

thermal
flow, level, interface
& temperature
switches & transmitters



CLASSIC™ Series

Thermal

KAYDEN®
Helping the World Switch™

 **Telematic.com**

KAYDEN[®]

Helping the World Switch[™]

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Helping the World Switch® - Kayden's Advanced Design

Patented Design

Kayden's patented designs provide the ultimate performance and features package for flow, level, interface and temperature sensing.

Kayden's products combine precision welded, highly accurate sensors, extremely rugged enclosures and advanced digital electronics.

The **CLASSIC 800 Series** combines the failure resistance inherent in Thermal Dispersion technology with the performance and features usually reserved for much more expensive instruments.

Universal Power Input

- Some manufacturers require all options such as relay-energized mode to be specified at time of order but with the Kayden CLASSIC 800 series, by simply pushing a few buttons you can select your choice of operation modes.
- The universal power input capability of the Kayden CLASSIC 800 series provides flexibility for use in all power input situations.



Discrete & Analog Outputs

- Modbus registers via RS-485 4-20 mA analog representation of Thermal Signal
- Two SPDT sealed relay contacts rated @ 4 amps resistive 230 VAC or 24 VDC maximum

Adjustments

- Adjustable Set Point Deadbands
- 4 Adjustable Independent Switch Point Timers

Advanced Diagnostics

- Kayden's CLASSIC 800 series uses an advanced microprocessor to perform continuous self-test diagnostics on the electronics and the sensor elements.
- Any open or shorted connection will result in a FAULT indication that also deactivates all relays and disables the heater circuitry.

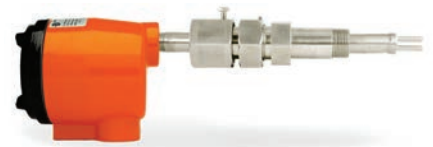


- An internal watchdog circuit ensures that the microprocessor code is performing as expected and a secondary external watchdog circuit ensures that the microprocessor itself is functioning. In the event of a malfunction both circuits force the contacts open, illuminate the Fault LED and force the heater off. This prevents the possibility of a "run-away" heater or a high thermal offset.



Intelligent User Controls

- The **Kayden CLASSIC 800** series Display Panel features very bright LED indicators for easy viewing even in direct sunlight.
- An **adjustable power-on Start-up Bypass Timer** is accessible from the Display Panel for low flow alarm pump protection applications. This makes it possible to disable a pump on low flow and have it automatically restart after a predetermined time in the event of a power interruption.
- Four adjustable delay timers** allow the introduction of repeatable time delay into the (set point) relay trip function. For example, in a pump protection application this function will shut down the pump after the switch sensor has gone "dry" for the pre-set time (delay) limit.
- The Kayden RCM (Remote Communications and Monitoring) Software allows all the settings to be configured remotely and saved as a file, transmitted as an email attachment, and/or printed for future reference.
- The Kayden RCM Software includes the option of locking the CLASSIC 800 Series Display Panel to eliminate field adjustments or tampering.
- Modbus allows multiple Kayden units to be connected to the same communications bus (via RS-485) and monitored simultaneously.



Principle of Operation - Thermal Dispersion

Kayden thermal switches use proven thermal dispersion technology to create a very accurate, economical and rugged device for sensing flow, point level, liquids interface and temperature.

The sensors incorporate two platinum Resistance Temperature Detectors (RTDs), one RTD measures the actual process temperature while the other RTD is heated to create a temperature differential.

Flow:

As the process travels over the tip of the sensor, the increased flow of the process reduces the temperature of the heated RTD. This reduced temperature difference between the two RTDs is monitored by the electronics and the switch changes state once the set point is reached.

Level:

In a dry to wet application the rising liquid level covers the sensor and disperses some of the heat from the heated RTD. This reduced temperature difference between the two RTDs is monitored by the electronics and the switch changes state at this set point.

Typical Applications

Flow:

Flow / No-Flow Monitoring & Verification

- Air, gases, water, hydrocarbon-based liquids, viscous fluids, liquids with particulates and/or suspended solids and slurries.
- Pump Protection
- Pipeline / Material storage
- Flare Gas Monitoring
- Relief Valve & Rupture Disk Flow Monitoring
- Purge Air Flow
- Eye Wash Stations
- Tanker Loading & Unloading
- Well Optimization

Level:

Leak Detection

- Fast, Accurate and Repeatable at Low Flow Rates
- Drain Line Flow
- Lube / Seal Oil Systems

High / Low Level Detection

- Water, hydrocarbon-based liquids, viscous fluids, liquids with particulates and/or suspended solids and slurries.
- Tank Overflow Protection
- Process Tank Batching Control

Temperature:

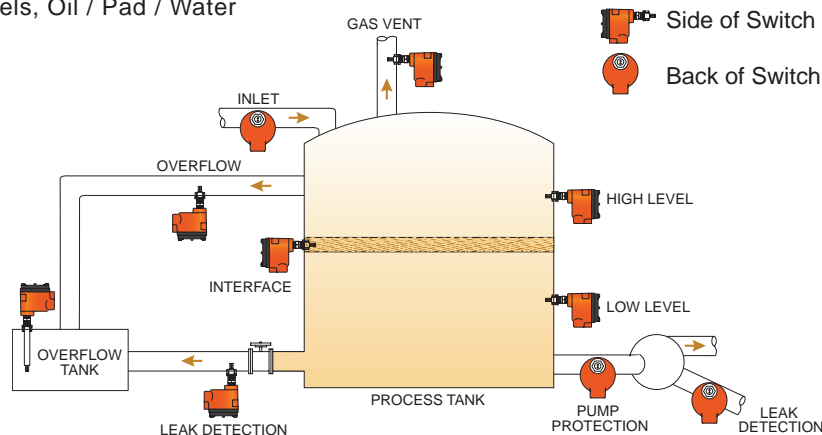
Process Temperature Monitoring

- One relay configurable for process temperature

Interface:

Interface (Level) Detection

- Separation Vessels, Oil / Pad / Water Knockout tanks



CLASSIC™ 800 Models - Flameproof/Explosion-proof

Applications: Flow, Level, Interface & Temperature

Every **CLASSIC 800** model is user configurable for **Flow, Level, Fluids Interface** and **Temperature** applications and suitable for use in Air, Gases, Water, Liquids and Slurries.

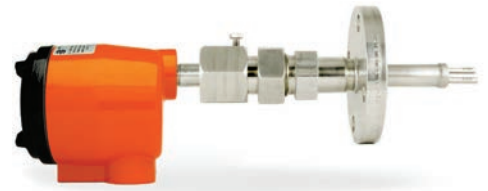
The **CLASSIC 800** has several unique features which make it the world's most advanced Thermal Flow/Level Switch including: temperature mode, 4-20 mA outputs, Modbus, digital temperature compensation, automated self-test diagnostics, and a simple intuitive user interface.



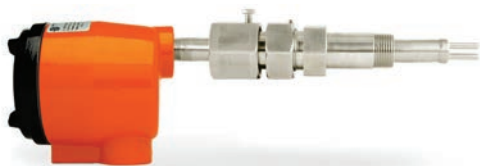
CLASSIC™ 810



CLASSIC™ 812



CLASSIC™ 814



CLASSIC™ 816



CLASSIC™ 828



CLASSIC™ 830



CLASSIC™ 832

CLASSIC™ 800 Electronics

The Display Panel of the CLASSIC 800 displays all process conditions and allows adjustment of all settings.

- The **Blue LED** on the Thermal Signal Bar Graph is a constant display of process condition (Flow/Level)
- Power, relay states, fault conditions, set points and delay timers all have dedicated LED indicators
- The push buttons replace internal dip switches, trim pots or slide switches and make set point, range, heater power and delay timer adjustments easier



CLASSIC 800 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

Standard Features:

- Microprocessor Based Electronics
- Intelligent User Interface
- Continuous self-test diagnostics of electronics and sensor
- Temperature Compensation
- Variable Heater Power
- Dual Independent Relays
- Relays are factory set to monitor flow
- Adjustable power-on Start-up Bypass Timer
- Adjustable set point Deadbands
- 4 Adjustable Independent Switch Point Timers
- Display Panel Lock-Out (controlled via the Kayden RCM software)
- No mechanical jumpers or trim-pots
- Process temperature via Modbus and/or one or both Alarm Relays

CLASSIC™ 800 Specifications

Applications:

- Flow, Level, Interface & Temperature

Process Connections:

- 1/2", 3/4", 1", 1-1/4", 1-1/2" & 2" MNPT
- 3/4" FNPT & Flanged InLine
- Flanged & Sanitary 1" to 3.5" Tri-Clamp®
- Threaded (1" MNPT) & Flanged Retractable Packing Glands

Insertion 'U' Lengths:

- **Imperial:**
1.2", 2", 3", 4", 6", 9", 12" & 18" standard
Model 828 (Sanitary) - 2", 3", 4" & 6" only
- **Metric:**
3, 5, 7.5, 10, 15, 23, 30 & 45 cm standard
Model 828 (Sanitary) - 5, 7.5, 10 & 15 cm only
- **Custom Lengths:**
Available in 1/2" or 1 cm increments
Min. 1.2" - Max. 120" (3.0 - 305 cm) model dependant

Wetted Materials:

- 316/316L Stainless Steel - standard
- Titanium Gr. 2, Hastelloy® C-276
- 316/316L Stainless Steel c/w Nickel Braze (830 & 832 InLine Models)
- Highly Saturated Nitrile (Pressure Seal - 814 & 816 Packing Gland Models)

Enclosure Material:

- Copper-free Aluminum (does not exceed 0.4% copper)
- Powder Coated Polyester TGIC (polyester triglycidyl isocyanurate)
- NEMA 4 / 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:**Threaded Style:**

- Maximum Working Pressure:
24 MPa (3500 psig) dependent on model and material of construction

Flanged Style:

- Maximum Working Pressure:
per flange rating

Sanitary Tri-Clamp® Style:

- Maximum Working Pressure:
per flange rating

Switch / Transmitter Switch Point Range**(Insertion Style - 1/2" to 2" MNPT, Flanged):**

