as far away from the deflation process as possible.

Deflate as follows

- use protective eye glasses
- unscrew the valve cap
- unscrew the valve cone. Ensure that no part of the body is in the possible trajectory of the valve mechanism.



INFLATING THE TYRE



DANGER

High-pressure tyres

Keep the face and body as far away from the inflation process as possible.

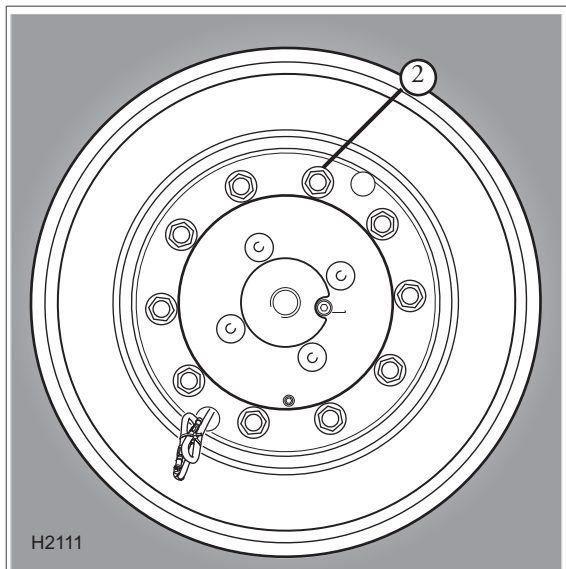
- Never hit a tyre or rim which is fully or partly inflated. The tyre must not be inflated until all parts are assembled.
- Rim components must never be assembled by means of hammer blows during inflating
- Disassemble the tyre and check the rim for damage if the tyre was deflated.
- It is important that all rim components are certified.
- Check that all components are in place when bead seating pressure is achieved.
- Final inflation adjustment to service pressure is performed with the wheel mounted to the truck or in a safety cage.
- The maximum inflation pressures specified by the tyre manufacturer must never be exceeded. If another rim or tyre than recommended is used, other pressure values might be valid. Get in contact with Konecranes Lifttrucks for advice.

Inflate the tyre as follows:

- Use a filter and dehumidifier (or dryer) on the compressed air line in order to prevent the entry of humidity which will lead to corrosion.
- Check that locking rings and split rim fittings are in place before starting inflation.
- Connect the compressed air line to the tyre air nipple.
- Keep the face and body as far away from the inflation process as possible.
- Check that all components are in place when bead seating pressure is achieved.
- Mount the tyre to the truck according to instructions.
- Inflate the tyre to the maximum pressures specified by the tyre manufacturer.

Changing a wheel

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DISMANTLING THE DRIVE WHEEL

Outer drive wheels

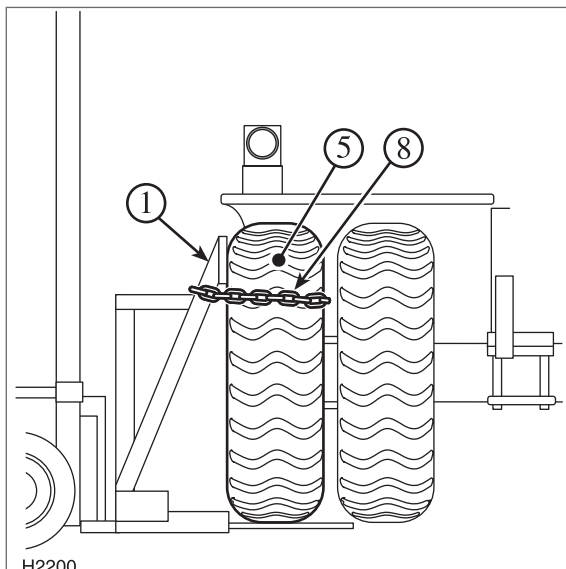


WARNING

Release the air from both tyres.

Risk of serious injury and death.

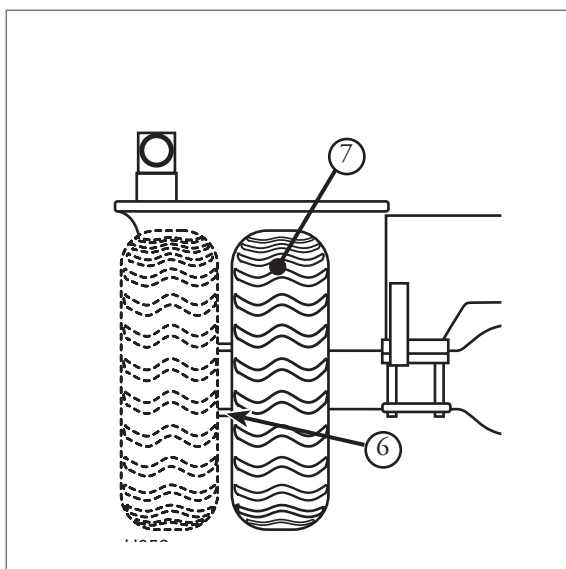
Deflate both tyres. If you do not, the conical ring and locking heads may release and shoot off when the pressure changes.



- Remove all but two of the nuts (2).
- Use the ancillary truck to support the weight of the outer wheel on its forks.
- Remove the two remaining nuts (2).
- Remove the conical joint.
- Lean the outer wheel against the ancillary truck's wheel support and secure it with a restraining chain (8).
- Reverse the ancillary truck carefully and unload the outer wheel (5).

Inner drive wheel

- Remove the outer drive wheel.
- Remove the spacer (6).
- Use the forks of the ancillary truck to support the weight of the inner wheel (7).
- Lean the inner wheel (7) against the wheel support (1) and secure it with a restraining chain (8).
- Carefully reverse the ancillary truck and unload the inner wheel (7).

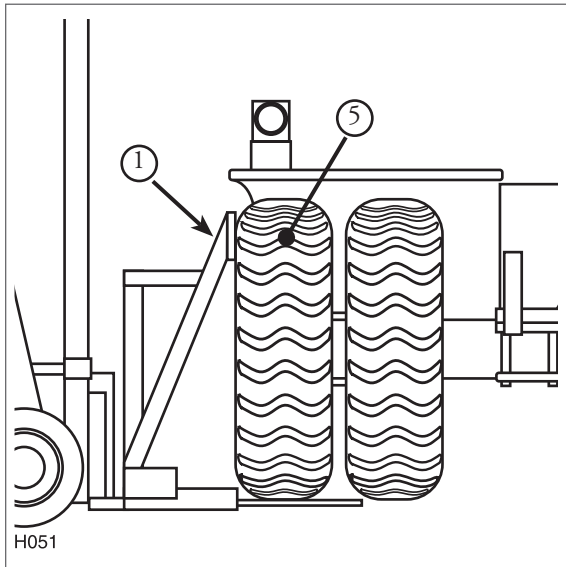


MOUNTING THE DRIVE WHEELS

The inner drive wheels

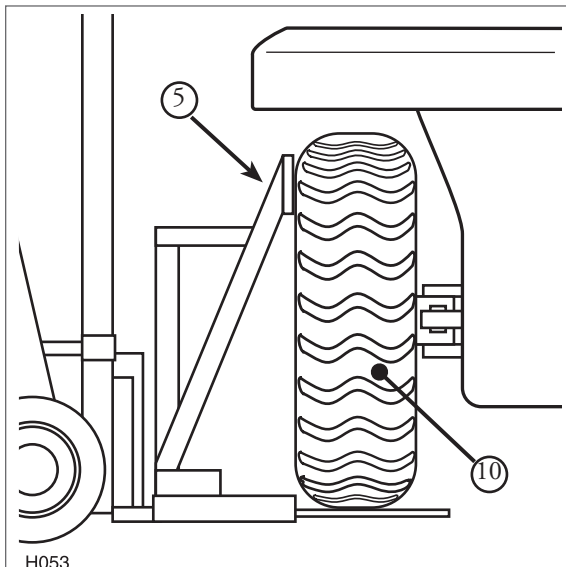
- Load the inner wheel (7) onto the ancillary truck and fasten it to the support.
- Clean the application surfaces.
- Carefully drive the ancillary truck to the required position and place the inner wheel (7) over the drive axle and the hub.
- Remove the fastening device from the wheel support (1) and the inner wheel (7) and straighten the wheel (7).
- Lower the forks of the ancillary truck until the inner wheel (7) is resting on the hub.
- Carefully reverse the ancillary truck.
- Mount the spacer (6).

Changing a wheel



Outer drive wheel

- Load the outer wheel (5) onto the ancillary truck and secure it to the wheel support. Carefully drive the ancillary truck into position and place the outer wheel (5) over the hub.
- Remove the fastening device from the wheel support (1) and the outer wheel (5) and straighten the wheel (5).
- Secure the conical joint and hold it in place with two nuts (2) placed diagonally to each other.
- Carefully reverse the ancillary truck.
- Fasten the remaining nuts (2) and tighten the wheel nuts cross-wise using the torque according to section 'Tightening torque'.
- Pump the tyres according to manufacturers recommendations.



Disassembling the steer wheels



WARNING

Tires with high air pressure.

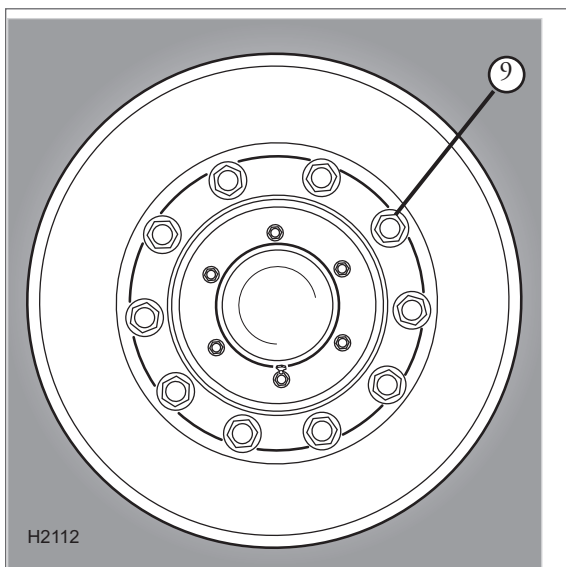
Risk of serious injury or death.

Never stand square with the wheel when emptying and pumping air.

Release the air from the tires. If you do not, the conical ring and locking heads may release and shoot off when the pressure changes.

Note that the valves may be damaged or that a valve may become plugged with ice when the air is released. If the air cannot be released through the valve it may be necessary to drill a hole in the tread.

- Remove all but two of the wheel nuts (9).
- Use the ancillary truck forks to support the weight of the steer wheel (10).
- Remove the remaining nuts.
- Lean the steer wheel (9) against the wheel support (1) and fasten it with a restraining chain (8).
- Carefully reverse the ancillary truck and unload the steer wheel (10).

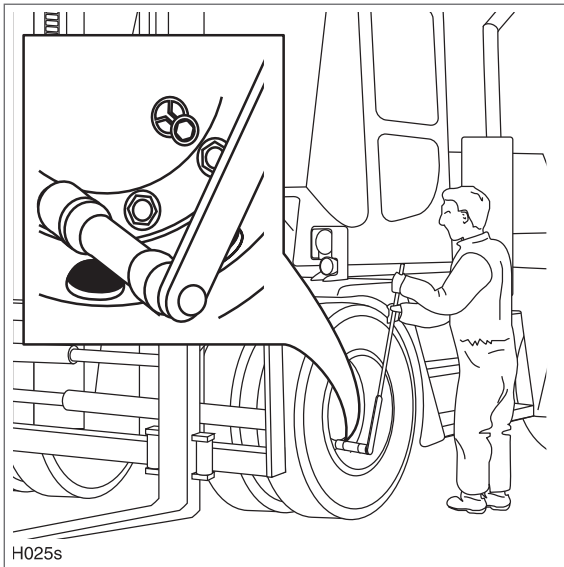


Assembling the steering wheels

- Load the steer wheel (10) onto the ancillary truck and fasten it onto the support.
- Clean the surfaces of the machine.
- Carefully drive the ancillary truck into position and place the steer wheel (10) against the hub.
- Use the forks of the ancillary truck to support the weight of the steer wheel.
- Fix and tighten two of the nuts (9) diagonal to each other.
- Remove the fork support.
- Fasten the remaining nuts (9) and tighten the wheel nuts cross-wise using the torque according to section 'Tightening torque'.
- Carefully reverse the ancillary truck.
- Pump the tyres according to manufacturers recommendations.

Tightening bolted joints

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Tightening torque

Information on friction ratio is needed in order to select the exact tightening torque.



WARNING

It is important that the torque of the bolted joints is checked regularly. It is especially important in connection with the "first servicing".



WARNING

The wheel nuts torque must be checked daily for 14 days or, until the rim, clamps and nuts have settled in and there is no more tightening

obtained. This must be done:

- After a new delivery of machine.
- After the truck has been taken into use.
- After a wheel has been removed or replaced.

The following pages describe how bolted joints should be tightened using a torque key.

Tightening the wheel nuts



WARNING

The wheel nuts torque must be checked daily for 14 days or, until the rim, clamps and nuts have settled in and there is no more tightening

obtained. This must be done:

- After a new delivery of machine.
- After the truck has been taken into use.
- After a wheel has been removed or replaced.

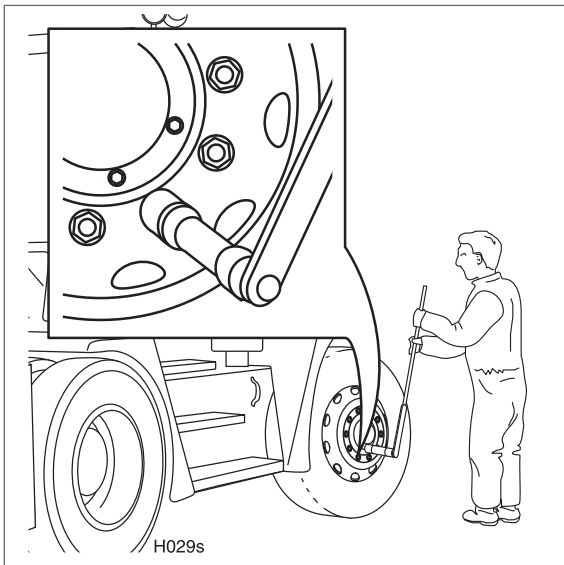
Tighten the nuts crosswise according to the table below.

Wheel nuts, drive axle

- | | | | |
|---------------|-----------|------|--------|
| - Drive shaft | M22 x 1.5 | 10.9 | 650 Nm |
|---------------|-----------|------|--------|

Wheel nuts, steer axle

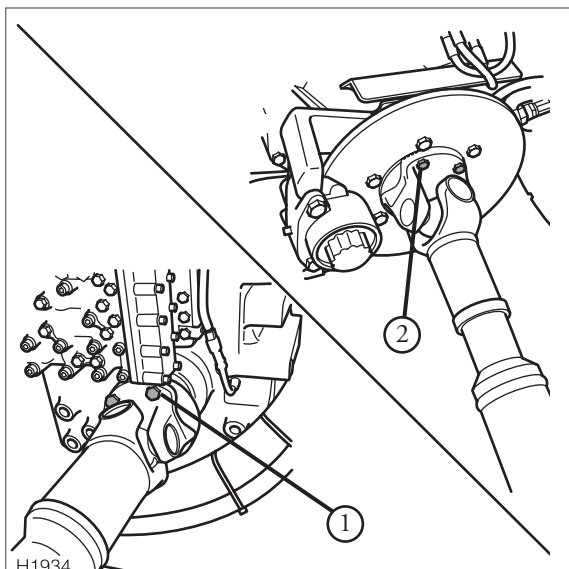
- | | | | |
|--------------|-----------|-----|--------|
| - Steer axle | M22 x 1,5 | 8.8 | 400 Nm |
|--------------|-----------|-----|--------|



Tightening bolted joints

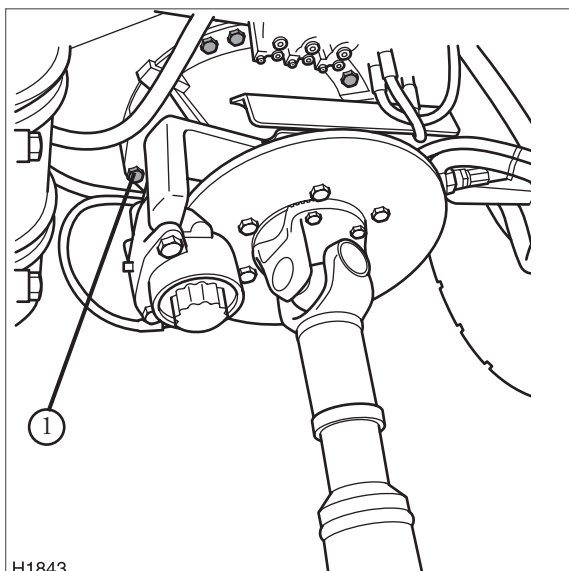
The tables below specify the torque for "lightly greased" bolts.

