

# *SandAlert*

## Non-invasive sand-in-oil monitoring systems

- Optimise production rates
- Assess damage to pipes and valves
- Help determine most effective control method
- Suitable for multi-phase flows

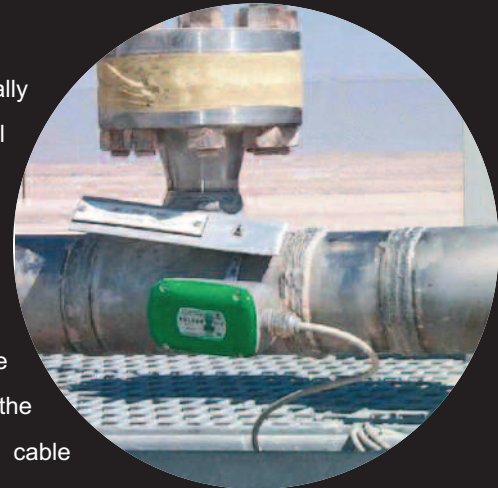
**PULSAR**  
Process Measurement

## Non-invasive sand in oil monitoring

Pulsar's range of sand monitoring equipment features a tough, intrinsically safe sensor mounted on the **outside of the pipeline** immediately after or on a bend and linked to the SandAlert control unit where the flow is displayed in real time. A simple and convenient solution to the challenge of monitoring sand content within oil pipelines, even with a multi-phase flow. All Pulsar SandAlert systems make use of an acoustic technique for determining changes in the pipeline flow characteristics that indicate the presence of sand. The key to the success of the Pulsar approach is simplicity in principle and rigorous sophistication in practice, using acoustic analysis techniques developed over many years. A number of options are available for the configuration of this control unit depending whether a fixed or portable installation is required and the desired information flow. The output signal may be calibrated to a mass flow measurement.

## Sand sensor

The unique acoustic sensor that forms the "ears" of the Pulsar system is an intrinsically safe unit (ATEX EEx ia IIC T4) made from 316 stainless steel with environmental protection to IP68. SandAlert is flexible for a wide variety of different applications, and installation could not be simpler: the sand sensor is connected to the outside of the pipeline with a stainless steel band, detecting changes in the acoustic signature of flow within the pipe and converting that into a sand/solids impact rate. Because the sensor monitors only a narrow frequency band, it is highly resistant to interference from background noise, fluid or gas flow. Any pipe diameter is suitable and the SandAlert may be positioned up to 1000m away using a standard instrument cable connection.



## Easy to operate

SandAlert is simple to operate, and requires no calibration to the flow rate. As soon as the sensor is clamped to the outside of the pipe it provides a measurement of flow rate. Because the system is not affected by flow rate it is particularly suitable for multi-phase flows.

Pulsar has developed sophisticated software algorithms that analyse complex acoustic waveforms automatically. Alarms are generated at user-defined levels of sand production and a milliamp output proportional to sand flow levels is produced. Communications capability via RS485 Modbus is included.

By calibrating the signal against known sand flow levels an a measurement of sand flow within the pipeline can be derived.



## An array of options

To suit your application Pulsar's SandAlert controllers are available in several formats. Whether the installation stands alone as either a wall or 19" rack mount, is part of a control panel, or fits into a site control system, there is a SandAlert controller designed for the task.

The modular approach taken by Pulsar means that single and multi-point installations can be conveniently constructed around a common operating and programming protocol. In all cases a 4-20mA output is provided proportional to solids production and three volt-free contacts allow you to generate alarm or control signals.

SandAlert control units should be mounted in a safe area and a suitable Zener barrier installed. SandAlert may be supplied by Pulsar with an I.S. barrier or customer can supply their own.



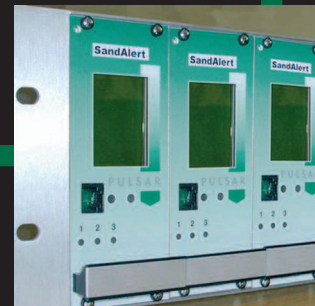
SandAlert in its Wall Mount format is typically used in single point fixed and semi-permanent installations. This version features a polycarbonate enclosure to IP65. Programming the unit is simple using the integral membrane keypad or via RS232 connection from a PC.

The display is back-lit with a numeric and bar graph display of sand production.

Can be supplied with suitable internal I.S. barrier or left for customer to fit their preferred barrier.



In panel mount guise, SandAlert is designed for mounting on a control panel where front panel space may be at a premium. All wiring is conveniently accessible from the rear of the panel mount enclosure and the electronics may be removed without disturbing the wiring connections or compromising the safety or integrity of the installation. Programming is via the optional Pulsar hand-held infra red programmer or RS232 PC link.



The 19" rack mounted version of the SandAlert lends itself perfectly to multipoint installation. Each unit is 3U high and 10HP wide and features a back-lit LCD display showing a bar graph and an instant readout of sand mass.

programming is again via a PC RS232 link or an optional infra-red hand held programmer.

## Sand Sensor

Type:	Acoustic intrinsically safe flow switch
Power supply:	24Vdc, protected by suitable IS barrier
Output:	0-5Vdc, coupled
Cable:	4 core cable with overall screen, wired to sensor terminals
Flammable atmosphere:	ATEX EEx ia IIC T6 or EExia IIC T4 for ambient temp to 92°C
IP rating:	IP68
Housing:	Type 316 stainless steel
Operating temperature:	-20°C to 120°C (200°C with heat shunt fitted)
Weight:	1Kg nominal
Dimensions	H 70mm x D 65mm x L 118mm

## SandAlert controllers - common features

Electrical supply:	110/240Vac 50/60Hz and 24Vdc. Power consumption 10W.
Temperature range:	-20°C to +60°C (electronics)
CE Approval:	EMC approval to BS EN50081-1:1992 for emissions and BS EN50082-2:1995 for immunity. BS EN61010-1:1993 for low voltage directive
Flammable atmosphere:	Safe area
Outputs:	Analogue: 4-20mA/0-20mA into 500Ω (user programmable and adjustable) 0.1% resolution. Digital: RS232 via RJ11 port Relays: 3 Form "C" SPDT rated at 5A at 240V. Trip point from 0-100% of range Comms: RS485 Modbus protocol

## SandAlert controllers - variants

Wall mount:	Dimensions - 240 x 184 x 118mm; weight - nominal 1Kg; case material - polycarbonate, flame resistant to UL94 V2; ingress protection - IP65; weight - nominal 1Kg
Panel mount:	Dimensions - 72 x 144 x 176mm deep; optional ingress protection - IP65; weight - nominal 1Kg
Rack mount:	Dimensions - 3U high x 10HP wide (128.5 x 50 x 160mm depth); weight - nominal 1Kg

Our policy is one of constant development and improvement. Pulsar reserves the right to amend technical details as necessary.

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