Panametrics

Application note

Moisture measurement in instrument air

Summary

The air we normally breath is utilized in industrial process and controls by compression from atmospheric pressure to 80 - 120 psig (5.5 – 8.3 bar). Instrument air is a safe and efficient means of providing power and motive force for pneumatic controls, machinery, motors, switch gear, tools, braking systems, valves, actuators, robotic systems and material transport systems. Compressed air is also used for cooling (vortex cooling) and to create a vacuum (eductors or venturi effect). It does not take a high concentration of water vapor in instrument air to completely shut down operations. To minimize down time and reduce maintenance costs due to excess water, Panametrics trace moisture instruments are used globally to continuously monitor and spot check and instrument air systems.

Application

When air is compressed the water vapor and contamination (particulate, oil mist, etc.) is concentrated. The water vapor concentration must be reduced to prevent liquid water in the instrument air system. Water accelerates corrosion and when mixed with oils and other contaminants can create blockages for small orifices used in pneumatic instruments and controls. Compressed air systems utilize a series filters, after-coolers, refrigerated air dryers and desiccant or membrane dryers to reduce the amount of water vapor to acceptable levels. Instrument air requirements specify that the dew point temperature be between -100 °F to -40 °F (-40 °C to -73 °C) dew point at the line pressure.

Benefits:

- Time proven & reliable sensors
- Sensor may be installed at line pressure
- Turnkey sample system: Just connect power and sample line

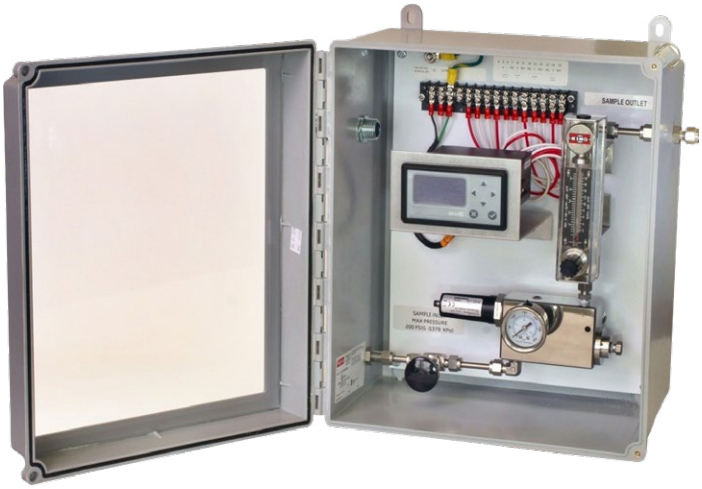
Application Specifications

- Range: -100 °F to 10 °F at line pressure (60 - 120 psig typical)
- Sample system for isolation, filtration, pressure and flow control
- Programable alarms
- Programable analog outputs

Challenge

There is substantial costs and energy consumption associated with drying instrument air. Panametrics dew point instruments are used to optimize the drying process such that dew point specifications are met while not over drying. Desiccant dryers consist of multiple columns filled with absorbent material (Silica Gel, Alumina, Molecular Sieve etc.). One column is online and other is regenerated by back purging with depressurized dry compressed air. To produce -40 °F (-40 °C) dew point approximately 15% of the dry compressed air is consumed for regeneration. To reduce the consumption of compressed air on larger desiccant dryers, the regeneration air is heated, or the column is heated internally to drive out absorbed moisture.

Dew point sensors are used for on-demand control of the regeneration process, thereby lowering energy cost versus using a timed cycle. Membrane dryers consume 15 - 20% of the dry compressed air they produce achieve dew points between -40 °F to -76 °F (-40 °C to -60 °C) and are often applied as point-of-use dryers.



Panametrics air.IQ

The solution

Panametrics has several options for both spot checking and continuously monitoring the dew point of instrument air. The aluminum oxide sensor is connected to an analyzer or integrated into a transmitter that provides local display and provides a 4 - 20mA signal to the plants data acquisition and control system. The sensor is installed in a sample system consisting of an isolation and flow control valves, filter, pressure gauge, and rotameter for flow indication. The air.IQ is a turnkey system where the sensor, meter, and sample conditioning components are assembled in an enclosure. The PM880 is a portable battery-operated analyzer equipped with a data logger making it ideal for spot checks and verification of instrument air systems.

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