Millimeter screws				Inch screws			
Thread M	Tensile strength class			Thread M	Tensile strength class		
	8.8 Nm	10.9 Nm	12.9 Nm		8.8 Nm	10.9 Nm	12.9 Nm
6	9,8	14	17	1/4"	11	15	19
8	24	33	40	5/16"	22	31	38
10	47	65	79	3/8"	38	54	68
12	81	114	136	7/16"	61	87	108
14	128	181	217	1/2"	93	131	163
16	197	277	333	9/16"	133	187	234
18	275	386	463	5/8"	183	259	323
20	385	541	649	3/4"	322	455	568
22	518	728	874	7/8"	516	729	909
24	665	935	1120	1"	772	1090	1360
27	961	1350	1620	1 1/8"	1090	1550	1930
30	1310	1840	2210	1 1/4"	1530	2160	2690
33	1770	2480	2980	1 3/8"	2020	2850	3550
36	2280	3210	3850	1 1/2"	2650	3750	4680



Drive shaft

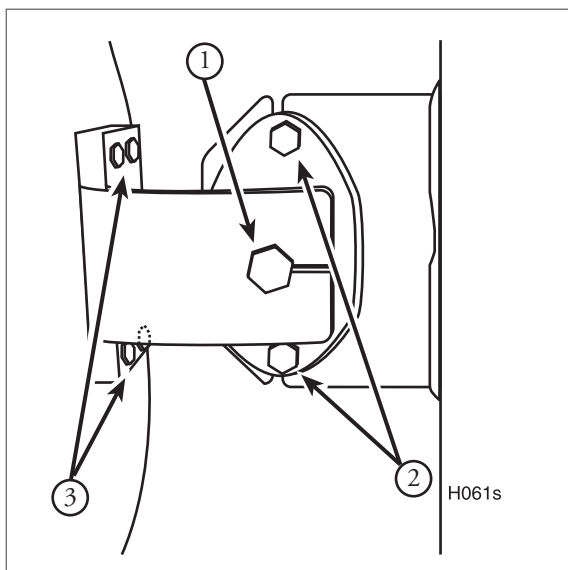
To the gearbox	(1)	M12	8.8	81 Nm
To the drive axle	(2)	M12	8.8	81 Nm



Differential nuts

- (1)	M14	10.9	181 Nm
-------	-----	------	--------

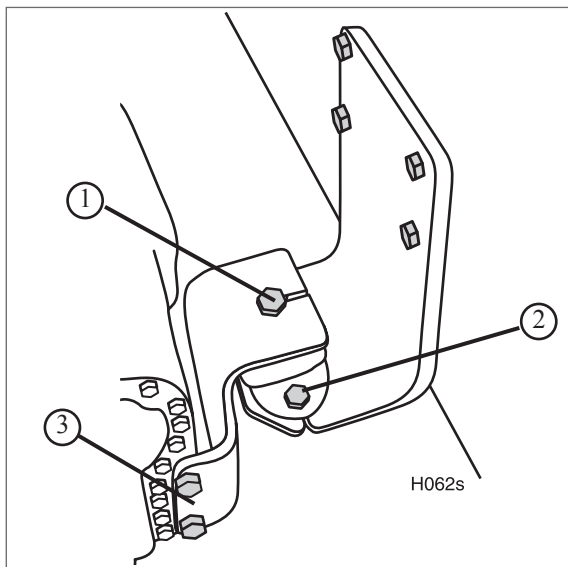
Tightening bolted joints

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The engine mountings

Check the condition of the rubber suspensions.
If any wear and tear is discovered, replace the damaged parts.
The engine mountings are accessible from the engine compartment, one on each side of the rear part of the engine.

- (1) M20 8.8 385 Nm
- (2) M16 8.8 197 Nm
- (3) M20 8.8 277 Nm

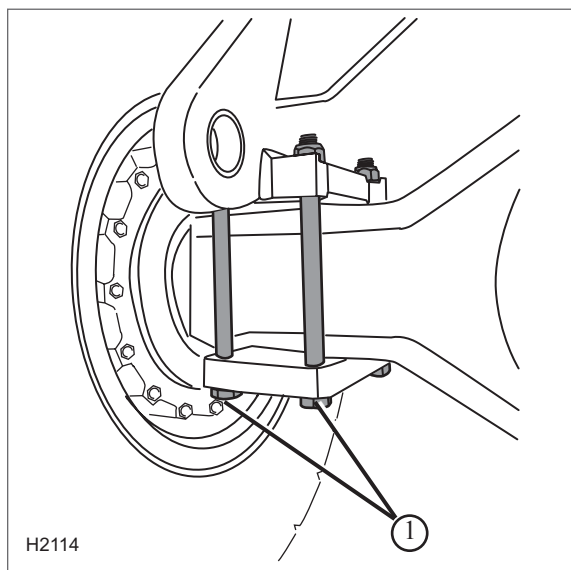


The gearbox mountings

Check the condition of the mountings and the rubber suspension. Replace the worn parts if you discover any wear and tear.
The mountings are accessible from the engine compartment, one on each side of the gearbox.

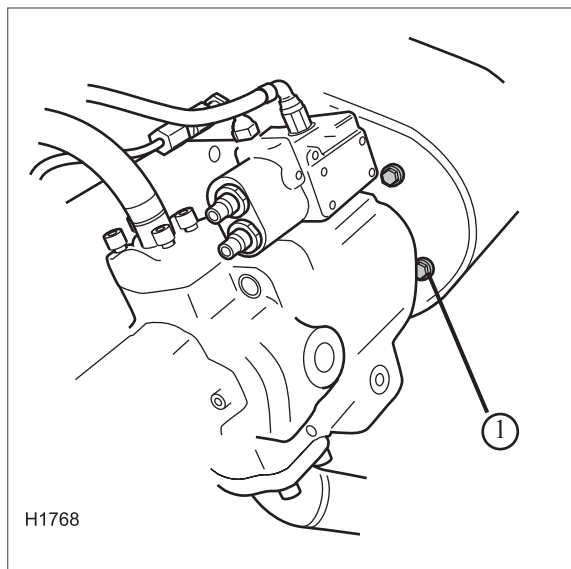
- (1) M20 8.8 385 Nm
- (2) M16 8.8 197 Nm
- (3) 3/4" UNC 8.8 385 Nm

Tightening bolted joints



Drive axle suspension

- (1) M 24 10.9 935 Nm

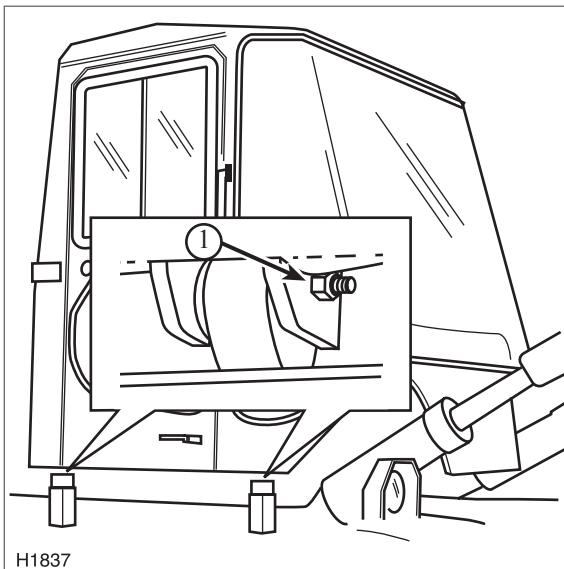


Hydraulic pumps

- (1) M12x40 8.8 81 Nm

Tightening bolted joints

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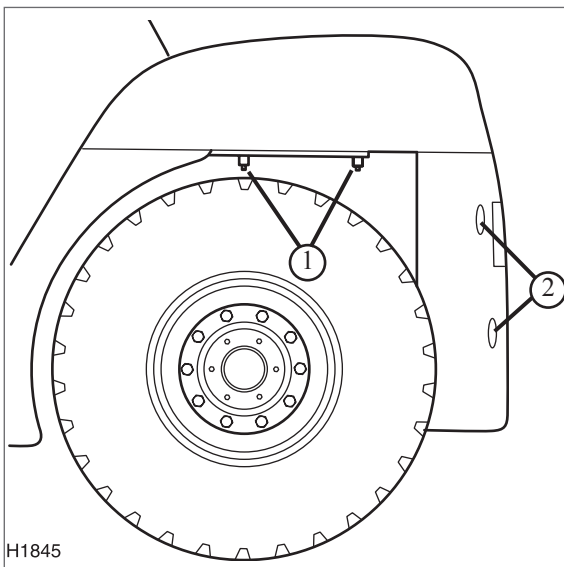


Cab suspension

- (1) M 24 8.8 245 Nm

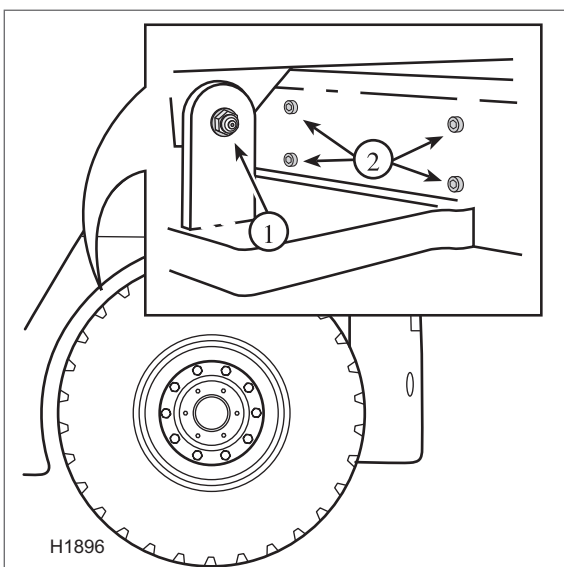
NOTE

The torque must not increase the specified above. The suspension ears can be scrunched and damage the mounting brackets.



Counterweights

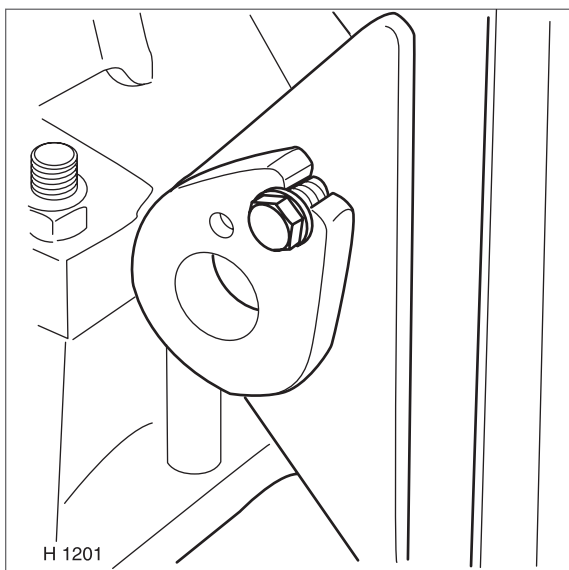
- (1) M 24 8.8 665 Nm
- (2) M 24 8.8 665 Nm



Steer axle

- (1) M 30x2 8.8 1310 Nm
- (2) M 20 12.9 649 Nm

Tightening bolted joints

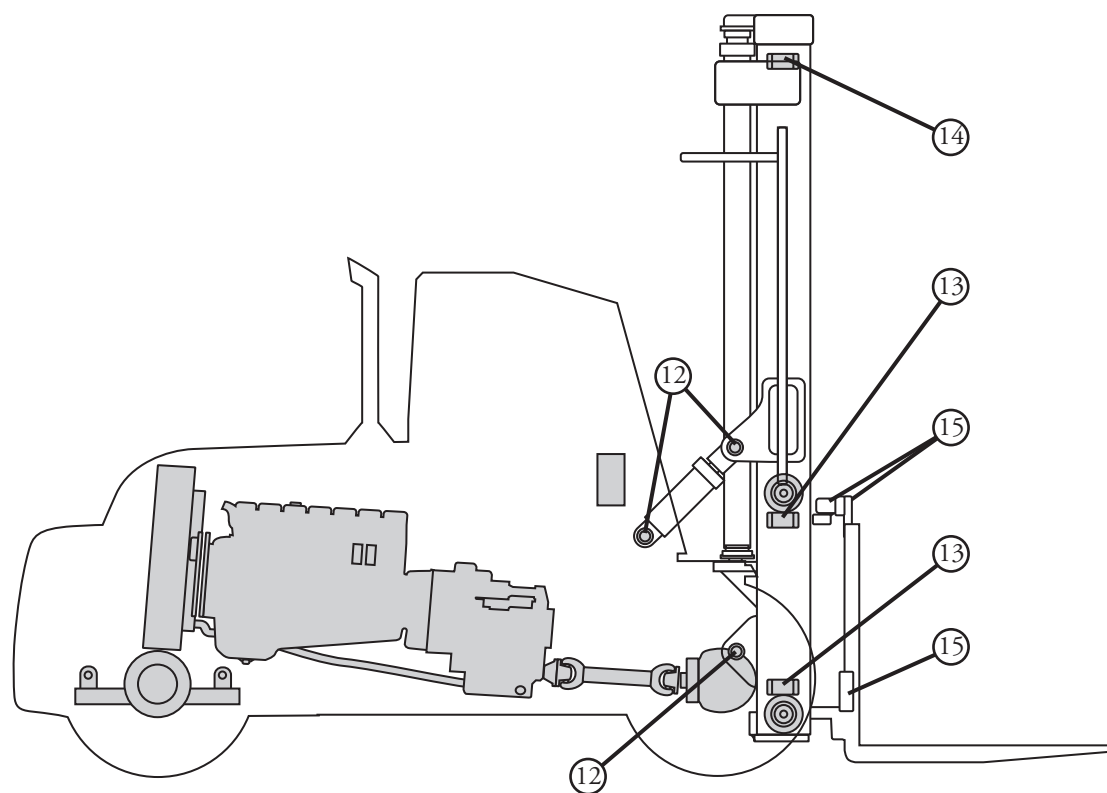
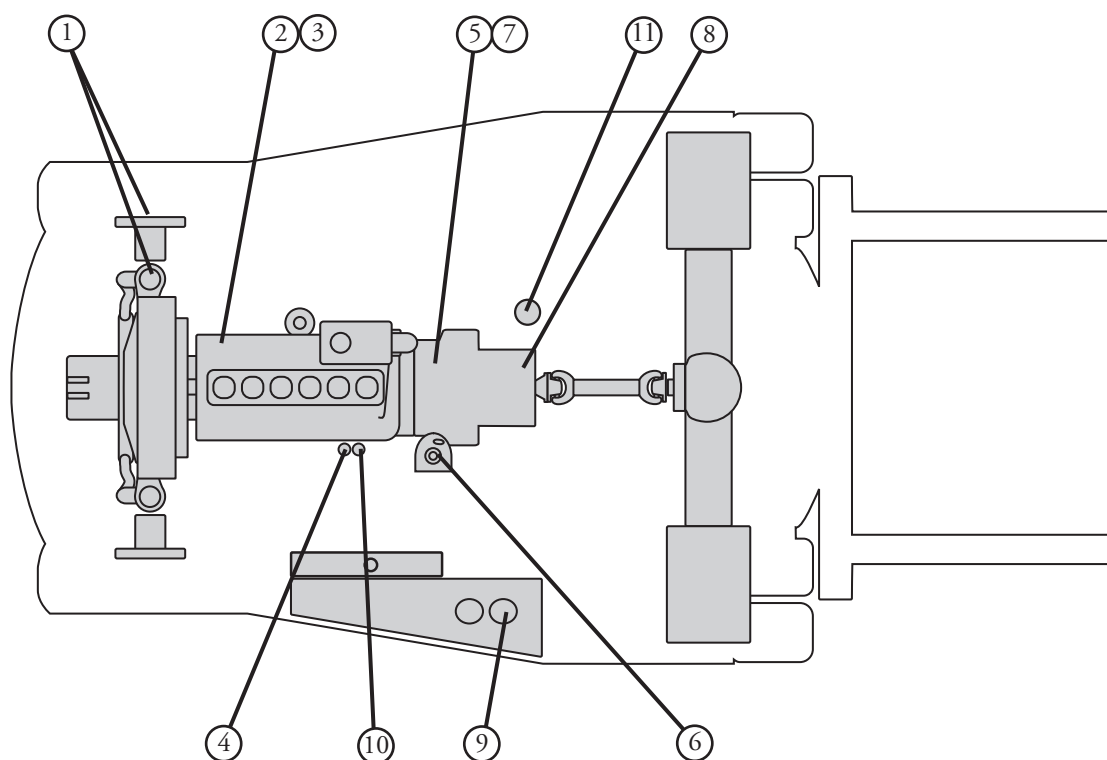


