

Operation Manual for

Mag652

Ultra-low-power Magnetic Event Sensor



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1. About this Manual

This manual provides the information necessary to help customers connect, install and operate the Mag652 magnetic event sensor.

Technical specifications of the products, including power supply requirements and analogue output details, can be found in [DS4277](#), whilst outline drawings can be found on [Mag652 product 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.



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.

3. Introduction



Figure 1. Mag652

The sensor is designed to trigger a voltage output when a magnetic field change of $>1\text{nT}$ is detected.

4. Overview

The Mag652 consists of two fluxgate sensors arranged along the X and Y axes. The output of each channel is fed into a low power comparator. When a local magnetic disturbance of $>1\text{nT}$ is detected, the comparator will trigger a TTL HIGH voltage on the output of the sensor. Internal regulation of the power supply ensures the Mag652 is suitable for battery powered operation, over both long and short cables (subject to the minimum supply voltage specified in datasheet [DS4277](#)).

The ultra-low-power rating of this product means it is ideally suited for battery power in remote locations.

5. Installation

The Mag652 is intended for integration into the customer's own system. Connector information, pin-out and power ratings are all available in the product datasheet.

5.1. Unpacking

Safe handling precautions must be observed.

5.2. Orientation

The Mag652 can be buried in any orientation.

Some experimentation may be required to determine the size and shape of the magnetic fields you are trying to detect. This may increase the effective measuring "distance".

On-axis fields (more parallel) will appear to be larger than off-axis fields (more perpendicular) to the Mag652.

For example: If a magnetic field is perfectly perpendicular to the Y-axis, then the Y-axis will not be able to measure that field. However, the magnetic field will then be parallel to the X-axis and this channel will pick up the field instead.

5.3. Mounting

There are no mounting features on the Mag652. It is designed to be buried in mud or sand.

6. Operating Instructions

Switch on the power supply to the Mag652.

The Mag652 will be operational within a few seconds. However, it is recommended to allow it to warm-up for at least 60 seconds to reduce any instances of false triggers caused by magnetic settling of the fluxgates.

In a stable magnetic field (no variations greater than 1nT), the output of the Mag652 will return to 0V. Though, without magnetic shielding, achieving magnetic field stability of <1nT can be difficult; especially in an office, or built-up area.

To test the trip output, it is best to perform this in a remote location away from magnetic disturbances. Once set up, walk towards the Mag652 with your object of interest until the trip output goes high. Refer to datasheet [DS4277](#) for magnetic settling times.



Caution: Subjecting the Mag652 to fields in excess of 2 x the nominal range may cause inaccuracy in future measurements. Degaussing the sensor can reverse such an effect.

7. Troubleshooting

Your 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.

Cause	Solution
No operation	Check the power supply. If this is operating correctly then contact Bartington Instruments.
Damaged sensor	If any physical damage is apparent to the sensor then it may need to be replaced. For information about disposal of a damaged unit, refer to End of Life Disposal .

High stability circuitry ensures that no interim calibration should be required.

8. Storage & Transport

Your sensor is a precision electronic instrument and should be treated as such.

Note: The sensor should be stored and transported in the original shipment packaging, or that of similar protective standard.

Note: Store only within the temperature range specified in datasheet [DS4277](#).



Caution: Do not expose this instrument to strong magnetic fields while being stored.



Caution: Take particular care when cleaning around electrical connections. Bent or damaged pins may cause the Mag652 to malfunction.

9. Environmental Precautions

Refer to datasheet [DS4277](#) for maximum environmental, electrical and mechanical ratings.



Caution: Exceeding the maximum environmental ratings may cause irreparable damage to the probe and electronics board.



Caution: This unpackaged product is susceptible to damage by electrostatic discharge.

10. 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.

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

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