

SANDVIK MR361 ROADHEADER

PRODUCT SPECIFICATION / MR361nEx_2020.521_REV2

Sandvik MR300 Series roadheaders are very powerful and highly effective rock cutting machines designed to excavate roadways, tunnels and underground chambers continuously without using explosives. They are equipped with high experience based, geometrically optimized, transverse cutter heads proven to give the best cutting performance in a wide range of rock formations.

Powered electro-hydraulically, they emit no fumes and are used extensively in coal mining, mineral mining and underground construction projects, where their ability to excavate the desired profile without causing severe and harmful vibrations is highly valued for both environmental and safety reasons.

This medium sized roadheader has a powerful transverse cutter head mounted on a robust cutter boom. It is designed to excavate considerably strong rock / rock mass of up to 80 MPa uniaxial compressive strength. The MR361nEx is a PLC (programmable logical controller) controlled machine and global as well as country-specific standards and regulations are considered to satisfy special customer needs and requirements.

KEY FEATURES AND BENEFITS

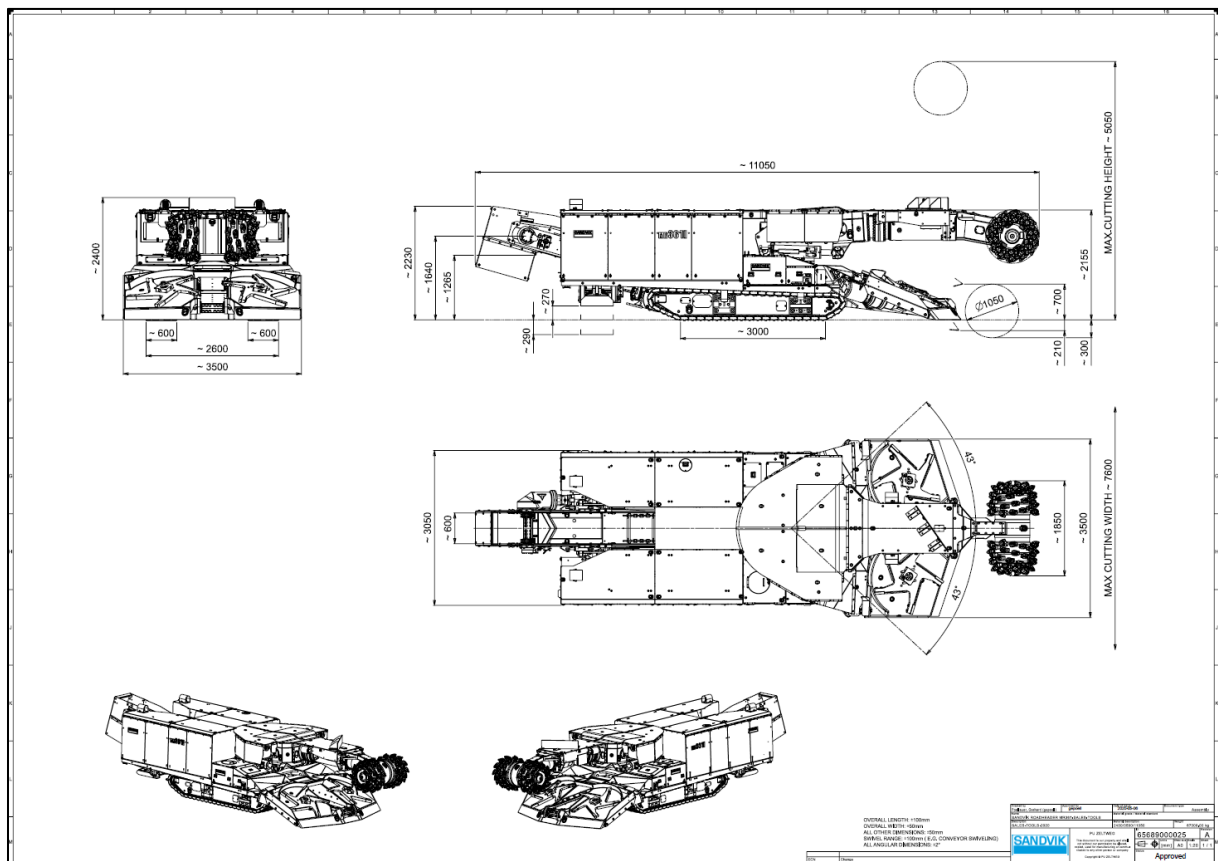
- Improved safety features ensure safe underground working conditions and less operational hazards.
- Different cutter heads for a wide range of rock conditions and applications serve for high versatility in machine operation.
- Various digitalization options like Cutronic (automated cutting cycle), which enables semi-autonomous machine cutting operation, optimize customer value.



