



Multimec MF 100 SD



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Pictures may include options and additional equipment.

INTRODUCTION



Normet Multimec system provides an innovative, multipurpose solution for logistics at mines and tunnel construction sites, allowing the operator to perform several jobs with just one machine.

Multimec MF 100 SD has a maximum payload of ten tonnes respectively. Multimec system consists of a series of cassette, each for a different purpose. With hydraulic operated cassette manipulator changing the cassette takes only couple of minutes.

The fully electric vehicle architecture (SmartDrive) includes latest Li-ion battery technology, fast charging capability, and two high-torque direct drive electric motors, which provide instant torque and efficient operation without any local emissions. Energy recuperation technology comes as a standard feature. Batteries are charged during downhill driving and deceleration which further increases total efficiency of the operation.

Maximum speed is 20 km/h. The fully reversible 4WD with high traction capability and instant torque ensures safe and sure movement in difficult ground conditions. Majority of the braking is done via electric motors recuperating energy, but the vehicle also includes efficient hydraulic dual-circuit oil immersed multi-disc brakes to provide additional braking power when it is needed.

Vehicle has an front axle suspension system, which improve safety, driving comfort and increases component lifetime.

Normet's FOPS and ROPS approved safety cabin provides superior visibility and comfortable compartment for the driver and the passenger. Cabin controls are easy and ergonomic to use, and the multifunctional display (MID) provides driving information (speed, RPM, temperatures, safety warnings & alarms etc.), which can be recorded for further analysis. The enclosed cabin and SmartDrive provide low noise level.



NorSmart 3 electric system is designed for harsh underground environment. System consists of self-extinguishing wire harnesses with tinned wires, water tight conduits and all exposed components are minimum IP65 protection class. In addition, vehicle layout allows easy access to all service points, all daily checks can be done from the ground level.

TECHNICAL SPECIFICATION

CASSETTE HANDLER

Carrying capacity 10 000 kg

ELECTRICAL SYSTEM

Main supply voltage

Power supply for the electrical functions

- 50 Hz
 - 380 V (IEC)
 - 400 V (IEC)
 - 415 V (IEC)
 - 525 V (IEC)
 - 690 V (IEC)
 - 1000 V (IEC)
 - 1000 V (AS/NZS)
- 60 Hz
 - 440 V (UL/CSA)
 - 440 V (IEC)
 - 480 V, (460 V) (UL/CSA)
 - 600 V, (575 V) (UL/CSA)
 - 1000 V (UL/CSA)

Robust and abrasion-resistant mains voltage supply cable with PUR outer sheath (excluding plug)

- 7 m cable without cable reel
- Hydraulically driven cable reel
 - No cable
 - 25 m cable

Pilot circuit

- No
- Yes

ELECTRIC MOTORS

Two direct drive permanent magnet electric motors

4-wheel drive, no separate transmission

Combined power rating 200 kW

PERFORMANCE

Max. tractive effort 99 kN

Tramming speed (horizontal) 20 km/h

Lateral gradient for tramming (continuous) 4°

Longitudinal gradient for tramming (continuous) 9°

Depending of machine configuration, lateral and longitudinal tramming gradient can temporarily be higher.

BATTERY

Li-ion battery technology

Nominal voltage 663 V

Energy content 90 kWh

Liquid cooled

Fast charging capability

BATTERY CHARGING

25-30 kW on-board 3-phase AC charging system

for up to 2.5 hours of charging time (from 0 to 80%)

CCS type 2 fast-charging socket

to charge batteries from 0-80% in up to 40 min depending on charger

NOTE: compatible CCS charging station required with type 2 plug

AXLES AND BRAKES

Dana planetary type axles

Fixed load end axle

Suspended engine end axle

Electronic braking: energy recuperation via electric motor braking

Service brake: hydraulically powered dual-circuit oil immersed multidisc brakes in both axles

Safety/Parking brake: spring applied hydraulically released fail-safe -type brake

Brake testing possible from cabin

TYRES AND RIMS

Tyres:

- Nokian Tyres 12.00-20"
- Bridgestone 12.00-20"

Rims:

