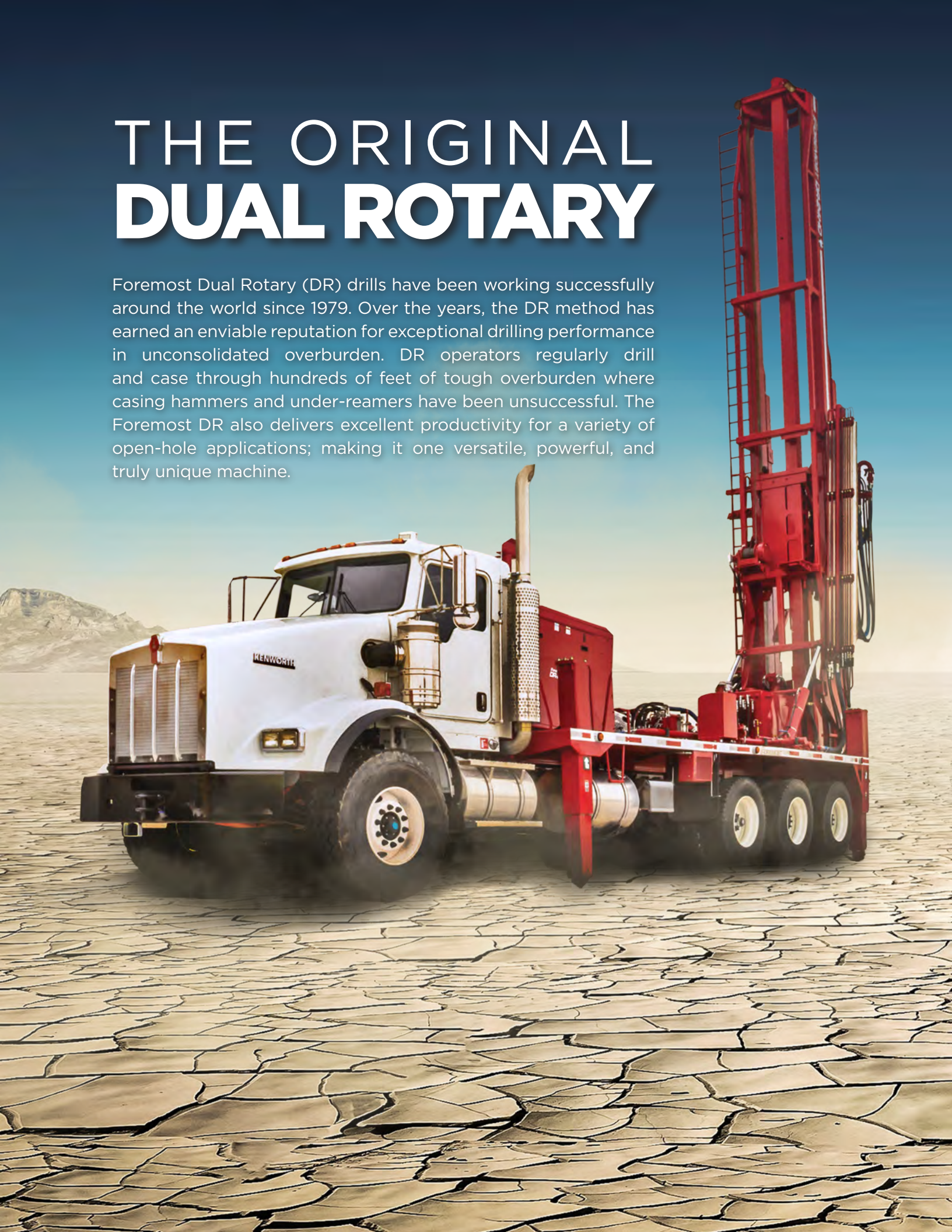
FOREMOST DRdrills

DUAL ROTARY DRILLS • PRODUCT OVERVIEW

THE ORIGINAL **DUAL ROTARY**

Foremost Dual Rotary (DR) drills have been working successfully around the world since 1979. Over the years, the DR method has earned an enviable reputation for exceptional drilling performance in unconsolidated overburden. DR operators regularly drill and case through hundreds of feet of tough overburden where casing hammers and under-reamers have been unsuccessful. The Foremost DR also delivers excellent productivity for a variety of open-hole applications; making it one versatile, powerful, and truly unique machine.



