

Inductive Proximity Sensors

iProx



E57P Performance



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.



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.

Revision notes

Volume 8—Sensing Solutions, CA08100010E

Tab 3—Inductive Proximity Sensors

| Revision date | Section | Change page(s) | Description |
|---------------|---------|-------------------------------|---|
| 09/08/2017 | 3.0 | V8-T3-3, V8-T3-6–V8-T3-10 | Content edit |
| 09/08/2017 | 3.1 | V8-T3-11 | Content edit |
| 09/08/2017 | 3.2 | V8-T3-18 | Content edit |
| 09/08/2017 | 3.3 | V8-T3-24, V8-T3-26 | Content edit |
| 09/08/2017 | 3.4 | V8-T3-29 | Content edit |
| 09/08/2017 | 3.5 | V8-T3-35 V8-T3-44–V8-T3-46 | Content edit |
| 09/08/2017 | 3.6 | V8-T3-49, V8-T3-50 | Content edit |
| 09/08/2017 | 3.7 | V8-T3-55 | Content edit |
| 09/08/2017 | 3.8 | V8-T3-58 | Content edit |
| 09/08/2017 | 3.9 | V8-T3-62 | Content edit |
| 09/08/2017 | 3.10 | V8-T3-65, V8-T3-67 | Content edit |
| 09/08/2017 | 3.11 | V8-T3-71 | Content edit |
| 09/08/2017 | 3.12 | V8-T3-76 | Content edit |
| 09/08/2017 | 3.13 | V8-T3-79 | Content edit |
| 09/08/2017 | 3.14 | V8-T3-83 | Content edit |
| 09/08/2017 | 3.15 | V8-T3-86 | Content edit |
| 09/08/2017 | 3.16 | V8-T3-88–V8-T3-91 | Content edit |
| 09/08/2017 | 3.17 | V8-T3-97 | Content edit |
| 09/08/2017 | All | All | Revision date changed to September 2017 |

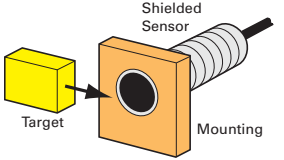
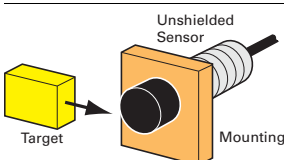
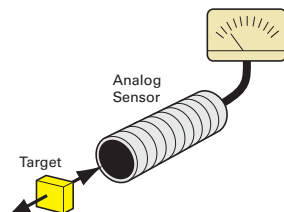
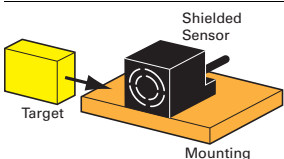
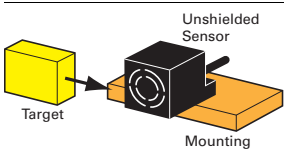


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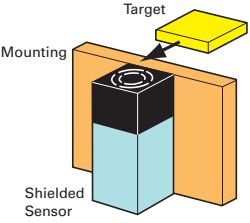
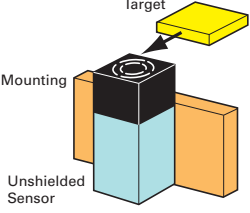
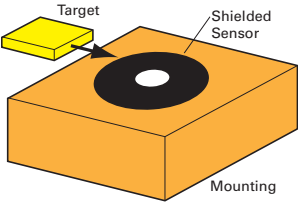
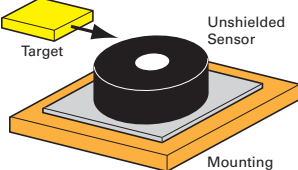
Quick Reference Guide

Inductive Proximity Sensors

3

| Sensing Application | Sensing Style | Size | Max Range | Product Family | Page |
|---|--------------------|------------------------------|------------------------------|------------------------------|---------------------------|
|  | Shielded tubular | 4 mm | 0.8 mm | Small Diameter Sensors | V8-T3-65 |
| | | 5 mm | 0.8 mm | Small Diameter Sensors | V8-T3-65 |
| | | 6.5 mm | 1 mm | Small Diameter Sensors | V8-T3-65 |
| | | 8 mm | 3 mm | Small Diameter Sensors | V8-T3-65 |
| | | 12 mm | 4 mm | iProx™ Sensors | V8-T3-11 |
| | | | 4 mm | E57P Performance Sensors | V8-T3-18, V8-T3-24 |
| | | | 4 mm | E57G General Purpose Sensors | V8-T3-29 |
| | | 18 mm | 8 mm | iProx Sensors | V8-T3-11 |
| | | | 8 mm | E57P Performance Sensors | V8-T3-18, V8-T3-24 |
| | | | 8 mm | E57G General Purpose Sensors | V8-T3-29 |
| 30 mm | 15 mm | iProx Sensors | V8-T3-11 | | |
| | 15 mm | E57P Performance Sensors | V8-T3-18, V8-T3-24 | | |
| | 15 mm | E57G General Purpose Sensors | V8-T3-29 | | |
|  | Unshielded tubular | 6.5 mm | 2 mm | Small Diameter | V8-T3-65 |
| | | 8 mm | 6 mm | Small Diameter | V8-T3-65 |
| | | 12mm | 10 mm | iProx Sensors | V8-T3-11 |
| | | | 8 mm | E57P Performance Sensors | V8-T3-18, V8-T3-24 |
| | | 8 mm | E57G General Purpose Sensors | V8-T3-29 | |
| | | | 18 mm | 18 mm | iProx Sensors |
| | | 12 mm | E57P Performance Sensors | V8-T3-18, V8-T3-24 | |
| | | | E57G General Purpose Sensors | V8-T3-29 | |
| 30 mm | 29 mm | iProx Sensors | V8-T3-11 | | |
| | 22 mm | E57P Performance Sensors | V8-T3-18, V8-T3-24 | | |
| | 22 mm | E57G General Purpose Sensors | V8-T3-29 | | |
|  | Analog tubular | 12 mm | 8 mm | AccuProx™ Analog Sensors | V8-T3-49 |
| | | 18 mm | 15 mm | AccuProx Analog Sensors | V8-T3-49 |
| | | 30 mm | 25 mm | AccuProx Analog Sensors | V8-T3-49 |
|  | Shielded cube | 40 x 40 x 40 mm | 20 mm | E52 Cube Style Sensors | V8-T3-79 |
|  | Unshielded cube | 40 x 40 x 40 mm | 40 mm | E52 Cube Style Sensors | V8-T3-79 |

Inductive Proximity Sensors, continued

| Sensing Application | Sensing Style | Size | Max Range | Product Family | Page |
|---|-------------------------|---|-----------|--|---|
|  | Shielded limit switch | 118 x 40 x 40 mm 114 x 39 x 38.4 mm | 13 mm | E51 Modular Limit Switch Style Sensors E51 Limit Switch Style, Factory Sealed 6P+ Sensors E55 Limit Switch Style Sensors with Nonmetallic Housings | V8-T3-88, V8-T3-97, V8-T3-86 |
|  | Unshielded limit switch | 118 x 40 x 40 mm 114 x 39 x 38.4 mm | 24 mm | E51 Series E55 Series | V8-T3-88, V8-T3-86 |
|  | Shielded pancake | 79 x 79 x 39 mm | 40 mm | E56 Series | V8-T3-71 |
|  | Unshielded pancake | 79 x 79 x 39 mm 110 x 110 x 41 mm 171.5 x 171.5 x 67.5 mm | 100 mm | E56 Series | V8-T3-71 |

Technical Reference

Inductive Proximity Sensors

3



General

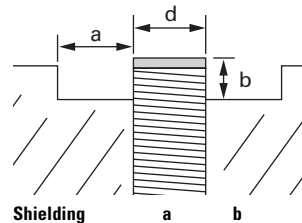
There are a number of factors which should be considered when applying induction proximity sensors. A detailed discussion of these factors can be found on **Page V8-T12-4**. Presented below are a few of the more important considerations for quick reference.

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 |
|-----------------------|--------|------------|
| Standard Range | | |
| Shielded | 0 | 0 |
| Unshielded | 2 x Sn | Cap height |
| Extended Range | | |
| 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 |
|-----------------------|-------------------|---------------------|
| 12 mm Diameter | | |
| | 35 lb-in (4.0 Nm) | 20 lb-in (2.3 Nm) |
| 18 mm Diameter | | |
| | 70 lb-in (7.9 Nm) | 70 lb-in (7.9 Nm) |
| 30 mm Diameter | | |
| | 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 E57P-18SPN5-C2 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 E57P-18SPN5-C2 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 ^①

| 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

^① Targets are 1 mm thick.

Product Selection Guide

iProx



Page V8-T3-11

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

UL® Listed, E166051
UL Tested to Canadian safety standards
CE
RoHS Compliant



E57P Performance Series



Page V8-T3-18

Overview

High performance inductive sensors. Extended and standard ranges available.

Applications

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

Product Features

12, 18 and 30 mm diameters
Three-wire DC sensors
360° LED indicators standard
NO or NC outputs
Short-circuit protection
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—
DC: 300 mA
Enclosure ratings—IP67, IP69K;
NEMA 4, 4X, 6, 6P
Construction—
Stainless steel housing and nuts

Approvals

UL Listed, E166051
UL Tested to Canadian safety standards
CE
RoHS Compliant



E57PS Performance Short Body



Page V8-T3-24

Overview

High performance inductive sensors with the ability to fit into tighter spaces.

Applications

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

Product Features

12, 18 and 30 mm diameters
Three-wire DC sensors
360° LED indicators standard
NO or NC outputs
Short-circuit protection
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—
DC: 300 mA
Enclosure ratings—IP67, IP69K;
NEMA 4, 4X, 6, 6P
Construction—
Stainless steel housing and nuts

Approvals

UL Listed, E166051
UL Tested to Canadian safety standards
CE
RoHS Compliant



E57G General Purpose



Page V8-T3-29

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

12, 18 and 30 mm diameters
Three-wire DC sensors
360° LED indicators standard
NO or NC outputs
Short-circuit protection
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—
DC: 100 mA
Enclosure ratings—IP67;
NEMA 4, 4X, 6, 6P
Construction—
Stainless steel housing and nickel-brass nuts

Approvals

UL Listed, E166051
UL Tested to Canadian safety standards
CE
RoHS Compliant



E57 Two-Wire (AC, AC/DC, DC) Proximity



Page V8-T3-35

Overview

Various models available in two-wire configurations:
Stainless steel (AC, AC/DC)
Stainless steel short body (AC, AC/DC)
Nickel-brass (AC, DC)

Applications

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

Product Features

12, 18 and 30 mm diameters
Two-wire AC, AC/DC, DC
Shielded and unshielded models
Standard and extended ranges
LED indicators
Cable and micro-connector
NO or NC outputs

Technical Data and Specifications

Stainless steel:
Current ratings—
500 mA maximum
Enclosure ratings—IP67, IP69K;
NEMA 4, 4X, 6, 6P, 12, 13
Nickel-Brass:
Current ratings—
200 mA (AC); 100 mA (DC)
Enclosure ratings—
IP69K, IP67

Approvals

RoHS Compliant
Stainless Steel:
UL Listed, E166051
UL Tested to Canadian safety standards
CE (AC/DC only)
Nickel-Brass:
CSA Certified, 224447
Products certified by CSA for US
CE (DC only)



AccuProx



Page V8-T3-49

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 (0–10 V)
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

UL Listed, E166051
UL Tested to Canadian safety standards
CE
RoHS Compliant



Ferrous Only Tubular



Page V8-T3-55

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

CSA Certified
Products certified by CSA for US
CE
RoHS Compliant



Metal Face



Page V8-T3-58

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

CSA Certified
Products certified by CSA for US
CE
RoHS Compliant



High Current Output



Page V8-T3-62

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

RoHS Compliant



Small Diameter



Page V8-T3-65

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
 RoHS Compliant
 8 mm standard models only:
 CSA Certified, 224447
 Products certified by CSA for US



E56 Pancake



Page V8-T3-71

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

UL Listed, E166051 (DC models only)
 UL tested to Canadian safety standards
 CE (DC models only)
 RoHS Compliant



Tubular, Nonmetallic Housing



Page V8-T3-76

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

CE
RoHS Compliant



E52 Cube Style



Page V8-T3-79

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

UL Listed, E166051
UL tested to Canadian safety standards
CE
RoHS Compliant



E52 Rectangular Style



Page V8-T3-83

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

CE (except E52RAL)
RoHS Compliant



E55 Limit Switch Style, Nonmetallic Housing



Page V8-T3-86

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

CE
 RoHS Compliant



E51 Modular Switch Style, Modular



Page V8-T3-88

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, E166051, E183975
 CSA Certified, 50513
 RoHS Compliant



E51 Limit Switch Style, Factory Sealed 6P +



Page V8-T3-97

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

UL Listed, E166051
 CSA Certified, 50513
 RoHS Compliant



iProx Sensors



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

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

Contents

Description

| | <i>Page</i> |
|---------------------------------------|-----------------|
| iProx Sensors | |
| Product Selection | |
| iProx Sensors | V8-T3-12 |
| Complementary and Dual Output Sensors | V8-T3-14 |
| Compatible Connector Cables | V8-T3-15 |
| Accessories | V8-T3-15 |
| Technical Data and Specifications | V8-T3-16 |
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| Dimensions | V8-T3-17 |

- 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])

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

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.

Standards and Certifications

- UL Listed, E166051
- UL Tested to Canadian safety standards
- CE
- RoHS Compliant



⚠ 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.

3.1

Inductive Proximity Sensors

iProx Sensors







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.

3

Two-Wire Sensors

| | Operating Voltage | Sensing Range | Shielding | Connection Type ^① | NO Output Catalog Number ^② | NC Output Catalog Number ^② |
|--|-------------------|---------------|------------|-------------------------------------|---------------------------------------|---------------------------------------|
| 12 mm Diameter | | | | | | |
| Standard Range  | 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 |
| Extended Range  | | 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 | | | | | | |
| Standard Range  | 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 |
| Extended Range  | | 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 | | | | | | |
| Standard Range  | 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 |
| Extended Range  | | 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-T3-15**.







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

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

③ Standard pigtail cable length is 12 in.

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

| | 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-T3-15**.
- ① For sensors with custom cable lengths or PUR jackets, contact Application Engineering at 1-800-426-9184.
- ② Sensors are ordered with pre-set outputs from the factory, but can be later programmed either NO or NC using the ProxView software.
- ③ Standard pigtail cable length is 12 in.

3.1







Inductive Proximity Sensors

iProx Sensors

Complementary and Dual Output Sensors

Four-Wire Sensors

3

| | Operating Voltage | Sensing Range | Shielding | Output Type | Connection Type | Complementary Output (1NO-1NC) Catalog Number | Dual NO Output 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 |
| Extended Range | | | | PNP (sourcing) | 4-pin micro DC connector | E59-M12A105D01-D3PP ☺ | E59-M12A105D01-D1PP ☺ |
| | | | | | 2-meter cable | E59-M12A105C02-D3PP | E59-M12A105C02-D1PP |
|  | | 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 |
| Extended Range | | | | PNP (sourcing) | 4-pin micro DC connector | E59-M18A108D01-D3PP ☺ | E59-M18A108D01-D1PP ☺ |
| | | | | | 2-meter cable | E59-M18A108C02-D3PP | E59-M18A108C02-D1PP |
|  | | 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 |
| Extended Range | | | | PNP (sourcing) | 4-pin micro DC connector | E59-M30A115D01-D3PP ☺ | E59-M30A115D01-D1PP ☺ |
| | | | | | 2-meter cable | E59-M30A115C02-D3PP | E59-M30A115C02-D1PP |
|  | | 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-T3-15](#).

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.




Compatible Connector Cables

Standard Cables ^①

| | Current Rating at 600 V | 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  | Micro-Style, Straight Female | | | | | | | |
| | — | AC | 3-pin, 3-wire | 22 AWG | 6.0 ft (2m) |  1-Green 2-Red/Black 3-Red/White | CSAS3F3CY2202 | CSAS3F3RY2202 |
| Mini-Style Straight Female  | Mini-Style, Straight Female | | | | | | | |
| | 13 A | — | 3-pin | 16 AWG | 6 ft (2m) |  1-Brown 2-White 3-Blue 4-Black | CSDS4A4CY2202 | CSDS4A4RY2202 |
| | | | | | | | Catalog Number | |
| | | | | | | | CSMS3F3CY1602 | |

Accessories

iProx Sensors

| | Description | Catalog Number |
|--|--|-----------------|
| Software  | Step-by-step programming software required to program iProx. Compatible with Microsoft Windows® and Windows® Mobile devices. | E59SW1 |
| Cable  | 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.) | E59RP1 |
| Labels  | Field applied labels for iProx sensor (100 pcs) | E59LABEL |

Note

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

3.1

Inductive Proximity Sensors

iProx Sensors

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

3

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; Unshielded models: <3% sensing distance | Shielded models: <1% sensing distance; Unshielded models: <3% sensing distance |
| Surge capacity | 3 A/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; face caps: Ryton®; cable: AWM style 20387 (PVC) | 303 stainless steel; end bells: polycarbonate; face caps: Ryton®; cable: AWM style 20387 (PVC) |
| Vibration and shock | Vibration: 10 to 55 Hz, 1 mm amplitude, IEC 60068-2-6; shock: 30 g, 11 ms per IEC 68-2-27 | Vibration: 10 to 55 Hz, 1 mm amplitude, IEC 60068-2-6; shock: 30 g, 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 All Two-Wire Models | Three-Wire Sensors 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).

Wiring Diagrams

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

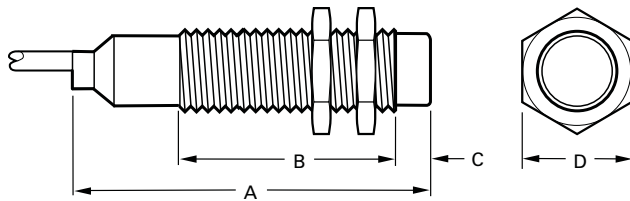
iProx Sensors

| Operating Voltage | Output | Cable Models | Connector Models (Face View Male Shown) | Micro | Mini |
|--|---------------------------|--------------|---|-------|------|
| Two-Wire Sensors | | | | | |
| 20–132 Vac | NO and NC | | | | |
| Three-Wire Sensors | | | | | |
| 6–48 Vdc | NO and NC (NPN and PNP) ① | ② | ② | | |
| Four-Wire Dual Output and Complementary Sensors | | | | | |
| 6–48 Vdc | NO and NC (NPN) | ③ | ③ | | |
| | NO and NC (PNP) | ③ | ③ | | |

Dimensions

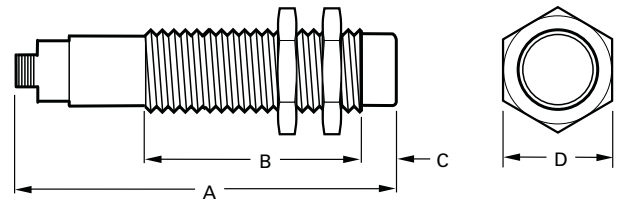
Approximate Dimensions in Inches (mm)

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).

3.2

Inductive Proximity Sensors

E57P Performance Series Sensors

E57P Performance Series Sensors

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| Product Selection | |
| E57P Performance Sensors | V8-T3-19 |
| Compatible Connector Cables | V8-T3-20 |
| Accessories | V8-T3-20 |
| Technical Data and Specifications | V8-T3-21 |
| Wiring Diagrams | V8-T3-22 |
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E57P Performance Series Sensors

Product Description

For sensing applications requiring more demanding specifications, the new E57P Performance series incorporates premium features without the premium price. With its stainless steel tubular body, IP69K rating, wide temperature range (down to -40 °C), fast switching speed and laser-etched markings, the E57P series provides value at a low price point.

Features

- 360° LED indicator
- Stainless steel tube
- 10–48 Vdc operating voltage
- Short-circuit protection
- -40 to 70 °C temperature range
- IP69K environmental rating
- Durable laser-engraved label
- Available in cable and micro-connector styles

Standards and Certifications

- UL Listed, E166051
- UL Tested to Canadian safety standards
- CE
- RoHS Compliant



DANGER

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



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

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

Product Selection

E57P Performance Sensors

Three-Wire Sensors

| | Operating Voltage | Sensing Range (Sn) | Shielding | Connection Type ^① | NO Output Catalog Number | NC Output Catalog Number |
|---|----------------------|-----------------------------------|------------------------|------------------------------|--------------------------|--------------------------|
|  | 10–48 Vdc | 12 mm Diameter End Sensing | | | | |
| | | 2 mm (standard range) | Shielded (PNP) | 2-meter cable | E57P-12SPN2-C2 | E57P-12SPC2-C2 |
| | | | | 4-pin micro DC connector | E57P-12SPN2-Q | E57P-12SPC2-Q |
| | | | Shielded (NPN) | 2-meter cable | E57P-12SNN2-C2 | E57P-12SNC2-C2 |
| | | | | 4-pin micro DC connector | E57P-12SNN2-Q | E57P-12SNC2-Q |
| | | 4 mm (standard range) | Unshielded (PNP) | 2-meter cable | E57P-12UPN4-C2 | E57P-12UPC4-C2 |
| | | | | 4-pin micro DC connector | E57P-12UPN4-Q | E57P-12UPC4-Q |
| | | | Unshielded (NPN) | 2-meter cable | E57P-12UNN4-C2 | E57P-12UNC4-C2 |
| | | | | 4-pin micro DC connector | E57P-12UNN4-Q | E57P-12UNC4-Q |
| | | 4 mm (extended range) | Shielded (PNP) | 2-meter cable | E57P-12SPN4-C2 | E57P-12SPC4-C2 |
| | | | | 4-pin micro DC connector | E57P-12SPN4-Q | E57P-12SPC4-Q |
| | | | Shielded (NPN) | 2-meter cable | E57P-12SNN4-C2 | E57P-12SNC4-C2 |
| 4-pin micro DC connector | E57P-12SNN4-Q | | | E57P-12SNC4-Q | | |
| 8 mm (extended range) | Unshielded (PNP) | 2-meter cable | E57P-12UPN8-C2 | E57P-12UPC8-C2 | | |
| | | 4-pin micro DC connector | E57P-12UPN8-Q | E57P-12UPC8-Q | | |
| | Unshielded (NPN) | 2-meter cable | E57P-12UNN8-C2 | E57P-12UNC8-C2 | | |
| | | 4-pin micro DC connector | E57P-12UNN8-Q | E57P-12UNC8-Q | | |
|  | 10–48 Vdc | 18 mm Diameter End Sensing | | | | |
| | | 5 mm (standard range) | Shielded (PNP) | 2-meter cable | E57P-18SPN5-C2 | E57P-18SPC5-C2 |
| | | | | 4-pin micro DC connector | E57P-18SPN5-Q | E57P-18SPC5-Q |
| | | | Shielded (NPN) | 2-meter cable | E57P-18SNN5-C2 | E57P-18SNC5-C2 |
| | | | | 4-pin micro DC connector | E57P-18SNN5-Q | E57P-18SNC5-Q |
| | | 8 mm (standard range) | Unshielded (PNP) | 2-meter cable | E57P-18UPN8-C2 | E57P-18UPC8-C2 |
| | | | | 4-pin micro DC connector | E57P-18UPN8-Q | E57P-18UPC8-Q |
| | | | Unshielded (NPN) | 2-meter cable | E57P-18UNN8-C2 | E57P-18UNC8-C2 |
| | | | | 4-pin micro DC connector | E57P-18UNN8-Q | E57P-18UNC8-Q |
| | | 8 mm (extended range) | Shielded (PNP) | 2-meter cable | E57P-18SPN8-C2 | E57P-18SPC8-C2 |
| | | | | 4-pin micro DC connector | E57P-18SPN8-Q | E57P-18SPC8-Q |
| | | | Shielded (NPN) | 2-meter cable | E57P-18SNN8-C2 | E57P-18SNC8-C2 |
| 4-pin micro DC connector | E57P-18SNN8-Q | | | E57P-18SNC8-Q | | |
| 12 mm (extended range) | Unshielded (PNP) | 2-meter cable | E57P-18UPN12-C2 | E57P-18UPC12-C2 | | |
| | | 4-pin micro DC connector | E57P-18UPN12-Q | E57P-18UPC12-Q | | |
| | Unshielded (NPN) | 2-meter cable | E57P-18UNN12-C2 | E57P-18UNC12-C2 | | |
| | | 4-pin micro DC connector | E57P-18UNN12-Q | E57P-18UNC12-Q | | |

Notes

⊕ See listing of compatible connector cables on [Page V8-T3-20](#).

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.

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Inductive Proximity Sensors

E57P Performance Series Sensors

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Three-Wire Sensors, continued

| Operating Voltage | Sensing Range (Sn) | Shielding | Connection Type ① | NO Output Catalog Number | NC Output Catalog Number | |
|-----------------------------------|--------------------------|------------------------|--------------------------|--------------------------|--------------------------|------------------------|
| 30 mm Diameter End Sensing | | | | | | |
| 10–48 Vdc | 10 mm (standard range) | Shielded (PNP) | 2-meter cable | E57P-30SPN10-C2 | E57P-30SPC10-C2 | |
| | | | 4-pin micro DC connector | E57P-30SPN10-Q | E57P-30SPC10-Q | |
| | | Shielded (NPN) | 2-meter cable | E57P-30SNN10-C2 | E57P-30SNC10-C2 | |
| | | | 4-pin micro DC connector | E57P-30SNN10-Q | E57P-30SNC10-Q | |
| | | 15 mm (standard range) | Unshielded (PNP) | 2-meter cable | E57P-30UPN15-C2 | E57P-30UPC15-C2 |
| | | | | 4-pin micro DC connector | E57P-30UPN15-Q | E57P-30UPC15-Q |
| | Unshielded (NPN) | | 2-meter cable | E57P-30UNN15-C2 | E57P-30UNC15-C2 | |
| | | | 4-pin micro DC connector | E57P-30UNN15-Q | E57P-30UNC15-Q | |
| | 15 mm (extended range) | Shielded (PNP) | 2-meter cable | E57P-30SPN15-C2 | E57P-30SPC15-C2 | |
| | | | 4-pin micro DC connector | E57P-30SPN15-Q | E57P-30SPC15-Q | |
| | | Shielded (NPN) | 2-meter cable | E57P-30SNN15-C2 | E57P-30SNC15-C2 | |
| | | | 4-pin micro DC connector | E57P-30SNN15-Q | E57P-30SNC15-Q | |
| 22 mm (extended range) | | Unshielded (PNP) | 2-meter cable | E57P-30UPN22-C2 | E57P-30UPC22-C2 | |
| | | | 4-pin micro DC connector | E57P-30UPN22-Q | E57P-30UPC22-Q | |
| Unshielded (NPN) | 2-meter cable | E57P-30UNN22-C2 | E57P-30UNC22-C2 | | | |
| | 4-pin micro DC connector | E57P-30UNN22-Q | E57P-30UNC22-Q | | | |

Compatible Connector Cables

Standard Cables ①

| Current Rating at 600 V | 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 | | | | | | | |
| — | DC | 4-pin, 4-wire | 22 AWG | 6.0 ft (2m) | | CSDS4A4CY2202 | CSDS4A4RY2202 |

Accessories

E57P Performance Sensors

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

Notes

② See listing of compatible connector cables on **Page V8-T3-20**.

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

Technical Data and Specifications

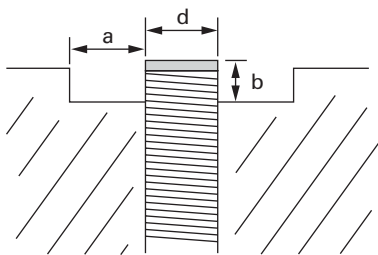
E57P Performance Sensors

| Description | Performance Three-Wire DC Sensors |
|--------------------------------|---|
| Operating voltage | 10–48 Vdc |
| Output current (continuous) | 300 mA |
| Switching frequency [Hz] | Standard range: 12 mm—Shielded: 2000; Unshielded: 2000 18 mm—Shielded: 1200; Unshielded: 1200 30 mm—Shielded: 600; Unshielded: 500 Extended range: 12 mm—Shielded: 1200; Unshielded: 500 18 mm—Shielded: 300; Unshielded: 300 30 mm—Shielded: 400; Unshielded: 200 |
| Leakage current | <100 μ A |
| Output voltage drop [Vsat] | <2.5 V |
| Current consumption | <10 mA |
| Short-circuit protection | Yes (Auto Reset) |
| Hysteresis [% of Sr] | 2–20% |
| Repeat accuracy | 1% shielded, 3% unshielded |
| Time delay before availability | <200 ms |
| Output indicator LED | 360° amber LED |
| Operating temperature range | –40 to 70 °C |
| Ingress protection | IEC IP67, IP69K, UL Type 1, NEMA Type 6P, NEMA Type 4X |
| Shock | 30 g, 11 ms per IEC 68-2-76 |
| Vibration | 10 to 55 Hz, 1 mm amplitude |
| Housing materials | Front face: Ryton Tube: Stainless steel End bells: M12 body: Polycarbonate Cable end bell: Polycarbonate Nuts: Stainless steel |
| Cable | 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.)

E57P Performance Sensors, Mounting



| Type | Shielding | a | b |
|----------------|------------|------------|--------|
| Standard range | Shielded | 0 | 0 |
| | Unshielded | Cap height | 2 x 5n |
| Extended range | Shielded | 0 | 0 |
| | Unshielded | Cap height | 2 x Sn |

Note

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

① 40–240 Vac at <–4 °F (<–20 °C).

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Inductive Proximity Sensors

E57P Performance Series Sensors

Wiring Diagrams

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

E57P Performance Sensors

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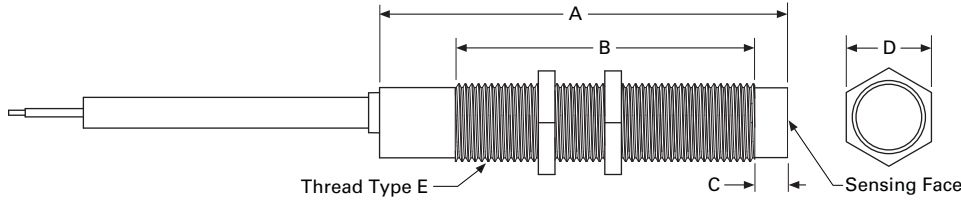
| Operating Voltage | Output | Cable Models | Connector Models (Face View Male Shown) Micro |
|---------------------------|----------|--------------|--|
| Three-Wire Sensors | | | |
| 10–48 Vdc | NO (NPN) | | |
| | NO (PNP) | | |
| | NC (NPN) | | |
| | NC (PNP) | | |

Dimensions

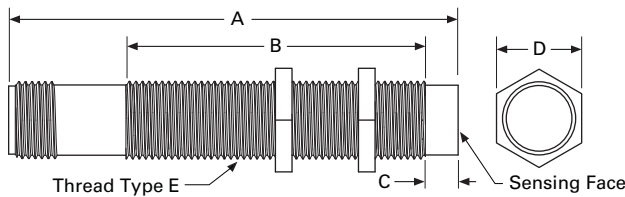
Approximate Dimensions in Inches (mm)

E57P Performance Series Sensors, End Sensing^①

Cable Models



Connector Models



| Size | Shielding | Overall Length A | Threaded Length B | Cap Height C | Nut Width D | Thread Size E |
|---|------------|---------------------|----------------------|-----------------|----------------|------------------|
| Three-Wire DC Sensors—Cable Models | | | | | | |
| 12 mm | Shielded | 2.52 (64.1) | 1.98 (50.3) | — | 0.67 (16.8) | M12 x 1 |
| | Unshielded | 2.52 (64.1) | 1.80 (45.8) | 0.20 (5.0) | 0.67 (16.8) | M12 x 1 |
| 18 mm | Shielded | 2.59 (65.9) | 2.00 (50.9) | — | 0.94 (23.8) | M18 x 1 |
| | Unshielded | 2.59 (65.9) | 1.75 (44.4) | 0.28 (7.0) | 0.94 (23.8) | M18 x 1 |
| 30 mm | Shielded | 2.67 (67.7) | 1.98 (50.3) | — | 1.41 (35.9) | M30 x 1.5 |
| | Unshielded | 2.67 (67.7) | 1.49 (37.8) | 0.51 (13.0) | 1.41 (35.9) | M30 x 1.5 |
| Three-Wire DC Sensors—Micro-Connector Models | | | | | | |
| 12 mm | Shielded | 2.70 (68.7) | 1.98 (50.3) | — | 0.67 (16.8) | M12 x 1 |
| | Unshielded | 2.70 (68.7) | 1.80 (45.8) | 0.20 (5.0) | 0.67 (16.8) | M12 x 1 |
| 18 mm | Shielded | 2.72 (69.2) | 2.00 (50.9) | — | 0.94 (23.8) | M18 x 1 |
| | Unshielded | 2.72 (69.2) | 1.75 (44.4) | 0.28 (7.0) | 0.94 (23.8) | M18 x 1 |
| 30 mm | Shielded | 2.79 (70.9) | 1.98 (50.3) | — | 1.41 (35.9) | M30 x 1.5 |
| | Unshielded | 2.79 (70.9) | 1.49 (37.8) | 0.51 (13.0) | 1.41 (35.9) | M30 x 1.5 |

Note

^① These dimensions apply to the Performance Series models in this section.

E57PS Performance Short Body Sensors

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Contents

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| E57PS Performance Short Body Sensors . . . | V8-T3-25 |
| Compatible Connector Cables | V8-T3-25 |
| Accessories | V8-T3-26 |
| Technical Data and Specifications | V8-T3-26 |
| Wiring Diagrams | V8-T3-27 |
| Dimensions | V8-T3-27 |

E57PS Performance Short Body Sensors

Product Description

For demanding sensing applications in areas too small for standard length units, the E57PS Performance Short Body series is an ideal solution as it incorporates the premium features of the E57P series but in a shorter body length. With its stainless steel tubular body, IP69K rating, wide temperature range (down to -40 °C), fast switching speed and laser-etched markings, the E57PS series provides value at a low price point.

