HARDWARE

FLOWSHARK® PULSE

For Open Channels

The FlowShark® Pulse for Open Channels from ADS® is a high performance liquid flow monitor for use in open channels of virtually any shape. It is designed for high accuracy and reliability, utilizing the most advanced velocity measurement technology available – gated cross correlation with digital pattern detection. Ease-of-use is also a design priority. Programming can be done completely on the built-in backlit display and data can be viewed and manipulated with any software that can read text files, such as Microsoft® Excel®.

FlowShark Pulse Features

- Profiling sensor measures average velocity by integrating up to 16 discrete point velocities in every sample
- Suitable for unusual or dynamic velocity profiles
- One analog input, 2 analog outputs, and 2 relays
- Built-in password-protected Web server interface
- No calibration required
- No laptop required – all functions accessible from touchpad
- No software required – data stored on Compact Flash Card in ASCII format readily opened in Microsoft Excel
- 128 MB memory card (provides over 2 years of storage for 5-minute readings)
- Combination uplooking ultrasonic depth, gated cross-correlation velocity, and pressure depth sensor
- 2-year warranty
- Cable lengths up to 820 feet (250 meters)
- All keypad functions and data collection available via the Internet using connection to internal Web server
- Optional insertion sensor for closed pipe applications
- Available Ex certification

Applications

The FlowShark Pulse is designed for the most demanding permanent monitoring applications where measurement accuracy is critical or hydraulic conditions are not suitable for general purpose monitoring technologies:

- Billing applications where data is used to drive custody transfer and/or revenue management
- Instrumentation applications where data is used for control systems, such as treatment plant operations, pump stations, inline storage controls, or collection system routing management
- SCADA systems where communication occurs through analog output channels or MODBUS TCP

About ADS

ADS Environmental Services®, a brand of ADS® LLC, is a leading technology and service provider and a reliable source of knowledge to the global wastewater collection system industry. Monitors manufactured, installed, and maintained by ADS measure over 4 billion gallons of flow daily across the globe. ADS delivers value to its customers by providing industry-leading solutions for flow monitoring, data analysis, reporting and field services. These customers rely on Underground Intelligence® from ADS to manage planning and rehabilitation, satellite community billing, regulatory compliance, O&M, and model calibration.

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ADS®

FlowShark Pulse Sensors

HARDWARE

The FlowShark Pulse offers four different sensors which enable its technology to successfully measure the most demanding permanent monitoring applications.

Combination Sensor:

The FlowShark Pulse Combination sensor minimizes the cost and the footprint of underwater sensors by combining three sensor technologies within a single, streamlined housing. The housing, measuring only 1.1 inches high x 1.6 inches wide x 9.4 inches long (2.8 x 4.1 x 23.8 cm), contains the following sensors:

Submerged Ultrasonic Depth Sensor

The ultrasonic depth sensor transmits a high-frequency sound pulse along a vertical path from the sensor to the water surface. The water surface acts as a reflecting boundary to the sound pulse. The sensor measures the short time interval that the pulse of sound requires to travel to the water surface and reflect back to the sensor. The computed speed of sound is then used to calculate the depth of the flow. It measures depths from 2.0 to 78.7 inches (5 to 200 cm) to with an accuracy of +/- 0.08 inches (0.20 cm).

Pressure Depth Sensor

The pressure sensor is a piezoresistive device that converts the water pressure above the sensor to a depth of flow. The pressure sensor overrides the ultrasonic depth sensor under three conditions: (1) when the ultrasonic sensor cannot obtain a reliable measurement (applies only to the Portable Pulse monitor); (2) when the sensor cannot be installed on the bottom of the pipe; and (3) when the water column exceeds the height of the pipe, such as during surcharge conditions.

Gated Cross Correlation Velocity Sensor

The velocity sensor in the FlowShark Pulse is a state-of-the-art advancement in velocity sensing technology. This complex technology tracks the movement of velocity particle signatures within 16 separate "gates" of the vertical cross section of the flow. These gates are integrated across a two-dimensional cross section in order to compute average velocity. The Cross Correlation Velocity sensor has a range of -3.28 to 19.7 feet per second (-1.00 to 6.00 mps) and provides a full velocity profile for depths up to 39.4 inches (100 cm).