TOP TEN REASONS YOU NEED A FOREMOST DUAL ROTARY RIG IN YOUR FLEET!

Since 1979, Foremost's Dual Rotary drills have delivered on the promise of better performance. They continue to make significant contributions to the productivity and profitability of operators worldwide. For a growing number of contractors, there's simply no better way to drill. Consider these top DR features:

1. Exceptional Overburden Performance: Foremost DR drills have been proven repeatedly in some of the toughest unconsolidated overburden formations, including sand, gravel, glacial till, and boulders. The DR method minimizes the likelihood of loss circulation and aquifer cross-contamination. Because the DR can drill without fluids, the ability to detect water in low-flow formations is improved.

2. Open-Hole Versatility: In addition to its overburden drilling ability, the DR can be configured for a variety of drilling methods including mud, reverse circulation, and flooded reverse circulation.

3. Straight Holes: The rotation of the casing by the lower drive results in a very straight hole. This minimizes stress on casing and casing welds, and eases the task of installing screens and pumps in water well applications. It also makes the DR ideal for drilling hydraulic elevator shaft holes and foundation piles.

4. Basin Extraction: The lower drive is equally effective at pulling back casing; thereby simplifying the process of exposing a well screen or abandoning a well.

5. Conventional Tools: Foremost DR drills utilize conventional tools. The drill string can be equipped with down-the-hole hammer, roller cone, or drag bit.

6. Control of Discharge: Cuttings are diverted through the discharge swivel and can be directed to a safe and convenient dumping or monitoring point. This is a useful feature when drilling at homeowner sites or when cuttings must be contained for environmental or safety reasons.

7. Ease of Maintenance: Foremost DR rigs feature a directly connected hydraulic feed system – which means no chains, sheaves, or sprockets to maintain. This type of feed system generates zero load on the mast crown, permitting a simple and lightweight mast design that does not sacrifice pullback capability.

8. Reduced Operational Risk: The DR's overburden drilling capability gives you the confidence to go into areas you might once have considered off-limits. Its flexibility allows you to expand into new applications. Knowing that you have the right equipment to get the hole down the first time will help reduce the risk to your company when bidding on projects.

9. Resale Value: There is arguably no drill on the market today that holds its value better than a Foremost DR. Dual Rotary owners tend to hold onto their rigs, making used inventory scarce. Demand for used DR drills remains strong, and consequently, prices favour the seller. Excellent resale potential provides an added level of comfort and financial security for those who might consider investing in a Foremost Dual Rotary drill.

10. Foremost Technical Support: Foremost Dual Rotary rigs are backed by the considerable product and application expertise of its product management team, field technicians, and one of the largest engineering departments in the industry. Foremost is committed to providing superior customer support. Repeat sales are proof of customer satisfaction.

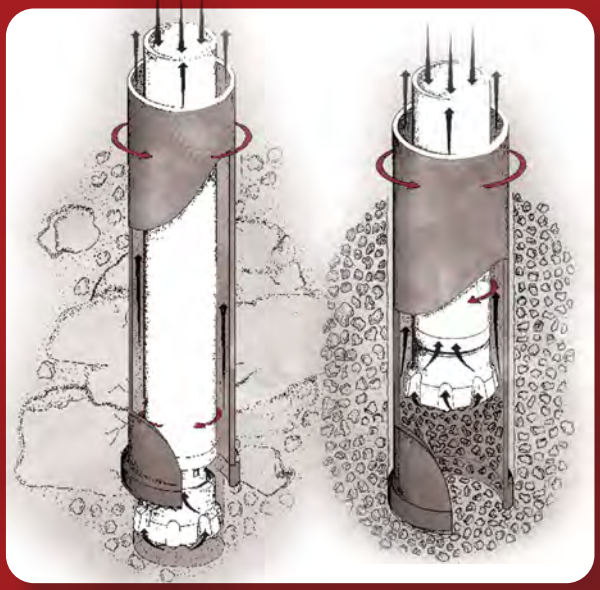
BETTER PRODUCTIVITY THROUGH BETTER TECHNOLOGY

Foremost Dual Rotary drills feature a unique lower rotary drive that is used to advance steel casing through unconsolidated overburden, such as sand, gravel, glacial till, and boulders. Pullback, pulldown, and rotational forces are effectively transmitted to the casing via high-strength steel jaws with carbide inserts.

