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网络化水轮机组状态监测与故障诊断系统设计

Networked condition monitoring and fault diagnosis system for hydraulic turbine set

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中文关键词: [水轮机组](#) [状态监测](#) [故障诊断](#) [AVR](#) [小波变换](#) [神经网络](#)

英文关键词: [hydraulic turbines](#) [condition monitoring](#) [fault diagnosis](#) [AVR](#) [wavelet](#) [neural network](#)

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中文摘要:

大中型水轮机组的安全运行对于水电站以及电网的运行有重要影响。在分析水轮机组状态监测与故障诊断原理的基础上,设计了一种新颖的网络化水轮机组状态实时监测与故障诊断系统。该系统有过程层、监测层和站控层3个层次,通过RS-485总线和以太网相互联接;现场节点以AVR单片机ATmega8515为核心;监测站是一台高性能的工业计算机,能实时监测水轮机组的运行状态,并采用小波分析和神经网络相结合的方法对机组的故障进行诊断;系统通过Web服务器实现基于Internet的远程状态监测与故障诊断。试验结果显示该系统能准确采集水轮机组的振动信号,并能实现2种常见故障类型的识别。

英文摘要:

The safe operation of the large-medium hydraulic turbine set has great influence on the hydropower station and the grid. With analysis of the principle of the condition monitoring and fault diagnosis of hydraulic turbine, a monitoring and diagnosis system for hydraulic turbine set was developed based on novel networks. The system had three layers that were interconnected by the RS-485 bus and Ethernet. The field nodes were designed based on 8-bit AVR ATmega8515. The monitoring station used a high performance industry PC to monitor the status of the hydraulic turbine, and had the functions of fault diagnosis by wavelet analysis and neural network method. The internet based remote monitoring and diagnosis system for the turbine set was realized by the web server. The experiment results showed that the vibration signals were measured accurately, and the two common types of turbine faults could be recognized effectively.

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