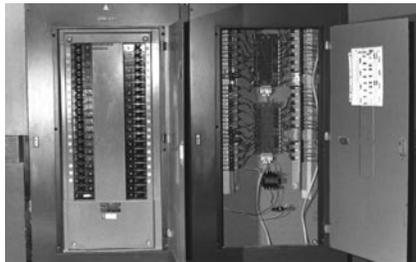

Facility Management



HP Data Acquisition Application Note

Description

Large facilities use a lot of energy to run equipment, fans, pumps, motors, heaters, lights, and air conditioners. By efficient use of this equipment, the amount of energy used by the facility can be significantly reduced.

Problem

The efficient management of lights, heating, air conditioning, ventilation, and even security systems requires equipment that is accurate and reliable. The equipment must be able to interface with a variety of transducers and control an array of other equipment.

Solution

A VXIbus data acquisition and control system from Hewlett-Packard has the speed, intelligence, reliability, and point count needed to monitor either small or large facilities and still reduce operating costs. When sufficient data is gathered, the data acquisition system can be expanded to control equipment such as fans, blowers, pumps, and lights. By making accurate measurements and timely decisions, the cost of electricity and natural gas can be reduced by an amount which can pay for the entire data acquisition system in less than a year.

Air temperature _____

Lighting control _____

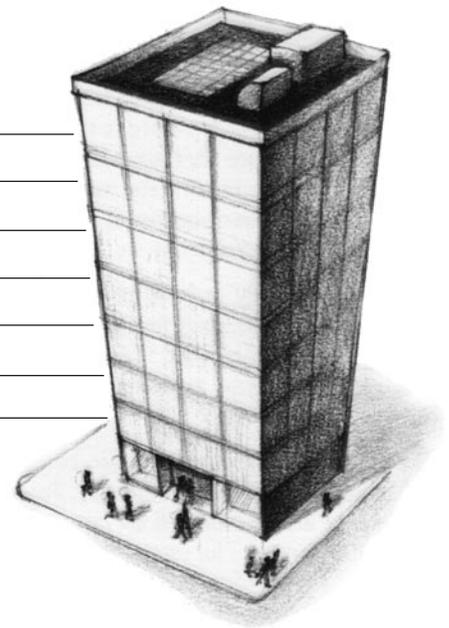
Air pressure _____

Water temperature _____

Water pressure _____

Power usage monitoring _____

Other systems _____



Applications

Factories
Office complexes
Sports facilities
Hotels
Airports

Departments

Facilities engineering
Maintenance engineering

Implementation

Air temperature

Temperatures at various points in the facility are monitored continuously to provide comfortable room temperatures. Warm or cool air can be moved throughout the facility to areas that need it. Monitoring outside temperatures can ensure that air brought into the building is heated or cooled only as needed. Thermistors are used to measure temperature when accuracy is critical. Thermocouples are used for higher temperatures and for low-cost general monitoring.

Lighting control

Lights in the facility can be turned on and off during the day depending on work schedules. Holidays and weekends can be set for different schedules. Parking lot lights can also be turned on or off based on hours of daylight. An override system allows people in the facilities to keep their lights on when working early or late.

Power usage monitoring

Most large facilities use commercial electricity to run compressors, fans, and large machinery. Power meters can be installed throughout the facility and monitored by counters to determine the power used by different departments. The energy rate for the facility is determined by peak loads during the daytime hours. By monitoring the power to these machines and shutting down non-essential loads (load shedding), the facility can lower its peak power usage and thus its electricity bill.

Air pressure

Air is circulated in and out of a building to maintain a comfortable working environment. In large facilities, uneven air flow can cause "wind tunnel" effects in hallways and stairwells. Pressure transducers monitor the pressure differences around the facility. To maintain proper pressures, fans and vents can be regulated by the data acquisition system.

Water temperature/pressure

Water temperatures can be monitored in large facilities to regulate building heat, swimming pool temperatures, or to prevent boiling in the pipes in high rise structures at high elevations. When used in conjunction with pressure, water temperature can be regulated throughout the facility to reduce waste and, therefore, costs.

Other systems

Other systems such as security alarms, lawn sprinklers, solar panels, and heat pumps can all be monitored and/or controlled by the data acquisition system. Accurate control of these systems can reduce energy costs.

Key System Features

- VXIbus open architecture
- Data Acquisition and Control on a single programmable VXIbus card (E1419A)
- Graphical programming language (HP VEE)
- Flexibility with deterministic control
- Wide choice of inputs/outputs
- Built-in control algorithms
- Up to 32 user-written "C" code algorithms
- 65,000 reading FIFO buffer
- 500 reading Current Value Table (CVT)
- All algorithms can write to FIFO/CVT
- Data can be time-stamped

Typical Configuration

Data Acquisition System	Qty
HP E1421B VXI 6-Slot Card Cage	1
HP E1406B VXI Slot 0 Command Module	1
HPE1419A Multifunction Measurement & Control Card	1-3
Analog input channels	20-100
Counters channels	5-10
Voltage DAC channels	5-25
Digital input channels	10-50
Digital output channels	26-62
Computer and Software	
HP Vectra Series PC with HP 82341C HP-IB Interface Card	
HP VEE for Windows 95	
HP LaserJet or InkJet printer	