

E51 Limit Switch Style, Modular Sensors



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E51 Limit Switch Style, Modular Sensors

Product Description

E51 Limit Switch Style Modular Sensors from Eaton’s Electrical Sector are available in thru-beam, reflex, polarized reflex, diffuse reflective and fiber optic sensing modes to solve a wide variety of sensing applications. Modular, plug-in components are easy to maintain, meaning less downtime and reduced inventory. Choose between two-wire sensors with AC/DC operation and four-wire sensors in either AC or DC styles. Connection options include terminal, mini-connector and various lengths of cable. Sensors can be ordered in component form or as fully assembled units.

Features

- Choose from five different sensing modes including fiber optic
- All heads feature a selector switch for light or dark operation
- Logic modules are available to provide additional control functions
- Rugged construction, ideal for industrial environments
- Viton gaskets ensure a positive seal and high chemical resistance
- Sensor heads can be rotated to any of four positions
- Components are interchangeable with E51 proximity sensors
- Sensors accommodate both U.S. and DIN mounting dimensions
- Sensor bodies feature bifurcated engagement prongs for a reliable electrical connection when plugging into receptacle stabs

Standards and Certifications

- UL Listed
- CSA Certified
- CE (where shown)



⚠ DANGER

THIS SENSOR IS NOT A SAFETY DEVICE AND IS NOT INTENDED TO BE USED AS A SAFETY DEVICE. This sensor is designed only to detect and read certain data in an electronic manner and perform no use apart from that, specifically no safety-related use. This sensor product does not include self-checking redundant circuitry, and the failure of this sensor product could cause either an energized or de-energized output condition, which could result in death, serious bodily injury, or property damage.

For the most current information on this product, visit our Web site: www.eaton.com

For Customer Service in the U.S. call 1-877-ETN CARE (386-2273), in Canada call 1-800-268-3578. For Application Assistance in the U.S. and Canada call 1-800-426-9184.

Product Selection

Assembled Sensors

Assembled Sensor



Sensor Heads ④

Reflex



Polarized Reflex



Diffuse Reflective



Thru-Beam Detector



Thru-Beam Source



Reflex, Diffuse Reflective and Thru-Beam Sensors

Sensor Body and Receptacle



Operating voltage
Output
Sensor body

Two-Wire Sensors

20–264 Vac/dc
NO or NC ①
E51SAL

Four-Wire Sensors

120 Vac
NO and NC complementary
E51SCL
E51SCN
Accepts logic module ②

10–30 Vdc
NO and NC complementary
E51SNL
NPN
E51SPL
PNP

Receptacle ③

E51RA

E51RC

E51RCB

E51RN

E51RN

Sensing Range

Response Time

Sensing Beam

Sensor Head Only Catalog Number

Assembled Sensors with Head, Sensor Body and Receptacle Catalog Number

Reflex

18 ft (5.5m)	Standard response	Infrared	E51DP1	E51ALP1	☺☺	E51CLP1	E51CNP1	E51NLP1	☺☺	E51PLP1	☺☺
35 ft (10.7m)	Standard response		E51DP3	—		E51CLP3	E51CNP3	E51NLP3	☺☺	E51PLP3	☺☺

Polarized Reflex

15 ft (4.5m)	Standard response	Visible red	E51DP5	—		E51CLP5	E51CNP5	E51NLP5	☺☺	E51PLP5	☺☺
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Diffuse Reflective

8 in (200 mm)	Standard response	Infrared	E51DP2	E51ALP2	☺☺	E51CLP2	E51CNP2	E51NLP2	☺☺	E51PLP2	☺☺
	Fast response		E51DP22	—		E51CLP22	E51CNP22	E51NLP22	☺☺	E51PLP22	☺☺
18 in (450 mm)	Standard response		E51DP6	—		E51CLP6	E51CNP6	E51NLP6	☺☺	E51PLP6	☺☺
40 in (1m)	Standard response		E51DP4	—		E51CLP4	E51CNP4	E51NLP4	☺☺	E51PLP4	☺☺

Thru-Beam Detector

300 ft (90m)	Standard response	—	E51DC1	E51ALC1	☺☺	E51CLC1	E51CNC1	E51NLC1	☺☺	E51PLC1	☺☺
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Thru-Beam Source ③

300 ft (90m)	—	Infrared with visible red alignment aid	E51DEL	E51ELA ⑤	E51ELA ⑤	E51ELA ⑤	E51ELA ⑤	E51ELA ⑤	E51ELA ⑤
			E51DED	E51EDN ⑥	E51EDN ⑥	E51EDN ⑥	E51EDN ⑥	E51EDN ⑥	E51EDN ⑥

Notes

☺☺ See listing of compatible connector cables on **Page V8-T5-103**.

