

Operation Manual for

Mag610-611

High Temperature Three-Axis Magnetic Field Probes

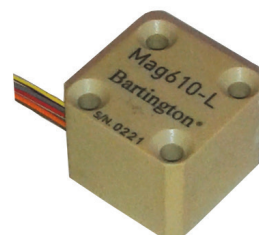


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1. About this Manual

This manual provides the information necessary to help customers connect, install and operate, the Mag610/611 High Temperature Three-Axis Fluxgate magnetometer.

Photographs of key components are included, labelled with numbers. A number in the text in square brackets [] refers to that label.

Technical specifications of the products, including power supply requirements and analogue output details, can be found in [DS3629](#), whilst outline drawings of both sensor head, electronics board and cable can be found on [product outline drawing page](#).

1.1. Symbols Glossary

The following symbols used within this manual call your attention to specific types of information:



WARNING: Indicates a situation in which serious bodily injury or death could result if the warning is ignored.



Caution: Indicates a situation in which bodily injury or damage to your instrument, or both, could result if the caution is ignored.



Indicates a situation in which ESD protection should be used.



Identifies items that must be disposed of safely to prevent unnecessary damage to the environment.

Note: A paragraph in this format provides useful supporting information on how to make better use of your purchase.

2. Safe Use



WARNING: These products are not qualified for use in explosive atmospheres or life support systems. Consult Bartington Instruments for advice.

WARNING: Environmental and electrical specifications should not be exceeded.



To prevent irreparable damage, electrostatic discharge (ESD) protection and precautions must be used when handling the unpackaged sensor electronics board.

Note: Do not expose to strong magnetic fields while being stored as this can magnetise the sensor and affect its offset performance.



WARNING: The Mag611 Probe contains high melting point lead solder at >85% concentration. Do not attempt to break open the enclosure.

3. Introduction

The Mag610/Mag611 are three-axis fluxgate probes for operation at high temperatures. The Mag610 will operate up to 175°C and the Mag611 up to 215 °C. Low noise versions are available.

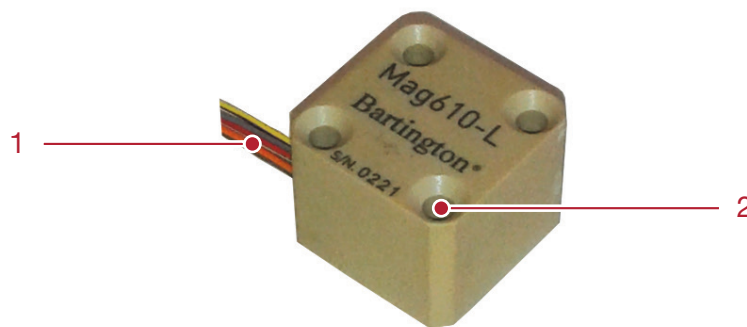
The probe is intended to be used with fluxgate electronics to provide measurements of static and alternating magnetic fields in three orthogonal axes.

The Mag610/Mag611 probes are externally identical apart from their labelling. The probes are designed to survive high levels of shock and vibration, have a compact probe head for easy integration into other systems, and are environmentally sealed.

The probe is designed to be installed by customers into a chassis for their own particular high temperature application.



The Mag611 probe contains high melting point solder containing lead at a concentration higher than 85%. This solder is exempt from RoHS.



4. General Description

Figure 1. Mag610/611 Probe

Key

1. Flying leads for connection to drive electronics 2. Mounting Holes (see DR2828)

5. Magnetic Field Sensor Circuit Design

High temperature magnetic field sensor circuit schematics and design notes are available, at additional cost, from Bartington Instruments.

Optionally, there are also packaged and unpackaged room temperature electronics available which are compatible with the Mag610/611 sensors. See the product brochure, or contact the Bartington Instruments sales team for more information on sales@bartington.com.

6. Probe Location and Mounting Recommendations

The probe should be located away from large sources of magnetic fields that may over-range the sensor or interfere with the field being measured. The probe should not be mounted on an electrically conductive surface, as this may trigger some apparent offsets.

The method of mounting will depend on the application and the enclosure.

