Centerfire Resistivity System

The Centerfire resistivity system is GE's high-temperature LWD offering. Rated to 175°C (347°F), it is the system of choice for hot-hole applications. The collar uses an industry standard transmitter-receiver design to provide eight different depth of investigation (DOI) borehole compensated resistivities—any combination of which can be transmitted in real-time for geosteering applications.

The fully retrievable probe-based directional MWD module is situated above the resistivity collar and can be removed from the tool string with the logging data downloaded at the surface even if the rest of the bottomhole assembly (BHA) remains stuck in hole.

The Centerfire collar is designed to provide existing Tensor customers an easy upgrade from directional or directional-gamma services to LWD.

Features and Benefits

Borehole Compensated Measurements

Industry standard antennae layout provides eight borehole compensated measurements, any of which can be transmitted in real time, enabling geosteering applications.

High Temperature Rating

The resistivity system's 175°C (347°F) temperature rating makes it the system of choice for hot-hole applications.

Retrievable MWD String

The use of a wet connect assembly to provide communication between the MWD string and the resistivity collar enables retrieval of the directional module if the BHA becomes stuck or lost in the hole.

Logging While Tripping

The Centerfire collar can be configured to run in memory-only mode, making it ideal for logging while tripping applications and providing invasion analysis without the need for circulation.

Deep-Reading 400 kHz Measurements

The deep-reading 400 kHz measurements from the 19 in. and 41 in. antennae spacings are ideal for geosteering applications and bed-boundary detection when combined with the shallower reading 2 MHz measurements.

2 MHz Measurements for Vertical Resolution

Excellent vertical resolution achieved using the 2 MHz measurements, providing identification of thin beds.

Proven Performance

With a history of successful deployments, including notable multi-lateral applications in China and offshore deployments in Mexico, the Centerfire system enables independent service companies to expand their service options, allowing them to compete in technologically advanced markets, with a cost-effective, proven platform.

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Mechanical Specifications

	4.75 in.	6.91 in.	8.25 in.
Tool OD	5.0 in. at antennae, 5.25 in. at wearbands	6.91 in. at antennae, 7.16 in. at wearbands	8.25 in. at antennae, 8.5 in. at wearbands
Length	14.5 ft (174 in.)	14.5 ft (174 in.)	15.16 ft (182 in.)
Tool Connections	3 1/2 in. IF (NC-38)	4 1/2 in. IF (NC-50)	6 5/8 in. API Reg
Equivalent Collar Stiffness (OD x ID)	5.00 in. x 2.81 in.	6.58 in. x 2.81 in.	8.25 in. x 2.81 in.
Make-Up Torque	9,600 lbf-ft	30,000 lbf-ft	54,000 lbf-ft
Max. Flow Rate	100 - 350 usgpm	300 - 750 usgpm	450 - 1200 usgpm
Max. Dogleg Rotating	12.2°/100 ft	8°/100 ft	7°/100 ft
Max. Dogleg Sliding	25°100 ft	17°/100 ft	14°/100 ft
Max. Temperature - Operating	347°F		
Max. Temperature - Survival	365°F		
Max. Pressure	20,000 psi		
Max. Sand Content	1% (volume)		
Max. LCM Tolerance	As per Tensor		
Telemetry Type	Positive pulse		
Resistivity Measure Points from Tool Bottom	**Directional Resistivity Gamma**		
	22.2 ft (266 in.) 6.1 ft (73.2 in.) 2.8 ft (33.6 in.)	22.2 ft (266 in.) 6.1 ft (73.2 in.) 2.5 ft (30 in.)	22.9 ft (275 in.) 6.8 ft (81.6 in.) 2.2 ft (26.4 in.)
Memory Capacity	14 MB (~273 hours with 10 second recorder rate)		
Max. Data Sampling Rate	Memory 10 seconds, telemetry 20 seconds rotating, 30 seconds sliding		
Battery Life	~150 hours		

Sensor Specifications

	Spacing	Frequency	Range	Accuracy
Phase Difference	41 in.	2 MHz	0.1 to 2,000 ohm-m	± 2% (0.1 to 20 ohm-m) ± 1 mmho/m (>20 ohm-m)
		400 kHz	0.1 to 500 ohm-m	± 2% (0.1 to 10 ohm-m) ± 2.0 mmho/m (>10 ohm-m)
	19 in.	2 MHz	0.1 to 1,000 ohm-m	± 1% (0.1 to 10 ohm-m) ± 1 mmho/m (>10 ohm-m)
		400 kHz	0.1 to 250 ohm-m	± 3% (0.1 to 5 ohm-m) ± 6 mmho/m (>5 ohm-m)
Attenuation	41 in.	2 MHz	0.1 to 50 ohm-m	± 5% (0.1 to 16 ohm-m) ± 3 mmho/m (>16 ohm-m)
		400 kHz	0.1 to 10 ohm-m	± 3% (0.1 to 3 ohm-m) ± 10 mmho/m (>3 ohm-m)
	19 in.	2 MHz	0.1 to 50 ohm-m	± 5% (0.1 to 8 ohm-m) ± 6 mmho/m (>8 ohm-m)
		400 kHz	0.1 to 10 ohm-m	± 5% (0.1 to 3 ohm-m) ± 15 mmho/m (>3 ohm-m)
Vertical Resolution	6 in.[1]			

[1] In conductive beds <10 ohm-m

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