

E51 Modular Limit Switch Style Sensors

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E51 Modular Limit Switch Style Sensors

Product Description

The E51 Inductive Proximity Sensor family from Eaton's Electrical Sector combines high performance with a familiar limit switch style housing. Modular, plug-in components provide application flexibility, ease of maintenance, less downtime and reduced inventory. Choose from two-wire sensors with AC/DC operation, or four-wire sensors in either AC or DC styles. Connection options include terminal, mini-connector or various lengths of cable.

Choose from standard sensors that detect all types of metallic targets. The next page provides more detail on these sensors.

Features

- Rugged construction is ideal for industrial environments
- Viton gaskets ensure a positive seal and high resistance to industry chemicals
- Direct replacement for worn out limit switches
- Sensor heads and bodies feature captive screws to eliminate loss
- All sensor heads include a selector switch to program output function to either NO or NC
- Sensor bodies feature bifurcated engagement prongs for a reliable connection when plugging into receptacle stabs

- Engagement key between sensor body and receptacle prevents improper assembly
- Sensors accommodate both U.S. and DIN mounting dimensions
- Wiring terminals feature captive pressure plate saddles for #18 to #12 AWG wire. A green screw identified ground terminal is also included
- Logic modules are available to provide additional control functions

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

Standard Sensors—Assembled with Terminal Wiring

Standard E51 sensors feature long sensing ranges and a choice of top or side sensing heads. Alternate frequency units eliminate interference when mounted close to standard frequency units. Order sensors in component form, as assembled plug-in units, or in a sealed version where the sensor body is factory assembled to an epoxy filled receptacle with tamper-proof screws to ensure a lasting seal.

Assembled Sensor



Assembled Sensors—Standard (with Terminal Wiring)

Sensor Body and Receptacle



Operating voltage	20–264 Vac/dc	Two-Wire Sensors		Four-Wire Sensors		10–30 Vdc
Output	NO or NC ①	NO and NC complementary		NO and NC complementary		NO and NC complementary
Sensor body	E51SAL	E51SCL	E51SCN Accepts logic modules ②	E51SPL PNP	E51SNL NPN	
Receptacle ③	E51RA	E51RC	E51RCB	E51RN	E51RN	

Sensor Heads ①

Top Sensing



Sensing Range	Shielding	Frequency	Sensor Head Only Catalog Number	Assembled Sensors with Head, Sensor Body and Receptacle Catalog Number								
Top Sensing												
0.51 in (13 mm)	Shielded	Standard	E51DT1	E51ALT1	☐☐	E51CLT1	E51CNT1	E51PLT1	☐☐	E51NLT1	☐☐	
		Alternate	E51DT2	E51ALT2	☐☐	E51CLT2	E51CNT2	E51PLT2	☐☐	E51NLT2	☐☐	
0.94 in (24 mm)	Unshielded	Standard	E51DT5	E51ALT5	☐☐	E51CLT5	E51CNT5	E51PLT5	☐☐	E51NLT5	☐☐	
		Alternate	E51DT6	E51ALT6	☐☐	E51CLT6	E51CNT6	E51PLT6	☐☐	E51NLT6	☐☐	
Side Sensing												
0.51 in (13 mm)	Shielded	Standard	E51DS1	E51ALS1	☐☐	E51CLS1	E51CNS1	E51PLS1	☐☐	E51NLS1	☐☐	
		Alternate	E51DS2	E51ALS2	☐☐	E51CLS2	E51CNS2	E51PLS2	☐☐	E51NLS2	☐☐	
0.94 in (24 mm)	Unshielded	Standard	E51DS5	E51ALS5	☐☐	E51CLS5	E51CNS5	E51PLS5	☐☐	E51NLS5	☐☐	
		Alternate	E51DS6	E51ALS6	☐☐	E51CLS6	E51CNS6	E51PLS6	☐☐	E51NLS6	☐☐	

Side Sensing



Notes

① All sensor heads feature a programmable output selector switch for NO or NC operation. Operation is as follows:

For This Output Type:	Set Selector Position:	
	"TARGET"	"NO TARGET"
NO	Target present	Target absent
NC	Target absent	Target present

② Logic module must be ordered separately, see [Page V8-T3-91](#). 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:

Connection Option	Catalog Number	Code Suffix	Example
20 mm thread at the conduit entrance	—	20	E51ALT120
Mini-connector termination with epoxy filled receptacle, see Page V8-T3-92 for additional receptacle options	Two-wire, 3-pin connector	CSMS3F3CY1602	P3 E51ALT1P3
	Four-wire, 5-pin connector	CSMS5D5CY1602	P5 E51CLT1P5
Pre-wired cable with epoxy filled receptacle	8 ft long	—	S E51ALT1S
	12 ft long	—	S12 E51ALT1S12
	20 ft long	—	S20 E51ALT1S20

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Standard Sensors—Assembled with Receptacles

Sensor body is attached to receptacle with tamper-proof screws.

