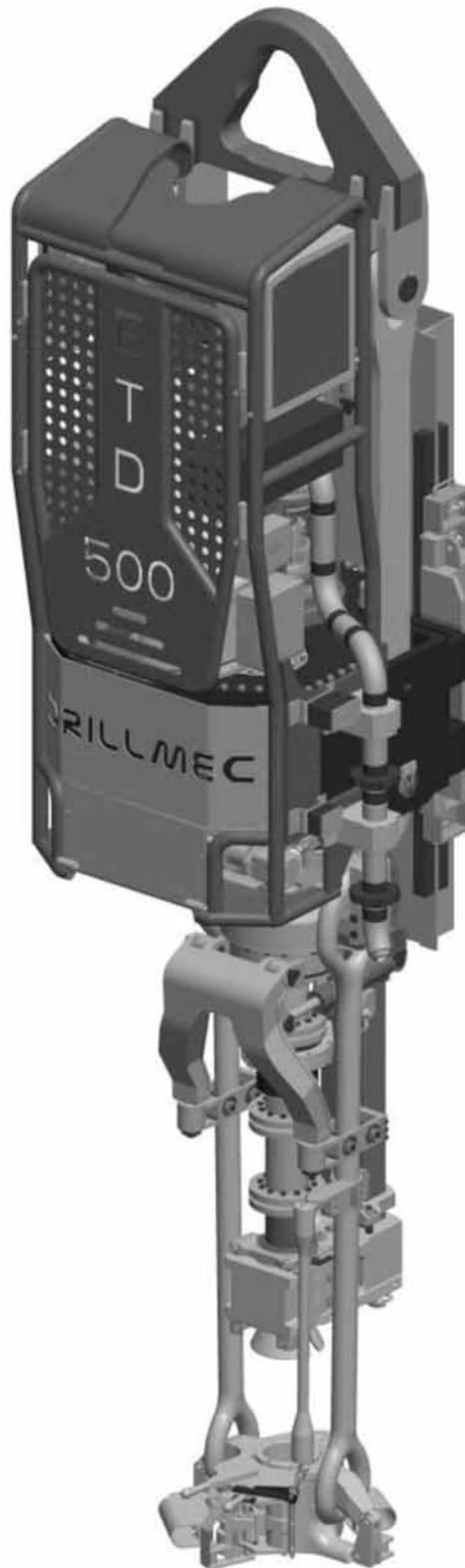


Technical Catalog

Top Drives



DRILLMEC
DRILLING TECHNOLOGIES

DRILLMEC's ETD Series is the *new generation* of *Electric Top Drives* designed for improved safety and performance.

DRILLMEC's ETD Series is designed both a transportable and a permanent unit for deep drilling rigs with different mast and derrick configurations. The system is powered by a AC motor.

The **ETD Series** is controlled by a separate control panel.

ETD SERIES - Main Features

- Hanger assembly with integrated counterbalance cylinders
- Standard washpipe
- Link-tilt-system with position monitoring designed for high impacts
- Remote controlled and manual IBOP
- Backup clamp to make up and break up the top drive drill pipe connection
- Guide rail system inducing the torque within the mast

ETD SERIES - Main Benefits

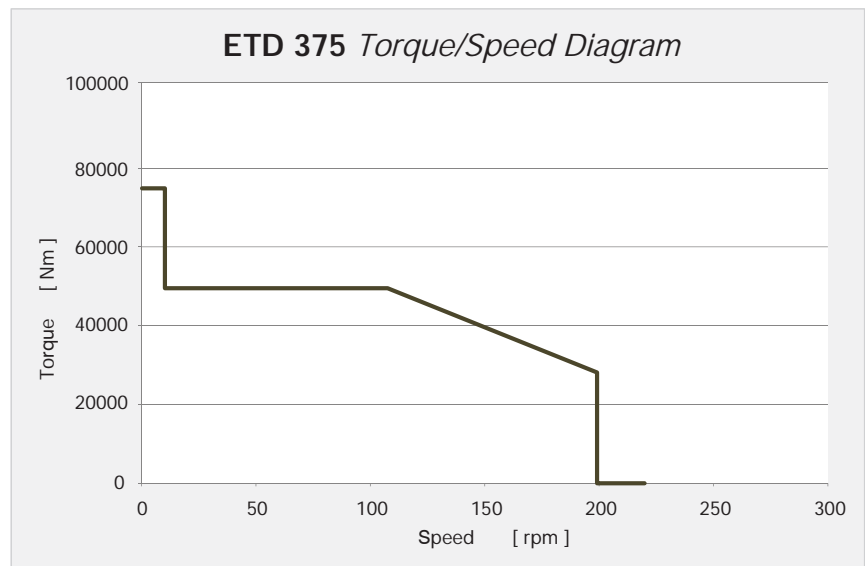
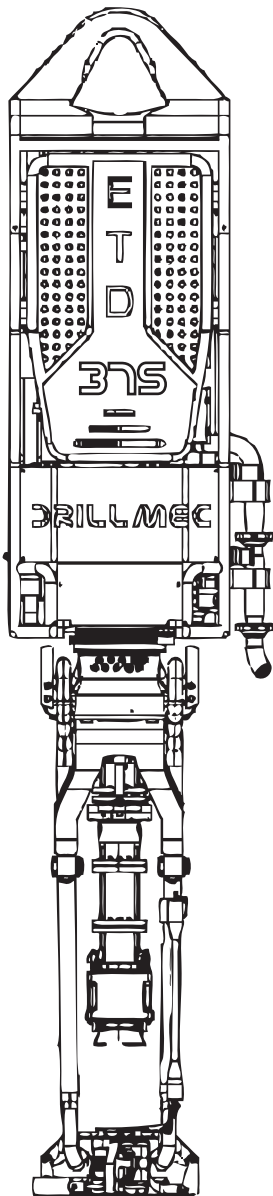
- Safety: sensors to avoid human mistakes and recognize problems
- Integration: PLC logic
- Adaptability: single or double guide rails
- Electrical service loop
- Suitable for installation on any kind of mast and derrick

