Product Information

Exceed Drilling Technologies LLC

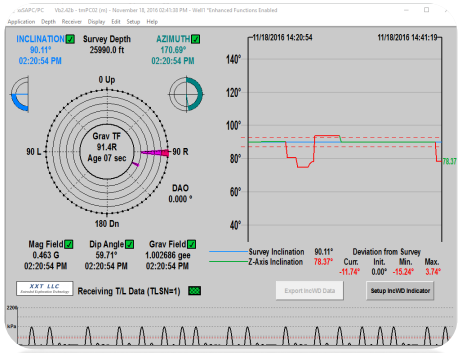
Dual Telemetry EM-Pulse System

The Dual Telemetry EM system allows simultaneous use of EM and positive pulse telemetry which helps the driller optimize ROP by increasing data rates and reduce lost time by having total telemetry redundancy.

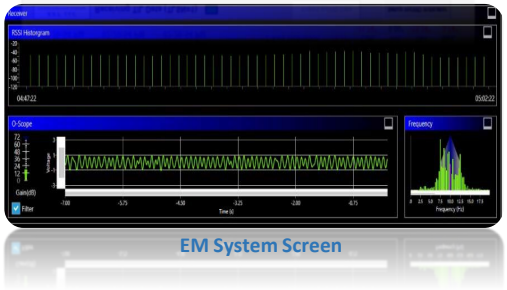
Advantages

- Faster surveys – 10 to 15 sec.
- Faster connections - Data transmission is independent of pump pressure.
- Does not require resync or pump cycling for lost surveys.
- Supports higher ROP yielding higher density gamma logs.
- EM achieves higher TF update rates and faster check-shots than mud pulse. This makes building curves and drilling tangents faster, easier, and more accurate.
- Faster troubleshooting via downlink diagnostic queries avoids unnecessary tripping.
- Tool's rugged retrievable design reduces financial risk associated with "lost in hole" conditions.

Internal GAP for retrievable and non-retrievable assemblies



Mud Pulse System - Continuous Inclination



EM System Screen

Features

- Inclination while drilling.
- 3- axis Shock and Vibrations monitor.
- Retrievable and non-retrievable versions available.
- Two-way communication; tool can be linked with pumps, rotary or EM.
- Advanced algorithm that allows for real time informed decisions on downhole conditions to optimize tool performance.

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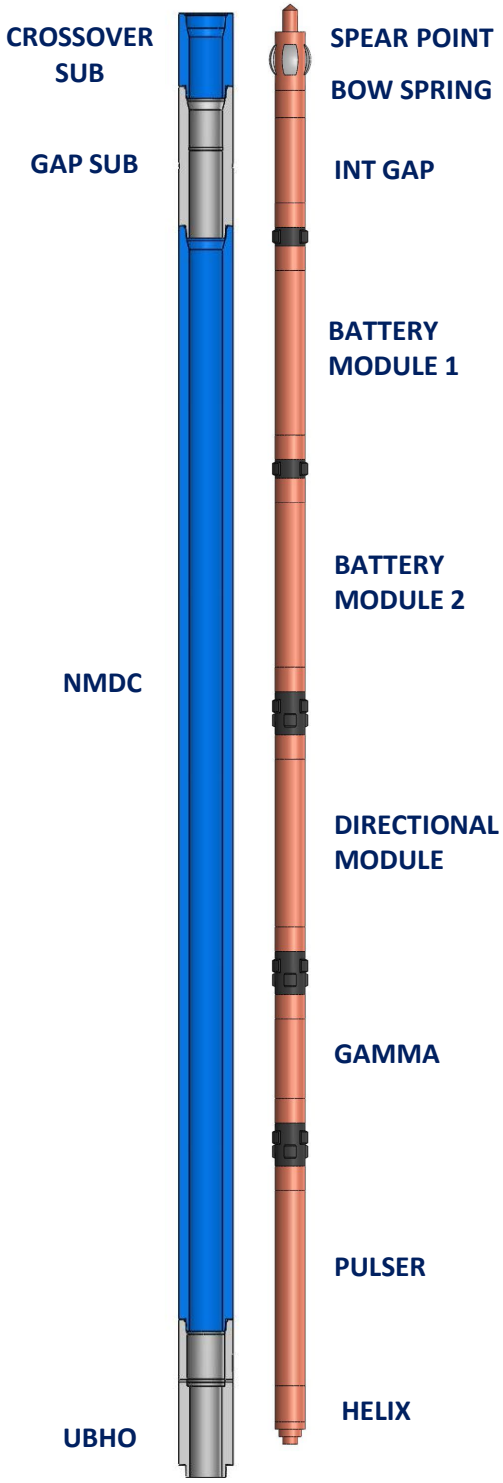
EM / MUD PULSE TOOL SPECIFICATIONS

General Tool Specifications

Tool Diameter / Length	1 7/8" O.D. / 22.27 - 39.8ft.	Gamma Capable	Yes
Tool Centralization Range (NMDC - I.D.)	2.20" - 4.00"	Survey while drilling: Sliding / Rotating	Yes / No
Maximum dogleg severity	100° / 100ft	Down link	Yes
Maximum working pressure, psi	20000 (138,000 kpa)	Downhole memory	Yes
Maximum operating temperature	175°C - 350°F	Maximum bit pressure / drop	No limit
Survey Trigger	Cycle pumps / 1 min. intervals	Retrievable / Reinsertable *	Yes
Transmission trigger	Pumps on	Pressure drop, psi through tool	approximately 0.33 psi/gpm
Telemetry type	Positive Pulse / EM	Survey sensor offset (from btm of MWD NMDC)	16 ft
Power source (operating time, hours)	Lithium Battery (200-500 hours)	Gamma sensor offset (from btm of MWD NMDC)	12 ft

Directional Sensor		Gamma Sensor	
MTF/GTF switching, inclination degrees	>1° angle (selectable)	Gamma ray detection type	Scintillator: NaI crystal
Survey time (Mud Pulse)	90-240 sec.(selectable)	Gamma Accuracy (over output range)	+/- 2%
Survey time (EM)	10-15 sec.	Gamma Sensor Vertical Resolution	6.8"
Tool face update time	6 - 24 sec.(selectable)	**Mud Property Information**	
Inclination accuracy	+/- 0.05°	LCM	<50lbs. / bbl
Azimuth accuracy	+/- 0.5°	Solid Content	Maximum 40%
Tool face accuracy	+/- 0.5°	Low Gravity Solids	<10%
Dip angle accuracy	+/- 0.1°	Sand Content	Maximum 0.5%
Shock measurement	+/- 400g	Glass & Poly beads	<20 lbs. / bbl.
Vibration measurement	+/- 200g	Maximum mud weight	<19 lb.

EM Signal is not impeded by Lost circulation zones or LCM



EM is required for:

- Underbalance drilling.
- Lost circulation zones.
- High LCM content applications.
- When mud pulse is to slow.
- High ROP requiring high density logging

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