rotronic
MEASUREMENT SOLUTIONS

INNOVATIVE, ENERGY SAVING MEASUREMENTS WITH ROTRONIC

Innovative measurement technology for control and monitoring data centers demands a high degree of specialized skill. Rotronic Instruments (UK) demonstrated to BladeRoom that Rotronic devices were the optimal solution for their application. The short response time and stable measurement features were decisive.

BladeRoom is a highly energy efficient modular data centre system, providing a scalable method of quickly developing data centers with an extremely low, proven annual Power Usage Efficiency (PUE). These modular data centers are built entirely in the factory,reducing the effort on site to a minimum. Set-up and commissioning therefore take only a fraction of the time it takes for a traditional build.

$$\text{PUE} = \frac{\text{Energy consumed by the system as a whole}}{\text{Energy consumed by the IT devices}}$$

BladeRoom contributes one vital factor to the success of a business: the control of the environmental conditions within very tight tolerances, assuring the reliability of the cooling system and all components. Depending on the climatic conditions, the cooling systems, both primary and back-up, use ambient and evaporative cooling for up to 100 % of the time to maximize efficiency.

To achieve this maximum efficiency, the system was designed for the specific ventilation requirements. Air is delivered seamlessly to where it is needed through the normal working zones, so ductwork and raised floors are not required.

In contrast to conventional data center cooling systems, which return and cool down the warm air from the IT equipment, a BladeRoom data center works like a server. Heavily filtered fresh air is introduced, and intelligently adjusted to the needs of the IT equipment. At the same time, the warm air – depending on the requirements – is extracted completely from the data center.

Evaporative and free cooling enables the IT equipment to be cooled with supply air temperatures of between 18 °C and 24 °C for more than 99 % of the year. The benefit of this is that mechanical cooling over a series of IT loads is not necessary. The back-up mechanical cooling system is only used for emergencies, and for partial cooling during extreme weather conditions. This system is then designed for the cooling of 100 % of the IT load.

Weather protection in use for fresh air monitoring.

As well as Rotronic humidity and temperature probes and measurement transmitters, BladeRoom also uses the Rotronic PF4 differential pressure transducer. Boyle's law states that the product of pressure and volume is constant for a given mass of confined gas, as long as the temperature is constant.

$$P_1V_1 = P_2V_2$$

In other words, in a constant volume, a measured difference in pressure implies a difference in temperature. It is this differential pressure that allows BladeRoom to move air effectively within the data center to maximize energy efficiency and therefore savings.

It is precisely this innovative measurement solution that demonstrates Rotronic's work philosophy, which is characteristic of projects that hinge on highest measurement precision. The fruitful cooperation with BladeRoom is a good example of this, and forms the basis of a successful business partnership.

Evaporative cooling

The drop in temperature resulting from the evaporation of a liquid, which removes latent heat from the surface at which evaporation takes place. This process is utilized in cooling systems, both in industry and in the home. From the point of view of physics, it is also the basis of perspiration.

Free cooling

This designates an economical method of utilizing low outside temperatures to cool water, which is then used in commercial processes or in air conditioning systems. The cold water can be used immediately, or kept in short-term or long-term storage.

" With their short response time and stable measurements, the Rotronic humidity sensors are perfect for controlling our data center."

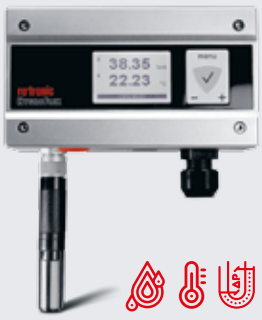
Adrian Edge
BladeRoom Group, England

BladeRoom

BladeRoom has over 20 years' experience in designing and producing state-of-the-art, modular infrastructures for Blue Chip companies and public bodies.

PF4 Series

The PF4 Series is an innovative development by Rotronic. The thermal measurement technique enables high precision measurements in the smallest of spaces. This differential pressure transducer gives customers a device to measure a further important parameter in addition to devices for humidity, temperature and CO_2 measurement. With the optional connector for a HygroClip2 probe, analog input or temperature sensor, the device is widely supported for the most diverse applications. The differential-pressure series lives up to these characteristics, with long term stability of <0.3 %/year and an accuracy of ±1.0 % of the end value.



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