Subject: Control of Building HVAC Systems

Reference AN0012

Control of Building HVAC Systems

Buildings are now becoming smarter and this not only applies to industrial buildings that need a controlled environment for manufacturing but also for office buildings, churches, schools and theatres to provide a pleasant working environment, whilst also keeping heating and cooling costs at a minimum.

HVAC (Heating, Ventilation and Air Conditioning) is important in the design of medium to large industrial and office buildings. Conditions can be regulated with respect to temperature and humidity through 'natural ventilation' using outside air without the use of fans or other mechanical systems. Accurate ventilation control requires monitoring of air flow and other atmospheric conditions.

Application Parameters Monitored

- In many applications, a single outdoor temperature and humidity sensor is the only reference point controlling various set points for building ventilation systems. Sensor selection is often overlooked, yet it is a critical decision that building or process owners must endure throughout the life of a building or project. A sensor that can survive a certain amount of dust and other pollutants, which MaxiMet has the benefit of a double unaspirated radiation shield that offers a prolong service the service interval in these installations. To ensure accurate readings, the temperature and humidity sensor would normally be installed away from air-conditioning vents or any process output vents.

- Precipitation is an important parameter for controlling skylights, windows, doors, or retractable roofs etc. A common instrument for measuring precipitation is a tipping bucket, however, more high tech solutions such as MaxiMets optical rain sensor, which has no moving parts and are maintenance-free offer a good alternative to the tipping bucket. Regardless of the technology used, the precipitation sensor would be mounted on the rooftop or the ground away from large obstacles.

- Solar radiation sensors are also used to provide a direct readings that can be feed into a building control systems and used to open / close blinds as required to aid control of the buildings internal temperature.

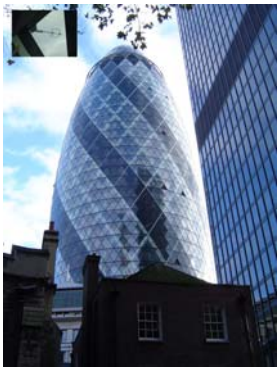
- Monitoring of wind flow for "mechanical" or "forced" ventilation can be used to control indoor air quality. Excess humidity, odours, and contaminants can often be controlled via dilution or replacement with outside air. However, in humid climates much energy is required to remove excess moisture from ventilation air. In this instance outside weather conditions should be measured using an accurate multi-sensor weather station. Ultrasonic wind sensors are also used in building management systems, providing vital information when access doors dramatically fluctuate indoor air quality and pressure.

Increased Building Safety

In certain high wind speed conditions it may be unsafe for automatic windows and doors to be used. Building management systems often rely on wind sensors to determine when this safety limit has been reached.

Installations

WindSonic, MaxiMet and MetPak provide the end user with all of the parameters that would be required for monitoring and the WindMaster has been used where vertical flow needs to be taken into account, which can be seen on the Swiss Re building in London.



Why Gill?

MaxiMet and MetPak can provide all of the measurement requirements in a compact, virtually maintenance free package along with a simple single datastring output that can be directly connected into the buildings controls system, which for most new building designs are using MODBUS.

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