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Series DPL
Paddle Wheel Flow Sensor

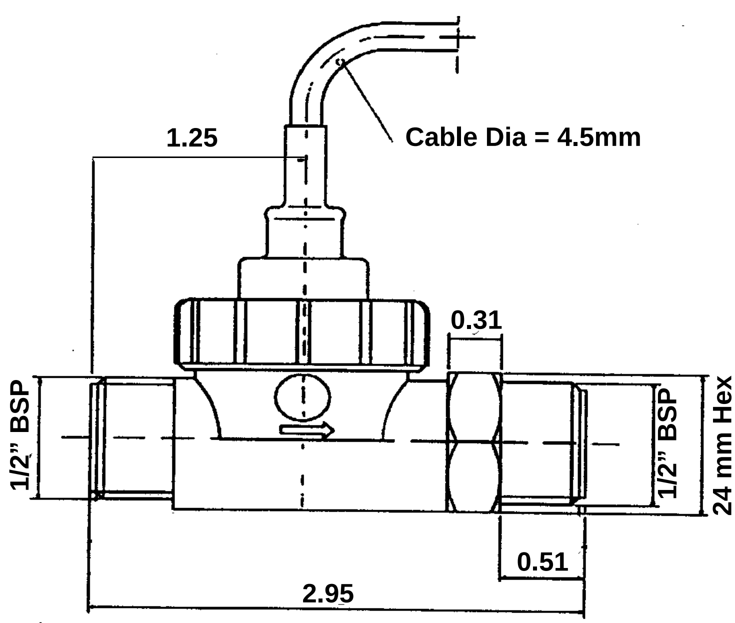
Precautions

- **User's Responsibility for Safety:** KOBOLD manufactures a wide range of process sensors and technologies. While each of these technologies are designed to operate in a wide variety of applications, it is the user's responsibility to select a technology that is appropriate for the application, to install it properly, to perform tests of the installed system, and to maintain all components. The failure to do so could result in property damage or serious injury.
- **Proper Installation and Handling:** Use a proper sealant with all installations. Never overtighten the sensor within its fittings. Always check for leaks prior to system start-up.
- **Wiring and Electrical:** Because this is an electrically operated device, only properly trained personnel should install and maintain this product. Input voltage limits will vary depending upon the choice of evaluating electronics, and is noted below. Electrical wiring of the sensor should be performed in accordance with all applicable national, state and local codes.
- **Temperature and Pressure:** The DPL is designed for use with media temperatures from -40°F to 158°F and a maximum pressure of 145 PSIG. Operation outside these limitations will cause damage to the unit.
- **Infrared Technology**: This sensor employs a paddle wheel that breaks an infrared light beam as fluid flows through the sensor body. This means that only translucent fluids which will pass light can be metered by the DPL.
- **Material Compatibility:** The DPL's process wetted parts are polypropylene, polysulfone, sapphire with Buna-N, EPDM or FKM seals, depending on the model. Make sure that the DPL's wetted materials are chemically compatible with the media. While the sensor's outer housing is liquid resistant when installed properly, it is not designed to be immersed. The device should be mounted in such a way that the external surfaces do not normally come into contact with fluid.
- **Flammable, Explosive and Hazardous Applications:** The DPL is not an explosion-proof design. It should not be used in applications where an explosion-proof design is required.
- **Make a Fail-Safe System:** Design a fail-safe system that accommodates the possibility of sensor or power failure. In critical applications, KOBOLD recommends the use of redundant backup systems and alarms in addition to the primary system.

Specifications

Accuracy:		
	5% of full scale	
Linearity:	1.5% of full scale	
Wetted Parts:		
Body:	Polypropylene, polysulfone, sapphire	
Seals:	Standard:	Buna-N
	Optional:	FKM or EPDM
Fittings:		
Standard:	1/2" BSP	
Optional:	1/2" PVC Hose Barb	
Max. Pressure:	145 PSIG	
Temperature Range:	-40°F to +158°F	
Filtration Requirements:	80 mesh for media with solids	
Electrical:		
Detector/Emitter LED:		
Input Power:	4.5-12 VDC	
	7 mA typical, 15-25 mA max.	
Output Sink Current:	10 mA max.	
Internal Pull-up	10 kOhm	
Output Signal:	NPN Open Collector	
Signal Amplitude:	Approx +V (High), <= 0.2V (Low)	
Output Loss:	max. 2.5 mW	

