

**E51 Modular Limit Switch Style
Inductive Proximity Sensors****Contents**

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The Cutler-Hammer® E51 Inductive Proximity Sensor Family from Eaton's electrical business 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 2-wire sensors with AC/DC operation, or 4-wire sensors in either AC or DC styles. Connection options include terminal, mini-connector or various lengths of cable.

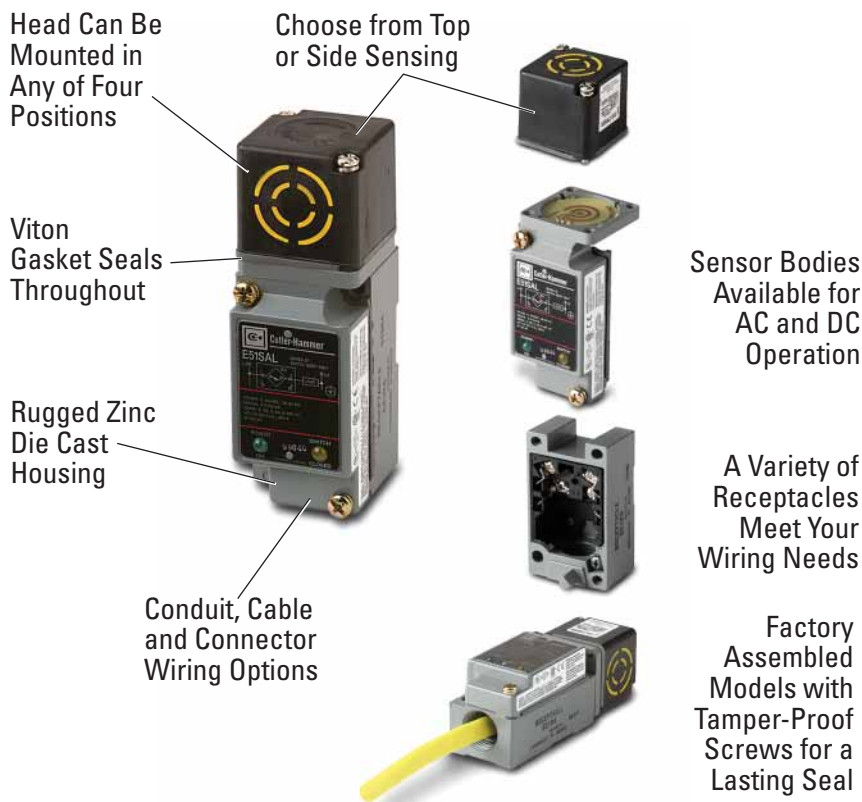
Choose from standard sensors that detect all types of metallic targets. The next page provides more detail on these sensors.

Approvals

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



Unless otherwise noted, the products contained in this document are not designed or intended for use in human safety applications.

**This Rugged Sensor Family Features Modular Components
for Versatile Sensing****Product 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 N.O. or N.C.
- 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

Viton® is a registered trademark of Dupont Dow Elastomers.

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**.

Standard Sensors

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.

Model Selection — Assembled Sensors — Standard (with Terminal Wiring)

Assembled Sensor	Sensor Body and Receptacle		2-Wire Sensors	4-Wire Sensors		
		Operating Voltage	20 – 264V AC/DC	120V AC		10 – 30V DC
		Output	N.O. or N.C. ①	N.O. and N.C. Complementary		N.O. and N.C. Complementary
		Sensor Body	E51SAL	E51SCL	E51SCN Accepts Logic Modules ②	E51SPL PNP E51SNL NPN
		Receptacle ③	E51RA	E51RC	E51RCB	E51RN

Sensor Heads ①	Sensing Range	Shielding	Frequency	Catalog Number Sensor Head Only	Catalog Number Assembled Sensors with Head, Sensor Body and Receptacle
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Standard Sensing