Features

- 360° LED indicator
- Stainless steel tube
- 10–48 Vdc operating voltage
- Short-circuit protection
- -40 to 70 °C temperature range
- IP69K environmental rating
- Durable laser-engraved label
- Available in cable and micro-connector styles

Standards and Certifications

- UL Listed, E166051
- UL Tested to Canadian safety standards
- CE
- RoHS Compliant



⚠ DANGER

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




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

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

Product Selection



E57PS Performance Short Body Sensors

Three-Wire Sensors

| | Operating Voltage | Sensing Range (Sn) | Shielding | Connection Type ^① | NO Output Catalog Number | NC Output Catalog Number |
|---|---|------------------------|--------------------------|------------------------------|--------------------------|--------------------------|
|  | 12 mm Diameter | | | | | |
| | 10–48 Vdc | 2 mm (standard range) | Shielded (PNP) | 2-meter cable | E57PS-12SPN2-C2 | E57PS-12SPC2-C2 |
| | | | | 4-pin micro DC connector | E57PS-12SPN2-Q ⊕ | E57PS-12SPC2-Q ⊕ |
| | | Shielded (NPN) | 2-meter cable | E57PS-12SNN2-C2 | E57PS-12SNC2-C2 | |
| | | | 4-pin micro DC connector | E57PS-12SNN2-Q ⊕ | E57PS-12SNC2-Q ⊕ | |
| | | 4 mm (standard range) | Unshielded (PNP) | 2-meter cable | E57PS-12UPN4-C2 | E57PS-12UPC4-C2 |
| | | | | 4-pin micro DC connector | E57PS-12UPN4-Q ⊕ | E57PS-12UPC4-Q ⊕ |
| | Unshielded (NPN) | | 2-meter cable | E57PS-12UNN4-C2 | E57PS-12UNC4-C2 | |
| | | | 4-pin micro DC connector | E57PS-12UNN4-Q ⊕ | E57PS-12UNC4-Q ⊕ | |
| |  | 18 mm Diameter | | | | |
| 10–48 Vdc | | 5 mm (standard range) | Shielded (PNP) | 2-meter cable | E57PS-18SPN5-C2 | E57PS-18SPC5-C2 |
| | | | | 4-pin micro DC connector | E57PS-18SPN5-Q ⊕ | E57PS-18SPC5-Q ⊕ |
| | | Shielded (NPN) | 2-meter cable | E57PS-18SNN5-C2 | E57PS-18SNC5-C2 | |
| | | | 4-pin micro DC connector | E57PS-18SNN5-Q ⊕ | E57PS-18SNC5-Q ⊕ | |
| | | 8 mm (standard range) | Unshielded (PNP) | 2-meter cable | E57PS-18UPN8-C2 | E57PS-18UPC8-C2 |
| | | | | 4-pin micro DC connector | E57PS-18UPN8-Q ⊕ | E57PS-18UPC8-Q ⊕ |
| Unshielded (NPN) | | | 2-meter cable | E57PS-18UNN8-C2 | E57PS-18UNC8-C2 | |
| | | | 4-pin micro DC connector | E57PS-18UNN8-Q ⊕ | E57PS-18UNC8-Q ⊕ | |
|  | | 30 mm Diameter | | | | |
| | 10–48 Vdc | 10 mm (standard range) | Shielded (PNP) | 2-meter cable | E57PS-30SPN10-C2 | E57PS-30SPC10-C2 |
| | | | | 4-pin micro DC connector | E57PS-30SPN10-Q ⊕ | E57PS-30SPC10-Q ⊕ |
| | | Shielded (NPN) | 2-meter cable | E57PS-30SNN10-C2 | E57PS-30SNC10-C2 | |
| | | | 4-pin micro DC connector | E57PS-30SNN10-Q ⊕ | E57PS-30SNC10-Q ⊕ | |
| | | 15 mm (standard range) | Unshielded (PNP) | 2-meter cable | E57PS-30UPN15-C2 | E57PS-30UPC15-C2 |
| | | | | 4-pin micro DC connector | E57PS-30UPN15-Q ⊕ | E57PS-30UPC15-Q ⊕ |
| | Unshielded (NPN) | | 2-meter cable | E57PS-30UNN15-C2 | E57PS-30UNC15-C2 | |
| | | | 4-pin micro DC connector | E57PS-30UNN15-Q ⊕ | E57PS-30UNC15-Q ⊕ | |

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 |
|---|-------------------------------------|----------------|--------|-------------|---|---------------------------|---------------------------|
|  | Micro-Style, Straight Female | | | | | | |
| | DC | 4-pin, 4-wire | 22 AWG | 6.0 ft (2m) |  1-Brown 2-White 3-Blue 4-Black | CSDS4A4CY2202 | CSDS4A4RY2202 |

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

E57PS Performance Short Body Sensors

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

Technical Data and Specifications

E57PS Performance Short Body Sensors

| Description | Three-Wire DC Sensors |
|--------------------------|--|
| Operating voltage | 10–48 Vdc |
| Maximum load current | 300 mA |
| Switching frequency [Hz] | 12 mm—Shielded: 2000; Unshielded: 2000 18 mm—Shielded: 1200; Unshielded: 1200 30 mm—Shielded: 600; Unshielded: 500 |
| Leakage current | 100 μ A maximum |
| Voltage drop | ≤ 2.5 V |
| Holding current | ≤ 10 mA |
| Short-circuit protection | Yes (Auto Reset) |
| Switching hysteresis | 2–20% of rated sensing distance |
| Repeat accuracy | 1% shielded, 3% unshielded |
| Output indicator LED | 360° amber LED |
| Operating temperature | –40 to 158 °F (–40 to 70 °C) |
| Enclosure ratings | IP67, IP69K; NEMA 4, 4X, 6, 6P |
| Shock | 30 g sine wave, 11 ms per IEC68-2-76 |
| Vibration | 10 to 55 Hz, 1 mm amplitude |
| Material of construction | Stainless steel, polycarbonate end bells, Ryton® front cap |
| Cable | AWM Style 20387 (PVC) |

Note

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

Wiring Diagrams

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

E57PS Performance Short Body Sensors

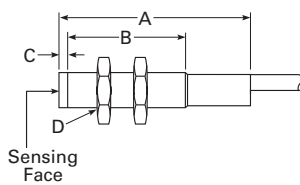
| Operating Voltage | Output | Cable Models | Micro-Connector Models (Face View Male Shown) |
|---------------------------|----------|--------------|---|
| Three-Wire Sensors | | | |
| 10–48 Vdc | NO (NPN) | | |
| | NO (PNP) | | |
| | NC (NPN) | | |
| | NC (PNP) | | |

Dimensions

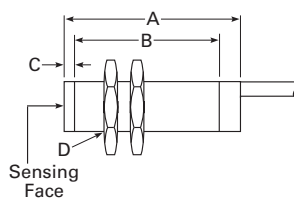
Approximate Dimensions in Inches (mm)

E57PS Performance Short Body Sensors—Cable Models

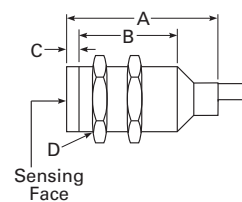
12 mm



18 mm



30 mm



| Size | Shielding | Overall Length A | Threaded Length B | Cap Height C | Thread Size D |
|------------------------------|------------|------------------|-------------------|--------------|---------------|
| Three-Wire DC Sensors | | | | | |
| 12 mm | Shielded | 1.61 (40.9) | 1.07 (27.2) | — | M12 x 1 |
| | Unshielded | 1.61 (40.9) | 0.89 (22.7) | 0.20 (5.0) | M12 x 1 |
| 18 mm | Shielded | 1.77 (44.9) | 1.17 (29.8) | — | M18 x 1 |
| | Unshielded | 1.77 (44.9) | 0.92 (23.3) | 0.28 (7.0) | M18 x 1 |
| 30 mm | Shielded | 1.84 (46.6) | 1.15 (29.3) | — | M30 x 1.5 |
| | Unshielded | 1.84 (46.6) | 0.66 (16.8) | 0.51 (13.0) | M30 x 1.5 |

3.3

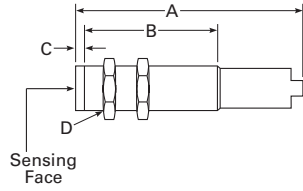
Inductive Proximity Sensors

E57PS Performance Short Body Sensors

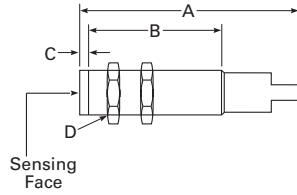
Approximate Dimensions in Inches (mm)

E57PS Performance Short Body Sensors—Micro-Connector Models

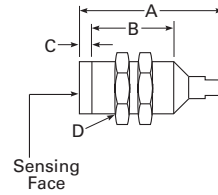
12 mm



18 mm



30 mm



| Size | Shielding | Overall Length A | Threaded Length B | Cap Height C | Thread Size D |
|------------------------------|------------|---------------------|----------------------|-----------------|------------------|
| Three-Wire DC Sensors | | | | | |
| 12 mm | Shielded | 1.64 (41.5) | 1.07 (27.2) | — | M12 x 1 |
| | Unshielded | 1.64 (41.5) | 0.89 (22.7) | 0.20 (5.0) | M12 x 1 |
| 18 mm | Shielded | 1.59 (40.3) | 1.17 (29.8) | — | M18 x 1 |
| | Unshielded | 1.59 (40.3) | 0.92 (23.3) | 0.28 (7.0) | M18 x 1 |
| 30 mm | Shielded | 1.77 (45.0) | 1.15 (29.3) | — | M30 x 1.5 |
| | Unshielded | 1.96 (49.7) | 0.66 (16.8) | 0.51 (13.0) | M30 x 1.5 |

E57G General Purpose Proximity Sensors



Contents

| Description | Page |
|--|-----------------|
| E57G General Purpose Proximity Sensors | |
| Product Selection | |
| E57G General Purpose Proximity Sensors | V8-T3-30 |
| Compatible Connector Cables | V8-T3-31 |
| Accessories | V8-T3-31 |
| Technical Data and Specifications | V8-T3-32 |
| Wiring Diagrams | V8-T3-33 |
| Dimensions | V8-T3-34 |

E57G General Purpose Proximity Sensors

Product Description

For global sensing applications, the E57G General Purpose series is designed for most standard inductive sensing needs. With its stainless steel tubular body, 360 degree visible LED, fast switching speed and laser-etched markings, the E57G series is an ideal cost-effective solution.

Features

- 360° LED indicator
- Stainless steel tube
- 10–30 Vdc operating voltage
- Short-circuit protection
- –25 to 70 °C temperature range
- IP67 environmental rating
- Durable laser-engraved label
- Available in cable and micro-connector styles
- Nickel-brass mounting nuts

Standards and Certifications

- UL Listed, E166051
- UL Tested to Canadian safety standards
- CE
- RoHS Compliant



DANGER

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

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

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

3.4

Inductive Proximity Sensors



E57G General Purpose Proximity Sensors

Product Selection

E57G General Purpose Proximity Sensors

3

Three-Wire Sensors

| | Operating Voltage | Sensing Range | Shielding | Output Type | Connection Type | NO Output Catalog Number | NC Output Catalog Number | | |
|---|---|------------------------|------------|--------------------------|--------------------------|--------------------------|--------------------------|------------------------|------------------------|
|  | 12 mm Diameter | | | | | | | | |
| | 10–30 Vdc | 2 mm (standard range) | Shielded | PNP | 2-meter cable | E57G-12SPN2-C2 | E57G-12SPC2-C2 | | |
| | | | | | 4-pin micro DC connector | E57G-12SPN2-Q | E57G-12SPC2-Q | | |
| | | | | NPN | 2-meter cable | E57G-12SNN2-C2 | E57G-12SNC2-C2 | | |
| | | | | | 4-pin micro DC connector | E57G-12SNN2-Q | E57G-12SNC2-Q | | |
| | | | | PNP | 4 mm (standard range) | Unshielded | 2-meter cable | E57G-12UPN4-C2 | E57G-12UPC4-C2 |
| | | | | | | | 4-pin micro DC connector | E57G-12UPN4-Q | E57G-12UPC4-Q |
| | NPN | 4 mm (standard range) | Unshielded | 2-meter cable | E57G-12UNN4-C2 | E57G-12UNC4-C2 | | | |
| | | | | 4-pin micro DC connector | E57G-12UNN4-Q | E57G-12UNC4-Q | | | |
| | 4 mm (extended range) | 4 mm (extended range) | Shielded | PNP | 2-meter cable | E57G-12SPN4-C2 | E57G-12SPC4-C2 | | |
| | | | | | 4-pin micro DC connector | E57G-12SPN4-Q | E57G-12SPC4-Q | | |
| | | | | NPN | 2-meter cable | E57G-12SNN4-C2 | E57G-12SNC4-C2 | | |
| | | | | | 4-pin micro DC connector | E57G-12SNN4-Q | E57G-12SNC4-Q | | |
| | | | | PNP | 8 mm (extended range) | Unshielded | 2-meter cable | E57G-12UPN8-C2 | E57G-12UPC8-C2 |
| | | | | | | | 4-pin micro DC connector | E57G-12UPN8-Q | E57G-12UPC8-Q |
| | NPN | 8 mm (extended range) | Unshielded | 2-meter cable | E57G-12UNN8-C2 | E57G-12UNC8-C2 | | | |
| | | | | 4-pin micro DC connector | E57G-12UNN8-Q | E57G-12UNC8-Q | | | |
| |  | 18 mm Diameter | | | | | | | |
| 10–30 Vdc | | 5 mm (standard range) | Shielded | PNP | 2-meter cable | E57G-18SPN5-C2 | E57G-18SPC5-C2 | | |
| | | | | | 4-pin micro DC connector | E57G-18SPN5-Q | E57G-18SPC5-Q | | |
| | | | | NPN | 2-meter cable | E57G-18SNN5-C2 | E57G-18SNC5-C2 | | |
| | | | | | 4-pin micro DC connector | E57G-18SNN5-Q | E57G-18SNC5-Q | | |
| | | | | PNP | 8 mm (standard range) | Unshielded | 2-meter cable | E57G-18UPN8-C2 | E57G-18UPC8-C2 |
| | | | | | | | 4-pin micro DC connector | E57G-18UPN8-Q | E57G-18UPC8-Q |
| NPN | | 8 mm (standard range) | Unshielded | 2-meter cable | E57G-18UNN8-C2 | E57G-18UNC8-C2 | | | |
| | | | | 4-pin micro DC connector | E57G-18UNN8-Q | E57G-18UNC8-Q | | | |
| 8 mm (extended range) | | 8 mm (extended range) | Shielded | PNP | 2-meter cable | E57G-18SPN8-C2 | E57G-18SPC8-C2 | | |
| | | | | | 4-pin micro DC connector | E57G-18SPN8-Q | E57G-18SPC8-Q | | |
| | | | | NPN | 2-meter cable | E57G-18SNN8-C2 | E57G-18SNC8-C2 | | |
| | | | | | 4-pin micro DC connector | E57G-18SNN8-Q | E57G-18SNC8-Q | | |
| | | | | PNP | 12 mm (extended range) | Unshielded | 2-meter cable | E57G-18UPN12-C2 | E57G-18UPC12-C2 |
| | | | | | | | 4-pin micro DC connector | E57G-18UPN12-Q | E57G-18UPC12-Q |
| NPN | | 12 mm (extended range) | Unshielded | 2-meter cable | E57G-18UNN12-C2 | E57G-18UNC12-C2 | | | |
| | | | | 4-pin micro DC connector | E57G-18UNN12-Q | E57G-18UNC12-Q | | | |

Note

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

Three-Wire Sensors, continued

30 mm



| Operating Voltage | Sensing Range | Shielding | Output Type | Connection Type | NO Output Catalog Number | NC Output Catalog Number | |
|------------------------|------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|------------------------|
| 30 mm Diameter | | | | | | | |
| 10–30 Vdc | 10 mm (standard range) | Shielded | PNP | 2-meter cable | E57G-30SPN10-C2 | E57G-30SPC10-C2 | |
| | | | | 4-pin micro DC connector | E57G-30SPN10-Q | E57G-30SPC10-Q | |
| | | | NPN | 2-meter cable | E57G-30SNN10-C2 | E57G-30SNC10-C2 | |
| | | 4-pin micro DC connector | | E57G-30SNN10-Q | E57G-30SNC10-Q | | |
| | | 15 mm (standard range) | Unshielded | PNP | 2-meter cable | E57G-30UPN15-C2 | E57G-30UPC15-C2 |
| | | | | | 4-pin micro DC connector | E57G-30UPN15-Q | E57G-30UPC15-Q |
| | NPN | | | 2-meter cable | E57G-30UNN15-C2 | E57G-30UNC15-C2 | |
| | | | 4-pin micro DC connector | E57G-30UNN15-Q | E57G-30UNC15-Q | | |
| | 15 mm (extended range) | | Shielded | PNP | 2-meter cable | E57G-30SPN15-C2 | E57G-30SPC15-C2 |
| | | | | | 4-pin micro DC connector | E57G-30SPN15-Q | E57G-30SPC15-Q |
| | | NPN | | 2-meter cable | E57G-30SNN15-C2 | E57G-30SNC15-C2 | |
| | | | 4-pin micro DC connector | E57G-30SNN15-Q | E57G-30SNC15-Q | | |
| 22 mm (extended range) | | Unshielded | PNP | 2-meter cable | E57G-30UPN22-C2 | E57G-30UPC22-C2 | |
| | | | | 4-pin micro DC connector | E57G-30UPN22-Q | E57G-30UPC22-Q | |
| | NPN | | 2-meter cable | E57G-30UNN22-C2 | E57G-30UNC22-C2 | | |
| | | 4-pin micro DC connector | E57G-30UNN22-Q | E57G-30UNC22-Q | | | |

Compatible Connector Cables

Standard Cables ①

Micro-Style Straight Female



| 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 | | | | | | |
| DC | 4-pin, 3-wire | 22 AWG | 6.0 ft (2m) | <p>1-Brown 2-No Wire 3-Blue 4-Black</p> | CSDS4A3CY2202 | CSDS4A3RY2202 |

Accessories

E57G General Purpose Proximity Sensors

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

Notes

- ② See listing of compatible connector cables on **Page V8-T3-31**.
- ① For a full selection of connector cables, see **Tab 10, section 10.1**.

Technical Data and Specifications

E57G General Purpose Proximity Sensors

| Description | Three-Wire DC Sensors |
|--------------------------------|---|
| Operating voltage | 10–30 Vdc |
| Output current (continuous) | 100 mA |
| Switching frequency [Hz] | Standard range: 12 mm—Shielded: 2000; Unshielded: 2000 18 mm—Shielded: 1200; Unshielded: 1200 30 mm—Shielded: 600; Unshielded: 500 Extended range: 12 mm—Shielded: 1200; Unshielded: 500 18 mm—Shielded: 300; Unshielded: 300 30 mm—Shielded: 400; Unshielded: 200 |
| Leakage current | <100 μ A |
| Output voltage drop [Vsat] | <2.5 V |
| Current consumption | <10 mA |
| Short-circuit protection | Yes (Auto Reset) |
| Hysteresis [% of Sr] | 2–20% |
| Repeat accuracy | 1% shielded, 3% unshielded |
| Time delay before availability | <200 ms |
| Output indicator LED | 360° amber LED |
| Operating temperature range | –25 to 70 °C |
| Ingress protection | IEC IP67, UL Type 1 |
| Mechanical shock | IEC 60947-5-2 30 G half-sine wave, 11 mS |
| Vibration | IEC 60947-5-2 10–55 Hz, 1 mm amplitude |
| Housing materials | Front face: Ryton Tube: stainless steel End bells: M12 body: Polycarbonate Cable end bell: Polycarbonate Nuts: Ni-Brass |
| Cable | AWM style 20387 (PVC) |

Wiring Diagrams

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

E57G General Purpose Proximity Sensors

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

3.4

Inductive Proximity Sensors

E57G General Purpose Proximity Sensors

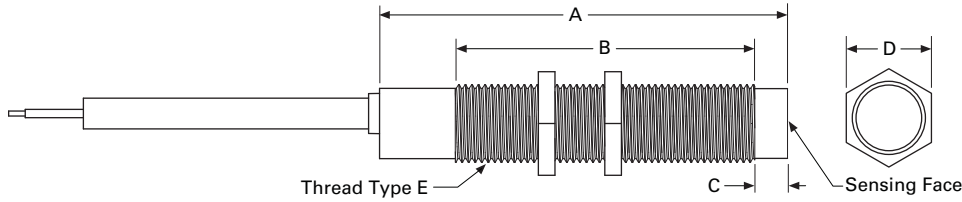
Dimensions

Approximate Dimensions in Inches (mm)

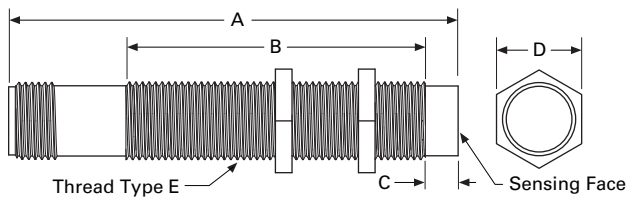
E57G General Purpose Proximity Sensors

Cable Models

3



Connector Models



| Size | Shielding | Overall Length A | Threaded Length B | Cap Height C | Nut Width D | Thread Size E |
|---|------------|---------------------|----------------------|-----------------|----------------|------------------|
| Three-Wire DC Sensors—Cable Models | | | | | | |
| 12 mm | Shielded | 2.52 (64.1) | 1.98 (50.3) | — | 0.67 (16.8) | M12 x 1 |
| | Unshielded | 2.52 (64.1) | 1.80 (45.8) | 0.20 (5.0) | 0.67 (16.8) | M12 x 1 |
| 18 mm | Shielded | 2.59 (65.9) | 2.00 (50.9) | — | 0.94 (23.8) | M18 x 1 |
| | Unshielded | 2.59 (65.9) | 1.75 (44.4) | 0.28 (7.0) | 0.94 (23.8) | M18 x 1 |
| 30 mm | Shielded | 2.67 (67.7) | 1.98 (50.3) | — | 1.41 (35.9) | M30 x 1.5 |
| | Unshielded | 2.67 (67.7) | 1.49 (37.8) | 0.51 (13.0) | 1.41 (35.9) | M30 x 1.5 |
| Three-Wire DC Sensors—Micro-Connector Models | | | | | | |
| 12 mm | Shielded | 2.70 (68.7) | 1.98 (50.3) | — | 0.67 (16.8) | M12 x 1 |
| | Unshielded | 2.70 (68.7) | 1.80 (45.8) | 0.20 (5.0) | 0.67 (16.8) | M12 x 1 |
| 18 mm | Shielded | 2.72 (69.2) | 2.00 (50.9) | — | 0.94 (23.8) | M18 x 1 |
| | Unshielded | 2.72 (69.2) | 1.75 (44.4) | 0.28 (7.0) | 0.94 (23.8) | M18 x 1 |
| 30 mm | Shielded | 2.79 (70.9) | 1.98 (50.3) | — | 1.41 (35.9) | M30 x 1.5 |
| | Unshielded | 2.79 (70.9) | 1.49 (37.8) | 0.51 (13.0) | 1.41 (35.9) | M30 x 1.5 |

E57 Two-Wire (AC, AC/DC, DC) Proximity Sensors



E57 Two-Wire (AC, AC/DC, DC) Proximity Sensors

Product Description

Eaton carries several options for your sensing needs in the E57 two-wire family. The stainless steel models are available in a standard length or short body, while available in AC or AC/DC configurations. The nickel-brass body models are available in standard length and either AC or DC two-wire configurations.

All of these are available in NPN or PNP with cable connections or micro connectors. The stainless steel standard length models are also available with mini connectors.

The stainless steel models in both lengths have 360 degree LEDs while the nickel-brass models have a single LED indicator.

Extended sensing ranges are also available in the stainless steel and nickel-brass standard length models, while shielded and unshielded models are offered throughout the E57 two-wire sensor products.

Contents

Description

E57 Two-Wire (AC, AC/DC, DC) Proximity Sensors

Product Selection

Stainless Steel Body (Standard Length) . . .

V8-T3-36

Stainless Steel Short Body

V8-T3-38

Nickel-Brass Body

V8-T3-39

Compatible Connector Cables

V8-T3-40

Accessories

V8-T3-40

Technical Data and Specifications

V8-T3-41

Wiring Diagrams

V8-T3-43

Dimensions

V8-T3-45

Standards and Certifications

- Stainless Steel:
 - UL Listed, E166051
 - UL Tested to Canadian safety standards
 - CE (AC/DC only)
 - RoHS Compliant
- Nickel-Brass:
 - CSA Certified, 224447
 - Products certified by CSA for US
 - CE (DC only)
 - RoHS Compliant



⚠ 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.

Highlighted Comparisons

| Description | Stainless Steel | Stainless Steel Short Body | Nickel-Brass |
|---------------------------------------|--|-------------------------------------|--------------|
| Current ratings | 250–500 mA | 250–500 mA | 200 mA |
| Enclosure ratings | NEMA 4, 4K, 6, 6P, 12, 13, IEC IP6, IP69K7 | NEMA 4, 4K, 6, 6P, 12, 13, IEC IP67 | IP67, IP69K |
| Operating temperature | –25 to 70 °C | –25 to 70 °C | –25 to 70 °C |
| Indicator | 360° LED | 360° LED | LED |
| Increased shock and vibration ratings | Yes | Yes | No |

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.

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

3.5

Inductive Proximity Sensors



E57 Two-Wire (AC, AC/DC, DC) Proximity Sensors

Product Selection

Stainless Steel Body (Standard Length)

3

Two-Wire Sensors

| | Operating Voltage | Sensing Range (Sn) | Shielding | Connection Type ^① | NO Output Catalog Number | NC Output Catalog Number | |
|---|---|------------------------|----------------------------------|----------------------------------|----------------------------------|--------------------------|-------------------------|
| 12 mm  | 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 ☹ | |
| | | 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 50/60 Hz ^② 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 ☹ | | |
| | | | 3-pin micro AC pigtail connector | E57SAL12A2EP ☹ | E57SBL12A2EP ☹ | | |
| 18 mm  | 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 ☹ | |
| | | 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 ☹ |
| | 18 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 ☹ | |
| | 40–250 Vac 50/60 Hz ^② 20–250 Vdc | 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 ☹ | |
| | | | | 3-pin micro AC pigtail connector | E57SAL18A2EP ☹ | E57SBL18A2EP ☹ | |
| | | | | 3-pin mini-connector | E57SAL18A2EB1 ☹ | E57SBL18A2EB1 ☹ | |

Notes



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

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.

Stainless Steel Body (Standard Length)

Two-Wire Sensors, continued

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

Notes

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

3.5




Inductive Proximity Sensors

E57 Two-Wire (AC, AC/DC, DC) Proximity Sensors

Stainless Steel Short Body

3

Two-Wire Sensors

| | Operating Voltage | Sensing Range (Sn) | Shielding | Connection Type ^① | NO Output Catalog Number | NC Output Catalog Number |
|---|---|-----------------------|------------|------------------------------|--------------------------|--------------------------|
| 12 mm  | 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 50/60 Hz ^② 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  | 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 50/60 Hz ^② 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  | | 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 50/60 Hz ^② 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-T3-40**.

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.

Nickel-Brass Body

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-D1 |
| | | | | | | 4-pin micro DC connector | E57-12GS02-DDB ☺ | E57-12GS02-D1DB ☺ |
| | 4 mm | | Unshielded | NPN/PNP | 2-meter cable | E57-12GU04-D | E57-12GU04-D1 | |
| | | | | | 4-pin micro DC connector | E57-12GU04-DDB ☺ | E57-12GU04-D1DB ☺ | |
| | 8 mm (extended range) | | | NPN/PNP | 2-meter cable | E57-12GE08-D | E57-12GE08-D1 | |
| | | | | | 4-pin micro DC connector | E57-12GE08-DDB ☺ | 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 ☺ | |
| | | 16 mm | | | | 3-pin micro AC connector | E57-18GE16-AAB ☺ | E57-18GE16-A1AB ☺ |
| | | | | | | | | |
| 10–30 Vdc | | 5 mm | Shielded | NPN/PNP | 2-meter cable | E57-18GS05-D | E57-18GS05-D1 | |
| | | | | | 4-pin micro DC connector | E57-18GS05-DDB ☺ | E57-18GS05-D1DB ☺ | |
| | | 8 mm | Unshielded | NPN/PNP | 2-meter cable | E57-18GU08-D | E57-18GU08-D1 | |
| | | | | | 4-pin micro DC connector | E57-18GU08-DDB ☺ | E57-18GU08-D1DB ☺ | |
| 16 mm (extended range) | | | | NPN/PNP | 2-meter cable | E57-18GE16-D | E57-18GE16-D1 | |
| | 4-pin micro DC connector | | | | E57-18GE16-DDB ☺ | 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-DDB ☺ | E57-30GS10-D1DB ☺ |
| | 15 mm | | Unshielded | NPN/PNP | 2-meter cable | E57-30GU15-D | E57-30GU15-D1 | |
| | | | | | 4-pin micro DC connector | E57-30GU15-DDB ☺ | E57-30GU15-D1DB ☺ | |
| | 25 mm (extended range) | | | NPN/PNP | 2-meter cable | E57-30GE25-D | E57-30GE25-D1 | |
| | | | | | 4-pin micro DC connector | E57-30GE25-DDB ☺ | E57-30GE25-D1DB ☺ | |

Note

☺☺ See listing of compatible connector cables on [Page V8-T3-40](#).

3.5

Inductive Proximity Sensors

E57 Two-Wire (AC, AC/DC, DC) Proximity Sensors


Compatible Connector Cables

Standard Cables ^①

3

Micro-Style
Straight Female



| 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 2-Red/Black 3-Red/White | CSAS3F3CY2202 | CSAS3F3RY2202 |

Accessories

E57 Two-Wire Proximity Sensors

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

Note

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

Technical Data and Specifications

Stainless Steel Body

| Description | Two-Wire AC/DC Sensors | | |
|--------------------------|---|---|---|
| | Two-Wire AC Sensors | AC Operation | DC Operation |
| Operating voltage | 40–250 Vac | 40–250 Vac | 20–250 Vdc |
| Maximum load current | 250 mA | 200 mA | 200 mA |
| Switching frequency | 20 Hz | 60 Hz | 60 Hz |
| Leakage current | 1.7 mA maximum at 70 °C | 1.7V mA maximum at 120 Vac | ≤2.0 mA |
| Voltage drop | 7V maximum | ≤4 V at >25 mA | 12 V at <10 mA |
| Holding current | 5 mA minimum | 5 mA minimum | 5 mA maximum |
| Protection | — | Resettable short circuit; overload protection | Resettable short circuit; overload protection |
| Switching hysteresis | 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 |
| Output indicator 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 |
| 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) |
| Shock | 30 g sine wave, 11 ms per IEC68-2-76 | 30 g sine wave, 11 ms per IEC68-2-76 | 30 g 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 |
| 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 |
| Cable | 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.

3.5

Inductive Proximity Sensors

E57 Two-Wire (AC, AC/DC, DC) Proximity Sensors

3

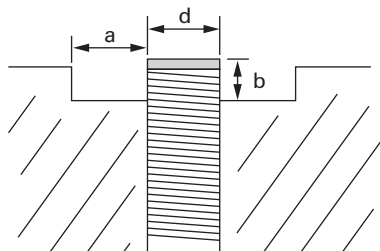
Nickel-Brass Body

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

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 |

Wiring Diagrams

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

Stainless Steel Body

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

3.5

Inductive Proximity Sensors

E57 Two-Wire (AC, AC/DC, DC) Proximity Sensors

Nickel-Brass Body

| Operating Voltage | Output | Cable Models | Connector Models (Face View Male Shown) Micro |
|-------------------------|----------|---|---|
| Two-Wire Sensors | | | |
| 20–250 Vac | NO | <p>* Internally connected to housing (use of this wire is optional)</p> | <p>* Internally connected to housing (use of this wire is optional)</p> |
| 10–30 Vdc | NO (NPN) | | |
| | NO (PNP) | | |

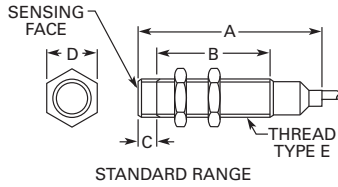
3

Dimensions

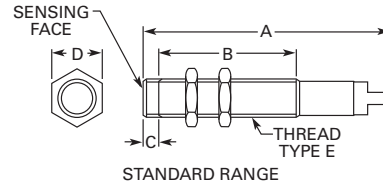
Approximate Dimensions in Inches (mm)

Stainless Steel Body (Standard Length)

Cable Models



Connector Models



| Size | Shielding | Overall Length A | Threaded Length B | Cap Height C | Nut Width D | Thread Size E |
|---|---------------|---------------------|----------------------|-----------------|----------------|------------------|
| Two-Wire AC Sensors—Cable Models | | | | | | |
| 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 |
| Two-Wire AC Sensors—Micro-Connector Models | | | | | | |
| 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 |

3.5

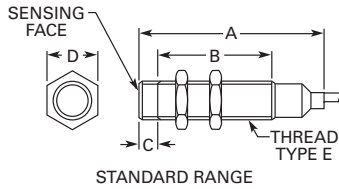
Inductive Proximity Sensors

E57 Two-Wire (AC, AC/DC, DC) Proximity Sensors

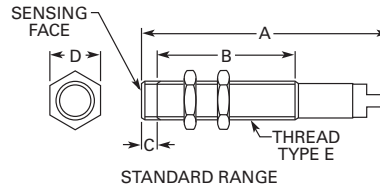
Approximate Dimensions in Inches (mm)

Stainless Steel Body (Standard Length)

Cable Models, continued



Connector Models, continued



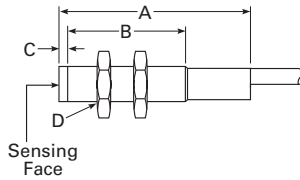
3

| Size | Shielding | Overall Length A | Threaded Length B | Cap Height C | Nut Width D | Thread Size E |
|--|---------------|---------------------|----------------------|-----------------|----------------|------------------|
| Two-Wire AC/DC Sensors—Cable Models | | | | | | |
| 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) | 2.12 (53.8) | — | 1.41 (35.9) | M30 x 1.5 |
| | Unshielded | 2.72 (69.3) | 1.63 (41.4) | 0.52 (13.26) | 1.41 (35.9) | M30 x 1.5 |
| Two-Wire AC/DC Sensors—Micro-Connector Models | | | | | | |
| 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 |
| Two-Wire AC Sensors—Mini-Connector Models | | | | | | |
| 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 |

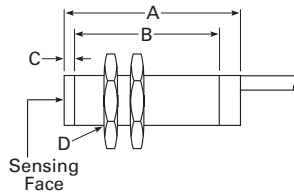
Approximate Dimensions in Inches (mm)

Stainless Steel Short Body (Cable Connector Models)

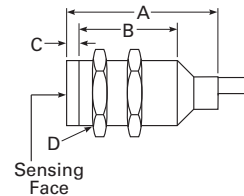
12 mm



18 mm



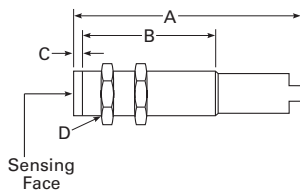
30 mm



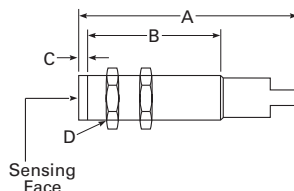
| Size | Shielding | Overall Length A | Threaded Length B | Cap Height C | Thread Size D |
|-------------------------------|------------|---------------------|----------------------|-----------------|------------------|
| Two-Wire AC Sensors | | | | | |
| 12 mm | Shielded | 2.04 (51.7) | 1.56 (39.6) | 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 |
| Two-Wire AC/DC Sensors | | | | | |
| 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 |

Stainless Steel Short Body (Micro-Connector Models)

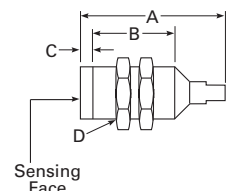
12 mm



18 mm



30 mm



| Size | Shielding | Overall Length A | Threaded Length B | Cap Height C | Thread Size D |
|-------------------------------|------------|---------------------|----------------------|-----------------|------------------|
| Two-Wire AC Sensors | | | | | |
| 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 |
| Two-Wire AC/DC Sensors | | | | | |
| 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 |

3.5

Inductive Proximity Sensors

E57 Two-Wire (AC, AC/DC, DC) Proximity Sensors

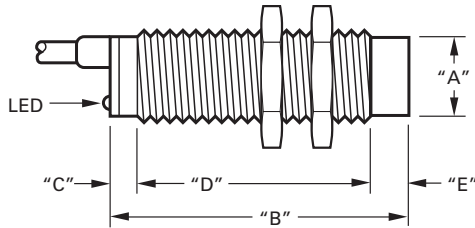
Approximate Dimensions in mm

Nickel-Brass Body

Cable Models

3

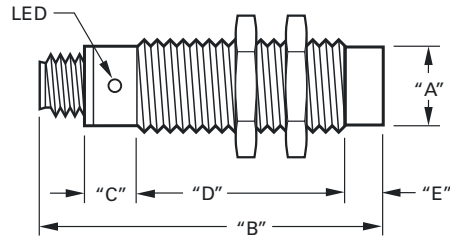
Two-Wire Sensors



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

Connector Models

Two-Wire Sensors



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

Note

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

AccuProx Analog Sensors



Contents

| Description | Page |
|---|-----------------|
| AccuProx Analog Sensors | |
| Application Guide | V8-T3-50 |
| Product Selection | |
| AccuProx Analog Sensors | V8-T3-51 |
| Compatible Connector Cables | V8-T3-51 |
| Technical Data and Specifications | V8-T3-52 |
| Wiring Diagrams | V8-T3-54 |
| Dimensions | V8-T3-54 |

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-T3-50** for more detail.

