UltraSense™ Bit Intelligence

Drill Bit Capable of Monitoring and Recording Drilling Parameters

Measurement Embedded Drill Bit

OVERVIEW

The Intelligent Drill Bit incorporates sensors and microchips within its internal flow path without compromising hydraulic or mechanical performance, enabling real-time measurement and storage of critical drilling parameters directly at the bit. The first-generation UltraSense™ Intelligence Bit captures downhole data on temperature, 3-axis shock and vibration, and rotational dynamics—parameters that cannot be reliably obtained by surface-based sensors.

This high-fidelity data is essential for monitoring and analyzing the drilling process, optimizing operational parameters, improving efficiency, preventing dysfunctions, and accelerating the drill bit design and iteration cycle. Advanced signal processing enables identification of downhole phenomena such as whirl, stick-slip, and torsional, axial, and lateral vibrations. Direct measurement at the bit is a foundational capability for advancing drilling digitalization and enabling intelligent, automated drilling systems.

FEATURES

- Comprehensive sensing of 4 to 7 key drilling parameters
- High-frequency data acquisition at 1000 to 1600 Hz
- Supports continuous or burst recording modes
- Simultaneous recording across 16 signal channels
- Sleep mode with automatic wake-up functionality
- Minimal bit modification and easy integration into any bit size
- Negligible pressure drop and no added drilling risk

BENEFITS

- Captures downhole conditions undetectable by surface sensors
- No additional sub required—measures directly at the bit
- Identifies stick-slip, whirl, and damaging shocks and vibrations
- Enables detailed post-run analysis
- Enhances drilling efficiency and safety with bit-level data

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Specifications

Operations	US-I	US-II175C	US-II200C
Max. temperature, °F [°C]	311 [155]	347 [175]	419 [215]
Max. operating pressure, psi [MPa]	25,000 [172]	27,000 [186]	30,000 [207]
Run time (depending on mode) [hours]	100-300	75-200	75-200
Max. sampling rate [hz]	1600	1600	1600
Available bit size to fit	8.5” – 13.2”	9.5” – 13.2”	9.5” – 13.2”
Power supply	Battery	Battery	Battery

Measurement			
Vibration	± 40 g	± 500 g	± 500 g
Accuracy	± 2.5%	± 10%	± 10%
Axis	X, Y, Z	X, Y, Z	X, Y, Z
Shock	± 200 g	± 500 g	± 500 g
Accuracy	± 5%	± 10%	± 10%
Axis	X, Y, Z	X, Y, Z	X, Y, Z
Gyro RPM	± 666 rpm	± 882 rpm	± 882 rpm
Accuracy	± 1%	± 5%	± 5%
Axis	X, Y, Z	X	X
Temperature °F [°C]	0 – 311[155]	0 - 365 [185]	0 - 419[215]
Accuracy	± 3%	± 5%	± 5%