

# Inductive Proximity Sensors

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iProx



Global Proximity



AccuProx



E56 Pancake



Nonmetallic Tubular



E52 Cube Style



E51, Factory Sealed



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Unless otherwise noted, the products contained in this section should not be used for functional safety applications. These products were not designed or tested to IEC 60947-5-3 or recommended for functional safety.



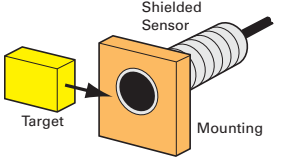
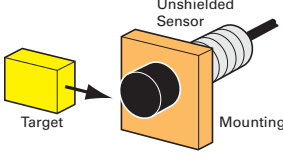
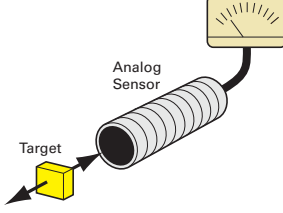
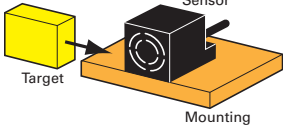
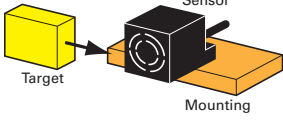
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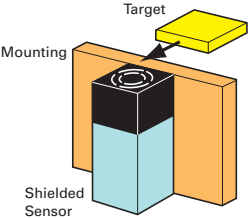
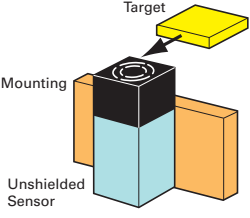
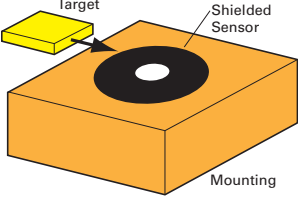
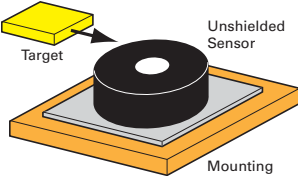
## Quick Reference Guide

## Inductive Proximity Sensors

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| Sensing Application                                                                 | Sensing Style      | Size            | Max Range | Product Family           | Page                      |
|-------------------------------------------------------------------------------------|--------------------|-----------------|-----------|--------------------------|---------------------------|
|    | Shielded tubular   | 8 mm            | 3 mm      | Global Proximity Sensors | <b>V8-T3-36</b>           |
|                                                                                     |                    | 12 mm           | 4 mm      | iProx™ Sensors           | <b>V8-T3-10</b>           |
|                                                                                     |                    |                 | 2 mm      | E57 Premium + Series     | <b>V8-T3-17, V8-T3-29</b> |
|                                                                                     |                    |                 | 5 mm      | Global Proximity Sensors | <b>V8-T3-36</b>           |
|                                                                                     |                    | 18 mm           | 8 mm      | iProx Sensors            | <b>V8-T3-10</b>           |
|                                                                                     |                    |                 | 5 mm      | E57 Premium + Series     | <b>V8-T3-17, V8-T3-29</b> |
|                                                                                     |                    |                 | 8 mm      | Global Proximity Sensors | <b>V8-T3-36</b>           |
|                                                                                     |                    | 30 mm           | 15 mm     | iProx Sensors            | <b>V8-T3-10</b>           |
|                                                                                     |                    |                 | 10 mm     | E57 Premium + Series     | <b>V8-T3-17, V8-T3-29</b> |
|                                                                                     |                    |                 | 15 mm     | Global Proximity Sensors | <b>V8-T3-36</b>           |
|    | Unshielded tubular | 8 mm            | 6 mm      | Global Proximity Sensors | <b>V8-T3-36</b>           |
|                                                                                     |                    | 12 mm           | 10 mm     | iProx Sensors            | <b>V8-T3-10</b>           |
|                                                                                     |                    |                 | 10 mm     | E57 Premium + Series     | <b>V8-T3-17, V8-T3-29</b> |
|                                                                                     |                    |                 | 10 mm     | Global Proximity Sensors | <b>V8-T3-36</b>           |
|                                                                                     |                    | 18 mm           | 18 mm     | iProx Sensors            | <b>V8-T3-10</b>           |
|                                                                                     |                    |                 | 20 mm     | E57 Premium + Series     | <b>V8-T3-17, V8-T3-29</b> |
|                                                                                     |                    |                 | 18 mm     | Global Proximity Sensors | <b>V8-T3-36</b>           |
|                                                                                     |                    | 30 mm           | 29 mm     | iProx Sensors            | <b>V8-T3-10</b>           |
|                                                                                     |                    |                 | 22 mm     | E57 Premium + Series     | <b>V8-T3-17, V8-T3-29</b> |
|                                                                                     |                    |                 | 29 mm     | Global Proximity Sensors | <b>V8-T3-36</b>           |
|  | Analog tubular     | 12 mm           | 8 mm      | AccuProx™ Analog Sensors | <b>V8-T3-45</b>           |
|                                                                                     |                    | 18 mm           | 15 mm     | AccuProx Analog Sensors  | <b>V8-T3-45</b>           |
|                                                                                     |                    | 30 mm           | 25 mm     | AccuProx Analog Sensors  | <b>V8-T3-45</b>           |
|  | Shielded cube      | 40 x 40 x 40 mm | 20 mm     | E52 Cube Style Sensors   | <b>V8-T3-74</b>           |
|  | Unshielded cube    | 40 x 40 x 40 mm | 40 mm     | E52 Cube Style Sensors   | <b>V8-T3-74</b>           |

### Inductive Proximity Sensors, continued

| Sensing Application                                                                 | Sensing Style           | Size                                                            | Max Range | Product Family                                                                                                                                           | Page                                |
|-------------------------------------------------------------------------------------|-------------------------|-----------------------------------------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
|    | Shielded limit switch   | 118 x 40 x 40 mm<br>114 x 39 x 38.4 mm                          | 13 mm     | E51 Modular Limit Switch Style Sensors<br>E51 Limit Switch Style, Factory Sealed 6P+ Sensors<br>E55 Limit Switch Style Sensors with Nonmetallic Housings | <b>V8-T3-83,</b><br><b>V8-T3-92</b> |
|    | Unshielded limit switch | 118 x 40 x 40 mm<br>114 x 39 x 38.4 mm                          | 24 mm     | E51 Series<br>E55 Series                                                                                                                                 | <b>V8-T3-83,</b><br><b>V8-T3-92</b> |
|    | Shielded pancake        | 79 x 79 x 39 mm                                                 | 40 mm     | E56 Series                                                                                                                                               | <b>V8-T3-66</b>                     |
|  | Unshielded pancake      | 79 x 79 x 39 mm<br>110 x 110 x 41 mm<br>171.5 x 171.5 x 67.5 mm | 100 mm    | E56 Series                                                                                                                                               | <b>V8-T3-66</b>                     |

## Technical Reference

### Inductive Proximity Sensors

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### General

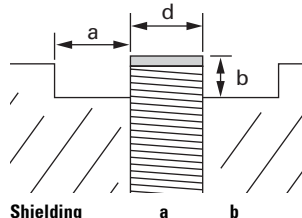
There are a number of factors which should be considered when applying induction proximity sensors. A detailed discussion of these factors can be found on **Page V8-T12-4**. Presented below are a few of the more important considerations for quick reference.

### Mounting

Inductive proximity sensors are available in two classifications: shielded (also known as embeddable or flush mountable) and unshielded (non-embeddable or non-flush mountable). What these terms refer to is the distance to surrounding metal that the device can be mounted. In the case of a shielded sensor the device can be mounted with the sensor completely surrounded by metal.

In the case of an unshielded sensor, a metal free zone must be provided when mounting the sensor. The size of the metal free zone is dependent on both the size of the sensor and the type of sensing range it has, for example, standard or extended.

### Mounting Ranges



| Shielding             | a      | b          |
|-----------------------|--------|------------|
| <b>Standard Range</b> |        |            |
| Shielded              | 0      | 0          |
| Unshielded            | 2 x Sn | Cap height |
| <b>Extended Range</b> |        |            |
| Semi-shielded         | Sn     | d          |
| Non-embeddable        | 2 x Sn | Cap height |

Where **a** and **b** are the metal free dimensions.

When mounting the sensors, do not exceed the following recommended torque specifications.

### Torque Specifications

| Stainless Steel       | Nickel-Plated Brass |
|-----------------------|---------------------|
| <b>12 mm Diameter</b> |                     |
| 35 lb-in (4.0 Nm)     | 20 lb-in (2.3 Nm)   |
| <b>18 mm Diameter</b> |                     |
| 70 lb-in (7.9 Nm)     | 70 lb-in (7.9 Nm)   |
| <b>30 mm Diameter</b> |                     |
| 70 lb-in (7.9 Nm)     | 70 lb-in (7.9 Nm)   |

### Extended Range Sensors

Extended range proximity sensors by Eaton's electrical sector offer sensing distances almost three times greater than conventional devices. They are available in semi-shielded designs: mounted similar to an embeddable sensor—and non-embeddable designs requiring more metal free zone area than conventional unshielded sensors. All are available in a variety of circuits and terminations.

### Target Material

When manufacturers of inductive proximity sensors state the sensing range of their devices, they are usually based upon a ferrous target made of carbon-rolled steel (IE FE 360) defined by ISO630. For example, in this product guide the E57LAL18A2 has a sensing range of 5 mm based upon a target of mild steel.

Sensing ranges to targets made of non-ferrous metals have to have a correction factor applied as listed in the table below. To use this table, multiply the sensing distance of the device by the factor given.

Example: The E57LAL18A2 has a sensing range of 5 mm. When used to sense a brass target, the sensing range becomes 2.25 mm (5 mm x 0.45).

### Table of Correction Factors

Multiply sensing range of device by factor given below.

#### Correction Factors

| Target              | Sensor Size |       |       |       | Limit Switch |
|---------------------|-------------|-------|-------|-------|--------------|
|                     | 4–8 mm      | 12 mm | 18 mm | 30 mm |              |
| Stainless steel 400 | 0.90        | 0.90  | 1.0   | 1.0   | 1.0          |
| Stainless steel 300 | 0.65        | 0.70  | 0.70  | 0.75  | 0.85         |
| Brass               | 0.35        | 0.45  | 0.45  | 0.45  | 0.5          |
| Aluminum            | 0.35        | 0.40  | 0.45  | 0.40  | 0.47         |
| Copper              | 0.30        | 0.25  | 0.35  | 0.30  | 0.40         |

### Target Size

Often overlooked when applying sensors is the fact that the manufacturer's stated sensing ranges are also dependent upon target size. The table below reflects the standard target sizes which were used to determine sensing ranges.

If targets are the same size or greater than standard, no reduction in sensing distance will occur. However, a smaller target size will result in a decrease in sensing range.

A general rule of thumb is that the target size shall be three times the range or the size of the sensor face, whichever is larger.

#### Standard Target Size <sup>①</sup>

| Target       | Standard Sensing Range |                    | Extended Sensing Range |                        |
|--------------|------------------------|--------------------|------------------------|------------------------|
|              | Shielded Devices       | Unshielded Devices | Semi-Shield Devices    | Non-Embeddable Devices |
| 4 mm         | 4 mm square            | 4 mm square        | —                      | —                      |
| 5 mm         | 5 mm square            | 5 mm square        | —                      | —                      |
| 6.5 mm       | 6.5 mm square          | 6.5 mm square      | —                      | —                      |
| 8 mm         | 8 mm square            | 8 mm square        | —                      | —                      |
| 12 mm        | 12 mm square           | 12 mm square       | 18 mm square           | 30 mm square           |
| 18 mm        | 18 mm square           | 24 mm square       | 36 mm square           | 60 mm square           |
| 30 mm        | 30 mm square           | 45 mm square       | 66 mm square           | —                      |
| Limit switch | 45 mm square           | 72 mm square       | —                      | —                      |

#### Note

<sup>①</sup> Targets are 1 mm thick.

## Product Selection Guide

## iProx

## E57 Premium+ Series

E57 Premium+ Series  
Short Barrel

## Global Proximity

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## Page V8-T3-10

## Overview

Designed to be the highest performing tubular inductive sensor. Standard features include extended sensing ranges, high noise-immunity, extreme durability and includes Autoconfigure Technology. Advanced features include output delay, speed detection and cloning with ProxView Software.

## Applications

Automotive, machine tool, material handling where high sensing performance and inventory consolidation is a priority

## Product Features

Auto-configure technology automatically detects a sinking (NPN) or sourcing (PNP) connection and switches the sensor accordingly, without any user intervention. Optional computer programming cable and Windows-based ProxView configuration software makes it easy to customize sensors.

Clone the sensor to match the characteristics of more than 4,800 competitive models, or configure it to match your specific application needs.

Advanced programmable features such as dual outputs, output delay, speed detection and more.

## Technical Data and Specifications

Current ratings—

AC: 250 mA

DC: 300 mA

Enclosure ratings—

NEMA® 4, 4X, 6, 6P, 12, 13

IEC IP67, IP69K

Construction—

Stainless steel

## Approvals

cUL® Listed



## Page V8-T3-17

## Overview

High performance inductive sensors include stainless steel models, extended ranges and right-angle sensing.

## Applications

A wide variety of applications including those where customers require AC/DC universal inventory sensors.

## Product Features

12, 18 and 30 mm diameters

Two- and three-wire AC and DC sensors

360° LED indicators standard

NO or NC outputs

Variety of terminations

Resettable short circuit protected and reverse polarity on select models.

Robust stainless steel tubes, shock-resistant front caps, polycarbonate end bells, and impact-absorbing potting compound are resistant to physical and environmental abuse in high temperature, high pressure washdown and high shock and vibration applications.

## Technical Data and Specifications

Current ratings—

AC: 250 mA

DC: 200 mA

Enclosure ratings—

NEMA 4, 4X, 6, 6P, 12, 13

IEC IP6, IP69K7

Construction—

Stainless steel

## Approvals

cUL Listed

CE (AC/DC and DC-only models)



## Page V8-T3-29

## Overview

Full featured sensors with shorter overall length than standard tubular sensors.

## Applications

Automation, robotics, transfer lines, conveyors, material handling

## Product Features

Available in 12, 18 and 30 mm diameters

Two-wire sensors offer 20–250 Vac or Vdc operation; AC only 20–135 Vac

Three-wire models operate on 6–30 Vdc

360° LED indicators

Same sensing ranges as standard sensors

High flex extra long 5m cable or pigtail micro-pin connector

Short circuit protection on AC/DC and DC-only versions

## Technical Data and Specifications

Current ratings—

AC mode—250 mA

DC mode—200 mA

Enclosure ratings—

NEMA 4, 4X, 6, 6P, 12, 13

IEC IP67

Construction—

Stainless steel

Semi-shielded models: nickel plated brass

## Approvals

UL® Listed

CSA® Certified

CE (AC/DC and DC-only models)



## Page V8-T3-36

## Overview

This full-line, tubular proximity sensor family provides a cost-effective solution for high volume OEM use.

## Applications

Machine tool detection, press applications, cam detection, material handling, valve and shaft position, automotive assembly

## Product Features

8, 12, 18 and 30 mm diameters

Two-wire sensors available in AC or DC versions

Three-wire sensors available in DC versions

Shielded and unshielded models

LED indicators standard

Cable, micro-connector and nano-connector terminations

Short circuit protection on DC models

NO or NC outputs

## Technical Data and Specifications

Current ratings—

AC mode—200 mA

DC mode—100 mA

Enclosure ratings—

IEC IP67, IP69K

Construction—

Nickel plated brass

8 mm Nano: stainless steel

## Approvals

cCSAus

CE (DC-only models)



**AccuProx****Page V8-T3-45****Overview**

AccuProx sensors feature analog outputs that change linearly as the target moves closer or further from the sensor face.

**Applications**

Part positioning, distance, size and thickness measurement, general inspection and error proofing (such as material imperfection or blemish detection), eccentricity or absolute angle detection, identification of different metals

**Product Features**

Extended linear sensing range of up to 25 mm—three times longer than standard tubular analog inductive sensors  
Outputs available in current (4–20 or 0–20 mA) and voltage (0–10V)  
High output resolution and repeatability for applications requiring precision sensing performance  
Robust stainless steel barrel, shock-resistant front cap, polycarbonate end bell and impact-absorbing potting compound  
Ideal for extreme temperature or high pressure washdown environments

**Technical Data and Specifications**

Current ratings—  
0–10 Vdc, 0–20 mA, 4–20 mA  
Enclosure ratings—  
NEMA 4, 4X, 6, 6P, 13  
Construction—  
Stainless steel

**Approvals**

cUL Listed

**Ferrous Only Tubular****Page V8-T3-51****Overview**

Sensors designed to detect only ferrous metals (steel/iron).

**Applications**

Workcell applications, automotive and aircraft production

**Product Features**

18 mm diameters  
Two-wire AC or three-wire DC  
NO or NC outputs  
Micro- and mini-pin terminations  
LED indicators

**Technical Data and Specifications**

Current ratings—  
AC: 500 mA continuous  
DC: 200 mA continuous  
Enclosure ratings—  
NEMA 4, 4X, 6, 6P, 12, 13  
IEC IP67  
Construction—  
Stainless steel

**Approvals**

UL Listed  
CSA Certified

**Metal Face****Page V8-T3-54****Overview**

Tough sensors with thick stainless steel sensing faces and barrels.

**Applications**

Metal cutting operations where damage to sensor face could occur

**Product Features**

12, 18 and 30 mm diameters  
Two-wire AC or three-wire DC  
20 mil thick stainless steel face  
303 stainless steel barrel  
LED indicator  
2-meter cable, micro- and mini-pin connections

**Technical Data and Specifications**

Current ratings—  
AC: 500 mA continuous  
DC: 200 mA continuous  
Enclosure ratings—  
NEMA 4, 4X, 6, 6P, 12, 13  
IEC IP67  
Construction—  
Stainless steel

**Approvals**

UL Listed  
CSA Certified

**High Current Output****Page V8-T3-58****Overview**

DC sensors which can carry extremely large continuous inrush current.

**Applications**

Heavy-duty vehicles, cement mixers, lift trucks, front end loaders, farm equipment

**Product Features**

30 mm diameter stainless steel housing  
Solid-state output for 12 ampere continuous, 50 ampere inrush capacity  
–40° to 158°F (–40° to 70°C) temperature range  
NO and NC isolated outputs  
Heavy gauge SJO cable

**Technical Data and Specifications**

Current ratings—  
Varies by model  
Enclosure ratings—  
NEMA 4, 4X, 6, 6P, 12, 13  
IEC IP67  
Construction—  
Stainless steel

**Approvals**

—

## Miniature Short Body



## Page V8-T3-61

## Overview

Small diameter and short body (4, 5, 6.5 and 8 mm) tubular housings for tight sensing applications.

## Applications

Automation equipment, robotics, machine tool, counting, sorting

## Product Features

Variety of diameters in stainless steel housings  
PVC cable, micro- and nano-pin connections  
LED indicators standard  
Short overall lengths  
Short circuit and reverse polarity protection

## Technical Data and Specifications

Current ratings—  
DC: 200 mA maximum  
Enclosure ratings—  
NEMA 4, 4X, 6, 6P, 12, 13  
IEC IP67  
Construction—  
Stainless steel

## Approvals

CE



## E56 Pancake



## Page V8-T3-66

## Overview

Self-contained sensors capable of sensing up to 3.94 inches (100 mm).

## Applications

Oil rig operations, floor conveyors, automotive assembly, overhead cranes

## Product Features

40, 50, 70 and 100 mm sensing distances  
Four-wire DC models have complementary outputs (1 NO/1 NC)  
Four-wire DC models use auto-configure technology, which allows the sensor to automatically adapt for NPN or PNP without user intervention  
Available in two-wire AC versions  
Power and output LED indicator  
Quick disconnect option  
Short circuit protected in DC  
Longest sensing distances available

## Technical Data and Specifications

Current ratings—  
AC: 500 mA continuous  
DC: 200 mA continuous  
Enclosure ratings—  
NEMA 4, 4X, 12, 13  
(some models also rated NEMA 6)  
IEC IP66  
Construction—  
PPS

## Approvals

cULus Listed



## Tubular, Nonmetallic Housing



## Page V8-T3-71

## Overview

Tubular sensors with nonmetallic housings offer high corrosion resistance.

## Applications

Food processing lines, high washdown environments

## Product Features

12, 18 and 30 mm diameters shielded and unshielded sensing  
Normally open or closed outputs  
AC and DC voltages  
Tough ABS plastic housing  
Output LED on all models

## Technical Data and Specifications

Current ratings—  
AC: 150 mA  
DC: 200 mA  
Enclosure ratings—  
NEMA 3, 3S, 4, 4X, 13  
IEC IP66  
Construction—  
ABS plastic

## Approvals

—

## E52 Cube Style



## Page V8-T3-74

## Overview

A family of industry-standard, cube-sized inductive sensors with long range capabilities.

## Applications

Automotive, manufacturing, machinery OEMs

## Product Features

Long inductive proximity ranges available (up to 40 mm sensing distance)  
Four-wire DC models have complementary outputs (1 NO/1 NC)  
Four-wire DC models use auto-configure technology, which allows the sensor to automatically adapt for NPN or PNP without user intervention  
Robust design featuring vibration and impact-absorbing potting compound  
Ideal for extreme temperatures or high pressure washdown environments

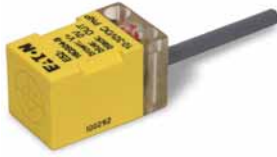
## Technical Data and Specifications

Current ratings—  
DC: 300 mA maximum  
Enclosure ratings—  
NEMA 4, 4X, 6, 6P, 12, 13  
IEC IP67  
Construction—  
Zinc alloy/PPS, PL

## Approvals

cULus Listed



**E52 Rectangular Style****Page V8-T3-78****Overview**

A variety of small rectangular sensors for limited space applications.

**Applications**

Tight applications where conventional sensor are too large

**Product Features**

Variety of housing styles R12, R18, Q16, Q25  
10 to 30 Vdc  
NPN and PNP output  
Short circuit protection  
LED indicator for output status

**Technical Data and Specifications**

Current ratings—  
DC: 100 mA maximum  
Enclosure ratings—  
NEMA 1, 2, 3, 3S, 4, 12  
IEC IP66  
Construction—  
PBT composition housing

**Approvals****E55 Limit Switch Style, Nonmetallic Housing****Page V8-T3-81****Overview**

These nonmetallic sensors provide corrosion resistance in a limit switch style housing.

**Applications**

Food processing lines, high washdown environments

**Product Features**

5 position head can be top mounted or in any of four side positions  
Long sensing ranges up to 40 mm  
Normally open or closed outputs  
AC voltages  
Tough PBT resin housing

**Technical Data and Specifications**

Current ratings—  
AC: 400 mA  
Enclosure ratings—  
NEMA 4, 4X, 6, 12, 13  
IEC IP67  
Construction—  
PBT resin

**Approvals****E51 Limit Switch Style, Factory Sealed 6P +****Page V8-T3-83****Overview**

Completely epoxy filled in unitized, one piece limit switch style construction for reliable performance under the most adverse of environmental conditions.

**Applications**

All corrosive environments: Coolants/ cutting oils, automotive applications

**Product Features**

One piece housing on switch body/ receptacle  
Head and housing totally epoxy encapsulated  
Side sensing head can be unfastened and moved to any of four positions  
Quick disconnect options  
Corrosive resistant epoxy coated housing

**Technical Data and Specifications**

Current ratings—  
AC: 1 ampere continuous  
DC: 0.6 ampere continuous  
Enclosure ratings—  
NEMA 3, 3S, 4, 4X, 6, 6P, 12, 13  
IEC IP67  
Construction—  
Die cast zinc  
Gasket material: Viton®

**Approvals**

cUL Listed

**E51 Limit Switch Style, Modular****Page V8-T3-92****Overview**

Modular design allows maximum use of inventories in these limit switch style housings. Solid-state circuitry in a variety of sensing ranges.

**Applications**

Machine tool, punch presses, automotive, conveyor systems

**Product Features**

Modular heads, switch bodies, receptacles  
Shielded or unshielded sensing ranges  
Solid-state electronics  
Viton gasket seals  
LED indicators for power and output status  
Top and side sensing heads  
Alternate frequency for side by side operation  
Components individually labeled for easy identification

**Technical Data and Specifications**

Current ratings—  
AC: 1 ampere continuous  
DC: 0.6 ampere continuous  
Enclosure ratings—  
NEMA 3, 3S, 4, 4X, 6, 6P, 12, 13  
IEC IP67  
Class I, Class II, Division 2  
Groups A, B, C, D, F and G; Class III  
Construction—  
Die cast zinc  
Gasket material: Viton

**Approvals**

UL Listed  
CSA Certified (most models)



## iProx Sensors

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## iProx Sensors

## Product Description

The iProx represents the highest performance, most versatile tubular inductive sensor offered by Eaton's electrical sector. By utilizing an embedded micro-processor and exclusive SmartSense™ technology, iProx can sense up to three times farther than typical sensors of its class, while providing an unheard-of level of customization.

Both shielded and unshielded versions of iProx feature extended sensing ranges. This allows the sensor to be mounted farther from the target, thereby reducing the potential for target impacts and increasing the sensing reliability of your application.

The iProx also includes a wide range of advanced features that can be enabled via optional programming tools. Using the ProxView Windows-based software package, an entirely custom sensor can be programmed to perfectly fit an application.

For the most current information on this product, visit our Web site: [www.eaton.com](http://www.eaton.com)

Sensor characteristics, such as sensing range, can be customized down to the nearest tenth of a millimeter. Outputs can be changed from NO to NC. The iProx even features built-in timing delays and speed detection logic—no PLC programming is necessary.

With extended sensing range, quality construction and the ability to adapt to its environment, iProx is the ideal choice for even the most demanding inductive sensing applications.

## Application Description

## Typical Applications

- Automotive
- Machine tool
- Material handling
- Metalworking

## Features

- Available in AC two-wire, DC three-wire and unique DC four-wire with complementary (NO-NC) or dual NO outputs
- Reliably detect metal targets at up to three times the range of conventional shielded or unshielded tubular inductive sensors

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- Quality construction using a stainless steel barrel, 360-degree dual-color LED indicator, Ryton® impact-resistant face cap and vibration-absorbing potting compound
- Auto-configure technology automatically detects a sinking (NPN) or sourcing (PNP) connection and switches the sensor accordingly, without any user intervention
- Exclusive SmartSense embedded microprocessor technology allows for customizable range, band sensing, nuisance metal rejection, timing delays and over/under speed detection
- Optional computer programming cable and Windows-based ProxView configuration software makes it easy to customize sensors
- Withstands high electrical noise (up to 20 V/m)
- Resistant to extreme temperatures (–40°F [–40°C])

## Standards and Certifications

- cUL Listed
- CE



**⚠ 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 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

## iProx Sensors

**Note:** Custom iProx models can also be ordered directly from the factory with pre-set ranges, outputs and connectors. Consult the Eaton Application Engineers at 1-800-426-9184 for more information.

## Two-Wire Sensors

|                                                                                     | Operating Voltage | Sensing Range | Shielding  | Connection Type ①        | NO Output Catalog Number ② | NC Output Catalog Number ② |
|-------------------------------------------------------------------------------------|-------------------|---------------|------------|--------------------------|----------------------------|----------------------------|
| 12 mm Diameter                                                                      |                   |               |            |                          |                            |                            |
|    | 20–132 Vac        | 4 mm          | Shielded   | 3-pin micro AC connector | E59-M12A105A01-A1 ☺        | E59-M12A105A01-A2 ☺        |
|                                                                                     |                   |               |            | 3-pin micro AC pigtail ③ | E59-M12A105A01P-A1 ☺       | E59-M12A105A01P-A2 ☺       |
|                                                                                     |                   |               |            | 3-pin mini AC pigtail ③  | E59-M12A105A01PB-A1 ☺      | E59-M12A105A01PB-A2 ☺      |
|                                                                                     |                   |               |            | 2-meter cable            | E59-M12A105C02-A1          | E59-M12A105C02-A2          |
|    |                   | 10 mm         | Unshielded | 3-pin micro AC connector | E59-M12C110A01-A1 ☺        | E59-M12C110A01-A2 ☺        |
|                                                                                     |                   |               |            | 3-pin micro AC pigtail ③ | E59-M12C110A01P-A1 ☺       | E59-M12C110A01P-A2 ☺       |
|                                                                                     |                   |               |            | 3-pin mini AC pigtail ③  | E59-M12C110A01PB-A1 ☺      | E59-M12C110A01PB-A2 ☺      |
|                                                                                     |                   |               |            | 2-meter cable            | E59-M12C110C02-A1          | E59-M12C110C02-A2          |
| 18 mm Diameter                                                                      |                   |               |            |                          |                            |                            |
|    | 20–132 Vac        | 8 mm          | Shielded   | 3-pin micro AC connector | E59-M18A109A01-A1 ☺        | E59-M18A109A01-A2 ☺        |
|                                                                                     |                   |               |            | 3-pin micro AC pigtail ③ | E59-M18A109A01P-A1 ☺       | E59-M18A109A01P-A2 ☺       |
|                                                                                     |                   |               |            | 3-pin mini AC pigtail ③  | E59-M18A109A01PB-A1 ☺      | E59-M18A109A01PB-A2 ☺      |
|                                                                                     |                   |               |            | 2-meter cable            | E59-M18A109C02-A1          | E59-M18A109C02-A2          |
|   |                   | 18 mm         | Unshielded | 3-pin micro AC connector | E59-M18C118A01-A1 ☺        | E59-M18C118A01-A2 ☺        |
|                                                                                     |                   |               |            | 3-pin micro AC pigtail ③ | E59-M18C118A01P-A1 ☺       | E59-M18C118A01P-A2 ☺       |
|                                                                                     |                   |               |            | 3-pin mini AC pigtail ③  | E59-M18C118A01PB-A1 ☺      | E59-M18C118A01PB-A2 ☺      |
|                                                                                     |                   |               |            | 2-meter cable            | E59-M18C118C02-A1          | E59-M18C118C02-A2          |
| 30 mm Diameter                                                                      |                   |               |            |                          |                            |                            |
|  | 20–132 Vac        | 15 mm         | Shielded   | 3-pin micro AC connector | E59-M30A115A01-A1 ☺        | E59-M30A115A01-A2 ☺        |
|                                                                                     |                   |               |            | 3-pin micro AC pigtail ③ | E59-M30A115A01P-A1 ☺       | E59-M30A115A01P-A2 ☺       |
|                                                                                     |                   |               |            | 3-pin mini AC pigtail ③  | E59-M30A115A01PB-A1 ☺      | E59-M30A115A01PB-A2 ☺      |
|                                                                                     |                   |               |            | 2-meter cable            | E59-M30A115C02-A1          | E59-M30A115C02-A2          |
|  |                   | 29 mm         | Unshielded | 3-pin micro AC connector | E59-M30C129A01-A1 ☺        | E59-M30C129A01-A2 ☺        |
|                                                                                     |                   |               |            | 3-pin micro AC pigtail ③ | E59-M30C129A01P-A1 ☺       | E59-M30C129A01P-A2 ☺       |
|                                                                                     |                   |               |            | 3-pin mini AC pigtail ③  | E59-M30C129A01PB-A1 ☺      | E59-M30C129A01PB-A2 ☺      |
|                                                                                     |                   |               |            | 2-meter cable            | E59-M30C129C02-A1          | E59-M30C129C02-A2          |

## Notes

☺ See listing of compatible connector cables on **Page V8-T3-14**.

<sup>①</sup> For sensors with custom cable lengths or PUR jackets, contact Application Engineering at 1-800-426-9184.

<sup>②</sup> Sensors are ordered with pre-set outputs from the factory, but can be later programmed either NO or NC using the ProxView software.

<sup>③</sup> Standard pigtail cable length is 12 in.

# 3.1

## Inductive Proximity Sensors

### iProx Sensors

**Note:** Custom iProx models can also be ordered directly from the factory with pre-set ranges, outputs and connectors. Consult the Eaton Application Engineers at 1-800-426-9184 for more information.

#### Three-Wire Sensors

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|                                                                                     | Operating Voltage | Sensing Range | Shielding  | Connection Type ①        | NO Output Catalog Number ② | NC Output Catalog Number ② |  |  |
|-------------------------------------------------------------------------------------|-------------------|---------------|------------|--------------------------|----------------------------|----------------------------|--|--|
| Standard Range                                                                      | 12 mm Diameter    |               |            |                          |                            |                            |  |  |
|    | 6–48 Vdc          | 4 mm          | Shielded   | 4-pin micro DC connector | E59-M12A105D01-D1 ☼        | E59-M12A105D01-D2 ☼        |  |  |
|                                                                                     |                   |               |            | 4-pin micro DC pigtail ③ | E59-M12A105D01P-D1 ☼       | E59-M12A105D01P-D2 ☼       |  |  |
|                                                                                     |                   |               |            | 2-meter cable            | E59-M12A105C02-D1          | E59-M12A105C02-D2          |  |  |
| Extended Range                                                                      |                   | 10 mm         | Unshielded | 4-pin micro DC connector | E59-M12C110D01-D1 ☼        | E59-M12C110D01-D2 ☼        |  |  |
|    |                   |               |            | 4-pin micro DC pigtail ③ | E59-M12C110D01P-D1 ☼       | E59-M12C110D01P-D2 ☼       |  |  |
|                                                                                     |                   |               |            | 2-meter cable            | E59-M12C110C02-D1          | E59-M12C110C02-D2          |  |  |
| Standard Range                                                                      | 18 mm Diameter    |               |            |                          |                            |                            |  |  |
|    | 6–48 Vdc          | 8 mm          | Shielded   | 4-pin micro DC connector | E59-M18A108D01-D1 ☼        | E59-M18A108D01-D2 ☼        |  |  |
|                                                                                     |                   |               |            | 4-pin micro DC pigtail ③ | E59-M18A108D01P-D1 ☼       | E59-M18A108D01P-D2 ☼       |  |  |
|                                                                                     |                   |               |            | 2-meter cable            | E59-M18A108C02-D1          | E59-M18A108C02-D2          |  |  |
| Extended Range                                                                      |                   | 18 mm         | Unshielded | 4-pin micro DC connector | E59-M18C116D01-D1 ☼        | E59-M18C116D01-D2 ☼        |  |  |
|    |                   |               |            | 4-pin micro DC pigtail ③ | E59-M18C116D01P-D1 ☼       | E59-M18C116D01P-D2 ☼       |  |  |
|                                                                                     |                   |               |            | 2-meter cable            | E59-M18C116C02-D1          | E59-M18C116C02-D2          |  |  |
| Standard Range                                                                      | 30 mm Diameter    |               |            |                          |                            |                            |  |  |
|  | 6–48 Vdc          | 15 mm         | Shielded   | 4-pin micro DC connector | E59-M30A115D01-D1 ☼        | E59-M30A115D01-D2 ☼        |  |  |
|                                                                                     |                   |               |            | 4-pin micro DC pigtail ③ | E59-M30A115D01P-D1 ☼       | E59-M30A115D01P-D2 ☼       |  |  |
|                                                                                     |                   |               |            | 2-meter cable            | E59-M30A115C02-D1          | E59-M30A115C02-D2          |  |  |
| Extended Range                                                                      |                   | 29 mm         | Unshielded | 4-pin micro DC connector | E59-M30C129D01-D1 ☼        | E59-M30C129D01-D2 ☼        |  |  |
|  |                   |               |            | 4-pin micro DC pigtail ③ | E59-M30C129D01P-D1 ☼       | E59-M30C129D01P-D2 ☼       |  |  |
|                                                                                     |                   |               |            | 2-meter cable            | E59-M30C129C02-D1          | E59-M30C129C02-D2          |  |  |

#### Notes

☼ See listing of compatible connector cables on **Page V8-T3-14**.

<sup>①</sup> For sensors with custom cable lengths or PUR jackets, contact Application Engineering at 1-800-426-9184.

<sup>②</sup> Sensors are ordered with pre-set outputs from the factory, but can be later programmed either NO or NC using the ProxView software.

<sup>③</sup> Standard pigtail cable length is 12 in.

## Complementary and Dual Output Sensors

## Four-Wire Sensors

|                                                                                     | Operating Voltage | Sensing Range | Shielding  | Output Type    | Connection Type          | Complementary Output (1NO-1NC)<br>Catalog Number | Dual NO Output<br>Catalog Number ① |                       |
|-------------------------------------------------------------------------------------|-------------------|---------------|------------|----------------|--------------------------|--------------------------------------------------|------------------------------------|-----------------------|
| Standard Range                                                                      | 12 mm Diameter    |               |            |                |                          |                                                  |                                    |                       |
|    | 6–48 Vdc          | 4 mm          | Shielded   | NPN (sinking)  | 4-pin micro DC connector | E59-M12A105D01-D3NN ☹                            | E59-M12A105D01-D1NN ☹              |                       |
|                                                                                     |                   |               |            |                | 2-meter cable            | E59-M12A105C02-D3NN                              | E59-M12A105C02-D1NN                |                       |
|                                                                                     |                   |               |            | PNP (sourcing) | 4-pin micro DC connector | E59-M12A105D01-D3PP ☹                            | E59-M12A105D01-D1PP ☹              |                       |
|                                                                                     |                   |               |            |                | 2-meter cable            | E59-M12A105C02-D3PP                              | E59-M12A105C02-D1PP                |                       |
| Extended Range                                                                      |                   | 10 mm         | Unshielded | NPN (sinking)  | 4-pin micro DC connector | E59-M12C110D01-D3NN ☹                            | E59-M12C110D01-D1NN ☹              |                       |
|                                                                                     |                   |               |            |                | 2-meter cable            | E59-M12C110C02-D3NN                              | E59-M12C110C02-D1NN                |                       |
|                                                                                     |                   |               |            | PNP (sourcing) | 4-pin micro DC connector | E59-M12C110D01-D3PP ☹                            | E59-M12C110D01-D1PP ☹              |                       |
|                                                                                     |                   |               |            |                | 2-meter cable            | E59-M12C110C02-D3PP                              | E59-M12C110C02-D1PP                |                       |
| Standard Range                                                                      | 18 mm Diameter    |               |            |                |                          |                                                  |                                    |                       |
|    | 6–48 Vdc          |               | 8 mm       | Shielded       | NPN (sinking)            | 4-pin micro DC connector                         | E59-M18A108D01-D3NN ☹              | E59-M18A108D01-D1NN ☹ |
|                                                                                     |                   |               |            |                |                          | 2-meter cable                                    | E59-M18A108C02-D3NN                | E59-M18A108C02-D1NN   |
|                                                                                     |                   |               |            |                | PNP (sourcing)           | 4-pin micro DC connector                         | E59-M18A108D01-D3PP ☹              | E59-M18A108D01-D1PP ☹ |
|                                                                                     |                   | 2-meter cable |            |                |                          | E59-M18A108C02-D3PP                              | E59-M18A108C02-D1PP                |                       |
| Extended Range                                                                      |                   | 18 mm         | Unshielded | NPN (sinking)  | 4-pin micro DC connector | E59-M18C116D01-D3NN ☹                            | E59-M18C116D01-D1NN ☹              |                       |
|                                                                                     |                   |               |            |                | 2-meter cable            | E59-M18C116C02-D3NN                              | E59-M18C116C02-D1NN                |                       |
|                                                                                     |                   |               |            | PNP (sourcing) | 4-pin micro DC connector | E59-M18C116D01-D3PP ☹                            | E59-M18C116D01-D1PP ☹              |                       |
|                                                                                     |                   |               |            |                | 2-meter cable            | E59-M18C116C02-D3PP                              | E59-M18C116C02-D1PP                |                       |
| Standard Range                                                                      | 30 mm Diameter    |               |            |                |                          |                                                  |                                    |                       |
|  | 6–48 Vdc          |               | 15 mm      | Shielded       | NPN (sinking)            | 4-pin micro DC connector                         | E59-M30A115D01-D3NN ☹              | E59-M30A115D01-D1NN ☹ |
|                                                                                     |                   |               |            |                |                          | 2-meter cable                                    | E59-M30A115C02-D3NN                | E59-M30A115C02-D1NN   |
|                                                                                     |                   |               |            |                | PNP (sourcing)           | 4-pin micro DC connector                         | E59-M30A115D01-D3PP ☹              | E59-M30A115D01-D1PP ☹ |
|                                                                                     |                   | 2-meter cable |            |                |                          | E59-M30A115C02-D3PP                              | E59-M30A115C02-D1PP                |                       |
| Extended Range                                                                      |                   | 29 mm         | Unshielded | NPN (sinking)  | 4-pin micro DC connector | E59-M30C129D01-D3NN ☹                            | E59-M30C129D01-D1NN ☹              |                       |
|                                                                                     |                   |               |            |                | 2-meter cable            | E59-M30C129C02-D3NN                              | E59-M30C129C02-D1NN                |                       |
|                                                                                     |                   |               |            | PNP (sourcing) | 4-pin micro DC connector | E59-M30C129D01-D3PP ☹                            | E59-M30C129D01-D1PP ☹              |                       |
|                                                                                     |                   |               |            |                | 2-meter cable            | E59-M30C129C02-D3PP                              | E59-M30C129C02-D1PP                |                       |

## Notes

☹ See listing of compatible connector cables on **Page V8-T3-14**.