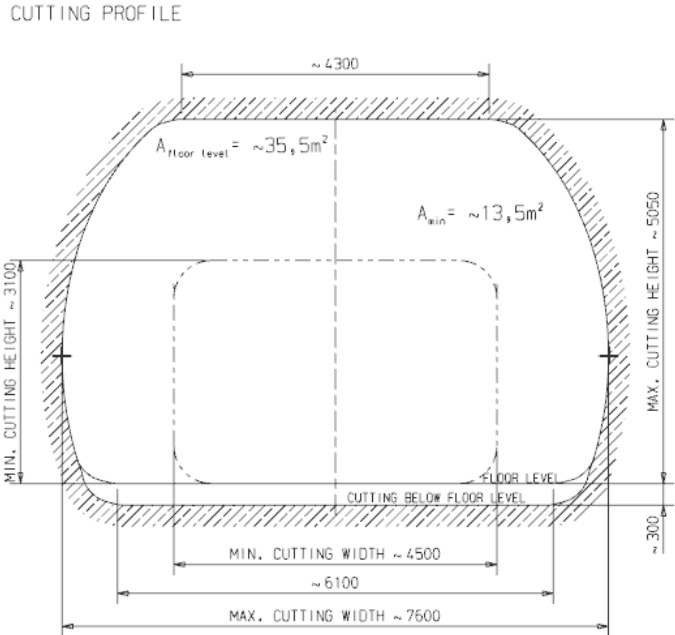
Machine Basics

Item	Figure	Unit
Weight	~ 67	[t]
Ground pressure	~ 0.17 – 0.19	[N/mm ²]
Total installed power	422 (S1) / 452 (S6)	[kW]
Maximum navigable in- & decline gradient	+/- 18	[°]
Maximum navigable side gradient	+/- 5	[°]
Cone radius	~ 25	[m]
Basin radius	~ 20	[m]