Electric Top Drive

ETD 375	750000 lbs (340 mtons)	36880 lbs*ft (5000 daNm)	55320 lbs*ft (7500 daNm)	200 rpm
ETD 500	1000000 lbs (453 mtons)	51600 lbs*ft (7000 daNm)	78640 lbs*ft (10663 daNm)	219 rpm
ETD 750	1500000 lbs (680 mtons)	66380 lbs*ft (9000 daNm)	95883 lbs*ft (13000 daNm)	219 rpm

ETD 375

Electric Top Drive



ETD 375 - Electric Top Drive

Drilling performance

- Max continuous torque	36880 lbs*ft	5000 daNm
- Speed at max torque	115 rpm	
- Max speed	200 rpm	

Lifting capacity

- Load on the shaft	750000 lbs	340 metric tons
- Load on the elevator axis	750000 lbs	340 metric tons

Length/Width/Height	247.24" x 52.91" x 69.21"	6280 x 1344 x 1758 mm
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Weight	27330 lbs	12400 kg
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Transport	Support frame for top drive transportation
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Technical Data

Electric motor, gear box & main shaft

- AC electric drive power	800 hp	596.5 kW
- Cooling system	Air (local blower)	

Circulation swivel

- Pressure rating	5000 psi	345 bar
- Washpipe ID	3"	76 mm

Pipe handler

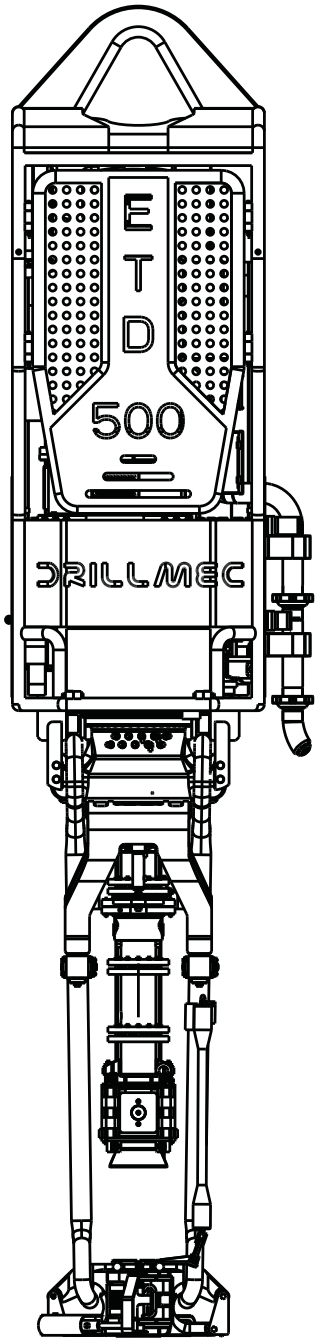
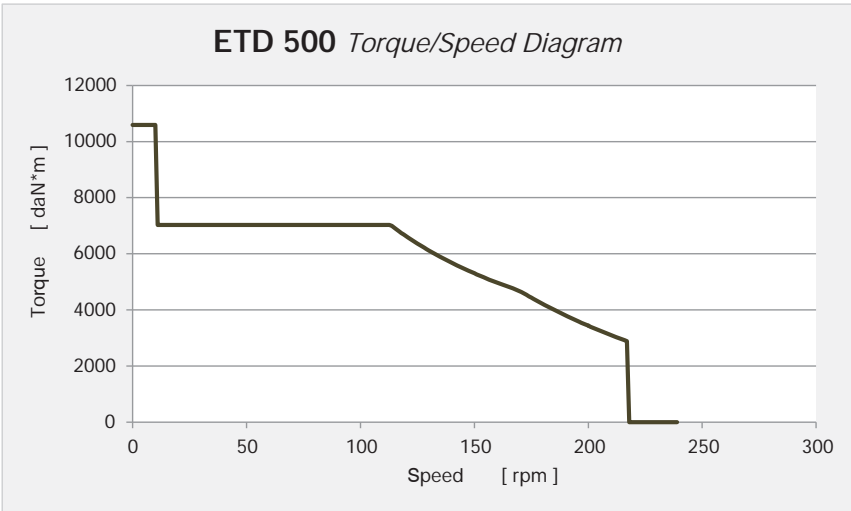
- Pipe handler orientation	Unlimited, remote controlled	
- Pipe handler lock	Remote controlled	
- Link tilt lifting capacity	4850 lbs @ 4.1/2 ft	2200 kg @ 1.4 m