 Top Sensing	0.51 inches (13 mm)	Shielded	Standard	E51DT1	E51ALT1	☺	E51CLT1	E51CNT1	E51PLT1	☺	E51NLT1	☺
			Alternate	E51DT2	E51ALT2	☺	E51CLT2	E51CNT2	E51PLT2	☺	E51NLT2	☺
	0.94 inches (24 mm)	Unshielded	Standard	E51DT5	E51ALT5	☺	E51CLT5	E51CNT5	E51PLT5	☺	E51NLT5	☺
			Alternate	E51DT6	E51ALT6	☺	E51CLT6	E51CNT6	E51PLT6	☺	E51NLT6	☺
 Side Sensing	0.51 inches (13 mm)	Shielded	Standard	E51DS1	E51ALS1	☺	E51CLS1	E51CNS1	E51PLS1	☺	E51NLS1	☺
			Alternate	E51DS2	E51ALS2	☺	E51CLS2	E51CNS2	E51PLS2	☺	E51NLS2	☺
	0.94 inches (24 mm)	Unshielded	Standard	E51DS5	E51ALS5	☺	E51CLS5	E51CNS5	E51PLS5	☺	E51NLS5	☺
			Alternate	E51DS6	E51ALS6	☺	E51CLS6	E51CNS6	E51PLS6	☺	E51NLS6	☺

① All sensor heads feature a programmable output selector switch for N.O. or N.C. operation. Operation is as follows:

For This Output Type:	Set Selector Position:	
	"TARGET"	"NO TARGET"
N.O.	Target Present	Target Absent
N.C.	Target Absent	Target Present

② Logic modules must be ordered separately, see **Page 4**. These sensor bodies are rated NEMA 4, 4X and 13.

☐ Fast turn product with typical one business day lead-time to shipment.



③ Receptacles feature terminal wiring with a 1/2" NPT thread at the conduit entrance. Other connection options are available:

Connection Option		Catalog Number	Suffix	Example
20 mm thread at the conduit entrance		—	20	E51ALT120
Mini-Connector termination with epoxy filled receptacle, see Page 5 for additional receptacle options	2-wire, 3-pin connector	CSMS3F3CY1602	P3	E51ALT1P3
	4-wire, 5-pin connector	CSMS5D5CY1602	P5	E51CLT1P5
Pre-wired cable with epoxy filled receptacle	8 feet long	—	S	E51ALT1S
	12 feet long	—	S12	E51ALT1S12
	20 feet long	—	S20	E51ALT1S20

☐ Stocked product, typical order quantities guaranteed in stock.


























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

Assembled Sensor	Sensor Base Type with 8 Foot Cable ②		2-Wire Sensors	4-Wire Sensors
		Operating Voltage	20 – 264V AC/DC	120V AC
		Output	N.O. or N.C. ①	N.O. and N.C. Complementary
				N.O. and N.C. Complementary
				PNP
				NPN

Sensor Heads ①	Sensing Range	Shielding	Frequency	Catalog Number Sensor Head Only	Catalog Number Assembled Sensors with Head and Sensor Base
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Standard Sensing (Sensor Body Is Attached to Receptacle with Tamper-Proof Screws)

Top Sensing 	0.51 inches (13 mm)	Shielded	Standard	E51DT1	E51ALT16P 	E51CLT16P	E51PLT16P 	E51NLT16P 
			Alternate	E51DT2	E51ALT26P	E51CLT26P	E51PLT26P 	E51NLT26P 
	0.94 inches (24 mm)	Unshielded	Standard	E51DT5	E51ALT56P 	E51CLT56P	E51PLT56P 	E51NLT56P 
			Alternate	E51DT6	E51ALT66P 	E51CLT66P	E51PLT66P 	E51NLT66P 
Side Sensing 	0.51 inches (13 mm)	Shielded	Standard	E51DS1	E51ALS16P 	E51CLS16P	E51PLS16P 	E51NLS16P 
			Alternate	E51DS2	E51ALS26P 	E51CLS26P	E51PLS26P 	E51NLS26P 
	0.94 inches (24 mm)	Unshielded	Standard	E51DS5	E51ALS56P 	E51CLS56P	E51PLS56P 	E51NLS56P 
			Alternate	E51DS6	E51ALS66P 	E51CLS66P	E51PLS66P 	E51NLS66P 

① All sensor heads feature a programmable output selector switch for N.O. or N.C. operation. Operation is as follows:

For This Output Type:	Set Selector Position:	
	"TARGET"	"NO TARGET"
N.O.	Target Present	Target Absent
N.C.	Target Absent	Target Present



