OPERATOR'S MANUAL

MOVING YOU FURTHER

HA30 / HA30A
HA45 / HA45A

HYUNDAI
CONSTRUCTION EQUIPMENT

HYUNDAI
DOOSAN INFRACORE

Operation & Maintenance Manual

HA30(T2;T4F) / HA30A(StageV)

HA45 (T2;T3;T4F) / HA45A (StageV)

English

Series: **7x1896 - and up**
8x1811 - and up

NOTE

The English version is the **"Original Instruction"**. All other languages are translated from the Original Instructions.

Operation & Maintenance Manuals are available in certain other languages. If other languages are required, please contact your local HYUNDAI Dealer for details of availability.

Manufacturer:
Doosan Infracore Norway AS
N - 6440 Elnesvågen - NORWAY
Printed in Norway

Dealer:

Table of contents

Foreword

This manual provides rules and guidelines which will help you use this dump truck safely and effectively. This manual describes procedures for operating, handling, lubricating, maintenance, checking and adjustment. It will help the operator to achieve peak performance through effective, economical and safe dump truck operation and maintenance.

- Keep this manual in the dump truck at all times and ensure that all personnel read it carefully before operating the dump truck.
- Continue studying the manual until proper operating procedures are completely adopted as personal habit.
- This manual describes the basic techniques. The operator's skill will increase with correct knowledge of dump truck operation.
- Operation, inspection and maintenance should be carefully carried out, and safety must be given first priority.

If this manual has been lost or has become dirty and cannot be read, request a replacement manual from your local HYUNDAI Dealer.

If you sell the dump truck, be sure to give this manual to the new owners.

Doosan Infracore Norway AS cannot be held responsible for damage or injury caused through use of improper spare parts not specified by Doosan Infracore Norway AS, improper handling, operation and utilization of the dump truck in other ways than those described in this manual. Doosan Infracore Norway AS cannot be held responsible for unauthorized modifications or the non-adherence to local, national government or international regulations.

This Operation & Maintenance Manual may contain standard extra equipment and optional accessories that are not available in your area. Please consult your local HYUNDAI Dealer for those items you may require.

Doosan Infracore Norway AS aim to continuously improve the dump trucks and therefore retain the right to make design changes and improvements whenever we feel it will improve the efficiency of the dump truck.

Doosan Infracore Norway AS also reserves the right to change data and equipment without prior notice, as well as amending instructions for maintenance and other service measures.

WARNING

- **This dump truck complies with EC directives 2006/42/EC (Machinery Directive) with amendments, 2000/14/EC (Noise Emission Directive) with amendments, 2014/30/EC (Electronic Compatibility) with amendments and 2004/26/EC (Exhaust Gas Emission) with amendments. Dump trucks complying with the directives display the CE mark. The dump truck must not be modified in such a way that it no longer complies with the EC - directives.**
- **Improper operation and maintenance of this dump truck can be hazardous and could result in serious injury or death.**
- **Operators and maintenance personnel should read this manual thoroughly before operation or maintenance.**
- **Some actions involved in operation and maintenance of the dump truck can cause serious accidents, if they are not carried out in a manner described in this manual.**
- **The procedures and precautions given in this manual apply only to intended uses of the dump truck. If you use your dump truck for any unintended uses that are not specifically prohibited, you must be sure that it is safe for you and others. In no event should you or others engage in the prohibited uses or actions which are described in this manual.**
- **Doosan Infracore Norway AS delivers dump trucks that comply with all applicable regulations and standards of the country to which it has been shipped. If this dump truck has been purchased in another country or purchased from someone in another country, it may lack certain safety devices and specifications that are necessary for use in your country. If there is any question about whether your product complies with the applicable standards and regulations of your country, consult your local HYUNDAI Dealer before operating the dump truck.**
- **Safety descriptions are given in SAFETY INFORMATION on page 1-14 and in SAFETY INSTRUCTION, chapter 2.**

Product information

Machine capacity

Do not exceed machine capacity by modifying machine or using unapproved attachments.

Exceeding machine capacity can adversely affect machine performance characteristics such as: stability, system certifications such as brakes and steering, the Roll-over Protective Structure (ROPS) and can result in death or serious injury. Contact your HYUNDAI distributor for further information.

Engine and emission control system maintenance

Proper inspection, maintenance and repair is essential to keeping engine and machine systems properly operating. This includes proper inspection and maintenance of the machine's emission control system. This could include machine and engine components, such as an EGR (Exhaust Gas Recirculation) system, fuel system, turbocharger, electrical system, air intake system and or cooling system.

As a heavy-duty off-road diesel engine owner, you are responsible for performing required maintenance. The required maintenance procedures are outlined in this Operation & Maintenance Manual, or Shop Manual. Do not remove, alter, or render inoperative, any emission control system.

Introduction

Intended use

This articulated dump truck is designed to be used mainly for earth moving at sites, both on and off road conditions.

The basic machine is intended to be used under normal conditions, that is, outdoors, above ground, underground ,off road, for earth moving, and in an ambient temperature between -25°C and +45°C with maintained performance. Conditions that deviate from this are also described in this manual. For use on public roads, the machine must be adapted according to governing national legislation. If it is used for other purposes or in potentially dangerous environments such as explosive atmosphere, areas with dust that contains asbestos, etc., precautions must be taken and the machine must be equipped for such use. Contact your HYUNDAI Dealer for more information. The machine is designed for a maximum machine weight (includes equipment and attachments) of 51,200 kg for HA30 and 71,100 for HA45 .

Overloading, adding extra equipment or modifications can cause the machine's design capacity exceeded, and can have a negative effect on the performance characteristics of the machine. This includes stability and system certifications such as brakes, steering, ROPS, etc. Always pay attention to national regulations for travelling on public roads Contact yours HYUNDAI dealer for further information.

General description

Dump truck HA30/HA45 is an articulated, 6-wheel drive dump truck. The free-swinging rear tandem housing, and the special articulation system, provide excellent performance in soft and difficult terrain. The special body design ensures that a low centre of gravity is maintained and an even load distribution to front and rear wheels, for stability on uneven ground and for fast easy tipping of the load. The dump truck is designed and manufactured to work under difficult conditions.

In addition, the wide range of optional equipment allows the dump truck to be used for several different applications.

Operating underground

The need for ventilation of the exhausts shall be checked before the machine is used in tunnels or other underground operations. Other legislation and rules may be applicable, such as national and labour laws.

Environmental requirements

Be aware of the environment when operating and during service and maintenance of the machine. Always follow local and national environmental legislation applicable to all handling of the machine.

Engine

Model	Emission	Engine
HA30	T2;T4F	Scania DC09 (9,3 litre)
HA30A	Stage V	
HA45	T2;T3;T4F	Scania DC13 (12,7 litre)
HA45A	Stage V	

The engines are based on a robust design with a strength optimized cylinder block containing wet cylinder liners, which can easily be exchanged. Individual cylinder heads with 4 valves per cylinder promote reparability and fuel economy.

Tier 2/Tier 3

The engine is equipped with a Scania developed Engine Management System, EMS, to ensure control of all aspects related to engine performance. The injection system is based on electronically controlled unit injectors, which provide low exhaust emissions with good fuel economy and a high torque.

Tier 4F

The engine is equipped with a Scania developed Engine Management System, EMS, in order to ensure the control of all aspects related to engine performance. The injection system is Scania's XPI (Extra High Pressure Injection), a common rail system that in combination with SCR (Selective Catalytic Reduction) and EGR (Exhaust Gas Recirculation) gives low exhaust emissions with good fuel economy and a high torque.

Stage V

Scania's Stage V engines are equipped with a Scania developed extra high pressure fuel injection system based on common rail technology, and a turbocharger optimized for operation in combination with the exhaust gas aftertreatment system. Together with Scania's Engine Management System, the result is an engine that fulfils the strictest exhaust emission requirements, with low fuel consumption and a high torque.

Electrical System

The machine has three control units. The Gauge Panel for the instrumentation is integrated with the display unit, warning lights, instruments to provide the operator with information. The VCU (vehicle control unit) for the machine, receives signals from sensors on the machine and these are passed to the main screen. The ECU controls the engine.

Transmission

The transmissions ZF ErgoPower L II 8 EP 320 (HA30) and EP 420 (HA45) consist of a multi-speed power shift transmission with integrated transfer case and front-mounted hydrodynamic torque converter. The torque converter is a wear-free starting device which is continuously variable adapting itself to the given situations (necessary input torque). Input by direct mounting via diaphragm to the engine, or by using a joint-shaft with mechanic.

Brakes

Service brakes

All hydraulic operated wet multiple disc brake on the front axle and the two front wheel hubs of the rear axle.

There are two separate circuits. Self-adjusting system.

Cooling brake circuit to all hubs with brakes.

Retarder brake (Main brake)

The integrated hydrodynamic retarder is installed in the basic transmission between converter and gear box.

Parking brake

Spring actuated, hydraulic released single disc brake on the rear prop. shaft. Self-centering system.

HA30 is equipped with one parking brake caliper.

HA45 is equipped with two parking brake calipers.

Steering system

The steering movement is created by articulation of the frames in relation to each other. The steering is fully hydraulically controlled. It has a steering angle of 45° both sides.

The machine is equipped with a ground driven emergency steering pump fitted on the transmission.

Suspension

Suspension system has outstanding performance in rough terrain due to big shock absorption capacity. The Self-leveling, hydro-gas front suspension system can adjust to match changing working conditions.

Front:

Independent self leveling suspension cylinder.

Rear:

Free-swinging tandem housing.

Cab

The cabin has an automatically controlled ventilation system with a window defrosting system. Air conditioning is standard. The cab has two exits: the door is the primary exit and the front right side window can be used if the primary exit is blocked. Break the front right side window using the hammer in the cab if using the secondary exit is necessary.

FOPS and ROPS

The cabin is approved as a protective cabin according to FOPS and ROPS standards. FOPS is an abbreviation of Falling Object Protective Structure (roof protection) and ROPS is an abbreviation of Roll Over Protective Structure (roll over protection). Never carry out any unauthorised alterations to the cabin, e.g. lowering the roof height, drilling, welding on brackets for fire extinguisher, radio aerial or other equipment, without first having discussed the alteration with personnel at the Doosan Infracore Norway Engineering Department. This department will decide whether the alteration may cause the approval to become void. It is important that all parties concerned are aware of these regulations.

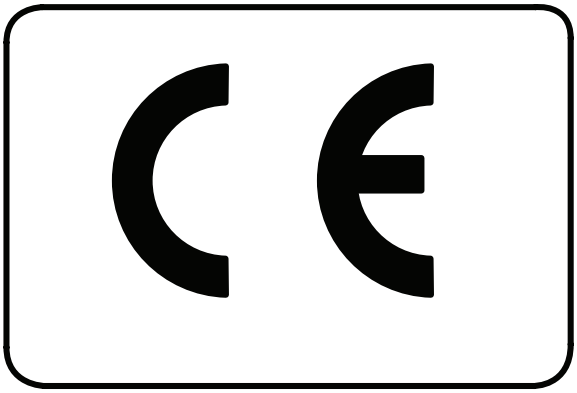
Hydraulic system

The system has one variable displacement piston pump. Pump supplies steering, tipping, fan, brakes system and self-leveling suspension system where the steering circuit has priority.

The main hydraulic pump and the emergency steering pump are attached on the transmission.

Equipment

The machine can be provided with different types of optional equipment, depending on the requirements of different markets or special needs. Examples of such equipment are body heating, heated driver seat and other.



CE Marking

(Declaration of Conformity)

This machine is CE marked. This means that when delivered the machine meets the applicable "Essential Health and Safety Requirements," which are given in the Machinery Safety Directive, 2006/42/EC.

Any person carrying out changes that affect the safety of the machine, is also responsible for the same.

As proof that the requirements are met, the machine is supplied with an EU Declaration of Conformity, issued by HYUNDAI for each separate machine. This EU declaration also covers attachments manufactured by HYUNDAI. The documentation is a valuable document, which must be kept safe and retained for at least ten years. The document should always accompany the machine when it is sold or transferred.

If the machine is used for other purposes or with other attachments than described in this manual, safety must at all times and in each separate case be maintained. The person carrying out such action is also responsible for the action which, in some cases, may require a new CE marking and the issue of a new EU Declaration of Conformity.

The European Union EMC-directive

The electronic equipment of the machine may in some cases cause interference to other electronic equipment, or suffer from external electromagnetic interference, which may constitute safety risks.

The EU EMC directive on "Electromagnetic Compatibility," 2014/30/EC, provides a general description of what requirements can be made of the machine from a safety perspective, where limit values have been established in international standards.

A machine or device which meets the requirements must be CE marked. Our machines have been tested particularly for electromagnetic interference. The CE marking of the machine and the declaration of conformity also cover the EMC directive.

If other electronic equipment is fitted to this machine, the equipment must be CE marked and tested on the machine with regard to electromagnetic interference.

NOTE

All installation of optional communication equipment must be carried out by trained professionals and in accordance with the Hyundai instructions applicable to the machine.

Declaration of Conformity

The next page shows a copy of EU declaration of conformity for machine.

Applies to HYUNDAI articulated dump truck.

NOTE

Declaration of conformity applies only within the European Union.

ENGLISH

HYUNDAI
CONSTRUCTION EQUIPMENT

DECLARATION OF CONFORMITY

DOOSAN INFRACORE NORWAY AS, 6440 ELNESVÅGEN hereby declare that the following machine:

MACHINE IDENTIFICATION:

Type of Machine:	**ARTICULATED DUMP TRUCK**
Brand:	**HYUNDAI**
Model Name:	
Engine Manufacturer:	**SCANIA**
Engine Type:	**DCXX XXXX (EU Stage V)**
Product identification number (PIN):	***XXXXXXXXXXXXXXXXXX***

MANUFACTURER:
DOOSAN INFRACORE NORWAY AS
VARHOLVEGEN 149
N - 6440 ELNESVÅGEN
NORWAY

Has been manufactured in conformity with the basic health and safety requirements in the following directives:

Directive 2006/42/EC (Machinery Directive)
Directive 2000/14/EC (Noise Emission Directive)
Directive 2014/30/EC (Electromagnetic Compatibility)
Directive 2004/26/EC (Exhaust Gas Emission)

Also conforms with the following harmonized standards:

BS EN 474-1 Earth-moving Machinery - Safety - General Requirements.
BS EN 474-6 Earth-moving Machinery - Safety - Requirements for Dumpers.

Other safety components provided with the machine:

BS EN ISO 3449 Earth-moving Machinery - Falling-object Protective Structures (FOPS)
BS EN ISO 3471 Earth-moving Machinery - Roll-over Protective Structures (ROPS)

Sound power level Lwa is XXXdB(A), at 2100 rpm, measured according to BS ISO 6395.

This declaration of conformity applies only to this machine in the condition it was delivered to the market from the manufacturer and excludes components which might have been added later by the owner/user.

Date: XXXXXXXX

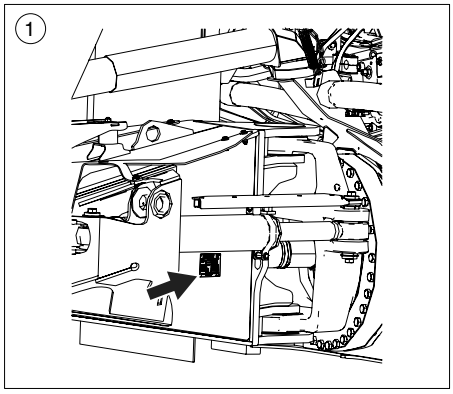
Signature:

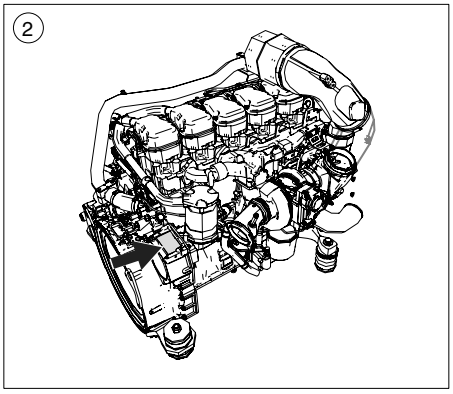
Name: XXXXXXXX
Position: XXXXXXXX

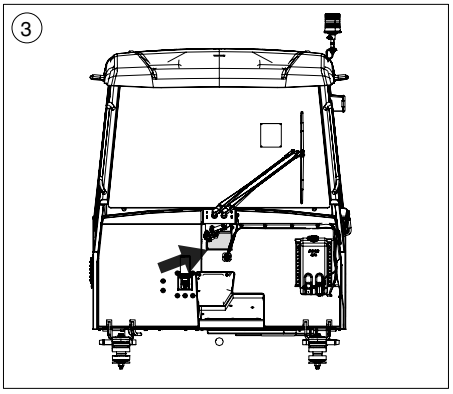
Product plates

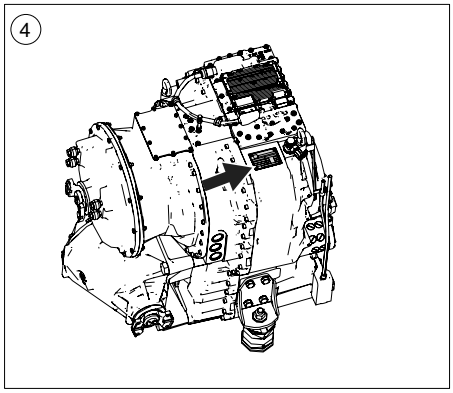
With the aid of the product plates shown below it is possible to identify the machine and its components. The product identification number (PIN) indicates the model designation engine code and serial number of the machine. The component identification number (CIN) indicates the serial number of the component.

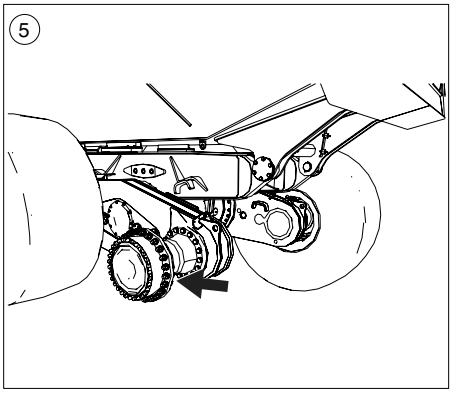
When ordering spare parts and in all telephone enquiries or correspondence, the PIN and CIN must always be quoted.

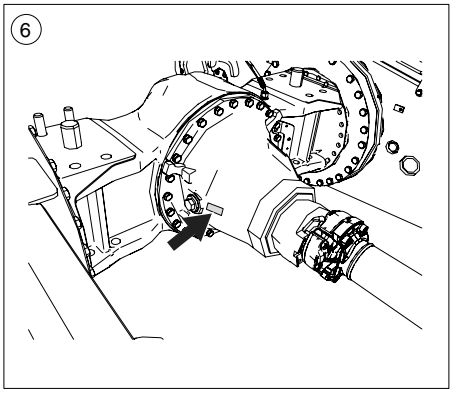












Reference Number	Description	
1	Product Plate	Product plate with Product Identification Number, PIN and model/type number for complete machine, as well as the manufacturer's name and address. The plate is located on the right side of dumper of the front of rear frame.
2	Engine	The engine type designation, part and serial number. The plate is located on the right side on rear of engine.
3	Cab	Cab type, and serial number, ROPS/FOPS number are located on the front side of cab.
4	Transmission	The transmission type designation and serial number. The plate is located on the top of transmission.
5	Front and rear axles	The part and serial numbers, name of supplier and date of manufacture. The position of the identification plate on the axle is mostly next to the drive assembly on the same side as the oil fill plug.
6	Rear differential	The part and serial numbers, name of supplier and date of manufacture. The type plate is usually located near the differential and carrier assembly on the side of the oil filling plug.

Safety messages

Safety messages and safety decals included in this manual and on the machine provide instructions how to operate, service and maintain the machine. Safety messages and safety decals indicate potential hazards and describe safety precautions required to avoid hazards. Operator and maintenance personal should read and understand these safety messages and decals before beginning operation or maintenance.

SAFETY ALERT SYMBOL

Be prepared - Get to know all operating and safety instructions.

This is a safety alert symbol - Wherever it appears in this manual or on safety decals on the machine, you MUST BE alert to the potential for personal injury or accidents. Always observe safety precautions and follow recommended procedures.

Signal words

The signal words "DANGER", "WARNING, "CAUTION" are used throughout safety messages and safety decals in this manual or on the machine. They indicate an existence of, and the relative seriousness of, a hazard. All three indicate that a safety risk is involved. Observe the precautions indicated whenever a safety alert symbol is present, no matter which signal word appears next to it.

DANGER

DANGER - This signal word is used on safety messages and safety labels and indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

WARNING - This signal word is used on safety messages and safety labels and indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

CAUTION - This signal word is used on safety messages and safety labels and indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

Other signal words

In addition to safety signal words, THE FOLLOWING signal words are used to indicate proper and effective use of machine.

IMPORTANT

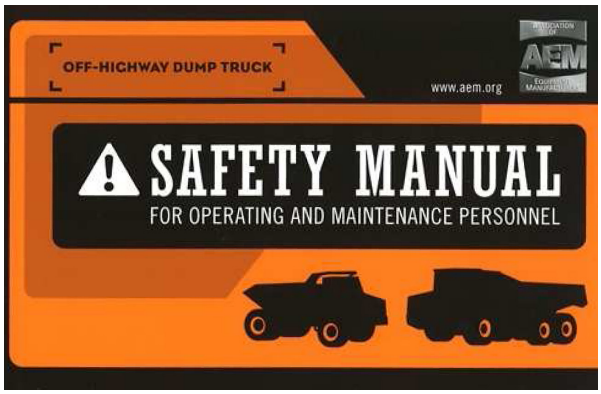
This signal word identifies procedures which must be followed to avoid damage to machine.

NOTE: The word "NOTE" identifies information for effective use.

To identify labels and decals on the dump truck, the following colours are used.

YELLOW & BLACK: These colours are used on safety labels where there is high/potential/moderate probability of death/ injury if the hazard is not avoided.

GREEN & WHITE: These colours are used on information labels.



AEM Safety manual (North America only)

The AEM Safety manual delivered with machine gives general safety information.

The AEM Safety Manual must be read and understood before beginning operation or maintenance and is not intended to replace the Operation & Maintenance Manual delivered with the machine.

California emission control warranty statement

Your warranty rights and obligations

The California Air Resources Board is pleased to explain the emission control system warranty on your 2020 engine. In California, new heavy-duty off-road engines must be designed, built, and equipped to meet the State's stringent anti-smog standards. Scania CV AB must warrant the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect or improper maintenance of your engine.

Your emission control system may include parts such as the fuel-injection system and the air induction system. Also included may be hoses, belts, connectors and other emission-related assemblies.

Where a warrantable condition exists, HYUNDAI will repair your heavy-duty off-road engine at no cost to you including diagnosis, parts and labour.

Safety Instructions

WARNING

Read and follow all safety precautions. Failure to do so may result in serious injury or death.

This safety section also contains precautions for standard extra equipment and optional accessories.

Safety decals

Safety decals are attached to the machine to alert the operator or maintenance person about potential hazards, the consequences of potential injury, and instructions and/or actions required to avoid the hazard. The location of the safety decals and the description of the decals are reviewed in the following section. Please become familiarized with all safety decals and their messages.

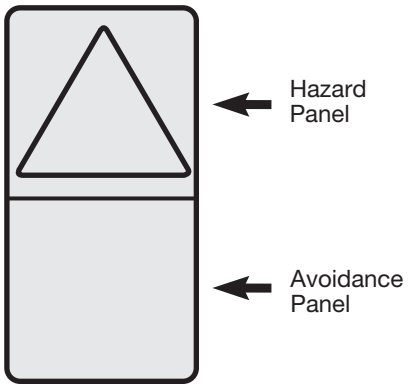
Make sure that all the safety decals are in their correct location and legible. Clean or replace the safety decals if they are damaged, missing, or the texts and pictorials are not legible. When you clean the safety decals, use a soft cloth, water, and soap. Do not use solvent, gasoline, or other harsh chemicals to clean the safety decals because this could loosen the adhesive that secures the decals to the machine. Remember, if a safety decal is attached to a part that is replaced, install a new safety decal on the replacement part.

This machine uses safety decals with and without text. The type and number of safety decals can vary depending upon geographical regions and machine models.

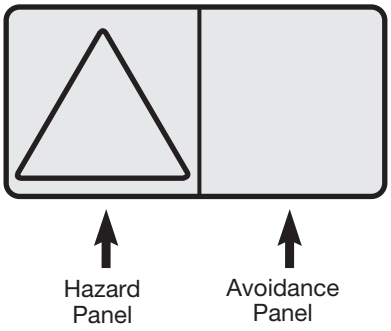
Safety Decals With Text

Safety decals with text consist of a signal word, pictorial and a text message panel. In some cases, a pictorial panel may not be part of the safety decal.

Vertical Configuration



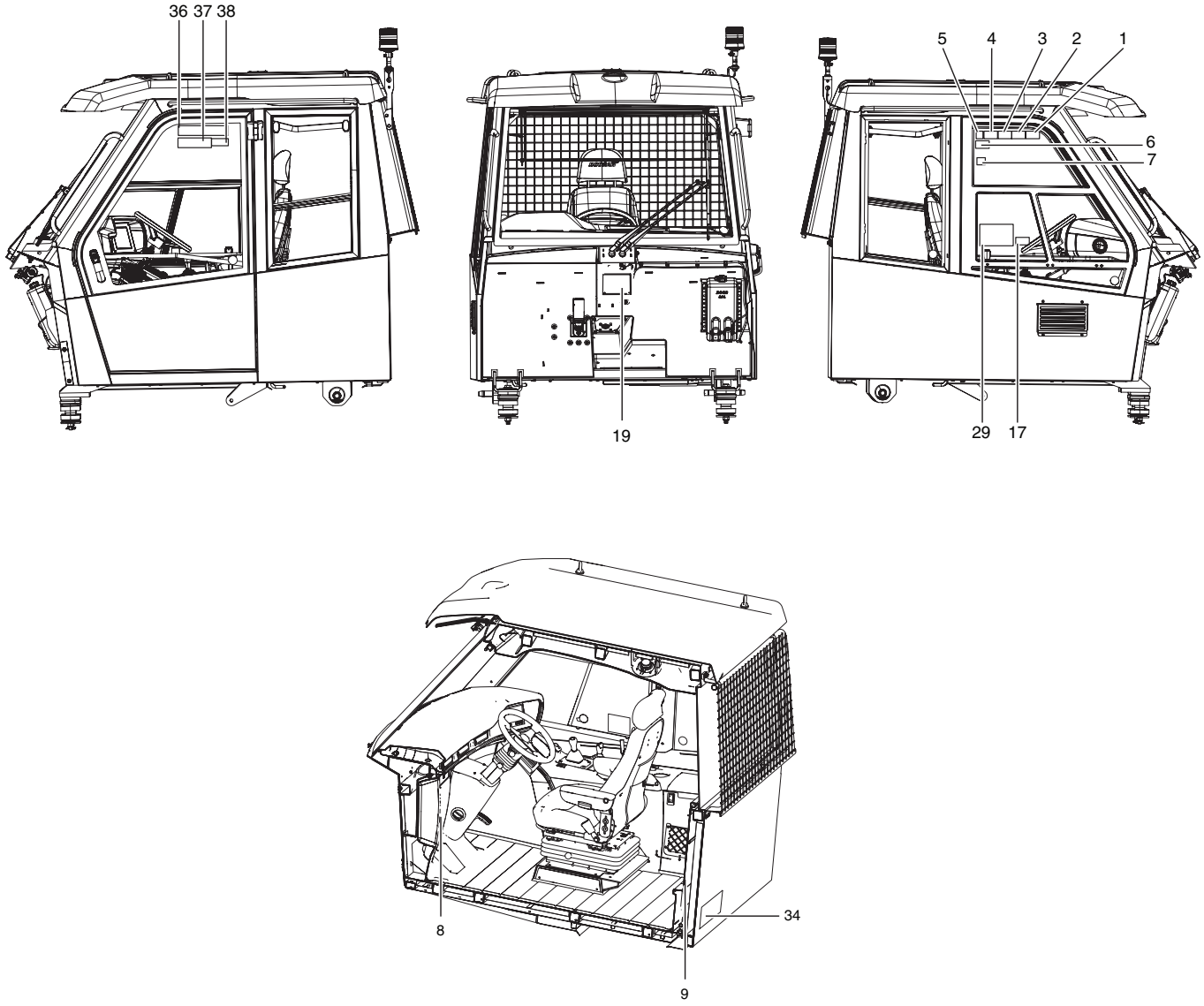
Horizontal Configuration

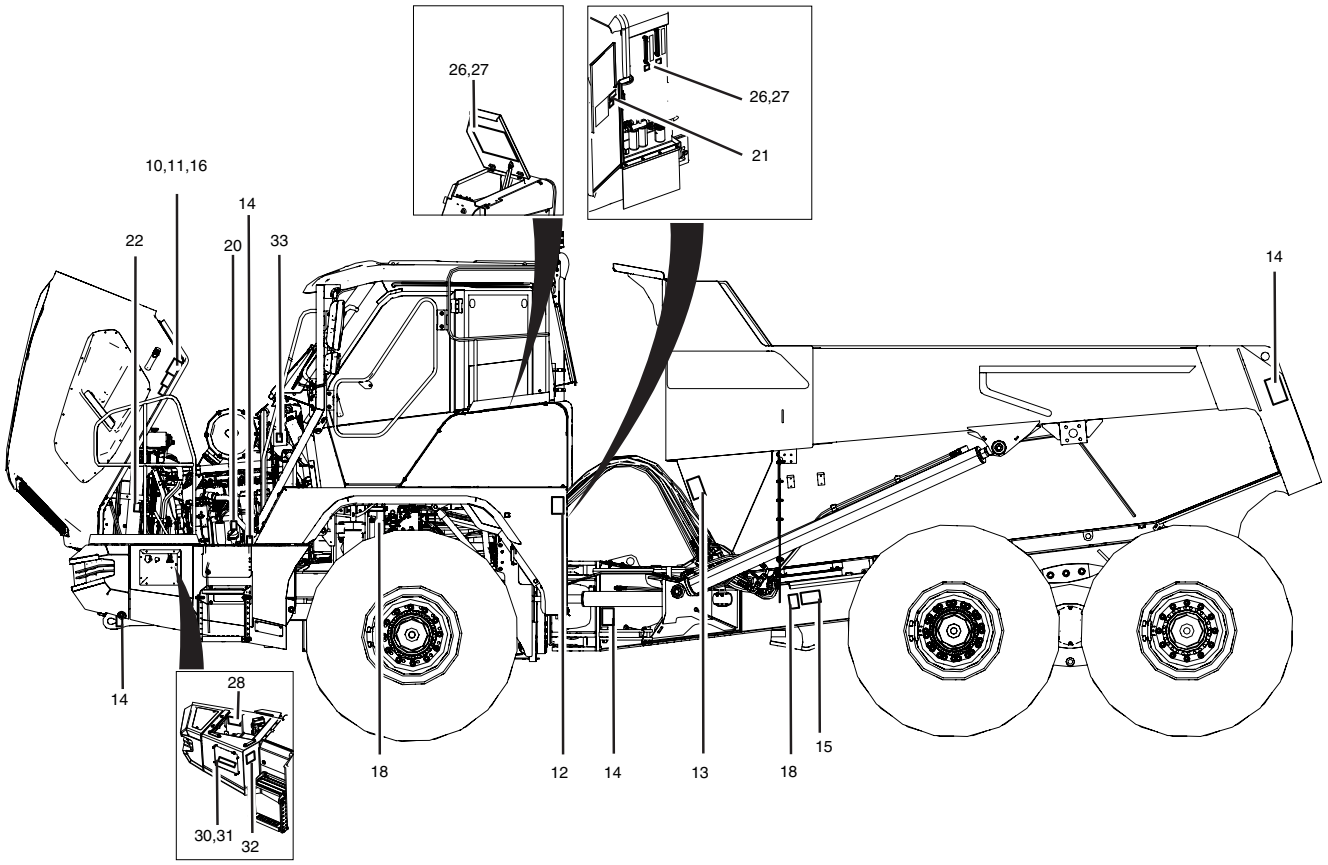


Safety Decals Without Text (No-Text)

Safety decals without text consist of a safety sign and safety information panel. The safety sign panel is located at the top or left side and the safety information panel is located at the bottom or right side of the decal depending on its configuration. The safety sign panel uses a black triangular band and a pictorial to identify the hazard and the potential consequences of the failure to follow instructions. The safety information panel uses pictorials and/or prohibition signs to identify the actions necessary to avoid the hazard.

Decal positions

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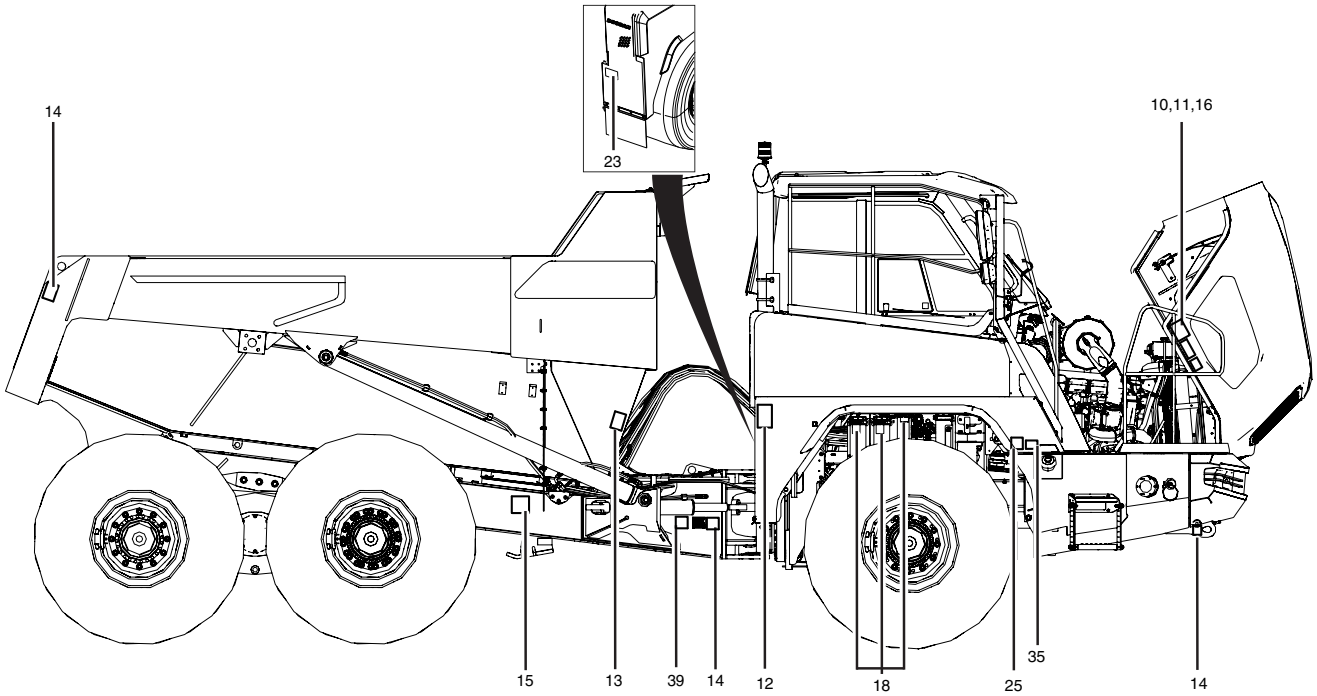
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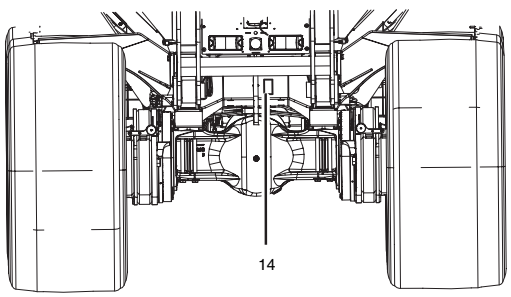

14

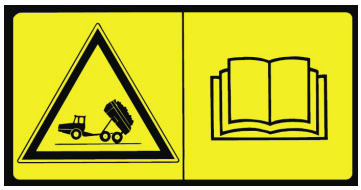
1

WARNING

Never coast in neutral

- Never coast with the gear selector in the neutral position.
- The braking effect and the operator's safety will be reduced.

2

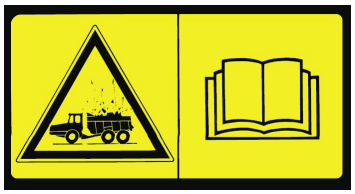


WARNING

Use of top tailgate

- Top tailgate is installed on this dump truck.
- Pay particular attention to the material handled by dump truck with top tailgate.
- Wrong material and improper use of top tailgate can cause a DANGEROUS situation and reduce the operator's safety.
- Read the operating manual (safety instructions, Page 2-39) before operation.

3

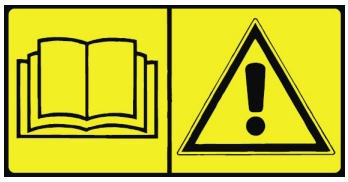


WARNING

Dangerous loads

- Explosive or inflammable loads must not be transport if the body is exhaust heated.
- Read the operating manual (safety instructions, page 2-38) before operation.

4



WARNING

Operation, inspection and maintenance

- Improper operation and maintenance can cause serious injury or death.
- Read the manual and labels before operation and maintenance. Follow instructions and warnings in the manual and on labels on the dump truck.
- Always keep the manual in the cab. If this manual is lost, please contact your Hyundai Dealer for a replacement.

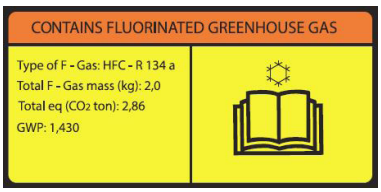
5

WARNING

Engine speed

- ALWAYS keep the engine speed below max. 2400 rpm. The retarder will be automatically engaged.

6



WARNING

HFC (hydrofluorocarbon) gas

7

WARNING

Emergency exit

- The emergency exit can be used by removing the hammer from the storage location and break front side window.
- Read the operating manual (safety instructions, page 2-28) before operation.

8

WARNING

Fire extinguisher

- The fire extinguisher is located on the left hand side in the cab.
- Read the operating manual (safety instructions, page 2-26).

9

First aid kit

- The first aid kit (if installed) is located on the left hand side in the cab, below the rear side window under instructor seat.
- Read the operating manual (safety instructions, page 2-26).

10

WARNING

Engine is running

- Never open the bonnet with the engine running.
- To prevent serious injury, stop the engine before opening the engine bonnet.
- Wait until all engine parts have completely stopped before touching them.
- Do not touch hot surfaces! Fingers or hands can be burnt.

11

WARNING

Welding precaution

- Disconnect the batteries and unplug the connectors on the electronic control units before welding.
- Read the operation manual (safety instructions, page 2-25 before welding).

12

WARNING

Limited visibility

- Keep out of this area when the engine is running, the operator has limited visibility.
- To prevent serious injury or death, carry out the following before moving the dump truck:
  - Be sure no one is on or near the dump truck.
  - Sound horn to alert people nearby.

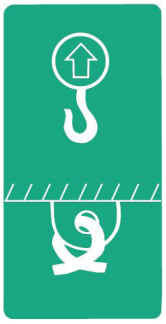
13

WARNING

Warning - pinch danger

- Keep clear, pinch danger in the articulation area.
- To prevent serious injury or death, carry out the following before moving/turning the dump truck:
  - Be sure no one is on or near the dump truck.
  - Sound horn to alert people nearby.
  - Always use the articulation lock when servicing!
- Read the operating manual (safety instructions, page 2-44).

14



NOTE: Sling and/or tie down point

- Read the operating manual (safety instructions, page 2-44 and 2-60) for correct use of the sling and/or tie down point.

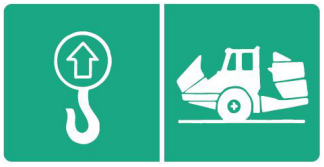
15

WARNING

Body support

- Do not stand underneath the body without applying the body support device.
- Always use the body support when working underneath the body.
- Empty body before body support is used.
- Read also the operating manual (safety instructions, page 2-47) before operation.

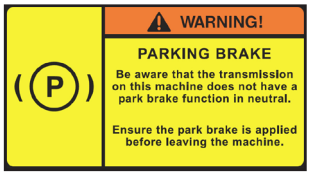
16



NOTE: Sling and/or tie down point

- Read the operating manual (safety instructions, page 2-44) for correct use of the sling and/or tie down point.

17

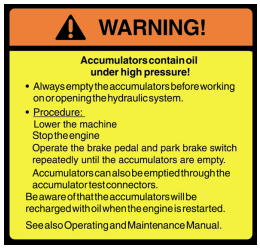


WARNING

Parking brake

- Ensure the park brake is applied before leaving the machine.

18

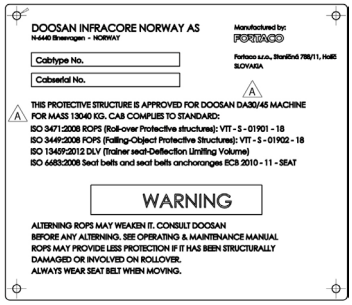


WARNING

Accumulators contain oil under high pressure

- Always empty the accumulators before working on or opening the hydraulic system.
- Read the operating manual (safety instructions, page 2-54 and chapter 7, maintenance) before servicing.

19



ROPS/FOPS approval cab

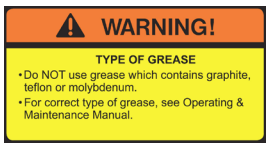
- Read the operating manual (safety instructions, page 2-28).

20

NOTE: Check oil specification

- Always check oil specifications before refilling.
- Read the operating manual (chapter 6, lubricants) before refilling.

21



WARNING

Type of grease

- Always check grease specifications before refilling.
- Read the operating manual (chapter 6, lubricants) before refilling.

22

WARNING

Air conditioner

- Refrigerant R 134a under high pressure.
- Read the operating manual (safety instructions, page 2-43 and chapter 7, maintenance) before servicing.

23

WARNING

Hot area!

- The exhaust pipes and nearby area may be hot. Fingers and hands can be burnt!

24

WARNING

Hot coolant can spurt out

- If it is necessary to refill coolant to the expansion tank, stop the engine and allow the engine and the expansion tank to cool down.
- Slowly loosen the cap to relieve pressure before removing the cap.

25

NOTE: Fuel tank

- Read the operating manual (safety instructions, page 2-25, 2-41 and 2-44) before refilling fuel.
- Always check fuel specification (chapter 6, lubricants) before refilling.

26

NOTE: Transmission

- Read the operating manual (safety instructions, page 2-25, 2-41 and 2-44) before refilling oil.
- Always check oil specification (chapter 6, lubricants) before refilling.

27

NOTE: Hydraulic tank

- Read the operating manual (safety instructions, page 2-25, 2-41 and 2-44) before refilling oil.
- Always check oil specification (chapter 6, lubricants) before refilling.

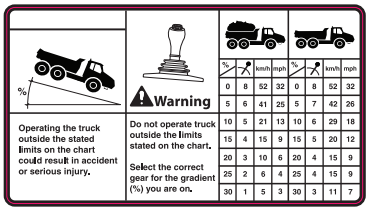
28

WARNING

Battery acid and gases (Inside battery compartment)

- Battery electrolyte contains sulfuric acid and can quickly burn the skin and eat holes in clothing. Flush the area with water if you have spilt acid on yourself.
- Batteries generate hydrogen gas. Hydrogen gas is very explosive, and is easily ignited with a small spark or flame.
- Read the operating manual (safety instructions, page 2-55) before working with batteries.

29

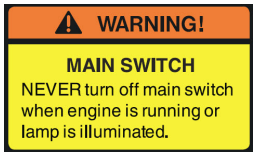


WARNING

Downhill Welding precaution (Inside battery compartment)

- Do not operate Dumper outside the limits stated on the chard

30



WARNING

Main switch

- Never turn off battery main switch when engine is running.
- Never turn off battery main switch when ignition is on.
- Read the Operating Manual (Chapter 3)

31

WARNING

Emergency stop of engine.

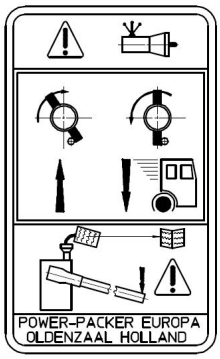
In case of danger situation push the button to emergency stop the engine.

32

NOTE: Urea tank (Only T4/Stage V)

- Read the operating manual (safety instructions, page 2-25) before refilling urea.

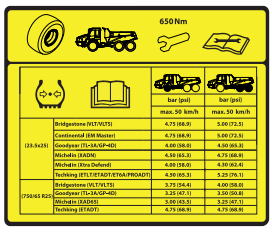
33

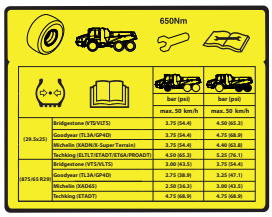


NOTE: Hydraulic cab pump

- Always position valve correctly before operating the truck
- Make sure valve is positioned correctly to prevent trapped pressure.

34





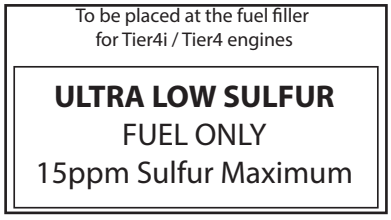
NOTE: Tire pressure

- Check tire pressure.
- Do not exceed tire pressure limits.

(For tire pressure, refer to the Hyundai Operating & Maintenance Manual Chapter 8)

(For regional sticker sets, refer to the Hyundai Parts Catalog)

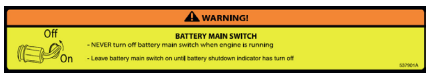
35



NOTE: Low sulfur fuel

By law , this label must be affixed at the filler cap on all engines certified in accordance with Tier4/Stage V

36



WARNING

Main switch

- Never turn off battery main switch when engine is running.
- Leave battery main switch on until battery shutdown indicator has turn off.
- Read the Operating Manual (Chapter 3)

37

WARNING

Breathing diesel engine exhaust warning

- Read the operating manual (safety instructions, page 2-66) before start the engine.

38

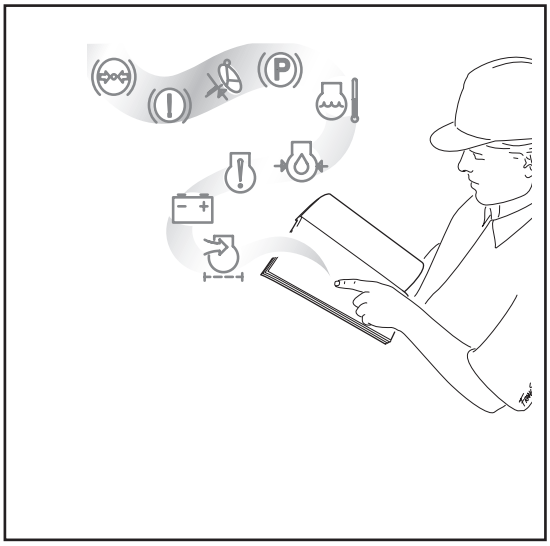
WARNING

Cancer and Reproductive Haram

39

NOTE: Stage V

Certified european nonroad Stage V standards with exhaust after-treatment systems.

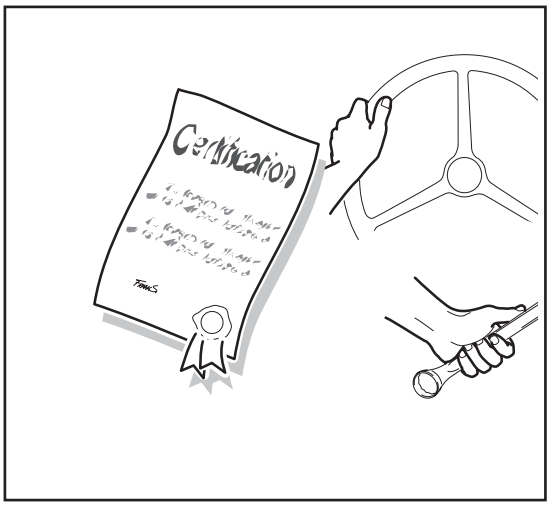


Safe operation is operator's responsibility

Only trained and authorised personnel should operate and maintain the machine.

Follow all safety rules, regulations and instructions when operating or performing maintenance on machine.

- Do not operate machine if you are under the influence of drugs or alcohol. An operator who is taking prescription drugs must get medical advice to determine if he or she can safely operate the machine.
- When working with other personnel on a work site, be sure that all personnel know the nature of work and understand all hand signals that are to be used.
- Be sure that all guards and shields are installed in their proper location. Have guards and shields repaired or replaced immediately if damaged.
- Be sure that you understand the use and maintenance of all safety features such as the articulation lock and seat belt. Use them always.
- Never remove, modify or disable any safety features. Always keep them in good operating condition.
- Always check for and know the location of underground and overhead utility lines before working.
- Failure to use and maintain safety features according to instructions in this manual, Safety Manual and Shop Manual can result in death or serious injury.



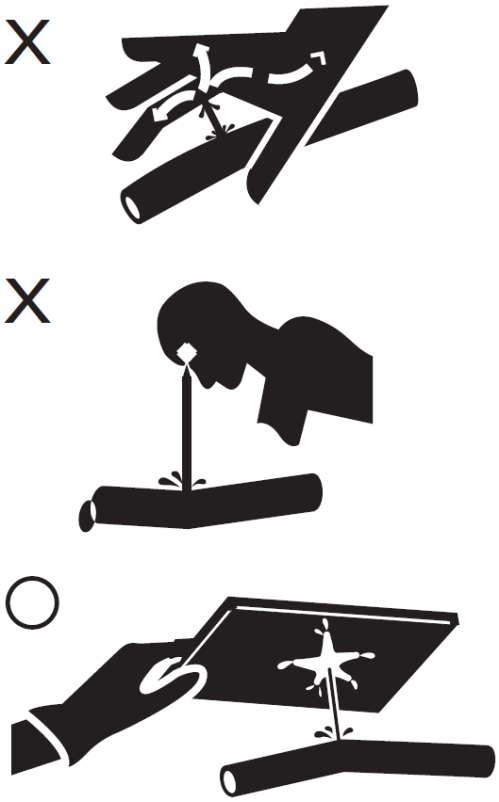
Know your machine

Know how to operate your machine. Know the purpose of all controls, gauges, signals, indicators and monitor displays. Know the rated load capacity, speed range, braking and steering characteristics, turning radius and operating clearances. Keep in mind that rain, snow, ice, loose gravel, soft ground, slopes, etc., can change operating capabilities of your machine.

Remember the check points and checking method of fluid levels.

Pressurised fluids

Pressurised air or fluids can cause debris and/or fluids to be blown out. This could result in death or serious injury.



WARNING

AVOID DEATH OR SERIOUS INJURY

Pressurised oil has enough force to pierce skin and cause death or serious injury. If fluid enters skin or eyes, get immediate medical attention from a physician familiar with this injury.

Immediately after operation is stopped, coolant, engine oil, and hydraulic oil are at their highest temperatures and the radiator and hydraulic tank are still under pressure. Always wait for temperature to cool down. Follow specified procedures when attempting to remove caps, drain oil or coolant, or replacing filters. Always wait for temperature to cool down, and follow specified procedures when performing these operations. Failure to do so can result in death or serious injury.

When pressurised air and/or pressurised water is used for cleaning, wear protective clothing, protective shoes, and eye protection. Eye protection includes goggles or a protective face shield.

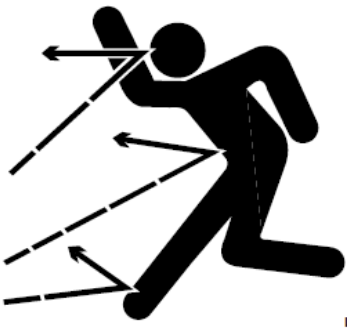
Pressure can be trapped in a hydraulic system and must be relieved before maintenance is started.

Releasing trapped pressure can cause sudden machine movement or attachment movement. Use caution if you disconnect hydraulic lines or fittings.

High-pressure oil that is released can cause a hose to whip or oil to spray. Fluid penetration can result in death or serious injury. If fluid enters skin or eyes, get immediate medical attention from a physician familiar with this injury.

Obey all local laws and regulations for disposal of liquids.

To prevent hot coolant from spraying out, stop engine and wait for coolant to cool. Using gloves, slowly loosen cap to relieve pressure.



Flying or falling objects

On work sites where there is a potential hazard that flying or falling objects can come in contact with operator's cabin, select and use a guard to match operating conditions for additional operator protection.

Working in mines, tunnels, deep pits, and loose or wet surfaces, can produce hazards of falling rocks or flying objects. Additional protection for operator's cabin may be required such as a Falling Object Protective Structure (FOPS) or window guards. Contact your Hyundai distributor for information on available protective guards.

To prevent personnel from being struck by flying objects, keep personnel out of work area.

Personal protective equipment

Do not wear loose clothing and accessories. Secure long hair. These items can snag on controls or on other parts of equipment.

Do not wear oily clothes. They are highly flammable.

Do not forget that some risks to your health may not be immediately apparent. Exhaust gases and noise pollution may not be visible, but these hazards can cause disabling or permanent injuries. Breathing masks and/or ear protection may be required.

Wear a hard hat, safety shoes, safety goggles, mask, leather gloves, earplugs and other protective equipment, as required.

While working on machine, never use inadequate tools. They could break or slip, or they may not adequately perform intended functions.

Correction of machine problems

If any machine problems are found during operation and maintenance (noise, vibration, smell, incorrect gauges, smoke, oil leakage, etc.), or if any abnormal warming alerts are displayed on display monitor, stop the machine immediately and take the necessary corrective actions. Do not operate the machine until problem has been corrected.

Crushing and cutting

Keep objects away from moving fan blades. Fan blades can throw and cut objects.

Do not use a wire rope that is kinked or frayed, or a wire rope with any loss of diameter. Wear leather gloves when handling a wire rope.

When striking a loose retainer pin, it can fly out and can cause a serious injury. Make sure that area is clear of personnel when striking a retainer pin. To avoid injury to your eyes, wear safety goggles when striking a retainer pin.

Do not put your hand, arm or any other part of your body between movable parts. If going between movable parts is necessary, always position and secure work equipment so it cannot move. Properly support equipment before performing any work or maintenance under raised equipment.

If control levers are operated, clearance between machine and work equipment will change and this may lead to serious damage or can result in death or serious injury. Stay clear of areas that may have a sudden change in clearance with machine movement or equipment movement. Stay clear of all rotating and moving parts. Unless instructed, never attempt adjustments while machine is moving or while engine is running.

Do not depend on hydraulic cylinders to support raised equipment. Equipment can fall if a control is moved, or if a hydraulic line breaks, is loosened or disconnected. If it is necessary to remove guards to perform maintenance, always install guards after maintenance is completed.

Always have at least two people working together if the engine must be running during service. One person needs to remain in the operator's seat, ready to work the controls to stop the machine or stop engine, if necessary.

Hot coolant and oils - burn prevention

Do not touch any part of an operating engine. Immediately after operations are stopped, coolant, engine oil, and hydraulic oil are at their highest temperatures. The radiator and hydraulic tank are still under pressure. Always wait for temperature to cool down. Attempting to remove caps, drain oil or coolant, or replacing filters may lead to serious burns, if done when hot. Relieve all pressure in air system, hydraulic oil system, lubrication system, fuel system, and cooling system, before any lines, fittings or related items are disconnected.

To prevent hot oil or coolant from spraying out, stop engine and wait for oil and coolant to cool. Using gloves, slowly loosen cap to relieve pressure.

Fire and explosion prevention

All fuels, most lubricants and some coolant mixtures are flammable and can cause a fire resulting in death or serious injury, and property damage. Flammable fluids that are leaking or spilled onto hot surfaces or onto electrical components can cause fire.

Inspect for and remove all flammable materials such as spilled fuel and oil, and debris from machine. Do not allow any flammable materials to accumulate on machine.

Always observe the following:

- Add fuel, oil, anti-freeze and hydraulic fluid to machine only in a well ventilated area. Machine must be parked with controls, lights and switches turned “OFF”. Engine must be “OFF” and any flames, glowing embers, auxiliary heating units or spark causing equipment must be extinguished, or turned “OFF” and kept well clear of machine.
- Dust that is generated from repairing or grinding non-metallic hoods or non-metallic fenders can be toxic, flammable and explosive. Repair these components in a well ventilated area away from flames or sparks and wear a dust mask when grinding painted parts.

Maintenance

The machine and some attachments have components that reach high temperatures under normal operating conditions. The primary source of high temperatures are the engine and exhaust system. If damaged or incorrectly maintained, the electrical system can be a source of arcs or sparks.

Flammable debris (leaves, straw, etc.) must be removed regularly. If flammable debris is allowed to accumulate, it can cause a fire hazard. Clean machine often to avoid this accumulation. Flammable debris in an engine compartment is a potential fire hazard.

The operator's area, engine compartment and engine cooling system must be inspected every day and cleaned. This is necessary to prevent fire hazards and overheating.

Operation

Do not use machine where exhaust, arcs, sparks or hot components can contact flammable material, explosive dust or gases.

Do not operate machine near any flame.

Exhaust shields (if equipped) protect hot exhaust components from oil spray or fuel spray in case of a break in a line, hose, or seal. Exhaust shields must be correctly installed and maintained properly.

Electrical

Check all electrical wiring and connections for damage daily.

Keep battery terminals clean and tight. Repair or replace any damaged parts or wires that are loose or frayed. Clean all electrical connections and tighten all electrical connections.

Never check battery charge by placing a metal object across terminal posts. Use a voltmeter or a hydrometer.

Battery gas can explode and can result in death or serious injury. Follow procedures in this manual for connecting battery and for jump-starting. Do not jump-start or charge a frozen or damaged battery. Keep all flames and sparks away from batteries. Do not smoke in battery charging area.

Improper jumper cable connections can cause an explosion that can result in death or serious injury.

Do not charge a frozen battery. This can cause an explosion.

After market radios or other electric operated equipment in cabin must have a fuse in the electrical circuit.

Hydraulic system

Check hydraulic tubes, hoses and fittings for damage, wear or for leaks. Hydraulic lines and hoses must be properly routed and have adequate support and secure clamps. Leaks can cause fires. Never use a flame or bare skin to check for leaks.

Tighten or replace any parts that show leakage.

Check that all hose and tube clamps, guards, and cushions are securely attached. If they are loose, they can vibrate during operation and rub against other parts. This can cause damage to hoses and cause high-pressure oil to spray on hot surfaces, causing a fire and death or serious injury.

Always clean fluid spills. Do not use petrol or diesel fuel for cleaning parts. Use commercial non-flammable solvents.

Fuelling

Use caution when you are refuelling a machine.

Fuel is flammable and can catch fire if it is brought close to a flame.

Stop engine and let it cool before adding fuel. Do not smoke while you are refuelling a machine. Do not refuel a machine near flames or sparks. Fill fuel tank outdoors.

Keep fuel and other fluid reservoir caps tight and do not start engine until caps have been secured.

Store fuels and lubricants in properly marked containers away from unauthorized personnel. Store oily rags and any flammable materials in protective containers.

Static electricity can produce dangerous sparks at fuel filling nozzle. In very cold, dry weather or other conditions that could produce a static discharge, keep tip of fuel nozzle in constant contact with neck of fuel filling nozzle, to provide a ground and prevent sparks.

Always place plastic fuel containers on the ground before filling.

Never use starting gas

Do not use ether or starting fluids on any engine that has glow plugs, or an electric grid type manifold heater. These starting aids can cause an explosion and result in death or serious injury.

Use procedures in this manual for connecting battery and for jump-starting.

Welding and grinding

Always clean machine and attachment, disconnect battery switch, and disconnect wiring from electronic controllers before welding. Cover rubber hoses, battery and all other flammable parts. Keep a fire extinguisher near machine when welding.

Toxic dust or gas can be produced when grinding or welding painted parts. Grinding or welding painted parts must be done in a well ventilated area. Wear a dust mask when grinding painted parts.

Dust generated from repairing non-metallic parts such as hoods, fenders or covers can be flammable or explosive.

Repair such components in a well ventilated area away from flames or sparks.

Do not weld on lines or on tanks that contain flammable fluids.

Do not flame cut lines or tanks that contain flammable fluid. Clean any such lines or tanks thoroughly with a non-flammable solvent before welding or flame cutting.

If a fire occurs

If a fire occurs:

- Do not attempt to move or continue operations.
- Turn starter switch “O” (OFF) position to stop engine.
- Use handrails and steps to get off machine.
- Immediately call for help or fire station.
- When using a fire extinguisher, always aim at base of fire.
- If an optional fire extinguishing system is in place, be familiar with its operating procedures.

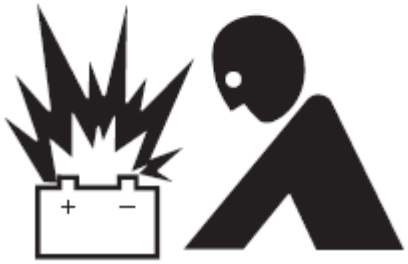
NOTE: Depending on job conditions, other procedures could be necessary if a fire occurs.

Fire Extinguisher, First-Aid Kit (Emergency Medical Kit) and Warning triangle

To be prepared in the event of a fire:

- Be sure that fire extinguishers have been provided and read labels to ensure that you know how to use them. It is recommended that an appropriately sized (2.27 kg [5 lb] or larger) multipurpose A/B/C fire extinguisher be mounted in cabin. Check and service fire extinguisher at regular intervals and make sure that all work site crew members are adequately trained in its use.
- Inspect fire extinguisher and service fire extinguisher regularly.
- Follow instructions on extinguisher instruction plate.
- Keep a first aid kit in storage compartment and keep another kit at work site. Check kit periodically and keep it properly supplied.
- Keep emergency numbers for doctor, ambulance service, hospital and fire department readily available.
- If the warning triangle is present, keep it in its storage location in the toolbox of the right hand side fender.

Electrical System and Electrical Shock



Never short across starter terminals or across batteries. Shorting could damage electrical system and engine neutral start system.

When engine is running or immediately after it has stopped, high voltage is generated at injector terminal and inside engine controller, so there is a potential for an electrical shock. Never touch injector terminal or inside of engine controller.

NOTE: If it is necessary to touch injector terminal or inside engine controller, contact your Hyundai distributor.

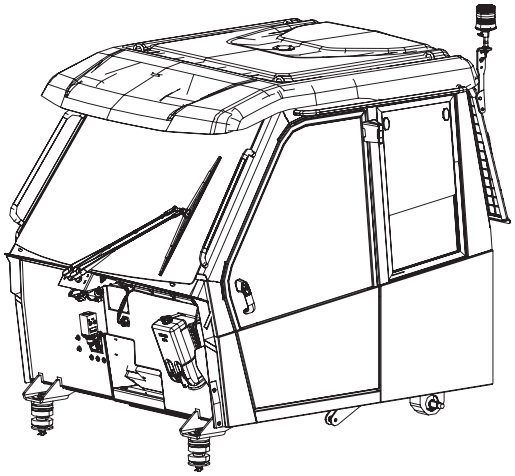
Roll-over Protective Structure (ROPS)/Falling Object Protective Structure (FOPS)

The operator's cabin is a ROPS/FOPS certified structure for protecting the seat-belted operator. It absorbs the impact energy of a roll-over impact or falling object. Do not allow machine weight (mass) to exceed certified value on certification plate (Figure 19 page 2-12). If weight is exceeded, the operator's protective structure will not be able to fulfil its safety function.

Do not increase machine weight beyond certified value by modifying machine or by installing attachments on machine. If weight limit of protective equipment is exceeded, protective equipment will not be able to protect operator, and this can result in death or serious injury. Always observe the following:

- This machine is equipped with a protective structure. Do not remove protective structure and perform operations without it.
- Never modify the operator's cabin by welding, grinding, drilling holes or adding attachments unless instructed by Hyundai in writing. Changes to the cabin can cause loss of operator protection from roll-over and falling objects, and result in death or serious injury.
- When protective structure is damaged or deformed by falling objects or by rolling over, its strength will be reduced and it will not be able to adequately protect the operator. Contact your Hyundai distributor if you have any questions about the ROPS. Never repair a damaged protective (ROPS/FOPS) cabin.
- Always wear your seat belt when operating machine.

ROPS Certification



This machine has an operator's cabin that meets ROPS/FOPS requirements. The seat belt must be worn for rollover protection.

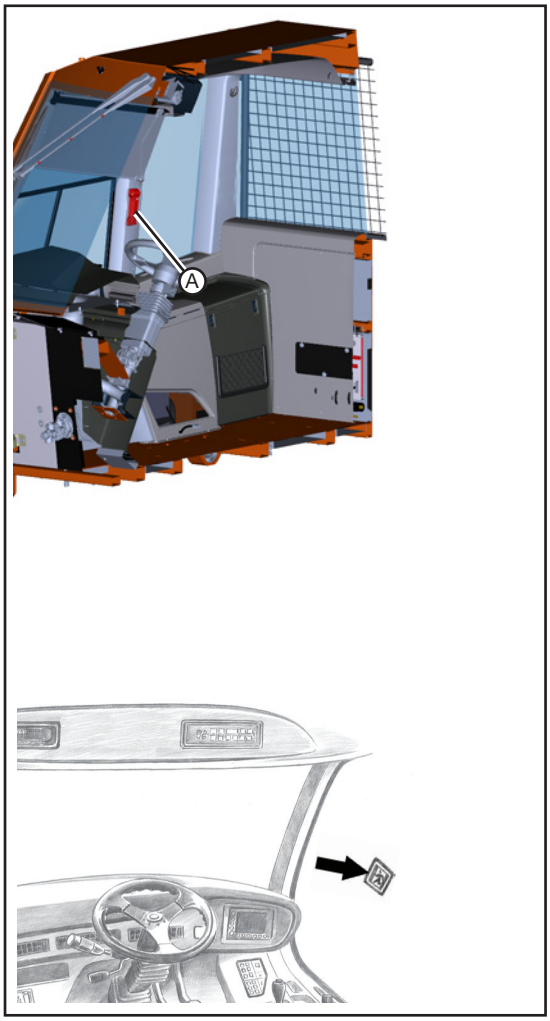
The ROPS/FOPS certification plate (Figure 19 page 2-12) is found on fire wall underneath the bonnet.

Check the operator's cabin, mounting, and hardware for damage.

Never modify the operator's cabin. Replace the cabin and hardware if damaged. See your Hyundai distributor for parts.

ROPS - Roll-over Protective Structure complies with ISO 3471.

FOPS - Falling Object Protective Structure complies with ISO 3449.



WARNING

Never modify the operator cabin by welding, grinding, drilling holes or adding attachments unless instructed in writing by Hyundai. Changes to the cabin can cause loss of operator protection from rollover and falling objects, and can result in death or serious injury.

Emergency Exit from Operator's Station

If the primary exit is blocked, the window on the right side may be used as an alternate exit. Remove hammer (A) from storage location and break front side window.

Before engine starting

Machine condition

Every day before starting engine for first time, perform the following checks and repair machine before operating, as necessary. If these checks are not properly done, death or serious injury could result.

- Check coolant, fuel, and hydraulic tank oil levels, and check for clogged air cleaner and damage to electrical wiring.
- Check operation of gauges, cameras (if equipped) and angle of mirrors, and check that pilot-cut-off switch is set to “ON” position.
- Check that pedals move freely, and pilot control lever(s) returns to “NEUTRAL” when released.
- Check that attachment is properly attached and locked.

IMPORTANT

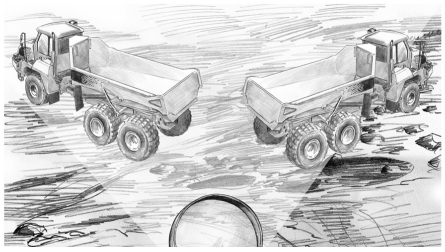
Only use Ultra Low Sulphur Diesel (ULSD) fuel and API-CI-4/ACEA-E9 grade engine oil.

Make sure that the machine is equipped with a lighting system that is adequate for job conditions and check that lights are working properly.

Before performing checks, move machine to an area where there are no obstructions, and operate slowly. Do not allow personnel near machine.

Know maximum operating dimensions of your machine.

Work site



Before starting operations, thoroughly check work area for any hazards, such as underground utility lines, overhead electrical lines, unstable ground, excessive slopes, etc.

Before starting engine and moving machine, make sure that no one is underneath machine, around machine, or on machine.

Know width and length of your machine and work equipment to maintain proper clearance when you operate machine or work equipment near fences or near boundary obstacles.

Know appropriate work site hand signals and personnel that are authorised to give hand signals. Follow hand signals from only one person.

If you need to operate on a street, protect pedestrians and cars by designating a person for work site traffic duty or by erecting fences and posting “No Entry” signs around work site.

Erect barricades or fences, post “No Entry” signs, and take other steps to prevent people from coming close to or entering work site. If people come too close to a moving machine, they may be struck or caught by machine, and this can result in death or serious injury.

Check tire pressure and condition

Maintain tire pressure but do not overinflate. Inspect tires and wheels daily. When inflating tires, follow procedures in Maintenance Section, which include using an extension to avoid standing in front of or over a tire. Do not change a tire unless you understand proper tire maintenance procedures and are using proper equipment.

Refer to “Recommended Air Pressure” on chapter 5 page 25.

Mounting/Dismounting

Before getting on or off machine, if there is any oil, grease, or mud on handrails or steps, wipe it off immediately. Always keep these parts clean. Repair any damage and tighten any loose bolts.

Never jump on or off machine. In particular, never get on or off a moving machine. These actions can result in death or serious injury.

When getting on or off machine, always face machine. Maintain a three-point contact (both feet and one hand or one foot and both hands) with handrails and steps to ensure that you support yourself securely.

Never hold onto any control levers when getting on or off machine.

Do not carry tools or supplies when you mount or dismount the machine.

Cleaning

Remove all straw, wood chips, leaves, grass, paper and other flammable debris accumulated in engine compartment, mufflers and around battery. Remove any dirt from window glass, mirrors, handrails, and steps.

Do not leave tools or spare parts in operator’s cabin. Vibration of machine during operation can cause tools or spare parts to fall and damage or break control levers or switches. Tools and spare parts can also get caught in spaces between control levers and cause accidental movement of work equipment causing death or serious injury.

When entering operator’s cabin, always remove all mud and oil from your shoes. If you operate travel pedal with mud or oil stuck to your shoes, your foot could slip off the control, or dirt and debris may interfere with proper operation of control levers.

After using ashtray, make sure that any matches or cigarettes are properly extinguished, and be sure to close ashtray.

Clean window glass and working lights for good visibility.

Do not stick suction pads to window glass. Suction pads act as a lens and can cause fire.

Never bring flammable or explosive items into operator’s cabin.

Do not leave cigarette lighters laying around operator’s cabin. If temperature inside operator’s cabin becomes too high, there is a potential hazard that lighter could explode.

Secure all loose items such as lunch boxes, and other items that are not a part of the machine itself.

Operator station

Inspect condition of seat belt and mounting hardware. Replace any parts that are worn or damaged. Do not use a seat belt extension on a retractable seat belt.

Adjust seat so full pedal travel can be achieved with operator's back against back of seat.

Keep all windows and doors closed on machine.

Adjust operator's seat to a position where it is easy to perform operations, and check that there is no damage or excessive wear to seat belt or mounting clamps.

Never reach in through a window to work a control. Do not try to operate the machine unless in operator's seat with the seat belt fastened.

Adjust and clean mirrors so area to rear of machine can be seen clearly from operator's seat.

When standing up from operator's seat, always place the controls in neutral and engage the parking brake. If you accidentally move work equipment levers, the machine could suddenly move and cause damage, death or serious injury.

Seat belt

Check seat belt on both the operator seat and instructor seat daily for correct function.

Inspect seat belt system more often if machine is exposed to severe environmental conditions or applications. Conduct the following inspection and replace seat belt system as necessary:

1. Check webbing. If system is equipped with a retractor, pull webbing completely out and inspect full length of webbing. Look for cuts, wear, fraying, dirt and stiffness.
2. Check buckle and latch for correct operation.
3. Make sure latch plate is not excessively worn, deformed or buckle is not damaged or casing is broken.
4. Check retractor web storage device (if equipped) by extending webbing and checking that it spools out and retracts correctly.
5. Check webbing in areas exposed to ultraviolet (UV) rays from sun or extreme dust or dirt. If original color of webbing in these areas is extremely faded and/or webbing is packed with dirt, webbing strength may be reduced.

NOTE: Contact your Hyundai distributor for seat belt system replacement parts.

WARNING

AVOID DEATH OR SERIOUS INJURY

Failure to properly inspect and maintain seat belt and seat belt system can cause lack of operator restraint and can result in death or serious injury.

Before fastening seat belt, check that there is no problem in belt mounting bracket. If it is worn or damaged, replace seat belt immediately. Fasten seat belt so it is not twisted.

Always wear seat belt when operating machine.

Visibility information

A rear view camera and mirrors provide the operator with additional means to see the work area.

NOTE: These devices may vary from one region to another, depending upon local and regional laws and regulations. If a machine is moved or sold into another region or marketplace, it is the owner's responsibility to make sure it complies with all applicable laws and regulations.

WARNING

AVOID DEATH OR SERIOUS INJURY

Failure to check for and clear people from the surrounding area of a machine can result in death or serious injury. The operator should make sure that visual aids (mirrors and camera(s)) are in proper working condition.

Your machine may be equipped with visual aids such as mirrors or a rear view camera. Even with these aids, there still may be areas around the machine which cannot be seen from the operator's seat. Always keep bystanders out of the work area. Be careful when operating and always look in direction of travel.

Adjust visual aids for best visibility around machine.

When backing up, press camera button (if equipped) to change display mode on display monitor so you can check rear and side of machine.

Before moving machine, look around work site and use mirrors and display monitor to confirm that no one is in the work area.

While operating or travelling in places with poor visibility it may be impossible to confirm conditions of the work site. Inspect and remove any obstacles around the machine that could be damaged and keep other personnel and bystanders out of the work area.

Inspect equipment and repair immediately if there are problems with visual aids. If machine cannot be fixed immediately, DO NOT use the machine. Contact your Hyundai distributor and arrange for repairs.

Work site rules

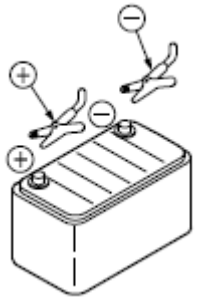
- If visibility cannot be sufficiently assured, use a flagman. The operator should pay careful attention to signals and follow instructions from flagman.
- Signals should only be given by one flagman.
- When working in dark places, turn “ON” work lights and front lights on the machine. Set up additional lighting in area.
- Stop operations if there is poor visibility, such as fog, snow, rain, or sandstorms.
- Check mirrors and rear view camera (if equipped) on machine before starting operations. Clean off any dirt and adjust view for good visibility.

When operating or travelling during poor visibility conditions, follow the preceding work site rules.

It may not be possible to adjust the visual aids to see all the way around the machine. Therefore, additional precautions such as flagman, barricades, etc., must be taken to keep personnel and bystanders out of the work area.

Boost starting or charging engine batteries

Follow these instructions to prevent an explosion or fire when connecting booster cables to batteries:



- Turn “OFF” all electric equipment before connecting leads to battery. This includes electric switches on battery charger or battery booster equipment.
- When boost starting from another machine or vehicle, do not allow two machines to touch. Wear safety goggles and gloves while battery connections are made.
- 24 volt battery units consisting of two series connected 12 volt batteries have a cable connecting one positive (+) terminal on one of the 12 volt batteries to a negative (-) terminal on the other battery. Booster or charger cable connections must be made between the none serial connected positive (+) terminals and between the negative (-) terminal of the booster battery and metal frame of the machine being boosted or charged. The final booster cable connection, at metal frame of the machine being charged or boost started, must be as far away from the batteries as possible.
- Connect positive (+) cable first when installing cables and disconnect negative (-) cable first when removing them.

Starting engine

Only operate the machine from the operator's seat with your seat belt fastened.

Only operate controls while engine is running.

Check for proper operation of all controls and all protective devices while you operate the machine slowly in an open area.

- Check operation of work equipment and travel system.
- Check for any problems with machine. Check for: unusual sounds, vibration, heat, odor, or improper readings from gauges. Check for any oil or fuel leaks.
- If any problem is found, stop operation and perform repairs immediately.

Do not use cellular telephones inside operator's cabin when driving or operating the machine.

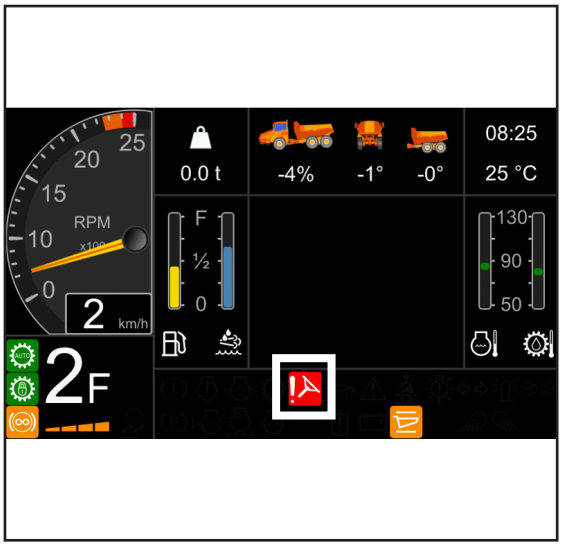
When operating the machine, do not extend your hands or head out of window.

Do not attempt to start engine by short-circuiting engine starting circuit. This can result in death or serious injury, or fire.

When starting engine, sound horn as a warning to alert personnel in the work area.

If there is a warning tag or "DO NOT OPERATE" tag hanging from machine control, do not start engine or move control.

Prevent personnel and all bystanders from walking or standing under raised dump body, unless it is properly supported.



Driving

When travelling with the machine, always keep lights on; make sure that you are in compliance with all federal, state and local laws and regulations concerning warning flags and signs.

If engine stops while machine is travelling, the emergency steering pump will be activated. It is possible to steer the dump truck when it is in motion, but the steering speed will be slower. If the engine stops, do the following:

- Stop as soon as possible and engage park brake. Continued driving may result in uncontrollable steering.
- Correct the fault before operating the dump truck again. If necessary, contact your Hyundai Distributor.

When travelling on rough ground, travel at low speed, and avoid sudden changes in direction.

Keep to permissible water depth. See "Working in Water" on page 2-62 in this manual.

When travelling over bridges or structures check first that bridge or structure can withstand weight of machine. Never exceed the maximum permitted load for bridges or structures.

It is important to keep in mind that the machine, in comparison with the rest of traffic, is a slow moving and wide vehicle which can cause traffic delays. Pay attention to traffic behind you and allow traffic to pass you.

Before operating the machine, always observe the following

precautions to prevent death or serious injury.

- When changing travel direction from forward to reverse or from reverse to forward, reduce speed and stop machine before changing travel direction.
- Sound horn to alert people in area.
- Check that there is no one in area around machine. There are restricted visibility areas behind machine.
- When operating in areas with poor visibility, designate a flagman to direct work site traffic.
- Keep unauthorized personnel away from turning radius or travel path of the machine.

Be sure to observe these precautions even if a backup alarm or mirrors are installed:

- Check that backup alarm works properly and that mirrors are clean, not damaged and properly adjusted.
- Always latch door and windows of operator's cabin in position (open or closed).
- On work sites where there is a hazard of flying or falling objects, or of objects entering operator's cabin, check that door and windows are securely closed. Install additional guards, if work site application requires them.

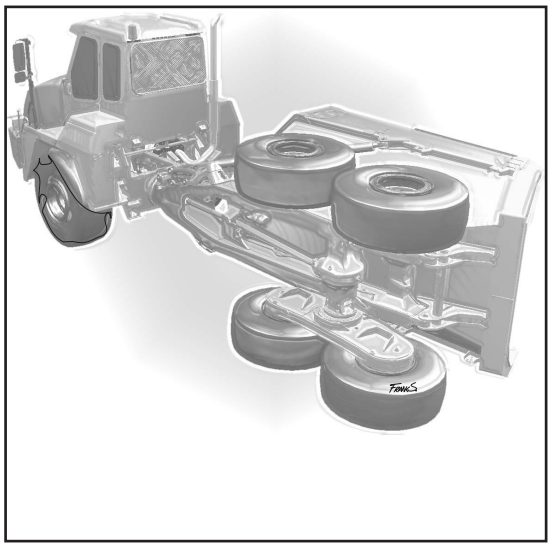
Never turn starter switch to "O" (OFF) position when travelling. This can cause a loss of steering control.

Do not operate dump body while travelling.

Never travel over obstacles or excessive slopes that will cause machine to tilt severely.

Know permitted ground pressure. Ground pressure of the machine may change depending on attachment and load.

Keep height and length of machine in mind.



Machine turning

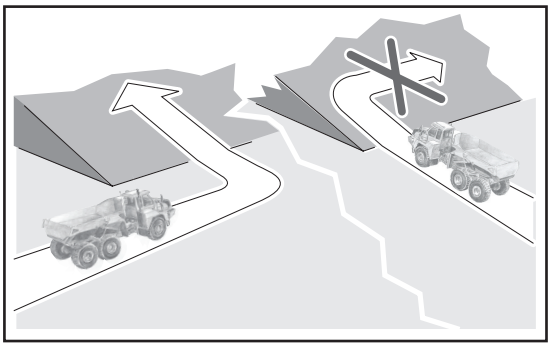
This articulated dump truck has two frames and the design allows unrestricted turning between front and rear chassis. Overturn of one frame while the other remains level is possible.

It is possible that the operator will not receive warning signs of an overturn, therefore:

- Avoid high speed turning and hard braking in curves.
- Reduce speed, avoid sudden turning if travelling across slopes.
- The rear chassis stability decreases when tipping dump body. Be alert when body is raised.

Do not under any circumstance, drive with raised dump body.

Operation on slopes

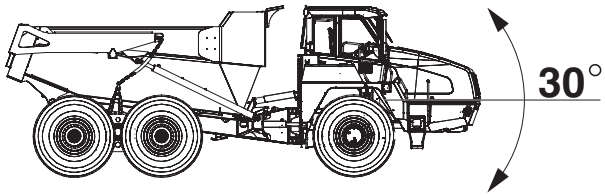


Travelling on hills, banks or slopes that are steep, can result in the dump truck starting to slide/slip or roll over.

Check ground conditions before travelling. Be careful to avoid any ground condition which could cause the machine to roll over. Roll-over can occur when you work on hills, on banks, or on slopes. Roll-over can also occur when you cross ditches, ridges, or travel over unexpected obstructions.

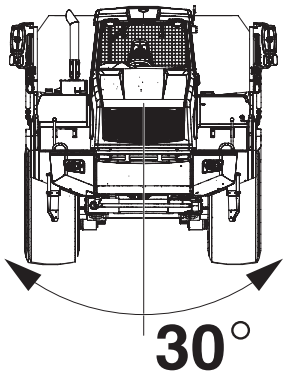
Always operate machine up slopes and down slopes. Avoid operating machine across slope.

Do not change travel direction on a slope. This could result in tipping or sliding sideways of machine. Always go down to a flat place to change position of the machine, then travel back up the slope again.



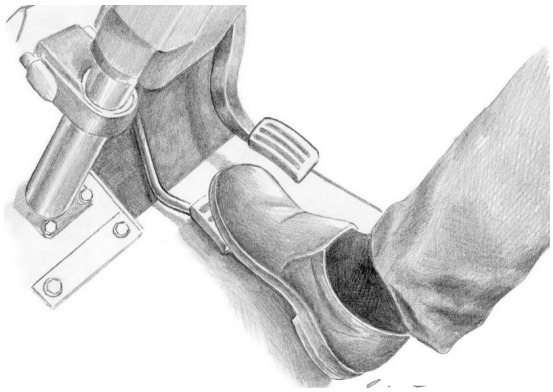
Do not travel on grass, fallen leaves, or wet steel plates. Even slight slopes can cause machine to slide down a slope. Travel at low speed and make sure that the machine is always travelling directly up or down the slope.

Keep the machine under control. Do not overload the machine beyond capacity.



DANGER

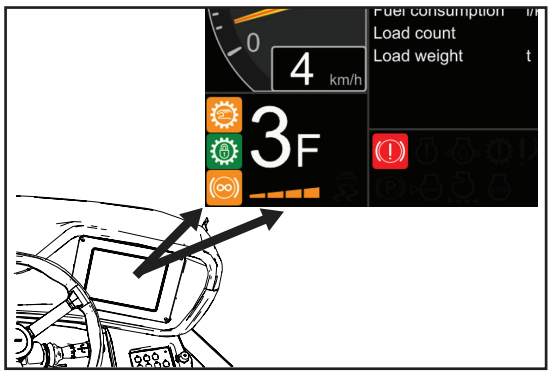
Damage to components may occur if maximum recommended gradient is exceeded.



Operation of brakes

The service brakes must never be applied for long periods due to danger of fading (loss of braking effect due to overheating). To avoid fading, depress the pedal firmly and release it after the speed is reduced.

Select a gear and adjust the speed on a downhill slope so that the speed can be controlled with the engine or retarder brake, without the use of the service brake to hold the speed. Never use the service brake for long periods. Avoid racing the engine. See also Operating Instructions .



Retarder brake operation

When the operator releases his foot off the accelerator pedal, the retarder brake is automatically engaged.

Pressing the accelerator pedal slightly will reduce retarder brake power.

Pressing accelerator pedal further down, until meeting the engine rpm, will disengage the retarder brake.

Standard retarder setting is 50%, and can be reduced from 100% to 25%, with a retarder lever on the steering column. Last state is restored when ignition is switched off/on.

Engine over speed

The transmission is equipped with an emergency up-shift function to protect the engine from over speed. If the engine exceeds 2400 rpm the transmission automatically shifts up.

WARNING

When driving in 8th gear there will be no automatic up-shift to protect engine. Use service brakes to reduce speed!

Vehicle over speed protection

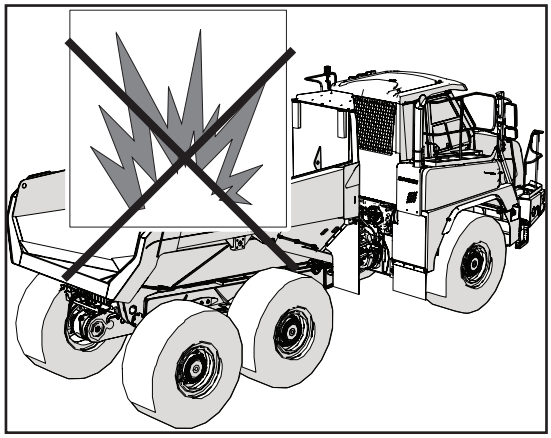
The vehicle maximum operating speed is set to 55 km/h as factory default. This limit can be reduced by Hyundai Dealer. If set speed limit is exceeded by 2 km/h the retarder will automatically be activated.