An independent rotary top drive simultaneously handles a drill string equipped with a down-the-hole hammer, drag bit, or roller cone bit. Cuttings are typically evacuated with air, but Foremost DR drills can also be configured with pumps for mud or flooded reverse circulation drilling.

The top and lower drives feed independently, meaning that the bit position can vary relative to the bottom of the casing. Once the desired casing depth has been achieved, the DR continues drilling open-hole like a conventional top drive drill. With a Foremost DR drill, there is no need to trip out or change tools when transitioning to open-hole drilling.

NORMAL BIT POSITION
In most situations, the drill bit is advanced flush with or slightly ahead of the casing shoe for best penetration rates.



BIT POSITION IN HEAVING FORMATION
In heaving formations, the casing is advanced ahead of the drill bit to create a plug in the casing. This allows drilling to continue in a controlled fashion. This method is also recommended where sample accuracy is important, as it helps to minimize cross-contamination of cuttings.

AVAILABLE MODELS

DR-12

The DR-12 is a light, yet powerful PTO rig popular among domestic water well contractors drilling in moderate to severe overburden. It will handle casing up to 12" (305 mm) in diameter, and has been field tested to depths beyond 550 ft (168 m) for a typical 6" (152 mm) cased well. The DR-12 is available with an optional pipe tub, single pipe loader arm and telescopic casing jib. The configuration accommodates diverse site conditions.

DR-24

The DR-24 will set casing up to 24" (610 mm) in diameter. This model is commonly used for domestic and municipal wells, and construction applications such as foundation piling projects and holes for hydraulic elevator jacks. The DR-24 is available in PTO or deck engine configurations and can be mounted on a truck, trailer or self-propelled tracked carrier. Available in a stock tandem (pictured above) or tridem configuration.

DR-24HD

The DR-24HD ('heavy-duty') features a heavy-duty gear-driven lower drive, which generates two and a half times the torque of the standard DR-24. The DR-24HD is also configured with a heavy-duty mast to withstand the additional torque and larger hoist cylinders for increased pullback capabilities. The DR-24HD is most commonly used in deep, large diameter applications such as municipal/industrial wells and mine de-watering.

DR-40

The DR-40 handles casing up to 40" (1,000 mm) in diameter. The DR-40 excels in large diameter construction and industrial water well applications. Standard configurations include tracked undercarriage or crane carrier with deck engine and on-board air compressor.

AVAILABLE MODELS

DR-24XHD

The DR-24XHD features the DR-24HD lower drive with increased top drive torque and pullback capability. The DR-24XHD is also configured with an angle package, with the ability to drill on an angle from 0-45 degrees. The DR-24XHD excels in deep hole waterwell and mine dewatering applications.

DR-40XHD

Building on the technology behind the DR-24XHD, the DR-40XHD features the DR-40 lower drive with increased pullback capability. The DR-40XHD can also be configured with an angle package, with the ability to drill on an angle from 0-45 degrees. The DR-40XHD excels in deep hole large diameter waterwell and construction applications.

DR-40SHD

Foremost's first fully electric drill features a remote console for operator safety. The DR-40SHD features a brand new 40" lower drive with increased capacity and improved chucking system. Utilizing the flexibility to drill anywhere from vertical to horizontal angles, the DR-40SHD can used in a wide variety of applications including de-salination projects and deep hole water wells.

CRANE LEAD SYSTEM & DECK KIT

For some applications, the Foremost DR Drill may not be suitable on a traditional chassis. All the versatility of the Foremost Dual Rotary Drill can be mounted on virtually any non-standard North American Chassis (pictured top-right), or installed and mounted onto crane leads (pictured top-left).