Mast suspension

- (1) M 16 8.8 197 Nm

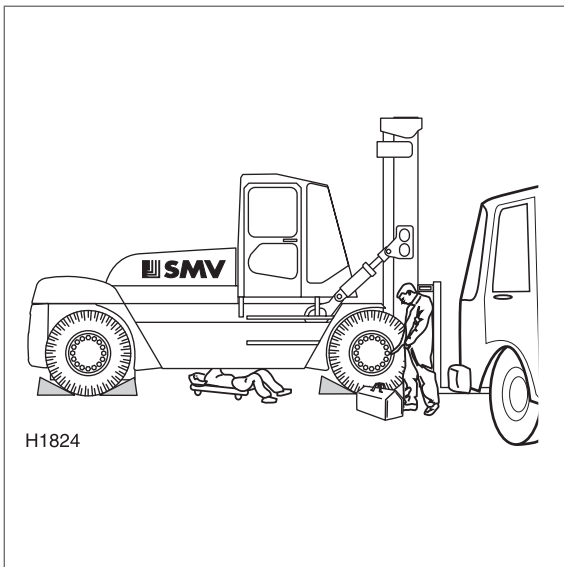
Lubrication table

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Lubrication table

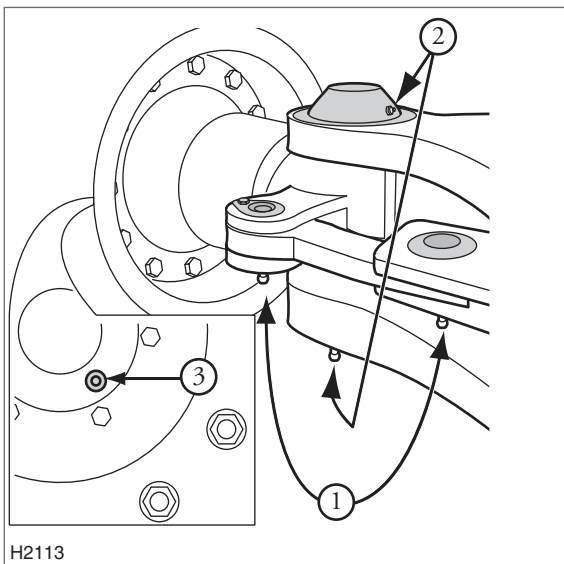
Pos.No.	Description	Illustration	Page No.
1.	Steer axle	H 2113	60
2.	Drain plug, engine	H 1872	62
3.	Filler cap, engine	H 1838	62
4.	Oil filter, engine	H 1839	62
5.	Drain plug, transmission	H 1846	63
6.	Filler cap , transmission	H 1847	63
7.	Oil filter, transmission	H 1880	63
8.	Breathing filter, transmission	H 1840	64
9.	Hydraulic oil filter	H 1885	65
10.	Fuel filter	H 1893	67
11.	Water separator	H 1894	67
12.	Mast suspension, tilt cylinders	H 124S	61
13.	Fork carriage and inner mast's roller bearings and bushings	H 124S	61
14.	Outer mast's top bearing rollers	H 124S	61
15.	Forks	H 126	60



H1824

General rules which apply to lubrication

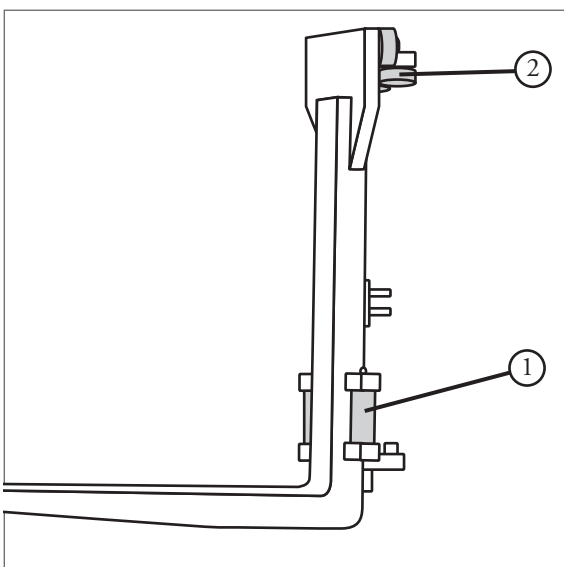
- Clean of old grease and clean nipples.
- Lubricate until fresh grease penetrates.
- Use only recommended grease.
- All slide bearings must be free of pressure for the grease to be able to penetrate.
- Slide bearings require frequent lubrication with a small amount of grease. Roller bearings require more grease less often.
- Also check the function and bearing slackness when lubricating.
- Specified lubrication periods apply in favourable conditions. More frequent lubrication is recommended in more demanding conditions, particularly of the slide bearings.



H2113

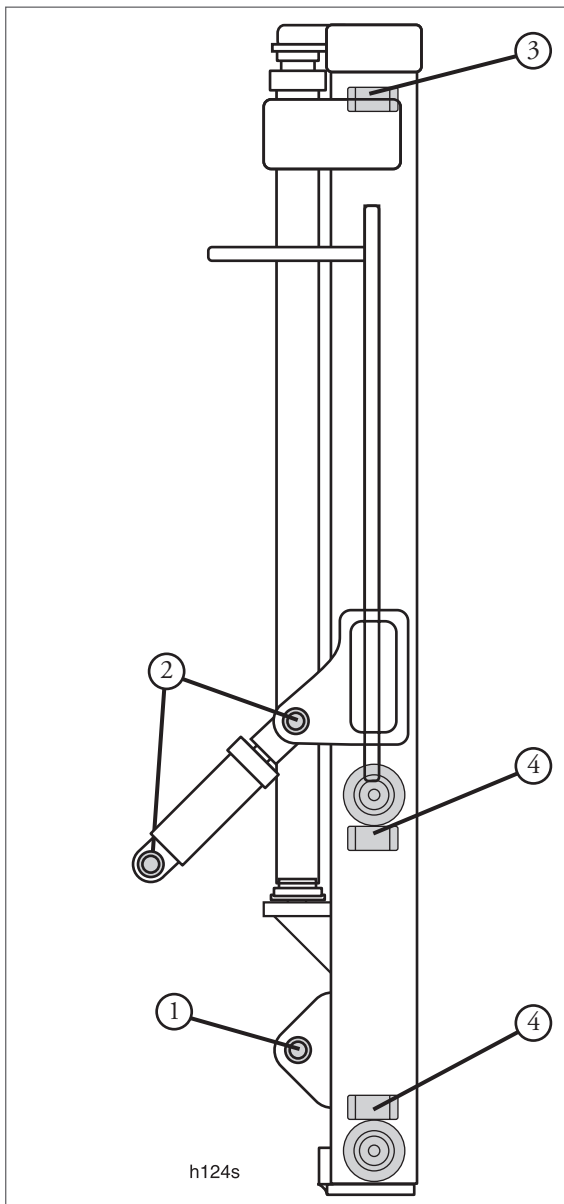
Lubricating the steer axle

- Clean off old grease and clean nipples.
- Lubricate the parallel tie-rods, four points (1) - two points on each parallel tie-rod (slide bearings).
- Lubricate the spindle bearings (2) one upper and one lower on each side.
- Lubricate the hub bearings (3) one on each side grease penetrates on to inside.



Lubricating the forks

- (1) Lower support rolls, two on each fork.
- (2) Upper support rolls, four on each fork.



Lubricating the mast

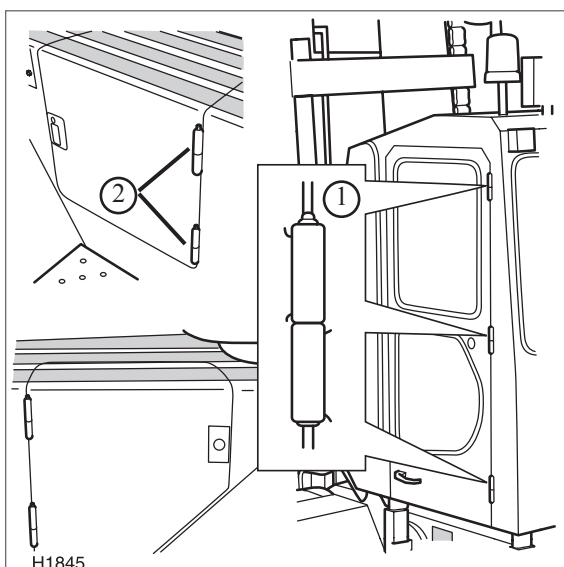


WARNING

As the mast and carriage have to be lifted during certain lubrication moments, make sure that the mast/carriage are secured.

- Lubricate the nipples at the suspension shafts of the mast (1), one on each side, accessible through the inside of the mast while the carriage is lifted up. Unload the shaft pins by lifting the mast using either a jack or a wood block and tilt forwards.
- Lubricate the tiltcylinder shafts (2) from the centre of the shaft pins, two on each side. Unload the shafts by tilting the mast backwards.
- The upper rollers (3) are accessible when the upright has been raised a little. One nipple on either side.
- Lubricate the carriage sidethrust rollers (4) from the inside of the carriage, two on each side (slide bearings).
- The corresponding rollers and wheels of the inner upright are reached through lifting up the carriage.
- Lubricate the chain wheels through the nipples.

Do not apply too much grease to the support rollers. Excessive grease in the mast channels will make the rollers and wheels to slide instead of rolling.

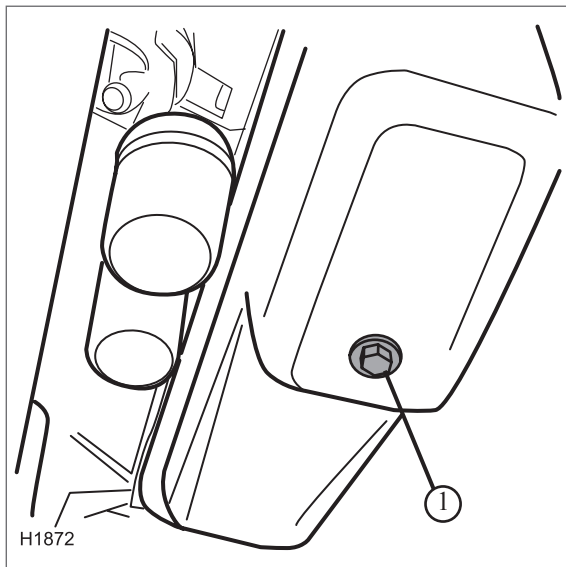


Lubricating the door hinges

- Inspect and clean the hinges of the cabin door and emergency exit.
- Lubricate the hinges (1) and open and close the doors in order to check that all parts of the hinges have been lubricated.
- Also lubricate the hinges of the battery compartment (2).

Changing oil and filters

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Draining the engine oil

Drain oil when the engine is at operational temperature.

The oil should be replaced once a year.

- Place a suitable container underneath the drain plug (1).
- Unscrew the drain plug.
- Allow the oil to run out.
- Check that the seal is not damaged. Renew if necessary.
- Fit the drain plug.
- Tighten up the drain plug.

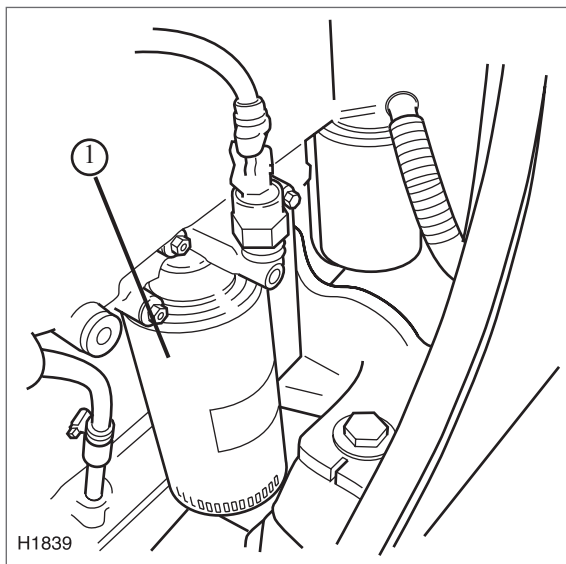


WARNING

Engine oil may be hot.

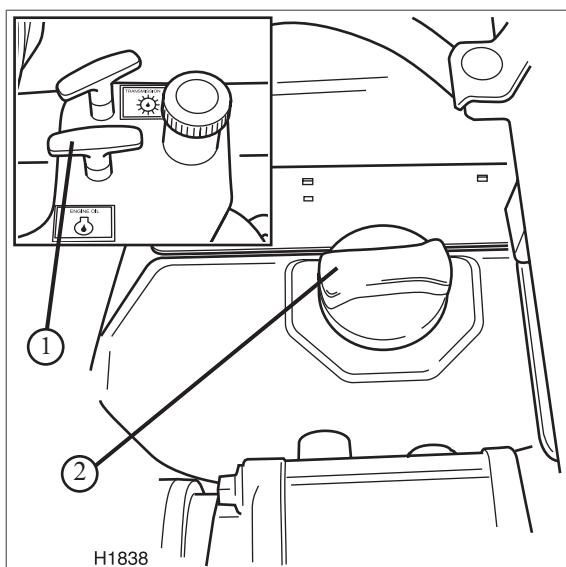
Risk of serious injury.

Use care in opening the cap to avoid burns.



Changing the engine oil filter

- Remove and dispose of the old filter (1).
- Lubricate the rubber seal and fit a new original filter.
- Secure the filter by hand.
- **Never use tools. The filter could be damaged and the circulation obstructed.**
- Start up the engine and check whether the filter is secure.



Filling up the engine oil

- Remove the oil filler cap (2).
- Pour oil through the opening.
- Check the oil level using the dipstick (1). Fill up to the maximum indicator level.
- Refit the cap (2).
- Close the engine cover.



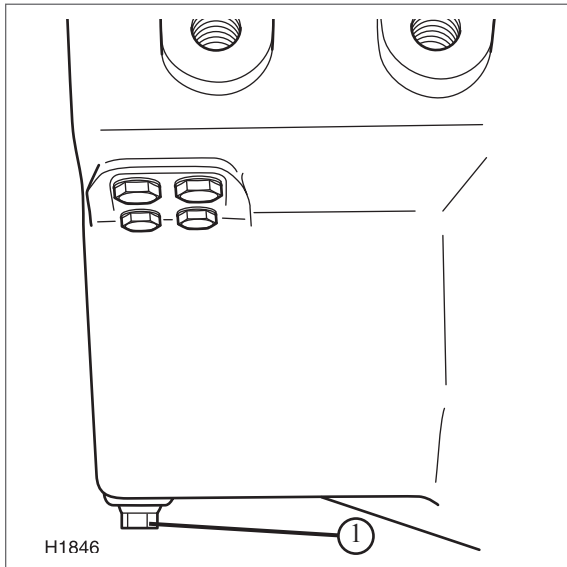
NOTE

When test running after changing the oil and filter, observe the oil pressure indicator and the warning light on the instrument panel. Also check that there are no leaks from the drain plug or the oil filter.

In order to check the oil level carefully, particularly when the oil filter is replaced, turn off the engine and check the oil level after around one minute.

Changing oil and filters

KONECRANES



CHANGING THE OIL IN THE GEARBOX

Drain the gearbox oil

The gearbox must be at operating temperature when the oil is replaced.

- Clean around the drain plug.
- Place a suitable container underneath the drain plug (1).
- Remove the drain plug and allow the oil to run out.
- Remount the drain plug (1).

