

Pressure Sensors, Transmitters and Transducers

HVAC & REFRIGERATION

With an increased pricing on utilities, many homes and businesses are focusing efforts to reduce energy costs. Using pressure sensors to assist with monitoring pressure can aid in the selection of the type of power used (steam vs. electric) as well as monitor the efficiency of a device before it requires maintenance or replacement.

Government funding has also increased in order to help municipalities and businesses "go green" through energy reduction programs. Here are some notes on pressure sensor technology and its importance.

AMMONIA PRESSURE

Pressure sensors for ammonia and other HVAC/R applications require special attention to media compatibility and environmental conditions. Ammonia offers refrigeration pump and compressor manufacturers an improved efficiency over Freon based systems. However, the thermodynamic behavior of ammonia is very different from Freon. When the refrigeration pump turns on, the ammonia temperature rapidly changes from 100°F to -70°F or below. This accelerated change, along with the type of sensor diaphragm material affects the pressure transducer performance and ultimately the control system.



OTHER TECHNOLOGIES

O-ring sealed pressure sensors cannot withstand rapid thermal changes and over time the internal O-ring will fail. Fluid filled pressure sensors suffer from freezing effects. This causes a rupture of the thin diaphragm membrane, which is welded in place to hold in the silicone oil-fill.

Thin film sensors [based on 15-5 and 17-4PH stainless steels] that have their diaphragm welded to a pressure port, will undergo thermal stresses that will eventually crack the steel.

THE AST SOLUTION

Thermal Flash Protection™ is the technology applied by AST to reduce the effects of thermal flash transients when the media is Ammonia. First, AST utilizes its one-piece stainless steel sensing element with 316LSS wetted materials.

This element is free of welds, oil-fill and internal O-rings. Next, a special non-clogging port design is used in order to minimize the effects of extreme temperature change. The pressure sensor will recognize a uniform temperature as to maintain system stability. To conclude, **Thermal Flash Protection™** is the pressure sensing technology for ammonia refrigeration applications. This option can be added to a variety of pressure ports including 1/4" NPT male and 1/8" NPT male.



The three digit option code at the end of the model is "117." To combine with Sealed gauge reference, option code "165" can be offered. This option protects the pressure sensor against any moisture or condensation that can be caused when the sensor and the environment differ in temperature. Without this option, the pressure sensor can run the risk of shorting the electronics.





COMPOUND PRESSURE RANGE

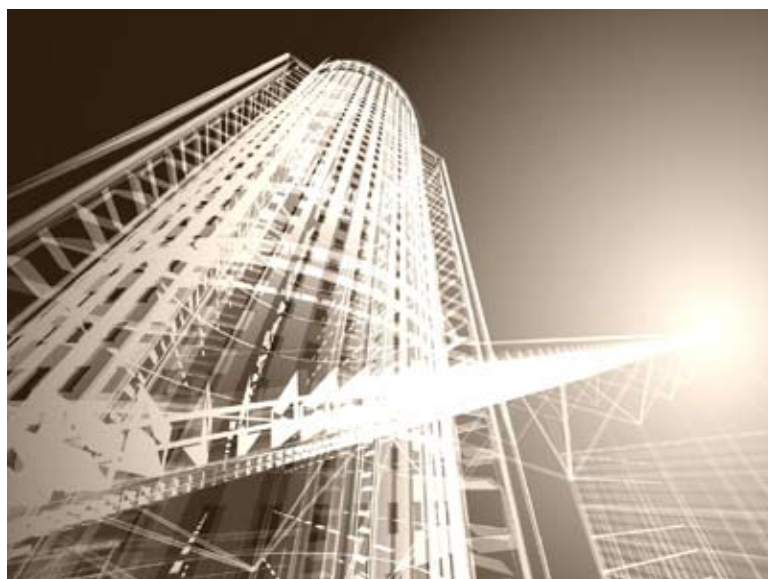
AST commonly packages its products, including the **AST4000** and **AST4300** series with a compound pressure range. The sensor is calibrated with a zero offset in order to measure vacuum. This feature is used in refrigeration applications to notify the user when a system has been evacuated. The first digit of the pressure range code is replaced with the letter "V."

One example of an AST4000 model would be:

- AST4000AV0100P4E1165
- AST4000
- 1/4" NPT Male pressure port
- -14.7 to 100 PSI
- 4-20mA output signal
- Mini-DIN43650C electrical connection
- 316L SS wetted materials

SCHRADER DEPRESSOR PIN

AST offers sensors for the refrigeration market by utilizing an SAE4 (7/16-20 UNF) female pressure port that contains an internal Schrader depressor pin. This port allows the sensor to be easily removed or installed in service, additionally eliminating the need for adaptors. The pressure port option is the letter "K" for the AST4000 series and the option code is "006." When combined with Sealed Gauge Reference, the option code "143."



BENEFITS

- One piece stainless steel construction - no internal seals or gaskets.
- High cyclical life (>100 million full cycles)
- Excellent long-term stability
- Compound ranges with linear output thru zero (i.e.: -14.7 to 100PSI, -14.7 to 500PSI)
- High level of EMI/RFI protection
- UL/cUL listed
- Hazardous area approvals for equipment installed in classified locations
- Pressure ports available: 1/8" NPT, 1/4" NPT, SAE4 male and female

APPLICATIONS

- Refrigeration Pump Controls
- Chillers
- Freon And Ammonia Cooling Systems
- High Pressure Wells
- Boiler Controller
- Environmental Testing

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