

E58 Harsh Duty Series Sensors



E58 Harsh Duty Series Sensors

Product Description

The E58 Harsh Duty Series by Eaton's Electrical Sector was designed to withstand your harshest physical, chemical and optical environments.

Extensive research dictated the choice of materials used in this sensor. Stainless steel, PVDF and tempered glass components are mechanically assembled using Viton® seals to ensure complete sealing and resistance to industry chemicals. All adhesives and potting subject to failure from chemical attack have been eliminated from the design. The result is a sensor highly resistant to chemical attack and moisture intrusion, that can withstand heavy shock and vibration in almost any application.

E58 Harsh Duty sensors feature unparalleled optical performance. They are ideal for automotive applications where exposure to lubricants, cutting fluids, coolants and glycols is common. For food processing applications, a smooth body version simplifies high-pressure chemical washdowns, and withstands the use of sanitizers, surfactants, and cleaning agents including diluted bases and acids.

Features

- Sensors are available in 18 mm and 30 mm diameters
- Highly refined optics for long sensing ranges and to see through high levels of contamination—unmatched optical performance
- Perfect Prox technology provides exceptional background rejection and extremely high excess gain

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

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- Resistant to the wide range of chemicals used in the automotive, food processing and forest products industries
- Suitable for high temperature, high pressure washdown (1200 psi)
- Mechanical Viton seals hold up to extreme temperature variations
- Visible sensing beam on all models lets you see where the beam is aimed for quick setup and alignment
- Output status indicator is the brightest available and is visible from any angle and in any lighting condition
- The industry's only background rejection sensors with a two-wire circuit design
- Models available with both AC and DC operation in a single unit
- Four-wire DC sensors offer dual NPN and PNP outputs

Standards and Certifications

- UL Listed
- cUL Listed
- CE



⚠ DANGER

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

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

Product Overview

E58 Harsh Duty Series Sensors Physical Attributes

Rugged physical construction

The E58 Harsh Duty Series was designed from the ground up to be the most rugged sensor family available. The strong metal housing, mechanical seals and surface mount electronics withstand heavy shock and vibration. The tempered glass lens cover provides protection in abrasive environments, and the sturdy cable is physically clamped to the sensor body.

Exceptional environmental protection and chemical resistance

The E58 Harsh Duty Series was designed to be used in the automotive, food processing and forest products industries. It is also well suited for applications in related industries such as pulp and paper, car wash and steel. These industries are all physically demanding on equipment and that's why we designed and tested these sensors to extreme levels of shock and vibration.

Many sensor failures, however, are actually due to chemical attack so we had to make them stand up to constant chemical exposure—day in and day out. To ensure resistance to the widest possible range of chemicals, we conducted extensive studies of the chemical agents commonly used in these industries.

We then selected only those materials that could withstand exposure to these chemicals without failure in the design of the E58 Harsh Duty Series. In addition, we eliminated adhesives in favor of more reliable Viton compression seals. Some of the more common chemicals against which this sensor has been tested are listed in the resistance chart.

This resistance chart reflects testing of the 303 stainless steel body used on the standard E58 Harsh Duty Series sensors. Additional chemical resistance for food industry applications is available using sensors with the optional 316 stainless steel body and hard-coated polycarbonate (or acrylic on reflex models) lens cover.

The E58 Harsh Duty Series was designed to resist the chemicals shown in this table under normal use and conditions. Extremes of environmental factors such as temperature, pressure, concentration, duration of exposure, ultraviolet sunlight and chemical interactions combined with the presence of these chemicals could result in premature material failure. For these cases, testing the sensor in the specific application is recommended.

