

TTS

REAL TIME DRILLING DATA

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TORQUE TENSION SUB



ProTorque TTS is installed in the top drive to measure torque, tension, RPM, pressure and 3D acceleration directly at the drill string real time. This eliminates algorithm, survey, down hole, hydraulic or electronic signal and sheave friction data errors. This means improved drilling data acquisition for improved BHA performance and life.

TORQUE & DRAG ANALYSIS

The ProTorque TTS can measure reactive torque of a down-hole mud motor when the top drive is not rotating (and not providing torque readings). Torque can be monitored even while drilling in the horizontal section of directional wells. The high speed/ high resolution tension measurements enable precise accurate and efficient auto-driller controls. ProTorque TTS data can provide early detection of down hole problems and conditions such as stick-slip, stuck pipe, high mechanical specific energy (MSE), and excess hole drag. For example, extreme stick-slip can destroy drilling bits and cause lost drill strings due to backed-off connections. Excessive shock events can be prevented by measuring acceleration.

Fishing for a lost drill string is very expensive, typically \$400,000.00 per event. The ProTorque TTS can be equipped with additional sensing capabilities for bending and shear to diagnose and solve quill damage issues due to top drive alignment problems. Torque and tension data measurements each use multiple strain gages that are distributed evenly around the core to compensate for off-axis loads such as bending.

3D ACCELERATION

To record and measure acceleration, the ProTorque TTS can be equipped to measure pump pressure to 5000 psi, RPM to 250 Rev/Min, and 3 axis XYZ acceleration to ± 70 g. It's designed with 2 independent measurement channels for redundancy in critical applications or to provide additional measurements. Each channel transmits on a different RF frequency to help avoid rig interference issues and is range-tested to 1200 feet.

SPECIFICATIONS

Size	4-1/2" IF NC50	6-5/8" REG	6-5/8" REG
Thread Orientation	Pin Up / Box Down or Box Up / Pin Down		
Torque Hook Load	40K ft.-lb.	50K ft.-lb.	85K ft.-lbs
Torque/Tension	350T	500T	690T
Accuracy	$\pm 0.5\%$ of Full Scale		$\pm 1\%$ of Full Scale
Turns Resolution	± 0.001 Turn Resolution, CW and CCW. 40 RPM Max.		
Temperature Range	-40°C to 65°C (149°F)		
Battery Life	480 hours at 25°C (77°F) (Approx. 20% lower at 0°C [32°F])		
Wireless Transmission	2.4 GHz, Direct Sequence Spread Spectrum Line of Sight: Range 150 ft.		
Enclosure Rating	Type 4X, Watertight		
Hazardous Area	North America Class 1, Division 1, Groups C & D, T4 ATEX: Zone 1, IIB, T4		
Design	Designed to API 8C Certification		
Weight (Approx.)	184 lbs	238 lbs	238 lbs
Length Connection	24" - 30"		