



MDR700 UNDERGROUND CORING MOBILE DRILL RIG

V3 | 4/28/2017

 **BOART LONGYEAR™**

MDR700 UNDERGROUND CORING MOBILE DRILL RIG

The MDR700 underground coring mobile drill rig is a powerful rig that utilizes proven Boart Longyear™ underground exploration technology like the LM™ 700 series feed frame and offers wide drilling angles, quick and easy setup, operation, and maintenance, advanced mobility, and engineered safety controls.

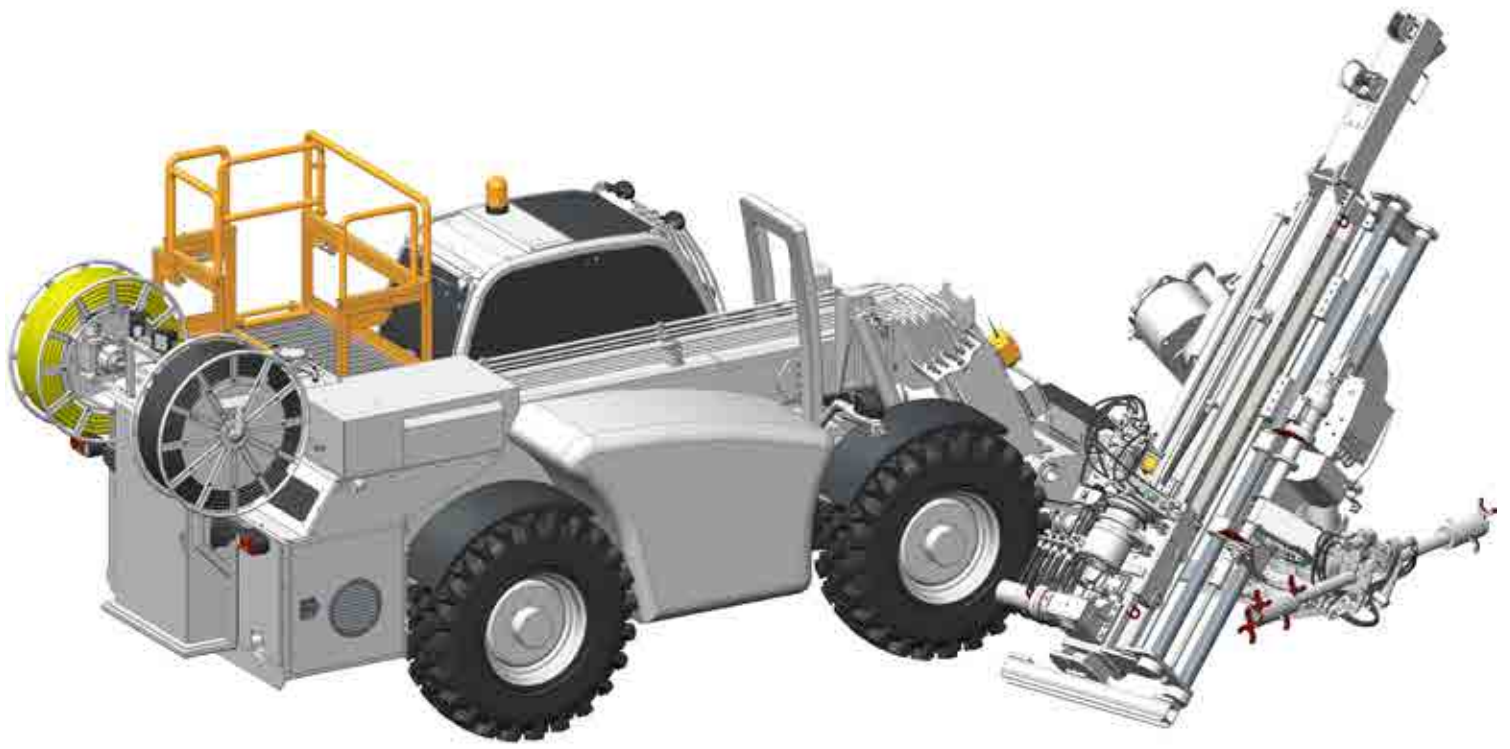
Wide Drilling Angles

The next-generation design of the integrated positioner and turntable offers extremely wide drilling angles and impressive reach to make positioning and drilling a series of holes easier. The rig features sophisticated articulations with three turning points so you can drill 280 degrees horizontally and vertically up to vertically down. The MDR700 can drill in a spherical manner without having to reposition the carrier.