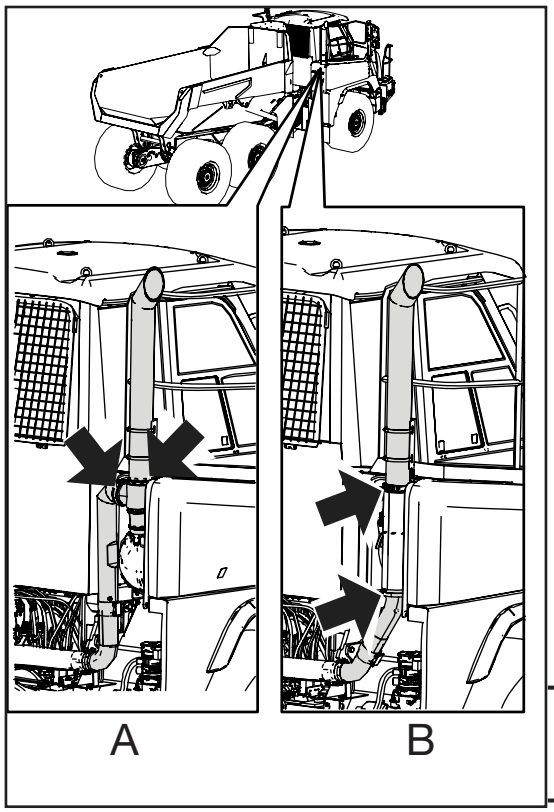
WARNING

The transmission retarder braking force will reduce if the oil temperature exceeds 130°C. Use the service brake to slow down.

DANGER

Never drive with to high transmission oil temperature. It will cause a danger situation and result serious injury or death.





Hauling hazardous loads

If the body is exhaust heated, hazardous loads such as explosives or flammable materials like petrol's, oils etc. **MUST NOT BE TRANSPORTED.**

In some countries there may be special national regulations for transportation of hazardous loads.

To shut off the exhaust heating, do as follows:

A - Only Engine T4F

B - Only Engines T2 /T3/ StageV

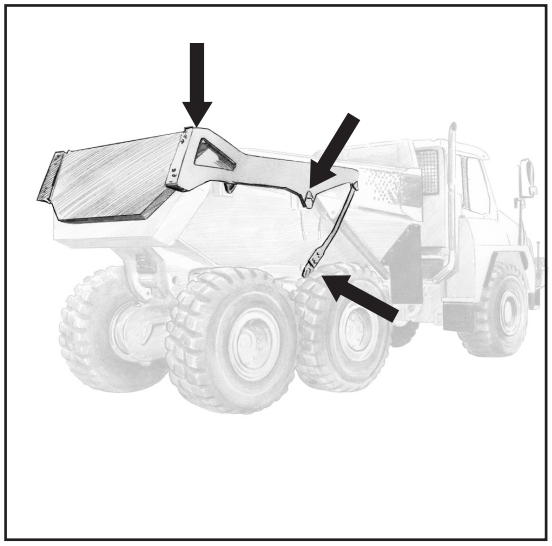
- Always allow the dump truck to cool down before changing exhaust direction.

1. Remove the clamps on both the vertical exhaust pipe and the pipe which goes to the body.
2. Remove the plate which gives heating to the body (in the vertical exhaust pipe).Replace with the ring in the same dimension.
3. Remove the ring from the pipe which goes to the body.
4. Install the plate which will block the exhaust to the body (in the pipe which goes to the body).
5. Be aware about different dimensions of the rings and plates
6. Refit the clamps.
7. There are 2 variations due to different engine versions, refer to Transport Guide for exhaust heating. See also chapter 5

For further information, refer to the Hyundai Shop Manual Chapter 9.

WARNING

Closing top exhaust outlet could cause serious damage to the truck.



Top tailgate

If top hinged tailgate is fitted to the dump truck, particular attention should be paid to the material handled in the interest of both safety and efficiency.

The top tailgate is suitable for materials which are both well fragmented and free floating, such as dry earth, gravel, sand, coal, etc. In such instances, discharge should be continuous during the whole cycle of tipping.

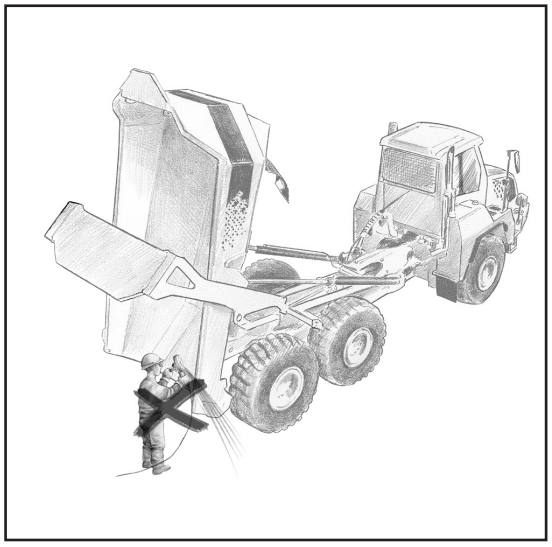
However, if the material is poorly fragmented or adhesive, such as clay, bulky boulders etc., it is imperative that the top tailgate is NOT fitted. Such materials do not have an even discharge and problems could arise during the tipping cycle when the material comes in contact with the top tailgate. The tailgate can restrict material causing material to collect in the rear of the dump body. This excess material may cause the front wheels of the dump truck to raise off the ground.

WARNING

CRUSHING CAN CAUSE DEATH OR SERIOUS INJURY

DO NOT stand under the tailgate while the dump body is raised.

The tailgate must be removed if any work is to be done inside the dump body while it is raised.



Removal of top tailgate

1. Attach wire or chain to the lifting points. The tailgate shall be disassembled in three parts, tailgate arms (left and right) and the rear tailgate plate. Be sure that wire or chain are attached to all three tailgate parts before disassembling.
2. Remove all screws (see arrows) on the tailgate (both sides) and lift off the tailgate parts.

Approx. weight:

HA30/HA30A - 1050 kg

HA45/HA40A - 1400kg

Equipment lowering with engine stopped

Before lowering any equipment with the engine stopped, clear the area around the equipment of all personnel and bystanders. The procedure to use will vary with the type of equipment to be lowered. Keep in mind most systems use high-pressure fluid or air to raise or lower equipment. The procedure will cause high-pressure air, or hydraulic pressure, or some other media to be released to lower the equipment.

Wear appropriate personal protective equipment and follow the established procedures.

Engine stop

Turn engine starter switch to “O” (OFF) position and remove engine starter switch key.

Before lowering any equipment with engine stopped, clear area around equipment of all personnel and bystanders. This procedure will cause high-pressure air or hydraulic pressure to be released to lower equipment.

Do not stop engine immediately after the machine has been operated under load. This can cause overheating and accelerated wear of engine components.

After the machine is parked, allow engine to run for at least five (5) minutes before stopping the engine. This allows hot areas of engine to begin to cool gradually.

- Do not leave operator’s seat when there is a raised load.

Parking machine

Park machine on firm and level ground away from traffic and away from high walls, drop-offs and any area of potential water accumulation or runoff. If parking on an incline is unavoidable, block wheels to prevent movement. Lower dump body onto stops to prevent unintended or accidental movement.

When parking on public roads, provide fences, barricades, signs, flags, or lights, and put up any other necessary signs to ensure that passing traffic can see machine clearly. Park the machine so the machine, flags, signs and fences do not obstruct traffic.

Position and place the pilot cut-off switch to “O” (OFF) position. This will disable all pilot control functions.

Always close door of operator’s cabin and lock all equipment to prevent any unauthorized person from operating the machine.

The hydraulic system remains pressurised, provided that the accumulators are charged even when engine is not running. Accumulator pressure should decrease in a short time (approximately one minute). While hydraulic system maintains a charge, hydraulic work tools and machine controls remain functional.

Machine movement will occur if any controls are moved. This can result in death or serious injury.

Maintenance

Improper operation and maintenance can result in death or serious injury. Read manual and safety decals before operating or maintaining the machine. Follow all instructions and safety messages.

WARNING

AVOID DEATH OR SERIOUS INJURY

Follow instructions before operating or servicing machine.

Read and understand the Operation & Maintenance Manual and signs (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after adjustments, repairs or service. Untrained operators and failure to follow instructions can result in death or serious injury.

Never service Hyundai equipment without instructions.

- Always fully lower dump body before doing any maintenance.
- Use correct procedure to lift and support machine.
- Cleaning and maintenance are required daily.
- Welding or grinding painted parts must be done in well ventilated areas.
- Wear a dust mask when grinding painted parts. Toxic dust and gas can be produced.
- Vent exhaust to outside when engine must be running for service.
- Exhaust system must be tightly sealed. Exhaust fumes are hazardous and can cause death or serious injury.
- Stop and allow engine to cool and clean engine of flammable materials before checking fluids.
- Never service or adjust machine with engine running unless instructed to do so in this manual.
- Avoid contact with leaking hydraulic fluid or diesel fuel under pressure. It can penetrate skin or eyes.
- Never fill fuel tank while engine running, while smoking, or when near an open flame or sparks.
- Keep body, jewelry and clothing away from moving parts, electrical components, hot parts and exhaust.
- Wear eye protection to guard from battery acid, compressed springs, fluids under pressure and flying debris when engine is running or tools are used. Use eye protection approved for welding.
- Lead-acid batteries produce flammable and explosive gases.
- Keep arcs, sparks, flames and lighted tobacco away from batteries.
- Batteries contain acid which burns eyes or skin on contact.

- Wear protective clothing. If acid contacts body, flush well with water. For eye contact, flush well and get immediate medical attention from a physician familiar with this injury.
- The maintenance procedures which are given in this manual can be performed by the owner or operator without any specific technical training. Maintenance procedures which are not in this manual must be performed ONLY BY QUALIFIED SERVICE PERSONNEL. Always use genuine Hyundai replacement parts.
- Only authorised personnel should service and repair the machine. Do not allow unauthorized personnel access to the machine or into work area.
- Lower dump body and stop engine before performing maintenance.
- Park machine on firm and level ground.
- Engage the parking brake.
- Stop the engine and remove key.
- Apply articulation lock.
- Check that battery relay is “OFF” and main power is shut off. (Wait for approximately one minute after turning “OFF” engine starter switch key and press horn button. If horn does not sound, the main power is shut off.)
- Put blocks against tire to prevent the machine from moving.
- To prevent injury, do not perform maintenance with engine running. If maintenance must be done with engine running, perform maintenance with at least two workers and do the following:
  1. One worker must always sit in the operator’s seat and be ready to stop engine at any time. All workers must maintain contact with other workers.
  2. When maintenance operations are near fan, fan belt, or other rotating parts, there is a potential hazard of being caught in rotating parts. Keep hands and tools away.
- Never drop or insert tools or other objects into rotating fan or fan belt. Parts can break off and hit someone.
- Do not touch any control levers or control pedals. If any control levers or control pedals must be operated, always give a signal to other workers and instruct them to move away.

- When performing maintenance of engine that causes exposure to engine noise for long periods of time, wear hearing protection while working.
- If noise from the machine is too loud, it can cause temporary or permanent hearing loss and/or other problems.
- Do not smoke when you service an air conditioner or if refrigerant gas is present.
- Inhaling fumes either from a flame or gas from a cigarette that has contacted air conditioner refrigerant can cause death or serious injury.
- Never put maintenance fluids into glass containers. Drain all liquids into a suitable container.
- Unless instructed otherwise, perform maintenance with equipment in servicing position. Refer to this manual for the proper procedure for placing equipment in servicing position.

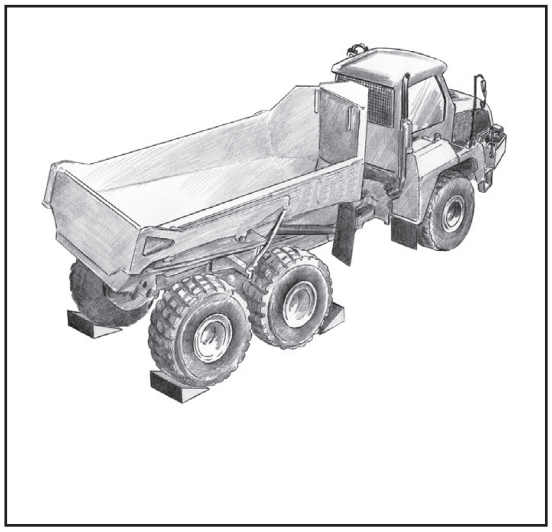
Warning tag

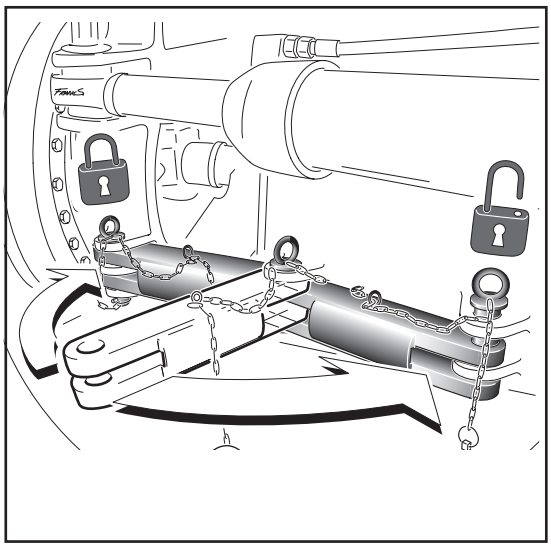
Alert others that service or maintenance is being performed by attaching a “DO NOT OPERATE” warning tag to the operator’s cabin controls – and other machine areas, if required. Use of the pilot cut-off switch in the “O” (OFF) position, complies with the occupational Safety and Health Administration’s (OSHA) lockout requirements.

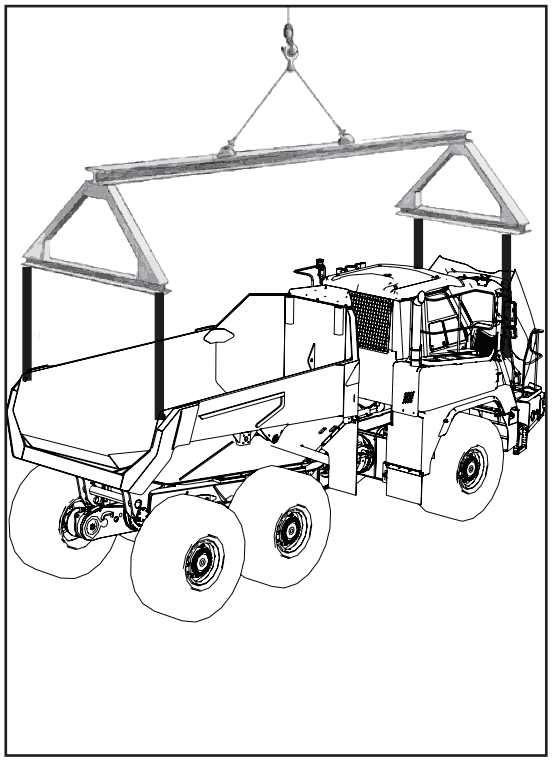
“DO NOT OPERATE” warning tags are available from your Hyundai distributor.

- Always attach “DO NOT OPERATE” warning tag to work equipment control lever in the operator’s cabin to alert others that service or maintenance is being performed on the machine. Attach additional warning tags on the machine, if necessary. Keep warning tags in tool box while they are not being used. If there is no tool box, store them in the owner manual storage pocket.
- If another person starts engine, and operates control levers or control pedals while you are performing service or maintenance, it can result in death or serious injury.

Attach a “DO NOT OPERATE” warning tag to starter switch or to controls before servicing or repairing equipment. Warning tags (Special Instruction, SEHS7332) are available from your Hyundai distributor.







Wheel chocks

Always place wheel chocks under the wheels to prevent rolling:

- When parking.
- During maintenance and other work.
- During transportation of dump truck.

Articulation lock

The lock prevents the dump truck turning when applied.

- Apply the lock:

1. Take out the spring cotter, lift the pin and swing the linkage forward into the hinge ear.
2. Insert the pin through linkage and ear and refit the spring cotter.

- Release the lock:

1. Take out the spring cotter, and remove the pin through the linkage and ear.
2. Swing the linkage backwards, insert the pin through the linkage and ear, and refit the spring cotter.

The lock must always be applied:

- During maintenance, greasing and other work.
- When lifting or hoisting the truck, see below Lifting/ Hoisting.
- **During dump truck transportation, see section Transportation.**

Lifting/Hoisting

WARNING

AVOID DEATH OR SERIOUS INJURY

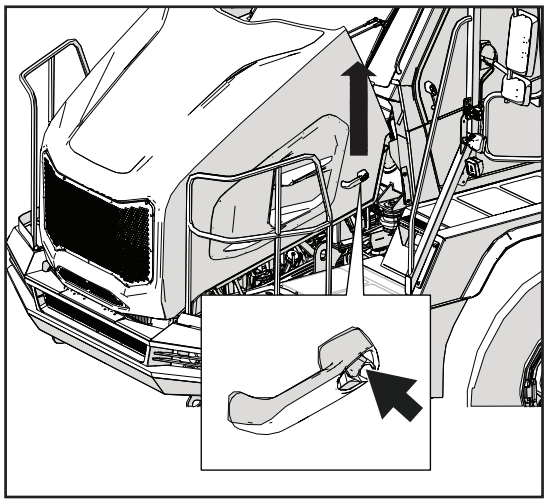
Never lift or hoist a loaded truck. The lift points are intended for an empty dump truck only.

1. Apply the articulation lock (See section Articulation lock).
2. Open and secure the bonnet (see next page).
3. Fit suitable lifting wires or chains to the hoisting points at both sides of the body and engine, and use a suitable lifting beam as shown.

Machine net weight may vary with optional equipment.:

HA30/HA30A: approx. 23,200 kg

HA45/HA45A: approx. 30,100 kg



Engine bonnet

Do not open the bonnet when the engine is running. The bonnet is fitted with lockable bonnet opener on left hand side. The bonnet must always be closed and secured with the lock when operating the dump truck.

When the bonnet is open, make sure that the bonnet catcher for open position (on left hand side) secures the bonnet from falling down.

To open the bonnet:

1. Depress the button on the handle grip on left hand side.
2. Push up the bonnet.

To close the bonnet:'

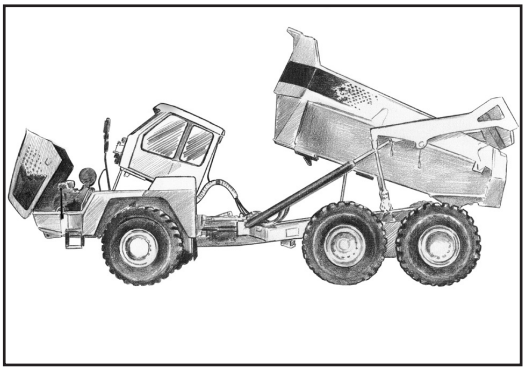
1. Push down the bonnet.

WARNING

CRUSHING CAN CAUSE DEATH OR SERIOUS INJURY

DO NOT work/stand under the bonnet without applying the bonnet catcher.

DO NOT operate the dump truck with a raised or unsecured bonnet.



Tiltable cab

Always secure the tilted cab with the support before working underneath the cab. The cab must always be closed and secured with the locks when operating the dump truck.

Before tilting the cab, check that there are no loose objects in the cab.

When the cab is tilted, make sure that the support secures the cab from falling down.

To tilt the cab:

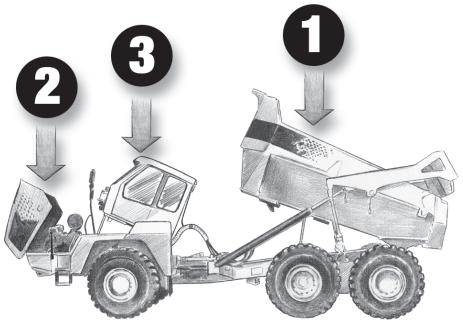
1. Lift the body and secure it with the body support (see section body support).
2. Stop the engine.
3. Open the bonnet and apply the bonnet catcher (see section Engine bonnet).
4. The cab has two tilted positions:

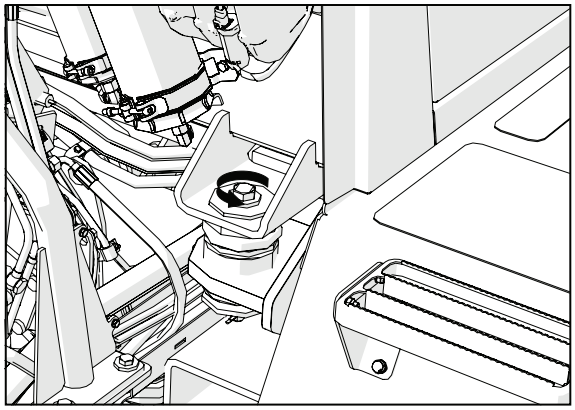
- Service position

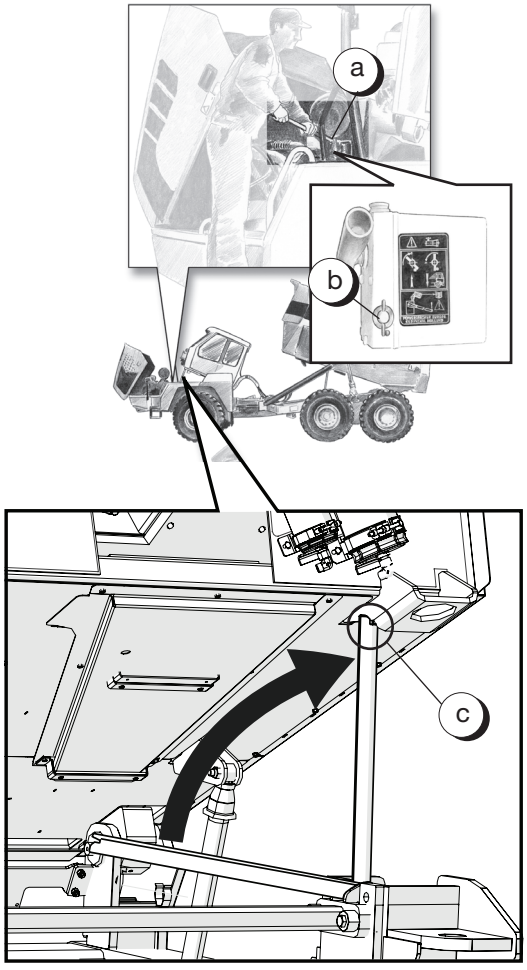
- Must be secured with the safety support, see next page.

- Top position

- If exhaust heating is fitted, this must be removed.







5. Remove one bolt on each side of the cab.

   Spanner: 30 mm

6. Push up the cab by using the hydraulic pump (a) on left hand side.

- Make sure that the handle for up- and down- pushing (b) is in the up-position (the illustration shows the down position).

7. In service position: Fasten the safety support (c) to the anchorage point at the cab.

Location of the safety support:

HA30/HA30A - Is placed on the front frame support bar.

- **To lower the cab:**

1. Remove the safety support (c). Re-locate it back in its storage position.
2. Lower the cab by using the hydraulic pump (a) on left hand side.

- Make sure that the handle for up- and down- pushing (b) is in the down-position (the illustration shows the down position).

3. Refit the bolt on each side of the cab.
4. Close the bonnet.
5. Lower the body.
6. Refit the exhaust heating, if this was removed.

WARNING

CRUSHING CAN CAUSE DEATH OR SERIOUS INJURY

DO NOT work/stand underneath the cab without applying the safety support.

Do not enter the cab while it is tilted.

Do not operate the dump truck with a tilted or unsecured cab!

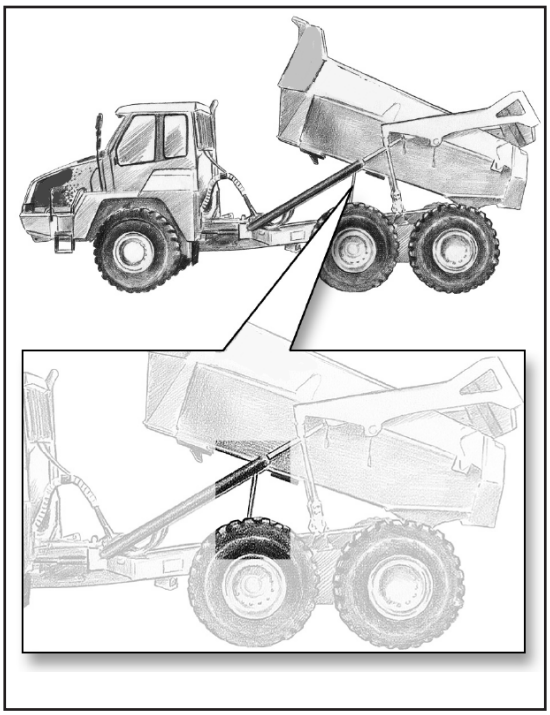
Body support

WARNING

CRUSHING CAN CAUSE DEATH OR SERIOUS INJURY

DO NOT work/stand underneath the dump body without applying the body support device.

Do not operate the dump truck with a raised body.



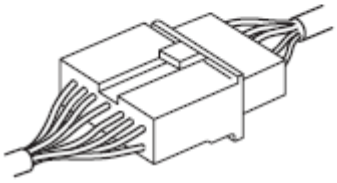
Always secure the raised body with the body support device before service/inspection and other work underneath the body. The body support device is intended for empty body only.

- Engagement of the support device:

1. Raise the body.
2. Make sure that the parking brake is on (locked) before leaving the cab.
3. Lift the body support in top position.
4. Slowly lower the body towards the support device until firmly positioned.
5. Return the tip control lever to hold position.
6. Stop the engine and remove the starter switch key.

- Disengagement of the support device:

1. Start the engine.
2. Lift the body slightly.
3. Return the tip control lever to hold position when the body is off the body support.
4. Make sure that the parking brake is on (locked) before leaving the cab.
5. Lower the body support.
6. Lower the body.



Cleaning

Clean machine before performing inspection and maintenance.

If inspection and/or maintenance are done when machine is dirty, it will become more difficult to locate problems, and this increases the risk of serious injury from slipping on steps and/or the work platform areas.

When washing machine, do the following:

- Wear shoes with nonslip soles to prevent slipping and falling.
- Wear safety goggles and protective clothing when washing machine with high-pressure steam or water.
- Do not spray water directly on electrical components (sensors and connectors). If water gets into electrical system, it can cause operation problems.
- Pick up any tools or hammers that are laying in workplace. Wipe up any grease or oil to prevent slippery surfaces, that can cause tripping or slipping.
- When cleaning cabin top window which is made of polycarbonate material, use tap water. Avoid use of organic solvents for cleaning, such as benzene, toluene or methanol. These solvents can cause a chemical reaction that will dissolve and damage the window.

Proper tools and clothing

Only use tools that are intended for the type of service to be done. Metal pieces from low quality or damaged tools, such as chisels or hammers, can break off and cause death or serious injury.

Disassembling precautions

When using a hammer to remove pins, pins can fly out or metal particles may break off. Always do the following:

- Hitting hard metal pins, bucket teeth, cutting edges or bearings with a hammer, can cause metal pieces to break or fly off resulting in serious injury. Always wear safety goggles and leather gloves. Keep personnel and bystanders away.

Use of lighting

When checking fuel, oil, battery electrolyte, window washer fluid, or coolant, always use proper lighting equipment to prevent arcs or sparks that could cause a fire or explosion resulting in death or serious injury.

Fire and explosion prevention

Fuels, most lubricants and some coolant mixtures are flammable. Flammable fluids that are leaking or spilled onto hot surfaces or onto electrical components can cause a fire resulting in property damage or death or serious injury.

Store all fuels and all lubricants in properly marked and approved containers and keep away from all unauthorized personnel.

Store oily rags and other flammable material in a protective container.

Tighten all fuel and oil caps.

Do not smoke while you refuel machine or while you are in a refuelling area.

Do not smoke in battery charging areas or in areas that contain flammable material.

Clean all electrical connections and tighten all electrical connections. Check electrical wires daily for wires that are loose or frayed. Tighten all loose, and repair or replace all frayed electrical wires before operating machine.

Remove all flammable materials and debris from the engine compartment, exhaust system components and hydraulic lines.

Burn prevention

When checking radiator coolant level, stop engine, let engine and radiator cool down, then check coolant recovery tank. If coolant level in coolant recovery tank is near upper limit, there is enough coolant in radiator.

Using gloves, loosen radiator cap slowly to release internal pressure before removing radiator cap.

If coolant level in coolant recovery tank is below lower limit, add coolant.

Cooling system conditioner contains alkali which can cause personal injury. Do not allow alkali to contact skin, eyes, or other body parts.

Allow cooling system components to cool before draining cooling system.

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin, eyes or other body parts.

Vent hydraulic tank only after engine has been stopped and hydraulic tank is cool. Using gloves, slowly tilt hydraulic tank air breather to relieve pressure.

Relieve all pressure in hydraulic oil system, in fuel system, or in cooling system before disconnecting any lines, hoses, fittings, or related components.

Batteries give off flammable fumes that can explode and start a fire.

Do not smoke while you are checking battery electrolyte level.

Electrolyte is an acid. Electrolyte can cause personal injury. Do not allow electrolyte to contact skin, eyes or other body parts.

Always wear safety goggles and face protection when working with batteries.

Rubber that contains fluorides

Observe extra great care when it is suspected that you may have to handle rubber that contains fluorides.

Certain seals which have to withstand high operating temperatures (e.g. in engines, transmissions, axles, hydraulic motors and pumps) may be made from rubber that contains fluorides, which, when exposed to high heat (fire), forms hydrogen fluoride and hydrofluoric acid. This acid is very corrosive and cannot be rinsed or washed off from the skin. It causes very severe burns which take a long time to heal.

It usually means that damaged tissue must be surgically removed. Several hours may pass after contact with the acid, before any symptoms appear and therefore one is not given any immediate warning. The acid may remain on the machine parts for several years after a fire.

If swelling, redness or a stinging feeling appears and one suspects that cause may be contact with heated rubber that contains fluorides, contact a medical doctor immediately. If a machine, or part of a machine, has been exposed to fire or severe heat, it must be handled by specially trained personnel. In all handling of machines after a fire, thick rubber gloves and protective goggles must be used.

The area around a part which has been very hot and which may be made of rubber that contains fluorides must be decontaminated by thorough and ample washing with limewater (a solution or suspension of calcium hydroxide, i.e. slaked lime in water). After the work has been completed, the gloves must be washed in limewater and then discarded.

Rubber and plastics

Polymer materials when heated, can form compounds that create a health hazard and can harm the environment. Scrapped rubber and plastic must never be burned. Extra precautions must be taken when servicing machines that have been in a fire or exposed to extreme heat.

If gas cutting or welding is to be done near such materials, the following safety instructions must be followed:

- Protect the material from heat.
- Use protective gloves, protective goggles and an approved respirator.

Waste Hazardous to the Environment

Painted parts or parts made of plastic or rubber which are to be scrapped must never be burned, but must be taken care of by an approved refuse handling plant.

Batteries, plastic objects and anything else which is suspected of being dangerous to the environment must be taken care of in an environmentally safe way.

Check List After Fire

When handling a machine which has been damaged by fire or been exposed to intense heat, the following protective measures must under all circumstances be followed:

Use thick, gloves made of rubber and wear goggles which are certain to protect your eyes.

Never touch burned components with your bare hands, as there is a risk that you may come into contact with melted polymer materials. First wash thoroughly with plenty of limewater (a solution or suspension of calcium hydroxide, i.e. slaked lime in water).

As a precaution, seals (O-rings and other oil seals) should always be handled as if they were made of rubber that contains fluorides.

Treat skin, which is suspected of having touched burned rubber that contains fluorides, with Hydrofluoric Acid Burn Jelly or something similar. Seek medical advice. Symptom may not appear until several hours afterwards.

Discard gloves, rags etc. which are suspected of having touched burned rubber that contains fluorides.

Welding repairs

IMPORTANT

When disconnecting or connecting connectors between VCU and engine, or connector between VCU and the machine, always disconnect the battery to prevent damage to VCU.

If you do not follow this procedure, the VCU will be damaged and/or the engine will not operate properly.

When performing welding repairs, perform welding in a properly equipped and well ventilated area. Repairs should only be performed by a qualified welder. Welding operations, can create potential hazards, including generation of gas, fire, or electric shock. Never let an unqualified welder do welding.

A qualified welder must do the following:

- To prevent battery explosion, disconnect battery terminals and remove batteries.
- To prevent generation of gas, remove paint from location of the weld.
- If hydraulic equipment, piping or component ports close to them are heated, a flammable gas or mist could cause an explosion or fire. To prevent this, protect and insulate components from excessive heat.
- Do not weld on pipes or on tubes that contain flammable fluids. Do not flame cut pipes or tubes that contain flammable fluids. Before welding on pipes or tubes, or before flaming cut pipes or tubes, clean them thoroughly with a non-flammable solvent. Make sure pressure inside pipes or tubes does not cause a rupture of the component parts.
- If heat is applied directly to rubber hoses or piping under pressure, they may suddenly break, so cover and insulate them with a fireproof covering.
- Wear protective clothing.
- Make sure there is good ventilation.
- Remove all flammable objects and make sure a fire extinguisher is available for immediate use.

Preparation for Electrical Welding on Body Structure

To prevent damage to VCU by electrical welding, observe the following procedures:

1. Turn battery disconnect switch to “OFF” position.
2. Unplug the connectors on the electronic control units for the engine(S3) and the transmission(S4). The connectors are located on the back under the cabin.
3. Ground connection should be less than 1m from welding point.
4. Proceed with welding.
5. After welding, connect the connector between VCUand machine, and the connector between VCUand engine.
6. Clean battery compartment.
7. Turn battery disconnect switch to “ON” position.
8. Close battery compartment door.

Accumulators

The hydraulic system is equipped with an accumulator. For a short period of time after engine has been stopped, accumulators will store a pressure charge that allow hydraulic controls to be activated. Activation of any controls will allow selected functions to operate.

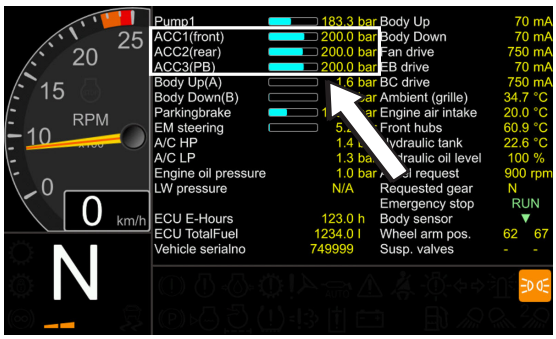
When performing maintenance on hydraulic system, release pressure in system.

The accumulators are charged with high-pressure nitrogen gas. If it is improperly handled, it can explode causing death or serious injury. Always observe the following precautions:

- Do not drill or punch holes in accumulators or expose it to any flames, fire or external heat source.
- Do not weld on accumulators.
- When performing disassembly or maintenance of accumulators, or when disposing of accumulators, charged nitrogen gas must be properly released before beginning such work. Contact your Hyundai distributor for assistance.
- Wear safety goggles and leather gloves when working on an accumulator. Hydraulic oil under pressure can penetrate skin and result in death or serious injury. If fluid enters skin or eyes, get immediate medical attention from a physician familiar with this injury.

Accumulators contain oil under high pressure!

Always empty the accumulators before working on or opening the hydraulic system.



Procedure:

- Completely sink down the front suspension. Refer to additional manual *Transport of Machine* placed in the cab.
- Stop the engine.
- Repeatedly press the brake pedal until pressure be equal to 0 on the main screen ACC1 and ACC2.
- Repeatedly turn ON/OFF parking brake button until pressure be equal to 0 on the main screen ACC3.

Compressed air

- When cleaning filters, radiator or other components with compressed air, there is a hazard of flying particles that can result in serious injury.
- Always wear safety goggles, dust mask, leather gloves, and other protective devices.

Supports and blocking for equipment

Do not allow weight or equipment loads to remain suspended and unsupported.

Lower dump body onto stops before leaving operator's seat.

Do not use hollow, cracked or unstable supports. Always use an approved support to prevent sudden lowering of the dump body or cab.

Do not work under any equipment supported only by a lifting jack.

High pressure lines, tubes and hoses

When inspecting or replacing high-pressure piping or hoses, check to verify that pressure has been released from circuit. Failure to release pressure can result in death or serious injury. Release pressure as described in "Handling of Accumulators" on page 2-51. Always do the following:

- Wear eye protection and leather gloves.
- Fluid leaks from hydraulic hoses or pressurised components can be difficult to see but has enough force to pierce skin and can result in death or serious injury. Always use a piece of wood or cardboard to check for suspected hydraulic leaks. Never use your hands or expose your fingers. Always wear safety goggles.
- Do not bend high-pressure lines. Do not strike high-pressure lines. Do not install lines, tubes or hoses that are bent or damaged.
- Make sure that all clamps, guards and heat shields are correctly installed to prevent vibration, rubbing against other parts, and excessive heat during operation.
- Replace hose or components if any of the following problems are found:

- Damage or leakage from hose end fitting.
- Wear, damage, cutting of hose covering, or wire braiding is exposed on any hose.
- Cover portion is swollen in any section.
- The hose is twisted or crushed.
- Foreign material is embedded in hose covering.
- Hose end is deformed.
- Connection fittings are damaged or leaking.

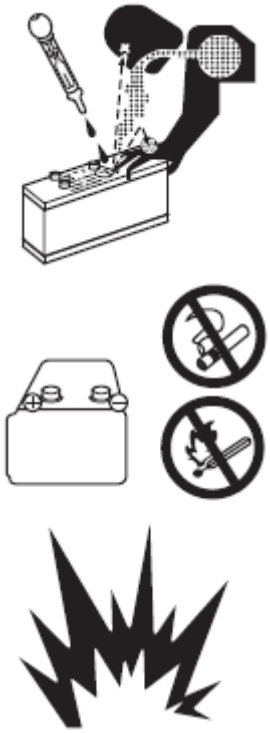
NOTE: Refer to "Hose In-service Lifetime Limit (European Standard ISO 8331 and EN982 CEN)" for additional European regulations.

High-pressure is generated inside fuel lines when engine is running. Before performing inspection or maintenance of fuel line system, wait for at least thirty seconds after stopping engine to let internal pressure drop and tip breather cap up to release residual pressure.

Oil or fuel leaks from high-pressure hoses can cause fire or improper operation, which can result in death or serious injury. If any loose bolts are found, stop work and tighten to specified torque. If any damaged hoses are found, stop operations immediately and contact your Hyundai distributor for replacement parts.

Battery

Battery Hazard Prevention



Battery electrolyte contains diluted sulfuric acid and generates hydrogen gas. Hydrogen gas is highly explosive, and improper handling can cause death or serious injury, or fire. Do not allow electrolyte to contact skin or eyes. Always wear safety goggles and protective clothing when servicing batteries. Wash hands after touching batteries and connectors. Use of acid-resistant gloves is recommended. Always observe the following precautions.

- Do not smoke or bring any flame near battery.
- When working with batteries, always wear safety goggles, protective clothing, and acid-resistant gloves.
- If you spill battery electrolyte on yourself or your clothes, immediately flush area with water.
- If battery electrolyte gets into your eyes, flush them immediately with large quantities of water and get immediate medical attention from a physician familiar with this injury.
- If you accidentally drink battery electrolyte, call a poison prevention centre immediately and get immediate medical attention from a physician familiar with this injury.
- When cleaning top surface of battery, wipe it with a clean, damp cloth. Never use petrol, thinner, or any other organic solvent or detergent.
- Tighten battery caps.
- If battery electrolyte is frozen, do not charge battery or start engine with power from another source. This could cause the battery to explode and start a fire.
- When charging battery or starting with power from another source in cold temperatures let battery electrolyte thaw and check that there is no leakage of battery electrolyte before starting operation.
- Always remove battery from machine before charging.

Do not use or charge battery if battery electrolyte level is below LOW LEVEL line. This can cause an explosion. Periodically check battery electrolyte level and add distilled water to bring electrolyte level to FULL LEVEL line.

Before maintaining or working with batteries, turn starter switch to “O” (OFF) position and battery main switch to “OFF” position.

Since there is a potential hazard that sparks could be generated, always do the following:

Do not let tools, rings or other metal objects make any contact with battery terminals. Do not leave tools or other metal objects lying near battery.

When disconnecting battery terminals, wait for approximately one minute after turning engine starter switch key to “O” (OFF) position, and be sure to disconnect grounding terminal / negative (-) terminal first. Conversely, when connecting them, begin with positive (+) terminal and then grounding (-) terminal. Make sure that all terminals are connected securely.

Flammable hydrogen gas is generated when battery is charged. Remove battery from machine, take it to a well ventilated place, and remove battery caps, before charging it.

After charging, tighten battery caps securely.

After charging, secure battery back in machine. When repairing or welding electrical system, wait for approximately one minute after turning engine starter switch key “OFF”. Then disconnect negative (-) terminal of battery to stop flow of electricity.

Preservation/Storing machine

Perform the following if storing the machine for more than one month.

Conditions	Maintenance required.
Cleaning	Pressure wash entire machine. Inspect for damage or loose or missing parts.
Lubrication	Perform all daily lubrication procedures.
	(If equipped) Everyday, turn on the central lubrication pump over 1 cycle (approximately 10 minutes). Use the auto grease switch in cabin.
	Apply a coating of light oil to exposed plated metal surfaces, such as hydraulic cylinder rods, etc.
	Apply a coating of light oil to all control linkages and control cylinders (control valve spools, etc.)
Battery	Turn “OFF” the battery disconnect switch.
Cooling system	Inspect coolant recovery tank to make sure that anti-freeze level in system is at correct level.
	Every 90 days, use a hydrometer to measure protection level of coolant. Refer to “Anti-freeze Concentration Tables” on page 7-63, to determine amount of protection cooling system requires. Add coolant as required.
Hydraulic system	Once a month, start engine and run at low idle speed until pressure in the various circuits is normal.

Complete the steps listed above.

Wash machine and touch up paint finish to avoid rusting.

Treat exposed parts with antirust agent, lubricate machine thoroughly and apply grease to unpainted surfaces like lifting and tilting cylinders etc.

Fill fuel tank and hydraulic oil tank to “FULL” marks.

Cover exhaust pipe (if parking outside).

Make sure that coolant is at proper concentration for expected lowest temperatures.

Parking machine on firm and level ground where there is no risk of freezing, landslide or flooding. Avoid parking machine on a slope.

Keep in mind that theft and burglary risk can be minimized by:

Removing starter key when the machine is left unattended.

Locking doors and covers after working hours.

Turning off electrical current with battery disconnect switch.

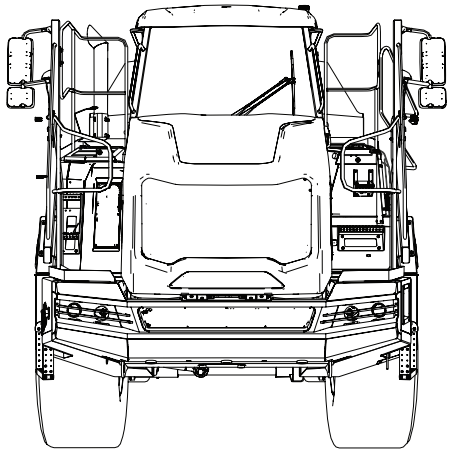
Parking machine where risk of theft, burglary and damage is minimized.

Removing valuables from cabin such as cellular phone, computer, radio and bags.

Check After Long-term Parking

- All oil and fluid levels.
- Tension of all belts.
- Air pressure.
- Air cleaner.
- Batteries and electrical connections.
- Lubricate all greasing points.
- (If equipped) Check the reservoir of the central lubrication pump, and change the grease if it is divided into two layers, oil and soap. It can cause blockage of system.
- Wipe off grease from piston rods.
- Inspect for signs of nests (i.e. birds, rodents, etc.)

Transportation



Obey State and Local Over-the-Road Laws and Regulations

Check federal, state and local laws and regulations regarding weight, width and length of a load before making preparations for transporting on public roads or highways.

The hauling vehicle, trailer and load must be in compliance with applicable regulations for the shipping route.

Partial disassembly of the machine may be necessary to meet travel restrictions or particular conditions at work site. See Shop Manual for information on partial disassembly.

Refer to “Transportation” manual stored in cab, for information on loading, unloading and towing.

The machine can be disassembled into parts for transporting. Contact your Hyundai distributor for assistance with disassembly.

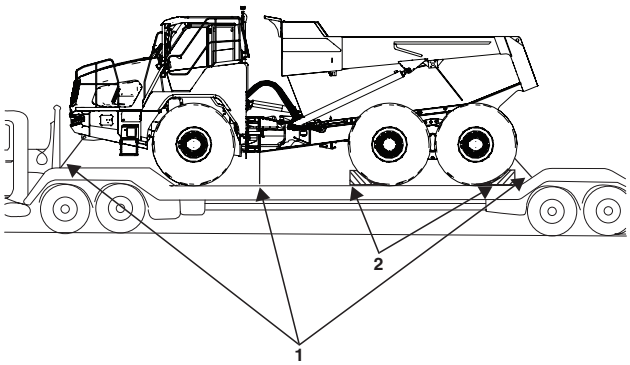
Transportation:

- Apply the parking brake.
- Apply the articulation lock.
- Apply wheel chocks.(2)

Attach suitable wires or chains to the tie down points on the front and rear frame as shown and secure safely.

WARNING

When tying down the machine, ensure machine does not come into contact with cables and chains. Machine can be damaged by inappropriate tie down method. Use only the main tie points (1) marked with the stickers.



Always transport the truck without load in the body!

Loading and Unloading

To prevent machine tip over or roll-over when loading or unloading machine, always do the following:

- Perform loading and unloading only on firm and level ground. Maintain a safe distance from edge of road or drop-off.
- Never use work equipment to load or unload machine. The machine may fall or tip over.
- Always use loading ramps of adequate strength and capacity. Be sure that ramps are wide, and long enough to provide a safe loading slope. Take steps to prevent ramps from moving out of position or coming off.
- Clean ramp surfaces so they are free of grease, oil, ice and loose materials. Remove dirt from machine tires. On a rainy day, be careful since ramp surfaces can be slippery.
- Run engine at low speed and travel slowly.
- When on ramps, do not operate any control lever except for gear shift lever.

- Never correct your steering on ramps. If necessary, drive off ramps, correct machine direction, then drive back onto ramps.
- Always lock door after loading machine to prevent door from suddenly opening during transportation.

Transporting Machine

When transporting machine on a trailer or truck, do the following:

- The weight, transportation height, and overall length of machine may change depending on work equipment attached to it. Always check the machine dimensions and work equipment's dimensions before transporting.
- When passing over bridges or structures on private land, check that structure is strong enough to support weight of machine. Before travelling on public roads, check with appropriate authorities and follow their instructions.

Environment and circumstances

Work Site Areas Requiring Extra Caution

- Do not operate too close to edge of a quay, ramp, etc.
- Do not operate too close to edge of a steep slope or drop-off. Use caution when working in a place where machine may tip over.
- Do not operate on soft ground or near riverbank that could collapse or where ground may not support weight of machine.
- Observe changes in ground and traction conditions after a rain or other changes in weather.

Drop-off or Edge

When working near or at an edge of a drop-off, the machine could tip over, which can result in death or serious injury. Always fasten your seat belt. Check ground conditions of work site before operating to prevent the machine from falling or rollover, and to prevent ground, stockpiles, or banks from collapsing.

Poor Visibility

For good visibility, always do the following:

- When working in dark areas, attach working lights and front lights to the machine. If necessary, set up additional lighting at work site.
- Stop operations when visibility is poor, such as in fog, mist, snow, and rain. Wait for visibility to improve before starting operation.

To avoid hitting work equipment and damaging other property, always do the following:

- When working in tunnels, on bridges, under electrical wires, or when parking the machine or performing other operations in places with limited height, be careful not to hit and damage other equipment or property.
- To prevent hitting objects, operate machine at a slow speed when working in confined spaces, indoors, or in crowded areas.

Loose or Soft Ground

Do not operate on soft ground or near edge of drop-offs, overhangs, or deep ditches. The ground can collapse because of the weight of the machine, causing the machine to fall or rollover.

Check ground conditions before beginning work with the machine. If ground is soft, reposition the machine before operating.

The excavated material must not be dumped too close to edge. The distance from an edge of an excavation where the excavated material must be dumped depends on soil type and moisture content. If loose clay is being excavated, place it at least 5 m (16 ft.) away from edge.

If excavated material is dumped too close to edge, its weight can cause a landslide.

Thawing of frozen ground, rain, traffic, piling and blasting are other factors which increase risk of landslide. The risk also increases on sloping ground.

High-voltage Cables

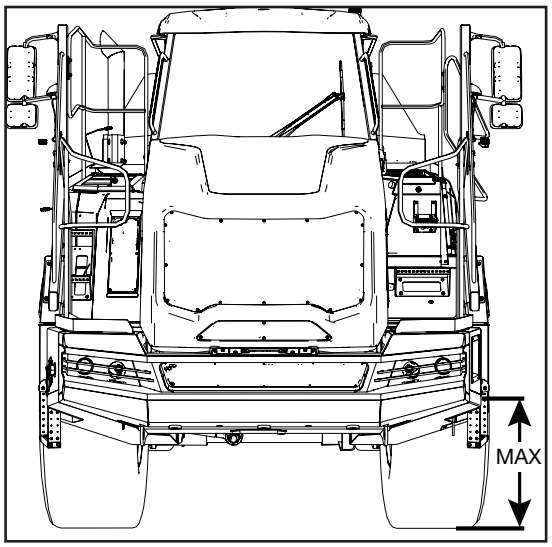
Do not travel or operate machine near electrical cables or overhead power lines. There is a hazard of electric shock, which can cause property damage and result in death or serious injury. The dump truck does not have to make physical contact with power lines for current to cause an electrocution.

Use a spotter and hand signals to stay away from power lines not clearly visible to operator. On work sites where machine may operate close to electrical cables, always do the following:

- Remember that the electrical voltage determines what minimum distance must be retained to stay safe from power lines. Please see the following table for minimum distances when working near to the electrical power lines. Electrical flashover can occur and cause damage to the machine and serious injury or death.

Voltage	Minimum distance
6,6 kV	3 m (9’ 10”)
33,0 kV	4 m (13’ 1”)
66,0 kV	5 m (16’ 5”)
154,0 kV	8 m (26’ 3”)
275,0 kV	10 m (32’ 10”)

- Always contact the power company responsible before beginning work near high voltage power lines.
- If the dump truck body should contact an electrical cable, the operator should not leave the operator's cab. The operator should remain in the cab until it has been confirmed that the electricity has been shut off.



Working in water

The water depth is an important factor to take into consideration when the machine is working in swampy areas. Do not enter water whose depth exceeds the machine's maximum wading depth.

The maximum wading depth is:

HA30/HA30A - 1100 mm, i.e. up to the main power box located in the left front fender.

HA45/HA45A - 1350 mm, i.e. up to the main power box located in the left front fender.

Observe the following conditions:

1. Check the water depth in advance when crossing a river.
2. Use the same precautions before crossing across a swampy area.
3. Do not enter rivers whose riverbed is steep or has a rapid flow.

After working in water, lubricate all lubrication points on components which have been under water so water is removed.

The parking brake linings must be checked/replaced more often when driving in wet and swampy areas, because wear of the linings will increase (see 500 hours service for procedure).

NOTE

Under no circumstances, let water flow through the front grill.

Working in Contaminated Environment

When working within an area which is contaminated or where there is a health risk, check local laws and regulations and contact your Hyundai distributor for assistance with identifying what additional safety precautions need to be taken.

Exhaust Ventilation

Engine exhaust gases can cause unconsciousness, loss of alertness, judgment and motor control. This can result in death or serious injury.

Make sure there is adequate ventilation before starting engine in any enclosed area.

Check for and be aware of any open windows, doors or ductwork where exhaust may be carried, or blown by wind, exposing others to hazardous exhaust gases.

Ventilation for Enclosed Area

If it is necessary to start engine within an enclosed area, or when handling fuel, flushing oil, or paint : open doors and windows to ensure that adequate ventilation is provided to prevent gas poisoning.

Diesel engine exhaust contains combustible materials which can be harmful to your health.

Always run engine in a well ventilated area. If you are in an enclosed area, vent exhaust to outside.

WARNING

AVOID DEATH OR SERIOUS INJURY

Avoid exposure to dust containing asbestos as it can cause death or serious injury to the lungs and other organs (mesothelioma, lung and other cancers, and asbestosis).

Asbestos dust can be HAZARDOUS to your health if it is inhaled. Materials containing asbestos fibre can be present on work sites. Breathing air that contains asbestos fibre can ultimately cause serious or fatal lung damage or diseases such as mesothelioma, lung and other cancers, and asbestosis. To prevent lung damage from asbestos fibre, observe the following precautions:

- Use an approved respirator that is approved for use in an asbestos-laden atmosphere.
- Use water to keep down dust.
- Always observe any laws and regulations related to work site and working environment.
- Avoid brushing or grinding materials that contain asbestos.
- Use a vacuum cleaner that is equipped with a high efficiency particulate air filter.
- Comply with applicable laws and regulations for workplace.
- Stay away from areas that might have asbestos particles in air.

Silica Dust Information

WARNING

AVOID DEATH OR SERIOUS INJURY

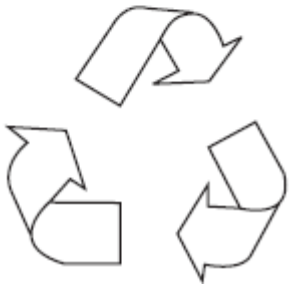
Avoid exposure to dust containing crystalline silica particles as it can cause serious injury to the lungs (silicosis).

Cutting or drilling concrete containing sand or rock containing quartz can result in exposure to silica dust. Do not exceed permissible Exposure Limits (PEL) to silica dust as determined by OSHA or other work site rules, laws and regulations. Use a respirator, water spray or other means to control dust. Silica dust can cause lung disease and is known to the state of California to cause cancer.

Disposal of Hazardous Materials

Physical contact with used motor oil or gear oil could create a health risk. Wipe oil from your hands promptly and wash off any remaining residue.

Used motor oil or gear oil is an environmental contaminant and should only be disposed of at approved collection facilities. To prevent pollution of environment, always do the following:



- Never dump waste oil in sewer systems, rivers, etc.
- Always put drained oil from your machine in approved, leak proof containers. Never drain oil directly onto ground.
- Obey appropriate laws and regulations when disposing of harmful materials such as oil, fuel, solvent, filters, and batteries.

Improperly disposing of waste can threaten environment. Potentially harmful fluids must be disposed of according to local laws and regulations.

Sound

Sound Level Information: Hearing protection may be needed when machine is operated with an open operator station for extended periods or in a noisy environment.

Sound pressure level (LpA) at operator position (Measurement according to ISO 6396:2008)	HA30/HA30A/ HA45/HA45A
	72 dB
Sound power level (LwA) around the machine (Measurement according to 2000/14/EC with applicable appendices and measuring method according to ISO 6395:2008)	107 dB

Vibration

Hands and Arms: The weighted root mean square acceleration to which hands and arms are subjected to less than 2.5 m/s2.

Whole Body: The weighted root mean square acceleration to which whole body is subjected to less than 0.5 m/s2.

Measurements are obtained on a representative machine, using measuring procedures as described in the following standards: ISO 2631-1, ISO 5349 and SAE J1166. Recommendations for Reducing Vibrations:

1. Select proper machine, equipment and attachments for a particular application.
2. Replace any damaged seat with a genuine Hyundai seat. Keep seat properly maintained and adjusted.

• Adjust seat and suspension for weight and size of operator.

- Inspect and maintain suspension and adjustment mechanisms of seat regularly.

3. Check that the machine is properly maintained.
4. Operate controls smoothly when steering, accelerating, slowing down, loading, or moving attachments.
5. Adjust machine speed and travel path to reduce vibration level.

- Slow down when travelling over rough terrain or long distances.
- Avoid obstacles and rough terrain.

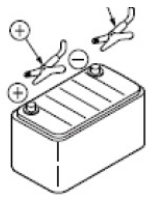
Operating Controls

Overview of the instrument panels and controls

WARNING

Do not drive the dump truck until you are well acquainted with the location and function of instruments and controls. Read the following carefully, together with the chapter about operation.

- Check the instruments now and then, when abnormal values are discovered in time. Precautions can be taken to prevent the occurrence of major damage.
- If red symbols/lights illuminate, stop the dump truck as soon as possible at a safe place and take necessary precautions. If you don't, safety could be compromised and/or the dump truck could be damaged.
- To be able to check the function of instruments and controls, the battery main switch must be connected and the starting switch key must be in position 1.

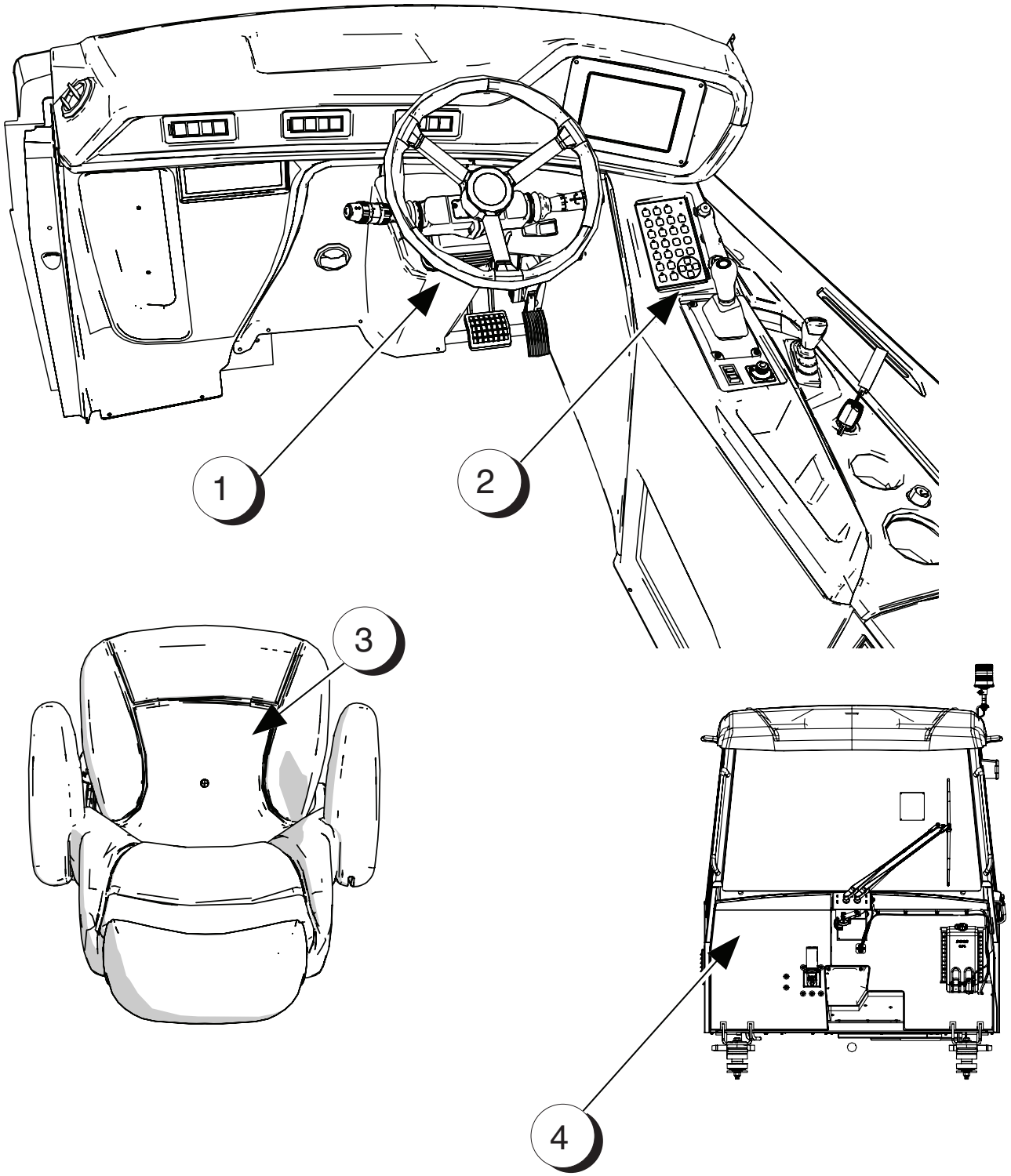


NOTE

The truck is equipped with the battery voltage level detection.
In case of low battery level the system will force off the following functions:
-Main lights (high and low beam)
-All work lamps
-HVAC (Heating, ventilation, and air conditioning)
-Heated seat and seat supply

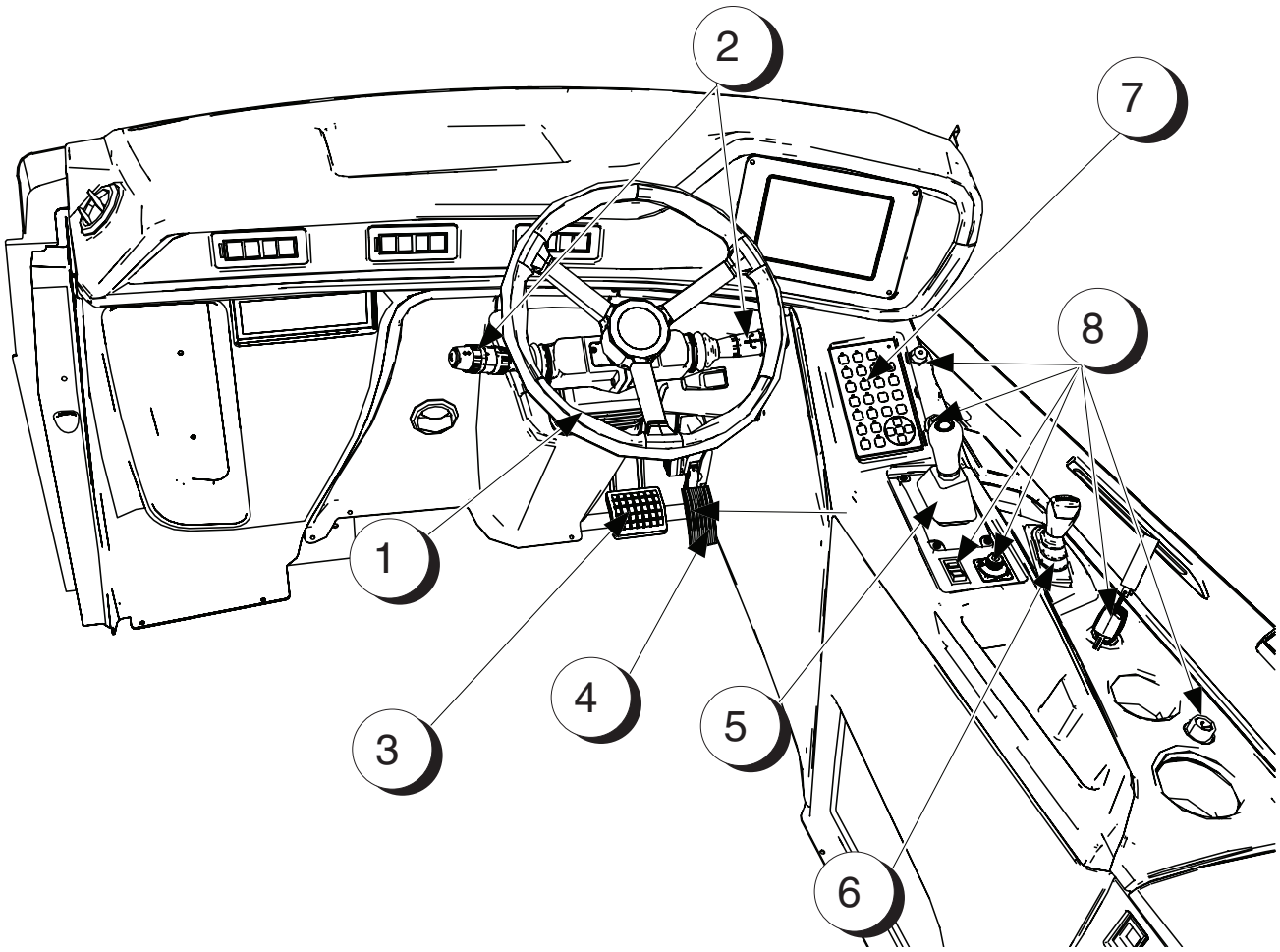
Operator's area

Standard extra equipment and optional accessories are also shown and described.



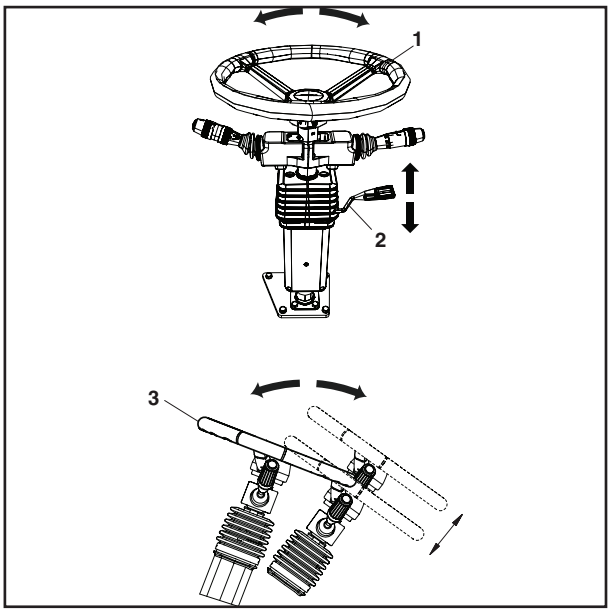
Pos	Description
1.	Steering Console and Pedals
2.	Keypad
3.	Seat Adjustment
4.	Various Cabin Locations

Steering console and pedals



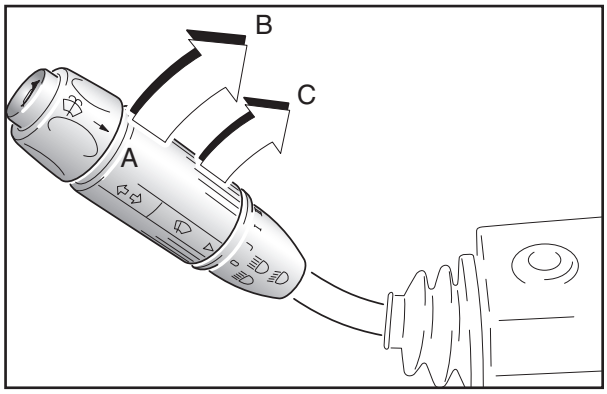
Pos	Description	Page	Remarks
1.	Steering Column	3-6	
2.	Column Switches	3-6	
3.	Brake Pedal	3-8	
4.	Accelerator Pedal	3-8	
5.	Gear Selector	3-9	
6.	Tip Control Lever	3-10	
7.	Keypad	3-10	
8.	Other Switches	3-12	

Steering console and pedals



Steering Column

1. Rotating of the steering wheel (1) controls position of the front frame against rear wagon and this determines direction of machine travel.
2. The steering wheel is installed on an adjustable column for comfortable reach and easy operation.
   - Height adjustment - lift lever (2) up to unlock.
   - Tilt adjustment - push lever (2) down to unlock.



Column switch left hand side

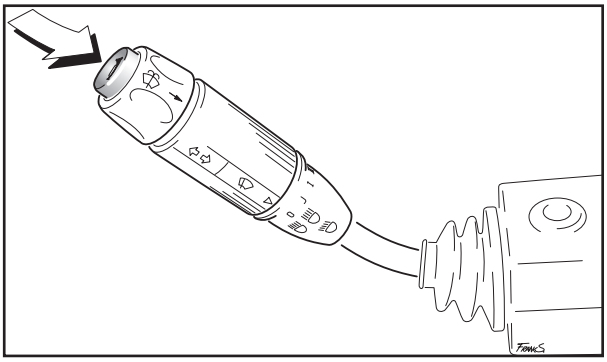
The column switch is a multi-function switch for main lights, horn, direction indicators and windscreen wiper/washer.

Main lights (A, B, C):

A. Low beam

B. High beam indicator will light.

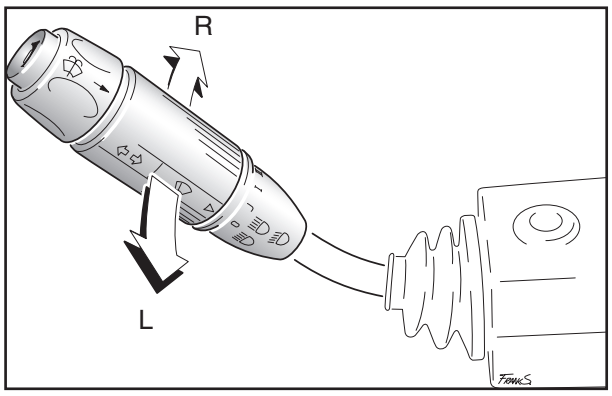
C. High beam flash. Automatic return.



Horn

Centre button, automatic return.

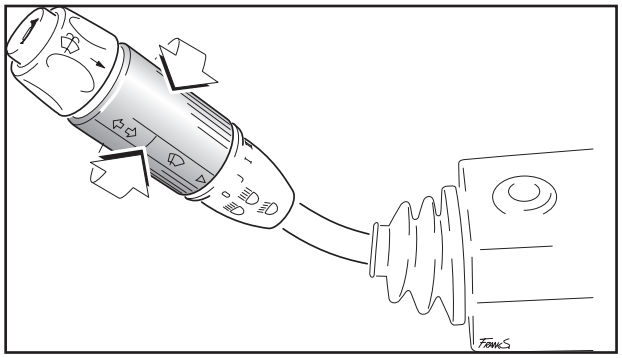
Steering console and pedals



Direction switch

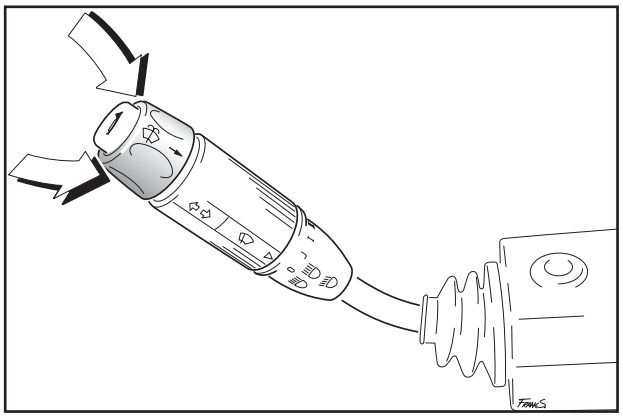
Right turn, all right direction indicators flash. Indicator direction light flashes correspondingly.

Left turn. All left direction indicators flash. Indicator direction light flashes correspondingly.



Windscreen wiper. Turn-handle. Positions:

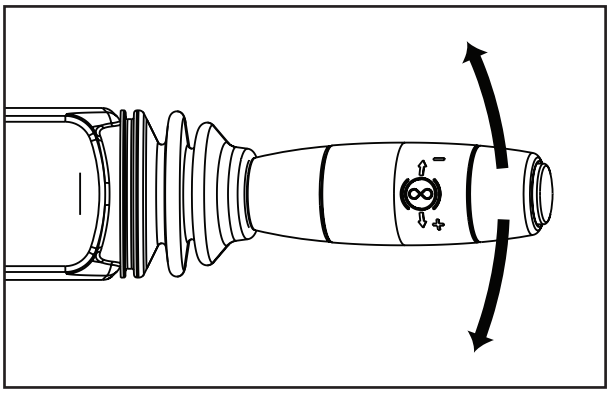
- 0 OFF
- J Interval
- I Low speed
- II High speed



Windscreen washer

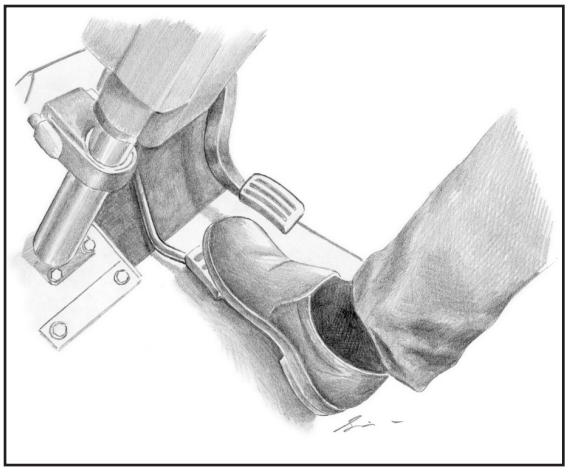
Push outer ring to activate the washer monitor. At the same time, the wiper wipes some times after releasing the ring.

Steering console and pedals



Retarder Lever (Main brake), right hand side.

Standard retarder setting is 50% and can be adjusted by the Retarder Lever (up or down) from 100% to 25%.

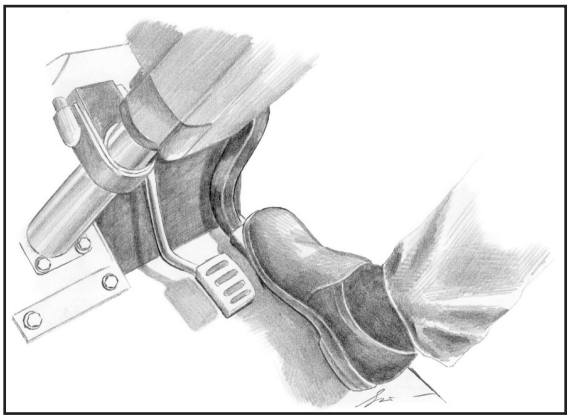


Brake pedal

The pedal controls the service brake. When depressing the pedal, the rear stop light will light. Braking effect depends on pedal position. Depress pedal gradually, and learn to associate braking requirements for loaded and unladen dump truck. Do not use the pedal for long period retardations, i.e. Loaded downhill. This will overheat and damage the brakes.

CAUTION

If warning for brake system failure lights up (brake system warning indicator), stop the dump truck immediately!



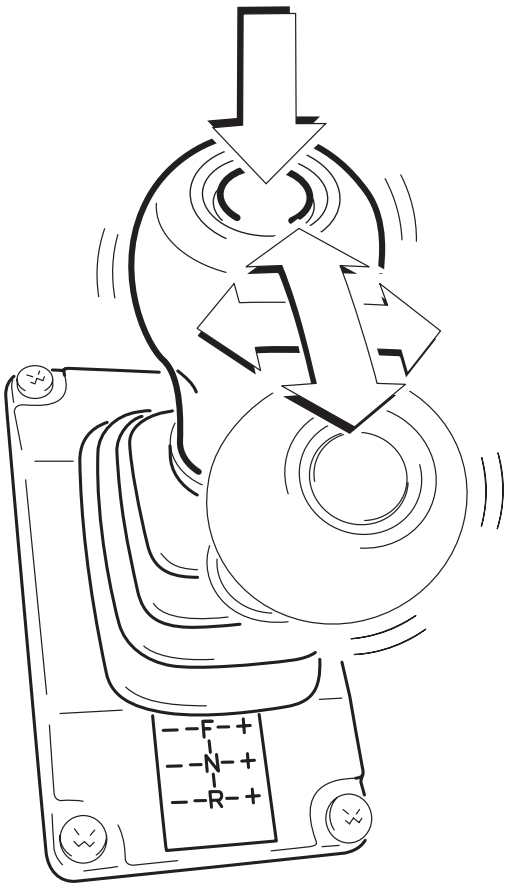
Accelerator pedal

The pedal controls the engine speed electronically.

NOTE

The further the pedal is pressed, the more the engine speed will increases. However, do not press the pedal more than necessary otherwise, it will increase fuel consumption.

Steering console and pedals



Gear selector

The dump truck is equipped with a fully automatic transmission with 8 forward and 4 reverse speeds. Gear shift pattern is speed and engine load dependent. Preselection of gears is possible. The main display will always show the engaged gear position.

Pos N: Neutral gear position
Depress the knob on top of the gear selector when shifting from neutral to forward or reverse position. Also, always depress the knob when shifting directly between forward and reverse direction.

Pos F: Forward drive position.
Automatic gear shift between 1st-8th gear according to speed and engine load. For preselection of gear, push the selector to the right (+) for upshifting or to the left (-) for downshifting. The selected gear will then be engaged when the speed matches the set points.

If the gear selector is pushed either to the left or right, manual gear shifting will take place.
The gear selector must then be pushed in order to change gear.
Manual gear shifting will also take place if the knob on the top of the gear selector is depressed while driving in automatic. To return to automatic gear shifting while driving in manual, depress the knob on top of the gear selector.

Pos R: Reverse drive position
Manual gear shift between 1st - 4th gear according to speed and engine load.
The transmission will always select the 1st reverse when the gear selector is moved to "R". The selected gear is engaged directly if the dump truck is stationary.
The gear selector has to be pushed in order to change gear.
For preselection of gear, push the selector to the right (+) for upshifting or to the left (-) for downshifting.

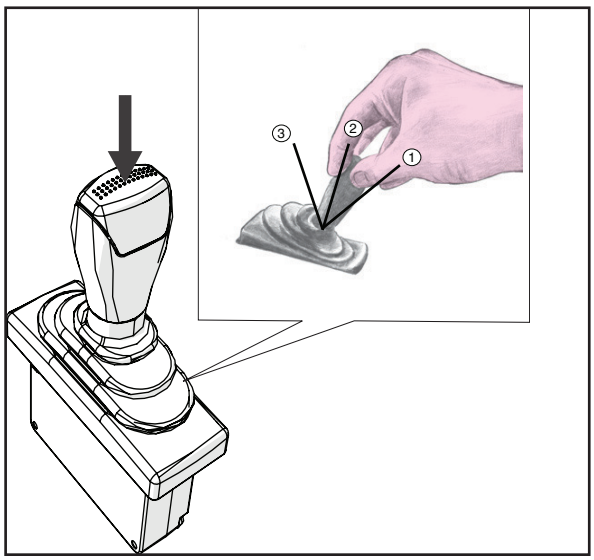
See also chapter 5, Operating Instructions

NOTE

The knob on top of the gear selector has three functions:

1. **Depress the knob when shifting from neutral to forward or reverse position.**
2. **Depress the knob when shifting directly between forward and reverse direction.**
3. **Depress the knob to change between automatic and manual gear shifting.**

Steering console and pedals



Tip control lever

The lever controls the body lifting and lowering.
The lever has 3 positions:

1. Lift (body up).
2. Hold (hold and floating position).
3. Lower (body down/power down).

The lever is electronically locked in the lower position, and has spring return from lower to hold.
Always keep the lever in hold position during loading and driving. Check that the body is resting on the frame rubber pad during loading and driving.

A warning light (body down indicator) will light when the body is lifted (i.e. when the body is not resting on the frame rubber pads).

Button on top of lever increase engine rpm when depressed (1800 rpm when lifting and 1300 rpm when lowering).

Keypad

A - These keys are used to control the display

 - Help button - This shows simplified Operators Manual

 - Menu button - This shows a menu that can be used to view the status of the Dumper and to modify a number of settings.

 - Info button - Use this to flip through the pages for the Trip Counters, Fault Codes,Tire Pressure Info and Detailed Info.

 - Home button - Shows either the main view or the rear camera view.

 - Menu Control Buttons.

 - Go Back.

 - Enter.

 - Move up.

 - Move down

 - Accept change or execute command

Steering console and pedals

Parking lights button

Push the button to activate the parking lights.

The work lights button

Push the button to activate the forward working lights.

Heated mirrors button (Option)

Push the button to activate the mirrors heater.

After activation turns off automatically after 2 hours.

Override button

Stops engine immediately when ignition key is switched off.

In combination with arrow buttons can adjust front suspension level in manual mode.

Suspension button

Use this button to put the front suspension in manual mode to adjust the height of the front frame for the transport purpose.

In Development

Inter-axle differential lock

Push the button to activate the Inter-axle differential lock.

NOTE

See chapter 5 for more details.

High beam lights button

Switches on the main lights. High beam is only activated with the steering column stick. When the parking lights were off, they are switched on also. A user settings allows the forward work lights to follow the activation of the main lights.

Rear work lights button

Push the button to activate the rear working lights.

Electrically heated driver's seat button.

Push the switch to activate the heating of driver's seat. Seat heating works only when the ignition is on

NOTE

This is an optional button and used only if the driver seat is not equipped with such.

In Development

In Development

In Development

Steering console and pedals

Under Development

Fuel heating (Only T4F)

Push the button to activate the fuel heater.

The button will be lit even if the fuel heater is not installed.

Cab light button

Push the button to activate light in the cab.

If the Interior light is switched manually on from the key panel then the timer for the door switch is ignored for 5 minutes

Hazard lights button

Push the button to activate the hazard lights.

Rotating beacon button

Push the button to activate the rotating beacon on top of the cab roof.

Heater (Option)

Engine and cabin heater (like e.g. Webasto). Manually activation button.

After activation the led light will light up on the button if the heater is installed.

Other switches

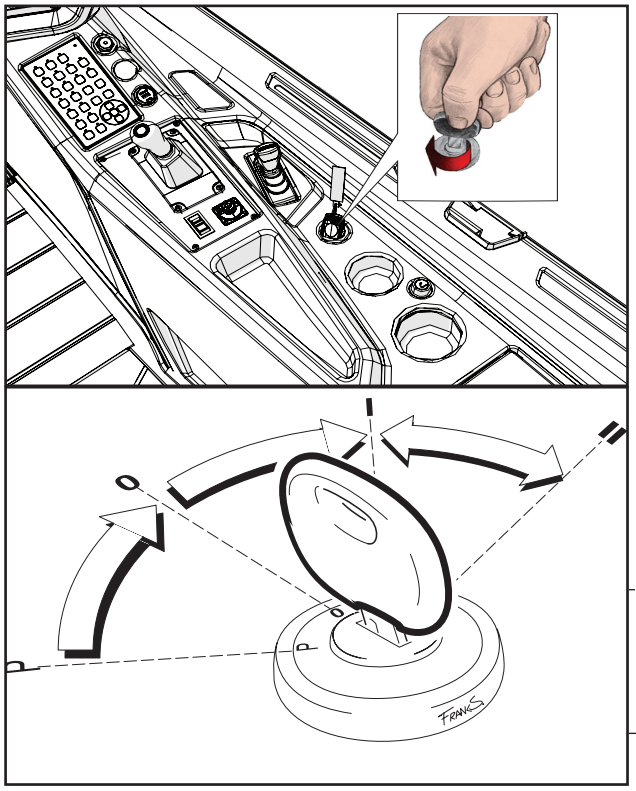
Parking brake switch

The parking brake is on (locked) when the switch is in the backward position. An indicator appear on main screen when the parking brake is on. Push the lock device to release the parking brake. In the forward position the parking brake is off (released). The parking brake must not be applied when the dump truck is in motion unless in an emergency situation. Indicator light and a buzzer will sound if a gear is selected while the parking brake is on (locked).

CAUTION

Do not drive the dump truck if the fluid pressure is below normal pressure (indicator brake system warning light and buzzer). The parking brake will not be fully released, and the service brakes may not have max. parking effect.

Steering console and pedals



Starter switch

The starter switch is key operated, and has 4 positions.

P = Park (key removable)

0 = Power off (key removable)

I = Power on (drive position).

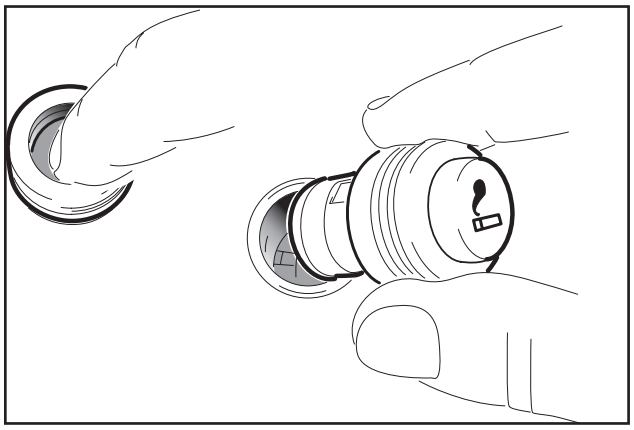
II = Starting position (key returns back to pos. I when released).

Auto ignition off (AIO)

Monitoring engine running and driveline movement.
Also monitoring the accelerator pedal press-down to keep ignition on.If not activity then ignition is forced off after 1 hour.

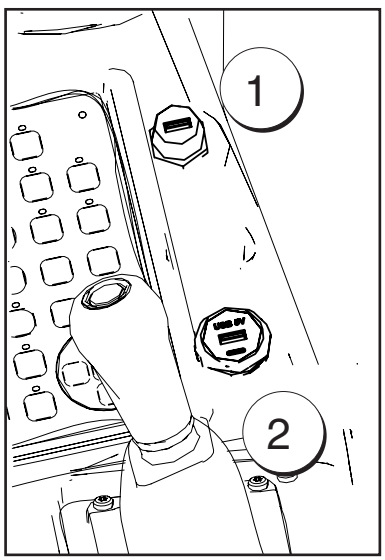
WARNING

Do not turn the key to off position if you do not intend to stop the engine. The engine has a key stop and requires neutral position on the gear selector to start again.



Cigarette lighter

Push in to activate the heating function. Automatic return when hot.
Can also be utilised as a 12 Volt / 10 amp power source.



USB ports

- The upper(1) port is dedicated to updating the display software.
- The bottom(2) port is dedicated to charging of other equipment.