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 (0–10 V)
- 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 20 V/m prevents many problems associated with electrical noise

Standards and Certifications

- UL Listed, E166051
- UL Tested to Canadian safety standards
- CE
- RoHS Compliant



⚠ DANGER

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

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

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

3.6

Inductive Proximity Sensors

AccuProx Analog Sensors

Application Guide

Presenting AccuProx— Unmatched Analog Range in a Proven Package

3

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.

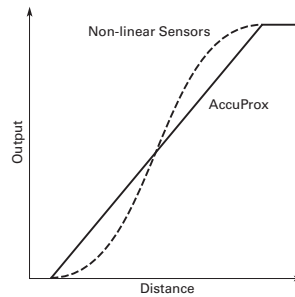
High Output Accuracy

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.

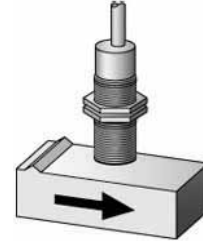
Linearity refers to the shape of the output curve. Many competitive analog sensors exhibit a wavy or “S-shaped” output curve. This means that a change in target distance may not always translate into an equivalent change in output, particularly at the innermost and outermost ranges of a non-linear analog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

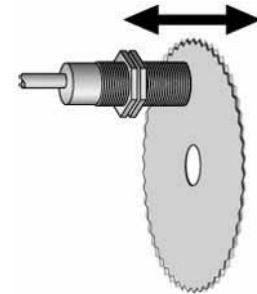
Typical Analog Applications Material Imperfection or Blemish Detection



Eccentricity or Absolute Angle Detection






Saw Blade Deflection



Product Selection




AccuProx Analog Sensors

Three-/Four-Wire Sensors

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

Compatible Connector Cables

Standard Cables ③

| | 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  | Micro-Style, Straight Female | | | | | | |
| | DC | 4-pin, 3-wire | 22 AWG | 6.0 ft (2m) |  1-Brown 2-No Wire 3-Blue 4-Black | CSDS4A3CY2202 | CSDS4A3RY2202 |
| | DC | 4-pin, 4-wire | 22 AWG | 6.0 ft (2m) |  1-Brown 2-White 3-Blue 4-Black | CSDS4A4CY2202 | CSDS4A4RY2202 |

Notes

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

Technical Data and Specifications

AccuProx Analog Sensors

3

| Description | 12 mm Models | | 18 mm Models | | 30 mm Models | |
|-------------------------------------|---|---|---|---|---|---|
| | Shielded | Unshielded | Shielded | Unshielded | Shielded | Unshielded |
| Performance | | | | | | |
| Analog operating range ^① | 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 (–40 to 70 °C) | –40 to 158 °F (–40 to 70 °C) | –40 to 158 °F (–40 to 70 °C) | –40 to 158 °F (–40 to 70 °C) | –40 to 158 °F (–40 to 70 °C) | –40 to 158 °F (–40 to 70 °C) |
| Temperature drift | <± 10% | <± 10% | <± 10% | <± 10% | <± 10% | <± 10% |
| Conformity | <± 10% | <± 10% | <± 10% | <± 10% | <± 10% | <± 10% |
| Repeat accuracy | <25 μm ^② | <20 μm ^② | <40 μm ^② | <20 μm ^② | <50 μm ^② | <30 μm ^② |
| 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. |
| Electrical | | | | | | |
| Style | AccuProx Analog, three-/four-wire DC | AccuProx Analog, three-/four-wire DC | AccuProx Analog, three-/four-wire DC | AccuProx Analog, three-/four-wire DC | AccuProx Analog, three-/four-wire DC | AccuProx Analog, 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 4–20 mA by model | 0–20 mA or 4–20 mA by model | 0–20 mA or 4–20 mA by model | 0–20 mA or 4–20 mA by model | 0–20 mA or 4–20 mA by model | 0–20 mA or 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 ^③ | 0–10 V | 0–10 V | 0–10 V | 0–10 V | 0–10 V | 0–10 V |
| Voltage output load resistance | 4.7–5.0 kohm (2.5 mA max.) | 4.7–5.0 kohm (2.5 mA max.) | 4.7–5.0 kohm (2.5 mA max.) | 4.7–5.0 kohm (2.5 mA max.) | 4.7–5.0 kohm (2.5 mA max.) | 4.7–5.0 kohm (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, 360° viewable | Dual-color, 360° viewable | Dual-color, 360° viewable | Dual-color, 360° viewable | Dual-color, 360° viewable | Dual-color, 360° viewable |
| Short-circuit protection | Incorporated ^④ | Incorporated ^④ | Incorporated ^④ | Incorporated ^④ | Incorporated ^④ | Incorporated ^④ |
| Wire breakage protection | Incorporated | Incorporated | Incorporated | Incorporated | Incorporated | Incorporated |
| Reverse polarity protection | Incorporated | Incorporated | Incorporated | Incorporated | Incorporated | Incorporated |
| Physical | | | | | | |
| Size | See Dimensions on Page V8-T3-54 . | | | | | |
| 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 | 30 g half-sine at 11 ms | 30 g half-sine at 11 ms | 30 g half-sine at 11 ms | 30 g half-sine at 11 ms | 30 g half-sine at 11 ms | 30 g half-sine at 11 ms |
| Vibration | 10–55 Hz, 1 mm amplitude | 10–55 Hz, 1 mm amplitude | 10–55 Hz, 1 mm amplitude | 10–55 Hz, 1 mm amplitude | 10–55 Hz, 1 mm amplitude | 10–55 Hz, 1 mm amplitude |
| Housing material | Stainless steel, polycarbonate end bell, polyphenylene sulfide front cap | Stainless steel, polycarbonate end bell, polyphenylene sulfide front cap | Stainless steel, polycarbonate end bell, polyphenylene sulfide front cap | Stainless steel, polycarbonate end bell, polyphenylene sulfide front cap | Stainless steel, polycarbonate end bell, polyphenylene sulfide front cap | Stainless steel, polycarbonate end bell, polyphenylene sulfide front cap |
| Termination | Micro-connector, potted cable, 2m; Pigtail, micro-connector, 2m | Micro-connector, potted cable, 2m; Pigtail, micro-connector, 2m | Micro-connector, potted cable, 2m; Pigtail, micro-connector, 2m | Micro-connector, potted cable, 2m; Pigtail, micro-connector, 2m | Micro-connector, potted cable, 2m; Pigtail, micro-connector, 2m | Micro-connector, potted cable, 2m; Pigtail, 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.

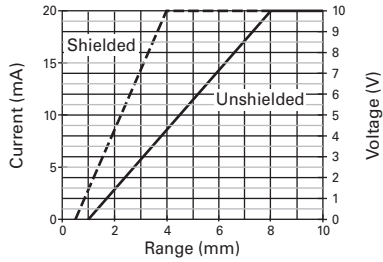
③ Voltage outputs available on models ending in **-CV**.

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

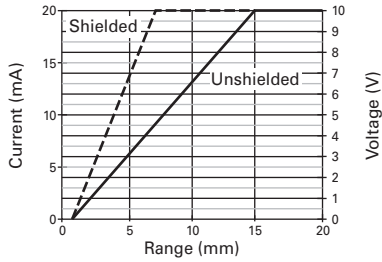
AccuProx Analog Performance Graphs

Linear Output

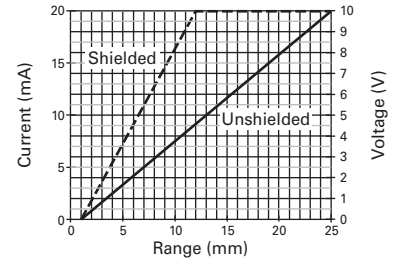
12 mm



18 mm

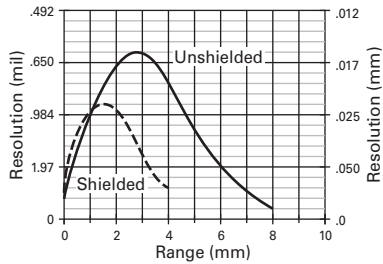


30 mm

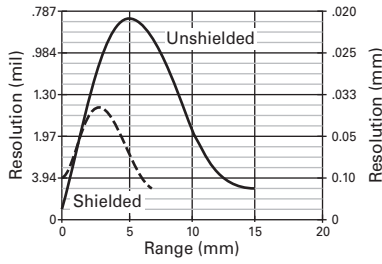


Measurement Resolution ①

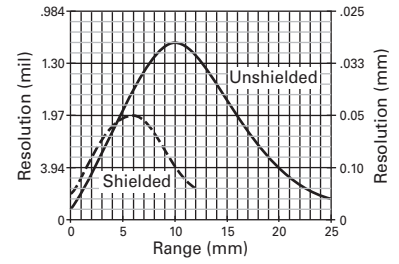
12 mm



18 mm

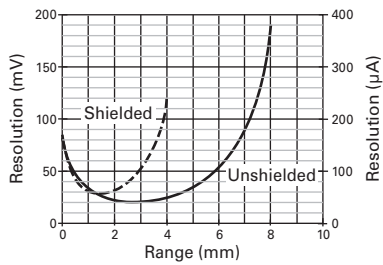


30 mm

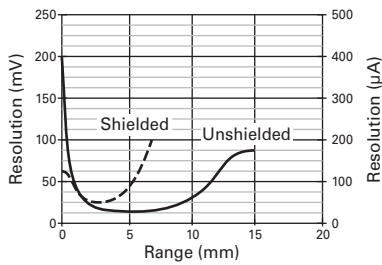


Output Resolution ②

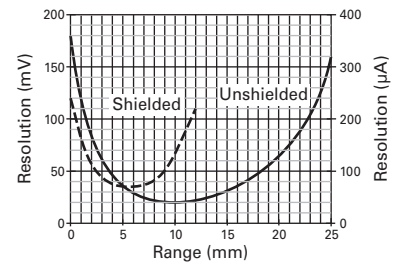
12 mm



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.

3.6

Inductive Proximity Sensors

AccuProx Analog Sensors

Wiring Diagrams

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

AccuProx Analog Sensors

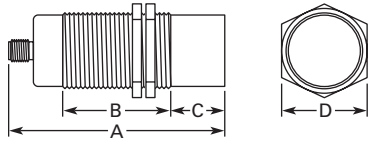
3

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

Dimensions

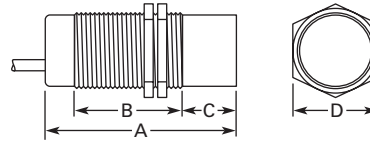
Approximate Dimensions in Inches (mm)

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

① 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



Contents

| Description | Page |
|---|-----------------|
| Ferrous Only Tubular Sensors | |
| Product Selection | |
| Ferrous Only Tubular Sensors | V8-T3-56 |
| Compatible Connector Cables | V8-T3-56 |
| Accessories | V8-T3-56 |
| Technical Data and Specifications | V8-T3-57 |
| Wiring Diagrams | V8-T3-57 |
| Dimensions | V8-T3-57 |

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)

Standards and Certifications

- CSA Certified
- Products certified by CSA for US
- CE
- RoHS Compliant



DANGER

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

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

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

3.7

Inductive Proximity Sensors


Ferrous Only Tubular Sensors

Product Selection


Ferrous Only Tubular Sensors

3

Two-Wire Sensors






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

Three-Wire Sensors

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

Compatible Connector Cables

Standard Cables ①

| | Current Rating at 600 V | 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 2-Red/Black 3-Red/White | CSAS3F3CY2202 | CSAS3F3RY2202 |
|  | Mini-Style, Straight Female | | | | | | | |
| | 13 A | — | 3-pin | 16 AWG | 6.0 ft (2m) |  1-Brown 2-No Wire 3-Blue 4-Black | CSDS4A3CY2202 | CSDS4A3RY2202 |
| | | | | | |  1-Green 2-Black 3-White | Catalog Number CSMS3F3CY1602 | |

Accessories

Ferrous Only Tubular Sensors

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

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 | 10 V maximum | 1.5 V 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 | 30 g sine wave, 11 ms per IEC68-2-76 | 30 g 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.

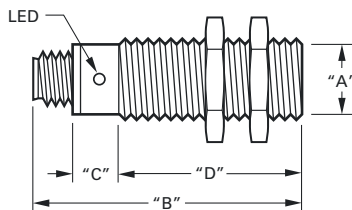
Ferrous Only Tubular Sensors

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

Dimensions

Approximate Dimensions in Inches (mm)

Ferrous Only Tubular Sensors



Connector Models

| Catalog Number | A | B | C | D |
|--------------------------|---------|-----------|-----------|-----------|
| Two-Wire Models | | | | |
| 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) |
| Three-Wire Models | | | | |
| E57FAL18T111SD | M18 x 1 | 3.11 (79) | 1.14 (29) | 1.97 (50) |

Metal Face Sensors

3



Contents

| <i>Description</i> | <i>Page</i> |
|-----------------------------------|-----------------|
| Metal Face Sensors | |
| Product Selection | |
| Metal Face Sensors | V8-T3-59 |
| Compatible Connector Cables | V8-T3-56 |
| Accessories | V8-T3-60 |
| Technical Data and Specifications | V8-T3-60 |
| Wiring Diagrams | V8-T3-61 |
| Dimensions | V8-T3-61 |

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)

Standards and Certifications

- CSA Certified
- Products certified by CSA for US
- CE
- RoHS Compliant



⚠ DANGER

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



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

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



Product Selection

Metal Face Sensors

Two-Wire Sensors




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

Three-Wire Sensors

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

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 |
|---|-------------------------------------|----------------|--------|-------------|---|---------------------------|---------------------------|
| Micro-Style Straight Female  | Micro-Style, Straight Female | | | | | | |
| | AC | 3-pin, 3-wire | 22 AWG | 6.0 ft (2m) |  1-Green 2-Red/Black 3-Red/White | CSAS3F3CY2202 | CSAS3F3RY2202 |
| | DC | 4-pin, 4-wire | 22 AWG | 6.0 ft (2m) |  1-Brown 2-White 3-Blue 4-Black | CSDS4A4CY2202 | CSDS4A4RY2202 |

Notes

- ⓘ See listing of compatible connector cables above.
- ⓘ For a full selection of connector cables, see **Tab 10, section 10.1**.

Accessories

Metal Face Sensors

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

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 μ A maximum |
| Voltage drop | 10 V maximum | 1.5 V 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 | 30 g sine wave, 11 ms per IEC68-2-76 | 30 g 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

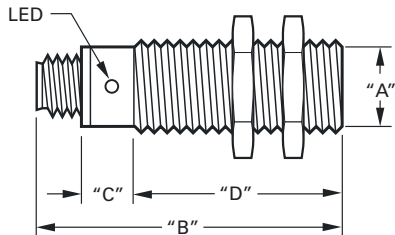
| Operating Voltage | Output | Micro-Connector Models (Face View Male Shown) |
|---------------------------|----------|---|
| Two-Wire Sensors | | |
| 20–250 Vac/dc 50/60 Hz | NO | |
| Three-Wire Sensors | | |
| 10–30 Vdc | NO (NPN) | |
| | NO (PNP) | |

Dimensions

Approximate Dimensions in Inches (mm)

Metal Face Sensors

Connector Models



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

High Current Output Sensors

3



Contents

| <i>Description</i> | <i>Page</i> |
|---|-----------------|
| High Current Output Sensors | |
| Product Selection | V8-T3-63 |
| Accessories | V8-T3-63 |
| Technical Data and Specifications | V8-T3-64 |
| Wiring Diagrams | V8-T3-64 |
| Dimensions | V8-T3-64 |

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 8 A. 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 8 A 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

Standards and Certifications

- RoHS Compliant



DANGER

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

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

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

Product Selection

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) | 3.5 A | 20 A | 2-meter cable | E57-30JS10-H |

30 mm

Six-Wire Sensors ^②



| 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) | 8 A | 50 A | 2-meter cable | E57-30HS10-K |

Accessories

High Current Output Sensors

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

Notes

- ① 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.
- ② 50 Amp surge, 12 Amp at 50% duty cycle and 8 Amp continuous.

3.9

Inductive Proximity Sensors

High Current Output Sensors

3

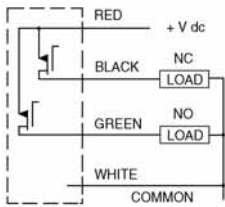
Technical Data and Specifications

High Current Output Sensors

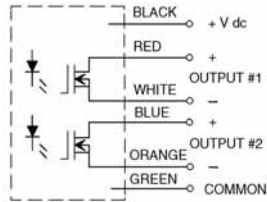
| Description | Four-Wire Sensors | Six-Wire Sensors |
|--------------------------------|---|---|
| Operating voltage | 10 to 55 Vdc | 10 to 30 Vdc |
| Switching rate | 250 Hz | 100 Hz |
| Off-state current | 100 A μ maximum | 100 A μ maximum |
| Voltage drop | 1.2 V | 2.0 V |
| Burden current | 10 mA 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 | 30 g sine wave, 11 ms | 30 g 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

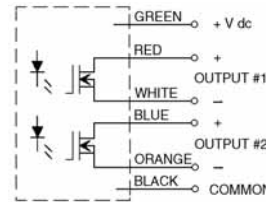
Four-Wire—PNP



Six-Wire—NO/NO Output Configuration



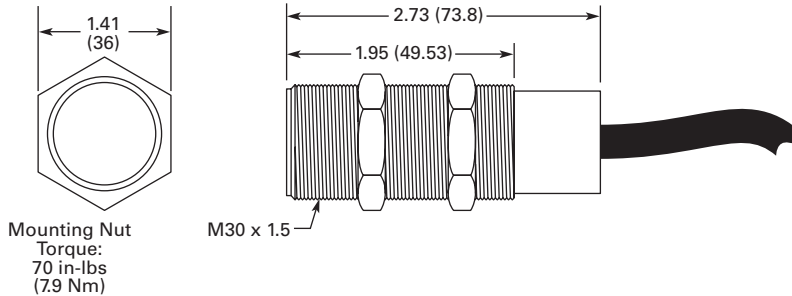
Six-Wire—NC/NC Output Configuration



Dimensions

Approximate Dimensions in Inches (mm)

High Current Output Sensors



Small Diameter (4, 5, 6.5, 8 mm) Sensors



Contents

| Description | Page |
|--|-----------------|
| Small Diameter (4, 5, 6.5, 8 mm) Sensors | |
| Product Selection | |
| Small Diameter (4, 5, 6.5, 8 mm) Sensors | V8-T3-66 |
| Compatible Connector Cables | V8-T3-68 |
| Accessories | V8-T3-56 |
| Technical Data and Specifications | V8-T3-69 |
| Wiring Diagrams | V8-T3-69 |
| Dimensions | V8-T3-70 |

Small Diameter (4, 5, 6.5, 8 mm) 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

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
- RoHS Compliant
- 8 mm standard models only:
 - CSA Certified, 224447
 - Products certified by CSA for US



! DANGER

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

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

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

3.10

Inductive Proximity Sensors





Small Diameter (4, 5, 6.5, 8 mm) Sensors

Product Selection

Small Diameter (4, 5, 6.5, 8 mm) Sensors

3

Three-Wire Sensors

| | Operating Voltage | Sensing Range (Sn) | Shielding | Connection Type | NO Output Catalog Number | NC Output Catalog Number | | |
|---|-----------------------------------|--------------------|----------------------|--------------------------|--------------------------|--------------------------|------------------------|------------------------|
| 4 mm  | 4 mm Diameter (Unthreaded) | | | | | | | |
| | 10–30 Vdc | 0.8 mm | Shielded (NPN) | 2-meter cable | E57EAL4T110SP | — | | |
| | | | | 3-pin nano-connector | E57EAL4T110SN ☹ | — | | |
| | | | Shielded (PNP) | 2-meter cable | E57EAL4T111SP | — | | |
| | | | | 3-pin nano-connector | E57EAL4T111SN ☹ | — | | |
| | 5 mm Diameter | | | | | | | |
| 5 mm  | 10–30 Vdc | 0.8 mm | Shielded (NPN) | 2-meter cable | E57EAL5T110SP | — | | |
| | | | | 3-pin nano-connector | E57EAL5T110SN ☹ | — | | |
| | | | Shielded (PNP) | 2-meter cable | E57EAL5T111SP | — | | |
| | | | | 3-pin nano-connector | E57EAL5T111SN ☹ | — | | |
| 6.5 mm Diameter (Unthreaded) | | | | | | | | |
| 6.5 mm  | 10–30 Vdc | 1 mm | Shielded (NPN) | 2-meter cable | E57EAL6T110SP | — | | |
| | | | | 3-pin nano-connector | E57EAL6T110SN ☹ | — | | |
| | | | | 4-pin micro DC connector | E57EAL6T110SD ☹ | — | | |
| | | | Shielded (PNP) | 2-meter cable | E57EAL6T111SP | — | | |
| | | | | 3-pin nano-connector | E57EAL6T111SN ☹ | — | | |
| | | | | 4-pin micro DC connector | E57EAL6T111SD ☹ | — | | |
| | 2 mm | Unshielded (NPN) | 2-meter cable | E57EAL6T110EP | — | | | |
| | | | 3-pin nano-connector | E57EAL6T110EN ☹ | — | | | |
| | | | 2-meter cable | E57EAL6T111EP | — | | | |
| | | | 3-pin nano-connector | E57EAL6T111EN ☹ | — | | | |
| 8 mm Diameter Short Body | | | | | | | | |
| 8 mm Short Body  | 10–30 Vdc | 1 mm | Shielded (NPN) | 2-meter cable | E57EAL8T110SP | E57EAL8T110SP | | |
| | | | | 3-pin nano-connector | E57EAL8T110SN ☹ | E57EAL8T110SN ☹ | | |
| | | | | 4-pin micro DC connector | E57EAL8T110SD ☹ | E57EAL8T110SD ☹ | | |
| | | | | Shielded (PNP) | 2-meter cable | E57EAL8T111SP | E57EAL8T111SP | |
| | | | | | 3-pin nano-connector | E57EAL8T111SN ☹ | E57EAL8T111SN ☹ | |
| | | | | | 4-pin micro DC connector | E57EAL8T111SD ☹ | E57EAL8T111SD ☹ | |
| | | | 2 mm | Unshielded (NPN) | 2-meter cable | E57EAL8T110EP | E57EAL8T110EP | |
| | | | | | 3-pin nano-connector | E57EAL8T110EN ☹ | E57EAL8T110EN ☹ | |
| | | | | | 4-pin micro DC connector | E57EAL8T110ED ☹ | E57EAL8T110ED ☹ | |
| | | | | | Unshielded (PNP) | 2-meter cable | E57EAL8T111EP | E57EAL8T111EP |
| | | | | | | 3-pin nano-connector | E57EAL8T111EN ☹ | E57EAL8T111EN ☹ |
| | | | | | | 4-pin micro DC connector | E57EAL8T111ED ☹ | E57EAL8T111ED ☹ |

Note

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

Three-Wire Sensors, continued

8 mm Standard Length



| Operating Voltage | Sensing Range | Shielding | Output Type | Connection Type | NO Output Catalog Number | NC Output Catalog Number |
|--------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 8 mm Diameter Standard Length | | | | | | |
| 10–30 Vdc | 1 mm | Shielded | NPN | 2-meter cable | E57-08GS01-C | E57-08GS01-C1 |
| | | | | 3-pin nano-connector | E57-08GS01-CNB ☺ | E57-08GS01-C1NB ☺ |
| | | | | 4-pin micro DC connector | E57-08GS01-CDB ☺ | E57-08GS01-C1DB ☺ |
| | | | PNP | 2-meter cable | E57-08GS01-G | E57-08GS01-G1 |
| | | | | 3-pin nano-connector | E57-08GS01-GNB ☺ | E57-08GS01-G1NB ☺ |
| | | | | 4-pin micro DC connector | E57-08GS01-GDB ☺ | E57-08GS01-G1DB ☺ |
| | 3 mm (extended range) | NPN | Shielded | 2-meter cable | E57-08GE03-C | E57-08GE03-C1 |
| | | | | 3-pin nano-connector | E57-08GE03-CNB ☺ | E57-08GE03-C1NB ☺ |
| | | | | 4-pin micro DC connector | E57-08GE03-CDB ☺ | E57-08GE03-C1DB ☺ |
| | | PNP | 2-meter cable | E57-08GE03-G | E57-08GE03-G1 | |
| | | | 3-pin nano-connector | E57-08GE03-GNB ☺ | E57-08GE03-G1NB ☺ | |
| | | | 4-pin micro DC connector | E57-08GE03-GDB ☺ | E57-08GE03-G1DB ☺ | |
| 2 mm | Unshielded | NPN | 2-meter cable | E57-08GU02-C | E57-08GU02-C1 | |
| | | | 3-pin nano-connector | E57-08GU02-CNB ☺ | E57-08GU02-C1NB ☺ | |
| | | | 4-pin micro DC connector | E57-08GU02-CDB ☺ | E57-08GU02-C1DB ☺ | |
| | | PNP | 2-meter cable | E57-08GU02-G | E57-08GU02-G1 | |
| | | | 3-pin nano-connector | E57-08GU02-GNB ☺ | E57-08GU02-G1NB ☺ | |
| | | | 4-pin micro DC connector | E57-08GU02-GDB ☺ | E57-08GU02-G1DB ☺ | |
| | 6 mm (extended range) | NPN | Unshielded | 2-meter cable | E57-08GE06-C | E57-08GE06-C1 |
| | | | | 4-pin micro DC connector | E57-08GE06-CDB ☺ | E57-08GE06-C1DB ☺ |
| | | | | PNP | 2-meter cable | E57-08GE06-G |
| | | 4-pin micro DC connector | E57-08GE06-GDB ☺ | | E57-08GE06-G1DB ☺ | |

Note

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

3.10






Inductive Proximity Sensors

Small Diameter (4, 5, 6.5, 8 mm) Sensors

Compatible Connector Cables

3

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  | Micro-Style, Straight Female | | | | | | |
| | DC | 4-pin, 3-wire | 22 AWG | 6.0 ft (2m) |  1-Brown 2-No Wire 3-Blue 4-Black | CSDS4A3CY2202 | CSDS4A3RY2202 |
| | | 4-pin, 4-wire | 22 AWG | 6.0 ft (2m) |  1-Brown 2-White 3-Blue 4-Black | CSDS4A4CY2202 | CSDS4A4RY2202 |
| Nano-Style Straight Female  | Nano-Style, Straight Female | | | | | | |
| — | 3-pin | 24 AWG | 6.0 ft (2m) |  1-Brown 3-Blue 4-Black | CSNS3A3CY2402 | CSNS3A3RY2402 | |

Accessories

Small Diameter Sensors

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

Note

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

Technical Data and Specifications

Small Diameter 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 | 1.5 V 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.

Small Diameter Sensors

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

3.10

Inductive Proximity Sensors

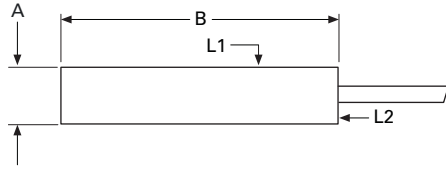
Small Diameter (4, 5, 6.5, 8 mm) Sensors

Dimensions

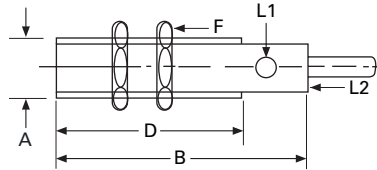
Approximate Dimensions in Inches (mm)

Cable Models

Unthreaded Barrel



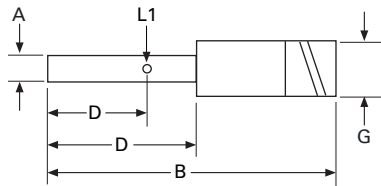
Threaded Barrel



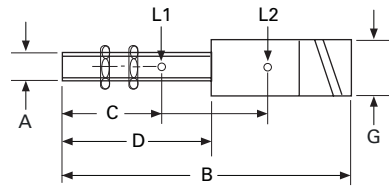
| Size A [Ⓢ] | Barrel Type | Length B | D | Thread Size | Nut Width F | Connector Diameter G | LED Location |
|----------------------------|-------------|-----------|-----------|-------------|-------------|----------------------|--------------|
| Cable Models | | | | | | | |
| 4 mm (S, Std) | Unthreaded | 1.0 (25) | — | — | — | — | L1 |
| 5 mm (S, Std) | Threaded | 1.0 (25) | 0.8 (21) | M5 x 0.5 | SW8 | — | L1 |
| 6.5 mm (S/U, Std) | Unthreaded | 1.8 (45) | — | — | — | — | L2 |
| 8 mm Short Body (S/U, Std) | Threaded | 1.2 (30) | 1.2 (30) | M8 x 1 | SW13 | — | L2 |
| Standard Length | | | | | | | |
| 8 mm (S, Std) | Threaded | 1.77 (45) | 1.77 (45) | M8 x 1 | SW13 | — | L2 |
| 8 mm (S, Ext) | Threaded | 1.81 (46) | 1.57 (40) | M8 x 1 | SW13 | — | L2 |
| 8 mm (U, Std) | Threaded | 1.77 (45) | 1.61 (41) | M8 x 1 | SW13 | — | L2 |
| 8 mm (U, Ext) | Threaded | 1.77 (45) | 1.61 (41) | M8 x 1 | SW13 | — | L2 |

Connector Models

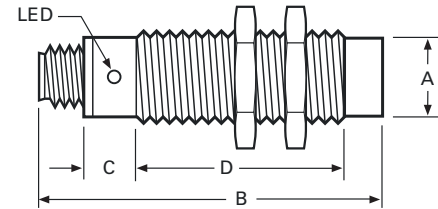
Unthreaded Barrel



Threaded Barrel



Standard Length 8 mm



| Size A [Ⓢ] | Barrel Type | Length B | C | D | Thread Size | Nut Width F | Connector Diameter G | LED Location |
|-------------------------------|-------------|-----------|-----------|-----------|-------------|-------------|----------------------|--------------|
| Nano-Connector Models | | | | | | | | |
| 4 mm (S, Std) | Unthreaded | 1.6 (40) | 0.7 (18) | 0.8 (21) | — | — | 0.31 (8) | L1 |
| 5 mm (S, Std) | Threaded | 1.6 (40) | 0.7 (18) | 0.8 (21) | M5 x 0.5 | SW8 | 0.31 (8) | L1 |
| 6.5 mm (S/U, Std) | Unthreaded | 2.4 (60) | 1.5 (39) | 2.0 (50) | — | — | 0.31 (8) | L1 |
| 8 mm Short Body (S/U, Std) | Threaded | 1.8 (45) | 1.0 (25) | 1.4 (36) | M8 x 1 | SW13 | 0.31 (8) | L1 |
| Standard Length | | | | | | | | |
| 8 mm (S, Std) | Threaded | 2.36 (60) | 0.79 (20) | 1.57 (40) | M8 x 1 | SW13 | 0.31 (8) | L2 |
| 8 mm (S, Ext) | Threaded | 2.40 (61) | 0.75 (19) | 1.65 (42) | M8 x 1 | SW13 | 0.31 (8) | L2 |
| 8 mm (U, Std) | Threaded | 2.36 (60) | 0.79 (20) | 1.42 (36) | M8 x 1 | SW13 | 0.31 (8) | L2 |
| Micro-Connector Models | | | | | | | | |
| 6.5 mm (S/U, Std) | Unthreaded | 2.9 (70) | 1.4 (36) | 1.5 (39) | — | — | 0.47 (12) | L1 |
| 8 mm Short Body (S/U, Std) | Threaded | 2.0 (50) | 1.6 (40) | 1.0 (25) | M8 x 1 | SW13 | 0.47 (12) | L2 |
| Standard Length | | | | | | | | |
| 8 mm (S, Std) | Threaded | 2.76 (70) | 0.83 (21) | 1.93 (49) | M8 x 1 | SW13 | 0.47 (12) | L2 |
| 8 mm (S, Ext) | Threaded | 2.80 (71) | 1.02 (26) | 1.42 (36) | M8 x 1 | SW13 | 0.47 (12) | L2 |
| 8 mm (U, Std) | Threaded | 2.76 (70) | 0.83 (21) | 1.77 (45) | M8 x 1 | SW13 | 0.47 (12) | L2 |
| 8 mm (U, Ext) | Threaded | 2.76 (70) | 1.22 (31) | 1.38 (35) | M8 x 1 | SW13 | 0.47 (12) | L2 |

Note

Ⓢ U = Unshielded (4 mm cap), S = Shielded; Std = Standard Range, Ext = Extended Range.

E56 Pancake Sensors



Contents

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| Technical Data and Specifications | V8-T3-74 |
| Wiring Diagrams | V8-T3-75 |
| Dimensions | V8-T3-75 |

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

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

- UL Listed, E166051 (DC models only)
- UL Tested to Canadian safety standards
- CE (DC models only)
- RoHS Compliant



⚠ DANGER

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

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

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

3.11

Inductive Proximity Sensors

E56 Pancake Sensors

Product Selection

E56 Pancake Sensors

3

Pancake Style



Two-Wire Sensors

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

DC Four-Wire Sensors

Small Diameter



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

Medium Diameter



| | | | | | | |
|--|----------------------------|---------------|------------|-----------------|----------------|-------------------------|
| Medium Diameter (110 x 110 x 41 mm) | | | | | | |
| 10–42 Vdc | NPN/PNP autoconfigure ② | 1 NO and 1 NC | Unshielded | 2.75 in (70 mm) | DC 4-pin mini | E56BDL70UAE01 ☹️ |
| | | | | | DC 4-pin micro | E56BDL70UAD01 ☹️ |

Large Diameter



| | | | | | | |
|---|----------------------------|---------------|------------|------------------|----------------|--------------------------|
| Large Diameter (172 x 172 x 68 mm) | | | | | | |
| 10–42 Vdc | NPN/PNP autoconfigure ② | 1 NO and 1 NC | Unshielded | 3.94 in (100 mm) | DC 4-pin mini | E56CDL100UAE01 ☹️ |
| | | | | | DC 4-pin micro | E56CDL100UAD01 ☹️ |

Notes







☹️ ☹️ See listing of compatible connector cables on **Page V8-T3-73**.

① Includes potentiometer for adjustment of sensing range.

