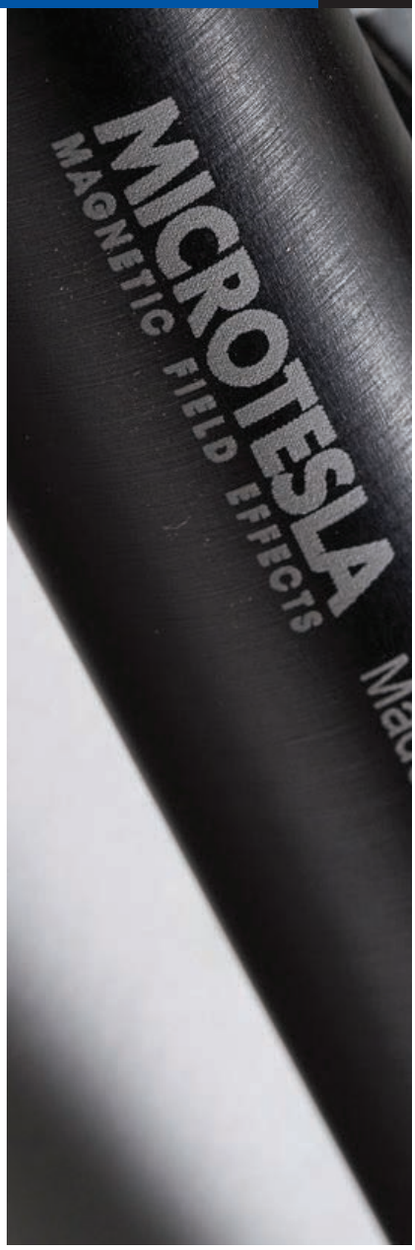
MICROTESLA
MAGNETIC FIELD EFFECTS



New Digitized Module, NDM

The MicroTesla NDM, New Digitized Module, is a new, high accuracy, advanced directional instrument designed for those MWD companies that have developed their own MWD system controller. It consists of a one-piece chassis made from a solid billet of 6061-TG aluminum. The ends are machined to fit the Customers system geometry. No end adapters, means no "loose" end adapters, and no end adapter misalignment. The NDM has (1) electronic board, for the core drive, mag sense, analog to digital conversion and power supply. The NDM has a high temperature, external, 24 bit analog to digital converter for extremely high resolution measurements. The MicroTesla ring core, fluxgate magnetometers are qualified to 210 degrees C and these magnetometers can detect a 1.6 nT magnetic field gradient.

Physical

- Length: Nominal 22.0″
- Diameter: 1.37″
- (2) MicroTesla proprietary two-axis fluxgate magnetometers
- (3) Q-flex accelerometers

Electrical

- Surface mount, high-temp electronics with Ulti-pak
- Voltage requirement: +10V to +40V
- Power Usage: 2W peak, .72W idle
- Digital interface: SV TTL
- Calibration coefficients downloaded directly into EEP ROM

Environmental

- All boards qualified for high-temp applications, 175ºC
- Accelerometers qualified, 185ºC
- MicroTesla magnetometers qualified, 210ºC
- Stronger stiffer chassis for improved resistance to bend and torsion twist

OFFICE: 713.856.8111
FAX: 713.856.7979
EMAIL: INFO@MICROTESLA.COM

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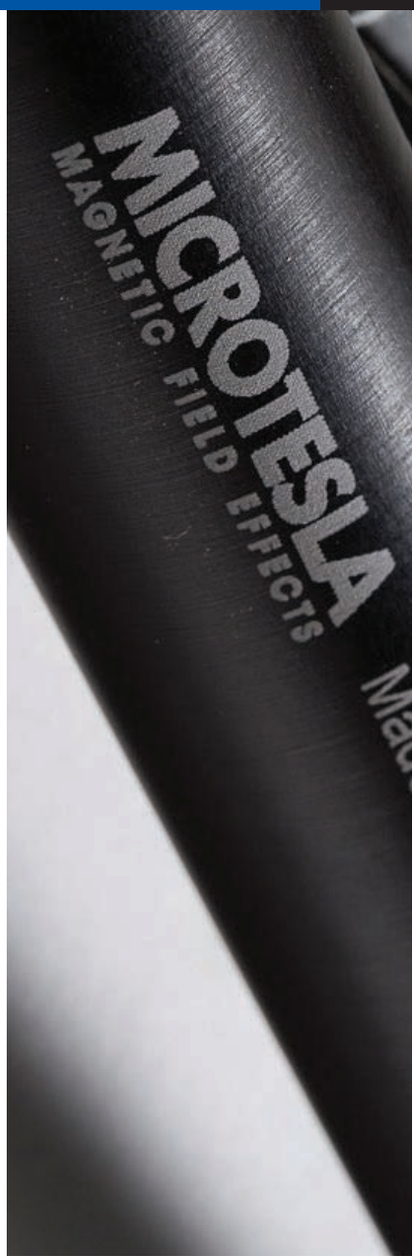

Mechanical and Environmental Specifications

Parameter	Minimum	Maximum	Units
Outside Diameter*		1.37 3.5	inches cm
Length*		22.0 55.9	inches cm
Operating Temperature	0 + 32	175 347	°C °F
Survival Temperature	- 40 - 40	190 374	°C °F
Vibration, Random		20	g RMS, 25-500 Hz
Shock		1,000	½ msec and ½ 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	< 0.08	degrees
Azimuth accuracy, absolute, 90° Inc	± 0.4	degrees
Azimuth spread axial rotation, 45° through 90°	< 0.35	degrees
Total face accuracy, axial rotation at 90° Inc	± 0.7	degrees
Total g field accuracy	± 2.5	mG
Total H field accuracy, absolute	± 180	nT
Total H field spread	< 150	nT
Magnetic dip accuracy	± 0.2	degrees
Dip spread	< .25	degrees
Inc.. while rotating	< .25	degrees
AZM while rotating	< 2	degrees
RPM rotation	> 10	RPM
RPM	+/- 2	RPM

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

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