

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

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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.

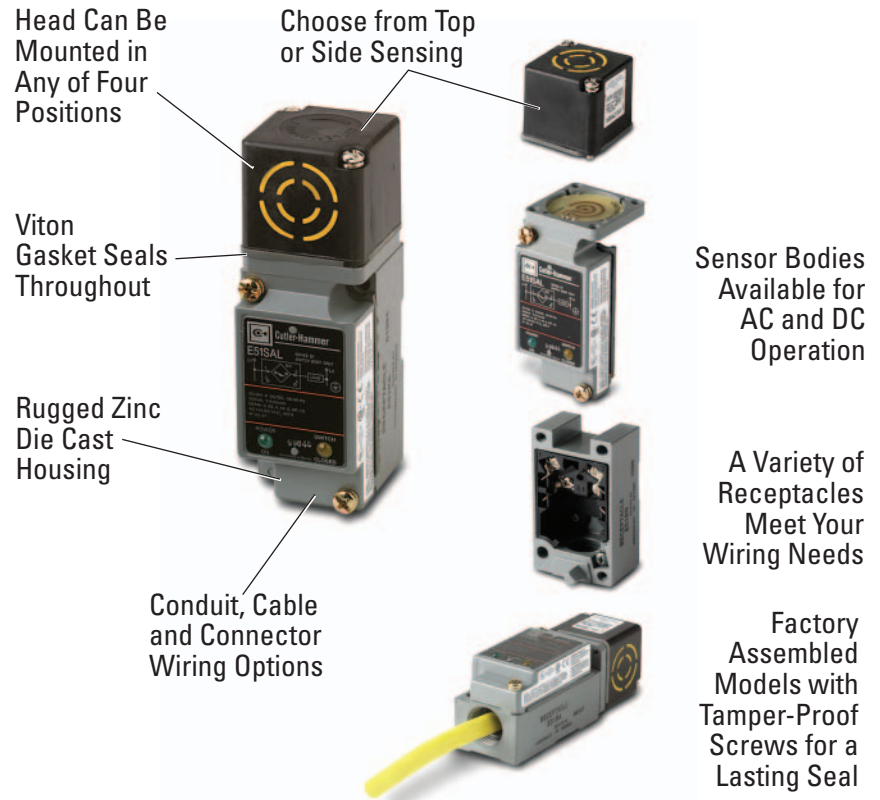
Choose from standard sensors that detect all types of metallic targets. The next page provides more detail on these sensors.

**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	<b>E51SAL</b>	<b>E51SCL</b>	<b>E51SCN</b> Accepts Logic Modules ②	<b>E51SPL</b> PNP	<b>E51SNL</b> NPN
Receptacle ③	<b>E51RA</b>	<b>E51RC</b>	<b>E51RCB</b>	<b>E51RN</b>	<b>E51RN</b>

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

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.

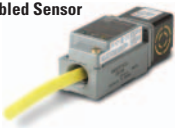
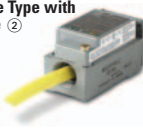
③ Receptacles feature terminal wiring with a 1/2" NPT thread at the conduit entrance. Other connection options are available:

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

☐ 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)**

		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	
			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)**

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

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	<b>E51ALT16PT</b>
Mini-Connector mounted to switch base	C	<b>E51ALT16PC</b>
Cable longer than 8 feet, add required length in 1 foot increments to listed Catalog Number — 20 foot maximum	(Length in feet)	<b>E51ALT16P12 for 12 feet</b>



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**





	0.51 inches (13 mm)	Shielded	Standard	All metals	<b>E51DT1</b>
			Alternate	All metals	<b>E51DT2</b>
	0.94 inches (24 mm)	Unshielded	Standard	All metals	<b>E51DT5</b>
			Alternate	All metals	<b>E51DT6</b>
	0.51 inches (13 mm)	Shielded	Standard	All metals	<b>E51DS1</b>
			Alternate	All metals	<b>E51DS2</b>
	0.94 inches (24 mm)	Unshielded	Standard	All metals	<b>E51DS5</b>
			Alternate	All metals	<b>E51DS6</b>

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
<b>2-Wire Sensors</b>						
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 <sup>①</sup> 
<b>4-Wire Sensors</b>						
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 <sup>①</sup>
				1.0A to 113° (45°), linearly derated to 0.3A at 176° (80°)	—	E51SCN <sup>②③</sup>
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 <sup>①</sup>
					PNP	E51SPL <sup>①</sup>


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 <sup>④</sup>	Catalog Number
 Reset time is 25 mS minimum. Rated NEMA 4, 4X and 13.	ON and OFF Delay	<ul style="list-style-type: none"> <li>■ Adjustable delay between time object is sensed and time switch function occurs</li> <li>■ Adjustable delay between time object leaves sensing field and time switch transfers back to non-sensing state</li> </ul>	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
	Conduit entrance, front or rear mounting	2-wire, AC/DC	—	—	<b>E51RA</b>	<b>E51RA20</b>
		4-wire, AC	Gray	—	<b>E51RC</b>	<b>E51RC20</b>
			Black ①	—	<b>E51RCB</b>	<b>E51RCB20</b>
		4-wire, DC	—	—	<b>E51RN</b>	<b>E51RN20</b>
	Epoxy filled receptacle with pre-wired Mini-Connector	2-wire, AC/DC	3-pin	—	<b>E51RAP3</b> ☼	—
		4-wire, AC	5-pin	—	<b>E51RCP5</b> ☼	—
		4-wire, DC	5-pin	—	<b>E51RNP5</b> ☼	—
	Epoxy filled receptacle with Mini-Connector mounted on 3 foot (900 mm) cable	2-wire, AC/DC	3-pin	3 feet (0.9m)	<b>E51RAPT3</b> ☼	—
		4-wire, AC	5-pin	3 feet (0.9m)	<b>E51RCT5</b> ☼	—
		4-wire, DC	5-pin	3 feet (0.9m)	<b>E51RNP5</b> ☼	—
	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)	<b>E51RAS</b>	<b>E51RA20S</b>
				12 feet (3.6m)	<b>E51RAS12</b>	—
				20 feet (6m)	<b>E51RAS20</b>	—
		4-wire, AC	5-conductor	8 feet (2.4m)	<b>E51RCS</b>	<b>E51RC20S</b>
				12 feet (3.6m)	<b>E51RCS12</b>	—
				20 feet (6m)	<b>E51RCS20</b>	—
		4-wire, DC	5-conductor	8 feet (2.4m)	<b>E51RNS</b>	<b>E51RN20S</b>
				12 feet (3.6m)	<b>E51RNS12</b>	—
				20 feet (6m)	<b>E51RNS20</b>	—

