



# Charmec MC 605 VE SD



Normet reserves the right to change  
this specification without further notice

Pictures may include options and additional equipment.

## INTRODUCTION



Charmec MC 605 VE SD charger is designed for face and production charging in underground mines and tunnels up to 65 m<sup>3</sup> cross sections where max face height is 8.8 m.

1.5 ton Normet ECM emulsion charging kit is located at the rear of the machine. Normet ECM includes emulsion mixing, pumping and delivery systems for development charging. Production charging hose pusher and reel are optional. Dedicated places for primers and detonators make it possible to bring all the needed explosive materials to the workplace at once which eliminates the need for an additional explosive service vehicle. In addition, optional compressor eliminates the need for external pressure airline.

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 charging process, 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

## CHARGING SYSTEM

Normet ECM Emulsion Charging Module:

Matrix capacity	1500 kg
Matrix delivery rate	20 - 95 kg/min

Charging reel for face charging

Radio control for all charging functions

Emulsion hose diameter for face charging: 20,4 x 25 mm: 15 m

Detonator box lining:

- Antistatic rubber lining
- IME SLP 22 lining

## PRODUCT TYPES

Forcit Kemiitti 810

DBS HEAT 9200

## NBB3S BASKET BOOM

2-operator basket

Lifting capacity (without optional equipment) 500 kg

Max. lifting height and wall coverage specified in dimensional drawing

Automatic levelling of basket

Start/stop from basket

Battery operated emergency lowering system

Basket installation position:

- Regular
- Hanging (reduce max. lifting height 500 mm)

Basket:

- Standard 2-operator basket
- Front gate 2-operator basket
- Short 2-operator square tube basket
- Short 2-operator open profile basket

Person lifter safety system:

- Dangerous movement preventing system (mandatory in NAP, NAS, CE area)
- Dangerous movement warning system with overload monitoring
- Dangerous movement warning system without overload monitoring

## 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)

Hydraulically driven cable reel with spooling device

- No cable
- 100 m cable

Cable in / out reeling function from the cabin and near the reel

- With supply cable (excluding plug)
- Without supply cable (must be sourced and installed locally)

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°

Lateral gradient for operation 3°

## 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 battery module 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

- 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 +/- 42°

## HYDRAULIC SYSTEM

Hydraulic oil tank capacity 145 l

### Battery driven hydraulic system

Variable displacement pump system for carrier and  
 explosive charging unit:

200 bar, 100 l/min

### Electrically driven hydraulic system 50/60 Hz

Variable displacement pump system for carrier and  
 explosive charging unit:

210 bar, 105/125 l/min at 1500/1800 rpm

## 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 on cabin

LED work lights in basket

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:

Mechanical suspended T-back seat with 3-point seat belt

Passenger's seat:

Mechanical suspended seats with retractable lap seat belt

Cabin door interlock switch with safety brake application

Puddle lights under door steps

## 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

Dry chemical fire extinguisher system:

Ansul A-101, Checkfire 210

Powder extinguisher:

- 12 kg
- Ansul Sentry

Number of extinguishers:

- 2
- 3

Painting and taping:

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

Reversing camera:

- 4 cameras, 3 displays
- 4 cameras, 3 displays and reversing radar
- 6 cameras, 3 displays with recording support
- 6 cameras, 3 displays with recording support and reversing radar

2 pairs of support legs; extendable legs at the load end and standard at the engine end

Front and rear grounding straps:

- Flat cable
- Chain

Electric pump for brake release

Text labels in:

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

Measurements:

- Noise
- Vibration

Normet reserves the right to change this specification without further notice

Pictures may include options and additional equipment.



## ACCESSORIES

### PROCESS PRODUCTIVITY

- Production charging
  - Hose diameter and length
    - 40 x 31 mm, 50 m
    - 32 x 23 mm, 50 m
  - Hose guides
    - Hose guide for upward production charging
    - Diverting pulley for downward production charging
  - Charging hose reel material
    - Steel
    - Stainless steel
- Acetic Acid additive dosing system: Improves gassing in low temperature ambient conditions
- Pressure water system for block opening in emulsion line: up to 30 bar adjustable pressure water pumping for emulsion line block opening
- Pressure air for emulsion line cleaning: improves the cleaning of emulsion main line
- Onboard compressor having capacity 2.6 m<sup>3</sup>/min
- Matrix transferring pump: capacity 200 kg/min
- Matrix tank level sensor
- 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
- Additional hydraulic pump system
- Socket supply voltage
  - 220/230/240 V
  - 110/120 V
- 3 x 100 W LED working lights on cabin roof (no UL or AS/NZS approval)

### 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
- Deutch connector for 24 V, 10 A for external power supply
- 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 BASKET BOOM

- Safety roof or bar on basket
  - Safety bar
  - Safety bar with hydraulic lift
    - Reduces lifting capacity 60 kg
  - Safety roof with hydraulic lift
    - Reduces lifting capacity 100 kg
  - Safety roof with hydraulic lift and slide
    - Reduces lifting capacity 200 kg

