

## Application Data Sheet



# Leak Detection Pipeline Pump Seal

**KAYDEN**<sup>®</sup>

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**Pump Mechanical Seal Leak Detection**

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**Application:** Pump Mechanical Seal Leak Detection

**Product:** Kayden CLASSIC 812 Series Flanged Thermal Dispersion Flow, Level, Interface & Temperature Switch & Transmitter

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**Description:**

Flow and liquid level detection in drain line systems.

**Problem:**

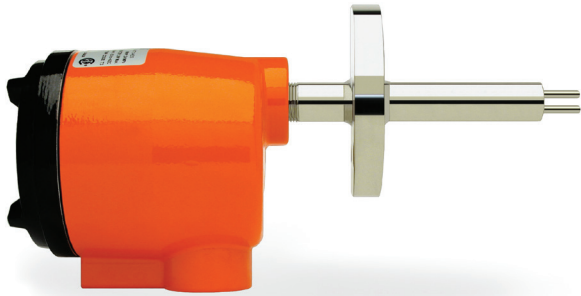
Pumps require a form of mechanical seal, these seals will eventually break down and leak. Determining the point of failure is achieved by routine monitoring of the seal. Seal leak can be tolerated by directing the fluid into a recovery system by use of a drain line that directs the fluid into a storage container.

How is it determined when the leak is occurring and to what degree? The Kayden CLASSIC 800 Series Flow, Level, Interface and Temperature Switch/Transmitter will help you determine whether or not to shut down the pump or send out a maintenance crew to service the mechanical seal.

**Solution:**

A common "Pipeline Leak Detection" setup for **No Flow Condition, Pump Protection:**

- Staff can monitor the storage container and recover the leaked fluid, however, the storage container will quickly be overwhelmed if the seal fails and floods the recovery system.
- Monitor inside the drain to detect if there is a fluid present and if so inform the relevant party.
- Monitor the liquid level in the drain pipe while monitoring the flow rate. It is now possible to choose both an alarm point and a shut-down point using the Kayden CLASSIC 800 Series Switch/Transmitter.



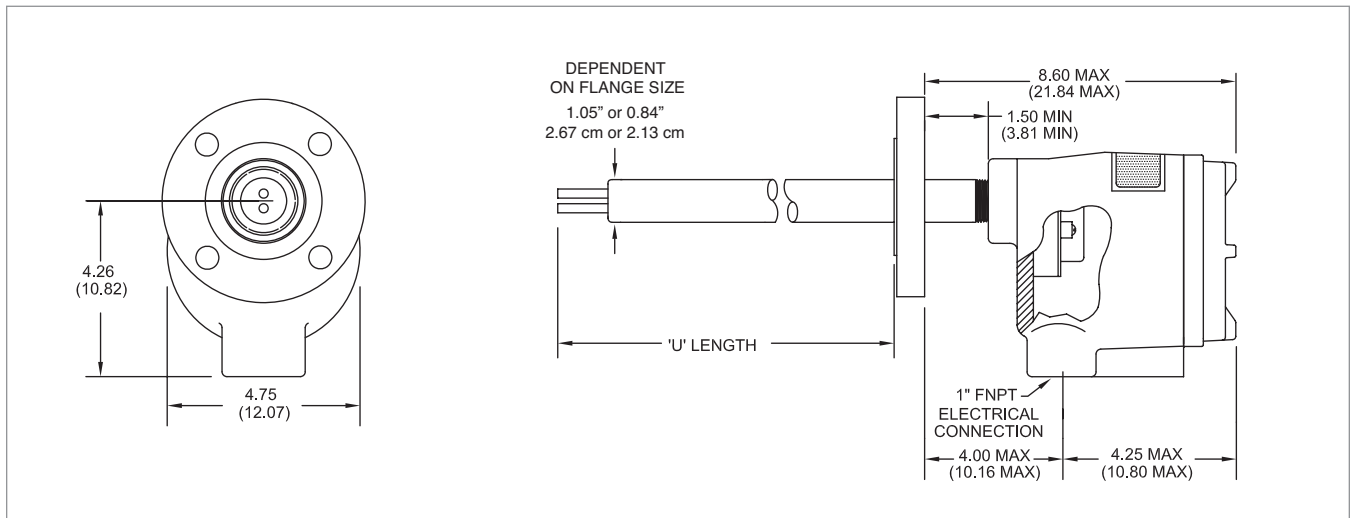
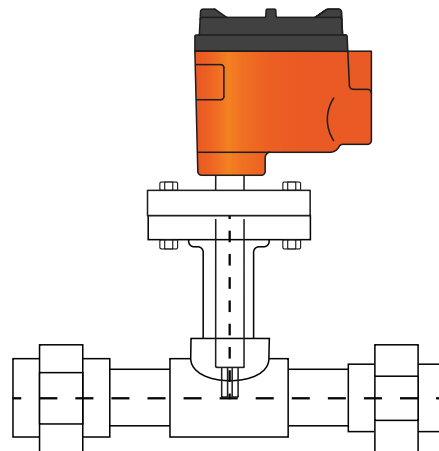
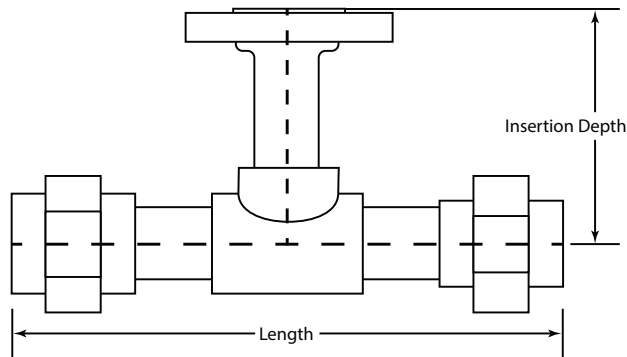
**Kayden CLASSIC™ 812**



