

Comparative Analysis of Reed Switches and Hall Sensors at Cryogenic Temperatures: An Argument for a Cost-Effective Alternative for Cryogenic Applications

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Hall sensors are commonly used as a non-contact way to relay positional data inside a cryostat to an external motion controller. However, cryogenic Hall sensors can be cost prohibitive and require peripheral electronics to interface with the motion controller. Here we contrast the accuracy and reliability of non-contact reed switches in cryogenic environments against the commercially available cryogenic Hall effect sensors. Accuracy for both units was optically measured using a filter wheel cooled down to 77K, while reliability and yield was determined by thermal-cycling multiple units down to liquid nitrogen (77K) and liquid helium (4.2K) temperatures. Lastly, we also argue that the lower cost and ease-of-implementation of reed switches make them better suited for many cryogenic motion control applications.

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