



Charmec MF 050 D Robot



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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 120 kW. Available emission standards are Tier 3 / Stage IIIA and Stage V that provides 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
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Dana 24000 series powershift transmission
3 speeds forward and reverse
4-wheel drive
Manual gear selector

- **Cummins B4.5, 120 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

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

- Nokian Tyres 12.00–20" with NDT inspected rims
- Bridgestone 12.00–20" with 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)
- Analytics license (includes connectivity hardware)

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
- Automatic lubrication system
- Reversing camera
 - 1 camera, 1 display
 - 1 cameras, 1 display with recording support
 - 3 cameras, 2 displays with recording support
- Spare rim and tyre
- Toolbox and maintenance tools
- Interior cooling fan
- Wax tape for electric connectors

SAFETY

- 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
- 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

Normet is committed to servicing its customers all over the world. We provide service from a single machine to an entire fleet. The Normet service offering consists of many different products from delivery of parts and training to fleet performance agreements.

More information check [normet.com](https://www.normet.com):

<https://www.normet.com/en/products-and-services>

For any questions about Normet Services contact local Normet.

<https://www.normet.com/en/contact/>

SPARE PARTS

As a leading global Original Equipment Manufacturer, we are committed to providing a complete solution to your spare parts needs. All of Normet's spare parts are manufactured to the highest possible standards to help maintain the safety and profitability of your projects. Our spare parts improve efficiency and total cost of ownership throughout your operations.

Start a carefree journey with Normet equipment by having the right selection of parts available from the beginning.

Spare part recommendation / Start-up Spare Part package:

Available for the first 2000h*: includes periodical service parts, most common wearing parts and other recommended parts. (*Recommendations are based on average hours that can vary depending on worksite conditions.)

Underground, every part is critical!

More information check <https://www.normet.com>

SERVICE AGREEMENTS

Service agreements are always customized to meet our customer needs, consisting of various Normet service products. The service solution is created together with the customer and the level of an agreement can vary with different support agreements (including e.g. parts, periodical maintenance, on-call services, and audits) up to guaranteed fleet availability or process performance (including e.g. parts, all maintenance activities, operator trainings and process audits).

Note that we can provide Digital solutions with connected equipment.

More information check [normet.com](https://www.normet.com).

TRAININGS

Training services can be tailored to your individual needs and range from equipment service training to process application training.

We offer a sustainable training path from the beginning of your operation to the execution stage of your project.

More information check [normet.com](https://www.normet.com).

COMMISSIONING

Equipment commissioning concerns **equipment familiarization**. This is included as part of Normet vehicle delivery. Safety introduction and operating basics for Normet Equipment. Review of Normet user and spare parts manuals. Hands-on equipment safety device operational training. Ensure product quality and customer satisfaction during handover.

Commissioning includes machinery handover to customers and safety operating principles without technical insights or process application training.

EXTENDED COMMISSIONING

We offer an extended training package on top of standard commissioning. Normet provides extended commissioning services that offer basic insights into maintenance manuals, periodical and daily maintenance, as well as modern operating perspectives to maximize handling efficiency. Safety-oriented training ensures reliable operations for Battery Electric Vehicles and Diesel-Driven based on your vehicle fleet. This cost-effective solution covers the essential aspects of equipment operation, safety, and maintenance schedules.

To ensure continuous and maximized safe operations with your new equipment and to expand your knowledge scale of operations, this option is the most suitable and recommended option for extending your new equipment training. This cost-effective solution covers the essential aspects of equipment operation, safety, and maintenance schedules.

UPGRADES AND MODIFICATIONS

We build our machines to last. We also understand that your needs on the ground can change - and reacting to that change makes a big difference in your productivity. Normet Upgrades & Modifications provide you with access to product improvements that meet your evolving requirements and let you stay one step ahead of the curve.

