



# Scamec LC Thor



Normet reserves the right to change  
this specification without further notice

Pictures may include options and additional equipment.

## INTRODUCTION

**Scamec LC Thor** is new generation scaling machine utilizing Normet modularity design principle. With Scamec Thor the scaling productivity; boom handling, work area visibility and operator ergonomics are brought up to superior level. Scamec Thor is purpose built machine for scaling applications with effective vertical reach up to 9,5 meters. The minimum tunnel width for this machine is 4 meters and minimum height 2,4 meters.



## PROCESS EQUIPMENT

Scamec Thor is equipped with NASB95 -boom (Normet Articulated Scaling Boom). Boom is designed for equally efficient scaling of all tunnel surfaces; roof, walls and the back face. Also scaling the lower corners is easy with the boom.

The boom is anchored to the frame with heavy duty slew ring which improves the visibility to the scaling tool as the boom turns away from the field of view just by turning the boom slightly sideways. All boom movements are done by hydraulic cylinders which tackle the scaling work forces and provide the easiest possible serviceability.

Scaling boom can be equipped with Epiroc SB 302 T or optional SB 452 T hydraulic hammers which are specifically designed for scaling. Hammers have reinforced tool shank, improved dust sealing for the tool and shank, pressurized air for keeping the dust particles out and automatic greasing function.

Optional dust suppression has variability; Hammers have dust suppression water nozzles in the front piece and boom is possible to equip with additional water nozzles for suppressing the surrounding dust. Water supply can be organized from on board 550 l water tank and hydraulically operated dust suppression pump or from the mine water line through 120 m hydraulically operated water reel.

Scamec Thor is available with optional dozer blade for clearing the way in the tunnel faces.

## CHASSIS

In scaling applications, a solid chassis is required to carry the scaling boom. Mechanical forces projected to equipment in this process are demanding and wear out lighter and carelessly designed structures quickly. In Scamec Thor the chassis is designed to withstand these forces and improved chassis lifetime is one of the primary design factors. Component locations are carefully thought, and spacious structures enable ease of access for maintenance purposes.

## POWER TRAIN

L-series units have powerful 6-cylinder liquid cooled turbo-charged 185 kW Volvo Penta engine. Available emission standards are Tier 3 / Stage IIIA and Stage V that provide clean and efficient operation. Automatically controlled engine brake and transmission lock up turbine ensure safe and efficient decline driving features.

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.



## CABIN

Scamec Thor cabin is FOPS and ROPS certified and tested. Cabin can be lifted 600 mm for enhanced visibility and tilted 15 degrees backwards for better operator ergonomics on roof scaling. Silent cabin design with replaceable air filters and optional AC/heater provides superior comfort to operator. Three point contact rails and non-slippery steps ensure safe passage in and out of the cabin.

Windscreen is 22 mm thick multi-layer glass and has protective grill in front against falling rock debris.

Operator seat is comfortably cushioned and adjustable to operator's weight and size. Optional camera systems increase safety and visibility around the machine.

All frequently needed operating controls are located in the hand control panels and provide great ergonomics.

There is also retractable trainer's seat available as option.



## SAFETY AND PRODUCTIVITY

Scaling includes more rock fall risks than any other underground work process. Scamec Thor has safety features build to minimize the effects of these risks. The boom design minimizes the risk of rocks falling on the boom to the cabin. Both longitudinal boom sections are covered with rock covers including guides projecting falling rocks to the side.

In scaling process fatal accidents can happen fast and therefore Scamec Thor offers emergency escape function.

Fire safety is done with standard hand held fire extinguishers and optional fire suppression system.

Scamec Thor scalers are designed for reliable and productive scaling works.