OVERVIEW OF DR FEATURES

Since acquiring the Dual Rotary technology from Barber Industries in 1993, Foremost has continually updated, refined and expanded the DR line with the goal of enhancing its functionality and extending its range of applications. Today, Foremost offers several DR models, each packed with features that deliver heightened safety, productivity, and profitability across a variety of drilling activities.

DEPTH RANGES AS REPORTED BY DR OPERATORS

CASING DIAMETER		DEPTH RANGE	
6" - 8"	152 - 203mm	200 - 1300 ft	60 - 400 m
10" - 14"	254 - 356mm	100 - 800 ft	30 - 244 m
16" - 24"	406 - 610mm	100 - 500 ft	30 - 244 m
26" - 40"	660 - 1016mm	50 - 350 ft	15 - 106 m
> 40"	> 1016mm	For surface casing only	

CYCLONE COLLECTOR

The optional cyclone sample collecting system slows discharge velocity to allow accurate and continuous sampling of the formation.

TILTING TOP DRIVE

The independent hydraulic top drive tilts for convenient loading of drill pipe and casing with the operator standing at ground level.

LOWER DRIVE

The lower rotary drive is also used as a powerful breakout and spinner for drill pipe, hammers, bits, and thread casing.

CASING JAWS

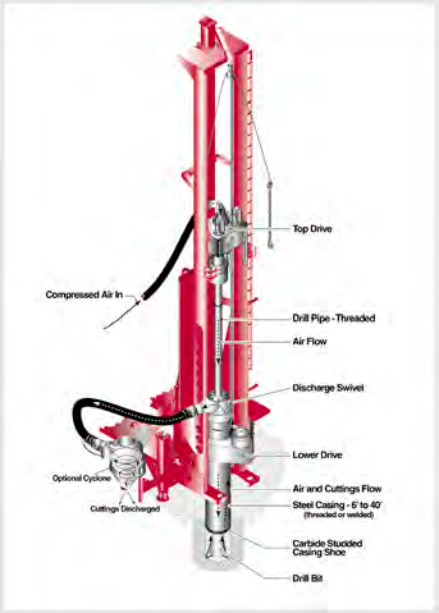
Rotation and feed forces are effectively transmitted from the lower drive to the casing via a set of three carbide inserts. Casing jaws are available for all common casing sizes and can be changed out quickly in the field.

CASING SHOE

A carbide-studded casing shoe is welded to the casing bottom. The shoe I.D. is flush with the casing I.D. so that there is no reduction in the bore hole diameter when switching to open-hole drilling.

DISCHARGE SWIVEL

All drill cuttings rise to the surface between the drill pipe and casing, and exit through the discharge swivel attached to the top of the casing. The discharge swivel directs cuttings to a safe dumping point or to an optional cyclone collection system.



Hydraulic Breakout	Lower rotary casing drive is used as a breakout and spinner wrench for drill pipe joints, drill bits, and threaded casing.
Hydraulic System	A closed loop hydraulic system is used for the lower casing rotator. Variable displacement pumps are used for all other hydraulic systems.
Hoist System	The hoist feed is direct by hydraulic cylinder; no cables, sheaves, chains, or sprockets are used in the hoist system.
Carrier	Truck, trailer, crane carrier, or self-propelled track carrier.
Popular Options	RC drilling package, sandline winch, mud pumps, hydraulic welder, and cyclone separator.

DRILLING PENETRATION RATES (BASED ON INDEPENDENT THIRD-PARTY OBSERVATIONS)

	FOREMOST DR	CONVENTIONAL AIR ROTARY	AUGER	CABLE TOOL
Drilling Speed (1)				
Sand and Gravel	20 - 40 min	45 - 90 min	30 - 60 min	1 - 4 hrs
Till	30 - 60 min	45 - 90 min	30 - 120 min	2 - 8 hrs
Rock	30 - 90 min	30 - 90 min	N/A	N/A
Casing Integrity	Excellent	Moderate - Poor	N/A	Moderate
Split Spoon Sampling Ability	Moderate - Poor	Poor - None (3)	Excellent	Good
Cross-Contamination Prevention	Good - Excellent	Moderate - Poor	Moderate - Poor	Moderate - Poor
Versatility	Excellent	Good (3)	Moderate - Excellent	Poor
Air	Yes	Yes	(3)	No
Mud	Yes	Yes	(3)	(3)
Water	Yes	Yes	(3)	Yes
Other Advantages/ Disadvantages	• Casing removal simplified • Controlled discharge sampling • Good casing seat in bed-rock	• Poor casing seat by juttering and drive shoe removal	• Mobile rig for tough access	• Rig simplicity