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

Compatible Connector Cables

Standard Cables ^①

| | Current Rating at 600 V | 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  | Micro-Style, Straight Female | | | | | | | | |
| | — | AC | 3-pin, 3-wire | 22 AWG | 6.0 ft (2m) |  | 1-Green 2-Red/Black 3-Red/White | CSAS3F3CY2202 | CSAS3F3RY2202 |
| | | | | | 16.4 ft (5m) | | | CSAS3F3CY2205 | CSAS3F3RY2205 |
| | | | | | 32.8 ft (10m) | | | CSAS3F3CY2210 | CSAS3F3RY2210 |
| | — | DC | 4-pin, 4-wire | 22 AWG | 6.0 ft (2m) |  | 1-Brown 2-White 3-Blue 4-Black | CSDS4A4CY2202 | CSDS4A4RY2202 |
| | | | | | 16.4 ft (5m) | | | CSDS4A4CY2205 | CSDS4A4RY2205 |
| 32.8 ft (10m) | | | | | CSDS4A4CY2210 | | | CSDS4A4RY2210 | |
| Mini-Style Straight Female  | Mini-Style, Straight Female | | | | | | | | |
| | 13 A | — | 3-pin, 3-wire | 16 AWG | 6.0 ft (2m) |  | 1-Green 2-Black 3-White | CSMS3F3CY1602 | — |
| | | | | | 13.1 ft (4m) | | | CSMS3F3CY1604 | — |
| | 10 A | AC/DC | 4-pin, 4-wire | 16 AWG | 6.0 ft (2m) |  | 1-Black 2-Blue 3-Brown 4-White | CSMS4A4CY1602 | — |
| | | | | | 13.1 ft (4m) | | | CSMS4A4CY1604 | — |
| | | | | | 19.7 ft (6m) | | | CSMS4A4CY1606 | — |

Note

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

Technical Data and Specifications

Two-Wire

3

| 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; below 32 °F (0 °C): 2.0 mA | At or above 32 °F (0 °C): <1.7 mA; below 32 °F (0 °C): 2.0 mA | At or above 32 °F (0 °C): <1.7 mA; below 32 °F (0 °C): 2.0 mA |
| Voltage drop | <10 V (5 V nominal) | <10 V (5 V nominal) | <10 V (5 V 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 | <2.5 V | <2.5 V | <2.5 V |
| 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 |

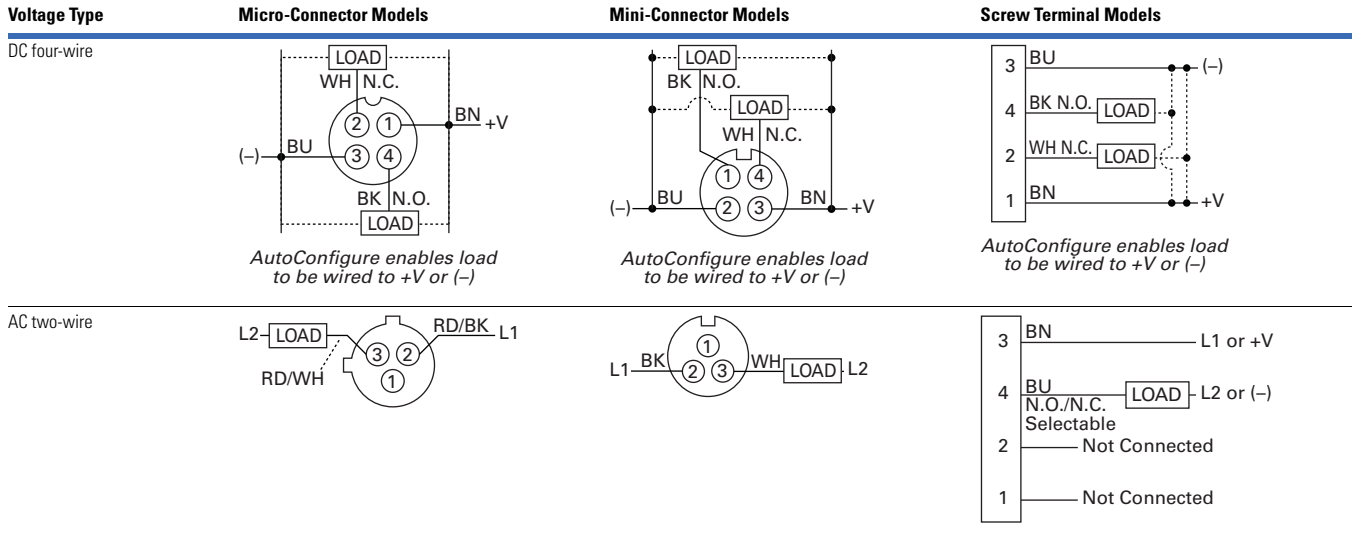
Note

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.

Wiring Diagrams

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

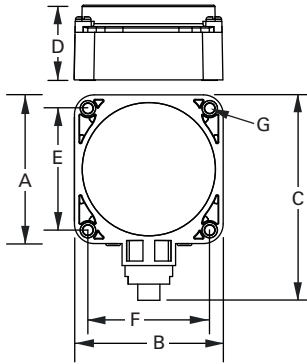
E56 Pancake Sensors



Dimensions

Approximate Dimensions in Inches (mm)

E56 Pancake Sensors



| Model | A (Depth) | B (Width) | C (Depth) | D (Height) | E (Mounting) | F (Mounting) | G (Diameter) |
|-------------------------------|--------------|--------------|--------------|-------------|---------------|---------------|--------------|
| Small Diameter Models | | | | | | | |
| 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) |
| Medium Diameter Models | | | | | | | |
| 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) |
| Large Diameter Models | | | | | | | |
| 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) |

3.12

Inductive Proximity Sensors

Nonmetallic Tubular Sensors

Nonmetallic Tubular Sensors



3

Contents

Description

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| Nonmetallic Tubular Sensors | |
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| Technical Data and Specifications | V8-T3-78 |
| Wiring Diagrams | V8-T3-78 |
| Dimensions | V8-T3-78 |

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

Standards and Certifications

- CE
- RoHS Compliant



⚠ DANGER

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




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

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




Product Selection

Nonmetallic Tubular Sensors

Two-Wire Sensors ^①

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

Three-Wire Sensors ^①

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

Note

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

3.12

Inductive Proximity Sensors

Nonmetallic Tubular Sensors

3

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

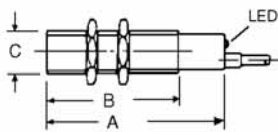
Nonmetallic Tubular Sensors

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

Dimensions

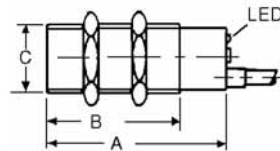
Approximate Dimensions in Inches (mm)

12 and 18 mm



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

30 mm



| A | B | Thread Size C |
|-----------|-----------|------------------|
| 3.15 (80) | 2.36 (60) | M30 x 1.5 |

E52 Cube Style Sensors



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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 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

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

- UL Listed, E166051
- UL Tested to Canadian safety standards
- CE (DC models only)
- RoHS Compliant



⚠ DANGER

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

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

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

3.13

Inductive Proximity Sensors



E52 Cube Style Sensors

Product Selection

E52 Cube Style Sensors





3

DC Four-Wire Sensors

| | Voltage Type | Output Configuration | Shielding | Output Type | Sensing Range | Connector Style | Catalog Number |
|---|---------------------------------------|-------------------------|---------------|---------------|---------------|-------------------------|-------------------------|
| Mini-Connector  | 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 ☹ |
| Unshielded | | | 1 NO and 1 NC | 15 mm | DC 4-pin mini | E52Q-DL15SAE01 ☹ | |
| Micro-Connector  | 10–48 Vdc | NPN/PNP autoconfigure ① | Shielded | 1 NO and 1 NC | 20 mm | DC 4-pin micro | E52Q-DL20SAD01 ☹ |
| | | | Unshielded | 1 NO and 1 NC | 20 mm | DC 4-pin mini | E52Q-DL20SAE01 ☹ |
| | | | | | 25 mm | DC 4-pin micro | E52Q-DL25UAD01 ☹ |
| | | | | | 25 mm | DC 4-pin mini | E52Q-DL25UAE01 ☹ |
| | | | | | 30 mm | DC 4-pin micro | E52Q-DL30UAD01 ☹ |
| | | | | | 30 mm | DC 4-pin mini | E52Q-DL30UAE01 ☹ |
| | | | | | 35 mm | DC 4-pin micro | E52Q-DL35UAD01 ☹ |
| | | | | | 35 mm | DC 4-pin mini | E52Q-DL35UAE01 ☹ |
| | | | | | 40 mm | DC 4-pin micro | E52Q-DL40UAD01 ☹ |
| | | | | | 40 mm | DC 4-pin mini | E52Q-DL40UAE01 ☹ |

Compatible Connector Cables

Standard Cables ②

| | Current Rating at 600 V | 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  | Micro-Style, Straight Female | | | | | | | | |
| | — | DC | 4-pin, 4-wire | 22 AWG | 6.0 ft (2m) |  | 1-Brown 2-White 3-Blue 4-Black | CSDS4A4CY2202 | CSDS4A4RY2202 |
| | | | | | 16.4 ft (5m) | | | CSDS4A4CY2205 | CSDS4A4RY2205 |
| 32.8 ft (10m) | | | | | CSDS4A4CY2210 | | | CSDS4A4RY2210 | |
| Mini-Style Straight Female  | Mini-Style, Straight Female | | | | | | | | |
| | 10 A | AC/DC | 4-pin, 4-wire | 16 AWG | 6.0 ft (2m) |  | 1-Black 2-Blue 3-Brown 4-White | CSMS4A4CY1602 | — |
| | | | | | 13.1 ft (4m) | | | CSMS4A4CY1604 | — |
| 19.7 ft (6m) | | | | | CSMS4A4CY1606 | | | — | |

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

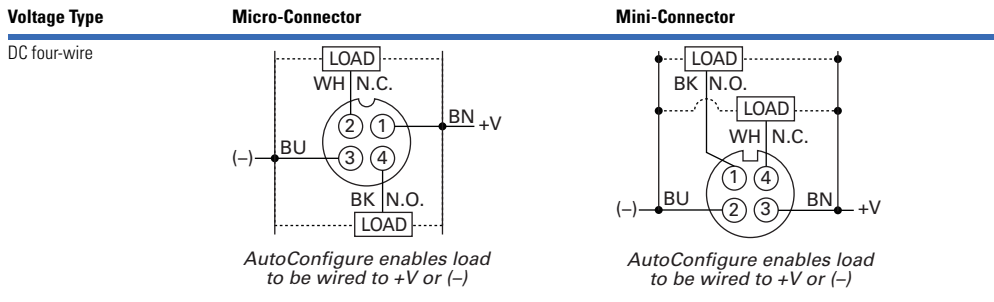
E52 Cube Style Sensors

| Description | DC Four-Wire |
|-----------------------------------|---|
| Operating voltage | 10–48 Vdc |
| Load current (maximum) | 300 mA |
| Burden current | <25 mA |
| Off-state leakage | <150 µA per output |
| Voltage drop | <2.5 V |
| 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 ① | –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



Note

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

3.13 Inductive Proximity Sensors

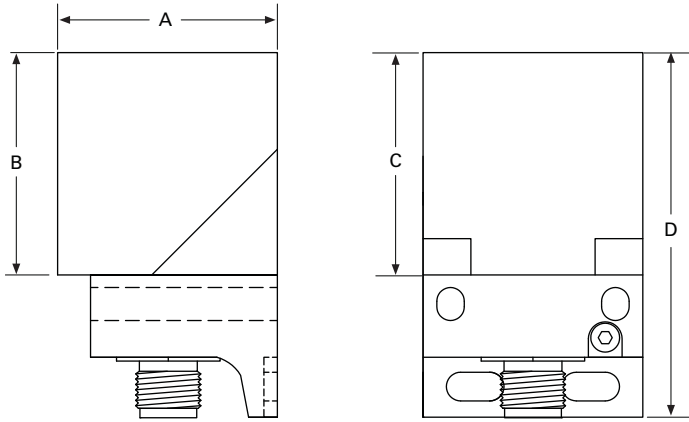
E52 Cube Style Sensors

Dimensions

Approximate Dimensions in Inches (mm)

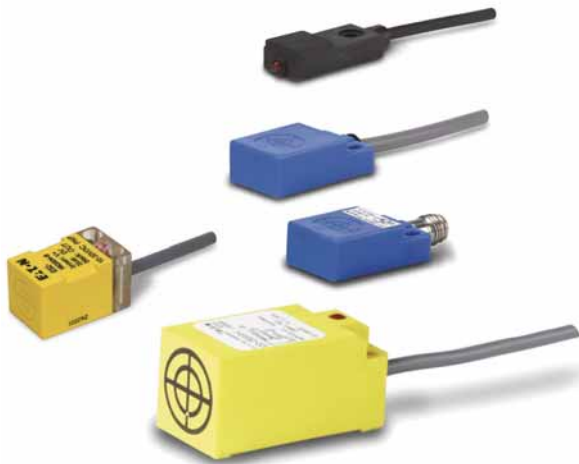
E52 Cube Style Sensors

3



| Model | Width A | Depth B | Height C | Overall Height 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



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| Wiring Diagrams | V8-T3-85 |
| Dimensions | V8-T3-85 |

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

Standards and Certifications

- CE (except E52RAL)
- RoHS Compliant



DANGER

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

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

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

3.14





Inductive Proximity Sensors

E52 Rectangular Style Sensors

Product Selection



E52 Rectangular Style Sensors

Three-Wire Models

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

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 |
|--|------------------------------------|----------------|--------|-------------|---|---------------------------|---------------------------|
| Nano-Style Straight Female  | Nano-Style, Straight Female | | | | | | |
| | DC | 3-pin | 24 AWG | 6.0 ft (2m) |  1-Brown 3-Blue 4-Black | CSNS3A3CY2402 | CSNS3A3RY2402 |

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**.

Wiring Diagrams

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

E52 Rectangular Style Sensors

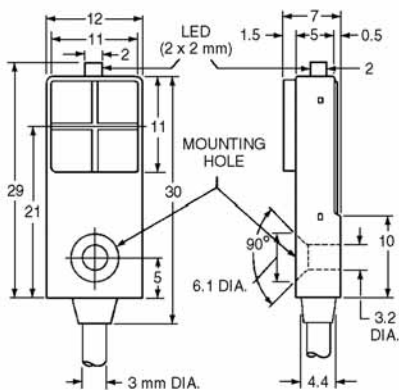
| Operating Voltage | Output | Cable Models | Nano-Connector Models (Face View Male Shown) |
|---------------------------|--------|--------------|--|
| Three-Wire Sensors | | | |
| DC | NPN | | |
| | PNP | | |

Dimensions

Approximate Dimensions in Inches (mm) except where noted

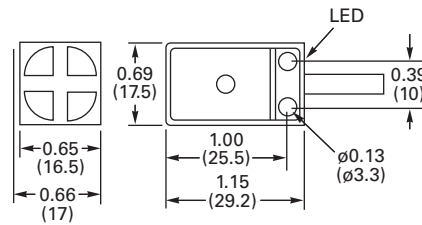
E52 Rectangular Style Sensors

R12

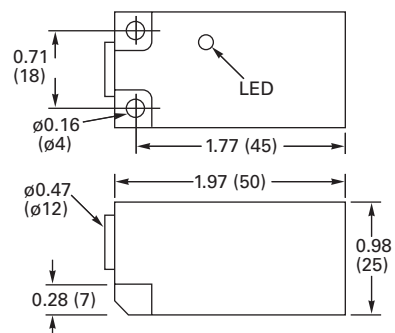


Note: Dimensions are mm only.

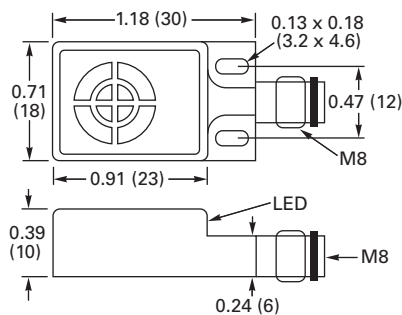
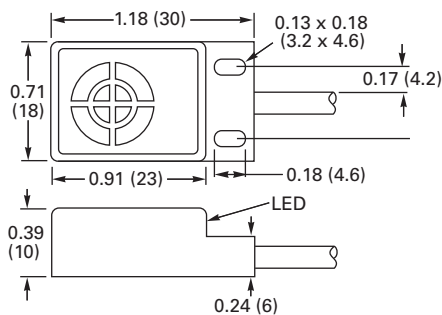
Q16



Q25



R18



3.15

Inductive Proximity Sensors

E55 Limit Switch Style Sensors with Nonmetallic Housings

3

E55 Limit Switch Style Sensors with Nonmetallic Housings



Contents

| Description | Page |
|--|----------|
| E55 Limit Switch Style Sensors with Nonmetallic Housings | |
| Product Selection | V8-T3-86 |
| Technical Data and Specifications | V8-T3-87 |
| Wiring Diagrams | V8-T3-87 |
| Dimensions | V8-T3-87 |

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

Standards and Certifications

- CE
- RoHS Compliant



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 |

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

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

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 | 5 A 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.

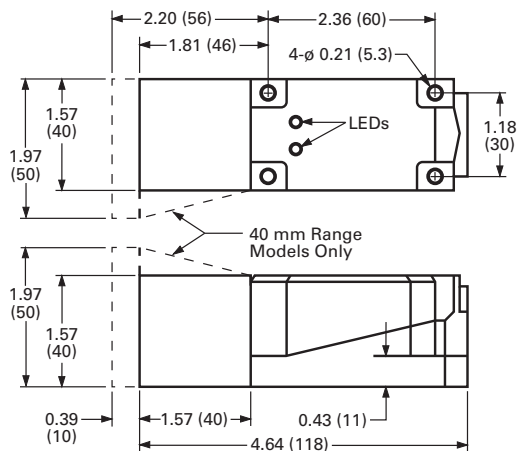
E55 Limit Switch Style Sensors

| Operating Voltage | Output | Terminal Models |
|-------------------------|--------|-----------------|
| Two-Wire Sensors | | |
| 35–250 Vac ① | NO | |
| | NC | |

Dimensions

Approximate Dimensions in Inches (mm)

E55 Limit Switch Style Sensors



Note

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

E51 Modular Limit Switch Style Sensors

3



Contents

| Description | Page |
|---|-----------------|
| E51 Modular Limit Switch Style Sensors | |
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| Standard Sensors— | |
| Assembled with Terminal Wiring | V8-T3-89 |
| Standard Sensors— | |
| Assembled with Receptacles | V8-T3-90 |
| Sensor Heads | V8-T3-90 |
| Sensor Bodies | V8-T3-91 |
| Logic Module | V8-T3-91 |
| Receptacles | V8-T3-92 |
| Compatible Connector Cables | V8-T3-93 |
| Accessories | V8-T3-93 |
| Technical Data and Specifications | V8-T3-94 |
| Wiring Diagrams | V8-T3-94 |
| Dimensions | V8-T3-95 |

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, E166051, E183975
- CSA Certified, 50513
- RoHS Compliant



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

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

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

Product Selection

Standard Sensors—Assembled with Terminal Wiring

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

Assembled Sensor



Assembled Sensors—Standard (with Terminal Wiring)

Sensor Body and Receptacle



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

Sensor Heads ①

Top Sensing



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

Side Sensing



Notes

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

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

② Logic module must be ordered separately, see [Page V8-T3-91](#). These sensor bodies are rated NEMA 4, 4X and 13.

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

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

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Inductive Proximity Sensors

E51 Modular Limit Switch Style Sensors

Standard Sensors—Assembled with Receptacles

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

Assembled Sensor



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

Sensor Base Type with 8 ft Cable ②



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

Sensor Heads ①

Top Sensing



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

Side Sensing



Sensor Heads

Sensor Heads ①

Top Sensing



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

Side Sensing



Notes

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

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

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

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

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

Sensor Bodies

Two-Wire Sensors

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



Four-Wire Sensors

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



Logic Module

Logic Module (for E51SCN Sensor Body Only)

| Type | Description | Timing Range ④ | Catalog Number |
|-----------------------|---|----------------------|----------------|
| Logic Module ⑤ | ON and OFF delay Adjustable delay between time object is sensed and time switch function occurs Adjustable delay between time object leaves sensing field and time switch transfers back to non-sensing state | 0.15 to 15.0 seconds | E51MTB |



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.

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Inductive Proximity Sensors

E51 Modular Limit Switch Style Sensors

Receptacles

Receptacles

3

| | Description | Style | Details | Cable Length | Conduit Entrance 1/2 in NPT Catalog Number | 20 mm Catalog Number |
|--|---|-----------------|--------------|-------------------|--|-------------------------|
| Surface Mount  | Surface Mount | | | | | |
| | Conduit entrance, front or rear mounting | Two-wire, AC/DC | — | — | E51RA | E51RA20 |
| | | Four-wire, AC | Gray | — | E51RC | E51RC20 |
| | | | Black ① | — | E51RCB | E51RCB20 |
| Four-wire, DC | — | — | E51RN | E51RN20 | | |
| Mini-Connector  | Mini-Connector | | | | | |
| | Epoxy filled receptacle with pre-wired mini-connector | Two-wire, AC/DC | 3-pin | — | E51RAP3 ☺ | — |
| | | Four-wire, AC | 5-pin | — | E51RCP5 ☺ | — |
| Four-wire, DC | | 5-pin | — | E51RNP5 ☺ | — | |
| Pigtail with Mini-Connector  | Pigtail with Mini-Connector | | | | | |
| | Epoxy filled receptacle with mini-connector mounted on 3 ft (0.9m) cable | Two-wire, AC/DC | 3-pin | 3 ft (0.9m) | E51RAPT3 ☺ | — |
| | | Four-wire, AC | 5-pin | 3 ft (0.9m) | E51RCP T5 ☺ | — |
| Four-wire, DC | | 5-pin | 3 ft (0.9m) | E51RNPT5 ☺ | — | |
| Pre-Wired Cable  | Pre-Wired Cable | | | | | |
| | 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) | E51RAS | E51RA20S |
| | | | | 12 ft (3.6m) | E51RAS12 | — |
| | | | | 20 ft (6m) | E51RAS20 | — |
| | | Four-wire, AC | 5-conductor | 8 ft (2.4m) | E51RCS | E51RC20S |
| | | | | 12 ft (3.6m) | E51RCS12 | — |
| | | | | 20 ft (6m) | E51RCS20 | — |
| | | Four-wire, DC | 5-conductor | 8 ft (2.4m) | E51RNS | E51RN20S |
| | | | | 12 ft (3.6m) | E51RNS12 | — |
| 20 ft (6m) | | | | E51RNS20 | — | |





Notes

☺☺ See listing of compatible connector cables on [Page V8-T3-93](#).

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






Compatible Connector Cables

Standard Cables ^①

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

Accessories

E51 Modular Limit Switch Style Sensors

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

Dimensions, see Page V8-T3-95.

Note

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

3.16

Inductive Proximity Sensors

E51 Modular Limit Switch Style Sensors

3

Technical Data and Specifications

E51 Modular Limit Switch Style Sensors

| Description | Specification |
|-----------------------------|--|
| Output rating (NEMA D150) | |
| AC/DC models | 0.5 A continuous |
| AC models | 1 A continuous |
| DC models | 0.6 A continuous |
| Protection | Latching short-circuit protection on two-wire AC/DC models; DC models: resettable short-circuit protection |
| Switching rate | AC models: 15 Hz; DC models: 50 Hz |
| Indicator LEDs | Lights when output is ON. One LED for each output |
| Alternate frequency | Standard and alternate frequencies allow side-by-side operation without interference |
| Enclosure material | Zinc die cast |
| Gasket material | Viton |
| Enclosure ratings | NEMA 3, 3S, 4, 4X, 6, 6P, 12 and 13 (IP67); E51SCN sensor body only: NEMA 4, 4X and 13 |
| Hazardous locations ratings | |
| Class I | Division II—GRPS ABCD |
| Class II | Division II—GRPS F and G |
| Class III | Division 2 |
| Temperature range | -13 to 158 °F (-25 to 70 °C) |
| Torque requirements | Switch body screws: 25–30 in-lbs; sensing head screws: 14–18 in-lbs |
| Vibration | 10–55 Hz, 1 mm amplitude |
| Shock | 30 g, 11 ms, 1/2 sine wave |
| Humidity | 95% non-condensing |
| Burden current | <25 mA |
| OFF-state leakage | DC version: 120 µA; two-wire AC: 1.9 mA maximum; three-wire AC: 1.1 mA |
| ON-state leakage | <2.5 Vdc |
| Power-up delay | <150 ms |

Wiring Diagrams

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

E51 Modular Limit Switch Style Sensors

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

Note

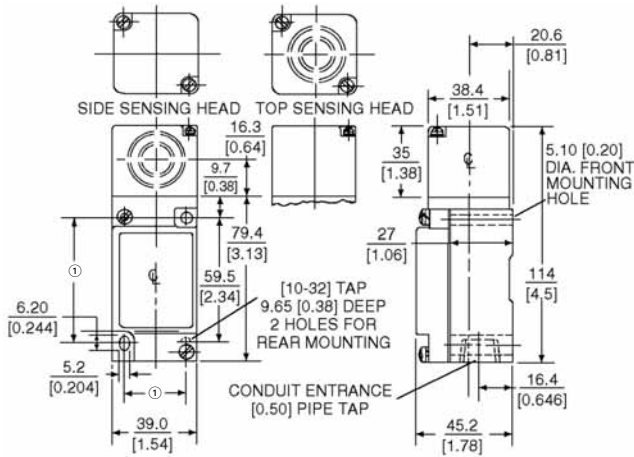
① Changing output switch on sensor head will reverse output function (NO becomes NC, and NC becomes NO).

Dimensions

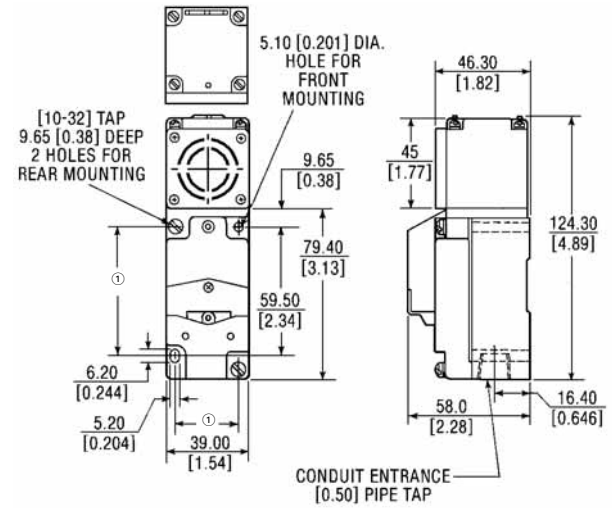
Approximate Dimensions in mm [in]

E51 Modular Limit Switch Style Sensors

Standard Sensors



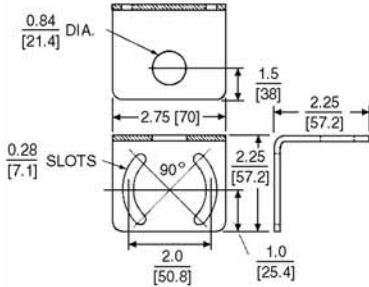
Sensor with Logic Module



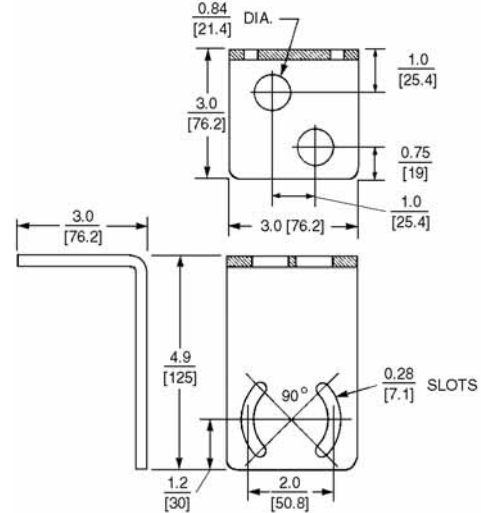
Accessories

Approximate Dimensions in Inches [mm]

Universal Mounting Bracket—One Hole



Universal Mounting Bracket—Two Holes



Note

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

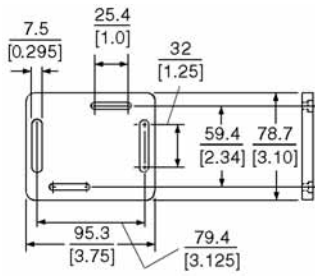
3.16 Inductive Proximity Sensors

E51 Modular Limit Switch Style Sensors

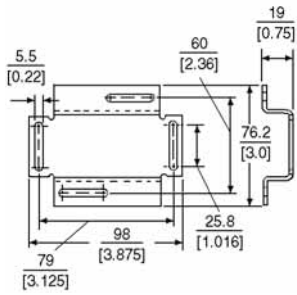
Approximate Dimensions in mm [in]

Machine Mounting Bracket

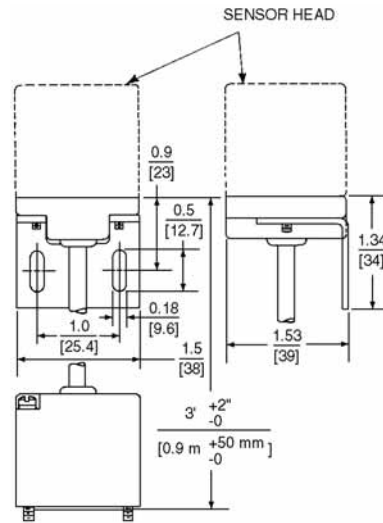
3



Stand-Off Mounting Bracket



Remote Sensor Head Assembly



E51 Limit Switch Style, Factory Sealed 6P+ Sensors



Contents

| Description | Page |
|--|------------------|
| E51 Limit Switch Style, Factory Sealed 6P+ Sensors | |
| Product Selection | |
| Unitized Sensors | V8-T3-98 |
| Compatible Connector Cables | V8-T3-98 |
| Accessories | V8-T3-99 |
| Technical Data and Specifications | V8-T3-99 |
| Wiring Diagrams | V8-T3-100 |
| Dimensions | V8-T3-100 |

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

Standards and Certifications

- UL Listed, E166051
- CSA Certified, 50513
- RoHS Compliant



⚠ DANGER

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

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

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

3.17

Inductive Proximity Sensors

E51 Limit Switch Style, Factory Sealed 6P+ Sensors

Product Selection

Unitized Sensors

3

Assembled Sensor with 8 ft Cable ①



Sensor Heads ②

Top Sensing ②



Side Sensing ②



Factory Sealed 6P+ Assembled Sensors

| Sensing Range | Shielding | Frequency ③ | Two-Wire Sensors | | Four-Wire Sensors | | |
|---------------------|------------|-------------|--|-------------------|-------------------|-------------------|-------------------------|
| | | | Operating voltage | Output | 120 Vac | 10–30 Vdc | NO and NC complementary |
| | | | Assembled Sensor with Head, Sensor Body and Receptacle | | | | |
| | | | 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 ⑥

Mini-Style Straight Female



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

Notes

① Switch bases feature 8 ft of S00W-A cable. Other connection options are available:

| Connection Option ④ | 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 T before U | E51ALT16PTU |
| Mini-connector mounted to switch base (3-pin for two-wire sensors; 5-pin for four-wire sensors) | Add the letter C before U | E51ALT16PCU |
| 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 | E51ALT16PU12 ⑤ |

② 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.

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





④ See listing of compatible connector cables above.

⑤ For 12 ft.

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

Accessories

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

| | Description | Catalog Number |
|---|--|----------------|
| One Hole  | Universal Mounting Bracket Includes mounting hardware, stainless steel | E51KH2 |
| Two Holes  | Includes mounting hardware, steel | E51KH4 |
| Machine Mounting Bracket  | Machine Mounting Bracket Zinc die cast construction | E50KH3 |
| Stand-Off Mounting Bracket  | Stand-Off Mounting Bracket Steel construction | E51KH3 |
| Dimensions , see Page V8-T3-100 . | | |

Technical Data and Specifications

E51 Limit Switch Style, Factory Sealed 6P+

| Description | Specification |
|---------------------------|--|
| Output rating (NEMA D150) | |
| AC/DC models | 0.5 A continuous |
| AC models | 1 A continuous |
| DC models | 0.6 A continuous |
| Protection | Latching short-circuit protection on two-wire AC/DC 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**.

3.17

Inductive Proximity Sensors

E51 Limit Switch Style, Factory Sealed 6P+ Sensors

Wiring Diagrams

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

E51 Limit Switch Style, Factory Sealed 6P+

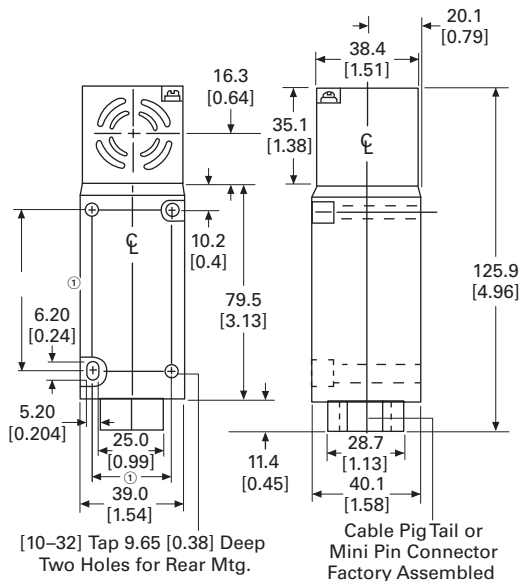
3

| Operating Voltage | Output | Cable Models | Mini-Connector Models (Face View Male Shown) |
|----------------------------|---------------------|--------------|--|
| Two-Wire Sensors | | | |
| 20–264 Vac or Vdc 50/60 Hz | NO or NC (NO shown) | | |
| Four-Wire Sensors | | | |
| 120 Vac 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+



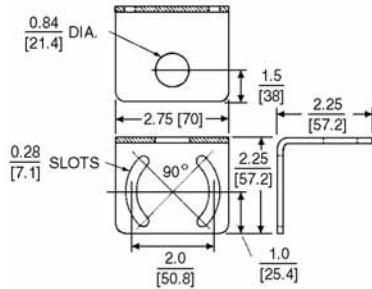
Note

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.