Back up wrench

- Break-out capacity	55317 lbs*ft	7500 daNm
- Make-up capacity	44253 lbs*ft	6000 daNm
- Back-up wrench gripper diameter range	3.1/2" - 7"	89 - 178 mm

ETD 500

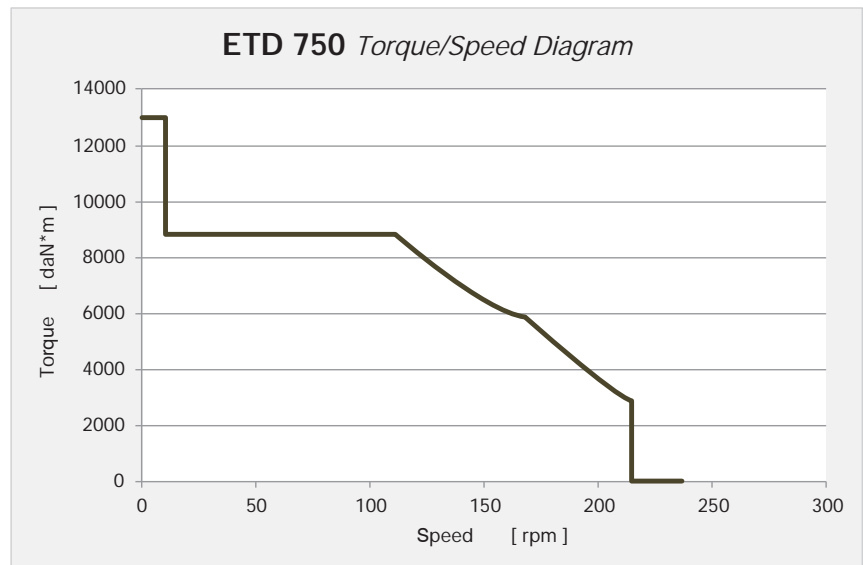
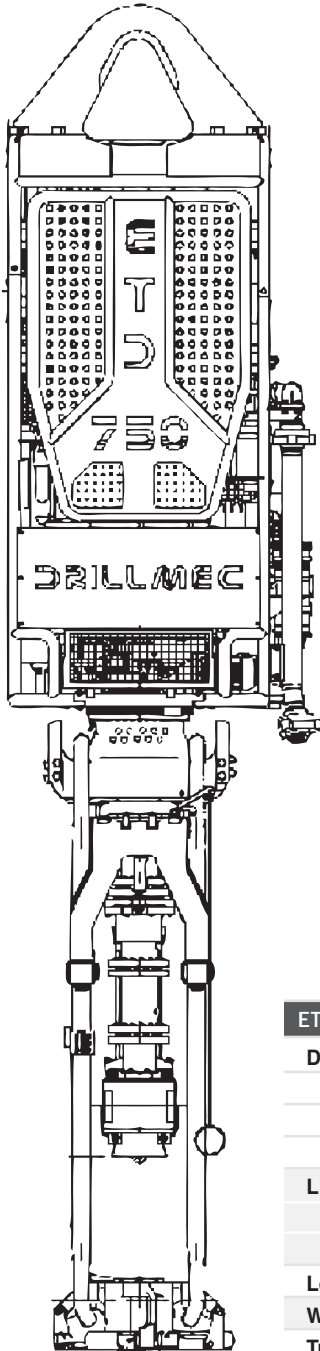
Electric Top Drive



