



Charmec MF 050 D Robot



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this specification without further notice

Pictures may include options and additional equipment.

INTRODUCTION

Charmec MF 050 D Robot is dedicated product for underground stoping in cases where mechanization of charging work and operating safety are highlighted as well if basket boom does not fit to narrow charging of upholes.



Charging boom radio control and open load end to accommodate up to 6-ton total weight bulk emulsion systems enables highest productivity and operating safety.

SAFETY AND USABILITY

Vehicle has an optional front axle suspension system, which improve safety, driving comfort and increases component life-time.

Normet's FOPS and ROPS approved safety cabin provides superior visibility and comfortable compartment for the driver and the passenger (flap seat). 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. Standard enclosed cabin provides low noise level ensuring safe and comfortable driving.



Emulsion charging system is designed to be safest possible having given extra care to electric current groundings and fire safety.

Two handheld fire extinguishers are standard and fire suppression system for diesel engine is automatic or manual having actuating points in all operating places.

Electric system is designed for harsh underground environment. System consists of self-extinguishing wire harnesses with tinned wires, watertight 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.

POWER TRAIN

M-series units have powerful 4-cylinder liquid cooled turbo-charged engines, which power range is between 110-121 kW, depending of the selected engine model. Available emission standards are Tier 3 / Stage IIIA and Stage V that provide clean and efficient operation.

Machine is equipped with Dana hydrodynamic transmission and planetary type axles which have hydraulically powered dual-circuit oil immersed multidisc service brakes. Moreover, axles have spring applied hydraulically released fail-safe -type parking/safety brake.

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PRODUCTIVITY

Agile charging manipulator boom is easy and fast to operate and has kinematics and reach to operate full 360-degree stoping round. Foldable telescopic boom structure enables to pick primer from ground and erect it to upholes without need of climb on top of boulders exposing operators to accidents.

TECHNICAL SPECIFICATION

CHARGING BOOM

FOLDABLE TELESCOPIC BOOM SB 500 B

Boom construction enables best possible production charging coverage for up- and down holes.

Boom tip rotation and tilt makes possible to reach full 360° access parallel to each borehole.

Boom radio control with cable back up provides reliable and ergonomic operation.

Boom working range:

Lateral uphole reach in 6 meter high tunnel	8.4 m
Lateral downhole reach	9.5 m
Vertical reach	8.5 m

CHARGING SYSTEM

Process platform on rear end of unit

Inner dimensions	2500 x 2000 mm
Max. load	6000 kg

Center of gravity shown in the dimensional picture

- Readiness for external emulsion unit according customer specification

Load end side compartment:

- Toolbox
- Detonator box with antistatic rubber lining

ENGINE AND TRANSMISSION

- **Deutz TCD 2013 L4, 120 kW/2300 rpm, Tier 3 / Stage IIIA approved**

Exhaust system for Deutz engine:

- Catalytic exhaust gas purifier and muffler
- Diesel particulate filter (DPF)

Fuel tank capacity 110 l

Dana 24000 series powershift transmission

3 speeds forward and reverse
4-wheel drive
Manual gear selector

- **Mercedes-Benz OM 904 LA, 110 kW/2200 rpm, with engine & exhaust brakes, Tier 3 / Stage IIIA approved**

Exhaust system for MB engine:

- Catalytic exhaust gas purifier and muffler
- Diesel particulate filter (DPF)

Fuel tank capacity 110 l

Dana 24000 series powershift transmission with lock-up

3 speeds forward and reverse
4-wheel drive

Gear selector:

- Manual
- Automatic

- **Cummins B4.5, 121 kW/2500 rpm with exhaust brake, Stage V approved**

Requires diesel exhaust fluid (DEF) and Ultra-low sulphur diesel (ULSD)

Diesel particulate filter (DPF)

Selective catalytic reduction (SCR)

DEF tank capacity: 19 l

Fuel tank capacity: 105 l

Dana 24000 series powershift transmission with lock-up

3 speeds forward and reverse
4-wheel drive

Gear selector:

- Manual
- Automatic

PERFORMANCE

Tramming speed (horizontal):

Deutz	26 km/h
Mercedes-Benz	28 km/h
Cummins	28 km/h

Lateral gradient for tramming (continuous) 4°

Longitudinal gradient for tramming (continuous) 9°

Lateral gradient for operation 4°

AXLES AND BRAKES

Load end axle:
Dana 123 series fixed

Engine end axle:
Dana 123 series

- +/- 8° oscillation and hydraulic lock
- Hydro-pneumatic suspension and +/- 8° oscillation

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

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

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 +/- 40°

HYDRAULIC SYSTEM

Variable displacement pump system 190 bar at 2200 rpm:

- Single pump for carrier and process 135 l/min
- Separated pumps for carrier 95 l/min and for process 135 l/min

Hydraulic oil tank capacity 110 l

REMOTE CONTROL SYSTEM

Wireless remote control with 10 m cable backup for charging boom control, charging and hose feeding functions.