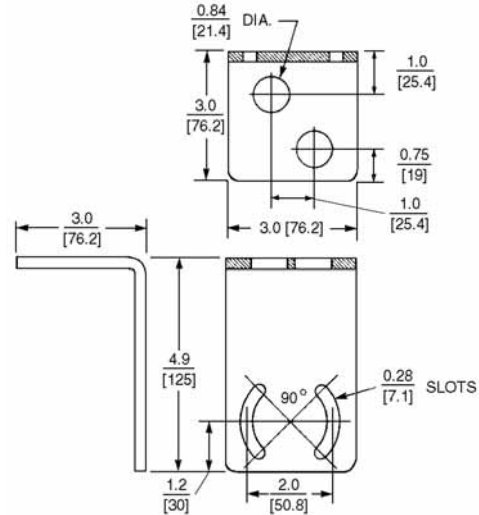
Approximate Dimensions in Inches [mm]

Accessories

Universal Mounting Bracket—One Hole

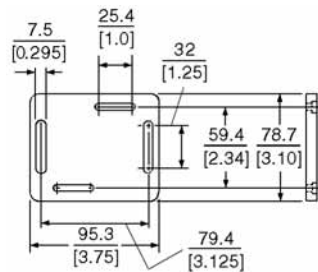


Universal Mounting Bracket—Two Holes

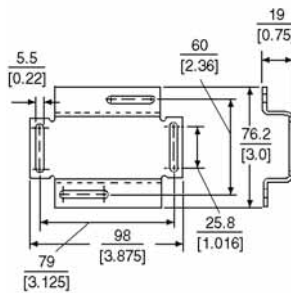


Approximate Dimensions in mm [in]

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.

iProx



E57P Performance



AccuProx



E56 Pancake



Nonmetallic Tubular



E52 Cube Style



E51, Factory Sealed



| | | |
|-------------|---|-----------------|
| 3.0 | Introduction | |
| | Quick Reference Guide | V8-T3-2 |
| 3.1 | iProx Sensors | |
| | Product Description | V8-T3-11 |
| 3.2 | E57P Performance Series Sensors | |
| | Product Description | V8-T3-18 |
| 3.3 | E57PS Performance Short Body Sensors | |
| | Product Description | V8-T3-24 |
| 3.4 | E57G General Purpose Proximity Sensors | |
| | Product Description | V8-T3-29 |
| 3.5 | E57 Two-Wire (AC, AC/DC, DC) Proximity Sensors | |
| | Product Description | V8-T3-35 |
| 3.6 | AccuProx Analog Sensors | |
| | Product Description | V8-T3-49 |
| 3.7 | Ferrous Only Tubular Sensors | |
| | Product Description | V8-T3-55 |
| 3.8 | Metal Face Sensors | |
| | Product Description | V8-T3-58 |
| 3.9 | High Current Output Sensors | |
| | Product Description | V8-T3-62 |
| 3.10 | Small Diameter (4, 5, 6.5, 8 mm) Sensors | |
| | Product Description | V8-T3-65 |
| 3.11 | E56 Pancake Sensors | |
| | Product Description | V8-T3-71 |
| 3.12 | Nonmetallic Tubular Sensors | |
| | Product Description | V8-T3-76 |
| 3.13 | E52 Cube Style Sensors | |
| | Product Description | V8-T3-79 |
| 3.14 | E52 Rectangular Style Sensors | |
| | Product Description | V8-T3-83 |
| 3.15 | E55 Limit Switch Style Sensors with Nonmetallic Housings | |
| | Product Description | V8-T3-86 |
| 3.16 | E51 Modular Limit Switch Style Sensors | |
| | Product Description | V8-T3-88 |
| 3.17 | E51 Limit Switch Style, Factory Sealed 6P+ Sensors | |
| | Product Description | V8-T3-97 |



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

Revision notes

Volume 8—Sensing Solutions, CA08100010E

Tab 3—Inductive Proximity Sensors

| Revision date | Section | Change page(s) | Description |
|---------------|---------|-------------------------------|---|
| 09/08/2017 | 3.0 | V8-T3-3, V8-T3-6–V8-T3-10 | Content edit |
| 09/08/2017 | 3.1 | V8-T3-11 | Content edit |
| 09/08/2017 | 3.2 | V8-T3-18 | Content edit |
| 09/08/2017 | 3.3 | V8-T3-24, V8-T3-26 | Content edit |
| 09/08/2017 | 3.4 | V8-T3-29 | Content edit |
| 09/08/2017 | 3.5 | V8-T3-35 V8-T3-44–V8-T3-46 | Content edit |
| 09/08/2017 | 3.6 | V8-T3-49, V8-T3-50 | Content edit |
| 09/08/2017 | 3.7 | V8-T3-55 | Content edit |
| 09/08/2017 | 3.8 | V8-T3-58 | Content edit |
| 09/08/2017 | 3.9 | V8-T3-62 | Content edit |
| 09/08/2017 | 3.10 | V8-T3-65, V8-T3-67 | Content edit |
| 09/08/2017 | 3.11 | V8-T3-71 | Content edit |
| 09/08/2017 | 3.12 | V8-T3-76 | Content edit |
| 09/08/2017 | 3.13 | V8-T3-79 | Content edit |
| 09/08/2017 | 3.14 | V8-T3-83 | Content edit |
| 09/08/2017 | 3.15 | V8-T3-86 | Content edit |
| 09/08/2017 | 3.16 | V8-T3-88–V8-T3-91 | Content edit |
| 09/08/2017 | 3.17 | V8-T3-97 | Content edit |
| 09/08/2017 | All | All | Revision date changed to September 2017 |

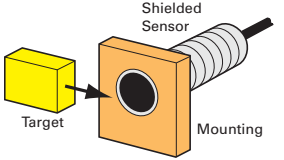
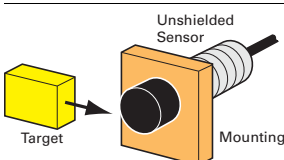
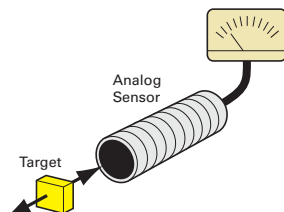
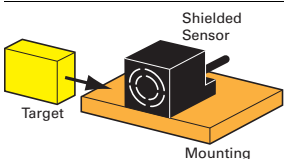
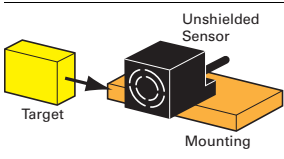


Powering Business Worldwide

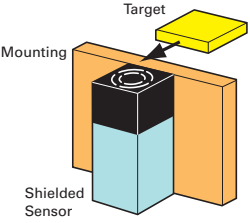
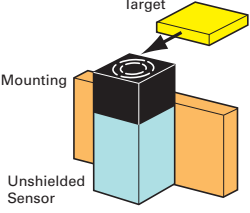
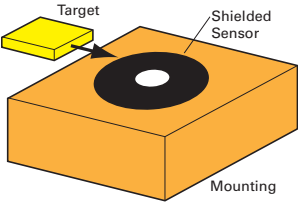
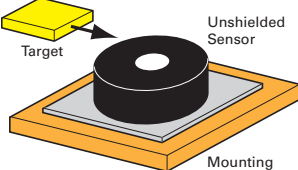
Quick Reference Guide

Inductive Proximity Sensors

3

| Sensing Application | Sensing Style | Size | Max Range | Product Family | Page |
|---|--------------------|------------------------------|------------------------------|------------------------------|---------------------------|
|  | Shielded tubular | 4 mm | 0.8 mm | Small Diameter Sensors | V8-T3-65 |
| | | 5 mm | 0.8 mm | Small Diameter Sensors | V8-T3-65 |
| | | 6.5 mm | 1 mm | Small Diameter Sensors | V8-T3-65 |
| | | 8 mm | 3 mm | Small Diameter Sensors | V8-T3-65 |
| | | 12 mm | 4 mm | iProx™ Sensors | V8-T3-11 |
| | | | 4 mm | E57P Performance Sensors | V8-T3-18, V8-T3-24 |
| | | | 4 mm | E57G General Purpose Sensors | V8-T3-29 |
| | | 18 mm | 8 mm | iProx Sensors | V8-T3-11 |
| | | | 8 mm | E57P Performance Sensors | V8-T3-18, V8-T3-24 |
| | | | 8 mm | E57G General Purpose Sensors | V8-T3-29 |
| 30 mm | 15 mm | iProx Sensors | V8-T3-11 | | |
| | 15 mm | E57P Performance Sensors | V8-T3-18, V8-T3-24 | | |
| | 15 mm | E57G General Purpose Sensors | V8-T3-29 | | |
|  | Unshielded tubular | 6.5 mm | 2 mm | Small Diameter | V8-T3-65 |
| | | 8 mm | 6 mm | Small Diameter | V8-T3-65 |
| | | 12mm | 10 mm | iProx Sensors | V8-T3-11 |
| | | | 8 mm | E57P Performance Sensors | V8-T3-18, V8-T3-24 |
| | | 8 mm | E57G General Purpose Sensors | V8-T3-29 | |
| | | | 18 mm | 18 mm | iProx Sensors |
| | | 12 mm | E57P Performance Sensors | V8-T3-18, V8-T3-24 | |
| | | | E57G General Purpose Sensors | V8-T3-29 | |
| 30 mm | 29 mm | iProx Sensors | V8-T3-11 | | |
| | 22 mm | E57P Performance Sensors | V8-T3-18, V8-T3-24 | | |
| | 22 mm | E57G General Purpose Sensors | V8-T3-29 | | |
|  | Analog tubular | 12 mm | 8 mm | AccuProx™ Analog Sensors | V8-T3-49 |
| | | 18 mm | 15 mm | AccuProx Analog Sensors | V8-T3-49 |
| | | 30 mm | 25 mm | AccuProx Analog Sensors | V8-T3-49 |
|  | Shielded cube | 40 x 40 x 40 mm | 20 mm | E52 Cube Style Sensors | V8-T3-79 |
|  | Unshielded cube | 40 x 40 x 40 mm | 40 mm | E52 Cube Style Sensors | V8-T3-79 |

Inductive Proximity Sensors, continued

| Sensing Application | Sensing Style | Size | Max Range | Product Family | Page |
|---|-------------------------|---|-----------|--|---|
|  | Shielded limit switch | 118 x 40 x 40 mm 114 x 39 x 38.4 mm | 13 mm | E51 Modular Limit Switch Style Sensors E51 Limit Switch Style, Factory Sealed 6P+ Sensors E55 Limit Switch Style Sensors with Nonmetallic Housings | V8-T3-88, V8-T3-97, V8-T3-86 |
|  | Unshielded limit switch | 118 x 40 x 40 mm 114 x 39 x 38.4 mm | 24 mm | E51 Series E55 Series | V8-T3-88, V8-T3-86 |
|  | Shielded pancake | 79 x 79 x 39 mm | 40 mm | E56 Series | V8-T3-71 |
|  | Unshielded pancake | 79 x 79 x 39 mm 110 x 110 x 41 mm 171.5 x 171.5 x 67.5 mm | 100 mm | E56 Series | V8-T3-71 |

Technical Reference

Inductive Proximity Sensors

3



General

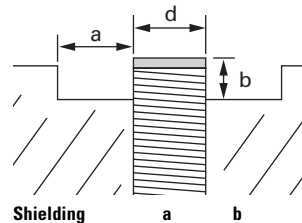
There are a number of factors which should be considered when applying induction proximity sensors. A detailed discussion of these factors can be found on **Page V8-T12-4**. Presented below are a few of the more important considerations for quick reference.

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 |
|-----------------------|--------|------------|
| Standard Range | | |
| Shielded | 0 | 0 |
| Unshielded | 2 x Sn | Cap height |
| Extended Range | | |
| 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 |
|-----------------------|-------------------|---------------------|
| 12 mm Diameter | | |
| | 35 lb-in (4.0 Nm) | 20 lb-in (2.3 Nm) |
| 18 mm Diameter | | |
| | 70 lb-in (7.9 Nm) | 70 lb-in (7.9 Nm) |
| 30 mm Diameter | | |
| | 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 E57P-18SPN5-C2 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 E57P-18SPN5-C2 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 ^①

| 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

^① Targets are 1 mm thick.

Product Selection Guide

iProx



Page V8-T3-11

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

UL® Listed, E166051
UL Tested to Canadian safety standards
CE
RoHS Compliant



E57P Performance Series



Page V8-T3-18

Overview

High performance inductive sensors. Extended and standard ranges available.

Applications

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

Product Features

12, 18 and 30 mm diameters
Three-wire DC sensors
360° LED indicators standard
NO or NC outputs
Short-circuit protection
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—
DC: 300 mA
Enclosure ratings—IP67, IP69K;
NEMA 4, 4X, 6, 6P
Construction—
Stainless steel housing and nuts

Approvals

UL Listed, E166051
UL Tested to Canadian safety standards
CE
RoHS Compliant



E57PS Performance Short Body



Page V8-T3-24

Overview

High performance inductive sensors with the ability to fit into tighter spaces.

Applications

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

Product Features

12, 18 and 30 mm diameters
Three-wire DC sensors
360° LED indicators standard
NO or NC outputs
Short-circuit protection
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—
DC: 300 mA
Enclosure ratings—IP67, IP69K;
NEMA 4, 4X, 6, 6P
Construction—
Stainless steel housing and nuts

Approvals

UL Listed, E166051
UL Tested to Canadian safety standards
CE
RoHS Compliant



E57G General Purpose



Page V8-T3-29

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

12, 18 and 30 mm diameters
Three-wire DC sensors
360° LED indicators standard
NO or NC outputs
Short-circuit protection
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—
DC: 100 mA
Enclosure ratings—IP67;
NEMA 4, 4X, 6, 6P
Construction—
Stainless steel housing and nickel-brass nuts

Approvals

UL Listed, E166051
UL Tested to Canadian safety standards
CE
RoHS Compliant



E57 Two-Wire (AC, AC/DC, DC) Proximity



Page V8-T3-35

Overview

Various models available in two-wire configurations:
Stainless steel (AC, AC/DC)
Stainless steel short body (AC, AC/DC)
Nickel-brass (AC, DC)

Applications

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

Product Features

12, 18 and 30 mm diameters
Two-wire AC, AC/DC, DC
Shielded and unshielded models
Standard and extended ranges
LED indicators
Cable and micro-connector
NO or NC outputs

Technical Data and Specifications

Stainless steel:
Current ratings—
500 mA maximum
Enclosure ratings—IP67, IP69K;
NEMA 4, 4X, 6, 6P, 12, 13
Nickel-Brass:
Current ratings—
200 mA (AC); 100 mA (DC)
Enclosure ratings—
IP69K, IP67

Approvals

RoHS Compliant
Stainless Steel:
UL Listed, E166051
UL Tested to Canadian safety standards
CE (AC/DC only)
Nickel-Brass:
CSA Certified, 224447
Products certified by CSA for US
CE (DC only)



AccuProx



Page V8-T3-49

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 (0–10 V)
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

UL Listed, E166051
UL Tested to Canadian safety standards
CE
RoHS Compliant



Ferrous Only Tubular



Page V8-T3-55

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

CSA Certified
Products certified by CSA for US
CE
RoHS Compliant



Metal Face



Page V8-T3-58

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

CSA Certified
Products certified by CSA for US
CE
RoHS Compliant



High Current Output



Page V8-T3-62

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

RoHS Compliant



Small Diameter



Page V8-T3-65

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
RoHS Compliant
8 mm standard models only:
CSA Certified, 224447
Products certified by CSA for US



E56 Pancake



Page V8-T3-71

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

UL Listed, E166051 (DC models only)
UL tested to Canadian safety standards
CE (DC models only)
RoHS Compliant



Tubular, Nonmetallic Housing



Page V8-T3-76

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

CE
 RoHS Compliant



E52 Cube Style



Page V8-T3-79

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

UL Listed, E166051
 UL tested to Canadian safety standards
 CE
 RoHS Compliant



E52 Rectangular Style



Page V8-T3-83

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

CE (except E52RAL)
 RoHS Compliant



E55 Limit Switch Style, Nonmetallic Housing



Page V8-T3-86

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

CE
 RoHS Compliant



E51 Modular Switch Style, Modular



Page V8-T3-88

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, E166051, E183975
 CSA Certified, 50513
 RoHS Compliant



E51 Limit Switch Style, Factory Sealed 6P +



Page V8-T3-97

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

UL Listed, E166051
 CSA Certified, 50513
 RoHS Compliant



iProx Sensors



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

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

Contents

Description

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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])

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

Standards and Certifications

- UL Listed, E166051
- UL Tested to Canadian safety standards
- CE
- RoHS Compliant



⚠ 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.

3.1

Inductive Proximity Sensors

iProx Sensors







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.

3

Two-Wire Sensors

| | Operating Voltage | Sensing Range | Shielding | Connection Type ^① | NO Output Catalog Number ^② | NC Output Catalog Number ^② |
|--|-------------------|---------------|------------|-------------------------------------|---------------------------------------|---------------------------------------|
| 12 mm Diameter | | | | | | |
| Standard Range  | 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 |
| Extended Range  | | 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 | | | | | | |
| Standard Range  | 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 |
| Extended Range  | | 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 | | | | | | |
| Standard Range  | 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 |
| Extended Range  | | 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-T3-15**.







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

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

③ Standard pigtail cable length is 12 in.

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

| | 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-T3-15**.
- ① For sensors with custom cable lengths or PUR jackets, contact Application Engineering at 1-800-426-9184.
- ② Sensors are ordered with pre-set outputs from the factory, but can be later programmed either NO or NC using the ProxView software.
- ③ Standard pigtail cable length is 12 in.

3.1







Inductive Proximity Sensors

iProx Sensors

Complementary and Dual Output Sensors

Four-Wire Sensors

3

| | Operating Voltage | Sensing Range | Shielding | Output Type | Connection Type | Complementary Output (1NO-1NC) Catalog Number | Dual NO Output 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 |
| Extended Range | | | | PNP (sourcing) | 4-pin micro DC connector | E59-M12A105D01-D3PP ☺ | E59-M12A105D01-D1PP ☺ |
| | | | | | 2-meter cable | E59-M12A105C02-D3PP | E59-M12A105C02-D1PP |
|  | | 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 |
| Extended Range | | | | 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 |
| Extended Range | | | | PNP (sourcing) | 4-pin micro DC connector | E59-M18A108D01-D3PP ☺ | E59-M18A108D01-D1PP ☺ |
| | | | | | 2-meter cable | E59-M18A108C02-D3PP | E59-M18A108C02-D1PP |
|  | | 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 |
| Extended Range | | | | 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 |
| Extended Range | | | | PNP (sourcing) | 4-pin micro DC connector | E59-M30A115D01-D3PP ☺ | E59-M30A115D01-D1PP ☺ |
| | | | | | 2-meter cable | E59-M30A115C02-D3PP | E59-M30A115C02-D1PP |
|  | | 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 |
| Extended Range | | | | 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-T3-15](#).

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.




Compatible Connector Cables

Standard Cables ^①

| | Current Rating at 600 V | 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  | Micro-Style, Straight Female | | | | | | | |
| | — | AC | 3-pin, 3-wire | 22 AWG | 6.0 ft (2m) |  1-Green 2-Red/Black 3-Red/White | CSAS3F3CY2202 | CSAS3F3RY2202 |
| Mini-Style Straight Female  | Mini-Style, Straight Female | | | | | | | |
| | 13 A | — | 3-pin | 16 AWG | 6 ft (2m) |  1-Brown 2-White 3-Blue 4-Black | CSDS4A4CY2202 | CSDS4A4RY2202 |
| | | | | | | | Catalog Number | |
| | | | | | |  1-Green 2-Black 3-White | CSMS3F3CY1602 | |

Accessories

iProx Sensors

| | Description | Catalog Number |
|--|--|-----------------|
| Software  | Step-by-step programming software required to program iProx. Compatible with Microsoft Windows® and Windows® Mobile devices. | E59SW1 |
| Cable  | 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.) | E59RP1 |
| Labels  | Field applied labels for iProx sensor (100 pcs) | E59LABEL |

Note

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

3.1

Inductive Proximity Sensors

iProx Sensors

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

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; Unshielded models: <3% sensing distance | Shielded models: <1% sensing distance; Unshielded models: <3% sensing distance |
| Surge capacity | 3 A/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; face caps: Ryton®; cable: AWM style 20387 (PVC) | 303 stainless steel; end bells: polycarbonate; face caps: Ryton®; cable: AWM style 20387 (PVC) |
| Vibration and shock | Vibration: 10 to 55 Hz, 1 mm amplitude, IEC 60068-2-6; shock: 30 g, 11 ms per IEC 68-2-27 | Vibration: 10 to 55 Hz, 1 mm amplitude, IEC 60068-2-6; shock: 30 g, 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 All Two-Wire Models | Three-Wire Sensors 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).

Wiring Diagrams

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

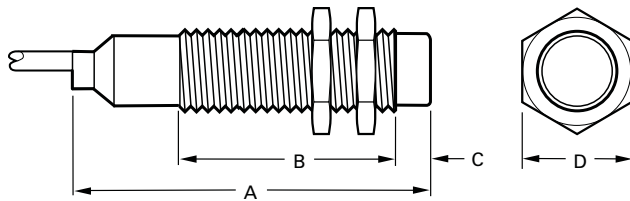
iProx Sensors

| Operating Voltage | Output | Cable Models | Connector Models (Face View Male Shown) | Mini |
|--|---------------------------|--------------|---|------|
| Two-Wire Sensors | | | | |
| 20–132 Vac | NO and NC | | | |
| Three-Wire Sensors | | | | |
| 6–48 Vdc | NO and NC (NPN and PNP) ① | ② | ② | — |
| Four-Wire Dual Output and Complementary Sensors | | | | |
| 6–48 Vdc | NO and NC (NPN) | ③ | ③ | — |
| | NO and NC (PNP) | ③ | ③ | — |

Dimensions

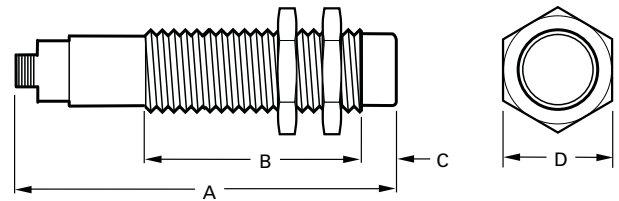
Approximate Dimensions in Inches (mm)

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).

3.2

Inductive Proximity Sensors

E57P Performance Series Sensors

E57P Performance Series Sensors

3



Contents

| <i>Description</i> | <i>Page</i> |
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| E57P Performance Series Sensors | |
| Product Selection | |
| E57P Performance Sensors | V8-T3-19 |
| Compatible Connector Cables | V8-T3-20 |
| Accessories | V8-T3-20 |
| Technical Data and Specifications | V8-T3-21 |
| Wiring Diagrams | V8-T3-22 |
| Dimensions | V8-T3-23 |

E57P Performance Series Sensors

Product Description

For sensing applications requiring more demanding specifications, the new E57P Performance series incorporates premium features without the premium price. With its stainless steel tubular body, IP69K rating, wide temperature range (down to -40 °C), fast switching speed and laser-etched markings, the E57P series provides value at a low price point.

Features

- 360° LED indicator
- Stainless steel tube
- 10–48 Vdc operating voltage
- Short-circuit protection
- -40 to 70 °C temperature range
- IP69K environmental rating
- Durable laser-engraved label
- Available in cable and micro-connector styles

Standards and Certifications

- UL Listed, E166051
- UL Tested to Canadian safety standards
- CE
- RoHS Compliant



DANGER

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



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

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

Product Selection

E57P Performance Sensors

Three-Wire Sensors

| | Operating Voltage | Sensing Range (Sn) | Shielding | Connection Type ^① | NO Output Catalog Number | NC Output Catalog Number |
|---|----------------------|-----------------------------------|------------------------|------------------------------|--------------------------|--------------------------|
|  | 10–48 Vdc | 12 mm Diameter End Sensing | | | | |
| | | 2 mm (standard range) | Shielded (PNP) | 2-meter cable | E57P-12SPN2-C2 | E57P-12SPC2-C2 |
| | | | | 4-pin micro DC connector | E57P-12SPN2-Q | E57P-12SPC2-Q |
| | | | Shielded (NPN) | 2-meter cable | E57P-12SNN2-C2 | E57P-12SNC2-C2 |
| | | | | 4-pin micro DC connector | E57P-12SNN2-Q | E57P-12SNC2-Q |
| | | 4 mm (standard range) | Unshielded (PNP) | 2-meter cable | E57P-12UPN4-C2 | E57P-12UPC4-C2 |
| | | | | 4-pin micro DC connector | E57P-12UPN4-Q | E57P-12UPC4-Q |
| | | | Unshielded (NPN) | 2-meter cable | E57P-12UNN4-C2 | E57P-12UNC4-C2 |
| | | | | 4-pin micro DC connector | E57P-12UNN4-Q | E57P-12UNC4-Q |
| | | 4 mm (extended range) | Shielded (PNP) | 2-meter cable | E57P-12SPN4-C2 | E57P-12SPC4-C2 |
| | | | | 4-pin micro DC connector | E57P-12SPN4-Q | E57P-12SPC4-Q |
| | | | Shielded (NPN) | 2-meter cable | E57P-12SNN4-C2 | E57P-12SNC4-C2 |
| 4-pin micro DC connector | E57P-12SNN4-Q | | | E57P-12SNC4-Q | | |
| 8 mm (extended range) | Unshielded (PNP) | 2-meter cable | E57P-12UPN8-C2 | E57P-12UPC8-C2 | | |
| | | 4-pin micro DC connector | E57P-12UPN8-Q | E57P-12UPC8-Q | | |
| | Unshielded (NPN) | 2-meter cable | E57P-12UNN8-C2 | E57P-12UNC8-C2 | | |
| | | 4-pin micro DC connector | E57P-12UNN8-Q | E57P-12UNC8-Q | | |
|  | 10–48 Vdc | 18 mm Diameter End Sensing | | | | |
| | | 5 mm (standard range) | Shielded (PNP) | 2-meter cable | E57P-18SPN5-C2 | E57P-18SPC5-C2 |
| | | | | 4-pin micro DC connector | E57P-18SPN5-Q | E57P-18SPC5-Q |
| | | | Shielded (NPN) | 2-meter cable | E57P-18SNN5-C2 | E57P-18SNC5-C2 |
| | | | | 4-pin micro DC connector | E57P-18SNN5-Q | E57P-18SNC5-Q |
| | | 8 mm (standard range) | Unshielded (PNP) | 2-meter cable | E57P-18UPN8-C2 | E57P-18UPC8-C2 |
| | | | | 4-pin micro DC connector | E57P-18UPN8-Q | E57P-18UPC8-Q |
| | | | Unshielded (NPN) | 2-meter cable | E57P-18UNN8-C2 | E57P-18UNC8-C2 |
| | | | | 4-pin micro DC connector | E57P-18UNN8-Q | E57P-18UNC8-Q |
| | | 8 mm (extended range) | Shielded (PNP) | 2-meter cable | E57P-18SPN8-C2 | E57P-18SPC8-C2 |
| | | | | 4-pin micro DC connector | E57P-18SPN8-Q | E57P-18SPC8-Q |
| | | | Shielded (NPN) | 2-meter cable | E57P-18SNN8-C2 | E57P-18SNC8-C2 |
| 4-pin micro DC connector | E57P-18SNN8-Q | | | E57P-18SNC8-Q | | |
| 12 mm (extended range) | Unshielded (PNP) | 2-meter cable | E57P-18UPN12-C2 | E57P-18UPC12-C2 | | |
| | | 4-pin micro DC connector | E57P-18UPN12-Q | E57P-18UPC12-Q | | |
| | Unshielded (NPN) | 2-meter cable | E57P-18UNN12-C2 | E57P-18UNC12-C2 | | |
| | | 4-pin micro DC connector | E57P-18UNN12-Q | E57P-18UNC12-Q | | |

Notes

⊕ See listing of compatible connector cables on [Page V8-T3-20](#).

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.

3.2

Inductive Proximity Sensors

E57P Performance Series Sensors

3



Three-Wire Sensors, continued

| Operating Voltage | Sensing Range (Sn) | Shielding | Connection Type ① | NO Output Catalog Number | NC Output Catalog Number |
|-----------------------------------|------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 30 mm Diameter End Sensing | | | | | |
| 10–48 Vdc | 10 mm (standard range) | Shielded (PNP) | 2-meter cable | E57P-30SPN10-C2 | E57P-30SPC10-C2 |
| | | | 4-pin micro DC connector | E57P-30SPN10-Q | E57P-30SPC10-Q |
| | | Shielded (NPN) | 2-meter cable | E57P-30SNN10-C2 | E57P-30SNC10-C2 |
| | | | 4-pin micro DC connector | E57P-30SNN10-Q | E57P-30SNC10-Q |
| | 15 mm (standard range) | Unshielded (PNP) | 2-meter cable | E57P-30UPN15-C2 | E57P-30UPC15-C2 |
| | | | 4-pin micro DC connector | E57P-30UPN15-Q | E57P-30UPC15-Q |
| | | Unshielded (NPN) | 2-meter cable | E57P-30UNN15-C2 | E57P-30UNC15-C2 |
| | | | 4-pin micro DC connector | E57P-30UNN15-Q | E57P-30UNC15-Q |
| | 15 mm (extended range) | Shielded (PNP) | 2-meter cable | E57P-30SPN15-C2 | E57P-30SPC15-C2 |
| | | | 4-pin micro DC connector | E57P-30SPN15-Q | E57P-30SPC15-Q |
| | | Shielded (NPN) | 2-meter cable | E57P-30SNN15-C2 | E57P-30SNC15-C2 |
| | | | 4-pin micro DC connector | E57P-30SNN15-Q | E57P-30SNC15-Q |
| 22 mm (extended range) | Unshielded (PNP) | 2-meter cable | E57P-30UPN22-C2 | E57P-30UPC22-C2 | |
| | | 4-pin micro DC connector | E57P-30UPN22-Q | E57P-30UPC22-Q | |
| | Unshielded (NPN) | 2-meter cable | E57P-30UNN22-C2 | E57P-30UNC22-C2 | |
| | | 4-pin micro DC connector | E57P-30UNN22-Q | E57P-30UNC22-Q | |

Compatible Connector Cables

Standard Cables ①

| Current Rating at 600 V | 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 | | | | | | | |
| — | DC | 4-pin, 4-wire | 22 AWG | 6.0 ft (2m) | | CSDS4A4CY2202 | CSDS4A4RY2202 |

Accessories

E57P Performance Sensors

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

Notes

② See listing of compatible connector cables on **Page V8-T3-20**.

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

Technical Data and Specifications

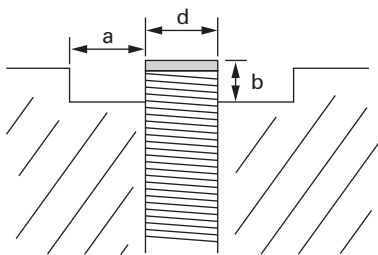
E57P Performance Sensors

| Description | Performance Three-Wire DC Sensors |
|--------------------------------|---|
| Operating voltage | 10–48 Vdc |
| Output current (continuous) | 300 mA |
| Switching frequency [Hz] | Standard range: 12 mm—Shielded: 2000; Unshielded: 2000 18 mm—Shielded: 1200; Unshielded: 1200 30 mm—Shielded: 600; Unshielded: 500 Extended range: 12 mm—Shielded: 1200; Unshielded: 500 18 mm—Shielded: 300; Unshielded: 300 30 mm—Shielded: 400; Unshielded: 200 |
| Leakage current | <100 μ A |
| Output voltage drop [Vsat] | <2.5 V |
| Current consumption | <10 mA |
| Short-circuit protection | Yes (Auto Reset) |
| Hysteresis [% of Sr] | 2–20% |
| Repeat accuracy | 1% shielded, 3% unshielded |
| Time delay before availability | <200 ms |
| Output indicator LED | 360° amber LED |
| Operating temperature range | –40 to 70 °C |
| Ingress protection | IEC IP67, IP69K, UL Type 1, NEMA Type 6P, NEMA Type 4X |
| Shock | 30 g, 11 ms per IEC 68-2-76 |
| Vibration | 10 to 55 Hz, 1 mm amplitude |
| Housing materials | Front face: Ryton Tube: Stainless steel End bells: M12 body: Polycarbonate Cable end bell: Polycarbonate Nuts: Stainless steel |
| Cable | 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.)

E57P Performance Sensors, Mounting



| Type | Shielding | a | b |
|----------------|------------|------------|--------|
| Standard range | Shielded | 0 | 0 |
| | Unshielded | Cap height | 2 x 5n |
| Extended range | Shielded | 0 | 0 |
| | Unshielded | Cap height | 2 x Sn |

Note

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

① 40–240 Vac at <–4 °F (<–20 °C).

3.2

Inductive Proximity Sensors

E57P Performance Series Sensors

Wiring Diagrams

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

E57P Performance Sensors

3

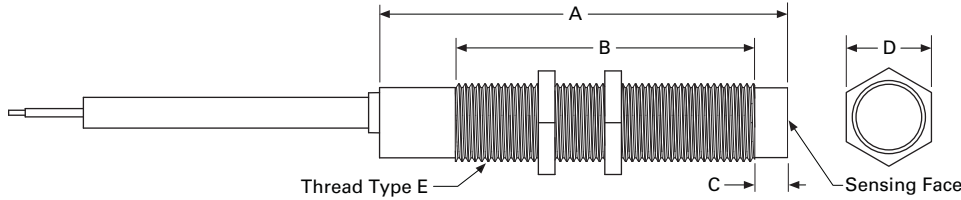
| Operating Voltage | Output | Cable Models | Connector Models (Face View Male Shown) Micro |
|---------------------------|----------|--------------|--|
| Three-Wire Sensors | | | |
| 10–48 Vdc | NO (NPN) | | |
| | NO (PNP) | | |
| | NC (NPN) | | |
| | NC (PNP) | | |

Dimensions

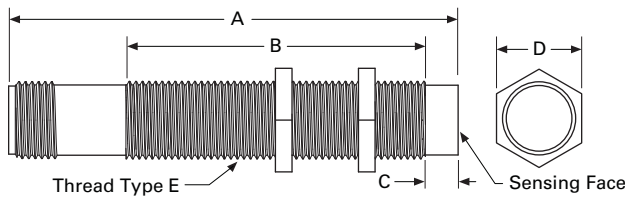
Approximate Dimensions in Inches (mm)

E57P Performance Series Sensors, End Sensing^①

Cable Models



Connector Models



| Size | Shielding | Overall Length A | Threaded Length B | Cap Height C | Nut Width D | Thread Size E |
|---|------------|---------------------|----------------------|-----------------|----------------|------------------|
| Three-Wire DC Sensors—Cable Models | | | | | | |
| 12 mm | Shielded | 2.52 (64.1) | 1.98 (50.3) | — | 0.67 (16.8) | M12 x 1 |
| | Unshielded | 2.52 (64.1) | 1.80 (45.8) | 0.20 (5.0) | 0.67 (16.8) | M12 x 1 |
| 18 mm | Shielded | 2.59 (65.9) | 2.00 (50.9) | — | 0.94 (23.8) | M18 x 1 |
| | Unshielded | 2.59 (65.9) | 1.75 (44.4) | 0.28 (7.0) | 0.94 (23.8) | M18 x 1 |
| 30 mm | Shielded | 2.67 (67.7) | 1.98 (50.3) | — | 1.41 (35.9) | M30 x 1.5 |
| | Unshielded | 2.67 (67.7) | 1.49 (37.8) | 0.51 (13.0) | 1.41 (35.9) | M30 x 1.5 |
| Three-Wire DC Sensors—Micro-Connector Models | | | | | | |
| 12 mm | Shielded | 2.70 (68.7) | 1.98 (50.3) | — | 0.67 (16.8) | M12 x 1 |
| | Unshielded | 2.70 (68.7) | 1.80 (45.8) | 0.20 (5.0) | 0.67 (16.8) | M12 x 1 |
| 18 mm | Shielded | 2.72 (69.2) | 2.00 (50.9) | — | 0.94 (23.8) | M18 x 1 |
| | Unshielded | 2.72 (69.2) | 1.75 (44.4) | 0.28 (7.0) | 0.94 (23.8) | M18 x 1 |
| 30 mm | Shielded | 2.79 (70.9) | 1.98 (50.3) | — | 1.41 (35.9) | M30 x 1.5 |
| | Unshielded | 2.79 (70.9) | 1.49 (37.8) | 0.51 (13.0) | 1.41 (35.9) | M30 x 1.5 |

Note

^① These dimensions apply to the Performance Series models in this section.

E57PS Performance Short Body Sensors

3



Contents

| <i>Description</i> | <i>Page</i> |
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| E57PS Performance Short Body Sensors | |
| Product Selection | |
| E57PS Performance Short Body Sensors . . . | V8-T3-25 |
| Compatible Connector Cables | V8-T3-25 |
| Accessories | V8-T3-26 |
| Technical Data and Specifications | V8-T3-26 |
| Wiring Diagrams | V8-T3-27 |
| Dimensions | V8-T3-27 |

E57PS Performance Short Body Sensors

Product Description

For demanding sensing applications in areas too small for standard length units, the E57PS Performance Short Body series is an ideal solution as it incorporates the premium features of the E57P series but in a shorter body length. With its stainless steel tubular body, IP69K rating, wide temperature range (down to -40 °C), fast switching speed and laser-etched markings, the E57PS series provides value at a low price point.