## TECHNICAL SPECIFICATION

### NASB95 BOOM

Fully articulating scaling boom made of high strength steel

Vertical reach	9.5 m
Horizontal reach	14.5 m
Slew angle	105°
Max. linear tool movement	4m
Heavy duty shielding for falling objects	

### SCALING TOOLS

- Epiroc SB 302 T, hydraulic impact hammer:
 

Impact rate	max. 1400 bpm
Weight	300 kg
Max. hydraulic input	20 kW
Tool diameter	80 mm
- Epiroc SB 452 T, hydraulic impact hammer:
 

Impact rate	max. 1250 bpm
Weight	450 kg
Max. hydraulic input	25 kW
Tool diameter	95 mm

### SCALING PROCESS

Hydraulically powered 0.4 m<sup>3</sup>/min compressor for air flushing of hammer's tool

Dust suppression system (hydraulic operated water pump, piping and valves) with:

- Without hose reel (only hose coupling)
  - Manually operated reel. Hose ID 1", length on the reel 30 m
  - Hydraulically operated reel. Hose ID 1", length on the reel 120 m

Automatic hammer lubrication

### ENGINE AND TRANSMISSION

- **Volvo Penta TAD851VE, 185 kW/2200 rpm, with engine brake, Tier 3 / Stage IIIA approved**

Fuel tank capacity: 280 l

**Dana T14 series powershift transmission with lock-up**

4 speeds forward and 3 reverse

4-wheel drive

Gear selector:
 
  - Manual
  - Automatic

- **Volvo Penta TAD881VE, 185 kW/2200 rpm, with engine brake, Stage V approved**

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

Diesel particulate filter (DPF)

Selective catalytic reduction (SCR)

Fuel tank capacity: 280 l

DEF tank capacity: 25 l

**Dana T14 series powershift transmission with lock-up**

4 speeds forward and 3 reverse

4-wheel drive

Gear selector:

- Manual
- Automatic

### PERFORMANCE

Tramming speed (horizontal) 30 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.

### CONTROL SYSTEM

NorSmart 3 control and diagnostic system to control:

- Scaling boom
- Process functions
- Carrier functions
- Safety elements
- Fault diagnostics
- Data logging

### AXLES AND BRAKES

Load end axle:

Dana 113 series fixed

Engine end axle:

Dana 113 series with +/-7° oscillation

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

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

Interactive brake testing possible from cabin

## TYRES AND RIMS

### Tyres:

Nokian Tyres 14.00–24"

### Rims:

- Standard rims
- NDT inspected rims

## STEERING

Orbitrol type hydraulic frame steering

Frame articulation +/- 40°

## HYDRAULIC SYSTEM

Dual circuit hydraulic system (separate circuits for chassis and scaling process)

Variable displacement pump system for carrier and boom:

190 bar, 180 l/min at 2200 rpm

Variable displacement pump system for scaling process:

190 bar, 150 l/min at 2200 rpm

Additional bypass filtering system

Hydraulic oil tank capacity (chassis circuit) 180 l

Hydraulic oil tank capacity (process circuit) 215 l

## 24 VDC ELECTRICAL SYSTEM

LED driving and indicator lights

LED work lights

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

### Cabin type:

Enclosed cabin FOPS/ROPS approved

Cabin lift: + 600 mm

Cabin tilt: 15°

### Driver's seat and seat belt:

- Mechanically suspended seat with 3-point seat belt
- Air suspended seat with 3-point seat belt

### Cabin safety features:

- Cabin door safety interlock switch applies safety brake
- Cabin up-position warning
- Puddle lights
- Wide-angle mirrors
- Neutral gear interlock applies safety brake
- Powder extinguisher 6 kg

### Operator controls:

- Ergonomically designed operating controls for efficient scaling work
- Foot pedal for hammer operation
- Touch screen display for monitoring machine's operational functions and NorSmart 3 operating system interface

## 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:

- 6 kg
- 12 kg
- Ansul Sentry

Number of extinguishers:

- 1
- 2

Front support legs

Rear support legs

Painting and taping:

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

Text labels in:

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

Measurements:

- Noise
- Vibration
- Emissions

## ACCESSORIES

### PROCESS PRODUCTIVITY

- Hammer maintenance tools for Epiroc SB 302 T
- Hammer maintenance tools for Epiroc SB 452 T
- Hammer tools for Epiroc SB 302 T
  - Moil point (Conical)
  - Blunt
  - Chisel
- Hammer tools for Epiroc SB 452 T
  - Moil point (Conical)
  - Blunt
  - Chisel
- Hydraulic operated dozer blade
- Chassis hydraulic circuit oil cooler for hot climate
- Radio remote control for remote drive (RDS) and process functions
- Boom hydraulic cylinder protection (Kevlar)
- Water tank for dust suppression system 550 l
- Additional dust suppression nozzles for boom
- Boot and cabin floor washer
- Pressure washer gun with reel and hose 20 m (operated by dust suppression system)

- High voltage electrical system:

Hydraulic power pack 55 kW:

Pump for carrier 125 l/min at 1500 rpm

Pump for process 100 l/min at 1500 rpm

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 (AN/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:

Hydraulically driven reel with spooling device

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)

Supports pilot circuited electric supply

Cable size: 3x25+3G6+2x1x1

Cable reel capacity: 150 m

## CARRIER PRODUCTIVITY

- Accessories for enclosed cabin:
  - Audio system
  - Air conditioning with heating
  - 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
- Auto engine shutdown during idling
- Engine shutdown delay
- Inlet plug for jump start
- Block heater with interior heater and battery charger 230 V
- Block heater with interior heater, battery charger, hydraulic oil and filter heaters 400 V
- Fuel operated pre-heater
- Fast fuel filling system
- Hand pump for filling of hydraulic tank
- Fluid evacuation panel with sampling points
- Automatic lubrication system
- Reversing camera
  - 2 cameras, 1 display
  - 6 cameras, 3 displays
  - 6 cameras, 3 displays. OACR/VCR system recording device with 72 hour memory
- Spare rim and tyre
- Seat cover
- Toolbox and maintenance tools
- Stand-alone vacuum pump for hydraulics service
- 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
- Emergency escape system (When activated machine automatically lifts support legs, dozer blade and engage reverse gear with audible and lights alarm)
- Trainers seat and safety belt
- Seat belt interlock switch applies safety brake
- Fire extinguisher system
  - Dry chemical
    - Ansul A-101
      - Manual
      - Automatic, Checkfire 110
    - Liquid agent
      - Ansul LVS
        - Manual
        - Automatic, Checkfire 110
      - Twin-agent
        - Ansul A-101/LVS
          - Manual
          - Automatic, Checkfire 110
  - Gear lockout:
    - Forward:
      - Highest gear locked out
      - 2 highest gears locked out
    - Reverse:
      - Highest gear locked out
      - 2 highest gears locked out
  - Front and rear grounding straps
    - Flat cable
    - Chain
  - Pump for brake release
    - Electric pump
    - Hand pump
  - Redundant brake monitoring system
  - Methane monitoring system
  - Tyre pressure indicators
  - Warning triangles
  - Flashlight with charger
  - Hearing protectors
  - Wheel chocks with brackets
  - Service isolator for starter



## 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
<b>1.1 Classroom training</b>		
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	
<b>1.2 Practical training</b>		
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