Charging hose length and speed information in remote display with language and brightness adjustment.

24 VDC ELECTRICAL SYSTEM

Main switch:

- Mechanical switch in battery box
- Electric switch with control in cabin and service switch in battery box
- Electric switch with control in cabin, start isolator and service switch in battery box

LED driving and indicator lights

LED work lights on cabin roof

LED work and reversing lights

LED work light

LED side lights (left/right):

- White / White
- Green / Red
- Red / Green

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

Driver's seat and seat belt:

Enclosed cabin FOPS/ROPS approved

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

Seat belt safety interlock for driver:

- Warning indicator in display
- Safety brake application

Wall mounted foldable seat for co-driver with retractable lap seat belt

Front facing throttle and brake pedals

Cabin door interlock switch with safety brake application

Puddle lights under door steps, on the side of the cabin

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

Powder extinguisher:

- 12 kg
- Ansul Sentry

Number of extinguishers:

- 2
- 3

Painting and taping:

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

Front and rear grounding straps:

- Flat cable
- Chain

Text labels in:

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

Measurements:

- Noise
- Vibration
- Emissions

ACCESSORIES

PROCESS PRODUCTIVITY

- Front support legs (mandatory if hydro-pneumatic suspension is selected)
- Installation service for external emulsion charging system
 - CE-marking for installation of external emulsion charging system
- Hydraulically driven pressure washer with hose reel:

Water pressure, max.	180 bar
Water flow, max.	30 l/min
Hose length	20 m

 - Standard pressure washer
 - Stainless steel reel and rod

CARRIER PRODUCTIVITY

- Accessories for enclosed cabin:
 - Audio system
 - Air conditioning with heating
 - Heated mirrors
- 12 V, 18 A power supply in cabin with socket and connector
- Deutch connector for 24 V, 10 A for external power supply
- Auto engine shutdown during idling
- Engine shutdown delay
- Inlet plug for jump start
- Block heater with interior heater and battery charger 230 V (Interior heater available with enclosed cabin)
- Block heater with interior heater, battery charger and filter heaters 400 V (Interior heater available with enclosed cabin)
- Fuel operated pre-heater
- Fast fuel filling system
- Pump for filling of hydraulic tank
 - Hand pump
 - Electric pump
- Fluid evacuation panel with sampling points
- Reversing camera
 - 1 camera, 1 display
 - 1 cameras, 1 display. OACR/VCR system recording device with 72 hour memory
 - 3 cameras, 2 displays. OACR/VCR system recording device with 72 hour memory
- Spare rim and tyre
- Toolbox and maintenance tools
- Interior cooling fan
- Wax tape for electric connectors

SAFETY

- Extra warning LED light (From the options below it is possible to choose 1-2 combinations)
 - Color
 - Amber
 - Blue
 - Red
 - Green (n/a with rotating light pattern)
 - White (n/a with rotating light pattern)
 - Light pattern
 - Strobe
 - Rotating
- Fire extinguisher system
 - Dry chemical
 - Ansul A-101
 - Manual
 - Automatic, Checkfire 110
 - Liquid agent
 - Fogmaker (Automatic)
- Highest gear locked out
- Pump for brake release
 - Electric pump
 - Hand pump
- Redundant brake monitoring system
- Hydraulic pressure monitoring kit
- Methane monitoring system
- Protection guards for tunnel curtains
- Tyre pressure indicators
- Additional wide angle mirrors (n/a with heated mirrors)
- Warning triangles
- Flashlight with charger (n/a with open cabin)
- 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