(1) Drilling speed shown represents average time required to drill and install 20 feet over a 100 foot well depth. (2) N/A denotes Not Applicable (3) Rig type dependent.

SPECS & PERFORMANCE

		DR-12	DR-24	DR-24HD	DR-40
TOP DRIVE					
Stroke		25 ft (7.62 m)	26 ft (7.92 m)	26 ft (7.92 m)	29 ft (8.84 m)
Hoist Speed	Up	177 ft/min (54 m/min)	122 ft/min (37 m/min)	78 ft/min (24 m/min)	78 ft/min (24m/min)
Hoist Capacity	Pullback	40,000 lbs (18140 kg)	60,000 lbs (27200 kg)	84,000 lbs (38100 kg)	84,000 lbs (38100 kg)
	Pulldown	12,000lbs (5400 kg)	20,000 lbs (9000 kg)	25,900 lbs (11800 kg)	25,900 lbs (11800 kg)
Torque (stall) **Standard Option**		10,000 ft-lbs (13,500 Nm)	10,000 ft-lbs (13,500 Nm)	14,000 ft-lbs (13,500 Nm)	22,000 ft-lbs (30000 Nm)
Rotation Speed **Standard Option**		0 - 125 rpm	0 - 125 rpm	0 - 90 rpm	0 - 42 rpm
Torque (stall) **Upgraded Option**		14,000 ft-lbs (13,500 Nm)	14,000 ft-lbs (13,500 Nm)		
Rotation Speed **Upgraded Option**		0 - 90 rpm	0 - 90 rpm		
LOWER DRIVE					
Stroke		12 ft (3.66 m)	12 ft (3.66 m)	12 ft (3.66 m)	12 ft (3.66 m)
Hoist Capacity	Pullback	42,400 lbs (19200 kg)	75,400 lbs (34200 kg)	117,000 lbs (53000 kg)	75,400 lbs (34200 kg)
	Pulldown	18,500 lbs (8400 kg)	33,000 lbs (15000 kg)	42,400 lbs (19200 kg)	33,000 lbs (15000 kg)
Torque		500,000 in-lbs (56500 Nm)	1,000,000 in-lbs (112000 Nm)	2,500,000 in-lbs (282000 Nm)	3,000,000 in-lbs (339000 Nm)
Rotation Speed		0 - 13 rpm	0 - 21 rpm	0 - 6 rpm	0 - 5 rpm
Max. Casing Diameter		12" (305 mm)	24" (609.6 mm)	24" (609.6 mm)	40" (1016 mm)
COMPRESSOR					
Air Flow		900 cfm (25.5 m3/min)	900-1150 cfm (25.5 m3/min)		1150 cfm (32.6 m3/min)
Pressure		350 psi (24.1 bar)	350 psi (24.1 bar)		350 psi (24.1 bar)
Engine Power		525 hp (391 kW)	525 hp (391 kW)		600 hp (447 kW)
DIMENSIONS					
Length		37 ft (11.28 m)	38 ft 9 in (11.81 m)		41 ft 11 in (12.77 m)
Height		13 ft (3.96 m)	13 ft 6 in (4.11 m)		13 ft 6 in (4.11 m)
Width		8 ft (2.44 m)	8 ft (2.44 m)		9 ft 6 in (2.90 m)
Weight		51,600 lbs (23500 kg)	56,000 - 72,000 lbs (25400 - 32650 kg)		105,000 lbs (47600 kg)
JIB BOOM WINCH					
Wire Rope Length		140 ft (42.67 m)	140 ft (42.67 m)		120 ft (36.58 m)
Wire Rope Diameter		1/2" (12.70 mm)	1/2" (12.70 mm)		5/8" (15.88 mm)
Line Pull on Bare Drum		6,000 lbs (2720 kg)	6,000 lbs (2720 kg)		12,000 lbs (5400 kg)
Line Speed on Full Drum		100 ft/min (30 m/min)	100 ft/min (30 m/min)		175 ft/min (53 m/min)
WATER & FOAM INJECTION					
Capacity		12 gpm (45 l/min)	12 - 25 gpm (45 - 75 l/min) 20 gpm (75 l/min)		25 gpm (75 l/min)
Pressure		600 psi (41.4 bar)	600 psi (41.4 bar)		600 psi (41.4 bar)

