

EM MWD Services

General Tool Specifications

- Length 30.75 Ft (9.373 Mts)
- Size 1.875: OD (5.715 Cms)
- Pressure Rating 20,000 psi (137,895 kPa)
- Downhole Data Storage Up to 144 hours of Gamma, Annular Pressure, Total Vibration
- Downlinking Pumps On/Off cycling sequence to change mode of operation
- Power Lithium Battery, from 130 to 300 hours depending upon bore hole conditions and transmitter power selection. Dual Battery Operation available.

Data Transmission Operating Specifications and Limits

- Type Low frequency electromagnetic waves
- Frequency 2 Hz to 12 Hz
- Data Rates 1.0 to 4.8 and 6.0 Bits per second
- Update Rates 18 secs @ 1 Baud, 3 secs @ 6 Baud
- Transmitted Parameters Filed Programmables
- Formation Resistivity 3 to 1000 ohmmeters depending upon formation strata, and borehole conditions.

Sensor Specifications

Parameter	Range	Resolution	Accuracy
• Inclination	0 - 180°	0.05°	+/- 0.2°
• Azimuth	0 - 360°	0.18°	+/- 1.0°
• Tool Face	0 - 360°	0.18°	+/- 1.5°
• Dip Angle	0 - +/- 90°	0.10°	+/- 0.2°
• Mag Field	0 - 70,000 ns	100	+/- 200
• Temperature	-20 - 150° C (-4 - 302° F)	0.07°C (1°F)	+/- 1.0°
• Total Vibration (in g ms)	0- 50	0.01	+/- 0.05
• Shock	Operating 1000 g, 0.05msecs, 1/2 sine Survival 2000 g, 0.05 msecs, 1/2 sine		
• Gamma Ray	2,000 cps	1 cps	+/- 1.0°
• Annulus Pressure	0 - 15,000 psi	1-8 psi according upon (FSR) Full Scale Range	1 % of FSR

Non Magnetic Drill Collars

OD"	ID"	ID decim	PIN X BOX	Pressure drop across the EM-MWD Probe at 8.0 Lb Mud
3 3/4	2 13/64	2.2030	2 7/8 HUGHES SL H90	180 psi (1241 k Pa) @ 160gpm
4 3/4	2 11/16	2.6785	3 1/2 IF	76 psi (524 k Pa) @ 370gpm
6 1/2	3 1/4	3.2500	4 1/2 IF or 4 1/2 XH	39 psi (269 k Pa) @ 700gpm
8	4	4.0000	6 5/8 REG	21 psi (145 k Pa) @ 1200gpm

Mud Fluid Parameters

- Velocity < 40 Ft/Sec
- Underbalanced / Air Drilling Minimum Injection rate from 30 GPM's

