

Mag-03RCU

Three-Axis Range Magnetometers





Mag-03RCU Three-axis Range Magnetometer

These magnetometers are designed for magnetic signature measurements and for marine surveillance. They operate over cables of up to 2km in length, and are submersible to 100m.

Installation and maintenance are made easy with underwater mateable connectors available in stainless steel or titanium. Both types can be integral to the housing or on a cable tail.

The DAS1 data acquisition system is available for use with up to 80 Mag-03RCU magnetometers.



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Features

- Measuring range options of $\pm 100\mu\text{T}$, $\pm 200\mu\text{T}$ or $\pm 300\mu\text{T}$
- Bandwidth from DC to 3kHz
- Built-in test facility
- Cable lengths up to 2km
- Underwater mateable connectors available

Typical Applications

- Magnetic signature measurements in marine ranges
- Degaussing ranges
- Marine surveillance



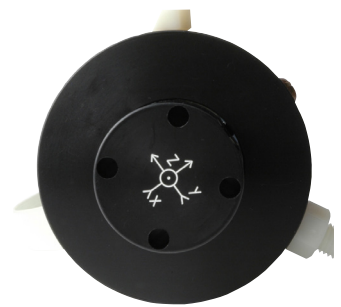
Product Identification

The Mag-03RC comes in two forms with codes to describe connector type, tail, connector construction and measuring range:

Product name	Connector type	Tail	Connector construction	Range in μT
Mag-03RC	U = underwater mateable connector	No Code = no cable tail Tx = flying tail, 5 metres long	No Code = stainless steel T = titanium	± 100 ± 200 ± 300

For example: Mag-03RCUT-T300: Underwater mateable connector on 5m tail, titanium construction, $\pm 300\mu\text{T}$ range.

The position of the three sensor axes is engraved on the lower end of the enclosure. The magnetometer designation, range and serial number are engraved along the flat face on the cylinder. To help with orientation during installation, the flat surface and pin combination at the top of the cylinder shows the X axis direction.



Mag-03RCU Specifications

Performance			
Number of axes	Three		
Polarity	+ve non-inverting output when pointing North		
Measuring range	$\pm 100\mu\text{T}$	$\pm 200\mu\text{T}$	$\pm 300\mu\text{T}$
Bandwidth at -3dB	3kHz ($\pm 10\%$)		
Measurement noise floor	$< 20\text{pTrms}/\sqrt{\text{Hz}}$ at 1Hz		
Scaling	100mV/ μT	50mV/ μT	33.33mV/ μT
Scaling temperature coefficient	10ppm/ $^{\circ}\text{C}$	20ppm/ $^{\circ}\text{C}$	30ppm/ $^{\circ}\text{C}$
Offset	$\pm 30\text{nT}$	$\pm 60\text{nT}$	$\pm 90\text{nT}$
Offset temperature coefficient	$\pm 0.2\text{nT}/^{\circ}\text{C}$	$\pm 0.4\text{nT}/^{\circ}\text{C}$	$\pm 0.6\text{nT}/^{\circ}\text{C}$
Scaling error	$\pm 0.5\%$ at DC		
Orthogonality error (all axes to the reference face)	$< 0.2^{\circ}$		
Linearity error	$< 0.0015\%$		
Frequency response	DC to 1kHz ($\pm 5\%$) at 1kHz		
Hysteresis (when powered) within measuring range beyond measuring range	$< 1\text{nT}$ 10nT at 1mT		
Power supply rejection ratio	1nT/V	2nT/V	3nT/V
Excitation breakthrough	$< 10\text{mV}$ pk-pk at 15.625kHz		

Special Features

Built-in test (BIT)	Active low input (TTL compatible) generates $1\mu\text{T}$ ($\pm 10\%$) magnetic field change in each axis. Test data is supplied for each sensor.
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Environmental

Operating temperature range	-10°C to +50°C
Ingress Protection rating	IP68 submersible to 100m
MTBF	75000 hours
Compliance	EMC BS EN 61326:2013 & RoHS

Mechanical

Sensor Variant	Mag-03RCU	Mag-03RCUT
Enclosure Material	Polyacetal	
Dimensions	582.5 x $\varnothing$ 50mm	516 x $\varnothing$ 50mm
Weight	1.1 kg (sensor only) 1.65 kg (with bowspring assembly)	
Connector	Hydrobond HRS106-10P/SS/L, or Hydrobond HRS106-10P/Ti/L	
Mating connector	Hydrobond HRS206-10S/SS/L, or Hydrobond HRS206-10S/Ti/L	
Mounting Arrangements (Optional)	Adjustable bowspring and centring studs for location within a 120 – $\varnothing$ 250mm barrel	

Outline drawings of the sensors are available on the Mag-03RC product page on the Bartington Instruments website.

Submersible mating connectors are not supplied.

Electrical

Supply voltage	+15V to +30V
Supply voltage (absolute min. and max.)	+12V to +30V
Current consumption	40 to 50mA at 25V
Power-on surge	210mA surge at switch-on
Analogue output	$\pm 10\text{V}$ (balanced. Differential; each output $\pm 5\text{V}$, 0V in zero field)
Output impedance	10 Ω
Maximum cable length	Dependent upon cable specification. Max. 2km.

Data Acquisition

The Mag-03RCU is best used with the DAS1 Magnetic Range Data Acquisition System from Bartington Instruments, which samples, records, processes and displays measurements from multiple sensors in one self-contained unit. Contact Bartington Instruments for further information.

Cables

Bartington Instruments can supply marine cables in lengths up to 2km for use with the Mag-03RC magnetometers. The connectors at the output end are compatible with the DAS1 system.

Different cable types are required for use with the Mag-03RCU/RCUT (underwater mateable connectors).

Outline drawings of the cables are available on the Mag-03RC product page on the Bartington Instruments website.



Mag-03RCU/RCUT Cable

- Polyurethane outer sheath
- Internal construction of five screened twisted-pairs and overall screen
- Hydrobond HRS206-10S/D connector at the magnetometer end
- Hirose RM15TPD10S connector at the data acquisition end
- Sealed to prevent water ingress
- Can be supplied with a Teredo worm barrier, if required

Mag-03RCU/RCUT Cable Specification	
Maximum length	2km
Overall diameter With Teredo worm barrier	15.3mm (± 0.5 mm)
Minimum bend radius Static Dynamic	123mm 184mm
Weight in air	276kg/km
Weight in seawater	87kg/km
Maximum conductor resistance	40.1 Ω /km
Spark test voltage	6kV
Working voltage	750V
Minimum insulation resistance Core – Core Core – Screen Screen – Screen	>500M Ω /km >500M Ω /km >10M Ω /km

The specifications of the products described in this brochure are subject to change without prior notice.

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