

# FloScan Very High Flow Diesel Turbine Stainless Flow Transducers

Series 233/236 High Flow Models E, F, and G

Very High Flow Series Flow Homogenizer and Pulsation Damper Canisters

## Description:

Series-233 and Series-236 temperature compensated turbine flow transducers are used to measure hydrocarbon based fuel flows such as Number-2 Diesel, and MGO, (Marine Gas Oil).

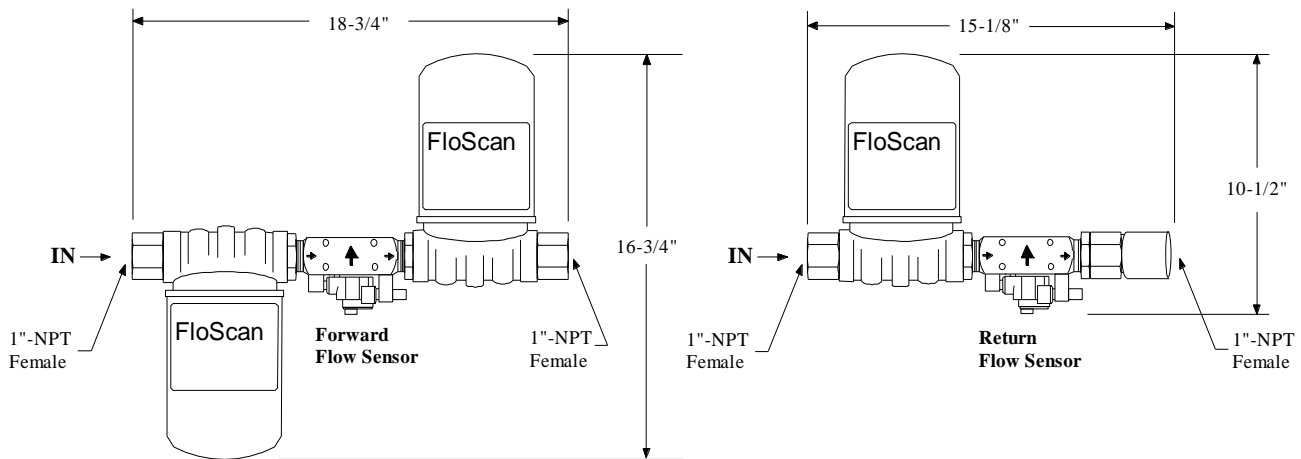
**NOTE:** Series-236 transducers utilize internal temperature probes to measure supply and return fuel temperatures; allowing FloScan instrumentation to compensate for thermal expansion in the return fuel flow. Series-233 transducers do not utilize internal temperature probes are not Temperature Compensated.

The transducer produces a square wave pulse signal from an optical-electronic pickup with a preamplifier.

## Principal of Operation:

Liquid enters the Flow Homogenizer canister on the Forward Sensor Assembly, or the Flow Homogenizer / Pulsation Damper canister on the Return Sensor Assembly. After exiting the canister, liquid then enters the Proportional Bypass Block where it divides. Part of the flow is forced down through the turbine flow transducer. Liquid enters the transducer's flow chamber tangentially following a helical flow path. Rotational velocity of liquid in the transducer is directly proportional to flow rate. A neutrally buoyant rotor spins with the liquid between V-jewel bearings. Rotor movement is sensed when notches in the rotor interrupt an infrared light beam between a LED and phototransistor.

After passing through the transducer, liquid is forced up into the Bypass Block where it joins the rest of the liquid flow. On the Forward Sensor Assembly liquid passes through the Pulsation Damper before exiting the assembly. On the Return Sensor Assembly fuel exits the Bypass Block and returns to tank.



**NOTE:** When all components are assembled, the assembly is called the Sensor Assembly or simply the Sensor.

## Very High Flow Sensor Models:

On engines with fuel return lines a sensor must be installed in both the fuel supply and fuel return lines. The correct sensor pair is determined by the fuel delivery rate from the engines lift or fuel transfer pump at maximum engine RPM and the full load consumption rate. On most applications the operating range of the supply sensor is higher than the operating range of the return sensor. Occasionally, especially on generators, the same flow range sensor is used on both the supply and return lines

FloScan sensor assemblies consist of three or four subassembly part groupings:

- Forward Sensor - Flow Homogenizer, Pulsation Damper, Proportional Bypass Block and Transducer
- Return Sensor - Combination Flow Homogenizer/Pulsation Damper, Proportional Bypass Block and Transducer

To facilitate installation in tight locations the various subassemblies can be removed from the Proportional Bypass Block/Transducer assembly and installed at different locations in the fuel line. Installing the transducer assembly components at different locations requires additional 1-5/16" SAE O-ring straight thread to 1" NPT adaptors.

Typical transducer combinations include: FE, FF, GF, GG

#### Performance Specifications:

Series 233/236 Model Letter	Operating Range	Pressure Drop, (PSI) @ Specified Flow Rate, (GPH) Large Flow Homogenizer and Large Pulsation Damper Canisters			
		(Full Flow) 100%	80% Flow	60% Flow	40% Flow
E	20 – 281 GPH	0.8 PSI @ 281 GPH	<0.5 PSI @ 225 GPH	<0.1 PSI @ 169 GPH	<0.1 PSI @ 112 GPH
F	30 – 492 GPH	1.3 PSI @ 492 GPH	0.7 PSI @ 394 GPH	<0.5 PSI @ 295 GPH	<0.1 PSI @ 197 GPH
G	50 – 860 GPH	2.3 PSI @ 860 GPH	2.2 PSI @ 637 GPH	1.8 PSI @ 516 GPH	<0.5 PSI @ 344 GPH

- Operating Temperature, (All Models): Up to 100° C
- Working Pressure, (All Models): Up to 100 PSI
- Bearing Life: Twenty, (20) Year Continuous Operation Minimum, (based on a five year round-the-clock test of 5-FloScan Transducers which exhibited no measurable wear during the test period)
- Accuracy guaranteed to within 2% after completion of the Two Step Calibration Process, (Step-1, No Load Idle Consumption Adjustment and Step-2, Totalizer Calibration based on known volume of fuel consumed)\*
- Transducer flow bench repeatability guaranteed to within  $\pm 0.5\%$ .

#### Material Specifications:

Flow Transducer Body – Aluminum or Zinc  
Proportional By-Pass Block – Aluminum  
Transducer By-Pass Inlet and Outlet Blocks – Aluminum  
Flow Homogenizer / Pulsation Damper Canisters – Steel  
Flow Homogenizer / Pulsation Damper Canister Castings – Aluminum  
SAE Jam Nuts – Steel  
SAE to NPT adapters – Steel  
Socket Head Cap Screws – Stainless Steel  
Button Head Security Screws – Stainless Steel  
Seals – Viton

#### Electrical Specifications:

12 to 15 VDC between RED (+) wire and BLACK (-) wire. 30 to 50 mA at 12 VDC.

#### Signal Specifications:

Open collector transistor output on WHITE wire. Sensor will pull-down to 1.0 volt with 10-15k ohm pull-up resistor installed.

\*Some Calibration may be required due to slight errors caused by fluctuations and pulsations in the engine's fuel injection system. Transducers are tested and calibrated on a flow bench using Number-2 Diesel equivalent calibration test fluid.