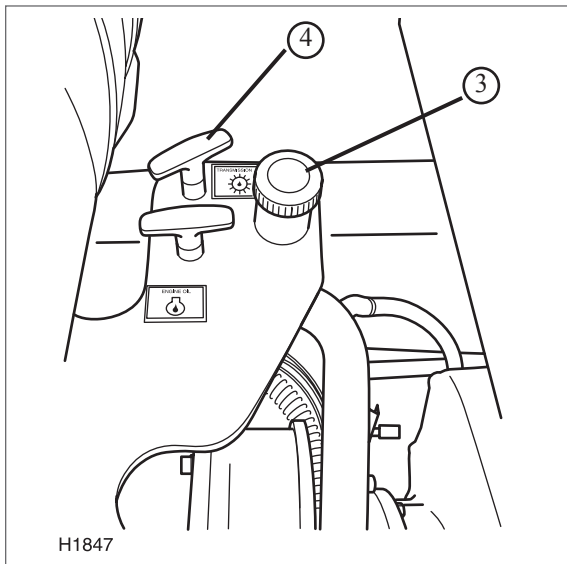


WARNING

Gearbox oil may be hot.

Risk of serious injury.

Use care in opening the cap to avoid burns.



Filling up gear box oil

- Remove the oil cap (3).
- Fill the gearbox with oil to the maximum mark on the dipstick (4).
- Run the engine at idling speed for one minute to fill the torque converter and pipes.
- Check the level of the oil when the engine has been running for one minute and then fill up with oil to the minimum mark.
- Check the oil level again when the operating temperature has reached 82 - 93° C. Fill to the maximum level mark.
- Refit the dipstick (4) and the oil cap (3).

See Maintenance Data regarding the oil level in the gearbox.

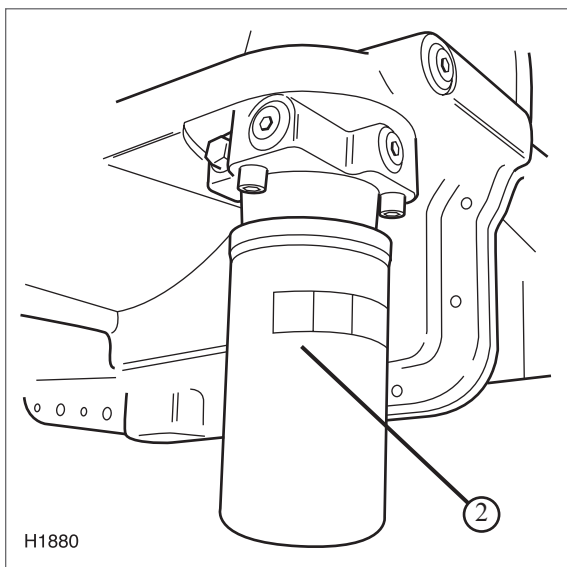


WARNING

Gearbox oil may be hot.

Risk of serious injury.

Use care in opening the cap to avoid burns.



Change the gearbox oil filter

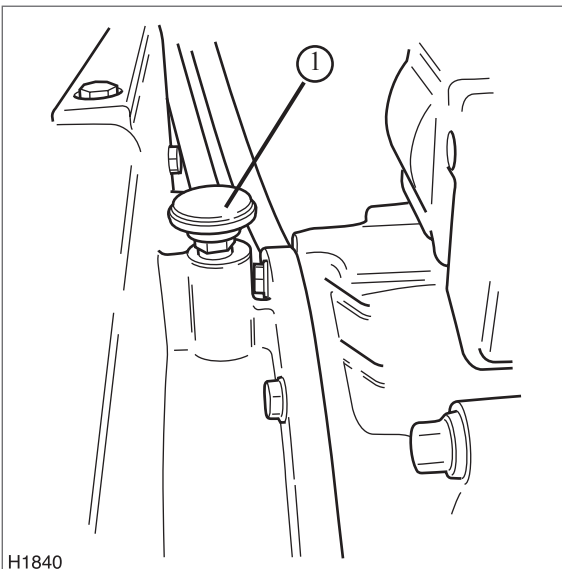
- Clean the outside of the filter unit (2).
- Place a suitable container underneath the filter unit.
- Loosen the filter unit with a filter wrench and dispose according to environmental legislation.
- Oil the the gasket lightly.
- Screw on the filter by hand until the gasket seals.

NOTE! Do not overtighten!

- Start the engine and check for leaks.

Changing oil and filters

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Changing of transmission breathing filter

- Unscrew the breathing filter (1).
- Replace with new

Checking the oil in the driveaxle

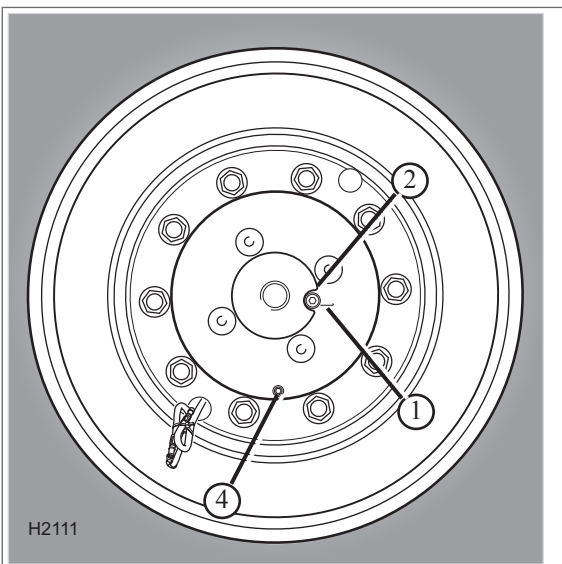
NOTE

Both hubs and the diff casing to be checked

- Park the truck on level ground.
- Place the truck so that the hub level mark (1) is horizontal.
- Carefully unscrew the filling/level plug (2) and check the oil level.
- If oil runs out from the plug, screw it back in.
- If no oil runs out, fill up with oil until it begins to seep out from the filling/level plug (2).
- Repeat the procedure for the other hub.
- Check the level in the banjo cap by unscrewing the filling/level plug (3).
- If oil runs out of the plug, screw it back in.
- If no oil runs out, fill it with oil until it begins to seep out.

NOTE

Overpressure can occur.



Changing the oil in the drive axle

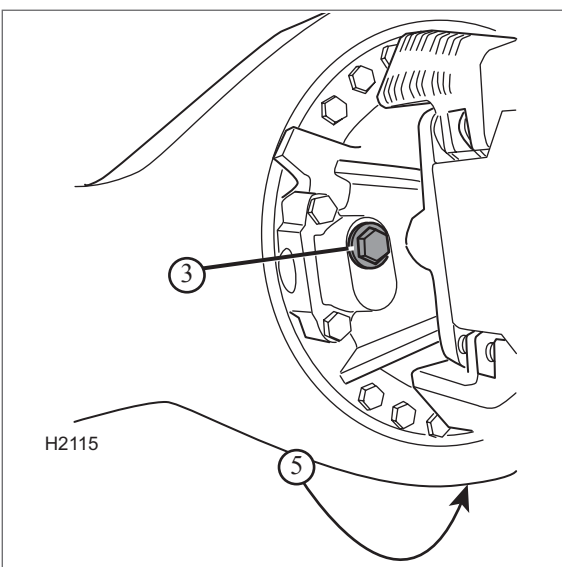
NOTE

Both hubs and the diff casing to be replaced

- Park the truck on level ground.
- Make a drainage hose using a thread which fit through the draining hole (4).
- Fix the hose in the drain hole whilst the drain plug is in its up-permost position.
- Carefully drive the truck forwards/backwards so that the drain plug returns to its lowest position.
- Allow the oil to run out through the hose into a suitable vessel.
- Repeat the procedure on the other side.
- Drain the diff casing through the drain plug (5).

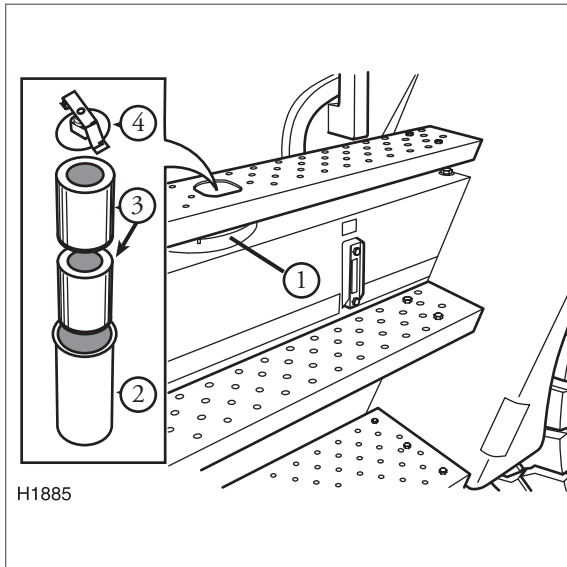
Note! The oil must have operational temperature.

- Refit all drain plugs (4 and 5).
- Place the truck so that the hub level mark (1) is horizontal.
- Fill the drive axle through the filling/level holes (2 and 3).
- Replace the filling/level plugs (2 and 3).



Changing oil and filters

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Changing the return filter, hydraulic oil

The return filters are situated on the right-hand side of the hydraulic tank by the filling cap.



CAUTION

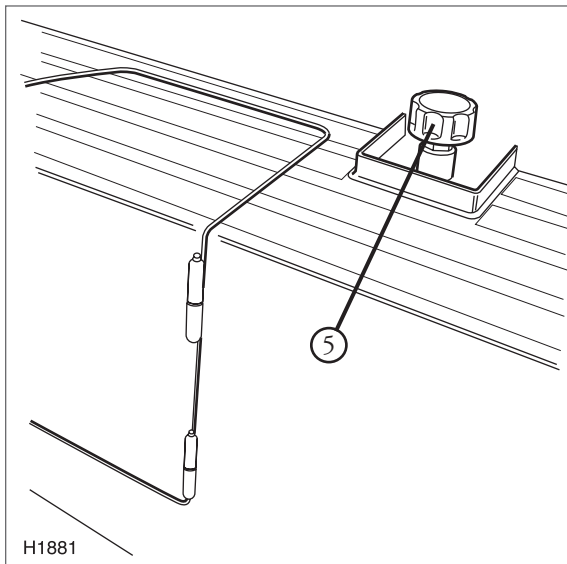
Follow these instructions. Otherwise you may risk damaging the hydraulic system.

- Remove the upper running plate.
- Clean carefully around the filter cap (1).
- Remove the filter cap.
- Loosen the four screws of the filter housing in the return chamber.
- Lift up the filter housing (2) and the filter element (3).

NOTE

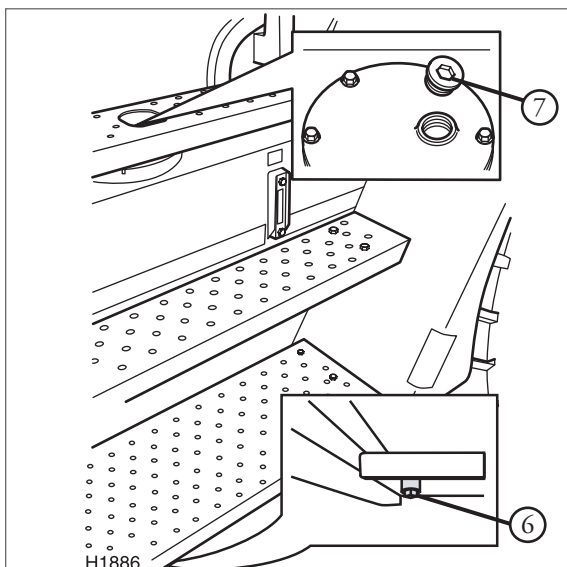
Do not disassemble the filter inside the hydraulic tank.

- Remove the element by pressing and turning the bypass valve (4).
- Check that the valve is closed.
- If the tank is empty: Also check the bottom of the tank for any impurities.
- Clean the filter housing.
- Fit new filters and close with the bypass valve (4). Press and turn to the correct position.
- Fit the filter housing in the tank.
- Fill with oil if it has been drained.
- Fit the filter cap.
- Start the engine and check for leakage.
- Turn off the engine and check the level.



Changing of hydraulic tank breathing filter

- Unscrew the breathing filter (5).
- Replace with new



Changing the hydraulic oil

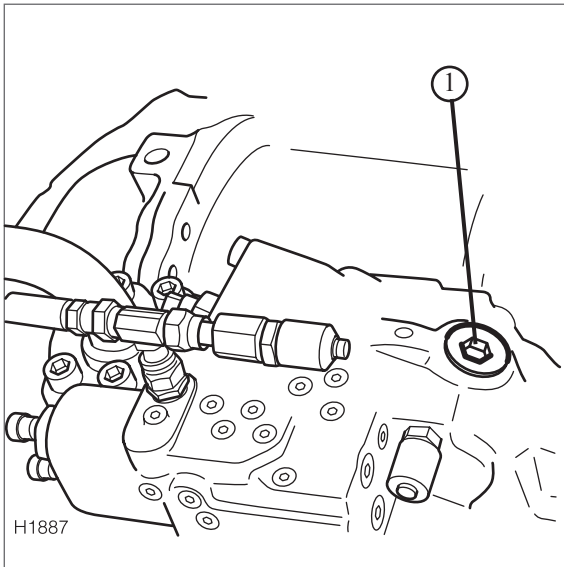
The hydraulic oil is replaced at the same time as the filter. It is recommended that the oil be replaced according to section 'Check and Maintenance schedule'.

- Drain the oil through the drain plug (6), using a suitable vessel. See oil volume, Maintenance Data.
- Alternatively, the oil can be sucked up through the filter housings if the filters have been removed.
- Inspect the bottom of the tank for any impurities.
- Assemble the filters and caps as above.
- Fill (7) with hydraulic oil.

That way, the oil poured in is filtered through the filters. It is advisable for the oil to be filled under some pressure.

Changing oil and filters

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Start of hydraulic pump

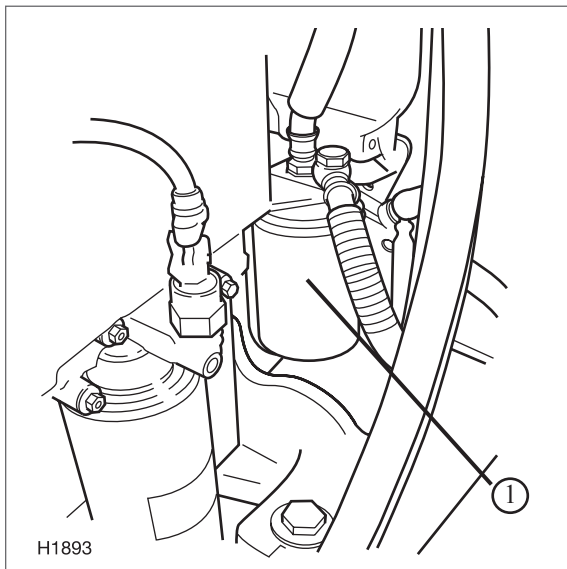
After maintaining the hydraulic pump or system the following procedure is performed:

- Loosen the plug (1).
- Fill up the pump housing with hydraulic oil.
- Refit the plug (1).
- Start the engine and lift the fork carriage.

Any noise from the hydraulic system should disappear after a few seconds. If not - stop the engine and troubleshoot the hydraulic system.

Changing oil and filters

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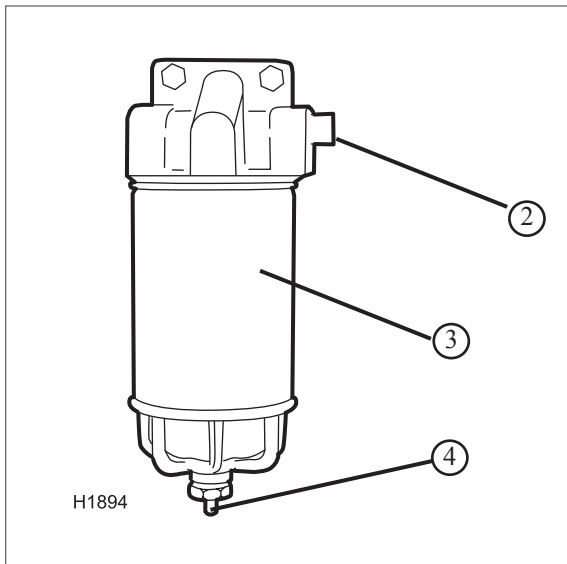
Changing the fuel filter

- Open the engine casing.
- Clean the outside of the filter unit carefully.
- Place a container underneath the fuel filter (1) to catch any spilled fuel.
- Loosen the fuel filter with a filter key.
- Unscrew and remove the filter by hand.
- Inspect the new filter and check that the covers are in good condition.
- Lightly lubricate the new seals with fuel.
- Screw in the new filters by hand until the seals are in contact with the cap.
- Turn the filters a half circle by hand.
- Bleed the fuel system.
- Close the engine housing.
- After a test run, check that there are no leakages.