**NOTE:** safety roofs and bar for the basket boom affect to the lifting capacity.

Accessories for basket boom:

- Boom suspension
- LED working lights on safety roof/bar
- Operator present: Foot pedal switch on basket
- Operator present: Spring loaded valve levers
- 24 V fan in the basket

## 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 (Green/Red)
  - Both lights always on
  - Lights follows driving direction
- 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
- Redundant brake monitoring system
- 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
- Hearing protectors
- Wheel chocks with brackets

## BEV SAFETY FEATURES

- Battery safe box (for transportation and storage)

## 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.

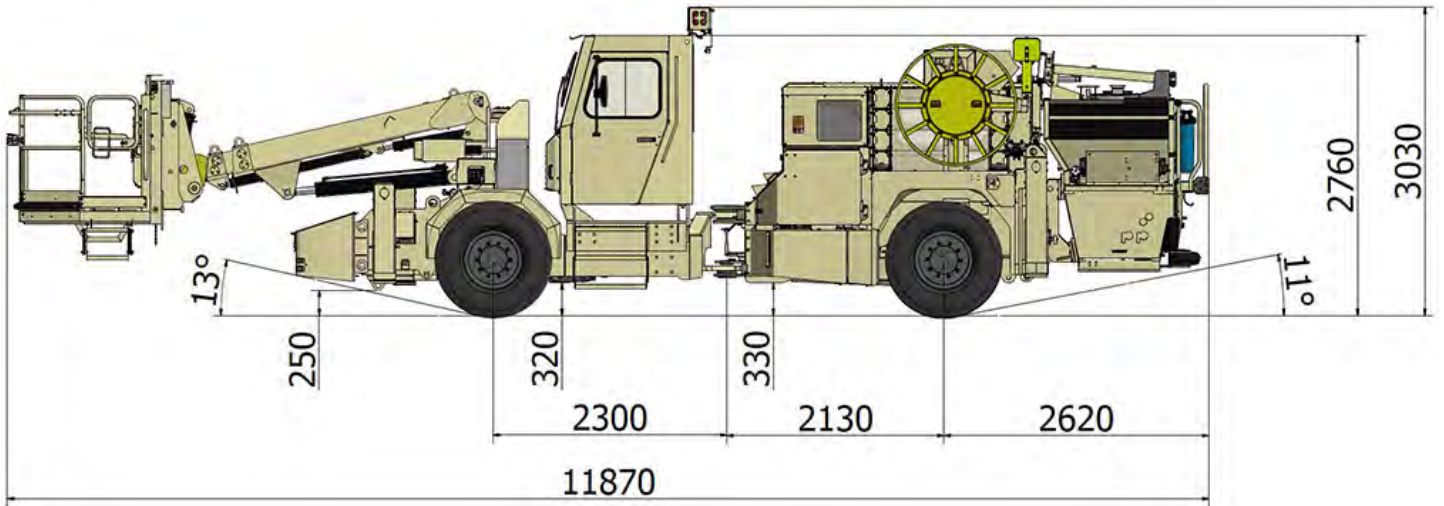
More information check [normet.com](https://www.normet.com).



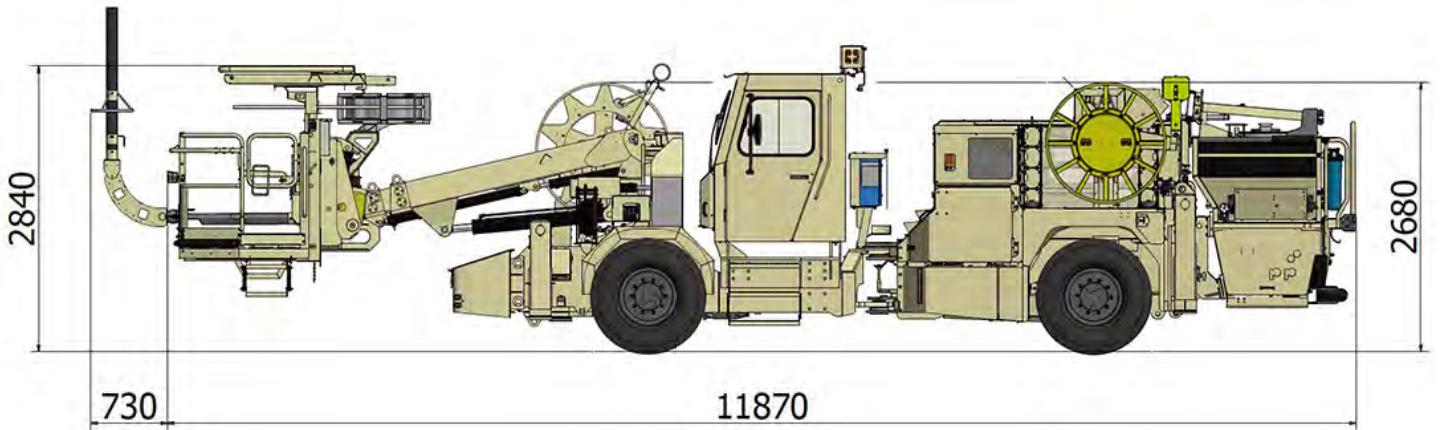
## DIMENSIONS

Length	11870 mm	Track	1670 mm
Width	2200 mm	Ground clearance	320 mm
Height	2760 mm	Turning radius outer	8110 mm
Wheel base	4430 mm	Turning radius inner	4760 mm

