Gaussmeter Test: Magnetic Flux Density Test

The flux density on the surface or at a certain distance from the magnet can be obtained using a Gaussmeter and an Axial or Transverse probe. The probes contain a Hall Effect element whose electrical current is proportional to the magnetic field strength (flux density). Figures 1a and 1b show the placement and direction of testing when using the two types of probes. Gaussmeter measurements provide an accurate and easily calibrated value for flux density (Gauss or Tesla) in a very specific location. However, the position of the probe in relation to the magnet must be in exactly the same location for each sample. Brass fixtures are commonly used for locating the probe to the sample being tested. Calibration is obtained by using a Zero Gauss chamber and a magnet with a known flux density value. It is important to note that this method obtains a flux density reading in Gauss (Tesla) which is not the same as the Gauss (Tesla) number specified as the Intrinsic Residual Induction, Br. For more information on testing the Br, please visit the link "Understanding a BH Curve" at www.allianceorg.com/design.

In order to obtain an accurate measurement, several steps must be taken prior to measuring the sample:

Determine what type of probe best suits your needs. The Axial probe length faces the magnet sample (fig. 1b) while the Transverse probe is perpendicular to it (fig. 1a):

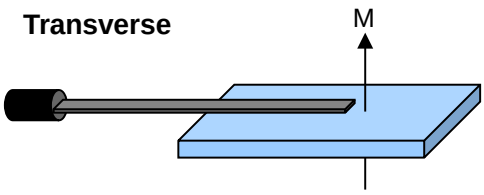


Fig. 1a

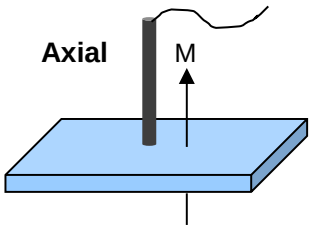
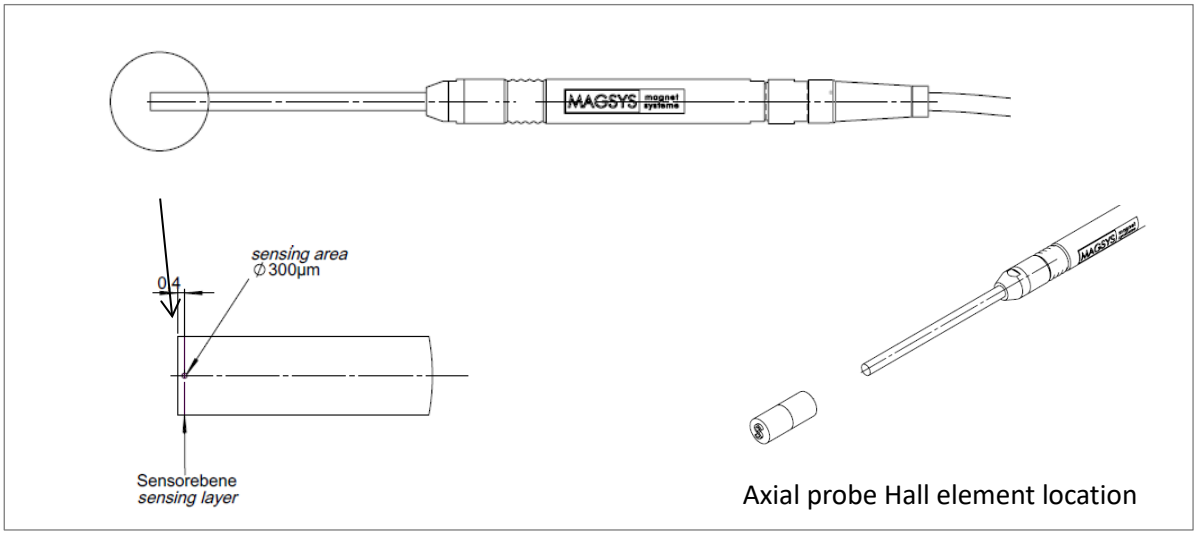
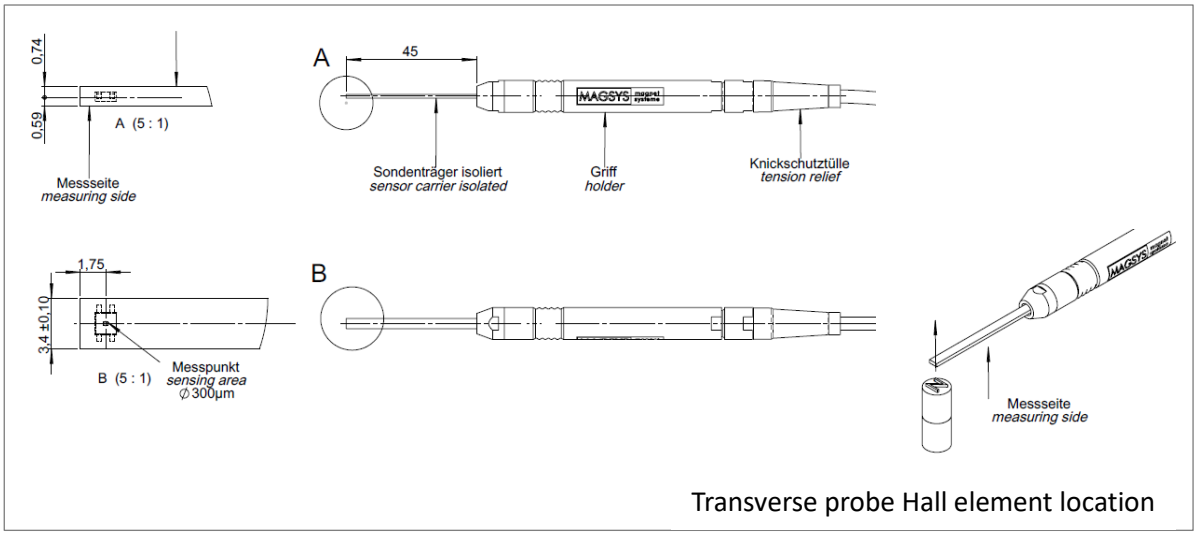