Overall machine dimensions

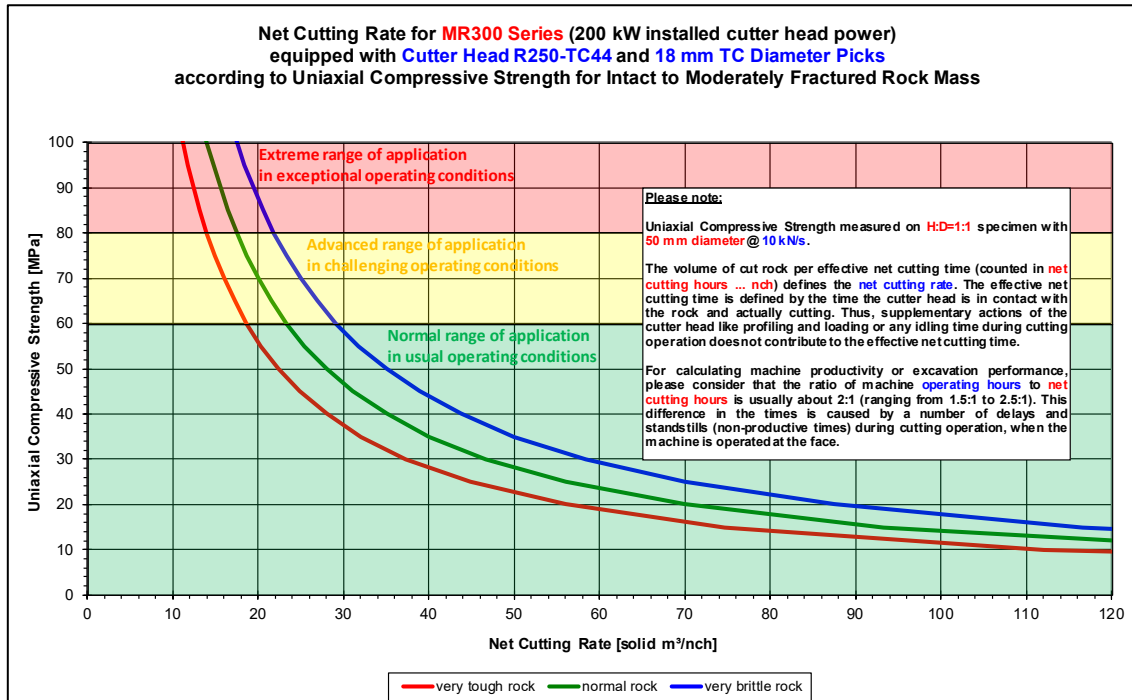


Cutting profile dimensions

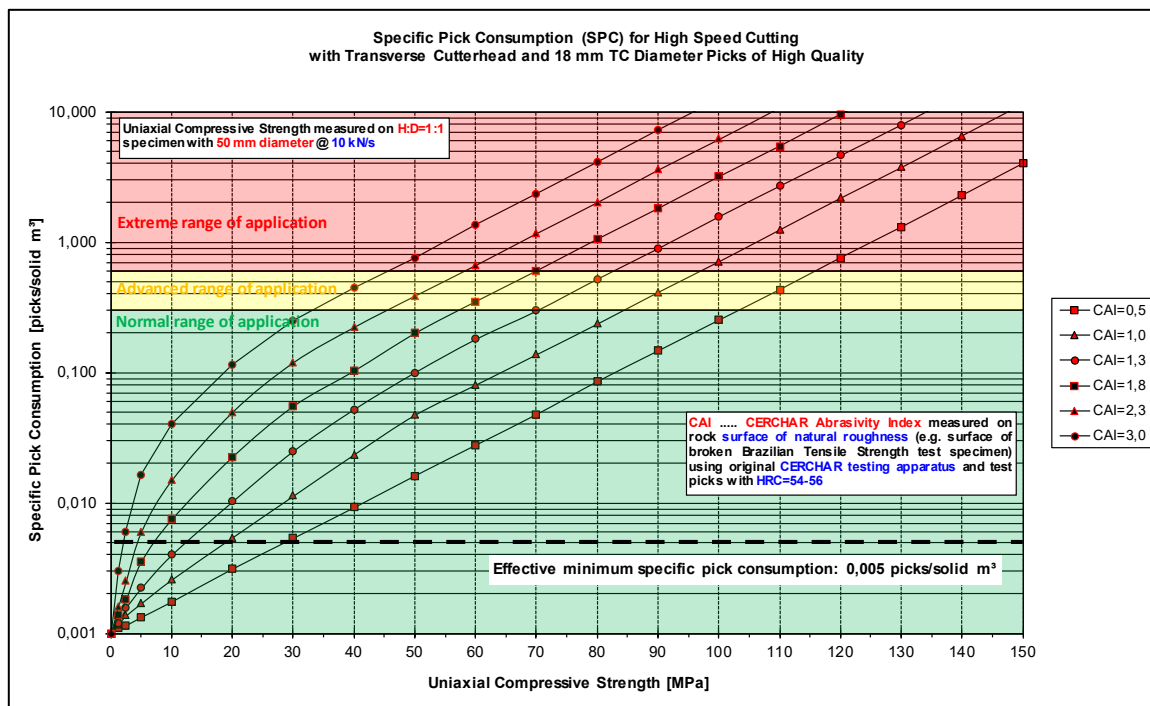


Cutting dimensions for machine in basic configuration!

Net Cutting Rate referring to Selection and Configuration of Cutting Unit and to Geological Conditions and Cross Section Size



Specific Pick Consumption referring to Selection and Configuration of Cutting Unit and to Geological Conditions



Machine Details

Conditions for Use & Dimensions

Standard items

Machine length with short, straight double chain conveyor	~ 11.05	[m]
Maximum navigable in- & decline gradient	+/- 18	[°]
Maximum navigable side gradient	+/- 5	[°]
Cone radius	~ 25	[m]
Basin radius	~ 20	[m]
Machine width over loading table	~ 3.5	[m]
Machine width over crawler tracks	~ 2.6	[m]
Machine height in basic configuration without conveyor	~ 2.2	[m]
Machine height in basic configuration @ top of lowered conveyor	~ 2.3	[m]
Machine weight in basic configuration	~ 67	[t]
Ground clearance @ rear support	~ 270	[mm]
Machine ground pressure in basic configuration (min. - max.)	~ 0.17 - 0.19	[N/mm ²]
Total installed power S1 / S6	422 / 452	[kW]
Maximum cuttable uniaxial compressive strength	up to 80	[MPa]