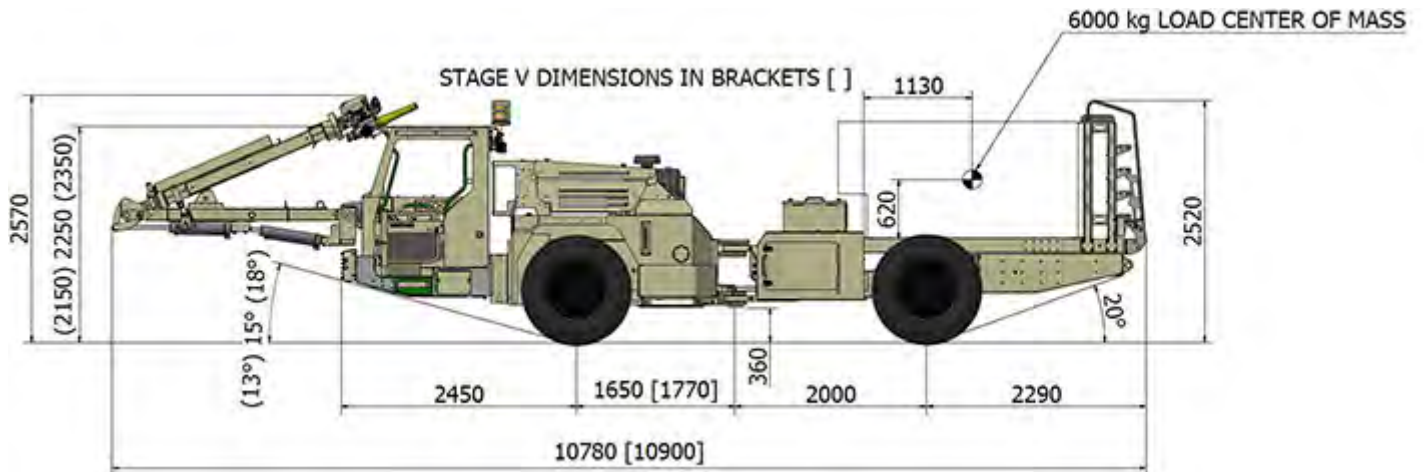
Contact your local Normet office for Upgrade offering to your fleet.

More information check [normet.com](https://www.normet.com).