CAUTION

Never use a sealant or lubricant. Never use tools to tighten the filter. Always use original spares when changing filters.



Water separating filter

Drainage must be carried out when filling fuel. The filter must be changed according to section 'Check and maintenance schedule'.

- Close the drain tap (1) before the filter.
- Unscrew the container and drain valve (4).
- Unscrew and change the filter (3). Lubricate the seal before tightening the new filter by hand.
- Screw the container and drain valve into position.
- Open the drain tap (1).
- Bleed the fuel system.

Bleeding the fuel system

Air can penetrate the fuel system when:

- the fuel tank runs completely empty.
- the fuel pipes are disconnected.
- the fuel filter is replaced.

Do as follows in order to bleed the fuel system:

- Remove the fuel return line from the pipe. Connect a hose to the pipe. Place the other end of the hose into a vessel half filled with fuel.
- Run the engine at 800-1000 rpm. Single bubbles can appear. If the amount of bubbles increases or foam is built up there is air in the system.
- Remedy by tightening all connections.

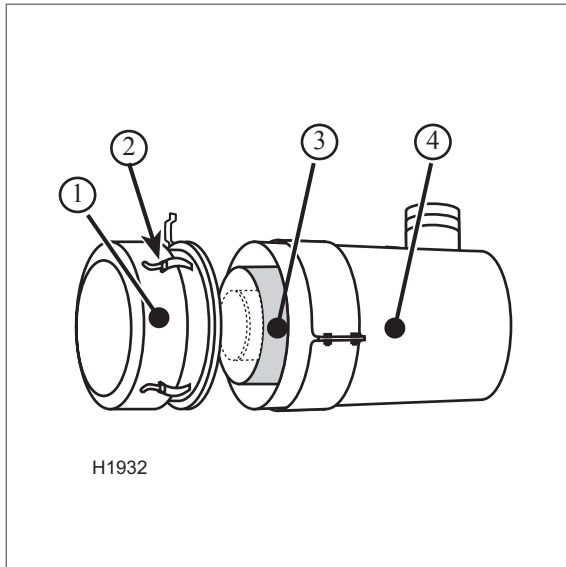


CAUTION

A leaking seal will disrupt fuel flow from the tank to the metering pump as it will enable air to enter the system.

Changing oil and filters

KONECRANES®



Cleaning/changing the air filter



WARNING

The air filter contains a significant amount of dust particles.
Danger of respiratory distress!
A protective mask must always be worn when servicing the air intake system. Do not inhale the dust particles.
Consider the environment when carrying out this work.
Major risk of engine damage if the filter element is damaged.



CAUTION

Cleaning the element always entails a risk of damaging it. It should only be cleaned four times a year at most. After cleaning it has poorer dust capacity than a new element.



CAUTION

Do not clean the inside of the filter casing with compressed air. All maintenance on the air intake system must be carried out while the engine is turned off. This is a dry filter element and must not be cleaned with water.

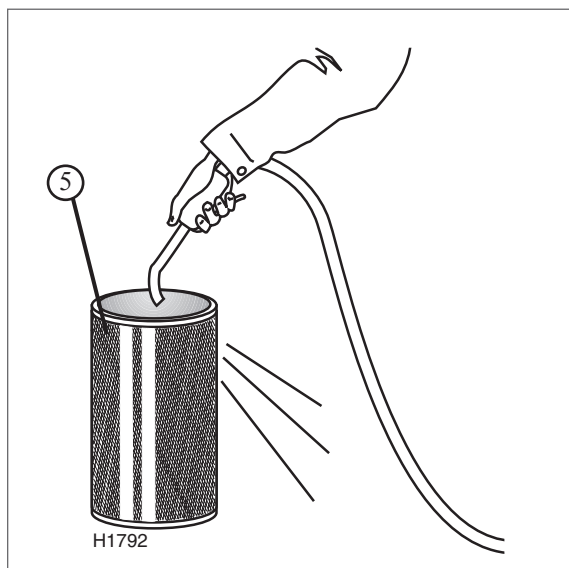
Clean or change the filter element if the low pressure indicator shows red.

- Open all of the clips (2) and remove the cap (1).
- Empty out the dust which has collected in the cap and dry the cap using a damp cloth.
- Carefully remove the filter element (3).
- Clean the inside of the filter casing (4) clean using a damp cloth.
- Insert a torch into the filter element and check from the outside that there are no holes or cracks in the filter paper.

NOTE

Do not clean the inside of the filter casing with compressed air. Clean using a damp cloth.

Changing oil and filters



- Blow dry compressed air over the filter element (5) to clean it, a maximum of 1 bar, from the inside until no more dust comes out.

NOTE

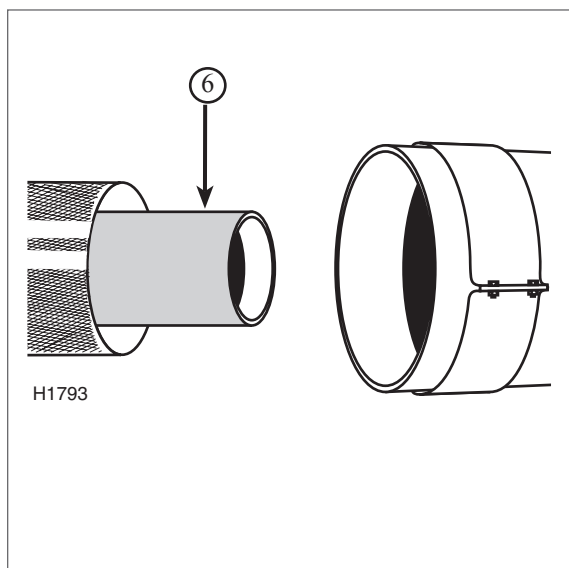
This is a dry filter element and must not be cleaned with water.

NOTE

Discard the filter element:

- if it has been cleaned 5 times.
- if it is damaged.
- after 1 000 hours of use.
- after 12 months of use, maximum.

Record each service carried out on the filter element.

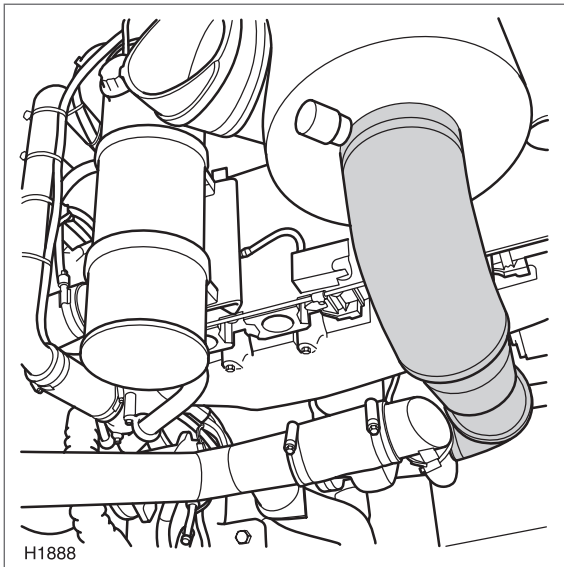


Safety cartridge

Never clean the safety cartridge.

Do not remove the safety cartridge unnecessarily.

- The safety cartridge (6) is normally replaced according to 'Check and maintenance schedule', or if there has been any damage to the main filter.
- Disassemble the filter lining as above.
- Fit in a new safety cartridge.

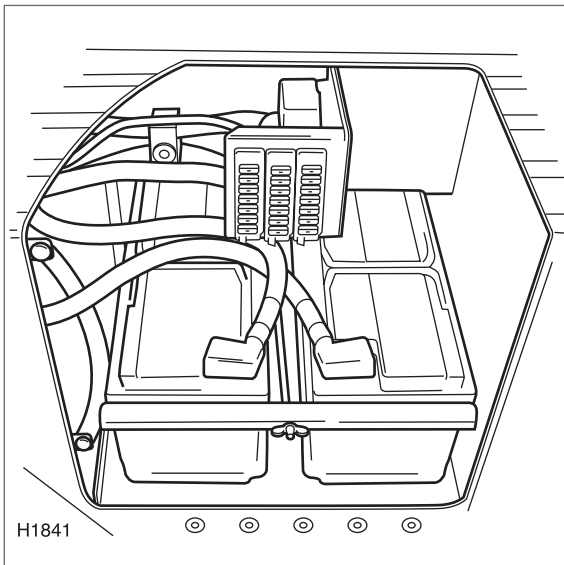


Checking the air intake system

It is of paramount importance for the air intake system to be intact. Broken and leaking pipes can drastically shorten the life of the engine.

Check the system regularly.

- Check the hoses for fissures and damage. If necessary, replace them.
- Ensure that all hose clips are tightened and fit snugly.
- Check that the filter container is intact.



Checking the battery

The batteries are located in the compartment on the right hand side of the machine.

The batteries are maintenance free.

- Keep the batteries clean.
- Remove corrosion from the battery connections and check that the cable connections are tightened.
- Lubricate the battery terminals using acid-free grease.



WARNING

The battery contains corrosive acid. Always use the necessary protective equipment.

Batteries generate explosive hydrogen when charged. Ensure that there is good ventilation and avoid sparking.

Beware of short-circuiting the battery, which may cause fire or explosion.

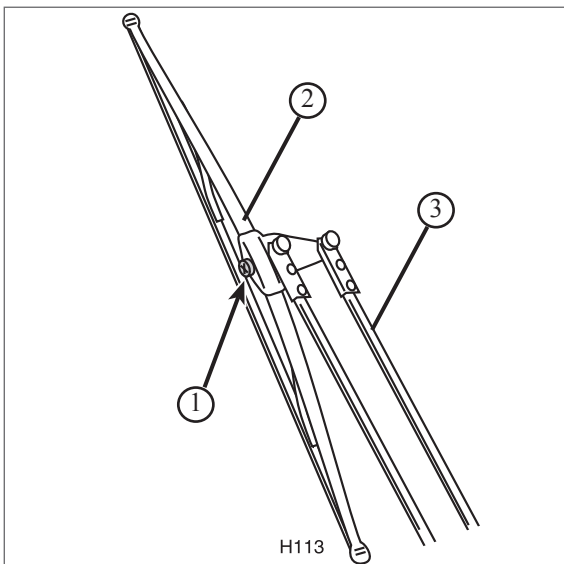
Risk for serious injury or death.

The main disconnect does not cut the power to the alternator.

Always disconnect the ground (minus) cable at the battery when working near or on the alternator.

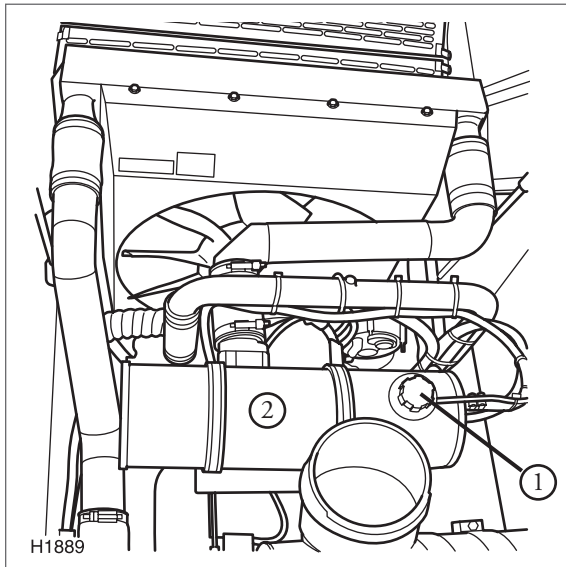
To reduce the risks of electrical shock and personal injury always remove jewelry and conductive material prior to working on the electrical system.

Unless in an emergency situation, do not turn off the main circuit switch while the engine is running.



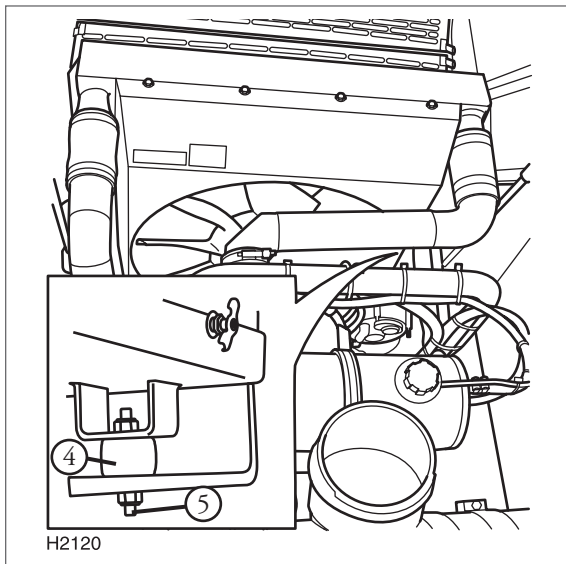
Changing the windscreen wipers

- Remove the bolt (1).
- Remove the blade (2) from the arm (3).
- Insert the new blade (2) into the arm (3).
- Replace the bolt.
- Lower the wiper back onto the windscreen.



Checking the cooling system

- Check all hoses by pressing them to find any fissures and leaks. If in doubt, replace them.
- Check the radiator for damage, leaks and blockage.
- Check the function of the cab heater.
- Check the level of the coolant: see below, glycol content, see Fuel and oil recommendations, and for any impurities.
- Replace the coolant if it is not clean and clear.



- Check the rubber pads (4) in the radiator fittings on the bottom of the radiator - replace if necessary.
- Check that the nuts (5) are tight.

Replacing the coolant

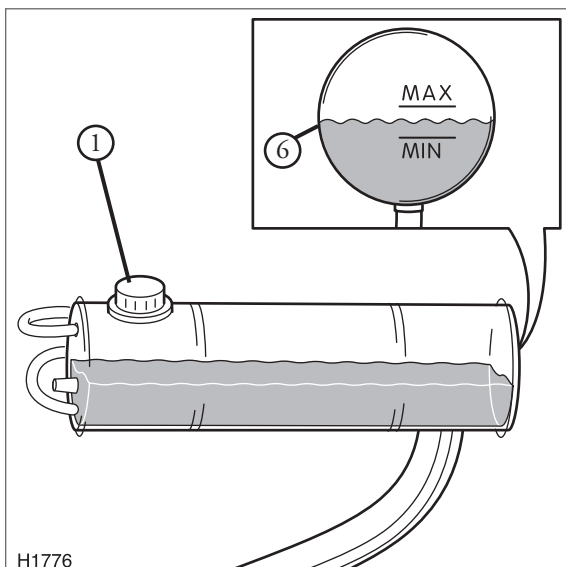


WARNING

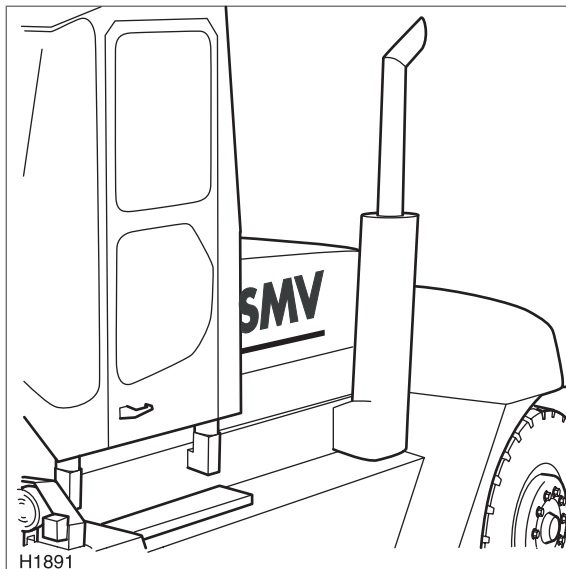
The coolant may be pressurised and hot.