- **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)

Switch / Transmitter Switch Point Range**(InLine Style):**

- **Water-based Liquids:**
0.015 to 50 cc/sec.
- **Hydrocarbon-based Liquids:**
0.033 to 110 cc/sec.
- **Gases:**
0.6 to 20,000 cc/sec.
Standard conditions: 21°C (70°F) at 14.7 psi (1 atm)

Accuracy:

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

CLASSIC™ 800 Specifications

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: 6.0 watts (fully configured)

Outputs:

- 4-20 mA current loop
- Two (2) independent SPDT sealed relay contacts rated @ 4 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 configuration¹
- Relay Actuation Delay Timer
 - Independently configurable for both On and Off, increasing or decreasing
 - Adjustable from 0 - 5,000 seconds
- Start-up Bypass Timer¹
 - Adjustable from 0 - 100 seconds
- Relay Mode Configuration¹
 - Energized above or below set point
- Relay Temperature Mode Configuration
- Heater Power setting¹
- Zero and Span settings¹
- Analog (4-20 mA) output configuration¹
- View and Print Graphing (Trend) function

- Configuring settings; write to device, save to file and print

- Fault Event Log

Note:¹ 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 + H2; AEx d IIB+H2
(Class I, Zone 1, Group IIB + H2,) T3; Enclosure Type 4 / IP55



- **Single Seal Approval**
Per ANSI/ISA 12.27.01-2003

- **CRN**
Canadian Registration Number



Note: CRN approvals available.
Visit telematic.com for CRN information per model and jurisdiction.

- **FM Approvals**
Class I, Div. 1, Groups B, C and D;
Class I, Zone 1, AEx d IIB+H2
T2D (Ta=75°C); T3 (Ta=65°C);
Enclosure Type 4 / IP55




Weights and Dimensions:

- 810 Threaded: 2" U length - 7 lbs (3.18 kg)
- Carton Size - 15" x 5" x 6" (38 cm x 13 cm x 15 cm)
- Other models/sizes - consult Telematic

Warranty:

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

810	CODE	Sensor Type										
	R	-45°C to +200°C (-50°F to +392°F) Continuous Service										
		CODE	Sensor Material									
		A	316/316L Stainless Steel									
		X	Titanium Gr. 2									
		T	Hastelloy C-276									
		CODE	Process Connection - MNPT									
		C	1/2"									
		D	3/4"									
		E	1"									
		F	1-1/4"									
		G	1-1/2"									
		H	2"									
		CODE	Insertion 'U' Lengths									
		0012	1.2"	(3.0 cm)							Custom 'U' Lengths: 2.5" - 120" (6.0 cm - 305 cm) Available in 1/2" (1.0 cm) increments.	
		0020	2"	(5.0 cm)								
		0030	3"	(7.5 cm)								
		0040	4"	(10.1 cm)								
		0060	6"	(15.2 cm)								
		0090	9"	(23 cm)								
		0120	12"	(30 cm)								
		0180	18"	(46 cm)								
		XXXX	Custom 'U' Lengths: Use 4 digits preceded by an 'I' (i.e. 3.5" 'U' = I0035) (Use 'M' for cm)									
		CODE	Input Power									
		C	12-24 VDC and 115-230 VAC, 50 to 60 Hz									
		Electronics										
		Microprocessor Controlled with User Interface.										
		Two SPDT sealed relay contacts. Modbus via RS-485. 4-20 mA current loop.										
		CODE	Local Enclosure									
		1	Flameproof - Aluminum									
		CODE	Cover - For Local Enclosure									
		B	Blind Cover - Flameproof									
		G	Glass Lens Cover - Flameproof									
		CODE	Remote Electronics Enclosure & Cover									
		0A	Not Required									
		1B	Blind Cover - Flameproof									
		1G	Glass Lens Cover - Flameproof									
		CODE	Agency Approvals									
		1	UL & CSA									
		3	UL, CSA & CRN									
		9	FM									
		CODE	Language									
		E	English									
810	R	A	D	0020	C		1	G	0A	9	E	



Flow, Level, Interface & Temperature
Switch & Transmitter

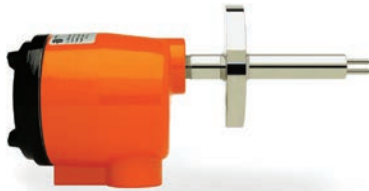


Flow, Level, Interface & Temperature Switch & Transmitter



Flow, Level, Interface & Temperature
Switch & Transmitter

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




Flow, Level, Interface & Temperature
Switch & Transmitter

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Please refer to telematic.com for current specifications and configurations.

Model Number Legend
DOC#: ML-812-004

ML-812-004-[009]

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830	CODE	Sensor Type										<div></div> <div>Flow, Level & Temperature Switch & Transmitter</div>													
	R	-45°C to +200°C (-50°F to +392°F) Continuous Service																							
		CODE	Sensor Material																						
		A3	316/316L Stainless Steel c/w Nickel Braze																						
			CODE	Process Connection - FNPT																					
			D	3/4"																					
				CODE	Sensor Assembly Body Length																				
				0035	3.5" (8.8 cm)																				
					CODE	Bleed Port																			
					A	Standard																			
						CODE	Sensor Mounting Orientation																		
						H	Horizontal Pipe																		
						V	Vertical Pipe																		
							CODE	Injection Tubes (3/4" MNPT x 1/4" FNPT)																	
							0	Not Required																	
							1	Type 1; .180" Bore; 316/316L Stainless Steel																	
							2	Type 2; .086" Bore; 316/316L Stainless Steel																	
								CODE	Mounting Bracket Kit																
								A	Not Required																
								B	90° Angle Bracket with hardware for wall/stand mounting																
									CODE	Power															
									C	12-24 VDC and 115-230 VAC, 50 to 60 Hz															
										Electronics															
										Microprocessor Controlled with User Interface. Two SPDT sealed relay contacts. Modbus via RS-485. 4-20 mA current loop.															
											CODE	Local Enclosure													
											1	Flameproof - Aluminum													
												CODE	Cover - For Local Enclosure / Sensor Enclosure												
												B	Blind Cover - Flameproof												
												G	Glass Lens Cover - Flameproof												
													CODE	Remote Electronics Enclosure & Cover											
													0A	Not Required											
													1B	Blind Cover - Flameproof											
													1G	Glass Lens Cover - Flameproof											
														CODE	Agency Approvals										
														1	UL & CSA										
														9	FM										
															CODE	Language									
															E	English									
830	R	A3	D	0035	A	H	1	A	C		1	B	0A	1	E										


 Flow, Level & Temperature
Switch & Transmitter

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Please refer to telematic.com for current specifications and configurations.


Model Number Legend
DOC#: ML-830-004

ML-830-004-[009]


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Flow, Level & Temperature
Switch & Transmitter

832	CODE	Sensor Type																
-	R	-45°C to +200°C (-50°F to +392°F) Continuous Service																
-	-	CODE	Sensor Material															
-	-	A3	316/316L Stainless Steel c/w Nickel Braze															
-	-	-	CODE	Process Connection - Flange Type														
-	-	-	A	Raised Face														
-	-	-	B	RTJ - Ring Type Joint														
<div></div> <div>Flow, Level & Temperature Switch & Transmitter</div>																		
CODE	ANSI	CODE	ANSI	CODE	ANSI	CODE	ANSI	CODE	ANSI	CODE	ANSI	CODE	ANSI	CODE	ANSI	CODE	ANSI	
3/4"		1"		1-1/2"		2"		3"		4"		5"		6"		8"		
111	150	121	150	131	150	141	150	151	150	161	150	171	150	181	150	191	150	
112	300	122	300	132	300	142	300	152	300	162	300	172	300	182	300	192	300	
113	600	123	600	133	600	143	600	153	600	163	600	173	600	183	600	193	600	
114	900	124	900	134	900	144	900	154	900	164	900	174	900	184	900	194	900	
-	-	-	-	-	-	CODE	Flange Material											
-	-	-	-	-	-	A	316/316L Stainless Steel											
-	-	-	-	-	-	CODE	Sensor Assembly Body Length (Flange Face to Flange Face)											
-	-	-	-	-	-	XXXX	Custom Body Lengths: Available in 1/2" (1.0 cm) increments. eg. 16.0" = 0160 ('M' = cm) 7" - 72" (relative to flange size/rating)											
-	-	-	-	-	-	CODE	Bleed Port											
-	-	-	-	-	-	A	1/4" Threaded - Standard											
-	-	-	-	-	-	CODE	Sensor Orientation											
-	-	-	-	-	-	H	Horizontal											
-	-	-	-	-	-	V	Vertical											
-	-	-	-	-	-	CODE	Pipe Schedule											
-	-	-	-	-	-	0	Schedule 40											
-	-	-	-	-	-	1	Schedule 80 (Standard)											
-	-	-	-	-	-	CODE	Input Power											
-	-	-	-	-	-	C	12-24 VDC and 115-230 VAC, 50 to 60 Hz											
-	-	-	-	-	-	Electronics												
-	-	-	-	-	-	Microprocessor Controlled with User Interface. Two SPDT sealed relay contacts. Modbus via RS-485. 4-20 mA current loop.												
-	-	-	-	-	-	CODE	Local Enclosure											
-	-	-	-	-	-	1	Flameproof - Aluminum											
-	-	-	-	-	-	CODE	Cover - For Local Enclosure / Sensor Enclosure											
-	-	-	-	-	-	B	Blind Cover - Flameproof											
-	-	-	-	-	-	G	Glass Lens Cover - Flameproof											
-	-	-	-	-	-	CODE	Remote Electronics Enclosure & Cover											
-	-	-	-	-	-	0A	Not Required											
-	-	-	-	-	-	1B	Blind Cover - Flameproof											
-	-	-	-	-	-	1G	Glass Lens Cover - Flameproof											
-	-	-	-	-	-	CODE	Agency Approvals											
-	-	-	-	-	-	1	UL & CSA											
-	-	-	-	-	-	9	FM											
-	-	-	-	-	-	CODE	Language											
-	-	-	-	-	-	E	English											
832	R	A3	A	131	A	I0060	A	H	O	C		1	G	0A	9	E		