E58 Harsh Duty Series Sensors Chemical Resistance Chart

Chemical Category	Commonly Found In
Oils, cutting fluids, aqueous coolants	Automotive, forest industry
Vegetable and mineral oil	Automotive, forest industry
Surfactants	Automotive, food processing
Dilute acids	Food processing
Dilute bases	Food processing
Sanitizers	Food processing

Sensing Modes

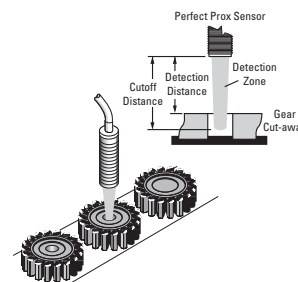
Perfect Prox

This is a unique type of diffuse reflective sensor that combines extremely high sensing power (called "excess gain") with a sharp optical cutoff to ignore backgrounds. This allows the sensor to reliably detect targets regardless of variations in color, reflectance, contrast or surface shape, while ignoring objects just slightly outside the target range. With Perfect Prox, the E58 Harsh Duty Series can act just like an inductive prox sensor—but with up to 20 times the range for mounting away from a moving target so you can avoid damage and downtime. 18 mm and 30 mm sizes, two-, three- and four-wire circuits, and cable, micro- and mini-connector terminations mean quick and easy replacement of damaged proximity sensors. A visible sensing beam lets you quickly confirm the sensor is aligned correctly in the application.

The 18 mm Perfect Prox has a sensing range of 2 or 4 in (50 or 100 mm), and the 30 mm version has a range of 6 or 11 in (150 or 280 mm).

This simplified application example shows the power of the Perfect Prox.

Application Example



If the hole is present in the gear, the sensor will shine through the hole and ignore the belt—no detection event will occur.

If the hole in the gear is missing, the sensor will detect the surface of the gear and reject the part.

Thru-Beam

This sensing mode is available in the 30 mm models. Rated sensing range is 800 ft, among the longest ranges available on the market. This provides extremely high excess gain when the source and detector are positioned at closer, optimum ranges to see through high levels of contamination. A visible red sensing beam and wide field-of-view mean quick and easy installation and alignment.




Polarized Reflex

Another sensing mode available in the 30 mm models is polarized reflex. In this mode, the sensing beam is reflected from a retroreflector back to the sensor. The maximum range of 34 ft is also among the longest available on the sensor market. The polarizing filter built into the sensor ensures only light reflected off a corner cube retroreflector is recognized by the sensor. This allows reliable detection of shiny targets that could reflect light back to the sensor and be missed by a non-polarized version. As in all models, a visible sensing beam is featured for easy installation and alignment.