Risk of serious injury.

The system may be pressurised, even if it is not the pressure type.



- Open the cap of the expansion tank (1) with care - first turn it 1/4 of a turn to ensure that the system is not under pressure when the cap has been removed.
- It can only be refilled through the expansion tank (2).
- Drain the whole system through the tap (3) when replacing the hoses and system components.
- Turn the cab heater control to maximum. Place a suitable container underneath the drainage tap.
- Open the tap and drain the system fully.
- Turn off the tap.
- Fill up through the expansion tank (1) to the maximum level.
- Start the engine and let it idle.
- Observe the level during this period and top up if necessary.
- When the operating temperature is reached, the level should have stabilised.
- The level should be up to the centre of the tank (6).



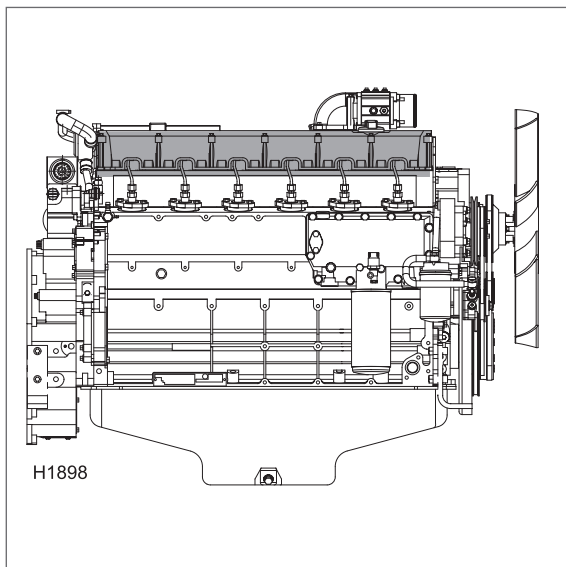
Checking the exhaust system for leaks



WARNING

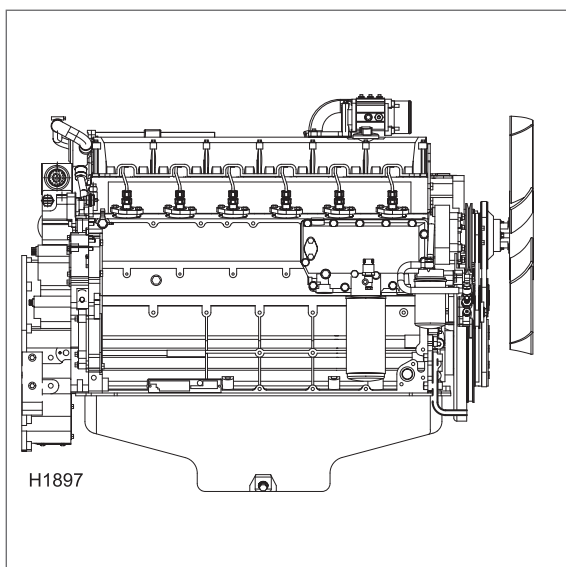
Wait until the exhaust system has cooled before starting work.

- Check the overall condition of the exhaust system, replace pipes or the silencer if they are leaking due to corrosion.
- Check all joints and screw joints.
- Check the exhaust manifold.
- Check the rubber silencer suspension. Replace if necessary.
- Start the engine.
- Check for any leaks in the exhaust system.



Valve clearance

The valve clearance should be checked at engine oil temperature 20-80° C. Follow the instructions in the engine manufacturer's instruction book.



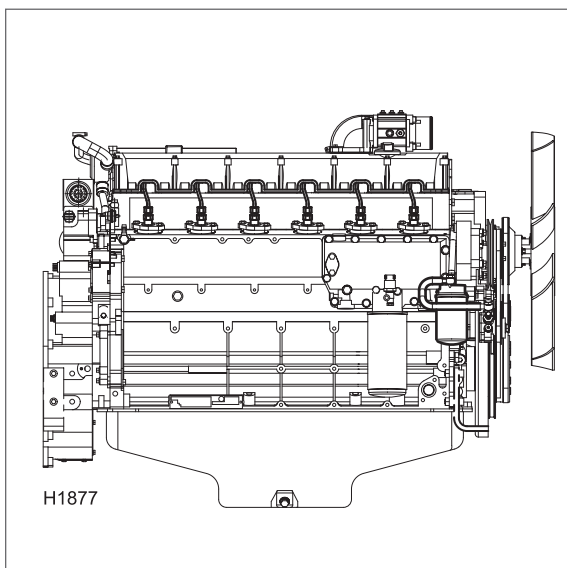
Checking the fuel injector

Check and adjust the injectors before the usual engine service is due to be carried out only if the engine is:

- misfiring.
- knocking on one or more of the cylinders.
- overheating.
- losing power.
- emitting black smoke from the exhaust.
- using too much fuel.

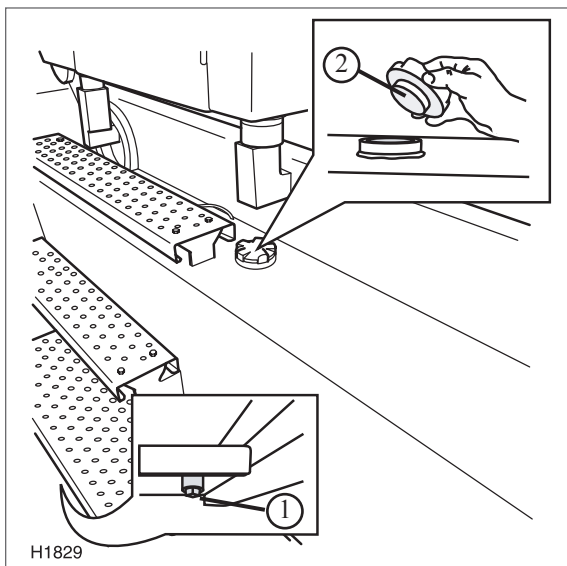
NOTE

The injectors must be checked and adjusted by an authorised dealer which has the necessary special equipment.



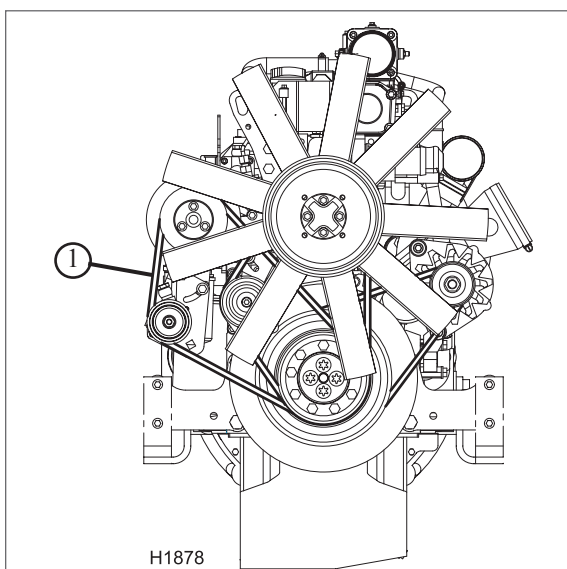
Checking the fuel system for leaks

- Check the fuel pipes according to the picture.



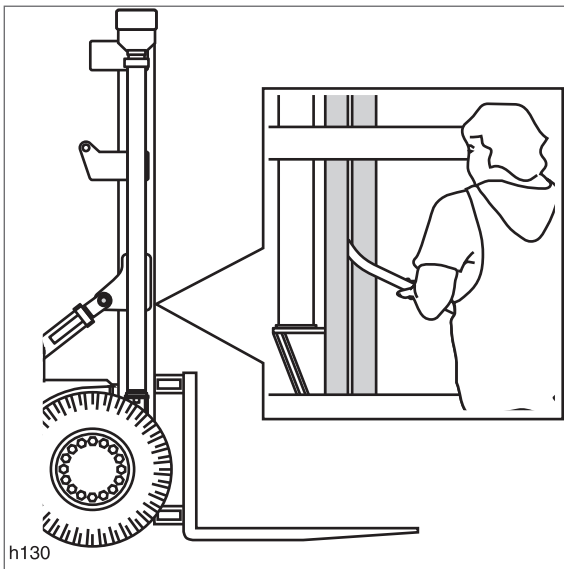
Checking the fuel tank

- Check the tank for any leaks.
- Drain the tank of any grime and water through the drain plug (1).
- Place a suitable vessel underneath the drain plug.
- When clear fuel comes through, replace the drain plug.
- Check the seal around the fuel cap (2).



Checking of poly-v belts

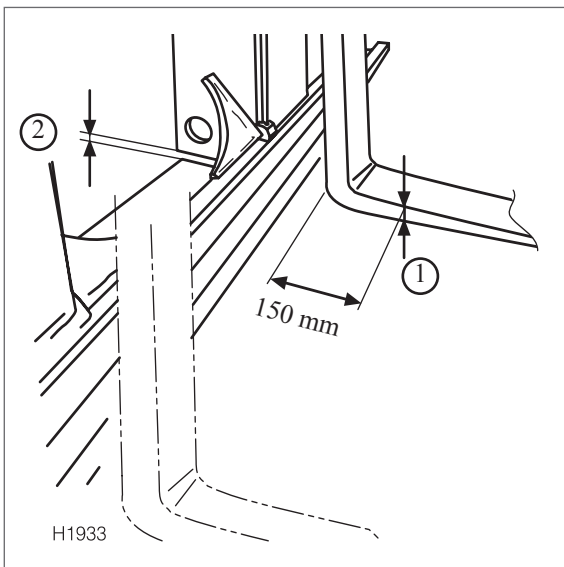
- If the poly-v-belt (2) is worn or damaged, it should be replaced.
- Check also the two manual belt tensioners alternatively the automatic belt tensioner (1) for function.



Checking the mast and fork carriage

- Use a claw wrench or crowbar to check the room between:
 - The carriage and the inner mast.
 - The inner and outer masts.

If there is an obvious gap of over 5 mm, seek advice from the nearest authorised Konecranes Lftrucks-dealer.



Checking of forks' wear pads

- Check the pads for wear.
The wear must not be more than 5 mm on the most worn part of the pad.

Checking of wear on fork blades

Check forks for cracks, deformation and blade thickness. This should be made on a yearly basis (local requirements may require more often).

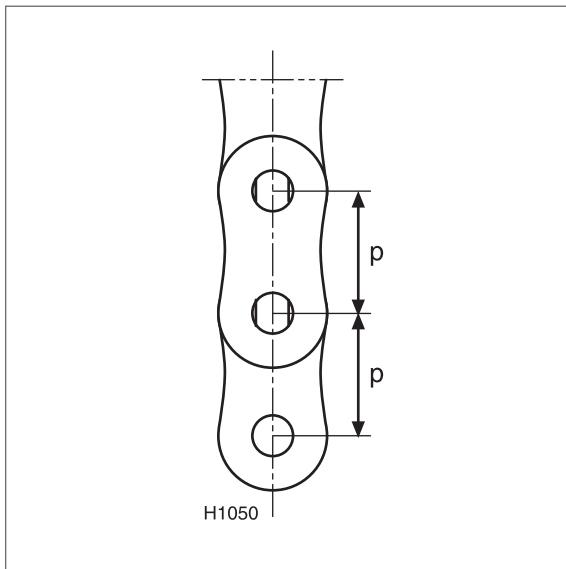
- Wear limit on fork blade is 90% of the original dimension.
Check thickness of blade at 150 mm from the fork heel (1)
- Forks with cracks visible by eye, may under no circumstances be used. Give special attention to cracks on the fork heels.
Forks should regularly be checked for cracks by penetration fluid or magnaflux methods.
Surface cracks to a maximum dept of 0,5 mm could be grinded off, followed by new test. This must be carried out by an authorised service dealer. Deeper cracks may generally not be repaired.
- Check the fork suspension regarding clearance.
- If the forks require reparation always contact Konecranes Lifttrucks or a service dealer authorised by Konecranes Lifttrucks. They can estimate if the forks are reparable.
- Surface cracks or wear must not be repaired by welding.
- Straightened forks will always require new heat treatment.

NOTE

Specially trained personnel have to check the forks for cracks annually.

Adjustment of chains

Check that there is a clearance of 10 mm between the carriage bottom and the bottom plate of the outer mast (2). If not, both the chains have to be adjusted to the same tension.



Checking of lifting chains

To ensure the safety of the lift chains it is necessary to check them regularly, see section 'Check and maintenance schedule'.

The entire length of the chains must be properly cleaned. Checking is performed unloaded.

- The chain length may not exceed 3% of its original length. Check according to table below for each forklift and chain type.
- Check measurement over the 25 links which are the first that goes over the sprocket (the most worn).
- Compare your measurements with the values in table below.
- If the 3% limit is exceeded the chains must be changed.

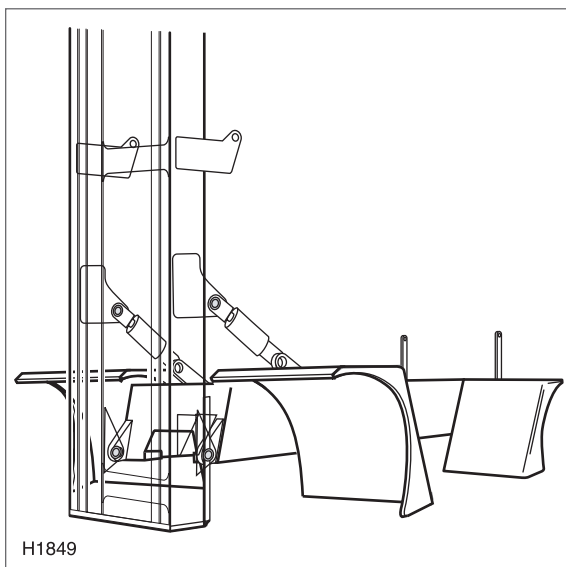
NOTE! Local legislations, or if security is based on one chain, can demand that the chain is changed when prolonged by 2%.

Forklift	Pitch (p) Inch mm		New chain, measurement over 25 links mm	Max allowed length over 25 links at 2% wear mm	Max allowed length over 25 links at 3% wear mm
SMV 10-12	1 1/2	38,10	952,50	971	981
SMV 12-16	2	50,80	1270	1295	1308

Also check for:

- Loose rivets in the outer washers.
- Cracks in any washers
- Mechanical damage
- Any noise when the chain is moving
- Corrosion
- Seizure.

Lubricate chains with thin oil or special chain spray that penetrates into the links.



WARNING

If a chain cracks, load can fall uncontrolled and cause damage.

Risk for serious injury or death.

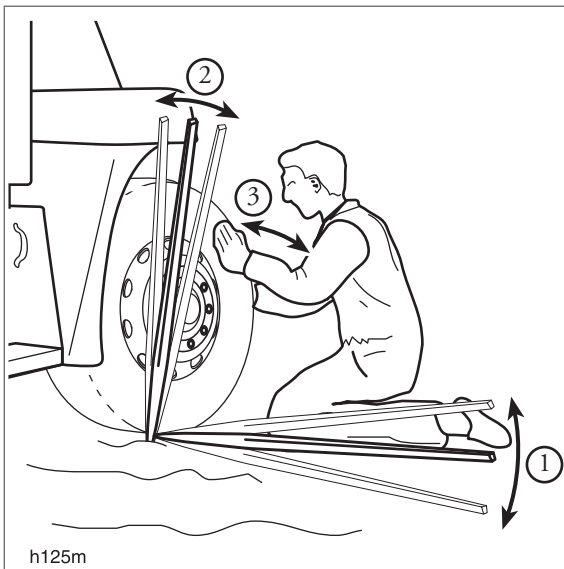
In case of any doubt, the chain should be replaced.

Chains are always replaced to its whole length. I.E. It is not allowed to replace only a part of a chain by re-riveting.

Checking weld constructions

Check the mast, chassis and all welded parts to see if there are any visible signs of damage, deformation, metal fatigue, etc. This should be done at least once a year, more often if the machine does shift work.

If there are any doubts, contact the Konecranes Lifttrucks dealer.