- Standard rims
- NDT inspected rims

STEERING

Orbitrol type hydraulic frame steering

Frame articulation +/- 42°

HYDRAULIC SYSTEM

Hydraulic oil tank capacity 145 l
Variable displacement pump system for carrier:
200 bar, 100 l/min

24 VDC ELECTRICAL SYSTEM

2 x 12 V deep cycle batteries
24 V battery charger (DC/DC converter)
LED driving and indicator lights
LED work lights
LED side lights
Warning LED light:
Color
• Amber
◦ Blue
◦ Red
◦ Green (n/a with rotating light pattern)
◦ White (n/a with rotating light pattern)
Light pattern
• Strobe
◦ Rotating

DRIVER'S COMPARTMENT

Enclosed 2-operator cabin FOPS/ROPS approved
Air conditioning and heating
Driver's seat and seat belt:
• Air suspended T-back seat with 3-point seat belt
◦ Air suspended heavy duty seat with 3-point seat belt
Passenger's seat:
• T-back seat with 3-point seat belt
◦ Heavy duty seat with 3-point seat belt
◦ 2 person seat with fixed lap seat belts
Cabin door interlock switches with safety brake application

MACHINE CONNECTIVITY

• Machine connectivity hardware (WLAN/3G/4G/LTE)
◦ Data lifetime license (Include connectivity hardware)
◦ Analytics lifetime license
(Include connectivity hardware and data lifetime license)

TECHNICAL DOCUMENTATION

Standard documents:

Instruction manuals, hard copy 2 pcs:

- English
- Russian
- One of destination EU languages

Spare parts manuals, hard copy 2 pcs:

- English
- Russian

PDF manuals on USB-stick 2 pcs, includes instruction and spare parts manuals

Additional documentation:

- Extra hard copies of manuals
- Extra PDF manuals
- LinkOne WebView electronic manuals
- Other than standard language manuals

OTHER

Dry chemical fire extinguisher system

Ansul A-101:

- Checkfire 110
- Checkfire 210

Powder extinguisher:

- 6 kg
- 12 kg
- Ansul Sentry

Number of extinguishers:

- 1
- 2

Painting and taping:

- Standard painting and taping
- Painting and taping according to customer specification

Reversing camera:

- 4 cameras, 4 displays
- 7 cameras, 4 displays. OACR/VCR system recording device with 72 h memory (4 recorded cameras)

Electric pump for brake release

Text labels in:

- En/Ru/One of destination EU languages
- Other language

Measurements:

- Noise
- Vibration

ACCESSORIES

PROCESS PRODUCTIVITY

- Hydraulics for mixer cassette
- Hydraulic front support legs

CARRIER PRODUCTIVITY

- Accessories for enclosed cabin:
 - Two-piece windscreen
 - Sliding rear window for driver's side
 - Audio system
 - Heated mirrors
- 12 V, 20 A power supply in cabin with socket and connector
- Drive battery coolant heater with interior heater and 24 VDC battery charger (230 V)
- Fluid evacuation panel with sampling points
- Automatic lubrication system
- Spare rim and tyre
- Toolbox and maintenance tools
- Interior cooling fan
- Wax tape for electric connectors

SAFETY

- Cabin door puddle lights
- Extra warning LED light
 - Color
 - Amber
 - Blue
 - Red
 - Green (n/a with rotating light pattern)
 - White (n/a with rotating light pattern)
 - Light pattern
 - Strobe
 - Rotating
- Direction lights (left/right)
 - Green/Red
 - Red/Green
- Extra warning LED light with battery backup
 - Color
 - Amber
 - Blue
 - Red
 - Green (n/a with rotating light pattern)
 - White (n/a with rotating light pattern)
 - Light pattern
 - Strobe
 - Rotating
- Seat belt interlock switch applies safety brake
- Front and rear grounding straps
 - Flat cable
 - Chain
- Redundant brake monitoring system
- Methane monitoring system
- Protection guards for tunnel curtains
- Tyre pressure indicators
- Warning triangles
- Flashlight with charger
- Hearing protectors
- Wheel chocks with brackets

SERVICES

NORMET SERVICES

Our services cover the whole life cycle of your equipment. They include start-up and commissioning, genuine spare parts, upgrades & modifications, and remanufacturing, as well as rental and leasing offerings, and field services. We also offer improvement services such as operator training and process audits.