Assembly Group #01 – Cutter Head

Standard cutter head for soft / weak rock / rock mass conditions

Cutter head type	R251-TC38	
Typical range of operation	10 - 40	[MPa]
Pick block type	EF58T/BRD	
Cutting speed @50Hz / @60Hz	2.31 / 2.76	[m/sec]
Pick type	P7JU-3870-2162	
Pick tip type	Insert	
Pick tip diameter	18	[mm]
Pick head length	70	[mm]

Optional cutter head for moderately hard / strong rock / rock mass conditions

Cutter head type	R251-TC44	
Typical range of operation	20 - 60	[MPa]
Pick block type	EF58T/BRD	
Cutting speed @50Hz / @60Hz	2.31 / 2.76	[m/sec]
Pick type	P7JU-3870-2162	
Pick tip type	Insert	
Pick tip diameter	18	[mm]
Pick head length	70	[mm]

Optional cutter head for significantly hard / strong rock / rock mass conditions

Cutter head type	R251-TC50	
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Typical range of operation	40 - 80	[MPa]
Pick block type	EF58T/BRD	
Cutting speed @50Hz / @60Hz	2.31 / 2.76	[m/sec]
Pick type	P7JU-3870-2162	
Pick tip type	Insert	
Pick tip diameter	18	[mm]
Pick head length	70	[mm]

Optional items

High wear resistance for cutter head

Assembly Group #03 – Cutter Gear

Standard items

Cutter gear CG251 for transversal cutter head		
Cutter gear weight for CG251	~ 2.25	[t]
Cutter gear configuration for CG251 @ 50Hz		
Output rotation speed for CG251 @ 50Hz	~ 42	[rpm]
Gear oil capacity	~ 80	[l]
Gear oil type for ambient temperature >10°C	Sandvik oil with viscosity 320	
Gear oil pump flow system		
Gear oil filtering and cooling system (OMFCS II)		
Gear oil temperature monitoring	analog	
Gear oil pressure monitoring	analog	
Gear oil filter electric clogging indicator	digital	

Optional items

Gear oil type for ambient temperature <10°C Sandvik oil with viscosity 220

Assembly Group #04 – Cutter Boom

Standard items

Minimum cutting height	~ 3000	[mm]
Maximum cutting height	~ 5050	[mm]
Minimum cutting width	~ 4500	[mm]
Maximum cutting width	~ 7600	[mm]
Minimum cutting profile area	~ 13	[m ²]
Maximum cutting profile area	~ 36	[m ²]
Maximum undercut below floor level	~ 300	[mm]
Cutter boom slewing time in fast speed for complete slewing range	~ 20	[sec]
Cutter boom lifting time in fast speed	~ 60	[sec]
Cutter boom lowering time in fast speed	~ 40	[sec]
Cutter boom horizontal slewing time (setup @ site)	~ 25 - 30	[sec]
Cutter boom vertical slewing time (setup @ site)	~ 80 - 100	[sec]

Assembly Group #05 – Turret Assembly

Standard items

Turret with linear transducer (1x)		
Turret slewing angle	2 x 43	[°]
Vertical lifting cylinders with linear transducers (2x)		

Assembly Group #06 – Loading System

Standard items

Loading device width linear transducers (2x)		
Loading device in wear resistant layout (5mm thick wear plates as top layer and heat-treated steel on chain guides)		
Loading device with fixed width	~ 3500	[mm]
Loading device lifting distance above floor	~ 700	[mm]
Loading device lowering distance below floor	~ 210	[mm]
Maximum cut material bunkering capacity	~ 3	[m ³]
Loading stars on left and right side of loading device driven by two electric motors (one motor for each loading star)	2 x 36	[kW]
Loading gear ratio	49.78	
Loading star output speed @ 50Hz	~ 29	[rpm]

