



FLO-CORP.com

SWITCHGUARD PLUS™ CFSG2

Flow & Temperature Switch w/ Compat Relay Controller

OPERATING INSTRUCTIONS



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Description

The CalFlo SwitchGuard Plus is a self-contained flow switch/controller with the option of adding an integral strobe light for operator visual alarm. The SwitchGuard Plus electronics is housed in a poly-pro NEMA 4X enclosure with a 1/2" conduit entry port on the side of the enclosure. The controller is designed to receive a signal from the integral flow sensor and either opens or closes a relay upon presence of flow or no-flow and changes the relay back again when the condition reverses. The relay in the controller is a single pole, double throw type and is rated for 10 amp. The connection can be made on the normally open or normally close side of the relay. There is an INVERT switch on the controller to reverse the signal and turns the internal relay either on or off. A time delay of 0-60 seconds can be set before the relay responds to the sensor signal.

Installation and Instructions

Install the SwitchGuard Plus by inserting the 1/2" MNPT threaded sensor tip into a tapped pipe or T-fitting. Use Pipe Tape or Plumbers Putty on NPT threads to aid in sealing. Tighten firmly, but do not over tighten as this could damage the NPT threads and prevent proper sealing.

Field connections should be made in the SwitchGuard Plus following the safety instructions on page 2.

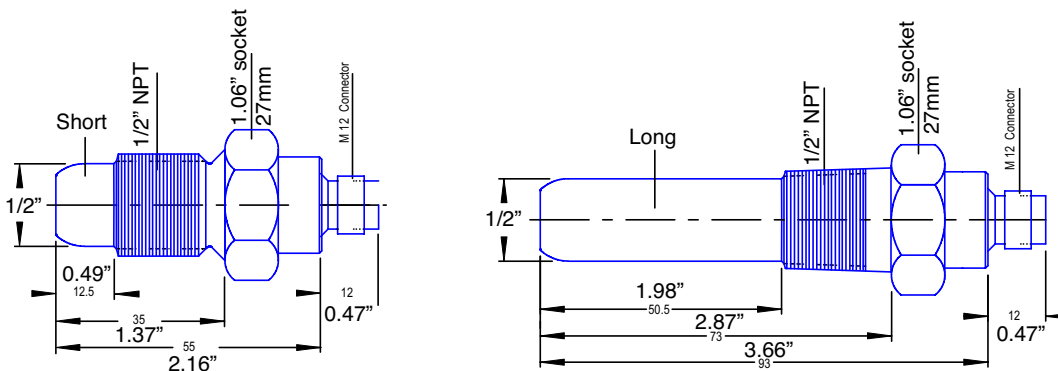
Upon initial power-up the unit will provide a temporary output as the unit is adjusting to the zero flow rate of the media. After approximately 10-15 seconds the output will turn off. Once the unit output has turned off, the unit is ready for operation. Once the threshold of the unit set point (approx. 1-1.3 feet/second) is reached the output will turn on.

As the SwitchGuard Plus unit also monitors the media temperature, the unit will provide a loss of signal if the temperature of the media goes above the threshold of the unit temperature set point (typically 122°F or 158°F), even with proper media flow.

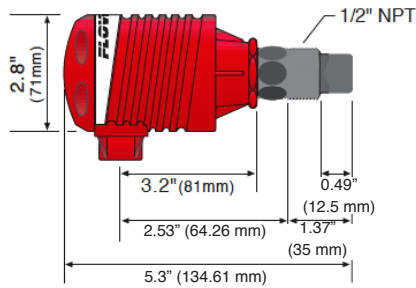
Note: Use caution while installing the SwitchGuard Plus so as not to damage the tip of the sensor. The electronics are embedded just behind the tip of the SwitchGuard Plus and denting or bottoming out of the tip could cause damage.

Maintenance is not required, as the SwitchGuard Plus has no moving parts. However, should the sensor become coated after a period of time in operation due to water or media conditions, simply wipe the probe with a soft cloth and alcohol.

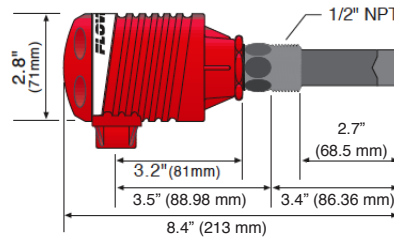
Sensor Dimensions In (mm)



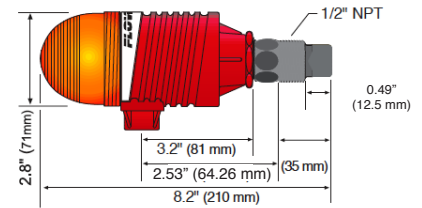
Sensor & Controller Dimensions In (mm)



Dimensions (w/ short sensor)



Dimensions (w/ long sensor)



Dimensions
(w/ short sensor & strobe light)

Safety Instructions

Electrical Shock Hazard

It is possible to contact components on the controller that carry high voltage, causing serious injury or death. All power to the controller and the relay circuit(s) it controls should be turned OFF prior to working on the controller. If it is necessary to make adjustments during powered operation, use extreme caution and use only insulated tools. Making adjustments to powered controllers is not recommended. Wiring should be performed by qualified personnel in accordance with all applicable national, state and local electrical codes.

Flammable or Explosive Applications

Sensor mount controllers should not be used with explosive or flammable liquids, which require an intrinsically safe or classified area rating

Relay Contact Rating

The relay is rated for a 10 amp resistive load. Many loads (such as a motor during start-up or incandescent lights) are reactive and may have an inrush current characteristic that may be 10 to 20 times their steady-state load rating. The use of a contact protection circuit may be necessary for your installation if the 10 amp rating does not provide an ample margin for such inrush currents.

