Product Guide

Level and Flow Measurement

Flow Pulse

pulsar®
PROCESS MEASUREMENT

Flow Pulse®:

Unique, non-invasive clamp-on flow monitor

Features

- Non-invasive, clamp-on
- Simple installation, no service interruption
- Use on all common pipe types, measures through corrugated or corroded pipes
- 4-20mA output
- Modbus RTU
- Self-contained, no external controller required to operate
- ATEX approval pending
- 2 versions depending on pipe diameter
- FM/FMC approval pending

Easily installed and simple to set up, Flow Pulse® uses an acoustic technique never before seen in flow monitoring to deliver reliable results across an amazing range of pipe materials and sizes. At a fraction of the installation cost of an equivalent magflow meter, Flow Pulse delivers repeatable flow monitoring.

Amazing new flow monitoring technology

Flow Pulse® is a major leap forward in flow measurement - no need to break into a pipe, or to get anycivils involved, just clamp a small sensor to the out-side of a pipe and get reliable, repeatable flow moni-toring straight away.

Virtually no installation costs, no interruption to service, clean and simple. Flow Pulse is simply fixed in place by a band (tools required = one screwdriver). A silicone coupling pad makes sure that the Flow Pulse makes a good acoustic contact to the pipe.

Flow Pulse uses a novel spread spectrum analysis technique never before used in flow monitoring. It incorporates a radical new Digital Signal Processing (DSP) approach that gives exceptional repeatability.

Flow Pulse produces a wide ultrasonic beam that is refracted by the pipe wall, as well as reflected by suspended particles in the flowing media.

Ultrasound is fired through the pipe wall at 90 degrees to the flow via a tangentially mounted high-output ceramic, then refracted at angles across the axis of the flow and subsequently reflected from bubbles, particles and vortices in all directions and at a wide range of frequencies. The wide, refracted, ultrasonic beam maximises the ultrasound energy captured from flowing particles. These multiple reflections are received back into the unit via a second high performance ceramic.

The returned signal is analysed using Flow Pulse's Refracted Spread Spectrum Analysis (RSSA) digital signal processing platform to derive flow information. RSSA analyses and integrates the received signals over a wide frequency range, then slices them for real-time analysis and flow rate calculation.

The digital platform also offers robust performance in the repeatability of measurement, as well as the flexibility to adapt to application requirement. For example, features such as damping and response time can be easily customised to suit.

Flow Pulse operates in a flow range from as little as 0.3m/s through to 4m/s (1 - 13 ft/sec), with a minimum particle size of 100μ and concentration of 200ppm or above (the equivalent of hard water).

Pipe material can be rigid plastic, stainless steel, mild steel or cast iron. Corrugated pipe is not an issue, and, as long as the silicone pad can fill in the irregularities, light corrosion will also give a good result.

Flow Pulse provides typical repeatability of ±5%.

Flow Pulse is a flow monitor not a flow meter and, while accuracy in some areas is excellent, accuracy results are both application and installation dependent.

SIMPLE INSTALLATION, MONITORING PUMP PERFORMANCE IN TWO-PUMP SEWAGE PUMPING STATION

RSSA - Developed

Pulsar have introduced two major innovations with the launch of Flow Pulse - firstly, of course, that the system is non-invasive, and secondly the new way that the mass of flow data is analysed. Pulsar call it Refracted Spread Spectrum Analysis (RSSA).

RSSA builds on Pulsar's track record of excellence in acoustic digital signal processing. Pulsar's non-contacting ultrasonic level and open channel flow measurement equipment has revolutionised the way that process and utility engineers view that technology, in large part down to the DATEM echo processing software on board. Similarly, Sludge Finder brought Pulsar's technical expertise to bear on the challenge of accurately and reliably measuring sludge blanket interface levels

Options and Outputs:

Flow Pulse® operates as a stand-alone device, requiring 18-28VDC. It includes 1 volt-free programmable relay, provides scalable 4-20mA proportional to flow and connects to a PC via RS232 (see software below).

