LF™350E DRILL RIG AND FREEDOM™ LOADER

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V5 6/28/17

BOART LONGYEAR™

LF™350E DRILL RIG

Boart Longyear has combined proven technology from its most popular surface coring drill rigs to create the powerful LF™350e. When paired with the FREEDOM™ Loader, the LF350e combination is ideal for deep hole exploration companies who want to target contracts that stipulate some of the highest safety standards, without compromising on productivity.

Totally hands free rod handling

The LF350e and FREEDOM Loader combination provides hands-free rod handling. No intervention from the driller's assistant is required to align and cycle the rods or connect a hoist plug when operating the loader. All operations happen behind the control panel at the touch of a finger.

Optimal safety without compromising productivity

The FREEDOM Loader can cycle 6 meter rods in same amount of time as a manual cycle which means enhanced safety is achieved without compromising productivity.

Electronic Controls

The LF350e drill rig is completely electronically controlled utilizing CAN bus and PLC devices. The patent pending control panel features a 12" touch screen display for drilling information and mode selection.

Depth capacity

With up to 3,360 meters of NQ™ V-Wall™ capacity, the LF350e can meet the demands of the deepest diamond coring projects. Need a larger size core in a deep hole? The LF350e can deliver 3050m of HQ core or 1800m of PQ core using HRQ™ V-Wall™ and PHD V-Wall™ rods.

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INTRODUCING THE FREEDOM™ SERIES

Introducing Boart Longyear's FREEDOM™ series of rod loaders, handlers and presenters. Our cutting-edge range has been engineered with drillers' safety and productivity front-of-mind.

FREEDOM TO DRILL

The FREEDOM series is your best option for reducing the risk of hand and back injuries while handling rods.

FREEDOM TO MOVE

Using the FREEDOM Loader remote control enables you to work from a safer location, away from the risks of moving rods.

FREEDOM TO BID

Only the FREEDOM series complies with today's rigorous CE standards, so you will have the freedom to bid on jobs with some of the most stringent health and safety standards.

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CA Patent No. 2,752,773; CN Patent No. 201080018683.3; US Patent No. 8,028,613; DE, FL, IT, PL & SE Patent No. 2425094; Patents Pending

LF™350E DRILL RIG & FREEDOM™ LOADER

1. HANDS-FREE ROD HANDLING

No intervention from the driller's assistant is required to trip and align the rods or connect to the top drive head when operating the Freedom™ Rod Loader. All operations happen behind the control panel at the touch of a finger.

2. TILTING TOP DRIVE HEAD

The forward tilting head design simplifies the rod handling process and reduces the need for operator intervention and maintenance.

3. ROD BREAKING CLAMP

A hydraulic breaking device means no wrench under power. Rod alignment device and centralizer included.

4. ROTATING FOOT CLAMP

The foot clamp rotates to break rod joints located between the foot clamp and Rod Breaking Clamp.