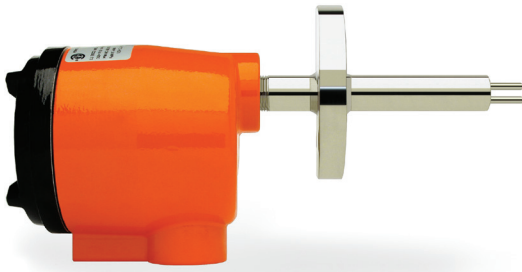
**CLASSIC™ 812 with Customer Specified T**



**Customer Specified T**



**CLASSIC™ 812 Flanged**



**Flow, Level, Interface & Temperature Switch & Transmitter**

- Flanged Process Connections - 316/316L Stainless Steel Sensor standard
- Exotic Alloys, Custom 'U' Lengths and Remote Mounted Electronics Available
- Digital Microprocessor Technology - Settings configurable by user for Flow, Level, Interface & Temperature Sensing
- No Jumpers - All Configurable Options are stored in Non-Volatile Memory
- FM Explosion-proof Class I, Div. 1, Groups B, C & D
- CSA/ANSI UL Flameproof Class I, Div. 1, Groups B, C & D
- 316/316L Stainless Steel & Exotic Alloy versions designed to ASME Section VIII Div. 1 2007 Latest Addenda and/or to be inserted in system complying with ASME/ANSI B31.3-2006 +2007 Addenda. Canadian Registration Number (CRN): 0F09437.2

**Display Panel & Intelligent User Interface**

The KAYDEN CLASSIC 800 Series Electronics Module is designed for quick and easy setup.

**Display Panel Indicators:**

- Relay 1 & 2
- Set Point 1 & 2
- Fault Alarm
- Run Mode
- Start-up Bypass Timer (for pump control)
- LED Bar Graph for Flow Rate, Level or Interface Indication

- Universal Power 12-24 VDC & 115-230 VAC standard
- Two SPDT Relays - independently adjustable
- 4-20 mA Analog Output
- "Smart Heater" function for power economy and increased heater life
- Start-up Bypass Timer (for pump control)