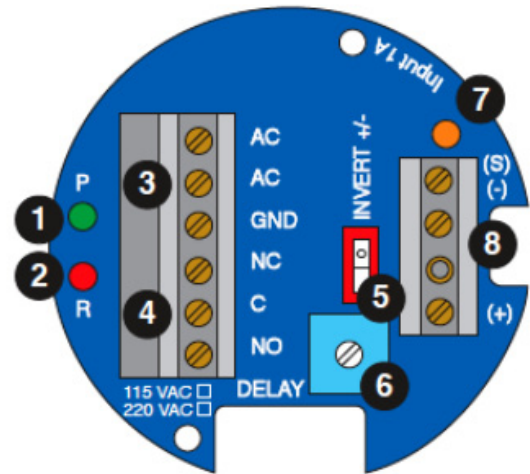
Make a Fail-Safe System

Design a fail-safe system that accommodates the possibility of relay or power failure. If power is cut off to the controller, it will de-energize the relay. Make sure that the de-energized state of the relay is the safe state in your process. For example, if controller power is lost, a pump filling a tank will turn off if it is connected to the Normally Open side of the relay.

While the internal relay is reliable, over the course of time relay failure is possible in tow modes: under a heavy load the contacts may be "welded" or stuck into the energized position, or corrosion may build up on a contact so that it will not complete the circuit when it should. In critical applications, redundant backup systems and alarms must be used in addition to the primary system. Such backup systems should use different sensor technologies where possible.

Important Indicators for Operating

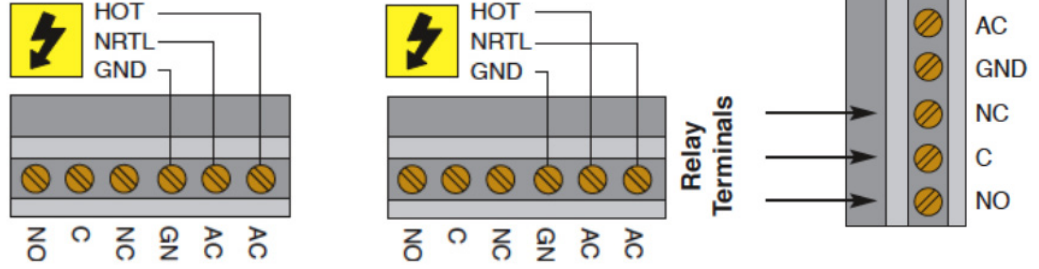
- Power LED:** Make sure the Green power LED is On when power is supplied to the controller.
- Input LED:** For NC switch wiring, the input LED on the controllers will be Amber when the switch reads no-flow and Off when the switch reads flow.
- Invert Operation:** When the input LED turns Off and On, the relay LED will also switch. With invert Off, the relay LED will be On when the input LED is On and Off when the input LED is Off. With invert On, the relay LED will be Off when the input LED is On and On when the input LED is Off.
- Relay Operation:** The relay may be wired with NO or NC. The normal state of the relay is when its LED is Off. With the LED On, the relay is in the energized mode and all terminal connections are reversed.
- Power Indicator:** This green LED lights when AC power is ON.
- Relay Indicator:** This red LED will light whenever the controller energizes the relay, in response to the proper condition at the sensor input(s) and after the time delay.
- AC Power Terminals:** Connection of 120 VAC power to the controller. The setting may be changed to 240 VAC if desired. This requires changing internal jumpers; this covered in the installation section of the manual. Polarity (neutral and hot) does not matter.
- Relay Terminals (NC, C, NO):** Connect the device you wish to control (pump, alarm, etc.) to these terminals: supply to the COM terminal, and the device to the NO or NC terminal as required. The switched device should be a noninductive load of not more than 10 amps; for reactive loads the current must be derated or protection circuits used. When the red LED is ON and the relay is in the energized state, the NO terminal will be closed and the NC terminal will be open.
- Invert Switch:** This DIP switch reverses the logic of the relay control in response to the sensor(s): conditions that used to energize the relay will make it turn off and vice versa.
- Time Delay:** After the input(s) change(s) state, this controller sets a delay from 0.15 to 60 seconds before the relay will respond.
- Input 1:** This amber LED will light immediately whenever the appropriate sensor attached to the terminals detects liquid, and will turn off when it is dry.
- Input Terminals:** Connect the wiring from the sensors to these terminals. Note the polarity: (+) is a 13.5 VDC, 100 mA power supply (to be connected to the red wire of a Flowline sensor), and (-) is the return path from the sensor (to be connected to the black wire of a Flowline sensor). (S) is the Relay signal input to be connected to the white wire with the Green wire returning to the (-) terminal.



Wiring

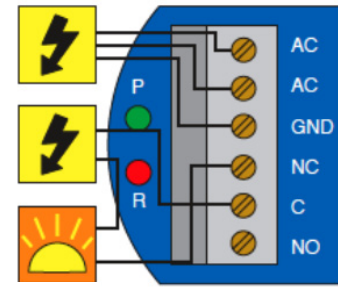
Relay Input Wiring:

The relay is a single pole, double throw type rated at 250 Volts AC, 10 Amps, 1/4 Hp. The two terminal NO and NC (normally open and normally closed) will be used in different applications. Remember that the "normal" state is when the relay coil is de-energized and the Red relay LED is Off / de-energized.



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