Optional items

Loading stars on left and right side of loading device driven by two hydraulic motors (one motor for each loading star, theoretical power)	2 x 65	[kW]
Loading star output speed @ 60Hz	~ 35	[rpm]
Loading device with fixed width @ 2x split	~ 3500	[mm]
Loading device with fixed width	~ 4200	[mm]
Loading device with fixed width @ 2x split	~ 4200	[mm]
Loading device with fixed width	~ 4500	[mm]
Loading device with fixed width @ 2x split	~ 4500	[mm]
Loading device with variable width @ 2x split	~ 4600 - 5200	[mm]
Loading device with variable width @ 4x split	~ 4600 - 5200	[mm]
Loading device with variable width @ 2x split	~ 5100 - 5800	[mm]
Loading device with variable width @ 4x split	~ 5100 - 5800	[mm]

Assembly Group #07 – Conveying System

Standard items

Straight, fixed height, wear resistant double chain conveyor (5mm thick wear plates as top layer and heat-treated steel on chain guides)		
Conveyor discharge height	~ 1640	[mm]
Conveyor chain type DIN 22252-2	19 x 64.5	[mm]
Conveyor chain running speed adjustable with variable hydraulic pump	~ 0.5 - 0.9	[m/s]
Conveyor hydraulic drive motor theoretical power @ 0.9m/s	1 x 65	[kW]
Conveyor hydraulic drive motor variable adjustment	0.160 - 0.070	[cm ³ /rev]

Conveyor width	~ 600	[mm]
Maximum conveyor capacity	~ 300	[m ³ /h]
Chain conveyor running monitoring		
Chain conveyor pressure monitoring		

Optional items

Vertical slewing option for straight double chain conveyor		
Slewing single chain conveyor hydraulically driven (theoretical power)	1 x 65	[kW]
Slewing single chain conveyor electrically driven	1 x 36	[kW]
Single chain conveyor slewing angle	2 x 45	[°]
Machine length with slewing single chain conveyor	~ 13.6	[m]
Maximum discharge height of slewing single chain conveyor	~ 2950	[mm]
Maximum machine height with slewing single chain conveyor @ upper edge of conveyor in down position	~ 2800	[mm]
Width of slewing single chain conveyor	~ 600	[mm]
Running speed of slewing single chain conveyor adjustable with variable hydraulic pump	~ 0.5 - 0.9	[m/sec]
Slewing belt conveyor hydraulically driven (requires short double chain conveyor without rear bumper)		
Slewing belt conveyor hydraulically driven (theoretical power)	1 x 30	[kW]
Machine length with slewing belt conveyor	~ 17.4	
Machine weight with slewing belt conveyor	~ 73	
Maximum discharge height of slewing belt	~ 3800	
Minimum machine height with slewing belt conveyor @ upper edge of conveyor in down position	~ 2500	
Width of slewing belt conveyor	~ 800	
Running speed of slewing belt conveyor in fast mode	~ 1.6	
Slewing belt conveyor running monitoring		
Slewing belt conveyor belt slip monitoring		

Assembly Group #08 – Crawler Track System

Standard items

Track frame left and right side bolted with frame		
Tramming theoretical power (hydraulic drive)	2 x 60	[kW]
Tramming speed forward (variable)	~ 0 - 15	[m/min]
Slow tramming speed	~ 0 - 4.5	[m/min]
Medium tramming speed	~ 0 - 9	[m/min]
Fast tramming speed	~ 9 - 15	[m/min]
Reverse tramming speed	~ 0 - 15	[m/min]
Track gear (2x)		
Track chain width	~ 600	[mm]
Track length on ground	~ 3000	[mm]
Track overall width - track exterior	~ 2600	[mm]
Track brake release (2x)		
Track tensioning device (2x)		

Crawler track left and right side gearbox (2x - 1 side each)		
Gear oil type for ambient temperature >10°C	Sandvik oil with viscosity 320	

Optional items

Gear oil type for ambient temperature <10°C	Sandvik oil with viscosity 220	
Large width crawler tracks for lower ground pressure	~ 720	[mm]
Track overall width - track exterior	~ 2840	[mm]
Machine ground pressure (min. - max.)	~ 0.15 - 0.17	[N/mm ²]

Assembly Group #09 – Frame

Standard items

Solid frame construction		
Rear bottom stabilizer linked via pins to machine frame		
Rear bottom stabilizer distance above floor @ retracted	~ 270	[mm]
Rear stabilizer distance below floor @ extracted	~ 290	[mm]
Rear bottom stabilizers - synchronized movement (1 solenoid)		
Rear bottom stabilizers - auto function DOWN for machine stabilization		
Rear bottom stabilizers - auto function UP for machine tramming		