SPARE PARTS

Genuine parts from Normet Services ensure that you always have the highest quality parts available to keep your equipment up and running. Depending on your needs, we can offer everything from individual parts to complete parts contracts, and our professionals around the world have the experience to ensure that you have the parts you need when you need them.

Initial spare parts package:

Available for 1000h of use*. Includes periodical service, most common wearing parts and most critical safety parts.

Spare parts packages made for customer needs:

Available based on hours of use*. Includes periodical service, most common wearing parts and most critical safety parts.

* Recommendations are based on average hours – can vary a lot depending on work site conditions.

UPGRADES AND MODIFICATIONS

Our Upgrades and Modifications services are designed to ensure the economical, efficient and purposeful performance of your equipment over its entire life cycle. A service provided by a reliable OEM like Normet ensures the safety and performance of your equipment. Normet Upgrades and Modifications save you both time and money, while delivering the high quality you expect from us.

SERVICE CONTRACTS



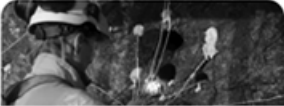

With a service agreement, Normet manages your fleet with guaranteed availability and agreed costs, giving you transparency for your life cycle costs, annual operational budget and fleet uptime. This lets you focus on your core operations. Each service agreement is built and customized to meet the individual customer's needs from our portfolio of services. Depending on the level of service agreement you need, you can choose anything from basic technical support for an individual machine all the way up to services for your entire fleet, as well as process performance. The service levels we offer are:

- Parts Availability
- Fleet Support
- Fleet Availability
- Process Performance

The content of a service level can be tailored to meet your particular requirements.

TRAINING SERVICE

Our Training Services are available for you and your operators throughout the equipment lifecycle and they include:

				
	Operation & Maintenance	Spraying	Charging	Scaling
ADVANCED	Advanced fault diagnostics & troubleshooting	Concrete chemicals, testing and preparing for EFNARC-certificate test	-	-
INTERMEDIATE	Troubleshooting training Foundations of electrics, hydraulics and mechanics NorSmart	Advanced training in concrete spraying Economics of concrete spraying	Advanced training in explosives Economics of charging	Advanced training in scaling Economics of scaling
BASIC	Operation and Maintenance Training Basic Product Training	Basic understanding of concrete spraying	Basic understanding of charging	Basic understanding of scaling
LEVEL	SERVICE	PROCESS KNOWLEDGE		

START-UP AND COMMISSIONING

1. OPERATOR TRAINING

	Start-up training	Commissioning
1.1 Classroom training		
General introduction and operation of machine	Basic	No classroom training included in commissioning
Safety instructions	Basic	
Use of manuals	Basic	
Technical introduction of equipment	Basic	
Hands-on service and pre-operation checks	Basic	
Controls and driving (starting, driving, stopping, parking)	Basic	
1.2 Practical training		
Pre-operation checks	Basic	Introduction
Driving, starting, stopping, parking	Basic	Introduction
Preparing the machine for specific operation conditions	Basic	Not covered
Operation	Basic	Introduction
Washing the machine	Basic	Introduction
Troubleshooting	Basic	Basic