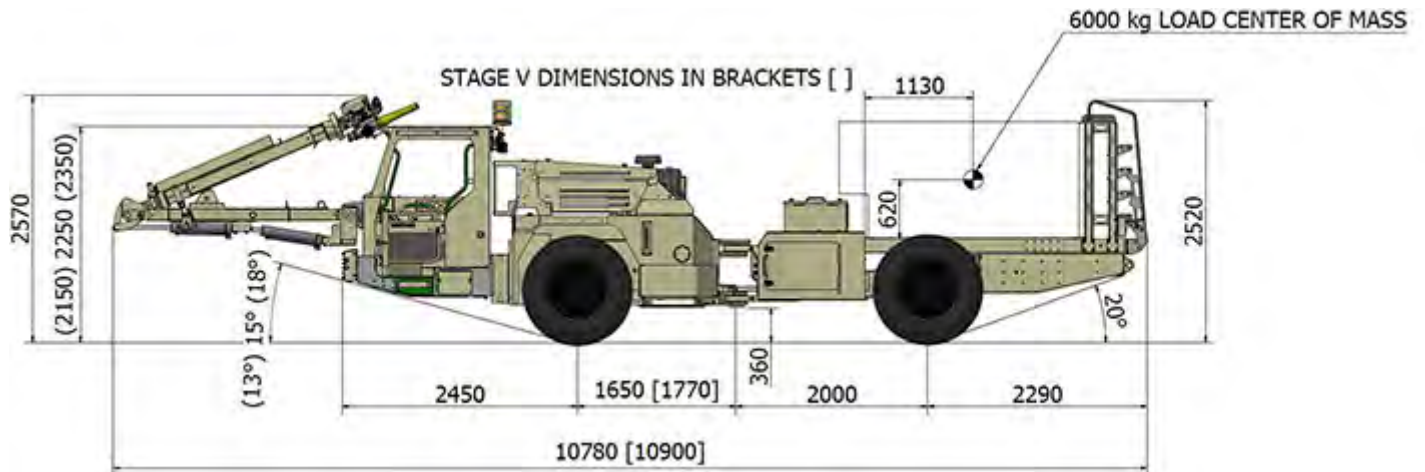
2. MAINTENANCE AND REPAIR TRAINING

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

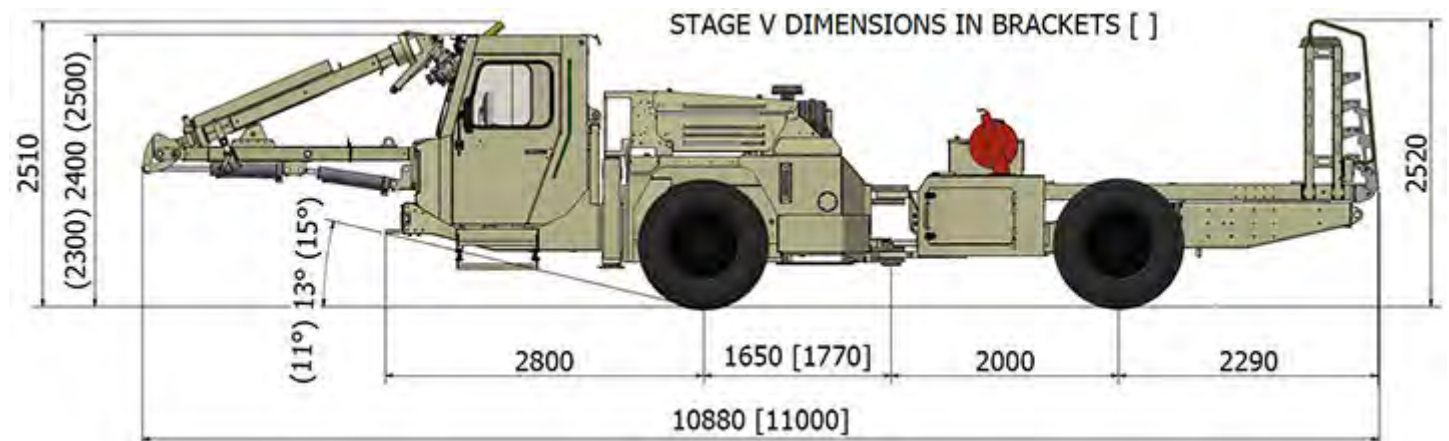
DIMENSIONS

Length	10 780 mm	Track	1670 mm
Width	2000 mm	Ground clearance as shown	360 mm
Height	2570 mm	Turning radius outer	7870 mm
Height of cabin	2250 mm	Turning radius outer (with 10° boom slew)	7600 mm
Wheel base	3650 mm	Turning radius inner	4480 mm