Optional items

Split frame construction		
Rear bottom stabilizers - separate movement (2 solenoids)		

Assembly Group #10 – Electric Motors

Standard items

Cutter motor power (water cooled @ S1 / S6 mode)	1 x 200 / 230	[kW]
Hydraulic motor power (air cooled @ S1 mode)	1 x 150	[kW]
Loader motor power (water cooled @ S1 mode)	2 x 36	[kW]

Optional items

Conveyor motor power (water cooled @ S1 mode) and loaders hydraulically driven	1 x 36	[kW]
Total installed power S1 / S6 with alternative conveyor motor	386 / 416	[kW]

Assembly Group #11 – Electrics, Electronics & Control System

Standard items

Main electrical enclosure SANDVIK SMV nEx-12 1000V / 50Hz / IP55		
Control system PLC B&R X20		
Data logging (SCU, data via OPC available, FDM ready)		
Display integrated in electric main panel		
Type of solenoid valves	24 V nEx	

SIL 2 emergency stop on main panel	1	[pcs.]
SIL 2 emergency stops on machine (2 on left side of machine and 2 on right side of machine)	4	[pcs.]
Supply voltage monitoring		
Monitoring of current consumption / supply of all electric motors		
Monitoring of all electric motor functions on display		
Monitoring of all hydraulic functions on display		
Monitoring of all sensors		
Fault monitoring of analog sensors		
Hydraulic motor hour meter (running hours)		
Cutter motor hour meter (running hours)		
Cutter motor net cutting hour meter (running hours @ motor load >50%, counting of net cutting hours)		
Loader motor left and right side hour meters (running hours)		
Conveyor motor hour meter (running hours)		
LED front headlight on cutter boom 24VDC	2	[pcs.]
LED front headlight on turret 24VDC	2	[pcs.]
LED rear / back headlight 24VDC	1	[pcs.]
LED area headlight 24VDC	2	[pcs.]
LED area floodlight 24VDC	4	[pcs.]
Emergency lighting (area light with rechargeable battery pack)	1	[pcs.]
Flash light red with sounder (for pre-start warning)	2	[pcs.]
Flash light white with sounder (for tramming reverse warning)	2	[pcs.]
Optional signal light orange (for radio remote control active warning)	1	[pcs.]
Optional signal light orange (for automatic cutting cycle active warning)	1	[pcs.]
Trailing cable pulling force protection		
Radio remote control system (1x RRC, 1x charger, 3x batteries)		
Radio remote control cable connection		
On-board basic WiFi communication		

Optional items

Spare part radio remote control (1x RRC, 1x charger, 3x batteries)		
Additional external display		
Cable from main panel to cable socket NSSHoeu 3 x 120		
Trailing cable plug / socket CAVOTEC PC5-TX04-1502R-1100V		
Trailing cable segment 3*95mm ²	100	[m]
4kVA / 230V socket for electric hand tools	2 x 30 (max.)	[kW]
60Hz package		
Star-delta-start for 200/230kW cutter motor		
Soft-start for 150kW hydraulic motor		
Interface for proximity detection system (PDS)		

Assembly Group #12 – Brackets & Covers

Standard items

Anti-slip coating on platforms		
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Weight limitation of covers - as per country regulations

Railing - as per country regulations

Assembly Group #13 – Hydraulic System

Standard items

Hydraulic cylinders with CrNi standard coating		
Mineral based hydraulic fluid		
Variable axial piston pump combination for main functions		
Vane pump combination for secondary functions		
Hose type	Semperit	
Fitting type (standard)	ORFS (flat seal)	
Maximum hydraulic pump pressure	330	[bar]
Solenoids nEx	24	[V]
Total hydraulic oil volume	~ 700	[l]
Hydraulic tank volume	~ 400	[l]
Bypass filter visual clogging indicator		
Return filter visual clogging indicator		
Brake release		
Oil re-filling device electrically driven 24VDC		
Oil level / temperature sensor (combined)	analog	
Bypass filter electric clogging indicator		
Return filter electric clogging indicator		
Pressure sensors for main hydraulic pumps		
Hydraulic oil type for standard ambient temperature (>15°C and <30°C)	Sandvik oil with viscosity 46	

