SM Series
Photoelectric Sensors

Contents

The Cutler-Hammer® SM Series from Eaton's electrical business provides high performance and ease of use in an economical, compact package.

Lock In on Great Performance with TargetLock™
A sensor can have the greatest performance in the world, but if it is slightly misaligned or the target is positioned at the wrong range, you will have reliability problems sooner or later. TargetLock™ not only simplifies sensor setup but visually confirms your sensor is positioned to operate with the highest possible reliability. In addition, TargetLock™ provides diagnostic information during use to inform you of impending problems before they result in equipment downtime.
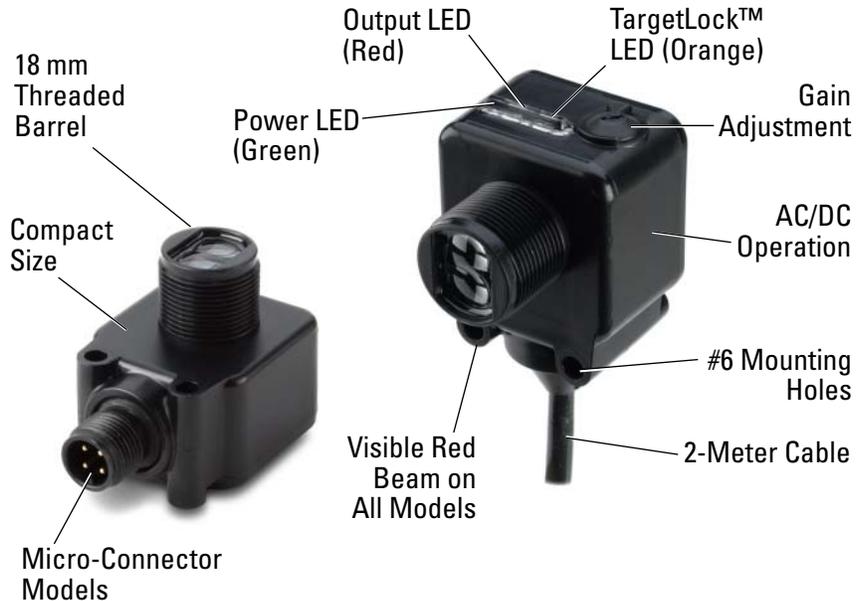
No Sensor Is Easier to Use
The SM Series includes many other features that simplify use. Visible sensing beams on all models show you exactly where the sensors are pointing. The durable housing features multiple mounting options to easily fit on your equipment in the tightest of spaces. Full protection from overvoltage, reverse polarity and short circuits reduces the chance of damage. Bright 360° LED indicators clearly show sensor status.

Approvals

■ UL Listed

■ C-UL Listed

CE

SM Series™ with TargetLock™
The *Easiest* Photoelectric Sensor to Set Up and Use

18 mm Threaded Barrel

Compact Size

Micro-Connector Models

Output LED (Red)

Power LED (Green)

TargetLock™ LED (Orange)

Gain Adjustment

AC/DC Operation

Visible Red Beam on All Models

#6 Mounting Holes

2-Meter Cable

Product Features

■ Highly visible LED indicators for power, output and TargetLock™

■ TargetLock™ simplifies setup and ensures the sensor operates at the highest level of reliability possible

■ Perfect Prox® models sense different colored targets at the same range and ignore objects in the background

■ AC/DC models operate on either 18 – 264V AC or 18 – 50V DC

■ DC-only models feature both NPN and PNP outputs

■ Visible beam on all models let you see exactly where the sensor is pointing

■ Compact size to fit in tight spaces

■ Multiple mounting options including industry standard 18 mm threads

■ Reverse polarity, overload and short circuit protection

■ Full family includes thru-beam, polarized reflex, diffuse reflective and Perfect Prox® background rejection

Typical Applications

■ Packaging Machines

■ Conveyors and Other Material Handling Equipment

■ Food Processing Equipment

■ Assembly Machines

■ Pharmaceutical Machines

Unparalleled Optical Performance — Perfect Prox®

Exceptional background rejection sets Perfect Prox® apart from all other sensors. Just point the sensor's visible beam at the target and get reliable detection regardless of color, reflectance, contrast or surface shape, while ignoring background objects just a fraction of an inch away.

