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Series DRG
Paddle 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:** This is an electrically operated device and only properly trained personnel should install and maintain this product. Be sure that the power supplied to the sensor is appropriate for the electronics supplied. Electrical wiring should be performed in accordance with all applicable national, state and local codes.
- **Temperature and Pressure:** The DRG is available in several material combinations. Temperature and pressure maximums vary depending upon the material selected. Operation outside these limitations will cause damage to the unit.
- **Material Compatibility:** The DRG process wetted parts for the various body materials are stated below. Make sure that the DRG is chemically compatible with the application liquids. While the sensor's outer housing is liquid resistant when installed properly, it is not designed to be immersed. It should be mounted in such a way that it does not normally come into contact with fluid.
- **Flammable, Explosive and Hazardous Applications:** The DRG 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: ±3.0% of full scale

Wetted Parts

DRG-11:	Bronze, Acrylic, PTFE, Ceramic, NBR
DRG-12:	Bronze, PTFE, Ceramic, NBR
DRG-14:	316SS, Acrylic, PTFE, Ceramic, FKM
DRG-15:	316SS, PTFE, Ceramic, FKM
DRG-18:	PP, PTFE, Ceramic, NBR

Max. Pressure:

DRG-18:	100 PSIG
DRG-11, 14:	230 PSIG
DRG-12, 15:	580 PSIG

Temperature Range: -10°F to +176°F

Electrical Protection (all versions): NEMA 4X/IP 65

Electrical (refer to model number table for model codes and descriptions for each output type)

Output F300

PNP Pulse Output: PNP open collector, 25mA max.
Input Power: 14-28 VDC

Connection: 4 pin, M-12 Micro-DC plug, male

Electrical (continued)

Output L342: 4-20 mA, 2-wire, Rmax < 500 ohms, 24 VDC

Connection: 4 pin, M-12 Micro-DC plug, male

Output L343: 4-20 mA, 3-wire, Rmax < 500 ohms, 24 VDC

Connection: 4 pin, M-12 Micro-DC plug, male

Output L442: 4-20 mA, 2-wire, Rmax < 500 ohms, 24 VDC

Connection: DIN 43650 (Hirschmann) plug

Outputs C34P & C30R

Output C34P: 4-20 mA, 3-wire, Rmax < 500 ohms + 1 PNP switch

Output C30R: 2 PNP switches

Power Supply: 24 VDC ±20%, 80 mA max.

Display: 3-digit LED

Switch Type: PNP open collector, 24 VDC, 300 mA max.

Connection: 5 pin, M-12 Micro-DC plug, male

PDF Rev. 12/15
DRG_manual_12-15

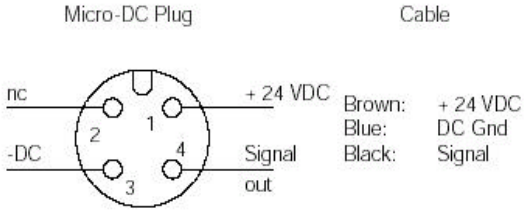
Part Number Decoding

Flow Range GPM Water	Nominal freq. at f.s. (Hz)	Material Combination & Flow Range					Fitting	Output/Electronics
		DRG-11	DRG-12	DRG-14	DRG-15	DRG-18		
0.15 - 3	120	..50	..50	..50	..50	..50	N1=1/8" NPT	F300=Frequency output, Micro-DC plug
0.15 - 6.6	217	..55	..55	..55	..55	..55	N2=1/4" NPT	L342=4-20 mA, 2 wire, Micro-DC plug
0.3 - 8	184	..60	..60	..60	..60	..60		L343=4-20 mA, 3 wire, Micro-DC plug
0.6 - 12	215	..65	..65	..65	..65	..65	N4=1/2" NPT	L442=4-20 mA, DIN 43650 plug
0.8 - 23	265	..70	..70	..70	..70	..70	N5=3/4" NPT	C34P=Compact Electronics, 4-20 mA w/1 PNP switch
1.5 - 37	180	..75	..75	..75	..75	..75		C30R=Compact Electronics, 2 PNP switches
3 - 37	180	..80	..80	..80	..80	..80	N6=1" NPT	

Accessories

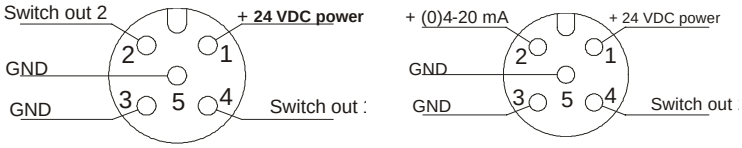
Part Number 807.037=Mating 4-pin Micro-DC plug with 6 ft. cable for output F300, L342, & L343
Part Number 807.007=Mating 5-pin Micro-DC plug with 6 ft. cable for output C34P, & C30R

Electrical Connection for Output F300 and L343 (3-wire transmitters)



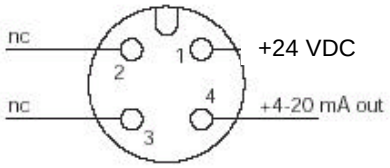
Electrical Connection for Output C30R & C34P (5-wire Micro-DC plug)

Cable: Brown= Pin 1; White= Pin 2; Blue= Pin 3; Black= Pin 4; Gray= Pin 5



C30R **C34P**

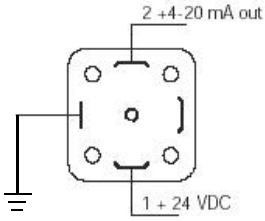
Electrical Connection for Output L342 (2-wire 4-20 mA)



Cable

Pin 1 = Brown = +24 VDC
Pin 4 = Black = 4-20 mA out

Electrical Connection for Output L442 (2-wire 4-20 mA)



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.

Horizontal flow direction with piping positioned above the flow body is recommended to minimize trapped air, which can cause output fluctuations and meter inaccuracy.

Additionally, be sure that the axle is always positioned in the horizontal plane to minimize friction, otherwise, meter inaccuracy and excessive paddle wheel wear can result.
In order to ensure that the fluid flow profile is fully developed and symmetrical, **a minimum straight pipe run of 20 nominal pipe diameters upstream and 5 diameters downstream of the sensor are required.** These 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 cause 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 pulsation dampener or accumulator may be used to dampen pulsations if required. If the fluid pulsations cannot be reduced to an acceptable level, a field calibration to determine the new K-factor for the sensor installed in a pulsating system may be required.

Viscosity: All flow range and calibration data assume water as the flow media. All paddle type transducers are affected by viscosity and higher viscosities tend to make the paddle wheel turn slower for a given flow rate. This results in a lower K-factor when the sensor 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 viscous media, a field calibration is required to determine the new K-factor for the sensor.

Field calibration: For frequency output versions, a simple field calibration may be performed to determine a new K-factor when the sensor is to be used in a manner in which the above specified calibration information does not apply (i.e. use with 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 the dispense. This information can then be used to determine the new K-factor specific to your system and fluid. 4-20mA output and / or Compact Electronic versions have a preset output span that is not field adjustable.