Each probe has four countersunk fixing holes, for M3.5 or 6-32 UNC screw attachment to a stable base of fixture.



Caution: Users should be careful not to overtighten threaded holes

For details of the mounting arrangements for the probe, refer to drawing DR2828.

Note: The use of magnetic materials in the mounting arrangement must be avoided. All mounting components should be checked before installation, by introducing the component within the immediate vicinity of the sensing elements of a working magnetic field sensor, and observing any variation in the background field.

The analogue output is positive for conventional flux direction, South to North, in the direction of the arrow shown on DR2828 for each axis; i.e. the maximum positive output will be obtained from any axis when the arrow points towards magnetic north along the total field vector.

7. Connections

Connection details for the Mag610/Mag611 probe are provided in DR2828.

If the Mag610 or Mag611 are to be used with the Mag610/611-RTUDE or -RTPDE, please refer to OM3222 (available from the product page) for connection information.

8. Cable Recommendations

When wiring the probe to its drive electronics, it is advised to shield the wires connecting the sensor head to the electronics to prevent interferences from being picked up by the wires.

9. Mag610/611 Operation

Once the electronics is fully connected to both sensor head and power supply/acquisition unit, the supply can be switched on. The sensor will provide an analogue output which is proportional to the field measured. Please refer to DS3629 for the sensor's scaling factor.

Testing of the sensor's response can be done, as an example, by moving the sensor in the Earth's field and ensuring that the signal vary in relation to their orientation. In the horizontal plane, a minimum value is obtained when the axis is in the magnetic East-West direction, and maximum when pointing Magnetic North.

10. Electromagnetic Compatibility

Note: The Mag610/611 probe is not shielded for immunity from, or emission of, electromagnetic fields.

Note: The Mag610/611 is intended for integration into other systems. Ensure these meet the appropriate level of shielding.

11. Troubleshooting

The sensor is unlikely to suffer any defects in normal use: no internal components are serviceable. The most likely causes of failure, and their solutions, are detailed in the following table.

In the event of any apparent malfunction beyond those described in the table below, please email service@bartington.com, or telephone the Bartington Instruments service team on +44 (0)1993 706565.

Problem	Cause	Solution
There are no analogue outputs present in X, Y or Z	Sensor head not connected	Ensure that the sensor head is connected to its drive electronics.
	Power supply not connected or not sufficient to power the sensor	Check that the power supply meets the requirement provided in DS3629.
	Broken coil	If only one or two axes is (are) not responding, one of the fluxgate coil can be damaged. Please return the unit to us for assessment.
	Component damage	If only one or two axes is (are) not responding, one component can be damaged. Please return the unit to us for assessment.

There is an abnormal current draw on the sensor	Faulty component	A faulty component can lead to an abnormal current draw before it fails. Please return the unit to us for assessment.
The amplitude of the Earth's field is abnormal	Erroneous scaling factor	If the scaling factor applied to convert volts into field amplitude is erroneous, the field reading will appear either systematically high or low depending on the error on the scaling factor. Please check the conversion rate used in the acquisition software.
The noise on the output is much higher than the specified noise at low frequency	Ambient environment is noisy	A noisy environment will be picked up by the sensor. Noise tests should be carried out in a shielded environment.
	Sensor breakthrough not filtered properly	The sensor has a high frequency noise component referred to as breakthrough in the datasheet. This signal at the excitation frequency of the sensor, if unfiltered can be aliased creating an apparent low frequency noise. Check that a suitable low pass filter is used or that the signal is sampled at a suitable frequency (at least twice the breakthrough frequency).

12. Care and Maintenance



Surface dirt contamination on the Mag610/611 probe should be removed using a mild detergent solution only. Electronics should be cleaned with an antistatic cloth only.

Note: Store only within the temperature range specified in the product brochure.

Note: Do not expose to strong magnetic fields while being stored as this can magnetise the sensor and affect its offset performance.

13. End of Life Disposal



This product (electrical and electronic equipment) should not be placed in municipal waste. Check local regulations for disposal of electronic products.



Please note: The Mag611 Probe contains lead.

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

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