

Application Note Series

S-Series Switch Alarm Outputs

Product Platform: Airflow Switches

Product: S-Series Switches

Purpose: Describe S-Series Switch alarm output options



ABSTRACT:

This document explains the solid state relay and open-drain alarm output options available with the [S-Series Switch](#) platform from [Degree Controls](#).

S-SERIES SWITCHES PROVIDE TWO TYPES OF ALARM OUTPUTS:

The Airflow Switch platform of air velocity and temperature switches from Degree Controls is optimized for demanding applications including laboratory, HVAC, high-performance electronics, and more. With both relay and open drain outputs available and configurable alarm behaviors, the S-Series is the most customizable, high-performance airflow switch platform on the market.

S-Series Switches from Degree Controls are orderable with one of two alarm output styles:

1. Solid State Relay (SSR) or
2. Open Drain.

Both the SSR and open drain outputs are available as normally open (NO) or normally closed (NC) output polarity. Wiring diagram examples are included later in this document.

Application Note Series

S-Series Switch Alarm Outputs

S-SERIES SWITCH ALARM OUTPUT OVERVIEW:

Solid State Relay Alarm Output

The SSR output functions as a conventional switch and performs input to output isolation. It can turn on or turn off power supplied to another device and allows for a direct connection to both sides of the "switch" to achieve your desired function.

If the SSR output is *configured as normally open*, contacts are open in the relay's natural state, the "no alarm" condition. With contacts open, there is no current flow, and resistance is very high.



Figure 1 Normally Open Output, Contacts Open in "No Alarm" State

Conversely, relay output contacts are closed when the output is active or alarming. With contacts closed, there is current flow, and resistance is very low.

If the SSR output is *configured as normally closed*, contacts are closed in the relay's natural state, the "no alarm" condition. With contacts closed, the SSR is conducting, and resistance is very low.



Figure 2 Normally Closed Output, Contacts Closed in "No Alarm" State

Conversely, relay output contacts are open when the output is active or alarming. With contacts open, the SSR is not conducting, and resistance is very high.

Open Drain Alarm Output

The open-drain output has no current flow when controlled to one state and sinks current, i.e. current is flowing into the node, in the other state. Using an open-drain together with a pull-up resistor is relatively common. The open drain output allows you to control an external circuit which may require a higher voltage level.

If the open-drain output is *configured as normally open*, the output is *effectively not connected to ground* in its natural state, the "no alarm" condition. There is no current flow, resistance is high, and the output acts as an open circuit.

Application Note Series

S-Series Switch Alarm Outputs

Conversely, the open-drain output effectively shorts to ground when the output is active or alarming. There is current flow, resistance is low, and the output acts as a short circuit, goes to 0V.

Use of Open Drain Alarm Output with Pull-Up Resistor

If you wish to have a specific voltage level on the output line, you need to supply it. For example, if you're connecting to a PLC input, a pull-up resistor can be connected between the open-drain output pin and the output voltage that is desired for a high state. For the *normally open* output configuration:

- The line is high (nearly Vcc) when the output is not active, the "no alarm" condition.
- The line is low or 0V when the output is active or alarming, effectively shorts to ground.

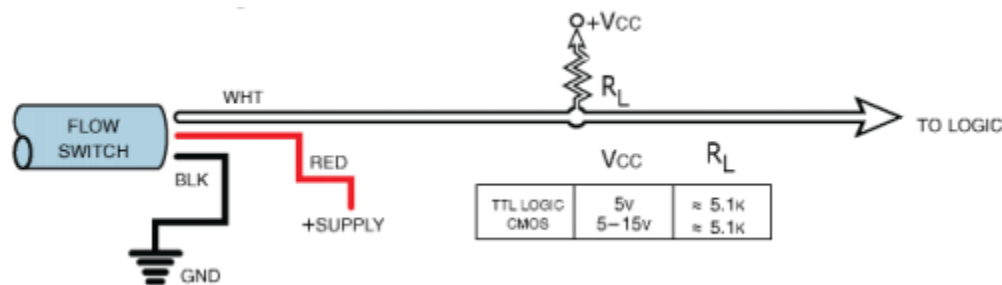


Figure 3 Open-Drain Output with Pull-Up Resistor

CHOOSING THE APPROPRIATE OUTPUT FOR YOUR APPLICATION:

When choosing the appropriate output for your application, there are many factors to consider. We recommend that you consult with your electrical engineering systems experts to make your selection. Check the S-Series Switch output specifications prior to implementation, and ensure that maximum ratings are not exceeded.

