Application Note

Application Note: 013107A

KAYDEN INSTRUMENTS

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.

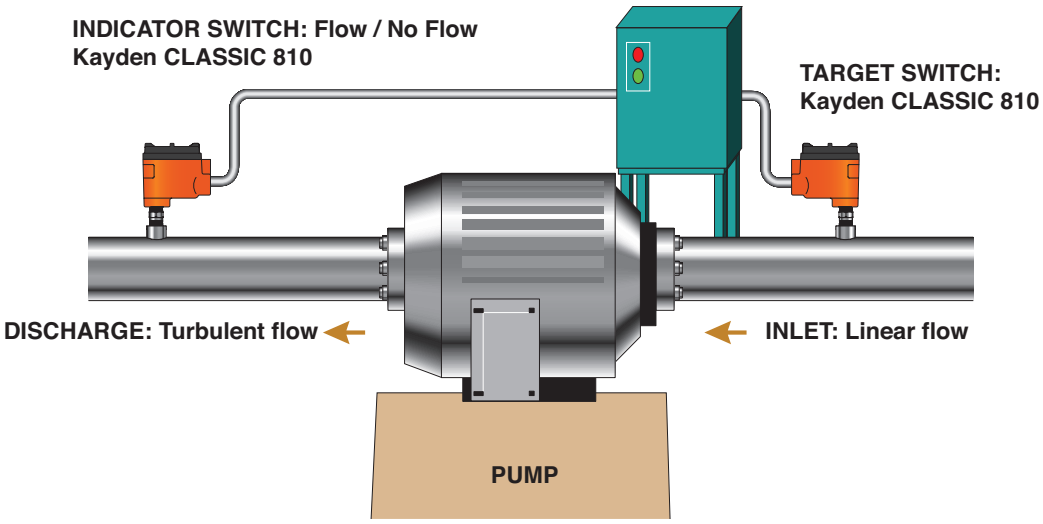


Figure 1 - Kayden Classic used in pump protection / monitoring

Solution

Every Kayden **CLASSIC 800 SERIES** Thermal Dispersion Flow, Level, Interface & Temperature Switch & Transmitter is configurable by the user for flow, level, interface and/or temperature with air, gases, liquids or 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 (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?

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

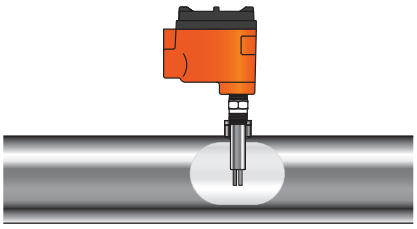


Figure 2 - Kayden CLASSIC 810 with 4”U length installed in a 6” pipe with a 1” weldolet.

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 turbulence will affect 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

Display Panel

Display Panel Indicators:

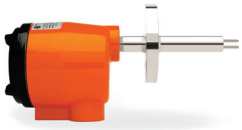
Relay 1	On steady when Relay 1 is energized
Relay 2	On steady when Relay 2 is energized
Fault	Indicates a self-test error or fault condition
Set Point 1	On steady when viewing Set Point 1
Set Point 2	On steady when viewing Set Point 2
Run Mode	Flashing when switch is operating
Bypass	Flashing when the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

The Thermal Signal increases as:

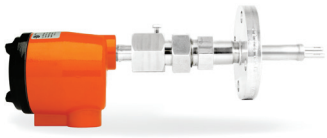
Flow	The flow rate increases
Level	The sensor is submerged
Interface	The sensor is submerged by the second liquid of greater thermal conductivity

Applicable CLASSIC® 800 Models

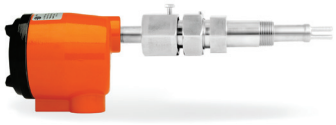
CLASSIC® 810



CLASSIC® 812

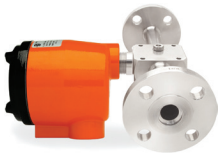


CLASSIC® 814



CLASSIC® 816

CLASSIC® 830



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Ordering Information

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Distributors

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