### SIDE VIEW – BASIC MACHINE



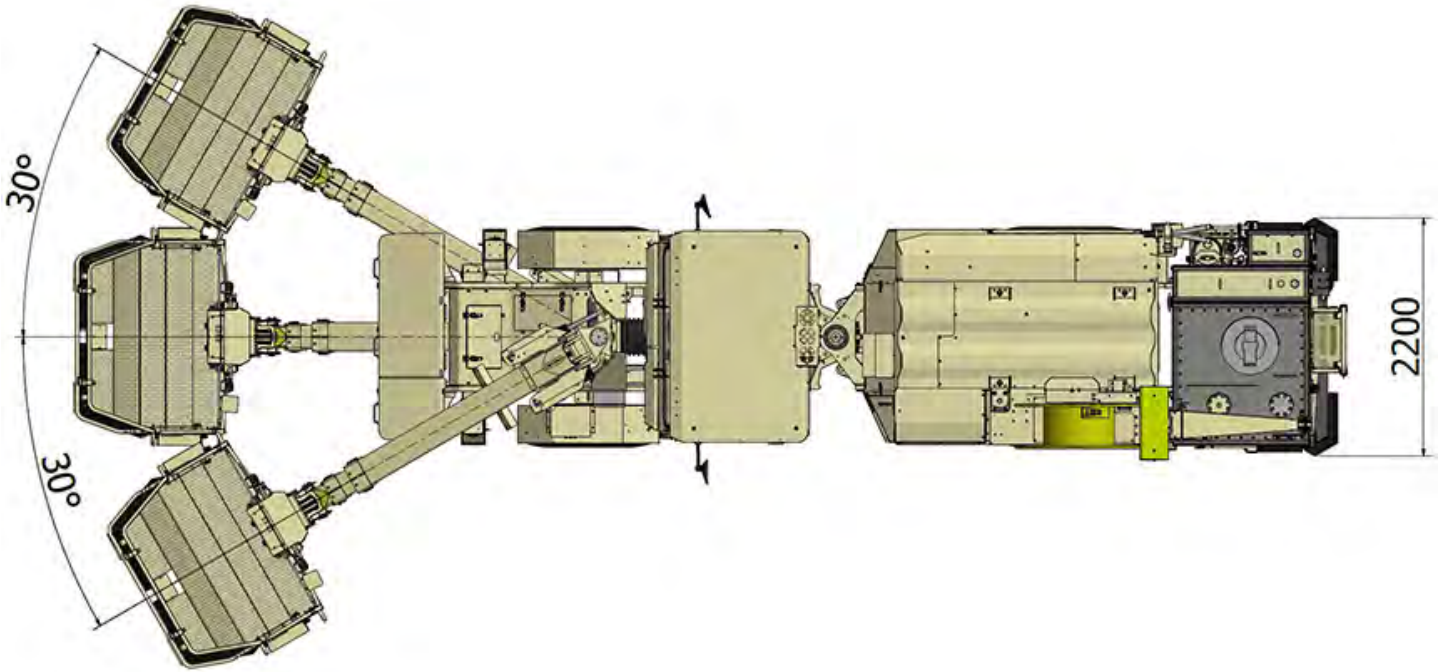
### SIDE VIEW – MACHINE WITH OPTIONS



Normet reserves the right to change this specification without further notice

Pictures may include options and additional equipment.