Optional items

Hydraulic oil type for high ambient temperature (>30°C)	Sandvik oil with viscosity 68
Hydraulic oil type for low ambient temperature (<15°C)	Sandvik oil with viscosity 32
Hydraulic cylinders with special acidic water resistant coating	
Fitting type (on special request)	DKO
Fitting type (on special request)	JIC
Connection for additional tooling system (2x – 1x left & 1x right)	
Connection for BU2900 roof bolting rig	
Fire resistant hydraulic fluid	

Assembly Group #14 – Operator Stand / Cabin

Standard items

NNo operator stand / cabin @ machine control via radio remote control

Optional items

Closed, air pressure-raised, FOPS certified operator cabin with air-condition and heating system excluding radio remote control

Closed, air pressure-raised, FOPS certified operator cabin with air-condition and heating system including radio remote control		
Machine height with operator stand / cabin	~ 2.9	[m]
Operator stand / cabinwidth	~ 1340	[mm]
Operator stand / cabin length	~ 2360	[mm]
Operator stand / cabin height	~ 1780	[mm]
Front window made of special bullet-proof glass		
Side windows and rear window having safety glass installed		
Fresh air supply filtered via 3 stage filter combination (M5, F7 and H14 filter class)		
Operator seat adjustable with shock absorbers, ergonomic positioned		
Control devices (i-panels) ergonomically located		
LCD operator screen with machine control system visualization (external display in combination with operator cabin replaces internal display in main electrical enclosure SANDVIK SMV nEx-12)		
Switch for operator presence control		

Assembly Group #15 – Lubrication System

Standard items

Automatic, consumption optimized lubrication / greasing system (hydraulically driven) with controlled activation and grease filling control		
Individual grease nipples and grease ledges for manual lubrication		
Grease type	DIN 51825, K2K-25	
Hand lever press with grease nipple tube 0.5kg		

Assembly Group #16 – Cooling & Spraying System

Standard items

The open cooling system is continuously supplied with fresh water for machine cooling and for water spraying for dust suppression		
Water supply volume	~ 50	[l/min]
Water supply temperature range	~ 10 - 35	[°C]
Water supply pressure range	~ 7 - 20	[bar]
Hose type	Semperit	
Fitting type (standard)	ORFS (flat seal)	
Incoming water pressure sensor		
Spraying system with flat nozzles		
Back flushing filter		
Pressure relief valve - 20bar		

Optional items

Pressure reduction valve ~15bar for water supply in high pressure range	~ 10 - 50	[bar]
Water booster pump station for spraying system hydraulically driven		
Water supply monitoring directly on high pressure water pump (pump stop when supply pressure <2-3bar)		
Closed circuit cooling system for maximum 35°C ambient temperature		

Additional hydraulic oil cooling for high ambient temperature	
Fitting type (on special request)	DKO
Fitting type (on special request)	JIC
Spraying nozzle installation on conveyor rear end for dust suppression	

Assembly Group #17 – Accessories & Tools

Standard items

Standard tool set for roadheader machine assembly

Optional items

Special hand tools for roadheader machine assembly
Special tool set for cutter head

Assembly Group #19 – Additional Equipment

Standard items

Mechanical boom stop for cutting arm (safety device)
Hand fire extinguisher 6 kg class ABC
Several lifting devices for basic machine

Optional items

CE - certification package includes ANSUL auto fire suppression system, methane (CH4) monitoring system incl. flash light red with sounder and oxygen (O2) monitoring system incl. flash light blue with sounder
Auto fire suppression system ANSUL
Auto fire suppression system SANDVIK
Basic surface COM via fiber optics (F/O)
Basis surface COM via power line modem (PLM)
Daylight IP camera system integrated
Roadheader guidance system Geodata integrated
General interface for third party roadheader guidance system
Cutronic (cutting automation)
Integrated dust intake channels
Special brackets and covers for container transport

Assembly Group #60 – Operating and Safety Labels

Standard items

Operating / maintenance manual - country language	1	[pcs.]
Parts manual	1	[pcs.]
Safety labels complete - country language	1	[pcs.]
Operating labels complete - country language	1	[pcs.]
Machine approval label - country specific	1	[pcs.]

Assembly Group #99 – Special Customer Requirements and Tests

Standard items

Disassembly, painting, design hours and software validation

Technical documentation: 3x hard copies, 3x electronic copies (1x in English and in 2x customer language)

Factory 4 hour operation test run

Machine tear-down for shipment

SANDVIK MINING AND ROCK TECHNOLOGY

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