Assembled Sensor



Assembled Sensors—Standard (with Epoxy Filled Receptacles and Pre-wired Cables)

Sensor Base Type with 8 ft Cable ^②



Operating voltage	Two-Wire Sensors 20–264 Vac/dc	Four-Wire Sensors 120 Vac	10–30 Vdc
Output	NO or NC ^①	NO and NC complementary	NO and NC complementary PNP NPN

Sensor Heads ^①

Top Sensing



Sensing Range	Shielding	Frequency	Sensor Head Only Catalog Number	Assembled Sensors with Head and Sensor Base Catalog Number						
Top Sensing										
0.51 in (13 mm)	Shielded	Standard	E51DT1	E51ALT16P	⊕ ⊕	E51CLT16P	E51PLT16P	⊕ ⊕	E51NLT16P	⊕ ⊕
		Alternate	E51DT2	E51ALT26P		E51CLT26P	E51PLT26P	⊕ ⊕	E51NLT26P	⊕ ⊕
0.94 in (24 mm)	Unshielded	Standard	E51DT5	E51ALT56P	⊕ ⊕	E51CLT56P	E51PLT56P	⊕ ⊕	E51NLT56P	⊕ ⊕
		Alternate	E51DT6	E51ALT66P	⊕ ⊕	E51CLT66P	E51PLT66P	⊕ ⊕	E51NLT66P	⊕ ⊕
Side Sensing										
0.51 in (13 mm)	Shielded	Standard	E51DS1	E51ALS16P	⊕ ⊕	E51CLS16P	E51PLS16P	⊕ ⊕	E51NLS16P	⊕ ⊕
		Alternate	E51DS2	E51ALS26P	⊕ ⊕	E51CLS26P	E51PLS26P	⊕ ⊕	E51NLS26P	⊕ ⊕
0.94 in (24 mm)	Unshielded	Standard	E51DS5	E51ALS56P	⊕ ⊕	E51CLS56P	E51PLS56P	⊕ ⊕	E51NLS56P	⊕ ⊕
		Alternate	E51DS6	E51ALS66P	⊕ ⊕	E51CLS66P	E51PLS66P	⊕ ⊕	E51NLS66P	⊕ ⊕

Side Sensing



Sensor Heads

Sensor Heads ^①

Top Sensing



Sensing Range	Shielding	Frequency	Target Material	Catalog Number
Top Sensing				
0.51 in (13 mm)	Shielded	Standard	All metals	E51DT1
		Alternate		E51DT2
0.94 in (24 mm)	Unshielded	Standard	All metals	E51DT5
		Alternate		E51DT6
Side Sensing				
0.51 in (13 mm)	Shielded	Standard	All metals	E51DS1
		Alternate		E51DS2
0.94 in (24 mm)	Unshielded	Standard	All metals	E51DS5
		Alternate		E51DS6

Side Sensing



Notes

^① All sensor heads feature a programmable output selector switch for NO or NC operation. Operation is as follows:

For This Output Type:	Set Selector Position:	
	"TARGET"	"NO TARGET"
NO	Target present	Target absent
NC	Target absent	Target present

^② Switch bases feature 8 ft of SOOW-A cable. Other connection options are available:

Connection Option ^③	Suffix	Example
Mini-connector mounted on 3 ft (0.9m) pigtail cable	T	E51ALT16PT
Mini-connector mounted to switch base	C	E51ALT16PC
Cable longer than 8 feet, add required length in 1 ft increments to listed catalog number—20 ft maximum	Length in ft	E51ALT16P12 for 12 ft

^③ See listing of compatible connector cables on **Page V8-T3-93**.

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Technical Data and Specifications

E51 Modular Limit Switch Style Sensors

Description	Specification
Output rating (NEMA D150)	
AC/DC models	0.5 A continuous
AC models	1 A continuous
DC models	0.6 A continuous
Protection	Latching short-circuit protection on two-wire AC/DC models; DC models: resettable short-circuit protection
Switching rate	AC models: 15 Hz; DC models: 50 Hz
Indicator LEDs	Lights when output is ON. One LED for each output
Alternate frequency	Standard and alternate frequencies allow side-by-side operation without interference
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
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-lbs; sensing head screws: 14–18 in-lbs
Vibration	10–55 Hz, 1 mm amplitude
Shock	30 g, 11 ms, 1/2 sine wave
Humidity	95% non-condensing
Burden current	<25 mA
OFF-state leakage	DC version: 120 µA; two-wire AC: 1.9 mA maximum; three-wire AC: 1.1 mA
ON-state leakage	<2.5 Vdc
Power-up delay	<150 ms