SIDE VIEW - BASIC MACHINE



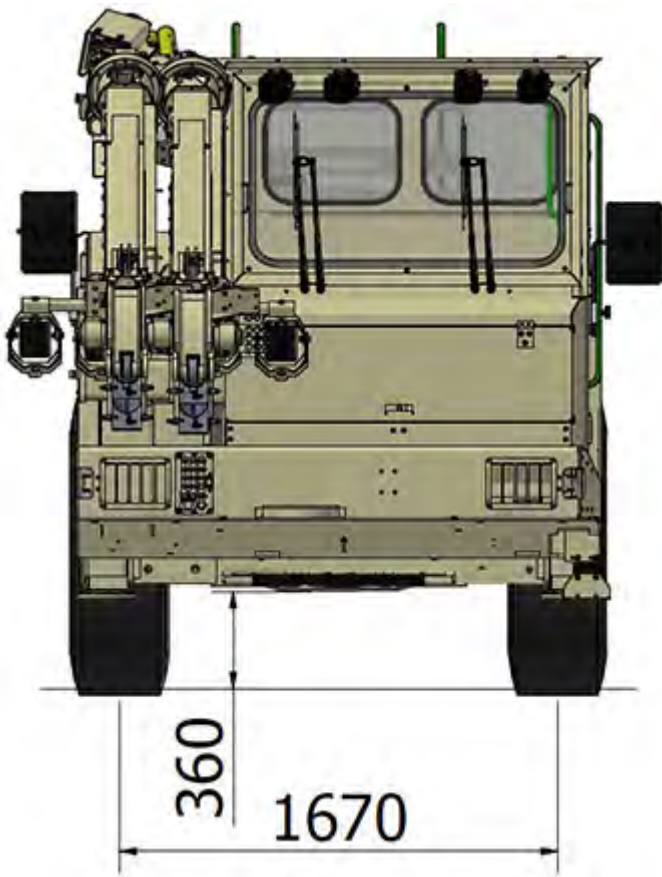
SIDE VIEW – MACHINE WITH OPTIONS