Instruments

Display main menu overview

MENU→ OPERATION → RESET TRIP A/B

SETTINGS → DISPLAY → REAR CAMERA → OPTIONAL CAMERA → LANGUAGE → UNITS → CLOCK → LOAD WEIGHT

I I

I WORK LAMPS

I I

I HEATER

I I

I AUTO SHUTDOWN

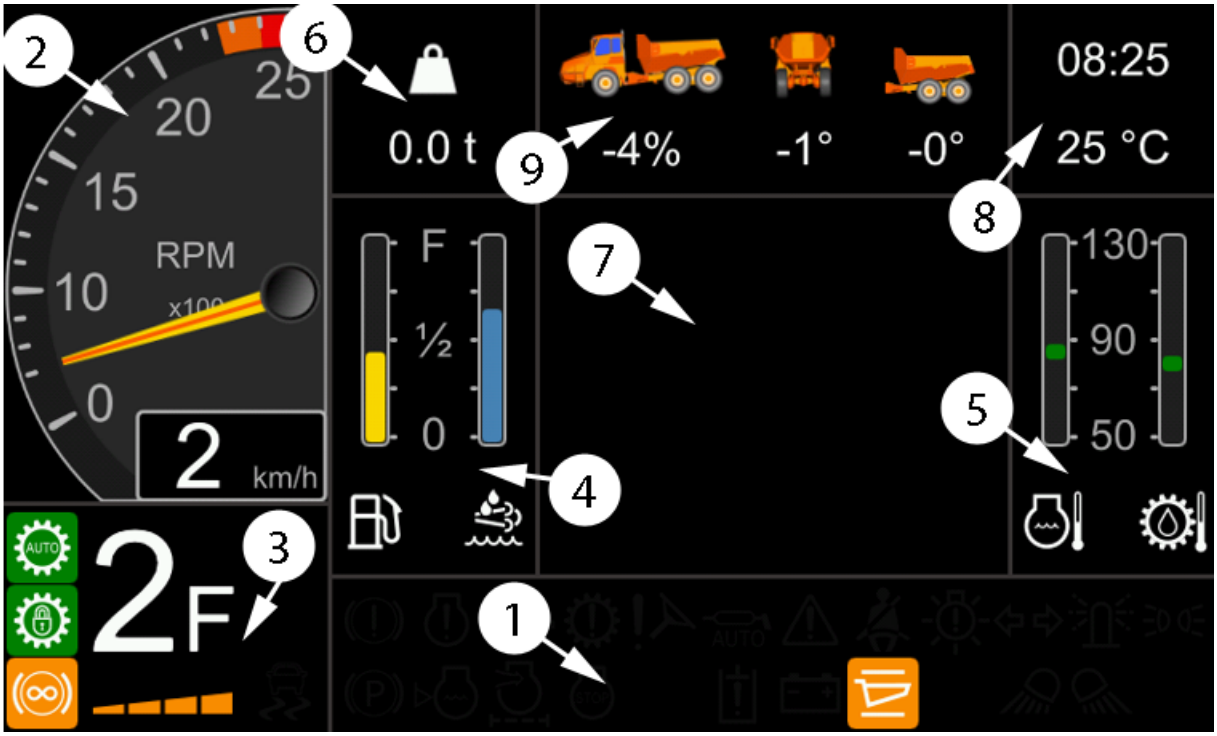
I

MACHINE STATUS → ENGINE → TRANSMISSION → VCU → LUBRICATION → TMS

I

SERVICE → TRANSMISSION OIL CHECK → TRANSMISSION CLUTCH CAL →. REAR-VIEW CAMERA ADJUST → DPF → SOFTWARE UPDATE

MAIN SCREEN VIEW



Pos	Description
1.	Indicators Overview
2.	Speed Screen
3.	Transmission Status
4.	Fuel Levels
5.	Engine coolant & transmission oil temperature
6.	Weighing System
7.	Information Screen
8.	Time/Temperature Screen
9.	Vehicle angle

Instruments

1. Indicators

Brake system warning, amber or red

When brake system hydraulic pressure is abnormal, lamp will illuminate.

It can also light when the starter switch is turned on, switches off when the fluid pressure is at a normal level. If the light does not switch off, check for leakage.

A warning buzzer will sound if the pressure is too low on the supply line.

An amber colour is warning, a red colour is an error.

If this illuminates:

A. Stop the dump truck on a safe place.

B. Select neutral gear position and apply the parking brake.

C. Check and note the error codes on the display.

D. Contact your Hyundai Dealer (a short explanation of the codes is listed under troubleshooting, chapter 5).

WARNING

Do not drive a dump truck with the brake failure warning lamp illuminates.

Engine failure warning,

This illuminates when engine failure occurs. Stop the dump truck, turn off the engine and contact your Hyundai Dealer immediately.

If this illuminates:

A. Stop the dump truck on a safe place.

B. Select neutral gear position and apply the parking brake.

C. Check and note the error codes on the display.

D. Contact your Hyundai Dealer.

Instruments

Low engine oil pressure warning.

This illuminates when low oil pressure in engine.

WARNING

In this event, stop the engine immediately.

Transmission failure warning.

This illuminates when an error has been detected.

If this illuminates:

A. Stop the dump truck on a safe place.

B. Select neutral gear position and apply the parking brake.

C. Check and note the error codes on the display.

D. Contact your Hyundai Dealer (a short explanation of the codes is listed under troubleshooting, page 5-32).

WARNING

- **If error codes are shown on the display, contact your Hyundai Dealer in all cases.**
- **All error codes (also the special features) shown on the display will be stored in the memory of the transmission controller.**

Emergency steering warning.

Lights if the emergency steering system is abnormal.

Lubrication system warning, amber or red

This will illuminate when a failure occurs in the trucks lubrication system. Stop the truck immediately and check the main lubricator.

An amber colour is a warning that the reservoir is almost empty

Red colour is an error. The lubrication system has stopped

If this illuminates:

A. Stop the dump truck on a safe place.

B. Select neutral gear position and apply the parking brake.

C. Check and note the error codes on the display.

D. Contact your Hyundai Dealer

NOTE

If there is a failure in the system, it is only possible to run the dump truck to 7 km/h until the failure is corrected.

Instruments

General failure warning, amber or red

This illuminates when a general error has been detected.

An amber color is a warning, a red color is an error.

If this illuminates:

A. Stop the dump truck on a safe place.

B. Select neutral gear position and apply the parking brake.

C. Check and note the error codes on the display.

D. Contact your Hyundai Dealer (a short explanation of the codes is listed under troubleshooting, (Chapter 5).

Seat belt warning.

This illuminates when driver has not fastened the safety belt.

Lamp fault, amber

This illuminates when some bulb of direction, back-up and main lights are damaged.

Direction light indicator.

Flashes when direction indicator or hazard light is activated.

- Will flash fast if one of the bulbs from external direction indicator is broken.

- All hazard warning lights are on

Rotating beacon indicator, amber

This illuminates when the rotating beacon light is activated.

Instruments

Parking lights.

This illuminates when the parking lights are activated.

Main lights indicator.

This illuminates when the main lights are activated.

High beam indicator.

This illuminates when the high beam lights are activated.

Parking brake activated indicator.

This illuminates when the parking brake is "on".

Low coolant level warning.

This illuminates when the coolant in the expansion tank it too low. Stop the truck immediately and see (chapter 7) for procedure.

WARNING

Engine damage may occur if truck is driven with little or no coolant.

Air filter warning, red

This illuminates when the engine air filter is clogged and needs maintenance.

See (chapter 7) for procedure .

Tires status

Red is Error.

At least one of the six tires has a serious problem. This requires immediate action to solve the error.

Amber is Warning.

At least one of the six tires has an issue. It is recommended check the system and fix the problem.

SCR failure warning.

Off - No error

On continuously- Error

Blinking slow - Active torque limit due to SCR failure

Blinking fast - Active speed limit due to SCR failure

Instruments

Particle filter failure/warning.

This illuminates when an error on Particle Filter (DPF) has been detected.

Amber

- ON - The particle filter is starting to become full. Increase the load to improve automatic regeneration or regenerate manually
- Blinking slow: Carry out manual regeneration as soon as possible.

Red

- Error. Blinking slow. The particle filter is overfull. Manual regeneration can only be carried out by service personnel
- Error. Blinking fast. The particle filter full. Regeneration is not possible. Replace the particle filter. Contact your Hyundai support.
- Amber strikethrough (ON) .This symbol indicates that it is not allowed to do either manual or automatic regeneration due to restrictions.
- Red strikethrough blinking fast. Indicates that the driver has switched off (temporarily) the automatic regeneration of the DPF.

Green ON - Automatic regeneration of the filter is active.

Amber ON - Manual regeneration of the filter is active.

Hydraulic system failure.

This illuminates when an error in hydraulic system has been detected.

An amber colour is a warning, a red colour is an error.

If this illuminates:

A. Stop the dump truck on a safe place.

B. Select neutral gear position and apply the parking brake.

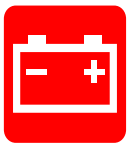
C. Check and note the error codes on the display.

D. Contact your Hyundai Dealer (a short explanation of the codes is listed under troubleshooting, chapter 5).

WARNING

Do not drive a dump truck with the hydraulic failure warning lamp illuminates.

Instruments



Battery charge warning.

Lights if the battery charging voltage is too low (less than 24 volts). Check alternator, multi-groove belt and regulator

Body status indicator.

Lights if body is lifted and it is only possible to run the dump truck to 10 km/h until the body is completely down.

Green colour means correct function.

An amber colour is a warning.

Body is slightly lifted

A red colour is an error.

Working and extra high beam lights indicator, amber

This illuminates when the working and extra high beam lights are activated.

Rear working lights indicator, amber

This illuminates when the rear working lights are activated.

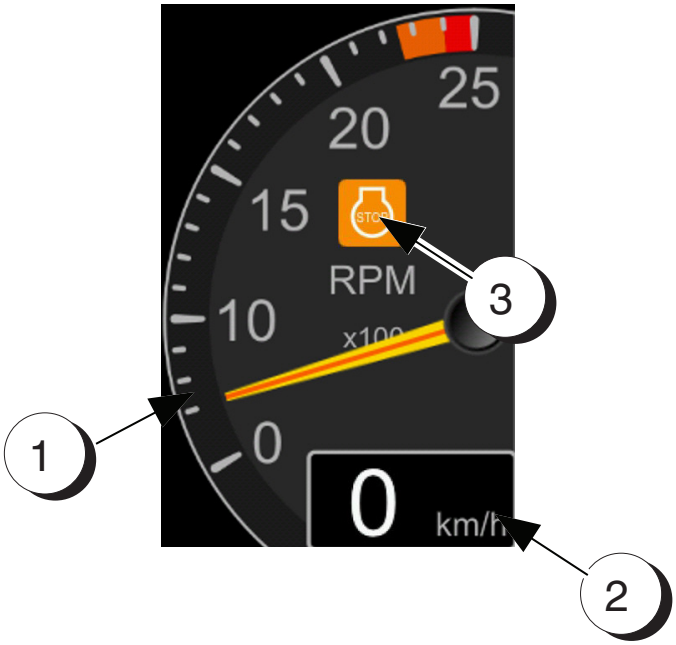
Optional work lights, amber

This illuminates when:

- 1- The optional lights are activated.
- 2- Both forward and optional work lights are on.

- Warning. Windscreen washer reservoir is low.

Instruments

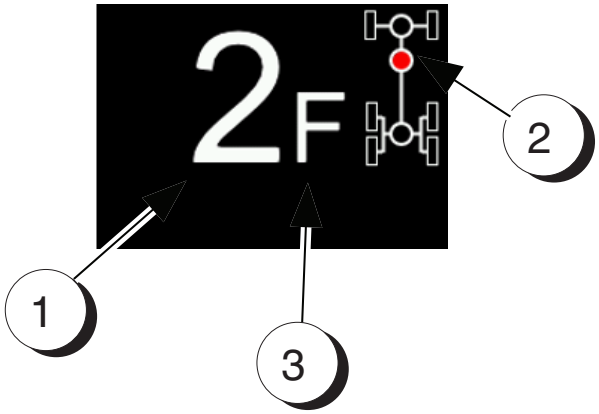


2. Speed Screen

1. Engine speed (rpm). Shown is idle around 720 rpm
2. Vehicle speed (km/h)
3. Engine status: This illuminates when the engine has just stopped automatically.

This counter indicates the engine rpm.
Normal revolution:

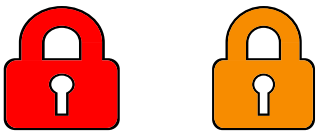
- Low idle: 720 rpm
- Max. economic area: 1500 - 1900 rpm
- High idle: 2280 rpm ± 20
- Max. allowed rpm: 2400 rpm



3. Transmission Status

Display shows gear ranges 1st - 8th and driving direction ¨F¨ for forward or 1st - 4th ¨R¨ for reverse and ¨N¨ for neutral.

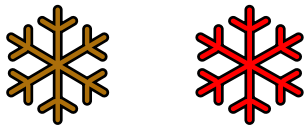
1. Current gear
2. Diff lock is engaged when red.
3. Direction.



Gear shift restriction.

Amber is Warning. Shown when gear shift is delayed because the clutches are too hot and need time to cool down.

Red is Error. Shown when it is not possible to engage gear because the clutches are too hot and need time to cool down.

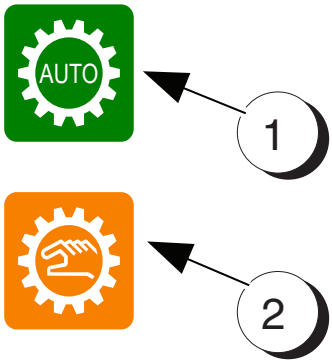


Shifting limitations at low temperature

Amber is Warning. Shown when gear shift is restricted because of low temperature of the gearbox.

Red is Error. Shown when it is not possible to engage gear because of low temperature of the gearbox.

Instruments



Status of the transmission

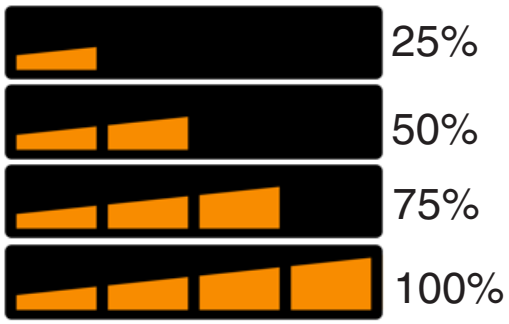
Automatic/Manual transmission status.

This shows which mode of transmission is active. AUTO (1) for automatic mode and (2) for manual mode of transmission.

Transmission lock-up indicator.

This illuminates when the automatic lock-up clutch for transmission is connected.

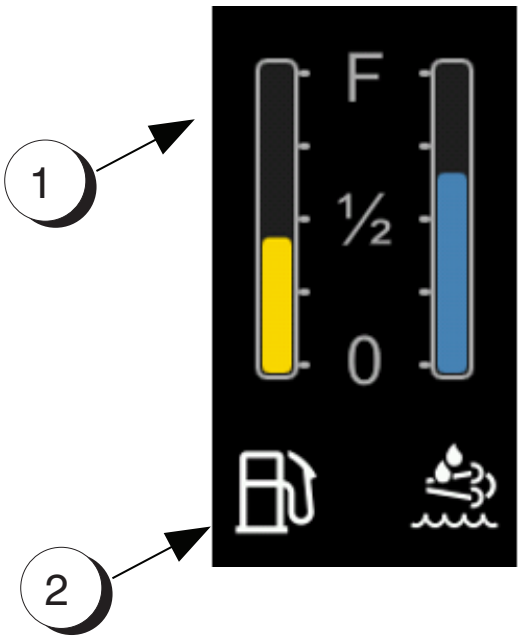
This illuminates when the retarder brake is active.



Retarder setting

Standard retarder setting is 50% and can be adjusted with a retarder lever from 100% to 25%.

Instruments



4. Fuel level

This indicates fuel tank level from empty to full (0% - 100%)
Tank capacity: HA30/HA30A, approx. 363 litres
Tank capacity: HA45/HA45A, approx. 490 litres

1. Fuel level in the Diesel tank

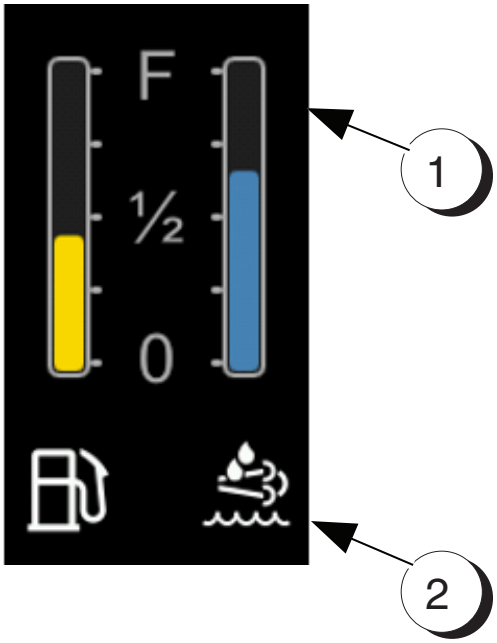
2. Status of the Fuel level

This illuminates if fuel level is below (5 %) and it is an attention.

This illuminates if the sensor failure is detected.

NOTE

Fill up with diesel when necessary and at the end of the shift.



Urea (AdBlue®) level

Only for dump trucks with Tier4 / Stage V engines.

Tank capacity: HA30/HA30A, approx. 70 litres

Tank capacity: HA45/HA45A, approx. 70 litres

This indicates urea tank level from empty to full. (0% - 100%)

1. Level of the Diesel Exhaust Fluid (AdBlue).

2. Status of the DEF level

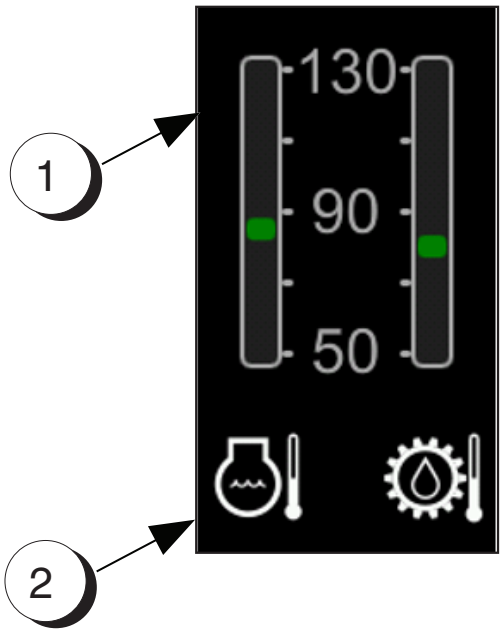
Urea level is between 11-20 %

Blinking slow - Urea level is between 1-10 %

Blinking fast - Urea level is 0 %

Error

Instruments



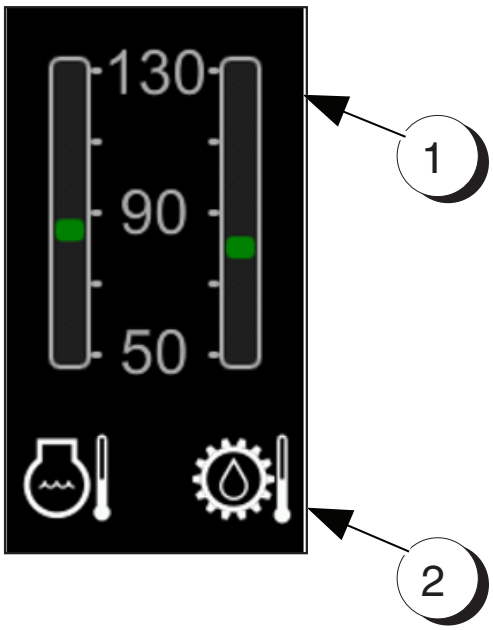
5. Engine coolant temperature

This indicates the temperature of the engine coolant.

1. Engine coolant temperature in °C.
2. Status of the coolant temperature.

This illuminates if temperature is between (97°C - 103°C) and it is an attention.

This illuminates if temperature is over (103°C) and it is a warning.



Transmission oil temperature

This indicates the temperature of the oil in transmission.

1. Transmission oil temperature in °C.
2. Status of the Transmission temperature.

This illuminates if temperature is between.

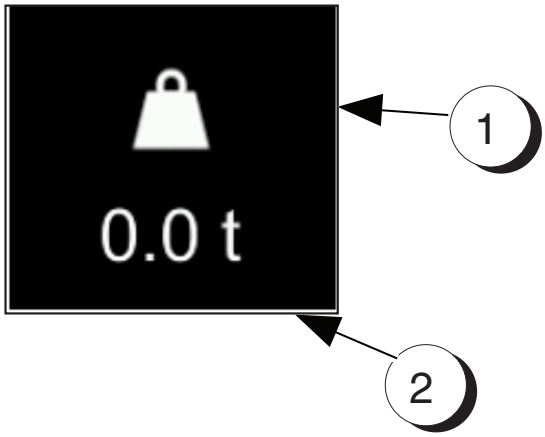
- (115°C - 125°C) and it is an attention.

This illuminates if temperature is over.

- (125°C) and it is a warning.

DANGER

Never drive with to high transmission oil temperature. It will cause a danger situation and result serious injury or death.



6. Weighing system

1. Status of the weighing system
2. Measured load in metric tons

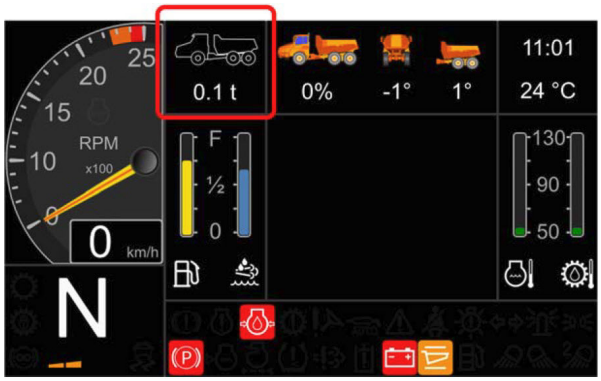
This indicates the weight of load on body in tons (t).

This illuminates if value of loads was reached:

- HA30/HA30A - 27,1 t
- HA45/HA45A - 39 t

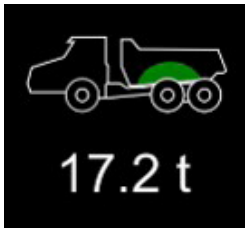
This illuminates if value of loads was reached:

- HA30/HA30A - 28,2 t
- HA45/HA45A - 40,1 t



6. Overload Protection System (OPS) only HA45/HA45A.

This indicates the weight of load on body in tons on the main screen. This is connected to status lights on the back side of cab.



Green

This illuminates if value of loads is in normal range:

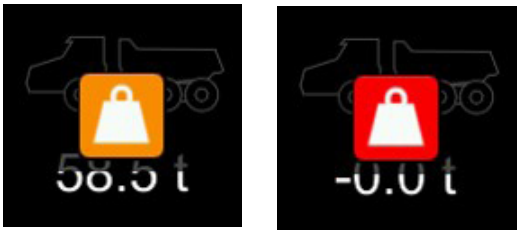
Amber

This illuminates if value of loads is in at limitation point:

Red

This illuminates if body is overloaded

1. Light is ON when value of loads is over then 39 metric ton
2. Blinking when value of loads is over then 42 metric ton (critical situation).

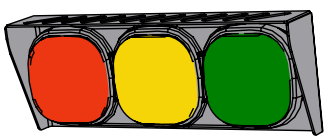


Amber

- Sensor error or calibration fault. Load weight is not available

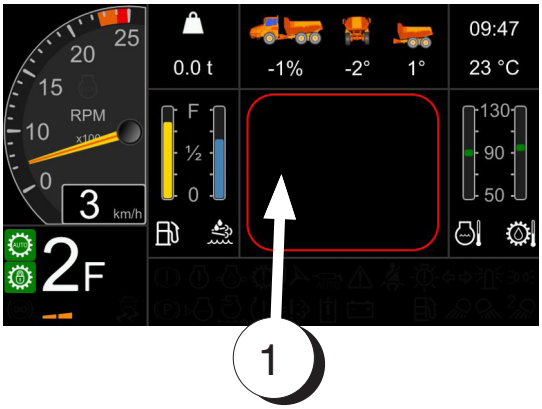
Red

Sensor signal missing (e.g. cable damage). Load weight is not available.



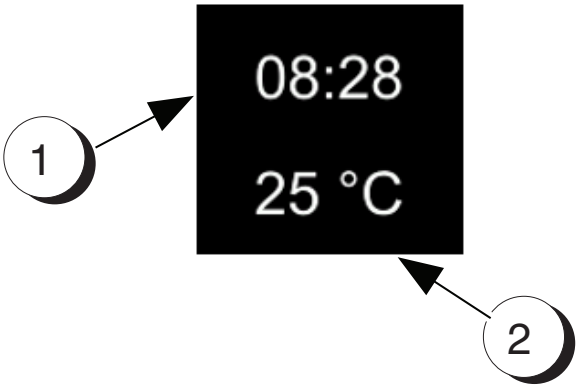
Status lights are located on the back side of cab.

Instruments



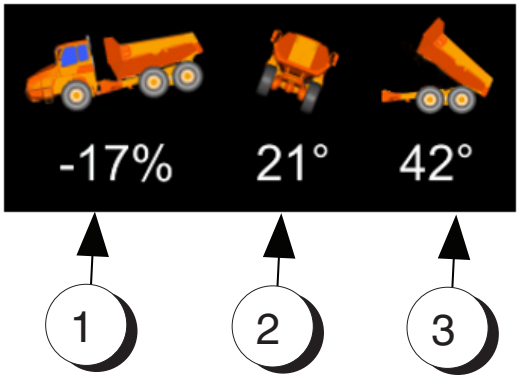
7. Information Screen

1. Here will be shown various information about the status of the truck, error code and sub menu.



8. Time/ Temperature

1. Time in 24 hours.
2. Outside temperature in degrees Celsius (°C).

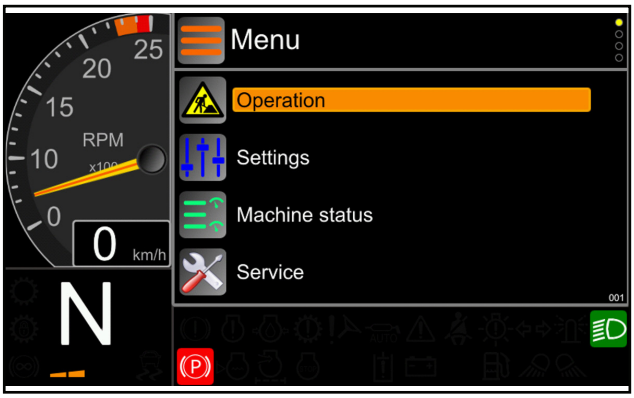


9. Vehicle angle.

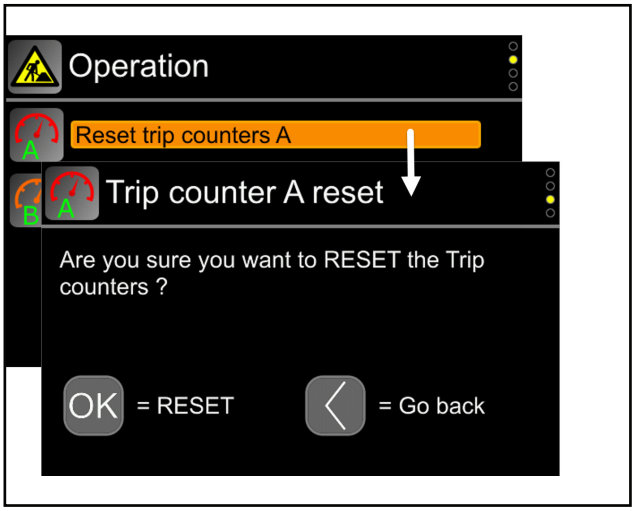
This screen will shown the position of the truck.

1. The longitudinal angle in percentage (%).
2. The sideways angle in degrees(°).
3. The body angle in degrees (°)

Main display

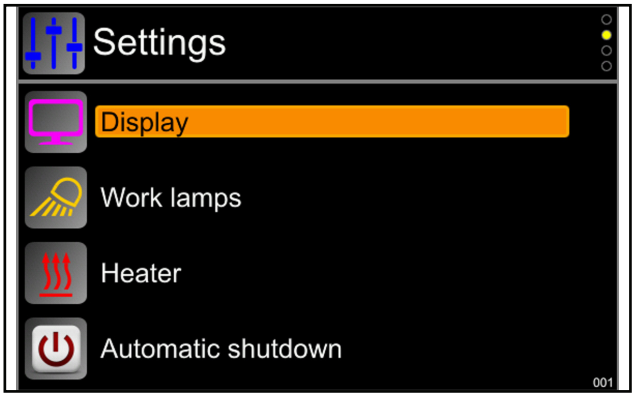


Main menu
The main menu screen is shown after pressing the Menu button. This shows a menu that can be used to view the status of the truck and to modify a number of settings.



Operation
When the cursor is on "Operation", press the ">" or OK button. The reset trip counters A or B will appear.

The operator can now reset the Trip counter A or B by pressing the "UP" or "DOWN" buttons and after execute the requested action.



Settings
When the cursor is on "Settings", press the ">" or OK button. The Settings submenu will appear.

When the selected menu item is highlighted, press the ">" or OK button to enter the next submenu.

Menu > Settings > Display

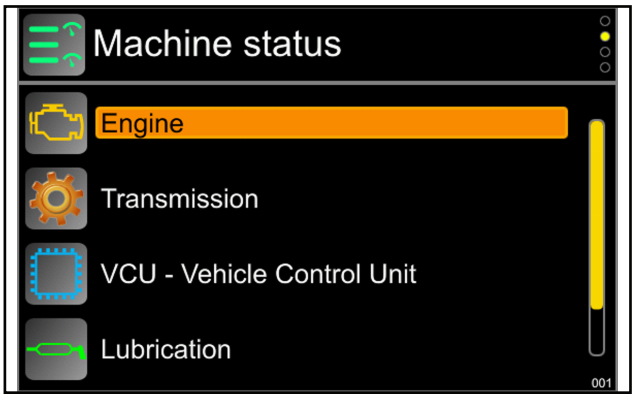
- Camera screen
  - » Automatic or manual view of the rear camera
  - » Small or widescreen view
  - » Left or right view of the camera picture
- Language settings
- Unit settings
- Clock settings
  - » DST (Daylight savings time). activation mode

Menu > Settings > Work lamp

Menu > Settings >Heater

Menu > Settings > Automatic shutdown

Main display

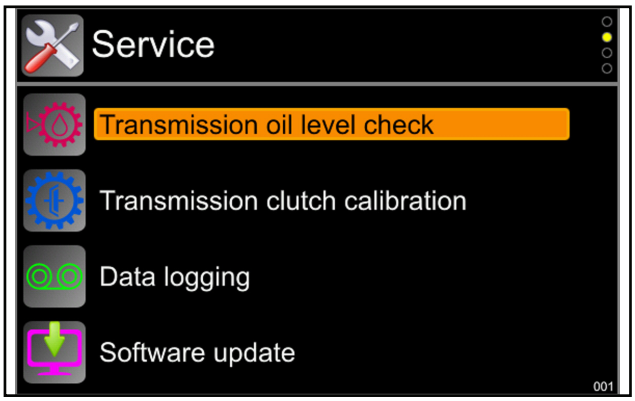


Machine status
When the cursor is on "Machine status", press the ">" or OK button. The Settings submenu will appear.

When the selected menu item is highlighted, press the ">" or OK button to enter the next submenu.
Pressing Back button will navigate to the Main Menu screen

Menu > Settings > Machine status

- Diagnostics Engine
- Diagnostics Transmission
- Diagnostics VCU
- Diagnostics Lubrication
  - » Possibility to run an extra lubrication cycle.
- Diagnostics TMS system



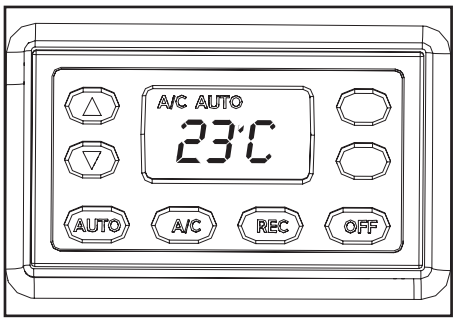
Service
When the cursor is on "Service", press the ">" or OK button. The Settings submenu will appear.

When the selected menu item is highlighted, press the ">" or OK button to enter the next submenu.
Pressing Back button will navigate to the Main Menu screen

Menu > Settings > Service

- Transmission oil level check
- Transmission clutch calibration
- Data logging
- Software update

Cab ventilation



Ventilation control panel

The air conditioning system allows high level of security during driving together with a total comfort and a constant thermo-balance is assured in the cab independently from the external environment that changes continuously.

To choose your ideal climate during any season, it is sufficient to select the desired temperature in cab.

We suggest to select temperatures between 20-23°C.

With this simple operation the microprocessor will maintain always the desired temperature in the cab.

In any condition the air conditioning system will control the temperature, the air quantity towards in-vehicle in order to avoid continuous interventions with the manual controls, as in the case of manually operated air conditioners.

- Keep the door and window shut.
- Always open the nozzles when operating the dump truck.
- Direct the air flow so that it does not blow straight on uncovered skin.
- Always turn on the fan when operating the dump truck and adjust fan speed until it feels comfortable in the cab.

AUTO

Pressing AUTO all the functions are automatically controlled. The AUTO symbol will appear on the display.

According to the cab setting and external temperatures, the controller will monitor the connected devices (water valve, compressor and blower) in order to achieve and maintain the required cab temperature.

A/C

Pushing A/C engages / disengages the compressor clutch.

When the symbol A/C appears on the display, then the cooling system will be in operation.

Conversely when the ECON symbol is lit, the compressor is turned off.

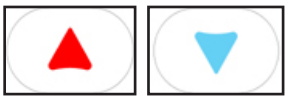
The automatic temperature controller will further monitor the system to hold the cab temperature in line with the set temperature, by making use of the fresh air and the heater capacity.

If cooling is required, press A/C or AUTO.

NOTE

When the outside temperature is below +3°C, the air conditioning system is disengaged to protect the compressor.

Cab ventilation



Temperature Up/down

The screen displays the cab temperature setting, the desired temperature in the cab.

Pressing ▲ will increase the displayed value.
Each touch on ▲ increases the value on the display by 1°C.

The maximum value to be set is 28°C. Beyond 28°C, the display shows “HI” (High). In this case the control will run for the maximum cab temperature the HVAC system can deliver under the existing conditions.

Selecting “HI” = Fastest Way to reach a higher cab temperature

Pressing ▼ will lower the display value (= desired cab temperature). Each touch on ▼ lowers the value on the display by 1°C.

The minimum value to be set is 18°C. Below 18°C the display shows “LO” (Low) which means the control system goes for the lowest cab temperature that the HVAC can reach under the existing conditions.

Selecting “LO” = Fastest Way to reach a lower cab temperature

Fan up/down

Pushing one of the ventilation buttons will interrupt the Auto Blower Speed Control and bring it in manual use - the Controller continues to control for the set Temperature without airflow control. AUTO symbol is turned off.

Return to automatic control by pushing AUTO.

Pressing increases the fan speed in steps to the maximum value.

Pressing decreases the fan speed in steps to zero.

Pressing again when blower display is at zero stops the controller and the “OFF” symbol appears on the display - all functions disabled.

Recirculation or fresh air mode.

When pushing , the actuator control device changes the state of the air intake.

When the symbol appears on the screen, the HVAC system operates with recirculation air from the cab only.

When the symbol does not show up on the screen, the HVAC system operates with 80% recirculation and 20% fresh air.

By manually changing the recirculation status, the system continues controlling the cab temperature, except when “AUTO” symbol is turned off.

Cab ventilation

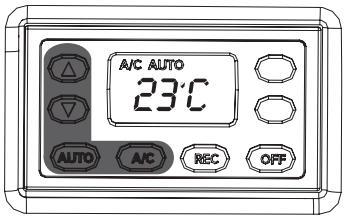
Outside temperature display.

When pressing EXT for less of 2 seconds, the external temperature value will be shown on display for about 6 seconds.

You will know, when the EXT and symbols are lit, that the external temperature value is showing up on the display.

When the external temperature is close to 0°C, the symbol is lit to indicate the possibility of ice forming.

When pressing EXT for 3 seconds at least, the internal temperature value will be shown on display for about 6 seconds.



Demist mode.

Press the A/C button and then AUTO and set the temperature 5°C above the desired temperature.

Air Conditioning and heating will be simultaneously on and the blower goes to maximum flow in order to defog the windscreen.

Regulation control.

Prior to the inspection:

- Check that the air inlets are not blocked by leaves.
- Check that the cab air louvers are opened to avoid evaporator freeze.
- Check the compressor drive belt tension:
  - A too high tension: early wearing of the compressor bearings
  - A too low tension: early wearing of the belt

NOTE

- **The air conditioning system works only if the vehicle is running.**
- **While using the air conditioning system, keep all doors and windows closed.**

AIR CONDITIONING CONTROL

Commands must be set as follows:
- Ventilation setting at maximum
- Temperature setting at minimum
- A/C symbol ON

Place the thermometer in one of the air louvers, and check the cool air outlet temperature.

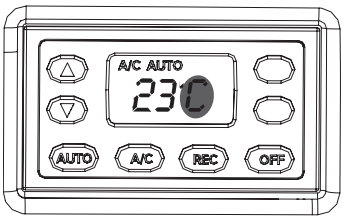
See table with the temperatures.

Outside temperature	Temperature at louver exit	Time needed to reach temperature
+20°C	+4°C	2 min
+25°C	+4°C	3,5 min
+30°C	+4°C	5 min

NOTE

Note: The temperatures were recorded with the vehicle staying in the workshop (not exposed to the direct sunlight) and with around 1100 rpm engine speed.

Cab ventilation

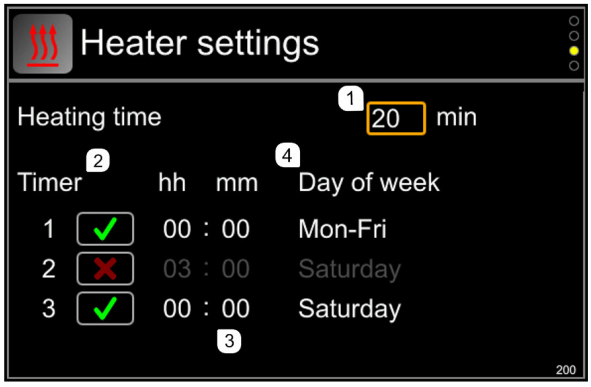


Ventilation control panel Celsius / Fahrenheit

To switch between Celsius / Fahrenheit:

- Switch off ignition
- Press both RED+BLUE button
- Switch on ignition
- Panel will show either ‘C’ (Celsius) or ‘F’ (Fahrenheit)
- Release both buttons after 2 seconds
- Now the panel will have switched either from Celsius to Fahrenheit or Fahrenheit to Celsius.

Heater (Option)



External coolant heater circulate the machines coolant over a heat exchanger and then pumps it back through the engine and HVAC system. The result is a pre-heated engine and interior.

The heater setting screen will appear when the operator navigate to :

Menu > Settings > Heater..

Use the screen buttons to sett up the wishes values of heater.

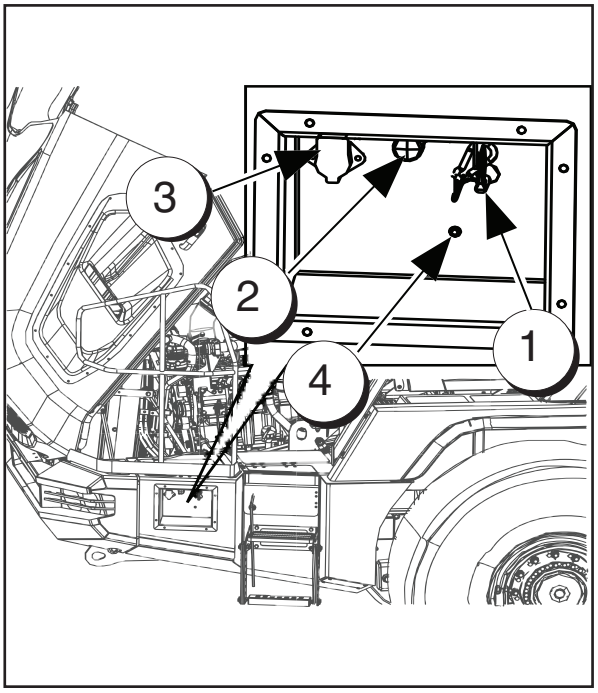
1. Select the maximum burning time for the heater.
2. Select the timer program.
3. Configure the start time.
4. Configure the days on which the heater start.

Manual activation.

After activation the led light will light up on the button if the heater is installed and the ignition is ON. The heater will run until the operator turn OFF the ignition.

When the ignition is OFF and button is activated then the heater will run maximum for the duration that is set in the display menu page for the heating time.

Other cab equipment



Main Switches Panel

1. Main switch on battery.

To disconnect the battery turn the switch to OFF position

To connect the battery turn the switch to ON position.

- **Never turn off battery main switch when engine is running.**
- **Never turn off battery main switch when ignition is on.**
- **Leave battery main switch in ON position as long the lamp (4) is light on or flashing. When the lamp(4) is off the main switch can safely be turned to OFF position.**

WARNING

This instruction need to be followed otherwise this will cause damage of the machine components. Specifically turning battery main switch OFF when engine is running is very destructive.

2. Emergency stop of engine.

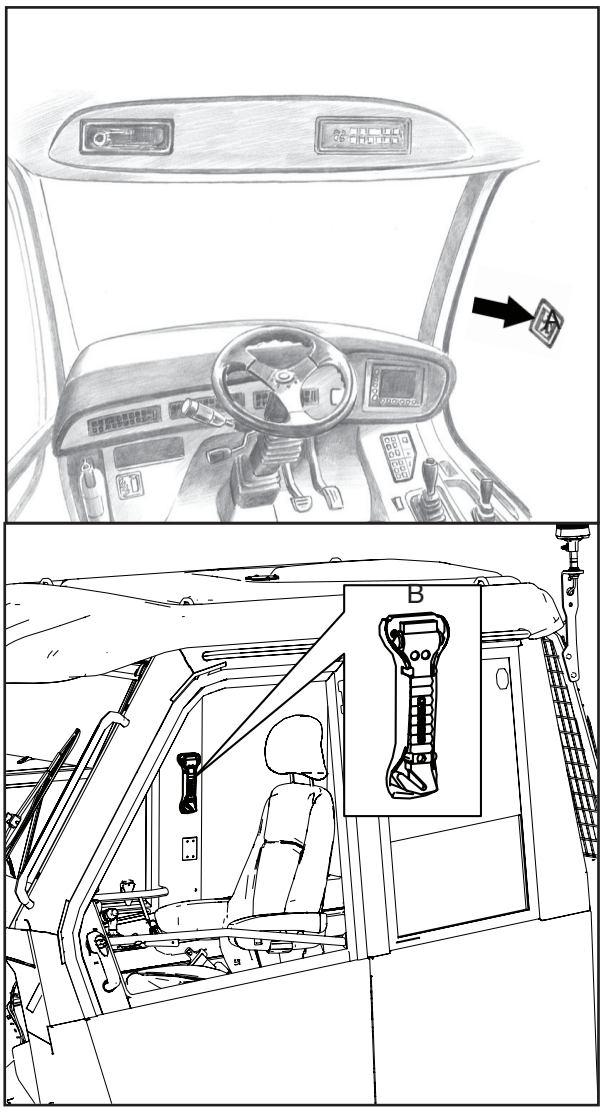
In case of danger situation push the button to emergency stop the engine.

To unlock the switch turn it clockwise.

3. External power supply output.

External equipment (pump, lights, etc.) can obtain power from this connection. Voltage is 24V. Maximum load is 16A.

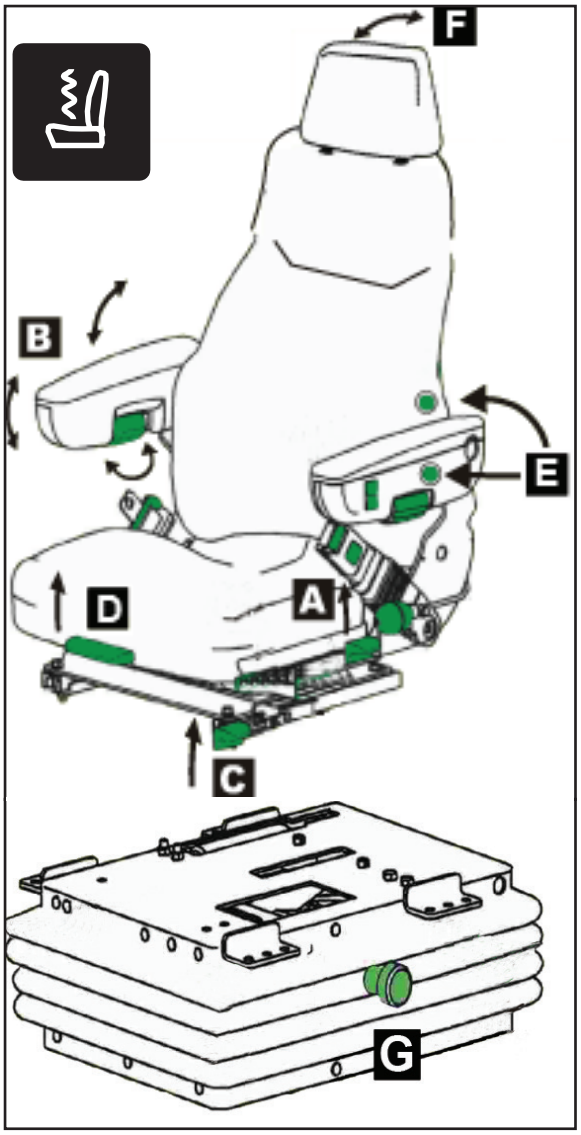
Other cab equipment



Emergency exit

- This dump truck is fitted with two emergency exits.
- Left door and front side window on right hand side (A).
- If the door is blocked, you can get out through the front side window.
- Remove hammer (B) from storage location and break front side window.

Other cab equipment



Driver's seat

The seat is air-sprung with a separate air compressor and adjustable in height, tilt, back support and lengthwise position. Adjust the seat to the desired position. Always use the safety belt when operating the dump truck.

Seat adjustment.

A. Backrest angle adjustment

B. Armrest angle adjustment
Can be lifted for easy access, and the inclination of the arm rests are adjustable for comfortable operating position.

C. Fore and aft slide adjustment
Lift lever up and slide the seat to a suitable position - release lever.

D. Thigh support adjustment (3 positions)

E. Seat heater
The seat can be heated by pushing the switch.

F. Headrest fore and aft adjustment

G. Adjustable damper control

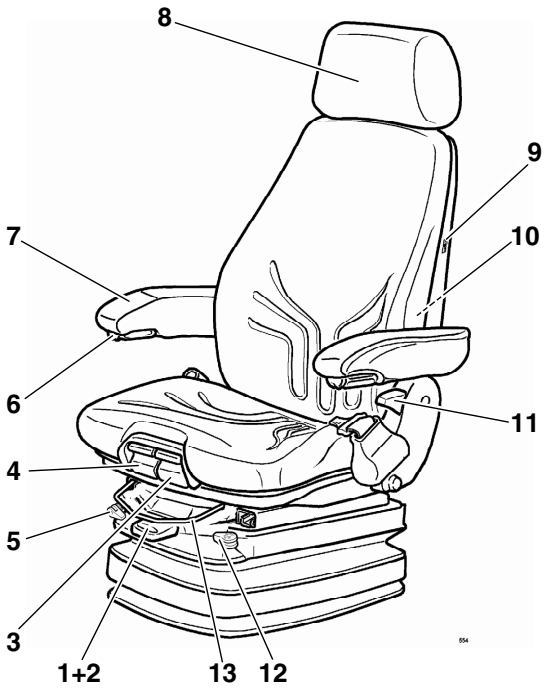
WARNING

For one seated occupant. Do not adjust seat when vehicle is in operation. Keep clear of all moving parts. Installation and maintenance should be carried out by authorised and competent personnel.

NOTE

The driver seat with heating is an option.
The seat can be heated by pushing the switch. Refer to button on keypad page 3-11.

Other cab equipment



High-comfort seat (Option)

The seat is air-sprung with a separate air compressor and adjustable height, pan angle, back support and lengthwise position. Adjust the seat to the desired position and according to the operators weight. Always use the safety belt when operating the dump truck.

Seat adjustment.

1. Weight adjustment
2. Height adjustment
3. Seat pan angle adjustment
4. Seat depth adjustment
5. Absorber
6. Armrest adjustment
7. Armrests
8. Headrest
9. Seat heater
10. Lumbar support
11. Backrest adjustment
12. Fore/aft isolator
13. Fore/aft adjustment

WARNING

For one seated occupant. Do not adjust seat when vehicle is in operation. Keep clear of all moving parts. Installation and maintenance should be carried out by authorised and competent personnel.

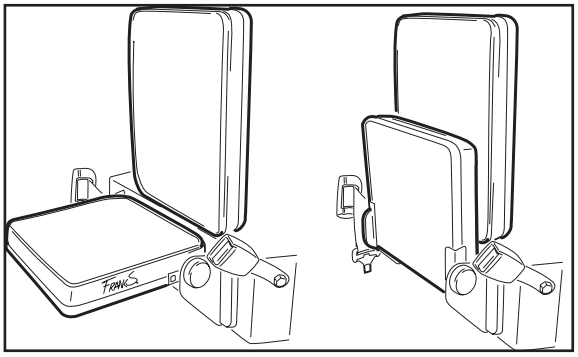
NOTE

Driver's seats that have been adjusted incorrectly have a smaller moving area. In order to prevent any personal injury, the seat must be adjusted for the driver's weight before use and before every change of driver

NOTE

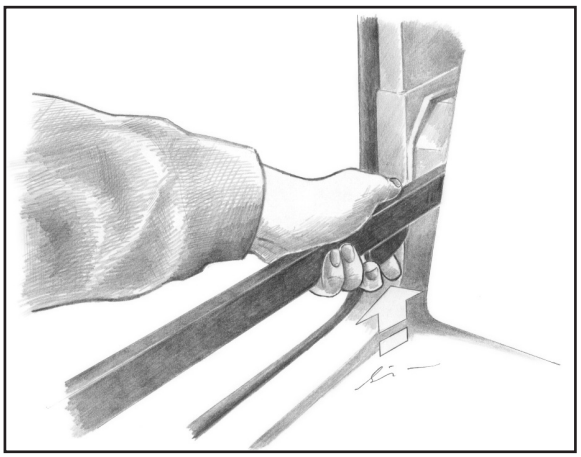
The driver seat with heating is an option.
The seat can be heated by pushing the switch. Refer to button on keypad page 3-11.

Other cab equipment



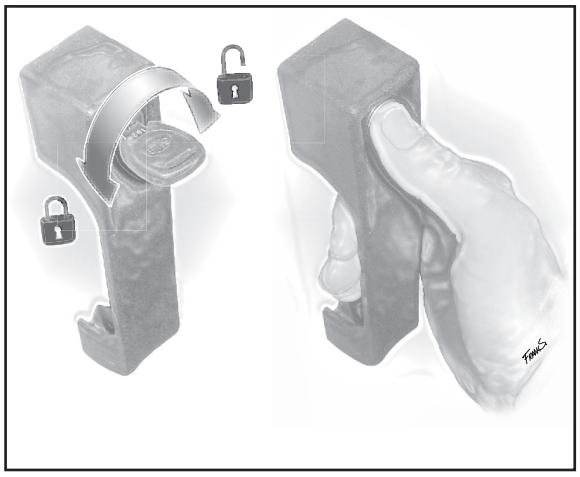
Instructor seat

There is one seat for instructor, on the left side of the driver seat. The seat cushion are spring-loaded and will return to upright position when released. The seat is fitted with safety belt which is recommended for use during driving, both for safety and comfort.



Internal door opener

- Push up handle to open the door.

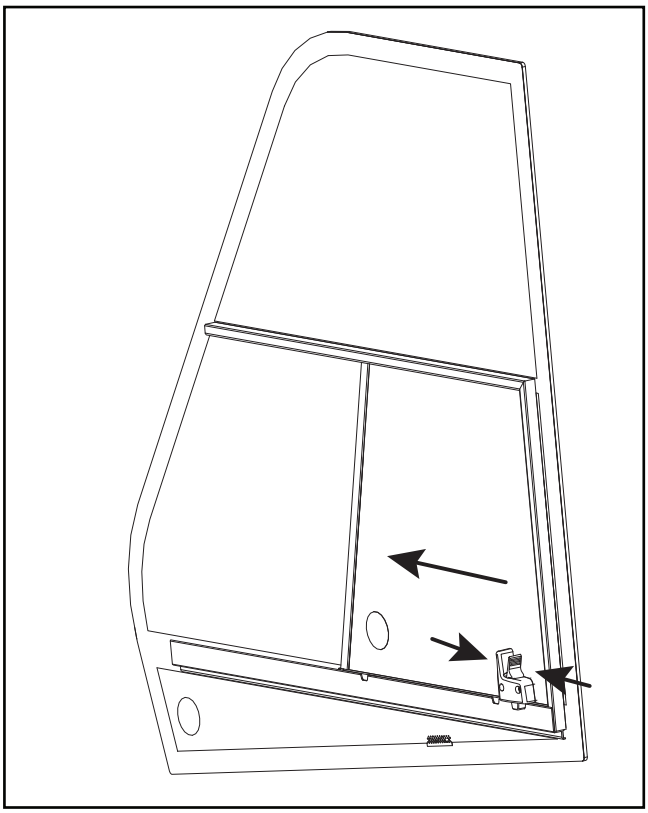


External door opener/lock

The door is fitted with lockable door opener.

- Depress the button on the handle grip to open the door.
- The door can be locked from outside by using the door key.

Other cab equipment

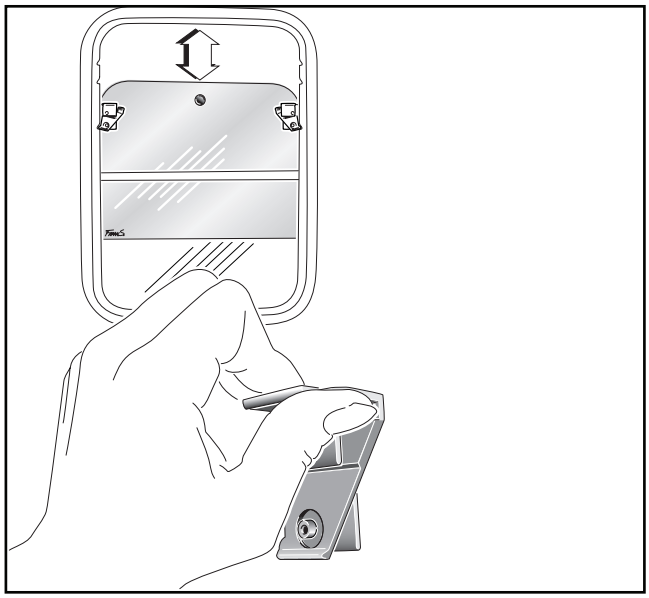


Side window, right front

- To open the window:
  Press both lock arms and push forward position.
- To close the window:
  Press both lock arms again and pull the window to the close position.

NOTE

Be aware not to push and pull too hard because this can damage the locking mechanism.



Side window, left rear

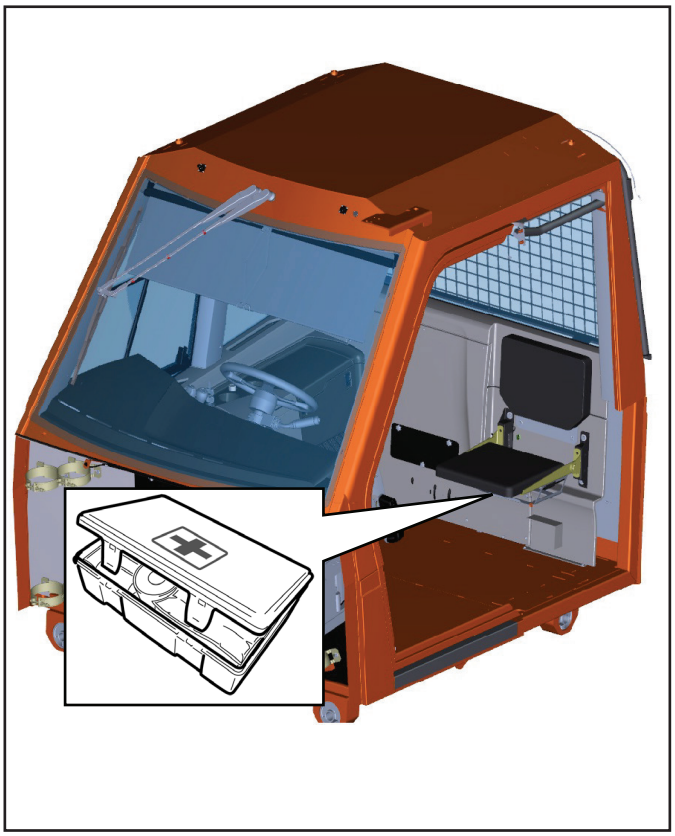
To open the window:

- Press both lock arms and lower the window to a suitable position.
- To close the window:
  Push window completely upward and check that the window locks are in the locked position.

NOTE

Be aware not to push and pull too hard because this can damage the locking mechanism.

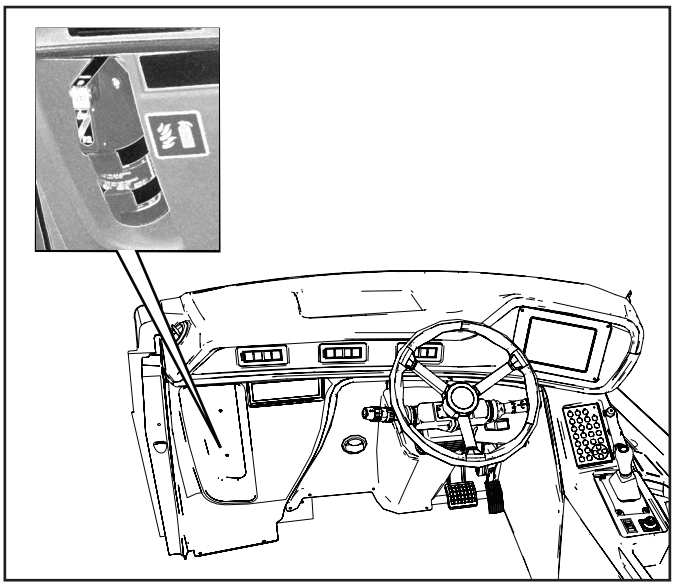
Other cab equipment



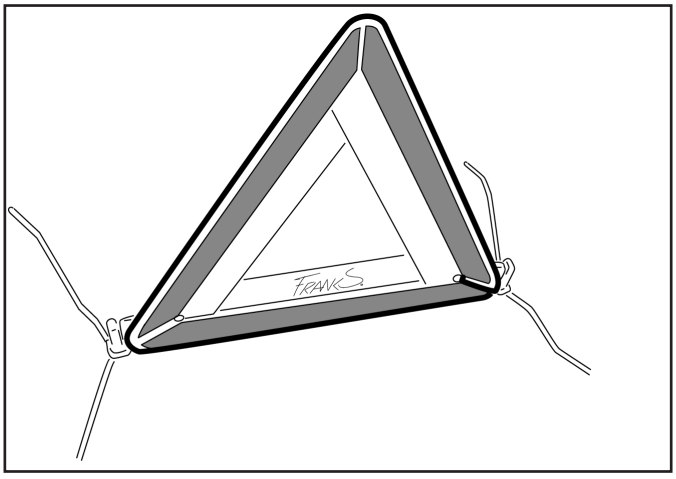
Safety equipment

Ensure the safety equipment is present. Always keep it in its storage place and make sure that it is in order:

- First aid kit.

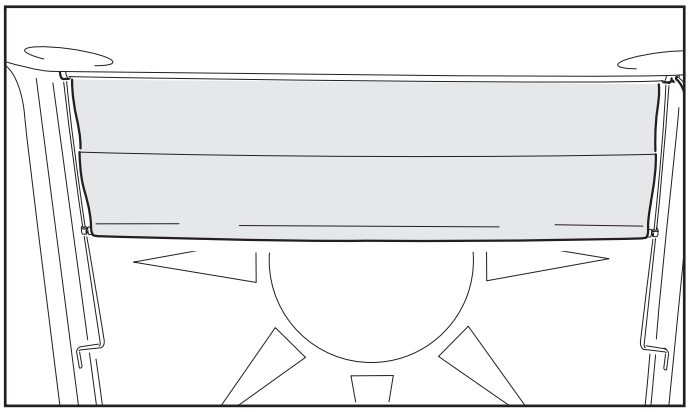


- Fire extinguisher, 2 kg, ABE class II powder. (Distributor / Dealer fitted)

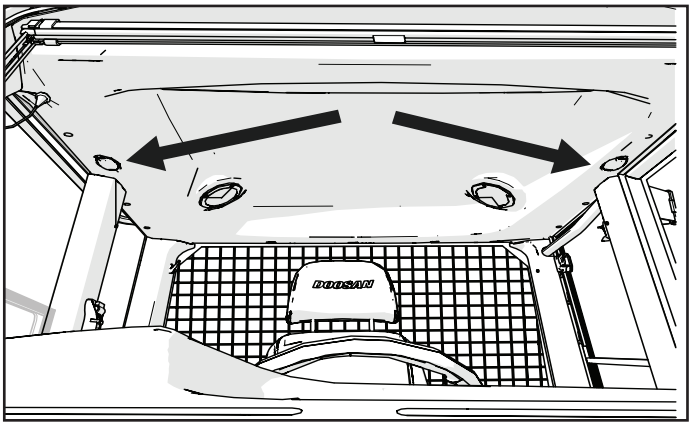


- Warning triangle (Optional equipment)

Other cab equipment



Retractable roller sun blind on front windscreen



Cab light

The cab light serves an extra function when error is detected. It will illuminate in red colour and flashes.

Radio

The radio has following security features:

- Security warning sticker and identification number.
- If any of the security features are missing, contact your local Hyundai Dealer.

Radio will be kept on after ignition is off. Radio will be turned off automatically after 30 minutes or when the door is opened.

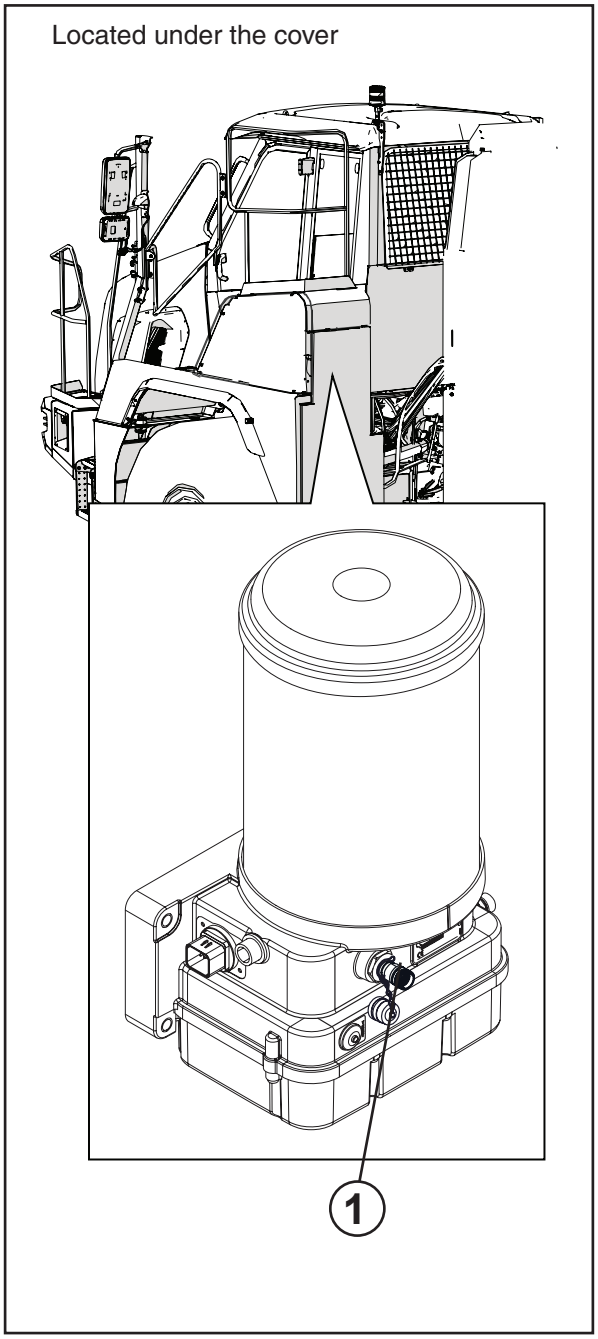
You can manually turn off the radio with the override button on keypad.

Operating Manual for the Radio.

For operation of the radio, see separate Operating Manual.

If the Operating Manual for the radio is missing, contact your local Hyundai Dealer.

Other cab equipment



Groeneveld pump test

Introduction.

To test the greasing system two different cycle tests can be performed with the test push-button on the pump (1) or via the display (single test only)

1. The single cycle test (through line-A or -B).
2. The multiple cycle test (continuous cycles through line-A and -B).

A cycle test can only be performed if the greasing system is performing the pressure retaining phase, the pressure decrease phase or the pause phase.

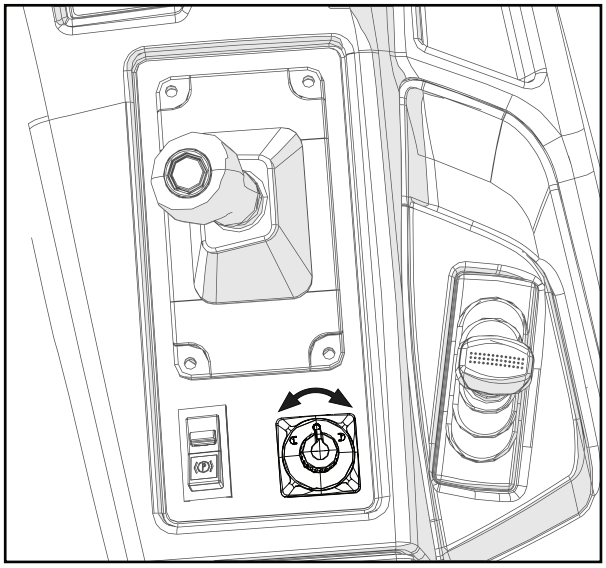
NOTE

When the system is already performing a pumping phase, the system will not respond when the test push-button is pushed.

WARNING

Only use the cycle test if necessary. Every time a cycles test is performed, grease is added to the grease points. This is at the expense of the grease volume and can lead to excessive greasing of the grease points.

Other cab equipment



Electrical adjustment on mirrors (Option)

The power mirror switch has three positions: left, off, and right. When the switch is in the centre position, neither mirror will be adjusted if the button is pressed. This is to ensure that the mirrors don't move if the directional control button is accidentally hit.

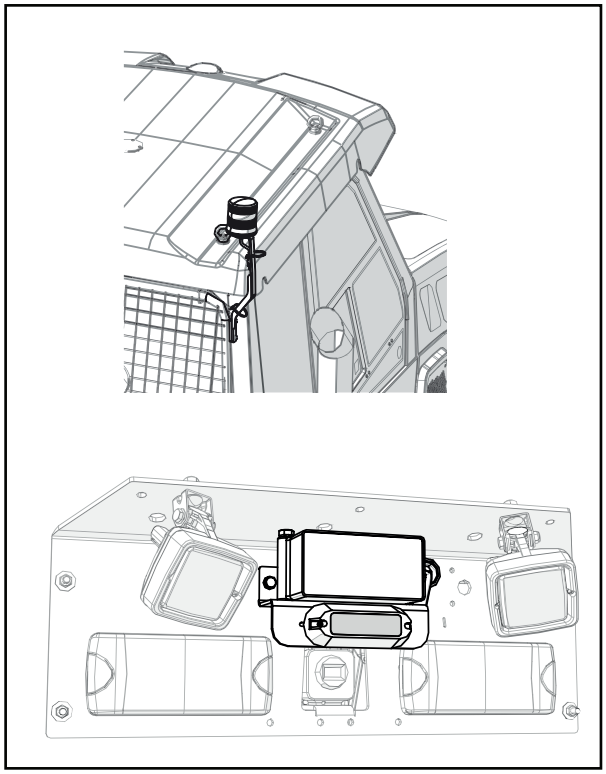
The directional control button has four directions that the mirror motor can move: up, down, right, and left. If the switch is moved to either the left or right side, that side mirror motor circuit is powered at the switch. When you press the directional control button on the switch, the mirror motor inside the mirror housing will pivot the mirror glass to the selected direction. When you release the button, the mirror stops moving.

The mirror motor has a limited amount of travel that is allowed to prevent damage to the mirror glass. Once the travel limit is reached, the motor will continue to click and bind until the directional control button is released. Continuing to press the button when at its limit will cause the mirror motor to burn out eventually, and it will cease to operate until it is replaced.

Ashtray and electrical adjustment of mirror can't be combined.

WARNING

Making sure your mirrors are adjusted for proper rear and side-view visibility is extremely important to safely operating. You need to be able to see the traffic beside and behind you to make informed decisions about your driving. Check your mirror adjustment every time you start drive dumper to make sure they are positioned properly for you.



Safety packages (Option)

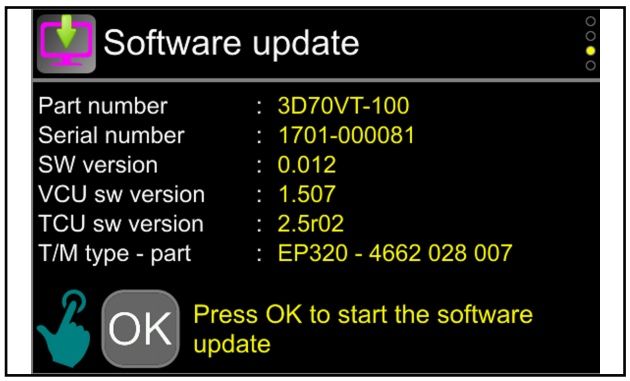
- Seat belt indicator

- The green flashing light on roof activates when the seat belt is fastened.

- On the rear lights plate.

- White Noise Backup alarm and blue LED Flasher activates when the gear selector is moved to "R" reverse position .

Software update



Display software update

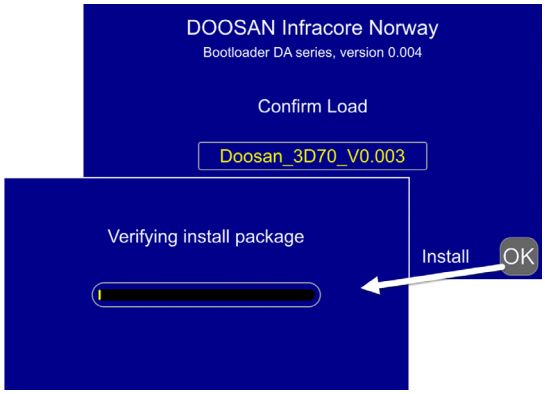
Press the Menu button.

Scroll with the arrow keys to highlight "Service".Press ">" or OK button.

Scroll with the arrow keys to highlight "software update", press the ">" or OK button. The software update screen will appear.
Menu > Service > Software update

Updating the existing application is only possible from the bootloader , press OK to enter bootloader.

- Insert usb stick containing file(s) with extension .din3D70.
  - » The up and down arrows (1) on the keypad can be used to scroll through these files.
  - » To cancel the update and return to the first view press Exit (2).



- Select the listed file by pressing the right arrow (3) on the keypad.
- Confirm the selected file by pressing the OK button.
  - » After confirmation, the bootloader will check the file.
- After verification, the bootloader will update the application.

- The bootloader has finished successfully. The display will reset and start the updated application.

- There was an error during the update. The display will reset and try to start the application. If this fails the bootloader will be shown again.
  - » If this will occur several times, please contact your Hyundai support.

Running-in period

1. Running-in operation

Each new dump truck requires careful operation the first 100 hours (refer to hour metre) to break in (run-in) all moving parts.

Follow instructions below during this period:

1. Start engine as described in "Operating Instructions" (chapter 5). Run engine at low idle speed until pressure in the various circuits is normal (i.e. brake system warning light switched off, also seepage 3-11).

2. Warm up by operating the dump truck at low load and reduced rpm until all gauges show normal range. Extend the warming up period in the winter (cold season).

3. During operation do not drive with constant high engine rpm and load, avoid heavy-duty work and high speed travelling.

4. Drive carefully and avoid sudden starts and stops, abrupt acceleration and turns.

5. Carefully perform the running-in services, see next page.

Take special care for the following points:

- A warming up period until display screen shows normal range is important - also after the dump truck has been run in.
- Operating up to the limit of the dump truck's capacity during the running-in period, may prematurely reduce the performance potential.

2. Running-in services

Running-in service is to be carried out after operating the dump truck the first 8, 100 and 500 hours.
These services are most important for running in a new dump truck.
This is the owner's responsibility.

2.1 First 8 hours:

1. Wheel nuts: Check tightening of nuts
   • Torque setting: 650 Nm. Spanner: 32 mm
2. Lubricating: Grease all lubricating points
3. Battery
4. Multi-groove belt: Checking multi-groove belt condition, see 1000 hours service item 2.4.
5. Carry on with the normal 8 hours service, listed in chapter 7 maintenance.
   Since these points are important for the dump truck to work satisfactorily right from the start they are also listed below.

All items below refer to 8 hours/daily service in chapter 7.

1. General
   • Walk around check, before start item 1.1.
   • Check driver's seat, before start item 1.2.
2. Engine
   • General condition check - look for leaks and repair as necessary item 2.1.
   • Drain the water separating fuel filter 6* item 2.2.
   • Check oil level, before start 1* item 2.3.
   • Check coolant level, before start 5* item 2.4.
   Coolant should be filled up when the engine is stopped after first stop.
   It is recommended to fill up with the same mixture as filled from the producer -
   40% glycol / 60% demineralized water, see also 2000 hours service, item 1.3 check the coolant.
   • Check fuel and urea tank (if fitted) level, before start 12*, 13* item 2.5. and 2.7
   • Function check of the centrifugal cleaner, after operation 2* item 2.6.
3. Transmission
   • Check oil level, before operation 20* item 3.1.
4. Hydraulic system
   • Check oil level 40*, coolng brake tank 34* item 4.1.
5. Brake system
   • Parking brake, check braking (holding) capacity, before operation item 5.1.
   • Service brake, check braking (holding) capacity, before operation item 5.2.
   • Service brake, check function, before operation item 5.3.
   • Accumulators, check the oil pressure, before operation item 5.4.
6. Steering
   • Check function, before operation item 6.1.
7. Retarder brake (Main brake)
   • Check function, before operation item 7.1.

2.2 First 100 hours:

1. Replace transmission oil filter 21* item 1.1.
2. Run the Transmission Clutch Calibration (AEB) item 1.2.
3. Replace hydraulic oil filter 42* item 2.1.
4. Rear differential change oil 31* item 3.1.
5. Tandem housing, rear planetary drive (hubs) change oil 32*;33* item 3.2.
6. Planetary drive front (hubs) change oil 33* item 3.3.
7. Multi-groove belt: Checking multi-groove belt condition, see 1000 hours service item 2.4.
8. Expander bolts: Checking torque setting on expander bolts on tip- and steering cylinders, see 500 hours service item 5.1.
9. Re-torque window wiper spindle nuts.
   • Torque setting: 25 Nm (M8)

* Numbers refers to position on lubrication schedule, chapter 6

2.3 First 500 hours:

1. Change oil in:

• Front differential	30*	See initial 500 hours service	item 1.1.
• Brake cooling tank	34*	See initial 500 hours service	item 3.1.
•Brake cooling filter	35*	See initial 500 hours service	item 3.1.

2. Check/adjust:

• Valve clearance	See initial 500 hours service	item 9.1.
• Adjusting the unit injector	See initial 500 hours service	item 9.2.
• Hydraulic oil pressure	Contact your local Hyundai Dealer	

3. Carry on with the normal 500 hours service, listed in chapter 7 maintenance:

• Change oil, engine	item 1.1.
• Check Air filter outer element , engine	item 1.5.
• Clean centrifugal cleaner	item 1.2.
• Replace oil filter	item 1.3.
• External cleaning of the radiator	item 1.4.
• Check oil levels	item 2.1.
• Check brake lining thickness	item 3.1.
• Check wheel nuts torque	item 4.1.
• Check expander bolts, tip- and steering cyl.	item 5.1.
• Air conditioner system, test operation	item 6.1.
• Check cab ventilation filter element	item 6.2.
• Check the automatic central lubrication system	item 7.1.

See chapter 7 for procedures and chapter 6 for fluid specifications.

* Numbers in brackets refer to position on lubrication schedule, chapter 6

Operating Instructions

Precautions on work sites

There are many different types of work sites, some of them could be:

- Dusty areas
- Rocky areas
- Wet, swampy or muddy areas
- Seashore or salty areas
- Altitude above 1000 m
- Steep driving
- Extremely hot areas
- Underground areas (mines)
- Transit, long distance drive-away (more than 3 km)
- Extremely cold areas

Rules and guidelines are listed below to increase the lifetime of the dump truck. Pay attention to these guidelines and let the safety always get first priority.

General

On work sites where extra heavy-duty operations are occurring, reduce the maintenance intervals and carry out greasing more frequently.

Clean the machine regularly. Keep grease fittings, breathers and oil level gauges clean and avoid dirt to enter these items.

Dusty areas/Underground areas (mines)

- Watch the air filter warning light, to see whether the engine air filter is clogged. Clean/replace the engine air filter at shorter intervals than specified, clean as often as necessary (see 1000 hours service for procedure).

Extremely dusty applications may require to clean the air filter every day!

- Clean the radiator core frequently, every week if necessary, to avoid clogging (see 500 hours service for procedure).
- Clean and replace the fuel filters frequently (see 1000 hours service for procedure).
- Check daily the cab ventilation filter and pre-filter. These filters will very soon be clogged in dusty areas, therefore it is necessary to clean and replace the cab ventilation filter and pre-filter more frequently than usual (see 40 and 500 hours service for procedure).

Never remove a filter element/pre-filter without replacing it with a new one!

- Clean electrical components, especially the starting motor and alternator, to avoid accumulation of dust.

Rocky areas

- Check for damage to the undercarriage and for looseness, flaws, wear and damage in wheel bolts and nuts.
- Check tires for damage and wear. Remove foreign object from the threads as soon as possible, these will sooner or later penetrate into the tire. Also protect the tires from falling stones during loading.

Wet, swampy or muddy areas
(see also page 2-62 - Working in water)

- The wear of the seals will also increase when driving in wet or swampy areas, check and replace sealing's as often as necessary.
- If mud sticks to the callipers or discs on parking brake, and the brakes are left in that condition, the wear of the lining will increase, therefore always wash the area well with water after operations. E.g. when clay is dried up it is hard as concrete, this will cause breakage and wear of the machine.
- Do not let the water flow through the grill or into the different breathers and air filters.
- Do not operate the dump truck in water/rivers permanently for a long period. And do not under no circumstances let the water flow through the grill.

Seashore or salty areas

- Before starting working, check the tightness of plugs and valves.
- Spray exposed areas with anti-corrosive.
- Check the parking brake linings more often (see 500 hours service for procedure). When driving in wet salty/sandy areas the wear of the lining will increase.
- Check the sealing's more often. The wear will increase in salty/sandy areas.
- Lubricate components more frequently than usual.
- Do not operate the dump truck in water/rivers for a long period of time.
- It is important to wash the machine immediately after use to protect the components from rusting and to remove dirt and sand.
- See also item above "Wet, swampy or muddy areas"

High altitude (above 2000 m)

- Be aware that the engine power and torque will be reduced due to low air density.
- Do not remove the air filter!

NOTE

The graphs of altitude power reduction are in chapter 8

Steep driving

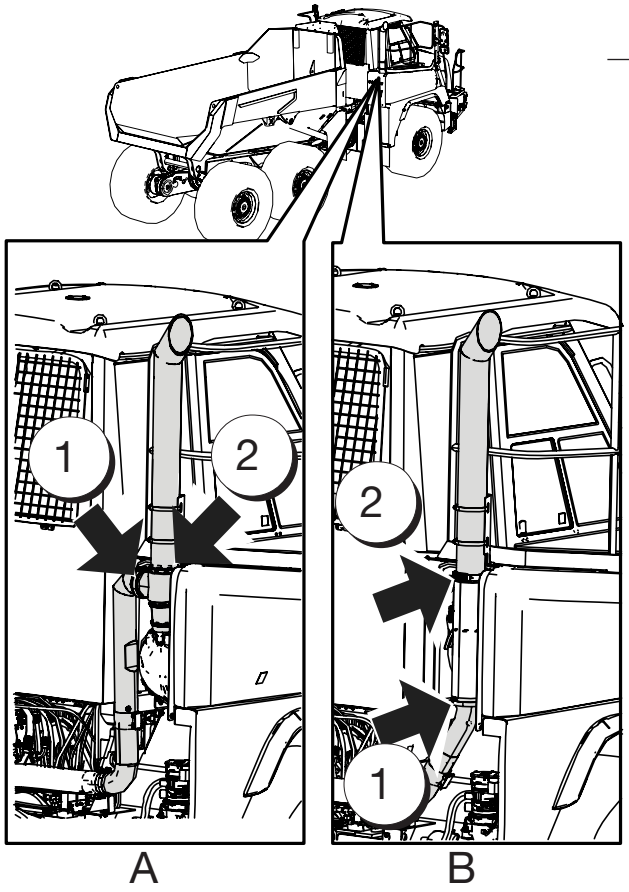
- When driving downhill and loaded, always use correct gear and the retarder brake for retarding. Refer to table on the downhill sticker in cab .The service brake (foot brake) must only be used for complete stop (see also page 2-34 - Operation of brakes and chapter 5, item 2.12 - Up, down and cross gradient travel).
- See also engine and retarder brake capacity chart at chapter 8.
- Operating the machine on slopes with a gradient above 30°=57% will reduce the machines lubrication and cooling capabilities etc., and increases risk of damage to components.

Extremely hot areas

- Observe the engine coolant temperature gauge, the engine coolant temperature warning light and the transmission oil temperature gauge. If the temperatures are at the limit, check the engine radiator for clogging (see 500 hours service).
- Observe the air filter warning light on the display screen. This will illuminate if the air filter is clogged. Clean/replace the engine air filter at shorter intervals than specified and clean as often as necessary (see 1000 hours service for procedure).

Extremely cold areas (see also chapter 5, item 8 - Cold weather)

- Use the engine heater.
- Check that the correct oils are used (see oil specification sheet, chapter 6).
- Check that there is enough glycol in the coolant (see 2000 hours service for freezing point and correct coolant).



Body heating (Option)

CAUTION

Turn off engine and allow dump truck to cool down before performing any work on exhaust system.

Enabling exhaust body heating

A - Only Engine T4F

B - Only Engines T2 /T3/ StageV

- Remove clamps (1) and (2) carefully.
- Restrictors are loose and only held in place by clamps.
- Remove the restrictors currently assembled.
- Replace with supplied restrictors, reducing exhaust flow to outlet and increase exhaust flow to body.

See also transport guide stored in cab.

Transit, long distance drive-away (more than 3 km)

- Check and adjust the tire pressure of cold tires before starting. Do not reduce pressure during driving.
- Generally replace the mineral based oil with fully synthetic oil. A mineral based oil will rapidly break down lubrication ability and cooling ability when operated at high temperatures (120 ^{O}C).
- Make sure that the inter axle differential is disconnected when driving, as the 50/50 torque split will generate a lot of heat increasing the risk of shaft wind up.
- Drive only without load.
- Drive for 1 hours and stop for minimum of 30 minutes, repeat. Monitor temperatures during driving. During stop , inspect the truck for sing of overheating (oil leaking, spatter or smoke from breathers. Etc.)
- Upper speed limit for this operation is : **55 km/h** Must not be exceeded!

Some simple rules to be observed prior to operation.

- Read and understand this Operating & Maintenance Manual before you begin to operate the dump truck.

- Never operate the dump truck if you are under the influence of alcohol, medicines or other drugs.

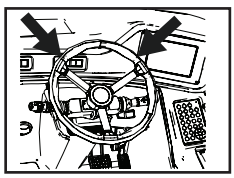
- You must wear personal safety equipment for safe operation.

- Wear a helmet to protect your head.

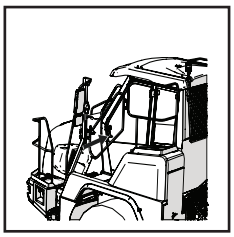
- When you climb up or down from the dump truck, always climb facing towards the truck using the steps and handles. Always use two feet and one hand or vice versa.

  DO NOT JUMP!

- Do not climb on surfaces which are not intended for climbing, always use the surfaces which are provided with anti-slip coatings.



- The cab is the driver's protection and conforms to the requirements for roll over protection (ROPS) and falling objects (FOPS), specified in the standard for these. The precondition for providing protection is that the driver uses the seat belt and remains in the cab. Therefore, hold on to the steering wheel (as indicated) if the dump truck should roll over.



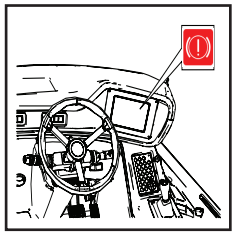
- When the dump truck is operated, the door should be shut.

- Check that the seat is adjusted for comfortable and safe operation of controls before operation.

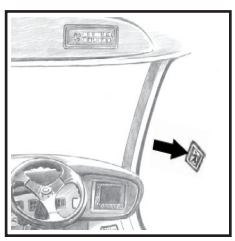
- Check that the steering column is adjusted for comfortable operation, confirm that it is fixed before operation. DO NOT ADJUST POSITION OF THE STEERING WHEEL WHILE DRIVING!

- Always use the seat belt during driving! If there is an instructor or passenger in the cab, be sure that they are seated on the instructor seat and are using seat belts!

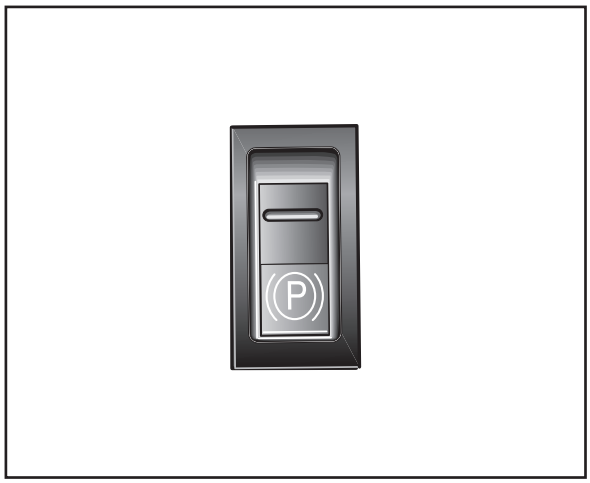
- If instructor seat is not installed, instructor or passenger may not stay in the cab during driving.



- Check that the brake system warning light is not illuminated before driving.



- The cab has two exits, one door and the front side window on the right hand side as emergency exit. The emergency exit can be used by removing the hammer from the storage location and breaking front side window.

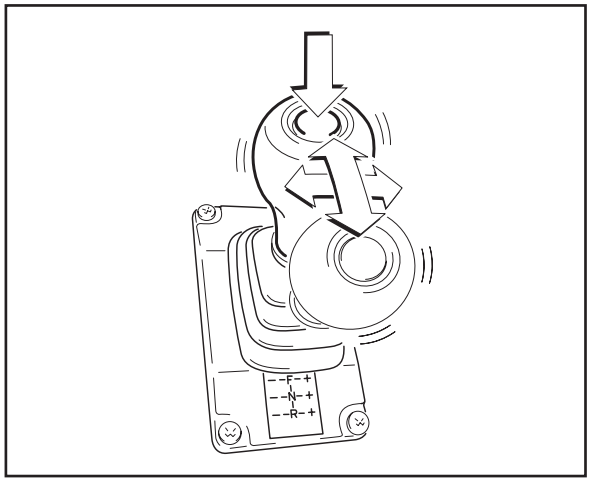


1. Starting the engine

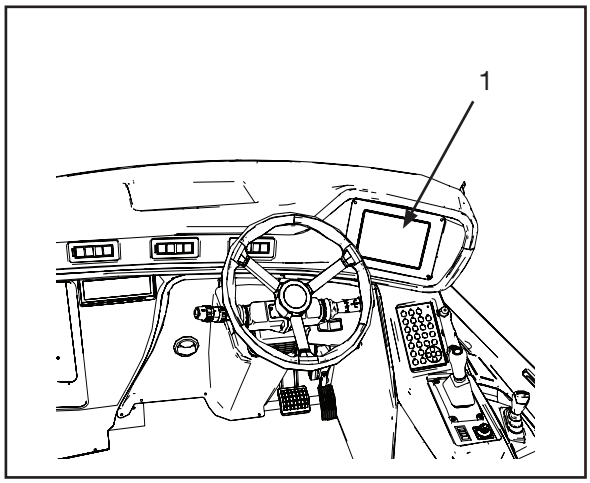
Before starting the engine in the morning, perform the Daily Service, see chapter 7.