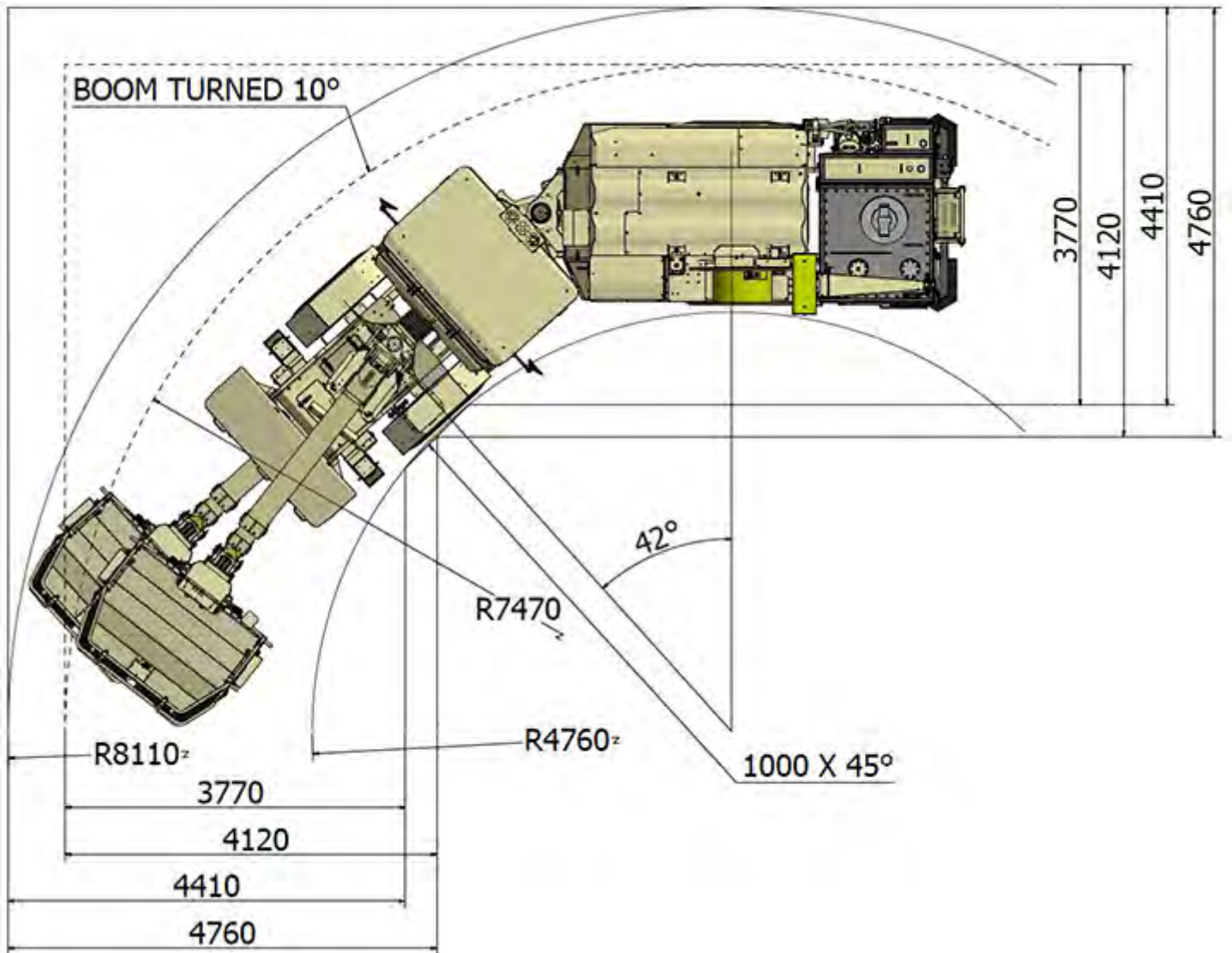
TOP VIEW



Normet reserves the right to change  
this specification without further notice

Pictures may include options and additional equipment.

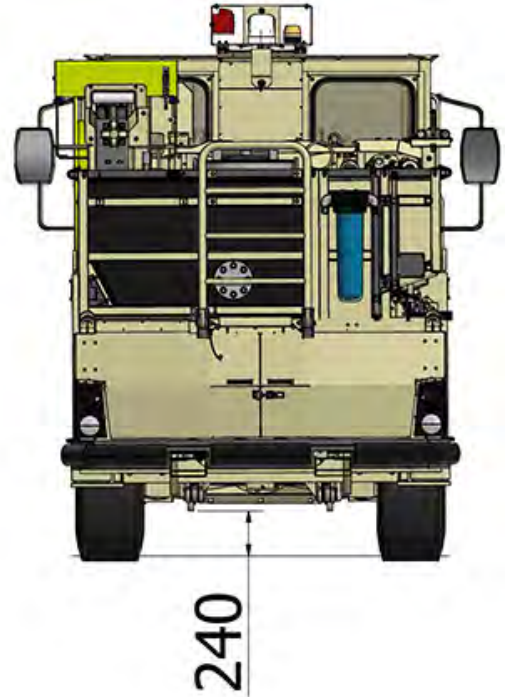
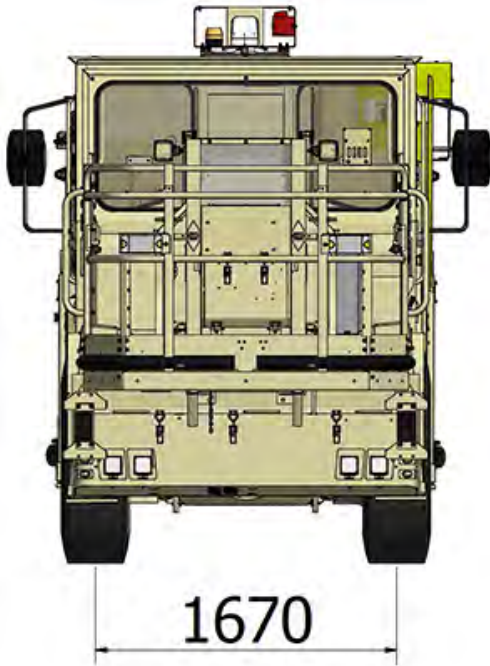
**TURNING RADIUS**



Normet reserves the right to change this specification without further notice

Pictures may include options and additional equipment.