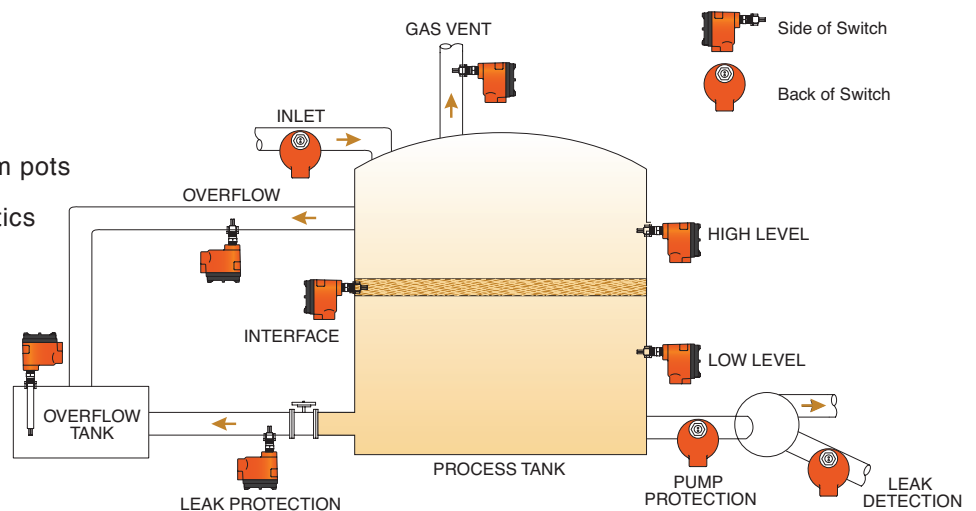
**Configuration Mode Features:**

- Adjustable Sensitivity
- Zero & Span Adjustment
- Modbus Addressable

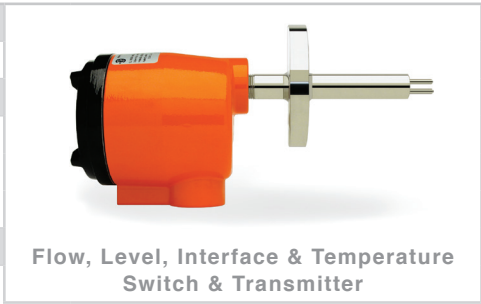
**Electronics Modules Feature:**

- Easy setup; no jumpers or trim pots
- Continuous Self-test Diagnostics with Fault Indicator
- Temperature Compensation

**Applications:**



<b>812</b>	<b>CODE</b>	<b>Sensor Type</b>																
	<b>R</b>	-45°C to +200°C (-50°F to +392°F) Continuous Service																
	<b>CODE</b>	<b>Sensor Material</b>																
	<b>A</b>	316/316L Stainless Steel																
	<b>X</b>	Titanium Gr. 2																
	<b>T</b>	Hastelloy C-276																
	<b>CODE</b>	<b>Process Connection - Flange Type</b>																
	<b>A</b>	Raised Face																
	<b>B</b>	RTJ - Ring Type Joint																
	<b>CODE</b>	<b>ANSI</b>	<b>CODE</b>	<b>ANSI</b>	<b>CODE</b>	<b>ANSI</b>	<b>CODE</b>	<b>ANSI</b>	<b>CODE</b>	<b>ANSI</b>	<b>CODE</b>	<b>ANSI</b>	<b>CODE</b>	<b>ANSI</b>	<b>CODE</b>	<b>ANSI</b>		
		<b>1"</b>		<b>1-1/2"</b>		<b>2"</b>		<b>3"</b>		<b>4"</b>		<b>5"</b>		<b>6"</b>		<b>8"</b>		<b>10"</b>
	<b>121</b>	150	<b>131</b>	150	<b>141</b>	150	<b>151</b>	150	<b>161</b>	150	<b>171</b>	150	<b>181</b>	150	<b>191</b>	150	<b>201</b>	150
	<b>122</b>	300	<b>132</b>	300	<b>142</b>	300	<b>152</b>	300	<b>162</b>	300	<b>172</b>	300	<b>182</b>	300	<b>192</b>	300	<b>202</b>	300
	<b>123</b>	600	<b>133</b>	600	<b>143</b>	600	<b>153</b>	600	<b>163</b>	600	<b>173</b>	600	<b>183</b>	600	<b>193</b>	600	<b>203</b>	600
	<b>124</b>	900	<b>134</b>	900	<b>144</b>	900	<b>154</b>	900	<b>164</b>	900	<b>174</b>	900	<b>184</b>	900	<b>194</b>	900	<b>204</b>	900
			<b>CODE</b>	<b>Flange Material</b>														
			<b>A</b>	316/316L SST X Titanium Gr. 2														
			<b>T</b>	Hastelloy C-276														
			<b>CODE</b>	<b>Insertion 'U' Lengths 2.5" - 120" (6.4 cm - 305 cm) in 1/2" (1.0 cm) increments.</b>														
			<b>IXXXX</b>	Custom 'U' Lengths: Use 4 digits preceded by an 'I' (i.e. 3.5" 'U' = I0035) ('M' = cm)														
			<b>CODE</b>	<b>Input Power</b>														
			<b>C</b>	12-24 VDC and 115-230 VAC, 50 to 60 Hz														
				<b>Electronics</b>														
				Microprocessor Controlled with User Interface.														
				Two SPDT sealed relay contacts. Modbus via RS-485. 4-20 mA current loop.														
			<b>CODE</b>	<b>Local Enclosure</b>														
			<b>1</b>	Flameproof - Aluminum														
			<b>CODE</b>	<b>Cover - For Local Enclosure</b>														
			<b>B</b>	Blind Cover - Flameproof														
			<b>G</b>	Glass Lens Cover - Flameproof														
			<b>CODE</b>	<b>Remote Electronics Enclosure &amp; Cover</b>														
			<b>0A</b>	Not Required														
			<b>1B</b>	Blind Cover - Flameproof														
			<b>1G</b>	Glass Lens Cover - Flameproof														
			<b>CODE</b>	<b>Agency Approvals</b>														
			<b>1</b>	UL & CSA														
			<b>3</b>	UL, CRN & CSA														
			<b>9</b>	FM														
			<b>CODE</b>	<b>Language</b>														
			<b>E</b>	English														
<b>812</b>	<b>R</b>	<b>A</b>	<b>A</b>	<b>131</b>	<b>A</b>	<b>I0035</b>	<b>C</b>	<b>1</b>	<b>G</b>	<b>0A</b>								



