



# DS411 ROCK SUPPORT BOLTER

TECHNICAL SPECIFICATION

Sandvik DS411 is a rock reinforcement drill rig that installs all most common rock bolt types in combination with steel wire meshes when required.

Provided with a strong and reliable boom TBR60, it can install from one carrier setup, several rows of rock bolts, from 1.5 m to 3 meters long.

The extremely short but powerful Sandvik RD314 rock drill delivers the best ratio between the rock bolt length and drift height. The rock bolting process is completely mechanized and controlled by a single operator from under a ROPS/FOPS safety cabin or FOPS safety canopy.

As all the Sandvik drill rigs based on the NC7 carrier family, the Sandvik DS411 is designed for safety. For example, most of the daily and routine checks are done with both feet on the ground.

## KEY FEATURES

|                                  |                                |
|----------------------------------|--------------------------------|
| Hydraulic rock drill             | RD314, 14 kW                   |
| Bolting head                     | BH (BH15 to BH30)              |
| Bolting boom                     | TBR60                          |
| Bolt length                      | From 1.5 m to 3 m (5' to 10')  |
| Turning width (T-section)        | 3 900 mm                       |
| Tramming / bolting width         | 2 740 mm / 3 975 mm            |
| Tramming height (cabin / canopy) | 2 940 mm / 2 940 mm            |
| Transport / bolting length       | 11 370 mm / 10 950 mm          |
| Total weight                     | 23 000 kg depending on options |



Scan or click to see the video.

## HYDRAULIC ROCK DRILL

|                     |                             |
|---------------------|-----------------------------|
| Type of rock drill  | RD314 (TS2-137)             |
| Percussion power    | 14 kW                       |
| Percussion pressure | Max. 160 bar                |
| Percussion rate     | 110 Hz                      |
| Rotation speed      | Max. 520 rpm (with OMS 100) |
| Rotation torque     | 340 Nm (with OMS 100)       |
| Hole size (bolting) | 33 - 43 mm                  |
| Shank adapter       | 45 mm / R32 female          |
| Weight              | 122 kg                      |
| Length              | 571 mm                      |

## BOLTING HEAD

|                        |   |
|------------------------|---|
| Type of bolting head   | BH (TS2-277)                                      |
| Bolting head feed      | KS140   |
| Bolt carousel capacity | 8 rock bolts with 150 x 150 mm maximum plate size |
| Bolt head length       | Max. 4 142 mm (BH30)                              |
| Net weight             | 1 720 kg (with RD314)                             |

## BOLTING BOOM

|                  |                 |
|------------------|-----------------|
| Type of boom     | TBR60 (TS2-327) |
| Boom extension   | 1 200 mm        |
| Boom weight, net | 2 200 kg        |
| Roll-over angle  | 358°            |

## HYDRAULIC SYSTEM

|                                     |                               |
|-------------------------------------|-------------------------------|
| Powerpack                           | HPP355 (1 x 55 kW)            |
| Percussion pump                     | 100 cc (variable)             |
| Rotation pump                       | 33 cc (gear)                  |
| Filtration size (pressure / return) | 20 µ / 12 µ                   |
| Oil tank volume                     | 200 liters                    |
| Oil tank filling pump               | Electric                      |
| Cooler for hydraulic oil            | OW30 oil-to-water (1 x 30 kW) |

## CONTROL SYSTEM

|                        |   |
|------------------------|---|
| Type of control system | TPC301 EW   |
| Power control          | Adjustable full power<br>Adjustable collaring power                   |
| Anti-jamming control   | Adjustable anti-jamming pressure                                      |
| Rotation control       | Adjustable rotation speed<br>Reversible rotation                      |
| Flushing control       | Water flushing flow and pressure control<br>air-mist flushing, option |
| Returns automatics     | Rock drill  |

## ELECTRIC SYSTEM

|  |   |
|--|---|
| Standard voltages                              | 380 - 690 V (± 10%), 50 or 60 Hz                    |
| Total installed power                          | 70 kW   |
| Main switch                                    | MSE 10  |
| IP classification                              | Specification TS2-132                               |
| Starting method                                | Star delta 380 V - 690 V<br>Soft starter 575 V      |
| Automatic cable reel                           | TCR3E with spooling system                          |
| Cable reel control                             | Operator station and remote control at rear machine |
| Batteries                                      | 2 x 12 V, 145 Ah                                    |
| Auxiliary outlet                               | 1 x 110 V or 1 x 230 V, 16 A                        |
| Battery jump start                             | Standard  |
| Front lights<br>(combined working and driving) | 6 x 50 W LED (4 200 lm, 6 000 K)                    |
| Rear lights<br>(combined working and driving)  | 4 x 50 W LED (4 200 lm, 6 000 K)                    |
| Remote search light                            | 1 x 50 W LED (4 200 lm, 6 000 K)                    |
| Rear parking / brake lights                    | 2 x Red LED (24V)                                   |
| Stair and service lights                       | LED (24 V)  |