KAYDEN™ | CLASSIC™ 816 Threaded Retractable Packing Gland

816	CODE	Sensor Type										<div></div> <div>Flow, Level, Interface & Temperature Switch & Transmitter</div>									
.	R	-45°C to +160°C (-50°F to +320°F) Continuous Service																			
.	.	CODE	Sensor Material																		
.	.	A	316/316L Stainless Steel																		
.	.	X	Titanium Gr. 2																		
.	.	T	Hastelloy C-276																		
.	.	CODE	Process Connection - MNPT																		
.	.	E	1"																		
.	.	CODE	Insertion 'U' Lengths																		
.	.	T	Low Pressure; 316/316L Stainless Steel (MWP 50 psi)																		
.	.	J	Low Pressure c/w Retaining Chain; 316/316L Stainless Steel (MWP 125 psi)																		
.	.	X	Medium Pressure; 316/316L Stainless Steel (MWP 500 psi)																		
.	.	CODE	Insertion 'U' Lengths																		
.	.	0060	6"	(15.2 cm)							Custom 'U' Lengths: 2.5" - 120" (6.0 cm - 305 cm) Available in 1/2" (1.0 cm) increments.										
.	.	0120	12"	(30 cm)																	
.	.	0180	18"	(46 cm)																	
.	.	0240	24"	(60 cm)																	
.	.	0360	36"	(91 cm)																	
.	.	0480	48"	(121 cm)																	
.	.	0600	60"	(152 cm)																	
.	.	XXXX	Custom 'U' Lengths: Use 4 digits preceded by an 'I' (i.e. 3.5" 'U' = I0035) (Use 'M' for cm)																		
.	.	CODE	Input Power																		
.	.	C	12-24 VDC and 115-230 VAC, 50 to 60 Hz																		
.	.	Electronics																			
.	.	Microprocessor Controlled with User Interface.																			
.	.	Two SPDT sealed relay contacts. Modbus via RS-485. 4-20 mA current loop.																			
.	.	CODE	Local Enclosure																		
.	.	1	Flameproof - Aluminum																		
.	.	CODE	Cover - For Local Enclosure																		
.	.	B	Blind Cover - Flameproof																		
.	.	G	Glass Lens Cover - Flameproof																		
.	.	CODE	Remote Electronics Enclosure & Cover																		
.	.	0A	Not Required																		
.	.	1B	Blind Cover - Flameproof																		
.	.	1G	Glass Lens Cover - Flameproof																		
.	.	CODE	Agency Approvals																		
.	.	1	UL & CSA																		
.	.	9	FM																		
.	.	CODE	Language																		
.	.	E	English																		
816	R	A	E	T	0020	C		1	G	0A	9	E									

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Please refer to telematic.com for current specifications and configurations.


Model Number Legend
DOC#: ML-816-004

ML-816-004-[009]
This is a Controlled Document and cannot be changed without the Approval of the Quality Control Manager.

***Sensor only.** The Packing Gland Assembly is available as standard in 316/316L Stainless Steel. For exotic alloys contact Telematic.

KAYDEN | CLASSIC™ 814 Flanged Retractable Packing Gland

814	CODE	Sensor Type																
	R	-45°C to +160°C (-50°F to +320°F) Continuous Service																
		CODE	Sensor Material															
		A	316/316L Stainless Steel															
		X	Titanium Gr. 2															
		T	Hastelloy C-276															
		CODE	Process Connection - Flange Type															
		A	Raised Face															
		B	RTJ - Ring Type Joint															
		CODE	ANSI	CODE	ANSI	CODE	ANSI	CODE	ANSI	CODE	ANSI	CODE	ANSI	CODE	ANSI	CODE	ANSI	
			1-1/2"		2"		3"		4"		5"		6"		8"		10"	
		131	150	141	150	151	150	161	150	171	150	181	150	191	150	201	150	
			CODE	Flange Material														
		A	316/316L SST		X	Titanium Gr. 2												
		T	Hastelloy C-276															
		CODE	Retraction Assembly															
		T	Low Pressure; 316/316L Stainless Steel (MWP 50 psi)															
		J	Low Pressure c/w Retaining Chain; 316/316L Stainless Steel (MWP 125 psi)															
		X	Medium Pressure; 316/316L Stainless Steel (MWP 275 psi)															
		CODE	Insertion 'U' Lengths 2.5" - 120" (6.4 cm - 305 cm) in 1/2" (1.0 cm) increments.															
		XXXX	Custom 'U' Lengths: Use 4 digits preceded by an 'I' (i.e. 3.5" 'U' = I0035) ('M' = cm)															
		CODE	Input Power															
		C	12-24 VDC and 115-230 VAC, 50 to 60 Hz															
		Electronics																
		Microprocessor Controlled with User Interface. Two SPDT sealed relay contacts. Modbus via RS-485. 4-20 mA current loop.																
		CODE	Local Enclosure															
		1	Flameproof - Aluminum															
		CODE	Cover - For Local Enclosure / Sensor Enclosure															
		B	Blind Cover - Flameproof															
		G	Glass Lens Cover - Flameproof															
		CODE	Remote Electronics Enclosure & Cover															
		0A	Not Required															
		1B	Blind Cover - Flameproof															
		1G	Glass Lens Cover - Flameproof															
		CODE	Agency Approvals															
		1	UL & CSA															
		9	FM															
		CODE	Language															
		E	English															
814	R	A	A	131	A	T	I0035	C		1	G	0A	9	E				



Flow, Level, Interface & Temperature Switch & Transmitter



Flow, Level, Interface & Temperature Switch & Transmitter

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Model Number Legend
DOC#: ML-814-004

ML-814-004-[009]

This is a Controlled Document and cannot be changed without the Approval of the Quality Control Manager.

***Sensor only.** The Packing Gland Assembly is available as standard in 316/316L Stainless Steel. For exotic alloys contact Telematic.

828	CODE	Sensor Type										
.	R	-45°C to +200°C (-50°F to +392°F) Continuous Service										
.	.	CODE	Sensor Material									
.	.	A6	316/316L Stainless Steel									
.	.	.	CODE	Process Connection - Tri-Clamp								
.	.	.	E	1"								
.	.	.	G	1.5"								
.	.	.	H	2"								
.	.	.	J	2.5"								
.	.	.	K	3"								
.	.	.	L	3.5"								
.	.	.	.	CODE	Insertion 'U' Lengths							
.	.	.	.	0020	2"	(5.0 cm)		Custom 'U' Lengths: 2.5" - 120" (6.0 cm - 305 cm) Available in 1/2" (1.0 cm) increments.				
.	.	.	.	0030	3"	(7.5 cm)						
.	.	.	.	0040	4"	(10.1 cm)						
.	.	.	.	0060	5"	(15.2 cm)						
.	.	.	.	XXXX	Custom 'U' Lengths: Use 4 digits preceded by an 'I' (i.e. 3.5" 'U' = I0035) (Use 'M' for cm)							
.	.	.	.	CODE	Input Power							
.	.	.	.	1	12-24 VDC and 115-230 VAC, 50 to 60 Hz							
.	Electronics							
.	Microprocessor Controlled with User Interface.							
.	Two SPDT sealed relay contacts. Modbus via RS-485. 4-20 mA current loop.							
.	CODE	Local Enclosure						
.	1	Flameproof - Aluminum						
.	CODE	Cover - For Local Enclosure						
.	B	Blind Cover - Flameproof						
.	G	Glass Lens Cover - Flameproof						
.	CODE	Remote Electronics Enclosure & Cover						
.	0A	Not Required						
.	1B	Blind Cover - Flameproof						
.	1G	Glass Lens Cover - Flameproof						
.	CODE	Agency Approvals						
.	1	UL & CSA						
.	9	FM						
.	CODE	Language						
.	E	English						
828	R	A6	E	0020	C		1	G	0A	9	E	



Flow, Level, Interface & Temperature
Switch & Transmitter



Flow, Level, Interface & Temperature Switch & Transmitter

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Please refer to telematic.com for current specifications and configurations.

Model Number Legend
DOC#: ML-828-004

ML-828-004-[009]

This is a Controlled Document and cannot be changed without the Approval of the Quality Control Manager.

Application Considerations - Flow

Flow

Ideal Process Conditions

Liquids:

- Consistent process composition & temperature
- Sufficient straight run flow profile (minimizes turbulence)
- Recommended minimum of 5 pipe diameters from any disturbance

Air & Gas:

- Consistent process composition & temperature
- Sufficient straight run flow profile (minimizes turbulence)
- Clean and dry

Slurries:

- Consistent process composition & temperature
- Sufficient straight run flow profile (minimizes turbulence)

Emulsion:

- Consistent process composition & temperature
- Sufficient straight run flow profile (minimizes turbulence)

Undesirable Process Conditions

Liquids:

- Inconsistent process composition or temperature
- Insufficient straight run
- Turbulence
- Aerated fluids

Air & Gas:

- Inconsistent process composition or temperature
- Wet or saturated air/gas

Slurries:

- Inconsistent process composition or temperature
- Insufficient straight run
- Turbulence
- Aerated fluids

Emulsion:

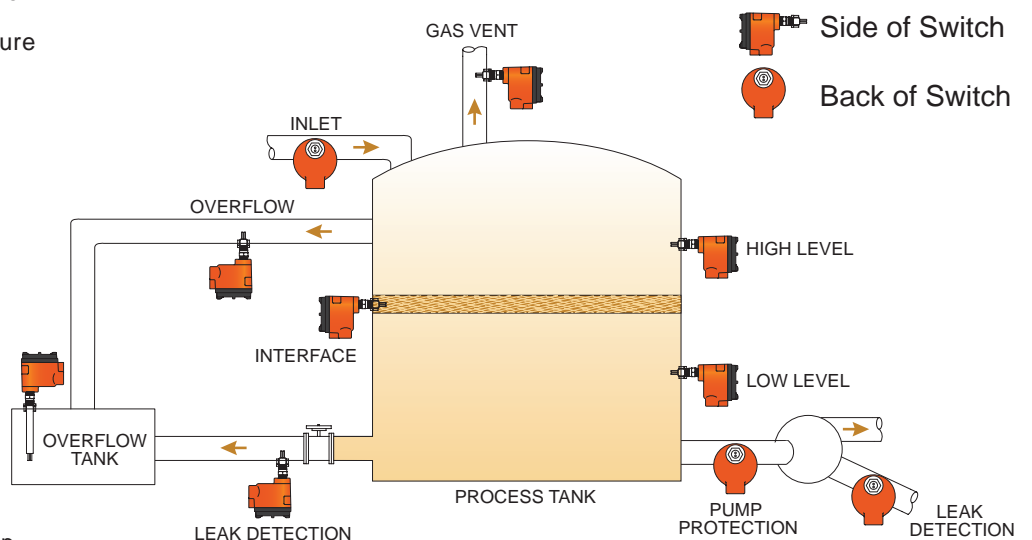
- Inconsistent process composition & temperature
- Insufficient straight run
- Turbulence
- Aerated fluids

Solids:

- Dry granulated processes are NOT good candidates for thermal switches

Application Principles - Flow, Level, Interface & Temperature

- ✓ Consistent process composition
- ✓ Consistent process temperature
- ✓ Clean or dirty process
- ✓ Liquids
- ✓ Dry air & gas
- ✓ Slurries
- ✓ Emulsion
- ✗ Aerated fluids
- ✗ Large temperature swings
- ✗ Wet or saturated air/gas
- ✗ Solids
- ✗ Sediment covering sensing tip

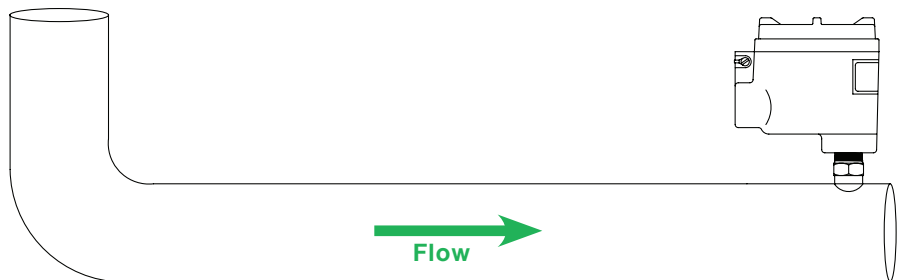


Mounting & Installation Diagrams for Flow

Flow

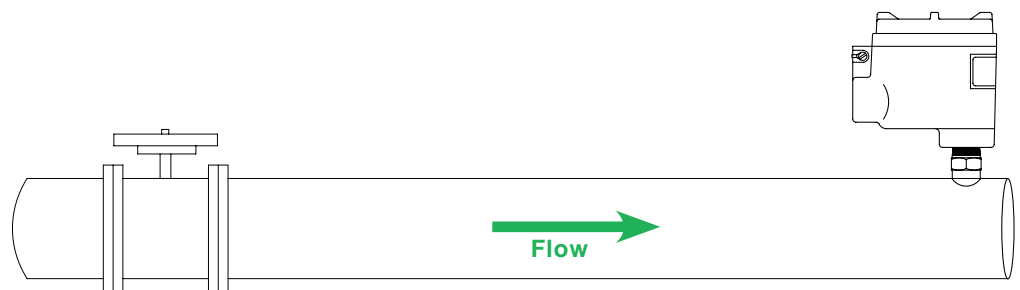
Bends, Elbows, etc.:

Good installation practice requires sufficient downstream placement of bends, expansions or reductions.



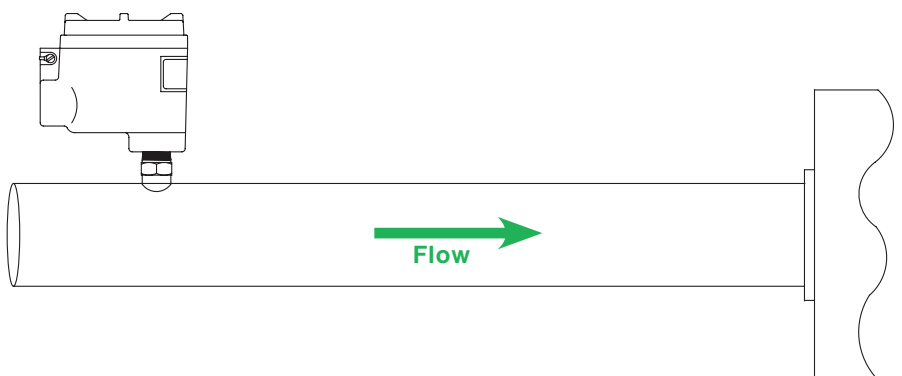
Valves, etc.:

Good installation practice requires sufficient downstream placement from isolation and control valves - especially if valves are only partially opened.



Pumps, Fans & Compressors:

Good installation practice requires sufficient downstream placement from pumps, fans and compressors. The preferred installation point for pump flow / no-flow detection is on the inlet side of the pump.



Note: Flow profiles will tend to be smoother as the downstream distance between the bend, elbow, valve, pump, fan or compressor and the switch increases.

Guidelines for Flow Applications (Liquids, Slurries, Air, Gas)

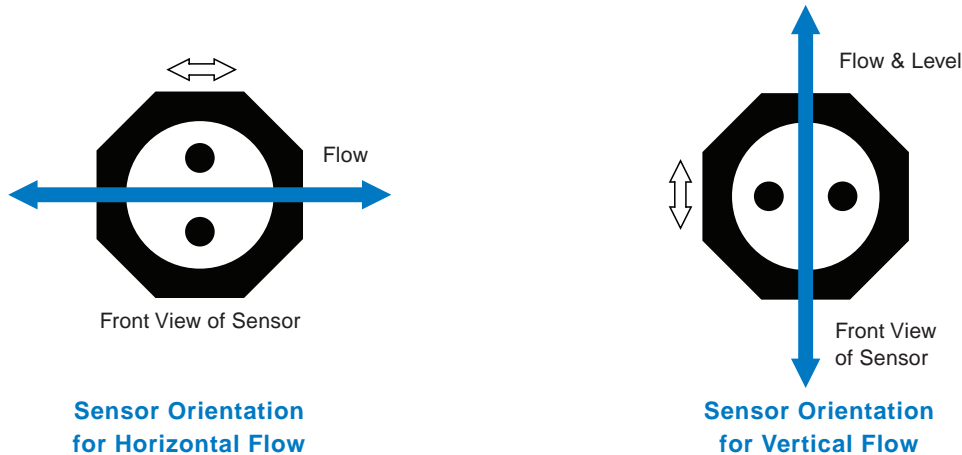
Flow

Mounting the Sensing Element:

- Ensure the arrows engraved on the sensor are oriented parallel to the process flow
- Liquids & Slurries: When mounted in a tee or section of pipe larger than the normal process pipe, position sensor in a vertical run of pipe with flow upward. This will prevent air or gas bubbles from becoming trapped around the sensing tip
- Avoid locations where sediment may accumulate and eventually isolate the sensing tip from the process. Situating the sensing tip in the sediment may prevent the switch from being able to sense any changes in the process as the sediment will insulate the sensing tip

Sensor Orientation

To optimize the sensor's performance and interpretation of the processes actions, ensure the sensor is positioned as outlined below:



Mounting Considerations:

- Where possible mount the sensor in the point of least turbulent flow.
- Pumps, fans, valves, or pipe bends of 90° or more may cause turbulence or significant variance in the flow which may affect the repeatability of the switch. When possible, care should be taken to minimize this possibility. Consult your local Representative or Kayden for questions or recommendations.
- Ensure the arrows engraved on the sensor are oriented parallel to the process flow.
- Liquids & Slurries: When mounted in a tee or section of pipe larger than the normal process pipe, position sensor in a vertical run of pipe with flow upward, this will prevent entrained air or gas from collecting around the sensing tip.
- Avoid locations where sediment may accumulate and eventually isolate the sensing tip from the process.
- **For pump flow/no-flow detecton the recommended installation point is on the inlet side of the pump.** The discharge side may have turbulence, reverse flow and an undeveloped flow profile. These factors may greatly reduce repeatability and accuracy.

Guidelines for Flow Applications (Liquids, Slurries, Air, Gas)

Flow

Horizontal Pipe - Side Mount (Ideal)

Ensure sensing tip is fully inside the pipe wall as a minimum and to the center of the pipe as a maximum. Avoid locations where sediment may accumulate and isolate the sensing tip from the process.

