

July 2005

**E58 Harsh Duty Series
Photoelectric Sensors****Contents**

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The Cutler-Hammer® E58 Harsh Duty Series by Eaton's electrical business 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.

Ratings and Approvals

- UL Listed
- C-UL Listed



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

**The World's Most Rugged and Best Sealed
Photoelectric Sensors**

30 mm Models Offer Industry-Leading Performance

360° Output Indicator Is the Brightest Available

Tempered Glass Lens Cover Protects Against Abrasion

All Models with Visible Red Beams

Reliable Viton Mechanical Seals Ensure Complete Sealing and Resistance to Industry Chemicals

Food Processing Versions Feature Non-glass Lens Covers, 316 Stainless Steel and Optional Smooth Body

18 mm Models for Compact Mounting

Connector Versions Available for All Models

Product 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
- 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 2-wire circuit design
- Models available with both AC and DC operation in a single unit
- 4-wire DC sensors offer dual NPN and PNP outputs

For Customer Service in the U.S. call 1-800-356-1243,
in Canada call 1-800-268-3578.
For Application Assistance in the U.S. and Canada
call 1-800-426-9184.

E58 Harsh Duty Series 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 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

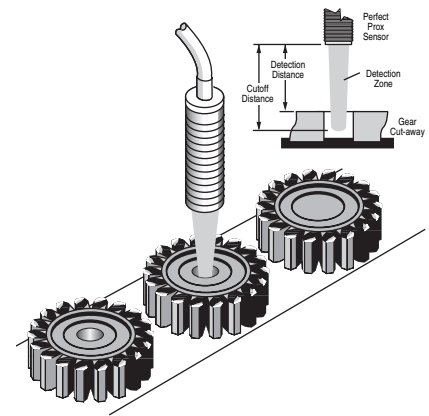
Sensing Modes

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, 2-, 3- and 4-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 inches (50 or 100 mm), and the 30 mm version has a range of 6 or 11 inches (150 or 280 mm).

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



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 feet, 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 feet 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.

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Model Selection — Thru-Beam and Reflex Sensors

	Operating Voltage	Sensing Range	Optimum Range	Field of View	Thru-Beam Component	Connection Type	Catalog Number		
							Light Operate	Dark Operate	
3-Wire and 4-Wire Sensors									
 <p>30 mm Diameter Thru-Beam</p> <p>Source</p> <p>Detector</p> <p>For a complete system, order One Source and One Detector</p>	20 – 132V AC 50/60 Hz or 15 – 30V DC	800 feet (250m)	0.1 to 300 feet (0.03 – 90m)	33 inches (830 mm) diameter at 25 feet (7.6m)	Source	2-meter Cable	E58-30TS250-GA		
						4-pin Micro AC Connector	E58-30TS250-GAP ⊕		
	10 – 30V DC	800 feet (250m)	0.1 to 300 feet (0.03 – 90m)	33 inches (830 mm) diameter at 25 feet (7.6m)	Source	2-meter Cable	E58-30TS250-HA		
						4-pin Micro DC Connector	E58-30TS250-HAP ⊕		
	—	—	—	—	—	Detector	2-meter Cable	E58-30TD250-GL	E58-30TD250-GD
							4-pin Micro AC Connector	E58-30TD250-GLP ⊕	E58-30TD250-GDP ⊕
 <p>30 mm Diameter Reflex</p> <p>Sensor</p> <p>Retroreflector (Not Included)</p> <p>For a complete system, order Sensor and Retroreflector (See Section 8)</p>	20 – 132V AC 50/60 Hz or 15 – 30V DC	59 feet (18m)	1 to 40 feet (0.03 – 12m)	6 inches (150 mm) diameter at 20 feet (6m)	—	2-meter Cable	E58-30RS18-GL	E58-30RS18-GD	
						4-pin Micro AC Connector	E58-30RS18-GLP ⊕	E58-30RS18-GDP ⊕	
	10 – 30V DC	59 feet (18m)	1 to 40 feet (0.03 – 12m)	6 inches (150 mm) diameter at 20 feet (6m)	—	Detector	2-meter Cable	E58-30RS18-HL	E58-30RS18-HD
							4-pin Micro DC Connector	E58-30RS18-HLP ⊕	E58-30RS18-HDP ⊕
 <p>30 mm Diameter Polarized Reflex</p> <p>Sensor</p> <p>Retroreflector (Not Included)</p> <p>For a complete system, order Sensor and Retroreflector (See Section 8)</p>	20 – 132V AC 50/60 Hz or 15 – 30V DC	34 feet (10m)	1 to 20 feet (0.03 – 6m)	6 inches (150 mm) diameter at 20 feet (6m)	—	2-meter Cable	E58-30RP10-GL	E58-30RP10-GD	
						4-pin Micro AC Connector	E58-30RP10-GLP ⊕	E58-30RP10-GDP ⊕	
	10 – 30V DC	34 feet (10m)	1 to 20 feet (0.03 – 6m)	6 inches (150 mm) diameter at 20 feet (6m)	—	Detector	2-meter Cable	E58-30RP10-HL	E58-30RP10-HD
							4-pin Micro DC Connector	E58-30RP10-HLP ⊕	E58-30RP10-HDP ⊕

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

⊕ See listing of compatible connector cables on Page 6-61.

Sensor Options for Thru-Beam and Reflex

(Built-to-order, contact Eaton's Cutler Hammer Sensor Applications Department at 1-800-426-9184 for delivery lead times)

Thru-Beam Apertured Versions

Reduces effective sensing beam to 0.2 x 0.9 inches (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 feet (70m). To order, substitute "070" in place of "250" in source or detector Catalog Number (Example: E58-30TS070-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).

