



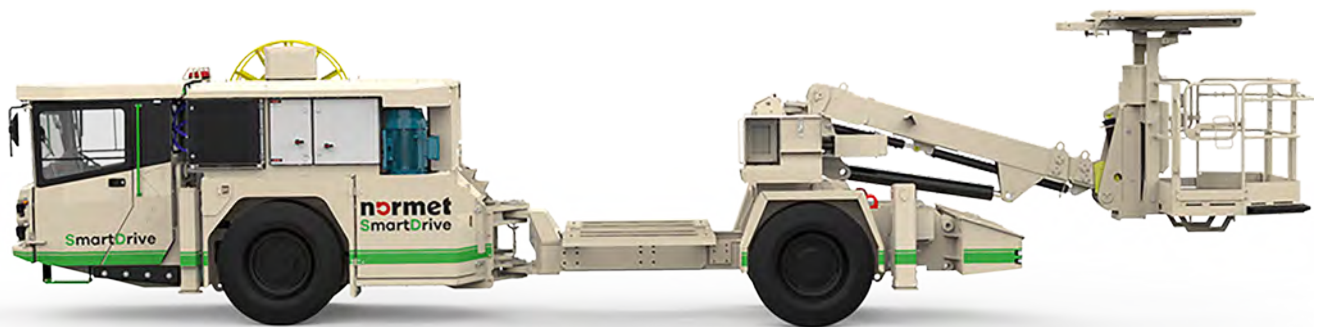
Charmec MF 605 V Long End SD



Normet reserves the right to change
this specification without further notice

Pictures may include options and additional equipment.

INTRODUCTION



Charmec MF 605 V Long End SD is a fully electric carrier for external emulsion unit which is designed for easiness of use and high productivity. It uses the latest Li-ion battery technology and charges the batteries from the same AC-socket which is used to power the process. Charmec MF 605 V Long End SD is designed for face and production charging in underground mines and tunnels up to 65 m³ cross sections where max face height is 8,8 m.

The room for external emulsion kit is in the middle of the unit. Dedicated places for primers and detonators make it possible to bring all the needed 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 downhill driving and deacceleration 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.



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

Process platform on rear end of unit

Inner dimensions 1680 x 2020 x 1600 mm

Max. load 6000 kg

Center of gravity shown in the dimensional picture

Detonator box lining:

- Antistatic rubber lining
- IME SLP 22 lining

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

Electric boom control

Start/stop from basket

Battery operated emergency lowering system

Operator present: Foot pedal switch on basket

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:

- 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 seats with retractable lap seat belts

Cabin door interlock switches with safety brake application

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 (2 pcs):

- 12 kg
- Ansul Sentry

Painting and taping:

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

Reversing camera:

- 3 cameras, 3 displays
- 3 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

ACCESSORIES

PROCESS PRODUCTIVITY

- Installation service for external emulsion charging system
 - CE-marking for installation of external emulsion charging system
- Compressed air inlets with water separator on carrier
- Compressed air outlet and oil lubrication unit in basket
- Water inlet with filter and pressure regulator
- Electrically controlled face charging reel and valve with face charging hose 25 x 20 mm, 15 m
- Production charging
 - Direct hydraulic controlled hose pusher
 - Electrically controlled hose pusher and valve

Hose diameter and length (includes 4 pcs of groove pulleys)

- Without hose
 - 32 x 23 mm, 50 m
 - 40 x 31 mm, 50 m

Additional groove pulleys, 4 pcs

- 28 mm
- 32 mm
- 40 mm

Hose guides

- Hose guide for upward production charging
- Extension for hose upward hose pusher
- Diverting pulley for downward production charging

Charging hose reel material

- Steel
- Stainless steel

Production charging reel coupling size

- 1 ½" rotary coupling and tube
- 1" rotary coupling and tube

- Onboard compressor
 - 2.6 m³/min
 - 0.45 m³/min
- 230 l water tank above the cabin (increased machine height 200 mm)
- 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 (no UL/CSA or AS/NZS approval)
 - 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
- Boom movement alarm
- LED working lights on safety roof/bar
- 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
- 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.

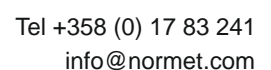
UPGRADES AND MODIFICATIONS

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.