ETD 500 - Electric Top Drive		
Drilling performance		
- Max continuous torque	51600 lbs*ft	7000 daNm
- Speed at max torque	115 rpm	
- Max speed	219 rpm	
Lifting capacity		
- Static hoist rating	1000000 lbs	453 metric tons
- Elevator load path	1000000 lbs	453 metric tons
Length/Width/Height	262.83” x 60.23” x 69.76”	6676 x 1530 x 1772 mm
Weight	34141 lbs	15485 kg
Transport	Support frame for top drive transportation	
Technical Data		
Electric motor, gear box & main shaft		
- Output power continuous	1150 hp	850 kW
- Static brake torque	92000 lbs*ft	12500 daNm
- Quill connection	6.5/8” API reg	
- Cooling system (local blower)	15 hp	11 kW
Circulation swivel		
- Pressure rating	5000 psi	345 bar
- Washpipe ID	3”	76 mm
Pipe handler		
- Pipe handler orientation	Unlimited, remote controlled	
- Pipe handler lock	120 position, remote controlled	
- Link tilt lifting capacity	5500 lbs @ 4.1/2 ft	2500 kg @ 1.4 m
- Back-up wrench maximum travel	37”	940 mm
Back up wrench		
- Break-out capacity	78646 lbs*ft	10663 daNm
- Make-up capacity	62692 lbs*ft	8500 daNm
- Back-up wrench gripper diameter range	4.3/8” - 8.1/4”	120 - 210 mm

ETD 750

Electric Top Drive



ETD 750 - Electric Top Drive

Drilling performance

- Max continuous torque	66380 lbs*ft	9000 daNm
- Speed at max torque	115 rpm	
- Max speed	219 rpm	

Lifting capacity

- Static hoist rating	1500000 lbs	680 metric tons
- Elevator load path	1500000 lbs	680 metric tons

Length/Width/Height

	265.4" x 62.4" x 70.15"	6676 x 1585 x 1782 mm
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Weight

	37250 lbs	16900 kg
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Transport

	Support frame for top drive transportation	
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Technical Data

Electric motor, gear box & main shaft

- Output power continuous	1450 hp	1080 kW
- Static brake torque	92000 lbs*ft	12500 daNm
- Quill connection	7.5/8" API reg	
- Cooling system (local blower)	15 hp	11 kW

Circulation swivel

- Pressure rating	7500 psi	517 bar
- Washpipe ID	3"	76 mm

Pipe handler

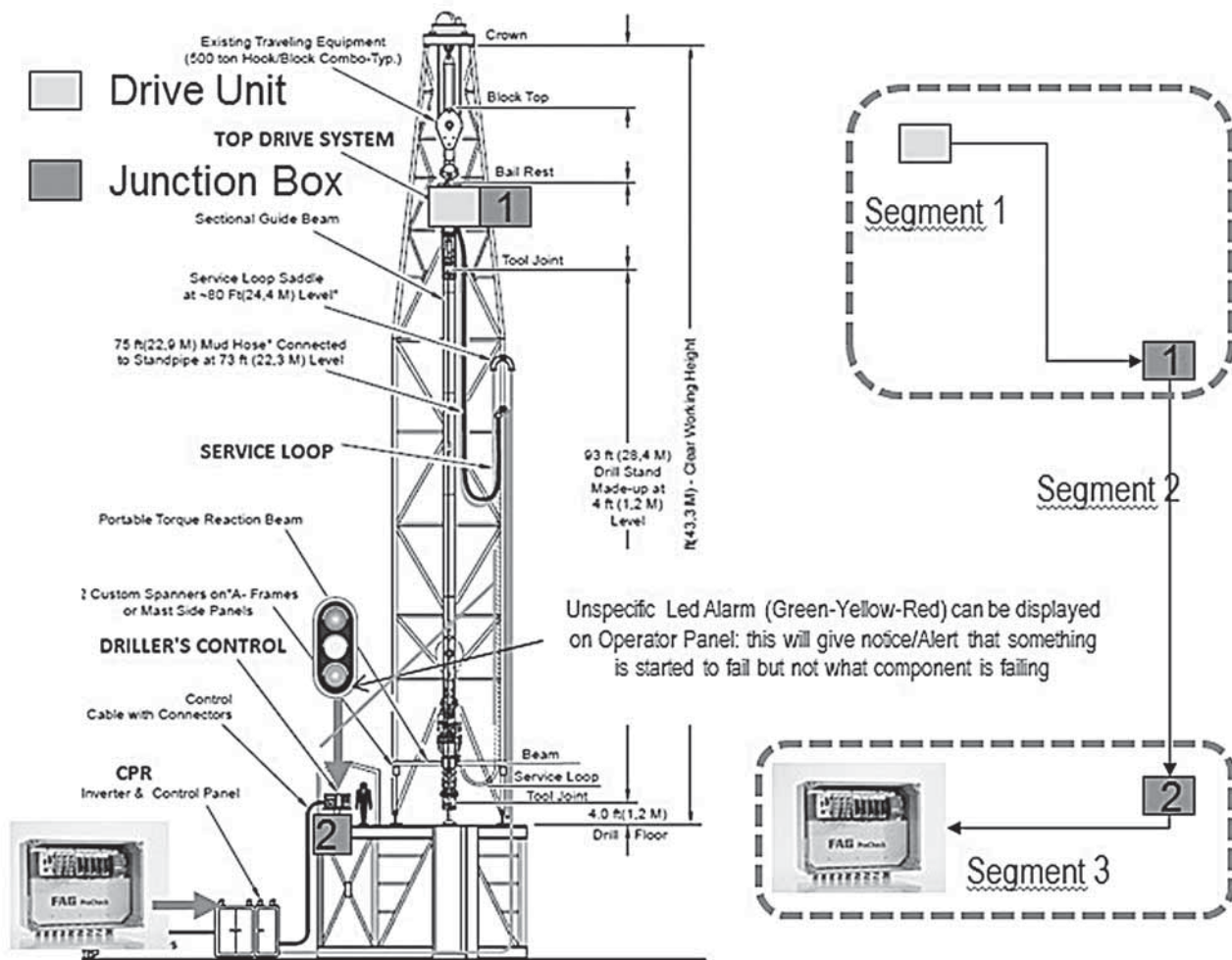
- Pipe handler orientation	Unlimited, remote controlled	
- Pipe handler lock	120 position, remote controlled	
- Link tilt lifting capacity	5500 lbs @ 4.1/2 ft	2500 kg @ 1.4 m
- Back-up wrench maximum travel	37"	940 mm