Features

- 360° LED indicator
- Stainless steel tube
- 10–48 Vdc operating voltage
- Short-circuit protection
- -40 to 70 °C temperature range
- IP69K environmental rating
- Durable laser-engraved label
- Available in cable and micro-connector styles

Standards and Certifications

- UL Listed, E166051
- UL Tested to Canadian safety standards
- CE
- RoHS Compliant



DANGER

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




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

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

Product Selection



E57PS Performance Short Body Sensors

Three-Wire Sensors

| | Operating Voltage | Sensing Range (Sn) | Shielding | Connection Type ^① | NO Output Catalog Number | NC Output Catalog Number |
|---|---|--------------------------|--------------------------|------------------------------|--------------------------|--------------------------|
|  | 12 mm Diameter | | | | | |
| | 10–48 Vdc | 2 mm (standard range) | Shielded (PNP) | 2-meter cable | E57PS-12SPN2-C2 | E57PS-12SPC2-C2 |
| | | | | 4-pin micro DC connector | E57PS-12SPN2-Q ⊕ | E57PS-12SPC2-Q ⊕ |
| | | Shielded (NPN) | 2-meter cable | E57PS-12SNN2-C2 | E57PS-12SNC2-C2 | |
| | | | 4-pin micro DC connector | E57PS-12SNN2-Q ⊕ | E57PS-12SNC2-Q ⊕ | |
| | | 4 mm (standard range) | Unshielded (PNP) | 2-meter cable | E57PS-12UPN4-C2 | E57PS-12UPC4-C2 |
| | | | | 4-pin micro DC connector | E57PS-12UPN4-Q ⊕ | E57PS-12UPC4-Q ⊕ |
| | Unshielded (NPN) | 2-meter cable | E57PS-12UNN4-C2 | E57PS-12UNC4-C2 | | |
| | | 4-pin micro DC connector | E57PS-12UNN4-Q ⊕ | E57PS-12UNC4-Q ⊕ | | |
| |  | 18 mm Diameter | | | | |
| 10–48 Vdc | | 5 mm (standard range) | Shielded (PNP) | 2-meter cable | E57PS-18SPN5-C2 | E57PS-18SPC5-C2 |
| | | | | 4-pin micro DC connector | E57PS-18SPN5-Q ⊕ | E57PS-18SPC5-Q ⊕ |
| | | Shielded (NPN) | 2-meter cable | E57PS-18SNN5-C2 | E57PS-18SNC5-C2 | |
| | | | 4-pin micro DC connector | E57PS-18SNN5-Q ⊕ | E57PS-18SNC5-Q ⊕ | |
| | | 8 mm (standard range) | Unshielded (PNP) | 2-meter cable | E57PS-18UPN8-C2 | E57PS-18UPC8-C2 |
| | | | | 4-pin micro DC connector | E57PS-18UPN8-Q ⊕ | E57PS-18UPC8-Q ⊕ |
| Unshielded (NPN) | | 2-meter cable | E57PS-18UNN8-C2 | E57PS-18UNC8-C2 | | |
| | | 4-pin micro DC connector | E57PS-18UNN8-Q ⊕ | E57PS-18UNC8-Q ⊕ | | |
|  | | 30 mm Diameter | | | | |
| | 10–48 Vdc | 10 mm (standard range) | Shielded (PNP) | 2-meter cable | E57PS-30SPN10-C2 | E57PS-30SPC10-C2 |
| | | | | 4-pin micro DC connector | E57PS-30SPN10-Q ⊕ | E57PS-30SPC10-Q ⊕ |
| | | Shielded (NPN) | 2-meter cable | E57PS-30SNN10-C2 | E57PS-30SNC10-C2 | |
| | | | 4-pin micro DC connector | E57PS-30SNN10-Q ⊕ | E57PS-30SNC10-Q ⊕ | |
| | | 15 mm (standard range) | Unshielded (PNP) | 2-meter cable | E57PS-30UPN15-C2 | E57PS-30UPC15-C2 |
| | | | | 4-pin micro DC connector | E57PS-30UPN15-Q ⊕ | E57PS-30UPC15-Q ⊕ |
| | Unshielded (NPN) | 2-meter cable | E57PS-30UNN15-C2 | E57PS-30UNC15-C2 | | |
| | | 4-pin micro DC connector | E57PS-30UNN15-Q ⊕ | E57PS-30UNC15-Q ⊕ | | |

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 |
|---|-------------------------------------|----------------|--------|-------------|---|---------------------------|---------------------------|
|  | Micro-Style, Straight Female | | | | | | |
| | DC | 4-pin, 4-wire | 22 AWG | 6.0 ft (2m) |  1-Brown 2-White 3-Blue 4-Black | CSDS4A4CY2202 | CSDS4A4RY2202 |

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

E57PS Performance Short Body Sensors

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

Technical Data and Specifications

E57PS Performance Short Body Sensors

| Description | Three-Wire DC Sensors |
|--------------------------|--|
| Operating voltage | 10–48 Vdc |
| Maximum load current | 300 mA |
| Switching frequency [Hz] | 12 mm—Shielded: 2000; Unshielded: 2000 18 mm—Shielded: 1200; Unshielded: 1200 30 mm—Shielded: 600; Unshielded: 500 |
| Leakage current | 100 μ A maximum |
| Voltage drop | ≤ 2.5 V |
| Holding current | ≤ 10 mA |
| Short-circuit protection | Yes (Auto Reset) |
| Switching hysteresis | 2–20% of rated sensing distance |
| Repeat accuracy | 1% shielded, 3% unshielded |
| Output indicator LED | 360° amber LED |
| Operating temperature | –40 to 158 °F (–40 to 70 °C) |
| Enclosure ratings | IP67, IP69K; NEMA 4, 4X, 6, 6P |
| Shock | 30 g sine wave, 11 ms per IEC68-2-76 |
| Vibration | 10 to 55 Hz, 1 mm amplitude |
| Material of construction | Stainless steel, polycarbonate end bells, Ryton® front cap |
| Cable | AWM Style 20387 (PVC) |

Note

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

Wiring Diagrams

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

E57PS Performance Short Body Sensors

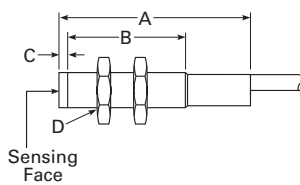
| Operating Voltage | Output | Cable Models | Micro-Connector Models (Face View Male Shown) |
|---------------------------|----------|--------------|---|
| Three-Wire Sensors | | | |
| 10–48 Vdc | NO (NPN) | | |
| | NO (PNP) | | |
| | NC (NPN) | | |
| | NC (PNP) | | |

Dimensions

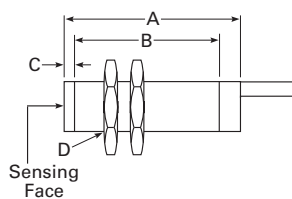
Approximate Dimensions in Inches (mm)

E57PS Performance Short Body Sensors—Cable Models

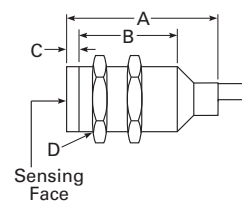
12 mm



18 mm



30 mm



| Size | Shielding | Overall Length A | Threaded Length B | Cap Height C | Thread Size D |
|------------------------------|------------|------------------|-------------------|--------------|---------------|
| Three-Wire DC Sensors | | | | | |
| 12 mm | Shielded | 1.61 (40.9) | 1.07 (27.2) | — | M12 x 1 |
| | Unshielded | 1.61 (40.9) | 0.89 (22.7) | 0.20 (5.0) | M12 x 1 |
| 18 mm | Shielded | 1.77 (44.9) | 1.17 (29.8) | — | M18 x 1 |
| | Unshielded | 1.77 (44.9) | 0.92 (23.3) | 0.28 (7.0) | M18 x 1 |
| 30 mm | Shielded | 1.84 (46.6) | 1.15 (29.3) | — | M30 x 1.5 |
| | Unshielded | 1.84 (46.6) | 0.66 (16.8) | 0.51 (13.0) | M30 x 1.5 |

3.3

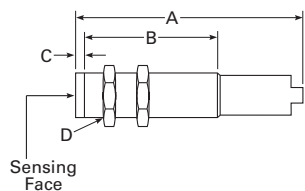
Inductive Proximity Sensors

E57PS Performance Short Body Sensors

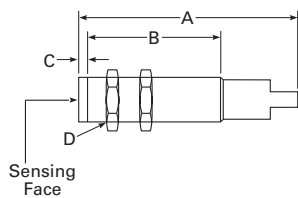
Approximate Dimensions in Inches (mm)

E57PS Performance Short Body Sensors—Micro-Connector Models

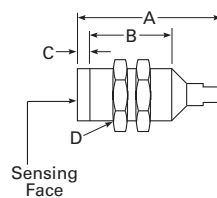
12 mm



18 mm



30 mm



| Size | Shielding | Overall Length A | Threaded Length B | Cap Height C | Thread Size D |
|------------------------------|------------|---------------------|----------------------|-----------------|------------------|
| Three-Wire DC Sensors | | | | | |
| 12 mm | Shielded | 1.64 (41.5) | 1.07 (27.2) | — | M12 x 1 |
| | Unshielded | 1.64 (41.5) | 0.89 (22.7) | 0.20 (5.0) | M12 x 1 |
| 18 mm | Shielded | 1.59 (40.3) | 1.17 (29.8) | — | M18 x 1 |
| | Unshielded | 1.59 (40.3) | 0.92 (23.3) | 0.28 (7.0) | M18 x 1 |
| 30 mm | Shielded | 1.77 (45.0) | 1.15 (29.3) | — | M30 x 1.5 |
| | Unshielded | 1.96 (49.7) | 0.66 (16.8) | 0.51 (13.0) | M30 x 1.5 |

E57G General Purpose Proximity Sensors



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|--|-----------------|
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| Compatible Connector Cables | V8-T3-31 |
| Accessories | V8-T3-31 |
| Technical Data and Specifications | V8-T3-32 |
| Wiring Diagrams | V8-T3-33 |
| Dimensions | V8-T3-34 |

E57G General Purpose Proximity Sensors

Product Description

For global sensing applications, the E57G General Purpose series is designed for most standard inductive sensing needs. With its stainless steel tubular body, 360 degree visible LED, fast switching speed and laser-etched markings, the E57G series is an ideal cost-effective solution.

Features

- 360° LED indicator
- Stainless steel tube
- 10–30 Vdc operating voltage
- Short-circuit protection
- –25 to 70 °C temperature range
- IP67 environmental rating
- Durable laser-engraved label
- Available in cable and micro-connector styles
- Nickel-brass mounting nuts

Standards and Certifications

- UL Listed, E166051
- UL Tested to Canadian safety standards
- CE
- RoHS Compliant



DANGER

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

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

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

3.4

Inductive Proximity Sensors



E57G General Purpose Proximity Sensors

Product Selection

E57G General Purpose Proximity Sensors

3

Three-Wire Sensors

| | Operating Voltage | Sensing Range | Shielding | Output Type | Connection Type | NO Output Catalog Number | NC Output Catalog Number | | |
|---|---|--------------------------|------------------------|--------------------------|--------------------------|--------------------------|--------------------------|------------------------|-----------------------|
| 12 mm  | 12 mm Diameter | | | | | | | | |
| | 10–30 Vdc | 2 mm (standard range) | Shielded | PNP | 2-meter cable | E57G-12SPN2-C2 | E57G-12SPC2-C2 | | |
| | | | | | 4-pin micro DC connector | E57G-12SPN2-Q | E57G-12SPC2-Q | | |
| | | | | NPN | 2-meter cable | E57G-12SNN2-C2 | E57G-12SNC2-C2 | | |
| | | | | | 4-pin micro DC connector | E57G-12SNN2-Q | E57G-12SNC2-Q | | |
| | | | | 4 mm (standard range) | Unshielded | PNP | 2-meter cable | E57G-12UPN4-C2 | E57G-12UPC4-C2 |
| | | | | | | | 4-pin micro DC connector | E57G-12UPN4-Q | E57G-12UPC4-Q |
| | NPN | 2-meter cable | E57G-12UNN4-C2 | | | E57G-12UNC4-C2 | | | |
| | | 4-pin micro DC connector | E57G-12UNN4-Q | | | E57G-12UNC4-Q | | | |
| | 4 mm (extended range) | Shielded | PNP | 2-meter cable | E57G-12SPN4-C2 | E57G-12SPC4-C2 | | | |
| | | | | 4-pin micro DC connector | E57G-12SPN4-Q | E57G-12SPC4-Q | | | |
| | | | NPN | 2-meter cable | E57G-12SNN4-C2 | E57G-12SNC4-C2 | | | |
| | | | | 4-pin micro DC connector | E57G-12SNN4-Q | E57G-12SNC4-Q | | | |
| | | | 8 mm (extended range) | Unshielded | PNP | 2-meter cable | E57G-12UPN8-C2 | E57G-12UPC8-C2 | |
| | | | | | | 4-pin micro DC connector | E57G-12UPN8-Q | E57G-12UPC8-Q | |
| | NPN | 2-meter cable | | | E57G-12UNN8-C2 | E57G-12UNC8-C2 | | | |
| | | 4-pin micro DC connector | | | E57G-12UNN8-Q | E57G-12UNC8-Q | | | |
| | 18 mm  | 18 mm Diameter | | | | | | | |
| 10–30 Vdc | | 5 mm (standard range) | Shielded | PNP | 2-meter cable | E57G-18SPN5-C2 | E57G-18SPC5-C2 | | |
| | | | | | 4-pin micro DC connector | E57G-18SPN5-Q | E57G-18SPC5-Q | | |
| | | | | NPN | 2-meter cable | E57G-18SNN5-C2 | E57G-18SNC5-C2 | | |
| | | | | | 4-pin micro DC connector | E57G-18SNN5-Q | E57G-18SNC5-Q | | |
| | | | | 8 mm (standard range) | Unshielded | PNP | 2-meter cable | E57G-18UPN8-C2 | E57G-18UPC8-C2 |
| | | | | | | | 4-pin micro DC connector | E57G-18UPN8-Q | E57G-18UPC8-Q |
| NPN | | 2-meter cable | E57G-18UNN8-C2 | | | E57G-18UNC8-C2 | | | |
| | | 4-pin micro DC connector | E57G-18UNN8-Q | | | E57G-18UNC8-Q | | | |
| 8 mm (extended range) | | Shielded | PNP | 2-meter cable | E57G-18SPN8-C2 | E57G-18SPC8-C2 | | | |
| | | | | 4-pin micro DC connector | E57G-18SPN8-Q | E57G-18SPC8-Q | | | |
| | | | NPN | 2-meter cable | E57G-18SNN8-C2 | E57G-18SNC8-C2 | | | |
| | | | | 4-pin micro DC connector | E57G-18SNN8-Q | E57G-18SNC8-Q | | | |
| | | | 12 mm (extended range) | Unshielded | PNP | 2-meter cable | E57G-18UPN12-C2 | E57G-18UPC12-C2 | |
| | | | | | | 4-pin micro DC connector | E57G-18UPN12-Q | E57G-18UPC12-Q | |
| NPN | | 2-meter cable | | | E57G-18UNN12-C2 | E57G-18UNC12-C2 | | | |
| | | 4-pin micro DC connector | | | E57G-18UNN12-Q | E57G-18UNC12-Q | | | |

Note

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

Three-Wire Sensors, continued

30 mm




| Operating Voltage | Sensing Range | Shielding | Output Type | Connection Type | NO Output Catalog Number | NC Output Catalog Number |
|------------------------|------------------------|------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 30 mm Diameter | | | | | | |
| 10–30 Vdc | 10 mm (standard range) | Shielded | PNP | 2-meter cable | E57G-30SPN10-C2 | E57G-30SPC10-C2 |
| | | | | 4-pin micro DC connector | E57G-30SPN10-Q | E57G-30SPC10-Q |
| | | Unshielded | PNP | 2-meter cable | E57G-30UPN15-C2 | E57G-30UPC15-C2 |
| | | | | 4-pin micro DC connector | E57G-30UPN15-Q | E57G-30UPC15-Q |
| | | NPN | Unshielded | 2-meter cable | E57G-30SNN10-C2 | E57G-30SNC10-C2 |
| | | | | 4-pin micro DC connector | E57G-30SNN10-Q | E57G-30SNC10-Q |
| | 15 mm (standard range) | Shielded | PNP | 2-meter cable | E57G-30SPN15-C2 | E57G-30SPC15-C2 |
| | | | | 4-pin micro DC connector | E57G-30SPN15-Q | E57G-30SPC15-Q |
| | | Unshielded | PNP | 2-meter cable | E57G-30UPN15-C2 | E57G-30UPC15-C2 |
| | | | | 4-pin micro DC connector | E57G-30UPN15-Q | E57G-30UPC15-Q |
| | | NPN | Unshielded | 2-meter cable | E57G-30SNN15-C2 | E57G-30SNC15-C2 |
| | | | | 4-pin micro DC connector | E57G-30SNN15-Q | E57G-30SNC15-Q |
| 15 mm (extended range) | Shielded | PNP | 2-meter cable | E57G-30SPN22-C2 | E57G-30SPC22-C2 | |
| | | | 4-pin micro DC connector | E57G-30SPN22-Q | E57G-30SPC22-Q | |
| | Unshielded | PNP | 2-meter cable | E57G-30UPN22-C2 | E57G-30UPC22-C2 | |
| | | | 4-pin micro DC connector | E57G-30UPN22-Q | E57G-30UPC22-Q | |
| | NPN | Unshielded | 2-meter cable | E57G-30SNN22-C2 | E57G-30SNC22-C2 | |
| | | | 4-pin micro DC connector | E57G-30SNN22-Q | E57G-30SNC22-Q | |

Compatible Connector Cables

Standard Cables ^①

Micro-Style Straight Female



| 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 | | | | | | |
| DC | 4-pin, 3-wire | 22 AWG | 6.0 ft (2m) |  1-Brown 2-No Wire 3-Blue 4-Black | CSDS4A3CY2202 | CSDS4A3RY2202 |

Accessories

E57G General Purpose Proximity Sensors

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

Notes

- ⊕ See listing of compatible connector cables on **Page V8-T3-31**.
- ① For a full selection of connector cables, see **Tab 10, section 10.1**.

Technical Data and Specifications

E57G General Purpose Proximity Sensors

| Description | Three-Wire DC Sensors |
|--------------------------------|---|
| Operating voltage | 10–30 Vdc |
| Output current (continuous) | 100 mA |
| Switching frequency [Hz] | Standard range: 12 mm—Shielded: 2000; Unshielded: 2000 18 mm—Shielded: 1200; Unshielded: 1200 30 mm—Shielded: 600; Unshielded: 500 Extended range: 12 mm—Shielded: 1200; Unshielded: 500 18 mm—Shielded: 300; Unshielded: 300 30 mm—Shielded: 400; Unshielded: 200 |
| Leakage current | <100 μ A |
| Output voltage drop [Vsat] | <2.5 V |
| Current consumption | <10 mA |
| Short-circuit protection | Yes (Auto Reset) |
| Hysteresis [% of Sr] | 2–20% |
| Repeat accuracy | 1% shielded, 3% unshielded |
| Time delay before availability | <200 ms |
| Output indicator LED | 360° amber LED |
| Operating temperature range | –25 to 70 °C |
| Ingress protection | IEC IP67, UL Type 1 |
| Mechanical shock | IEC 60947-5-2 30 G half-sine wave, 11 mS |
| Vibration | IEC 60947-5-2 10–55 Hz, 1 mm amplitude |
| Housing materials | Front face: Ryton Tube: stainless steel End bells: M12 body: Polycarbonate Cable end bell: Polycarbonate Nuts: Ni-Brass |
| Cable | AWM style 20387 (PVC) |

Wiring Diagrams

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

E57G General Purpose Proximity Sensors

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

3.4

Inductive Proximity Sensors

E57G General Purpose Proximity Sensors

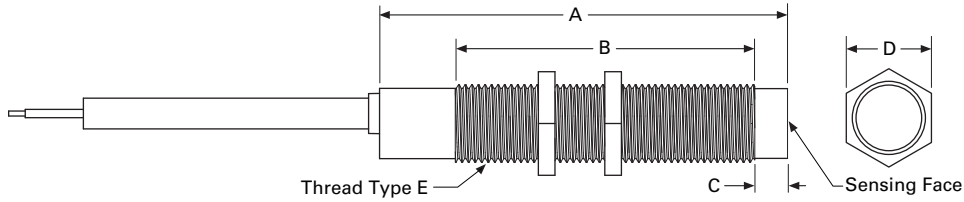
Dimensions

Approximate Dimensions in Inches (mm)

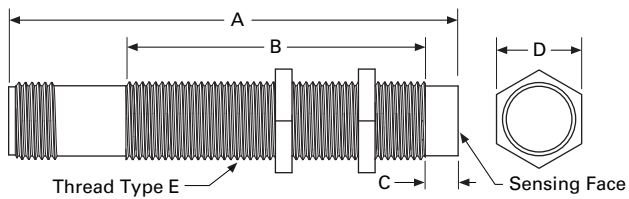
E57G General Purpose Proximity Sensors

Cable Models

3



Connector Models



| Size | Shielding | Overall Length A | Threaded Length B | Cap Height C | Nut Width D | Thread Size E |
|---|------------|---------------------|----------------------|-----------------|----------------|------------------|
| Three-Wire DC Sensors—Cable Models | | | | | | |
| 12 mm | Shielded | 2.52 (64.1) | 1.98 (50.3) | — | 0.67 (16.8) | M12 x 1 |
| | Unshielded | 2.52 (64.1) | 1.80 (45.8) | 0.20 (5.0) | 0.67 (16.8) | M12 x 1 |
| 18 mm | Shielded | 2.59 (65.9) | 2.00 (50.9) | — | 0.94 (23.8) | M18 x 1 |
| | Unshielded | 2.59 (65.9) | 1.75 (44.4) | 0.28 (7.0) | 0.94 (23.8) | M18 x 1 |
| 30 mm | Shielded | 2.67 (67.7) | 1.98 (50.3) | — | 1.41 (35.9) | M30 x 1.5 |
| | Unshielded | 2.67 (67.7) | 1.49 (37.8) | 0.51 (13.0) | 1.41 (35.9) | M30 x 1.5 |
| Three-Wire DC Sensors—Micro-Connector Models | | | | | | |
| 12 mm | Shielded | 2.70 (68.7) | 1.98 (50.3) | — | 0.67 (16.8) | M12 x 1 |
| | Unshielded | 2.70 (68.7) | 1.80 (45.8) | 0.20 (5.0) | 0.67 (16.8) | M12 x 1 |
| 18 mm | Shielded | 2.72 (69.2) | 2.00 (50.9) | — | 0.94 (23.8) | M18 x 1 |
| | Unshielded | 2.72 (69.2) | 1.75 (44.4) | 0.28 (7.0) | 0.94 (23.8) | M18 x 1 |
| 30 mm | Shielded | 2.79 (70.9) | 1.98 (50.3) | — | 1.41 (35.9) | M30 x 1.5 |
| | Unshielded | 2.79 (70.9) | 1.49 (37.8) | 0.51 (13.0) | 1.41 (35.9) | M30 x 1.5 |

E57 Two-Wire (AC, AC/DC, DC) Proximity Sensors



Contents

| Description | Page |
|--|-----------------|
| E57 Two-Wire (AC, AC/DC, DC) Proximity Sensors | |
| Product Selection | |
| Stainless Steel Body (Standard Length) . . . | V8-T3-36 |
| Stainless Steel Short Body | V8-T3-38 |
| Nickel-Brass Body | V8-T3-39 |
| Compatible Connector Cables | V8-T3-40 |
| Accessories | V8-T3-40 |
| Technical Data and Specifications | V8-T3-41 |
| Wiring Diagrams | V8-T3-43 |
| Dimensions | V8-T3-45 |

E57 Two-Wire (AC, AC/DC, DC) Proximity Sensors

Product Description

Eaton carries several options for your sensing needs in the E57 two-wire family. The stainless steel models are available in a standard length or short body, while available in AC or AC/DC configurations. The nickel-brass body models are available in standard length and either AC or DC two-wire configurations.

All of these are available in NPN or PNP with cable connections or micro connectors. The stainless steel standard length models are also available with mini connectors.

The stainless steel models in both lengths have 360 degree LEDs while the nickel-brass models have a single LED indicator.

Extended sensing ranges are also available in the stainless steel and nickel-brass standard length models, while shielded and unshielded models are offered throughout the E57 two-wire sensor products.

Standards and Certifications

- Stainless Steel:
 - UL Listed, E166051
 - UL Tested to Canadian safety standards
 - CE (AC/DC only)
 - RoHS Compliant
- Nickel-Brass:
 - CSA Certified, 224447
 - Products certified by CSA for US
 - CE (DC only)
 - RoHS Compliant



⚠ 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.

Highlighted Comparisons

| Description | Stainless Steel | Stainless Steel Short Body | Nickel-Brass |
|---------------------------------------|--|-------------------------------------|--------------|
| Current ratings | 250–500 mA | 250–500 mA | 200 mA |
| Enclosure ratings | NEMA 4, 4K, 6, 6P, 12, 13, IEC IP6, IP69K7 | NEMA 4, 4K, 6, 6P, 12, 13, IEC IP67 | IP67, IP69K |
| Operating temperature | –25 to 70 °C | –25 to 70 °C | –25 to 70 °C |
| Indicator | 360° LED | 360° LED | LED |
| Increased shock and vibration ratings | Yes | Yes | No |

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

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

3.5

Inductive Proximity Sensors



E57 Two-Wire (AC, AC/DC, DC) Proximity Sensors

Product Selection

Stainless Steel Body (Standard Length)

3

Two-Wire Sensors

| | Operating Voltage | Sensing Range (Sn) | Shielding | Connection Type ^① | NO Output Catalog Number | NC Output Catalog Number | |
|---|---|------------------------|--------------------------|----------------------------------|----------------------------------|--------------------------|-------------------------|
| 12 mm  | 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 ☹ | |
| | | 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 50/60 Hz ^② 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 ☹ | | |
| | | | 3-pin micro AC connector | E57SAL12A2EA ☹ | E57SBL12A2EA ☹ | | |
| 18 mm  | 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 ☹ | |
| | | 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 ☹ |
| | 18 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 ☹ | |
| | 40–250 Vac 50/60 Hz ^② 20–250 Vdc | 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 ☹ | |
| | | | | 3-pin micro AC connector | E57SAL18A2EA ☹ | E57SBL18A2EA ☹ | |
| | | | | 3-pin micro AC connector | E57SAL18A2EA ☹ | E57SBL18A2EA ☹ | |

Notes



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

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.

Stainless Steel Body (Standard Length)

Two-Wire Sensors, continued

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

Notes

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

3.5




Inductive Proximity Sensors

E57 Two-Wire (AC, AC/DC, DC) Proximity Sensors

Stainless Steel Short Body

3

Two-Wire Sensors

| | Operating Voltage | Sensing Range (Sn) | Shielding | Connection Type ^① | NO Output Catalog Number | NC Output Catalog Number |
|---|---|-----------------------|------------|------------------------------|--------------------------|--------------------------|
| 12 mm  | 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 50/60 Hz ^② 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  | 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 50/60 Hz ^② 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  | | 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 50/60 Hz ^② 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-T3-40**.

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.

Nickel-Brass Body

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-D1 |
| | | | | | 4-pin micro DC connector | E57-12GS02-DDB ☺ | E57-12GS02-D1DB ☺ |
| | | 4 mm | Unshielded | NPN/PNP | 2-meter cable | E57-12GU04-D | E57-12GU04-D1 |
| | | | | | 4-pin micro DC connector | E57-12GU04-DDB ☺ | E57-12GU04-D1DB ☺ |
| | | 8 mm (extended range) | | | NPN/PNP | 2-meter cable | E57-12GE08-D |
| 4-pin micro DC connector | | | | | | E57-12GE08-DDB ☺ | 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 | — |
| | | 16 mm | | | 3-pin micro AC connector | E57-18GU08-AAB ☺ | E57-18GU08-A1AB ☺ |
| | | | | | 3-pin micro AC connector | E57-18GE16-AAB ☺ | E57-18GE16-A1AB ☺ |
| | | | | | 10–30 Vdc | 5 mm | Shielded |
| | 4-pin micro DC connector | E57-18GS05-DDB ☺ | E57-18GS05-D1DB ☺ | | | | |
| | 8 mm | Unshielded | NPN/PNP | 2-meter cable | E57-18GU08-D | | |
| | | 16 mm (extended range) | | | 4-pin micro DC connector | E57-18GU08-DDB ☺ | E57-18GU08-D1DB ☺ |
| 2-meter cable | | | | | E57-18GE16-D | E57-18GE16-D1 | |
| 4-pin micro DC connector | | | | | E57-18GE16-DDB ☺ | 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 | — |
| | 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-DDB ☺ | E57-30GS10-D1DB ☺ |
| | | 15 mm | Unshielded | NPN/PNP | 2-meter cable | E57-30GU15-D | E57-30GU15-D1 |
| | | | | | 4-pin micro DC connector | E57-30GU15-DDB ☺ | E57-30GU15-D1DB ☺ |
| | | 25 mm (extended range) | | | NPN/PNP | 2-meter cable | E57-30GE25-D |
| 4-pin micro DC connector | | | | | | E57-30GE25-DDB ☺ | E57-30GE25-D1DB ☺ |

Note

☺☺ See listing of compatible connector cables on [Page V8-T3-40](#).

3.5

Inductive Proximity Sensors

E57 Two-Wire (AC, AC/DC, DC) Proximity Sensors


Compatible Connector Cables

Standard Cables ^①

3

Micro-Style
Straight Female



| 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 2-Red/Black 3-Red/White | CSAS3F3CY2202 | CSAS3F3RY2202 |

Accessories

E57 Two-Wire Proximity Sensors

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

Note

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

Technical Data and Specifications

Stainless Steel Body

| Description | Two-Wire AC/DC Sensors | | |
|--------------------------|---|---|---|
| | Two-Wire AC Sensors | AC Operation | DC Operation |
| Operating voltage | 40–250 Vac | 40–250 Vac | 20–250 Vdc |
| Maximum load current | 250 mA | 200 mA | 200 mA |
| Switching frequency | 20 Hz | 60 Hz | 60 Hz |
| Leakage current | 1.7 mA maximum at 70 °C | 1.7V mA maximum at 120 Vac | ≤2.0 mA |
| Voltage drop | 7V maximum | ≤4 V at >25 mA | 12 V at <10 mA |
| Holding current | 5 mA minimum | 5 mA minimum | 5 mA maximum |
| Protection | — | Resettable short circuit; overload protection | Resettable short circuit; overload protection |
| Switching hysteresis | 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 |
| Output indicator 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 |
| 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) |
| Shock | 30 g sine wave, 11 ms per IEC68-2-76 | 30 g sine wave, 11 ms per IEC68-2-76 | 30 g 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 |
| 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 |
| Cable | 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.

3.5

Inductive Proximity Sensors

E57 Two-Wire (AC, AC/DC, DC) Proximity Sensors

3

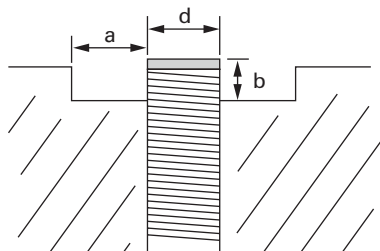
Nickel-Brass Body

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

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 |

Wiring Diagrams

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

Stainless Steel Body

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

3.5

Inductive Proximity Sensors

E57 Two-Wire (AC, AC/DC, DC) Proximity Sensors

Nickel-Brass Body

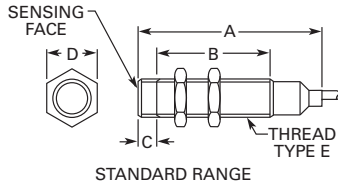
| Operating Voltage | Output | Cable Models | Connector Models (Face View Male Shown) Micro |
|-------------------------|----------|--------------|--|
| Two-Wire Sensors | | | |
| 20–250 Vac | NO | | |
| 10–30 Vdc | NO (NPN) | | |
| | NO (PNP) | | |

Dimensions

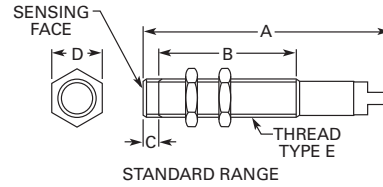
Approximate Dimensions in Inches (mm)

Stainless Steel Body (Standard Length)

Cable Models



Connector Models



| Size | Shielding | Overall Length A | Threaded Length B | Cap Height C | Nut Width D | Thread Size E |
|---|---------------|---------------------|----------------------|-----------------|----------------|------------------|
| Two-Wire AC Sensors—Cable Models | | | | | | |
| 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 |
| Two-Wire AC Sensors—Micro-Connector Models | | | | | | |
| 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 |

3.5

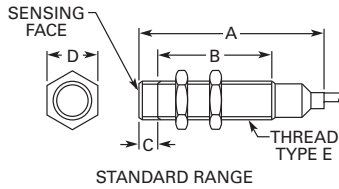
Inductive Proximity Sensors

E57 Two-Wire (AC, AC/DC, DC) Proximity Sensors

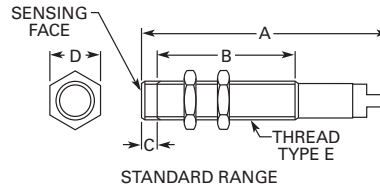
Approximate Dimensions in Inches (mm)

Stainless Steel Body (Standard Length)

Cable Models, continued



Connector Models, continued



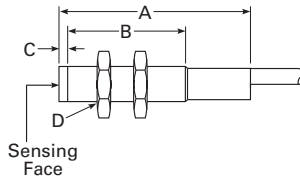
3

| Size | Shielding | Overall Length A | Threaded Length B | Cap Height C | Nut Width D | Thread Size E |
|--|---------------|---------------------|----------------------|-----------------|----------------|------------------|
| Two-Wire AC/DC Sensors—Cable Models | | | | | | |
| 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) | 2.12 (53.8) | — | 1.41 (35.9) | M30 x 1.5 |
| | Unshielded | 2.72 (69.3) | 1.63 (41.4) | 0.52 (13.26) | 1.41 (35.9) | M30 x 1.5 |
| Two-Wire AC/DC Sensors—Micro-Connector Models | | | | | | |
| 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 |
| Two-Wire AC Sensors—Mini-Connector Models | | | | | | |
| 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 |

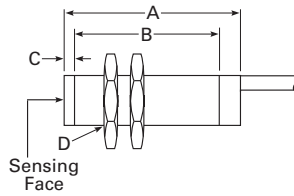
Approximate Dimensions in Inches (mm)

Stainless Steel Short Body (Cable Connector Models)

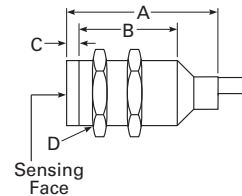
12 mm



18 mm



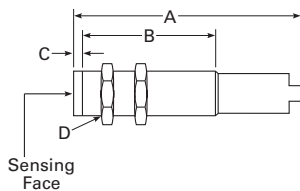
30 mm



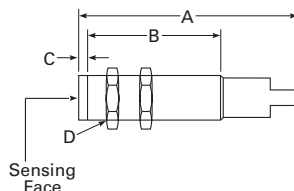
| Size | Shielding | Overall Length A | Threaded Length B | Cap Height C | Thread Size D |
|-------------------------------|------------|---------------------|----------------------|-----------------|------------------|
| Two-Wire AC Sensors | | | | | |
| 12 mm | Shielded | 2.04 (51.7) | 1.56 (39.6) | 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 |
| Two-Wire AC/DC Sensors | | | | | |
| 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 |

Stainless Steel Short Body (Micro-Connector Models)

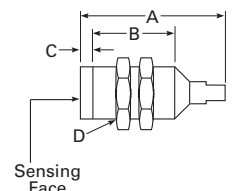
12 mm



18 mm



30 mm



| Size | Shielding | Overall Length A | Threaded Length B | Cap Height C | Thread Size D |
|-------------------------------|------------|---------------------|----------------------|-----------------|------------------|
| Two-Wire AC Sensors | | | | | |
| 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 |
| Two-Wire AC/DC Sensors | | | | | |
| 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 |

3.5

Inductive Proximity Sensors

E57 Two-Wire (AC, AC/DC, DC) Proximity Sensors

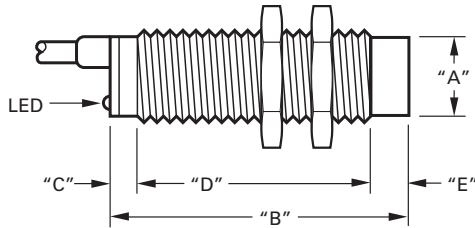
Approximate Dimensions in mm

Nickel-Brass Body

Cable Models

3

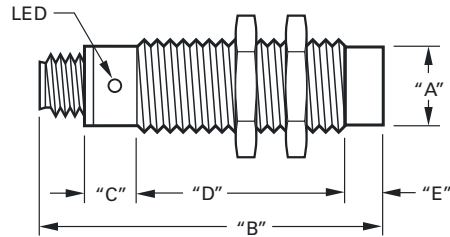
Two-Wire Sensors



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

Connector Models

Two-Wire Sensors



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

Note

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

AccuProx Analog Sensors



Contents

| Description | Page |
|---|-----------------|
| AccuProx Analog Sensors | |
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| Product Selection | |
| AccuProx Analog Sensors | V8-T3-51 |
| Compatible Connector Cables | V8-T3-51 |
| Technical Data and Specifications | V8-T3-52 |
| Wiring Diagrams | V8-T3-54 |
| Dimensions | V8-T3-54 |

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-T3-50** for more detail.