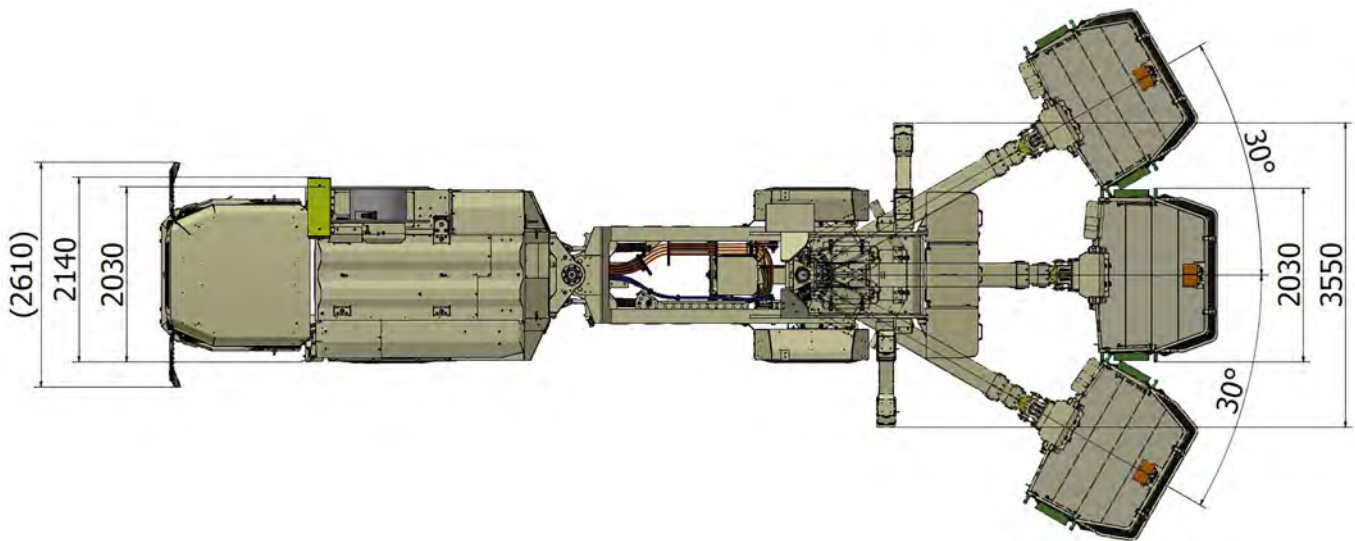
Contact your local Normet office for Upgrade offering to your fleet.

