

# ClampOn DSP Leak Monitor

DIGITAL SIGNAL PROCESSING



*ClampOn DSP Leak Monitor Ex ia version.*

## ADVANTAGES

- **Easy to install**
- **Non-intrusive**
- **Real time measurement**
- **Retrofit-installable with no prod. shutdown**

## BACKGROUND

A leak in an oil or gas flow line is a highly dangerous situation – upstream as well as downstream, so it is extremely important for the operator to be warned about any leak immediately should it occur. A leak in a flow line, valve, flange or any other component can compromise safety and may also lead to a shutdown at the production stage or down-stream at a refinery or terminal. A product leak normally has a very low flow-rate, which is determined by the size of the defect, the properties of the fluid and the pressure differential. The ClampOn

DSP Leak Monitor has been developed with the aim of offering a product that can quantify a leak through a closed valve. Reasons for installing a ClampOn DSP Leak Monitor are plentiful:

- Reduced loss to flare
- Monitoring of internal valve leak rate
- Improved maintenance planning
- Prevention of leak to atmosphere

## OPERATING PRINCIPLE

The basic theory is that a leak creates a very high-frequency noise that can be monitored by an ultrasonic sensor. In a «non-leak» situation the ultrasonic pattern will be stable, but when a leak occurs the signature will change drastically. The ClampOn DSP Leak Monitor is based on the ClampOn Ultrasonic Intelligent Sensor technology platform. The instrument's ability to monitor signal at multiple frequency, combined with extreme sensitivity enables it to distin-



*Subsea version of the ClampOn DSP Leak Monitor.*

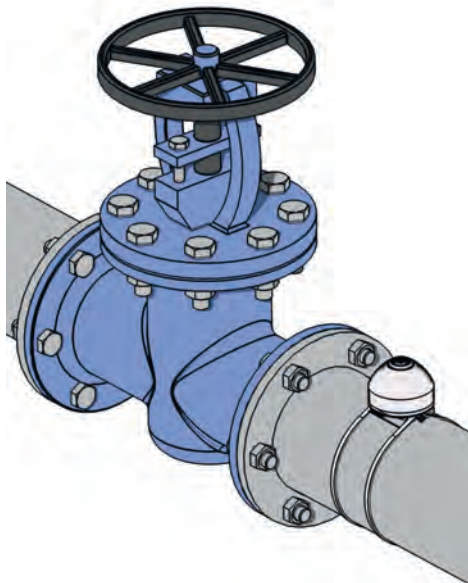
guish and eliminates background noise unrelated to leakages so that the “hiss” from a leak can be monitored and the operator warned when a leak is present. The ClampOn DSP Leak Monitor detects small and medium leaks or flow-throughs, even with low differential pressure over the measuring point on pipes and valves.

## INSTALLATION

The ClampOn DSP Leak Monitor, based on our patented Ultrasonic Intelligent Sensor technology, is available in topside and subsea versions. The sensor is easy to install and operate. It's non-intrusive design and clever clamp-on mounting fixtures makes it an effortless job to install, both at yard and in the field for retrofit systems. Installation point is on or next to the area/valve of interest.

The sensor body is made from of stainless steel for topside units and titanium for subsea units, and is clamped to the location (valve, flange or pipe) to be monitored. The topside units are certified to Ex ia IIB, or Ex d IIC, pipe wall temperatures from -40 to +225 oC (437 oF). An unlimited number of sensors can be connected to a single computer for real-time measurements.

The signal from the sensors can be interfaced directly with any type of Main Control System, and can even communicate as a ModBus Slave with any ModBus Master unit.



Placement of sensor; on the valve itself or as close as possible on the pipe.



Data from the sensor can be displayed on PC or interfaced with control system.

## KEY SPECIFICATIONS

- |                              |  |
|------------------------------|--|
| • Method of operation        | Passive acoustics (ultrasonic)   |
| • Processing                 | Intelligent DSP electronics inside sensor unit   |
| • Method of installation     | Non-intrusive, clamped to pipe surface   |
| • Minimum detectable leakage | Gas: dP>1 bar, min. leakage rate 0.1 l/min<br>Liquid: dP>3 bar, min. leakage rate 0.1 l/min<br>(depending on delta pressure [dP] over the leakage point) |
| • Repeatability              | Better than 1%   |
| • Interface options          | RS485 (ASCII, binary, ModBus RTU), 4-20mA Yes  |
| • Two-way communication      | Yes  |
| • Software upgrading         | Yes  |
| • Ambient temperature        | -50 °C ≤ T <sub>amb</sub> ≤ +85 °C   |
| • Flow regimes               | Oil, gas, water, multiphase  |
| • Diagnostic features        | Intelligent "health check"   |
| • Ingress protection         | IP66/IP68 (1 meter for 24 hours) in accordance with IEC 60529  |
| • Housing material           | Stainless Steel 316L   |
| • Dimensions/Weight          | 112 mm x 132mm [4.4 in x 5.2 in]   |
| • Ex approval                | Ex d   |
| • Power Consumption          | Typical 1.2 W @24 VDC  |



ULTRASONIC INTELLIGENT SENSORS

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