① All sensor heads feature a light or dark operation selector switch which reverses the output function.

② Logic module must be ordered separately, see **Page V8-T5-102**. These sensor bodies are rated NEMA 4, 4X and 13.

③ Receptacles feature terminal wiring with a 1/2 in NPT thread at the conduit entrance. Other connection options are available (see below and **Page V8-T5-103**).

Connection Option		Suffix	Example
20 mm thread at the conduit entrance		20	E51ALP20
Built-in mini-connector with epoxy filled receptacle	2-wire, 3-pin connector	P3	E51ALP3 ☺☺
	4-wire, 5-pin connector	P5	E51CLP5 ☺☺
Pigtail with mini-connector	2-wire, AC/DC	T3	E51RAP3 ☺☺
	4-wire, AC	T5	E51RCPT5 ☺☺
	4-wire, DC	T5	E51RNPT5 ☺☺
Pre-wired cable with epoxy filled receptacle	8 ft long	S	E51ALP1S
	12 ft long	S12	E51ALP1S12
	20 ft long	S20	E51ALP1S20

④ Includes sensor head mounted to sensor body. Head can be rotated to any of four discrete positions on body, 90° apart, but is not separate from body.

⑤ 120 Vac operation.

⑥ 10–30 Vdc operation.

Technical Data and Specifications

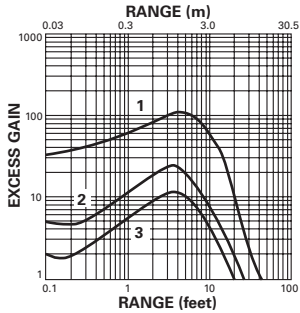
E51 Limit Switch Style, Modular Sensors

Description	Specification
Output ratings (NEMA D150)	
AC/DC models	0.5A continuous
AC models	1A continuous
DC models	0.6A continuous
Protection	Latching short circuit protection on two-wire AC/DC and four-wire DC models
Indicator LEDs	Lights when output is ON. One LED for each output
Enclosure material	Zinc die cast
Gasket material	Viton
Enclosure ratings	NEMA 3, 3S, 4, 4X, 6, 6P, 12 and 13 (IP67) E51SCN sensor body only: NEMA 4, 4X and 13 ①
Hazardous locations ratings	
Class I	Division II—GRPS ABCD
Class II	Division II—GRPS F and G
Class III	Division 2
Temperature range	-13° to 158°F (-25° to 70°C)
Torque requirements	Switch body screws: 25–30 in-lb; Sensing head screws: 14–18 in-lb
Vibration	10–55 Hz, 1 mm amplitude
Shock	30g, 11 ms, 1/2 sine wave
Humidity	95% non-condensing

Excess Gain

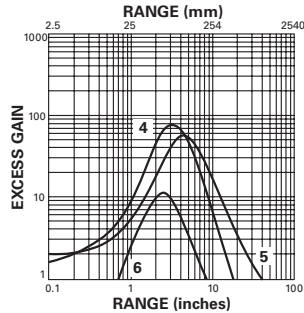
Sensor Heads—Reflex, Diffuse Reflective and Thru-Beam

Reflex (3 in diameter retroreflector)



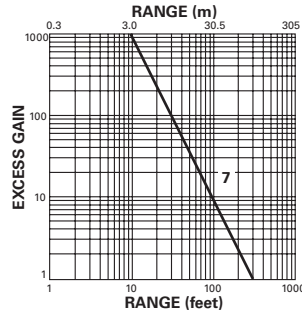
1. E51DP3
2. E51DP1
3. E51DP5

Diffuse Reflective (90% reflective white card)



4. E51DP6
5. E51DP4
6. E51DP2 and E51DP22

Thru-Beam



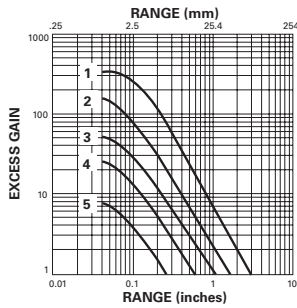
7. E51DEL and E51DED sources using E51DC1 detector

Note

① Our products conform to NEMA tests as indicated, however, some severe washdown applications can exceed these NEMA test specifications.