Back up wrench

- Break-out capacity	95833 lbs*ft	13000 daNm
- Make-up capacity	77444 lbs*ft	10500 daNm
- Back-up wrench gripper diameter range	4.1/2" - 9"	114 - 228 mm

ETD Series

Optional Solutions



Condition Monitoring System CMS - Electric Top Drives

The CMS unit measures the monitored values through specific sampling frequencies. An automatic analysis (using tools such as FFT) must be done by the CMS unit.

As a result, proper alarms (usually red-yellow-green) are configured on the measured parameters in order to alert the operator when one of the monitored values is exceeding the acceptable limits.

These alarms must be shown both on the CMS unit and on the Drilling Operator's Control Panel.

Other detailed data correlation, visualization and post analysis must be done remotely by a trained service engineer in the monitoring center.

Communication between the CMS unit, located on the drilling rig, and the monitoring center can be done through: GSM, GPRS, Analogue, ISDN, Ethernet. The CMS unit must also be able to notify alarms/alerts/warnings, with proper information and data tagging, via email and sms.

Soft Torque System - ST System - Electric Top Drive

The ST system is designed to mitigate the stick-slip behaviour.

The ST controller is a speed controller tuned with the K_f (drive stiffness in Nm/rad) and C_f (drive damping in Nms/rad) values.

The tuning parameters K_f and C_f are calculated depending on the drill string and BHA (bottom hole assembly) configuration. ST will be able to improve damping of stick-slip when the two tuning parameters K_f and C_f are on target or not too far from ideal values. Also drill speed needs to be above a critical value.

Compared to a normal operation (ST is off) the critical speed value is lower when soft torque is on.

Soft Torque System - ST System - Main Features

1. Switching Soft Torque (ST) ON and OFF.
2. Entering the right settings for the tuning parameters K_f and C_f .
3. Calculation of K_f and C_f depending on BHA and Drill pipe specifications.

Actual values of speed and torque can be monitored in real-time on the touch panel.

These values can also be monitored graphically in a trend display of 100 seconds.

Anti-Collision System - Electric Top Drives

The Anti-Collision System helps keep the operator from colliding the top drive with the crown, floor, racking board, derrick structure and other moving equipment.

This wireless system can be used to slow down and then stop the rig prior to a collision.

Drillmec HTD Series top drives can be fitted to almost any rig in order to increase performance and help in operations such as directional or horizontal drilling. Drillmec designs top drive rails and torque tubes starting from drawings of the customer's rig or from data collected by our technicians directly on the rig field.

The torque tube provides the connection between the new HTD top drive and the existing rig. The HTD top drive is supplied with an independent hydraulic power pack and controls and with a transportation cradle designed to hold it and help during the move.

