

OmniSphere RGM

Slimhole petrophysics evaluation-while-drilling service

APPLICATIONS

- Directional drilling and formation evaluation in slim holes
- Harsh and complex drilling environments
- Casing while drilling (CWD)

BENEFITS

- Reduces surveying time
- Improves the reliability of the integrated MWD
- Mitigates borehole instability risk and stuck pipe
- Endures severe shock and corrosive muds
- Eliminates need to alter flow rate to enable static direction and inclination survey

FEATURES

- Real-time continuous and static direction and inclination surveying
- Azimuthal gamma ray
- Ten multidepth resistivities
- Corrosion-resistant drill collar option
- Reinforced mechanical and electronic firmware for enhanced durability
- The QuikSurvey* continuous-circulation directional survey service and pumps-off surveying
- Optional shock resistance feature with enhanced electronics packaging

The OmniSphere RGM* slimhole petrophysics evaluation-while-drilling service was developed for directional drilling and formation evaluation applications in slim holes—onshore or offshore. Capable of both continuous and static direction and inclination surveying, gamma ray, and resistivity measurements for 5¾-in hole sizes and larger, the OmniSphere service measures formation resistivities at multiple depths of investigation using an electromagnetic antenna array of five transmitters and two receivers. Measured data is transmitted at physical rates up to 6 bps with the contingency frame set list feature.

Compatible with Schlumberger RSS and LWD services for complete real-time formation evaluation services, the OmniSphere RGM service incorporates the QuikSurvey service that streamlines the well construction process. This patented service acquires surveys while the mud continues circulation because it triggers a survey when pipe rotation ends rather than when mud pumps cease. The QuikSurvey service eliminates the need to alter the flow rate in order to take a stationary direction and inclination survey.

In combination with the QuikSurvey service, shared power through batteries of the VPWD* collar-mounted verified pressure-while-drilling service enables pumps-off direction and inclination surveys to further minimize surveying time. As a result, the OmniSphere RGM service significantly reduces borehole instability risks and stuck pipe incidents while increasing the efficiency in survey time—especially in highly permeable formations.

The OmniSphere RGM service features mechanical and electronic components that improve survey acquisition methodology while further reducing failure rates. Corrosion- and shock-resistant features further extend service reliability in challenging drilling environments, including high-temperature applications.

Measurement Specifications

Direction and Inclination Survey

Direction	Static	Continuous
Range	0° to 360°	0° to 360°
Accuracy	±1° (above 5° inclination)	±2°
Resolution	0.5°	1°

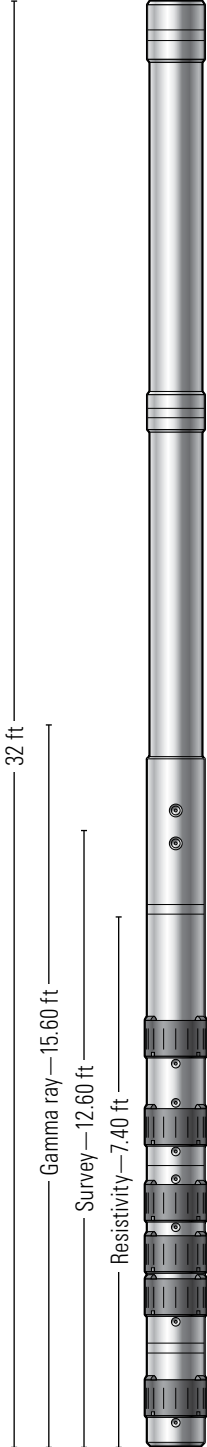
Inclination

Range	0° to 180°	0° to 180°
Accuracy	±0.1°	±0.2°
Resolution	0.03°	0.10°

Magnetic toolface (MTF) and gravity toolface (GTF)†

Range	0° to 360°
Accuracy	±2°
Resolution	6°

†Minimum update rate: 3.5 s at 1.5 bps or greater.



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Resistivity Depth of Investigation and Vertical Resolution

Spacing	10 in	16 in	22 in	28 in	34 in
Phase resistivity	0.2–200 ohm.m	0.2–200 ohm.m	0.2–200 ohm.m	0.2–200 ohm.m	0.2–200 ohm.m
Attenuation	0.2–20 ohm.m	0.2–30 ohm.m	0.2–50 ohm.m	0.2–50 ohm.m	0.2–50 ohm.m

Accuracy

Phase resistivity	Below 60 ohm.m: $\pm 3\%$; and above 60 ohm.m: ± 0.5 mS/m
Attenuation	Below 25 ohm.m: $\pm 5\%$; and above 25 ohm.m: ± 2 mS/m

Vertical Resolution

Phase resistivity	At 0.2 ohm.m: 0.7 ft; and at 200 ohm.m: 2 ft
Attenuation	At 0.2 ohm.m: 1 ft; and at 50 ohm.m: 8 ft

Gamma Ray

Range	0–250 gAPI
Accuracy	$\pm 3\%$
Statistical repeatability	± 2 gAPI at 100 gAPI and 100 ft/h, 3-point average
Vertical resolution	6 in

General Specifications

Collar Dimensions

Nominal diameter, in	4.75	Top thread connection	NC-38 (3½-in IF) box
Maximum diameter, in	5.25	Bottom thread connection	NC-38 (3½-in IF) pin

Tool Length and Weight

Nominal length, ft	32	Nominal weight in air	1,600 lbm
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Operation

Hole size, in	5¼–6¾	Power supply	MWD turbine
Maximum operating temperature, degC [degF]	175 [347]	Real-time telemetry	Continuous wave (mud siren)
Frequency range, Hz	0.5 to 12	Data rate (physical)	0.5 to 6 bps

Mechanical Specifications

Dogleg Severity

Rotary mode	15°/100 ft	Sliding mode	30°/100 ft
Bending strength ratio			
Top connection	2.04	Equivalent bending stiffness	38.5 ft
Bottom connection	2.01	Average moment of inertia	20 in ⁴

Axial and Rotational Load

Maximum weight on bit	30,000 lbf	Joint yield torque	8,800 ft.lbf
Maximum jarring load	300,000 lbf		

Hydraulics

Maximum operating pressure	20,000 psi (25,000 psi option)	Pressure drop constant (<i>C</i>)	6,000
Full flow range	130 to 360 galUS/min		

Operating Environment

Maximum mud sand content	3%	Maximum solids concentration in mud	20%
Maximum silicate concentration in mud	9%	Maximum lost circulation material (LCM) size	Medium nut plug
Maximum salt concentration in mud	10%	Maximum LCM concentration	50 ppb

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Schlumberger