① At this time, iProx Complementary and Dual Output models are not available with auto-sink/source detection. Therefore, PNP (sourcing) and NPN (sinking) models must be ordered separately.

# 3.1

## Inductive Proximity Sensors

### iProx Sensors

#### Compatible Connector Cables

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#### Standard Cables <sup>①</sup>

|                                                                                                                         | Current Rating at 600V              | Voltage Style | Number of Pins | Gauge  | Length      | Pin Configuration/Wire Colors (Face View Female Shown)                                                                  | PVC Jacket Catalog Number | PUR Jacket Catalog Number |
|-------------------------------------------------------------------------------------------------------------------------|-------------------------------------|---------------|----------------|--------|-------------|-------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|
| <b>Micro-Style Straight Female</b><br> | <b>Micro-Style, Straight Female</b> |               |                |        |             |                                                                                                                         |                           |                           |
|                                                                                                                         | —                                   | AC            | 3-pin, 3-wire  | 22 AWG | 6.0 ft (2m) |  1-Green<br>2-Red/Black<br>3-Red/White | <b>CSAS3F3CY2202</b>      | <b>CSAS3F3RY2202</b>      |
| <b>Mini-Style Straight Female</b><br>  | <b>Mini-Style, Straight Female</b>  |               |                |        |             |                                                                                                                         |                           |                           |
|                                                                                                                         | 13A                                 | —             | 3-pin          | 16 AWG | 6 ft (2m)   |  1-Green<br>2-Black<br>3-White         | <b>CSMS3F3CY1602</b>      |                           |

#### Accessories

#### iProx Sensors

|                                                                                                        | Description                                                                                                                                                                                                                                                        | Catalog Number  |
|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Software</b><br> | Step-by-step programming software required to program iProx. Compatible with Microsoft Windows® and Windows® Mobile devices.                                                                                                                                       | <b>E59SW1</b>   |
| <b>Cable</b><br>    | The iProx programming cable is used to program individual iProx sensors, providing a connection between the computer and the sensor. Connects to computer via a serial (RS-232) or USB port. (USB connection requires an adapter which is included with purchase.) | <b>E59RP1</b>   |
| <b>Labels</b><br>   | Field applied labels for iProx sensor (100 pcs)                                                                                                                                                                                                                    | <b>E59LABEL</b> |

#### Note

<sup>①</sup> For a full selection of connector cables, see **Tab 10, section 10.1**.

**Starter Kit****iProx Starter Kits****Description****Catalog Number****Interested in custom programming iProx sensors to fit your application?**

These kits include everything needed to get the most out of iProx: a sensor, a programming cable (E59RP1), a micro connector cable (CSDS4A4CY2202) and ProxView software on CD-ROM (E59SW1).

Starter kit includes:

|                                                      |                   |
|------------------------------------------------------|-------------------|
| 12 mm AC unshielded iProx sensor (E59-M12C110A01-A1) | <b>E5912ACKIT</b> |
| 12 mm DC unshielded iProx sensor (E59-M12C110D01-D1) | <b>E5912DCKIT</b> |
| 18 mm AC unshielded iProx sensor (E59-M18C118A01-A1) | <b>E5918ACKIT</b> |
| 18 mm DC unshielded iProx sensor (E59-M18C116D01-D1) | <b>E5918DCKIT</b> |
| 30 mm AC unshielded iProx sensor (E59-M30C129A01-A1) | <b>E5930ACKIT</b> |
| 30 mm DC unshielded iProx sensor (E59-M30C129D01-D1) | <b>E5930DCKIT</b> |

**Demo Kit****iProx Demonstration Kit****Description****Catalog Number**

A powered, briefcase demo kit show-casing the capabilities of iProx and AccuProx sensors. Kit includes one 18 mm iProx sensor and one 18 mm AccuProx sensor. A quick disconnect cable and mounting system allow for fast swapping of sensors. Demo kit is powered by two replaceable 9-volt alkaline batteries.

**E59DEM01**

**Technical Data and Specifications****iProx Sensors**

| Description              | Two-Wire Sensors                                                                                  | Three-Wire Sensors                                                                                |
|--------------------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| Input voltage            | 20–132 Vac                                                                                        | 6–48 Vdc                                                                                          |
| Load current             | 250 mA                                                                                            | 300 mA                                                                                            |
| Leakage current          | ≤1.7 mA at 32°F (0°C), 2.0 mA at –40°F (–40°C)                                                    | ≤150 µA                                                                                           |
| Voltage drop             | <5 Vac                                                                                            | ≤2.5 Vdc                                                                                          |
| Burden current           | —                                                                                                 | ≤15 mA                                                                                            |
| Protection               | None                                                                                              | Auto reset                                                                                        |
| Switching hysteresis     | <15% rated sensing distance                                                                       | <15% rated sensing distance                                                                       |
| Repeat accuracy          | Shielded models: <1% sensing distance;<br>Unshielded models: <3% sensing distance                 | Shielded models: <1% sensing distance;<br>Unshielded models: <3% sensing distance                 |
| Surge capacity           | 3A/30 ms                                                                                          | —                                                                                                 |
| Temperature range        | –40° to 158°F (–40° to 70°C)                                                                      | –40° to 158°F (–40° to 70°C)                                                                      |
| Material of construction | 303 stainless steel; end bells: polycarbonate;<br>face caps: Ryton®; cable: AWM style 20387 (PVC) | 303 stainless steel; end bells: polycarbonate;<br>face caps: Ryton®; cable: AWM style 20387 (PVC) |
| Vibration and shock      | Vibration: 10 to 55 Hz, 1 mm amplitude,<br>IEC 60068-2-6; shock: 30g, 11 ms per IEC 68-2-27       | Vibration: 10 to 55 Hz, 1 mm amplitude,<br>IEC 60068-2-6; shock: 30g, 11 ms per IEC 68-2-27       |
| Indicator LED            | 360° viewable LED                                                                                 | 360° viewable LED                                                                                 |
| Enclosure ratings        | NEMA 4, 4X, 6, 6P, 12 and 13 (IP67) IP69K ①                                                       | NEMA 4, 4X, 6, 6P, 12 and 13 (IP67) IP69K ①                                                       |

**Response Time ②**

| Description              | Two-Wire Sensors<br>All Two-Wire Models            | Three-Wire Sensors<br>Shielded |                 |                 | Unshielded      |                 |                 |
|--------------------------|----------------------------------------------------|--------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                          |                                                    | 12 mm                          | 18 mm           | 30 mm           | 12 mm           | 18 mm           | 30 mm           |
| Factory default mode     | Shipped in “Side by Side Mode” by default (20 V/m) | 580 Hz (10 V/m)                | 390 Hz (10 V/m) | 240 Hz (10 V/m) | 300 Hz (10 V/m) | 150 Hz (10 V/m) | 145 Hz (10 V/m) |
| Side by side ③           | 30 Hz (10 V/m)                                     | 50 Hz (20 V/m)                 | 50 Hz (20 V/m)  | 50 Hz (20 V/m)  | 50 Hz (20 V/m)  | 50 Hz (20 V/m)  | 50 Hz (20 V/m)  |
| High noise immunity mode | 10 Hz (>20 V/m)                                    | 10 Hz (>20 V/m)                | 10 Hz (>20 V/m) | 10 Hz (>20 V/m) | 10 Hz (>20 V/m) | 10 Hz (>20 V/m) | 10 Hz (>20 V/m) |

**Notes**

Ryton® is a registered trademark of Phillips Chemical (division of Phillips Petroleum).

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

② iProx sensors may be programmed to perform in side by side or high noise immunity applications using the iProx programming cable (E59RP1) and ProxView software (E59SW1).

③ Use the side by side response time parameter when using the iProx Tray Programmer (E59TP1), iProx programming cable (E59RP1) and ProxView software (E59SW1).

# 3.1

## Inductive Proximity Sensors

### iProx Sensors

#### Wiring Diagrams

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

#### iProx Sensors

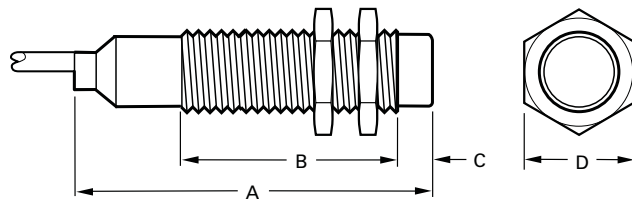
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| Operating Voltage                                      | Output                    | Cable Models | Connector Models (Face View Male Shown) |      |
|--------------------------------------------------------|---------------------------|--------------|-----------------------------------------|------|
|                                                        |                           |              | Micro                                   | Mini |
| <b>Two-Wire Sensors</b>                                |                           |              |                                         |      |
| 20–132 Vac                                             | NO and NC                 |              |                                         |      |
| <b>Three-Wire Sensors</b>                              |                           |              |                                         |      |
| 6–48 Vdc                                               | NO and NC (NPN and PNP) ① |              |                                         | —    |
| <b>Four-Wire Dual Output and Complementary Sensors</b> |                           |              |                                         |      |
| 6–48 Vdc                                               | NO and NC (NPN)           |              |                                         | —    |
|                                                        | NO and NC (PNP)           |              |                                         | —    |

#### Dimensions

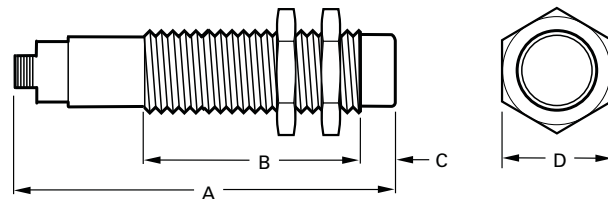
Approximate Dimensions in Inches (mm)

##### Cable Models



| Size  | Shielding  | A           | B           | C           | D         |
|-------|------------|-------------|-------------|-------------|-----------|
| 12 mm | Shielded   | 2.46 (62.4) | 1.98 (50.3) | 0.02 (0.5)  | 0.67 (17) |
|       | Unshielded | 2.46 (62.4) | 1.64 (41.6) | 0.36 (9)    | 0.67 (17) |
| 18 mm | Shielded   | 2.54 (64.5) | 2.00 (50.9) | 0.02 (0.5)  | 0.94 (24) |
|       | Unshielded | 2.54 (64.5) | 1.47 (37.4) | 0.55 (14)   | 0.94 (24) |
| 30 mm | Shielded   | 2.74 (69.6) | 2.13 (54.1) | 0.03 (0.75) | 1.41 (36) |
|       | Unshielded | 2.74 (69.6) | 1.41 (35.8) | 0.75 (19)   | 1.41 (36) |

##### Micro-Connector Models



| Size  | Shielding  | A           | B           | C           | D         |
|-------|------------|-------------|-------------|-------------|-----------|
| 12 mm | Shielded   | 2.71 (68.7) | 1.98 (50.3) | 0.02 (0.5)  | 0.67 (17) |
|       | Unshielded | 2.71 (68.7) | 1.64 (41.6) | 0.36 (9)    | 0.67 (17) |
| 18 mm | Shielded   | 2.73 (69.3) | 2.00 (50.9) | 0.02 (0.5)  | 0.94 (24) |
|       | Unshielded | 2.73 (69.3) | 1.47 (37.4) | 0.55 (14)   | 0.94 (24) |
| 30 mm | Shielded   | 2.92 (74.1) | 2.13 (54.1) | 0.03 (0.75) | 1.41 (36) |
|       | Unshielded | 2.92 (74.1) | 1.41 (35.8) | 0.75 (19)   | 1.41 (36) |

#### Notes

- ① The three-wire DC version of iProx automatically configures itself to NPN or PNP based on field wiring. No user intervention is required.
- ② Pin numbers 2 and 4 are internally jumpered together. Either pin may be used.
- ③ The complementary (1NO-1NC) output models feature the NC output on pin 2 (white).

## E57 Premium+ Series Sensors



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## E57 Premium+ Series Sensors

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## E57 Premium+ Series Sensors

## Product Description

The Premium+ Series Inductive Proximity Sensors by Eaton's electrical sector have improved sensing performance, product durability and selection. This improved line of sensors carries the Premium+ Series name because we have upgraded the design to a rugged stainless steel body, shock-resistant front caps and impact-absorbing potting compound. Plus, the Premium+ Series line now includes a choice of AC, AC/DC and DC-only, 12, 18 and 30 mm sensors with unmatched noise immunity of greater than 20V/meter.

## Features

- New expanded offering of two-wire, three-wire, AC, DC, and AC/DC multiple range sensor models
- Manufactured to take physical and environmental abuse
- Designed with stainless steel barrel and new potting compound for robust, high temperature, high pressure washdown, as well as intense shock and vibration applications
- Unmatched high noise immunity eliminates problems associated with electrical noise (all models >20V/meter)
- 360° output status indicator is visible from any angle and in any light condition
- Resettable short circuit protection and reverse polarity in select models
- Right angle sensing models offer unique problem-solving capabilities
- Wide temperature range –13° to 158°F (–25° to 70°C) on cable, micro-style connections

## Standards and Certifications

- cUL Listed
- CE (AC/DC and DC-only models)

**! 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](http://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

## E57 Premium+ Sensors

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## Two-Wire Sensors

|                                                                                     | Operating Voltage                     | Sensing Range (Sn)         | Shielding              | Connection Type ①                | NO Output Catalog Number         | NC Output Catalog Number |                  |                |
|-------------------------------------------------------------------------------------|---------------------------------------|----------------------------|------------------------|----------------------------------|----------------------------------|--------------------------|------------------|----------------|
| Standard Range                                                                      | 12 mm Diameter End Sensing            |                            |                        |                                  |                                  |                          |                  |                |
|    | 20–250 Vac                            | 2 mm (standard range)      | Shielded               | 2-meter cable                    | E57LAL12A2                       | E57LBL12A2               |                  |                |
|                                                                                     |                                       |                            |                        | 3-pin micro AC connector         | E57LAL12A2SA ☺                   | E57LBL12A2SA ☺           |                  |                |
|                                                                                     |                                       |                            |                        | 3-pin micro AC pigtail connector | E57LAL12A2SP ☺                   | E57LBL12A2SP ☺           |                  |                |
| Extended Range                                                                      |                                       | 4 mm (standard range)      | Unshielded             | 2-meter cable                    | E57LAL12A2E                      | E57LBL12A2E              |                  |                |
|                                                                                     |                                       |                            |                        | 3-pin micro AC connector         | E57LAL12A2EA ☺                   | E57LBL12A2EA ☺           |                  |                |
|                                                                                     |                                       |                            |                        | 3-pin micro AC pigtail connector | E57LAL12A2EP ☺                   | E57LBL12A2EP ☺           |                  |                |
|                                                                                     | 20–132 Vac                            | 6 mm (extended range)      | Semi-shielded          | 2-meter cable                    | E57-12LE06-A                     | E57-12LE06-A1            |                  |                |
|                                                                                     |                                       |                            |                        | 3-pin micro AC connector         | E57-12LE06-AA ☺                  | E57-12LE06-A1A ☺         |                  |                |
|                                                                                     |                                       |                            |                        | 3-pin micro AC pigtail connector | E57-12LE06-AP ☺                  | —                        |                  |                |
|                                                                                     |                                       | 10 mm (extended range)     | Non-embeddable         | 2-meter cable                    | E57-12LE10-A                     | E57-12LE10-A1            |                  |                |
|                                                                                     |                                       |                            |                        | 3-pin micro AC connector         | E57-12LE10-AA ☺                  | E57-12LE10-A1A ☺         |                  |                |
|                                                                                     |                                       |                            |                        | 3-pin micro AC pigtail connector | E57-12LE10-AP ☺                  | E57-12LE10-A1P ☺         |                  |                |
|                                                                                     | 40–250 Vac<br>50/60 Hz②<br>20–250 Vdc | 2 mm (standard range)      | Shielded               | 2-meter cable                    | E57SAL12A2                       | E57SBL12A2               |                  |                |
|                                                                                     |                                       |                            |                        | 3-pin micro AC connector         | E57SAL12A2SA ☺                   | E57SBL12A2SA ☺           |                  |                |
|                                                                                     |                                       |                            |                        | 3-pin mini-connector             | E57MAL12A2B1 ☺                   | —                        |                  |                |
|                                                                                     |                                       | 4 mm (standard range)      | Unshielded             | 2-meter cable                    | E57SAL12A2E                      | E57SBL12A2E              |                  |                |
|                                                                                     |                                       |                            |                        | 3-pin micro AC connector         | E57SAL12A2EA ☺                   | E57SBL12A2EA ☺           |                  |                |
|                                                                                     | Standard Range                        | 18 mm Diameter End Sensing |                        |                                  |                                  |                          |                  |                |
|  | 20–250 Vac                            | 5 mm (standard range)      | Shielded               | 2-meter cable                    | E57LAL18A2                       | E57LBL18A2               |                  |                |
|                                                                                     |                                       |                            |                        | 3-pin micro AC connector         | E57LAL18A2SA ☺                   | E57LBL18A2SA ☺           |                  |                |
|                                                                                     |                                       |                            |                        | 3-pin micro AC pigtail connector | E57LAL18A2SP ☺                   | E57LBL18A2SP ☺           |                  |                |
|                                                                                     |                                       |                            |                        | 3-pin mini-connector             | E57MAL18A2B1 ☺                   | E57MBL18A2B1 ☺           |                  |                |
| Extended Range                                                                      |                                       | 8 mm (standard range)      | Unshielded             | 2-meter cable                    | E57LAL18A2E                      | E57LBL18A2E              |                  |                |
|                                                                                     |                                       |                            |                        | 3-pin micro AC connector         | E57LAL18A2EA ☺                   | E57LBL18A2EA ☺           |                  |                |
|                                                                                     |                                       |                            |                        | 3-pin micro AC pigtail connector | E57LAL18A2EP ☺                   | E57LBL18A2EP ☺           |                  |                |
|                                                                                     |                                       |                            |                        | 3-pin mini-connector             | E57MAL18A2EB1 ☺                  | E57MBL18A2EB1 ☺          |                  |                |
|                                                                                     |                                       | 20–132 Vac                 | 12 mm (extended range) | Semi-shielded                    | 2-meter cable                    | E57-18LE12-A             | E57-18LE12-A1    |                |
|                                                                                     |                                       |                            |                        |                                  | 3-pin micro AC connector         | E57-18LE12-AA ☺          | E57-18LE12-A1A ☺ |                |
|                                                                                     |                                       |                            |                        |                                  | 3-pin micro AC pigtail connector | E57-18LE12-AP ☺          | E57-18LE12-A1P ☺ |                |
|                                                                                     |                                       |                            |                        |                                  | 3-pin mini-connector             | E57-18LE12-AB ☺          | E57-18LE12-A1B ☺ |                |
|                                                                                     | 40–250 Vac<br>50/60 Hz②<br>20–250 Vdc | 20 mm (extended range)     | Non-embeddable         | 2-meter cable                    | E57-18LE20-A                     | E57-18LE20-A1            |                  |                |
|                                                                                     |                                       |                            |                        | 3-pin micro AC connector         | E57-18LE20-AA ☺                  | E57-18LE20-A1A ☺         |                  |                |
|                                                                                     |                                       |                            |                        | 3-pin micro AC pigtail connector | E57-18LE20-AP ☺                  | E57-18LE20-A1P ☺         |                  |                |
|                                                                                     |                                       |                            |                        | 3-pin mini-connector             | E57-18LE20-AB ☺                  | E57-18LE20-A1B ☺         |                  |                |
|                                                                                     |                                       | 5 mm (standard range)      | Shielded               | 2-meter cable                    | E57SAL18A2                       | E57SBL18A2               |                  |                |
|                                                                                     |                                       |                            |                        | 3-pin micro AC connector         | E57SAL18A2SA ☺                   | E57SBL18A2SA ☺           |                  |                |
|                                                                                     |                                       |                            |                        | 8 mm (standard range)            | Unshielded                       | 2-meter cable            | E57SAL18A2E      | E57SBL18A2E    |
|                                                                                     |                                       |                            |                        |                                  |                                  | 3-pin micro AC connector | E57SAL18A2EA ☺   | E57SBL18A2EA ☺ |

## Notes

☺ See listing of compatible connector cables on **Page V8-T3-23**.

① For cable lengths longer than 2 meters, add the number of the desired length in meters to the end of the listed catalog number (for catalog numbers ending with a number, add an **S** and then the length). Examples for a 5-meter cable: E57-18LE12-A becomes E57-18LE12-A5; E57LAL12A2 becomes E57LAL12A2S5.

② Avoid wiring these AC/DC models in series as the sensors may not perform reliably. Contact Eaton's Applications Engineering at 1-800-426-9184 with questions.

## Two-Wire Sensors, continued

|                                                                                                            | Operating Voltage                         | Sensing Range (Sn)        | Shielding     | Connection Type ①                | NO Output Catalog Number | NC Output Catalog Number |
|------------------------------------------------------------------------------------------------------------|-------------------------------------------|---------------------------|---------------|----------------------------------|--------------------------|--------------------------|
| <b>Right Angle</b><br>    | <b>18 mm Diameter Right Angle Sensing</b> |                           |               |                                  |                          |                          |
|                                                                                                            | 20–250 Vac                                | 5 mm                      | Shielded      | 2-meter cable                    | <b>E57RAL18A2</b>        | <b>E57RBL18A2</b>        |
|                                                                                                            |                                           |                           |               | 3-pin micro AC connector         | <b>E57RAL18A2SA</b> ☹    | <b>E57RBL18A2SA</b> ☹    |
|                                                                                                            |                                           |                           |               | 3-pin micro AC pigtail connector | <b>E57RAL18A2SP</b> ☹    | <b>E57RBL18A2SP</b> ☹    |
|                                                                                                            |                                           |                           |               | 3-pin mini-connector             | <b>E57RAL18A2B1</b> ☹    | <b>E57RBL18A2B1</b> ☹    |
|                                                                                                            |                                           | 8 mm                      | Unshielded    | 2-meter cable                    | <b>E57RAL18A2E</b>       | <b>E57RBL18A2E</b>       |
|                                                                                                            |                                           |                           |               | 3-pin micro AC connector         | <b>E57RAL18A2EA</b> ☹    | <b>E57RBL18A2EA</b> ☹    |
|                                                                                                            |                                           |                           |               | 3-pin micro AC pigtail connector | <b>E57RAL18A2EP</b> ☹    | <b>E57RBL18A2EP</b> ☹    |
|                                                                                                            |                                           |                           |               | 3-pin mini-connector             | <b>E57RAL18A2EB1</b> ☹   | <b>E57RBL18A2EB1</b> ☹   |
| <b>Standard Range</b><br> | <b>30 mm Diameter End Sensing</b>         |                           |               |                                  |                          |                          |
|                                                                                                            | 20–250 Vac                                | 10 mm<br>(standard range) | Shielded      | 2-meter cable                    | <b>E57LAL30A2</b>        | <b>E57LBL30A2</b>        |
|                                                                                                            |                                           |                           |               | 3-pin micro AC connector         | <b>E57LAL30A2SA</b> ☹    | <b>E57LBL30A2SA</b> ☹    |
|                                                                                                            |                                           |                           |               | 3-pin micro AC pigtail connector | <b>E57LAL30A2SP</b> ☹    | <b>E57LBL30A2SP</b> ☹    |
|                                                                                                            |                                           |                           |               | 3-pin mini-connector             | <b>E57MAL30A2B1</b> ☹    | <b>E57MBL30A2B1</b> ☹    |
|                                                                                                            |                                           | 15 mm<br>(standard range) | Unshielded    | 2-meter cable                    | <b>E57LAL30A2E</b>       | <b>E57LBL30A2E</b>       |
|                                                                                                            |                                           |                           |               | 3-pin micro AC connector         | <b>E57LAL30A2EA</b> ☹    | <b>E57LBL30A2EA</b> ☹    |
|                                                                                                            |                                           |                           |               | 3-pin micro AC pigtail connector | <b>E57LAL30A2EP</b> ☹    | <b>E57LBL30A2EP</b> ☹    |
|                                                                                                            |                                           |                           |               | 3-pin mini-connector             | <b>E57MAL30A2EB1</b> ☹   | <b>E57MBL30A2EB1</b> ☹   |
|                                                                                                            | 20–132 Vac                                | 22 mm<br>(extended range) | Semi-shielded | 2-meter cable                    | <b>E57-30LE22-A</b>      | <b>E57-30LE22-A1</b>     |
|                                                                                                            |                                           |                           |               | 3-pin micro AC connector         | <b>E57-30LE22-AA</b> ☹   | <b>E57-30LE22-A1A</b> ☹  |
|                                                                                                            |                                           |                           |               | 3-pin micro AC pigtail connector | <b>E57-30LE22-AP</b> ☹   | <b>E57-30LE22-A1P</b> ☹  |
|                                                                                                            |                                           |                           |               | 3-pin mini-connector             | <b>E57-30LE22-AB</b> ☹   | <b>E57-30LE22-A1B</b> ☹  |
| <b>Extended Range</b><br> | 40–250 Vac<br>50/60 Hz ②<br>20–250 Vdc    | 10 mm<br>(standard range) | Shielded      | 2-meter cable                    | <b>E57SAL30A2</b>        | <b>E57SBL30A2</b>        |
|                                                                                                            |                                           |                           |               | 3-pin micro AC connector         | <b>E57SAL30A2SA</b> ☹    | <b>E57SBL30A2SA</b> ☹    |
|                                                                                                            |                                           | 15 mm<br>(standard range) | Unshielded    | 2-meter cable                    | <b>E57SAL30A2E</b>       | <b>E57SBL30A2E</b>       |
|                                                                                                            |                                           |                           |               | 3-pin micro AC connector         | <b>E57SAL30A2EA</b> ☹    | <b>E57SBL30A2EA</b> ☹    |

**Notes**

Ⓢ See listing of compatible connector cables on **Page V8-T3-23**.

① For cable lengths longer than 2 meters, add the number of the desired length in meters to the end of the listed catalog number (for catalog numbers ending with a number, add an **S** and then the length). Examples for a 5-meter cable: E57-18LE12-A becomes E57-18LE12-A**5**; E57LAL12A2 becomes E57LAL12A2**S5**.

② Avoid wiring these AC/DC models in series as the sensors may not perform reliably. Contact Eaton's Applications Engineering at 1-800-426-9184 with questions.

## Three-Wire Sensors

|                                                                                     | Operating Voltage          | Sensing Range (Sn)    | Shielding                        | Connection Type ①                | NO Output Catalog Number         | NC Output Catalog Number |                                  |                  |                  |
|-------------------------------------------------------------------------------------|----------------------------|-----------------------|----------------------------------|----------------------------------|----------------------------------|--------------------------|----------------------------------|------------------|------------------|
| Standard Range                                                                      | 12 mm Diameter End Sensing |                       |                                  |                                  |                                  |                          |                                  |                  |                  |
|    | 6–48 Vdc                   | 2 mm (standard range) | Shielded (NPN)                   | 2-meter cable                    | E57LAL12T110                     | E57LBL12T110             |                                  |                  |                  |
|                                                                                     |                            |                       |                                  | 4-pin micro DC connector         | E57LAL12T110SD ☹                 | E57LBL12T110SD ☹         |                                  |                  |                  |
|                                                                                     |                            |                       |                                  | 4-pin micro DC pigtail connector | E57LAL12T110SP ☹                 | E57LBL12T110SP ☹         |                                  |                  |                  |
| Extended Range                                                                      |                            |                       | Shielded (PNP)                   | 2-meter cable                    | E57LAL12T111                     | E57LBL12T111             |                                  |                  |                  |
|                                                                                     |                            |                       |                                  | 4-pin micro DC connector         | E57LAL12T111SD ☹                 | E57LBL12T111SD ☹         |                                  |                  |                  |
|                                                                                     |                            |                       |                                  | 4-pin micro DC pigtail connector | E57LAL12T111SP ☹                 | E57LBL12T111SP ☹         |                                  |                  |                  |
|                                                                                     |                            |                       | 4 mm (standard range)            | Unshielded (NPN)                 | 2-meter cable                    | E57LAL12T110E            | E57LBL12T110E                    |                  |                  |
|                                                                                     |                            |                       |                                  |                                  | 4-pin micro DC connector         | E57LAL12T110ED ☹         | E57LBL12T110ED ☹                 |                  |                  |
|                                                                                     |                            |                       |                                  |                                  | 4-pin micro DC pigtail connector | E57LAL12T110EP ☹         | E57LBL12T110EP ☹                 |                  |                  |
|                                                                                     |                            |                       |                                  | Unshielded (PNP)                 | 2-meter cable                    | E57LAL12T111E            | E57LBL12T111E                    |                  |                  |
|                                                                                     |                            |                       |                                  |                                  | 4-pin micro DC connector         | E57LAL12T111ED ☹         | E57LBL12T111ED ☹                 |                  |                  |
|                                                                                     |                            |                       |                                  |                                  | 4-pin micro DC pigtail connector | E57LAL12T111EP ☹         | E57LBL12T111EP ☹                 |                  |                  |
|                                                                                     |                            |                       | 6 mm (extended range)            | Semi-shielded (NPN)              | 2-meter cable                    | E57-12LE06-C             | E57-12LE06-C1                    |                  |                  |
|                                                                                     |                            |                       |                                  |                                  | 4-pin micro DC connector         | E57-12LE06-CD ☹          | E57-12LE06-C1D ☹                 |                  |                  |
|                                                                                     |                            |                       |                                  |                                  | 4-pin micro DC pigtail connector | E57-12LE06-CP ☹          | E57-12LE06-C1P ☹                 |                  |                  |
|                                                                                     |                            |                       |                                  | Semi-shielded (PNP)              | 2-meter cable                    | E57-12LE06-B             | E57-12LE06-B1                    |                  |                  |
|                                                                                     |                            |                       |                                  |                                  | 4-pin micro DC connector         | E57-12LE06-BD ☹          | E57-12LE06-B1D ☹                 |                  |                  |
|                                                                                     |                            |                       |                                  |                                  | 4-pin micro DC pigtail connector | E57-12LE06-BP ☹          | E57-12LE06-B1P ☹                 |                  |                  |
|                                                                                     |                            |                       | 10 mm (extended range)           | Non-embeddable (NPN)             | 2-meter cable                    | E57-12LE10-C             | E57-12LE10-C1                    |                  |                  |
|                                                                                     |                            |                       |                                  |                                  | 4-pin micro DC connector         | E57-12LE10-CD ☹          | E57-12LE10-C1D ☹                 |                  |                  |
|                                                                                     |                            |                       |                                  |                                  | 4-pin micro DC pigtail connector | E57-12LE10-CP ☹          | —                                |                  |                  |
|                                                                                     |                            |                       |                                  | Non-embeddable (PNP)             | 2-meter cable                    | E57-12LE10-B             | E57-12LE10-B1                    |                  |                  |
|                                                                                     |                            |                       |                                  |                                  | 4-pin micro DC connector         | E57-12LE10-BD ☹          | E57-12LE10-B1D ☹                 |                  |                  |
| 4-pin micro DC pigtail connector                                                    | E57-12LE10-BP ☹            | —                     |                                  |                                  |                                  |                          |                                  |                  |                  |
| Standard Range                                                                      | 18 mm Diameter End Sensing |                       |                                  |                                  |                                  |                          |                                  |                  |                  |
|  | 6–48 Vdc                   | 5 mm (standard range) | Shielded (NPN)                   | 2-meter cable                    | E57LAL18T110                     | E57LBL18T110             |                                  |                  |                  |
|                                                                                     |                            |                       |                                  | 4-pin micro DC connector         | E57LAL18T110SD ☹                 | E57LBL18T110SD ☹         |                                  |                  |                  |
|                                                                                     |                            |                       |                                  | 4-pin micro DC pigtail connector | E57LAL18T110SP ☹                 | E57LBL18T110SP ☹         |                                  |                  |                  |
| Extended Range                                                                      |                            |                       |                                  | 4-pin mini-connector             | E57MAL18T110B1 ☹                 | E57MBL18T110B1 ☹         |                                  |                  |                  |
|                                                                                     |                            |                       |                                  | Shielded (PNP)                   | 2-meter cable                    | E57LAL18T111             | E57LBL18T111                     |                  |                  |
|                                                                                     |                            |                       |                                  |                                  | 4-pin micro DC connector         | E57LAL18T111SD ☹         | E57LBL18T111SD ☹                 |                  |                  |
|                                                                                     |                            |                       | 4-pin micro DC pigtail connector |                                  | E57LAL18T111SP ☹                 | E57LBL18T111SP ☹         |                                  |                  |                  |
|                                                                                     |                            |                       |                                  |                                  | 4-pin mini-connector             | E57MAL18T111B1 ☹         | E57MBL18T111B1 ☹                 |                  |                  |
|                                                                                     |                            |                       |                                  |                                  | 8 mm (standard range)            | Unshielded (NPN)         | 2-meter cable                    | E57LAL18T110E    | E57LBL18T110E    |
|                                                                                     |                            |                       |                                  |                                  |                                  |                          | 4-pin micro DC connector         | E57LAL18T110ED ☹ | E57LBL18T110ED ☹ |
|                                                                                     |                            |                       |                                  |                                  |                                  |                          | 4-pin micro DC pigtail connector | E57LAL18T110EP ☹ | E57LBL18T110EP ☹ |
|                                                                                     |                            |                       | 4-pin mini-connector             | E57MAL18T110EB1 ☹                |                                  |                          | E57MBL18T110EB1 ☹                |                  |                  |
|                                                                                     |                            |                       |                                  | Unshielded (PNP)                 | 2-meter cable                    | E57LAL18T111E            | E57LBL18T111E                    |                  |                  |
|                                                                                     |                            |                       |                                  |                                  | 4-pin micro DC connector         | E57LAL18T111ED ☹         | E57LBL18T111ED ☹                 |                  |                  |
|                                                                                     |                            |                       |                                  |                                  | 4-pin micro DC pigtail connector | E57LAL18T111EP ☹         | E57LBL18T111EP ☹                 |                  |                  |
|                                                                                     |                            |                       |                                  |                                  | 4-pin mini-connector             | E57MAL18T111EB1 ☹        | E57MBL18T111EB1 ☹                |                  |                  |

## Notes

☹ See listing of compatible connector cables on **Page V8-T3-23**.

<sup>①</sup> For cable lengths longer than 2 meters, add the number of the desired length in meters to the end of the listed catalog number (for catalog numbers ending with a number, add an **S** and then the length). Examples for a 5-meter cable: E57-18LE12-A becomes E57-18LE12-A**5**; E57LAL12A2 becomes E57LAL12A2**S5**.

## Three-Wire Sensors, continued

|                                                                                    | Operating Voltage                     | Sensing Range (Sn)     | Shielding              | Connection Type ①                | NO Output Catalog Number         | NC Output Catalog Number |                  |
|------------------------------------------------------------------------------------|---------------------------------------|------------------------|------------------------|----------------------------------|----------------------------------|--------------------------|------------------|
| Standard Range                                                                     | 18 mm Diameter End Sensing, continued |                        |                        |                                  |                                  |                          |                  |
|   | 6–48 Vdc                              | 12 mm (extended range) | Semi-shielded (NPN)    | 2-meter cable                    | E57-18LE12-C                     | E57-18LE12-C1            |                  |
|                                                                                    |                                       |                        |                        | 4-pin micro DC connector         | E57-18LE12-CD ☹                  | E57-18LE12-C1D ☹         |                  |
|                                                                                    |                                       |                        |                        | 4-pin micro DC pigtail connector | E57-18LE12-CP ☹                  | E57-18LE12-C1P ☹         |                  |
|                                                                                    |                                       |                        |                        | 4-pin mini-connector             | E57-18LE12-CB ☹                  | E57-18LE12-C1B ☹         |                  |
| Extended Range                                                                     |                                       |                        | Semi-shielded (PNP)    | 2-meter cable                    | E57-18LE12-B                     | E57-18LE12-B1            |                  |
|                                                                                    |                                       |                        |                        | 4-pin micro DC connector         | E57-18LE12-BD ☹                  | E57-18LE12-B1D ☹         |                  |
|                                                                                    |                                       |                        |                        | 4-pin micro DC pigtail connector | E57-18LE12-BP ☹                  | E57-18LE12-B1P ☹         |                  |
|                                                                                    |                                       |                        |                        | 4-pin mini-connector             | E57-18LE12-BB ☹                  | E57-18LE12-B1B ☹         |                  |
|                                                                                    |                                       |                        | 20 mm (extended range) | Non-embeddable (NPN)             | 2-meter cable                    | E57-18LE20-C             | E57-18LE20-C1    |
|                                                                                    |                                       |                        |                        |                                  | 4-pin micro DC connector         | E57-18LE20-CD ☹          | E57-18LE20-C1D ☹ |
|                                                                                    |                                       |                        |                        |                                  | 4-pin micro DC pigtail connector | E57-18LE20-CP ☹          | E57-18LE20-C1P ☹ |
|                                                                                    |                                       |                        |                        |                                  | 4-pin mini-connector             | E57-18LE20-CB ☹          | E57-18LE20-C1B ☹ |
|                                                                                    |                                       |                        |                        | Non-embeddable (PNP)             | 2-meter cable                    | E57-18LE20-B             | E57-18LE20-B1    |
|                                                                                    |                                       |                        |                        |                                  | 4-pin micro DC connector         | E57-18LE20-BD ☹          | E57-18LE20-B1D ☹ |
|                                                                                    |                                       |                        |                        |                                  | 4-pin micro DC pigtail connector | E57-18LE20-BP ☹          | E57-18LE20-B1P ☹ |
|                                                                                    |                                       |                        |                        |                                  | 4-pin mini-connector             | E57-18LE20-BB ☹          | E57-18LE20-B1B ☹ |
| Right Angle                                                                        | 18 mm Diameter Right Angle Sensing    |                        |                        |                                  |                                  |                          |                  |
|  | 6–48 Vdc                              | 5 mm                   | Shielded (NPN)         | 2-meter cable                    | E57RAL18T110                     | E57RBL18T110             |                  |
|                                                                                    |                                       |                        |                        | 4-pin micro DC connector         | E57RAL18T110SD ☹                 | E57RBL18T110SD ☹         |                  |
|                                                                                    |                                       |                        |                        | 4-pin micro DC pigtail connector | E57RAL18T110SP ☹                 | E57RBL18T110SP ☹         |                  |
|                                                                                    |                                       |                        |                        | 4-pin mini-connector             | E57RAL18T110B1 ☹                 | E57RBL18T110B1 ☹         |                  |
|                                                                                    |                                       |                        | Shielded (PNP)         | 2-meter cable                    | E57RAL18T111                     | E57RBL18T111             |                  |
|                                                                                    |                                       |                        |                        | 4-pin micro DC connector         | E57RAL18T111SD ☹                 | E57RBL18T111SD ☹         |                  |
|                                                                                    |                                       |                        |                        | 4-pin micro DC pigtail connector | E57RAL18T111SP ☹                 | E57RBL18T111SP ☹         |                  |
|                                                                                    |                                       |                        |                        | 4-pin mini-connector             | E57RAL18T111B1 ☹                 | E57RBL18T111B1 ☹         |                  |
|                                                                                    |                                       | 8 mm                   | Unshielded (NPN)       | 2-meter cable                    | E57RAL18T110E                    | E57RBL18T110E            |                  |
|                                                                                    |                                       |                        |                        | 4-pin micro DC connector         | E57RAL18T110ED ☹                 | E57RBL18T110ED ☹         |                  |
|                                                                                    |                                       |                        |                        | 4-pin micro DC pigtail connector | E57RAL18T110EP ☹                 | E57RBL18T110EP ☹         |                  |
|                                                                                    |                                       |                        |                        | 4-pin mini-connector             | E57RAL18T110EB1 ☹                | E57RBL18T110EB1 ☹        |                  |
|                                                                                    |                                       |                        | Unshielded (PNP)       | 2-meter cable                    | E57RAL18T111E                    | E57RBL18T111E            |                  |
|                                                                                    |                                       |                        |                        | 4-pin micro DC connector         | E57RAL18T111ED ☹                 | E57RBL18T111ED ☹         |                  |
|                                                                                    |                                       |                        |                        | 4-pin micro DC pigtail connector | E57RAL18T111EP ☹                 | E57RBL18T111EP ☹         |                  |
|                                                                                    |                                       |                        |                        | 4-pin mini-connector             | E57RAL18T111EB1 ☹                | E57RBL18T111EB1 ☹        |                  |

## Notes

☹ See listing of compatible connector cables on **Page V8-T3-23**.① For cable lengths longer than 2 meters, add the number of the desired length in meters to the end of the listed catalog number (for catalog numbers ending with a number, add an **S** and then the length). Examples for a 5-meter cable: E57-18LE12-A becomes E57-18LE12-A**5**; E57LAL12A2 becomes E57LAL12A2**S5**.