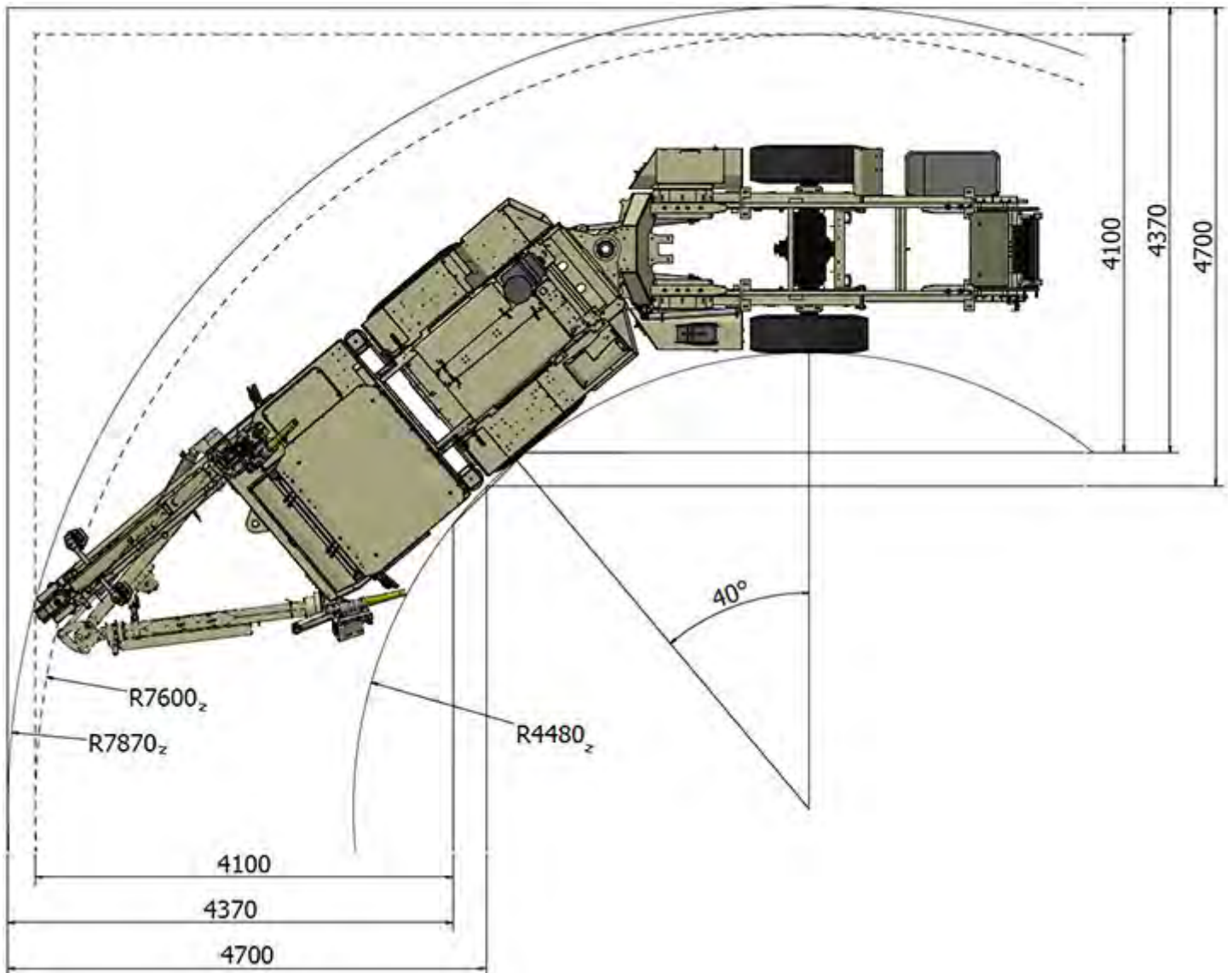
TOP VIEW



FRONT VIEW



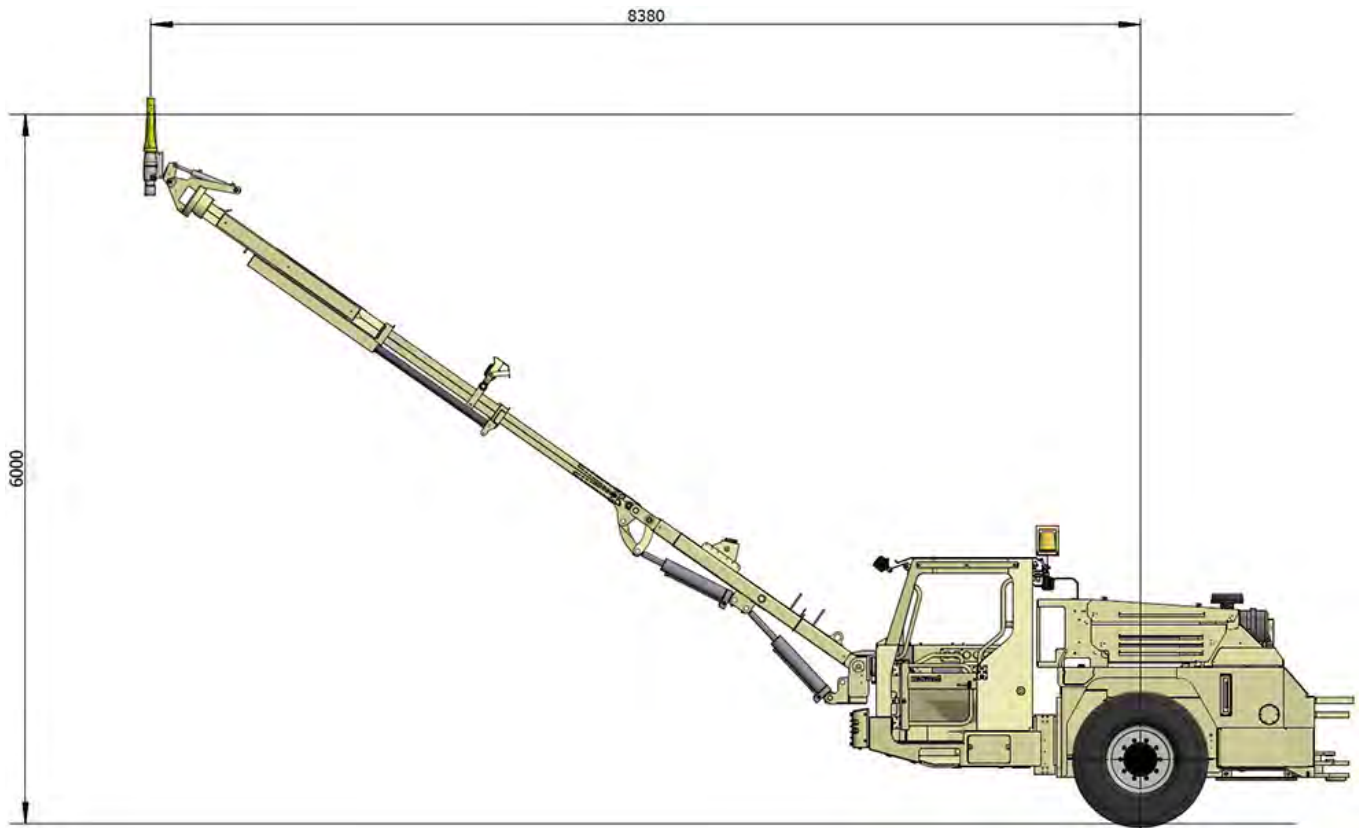
TURNING RADIUS