5. CLIMATE CONTROLLED CAB

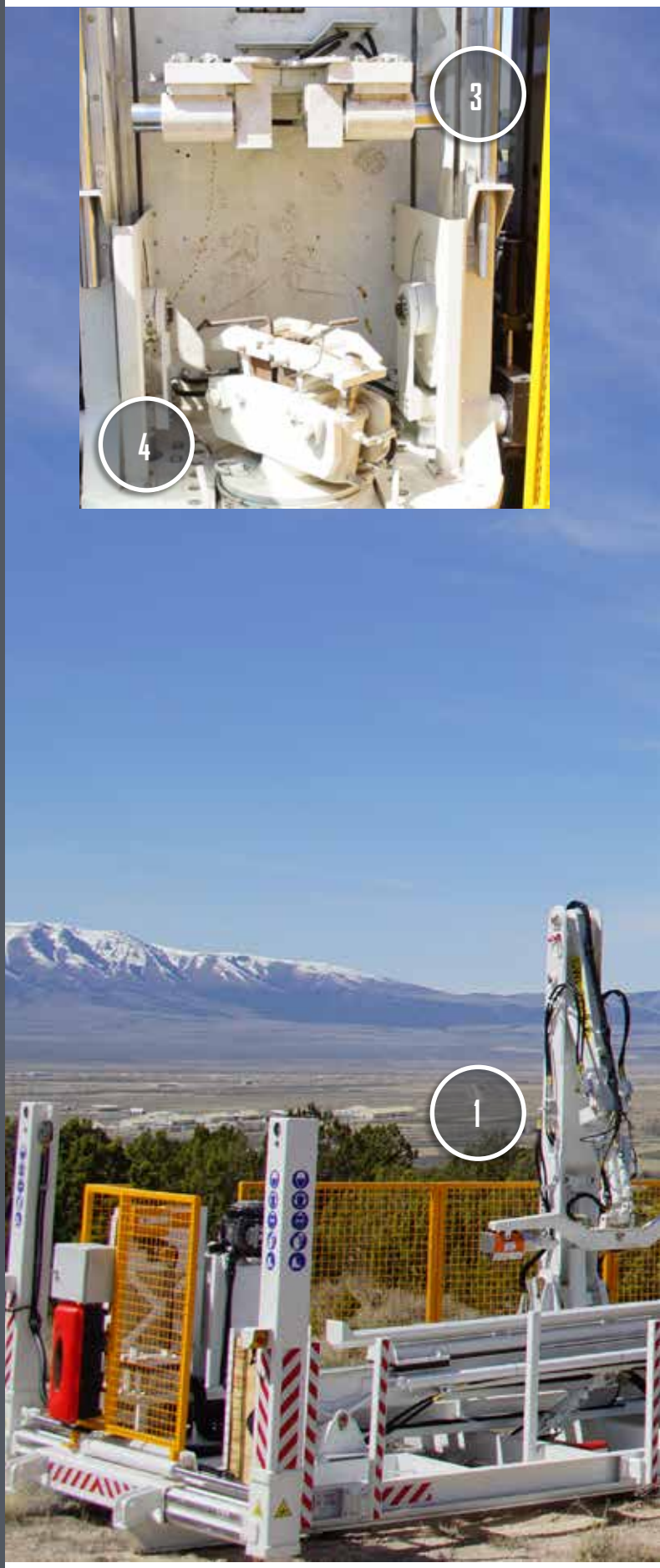
The heated and air conditioned drillers cab protects workers from the elements.

6. DEPTH CAPACITY

With up to 3,360 meters of NQ™ V-Wall™ capacity, the LF350E covers all of your deep hole exploration needs.

7. ELECTRONIC CONTROLS

Utilizing CAN bus communication and PLC programming, all functions are controlled electronically. The "e" in LF350e refers to the fully electronic control system.



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TOP FIVE FEATURES OF THE LF™350E

1. Tilting Top Head Drive

The tilting top drive head simplifies rod handling with built-in tools and functionality.

The rod clamp attached to the head carriage is used to make and break joints at the drive sub with power from the head. You don't have to worry about inadvertently breaking a joint elsewhere in the string.

The floating spindle is spring loaded to provide just the right amount of tension or compression when threading rods. This will reduce thread wear and other issues associated with making rod joints.

The tilting function of the head allows for all joints to be made low to the ground where the driller has a clear and comfortable view of the joint. Tripping rods at a near horizontal angle is ideal for auxiliary equipment such as the FREEDOM™ Loader.

Other benefits of the tilting top drive head include the elimination of the mainline hoist, hoisting plug and water swivel management.

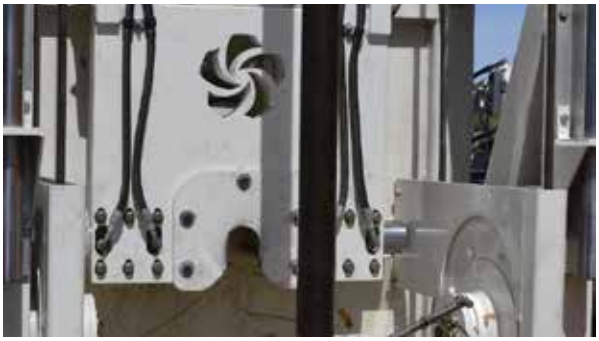
2. Rod Breaking Clamp

Folded down into the mast when not in use, the LF350e comes equipped with a Rod Breaking Clamp.