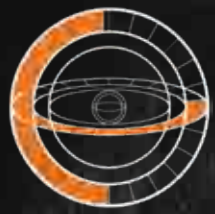
Quick and Easy Setup, Operation, and Maintenance

Using the handheld remote controller makes setup quick and easy. Rig moves are faster and easier with the four-wheel drive, diesel engine powered carrier. Operating the MDR700 and the rod handler is smooth and easy when paired with the Drill Control Interface (DCi). And the MDR700's maintenance-friendly layout provides easy access for hydraulic servicing.





180°



280°

WIDE DRILLING ANGLES FOR FEWER RIG MOVES AND BETTER POSITIONING





THREE AVAILABLE STEERING MODES

TWO-WHEEL STEERING
FOR ON-ROAD TRAVEL



FOUR-WHEEL STEERING
FOR SHORT TURNING RADIUS



CRAB-LIKE MOVEMENT FOR LATERAL
APPROACHES AND DELICATE EXITS



Advanced Mobility

The mobility of the new MDR700 is a time-saver when moving from hole to hole using a diesel powered four-wheel drive carrier. During field trials, the average time to move the MDR700 rig from hole to hole proved to be up to 80% faster than a regular underground exploration rig.

The carrier features three available steering modes – four-wheel, two-wheel, and crab-like movement. This unique design feature makes maneuvering the rig underground easier and faster. The MDR700 rig is easy to navigate and can move at up to 7.5 km/hr (4.7 mph). For improved visibility and safety, multiple cameras are located on the rig and viewed/monitored from the cabin of the carrier.

Power to Get it Done

The MDR700 is powered by a 90kW electric motor and features the proven Boart Longyear LM™ 700 series feed frame delivering 81.4kN of pull back. The MDR700, coupled with the proven HQ rotation unit, gets you to the target productively in all coring diameters up to HQ™.

The drill rig also features a breakout system on the rotation unit that uses high-pressure oil and gear rack assistance to effortlessly break rod joints.

Engineered Safety Controls

The MDR700's engineered safety controls include a dual emergency braking system and an engine fire suppression system on the carrier, meeting the most advanced underground mine standards. The spring-close and hydraulic open rod clamp ensures fail-safe operation in case of burst hose or power loss.

The rig also offers exclusive features like a patented¹ rod handler and DCi (Drill Control Interface) that takes safety as well as productivity to the next level. The DCi offers semi-automated drilling, rod feed, and pull functions while controlling both the rod handler and the rig.

¹AU Patent No. 764456; BR Patent No. PI 0010106-0; CA Patent No. 2,371,989; SE Patent No. 522931; US Patent No. 6,634,443; ZA Patent No. 2001/8288.



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Patented Rod Handler (included) - The patented rod handler is easy to use, versatile, and most importantly, offers drillers a safer working environment. By removing drillers from risks associated with adding or removing rods from the drill string, the rod handler is one of the top engineered safety controls in the field of drilling.

Sensors ensure the drill rods are loaded in a safe position and hard stops ensure fast and accurate rod alignment. The rod gripper rollers along with breakout assistance from the rotation unit enable effortless and hands-free making and breaking of rods.