Product Selection

Thru-Beam and Reflex Sensors

Three-Wire and Four-Wire Sensors

	Operating Voltage	Sensing Range	Optimum Range	Field of View	Thru-Beam Component	Connection Type	Light Operate Catalog Number	Dark Operate Catalog Number
30 mm Diameter Thru-Beam ^①								
 Source Detector	20–132 Vac 50/60 Hz or 15–30 Vdc	800 ft (250m)	0.1 to 300 ft (0.03 to 90m)	33 in (830 mm) diameter at 25 ft (7.6m)	Source	2m cable	E58–30TS250-GA	—
						4-pin micro AC connector	E58–30TS250-GAP Ⓢ	—
	10–30 Vdc	800 ft (250m)	0.1 to 300 ft (0.03 to 90m)	33 in (830 mm) diameter at 25 ft (7.6m)	Detector	2m cable	E58–30TD250-GL	E58–30TD250-GD
						4-pin micro AC connector	E58–30TD250-GLP Ⓢ	E58–30TD250-GDP Ⓢ
					Source	2m cable	E58–30TS250-HA	—
						4-pin micro DC connector	E58–30TS250-HAP Ⓢ	—
Detector	2m cable	E58–30TD250-HL	E58–30TD250-HD					
	4-pin micro DC connector	E58–30TD250-HLP Ⓢ	E58–30TD250-HDP Ⓢ					
30 mm Diameter Reflex ^②								
 Sensor Retroreflector ^③	20–132 Vac 50/60 Hz or 15–30 Vdc	59 ft (18m)	1 to 40 ft (0.03 to 12m)	6 in (150 mm) diameter at 20 ft (6m)	—	2m cable	E58–30RS18-GL	E58–30RS18-GD
						4-pin micro AC connector	E58–30RS18-GLP Ⓢ	E58–30RS18-GDP Ⓢ
	10–30 Vdc	59 ft (18m)	1 to 40 ft (0.03 to 12m)	6 in (150 mm) diameter at 20 ft (6m)	—	2m cable	E58–30RS18-HL	E58–30RS18-HD
						4-pin micro DC connector	E58–30RS18-HLP Ⓢ	E58–30RS18-HDP Ⓢ
30 mm Diameter Polarized Reflex ^②								
 Retroreflector ^③	20–132 Vac 50/60 Hz or 15–30 Vdc	34 ft (10m)	1 to 20 ft (0.03 to 6m)	6 in (150 mm) diameter at 20 ft (6m)	—	2m cable	E58–30RP10-GL	E58–30RP10-GD
						4-pin micro AC connector	E58–30RP10-GLP Ⓢ	E58–30RP10-GDP Ⓢ
	10–30 Vdc	34 ft (10m)	1 to 20 ft (0.03 to 6m)	6 in (150 mm) diameter at 20 ft (6m)	—	2m cable	E58–30RP10-HL	E58–30RP10-HD
4-pin micro DC connector						E58–30RP10-HLP Ⓢ	E58–30RP10-HDP Ⓢ	

Options, see **Page V8-T5-89**.**Notes**Ⓢ See listing of compatible connector cables on **Page V8-T5-88**.

① For a complete system, order one source and one detector.

② For a complete system, order sensor and retroreflector (see **Tab 8, section 8.1**).

③ Retroreflector not included.

Perfect Prox Background Rejection Sensors**Two-Wire Sensors****18 mm Diameter Perfect Prox**

Operating Voltage	Nominal Range ①	Optimum Range	Cutoff Range ②	Field of View	Connection Type	Light Operate Catalog Number	Dark Operate Catalog Number
18 mm Diameter Perfect Prox							
90–132 Vac 50/60 Hz or 18–50 Vdc	2 in (50 mm)	0.4 to 1.8 in (10 to 45 mm)	2.25 in (57 mm) and beyond	0.25 in (6 mm) diameter at 2 in (50 mm)	2m cable	E58–18DP50-EL	E58–18DP50-ED
					3-pin micro AC connector	E58–18DP50-ELP ☺	E58–18DP50-EDP ☺
					3-pin mini-connector	E58–18DP50-ELPB ☺	E58–18DP50-EDPB ☺
	4 in (100 mm)	0.5 to 3 in (13 to 76 mm)	5 in (127 mm) and beyond	0.38 in (10 mm) diameter at 4 in (100 mm)	2m cable	E58–18DP100-EL	E58–18DP100-ED
					3-pin micro AC connector	E58–18DP100-ELP ☺	E58–18DP100-EDP ☺
					3-pin mini-connector	E58–18DP100-ELPB ☺	E58–18DP100-EDPB ☺
18–50 Vdc	2 in (50 mm)	0.4 to 1.8 in (10 to 45 mm)	2.25 in (57 mm) and beyond	0.25 in (6 mm) diameter at 2 in (50 mm)	4-pin micro DC connector	E58–18DP50-DLP ☺	E58–18DP50-DDP ☺
					4-pin micro DC connector	E58–18DP100-DLP ☺	E58–18DP100-DDP ☺