The clamp is used when breaking a rod joint above the foot clamp when pulling rods in 6m or 20' length. By clamping the rod just above the foot clamp, you are guaranteed to break the correct joint, leaving the middle joint tight for rod handling.

The clamp is deployed with a hydraulic cylinder into the drill centerline. Two clamping cylinders activate to securely grip the rod for breakout.

When making joints, the clamp is also used to align joints for easy stabbing and threading. An adjustable guide plate mounted above the clamping jaws keeps the new rod located in the drill centerline.



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AU Patent No. 2008296490; CA Patent No. 2,696,269; CN Patent No. 200880104593.9; PE Patent No. 6564; Patent No. 7,997,167; ZA Patent No. 2010/00778; Patents Pending

3. Rotaing foot clamp

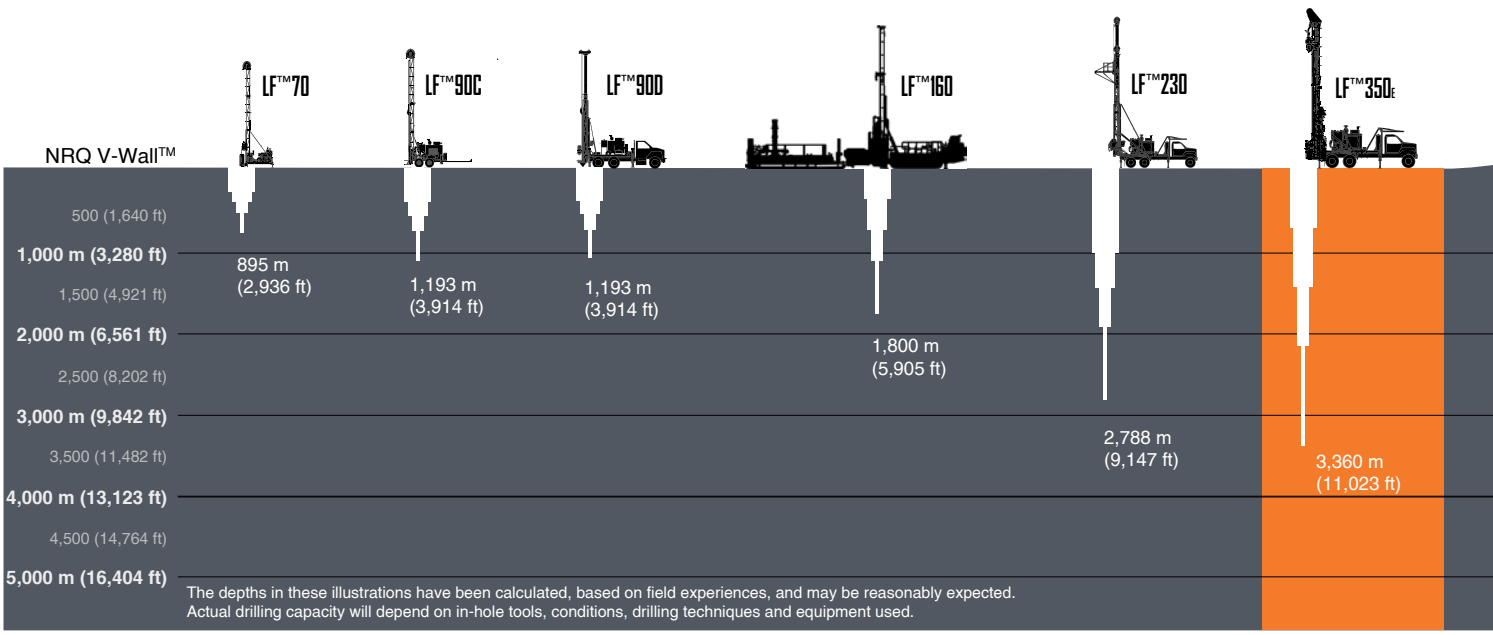
The uniquely mounted foot clamp can be quickly removed by opening the hydraulically activated drilling table. This allows for the passing of larger tools as required in special drilling conditions.The foot clamp assembly rotates to break joints between the foot clamp and rod breaking clamp.