## AIR AND WATER SYSTEM

|                                     |                                      |
|-------------------------------------|--------------------------------------|
| Flushing                            | By water                             |
| Water booster pump                  | WBP1                                 |
| Water pump capacity                 | 50 l/min                             |
| Water pump inlet pressure           | 2 bar (Min.)                         |
| Flushing water pressure             | 10 - 15 bar                          |
| Shank lubrication device            | SLU1 (air / oil mist)                |
| Rock drill oil consumption          | 100 - 200 g/h                        |
| Rock drill air consumption          | 150 - 250 l/min                      |
| Air compressor                      | CTN10, 1 m <sup>3</sup> /min (7 bar) |
| Air cleaner for external air supply | IP5                                  |

## OPERATOR'S SAFETY CABIN

|  |   |
|--|---|
| Safety cabin                               | FOPS / ROPS (ISO 3449 / 3471)                                       |
| Operation                                  | Seated drilling and tramming  |
| Sound pressure level according to EN 16228 | Operator station: 76 dB(A)  |
| Seat                                       | Ergonomic, adjustable for tramming and drilling including seat belt |
| Air conditioning system                    | For drilling and tramming   |
| Audio system                               | CD / MP3-player, radio and loudspeakers                             |
| Boot washer                                | At cabin entrance   |
| Cabin safety grill                         | Standard  |

## CARRIER

|                              |   |
|------------------------------|---|
| Type of carrier              | NC7N (frame-steered)  |
| Carrier articulation         | ± 35°   |
| Rear axle oscillation        | ± 10°   |
| Ground clearance             | 420 mm  |
| Diesel engine                | MB OM904LA, 110 kW, Tier 3, Stage IIIA  |
| Exhaust catalyzer + muffler  | Standard  |
| Transmission                 | Hydrodynamic, Spicer T20 000  |
| Axles                        | Dana Spicer   |
| Tires                        | 14.00-20  |
| Service brakes               | Hydraulic wet disc brakes   |
| Parking and emergency brakes | SAHR type, fail safewet disc brakes   |
| Tramming speed               | 16 km/h (Horizontal)<br>5 km/h (14%=1:7=8°)   |
| Gradeability / sideways tilt | Max. 15° / 5°   |
| Fuel tank                    | 140 liters  |
| Carrier stabilization        | 2 x TJ40 Vertical (front)<br>2 x TJ60 Vertical (rear)   |
| Hand throttle                | Standard  |
| Centralized greasing points  | Specification 5-2110  |
| Hand held fire extinguisher  | 1 x 7.7 or 9 kg (type ABC)  |
| Tramming alarm               | Standard  |
| Colour scheme                | Sandvik   |
| Documentation                | 2 x Operator's manual<br>2 x Maintenance manual<br>2 x Technical manual (in English only)<br>2 x Parts manual (in English only)<br>2 x Toolman CD |

## OPTIONAL FEATURES AND PACKAGES

### Bolting head

|                         |  |
|-------------------------|--|
| *Bolt carousel capacity | 10 rock bolts for square plate 120 mm<br>12 rock bolts for square plate 100 mm<br>16 rock bolts for square plate 85 mm |
|-------------------------|--|

### Bolting option

|   |   |
|---|---|
| *Bolting alternatives                           | GCR, WI, S, BC, M, K  |
| Automatic resin shooting                        | ARI system (TS2-282)  |
| Bolt storage with a drill bit rack              | Max. 3 meters length (front)                                |
| Bolt storage                                    | Right side  |
| "In the hole" resin cartridges injection system | Specification TS2-290                                       |
| Utility boom                                    | SUB2iA (TS2-360)<br>FOPS safety canopy (optional)           |
| Screen handler                                  | SB60RSH (Not compatible with utility boom) + tires 14.00-20 |
| Cement dust collector                           | Above the mixer   |
| Rod rack  | For 4 rods (N/A with bolt storage)                          |
| Bolting head oiler                              | For BC and BCS system (TS2-291)                             |
| Dry cement silo                                 | 400 kg, above right mud guard                               |

### Hydraulic system

|             |                   |
|-------------|-------------------|
| By pass     | Oil filter        |
| Vacuum pump | For hydraulic oil |

### Instrumentation

|                         |  |
|-------------------------|--|
| Bolting instrumentation | SBI (Sandvik bolting instrumentation)<br>Navigate with fan laser or tachymeter |
| Access detector         | Mandatory in Europe (TS2-211)  |