30 mm Diameter Perfect Prox

30 mm Diameter Perfect Prox							
90–132 Vac 50/60 Hz or 18–50 Vdc	6 in (150 mm)	1 to 6 in (26 to 150 mm)	6.5 in (165 mm) and beyond	0.75 in (19 mm) diameter at 6 in (150 mm)	2m cable	E58–30DP150-EL	E58–30DP150-ED
					3-pin micro AC connector	E58–30DP150-ELP ☺	E58–30DP150-EDP ☺
					3-pin mini-connector	E58–30DP150-ELPB ☺	E58–30DP150-EDPB ☺
	11 in (280 mm)	1 to 9 in (26 to 228 mm)	12.5 in (318 mm)	1.0 in (26 mm) diameter at 11 in (280 mm)	2m cable	E58–30DPS280-EL	E58–30DPS280-ED
					3-pin micro AC connector	E58–30DPS280-ELP ☺	E58–30DPS280-EDP ☺
					3-pin mini-connector	E58–30DPS280-ELPB ☺	E58–30DPS280-EDPB ☺
18–50 Vdc	6 in (150 mm)	1 to 6 in (26 to 150 mm)	6.5 in (165 mm) and beyond	0.75 in (19 mm) diameter at 6 in (150 mm)	4-pin micro DC connector	E58–30DP150-DLP ☺	E58–30DP150-DDP ☺

Options, see **Page V8-T5-89**.**Three-Wire and Four-Wire Sensors****18 mm Diameter Perfect Prox**

18 mm Diameter Perfect Prox							
10–30 Vdc	2 in (50 mm)	0.4 to 1.8 in (10 to 45 mm)	2.25 in (57 mm) and beyond	0.25 in (6 mm) diameter at 2 in (50 mm)	2m cable	E58–18DP50-HL	E58–18DP50-HD
					4-pin micro DC connector	E58–18DP50-HLP ☺	E58–18DP50-HDP ☺
	4 in (100 mm)	0.5 to 3 in (13 to 76 mm)	5 in (127 mm) and beyond	0.38 in (10 mm) diameter at 4 in (100 mm)	2m cable	E58–18DP100-HL	E58–18DP100-HD
					4-pin micro DC connector	E58–18DP100-HLP ☺	E58–18DP100-HDP ☺

30 mm Diameter Perfect Prox

30 mm Diameter Perfect Prox							
20–132 Vac 50/60 Hz or 15–30 Vdc	6 in (150 mm)	1 to 6 in (26 to 150 mm)	6.5 in (165 mm) and beyond	0.75 in (19 mm) diameter at 6 in (150 mm)	2m cable	E58–30DP150-GL	E58–30DP150-GD
					4-pin micro AC connector	E58–30DP150-GLP ☺	E58–30DP150-GDP ☺
	11 in (280 mm)	1 to 9 in (26 to 228 mm)	12.5 in (318 mm)	1.0 in (26 mm) diameter at 11 in (280 mm)	2m cable	E58–30DPS280-GL ☺	E58–30DPS280-GD ☺
					4-pin micro AC connector	E58–30DPS280-GLP ☺	E58–30DPS280-GDP ☺
10–30 Vdc	6 in (150 mm)	1 to 6 in (26 to 150 mm)	6.5 in (165 mm) and beyond	0.75 in (19 mm) diameter at 6 in (150 mm)	2m cable	E58–30DP150-HL	E58–30DP150-HD
					4-pin micro DC connector	E58–30DP150-HLP ☺	E58–30DP150-HDP ☺
	11 in (280 mm)	1 to 9 in (26 to 228 mm)	12.5 in (318 mm)	1.0 in (26 mm) diameter at 11 in (280 mm)	2m cable	E58–30DPS280-HL	E58–30DPS280-HD
					4-pin micro DC connector	E58–30DPS280-HLP ☺	E58–30DPS280-HDP ☺




Options, see **Page V8-T5-89**.**Notes**☺ ☺ See listing of compatible connector cables on **Page V8-T5-88**.

① Sensor will detect a 90% reflectance card at this range.


② Sensor will ignore a 90% reflectance card at this range.