- 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)
<b>Standard Cables — Mini Style</b>						
 <p>Mini Style Straight Female Current Rating @ 600V 3-pin: 13A 4-pin: 10A</p>	—	3-pin	16 AWG	6 feet (2m)	<b>CSMS3F3CY1602</b>	 <p>1-Green 2-Black 3-White</p>
	AC/DC	4-pin, 4-wire	16 AWG	6 feet (2m)	<b>CSMS4A4CY1602</b>	 <p>1-Black 2-Blue 3-Brown 4-White</p>
	—	5-pin	16 AWG	6 feet (2m)	<b>CSMS5D5CY1602</b>	 <p>1-White 2-Red 3-Green 4-Orange 5-Black</p>

- 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)
<b>2-Wire Sensors</b>			
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)		
<b>4-Wire Sensors</b>			
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.).


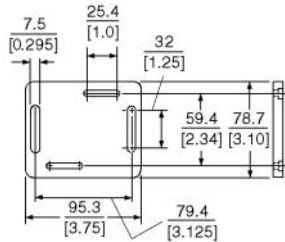

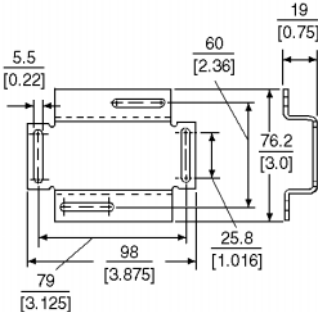

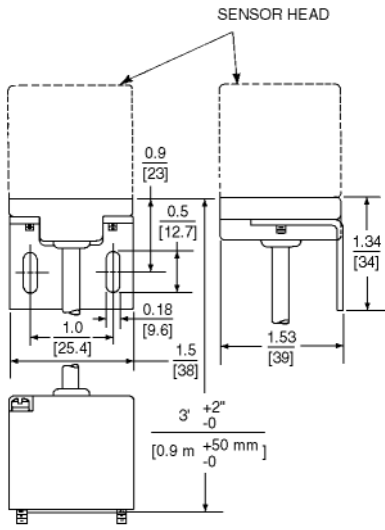
**Model Selection — Accessories**


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

■ 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
	Zinc die cast construction	<b>E50KH3</b>	<p><b>NOTE:</b> Dimensions in mm [Inches]</p> 
	Steel construction	<b>E51KH3</b>	<p><b>NOTE:</b> Dimensions in mm [Inches]</p> 
	Permits mounting sensor head up to 3 feet (0.9m) from sensor body	<b>E51KRM</b>	<p>SENSOR HEAD</p> 
Connector Cables	A variety of cables, connector blocks and accessories	See <b>PG.05.05.T.E</b>	

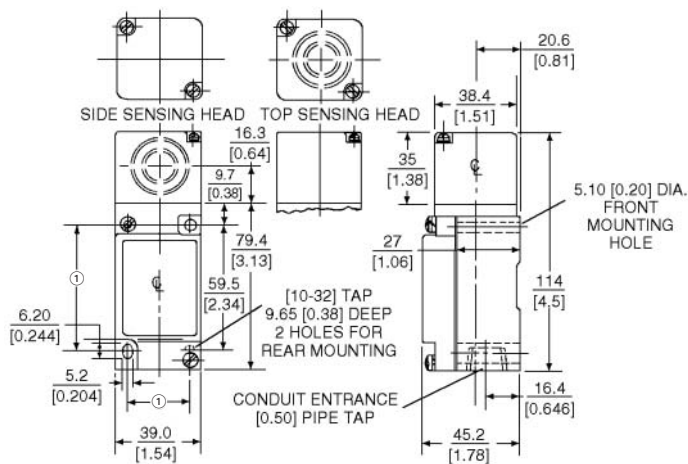
 Stocked product, typical order quantities guaranteed in stock.

### 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

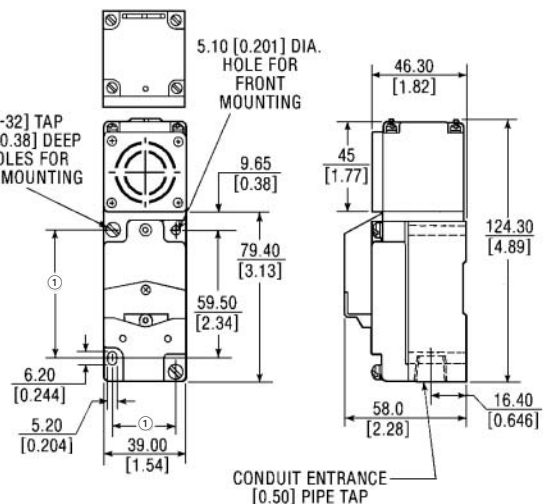
### Approximate Dimensions in mm [Inches]

#### 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.