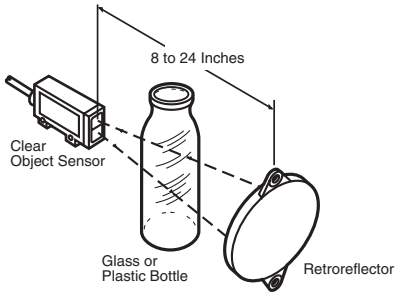
E65 Miniature Series Photoelectric Sensors

Contents

Overview 5-97
Model Selection, Sensors 5-98
Model Selection, Accessories . . . 5-99
Wiring Diagrams 5-99
Specifications 5-99
Dimensions 5-100

The Cutler-Hammer® E65 Miniature Series by Eaton's electrical business delivers high performance in a compact package. E65 Series sensors operate on 10 to 30V DC and can be easily configured for PNP or NPN output and light or dark operation. All models are available in both forward and right-angle viewing styles with the same optical specifications. Fiber optic models include a built-in DIN rail mounting clip. This versatile line includes specialty sensors for detecting clear objects.



Clear Object Sensor

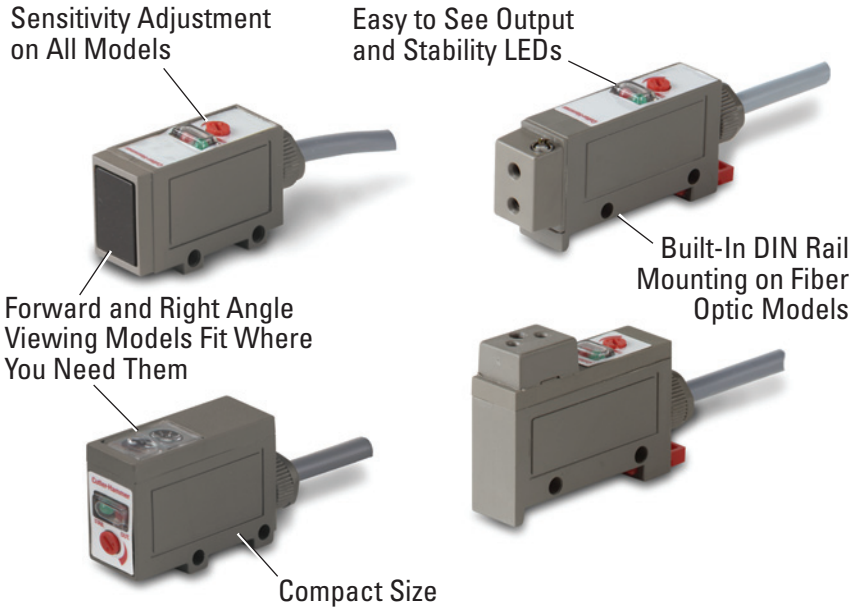
Approvals

- UL recognized

CE

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

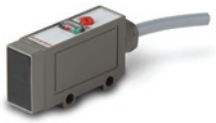
Compact Sensors for a Wide Variety of Applications Including Reliable Detection of Clear Objects



Product Features

- 10 – 30V DC operation
- Output and stability indicators
- NPN or PNP selectable by wiring
- Light or dark operation selectable by wiring
- Sensitivity adjustment for fine tuning the sensor in your application
- All sensors include an adjustable mounting bracket for easy installation and alignment
- All sensors built with 2 meter cable for ease of use
- **Fixed focus diffuse sensor** with an ultra-fast response time of 330 microseconds
- **Thru-beam sensors** with test outputs to verify proper operation of the source or detector from a remote location
- **Polarized reflex sensors** with a polarizing filter to ensure that 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 falsely trigger a non-polarized sensor
- **Clear object sensors** that reliably detect plastic bottles, molds, cartons and films with densities as thin as 1/1000 of an inch and certain densities of glass objects. A sensitivity adjustment allows you to fine tune the sensor for detecting a wide variety of colors and thicknesses of clear materials. These sensors operate in reflex mode with a maximum range of 24 inches (0.6m)

Model Selection — Sensors

	Type	Sensing Range	Sensing Beam	Response Time	Switching Frequency	Connection Type	Catalog Number	
							Forward Viewing	Right-Angle Viewing
①  Source / Detector	Thru-Beam Source	16.5 feet (5m)	Infrared	—	—	2-meter Cable	**E65CBL4**	**E65VBL4**
	Thru-Beam Detector	16.5 feet (5m)	—	2 mS	250 Hz max.		**E65CBL3**	**E65VBL3**
②  Sensor / Retroreflector (Included)	Polarized Reflex	4 – 70 inches (0.1 – 1.8m) ②	Visible Red	1 mS	500 Hz max.		**E65CBL5**	**E65VBL5**
	Clear Object Sensors ②	8 – 24 inches (0.2 – 0.6m) ②	Infrared	1 mS	500 Hz max.		—	**E65VBL1C**
	Diffuse Reflective Short Range	4 inches (100 mm) ③	Infrared	1 mS	500 Hz max.		**E65CBL2**	**E65VBL2**
	Diffuse Reflective Long Range	20 inches (500 mm) ③	Infrared	1 mS	500 Hz max.		**E65CBL2N**	**E65VBL2N**
	Diffuse Reflective Fixed Focus	0.5 inch (12 mm) ③	Visible Red	1 mS	500 Hz max.		**E65CBL6**	**E65VBL6**
 (Requires plastic fiber optic cables, see **Section 9**)	Fiber Optic	In thru-beam mode: 4.3 inches (11 cm) In diffuse reflective mode: 1.3 inches (3.3 cm) ④	Visible Red	1 mS	500 Hz max.		**E65CBL7R**	—

