Also available from SECO-LARM:

Twin Photobeam Sensors
- Up to 390ft (120m) range
- Laser-beam alignment
- Weatherproof
- Anti-frost system
- Adjustable response time

Quad Photobeam Detectors
- 4 Models available - up to 660ft (200m) range
- Laser-beam alignment
- 12-24 VAC/VDC

Curtain / Barrier Sensors
- 2, 4, 6, 8 or 10 Beams available
  (10 Beams - curtain sensor only)
- Barrier sensor - Up to 50ft (15m)
- Weatherproof
- Adjustable interruption time

Reflective Photobeam Sensor
- Available with 45ft (14m) or 35ft (11m) range
- Weatherproof
- Mounting hardware included
- Reflector included
- UL325 - 2016 compliant

Hooded Reflective Photobeam Sensor
- Available with 50ft (15m) or 33ft (10m) range
- Weatherproof
- Polarized version available
- Round reflector included

Flush-Mount Photobeam Sensors
- Available with reflective beam and 16ft (5m) range or through-beam and 33ft (10m) range
- Adjustable alignment angle
- Mounts to a single-gang box

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Features:
- Four selectable beam frequencies (For E-964-D390GQ model only).
- Twin beams provide reliable perimeter security, minimizing false alarms from falling leaves, birds, etc.
- Lensed optics reinforce beam strength and provide excellent immunity to false alarms due to rain, snow, mist, etc.
- Weatherproof, sunlight-filtering case for indoor and outdoor use.
- Non-polarized power inputs.

Beam Frequency Selection Chart (E-964-D390GQ Model Only)

Multiple Sensors Sample Applications

Adjusting the Alignment

Testing the Unit

Specifications

Dimensions

Troubleshooting

Table 6: Troubleshooting

Possible Problem
Incorrectly wired and/or insufficient voltage
a. Insufficient voltage
b. Beam reflected away from receiver
c. Beams not simultaneously interrupted.

Receiver LED never lights up when the beam is interrupted.
a. Insufficient voltage
b. Beams not simultaneously interrupted.

Beams interrupted and LED lights, but no trigger output.
Trigger cable may be cut, or the relay contact stuck due to overloading.

Trigger LED continuously lit.
a. Lenses out of alignment.
b. Beams are blocked.
c. Cover is foggy or dirty.

Trigger becomes erratic in bad weather.
Lenses out of alignment.

Frequent false triggers from leaves, birds, etc.
a. Too sensitive.
b. Bad location.

Transmitter LED does not light.
Ensure the power supply to the transmitter is 12 to 30V DC/AC, 60Hz.

a. Double-check the voltage.
b. Clean the cover.
c. Check overall installation.

Check the continuity of the wiring between the sensor and the alarm.

a. Realign the lenses.
b. Remove any obstacles.
c. Clean the cover.

Check overall system installation.
If still erratic, realign the lenses.

a. Reduce the response time.
b. Change the transmitter and/or location.
Testing the Unit

1. Power up the transmitter and receiver.
2. If the yellow or red LED remains steady ON even when the beam is not interrupted, re-adjust the alignment.
3. Walk between the transmitter and receiver to interrupt the beams. Walk at various speeds, and adjust the delay time adjustment knob as needed.

Table 5: Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>E-960-D90GQ</th>
<th>E-960-D190GQ</th>
<th>E-960-D290GQ</th>
<th>E-964-D390GQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. range (outdoor)</td>
<td>90’ (30m)</td>
<td>190’ (60m)</td>
<td>290’ (90m)</td>
<td>390’ (120m)</td>
</tr>
<tr>
<td>Max. range (indoor)</td>
<td>190’ (60m)</td>
<td>390’ (120m)</td>
<td>590’ (180m)</td>
<td>790’ (240m)</td>
</tr>
<tr>
<td>No. of beam channel</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>4</td>
</tr>
<tr>
<td>Current draw</td>
<td>50mA max. (laser alignment only)</td>
<td>150mA max. (active operation excluding laser alignment)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating voltage</td>
<td>12-30V DC/AC 60Hz, 200mA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Detection method</td>
<td>Simultaneous breaking of 2 beams</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interrupt speed</td>
<td>10msec</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trigger output</td>
<td>SPDT NO/NC/COM relay, 1A@30 VDC/VAC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tamper output (Tx &amp; Rx)</td>
<td>N.C. switch, 1A@30 VDC/VAC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensor LED (receiver)</td>
<td>Red LED - ON: When transmitter and receiver are not aligned or when beam is broken</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Signal LED (receiver)</td>
<td>Yellow LED - ON: When receiver’s signal is weak or when beam is broken</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power LED (Tx &amp; Rx)</td>
<td>Green LED ON: Indicates connected to power</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laser wavelength</td>
<td>650nm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laser output power</td>
<td>≤5mW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alignment angle</td>
<td>Horizontal: ± 90°, Vertical: ± 5°</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-13°F ~ +131°F (-25°C ~ +55°C)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>2.5-lb (1.1kg)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case</td>
<td>PC Resin</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Depending on the monitoring system used by the gate motor, it may be necessary to use either the N.C. output or connect the included 10kΩ resistor to the N.O. or N.C. output. Please refer to the gate operator manual or the gate operator manufacturer for the preferred monitoring method.