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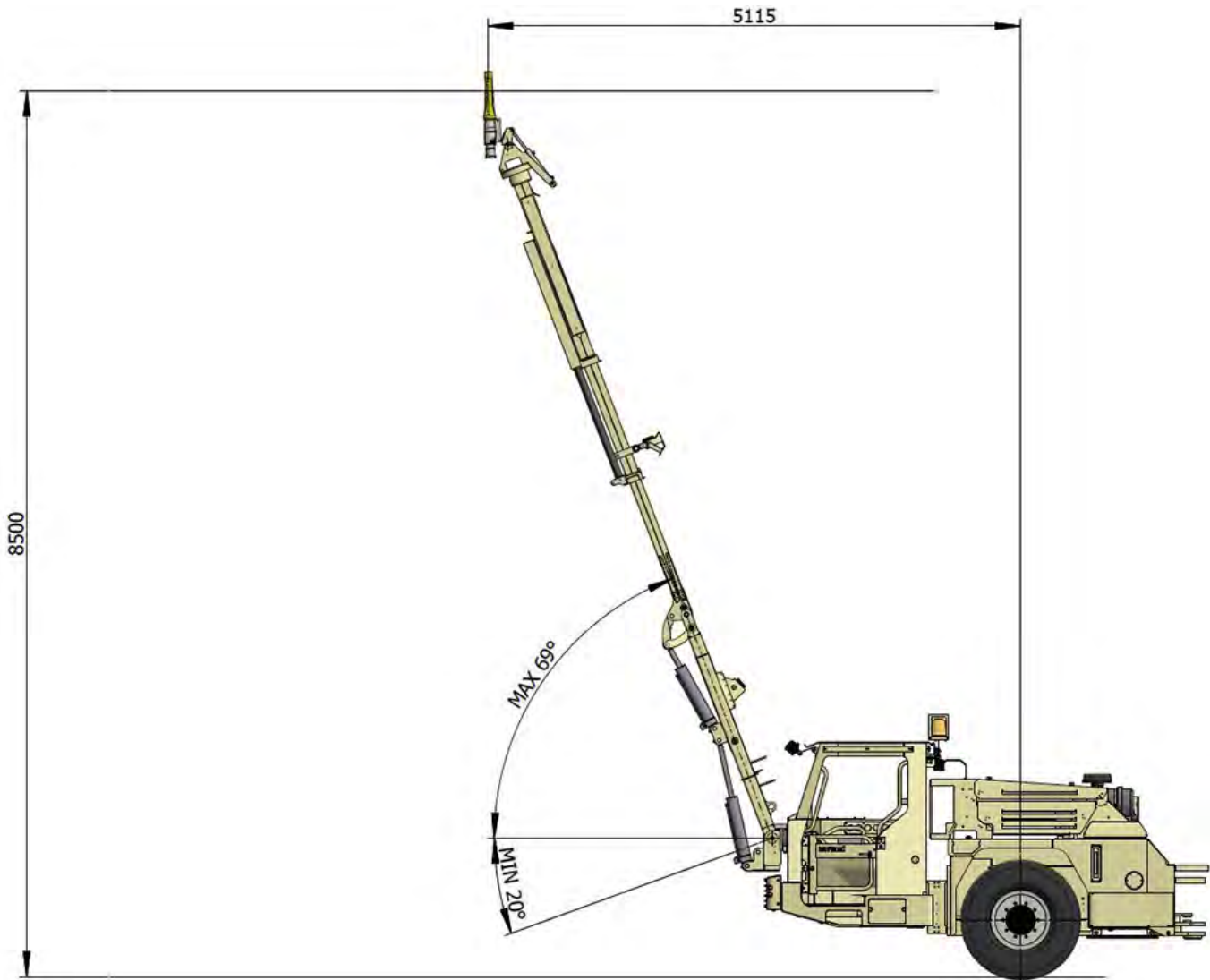
BOOM REACH - SB 500 B