FRONT AND BACK VIEWS

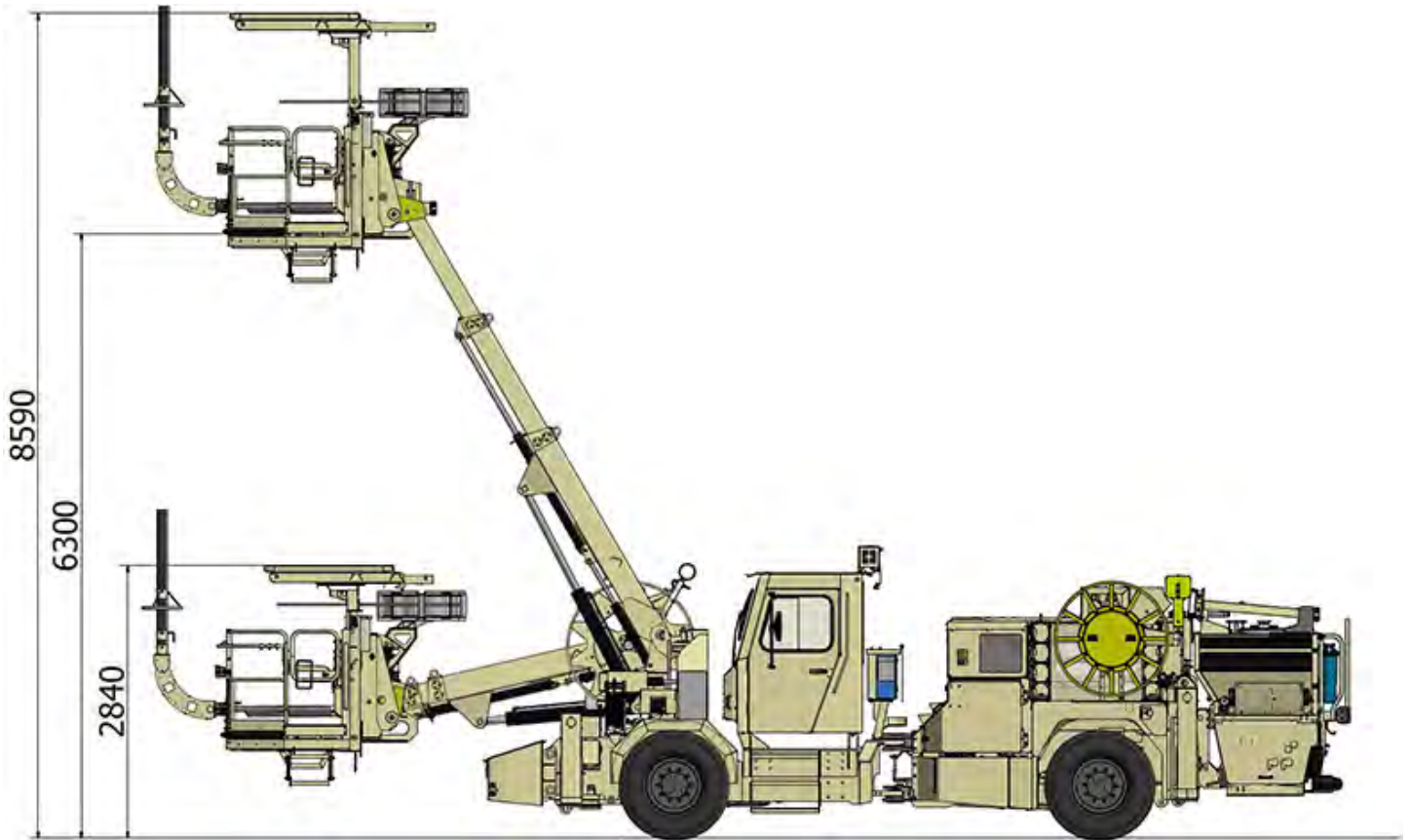


Normet reserves the right to change this specification without further notice

Pictures may include options and additional equipment.



