

Application Note

Application Note: 013107A

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

Pump Monitoring & Protection

Application: Pump Monitoring and Pump (motor) Protection

Product: Kayden CLASSIC 800 Series Thermal Dispersion Flow, Level, Interface & Temperature Switch & Transmitter

Description:

Provide a rugged and reliable means for pump protection and monitoring.

- Shut down the pump (motor) when the inlet line is dry / empty
- Automatically re-start the pump when the flow of the process material is restored
- Provide an alarm when blockages occur in the pipeline
- React to changes in the flow rate & temperature if desired.

Problem:

It is difficult to find one device that can be configured for a wide variety of flow conditions and will not require frequent maintenance.

To perform well in this application the flow switch must resist failures caused by:

- Corrosion and / or “sludging”
- Vibration
- Water contamination - feed water and cooling water often contain high mineral content & sediment
- Electromagnetic interference from motors (etc).
- Difficult and/or controlled access points limit monitoring and daily maintenance

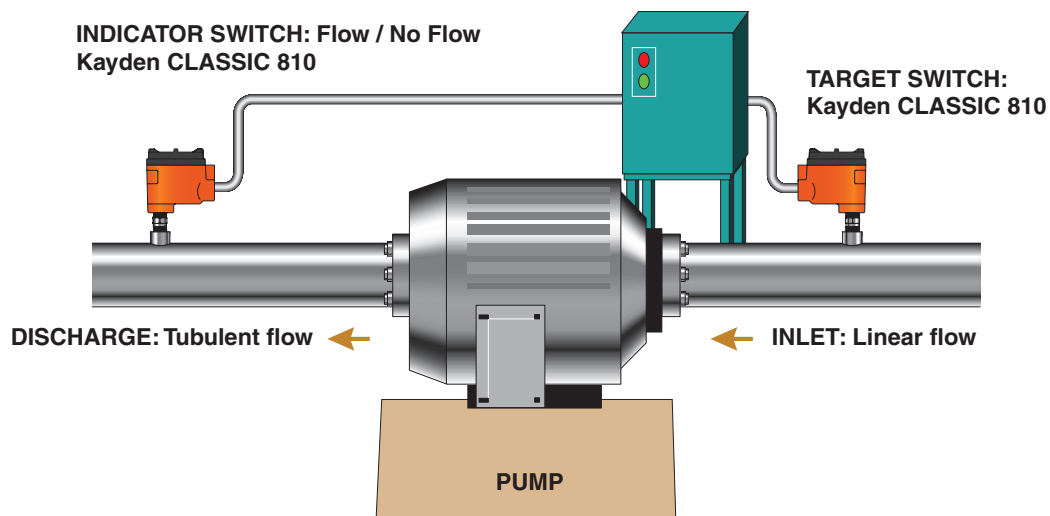


Figure 1 - Kayden Classic used in pump protection / monitoring

Solution:

Every Kayden **CLASSIC 800 SERIES** Thermal Dispersion Flow, Level, Interface & Temperature Switch & Transmitter is configurable by the user for flow, level, interface level and/or temperature indication in air, gases, oil, water, liquids and slurries. **The digital electronics are configured by the user for each application and are 100% interchangeable.**

- Unlike float, paddle or gap switches, Kayden switches are built specifically for demanding applications, remote locations and harsh conditions while providing remote user access.
 - Easy Display Panel controls and an LED display make setup fast and easy
 - No-moving-parts design and all-welded sensors eliminate drift and sensor failures
 - Digital electronics provide precise adjustment and optimum repeatability. No calibration is required
 - Automatic, continuous self-diagnostics with auto-alarm function
- The Kayden **CLASSIC 800** may be set to alarm via either of the two (2) independent relay contacts and / or a 4-20 mA analog output, on flow (or increasing) or no-flow (decreasing)
- The heater power, range limits, and relay set point(s) are independently and incrementally configured and may be quickly and easily adjusted via the Display Panel push buttons (no trim pots!). This allows the CLASSIC 800 Series switch to achieve application-specific response times and to eliminate “nuisance alarms”

Start-Up Bypass Timer:

The Start-Up Bypass Timer makes it possible to disable the pump on low flow and have it restart automatically after a predetermined time.

- The Start-Up Bypass Timer allows users to set the delay from 0 to 100 seconds, in 5 second increments.
- The Start-Up Bypass Timer is a programmable feature of Kayden’s digital electronics and as such requires no additional wiring or hardware.
- In the event of a power interruption the Start-Up Bypass Timer will automatically re-start the pump as desired at power-on or restart.
- During the Bypass Delay both relays are energized regardless of their mode or the value of the Thermal Signal.

Important Guidelines for Installation and Operation in Pump Monitoring Applications:

INLET or OUTLET?:

The diagram on page 1 shows the Kayden flow switch installed as a “Target Switch” on the INLET side, and as an “Indicator Switch” on the OUTLET side of the pump.

It is almost always preferable to install the flow switch on the INLET side of the pump.

- The flow will be (much more) linear on the inlet side and the probe (flow switch) is less likely to be affected by “low flow” that is actually seeping or “chugging” on the outlet side

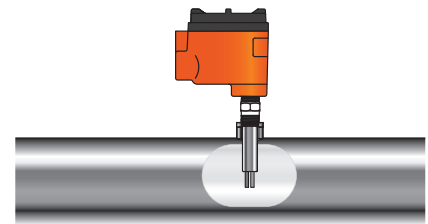


Figure 2 – Kayden CLASSIC 810 with 4”U length installed in a 6” pipe with a 1” weldolet.

- In this position the switch may be configured to react to a specific flow range or to indicate increasing / decreasing flow

If the flow switch has been, or must be, installed on the OUTLET side of the pump.

- The Kayden switch will work as a flow / no-flow indicator when installed on the outlet side. However as the turbulence will effect the switch, more care must be taken to properly configure the range (0% - 100% Thermal Signal) and set point(s) (relay 1 and / or 2) to avoid false indications
- When installed on the outlet side significant changes in fluid temperature or composition (oil to water for example) may require an adjustment to the programming of the switch

Note: Insertion Depth / Probe “U” Length

The diagram below illustrates a Kayden flow, level, interface and interface switch with a 4” ‘U’ installed in a 6” pipe in a typical top-mount pipe installation. It is extremely important to remember two (2) factors when determining the correct ‘U’ length:

- The dimension of the weldolet (1” in this example) must be added to the diameter of the pipe to correctly size the ‘U’ length of the flow switch. In this case the 4” ‘U’ probe will be in the center of the 6” pipe with the 1” weldolet
- If the pipe may have flow, but not be completely full, the probe must extend far enough into the pipe that the sensors are immersed



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

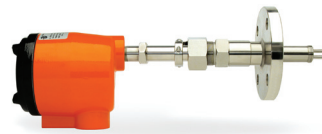
Applicable CLASSIC™ 800 Models



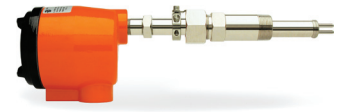
CLASSIC™ 810



CLASSIC™ 812



CLASSIC™ 814



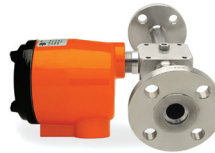
CLASSIC™ 814



CLASSIC™ 828



CLASSIC™ 830



CLASSIC™ 832

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Distributors

Visit kayden.com to find a local Distributor near you. Kayden Distributors provide local inventory, technical support and service.



For more information about the CLASSIC 800 Series or any of Kayden's other products, or to learn more about Kayden, please visit kayden.com