Fast and Easy Setup

The SM Series features an advanced 3-LED indicator display to provide valuable information at a glance. The bright display is clearly visible from 360°. In addition to LEDs for power and output status indication, the SM features a third LED that is part of the TargetLock™ system.

TargetLock™ is a microprocessor-controlled system that enables you to quickly and easily align the sensor and ensure it is operating most reliably.

- **Alignment:** The TargetLock™ LED provides a quick and easy way to set up the sensor for optimum operation. On initial setup, when you have achieved the minimum signal required for the sensor to operate, the TargetLock™ LED will blink in a short flash pattern. As you improve the setup and approach the best alignment and range, the LED changes from short flash to long flash to a solid ON condition. This means that even after you reach a point where the sensor will operate in the application, you are able to further fine tune the setup for highest reliability.

- **Maintenance:** Another valuable feature of the TargetLock™ LED is to indicate the need for maintenance prior to loss of sensor operation. Observing a change from the normal operation of the LED (for example, from solid ON to a long flash) indicates the gain has been reduced. Possible causes include bumping or vibrating out of alignment or contamination buildup on the lens. With the TargetLock™ LED, you are made aware of this condition before the sensor stops working, allowing you ample time to address the problem before your machine goes down.

The following chart details the function of each of the SM Series LED indicators.

| LED	State	LED Condition	
		(Thru-Beam/ Reflex)	**(Diffuse/ Perfect Prox®)**
Power (Green)	ON	Power is applied to sensor	
	OFF	No power	
Output (Red)	ON	Output is ON	
	OFF	Output is OFF	
	Flashing	Output is short circuited or overloaded	
Target-Lock™ (Orange)	ON	Excellent alignment; sensor is operating within optimum range	Target present — excellent gain; sensor is operating within optimum range
	Long Flash	Good alignment ①	Target present — good gain
	Short Flash	Poor alignment ①	Target present — poor gain
	OFF	Target is present; If no target present: sensor is out of alignment or beyond range	No target, or sensor is beyond range

① A target that doesn't fully block the effective sensing beam or is translucent may cause a flashing indication and unreliable performance.

Gain Adjustment

Thru-beam and diffuse reflective sensors include an adjustment control for optimizing the amount of gain for the application. The 3/4-turn pot provides a 10:1 adjustment of gain. A mechanical stop eliminates the possibility of sensor damage. Adjustment of the control does not require any special tools.

Mounting

The SM sensor features two mounting holes in the rectangular section of the body for mounting to a surface with #6 or smaller hardware. The threaded barrel and jam nut allows mounting into any 0.75 inch (19 mm) hole or a selection of accessory mounting brackets available from Eaton and detailed in **Section 8**.
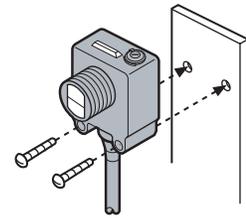
Mounting sensor using #6 hardware.
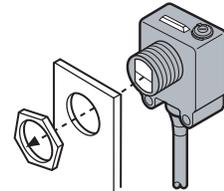
Mounting sensor using a jam nut.

Mounted SM sensor in 18 mm Ball Swivel Bracket, as seen in **Section 8**.