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Model Number Legend  
DOC#: ML-812-004

ML-812-004-[011]  
This is a Controlled Document and cannot be changed without the Approval of the Quality Control Manager.

**CLASSIC™ 812 Specifications**

**Applications:**

- Flow, Level, Interface & Temperature

**Process Connections:**

- Flanged

**Insertion ‘U’ Lengths:**

- **Custom Lengths:**  
Available in 1/2” or 1 cm increments  
Min. 1.2” - Max. 120” (3.0 - 305 cm)

**Wetted Materials:**

- 316/316L Stainless Steel standard
- Titanium Gr. 2, Hastelloy® C-276, Monel® 400, Inconel® 600, Alloy 20, Nickel 200

**Enclosure Material:**

- Copper-free Aluminum (does not exceed 0.4% copper)
- Powder Coated Polyester TGIC (polyestertriglycidyl isocyanurate)
- NEMA 4X / Type 4 / IP55
- 1” FNPT Conduit Connection
- Buna O-ring on Cover

**Temperature Range – Continuous Service:**

- **Sensors:**  
-45°C to +200°C (-50°F to +392°F)  
(Models 814 & 816: -45°C to +160°C [-50°F to +320°F])
- **Electronics:**  
-55°C to +65°C (-67°F to +149°F)  
**Note:** For temperatures above +65°C (+149°F) electronics must be remotely mounted.
- **Storage:**  
-55°C to +75°C (-67°F to +167°F)

**Operating Pressure - Sensor:**

- Flanged Style:**
- Maximum Working Pressure: per flange rating

**Switch / Transmitter Switch Point Range**

- **Water-based Liquids:**  
0.01 to 3.0 ft./sec. (0.003 to 0.9 meters/sec.)
- **Hydrocarbon-based Liquids:**  
0.01 to 5.0 ft./sec. (0.003 to 1.5 meters/sec.)
- **Gases:**  
0.25 to 254 sfps (0.076 to 77 smps)  
Standard conditions: 21°C (70°F) at 14.7 psi (1 atm)



