

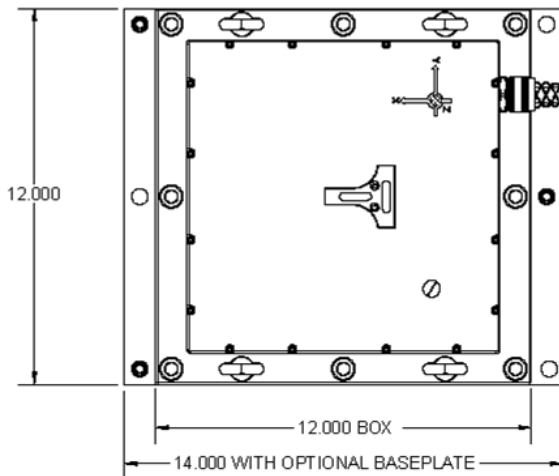
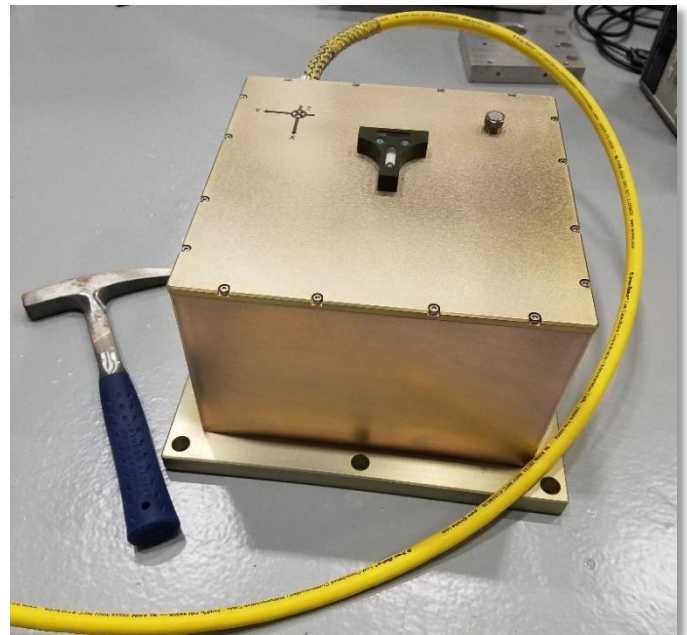
# Proto-SMHD Triad Box (Triaxial Seismic Rotational Rate Sensor)

The Prototype Seismic Magnetohydrodynamic (Proto-SMHD) Triad Box combines three of ATA's Proto-SMHD sensors in a field-deployable package. The Triad Box measures three (3) orthogonal axes of rotational earth motion.

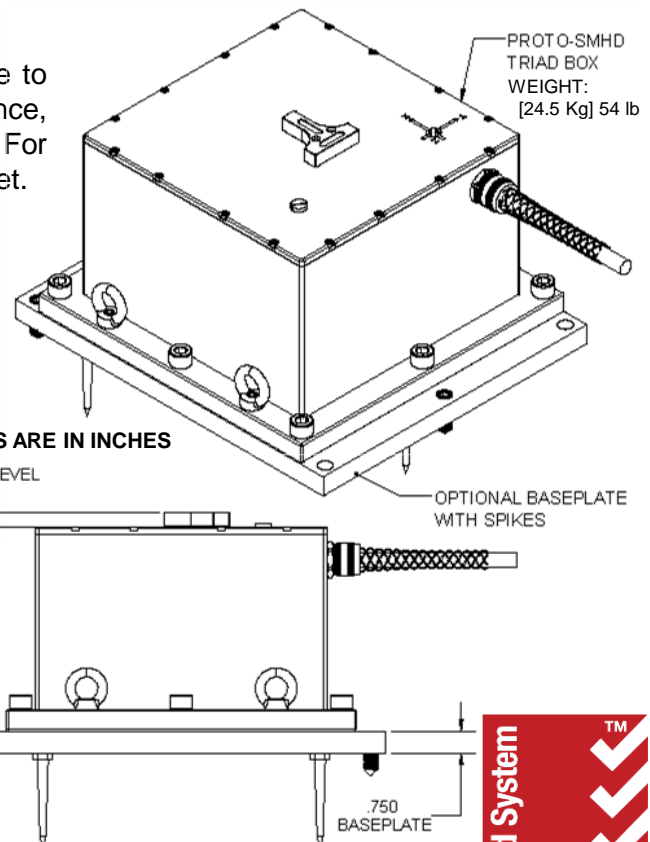
The Proto-SMHD Triad Box is tailored for mid-frequency micro-seismic signal measurement, with state-of-the-art *nanoradian/second* capability from 1-100 Hz. The "prototype" status designates that the sensor is suited for surface and shallow burial operations, particularly scientific studies and proof-of-concept deployments. The Proto-SMHD Triad Box offers performance formerly available only at scientific observatories, but now in a field-portable package.

The triaxial sensor configuration measures angular rate around orthogonal x, y, and z axes (axes are parallel to box faces). The z axis is down and the x and y axes are scribed for reference on the box lid.

Boxed sensors are very rugged and cabled for interface to standard field data acquisition. Sensor performance, sensitivity, and noise are consistent from axis to axis. For additional information, see ATA's "Proto-SMHD" datasheet.



ALL DIMENSIONS ARE IN INCHES



Specifications are subject to change without notice.