Remember to connect the battery main switch on the front right hand fender next to the mount rail (if disconnected) otherwise there will be no power supply.

1.1. Confirm that parking brake is ON



1.2. Confirm that gear selector is in neutral position



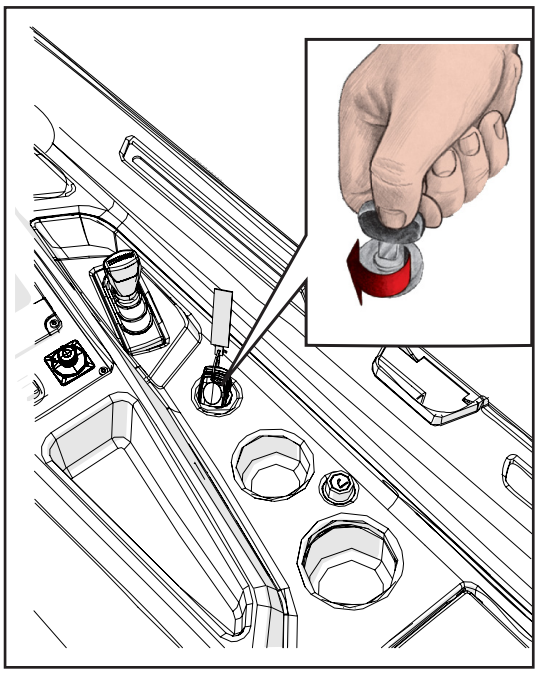
1.3. Turn the starter switch ON, pos 1

Check the warning lights illuminated on the display screen (1) before starting:

- parking brake.
- brake system - could light up if the fluid pressure is too low. If the light does not switch off after engine is started, check for possible fault.

If any of these lights do not light up, there is a fault in the electrical system. This should be checked and fixed before starting if necessary.

Before starting engine wait 2 sec on pos 1. Control system will inhibit any attempt to start engine until 2 sec has elapsed.

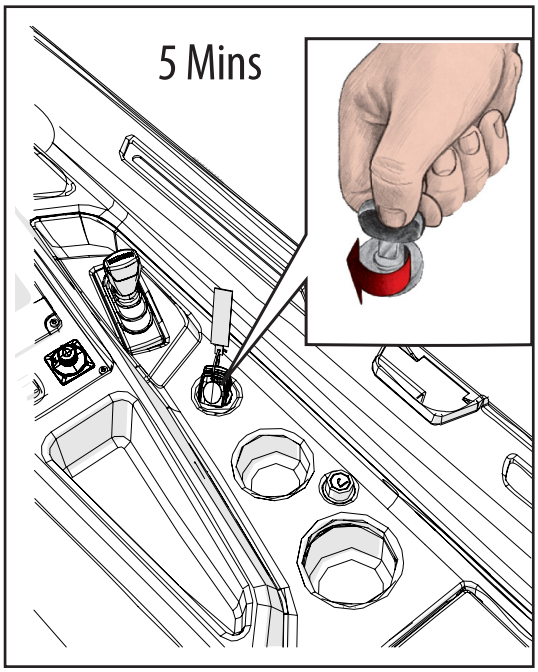


1.4. Start the engine

1. Turn the starter switch key to the right, pos. II to engage the starter.
2. Hold until engine starts (Max. 30 sec).
3. Check that warning lights for engine oil pressure and battery charge switch off.

WARNING

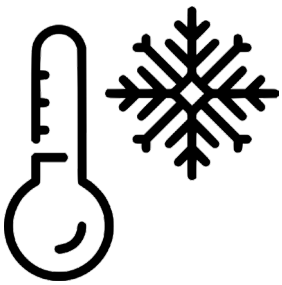
- **Never use starter gas or similar agents to help start the engine. An explosion may occur in the intake manifold with a risk of personal injury.**
- **Only start the engine in a well ventilated area. When operating the engine in an enclosed space, there should be an effective device to extract exhaust gases and crankcase gases.**



1.5. If engine does not start

1. Turn starter switch OFF, and wait until engine has stopped completely before attempting to start again.
2. After that it must rest for at least 5 minutes before restart.

1.6. Starting in cold weather at low temperatures



At extremely cold areas the engine heater should be used to avoid starting problems and white smoke.

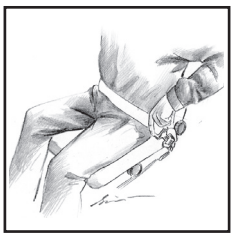
After the start keep engine running at low speed with moderate load to warm up.

2. Operating the dump truck

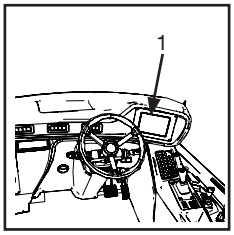
2.1. Before operation

When the engine is running properly and the fluid pressures are within operating range:

1. Clean/defrost the windows before driving.



2. Fasten the seat belt before driving.

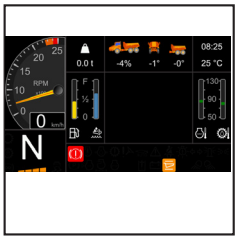


3. Check that gauges and warning lights on the display screen (1) do not indicate any abnormalities.

4. Accumulators charging.

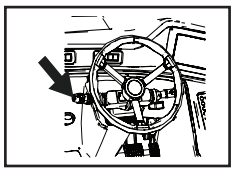
   Accumulator symbol will fill up and show the percentage.

   The symbol will change to green when it's almost full.

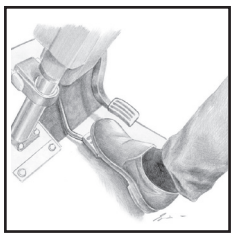


5. Confirm low idle speed.

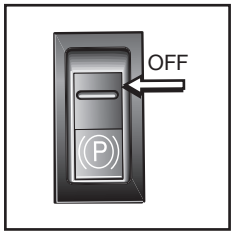
6. Check that there are no persons or objects in front of the dump truck, or in the articulation area, before you drive off.



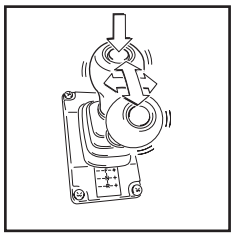
7. Sound the horn as alert.



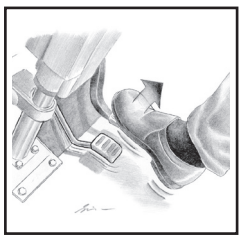
8. Depress the brake pedal.



9. Release the parking brake and confirm that the indicator light turns off.



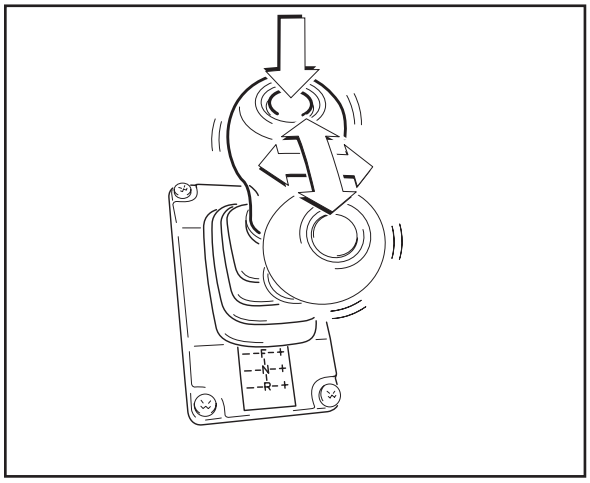
10. Select a suitable gear position at low idle (see item 2.3, Gear shifting).



11. Release the brake pedal and increase the engine speed by pressing the throttle pedal down.

2.2. Warming up period

When driving a cold dump truck, operate gently with reduced engine load and rpm to warm up until all gauges indicate operating range. This is important to avoid reduction in the dump trucks operating performance potential.



2.3. Gear shifting

The transmission has automatic gear shift to match the travel speed. The shifting is electronically controlled and a lock-up clutch is installed in the transmission to increase efficiency in all gears. Connection/ disconnection is automatic but speed and engine load related.

Gear position N: Neutral gear position

The engine will not start if the gear selector is out of neutral position.

When the gear selector is in neutral position it is always necessary to depress the knob on top of the selector to shift to forward or reverse position. Also, always depress the knob when shifting directly between forward and reverse direction.

Gear position F: Forward drive position

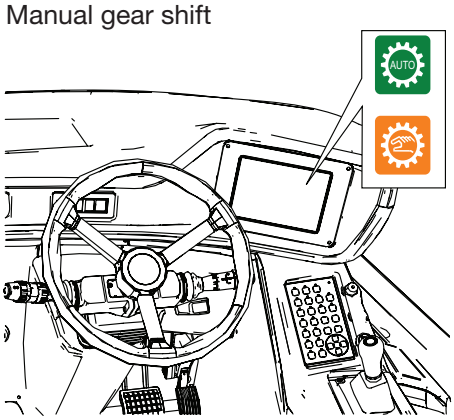
The transmission shifts automatically between 1st and 8th gear, according to dump truck speed and engine load.

The transmission will normally start in 2nd gear. If the conditions are heavy, it will automatically shift down to 1st gear.

Gear shift program

The gear shift program is decided automatically by the dump trucks computer. The computer chooses the gear shift program that is most relevant to the throttle pedals position.
Shifting at low rpm happens when the pedal is partially depressed. If the throttle pedal is further depressed, the gear shift will take place at higher rpm. With the throttle pedal fully depressed, the gear shift will either be prevented or close to the maximum engine rpm.
When the throttle pedal is released the retarder brake is engaged, the down shift will take place at high rpm.

Manual gear shift



Preselection of gears

The gears can be preselected by the driver as follows: Push the gear selector to the right (+) for upshifting or to the left (-) for downshifting.

When a gear is preselected and the gear selector is pushed either to the left or right, the gear system will switch to manual gear shifting.
The gear selector must then be pushed in order to change gear.
When the selected gear is engaged, the transmission will only operate in this gear until the selector is pushed to another position or changed back to automatic gear shift by depressing the knob on top of the gear selector.

When a gear is preselected and not engaged, the digits on the gear display will flash.

Manual gear shifting

To avoid repeated up and down shifting when driving in heavy conditions it is an advantage to use manual gear shift. When changing from automatic gear shift to manual gear shift, push the gear selector either to the left for downshift or to the right for upshift, or manual gear shift can be obtained by depressing the knob on top of the gear selector while driving in automatic.
In manual gear shift mode the selector must be pushed in order to change gear. Preselection of gears is also possible in manual gear shift.
When the selected gear is engaged the transmission will only operate in this gear until the selector is pushed to another position. If the dump truck is stationary, the selected gear will be engaged directly.

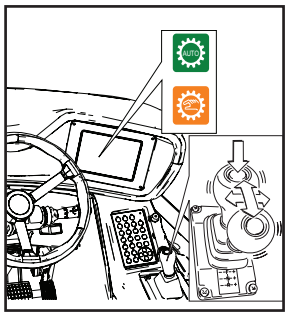
To return to automatic gear shift while driving in manual, depress the knob on top of the gear selector.

CAUTION

With the dump truck stationary, do not engage a gear at high engine speed.

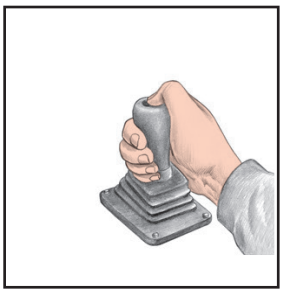
Operating hints

Different types of terrain require different operating techniques.



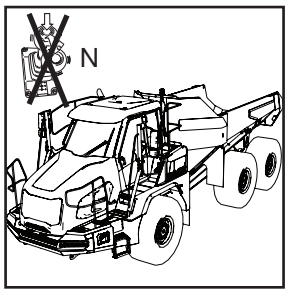
- Use automatic gear shift, for normal travel.
- In terrain, before uphill/ downhill driving, manually select a suitable position for the estimated speed in the area. Avoid repeated up and down shift in hilly terrain.

- The knob on top of the gear selector is used for:



- Shifting from neutral to forward or reverse position.
- Shifting directly between forward and reverse direction.
- Changing between automatic and manual gear shift.

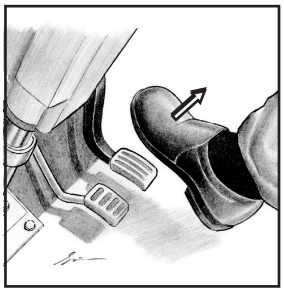
- When selecting a gear from the neutral position and when shifting between forward and reverse gears:



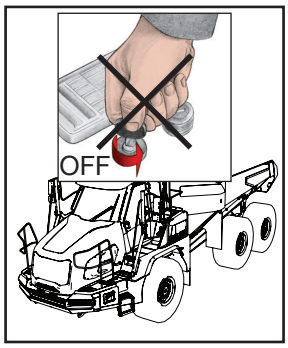
- Neutral position **must not** be selected during driving.

NOTE

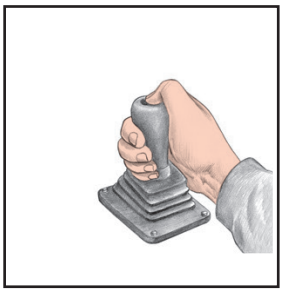
Added increased idle and alarm if machine is moving in neutral



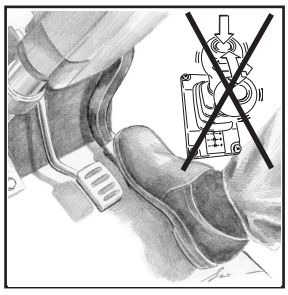
- Stop the truck and release the throttle pedal completely.



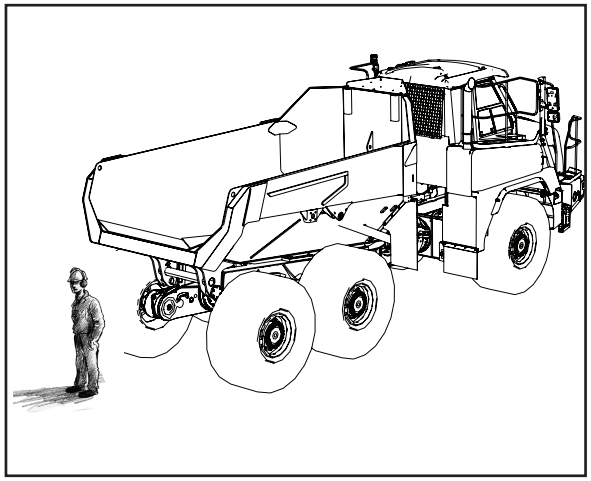
- The starter switch must NEVER be turned off (position 0) during driving, if you do not intend to stop the engine! The engine can be stopped by turning key in ignition to position "0", gear selector must be in neutral to start machine again.



- Depress the knob on the top of the gear selector, select the desired gear and wait until the gear is engaged before increasing the engine speed.



- Do not operate the gear selector with the throttle pedal depressed. This will cause a big shock, and will also reduce the life of the dump truck.



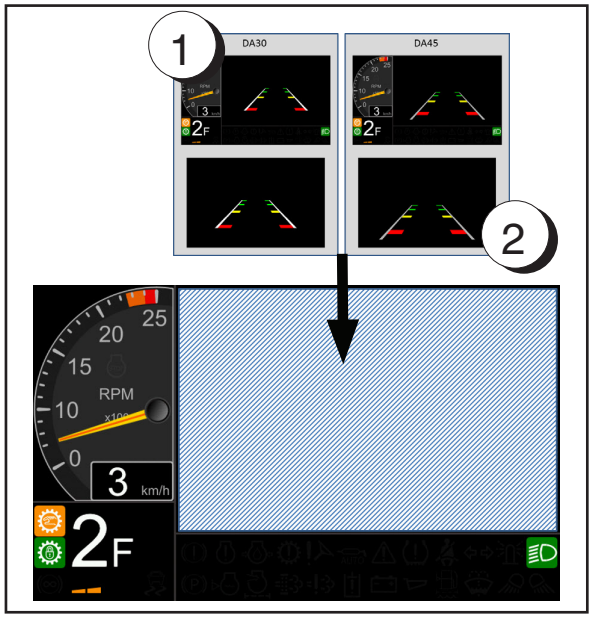
2.4. Reversing (back-up) operations

1. Before reversing, make sure that no persons or objects are behind the dump truck or in the articulation area.
2. Stop the dump truck completely before selecting the reverse gear.
3. Depress the knob on top of the gear selector and place the gear selector in position R with engine running at low idle. The transmission will always select 1st reverse.
4. Increase the engine speed.

The reverse drive position has only manual gear shift between 1st, 2nd, 3th and 4th gear. The selector must be pushed in order to change gear. When a gear is engaged, the transmission will only operate in this gear until the selector is pushed to another position.

WARNING

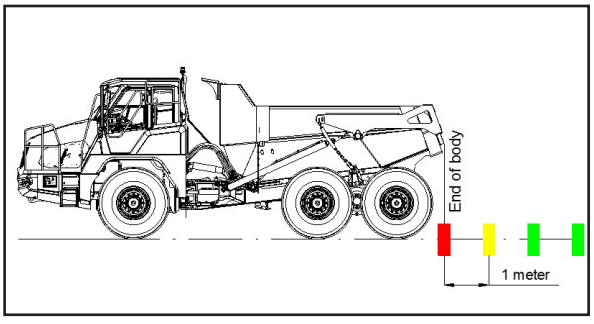
Be careful when reversing, the rear visibility is limited!



Rear camera view

When driver shift a gear selector in position R, the back-up camera automatically turns on. A video display shows an image of the area behind Dumper.

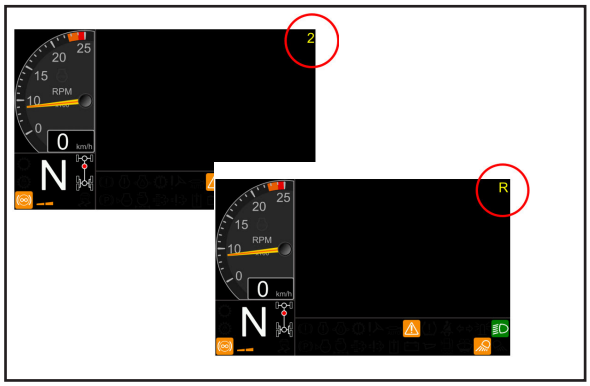
1. Small camera view
2. Full screen camera view.



The camera is adjusted when the truck is empty and the front suspension is at normal (auto) level.

A loaded truck will push the body (and camera) down. This causes an error.

When loaded, the real distance between the colour bars is less than 1 meter. However the red bar is still indicating the end of the body



Optional camera

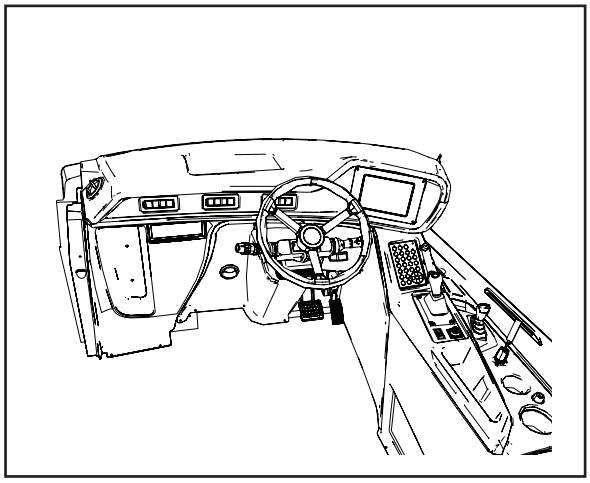
The dumper can be equipped with an additional view camera.

If camera is mounted then the selection is done by a function key on the keypad. This can be configured under

Menu > Display > Optional camera

When used, the camera picture is identified by a “2” on the screen.

Also the reverse camera will then have a “R” token visible.



2.5. Normal operation

Always operate the dump truck with caution. Careful driving is recommended for safe and comfortable operation. Regulate dump truck speed in accordance with the ground conditions and surrounding environments.

In manual gear shift mode, always drive allowing the lock-up clutch to connect.

If abnormal noise, vibration, smoke or odors occur during operation, check for possible faults and remedy.

Check at regular intervals that all gauges are indicating normal values, and that no warning lights are on.

- Normal Transm. oil temp.: 50 - 115°C,

NOTE

For more information about the transmission oil temperature see also Chapter 3

2.6. Brakes

There are three different brake systems on the dump truck. Check the brakes every day to ensure function.

Service brake

All hydraulic operated wet multiple disc brake on each wheel. There are two separate circuits. If a fault occurs in one of the circuits, the dump truck can still brake with the intact circuit. Self-adjusting system.

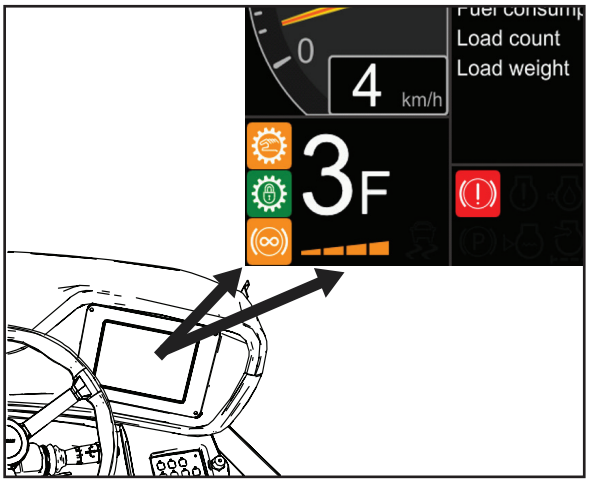
Retarder brake (Main brake)

The integrated hydrodynamic retarder is installed in the basic transmission between converter and gear box.

The installation position of the retarder at the transmission input (so-called primary retarder) increases the brake torque at the output by the given transmission ratio. Thus a high retarder brake torque is available in the lower speeds which can be used almost until standstill of the vehicle. The retarder is usually controlled by actuating the brake pedal, a hand lever or automatically.

Parking brake

Spring actuated, hydraulic released single disc brake on the rear prop. shaft. Self-centering system.



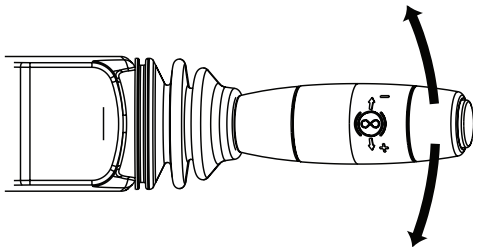
2.7. Retarder brake operation

When the operator releases his foot off the accelerator pedal, the retarder brake is automatically engaged.

Pressing the accelerator pedal slightly will reduce retarder brake power.

Pressing accelerator pedal further down, until meeting the engine rpm, will disengage the retarder brake.

Retarder reducing button

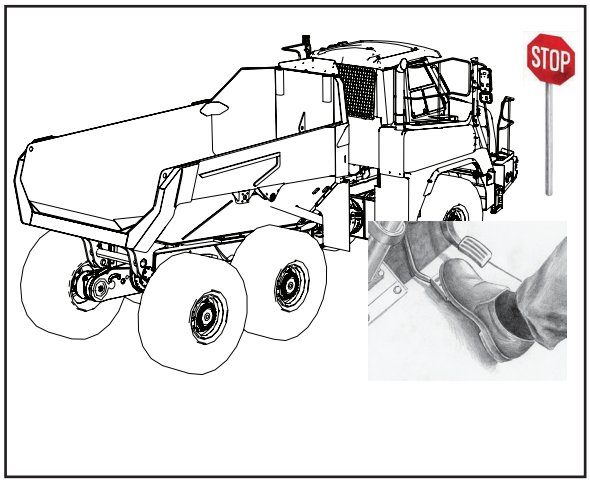


The Steering column is equipped with a Retarder reducing lever , if the retarder reducing lever is engaged, operation of the retarder brake can be setup on request.

Standard retarder setting is 100%, and can be reduced from 100% to 75%,50%,25% with a Retarder Lever on the steering column. Last state is restored when ignition is switched off/on.

NOTE

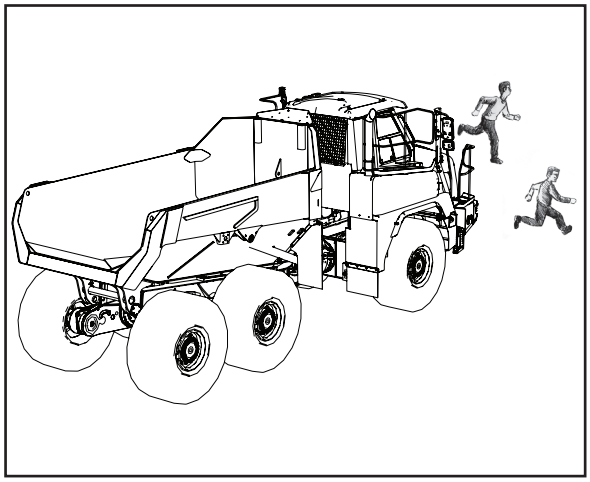
- **To avoid engine over speed, the retarder brake will automatically engage if the engine speed exceeds acceptable operating speed. This will happen regardless to the accelerator pedal.**
- **Reduce the engine speed immediately!**



2.8. Braking/stopping the dump truck

Learn to associate the braking requirements for loaded and unloaded machine.
(See also chapter 2. Safety Instructions)

1. Release the throttle pedal.
2. The retarder will apply automatically with the force in depends to how it is set up.
3. Depress the brake pedal gradually, until desired deceleration is obtained.
4. When the dump truck is completely stopped, move the gear selector to neutral.
5. Apply the parking brake.



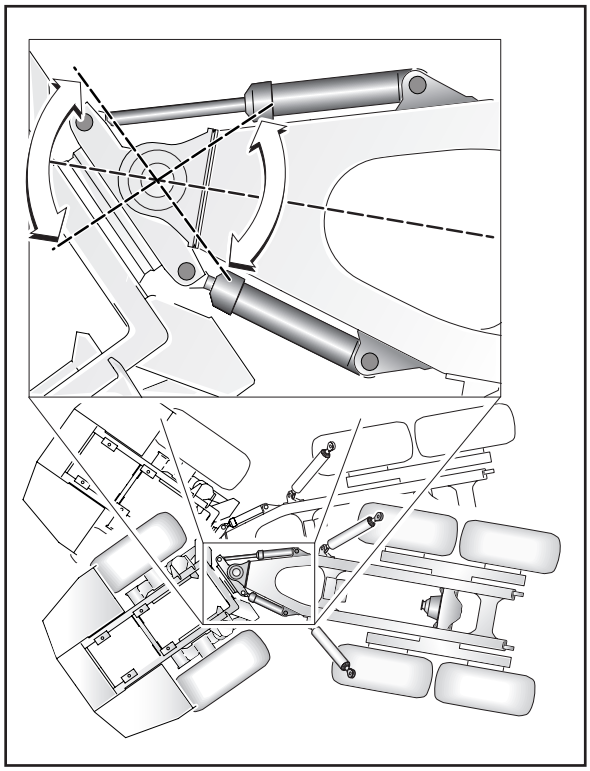
2.9. Emergency braking

If braking effect is lost in both brake circuits, the dump truck can be braked as follows:

1. Release the throttle pedal.
2. Move the parking brake to locked (ON) position.
3. Move the gear selector to 1st gear manually as quickly as possible.
4. When the dump truck has stopped, immediately put wheel chocks under the wheels.

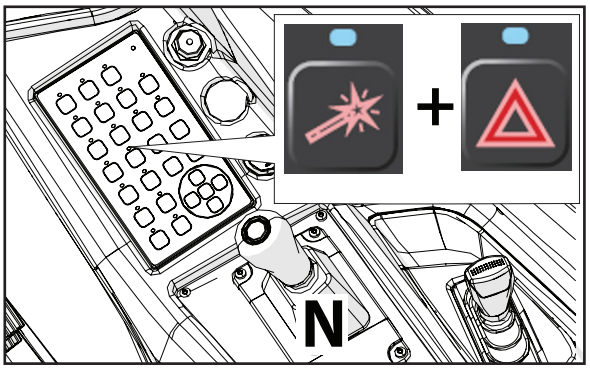
WARNING

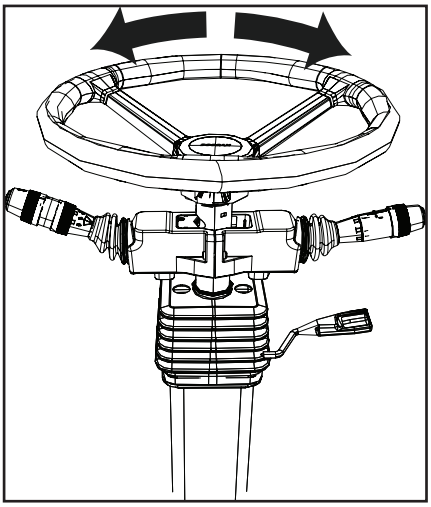
After an emergency stop: DO NOT CONTINUE!
The parking brake MUST be checked as well as the reason for the service brake failure! Consult your Hyundai Dealer.



2.10. Steering

- The dump truck has 2 frames. The steering movement is created by articulation of the frames in relation to each other. The steering is fully hydraulically controlled and there are no mechanical links between the steering column and the steering cylinders. The steering circuit has priority over the tipping circuit, ensuring hydraulic oil available to the steering at any time.
- The dump truck is equipped with an emergency steering system, which will deliver oil through a ground-driven pump as long as the truck is in motion. It will then be possible to steer the dump truck if the engine stops. The steering movement will then be slower and the warning light for emergency steering will light. Repair the fault before operating the dump truck again!



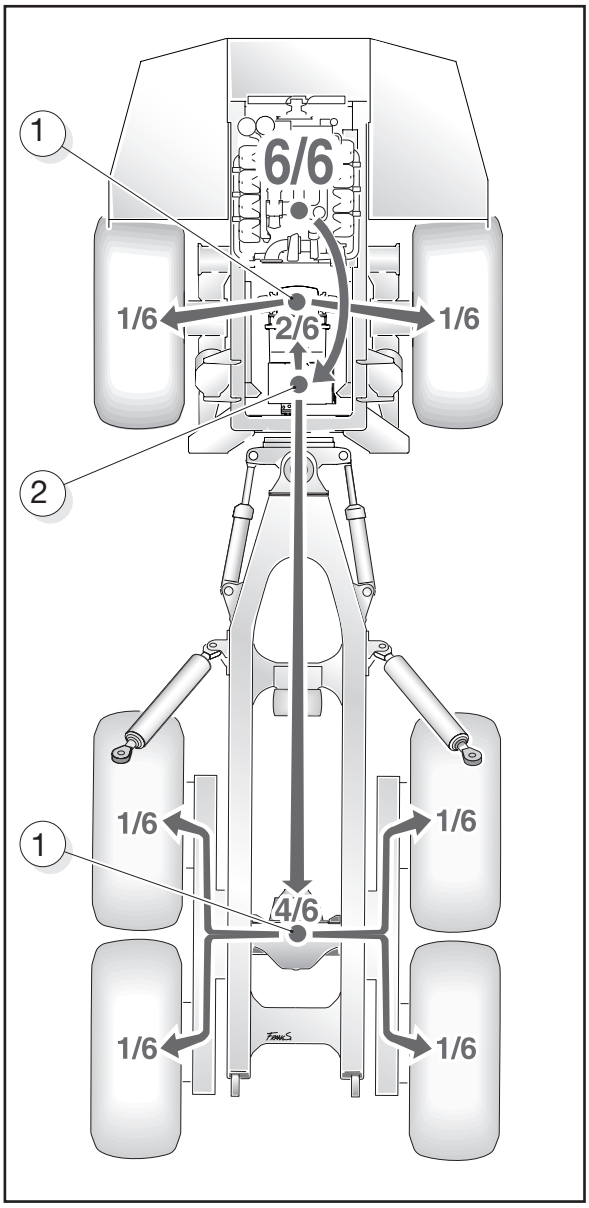


Test of emergency steering

- If testing of the emergency steering need to be performed, the daily routine start up inspection must be carried out first.
- Perform the starting machine operation.
- Drive the machine to the desired speed (8 to 20 km/h) and then release the throttle.
- Put the gear selector in neutral position.
- Press the override button + hazard lights buttons. Hold it until the engine stops completely.
- At this point the driver must perform the steering test by turning to the left and right several times and making sure that the machine turns in the desired direction.
- During this test the steering system is in emergency mode, it means that the functionality of the system is reduced.
- After fulfill emergency steering test stop the machine completely engage the park brake and restart the engine to continue the driving.

WARNING

This test must only be performed on a flat, open, demarcated area. The width of the demarcated area shall be at least twice the overall width of the test machine to be enable the operator to test the steering to the left and right without moving out of the demarcated area. No other vehicle or pedestrian must under any circumstances be allowed within the test area or be parked closer than 2 meters from the test area as long as the test is in progress.



2.11. Differentials

The dump truck has permanent 6-wheel drive with 2 differentials.

1. Front differential, automatic differential brake (limited slip type) fitted to the transmission and. Transfers the power to left and right front wheels.

   The differential will automatically provide highest torque to the wheels which have best grip. The locking ratio is 45% on the front differential, i.e. the differential is capable of compensating for a 1:2.64 front and 1:1,85 rear difference in friction between left and right wheels.

2. Inter axle differential, 100% lockable torque divider integrated in the transmission. Transfers the torque by 1/3 to the front axle and 2/3 to the rear axle. The differential lock can improve dump truck performance and should be used to avoid wheel spinning in severe conditions, i.e. slippery surfaces. Engage the differential lock before entering an area with a slippery surface, soft ground, or if the dump truck is stuck in the terrain. The differential lock must not be used when driving on firm ground!

The criteria for engaging the centre differential lock is:

- Vehicle speed <18 km/h
- Transmission input torque < 1000 Nm.

The centre differential lock will automatically disengage if vehicle speed >20 km/h.

CAUTION

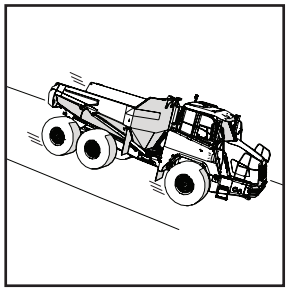
Use the differential lock to avoid spinning on front and rear axle.

Inter-axle differential lock.

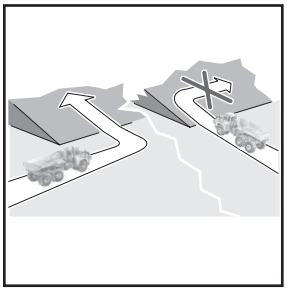
The centre lock button on the panel are requests for diff-lock. The differential lock are engaged only if conditions are in valid ranges. If differential lock is released automatically due to exceeded protection conditions, then the panel buttons (requests) will also be forced off.

If conditions are in valid ranges again then the differential lock are forced back to on.

2.12.Up, down and cross gradient travel



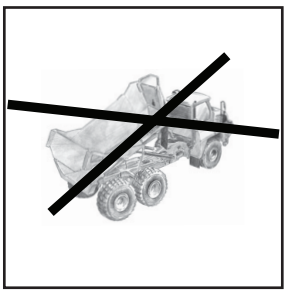
- When travelling on gradients, consider the ground condition, and maintain a safe speed according to the grade of the path, the surface, degree of curves and road width.



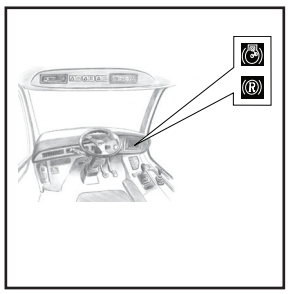
- Operate the dump truck sensibly and avoid cross gradient travel. Select a low speed and negotiate the terrain without exaggerated steering movements and sudden braking.

- Before starting downhill, release the throttle pedal and slow down the dump truck to a safe speed for the downhill slope. Move the gear selector to a suitable position (1st, 2nd or 3rd).

Rule: Select the same gear for operating downhill as you would for operating up the same hill.

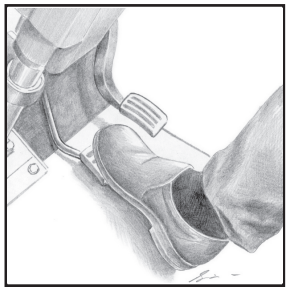


- Do not under any circumstances drive the dump truck with raised body.



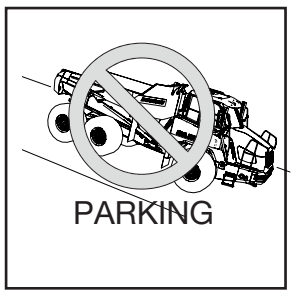
- Long time engagement and unnecessary use of the service brakes can cause excessive wear and a possibility of loss of braking effect due to over-heated brakes.

- Keep engine speed at the upper area, 1500 - 1900 rpm in heavy conditions and for hill travel. Select a manual gear position for steep hill travel.



- If use of the retarder brake is insufficient to keep the dump truck within a safe speed, reduce the speed by depressing the brake pedal. The travel must then continue in a lower gear.

To avoid engine over speed, the retarder brake will automatically engage if the engine speed exceeds acceptable operating speed.



- Do not park or leave the dump truck on grades or slopes. The risk for spontaneous rolling is high!

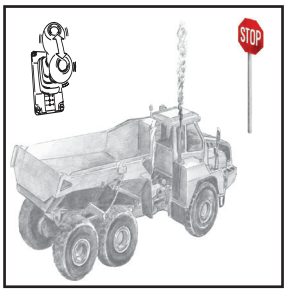
- Pay attention to the transmission oil temperature when the retarder brake is applied.

- ALWAYS keep the engine speed below max. allowed rpm when travelling downhill! The retarder brake (emergency retarder) will be automatically engaged.

2.13. Important operating instructions

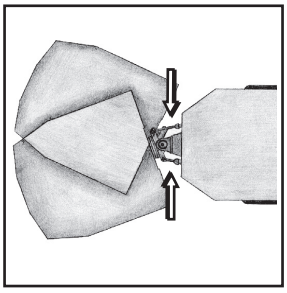
- The dump truck must not coast with gear selector in neutral position.

- Engine speed within 1500 -1900 rpm with engaged lockup is recommended during driving.

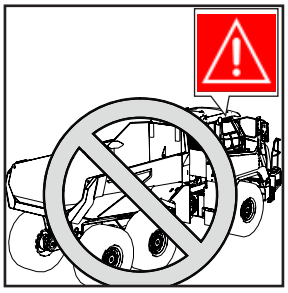


- Engine speed must be reduced, and the dump truck must be stopped completely before changing between reverse and forward gears.

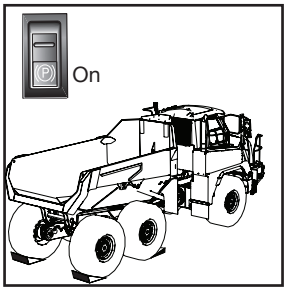
- The retarder brake (emergency retarder) will be automatically engaged if the engine speed exceeds the acceptable operating speed. This will also increase transmission retarder braking to 100%, to avoid over speed of the engine.



- Do not keep turning against the mechanical end stops, or force it into this point when making maximum turns.

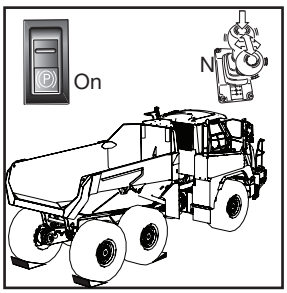


- Do not continue to operate the dump truck if a warning lamp lights, a gauge shows abnormal value, or if the warning buzzer sounds.



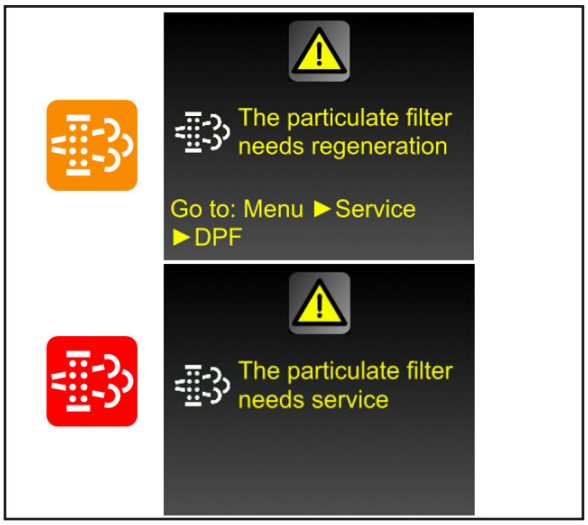
- There is no braking effect from transmission when the engine is stopped.

- Always operate the dump truck within the rated limits and carry out maintenance according to the scheduled program. Overloading and lack of maintenance reduces safety and the life time of the dump truck is reduced.



- Select neutral gear and apply the parking brake when leaving the dump truck. Never leave the dump truck with a gear engaged!

- In case of problems with the dump truck, stop the vehicle and contact your local Hyundai Dealer to amend the fault.



2.14 Regeneration of the particulate filter (DPF) only Stage V engine.

The particulate filter is regenerated, i.e. cleaned, automatically. If a certain amount of soot is accumulated.

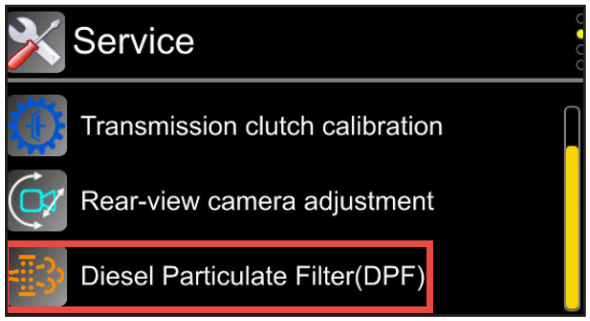
However, if the particulate filter becomes full, it must be regenerated manually. The engine cannot be used for approximately 45 minutes while manual regeneration is carried out.

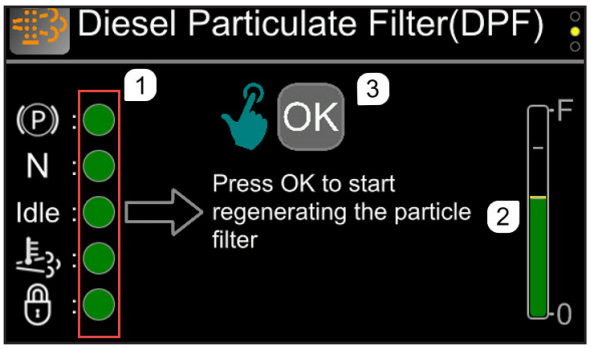
Amber

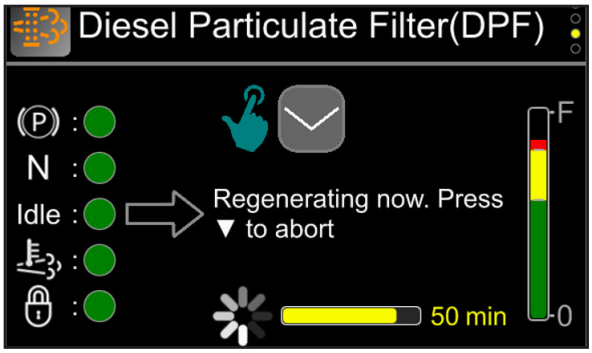
Warning. Blinking slow. DPF. Carry out manual regeneration as soon as possible

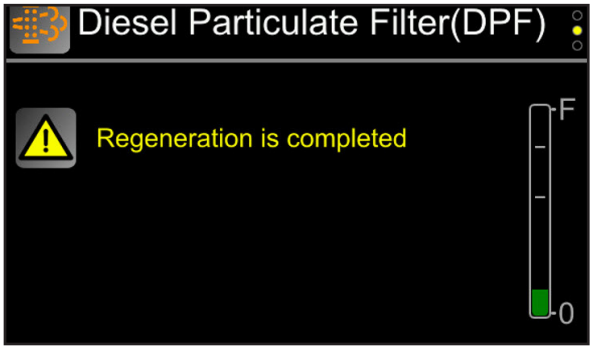
Red

Error. Blinking slow. DPF is overfull. Manual regeneration can only be service personnel.









Manual regeneration of DPF

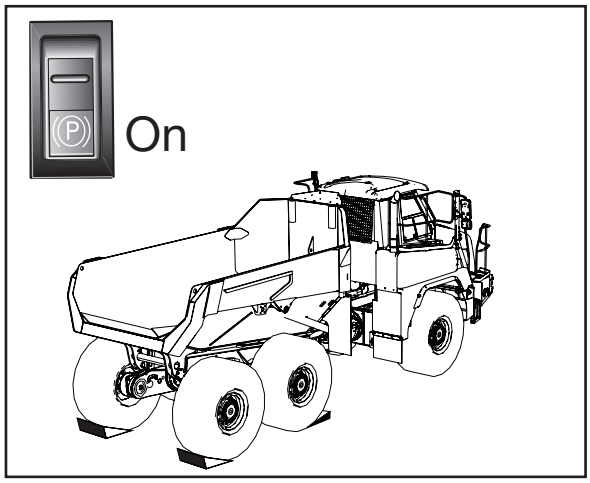
The manual regeneration of particulate filter screen will appear when the operator navigate to :
Menu > Service > Diesel Particulate Filter (DPF)

1.Make sure that the all requirements are fulfilled and confirmed with the green light.

- Parking brake on,
- Gear in neutral
- The RPM is controlled by the Engine Control Unit (ECU) , operator should not press the accelerator pedal.
- Temperature should in normal operation rage.

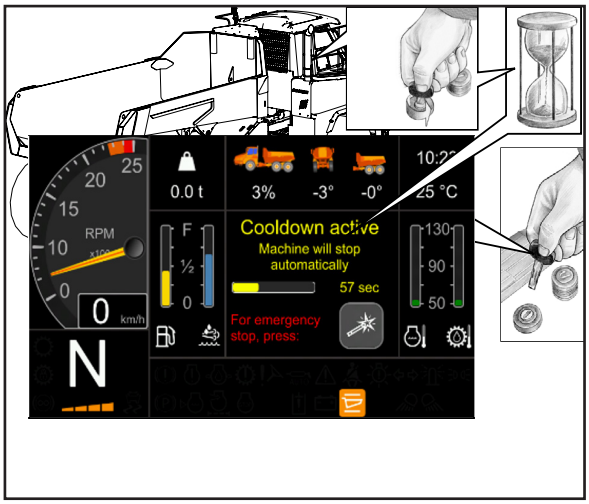
2. The level of exhaust soot need to be in specific lever to execute the regeneration.

3. Press the OK button to start the regeneration.



3. Parking the dump truck

1. Avoid parking with loaded body.
2. Do not park on grades or slopes.
3. Park on a safe ground, where it will not freeze in place, sink down, etc. A change of weather may affect the ground.
4. Move the gear selector to neutral position.
5. Apply the parking brake.
6. Lower the body completely.
7. Neutralise all operating controls.
8. Turn off ignition
9. Secure the dump truck from spontaneous rolling by adding wheel chocks under the wheels before leaving the dump truck.

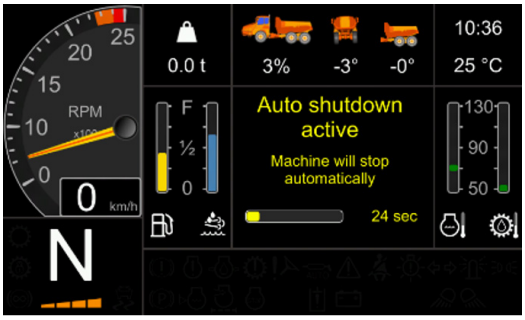


4. Stopping the engine

1. Stop the dump truck.
2. Before stopping the engine, check that the main warning lights for engine failure is not on or flashing. See chapter 3, Operating Controls for procedure if the warning lights are on or flashing.
3. Ensure the transmission is in the neutral position.
4. Turn the key in starter switch to OFF position.
5. If the dump truck has been driven with a heavy load and the key in starter switch is turned to position OFF, the cooling mode is activated to max 3 minutes after then the engine should be stopped.
6. Remove the key from starter switch.
7. Let engine cool down
8. Do not turn off battery main switch before engine has stopped completely and additional 5 minutes has passed.

WARNING

• If driver is aborting cooldown or stopping engine using either outside emergency switch or internal keypad sequence (only if >1km/h) the horn alarm will be activated by 15 horns cycles in 10 sec
• If engine is stopped suddenly before it cools down, engine life may be shortened.
• Never stop the engine immediately after driving except in case of emergency.
• Never turn off battery main switch when engine is running.
• Never turn off battery main switch when ignition is on.
• Leave battery main switch on for at least 5 minutes after engine has stopped.



Auto shut down (ASD)

This function will automatically shut down the engine after specified time.

The function is set as default in disabled, and need to be set up manually in the display.

After activation and fulfillment of certain conditions such as:

- Engine on and the engine temperature need to be inoperation temperature (approx. 60˚C)

- Kept the gear selection in N position.

ASD shut down time can be adjusted from 3-60 minutes

The Display will show warning message 60 seconds before shutdown.

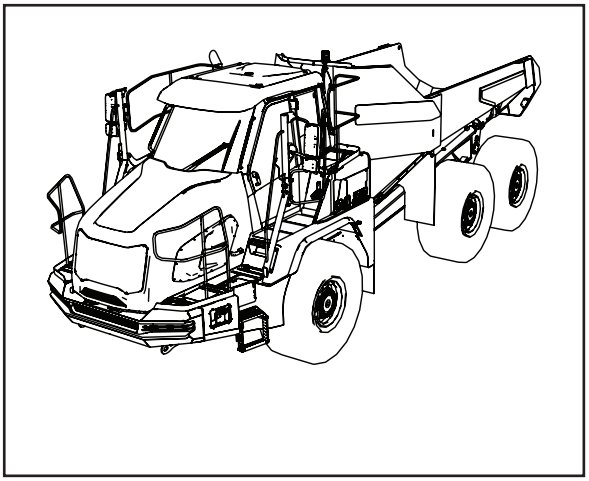
Buzzer will make short beeps 10 seconds before shutdown.

Ignition will be kept on after shut down

Function can be aborted by:

- Push accelerator pedal
- Disengage park brake
- Engage gear

Just after shutdown this indicator will show that the engine was stopped



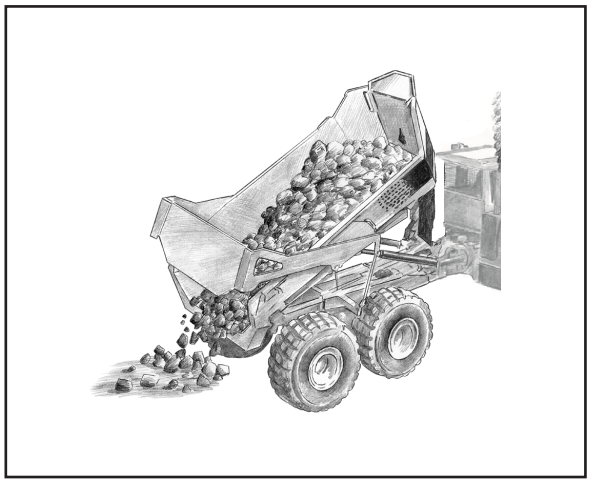
5. Checks after stopping the engine

1. Lock the sliding windows and the cab door.
2. Turn off the battery main switch.
3. Check for leakage of oil or coolant.
4. Fill up the fuel tank.
   Make sure that the filler cap and the area around the filler opening is clean to avoid contamination of the fuel.
5. Remove any waste paper or other flammable material which may cause fire in the engine compartment.
6. Remove any mud stuck to the chassis.

6. Loading and tipping

6.1. Loading

- The body must be lowered completely before loading materials. The tip control lever must stay in hold (float) position.
- When loading large rocks, cover the body bottom with gravel or start with the smallest stones first.
- During loading, the parking brake should be applied and gear selector should stay in neutral position.
- Before driving off, check that no danger can occur during travel. Maintain an even load distribution, avoid unbalanced loads.
- Never overload the dump truck. The operator's safety will be considerably reduced and lifetime of the dump truck will drop.



6.2. Tipping

1. Place the dump truck on a firm, level ground. Check that the tipping may take place safely.
2. The gear selector must be in neutral position, and the parking brake must be applied.
3. Move the tip control lever to body "up" position and increase the engine speed. The body will raise. The tipping speed is proportional with the engine speed.
4. Reduce the engine speed before the body reaches the top position.
5. To stop the tipping movement, release the tip control lever. It will then automatically return to hold position.
6. Move the tip control lever to "down", and the body will go down. The tip lever will magnetically hold in position. The tipping cylinders are double acting. The lowering speed is proportional with the engine speed.
7. The tip control lever must stay in hold (float) position when not operated.

NOTE

For safety reasons, the system slows down the tipping speed when the load starts to pull the hoist cylinders backwards. This feature notifies the operator and reduces chance for ”sticky” load lifting the front half of the truck.

WARNING

- **Reduce tipping speed when dumping large rocks!**
- **Do not load material into the body if the body is raised!**
- **Do not drive an empty or loaded truck with a raised body!**
- **Do not raise body near electrical power lines! See Chapter 2. SAFETY INSTRUCTIONS**
- **Avoid tipping on cross-gradients!**

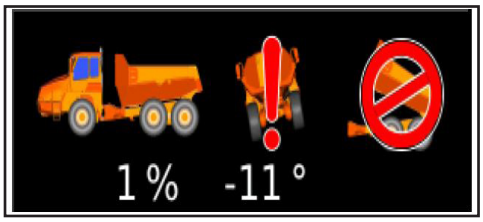
Tip up restriction

A blinking warning indication is added to indicate when a tip up restriction is active.

This occurs when the sideways angle of the truck is above a certain value.

Then lifting of the body is not allowed. Moving the body further down is still possible.

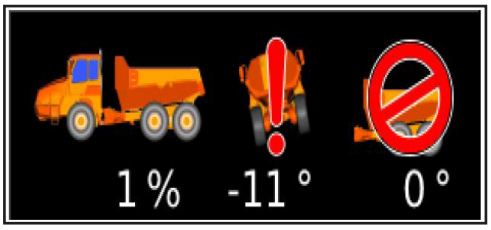
When the warning is active, both the exclamation mark and the prohibitory sign will blink at a rate of approximately 1Hz.



There are two separate situations when this warning is active:

1. No body angle sensor is installed.

   - This will show a body at a fixed angle.



2. Body angle sensor is installed

   - This will show the actual body angle.

Tip up restriction warning

This view will appear when the body cannot be lifted because the truck is leaning to much to one of the side. There is the danger that, the whole truck can tip over.

Refer to the machine's ability to warning alarm for tipping angle. The tipping restriction warning can be adjust between 2° to 15° (in default mode is off).

7. Tire handling

General

This is a general instruction for the standard tires. Contact the tire supplier or your local Hyundai supplier for exact specifications.
Off-road tires produce more heat during operation than ordinary car tires, therefore the tires must be used correctly to obtain long lifetime and safe operation. Please note that the following can cause overheating of tires:

- Too low tire pressure
- Overloading
- Driving long distances non-stop
- Travelling at high speed

CAUTION

Extremely low temperature (below -40°C) requires special operation!

7.1. Difference in tire diameter

If it is necessary to change a wheel as a result of puncture or in emergencies, Hyundai allows up to 3% difference in the tire diameter on the same side of the tandem. But the most ideal situation in all cases is to have the same tire diameter on the same side of the tandem. This is strongly recommended.

7.2. Correct tire pressure

Tire pressures mainly depend on operation speed and load. Road configuration, flotation/traction requirements, risk of cutting, hacking, shock damage and ambient temperatures are also factors to consider.

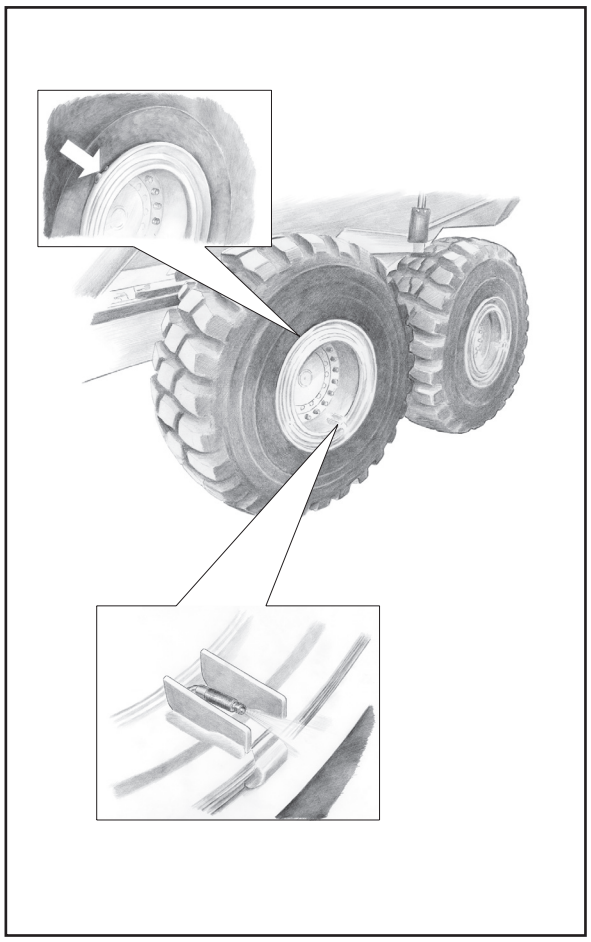
Both too high and too low tire pressure may result in damage and shortened lifetime of the tires. Tire pressure checks and corrections must be carried out on cold tires.

Basic pressure for cold tires (based on max. load and max. speed):

See chapter 8 for tire pressure

7.3. Specified loading

Do not overload the dump truck. Maintain an even load distribution, avoid unbalanced loads. Protect tires from falling stones during loading.



7.4. Proper maintenance

Perform tire inspections according to Maintenance schedule.

Also roads and driving paths should be maintained to achieve max. tire serviceability.

Damaged, excessively worn or aged tires should be replaced. Remove foreign objects from the treads, these will sooner or later penetrate into the tire.

Removal or repairing of tires should be performed by a tire specialist to avoid unsafe working conditions.

WARNING

Always let the air out of the tire before removing foreign objects and before demounting or repairing! See also chapter 2, Safety Instructions (High pressure).

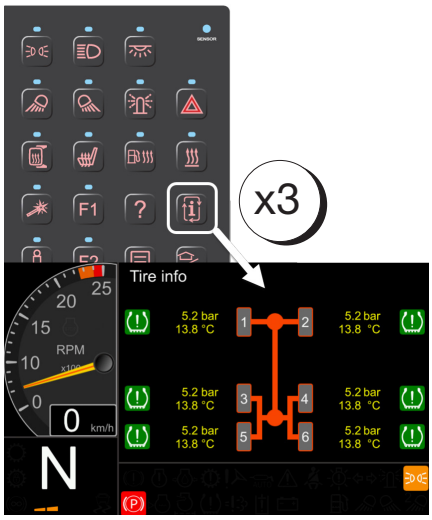
7.5. Transit, long distance drive-away on road

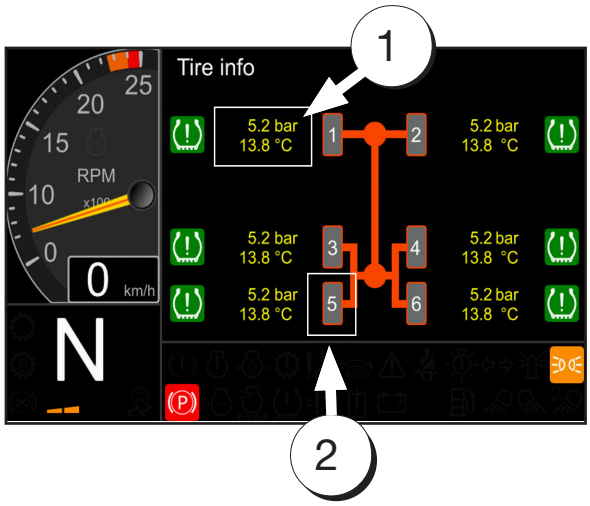
This special type of driving requires special operation:

- Check and adjust the tire pressure on cold tires before starting. Do not reduce pressure during driving.
- Drive only without load.
- Drive 2 hours and stop for minimum 30 min. Drive another 2 hours and stop for minimum 1 hour. Repeat.
- Upper speed limit for this operation: **2280 rpm at 8th gear. Must not be exceeded!**
- **Must not** have diff-lock engaged.

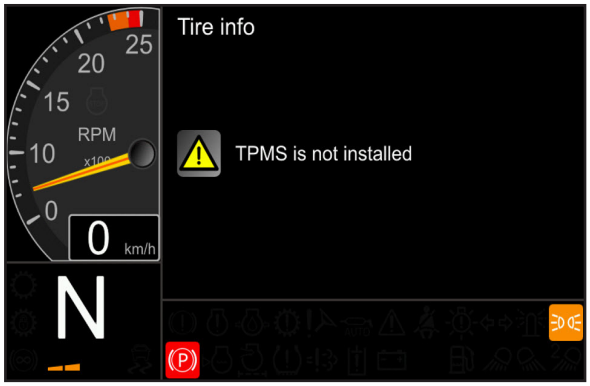
7.5. Tire Pressure Monitor System (Option)

The Tire Pressure Monitor System screen will appear when the operator repeatedly pressing "Info" button from the keypad. The purpose of this screen is to provide the available live data information about the tire pressure status on wheels.



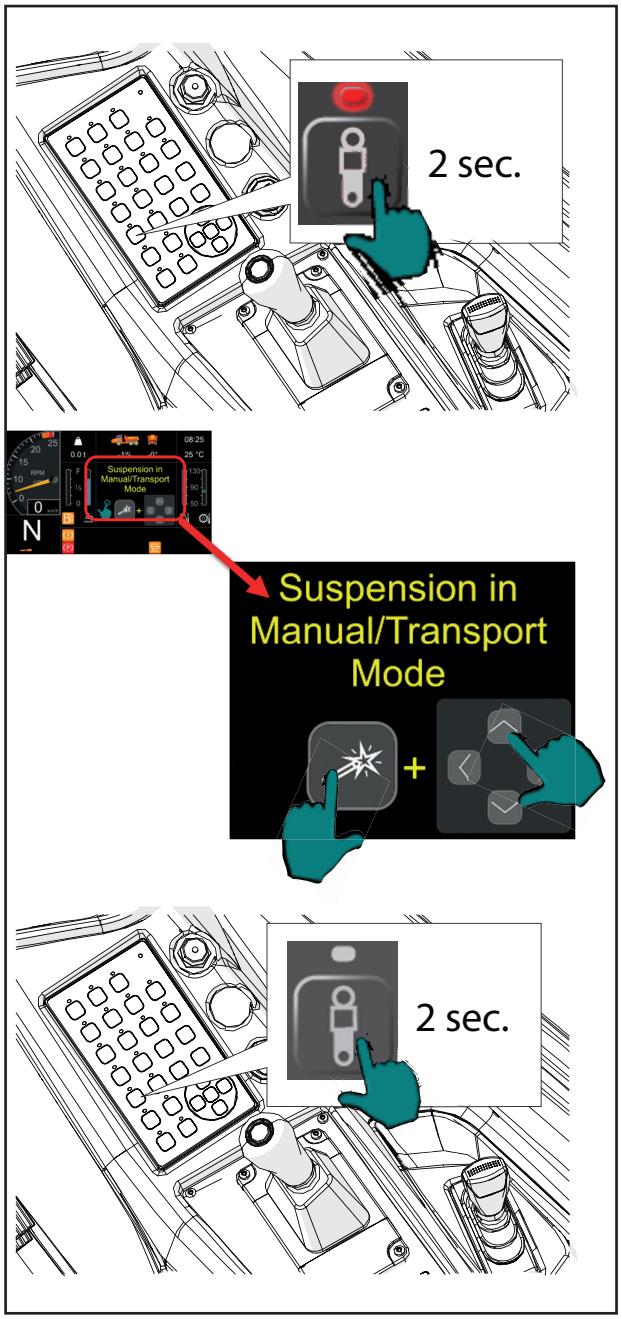


1. Shows pressure and temperature of the tire
2. Each tire location has a fixed number that is also used in the fault code



This screen appear when the TPMS is not installed on this machine.

8. Front suspension



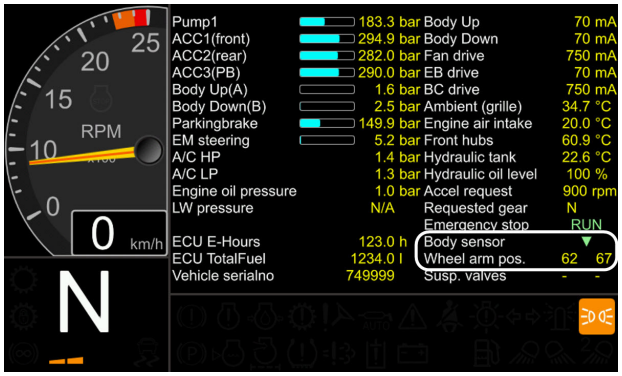
Front suspension is equipped with the self-leveling hydro-gass suspension cylinders one on each side.

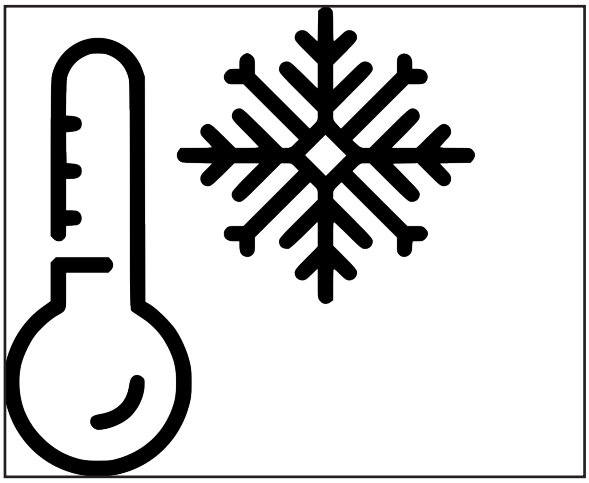
It's possible to switch between manual and the automatic mode on the front suspension.

1. The dump truck must be standing still.
2. The gear selector must be in neutral and confirm that the parking brake is ON.
3. Run the engine at low idle.
4. Depress and hold 5 sec. the suspension button the the keypad. The manual mode will be confirm by the light on the button.
5. When the manual mode is on adjustment of the suspension is available. To adjust the suspension the combination of the override and up/down arrows need to be used.
6. To switch back to automatic mode, hold the suspension button for the 5 sec.
7. The detail info screen showing the status level of the suspension of the machine

WARNING

For safety reasons, the mode of the suspension system cannot be changed if the machine is moving.



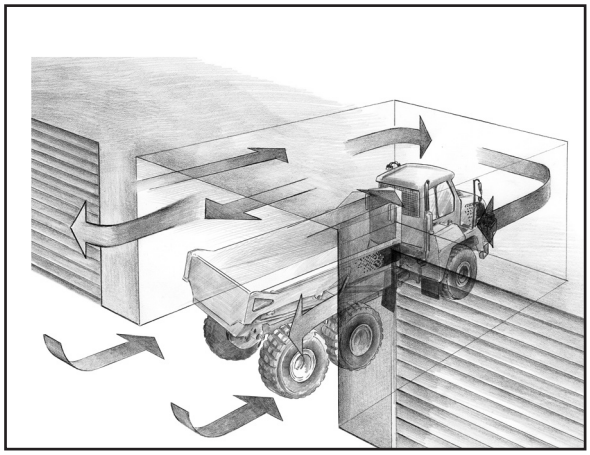


9. Cold weather

Cold weather operation (below 0 °C) requires special care to avoid problems and to maintain high comfort and safety.

- The viscosity of oils in engine, transmission, differentials, and hydraulic system should be of a suitable viscosity for the lowest expected ambient temperature, see Oil Specification Sheet, page 6-5.
- The coolant must contain anti-freeze to avoid ice in the cooling system and to protect against corrosion, see chapter 7, maintenance, 2000 Hours Service.
- As the temperature drops, the battery capacity drops accordingly. The batteries must be in good condition and fully charged when the dump truck is operated in low temperatures.
- Fuel must be of a low pour point, and the fuel tank must be filled up at the end of the shift. 0.5 - 2 % alcohol (isopropanol) can be added to avoid condensation.
- The washer fluid should contain a mix of alcohol (isopropanol) and water which at least is sufficient to avoid icing in the tubes.
- At very low temperatures (below -10 °C) use of engine heater can be necessary to avoid starting difficulties. It is recommended to use an engine heater (optional equipment) at low temperatures. The engine heater has an electrical element which heats the engine coolant.
- Extend the warm-up period to secure that component lubrication is obtained. The dump truck must be operated with light load and reduced rpm during warming up.
- Pay special attention to the ground surface. In case of snow and ice, use snow chains on the wheels to secure the wheel grip.
- If the dump truck is equipped with exhaust-heated body, this should be connected to avoid material freezing to the body.
- Run the A/C compressor once a week to perform internal seals lubrication.
- Start engine, making sure it is warm enough before running the AC (the compressor). This will allow the refrigerant stored as liquid on the bottom of the system to become gas. When the compressor sucks liquid it can damage the weak valves.

(See also chapter 3 Operating controls)

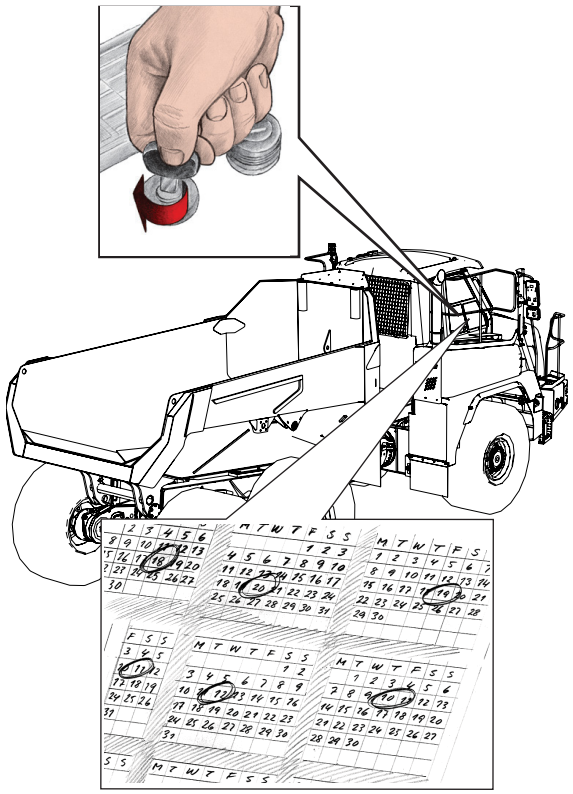


10. Long term storage

If the dump truck is to be stored for a longer period of time, special preparation must be carried out to avoid deterioration and damage. Store it preferably indoors in a dry and ventilated room or outdoors under shelter.

10.1. Before storage:

1. Neutralise all operating controls, place the gear selector in neutral position and apply the parking brake.
2. Thoroughly wash and clean the dump truck.
3. Completely fill the fuel tank.
4. Replace oil and filters with new and lubricate all nipples. Check viscosities to match the expected ambient temperature.
5. If the ambient temperature is expected to drop below 0 °C, always add anti-freeze to the cooling water.
6. Fully charge the batteries and disconnect terminals. The battery is preferably stored separately in a cold place.
7. Cover all cylinder piston rods with rust protecting fluid.
8. Inflate the tires to correct pressure (See chapter 8).
9. Lock the sliding windows, door, fender hatches and bonnet.



10.2. During storage:

Operate the truck once a month by driving it i.e. until engine temperature reaches normal operating temperatures. This will lubricate all moving parts. At the same time check for leakages and recharge the batteries. Grease the nipples.

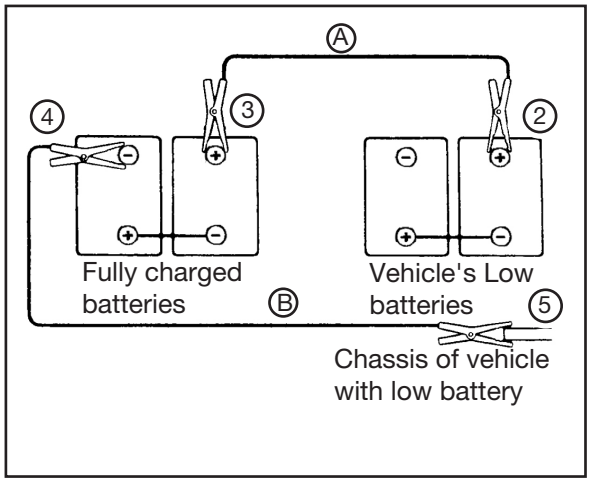
NOTE

Check oil and fluid levels before starting the engine! Drive slowly and with care the first 5 minutes or 1 km.

11.Battery power assistance

In case of discharged batteries, the dump truck can be started by connecting charged batteries, 24 volts with capacity approx. equal to the discharged batteries.

- If the batteries have been discharged, check the reason why (Are the batteries defective? Is there a short circuit somewhere on the dump truck? etc.).
- Discharged batteries should be charged as soon as possible.
- Check the electrolyte level and density after charging the batteries.



Connection:

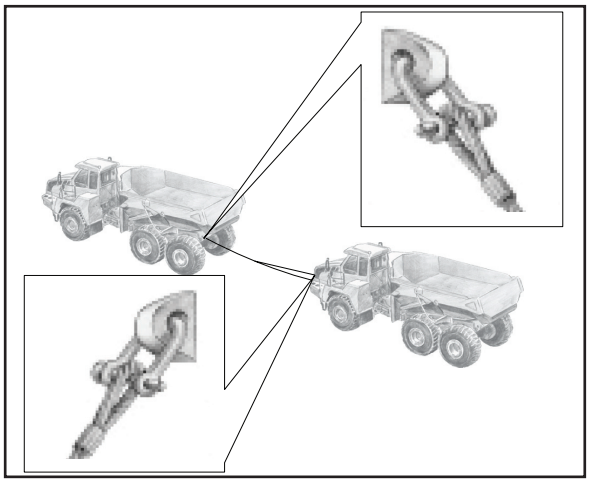
1. Turn off the battery main switch on the right hand side fender.
2. Connect first cable (A) from positive (+) terminal on discharged batteries....
3. .... to the positive (+) terminal on the assisting battery.
4. Connect second cable (B) from negative (-) terminal on assisting battery....
5. .... to chassis on the dump truck with the discharged batteries, some distance from the batteries.
6. Turn on the battery main switch and start the engine in the normal way.

Disconnection:

Disconnect cables in the opposite order, 5 - 4 - 3 - 2.

CAUTION

- **Use cables with min. 25 mm² cross section.**
- **Connect in sequence described above.**
- **Good clamp contact is essential.**
- **Do not stand near a battery when connecting the cable to the chassis.**
- **Do not disconnect the original battery cables.**



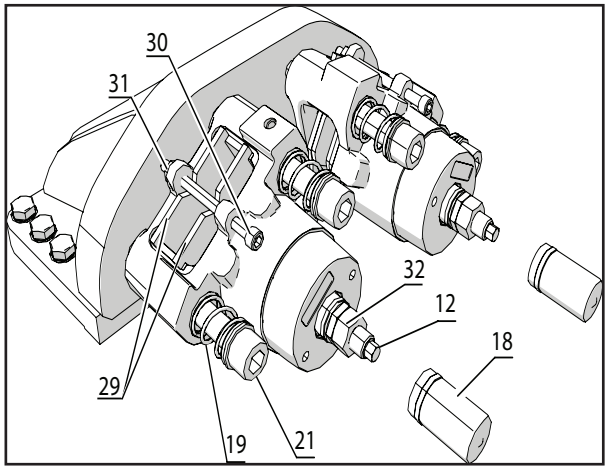
12.Towing the dump truck.

- The dump truck can be towed by attaching a wire/chain to the eyes on the front/rear of the dump truck.
- Check that the wire/chain is capable of towing the load.
- The towing distance must not exceed 10 km, and the maximum allowed speed is 10 km/h!
- The engine must run at low idle to steer the dump truck in the normal way. If the engine is stopped, the steering movement will be heavier and slower than normal because there is no oil flow from the main hydraulic pump.
- The maximum towing force is:
  - Front: 100 kN (each)
  - Rear: 200 kN

CAUTION

- **If fluid pressure is lost, the service brake will not function and the parking brake will be engaged.**
- **An engaged parking brake can be loosened even if there is no fluid pressure in the system, see item 12.**
- **It is not possible to start the engine by towing!**

13.Manual release of parking brake.

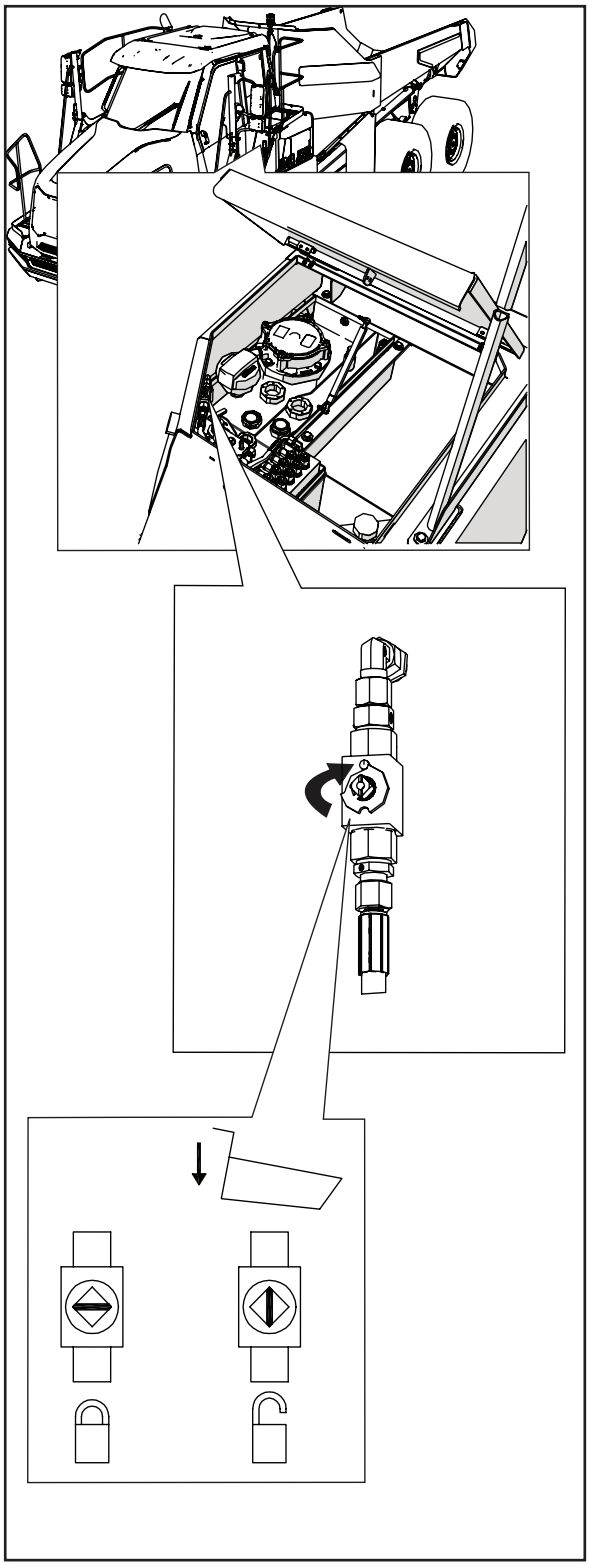


If the parking brake must be disengaged when hydraulic pressure is not available, the following procedure should be carried out (one unit on HA30/HA30A, two units on HA45/HA45A) :

1. Secure the dump truck with wheel chocks so that it will not move as the parking brake is disengaged.
2. Raise the body and secure it with the body support (see chapter 2 - safety instructions).
3. Remove the cap (item 18)
4. Loosen the hex nut (item 32) and rotate the screw-adjustment (item 12) in counter-clocIkwise until the piston assy is flush with the exposed end of the piston.
5. The brake assembly is now released.
6. Repair the dump truck so that hydraulic pressure is available to the parking brake.
7. Tighten the screw-adjustment (item 12) clockwise until brake pads are clamped onto the disc. The screw (item 30) must not contact the park brake bracket during this procedure.
8. Check or tighten the screw (item 21) until the spring-compression (item 19) should be 12.70-16.81 mm when properly adjusted.
9. Apply the hydraulic brake line. The brake is now ready for ıce adjustment procedure (See the 500 hour.)

DANGER

All braking systems are out of function when the parking brake is manual released. Extreme care must be taken to avoid spontaneous rolling.

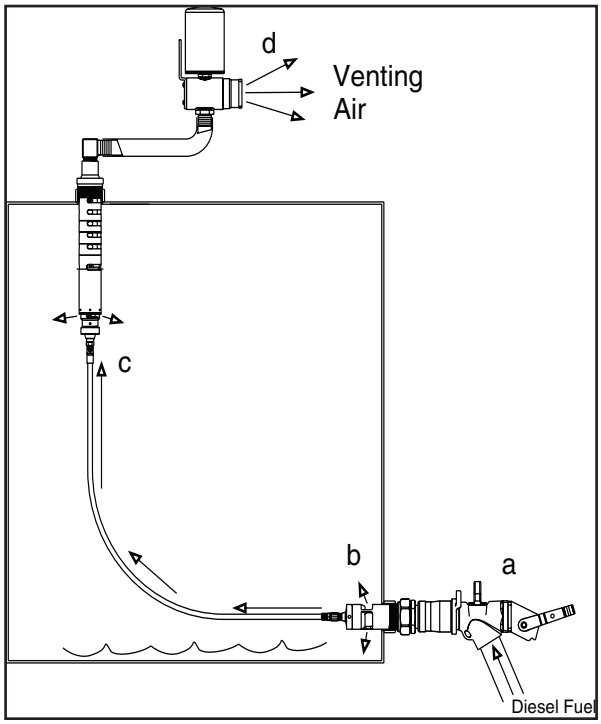


14.Manual release of tilted body.

If the body is lifted and cannot be lowered by the tip control lever, i.e. hydraulic pressure has been lost, the ball valve may be manually released.

1. The ball valve is located on top of hydraulic tank on the left side of the cab.
2. Open the hydraulic tank hatch.
3. Turn the valve lever to the vertical position.
4. Wait until the body is in the lowered position.
5. Turn the valve lever to the horizontal position.

15.Fast fill system (Option)

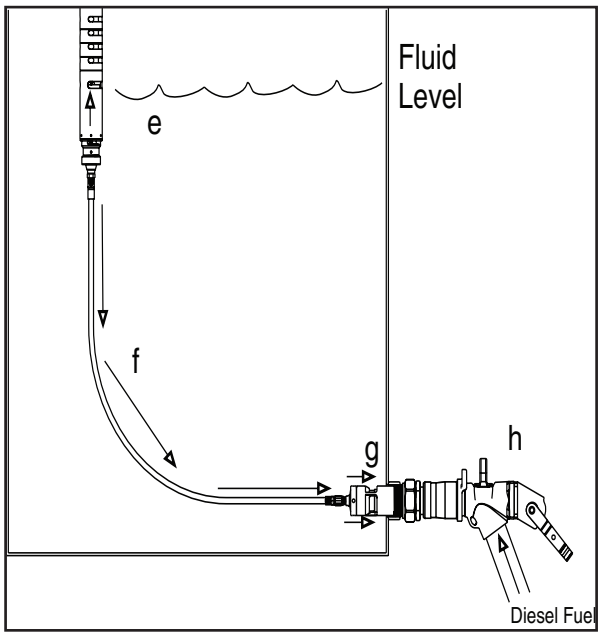


The Fast Fill Systems Pressureless Diesel Fueling System allows automatic shut-off with out introducing pressure to the tank structure. This is a positive shut-off system, which closes the shutoff valve by sensing the level in the tank.

Fueling Initiated

The diesel fuel nozzle (a) is connected to the receiver and is turned on. The incoming fuel pushes the inlet/shutoff valve open filling the diesel fuel tank (b). A small amount of fuel flows through the 3/8" signal line (c) to the vent/level controller and is bled off into the tank.

As diesel fuel fills the tank, the vapor (d) is discharged through the vent/level control and vent filter assembly.



Diesel Fuel Reaches Shut-Off Level

When the diesel fuel reaches the predetermined shutoff level (e) a float in the vent/level control is raised and pressure begins to build in the signal line (f).

Shutoff is Initiated

The inlet/shutoff valve (g) senses the pressure in the signal and closes. The pressure sensitive diesel fuel nozzle senses an increase in pressure, because the inlet/shutoff valve closed, and shuts off. The shutoff valve cannot be reopened until the fuel level is decreased to lower the float; the diesel fuel nozzle can not add fuel until the shutoff valve can be reopened.

Requirements

Maximum Operating Pressure: 14,5 psi / 100 kPa

Minimum Operating Pressure: 5 psi / 35 kPa*

Minimum Flow Rate: 25 gpm / 95 lpm

Diesel Fuel Nozzle Shut-Off Pressure: 7psi / 48 kPa or greater

Flow rates over 150 gpm / 568 lpm only possible with diesel fuel nozzles rated for such, e.g. N150SL800

* Requirement at the nozzle. Additional plumbing between the pump and the diesel fuel nozzle will add additional pressure drop to the system.

16.Troubleshooting

If the action below does not solve the problem or the fault cannot be found, contact Hyundai Dealer.

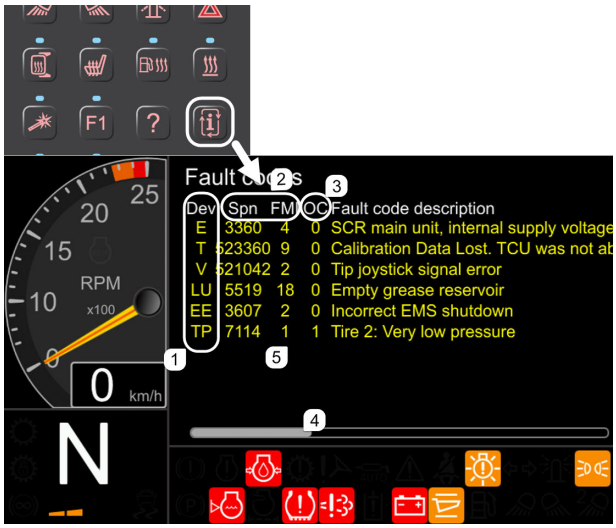
*= Always contact your Hyundai Dealer.