Choose a Location

To prevent erratic operation and/or false alarms:

- Wind will not directly cause false alarms, but could cause leaves or similar objects to fly or wave into the beams. Therefore, do not mount near trees, bushes, or other leafy vegetation.
- Do not mount where the transmitter or receiver could be splashed by water or mud.
- Do not mount where the unit could be suddenly exposed to a bright light, such as a floodlight or a passing automobile’s headlight.
- Do not let sunlight or any direct beam of light enter the sensing spot of the transmitter. If needed, mount so the receiver, not the transmitter, faces the sun.
- Do not mount where animals could break the beams.

![Fig. 1: Identifying the Sensors](image1)

* For multi-frequency E-964-D390GQ model only.

![Fig. 2: Vertical and Horizontal Adjustments](image2)

![Fig. 3: Typical Installations](image3)
Typical Installations

The photoelectric beam lens can be adjusted horizontally ±90°, and vertically ±5° (see fig. 2). This allows much flexibility in terms of how the transmitter and receiver can be mounted. See fig. 3.

Install at a distance of 32” to 39” (80 to 100 cm) above the ground for most situations. See fig. 3.

Running the Cable

Run a cable from the control unit to the photobeam sensor. If burying the cable is required, make sure to use electrical conduit. Shielded cable is strongly suggested. See Table 1 for maximum cable length.

Table 1: Cable Length

<table>
<thead>
<tr>
<th>Model</th>
<th>Wire Size</th>
<th>12V</th>
<th>24V</th>
</tr>
</thead>
<tbody>
<tr>
<td>AWG22 0.33mm²</td>
<td>320m</td>
<td>1.050 ft.</td>
<td>2.800m</td>
</tr>
<tr>
<td></td>
<td>1,050 ft.</td>
<td>18,000 ft.</td>
<td>4,800m</td>
</tr>
<tr>
<td>AWG20 0.52mm²</td>
<td>550m</td>
<td>1.800 ft.</td>
<td>4,500m</td>
</tr>
<tr>
<td></td>
<td>1,800 ft.</td>
<td>15,750 ft.</td>
<td>4,500m</td>
</tr>
<tr>
<td>AWG18 0.83mm²</td>
<td>800m</td>
<td>2.600 ft.</td>
<td>6,200m</td>
</tr>
<tr>
<td></td>
<td>2,600 ft.</td>
<td>23,620 ft.</td>
<td>6,200m</td>
</tr>
<tr>
<td>AWG16 1.03mm²</td>
<td>980m</td>
<td>3.190 ft.</td>
<td>7,600m</td>
</tr>
<tr>
<td></td>
<td>3,190 ft.</td>
<td>28,870 ft.</td>
<td>7,600m</td>
</tr>
</tbody>
</table>

Note (1): Max. cable length when two or more sets are connected is the value shown in Table 1 divided by the number of sets.

Note (2): The power line can be wired to a distance of up to 3,300 ft. (1,000m) with AWG22 (0.33mm²) telephone wire.

Wiring the Transmitter — Wall Mount

1. Remove the cover. Remove the screw under the lens unit in order to detach the mounting plate. See fig. 4.

2. If the sensor wiring comes from inside the wall — Break a hole in the mounting plate’s rubber grommet, and pull the cable through the grommet’s hole. Then run the cable through the hole near the top of the sensor unit so it comes out the front. Using two of the included mounting screws, attach the mounting plate to the wall. Then reattach the sensor unit to the mounting plate, connect the wires, and snap on the cover. See fig. 5.

3. If the sensor wiring is run along the surface of the wall — There are two plastic knockouts on the back of the sensor unit, one on top and one on bottom. Break out the appropriate knockout, and pull the wiring through the knockout. Then run the wiring through the hole near the top of the sensor unit so it comes out the front. Using two of the included mounting screws, attach the mounting plate to the wall. Then reattach the sensor unit to the mounting plate, connect the wires, and snap on the cover. See fig. 6.

