



MWD/LWD - Resistivity

The PR2 system provides a full MWD & LWD solution. It combines resistivity, measure while drilling, gamma and pressure to form a complete 31.5' instrument.

This unique system consists of The PR2 resistivity propagation tool with dual transmitter / receiver pair spacings and two measurement frequencies. It provides 8 resistivity measurements, compensated for bore hole and electronics errors in real time or memory. It is compatible with all muds and drilling fluids whether they are all oil-based or salt-saturated and provides real-time resistivity data. In addition to the resistivity measurements, the PR2 tool also measures bore hole and annular pressure.

The gamma sensor provides real time gamma curves that when used in conjunction with resistivity, provides improved geo steering capabilities. The MWD directional sensor provides real time inclination, azimuth, tool face and temperature measurements for surveying and geo steering.

It also incorporates a real time shock and vibration sensor for monitoring drilling conditions. All of this is combined with the HPC high speed mud pulser to deliver the gathered logging and measurement information to the surface system for high quality LWD curves and immediate steering feedback!

Mechanical & Environmental Specifications

Tool Outer Diameter (nom.)	4.75"	6.75"	8.25"
Tool Outer Diameter (max.@wear bands)	5.25"	7.25"	8.75"
	32"	32"	32"
Makeup Length (w/o saver subs)	176"	176"	TBD
Max.Flow Rate	350USGPM	750USGPM	1200 USGPM
Connections	3.5"IFINC384.5"	IF/NC50	6 5/8"
Dogleg Severity-Sliding(max.)	25° 100'	16° 100'	14° 100'
Dogleg Severity-Rotating(max.)	12.5° 100'	8° 100'	7° 100'
Operating Temperature Range	0 -175° C		
Survival Temperature Range	-55 -185° C		
Pressure (max.)	20,000PSI		



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Phase- Difference Resistivity Measurement Specifications

Frequency	Spacing	Range	Accuracy	Range	Accuracy
400kHz	22"	0.1-10 ohm,m	± 2%	10-400 ohm,m	± 2 mmho/m
	40"	0.1-10ohm-m	± 2%	10-400 ohm,m	± 2 mmho/m
2.0MHz	22"	0.1-60 ohm,m	± 2%	60-3000 ohm,m	± 0.3 mmhoIn
	40"	0.1-60 ohm.m	± 2%	60-3000 ohm.m	± 0.3 mmhahn

Attenuation Resistivity Measurement Specifications

400kHz	22"	0.1-3 ohm,m	± 5%	3-10 ohm.m	± 18 mmho/m
	40"	0.1-3 ohm,m	± 3%	3-10 ohm.m	± 10
2.0MHz	22"	0.1-15 ohm,m	± 5%	15-50 ohm.m	± 4 mmho/m
	40"	0.1-15 ohm,m	± 3%	15-50 ohm.m	± 2 mmho/m

Pressure Measurement Specifications

	Range	Accuracy
Borehole Pressure	0- 20,000 PSI	10PSI
Annular Pressure	0 -20,000 PSI	10PSI

Additional Operating Specifications

Input Voltage of 18--36V from downhole lithium batteries. Input power, on average, is less than 6 Watts.

Logging memory capacity is more than 200 hours of data.