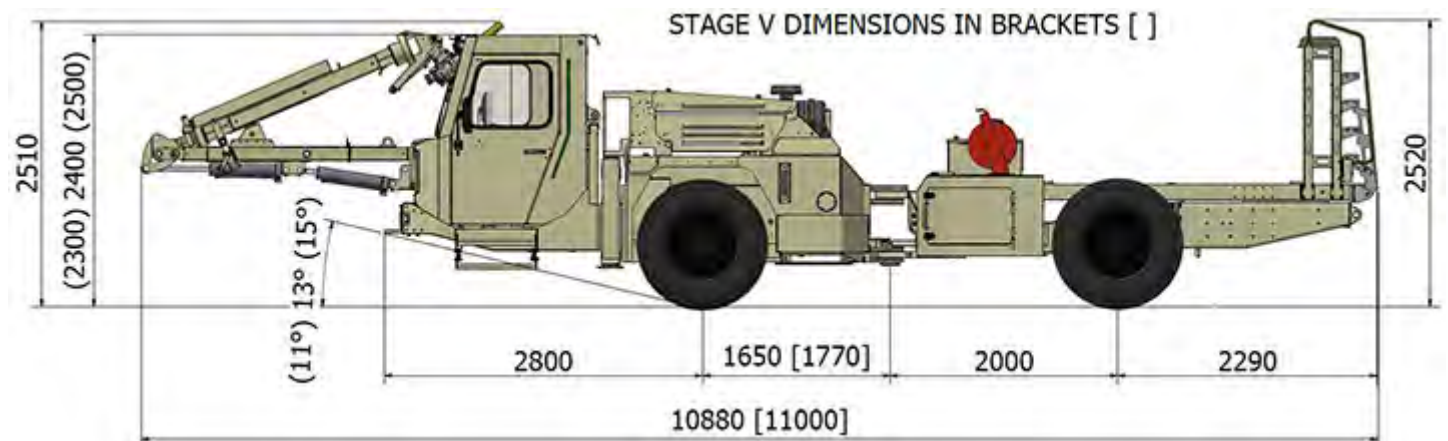
DIMENSIONS

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