① For a complete system order one source (forward or right-angle viewing) and one detector (forward or right-angle viewing). Sensors include slit masks. Thru-beam sensor performance with slit masks.

Size	On Source Only	On Source and Detector
2 mm x 6 mm	**5 feet (1.5m)**	**2.5 feet (0.75m)**
1 mm x 6 mm	**3.5 feet (1.1m)**	**1.7 feet (0.52m)**
0.5 mm x 6 mm	**2.5 feet (0.75m)**	**1.2 feet (0.36m)**

② Ranges are measured to 2-inch retroreflector — included with sensor.
③ Diffuse reflective ranges measured to a 90% reflectance white card.
④ Ranges using 1 mm diameter straight fibers (pre-assembled cables or equivalent length of bulk fiber).
Stocked product, typical order quantities guaranteed in stock.

Excess Gain

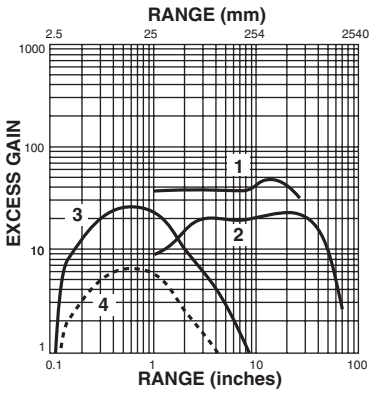
Clear Object Sensor
1. CBL1C and VBL1C — Typical

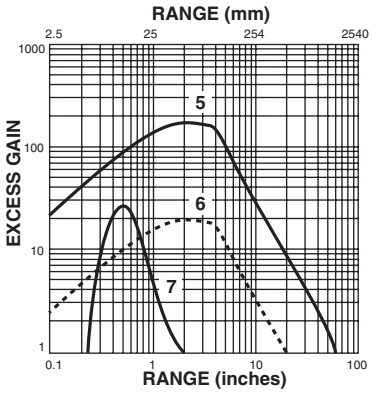
Polarized Reflex
2. CBL5 and VBL5 — Typical

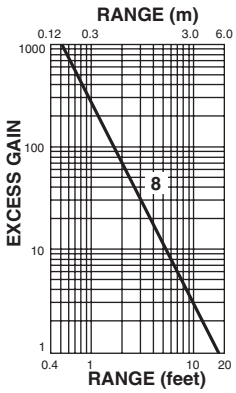
Diffuse Reflective
3. CBL2 and VBL2 — Typical
4. CBL2 and VBL2 — Minimum

Diffuse Reflective
5. CBL2N and VBL2N — Typical
6. CBL2N and VBL2N — Minimum
7. CBL6, VBL6 and VBL4/VBL3 — Typical

Thru-Beam
8. E65CBL4/CBL3 and VBL4/VBL3 — Typical





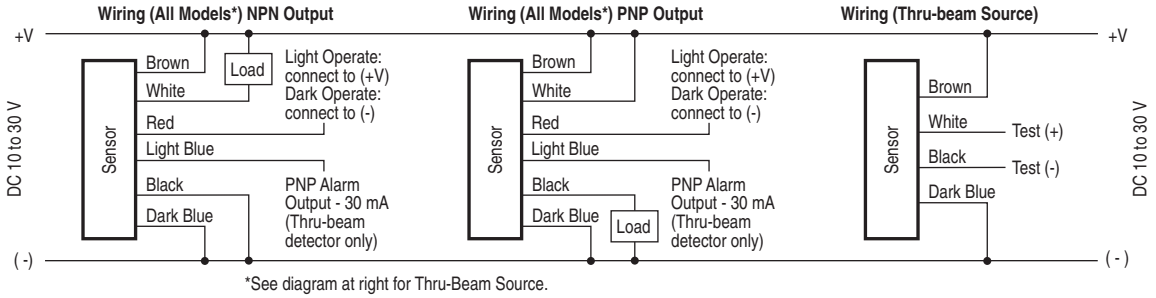


Model Selection — Accessories

	Description	Catalog Number
	2 inch retroreflector Supplied with polarized reflex and clear object sensors Additional retroreflectors, see **Section 8** ①	**E65KR55**

① For Polarized Reflex Sensors only. Use Catalog Number **E65KR55** for clear object sensors.