Area of dump truck	Symptom/Problem	Cause	Remedy/Solution
Engine	Dump truck will not start	Main switch disconnected	Turn on
		Out of fuel	Refill fuel, bleed system
		Low battery current	Recharge
		Blown fuse	Check circuit, replace fuse
		Defective wiring	Check connections, wires
		Hydrostatic lock	Repair *
		Starter motor defective	Replace *
		Electronic controller or sensors defective	Check/repair *
	Starts but engine cuts out sud-denly, runs un-evenly or hunts. Low output	Fuel system disturbance	Check fuel lines, bleed system
		Condensed water in diesel	Drain tank
		Bad fuel quality	Change fuel
		Low fuel level	Refill fuel
		Fuel filters clogged	Replace filters
		Air filter clogged	Replace or clean
		Fuel tank breather clogged	Clean tank cover
		Wrong injection setting	Adjust *
		Injector defective	Repair/replace *
		Turbo charger defective	Repair/replace *
		Worn engine or internal damage	Overhaul *
		Electronic controller or sensors defective	Check/repair *
	Overheated (Warning light)	Low coolant level	Add coolant, check for leakages
		Fan belt problem	Tighten/replace
		Air in cooling system	Bleed system
		Dirt inside cooling system	Clean and replace coolant
		Radiator fins clogged/damaged	Clean
		Thermostat faulty	Replace *
		Sensor/gauge defective	Replace *
		Coolant pump worn	Overhaul *
	Low coolant temperature	Sensor/gauge defective	Replace *
		Thermostat stuck open	Replace *
	Low oil pressure	Too low oil level	Add oil, check for leakage
		Incorrect oil type	Change to correct oil type *
		Sensor/gauge defective	Replace *
		Oil pressure red - valve faulty	Overhaul *
		Worn oil pump	Overhaul *
	Blue smoke, oil consumed	Too high oil level	Adjust to specified level
		Incorrect oil type	Change to correct oil type*
		Worn engine or internal damage	Overhaul *
	Black or white smoke	Clogged air filter	Replace or clean
		Fuel pump/injection system worn or faulty	Adjust/repair *
		Cylinder gasket defective	Replace *
		Turbocharger defective	Repair/replace *
	Oil in coolant or coolant in oil	Internal leak in engine cooler	Replace *
		Cylinder gasket defective	Replace *
		Worn engine or internal damage	Overhaul *

Area of dump truck	Symptom/Problem	Cause	Remedy/Solution
Engine	Knocking noise	Bad fuel quality	Change fuel
		Valves incorrectly adjusted	Adjust
		Injectors incorrectly adjusted	Adjust *
		Injector defective	Replace *
		Worn engine or internal damage	Overhaul *
	Main warning light illuminates	Engine/engine controller failure	Stop the dump truck at a safe place, check the error codes and contact your Hyundai Dealer.
Transmission	Too high temperature	Too high oil level	Adjust to specified level
		Incorrect oil type	Change to correct oil type *
		Cooling circuit failure	Check/repair *
		Lock-up fault	Overhaul *
		Worn oil pump	Overhaul *
	Will not drive in any gear or only possible to drive in some gears	Too low oil level	Add oil, check for leakage
		Blown fuse	Check circuit *
		Convertor prop. shaft	Replace *
		Electronic controller detection failure, neutral engaged	Check/repair *
		Electronic controller or sensors defective	Check/repair *
		Flywheel damper separated	Replace *
		Drive line failure	Check/repair *
		Internal transmission failure	Overhaul/replace *
		Automatic central lubrication failure	Check/repair *
	Low oil pressure	Too low oil level	Add oil, check for leakage
		Incorrect oil type	Change to correct oil type *
		Sensor/gauge defective	Replace *
		Pressure control valve failure	Check/repair *
		Worn oil pump	Overhaul *
		Internal transmission failure	Overhaul/replace *
	Noise	Too low oil level	Add oil, check for leakage
		Incorrect oil type in differential(s)	Change to correct type *
		Worn transmission or internal damage	Overhaul/replace *
	Main warning light illuminates	Transmission/transmission controller failure	Stop the dump truck at a safe place, check the error codes on the gear display and contact your Hyundai Dealer.

Area of dump truck	Symptom/Problem	Cause	Remedy/Solution
Brakes	Poor braking effect or truck pull to one side when braking	Insufficient oil pressure	Check charging and system*
		Worn out brakes	Overhaul/replace *
Hydraulic system	Emergency steering light	No oil flow from emergency pump	Check and repair *
	Truck will not go straight ahead, uneven steering movement or periodically sticking	Low hydraulic pressure	Add oil, check for leakage
		Air trapped in hydraulic system	Bleed system *
		Contaminated oil	Change oil and flush system *
		Incorrect oil type	Change to correct oil type *
		Steering cylinders internal leak	Overhaul *
		Orbitrol or steering valve failure	Check and repair *
	Not possible to tip or activate slow tipping	Low hydraulic oil level	Add oil, check for leakage
		Clogged oil filter	Replace
		Clogged tank strainer or breather	Replace/clean
		Low oil pressure	Check/repair *
		Worn oil pump	Check/repair *
		Tip valve failure	Overhaul *
	Main warning light illuminates	Hydraulic failure	Stop the dump truck at a safe place, and check the error codes on the main display and contact your Hyundai Dealer.
Lubrication system	Main warning light illuminates	Lubrication system failure	Check the error codes on the main display
Electrical system	No electrical power	Main switch disconnected	Turn on
		Batteries discharged	Recharge
		Battery terminals/wiring defective	Repair *
	Charge warning light on	Fan belt problem	Tighten/replace
		Defective/worn alternator	Replace *
		Defective wiring	Check connections, wires *
Chassis	Uncomfortable travel (jumping)	Defective Suspension Cylinder	Replace *
		Articulation turning ring worn	Overhaul *
	Vibrations	Engine or transmission mountings	Replace
		Fan or flywheel loose/imbalance	Check/repair *
		Defective elastic coupling	Check/repair *
		Prop. shaft failure	Check/repair *
		Drive line problem	Check/repair *

17.Fault codes



There is possibility to read the fault codes directly from the main screen.

The fault info screen (5) is shown after pressing the info button. If there is any problem with the machine the code will appear on the list.

1. The Device fault codes comes from
   - E = Engine
   - T = Transmission
   - V = VCU3
   - LU = Lubrication system
   - EE = Engine Exhaust gas aftertreatment system
   - TP = Tire Pressure monitor system (option)
2. Combination of Spn and FMI uniquely identifies the fault code
3. The OC= Occurrence count. Shows the number of times this error happened.
4. The arrow keys can be used to scroll through the list and also see the full line of text.

Lubricants

Lubrication schedule HA30/HA30A -HA45/HA45A

Complete instructions in section 7. Maintenance.

Pos.	Component	1st service		Service interval						Min. once a year	VISCOSITY GRADE/ lubricant class
	Engine hours -->	100	500	8	40	500	1000	2000	4000		
	ENGINE										
1	Engine oil T2/T3/T4F			C		R					**15W-40 API CI-4, ACEA E7**
1	Engine oil StageV			C		R					**5W-30 Scania LDF-4**
2	Centrifugal cleaner			C		Cl					
3	Engine oil filter					R					
4	Fuel filter (2 - only T4F/Stage V)						R				
5	Coolant/cooling system			C				C	R	C/R*	**40% Coolant**
6	Water separator			D			R				
	ENGINE RELATED										
10	Air filter, outer element -Inner element: replace every 2 years					C/R*				Cl/R*	
11	Batteries (2)						C			C	
12	Fuel tank			C							
13	Urea tank			C							**Only for - T4F / StageV**
14	Urea filling/ventilation point					Cl					**Only for - T4F / StageV**
15	Urea filter						R				**Only for - T4F / StageV**
	TRANSMISSION										
20	Transmission oil			C			R**		R*	R**	**ZF TE-ML 03M *- minimum once every two years ** - If use ZF TE-ML 03H**
21	Filter (2)	R					R			R	
	DRIVE LINE										
30	Front differential oil		R			C		R		R	**Universal axle and transmission oil ZF TE-MI 05F**
31	Rear differential oil	R				C		R		R	**SAE 75 W-90 MIL-L2105B / API GL 5**
32	Tandem housing oil (2)	R				C		R		R	**SAE 75 W-90 MIL-L2105B / API GL 5**
33	Planetary hub (6)	R				C		R		R	**SAE 75 W-90 MIL-L2105B / API GL 5**
34	Separate brake cooling tank		R					R		R	**ISO VG32 with 3-6% Lubrizol**
35	Separate brake cooling filter		R				R			R	
	HYDRAULIC										
40	Hydraulic oil			C					R		**ISO VG32**
41	Breather element on tank						R				
42	Filter	R					R				
	LUBRICATION POINTS										
50	Fender hatches, bonnet (6 points)					L					**NLGI 2**
51	Cab hinges (2 points)					L					
52	Cardan shaft (2 points)					L-X					
53	Cardan shaft (2 points)					L-X					
55	Cardan shaft (2 points)					L-X					
56	Cardan shaft (2+2 points)					L-X					
58	Tilt support					L					
59	Lubrication unit				C						
	MISCELLANEOUS										
70	Cab ventilation filter, external				Cl/R*	C/R*					
80	Hydr. pump, tiltable cab						C				**ISO VG15**
100	Cab ventilation filter, internal				Cl/R*	R					
110	Receiver - dryer filter							R			
120	Refrigerant AC system								C/R*		**R - 134a**
130	Fast fill filter	C					C/R			C	**Option**

Not all items are shown in the illustration on the next page

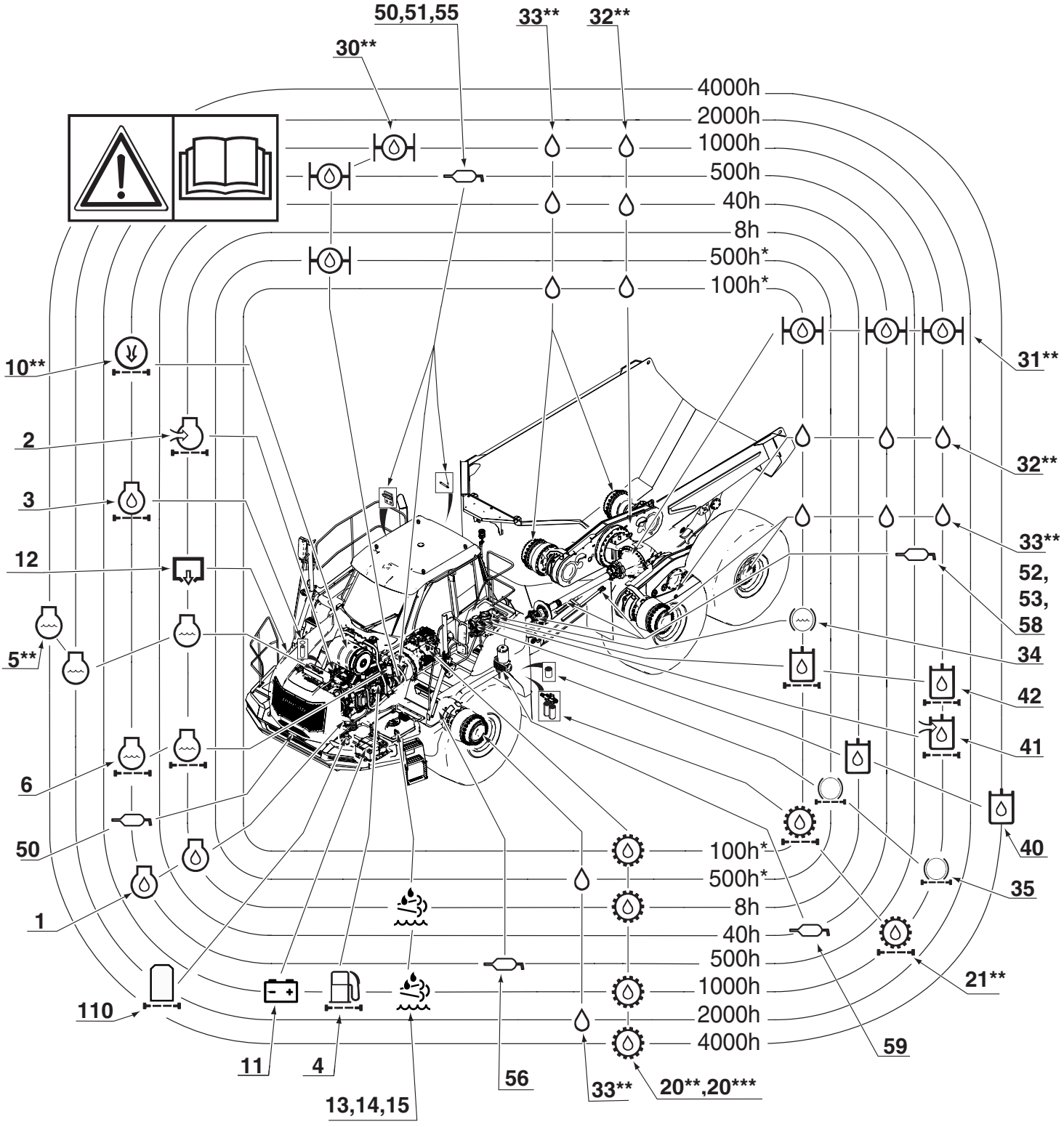
R=Replace C=Check Cl=Clean L=Lubricate D=Drain *=or when required

L-X= Universal joints: Pump grease until it purges out of all spider bearing block seals.

Overview of oil and lubrication points HA30/HA30A -HA45/HA45A

The numbers refer to table on previous page.

Lubrication and Service Chart



*1st. service

**Min. once a year

***Min. once every two years

Oil specification sheet HA30/HA30A -HA45/HA45A

This table presents guidelines for oil, coolant, fuel, lubricants and other fluids best suited for good performance and long life.

Component	Kind of fluid	Ambient temperature -40 -22 -4 14 32 50 68 86 104 122 °F -40 -30 -20 -10 0 10 20 30 40 50 °C	Remarks
Engine oil pan	Engine oil T2/T3/T4	SAE 50 SAE 5W-30 SAE 15W-40 SAE 10W-30 SAE 20W-30 SAE 30 SAE 40	The engine oil should at least meet the requirements for one of the following oil classifications: **- ACEA E5 and E7** **- API CI-4** (For fuel with maximum 15ppm (0,0015%) sulphur content) - The Total Base Number (TBN) should be a **minimum** of 12-13 (ASTM 2896) If fuel contains more than 0.3% (weight) sulphur: Reduce the oil change interval with 50%. Make sure the oil can sustain all temperature variations up until next oil change. Ask your local Hyundai Dealer or oil supplier Doosan Engine oil API CI-4 & ACEA E7 10W-40
	Stage V	SAE 5W-30	- **ACEA E5 and E7** **- API CI-4 , CI-4+** Scania LDF-4
Fuel Tank	Diesel fuel	ASTM D975 No.1 ASTM D975 No.2	**Acc. to: ASTM and ISO standards** **Cetane number: min.49.** **Sulphur contents: max. 0.3%(weight)** Max 2% isopropanol additive
Cooling system	Water + antifreeze		30-50% Nitrate-free glycol antifreeze is recommended. See 2000 hours service. Doosan Long- Life coolant
ZF transmission	ATF	ZF TE - ML 03M / 03H	When changing oil, it is recommended to run the transmission clutch calibration (AEB-tester). **Only oils in the transmission oil list can be used !** **NOTE:** Min. 20 minutes warming up period in neutral position is required when ambient temperature is within this area : **Be aware about the oil class change will affecting the maintenance intervals.**
Rear diff, **Tandem housing and Hubs (6)**	Gear oil with Limited-slip additives	SAE 75W-85 SAE 90 SAE 140	**According to:** API GL-5 Only Oils with LS additives Hypoid – gear oil per MIL-L – 2105 B / API GL 5 Hypoid – gear oil in multi – range characteristic per MIL-L – 2105 C / D / API GL 5 SAE 90 or multi grade oils for normal external temperature SAE 75 W – 90; SAE 75 W – 85 for external temperature lower – 10°C SAE 140 or multi grade oils for external temperature over + 30°C
Brake cooling tank			Moderate climate : ISO VG 22-32 Cery cold climate : ISO VG 15 Very warm climate: ISO VG 46
Front diff.	Universal axle transmission oil	ZF TE-ML - 05F	ZF TE-ML 05F
Hydraulic tank	Hydraulic oil	ISO VG 15 ISO VG 32 ISO VG 46 ISO VG 68	Only mineral based oils Viscosity approx. 20 cSt at normal operating temp. Range: 10-250 cSt, max. 850 cSt at cold start. **Hydraulic oil:** HM or HV oils (ISO 6743/4, CETOP RP 91H) or H-LP oils (DIN 51524). • Contact oil supplier when operating in temperature below -25°C • Warm up in neutral after starting at temperature near lower limitation of the oil . • If using **Biological oil** contact your Hyundai Dealer before use. The oil must be approved by Doosan Infracore Norway AS.
Lubricator			Lithium saponified with EP-additive Consistency NLGI - 0/1/2.
Automatic Central lubr. system	Universal grease	NLGI 0/1	**NOTE**: See specification on the next page, Grease should not contain graphite or PTFE. Consitency NLGI-2 or synthetic 2, NLGI 0/1 or Synthetic 0/1
Hydraulic pump, tiltable cab	Hydraulic oil	ISO VG 15 See remarks	**NOTE:** If the cab should be tilted by use of the hydraulic pump at temperatures below -20°C, use oil fluid 4 Aero Shell or similar

Description	ASTM test Method	Min/Max	Specification	Remarks
NLGI Grade	D217	Std	2	-25 °C to +130 °C
Thickener type		Min	Lithium Complex	
Solid Additives, Moly		Max	5 %	No Graphite
Oxidation Stability	D942	Max	0,3 bar	@ 100 hrs
Water washout	D1264	Max	5 %	@ 79 °C
Dropping point	D1264	Min	140 °C	
Rust protection	D1743		Pass	
Copper corrosion	D4048	Max	1 B	
Base oil viscosity	D445	Min	600 cSt	@ 40 °C
Four ball (EP) weld point	D2596	Min	400 kg	
Four ball wear	D2266	Max	0,6 mm	1 hr @ 75 °C/1200 rpm/40 kg

The grease quality is important due to potential damage and wear in bearings, any failure in the tandem and articulation bearing will create a high repair cost.
Use of Grease with wrong specification will affect warranty claims.
Make sure that you meet the specifications, and have extra focus at:

1. Four ball (Extreme Pressure) weld point.
2. Four ball wear.

Filling capacities HA30/HA30A

All capacities are measured in litres (dm3), and are approximate values. To achieve correct level **ALWAYS**: check at dip stick, level eye, level plug etc.

(Refer to the Hyundai Operating & Maintenance Manual Chapter 7)

Description:

Specified capacity: Total tank/reservoir volume or total capacity from empty.

Component/Fluid	Specified capacity (litres/kilograms)
Engine oil	33,5
Engine coolant	45
Fuel Tank	363
Transmission oil*	67
Front differential	9,4
Tandem housing, Rear reduction gear, Rear differential***	128
Front reduction gear (each)	2 x 3
Brake cooling tank	15
Hydraulic tank	63
Windscreen washer tank	4,5
AdBlue® tank	70
AC system	2,0 kg **

* - Check level when engine runs at low idle.
Do **not** run engine **without** oil in the transmission.
** - 2,86 tonnes CO_2 equivalent each unit
*** - Several filling points

Filling capacities HA45/HA45A

All capacities are measured in liters (dm3), and are approximate values. To achieve correct level **ALWAYS**: check at dip stick, level eye, level plug etc.

(Refer to the Hyundai Operating & Maintenance Manual Chapter 7)

Description:

Specified capacity: Total tank/reservoir volume or total capacity from empty.

Component/Fluid	Specified capacity (litres/kilograms)
Engine oil	45
Engine coolant	50
Fuel Tank	490
Transmission oil*	68
Front differential	9,4
Tandem housing, Rear reduction gear, Rear differential ***	240
Front reduction gear (each)	2 x 4,8
Brake cooling tank	15
Hydraulic tank	63
Windscreen washer tank	4.5
AdBlue® tank	70
AC system	2,0 kg **

* - Check level when engine runs at low idle.
Do **not** run engine **without** oil in the transmission.
** - 2,86 tonnes CO_2 equivalent each unit
*** - Several filling points

Composition of the fuel

The composition of the fuel is extremely important for the operation and service life of the engine and injection system. The engine output and exhaust gases are also dependent on the fuel grade.

The fuel must conform to EU standard EN590. The tables below shows some of the key properties.

T2/T3 - PDE properties

Property (PDE)	Requirements
Viscosity at 40°C (104°F)	2.0-4.5 cSt
Density at 15°C (59°F)	0.82-0.86 cSt
Ignitability (CET rating)	minimum 49
Flashpoint	56°C (132°F)

The A sulphur content of 0-2,000 ppm in the fuel (0.2%) gives an oil change interval of up to 500 hours.
- With a sulphur content of 2,000-4,000 ppm in the fuel, the oil change interval is halved to max. 250 hours.
- Maximum permitted sulphur contents in the fuel is 4,000 ppm.

T4F /StageV XPI properties

Property (XPI)	Requirements
Viscosity at 40°C (104°F)	1.4-4.5 cSt
Density at 15°C (59°F)	0.77-0.87 kg/dm³
Ignitability (CET rating)	minimum 49
Flashpoint	56°C (132°F)
Particulate contamination level	Classification 22/20/17 according to ISO 4406

It is important for sulphur-free or ultra-low sulphur diesel to be used on engines with SCR systems certified in accordance with Stage III B/ Tier 4i or later to ensure that the engine operates correctly. If diesel with an excessive sulphur content is used, it can cause damage to the engine and the SCR system.

From January 2011 legislation in the USA and Europe requires all diesel engines not used on the road to be run on sulphur-free or ultra-low sulphur diesel.

NOTE

In Europe, the fuel should be sulphur-free according to standard EN 590. This means that the sulphur content must not exceed 10 ppm.
In the USA the fuel must be an ultra-low sulphur fuel in accordance with standard ASTM D975. This means that the sulphur content may not exceed 15 ppm.

NOTE

European standard: EN 590. EN 590 contains maximum 7% Biodiesel EN 14214.

Transmission oil list

This list comes from the ZF website and is updated every 3 months. Please check the date of publication of the ZF transmission oil list, if necessary please go to the ZF website:

https://aftermarket.zf.com/remotemedia/lol-lubricants/lol-en/lol-te-ml-03-en.pdf

to download the latest version of the ZF transmission oil list.

For transmission - ERGOPOWER L2 (generation A)

Date of version 01.10.2020

Lubricant class 03H

Biodegradable lubricants
Environmental label RAL-UZ 79 (Blauer Engel), VAMIL-regeling

Viscosity grade: SAE 75W-80

Instructions on the use of biodegradable lubricants:

The oil manufacturer´s change-over directives included in the product description are to be observed when change-over to biodegradable lubricants is effected.

Manufacturer	Trade name
PANOLIN AG, MADETSWIL/CH	PANOLIN BIOFLUID ZFH 10W/30

Lubricant class 03M

Automatic Transmission Fluids (ATF)

Manufacturer	Trade name
BASF SE, LUDWIGSHAFEN/DE	EMGARD 2805
CASTROL LTD, LONDON/GB	CASTROL TRANSYND
CASTROL LTD, LONDON/GB	TES-295 SYN TRANSMISSION FLUID
EXXONMOBIL CORPORATION, HOUSTON, TX/US	MOBIL DELVAC 1 ATF
JOHN DEERE, MOLINE, ILLINOIS/US	HD SYNTHETIC TRANSMISSION FLUID

Axles oil list

This list comes from the ZF website and is updated every 3 months. Please check the date of publication of the ZF transmission oil list, if necessary please go to the ZF website:

https://aftermarket.zf.com/remotemedia/lol-lubricants/lol-en/lol-te-ml-05-en.pdf

(05F)

to download the latest version of the ZF transmission oil list.

Date of version 01.10.2020

Lubricant class 05F

Universal axle and transmission oil

Manufacturer	Trade name
ADDINOL LUBE OIL GMBH, LEUNA/DE	ADDINOL UTTO SAE 10W-30
ADDINOL LUBE OIL GMBH, LEUNA/DE	ADDINOL UTTO EXTRA (SAE 20W-40)
ARAL AG, BOCHUM/DE	ARAL FLUID HGS
ARGO TRACTORS S.P.A., FABBRICO RE/IT	VELA C+ LANDINI
ARGO TRACTORS S.P.A., FABBRICO RE/IT	VELA C+ MCCORMICK
ARGO TRACTORS S.P.A., FABBRICO RE/IT	VELA C+ AGROLUBE
AVIA AG, MÜNCHEN/DE	AVIA HYDROFLUID TD
BAYWA AG MÜNCHEN, MÜNCHEN/DE	TECTROL UTTO-ZF
BAYWA AG MÜNCHEN, MÜNCHEN/DE	TECTROL UTTO-HF
BLASER SWISSLUBE AG, HASLE-RÜEGSAU/CH	EVOLCA UTTO 8068
BP PLC., LONDON/GB	BP VANELLUS AGRI SUPER TRANSMISSION 80W
BP PLC., LONDON/GB	BP TRACTRAN TF-10
BP PLC., LONDON/GB	BP VANELLUS AGRI SUPER TRANSMISSION 80W
BUCHER AG LANGENTHAL, LANGENTHAL/CH	FARMER POLY 304
BUCHER AG LANGENTHAL, LANGENTHAL/CH	MOTOREX UTTO CF
BUCHER AG LANGENTHAL, LANGENTHAL/CH	FARMER POLY 604
CASTROL LTD, LONDON/GB	CASTROL AGRI TRANS PLUS 80W
CASTROL LTD, LONDON/GB	CASTROL AGRI TRANS PLUS 10W-30
CASTROL LTD, LONDON/GB	CASTROL TRANSMAX AGRI TRANS PLUS 80W
CASTROL LTD, LONDON/GB	CASTROL AGRI TRANS PLUS 80W
CASTROL LTD, LONDON/GB	CASTROL TRANSMAX AGRI TRANS PLUS 80W
CATERPILLAR, INC., MOSSVILLE/US	CAT MULTIPURPOSE TRACTOR OIL
CEPSA COMERCIAL PETRÓLEO S.A.U., MADRID/ES	CEPSA AURIGA TE 55 10W-30
CHEVRON LUBRICANTS, SAN RAMON, CA/US	CHEVRON 1000 THF
CLASS KGAA MBH, HARSEWINKEL/DE	CLAAS AGRISHIFT GA 12
DEUTSCHE ÖLWERKE LUBMIN, LUBMIN/DE	AVENO UTTO
EUROL B.V., NJIVERDAL/NL	EUROL HYKROL JD 68
EXXONMOBIL CORPORATION, HOUSTON, TX/US	MOBILFLUID 424
EXXONMOBIL CORPORATION, HOUSTON, TX/US	MOBILFLUID 426
EXXONMOBIL CORPORATION, HOUSTON, TX/US	MOBIL HYDRAUL 56
EXXONMOBIL CORPORATION, HOUSTON, TX/US	MOBILFLUID 424
EXXONMOBIL CORPORATION, HOUSTON, TX/US	MOBILFLUID 426
EXXONMOBIL CORPORATION, HOUSTON, TX/US	MOBILFLUID 428
FINKE MINERALÖLWERK GMBH, 27374 VISSELHÖVEDE/DE	AVIATICON AGRA PREMIUM UTTO
FUCHS PETROLUB SE, MANNHEIM/DE	FUCHS TITAN UTTO ZF (SAE 20W-40)
FUCHS PETROLUB SE, MANNHEIM/DE	FUCHS TITAN AGRIFARM UTTO MP
FUCHS PETROLUB SE, MANNHEIM/DE	FUCHS TITAN AGRIFARM UTTO MP
GAZPROMNEFT-LUBRICANTS, MOSCOW/RU	G-SPECIAL UTTO 10W-30
GAZPROMNEFT-LUBRICANTS, MOSCOW/RU	G-SPECIAL UTTO 10W-30
GAZPROMNEFT-LUBRICANTS, MOSCOW/RU	G-SPECIAL UTTO PREMIUM 10W-30
GB LUBRICANTS, GATESHEAD/GB	GB UNITRANS(R) ZF
GS CALTEX CORPORATION, SEOUL/KR	DOOSAN AXLE OIL STANDARD
GULF OIL INTERNATIONAL, MUMBAI/IN	GULF MPTF 10W-30
GULF OIL INTERNATIONAL, MUMBAI/IN	GULF MPTF 10W-30
HINDUSTAN PETROLEUM CORPORATION LTD., MUMBAI/IN	HP SUPERTRAN FM
HYUNDAI OILBANK CO., LTD., SEOUL/KR	XTEER THF 75W-80
INA MAZIVA LTD., ZAGREB/HR	INA TRANSHIDROL JD 50
INA MAZIVA LTD., ZAGREB/HR	INA TRANSHIDROL ZF 20W-40
INA MAZIVA LTD., ZAGREB/HR	INA TRANSHIDROL JD 50
JCB INDIA, BALLABGARH/IN	JCB REAR AXLE OIL
JOHN DEERE, MOLINE, ILLINOIS/US	JOHN DEERE HY-GARD
JXTG NIPPON OIL & ENERGY CORPORATION, TOKYO/JP	KUBOTA UDT-HD
KUWAIT PETROLEUM INTERNATIONAL LUBRICANT, ANTWERP/NL	Q8 T 2000
KUWAIT PETROLEUM INTERNATIONAL LUBRICANT, ANTWERP/NL	JCB HP GEAR OIL PLUS
KUWAIT PETROLEUM INTERNATIONAL LUBRICANT, ANTWERP/NL	JCB HP GEAR OIL PLUS
KUWAIT PETROLEUM INTERNATIONAL LUBRICANT, ANTWERP/NL	JCB HP GEAR OIL PLUS
KUWAIT PETROLEUM INTERNATIONAL LUBRICANT, ANTWERP/NL	Q8 T 2200
KUWAIT PETROLEUM INTERNATIONAL LUBRICANT, ANTWERP/NL	Q8 T 2200
LIEBHERR HYDRAULIKBAGGER GMBH, KIRCHDORF/DE	LIEBHERR GEAR MF 80W
LIEBHERR HYDRAULIKBAGGER GMBH, KIRCHDORF/DE	LIEBHERR GEAR MF 80W
LIEBHERR HYDRAULIKBAGGER GMBH, KIRCHDORF/DE	LIEBHERR GEAR PLUS 20W-40

LIQUI MOLY GMBH, ULM/DE	LIQUI MOLY SPECIAL UTTO
MEGUIN GMBH & CO. KG, SAARLOUIS/DE	MEGOL TRAKTORENOEL UTTO PREMIUM SAE 10W-30
OBNINSKORGSINTEZ, OBNINSK/RU	RW DRIVE FORCE UTTO SAE 10W-30
OOO "LLK-INTERNATIONAL", MOSCOW/RU	LUKOIL VERSO PLUS
OOO "LLK-INTERNATIONAL", MOSCOW/RU	LUKOIL VERSO LVX
OPET FUCHS MADENI YAG. SAN. VE TIC. A.S., IZMIR/TR	OPET FULLGEAR FD 80W-140
PAKELO MOTOR OIL, SAN BONIFACIO (VR)/IT	UTTO FLUID 4 D SAE 10W-30
PANOLIN AG, MADETSWIL/CH	PANOLIN JD 303
PANOLIN AG, MADETSWIL/CH	PANOLIN CONSTAR UTTO 803
PETROBRAS DISTRIBUIDORA S.A., DUQUE DE CAXIAS/BR	LUBRAX UNITRACTOR SAE 10W-30
PETROGAL S.A., LISBOA/PT	GALP TRALUB 807 S
PETROL OFISI A.S., ISTANBUL/TR	MAXITRAK TMS OIL 500
PETRONAS LUBRICANTS INTERNATIONAL SDN BH, KUALA LUMPUR/MY	AMBRA MULTI G (SAE 10W-30)
PETRONAS LUBRICANTS INTERNATIONAL SDN BH, KUALA LUMPUR/MY	AMBRA MULTI G (SAE 10W-30)
PETRONAS LUBRICANTS INTERNATIONAL SDN BH, KUALA LUMPUR/MY	AMBRA MULTI G (SAE 10W-30)
PETRONAS LUBRICANTS INTERNATIONAL SDN BH, KUALA LUMPUR/MY	AMBRA TRX 20W-40 (SAE 20W-40)
PETRONAS LUBRICANTS INTERNATIONAL SDN BH, KUALA LUMPUR/MY	AMBRA TRX 80W-140 (SAE 80W-140)
PETRONAS LUBRICANTS INTERNATIONAL SDN BH, KUALA LUMPUR/MY	ARBOR TRW 140 SPECIAL (SAE 80W-140)
PETRONAS LUBRICANTS INTERNATIONAL SDN BH, KUALA LUMPUR/MY	AKCELA TRANSAXLE FLUID 20W-40 (SAE 20W-40)
PETRONAS LUBRICANTS INTERNATIONAL SDN BH, KUALA LUMPUR/MY	AKCELA TRANSAXLE FLUID 80W-140 (SAE 80W-140)
PETRONAS LUBRICANTS INTERNATIONAL SDN BH, KUALA LUMPUR/MY	AKCELA TRANSAXLE FLUID 80W-140 (SAE 80W-140)
PETRONAS LUBRICANTS INTERNATIONAL SDN BH, KUALA LUMPUR/MY	AKCELA TRANSAXLE FLUID 20W-40
PETRONAS LUBRICANTS INTERNATIONAL SDN BH, KUALA LUMPUR/MY	AMBRA MULTI G (SAE 10W-30)
PETRONAS LUBRICANTS INTERNATIONAL SDN BH, KUALA LUMPUR/MY	ARBOR MTF (SAE 10W-30)
PETRONAS LUBRICANTS INTERNATIONAL SDN BH, KUALA LUMPUR/MY	AKCELA NEXPLORE (SAE 10W-30)
PETRONAS LUBRICANTS INTERNATIONAL SDN BH, KUALA LUMPUR/MY	AKCELA NEXPLORE (SAE 10W-30)
PETRONAS LUBRICANTS INTERNATIONAL SDN BH, KUALA LUMPUR/MY	AMBRA MULTI G (SAE 10W-30)
PETRONAS LUBRICANTS INTERNATIONAL SDN BH, KUALA LUMPUR/MY	AKCELA NEXPLORE (SAE 10W-30)
PETRONAS LUBRICANTS INTERNATIONAL SDN BH, KUALA LUMPUR/MY	ARBOR MTF (SAE 10W-30)
PETRONAS LUBRICANTS INTERNATIONAL SDN BH, KUALA LUMPUR/MY	AMBRA TRX 80W-140 (SAE 80W-140)
PETRONAS LUBRICANTS INTERNATIONAL SDN BH, KUALA LUMPUR/MY	AKCELA TRANSAXLE FLUID 80W-140 (SAE 80W-140)
PETRONAS LUBRICANTS INTERNATIONAL SDN BH, KUALA LUMPUR/MY	AMBRA TRX 20W-40 (SAE 20W-40)
PETRONAS LUBRICANTS INTERNATIONAL SDN BH, KUALA LUMPUR/MY	AKCELA TRANSAXLE FLUID 20W-40 (SAE 20W-40)
PETRONAS LUBRICANTS INTERNATIONAL SDN BH, KUALA LUMPUR/MY	AMBRA MULTI G (SAE 10W-30)
PETRONAS LUBRICANTS INTERNATIONAL SDN BH, KUALA LUMPUR/MY	PETRONAS AKCELA NEXPLORE (SAE 10W-30)
PHI OIL GMBH, ST. GEORGEN/AT	GEAR OIL UTTO SILVER 10W-30
RAVENSBERGER SCHMIERSTOFFVERTRIEB GMBH, WERTHER/DE	RAVENOL GETRIEBEOEL UTTO
REPSOL LUBRICANTES Y ESPECIALIDADES, S.A, MADRID/ES	REPSOL ORION UTTO
ROLF LUBRICANTS GMBH, LEVERKUSEN/DE	ROLF UTTO SAE 10W-30
SAME DEUTZ FAHR, TREVIGLIO/IT	SDF UTTO
SAME DEUTZ FAHR, TREVIGLIO/IT	DF UTTO
SASOL ENERGY, JOHANNESBURG/ZA	UNIVERSAL TRANSMISSION OIL 68
SASOL ENERGY, JOHANNESBURG/ZA	SASOL UNIVERSAL TRANSMISSION OIL RS 68
SAVITA OIL TECHNOLOGIES LIMITED, MUMBAI/IN	SAVSOL 315 HAT
SEANON PETROCHEMICAL CO.,LTD., LIUZHOU, GUANGXI/CN	SEANON DEDICATED TRANSMISSION OIL 10W-30
SHELL INTERNATIONAL PETROLEUM COMP. LTD, LONDON/GB	SHELL SPIRAX S4 TXM
SHELL INTERNATIONAL PETROLEUM COMP. LTD, LONDON/GB	SHELL SPIRAX S4 TXM
SHELL INTERNATIONAL PETROLEUM COMP. LTD, LONDON/GB	SHELL SPIRAX S4 TXM
SHELL INTERNATIONAL PETROLEUM COMP. LTD, LONDON/GB	SHELL SPIRAX S6 TXME
SHELL INTERNATIONAL PETROLEUM COMP. LTD, LONDON/GB	SHELL SPIRAX S4 TXM
SHELL INTERNATIONAL PETROLEUM COMP. LTD, LONDON/GB	SHELL SPIRAX S4 TXM
SHELL INTERNATIONAL PETROLEUM COMP. LTD, LONDON/GB	SHELL SPIRAX S4 TXM
SINOPEC LUBRICANT CO., LTD., BEIJING/CN	SINOPEC GREATWALL UTTO
SINOPEC LUBRICANT CO., LTD., BEIJING/CN	SINOPEC UTTO
SK LUBRICANTS, SEOUL/KR	SK ZIC GL-4 ZF 80W
SRS SCHMIERSTOFF VERTRIEB GMBH, SALZBERGEN/DE	SRS HYDROFLUID N
SRS SCHMIERSTOFF VERTRIEB GMBH, SALZBERGEN/DE	SRS HYDROFLUID A
TOTAL LUBRIFIANTS S.A., NANTERRE/FR	TOTAL DYNATRANS MPV
TOTAL LUBRIFIANTS S.A., NANTERRE/FR	ELF TRACTELF BF 16
TOTAL LUBRIFIANTS S.A., NANTERRE/FR	TOTAL DYNATRANS LS 20W-40
TOTAL LUBRIFIANTS S.A., NANTERRE/FR	TOTAL DYNATRANS MPWB
TOTAL LUBRIFIANTS S.A., NANTERRE/FR	TOTAL DYNATRANS MPV
TOTAL LUBRIFIANTS S.A., NANTERRE/FR	ELF TRACTELF BF 16
TOTAL LUBRIFIANTS S.A., NANTERRE/FR	TOTAL DYNATRANS MPX
UNIL OPAL, SAUMUR/FR	UNIL OPAL FLUID G2 VARIO
UNIL OPAL, SAUMUR/FR	UNIL OPAL FLUID MVZ
VALVOLINE CUMMINS PVT LIMITED, GURGAON/IN	VALVOLINE UTF PREMIUM
VALVOLINE EUROPE, DORDRECHT/NL	UNITRAC 80W
VALVOLINE EUROPE, DORDRECHT/NL	NESTE GEAR UTTO

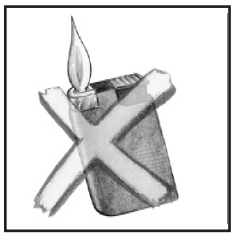
Maintenance

Maintenance precautions

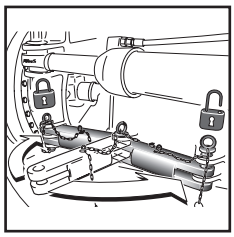
- Always prepare the dump truck before starting any maintenance adjustments or other work on the dump truck, see Service Position in the Safety Instructions chapter (Chapter 2).

- Fuel and oil are dangerous substances. Never handle fuel, oil, grease or oily clothes in places where there is any fire or flame. In case of fire, always know the location and how to use fire extinguishers and other fire fighting equipment.

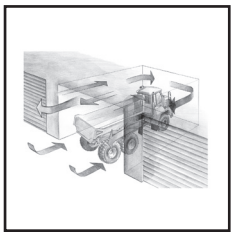
- Wear a well-fitting helmet, safety shoes and working clothes. When drilling, grinding or hammering always wear protective goggles.



- Flames should never be used instead of lamps. Never use a naked flame to check leaks or level of oil, fuel, anti-freeze or electrolyte.

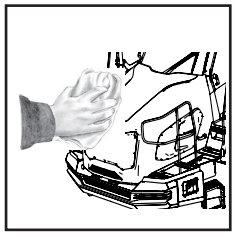


- Park the dump truck on firm, level ground. Apply the Articulation Lock.



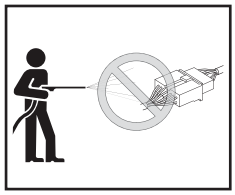
- Exhaust gas is dangerous. When working inside, be particularly careful to have good ventilation.

- When working with others, choose a group leader and follow the leader's instructions. Do not perform any maintenance beyond the agreed work.



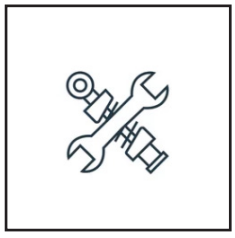
- Thoroughly wash the engine. In particular, be careful to clean the filler caps, grease fittings and the area around the dipsticks. Be careful not to let any dirt or dust into the system.

- Always stop the engine when performing maintenance near moving parts.

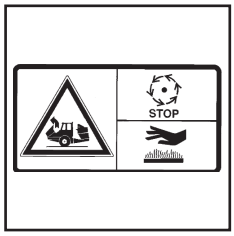


- Wash the dump truck, be careful not to wet electrical components or inside cab.

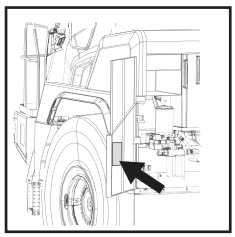
- During maintenance, do not allow any unauthorized person to stand near the dump truck.



- Always use Hyundai genuine parts for replacement.
- Contact your Hyundai dealer for 500 hour maintenance kit.

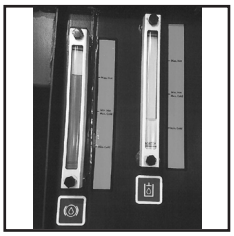


- Unless you have special instructions to the contrary, maintenance should always be carried out with engine stopped. If maintenance is carried out with the engine running, there must be two persons present: One operating the engine, and the other performing the maintenance. In such a case, never touch any moving parts.



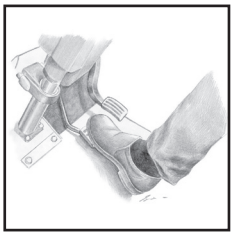
- Always use the grades of grease and oil recommended by the manufacturer. Choose the viscosity specified for the ambient temperature. See chapter 6.

* Numbers refer to positions on the lubrication schedule, chapter 6



- When adding oil check that the oil is at the correct level.
- After greasing up, always wipe off the old grease which was forced out.

- Always use pure oil or grease, and be sure to use clean containers.



For empty the hydraulic accumulators this need to be follow.

- Repeatedly press the brake pedal until pressure be equal to 0 on the main screen ACC1 and ACC2.
- Repeatedly turn ON/OFF parking brake button until pressure be equal to 0 on the main screen ACC3.
- Completely sink down the front suspension.

- When changing the oil or filter, check the drained oil and filter for any signs of excessive metal particles or other foreign materials.

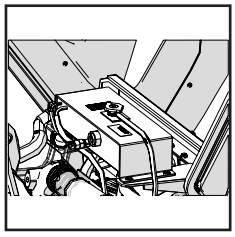
- When removing parts containing O-rings, gaskets or seals, clean the mounting surface and replace with new sealing parts.

- When checking or changing the oil, do it in a place free of dust, and prevent any dirt from getting into the oil.

- When lubricating oil or cooling water has been drained, keep an eye on the instrument panel so that the dump truck is not operated without oil or cooling water.

- Before draining the oil, warm it up to a temperature of 30° to 40° C. Be aware of possible internal pressure when opening any drain, level or filling plug. Hot oil can spurt out and inflict personal injury.

- After replacing oil, filter element or strainer, bleed the air from the circuit.



- Be particularly careful when removing the expansion tank cap. If this is done immediately after using the engine, there is a danger that hot coolant and steam may spurt out.

- When the strainer is located in the oil filler, the strainer must not be removed while adding oil.

- In case of difficult maintenance, contact your Hyundai Dealer.

- In case of difficult maintenance, refer to your Hyundai Dealer.

* Numbers refer to positions on the lubrication schedule, chapter 6

Maintenance table

Initial 100 Hours Service

Initial 500 Hours Service

8. Hours / Daily Service

40 Hours / Weekly Service

* Numbers refer to positions on the lubrication schedule, chapter 6

Maintenance table

500 Hours Service

1000 Hours Service

2000 Hours Service

* Numbers refer to positions on the lubrication schedule, chapter 6

Maintenance table

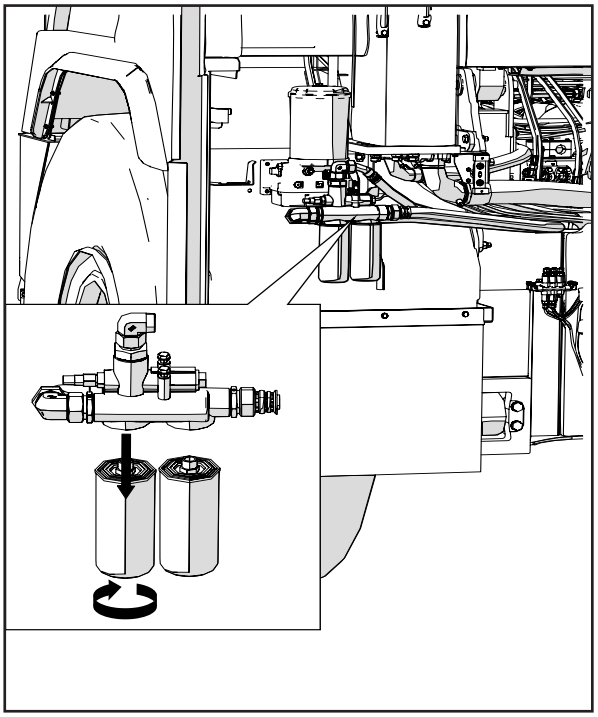
4000 Hours Service

Yearly recommended maintenance

* Numbers refer to positions on the lubrication schedule, chapter 6

Initial 100 Hours Service

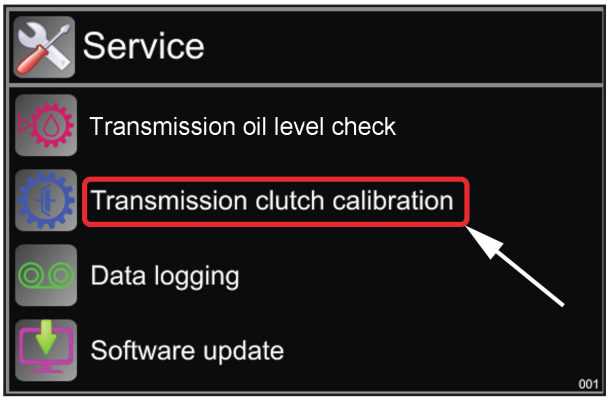
Maintenance to be performed after the first 100 hours only

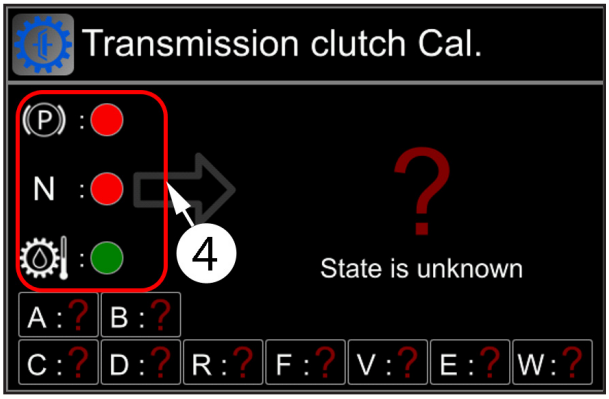


1. Transmission

1.1. Replace filter elements (located on the left hand side)

1. The dump truck must be standing on level ground.
2. The oil must be at operating temperature.
3. Open the maintenance door of the hydraulic tank.
4. Clean well around the filters.
5. Place a suitable container beneath the filters to catch spillage.
6. Unscrew the filter elements.
7. Check for wear particles in the oil.
8. Apply oil to the seals on the new elements.
9. Screw the filter elements in until contact with the sealing surface is obtained. Tighten the elements firmly by hand.
10. Warm up and check for leaks. Re-check level and adjust if necessary.





1.2. Run the Transmission Clutch Calibration (AEB) AEB = Automatic Filling Parameter Adjustment

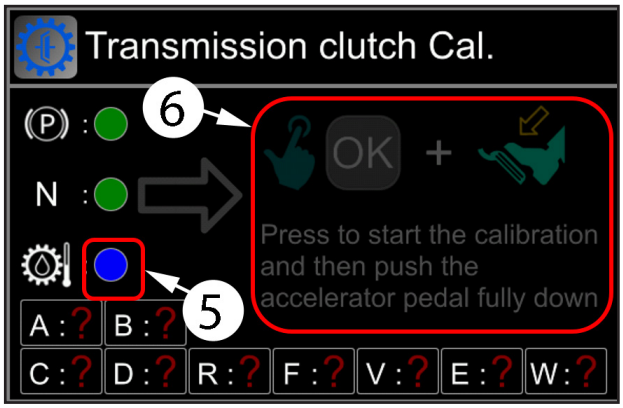
To optimize the transmission, run the AEB-Tester.

1. Push MENU on the display screen.
2. Select SERVICE
3. Select Transmission Clutch Calibration (AEB).
4. Make sure that the all requirements are fulfilled

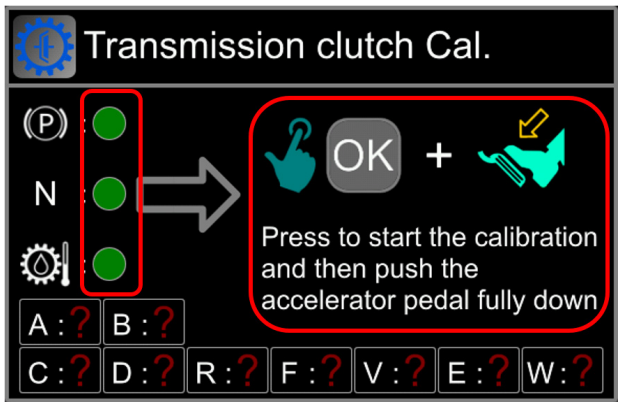
* Numbers refer to positions on the lubrication schedule, chapter 6

Initial 100 Hours Service

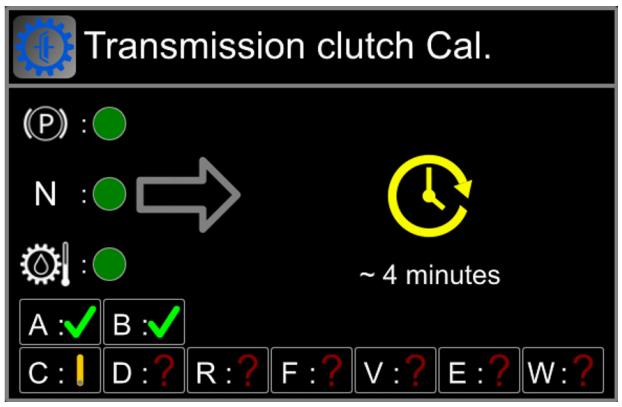
Maintenance to be performed after the first 100 hours only



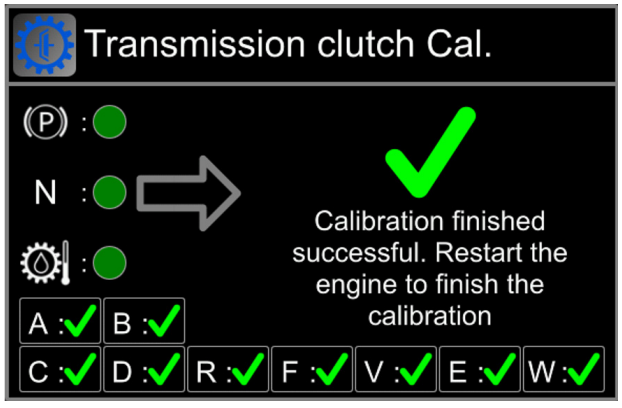
5. This means that the transmission is still too cold.
6. That is why it is not possible yet to start the calibration.



Finally when all condition are fulfilled then it is possible to start the calibration.



The yellow bar is rotating during calibration, on average it takes around 4 minutes to finish a successful calibration. Clutches A & B are calibrated successfully. Currently handling clutch C.



The calibration finished successfully. If not, a failure cause will be shown on the screen.

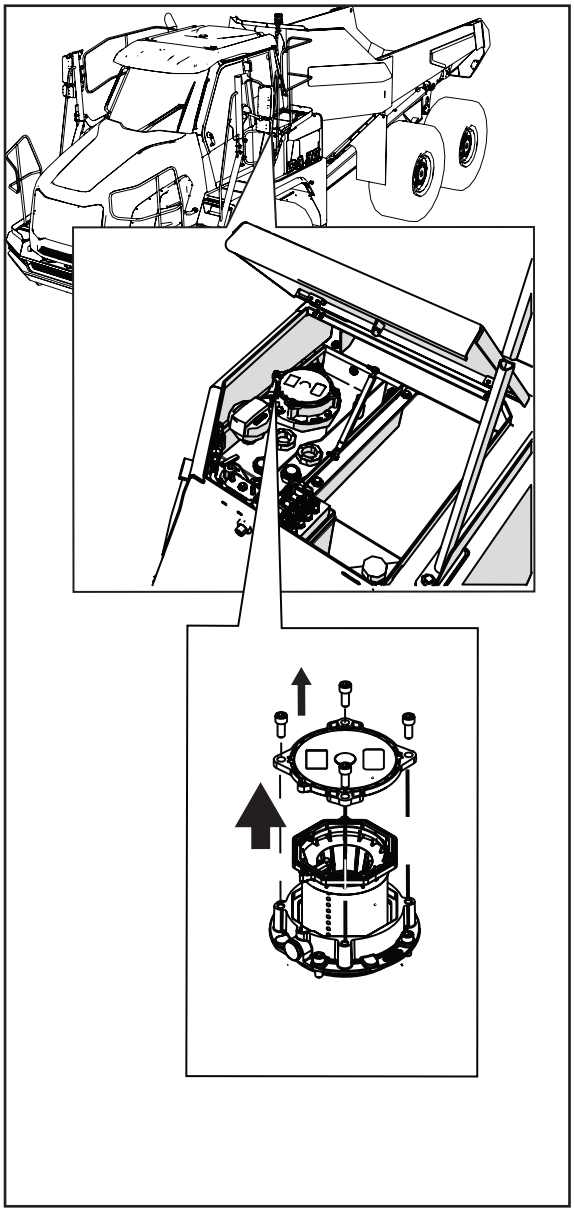
NOTE

Transmission Clutch Calibration must be performed after every oil change in transmission!

* Numbers refer to positions on the lubrication schedule, chapter 6

Initial 100 Hours Service

Maintenance to be performed after the first 100 hours only.



2. Hydraulic System

2.1. Replace hydraulic return filter element 42*.

- *Replacement of hydraulic return filter element must also be carried out every 1000 hours of operation.*
- *Replacement of the return filter can be also raised by the clogging indicator on the main screen.*

1. Accumulators contain oil under high pressure! Empty the accumulators, before unscrewing the filter. Procedure is described under Maintenance Precautions section.
2. The filter is located on the top of the hydraulic tank. Open the cover to get into the filter.
3. Clean well around the filter housing.
4. Place a suitable container beneath the draining hose to catch spillage.
5. Use allen key to unscrew 4 screws from the cover of filter (counter clockwise).
6. Remove the filter element.
7. Check for wear particles in the oil.
8. Install a new filter element and replace the 4 screws by turning it clockwise with the torque 25 + 5 Nm.
9. Clean off any oil spill.
10. Start engine and check the oil level and any leaks. The accumulators will be recharged with oil when the engine is re-started.

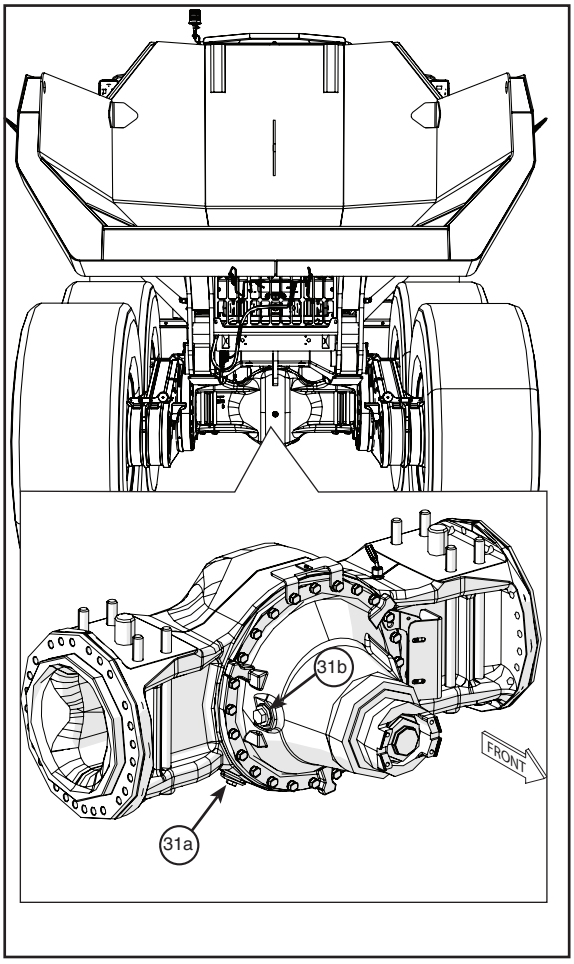
CAUTION

Pay special attention to cleanliness when working with the hydraulic system! Contamination can give steering disturbance and reduce safety.

* Numbers refer to positions on the lubrication schedule, chapter 6

Initial 100 Hours Service

Maintenance to be performed after the first 100 hours only.



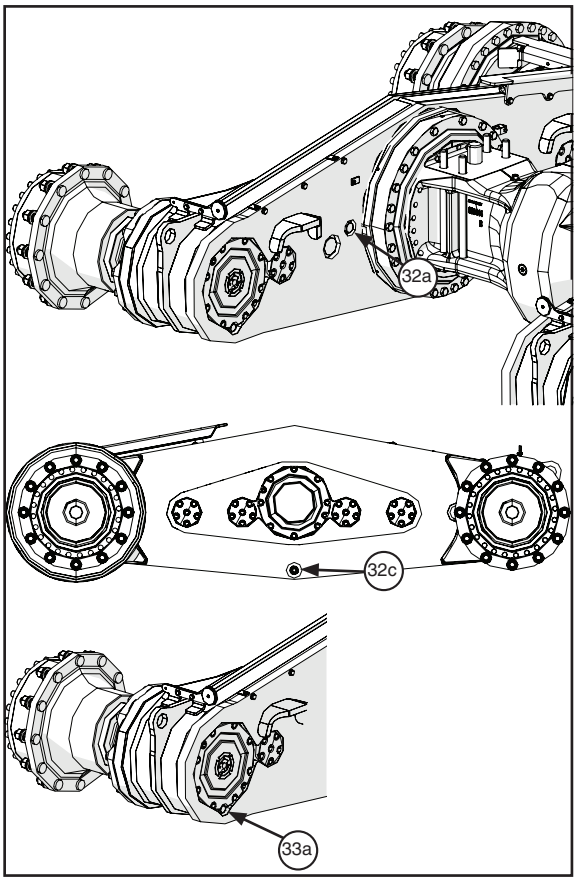
3. Drive line

3.1. Rear differential Oil change 31*

** Replacement of rear differential oil must also be carried out every 1000 hours of operation or at least once a year.*

1. The oil should be at working temperature prior to draining. Take care, there is a risk of scalding.
2. Clean the areas around the screw plugs 31a, 31b.
3. Remove oil filler plug 31b, then open the drain plug 31a and drain the oil.
4. Clean the oil drain plug 31a magnet of debris before reinstalling the plug. Fill with new oil (refer to the lubrication table chapter 6) wait a few minutes. If the oil level falls add oil until the level remains constant on the control opening 31b.
5. Reinstall control/filling plug 31b.

	Torque
31a	140 Nm
31b	140 Nm



3.2 Tandem housing , planetary drive (hubs) Oil change 32*,33*

** Replacement of tandem housing oil and planetary drive (hubs) must also be carried out every 1000 hours of operation or at least once a year.*

NOTE

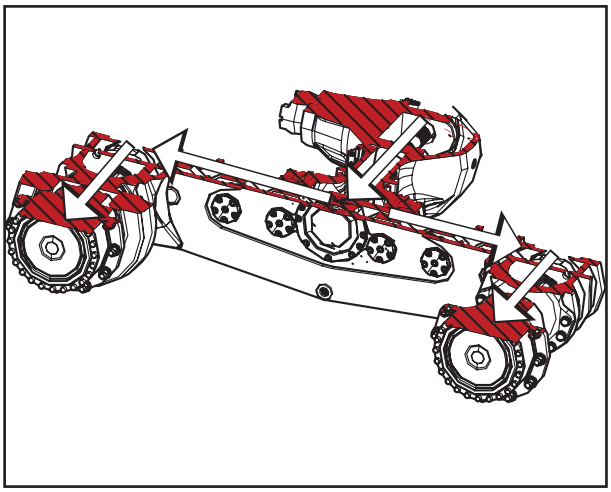
By changing the oil on the tandem you will at the same time change the oil on wheel hubs due to open oil circulation between the tandem and the wheel hubs.

1. The oil should be at working temperature prior to draining. Take care, there is a risk of scalding.
2. Ensure that the tandem housing is placed horizontally and the axle remains still for 30 minutes to allow oil contamination to rest.
3. Remove and clean the level/filling plug 32a, clean the area around it.
4. Remove the drain plug 32c and 33a, drain the oil after that clean off the magnet of any grime then reinstall the plugs.
5. Fill the tandem housing with oil (see "Chapter 6") until oil exits from the level control opening (32a).

* Numbers refer to positions on the lubrication schedule, chapter 6

Initial 100 Hours Service

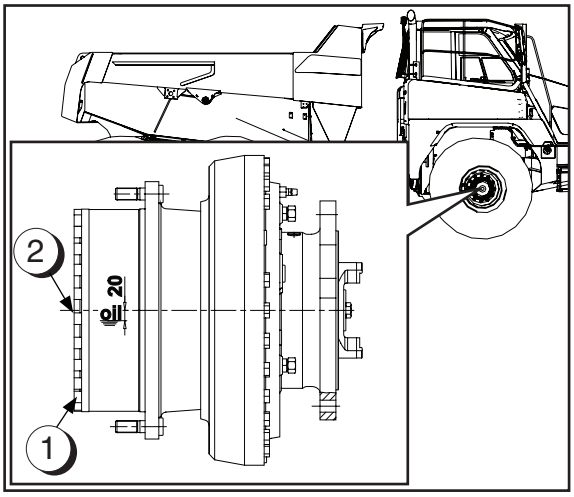
Maintenance to be performed after the first 100 hours only.



6. Reinstall the level/ filling plug (32a).
7. After test driving, check that the oil is at lower edge of the level plug.

	Torque
32a	140 Nm
32c	140 Nm
33a	140 Nm

3.3. Front reduction gears 33*



1. Clean filling point and oil filling plug (2) also the drainage point and oil drain plug(1).
2. Turn hub assembly into position.
   - The oil drain plugs has to be at the bottom.
3. Open the oil drain plug (1) and allow oil to drain.
   - Collect the oil in a suitable container.
   - Dispose of the oil in an environmentally friendly manner.
4. Clean borehole and oil drain plug.
5. Screw oil drain plug (1) back in.
6. Open the oil filling plug.(2)
7. Fill hub assembly with clean oil until the oil level reaches the filling bore (= inspection bore).
   - Overflow check
   - Oil in accordance with the specified lubricants. see "Chapter 6"
8. After a few minutes, check the oil level again at the filling bores.
   - Keep filling the hub assembly with oil until the oil level remains constant.
9. Clean borehole and oil filling plug.
10. Screw oil filling plug (2) back in.

	Torque
1	120 Nm
2	120 Nm

* Numbers refer to positions on the lubrication schedule, chapter 6

Initial 100 Hours Service

Maintenance to be performed after the first 100 hours only.

4 Engine

4.1. Check multi-groove belt condition, at least once a year

see 1000 hours service for procedure

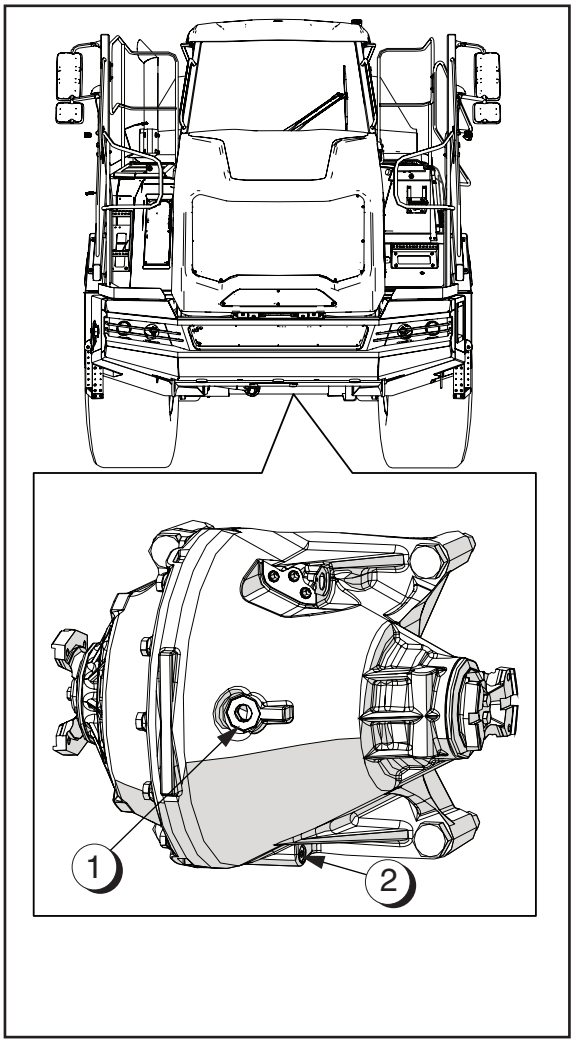
5. Wheel nuts

5.1. Check tightness

Torque setting 650 Nm.

Initial 500 Hours Service

Maintenance to be performed after the first 500 hours only.



1. Front differential

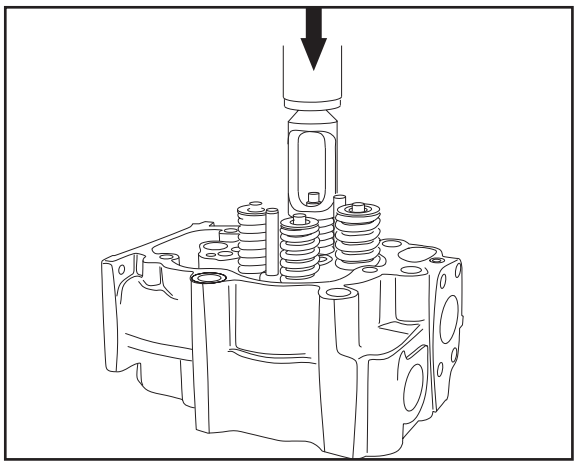
1.1. Change oil 30*

Replacement of front differential oil must also be carried out every 1000 hours of operation or at least once a year 30*

1. Access to the drain plug through transmission bottom guard.
2. Open level/filling plug (1), special spanner in tool kit.
3. Unscrew drain plug (2).
4. Drain the oil into a suitable container.
5. Clean the drain plug (2), replace seal if necessary and reinstall.
   • Tightening torque: 50 Nm.
6. Fill new oil, according to the oil specification sheet (chapter 6), through the level/filling plug, oil level must be at lower edge of hole when dump truck is horizontal.
7. Clean the plug (1), replace seal if necessary and rein-stall.
   • Tightening torque: 150 Nm.

CAUTION

Be aware of possible internal pressure when the oil is hot! Oil can spurt out when opening the drain plug.



2. Engine

2.1. Checking and adjusting the valve clearance.

- Contact Hyundai Dealer for checking/adjusting of the valve clearance. (see item 1.1. 2000 hours service)

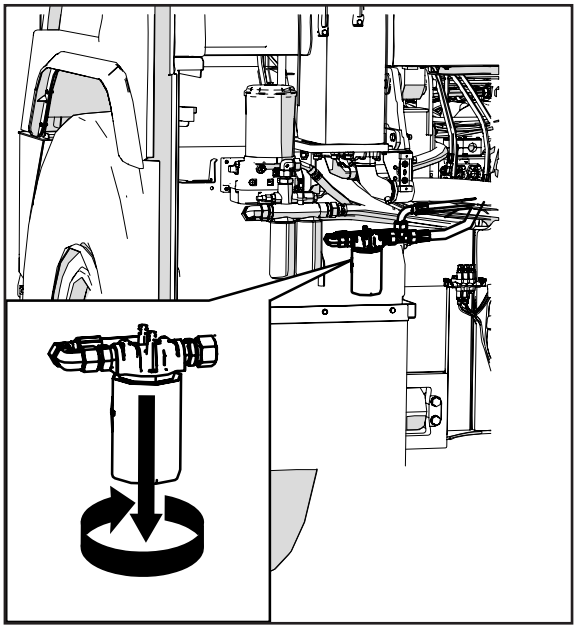
2.2. Checking and adjusting injectors. (Only T2 engine)

- Contact Hyundai Dealer for checking/adjusting of the injector. (see item 1.2. 2000 hours service)

* Numbers refer to positions on the lubrication schedule, chapter 6

Initial 500 Hours Service

Maintenance to be performed after the first 500 hours only.



3. Brake system

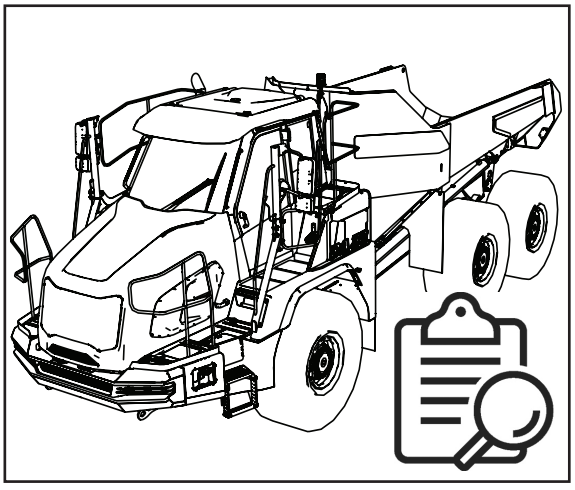
3.1. Change brake cooling oil and filter 34*,35*

- Replacement of brake cooling filter must also be carried out after 1000 hours of operation
- For brake cooling oil change please see 2000 hours of operation.

1. Open the maintenance door of the hydraulic tank.
2. Clean thoroughly around the filter.
3. Place a suitable container underneath the filter to catch spillage.
4. Unscrew the filter.
5. Check for wear particles in the oil.
6. Apply oil to the seals on the new elements.
7. Screw the filter element in until contact with the sealing surface is obtained. Tighten the element firmly by hand.
8. Check the oil level and any leaks.

8 Hours / Daily Service

To be performed every 8 hours of operation or daily.



1. General

1.1. Walk around check, before start

- Check for leaks at the engine (see also item 2.1), transmission, differentials, reduction/tandem housings, tanks, hydraulic hoses and lubrication system.
- General check for loose bolts on the driveline, specially on radiator, engine/transmission brackets and at the prop. shaft flanges.
- Check for damage, wear and other abnormalities on the visible parts of frames, body, tiers, cylinders, etc.
- Check lights. Replace burnt out bulbs.

If leakages, loose bolts, damages or other abnormalities are observed, remedy if necessary (before operation). If necessary contact your local Hyundai Dealer.

1.2. Check driver's seat, before start

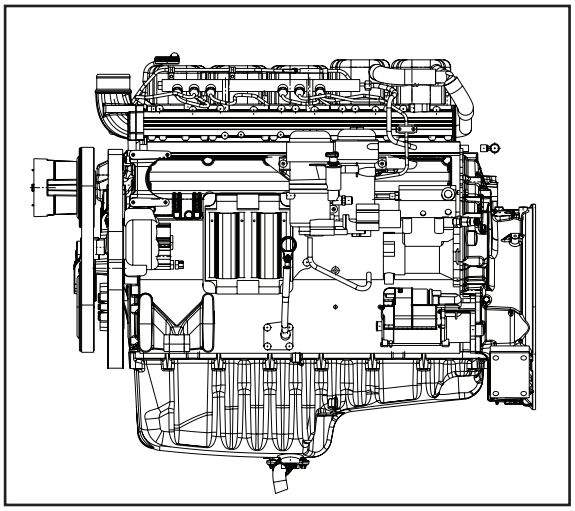
- Check function.
- Check all seat adjustments for easy operation.
- Check function of the air valve.
- Check safety belt for proper lock functions.

See chapter 3, seat adjustment, for more detailed information.

* Numbers refer to positions on the lubrication schedule, chapter 6

8 Hours / Daily Service

To be performed every 8 hours of operation or daily.

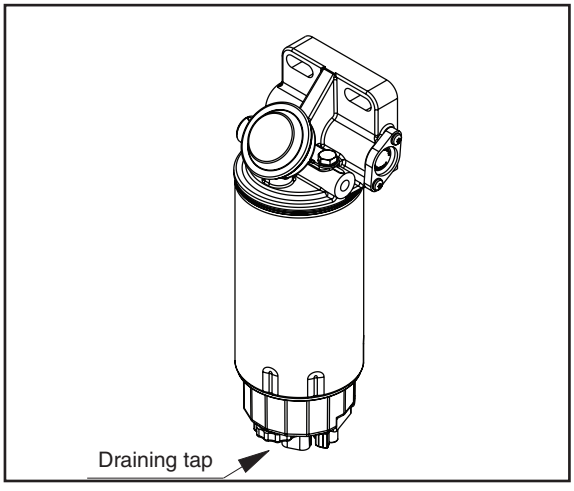


2. Engine

2.1. General condition check - look for leakages, remedy as necessary

1. Start the engine.
2. Look for leaks of oil, coolant, fuel, air and exhaust.
3. Tighten or change leaking connections. Check the overflow holes which show whether the O-rings between the cylinder liner and crankcase are leaking. Overflow holes is located on the right side of the engine, directly under inspection covers.
   a. If coolant is leaking out, the O-rings are leaking.
   b. If oil is leaking out, the liner shelf is leaking.
4. A small amount of leakage from the overflow holes during the engine's running-in period is normal. (Seals and O-rings are lubricated with soap or oil when installed). This leakage normally stops after a time.

If there is a large amount of leakage - contact your Hyundai Dealer.



2.2. Drain the water separating fuel filter 6*

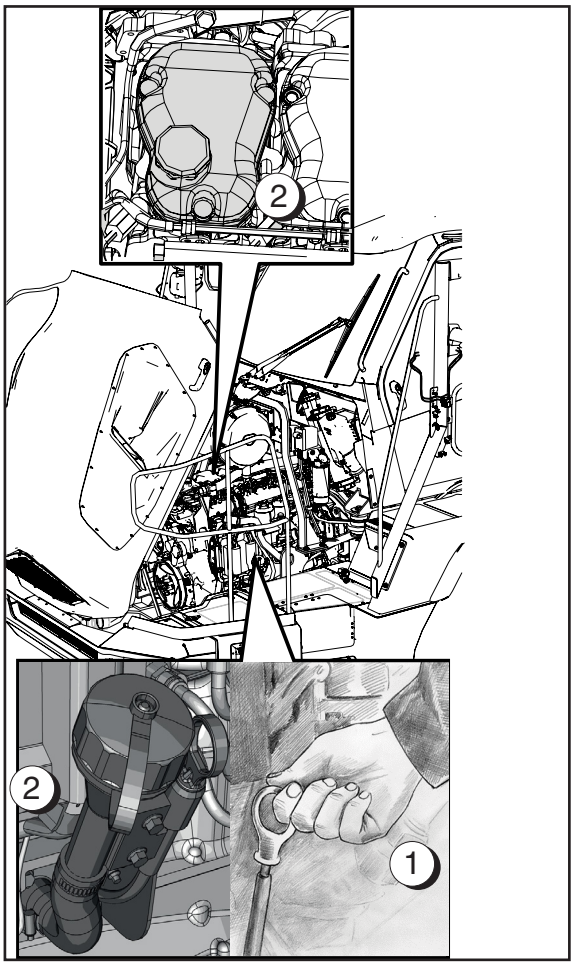
The water separating fuel filter is located on the left hand side of the engine.

Drain the filter by unscrewing the tap in the bottom of the filter.

* Numbers refer to positions on the lubrication schedule, chapter 6

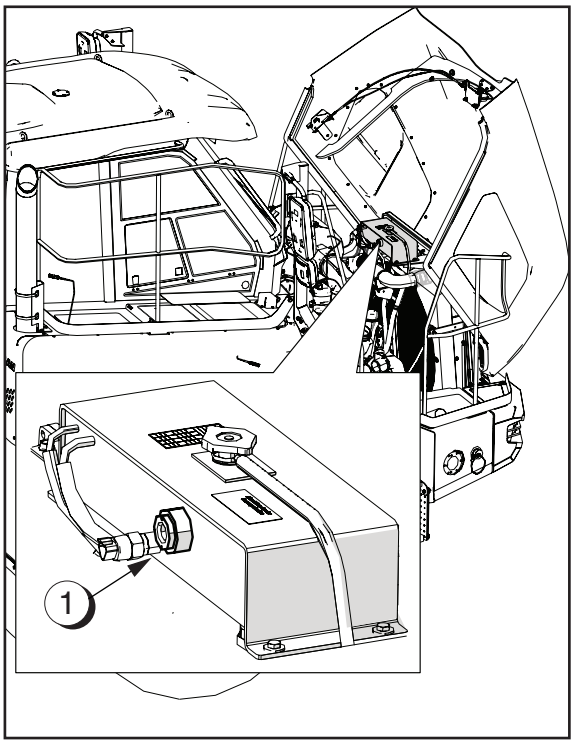
8 Hours / Daily Service

To be performed every 8 hours of operation or daily.



2.3. Check oil level, before start 1*

- If the engine has been running: Let the engine remain stationary for at least 1 minute before checking the oil level.
- The dipstick (1) is found on the left hand side of the engine.
- The correct level is between upper and lower mark on the dip stick (1) (dump truck on level ground).
- Fill up with oil (2) if level has dropped to the lower mark. *See oil specification sheet, chapter 6 for correct oil type.*
- Check level correctness.



2.4. Check coolant level, before start 5*

- The level in the expansion tank must be between minimum and maximum when the dump truck is on level ground. See level gauge on the tank (1). On later machines the level gauge has been moved to left side of the expansion tank.
  Refill with coolant of correct mixture if level is lower than minimum.
- If large quantities are required to correct the level, check and remedy the cause in such a case.

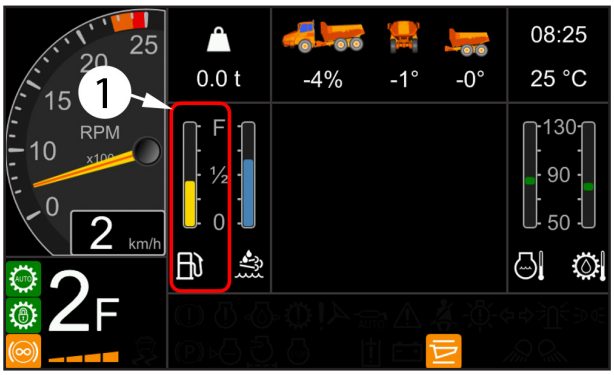
CAUTION

Be careful when removing the filler cap of a hot expansion tank . Hot coolant and steam can spurt out! Never add large amounts of cold coolant when engine is hot. The temperature difference can cause cracks in the engine. Always top up with pre-mixed coolant.

* Numbers refer to positions on the lubrication schedule, chapter 6

8 Hours / Daily Service

To be performed every 8 hours of operation or daily.

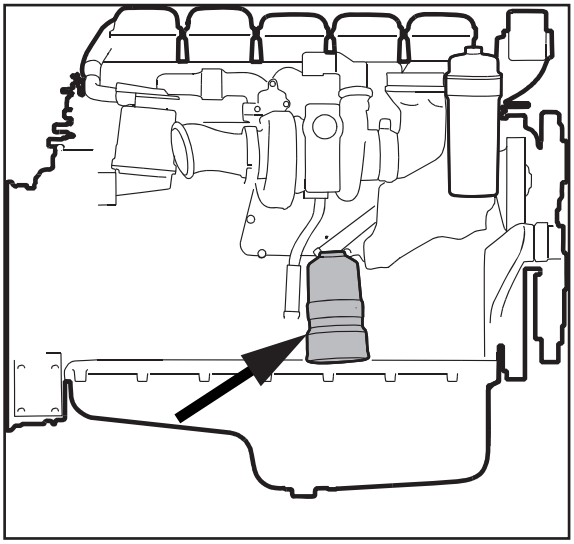


2.5. Check fuel level, before start 12*

1. Turn on the starter switch key (to pos. 1) and check on the fuel gauge (display screen) that there is enough fuel (1).
2. Fill up with fuel if necessary (2).

NOTE

Always make sure that there is enough fuel in the tank. NEVER run out of fuel, fuel injectors (T2 only) will be damaged.



2.6. Function check of the centrifugal cleaner, after operation 2*

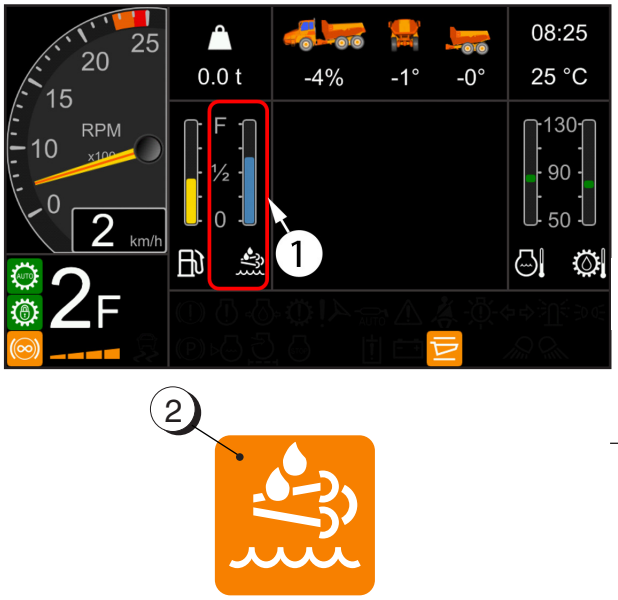
The rotor rotates very fast, and will normally carry on rotating after the engine is stopped.

1. Stop the engine when it is hot.
2. Listen for spinning sound from rotor, or feel if cleaner housing vibrates.
3. The rotor normally rotates **30 - 60 seconds** after the engine has stopped.
4. If not, dismantle and check the cleaner, see 500 hours service.

* Numbers refer to positions on the lubrication schedule, chapter 6

8 Hours / Daily Service

To be performed every 8 hours of operation or daily.

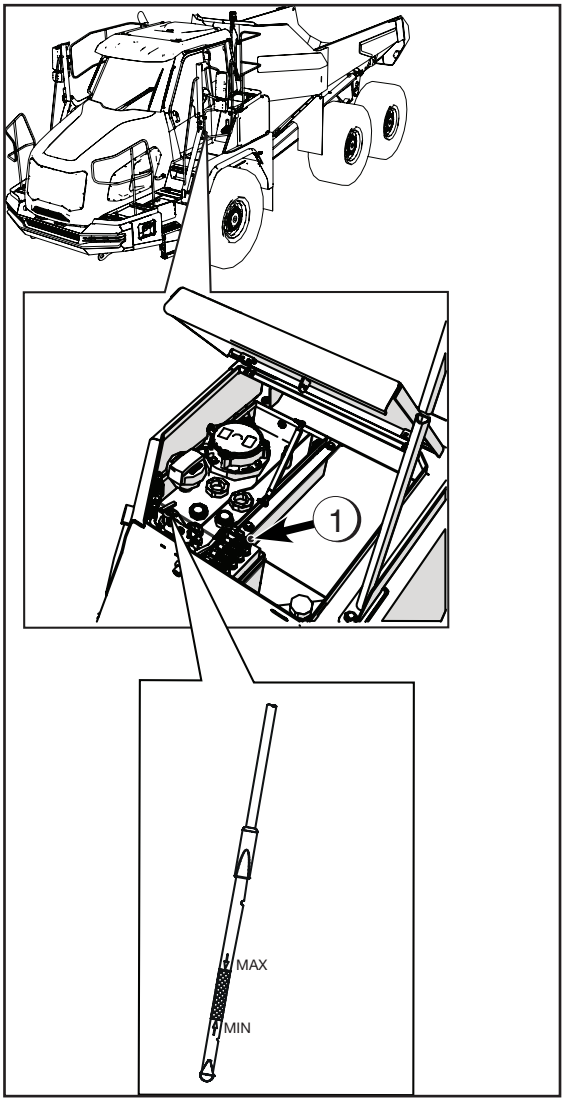


2.7. Check urea (AdBlue®) level, before start 13*(Only T4 and Stage V)

1. Turn on the starter switch key (to pos. 1) and check on the urea gauge (display screen) that there is enough urea(1).
2. Fill up with urea if necessary (2).

WARNING

Running the engine without urea AdBlue® violates emissions legislation and will damage the SCR system



3. Transmission

3.1. Check oil level, before operation 20*

1. The dump truck must be standing on level ground.
2. The gear selector must be in neutral and confirm that the parking brake is ON.
3. Run the engine at low idle.
4. To check the transmission oil level, see dipstick.
5. Check the level at oil temp 80 °C:
   - The correct level is between upper and lower mark on the dip stick.
6. If necessary, correct the level by adding oil according to the transmission oil list (chapter 6) through the filling tube (1).