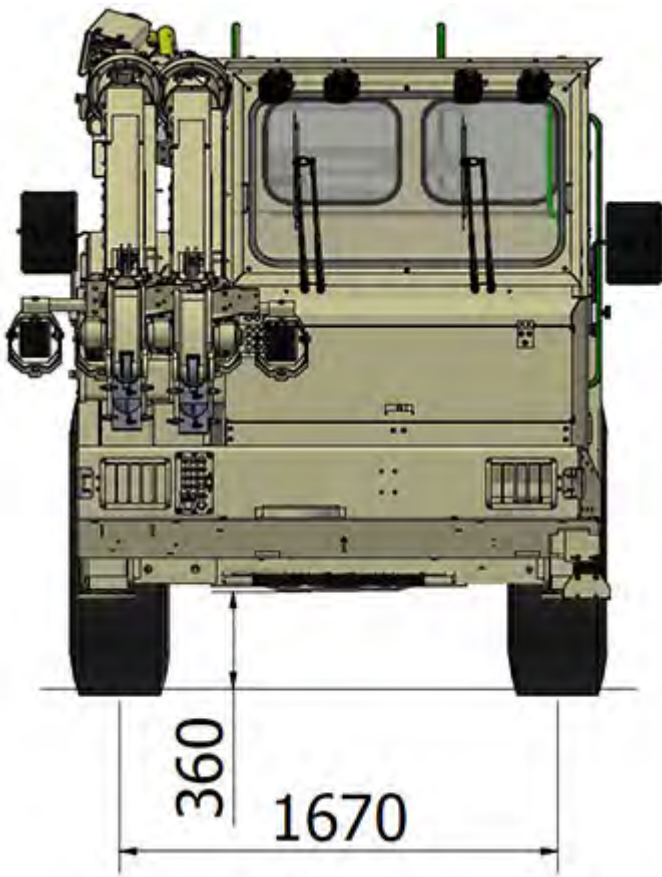
SIDE VIEW – MACHINE WITH OPTIONS



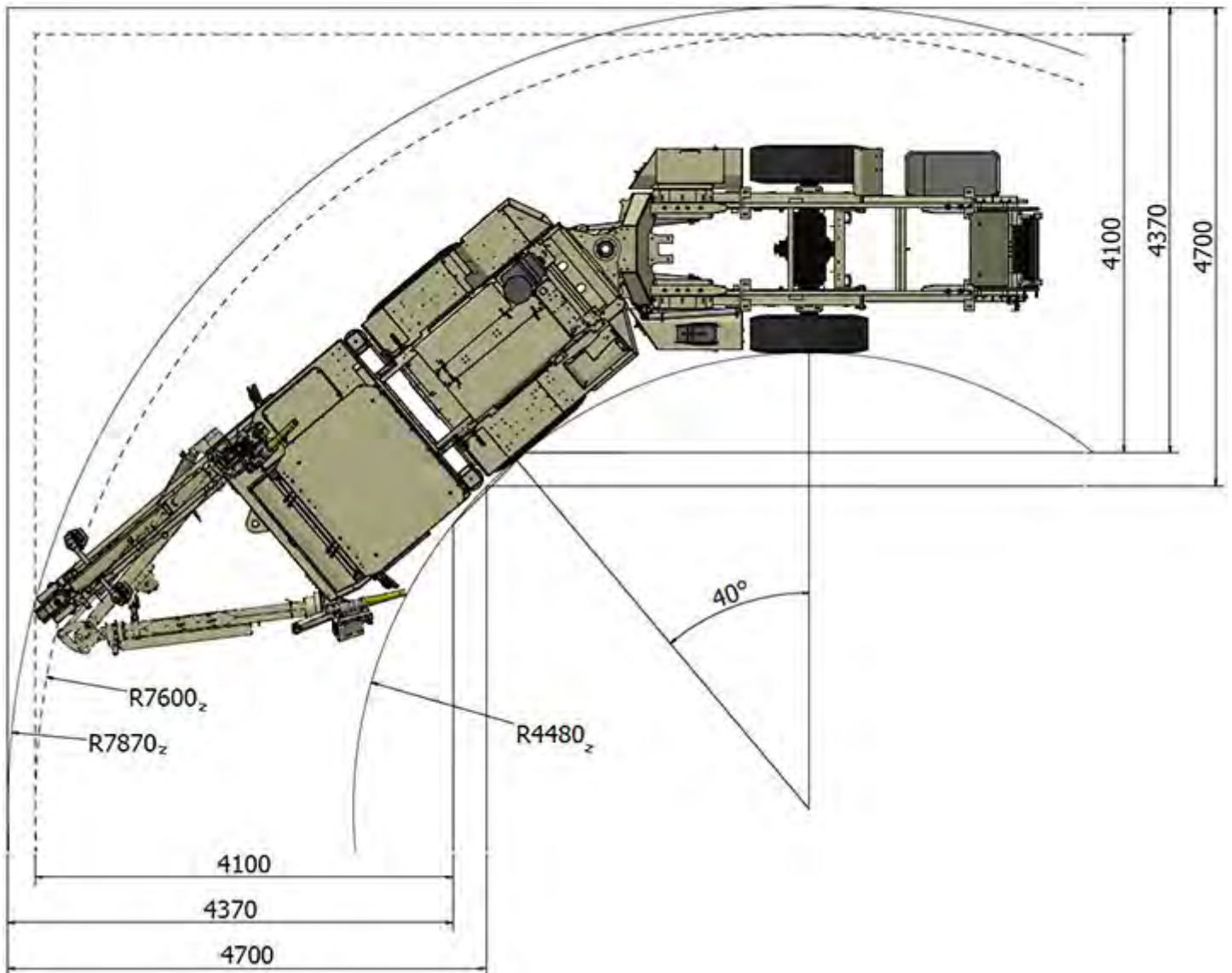