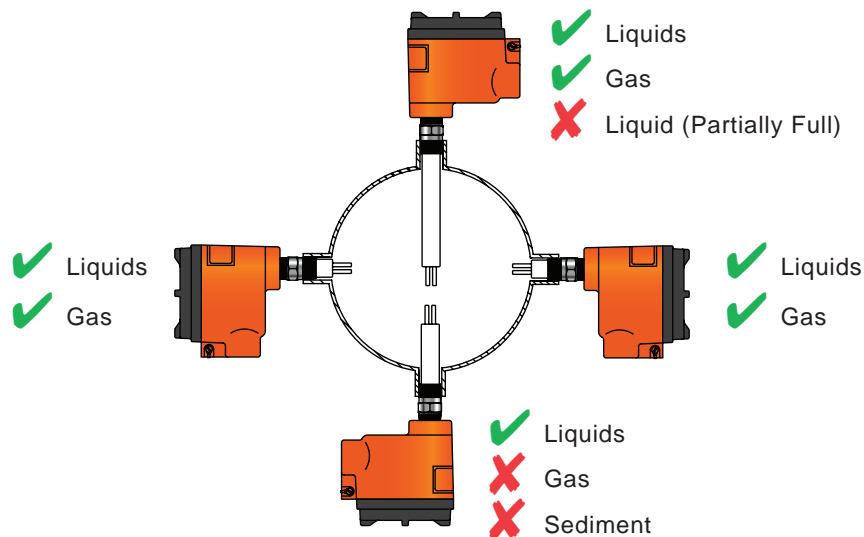
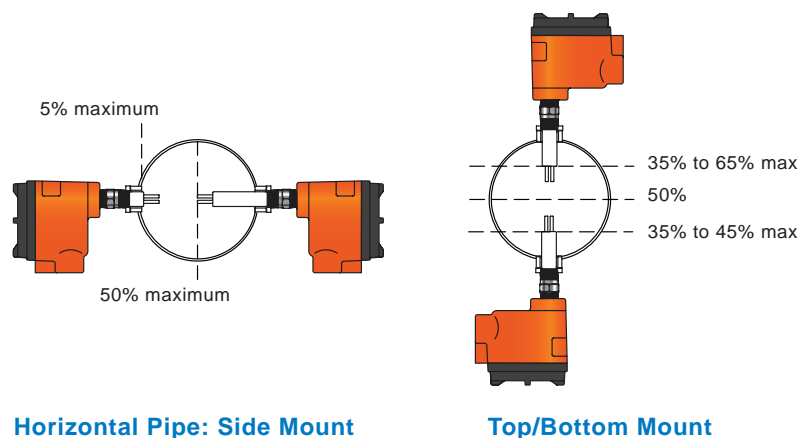
Horizontal Pipe - Top Mount

Ensure sensing tip is fully inside the pipe wall to a position where it will be constantly and fully exposed to the desired process in order for the flow or lack of flow to be recognized at any given time.

Horizontal Pipe - Bottom Mount

Ensure sensing tip is fully inside the pipe wall to a position where it will be constantly covered by the process in order for the flow or lack of flow to be recognized at any given time. Ensure the desired process covers the sensing tip – if the sensing tip is situated near the top of the pipe, the process must be filling the pipe to a level where the sensing tip is covered at all times. A wide selection of insertion 'U' lengths are available starting at 1.2".

Avoid locations where sediment may accumulate and eventually isolate the sensing tip from the process.



Sensor Positioning, Horizontal Pipe

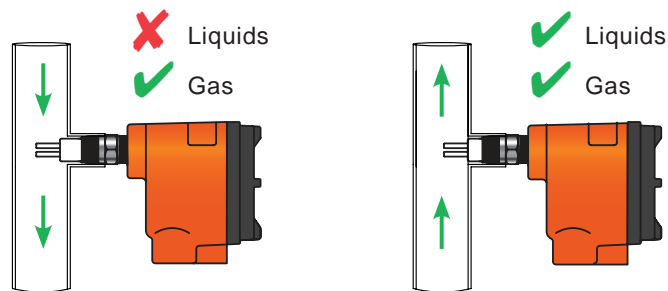
Guidelines for Flow Applications (Liquids, Slurries, Air, Gas)**Flow****Vertical Pipe - Side Mount (Acceptable)**

Ensure sensing tip is fully inside the pipe wall as a minimum and to the center of the pipe as a maximum.

Note: When installing the switch in vertical piping, Kayden strongly recommends installing thermal switches at a point of UPWARD process flow to ensure continued total immersion of the sensing tip.

Vertical Pipe - Side Mount - Downward Flow:

- Is only recommended for higher flow rates where the LINE IS KEPT FULL OF LIQUID/SLURRY
- For installation in a vertical gravity flow, the switch must be distant enough from an open outlet that air cavitation does not affect the sensing tip and cause a false flow signal. A constriction at the outlet avoids this problem.
- A waterfall effect will occur in vertical pipe with low flow rates. Also, the process is likely to become substantially aerated. The switch will interpret the aeration as a substantially lower flow rate and possibly cause a false low flow alarm.



Sensor Positioning, Horizontal Pipe

Vertical Pipe - Side Mount - Top & Bottom Mount (Less Desirable)

Positioning the sensor on a corner or elbow is not recommended as the process will be turbulent. The switch may interpret the turbulence as a constantly changing flow rate and fail to alarm as required.

Application Considerations - Level

Level

Ideal Process Conditions

Liquids:

- Consistent process composition
- Non-turbulent

Slurries:

- Consistent process composition

Emulsion:

- Consistent process composition

Undesirable Process Conditions

Liquids:

- Inconsistent process composition
- Turbulence
- Large temperature swings

Slurries:

- Inconsistent process composition
- Turbulence
- Large temperature swings

Emulsion:

- Inconsistent process composition
- Turbulence
- Large temperature swings

Solids:

- Dry granulated processes are NOT good candidates for thermal switches

Application Considerations - Interface

Interface

Ideal Process Conditions

Liquids:

- Liquid to Liquid:
- Consistent process composition & temperature
- Non-turbulent applications
- Large differential in thermal conductivities

Air or Gas to Liquid:

- Consistent process composition & temperature
- Non-turbulent applications
- Dry gas

Emulsion:

- Consistent process composition & temperature
- Large differential in thermal conductivities

Undesirable Process Conditions

Liquid to Liquid:

- Inconsistent process composition or temperature
- High aeration
- High turbulence
- Small differential in thermal conductivities

Air or Gas to Liquid:

- Inconsistent process composition or temperature
- High turbulence

Emulsion:

- Inconsistent process composition or temperature
- High aeration
- High turbulence
- Small differential in thermal conductivities

Solids:

- Dry granulated processes are NOT good candidates for thermal switches

Point Level & Fluids Interface

Liquid Level

Mounting Considerations:

- Where possible mount the sensor in the point of least turbulence
- Agitators, bubblers, valves, or screens may affect the repeatability of the switch.

Note: When possible, care should be taken to minimize this possibility. Consult your local Representative or Kayden for questions or recommendations

- Ensure the arrows on the sensor are oriented parallel to the process surface
- Keep sensing tip clear of any mixing devices that may cause damage

Tanks and Vessels - Side Mount (Ideal)

Ensure sensing tip is fully inside the tank wall as a minimum.

Tanks and Vessels - Top Mount

Ensure sensing tip is fully inserted to the desired sensing point.

Kayden RCM Software



- Use the RCMS program to **change Set Points 1 & 2**, adjust Relay modes, **adjust the Start-up Bypass Timer** and **Set Point Delays**, set the heater to optimize response, **lock or unlock the Display Panel** when **security** and/or settings are critical, visualize the actions of the process via the graphical display and many other features
- Requires an RS-485 adapter such as the Kayden SCA and a communication cable
- Provides an additional interface for all CLASSIC 800 models

Part Number: A11-SFT

Converters / Adapters - USB to RS-485

USB to RS-485 Adapter

Combines functions of USB to DB-9 and DB-9 to RS-485. Driverless functionality with newer operating systems.

Part Number A15-323



Communication Cable

Communication Cable is used to connect the SCA (Serial Communication Adapter) to the switch.

Standard Lengths: 4, 8 & 10 feet.

Part Number: **A05-CC-0004** 4 feet
 A05-CC-0008 8 feet
 A05-CC-0010 10 feet



These items can be purchased separately but are required to use the Kayden RCM software.

Equipment Tags



Stainless Steel Tags

Stainless Steel tags are attached with stainless steel wire to the switch. Please provide the exact information to be engraved.

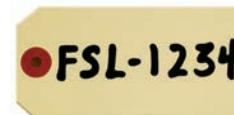
Part Number: A20-0001



Lamacoid Tags

Lamacoid equipment tags are applied with double sided tape to any product. Please provide the exact information to be engraved.

Part Number: A20-0002



Paper Tags

Select paper tags when temporary labeling is required. Please provide the exact information.

Part Number: A20-0003

Interconnecting Cable for Remote Electronics

Kayden's cables are used to connect sensors to remote electronics. Kayden offers cables for both hazardous and general purpose locations. Cables and cable fittings are pre-assembled and fitted at Kayden's factory to ensure integrity of all connections.

Non-Armored Cable



Assembly includes heat shrink with crimp ferrules.

(Strain relief fittings are not included, however are available as an option).

Construction: 8 color coded conductors 20 AWG, shielded cable, PVC jacket.

Voltage Rating: 30 volts RMS

Temperature Rating: -4°F to +176°F (-20°C to +80°C)

Part Number: A05-GP-xxxx (xxxx = length in feet)

Armored Cable

General Purpose (Non-hazardous) Cable & Connector Assembly



Assembly includes 2 general purpose cable fittings.

Construction: 8-strand concentric, Class B tinned copper, .020" PVC insulation, individual and overall foil shield, color & number coded, drain and Mylar separator, PVC inner jacket, aluminum interlock armor, PVC outer jacket.

Voltage Rating: 300 volts

Temperature Rating:

-40°F to +194°F (-40°C to +90°C);
insulation rated @ 221°F (105°C)

Part Number: A06-GP-xxxx
(xxxx = length in feet)

Flameproof Cable & Connector Assembly



Assembly includes 2 sealed XP cable fittings and sealing compound.

Construction: 8-strand concentric, Class B tinned copper, .020" PVC insulation, individual and overall foil shield, color & number coded, drain and Mylar separator, PVC inner jacket, aluminum interlock armor, PVC outer jacket.

