具有异径测量管的低功耗电磁流量计研究

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摘　要：

为了在保证测量精度的前提下降低电池供电电磁流量计的功耗，延长电池使用寿命，本文提出一种新型低功耗电磁流量计设计方案。通过仿真分析，设计了具有异径测量管道的电磁流量传感器，测量管道从圆形截面的入口逐渐收缩为矩形截面，显著提高了电磁流量传感器的励磁效率和输出灵敏度。根据所提出的设计研制了原型样机，实验结果表明样机测量精度在全量程范围内优于±0.5%，采用高能锂电池组供电可连续工作三年以上，验证了本文所提设计方案的可行性。

关键词：功耗，励磁，灵敏度，异径管道，流速分布

Study on Low-Power Electromagnetic Flowmeter with Locally Shrunk Measurement Pipe

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Abstract:

A new design of battery powered electromagnetic flowmeter is proposed to reduce the power consumption and extend the life-time of the battery. Based on computer simulation, a new design of measurement pipe with locally shrunk cross section is proposed, the efficiency of the magnetic field excitation circuit is effectively enhanced, the sensitivity of the transducer is increased. A prototype flowmeter was developed based on the proposed design and was tested. The experiment result shows that the prototype has the precision better than 0.5% over the specified measurement range. When powered with a high power lithium battery set, the prototype can work for more than 3 years continuously. The feasibility of the proposed design was proved.

Keywords: Power-consumption; Magnetic field excitation; Sensitivity; Locally shrunk pipe; Velocity distribution

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