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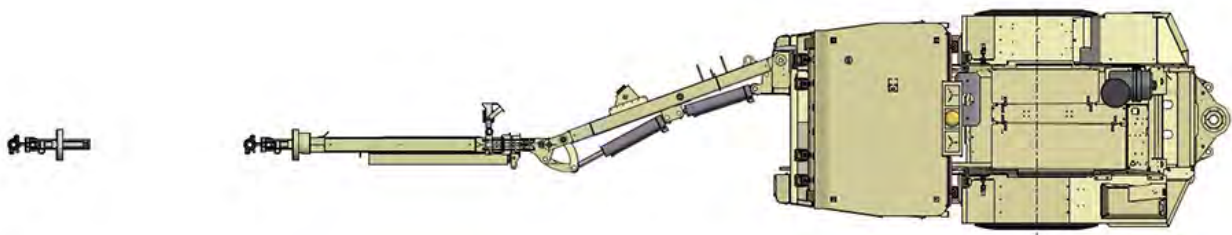
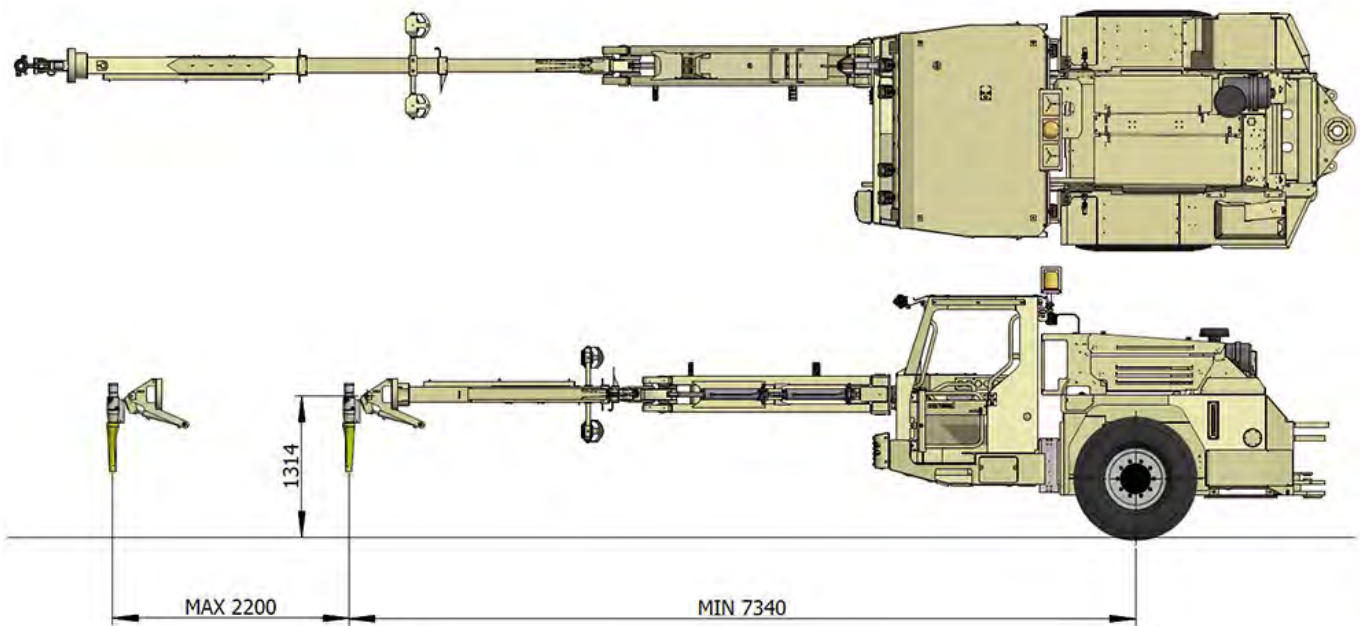
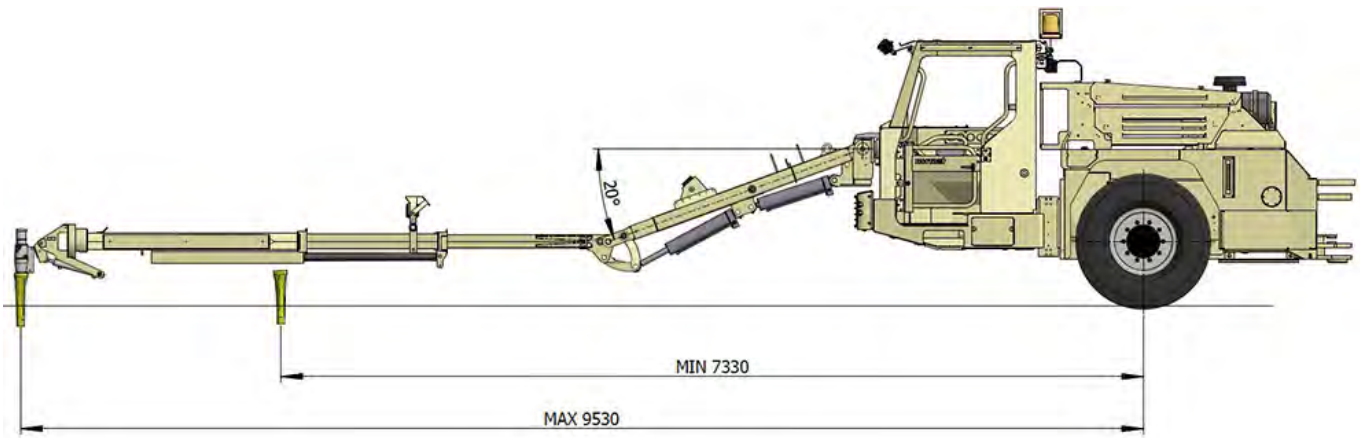
BOOM REACH - SB 500 B