Checking of the steer axle bearings

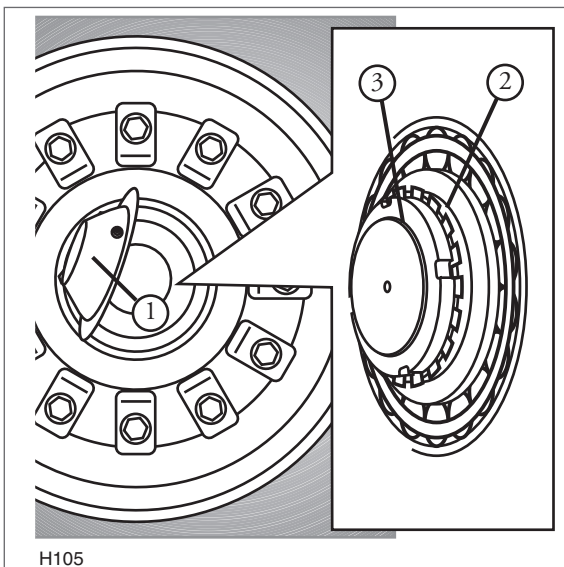
Check the wheel and spindle bearings regularly and always when the tyres are replaced. Important during the running in period. As these bearings are exposed to high loads and shocks it is of greatest importance that there is no play whatsoever in these bearings. Any play will result sooner or later in bearing breakdown. Bearings are adjustable, see next page. Play in link bearings is acceptable to 1-2 mm per each bearing, this is however not adjustable.

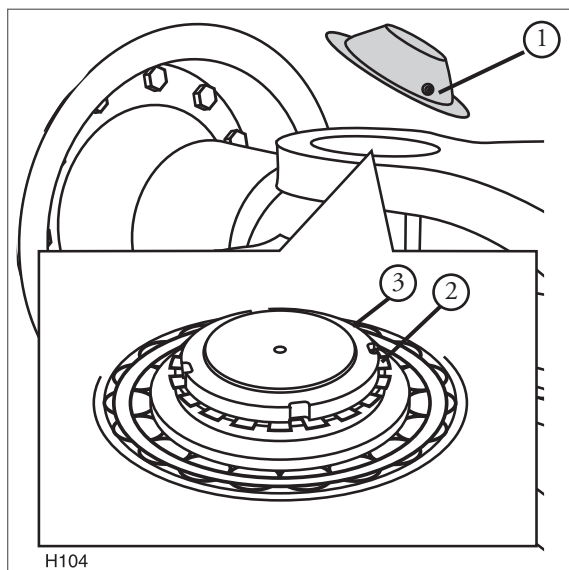
Use a jack to lift up each side (see Changing a wheel) and check as follows:

- Check the spindle bearings by lifting the wheel with a prybar (1).
- Check the hub bearings by prying the wheel vertically (2).
- Check the link bearings by turning the wheels in the steering direction (3).

Checking and adjusting steer axle bearings

- Remove the cap (1).
- Check that the grease is clean and free from particles. If not, a damaged bearing could be the cause of the gap.
- Turn down the lock washer (2).
- Tighten the nut (3); the correct torque is 245-294 Nm.
- Rotate the hub. There should only be slight resistance. Noise or irregular rotation is proof for bearing damage. Replace bearing.
- Check the gap.
- Secure the nut (3) with washer (2).
- Remount the cap (1).





Adjusting the spindle bearings

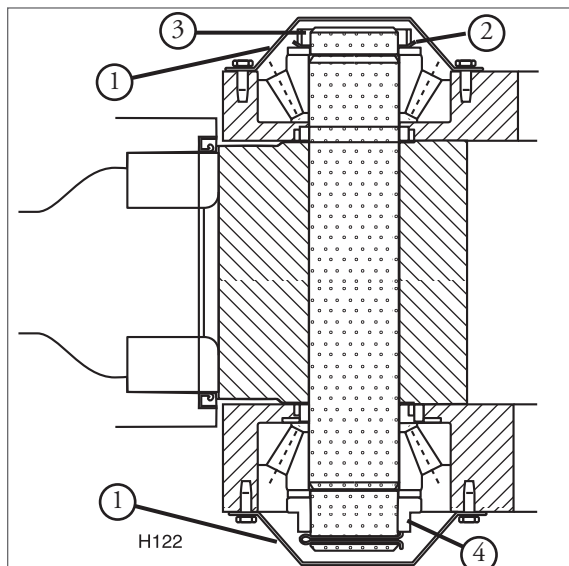
- Remove the steering link.
- Remove the caps (1).
- Check the grease.
- Turn down the lock washer (2).
- Unscrew the nut (3) a few turns.
- Check that the lower nut (4) is tightened; the correct torque is around approx. 980 Nm.

NOTE

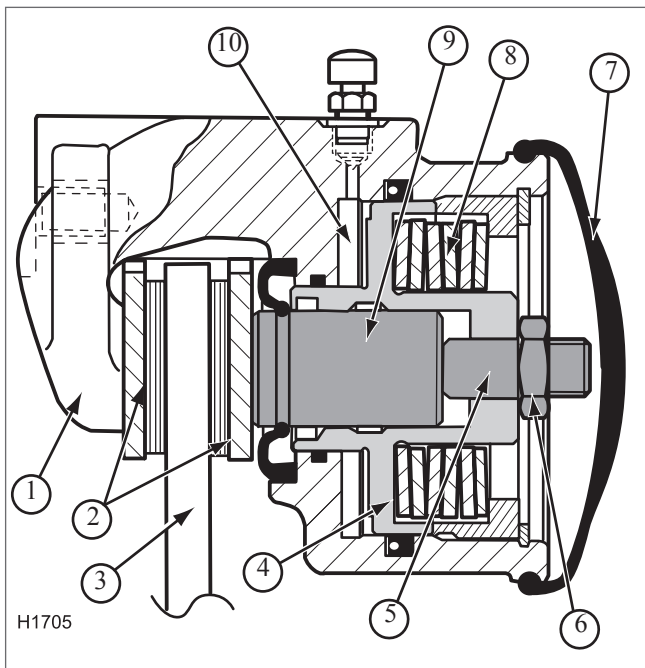
The nut (4) is not used to preload the bearing.

All bearing preload is adjusted with the upper nut (3).

- Tighten the upper nut (3) to around 245-294 Nm.
- Check that there is no gap and that the spindle can easily be turned without making any noise or offering irregular resistance.
- Remount the caps (1).



Checking and other maintenance

KONECRANES®


PARKING BRAKE

The parking brake consists of brake calliper and a brake disc which is mounted on the drive axle.

The brake calliper consists of housing (1), piston (4), spring-washers (8) which press on the piston, brake pads (2) and disc (3).

The brake is normally applied.

The brake calliper is opened by hydraulic pressure in the oil chamber (10). Hydraulic pressure moves the piston and compresses the springs. At least 100 bar is required to open the brake.

Pressure is coming from the accumulator system via a solenoid valve, controlled by the parking switch.



WARNING

The brake is a pure parking brake and should be used as such - to keep the machine stationary.

Due to the gear ratio through the drive axle, the brake is very powerful, however if the brake is used to stop the machine it will wear the pads rapidly. Use the parking brake to stop the machine with only in emergency. After such a braking the brake should be checked, adjusted and if necessary pads replaced. As being an emergency brake, the function of it has to be checked daily by the operator. To ensure the function and to make the following adjusting procedures to go easy, it's necessary to keep the calliper well lubricated and all parts in good condition. In case of any doubts, dismantle, clean and lubricate.

Adjustment of parking brake

Note. It is important that the parking brake is activated (released) during adjustment.

- Park the vehicle on a level surface.



WARNING

Block the wheels to prevent the vehicle from moving.

- Start the machine to ensure correct brake system pressure.
- Release the parking brake by using the switch in the cabin.

The oil chamber (10) should now be pressurised. The piston assembly, consisting of push rod (9), piston (4), adjusting screw (5), and lock nut (6) compress the spring washers (8). To ensure that the brake pressure is maintained it may be necessary to run the engine.

Parking brake emergency release



WARNING

When the parking brake is released, the vehicle does not have any park brake function. You must block the wheels to prevent the vehicle from moving. Serious personal injury and damage to components can result.

If hydraulic pressure is not available, the parking brake can be manually released using the following procedure.

- Park the vehicle on a level surface. Block the wheels to prevent the vehicle from moving.
- Remove the cap (7).
- Loosen the lock nut (6).
- Turn the adjusting screw counterclockwise until the brake is released. Emergency release requires approximately 30 lb-ft (40 Nm) torque on the adjusting screw (5).
- Tighten the lock nut (3). Install the cap.
- Before you return the vehicle to service, adjust the brake using the procedure in this section.
- Remove the cap (7).
- Release lock nut (6) and turn the adjuster screw (5) clockwise until both brake pads (2) are in contact with the brake disc (3).
- Turn the adjuster screw counterclockwise until the disc (3) is just moving freely.
- Tighten lock nut (6) and recheck by moving the disc (3).
- Apply the parking brake.
- Remove the blockage from the wheels.
- Test the function of the parking brake.
- Install the cap (7).

Delivery-/start-up service

DELIVERY INSPECTION AND INITIAL START-UP

Always perform maintenance, lubrication, inspection and daily maintenance according to the instructions in this book. Before commissioning of the truck, inspection points according to the guarantee/delivery report.

The guarantee/delivery report must be filled in and returned to Konecranes Lifttrucks within one week from commissioning the truck in order to make the guarantee value from commissioning date.

If the guarantee/delivery report is not returned within one week, the guarantee is value as from the day the truck was delivered by Konecranes Lifttrucks.

DELIVERY/COMMISSIONING SERVICE

Pos.	Inspection points to check or maintain	Activity
1	Clean the truck	X
2	Tighten the wheel nuts according to torque	X
3	Check tire pressure and condition	X
4	Check fluid level/fill up the washing fluid container	X
5	Check fuel level	X
6	Check cooling fluid level	X
7	Check gear box oil level	X
8	Check engine oil level	X
9	Check oil level of the hydraulic system	X
10	Check function of service and parking brake	X
11	Check function of steering system	X
12	Lubricate according to lubrication chart	X
13	Check function/condition of electrical system, lighting, instruments, switches and safety system	X
14	Check function of hydraulic system	X
15	Check oil level of the drive axle	X
16	Check condition of batteries	X
17	Check safety and condition of driver's cab, fuel and oil tanks, chassis, counter weights, lifting equipment and attachment	X
18	Check condition of painting and windows	X
19	Compare specifications with customer's acceptance of order	X
20	Check ID and warning signs	X
21	Check that the proper driver's service book is delivered with the truck	X

Checking and Maintenance schedule

KONECRANES®

DAILY MAINTENANCE AND SERVICE BEFORE START-UP

Pos.	Service points to check or maintain	Activity
1	Check the main circuit switch	X
2	Check cooling fluid level	X
3	Check washer level	X
4	Check air filter indicator	X
5	Check engine oil level	X
6	Check gear box oil level	X
7	Check hydraulic oil level	X
8	Check fuel level	X
9	Check tyre pressure, condition and wheel nuts	X
10	Check brake system for function	X
11	Check steering system for function	X
12	Check hydraulic system for function	X
13	Check lights and horn	X

SERVICE POINTS AFTER THE FIRST 150 HOURS

Pos.	Service points to check or maintain	At 150 hours
1	Change engine oil	X
2	change engine oil filter	X
3	Change gearbox oil	X
4	Change gearbox oil filter	X
5	Lubricate machine according to lubrication schedule	X
6	Check oil level in drive axle	X
7	check cooling fluid level	X
8	Check cooling freezing point	X
9	Check engine drive belt	X
10	Check hydraulic oil level	X
11	Check battery condition	X
12	Check exhaust system	X
13	Check (clean if necessary) air filter and air intake	X
14	Check lifting chains	X
15	Check tyre pressure and condition	X
16	Tighten wheel nuts to proper torque	X
17	Check steer axle bearings	X
18	Check/tighten bolt joints	X
19	Check condition and function of electrical system, lighting, instrumentation, switches and safety system.	X
20	Check safety and condition of cab, tanks, chassis, counter weights, lifting equipment and attachments	X
21	Check condition of painting and windows	X
22	Check function of service and parking brake	X
23	Check function of steering system	X
24	Check function of hydraulic system	X
25	Check/adjust valve clearance ¹⁾	X
26	Tighten injection nozzles ¹⁾	X

NOTE! Extra service after 500 hours on Scania engines

27	Check and adjust injectors/valves on Scania-engines after the first 500 hours ²⁾	X
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NOTE!

1) Due for Volvo's 6-7 liters standard engines, see manufacturers instruction handbook.

2) Check/adjustment after the first 500 hours, see manufacturers instruction handbook.

Checking and Maintenance schedule

KONECRANES®

REGULAR SERVICE

Pos.	Service points to maintain	When necessary	500 h-service	1000 h-service	2000 h-service	4000 h-service
1	Clean the machine	X				
2	Clean the radiator	X				
Filter- and liquid change						
3	Lubricate according to Lubrication schedule		X	X	X	X
4	Change engine oil*		X	X	X	X
5	Change/clean engine oil filter*		X	X	X	X
6	Change fuel filter			X	X	X
7	Change fuel water separator filter			X	X	X
8	Change/clean engine air filter	X		X	X	X
9	Change gearbox oil			X	X	X
10	Change gearbox oil filter			X	X	X
11	Change cab filter	X		X	X	X
12	Change hydraulic oil filter				X	X
13	Change hydraulic oil	X				X
14	Change hydraulic oil tank breathing filter	X				X
15	Change drive axle oil					X
16	Change air filter safety cartridge					X
Checking and cleaning						
17	Drain fuel filter water separator	X	X	X	X	X
18	Check tyre pressure and condition	X	X	X	X	X
19	Tighten wheel nuts to proper torque	X	X	X	X	X
20	Check cooling level	X	X	X	X	X
21	Check oil level in drive axle		X	X	X	X
22	Check battery condition		X	X	X	X
23	Check engine drive belts		X	X	X	X
24	Check exhaust system		X	X	X	X
25	Check adjustment of parking brake		X	X	X	X
26	Check mast and fork carriage		X	X	X	X
27	Check lifting chains		X	X	X	X
28	Check forks visually		X	X	X	X
29	Check/tighten bolted joints	X	X	X	X	X
30	Check condition of painting and windows		X	X	X	X
31	Check safety and condition of cab, tanks, chassis, counter weights, lifting equipment and attachments		X	X	X	X
32	Check ID-plates and warning signs		X	X	X	X
33	Check electric system for function		X	X	X	X
34	Check service and parking brake for function		X	X	X	X
35	Check steering system for function		X	X	X	X
36	Check hydraulic system for function		X	X	X	X
37	Check/adjust valve clearance	See engine service schedule				
38	Check/adjust fuel injectors	See engine service schedule				
39	Check steer axle bearings	X		X	X	X
40	Check cooling freezing point and anticorrosion				X	X
41	Check welding constructions				X	X
42	Clean/drain fuel tank	X				X
Calibration						
43	Calibration of the gearbox		X	X	X	X
NOTE!						
*) Change intervals for oil and filters is dependent on sulphur content of the fuel and operation conditions.						

Engine service schedule

KONECRANES®

SCANIA DC9, SCANIA DI12 / DC12

First service after 500 hours

Check/adjust valve clearance *)

Check/adjust PDE-injectors *)

Check points every 2500 hours

Check/adjust valve clearance *)

Check/adjust PDE-injectors *)

VOLVO TAD 620VE AND TAD 722VE, VOLVO TAD 660VE AND TAD 762VE

First service at 150 hours

Check/adjust valve clearance *)

Tighten injectors 50 Nm *)

Check points every 1500 hours

Check/adjust valve clearance *)

Check points every 3000 hours

Check injectors *)

VOLVO TWD 1240VE, VOLVO TAD 1250VE

Check points every 2000 hours

Check/adjust valve clearance *)

CUMMINS QSB6,7

Check points every 5000 hours

Check/adjust valve clearance *)

CUMMINS QSM11

Check points every 1500 hours

Check/adjust valve clearance *)

*) Note! See manufacturer's instruction manual.