TOP VIEW



FRONT VIEW



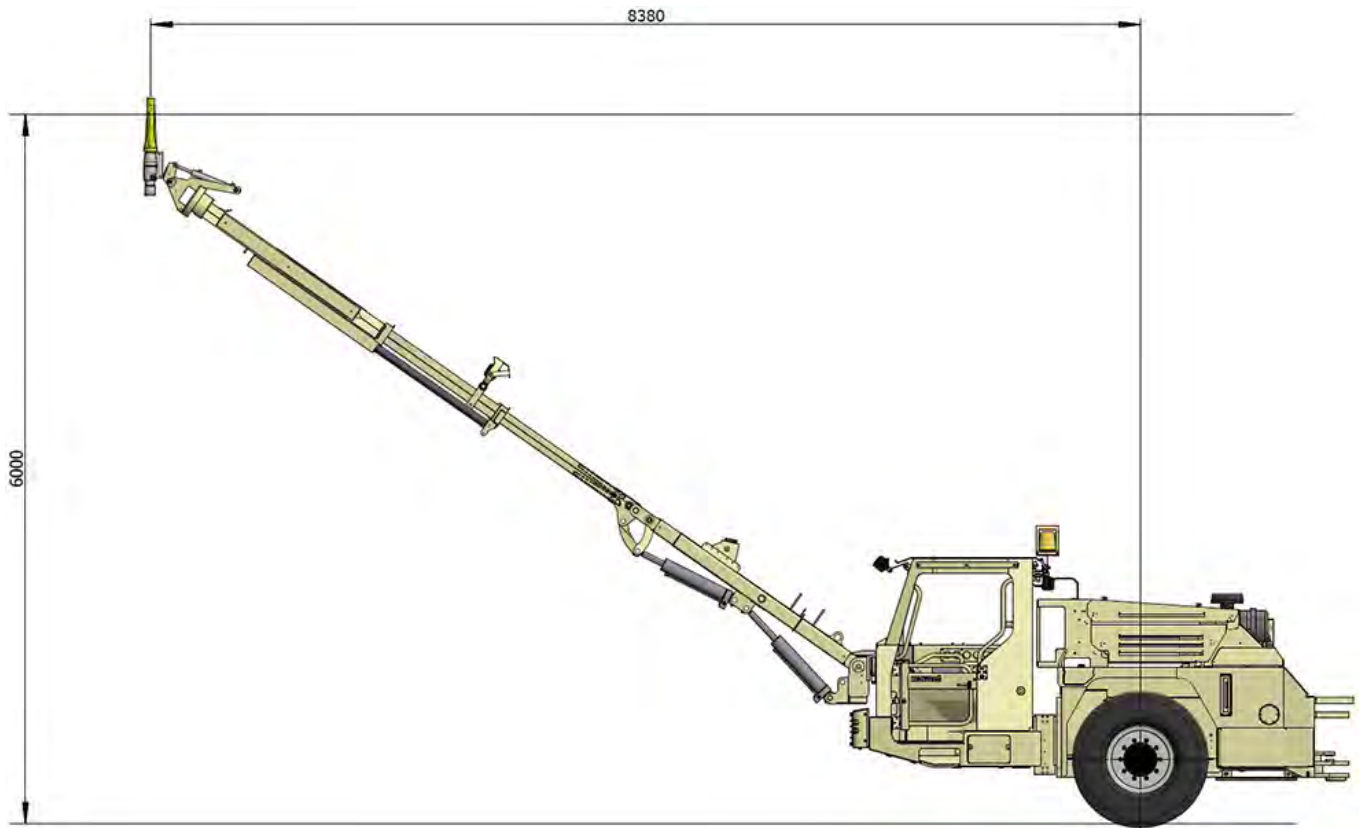
TURNING RADIUS