Compatible Connector Cables

Micro-Style,
Straight FemaleStandard Cables—Micro ^①

Voltage Style	Number of Pins	Gauge	Length	Pin Configuration/ Wire Colors (Face View Female Shown)	PVC Jacket Catalog Number	PUR Jacket Catalog Number	IRR PUR Jacket Catalog Number
Micro-Style, Straight Female							
AC	3-pin, 3-wire	22 AWG	6 ft (2m)	 1-Green 2-Red/Black 3-Red/White	CSAS3F3CY2202	CSAS3F3RY2202	—
	4-pin, 4-wire	22 AWG	6 ft (2m)	 1-Red/Black 2-Red/White 3-Red 4-Green	CSAS4F4CY2202	CSAS4F4RY2202	CSAS4F4IO2202
DC	4-pin, 4-wire	22 AWG	6 ft (2m)	 1-Brown 2-White 3-Blue 4-Black	CSDS4A4CY2202	CSDS4A4RY2202	CSDS4A4IO2202

Mini-Style,
Straight FemaleStandard Cables—Mini ^①

Current Rating at 600V	Voltage Style	Number of Pins	Gauge	Length	Pin Configuration/ Wire Colors (Face View Female Shown)	Catalog Number
Mini-Style, Straight Female						
13A	—	3-pin	16 AWG	6 ft (2m)	 1-Green 2-Black 3-White	CSMS3F3CY1602

Accessories

E58 Harsh Duty Series Sensors

Description	Reference
Retroreflectors and retroreflective tape	See Tab 8, section 8.1
Mounting brackets	See Tab 8, section 8.2
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**.

Options

Sensor options are built-to-order, contact Eaton's Sensor Applications Department at 1-800-426-9184 for delivery lead times.

Thru-Beam and Reflex Sensors

Thru-Beam Apertured Versions

Reduces effective sensing beam to 0.2 x 0.9 in (5 x 23 mm) for accurate edge detection or sensing smaller objects. Factory installed behind lens cover for protection and sealing. Sensing range is reduced to 230 ft (70m).

To order, substitute "**070**" in place of "**250**" in source or detector catalog number.

Example:
E58-30TS**070**-GA

Food Processing Versions with Threaded Housings

Upgrade to a 316 stainless steel threaded body from 303, and change the lens cover to hard-coated polycarbonate (cast acrylic for reflex models) from glass.

To order, add the suffix "**-FC**" to the end of the catalog number.

Example:
E58-30RP10-GL-**FC**

Food Processing Versions with Smooth (Non-Threaded) Housings

Upgrade to a 316 stainless steel smooth (non-threaded) body from 303, and change the lens cover to hard-coated polycarbonate (cast acrylic for reflex models) from glass.

To order, add the suffix "**-FSC**" to the end of the catalog number.

Example:
E58-30RP10-GL-**FSC**

Perfect Prox 30 mm Diameter Model Sensors Only

Food Processing Versions with Threaded Housings

Upgrade to a 316 stainless steel threaded body from 303, and change the lens cover to hard-coated polycarbonate from glass.

To order, add the suffix "**-FC**" to the end of the catalog number.

Example:
E58-30DP150-EL-**FC**

Food Processing Versions with Smooth (Non-Threaded) Housings

Upgrade to a 316 stainless steel smooth (non-threaded) body from 303, and change the lens cover to hard-coated polycarbonate from glass.

To order, add the suffix "**-FSC**" to the end of the catalog number.