Voltage Rating: 300 volts

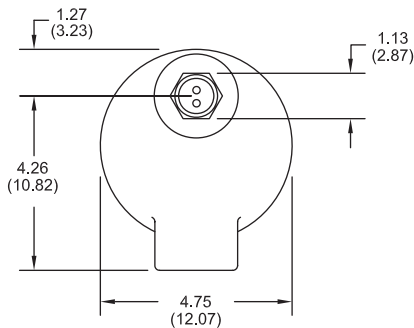
Temperature Rating:

-40°F to +194°F (-40°C to +90°C);
insulation rated @ 221°F (105°C)

Part Number: A06-XP-xxxx
(xxxx = length in feet)

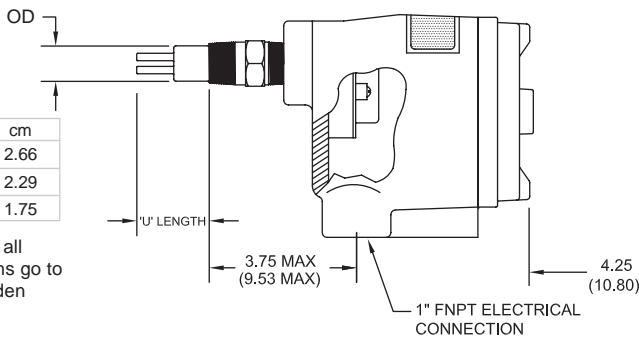
CLASSIC™ 810 Threaded

Inches (cm)

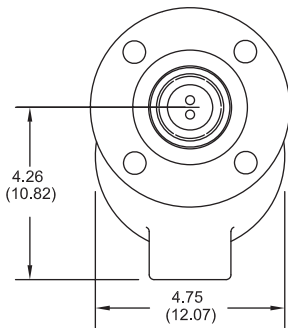


	Inches	cm
RAE	1.05	2.66
RAD	0.90	2.29
RAC	0.69	1.75

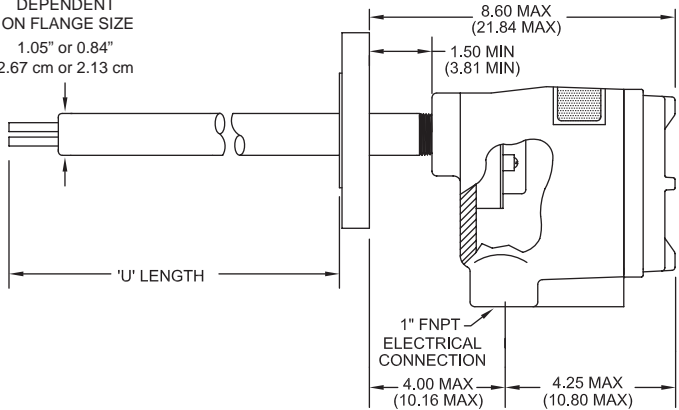
For dimensions on all process connections go to telematic.com/kayden



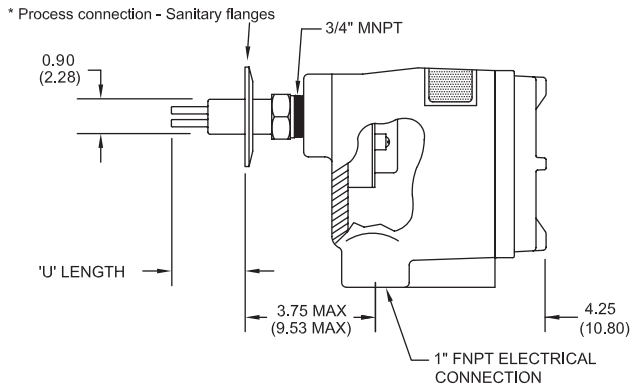
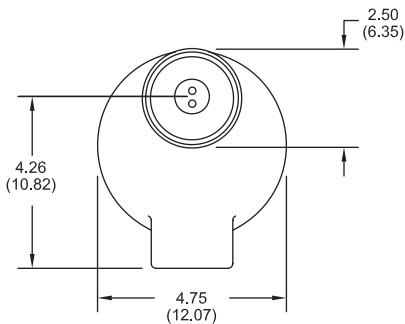
CLASSIC™ 812 Flanged



DEPENDENT
ON FLANGE SIZE
1.05" or 0.84"
2.67 cm or 2.13 cm

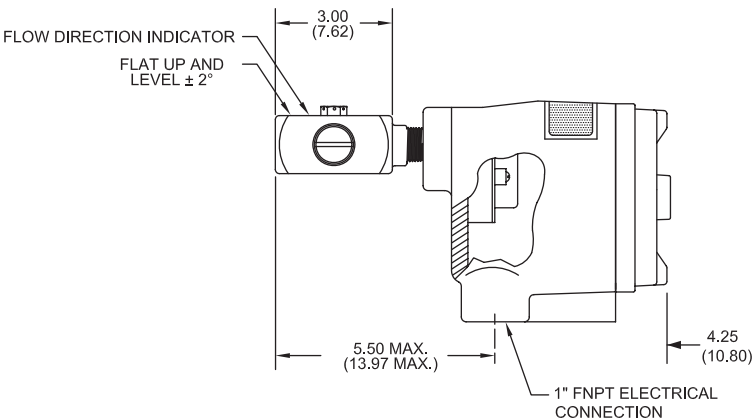
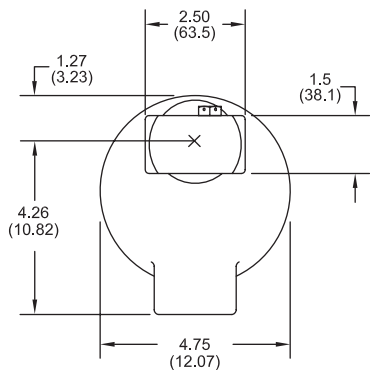


CLASSIC™ 828 Sanitary Flanged

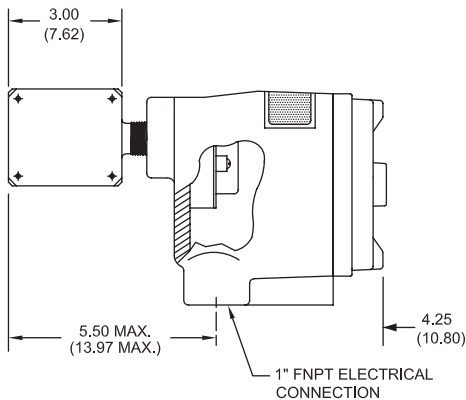
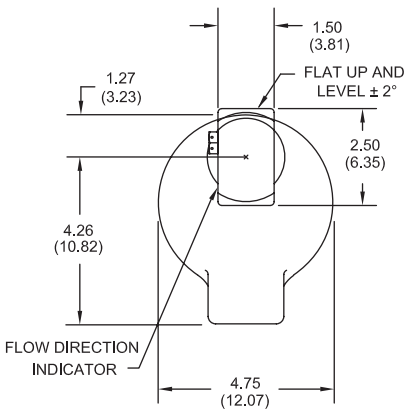


CLASSIC™ 830 InLine Threaded (Horizontal)

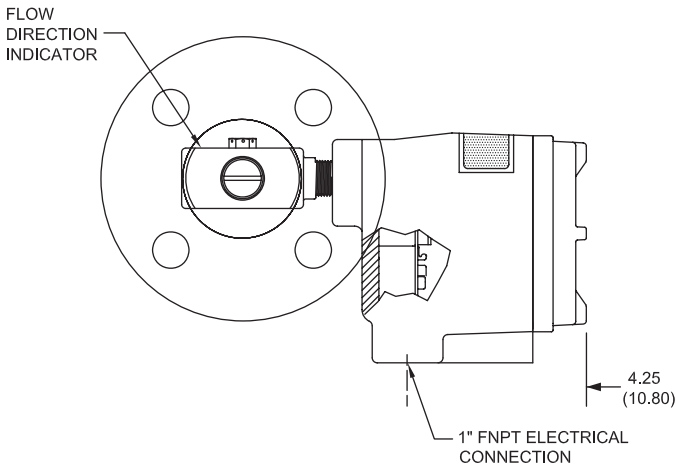
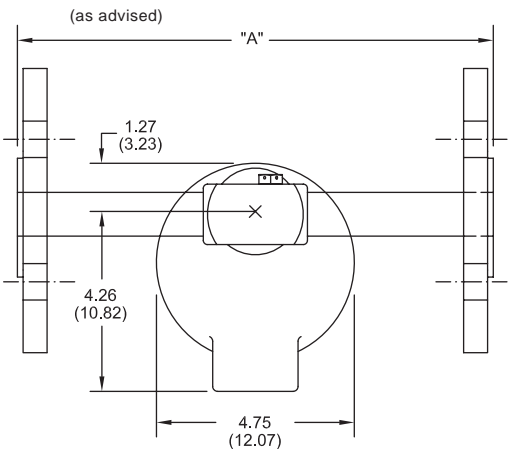
Inches (cm)



CLASSIC™ 830 InLine Threaded (Vertical)

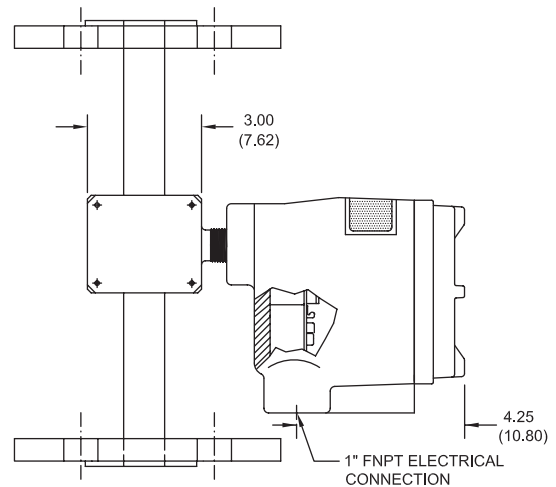
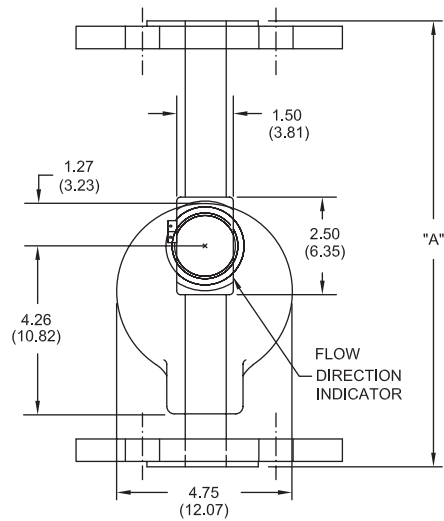


CLASSIC™ 832 InLine Flanged (Horizontal)