4. Climate Controlled Cab

Close the doors and get comfortable. The LF350e comes standard with a heated and air conditioned drillers cab

5. Depth Capacity

The LF350e is a very powerful exploration drill rig. The 29 metric tons (65,000 lbs) of pull back and 3.7 kNm (2,737 ft-lbf) of torque at 260 RPM makes the LF350e the most powerful of Boart Longyear's diamond coring drill rigs. The machine can produce a PQ core to a depth of 1800 m (5900 ft) using PHD V-Wall rods.



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US Patent No. 8,991,791; Patents Pending

LF™350E DRILL RIG TECHNICAL INFORMATION

Drilling Capacity*		
	Metric Units	**US Customary Units**
Diamond Core BQ™ / BRQ™ (Rod limited to 1500m / 3000m respectively)	3000 m	9800 ft
Diamond Core NQ™ / NRQ™ (Rod limited to 1500m / 3000m respectively)	3000 m	9800 ft
Diamond Core NRQ™ V-Wall™ (Rod limited to 3360m)	3360 m	11,000 ft
Diamond Core HQ™ / HRQ™ (Rod limited to 1500m / 2500m respectively)	2500 m	8200 ft
Diamond Core HRQ™ V-Wall™ (Rod limited to 3050m)	3050 m	10,000 ft
Diamond Core PHD	1300 m	4300 ft
Diamond Core PHD V-Wall™	1800 m	5900 ft
*The figures in this table have been calculated using torque and pulling capacity of the head with a fluid filled vertical hole and an effective rock tensile strength of 5 Mpa. Actual drilling results may vary and will be affected by in-hole tools, fluid level in the hole, subsurface conditions, drilling techniques, additives and equipment used.		

Safety Design Highlights	
Rod Handling	Hands Free when used with compatible Rod Loader
Interlocked Rotation Barrier	Reduced Operation Mode
Noise Level	Driller's deck 92dB, Driller's Capsule 91 dB

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Other Safety Feature	Climate Controlled Driller's Cabin, Rotation Barrier, Mode-switches, Emergency Stops, Head Rod Clamp, Breaking device, Hands Free Rod Handling and more.

Prime Mover		
Engine (option)	Cummins QSL 8.9L, turbo charged, after cooled diesel	
Emissions compliance	Stage IIIA	Tier 3
Fuel	Diesel	
Fuel Consumption @ Full Power	75.7 l/hr	20 gal/hr
Maximum Power @ 1800 RPM	275 kW	369 HP
Electrical Voltage	12 V	
Recommended max altitude of operation	3,636 m	12,000 ft
Fuel Tank Capacity	681 L	180 gal

Hydraulic System		
Primary Pump [x4]	Axial Piston, variable displacement load sensing, pressure compensated	
Maximum Flow	1,111L/min	293 gal/min
Maximum Pressure	324 bar	4,700 psi
Auxiliary Pumps [x1]	Gear Pump	
Maximum Flow	250 L/min	66 gal/min
Maximum Pressure	31 bar	450 psi
Hydraulic Oil Tank Capacity	946 L	250 gal

Rotary Head		
Model	Boart Longyear LCH20	
Configuration	Top Drive, floating spindle, tilt-out with rod clamps	
Number of Gear Speeds	1 Speeds	
Gear Ratio	3.4:1	
Head fine RPM control	Motor displacement adjustment	
High Speed Torque @ RPM	1.2 kNm @ 1000 RPM	898 ft*lb @ 1000 RPM

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Low Speed Torque @ RPM	3.7 kNm @ 260 RPM	2737 ft*lb @ 260 RPM
Head Lubrication Pump	Speed Dependent. Driven by head rotation.	
Head Lubrication Flow	34.8 L/min @ 525rpm	9.2 gal/min @ 525rpm
Floating Spindle: Inside Diameter	25 mm	1 in
Floating Spindle: Floating Distance	108 mm	4.25 in
Tilt-out head	90°	
Rod Clamp Extension Distance	152 mm	6 in

Truck Mount	
INTERANTIONAL	7600 - 6x4 (with Pusher axle)