Example:
E58-30DP150-EL-**FSC**

Technical Data and Specifications

E58 Harsh Duty Series Sensors

Description	Three-Wire and Four-Wire Sensors			Two-Wire Sensors	
	AC/DC Models (DC Operation)	AC/DC Models (DC Operation)	DC Only Models	AC/DC Models (AC Operation)	DC Only and AC/DC Models (DC Operation)
Input voltage	20–132 Vac, 50/60 Hz	15–30 Vdc	10–30 Vdc	90–132 Vac, 50/60 Hz	18–50 Vdc
Power dissipation	3W maximum	3W maximum	2W maximum	3W maximum	3W maximum
Output type	VMOS (bi-directional)	NPN (sink)	Four-wire: NPN and PNP (dual outputs)	18 mm models: DMOS/bipolar; 30 mm models: DMOS	18 mm models: DMOS/bipolar; 30 mm models: DMOS
Current switching	300 mA maximum	300 mA maximum	PNP: 100 mA max. NPN: 18 mm models: 250 mA max.; 30 mm models: 100 mA max.	18 mm models: 100 mA; 30 mm models: 300 mA	18 mm models: 100 mA; 30 mm models: 300 mA
Voltage switching	186V peak maximum	186V peak maximum	30 Vdc maximum	186V peak maximum	50 Vdc maximum
OFF-state leakage	250 μ A typical; 500 μ A maximum	250 μ A typical; 500 μ A maximum	10 μ A maximum	1.7 mA maximum	18 mm models: 1.7 mA max. 30 mm models: 1.5 mA max.
Surge current	2A maximum	2A maximum	1A maximum	1A AC	1A DC
ON-state voltage drop	—	1.8V at 10 mA 4.0V at 300 mA	NPN: 1.2V at 10 mA; 18 mm models: 2.0V at 100 mA; 30 mm models: 2.0V at 250 mA; PNP: 2.8V at 100 mA	10 Vac rms	18 mm models: 10 Vdc 30 mm models: 8 Vdc
Response time	10 ms	2 ms	18 mm models: 1 ms; 30 mm models: 1.6 ms	35 ms	35 ms
Short circuit protection	Sensor will turn off immediately when a short or overload is detected (indicator LED will flash) ①	Sensor will turn off immediately when a short or overload is detected (indicator LED will flash) ①	Sensor will turn off immediately when a short or overload is detected (indicator LED will flash) ①	Auto reset	Auto reset
Operating and storage temperature range	–40° to 131°F (–40° to 55°C)	–40° to 131°F (–40° to 55°C)	–40° to 131°F (–40° to 55°C)	18 mm models: –40° to 158°F (–40° to 70°C) 30 mm models: –10° to 131°F (–25° to 55°C)	18 mm models: –40° to 158°F (–40° to 70°C) 30 mm models: –10° to 131°F (–25° to 55°C)

Description	All Models
Enclosure material	Cable jacket: PVC (poly vinyl chloride) Indicator ring: PVDF (high-density fluorinated polymer) Seals: Viton (registered trademark of Dupont) Lens cover: Thru-beam and Perfect Prox models: Tempered glass (or hard-coated polycarbonate for models ending in FC or FSC) Polarized reflex models: Glass (or cast acrylic for models ending in FC or FSC) Body: 303 stainless steel (or 316 stainless steel for models ending in FC or FSC)
Cable versions	2m cable length
Connector versions	Male mini- and micro-connectors on 7 in pigtail (refer to model selection for number of pins per model)
Vibration and shock	Vibration: 30g over 20 Hz to 2 kHz; shock: 100g for 3 ms 1/2 sinewave pulse
Indicator LED	Thru-beam source: Lights when power is ON; all other models: Lights steady when output is ON, flashes when short circuit protection is in latch condition (except two-wire models)
Sunlight immunity	Perfect Prox 5000 ft-candles others: 10,000 ft-candles
Enclosure ratings	NEMA 1, 2, 3, 3R, 3S, 4, 4X, 6, 6P, 12, 12K and 13 (IP69K); This product is suitable for high temperature, high pressure washdown (1200 psi).
Chemical resistance	This product was designed to withstand chemicals commonly used in the automotive, machine tool, food processing and forest industries.