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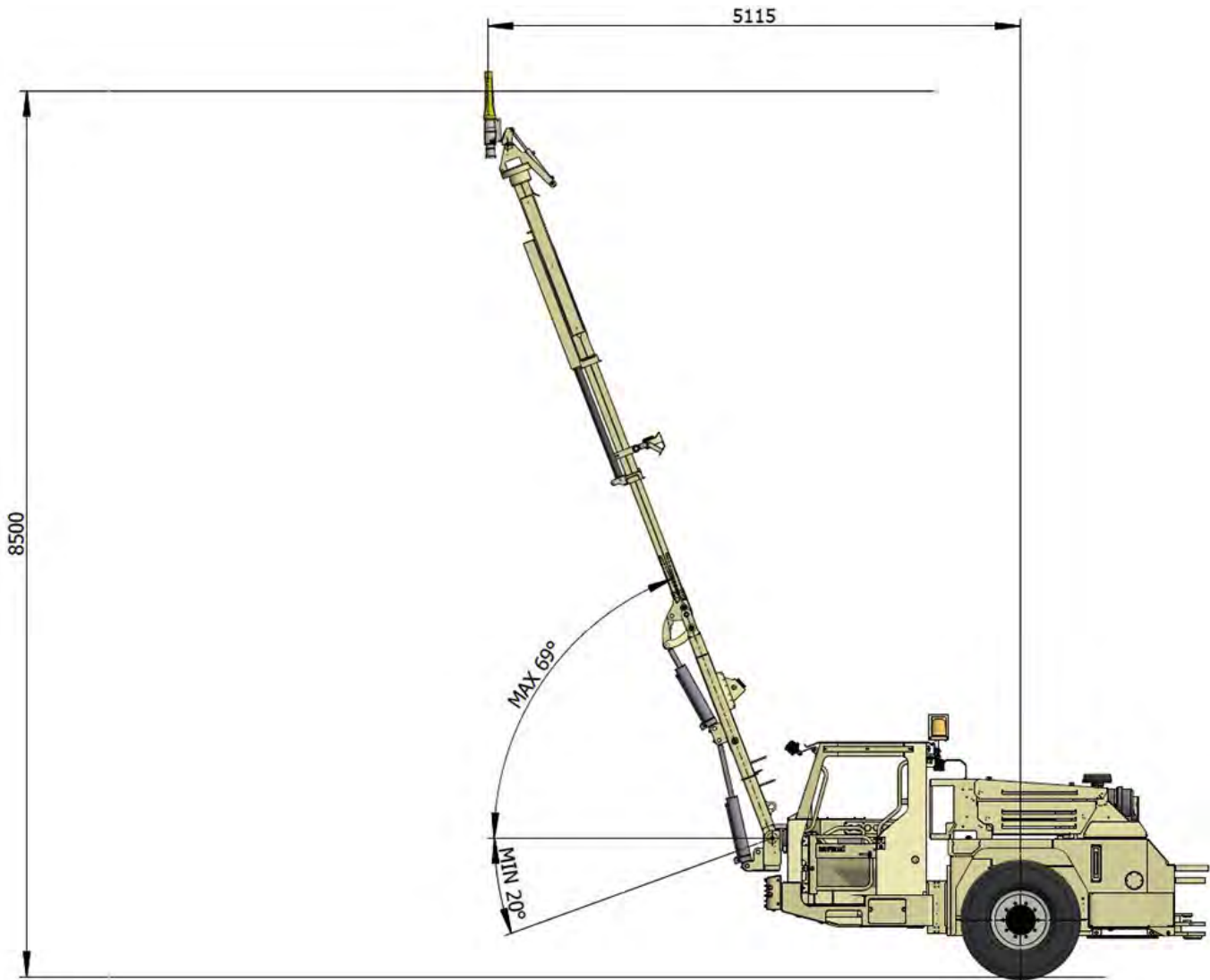
BOOM REACH - SB 500 B