## Three-Wire Sensors, continued

|                                                                                   | Operating Voltage                 | Sensing Range (Sn)     | Shielding           | Connection Type <sup>①</sup>     | NO Output Catalog Number | NC Output Catalog Number |
|-----------------------------------------------------------------------------------|-----------------------------------|------------------------|---------------------|----------------------------------|--------------------------|--------------------------|
| <b>Standard Range</b>                                                             | <b>30 mm Diameter End Sensing</b> |                        |                     |                                  |                          |                          |
|  | 6–48 Vdc                          | 10 mm (standard range) | Shielded (NPN)      | 2-meter cable                    | <b>E57LAL30T110</b>      | <b>E57LBL30T110</b>      |
|                                                                                   |                                   |                        |                     | 4-pin micro DC connector         | <b>E57LAL30T110SD</b> ☹  | <b>E57LBL30T110SD</b> ☹  |
|                                                                                   |                                   |                        |                     | 4-pin micro DC pigtail connector | <b>E57LAL30T110SP</b> ☹  | <b>E57LBL30T110SP</b> ☹  |
|                                                                                   |                                   |                        |                     | 4-pin mini-connector             | <b>E57MAL30T110B1</b> ☹  | <b>E57MBL30T110B1</b> ☹  |
|  |                                   |                        | Shielded (PNP)      | 2-meter cable                    | <b>E57LAL30T111</b>      | <b>E57LBL30T111</b>      |
|                                                                                   |                                   |                        |                     | 4-pin micro DC connector         | <b>E57LAL30T111SD</b> ☹  | <b>E57LBL30T111SD</b> ☹  |
|                                                                                   |                                   |                        |                     | 4-pin micro DC pigtail connector | <b>E57LAL30T111SP</b> ☹  | <b>E57LBL30T111SP</b> ☹  |
|                                                                                   |                                   |                        |                     | 4-pin mini-connector             | <b>E57MAL30T111B1</b> ☹  | <b>E57MBL30T111B1</b> ☹  |
|                                                                                   |                                   | 15 mm (standard range) | Unshielded (NPN)    | 2-meter cable                    | <b>E57LAL30T110E</b>     | <b>E57LBL30T110E</b>     |
|                                                                                   |                                   |                        |                     | 4-pin micro DC connector         | <b>E57LAL30T110ED</b> ☹  | <b>E57LBL30T110ED</b> ☹  |
|                                                                                   |                                   |                        |                     | 4-pin micro DC pigtail connector | <b>E57LAL30T110EP</b> ☹  | <b>E57LBL30T110EP</b> ☹  |
|                                                                                   |                                   |                        |                     | 4-pin mini-connector             | <b>E57MAL30T110EB1</b> ☹ | <b>E57MBL30T110EB1</b> ☹ |
|                                                                                   |                                   |                        | Unshielded (PNP)    | 2-meter cable                    | <b>E57LAL30T111E</b>     | <b>E57LBL30T111E</b>     |
|                                                                                   |                                   |                        |                     | 4-pin micro DC connector         | <b>E57LAL30T111ED</b> ☹  | <b>E57LBL30T111ED</b> ☹  |
|                                                                                   |                                   |                        |                     | 4-pin micro DC pigtail connector | <b>E57LAL30T111EP</b> ☹  | <b>E57LBL30T111EP</b> ☹  |
|                                                                                   |                                   |                        |                     | 4-pin mini-connector             | <b>E57MAL30T111EB1</b> ☹ | <b>E57MBL30T111EB1</b> ☹ |
|                                                                                   |                                   | 22 mm (extended range) | Semi-shielded (NPN) | 2-meter cable                    | <b>E57-30LE22-C</b>      | <b>E57-30LE22-C1</b>     |
|                                                                                   |                                   |                        |                     | 4-pin micro DC connector         | <b>E57-30LE22-CD</b> ☹   | <b>E57-30LE22-C1D</b> ☹  |
|                                                                                   |                                   |                        |                     | 4-pin micro DC pigtail connector | <b>E57-30LE22-CP</b> ☹   | <b>E57-30LE22-C1P</b> ☹  |
|                                                                                   |                                   |                        |                     | 4-pin mini-connector             | <b>E57-30LE22-CB</b> ☹   | <b>E57-30LE22-C1B</b> ☹  |
|                                                                                   |                                   |                        | Semi-shielded (PNP) | 2-meter cable                    | <b>E57-30LE22-B</b>      | <b>E57-30LE22-B1</b>     |
|                                                                                   |                                   |                        |                     | 4-pin micro DC connector         | <b>E57-30LE22-BD</b> ☹   | <b>E57-30LE22-B1D</b> ☹  |
|                                                                                   |                                   |                        |                     | 4-pin micro DC pigtail connector | —                        | <b>E57-30LE22-B1P</b> ☹  |
|                                                                                   |                                   |                        |                     | 4-pin mini-connector             | <b>E57-30LE22-BB</b> ☹   | <b>E57-30LE22-B1B</b> ☹  |

**Notes**☹ See listing of compatible connector cables on **Page V8-T3-23**.① For cable lengths longer than 2 meters, add the number of the desired length in meters to the end of the listed catalog number (for catalog numbers ending with a number, add an **S** and then the length). Examples for a 5-meter cable: E57-18LE12-A becomes E57-18LE12-A**5**; E57LAL12A2 becomes E57LAL12A2**S5**.

**Compatible Connector Cables****Standard Cables** <sup>①</sup>

|                                                                                                                         | Current Rating at 600V              | Voltage Style | Number of Pins | Gauge  | Length      | Pin Configuration/Wire Colors (Face View Female Shown)                                                                    | PVC Jacket Catalog Number | PUR Jacket Catalog Number |
|-------------------------------------------------------------------------------------------------------------------------|-------------------------------------|---------------|----------------|--------|-------------|---------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|
| <b>Micro-Style Straight Female</b><br> | <b>Micro-Style, Straight Female</b> |               |                |        |             |                                                                                                                           |                           |                           |
|                                                                                                                         | —                                   | AC            | 3-pin, 3-wire  | 22 AWG | 6.0 ft (2m) |  1-Green<br>2-Red/Black<br>3-Red/White   | <b>CSAS3F3CY2202</b>      | <b>CSAS3F3RY2202</b>      |
|                                                                                                                         | —                                   | DC            | 4-pin, 4-wire  | 22 AWG | 6.0 ft (2m) |  1-Brown<br>2-White<br>3-Blue<br>4-Black | <b>CSDS4A4CY2202</b>      | <b>CSDS4A4RY2202</b>      |
| <b>Mini-Style Straight Female</b><br>  | <b>Mini-Style, Straight Female</b>  |               |                |        |             |                                                                                                                           |                           | <b>Catalog Number</b>     |
|                                                                                                                         | 13A                                 | —             | 3-pin          | 16 AWG | 6 ft (2m)   |  1-Green<br>2-Black<br>3-White           | <b>CSMS3F3CY1602</b>      |                           |
|                                                                                                                         | 10A                                 | AC/DC         | 4-pin, 4-wire  | 16 AWG | 6 ft (2m)   |  1-Black<br>2-Blue<br>3-Brown<br>4-White | <b>CSMS4A4CY1602</b>      |                           |

**Accessories****E57 Premium+ Sensors**

| Description                                     | Reference                       |
|-------------------------------------------------|---------------------------------|
| Mounting brackets                               | See <b>Tab 8, section 8.2</b>   |
| Replacement mounting nuts and other accessories | See <b>Tab 8, section 8.3</b>   |
| Connector cables                                | See <b>Tab 10, section 10.1</b> |

**Note**

① For a full selection of connector cables, see **Tab 10, section 10.1**.

## Technical Data and Specifications

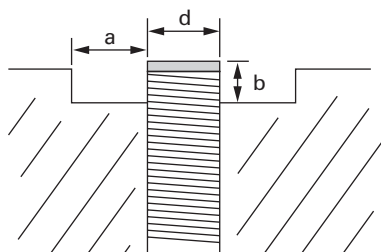
## E57 Premium+ Sensors

| Description                    | Two-Wire AC Sensors                                                                          | Two-Wire AC/DC Sensors                                                                       | Three-Wire DC Only Sensors                                                                   |
|--------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Operating voltage              | 20–250 Vac                                                                                   | 40–240 Vac <sup>①</sup><br>20–250 Vdc                                                        | 6–48 Vdc                                                                                     |
| Maximum load current           | 250 mA                                                                                       | 250 mA                                                                                       | 500 mA at 6–30 Vdc                                                                           |
| Switching frequency            | 20 Hz                                                                                        | 60 Hz                                                                                        | 12 mm: 800 Hz<br>18 mm: 500 Hz<br>30 mm: 300 Hz                                              |
| Leakage current                | 1.7 mA maximum at 158°F (70°C)                                                               | ≤2.0 mA                                                                                      | ≤100 µA                                                                                      |
| Voltage drop                   | 7V maximum                                                                                   | 12V at <10 mA<br>≤4V at >25 mA                                                               | ≤2.5V                                                                                        |
| Holding current                | 5 mA minimum                                                                                 | 5 mA minimum                                                                                 | —                                                                                            |
| Burden current                 | —                                                                                            | —                                                                                            | ≤10 mA                                                                                       |
| Protection                     | —                                                                                            | Resettable short circuit; overload protection                                                | Auto reset                                                                                   |
| Switching hysteresis           | 2 to 20% of rated sensing range                                                              | <15% rated sensing distance                                                                  | <15% rated sensing distance                                                                  |
| Repeat accuracy                | <3% sensing distance                                                                         | Shielded models: <1% sensing distance;<br>unshielded and extended range: <3%                 | Shielded models: <1% sensing distance;<br>unshielded and extended range: <3%                 |
| Time delay before availability | —                                                                                            | <200 ms                                                                                      | <200 ms                                                                                      |
| Output indicator LED           | 360° viewable LED                                                                            | 360° viewable LED                                                                            | 360° viewable LED                                                                            |
| Operating temperature          | –13° to 158°F (–25° to 70°C)<br>Mini Conn.: –13° to 122°F (–25° to 50°C)                     | –13° to 158°F (–25° to 70°C)<br>Mini Conn.: –13° to 122°F (–25° to 50°C)                     | –13° to 158°F (–25° to 70°C)<br>Mini Conn.: –13° to 122°F (–25° to 50°C)                     |
| Enclosure ratings              | NEMA 4, 4X, 6, 6P, 12 and 13 (IP67) IP69K                                                    | NEMA 4, 4X, 6, 6P, 12 and 13 (IP67) IP69K                                                    | NEMA 4, 4X, 6, 6P, 12 and 13 (IP67) IP69K                                                    |
| Shock                          | 30g, 11 ms per IEC 68-2-76                                                                   | 30g, 11 ms per IEC 68-2-76                                                                   | 30g, 11 ms per IEC 68-2-76                                                                   |
| Vibration                      | 10 to 55 Hz, 1 mm amplitude                                                                  | 10 to 55 Hz, 1 mm amplitude                                                                  | 10 to 55 Hz, 1 mm amplitude                                                                  |
| Housing material               | 303 stainless steel <sup>②</sup> ; polycarbonate end bells;<br>Ryton <sup>®</sup> front ends | 303 stainless steel <sup>②</sup> ; polycarbonate end bells;<br>Ryton <sup>®</sup> front ends | 303 stainless steel <sup>②</sup> ; polycarbonate end bells;<br>Ryton <sup>®</sup> front ends |
| Cable                          | AWM Style 20387 (PVC)                                                                        | AWM Style 20387 (PVC)                                                                        | AWM Style 20387 (PVC)                                                                        |

## Recommended Mounting Clearances

For unshielded standard range sensors and extended range sensors, clearance must be provided around the sensor when mounting for reliable performance. (“Sn” is the sensing range of the sensor, “d” is the sensor diameter.)

## E57 Premium+ Sensors, Mounting



| Type           | Shielding      | a          | b      |
|----------------|----------------|------------|--------|
| Standard range | Shielded       | 0          | 0      |
|                | Unshielded     | Cap height | 2 x Sn |
| Extended range | Semi-shielded  | d          | Sn     |
|                | Non-embeddable | Cap height | 2 x Sn |

## Notes

Ryton<sup>®</sup> is a registered trademark of Phillips Chemical (division of Phillips Petroleum).

<sup>①</sup> 40–240 Vac at <–4°F (<–20°C).

<sup>②</sup> Semi-shielded models are nickel-plated brass.

### Wiring Diagrams

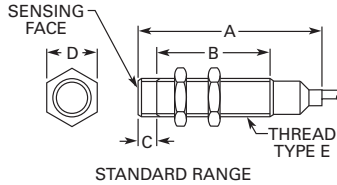
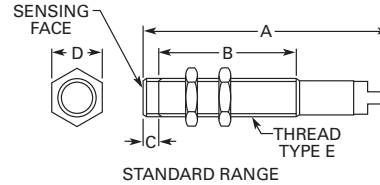
Pin numbers are for reference, rely on pin location when wiring.

#### E57 Premium+ Sensors

| Operating Voltage                                 | Output             | Cable Models | Connector Models (Face View Male Shown) |      |
|---------------------------------------------------|--------------------|--------------|-----------------------------------------|------|
|                                                   |                    |              | Micro                                   | Mini |
| Two-Wire Sensors                                  |                    |              |                                         |      |
| 20–250 Vac/dc<br>and AC-only<br>AC wiring example | NO and NC          |              |                                         |      |
| 20–250 Vac/dc<br>DC wiring example                | NO and NC<br>(NPN) |              |                                         | —    |
|                                                   | NO and NC<br>(PNP) |              |                                         | —    |
| Three-Wire Sensors                                |                    |              |                                         |      |
| 6–48 Vdc                                          | NO<br>(NPN)        |              |                                         |      |
|                                                   | NO<br>(PNP)        |              |                                         |      |
|                                                   | NC<br>(NPN)        |              |                                         |      |
|                                                   | NC<br>(PNP)        |              |                                         |      |

**Dimensions**

Approximate Dimensions in Inches (mm)

**E57 Premium+ Series Sensors, End Sensing** ①②**3****Cable Models****Connector Models**

| Size                                                 | Shielding     | Overall Length<br>A | Threaded Length<br>B | Cap Height<br>C | Nut Width<br>D | Thread Size<br>E |
|------------------------------------------------------|---------------|---------------------|----------------------|-----------------|----------------|------------------|
| <b>Two-Wire AC Sensors—Cable Models</b>              |               |                     |                      |                 |                |                  |
| 12 mm                                                | Shielded      | 2.46 (62.4)         | 1.98 (50.3)          | —               | 0.67 (16.8)    | M12 x 1          |
|                                                      | Semi-shielded | 2.87 (72.8)         | 2.28 (57.9)          | 0.06 (1.62)     | 0.67 (16.8)    | M12 x 1          |
|                                                      | Unshielded    | 2.87 (72.7)         | 1.98 (50.3)          | 0.36 (9.14)     | 0.67 (16.8)    | M12 x 1          |
| 18 mm                                                | Shielded      | 2.54 (64.5)         | 2.00 (50.9)          | —               | 0.94 (23.8)    | M18 x 1          |
|                                                      | Semi-shielded | 2.60 (66.1)         | 1.90 (48.2)          | 0.10 (2.54)     | 0.94 (23.8)    | M18 x 1          |
|                                                      | Unshielded    | 2.60 (66.0)         | 1.47 (37.2)          | 0.56 (14.1)     | 0.94 (23.8)    | M18 x 1          |
| 30 mm                                                | Shielded      | 2.73 (69.3)         | 1.98 (50.3)          | —               | 1.41 (35.9)    | M30 x 1.5        |
|                                                      | Semi-shielded | 2.67 (67.8)         | 1.90 (48.2)          | 0.13 (3.30)     | 1.41 (35.9)    | M30 x 1.5        |
|                                                      | Unshielded    | 2.73 (69.3)         | 1.49 (37.8)          | 0.52 (13.26)    | 1.41 (35.9)    | M30 x 1.5        |
| <b>Two-Wire AC Sensors—Micro-Connector Models</b>    |               |                     |                      |                 |                |                  |
| 12 mm                                                | Shielded      | 2.69 (68.4)         | 1.98 (50.3)          | —               | 0.67 (16.8)    | M12 x 1          |
|                                                      | Semi-shielded | 3.04 (77.2)         | 2.28 (57.9)          | 0.06 (1.62)     | 0.67 (16.8)    | M12 x 1          |
|                                                      | Unshielded    | 3.06 (77.7)         | 1.98 (50.3)          | 0.36 (9.14)     | 0.36 (9.14)    | M12 x 1          |
| 18 mm                                                | Shielded      | 2.72 (69.06)        | 2.00 (50.9)          | —               | 0.94 (23.8)    | M18 x 1          |
|                                                      | Semi-shielded | 2.72 (69.1)         | 1.90 (48.2)          | 0.10 (2.54)     | 0.94 (23.8)    | M18 x 1          |
|                                                      | Unshielded    | 2.74 (69.4)         | 1.47 (37.2)          | 0.56 (14.1)     | 0.94 (23.8)    | M18 x 1          |
| 30 mm                                                | Shielded      | 2.91 (73.8)         | 1.98 (50.3)          | —               | 1.41 (35.9)    | M30 x 1.5        |
|                                                      | Semi-shielded | 2.78 (70.6)         | 1.90 (48.2)          | 0.13 (3.30)     | 1.41 (35.9)    | M30 x 1.5        |
|                                                      | Unshielded    | 2.91 (73.8)         | 1.49 (37.8)          | 0.52 (13.26)    | 1.41 (35.9)    | M30 x 1.5        |
| <b>Two-Wire AC/DC Sensors—Cable Models</b>           |               |                     |                      |                 |                |                  |
| 12 mm                                                | Shielded      | 2.45 (62.4)         | 1.98 (50.3)          | —               | 0.67 (16.8)    | M12 x 1          |
|                                                      | Unshielded    | 2.45 (62.4)         | 1.80 (45.8)          | 0.20 (5)        | 0.67 (16.8)    | M12 x 1          |
| 18 mm                                                | Shielded      | 2.54 (64.5)         | 2.00 (50.9)          | —               | 0.94 (23.8)    | M18 x 1          |
|                                                      | Unshielded    | 2.54 (64.5)         | 1.75 (44.4)          | 0.28 (7)        | 0.94 (23.8)    | M18 x 1          |
| 30 mm                                                | Shielded      | 2.72 (69.3)         | 1.98 (50.3)          | —               | 1.41 (35.9)    | M30 x 1.5        |
|                                                      | Unshielded    | 2.72 (69.3)         | 1.49 (37.8)          | 0.52 (13.26)    | 1.41 (35.9)    | M30 x 1.5        |
| <b>Two-Wire AC/DC Sensors—Micro-Connector Models</b> |               |                     |                      |                 |                |                  |
| 12 mm                                                | Shielded      | 2.69 (68.4)         | 1.98 (50.3)          | —               | 0.67 (16.8)    | M12 x 1          |
|                                                      | Unshielded    | 2.69 (68.4)         | 1.80 (45.8)          | 0.20 (5)        | 0.67 (16.8)    | M12 x 1          |
| 18 mm                                                | Shielded      | 2.72 (69.06)        | 2.00 (50.9)          | —               | 0.94 (23.8)    | M18 x 1          |
|                                                      | Unshielded    | 2.72 (69.06)        | 1.75 (44.4)          | 0.28 (7)        | 0.94 (23.8)    | M18 x 1          |
| 30 mm                                                | Shielded      | 2.91 (73.8)         | 1.98 (50.3)          | —               | 1.41 (35.9)    | M30 x 1.5        |
|                                                      | Unshielded    | 2.91 (73.8)         | 1.49 (37.8)          | 0.52 (13.26)    | 1.41 (35.9)    | M30 x 1.5        |

**Notes**

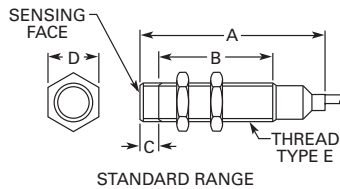
① These dimensions apply to the Premium+ Series models in this section. Not indicated Premium Series models.

② For short barrel model dimensions (E57SAL ...) refer to **Page V8-T3-29**.

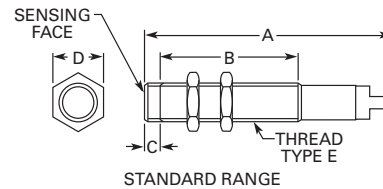
Approximate Dimensions in Inches (mm)

### E57 Premium+ Series Sensors, End Sensing <sup>①②</sup>

#### Cable Models, continued



#### Connector Models, continued



| Size                                                | Shielding     | Overall Length<br>A | Threaded Length<br>B | Cap Height<br>C | Nut Width<br>D | Thread Size<br>E |
|-----------------------------------------------------|---------------|---------------------|----------------------|-----------------|----------------|------------------|
| <b>Two-Wire AC/DC Sensors—Mini-Connector Models</b> |               |                     |                      |                 |                |                  |
| 18 mm                                               | Shielded      | 3.39 (86.1)         | 2.00 (50.8)          | 0.02 (0.5)      | 0.94 (23.8)    | M18 x 1          |
|                                                     | Semi-shielded | 3.39 (86.0)         | 1.90 (48.2)          | 0.10 (2.54)     | 0.94 (23.8)    | M18 x 1          |
|                                                     | Unshielded    | 3.39 (86.1)         | 1.46 (37.0)          | 0.57 (14.5)     | 0.94 (23.8)    | M18 x 1          |
| 30 mm                                               | Shielded      | 3.39 (86.1)         | 2.1 (53.3)           | 0.03 (0.8)      | 1.41 (35.9)    | M30 x 1.5        |
|                                                     | Semi-shielded | 3.44 (87.4)         | 1.90 (48.2)          | 0.13 (3.30)     | 1.41 (35.9)    | M30 x 1.5        |
|                                                     | Unshielded    | 3.39 (86.1)         | 1.55 (39.4)          | 0.55 (14.0)     | 1.41 (35.9)    | M30 x 1.5        |
| <b>Three-Wire DC Sensors—Mini-Connector Models</b>  |               |                     |                      |                 |                |                  |
| 18 mm                                               | Shielded      | 3.39 (86.1)         | 2.00 (50.8)          | 0.02 (0.5)      | 0.94 (23.8)    | M18 x 1          |
|                                                     | Semi-shielded | 3.39 (86.0)         | 1.90 (48.2)          | 0.10 (2.54)     | 0.94 (23.8)    | M18 x 1          |
|                                                     | Unshielded    | 3.39 (86.1)         | 1.46 (37.0)          | 0.57 (14.5)     | 0.94 (23.8)    | M18 x 1          |
| 30 mm                                               | Shielded      | 3.39 (86.1)         | 2.1 (53.3)           | 0.03 (0.8)      | 1.41 (35.9)    | M30 x 1.5        |
|                                                     | Semi-shielded | 3.44 (87.4)         | 1.90 (48.2)          | 0.13 (3.30)     | 1.41 (35.9)    | M30 x 1.5        |
|                                                     | Unshielded    | 3.39 (86.1)         | 1.55 (39.4)          | 0.55 (14.0)     | 1.41 (35.9)    | M30 x 1.5        |
| <b>Three-Wire DC Sensors—Cable Models</b>           |               |                     |                      |                 |                |                  |
| 12 mm                                               | Shielded      | 2.46 (62.4)         | 1.98 (50.3)          | —               | 0.67 (16.8)    | M12 x 1          |
|                                                     | Semi-shielded | 2.87 (72.8)         | 2.28 (57.9)          | 0.06 (1.62)     | 0.67 (16.8)    | M12 x 1          |
|                                                     | Unshielded    | 2.87 (72.7)         | 1.98 (50.3)          | 0.36 (9.14)     | 0.67 (16.8)    | M12 x 1          |
| 18 mm                                               | Shielded      | 2.54 (64.5)         | 2.00 (50.9)          | —               | 0.94 (23.8)    | M18 x 1          |
|                                                     | Semi-shielded | 2.60 (66.1)         | 1.90 (48.2)          | 0.10 (2.54)     | 0.94 (23.8)    | M18 x 1          |
|                                                     | Unshielded    | 2.60 (66.0)         | 1.47 (37.2)          | 0.56 (14.1)     | 0.94 (23.8)    | M18 x 1          |
| 30 mm                                               | Shielded      | 2.73 (69.3)         | 1.98 (50.3)          | —               | 1.41 (35.9)    | M30 x 1.5        |
|                                                     | Semi-shielded | 2.67 (67.8)         | 1.90 (48.2)          | 0.13 (3.30)     | 1.41 (35.9)    | M30 x 1.5        |
|                                                     | Unshielded    | 2.73 (69.3)         | 1.49 (37.8)          | 0.52 (13.26)    | 1.41 (35.9)    | M30 x 1.5        |
| <b>Three-Wire DC Sensors—Micro-Connector Models</b> |               |                     |                      |                 |                |                  |
| 12 mm                                               | Shielded      | 2.71 (68.7)         | 1.98 (50.3)          | —               | 0.67 (16.8)    | M12 x 1          |
|                                                     | Semi-shielded | 3.04 (77.2)         | 2.28 (57.9)          | 0.06 (1.62)     | 0.67 (16.8)    | M12 x 1          |
|                                                     | Unshielded    | 3.06 (77.7)         | 1.98 (50.3)          | 0.36 (9.14)     | 0.67 (16.8)    | M12 x 1          |
| 18 mm                                               | Shielded      | 2.73 (69.3)         | 2.00 (50.9)          | —               | 0.94 (23.8)    | M18 x 1          |
|                                                     | Semi-shielded | 2.72 (69.1)         | 1.90 (48.2)          | 0.10 (2.54)     | 0.94 (23.8)    | M18 x 1          |
|                                                     | Unshielded    | 2.74 (69.4)         | 1.47 (37.2)          | 0.56 (14.1)     | 0.94 (23.8)    | M18 x 1          |
| 30 mm                                               | Shielded      | 2.92 (74.1)         | 1.98 (50.3)          | —               | 1.41 (35.9)    | M30 x 1.5        |
|                                                     | Semi-shielded | 2.78 (70.6)         | 1.90 (48.2)          | 0.13 (3.30)     | 1.41 (35.9)    | M30 x 1.5        |
|                                                     | Unshielded    | 2.92 (74.1)         | 1.49 (37.8)          | 0.52 (13.26)    | 1.41 (35.9)    | M30 x 1.5        |

#### Notes

① These dimensions apply to the Premium+ Series models in this section. Not indicated Premium Series models.

② For short barrel model dimensions (E57SAL ...) refer to **Page V8-T3-29**.

# 3.2

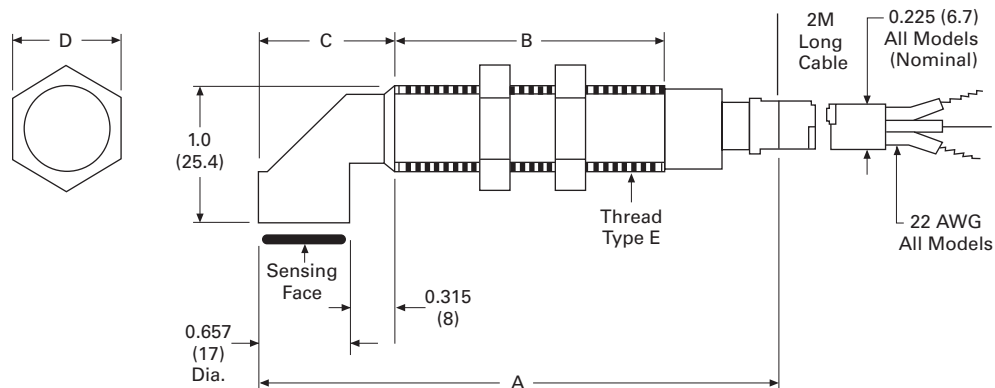
## Inductive Proximity Sensors

### E57 Premium+ Series Sensors

Approximate Dimensions in Inches (mm)

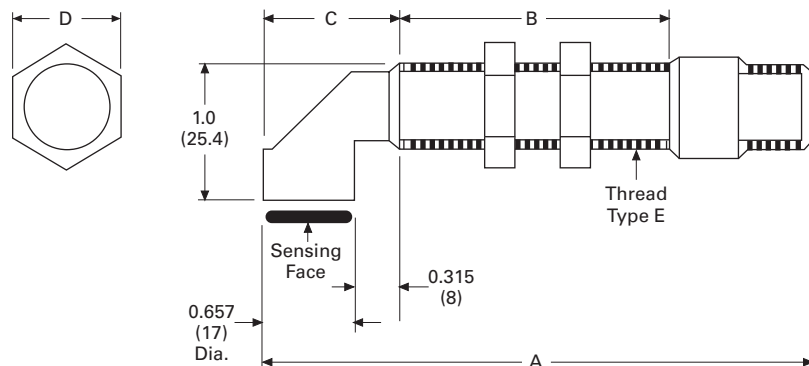
#### E57 Premium+ Series Sensors, Right Angle Sensing

##### Cable Models



| Size                | Overall Length<br>A | Thread<br>B | Cap<br>C  | Nut Width<br>D | Thread Size<br>E |
|---------------------|---------------------|-------------|-----------|----------------|------------------|
| <b>Cable Models</b> |                     |             |           |                |                  |
| 18 mm               | 3.465 (88)          | 1.97 (50)   | 0.98 (25) | 0.94 (24)      | M18 x 1          |

##### Connector Models



| Size                          | Overall Length<br>A | Thread<br>B | Cap<br>C  | Nut Width<br>D | Thread Size<br>E |
|-------------------------------|---------------------|-------------|-----------|----------------|------------------|
| <b>Mini-Connector Models</b>  |                     |             |           |                |                  |
| 18 mm                         | 4.303 (109)         | 1.97 (50)   | 0.98 (25) | 0.94 (24)      | M18 x 1          |
| <b>Micro-Connector Models</b> |                     |             |           |                |                  |
| 18 mm                         | 3.65 (93)           | 1.97 (50)   | 0.98 (25) | 0.94 (24)      | M18 x 1          |

## E57 Premium+ Series Short Barrel Sensors



## E57 Premium+ Series Short Barrel Sensors

## Product Description

The new Premium+ Series Short Barrel Inductive Proximity Sensors from Eaton's electrical sector feature the same sensing ranges as our standard length sensors, but in a body with a substantially shorter length. This allows the sensors to be used in applications where mounting space is limited.

Our robust Premium+ Series design has been added to the short barrel line. This means these sensors have been upgraded to include rugged stainless steel barrels, polycarbonate end bells, shock-resistant front cap and potting compound. Plus, the short barrel line now includes a choice of AC, AC/DC and DC-only, 12, 18 and 30 mm sensors. Cable models feature an optional extra long 5-meter cable. Every sensor is designed with 360° LED.

## Features

- Manufactured to take physical and environmental abuse
- Designed with stainless steel barrel and impact-absorbing new potting compound for robust, high temperature, high pressure washdown, as well as intense shock and vibration applications
- Unmatched high noise immunity eliminates problems associated with electrical noise (all models >20V/meter)
- 360° output status indicator is visible from any angle and in any light condition
- Resettable short circuit protection in AC/DC and DC models
- Reverse polarity protection in three-wire DC versions
- Small size to fit in tight spaces
- Choice of cable for low cost wiring, or micro-connector for quick installation or replacement
- Cable models include an extra long 5-meter cable as option

## Standards and Certifications

- cUL Listed
- CE (AC/DC and DC-only models)

**! 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.**

## Contents

## Description

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| E57 Premium+ Series Short Barrel Sensors |                 |
| Product Selection                        |                 |
| E57 Premium+ Series Short Barrel Sensors | <b>V8-T3-30</b> |
| Compatible Connector Cables              | <b>V8-T3-31</b> |
| Accessories                              | <b>V8-T3-32</b> |
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| Wiring Diagrams                          | <b>V8-T3-33</b> |
| Dimensions                               | <b>V8-T3-34</b> |

For the most current information on this product, visit our Web site: [www.eaton.com](http://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.

# 3.3

## Inductive Proximity Sensors

### E57 Premium+ Series Short Barrel Sensors

#### Product Selection

#### E57 Premium+ Series Short Barrel Sensors

3

#### Two-Wire Sensors

|                                                                                     | Operating Voltage                                                                 | Sensing Range (Sn) | Shielding  | Connection Type ①        | NO Output Catalog Number | NC Output Catalog Number |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------|------------|--------------------------|--------------------------|--------------------------|
|    | 12 mm Diameter                                                                    |                    |            |                          |                          |                          |
|                                                                                     | 20–250 Vac                                                                        | 2 mm               | Shielded   | 2-meter cable            | E57SAL12A4               | E57SBL12A4               |
|                                                                                     |                                                                                   |                    |            | 3-pin micro AC connector | E57SAL12A4SA ☹           | E57SBL12A4SA ☹           |
|                                                                                     |                                                                                   | 4 mm               | Unshielded | 2-meter cable            | E57SAL12A4E              | E57SBL12A4E              |
|                                                                                     |                                                                                   |                    |            | 3-pin micro AC connector | E57SAL12A4EA ☹           | E57SBL12A4EA ☹           |
|                                                                                     | 40–250 Vac<br>50/60 Hz ②<br>20–250 Vdc                                            | 2 mm               | Shielded   | 2-meter cable            | E57SAL12A2               | E57SBL12A2               |
|                                                                                     |                                                                                   |                    |            | 3-pin micro AC connector | E57SAL12A2SA ☹           | E57SBL12A2SA ☹           |
|                                                                                     |                                                                                   | 4 mm               | Unshielded | 2-meter cable            | E57SAL12A2E              | E57SBL12A2E              |
|                                                                                     |                                                                                   |                    |            | 3-pin micro AC connector | E57SAL12A2EA ☹           | E57SBL12A2EA ☹           |
|                                                                                     |  | 18 mm Diameter     |            |                          |                          |                          |
| 20–250 Vac                                                                          |                                                                                   | 5 mm               | Shielded   | 2-meter cable            | E57SAL18A4               | E57SBL18A4               |
|                                                                                     |                                                                                   |                    |            | 3-pin micro AC connector | E57SAL18A4SA ☹           | E57SBL18A4SA ☹           |
|                                                                                     |                                                                                   | 8 mm               | Unshielded | 2-meter cable            | E57SAL18A4E              | E57SBL18A4E              |
|                                                                                     |                                                                                   |                    |            | 3-pin micro AC connector | E57SAL18A4EA ☹           | E57SBL18A4EA ☹           |
| 40–250 Vac<br>50/60 Hz ②<br>20–250 Vdc                                              |                                                                                   | 5 mm               | Shielded   | 2-meter cable            | E57SAL18A2               | E57SBL18A2               |
|                                                                                     |                                                                                   |                    |            | 3-pin micro AC connector | E57SAL18A2SA ☹           | E57SBL18A2SA ☹           |
|                                                                                     |                                                                                   | 8 mm               | Unshielded | 2-meter cable            | E57SAL18A2E              | E57SBL18A2E              |
|                                                                                     |                                                                                   |                    |            | 3-pin micro AC connector | E57SAL18A2EA ☹           | E57SBL18A2EA ☹           |
|  |                                                                                   | 30 mm Diameter     |            |                          |                          |                          |
|                                                                                     | 20–250 Vac                                                                        | 10 mm              | Shielded   | 2-meter cable            | E57SAL30A4               | E57SBL30A4               |
|                                                                                     |                                                                                   |                    |            | 3-pin micro AC connector | E57SAL30A4SA ☹           | E57SBL30A4SA ☹           |
|                                                                                     |                                                                                   | 15 mm              | Unshielded | 2-meter cable            | E57SAL30A4E              | E57SBL30A4E              |
|                                                                                     |                                                                                   |                    |            | 3-pin micro AC connector | E57SAL30A4EA ☹           | E57SBL30A4EA ☹           |
|                                                                                     | 40–250 Vac<br>50/60 Hz ②<br>20–250 Vdc                                            | 10 mm              | Shielded   | 2-meter cable            | E57SAL30A2               | E57SBL30A2               |
|                                                                                     |                                                                                   |                    |            | 3-pin micro AC connector | E57SAL30A2SA ☹           | E57SBL30A2SA ☹           |
|                                                                                     |                                                                                   | 15 mm              | Unshielded | 2-meter cable            | E57SAL30A2E              | E57SBL30A2E              |
|                                                                                     |                                                                                   |                    |            | 3-pin micro AC connector | E57SAL30A2EA ☹           | E57SBL30A2EA ☹           |

#### Notes

☹ See listing of compatible connector cables on **Page V8-T3-31**.

① Cable models are supplied as standard with a 2-meter cable. A 5-meter cable is available by adding **S5** to the catalog number. Example: E57SAL12T110 becomes E57SAL12T110**S5**.

② Avoid wiring these AC/DC models in series as the sensors may not perform reliably. Contact Eaton's Applications Engineering at 1-800-426-9184 with questions.

