NEWTON SYSTEM

Extended Reach Tool with Downhole Sensors for Coiled Tubing Applications

Downhole Sensors

- Weight-on-Bit
- Annular Pressure
- Bore Pressure
- Inclination
- Temperature
- Gravity Toolface
- Vibration

Applications

- Milling
- Annular Frac
- Fishing
- Clean Out

Features

- Real Time & Recorded Data
- Surface Data Display
- Toggle Pulser On/Off from Surface
- Programmable Data Transmission
- Programmable Thrusting Force
- Reverse Circulate
- Low Pressure Drop

Benefits

- Extend Reach
- Improve Hole Cleaning
- Reduce Cost
- Improve Decisions
- Post Well Analysis

- The NEWTON SYSTEM incorporates downhole sensors that continuously record bore pressure, annulus pressure, weight-on-bit, temperature, gravity toolface, vibration and inclination. The downhole tool can be programmed to transmit measurement data from any or all of the sensors at specified intervals. Pulse signals can be reliably transmitted and decoded in CT strings greater than 25,000 feet in length. All data are stored in the tool's memory for post well analysis.
- The system's pulser performs the dual functions of developing force to advance the coiled tubing and creating coded pressure pulses to transmit sensor readings to the surface. The rapid operation of the system's pulser generates pressure signals and delivers axial thrust, advancing the BHA in the well's horizontal section, while simultaneously propagating a pressure wave to surface, significantly reducing friction.
- Real-time measurement and surface display of downhole weight-on-bit improves an operator's ability to time-drill plugs and generate smaller cuttings that are easier to circulate out of the hole.
- In annular frac applications, the NEWTON SYSTEM provides reverse circulation capability in the event of a screen out. The downhole tool is compliant with the use of Hydrochloric (HCL) and Hydrofluoric (HF) acids and allows for sand jet perforating.
- The NEWTON SYSTEM provides the ability to make informed decisions about pulling out of hole, based on downhole weight-on – bit and differential pressure measurements, eliminating inference and guesswork inherent with surface measurements, avoiding unnecessary trips to change out downhole tools.
- The NEWTON SYSTEM is made up in the bottomhole assembly directly above the downhole motor during plug mill-out operations, so that measurements are taken as close to the bit as possible, while allowing ball drop-activated tools to be operated in the normal fashion.

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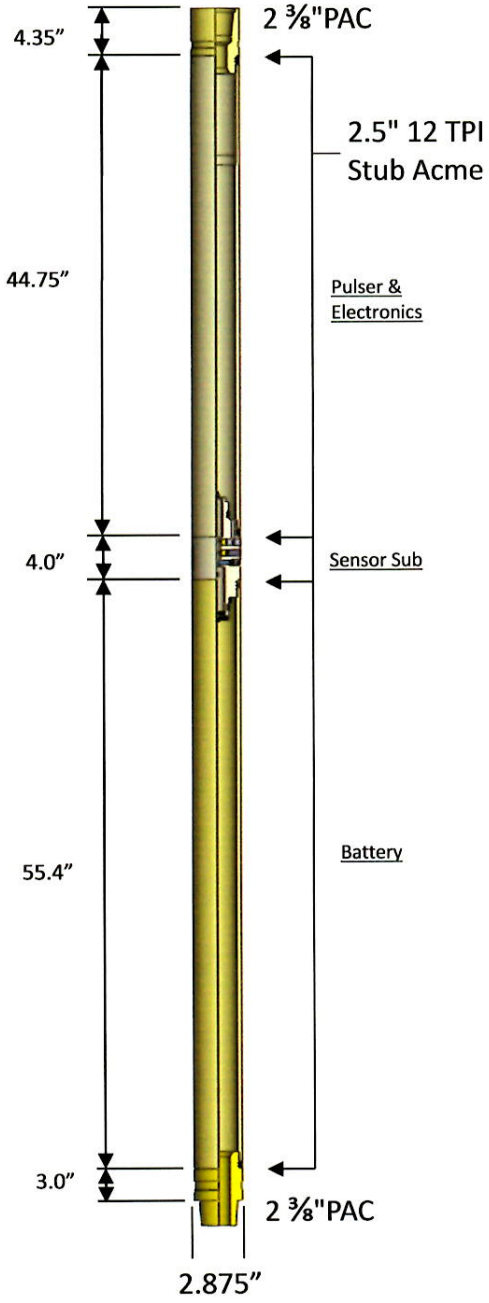
Tool Specification

Outside Diameter	2 ⅞"
Tool Joints	2 ⅜" PAC box up, pin down 2 ⅜" REG box up, pin down[1]
Length	111.5 inches (9.3 ft.)
Weight	105 lbs.
Min. Flow Rate	1 BPM
Max. Flow Rate	5 BPM
Max. Temperature	175° C 347° F
Max. Pressure	16,000 psi
Battery Life[2]	80 hours minimum



Tool Pressure Drop

1 BPM	< 50 psi
2 BPM	50 psi
3 BPM	150 psi
4 BPM	250 psi
5 BPM	400 psi

Sensor Specification

Bore Pressure (P_b)[3]	0 - 15,000 psi
Annular Pressure (P_a)[3]	0 - 15,000 psi
Compression/Tension	-10,000 to +10,000 lbf.
Inclination	0 - 180°
Temperature	-40° - 175° C -40° - 347° F
Gravity Tool Face	-180° to +180°
Vibration	± 55g, 2 axis - X,Z ± 6g, 3 axis

[1] 3 ⅛" BHA configuration

[2] Under normal operating conditions

[3] Differential Pressure: $\Delta P = P_b - P_a$

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