

Hall Sensor Mounting Information

Although, cryogenic Hall sensors have been constructed to be as rugged and strain-free as possible for maximum reliability after repeated temperature cycling, they are precision semiconductor devices and must be treated accordingly. Do not touch the electrical system of the un-packaged Hall sensor.

It is very important to understand that environmental stress from incompressible thermal expansions or mechanical sources can affect the output of the Hall sensor and significantly modify the calibration curve.

When gluing the packaged Hall sensor to a holder, match the thermal expansion coefficient of the glue as closely as possible to the expansion rate of 2.5 to 6.5×10^{-5} K⁻¹. Highly filled nonconductive epoxies fit well into this category. Do not use cyanoacrylate adhesives because of high rate of shrinkage and biodegradable inclination.

For gluing the un-packaged Hall sensor choose a material with thermal expansion coefficient in the range of 0.5 to 1.5×10^{-5} K⁻¹ (ceramic, steel, glass). Use very tiny dot sizes to glue the sensor to the surface. In situations where the Hall sensor must be glued on a material with higher coefficient of thermal expansion a buffer aluminum oxide substrate is recommended. The electrical system of the un-packaged types cannot be covered with adhesives or with vacuum grease or with other varnishes.

Mounting of the Hall sensor's leads is necessary part of the sensor gluing. Leads should not be formed closer to the package than 3 mm. Avoid reciprocal bending or tension on the leads. There is no allowable force trying to pull leads from the package during the thermal dilatation.

A lot of magnetic field measurements are made as close as possible to a sample surface. After the Hall sensor mounting must be carefully examined the position and thermal elongation of all system elements to avoid unexpected clash with the sensing area.

Do not remove the Hall sensor from its original package until you are ready to install it. Ground yourself to discharge any static electric charge that may build up in your body while working on installation or handling the sensor. Handle the sensor by its edges or by the leads to avoid touching the uncovered electrical system of the sensor. Do not touch a measured sample by an uncovered type of the Hall sensor.

To avoid damaging the sensor by frozen water, the surface must be carefully dried by fine airflow before insertion to a cryostat. Cool down the sensor slowly in dry atmosphere. Dry up the sensor using a stream of dry air after the measurement.

Maximum ratings are absolute ratings. Exceeding any one of these values may cause irreversible damage to the Hall sensor. Before connecting the Hall sensor to a current source check the output for a current peak when it is turned on/off. The bias current must be switched off during rapid temperature changes (cooling and heating) of the sensor. Do not switch on maximal bias current unless the sensor is at a constant temperature.

The offset voltage of the Hall sensor can be changed if some component of your cryogenic system has a remanent magnetic field. In this case, it is recommended to carefully examine the equipment for magnetic materials or parts, which tend to remain magnetized.