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Model Selection

	Operating Voltage	Sensing Range	Optimum Range	Cutoff Range	Field of View	Thru-Beam Component	Connection Type	Catalog Number	
								Light Operate	Dark Operate
3-Wire and 4-Wire Sensors									
Thru-Beam	10 – 30V DC	50 feet (15m)	0.1 to 25 feet (30 mm to 7.5m)	—	10 inch (254 mm) diameter at 10 feet (3m)	Source	2-meter Cable	E65-SMTS15-HA	
							4-pin Micro DC Connector	E65-SMTS15-HAD ⊕	
Source Detector						Detector	2-meter Cable	E65-SMTD15-HL	E65-SMTD15-HD
For a complete system, order one Source and one Detector							4-pin Micro DC Connector	E65-SMTD15-HLD ⊕	E65-SMTD15-HDD ⊕
Polarized Reflex	18 – 264V AC 50/60 Hz or 18 – 50V DC	10 feet (3m)	0.1 to 5 feet (30 mm to 1.5m)	—	1 inch (25 mm) diameter at 50 inches (1.3m)	—	2-meter Cable	E65-SMPR3-GL	E65-SMPR3-GD
							4-pin Micro AC Connector	E65-SMPR3-GLD ⊕	E65-SMPR3-GDD ⊕
	10 – 30V DC	10 feet (3m)	0.1 to 5 feet (30 mm to 1.5m)	—	1 inch (25 mm) diameter at 50 inches (1.3m)	—	2-meter Cable	E65-SMPR3-HL	E65-SMPR3-HD
Retroreflector (Not Included) Sensor							4-pin Micro DC Connector	E65-SMPR3-HLD ⊕	E65-SMPR3-HDD ⊕
For Complete System, Order Sensor and Retrore-flector (See **Section 8**)									
Diffuse Reflective	18 – 264V AC 50/60 Hz or 18 – 50V DC	8 inches (200 mm) ①	0.25 to 5 inches (6 mm to 127 mm)	—	2 inch (50 mm) diameter at 5 inches (127 mm)	—	2-meter Cable	E65-SMSD200-GL	E65-SMSD200-GD
							4-pin Micro AC Connector	E65-SMSD200-GLD ⊕	E65-SMSD200-GDD ⊕
	10 – 30V DC	8 inches (200 mm) ①	0.25 to 5 inches (6 mm to 127 mm)	—	2 inch (50 mm) diameter at 5 inches (127 mm)	—	2-meter Cable	E65-SMSD200-HL	E65-SMSD200-HD
							4-pin Micro DC Connector	E65-SMSD200-HLD ⊕	E65-SMSD200-HDD ⊕
Perfect Prox®	18 – 264V AC 50/60 Hz or 18 – 50V DC	2 inches (50 mm)	0.4 to 1.8 inches (10 mm to 45 mm)	2.3 inches (58 mm) and beyond ②	0.25 inch (6 mm) diameter at 2.25 inches (57 mm)	—	2-meter Cable	E65-SMPP050-GL	E65-SMPP050-GD
							4-pin Micro AC Connector	E65-SMPP050-GLD ⊕	E65-SMPP050-GDD ⊕
		4 inches (100 mm)	0.5 to 3 inches (13 mm to 76 mm)	5 inches (127 mm) and beyond ②	0.35 inch (9 mm) diameter at 5 inches (127 mm)	—	2-meter Cable	E65-SMPP100-GL	E65-SMPP100-GD
							4-pin Micro AC Connector	E65-SMPP100-GLD ⊕	E65-SMPP100-GDD ⊕
	10 – 30V DC	2 inches (50 mm)	0.4 to 1.8 inches (10 mm to 45 mm)	2.3 inches (58 mm) and beyond ②	0.25 inch (6 mm) diameter at 2.25 inches (57 mm)	—	2-meter Cable	E65-SMPP050-HL	E65-SMPP050-HD
							4-pin Micro DC Connector	E65-SMPP050-HLD ⊕	E65-SMPP050-HDD ⊕
		4 inches (100 mm)	0.5 to 3 inches (13 mm to 76 mm)	5 inches (127 mm) and beyond ②	0.35 inch (9 mm) diameter at 5 inches (127 mm)	—	2-meter Cable	E65-SMPP100-HL	E65-SMPP100-HD
							4-pin Micro DC Connector	E65-SMPP100-HLD ⊕	E65-SMPP100-HDD ⊕

① Nominal range — sensor will detect a 90% reflectance white card at this range.
② Sensor will ignore a 90% reflectance white card at this range.
▭ Fast turn product with typical one day lead-time to shipment.
⊕ See listing of compatible connector cables on **Page 6-25**.

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