**Display Panel**

**Display Panel Indicators:**

- Relay 1** On steady when Relay 1 is energized
- Relay 2** On steady when Relay 2 is energized
- Fault** Indicates a self-test error or fault condition
- Set Point 1** On steady when viewing Set Point 1
- Set Point 2** On steady when viewing Set Point 2
- Run Mode** Flashing when switch is operating
- Bypass** Flashing when the Start-up Bypass Timer is active
- Thermal Signal** Displays Thermal Signal

**The Thermal Signal increases as:**

- Flow** The flow rate increases
- Level** The sensor is submerged
- Interface** The sensor is submerged by the second liquid of greater thermal conductivity

**CLASSIC™ 812 Specifications**

**Accuracy:**

- **Flow Service:**  
±1% set point velocity  
over operating range of ±28°C (±50°F)
- **Level Service:**  
±0.25 inches (±0.64 cm)

**Response Time:**

- Approximately 0.5 to 30 seconds

**Remote Electronics Option:**

- Maximum recommended cable length - 200 feet (60 m)
- Cable type - 24 AWG minimum - twisted pairs

**Heater Power:**

- Field adjustable to optimize performance

**Input Power:**

- Universal Power standard  
12-24 VDC and 115-230 VAC, 50-60 Hz
- Consumption: Maximum: 4.8 watts (fully configured)

**Outputs:**

- 4-20 mA current loop
- Two (2) SPDT sealed relay contacts  
rated @ 5 amps resistive 230 VAC or 30 VDC  
Max.;  
individually adjustable

**Start-Up Bypass Timer:**

- Adjustable for 0 to 100 seconds

**Communications:**

- Modbus via RS-485

**RCMS (Remote Control & Monitoring Software) Functions and Features:**

- Display Panel Lock-Out
- Set Points configuration<sup>1</sup>
- Relay Actuation Delay Timer
  - Independently configurable for both On and Off, increasing or decreasing
  - Adjustable from 0 - 5,000 seconds
- Start-up Bypass Timer<sup>1</sup>
  - Adjustable from 0 - 100 seconds
- Relay Mode Configuration<sup>1</sup>
  - Energized above or below set point
- Relay Temperature Mode Configuration
- Heater Power setting<sup>1</sup>

- Zero and Span settings<sup>1</sup>
- Analog (4-20 mA) output configuration<sup>1</sup>
- View and Print Graphing (Trend) function
- Configuring settings; write to device, save to file and print
- Fault Event Log

**Note:**<sup>1</sup> Also configurable from Display Panel

**Diagnostics:**

- Primary watchdog circuit monitors microprocessor parameter anomalies
- Secondary watchdog circuit monitors microprocessor health
- Heater monitored for out-of-range conditions
- Fault Mode de-energizes relay(s) and halts power to the heater

**Agency Approvals:**

- **CSA - ANSI/UL**  
Class I, Div. 1, Groups B, C and D;  
Ex d IIB + H<sub>2</sub>; AEx d IIB+H<sub>2</sub>  
(Class I, Zone 1, Group IIB + H<sub>2</sub>,)  
T3; Enclosure Type 4 / IP55
- **Single Seal Approval**  
Per ANSI/ISA 12.27.01-2003
- **CRN**  
Canadian Registration Number
- **FM**  
Class I, Div. 1, Groups B, C and D;  
Class I, Zone 1, AEx d IIB+H<sub>2</sub>  
T2D (Ta=75°C); T3 (Ta=65°C);  
Enclosure Type 4 / IP55



**Weights and Dimensions:**

- 812 Flanged: 1-1/2" 300#, 7" U length - 16 lbs (7.25 kg) (for example)
- Carton Size - 15" x 8" x 8" (38 cm x 20 cm x 20 cm) (for example)

**Warranty:**

- One (1) Year from shipment date from factory (see Terms & Conditions on kayden.com for details)

## Ordering Information

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## Contact Us

### Telephone

1 (403) 253-1423  
001 403 253-1423

### Fax

1 (403) 255-0042 North America  
001 403 255-0042 International

### E-Mail

info@kayden.com

### Web

kayden.com

**Hours** Monday – Friday 8:00 a.m. – 5:00 p.m. MST

**Mailing Address** 3364–114th Avenue S.E., Calgary, Alberta, Canada T2Z 3V6

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**KAYDEN**  
I N S T R U M E N T S



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