

Application Note – AN221

HMR3500/HMR3600

Experiencing Azimuth (Heading) Error



The Honeywell HMR3500 and HMR3600 magnetic compasses use 2 magnetic sensors to create 3 axis of magnetic field sensors, configured as a xy and z axis sensor. If either of these magnetic sensors contains magnetic material, and the sensor is exposed to a large magnetic field, the sensor could retain a fraction of this field. This retained field could then be superimposed onto the field the magnetic sensor is sensing and result in errors in azimuth readings.

PURPOSE

This document discusses a potential cause of errors in azimuth readings which begin to occur after you have used the compass module for a while.

BACKGROUND

The True Point (HMR3500) and Micro Point (HMR3600) compasses use 3-axes magnetic sensors to measure the Earth's magnetic field to compute the azimuth for compass functions.

In some instances, the leads on the Z-axis magnetic field sensor component contain some magnetic material that could cause inaccurate magnetic field measurements for this component if the part has been exposed to a large magnetic field. The magnetic material in the leads can retain a fraction of magnetic field when it is exposed to an external magnetic field greater than 10 gauss. The retained magnetic field is superimposed on any magnetic field that the magnetic sensor measures and then could act as a constant offset in the magnetometer reading.

Experiments in the lab indicated that in the normal usage and earth magnetic field environment, the compass has typical readings. After exposure to a large magnetic field such as a magnetized screwdriver, or permanent magnets in an audio speaker, some units have been seen to carry residual errors on the order of tens of degrees. The magnitude of the error is dependent on the strength of the magnetizing field.

CAUSE

During 2006 a batch of the z axis magnetic sensor components from a supplier were determined to hold a magnetic charge. This can occur if the lead-frame of the part contains magnetic material. If the part does have magnetic material included, it could cause the problem described in this application note.

CORRECTIVE ACTION

If you are experiencing unusual azimuth errors and purchased your part in late 2006 or early 2007, contact the Honeywell factory at 1-800-323-8295 option 1 or 763-954-2474 to discuss potential corrective actions.

If you contact Honeywell we will have you talk with an application engineer to help determine the vintage of the compass module. They may also have you perform a few tests to evaluate the potential for the z axis sensor to become magnetized. If necessary, we may choose to replace the z axis magnetic sensor on your compass module. This will require a return of the compass to Honeywell for repair. You will need to obtain an RMA number from Honeywell.

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