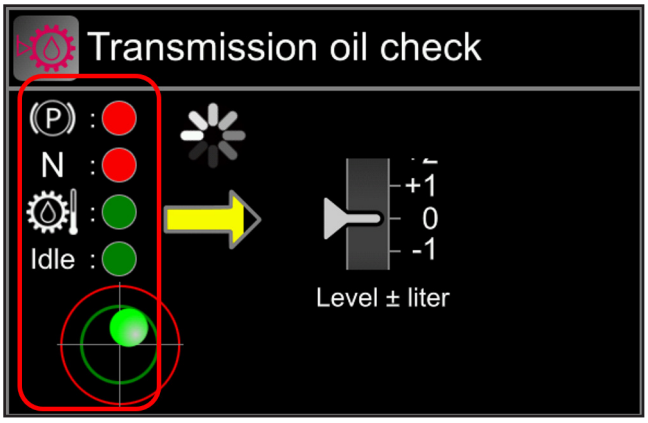
CAUTION

Do not overfill with oil! Both too high and too low of a level can cause serious internal damage!

* Numbers refer to positions on the lubrication schedule, chapter 6

8 Hours / Daily Service

To be performed every 8 hours of operation or daily.



Check transmission oil level before operating ADT. (Electronic oil level)

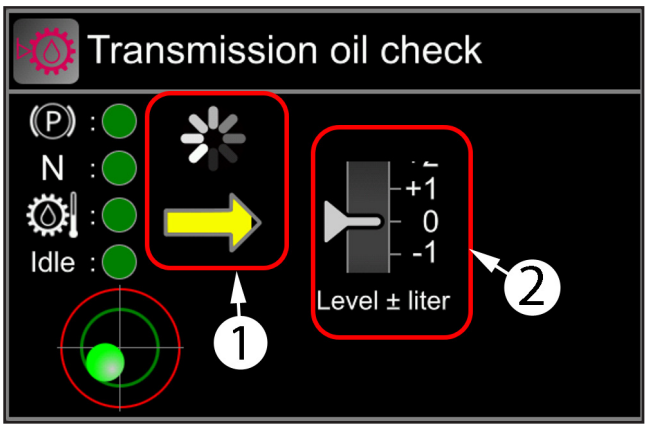
Chose the Menu - Service-

Follow the instruction from the screen and make sure that the all requirements are fulfilled

- Vehicle is not moving
- Park brake is activated
- Gear should be in neutral
- The dumper is leveled
- Engine at the low idle
- Transmission oil temperature is in range 40-90°C.

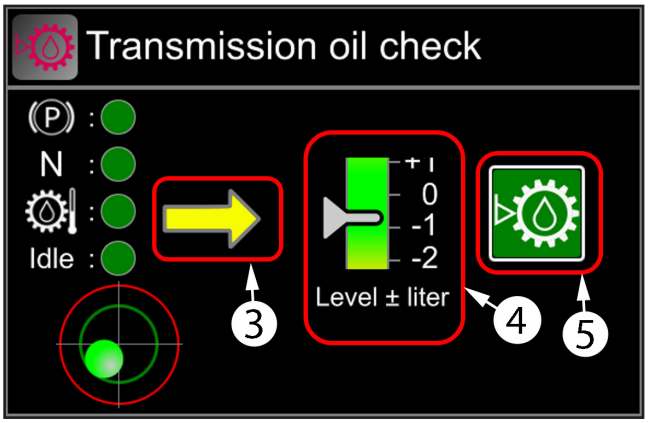
NOTE

It is recommended to use the dipstick when replacing the oil.



1 When conditions are stable it also takes some time for the oil to stabilize. Visible is a rotating bar and a yellow arrow that fills up.

2. This will show the resulting oil level. Now grayed out because the measurement hasn't finished yet



3. The measurement is finished.

4. Now it shows the resulting oil level

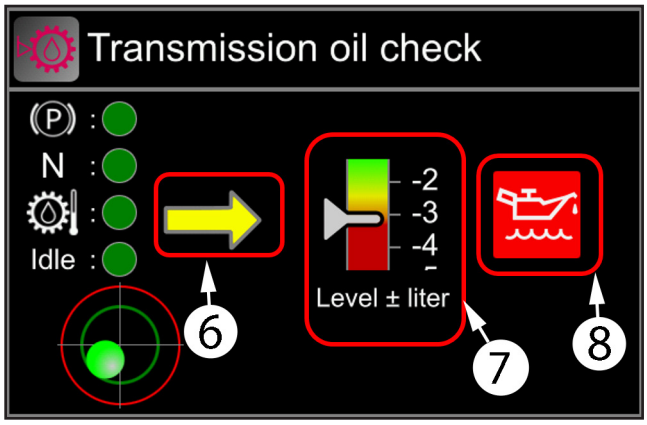
5. The green symbol indicates that the oil level is ok.

That means it is within +/- 2 liter.

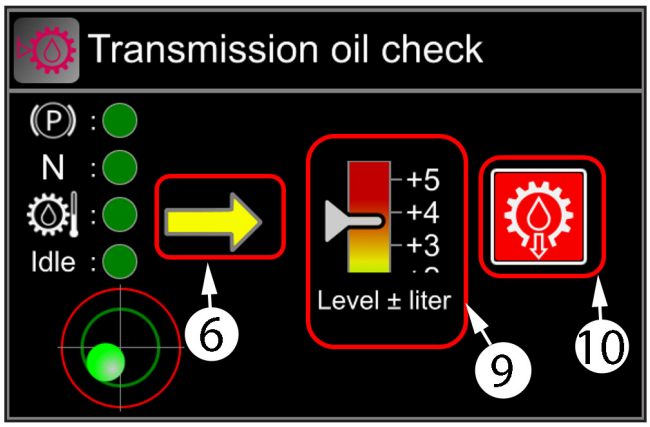
* Numbers refer to positions on the lubrication schedule, chapter 6

8 Hours / Daily Service

To be performed every 8 hours of operation or daily.



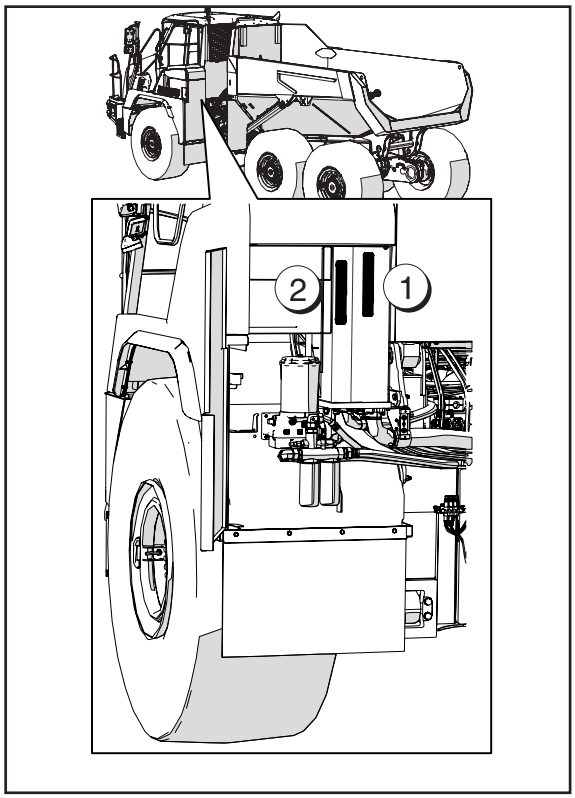
6. The measurement is finished
7. It shows a low oil level
8. Here the red symbol indicates that the oil level is too low



9. It shows a high oil level
10. Here the red symbol indicates that the oil level is too high.

CAUTION

Do not overfill with oil! Both too high and too low of a level can cause serious internal damage!



4. Hydraulic system

4.1. Check oil level at hydraulic tank 40*, Cooling brake tank 34*

1. The dump truck must be standing on level ground.
2. The gear selector must be in neutral and confirm that the parking brake is ON.
3. Run the engine at low idle.
4. Read the oil level in the oil level gauges (located on the back of the hydraulic tank).
   • *Please refer to explanation on the tank stickers.*
   Hydraulic tank (1)
   Cooling brake tank (2)
5. Fill up with oil (see oil specification sheet, chapter 6) if necessary. Oil filler located on the top of the hydraulic tank.

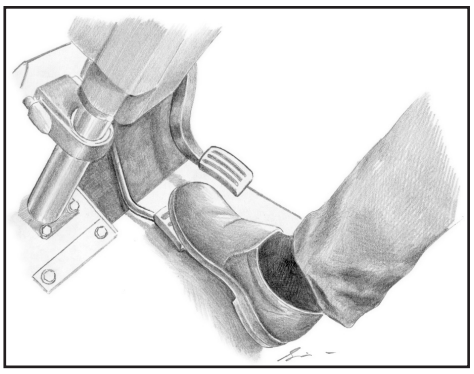
NOTE

The dump truck must be horizontal and dump body completely lowered!

* Numbers refer to positions on the lubrication schedule, chapter 6

8 Hours / Daily Service

To be performed every 8 hours of operation or daily.



5. Brake system

5.1. Parking brake
Check braking (holding) capacity, before operation

1. Park the machine on level ground and make sure the brake accumulators are fully charged and that transmission oil temp is between 80-95°C
2. Apply the parking brake (indicator light).
3. Move the gear selector to 1st gear.
4. Increase the engine speed slowly.
5. The parking brake must be able to keep the dump truck stationary at engine speeds up to 1300 rpm. If not, check parking brake system and contact your Hyundai Dealer.

5.2. Service brake
Check braking (holding) capacity, before operation

1. Park the machine on level ground and make sure the brake accumulators are fully charged and that transmission oil temp is between 80-95°C
2. Apply the parking brake (indicator light).
3. Depress the brake pedal.
4. Release the parking brake.
5. Move the gear selector to 1st gear.
6. Increase the engine speed slowly.
7. The service brake must be able to keep the dump truck stationary at engine speed up to 1300 rpm. If not, check the brake system and contact your Hyundai Dealer.

5.3. Service brake
Check function, before operation

1. Park the machine on level ground and make sure the brake accumulators are fully charged and that transmission oil temp is between 80-95°C
2. Apply the parking brake (indicator light).
3. Stop the engine.
4. Check for hydraulic oil leakage at accumulators, pipes and hoses.
5. Start the engine and release the parking brake.
6. Check that the brake system warning light (chapter 3) does not illuminate.
7. Drive the dump truck slowly on firm, level ground and depress the brake pedal firmly.
8. Check that the braking effect is good and equal.

* Numbers refer to positions on the lubrication schedule, chapter 6

8 Hours / Daily Service

To be performed every 8 hours of operation or daily.

5.4. Accumulators

Check the oil pressure, before operation

1. The dump truck must be parked on a firm, level ground.
2. Apply the parking brake.
3. Start the engine and let it run at low idle until the accumulators are fully charged (warning light off).
4. Stop the engine.
5. Release the parking brake, wait 5 sec. Apply the parking brake, wait 10 sec. Release the parking brake again, wait 5 sec. Apply the parking brake again, wait 10 sec. Continue until the brake warning light comes on.
6. Recharge the accumulators by starting the engine and let it run at low idle until the accumulators are fully charged (warning light off).
7. Stop the engine
8. With the parking brake applied, check the service brake as follows:
9. Apply the service brake pedal, hold for 10 sec. Release the brake pedal and wait 5 sec. Apply the brake pedal again and hold for 10 sec. Then release the brake pedal again and wait 5 sec. Continue until the brake warning light comes on.
10. Recharge the accumulators by starting the engine and let it run at low idle until the accumulators are fully charged (warning light off).

WARNING

Accumulators contain oil under high pressure!

- **Always empty the accumulators before working on or opening the hydraulic system.**
- **Procedure:**
- **Stop the engine.**
- **Operate the brake pedal repeatedly until the accumulators are empty. Accumulators can also be emptied through the accumulator test connectors.**
  Be aware of that the accumulators will be recharged with oil when the engine is restarted.

* Numbers refer to positions on the lubrication schedule, chapter 6

8 Hours / Daily Service

To be performed every 8 hours of operation or daily.

6. Steering

6.1. Check function, before operation

1. Turn the steering wheel at an even speed until end stop, both sides.
2. Check that the movement is uniform.

7. Retarder brake

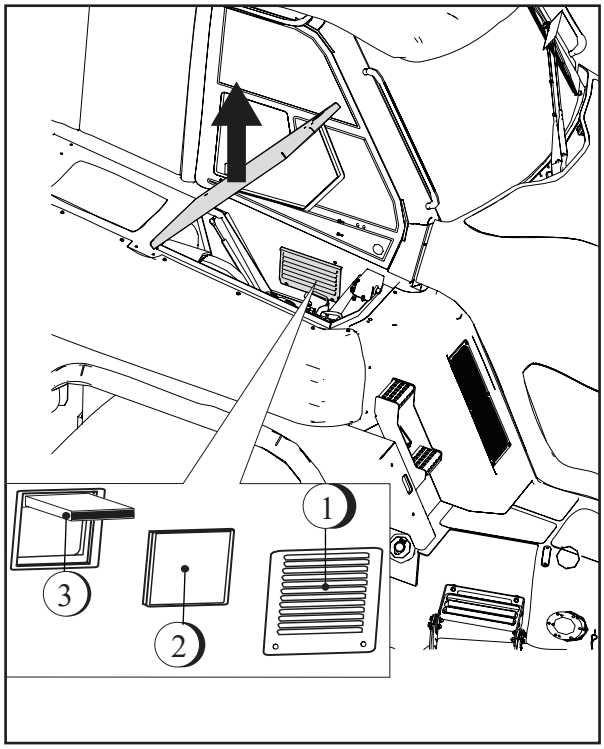
7.1. Check function, before operation

1. Drive the dump truck forwards at approx 10-15 km/h.
2. Make sure that the retarder brake is in 100% active mode use retarder lever to adjustment and release the throttle pedal.
3. Check the indicator lights for function, retarder brake and note the braking power.
4. Depress the throttle pedal again and notify that retarder brake go off (i.e no braking power and the indicator lights switch off).

* Numbers refer to positions on the lubrication schedule, chapter 6

40 Hours / Weekly Service

To be performed every 40h of operation or weekly.



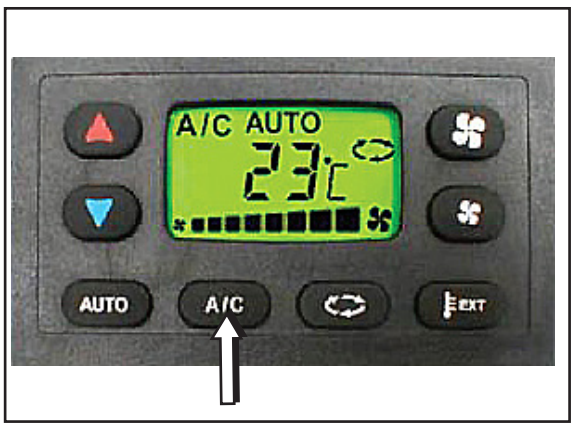
1. Cab ventilation

1.1. Clean internal filter element and prefilter 100*, 70*

1. Open cover on the RHS of the truck.
2. Open cover (1) by the removing two screws.
3. Remove the pre-filter (2), and clean it with compressed air.
   • Replace if necessary
4. Remove cab ventilation filter element (3) and clean it with compressed air.
   • Replace if necessary
5. Reassemble the opposite way.
6. Adjust the check interval if another requirement is experienced.
7. Check the condenser, clean it if necessary.

NOTE

Never start driving without prefilter. The heater could be damaged.



1.2. Air conditioner system

- The equipment must be used for at least five minutes every week, to distribute oil in the system, this prevent leaks and ensures that the seals are lubricated
  • See operating controls, chapter 3, cab ventilation, about how to use the air conditioner.
- This must also be done during cold weather operation.

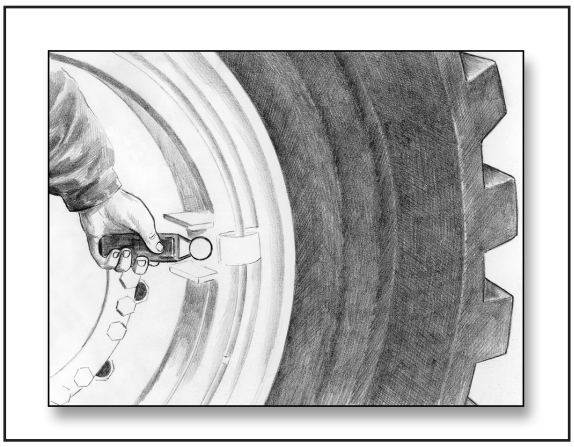
NOTE

At ambient temperatures below + 4° C the air conditioner will not engage. Warm up the cab before operating the air conditioner for 10 minutes.

* Numbers refer to positions on the lubrication schedule, chapter 6

40 Hours / Weekly Service

To be performed every 40 hours of operation or weekly.



2. Tires

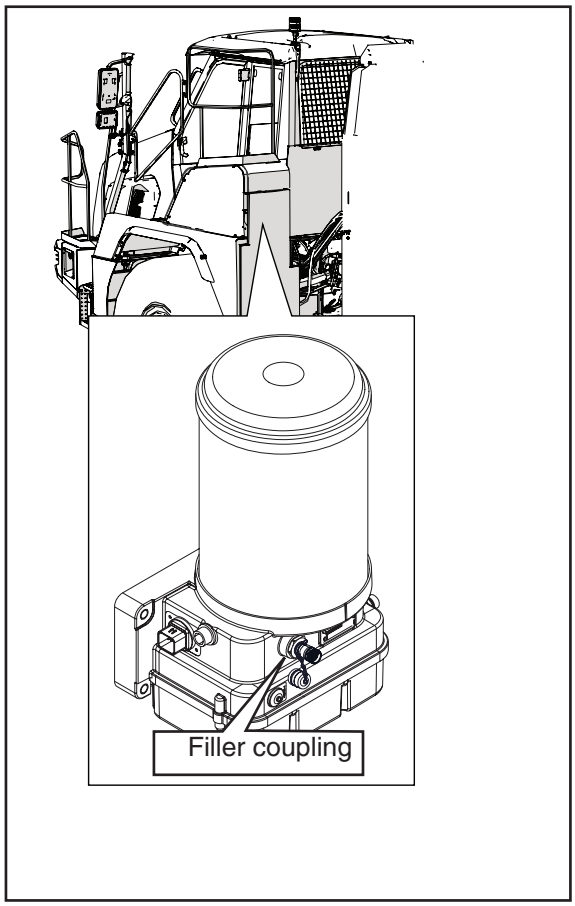
2.1. Check tire pressures, before operation

When the pressure is measured, the dump truck must be unloaded.

Measure the pressure for cold tires with a tire pressure gauge and adjust if necessary. For tire pressure recommendation, see chapter 8 - Technical data, and chapter 5 - Operating instructions.

WARNING

Stand behind the tread when checking the inflation pressure. Pressures inside tires are substantial and an explosion can cause damage and serious personal injury.



3. Automatic central lubrication

3.1. Check the lubricant level in the reservoir. Refill the reservoir if the level has dropped to a minimum

The reservoir must also be refilled if the indicator light flashes for 2 minutes (0.5s on/0.5s off) at the beginning of each cycle.

1. Remove the dust cap from the filler coupling.
2. Carefully clean the filler coupling and the coupling on the filler tube.
3. Use following grease pump located inside the hydraulic tank to fill the reservoir.
4. Connect pump to filler coupling.
5. Fill the reservoir up to the maximum level indicated on the reservoir. Use only grease as specified in chapter 6, lubricants.
6. Remove the filler connector and install the dust cap.

WARNING

- **The grease must be free from impurities and must not change consistency over time.**
- **Always switch off power when filling the reservoir tank.**
- **Risk of bursting reservoir tank if you overfill!**
- **If reservoir tank has been completely emptied, it could take up to 10 minutes for the lubrication system to achieve full output again.**

* Numbers refer to positions on the lubrication schedule, chapter 6

40 Hours / Weekly Service

To be performed every 40 hours of operation or weekly.

NOTE

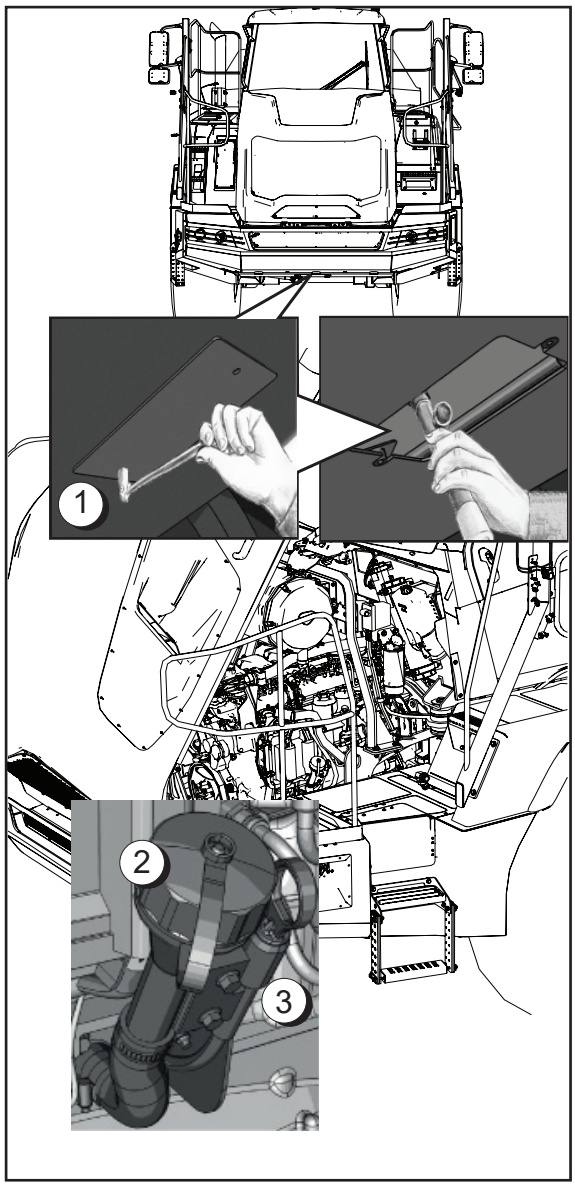
- **Do NOT use grease which contains graphite, teflon or molybdenum**
- **Even if the automatic central lubrication is installed, do not forget that there are still some greasing points that must be greased by hand, these are the door, fender hatches and the cab rear hinges.**

4. Continue with all items in 8 Hours / Daily Service.

* Numbers refer to positions on the lubrication schedule, chapter 6

500 Hours Service

Maintenance to be performed every 500 hours of operation.



1. Engine

1.1. Change oil 1*

Change oil more often if the engine is subjected to particularly demanding operation, such as a dusty environment, poor fuel quality or if deposits in the centrifugal oil cleaner are thicker than 28 mm.

1. Remove the cap on the drain plug, install the draining hose (tool kit) and drain the oil when the engine is hot. Access through the drain hole in engine bottom guard (1).
2. When all oil is drained, remove the draining hose and re-install the cap.
3. Reinstall the cover for drain hole in engine bottom guard.
4. Fill oil through filler (2). Do not overfill!
5. Check oil level on dipstick (3).

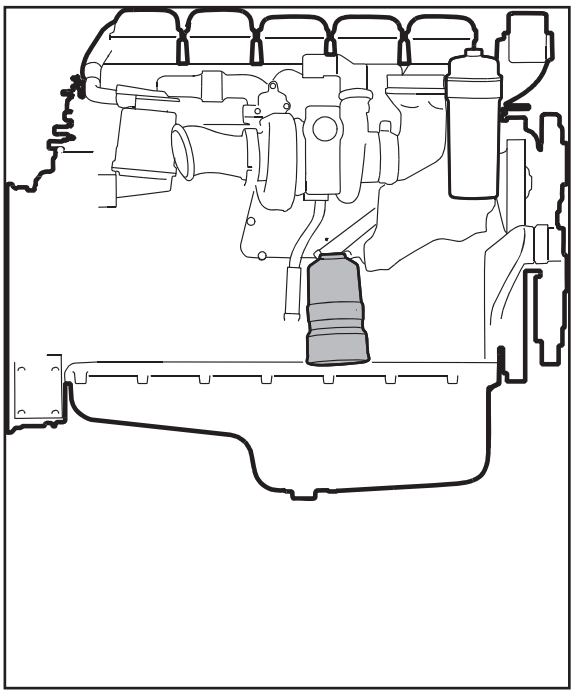
CAUTION

- **The oil may be hot! Wear protective gloves and eye protection.**
- **The oil filler cap must always be in place when starting and running the engine to prevent oil being ejected.**

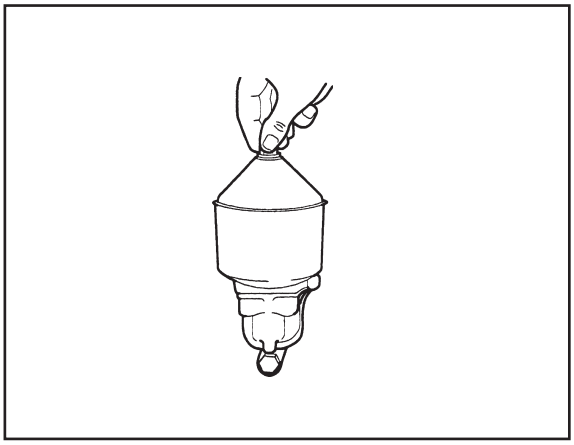
** Numbers refer to positions on the lubrication schedule, chapter 6*

500 Hours Service

Maintenance to be performed every 500 hours of operation.



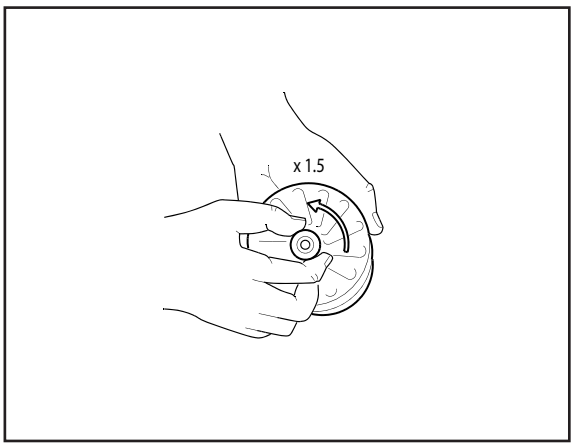
1.2. Clean centrifugal cleaner 2* (at the same time as oil change, item 1.1)



1. Clean the cover. Unscrew the nut and remove cover.

CAUTION

Open the cover with care. The oil and inner parts may be hot!

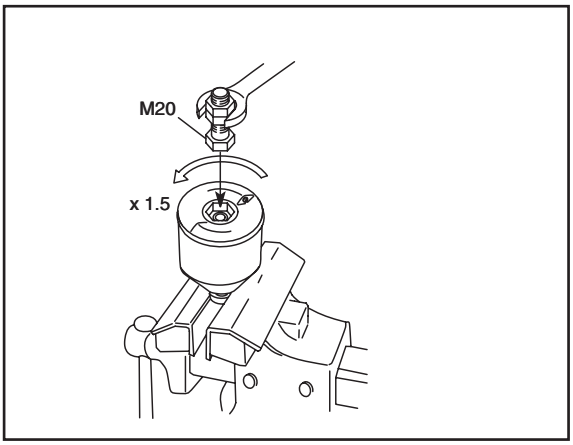


2. Let the oil run out from the rotor
3. Lift out the rotor assembly and loosen the nut for the rotor cover three turns.

** Numbers refer to positions on the lubrication schedule, chapter 6*

500 Hours Service

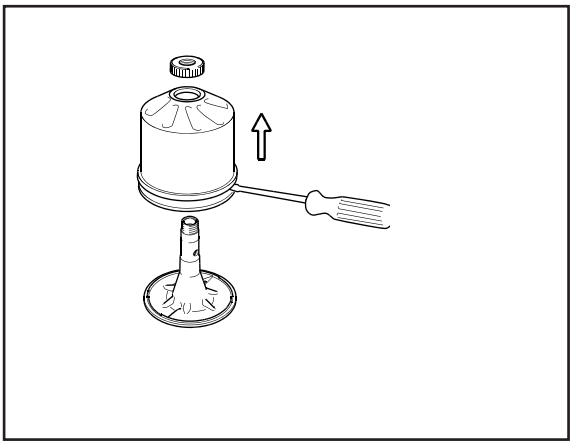
Maintenance to be performed every 500 hours of operation.



4. If the rotor nut is jammed: Turn the rotor upside down and fasten the nut in a vice. Turn the rotor approximately one and a half turns anti-clockwise by hand or use an M20 bolt as illustrated.

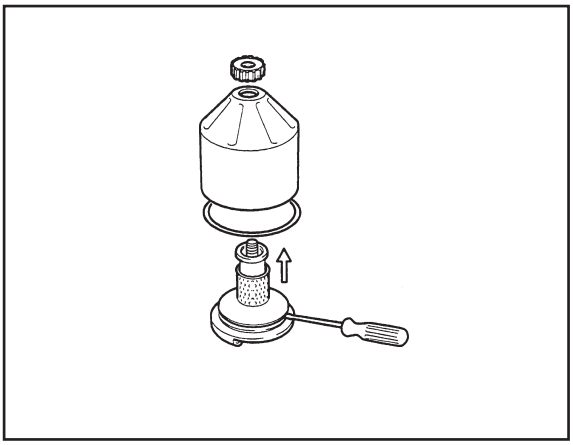
CAUTION

The rotor must not be put in a vice. Never strike the rotor cover. This may cause damage resulting in imbalance.

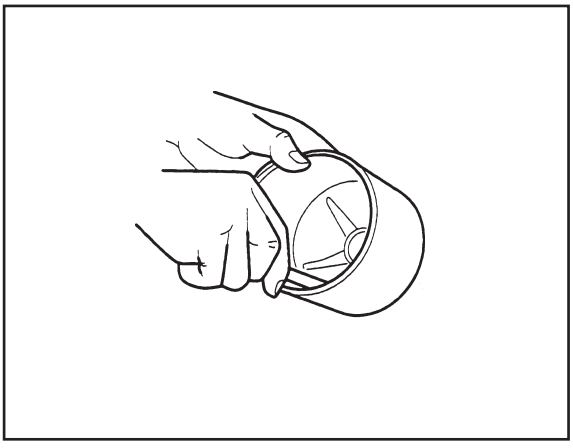


5. Gently tap the nut with hand or with a plastic hammer to separate the rotor from bottom plate.

6. Undo the nut and remove the rotor cover. by holding the rotor in both hands and tapping the rotor nut against the table. Never strike the rotor directly as this may damage its bearings.



7. Carefully pry the strainer loose from the bottom plate If the strainer is stuck, insert a screwdriver between the rotor cover and strainer and carefully prise them apart.

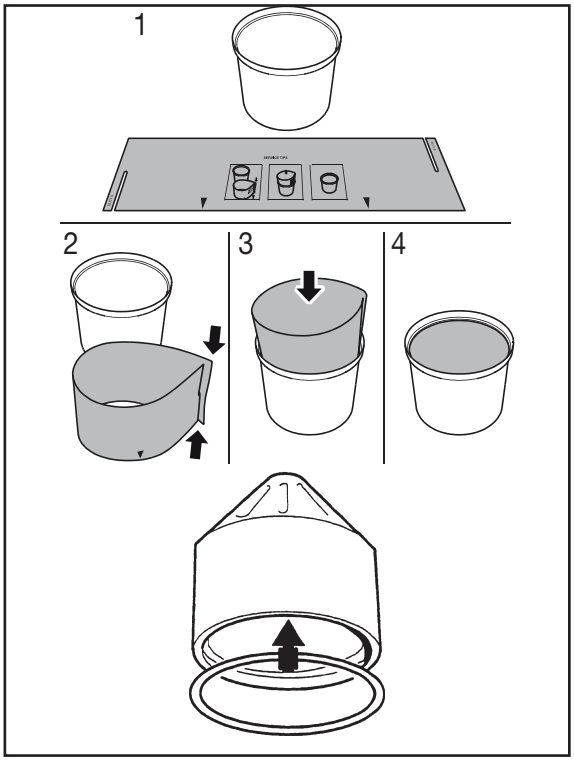


8. Remove paper insert and scrape off the deposits from the inside of rotor cover.
   - *If there are no deposits, this shows that the cleaner is not working.*
   - *Clean more frequently if deposits are thicker than 28 mm.*
9. Clean all parts in diesel fuel.

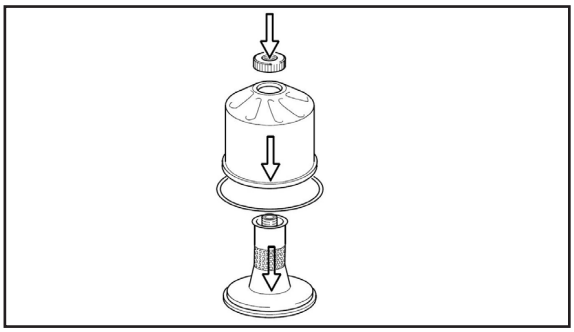
** Numbers refer to positions on the lubrication schedule, chapter 6*

500 Hours Service

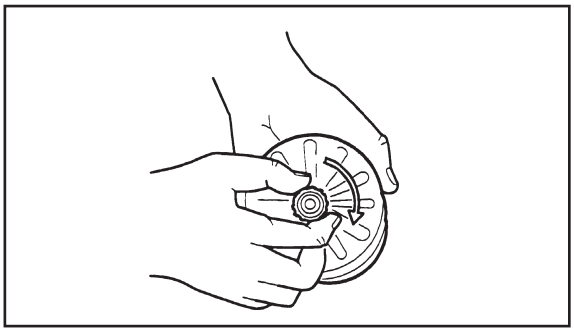
Maintenance to be performed every 500 hours of operation.



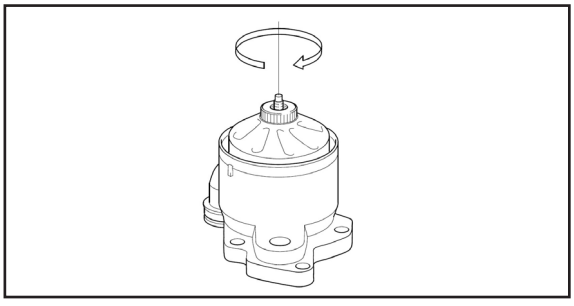
10. Place a new O-ring and paper insert in the rotor cover.
    - *The O-ring must not be damaged.* Change if necessary.



11. Assemble the rotor.



12. Tighten rotor nut firmly by hand.

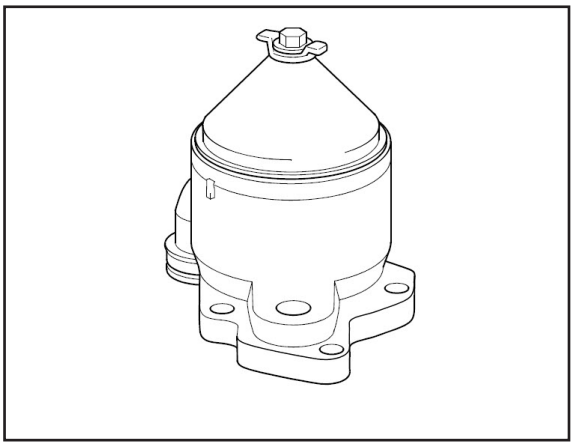


13. Reinstall the rotor.
    - *Check that it rotates easily.*

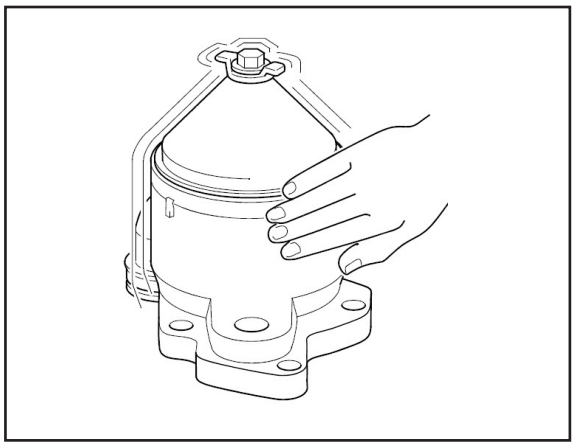
** Numbers refer to positions on the lubrication schedule, chapter 6*

500 Hours Service

Maintenance to be performed every 500 hours of operation.



14. Check that the O-ring in the cover is not damaged. Hard or damaged O-ring must be replaced.
15. Refit the cover and tighten the lock nut.
    - Tightening torque 20 Nm
16. If the nut is tightened too hard (for instance by using tools), the cover, nut or rotor shaft may be damaged!
17. Replace damaged parts!



18. Function check

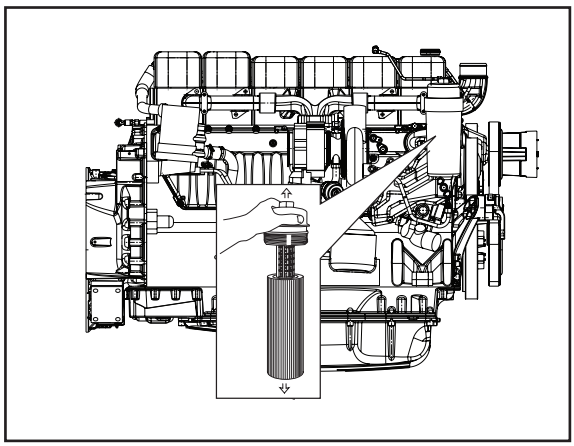
    The rotor rotates very fast, and will normally carry on rotating after the engine is stopped.

    a. Run the engine until it reaches normal operating temperature, then stop the engine.

    b. Listen for spinning sound from rotor, or feel if cleaner housing vibrates.

    c. The rotor normally rotates **30 - 60 seconds** after the engine has stopped.

    d. If not, dismantle and check the cleaner.



1.3. Replace oil filter 3* (at the same time as oil change, item 1.1)

1. Unscrew the filter cover with a closed tool with hexagon driver, e.g. 36 mm.
2. Lift out the filter housing cover with filter element. The filter housing will drain automatically once the filter has been removed.
3. Detach the old filter from the cover by holding the cover and carefully tapping the entire filter element against something hard. Remember that there will be oil splashes.
4. Install the new filter and tighten filter cover to 25 Nm.

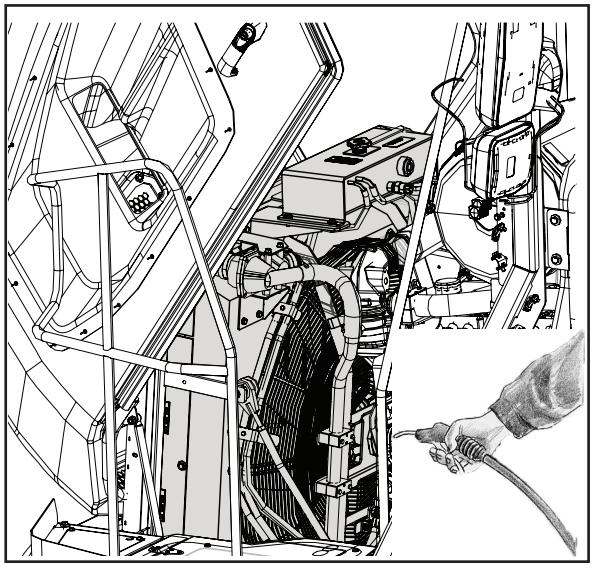
NOTE

- **Do not use an adjustable spanner or other open tool as there is risk of damaging the filter cover.**
- **Use only genuine filter!**
- **Clean the centrifugal oil cleaner when renewing the oil filter. Otherwise, the oil filter will be blocked and resistance in the filter will increase. If this happens, an overflow valve in the filter retainer opens and lets the oil pass without being filtered.**

** Numbers refer to positions on the lubrication schedule, chapter 6*

500 Hours Service

Maintenance to be performed every 500 hours of operation.



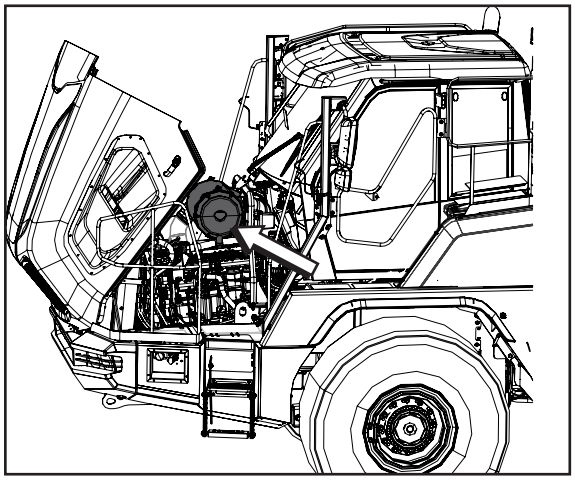
1.4. External cleaning of the radiator, at least once a year 5*. If necessary, the cooling system should be cleaned more often.

1. Clean externally the radiator fins and hoses by using a brush.
   The radiator can also be washed with water from the backside.
2. Check that the radiator is not blocked on the air side and that the fins are not damaged.
3. Carefully scrape the deposit away from the radiator fins. If necessary, a paraffin-based engine cleaner may be used.
4. Check the fins, rubber hoses, clamps and pipes for corrosion, damage and leakages.
5. Bent fins can be carefully straightened, e.g. using a steel wire brush.

CAUTION

The cooling system must not be cleaned using caustic soda. It can damage aluminium parts.

** Numbers refer to positions on the lubrication schedule, chapter 6*



500 Hours Service

Maintenance to be performed every 500 hours of operation.

1.5. Air filter 10*

The air filter is located on the top of the engine, under the bonnet.

- Always stop the engine before servicing the air filter.
- Open the bonnet and apply the bonnet catcher.
- For cleaning and replacement of outer and inner element, see this page and next page.

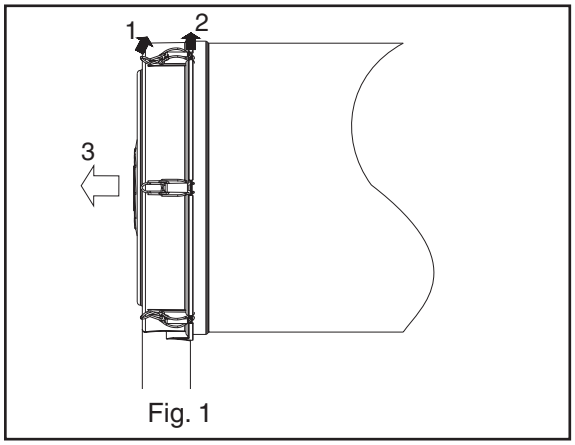


Fig. 1

Outer element:

Check element every 500 hours of operation or if the air filter warning light illuminates at full load on the engine.

- Replace the outer element if it is clogged or at the latest after 2 years.

1. Loosen all clamps and remove the cover (Fig. 1).
2. Remove outer element with a light turning movement (Fig. 2).

Because the filter fits tightly over the outlet tube there will be some initial resistance, similar to breaking the seal on a jar. Gently move the end of the filter back and forth to break the seal then rotate while pulling straight out. Avoid knocking the filter against the housing. Visually check a Vacuator™ Valve, check and physically squeeze it. (Fig. 3)

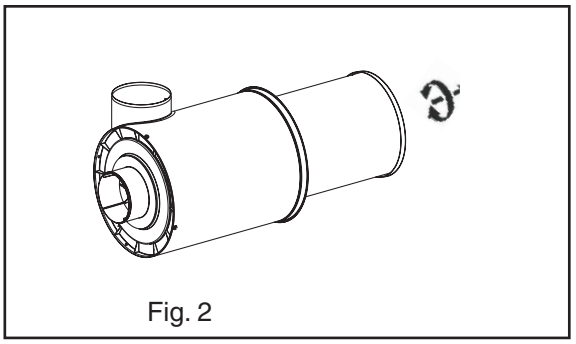


Fig. 2

NOTE

Make sure the valve is flexible and not inverted, damaged or plugged. Replace it if damaged or if it looks like any of these images. A damaged or missing vac valve will disrupt the designed flow of air through the air cleaner. (Fig.4)

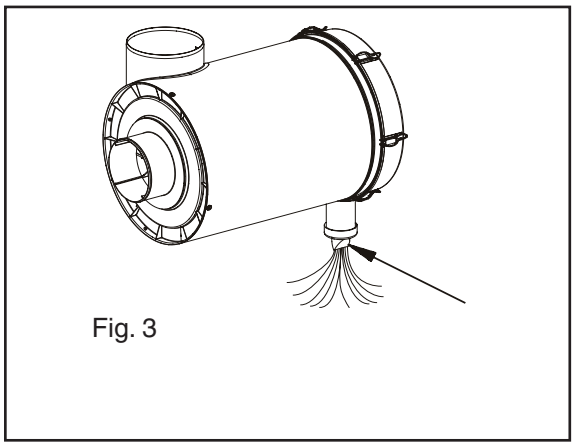


Fig. 3

Visually Check the Safety Filter and Clean Both Surfaces of the Outlet Tube.

If your air cleaner has a safety filter, visually check the safety filter in place for signs of damage. Do not remove the safety filter unless it is damaged or due for replacement. Also verify that the safety filter is properly seated in the housing.

The safety filter should be replaced every three primary filter changes. Use a clean damp cloth to wipe both the filter sealing surface and the inside of the outlet tube. Ensure that the outlet tube sealing area is undamaged.

See also precautions on next page

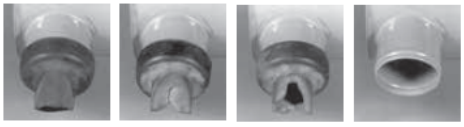
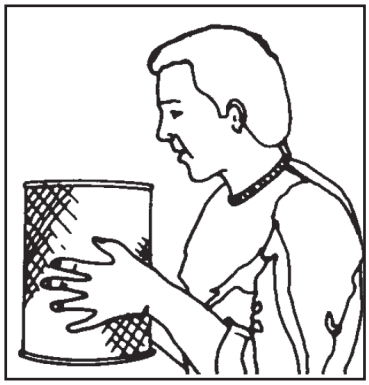


Fig. 4

** Numbers refer to positions on the lubrication schedule, chapter 6*

500 Hours Service

Maintenance to be performed every 500 hours of operation.

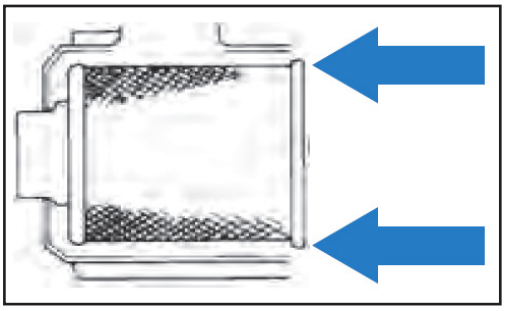


Contaminant on the sealing surface could hinder an effective seal and cause leakage. If the safety filter is to be replaced, avoid leaving the outlet tube exposed to the air.

If there is to be a delay in installing the new safety filter, cover the air cleaner outlet tube to avoid admitting any dust.

Inspect the Old Filter.

Inspect the old filter for any signs of leaks. A streak of dust on the clean side of the filter is a telltale sign. Eliminate any source of air leaks before installing the new primary filter.

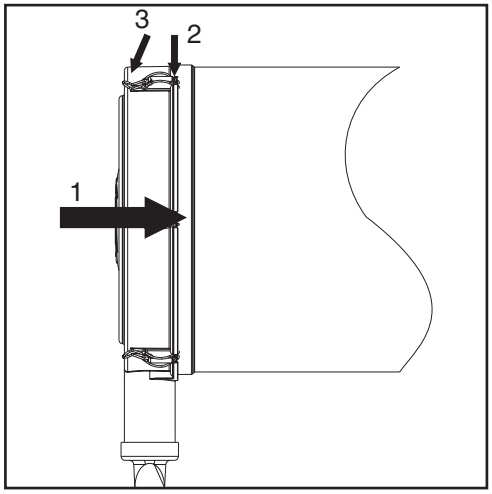


Inspect the New Filter.

Inspect the new filter for any damage that may have occurred through mishandling. NEVER install a damaged filter. Visually check the inside of the open end, which is the sealing area.

Do not wipe the filter area as the new filter may have a dry lubricant on the seal to aid installation.

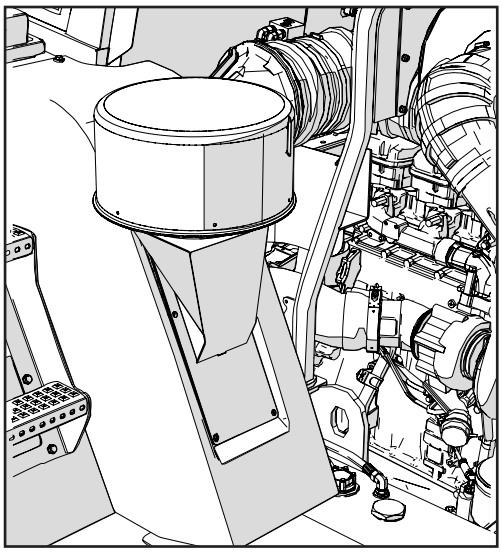
Insert the New Filter



First, if you're servicing the safety filter at this change-out, seat it properly into position before installing the primary filter. Insert new filters carefully. Seat the primary filter by hand, making certain it is inserted completely into the air cleaner housing. To complete a tight seal, apply pressure by hand at the outer rim of the filter, not the flexible center.

No cover pressure is required to hold the seal in place and one should NEVER use the service cover to apply pressure. This could damage the housing and fasteners and void the warranty. If the service cover presses against the filter before the cover is fully in place, remove the cover. With cover off, push the filter farther into the air cleaner by hand and then the cover will go on with no extra force. Once the filter is in place, secure the service cover.

Top spin pre cleaner (Option)

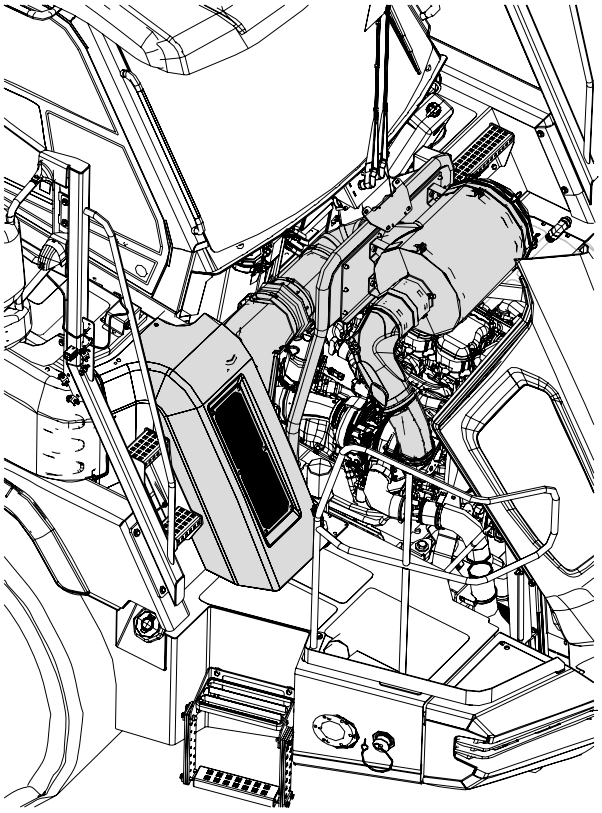


The air pre-cleaner is located on the right side of dumper on the front wagon. It's recommended for heavy dusty areas and free of the maintenance.

** Numbers refer to positions on the lubrication schedule, chapter 6*

500 Hours Service

Maintenance to be performed every 500 hours of operation.



Check Connectors for Tight Fit

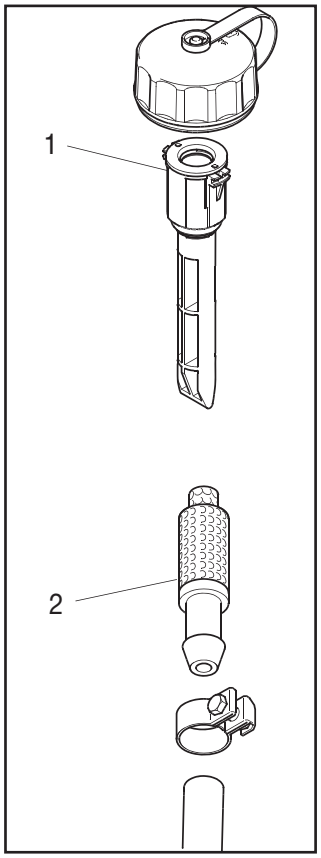
Make sure service indicators are reset and in proper working order.

Check that all mounting bands, clamps, bolts, and connections in the entire air cleaner system are tight.

Check for holes in piping, and repair or replace as needed.

Any leaks in the intake piping will admit dust directly to the engine.

- **Do not attempt to reinstall a cleaned inner element.**
- **Do not clean or replace the elements when the engine is running.**
- **Replace the outer element if small holes or thinner parts are found on the element when it is checked with an electric bulb after cleaning.**
- **Do not use an element in which folds, gasket or seal are damaged.**
- **When cleaning the element, do not hit or hammer it.**
- **Do not dismantle the inner element unnecessarily.**
- **NEVER use the service cover to push the filter into place! Using the cover to push the filter in could cause damage to the housing, cover fasteners and will void the warranty.**



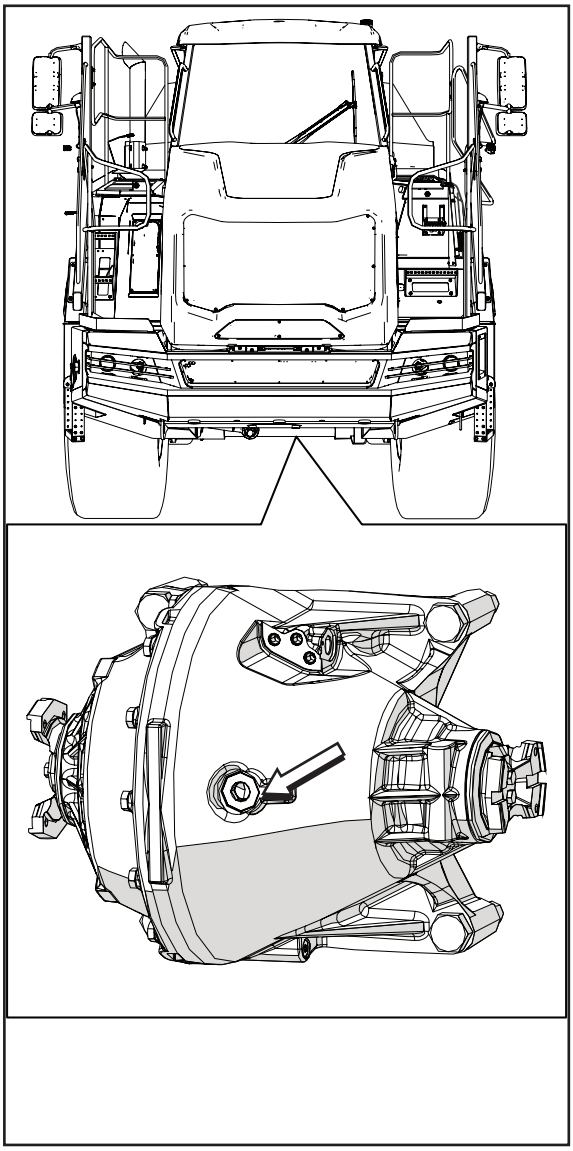
1.6. Urea filling/ventilation point 14*.

1. Cleaning the reductant tank filler filter
   - Make sure that the filler filter (1) is clean. If it is dirty: Clean the filler filter with clean water and refit it.
2. Cleaning the reductant tank ventilation filter.
   - Make sure that the ventilation filter (2) is clean. If it is dirty: Clean the ventilation filter with clean water and refit it.

** Numbers refer to positions on the lubrication schedule, chapter 6*

500 Hours Service

Maintenance to be performed every 500 hours of operation.



2. Drive line

2.1. Check oil levels

- Measurements must be carried out when dump truck is parked on a firm, level ground.
- Check that oil level is near the bottom edge of the plugs.
- Refill with oil if level is too low.
- If the dump truck tandem housing is angled, the reading will be incorrect.

CAUTION

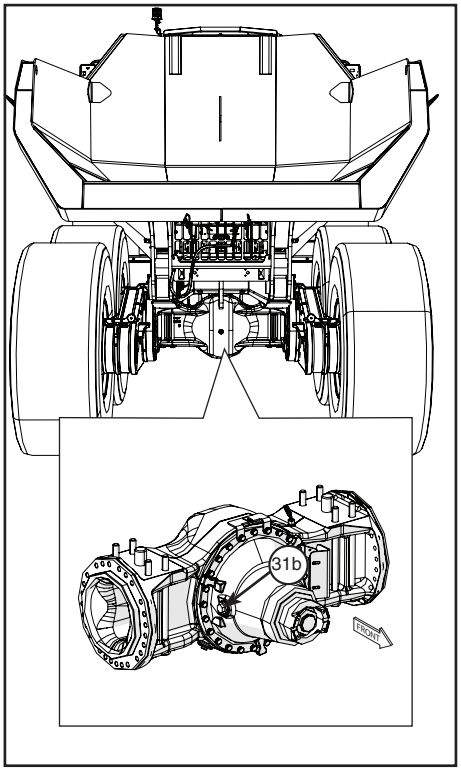
Be aware of possible internal pressure when the oil is hot!

1. Front differential 30*
   - Use a hexagonal key to unscrew the upper filling/level plug.
   - Oil level must be at lower edge of hole when dump truck is horizontal.
   - Clean the plug, replace seal if necessary and reinstall.
     >*Tightening torque: 150 Nm*

** Numbers refer to positions on the lubrication schedule, chapter 6*

500 Hours Service

Maintenance to be performed every 500 hours of operation.

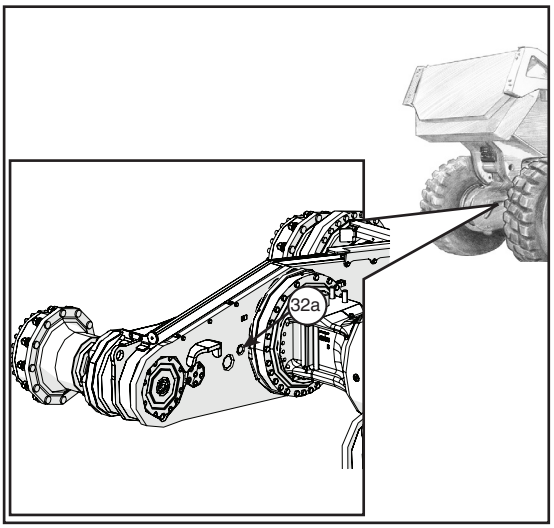


2. Rear differential 31* HA30/HA30A

Use a hexagonal key to unscrew the filling/level plug (31b) at the right side of housing.

- Oil level must be at lower edge of hole when dump truck is horizontal.
- Clean the plug, replace seal if necessary and reinstall.

	Torque
31b	140 Nm



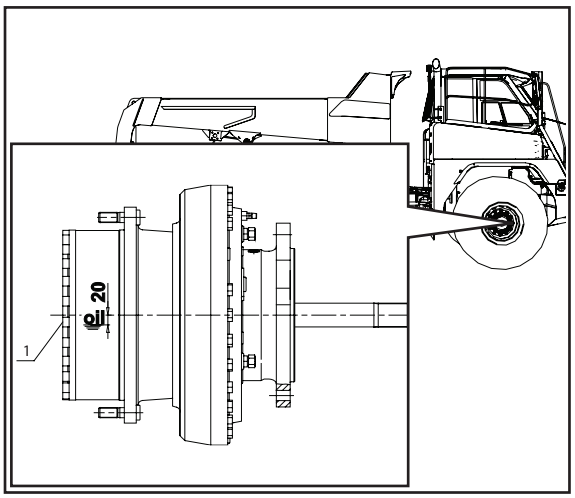
3. Tandem housings 32*, rear reduction gears 33*

Use a hexagonal key to unscrew the level plugs on the inside of the housing.

By checking the oil level on tandem you will at the same time confirm the correct oil level on wheel hubs due to open oil circulation between the tandem and the wheel hubs.

- Oil level must be at lower edge of hole when dump truck is horizontal.
- Clean the plug, replace seal if necessary and reinstall.

	Torque
32a	140 Nm



4. Front reduction gears 33*

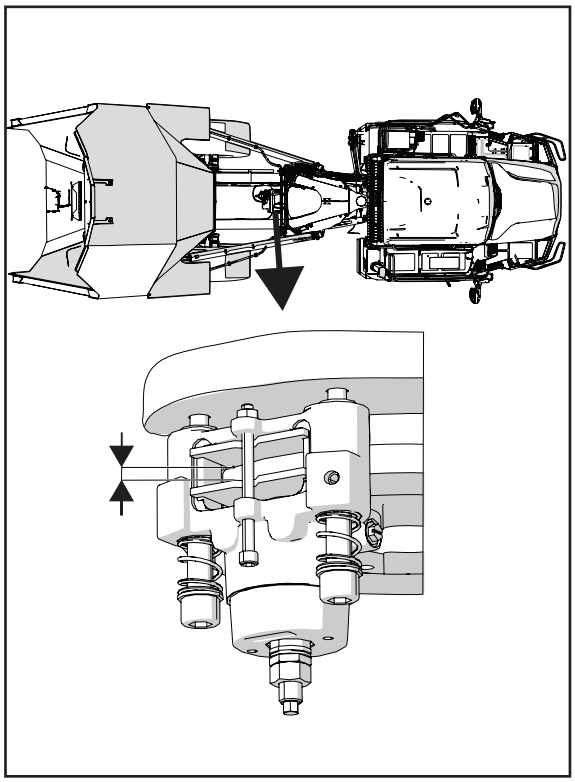
1. Clean filling point and oil filling plug.
2. Turn hub assembly into position.
   - The oil drain plug has to be at the bottom.
3. Open the oil filling plug. (1)
4. Check the oil level again at the filling bores.
6. Clean borehole and oil filling plug.
7. Screw oil filling plug back in.

	Torque
1	120 Nm

** Numbers refer to positions on the lubrication schedule, chapter 6*

500 Hours Service

Maintenance to be performed every 500 hours of operation.



3. Parking brake

3.1. Check lining thickness

- Checking of brake lining thickness must also be carried out after the first 500 hours of operation.

1. Parking brake:

   Lift body and apply the body support and check thickness of linings. Change when approaching limit.

   - In connection with replacement, perform adjustment, see next page.

   Standard lining thickness: Parking brake: 5.0 mm.

   Min. thickness: Parking brake: 0.79 mm.

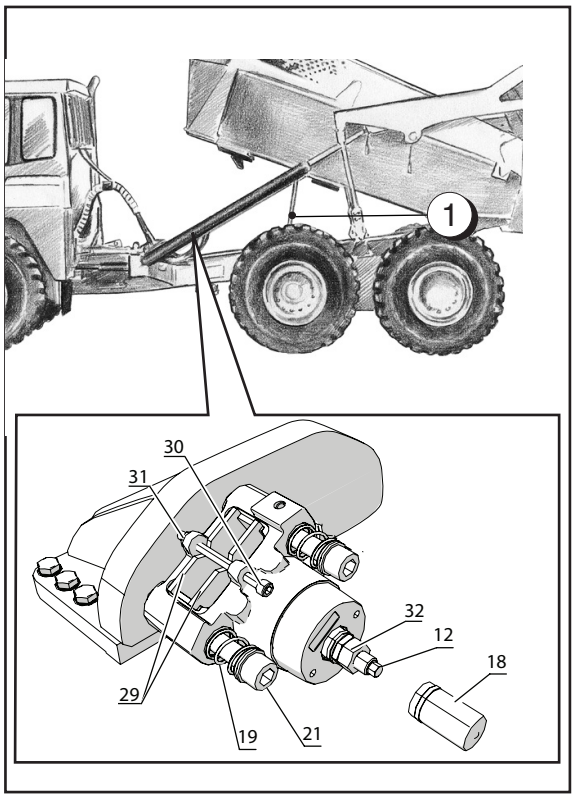
CAUTION

This applies to normal driving. For rough operating conditions with much braking and/or driving in water, the brake linings should be checked more often!

** Numbers refer to positions on the lubrication schedule, chapter 6*

500 Hours Service

Maintenance to be performed every 500 hours of operation.



3.2. How to change linings and adjust the parking brake.

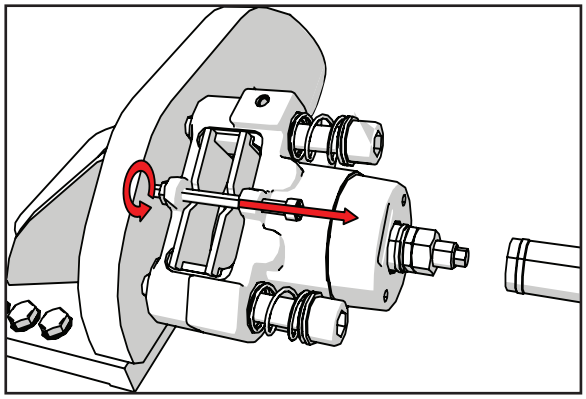
To be performed in connection with replacement of parking brake linings.

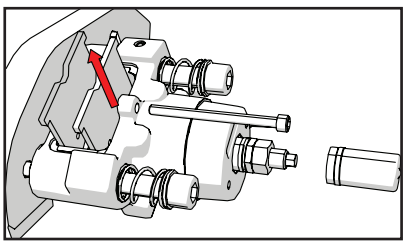
- **Before removing the parking brake linings, do as follows:**

1. Make sure that the accumulators are charged with pressure. Can start the engine if there is not enough pressure during operation (185-207 bar)
2. Apply the parking brake.
3. Lift the body.
4. Apply the body support (1) (see also safety instructions, chapter 2).
5. Stop the engine.
6. Secure the dump truck with wheel chocks (see also safety instructions, chapter 2).
7. Release the parking brake by the parking brake switch.
8. Loosen hex nut (item 31) and remove the screw (item 30)

NOTE

When the centring screw is released, the compression springs on the slider bolts should push the caliper assembly and the rear pad against the brake disc. If not, the caliper is stuck and must be repaired or replaced.

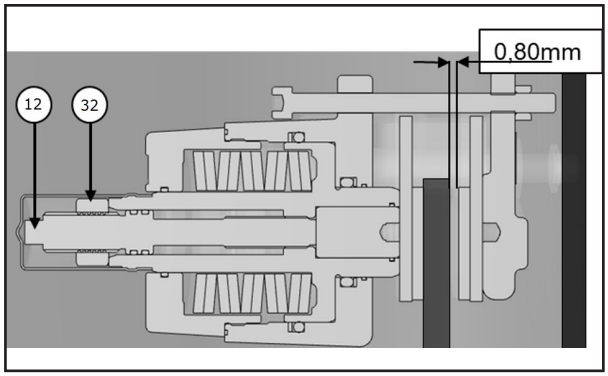




9. The parking brake linings can now be replaced. Replace the items 30 and 31.

- **After installation of new parking brake linings, do as follows:**

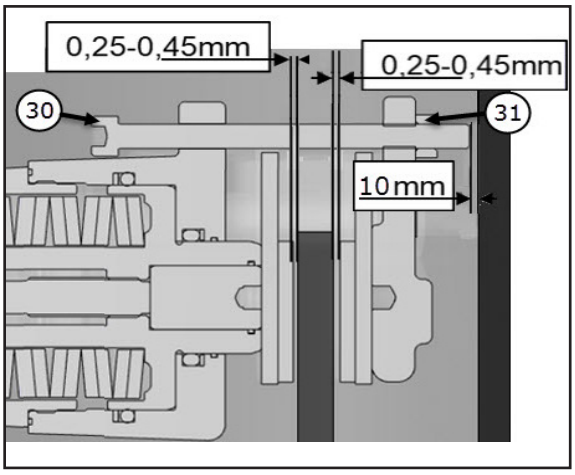
1. Remove the cap (item 18) hold 30mm hex nut (item 32) with a wrench and rotate the adjustment screw (item 12) clockwise, using the a M12 socket until both brake pads contact the disc. The brake linings (item 29) are no longer loose. Do not exceed 13.6 Nm on the screw adjustment.
2. Rotate counter-clockwise (back off) screw adjustment (item 12) approx. 1/2 turn to create a total gap between the disc and front brake pad 0.80mm.
3. Tighten adjustment screw lock nut (item 32) 60 Nm.



** Numbers refer to positions on the lubrication schedule, chapter 6*

500 Hours Service

Maintenance to be performed every 500 hours of operation.



4. With the hex nut (item 31) loose, adjust the screw (item 30) until it needed clearance is reached (10 mm from bracket).
5. Using a 0.40 mm thick feeler gauge in the gap between the brake pads and the disc, adjust the screw (item 30) until the feeler is slightly tight in the gap.
6. Torque the hex nut (item 31) to 45 Nm while preventing rotation of the screw (item 30).
7. Release hydraulic pressure at least two times. Using feeler gauge, check clearance on each side of disc. Clearance should be 0.25 - 0.45mm per side. If clearances are not within specifications , repeat adjustment.
8. Replace the cap (item 18)
9. Re-adjust the brake when running clearance reaches a total 3 mm (1.5 mm on the each side of the brake disc)
10. After adjustment of the parking brake, perform a holding capacity test (See Daily Service instruction)

NOTE

HA30/HA30A is equipped with one parking brake unit.
HA45/HA45A is equipped with two parking brake units

4. Wheels

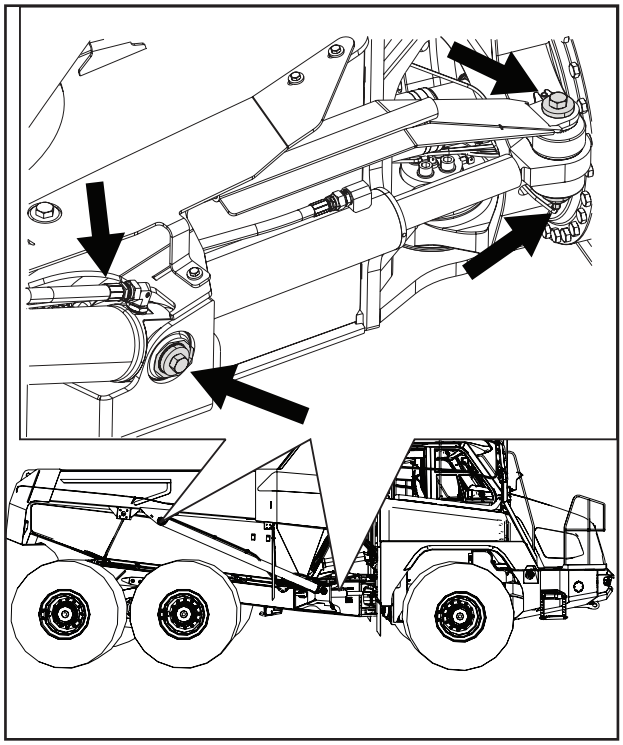
4.1. Check wheel nuts torque.

Torque setting 650 Nm.

** Numbers refer to positions on the lubrication schedule, chapter 6*

500 Hours Service

Maintenance to be performed every 500 hours of operation.



5. Tip- and steering cylinders

5.1. Check expander bolts.

- *Checking of the expander bolts torque setting must also be carried out after the first 100 hours of operation.*

Torque setting:

- Tip cylinder bolt: 350 Nm
- Steering cylinder bolt: 350 Nm
- The torque must be checked on both sides of the bolts for steering cylinders.
- The torque must be checked on both sides of the cylinders.
- *Be aware of the lubrication nipples on the bolts when checking the torque.*

6. Cab ventilation

6.1. Air conditioner system, test operation

1. Start the engine.
2. Press down the air conditioner switch (see also chapter 3) and open all nozzles.
3. Check that the temperature in the cab decreases.
   - If the temperature does not decrease:
     - Check whether the fuse is burnt out. If yes, replace the fuse.
     - If the fuse is not burnt out, there can be a failure or too little refrigerant in the system:

CONTACT YOUR LOCAL HYUNDAI DEALER

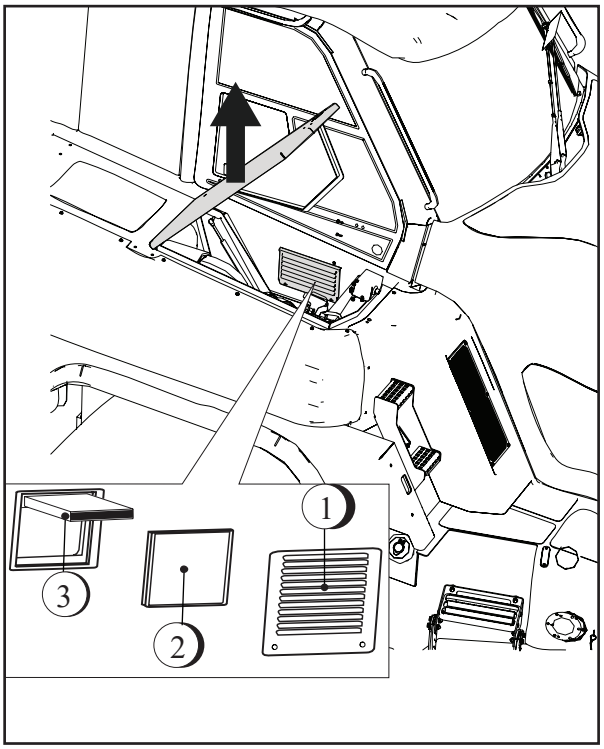
** Numbers refer to positions on the lubrication schedule, chapter 6*

500 Hours Service

Maintenance to be performed every 500 hours of operation.

WARNING

- **If the air conditioning system does not work properly, contact your Hyundai Dealer.**
- **Always use safety glasses or goggles, gloves, boiler suit and protective footwear when inspecting, servicing and repairing the air conditioning system.**
- **Refrigerant R134a has a property that can cause frostbite if it comes into contact with bare skin or eyes.**
- **Always work on the air conditioning system in well ventilated places.**
- **The system contains refrigerant R134a under pressure. Repair and refilling of the refrigerant circuit must only be done by accredited personnel.**
- **Dispose of waste oil/fluids in an environmentally friendly manner!**
- **High concentration of the refrigerant in gaseous form can cause drowsiness, headache, dizziness and at worst unconsciousness. Very high concentration of the gas can even cause cardiac insufficiency. Do not smoke when servicing the air conditioning system!**
- **Be careful with all hoses connected to the air conditioning system. There is always a certain over pressure in the system. Therefore, never undo hoses or the filler opening on the compressor except during repairs to the system.**
- **If there is any suspicion of leakage, the system must not be filled up - leave the leakage site and contact your Hyundai Dealer for repairs.**
- **Get your Hyundai Dealer to check the air conditioning system yearly and refill refrigerant, if necessary.**
- **See also chapter 2, Safety Instructions.**



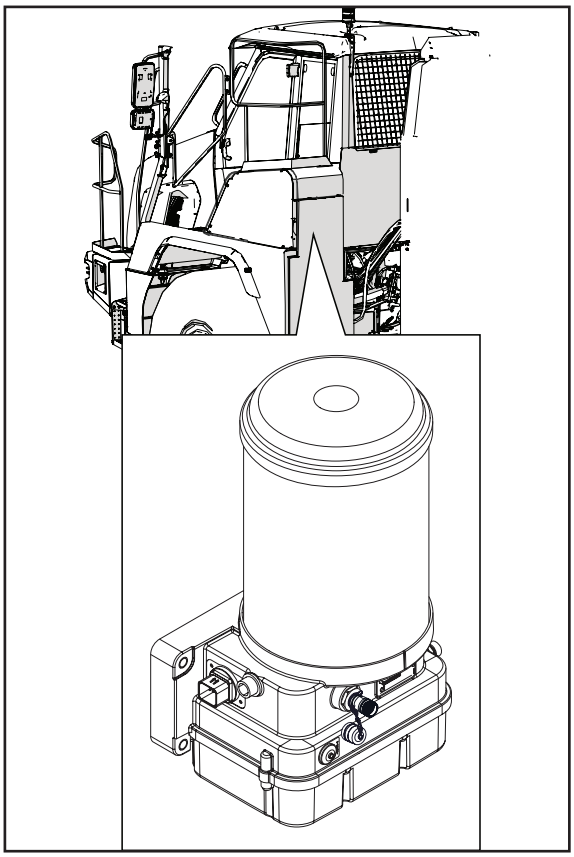
6.2. Check/replace cab ventilation filters 70*, 100*

1. Open cover on the RHS of the truck.
2. Open cover (1) by removing 2 screws.
3. Remove the pre-filter (2)
   - Replace if necessary.
4. Remove cab ventilation filter element (3) and replace.
5. Reassemble the opposite way.
6. Adjust the check interval if another requirement is experienced.

** Numbers refer to positions on the lubrication schedule, chapter 6*

500 Hours Service

Maintenance to be performed every 500 hours of operation.



7. Automatic central lubrication.

7.1. Check the system

- Check the pump for damage and leaks.
- Check the grease lines for damage and leaks.
- Check, if possible, the condition of the grease points the system serves. Sufficient fresh grease should be present.
- Check the operation of the system. Perform a cycle test (see chapter 3 for how to perform a cycle test). *Note that every time you perform a cycle test, grease is supplied to the grease points.*
- Clean the pump-unit and its surroundings.

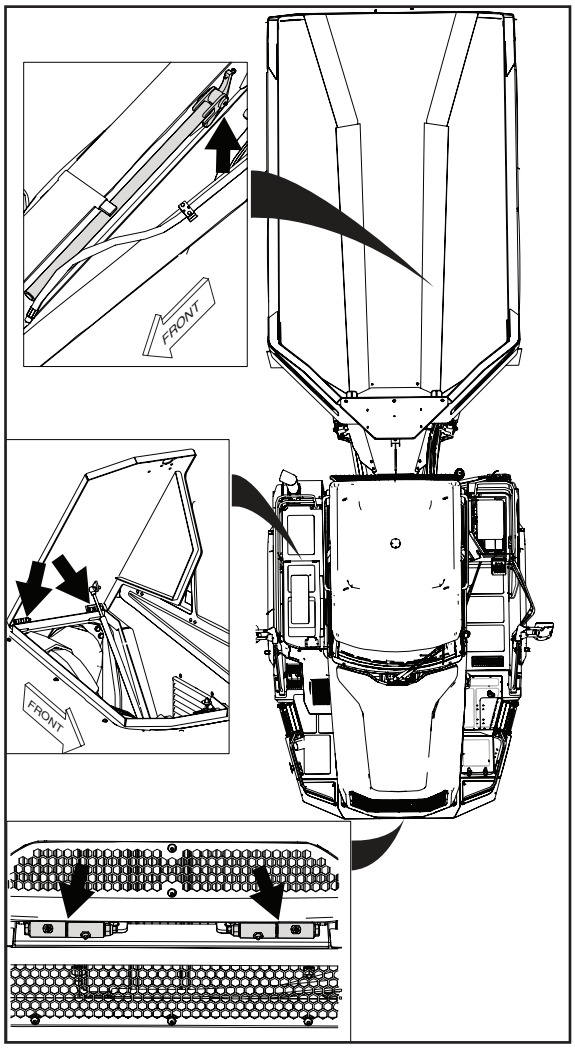
NOTE

- **If you use high-pressure air or water to clean the dump truck, do not spray directly onto the pump unit. Water or dirt might enter the pump-unit through the breather.**

** Numbers refer to positions on the lubrication schedule, chapter 6*

500 Hours Service

Maintenance to be performed every 500 hours of operation.



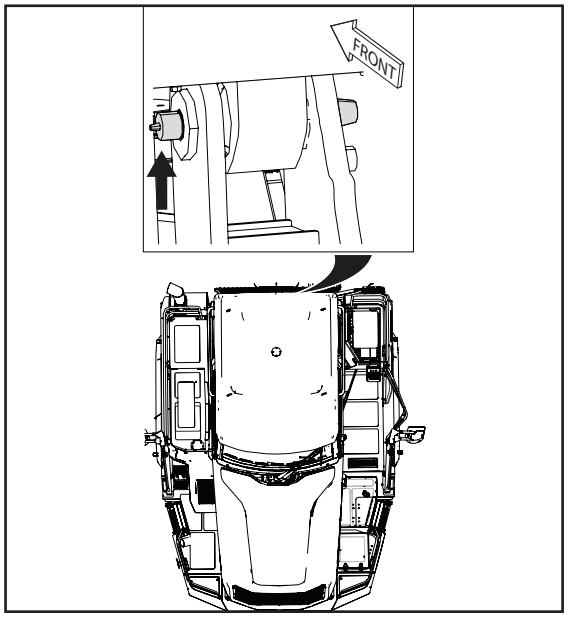
8. Lubrication

Grease lubrication points until pure grease is forced out of the components. Wipe off.

8.1. Fender hatches, bonnet 6 lubricators 50*

There are 2 lubricators on right hand side fender (one per hinge), 4 lubricators on front of the bonnet (two per hinge).

These lubricators must be manually greased, even if the automatic central lubrication is installed.



8.2. Cab rear hinges, 2 lubricators 51 *

There is 1 lubricator on each side of the cab.

These lubricators must be manually greased, even if the automatic central lubrication is installed.

9. Wheel nuts

9.1 Check tightness

10. Continue with all items in 40 Hours Service.

** Numbers refer to positions on the lubrication schedule, chapter 6*

1000 Hours Service

Maintenance to be performed every 1000 hours of operation.

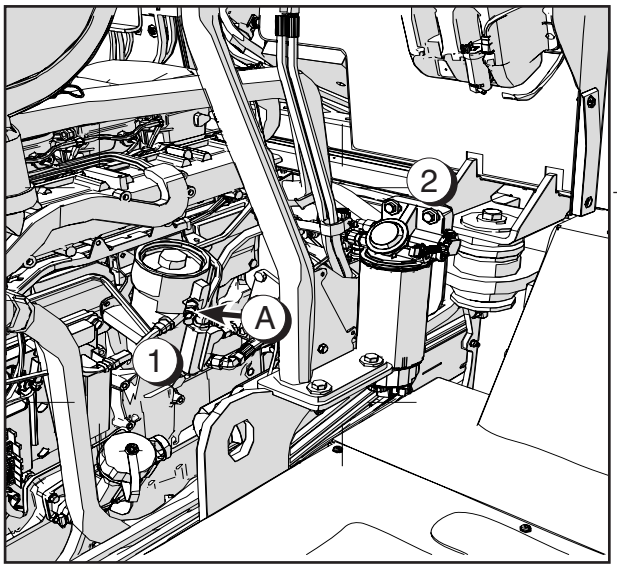
1. Driver's seat

1.1. General safety check

- Check for play in seat gliders. Max. allowed in length or sideways 1 mm. Grease the gliders.
- Check shock absorbers for oil leakages.
- Check seat mounting to the dump truck.
- Check safety belt and lock mechanism for wear and damage.
- Check that no pins are loose/worn in the seat base.
- Replace worn/damaged parts.

2. Engine

2.1. Replace fuel filter PDE 4* Replace water separating fuel filter PDE 6*



CAUTION

Observe extreme cleanliness when working with the fuel system. Otherwise operational interruption may easily occur and the injection equipment may be damaged.

2.1.1. Renewing the fuel filter, PDE

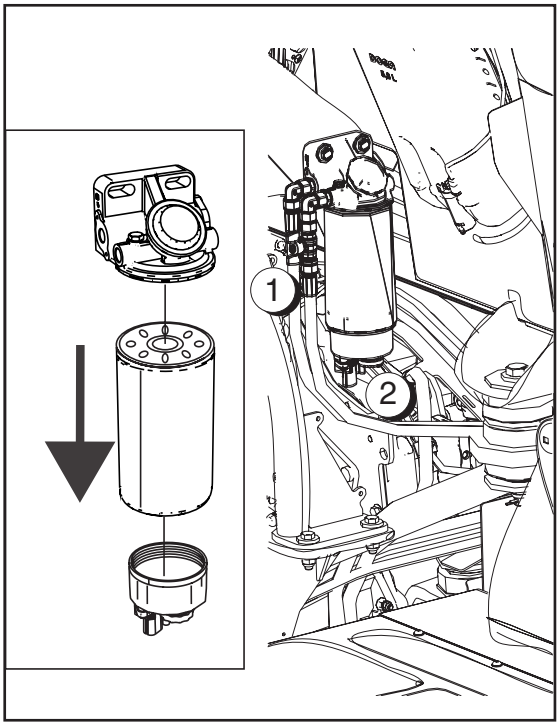
Before starting work: Close the shut-off cock on the water separator (2) and position a container under the filter.

1. Open the bleed nipple (A) on the fuel filter housing (1) to release any remaining pressure. It may be difficult to unscrew the filter cover if the system pressure has not fallen enough. Unscrew the filter cover with a closed tool with hexagon driver, e.g. socket 36 mm, so as not to damage the filter cover.
2. Lift out the filter cover and filter element. The filter housing will drain automatically. This applies only if the fuel tank is lower than the engine. Otherwise the fuel shut-off cock on the water separator (2) must be closed first.
3. Undo the removed filter element from the cover by carefully bending it to one side.
4. Renew the O-ring in the cover. Lubricate the O-ring with O-ring grease.
5. Check that the filter housing is drained of fuel. Contaminated fuel may enter the injectors if the drainage does not work.
6. Press a new filter element into the snap fastener in the cover.
7. Fit the filter element and cover in the filter housing. Tighten the cover to 25 Nm (18.4 lbf/ft).
8. Bleed the fuel system after replacing the water separating filter.

** Numbers refer to positions on the lubrication schedule, chapter 6*

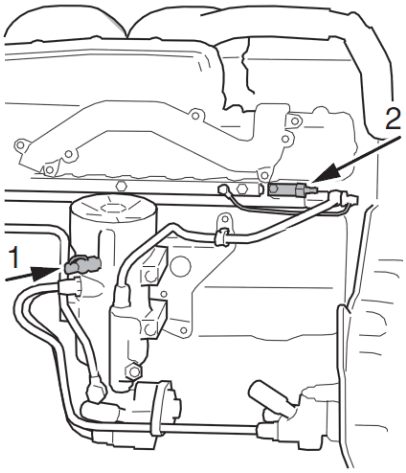
1000 Hours Service

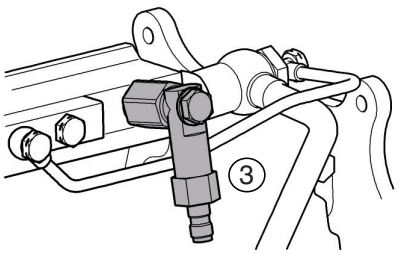
Maintenance to be performed every 1000 hours of operation.



2.1.2. Renewing the water separating filter

1. Close the shut-off cock (1) in the fuel pipe and position a container under the filter.
2. Open the drain tap (2) in the filter cover and let the fluid run down into the container.
3. Unscrew the filter from the filter head.
4. Discard the old filter and use a new filter.
5. Lubricate the O-ring in the filter cover with engine oil.
6. Screw the filter cover onto the new filter by hand. Make sure that the drain tap is fully closed.
8. Lubricate the O-ring on the filter with engine oil.
9. Fill the width of the filter with clean fuel.
10. Screw the filter into position until the O-ring rests against the filter head. Tighten the filter another 1/2-3/4 turn by hand.
11. Open the shut-off cock and check the system for leaks.
12. Bleed the fuel system after replacing the water separating filter.





