

MICROTESLA

MAGNETIC FIELD EFFECTS

MDME175-XE-HR-4AM: MicroTesla Digitized Module with Expansion and 8-Axis Array

The MicroTesla MDME 4AM instrument is a brand new, patent pending, directional steering instrument. It incorporates an additional accelerometer and two additional magnetometers for the industry's first 8-axis sensor array. In addition to the sensor redundancy, the sensor axes are arranged in a skewed array. This skewed array requires a new mathematical treatment which results in optimal sensor outputs in virtually every instrument orientation. The oversubscribed equations provide a unique opportunity to use advanced survey quality management methods to ensure that definitive borehole surveys are acquired during drilling. This allows a direct reduction in borehole uncertainty and ensures optimal wellbore placement into the production reservoir. Development of near wellbore proximity algorithms is also being undertaken.

Physical

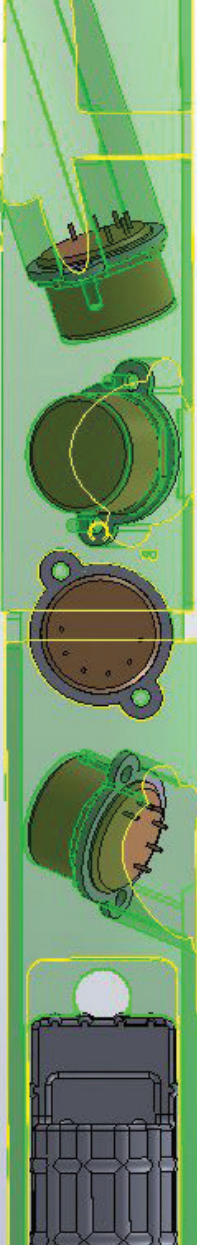
- Length: Nominal 32"
- Diameter: 1.37"
- (4) MicroTesla proprietary fluxgate magnetometers
- (4) Honeywell Mini-Q accelerometers
- All XE chassis boards are covered with a one-piece sleeve

Electrical

- Surfacemount electronics packaging with Ulti-pak board encapsulation
- Voltage requirement: 12V to 36V
- Power Usage: 1.6W peak, 0.5W idle
- Digital interfaces: serial RS-232, serial logic level or SPI
- High-resolution analog-to-digital conversion and onboard memory

Environmental

- All boards qualified for high-temp applications, 175°C
- Honeywell accelerometers qualified, 180°C
- MicroTesla magnetometers qualified, 200°C
- Ulti-pak board mounting for improved shock and vibration isolation

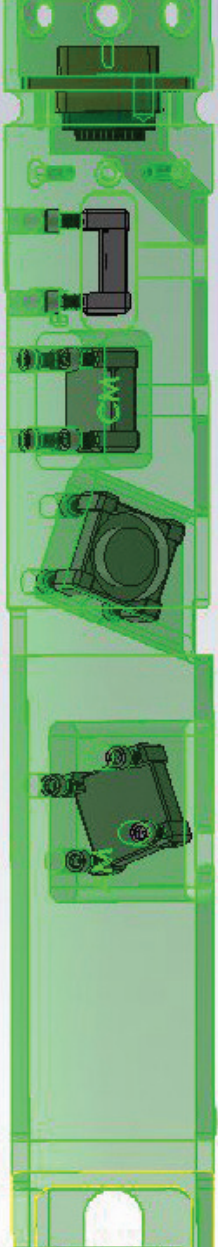


6830 N. ELDRIDGE PKWY, STE. 110
HOUSTON, TX 77041
OFFICE: 713.856.8111
FAX: 713.856.7979
EMAIL: INFO@MICROTESLA.COM

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Mechanical and Environmental Specifications

Parameter	Minimum	Maximum	Units
Outside Diameter*		1.37	inches
		3.5	cm
Length*		32.0	inches
		81.3	cm
Operating Temperature	0	175	°C
	+ 32	347	°F
Survival Temperature	- 40	190	°C
	- 40	374	°F
Vibration, Random (Limited to accelerometers)		30	g RMS, 50-500 Hz
Shock (Limited to accelerometers)		1000	g 0.5 mSec, half-sine

* Dimensions do not include running gear, centralizers, or axial shock absorbers.

Instrument Accuracy Specifications

Parameter	Minimum	Units
Inclination accuracy, absolute*	± 0.08	degrees
Inclination spread on axial rotation at 90° Inc	< 0.15	degrees
Azimuth accuracy, absolute, 90° Inc	± 0.4	degrees
Azimuth spread axial rotation, 10° through 90°	< 0.8	degrees
Total face accuracy, axial rotation at 90° Inc	± 0.75	degrees
Total g field accuracy	± 2.0	mG
Total H field accuracy, sensitivity	± 1.5	nT

* Absolute accuracy is achieved when the instrument is tested in a controlled environment using a calibrated and certified reference position.

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