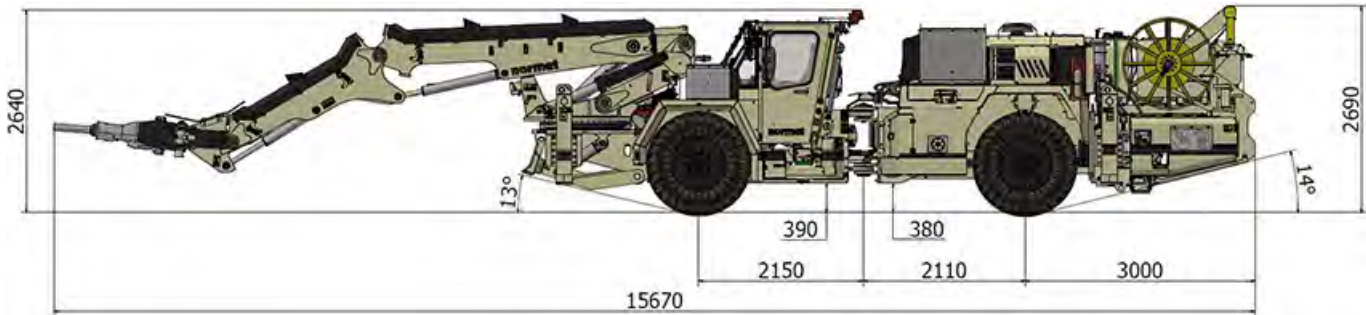
## 2. MAINTENANCE AND REPAIR TRAINING

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

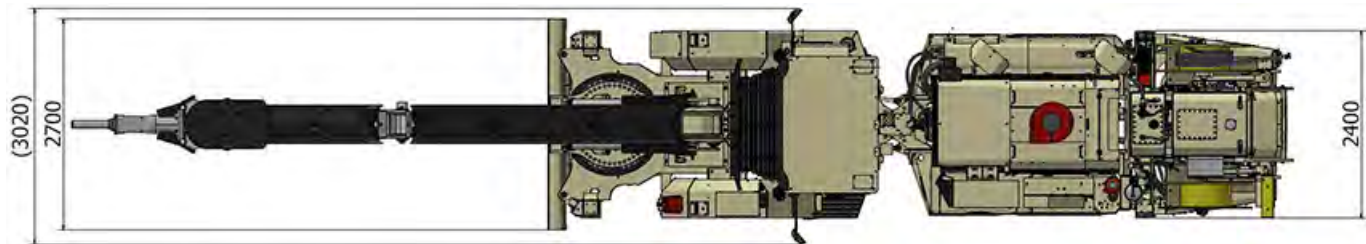
## DIMENSIONS

Length	15670 mm	Track	1950 mm
Width	2700 mm	Ground clearance as shown	260 mm
Height	2690 mm	Turning radius outer	7550 mm
Wheel base	4260 mm	Turning radius inner	4660 mm

