pulsar MEASUREMENT

Greyline
DFS 5.1

Pump protection. High- or low-flow control. Overfill alarm. Bargraph flow rate indication.

Clamp-On Flow Sensor Installs Without Cutting the Pipe

Installs in Minutes with No Moving Parts

Mount the DFS 5.1 Doppler Flow Switch ultrasonic sensor on the outside of metal or plastic pipes. The sensor continuously injects high-frequency sound through the pipe wall and into the moving fluid where acoustic pulses are reflected back to the sensor from particles or bubbles in the fluid.

Ideal for "Difficult" Liquids — No Contact, No Maintenance

Flow rates of most liquids can be accurately controlled including acids, caustics, lubrication fluids, chemicals, abrasives, wastewater, and sludge. There are no moving parts and no sensor maintenance is required.

Easy Calibration

Installation can be made while the flow system is in full operation. No contact is made with the moving fluid and no holes are drilled in the pipe. There is no fouling or scale build-up on the sensor.

No Pipe Cutting. No Pressure Drop. No Sensor Fouling. No Maintenance!

It takes just a few minutes to install and calibrate a DFS 5.1 Doppler Flow Switch. The DFS 5.1 controls flow of most liquids in closed pipes. The ultrasonic sensor mounts on the outside of any pipe from 12.7 mm to 4.6 m (0.5 in to 15 ft) I.D.

THE RIGHT METER FOR

- Treated Water
- Raw Sewage
- Viscous Liquids
- Acids
- Food Products
- Oils & Paint
- Sludge & Slurries
- Solvents & Chemicals
- Pulp Stock
- Aerated Water
- Cooling Water

Easy to Calibrate

The DFS 5.1 control relay can be set to turn ON and OFF at any flow rate between 80 mm/s to 3 m /s (3.1 in/s to 9.8 ft/s). Insert two links for separate ON/OFF setpoints or just one link for a Hi or Lo flow alarm. Set relay actuation time delay from 0 to 80 seconds.

Ideal for Pump Protection

Avoid expensive pump repairs and downtime. The DFS 5.1 strap-on sensor can be installed in minutes without shutting down flow or cutting pipe. Use the adjustable relay time delay to eliminate relay "chatter" and reduce pump wear.

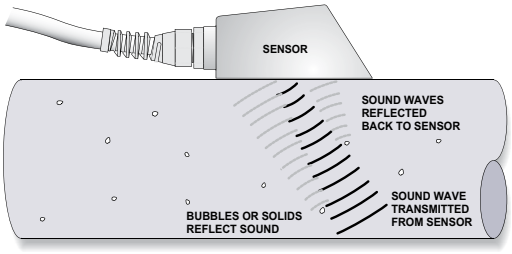
Reliable & Repeatable

Repeatability is ±0.1% of full scale (3 mm/s (0.1 in/s)). There are no moving parts and no maintenance is required.

The clamp-on ultrasonic sensor cannot be damaged or fouled by contact with the liquid it measures. Sealed in a stainless steel housing, the DFS 5.1 sensor withstands moisture or accidental submersion in water up to 69 Kpa (10 psi).

Self-Tunes to Extended Sensor Cable

Up to 152.4 m (500 ft) extra sensor coaxial cable can be added. Extended cable and junction box can be ordered from Pulsar Measurement. The cable can be cut or extended as required during installation. The flow switch automatically tunes to the cable length. No circuit adjustment or calibration is required



Designed for "Difficult" Liquids

The DFS 5.1 Doppler Flow Switch is recommended for flow control of liquids containing gas bubbles or solids: chemicals, slurries, sewage, sludge, viscous liquids, wastewater, caustics, and abrasives. The ultrasonic sensor injects high-frequency sound through the pipe wall into the flowing liquid. Acoustic pulses are continuously reflected back to the sensor and the DFS 5.1 measures a frequency shift to calculate flow velocity.

Each DFS 5.1 Flow Switch Includes:

- Adjustable ON and OFF relay setpoints
- Adjustable time delay
- Flow rate bar graph
- Relay LED

Repeatable, Reliable Flow Control

Use the DFS 5.1 for pump protection, valve control, and flow/no-flow alarms. It is ideal for "difficult" liquids like wastewater, slurries, abrasives, and chemicals, or any liquid which contains gas bubbles or solids. The standard Sensor mounts on any pipe 12.5 mm (0.5 in) diameter or larger.