Optionally, Flow Pulse can interface directly with a dedicated wall mounted device, Flow Monitor, which can be either AC or DC supplied, providing the power and interface for the Flow Pulse via a 4-core cable.

Flow Monitor expands the capability of Flow Pulse, providing two relays that can be programmed as alarm (relay 1) or control (relay 2) for flow or velocity. Either relay can alternatively be programmed as a totaliser.

Flow Monitor also provides a mA output and on-board logging, including a daily total. Typical capacity is 36 days flow logging at 1 minute intervals (using optional logging software).

Flow Monitor has an LCD display of flow rate and flow velocity (selectable), and is menu-programmable via a set of function keys.

Features
Flow Monitor

- Power for Flow Pulse® 22-28V DC & Universal AC 85-264V

- Display for flow/velocity from single Flow Pulse Controller

- Setup of Flow Pulse sensor

- Two programmable relays for control and alarm

- mA Output of flow or velocity

- Daily and system / resettable totalisers

- Logging, setup and download via Optional Log Software

OPTIONAL FLOW MONITOR POWERS FLOW PULSE AND PROVIDES PROGRAMMING, ALARM AND FLOW LOGGING EXPANSION

TOOLS NEEDED TO FIX FLOW PULSE IN PLACE: 1 SCREWDRIVER

Software:

To accompany Flow Pulse®, Pulsar have introduced Flow Pulse PC, software to control, set up and monitor Flow Pulse.

From here, users can see at a glance the flow rate in units of their choice, the application can be monitored in terms of signal strength and confidence, and the raw signal can be seen. The RS232 Modbus connection allows the Flow Pulse to be set up through an intuitive and straightforward set of parameters, while real-time flow information can be read and recorded.
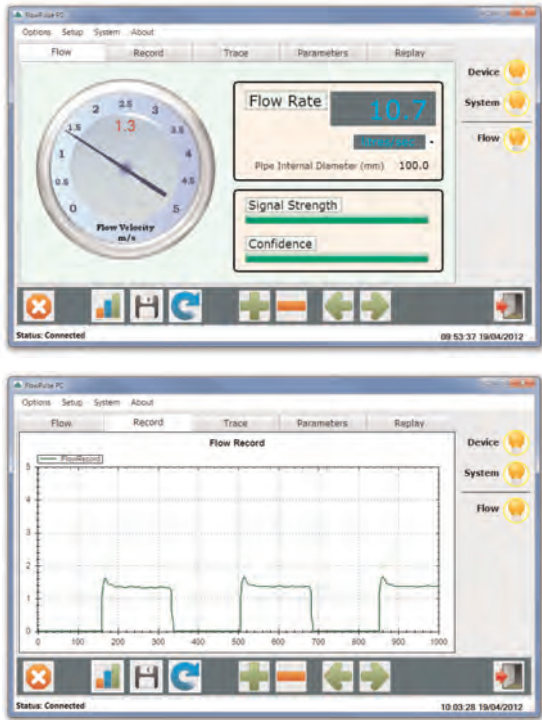
Flow Pulse is simplicity itself to set up. All that is required once Flow Pulse is in position and powered is to provide the internal diameter. The rest of the set-up process is all about options and the way that the information is presented and recorded, especially if multi-drop Modbus RTU is in use.

'Signal Strength' (see screen shot opposite) is a measurement of the total strength of the returning echoes from the interior of the pipe. 'Confidence' is, as the term suggests, a measurement of how sure Flow Pulse is of the measurement and is an indication of the consistency of the flow rate. Confidence will increase the longer flow continues.

Flow Pulse PC is free-issued with Flow Pulse and requires no further licensing or equipment to run, other than an RS232 cable (available from Pulsar if required).

THE MAIN FLOW SCREEN GIVES 'AT A GLANCE' DISPLAY OF THE CURRENT FLOW RATE, WITH UNITS SELECTABLE.

