Finding an Ideal Mounting Location for a Watson Magnetometer

The heading calibration of a Watson unit depends on its ability to sense the Earth's magnetic field in its mounting position. Certain materials and/or devices have or can generate a magnetic field significant enough to distort the Earth's field and cause erroneous headings in the Watson sensor. Some examples are: motors, relays, batteries, transponders, ferrous metals, and high current carrying conductors. If any of these materials or devices are within close proximity to the Watson unit, calibration may be impossible in that mounting location.

The most practical method of surveying potential mounting locations for your magnetometer equipped Watson sensor is to use a hand-held compass. Place the compass in the area you intend to mount the sensor and see if it can accurately sense north, then turn the vehicle or device approximately 90° and check again. If you observe that the compass has drastic heading errors (over 20°) for either of the two tests, search elsewhere for a more suitable mounting location.

Shielding the sensor from the magnetic fields near a particular mounting location will not solve a location problem. The shielding will keep the magnetometer from sensing all magnetic fields, including the Earth's field.

It is important to monitor the behavior of the mounting environment while power is being applied to the vehicle or device in which the magnetometer is to be mounted. In different vehicles, current may only pass through conductors during certain times but it can still affect heading readings from the Watson sensor.

It is also important to keep the environment outside the vehicle or device clear of any materials or devices that have or can create magnetic fields. A sensor with the best mounting location possible can still calibrate poorly if the area around the vehicle or device is surrounded by magnetic materials.

The graph below is presented as an example of how installation location and the test environment can affect calibration results. This graph shows actual magnetometer data captured from a Watson AHRS as it was turned in a complete circle. The magnetometer in a Watson unit detects the Earth's magnetic field in three parts, X, Y, and Z. Ideally, the X and Y data should both be in the shape of a sine wave, whereas the Z data should be close to a flat line.

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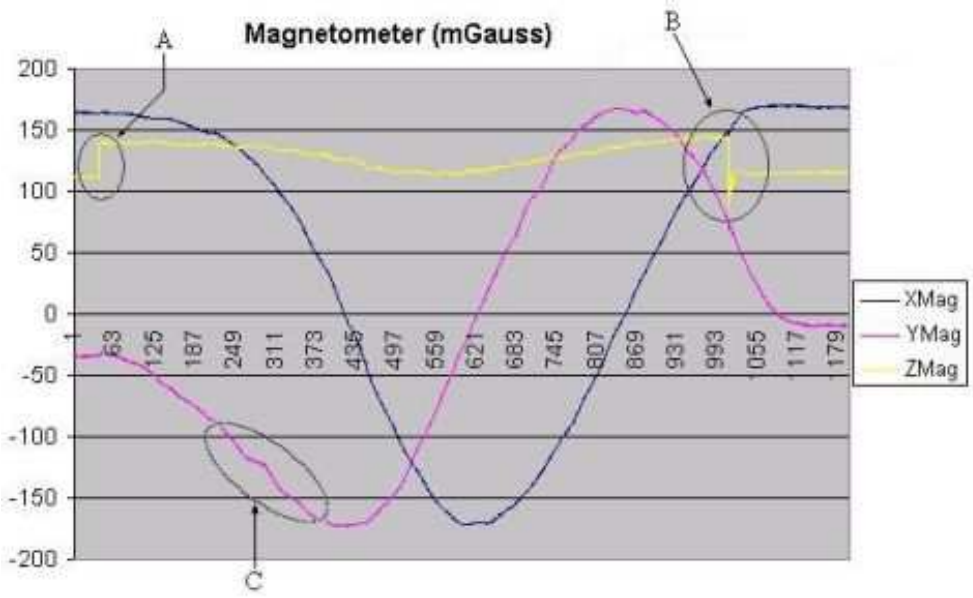

Magnetic field errors generated by installation and environment

Item	Description
A	The Watson unit in this test was installed in an automobile. It was mounted in close proximity to the cabling running to the rear brake lights. This is evident when viewing the Z magnetometer data. When the test starts, the brake lights turn off, causing a jump in the Z signal.
B	Likewise, near the end of the test the brakes are applied and current again flows to the brake lights causing the Z signal to change once more.
C	During the test, the vehicle moved close to a lamp post. This resulted in a noticeable disturbance on the Y magnetometer data for a part of the test.

You may have application specific questions about installing a magnetometer equipped Watson sensor in your vehicle or device. Please remember that Watson Industries' experienced support staff is ready and willing to assist you with any of your installation questions. We have helped many customers with suggestions about their installations and have also assisted installations with on-site engineering support.

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