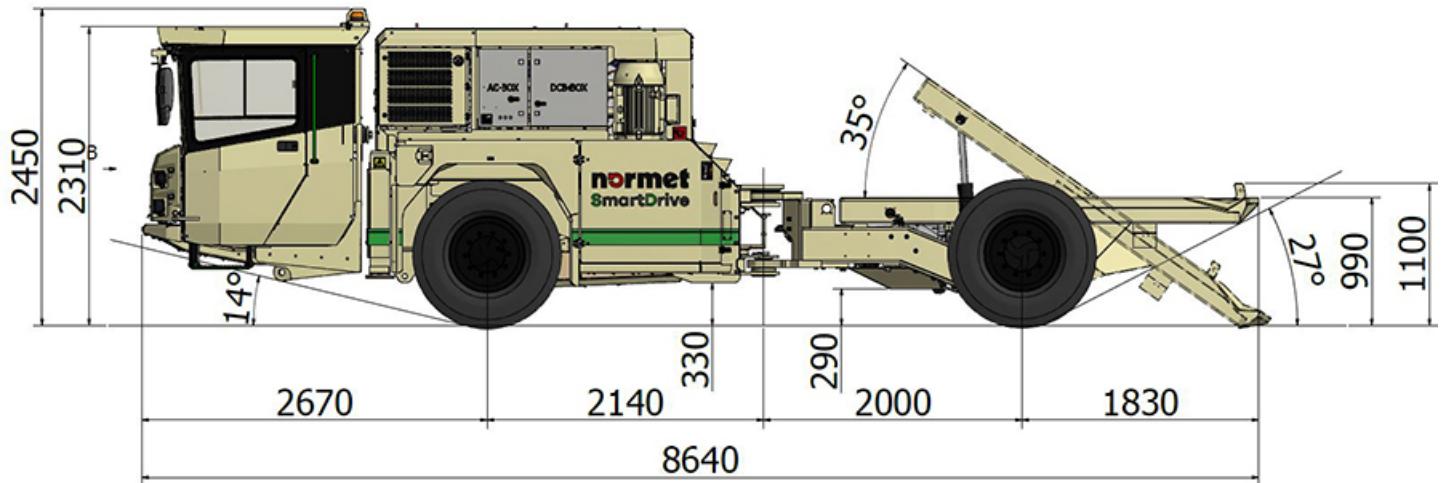
2. MAINTENANCE AND REPAIR TRAINING

General operation of machines	Basic	Introduction
Symbols of drawings and codes	Basic	Not covered
Understanding hydraulic and electric schematics	Basic	Introduction
Control systems	Basic	Introduction
Function of main components (depending on equipment)	Basic	Introduction
Locations of components in the machine	Basic	Not covered
Periodical maintenance	Basic	Introduction
Troubleshooting	Basic	Not covered
Use of manuals	Basic	Introduction
Connection of hydraulic and electrical equipment	Basic	Not covered

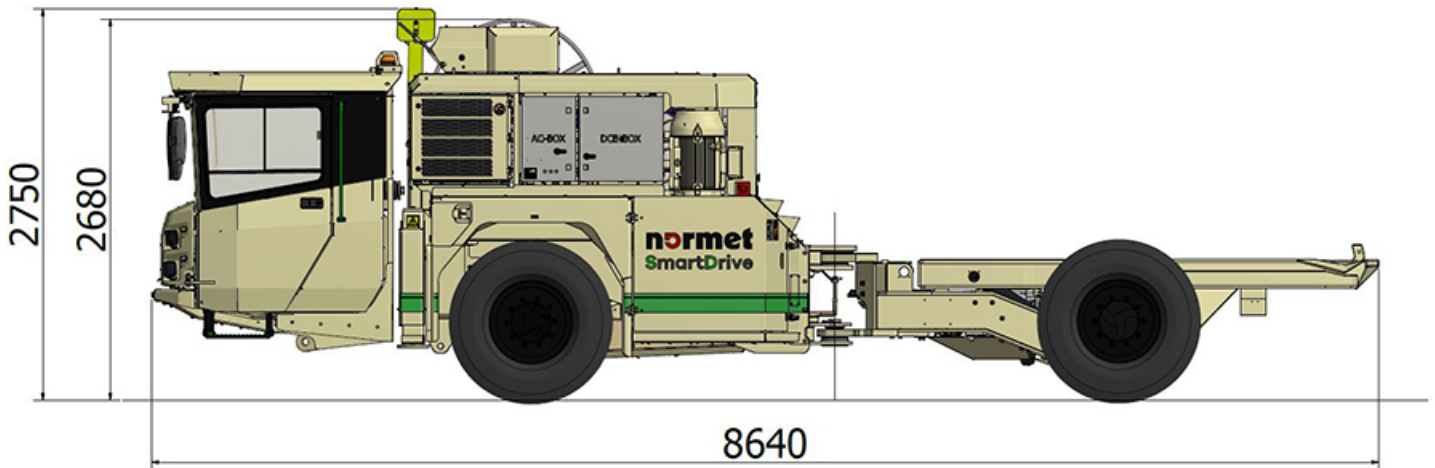
DIMENSIONS

Length	8640 mm	Track	1670 mm
Width	2040 mm	Ground clearance as shown	330 mm
Height	2450 mm	Turning radius outer	6610 mm
Wheel base	4140 mm	Turning radius inner	4350 mm