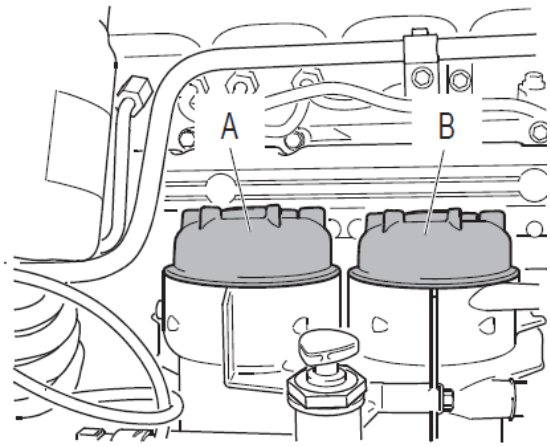
2.1.3. Bleeding the system

1. Connect a transparent plastic hose to the bleed nipple (1) on fuel filter housing. Place the end of the plastic hose in a container with a capacity of at least 3 liters (0.8 US gallons).
2. Open the bleed nipple and pump with the hand pump until fuel comes out of the hose. If the fuel system is empty, it is necessary to pump approximately 100 strokes in order to draw up the fuel. Depending on the installation, a much greater number of pump strokes may be required before fuel comes out.
3. Pump until fuel without air bubbles comes out, approximately 20 strokes.
4. Close the bleed nipple and remove the hose.
5. Transfer the plastic hose to the fuel manifold bleed nipple (2).
6. Open the fuel manifold ventilating valve (3).
7. Pump with the hand pump until fuel without air bubbles comes out, approximately 50 strokes.
8. Close the bleed nipple on the fuel manifold and remove the plastic hose.
9. Pump approximately 20 strokes with the hand pump until the overflow valve opens. A hissing sound should be heard.
10. Start the engine. The engine should be easy to start.

** Numbers refer to positions on the lubrication schedule, chapter 6*

1000 Hours Service

Maintenance to be performed every 1000 hours of operation.



A Water separating suction filter

B Pressure filter

2.2. Replace fuel filter XPI 4* Replace water separating fuel filter XPI 6*

2.2.1. Renewing the fuel filter XPI 4*

NOTE

Engines with XPI have dual fuel filters in the form of a water separating suction filter and a pressure filter.

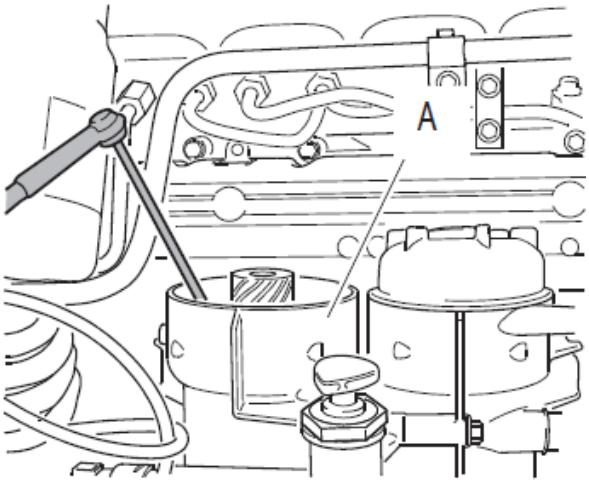
NOTE

Collect all fuel coming out when renewing the fuel filter according to environmental regulations.

To ensure that the filter housings are drained properly, the filter covers must be removed as follows:

Start with the water separating suction filter (A)! Do not open the pressure filter cover (B) until the filter housing for the water separating filter (A) is completely drained.

Do not use an adjustable spanner or other open tool to undo the filter covers, as this risks damaging the filter covers.



1. Make a mark on the water separating suction filter cover. Unscrew the cover 3 to 4 turns using a closed tool with hexagon driver, e.g. socket 36 mm.
2. Unscrew the filter cover and lift it up slowly with the filter element.
3. Make sure the suction tool is completely drained before starting work. Draw out remaining fuel and any particles using suction tool or a similar tool.
4. Keep the suction tool hose in the filter housing for the water separating suction filter.
5. Make a mark on the pressure filter cover. Unscrew the cover 3 to 4 turns using a closed tool with hexagon driver, e.g. socket 36 mm. Draw out fuel which may drain into the water separating suction filter housing when the pressure filter is detached.
6. Unscrew the pressure filter cover and lift it up slowly with the filter element.
7. Fuel from the pressure filter housing will flow into the water separating suction filter housing. Leave the suction tool in the water separating suction filter housing until it is completely drained of fuel.
8. Move the suction tool to the pressure filter housing. Draw out remaining fuel and particles.
9. Undo the old filter elements from the covers by carefully bending them to one side.

** Numbers refer to positions on the lubrication schedule, chapter 6*

1000 Hours Service

Maintenance to be performed every 1000 hours of operation.

2.2.2. Fuel filter fitting

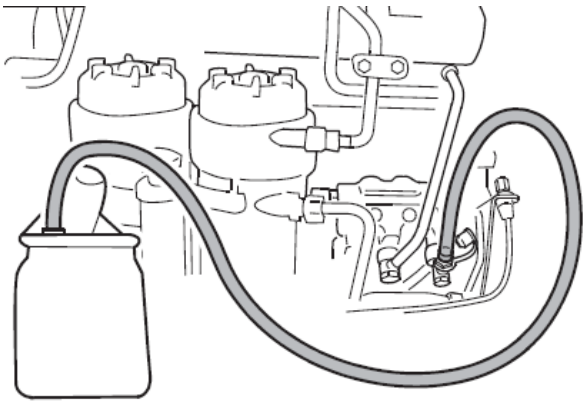
Check that there is no remaining packaging material stuck to the filters.

1. Unpack the new filter elements and the supplied O-rings.
2. Fit the new O-rings to the covers. Lubricate the O-rings with O-ring grease.
3. Press the filter elements into the snap fasteners on the covers

NOTE

Fit the filter element to the filter cover before positioning it in the fuel filter housing. The filter element can otherwise be damaged.
Open the bleed nipple to prevent back pressure in the filter housings when the filter elements are screwed on.

4. Press down the filter element with the filter cover into the fuel filter housing.
5. Screw on the filter cover. Use a closed tool with hexagon driver, e.g. socket 36 mm.
6. Check that there is no gap between the filter cover and the filter housing. If there is a gap, repeat the procedure and make sure that the bleed nipple is open.



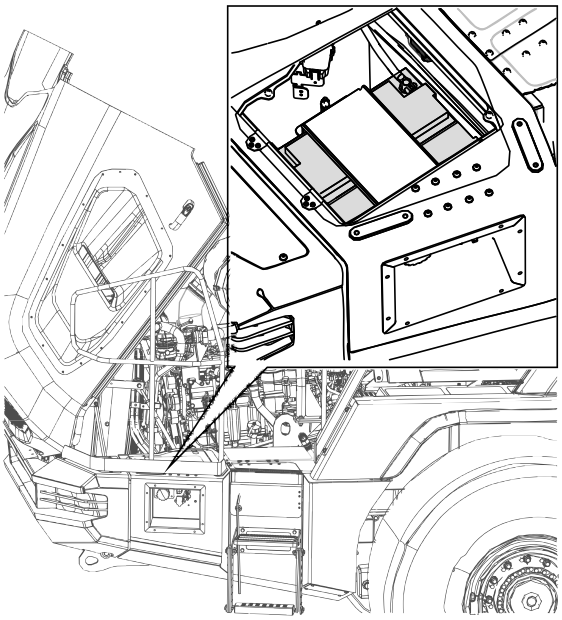
2.2.3. Bleeding the fuel system XPI

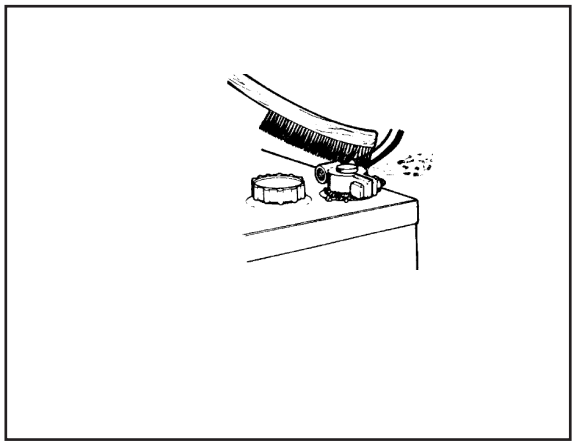
1. Open the bleed nipple at the high pressure pump and connect a clear plastic hose from suction tool or similar tool.
2. Drain the suction tool. Hold the suction tool straight and draw out a full container of fuel.
3. If the fuel coming out of the hose is free of air bubbles then bleeding is complete.
4. Close bleed nipple at the high pressure pump, remove the hose and suction tool.
5. Start the engine and check for leaks

** Numbers refer to positions on the lubrication schedule, chapter 6*

1000 Hours Service

Maintenance to be performed every 1000 hours of operation.





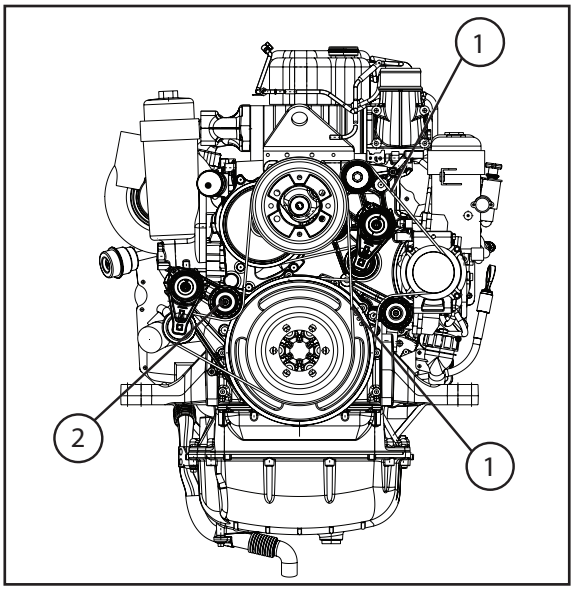
2.3. Check battery clamping and battery terminals for tightness and corrosion 11*

Clean if necessary, apply acid-free Vaseline on the terminals and re-tighten the clamps.

** Numbers refer to positions on the lubrication schedule, chapter 6*

1000 Hours Service

Maintenance to be performed every 1000 hours of operation.



2.4. Check multi-groove belt condition, at least once a year

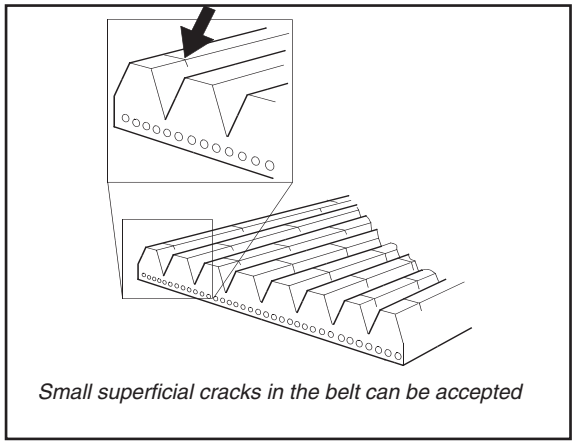
- *Checking of multi-groove belt condition must also be carried out after the first 8 and 100 hours of operation.*
- Stop the engine to inspect the multi-groove belt (1), see item 2.4.1 for procedure.
- Change the belt (1) if damaged or worn, see figures 1 to 3 below.
- Check that the automatic belt tensioner (2) is in proper working order and keeps the multi-groove belt sufficiently tightened.

2.4.1. Inspect the multi-groove belt.

- Loosen the multi-groove belt from the belt pulleys but leave it around the fan shaft so that the direction of rotation for the multi-groove belt is not changed.
- Check the multi-groove belt carefully. If the multi-groove belt has one or more cracks, as shown in Fig. 1, it should be replaced.
- Also check the wear on the multi-groove belt as shown in Fig. 2 and 3.

NOTE

Do not change the direction of rotation of the multi-groove belt if it is reinstalled.



Small superficial cracks in the belt can be accepted

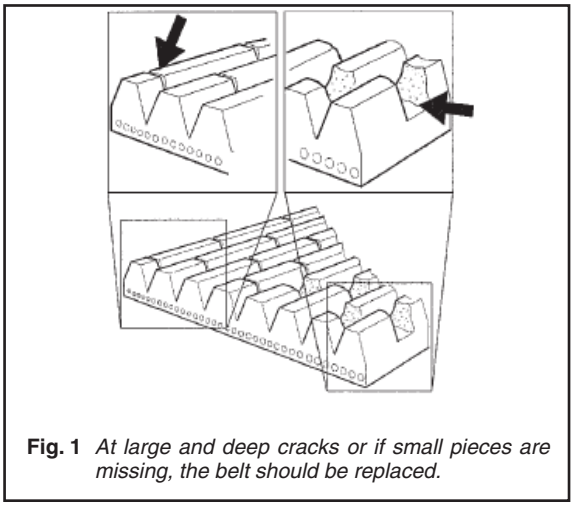


Fig. 1 *At large and deep cracks or if small pieces are missing, the belt should be replaced.*

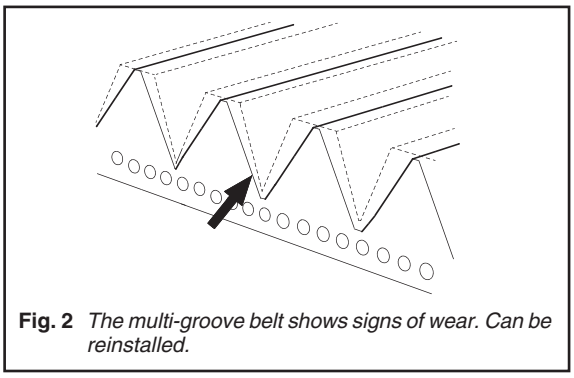


Fig. 2 *The multi-groove belt shows signs of wear. Can be reinstalled.*

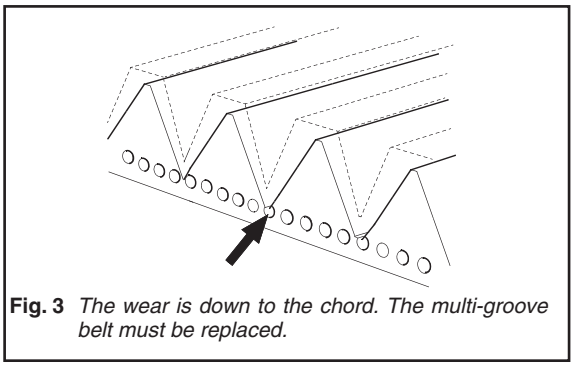
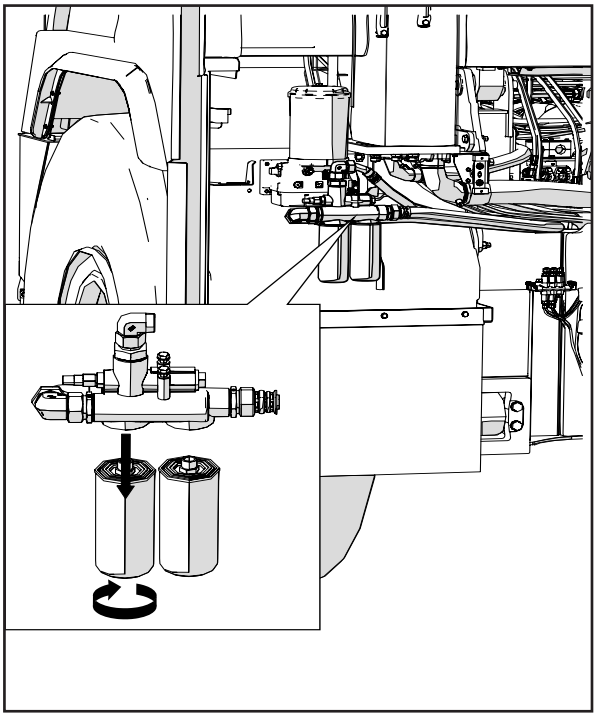


Fig. 3 *The wear is down to the chord. The multi-groove belt must be replaced.*

** Numbers refer to positions on the lubrication schedule, chapter 6*

1000 Hours Service

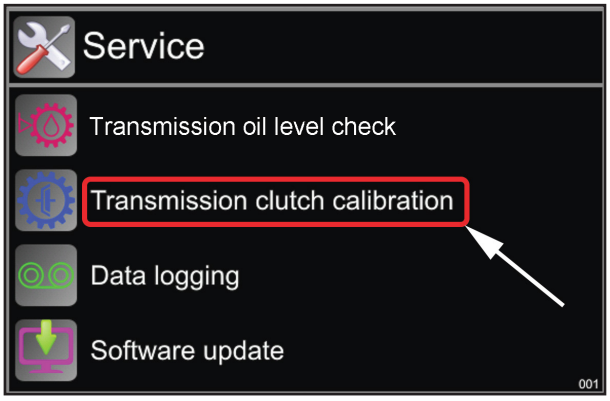
Maintenance to be performed every 1000 hours of operation.

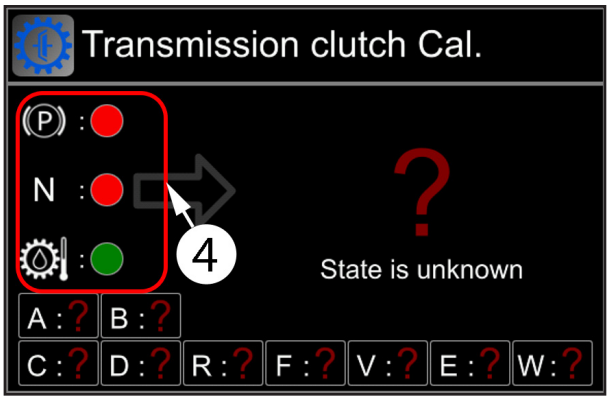


3. Transmission

3.1. Replace filter elements (located on the left hand side)

1. The dump truck must be standing on level ground.
2. The oil must be at operating temperature.
3. Open the maintenance door of the hydraulic tank.
4. Clean well around the filters.
5. Place a suitable container beneath the filters to catch spillage.
6. Unscrew the filter elements.
7. Check for wear particles in the oil.
8. Apply oil to the seals on the new elements.
9. Screw the filter elements in until contact with the sealing surface is obtained. Tighten the elements firmly by hand.





3.2. Run the Transmission Clutch Calibration (AEB) AEB = Automatic Filling Parameter Adjustment

To optimize the transmission, run the AEB-Tester.

1. Push MENU on the display screen.
2. Select SERVICE
3. Select Transmission Clutch Calibration (AEB).
4. Make sure that the all requirements are fulfilled

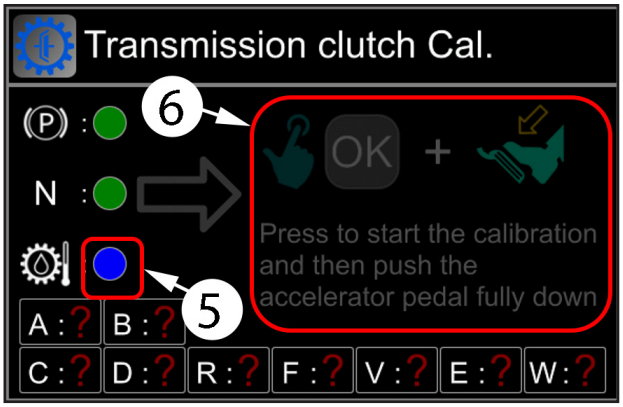
There are 3 conditions that need to be fulfilled before a calibration can be started. These are:

- parking brake on,
- gear in neutral
- the transmission temperature should be around 85 °C.

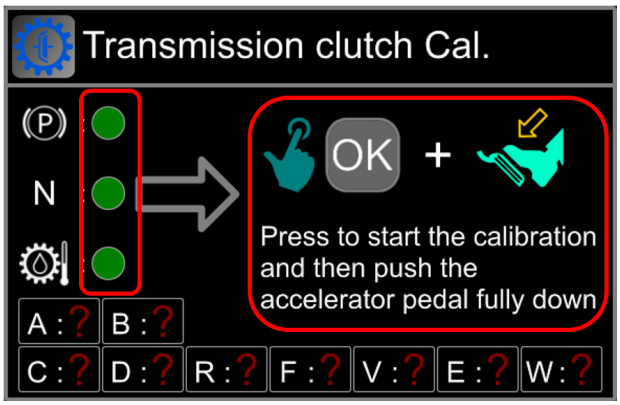
** Numbers refer to positions on the lubrication schedule, chapter 6*

1000 Hours Service

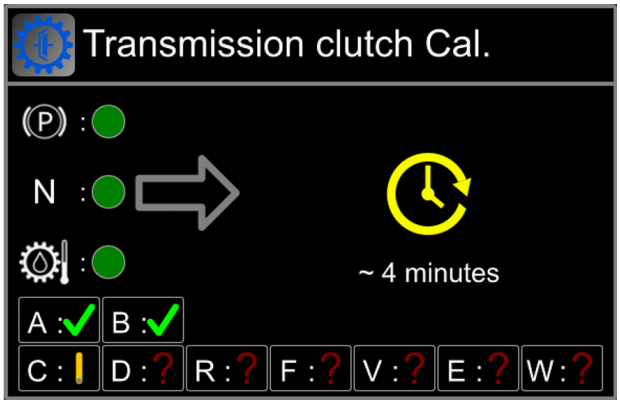
Maintenance to be performed every 1000 hours of operation.



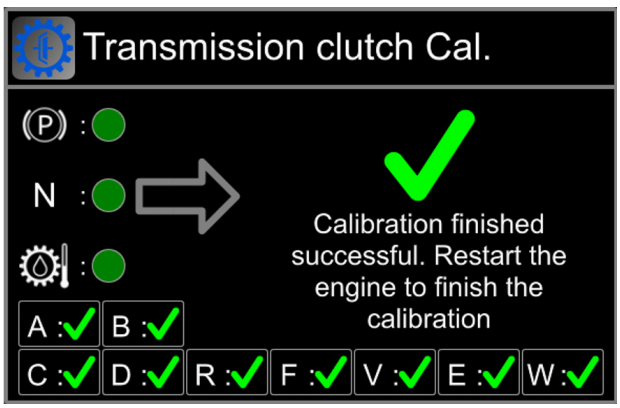
5. This means that the retarder is still too cold.
6. That is why it is not possible yet to start the calibration.



Finally when all condition are fulfilled then it is possible to start the calibration.



The yellow bar is rotating during calibration, on average it takes around 4 minutes to finish a successful calibration. Clutches A & B are calibrated successfully. Currently handling clutch C.



The calibration finished successfully. If not, a failure cause will be shown on the screen.

NOTE

Transmission Clutch Calibration must be performed after every oil change in transmission!

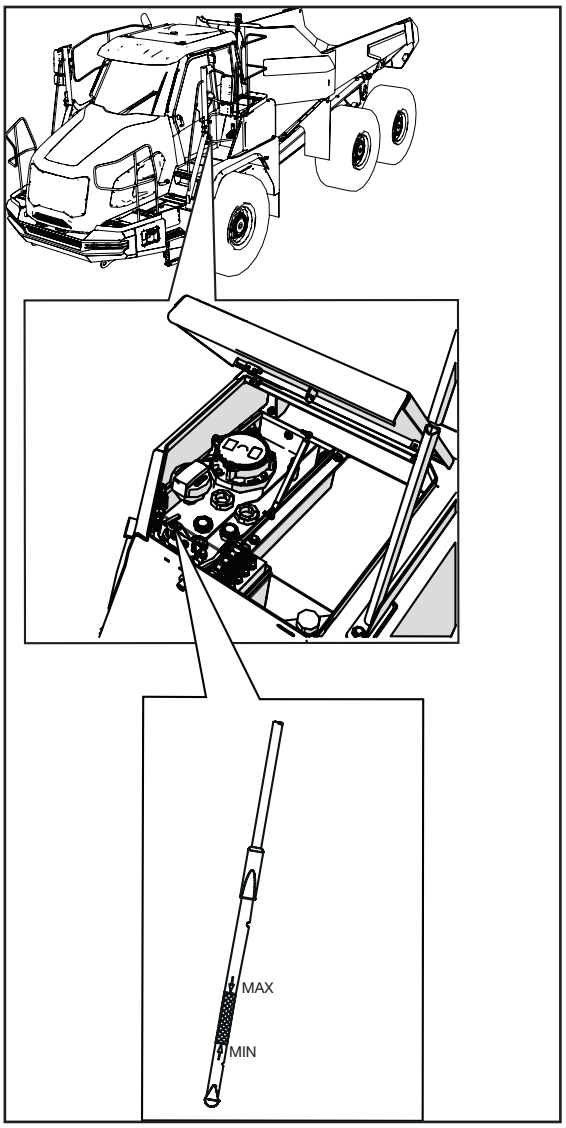
NOTE

To prevent the transmission oil temperature from falling during AEB operation, keep the transmission oil temperature about 85°C before starting AEB. (Temperature Range: 75°C - 92°C)

** Numbers refer to positions on the lubrication schedule, chapter 6*

1000 Hours Service

Maintenance to be performed every 1000 hours of operation.

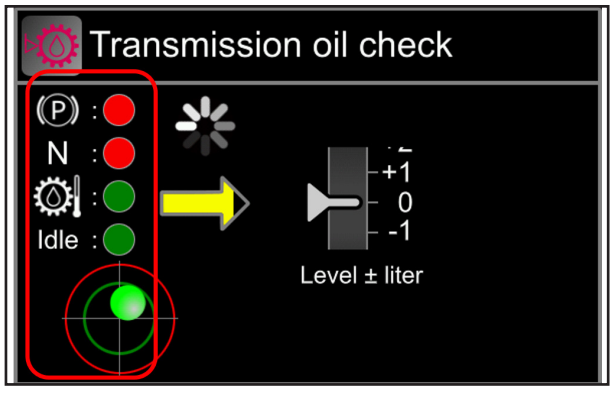


3.3. Check oil level, before operation 20*

1. The dump truck must be standing on level ground.
2. The gear selector must be in neutral and confirm that the parking brake is ON.
3. Run the engine at low idle.
4. To check the transmission oil level, see dipstick.
5. Check level: Cold oil, 40 °C: lower mark
   Hot oil, 80 °C: upper mark
6. If necessary, correct the level by adding oil according to the transmission oil list (chapter 6) through the filling tube (1).

CAUTION

Do not overfill with oil! Both too high and too low of a level can cause serious internal damage!



Check transmission oil level before operating ADT. (Electronic oil level)

Chose the Menu - Service-

Follow the instruction from the screen and make sure that the all requirements are fulfilled

- Vehicle is not moving
- Park brake is activated
- Gear should be in neutral
- The dumper is leveled
- Engine at the low idle
- Transmission oil temperature is in range 40-90°C.

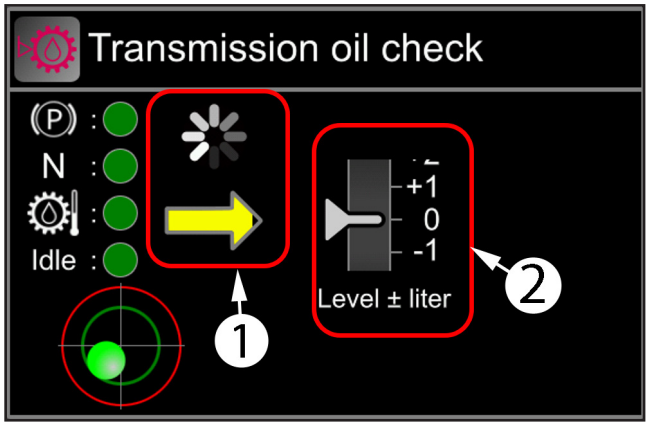
NOTE

It is recommended to use the dipstick when replacing the oil.

** Numbers refer to positions on the lubrication schedule, chapter 6*

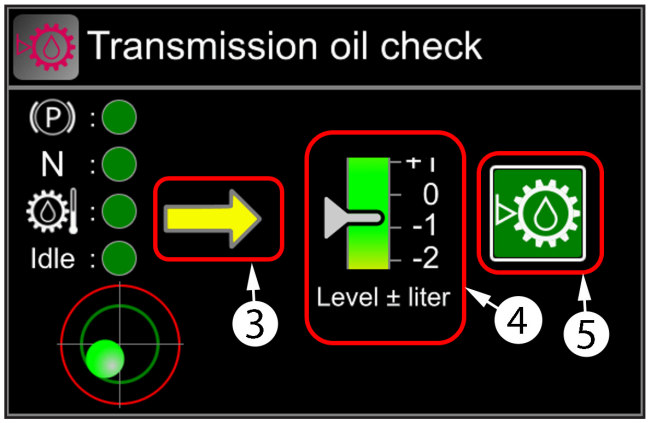
1000 Hours Service

Maintenance to be performed every 1000 hours of operation.



1 When conditions are stable it also takes some time for the oil to stabilize. Visible is a rotating bar and a yellow arrow that fills up.

2. This will show the resulting oil level. Now grayed out because the measurement hasn't finished yet

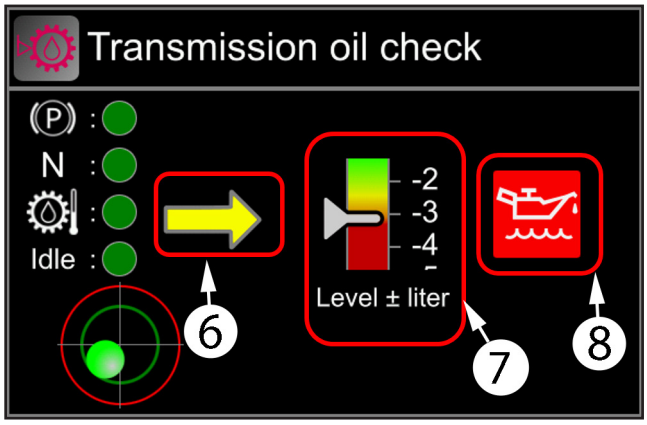


3. The measurement is finished.

4. Now it shows the resulting oil level

5. The green symbol indicates that the oil level is ok.

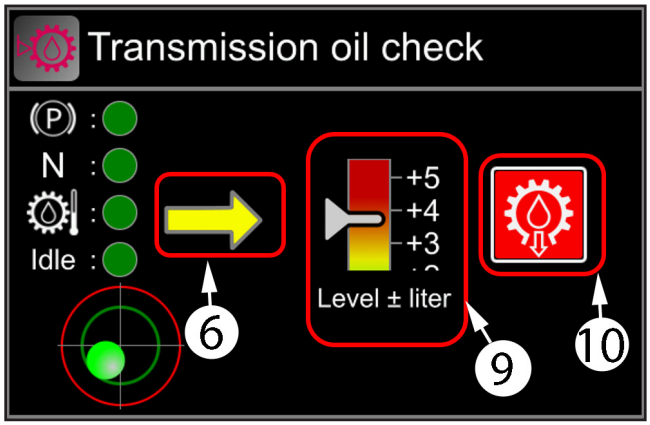
That means it is within +/- 2 liter.



6. The measurement is finished

7. It shows a low oil level

8. Here the red symbol indicates that the oil level is too low



9. It shows a high oil level

10. Here the red symbol indicates that the oil level is too high.

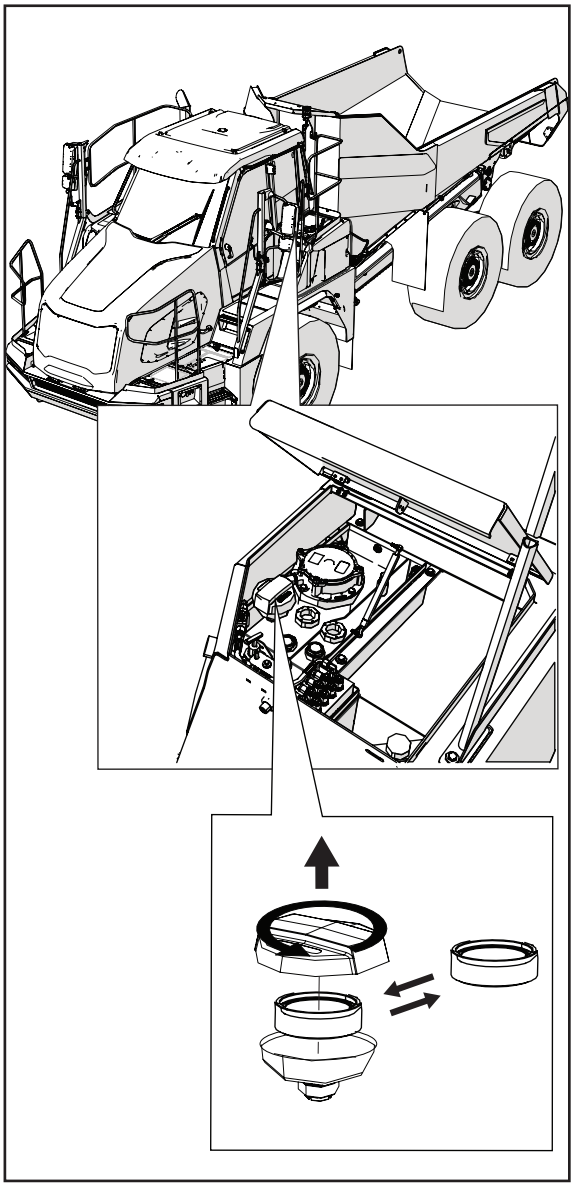
CAUTION

Do not overfill with oil! Both too high and too low of a level can cause serious internal damage!

** Numbers refer to positions on the lubrication schedule, chapter 6*

1000 Hours Service

Maintenance to be performed every 1000 hours of operation.



4. Hydraulic system

4.1. Replace breather element 41*

1. The filter is located on the top of the hydraulic tank. Open the cover to get into the filter.
2. Clean well around the filter housing.
3. Unscrew the cover of the breather filter.
4. Change the filter element on the breathier.
5. Replace the cover on the breather filter.

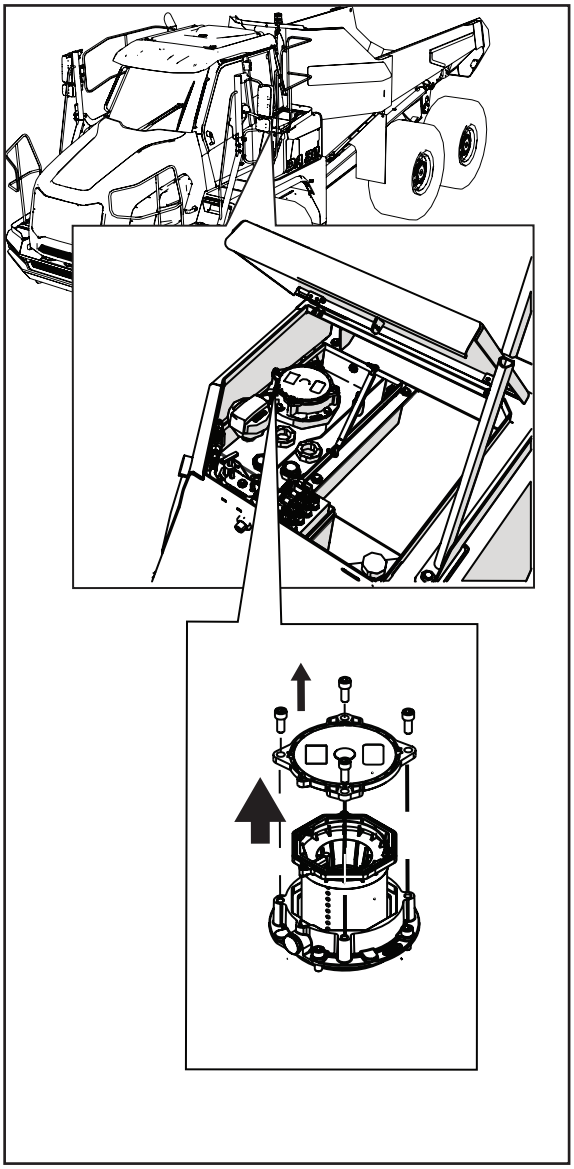
CAUTION

Pay special attention to cleanliness when working with the hydraulic system! Contamination can give steering disturbance and reduce safety.

** Numbers refer to positions on the lubrication schedule, chapter 6*

1000 Hours Service

Maintenance to be performed every 1000 hours of operation.



4.2. Replace hydraulic return filter element 42*

- *Replacement of the return filter can be also raised by the clogging indicator on the main screen.*

1. Accumulators contain oil under high pressure! Empty the accumulators, before unscrewing the filter. Procedure is described under Maintenance Precautions section.
2. The filter is located on the top of the hydraulic tank. Open the cover to get into the filter.
3. Clean well around the filter housing.
4. Place a suitable container beneath the draining hose to catch spillage.
5. Use allen key to unscrew 4 screws from the cover of filter (counter clockwise).
6. Remove the filter element.
7. Check for wear particles in the oil.
8. Install a new filter element and replace the 4 screws by turning it clockwise with the torque 25 + 5 Nm.
9. Clean off any oil spill.
10. Start engine and check the oil level and any leaks. The accumulators will be recharged with oil when the engine is re-started.

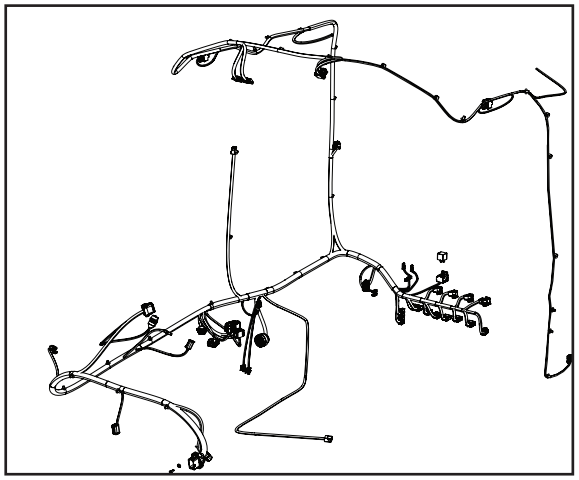
CAUTION

Pay special attention to cleanliness when working with the hydraulic system! Contamination can give steering disturbance and reduce safety.

** Numbers refer to positions on the lubrication schedule, chapter 6*

1000 Hours Service

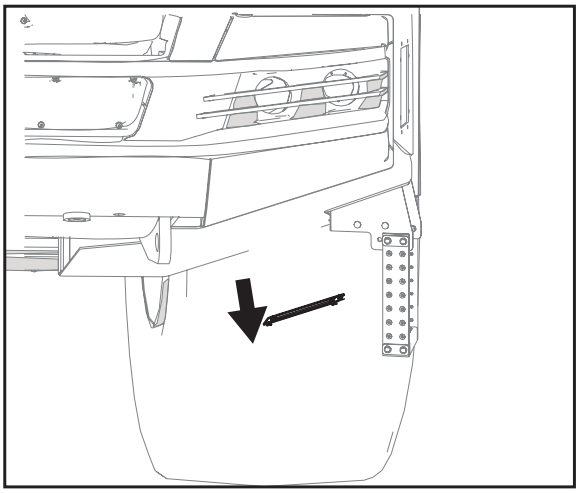
Maintenance to be performed every 1000 hours of operation.

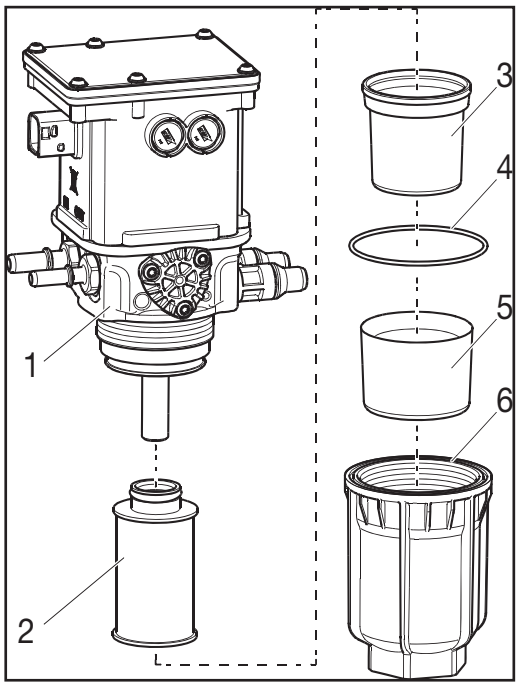


5. Electrical system

5.1. Check wiring

The wiring harness must not be damaged. Check that the cables on the articulation hinge and on the rear frame/ body are not squeezed, have sharp bends or loose/bad connections.





6. Urea filter (Only T4/Stage V)

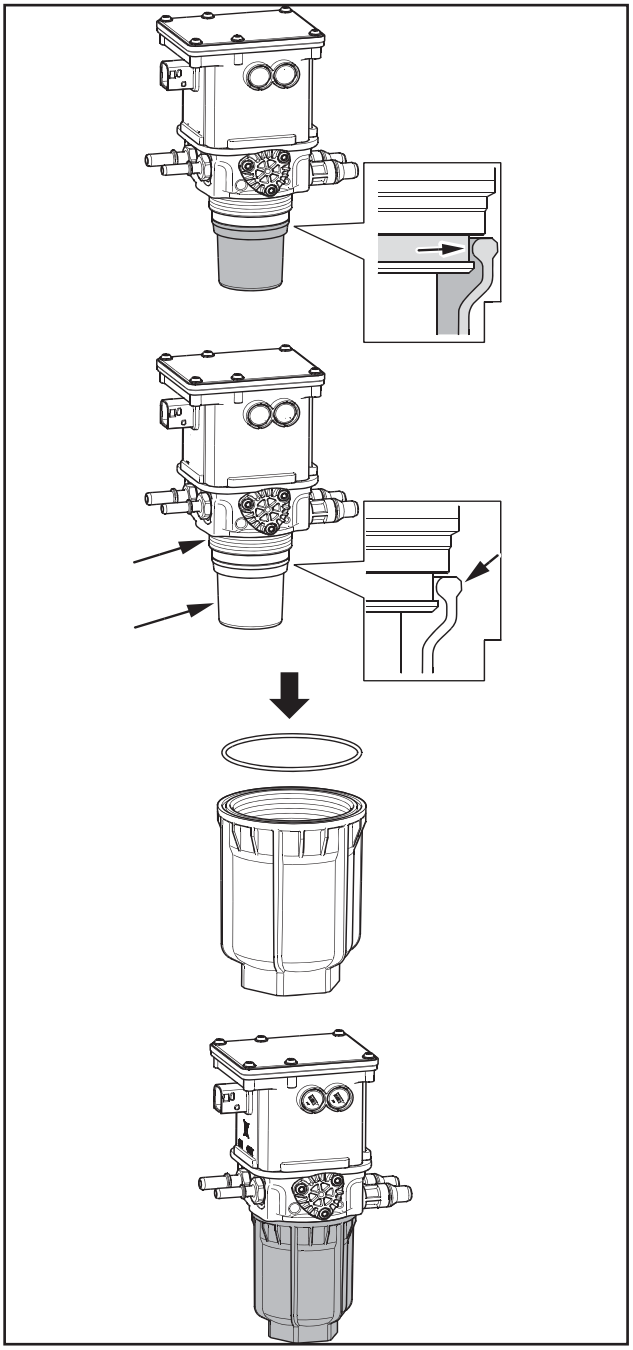
6.1. Replace the Urea filter

1. Remove the cover under the left fender.
2. Wipe clean around the filter housing to prevent impurities from penetrating it.
3. Remove the filter housing (6). Use a 46 mm socket.
4. Remove the sealing diaphragm (3).
5. Remove the old reductant filter (2) and fit a new one.
6. If the anti-freeze protection (5) in the filter housing (6) comes loose, wipe both thoroughly so that they are completely dry before they are assembled again.

** Numbers refer to positions on the lubrication schedule, chapter 6*

1000 Hours Service

Maintenance to be performed every 1000 hours of operation.



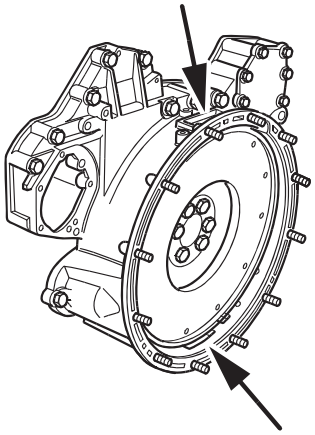
7. Wipe the sealing diaphragm and fit it over the filter. Ensure that the edge of the diaphragm is sitting in the groove.
8. Lubricate the sealing diaphragm and threads with the accompanying spray.
9. Renew the O-ring. Place the new O-ring in the filter housing.
10. Refit the filter housing. Use a 46 mm socket.
    - Tighten to 80 Nm

7. Continue with all items in 500 Hours Service

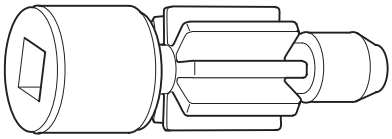
** Numbers refer to positions on the lubrication schedule, chapter 6*

2000 Hours Service

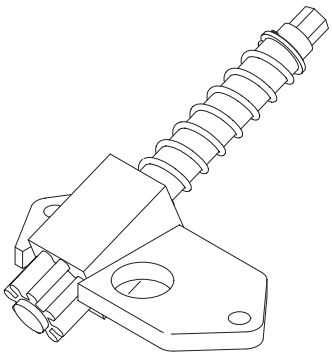
Maintenance to be performed every 2000 hours of operation



Openings for taking readings on the flywheel housing.



Special tool is used when turning from below.



Special tool is used when turning from above.

1. Engine

1.1. Check/adjust valve clearance (5 cylinders)

- Checking/adjusting valve clearance must also be carried out after the first 500 hours of operation.
- Contact Hyundai Dealer for checking/adjusting of the valve clearance.
- The checking/adjusting of the valve clearance must only be carried out by qualified personnel.
- The air filter and air filter bracket has to be removed before adjustment takes place.

Adjust if necessary:
- Inlet: 0,45 mm
- Exhaust: 0,70 mm
  see instruction sign on one of the rocker covers.

Valves should be adjusted when the engine is cold, at least 30 minutes after operation.

Readings can be taken from the flywheel through openings in the flywheel housing either from above or below depending on access when installing.

"TDC up" or "TDC down" is found on the flywheel. Both openings are installed with a blanking piece at delivery.

From below	Valve transition	Valve adjustment	From above
TDC down		1	TDC up
72/432	5		252/612
144/504		2	324/684
216/576	3		36/396
288/648		4	108/468
TDC down	1		TDC up
72/432		5	252/612
144/504	2		324684
216/576		3	36396
288/648	4		108/468

- Turn the flywheel in the engine's direction of rotation so that TDC up or TDC down is visible in the flywheel housing window.
- If there is valve clearance on cylinder 1, start valve adjustment as indicated in the table.
- If there is valve transition on cylinder 1, work should start at row six of the table.

Tightening torque for lock nut 35 Nm (26 lbf/ft).

WARNING

Remove ignition key when working on the engine! To avoid a SERIOUS RISK OF INJURY!

* Numbers refer to positions on the lubrication schedule, chapter 6

2000 Hours Service

Maintenance to be performed every 2000 hours of operation

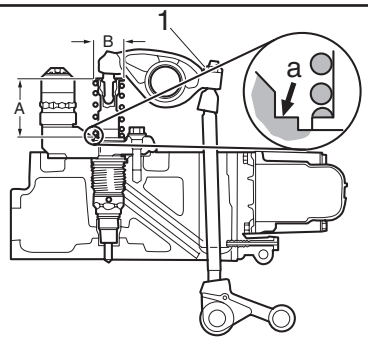
Option 2

Set cylinder 1 exactly at TDC after the compression stroke. Adjust the following valves:

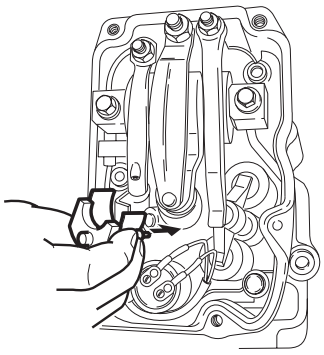
Cyl.1	Intake and exhaust
Cyl.2	Intake
Cyl.3	Exhaust
Cyl.4	Intake
Cyl.5	Exhaust

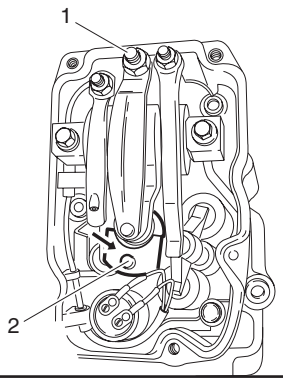
Turn the crankshaft exactly one revolution. Adjust the following valves:

Cyl.2	Exhaust
Cyl.3	Intake
Cyl.4	Exhaust
Cyl.5	Intake
Cyl.6	Intake and exhaust



Measurement A=69.9+/-0.1 (2.75 in)
Measurement B=38.8 (1.53 in)





1.2. Checking and adjusting injector (Only T2)

The unit injectors are adjusted using setting tool MX512264 or a digital sliding caliper.

1. Attach the setting tool with the metal plate around the unit injector.

WARNING

Be very careful when checking the unit injector if the measurement is outside the setting dimension. The spring is pre-tensioned and can come loose, causing personal injury.

2. When adjusting, undo the lock nut around the adjusting screw and adjust the unit injector with the adjusting screw 1.

The unit injector is correctly set when the small piston 2 is level with the flat upper surface of the tool. Use a finger to check. Setting dimension is 69.9 +/- 0.1 mm (2.75 in).

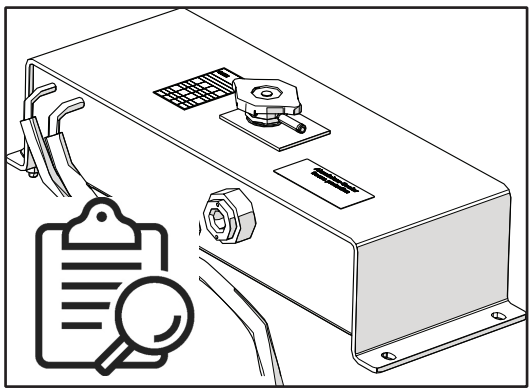
Reassemble top cover after checking and adjusting is complete.

Torque: 18±5Nm

* Numbers refer to positions on the lubrication schedule, chapter 6

2000 Hours Service

Maintenance to be performed every 2000 hours of operation



1.3. Check the coolant, at least once a year 5*

Coolant composition:

The coolant should contain 35-55% by volume antifreeze (ethylene glycol) and corrosion inhibitor. The percentage varies depending on the need for antifreeze.

A minimum of 35% by volume of antifreeze and corrosion protection is needed to provide sufficient protection against corrosion.

The antifreeze and corrosion protection used in Scania engines should be antifreeze (ethylene glycol) and corrosion inhibitor. Use a mixture of ethylene glycol and demineralized water as cooling agent.

Demineralized water quality should comply with the following parameters:

- pH=6.5-8
- suspended solids <50ppm
- chlorine concentration <100 ppm
- total hardness (expressed in CaCO3) <200ppm
- sulfates concentration <100 ppm

NOTE

Too high a dose of antifreeze and corrosion inhibitor will increase the amount of sludge and blockages accumulating in the radiator. Too low a concentration can lead to corrosion of the cooling system and ice formation at low temperatures.

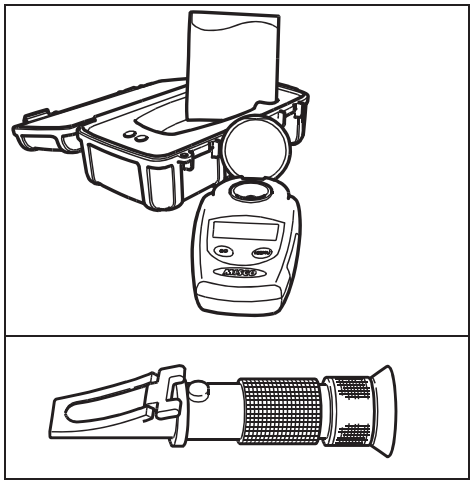
WARNING

Ethylene glycol is highly dangerous if consumed can prove fatal.
Avoid contact with the skin as this may cause irritation to the skin.
Wear protective goggles and gloves when handling coolant.

* Numbers refer to positions on the lubrication schedule, chapter 6

2000 Hours Service

Maintenance to be performed every 2000 hours of operation



1.3.1. Check the coolant's antifreeze and corrosion protection at least once a year

- Pour a small amount of coolant into a container and check that the coolant is pure and clear.
- Change the coolant if it is contaminated or cloudy.
- Measure the antifreeze and corrosion inhibitor content with the refractometer.
- The water for the coolant should be free of dirt.
- Use demineralized or distilled water with a pH of 6,5 - 8.

NOTE

The coolant should be changed when the cooling system is cleaned. Every 4000 hours or every 5 years.

1.3.2. Antifreeze and corrosion protection concentration table, liters

35% by volume of Scania antifreeze provides sufficient protection against corrosion.

Example:

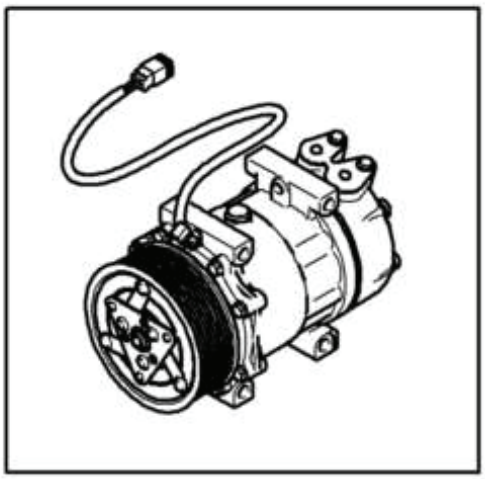
- The total volume of the cooling system is 40 litres.
- The measured concentration of ethylene glycol is 35% by volume (freezing point -21°C). According to the table, there are 14 litres of ethylene glycol in the cooling system.
- The required concentration of ethylene glycol is 45% by volume (freezing point -30°C). According to the table, 18 litres of ethylene glycol are required in the cooling system.
- Since there are already 14 litres in the cooling system, 4 litres of ethylene glycol must be added to the cooling system (18 - 14 = 4 litres).

	Adequate protection against corrosion					
Volume of ethylene glycol (%)	35	40	45	50	60	Cooling system volume
Ice slush forms (°C)	-21	-24	-30	-38	-50	
Volume of ethylene glycol (litres)	11	12	14	15	18	30
	14	16	18	20	24	40
	18	20	23	25	30	50
	21	24	27	30	36	60
	25	28	32	35	42	70
	28	32	36	40	48	80
	32	36	41	45	54	90
	35	40	45	50	60	100
	39	44	50	55	66	110
	42	48	54	60	72	120
	46	52	59	65	78	130
	49	56	63	70	84	140
	53	60	68	75	90	150
	56	64	72	80	96	160
	60	68	77	85	102	170
	63	72	81	90	108	180
	67	76	86	95	114	190
	70	80	90	100	120	200

* Numbers refer to positions on the lubrication schedule, chapter 6

2000 Hours Service

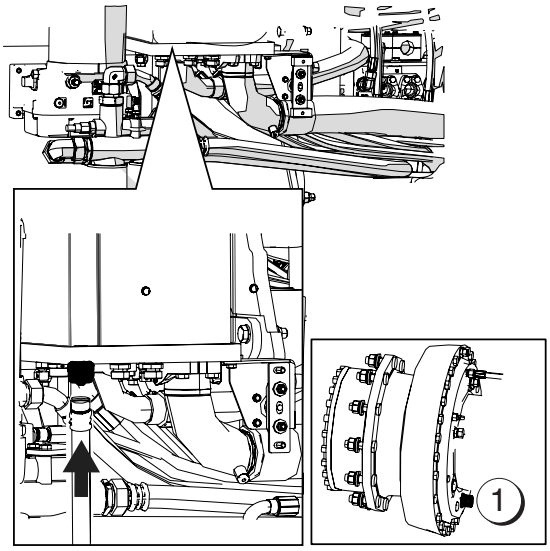
Maintenance to be performed every 2000 hours of operation



1.4. Cab ventilation

1.4.1.Air conditioner system

1. Clean evaporator coils.
2. Clean valves.
3. Recover the refrigerant and replace the filter - receiver - dryer.
4. Check the thermostat.

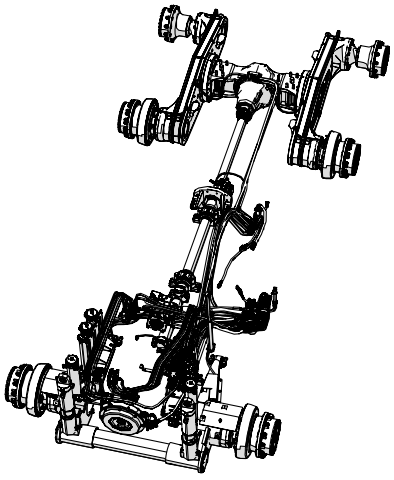


2. Brake system

2.1 Oil change brake cooling tank 34*

* Replacement of brake cooling oil shall also be carried out after first 500 hours service.

1. The dump truck must be horizontal.
2. Unscrew the filling plug located on top cover of hydraulic tank.
3. Unscrew the cap of drain plug and place the drain hose.
4. Drain the oil from tank into a suitable container.
5. Once tank is emptied remove hose and reinstall the drain cap.
6. Unscrew the plugs from the front hubs (1) on both sides of truck and two on the rear axel with the breaks.
7. Drain the oil from the hubs into suitable containers.
8. Clean the plug (1), replace O-ring if necessary and reinstall.
   - Tightening torque: 60 Nm.
9. Fill new oil, according to the oil specification sheet (chapter 6), through filling point on the tank with about 12 liters. After that, start the engine and refill to the correct level.



2.2. Inspect brake lines, at least once a year.

Replace pipes, hoses and fittings which are corroded (deep seated rust), deteriorated (aged), leaking or otherwise damaged.

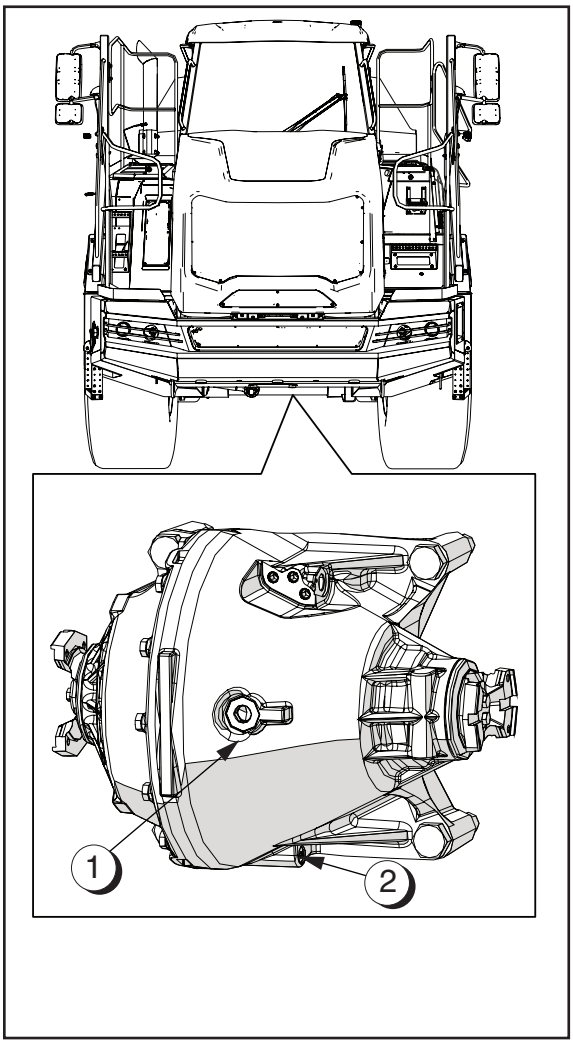
CAUTION

Check more often when operating in salty conditions or similar environment that may affect the brake system!

* Numbers refer to positions on the lubrication schedule, chapter 6

2000 Hours Service

Maintenance to be performed every 2000 hours of operation



3. Drive line

3.1. Front differential change oil, at least once a year 30*

- *Change front diff. oil must also be carried out after the first 500 hours of operation.*

1. Access to the drain plug through transmission bottom guard.
2. Open level/filling plug (1), special spanner in tool kit.
3. Unscrew drain plug (2).
4. Drain the oil into a suitable container.
5. Clean the drain plug, replace seal if necessary and reinstall.
   • Tightening torque: 50 Nm.
6. Fill with new oil, according to the oil specification sheet (chapter 6), through the level/filling plug, level must be at lower edge of hole when dump truck is horizontal.
7. Clean the plug, replace seal if necessary and reinstall.
   • Tightening torque: 150 Nm.

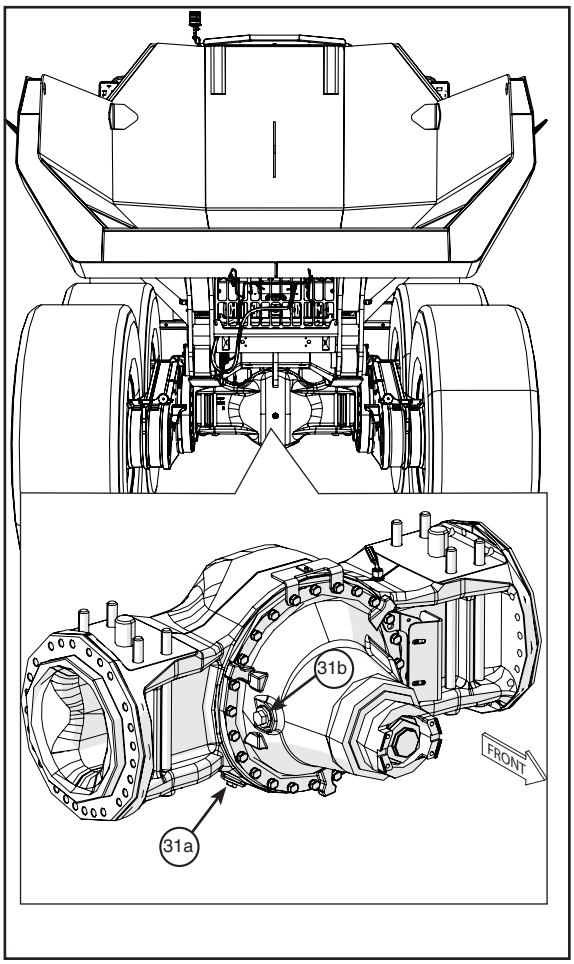
CAUTION

Be aware of possible internal pressure when the oil is hot! Oil can spurt out when opening the drain plug.

* Numbers refer to positions on the lubrication schedule, chapter 6

2000 Hours Service

Maintenance to be performed every 2000 hours of operation

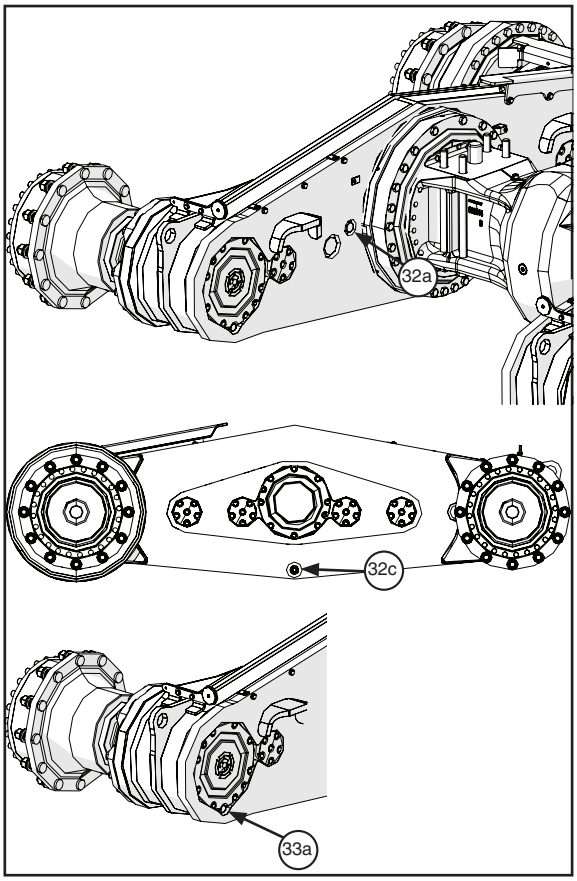


3.2 Rear differential oil change 31*

** Replacement of rear differential oil must also be carried out every 1000 hours of operation or at least once a year.*

1. Clean the areas around the screw plugs 31a, 31b.
2. Remove oil filler plug 31b, then open the drain plug 31a and drain the oil.
3. Clean the oil drain plug 31a magnet of debris before reinstalling the plug. Fill with new oil (refer to the lubrication table chapter 6) wait a few minutes. If the oil level falls add oil until the level remains constant on the control opening 31b.
4. Reinstall control/filling plug 31b.

	Torque
31a	140 Nm
31b	140 Nm



3.3 Tandem housing , planetary drive (hubs) Oil change 32*,33*

** Replacement of tandem housing oil and planetary drive (hubs) must also be carried out every 1000 hours of operation or at least once a year.*

NOTE

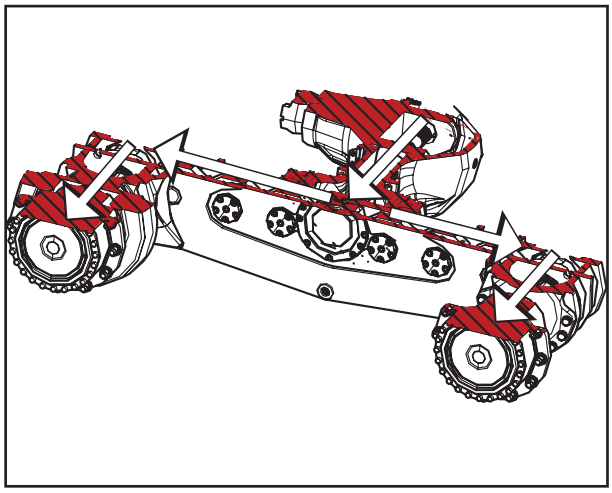
By changing the oil on the tandem you will at the same time change the oil on wheel hubs due to open oil circulation between the tandem and the wheel hubs.

1. Ensure that the tandem housing is placed horizontally and the axle remains still for 30 minutes to allow oil contamination to rest.
2. Remove and clean the level/filling plug 32a, clean the area around it.
3. Remove the drain plug 32c and 33a, drain the oil after that clean off the magnet of any grime then reinstall the plugs.
4. Fill the tandem housing with oil (see "Chapter 6") until oil exits from the level control opening (32a).

* Numbers refer to positions on the lubrication schedule, chapter 6

2000 Hours Service

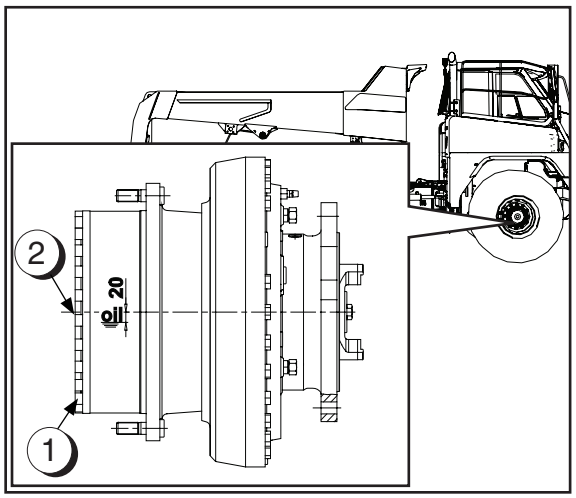
Maintenance to be performed every 2000 hours of operation



5. Reinstall the level/ filling plug (32a)
6. After test driving, check that the oil is at lower edge of the level plug.

	Torque
32a	140 Nm
32c	140 Nm
33a	140 Nm

3.4. Front reduction gears 34*



1. Clean filling point and oil filling plug (2) also the drainage point and oil drain plug(1).
2. Turn hub assembly into position.
   - The oil drain plugs has to be at the bottom.
3. Open the oil drain plug (1) and allow oil to drain.
   - Collect the oil in a suitable container.
   - Dispose of the oil in an environmentally friendly manner.
4. Clean borehole and oil drain plug.
5. Screw oil drain plug (1) back in.
6. Open the oil filling plug.(2)
7. Fill hub assembly with clean oil until the oil level reaches the filling bore (= inspection bore).
   - Overflow check
   - Oil in accordance with the specified lubricants. see "Chapter 6"
8. After a few minutes, check the oil level again at the filling bores.
   - Keep filling the hub assembly with oil until the oil level remains constant.
9. Clean borehole and oil filling plug.
10. Screw oil filling plug (2) back in.

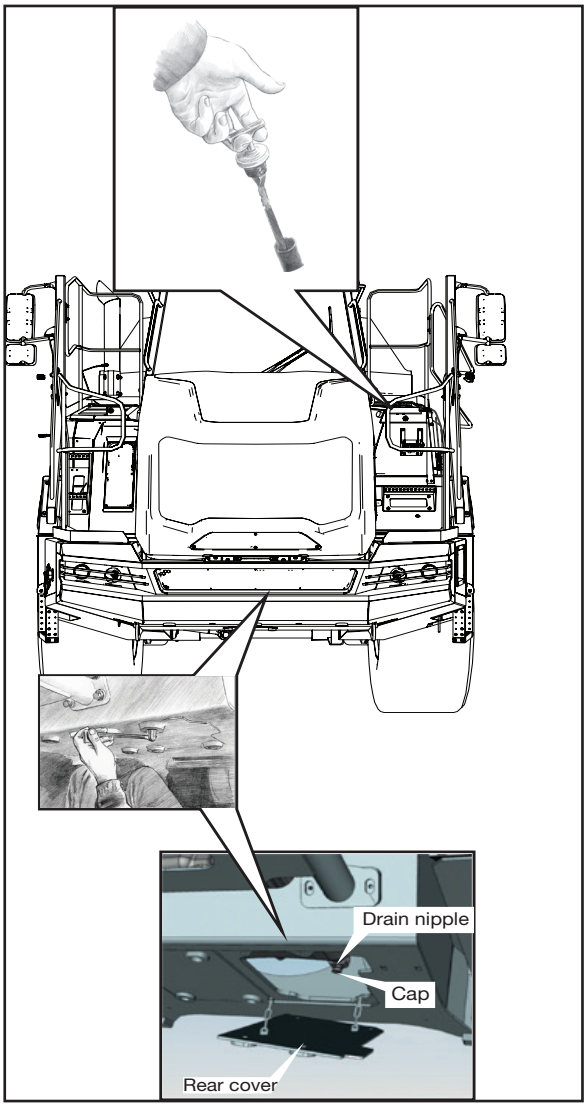
	Torque
1	120 Nm
2	120 Nm

4. Continue with all items in 1000 Hours Service

* Numbers refer to positions on the lubrication schedule, chapter 6

4000 Hours Service

Maintenance to be performed every 4000 hours of operation

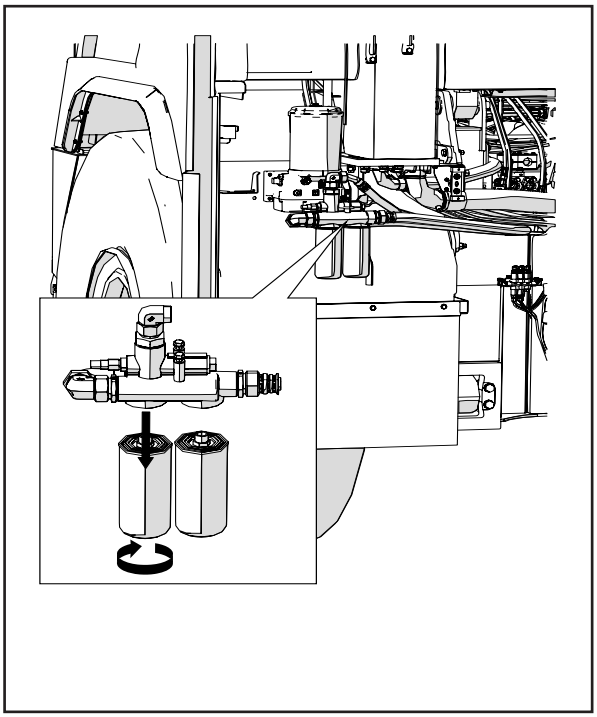


1. Transmission

1.1. Change oil 20*Replace filter element 21*.

Drain oil:

1. The dump truck must be standing on level ground.
2. The oil must be at operating temperature.
3. Unscrew the filling cover/dipstick (located under hydraulic tank cover).
4. Remove cover plate under the transmission, by removing the 4 M12 bolts.
5. Remove cap.
6. Place drain hose with connection on drain nipple.
7. Once transmission oil is emptied, remove hose and replace cap.



Replace filter elements (located on the left hand side):

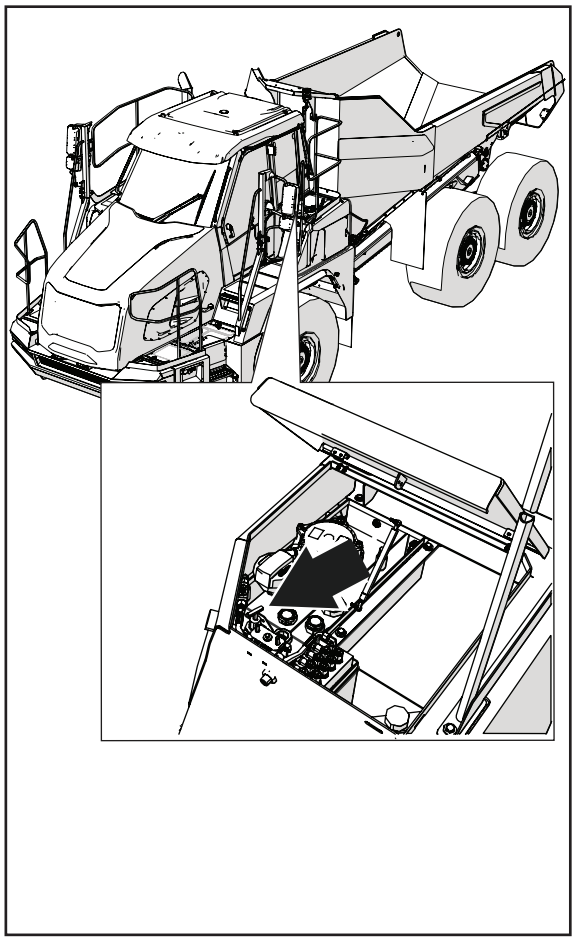
Access to the filters through the engine bottom guard

8. Open the maintenance door of the hydraulic tank.
9. Clean well around the filters.
10. Place a suitable container beneath the filters to catch spillage.
11. Unscrew the filter elements.
12. Check for wear particles in the oil.
13. Apply oil to the seals on the new elements.
14. Screw the filter elements in until contact with the sealing surface is obtained. Tighten the elements firmly by hand.

* Numbers refer to positions on the lubrication schedule, chapter 6

4000 Hours Service

Maintenance to be performed every 4000 hours of operation



Fill new oil:

22. Fill with new oil, according to the transmission oil list and oil specification sheet (chapter 6), through the filling tube.
23. Insert the filling cover/dipstick again and turn handle clockwise to tighten the sealing.

Check:

24. Start the engine and check oil level (see daily maintenance, for procedure) at low idle. Both too low and too high of a level can cause serious internal damage!
25. Warm up the oil and check for leaks. Re-check level and adjust if necessary.

NOTE

- **Do not overfill! Both too high and too low of a level can cause serious internal damage!**
- **For rough operation conditions, the oil and the filter element must be changed more often (every 500 hours).**

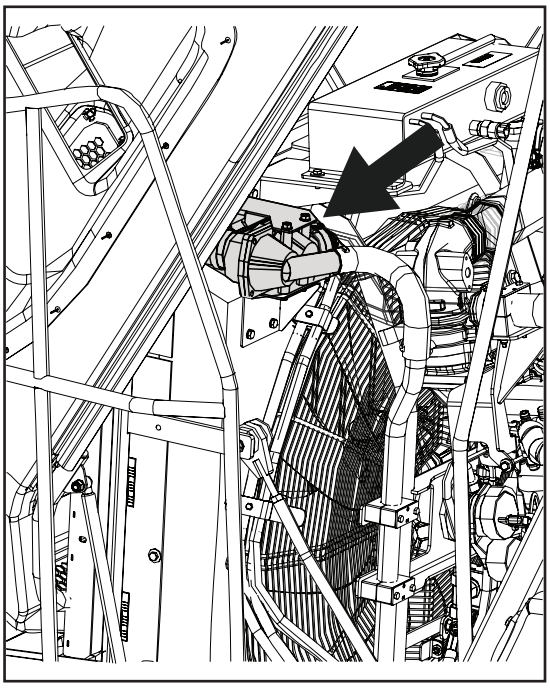
1.2. Run the Transmission Clutch Calibration (AEB) AEB = Automatic Filling Parameter Adjustment

See the 100 hours service for procedure.

* Numbers refer to positions on the lubrication schedule, chapter 6

4000 Hours Service

Maintenance to be performed every 4000 hours of operation



2. Cooling system

**2.1. Internal cleaning, every 2 years 5*
Removing deposits, oil and grease**

For internal cleaning use liquid dishwasher detergent designed for household use. Alternative BASF Glycacorr G93 or Texaco Havoline XLI can be used.

Important: *The cleaning agent must not foam.*

1. If possible, run the engine until it is warm and then drain the cooling system, see changing coolant, item 1.2.
2. Remove the thermostat housing and replace it with a hose. Plug the by-pass.
3. Fill the system with clean, hot water mixed with liquid dishwasher designed for household (use a dishwasher detergent for household dishwashers that does not foam). Concentration 1% (0.1 L by 10 L water). Alternative BASF Glycacorr G93 or Texaco Havoline XLI can be used.
4. Run the engine for about 20-30 minutes.

NOTE! Do not forget to turn cab heater on and max heat.

5. Drain the cooling system.
6. Fill the system again with hot water and run the engine for about 20-30 minutes.
7. Drain the water from the cooling system.
8. Repeat steps 3-7 if the cooling system is not clean.
8. Reinstall the thermostat (change if necessary) housing and the connections.
9. Fill the system with coolant as described in the specifications in item 1.3 at 2000 hours service.

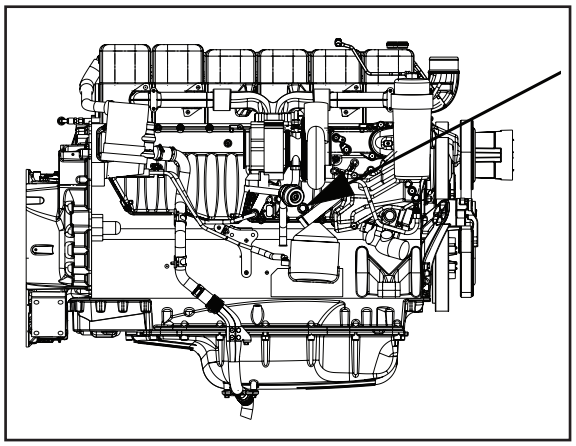
WARNING

Handling cleaning agents for the cooling system: Read the warning label on the container.

* Numbers refer to positions on the lubrication schedule, chapter 6

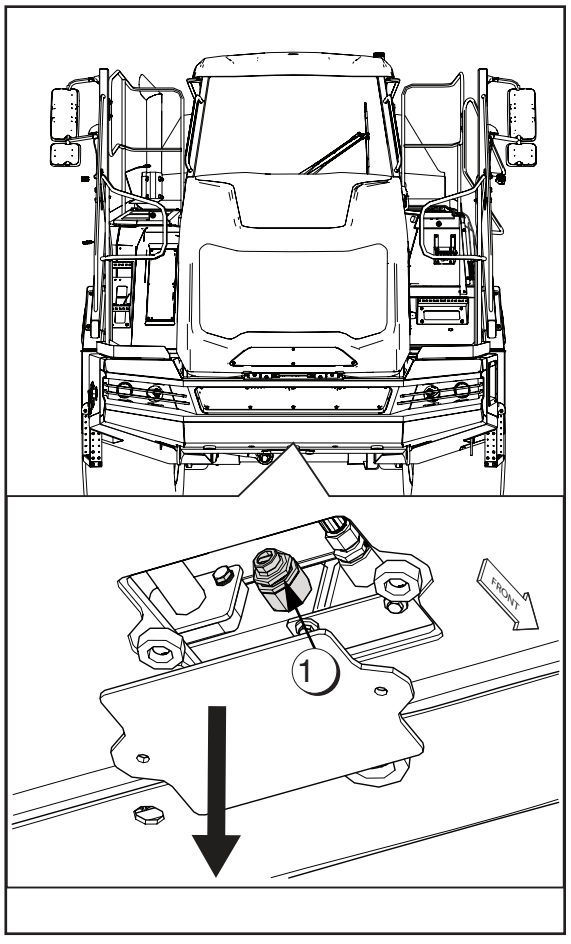
4000 Hours Service

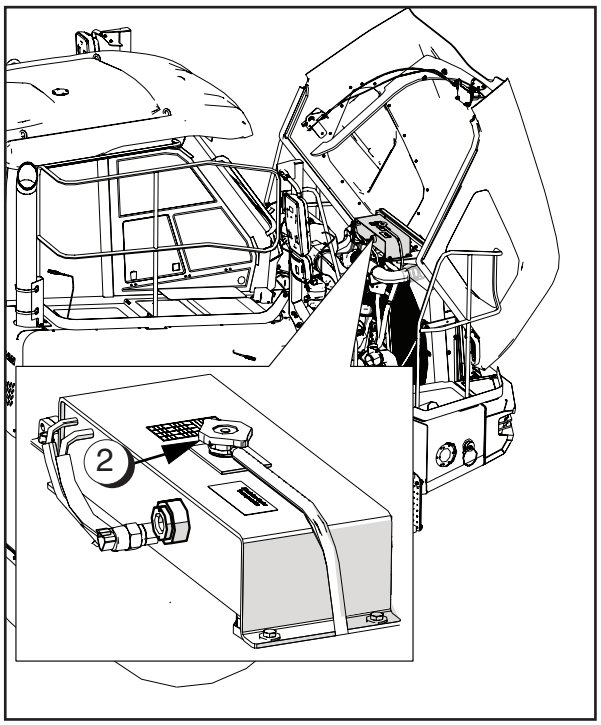
Maintenance to be performed every 4000 hours of operation



2.2. Change coolant, every 2 years 5*

1. Remove the filler cap (2) from the expansion tank.
2. Drain the coolant in two places:
   - the "lowest point" on the engine block, see illustration.
   - the "lowest point" of the cooling system (1), under the oil cooler on left hand side. Access through the engine bottom guard.
3. Close the cocks.
4. Connect the coolant trolley to the filler nipple in the cylinder block. Fill with correct mixture, pre-mixed coolant using coolant trolley to pump up to the maximum level of the expansion tank.
5. Disconnect the coolant trolley.
5. Set the heating control to maximum heating and start the engine. Idling speed must not exceed the normal rpm. Leave engine idling for 15 minutes.
6. Stop the engine and top up with coolant to the maximum level through the expansion tank.
7. A small amount of air may still be left in pockets of the cooling system which will disappear when the vehicle is back on the road. This means that it will need some topping up to start with.

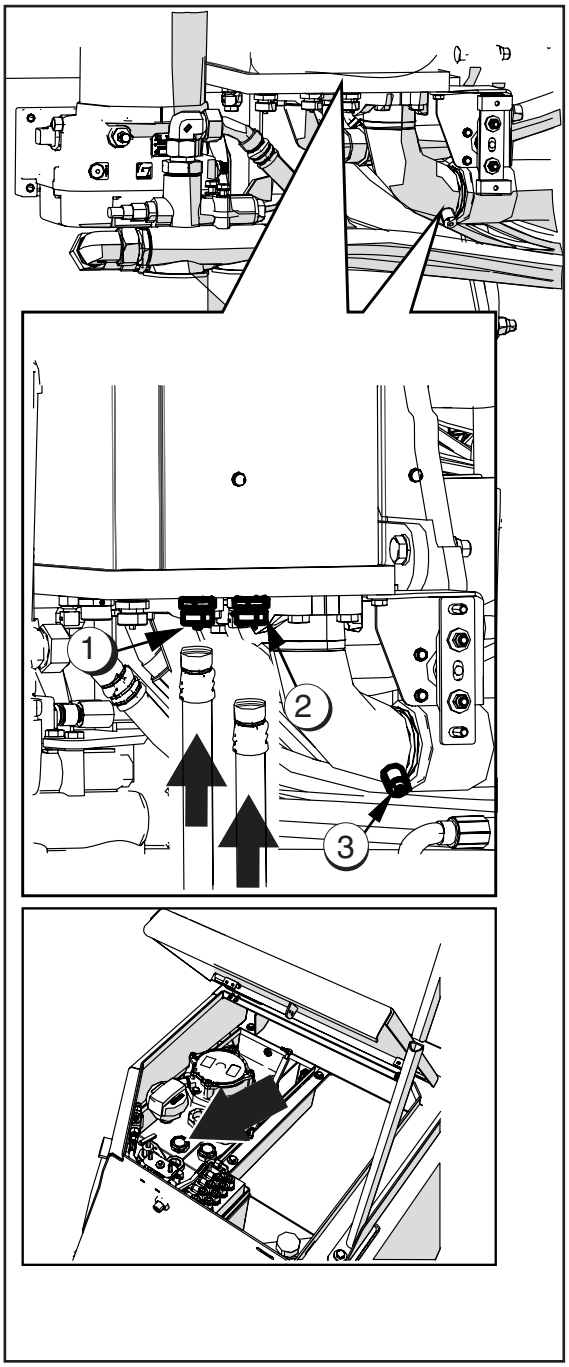




* Numbers refer to positions on the lubrication schedule, chapter 6

4000 Hours Service

Maintenance to be performed every 4000 hours of operation



3. Hydraulic system

3.1. Change oil hydraulic tank 40*

1. Accumulators contain oil under high pressure! Empty the accumulators, before draining the hydraulic oil. Procedure is described in chapter 2.
2. The both drain plugs are located on the right hand side of the hydraulic tank (on the bottom).
3. Open the maintenance door of the hydraulic tank. to get into the magnetic plugs.
4. Place a suitable container to catch spillage.
5. Remove the cap from both drain plugs.
6. Install the draining hose with nipple to the first drain plug (1) and drain the oil into the container.
6. Install the draining hose to the second drain plug(2) and drain the oil into the container.
7. Remove the draining hose and reinstall both caps.
8. Remove the plug (3) and drain the oil into the container and reinstall the plug.
9. The oil filler is located on the top of the hydraulic tank, under the cover.
9. Fill with new oil through the oil filler, according to the oil specification sheet, chapter 6.

• The accumulators will be recharged with oil when the engine is re-started.

