

Technical Publication



Thermal Flow Meter Helps Compressed Air System Manufacturer Keep The Pressure Steady

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CAL-EDGE device for audits and monitoring (P/O)

FS10i Thermal mass flow meters for compressed air applications

Industrial compressed air system leaks have been identified for decades as a serious cost issue that also adds to the strain on the electric grid, according to the U.S. Department of Energy and many other agencies around the globe. As industrialized nations now struggle with energy shortages along with much higher costs and address zero emissions goals simultaneously, the impact of leaky compressed air systems is a top priority for many companies.

According to some estimates, compressed air systems waste as much as 20% or more of the energy required to operate them. Over time, the utility costs of operating these systems will easily pay for the detection and repair of leaks or the complete replacement of obsolete systems that have served beyond their useful expected life cycle.

Detecting air/gas leaks requires accurate flow measurement. There is an old saying in industrial process control that you can't control what you don't measure. In the case of air compressor systems, that statement is certainly true. If ignored by plant managers and engineers, air/gas leaks make it nearly impossible to achieve reasonable plant efficiency.

The Problem

When engineers at CALMS Air needed a new and more dependable flow measurement solution to monitor compressed air leaks, the company contacted the applications group at Fluid Components International (FCI) about its thermal dispersion sensing technology flow meters. CALMS Air was looking for an

accurate meter with low flow measurement capabilities that could be easily installed in multiple line sizes and with ISO17025/NIST-traceable compressed air meter calibration to support its air monitoring products.

CALMS Air is a platform for ongoing compressed air optimization and manufactures several different compressed air products. The CALMS CAL-Edge device is a remote data logger for auditing compressed air systems. The CALMS CAL-PM device is a data logger for permanent monitoring and PLC control of compressed air applications. The CALMS CAL-PM EMCS is an energy management control system add-on for permanent monitoring.

CALMS Air is part of the HPE group founded in 2001. HPE is known as a total compressed air solutions provider; performing audits, projects, energy solutions, delivery, installation and maintenance of compressed air systems. CALMS headquarters is in Slovenia, although the company operates worldwide with additional locations in Sweden and New York City.

The Solution

The engineers at FCI recommended the compact FS10i Thermal Flow Meter for use in CALMS Air applications. This flow meter was designed specifically for compressed air applications and other small line processes. Its advanced thermal dispersion flow sensing technology and electronics offer a number of advantages.

These compressed air measurement advantages include: thermal dispersion direct mass flow measurement requiring no additional pressure or temperature sensors, easy hot-tap insertion installation for temporary or permanent service, no moving parts for safety and a sealed design with no orifices to clog or foul.



Installed CAL-PM device and FS10i with hot tap installation

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The versatile FS10i Flow Meters are designed for a wide range of applications beyond air compressors. They are also ideal for any type of process or waste gas leak detection, zone monitoring, blowers, boiler and burner air and gas fuel feed lines, calciners, kilns, ovens, packaging equipment and plant sub-metering systems.

Independently third-party evaluated, the FS10i Flow Meters are the only instruments in their class to achieve SIL 2 certification as an HFT0 device. This rating makes them the optimum choice for safety instrumented systems (SIS) in critical and hazardous processes.

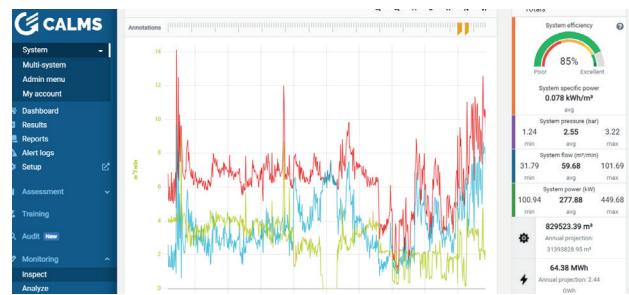
The FS10i Flow Meters provide a fluid-matched, calibrated and linearized 4-20mA output of flow rate, and a user programmable high or low flow alarm/trip point with a 1A SPDT relay output. For visual indication, the FS10i Flow Meters include a 10-segment LED array. This display illuminates proportionally to the flow rate and flashes if an alarm trip occurs.

The FS10i Flow Meters support installation in line sizes from 1 inch to 20 inches. They operate over a wide, 100:1 turndown from 1 to 400 SCFM depending on the fluid media and line size. Their 316L stainless steel wetted parts ensure superior corrosion resistance in the pipe. Hastelloy C22 sensor tips are also available for corrosive applications, and the sensor is fully retractable inside the compression fitting.

An aluminum housing and protective rubber boot surrounding the display area make the FS10i suitable for installation in demanding IP 64/65/66 locations. The FS10i Flow Meter also carries global approvals: FM, FMC, ATEX, IECEx and EAC/TR CU (Div 2) and Zone 2/Zone 22 installations.

Conclusion

Thermal flow meters such as FCI's Model FS10i are ideal to perform compressed air audits, sub metering of compressed air and demand side monitoring, as well as cost allocation by measuring compressed air flow to points of usage. They can be installed in different locations throughout a plant for zone monitoring to provide area functional compressed air usage data.



Zone monitoring with FS10i Flow Meter and CALMS software (P/O)

The product engineers at CALMS Air have installed multiple FCI FS10i Flow Meters into various product lines sold to customers worldwide. They have been impressed with the accuracy, simplicity, dependability and versatility of this flow measurement solution and the way it allows their customers to maximize the operational efficiency, reliability and financial analysis of compressed air systems while also reducing their energy consumption and costs.