Dimensions



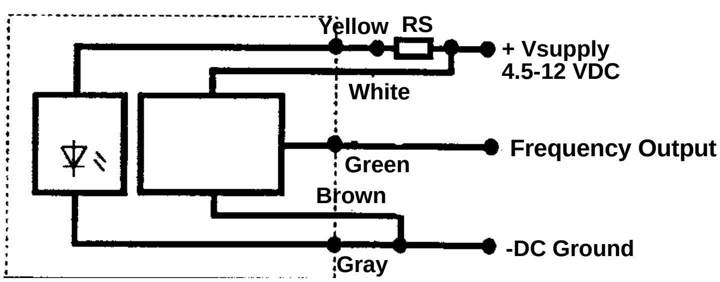
All dimensions in inches unless otherwise noted

Part Number Decoding

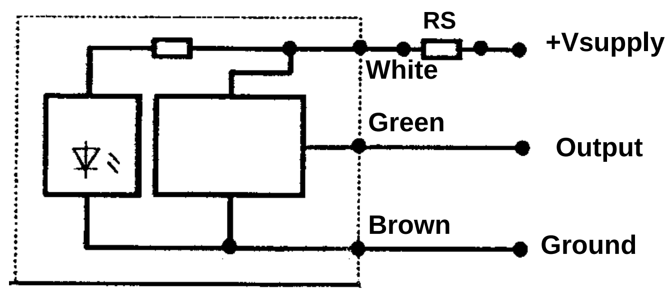
Range GPH	Maxi-mum DP (PSI)	Frequency At Max. Flow (HZ)	Model Number	Option Suffixes		
				O-rings	Signal	Fittings
0.4-8.0	11	272	DPL-1005	-V: FKM	-F2 1/2 frequency	-S: 1/2” PVC Hose Barbs
0.8-28	11	471	DPL-1018	-E: EPDM	-F4 1/4 frequency	
3.0-95	10	528	DPL-1060		-F8: 1/8 frequency	
6.0-190	15	300	DPL-1120			
16-400	19	399	DPL-1250			

Electrical Connections

Standard frequency output w/5-wire attached cable



Suffix -F2, F4, F8



RS = User-supplied, external current limiting resistor

To calculate the minimum desired resistance value in Ohms:

$$RS = \frac{Vsupply-1.2}{0.015}$$

Mechanical Installation

Piping Preparation: Piping should be rigidly supported at both the inlet and outlet of the sensor to prevent potential damage due to excessive stress on the sensor fittings. In order to ensure that the fluid flow profile is fully developed and symmetrical, a minimum straight piping run of 10 pipe diameters upstream and 5 diameters downstream of the sensor are required. The straight runs should be free of tees, elbows, valves, reducers and other disturbances.

Pumps: All pumps cause pulsations in the fluid. Centrifugal pumps cause the least amount of pulsations in the fluid and positive displacement or reciprocating pumps the most. In order to minimize the effect of these pulsations on sensor accuracy, the sensor should be located as far away from the pump as possible. A small amount of back pressure is desirable. A pulsation dampener or accumulator may be needed to dampen severe pump pulsations. If the fluid pulsations cannot be reduced to an acceptable level, a field calibration to determine a new K-factor may be required.

Viscosity: All flow range and calibration data provided with this sensor are for water. All turbine type transducers are affected by viscosity. Higher viscosities tend to make the turbine wheel turn slower for a given flow rate. This results in a lower K-factor for the sensor when it is used with a viscous media (i.e. viscosity > 10 cSt.) and the calibration data provided for water flow is no longer valid. If the sensor is to be used with slightly viscous media, a field calibration is required to determine the new K-factor for the sensor.

Field Calibration: A field calibration may be performed to determine the new K-factor for the sensor when it is to be used in a manner in which the above specified calibration information does not apply (i.e. use with slightly viscous or pulsating media, insufficient straight run, etc.). With the sensor installed in the system, dispense a known quantity of the fluid to be measured while using a pulse counter to count the number of pulses generated during this time period. This information can then be used to determine the new K-factor specific to your system and fluid.