Technical Specifications

GENERAL SPECIFICATIONS

Transducer:	Model SE4 Single-head 316SS ultrasonic, with 6 m (19.7 ft) shielded cable and stainless steel mounting
Operating Temperature: (Sensor)	-40 °C to 150 °C (-40 °F to 300 °F)
Electronics Enclosure:	NEMA4X (IP66) polycarbonate with clear, shatterproof cover
Accuracy:	±2%, requires solids or bubbles minimum size of 100 microns, minimum concentration 75 ppm. Repeatability: ±0.1%
Power Input:	100-240 V AC 50-60 Hz (see Popular Options), 10 VA max depending on options
Control Relays:	5 A DPDT
Set Points:	ON/OFF adjustment from 80 mm/s to 3 m /s (3.1 in/s to 9.8 ft/s)
Operating Temp. (Electronics):	-23 °C to +60 °C (-10 °F to +140 °F)
Pipe Size:	Any pipe ID from 12.7 mm to 4.6 m (0.5 in to 15 ft)
Approximate Shipping Weight:	3.6 kg (8 lb)
Approvals:	CE, cCSAus

STANDARD FEATURES

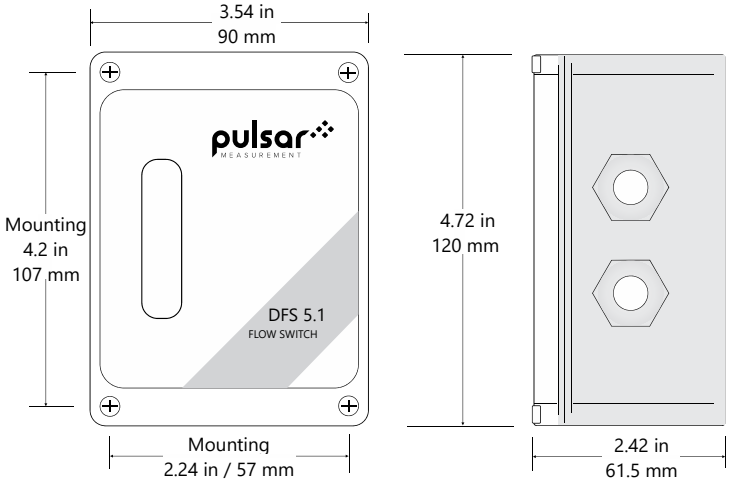
Setpoint:	Field-adjustable with separate ON/OFF setpoints or select high-flow alarm or low-flow alarm mode
Indication:	Flow rate LED bargraph, relay status LED
Time Delay:	Adjustable 0 to 80 seconds
Electrical Surge Protection:	AC power input and sensor
Transducer:	Mounting bracket clamp and coupling compound included

POPULAR OPTIONS

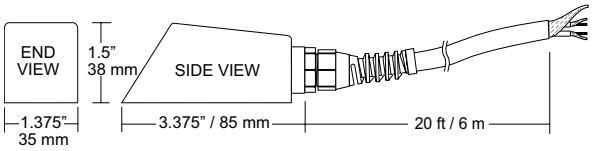
Transducer Cables:	15.2 m or 30.5 m (50 ft or 100 ft) continuous RG62AU coaxial from sensor, or splice up to 152.4 m (500 ft) with Junction Box
Sensor Mounting Clamp:	stainless steel, adjustable
Power Input:	12-24 V DC (±10%), 3 W Max

APPLICATIONS

Liquids:	Recommended for liquids containing suspended solids or bubbles minimum size of 100 microns, minimum concentration 75 ppm
Sensor Mounting Location:	On vertical or horizontal pipes, 6-10 pipe diameters from elbows, tees (turbulence increasing devices) >30 pipe diameters from pumps, controlling valves and pipe discharge
Pipe Materials:	Steel, stainless steel, cast iron, PVC, fiberglass, any contiguous pipe material that conducts sound, including lined pipes with liner bonded to pipe wall. Avoid pipes with loose insertion liners and pipe materials which contain air pockets (concrete, wood, etc.)



DFS 5.1 mount drawing front and side



SE4 Ultrasonic Doppler Sensor

Greyline DFS 5.1 Doppler Flow Switch

The DFS 5.1 flow sensor can be installed without cutting the pipe and takes just a few minutes to mount the sensor on the outside, causing no interruption to flow and minimizing installation costs. The switch/electronics enclosure can be mounted 6 m (19.7 ft) away from the sensor, optional up to 152.4 m (500 ft) to simplify wiring to pumps, alarms, valves, or other equipment.

Switch adjustments and electrical connections are fast and easy. The DFS 5.1 relay time delay is adjustable from 0 to 80 seconds to prevent nuisance alarms and relay "chatter" in turbulent flow. Includes switch selectable "normal" and "failsafe" operating modes.

Choose the DFS 5.1 Flow Switch for:

- No contact with the measured liquid
- No obstruction to flow - No pressure drop
- The sensor mounts easily on the outside of the pipe
- Can be installed while the pipeline is in use
- Insensitive to pressure, specific gravity, and conductivity
- Does not require pipe metering sections
- Does not require consideration of material compatibility with the liquid

pulsar MEASUREMENT

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