Excess Gain

Thru Beam

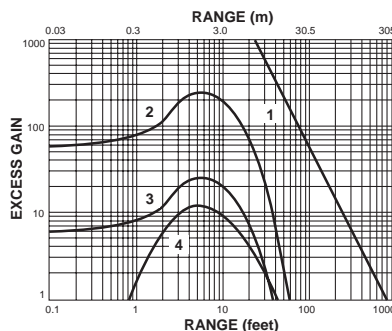
1. Thru-Beam

Reflex

2. Performance to 3-inch Retroreflector

Polarized Reflex

3. Performance to 3-inch Retroreflector
4. Performance to Corner-Cube Retroreflective tape



Model Selection — Perfect Prox® Background Rejection Sensors

	Operating Voltage	Nominal Range ①	Optimum Range	Cutoff Range ②	Field of View	Connection Type	Catalog Number		
							Light Operate	Dark Operate	
2-Wire Sensors									
 18 mm Diameter Perfect Prox®	90 – 132V AC 50/60 Hz or 18 – 50V DC	2 inches (50 mm)	0.4 to 1.8 inches (10 to 45 mm)	2.25 inches (57 mm) and beyond	0.25 inch (6 mm) diameter at 2 inches (50 mm)	2-meter 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 inches (100 mm)	0.5 to 3 inches (13 to 76 mm)	5 inches (127 mm) and beyond	0.38 inch (10 mm) diameter at 4 inches (100 mm)	2-meter 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 – 50V DC	2 inches (50 mm)	0.4 to 1.8 inches (10 to 45 mm)	2.25 inches (57 mm) and beyond	0.25 inch (6 mm) diameter at 2 inches (50 mm)	4-pin Micro DC Connector	E58-18DP50-DLP Ⓢ	E58-18DP50-DDP Ⓢ		
					4 inches (100 mm)	0.5 to 3 inches (13 to 76 mm)	5 inches (127 mm) and beyond	0.38 inch (10 mm) diameter at 4 inches (100 mm)	4-pin Micro DC Connector
 30 mm Diameter Perfect Prox®	90 – 132V AC 50/60 Hz or 18 – 50V DC	6 inches (150 mm)	1 to 6 inches (26 to 150 mm)	6.5 inches (165 mm) and beyond	0.75 inch (19 mm) diameter at 6 inches (150 mm)	2-meter 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 inches (280 mm)	1 to 9 inches (26 to 228 mm)	12.5 inches (318 mm)	1.0 inch (26 mm) diameter at 11 inches (280 mm)	2-meter 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 – 50V DC	6 inches (150 mm)	1 to 6 inches (26 to 150 mm)	6.5 inches (165 mm) and beyond	0.75 inch (19 mm) diameter at 6 inches (150 mm)	4-pin Micro DC Connector	E58-30DP150-DLP Ⓢ	E58-30DP150-DDP Ⓢ		
3-Wire and 4-Wire Sensors									
 18 mm Diameter Perfect Prox®	10 – 30V DC	2 inches (50 mm)	0.4 to 1.8 inches (10 to 45 mm)	2.25 inches (57 mm) and beyond	0.25 inch (6 mm) diameter at 2 inches (50 mm)	2-meter Cable	E58-18DP50-HL	E58-18DP50-HD	
						4-pin Micro DC Connector	E58-18DP50-HLP Ⓢ	E58-18DP50-HDP Ⓢ	
		4 inches (100 mm)	0.5 to 3 inches (13 to 76 mm)	5 inches (127 mm) and beyond	0.38 inch (10 mm) diameter at 4 inches (100 mm)	2-meter Cable	E58-18DP100-HL	E58-18DP100-HD	
						4-pin Micro DC Connector	E58-18DP100-HLP Ⓢ	E58-18DP100-HDP Ⓢ	
 30 mm Diameter Perfect Prox®	20 – 132V AC 50/60 Hz or 15 – 30V DC	6 inches (150 mm)	1 to 6 inches (26 to 150 mm)	6.5 inches (165 mm) and beyond	0.75 inch (19 mm) diameter at 6 inches (150 mm)	2-meter Cable	E58-30DP150-GL	E58-30DP150-GD	
						4-pin Micro AC Connector	E58-30DP150-GLP Ⓢ	E58-30DP150-GDP Ⓢ	
						11 inches (280 mm)	1 to 9 inches (26 to 228 mm)	12.5 inches (318 mm)	1.0 inch (26 mm) diameter at 11 inches (280 mm)
		10 – 30V DC	6 inches (150 mm)	1 to 6 inches (26 to 150 mm)	6.5 inches (165 mm) and beyond	0.75 inch (19 mm) diameter at 6 inches (150 mm)	4-pin Micro AC Connector	E58-30DPS280-GLP Ⓢ	E58-30DPS280-GDP Ⓢ
							2-meter Cable	E58-30DP150-HL	E58-30DP150-HD
							4-pin Micro DC Connector	E58-30DP150-HLP Ⓢ	E58-30DP150-HDP Ⓢ
11 inches (280 mm)	1 to 9 inches (26 to 228 mm)	12.5 inches (318 mm)	1.0 inch (26 mm) diameter at 11 inches (280 mm)	2-meter Cable	E58-30DPS280-HL	E58-30DPS280-HD			
				4-pin Micro DC Connector	E58-30DPS280-HLP Ⓢ	E58-30DPS280-HDP Ⓢ			

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

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

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

Ⓢ See listing of compatible connector cables on **Page 6-61**.