

Innovation in Magnetic Field Measuring Instruments

Magnetometer Power Supplies



Bartington[®]
Instruments



Magnetometer Power Supplies Units

A wide range of power supply units are available for our range of single and three-axis magnetic field sensors.

All units accept analogue inputs from our sensors and output the signal to an analogue-to-digital converter or other separate device.

The range includes:

- PSU1
- Magmeter-2 Power Supply and Display Unit
- DecaPSU

Product	Function
PSU1 Power Supply Unit	Battery powered portable power supply for a single or three-axis magnetic field sensor and AC filtering of the sensor's outputs.
Magmeter-2 Power Supply and Display Units	A PSU1 with three displays for magnetic field value readings.
DecaPSU	Power supply unit and low-noise connection for up to 10 magnetometers at the end of long sensor cables.

Further details of each product, including performance, environmental, mechanical and electrical specifications, are shown on the following pages.



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Product Compatibility

	PSU1	Magmeter-2	DecaPSU
Mag-13	•	•	•
Mag-03	•	•	•†
Mag690	•	•	•†
Mag648/649	•*	•*	•*
Mag650	•*	•*	•*
Mag651	•*	•*	•*
Mag612	•	•	•
Mag619	•	•	•
Mag585/592	•	•	•†
Mag670/646	•	•	•†
Mag678/679	•*	•*	•*

* The filtering function will be less effective at removing breakthrough from these sensors

† Adaptor cable required



PSU1 Power Supply Unit

The PSU1 is a self-contained, portable power supply for most Bartington Instruments magnetic field sensors, for use in any situation requiring the simple measurement of a magnetic field. It is also a simple AC filter for the sensor's XYZ outputs.



Features

- Low-pass filtering (9.5kHz) applied to all sensor outputs
- High-pass filter (0.1Hz) selectable via front panel switch
- Converts the analogue outputs of Bartington Instruments balanced (differential) sensors into unbalanced (single-ended) signals
- Powered by internal rechargeable batteries
- Supplied with mains AC charging adaptor to allow continuous operation

Typical Application

- Basic power supply for magnetic field sensors

PSU1 Specifications

Performance	
Number of input channels	Three
Voltage input range	$\pm 10V$
Frequency response (-3dB)	DC to 9.5kHz (DC coupling) 0.1Hz to 9.5kHz (AC coupling)
Frequency response error	DC to 6kHz $\pm 2\%$
Internal measurement noise floor	<2pT/VHz at 1Hz (battery powered) <5pT/VHz at 1Hz (with mains charger connected)
Linearity	1%
Offset error	0.5% full scale

Environmental	
Operating temperature range - continuous	0°C to +50°C (0°C to +40°C for charging)
Storage temperature range	5°C to +30°C long term -10°C to +50°C short term -20°C to +65°C without batteries
Humidity	0-90% non-condensing
EMC approvals	BS EN 61326-1: 2012+AC: 2013 BS EN 61000-3-2: 2014 BS EN 61000-3-3: 2013

Mechanical	
Dimensions (W x H x D)	106 x 60 x 148mm
Weight	615g (battery included)
Enclosure material	Extruded aluminium with plastic bezels
Sensor input	Hirose RM15TRD-10P (mating connector - RM15TPD-10S)
Analogue outputs	3 off BNC connectors (X, Y and Z)
Battery charger inlet	2.1mm socket

Electrical	
Analogue output	$\pm 10V$
Current Consumption (no sensor connected)	90mA
Battery	5 x AA NiMH 2400mAh (nominal) Duracell rechargeable batteries
Battery life	10 hours (typical)
Battery charging time	<3 hours for full charge
Power output to sensor	$\pm 12V$; $\pm 90mA$
Sensor input mode	Balanced/unbalanced
Output Impedance	50k Ω per channel

Magmeter-2 Power Supply and Display Units

The Magmeter-2 provides filtered readings of a magnetic field sensor's X, Y and Z outputs via three LCD displays, and enables rapid monitoring of magnetic fields. It also provides analogue outputs of each axis for the display, or the precise acquisition, of magnetic field data using third party equipment. The units are battery powered to facilitate fieldwork and to reduce internal noise during precision measurements.



Low-pass filtering (9.5kHz) is applied to all inputs in order to prevent the excitation signal of the fluxgate sensor from affecting the measurement, while a high-pass filter (0.1Hz) is selectable via a front panel switch when AC measurements are preferred. The unit is compatible with most differential or single-ended sensors from Bartington Instruments. The internal batteries are recharged when the unit is connected to mains power using the adaptor provided.