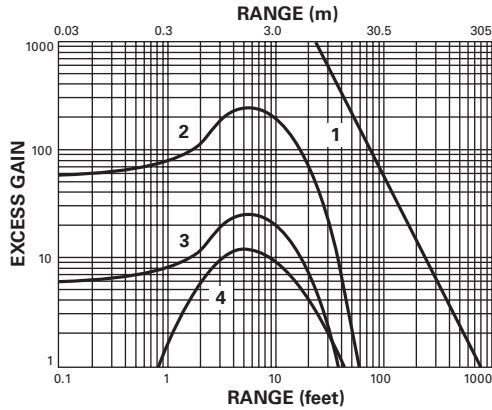
Note

① Turn power OFF and back ON to reset. Sensor will reset when short is removed.

Excess Gain

Thru-Beam, Reflex and Polarized Reflex Sensors

All Models



Thru-Beam

1. Thru-beam

Reflex

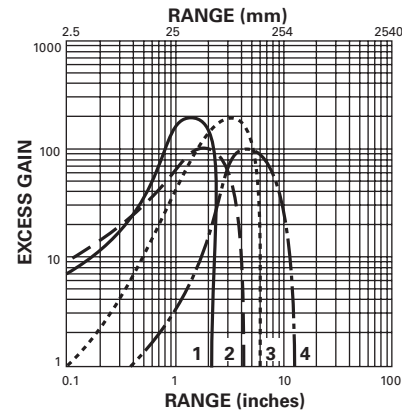
2. Performance to 3 in retroreflector

Polarized Reflex

3. Performance to 3 in retroreflector
4. Performance to corner-cube retroreflective tape

Perfect Prox Background Rejection Sensors

All Models



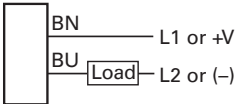
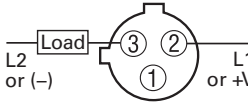
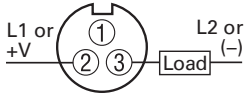
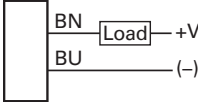
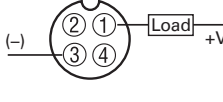
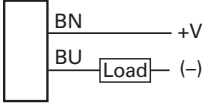
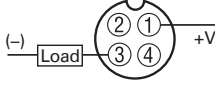
Perfect Prox

1. 18 mm diameter, 2 in (50 mm) range models
2. 18 mm diameter, 4 in (100 mm) range models
3. 30 mm diameter, 6 in (150 mm) range models
4. 30 mm diameter, 11 in (280 mm) range models

Wiring Diagrams

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

Perfect Prox Background Rejection Sensors

Operating Voltage	Mode/Output	Cable Models	Connector Models (Face View Male Shown)	
			Micro	Mini
Two-Wire Sensors				
90–132 Vac 50/60 Hz or 18–50 Vdc	All			
18–50 Vdc	All (NPN)			—
	All (PNP)			—

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

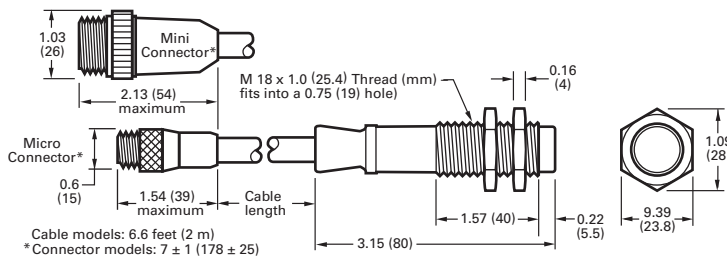
E58 Harsh Duty Series Sensors

Operating Voltage	Mode/Output	Cable Models	Micro-Connector Models (Face View Male Shown)
Three-Wire and Four-Wire Sensors			
20–132 Vac 50/60 Hz or 15–30 Vdc	Thru-beam source		
	All others		
10–30 Vdc	Thru-beam source		
	All others (NPN and PNP)		

Dimensions

Approximate Dimensions in Inches (mm) except where noted

18 mm Diameter (Threaded Model Shown)



30 mm Diameter (Threaded Model Shown)

