

120 VAC THREE-WIRE SWITCH 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 available Eaton sensor head (except Series A1) may be used with the E51SCL switch. The power supply in the E51SCL switch is especially designed to handle sensor heads with higher power requirements, such as the E5IDP3 Extended Range Retroreflective Sensor. Refer to publication 17706 for a listing of available sensor heads and other E51 products and publications. Only the E51RC wiring receptacle may be used with the E51SCL switch. Attempts to use any other receptacle will not work because the mechanical keying prohibits the assembly of any other switch body to the wiring receptacle.

The E51SCL solid state switch has both normally open and normally closed (N.O. & N.C.) outputs (refer to wiring diagram below). Two loads may be connected at the same time. To connect one load, wire only the desired output terminal. Factory-installed light emitting diodes (LEOs) signify switch closure for N.O. and N.C.

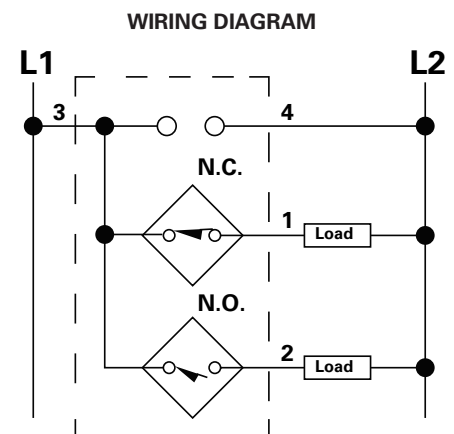
When line voltage is first applied to the E51SCL switch, both N.O. and N.C. outputs will be open and both LED's will be off. At the end of this "time before availability" period, the outputs will be open or closed, as determined by the signal from the sensor head.



ELECTRICAL OPERATING SPECIFICATIONS @ 25°C

| | |
|---|--|
| Operating Temperature Range | -20°C to +80°C |
| Absolute Voltage Range | 90 to 132 Vac 50/60Hz |
| Continuous Load Current (Resistive or Inductive) | 1 Ampere from -20°C to +65°C (Over +65°C, derate linearly according to curve on page 2) |
| Make | 10 A |
| Break | 1 A |
| Recommended Minimum Load Current | 10 mA |
| Residual Output Current @ 120 VAC | 1.1 mA max. |
| Power Supply Burden Current | 37 mA |
| Output Voltage Drop (<100mA load) | 7 Vac (typical) 18 Vac max. @ -20°C |
| Output Voltage Drop (>100mA load) | 1.5 Vac max. @ -20°C |
| Operating Rate with E51DT1 Sensor | 15 Operations per Second |
| Response Time with E51DT1 Sensor | |
| Operate | 10 ms |
| Release* | 10 ms plus 8 ms* |
| Time Delay Before Availability | 190 ms (Typical) |
| With E51DT1 Sensor @ 120 Vac | 270 ms max. |

* The E51SCL adds up to one half cycle to the release time of any sensor due to the nature of the Triac Switch.



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.

3-Wire ac Devices- 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.

3-Wire ac Sensors in Series- When E51 three-wire sensors are connected in series, each sensor displays a voltage drop of approximately one volt. The sum of the voltage drops should be considered so that sufficient voltage will be available to the load when all sensors are conducting. The number of E51 three-wire ac sensors that can be connected in series depends on the minimum voltage requirements of the load. Time delay before availability is increased by the amount specified in the ratings table for each sensor connected in series.

3-Wire ac Sensors in Parallel - E51 three-wire ac sensors can operate in parallel to give an OR Function.

Note: The current requirement of the load must not exceed the output current rating as specified in the rating table.

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

1. Check receptacle wiring to determine correct connections have been made.
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 plug-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.

Caution: Avoid applying power to the switch while the head is not attached. Avoid attaching the head while power is applied to the switch. Line voltage with respect to ground is present on switchbody printed circuit board when the head is removed.

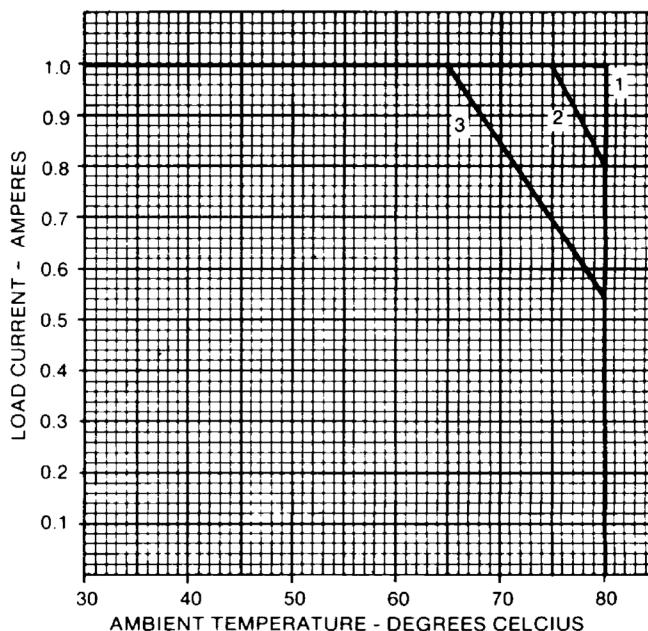
Caution: When sensor heads are added or changed, the head must be securely tightened to the switch body assembly. To assure and maintain a proper seal, 18 inch pounds of torque are required at the sensor head screws.

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

E51SCL DERATING CURVE

Curve No.

1. Either output's load energized continuously (no derating).
2. One output loaded, 250 operations per minute at 50% duty cycle with ten times inrush (make) current (derated at- 40mA/°C above 75C).
3. Both outputs equally loaded, 250 operations per minute at 50% duty cycle with ten times inrush (derate at- 30mA/°C above 65C).



GLOSSARY

Residual Current - The residual current is the load current which flows when the proximity switch output is off.

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 functions as intended.

Burden Current - Current required for switch function and operation. It is not a component of load current.

Output Voltage Drop - The difference in magnitude between the line voltage and the load voltage.

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