Wiring Diagrams

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

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Operating Voltage	Output	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 (NO shown, can be changed to NC using switch on sensor head)		
Four-Wire Sensors			
120 Vac 50/60 Hz	NO and NC ①		
10–30 Vdc	NO and NC NPN ①		
	NO and NC PNP ①		

Note

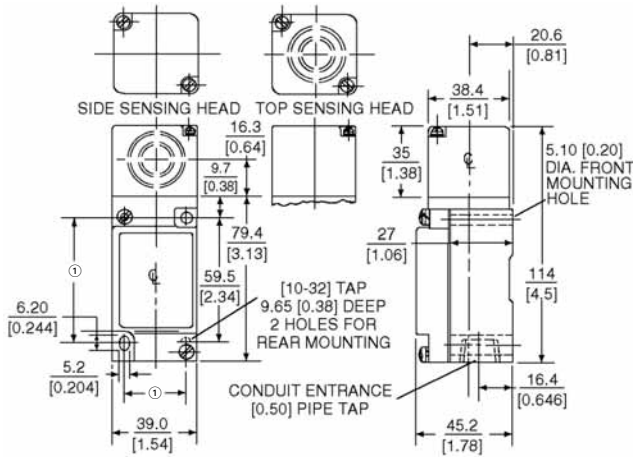
① Changing output switch on sensor head will reverse output function (NO becomes NC, and NC becomes NO).

Dimensions

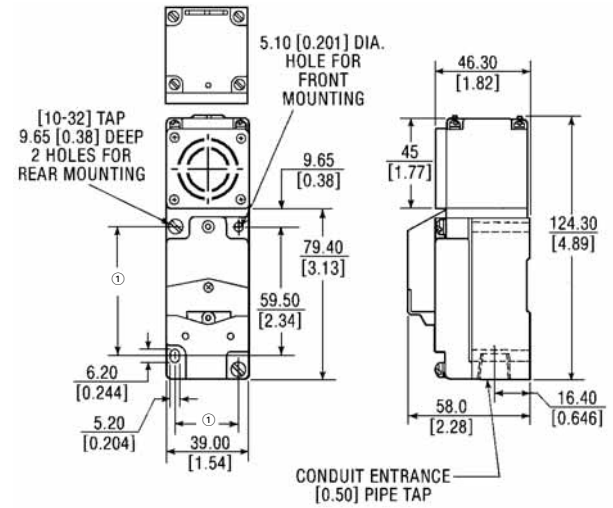
Approximate Dimensions in mm [in]

E51 Modular Limit Switch Style Sensors

Standard Sensors



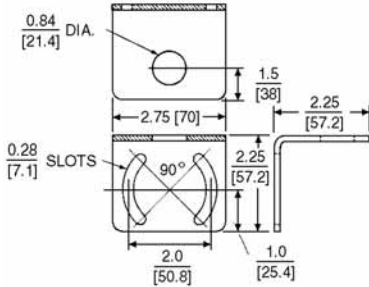
Sensor with Logic Module



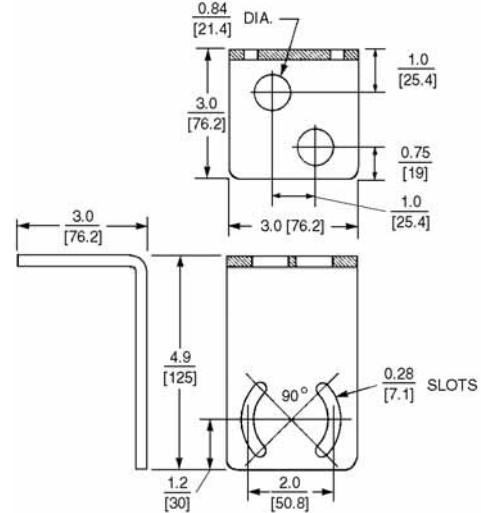
Accessories

Approximate Dimensions in Inches [mm]

Universal Mounting Bracket—One Hole



Universal Mounting Bracket—Two Holes



Note

① Can accommodate both U.S., 29.4 [1.16] x 59.5 [2.36] and DIN, 30 [1.18] x 60 [2.36], mounting dimensions are in mm [in].

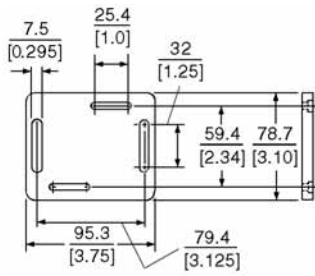
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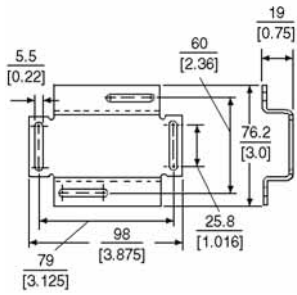
Approximate Dimensions in mm [in]

Machine Mounting Bracket

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Stand-Off Mounting Bracket



Remote Sensor Head Assembly