**BOOM REACH**



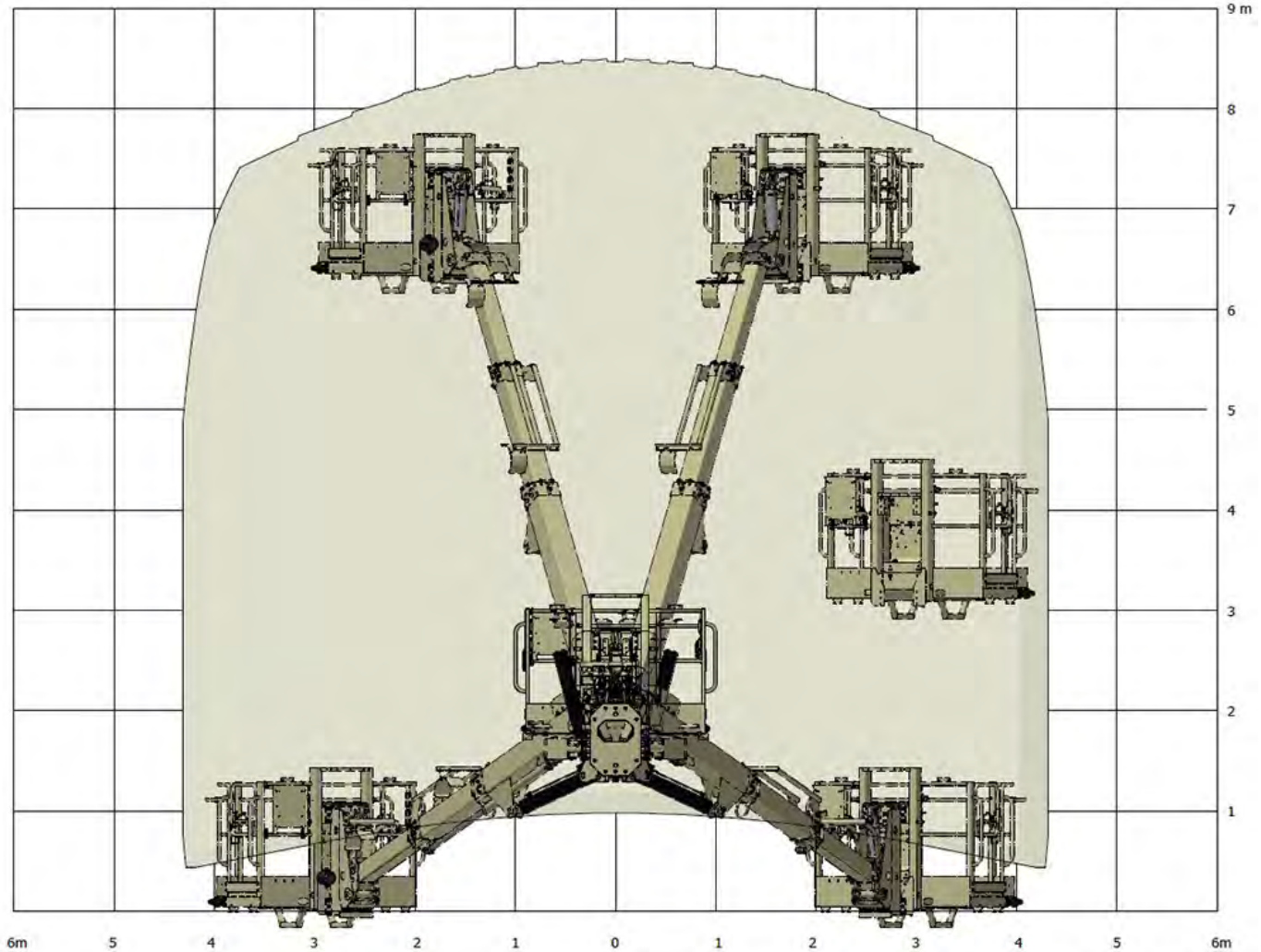
Normet reserves the right to change  
this specification without further notice

Pictures may include options and additional equipment.