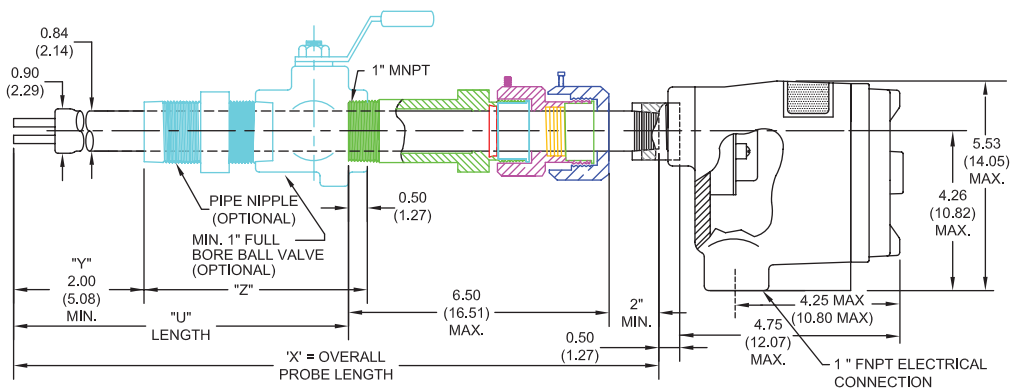
CLASSIC™ 832 InLine Flanged (Vertical)

Inches (cm)



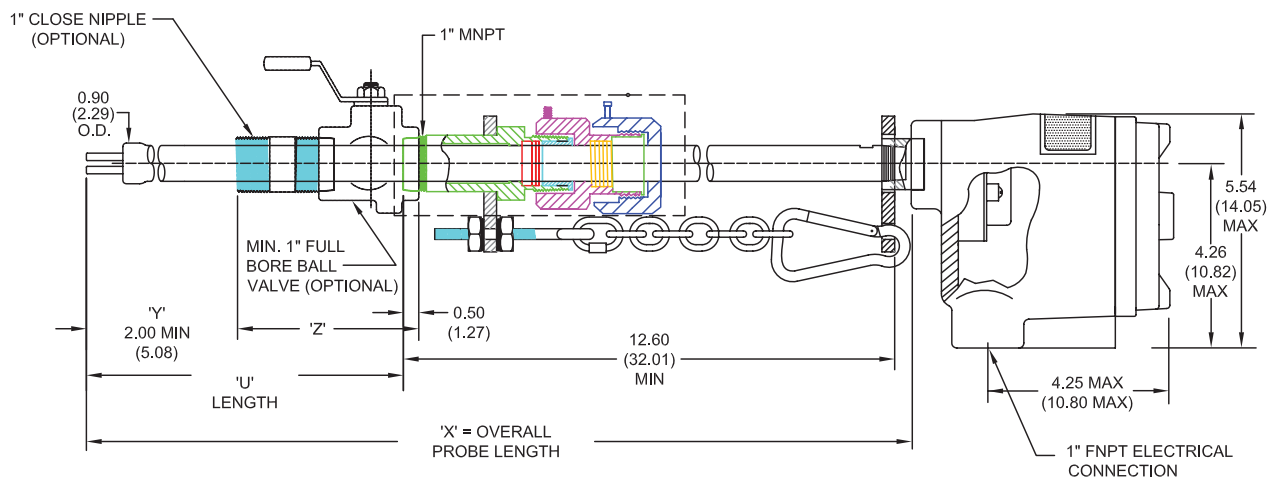
CLASSIC™ 816 Retractable Packing Gland Threaded

1" MNPT - 50 psi



CLASSIC™ 816 Retractable Packing Gland Threaded

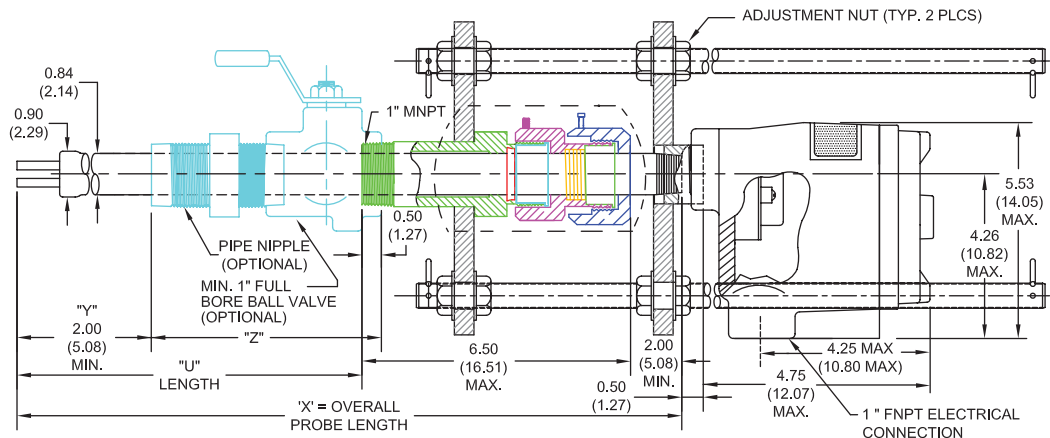
1" MNPT - c/w Retaining Chain - to 125 psi



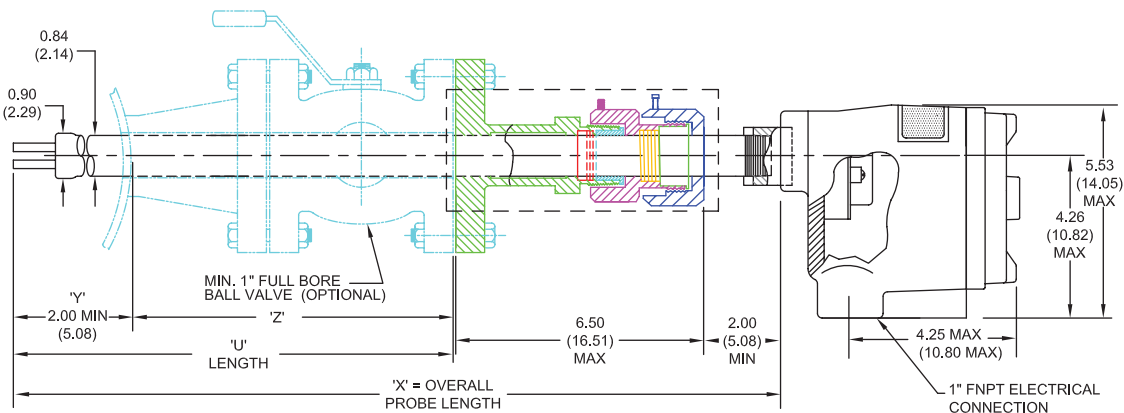
CLASSIC™ 816 Retractable Packing Gland Threaded

1" MNPT - 275 psi

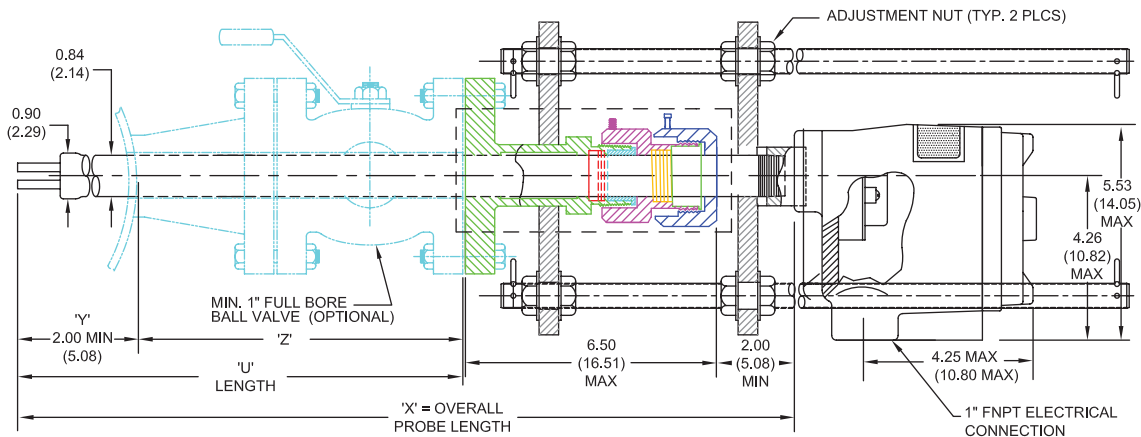
Inches (cm)



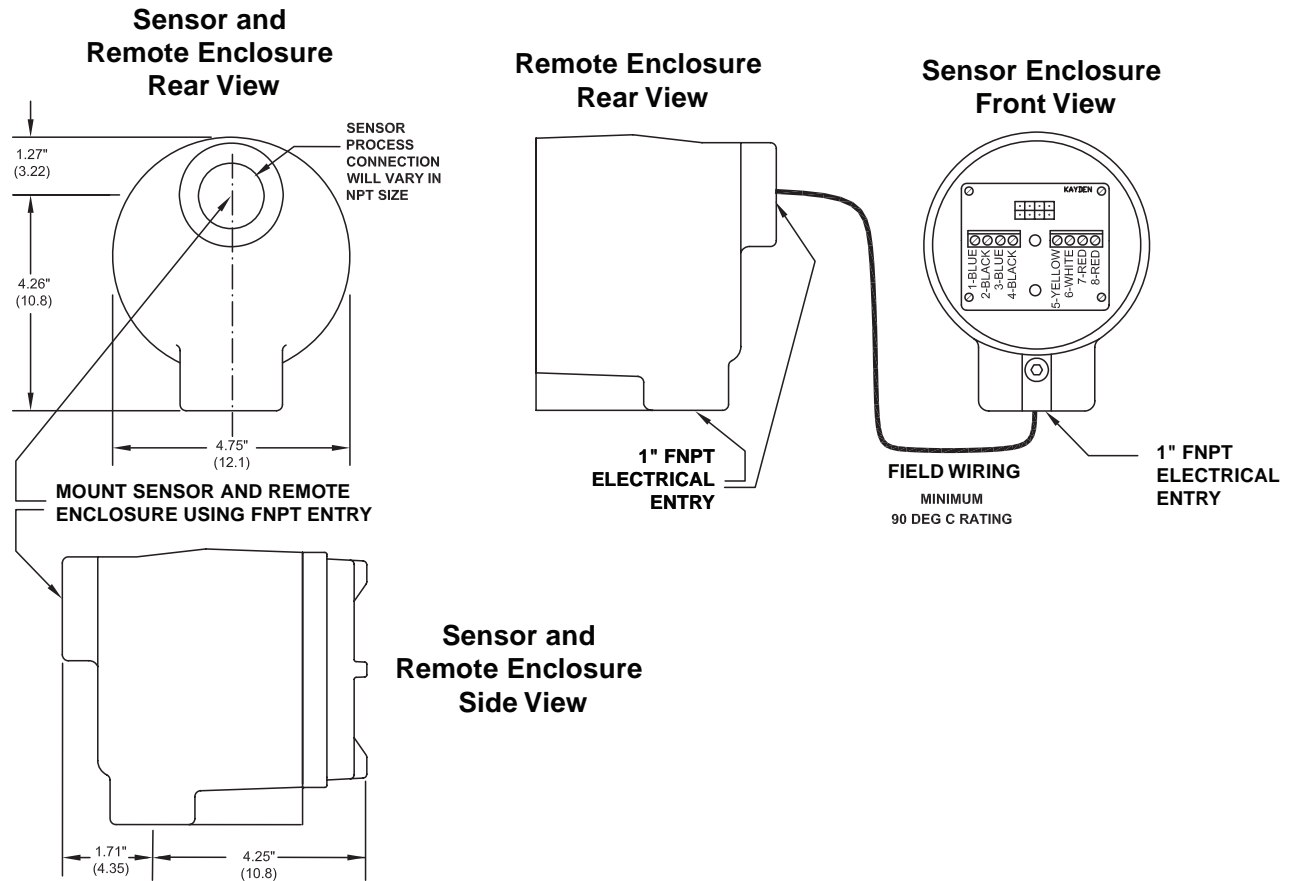
CLASSIC™ 814 Retractable Packing Gland Flanged - to 50 psi



