

## FIRST CSA-APPROVED I/P TRANSMITTER FOR USE WITH NATURAL GAS IN HAZARDOUS, REMOTE SITES

By Gus H. Elias



A major challenge that faces natural gas extraction and transport applications is that they are often located in extremely remote locations. Natural gas gathering stations, compressor stations, pipeline feed applications, and booster stations all involve the

operation of pneumatic control valve actuators that require a pneumatic supply for operation.

In most process plants, this is easily accomplished using readily available compressed plant air. However, at remote locations the air demand is not large enough to warrant the significant costs of installing, operating, and maintaining an on-site air compressor.

### Off-the-shelf I/Ps present safety concerns

The conventional answer is to use natural gas from the pipeline to provide the operating pressure the pneumatic valve's current-to-pressure (I/P) transmitter requires. The I/P transmitter (often called an I/P transducer or converter) converts an electrical signal, typically a 4-20 mA, from a DCS or PLC to a proportional pneumatic signal, such as 3-15 psig, for valve actuator control (Figure 1).

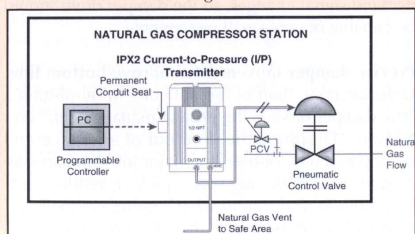


Figure 1. A current-to-pressure transmitter provides an interface between electronic control systems, such as a DCS or PLC, and a pneumatic control valve actuator.

While this appears to be a practical solution, it may pose serious hazards if the gases used for control leak through the off-the-shelf I/P transmitter's electrical fitting, or if the I/P's exhaust gases are improperly vented.

Off-the-shelf I/P transmitters are potentially dangerous because inappropriate seals on their wiring conduit can permit natural gas to migrate into the conduit, leak to atmosphere, or leak into non-hazardous areas where the presence of gas could cause a potential fire or explosion hazard.

Unfortunately, until now there was no other choice but to rely on I/P transmitters that were not technically designed and CSA-approved for use in hazardous-classified natural gas applications. This presents a liability problem, and worse, a potential serious safety problem.

### First I/P CSA-approved for natural gas

At the request of Syntech (Syndicated Technologies, an EnSource company), Moore Industries solved this predicament by developing the first I/P transmitter, model IPX2 (with the -NG option), that is CSA-approved to be used with natural gas as its pneumatic supply (Figure 2).

The I/P can be used with sweet



Figure 2. In addition to instrument air (shown), the IPX2 Current-to-Pressure Transmitter is the first unit to be CSA-approved for use with natural gas as its pneumatic supply.

natural gas - a type of gas that has low corrosive effects and consists of up to 20 ppm H<sub>2</sub>S.

CSA approvals allow the IPX2 to be installed in explosion-proof hazardous areas (Class I, II and III, Division I, Groups A through G) as well as intrinsically safe and non-incendive applications with IP66 and NEMA 4X environmental protection ratings. The company plans to acquire similar approvals with Factory Mutual (FM) and European (LCIE/ATEX) certification agencies.

Moore Industries' solution involves special conduit seal and gas venting methods. The nipple and seal assembly prevents natural gas from travelling into the electrical conduit or into the atmosphere. To accomplish this, the seal must be designed to prevent natural gas from migrating into the instrument's wiring conduit. This includes gas travelling through the small space between the copper wires and its insulation and escaping from the outside of the wires into the conduit. The seal must also prevent gas from escaping into the atmosphere from the conduit connection.

Most I/P transmitters have small, built-in vents that release the air that powers the unit into the atmosphere. In a natural gas application, such as one in an enclosed compressor station, this is (of course) unacceptable. The gas must be released into a safe area, often far away from the application. The IPX2 solves this problem by providing ports where piping can be connected to escort the explosive gases to an area where they can be safely vented as required.

The IPX2 Current-to-Pressure Transmitter comes in a rugged field-mount metal enclosure that stands up to installation in inhospitable field conditions. In addition to natural gas, available models handle standard instrument air supplies. The IPX2 offers 4-20 mA, 4-12 mA, and 12-20 mA inputs with 22 direct and reverse output choices including 3-15 psig, 15-3 psig, 0.2-1 bar, and 20-100 kPa.

For installation in harsh weather conditions, the IPX2 is rated to operate in very low and very high ambient conditions, between -40°C to 80°C (-40°F to 176°F). The IPX2 delivers accuracy of +/-0.25% of span, high air capability of 5.0 scfm, and excellent immunity to the harmful effects of RFI/EMI and vibration. Gus H. Elias is Moore Industries' Senior Certifications and Applications Engineer. His primary function is to obtain and maintain worldwide hazardous area and safety certifications for the company's complete lines of signal interface instruments.

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