

人工心脏磁悬浮系统涡电流位移传感器的设计

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摘要：

设计一种用于人工心脏的非接触式涡电流位移传感器。针对人工心脏磁悬浮系统特有的钛合金隔层结构，采用有限元分析涡电流位移传感器磁场，得到其结构参数；同时研制能实时监控传感器线圈绕制的装置，以提高线圈阻抗的一致性。经对传感器性能测试，结果显示所设计的涡电流位移传感器标准偏差为3.8%，灵敏度高于10%，能满足人工心脏磁悬浮系统的要求。

关键词：人工心脏；涡电流传感器；磁悬浮；钛合金隔层

Design of eddy current displacement sensors for maglev system of ventricular assist device

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Abstract:

Noncontact eddy current displacement sensor was designed for the maglev system of the ventricle assist device (VAD). With regard to the special structure in which there was a titanium alloy frame between the displacement sensor and VAD's rotor, this paper analyzed the sensor magnetic field by using finite element method to obtain structural parameters of sensor, built a device to monitor coil winding for improving the impedance consistency. Performance test of sensor coils shows that the standard deviation of sensor coils is 3.8%, the sensitivity is higher than 10%, and the good properties are feasible for the maglev system of VAD.

Keywords: ventricular assist device; eddy current sensor; maglev; titanium alloy frame

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