### Automation

|   |   |
|---|---|
| OptiMine™ remote monitoring for data management | Option or std. in country package for certain areas |
|---|---|

## OPTIONAL FEATURES AND PACKAGES

### Air and water system

|                          |                                       |
|--------------------------|---------------------------------------|
| *Air compressor          | CT28, 2.8 m <sup>3</sup> /min (19 kW) |
| Water hose reel and hose | THR2.5E and Ø32 mm (1 ¼"), 100 m      |
| Compressed air outlet    | Quick coupling for pneumatic tools    |

### Cleaning system

|  |                         |
|--|-------------------------|
| Low pressure system with reel            | Up to 15 bar (TS2-343)  |
| High pressure system with reel           | Up to 180 bar (TS2-343) |
| Bolting module continuous washing system | Remote controlled       |

### Greasing systems

|                  |                      |
|------------------|----------------------|
| Manual system    | Specification 5-2110 |
| Automatic system | Lincoln (complete)   |

### Electric system

|   |   |
|---|---|
| *Voltage option                         | 1 000 V (50 or 60 Hz) with Direct-On-Line starter |
| Electric cable                          | Specification TS2-121                             |
| Ground fault and overcurrent protection | VYK   |
| Dewatering pump outlet                  | 380 - 690 V (Max. 8 kW)                           |
| Battery jump start                      | Optional  |
| Amber flashing light                    | LED (24 V)  |

### Operator's safety cabin / canopy

|                                  |                              |
|----------------------------------|------------------------------|
| *Stainless steel cabin           | FOPS (ISO 3449)              |
| *Safety canopy with safety grill | FOPS (ISO 3449)              |
| Cabin heating                    | During tramming and drilling |
| Canopy boot washer               | At each access               |

### Fire suppression system

|                                   |                            |
|-----------------------------------|----------------------------|
| Spare hand held fire extinguisher | 1 x 7.7 or 9 kg (type ABC) |
| Manual or automatic system        | Ansul, 6 nozzles           |
| Automatic system                  | Sandvik Eclipse™           |

### Carrier

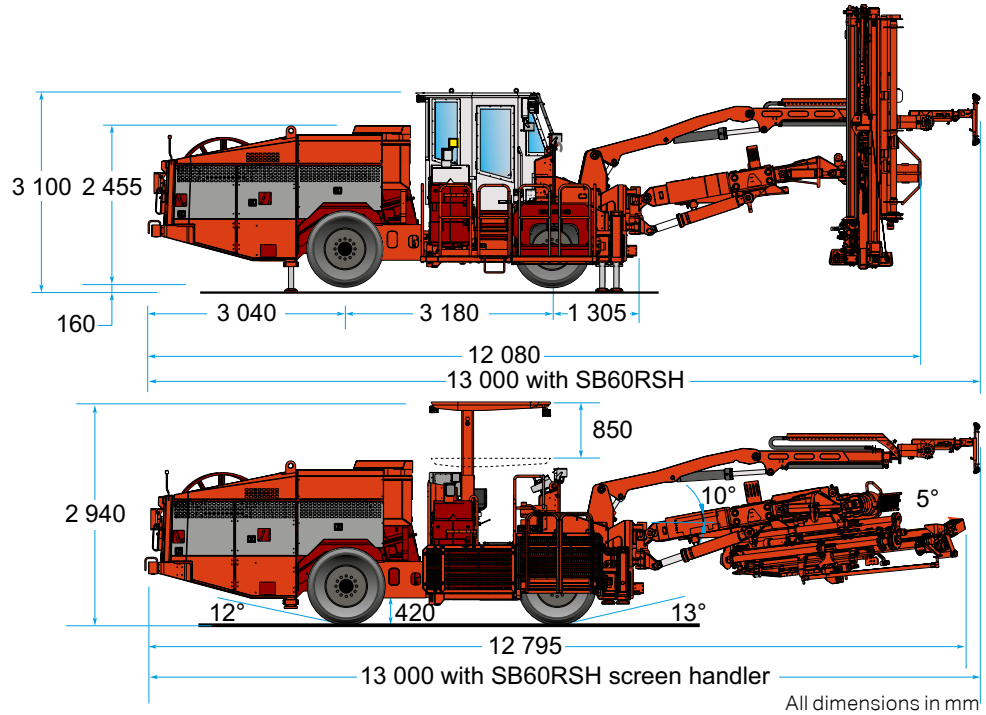
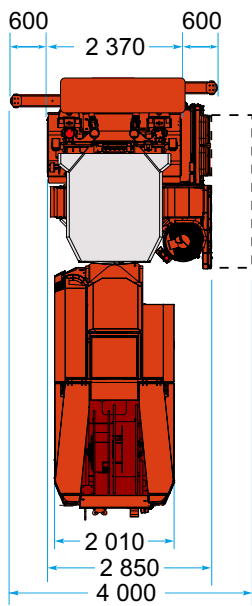
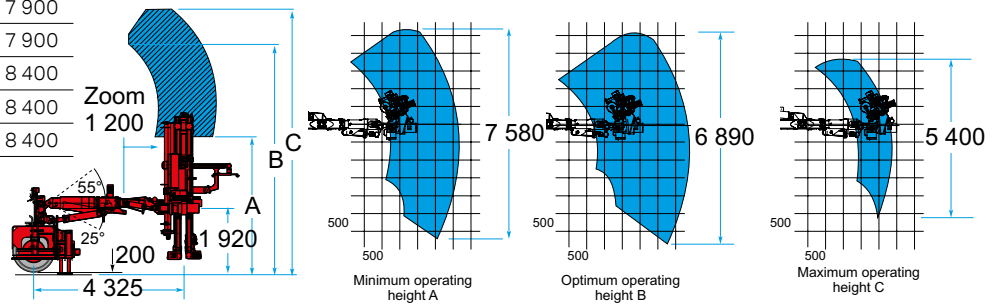
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|--------------------------|-------------------------------------|
| Reduced tramming speed   | 3rd gear lockout                    |
| Tramming camera          | Rear and side                       |
| Diesel engine            | QSB4.5, 119 kW, tier 4i, Stage IIIB |
| *Foam filled tires       | 4 pcs                               |
| Fast filling systems     | Complete                            |
| Wheel chocks and holders | 2 Sets                              |
| Rod rack                 | For 4 rods (N/A with bolt storage)  |

