Edgetech Instruments

Aluminum Oxide Moisture Transmitter Application Note

Application: Instrument Air

Application Description:

Instrument air, or compressed air, is a very common utility found in most manufacturing facilities. It can be used in any number of applications from the pnuematic-conveying of material, to pneumatic power tools, to actuated valve control, to a cooling medium, to a drying medium, and many more. Another term for instrument air, sometimes used synonymously, is “plant air”. However, in general, plant air is considered to be of lesser quality, generally dirtier, and not dried to reduce its humidity level.

Why Moisture Measurement is desired/required:

Moisture can be a major contaminant in instrument/compressed air. As mentioned above, plant air may have uses within a facility that do not require it to be of good quality. So, a plant air system may not be filtered to remove contaminants such as particulates or oils, and it may not be dried to reduce its moisture content. However, instrument air usually is both filtered and dried.

The detrimental effects of poor quality instrument air can manifest in various ways including:

- Corrosioin of equipment and piping systems
- Damage to manufacturing equipment
- Micro-organism growth
- Affect product quality

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Factors to Consider Effecting the Moisture Measurement:

Because dew/frost point is a function of the process pressure, the dew/frost point is commonly measured at one of two convenient pressure levels: process pressure or atmospheric pressure. For a given moisture content, the higher the process pressure, the wetter the dew/frost point. The factors normally used to assist with this decision are usually either that the dew/frost point at line/process pressure is required, so the dew/frost point measurement is accurate for the process line conditions, or the gas is allowed to expand (normally over a needle valve) to atomspheric pressure, allowing for dew/frost point readings that are always relative to atmospheric pressure. Also, atmospheric pressure dew/frost point allows for easier conversion to a parts per million (PPMv) measurement because the pressure never varies from atmospheric pressure. In other words, the PPMv calculation will always be based on atmospheric pressure.

Typical Application Conditions/Parameters:

ANSI/ISA–7.0.01–1996: Quality Standard for Instrument Air (Typical compressed air dryer types)

1) Regenerative desiccant dryers

A. Regeneration with Heaters

Flow Range: 0 - 50,000 SCFM @ 100°F at 100 psig

Outlet Dew/Frost Point Range at Line Pressure: -40°C (-40°F)

B. Regeneration without Heaters

Flow Range: 0 - 10,000 SCFM @ 100°F at 100 psig

Outlet Dew/Frost Point Range at Line Pressure: -40°C (-40°F)

2) Heat of compression dryers

A. Flow Range: 0 - 10,000 SCFM @ 300°F at 100 psig

Outlet Dew/Frost Point Range at Line Pressure: -18°C to 4°C (0°F to 40°F)

3) Refrigerant dryers

A. Flow Range: 0 - 5,000 SCFM @ 100°F at 100 psig

Outlet Dew Point Range at Line Pressure: 2°C to 4°C (35°F to 39°F)

B. Flow Range: 5,000 - 10,000 SCFM @ 100°F at 100 psig

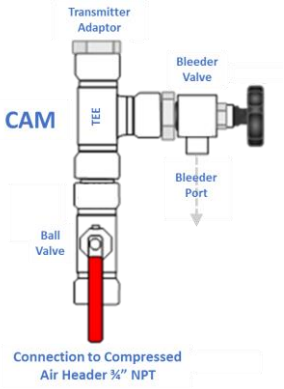
Outlet Dew Point Range at Line Pressure: 10°C (50°F)

Equipment Recommended:

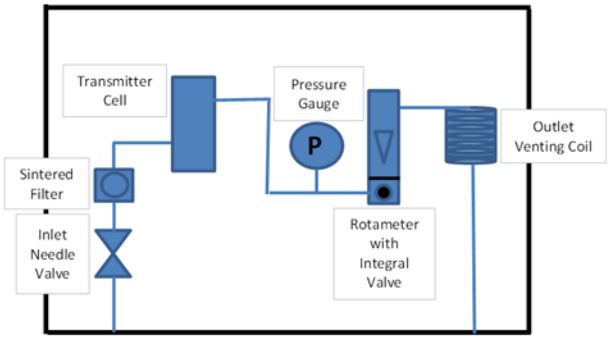
Product name and/or model number: AcuDew Moisture Transmitter

Potential Sample Systems depending on the conditions of the instrument air line:

A. No particulates/No entrained liquids: CAM (Compressed Air Module)



B. Particulates/No entrained liquids: Typical Sample System



C. Entrained Liquids/Particulates: Typical Sample System