Traditional drilling practice requires the operator to lift the rod into the drill string at whatever angle the feed frame is positioned and then manually thread the rod. This can result in operator injury due to awkward lifting, twisting, and straining. Rod handling devices are a safer alternative which allow the operator to load rods into the rod handler horizontally at a comfortable height. The rod is then mechanically loaded into the rod string and pre-threaded for drilling. During rod pulling operations and after breaking the threads with the rotation unit, the rod handler un-threads from the drill string and presents the rod back to a horizontal position for operator rod removal. By eliminating the repetitive procedure of manually spinning the rods, the rod handler significantly reduces driller fatigue.

DCi - The Drill Control Interface (DCi) is a fully electronic interface that allows one operator to control both the drill rig and the rod handler while providing real-time feedback on drilling conditions. The DCi incorporates CAN bus (Controller Area Network) technology to enable communication between the drill rig, the rod handler and the DCi to self-monitor and semi-automate most drilling operations.

Complete control system integration and sensors provide immediate feedback of drilling conditions and records both event and drilling conditions data for reporting and analysis and is downloadable to a USB. Sensors provide real-time status display on rotation speed and pressure, feed and holdback pressure, water flow and pressure, penetration rate, bit force, diagnostics, and alarms. Both imperial and/or metric units can be selected for display.

The DCi facilitates unattended drilling, allowing the rig to complete a rod run letting drillers complete a shift change, take a meal break, or catch up on other tasks. The driller sets up operating parameters and a laser beam near the drill and the DCi will automatically shut down drilling if either the drilling condition parameters or the laser beam is breached. Because the DCi has the capability to set up drilling condition parameters, this also allows supervisors to set up parameters for less experienced drillers.

Once drilling has commenced, with the push of a single button on the DCi control panel, the control system monitors drill rod position, rotation speed and feed, and continues drilling unattended. This sequence includes a re-chucking process to feed the entire rod. On completion, the control system disables rotation and allows for a short period of water flushing before shutting down. Additionally, one-touch rod feed and pull functionality allows the driller to efficiently and effortlessly trip rods.

The DCi works with conventional drilling and wireline methods and the rig is equipped with 600 m (1,969 ft.) of 5 mm wireline cable. For wireline drilling, a wireline drum counter has been incorporated into the DCi for semi-automatic descent and retrieval of the wireline. While attention must be paid when sending or retrieving wireline and tooling, the driller is no longer required to keep his finger on the button or hold a lever when retrieving core.

The DCi is a considerable step forward for increasing safety on-site by moving the driller away from hydraulic hoses – isolating the driller from this hazard. The DCi control panel is lightweight and portable offering a distinct advantage over heavier hydraulic control panels for rig moves.





1 MOBILITY

Rig moves are up to 80% faster and easier with the four-wheel drive diesel-engine powered carrier that moves at speeds of up to 7.5 km/hr (4.7 mph).

2 QUICK AND EASY SETUP

A time saver when moving from hole to hole with unique maneuvering features like three available steering modes: four-wheel, two-wheel, and crab-like movement. Positioning is quick and easy using a handheld remote controller.

3 OPERATOR SAFETY AND COMFORT

Extensive insulation in the engine and pump compartments makes the MDR700 a quieter rig – 88dB* while drilling and 74 dB* when equipment is idling.

4 EFFORTLESSLY BREAK ROD JOINTS

The breakout system on the drill head uses a high-pressure oil and gear rack assistance to effortlessly break rod joints.

5 WIDE DRILLING ANGLES

Integrated positioner and slew drive articulation allows for 280 degrees of horizontal movement and vertical up to vertical down drilling range with ease.

6 ENGINEERED SAFETY - ROD HANDLING

Semi-automated rod handling includes smart hydraulics with synchronized control between the rotation unit and foot clamp for faster and safer rod handling.

7 SEMI-AUTOMATED DRILLING - DCI

The Drill Control Interface (DCI), semi-automates drilling and provides a fully electronic interface to safely and efficiently operate both the drill rig and the rod handler.

*Manual sound recording not conducted in a controlled environment.