Adjusting the Alignment

The transmitter and receiver sensor units can be adjusted ±5° vertically and ±90° horizontally once the unit is mounted and power is connected (see fig. 2 on page 3).

There are two ways to adjust alignment:

1. Laser adjustment (see fig. 1 on page 3):
   a. Remove the transmitter cover, then turn the laser on with the ON/OFF switch (see fig. 1 on page 3). A red dot will show where the photoelectric beams are aimed.
   b. Adjust the transmitter’s sensor unit vertically and horizontally until the red dot is centered on the receiver and both the receiver’s LEDs turn off. See Table 3. It may be necessary to adjust the horizontal and vertical angles of the receiver’s sensor unit as well.
   c. Repeat steps a and b for the receiver.
   d. Turn the lasers off, and then replace the covers.

   WARNING: Do not look directly at the lasers.

2. Eyeball adjustment (see fig. 10):
   a. Remove the transmitter cover, then look into one of the alignment viewfinders (one of the four holes located between the two lenses) at a 45° angle.
   b. Adjust the horizontal angle of the lens vertically and horizontally until the receiver is clearly seen in the viewfinder.
   c. Repeat steps a and b for the receiver.
   d. Replace the transmitter and receiver covers.

   NOTE - If you cannot see the opposite unit in the viewfinder, put a sheet of white paper near the unit to be seen, move your eyes about 2’ (5cm) away from the viewfinder, and try again.

Fine Tuning the Receiver

1. Once the sensor is mounted and aligned, the sensor can be fine tuned using the voltage output jack.
   a. Set the range of a volt-ohm meter (VOM) to 1~5VDC.
   b. Insert the red (+) probe into the (+) terminal and the black (-) probe into the (-) terminal.
   c. Measure the voltage (see table 4).
   d. Adjust the horizontal angle by hand until the VOM indicates the highest voltage.
   e. Adjust the vertical angle by turning the vertical adjustment screw until the VOM indicates the highest voltage.

   NOTE: Do not interrupt the beam while adjusting alignment.
3. Two layer (double stacked) applications.

4. Perimeter security application.

5. Two layer (double stacked) perimeter security application.

Wiring the Transmitter — Pole Mount

(NOTE — Pole mounting bracket required.)

1. Remove the cover. Remove the screw under the lens unit in order to detach the mounting plate. See fig. 4.

2. Break a hole in the mounting plate’s rubber grommet, and pull the cable through the grommet’s hole. Then run the cable through the hole near the top of the sensor unit so it comes out the front. Use the included mounting bracket to mount to the pole. Then reattach the sensor unit to the mounting plate, connect the wires, and snap on the cover. See fig. 7.

Wiring (fig. 8)

1. Screw the wires tightly to avoid slipping off the terminals, but not so tight that they break.

2. Screws on terminals which are not used should be tightened.

3. Grounding may be necessary, depending on the location.

Fig. 4: Remove the Transmitter cover

Fig. 5: Wall Mount, Wire from Inside Wall

Fig. 6: Wall Mount, Wire Runs Along Wall

Fig. 7: Pole Mount

Fig. 8: Wiring

Transmitter

- Trigger output
  - 30V (AC/DC) 1A
  - (Triggers if cover detached)

- Power
  - 12-30V DC/AC (60Hz), 100mA

Receiver

- Trigger output
  - N.C. switch 30V (AC/DC) 1A
  - (Triggers if cover detached)

- Power
  - 12-30V DC/AC (60Hz), 100mA
Fig. 9: Examples of Possible Ways To Connect One or More Sensors

Example connection 1 - Standard

Example connection 2 - Dual Sensors, Separate Channels

Example connection 3 - In-line Single Channel

Example connection 4 - Two stacked

Selectable 4-channel beam frequency (For E-964-D390GQ model only)
The sensor beam frequency can be set at different levels on-site to avoid interference from other twin photobeam sensors nearby. Useful during multiple sensor applications as shown below. To select between four different beam frequencies, adjust the beam channel switch of the transmitter side and receiver side. See fig. 1 for switch location and table 2 for switch position.

Important — The transmitter and receiver sensor pair must be set with the same frequency.

<table>
<thead>
<tr>
<th>Frequency channel</th>
<th>CH1</th>
<th>CH2</th>
<th>CH3</th>
<th>CH4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch position</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
</tbody>
</table>

Table 2: Beam Frequency Selection Chart (For E-964-D390GQ model only)

Multiple sensor sample applications (For E-964-D390GQ model only)

1. Single pair multiple layer application.

2. Long distance series application.