SIDE VIEW – BASIC MACHINE



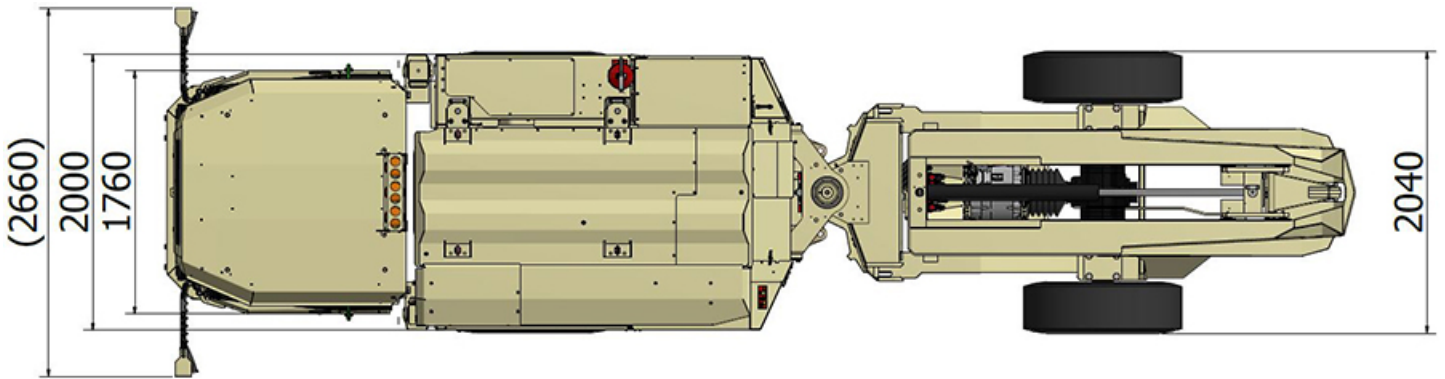
SIDE VIEW – MACHINE WITH OPTIONS



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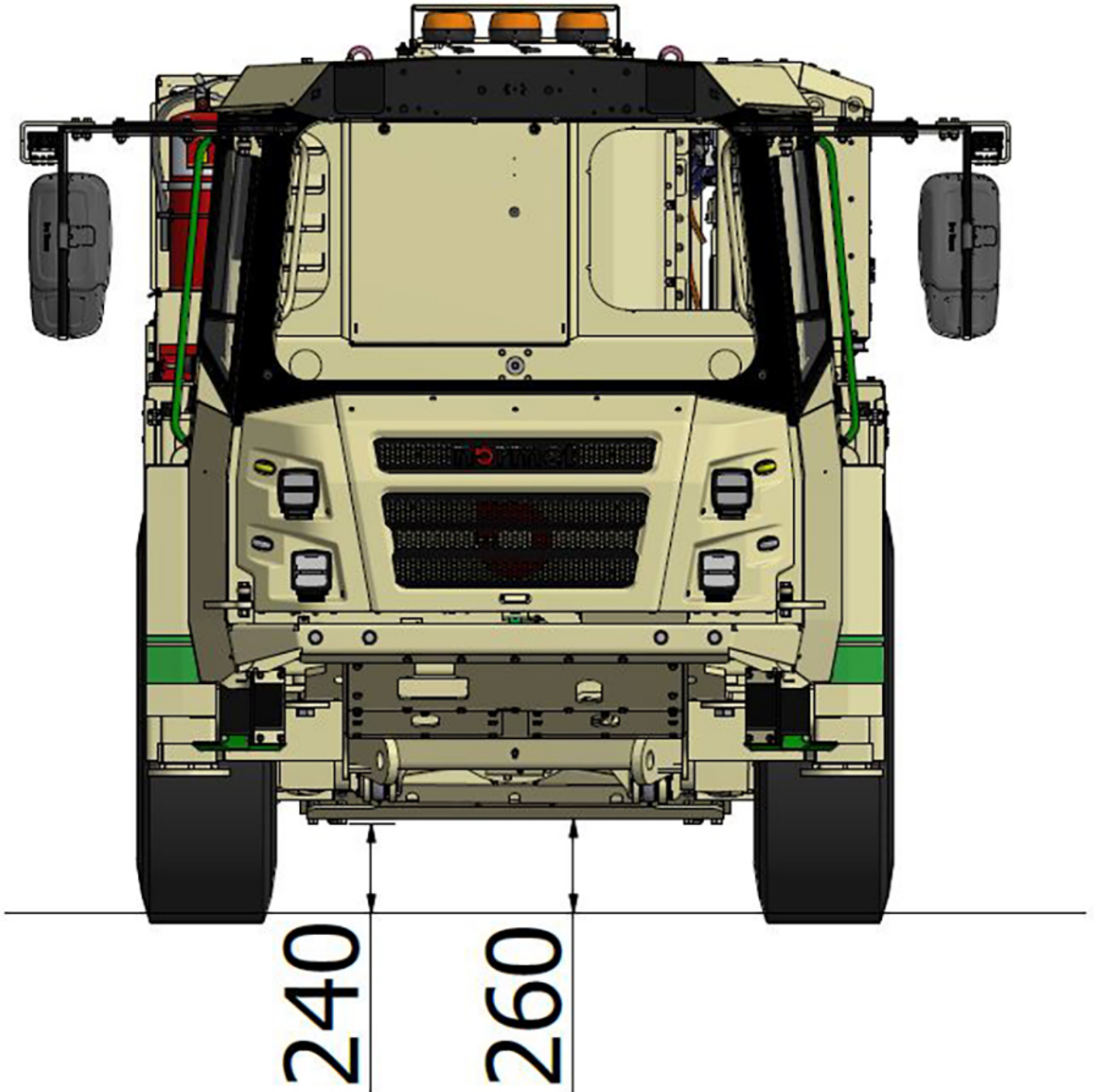
TOP VIEW