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 (0–10 V)
- 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 20 V/m prevents many problems associated with electrical noise

Standards and Certifications

- UL Listed, E166051
- UL Tested to Canadian safety standards
- CE
- RoHS Compliant



⚠ DANGER

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

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

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

3.6

Inductive Proximity Sensors

AccuProx Analog Sensors

Application Guide

Presenting AccuProx— Unmatched Analog Range in a Proven Package

3

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.

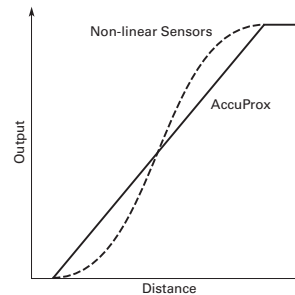
High Output Accuracy

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.

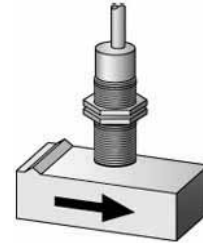
Linearity refers to the shape of the output curve. Many competitive analog sensors exhibit a wavy or “S-shaped” output curve. This means that a change in target distance may not always translate into an equivalent change in output, particularly at the innermost and outermost ranges of a non-linear analog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

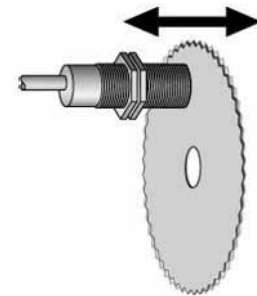
Typical Analog Applications Material Imperfection or Blemish Detection



Eccentricity or Absolute Angle Detection






Saw Blade Deflection



Product Selection




AccuProx Analog Sensors

Three-/Four-Wire Sensors

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

Compatible Connector Cables

Standard Cables ③

| | 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  | Micro-Style, Straight Female | | | | | | |
| | DC | 4-pin, 3-wire | 22 AWG | 6.0 ft (2m) |  1-Brown 2-No Wire 3-Blue 4-Black | CSDS4A3CY2202 | CSDS4A3RY2202 |
| | DC | 4-pin, 4-wire | 22 AWG | 6.0 ft (2m) |  1-Brown 2-White 3-Blue 4-Black | CSDS4A4CY2202 | CSDS4A4RY2202 |

Notes

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

Technical Data and Specifications

AccuProx Analog Sensors

3

| Description | 12 mm Models | | 18 mm Models | | 30 mm Models | |
|-------------------------------------|---|---|---|---|---|---|
| | Shielded | Unshielded | Shielded | Unshielded | Shielded | Unshielded |
| Performance | | | | | | |
| Analog operating range ^① | 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 (–40 to 70 °C) | –40 to 158 °F (–40 to 70 °C) | –40 to 158 °F (–40 to 70 °C) | –40 to 158 °F (–40 to 70 °C) | –40 to 158 °F (–40 to 70 °C) | –40 to 158 °F (–40 to 70 °C) |
| Temperature drift | <± 10% | <± 10% | <± 10% | <± 10% | <± 10% | <± 10% |
| Conformity | <± 10% | <± 10% | <± 10% | <± 10% | <± 10% | <± 10% |
| Repeat accuracy | <25 μm ^② | <20 μm ^② | <40 μm ^② | <20 μm ^② | <50 μm ^② | <30 μm ^② |
| 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. |
| Electrical | | | | | | |
| Style | AccuProx Analog, three-/four-wire DC | AccuProx Analog, three-/four-wire DC | AccuProx Analog, three-/four-wire DC | AccuProx Analog, three-/four-wire DC | AccuProx Analog, three-/four-wire DC | AccuProx Analog, 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 4–20 mA by model | 0–20 mA or 4–20 mA by model | 0–20 mA or 4–20 mA by model | 0–20 mA or 4–20 mA by model | 0–20 mA or 4–20 mA by model | 0–20 mA or 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 ^③ | 0–10 V | 0–10 V | 0–10 V | 0–10 V | 0–10 V | 0–10 V |
| Voltage output load resistance | 4.7–5.0 kohm (2.5 mA max.) | 4.7–5.0 kohm (2.5 mA max.) | 4.7–5.0 kohm (2.5 mA max.) | 4.7–5.0 kohm (2.5 mA max.) | 4.7–5.0 kohm (2.5 mA max.) | 4.7–5.0 kohm (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, 360° viewable | Dual-color, 360° viewable | Dual-color, 360° viewable | Dual-color, 360° viewable | Dual-color, 360° viewable | Dual-color, 360° viewable |
| Short-circuit protection | Incorporated ^④ | Incorporated ^④ | Incorporated ^④ | Incorporated ^④ | Incorporated ^④ | Incorporated ^④ |
| Wire breakage protection | Incorporated | Incorporated | Incorporated | Incorporated | Incorporated | Incorporated |
| Reverse polarity protection | Incorporated | Incorporated | Incorporated | Incorporated | Incorporated | Incorporated |
| Physical | | | | | | |
| Size | See Dimensions on Page V8-T3-54 . | | | | | |
| 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 | 30 g half-sine at 11 ms | 30 g half-sine at 11 ms | 30 g half-sine at 11 ms | 30 g half-sine at 11 ms | 30 g half-sine at 11 ms | 30 g half-sine at 11 ms |
| Vibration | 10–55 Hz, 1 mm amplitude | 10–55 Hz, 1 mm amplitude | 10–55 Hz, 1 mm amplitude | 10–55 Hz, 1 mm amplitude | 10–55 Hz, 1 mm amplitude | 10–55 Hz, 1 mm amplitude |
| Housing material | Stainless steel, polycarbonate end bell, polyphenylene sulfide front cap | Stainless steel, polycarbonate end bell, polyphenylene sulfide front cap | Stainless steel, polycarbonate end bell, polyphenylene sulfide front cap | Stainless steel, polycarbonate end bell, polyphenylene sulfide front cap | Stainless steel, polycarbonate end bell, polyphenylene sulfide front cap | Stainless steel, polycarbonate end bell, polyphenylene sulfide front cap |
| Termination | Micro-connector, potted cable, 2m; Pigtail, micro-connector, 2m | Micro-connector, potted cable, 2m; Pigtail, micro-connector, 2m | Micro-connector, potted cable, 2m; Pigtail, micro-connector, 2m | Micro-connector, potted cable, 2m; Pigtail, micro-connector, 2m | Micro-connector, potted cable, 2m; Pigtail, micro-connector, 2m | Micro-connector, potted cable, 2m; Pigtail, 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.

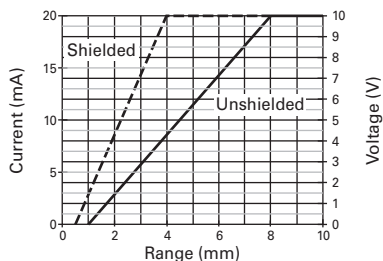
③ Voltage outputs available on models ending in **-CV**.

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

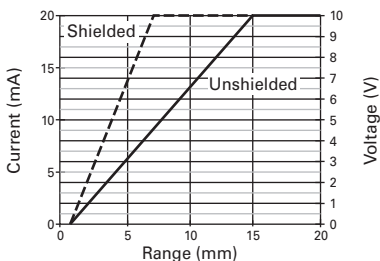
AccuProx Analog Performance Graphs

Linear Output

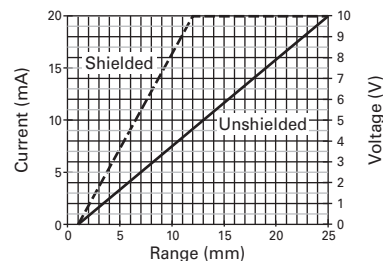
12 mm



18 mm

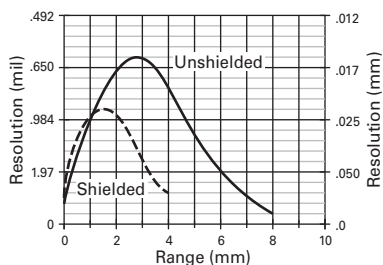


30 mm

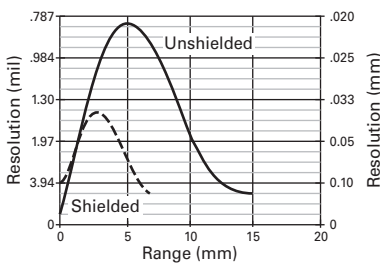


Measurement Resolution ①

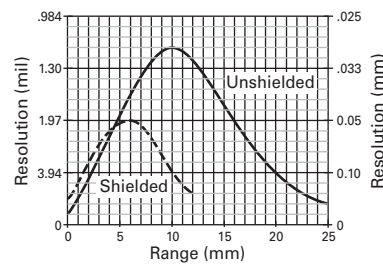
12 mm



18 mm

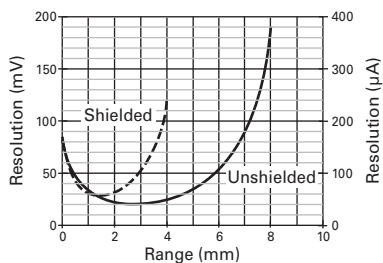


30 mm

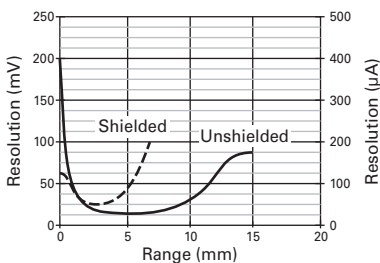


Output Resolution ②

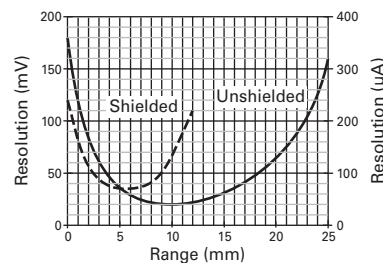
12 mm



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.

3.6

Inductive Proximity Sensors

AccuProx Analog Sensors

Wiring Diagrams

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

AccuProx Analog Sensors

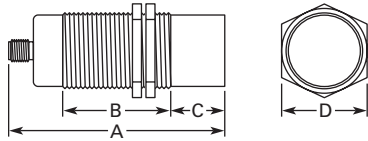
3

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

Dimensions

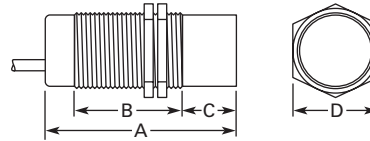
Approximate Dimensions in Inches (mm)

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

① 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



Contents

| Description | Page |
|---|-----------------|
| Ferrous Only Tubular Sensors | |
| Product Selection | |
| Ferrous Only Tubular Sensors | V8-T3-56 |
| Compatible Connector Cables | V8-T3-56 |
| Accessories | V8-T3-56 |
| Technical Data and Specifications | V8-T3-57 |
| Wiring Diagrams | V8-T3-57 |
| Dimensions | V8-T3-57 |

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)

Standards and Certifications

- CSA Certified
- Products certified by CSA for US
- CE
- RoHS Compliant



⚠ DANGER

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

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

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

3.7

Inductive Proximity Sensors


Ferrous Only Tubular Sensors

Product Selection


Ferrous Only Tubular Sensors

3

Two-Wire Sensors






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

Three-Wire Sensors

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

Compatible Connector Cables

Standard Cables ①

| | Current Rating at 600 V | 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 2-Red/Black 3-Red/White | CSAS3F3CY2202 | CSAS3F3RY2202 |
|  | Mini-Style, Straight Female | | | | | | | |
| | 13 A | — | 3-pin | 16 AWG | 6.0 ft (2m) |  1-Brown 2-No Wire 3-Blue 4-Black | CSDS4A3CY2202 | CSDS4A3RY2202 |
| | | | | | |  1-Green 2-Black 3-White | Catalog Number CSMS3F3CY1602 | |

Accessories

Ferrous Only Tubular Sensors

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

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 | 10 V maximum | 1.5 V 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 | 30 g sine wave, 11 ms per IEC68-2-76 | 30 g 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.

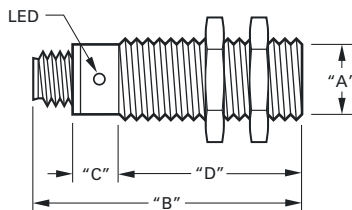
Ferrous Only Tubular Sensors

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

Dimensions

Approximate Dimensions in Inches (mm)

Ferrous Only Tubular Sensors



Connector Models

| Catalog Number | A | B | C | D |
|--------------------------|---------|-----------|-----------|-----------|
| Two-Wire Models | | | | |
| 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) |
| Three-Wire Models | | | | |
| E57FAL18T111SD | M18 x 1 | 3.11 (79) | 1.14 (29) | 1.97 (50) |

Metal Face Sensors

3



Contents

| <i>Description</i> | <i>Page</i> |
|-----------------------------------|-----------------|
| Metal Face Sensors | |
| Product Selection | |
| Metal Face Sensors | V8-T3-59 |
| Compatible Connector Cables | V8-T3-56 |
| Accessories | V8-T3-60 |
| Technical Data and Specifications | V8-T3-60 |
| Wiring Diagrams | V8-T3-61 |
| Dimensions | V8-T3-61 |

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)

Standards and Certifications

- CSA Certified
- Products certified by CSA for US
- CE
- RoHS Compliant



⚠ DANGER

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



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

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



Product Selection

Metal Face Sensors

Two-Wire Sensors




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

Three-Wire Sensors

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

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 |
|---|-------------------------------------|----------------|--------|-------------|---|---------------------------|---------------------------|
|  | Micro-Style, Straight Female | | | | | | |
| | AC | 3-pin, 3-wire | 22 AWG | 6.0 ft (2m) |  1-Green 2-Red/Black 3-Red/White | CSAS3F3CY2202 | CSAS3F3RY2202 |
| | DC | 4-pin, 4-wire | 22 AWG | 6.0 ft (2m) |  1-Brown 2-White 3-Blue 4-Black | CSDS4A4CY2202 | CSDS4A4RY2202 |

Notes

- ⓘ See listing of compatible connector cables above.
- ⓘ For a full selection of connector cables, see **Tab 10, section 10.1**.

Accessories**Metal Face Sensors**

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

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 | 10 V maximum | 1.5 V 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 | 30 g sine wave, 11 ms per IEC68-2-76 | 30 g 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

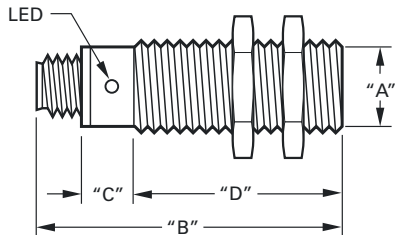
| Operating Voltage | Output | Micro-Connector Models (Face View Male Shown) |
|---------------------------|----------|---|
| Two-Wire Sensors | | |
| 20–250 Vac/dc 50/60 Hz | NO | |
| Three-Wire Sensors | | |
| 10–30 Vdc | NO (NPN) | |
| | NO (PNP) | |

Dimensions

Approximate Dimensions in Inches (mm)

Metal Face Sensors

Connector Models



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

High Current Output Sensors

3



Contents

| <i>Description</i> | <i>Page</i> |
|---|-----------------|
| High Current Output Sensors | |
| Product Selection | V8-T3-63 |
| Accessories | V8-T3-63 |
| Technical Data and Specifications | V8-T3-64 |
| Wiring Diagrams | V8-T3-64 |
| Dimensions | V8-T3-64 |

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 8 A. 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 8 A 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

Standards and Certifications

- RoHS Compliant



⚠ DANGER

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

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

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

Product Selection

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) | 3.5 A | 20 A | 2-meter cable | E57-30JS10-H |

30 mm

Six-Wire Sensors ^②



| 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) | 8 A | 50 A | 2-meter cable | E57-30HS10-K |

Accessories

High Current Output Sensors

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

Notes

- ① 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.
- ② 50 Amp surge, 12 Amp at 50% duty cycle and 8 Amp continuous.

3.9

Inductive Proximity Sensors

High Current Output Sensors

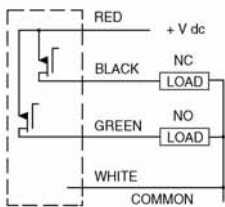
Technical Data and Specifications

High Current Output Sensors

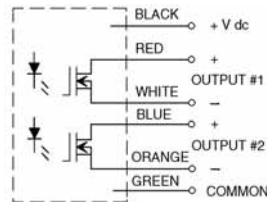
| Description | Four-Wire Sensors | Six-Wire Sensors |
|--------------------------------|---|---|
| Operating voltage | 10 to 55 Vdc | 10 to 30 Vdc |
| Switching rate | 250 Hz | 100 Hz |
| Off-state current | 100 A μ maximum | 100 A μ maximum |
| Voltage drop | 1.2 V | 2.0 V |
| Burden current | 10 mA 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 | 30 g sine wave, 11 ms | 30 g 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

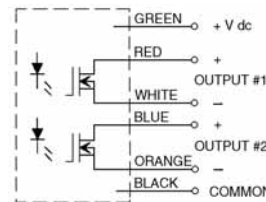
Four-Wire—PNP



Six-Wire—NO/NO Output Configuration



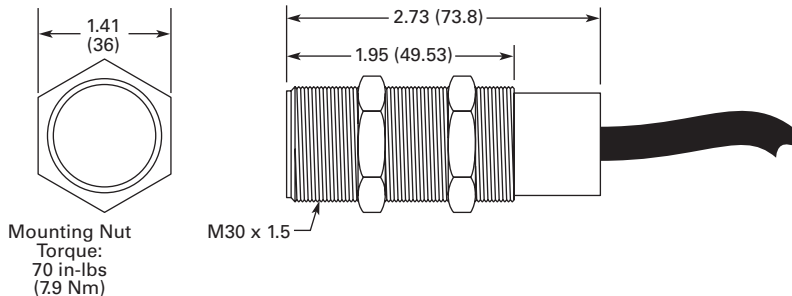
Six-Wire—NC/NC Output Configuration



Dimensions

Approximate Dimensions in Inches (mm)

High Current Output Sensors



Small Diameter (4, 5, 6.5, 8 mm) Sensors



Contents

| Description | Page |
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| Accessories | V8-T3-56 |
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| Wiring Diagrams | V8-T3-69 |
| Dimensions | V8-T3-70 |

Small Diameter (4, 5, 6.5, 8 mm) 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

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
- RoHS Compliant
- 8 mm standard models only:
 - CSA Certified, 224447
 - Products certified by CSA for US



! DANGER

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

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3.10

Inductive Proximity Sensors





Small Diameter (4, 5, 6.5, 8 mm) Sensors

Product Selection

Small Diameter (4, 5, 6.5, 8 mm) Sensors

3

Three-Wire Sensors

| | Operating Voltage | Sensing Range (Sn) | Shielding | Connection Type | NO Output Catalog Number | NC Output Catalog Number | | |
|---|-----------------------------------|--------------------|----------------------|--------------------------|--------------------------|--------------------------|------------------------|------------------------|
| 4 mm  | 4 mm Diameter (Unthreaded) | | | | | | | |
| | 10–30 Vdc | 0.8 mm | Shielded (NPN) | 2-meter cable | E57EAL4T110SP | — | | |
| | | | | 3-pin nano-connector | E57EAL4T110SN ☹ | — | | |
| | | | Shielded (PNP) | 2-meter cable | E57EAL4T111SP | — | | |
| | | | | 3-pin nano-connector | E57EAL4T111SN ☹ | — | | |
| | 5 mm Diameter | | | | | | | |
| 5 mm  | 10–30 Vdc | 0.8 mm | Shielded (NPN) | 2-meter cable | E57EAL5T110SP | — | | |
| | | | | 3-pin nano-connector | E57EAL5T110SN ☹ | — | | |
| | | | Shielded (PNP) | 2-meter cable | E57EAL5T111SP | — | | |
| | | | | 3-pin nano-connector | E57EAL5T111SN ☹ | — | | |
| 6.5 mm Diameter (Unthreaded) | | | | | | | | |
| 6.5 mm  | 10–30 Vdc | 1 mm | Shielded (NPN) | 2-meter cable | E57EAL6T110SP | — | | |
| | | | | 3-pin nano-connector | E57EAL6T110SN ☹ | — | | |
| | | | | 4-pin micro DC connector | E57EAL6T110SD ☹ | — | | |
| | | | Shielded (PNP) | 2-meter cable | E57EAL6T111SP | — | | |
| | | | | 3-pin nano-connector | E57EAL6T111SN ☹ | — | | |
| | | | | 4-pin micro DC connector | E57EAL6T111SD ☹ | — | | |
| | 2 mm | Unshielded (NPN) | 2-meter cable | E57EAL6T110EP | — | | | |
| | | | 3-pin nano-connector | E57EAL6T110EN ☹ | — | | | |
| | | | 2-meter cable | E57EAL6T111EP | — | | | |
| | | | 3-pin nano-connector | E57EAL6T111EN ☹ | — | | | |
| 8 mm Diameter Short Body | | | | | | | | |
| 8 mm Short Body  | 10–30 Vdc | 1 mm | Shielded (NPN) | 2-meter cable | E57EAL8T110SP | E57EAL8T110SP | | |
| | | | | 3-pin nano-connector | E57EAL8T110SN ☹ | E57EAL8T110SN ☹ | | |
| | | | | 4-pin micro DC connector | E57EAL8T110SD ☹ | E57EAL8T110SD ☹ | | |
| | | | | Shielded (PNP) | 2-meter cable | E57EAL8T111SP | E57EAL8T111SP | |
| | | | | | 3-pin nano-connector | E57EAL8T111SN ☹ | E57EAL8T111SN ☹ | |
| | | | | | 4-pin micro DC connector | E57EAL8T111SD ☹ | E57EAL8T111SD ☹ | |
| | | | 2 mm | Unshielded (NPN) | 2-meter cable | E57EAL8T110EP | E57EAL8T110EP | |
| | | | | | 3-pin nano-connector | E57EAL8T110EN ☹ | E57EAL8T110EN ☹ | |
| | | | | | 4-pin micro DC connector | E57EAL8T110ED ☹ | E57EAL8T110ED ☹ | |
| | | | | | Unshielded (PNP) | 2-meter cable | E57EAL8T111EP | E57EAL8T111EP |
| | | | | | | 3-pin nano-connector | E57EAL8T111EN ☹ | E57EAL8T111EN ☹ |
| | | | | | | 4-pin micro DC connector | E57EAL8T111ED ☹ | E57EAL8T111ED ☹ |

Note

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

Three-Wire Sensors, continued

8 mm Standard Length



| Operating Voltage | Sensing Range | Shielding | Output Type | Connection Type | NO Output Catalog Number | NC Output Catalog Number |
|--------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 8 mm Diameter Standard Length | | | | | | |
| 10–30 Vdc | 1 mm | Shielded | NPN | 2-meter cable | E57-08GS01-C | E57-08GS01-C1 |
| | | | | 3-pin nano-connector | E57-08GS01-CNB ☺ | E57-08GS01-C1NB ☺ |
| | | | | 4-pin micro DC connector | E57-08GS01-CDB ☺ | E57-08GS01-C1DB ☺ |
| | | | PNP | 2-meter cable | E57-08GS01-G | E57-08GS01-G1 |
| | | | | 3-pin nano-connector | E57-08GS01-GNB ☺ | E57-08GS01-G1NB ☺ |
| | | | | 4-pin micro DC connector | E57-08GS01-GDB ☺ | E57-08GS01-G1DB ☺ |
| | 3 mm (extended range) | NPN | 2-meter cable | E57-08GE03-C | E57-08GE03-C1 | |
| | | | 3-pin nano-connector | E57-08GE03-CNB ☺ | E57-08GE03-C1NB ☺ | |
| | | | 4-pin micro DC connector | E57-08GE03-CDB ☺ | E57-08GE03-C1DB ☺ | |
| | | PNP | 2-meter cable | E57-08GE03-G | E57-08GE03-G1 | |
| | | | 3-pin nano-connector | E57-08GE03-GNB ☺ | E57-08GE03-G1NB ☺ | |
| | | | 4-pin micro DC connector | E57-08GE03-GDB ☺ | E57-08GE03-G1DB ☺ | |
| 2 mm | Unshielded | NPN | 2-meter cable | E57-08GU02-C | E57-08GU02-C1 | |
| | | | 3-pin nano-connector | E57-08GU02-CNB ☺ | E57-08GU02-C1NB ☺ | |
| | | | 4-pin micro DC connector | E57-08GU02-CDB ☺ | E57-08GU02-C1DB ☺ | |
| | | PNP | 2-meter cable | E57-08GU02-G | E57-08GU02-G1 | |
| | | | 3-pin nano-connector | E57-08GU02-GNB ☺ | E57-08GU02-G1NB ☺ | |
| | | | 4-pin micro DC connector | E57-08GU02-GDB ☺ | E57-08GU02-G1DB ☺ | |
| | 6 mm (extended range) | NPN | 2-meter cable | E57-08GE06-C | E57-08GE06-C1 | |
| | | | 4-pin micro DC connector | E57-08GE06-CDB ☺ | E57-08GE06-C1DB ☺ | |
| | | | PNP | 2-meter cable | E57-08GE06-G | E57-08GE06-G1 |
| | | 4-pin micro DC connector | | E57-08GE06-GDB ☺ | E57-08GE06-G1DB ☺ | |

Note

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

3.10






Inductive Proximity Sensors

Small Diameter (4, 5, 6.5, 8 mm) Sensors

Compatible Connector Cables

3

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  | Micro-Style, Straight Female | | | | | | |
| | DC | 4-pin, 3-wire | 22 AWG | 6.0 ft (2m) |  1-Brown 2-No Wire 3-Blue 4-Black | CSDS4A3CY2202 | CSDS4A3RY2202 |
| | | 4-pin, 4-wire | 22 AWG | 6.0 ft (2m) |  1-Brown 2-White 3-Blue 4-Black | CSDS4A4CY2202 | CSDS4A4RY2202 |
| Nano-Style Straight Female  | Nano-Style, Straight Female | | | | | | |
| — | 3-pin | 24 AWG | 6.0 ft (2m) |  1-Brown 3-Blue 4-Black | CSNS3A3CY2402 | CSNS3A3RY2402 | |

Accessories

Small Diameter Sensors

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

Note

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

Technical Data and Specifications

Small Diameter 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 | 1.5 V 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.

Small Diameter Sensors

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

3.10

Inductive Proximity Sensors

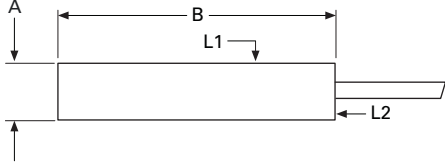
Small Diameter (4, 5, 6.5, 8 mm) Sensors

Dimensions

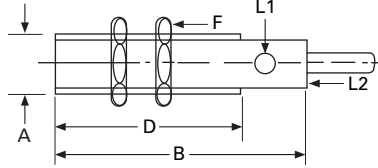
Approximate Dimensions in Inches (mm)

Cable Models

Unthreaded Barrel



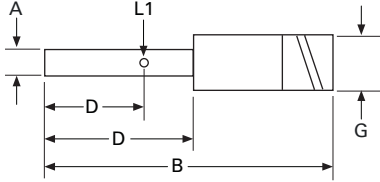
Threaded Barrel



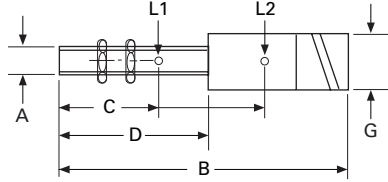
| Size A ① | Barrel Type | Length B | D | Thread Size | Nut Width F | Connector Diameter G | LED Location |
|----------------------------|-------------|-----------|-----------|-------------|-------------|----------------------|--------------|
| Cable Models | | | | | | | |
| 4 mm (S, Std) | Unthreaded | 1.0 (25) | — | — | — | — | L1 |
| 5 mm (S, Std) | Threaded | 1.0 (25) | 0.8 (21) | M5 x 0.5 | SW8 | — | L1 |
| 6.5 mm (S/U, Std) | Unthreaded | 1.8 (45) | — | — | — | — | L2 |
| 8 mm Short Body (S/U, Std) | Threaded | 1.2 (30) | 1.2 (30) | M8 x 1 | SW13 | — | L2 |
| Standard Length | | | | | | | |
| 8 mm (S, Std) | Threaded | 1.77 (45) | 1.77 (45) | M8 x 1 | SW13 | — | L2 |
| 8 mm (S, Ext) | Threaded | 1.81 (46) | 1.57 (40) | M8 x 1 | SW13 | — | L2 |
| 8 mm (U, Std) | Threaded | 1.77 (45) | 1.61 (41) | M8 x 1 | SW13 | — | L2 |
| 8 mm (U, Ext) | Threaded | 1.77 (45) | 1.61 (41) | M8 x 1 | SW13 | — | L2 |

Connector Models

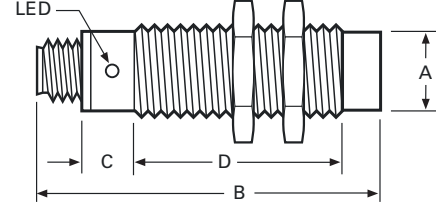
Unthreaded Barrel



Threaded Barrel



Standard Length 8 mm



| Size A ① | Barrel Type | Length B | C | D | Thread Size | Nut Width F | Connector Diameter G | LED Location |
|-------------------------------|-------------|-----------|-----------|-----------|-------------|-------------|----------------------|--------------|
| Nano-Connector Models | | | | | | | | |
| 4 mm (S, Std) | Unthreaded | 1.6 (40) | 0.7 (18) | 0.8 (21) | — | — | 0.31 (8) | L1 |
| 5 mm (S, Std) | Threaded | 1.6 (40) | 0.7 (18) | 0.8 (21) | M5 x 0.5 | SW8 | 0.31 (8) | L1 |
| 6.5 mm (S/U, Std) | Unthreaded | 2.4 (60) | 1.5 (39) | 2.0 (50) | — | — | 0.31 (8) | L1 |
| 8 mm Short Body (S/U, Std) | Threaded | 1.8 (45) | 1.0 (25) | 1.4 (36) | M8 x 1 | SW13 | 0.31 (8) | L1 |
| Standard Length | | | | | | | | |
| 8 mm (S, Std) | Threaded | 2.36 (60) | 0.79 (20) | 1.57 (40) | M8 x 1 | SW13 | 0.31 (8) | L2 |
| 8 mm (S, Ext) | Threaded | 2.40 (61) | 0.75 (19) | 1.65 (42) | M8 x 1 | SW13 | 0.31 (8) | L2 |
| 8 mm (U, Std) | Threaded | 2.36 (60) | 0.79 (20) | 1.42 (36) | M8 x 1 | SW13 | 0.31 (8) | L2 |
| Micro-Connector Models | | | | | | | | |
| 6.5 mm (S/U, Std) | Unthreaded | 2.9 (70) | 1.4 (36) | 1.5 (39) | — | — | 0.47 (12) | L1 |
| 8 mm Short Body (S/U, Std) | Threaded | 2.0 (50) | 1.6 (40) | 1.0 (25) | M8 x 1 | SW13 | 0.47 (12) | L2 |
| Standard Length | | | | | | | | |
| 8 mm (S, Std) | Threaded | 2.76 (70) | 0.83 (21) | 1.93 (49) | M8 x 1 | SW13 | 0.47 (12) | L2 |
| 8 mm (S, Ext) | Threaded | 2.80 (71) | 1.02 (26) | 1.42 (36) | M8 x 1 | SW13 | 0.47 (12) | L2 |
| 8 mm (U, Std) | Threaded | 2.76 (70) | 0.83 (21) | 1.77 (45) | M8 x 1 | SW13 | 0.47 (12) | L2 |
| 8 mm (U, Ext) | Threaded | 2.76 (70) | 1.22 (31) | 1.38 (35) | M8 x 1 | SW13 | 0.47 (12) | L2 |

Note

① U = Unshielded (4 mm cap), S = Shielded; Std = Standard Range, Ext = Extended Range.

E56 Pancake Sensors



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| Description | Page |
|---|-----------------|
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| Product Selection | |
| E56 Pancake Sensors | V8-T3-72 |
| Compatible Connector Cables | V8-T3-73 |
| Technical Data and Specifications | V8-T3-74 |
| Wiring Diagrams | V8-T3-75 |
| Dimensions | V8-T3-75 |

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

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

- UL Listed, E166051 (DC models only)
- UL Tested to Canadian safety standards
- CE (DC models only)
- RoHS Compliant



⚠ DANGER

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

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

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

3.11

Inductive Proximity Sensors

E56 Pancake Sensors

Product Selection

E56 Pancake Sensors

3

Pancake Style



Two-Wire Sensors

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

DC Four-Wire Sensors

Small Diameter



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

Medium Diameter



| | | | | | | |
|--|----------------------------|---------------|------------|-----------------|----------------|-------------------------|
| Medium Diameter (110 x 110 x 41 mm) | | | | | | |
| 10–42 Vdc | NPN/PNP autoconfigure ② | 1 NO and 1 NC | Unshielded | 2.75 in (70 mm) | DC 4-pin mini | E56BDL70UAE01 ☹️ |
| | | | | | DC 4-pin micro | E56BDL70UAD01 ☹️ |

Large Diameter



| | | | | | | |
|---|----------------------------|---------------|------------|------------------|----------------|--------------------------|
| Large Diameter (172 x 172 x 68 mm) | | | | | | |
| 10–42 Vdc | NPN/PNP autoconfigure ② | 1 NO and 1 NC | Unshielded | 3.94 in (100 mm) | DC 4-pin mini | E56CDL100UAE01 ☹️ |
| | | | | | DC 4-pin micro | E56CDL100UAD01 ☹️ |

Notes







☹️☹️ See listing of compatible connector cables on [Page V8-T3-73](#).