Sensor Heads—Glass Fiber Optic

Diffuse Reflective (90% reflective white card)



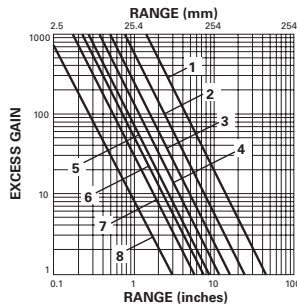
E51DF1 and E51DF3 high power sensor head with:

- 1. 0.125 in fiber bundle
- 2. 0.094 in fiber bundle
- 4. 0.063 in fiber bundle

E51DF33 fast response sensor head with:

- 3. 0.125 in fiber bundle
- 4. 0.094 in fiber bundle
- 5. 0.063 in fiber bundle

Thru-Beam



E51DF4 extended range sensor head with:

- 1. 0.125 in fiber bundle
- 4. 0.063 in fiber bundle

E51DF1 and E51DF3 high power sensor head with:

- 2. 0.125 in fiber bundle
- 3. 0.094 in fiber bundle
- 6. 0.063 in fiber bundle

E51DF33 fast response sensor head with:

- 5. 0.125 in fiber bundle
- 7. 0.094 in fiber bundle
- 8. 0.063 in fiber bundle

Wiring Diagrams

Pin numbers are for reference, rely on pin location when wiring.

E51 Limit Switch Style, Modular Sensors

Operating Voltage	Output ①	Terminal and Cable Models	Mini-Connector Models (Face View Male Shown)
Two-Wire Sensors			
20–264 Vac or Vdc 50/60 Hz	NO or NC		
Four-Wire Sensors			
120 Vac 50/60 Hz	NO and NC		
10–30 Vdc	NO and NC NPN		
	NO and NC PNP		

Note

① Changing light/dark switch on sensor head will reverse output function (NO becomes NC, and NC becomes NO).

5.10

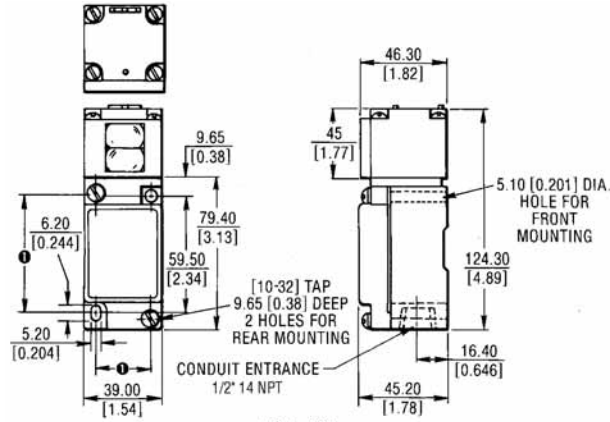
Photoelectric Sensors

E51 Limit Switch Style, Modular Sensors

Dimensions

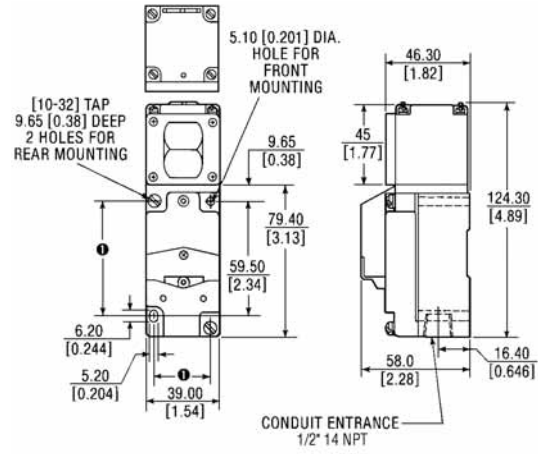
Approximate Dimensions in mm [in]

Standard Sensor



① CAN ACCOMMODATE BOTH U.S. 29.4 x 59.5 [1.16 x 2.34] AND DIN 30 x 60 [1.18 x 2.36] MOUNTING DIMENSIONS.

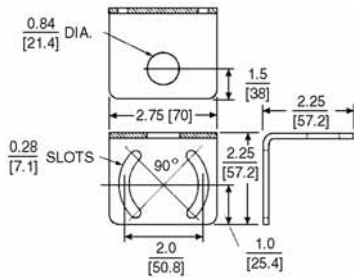
Sensor with Logic Module



Accessories

Approximate Dimensions in Inches [mm]

Universal Mounting Bracket—E51KH2



Universal Mounting Bracket—E51KH4

