

ClampOn Subsea Flow Temperature Monitor

DIGITAL SIGNAL PROCESSING



Subsea Flow Temperature Monitor

ADVANTAGES

- **Non-intrusive**
- **Retrofittable**
- **Very long lifetime**
- **ROV retrievable**
- **Early detection**
- **Safe operation**
- **no impact on production**
- **Can be used as add-on to sand/pig/vibration/CEM sensors**

BACKGROUND

The ClampOn Subsea Flow Temperature Monitor is a non-intrusive instrument that calculates and monitors the temperature of the flow medium from outside the pipe.

The ClampOn Subsea Flow Temperature Monitor can be used

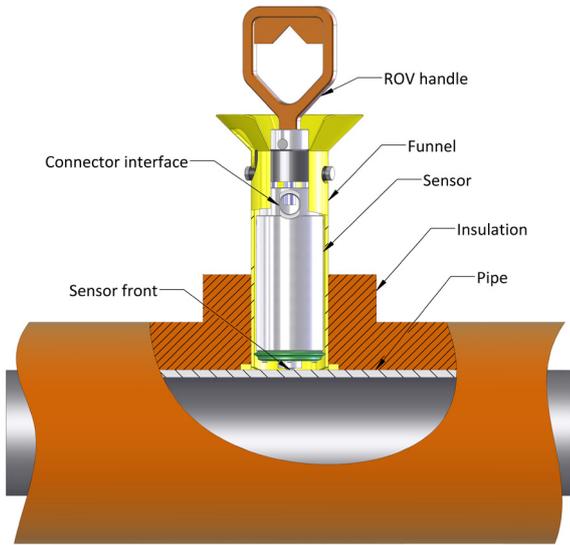
as a standalone temperature sensor. The instrument can be retrofitted to existing installations, for example to replace broken intrusive sensors. It can also be integrated into ClampOn's range of Compact sensors to provide temperature measurement alongside sand monitoring, pig detection, vibration monitoring or leak detection.

WORKING PRINCIPLE

The sensor calculates flow temperature by measuring the pipe skin temperature underneath insulation and using algorithms to compensate for ambient temperature and the insulation coefficient. On projects where the pipeline is not insulated,

a section of pipe approximately 60 cm upstream and downstream of the sensor must be insulated to provide stable conditions around the sensor. The instrument communicates over RS485 Modbus or Canbus using CANopen SIIIS Level 2.

The ClampOn subsea flow temperature sensor utilizes our well-established DSP subsea hardware platform. This platform has been in operation for more than 20 years and is built into more than 4000 subsea sand monitors, pig detectors, leak monitors and vibration monitors installed world wide.



ClampOn non-intrusive temperature sensor under insulation

INSTALLATION

The ClampOn Subsea Flow Temperature Monitor is easy to install and operate. It's non-intrusive design and clever clamp-on fixtures makes it an effortless job to install, both at yard and in the field for retrofit systems. Permanent subsea installation is normally done by the

subsea EPC contractor, but retrofit or non-permanent solutions are available for ROV or diver installation. Once a ClampOn system is installed, it requires very little maintenance. It's all about taking value from the data and information it provides!

CLAMPON'S SUBSEA PHILOSOPHY

Subsea operating conditions, and in particular deepwater environments, demand technical solutions that combine flexibility with high performance and extremely long service life. To ensure our instruments meets all industry requirements within safety, lifetime and performance.

The Subsea sensor is designed with:

- * 1atm. Electronics chamber
- * EB welding (no gasket or seals)
- * Titanium body
- * Glas-metal penetrator
- * 5th generation ClampOn DSP



ClampOn Subsea Flow Temperature Monitor

KEY SPECIFICATIONS

- | | |
|--------------------------|--|
| • Method of installation | Non-intrusive, clamped to pipe surface |
| • Temperature range | - 40 °C to +150 °C |
| • Uncertainty | ± 0.5 °C |
| • Weight | 7 kg air / 5 kg water |
| • Interface options | RS485: Modbus, Canbus - CANOpen SIISL2 |
| • Housing material | Titanium |
| • Max water depth | 3048 meters (10000ft) |
| • House/jumper interface | Bennex or ODI / jumper or bulkhead |
| • Power Supply | 12-28VDC, 1.2W |
| • Flow conditions | Oil, water, gas, multiphase |

Sensor is qualified to API17F 4th edition and ISO 13628-6, and rated TRL 7

All specifications are subject to change without notice



ULTRASONIC INTELLIGENT SENSORS

Norway: ClampOn AS, Vaagsgaten 10, NO-5160 Laksevaag, Bergen, Norway, Phone: +47 5594 8850, e-mail: mail@clampon.com

USA: ClampOn, Inc., 15720 Park Row, Ste. 300 (77084), Houston, TX, USA, Phone: +1 281 492 9805, email: infoinc@clampon.com

www.clampon.com