① Includes potentiometer for adjustment of sensing range.

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

Compatible Connector Cables

Standard Cables ^①

| | Current Rating at 600 V | 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  | Micro-Style, Straight Female | | | | | | | |
| | — | AC | 3-pin, 3-wire | 22 AWG | 6.0 ft (2m) |  1-Green 2-Red/Black 3-Red/White | CSAS3F3CY2202 | CSAS3F3RY2202 |
| | | | | | 16.4 ft (5m) | | CSAS3F3CY2205 | CSAS3F3RY2205 |
| | | | | | 32.8 ft (10m) | | CSAS3F3CY2210 | CSAS3F3RY2210 |
| | — | DC | 4-pin, 4-wire | 22 AWG | 6.0 ft (2m) |  1-Brown 2-White 3-Blue 4-Black | CSDS4A4CY2202 | CSDS4A4RY2202 |
| | | | | | 16.4 ft (5m) | | CSDS4A4CY2205 | CSDS4A4RY2205 |
| 32.8 ft (10m) | | | | | CSDS4A4CY2210 | | CSDS4A4RY2210 | |
| Mini-Style Straight Female  | Mini-Style, Straight Female | | | | | | | |
| | 13 A | — | 3-pin, 3-wire | 16 AWG | 6.0 ft (2m) |  1-Green 2-Black 3-White | CSMS3F3CY1602 | — |
| | | | | | 13.1 ft (4m) | | CSMS3F3CY1604 | — |
| | 10 A | AC/DC | 4-pin, 4-wire | 16 AWG | 6.0 ft (2m) |  1-Black 2-Blue 3-Brown 4-White | CSMS4A4CY1602 | — |
| | | | | | 13.1 ft (4m) | | CSMS4A4CY1604 | — |
| | | | | | 19.7 ft (6m) | | CSMS4A4CY1606 | — |

Note

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

Technical Data and Specifications

Two-Wire

3

| 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; below 32 °F (0 °C): 2.0 mA | At or above 32 °F (0 °C): <1.7 mA; below 32 °F (0 °C): 2.0 mA | At or above 32 °F (0 °C): <1.7 mA; below 32 °F (0 °C): 2.0 mA |
| Voltage drop | <10 V (5 V nominal) | <10 V (5 V nominal) | <10 V (5 V 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 | <2.5 V | <2.5 V | <2.5 V |
| 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 |

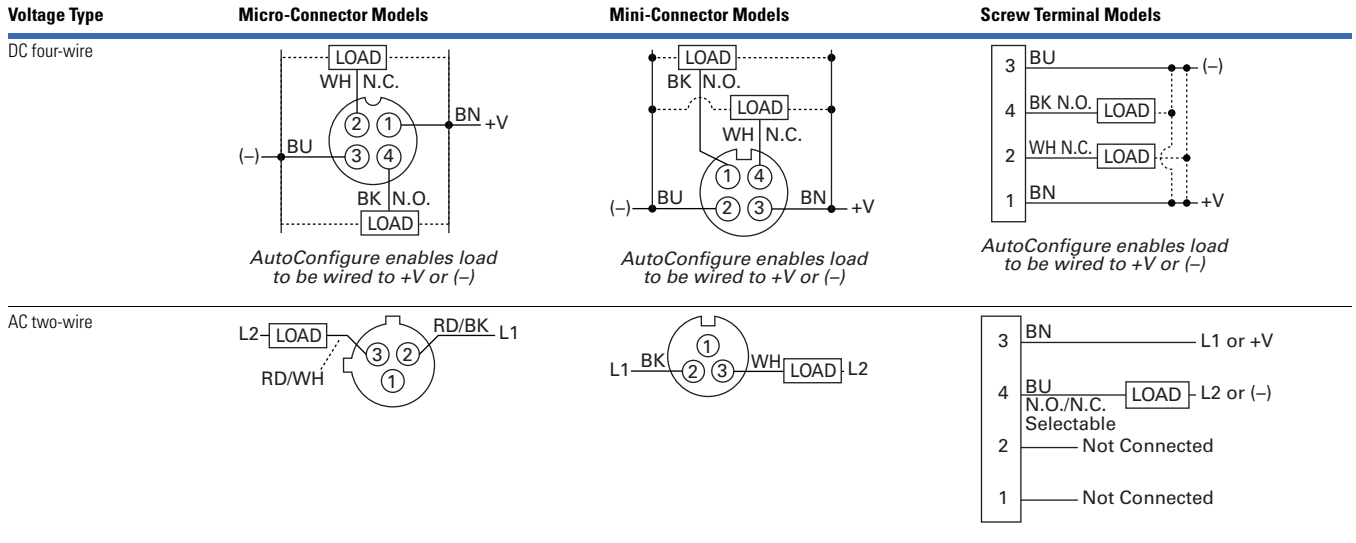
Note

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.

Wiring Diagrams

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

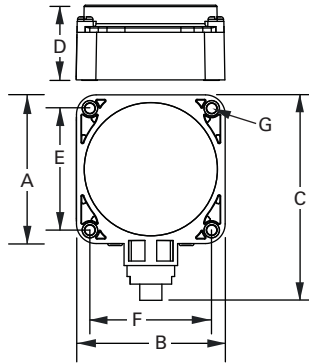
E56 Pancake Sensors



Dimensions

Approximate Dimensions in Inches (mm)

E56 Pancake Sensors



| Model | A (Depth) | B (Width) | C (Depth) | D (Height) | E (Mounting) | F (Mounting) | G (Diameter) |
|-------------------------------|--------------|--------------|--------------|-------------|---------------|---------------|--------------|
| Small Diameter Models | | | | | | | |
| 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) |
| Medium Diameter Models | | | | | | | |
| 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) |
| Large Diameter Models | | | | | | | |
| 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) |

3.12

Inductive Proximity Sensors

Nonmetallic Tubular Sensors

Nonmetallic Tubular Sensors



3

Contents

Description

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| Nonmetallic Tubular Sensors | |
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| Technical Data and Specifications | V8-T3-78 |
| Wiring Diagrams | V8-T3-78 |
| Dimensions | V8-T3-78 |

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

Standards and Certifications

- CE
- RoHS Compliant



⚠ DANGER

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




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

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




Product Selection

Nonmetallic Tubular Sensors

Two-Wire Sensors ^①

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

Three-Wire Sensors ^①

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

Note

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

3.12

Inductive Proximity Sensors

Nonmetallic Tubular Sensors

3

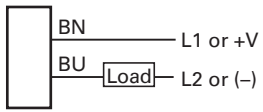
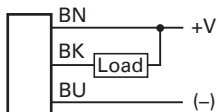
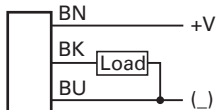
Technical Data and Specifications

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

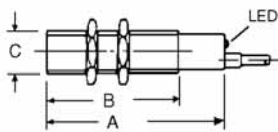
Nonmetallic Tubular Sensors

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

Dimensions

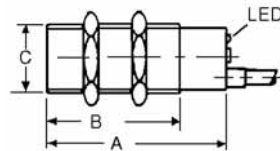
Approximate Dimensions in Inches (mm)

12 and 18 mm



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

30 mm



| A | B | Thread Size C |
|-----------|-----------|------------------|
| 3.15 (80) | 2.36 (60) | M30 x 1.5 |

E52 Cube Style Sensors



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| Dimensions | V8-T3-82 |

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 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

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

- UL Listed, E166051
- UL Tested to Canadian safety standards
- CE (DC models only)
- RoHS Compliant



⚠ DANGER

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

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

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

3.13

Inductive Proximity Sensors



E52 Cube Style Sensors

Product Selection

E52 Cube Style Sensors





3

DC Four-Wire Sensors

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

Compatible Connector Cables

Standard Cables ②

| | Current Rating at 600 V | 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  | Micro-Style, Straight Female | | | | | | | | |
| | — | DC | 4-pin, 4-wire | 22 AWG | 6.0 ft (2m) |  | 1-Brown 2-White 3-Blue 4-Black | CSDS4A4CY2202 | CSDS4A4RY2202 |
| | | | | | 16.4 ft (5m) | | | CSDS4A4CY2205 | CSDS4A4RY2205 |
| 32.8 ft (10m) | | | | | CSDS4A4CY2210 | | | CSDS4A4RY2210 | |
| Mini-Style Straight Female  | Mini-Style, Straight Female | | | | | | | | |
| | 10 A | AC/DC | 4-pin, 4-wire | 16 AWG | 6.0 ft (2m) |  | 1-Black 2-Blue 3-Brown 4-White | CSMS4A4CY1602 | — |
| | | | | | 13.1 ft (4m) | | | CSMS4A4CY1604 | — |
| 19.7 ft (6m) | | | | | CSMS4A4CY1606 | | | — | |

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

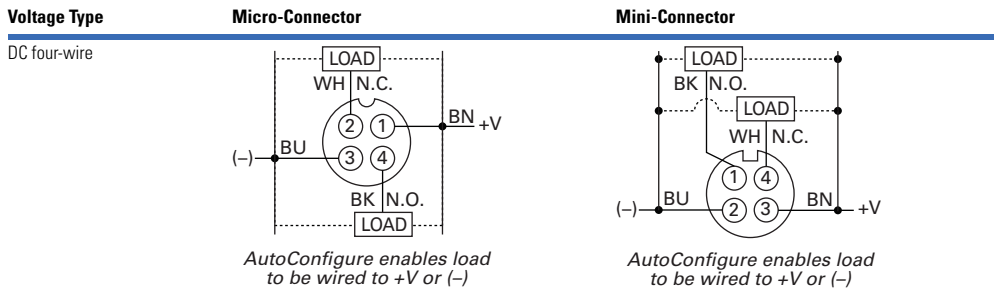
E52 Cube Style Sensors

| Description | DC Four-Wire |
|------------------------------------|---|
| Operating voltage | 10–48 Vdc |
| Load current (maximum) | 300 mA |
| Burden current | <25 mA |
| Off-state leakage | <150 μ A per output |
| Voltage drop | <2.5 V |
| 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 ^① | –25 to 158 °F (–25 to 70 °C) |
| Temperature drift | \pm 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



Note

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

3.13 Inductive Proximity Sensors

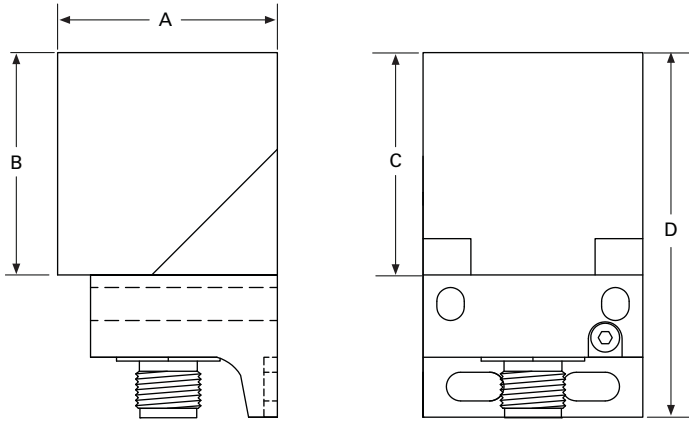
E52 Cube Style Sensors

Dimensions

Approximate Dimensions in Inches (mm)

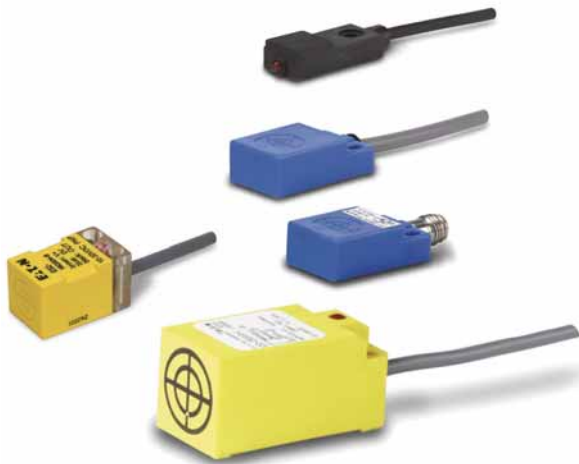
E52 Cube Style Sensors

3



| Model | Width A | Depth B | Height C | Overall Height 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



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| Wiring Diagrams | V8-T3-85 |
| Dimensions | V8-T3-85 |

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

Standards and Certifications

- CE (except E52RAL)
- RoHS Compliant



⚠ DANGER

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

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

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

3.14

Inductive Proximity Sensors





E52 Rectangular Style Sensors

3

Product Selection



E52 Rectangular Style Sensors

Three-Wire Models

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

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 |
|--|------------------------------------|----------------|--------|-------------|--|---------------------------|---------------------------|
| Nano-Style Straight Female  | Nano-Style, Straight Female | | | | | | |
| | DC | 3-pin | 24 AWG | 6.0 ft (2m) |  1-Brown 2-Blue 3-Black | CSNS3A3CY2402 | CSNS3A3RY2402 |

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**.

Wiring Diagrams

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

E52 Rectangular Style Sensors

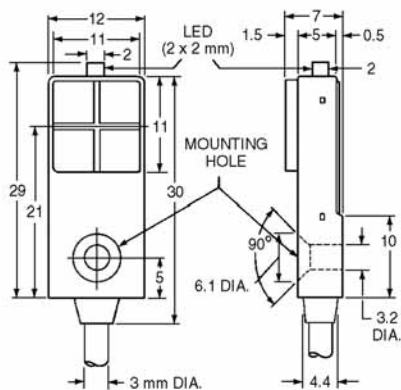
| Operating Voltage | Output | Cable Models | Nano-Connector Models (Face View Male Shown) |
|---------------------------|--------|--------------|--|
| Three-Wire Sensors | | | |
| DC | NPN | | |
| | PNP | | |

Dimensions

Approximate Dimensions in Inches (mm) except where noted

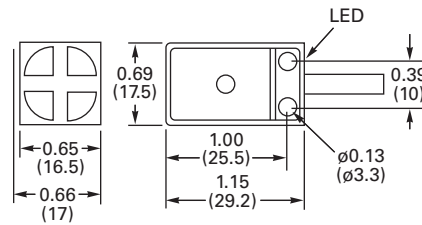
E52 Rectangular Style Sensors

R12

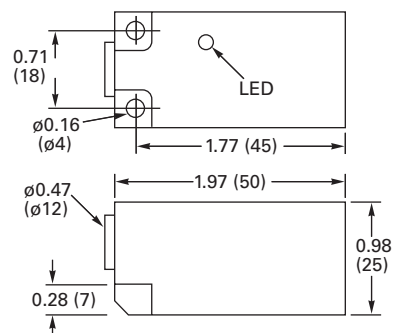


Note: Dimensions are mm only.

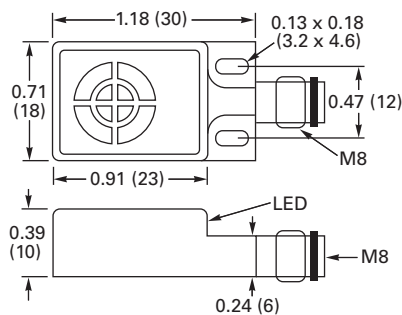
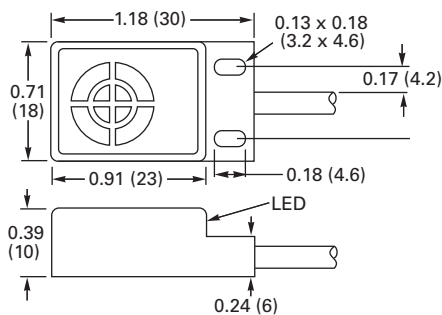
Q16



Q25



R18



3.15

Inductive Proximity Sensors

E55 Limit Switch Style Sensors with Nonmetallic Housings

3

E55 Limit Switch Style Sensors with Nonmetallic Housings



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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

Standards and Certifications

- CE
- RoHS Compliant



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 |

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

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

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 | 5 A 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.

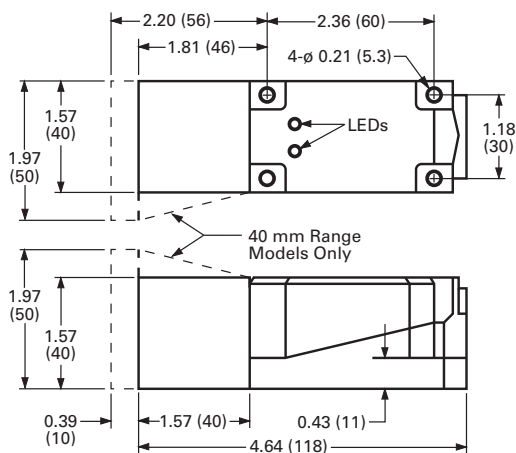
E55 Limit Switch Style Sensors

| Operating Voltage | Output | Terminal Models |
|-------------------------|--------|-----------------|
| Two-Wire Sensors | | |
| 35–250 Vac ① | NO | |
| | NC | |

Dimensions

Approximate Dimensions in Inches (mm)

E55 Limit Switch Style Sensors



Note

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

E51 Modular Limit Switch Style Sensors

3



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| Receptacles | V8-T3-92 |
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| Accessories | V8-T3-93 |
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E51 Modular Limit Switch Style Sensors

Product Description

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

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

Features

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

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

Standards and Certifications

- UL Listed, E166051, E183975
- CSA Certified, 50513
- RoHS Compliant



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

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

Product Selection

Standard Sensors—Assembled with Terminal Wiring

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

Assembled Sensor



Assembled Sensors—Standard (with Terminal Wiring)

Sensor Body and Receptacle



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

Sensor Heads ①

Top Sensing



Side Sensing



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

Notes

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

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

② Logic module must be ordered separately, see [Page V8-T3-91](#). These sensor bodies are rated NEMA 4, 4X and 13.

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

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

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Inductive Proximity Sensors

E51 Modular Limit Switch Style Sensors

Standard Sensors—Assembled with Receptacles

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

Assembled Sensor



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

Sensor Base Type with 8 ft Cable ②



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

Sensor Heads ①

Top Sensing



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

Side Sensing



Sensor Heads

Sensor Heads ①

Top Sensing



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

Side Sensing



Notes

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

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

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

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

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

Sensor Bodies

Two-Wire Sensors

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



Four-Wire Sensors

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



Logic Module

Logic Module (for E51SCN Sensor Body Only)

| Type | Description | Timing Range ④ | Catalog Number |
|-----------------------|---|----------------------|----------------|
| Logic Module ⑤ | ON and OFF delay Adjustable delay between time object is sensed and time switch function occurs Adjustable delay between time object leaves sensing field and time switch transfers back to non-sensing state | 0.15 to 15.0 seconds | E51MTB |



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.

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Inductive Proximity Sensors

E51 Modular Limit Switch Style Sensors

Receptacles

Receptacles

3

| | Description | Style | Details | Cable Length | Conduit Entrance 1/2 in NPT Catalog Number | 20 mm Catalog Number |
|--|---|-----------------|--------------|-------------------|--|-------------------------|
| Surface Mount  | Surface Mount | | | | | |
| | Conduit entrance, front or rear mounting | Two-wire, AC/DC | — | — | E51RA | E51RA20 |
| | | Four-wire, AC | Gray | — | E51RC | E51RC20 |
| | | | Black ① | — | E51RCB | E51RCB20 |
| Four-wire, DC | — | — | E51RN | E51RN20 | | |
| Mini-Connector  | Mini-Connector | | | | | |
| | Epoxy filled receptacle with pre-wired mini-connector | Two-wire, AC/DC | 3-pin | — | E51RAP3 ☺ | — |
| | | Four-wire, AC | 5-pin | — | E51RCP5 ☺ | — |
| Four-wire, DC | | 5-pin | — | E51RNP5 ☺ | — | |
| Pigtail with Mini-Connector  | Pigtail with Mini-Connector | | | | | |
| | Epoxy filled receptacle with mini-connector mounted on 3 ft (0.9m) cable | Two-wire, AC/DC | 3-pin | 3 ft (0.9m) | E51RAPT3 ☺ | — |
| | | Four-wire, AC | 5-pin | 3 ft (0.9m) | E51RCP5T ☺ | — |
| Four-wire, DC | | 5-pin | 3 ft (0.9m) | E51RNP5T ☺ | — | |
| Pre-Wired Cable  | Pre-Wired Cable | | | | | |
| | 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) | E51RAS | E51RA20S |
| | | | | 12 ft (3.6m) | E51RAS12 | — |
| | | | | 20 ft (6m) | E51RAS20 | — |
| | | Four-wire, AC | 5-conductor | 8 ft (2.4m) | E51RCS | E51RC20S |
| | | | | 12 ft (3.6m) | E51RCS12 | — |
| | | | | 20 ft (6m) | E51RCS20 | — |
| | | Four-wire, DC | 5-conductor | 8 ft (2.4m) | E51RNS | E51RN20S |
| | | | | 12 ft (3.6m) | E51RNS12 | — |
| 20 ft (6m) | | | | E51RNS20 | — | |





Notes

☺☺ See listing of compatible connector cables on [Page V8-T3-93](#).

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






Compatible Connector Cables

Standard Cables ^①

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

Accessories

E51 Modular Limit Switch Style Sensors

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

Dimensions, see **Page V8-T3-95**.

Note

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

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Inductive Proximity Sensors

E51 Modular Limit Switch Style Sensors

Technical Data and Specifications

E51 Modular Limit Switch Style Sensors

| Description | Specification |
|-----------------------------|--|
| Output rating (NEMA D150) | |
| AC/DC models | 0.5 A continuous |
| AC models | 1 A continuous |
| DC models | 0.6 A continuous |
| Protection | Latching short-circuit protection on two-wire AC/DC models; DC models: resettable short-circuit protection |
| Switching rate | AC models: 15 Hz; DC models: 50 Hz |
| Indicator LEDs | Lights when output is ON. One LED for each output |
| Alternate frequency | Standard and alternate frequencies allow side-by-side operation without interference |
| Enclosure material | Zinc die cast |
| Gasket material | Viton |
| Enclosure ratings | NEMA 3, 3S, 4, 4X, 6, 6P, 12 and 13 (IP67); E51SCN sensor body only: NEMA 4, 4X and 13 |
| Hazardous locations ratings | |
| Class I | Division II—GRPS ABCD |
| Class II | Division II—GRPS F and G |
| Class III | Division 2 |
| Temperature range | -13 to 158 °F (-25 to 70 °C) |
| Torque requirements | Switch body screws: 25–30 in-lbs; sensing head screws: 14–18 in-lbs |
| Vibration | 10–55 Hz, 1 mm amplitude |
| Shock | 30 g, 11 ms, 1/2 sine wave |
| Humidity | 95% non-condensing |
| Burden current | <25 mA |
| OFF-state leakage | DC version: 120 µA; two-wire AC: 1.9 mA maximum; three-wire AC: 1.1 mA |
| ON-state leakage | <2.5 Vdc |
| Power-up delay | <150 ms |

Wiring Diagrams

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

E51 Modular Limit Switch Style Sensors

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

Note

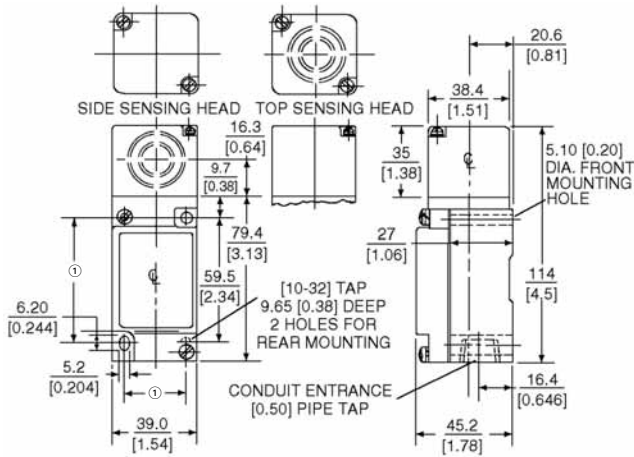
① Changing output switch on sensor head will reverse output function (NO becomes NC, and NC becomes NO).

Dimensions

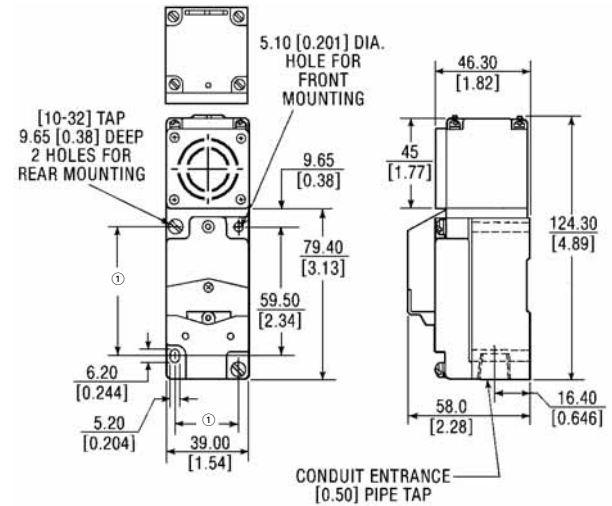
Approximate Dimensions in mm [in]

E51 Modular Limit Switch Style Sensors

Standard Sensors



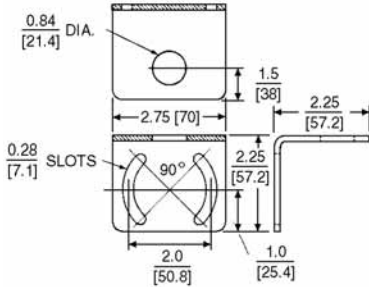
Sensor with Logic Module



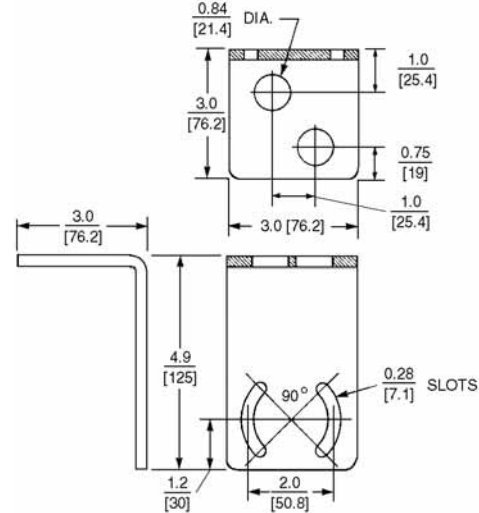
Accessories

Approximate Dimensions in Inches [mm]

Universal Mounting Bracket—One Hole



Universal Mounting Bracket—Two Holes



Note

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

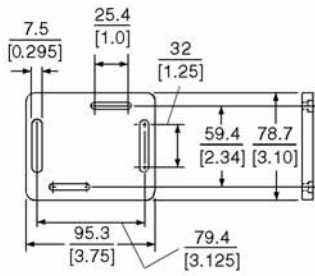
3.16 Inductive Proximity Sensors

E51 Modular Limit Switch Style Sensors

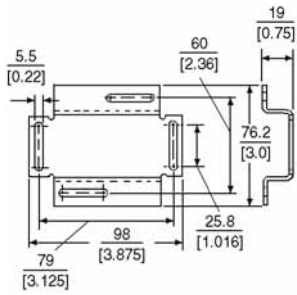
Approximate Dimensions in mm [in]

Machine Mounting Bracket

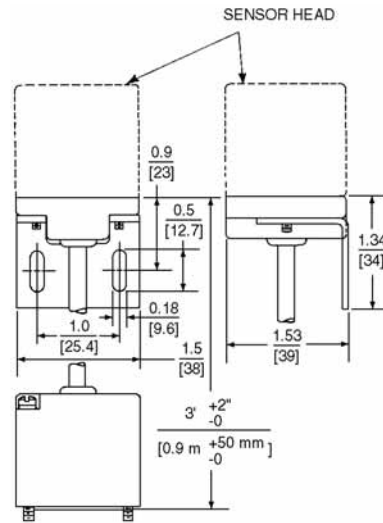
3



Stand-Off Mounting Bracket



Remote Sensor Head Assembly



E51 Limit Switch Style, Factory Sealed 6P+ Sensors



Contents

| Description | Page |
|--|------------------|
| E51 Limit Switch Style, Factory Sealed 6P+ Sensors | |
| Product Selection | |
| Unitized Sensors | V8-T3-98 |
| Compatible Connector Cables | V8-T3-98 |
| Accessories | V8-T3-99 |
| Technical Data and Specifications | V8-T3-99 |
| Wiring Diagrams | V8-T3-100 |
| Dimensions | V8-T3-100 |

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

Standards and Certifications

- UL Listed, E166051
- CSA Certified, 50513
- RoHS Compliant



⚠ DANGER

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

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

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

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Inductive Proximity Sensors

E51 Limit Switch Style, Factory Sealed 6P+ Sensors

Product Selection

Unitized Sensors

3

Assembled Sensor with 8 ft Cable ^①



Sensor Heads ^②

Top Sensing ^②



Side Sensing ^②



Factory Sealed 6P+ Assembled Sensors

| Sensing Range | Shielding | Frequency ^③ | Two-Wire Sensors | | Four-Wire Sensors | | |
|---------------------|------------|------------------------|--|-------------------|-------------------|-------------------|-------------------------|
| | | | Operating voltage | Output | 120 Vac | 10–30 Vdc | NO and NC complementary |
| | | | Assembled Sensor with Head, Sensor Body and Receptacle | | | | |
| | | | 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 ^⑥

Mini-Style Straight Female



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

Notes

^① Switch bases feature 8 ft of SOOW-A cable. Other connection options are available:

| Connection Option ^④ | 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 T before U | E51ALT16PTU |
| Mini-connector mounted to switch base (3-pin for two-wire sensors; 5-pin for four-wire sensors) | Add the letter C before U | E51ALT16PCU |
| 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 | E51ALT16PU12 ^⑤ |

^② 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.

^③ Sensor heads feature color coded target symbols: Yellow for standard frequency; Green for alternate frequency.





^④ See listing of compatible connector cables above.

^⑤ For 12 ft.

^⑥ For a full selection of connector cables, see **Tab 10, section 10.1**.

Accessories

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

| | Description | Catalog Number |
|---|--|----------------|
| One Hole  | Universal Mounting Bracket Includes mounting hardware, stainless steel | E51KH2 |
| Two Holes  | Includes mounting hardware, steel | E51KH4 |
| Machine Mounting Bracket  | Machine Mounting Bracket Zinc die cast construction | E50KH3 |
| Stand-Off Mounting Bracket  | Stand-Off Mounting Bracket Steel construction | E51KH3 |
| Dimensions , see Page V8-T3-100 . | | |

Technical Data and Specifications

E51 Limit Switch Style, Factory Sealed 6P+

| Description | Specification |
|---------------------------|--|
| Output rating (NEMA D150) | |
| AC/DC models | 0.5 A continuous |
| AC models | 1 A continuous |
| DC models | 0.6 A continuous |
| Protection | Latching short-circuit protection on two-wire AC/DC 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**.

3.17

Inductive Proximity Sensors

E51 Limit Switch Style, Factory Sealed 6P+ Sensors

Wiring Diagrams

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

E51 Limit Switch Style, Factory Sealed 6P+

3

Operating Voltage

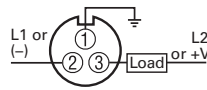
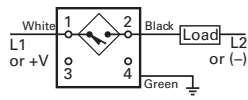
Output

Cable Models

**Mini-Connector Models
(Face View Male Shown)**

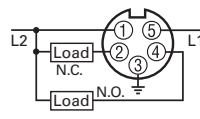
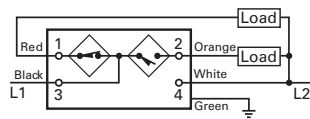
Two-Wire Sensors

20–264 Vac or Vdc 50/60 Hz NO or NC (NO shown)

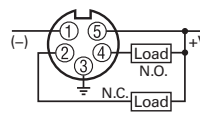
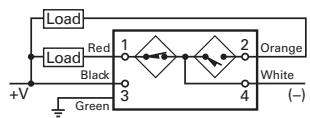


Four-Wire Sensors

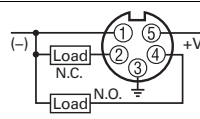
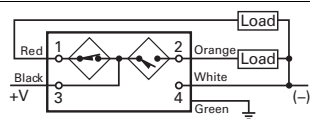
120 Vac 50/60 Hz NO and NC



10–30 Vdc NO and NC NPN



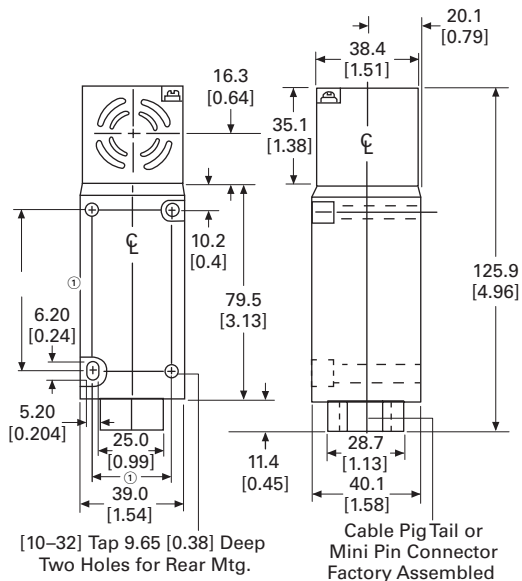
NO and NC PNP



Dimensions

Approximate Dimensions in mm [in]

E51 Limit Switch Style, Factory Sealed 6P+



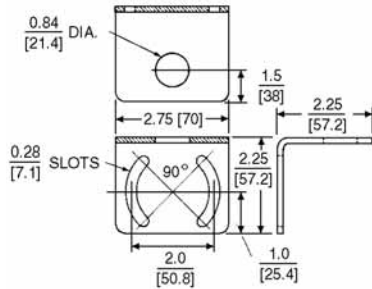
Note

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.

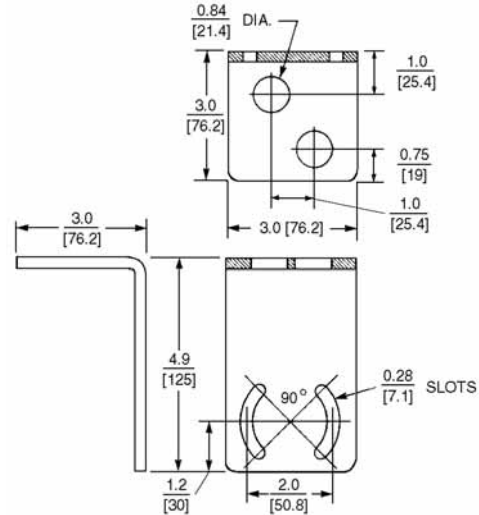
Approximate Dimensions in Inches [mm]

Accessories

Universal Mounting Bracket—One Hole

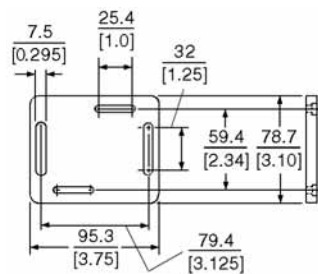


Universal Mounting Bracket—Two Holes

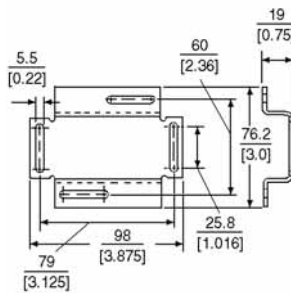


Approximate Dimensions in mm [in]

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.