## Three-Wire Sensors

|                                                                                    | Operating Voltage     | Sensing Range (Sn)       | Shielding               | Connection Type ①        | NO Output Catalog Number | NC Output Catalog Number |
|------------------------------------------------------------------------------------|-----------------------|--------------------------|-------------------------|--------------------------|--------------------------|--------------------------|
| <b>12 mm</b>                                                                       | <b>12 mm Diameter</b> |                          |                         |                          |                          |                          |
|   | 6–48 Vdc              | 2 mm                     | Shielded (NPN)          | 2-meter cable            | <b>E57SAL12T110</b>      | —                        |
|                                                                                    |                       |                          |                         | 4-pin micro DC connector | <b>E57SAL12T110SD</b> ②  | —                        |
|                                                                                    |                       | 4 mm                     | Shielded (PNP)          | 2-meter cable            | <b>E57SAL12T111</b>      | <b>E57SBL12T111</b>      |
|                                                                                    |                       |                          |                         | 4-pin micro DC connector | <b>E57SAL12T111SD</b> ②  | <b>E57SBL12T111SD</b> ②  |
|                                                                                    |                       |                          | Unshielded (NPN)        | 2-meter cable            | <b>E57SAL12T110E</b>     | <b>E57SBL12T110E</b>     |
|                                                                                    |                       |                          |                         | 4-pin micro DC connector | <b>E57SAL12T110ED</b> ②  | <b>E57SBL12T110ED</b> ②  |
|                                                                                    | Unshielded (PNP)      | 2-meter cable            | <b>E57SAL12T111E</b>    | <b>E57SBL12T111E</b>     |                          |                          |
|                                                                                    |                       | 4-pin micro DC connector | <b>E57SAL12T111ED</b> ② | <b>E57SBL12T111ED</b> ②  |                          |                          |
| <b>18 mm</b>                                                                       | <b>18 mm Diameter</b> |                          |                         |                          |                          |                          |
|   | 6–48 Vdc              | 5 mm                     | Shielded (NPN)          | 2-meter cable            | <b>E57SAL18T110</b>      | <b>E57SBL18T110</b>      |
|                                                                                    |                       |                          |                         | 4-pin micro DC connector | <b>E57SAL18T110SD</b> ②  | <b>E57SBL18T110SD</b> ②  |
|                                                                                    |                       | 8 mm                     | Shielded (PNP)          | 2-meter cable            | <b>E57SAL18T111</b>      | <b>E57SBL18T111</b>      |
|                                                                                    |                       |                          |                         | 4-pin micro DC connector | <b>E57SAL18T111SD</b> ②  | <b>E57SBL18T111SD</b> ②  |
|                                                                                    |                       |                          | Unshielded (NPN)        | 2-meter cable            | <b>E57SAL18T110E</b>     | <b>E57SBL18T110E</b>     |
|                                                                                    |                       |                          |                         | 4-pin micro DC connector | <b>E57SAL18T110ED</b> ②  | <b>E57SBL18T110ED</b> ②  |
|                                                                                    | Unshielded (PNP)      | 2-meter cable            | <b>E57SAL18T111E</b>    | <b>E57SBL18T111E</b>     |                          |                          |
|                                                                                    |                       | 4-pin micro DC connector | <b>E57SAL18T111ED</b> ② | <b>E57SBL18T111ED</b> ②  |                          |                          |
| <b>30 mm</b>                                                                       | <b>30 mm Diameter</b> |                          |                         |                          |                          |                          |
|  | 6–48 Vdc              | 10 mm                    | Shielded (NPN)          | 2-meter cable            | <b>E57SAL30T110</b>      | <b>E57SBL30T110</b>      |
|                                                                                    |                       |                          |                         | 4-pin micro DC connector | <b>E57SAL30T110SD</b> ②  | <b>E57SBL30T110SD</b> ②  |
|                                                                                    |                       | 15 mm                    | Shielded (PNP)          | 2-meter cable            | <b>E57SAL30T111</b>      | <b>E57SBL30T111</b>      |
|                                                                                    |                       |                          |                         | 4-pin micro DC connector | <b>E57SAL30T111SD</b> ②  | <b>E57SBL30T111SD</b> ②  |
|                                                                                    |                       |                          | Unshielded (NPN)        | 2-meter cable            | <b>E57SAL30T110E</b>     | <b>E57SBL30T110E</b>     |
|                                                                                    |                       |                          |                         | 4-pin micro DC connector | <b>E57SAL30T110ED</b> ②  | <b>E57SBL30T110ED</b> ②  |
|                                                                                    | Unshielded (PNP)      | 2-meter cable            | <b>E57SAL30T111E</b>    | <b>E57SBL30T111E</b>     |                          |                          |
|                                                                                    |                       | 4-pin micro DC connector | <b>E57SAL30T111ED</b> ② | <b>E57SBL30T111ED</b> ②  |                          |                          |

## Compatible Connector Cables

## Standard Cables ②

|                                                                                                                           | Voltage Style                       | Number of Pins | Gauge  | Length      | Pin Configuration/Wire Colors (Face View Female Shown)                                                                      | PVC Jacket Catalog Number | PUR Jacket Catalog Number |
|---------------------------------------------------------------------------------------------------------------------------|-------------------------------------|----------------|--------|-------------|-----------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|
| <b>Micro-Style Straight Female</b><br> | <b>Micro-Style, Straight Female</b> |                |        |             |                                                                                                                             |                           |                           |
|                                                                                                                           | AC                                  | 3-pin, 3-wire  | 22 AWG | 6.0 ft (2m) |  1-Green<br>2-Red/Black<br>3-Red/White   | <b>CSAS3F3CY2202</b>      | <b>CSAS3F3RY2202</b>      |
|                                                                                                                           | DC                                  | 4-pin, 4-wire  | 22 AWG | 6.0 ft (2m) |  1-Brown<br>2-White<br>3-Blue<br>4-Black | <b>CSDS4A4CY2202</b>      | <b>CSDS4A4RY2202</b>      |

## Notes

ⓘ See listing of compatible connector cables above.

① Cable models are supplied as standard with a 2-meter cable. A 5-meter cable is available by adding **S5** to the catalog number. Example: E57SAL12T110 becomes E57SAL12T110**S5**.

② For a full selection of connector cables, see **Tab 10, section 10.1**.

## Accessories

### E57 Premium+ Series Short Barrel Sensors

| Description                                     | Reference                       |
|-------------------------------------------------|---------------------------------|
| Mounting brackets                               | See <b>Tab 8, section 8.2</b>   |
| Replacement mounting nuts and other accessories | See <b>Tab 8, section 8.3</b>   |
| Connector cables                                | See <b>Tab 10, section 10.1</b> |

## Technical Data and Specifications

### E57 Premium+ Series Short Barrel Sensors

| Description              | Two-Wire AC Sensors                                        | Two-Wire AC/DC Sensors                                     |                                                            | Three-Wire DC Sensors                                      |
|--------------------------|------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------|
|                          |                                                            | AC Operation                                               | DC Operation                                               |                                                            |
| Operating voltage        | 40–250 Vac                                                 | 40–250 Vac                                                 | 20–250 Vdc                                                 | 6–48 Vdc                                                   |
| Maximum load current     | 250 mA                                                     | 200 mA                                                     | 200 mA                                                     | 250 mA                                                     |
| Switching frequency      | 20 Hz                                                      | 60 Hz                                                      | 60 Hz                                                      | 12 mm: 800 Hz<br>18 mm: 500 Hz<br>30 mm: 300 Hz            |
| Leakage current          | 1.7 mA maximum at 70°C                                     | 1.7V mA maximum at 120 Vac                                 | ≤2.0 mA                                                    | 100 µA maximum                                             |
| Voltage drop             | 7V maximum                                                 | ≤4V at >25 mA                                              | 12V at <10 mA                                              | ≤2.5V                                                      |
| Holding current          | 5 mA minimum                                               | 5 mA minimum                                               | 5 mA maximum                                               | ≤10 mA                                                     |
| Protection               | —                                                          | Resettable short circuit;<br>overload protection           | Resettable short circuit;<br>overload protection           | Auto reset                                                 |
| Switching hysteresis     | 2–20% of rated sensing distance                            | 2–20% of rated sensing distance                            | 2–20% of rated sensing distance                            | 2–20% of rated sensing distance                            |
| Repeat accuracy          | <3% sensing distance                                       | <3% sensing distance                                       | <3% sensing distance                                       | <3% sensing distance                                       |
| Output indicator LED     | 360° viewable LED                                          | 360° viewable LED                                          | 360° viewable LED                                          | 360° viewable LED                                          |
| Operating temperature    | –13° to 158°F (–25° to 70°C) ①                             | –13° to 158°F (–25° to 70°C) ①                             | –13° to 158°F (–25° to 70°C) ①                             | –13° to 158°F (–25° to 70°C) ①                             |
| Enclosure ratings        | NEMA 4, 4X, 6, 6P, 12 and 13 (IP67)                        | NEMA 4, 4X, 6, 6P, 12 and 13 (IP67)                        | NEMA 4, 4X, 6, 6P, 12 and 13 (IP67)                        | NEMA 4, 4X, 6, 6P, 12 and 13 (IP67)                        |
| Shock                    | 30g sine wave, 11 ms per IEC68-2-76                        | 30g sine wave, 11 ms per IEC68-2-76                        | 30g sine wave, 11 ms per IEC68-2-76                        | 30g sine wave, 11 ms per IEC68-2-76                        |
| Vibration                | 10 to 55 Hz, 1 mm amplitude                                | 10 to 55 Hz, 1 mm amplitude                                | 10 to 55 Hz, 1 mm amplitude                                | 10 to 55 Hz, 1 mm amplitude                                |
| Material of construction | Stainless steel, polycarbonate end bells, Ryton® front cap | Stainless steel, polycarbonate end bells, Ryton® front cap | Stainless steel, polycarbonate end bells, Ryton® front cap | Stainless steel, polycarbonate end bells, Ryton® front cap |
| Cable                    | AWM Style 20387 (PVC)                                      | AWM Style 20387 (PVC)                                      | AWM Style 20387 (PVC)                                      | AWM Style 20387 (PVC)                                      |

#### Notes

Ryton® is a registered trademark of Phillips Chemical (division of Phillips Petroleum).

① 240 Vac operation is limited to less than 122°F (50°C) in two-wire AC/DC models.

### Wiring Diagrams

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

#### E57 Premium+ Series Short Barrel Sensors

| Operating Voltage                                 | Output          | Cable Models | Micro-Connector Models (Face View Male Shown) |
|---------------------------------------------------|-----------------|--------------|-----------------------------------------------|
| <b>Two-Wire Sensors</b>                           |                 |              |                                               |
| 20–250 Vac/dc<br>45/65 Hz<br>DC wiring example    | NO and NC (NPN) |              |                                               |
|                                                   | NO and NC (PNP) |              |                                               |
| 20–250 Vac/dc<br>and AC-only<br>AC wiring example | NO and NC       |              |                                               |
| <b>Three-Wire Sensors</b>                         |                 |              |                                               |
| 6–48 Vdc                                          | NO (NPN)        |              |                                               |
|                                                   | NO (PNP)        |              |                                               |
|                                                   | NC (NPN)        |              |                                               |
|                                                   | NC (PNP)        |              |                                               |

# 3.3

## Inductive Proximity Sensors

### E57 Premium+ Series Short Barrel Sensors

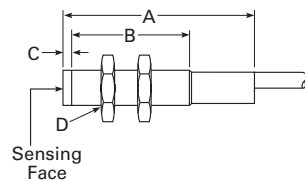
#### Dimensions

Approximate Dimensions in Inches (mm)

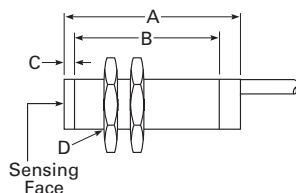
#### E57 Premium+ Series Short Barrel Sensors—Cable Models

3

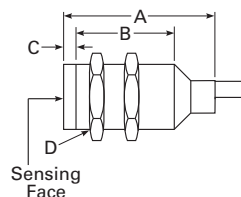
##### 12 mm



##### 18 mm



##### 30 mm

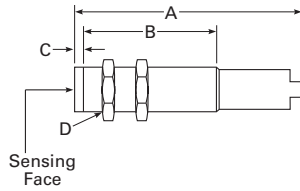


| Size                          | Shielding  | Overall Length<br>A | Threaded Length<br>B | Cap Height<br>C | Thread Size<br>D |
|-------------------------------|------------|---------------------|----------------------|-----------------|------------------|
| <b>Two-Wire AC Sensors</b>    |            |                     |                      |                 |                  |
| 12 mm                         | Shielded   | 2.04 (51.7)         | 1.56 (39.6)          | 0.02 (0.5)      | M12 x 1          |
|                               | Unshielded | 2.04 (51.7)         | 1.38 (35.1)          | 0.20 (5)        | M12 x 1          |
| 18 mm                         | Shielded   | 1.39 (35.3)         | 0.86 (21.82)         | 0.02 (0.5)      | M18 x 1          |
|                               | Unshielded | 1.39 (35.3)         | 0.60 (15.32)         | 0.28 (7)        | M18 x 1          |
| 30 mm                         | Shielded   | 1.58 (40.2)         | 0.99 (25.15)         | 0.03 (0.8)      | M30 x 1.5        |
|                               | Unshielded | 1.77 (44.9)         | 0.68 (17.27)         | 0.52 (13.26)    | M30 x 1.5        |
| <b>Two-Wire AC/DC Sensors</b> |            |                     |                      |                 |                  |
| 12 mm                         | Shielded   | 2.46 (62.4)         | 1.98 (50.27)         | —               | M12 x 1          |
|                               | Unshielded | 2.46 (62.4)         | 1.80 (45.77)         | 0.20 (5)        | M12 x 1          |
| 18 mm                         | Shielded   | 2.54 (64.5)         | 2.00 (50.9)          | —               | M18 x 1          |
|                               | Unshielded | 2.54 (64.5)         | 1.75 (44.4)          | 0.28 (7)        | M18 x 1          |
| 30 mm                         | Shielded   | 2.72 (69.3)         | 2.12 (53.8)          | —               | M30 x 1.5        |
|                               | Unshielded | 2.72 (69.3)         | 1.63 (41.4)          | 0.52 (13.26)    | M30 x 1.5        |
| <b>Three-Wire DC Sensors</b>  |            |                     |                      |                 |                  |
| 12 mm                         | Shielded   | 1.39 (35.3)         | 0.91 (23.09)         | 0.02 (0.5)      | M12 x 1          |
|                               | Unshielded | 1.39 (35.3)         | 0.73 (18.59)         | 0.20 (5)        | M12 x 1          |
| 18 mm                         | Shielded   | 1.39 (35.3)         | 0.86 (21.82)         | 0.02 (0.5)      | M18 x 1          |
|                               | Unshielded | 1.39 (35.3)         | 0.60 (15.32)         | 0.28 (7)        | M18 x 1          |
| 30 mm                         | Shielded   | 1.58 (40.2)         | 0.84 (21.26)         | 0.03 (0.8)      | M30 x 1.5        |
|                               | Unshielded | 1.77 (44.9)         | 0.53 (13.46)         | 0.52 (13.26)    | M30 x 1.5        |

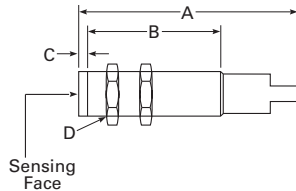
Approximate Dimensions in Inches (mm)

**E57 Premium+ Series Short Barrel Sensors—Micro-Connector Models**

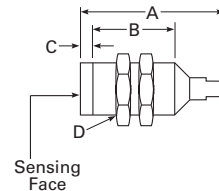
**12 mm**



**18 mm**



**30 mm**



| Size                          | Shielding  | Overall Length<br>A | Threaded Length<br>B | Cap Height<br>C | Thread Size<br>D |
|-------------------------------|------------|---------------------|----------------------|-----------------|------------------|
| <b>Two-Wire AC Sensors</b>    |            |                     |                      |                 |                  |
| 12 mm                         | Shielded   | 2.27 (57.8)         | 1.56 (39.6)          | 0.02 (0.5)      | M12 x 1          |
|                               | Unshielded | 2.27 (57.8)         | 1.38 (35.1)          | 0.20 (5)        | M12 x 1          |
| 18 mm                         | Shielded   | 1.57 (40.0)         | 0.86 (21.82)         | 0.02 (0.5)      | M18 x 1          |
|                               | Unshielded | 1.57 (40.0)         | 0.60 (15.32)         | 0.28 (7)        | M18 x 1          |
| 30 mm                         | Shielded   | 1.76 (44.8)         | 0.99 (25.15)         | 0.03 (0.8)      | M30 x 1.5        |
|                               | Unshielded | 1.95 (49.5)         | 0.68 (17.27)         | 0.52 (13.26)    | M30 x 1.5        |
| <b>Two-Wire AC/DC Sensors</b> |            |                     |                      |                 |                  |
| 12 mm                         | Shielded   | 2.69 (68.4)         | 1.98 (50.27)         | —               | M12 x 1          |
|                               | Unshielded | 2.69 (68.4)         | 1.80 (45.77)         | 0.20 (5)        | M12 x 1          |
| 18 mm                         | Shielded   | 2.72 (69.06)        | 2.00 (50.9)          | —               | M18 x 1          |
|                               | Unshielded | 2.72 (69.06)        | 1.75 (44.4)          | 0.28 (7)        | M18 x 1          |
| 30 mm                         | Shielded   | 2.91 (73.8)         | 2.12 (53.8)          | —               | M30 x 1.5        |
|                               | Unshielded | 2.91 (73.8)         | 1.63 (41.4)          | 0.52 (13.26)    | M30 x 1.5        |
| <b>Three-Wire DC Sensors</b>  |            |                     |                      |                 |                  |
| 12 mm                         | Shielded   | 1.64 (41.5)         | 0.91 (23.09)         | 0.02 (0.5)      | M12 x 1          |
|                               | Unshielded | 1.64 (41.5)         | 0.73 (18.59)         | 0.20 (5)        | M12 x 1          |
| 18 mm                         | Shielded   | 1.59 (40.3)         | 0.86 (21.82)         | 0.02 (0.5)      | M18 x 1          |
|                               | Unshielded | 1.59 (40.3)         | 0.60 (15.32)         | 0.28 (7)        | M18 x 1          |
| 30 mm                         | Shielded   | 1.77 (45.0)         | 0.84 (21.26)         | 0.03 (0.8)      | M30 x 1.5        |
|                               | Unshielded | 1.96 (49.7)         | 0.53 (13.46)         | 0.52 (13.26)    | M30 x 1.5        |

## Global Proximity Sensors

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## Global Proximity Sensors

## Product Description

The Global Proximity Sensor family was created by Eaton's electrical sector with the high volume OEM in mind. It has been optimized to include only those functions necessary for basic, reliable sensing. Why pay for extra features when you don't need them? That's not to say these sensors lack the performance or features you expect. Our DC units are short circuit protected and will sense up to 2000 operations per second. Plus, all sensors include a bright LED indicator to show output status.

There's no need to design your machine around these sensors. The Global family includes models in a variety of diameters so they will fit right where you need them.

Select models from 8 mm diameter all the way up to 30 mm, for just the size or sensing range that you require. Need something smaller? Our standard line includes inductive proximity sensors as small as 4 mm in diameter.

The Global Proximity is available in AC or DC, two-wire or three-wire, and NPN or PNP. You can even choose between cable wiring or quick-disconnect connectors. For power handling, our DC units feature a 100 mA load current rating and AC units are rated up to 200 mA.

## Contents

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Wiring Diagrams ..... **V8-T3-42**

Dimensions ..... **V8-T3-43**

## Features

- The Global Proximity Line features solid performance and a basic feature set for reliable, cost-effective sensing
- Available in a variety of sizes to fit in all of your applications: 8 mm, 12 mm, 18 mm and 30 mm diameters
- DC sensors operate on 10–30 Vdc in two-wire and three-wire (NPN or PNP) configurations
- AC sensors operate on 20–250 Vac in two-wire configuration
- Switching frequency of 2 kHz for DC models
- Shielded and unshielded versions available
- Terminations include:
  - 2-meter cable
  - Micro-connector
  - Nano-connector
- DC units include short circuit protection

## Standards and Certifications

- CE (DC models only)
- cCSAus


**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](http://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

## Global Proximity Sensors

## Two-Wire Sensors

|                                                                                     | Operating Voltage | Sensing Range             | Shielding                | Output Type      | Connection Type          | NO Output Catalog Number | NC Output Catalog Number |
|-------------------------------------------------------------------------------------|-------------------|---------------------------|--------------------------|------------------|--------------------------|--------------------------|--------------------------|
|    | 12 mm Diameter    |                           |                          |                  |                          |                          |                          |
|                                                                                     | 20–250 Vac        | 2 mm                      | Shielded                 | —                | 2-meter cable            | E57-12GS02-A             | E57-12GS02-A1            |
|                                                                                     |                   |                           |                          |                  | 3-pin micro AC connector | E57-12GS02-AAB ☺         | E57-12GS02-A1AB ☺        |
|                                                                                     |                   | 4 mm                      | Unshielded               | —                | 2-meter cable            | E57-12GU04-A             | E57-12GU04-A1            |
|                                                                                     |                   |                           |                          |                  | 3-pin micro AC connector | E57-12GU04-AAB ☺         | E57-12GU04-A1AB ☺        |
|                                                                                     | 10–30 Vdc         | 2 mm                      | Shielded                 | NPN/PNP          | 2-meter cable            | E57-12GS02-D             | E57-12GS02-D             |
|                                                                                     |                   |                           |                          |                  | 4-pin micro DC connector | E57-12GS02-DOB ☺         | E57-12GS02-D1DB ☺        |
|                                                                                     |                   | 4 mm                      | Unshielded               | NPN/PNP          | 2-meter cable            | E57-12GU04-D             | E57-12GU04-D1            |
|                                                                                     |                   |                           |                          |                  | 4-pin micro DC connector | E57-12GU04-DOB ☺         | E57-12GU04-D1DB ☺        |
|                                                                                     |                   | 8 mm<br>(extended range)  |                          | NPN/PNP          | 2-meter cable            | E57-12GE08-D             | E57-12GE08-D1            |
| 4-pin micro DC connector                                                            |                   |                           |                          |                  | E57-12GE08-DOB ☺         | E57-12GE08-D1DB ☺        |                          |
|    | 18 mm Diameter    |                           |                          |                  |                          |                          |                          |
|                                                                                     | 20–250 Vac        | 5 mm                      | Shielded                 | —                | 2-meter cable            | E57-18GS05-A             | E57-18GS05-A1            |
|                                                                                     |                   |                           |                          |                  | 3-pin micro AC connector | E57-18GS05-AAB ☺         | E57-18GS05-A1AB ☺        |
|                                                                                     |                   | 8 mm                      | Unshielded               | —                | 2-meter cable            | E57-18GU08-A             | E57-18GU08-A1            |
|                                                                                     |                   |                           |                          |                  | 3-pin micro AC connector | E57-18GU08-AAB ☺         | E57-18GU08-A1AB ☺        |
|                                                                                     | 10–30 Vdc         | 16 mm                     |                          |                  | 3-pin micro AC connector | E57-18GE16-AAB ☺         | E57-18GE16-A1AB ☺        |
|                                                                                     |                   |                           |                          |                  |                          |                          |                          |
|                                                                                     |                   | 5 mm                      | Shielded                 | NPN/PNP          | 2-meter cable            | E57-18GS05-D             | E57-18GS05-D1            |
|                                                                                     |                   |                           |                          |                  | 4-pin micro DC connector | E57-18GS05-DOB ☺         | E57-18GS05-D1DB ☺        |
|                                                                                     |                   | 8 mm                      | Unshielded               | NPN/PNP          | 2-meter cable            | E57-18GU08-D             | E57-18GU08-D1            |
| 4-pin micro DC connector                                                            |                   |                           |                          |                  | E57-18GU08-DOB ☺         | E57-18GU08-D1DB ☺        |                          |
| 16 mm<br>(extended range)                                                           |                   | NPN/PNP                   | 2-meter cable            | E57-18GE16-D     | E57-18GE16-D1            |                          |                          |
|                                                                                     |                   |                           | 4-pin micro DC connector | E57-18GE16-DOB ☺ | E57-18GE16-D1DB ☺        |                          |                          |
|  | 30 mm Diameter    |                           |                          |                  |                          |                          |                          |
|                                                                                     | 20–250 Vac        | 10 mm                     | Shielded                 | —                | 2-meter cable            | E57-30GS10-A             | E57-30GS10-A1            |
|                                                                                     |                   |                           |                          |                  | 3-pin micro AC connector | E57-30GS10-AAB ☺         | E57-30GS10-A1AB ☺        |
|                                                                                     |                   | 15 mm                     | Unshielded               | —                | 2-meter cable            | E57-30GU15-A             | E57-30GU15-A1            |
|                                                                                     |                   |                           |                          |                  | 3-pin micro AC connector | E57-30GU15-AAB ☺         | E57-30GU15-A1AB ☺        |
|                                                                                     | 10–30 Vdc         | 10 mm                     | Shielded                 | NPN/PNP          | 2-meter cable            | E57-30GS10-D             | E57-30GS10-D1            |
|                                                                                     |                   |                           |                          |                  | 4-pin micro DC connector | E57-30GS10-DOB ☺         | E57-30GS10-D1DB ☺        |
|                                                                                     |                   | 15 mm                     | Unshielded               | NPN/PNP          | 2-meter cable            | E57-30GU15-D             | E57-30GU15-D1            |
|                                                                                     |                   |                           |                          |                  | 4-pin micro DC connector | E57-30GU15-DOB ☺         | E57-30GU15-D1DB ☺        |
|                                                                                     |                   | 25 mm<br>(extended range) |                          | NPN/PNP          | 2-meter cable            | E57-30GE25-D             | E57-30GE25-D1            |
| 4-pin micro DC connector                                                            |                   |                           |                          |                  | E57-30GE25-DOB ☺         | E57-30GE25-D1DB ☺        |                          |

## Note

☺☺ See listing of compatible connector cables on **Page V8-T3-40**.

## Three-Wire Sensors

|                                                                                                     | Operating Voltage | Sensing Range             | Shielding  | Output Type | Connection Type          | NO Output Catalog Number | NC Output Catalog Number |
|-----------------------------------------------------------------------------------------------------|-------------------|---------------------------|------------|-------------|--------------------------|--------------------------|--------------------------|
| <b>8 mm</b><br>    | 10–30 Vdc         | 1 mm                      | Shielded   | NPN         | 2-meter cable            | <b>E57-08GS01-C</b>      | <b>E57-08GS01-C1</b>     |
|                                                                                                     |                   |                           |            |             | 3-pin nano-connector     | <b>E57-08GS01-CNB</b> Ⓜ  | <b>E57-08GS01-C1NB</b> Ⓜ |
|                                                                                                     |                   |                           |            |             | 4-pin micro DC connector | <b>E57-08GS01-CDB</b> Ⓜ  | <b>E57-08GS01-C1DB</b> Ⓜ |
|                                                                                                     |                   |                           |            | PNP         | 2-meter cable            | <b>E57-08GS01-G</b>      | <b>E57-08GS01-G1</b>     |
|                                                                                                     |                   |                           |            |             | 3-pin nano-connector     | <b>E57-08GS01-GNB</b> Ⓜ  | <b>E57-08GS01-G1NB</b> Ⓜ |
|                                                                                                     |                   |                           |            |             | 4-pin micro DC connector | <b>E57-08GS01-GDB</b> Ⓜ  | <b>E57-08GS01-G1DB</b> Ⓜ |
|                                                                                                     |                   | 3 mm<br>(extended range)  |            | NPN         | 2-meter cable            | <b>E57-08GE03-C</b>      | <b>E57-08GE03-C1</b>     |
|                                                                                                     |                   |                           |            |             | 3-pin nano-connector     | <b>E57-08GE03-CNB</b> Ⓜ  | <b>E57-08GE03-C1NB</b> Ⓜ |
|                                                                                                     |                   |                           |            |             | 4-pin micro DC connector | <b>E57-08GE03-CDB</b> Ⓜ  | <b>E57-08GE03-C1DB</b> Ⓜ |
|                                                                                                     |                   |                           |            | PNP         | 2-meter cable            | <b>E57-08GE03-G</b>      | <b>E57-08GE03-G1</b>     |
|                                                                                                     |                   |                           |            |             | 3-pin nano-connector     | <b>E57-08GE03-GNB</b> Ⓜ  | <b>E57-08GE03-G1NB</b> Ⓜ |
|                                                                                                     |                   |                           |            |             | 4-pin micro DC connector | <b>E57-08GE03-GDB</b> Ⓜ  | <b>E57-08GE03-G1DB</b> Ⓜ |
|                                                                                                     |                   | 2 mm                      | Unshielded | NPN         | 2-meter cable            | <b>E57-08GU02-C</b>      | <b>E57-08GU02-C1</b>     |
|                                                                                                     |                   |                           |            |             | 3-pin nano-connector     | <b>E57-08GU02-CNB</b> Ⓜ  | <b>E57-08GU02-C1NB</b> Ⓜ |
|                                                                                                     |                   |                           |            |             | 4-pin micro DC connector | <b>E57-08GU02-CDB</b> Ⓜ  | <b>E57-08GU02-C1DB</b> Ⓜ |
|                                                                                                     |                   |                           |            | PNP         | 2-meter cable            | <b>E57-08GU02-G</b>      | <b>E57-08GU02-G1</b>     |
|                                                                                                     |                   |                           |            |             | 3-pin nano-connector     | <b>E57-08GU02-GNB</b> Ⓜ  | <b>E57-08GU02-G1NB</b> Ⓜ |
|                                                                                                     |                   |                           |            |             | 4-pin micro DC connector | <b>E57-08GU02-GDB</b> Ⓜ  | <b>E57-08GU02-G1DB</b> Ⓜ |
|                                                                                                     |                   | 6 mm<br>(extended range)  |            | NPN         | 2-meter cable            | <b>E57-08GE06-C</b>      | <b>E57-08GE06-C1</b>     |
|                                                                                                     |                   |                           |            |             | 4-pin micro DC connector | <b>E57-08GE06-CDB</b> Ⓜ  | <b>E57-08GE06-C1DB</b> Ⓜ |
|                                                                                                     |                   |                           |            |             |                          |                          |                          |
|                                                                                                     |                   |                           |            | PNP         | 2-meter cable            | <b>E57-08GE06-G</b>      | <b>E57-08GE06-G1</b>     |
|                                                                                                     |                   |                           |            |             | 4-pin micro DC connector | <b>E57-08GE06-GDB</b> Ⓜ  | <b>E57-08GE06-G1DB</b> Ⓜ |
|                                                                                                     |                   |                           |            |             |                          |                          |                          |
| <b>12 mm</b><br> | 10–30 Vdc         | 2 mm                      | Shielded   | NPN         | 2-meter cable            | <b>E57-12GS02-C</b>      | <b>E57-12GS02-C1</b>     |
|                                                                                                     |                   |                           |            |             | 4-pin micro DC connector | <b>E57-12GS02-CDB</b> Ⓜ  | <b>E57-12GS02-C1DB</b> Ⓜ |
|                                                                                                     |                   |                           |            |             |                          |                          |                          |
|                                                                                                     |                   |                           |            | PNP         | 2-meter cable            | <b>E57-12GS02-G</b>      | <b>E57-12GS02-G1</b>     |
|                                                                                                     |                   |                           |            |             | 4-pin micro DC connector | <b>E57-12GS02-GDB</b> Ⓜ  | <b>E57-12GS02-G1DB</b> Ⓜ |
|                                                                                                     |                   |                           |            |             |                          |                          |                          |
|                                                                                                     |                   | 5 mm<br>(extended range)  |            | NPN         | 2-meter cable            | <b>E57-12GE05-C</b>      | <b>E57-12GE05-C1</b>     |
|                                                                                                     |                   |                           |            |             | 4-pin micro DC connector | <b>E57-12GE05-CDB</b> Ⓜ  | <b>E57-12GE05-C1DB</b> Ⓜ |
|                                                                                                     |                   |                           |            |             |                          |                          |                          |
|                                                                                                     |                   |                           |            | PNP         | 2-meter cable            | <b>E57-12GE05-G</b>      | <b>E57-12GE05-G1</b>     |
|                                                                                                     |                   |                           |            |             | 4-pin micro DC connector | <b>E57-12GE05-GDB</b> Ⓜ  | <b>E57-12GE05-G1DB</b> Ⓜ |
|                                                                                                     |                   |                           |            |             |                          |                          |                          |
|                                                                                                     |                   | 4 mm                      | Unshielded | NPN         | 2-meter cable            | <b>E57-12GU04-C</b>      | <b>E57-12GU04-C1</b>     |
|                                                                                                     |                   |                           |            |             | 4-pin micro DC connector | <b>E57-12GU04-CDB</b> Ⓜ  | <b>E57-12GU04-C1DB</b> Ⓜ |
|                                                                                                     |                   |                           |            |             |                          |                          |                          |
|                                                                                                     |                   |                           |            | PNP         | 2-meter cable            | <b>E57-12GU04-G</b>      | <b>E57-12GU04-G1</b>     |
|                                                                                                     |                   |                           |            |             | 4-pin micro DC connector | <b>E57-12GU04-GDB</b> Ⓜ  | <b>E57-12GU04-G1DB</b> Ⓜ |
|                                                                                                     |                   |                           |            |             |                          |                          |                          |
|                                                                                                     |                   | 10 mm<br>(extended range) |            | NPN         | 2-meter cable            | <b>E57-12GE10-C</b>      | <b>E57-12GE10-C1</b>     |
|                                                                                                     |                   |                           |            |             | 4-pin micro DC connector | <b>E57-12GE10-CDB</b> Ⓜ  | <b>E57-12GE10-C1DB</b> Ⓜ |
|                                                                                                     |                   |                           |            |             |                          |                          |                          |
|                                                                                                     |                   |                           |            | PNP         | 2-meter cable            | <b>E57-12GE10-G</b>      | <b>E57-12GE10-G1</b>     |
|                                                                                                     |                   |                           |            |             | 4-pin micro DC connector | <b>E57-12GE10-GDB</b> Ⓜ  | <b>E57-12GE10-G1DB</b> Ⓜ |
|                                                                                                     |                   |                           |            |             |                          |                          |                          |

**Note**ⓂⓂ See listing of compatible connector cables on **Page V8-T3-40**.

## Three-Wire Sensors, continued

18 mm



## 18 mm Diameter

| Operating Voltage | Sensing Range             | Shielding  | Output Type | Connection Type          | NO Output Catalog Number | NC Output Catalog Number |
|-------------------|---------------------------|------------|-------------|--------------------------|--------------------------|--------------------------|
| 10–30 Vdc         | 5 mm                      | Shielded   | NPN         | 2-meter cable            | <b>E57-18GS05-C</b>      | <b>E57-18GS05-C1</b>     |
|                   |                           |            |             | 4-pin micro DC connector | <b>E57-18GS05-CDB</b> ☹  | <b>E57-18GS05-C1DB</b> ☹ |
|                   |                           |            | PNP         | 2-meter cable            | <b>E57-18GS05-G</b>      | <b>E57-18GS05-G1</b>     |
|                   |                           |            |             | 4-pin micro DC connector | <b>E57-18GS05-GDB</b> ☹  | <b>E57-18GS05-G1DB</b> ☹ |
|                   | 8 mm<br>(extended range)  |            | NPN         | 2-meter cable            | <b>E57-18GE08-C</b>      | <b>E57-18GE08-C1</b>     |
|                   |                           |            |             | 4-pin micro DC connector | <b>E57-18GE08-CDB</b> ☹  | <b>E57-18GE08-C1DB</b> ☹ |
|                   |                           |            | PNP         | 2-meter cable            | <b>E57-18GE08-G</b>      | <b>E57-18GE08-G1</b>     |
|                   |                           |            |             | 4-pin micro DC connector | <b>E57-18GE08-GDB</b> ☹  | <b>E57-18GE08-G1DB</b> ☹ |
|                   | 8 mm                      | Unshielded | NPN         | 2-meter cable            | <b>E57-18GU08-C</b>      | <b>E57-18GU08-C1</b>     |
|                   |                           |            |             | 4-pin micro DC connector | <b>E57-18GU08-CDB</b> ☹  | <b>E57-18GU08-C1DB</b> ☹ |
|                   |                           |            | PNP         | 2-meter cable            | <b>E57-18GU08-G</b>      | <b>E57-18GU08-G1</b>     |
|                   |                           |            |             | 4-pin micro DC connector | <b>E57-18GU08-GDB</b> ☹  | <b>E57-18GU08-G1DB</b> ☹ |
|                   | 18 mm<br>(extended range) |            | NPN         | 2-meter cable            | <b>E57-18GE18-C</b>      | <b>E57-18GE18-C1</b>     |
|                   |                           |            |             | 4-pin micro DC connector | <b>E57-18GE18-CDB</b> ☹  | <b>E57-18GE18-C1DB</b> ☹ |
|                   |                           |            | PNP         | 2-meter cable            | <b>E57-18GE18-G</b>      | <b>E57-18GE18-G1</b>     |
|                   |                           |            |             | 4-pin micro DC connector | <b>E57-18GE18-GDB</b> ☹  | <b>E57-18GE18-G1DB</b> ☹ |

30 mm



## 30 mm Diameter

| Operating Voltage | Sensing Range             | Shielding  | Output Type | Connection Type          | NO Output Catalog Number | NC Output Catalog Number |
|-------------------|---------------------------|------------|-------------|--------------------------|--------------------------|--------------------------|
| 10–30 Vdc         | 10 mm                     | Shielded   | NPN         | 2-meter cable            | <b>E57-30GS10-C</b>      | <b>E57-30GS10-C1</b>     |
|                   |                           |            |             | 4-pin micro DC connector | <b>E57-30GS10-CDB</b> ☹  | <b>E57-30GS10-C1DB</b> ☹ |
|                   |                           |            | PNP         | 2-meter cable            | <b>E57-30GS10-G</b>      | <b>E57-30GS10-G1</b>     |
|                   |                           |            |             | 5-meter Cable            | <b>E57-30GS10-G5</b>     | —                        |
|                   | 15 mm<br>(extended range) |            | NPN         | 4-pin micro DC connector | <b>E57-30GS10-GDB</b> ☹  | <b>E57-30GS10-G1DB</b> ☹ |
|                   |                           |            |             | 2-meter cable            | <b>E57-30GE15-C</b>      | <b>E57-30GE15-C1</b>     |
|                   |                           |            | PNP         | 4-pin micro DC connector | <b>E57-30GE15-CDB</b> ☹  | <b>E57-30GE15-C1DB</b> ☹ |
|                   |                           |            |             | 2-meter cable            | <b>E57-30GE15-G</b>      | <b>E57-30GE15-G1</b>     |
|                   | 15 mm                     | Unshielded | NPN         | 4-pin micro DC connector | <b>E57-30GE15-GDB</b> ☹  | <b>E57-30GE15-G1DB</b> ☹ |
|                   |                           |            |             | 2-meter cable            | <b>E57-30GU15-C</b>      | <b>E57-30GU15-C1</b>     |
|                   |                           |            | PNP         | 4-pin micro DC connector | <b>E57-30GU15-CDB</b> ☹  | <b>E57-30GU15-C1DB</b> ☹ |
|                   |                           |            |             | 2-meter cable            | <b>E57-30GU15-G</b>      | <b>E57-30GU15-G1</b>     |
|                   | 29 mm<br>(extended range) |            | NPN         | 4-pin micro DC connector | <b>E57-30GU15-GDB</b> ☹  | <b>E57-30GU15-G1DB</b> ☹ |
|                   |                           |            |             | 2-meter cable            | <b>E57-30GE29-C</b>      | <b>E57-30GE29-C1</b>     |
|                   |                           |            | PNP         | 4-pin micro DC connector | <b>E57-30GE29-CDB</b> ☹  | <b>E57-30GE29-C1DB</b> ☹ |
|                   |                           |            |             | 2-meter cable            | <b>E57-30GE29-G</b>      | <b>E57-30GE29-G1</b>     |
|                   |                           |            |             | 4-pin micro DC connector | <b>E57-30GE29-GDB</b> ☹  | <b>E57-30GE29-G1DB</b> ☹ |

**Note**☹ See listing of compatible connector cables on **Page V8-T3-40**.

Compatible Connector Cables

Standard Cables ①

|                                                                                   | Voltage Style                | Number of Pins | Gauge  | Length      | Pin Configuration/Wire Colors (Face View Female Shown)                                                                      | PVC Jacket Catalog Number | PUR Jacket Catalog Number |
|-----------------------------------------------------------------------------------|------------------------------|----------------|--------|-------------|-----------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|
|  | Micro-Style, Straight Female |                |        |             |                                                                                                                             |                           |                           |
|                                                                                   | AC                           | 3-pin, 3-wire  | 22 AWG | 6.0 ft (2m) |  1-Green<br>2-Red/Black<br>3-Red/White     | CSAS3F3CY2202             | CSAS3F3RY2202             |
|                                                                                   | DC                           | 4-pin, 3-wire  | 22 AWG | 6.0 ft (2m) |  1-Brown<br>2-No Wire<br>3-Blue<br>4-Black | CSDS4A3CY2202             | CSDS4A3RY2202             |
|  | Nano-Style, Straight Female  |                |        |             |                                                                                                                             |                           |                           |
|                                                                                   | DC                           | 3-pin          | 24 AWG | 6.0 ft (2m) |  1-Brown<br>3-Blue<br>4-Black              | CSNS3A3CY2402             | CSNS3A3RY2402             |

Accessories

Global Proximity Sensors

| Description                                     | Reference                       |
|-------------------------------------------------|---------------------------------|
| Mounting brackets                               | See <b>Tab 8, section 8.2</b>   |
| Replacement mounting nuts and other accessories | See <b>Tab 8, section 8.3</b>   |
| Connector cables                                | See <b>Tab 10, section 10.1</b> |

Note

① For a full selection of connector cables, see **Tab 10, section 10.1**.