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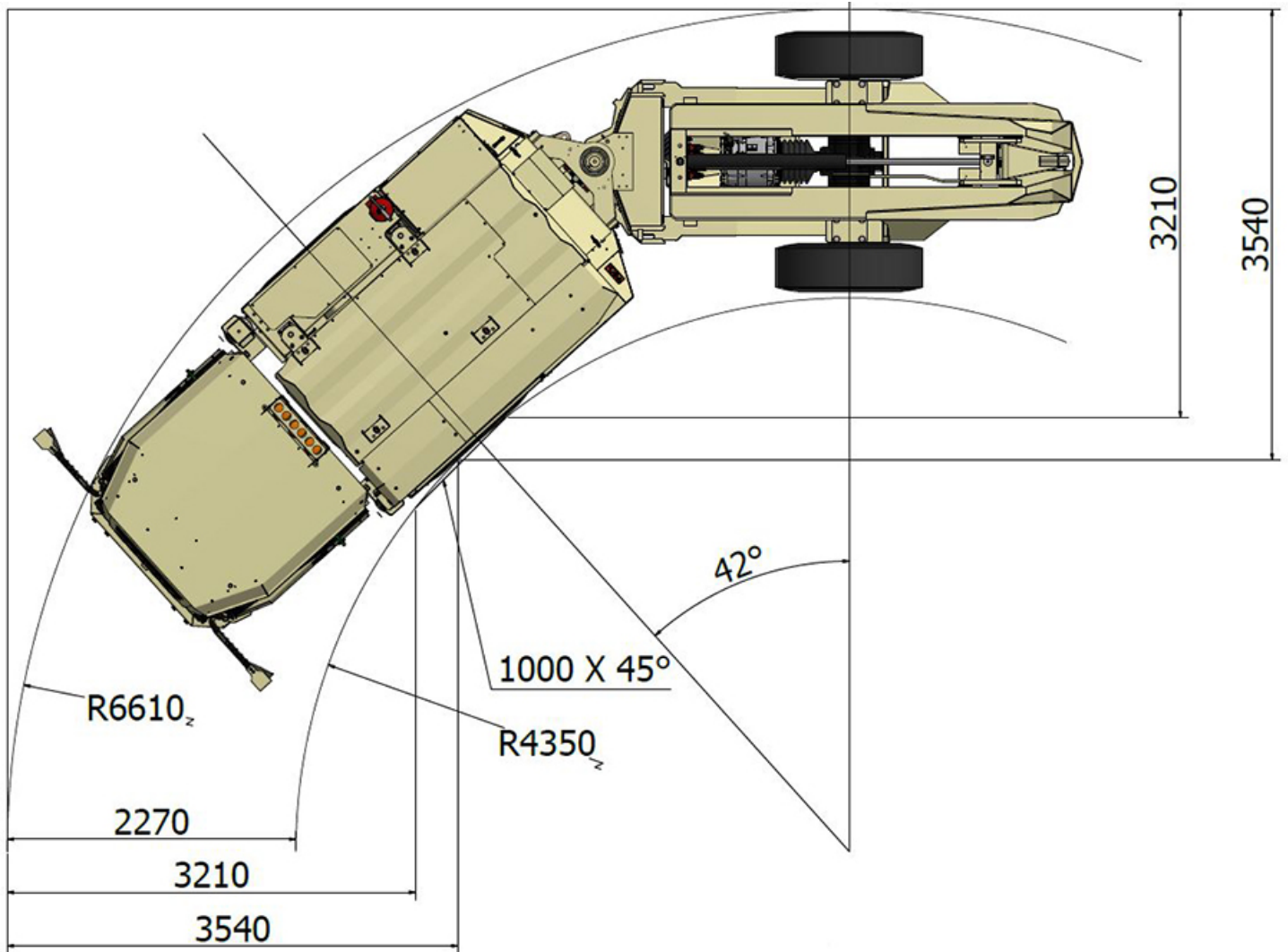
FRONT VIEW