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

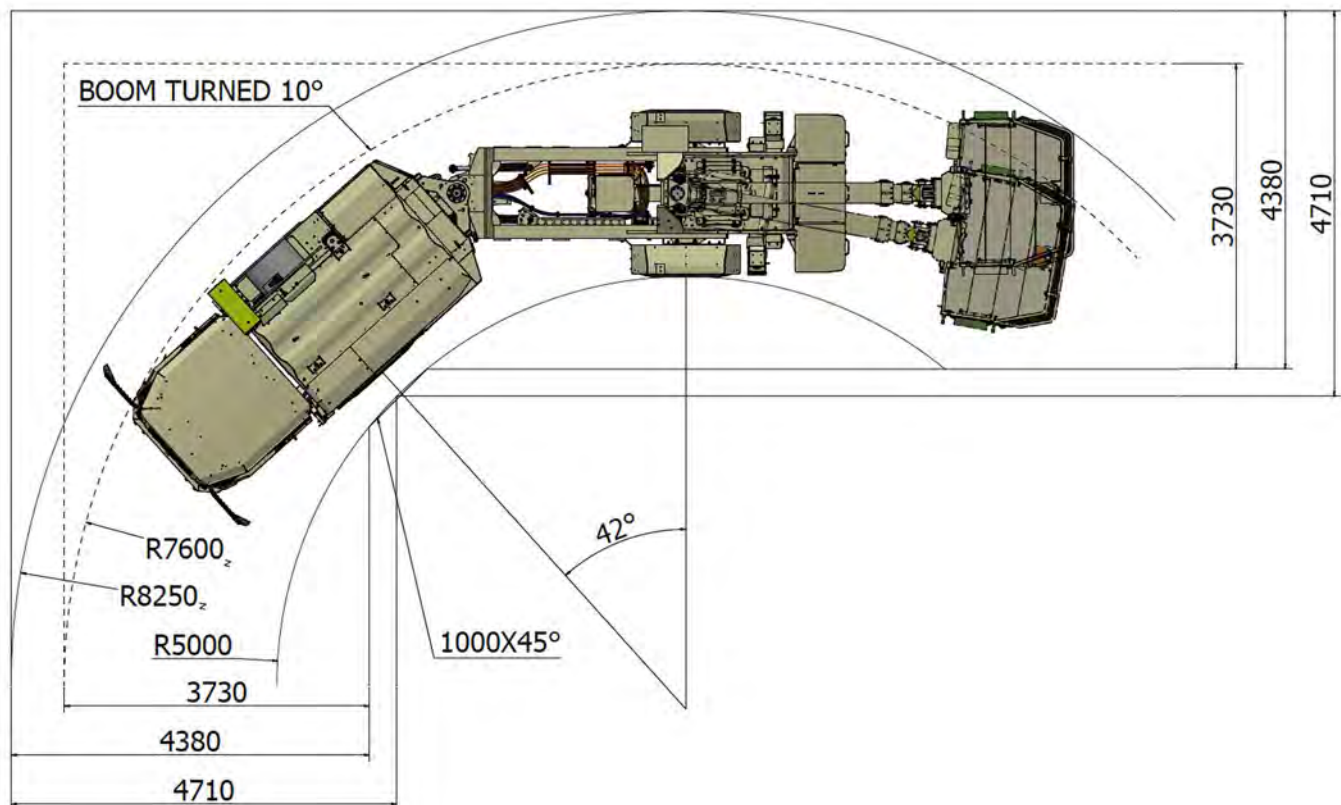
SIDE VIEW – BASIC MACHINE



TOP VIEW



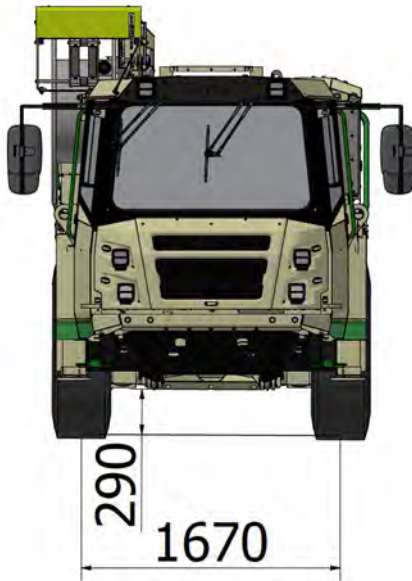