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

Connection Option ③	Suffix	Example
Mini-Connector mounted on 3 foot (900 mm) pigtail cable	T	E51ALT16PT
Mini-Connector mounted to switch base	C	E51ALT16PC
Cable longer than 8 feet, add required length in 1 foot increments to listed Catalog Number — 20 foot maximum	(Length in feet)	E51ALT16P12 for 12 feet

③ See listing of compatible connector cables on **Page 5**.☐ Fast turn product with typical one business day lead-time to shipment.**Model Selection — Sensor Heads ④**

	Sensing Range	Shielding	Frequency	Target Material	Catalog Number
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Standard Sensing







Top Sensing 	0.51 inches (13 mm)	Shielded	Standard	All metals	E51DT1
			Alternate	All metals	E51DT2
	0.94 inches (24 mm)	Unshielded	Standard	All metals	E51DT5
			Alternate	All metals	E51DT6
Side Sensing 	0.51 inches (13 mm)	Shielded	Standard	All metals	E51DS1
			Alternate	All metals	E51DS2
	0.94 inches (24 mm)	Unshielded	Standard	All metals	E51DS5
			Alternate	All metals	E51DS6

④ All sensor heads feature a programmable output selector switch for N.O. or N.C. operation. Operation is as follows:

For This Output Type:	Set Selector Position:	
	"TARGET"	"NO TARGET"
N.O.	Target Present	Target Absent
N.C.	Target Absent	Target Present

☐ Fast turn product with typical one business day lead-time to shipment.

Model Selection — Sensor Bodies

	Operating Voltage	Output	Protection	Output Rating Continuous	Type	Catalog Number
2-Wire Sensors						
AC/DC 	20 – 264V AC/DC, 50/60 Hz	1 output, load powered, N.O. or N.C., programmable from head; off state leakage current: <1.7 mA at 120V AC/DC, <2.0 mA at 240V AC	Latching short circuit and overload	0.5A	—	E51SAL ^① 
4-Wire Sensors						
AC  E51SCN Shown	120V AC, 50/60 Hz	2 complementary outputs, line powered, N.O. and N.C.	—	1.0A to 158° (70°), linearly derated to 0.6A at 176° (80°)	—	E51SCL ^①
				1.0A to 113° (45°), linearly derated to 0.3A at 176° (80°)	—	E51SCN ^{②③}
DC 	10 – 30V DC	2 complementary outputs, line powered, N.O. and N.C.	Reverse polarity	0.6A to 104° (40°), linearly derated to 0.36A at 176° (80°)	NPN	E51SNL ^① 
					PNP	E51SPL ^① 


① This sensor body is available in a factory-sealed, non plug-in configuration (with 8-foot cable), add **6P** to listed Catalog Number.
Example: E51SAL6P.

② Sensor body is black. E51SCN sensor bodies are rated NEMA 4, 4X and 13.

③ This sensor accepts logic modules, as seen in chart below.

 Fast turn product with typical one business day lead-time to shipment.

Model Selection — Logic Modules (for E51SCN Sensor Body Only)





	Type	Description	Timing Range ^④	Catalog Number
 Reset time is 25 mS minimum. Rated NEMA 4, 4X and 13.	ON and OFF Delay	<ul style="list-style-type: none"> Adjustable delay between time object is sensed and time switch function occurs Adjustable delay between time object leaves sensing field and time switch transfers back to non-sensing state 	0.15 to 15.0 seconds	E51MTB

④ Repeatability of the timing cycle is $\pm 1\%$ at constant voltage, ambient temperature and reset time.

 Fast turn product with typical one business day lead-time to shipment.

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Model Selection — Receptacles