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TURNING RADIUS



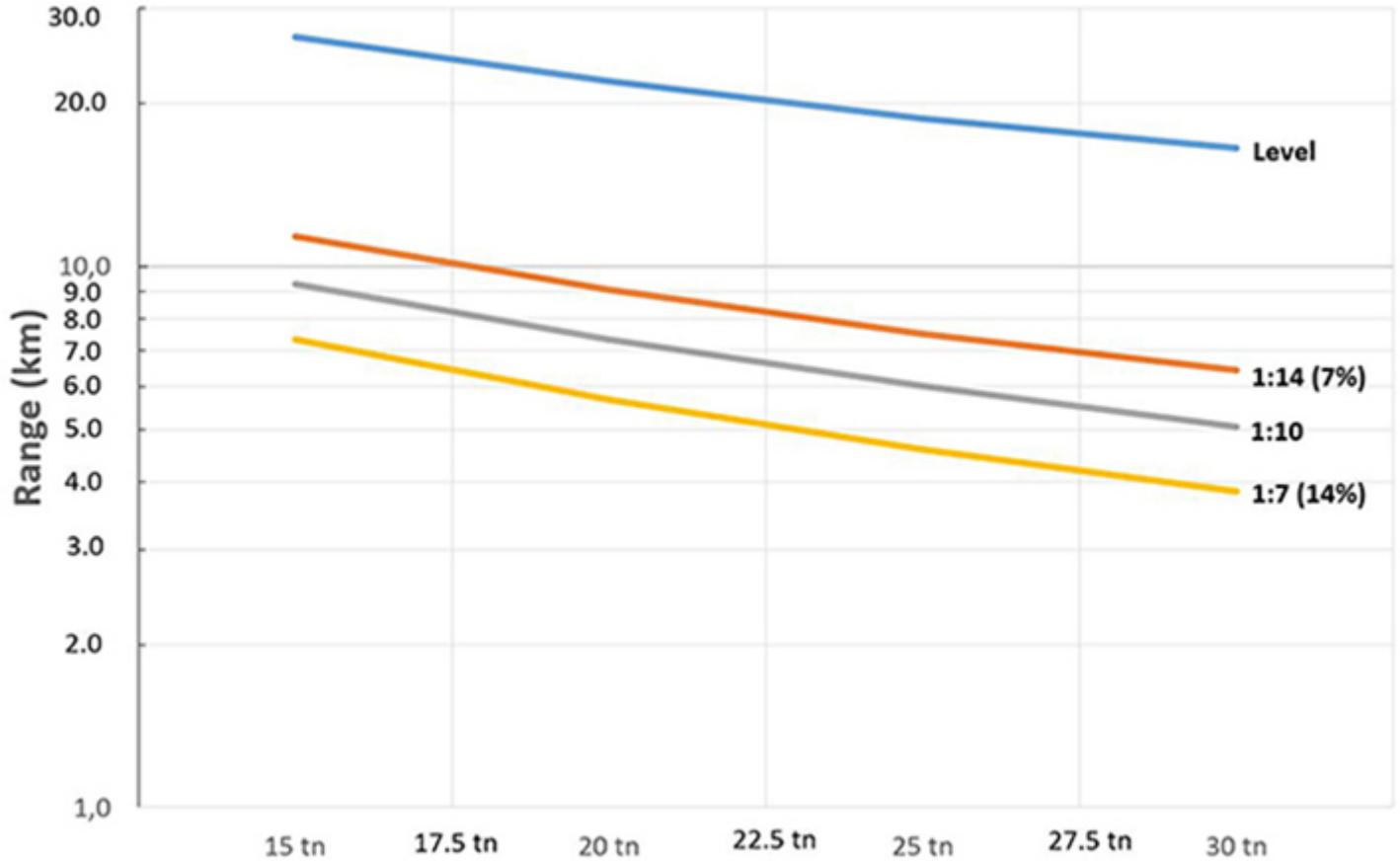
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DRIVING RANGE AND TRACTIVE EFFORT