TURNING RADIUS



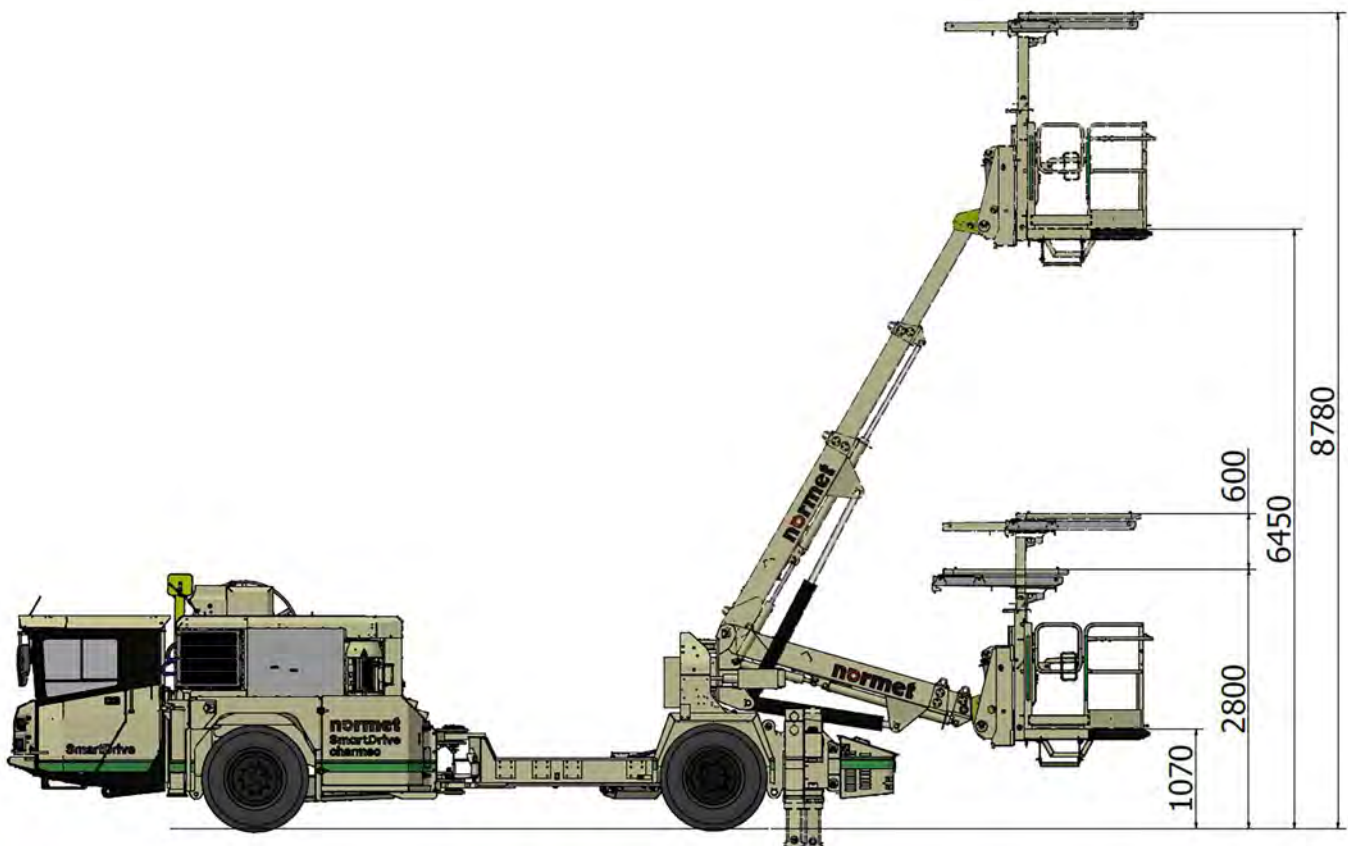
Normet reserves the right to change this specification without further notice

Pictures may include options and additional equipment.

