

## KAL-D Flow Switch



### Benefits and Features

- No Moving Parts
- Switching Range 0.15 to 6.6 Ft/Sec.
- Max. Pressure 580 PSIG
- Max. Operating Temperature 210°F
- Clean-In-Place to 250°F
- ¼ or ½ NPT or BSP connection
- PNP Normally Open or Normally closed
- LCD Trend Indication
- Adjustable Set Point
- Small Footprint (less than 2" diameter)

### General Description

The KAL-D series combines the features of our legendary KAL-K thermal flow switch with a compact size. The KAL-D uses the calorimetric principle to monitor the flowrate of non-viscous water-based liquids. The sensor tip is heated to a few degrees above the liquid temperature. As the liquid flows across the tip, it is cooled by the liquid.

The amount of cooling is proportional to liquid velocity. The liquid velocity is compared to the setpoint which is field-adjustable by the user. A transistor switch is activated when the flow setpoint is reached. The KAL-D series has a smooth measuring probe with no moving parts making it exceptionally reliable and insensitive to dirt and solids. The insertion type probe allows for flow monitoring with minimal system pressure loss.

#### Microprocessor-Based Temperature Compensation

The KAL-D series achieves superior compensation for changes in liquid temperature during the measuring cycle by use of a microcontroller. This method of temperature compensation allows for very precise correction of flow measurement when liquid temperature changes occur.

### Specifications

<b>Applications:</b>	Non-viscous, water-based liquids (viscosity $\leq 60$ cSt)	<b>Max. Clean-in-Place Temperature:</b>	250°F
<b>Switching Range:</b>	0.15 to 6.6 Ft/Sec.	<b>Wetted Parts:</b>	316L SS
<b>Repeatability:</b>	$\pm 2\%$	<b>Housing Material:</b>	304 SS
<b>Response Time:</b>	5.6-12 seconds typical	<b>Power Requirements:</b>	24 VDC $\pm 10\%$ @150 mA Max.
<b>Switch Point Adjustment:</b>	Via potentiometer. Flashing LED indicates setpoint on 8 LED bargraph indicator	<b>Switch Type:</b>	NPN or PNP open collector normally open or normally closed based on ordering code
<b>Status Indicator:</b>	1 dual color LED	<b>Switch Rating:</b>	400 mA Max. @ 24 VDC, short circuit protected
<b>Maximum Pressure:</b>	580 PSIG	<b>Electrical Connection:</b>	Micro DC plug, 4-pin male
<b>Operating Temperature Range:</b>	-4 to 176°F	<b>Electrical Protection:</b>	NEMA 4X/IP65

## KAL-D Flow Switch

### Measuring/Switch Ranges

Pipe Diameter	Approximate Switching Range GPM	Pipe Diameter	Approximate Switching Range GPM
1/4"	0.03-1.5	2"	1.3-60
1/2"	0.11-5.8	2-1/2"	2-90
3/4"	0.2-10	3"	4-150
1"	0.3-15.6	4"	5-240
1-1/2"	0.8-40	6"	12-560

**Important:** The above listed approximate measuring ranges were calculated based on the pipe size and the KAL-D switching velocity range of 0.15 to 6.6 Ft/Sec. Depending on the pipe size, sensor immersion depth and orientation, large deviations from the above listed ranges occur.

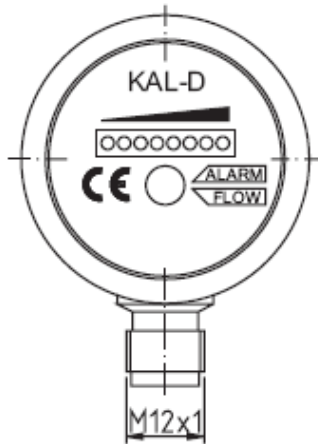
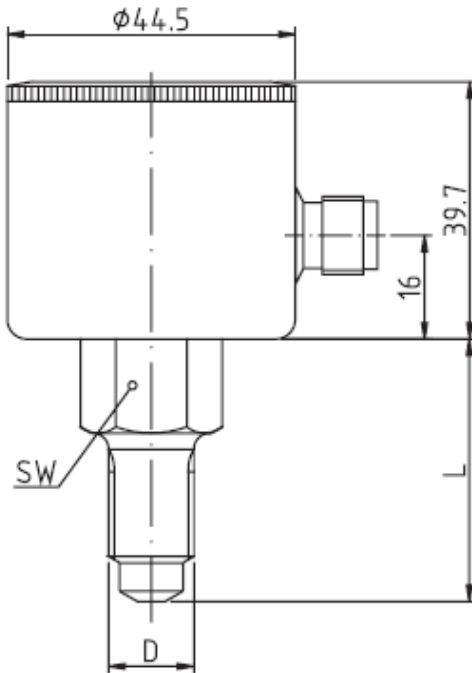
### Ordering Information

#### Order Numbers for Standard Types

Fitting Type	Model	Type of Switch	Connector
1/4" NPT	KAL-D5408	...N=NPN, N/O	...ST3= Micro-DC plug, 4-PIN, male
1/2" NPT	KAL-D5415	...P=PNP, N/O	
M12 x 1	KAL-D0412	...M=NPN, N/C	
1/4" BSP	KAL-D1408	...R=PNP, N/C	
1/2" BSP	KAL-D1415		
<b>Accessories</b>			
P/N 807.037 = Mating 4-pin Micro DC plug with 6 foot cable			

## KAL-D Flow Switch

### ↔ Dimensions



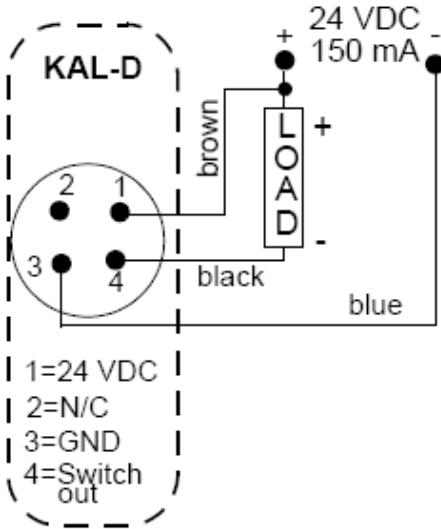
D	L	SW
1/4" NPT	1.6"	19mm
1/2" NPT	2.2"	27mm
M12x1	1.6"	19mm
1/4" BSP	1.6"	19mm
1/2" BSP	2.2"	27mm

## Electrical Connections

Diagram shows typical electrical wiring for the KAL-D configured as either a NPN or PNP transistor switch. The transistor switch output is configured as either an NPN or PNP open collector at the factory, based on the order code. It is not switchable from NPN to PNP or vice versa in the field. The wire colors listed in Diagram 4.2 correspond to the color codes on the mating micro-DC plug with cable (sold separately).

### NPN Configuration

DC Ground switched to pin 4 when switch is activated. High impedance at pin 4 when switch is not activated.



### PNP Configuration

24 VDC is switched to pin 4 when switch is activated. High impedance at pin 4 when switch is not activated.