Extended Model Combination Sensor:

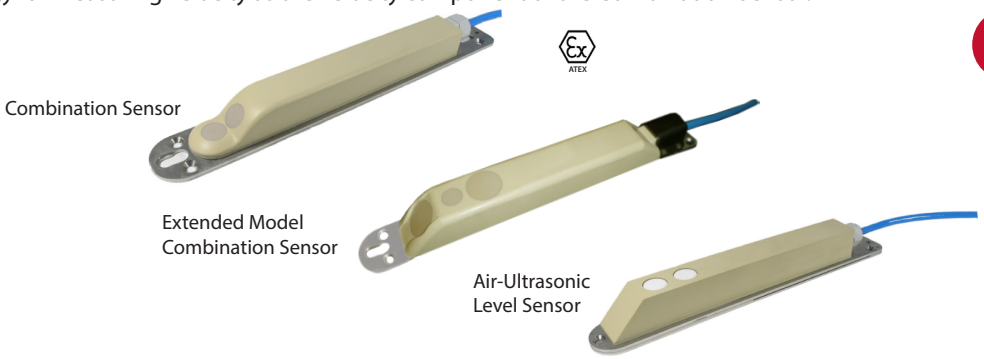
Like the Combination Sensor, the new Extended Model sensor combines the three sensor technologies described above within a single, streamlined housing measuring 1.3 inches high x 1.6 inches wide x 9.8 inches long (3.3 x 4.1 x 24.8 cm). It offers an extended measurement range for measuring depths and velocities between 0 and 197 inches (0 and 500 cm).

Air-Ultrasonic Level Sensor:

The air-ultrasonic depth sensor uses horizontal sensor crystals to determine the distance (range) from the sensor to the flow surface based on the time difference between transmitting and receiving a pulse reflected off the flow surface. The flow depth is calculated by subtracting the range and the sensor offset from the pipe height. It has a measurement range from its sensor face of 4.0 to 78.7 inches (10.2 to 200.0 cm) with an accuracy of less than 0.2 inches (0.5 cm).

Pipe Insertion Sensor:

The pipe insertion sensor is primarily used to measure flow velocity in closed pipes that remain full. When installed, the sensor mounts perpendicular to the pipe and extends from the outside of the pipe through the pipe wall into the flow. The pipe insertion sensor uses the same technology for measuring velocity as the velocity component of the Combination Sensor.



FlowShark Pulse Specifications

- 100-240 volts AC or 9-36 volts DC power
- LAN/WAN Interface (Ethernet)
- Polycarbonate enclosure: 6.4 lbs. (2.9 kg)
- Backlit graphic display: 128 x 128 pixels
- 18-button touchpad
- Data storage: 128 MB Compact Flash Card
- Cable length: 33 ft. (10 m), extendable to 820 ft. (250 m)

Submerged Ultrasonic Depth Sensor

- Submerged ultrasonic time technology
- Range (Combination Sensor): 2.0 to 78.7 in. (5 to 200 cm)
- Range (Extended Model): 3.1 to 197 in. (8 cm to 500 cm)
- Accuracy: +/- 0.08 in. (0.20 cm)

Pressure Depth Sensor

- Piezoresistive pressure technology
- Range: 0 to 197 in. (500 cm)
- Error: < 0.75% of final value

Gated Cross Correlation Velocity Sensor

- Gated cross correlation with digital pattern recognition technology operating at 1MHz
- 16 scan layers
- Range (Combination Sensor): -3.28 to 19.7 fps (-1.0 to 6.0 mps), maximum depth for full velocity profile: 39.4 in. (100 cm)
- Range (Extended Model): -3.28 to 19.7 fps (-1.0 to 6.0 mps); maximum depth for full velocity profile: 157 in. (400 cm)
- Accuracy: < 1% of measurement value

Air-Ultrasonic

- Time difference between transmitting and receiving a pulse reflected off the flow surface
- Range: 4.0 to 78.7 in. (10.2 to 200 cm)
- Accuracy: < +/- 0.2 in. (0.5 cm)

Pipe Insertion Sensor

- Same as Gated Cross Correlation Velocity sensor

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