## Technical Data and Specifications

### Global Proximity Sensors

| Description                    | Two-Wire AC Sensors                                                                          | Two-Wire DC Sensors                                                                          | Three-Wire DC Sensors                                                                        |
|--------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Operating voltage              | 20–250 Vac                                                                                   | 10–30 Vdc                                                                                    | 10–30 Vdc                                                                                    |
| OFF-state leakage              | <1.8 mA                                                                                      | <0.8 mA                                                                                      | <0.01 mA                                                                                     |
| Maximum load current           | 200 mA                                                                                       | 100 mA                                                                                       | 100 mA                                                                                       |
| Minimum load current           | 5 mA                                                                                         | 3 mA                                                                                         | —                                                                                            |
| Surge current                  | 5A (20 ms)                                                                                   | —                                                                                            | —                                                                                            |
| Voltage drop                   | <8 Vac at 400 mA                                                                             | <6V                                                                                          | <1.5V                                                                                        |
| Switching frequency            |                                                                                              |                                                                                              |                                                                                              |
| 8 mm diameter                  | —                                                                                            | —                                                                                            | 2 kHz (shielded and unshielded)                                                              |
| 12 mm diameter                 | 25 Hz                                                                                        | 1 kHz (shielded); 1 kHz (unshielded)                                                         | 2 kHz (shielded); 1 kHz (unshielded)                                                         |
| 18 mm diameter                 | 25 Hz                                                                                        | 1 kHz (shielded); 500 Hz (unshielded)                                                        | 1 kHz (shielded); 500 Hz (unshielded)                                                        |
| 30 mm diameter                 | 25 Hz                                                                                        | 500 Hz (shielded); 200 Hz (unshielded)                                                       | 300 Hz (shielded); 150 Hz (unshielded)                                                       |
| Short circuit protection       | No                                                                                           | Yes                                                                                          | Yes                                                                                          |
| Overload trip point            | —                                                                                            | >120 mA                                                                                      | 220 mA                                                                                       |
| Time delay before availability | —                                                                                            | —                                                                                            | <10 ms                                                                                       |
| Transient protection           | —                                                                                            | 2 kV, 1 ms, 1 kohm                                                                           | 1kV, 0.1 ms, 1 kohm                                                                          |
| Repeat accuracy                | Shielded: <1.0%/Unshielded: <3.0% (Sr)                                                       | <2.0% (Sr)                                                                                   | <1.0% (Sr)                                                                                   |
| Switching hysteresis           | <15%                                                                                         | <15%                                                                                         | <15%                                                                                         |
| Operating temperature          | –13° to 158°F (–25° to 70°C)<br>(32° to 140°F [0° to 60°C]<br>for all extended range models) | –13° to 158°F (–25° to 70°C)<br>(32° to 140°F [0° to 60°C]<br>for all extended range models) | –13° to 158°F (–25° to 70°C)<br>(32° to 140°F [0° to 60°C]<br>for all extended range models) |
| Temperature drift              | <10% (Sr)                                                                                    | <10% (Sr)                                                                                    | <10% (Sr)                                                                                    |
| Protection                     | IP67, IP69K                                                                                  | IP67, IP69K                                                                                  | IP67, IP69K                                                                                  |
| Housing material               | Nickel plated brass (stainless steel for 8 mm diameter, nano-connector models)               | Nickel plated brass (stainless steel for 8 mm diameter, nano-connector models)               | Nickel plated brass (stainless steel for 8 mm diameter, nano-connector models)               |
| Cable                          | PVC jacket, 2-meter length                                                                   | PVC jacket, 2-meter length                                                                   | PVC jacket, 2-meter length                                                                   |

# 3.4

## Inductive Proximity Sensors

### Global Proximity Sensors

#### Wiring Diagrams

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

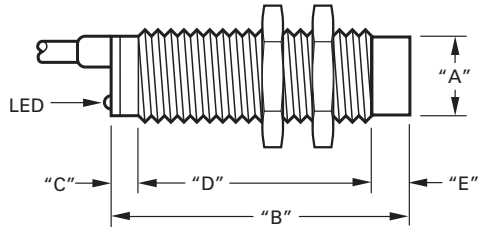
#### Global Proximity Sensors

3

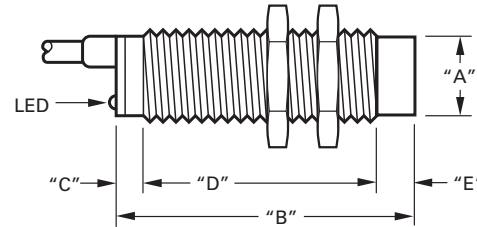
| Operating Voltage  | Output   | Cable Models                                                                                                                   | Connector Models (Face View Male Shown)                                                                          |                                                    |
|--------------------|----------|--------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
|                    |          |                                                                                                                                | Micro                                                                                                            | Nano                                               |
| Two-Wire Sensors   |          |                                                                                                                                |                                                                                                                  |                                                    |
| 20–250 Vac         | NO       | <p>BN — L1<br/>BU — Load — L2<br/>Yellow/Green — *</p> <p>* Internally connected to housing (use of this wire is optional)</p> | <p>L2 — Load — 3    2 — L1<br/>1 — *</p> <p>* Internally connected to housing (use of this wire is optional)</p> | —                                                  |
| 10–30 Vdc          | NO (NPN) | <p>BN — Load — +V<br/>BU — (-)</p>                                                                                             | <p>2 — 1 — Load — (+V)<br/>3 — (-)</p>                                                                           | —                                                  |
|                    | NO (PNP) | <p>BN — +V<br/>BU — Load — (-)</p>                                                                                             | <p>2 — 1 — (+V)<br/>3 — Load — (-)</p>                                                                           | —                                                  |
| Three-Wire Sensors |          |                                                                                                                                |                                                                                                                  |                                                    |
| 10–30 Vdc          | NO (NPN) | <p>BN — +V<br/>BK — Load — +V<br/>BU — (-)</p>                                                                                 | <p>2 — 1 — +V<br/>3 — Load — (-)<br/>4 — (-)</p>                                                                 | <p>3 — 4 — Load — (+V)<br/>1 — (-)<br/>2 — (-)</p> |
|                    | NO (PNP) | <p>BN — +V<br/>BK — Load — +V<br/>BU — (-)</p>                                                                                 | <p>2 — 1 — +V<br/>3 — Load — (-)<br/>4 — (-)</p>                                                                 | <p>3 — 4 — Load — (+V)<br/>1 — (-)<br/>2 — (-)</p> |
|                    | NC (NPN) | <p>BN — +V<br/>BK — Load — +V<br/>BU — (-)</p>                                                                                 | <p>2 — 1 — +V<br/>3 — Load — (-)<br/>4 — (-)</p>                                                                 | <p>3 — 4 — Load — (+V)<br/>1 — (-)<br/>2 — (-)</p> |
|                    | NC (PNP) | <p>BN — +V<br/>BK — Load — +V<br/>BU — (-)</p>                                                                                 | <p>2 — 1 — +V<br/>3 — Load — (-)<br/>4 — (-)</p>                                                                 | <p>3 — 4 — Load — (+V)<br/>1 — (-)<br/>2 — (-)</p> |

**Dimensions**

Approximate Dimensions in mm

**Cable Models****Two-Wire Sensors**

| Catalog Number       | Operating Voltage | A       | B  | C  | D  | E  |
|----------------------|-------------------|---------|----|----|----|----|
| <b>E57-12GS02-A</b>  | 20–250 Vac        | M12x1   | 65 | 15 | 50 | —  |
| <b>E57-12GU04-A</b>  |                   | M12x1   | 60 | 15 | 42 | 8  |
| <b>E57-18GS05-A</b>  |                   | M18x1   | 80 | 20 | 60 | —  |
| <b>E57-18GU08-A</b>  |                   | M18x1   | 80 | 20 | 48 | 12 |
| <b>E57-30GS10-A</b>  |                   | M30x1.5 | 80 | 20 | 60 | —  |
| <b>E57-30GU15-A</b>  |                   | M30x1.5 | 80 | 20 | 45 | 15 |
| <b>E57-12GS02-D</b>  | 10–30 Vdc         | M12x1   | 50 | —  | 50 | —  |
| <b>E57-12GU04-D</b>  |                   | M12x1   | 50 | —  | 42 | 8  |
| <b>E57-12GE08-D</b>  |                   | M12x1   | 50 | —  | 42 | 8  |
| <b>E57-12GE08-D1</b> |                   | M12x1   | 50 | —  | 42 | 8  |
| <b>E57-18GS05-D</b>  |                   | M18x1   | 55 | 5  | 50 | —  |
| <b>E57-18GU08-D</b>  |                   | M18x1   | 55 | 5  | 38 | 12 |
| <b>E57-18GE16-D</b>  |                   | M18x1   | 55 | 5  | 38 | 12 |
| <b>E57-18GE16-D1</b> |                   | M18x1   | 55 | 5  | 38 | 12 |
| <b>E57-30GS10-D</b>  |                   | M30x1.5 | 55 | 5  | 50 | —  |
| <b>E57-30GU15-D</b>  |                   | M30x1.5 | 55 | 5  | 35 | 15 |
| <b>E57-30GE25-D</b>  |                   | M30x1.5 | 55 | 5  | 35 | 15 |
| <b>E57-30GE25-D1</b> |                   | M30x1.5 | 55 | 5  | 35 | 15 |

**Three-Wire Sensors**

| Catalog Number      | Operating Voltage | A       | B    | C   | D  | E    |
|---------------------|-------------------|---------|------|-----|----|------|
| <b>E57-08GE03-C</b> | 10–30 Vdc         | M8x1    | 46   | 6   | 40 | —    |
| <b>E57-08GE03-G</b> |                   | M8x1    | 46   | 6   | 40 | —    |
| <b>E57-08GE06-C</b> |                   | M8x1    | 45   | —   | 41 | 4    |
| <b>E57-08GE06-G</b> |                   | M8x1    | 45   | —   | 41 | 4    |
| <b>E57-08GS01-C</b> |                   | M8x1    | 45   | —   | 45 | —    |
| <b>E57-08GS01-G</b> |                   | M8x1    | 45   | —   | 45 | —    |
| <b>E57-08GU02-C</b> |                   | M8x1    | 45   | —   | 41 | 4    |
| <b>E57-08GU02-G</b> |                   | M8x1    | 45   | —   | 41 | 4    |
| <b>E57-12GE05-C</b> |                   | M12x1   | 51   | 2   | 49 | —    |
| <b>E57-12GE05-G</b> |                   | M12x1   | 51   | 2   | 49 | —    |
| <b>E57-12GE10-C</b> |                   | M12x1   | 50.5 | 1.7 | 41 | 7.8  |
| <b>E57-12GE10-G</b> |                   | M12x1   | 50.5 | 1.7 | 41 | 7.8  |
| <b>E57-12GS02-C</b> |                   | M12x1   | 50   | —   | 50 | —    |
| <b>E57-12GS02-G</b> |                   | M12x1   | 50   | —   | 50 | —    |
| <b>E57-12GU04-C</b> |                   | M12x1   | 50   | —   | 42 | 8    |
| <b>E57-12GU04-G</b> |                   | M12x1   | 50   | —   | 42 | 8    |
| <b>E57-18GE08-C</b> |                   | M18x1   | 67.5 | 2.5 | 65 | —    |
| <b>E57-18GE08-G</b> |                   | M18x1   | 65.5 | 2.5 | 65 | —    |
| <b>E57-18GE18-C</b> |                   | M18x1   | 66   | 2.5 | 52 | 11.5 |
| <b>E57-18GE18-G</b> |                   | M18x1   | 66   | 2.5 | 52 | 11.5 |
| <b>E57-18GS05-C</b> |                   | M18x1   | 55   | 5   | 50 | —    |
| <b>E57-18GS05-G</b> |                   | M18x1   | 55   | 5   | 50 | —    |
| <b>E57-18GU08-C</b> |                   | M18x1   | 55   | 5   | 38 | 12   |
| <b>E57-18GU08-G</b> |                   | M18x1   | 55   | 5   | 38 | 12   |
| <b>E57-30GE15-C</b> |                   | M30x1.5 | 69   | 5   | 64 | —    |
| <b>E57-30GE15-G</b> |                   | M30x1.5 | 69   | 5   | 64 | —    |
| <b>E57-30GE29-C</b> |                   | M30x1.5 | 83   | 5   | 64 | 15   |
| <b>E57-30GE29-G</b> |                   | M30x1.5 | 83   | 5   | 64 | 15   |
| <b>E57-30GS10-C</b> |                   | M30x1.5 | 55   | 5   | 50 | —    |
| <b>E57-30GS10-G</b> |                   | M30x1.5 | 55   | 5   | 50 | —    |
| <b>E57-30GU15-C</b> |                   | M30x1.5 | 55   | 5   | 35 | 15   |
| <b>E57-30GU15-G</b> |                   | M30x1.5 | 55   | 5   | 35 | 15   |

# 3.4

## Inductive Proximity Sensors

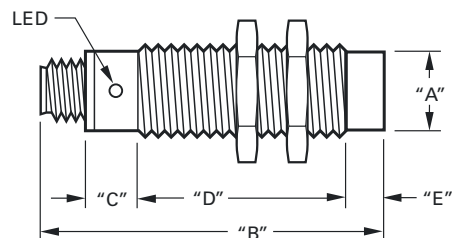
### Global Proximity Sensors

Approximate Dimensions in mm

#### Connector Models

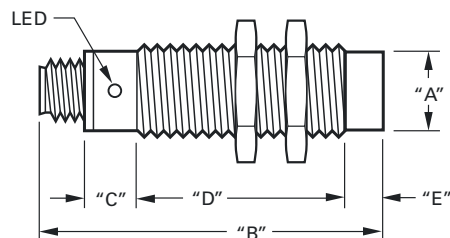
##### Two-Wire Sensors

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| Catalog Number ①       | Operating Voltage | A       | B    | C  | D  | E    |
|------------------------|-------------------|---------|------|----|----|------|
| <b>E57-12GS02-AAB</b>  | 20–250 Vac        | M12x1   | 68   | 16 | 42 | —    |
| <b>E57-12GU04-AAB</b>  |                   | M12x1   | 68   | 16 | 34 | 8    |
| <b>E57-18GS05-AAB</b>  |                   | M18x1   | 91   | 20 | 60 | —    |
| <b>E57-18GU08-AAB</b>  |                   | M18x1   | 91   | 20 | 48 | 12   |
| <b>E57-18GE16-AAB</b>  |                   | M18x1   | 79.2 | 15 | 37 | 11.5 |
| <b>E57-30GS10-AAB</b>  | 10–30 Vdc         | M30x1.5 | 80   | 20 | 60 | —    |
| <b>E57-30GU15-AAB</b>  |                   | M30x1.5 | 91   | 20 | 45 | 15   |
| <b>E57-12GS02-DDB</b>  |                   | M12x1   | 69   | 16 | 42 | —    |
| <b>E57-12GU04-DDB</b>  |                   | M12x1   | 68   | 16 | 34 | 8    |
| <b>E57-12GE08-DDB</b>  |                   | M12x1   | 68   | 10 | 50 | 8    |
| <b>E57-12GE08-D1DB</b> |                   | M12x1   | 68   | 10 | 50 | 8    |
| <b>E57-18GS05-DDB</b>  |                   | M18x1   | 76   | 15 | 61 | —    |
| <b>E57-18GU08-DDB</b>  |                   | M18x1   | 80   | 15 | 49 | 12   |
| <b>E57-18GE16-DDB</b>  |                   | M18x1   | 79   | 15 | 52 | 12   |
| <b>E57-30GS10-DDB</b>  |                   | M30x1.5 | 75   | 15 | 60 | —    |
| <b>E57-30GU15-DDB</b>  |                   | M30x1.5 | 79   | 15 | 45 | 15   |
| <b>E57-30GE25-DDB</b>  |                   | M30x1.5 | 78   | 15 | 48 | 15   |

##### Three-Wire Sensors



| Catalog Number ①      | Operating Voltage | A       | B    | C    | D  | E    |
|-----------------------|-------------------|---------|------|------|----|------|
| <b>E57-08GE03-CDB</b> | 10–30 Vdc         | M8x1    | 71   | 26   | 36 | —    |
| <b>E57-08GE03-CNB</b> |                   | M8x1    | 61   | 19   | 42 | —    |
| <b>E57-08GE03-GDB</b> |                   | M8x1    | 71   | 26   | 36 | —    |
| <b>E57-08GE03-GNB</b> |                   | M8x1    | 61   | 19   | 42 | —    |
| <b>E57-08GE06-CDB</b> |                   | M8x1    | 70   | 31   | 35 | 4    |
| <b>E57-08GE06-GDB</b> |                   | M8x1    | 70   | 31   | 35 | 4    |
| <b>E57-08GS01-CDB</b> |                   | M8x1    | 70   | 21   | 49 | —    |
| <b>E57-08GS01-CNB</b> |                   | M8x1    | 60   | 20   | 40 | —    |
| <b>E57-08GS01-GDB</b> |                   | M8x1    | 70   | 21   | 49 | —    |
| <b>E57-08GS01-GNB</b> |                   | M8x1    | 60   | 20   | 40 | —    |
| <b>E57-08GU02-CDB</b> |                   | M8x1    | 70   | 21   | 45 | 4    |
| <b>E57-08GU02-CNB</b> |                   | M8x1    | 60   | 20   | 36 | 4    |
| <b>E57-08GU02-GDB</b> |                   | M8x1    | 70   | 21   | 45 | 4    |
| <b>E57-08GU02-GNB</b> |                   | M8x1    | 60   | 20   | 36 | 4    |
| <b>E57-12GE05-CDB</b> |                   | M12x1   | 69   | 24   | 45 | —    |
| <b>E57-12GE05-GDB</b> |                   | M12x1   | 69   | 24   | 45 | —    |
| <b>E57-12GE10-CDB</b> |                   | M12x1   | 68.5 | 10.3 | 36 | 7.8  |
| <b>E57-12GE10-GDB</b> |                   | M12x1   | 68.5 | 10.3 | 36 | 7.8  |
| <b>E57-12GS02-CDB</b> |                   | M12x1   | 68   | 16   | 52 | —    |
| <b>E57-12GS02-GDB</b> |                   | M12x1   | 68   | 16   | 52 | —    |
| <b>E57-12GU04-CDB</b> |                   | M12x1   | 68   | 20   | 31 | 8    |
| <b>E57-12GU04-GDB</b> |                   | M12x1   | 68   | 20   | 31 | 8    |
| <b>E57-18GE08-CDB</b> |                   | M18x1   | 79   | 30   | 49 | —    |
| <b>E57-18GE08-GDB</b> |                   | M18x1   | 79   | 30   | 49 | —    |
| <b>E57-18GE18-CDB</b> |                   | M18x1   | 79.2 | 15   | 37 | 11.5 |
| <b>E57-18GE18-GDB</b> |                   | M18x1   | 79.2 | 15   | 37 | 11.5 |
| <b>E57-18GS05-CDB</b> |                   | M18x1   | 76   | 15   | 61 | —    |
| <b>E57-18GS05-GDB</b> |                   | M18x1   | 76   | 15   | 61 | —    |
| <b>E57-18GU08-CDB</b> |                   | M18x1   | 76   | 15   | 49 | 12   |
| <b>E57-18GU08-GDB</b> |                   | M18x1   | 80   | 15   | 49 | 12   |
| <b>E57-30GE29-CDB</b> |                   | M30x1.5 | 79   | 30   | 34 | 15   |
| <b>E57-30GE29-GDB</b> |                   | M30x1.5 | 79   | 30   | 34 | 15   |
| <b>E57-30GS10-CDB</b> |                   | M30x1.5 | 79   | 15   | 60 | —    |
| <b>E57-30GS10-GDB</b> |                   | M30x1.5 | 75   | 15   | 60 | —    |
| <b>E57-30GU15-CDB</b> |                   | M30x1.5 | 75   | 15   | 45 | 15   |
| <b>E57-30GU15-GDB</b> |                   | M30x1.5 | 75   | 15   | 45 | 15   |

#### Note

① Normally closed models are dimensionally identical to equivalent normally open models.

## AccuProx Analog Sensors



## AccuProx Analog Sensors

## Product Description

The AccuProx from Eaton's electrical sector is a high performance analog inductive proximity sensor. The AccuProx family of analog sensors provide unmatched sensing range, linearity and resolution in an affordable and compact tubular package.

Unlike standard inductive sensors, which send an open or close signal upon target presence or absence, AccuProx analog sensors provide an electrical signal that varies in proportion to the position of the metal target within its sensing range. This makes AccuProx ideal for applications requiring precise position sensing and measurement.

The sensing performance of AccuProx sets it apart from traditional analog inductive designs. Utilizing components from the cutting-edge iProx family, AccuProx provides sensing ranges of three to four times that of typical tubular analog inductive sensors—all without compromising accuracy.

Unlike many competitive products, which are often hampered by an "S-shaped" output curve, AccuProx outputs are linear.

AccuProx has the range and precision to solve your most difficult measurement applications.

## Application Description

## Typical Applications

- Part positioning
- Distance, size and thickness measurement
- General inspection and error proofing, such as material imperfection or blemish detection
- Eccentricity or absolute angle detection
- Identification of different metals

See the Application Guide on **Page V8-T3-46** for more detail.

## Contents

## Description

## Page

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## Features

- Extended linear sensing range of up to 25 millimeters—three times longer than standard tubular analog inductive sensors
- Outputs available in current (4–20 or 0–20 mA) and voltage (0–10V)
- High output resolution and repeatability for applications requiring precision sensing performance
- Robust stainless steel barrel, shock-resistant front cap, polycarbonate end bell and impact-absorbing potting compound
- Ideal for extreme temperature or high pressure washdown environments
- High noise immunity of 20V/m prevents many problems associated with electrical noise

## Standards and Certifications

- cUL Listed
- CE



**⚠ 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](http://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.

## Application Guide

### Presenting AccuProx— Unmatched Analog Range in a Proven Package

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Historically, analog sensors have been limited by very short sensing ranges—as little as one or two millimeters. By utilizing technology first perfected in the iProx family of digital inductive sensors, AccuProx can sense objects as far as 25 millimeters. This extended range can be achieved without making compromises often found in competitive products, such as reduced output accuracy.

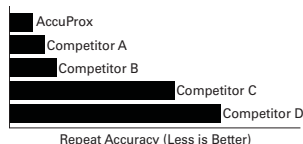
AccuProx utilizes many of the proven materials found in other tubular sensor families. The threaded barrel and included mounting nuts are made of stainless steel, which exhibits superior corrosion and abrasion resistance versus nickel-plated brass. AccuProx also features a proprietary internal potting compound that absorbs impacts and vibration while sealing out moisture. The materials used in the construction of AccuProx are time-tested and proven to work.

### High Output Accuracy

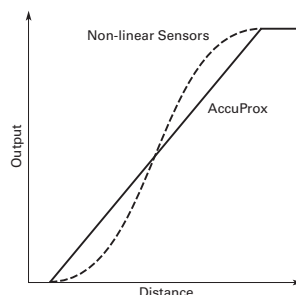
Analog inductive sensors are often used in applications that require a higher level of precision than a standard digital sensor. For example, applications such as part inspection require a sensor that can detect very small variances. AccuProx has been designed with these applications in mind.

Output accuracy is determined by the repeat accuracy, linearity, resolution and response time of the sensor.

Repeat accuracy refers to the variations in sensing distance between successive sensor operations due to component tolerances, where all operating conditions are kept the same. The repeat accuracy of an 18 millimeter, unshielded AccuProx sensor is less than 20 micrometers. See the chart below for a repeat accuracy comparison of AccuProx versus the competition.



Linearity refers to the shape of the output curve. Many competitive analog sensors exhibit a wavy or “S-shaped” output curve. This means that a change in target distance may not always translate into an equivalent change in output, particularly at the innermost and outermost ranges of a non-linear analog sensor. AccuProx features a linear output. See the diagram below for an example of AccuProx versus a non-linear competitive offering.

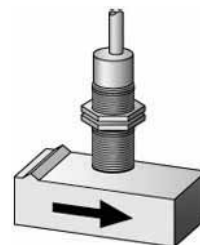


Resolution refers to the number of “steps” in the sensor output. A higher resolution is ideal because it will allow the sensor to detect smaller changes in target position.

An 18 millimeter, unshielded AccuProx features more than 350 output steps, ensuring consistent performance.

### Typical Analog Applications

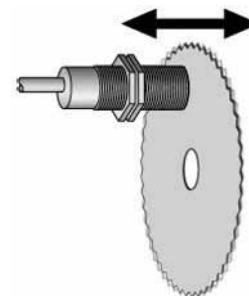
#### Material Imperfection or Blemish Detection



#### Eccentricity or Absolute Angle Detection



#### Saw Blade Deflection



## Product Selection

## AccuProx Analog Sensors

## Three-/Four-Wire Sensors

|                                                                                                    | Operating Voltage     | Sensing Range <sup>①</sup> | Shielding  | Connection Type          | Current (0–20 mA) and Voltage (0–10V) Output <sup>②</sup><br>Catalog Number | Current (4–20 mA) Output Only <sup>②</sup><br>Catalog Number |
|----------------------------------------------------------------------------------------------------|-----------------------|----------------------------|------------|--------------------------|-----------------------------------------------------------------------------|--------------------------------------------------------------|
| <b>12 mm</b><br>  | <b>12 mm Diameter</b> |                            |            |                          |                                                                             |                                                              |
|                                                                                                    | 15–30 Vdc             | 0.5–4 mm                   | Shielded   | 4-pin micro DC connector | <b>E59-A12A104D01-CV</b> ☼                                                  | <b>E59-A12A104D01-C1</b> ☼                                   |
|                                                                                                    |                       |                            |            | 4-pin micro DC pigtail   | <b>E59-A12A104D01P-CV</b> ☼                                                 | <b>E59-A12A104D01P-C1</b> ☼                                  |
|                                                                                                    |                       |                            |            | 2-meter cable            | <b>E59-A12A104C02-CV</b>                                                    | <b>E59-A12A104C02-C1</b>                                     |
|                                                                                                    |                       | 1–8 mm                     | Unshielded | 4-pin micro DC connector | <b>E59-A12C108D01-CV</b> ☼                                                  | <b>E59-A12C108D01-C1</b> ☼                                   |
|                                                                                                    |                       |                            |            | 4-pin micro DC pigtail   | <b>E59-A12C108D01P-CV</b> ☼                                                 | <b>E59-A12C108D01P-C1</b> ☼                                  |
|                                                                                                    |                       |                            |            | 2-meter cable            | <b>E59-A12C108C02-CV</b>                                                    | <b>E59-A12C108C02-C1</b>                                     |
| <b>18 mm</b><br>  | <b>18 mm Diameter</b> |                            |            |                          |                                                                             |                                                              |
|                                                                                                    | 15–30 Vdc             | 1–7 mm                     | Shielded   | 4-pin micro DC connector | <b>E59-A18A107D01-CV</b> ☼                                                  | <b>E59-A18A107D01-C1</b> ☼                                   |
|                                                                                                    |                       |                            |            | 4-pin micro DC pigtail   | <b>E59-A18A107D01P-CV</b> ☼                                                 | <b>E59-A18A107D01P-C1</b> ☼                                  |
|                                                                                                    |                       |                            |            | 2-meter cable            | <b>E59-A18A107C02-CV</b>                                                    | <b>E59-A18A107C02-C1</b>                                     |
|                                                                                                    |                       | 1–15 mm                    | Unshielded | 4-pin micro DC connector | <b>E59-A18C115D01-CV</b> ☼                                                  | <b>E59-A18C115D01-C1</b> ☼                                   |
|                                                                                                    |                       |                            |            | 4-pin micro DC pigtail   | <b>E59-A18C115D01P-CV</b> ☼                                                 | <b>E59-A18C115D01P-C1</b> ☼                                  |
|                                                                                                    |                       |                            |            | 2-meter cable            | <b>E59-A18C115C02-CV</b>                                                    | <b>E59-A18C115C02-C1</b>                                     |
| <b>30 mm</b><br> | <b>30 mm Diameter</b> |                            |            |                          |                                                                             |                                                              |
|                                                                                                    | 15–30 Vdc             | 1–12 mm                    | Shielded   | 4-pin micro DC connector | <b>E59-A30A112D01-CV</b> ☼                                                  | <b>E59-A30A112D01-C1</b> ☼                                   |
|                                                                                                    |                       |                            |            | 4-pin micro DC pigtail   | <b>E59-A30A112D01P-CV</b> ☼                                                 | <b>E59-A30A112D01P-C1</b> ☼                                  |
|                                                                                                    |                       |                            |            | 2-meter cable            | <b>E59-A30A112C02-CV</b>                                                    | <b>E59-A30A112C02-C1</b>                                     |
|                                                                                                    |                       | 1–25 mm                    | Unshielded | 4-pin micro DC connector | <b>E59-A30C125D01-CV</b> ☼                                                  | <b>E59-A30C125D01-C1</b> ☼                                   |
|                                                                                                    |                       |                            |            | 4-pin micro DC pigtail   | <b>E59-A30C125D01P-CV</b> ☼                                                 | <b>E59-A30C125D01P-C1</b> ☼                                  |
|                                                                                                    |                       |                            |            | 2-meter cable            | <b>E59-A30C125C02-CV</b>                                                    | <b>E59-A30C125C02-C1</b>                                     |

## Compatible Connector Cables

Standard Cables <sup>③</sup>

|                                                                                                                               | Voltage Style                       | Number of Pins   | Gauge  | Length      | Pin Configuration/Wire Colors<br>(Face View Female Shown)                                                                     | PVC Jacket<br>Catalog Number | PUR Jacket<br>Catalog Number |
|-------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------|--------|-------------|-------------------------------------------------------------------------------------------------------------------------------|------------------------------|------------------------------|
| <b>Micro-Style<br/>Straight Female</b><br> | <b>Micro-Style, Straight Female</b> |                  |        |             |                                                                                                                               |                              |                              |
|                                                                                                                               | DC                                  | 4-pin,<br>3-wire | 22 AWG | 6.0 ft (2m) |  1-Brown<br>2-No Wire<br>3-Blue<br>4-Black | <b>CSDS4A3CY2202</b>         | <b>CSDS4A3RY2202</b>         |
|                                                                                                                               | DC                                  | 4-pin,<br>4-wire | 22 AWG | 6.0 ft (2m) |  1-Brown<br>2-White<br>3-Blue<br>4-Black   | <b>CSDS4A4CY2202</b>         | <b>CSDS4A4RY2202</b>         |

## Notes

☼ See listing of compatible connector cables above.

<sup>①</sup> Published range data is based on a 1 mm thick square target made of Type FE 360 steel per ISO Standard 630.<sup>②</sup> Models available in custom output configurations (for example, 1–5V, 0–5V). Contact factory for details.<sup>③</sup> For a full selection of connector cables, see **Tab 10, section 10.1**.

## Technical Data and Specifications

## AccuProx Analog Sensors

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| Description                         | 12 mm Models                                                                      |                                                                                   | 18 mm Models                                                                      |                                                                                   | 30 mm Models                                                                      |                                                                                   |
|-------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
|                                     | Shielded                                                                          | Unshielded                                                                        | Shielded                                                                          | Unshielded                                                                        | Shielded                                                                          | Unshielded                                                                        |
| <b>Performance</b>                  |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Analog operating range <sup>①</sup> | 0.5–4 mm                                                                          | 1–8 mm                                                                            | 1–7 mm                                                                            | 1–15 mm                                                                           | 1–12 mm                                                                           | 1–25 mm                                                                           |
| Temperature range                   | –40° to 158°F<br>(–40° to 70°C)                                                   | –40° to 158°F<br>(–40° to 70°C)                                                   | –40° to 158°F<br>(–40° to 70°C)                                                   | –40° to 158°F<br>(–40° to 70°C)                                                   | –40° to 158°F<br>(–40° to 70°C)                                                   | –40° to 158°F<br>(–40° to 70°C)                                                   |
| Temperature drift                   | <± 10%                                                                            | <± 10%                                                                            | <± 10%                                                                            | <± 10%                                                                            | <± 10%                                                                            | <± 10%                                                                            |
| Conformity                          | <± 10%                                                                            | <± 10%                                                                            | <± 10%                                                                            | <± 10%                                                                            | <± 10%                                                                            | <± 10%                                                                            |
| Repeat accuracy                     | <25 µm <sup>②</sup>                                                               | <20 µm <sup>②</sup>                                                               | <40 µm <sup>②</sup>                                                               | <20 µm <sup>②</sup>                                                               | <50 µm <sup>②</sup>                                                               | <30 µm <sup>②</sup>                                                               |
| Minimum repeat accuracy             | <3.0% at max. range                                                               | <1.1% at max. range                                                               | <2.2% at max. range                                                               | <1.2% at max. range                                                               | <1.2% at max. range                                                               | <0.8% at max. range                                                               |
| Recovery time                       | <1.0 ms                                                                           | <1.1 ms                                                                           | <1.5 ms                                                                           | <2.0 ms                                                                           | <2.0 ms                                                                           | <3.0 ms                                                                           |
| Response time                       | 200 Hz                                                                            | 100 Hz                                                                            | 200 Hz                                                                            | 100 Hz                                                                            | 140 Hz                                                                            | 100 Hz                                                                            |
| Linearity tolerance                 | <± 1.0% of full scale                                                             | <± 1.0% of full scale                                                             | <± 1.0% of full scale                                                             | <± 1.0% of full scale                                                             | <± 1.0% of full scale                                                             | <± 1.0% of full scale                                                             |
| Resolution                          | 23 µm max.                                                                        | 16 µm max.                                                                        | 40 µm max.                                                                        | 21 µm max.                                                                        | 50 µm max.                                                                        | 30 µm max.                                                                        |
| <b>Electrical</b>                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Style                               | AccuProx Analog,<br>three-/four-wire DC                                           | AccuProx Analog,<br>three-/four-wire DC                                           | AccuProx Analog,<br>three-/four-wire DC                                           | AccuProx Analog,<br>three-/four-wire DC                                           | AccuProx Analog,<br>three-/four-wire DC                                           | AccuProx Analog,<br>three-/four-wire DC                                           |
| Operating voltage                   | 15–30 Vdc                                                                         | 15–30 Vdc                                                                         | 15–30 Vdc                                                                         | 15–30 Vdc                                                                         | 15–30 Vdc                                                                         | 15–30 Vdc                                                                         |
| Current output signal               | 0–20 mA or<br>4–20 mA by model                                                    | 0–20 mA or<br>4–20 mA by model                                                    | 0–20 mA or<br>4–20 mA by model                                                    | 0–20 mA or<br>4–20 mA by model                                                    | 0–20 mA or<br>4–20 mA by model                                                    | 0–20 mA or<br>4–20 mA by model                                                    |
| Current output load resistance      | 400–500 ohms                                                                      | 400–500 ohms                                                                      | 400–500 ohms                                                                      | 400–500 ohms                                                                      | 400–500 ohms                                                                      | 400–500 ohms                                                                      |
| Current output ripple content       | ± 40 µA max.                                                                      | ± 40 µA max.                                                                      | ± 40 µA max.                                                                      | ± 40 µA max.                                                                      | ± 40 µA max.                                                                      | ± 40 µA max.                                                                      |
| Current output minimum change       | 30 µA                                                                             | 20 µA                                                                             | 50 µA                                                                             | 28 µA                                                                             | 66 µA                                                                             | 40 µA                                                                             |
| Voltage output signal <sup>③</sup>  | 0–10V                                                                             | 0–10V                                                                             | 0–10V                                                                             | 0–10V                                                                             | 0–10V                                                                             | 0–10V                                                                             |
| Voltage output load resistance      | 4.7–5.0 kohm<br>(2.5 mA max.)                                                     | 4.7–5.0 kohm<br>(2.5 mA max.)                                                     | 4.7–5.0 kohm<br>(2.5 mA max.)                                                     | 4.7–5.0 kohm<br>(2.5 mA max.)                                                     | 4.7–5.0 kohm<br>(2.5 mA max.)                                                     | 4.7–5.0 kohm<br>(2.5 mA max.)                                                     |
| Voltage output ripple content       | ± 10 mV max.                                                                      | ± 10 mV max.                                                                      | ± 10 mV max.                                                                      | ± 10 mV max.                                                                      | ± 10 mV max.                                                                      | ± 10 mV max.                                                                      |
| Voltage output minimum change       | 15 mV                                                                             | 10 mV                                                                             | 25 mV                                                                             | 14 mV                                                                             | 33 mV                                                                             | 20 mV                                                                             |
| Burden current                      | <20 mA                                                                            | <20 mA                                                                            | <20 mA                                                                            | <20 mA                                                                            | <20 mA                                                                            | <20 mA                                                                            |
| Output LED                          | Dual-color,<br>360° viewable                                                      | Dual-color,<br>360° viewable                                                      | Dual-color,<br>360° viewable                                                      | Dual-color,<br>360° viewable                                                      | Dual-color,<br>360° viewable                                                      | Dual-color,<br>360° viewable                                                      |
| Short circuit protection            | Incorporated <sup>④</sup>                                                         | Incorporated <sup>④</sup>                                                         | Incorporated <sup>④</sup>                                                         | Incorporated <sup>④</sup>                                                         | Incorporated <sup>④</sup>                                                         | Incorporated <sup>④</sup>                                                         |
| Wire breakage protection            | Incorporated                                                                      | Incorporated                                                                      | Incorporated                                                                      | Incorporated                                                                      | Incorporated                                                                      | Incorporated                                                                      |
| Reverse polarity protection         | Incorporated                                                                      | Incorporated                                                                      | Incorporated                                                                      | Incorporated                                                                      | Incorporated                                                                      | Incorporated                                                                      |
| <b>Physical</b>                     |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Size                                | See Dimensions on <b>Page V8-T3-50</b> .                                          |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| Enclosure protection                | NEMA 4, 4X, 6, 6P, 13                                                             | NEMA 4, 4X, 6, 6P, 13                                                             | NEMA 4, 4X, 6, 6P, 13                                                             | NEMA 4, 4X, 6, 6P, 13                                                             | NEMA 4, 4X, 6, 6P, 13                                                             | NEMA 4, 4X, 6, 6P, 13                                                             |
| Shock                               | 30g half-sine at 11 ms                                                            | 30g half-sine at 11 ms                                                            | 30g half-sine at 11 ms                                                            | 30g half-sine at 11 ms                                                            | 30g half-sine at 11 ms                                                            | 30g half-sine at 11 ms                                                            |
| Vibration                           | 10–55 Hz,<br>1 mm amplitude                                                       | 10–55 Hz,<br>1 mm amplitude                                                       | 10–55 Hz,<br>1 mm amplitude                                                       | 10–55 Hz,<br>1 mm amplitude                                                       | 10–55 Hz,<br>1 mm amplitude                                                       | 10–55 Hz,<br>1 mm amplitude                                                       |
| Housing material                    | Stainless steel,<br>polycarbonate end bell,<br>polyphenylene sulfide<br>front cap | Stainless steel,<br>polycarbonate end bell,<br>polyphenylene sulfide<br>front cap | Stainless steel,<br>polycarbonate end bell,<br>polyphenylene sulfide<br>front cap | Stainless steel,<br>polycarbonate end bell,<br>polyphenylene sulfide<br>front cap | Stainless steel,<br>polycarbonate end bell,<br>polyphenylene sulfide<br>front cap | Stainless steel,<br>polycarbonate end bell,<br>polyphenylene sulfide<br>front cap |
| Termination                         | Micro-connector,<br>potted cable, 2m;<br>Pigtail,<br>micro-connector, 2m          | Micro-connector,<br>potted cable, 2m;<br>Pigtail,<br>micro-connector, 2m          | Micro-connector,<br>potted cable, 2m;<br>Pigtail,<br>micro-connector, 2m          | Micro-connector,<br>potted cable, 2m;<br>Pigtail,<br>micro-connector, 2m          | Micro-connector,<br>potted cable, 2m;<br>Pigtail,<br>micro-connector, 2m          | Micro-connector,<br>potted cable, 2m;<br>Pigtail,<br>micro-connector, 2m          |

## Notes

① Published range data is based on a 1 mm thick square target made of Type FE 360 steel per ISO Standard 630.

② The sensor achieves its maximum repeat accuracy after warming up for a period of at least one hour.

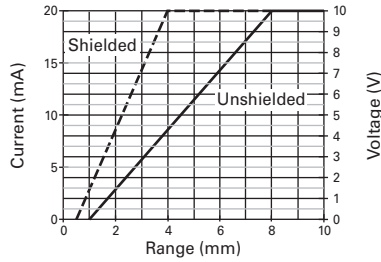
③ Voltage outputs available on models ending in **-CV**.

④ Continuous short-circuits can exceed power dissipation ratings and cause eventual destruction.