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BOOM REACH - SB 500 B



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TRACTIVE EFFORTS

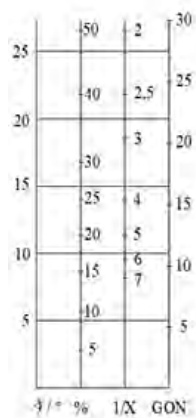
OPERATING WEIGHT

Empty	13 200 kg
Fully loaded	20 000 kg

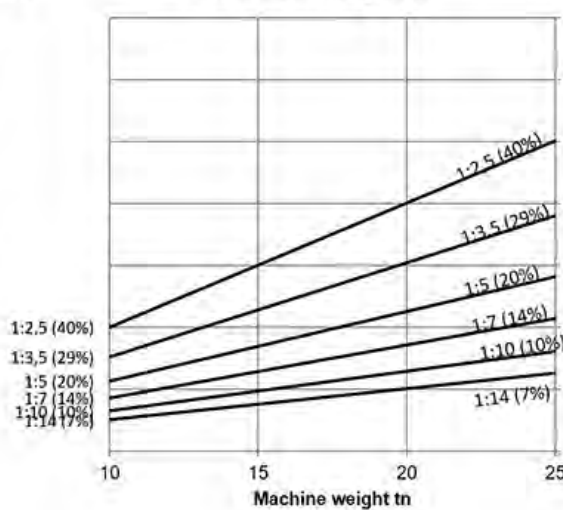
DEUTZ TCD 2013 L4, 120 KW

Performance curve DOC060005

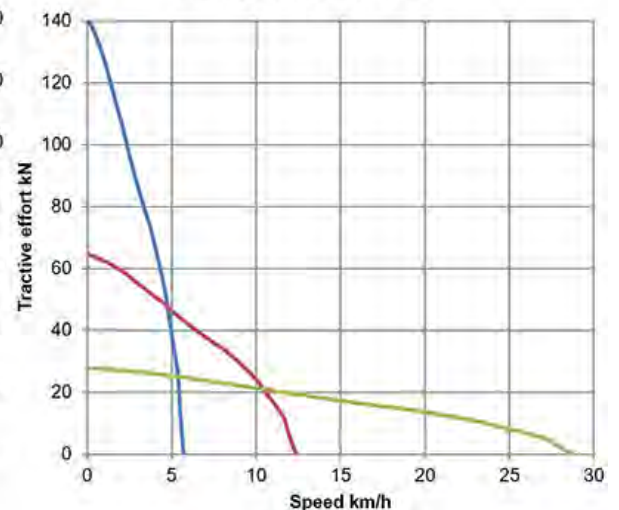
Conversion chart



Gradeability kN



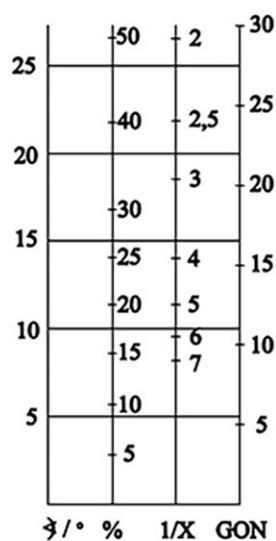
Tractive effort kN



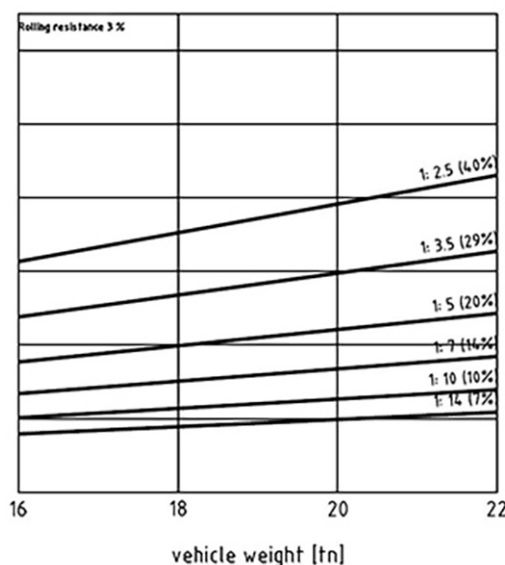
MERCEDES-BENZ OM 904 LA 110 KW

Performance curve with lock-up 100006272

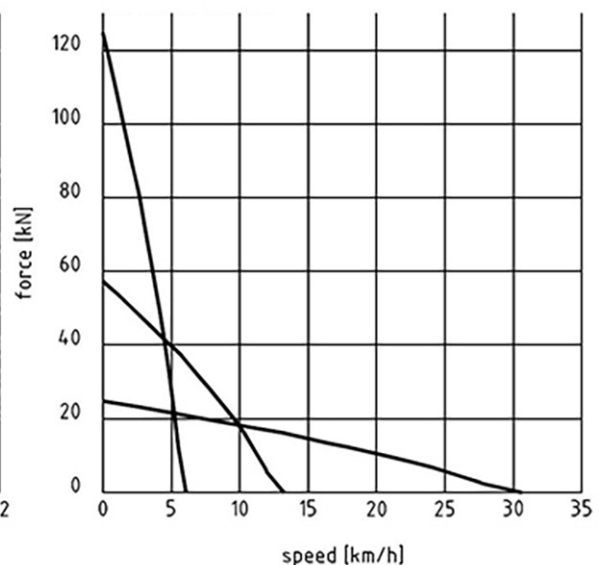
CONVERSION CHART



GRADIENT



TRACTIVE EFFORT



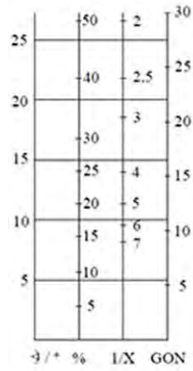
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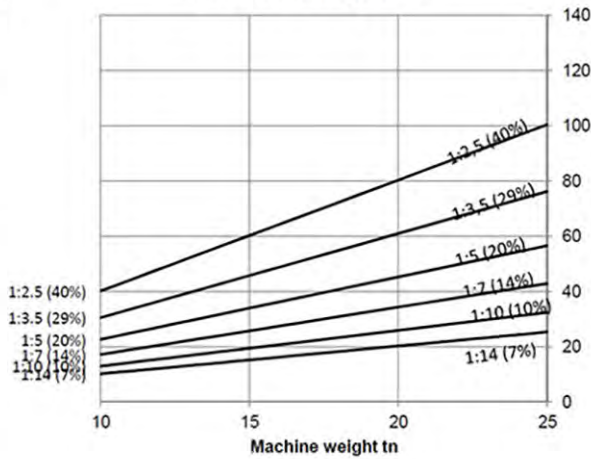
CUMMINS B 4.5 121 KW

Performance curve with lock-up DOC028557

Conversion chart



Gradeability kN



Tractive effort kN

