# ProSense® VFS Series (-1001) Vortex Flow Sensors


*Part No.VFSXX-X-1001*

## Overview

AutomationDirect's ProSense VFS series vortex flow sensors offer a very cost-effective solution optimized for monitoring water and deionized water flow in industrial applications. Vortex flow sensors are a reliable alternative to other flow sensing technologies and are a simple, low cost, and proven method for measuring flow of water-based liquids that is independent of the liquid's pressure or temperature fluctuations. Using the pushbuttons and display, the VFS series can be easily set up to measure both flow rate and temperature. The VFS series is available with ½" or ¾" NPT process connections. The VFS (-1001) series offers two separate outputs that can be used either as a flow or temperature limit switch or to monitor continuous flow rate or temperature. The TFT color display and switch point LEDs are used during configuration and operation to provide clear indication of both flow and temperature measured variables simultaneously.

## Features

Optimized for measurement of water and deionized water flow applications
- Cost effective solution for flow switch or continuous flow measurement
- Volumetric flow rate and temperature measurement
- TFT color display with pushbutton setup
- 1/2" or 3/4" NPT rotatable process connections
- Two outputs selectable for switch or frequency signals
- 4-pin M12 quick disconnect electrical connection
- 5-year warranty


## Output Function Selections

Output 1: 2 Selection Options
- Switching signal for flow limit value
- Frequency signal for flow

Output 2: 4 Selection Options
- Switching signal for flow limit value
- Switching signal for temperature limit value
- Frequency signal for flow
- Frequency signal for temperature

| ProSense VFS Series (-1001) Vortex Flow Sensors | | | |
|---|---|---|---|
| ***Model*** | ***VFS50-5-1001*** | ***VFS50-10-1001*** | ***VFS75-26-1001*** |
| ***Price*** | | | |
| ***Application*** | | | |
| ***Media*** | Water and deionized water | | |
| ***Medium Temperature**** | 14 to 194°F (-10 to 90°C) | | |
| ***Pressure Rating***** | 174 psig (12 bar) | | |
| ***Electrical Data*** | | | |
| ***Operating Voltage*** | 18 to 30 VDC | | |
| ***Current Consumption*** | < 30mA | | |
| ***Insulation Resistance*** | 100MΩ @ 500VDC | | |
| ***Protection Class*** | III | | |
| ***Reverse Polarity Protection*** | Yes | | |
| ***Power-on Delay Time*** | < 3 seconds | | |
| ***Outputs*** | | | |
| ***Number of Digital Outputs*** | 2 | | |
| ***Output Signal*** | Switch or frequency<br>PNP / NPN Selectable<br>N.O. / N.C. Selectable<br>Max. voltage drop: 2.5 VDC<br>Current rating: 100mA<br>Frequency: 0 to 1000 Hz | | |
| ***Short-circuit Protection*** | Yes | | |
| ***Overload Protection*** | Yes | | |

*** Water mixed with glycol or with dissolved solids, such as a saline solution, used to lower the freezing point will also increase the viscosity of the solution reducing the flow accuracy. See Flow Monitoring Accuracy in table below.**
** Up to 104°F (40°C)