	Description	Style	Details	Cable Length	Catalog Number	
					Conduit Entrance	
					1/2" NPT	20 mm
Surface Mount 	Conduit entrance, front or rear mounting	2-wire, AC/DC	—	—	E51RA	E51RA20
		4-wire, AC	Gray	—	E51RC	E51RC20
			Black ①	—	E51RCB	E51RCB20
		4-wire, DC	—	—	E51RN	E51RN20
Mini-Connector 	Epoxy filled receptacle with pre-wired Mini-Connector	2-wire, AC/DC	3-pin	—	E51RAP3 Ⓢ	—
		4-wire, AC	5-pin	—	E51RCP5 Ⓢ	—
		4-wire, DC	5-pin	—	E51RNP5 Ⓢ	—
Pigtail with Mini-Connector 	Epoxy filled receptacle with Mini-Connector mounted on 3 foot (900 mm) cable	2-wire, AC/DC	3-pin	3 feet (0.9m)	E51RAPT3 Ⓢ	—
		4-wire, AC	5-pin	3 feet (0.9m)	E51RCTP5 Ⓢ	—
		4-wire, DC	5-pin	3 feet (0.9m)	E51RNPT5 Ⓢ	—
Pre-wired Cable 	Epoxy filled receptacle with pre-wired 16 gauge, yellow jacketed, type SOOW-A cable. Cable enters through hole threaded for conduit	2-wire, AC/DC	3-conductor	8 feet (2.4m)	E51RAS	E51RA20S
				12 feet (3.6m)	E51RAS12	—
				20 feet (6m)	E51RAS20	—
		4-wire, AC	5-conductor	8 feet (2.4m)	E51RCS	E51RC20S
				12 feet (3.6m)	E51RCS12	—
				20 feet (6m)	E51RCS20	—
		4-wire, DC	5-conductor	8 feet (2.4m)	E51RNS	E51RN20S
				12 feet (3.6m)	E51RNS12	—
				20 feet (6m)	E51RNS20	—

① Black receptacle is for color compatibility with E51SCN sensor body.

■ Fast turn product with typical one business day lead-time to shipment.

Ⓢ Ⓢ See listing of compatible connector cables below.

Model Selection — Compatible Connector Cables ②

	Voltage Style	Number of Pins	Gauge	Length	Catalog Number	Pin Configuration/Wire Colors (Face View Female Shown)
Standard Cables — Mini Style						
Mini Style Straight Female  Current Rating @ 600V 3-pin: 13A 4-pin: 10A	—	3-pin	16 AWG	6 feet (2m)	CSMS3F3CY1602	 1-Green 2-Black 3-White
	AC/DC	4-pin, 4-wire	16 AWG	6 feet (2m)	CSMS4A4CY1602	 1-Black 2-Blue 3-Brown 4-White
	—	5-pin	16 AWG	6 feet (2m)	CSMS5D5CY1602	 1-White 2-Red 3-Green 4-Orange 5-Black

② For a full selection of connector cables, see PG.05.05.T.E.

■ Stocked product, typical order quantities guaranteed in stock.

Wiring Diagrams (Pin numbers are for reference, rely on pin location when wiring)

Operating Voltage	Output	Terminal and Cable Models	Mini-Connector Models (Face View Male Shown)
2-Wire Sensors			
20 – 264V AC or DC 50/60 Hz	N.O. or N.C. (N.O. shown, can be changed to N.C. using switch on sensor head)		
4-Wire Sensors			
120V AC 50/60 Hz	N.O. and N.C. ①		
10 – 30V DC	N.O. and N.C. NPN ①		
	N.O. and N.C. PNP ①		

① Changing output switch on sensor head will reverse output function (N.O. becomes N.C., and N.C. becomes N.O.).


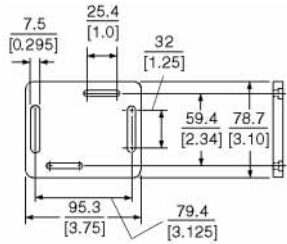

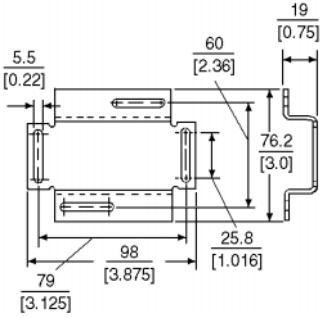

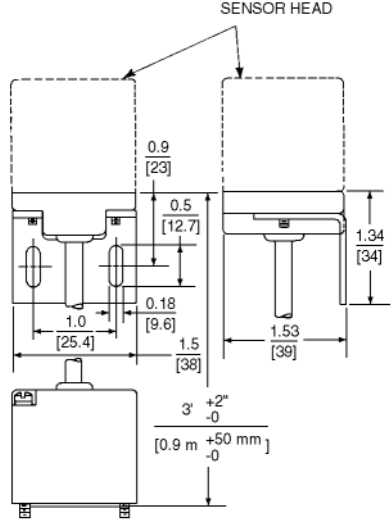
Model Selection — Accessories

	Description	Catalog Number	Approximate Dimensions in Inches [mm] Except Where Noted
	1 hole, includes mounting hardware, stainless steel	E51KH2	
	2 hole, includes mounting hardware, steel	E51KH4	

Stocked product, typical order quantities guaranteed in stock.