DRIVING RANGE

Driving range curve: DOC060017

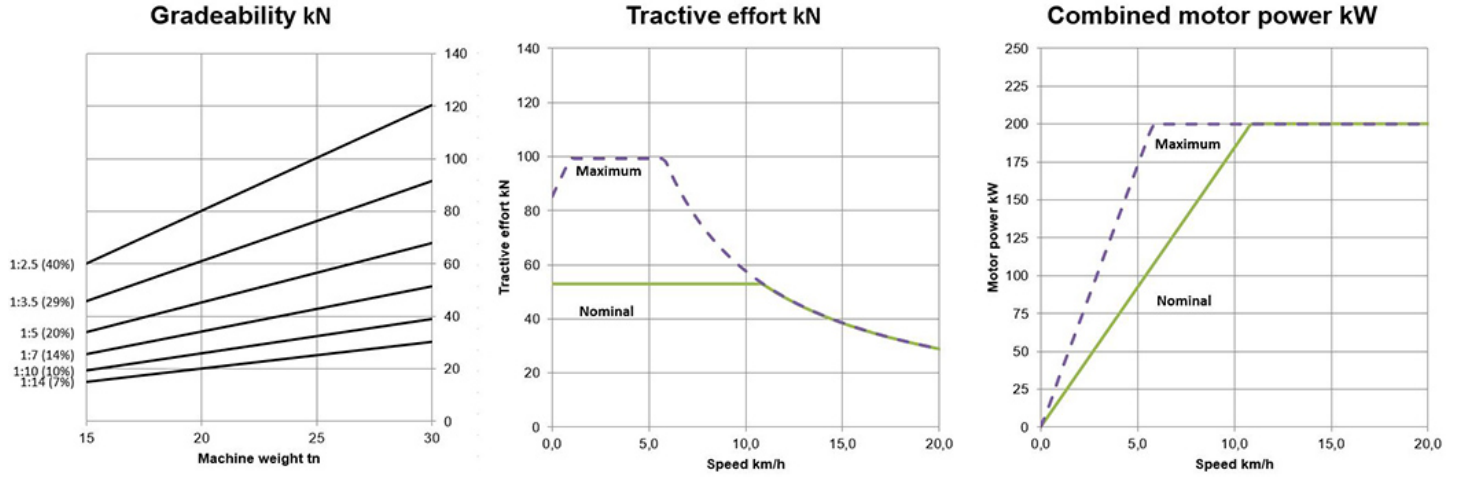


OPERATING WEIGHT

Empty	13 000 kg
Fully loaded	23 000 kg

TRACTIVE EFFORT

Performance curve: DOC05935



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