**BOOM REACH - NBB3S WITH 30° TURN**

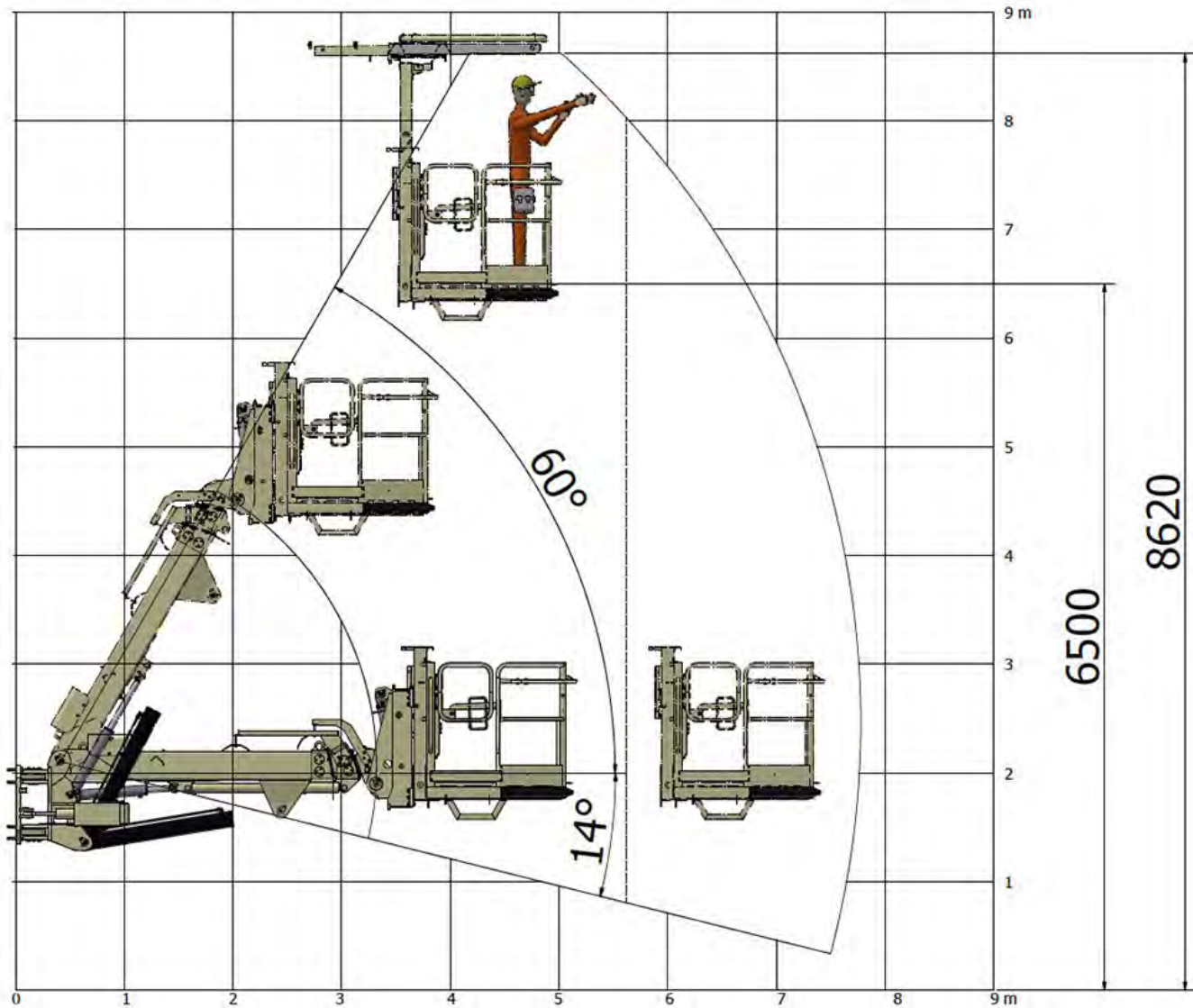
Maximized face coverage with single position of machine



Normet reserves the right to change this specification without further notice

Pictures may include options and additional equipment.