Rig Controls	
Drilling Controls	Fully Electric PLC Controlled with CAN bus
Hose Management	Traveling Energy Chain

Drill Mast and Feed System		
Drill Mast Feed Method	Cable and Hydraulic Hoist	
Drill Mast Length	11 m	36ft
Feed Stroke Length	6.86 m	22 ft 6 in
Fast Feed Speed - Up	34 m/min	111 ft/min
Max Pull Down Force	129 kN	29,000 lbf
Max Pull Back Force	289 kN	65,000 lbf
Maximum rod pull length	6 m	20 ft
Drilling Inclination	45° - 90° (vertical down)	

Rod Clamping/Breaking Systems		
Maximum Clamp Diameter	140 mm (PWT)	5-1/2” (PWT)
Clamping Range	44 mm - 140 mm	1-3/4” - 5-1/2”
Type	Hydraulically Closed / Hydraulically Opened; Wedge Style	
Power Failure Protection	Wedge Action	
Maximum Footclamp Weight Capacity	29,484 kg	65,000 lb

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Maximum Break Out Torque	1464 kg-m	10,590 ft-lb
Clamp Jaw Style	Wedge Slip Coring Jaws	
Rod Breaking Clamp	BQ™, NQ™, HQ™, PHD, PWT (other size available)	

Mud Pump		
Pump Type	FMC L1118 Triplex Piston Pump	
Valve Type	Ball Valves	
Flow	246 L/min	65 gpm
Pressure	76 bar	1,100 psi

Wireline		
Maximum pull on inner layer	13.0 kN @ 70.4 m/min	2,923 lbf @ 231 ft/min
Line Speed	up to 360 m/min	up to 878 ft/min
Cable Diameter	6 mm	0.24 in
Cable Capacity (6mm)	2,495 m	8,235 ft
Cable Diameter	5 mm	0.1875 in
Cable Capacity (5mm)	4,658 m	15,370 ft
Spooling device	Standard	
Max Lifting Capacity (for auxilliary use)	250 kg	550 lbs

Air Supply		
Air Compressor Model	Dynaset HK450 / 8-14	
Compressor Type	Hydraulic Piston Compressor	
Max Flow	450l/min @ 6 bar	120 gal/min @ 87 psi
Max Pressure	8 bar	115 psi

Wash Pump		
Pump Model	FMC A0410C	
Flow	15 L/min	4 gpm
Pressure	62 bar	900 psi

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Rod Loader Power Supply		
Hydraulic PTO - Load Sense	72 lpm @ 276 bar (163 lpm @ 103 bar)	19 gal/min @ 4000 psi (43 gal/min @ 1500 psi)
Electrical Supply	24 V	

Aux PTO		
Mud Mixer/Auxilliary	25 L/min @ 85 bar	6.6 gal/min @ 1230 psi

Refer to Diagrams for Reference		
Transport Dimensions (Including Truck)		
Weight	28,800 kg	65,700 lb
Width (F)	2.67 m	8 ft 9 in
Height (C)	3.32 m	14 ft 2 in
Length (B)	11.9 m plus 1.0 m front overhang	39’ 1” plus 3’ 3” front overhang

Dimensions - Job Site Rig Only		
Width (G)	4.3 m	14 ft 1 in
Length (E)	2.6 m	39 ft 10 in
Mast Height, 45° (A)	8.9 m	29 ft
Mast Heignt, 90° (D)	12.2 m	40 ft 1 in

Dimensions - Job Site with FREEDOM Loader		
Width (G)	4.3 m	14 ft 1 in
Length (E)	20.2 m	66 ft 3 in
Mast Height, 45° (A)	8.8 m	29 ft
Mast Heignt, 90° (D)	12.2 m	40 ft 1 in