		DR-24XHD	DR-40XHD	DR-40SHD
TOP DRIVE				
Stroke		29 ft (8.8 m)	29 ft (8.8 m)	29 ft (8.8 m)
Hoist Speed	Up	115 ft/min (35 m/min)	115 ft/min (35 m/min)	115 ft/min (35 m/min)
Hoist Capacity	Pullback	130,000 lbs (58967 kg)	130,000 lbs (58967 kg)	130,000 lbs (58967 kg)
	Pulldown	30,000 lbs (13600 kg)	30,000 lbs (13600 kg)	30,000 lbs (13600 kg)
Torque (stall)		22,000 ft-lbs (29,828 Nm)	22,000 ft-lbs (29,828 Nm)	22,000 ft-lbs (29,828 Nm)
Rotation Speed		85 rpm	85 rpm	85 rpm Spindle Thru Hole = 6"
LOWER DRIVE				
Stroke		12 ft (3.66 m)	12 ft (3.66 m)	16 ft (4.87 m)
Hoist Capacity	Pullback	117,000 lbs (53000 kg)	117,000 lbs (53000 kg)	117,000 lbs (53000kg)
	Pulldown	42,400 lbs (19200 kg)	42,400 lbs (19200 kg)	
Torque		2,500,000 in-lbs (282,462 Nm)	3,000,000 in-lbs (339,000 Nm)	5,000,000 in-lbs (564,924 Nm)
Rotation Speed		0 - 6 rpm	0 - 5 rpm	0 - 6 rpm
Max. Casing Diameter		24" (609.6 mm)	40" (1016 mm)	40" (1016 mm)
COMPRESSOR				**POWER**
Air Flow		1350-1150 cfm, dual pressure	1350-1150 cfm, dual pressure	Motor = 400 HP AC (298 kW)
Pressure		350/500 psi (24.1/34.5 bar)	350/500 psi (24.1/34.5 bar)	
Engine Power		800 hp (596 kW)	800 hp (596 kW)	
DIMENSIONS				
Length		51 ft 9 in (15.7 m)	51 ft 9 in (15.7 m)	55 ft 4 in (16.8 m)
Height		13 ft 6 in (4.11 m)	13 ft 6 in (4.1 m)	14 ft 4 in (4.4 m)
Width		10 ft 6 in (3.2 m)	12 ft (3.7m)	12 ft (3.6 m)
Weight		110,000 lbs (49895 kg)	120,000 lbs (54,431 kg)	139,000 lbs (63049 kg)
JIB BOOM WINCH				
Wire Rope Length		140 ft (42.67 m)	140 ft (42.67 m)	126 ft (38.4 m)
Wire Rope Diameter		1/2" (12.70 mm)	1/2" (12.70 mm)	⅝ in (1.58 cm)
Line Pull on Bare Drum		8,000 lbs (3628 kg)	8,000 lbs (3628 kg)	12,000 lbs (5443 kg)
Line Speed on Full Drum		170 ft/min (51.8 m/min)	170 ft/min (51.8 m/min)	175 ft/min (53.3 m/min)
WATER & FOAM INJECTION				
Capacity		24 gpm (90.8L/min)	24 gpm (90.8L/min)	24 gpm (90.8L/min)
Pressure		700 psi (48.3 bar)	700 psi (48.3 bar)	700 psi (48.3 bar))

**Performance specifications are theoretical maximums. Actual performance may vary.*
***All DR rigs can be ordered without compressor.*

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