MDR700 TECHNICAL INFORMATION

Drill Depth Guidelines						
Drill Rod/Core Barrel	Hole Depth - Metric			Hole Depth - U.S.		
	Up	Horizontal	Down	Up	Horizontal	Down
ARQ™TK*	650	1150	1700	2133	3773	5577
BQ™	400	740	1000	1312	2428	3281
NQ™	250	650	700	820	2133	2297
HQ™	120	430	345	394	1411	1132
Note	Depth capacity includes allowance for force required to break core using 10 MPa rock strength					
*	ARQ™TK capacity shown for comparison purposes only. It is not recommended drilling practice to drill over 1500 m depth (ARQ™TK)					

Drill Specifications		
Feed Frame (LM™700 Series)	Metric	U.S.
Feed Stroke	1800 mm	70.9 in
Max. rated pushing force	53.9 kN @ 28.5 MPa	12117 lbf @ 4130 psi
Max. rated pulling force	81.4 kN @ 28.5 MPa	18299 lbf @ 4130 psi
Rated carriage speed	0.70 m/s per complete cycle	2.3 ft/s per complete cycle
Normal rod handling speed	Approximately 6 m/min.*	Approximately 20 ft/minute*
*	Actual rod handling speed may vary with working conditions. Handling speed includes rod handler operation time as part of the cycle.	

Chuck and Rod Holder		
	HQ™ Chuck	HQ™ Rod Holder
Maximum opening	97.0 mm (3.82 in) Diameter corresponding to the ID of the HQ™ guide bush	97.0 mm (3.82 in) Diameter corresponding to the ID of the HQ™ guide bush
Type	Closed hydraulically Opened mechanically Automatic synchronization with rod holder	Closed mechanically Opened hydraulically Automatic synchronization with chuck, including override provision
Jaws	3 with tungsten carbide inserts	2 with tungsten carbide inserts
Max. rated axial holding capacity	85kN* (19109 lbf*)	80kN* (17985 lbf*)
Max. rated static torsional holding capacity	Forward and reverse rotation 3900 N-m (2870 lbf*)	Forward and reverse rotation 3900 N-m (2870 lbf*)
*	At 7 MPa (1015 psi) with new jaws and rods	

Drill Head (HQ™)		
Forward Rotation	Metric	U.S.
Chuck Speed	1300 RPM, continuously variable (Speed will vary with oil type and temperature and is approximate only).	
Chuck torque output	371 N-m @ 1250 RPM 1030 N-m @ 500 RPM	274 lb-ft @ 1250 RPM 760 lb-ft @ 500 RPM
Reverse Rotation		
Chuck Speed	Limited to help prevent rod thread damage.	
Chuck torque output	3770 N-m with break-out device @ 28.5 MPa	2781 lb-ft with break-out device @ 4130 PSI

MDR700 TECHNICAL INFORMATION

Carrier		
	Metric	U.S.
Engine (MT 835 option)	Perkins 854E-34TA Diesel Engine	
Emmissions compliance	EU Stage IIIB	EPA Tier 4i
Fuel	Diesel	
Maximum Power	75kW	102 HP
Speed	10 km/h	6.2 mph
Fuel Tank Capacity	120 L	31.7 gal
Hydraulic Tank Capacity	175 L	46.2 gal
Engine (MT-X 732 option)	Perkins 1104D-44 T Diesel Engine	
Emmissions compliance	EU Stage IIIA	EPA Tier 3
Fuel	Diesel	
Maximum Power	70 kW	95 HP
Speed	7.5 km/h	6.2 mph
Fuel Tank Capacity	120 L	31.7 gal
Hydraulic Tank Capacity	128 L	33.8 gal
Electrical Voltage	12 V	
Max lateral gradient	5%	
Max gradient uphill	15%	
Max gradient downhill	10%	
Air Cleaner	Metallic Self Cleaning	
Stabalizers	Front Folding Hydraulic	
Braking System	Spring applied, hydraulic released Mining Automatic fail-safe brakes. Dual braking circuits. Accumalators to aid stopping with engine failure.	
Safety Device Monitoring	Guardian Angel Mining System, Level 1	
Electrical Harness	Ultimate Electrical Protection System	
Engine Compartment Fire Prevention and Control	Yes	
Battery Isolation and Jump Start connection	Yes	
Safe Maintenance Kit	Yes	
Parking Brake	Yes; activated also when door is open	