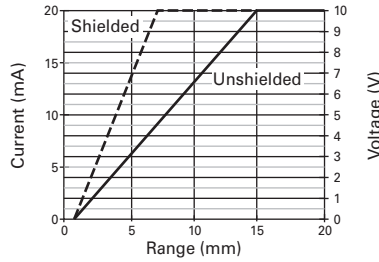
### AccuProx Analog Performance Graphs

#### Linear Output

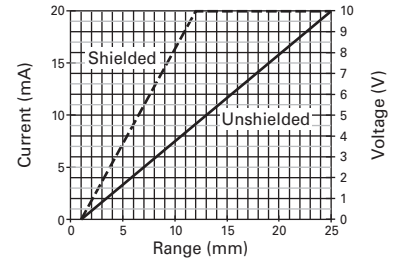
##### 12 mm



##### 18 mm

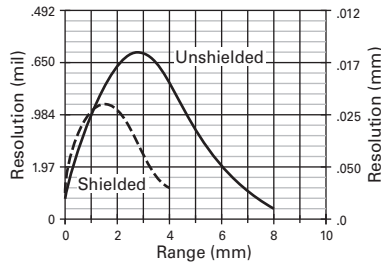


##### 30 mm

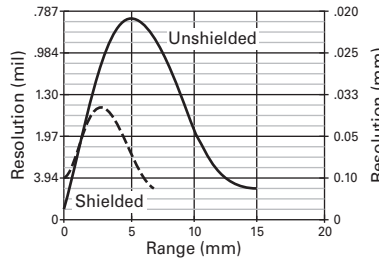


#### Measurement Resolution <sup>①</sup>

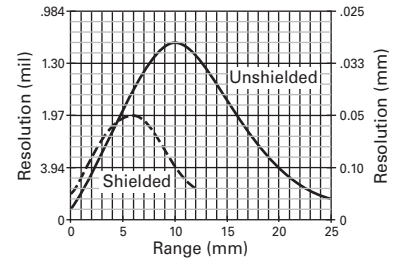
##### 12 mm



##### 18 mm

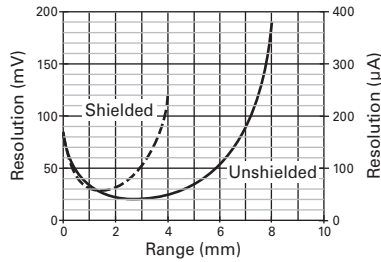


##### 30 mm

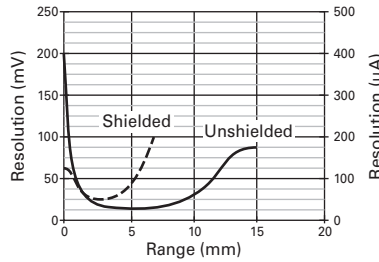


#### Output Resolution <sup>②</sup>

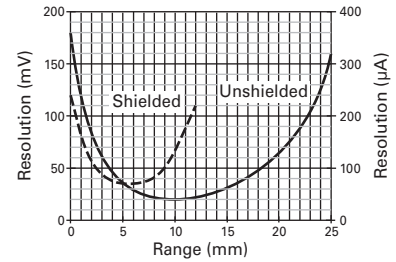
##### 12 mm



##### 18 mm



##### 30 mm



#### Notes

- ① Measurement resolution is the sensor's ability to detect a change in target position. The measurement resolution is the finest at the highest point in the curve.
- ② Output resolution is the change in output signal relative to target position. The minimum change in output resolution is defined by the lowest point in the curve.

## Wiring Diagrams

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

### AccuProx Analog Sensors

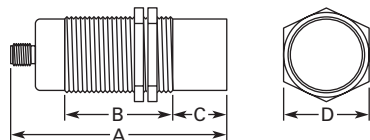
3

| Style                                                          | Output(s)                          | Micro-Connector Models | Cable and Pigtail Models |
|----------------------------------------------------------------|------------------------------------|------------------------|--------------------------|
| 12 mm diameter models ending in <b>-C1</b> <sup>①</sup>        | Current: 4–20 mA                   |                        |                          |
| 18 and 30 mm diameter models ending in <b>-C1</b> <sup>①</sup> |                                    |                        |                          |
| Models ending in <b>-CV</b>                                    | Current: 0–20 mA<br>Voltage: 0–10V |                        |                          |

## Dimensions

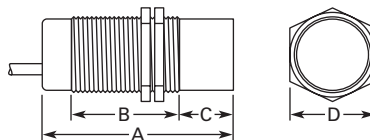
Approximate Dimensions in Inches (mm)

### Micro-Connector Models



| Size  | Shielding  | A           | B           | C           | D         |
|-------|------------|-------------|-------------|-------------|-----------|
| 12 mm | Shielded   | 3.05 (77.5) | 1.98 (50.3) | 0.02 (0.50) | 0.67 (17) |
|       | Unshielded | 3.05 (77.5) | 1.64 (41.6) | 0.36 (9)    | 0.67 (17) |
| 18 mm | Shielded   | 2.73 (69.3) | 2.00 (50.9) | 0.02 (0.50) | 0.94 (24) |
|       | Unshielded | 2.73 (69.3) | 1.47 (37.4) | 0.55 (14)   | 0.94 (24) |
| 30 mm | Shielded   | 2.92 (74.1) | 2.13 (54.1) | 0.03 (0.75) | 1.41 (36) |
|       | Unshielded | 2.92 (74.1) | 1.41 (35.8) | 0.75 (19)   | 1.41 (36) |

### Cable and Pigtail Models



| Size  | Shielding  | A           | B           | C           | D         |
|-------|------------|-------------|-------------|-------------|-----------|
| 12 mm | Shielded   | 2.46 (62.4) | 1.98 (50.3) | 0.02 (0.5)  | 0.67 (17) |
|       | Unshielded | 2.46 (62.4) | 1.64 (41.6) | 0.36 (9)    | 0.67 (17) |
| 18 mm | Shielded   | 2.54 (64.5) | 2.00 (50.9) | 0.02 (0.5)  | 0.94 (24) |
|       | Unshielded | 2.54 (64.5) | 1.47 (37.4) | 0.55 (14)   | 0.94 (24) |
| 30 mm | Shielded   | 2.74 (69.6) | 2.13 (54.1) | 0.03 (0.75) | 1.41 (36) |
|       | Unshielded | 2.74 (69.6) | 1.41 (35.8) | 0.75 (19)   | 1.41 (36) |

### Note

- <sup>①</sup> For models ending in **-C1** (current output only models), pins 2 and 4 are intentionally connected.  
Do not connect outputs of **-C1** models to separate loads—this sensor should only be connected to a single-output load.

## Ferrous Only Tubular Sensors



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## Description

## Page

## Ferrous Only Tubular Sensors

## Product Selection

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V8-T3-53

Dimensions . . . . .

V8-T3-53

## Ferrous Only Tubular Sensors

## Product Description

These unique Inductive Proximity Sensors have been specially made by Eaton's electrical sector to detect only a specific type of metal. Ferrous Only models will detect only ferrous metals such as steel, iron, nickel or cobalt.

A typical application for **Ferrous Only** sensors would be in workcell applications where cutting tools, tool pallets and fixtures must be detected for proper workpiece manipulation. The sensors detect ferrous objects while ignoring aluminum.

These sensors are available in a standard 18 mm diameter, and are epoxy filled for shock/vibration resistance and heat tolerance.

## Features

- Ferrous Only sensors detect ferrous metals, such as steel or iron, while ignoring non-ferrous metals
- Selection of two-wire and three-wire, AC/DC and DC-only sensor models
- Wide operating temperature range: -13° to 158°F (-25° to 70°C)

 **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](http://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.

# 3.6

## Inductive Proximity Sensors

### Ferrous Only Tubular Sensors

#### Product Selection

##### Ferrous Only Tubular Sensors

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#### Two-Wire Sensors

|                                                                                   | Operating Voltage         | Sensing Range (Sn) | Shielding | Connection Type          | NO Output Catalog Number |
|-----------------------------------------------------------------------------------|---------------------------|--------------------|-----------|--------------------------|--------------------------|
| <b>18 mm</b>                                                                      | <b>18 mm Diameter</b>     |                    |           |                          |                          |
|  | 20–250 Vac/dc<br>50/60 Hz | 5.0 mm             | Shielded  | 3-pin micro AC connector | <b>E57FAL18A2SA</b> Ⓡ    |
|                                                                                   |                           |                    |           | 3-pin mini-connector     | <b>E57FAL18A2B1</b> Ⓡ    |

#### Three-Wire Sensors

|                                                                                   | Operating Voltage     | Sensing Range (Sn) | Shielding      | Connection Type          | NO Output Catalog Number |
|-----------------------------------------------------------------------------------|-----------------------|--------------------|----------------|--------------------------|--------------------------|
| <b>18 mm</b>                                                                      | <b>18 mm Diameter</b> |                    |                |                          |                          |
|  | 10–30 Vdc             | 5.0 mm             | Shielded (PNP) | 4-pin micro DC connector | <b>E57FAL18T111SD</b> Ⓡ  |

#### Compatible Connector Cables

##### Standard Cables ①

|                                                                                                                           | Current Rating at 600V              | Voltage Style | Number of Pins | Gauge  | Length      | Pin Configuration/Wire Colors (Face View Female Shown)                                                                        | PVC Jacket Catalog Number | PUR Jacket Catalog Number |
|---------------------------------------------------------------------------------------------------------------------------|-------------------------------------|---------------|----------------|--------|-------------|-------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|
| <b>Micro-Style Straight Female</b><br> | <b>Micro-Style, Straight Female</b> |               |                |        |             |                                                                                                                               |                           |                           |
|                                                                                                                           | —                                   | AC            | 3-pin, 3-wire  | 22 AWG | 6.0 ft (2m) |  1-Green<br>2-Red/Black<br>3-Red/White     | <b>CSAS3F3CY2202</b>      | <b>CSAS3F3RY2202</b>      |
|                                                                                                                           | —                                   | DC            | 4-pin, 3-wire  | 22 AWG | 6.0 ft (2m) |  1-Brown<br>2-No Wire<br>3-Blue<br>4-Black | <b>CSDS4A3CY2202</b>      | <b>CSDS4A3RY2202</b>      |
| <b>Mini-Style Straight Female</b><br>  | <b>Mini-Style, Straight Female</b>  |               |                |        |             |                                                                                                                               |                           | <b>Catalog Number</b>     |
|                                                                                                                           | 13 A                                | —             | 3-pin          | 16 AWG | 6.0 ft (2m) |  1-Green<br>2-Black<br>3-White             | <b>CSMS3F3CY1602</b>      |                           |

#### Accessories

##### Ferrous Only Tubular Sensors

| Description                                     | Reference                       |
|-------------------------------------------------|---------------------------------|
| Mounting brackets                               | See <b>Tab 8, section 8.2</b>   |
| Replacement mounting nuts and other accessories | See <b>Tab 8, section 8.3</b>   |
| Connector cables                                | See <b>Tab 10, section 10.1</b> |

##### Notes

ⓇⓈ See listing of compatible connector cables above.

① For a full selection of connector cables, see **Tab 10, section 10.1**.

## Technical Data and Specifications

### Ferrous Only Tubular Sensors

| Description                    | Two-Wire AC/DC Sensors                          | Three-Wire DC Sensors                           |
|--------------------------------|-------------------------------------------------|-------------------------------------------------|
| Operating voltage              | 20–250 Vac/dc                                   | 10–30 Vdc                                       |
| Maximum load current           | 100 mA                                          | 100 mA                                          |
| Switching frequency            | 15 Hz                                           | 1000 Hz                                         |
| Leakage current                | 2.5 mA maximum                                  | <0.01 mA                                        |
| Voltage drop                   | 10V maximum                                     | 1.5V maximum                                    |
| Holding current                | 5 mA minimum                                    | —                                               |
| Burden current                 | —                                               | 17 mA                                           |
| Protection                     | Transient, power on false pulse suppression     | Short circuit protection                        |
| Switching hysteresis           | <15% rated sensing distance                     | <15% rated sensing distance                     |
| Repeat accuracy                | <1% sensing distance                            | <1% sensing distance                            |
| Time delay before availability | <10 ms                                          | <10 ms                                          |
| Output indicator LED           | Lights when output is ON                        | Lights when output is ON                        |
| Operating temperature          | –13° to 131°F (–25° to 55°C)                    | –13° to 131°F (–25° to 55°C)                    |
| Enclosure ratings              | NEMA 4, 4X, 6, 6P, 12 and 13 (IP67)             | NEMA 4, 4X, 6, 6P, 12 and 13 (IP67)             |
| Shock                          | 30g sine wave, 11 ms per IEC68-2-76             | 30g sine wave, 11 ms per IEC68-2-76             |
| Vibration                      | 10 to 55 Hz, 1 mm amplitude in all three planes | 10 to 55 Hz, 1 mm amplitude in all three planes |
| Housing material               | Stainless steel                                 | Stainless steel                                 |

## Wiring Diagrams

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

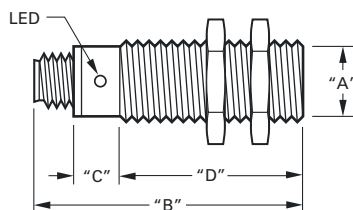
### Ferrous Only Tubular Sensors

| Operating Voltage         | Output      | Connector Models (Face View Male Shown) |      |
|---------------------------|-------------|-----------------------------------------|------|
|                           |             | Micro                                   | Mini |
| <b>Two-Wire Sensors</b>   |             |                                         |      |
| 20–250 Vac/dc<br>50/60 Hz | NO          |                                         |      |
| <b>Three-Wire Sensors</b> |             |                                         |      |
| 10–30 Vdc                 | NO<br>(PNP) | —                                       |      |

## Dimensions

Approximate Dimensions in Inches (mm)

### Ferrous Only Tubular Sensors



### Connector Models

| Catalog Number           | A       | B         | C         | D         |
|--------------------------|---------|-----------|-----------|-----------|
| <b>Two-Wire Models</b>   |         |           |           |           |
| E57FAL18A2SA             | M18 x 1 | 3.11 (79) | 1.38 (35) | 1.73 (44) |
| E57FAL18A2B1             | M18 x 1 | 3.90 (99) | 1.34 (34) | 2.56 (65) |
| <b>Three-Wire Models</b> |         |           |           |           |
| E57FAL18T111SD           | M18 x 1 | 3.11 (79) | 1.14 (29) | 1.97 (50) |

## Metal Face Sensors

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## Metal Face Sensors

## Product Description

Metal Face Inductive Proximity Sensors by Eaton's electrical sector incorporate tough stainless steel sensing faces in place of the plastic faces found in standard sensors. This provides a higher level of protection for more reliable operation and longer life in harsh environments.

The sensors stand up to abrasion and impact caused by flying metal chips, grit, and misaligned or vibrating targets. In addition, the stainless steel body resists corrosion and chemical attack.

Common sensor diameters, voltage styles and wiring connections make it easy to retrofit your existing, damaged sensors. Solve the problem of damaged sensors permanently with Eaton's Metal Face Sensors.

## Features

- Two-wire AC/DC models and three-wire DC models are compatible with your existing wiring
- Common 12 mm, 18 mm and 30 mm housing diameters allow easy changeout of existing damaged sensors
- The 20 mil stainless steel sensing face is thicker than competing units for a higher level of protection
- The stainless steel body is damage and corrosion resistant
- Wide operating temperature range: -13° to 158°F (-25° to 70°C)

## Contents

## Description

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| Accessories                       | V8-T3-56 |
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## 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](http://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

## Metal Face Sensors

## Two-Wire Sensors

|                                                                                   | Operating Voltage         | Sensing Range (Sn) | Shielding | Connection Type          | NO Output Catalog Number |
|-----------------------------------------------------------------------------------|---------------------------|--------------------|-----------|--------------------------|--------------------------|
| <b>12 mm</b>                                                                      | <b>12 mm Diameter</b>     |                    |           |                          |                          |
|  | 20–250 Vac/dc<br>50/60 Hz | 2 mm               | Shielded  | 3-pin micro AC connector | <b>E57FAL12A2SA-M</b> ⓘ  |
| <b>30 mm</b>                                                                      | <b>30 mm Diameter</b>     |                    |           |                          |                          |
|  | 20–250 Vac/dc<br>50/60 Hz | 10 mm              | Shielded  | 3-pin micro AC connector | <b>E57FAL30A2SA-M</b> ⓘ  |

## Three-Wire Sensors

|                                                                                    | Operating Voltage     | Sensing Range (Sn) | Shielding      | Connection Type          | NO Output Catalog Number  |
|------------------------------------------------------------------------------------|-----------------------|--------------------|----------------|--------------------------|---------------------------|
| <b>12 mm</b>                                                                       | <b>12 mm Diameter</b> |                    |                |                          |                           |
|   | 10–30 Vdc             | 2 mm               | Shielded (PNP) | 4-pin micro DC connector | <b>E57FAL12T111SD-M</b> ⓘ |
| <b>18 mm</b>                                                                       | <b>18 mm Diameter</b> |                    |                |                          |                           |
|  | 10–30 Vdc             | 5 mm               | Shielded (PNP) | 4-pin micro DC connector | <b>E57FAL18T111SD-M</b> ⓘ |

## Compatible Connector Cables

## Standard Cables ⓘ

|                                                                                                                           | Voltage Style                       | Number of Pins   | Gauge  | Length      | Pin Configuration/Wire Colors (Face View Female Shown)                                                                      | PVC Jacket Catalog Number | PUR Jacket Catalog Number |
|---------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------------|--------|-------------|-----------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|
| <b>Micro-Style Straight Female</b><br> | <b>Micro-Style, Straight Female</b> |                  |        |             |                                                                                                                             |                           |                           |
|                                                                                                                           | AC                                  | 3-pin,<br>3-wire | 22 AWG | 6.0 ft (2m) |  1-Green<br>2-Red/Black<br>3-Red/White   | <b>CSAS3F3CY2202</b>      | <b>CSAS3F3RY2202</b>      |
|                                                                                                                           | DC                                  | 4-pin,<br>4-wire | 22 AWG | 6.0 ft (2m) |  1-Brown<br>2-White<br>3-Blue<br>4-Black | <b>CSDS4A4CY2202</b>      | <b>CSDS4A4RY2202</b>      |

## Notes

ⓘ See listing of compatible connector cables above.

① For a full selection of connector cables, see **Tab 10, section 10.1**.

**Accessories****Metal Face Sensors**

3

| Description                                     | Reference                       |
|-------------------------------------------------|---------------------------------|
| Mounting brackets                               | See <b>Tab 8, section 8.2</b>   |
| Replacement mounting nuts and other accessories | See <b>Tab 8, section 8.3</b>   |
| Connector cables                                | See <b>Tab 10, section 10.1</b> |

**Technical Data and Specifications****Metal Face Sensors**

| Description                    | Two-Wire AC/DC Sensors                          | Three-Wire DC Only Sensors                      |
|--------------------------------|-------------------------------------------------|-------------------------------------------------|
| Operating voltage              | 20–250 Vac/dc                                   | 10–30 Vdc                                       |
| Maximum load current           | 100 mA                                          | 100 mA                                          |
| Switching frequency            |                                                 |                                                 |
| 12 mm                          | 15 Hz                                           | 2000 Hz                                         |
| 18 mm                          | —                                               | 1000 Hz                                         |
| 30 mm                          | —                                               | 300 Hz                                          |
| Leakage current                | 2.5 mA maximum                                  | 600 µA maximum                                  |
| Voltage drop                   | 10V maximum                                     | 1.5V maximum                                    |
| Holding current                | 5 mA minimum                                    | —                                               |
| Burden current                 | —                                               | 17 mA                                           |
| Protection                     | Transient, power on false pulse suppression     | Short circuit protection                        |
| Switching hysteresis           | <15% rated sensing distance                     | <15% rated sensing distance                     |
| Repeat accuracy                | <1% sensing distance                            | <1% sensing distance                            |
| Time delay before availability | <200 ms                                         | <200 ms                                         |
| Output indicator LED           | Lights when output is ON                        | Lights when output is ON                        |
| Operating temperature          | –13° to 131°F (–25° to 55°C)                    | –13° to 131°F (–25° to 55°C)                    |
| Enclosure ratings              | NEMA 4, 4X, 6, 6P, 12 and 13 (IP67)             | NEMA 4, 4X, 6, 6P, 12 and 13 (IP67)             |
| Shock                          | 30g sine wave, 11 ms per IEC68-2-76             | 30g sine wave, 11 ms per IEC68-2-76             |
| Vibration                      | 10 to 55 Hz, 1 mm amplitude in all three planes | 10 to 55 Hz, 1 mm amplitude in all three planes |
| Housing material               | 303 stainless steel                             | 303 stainless steel                             |
| Face thickness                 | 20 mils                                         | 20 mils                                         |

## Wiring Diagrams

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

### Metal Face Sensors

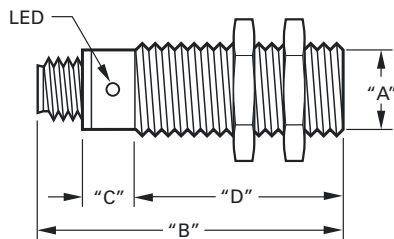
| Operating Voltage         | Output   | Micro-Connector Models<br>(Face View Male Shown) |
|---------------------------|----------|--------------------------------------------------|
| <b>Two-Wire Sensors</b>   |          |                                                  |
| 20–250 Vac/dc<br>50/60 Hz | NO       |                                                  |
| <b>Three-Wire Sensors</b> |          |                                                  |
| 10–30 Vdc                 | NO (NPN) |                                                  |
|                           | NO (PNP) |                                                  |

## Dimensions

Approximate Dimensions in Inches (mm)

### Metal Face Sensors

#### Connector Models



| Catalog Number           | A      | B         | C         | D         |
|--------------------------|--------|-----------|-----------|-----------|
| <b>Two-Wire Models</b>   |        |           |           |           |
| <b>E57FAL12A2SA-M</b>    | M x 12 | 2.67 (68) | 1.10 (28) | 1.58 (40) |
| <b>E57FAL30A2SA-M</b>    | M x 30 | 3.70 (94) | 1.34 (34) | 2.36 (60) |
| <b>Three-Wire Models</b> |        |           |           |           |
| <b>E57FAL12T111SD-M</b>  | M x 12 | 2.67 (68) | 1.02 (26) | 1.65 (42) |
| <b>E57FAL18T110SD-M</b>  | M x 18 | 3.11 (79) | 1.14 (29) | 1.97 (50) |
| <b>E57FAL18T111SD-M</b>  | M x 18 | 3.11 (79) | 1.14 (29) | 1.97 (50) |

## High Current Output Sensors

3



## High Current Output Sensors

## Product Description

Now there is an alternative to limit switches for position sensing on industrial vehicles. High Current Output Sensors feature a continuous output current rating from 2 to 8A. These sensors from Eaton's electrical sector are ideally suited to handle high current loads found on such industrial vehicles as aerial lift trucks, fork lifts, refuse trucks, cement mixers, dump trucks, hook and ladder trucks, front end loaders, farm equipment and hundreds of other vehicles that are constantly subjected to mechanical (shock, vibration, collisions) and environmental (dirt, grease, ice, rain) abuse that create havoc with mechanical devices.

## Features

- Solid-state output can handle up to 8A continuous
- Ideal for vehicle use to replace mechanical limit switches, typically required to handle high currents
- Wide voltage and temperature range covers most vehicle power supplies and operating environments
- Normally Open and Normally Closed isolated outputs
- SJO cable is available in custom lengths
- Dual colored 360° LED indicating light, green as power ON and red as output

## Contents

## Description

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| High Current Output Sensors             |                 |
| Product Selection .....                 | <b>V8-T3-59</b> |
| Accessories .....                       | <b>V8-T3-59</b> |
| Technical Data and Specifications ..... | <b>V8-T3-60</b> |
| Wiring Diagrams .....                   | <b>V8-T3-60</b> |
| Dimensions .....                        | <b>V8-T3-60</b> |

**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](http://www.eaton.com)

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in Canada call 1-800-268-3578.  
For Application Assistance in the U.S. and Canada  
call 1-800-426-9184.

## Product Selection

## High Current Output Sensors

30 mm



## Four-Wire Sensors

| Operating Voltage | Sensing Range | Shielding | Output Type     | Output Rating |               | Connection Type ① | Catalog Number |
|-------------------|---------------|-----------|-----------------|---------------|---------------|-------------------|----------------|
|                   |               |           |                 | Continuous    | <100 ms Pulse |                   |                |
| 30 mm Diameter    |               |           |                 |               |               |                   |                |
| 10–55 Vdc         | 10 mm         | Shielded  | NO and NC (PNP) | 3.5A          | 20A           | 2-meter cable     | E57-30JS10-H   |

30 mm

Six-Wire Sensors <sup>②</sup>

| Operating Voltage | Sensing Range | Shielding | Output Type                          | Output Rating |               | Connection Type ① | Catalog Number |
|-------------------|---------------|-----------|--------------------------------------|---------------|---------------|-------------------|----------------|
|                   |               |           |                                      | Continuous    | <100 ms Pulse |                   |                |
| 30 mm Diameter    |               |           |                                      |               |               |                   |                |
| 10–30 Vdc         | 10 mm         | Shielded  | NO and NO, or NC and NC (NPN or PNP) | 8A            | 50A           | 2-meter cable     | E57-30HS10-K   |

## Accessories

## High Current Output Sensors

| Description                                     | Reference                     |
|-------------------------------------------------|-------------------------------|
| Mounting brackets                               | See <b>Tab 8, section 8.2</b> |
| Replacement mounting nuts and other accessories | See <b>Tab 8, section 8.3</b> |

## Notes

- <sup>①</sup> For additional cable length other than 2-meter, add desired length in meters to listed catalog number.  
Example: For an E57-30JS10-H with a 5-meter cable, order E57-30JS10-H5.
- <sup>②</sup> 50 Amp surge, 12 Amp at 50% duty cycle and 8 Amp continuous.

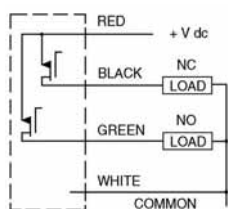
## Technical Data and Specifications

## High Current Output Sensors

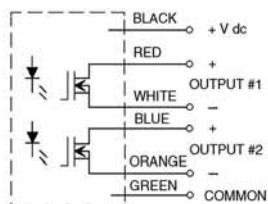
| Description                    | Four-Wire Sensors                           | Six-Wire Sensors                            |
|--------------------------------|---------------------------------------------|---------------------------------------------|
| Operating voltage              | 10 to 55 Vdc                                | 10 to 30 Vdc                                |
| Switching rate                 | 250 Hz                                      | 100 Hz                                      |
| Off-state current              | 100 A $\mu$ maximum                         | 100 A $\mu$ maximum                         |
| Voltage drop                   | 1.2V                                        | 2.0V                                        |
| Burden current                 | 10 mA at 55 volts                           | 30 mA at 30 volts                           |
| Time delay before availability | <100 ms                                     | <100 ms                                     |
| Output indicator LED           | 360° visibility                             | 360° visibility                             |
| Output type                    | Solid-state                                 | Solid-state, isolated                       |
| Protection                     | Transient and power on false pulse          | Transient and power on false pulse          |
| Enclosure ratings              | NEMA 4, 4X, 6, 6P, 12 and 13 (IEC IP67)     | NEMA 4, 4X, 6, 6P, 12 and 13 (IEC IP67)     |
| Ambient temperature range      | –40° to 158°F (–40° to 70°C)                | –40° to 158°F (–40° to 70°C)                |
| Barrel material                | 303 stainless steel                         | 303 stainless steel                         |
| Cable                          | 2m standard SJO water resistive (18 AWG)    | 2m standard SJO water resistive (18 AWG)    |
| Shock                          | 30g sine wave, 11 ms                        | 30g sine wave, 11 ms                        |
| Vibration                      | 10 to 55 Hz, 2 mm amplitude in all 3 planes | 10 to 55 Hz, 2 mm amplitude in all 3 planes |

## Wiring Diagrams

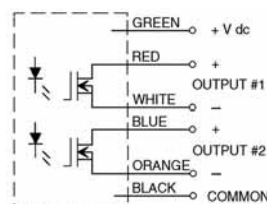
## Four-Wire—PNP



## Six-Wire—NO/NO Output Configuration



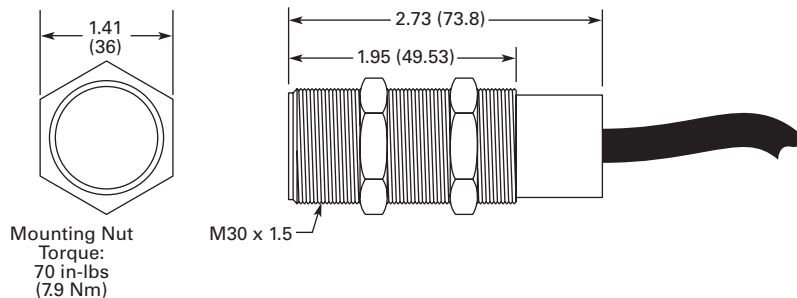
## Six-Wire—NC/NC Output Configuration



## Dimensions

Approximate Dimensions in Inches (mm)

## High Current Output Sensors



## Miniature Short Body Sensors



## Miniature Short Body Sensors

## Product Description

These unique Inductive Proximity Sensors by Eaton's electrical sector are designed to be used in extremely small spaces. A wide variety of models are available with housing diameters from 8 mm all the way down to 4 mm, allowing you to choose the one that best fits your application. The sensors are three-wire devices that operate from 10 to 30 Vdc. Both shielded and unshielded versions are available.

## Application Description

## Typical Applications

- Automation equipment
- Robotics
- Machine tool
- Counting
- Sorting

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## Miniature Short Body Sensors

## Product Selection

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Compatible Connector Cables ..... **V8-T3-63**

Accessories ..... **V8-T3-52**

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Wiring Diagrams ..... **V8-T3-64**

Dimensions ..... **V8-T3-65**

3

## Features

- Small 4, 5, 6.5 and 8 mm diameters for use in applications with limited space for mounting sensors
- Stainless steel housings
- All models include an LED indicator to show output status
- Short circuit and reverse polarity protection
- Rated NEMA 4, 4X, 6, 6P, 12 and 13 (IP67) for high resistance to environmental factors

## Standards and Certifications

- CE



**! 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.**

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For Application Assistance in the U.S. and Canada call 1-800-426-9184.

## Product Selection

## Miniature Short Body Sensors

3

## Three-Wire Sensors

|                                                                                     | Operating Voltage | Sensing Range (Sn) | Shielding                         | Connection Type          | NO Output Catalog Number | NC Output Catalog Number |
|-------------------------------------------------------------------------------------|-------------------|--------------------|-----------------------------------|--------------------------|--------------------------|--------------------------|
|    | 10–30 Vdc         | 0.8 mm             | <b>4 mm Diameter (Unthreaded)</b> |                          |                          |                          |
|                                                                                     |                   |                    | Shielded (NPN)                    | 2-meter cable            | <b>E57EAL4T110SP</b>     | —                        |
|                                                                                     |                   |                    |                                   | 3-pin nano-connector     | <b>E57EAL4T110SN</b> ☹   | —                        |
|                                                                                     |                   |                    | Shielded (PNP)                    | 2-meter cable            | <b>E57EAL4T111SP</b>     | —                        |
|                                                                                     |                   |                    |                                   | 3-pin nano-connector     | <b>E57EAL4T111SN</b> ☹   | —                        |
|                                                                                     |                   |                    | <b>5 mm Diameter</b>              |                          |                          |                          |
|    | 10–30 Vdc         | 0.8 mm             | Shielded (NPN)                    | 2-meter cable            | <b>E57EAL5T110SP</b>     | —                        |
|                                                                                     |                   |                    |                                   | 3-pin nano-connector     | <b>E57EAL5T110SN</b> ☹   | —                        |
|                                                                                     |                   |                    | Shielded (PNP)                    | 2-meter cable            | <b>E57EAL5T111SP</b>     | —                        |
|                                                                                     |                   |                    |                                   | 3-pin nano-connector     | <b>E57EAL5T111SN</b> ☹   | —                        |
|    | 10–30 Vdc         | 1 mm               | Shielded (NPN)                    | 2-meter cable            | <b>E57EAL6T110SP</b>     | —                        |
|                                                                                     |                   |                    |                                   | 3-pin nano-connector     | <b>E57EAL6T110SN</b> ☹   | —                        |
|                                                                                     |                   |                    |                                   | 4-pin micro DC connector | <b>E57EAL6T110SD</b> ☹☹  | —                        |
|                                                                                     |                   |                    | Shielded (PNP)                    | 2-meter cable            | <b>E57EAL6T111SP</b>     | —                        |
|                                                                                     |                   |                    |                                   | 3-pin nano-connector     | <b>E57EAL6T111SN</b> ☹   | —                        |
|                                                                                     |                   |                    |                                   | 4-pin micro DC connector | <b>E57EAL6T111SD</b> ☹☹  | —                        |
|                                                                                     |                   | 2 mm               | Unshielded (NPN)                  | 2-meter cable            | <b>E57EAL6T110EP</b>     | —                        |
|                                                                                     |                   |                    |                                   | 3-pin nano-connector     | <b>E57EAL6T110EN</b> ☹   | —                        |
|                                                                                     |                   |                    |                                   | 2-meter cable            | <b>E57EAL6T111EP</b>     | —                        |
|                                                                                     |                   |                    | Unshielded (PNP)                  | 3-pin nano-connector     | <b>E57EAL6T111EN</b> ☹   | —                        |
|                                                                                     |                   |                    |                                   | 2-meter cable            | <b>E57EAL6T111EP</b>     | —                        |
|                                                                                     |                   |                    |                                   | 3-pin nano-connector     | <b>E57EAL6T111EN</b> ☹   | —                        |
|  | 10–30 Vdc         | 1 mm               | Shielded (NPN)                    | 2-meter cable            | <b>E57EAL8T110SP</b>     | <b>E57EBL8T110SP</b>     |
|                                                                                     |                   |                    |                                   | 3-pin nano-connector     | <b>E57EAL8T110SN</b> ☹   | <b>E57EBL8T110SN</b> ☹   |
|                                                                                     |                   |                    |                                   | 4-pin micro DC connector | <b>E57EAL8T110SD</b> ☹☹  | <b>E57EBL8T110SD</b> ☹☹  |
|                                                                                     |                   |                    | Shielded (PNP)                    | 2-meter cable            | <b>E57EAL8T111SP</b>     | <b>E57EBL8T111SP</b>     |
|                                                                                     |                   |                    |                                   | 3-pin nano-connector     | <b>E57EAL8T111SN</b> ☹   | <b>E57EBL8T111SN</b> ☹   |
|                                                                                     |                   |                    |                                   | 4-pin micro DC connector | <b>E57EAL8T111SD</b> ☹☹  | <b>E57EBL8T111SD</b> ☹☹  |
|                                                                                     |                   | 2 mm               | Unshielded (NPN)                  | 2-meter cable            | <b>E57EAL8T110EP</b>     | <b>E57EBL8T110EP</b>     |
|                                                                                     |                   |                    |                                   | 3-pin nano-connector     | <b>E57EAL8T110EN</b> ☹   | <b>E57EBL8T110EN</b> ☹   |
|                                                                                     |                   |                    |                                   | 4-pin micro DC connector | <b>E57EAL8T110ED</b> ☹☹  | <b>E57EBL8T110ED</b> ☹☹  |
|                                                                                     |                   |                    | Unshielded (PNP)                  | 2-meter cable            | <b>E57EAL8T111EP</b>     | <b>E57EBL8T111EP</b>     |
|                                                                                     |                   |                    |                                   | 3-pin nano-connector     | <b>E57EAL8T111EN</b> ☹   | <b>E57EBL8T111EN</b> ☹   |
|                                                                                     |                   |                    |                                   | 4-pin micro DC connector | <b>E57EAL8T111ED</b> ☹☹  | <b>E57EBL8T111ED</b> ☹☹  |

## Note

☹☹ See listing of compatible connector cables on **Page V8-T3-63**.

**Compatible Connector Cables****Standard Cables<sup>①</sup>**

|                                                                                                                         | Voltage Style                       | Number of Pins | Gauge  | Length      | Pin Configuration/Wire Colors (Face View Female Shown)                                                                      | PVC Jacket Catalog Number | PUR Jacket Catalog Number |
|-------------------------------------------------------------------------------------------------------------------------|-------------------------------------|----------------|--------|-------------|-----------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|
| <b>Micro-Style Straight Female</b><br> | <b>Micro-Style, Straight Female</b> |                |        |             |                                                                                                                             |                           |                           |
|                                                                                                                         | DC                                  | 4-pin, 3-wire  | 22 AWG | 6.0 ft (2m) |  1-Brown<br>2-No Wire<br>3-Blue<br>4-Black | CSDS4A3CY2202             | CSDS4A3RY2202             |
| <b>Nano-Style Straight Female</b><br>  | <b>Nano-Style, Straight Female</b>  |                |        |             |                                                                                                                             |                           |                           |
|                                                                                                                         | —                                   | 3-pin          | 24 AWG | 6.0 ft (2m) |  1-Brown<br>3-Blue<br>4-Black              | CSNS3A3CY2402             | CSNS3A3RY2402             |

**Accessories****Miniature Short Body Sensors**

| Description                                     | Reference                       |
|-------------------------------------------------|---------------------------------|
| Mounting brackets                               | See <b>Tab 8, section 8.2</b>   |
| Replacement mounting nuts and other accessories | See <b>Tab 8, section 8.3</b>   |
| Connector cables                                | See <b>Tab 10, section 10.1</b> |

**Note**

<sup>①</sup> For a full selection of connector cables, see **Tab 10, section 10.1**.

## Technical Data and Specifications

### Miniature Short Body Sensors

| Description                    | Three-Wire DC Only Sensors                                            |
|--------------------------------|-----------------------------------------------------------------------|
| Operating voltage              | 10–30 Vdc                                                             |
| Maximum load current           | 200 mA                                                                |
| Switching frequency            | 2 kHz                                                                 |
| Leakage current                | 0.01 mA maximum                                                       |
| Voltage drop                   | 1.5V maximum                                                          |
| Burden current                 | 10 mA maximum                                                         |
| Protection                     | Transient, power on false pulse suppression, auto-reset short circuit |
| Switching hysteresis           | <15% rated sensing distance                                           |
| Repeat accuracy                | <1% sensing distance                                                  |
| Time delay before availability | <50 ms                                                                |
| Output indicator LED           | Lights when output is ON                                              |
| Operating temperature          | –13° to 158°F (–25° to 70°C)                                          |
| Enclosure ratings              | NEMA 4, 4X, 6, 6P, 12 and 13 (IP67)                                   |
| Housing material               | Stainless steel                                                       |
| Cable                          | PVC high flex, oil/water resistant, 22 AWG                            |

## Wiring Diagrams

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

### Miniature Short Body Sensors

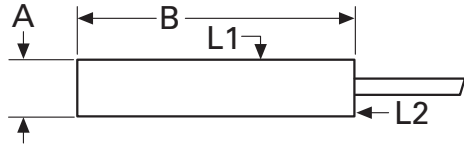
| Operating Voltage         | Output   | Cable Models | Connector Models (Face View Male Shown) |      |
|---------------------------|----------|--------------|-----------------------------------------|------|
|                           |          |              | Micro                                   | Nano |
| <b>Three-Wire Sensors</b> |          |              |                                         |      |
| 10–30 Vdc                 | NO (NPN) |              |                                         |      |
|                           | NO (PNP) |              |                                         |      |
|                           | NC (NPN) |              |                                         |      |
|                           | NC (PNP) |              |                                         |      |

### Dimensions

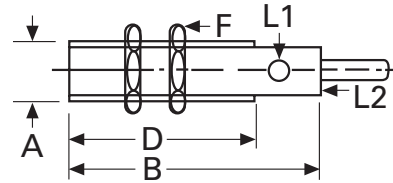
Approximate Dimensions in Inches (mm)

#### Cable Models

##### Unthreaded Barrel



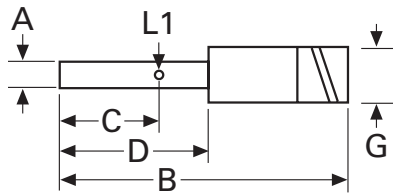
##### Threaded Barrel



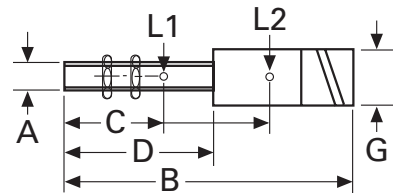
| Size A              | Barrel Type | Length B | D        | Thread Size | Nut Width F | Connector Diameter G | LED Location |
|---------------------|-------------|----------|----------|-------------|-------------|----------------------|--------------|
| <b>Cable Models</b> |             |          |          |             |             |                      |              |
| 4 mm                | Unthreaded  | 1.0 (25) | —        | —           | —           | —                    | L1           |
| 5 mm                | Threaded    | 1.0 (25) | 0.8 (21) | M5 x 0.5    | SW8         | —                    | L1           |
| 6.5 mm              | Unthreaded  | 1.8 (45) | —        | —           | —           | —                    | L2           |
| 8 mm                | Threaded    | 1.2 (30) | 1.2 (30) | M8 x 1      | SW13        | —                    | L2           |

#### Connector Models

##### Unthreaded Barrel



##### Threaded Barrel



| Size A                        | Barrel Type | Length B | C        | D        | Thread Size | Nut Width F | Connector Diameter G | LED Location |
|-------------------------------|-------------|----------|----------|----------|-------------|-------------|----------------------|--------------|
| <b>Nano-Connector Models</b>  |             |          |          |          |             |             |                      |              |
| 4 mm                          | Unthreaded  | 1.6 (40) | 0.7 (18) | 0.8 (21) | —           | —           | 0.31 (8)             | L1           |
| 5 mm                          | Threaded    | 1.6 (40) | 0.7 (18) | 0.8 (21) | M5 x 0.5    | SW8         | 0.31 (8)             | L1           |
| 6.5 mm                        | Unthreaded  | 2.4 (60) | 1.5 (39) | 2.0 (50) | —           | —           | 0.31 (8)             | L1           |
| 8 mm                          | Threaded    | 1.8 (45) | 1.0 (25) | 1.4 (36) | M8 x 1      | SW13        | 0.31 (8)             | L1           |
| <b>Micro-Connector Models</b> |             |          |          |          |             |             |                      |              |
| 6.5 mm                        | Unthreaded  | 2.9 (70) | 1.4 (36) | 1.5 (39) | —           | —           | 0.47 (12)            | L1           |
| 8 mm                          | Threaded    | 2.0 (50) | 1.6 (40) | 1.0 (25) | M8 x 1      | SW13        | 0.47 (12)            | L2           |

## E56 Pancake Sensors



## E56 Pancake Sensors

## Product Description

The E56 Pancake Sensor from Eaton's electrical sector is a high performance inductive proximity sensor. The E56 Pancake provides greater sensing ranges than other inductive sensor package types.