FRONT VIEW



BOOM REACH

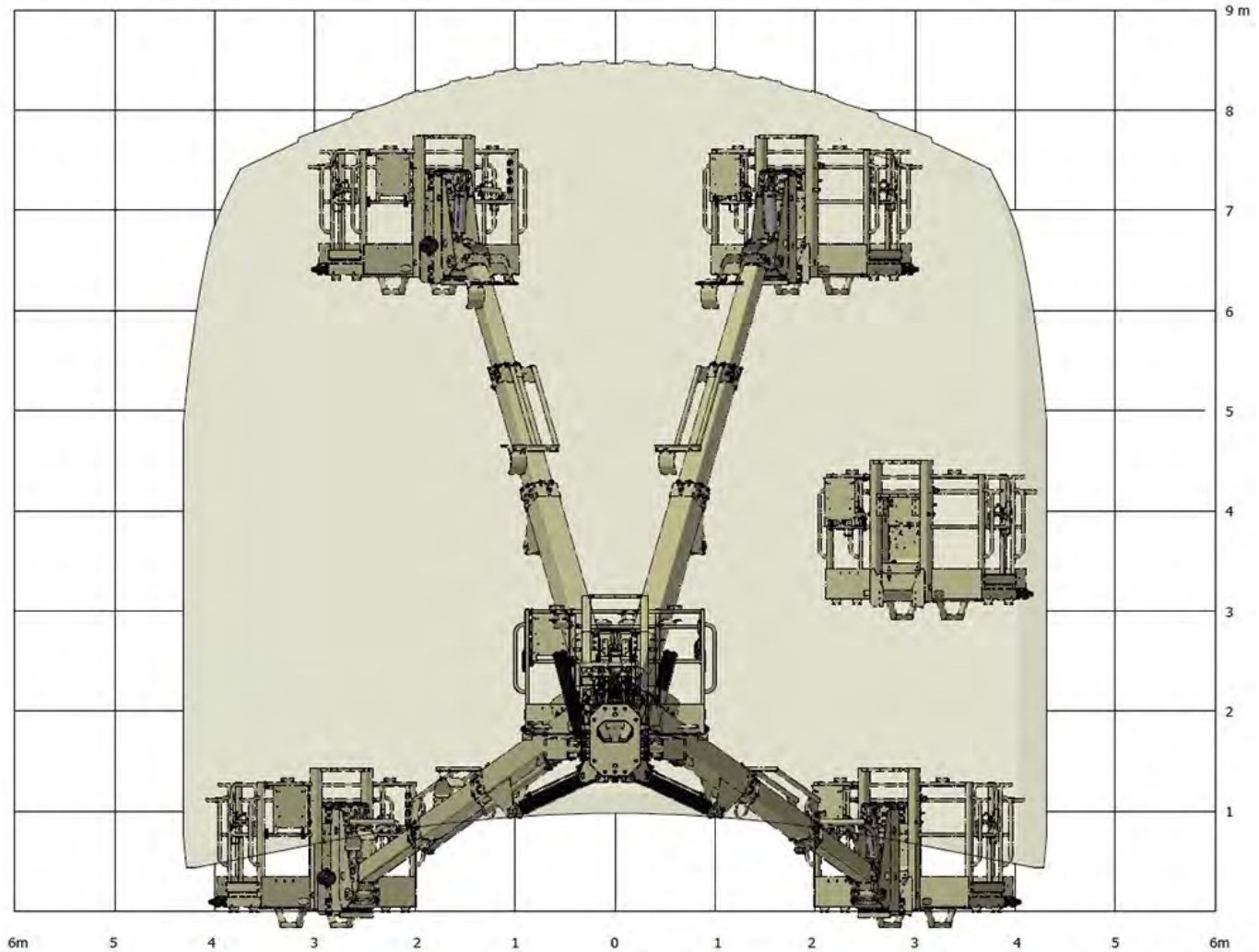


Normet reserves the right to change
 this specification without further notice

Pictures may include options and additional equipment.

BOOM REACH - NBB3S WITH 30° TURN

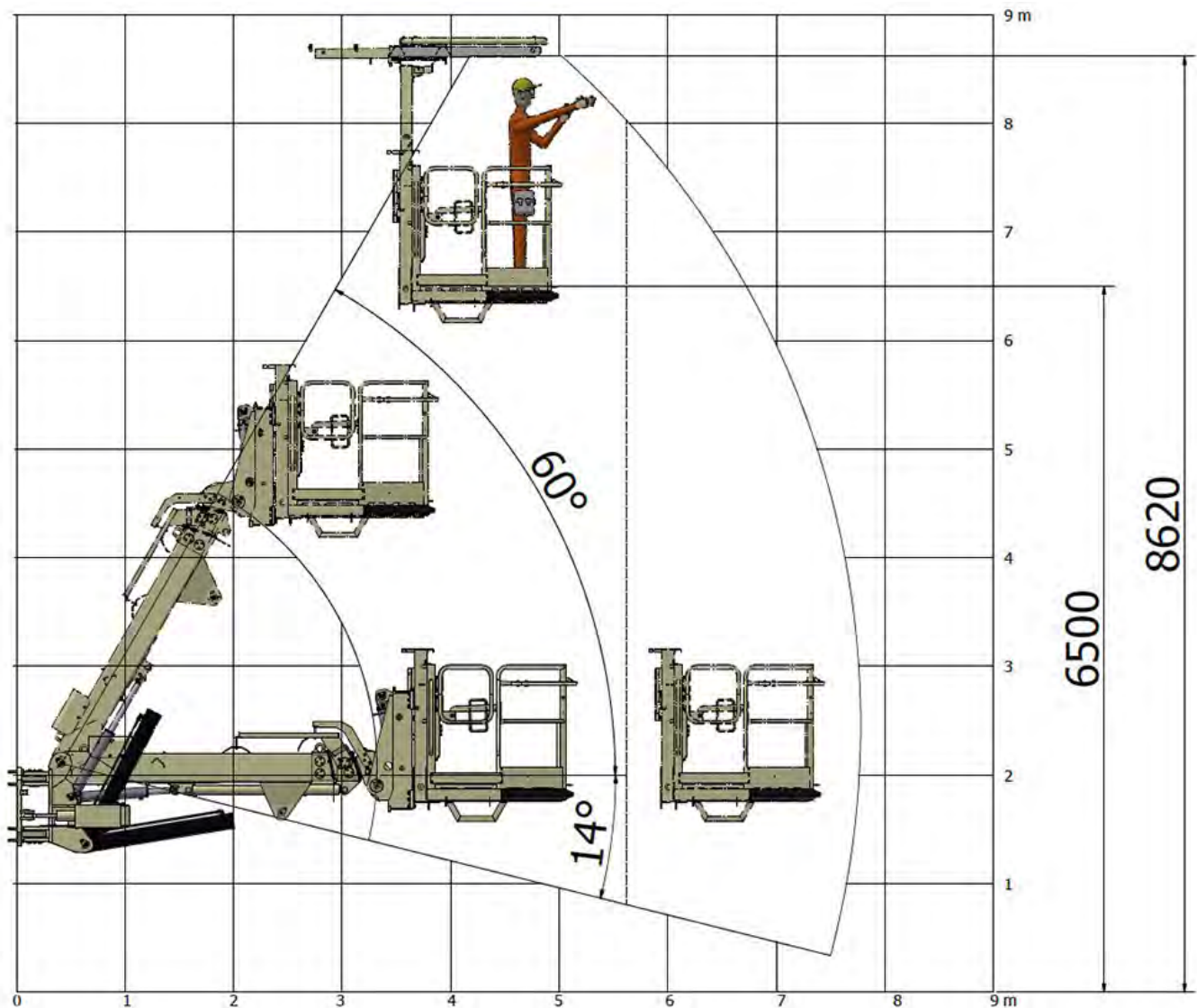
Maximized face coverage with single position of machine