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Model Selection — Accessories (Continued)

	Description	Catalog Number	Approximate Dimensions in Inches [mm] Except Where Noted
Machine Mounting Bracket 	Zinc die cast construction	E50KH3	NOTE: Dimensions in mm [Inches] 
Stand-Off Mounting Bracket 	Steel construction	E51KH3	NOTE: Dimensions in mm [Inches] 
Remote Sensor Head Assembly 	Permits mounting sensor head up to 3 feet (0.9m) from sensor body	E51KRM	
Connector Cables	A variety of cables, connector blocks and accessories	See PG.05.05.T.E	

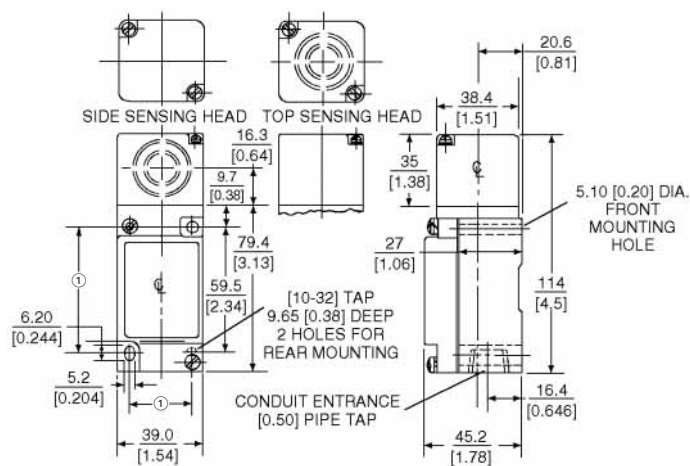
 Stocked product, typical order quantities guaranteed in stock.

Specifications

Description	Specification
Output Rating (NEMA D150) AC/DC Models AC Models DC Models	0.5A continuous 1A continuous 0.6A continuous
Protection	Latching short circuit protection on 2-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 Class II Class III	Division II — GRPS ABCD Division II — GRPS F and G 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
Burden Current	<25 mA
OFF-State Leakage	DC Version: 120 µA; 2-wire AC: 1.9 mA maximum; 3-wire AC: 1.1 mA
ON-State Leakage	<2.5V DC
Power-Up Delay	<150 mS

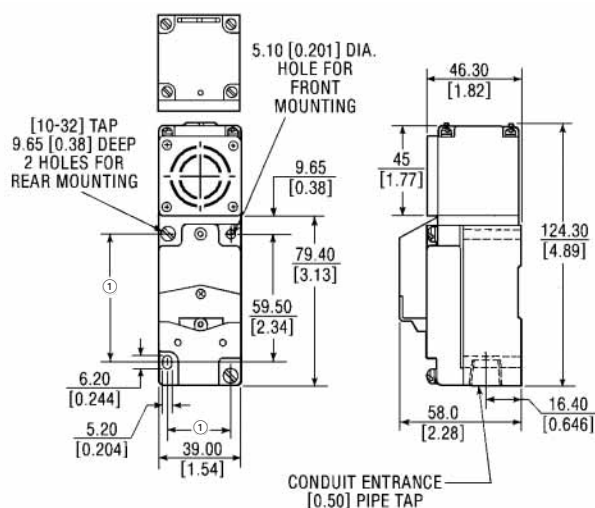
Approximate Dimensions in mm [Inches]

Standard Sensors



① Can accommodate both U.S., 29.4 [1.16] x 59.5 [2.34] and DIN, 30 [1.18] x 60 [2.36], mounting dimensions.

Sensor with Logic Module



① Can accommodate both U.S., 29.4 [1.16] x 59.5 [2.34] and DIN, 30 [1.18] x 60 [2.36], mounting dimensions.