The E56 Pancake family provides convenience and ease of wiring with auto-configurable, complementary outputs. (Auto-configurable outputs automatically detect an NPN or PNP output configuration and switch the sensor accordingly, without user intervention.) Power and output LEDs make troubleshooting much easier than conventional proximity sensors, which usually only feature output LEDs. These convenience features, combined with the performance of the E56 Pancake, make it an excellent inductive sensing solution for applications requiring an extremely rugged, long-range sensing solution.

## Application Description

## Typical Applications

- Heavy-duty trucks, cranes and machinery
- Steel mills
- Pipe and rod manufacturing
- Automotive manufacturing
- Amusement parks

## Contents

## Description

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| E56 Pancake Sensors               |          |
| Product Selection                 |          |
| E56 Pancake Sensors               | V8-T3-67 |
| Compatible Connector Cables       | V8-T3-68 |
| Technical Data and Specifications | V8-T3-69 |
| Wiring Diagrams                   | V8-T3-70 |
| Dimensions                        | V8-T3-70 |

## Features

- Longest inductive sensing ranges available (up to 100 mm)
- Three sizes to meet your application needs, with maximum ranges of 50, 70 or 100 mm
- Complementary outputs (1NO/1NC) on four-wire DC models
- Auto-configure output technology on four-wire DC models, which automatically detect how the sensor has been wired (NPN or PNP) and switch the sensor without user intervention
- Small diameter, two-wire AC models feature a selector switch inside the housing, enabling output contacts to be used as either NO or NC
- Robust design featuring vibration and impact-absorbing potting compound
- Ideal for extreme temperatures or high pressure washdown environments

## Standards and Certifications

- CE


**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](http://www.eaton.com)

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For Application Assistance in the U.S. and Canada call 1-800-426-9184.

## Product Selection

## E56 Pancake Sensors

## Pancake Style



## Two-Wire Sensors

| Voltage Type           | Output Configuration | Output Contacts | Shielding  | Sensing Range      | Connector Style      | Catalog Number         |
|------------------------|----------------------|-----------------|------------|--------------------|----------------------|------------------------|
| <b>Pancake Style</b>   |                      |                 |            |                    |                      |                        |
| 20–250 Vac<br>45/65 Hz | —                    | NO or NC        | Unshielded | 1.57 in (40 mm)    | Screw terminals      | <b>E56CDL40A2</b>      |
|                        |                      |                 |            |                    | 3-pin mini-connector | <b>E56CDL40A2B1</b> Ⓢ  |
|                        |                      | NO or NC        | Unshielded | 2 in (50 mm)       | Screw terminals      | <b>E56CDL50A2E</b>     |
|                        |                      |                 |            |                    | 3-pin mini-connector | <b>E56CDL50A2EB1</b> Ⓢ |
| 90–260 Vac<br>45/65 Hz | —                    | NO              | Unshielded | 2.75 in (70 mm) ①  | 3-pin mini-connector | <b>E56CAL70B1S1</b> Ⓢ  |
|                        |                      | NO              | Unshielded | 3.94 in (100 mm) ① | 3-pin mini-connector | <b>E56CAL100B1S1</b> Ⓢ |

## DC Four-Wire Sensors

## Small Diameter



| Voltage Type                            | Output Configuration       | Output Contacts | Shielding  | Sensing Range   | Connector Style | Catalog Number         |
|-----------------------------------------|----------------------------|-----------------|------------|-----------------|-----------------|------------------------|
| <b>Small Diameter (79 x 79 x 39 mm)</b> |                            |                 |            |                 |                 |                        |
| 10–42 Vdc                               | NPN/PNP<br>autoconfigure ② | 1 NO and 1 NC   | Shielded   | 1.57 in (40 mm) | DC screw        | <b>E56ADL40SA</b>      |
|                                         |                            |                 |            |                 | DC 4-pin mini   | <b>E56ADL40SAE01</b> Ⓢ |
|                                         |                            |                 |            |                 | DC 4-pin micro  | <b>E56ADL40SAD01</b> Ⓢ |
|                                         |                            |                 | Unshielded | 1.57 in (40 mm) | DC screw        | <b>E56ADL40UA</b>      |
|                                         |                            |                 |            |                 | DC 4-pin mini   | <b>E56ADL40UAE01</b> Ⓢ |
|                                         |                            |                 |            |                 | DC 4-pin micro  | <b>E56ADL40UAD01</b> Ⓢ |
|                                         |                            |                 | Unshielded | 2 in (50 mm)    | DC screw        | <b>E56ADL50UA</b>      |
|                                         |                            |                 |            |                 | DC 4-pin mini   | <b>E56ADL50UAE01</b> Ⓢ |
|                                         |                            |                 |            |                 | DC 4-pin micro  | <b>E56ADL50UAD01</b> Ⓢ |

## Medium Diameter



| Voltage Type                               | Output Configuration       | Output Contacts | Shielding  | Sensing Range   | Connector Style | Catalog Number         |
|--------------------------------------------|----------------------------|-----------------|------------|-----------------|-----------------|------------------------|
| <b>Medium Diameter (110 x 110 x 41 mm)</b> |                            |                 |            |                 |                 |                        |
| 10–42 Vdc                                  | NPN/PNP<br>autoconfigure ② | 1 NO and 1 NC   | Unshielded | 2.75 in (70 mm) | DC 4-pin mini   | <b>E56BDL70UAE01</b> Ⓢ |
|                                            |                            |                 |            |                 | DC 4-pin micro  | <b>E56BDL70UAD01</b> Ⓢ |

## Large Diameter



| Voltage Type                              | Output Configuration       | Output Contacts | Shielding  | Sensing Range    | Connector Style | Catalog Number          |
|-------------------------------------------|----------------------------|-----------------|------------|------------------|-----------------|-------------------------|
| <b>Large Diameter (172 x 172 x 68 mm)</b> |                            |                 |            |                  |                 |                         |
| 10–42 Vdc                                 | NPN/PNP<br>autoconfigure ② | 1 NO and 1 NC   | Unshielded | 3.94 in (100 mm) | DC 4-pin mini   | <b>E56CDL100UAE01</b> Ⓢ |
|                                           |                            |                 |            |                  | DC 4-pin micro  | <b>E56CDL100UAD01</b> Ⓢ |

## Notes

Ⓢ Ⓢ See listing of compatible connector cables on **Page V8-T3-68**.

① Includes potentiometer for adjustment of sensing range.

② Autoconfigure technology allows the sensor to automatically adapt to NPN or PNP without user intervention.

# 3.10

## Inductive Proximity Sensors

### E56 Pancake Sensors

#### Compatible Connector Cables

##### Standard Cables <sup>①</sup>

|                                                                                   | Current Rating at 600V       | Voltage Style | Number of Pins | Gauge  | Length        | Pin Configuration/Wire Colors (Face View Female Shown)                                                                                                                            | PVC Jacket Catalog Number | PUR Jacket Catalog Number |
|-----------------------------------------------------------------------------------|------------------------------|---------------|----------------|--------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|
|  | Micro-Style, Straight Female |               |                |        |               |                                                                                                                                                                                   |                           |                           |
|                                                                                   | —                            | AC            | 3-pin, 3-wire  | 22 AWG | 6.0 ft (2m)   |  1- <span>Green</span><br>2- <span>Red/Black</span><br>3- <span>Red/White</span>                 | <b>CSAS3F3CY2202</b>      | <b>CSAS3F3RY2202</b>      |
|                                                                                   |                              |               |                |        | 16.4 ft (5m)  |                                                                                                                                                                                   | <b>CSAS3F3CY2205</b>      | <b>CSAS3F3RY2205</b>      |
|                                                                                   |                              |               |                |        | 32.8 ft (10m) |                                                                                                                                                                                   | <b>CSAS3F3CY2210</b>      | <b>CSAS3F3RY2210</b>      |
|                                                                                   | —                            | DC            | 4-pin, 4-wire  | 22 AWG | 6.0 ft (2m)   |  1- <span>Brown</span><br>2- <span>White</span><br>3- <span>Blue</span><br>4- <span>Black</span> | <b>CSDS4A4CY2202</b>      | <b>CSDS4A4RY2202</b>      |
|                                                                                   |                              |               |                |        | 16.4 ft (5m)  |                                                                                                                                                                                   | <b>CSDS4A4CY2205</b>      | <b>CSDS4A4RY2205</b>      |
|                                                                                   |                              |               |                |        | 32.8 ft (10m) |                                                                                                                                                                                   | <b>CSDS4A4CY2210</b>      | <b>CSDS4A4RY2210</b>      |
|  | Mini-Style, Straight Female  |               |                |        |               |                                                                                                                                                                                   |                           |                           |
|                                                                                   | 13A                          | —             | 3-pin, 3-wire  | 16 AWG | 6.0 ft (2m)   |  1- <span>Green</span><br>2- <span>Black</span><br>3- <span>White</span>                         | <b>CSMS3F3CY1602</b>      | —                         |
|                                                                                   |                              |               |                |        | 13.1 ft (4m)  |                                                                                                                                                                                   | <b>CSMS3F3CY1604</b>      | —                         |
|                                                                                   | 10A                          | AC/DC         | 4-pin, 4-wire  | 16 AWG | 6.0 ft (2m)   |  1- <span>Black</span><br>2- <span>Blue</span><br>3- <span>Brown</span><br>4- <span>White</span> | <b>CSMS4A4CY1602</b>      | —                         |
|                                                                                   |                              |               |                |        | 13.1 ft (4m)  |                                                                                                                                                                                   | <b>CSMS4A4CY1604</b>      | —                         |
|                                                                                   |                              |               |                |        | 19.7 ft (6m)  |                                                                                                                                                                                   | <b>CSMS4A4CY1606</b>      | —                         |

#### Note

<sup>①</sup> For a full selection of connector cables, see **Tab 10, section 10.1**.

## Technical Data and Specifications

### Two-Wire

| Description                       | AC Two-Wire                                                  |                                                              |                                                              |
|-----------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------|
|                                   | Small Diameter                                               | Medium Diameter                                              | Large Diameter                                               |
| Operating voltage                 | 20–250 Vac                                                   | 20–250 Vac                                                   | 20–250 Vac                                                   |
| Load current (maximum)            | 400 mA                                                       | 400 mA                                                       | 400 mA                                                       |
| Off-state leakage                 | At or above 32°F (0°C): <1.7 mA;<br>below 32°F (0°C): 2.0 mA | At or above 32°F (0°C): <1.7 mA;<br>below 32°F (0°C): 2.0 mA | At or above 32°F (0°C): <1.7 mA;<br>below 32°F (0°C): 2.0 mA |
| Voltage drop                      | <10V (5V nominal)                                            | <10V (5V nominal)                                            | <10V (5V nominal)                                            |
| Outputs                           | NO or NC (switch selectable)                                 | NO or NC by model                                            | NO or NC by model                                            |
| Sensing range (maximum)           | 50 mm                                                        | 70 mm                                                        | 100 mm                                                       |
| Range adjustment                  | Not adjustable                                               | Potentiometer adjustable down to 50% of rated maximum range  | Potentiometer adjustable down to 50% of rated maximum range  |
| Standard target size (mild steel) | 150 mm                                                       | 210 mm                                                       | 300 mm                                                       |
| Frequency of operation            | 30 Hz                                                        | 10 Hz                                                        | 10 Hz                                                        |
| Repeatability                     | <3%                                                          | <3%                                                          | <3%                                                          |
| Hysteresis (maximum)              | 10–15%                                                       | 10–15%                                                       | 10–15%                                                       |
| Time delay before availability    | 300 ms                                                       | 300 ms                                                       | 300 ms                                                       |
| Circuit protection                | Short circuit protection with auto-reset                     | Short circuit protection with auto-reset                     | Short circuit protection with auto-reset                     |
| Operating temperature             | –13° to 158°F (–25° to 70°C) ①                               | –13° to 158°F (–25° to 70°C) ①                               | –13° to 158°F (–25° to 70°C) ①                               |
| Temperature drift                 | ±10%                                                         | ±10%                                                         | ±10%                                                         |
| Enclosure rating                  | NEMA 4, 4X, 6, 6P, 12 and 13 (IP67)                          | NEMA 4, 4X, 6, 6P, 12 and 13 (IP67)                          | NEMA 4, 4X, 6, 6P, 12 and 13 (IP67)                          |
| Indicator LEDs                    | Output status                                                | Output status                                                | Output status                                                |
| Materials of construction         | PPS housing                                                  | PPS housing; aluminum baseplate                              | PPS housing; aluminum baseplate                              |

### Four-Wire

| Description                       | DC Four-Wire                             |                                                             |                                                             |
|-----------------------------------|------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|
|                                   | Small Diameter                           | Medium Diameter                                             | Large Diameter                                              |
| Operating voltage                 | 10–42 Vdc                                | 10–42 Vdc                                                   | 10–42 Vdc                                                   |
| Load current (maximum)            | 300 mA                                   | 300 mA                                                      | 300 mA                                                      |
| Burden current                    | <25 mA                                   | <25 mA                                                      | <25 mA                                                      |
| Off-state leakage                 | <150 µA per output                       | <150 µA per output                                          | <150 µA per output                                          |
| Voltage drop                      | <2.5V                                    | <2.5V                                                       | <2.5V                                                       |
| Outputs                           | 1 NO/1 NC (complementary)                | 1 NO/1 NC (complementary)                                   | 1 NO/1 NC (complementary)                                   |
| Sensing range (maximum)           | 50 mm                                    | 70 mm                                                       | 100 mm                                                      |
| Range adjustment                  | Not adjustable                           | Potentiometer adjustable down to 50% of rated maximum range | Potentiometer adjustable down to 50% of rated maximum range |
| Standard target size (mild steel) | 150 mm                                   | 210 mm                                                      | 300 mm                                                      |
| Frequency of operation            | 70 Hz                                    | 40 Hz                                                       | 30 Hz                                                       |
| Repeatability                     | <3%                                      | <3%                                                         | <3%                                                         |
| Hysteresis (maximum)              | 10–15%                                   | 10–15%                                                      | 10–15%                                                      |
| Time delay before availability    | 300 ms                                   | 300 ms                                                      | 300 ms                                                      |
| Circuit protection                | Short circuit protection with auto-reset | Short circuit protection with auto-reset                    | Short circuit protection with auto-reset                    |
| Operating temperature             | –13° to 158°F (–25° to 70°C) ①           | –13° to 158°F (–25° to 70°C) ①                              | –13° to 158°F (–25° to 70°C) ①                              |
| Temperature drift                 | ±10%                                     | ±10%                                                        | ±10%                                                        |
| Enclosure rating                  | NEMA 4, 4X, 6, 6P, 12 and 13 (IP67)      | NEMA 4, 4X, 6, 6P, 12 and 13 (IP67)                         | NEMA 4, 4X, 6, 6P, 12 and 13 (IP67)                         |
| Indicator LEDs                    | Green: power; Red: output status         | Green: power; Red: output status                            | Green: power; Red: output status                            |
| Materials of construction         | PPS housing                              | PPS housing; aluminum baseplate                             | PPS housing; aluminum baseplate                             |

#### Note

① Small diameter DC unshielded models are rated at –40°F (–40°C). All other models can be operated at –40°F (–40°C), but range drift will occur.

# 3.10

## Inductive Proximity Sensors

### E56 Pancake Sensors

#### Wiring Diagrams

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

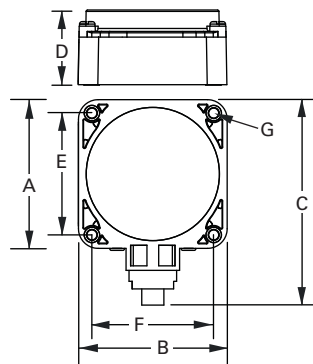
#### E56 Pancake Sensors

| Voltage Type | Micro-Connector Models                                            | Mini-Connector Models                                             | Screw Terminal Models                                             |
|--------------|-------------------------------------------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------|
| DC four-wire | <p><i>AutoConfigure enables load to be wired to +V or (-)</i></p> | <p><i>AutoConfigure enables load to be wired to +V or (-)</i></p> | <p><i>AutoConfigure enables load to be wired to +V or (-)</i></p> |
| AC two-wire  |                                                                   |                                                                   |                                                                   |

#### Dimensions

Approximate Dimensions in Inches (mm)

#### E56 Pancake Sensors



| Model                         | A (Depth)    | B (Width)    | C (Depth)    | D (Height)  | E (Mounting)  | F (Mounting)  | G (Diameter) |
|-------------------------------|--------------|--------------|--------------|-------------|---------------|---------------|--------------|
| <b>Small Diameter Models</b>  |              |              |              |             |               |               |              |
| Micro-connector               | 3.13 (79.0)  | 3.13 (79.0)  | 4.32 (110.0) | 1.54 (39.0) | 2.56 (65.0)   | 2.56 (65.0)   | 0.21 (5.0)   |
| Mini-connector                | 3.13 (79.0)  | 3.13 (79.0)  | 4.67 (119.0) | 1.54 (39.0) | 2.56 (65.0)   | 2.56 (65.0)   | 0.21 (5.0)   |
| Screw terminal                | 3.13 (79.0)  | 3.13 (79.0)  | 3.87 (92.0)  | 1.54 (39.0) | 2.56 (65.0)   | 2.56 (65.0)   | 0.21 (5.0)   |
| <b>Medium Diameter Models</b> |              |              |              |             |               |               |              |
| Micro-connector               | 4.35 (110.0) | 4.35 (110.0) | 4.94 (125.4) | 1.63 (41.0) | 3.625 (92.0)  | 3.625 (92.0)  | 0.218 (5.5)  |
| Mini-connector                | 4.35 (110.0) | 4.35 (110.0) | 5.29 (134.4) | 1.63 (41.0) | 3.625 (92.0)  | 3.625 (92.0)  | 0.218 (5.5)  |
| <b>Large Diameter Models</b>  |              |              |              |             |               |               |              |
| Micro-connector               | 6.75 (171.5) | 6.75 (171.5) | 7.26 (184.4) | 2.66 (67.5) | 5.875 (149.0) | 5.875 (149.0) | 0.266 (7.0)  |
| Mini-connector                | 6.75 (171.5) | 6.75 (171.5) | 7.61 (193.3) | 2.66 (67.5) | 5.875 (149.0) | 5.875 (149.0) | 0.266 (7.0)  |

## Nonmetallic Tubular Sensors



## Nonmetallic Tubular Sensors

## Product Description

E55 Tubular Inductive Proximity Sensors by Eaton's electrical sector are constructed of corrosion resistant PBT plastic. They are ideally suited for wash down applications such as those found in food processing plants. They are available in 12 mm, 18 mm and 30 mm diameters, shielded or unshielded. Shielded units can be embedded in metallic surfaces.

## Features

- Models available that operate on two-wire AC or three-wire DC power
- Threaded tubular housings in three diameters allow easy integration into new and existing applications
- Nonmetallic construction offers excellent resistance to corrosion
- Output indicator LED is standard on all models

## Contents

## Description

Nonmetallic Tubular Sensors

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**⚠ 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](http://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

## Nonmetallic Tubular Sensors

3

Two-Wire Sensors <sup>①</sup>

|                                                                                            | Operating Voltage      | Sensing Range (Sn)    | Shielding  | Connection Type | NO Output Catalog Number | NC Output Catalog Number |
|--------------------------------------------------------------------------------------------|------------------------|-----------------------|------------|-----------------|--------------------------|--------------------------|
| 12 mm<br> | 20–250 Vac<br>50/60 Hz | <b>12 mm Diameter</b> |            |                 |                          |                          |
|                                                                                            |                        | 2 mm                  | Shielded   | 2-meter cable   | <b>E55CAL12A2</b>        | <b>E55CBL12A2</b>        |
|                                                                                            |                        | 4 mm                  | Unshielded | 2-meter cable   | <b>E55CAL12A2E</b>       | <b>E55CBL12A2E</b>       |
| 18 mm<br> | 20–250 Vac<br>50/60 Hz | <b>18 mm Diameter</b> |            |                 |                          |                          |
|                                                                                            |                        | 5 mm                  | Shielded   | 2-meter cable   | <b>E55CAL18A2</b>        | <b>E55CBL18A2</b>        |
|                                                                                            |                        | 8 mm                  | Unshielded | 2-meter cable   | <b>E55CAL18A2E</b>       | <b>E55CBL18A2E</b>       |
| 30 mm<br> | 20–250 Vac<br>50/60 Hz | <b>30 mm Diameter</b> |            |                 |                          |                          |
|                                                                                            |                        | 10 mm                 | Shielded   | 2-meter cable   | <b>E55CAL30A2</b>        | <b>E55CBL30A2</b>        |
|                                                                                            |                        | 15 mm                 | Unshielded | 2-meter cable   | <b>E55CAL30A2E</b>       | <b>E55CBL30A2E</b>       |

Three-Wire Sensors <sup>①</sup>

|                                                                                              | Operating Voltage | Sensing Range (Sn)    | Shielding        | Connection Type | NO Output Catalog Number | NC Output Catalog Number |
|----------------------------------------------------------------------------------------------|-------------------|-----------------------|------------------|-----------------|--------------------------|--------------------------|
| 12 mm<br>  | 10–30 Vdc         | <b>12 mm Diameter</b> |                  |                 |                          |                          |
|                                                                                              |                   | 2 mm                  | Shielded (NPN)   | 2-meter cable   | <b>E55CAL12T110</b>      | <b>E55CBL12T110</b>      |
|                                                                                              |                   |                       | Shielded (PNP)   | 2-meter cable   | <b>E55CAL12T111</b>      | <b>E55CBL12T111</b>      |
|                                                                                              |                   | 4 mm                  | Unshielded (NPN) | 2-meter cable   | <b>E55CAL12T110E</b>     | <b>E55CBL12T110E</b>     |
|                                                                                              |                   |                       | Unshielded (PNP) | 2-meter cable   | <b>E55CAL12T111E</b>     | <b>E55CBL12T111E</b>     |
| 18 mm<br> | 10–30 Vdc         | <b>18 mm Diameter</b> |                  |                 |                          |                          |
|                                                                                              |                   | 5 mm                  | Shielded (NPN)   | 2-meter cable   | <b>E55CAL18T110</b>      | <b>E55CBL18T110</b>      |
|                                                                                              |                   |                       | Shielded (PNP)   | 2-meter cable   | <b>E55CAL18T111</b>      | <b>E55CBL18T111</b>      |
|                                                                                              |                   | 8 mm                  | Unshielded (NPN) | 2-meter cable   | <b>E55CAL18T110E</b>     | <b>E55CBL18T110E</b>     |
|                                                                                              |                   |                       | Unshielded (PNP) | 2-meter cable   | <b>E55CAL18T111E</b>     | <b>E55CBL18T111E</b>     |
| 30 mm<br> | 10–30 Vdc         | <b>30 mm Diameter</b> |                  |                 |                          |                          |
|                                                                                              |                   | 10 mm                 | Shielded (NPN)   | 2-meter cable   | <b>E55CAL30T110</b>      | <b>E55CBL30T110</b>      |
|                                                                                              |                   |                       | Shielded (PNP)   | 2-meter cable   | <b>E55CAL30T111</b>      | <b>E55CBL30T111</b>      |
|                                                                                              |                   | 15 mm                 | Unshielded (NPN) | 2-meter cable   | <b>E55CAL30T110E</b>     | <b>E55CBL30T110E</b>     |
|                                                                                              |                   |                       | Unshielded (PNP) | 2-meter cable   | <b>E55CAL30T111E</b>     | <b>E55CBL30T111E</b>     |

**Note**

<sup>①</sup> For a selection of mounting brackets and other accessories for use with these sensors, see **Tab 8, section 8.2**.

## Technical Data and Specifications

### Nonmetallic Tubular Sensors

| Description          | Two-Wire AC Models              | Three-Wire DC Models                     |
|----------------------|---------------------------------|------------------------------------------|
| Operating voltage    | 20–250 Vac, 50/60 Hz            | 10–30 Vdc                                |
| Maximum load current | 150 mA                          | 200 mA                                   |
| Switching frequency  |                                 |                                          |
| 12 mm                | 25 Hz                           | 2000 Hz (shielded); 1000 Hz (unshielded) |
| 18 mm                | 25 Hz                           | 1000 Hz (shielded); 500 Hz (unshielded)  |
| 30 mm                | 25 Hz                           | 300 Hz (shielded); 150 Hz (unshielded)   |
| Protection           | —                               | Short circuit and reverse polarity       |
| Temperature range    | –13° to 158°F (–25° to 70°C)    | –13° to 158°F (–25° to 70°C)             |
| Enclosure material   | Polybutylene Teraphtalate (PBT) | Polybutylene Teraphtalate (PBT)          |
| Enclosure rating     | NEMA 3, 3S, 4, 4X, 13 (IP66)    | NEMA 3, 3S, 4, 4X, 13 (IP66)             |
| Indicator LED        | Lights when output is ON        | Lights when output is ON                 |

## Wiring Diagrams

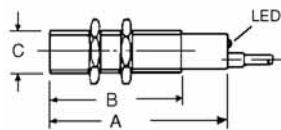
### Nonmetallic Tubular Sensors

| Operating Voltage       | Output | Cable Models | Operating Voltage         | Output | Cable Models |
|-------------------------|--------|--------------|---------------------------|--------|--------------|
| <b>Two-Wire Sensors</b> |        |              | <b>Three-Wire Sensors</b> |        |              |
| 20–250 Vac<br>50/60 Hz  | All    |              | 10–30 Vdc                 | NPN    |              |
|                         |        |              |                           | PNP    |              |

## Dimensions

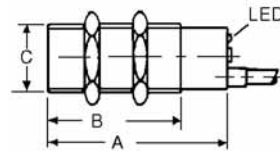
Approximate Dimensions in Inches (mm)

### 12 and 18 mm



| A            | B         | Thread Size<br>C |
|--------------|-----------|------------------|
| <b>12 mm</b> |           |                  |
| 2.17 (55)    | 1.77 (45) | M12 x 1          |
| <b>18 mm</b> |           |                  |
| 2.17 (55)    | 1.77 (45) | M18 x 1          |

### 30 mm



| A            | B         | Thread Size<br>C |
|--------------|-----------|------------------|
| <b>30 mm</b> |           |                  |
| 3.15 (80)    | 2.36 (60) | M30 x 1.5        |

## E52 Cube Style Sensors

3



## E52 Cube Style Sensors

## Product Description

The E52 Cube Sensor from Eaton's electrical sector is a high performance inductive proximity sensor, providing long sensing ranges in a compact, industry-standard package.

The E52 Cube family features Eaton's Autoconfigure output technology, which automatically detects NPN or PNP wiring states and switches the sensor accordingly, without user intervention. The E52 also utilizes complementary outputs to further reduce the number of models needed to cover a wide array of inductive sensing applications. Individual power and output LEDs make installation and troubleshooting easy. Combine the above features with the range and five-way mounting flexibility of the E52 Cube family, and chances are there's an E52 solution to your sensing needs.

The E52 Cube was designed with the most heavy-duty applications in mind. Some of those applications include automotive manufacturing, aggregate machinery, and metalworking applications. Try the E52 Cube in some of your most demanding applications today.

## Application Description

## Typical Applications

- Automotive manufacturing
- Metalworking
- Machinery OEMs
- Pipe and rod manufacturing
- Block and brick manufacturing equipment
- Amusement parks
- Heavy-duty trucks, cranes and lifts

## Contents

## Description

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## E52 Cube Style Sensors

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## Features

- Long inductive proximity ranges available (up to 40 mm sensing distance)
- Four-wire DC models have complementary outputs (1NO-1NC)
- Four-wire DC models use auto-configure technology, which allows the sensor to automatically adapt for NPN or PNP without user intervention
- Robust design featuring vibration and impact-absorbing potting compound
- Ideal for extreme temperatures or high pressure washdown environments

## Standards and Certifications

- CE


**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](http://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

## E52 Cube Style Sensors

## DC Four-Wire Sensors

|                                                                                   | Voltage Type                   | Output Configuration    | Shielding  | Output Type   | Sensing Range | Connector Style | Catalog Number   |
|-----------------------------------------------------------------------------------|--------------------------------|-------------------------|------------|---------------|---------------|-----------------|------------------|
|  | Cube Package (40 x 40 x 40 mm) |                         |            |               |               |                 |                  |
|                                                                                   | 10–48 Vdc                      | NPN/PNP autoconfigure ① | Shielded   | 1 NO and 1 NC | 15 mm         | DC 4-pin micro  | E52Q-DL15SAD01 ⓘ |
|                                                                                   |                                |                         |            |               |               | DC 4-pin mini   | E52Q-DL15SAE01 ⓘ |
|                                                                                   |                                |                         | Unshielded | 1 NO and 1 NC | 15 mm         | DC 4-pin micro  | E52Q-DL15UAD01 ⓘ |
|                                                                                   |                                |                         |            |               |               | DC 4-pin mini   | E52Q-DL15UAE01 ⓘ |
|  | 10–48 Vdc                      | NPN/PNP autoconfigure ① | Shielded   | 1 NO and 1 NC | 20 mm         | DC 4-pin micro  | E52Q-DL20SAD01 ⓘ |
|                                                                                   |                                |                         |            |               |               | DC 4-pin mini   | E52Q-DL20SAE01 ⓘ |
|                                                                                   |                                |                         | Unshielded | 1 NO and 1 NC | 20 mm         | DC 4-pin micro  | E52Q-DL20UAD01 ⓘ |
|                                                                                   |                                |                         |            |               |               | DC 4-pin mini   | E52Q-DL20UAE01 ⓘ |
|                                                                                   |                                |                         |            |               | 25 mm         | DC 4-pin micro  | E52Q-DL25UAD01 ⓘ |
|                                                                                   |                                |                         |            |               |               | DC 4-pin mini   | E52Q-DL25UAE01 ⓘ |
|                                                                                   |                                |                         |            |               | 30 mm         | DC 4-pin micro  | E52Q-DL30UAD01 ⓘ |
|                                                                                   |                                |                         |            |               |               | DC 4-pin mini   | E52Q-DL30UAE01 ⓘ |
|                                                                                   |                                |                         |            |               | 35 mm         | DC 4-pin micro  | E52Q-DL35UAD01 ⓘ |
|                                                                                   |                                |                         |            |               |               | DC 4-pin mini   | E52Q-DL35UAE01 ⓘ |
|                                                                                   |                                |                         |            |               | 40 mm         | DC 4-pin micro  | E52Q-DL40UAD01 ⓘ |
|                                                                                   |                                |                         |            |               |               | DC 4-pin mini   | E52Q-DL40UAE01 ⓘ |

## Compatible Connector Cables

## Standard Cables ②

|                                                                                                                           | Current Rating at 600V              | Voltage Style | Number of Pins | Gauge  | Length        | Pin Configuration/Wire Colors (Face View Female Shown)                                                                      | PVC Jacket Catalog Number | PUR Jacket Catalog Number |
|---------------------------------------------------------------------------------------------------------------------------|-------------------------------------|---------------|----------------|--------|---------------|-----------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|
| <br><b>Micro-Style Straight Female</b> | <b>Micro-Style, Straight Female</b> |               |                |        |               |                                                                                                                             |                           |                           |
|                                                                                                                           | —                                   | DC            | 4-pin, 4-wire  | 22 AWG | 6.0 ft (2m)   |  1-Brown<br>2-White<br>3-Blue<br>4-Black | <b>CSDS4A4CY2202</b>      | <b>CSDS4A4RY2202</b>      |
|                                                                                                                           |                                     |               |                |        | 16.4 ft (5m)  |                                                                                                                             | <b>CSDS4A4CY2205</b>      | <b>CSDS4A4RY2205</b>      |
|                                                                                                                           |                                     |               |                |        | 32.8 ft (10m) |                                                                                                                             | <b>CSDS4A4CY2210</b>      | <b>CSDS4A4RY2210</b>      |
| <br><b>Mini-Style Straight Female</b>  | <b>Mini-Style, Straight Female</b>  |               |                |        |               |                                                                                                                             |                           |                           |
|                                                                                                                           | 10A                                 | AC/DC         | 4-pin, 4-wire  | 16 AWG | 6.0 ft (2m)   |  1-Black<br>2-Blue<br>3-Brown<br>4-White | <b>CSMS4A4CY1602</b>      | —                         |
|                                                                                                                           |                                     |               |                |        | 13.1 ft (4m)  |                                                                                                                             | <b>CSMS4A4CY1604</b>      | —                         |
|                                                                                                                           |                                     |               |                |        | 19.7 ft (6m)  |                                                                                                                             | <b>CSMS4A4CY1606</b>      | —                         |

## Notes

ⓘ See listing of compatible connector cables above.

① Autoconfigure technology allows the sensor to automatically adapt to NPN or PNP without user intervention.

② For a full selection of connector cables, see **Tab 10, section 10.1**.

## Technical Data and Specifications

### E52 Cube Style Sensors

| Description                        | DC Four-Wire                              |
|------------------------------------|-------------------------------------------|
| Operating voltage                  | 10–48 Vdc                                 |
| Load current (maximum)             | 300 mA                                    |
| Burden current                     | <25 mA                                    |
| Off-state leakage                  | <150 $\mu$ A per output                   |
| Voltage drop                       | <2.5V                                     |
| Outputs                            | 1 NO/1 NC (complementary)                 |
| Standard target size (mild steel)  | 120 mm                                    |
| Frequency of operation             | 100 Hz                                    |
| Repeatability                      | <3%                                       |
| Hysteresis (maximum)               | 10–15%                                    |
| Time delay before availability     | 300 ms                                    |
| Circuit protection                 | Short circuit protection with auto-reset  |
| Operating temperature <sup>①</sup> | –25° to 158°F (–25° to 70°C)              |
| Temperature drift                  | ±10%                                      |
| Enclosure rating                   | NEMA 4, 4X, 6, 6P, 12 and 13 (IP67, IP68) |
| Indicator LEDs                     | Green: power; Red: output status          |
| Material of construction           | Zinc alloy housing, PPS, PC               |

## Wiring Diagrams

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

### E52 Cube Style Sensors

| Voltage Type | Micro-Connector                                                   | Mini-Connector                                                    |
|--------------|-------------------------------------------------------------------|-------------------------------------------------------------------|
| DC four-wire | <p><i>AutoConfigure enables load to be wired to +V or (-)</i></p> | <p><i>AutoConfigure enables load to be wired to +V or (-)</i></p> |

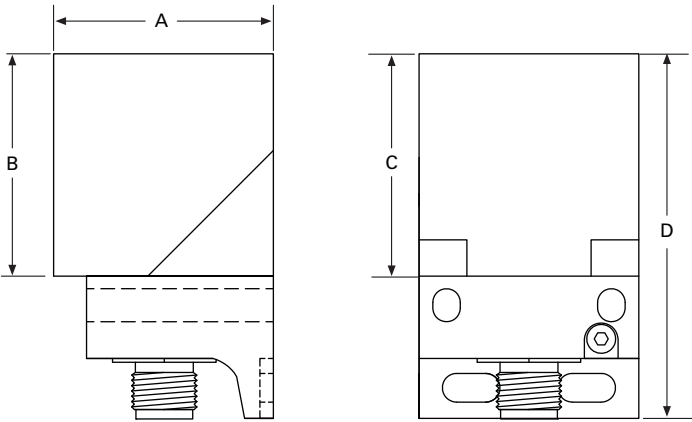
#### Note

① Will operate at –40°F (–40°C), but range drift will occur.

Dimensions

Approximate Dimensions in Inches (mm)

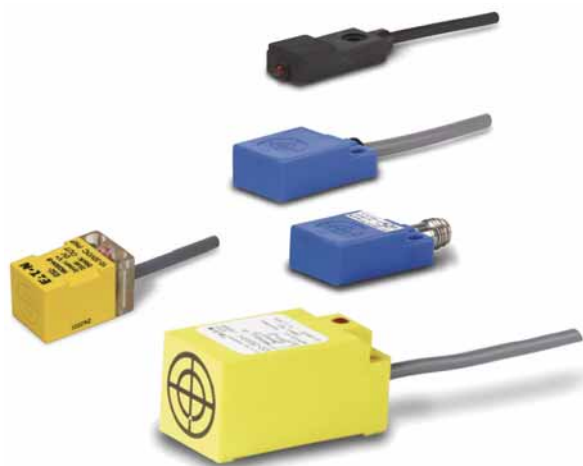
E52 Cube Style Sensors



| Model           | Width<br>A | Depth<br>B | Height<br>C | Overall Height<br>D |
|-----------------|------------|------------|-------------|---------------------|
| Micro-connector | 1.57 (40)  | 1.57 (40)  | 1.57 (40)   | 2.725 (69.2)        |
| Mini-connector  | 1.57 (40)  | 1.57 (40)  | 1.57 (40)   | 2.965 (75.3)        |

## E52 Rectangular Style Sensors

3



## E52 Rectangular Style Sensors

## Product Description

Rectangular E52 Inductive Proximity Sensors from Eaton's electrical sector feature a small, thin, compact space-saving design for applications where tubular type sensors cannot be used. Sensors are self-contained for direct connection to a logic circuit, relay, counter, programmable controller, and so on.