Normet reserves the right to change
this specification without further notice

Pictures may include options and additional equipment.

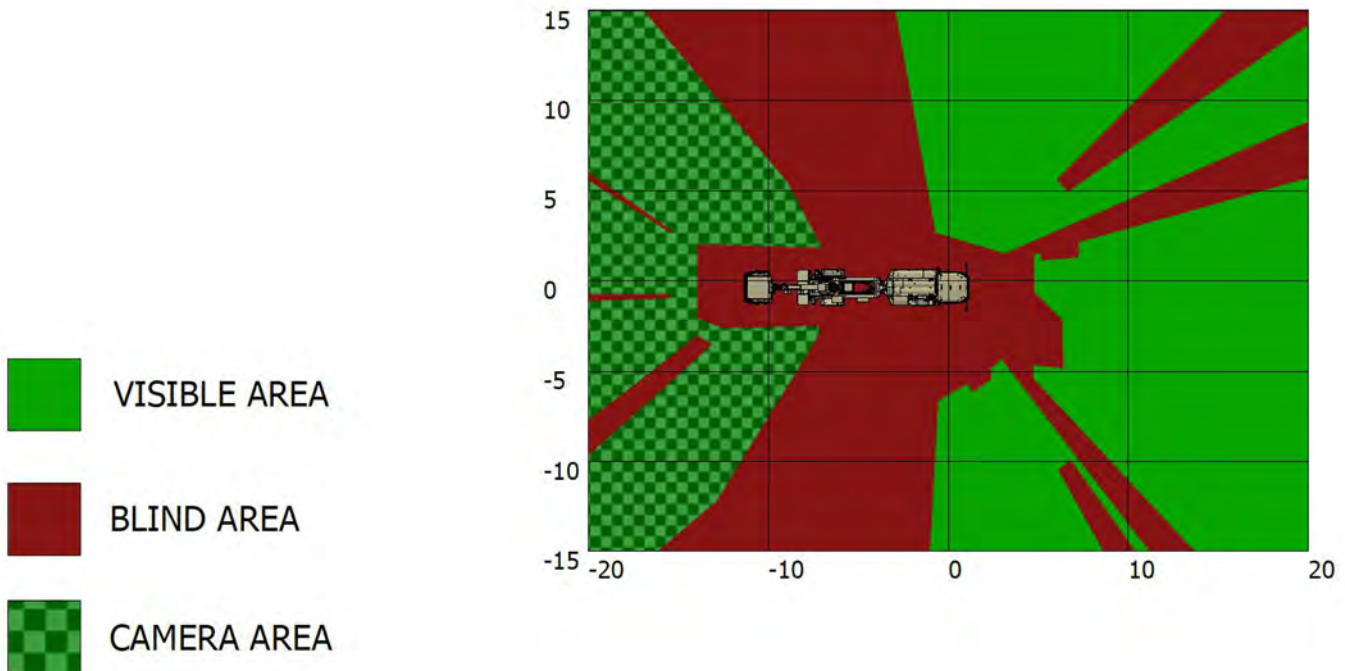
BOOM REACH - NBB3S WITH 30° TURN



Normet reserves the right to change
 this specification without further notice

Pictures may include options and additional equipment.

