

Sensors and meters compliant to CiA 443



Campon's PIG detector (left) and sand monitor (right)

SEVERAL COMPANIES HAVE IMPLEMENTED THE CiA 443 CANopen profile for subsea equipment, also known as SIIS level-2 devices. This includes simple sensors, complex meters as well as valves. Clampon (Norway) for example has proven its acoustic sand and vibration monitor during the second SIIS level-2 plug-fest. The company also offers a PIG detector with CANopen interface compliant to CiA 443.

Siemens has acquired Matre, a manufacturer of pressure and temperature sensors. The transducers provide CANopen interfaces since many years. First the Norwegian company has implemented a generic CANopen device profile (CiA 404), today they support also SIIS level-2 connectivity. The engineers participated from the beginning in the CiA 443 development.

[Siemens goes subsea \(read on\)](#)

Also General Electric (GE) is interested in the subsea business. Besides its own GE Measurement & Control division and the acquired Vetco Gray Controls, the US enterprise owns since August 2012 Presens (Norway), a provider of pressure, temperature and flow measurement solutions for subsea applications. The company also offers CiA 443 compatible devices. GE has also acquired Naxys (Norway) in order to strengthen its presence in North Europe. The Norwegian daughter develops and supplies leak detection and condition monitoring sensors. GE Measurement & Control has developed the PTX 400 series of pressure, temperature, and combined pressure/temperature transmitters. They are designed for long term use in subsea locations and are compliant with CiA 443. The products utilize micro-machined piezo resistive silicon pressure measuring technology proofed by GE Druck for 30 years. In addition, temperature measurement capability is provided by an integrated platinum resistance type sensor.

Weatherford has developed several instruments supporting SIIS level-2 communication. The US-company offers for example a CiA 443 subsea water-cut meter, which is rated for 1000-bar pressures and temperature up to 250 °F. The Red Eye meter operates on the principle of near-infrared absorption, in which water is more than 100000 times more absorbent than the other pipeline constituents at select wavelength bands. This contributes to very sensitive water detection that is independent of salinity such that no corrections are necessary. The most used sensor types in subsea production and control systems are pressure and temperature sensors. Besides Matre and Presens, also Paine (USA) offers CiA 443 compliant transducers. The Digital Subsea CANopen series compensate effects of temperature and non-linearity.



Weatherford's Red Eye water-cut meter



TPT SIIS-L2 pressure and temperature transmitter by Transcontrol

Transcontrol's (Brazil) TPT SIIS-L2 is also a subsea pressure and temperature transmitter that combines the company's experienced mechanical design, expertise in sensor featuring CANopen connectivity. After 44 years in the market, the company has deployed more than a thousand subsea sensors. The application of the TPT SIIS-L2 is to perform pressure and temperature measurements while attached to wet Christmas Trees or manifolds on the seabed. The transducers are able to transmit up to ten TPDOs per second containing updated pressure and temperature data. Other features include remote firmware upgrade, digital filter control for faster or increased accuracy measurements. The product is in the final phase of the qualification process. Internal qualification has already been finished, including the CANopen conformance test in the company's laboratory. During February 2013 the official CANopen conformance test will be performed at CiA facility. Skoflow (USA) is currently the only supplier of subsea chemical injection valves with a

CANopen SIIS level-2 interface. The CiA 443 compliant L-series can work 3 km below the sea level. The flow ranges from a minimum of 0,3 l/h to 200 l/h.

The Seastream Flocalculator meters by Solartron (UK) provide a direct flow measurement output. They are designed particularly for single-phase subsea metering, which are suitable for applications such as gas lifting and injection as well as water and inhibitor injection. The products' interoperability was evaluated during the second SIIS plug-fest. They feature CiA 443 connectivity supporting boat-loader functionality and ISO 11898-3 (fault-tolerant) transceivers. A simulator for SCM testing is available. Each meter is designed for a unique project application to suit individual operator specifications. The meter can be customized for example regarding the used temperature correction and actual fluid density method. Also the polynomial coefficients and meter calibration data are application-specific. All are configurable using off-the-shelf CANopen network software.



Integrated flow meter by Solartron