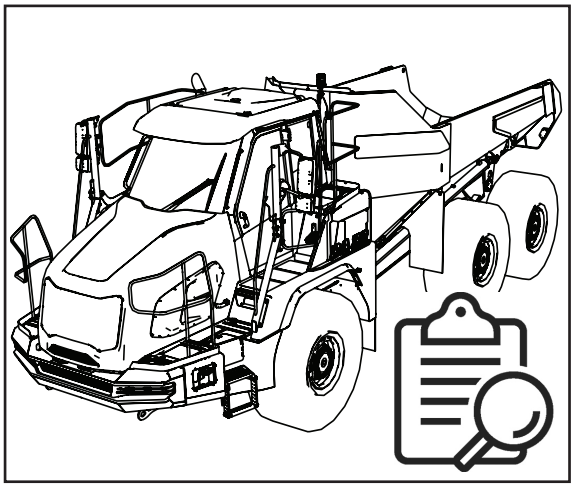
10. Warm up and check for leaks. Re-check level and adjust if necessary.

4. Continue with all items in 2000 Hours Service.

* Numbers refer to positions on the lubrication schedule, chapter 6

Yearly recommended maintenance

Maintenance recommended to be performed yearly



1. Transmission

1.1. General condition check

1. Check tightness of lubrication system when engine is running.
   • *Tighten or change defective connections.*
2. Check transmission rubber mountings and replace if necessary. Inspect the mounting bolts.

2. Drive line

2.1. General condition check

Check the general condition and mountings, joints, bearings, etc. for general deterioration, wear, damages and leakages.

• *Replace or recondition if necessary.*

1. Rear axle and tandem housing.
2. Articulation hinge and turning ring.
3. Suspension:
   • shock absorbers
   • rubber dampers
   • arms and rods
4. All prop. shafts, universal joints included.

3. Tanks

3.1. General condition check

Check the hydraulic and the diesel tank bolts/ mountings.

* Numbers refer to positions on the lubrication schedule, chapter 6

Yearly recommended maintenance

Maintenance recommended to be performed yearly

4. system

4.1. Inspect the hydraulic hoses

Replace hoses which are deteriorated, leaking or otherwise damaged.

5. Exhaust system

5.1. Safety check

- Check fastening brackets, muffler, pipes and joints for leaks, damages and insecurity.
- If body is exhaust heated, check that the channels in the body has not clogged by any means.

CAUTION

Be aware of hot parts when engine has been running!

6. Bearings

6.1. Check clearance

Contact your local Hyundai Dealer for checking of the bearing clearance:

- Tandem bearing
- Tip bearings
- Turning ring and articulation bearings
- Wheel bearings

* Numbers refer to positions on the lubrication schedule, chapter 6

Technical Data

Measurements

Machine dimensions (mm)	HA30/HA30A	HA45/HA45A
Total length	9515	10590
Total width (with standard tyres)	2990	3475
Total width (with optional tyres)	2976	3475
Total height	3604	3850
Overhang, front	2605	2775
Overhang, rear	1024	1410
Wheelbase	1771	1960
Body upper height (rear edge)	2946	3355
Body floor height (rear edge)	2100	2390
Total height, raised body	5885	6680
Ground clearance, raised body	610	763
Ground clearance	567	643
Min. ground clearance, loaded	549	606
Turning radius (ISO 7457)	7680	8420
Body tipping angle	70°	70°
Steering angle, both sides	45°	45°
Standard tyre dimension	23.5 R25	29.5 R25
Tyre load/speed index	195A/185B (2 stars)	216A2/200B (2 star)
Machine weights (kg)		
Empty weight	23200	30100
Gross weight	51200	71100
Maximum payload	28000	41000
Weight distribution (kg)		
Front axle empty	12650	14200
Rear axle empty	10350	15900
Body capacity (m^3)		
Loaded (with / without tailgate)	14.2/13.6	20.4/19.6
Heaped, SAE 2:1 (with / without tailgate)	17.8/16.8	26/24.4
Machine speed (km/h)		
Forward speeds (1/2/3/4/5/6/7/8)	6/8/11/16/23/32/45/55/	6/9/12/17/24/34/48/55
Reverse speeds (1/2/3/4)	6/8/11/16	6/9/12/17
Towing load on hooks (kN)		
Front	100 (each)	100 (each)
Rear	200	200
Sound power level, dB (A)		
According to ISO 6395 (external)	107	107
Sound pressure level, dB (A)		
According to ISO 6396 (in cab)	72	72
Ambient operating temperature (°C)		
Min. (-)	- 25	- 25
Max. (+)	+45	+45

The measurements are valid for a standard, unloaded machine if nothing else is given.

Engine

1 kW = hp / 1,36

Water cooled, unit injected (T2) and extra high pressure injection (T4F) diesel engine with turbo charger and air to air intercooler.

Engine	HA30/HA30A - T2F/T4F/ Stage V	HA45/HA45A - T2F // T4F/ Stage V	HA45 T3
Type	Scania DC09 074A/DC09 086A/ DC09 313A	Scania DC13 074A//DC13 085A/ DC13 313A	Scania DC13 076A
Cylinder volume	9.3 liters	12.7 liters	
Bore x stroke	130 x 140 mm	130 x 160 mm	
No. of cylinders	5 (in line)	6 (in line)	
Power rating (ISO3046)	276 kW (375hp)	368 kW (500hp)	331 kW (450hp)
Power rating (ISO9249)	270 kW (367hp)	360 kW (489hp)	322 kW (438hp)
Max. torque (Nm)	1873/1876 (StageV)	2373/2476 (StageV)	2007
Engine speed, low idle	Set to 720 rpm ±20		
Engine speed, high idle	Set to 2280 rpm ±20		
Max. allowed engine speed	2400 rpm		
Oil capacity	33,5 liters	45 liters	
Oil pressure Normal with the warm engine, operating speed	3-6 bar		
Oil pressure Normal with the warm engine, minimum permitted at idling speed	Min. 0,7	Min. 1.0 bar	
Specific oil consumption	<0.3 g/kWh		
Coolant volume	45 liters (approx.)	50 liters (approx.)	
Normal temperature	70-90°C	70-93°C	
Thermostat	83°C	83°C	
Max. system pressure	0.5 bar		
Compression ratio	16:1(T2) / 17:1(T4) / 19:1(StageV)	17,3:1(T2/T3) / 21,3:1(T4/StageV)	
Firing order	1-2-4-5-3	1-5-3-6-2-4	
Engine rotation, seen from rear	Counter clockwise		
Valve clearance (cold engine)	0.45 mm, inlet valves 0.70 mm, exhaust valves		

Transmission

Automatic transmission. Integrated in the gearbox: torque converter, automatic lock-up clutch, retarder brake and lockable inter axle differential.

Transmission	HA30/HA30A	HA45/HA45A
Type	ZF 8EP-320	ZF 8EP-420
No. of forward gears	8	
No. of reverse gears	4	
Oil capacity	67 liters	68 liters
Normal temperature	50-105°C	
Max. permitted temp. when using retarder brake	125°C (short period only)	
Lock -up clutch	In all gears	
Lock-up in/out	Depending on the engaged mode	
Inter axle diff. distribution	1/3 to front axle, 2/3 to rear axle, lockable	

Hydraulic system

HA30/HA30A - HA45/HA45A

The system has one variable displacement piston pump. Pump supplies steering, tilting, fan and brakes system, where the steering circuit has priority.

The main and emergency steering pumps are installed on the transmission.

Hydraulic system	**HA30/HA30A**	**HA45/HA45A**
Tank capacity	63 ± 8 l	63 ± 8 l
Normal oil temperature	40-90°C	
Filter	One return flow filter	
Pump	1 variable displacement axial piston pump	
Steering/tipping	308 l/min at 2200rpm	
Emergency steering pump	Piston pump, ground driven, speed dependent	
Pump delivery	Max. 50 l/min	
Pressure settings - main safety valves		
Tipping circuit- up (pump setting)	280 bar	
Tipping circuit- down (pump setting)		
Shock valves in the tip circuit	300 bar (up), 80 bar (down)	
Steering circuit	210 bar	
Tipping cylinders	2 x Single stage, double acting	
Steering cylinders	2 x Single stage, double acting	
Steering wheel turns	Approx. 5	

Tire pressures

Basic pressure for cold tires (based on max. load and max. speed):

Model	Type	Front (bar {psi})	Rear (bar {psi})
		max. 50 km/h	max. 50 km/h
HA30/HA30A(23.5)	Bridgestone VLT/VLTS	4.75 {68.9}	5.00 {72.5}
	Continental (EM Master)	4.75 {68.9}	5.00 {72.5}
	Goodyear (TL-3A/GP-4D)	4.00 {58}	4.50 {65.3}
	Michelin (XADAN)	4.50 {65.3}	4.75 {68.9}
	Michelin (Xtra Defend)	4.00 {58}	4.30 {62.4}
	Techking (ETLT/ETADT/ET6A/PROADT)	4.50 {65.3}	5.25 {76.1}
HA30/ HA30A(750/65)	Bridgestone (VLT/VLTS)	3.75 {54.4}	4.00 {58}
	Goodyear (TL-3A/GP-4D)	3.25 {47.1}	3.50 {50.8}
	Michelin (XAD65)	3.00 {43.5}	3.25 {47.1}
	Techking (ETADT)	4.75 {68.9}	4.75 {68.9}
HA45/HA45A(29.5)	Bridgestone VLT/VLTS	3.75 {54.4}	4.50 {65.3}
	Continental (EM Master)	3.75 {54.4}	4.50 {65.3}
	Goodyear (TL-3A/GP-4D)	3.75 {54.4}	4.75 {68.9}
	Michelin (XADAN/X Super Terrain-)	3.75 {54.4}	4.40 {63.8}
	Michelin (Xtra Defend)	3.30 {47,9}	4.00 {58}
	Techking (ETLT/ETADT/ET6A/PROADT)	4.50 {65.3}	5.25 {76.1}
HA45/ HA45A(875/65)	Bridgestone VLT/VLTS	3.00 {43.5}	3.75 {54.4}
	Goodyear (TL-3A/GP-4D)	2.75 {39.9}	3.25 {47.1}
	Michelin (XAD65)	2.50 {36.3}	3.00 {43.5}
	Techking (ETADT)	4.75 {68.9}	4.75 {68.9}

Regarding Tire pressure: Contact your Hyundai Dealer or Tire supplier to get further information.

Electrical System

Voltage

The truck has a 24V system. The battery ÷ is used as ground connection.

Supply

Two batteries, each 12V/140Ah, are connected together in serial connection to provide the system with 24V. The batteries are located on the left hand side of the fender. A 28V/100A alternator is used to charge the batteries. The alternator is located on the front of the engine.

Battery main switch

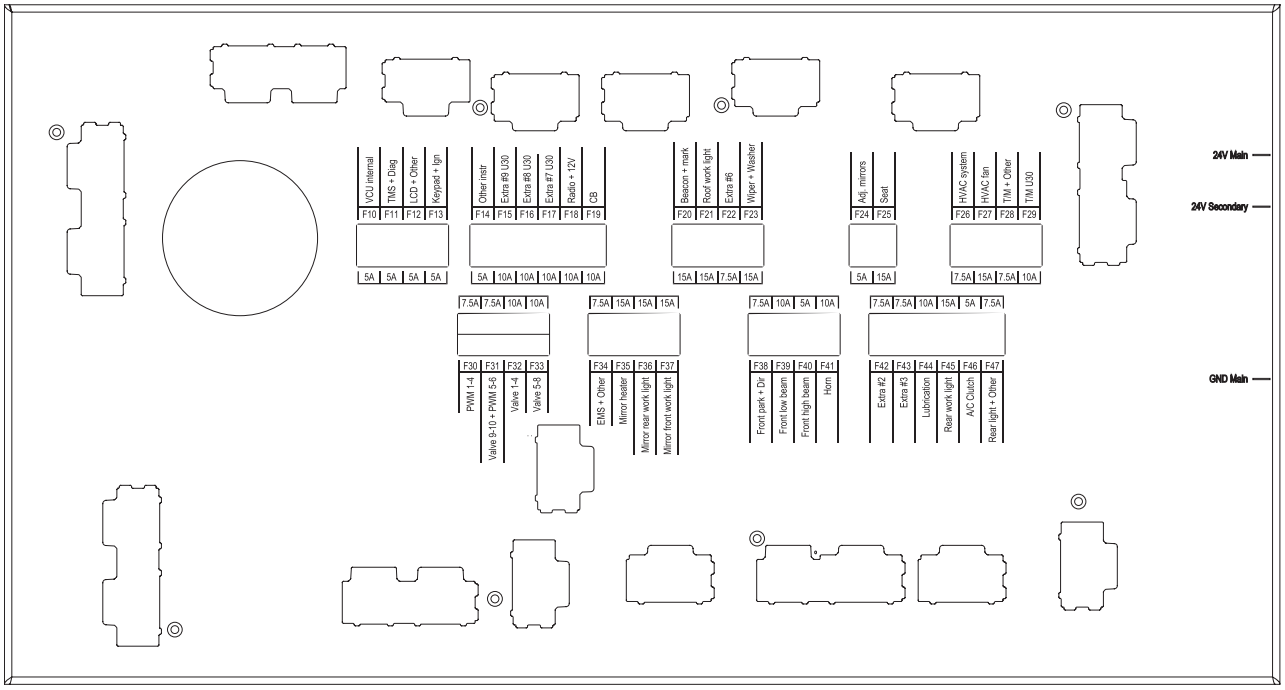
A main switch is connected to the battery + supply cabel. The battery main switch is located in the left hand side fender.

Fuses

The fuses are located on the VCU3 inside the cab, behind the cover on the back wall + “junction” box in front left fender.

VCU (Control unit)

The VCU powers the control panel and the HVAC unit. It can also activate the A/C compressor clutch when the control panel signals this and both pressure and evaporator temperature allow it.



For the parts please use the spare parts catalogue.

For more specific technical informations please refer to Shop Manual

Metering conversion table

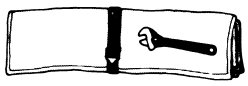
Length:	1 m	=	1.094 yd	=	3.281 ft	=	39.37 in
	1 km	=	1000 m	=	0.621 mile		
Volume:	1 dm^3	=	1 litre	=	0.264 gal (US)	=	0.220 gal (UK)
	1 dm^3	=	0.0353 ft^3	=	61.02 in^3		
	1 m^3	=	35.32 ft^3				
Weight:	1 kg	=	2.20 lb	=	35.27 oz		
	1000 kg	=	1 ton (metric)	=	0.984 ton (UK)	=	0.902 ton (US)
Power:	1 kW	=	1.34 hp (British)				
		=	1.36 hp (Metric)				
Torque:	10 Nm	=	1.02 kpm	=	7.38 lbf ft (pound-force foot)		
Pressure:	1 bar	=	1.02 kp/cm^2	=	14.5 p.s.i.	=	100 kPa
Temperature:	°C	=	5/9 x (°F- 32)				
	°F	=	(9/5 x °C)+32				
Speed:	1 km/h	=	0.62 mph				

Tool kit content (standard)

- Operation manual
- Safety support (tiltable body)
- Draining hose
- Basic driving instruction
- Parts catalogue and Operation Manual USB
- Lever for lifting cab

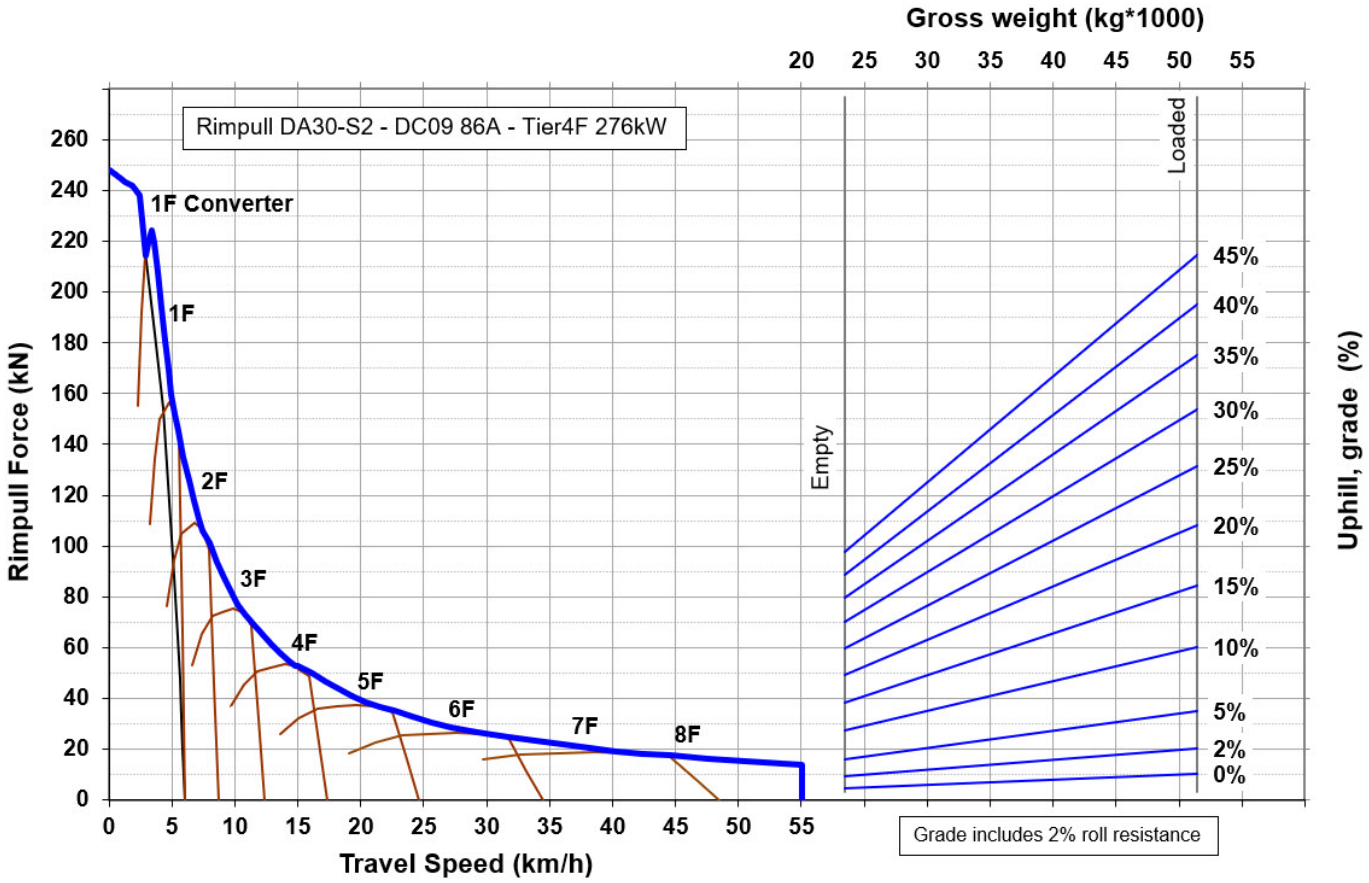
Tool kit content (optional)

- Hex. sockets 10,12,17,22 mm
- Socket 30 mm
- Long socket 32 mm
- Grease gun
- Extension arm 200 mm
- Extension arm 470 mm
- Handle 510 mm
- Toggle joint

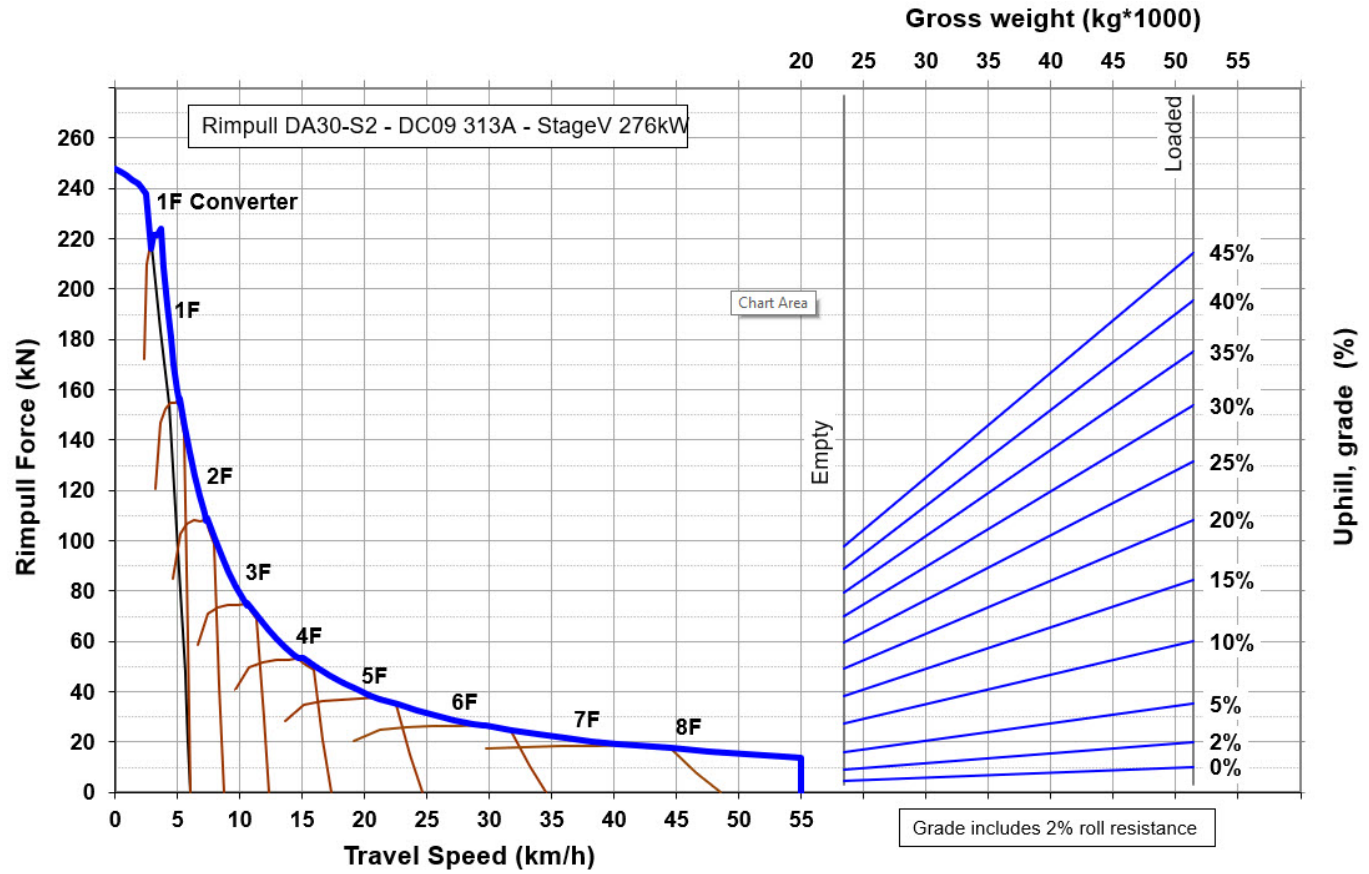


Rimpull Performance

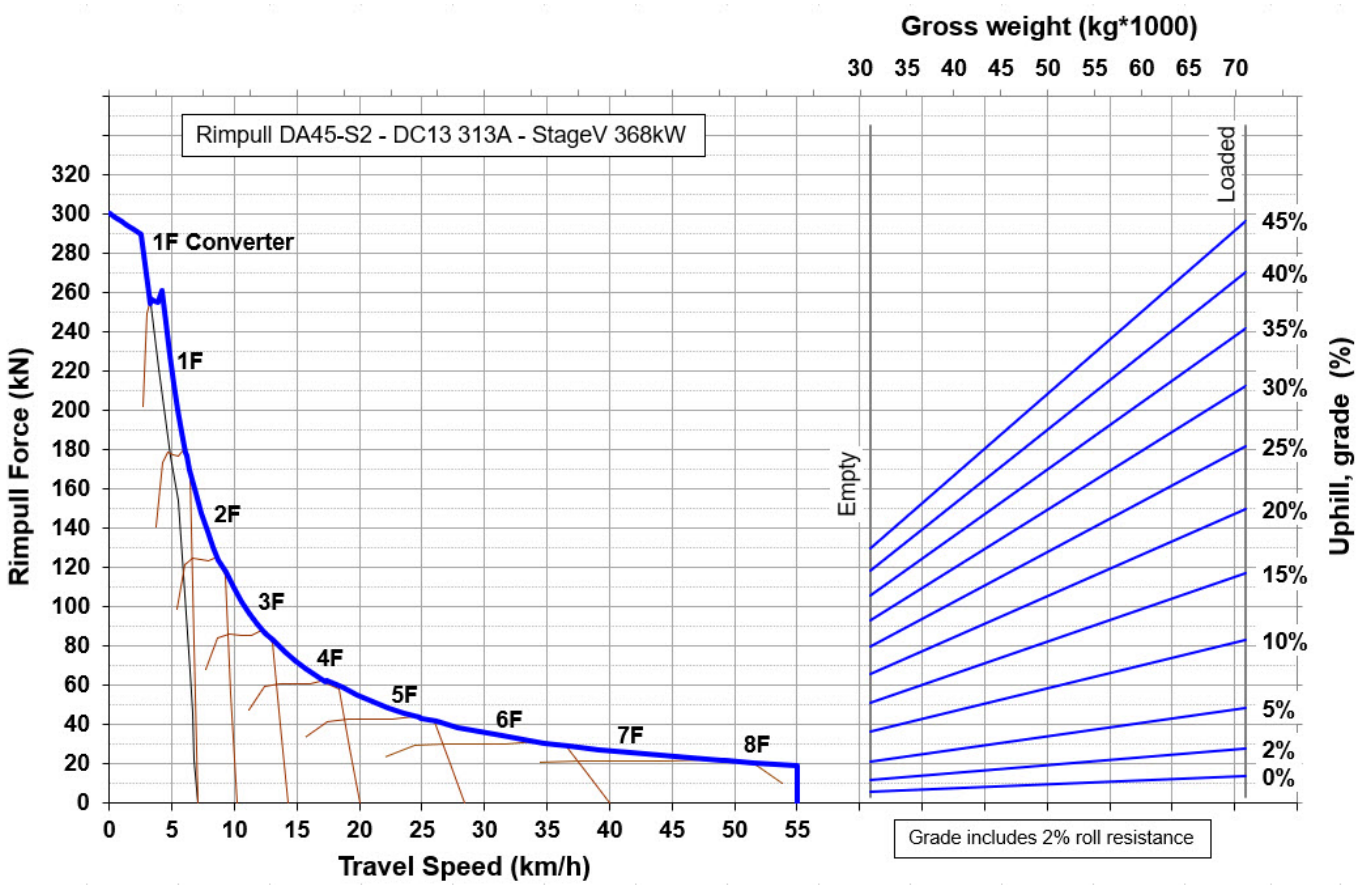
HA30



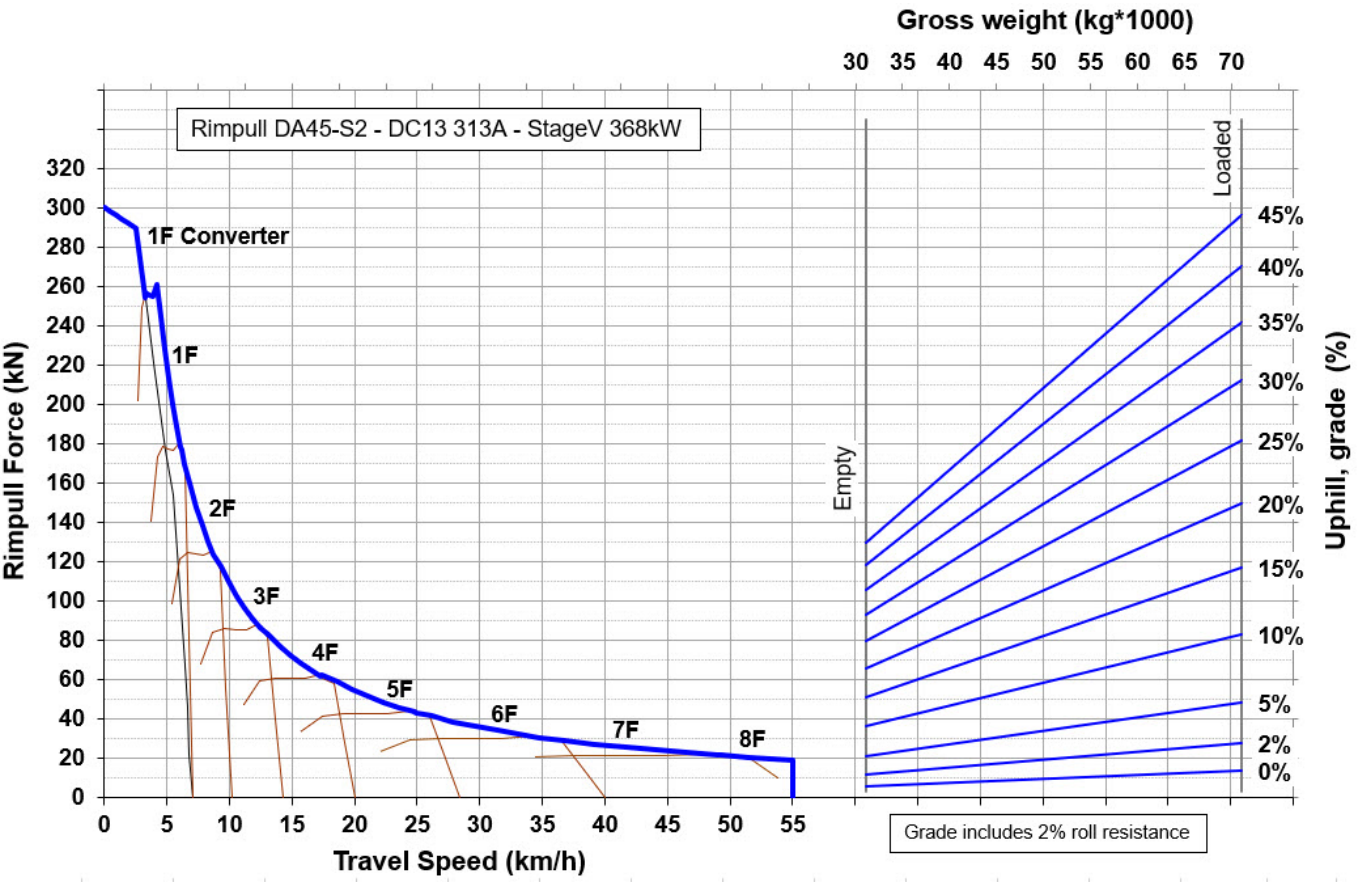
HA30A



HA45


Gross weight (kg*1000)
30 35 40 45 50 55 60 65 70
Rimpull DA45-S2 - DC13 313A - StageV 368kW
Rimpull Force (kN)
320 300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0
1F Converter
1F
2F
3F
4F
5F
6F
7F
8F
0 5 10 15 20 25 30 35 40 45 50 55
Travel Speed (km/h)
Empty
Loaded
45%
40%
35%
30%
25%
20%
15%
10%
5%
2%
0%
Uphill, grade (%)
Grade includes 2% roll resistance

HA45


Gross weight (kg*1000)
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Rimpull DA45-S2 - DC13 313A - StageV 368kW
Rimpull Force (kN)
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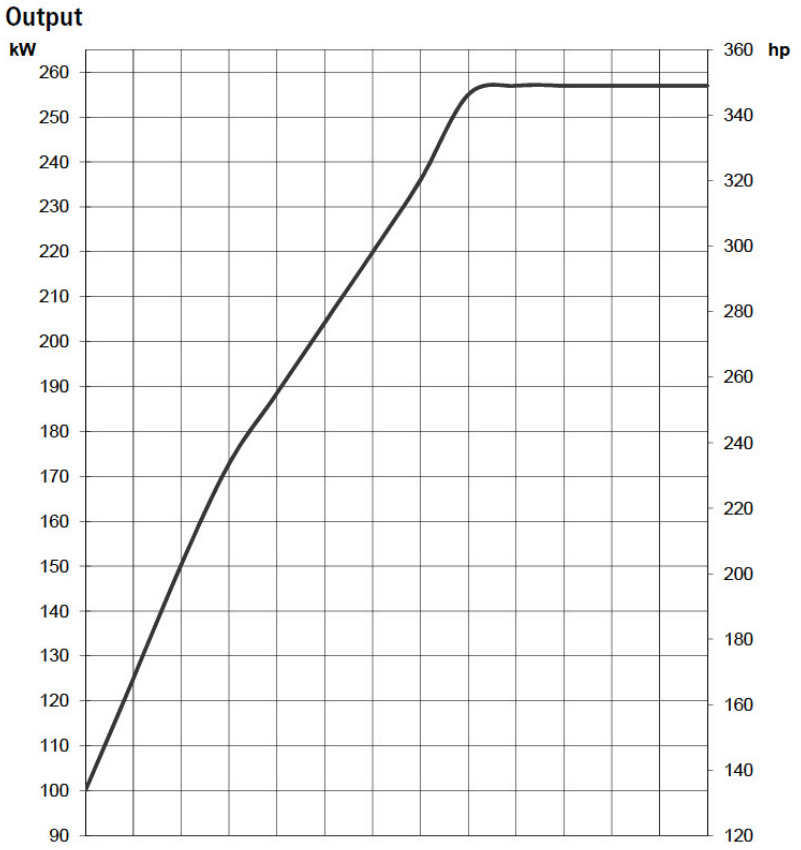
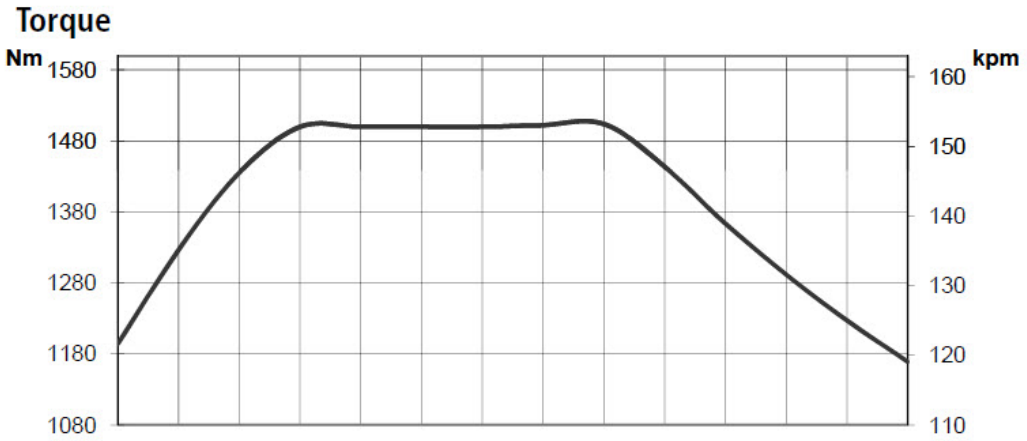
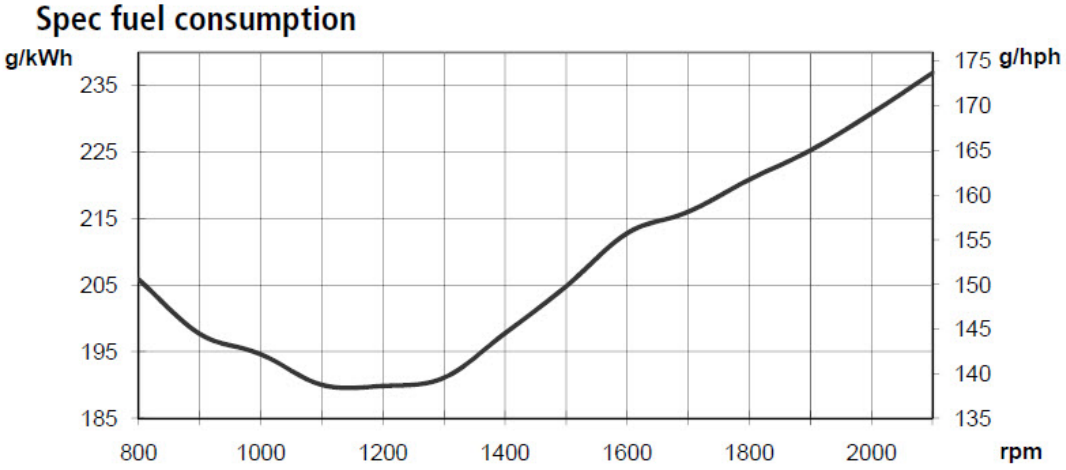
1F Converter
1F
2F
3F
4F
5F
6F
7F
8F
0 5 10 15 20 25 30 35 40 45 50 55
Travel Speed (km/h)
Empty
Loaded
45%
40%
35%
30%
25%
20%
15%
10%
5%
2%
0%
Uphill, grade (%)
Grade includes 2% roll resistance

Output, Torque , fuel consumption

HA30 T2

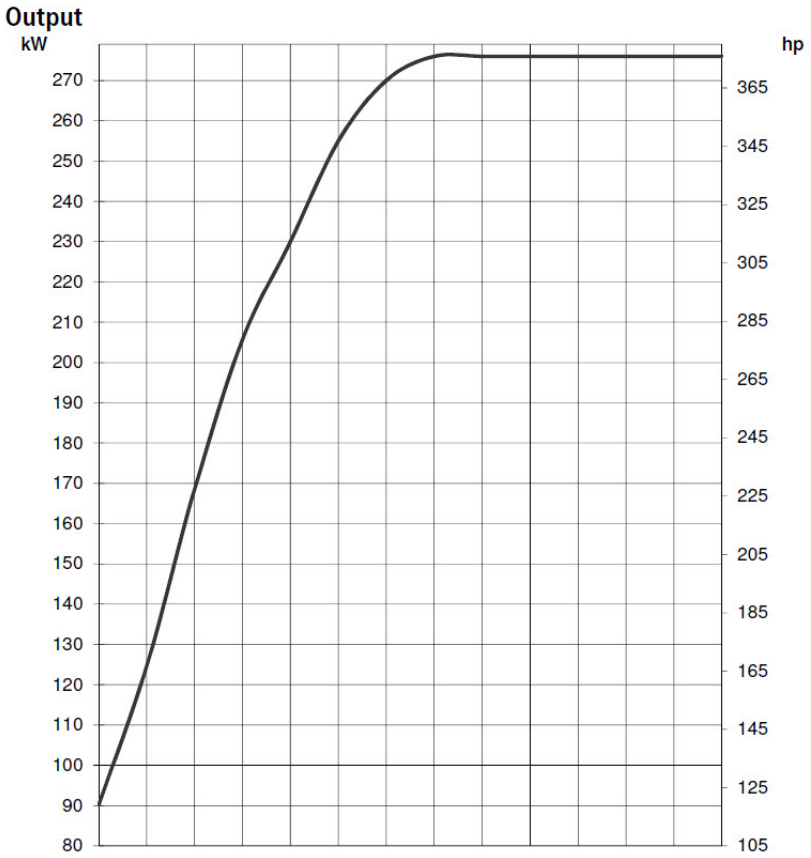


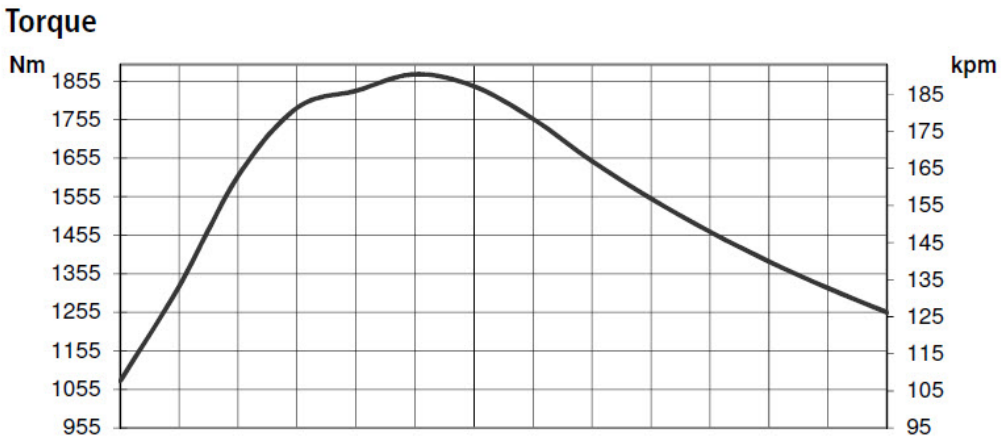


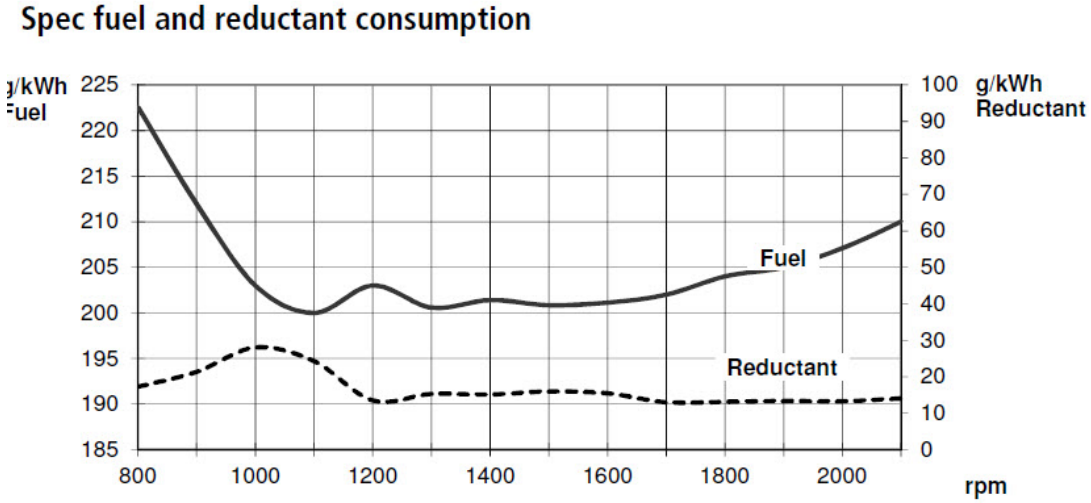


Output, Torque , fuel consumption

HA30 T4F



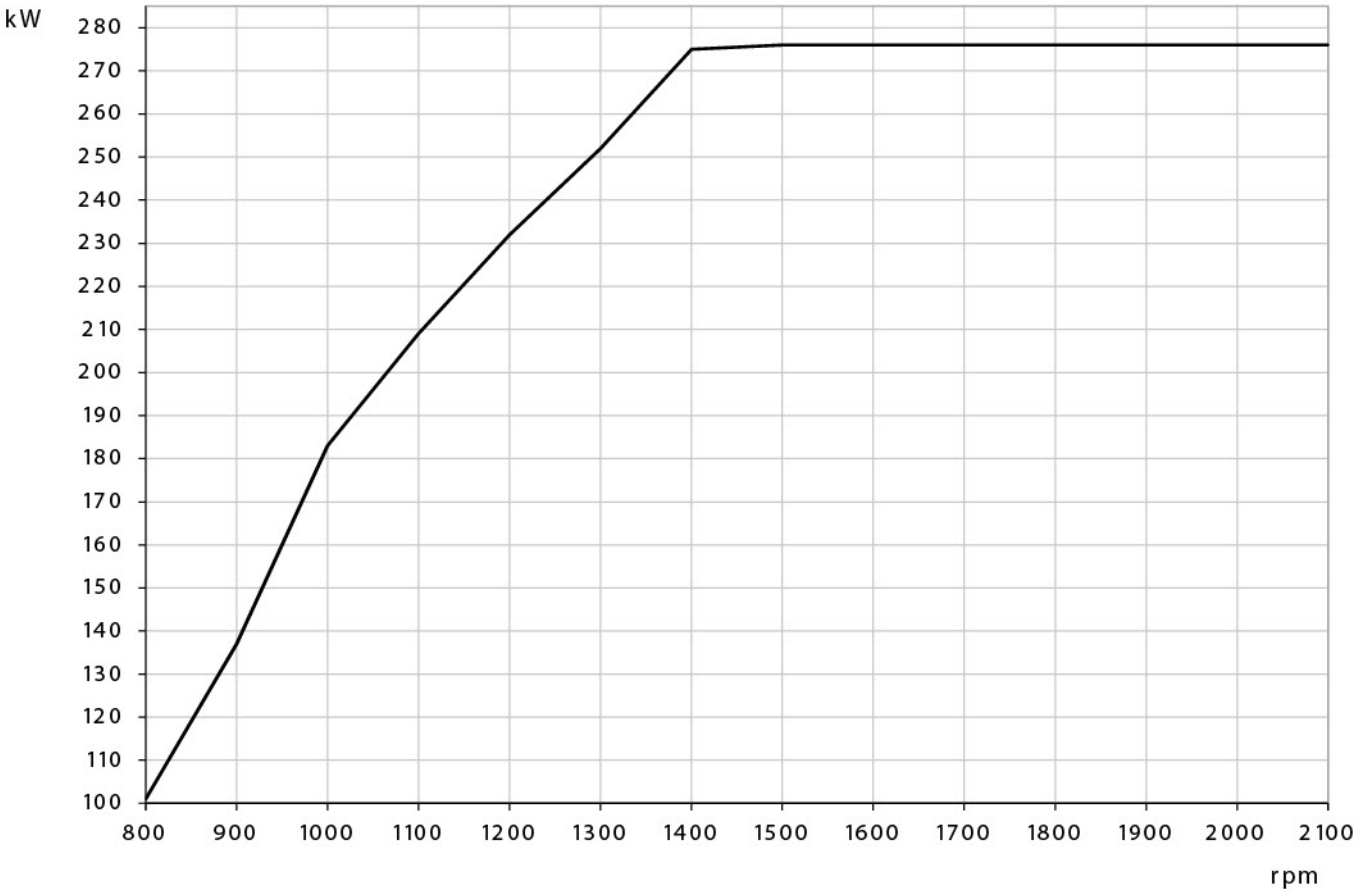




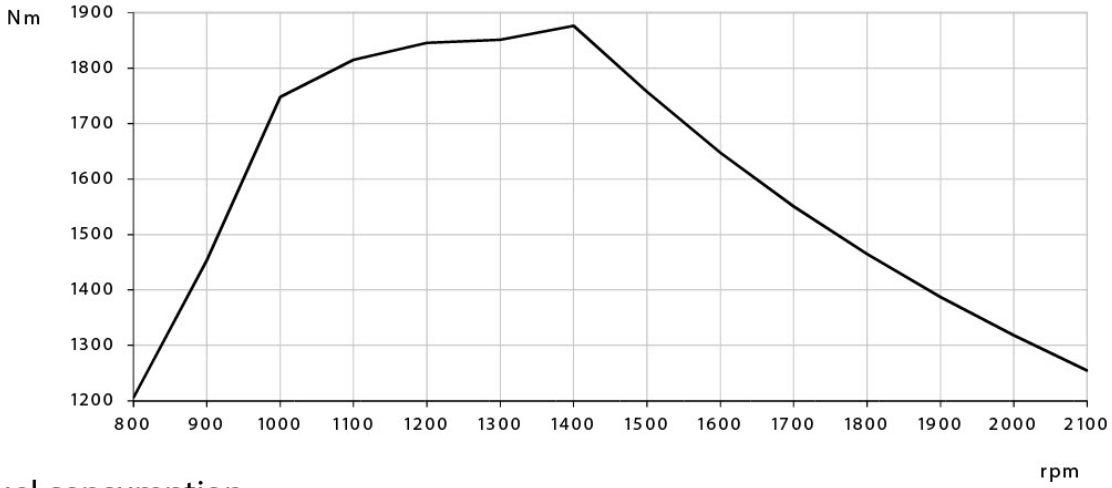
Output, Torque , fuel consumption

HA30 Stage V

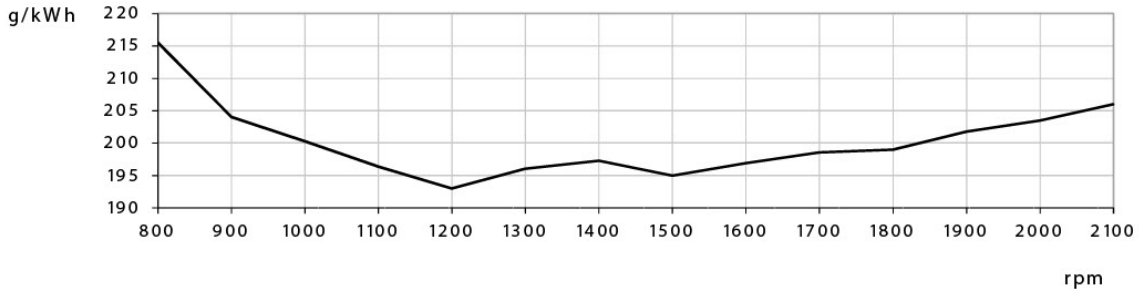
Power



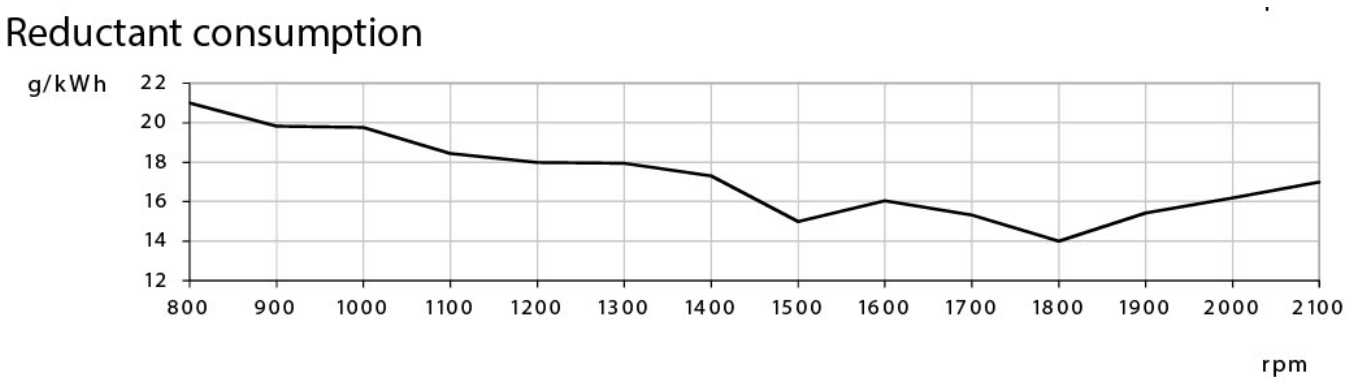
Torque



Fuel consumption



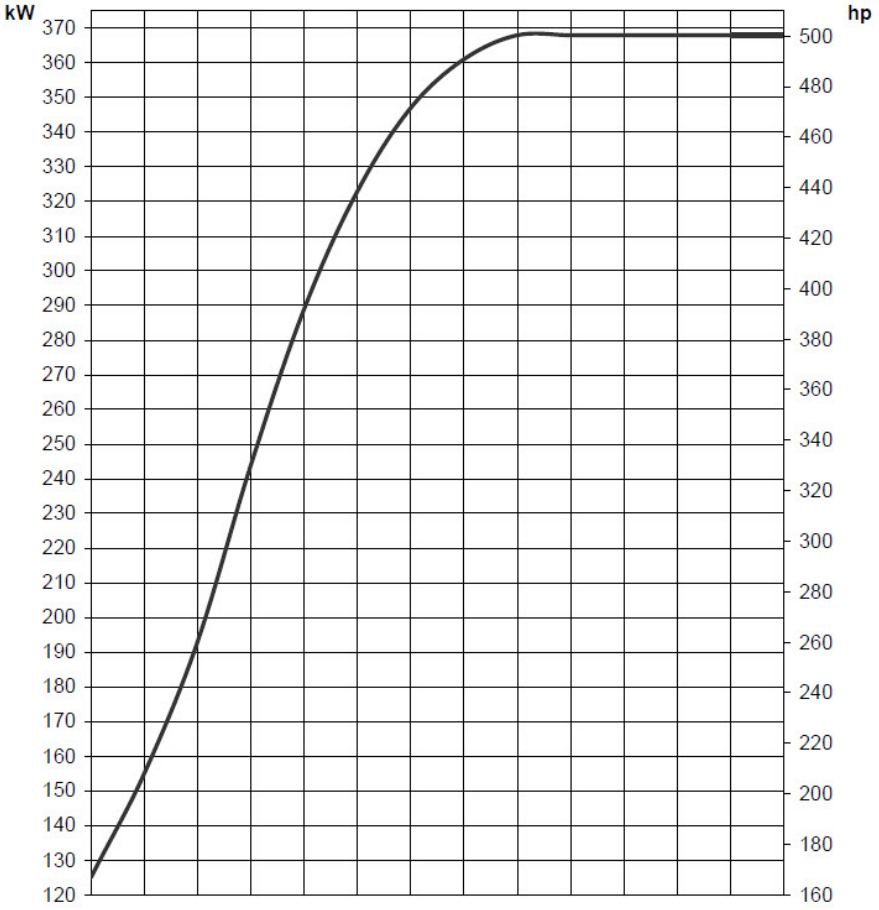
Output, Torque , fuel consumption



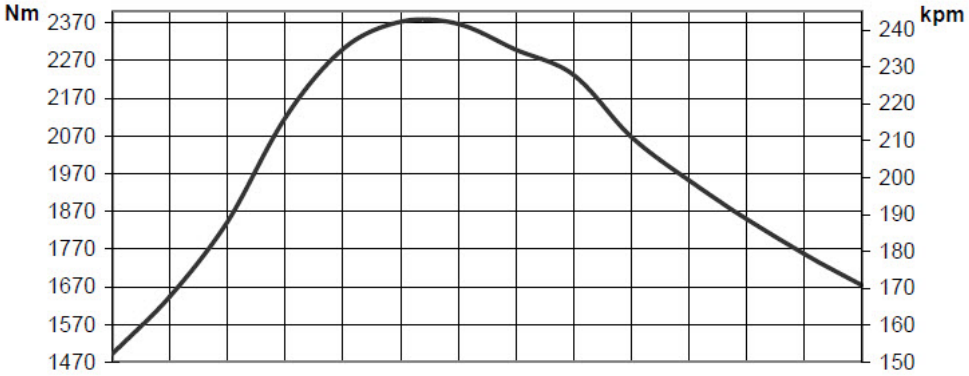
Output, Torque , fuel consumption

HA45 T2/T3

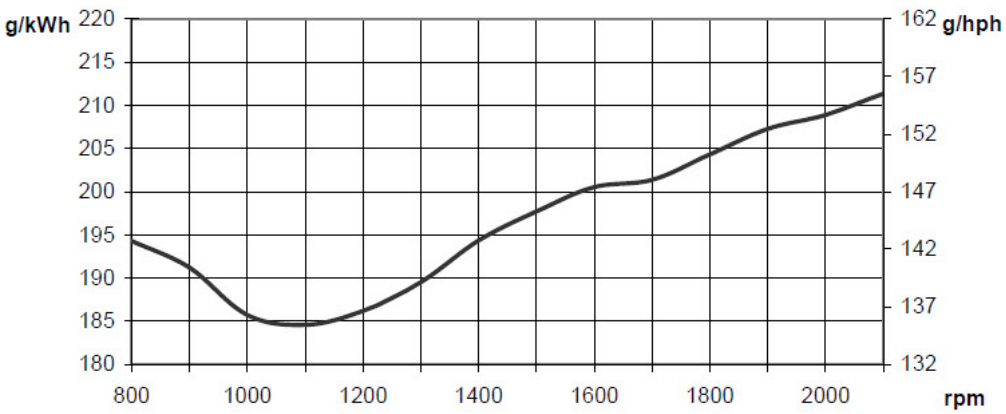
Output



Torque



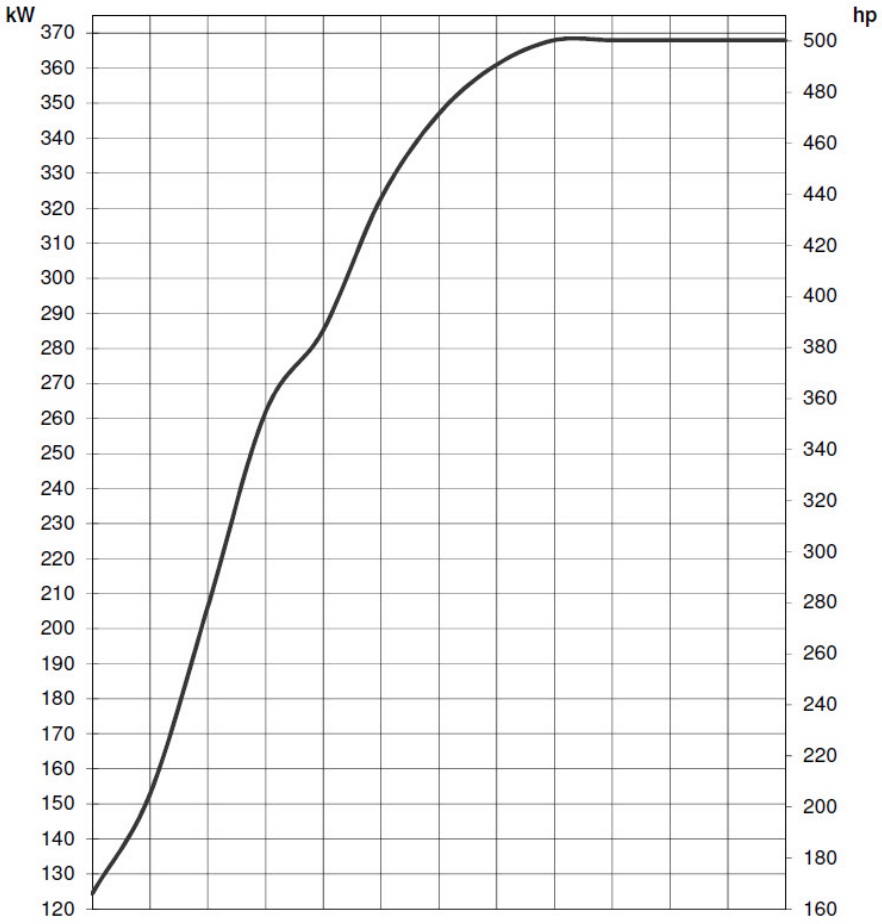
Spec fuel consumption



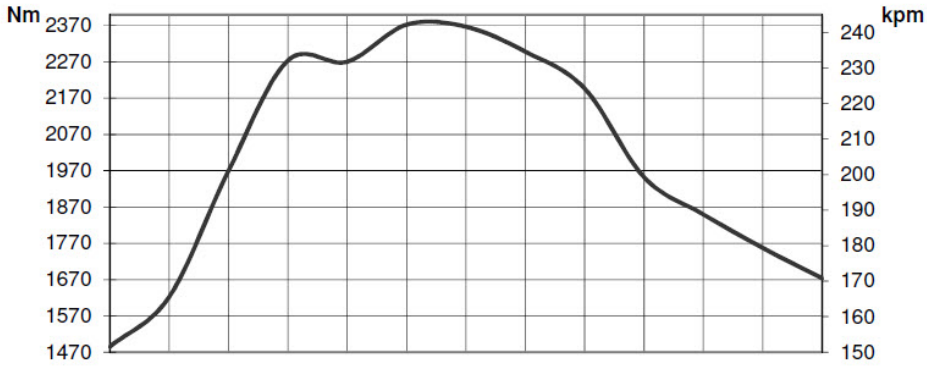
Output, Torque , fuel consumptio

HA45 T4F

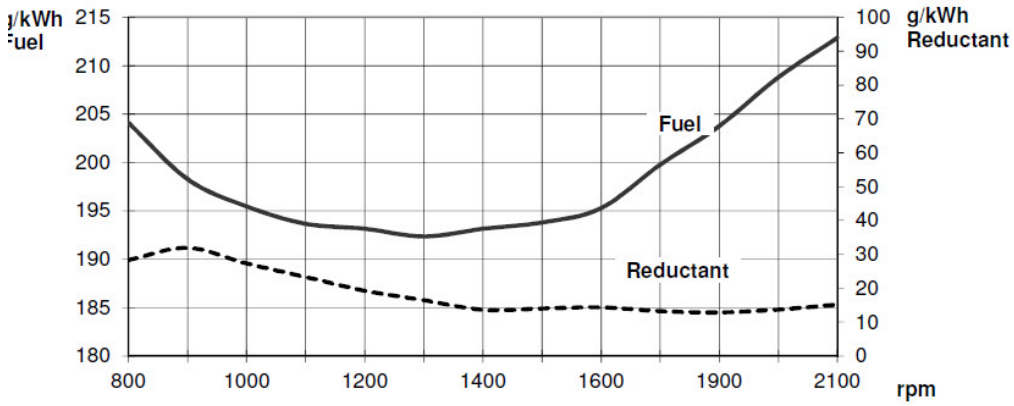
Output



Torque



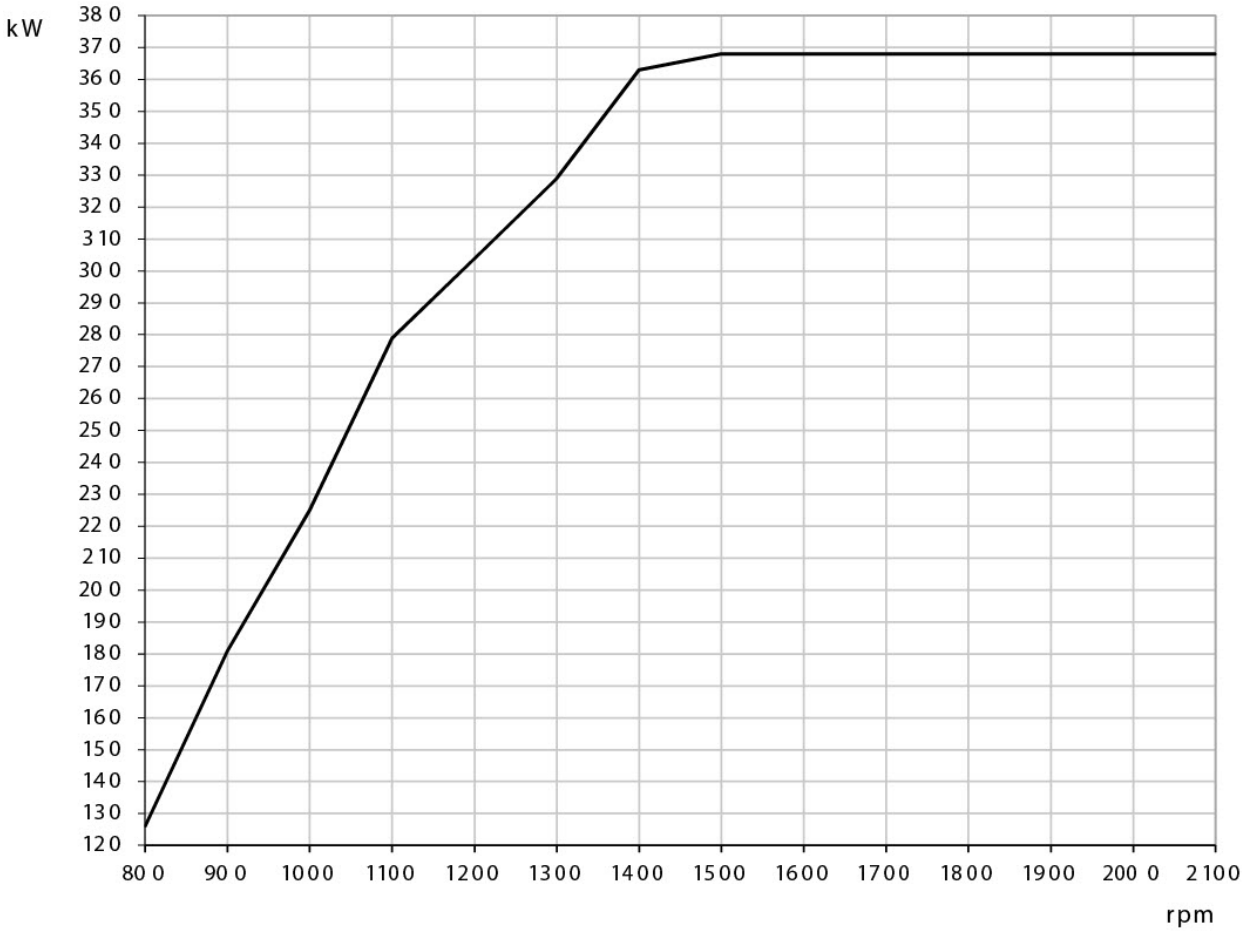
Spec fuel and reductant consumption



Output, Torque , fuel consumption

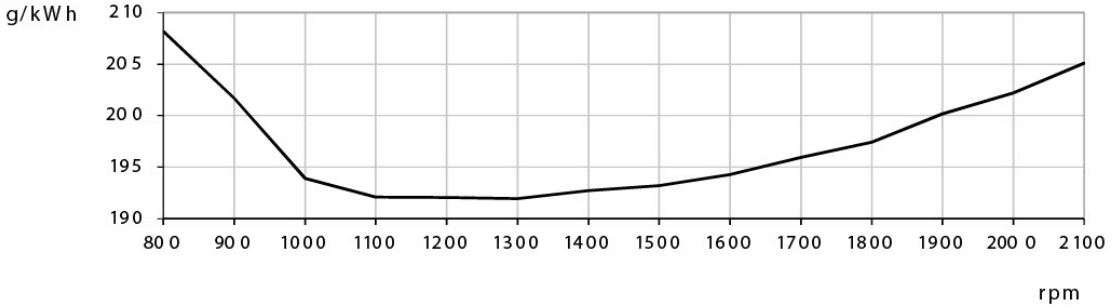
HA45 Stage V

Power



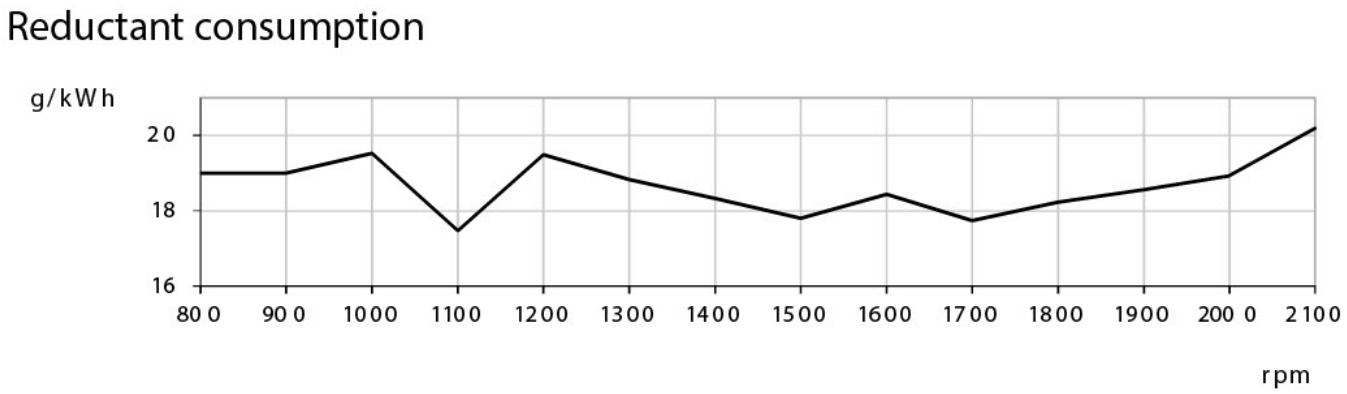
Torque

Fuel consumption



Output, Torque , fuel consumption

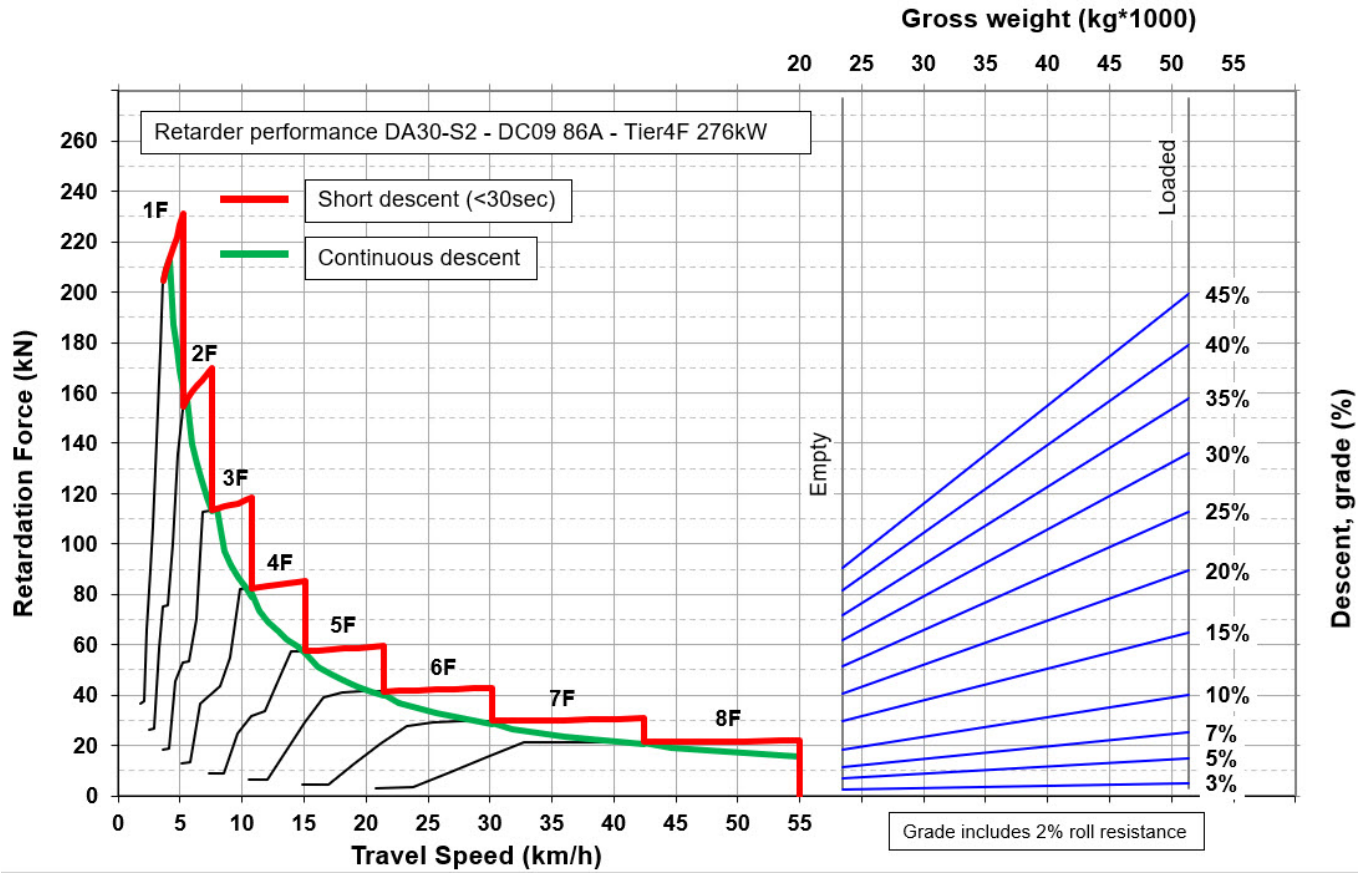
HA45 Stage V



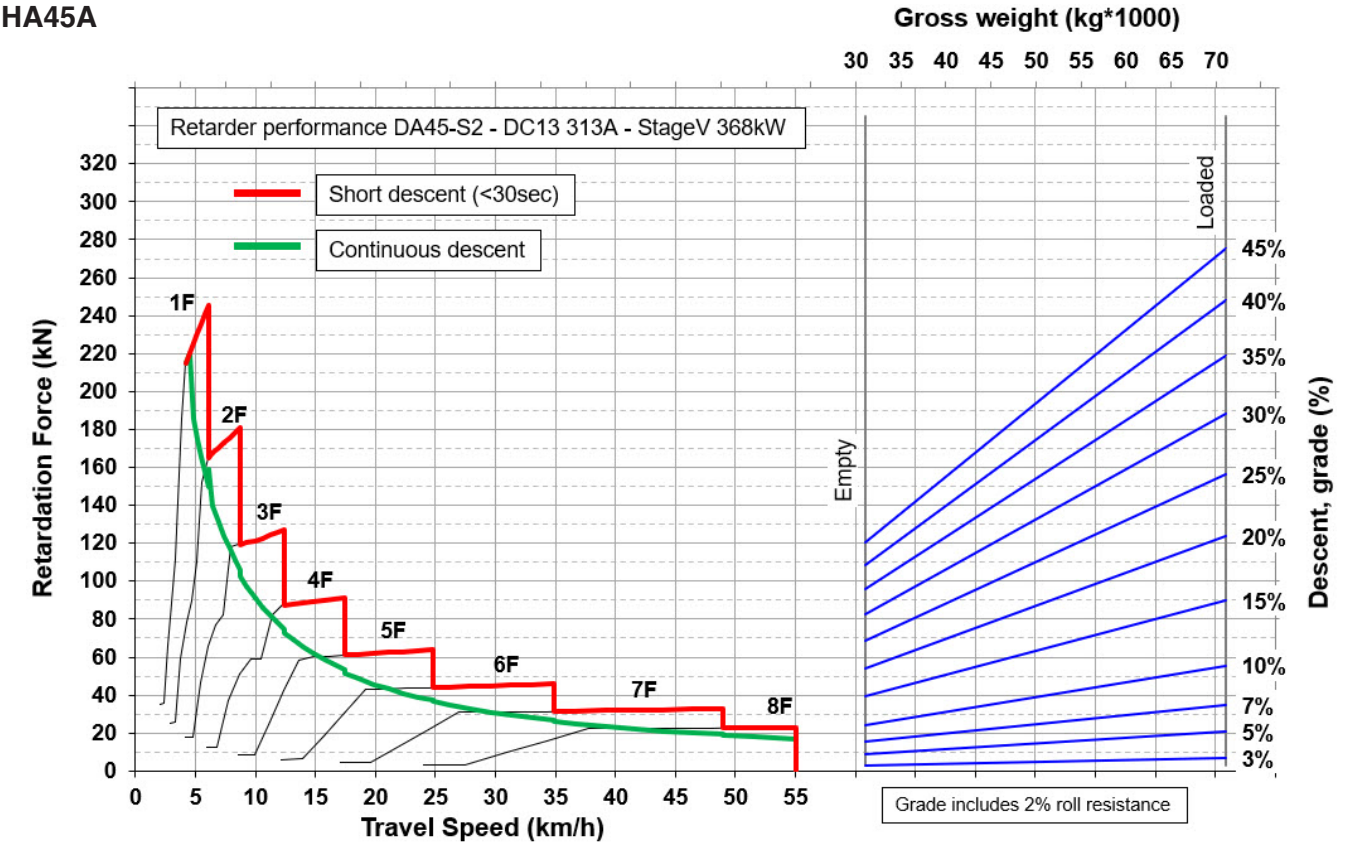
Retarder brake capacity chart

Below diagram gives guidelines for calculation of the dump truck retarder brake performance related to rolling grade. The traction capabilities depend on the ground conditions and surroundings, i.e. available wheel grip (friction), tire pattern, weight on the wheels, etc. If the driving conditions (f.ex curves) requires hard decelerating by using the main brake, driving in a lower gear is advised.

HA30A



HA45A



Torque limits for bolts

This tables indicates standard torque limits in Nm for the various screw and bolt qualities and dimensions. The torques are valid for screws on the outside of the components.

Metric Threads

Dim./Class	8.8	10.9	12.9
M8	24	33	40
M10	47	65	79
M12	81	114	136
M14	128	181	217
M16	197	277	333
M18	275	386	463
M20	385	541	649
M22	518	728	874
M24	665	935	1120
M27	961	1350	1620
M30	1310	1840	2210
M33	1770	2480	2980
M36	2280	3210	3850

Fine Metric Threads

Dim./Class	8.8	10.9	12.9
M8 x 1	25	35	42
M10 x 1.25	48	68	81
M10 x 1	49	70	84
M12 x 1.5	83	117	140
M12 x 1.25	85	120	144
M14 x 1.5	135	190	228
M16 x 1.5	204	287	344
M18 x 1.5	294	413	496
M20 x 1.5	408	574	688
M22 x 1.5	546	768	921
M24 x 2	696	979	1170
M27 x 2	1000	1410	1690
M30 x 2	1390	195 0	2340
M33 x 2	1860	2610	3130
M36 x 3	2350	3310	3970

UNF - Threads

Dim./Class	8.8	10.9	12.9
3/8" UNF	41	59	73
7/16" UNF	66	93	115
1/2" UNF	99	141	175
9/16" UNF	142	201	250
5/8" UNF	197	279	347
3/4" UNF	344	486	606
7/8" UNF	547	772	963
1" UNF	814	1150	1430
1 1/8" UNF	1170	1660	2060
1 1/4" UNF	1620	2290	2850
1 3/8" UNF	2170	3070	3820
1 1/2" UNF	2840	4000	5000

Reference information

Machine model:_____ Serial no.:_____

Prod. year:_____ In operation:_____

Engine s/no.:_____ Transm. s/no.:_____

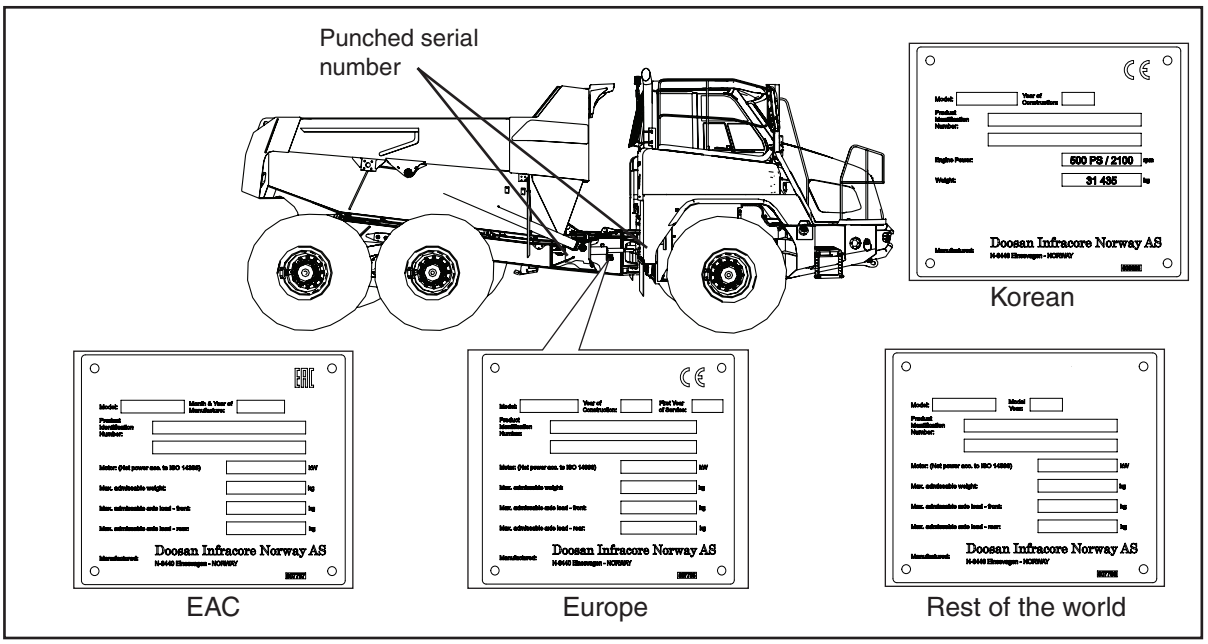
Dealer:_____

_____

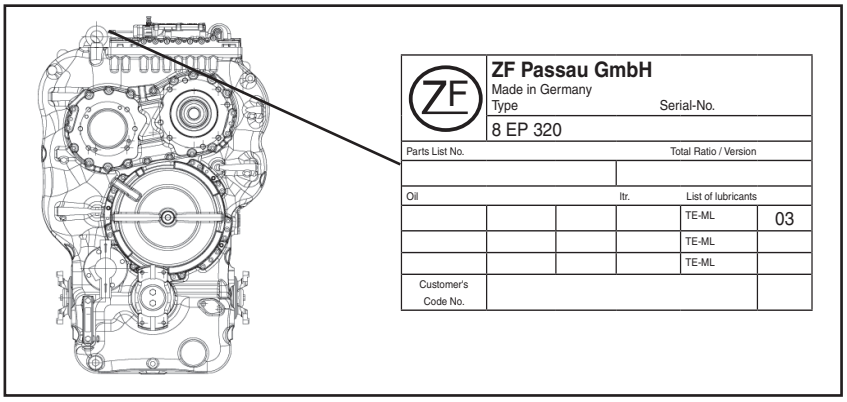
Consumable parts

Part No.	Quantity	Description

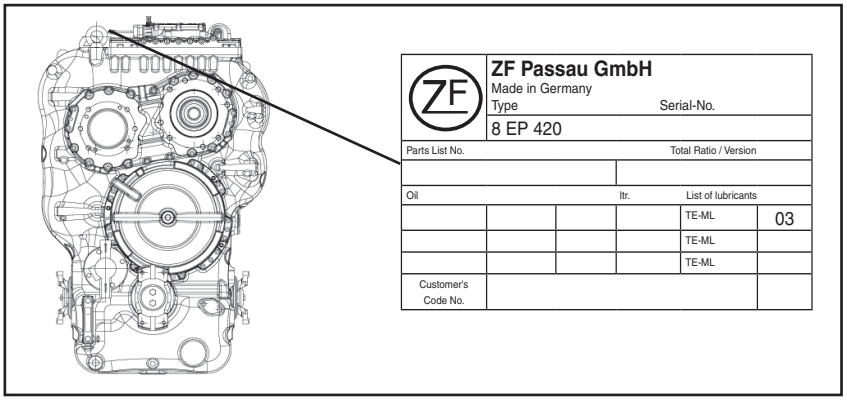
Product signs



Data plate can looks different because of the construction changes.

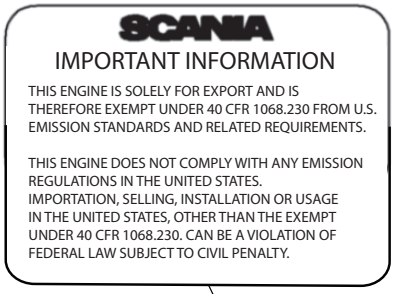


HA45



3

4



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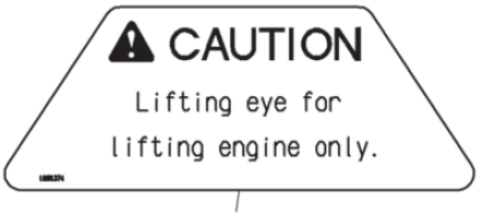

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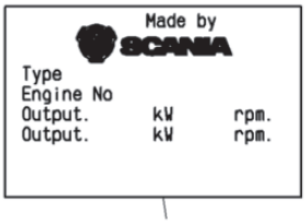

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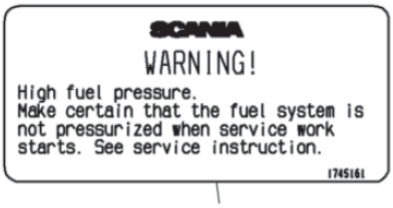

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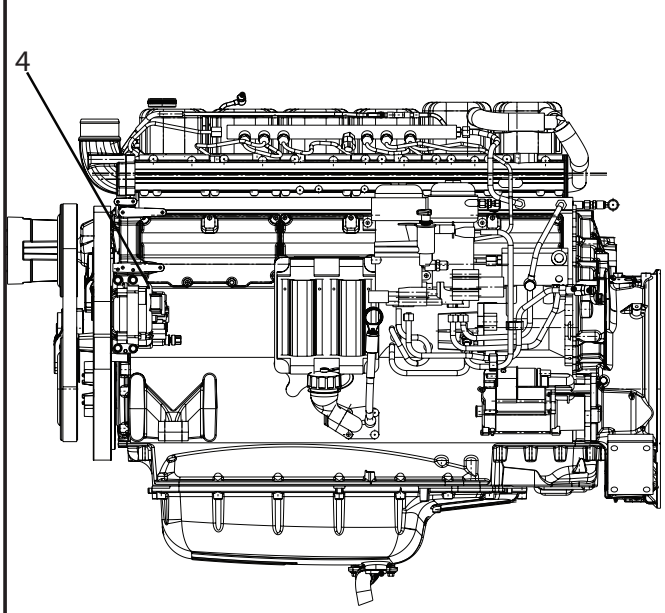
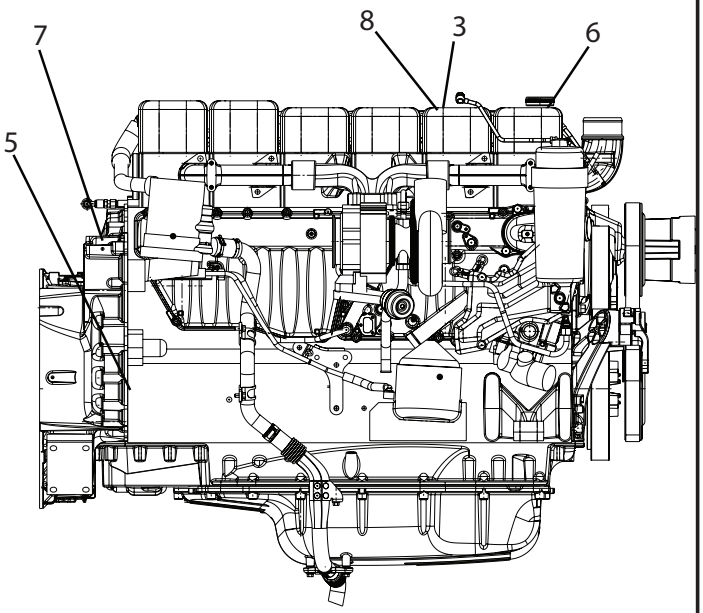


LH side



RH side

Periodic service

Fill in the boxes according to the maintenance performed on the dump truck

serial no.:

DELIVERY **Hrs:** ________ **Date:** ________
Stamp / Sign.:

SERVICE **Hrs:** ________ **Date:** ________
Stamp / Sign.:

SERVICE **Hrs:** ________ **Date:** ________
Stamp / Sign.:

SERVICE **Hrs:** ________ **Date:** ________
Stamp / Sign.:

SERVICE **Hrs:** ________ **Date:** ________
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Stamp / Sign.:

SERVICE **Hrs:** ________ **Date:** ________
Stamp / Sign.:

DELIVERY **Hrs:** _________ **Date:** _____________
Stamp / Sign.:

Fill in the boxes according to the maintenance performed on the dump truck

serial no.:

SERVICE **Hrs:** ________ **Date:** ______________
Stamp / Sign.:

SERVICE **Hrs:** ________ **Date:** ______________
Stamp / Sign.:

SERVICE **Hrs:** ________ **Date:** ______________
Stamp / Sign.:

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Stamp / Sign.:

DELIVERY **Hrs:** ________ **Date:** ____________
Stamp / Sign.:

Fill in the boxes according to the maintenance performed on the dump truck

serial no.:

SERVICE **Hrs:** ________ **Date:** ____________
Stamp / Sign.:

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Stamp / Sign.:

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Stamp / Sign.:

SERVICE **Hrs:** ________ **Date:** ____________
Stamp / Sign.:

HYUNDAI
CONSTRUCTION EQUIPMENT

PART NO. : 950106-03037
Printed in Norway(2022.6)