ATA

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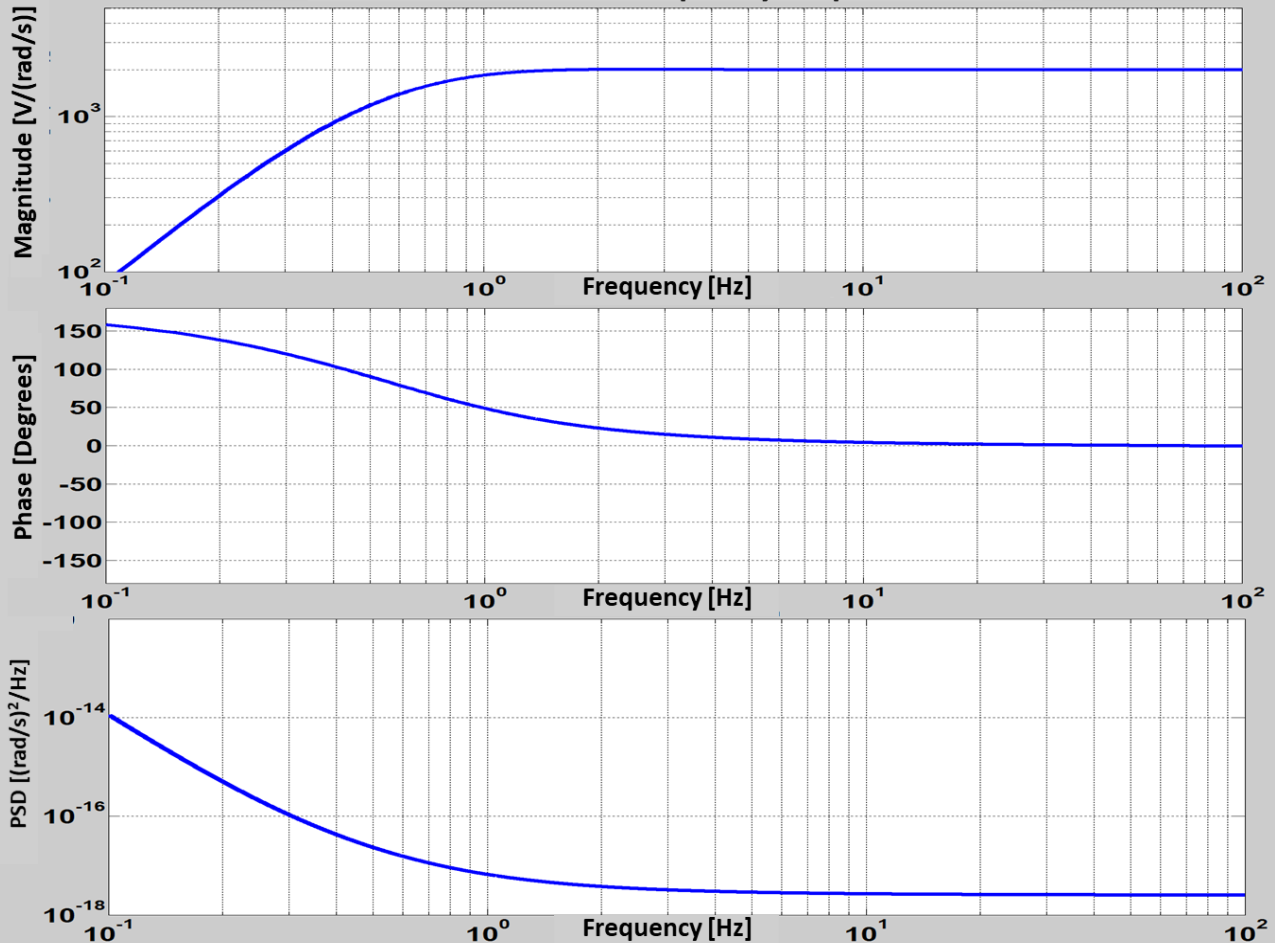
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# Nominal Proto-SMHD Triad Box Product Specification – Each Axis

## Proto-SMHD Frequency Response



### Performance / Electrical

Proto-SMHD Range ( $\pm 10$ V)	$\pm 0.005$ radian/sec
Proto-SMHD Scale Factor <sup>1</sup>	2,000 Volt/(radian/sec)
Bandwidth, -3dB in testing	<1 to 100+ Hz
Cross-axis Angular Error	<1 % (estimated)
Translational Acceleration Sensitivity	<1e-6 radian/g (estimated)
Noise Equivalent Rate (1-100 Hz)	<2e-8 radian/sec rms
Noise Equivalent Angle (1-100 Hz)	<4e-10 radian rms
Temperature Coefficient <sup>2</sup>	<0.1 % / °C (estimated)
Power Dissipation	<2.0 Watt (+12 VDC)
Output Impedance	<100 Ohm
Grounding <sup>3</sup>	Case isolated from signal common by 1M $\Omega$ minimum

#### Notes:

1. Measured at 10 Hz, custom scale factors available.
2. Percent change in scale factor per °C measured at 10 Hz.
3. Signal common may be connected to case if required.
4. Prototype units not warranted for temperature >40°C.
5. Prototype units contain mercury sealed inside case. Dispose of properly or return units to ATA.

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### Wiring

#### Amphenol PT02A-14-19S

A	SMHD X-AXIS OUT
B	SMHD X-AXIS RETURN
C	SMHD Y-AXIS OUT
D	SMHD Y-AXIS RETURN
E	SMHD Z-AXIS OUT
F	SMHD Z-AXIS RETURN
G	ANALOG GROUND
H	+12VDC POWER
J	POWER GROUND
K	SMHD X-AXIS TEMP OUT
L	SMHD Y-AXIS TEMP OUT
M	SMHD Z-AXIS TEMP OUT
N/C	ALL SHIELDS

### Environmental

Temperature-Operating <sup>4</sup>	-20°C to +40°C
Temperature- Non-Operating <sup>4</sup>	-20°C to +40°C
Hazardous Materials <sup>5</sup>	Mercury