AlphaLab Inc.

Zero Gauss Chamber Instructions

The white plastic part (spacer) can be removed at any time, but it should be used if you want to center a gaussmeter probe inside the chamber. When placed in either end, this white spacer will allow the end of a probe to be inserted exactly 1.6 mm past the center of the chamber. Therefore the actual sensor for AlphaLab models VGM, GM-2, GM-3, 1-ST and 1-HS will be properly centered in the chamber. The zero gauss region has diameter 9.4 mm (0.370”) and occupies the center 5 mm (0.197”) within the chamber. (The chamber dimension in its long axis is 36 mm, or 1.42”). In the center 5 mm, the magnetic field is < 0.01 gauss after pressing the black degauss button, regardless of the orientation of the chamber. It will remain < 0.01 gauss as long as the chamber is not rotated more than 30 degrees from its orientation when degaussed. (Note that this specification is valid if the field outside is <0.6 gauss, which is characteristic of the Earth field.) Insert the gaussmeter probe into the chamber and zero the gaussmeter.

The field inside the chamber can be reduced to < 0.002 gauss (2 milligauss) if the long axis is oriented the east-west direction when the degauss button is pressed, and if the chamber is kept in that orientation. However, 0.002 gauss accuracy is not necessary for most gaussmeters, which generally read down to 0.01 or 0.1 gauss.

As with any zero gauss chamber, exposure to a magnet or strong field (> 5 gauss) will “permanently” magnetize the chamber. For the model ZGC, this permanent internal field can be as high as 0.2 gauss after being exposed to a strong field. Any such chamber will then have to be degaussed to erase this effect. The ZGC has a built-in degausser, which will reduce the field as specified above. For fields above 0.6 gauss, 1.5% of the field component parallel to the long axis of the chamber will leak into the chamber. For the other two axes (perpendicular to the long axis), magnetic field leakage is < 0.2%. For comparison, the Earth field is between 0.2 and 0.6 gauss. The ZGC will only remagnetize if it is exposed to a magnet again. To degauss, snap a 9 volt battery to the case and press and hold the small button for at least 1/4 second. For the lowest possible internal field, the long axis be pointing east-west (or in a direction with low field: less than 0.05 gauss) during degaussing.

The battery can remain connected because it draws no power unless the button is being held down. Even while the button is pressed, current consumption is about 0.05 ma, and the battery can last over 6 months at that load. The steel case of most 9 volt batteries may be unwanted in a low-gauss area, so the battery is easily disconnected. Standard batteries, if magnetized, may allow as much as an extra 0.001 gauss to leak inside the ZGC. If very low field is required, attach the battery for at least 2 seconds to charge the internal one microfarad degaussing capacitor. Then remove the battery to degauss. All of the energy for one degauss cycle is stored in the capacitor and the capacitor will remain charged for >10 minutes. Degaussing is complete (and the capacitor becomes completely discharged) within 1/10 second after pressing the degauss button.

To get a very low field, it was mentioned above that the ZGC should be degaussed while the long axis of the chamber (left-right direction of the label text) is pointed east-west so that the field in that direction is < 0.05 gauss. To verify that the east-west direction is < 0.05 gauss, or to find a direction that *is* low-field, select a direction and measure the field in that direction with a gaussmeter. The meter does *not* need to be correctly zeroed. For 3-axis gaussmeters such as the VGM or GM-3, examine only a single axis, such as Z, and point that axis of the probe toward the selected direction. Then point the probe in the opposite direction: 180° away, and remeasure. If you have chosen a low-field direction, these two numbers should be the same, or at least within 0.1 gauss of each other.

The proper functioning of the chamber (i.e., whether it is approximately true zero) can be independently verified with a gaussmeter even if the gaussmeter is not zeroed. To verify zero in the *long axis* of the chamber, examine the Z field with a VGM or GM-3 meter, or use an axial probe with a single-axis gaussmeter model. (With single-axis models, verifying the *long-axis* zero is irrelevant if your probe is either transverse or universal). Degauss and orient the ZGC east-west as above. Use the white plastic spacer as a stop; insert the probe and measure. Then without moving the ZGC, interchange the probe with the spacer and measure again. These numbers should be the same within the gaussmeter’s stability. To verify zero gauss in the perpendicular direction, either examine X with a VGM or GM-3 meter, or use a transverse probe or a universal probe which is not bent to an angle when verifying with a single-axis gaussmeter model. Rotate the probe 360° inside the hole. The displayed number should not change during the rotation.

The warranty period for this meter is one year from the date of delivery.

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