HTD SERIES - Main Features & Benefits

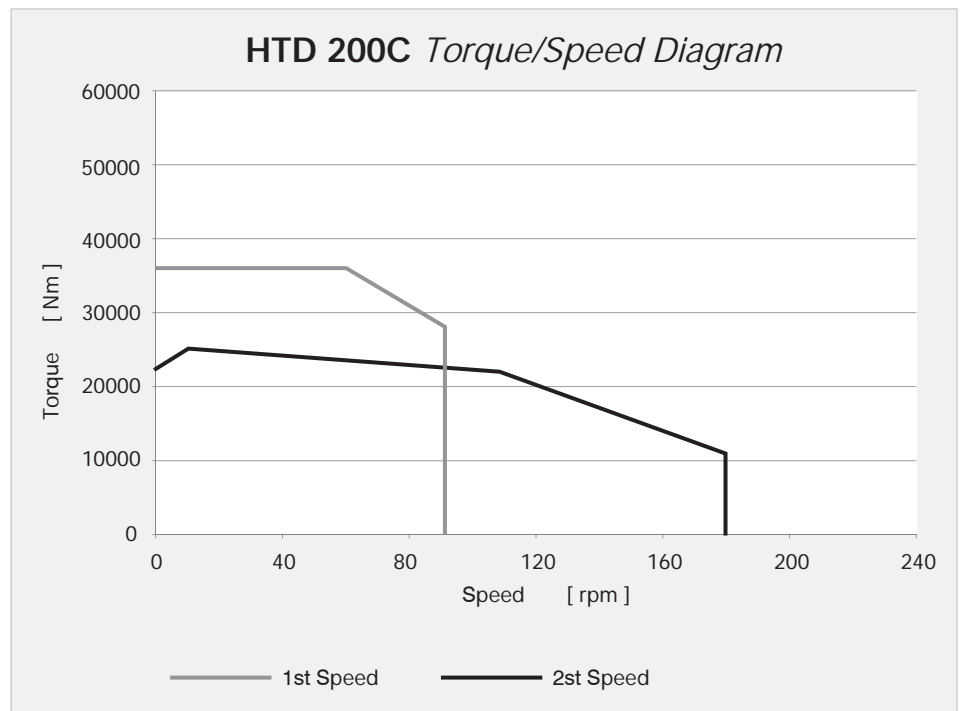
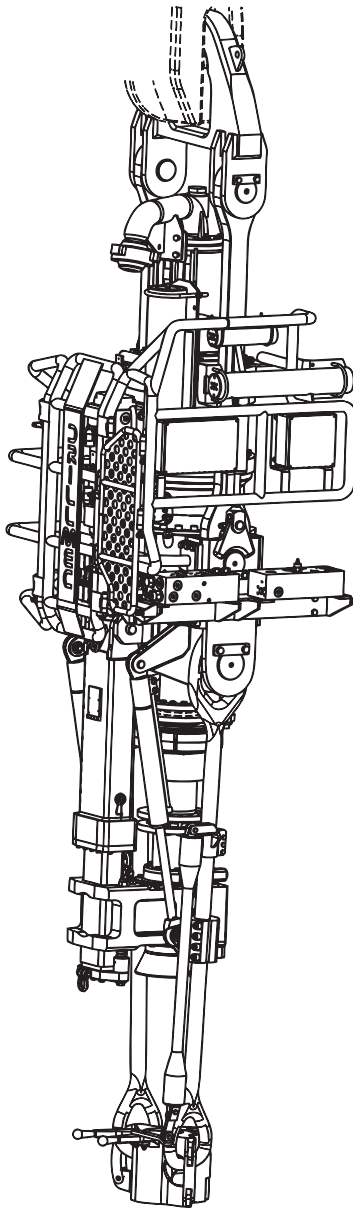
- Reduced dimensions and weight
- Easy and fast installation procedure (also on other manufacturer's mast)
- Power swivel driven by a top-head hollow shaft hydraulic motor with two gears for higher torque and high control
- Polymer slide guide runners
- Complete top drive with a hydraulic disc brake that is installed directly on the shaft to improve precision and sensitivity
- Second ibop valve to enhance safety

Compact Hydraulic Top Drives

HTD 200C	400000 lbs (181 mtons)	26550 lbs*ft (3600 daNm)	28764 lbs*ft (3900 daNm)	180 rpm
HTD 250C	500000 lbs (226 mtons)	26550 lbs*ft (3600 daNm)	28764 lbs*ft (3900 daNm)	180 rpm
HTD 350	700000 lbs (317 mtons)	28941 lbs*ft (3924 daNm)	32548 lbs*ft (4414 daNm)	190 rpm

