

## DS411 UNDERGROUND DRILL RIG

### TECHNICAL SPECIFICATION

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 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 drill rigs based on the NC7 carrier family, the 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



## 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 headfeed	KS140
Bolt carousel capacity	8 rock bolts with 150 x 150 mm maximum plate size
Bolt headlength	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	TPC301EW
Power control	Adjustable full power Adjustable collaring power
Anti-jamming control	Adjustable anti-jamming pressure
Rotation control	Adjustable rotation speed Reversible rotation
Flushing control	Water flushing flow and pressure control 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 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 jumpstart	Standard
Front lights (combined working and driving)	6 x 50 W LED (4 200 lm, 6 000 K)
Rear lights (combined working and driving)	4 x 50 W LED (4 200 lm, 6 000 K)
Remote searchlight	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 (24V)

## 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 m³/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 safe wet disc brakes
Tramming speed	16 km/h (Horizontal) 5 km/h (14% = 1:7 = 8°)
Gradeability / sideways tilt	Max. 15° / 5°
Fuel tank	140 liters
Carrier stabilization	2 x TJ40 Vertical (front) 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
Documentation	2 x Operator's manual 2 x Maintenance manual 2 x Technical manual (in English only) 2 x Parts manual (in English only) 2 x Toolman CD

## OPTIONAL FEATURES AND PACKAGES

Bolting head	
*Bolt carousel capacity	10 rock bolts for square plate 120 mm 12 rock bolts for square plate 100 mm 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) FOPS safety canopy (optional)
Screen handler	SB60RSH (Not compatible with utility boom) + tires 14.00-20 Above the mixer
Cement dust collector	For 4 rods (N/A with bolt storage)
Rod rack	For BC and BCS system (TS2-291)
Bolting head oiler	
Dry cement silo	400 kg, above right mud guard
Hydraulic system	
By pass	Oil filter
Vacuum pump	For hydraulic oil
Instrumentation	
Bolting instrumentation	SBI (bolting instrumentation) 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 m³/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 Specification TS2-121
Electric cable	VYK
Ground fault and overcurrent protection	
Dewatering pump outlet	380 - 690 V (Max. 8 kW)
Battery jump start	Optional
Amber flashing light	LED (24V)
Operator's safety cabin / canopy	
*Stainless steel cabin	FOPS (ISO3449)
*Safety canopy with safety grill	FOPS (ISO3449)
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	Eclipse™
Carrier	
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 Package:	Extra, Catbase, Link one manuals
Country specific options	USC, AUS, EUR
* Package: Harsh water	
* Package: Anti-freezing	Basic or advanced (TS2-049) Block heater for engine, heater for hydraulic oil, water circuit flushing with air, antifreeze adding in water circuit.

\*) replaces standard feature