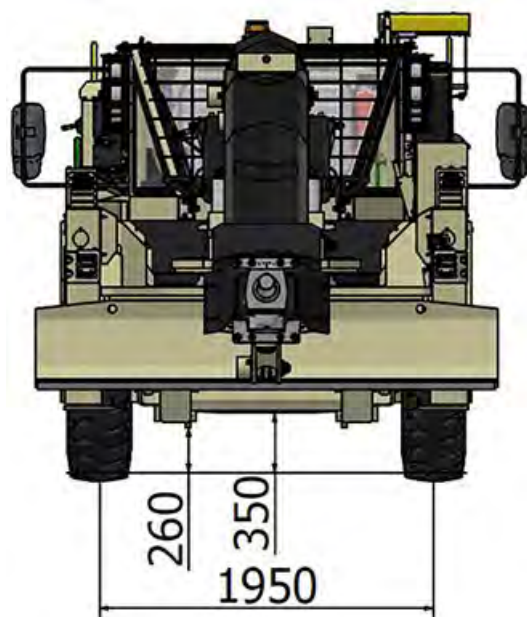
### SIDE VIEW – BASIC MACHINE



### TOP VIEW



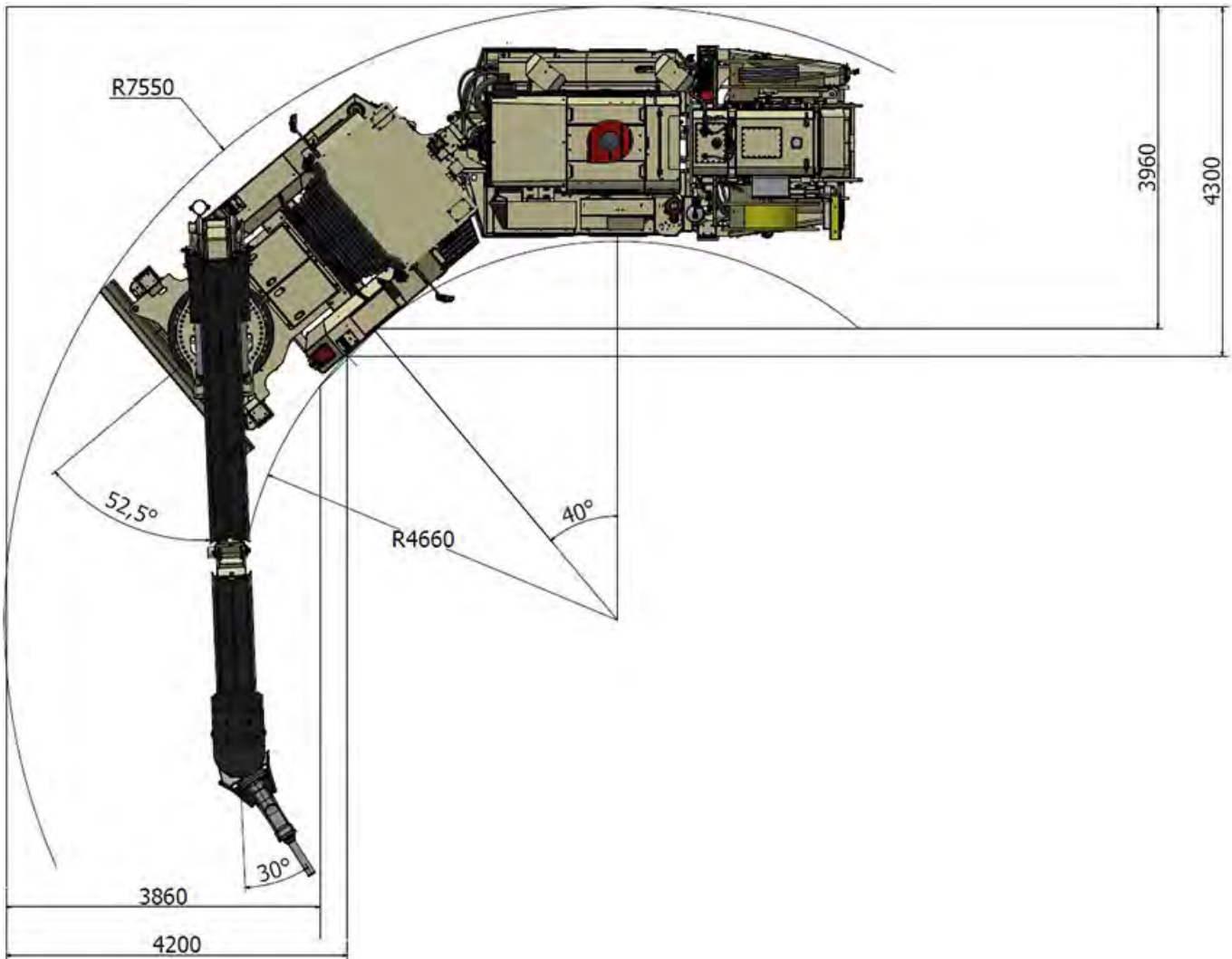
### FRONT VIEW



Normet reserves the right to change this specification without further notice

Pictures may include options and additional equipment.