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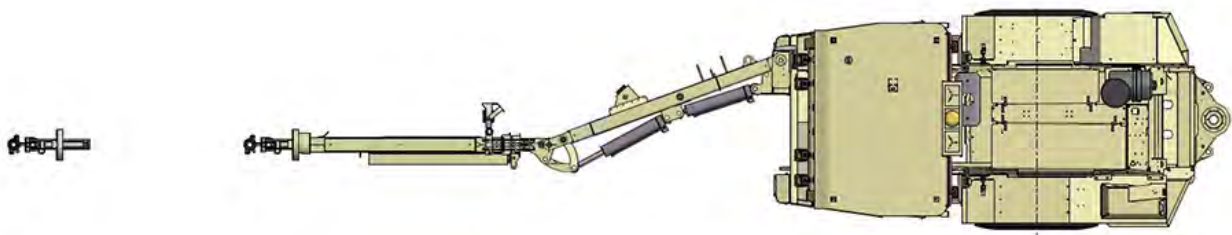
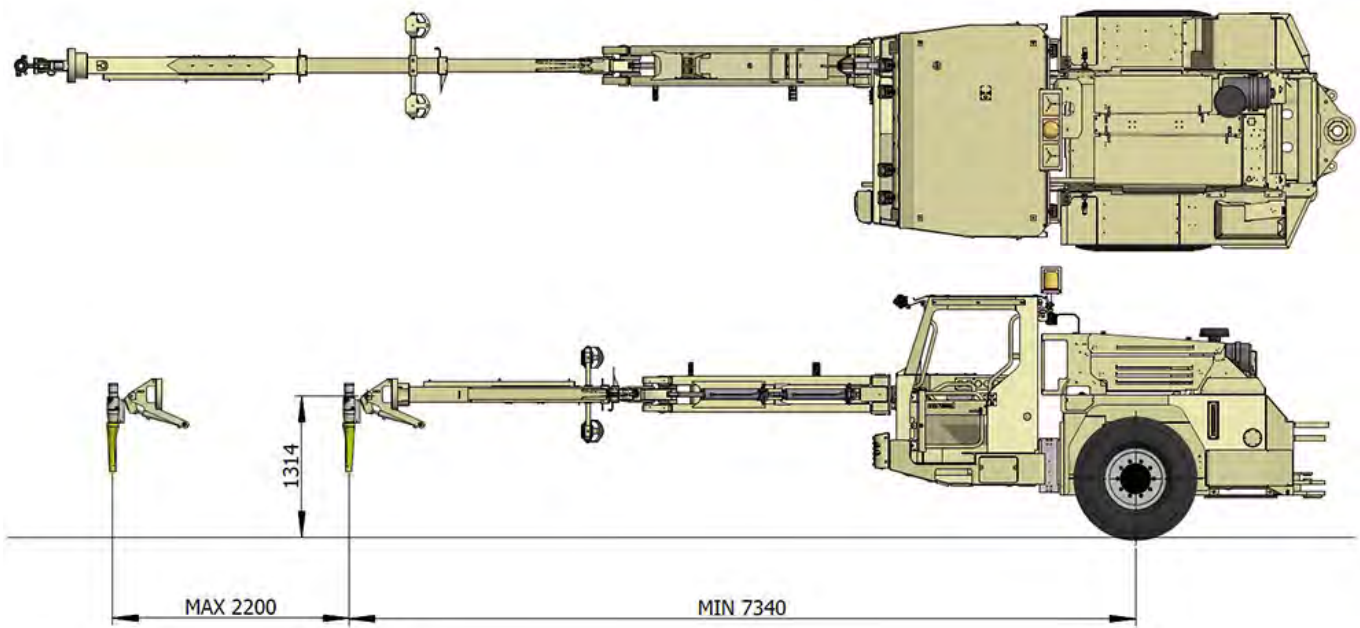
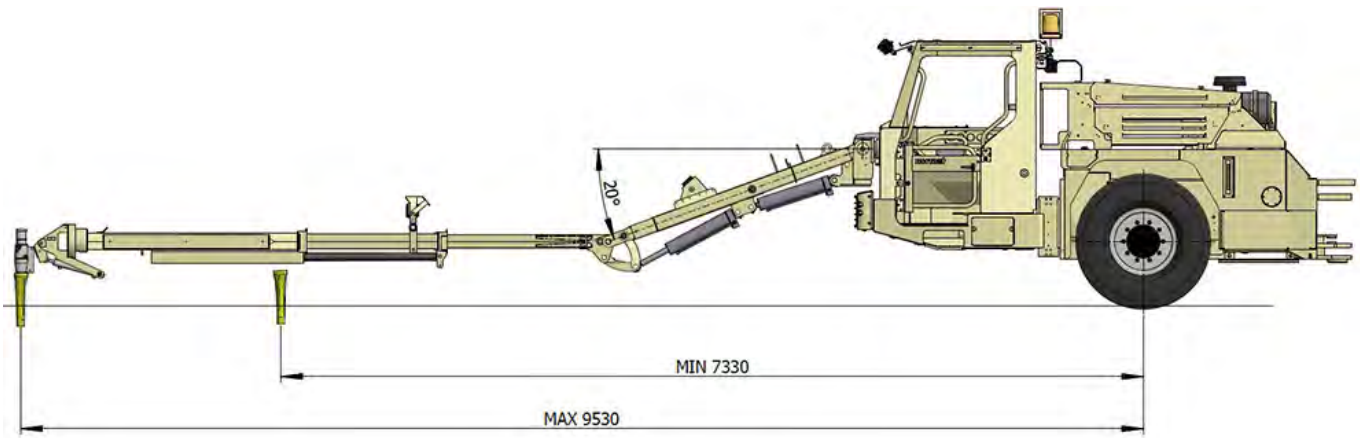
BOOM REACH - SB 500 B