Rig Controls	
Moving (driving)	Operators Cab. Powered by Diesel Engine.
Boom height and extension	Hydraulic, from within cab. Powered by Diesel Engine.
Positioner Setup	Radio remote control. Powered by Diesel Engine.
Drilling Controls	DCi control panel. Powered by Electric motor.

MDR700 TECHNICAL INFORMATION

Drilling Hydraulic System		
	Metric	U.S.
Primary Pump	Variable displacement, axial piston w/ pressure compensated load sensing control.	
Maximum Pressure	310 bar	4,500 psi
Recirculation Pump	Gear, fixed displacement	
Maximum Pressure Setting	1 - 1.5 bar	14.5 - 21.8 psi
Hydraulic Oil Tank Capacity	280 L	74 gal

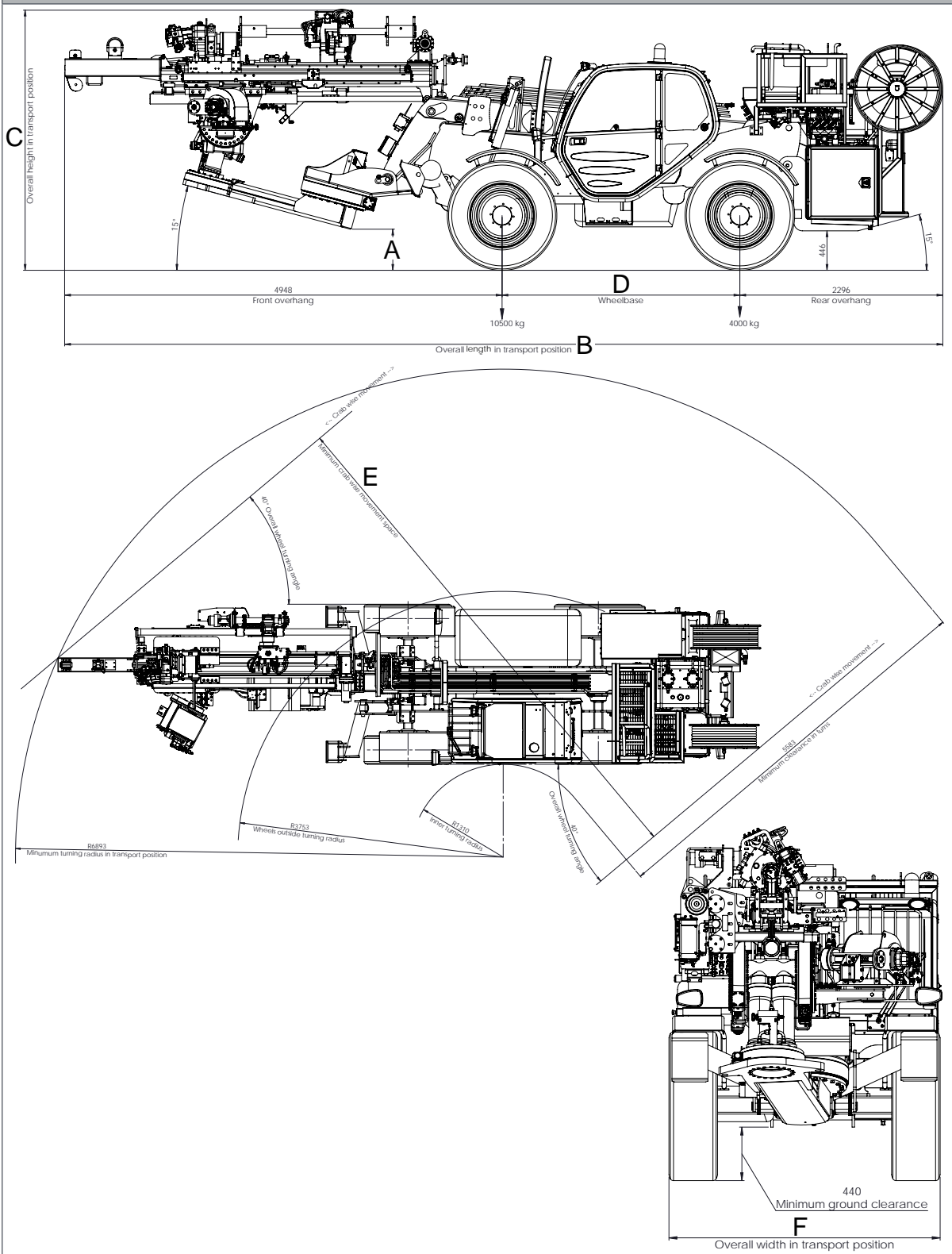
Positioner		
	Metric	U.S.
Number of positioner joints (adjustments)	8	
Boom Lift	-2° to +8.5°	
Boom Extension	400 mm	1 ft 3 in
Positioner Tilt (at attachment to boom)	-24° to +28°	
Slew Joint #1 (horizontal, nearest to boom)	130° (65° each side)	
Slew Joint #2 (horizontal, under feed frame)	150° (90° right, 60° left)	
Combined horizontal range	280° (155° right, 125° left)	
Height Adjustment (dual telescopic cylinder)	600 mm	1 ft 11 in
Slew joint #3 Dip Angle	180° (90° up, 90° down)	
Crowd Distance (dump cylinder)	1500 mm	5 ft 6 in