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|---|---|---|---|
| ***Model*** | ***VFS50-5-1001*** | ***VFS50-10-1001*** | ***VFS75-26-1001*** |
| ***Flow Rate Monitoring*** | | | |
| ***Measuring Range**** | 0.26 to 5.28 GPM (16 to 317 GPH) | 0.55 to 10.55 GPM (32 to 634 GPH) | 1.3 to 26.4 GPM (80 to 1585 GPH) |
| ***Display Range*** | 0 to 6.34 GPM (0 to 380 GPH) | 0 to 12.7 GPM (0 to 760 GPH) | 0 to 31.7 GPM (0 to 1900 GPH) |
| ***Resolution*** | 0.02 GPM (1 GPH) | 0.05 GPM (2 GPH) | 0.1 GPM (5 GPH) |
| ***Set Point, SP*** | 0.32 to 5.28 GPM (10 to 317 GPH) | 0.65 to 10.55 GPM (38 to 634 GPH) | 1.6 to 26.4 GPM (95 to 1585 GPH) |
| ***Reset Point, rP*** | 0.26 to 5.24 GPM (16 to 314 GPH) | 0.55 to 10.45 GPM (32 to 628 GPH) | 1.3 to 26.2 GPM (80 to 1570 GPH) |
| ***Process Value End Point (@ FRP), FEP*** | 1.06 to 5.28 GPM (63 to 317 GPH) | 2.1 to 10.55 GPM (126 to 634 GPH) | 5.3 to 26.4 GPM (315 to 1585 GPH) |
| ***In Steps Of*** | 0.02 GPM (1 GPH) | 0.05 GPM (2 GPH) | 0.1 GPM (5 GPH) |
| ***Frequency at Process Value End Point, FRP*** | 100 to 1,000 Hz | | |
| ***Temperature Monitoring*** | | | |
| ***Measuring Range*** | 14 to 194°F | | |
| ***Display Range*** | -22 to 230°F | | |
| ***Resolution*** | 1°F | | |
| ***Set Point, SP*** | 16 to 194°F | | |
| ***Reset Point, rP*** | 14 to 192°F | | |
| ***In Steps Of*** | 1°F | | |
| ***Process Value Start Point (@ 0Hz), FSP*** | 14 to 158°F | | |
| ***Process Value End Point (@ FRP), FEP*** | 50 to 194°F | | |
| ***Frequency at Process Value End Point, FRP*** | 100 to 1,000 Hz | | |
| ***Accuracy / Deviations*** | | | |
| ***Flow Monitoring*** | | | |
| ***Accuracy (In the Measuring Range)**** | ± 2% MEW (viscosity less than 2cSt) | | |
| ***Repeatability*** | ± 0.5% MEW | | |
| ***Temperature Monitoring*** | | | |
| ***Accuracy*** | ± 1K | | |
| ***Reaction Times*** | | | |
| ***Flow Monitoring*** | | | |
| ***Response Time*** | 1 second; (dAP = 0) | | |
| ***Damping for the Switching Output dAP*** | 0 to 5 seconds | | |
| ***Temperature Monitoring*** | | | |
| ***Dynamic Response T05 / T09*** | T09 = 6 seconds | | |
| ***Environment*** | | | |
| ***Ambient Temperature***** | 32 to 140°F (0 to 60°C) | | |
| ***Storage Temperature*** | -4 to 176°F (-20 to 80°C) | | |
| ***Protection*** | IP 65; IP 67 | | |

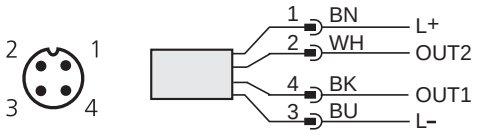
*** Measuring Range minimum flow rate at <2 cSt. For higher viscosties see Viscosity/Minimum Flow Rate chart.**
**** For viscosities from 2 to 4 cSt, accuracy is 3% of full range and from 4 to 14 cSt, accuracy is 4% of full range.**
***** Medium Temperature < 176°F (80°C); Ambient 32 to 140°F (0 to 60°C)**
**Medium Temperature < 194°F (90°C); Ambient 32 to 122°F (0 to 50°C)**
MEW = Final value of the measuring range

# ProSense® VFS Series (-1001) Vortex Flow Sensors

| ProSense VFS Series (-1001) Vortex Flow Sensors | | | |
|---|---|---|---|
| ***Model*** | ***VFS50-5-1001*** | ***VFS50-10-1001*** | ***VFS75-26-1001*** |
| ***Mechanical Data*** | | | |
| ***Weight*** | 1.06 lbs | 1.03 lbs | 1.11 lbs |
| ***Process Connection*** | 1/2" NPT female rotatable | 1/2" NPT female rotatable | 3/4" NPT female rotatable |
| ***Materials (wetted parts)*** | Stainless steel (1.4404 / 316L); ETFE; PA 6T; PPS; FKM | | |
| ***Housing Materials*** | Stainless steel (1.4404 / 316L): PC; PBT+PC-GF30; PPS; TPE-U | | |
| ***Tightening Torque*** | 30Nm | | |
| ***Displays / Operating Elements*** | | | |
| ***Display*** | 25 x 25mm TFT LCD<br>2 x Orange LEDs | | |
| ***Electrical Connection*** | | | |
| ***Connection*** | M12 connector; gold-plated contacts | | |
| ***Tests / Approvals*** | | | |
| ***EMC*** | DIN EN 61000-6-2<br>DIN EN 61000-6-3 | | |
| ***Shock Resistance*** | DIN EN 60068-2-27: 5g (11ms) | | |
| ***Vibration Resistance*** | DIN EN 60068-2-6: With water / 10 to 50 HZ 1mm<br>DIN EN 60068-2-6: With water / 50 to 2,000 Hz 2g | | |
| ***Pressure Equipment Directive*** | For group 2 fluids in accordance with sound engineering practices | | |
| ***UL Approval*** | E320431 | | |
| ***CE*** | EMC; RoHS II | | |
| **To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page at** | | | |

