



井下磁力计数据采集系统的研制

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基金项目: 中国地震局地球物理研究所中央级公益性科研院所基本科研业务费专项, “十一五”国家科技支撑

摘要:

根据用于地震前兆信息监测的井下集成综合观测系统对各传感器单元的高可靠性和高精度实时观测及便于远程监控要求,提出了井下磁力计单元的数据采集、控制和实时传输系统.针对井下仪器不能进行人工直接操作的情况,设计了高精度的背景磁场自动补偿系统;在上位机GPS定时授时控制下和采用温度补偿有源晶体,设计了高采样时刻记录精度和高幅值记录精度的三通道24位AD采集;设计了高可靠的采集软件.通过井下集成系统的联调和在天津静海地磁台站的应用表明,该采集系统连续工作稳定,观测结果准确,能够实现观测的自动化远程监控功能,满足井下实际观测要求.

关键词: 井下磁力计;数据采集系统;背景地磁场补偿;MSP430F1611

Design of the data-acquisition system of the borehole magnetometer

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Abstract:

The borehole comprehensive observation system is used for monitoring seismic precursor information, and the borehole magnetometer is one part of the system. The paper introduced the design of the digital circuit and the inbeded program of the magnetometer, including the control hardware design using MSP430F1611 MCU, high-precision A/D conversion circuit, background magnetic field compensation circuit which can be auto & hand operated, program design of protocol analysis and data transimission, etc. The results of practical observation at Jinhai Seismic Station show: a) the magnetometer is reliable on continuous observation; and b) it's veracity of mearsure is high, which resolution is 0.043nT; d) magnetometer meet the demand to auto remote- monitor & control.

Keywords: borehole magnetometer; data acquisition systems; compensating field; MSP430F1611

投稿时间: 2011-05-17

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