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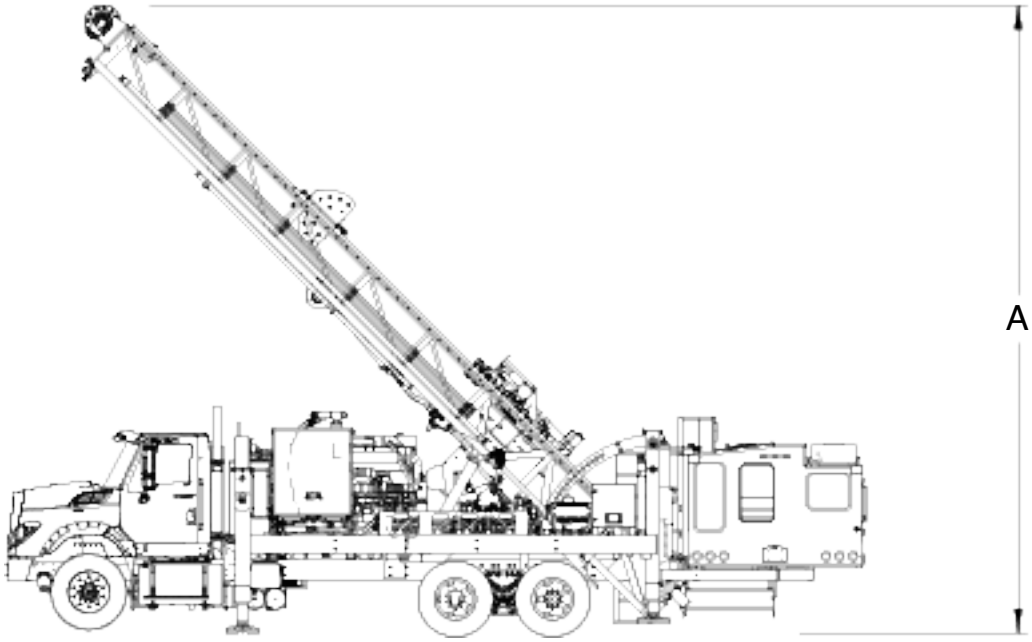
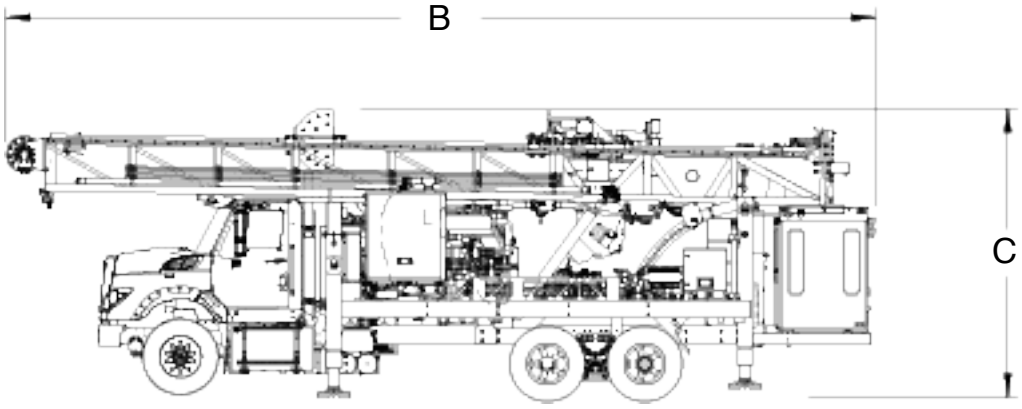
Measurements

