

## NPN and PNP Three Wire Switches for File E51 Sensors

### INTRODUCTION

File E51 Sensors are comprised of three modular components, easily assembled to form a complete device. The components consist of a sensor head, a solid state plug-in switch and a wiring receptacle.

Any E51 Inductive Proximity, Photoelectric Fiber Optic Sensor Head may be used with the E51SNL or E51SPL switch bodies, allowing easy installation and modification of switch function and sensing characteristics. The switch body plugs into the Eaton E51RN Wiring Receptacle, and connections to the line and loads are made according to the diagram below.



### OPERATION

Customer connections to the sensor are made through the Catalog No. E51RN receptacle. Mechanical keying prevents other Eaton wiring receptacles from being used with the three-wire DC switch bodies. This will prevent the inadvertent installation of an AC switch body from being connected to a receptacle wired from a DC source, for example.

E51SNL and E51SPL Solid State Switches both have a normally open and normally closed (N.O. & N.C.) complementary output configuration (refer to "Wiring Diagrams" below).

Both devices have factory-installed light emitting diodes which signify switch closure for both N.O. and N.C. contacts. These devices are also protected from damage should reverse polarity DC voltage be applied to them

The resettable short circuit protection feature built into these switches will turn the output off if the load is shorted or the output is inadvertently applied across the DC power supply. When the protection feature operates, it causes the light emitting diode for that output to turn OFF, as a fault indication. The output can be reset by cycling power, or by moving a target in and out of the sensing range.

When power is first applied to the switch bodies, both N.O. and N.C. outputs will be open and both LEDs will be off. At the end of this "time before availability" period the outputs will be open or closed, as determined by the signal for the sensor head.

### INSTALLATION

File E51 Switches may be wired into common conduit with wiring from other AC or DC control devices. Grounding by means of the grounding terminal provided in the wiring receptacle is optional or as required by the applicable electrical code.

**Caution:** E51SNL and E51SPL switches must always be connected with a suitable load. They should not be connected to relays whose pick-up currents exceed their maximum current rating. They should not be connected to incandescent lamp loads which exceed their incandescent steady state current rating. If the load current rating is exceeded, the short circuit protection feature may cause faulty operation.

**Three-wire DC Devices-** E51 three-wire DC sensors (both PNP and NPN) have two complementary outputs (1 N.O. - 1 N.C.). Two loads can be connected at the same time. To connect only one load, wire only the desired output terminal.

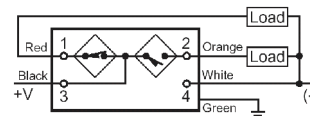
E51 three-wire devices have four terminals- two are connected directly across the line, the remaining two are for the two outputs to the loads. The operating current for the sensors (burden current) is supplied through the line connections- leakage current through the load in the microampere range is negligible.

**Three-wire DC Sensors to Parallel** - E51 three-wire DC sensors can operate in parallel to give an OR function.

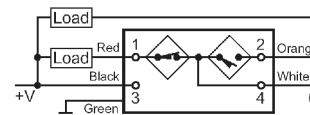
### ABSOLUTE MAX. RATINGS FOR RATED TEMPERATURE RANGE:

Catalog No.	E51SNL & E51SPL
Type of Switch	NPN & PNP
Operating Temperature	-25 degrees C to +70 degrees C
Absolute Voltage Range	10-30 VDC (10% max peak to peak ripple)
Load Current	600 mA from -25°C to 70°C
Burden Current	600 uA / < 25mA
Response Time	50 Hz
Power up Delay	<150 mS
Leakage	On-state: <2.5 VDC; Off-state: <120 uA
Power Dissipation	1.5W
Vibration	10-55 Hz, 1mm amplitude
Shock	30g 11mS, 1/2 sine
Humidity	95% non-condensing
Enclosure	NEMA 3, 3S, 4, 4X, 6, 6P, 12 & 13 (IP67)

### WIRING DIAGRAMS



E51SPL  
10-30 VDC  
Source  
(PNP)



E51SNL  
10-30 VDC  
Sink (NPN)



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# Installation Instructions P17334

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**Note:** The current requirement of the load must not exceed the output current rating of any individual sensor in the parallel circuit configuration.

**Caution:** Do not connect the E51SNL and E51SPL switch bodies in series.

**Caution:** Avoid applying power in the switch while the head is not attached. Avoid attaching the head while power is applied to the switch body.

**Caution:** When sensor heads are added or changed, the head must be securely tightened to the switch body assembly. To assure and maintain a proper seal, 18 inch pounds of torque are required at the sensor head screws.

In case of difficulty during the course of operation, the following checks may be made to locate the source of difficulty:

1. Check receptacle wiring to determine correct connections have been made. (Wiring connection are not identical for E51SPL and E51SNL.)
2. Determine that the proper voltage (and polarity) is applied to the switch and that a load is series connected to it.
3. If difficulty still exists after the procedures in steps 1 and 2 have been followed. Replace the solid state plus-in switch with a known functioning unit. Check the complete device for proper operation.

**Note:** Series A1 heads are not to be used on these switches. If used, an inadequate seal between the switch and head assembly would result.

**Caution:** If step 3 does not correct the difficulty, the sensor head may be replaced with a known functioning unit. However, since a defective switch can damage a head (but not vice versa), it is recommended that the complete device be replaced.

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**The installation and use of Eaton products should be in accordance with provisions of the US National Electrical Code and/or other local codes of industry standards that are pertinent to the particular end use. Installation or use not in accordance with these codes and standard could be hazardous to personnel and/or equipment.**

## GLOSSARY

**Time Delay Before Availability**- The time delay before availability is the time between the application of power to the proximity sensor and the availability of the proximity sensor to the functions as intended.

**Burden Current**- Current required for the switch function and operation (is not a component of load current).

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