	Solid State Relay Output	Open Drain Output
<i>Ground Connection</i>	Connection to ground	No connection to ground
<i>Output Leads</i>	2 wires	1 wire
<i>Isolation</i>	Isolated	Non-isolated

Application Note Series

S-Series Switch Alarm Outputs

S-Series Switch Part Number Format: SX00 - D - L - **O** - **P** - F

X = Input Voltage

D = Direction (directional or non-directional airflow sense)

L = Probe Length

O = Output

1 = Relay

2 = Open Drain

P = Polarity

1 = Normally Open (NO)

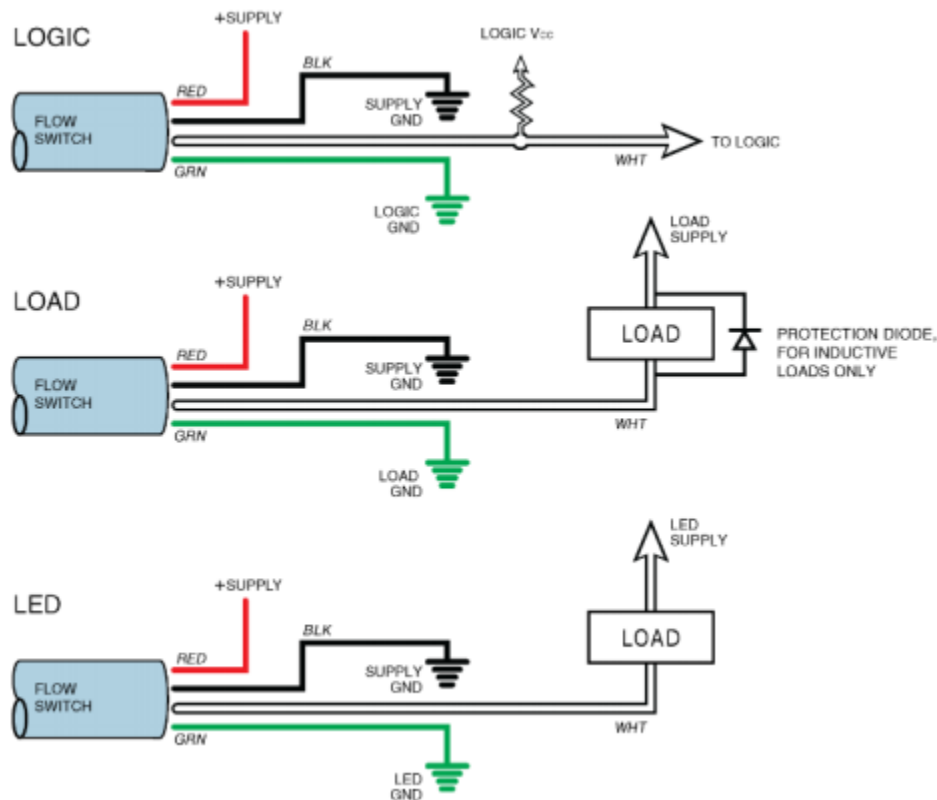
2 = Normally Closed (NC)

F = Fitting (Gland Nut or °C Clamp)

See the [S-Series data sheet](#) for current ordering information.

WIRING DIAGRAMS – SOLID STATE RELAY ALARM OUTPUT:

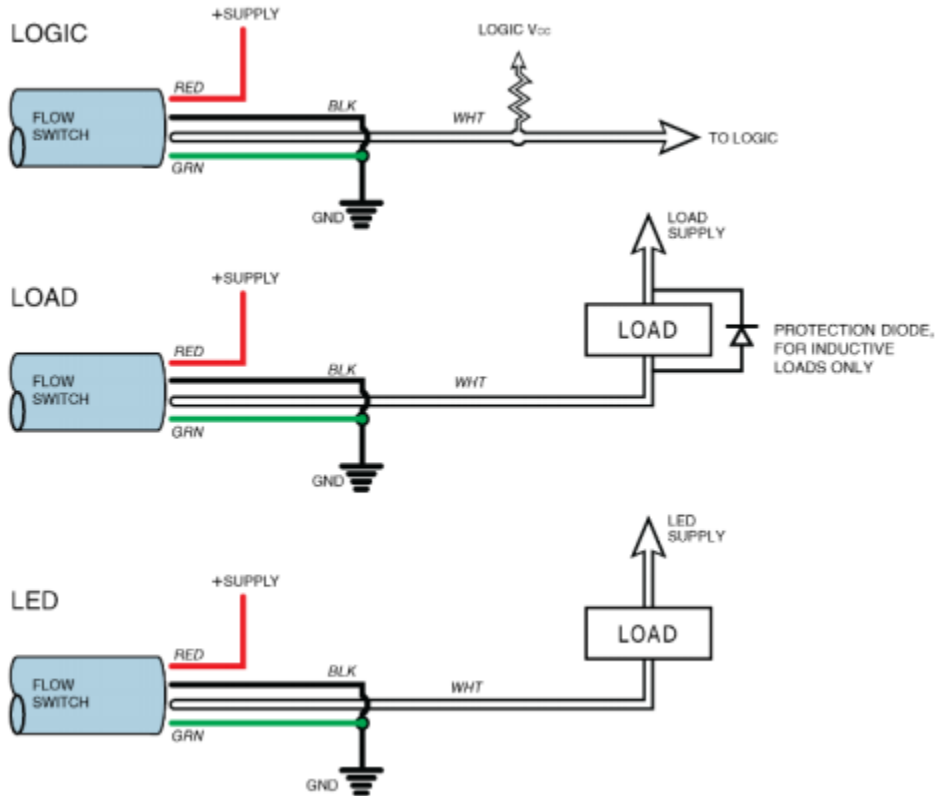
Isolated Grounds



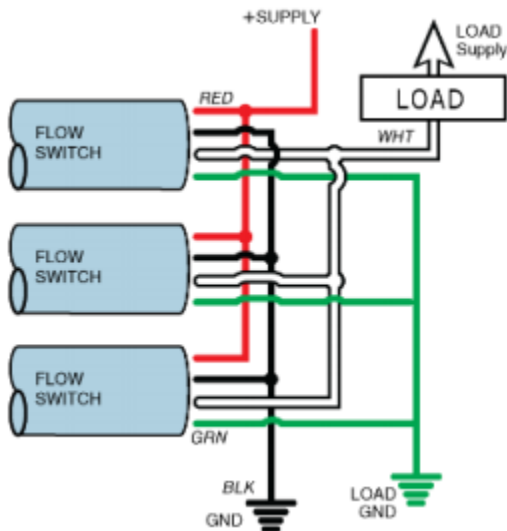
Application Note Series

S-Series Switch Alarm Outputs

Non-Isolated Grounds



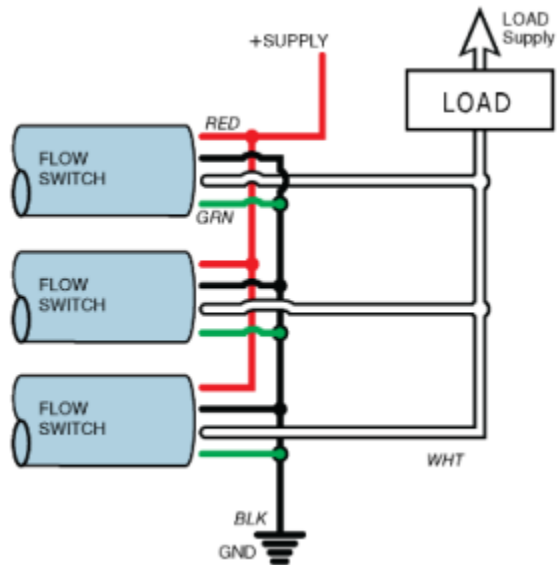
Multiple Isolated Grounds



Application Note Series

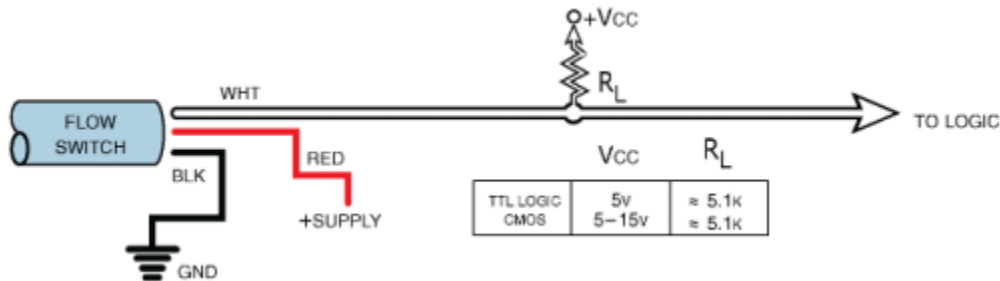
S-Series Switch Alarm Outputs

Multiple Non-Isolated Grounds

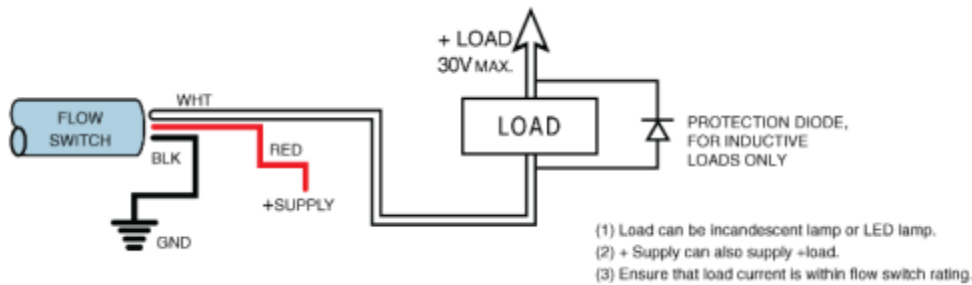


WIRING DIAGRAMS – OPEN-DRAIN ALARM OUTPUT:

Drive Logic



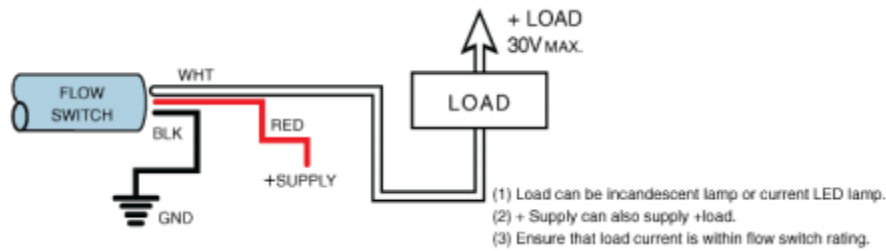