### Extra Item

|                                   |   |
|-----------------------------------|---|
| Spare rock drill                  | RD314   |
| Spare wheel assembly              | Air or foam-filled  |
| Special tools for rock drill      | RD314   |
| Warranty extension                | One year (excl. Kazakhstan)   |
| Documentation                     | Extra, Catbase, Link one manuals  |
| Package: Country specific options | USC, AUS, EUR   |
| * Package: Harsh water            | Basic or advanced (TS2-049)   |
| * Package: Anti-freezing          | Block heater for engine, heater for hydraulic oil, water circuit flushing with air, antifreeze adding in water circuit. |

\*) replaces standard feature

| Bolting head | Bolt length (m) | A (mm) | B (mm) | C (mm) |
|--------------|-----------------|--------|--------|--------|
| BH15         | 1.2 - 1.5       | 2 700  | 6 600  | 7 900  |
| BH18         | 1.2 - 1.8       | 3 100  | 6 600  | 7 900  |
| BH22         | 1.5 - 2.2       | 3 600  | 6 600  | 7 900  |
| BH24         | 1.5 - 2.4       | 3 800  | 7 100  | 8 400  |
| BH27         | 1.5 - 2.7       | 4 000  | 7 100  | 8 400  |
| BH30         | 1.5 - 3.0       | 4 300  | 7 100  | 8 400  |



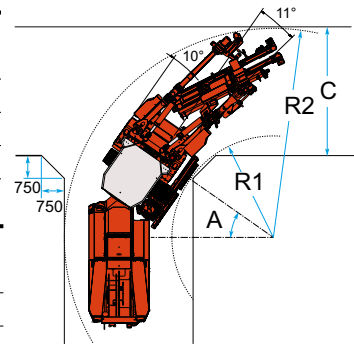
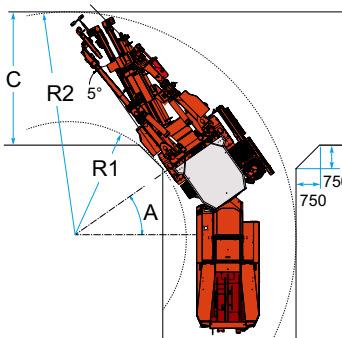
All dimensions in mm

**CORNERING (LEFT)**

|                    | Angle (A) | Internal radius (R1) | External radius (R2) | T-cross (C) |
|--------------------|-----------|----------------------|----------------------|-------------|
| DS411              | 35°       | 3 800                | 6 850                | 3 900       |
| DS411 with SUB2i   | 35°       | 3 800                | 6 850                | 3 900       |
| DS411 with SB60RSH | 30°       | 4 650                | 8 392                | 4 750       |

**CORNERING (RIGHT)**

|                    | Angle (A) | Internal radius (R1) | External radius (R2) | T-cross (C) |
|--------------------|-----------|----------------------|----------------------|-------------|
| DS411              | 35°       | 3 350                | 6 600                | 4 000       |
| DS411 with SUB2i   | 35°       | 3 350                | 7 600                | 5 000       |
| DS411 with SB60RSH | 30°       | 4 275                | 8 125                | 4 750       |



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