## Features

- Small, low-profile design for use in space restrictive applications
- Three-wire DC operation
- Choose from a variety of sizes, and side or end sensing configurations
- Output indicator included on all models
- Epoxy filled cavities stop fluids from contacting any electrical component
- Convenient mounting holes integrated into each sensor housing

## Contents

## Description

## Page

## E52 Rectangular Style Sensors

## Product Selection

E52 Rectangular Style Sensors ..... **V8-T3-79**Compatible Connector Cables ..... **V8-T3-79**Technical Data and Specifications ..... **V8-T3-79**Wiring Diagrams ..... **V8-T3-80**Dimensions ..... **V8-T3-80**
 **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.**

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## Product Selection

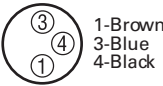
## E52 Rectangular Style Sensors

## Three-Wire Models

|                                                                                   | Voltage                 | Sensing Range   | Frequency        | Shielding            | Connection Type        | NO Output Catalog Number | NC Output Catalog Number |
|-----------------------------------------------------------------------------------|-------------------------|-----------------|------------------|----------------------|------------------------|--------------------------|--------------------------|
| <b>R12 Side Sensing</b>                                                           | <b>R12 Side Sensing</b> |                 |                  |                      |                        |                          |                          |
|  | 12–24 Vdc               | 0.12 in (3 mm)  | Standard         | Shielded (NPN)       | 1-meter cable          | <b>E52RAL12T110</b>      | —                        |
|                                                                                   |                         |                 |                  | Shielded (PNP)       |                        | <b>E52RAL12T111</b>      | —                        |
|                                                                                   |                         |                 | Alternate        | Shielded (NPN)       | 1-meter cable          | <b>E52RAL12T110AF</b>    | —                        |
|                                                                                   |                         |                 |                  | Shielded (PNP)       |                        | <b>E52RAL12T111AF</b>    | —                        |
| <b>Q16 End Sensing</b>                                                            | <b>Q16 End Sensing</b>  |                 |                  |                      |                        |                          |                          |
|  | 12–30 Vdc               | 0.20 in (5 mm)  | Standard         | Unshielded (NPN)     | 2-meter cable          | <b>E52-16QS04-C</b>      | <b>E52-16QS04-C1</b>     |
|                                                                                   |                         |                 |                  | Unshielded (PNP)     | 2-meter cable          | <b>E52-16QS04-B</b>      | <b>E52-16QS04-B1</b>     |
| <b>R18 Side Sensing</b>                                                           | <b>R18 Side Sensing</b> |                 |                  |                      |                        |                          |                          |
|  | 10–30 Vdc               | 0.16 in (4 mm)  | Standard         | Unshielded (NPN)     | 2-meter cable          | <b>E52-18RU04-C</b>      | <b>E52-18RU04-C1</b>     |
|                                                                                   |                         |                 |                  |                      | 3-pin nano-connector   | <b>E52-18RU04-CN</b> ☹   | <b>E52-18RU04-C1N</b> ☹  |
|                                                                                   |                         |                 | Unshielded (PNP) | 2-meter cable        | <b>E52-18RU04-B</b>    | <b>E52-18RU04-B1</b>     |                          |
|                                                                                   |                         |                 |                  | 3-pin nano-connector | <b>E52-18RU04-BN</b> ☹ | <b>E52-18RU04-B1N</b> ☹  |                          |
| <b>Q25 End Sensing</b>                                                            | <b>Q25 End Sensing</b>  |                 |                  |                      |                        |                          |                          |
|  | 10–30 Vdc               | 0.39 in (10 mm) | Standard         | Shielded (NPN)       | 2-meter cable          | <b>E52-25QS10-C</b>      | <b>E52-25QS10-C1</b>     |
|                                                                                   |                         |                 |                  | Shielded (PNP)       | 2-meter cable          | <b>E52-25QS10-B</b>      | <b>E52-25QS10-B1</b>     |

## Compatible Connector Cables

Standard Cables <sup>①</sup>

|                                                                                     | Voltage Style                      | Number of Pins | Gauge  | Length      | Pin Configuration/Wire Colors (Face View Female Shown)                               | PVC Jacket Catalog Number | PUR Jacket Catalog Number |
|-------------------------------------------------------------------------------------|------------------------------------|----------------|--------|-------------|--------------------------------------------------------------------------------------|---------------------------|---------------------------|
| <b>Nano-Style Straight Female</b>                                                   | <b>Nano-Style, Straight Female</b> |                |        |             |                                                                                      |                           |                           |
|  | DC                                 | 3-pin          | 24 AWG | 6.0 ft (2m) |  | <b>CSNS3A3CY2402</b>      | <b>CSNS3A3RY2402</b>      |
|                                                                                     |                                    |                |        |             |                                                                                      |                           |                           |

## Technical Data and Specifications

## E52 Rectangular Style Sensors

| Description               | Specification                      |
|---------------------------|------------------------------------|
| Input current             | Less than 10 mA                    |
| Load current              | 100 mA maximum                     |
| Switching rate            | 500 operations per second          |
| Circuit protection        | Short circuit                      |
| Ambient temperature range | –13° to 130°F (–10° to 55°C)       |
| Enclosure rating          | NEMA 1, 2, 3, 3S, 4, 12 (IEC IP66) |
| Enclosure material        | PBT composition                    |
| Output indicator LED      | Lights when output is ON           |

## Notes

☹ See listing of compatible connector cables above.

① For a full selection of connector cables, see **Tab 10, section 10.1**.

# 3.13

## Inductive Proximity Sensors

### E52 Rectangular Style Sensors

#### Wiring Diagrams

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

#### E52 Rectangular Style Sensors

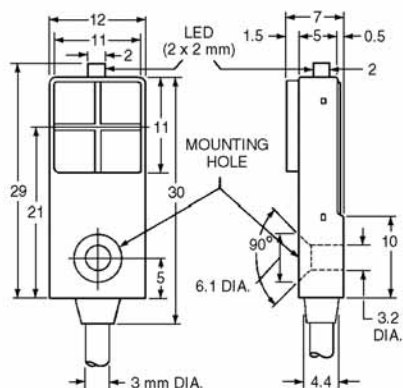
| Operating Voltage         | Output | Cable Models | Nano-Connector Models (Face View Male Shown) |
|---------------------------|--------|--------------|----------------------------------------------|
| <b>Three-Wire Sensors</b> |        |              |                                              |
| DC                        | NPN    |              |                                              |
|                           | PNP    |              |                                              |

#### Dimensions

Approximate Dimensions in Inches (mm) except where noted

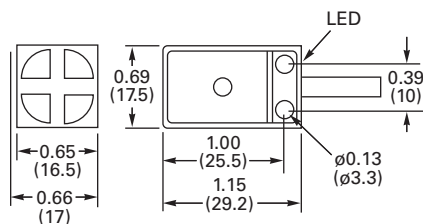
#### E52 Rectangular Style Sensors

##### R12

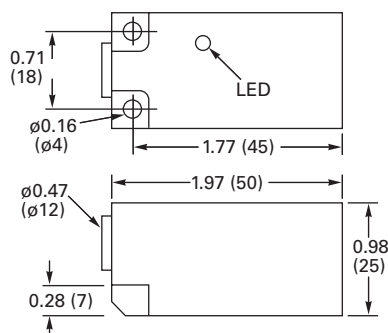


**Note:** Dimensions are mm only.

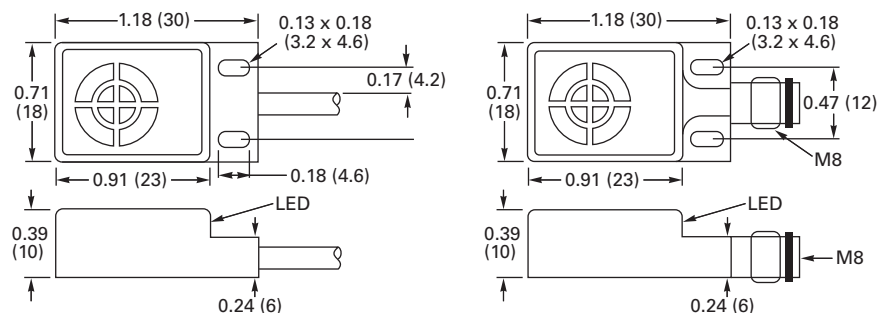
##### Q16



##### Q25



##### R18



## E55 Limit Switch Style Sensors with Nonmetallic Housings



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E55 Limit Switch Style Sensors with Nonmetallic Housings

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| Technical Data and Specifications ..... | V8-T3-82 |
| Wiring Diagrams .....                   | V8-T3-82 |
| Dimensions .....                        | V8-T3-82 |

## E55 Limit Switch Style Sensors with Nonmetallic Housings

## Product Description

These sensors from Eaton's electrical sector feature PBT resin housings for high resistance to corrosion. The housing is sized to offer a direct replacement for standard limit switches. The unique sensing head is factory assembled for top sensing, but can be easily converted in the field to any one of four side sensing positions. Models are available with sensing ranges from 15 mm to 40 mm. The sensors can be wired for NO or NC operation.

## Features

- Nonmetallic housing offers excellent resistance to corrosion
- Same form factor and mounting as standard limit switches for easy retrofit
- Sensor head features five sensing positions (top and all four sides) that can be easily changed in the field
- Long sensing ranges up to 40 mm

**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.**

## Product Selection

## E55 Limit Switch Style Sensors

## E55 Limit Switch



## Two-Wire Sensors

| Voltage Type | Sensing Range (Sn) | Shielding  | Output   | Connection Type | Catalog Number |
|--------------|--------------------|------------|----------|-----------------|----------------|
| 35–250 Vac   | 15 mm              | Shielded   | NO or NC | Terminal wiring | E55BLT1C       |
|              | 20 mm              | Unshielded |          |                 | E55BLT1D       |
|              | 30 mm              |            |          |                 | E55BLT1E       |
|              | 40 mm              |            |          |                 | E55BLT1F       |

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## Technical Data and Specifications

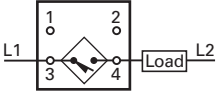
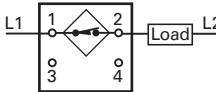
### E55 Limit Switch Style Sensors

| Description           | Specification                                                             |
|-----------------------|---------------------------------------------------------------------------|
| Operating voltage     | 35–250 Vac                                                                |
| Maximum load current  | 400 mA                                                                    |
| Switching frequency   | 25 Hz maximum                                                             |
| Leakage current       | 1.8 mA                                                                    |
| Voltage drop          | 8V maximum                                                                |
| Inrush                | 5A maximum for 20 ms                                                      |
| Indicator LEDs        | Two LEDs: One lights when power is ON, the other lights when output is ON |
| Operating temperature | –13° to 158°F (–25° to 70°C)                                              |
| Enclosure ratings     | NEMA 4, 4X, 6, 12, 13 (IP67)                                              |
| Housing material      | PBT resin                                                                 |

## Wiring Diagrams

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

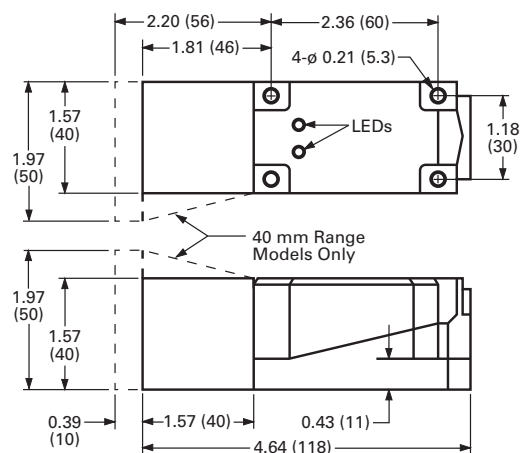
### E55 Limit Switch Style Sensors

| Operating Voltage       | Output | Terminal Models                                                                     |
|-------------------------|--------|-------------------------------------------------------------------------------------|
| <b>Two-Wire Sensors</b> |        |                                                                                     |
| 35–250 Vac <sup>①</sup> | NO     |   |
|                         | NC     |  |

## Dimensions

Approximate Dimensions in Inches (mm)

### E55 Limit Switch Style Sensors



#### Note

<sup>①</sup> Switches are shipped as NO configuration. Internal jumpers must be moved to program for NC.

## E51 Modular Limit Switch Style Sensors



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## Description

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## E51 Modular Limit Switch Style Sensors

## Product Selection

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| Standard Sensors—<br>Assembled with Receptacles . . . . .     | V8-T3-85 |
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| Sensor Bodies . . . . .                                       | V8-T3-86 |
| Logic Module . . . . .                                        | V8-T3-86 |
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| Accessories . . . . .                                         | V8-T3-88 |
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| Wiring Diagrams . . . . .                                     | V8-T3-89 |
| Dimensions . . . . .                                          | V8-T3-90 |

## 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**

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## 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.

3

**Assembled Sensor****Assembled Sensors—Standard (with Terminal Wiring)****Sensor Body and Receptacle**

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

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****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** ☞ ☞**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-T3-86**. 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<br>Suffix | Example           |
|---------------------------------------------------------------------------------------------------------------------|-------------------------------|----------------------|----------------|-------------------|
| 20 mm thread at the conduit entrance                                                                                |                               | —                    | <b>20</b>      | <b>E51ALT120</b>  |
| Mini-connector termination with epoxy filled receptacle, see <b>Page V8-T3-87</b> for additional receptacle options | Two-wire,<br>3-pin connector  | <b>CSMS3F3CY1602</b> | <b>P3</b>      | <b>E51ALT1P3</b>  |
|                                                                                                                     | Four-wire,<br>5-pin connector | <b>CSMS5D5CY1602</b> | <b>P5</b>      | <b>E51CLT1P5</b>  |
| Pre-wired cable with epoxy filled receptacle                                                                        | 8 ft long                     | —                    | <b>S</b>       | <b>E51ALT1S</b>   |
|                                                                                                                     | 12 ft long                    | —                    | <b>S12</b>     | <b>E51ALT1S12</b> |
|                                                                                                                     | 20 ft long                    | —                    | <b>S20</b>     | <b>E51ALT1S20</b> |

**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 | <b>Two-Wire Sensors</b><br>20–264 Vac/dc | <b>Four-Wire Sensors</b><br>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                                                     | <b>T</b>            | <b>E51ALT16PT</b>            |
| Mini-connector mounted to switch base                                                                   | <b>C</b>            | <b>E51ALT16PC</b>            |
| Cable longer than 8 feet, add required length in 1 ft increments to listed catalog number—20 ft maximum | <b>Length in ft</b> | <b>E51ALT16P12 for 12 ft</b> |

③ See listing of compatible connector cables on **Page V8-T3-88**.

## Sensor Bodies

3

## Two-Wire Sensors

| Operating Voltage          | Output                                                                                                                                  | Protection                             | Output Rating Continuous | Type | Catalog Number                                                                                                 |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|--------------------------|------|----------------------------------------------------------------------------------------------------------------|
| <b>AC/DC</b>               |                                                                                                                                         |                                        |                          |      |                                                                                                                |
| 20–264 Vac/dc,<br>50/60 Hz | 1 output, load powered, NO or NC,<br>programmable from head; off state<br>leakage current: <1.7 mA at 120 Vac/dc,<br><2.0 mA at 240 Vac | Latching short circuit<br>and overload | 0.5A                     | —    | <b>E51SAL</b> <sup>①</sup>  |



## Four-Wire Sensors

| Operating Voltage        | Output                                              | Protection       | Output Rating Continuous                                           | Type | Catalog Number              |
|--------------------------|-----------------------------------------------------|------------------|--------------------------------------------------------------------|------|-----------------------------|
| <b>AC (E51SCN Shown)</b> |                                                     |                  |                                                                    |      |                             |
| <b>AC</b>                |                                                     |                  |                                                                    |      |                             |
| 120 Vac,<br>50/60 Hz     | 2 complementary outputs, line powered,<br>NO and NC | —                | 1.0A to 158°F (70°C), linearly<br>derated to 0.6A at 176°F (80°C)  | —    | <b>E51SCL</b> <sup>①</sup>  |
|                          |                                                     |                  | 1.0A to 113°F (45°C), linearly<br>derated to 0.3A at 176°F (80°C)  | —    | <b>E51SCN</b> <sup>②③</sup> |
| <b>DC</b>                |                                                     |                  |                                                                    |      |                             |
| 10–30 Vdc                | 2 complementary outputs, line powered,<br>NO and NC | Reverse polarity | 0.6A to 104°F (40°C), linearly<br>derated to 0.36A at 176°F (80°C) | NPN  | <b>E51SNL</b> <sup>①</sup>  |
|                          |                                                     |                  |                                                                    | PNP  | <b>E51SPL</b> <sup>①</sup>  |



## Logic Module

## Logic Module (for E51SCN Sensor Body Only)

| Type                             | Description      | Timing Range <sup>④</sup>                                                                                           | Catalog Number |
|----------------------------------|------------------|---------------------------------------------------------------------------------------------------------------------|----------------|
| <b>Logic Module</b> <sup>⑤</sup> | ON and OFF delay | Adjustable delay between time object is sensed<br>and time switch function occurs                                   | <b>E51MTB</b>  |
|                                  |                  | Adjustable delay between time object leaves<br>sensing field and time switch transfers back to<br>non-sensing state |                |



## Notes

- ① This sensor body is available in a factory-sealed, non plug-in configuration (with 8-ft cable), add **6P** to listed catalog number. Example: E51SAL**6P**.
- 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 above.
- ④ Repeatability of the timing cycle is ±1% at constant voltage, ambient temperature and reset time.
- ⑤ Reset time is 25 ms minimum. Rated NEMA 4, 4X and 13.

**Receptacles****Receptacles**

|                                                                                                                          | Description                                                                                                                         | Style           | Details     | Cable Length | Conduit Entrance<br>1/2 in NPT<br>Catalog Number | 20 mm<br>Catalog Number |
|--------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------|--------------|--------------------------------------------------|-------------------------|
| <b>Surface Mount</b><br>                | <b>Surface Mount</b>                                                                                                                |                 |             |              |                                                  |                         |
|                                                                                                                          | Conduit entrance, front or rear mounting                                                                                            | Two-wire, AC/DC | —           | —            | <b>E51RA</b>                                     | <b>E51RA20</b>          |
|                                                                                                                          |                                                                                                                                     | Four-wire, AC   | Gray        | —            | <b>E51RC</b>                                     | <b>E51RC20</b>          |
|                                                                                                                          |                                                                                                                                     |                 | Black ①     | —            | <b>E51RCB</b>                                    | <b>E51RCB20</b>         |
|                                                                                                                          |                                                                                                                                     | Four-wire, DC   | —           | —            | <b>E51RN</b>                                     | <b>E51RN20</b>          |
| <b>Mini-Connector</b><br>               | <b>Mini-Connector</b>                                                                                                               |                 |             |              |                                                  |                         |
|                                                                                                                          | Epoxy filled receptacle with pre-wired mini-connector                                                                               | Two-wire, AC/DC | 3-pin       | —            | <b>E51RAP3</b> ☹                                 | —                       |
|                                                                                                                          |                                                                                                                                     | Four-wire, AC   | 5-pin       | —            | <b>E51RCP5</b> ☹                                 | —                       |
|                                                                                                                          |                                                                                                                                     | Four-wire, DC   | 5-pin       | —            | <b>E51RNP5</b> ☹                                 | —                       |
| <b>Pigtail with Mini-Connector</b><br> | <b>Pigtail with Mini-Connector</b>                                                                                                  |                 |             |              |                                                  |                         |
|                                                                                                                          | Epoxy filled receptacle with mini-connector mounted on 3 ft (0.9m) cable                                                            | Two-wire, AC/DC | 3-pin       | 3 ft (0.9m)  | <b>E51RAPT3</b> ☹                                | —                       |
|                                                                                                                          |                                                                                                                                     | Four-wire, AC   | 5-pin       | 3 ft (0.9m)  | <b>E51RCP5T</b> ☹                                | —                       |
|                                                                                                                          |                                                                                                                                     | Four-wire, DC   | 5-pin       | 3 ft (0.9m)  | <b>E51RNPT5</b> ☹                                | —                       |
| <b>Pre-Wired Cable</b><br>            | <b>Pre-Wired Cable</b>                                                                                                              |                 |             |              |                                                  |                         |
|                                                                                                                          | Epoxy filled receptacle with pre-wired 16 gauge, yellow jacketed, type SOOW-A cable. Cable enters through hole threaded for conduit | Two-wire, AC/DC | 3-conductor | 8 ft (2.4m)  | <b>E51RAS</b>                                    | <b>E51RA20S</b>         |
|                                                                                                                          |                                                                                                                                     |                 |             | 12 ft (3.6m) | <b>E51RAS12</b>                                  | —                       |
|                                                                                                                          |                                                                                                                                     |                 |             | 20 ft (6m)   | <b>E51RAS20</b>                                  | —                       |
|                                                                                                                          |                                                                                                                                     | Four-wire, AC   | 5-conductor | 8 ft (2.4m)  | <b>E51RCS</b>                                    | <b>E51RC20S</b>         |
|                                                                                                                          |                                                                                                                                     |                 |             | 12 ft (3.6m) | <b>E51RCS12</b>                                  | —                       |
|                                                                                                                          |                                                                                                                                     |                 |             | 20 ft (6m)   | <b>E51RCS20</b>                                  | —                       |
|                                                                                                                          |                                                                                                                                     | Four-wire, DC   | 5-conductor | 8 ft (2.4m)  | <b>E51RNS</b>                                    | <b>E51RN20S</b>         |
|                                                                                                                          |                                                                                                                                     |                 |             | 12 ft (3.6m) | <b>E51RNS12</b>                                  | —                       |
|                                                                                                                          |                                                                                                                                     |                 |             | 20 ft (6m)   | <b>E51RNS20</b>                                  | —                       |

**Notes**

☹ ☹ See listing of compatible connector cables on **Page V8-T3-88**.

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

## Compatible Connector Cables

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Micro-Style  
Straight FemaleStandard Cables <sup>①</sup>

| Current Rating at 600V              | Voltage Style | Number of Pins   | Gauge  | Length    | Pin Configuration/Wire Colors (Face View Female Shown)                                                                                | Catalog Number |
|-------------------------------------|---------------|------------------|--------|-----------|---------------------------------------------------------------------------------------------------------------------------------------|----------------|
| <b>Micro-Style, Straight Female</b> |               |                  |        |           |                                                                                                                                       |                |
| 13A                                 | —             | 3-pin            | 16 AWG | 6 ft (2m) |  1-Green<br>2-Black<br>3-White                      | CSMS3F3CY1602  |
| 10A                                 | AC/DC         | 4-pin, four-wire | 16 AWG | 6 ft (2m) |  1-Black<br>2-Blue<br>3-Brown<br>4-White            | CSMS4A4CY1602  |
| 8A                                  | —             | 5-pin            | 16 AWG | 6 ft (2m) |  1-White<br>2-Red<br>3-Green<br>4-Orange<br>5-Black | CSMS5D5CY1602  |

## Accessories

## E51 Modular Limit Switch Style Sensors

|                                                                                                                           | Description                                                     | Catalog Number |
|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|----------------|
| <b>One Hole</b><br>                     | <b>Universal Mounting Bracket</b>                               |                |
|                                                                                                                           | One hole, includes mounting hardware, stainless steel           | E51KH2         |
| <b>Two Holes</b><br>                   |                                                                 |                |
|                                                                                                                           | Two holes, includes mounting hardware, steel                    | E51KH4         |
| <b>Machine Mounting Bracket</b><br>    | <b>Machine Mounting Bracket</b>                                 |                |
|                                                                                                                           | Zinc die cast construction                                      | E50KH3         |
| <b>Stand-Off Mounting Bracket</b><br>  | <b>Stand-Off Mounting Bracket</b>                               |                |
|                                                                                                                           | Steel construction                                              | E51KH3         |
| <b>Remote Sensor Head Assembly</b><br> | <b>Remote Sensor Head Assembly</b>                              |                |
|                                                                                                                           | Permits mounting sensor head up to 3 ft (0.9m) from sensor body | E51KRM         |
| <b>Dimensions, see Page V8-T3-90.</b>                                                                                     |                                                                 |                |

## Note

<sup>①</sup> For a full selection of connector cables, see **Tab 10, section 10.1**.

## Technical Data and Specifications

### E51 Modular Limit Switch Style Sensors

| Description                 | Specification                                                                                              |
|-----------------------------|------------------------------------------------------------------------------------------------------------|
| Output rating (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 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                       | 30g, 11 ms, 1/2 sine wave                                                                                  |
| Humidity                    | 95% non-condensing                                                                                         |
| Burden current              | <25 mA                                                                                                     |
| OFF-state leakage           | DC version: 120 $\mu$ A; 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.

### E51 Modular Limit Switch Style Sensors

| Operating Voltage          | Output                                                                | Terminal and Cable Models | Mini-Connector Models (Face View Male Shown) |
|----------------------------|-----------------------------------------------------------------------|---------------------------|----------------------------------------------|
| <b>Two-Wire Sensors</b>    |                                                                       |                           |                                              |
| 20–264 Vac or Vdc 50/60 Hz | NO or NC (NO shown, can be changed to NC using switch on sensor head) |                           |                                              |
| <b>Four-Wire Sensors</b>   |                                                                       |                           |                                              |
| 120 Vac 50/60 Hz           | NO and NC <sup>①</sup>                                                |                           |                                              |
| 10–30 Vdc                  | NO and NC NPN <sup>①</sup>                                            |                           |                                              |
|                            | NO and NC PNP <sup>①</sup>                                            |                           |                                              |

#### Note

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

# 3.15 Inductive Proximity Sensors

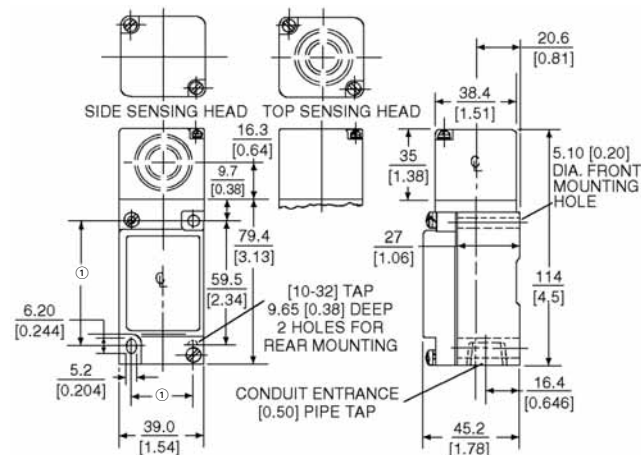
## E51 Modular Limit Switch Style Sensors

### Dimensions

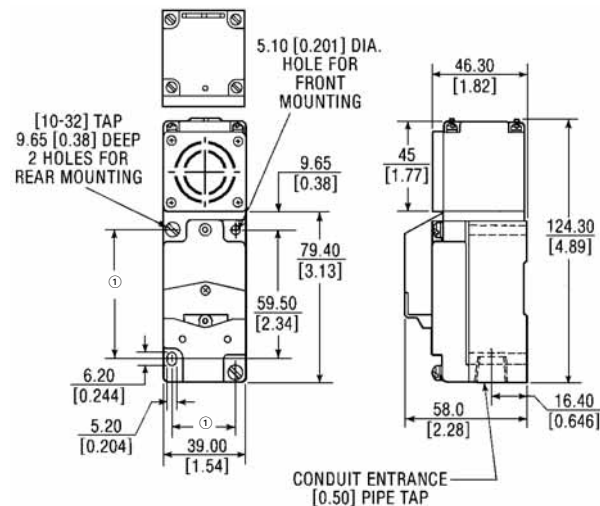
Approximate Dimensions in mm [in]

### E51 Modular Limit Switch Style Sensors

#### Standard Sensors



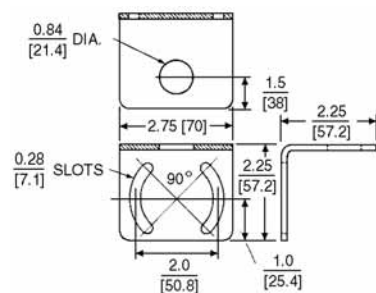
#### Sensor with Logic Module



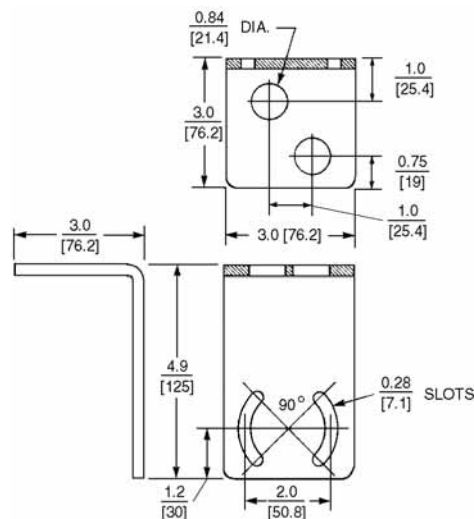
### Accessories

Approximate Dimensions in Inches [mm]

#### Universal Mounting Bracket—One Hole



#### Universal Mounting Bracket—Two Holes

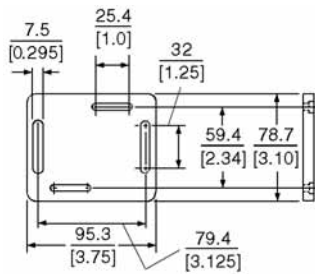


### Note

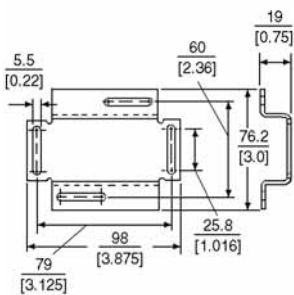
① Can accommodate both U.S., 29.4 [1.16] x 59.5 [2.34] and DIN, 30 [1.18] x 60 [2.36], mounting dimensions are in mm [in].

Approximate Dimensions in mm [in]

### Machine Mounting Bracket

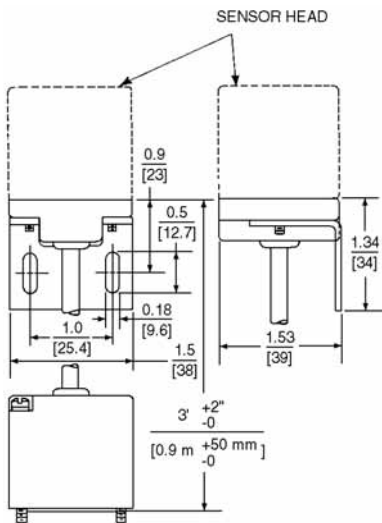


### Stand-Off Mounting Bracket



Approximate Dimensions in Inches [mm]

### Remote Sensor Head Assembly



## E51 Limit Switch Style, Factory Sealed 6P+ Sensors

3



## Contents

## Description

## Page

E51 Limit Switch Style, Factory Sealed 6P+ Sensors

Product Selection

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## E51 Limit Switch Style, Factory Sealed 6P+ Sensors

## Product Description

E51 6P+ Inductive Proximity Sensors from Eaton's electrical sector are fully sealed, pre-wired and designed specifically to ensure reliability under the most adverse of environmental conditions. They have been proven to withstand the penetrating properties of dirt, dust, grit, extreme temperatures and humidity. The unitized design eliminates plug-in connections that can lead to reliability problems in rugged environments.

## Features

- The one-piece body and sensing head are both epoxy filled to protect internal components from contamination
- The head is hard-wired to the sensor body to ensure trouble-free performance
- Choose from top and side sensing heads
- Side sensing heads can be rotated to any of four positions
- Mounting dimensions allow direct replacement of worn out limit switches
- Rugged zinc die cast construction withstands physical abuse
- Connection options include pre-wired cable, body mounted connector and pigtail connector

**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](http://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

## Unitized Sensors

Assembled Sensor with 8 ft Cable <sup>①</sup>Sensor Heads <sup>②</sup>Top Sensing <sup>②</sup>Side Sensing <sup>②</sup>

## Factory Sealed 6P+ Assembled Sensors

|                 |            | Two-Wire Sensors  |                                                                          | Four-Wire Sensors |                         |                                                         |            |
|-----------------|------------|-------------------|--------------------------------------------------------------------------|-------------------|-------------------------|---------------------------------------------------------|------------|
| Sensing Range   | Shielding  | Operating voltage | 20–264 Vac/dc                                                            |                   | 120 Vac                 | 10–30 Vdc                                               |            |
|                 |            | Output            | NO                                                                       | NC                | NO and NC complementary | NO and NC complementary<br>PNP                      NPN |            |
|                 |            | Frequency ③       | Assembled Sensor with Head, Sensor Body and Receptacle<br>Catalog Number |                   |                         |                                                         |            |
| Top Sensing     |            |                   |                                                                          |                   |                         |                                                         |            |
| 0.51 in (13 mm) | Shielded   | Standard          | E51ALT16PU                                                               | E51BLT16PU        | E51CLT16PU              | E51PLT16PU                                              | E51NLT16PU |
|                 |            | Alternate         | E51ALT26PU                                                               | E51BLT26PU        | E51CLT26PU              | E51PLT26PU                                              | E51NLT26PU |
| 0.94 in (24 mm) | Unshielded | Standard          | E51ALT56PU                                                               | E51BLT56PU        | E51CLT56PU              | E51PLT56PU                                              | E51NLT56PU |
|                 |            | Alternate         | E51ALT66PU                                                               | E51BLT66PU        | E51CLT66PU              | E51PLT66PU                                              | E51NLT66PU |
| Side Sensing    |            |                   |                                                                          |                   |                         |                                                         |            |
| 0.51 in (13 mm) | Shielded   | Standard          | E51ALS16PU                                                               | E51BLS16PU        | E51CLS16PU              | E51PLS16PU                                              | E51NLS16PU |
|                 |            | Alternate         | E51ALS26PU                                                               | E51BLS26PU        | E51CLS26PU              | E51PLS26PU                                              | E51NLS26PU |
| 0.94 in (24 mm) | Unshielded | Standard          | E51ALS56PU                                                               | E51BLS56PU        | E51CLS56PU              | E51PLS56PU                                              | E51NLS56PU |
|                 |            | Alternate         | E51ALS66PU                                                               | E51BLS66PU        | E51CLS66PU              | E51PLS66PU                                              | E51NLS66PU |

## Compatible Connector Cables

Standard Cables <sup>⑥</sup>

## Mini-Style Straight Female



| Current Rating at 600V      | Voltage Style | Number of Pins | Gauge  | Length    | Pin Configuration/Wire Colors (Face View Female Shown)                                                                                    | Catalog Number |
|-----------------------------|---------------|----------------|--------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Mini-Style, Straight Female |               |                |        |           |                                                                                                                                           |                |
| 13A                         | —             | 3-pin          | 16 AWG | 6 ft (2m) |  1-Green<br>2-Black<br>3-White                       | CSMS3F3CY1602  |
| 10A                         | —             | 4-pin          | 16 AWG | 6 ft (2m) |  1-Black<br>2-Blue<br>3-Brown<br>4-White             | CSMS4A4CY1602  |
| 8A                          | AC/DC         | 5-pin, 5-wire  | 16 AWG | 6 ft (2m) |  1-Black<br>2-Blue<br>3-Orange<br>4-Brown<br>5-White | CSMS5A5CY1602  |

## Notes

<sup>①</sup> Switch bases feature 8 ft of SOOW-A cable. Other connection options are available:

| Connection Option <sup>④</sup>                                                                                | Instructions                                | Example                          |
|---------------------------------------------------------------------------------------------------------------|---------------------------------------------|----------------------------------|
| Mini-connector mounted on 3 ft (0.9m) pigtail cable (3-pin for two-wire sensors; 5-pin for four-wire sensors) | Add the letter <b>T</b> before <b>U</b>     | <b>E51ALT16PTU</b>               |
| Mini-connector mounted to switch base (3-pin for two-wire sensors; 5-pin for four-wire sensors)               | Add the letter <b>C</b> before <b>U</b>     | <b>E51ALT16PCU</b>               |
| Cable longer than 8 ft, add required length in 1 ft increments to listed catalog number—20 ft maximum         | Add length in feet to end of catalog number | <b>E51ALT16PU12 <sup>⑤</sup></b> |

<sup>②</sup> Sensor head is hard wired to sensor body and cannot be detached. Side sensing head can be unfastened and rotated to any of four positions.

<sup>③</sup> Sensor heads feature color coded target symbols: Yellow for standard frequency; Green for alternate frequency.

<sup>④</sup> See listing of compatible connector cables above.

<sup>⑤</sup> For 12 ft.

<sup>⑥</sup> For a full selection of connector cables, see **Tab 10, section 10.1**.

## Accessories

3

## E51 Limit Switch Style, Factory Sealed 6P+ ①

|                                                                                                                         | Description                                 | Catalog Number |
|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|----------------|
| <b>One Hole</b><br>                    | <b>Universal Mounting Bracket</b>           |                |
|                                                                                                                         | Includes mounting hardware, stainless steel | E51KH2         |
| <b>Two Holes</b><br>                   | Includes mounting hardware, steel           | E51KH4         |
|                                                                                                                         |                                             |                |
| <b>Machine Mounting Bracket</b><br>    | <b>Machine Mounting Bracket</b>             |                |
|                                                                                                                         | Zinc die cast construction                  | E50KH3         |
| <b>Stand-Off Mounting Bracket</b><br> | <b>Stand-Off Mounting Bracket</b>           |                |
|                                                                                                                         | Steel construction                          | E51KH3         |
| <b>Dimensions</b> , see <b>Page V8-T3-95</b> .                                                                          |                                             |                |

## Technical Data and Specifications

## E51 Limit Switch Style, Factory Sealed 6P+

| Description               | Specification                                                                        |
|---------------------------|--------------------------------------------------------------------------------------|
| Output rating (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 three-wire DC models         |
| 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        | Cast metal                                                                           |
| Gasket material           | Zinc die cast                                                                        |
| Enclosure ratings         | NEMA 3, 3S, 4, 4X, 6, 6P, 12 and 13 (IP68)                                           |
| 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                  |
| 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                                                                             |

**Note**① For a full selection of connector cables, see **Tab 10, section 10.1**.

### Wiring Diagrams

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

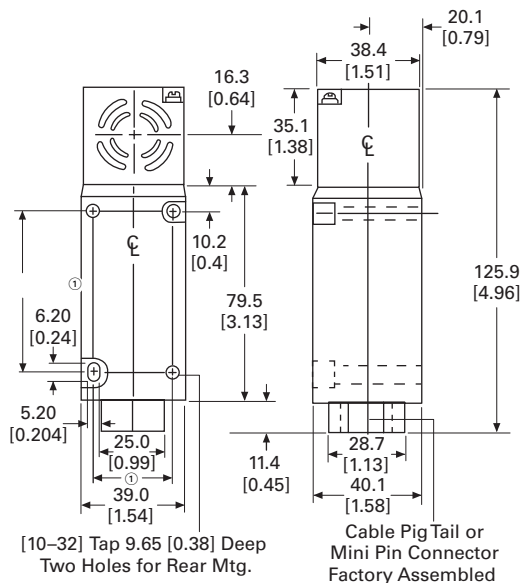
#### E51 Limit Switch Style, Factory Sealed 6P+

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

### Dimensions

Approximate Dimensions in mm [in]

#### E51 Limit Switch Style, Factory Sealed 6P+



#### Note

- 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.

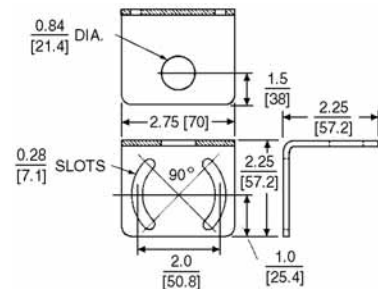
# 3.16 Inductive Proximity Sensors

E51 Limit Switch Style, Factory Sealed 6P+ Sensors

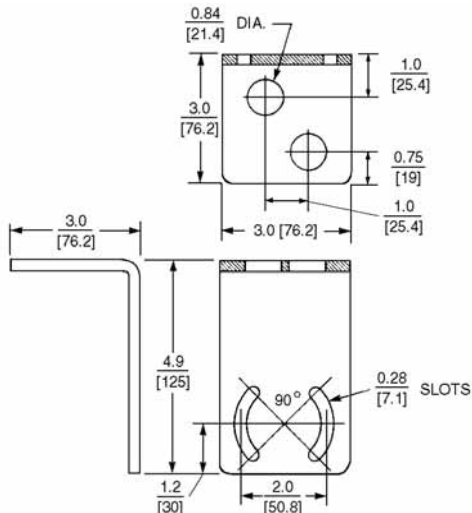
Approximate Dimensions in Inches [mm]

## Accessories

### Universal Mounting Bracket—One Hole

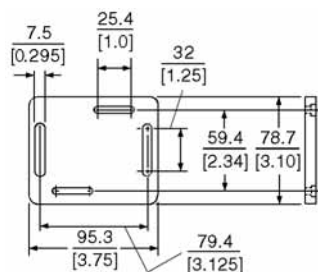


### Universal Mounting Bracket—Two Holes

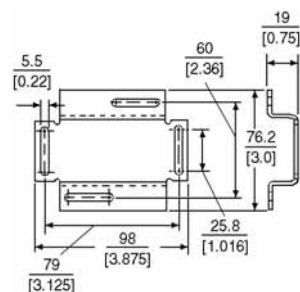


Approximate Dimensions in mm [in]

### Machine Mounting Bracket



### Stand-Off Mounting Bracket



## Note

- 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.