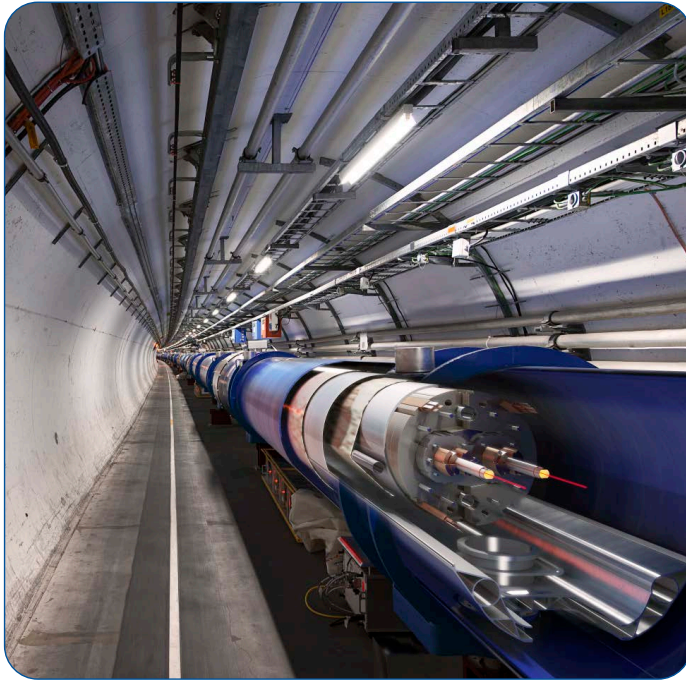


# CryoMag<sup>®</sup>

Three-Axis Magnetic Field Sensor





## CryoMag® Three-Axis Magnetic Field Sensor

The CryoMag sensor provides high precision measurements of static and alternating magnetic fields.

CryoMag is a two-part Magnetometer that has been adapted to operate at temperatures down to 2-4K, making it ideal for use in cryostats for superconducting radio frequency cavities, in quantum computing applications, and other low temperature environments and applications.



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## Features

- Operating temperature down to 2K
- Noise level down to  $<20\text{pT}_{\text{rms}}/\sqrt{\text{Hz}}$  at 1Hz
- Frequency response from DC to 1kHz
- Measuring ranges of  $\pm 70$ ,  $\pm 100$ ,  $\pm 250$  and  $\pm 500\mu\text{T}$

## Typical Applications

- Magnetic field monitoring in cryostats and other low temperature environments
- Use as feedback sensors in active magnetic field cancellation systems

## Product Identification

Product Name	Sensor Head Type	Measuring Range
CryoMag	No code = Standard 3-axis Probe	70 = $\pm 70\mu\text{T}$ 100 = $\pm 100\mu\text{T}$ 250 = $\pm 250\mu\text{T}$ 500 = $\pm 500\mu\text{T}$

**For example:** CryoMag-250 = A  $\pm 250\mu\text{T}$  range CryoMag.



## CryoMag® Specification

Performance				
Number of axes	Three			
Polarity	+ve when pointing North			
Analogue outputs	±10V single-ended (0V = zero-field)			
Full Scale Measuring Ranges	±70µT	±100µT	±250µT	±500µT
Scaling calibration error	<0.5%			
Scaling Temperature Coefficient	<±100ppm	<±125ppm	<±175ppm	<±200ppm
Linearity error	0.0015% (least squares fit)			
Frequency response	DC to 1kHz (±5%)			
Bandwidth (-3dB)	<2kHz (-11dB/octave roll-off)			
Noise	<20pTrms/√Hz at 1Hz			
Zero field offset	±30nT	±30nT	±60nT	±100nT
Offset Temperature Coefficient	+0.5nT/°C	+0.5nT/°C	+1nT/°C	+1nT/°C
Perming (magnetisation hysteresis)	<2nT at 1x Full-scale, when powered			
Orthogonality error between axes	<±0.1°			
Excitation breakthrough	<5 mV pk-pk at 15.625kHz typical			
Start-up time	<10 seconds			
Warm-up time	<15 minutes to meet specifications for scaling & noise			

Environmental		
Operational temperature range	Probe + probe harness	-271 to +70°C
	Electronics + interconnection block	0 to +70°C (dynamic cable) -40 to +70°C (static cable)
Storage temperature range	-40 to +60°C	
Vacuum	10e-7 Atmosphere (Medium Vacuum)	
IP Rating	Probe + Interconnection Block	IP40
	Electronics Enclosure	IP65 (Unmated Connector)
Humidity - electronics	Up to 90% RH, non-condensing	
Compliance	BS EN 61326-1:2013, WEEE and RoHS II	



Mechanical	
Construction	Two Part
Probe Enclosure Material	PEEK GF30
Probe Dimensions	21mm Diameter x 50mm Long
Probe Harness Material	24-Way Cryogenic Loom Dia 0,1mm Beryllium-Copper (BeCu) Cores; Polyester Insulation 3.5mm Max Loom Diameter (Folded)
Dimensions – Electronics Enclosure	25.4mm Diameter x 220mm Long
Weight	320g
Connectors	Fischer AL-1731-DEU-1031-A010-SR-11-11-G-12
Bartington Helmholtz Jig	Helmholtz Carrier PM4583

Electrical	
Positive supply voltage (range)	+12 to +17V
Current drawn (max. mA)	65mA +3mA/100uT on each axis
Over-voltage protection	Varistor
Reverse polarity protection	Diode – 40V max
Current limit	none
Power Supply Noise Rejection Ratio	5uV/V (105 dB)
Negative supply voltage (range)	-12 to -17V
Current drawn (max. mA)	33 mA +3mA/100uT on each axis
Over-voltage protection	Varistor
Reverse polarity protection	Diode – 40V max
Current limit	none
Power Supply Noise Rejection Ratio	5uV/V (105 dB)
Output Signals X, Y and Z axes	Magnetic field strength
Output Impedance	20 ohms typical
Maximum load capacitance (CLOAD)	<1µF
Maximum cable length	1.5km (but supply must be adequate to achieve ±12V at Magnetometer)
Over-voltage protection	Varistor
Reverse polarity protection	none
Current limit	protected against short circuit to 0V

Cable	
Interconnect Cable	Mag-13MS/MC Cable PM3377

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

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