Side View - 45°



Measurements

Side View - Horizontal



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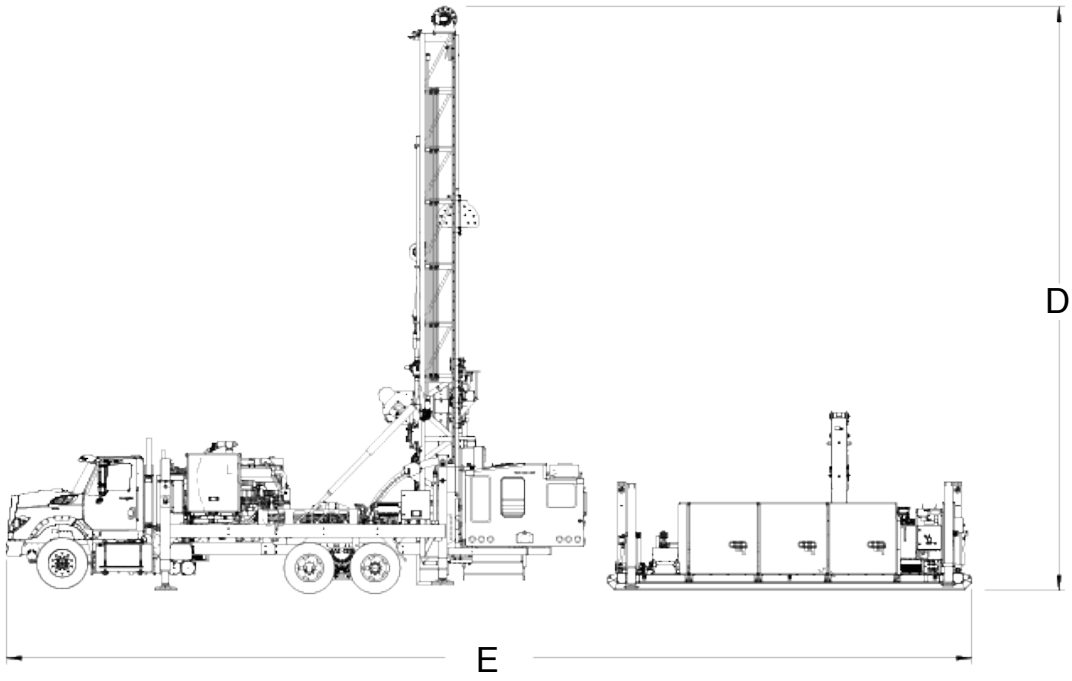
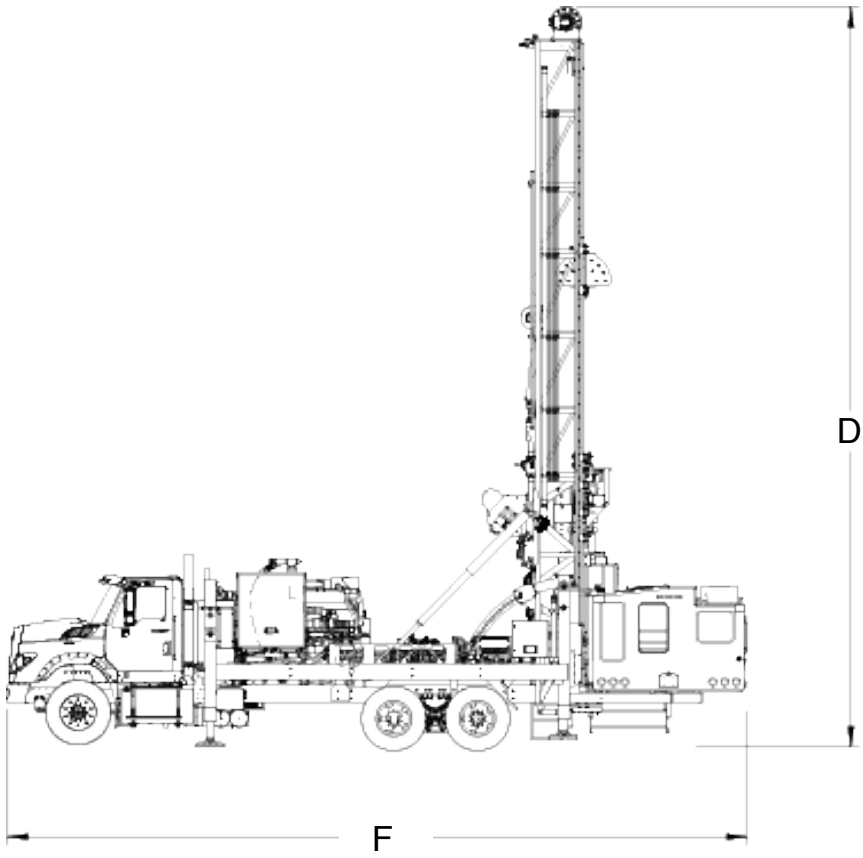
Measurements