INSPECTION AND MAINTENANCE DATA

No.	Unit	Material/oil/ lubricant	
1.	Engine	Engine oil	Volvo TAD 620 VE, Filter and oil change 16 l (4,2 US Gal) TAD 722 VE, Filter and oil change 23 l (6,1 US Gal) TAD 660 VE, Filter and oil change 15,5 l (4,1 US Gal) TAD 760 VE, Filter and oil change 21,5 l (5,7 US Gal) Scania DC9, Filter and oil change 37 l (9,8 US Gal) Cummins QSB 6,7, Filter and oil change 16,7 l (4,4 US Gal)
2.	Air filter	Air pressure max 1 bar (cleaning)	
3.	Fuel tank	Diesel	SMV 10/12-600 B 131 l (35 US Gal) SMV 10-1200 B/13,6-600 B 168 l (44 US Gal) SMV 12-1200/16-600 B/900 B 206 l (55 US Gal) SMV 15-1200 B/16-1200 B 243 l (64 US Gal)
4.	Cooling system	Glycol/water mix.	50 l (13,2 US Gal)
5.	Hydraulic oil system (total volume)	Hydraulic oil	SMV 10/12-600 B 152 l (40 US Gal) SMV 10-1200 B/13,6-600 B 192 l (51 US Gal) SMV 12-1200/16-600 B/900 B 227 l (60 US Gal) SMV 15-1200 B/16-1200 B 272 l (72 US Gal)
6.	Drive axle	Drive axle oil	Each hub D81 PL478 1,5 l (0,4 US Gal) Diff. 21 l (5,5 US Gal)
7.	Gearbox	Dexron III	DANA TE17 25-30 l (6,6-7,9 US Gal)
8.	Tyres	Air	See manufacturer's manual
9.	All lubrication points	Grease	When necessary
10.	Valve clearance	-	See manufacturer's recommendations
11.	Fuel injection.	Diesel	See manufacturer's work-shop manual

Fuel and oil recommendations

KONECRANES®

Quality of the engine oil

The engine oil must comply with one of below classifications for oil:

- ACEA E3, E4, or E5
- TBN-value should at least be 12-13 (ASTM 2896)

Check with your oil supplier if your oil meets these demands.

The stated oil change intervals are valid if the sulphur content of the fuel is below 0.3%. If the sulphur content is higher than 0.3%, the oil change intervals must be divided in half (250 h).

When the engine is in use, some of the oil which serves as a lubricant will be burned (used) prior to reaching the pistons. The combustion products in combination with the high temperatures lead to "oil wear", particularly for the chemical additives.

Since this oil wear depends on operating conditions, the quality of the oil (the productivity of the oil) and the fuel used, the intervals between changing the oil may vary in length.

The longest possible time before the engine lubricating oil is replaced is one year, i.e. the oil should be replaced after a maximum of one year's operation.

Since the viscosity of the oil varies according to temperature, the temperature in the place where the truck is being used is vital to the choice of the engine oil viscosity range (see diagram).

Changing the oil due to a replace in season may be avoided by using what are known as multi-grade oils. Specified intervals for changing the oil also apply to multi-grade oils.

NOTE

No oil additives of any sort must be added to those oils recommended! Using such additives could invalidate the engine warranty.

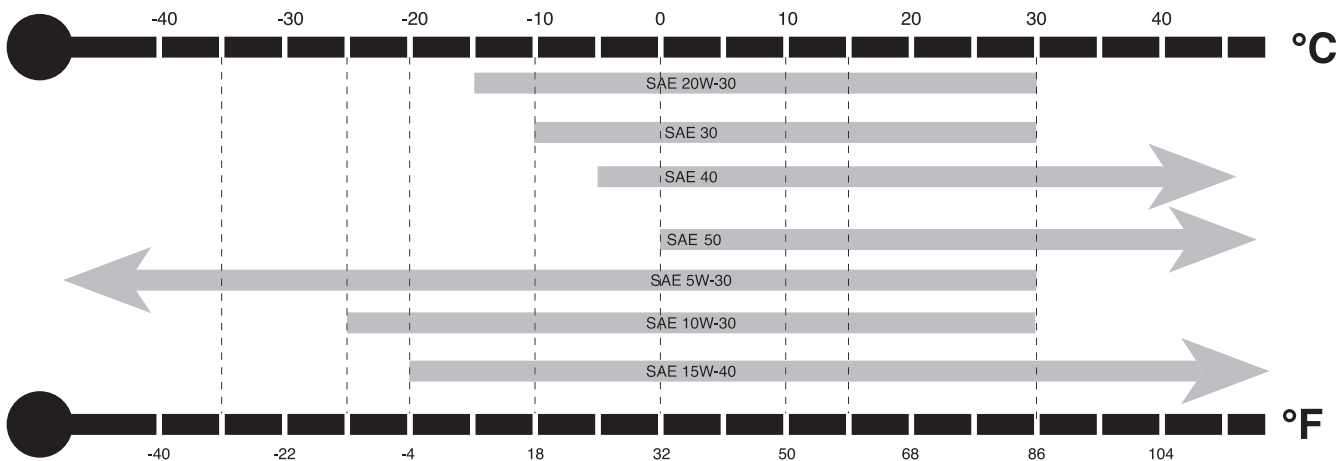
Mixing different brands of oil should be avoided. Since the temperature ranges for adjacent SAE classes overlap, the oil does not need to be replaced when shortterm temperature replaces occur.

NOTE

In order to ensure trouble free cold starts, it is important to select SAE-class according to the momentaneous ambient temperature.

Extended oil change interval

Extended oil service life may result when using synthetic fluids. Appropriate change intervals should be determined for each engine by measuring oil oxidation and wear metals over time, to determine a baseline. Wear metals analysis can provide useful information but an engine should not be removed from service based solely on this analysis.



RECOMMENDED FUELS AND HYDRAULIC OILS

Diesel

Use only fuel in accordance with DIN 51601 with a cetane rating not below 45.

The diesel sulphur content should not exceed 0.3 %. If the sulphur content lies over 0.3 % the oil changing intervals in the maintenance table must be halved.

If the values are higher, contact the manufacturer of the fork-lift truck or the lubricant.

NOTE

As the surrounding temperature falls, the flow characteristics of the diesel are reduced to a point where paraffin begins to precipitate. If "summer quality" diesel is used, this may cause trouble in operation. For this reason, "winter quality" diesel should be used during the cold part of the year, as it operates in the cold better and functions reliably at -15 °C.

Using additives to improve the flow is not recommended. They may reduce the capacity to start from cold.

Converter/transmission oil

ATF Dexron III

Oil change interval

Drain and refill system every 1000 hrs for average environmental and duty cycle conditions. Severe or sustained high operating temperature or very dusty atmospheric conditions will result in accelerated deterioration or contamination.

Hydraulic oil

Universal TracTor Transmission Oil (UTTO)

The oil must comply with one of the following classifications:

- John Deere JD20C
- Massey Ferguson
MF1141/MF1135/ MF1143
- ZF TE-ML 03E/TE-ML 05F/TE-ML 06K

It is also possible to use a standard hydraulic oil according to specification

DIN 51524 Part 2 HLP and Part 3 HVLP

in addition with 1.5 % Lubrizol.

Use hydraulic oil from a well-known oil company for mobile applications.

Viscosity	Temperature range
SHS 32	-30 °C – +10 °C
SHS 46	-20 °C – +50 °C
SHS 68	±0 °C – +50 °C

Grease

Multipurpose type E.P. according to N LGI Grade 2.

Coolant

Use only ethylene glycol-based coolants with an additive to prevent corrosion. Do not mix with anti-freeze liquid containing ethanalamine.

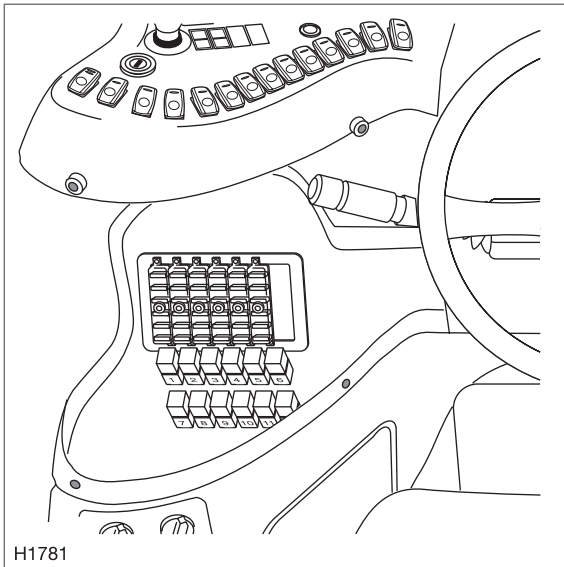
Drive axle oil

API GL.5 SAE 80 W-140

NOTE

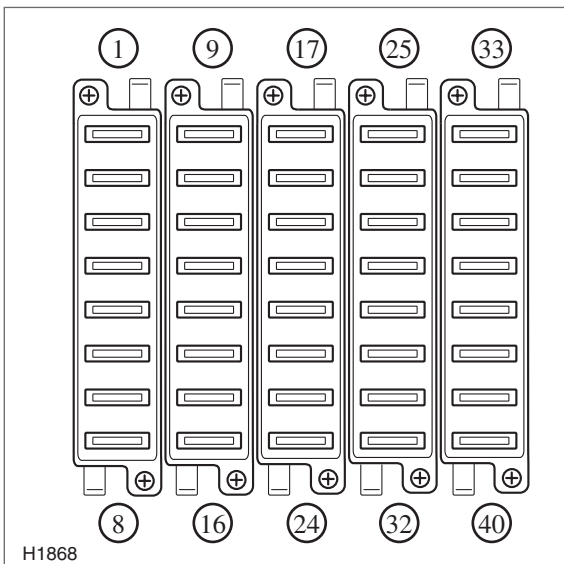
The above are strictly recommendations. When ever hesitating contact the Konecranes Lifttrucks-dealer for advice.

Liquid anti-freeze at the lowest temperature	% volume mixture liquid anti-freeze °C	Mixture of anti-freeze and water
-12	25	1:3
-18	30	1:2
-25	40	1:1,5
-37	50	1:1
-60	66	2:1



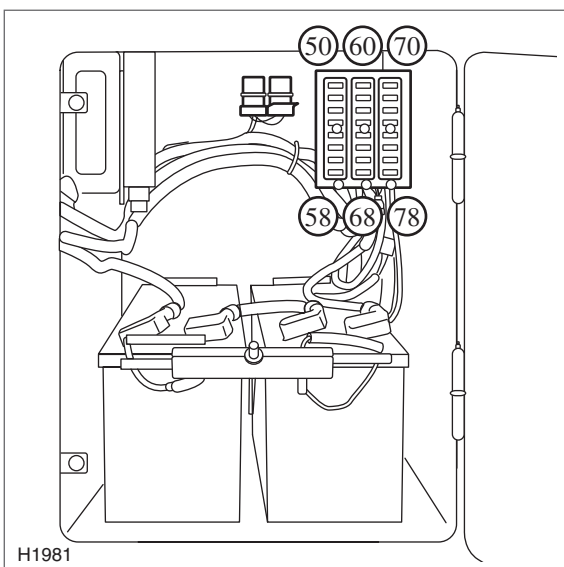
Fuses

Fuses are located below the left hand dash board. They are numbered (1), upper left to (40), lower right. *Italic = optional.*



Fuses below the dash board

Fuses are located below the dash board. They are numbered (1), upper left to (40), lower right.



Fuses in the battery compartment.



WARNING

Beware of short-circuiting the battery, which may cause fire or explosion.

Risk for serious injury or death.

The battery contains corrosive acid. Always use the necessary protective equipment.

Batteries generate explosive hydrogen when charged. Ensure that there is good ventilation and avoid sparking.

The main disconnect does not cut the power to the alternator. Always disconnect the ground (minus) cable at the battery when working near or on the alternator.

To reduce the risks of electrical shock and personal injury always remove jewelry and conductive material prior to working on the electrical system.

Unless in an emergency situation, do not turn off the main circuit switch while the engine is running.

FUSES

The fuses are located below the left hand dashboard. They are numbered (1), upper left, to (40), lower right.

Italic = optional.

FUSE	SIZE	FUNCTION
F1	10 A	SCANIA EMS, Charging Ind. Lamp, Relays Workinglights
F2	7,5 A	Break Lights , Side Marker Lamps, Dome Lamp, Switch Illumination
F3	15 A	HVAC,
F4	5 A	Fuel Shutoff valve, Central Lubrication Pump, Buzzer Seat
F5	15 A	Condensor Fan Motor
F6	7,5 A	Road lights and high Beam
F7	7,5 A	Road lights and low Beam
F8	10 A	IQAN-MDL
F9	3 A	Can-cockpit
F10	10 A	IQAN-XA2-B0
F11	10 A	IQAN-XA2-B1
F12	7,5 A	Turn Lamps, HVAC
F13	7,5 A	Relay Key-Start SW., Cold Start Aid, Relay Starter Motor
F14	15 A	ROAD LIGHTS, High Beam, Low Beam
F15	10 A	Entrance Lights
F16	10 A	Wiper Motor Front, Wiper Motor Rear, Wiper Motor Roof, Windshield Washer Motor, Horn
F17	7,5 A	Turn Lamps, Seat Heater
F18	10 A	Seat Suspension Air Compressor
F19	7,5 A	<i>Workinglights Extra ELME</i>
F20	7,5 A	Beacon, Rear View Mirror Heater, Map Light, Search Light
F21	7,5 A	Backup Lights, Backup Alarm
F22	7,5 A	Radio
F23	15 A	24V Outlet
F24	7,5 A	IQAN-MDL (+RTC), Timer Diesel Fired Preheater
F25	10 A	Marker Lights Left
F26	10 A	Marker Lights Right
F27	7,5 A	Workinglights Mast Right
F28	7,5 A	Workinglights Mast Left
F29	7,5 A	<i>Workinglights chassi front</i>
F30	7,5 A	<i>Workinglights chassi front</i>
F31		<i>Attachment</i>
F32		Extra
F33		Can-Cockpit
F34		Extra
F35	15 A	Power upply <i>SCANIA EMS S6/Cummins QMS</i> <i>Diagnostics outlet in cab EMS/QMS</i>
F36	15 A	Power upply <i>SCANIA EMS S6/Cummins QMS</i>
F37	10 A	Computer/Customer equipment
F38	10 A	Computer/Customer equipment
F39	15 A	Reserved for seat compressor. (Large) Fuse not mounted
F40	3 A	Back-up camera

Electrical system

KONECRANES®

Fuses F51-F68 and F71-F78 are situated in the battery compartment.

FUSE	SIZE	FUNCTION
F51	10 A	main fuse, F12 & F24,
F52		Extra
F53		Extra
F54	15 A	Engine Preheater
F55	15 A	Engine Preheater
F56	5 A	APC200
F57	10 A	Volvo EMS2
	15 A	Cummins QSB
F58	15 A	Extra/Cummins QSB
F61	30 A	Main fuse F1, F3, F4 & F5
F62	30 A	Main fuse F8, F9, F10, F11, F33 & F34
F63	30 A	Main fuse F16, F17, F18, F21, F31 & F32
F64	30 A	Main fuse F2, F13, F27 & F28,
F65	30 A	Main fuse F14, F15, F29 & F30
F66	30 A	Main fuse F19, F20, F22, F37, F38 & 32
F67	30 A	Main fuse F23, F35 & F36
F68	30 A	Starter relay
F71	10 A	ELME Spreader
F72		Extra
F73		Extra
F74	10 A	Volvo EDC4/Volvo EMS2/Cummins QSB
F75	5 A	APC200
F76		Extra
F77		Extra
F78		Extra

RELAIS

K1-K17 is mounted in the electrical main box.

K31, K32, K33 and K34 are mounted near the main fuses.

Relay nr.	Relay function
K1	Used only in combination with automatic engine shut-off by Can-Cockpit
K2	Used only in combination with automatic engine shut-off by Can-Cockpit.
K3	Time relay, sed only in combination with automatic engine shut-off by Can-Cockpi.
K4	Working lights mast.
K5	Working lights roof.
K6	Working lights extra.
K7	Buck-up light
K8	Interlocking direction selector when joystick steering..
K9	Rear view mirror heater.
K10	Windshield wiper rear.
K11	Windshield wiper roof.
K12	<i>Windshield wiper front.</i>
K13	Directionals
K14	Backup camera.
K15	<i>Switching marker light rot. drivers seat.</i>
K16	<i>Switching brake light, backup warning rot. driving seat.</i>
K17	<i>Switching roading lights, backup lights rot. driving seat.</i>
K18	Start blocker at engaged gear, used only in combination with Can-cockpit
K19	Used only in combination with automatic engine shut-off by IQAN-MDL
K31	Starter (diesel).
K32	Stop solenoid (Main power relay)
K33	Restart relay
K34	Hold function APC 200 DANA