**BOOM REACH - NBB3S WITH 30° TURN**



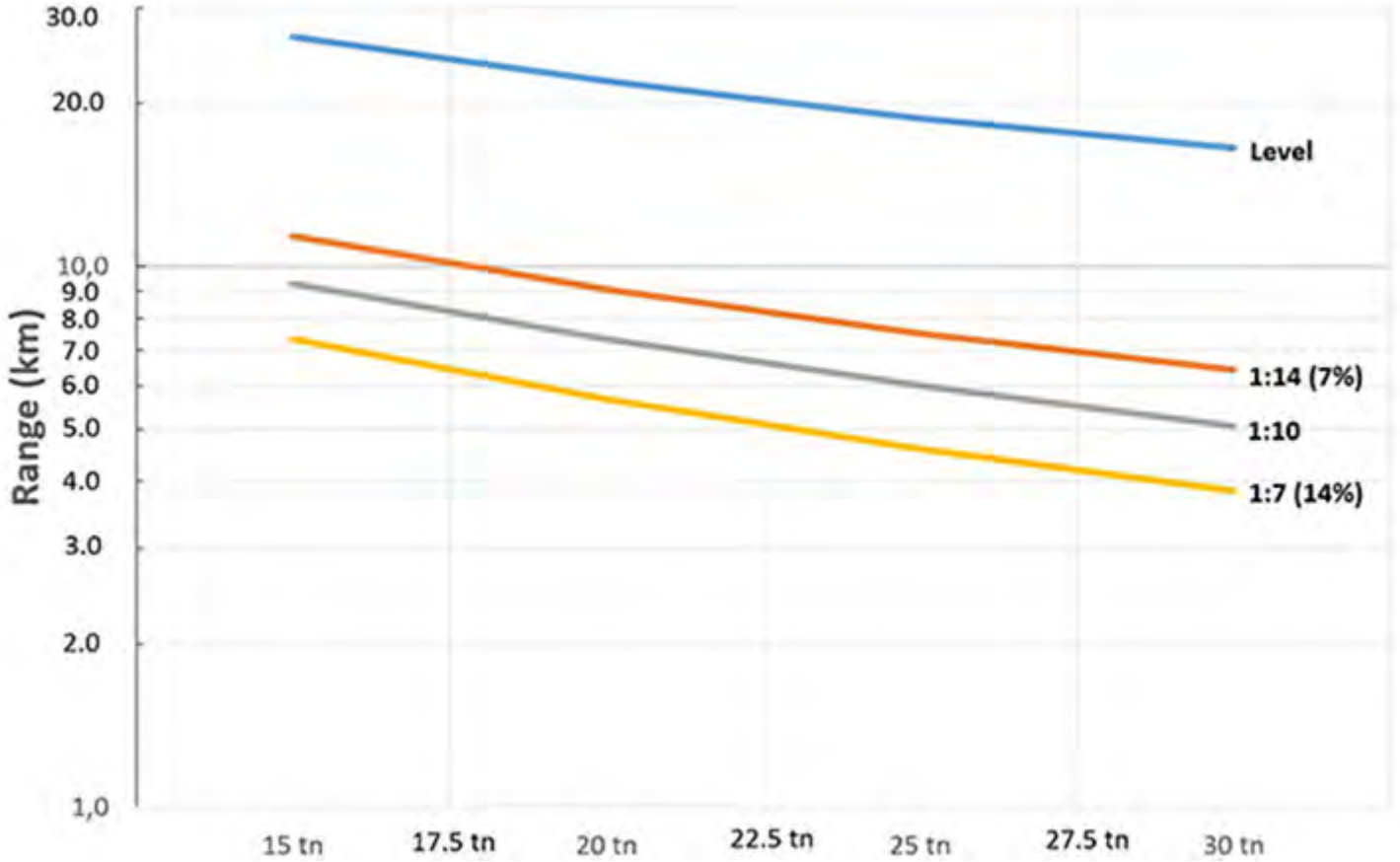
Normet reserves the right to change this specification without further notice

Pictures may include options and additional equipment.

# DRIVING RANGE AND TRACTIVE EFFORT

## DRIVING RANGE

Driving range curve: DOC060017



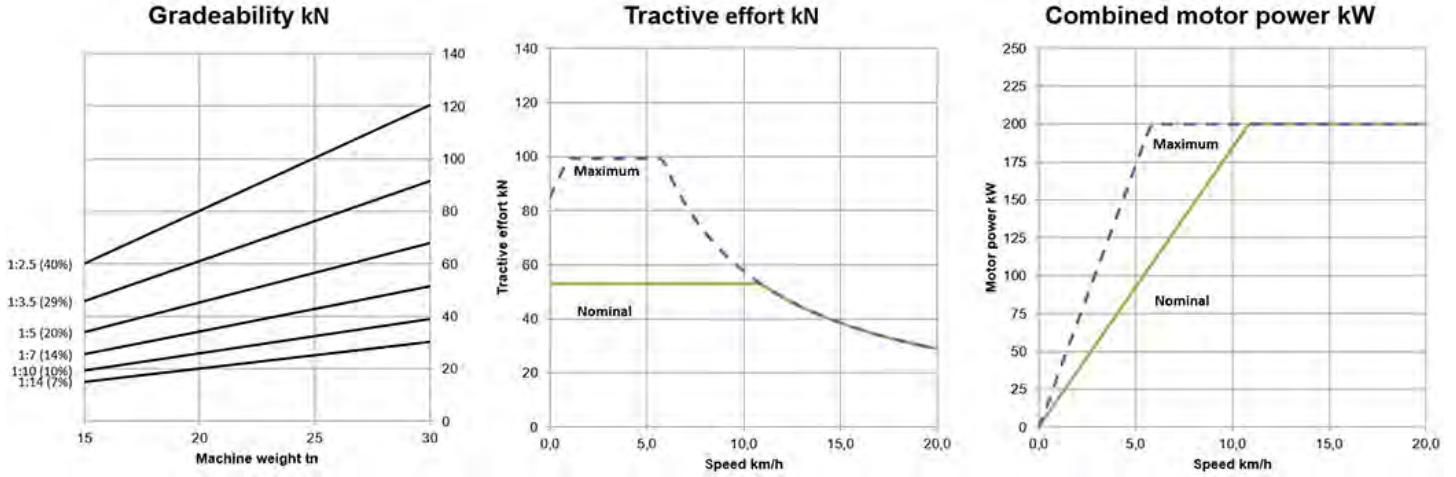
## OPERATING WEIGHT

Empty	21 000 kg
Fully loaded	23 500 kg

final machine weight variate in agree with selected options

**TRACTIVE EFFORT**

Performance curve: DOC059935



Normet reserves the right to change this specification without further notice

Pictures may include options and additional equipment.