CLASSIC™ 814 Retractable Packing Gland Flanged - to 275 psi

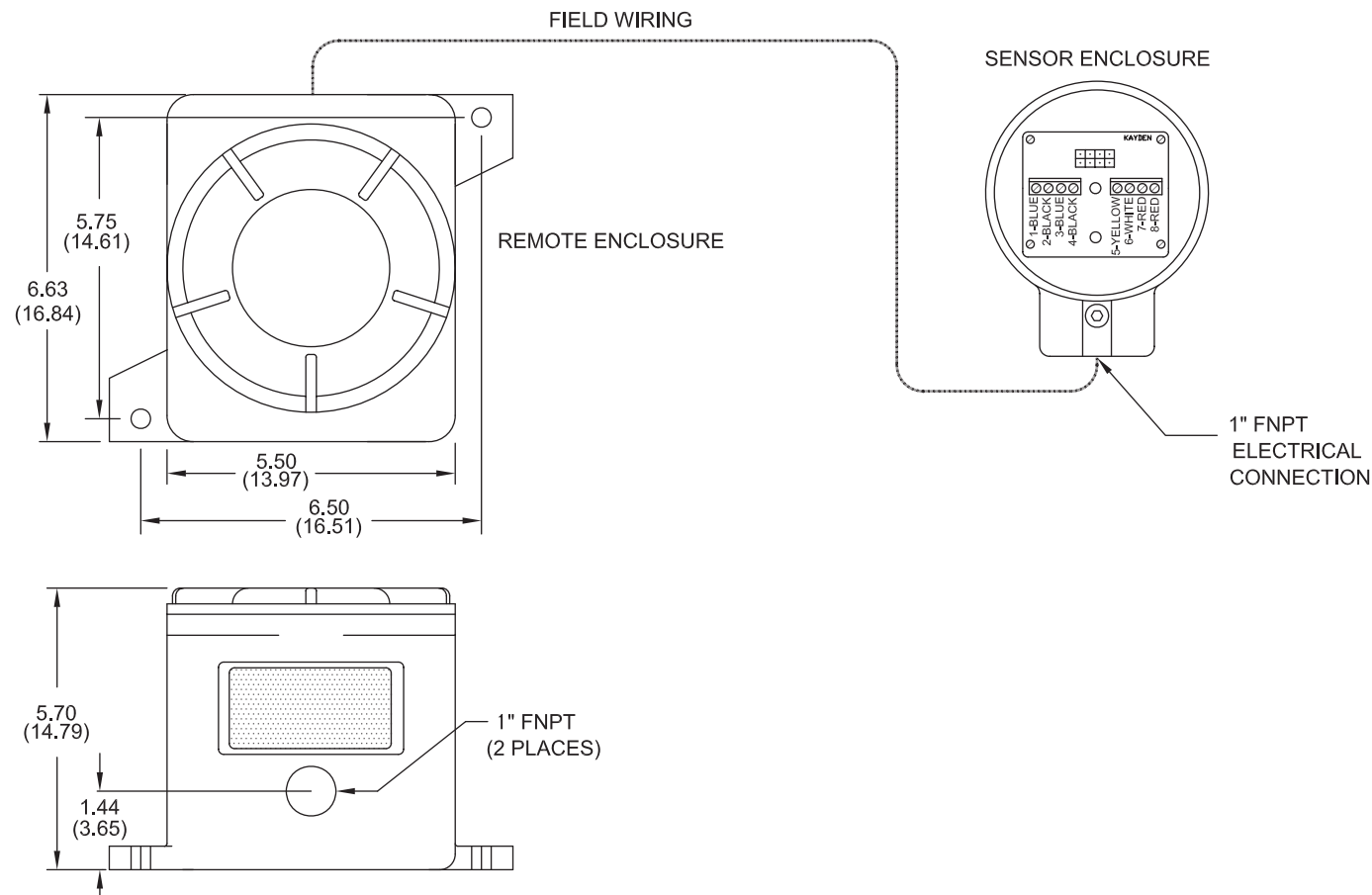


Remote Electronics Enclosure - Flameproof (FM)



Note: Suitable for one (1) Classic Electronics Module.

Remote Electronics Enclosure - Flameproof (CSA)



Note: Suitable for one (1) Classic Electronics Module.

Notes

Notes

Notes




FEATURES	CLASSIC™ 800 Series
Flow	✓
Level ¹	✓
Interface - Liquid / Slurry	✓
Temperature ²	✓
Process Media	
Liquids	✓
Air & Gases	✓
Slurries	✓
Interface	✓
Features	
4-20 mA Analog Output	✓
Temperature Mode ²	✓
Relay Contacts	Dual SPDT
Start-up Bypass Timer ³	✓
Adjustable Set Point Deadbands	✓
Display Panel Lock-Out ⁴	✓
Remote Communications ⁵	✓
Input Power	
12-24 VDC; 115-230 VAC, 50-60 Hz	✓
Remote Mount Electronics	
CSA Approved (Class I, Div. 1) Enclosures	✓
FM Approved (Class I, Div. 1) Enclosures	✓
Agency Approvals	
CSA - ANSI/UL Class I, Div. 1	✓ Groups B, C & D
FM Class I, Div. 1	✓ Groups B, C & D
Canadian Registration Number (CRN) ⁶	✓

Notes:

 DOC#: PC-004 Effective: October 2015
 PC-004-[004]

1. Point Level: physical location of the probe determines sensing point.
2. Requires Kayden RCMS and the Modbus communications (see note 5 below). Relay 2 may be configured to actuate on process temperature while the switch functions in a traditional Flow or Level application.
3. Adjustable from 0 - 100 seconds, the Start-up Bypass Timer is useful when restarting a pump.
4. The programming buttons on the Display Panel of the switch may be disabled using the Kayden RCMS and the Modbus communications.
5. Modbus RS-485; requires Kayden RCMS (included at no charge upon request), a Serial Communication Adapter (SCA) or USB Adapter and communications cable are available.
6. Visit telematic.com for CRN information per model and jurisdiction.

CLASSIC™ 800 Features Overview

Series	CLASSIC™ 800
Models & Applications	810, 812, 814, 816, 828, 830 & 832 Flow, Level, Interface & Temperature
Process Connections	810: 1/2" to 2" MNPT Threaded 812: Flanged 814: Flanged Retractable Packing Gland 816: 1" MNPT Threaded Retractable Packing Gland 828: 1" to 3" Sanitary Tri-Clamp® 830: 3/4" FNPT (InLine) 832: Flanged (InLine)
Insertion 'U' Lengths	1.2", 2", 3", 4", 6", 9", 12" & 18" Standard (most models) Custom lengths available to 240"
Sensor Material	316/316L Stainless Steel, Titanium Gr. 2, Hastelloy C-276 & Monel 400 830 & 832: 316/316L Stainless Steel c/w Nickel Braze 828: 304/316/316L Stainless Steel
Remote Electronics Option	Explosion-proof - Standard
Input Power	Universal AC & DC
Power Consumption	Maximum: 6.0 watts (fully configured)
Communications	RS-485
Outputs	Two SPDT sealed relay contacts 4 amps resistive 230 VAC / 24 VDC Modbus via RS-485. 4-20 mA current loop
Temperature Compensation	Yes
Operating Temperature - Sensor	Continuous Use: -45°C to +200°C (-50°F to +392°F) 814 & 816: -45°C to +160°C (-50°F to +320°F)
Operating Temperature - Electronics	Continuous Use: -55°C to +65°C (-67°F to +167°F)
Operating Pressure - Sensor	Maximum Design Pressure: 24 MPa (3500 psig) Temperature derated. Visit telematic.com for pressure ratings per model.
Self-Test	Automated diagnostics performed on electronics & sensing elements
Agency Approvals	  

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- 60 calendar days from the date of invoice.
- Up to twenty-five (25) Standard Products of any type or combination per order. Should the customer, for any reason, be unsatisfied with any or all of the Products, he/she may return any or all of them for a full refund.

Visit telematic.com to view the 60-Day 100% Satisfaction Guarantee in detail.

Warranty

One (1) Year from shipment date from factory (see Terms & Conditions of Sale).

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For more information about the CLASSIC Series or any of Kayden's other products, please visit telematic.com

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