Drive Circuit-Breakers, Alarms, Relays



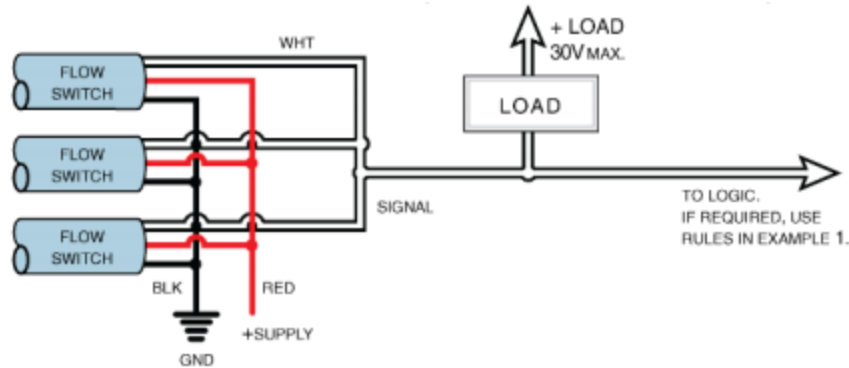
Application Note Series

S-Series Switch Alarm Outputs

Drive Warning Lamp or LED Indicator



Drive Multiple Flow Switches (Only 3 shown – more may be used)



CONTACT:

To find out more about Degree Controls' sensor products and solutions, contact us at 1-877-degreeC, or visit our website at www.degreeC.com. Email sales inquiries to sales@degrec.com.

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