THIS SCREEN SHOT SHOWS A TYPICAL FLOW PULSE RECORD, WITH THE CHARACTERISTIC FLAT-TOP FLOW PATTERN.

Technical Specification: Flow Monitor

PHYSICAL:	
Wall Mount	
Outside dimensions:	130 x 150 x 63.5mm (5.12 x 5.9 x 2.5in)
Weight:	Nominal 0.65kg (1.4lbs)
Enclosure material/description:	ABS base with Polycarbonate lid flammability rating UL94HB
Cable entry detail:	Underside fitted with 3 x M20, nylon cable glands suitable for 6-12mm (0.24-0.47in) cable.
Sensor cable extensions:	5-core screened
Maximum separation:	500m (1640ft)
ENVIRONMENTAL:	
IP Rating (Wall):	IP66/67
Max. & min. temperature (electronics):	-20°C to +50°C (-4°F to +122°F)
CE approval:	See the CE certificate in the manual. Available from www.pulsar-pm.com
PERFORMANCE:	
Max. range:	4m/s (13.12 feet/sec)
Min. range:	0.3m/s (1 foot/sec)
OUTPUTS:	
Analogue output:	Isolated active output (passive output optional) of 4-20mA or 0-20mA into 1KΩ (user programmable and adjustable) 0.1% resolution
Display:	2 x 12 alpha numeric
Serial port:	RS232 for programming and data extraction
Volt free contacts, number and rating	2 form "C" (SPDT) rated at 2A at 240V AC
PROGRAMMING:	
Onboard programming (standard):	By integral keypad
Logging Capacity:	256KB. Total logged period is dependent on the amount of information required to be data logged. Examples: Monitoring level and temperature every 15 minutes, memory capacity 546 days. Monitoring level, temperatures and echo strength every 5mins, memory capacity 182 days.
Remote programming (optional):	Via RS232 using optional hand held calibrator
Programming security:	Via passcode (user selectable and adjustable)
Programmed data integrity:	Via non-volatile RAM
SUPPLY:	
Power supply:	85-264V ac 50/60 Hz, 22-28V dc, 10W max. power (typically 8W)

Technical Specification: Flow Pulse®

PHYSICAL:	
Outside dimensions:	120 x 65 x 65mm (4.75 x 2.6 x 2.6in)
Weight:	Nominal 1.5kg (3.3lbs)
Case material:	Type 316 stainless steel casting
Maximum cable length:	500m (1640ft) (minimum of 22VDC supply @ 500m)
Cable entry:	1x M20 x 1.5mm gland

ENVIRONMENTAL:	
IP rating:	IP68
Max. and min. temperature:	-20°C to +70°C (-4°F to 158°F)
CE/EMC approval:	See the CE certificate in the manual. Available from www.pulsar-pm.com.
Power supply:	18-28 VDC, 125mA

APPLICATION:	
Repeatability:	±5% typical subject to installation and pipe conditions
Pipe diameter:	30mm to 350mm (1.2 to 14 inch) (version 1) 30mm to 1250mm (1.2 to 49.2 inch) (version 2)
Velocity range:	0.3m/s to 4m/s (1-13 feet/sec) (high speed version available up to 10m/s)
Minimum particle size:	>100μ
Minimum particle concentration:	>200ppm
Pipe wall thickness	Metal or rigid pipe up to 20mm (0.8 inch) thick
Installation:	By means of a banding strap, using a silicone coupling pad applied to the base of the sensor and on the pipe.

ECHO PROCESSING:	
Echo processing:	RSSA Digital Signal Processing

INPUT/OUTPUT:	
Volt free contact:	1 volt free programmable relay
Analogue output:	4-20mA scalable
Digital communications:	RS232 and RS485 Modbus RTU
PC software:	Flow Pulse PC included

120 mm (4.7")
65 mm (2.56")
65mm (2.56")
47mm (1.85")
12mm SLOT FOR BANDING (0.47")
M20 THREAD FOR GLAND

Flow Pulse® is a registered trademark of Pulsar Process Measurement Ltd in the USA.