



BAKER HUGHES BOLSTERS ITS HYDROGEN SENSOR PORTFOLIO

THREE NEW PRODUCTS EXPAND PANAMETRICS' GAS, FLOW, AND MOISTURE SENSOR LINEUP

BY BRENT HAIGHT

Panametrics, a Baker Hughes business, has launched three sensor technologies targeting hydrogen and other applications. The XMTcpro process gas analyzer (XMTcpro), HygroPro XP moisture transmitter (HygroPro XP), and T5MAX Transducer (T5MAX) join a fast-growing portfolio of gas, flow, and moisture sensor technologies from Panametrics.

"Building on the growing demand for greater levels of accuracy and reliability across critical measurements in hydrogen and other energy and industrial applications, Baker Hughes has several new Panametrics gas, flow, and moisture measurement solutions in the pipeline, including the three new solutions launched recently," said Colin Hehir, vice president of Panametrics.

XMTcpro

The XMTcpro is the successor of the XMTc, which has more than 10,000 installations over a wide range of industries and applications. The XMTcpro is a process gas analyzer that provides continuous measurements of percent-level concentrations of binary gas mixtures, such as hydrogen and oxygen or methane and carbon dioxide. "The XMTcpro uses the thermal conductivity of the measuring gas to determine its

concentration," said Hehir. "This property causes a temperature change in the temperature-stabilized thermistors, which are extremely stable and durable. The electronics then register a change in the electrical resistance and compensate for this by applying a voltage. This voltage is linearly related to the concentration of the measuring gas."

The XMTcpro has no moving parts, requires no consumables, and is immune to background gas fluctuations. "It can withstand extreme environments and is therefore ideal for long-term measurements and monitoring many processes. The integrated, high-contrast, and easy-to-read display with intuitive operation and digital communication capabilities round off the XMTcpro and make it an advanced and modern analyzer," said Hehir.

"With electrolyzer production increasing and manufacturers driving improved safety performance to ensure hydrogen and oxygen concentrations are below explosive limits, the XMTcpro provides customers with advanced levels of reliability and accuracy when monitoring gas concentration," continued Hehir. "Featuring real-time error detection and enhanced signal measurement for fast response in a thermal conductivity-based binary gas analyzer, the Safety Integrity

Level (SIL)-certified XMTcpro is contamination-resistant by design, requiring minimal maintenance. This makes it ideal for widescale adoption across harsh-environment, industrial applications."

HygroPro XP

The HygroPro XP is an explosion-proof aluminum oxide moisture transmitter that measures moisture concentration in gases and nonaqueous liquids from trace to ambient levels. The HygroPro XP sensor consists of a porous oxide layer with a very thin metal coating. Water vapor rapidly equilibrates on the pore walls of the oxide layer. The number of water molecules adsorbed on the oxide structure determines the conductivity of the pore walls, which in turn is functionally related to the water vapor pressure expressed as water dewpoint, PPMv, PPMw, etc. The HygroPro XP measures moisture concentration in gases and nonaqueous liquids in natural gas, petrochemical, refinery, hydrogen, industrial gas, and power generation applications.

"Designed to protect customers from the product quality related impact of the presence of trace moisture across oil and gas and industrial applications, the HygroPro XP can quickly and accurately measure moisture in gases and hydrocarbon liquids across a wide dew point range," said Hehir. "This loop-powered transmitter features a compact explosion-proof enclosure, live temperature and pressure sensors, and HART communication enabling connection between intelligent field

instruments. The HygroPro XP can be used across hydrogen transportation, storage, end use, and production applications, including accurately measuring trace moisture in electrolyzer production."

T5MAX TRANSDUCER

"This new transducer generation works when pairing with another transducer that alternatively transmits and receives ultrasonic pulses, as per the ultrasonic transit time technique. The time difference between the sound going with the flow and the one going against the flow is directly proportional to the flow velocity of the measured medium into a pipe," said Hehir. "That is the theory. In practice, field applications may face additional challenges, such as attenuation coming from carbene dioxide, wide speed of sound changes with hydrogen, flow distortions generating noise and consequently reducing the transducers' signal to noise ratio (SNR), etc. The new T5MAX transducers offer a much stronger SNR, enabling customers to use it in applications where the previous generation required a reduced path length to accommodate these difficult conditions."

According to Hehir, with energy and industrial sectors driving greater pipeline efficiency and productivity, the T5MAX Transducer's enhanced signal strength enables a step change in ultrasonic flow meter performance across challenging gas flow measurement applications, including hydrogen. "In low-flow rate applications, where accurate measurements are difficult to capture, the stronger signal provides customers with a longer flow path length, and therefore greater accuracy," said Hehir. "Customers following the World Bank GFMR (Global Flaring and Methane Reduction) guidelines are already placing advance orders to adhere to zero routine flaring standards, resulting in extremely low flow rates."

Panametrics tested the T5MAX Transducer on its in-house air calibration loop with its first prototypes and pre-series units. Those tests were successful. "We then brought the T5MAX to external ISO 17025 air calibration facilities with larger flow rates and high velocities to confirm performance," said Hehir. "We finally ran some static tests with pure hydrogen and pure carbon dioxide to make our final technical assessment prior to field testing on a flare line and a couple of other less challenging applications. After this successful field testing in the energy industry, we launched the T5MAX to the market."

APPLICATIONS

Baker Hughes' products and services touch the entire hydrogen value chain, from production to transportation and utilization. The company's portfolio includes advanced compressors, gas turbines, valves, centrifugal pumps, non-metallic pipes, hydrogen sensors, monitoring and diagnostics including inspection solutions for hydrogen embrittlement in production and storage, as well as clean power solutions to produce power with hydrogen and hydrogen blends.

Panametrics' offerings include ten analyzer systems that measure moisture, oxygen, and hydrogen and 15 measurement systems for liquid, steam, flare, and gas flow. Panametrics' new measurement sensor technologies can be deployed in sectors including hydrogen, oil and gas, metals, chemicals, biogas, power generation, and carbon capture, utilization, and storage. 