HTD 200C

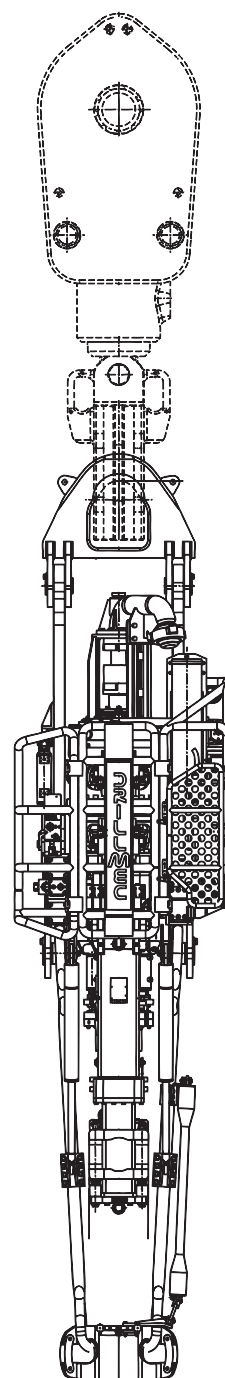
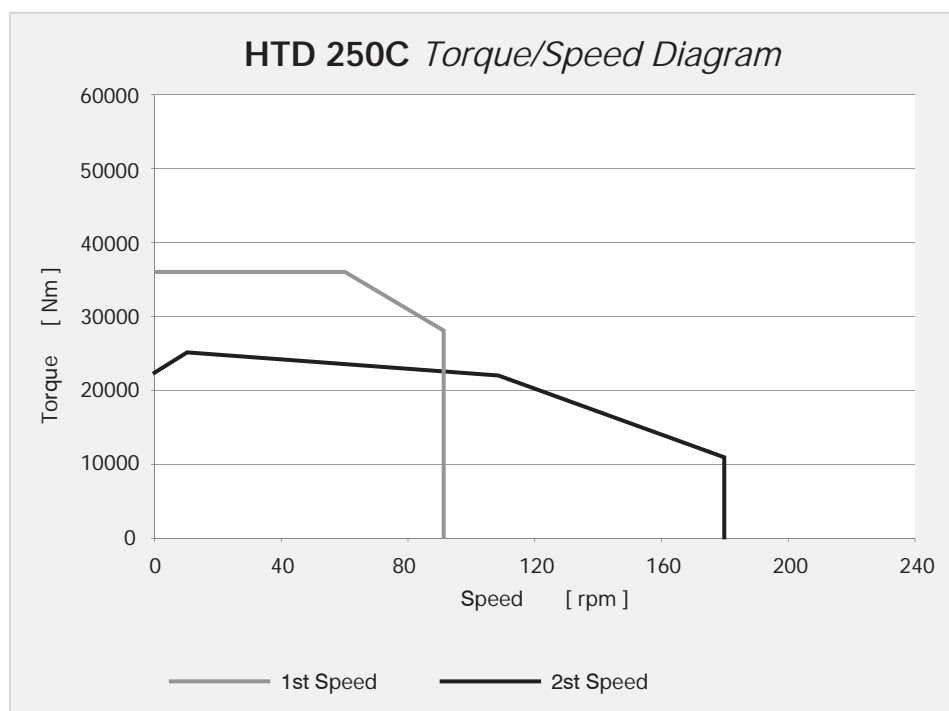
Compact Hydraulic Top Drive



HTD 200C - Compact Hydraulic Top Drive		
Max pull up static	400000 lbs	181 metric tons
Max drilling torque	26550 lbs*ft	3600 daNm
Max make up torque	28764 lbs*ft	3900 daNm
Max break down torque	32170 lbs*ft	4360 daNm
Working pressure	5000 psi	345 bar
Dimensions	49" x 49"	1250 mm x 1250 mm
Working length	174"	4424 mm
Weight	11020 lbs	5000 kg
Speed	0-180 rpm	
ID full opening	2.3/8"	60 mm