Fig. 1b

Next, ensure that you know the exact location of the Hall element within the probe. For example, when a certain gap is specified for testing, that is not the distance between the sample and probe end. It is the distance from the sample to the hall element located close the probe end. Gaussmeter equipment suppliers have data or drawings indicating the exact distance between the Hall element and the probe surface:

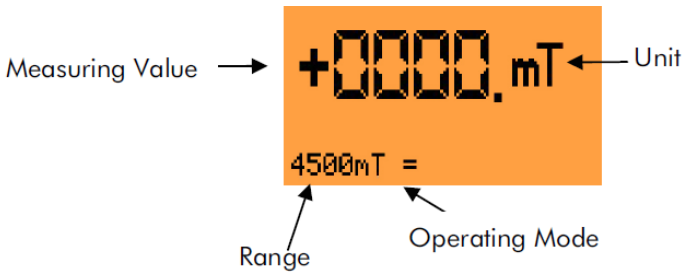


Axial probe Hall element location



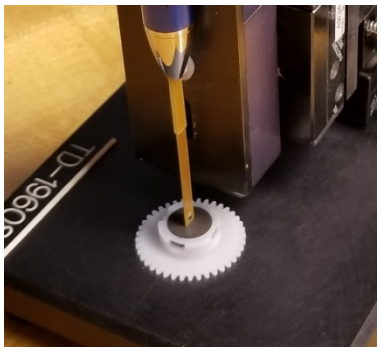
Transverse probe Hall element location

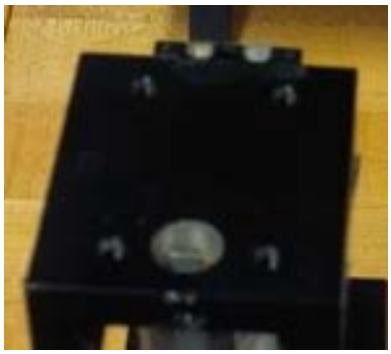
Now the Gaussmeter needs to be set up. Make sure the probe is connected to the instrument before it is turned on. Determine if you will use Gauss (G) or Tesla (T) values. Then pick a range for the data. If you use a range that is too small for the magnet, the screen will show -OL- or will blink.



Before starting sample measurements, the probe and meter need to be “zeroed” or calibrated to a known magnetic reading. Suppliers of this equipment often include a Zero Gauss chamber or a calibration magnet sealed inside a closed circuit to protect its magnetic reading. When the probe is placed inside a Zero Gauss chamber, press the Null or Zero button on the Gaussmeter. After a few seconds, your unit will be ready for testing.

Once the equipment has been zeroed or calibrated, testing can begin by accurately placing the probe where you need the magnetic measurement. The sensing element measures only the lines of flux that are perpendicular to it, therefore it is important to note that any slight change in angle or location of the probe in relation to the magnet being tested will yield different results. For measuring large numbers of samples, simple fixtures can be made out of non-magnetic material.





When measuring, please keep in mind that the probes are sensitive to any other magnetic devices nearby. You should keep the lot of samples several feet away from the location of your probe and only bring one magnet at a time to measure. Verify that there is no metal nearby or underneath the probe fixture as that will affect the accuracy of your test.

If you have any questions regarding the equipment, probes, or testing procedure, please feel free to call or customer support team at 219-548-3799 or engineering@allianceorg.com