

Omega Propagation Resistivity Tool

DESCRIPTION

The patented Omega resistivity tool uses propagating radio frequency (RF) to determine the resistivity of the surrounding formation. The probe lands into a slotted collar which allows the RF pass into the formation. These readings are fully compensated against bore hole effects by combining the results from two symmetrically placed transmitters. Attenuation and phase shift resistivity are measured at 400 kHz and 2 MHz. Measurements can be made in oil and water based mud. The tool is a fully retrievable configuration and makes it the better choice over collar mounted resistivity tools.

FEATURES & BENEFITS

- Four depths of investigation.
- Memory Recordable Measurements.
- Fully Retrievable.
- A single tool can operate in multiple collar sizes, thus reducing cost.
- Modular design allows adaptive bit to sensor placement.
- Works in water/oil based drilling muds.
- Can be used in conjunction with other Q-bus or CAN-bus based MWD tools.

APPLICATIONS

- Oil water contact detection.
- Bed boundary mapping.
- Logging while tripping.
- MAD PASS (Measurement after drilling)

SENSOR MEASUREMENTS

The Omega has a vibration sensor that can measure the following:

Peak Z Vibration (raw)	Z Shock (Counts)
Peak X-Y Vibration (raw)	X-Y Shock Flag
Z Vibration (raw)	X-Y Vibration Flag
X-Y Vibration (raw)	Z Shock Flag
Z Vibration Flag	



Operating Parameters

Collar O.D.	3.75", 4.75", 6.75" and 8"
Tool Length	138.31" (3.513 m)
Collar Length	130.5" (331cm)
Max Dogleg	15°/30 m (100ft)
Max Operating Temp	150 °C(302°F)
Max Operating Pressure	20,000 psi
Max Sand Content	0.50%
Recorder Capacity	40000 Records
Power Source	4-28V Lithium Batteries 25AH
Input Voltage Range	18.5 - 30 VDC

Resistivity Range and Precision

Measurement	Center Resistivity	± % Variation
2 MHz Phase Shift	150 $\Omega \cdot m$	1.0
2 MHz Phase Shift	400 $\Omega \cdot m$	2.6
2 MHz Phase Shift	1000 $\Omega \cdot m$	13
400 kHz Phase Shift	100 $\Omega \cdot m$	2.9
400 kHz Phase Shift	150 $\Omega \cdot m$	4.2
400 kHz Phase Shift	400 $\Omega \cdot m$	11
2 MHz Attenuation	10 $\Omega \cdot m$	.5
2 MHz Attenuation	150 $\Omega \cdot m$	5.5
400 kHz Attenuation	1 $\Omega \cdot m$	.2
400 kHz Attenuation	10 $\Omega \cdot m$	1.7
400 kHz Attenuation	25 $\Omega \cdot m$	10

Depth of Investigation

Measurement	Radius of Investigation 1 $\Omega \cdot m$	Radius of Investigation 10 $\Omega \cdot m$
2 MHz Phase Shift	18" (45.5 cm)	28" (71.0 cm)
400 kHz Phase Shift	24" (62.5 cm)	37" (94.0 cm)
2 MHz Attenuation	30" (72.75 cm)	48" (122.0 cm)
400 kHz Attenuation	41" (104.5 cm)	76" (193.0 cm)

Resistivity depth of investigation is the radius at which the integrated geometrical factor reaches 0.5 in the specified formation resistivity.

Measurement	Ideal Operating Range
2 MHz Phase Shift	0.4 to 2000 $\Omega \cdot m$
400 kHz Phase Shift	0.1 to 1000 $\Omega \cdot m$
2 MHz Attenuation	0.4 to 200 $\Omega \cdot m$
400 kHz Attenuation	0.1 to 50 $\Omega \cdot m$

Vertical Resolution

Measurement	Vertical Resolution 1 $\Omega \cdot m$	Vertical Resolution 10 $\Omega \cdot m$
2 MHz Phase Shift	12" (30.5 cm)	21" (53.5 cm)
400 kHz Phase Shift	16" (40.5 cm)	28" (71.0 cm)
2 MHz Attenuation	22" (56.0 cm)	40" (102.0 cm)
400 kHz Attenuation	33" (84.0 cm)	58" (147.0 cm)

Vertical Resolution is the width at 50% of the vertical response function.