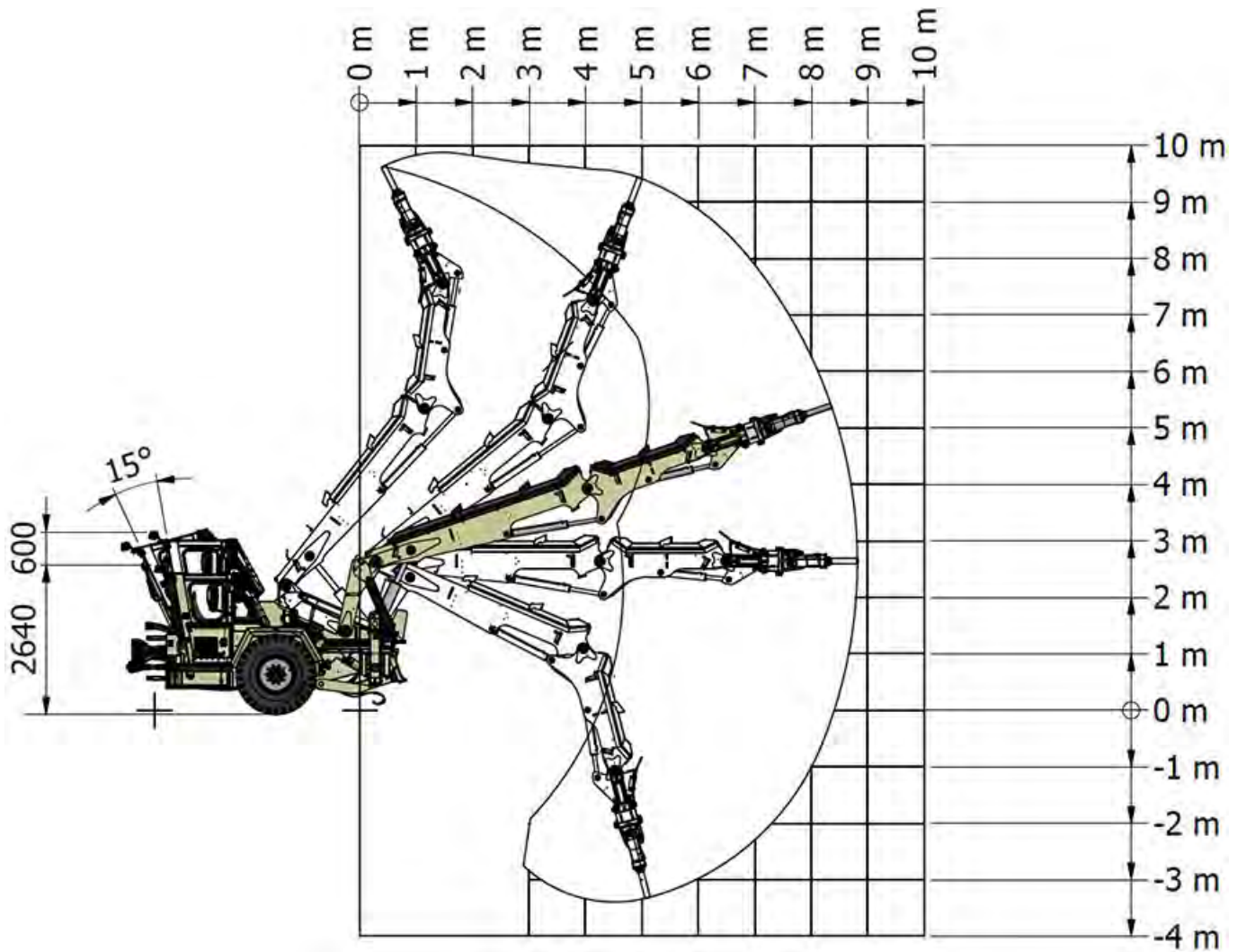
## TURNING RADIUS



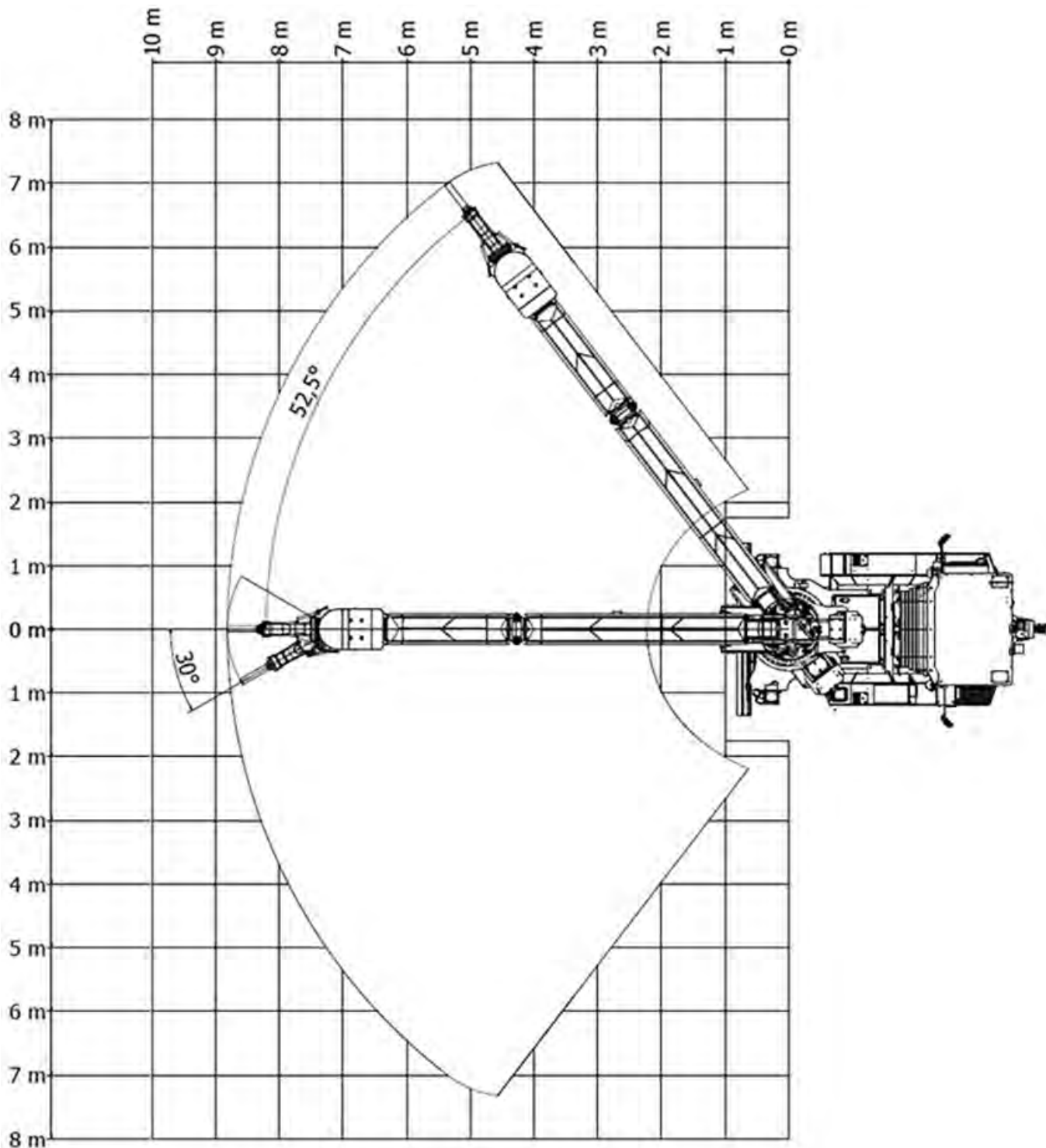
Normet reserves the right to change this specification without further notice

Pictures may include options and additional equipment.

