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# Operation & Maintenance Manual

**HA30**<sub>(T2;T4F)</sub> / **HA30A**<sub>(StageV)</sub>

**HA45** <sub>(T2;T3;T4F)</sub> / **HA45A** <sub>(StageV)</sub>

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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:**

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## 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 your 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.

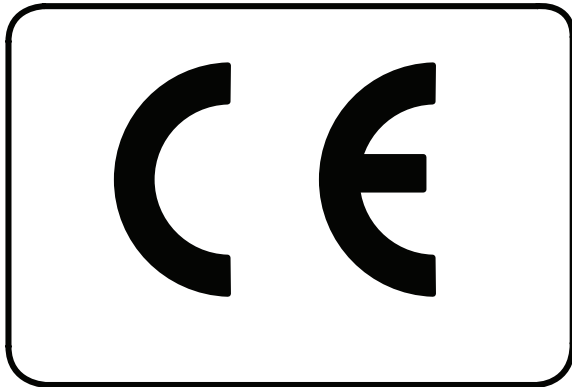
The main hydraulic pump and the emergency steering pump are attached on the transmission.

**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.**

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## 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.**

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ENGLISH



## DECLARATION OF CONFORMITY

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

### MACHINE IDENTIFICATION:

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

### 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 **XXX**dB(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:

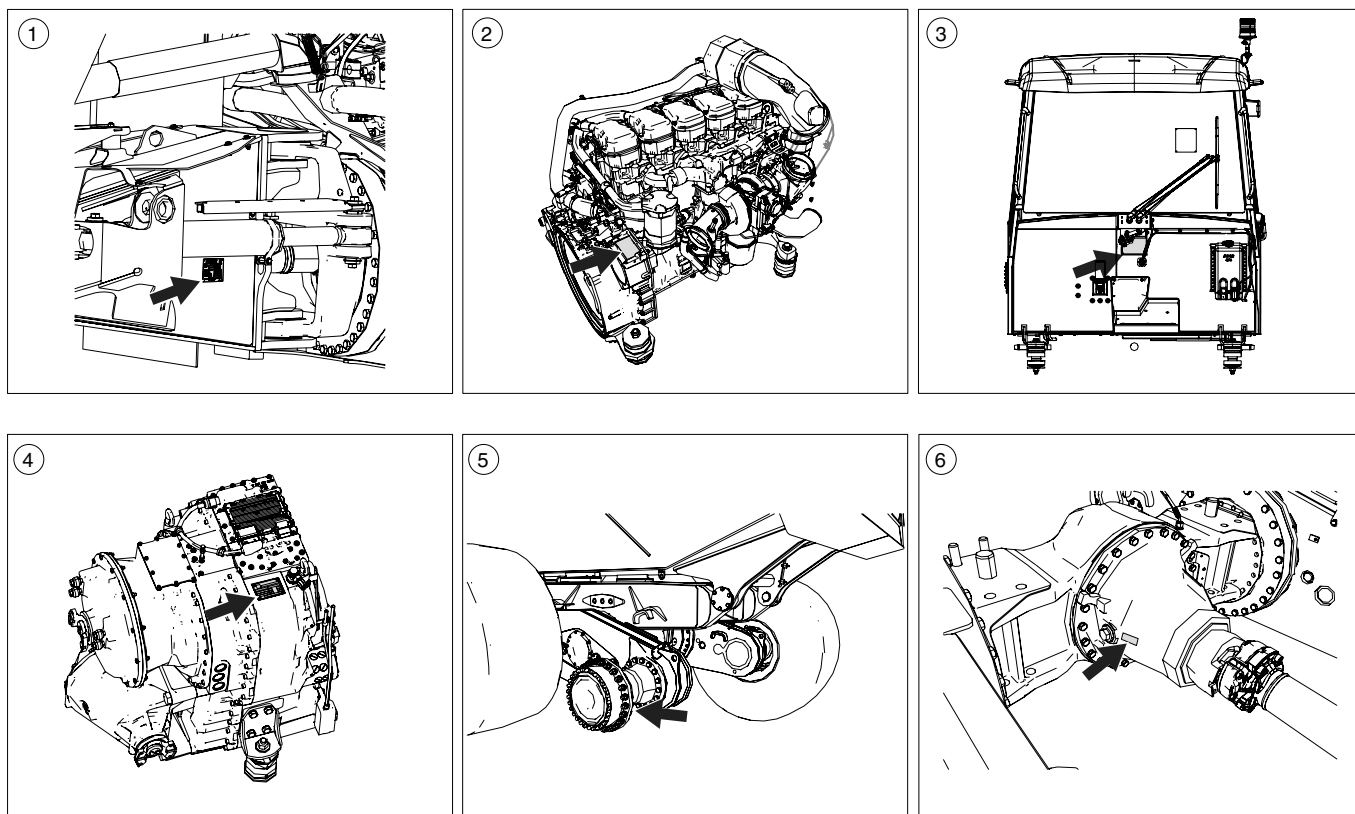
Name: **XXXXXXXX**

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 personnel 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.**

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### 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.

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### 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.**

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### 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.

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## IMPORTANT

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

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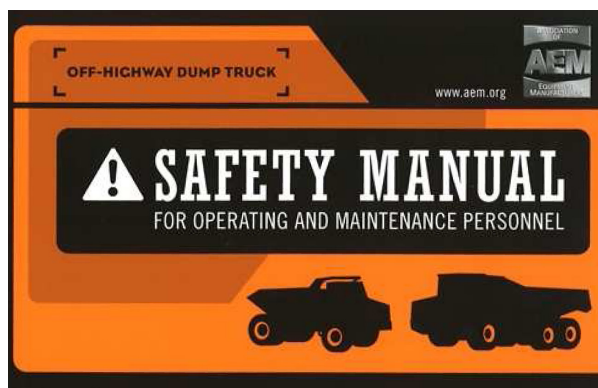
**NOTE:** The word "NOTE" identifies information for effective use.

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.

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### 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.