Wiring Diagrams



*See diagram at right for Thru-Beam Source.

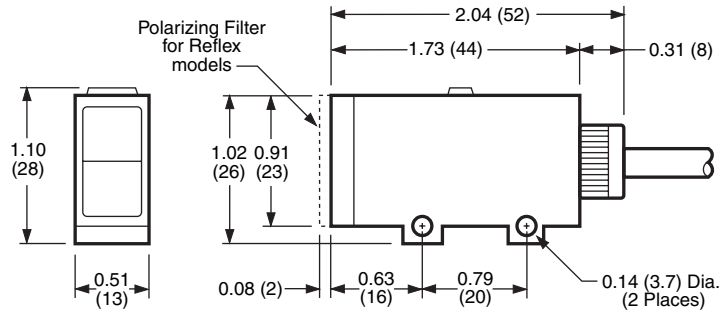
Specifications

Description	Specification
Input Voltage	10 to 30V DC
Current Consumption	30 mA maximum Fast response fixed focus diffuse reflective model: 45 mA maximum
Ripple Voltage	2 Vpp maximum
Saturation Voltage	1.5V maximum (NPN or PNP output)
Output Type	NPN or PNP by wiring
Current Switching	100 mA maximum
Protection	Short circuit and transient
Light/Dark Operation	Selectable by wiring
Operating Temperature	+5° to +131°F (-15° to +55°C)
Storage Temperature	-4° to +158°F (-20° to +70°C)
Output Indicator	Red LED lights when output is "ON"
Stability Indicator	Green LED lights to indicate a reliable sensing condition
Material of Construction	Housing: ABS plastic; Lens: PMMA methacrylate
Cable	6.6 feet (2 meters)
Vibration	10 to 55 Hz, amplitude 0.06 inch (1.5 mm) p-p, 2 hours each in axes X, Y, Z
Enclosure Ratings	NEMA 1, 3, 4, 12, and 13, IP66 ②
Approvals	UL recognized

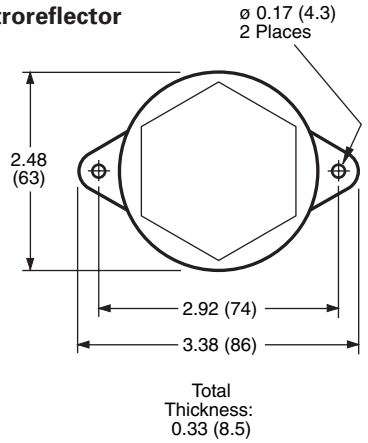
② NOTE: Our products conform to NEMA tests as indicated, however, some severe washdown applications can exceed these NEMA test specifications. If you have questions about a specific application, contact Eaton's Cutler-Hammer Sensor Applications Department at 1-800-426-9184.

Approximate Dimensions in Inches (mm)

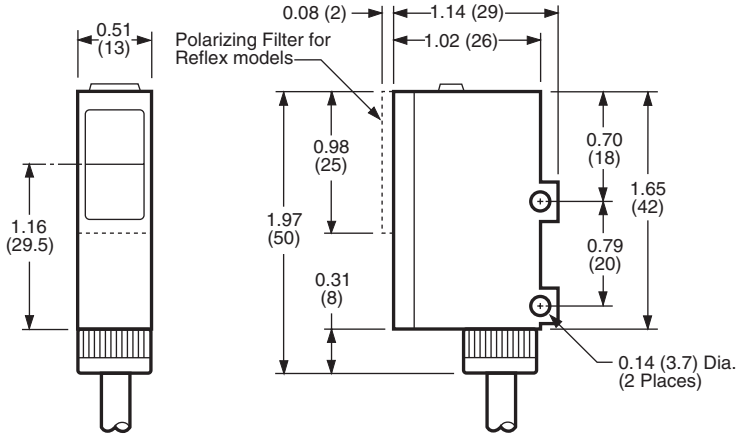
Forward Viewing Models (Except Fiber Optic)



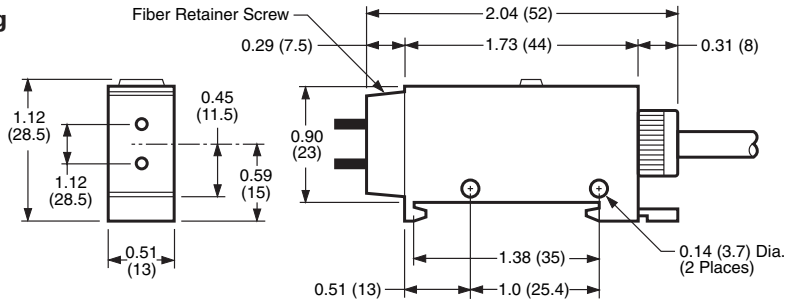
E65KR55 Retroreflector



Right-Angle Viewing Models (Except Fiber Optic)



Forward Viewing Fiber Optic Models



Right-Angle Viewing Fiber Optic Models