Side View - With Loader



Measurements

Mast - 90°



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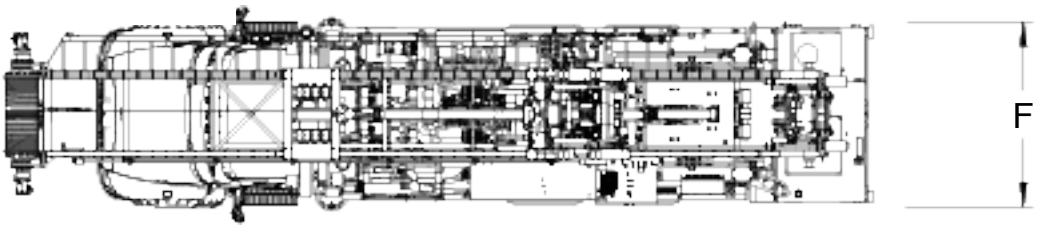
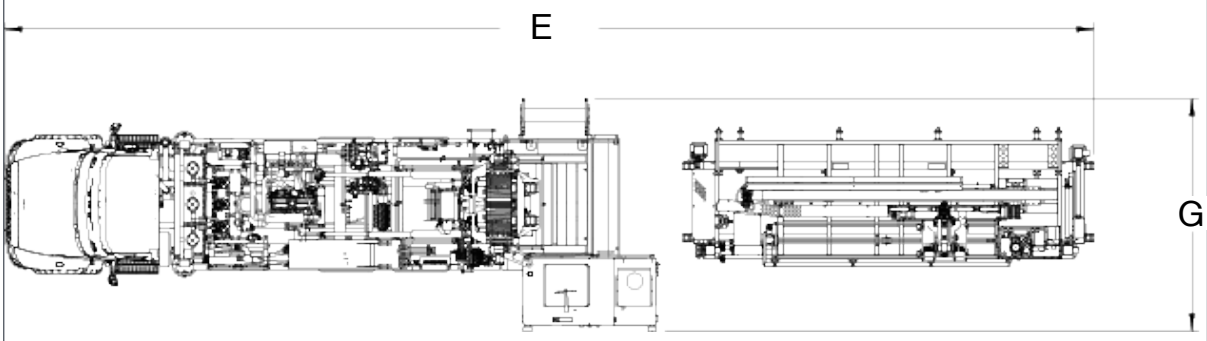
Measurements

Top View



Measurements

Top View - With Loader



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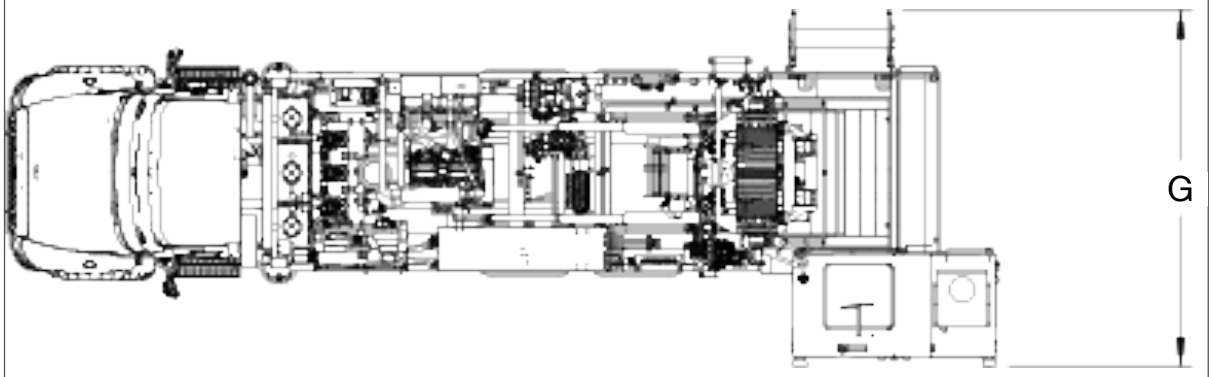
Measurements

Top View - Mast Up



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BOART LONGYEAR™ PERFORMANCE TOOLING

DIAMOND PRODUCTS

GENUINE Q™ WIRELINE TOOLING

RODS AND CASINGS

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BOART LONGYEAR™

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