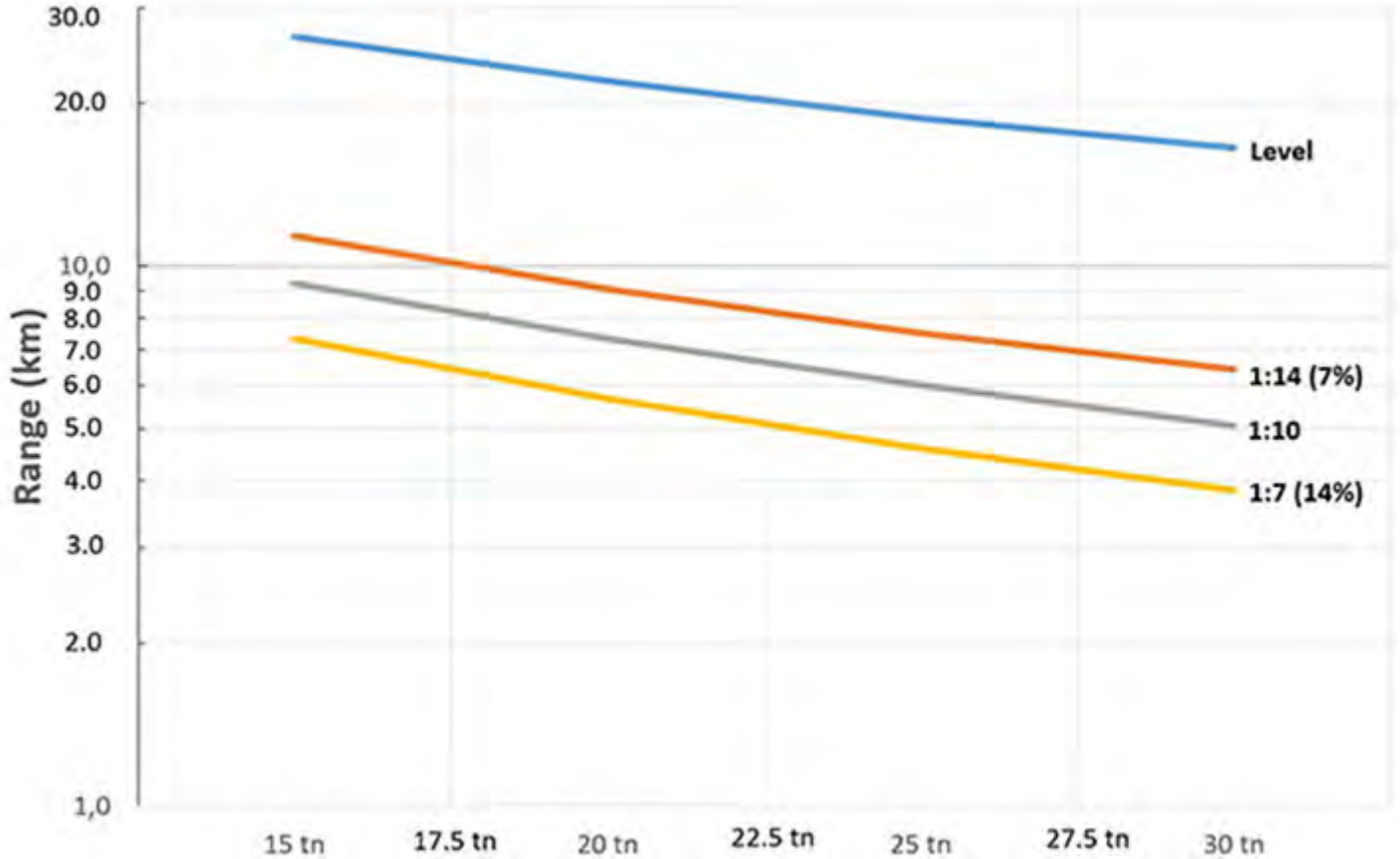
VISIBILITY MAP



DRIVING RANGE AND TRACTIVE EFFORT

DRIVING RANGE

Driving range curve: DOC060017



OPERATING WEIGHT

Empty	19 000 kg
Fully loaded	25 000 kg
final machine weight variate in agree with selected options	

TRACTIVE EFFORT

Performance curve: DOC059935