Wireline Hoist		
Variable speed hydraulically driven		
Type	All hydraulic with proportional controlled power up and power down. Free wheel override and spooling device included.	
Line Pull		
Bare Drum	13.57 kN	3050 lb
Full Drum	5.59 kN	1257 lb
Line Speed		
Bare Drum	0 - 100 m/min	0 - 328 ft/min
Full Drum	0 - 254 m/min	0 - 833 ft/min
Drum Capacity		
5 mm	800 m	2624 ft 8 in
3/16"	880 m	2887 ft 2 in
6 mm	550 m	1804 ft 6 in
1/4"	500 m	1640 ft 5 in

Please note that the standard wireline sold with unit is 600 m (1971 ft.). Actual target depth is dependent on the wireline cable length and drum capacity is greater, relative to the width of the cable.

Measurements

Transport Position

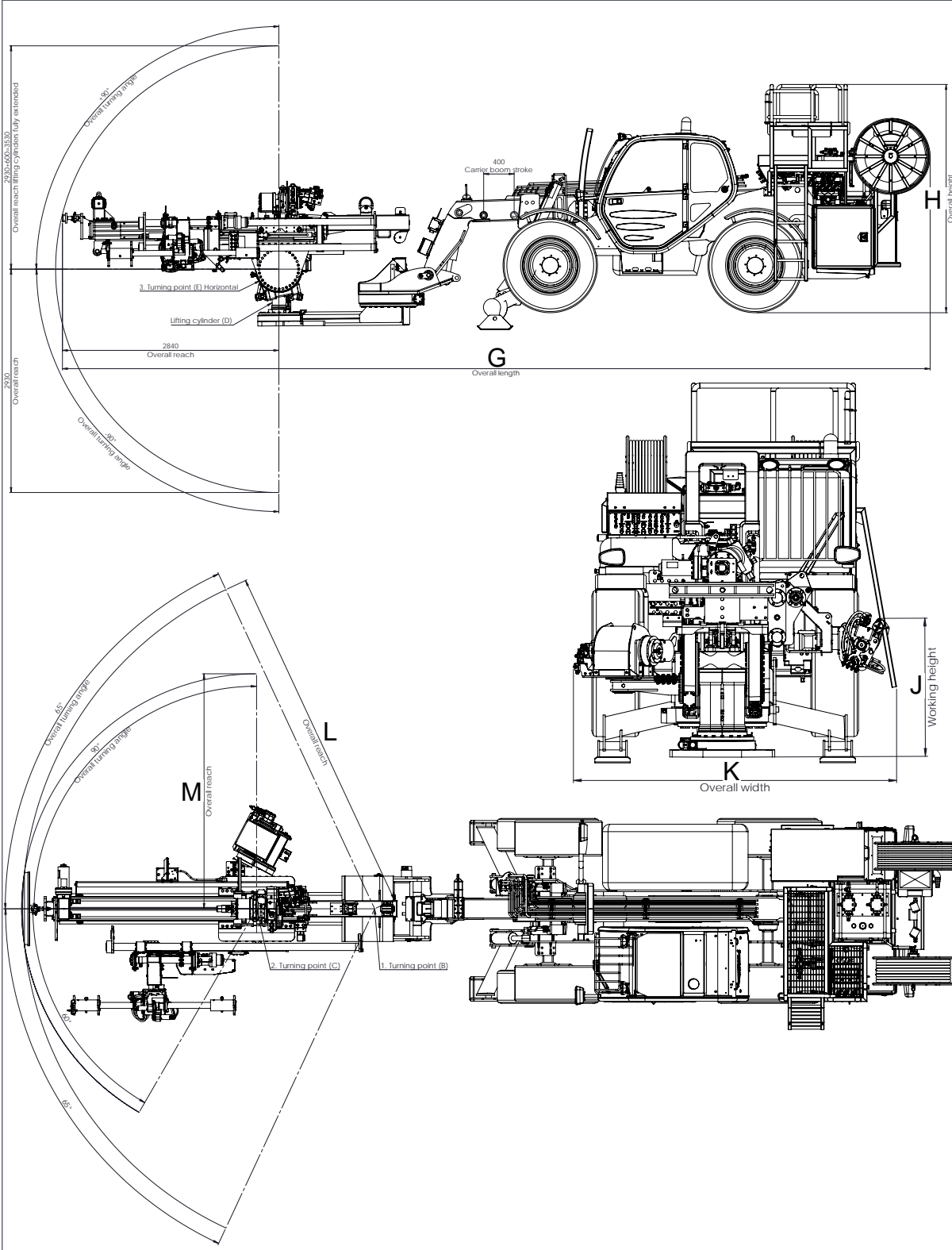


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	Metric	US		Metric	US
Weight	14,500 kg	31,967 lbs	E	7347 mm	289.25 in
A	465 mm	18.31 in	F	2261 mm	89.02 in
B	9935 mm	391.14 in			
C	2291 mm	90.20 in			
D	2690 mm	105.91 in			

Measurements

Drilling Straight Ahead



	Metric	US		Metric	US
G	11389 mm	448.39 in	L	4306 mm	169.53 in
H	2995 mm	117.91 in	M	2873 mm	113.11 in
J	1170 mm	46.06 in			
K	2739 mm	107.83 in			



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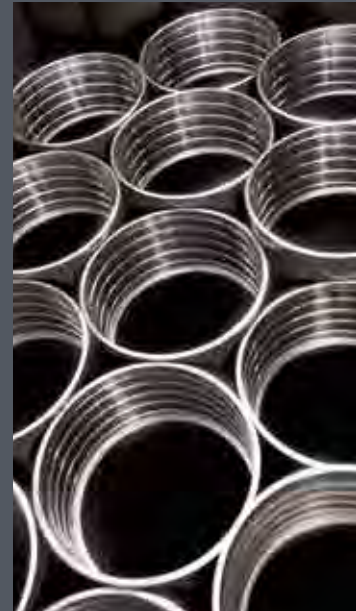
MINING AND EXPLORATION DRILLING PRODUCTS



Diamond Products



Genuine Q™ Wireline
Tooling



Rods and Casing