HTD 250C

Compact Hydraulic Top Drive

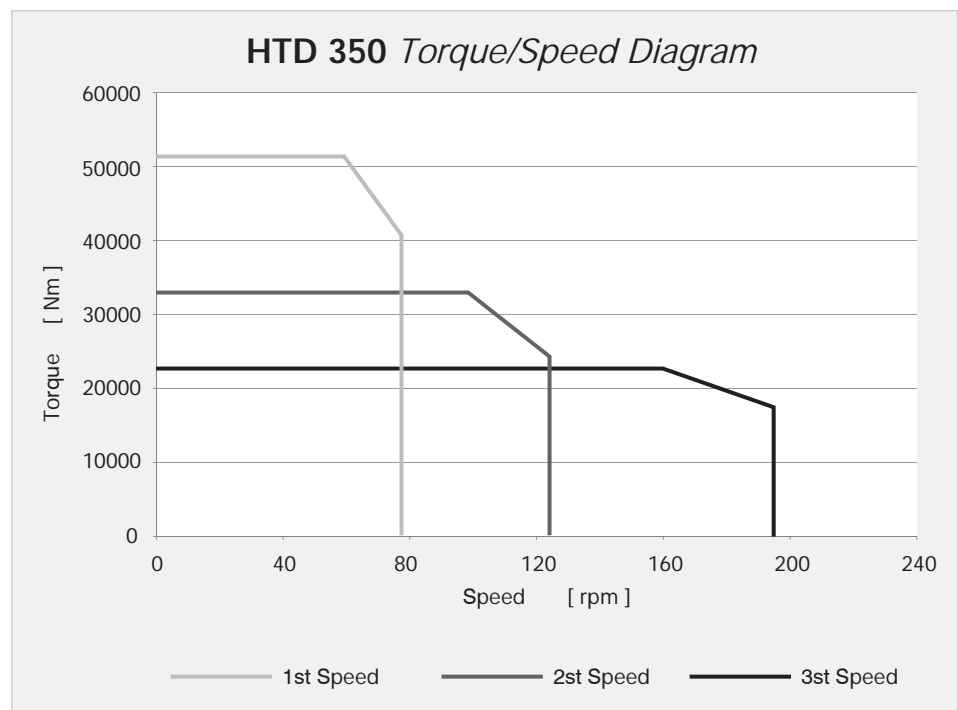
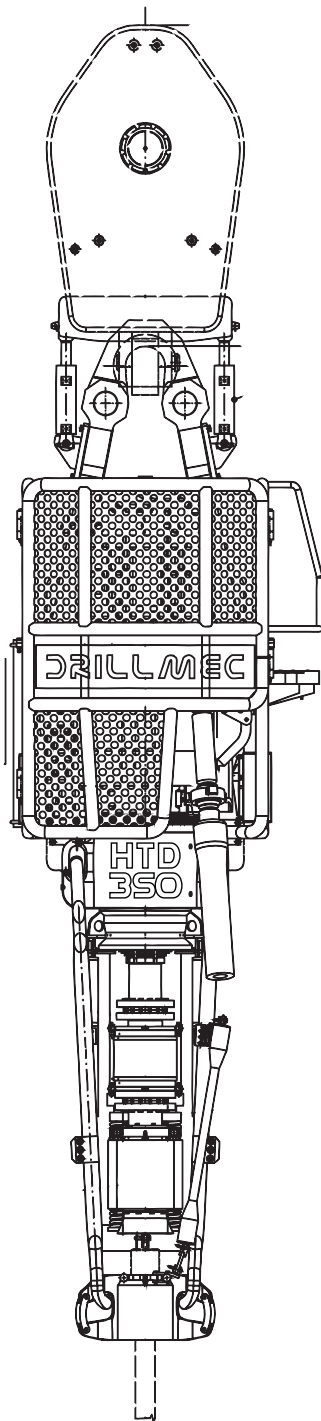


HTD 250C - Compact Hydraulic Top Drive

Max pull up static	500000 lbs	226 metric tons
Max drilling torque	26550 lbs*ft	3600 daNm
Max make up torque	28764 lbs*ft	3900 daNm
Max break down torque	32170 lbs*ft	4360 daNm
Working pressure	5000 psi	345 bar
Dimensions	49" x 49"	1250 mm x 1250 mm
Working length	174"	4424 mm
Weight	11230 lbs	5500 kg
Speed	0-180 rpm	
ID full opening	2.3/8"	60 mm

HTD 350

Compact Hydraulic Top Drive



HTD 350 - Compact Hydraulic Top Drive

Max pull up static	700000 lbs	317 metric tons
Max drilling torque	28940 lbs*ft	3924 daNm
Max make up torque	32548 lbs*ft	4414 daNm
Max break down torque	48834 lbs*ft	6621 daNm
Working pressure	5000 psi	345 bar
Dimensions	70" x 70"	1800 mm x 1800 mm
Working length	215"	5485 mm
Weight	22050 lbs	10000 kg
Speed	0-190 rpm	
ID full opening	3"	76 mm

Top Drives - Technical Catalog

Datasheet Summary

Electric Top Drive

ETD 375	750000 lbs (340mtons)	36880 lbs*ft (5000 daNm)	55320 lbs*ft (7500 daNm)	200 rpm
ETD 500	1000000 lbs (453 mtons)	51600 lbs*ft (7000 daNm)	78640 lbs*ft (10663 daNm)	219 rpm
ETD 750	1500000 lbs (680 mtons)	66380 lbs*ft (9000 daNm)	95883 lbs*ft (13000 daNm)	219 rpm

Compact Hydraulic Top Drive

HTD 200C	400000 lbs (181 mtons)	26550 lbs*ft (3600 daNm)	28764 lbs*ft (3900 daNm)	180 rpm
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HTD 350	700000 lbs (317 mtons)	28941 lbs*ft (3924 daNm)	32548 lbs*ft (4414 daNm)	190 rpm

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