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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
 final machine weight variate in agree with selected options

DEUTZ TCD 2013 L4, 120 KW

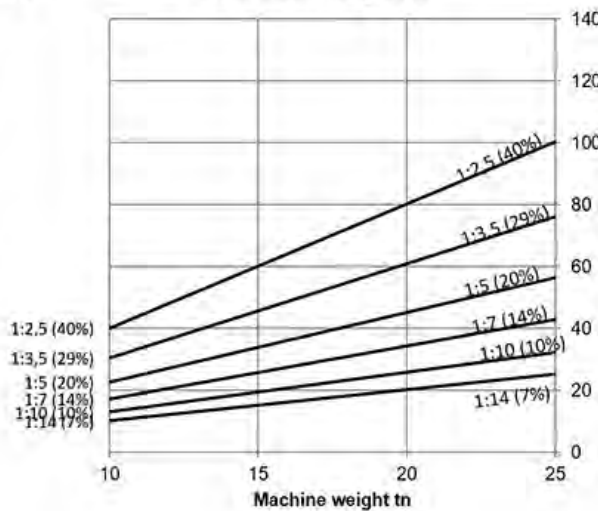
Performance curve DOC060005

Conversion chart

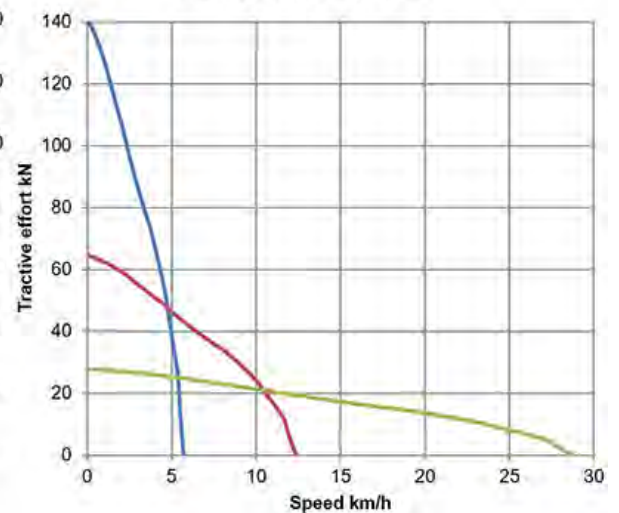
50	2	30
40	2.5	25
30	3	20
25	4	15
20	5	10
15	6	5
10	7	5
5		

g/h % 1/X GON

Gradeability kN



Tractive effort kN



CUMMINS B 4.5 120 KW

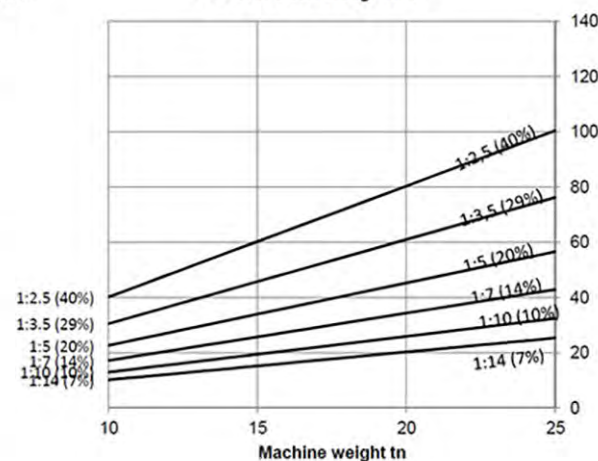
Performance curve with lock-up DOC028557

Conversion chart

50	2	30
40	2.5	25
30	3	20
25	4	15
20	5	10
15	6	5
10	7	5
5		

g/h % 1/X GON

Gradeability kN



Tractive effort kN