*NOTE: CHECK THE CHEMICAL COMPATIBILITY OF THE SENSOR'S WETTED PARTS WITH THE MEDIUM TO BE MEASURED.*

## Wiring Diagram




**Cable Assembly Wiring Colors:**
**Pin 1 - Brown**
**Pin 2 - White**
**Pin 3 - Blue**
**Pin 4 - Black**

**Colors to DIN EN 60947-5-2**

**For additional wiring details see individual product manuals.**

Note: Wiring colors are based on AutomationDirect CD12L and CD12M 4-pole cable assemblies.

## Output Function Selections

**Output 1:**
**Flow monitoring**
**Switching output**
**Frequency output**

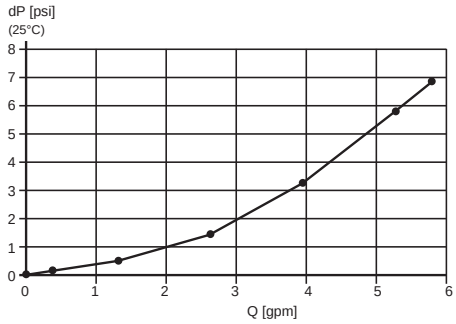
**Output 2:**
**Flow monitoring or temperature monitoring**
**Switching output**
**Frequency output**

*Click or scan the above QR code to be taken to the installation insert for the VFS1001 Series Vortex Flow Sensors*

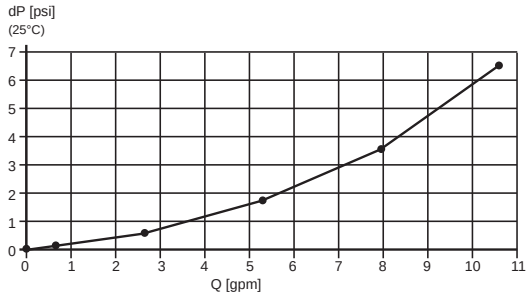
# VFS Series (-1001) Vortex Flow Sensors