## BOOM REACH



## BOOM REACH

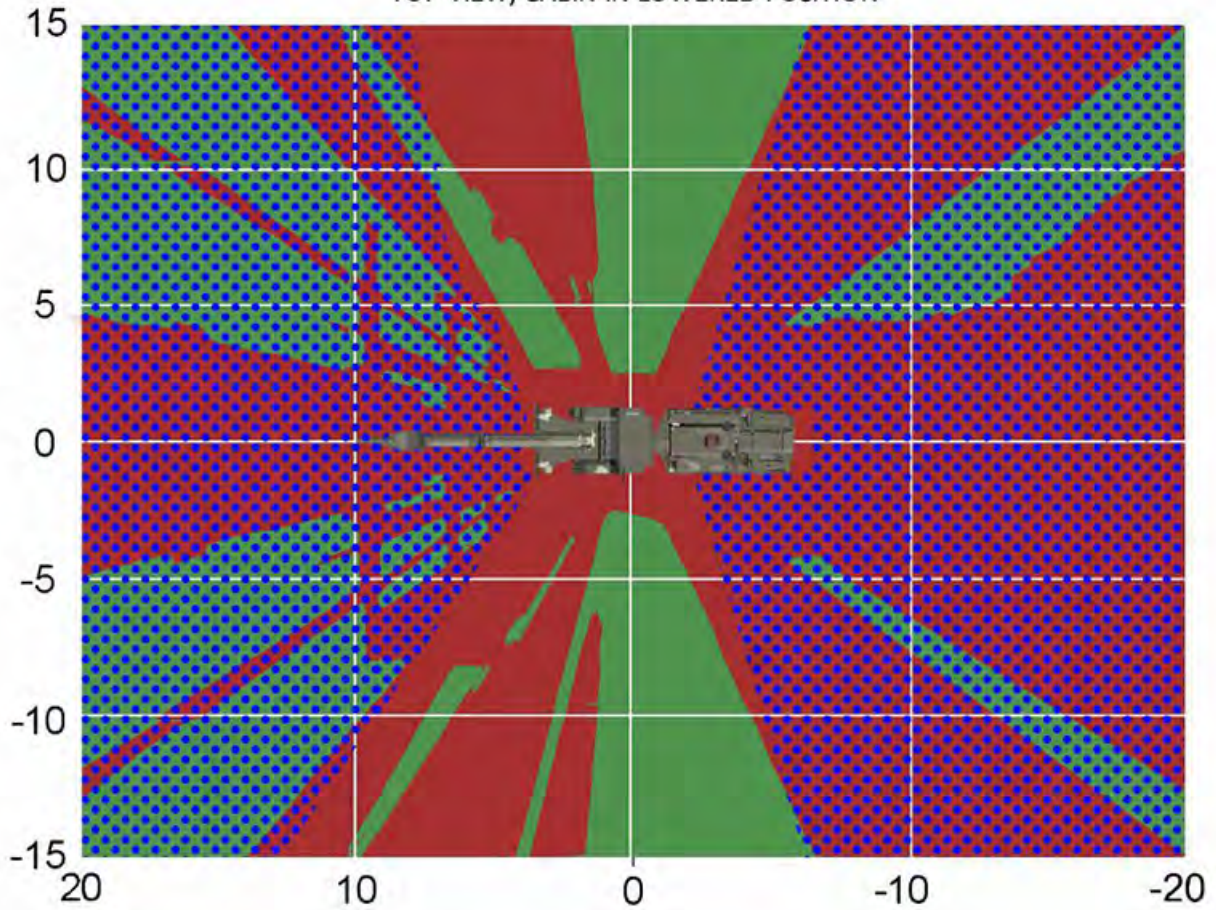





Normet reserves the right to change this specification without further notice

Pictures may include options and additional equipment.

## VISIBILITY MAP

TOP VIEW, CABIN IN LOWERED POSITION



-  Visible area
-  Blind area
-  Camera visibility area

## TRACTIVE EFFORTS

### OPERATING WEIGHT

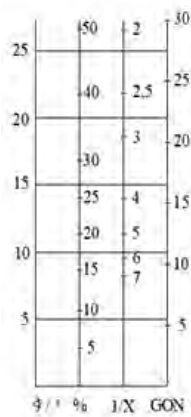
Operating weight

26 000 kg

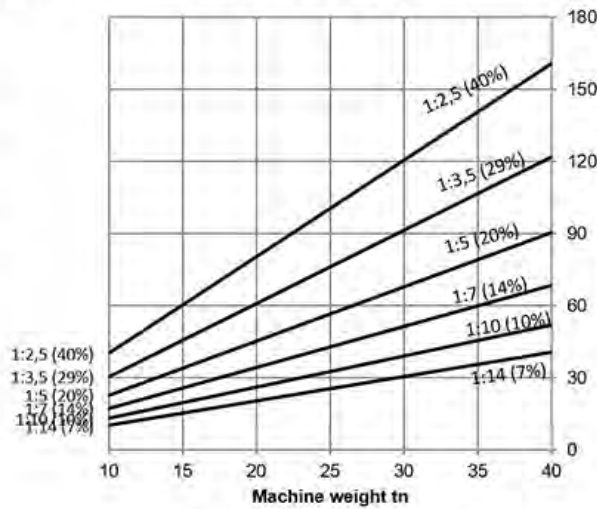
### VOLVO PENTA TAD 851/881 185 KW

Performance curve with turbine lock-up DOC059932

#### Conversion chart



#### Gradeability kN



#### Tractive effort kN