Features

- 10nT resolution for ranges up to $\pm 100\mu\text{T}$; 100nT resolution for ranges up to $\pm 1000\mu\text{T}$
- Low-pass filtering (9.5kHz) applied to all sensor outputs
- High-pass filter (0.1Hz) selectable via a front panel switch
- Powered by internal rechargeable batteries
- Supplied with mains AC charging adaptor to enable continuous operation

Typical Application

- Rapid measurements of magnetic field strength

Magmeter-2 Specifications

Performance	
Number of input channels	Three
Voltage input range	±10V
Bandwidth (-3dB)	DC to 9.5kHz (DC coupling); 0.1Hz to 9.5kHz (AC coupling)
Frequency response (±2%)	DC to 6kHz (DC coupling) ±2%
Measurement noise floor	<2pT/VHz at 1Hz (battery powered); <5pT/VHz at 1Hz (with mains charger connected)
Linearity	1%
Offset error	0.5% full scale

Environmental	
Operating temperature range	0°C to +50°C (0°C to +40°C for charging)
Storage temperature range	-20°C to +35°C long term; -20°C to +50°C short term; -20°C to +65°C without batteries
Humidity	0-90% non-condensing

Mechanical	
Dimensions (W x H x D)	106 x 63 x 148mm
Weight	630g (battery included)
Enclosure material	Extruded aluminium with plastic bezels
Sensor connector	Hirose RM15TRD-10P (mating connector - RM15TPD-10S)
Output connectors	3 off BNC connectors (X, Y and Z)
Battery charger inlet	2.1mm socket

Electrical	
Analogue output voltage	±10V
Current Consumption (no sensor connected)	125mA (225mA with backlight on)
Battery	5 x AA NiMH 2400mAh (nominal) Duracell rechargeable batteries
Battery life	8 hours (typical)
Battery charging time	<3 hours for full charge
Power output to sensor	±12V; ±90mA
Sensor input	Balanced/unbalanced
Output Impedance	50kΩ per channel

Display	
Display Type	3 x 4½ digit LCD backlit
Resolution	10nT for ranges up to ±100µT; 100nT for ranges up to ±1000µT
Accuracy	±4 counts
Temperature drift	±1 count/°C maximum
Compatible magnetic field sensor ranges	1000µT/10V full scale output 500µT/10V full scale output 300µT/10V full scale output 250µT/10V full scale output 60µT/3V full scale output 100µT/10V full scale output 70µT/10V full scale output 100µT/3V full scale output

DecaPSU Power Supply Unit

The DecaPSU is a low noise, rack-mounted, mains powered power supply unit and analogue interface for up to ten Bartington Instruments single or three-axis magnetic field sensors. It can be used in any application that requires a single power supply to multiple fixed, distributed sensors.

The low-noise unit includes anti-aliasing filters to ensure the quality of the sensor signal to the customer's digitiser.



Features

- Powers ten magnetometers from the mains without increasing noise measured from each magnetometer
- Two-pole anti-alias filter on each channel
- Compatible with most Bartington magnetometers

Typical Applications

- Multi-sensor cancellation systems
- Any application requiring a single power supply to multiple fixed, distributed sensors

DecaPSU Specifications

Performance	
Number of inputs	Ten, each for a three-axis magnetometer
Input signal range	$\pm 10\text{V}$, surge protected at $\pm 15\text{V}$
Filter	Two pole filter, 10kHz nominal -3dB frequency
Measurement noise floor	Equivalent noise at 1Hz is $0.2\mu\text{V}/\sqrt{\text{Hz}}$ typical, $0.3\mu\text{V}/\sqrt{\text{Hz}}$ maximum. This equates to $2\text{pT}/\sqrt{\text{Hz}}$ (typical) for a sensor with $100\mu\text{T}/10\text{V}$ scaling.
Linearity	Unity gain from input-gain error $<1\%$ Linearity and offset error $<0.5\%$

Environmental	
Operating temperature range	-20°C to $+55^{\circ}\text{C}$
Storage temperature	-30°C to $+70^{\circ}\text{C}$
Humidity	0-70% non-condensing

Mechanical	
Dimensions (W x H x D)	Standard 1U rack-mounting (482 x 44x 254mm)
Weight	3kg
Input – front panel signals	Hirose RM15TRD-10P (mating connector – RM15TPD-10S)
Output connector – rear panel	2 x 37W D sub-miniature. Three signal and one ground connection for each sensor
Power connector – rear panel	3 pin IEC320
Ground point – rear panel	M4 threaded hole

Electrical	
Supply voltage	90 to 264V AC, 50 to 60Hz
Supply power / current	$\pm 15\text{ VA}$ typical with 10 sensors; 250 to 125mA
Common-mode voltage range	$\pm 2\text{V}$
Sensor power	$\pm 15\text{V}$ at up to 65mA per output. Each output protected against overload/short circuit
Input protection	ESD and surge protection on each input against static discharge and lightning strike
Signal outputs	$\pm 10\text{V}$ nominal. Single-ended, referenced to local 0V



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