## Pressure Loss

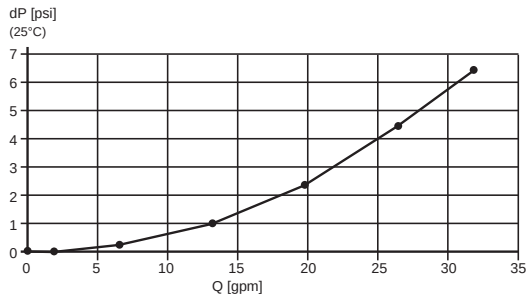
VFS50-5-1001




VFS50-10-1001

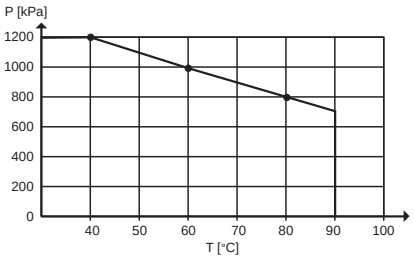



VFS75-26-1001

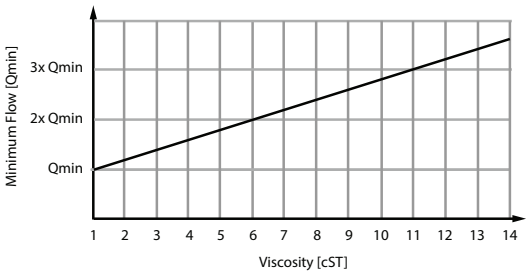



## Pressure Rating

VFS50-5-1001
VFS50-10-1001
VFS75-26-1001

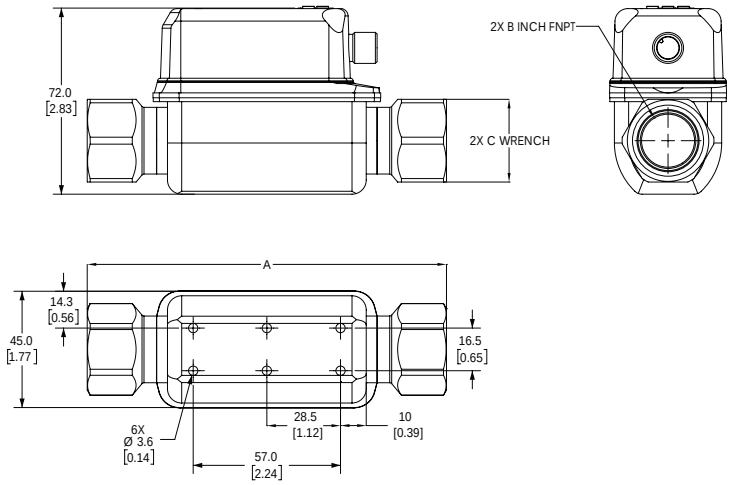



## Viscosity/Minimum Flow Rate




## Dimensions

***mm [inches]***




| *Model* | *A* | *B* | *C* |
|---|---|---|---|
| ***VFS50-5-1001*** | 119.0 [4.69] | 1/2" FNPT | 27.0 [1.06] |
| ***VFS50-10-1001*** | 119.0 [4.69] | 1/2" FNPT | 27.0 [1.06] |
| ***VFS75-26-1001*** | 139.0 [5.47] | 3/4" FNPT | 32.0 [1.26] |

*See our website _____ for complete Engineering drawings.*

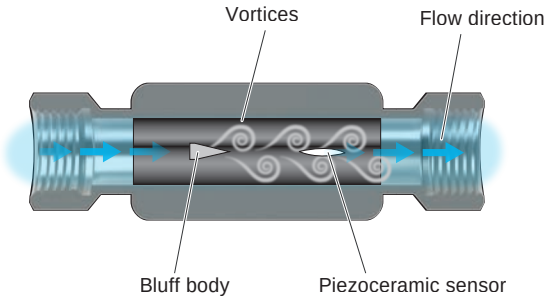
# ProSense® VFS Series Vortex Flow Sensors


## Vortex Flow Sensor Measuring Principle

Vortex shedding or vortex flow sensing technology is based on the principle that liquid flow will produce alternating vortices downstream when passing by an obstacle in the flow. Inside of a vortex sensor the obstacle is a bluff body that has a broad, flat front and extends vertically in the center of the sensor. As the liquid flow reaches a certain velocity, alternating vortices form behind the bluff body, detach or shed from the bluff body, and flow downstream. A piezoceramic sensor in the sensor detects these vortices and the sensor electronics determine the flow velocity based on the frequency of the vortices. Because the cross-sectional area inside the meter is known, it can be used by the sensor to determine flow rate.

The vortex flow principle is a simple, low cost, and proven method for measuring flow of water-based liquids that is independent of the liquid's pressure or temperature fluctuations.

## Vortex Flow Sensor Measuring Principle




## VFS Series Vortex Flow Sensor Features


| ProSense VFS Series Vortex Flow Sensor Selection Guide | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Model*** | ***Price*** | ***Process Connection*** | ***Flow Range*** | ***Temperature Range*** | ***Display Units*** | ***Output 1*** | ***Output 2*** |
| ***VFS50-5-1001*** | | 1/2" NPT female | 0.26 to 5.28 GPM (16 to 317 GPH) | 14 to 194°F | Switching status: 2 x LED, orange Measured values: alphanumeric TFT color display | PNP/NPN Switch or frequency (flow) | PNP/NPN Switch or frequency (flow or temperature) |
| ***VFS50-10-1001*** | | | 0.55 to 10.55 GPM (32 to 634 GPH) | | | | |
| ***VFS75-26-1001*** | | 3/4" NPT female | 1.3 to 26.4 GPM (80 to 1585 GPH) | | | | |
| ***VFS50-5-1002*** | | 1/2" NPT female | 0.26 to 5.28 GPM (16 to 317 GPH) | | Measured values: alphanumeric TFT color display | 4 to 20 mA scalable analog (temperature) | 4 to 20 mA scalable analog (flow) |
| ***VFS50-10-1002*** | | | 0.55 to 10.55 GPM (32 to 634 GPH) | | | | |
| ***VFS75-26-1002*** | | 3/4" NPT female | 1.3 to 26.4 GPM (80 to 1585 GPH) | | | | |