S30 Barrel-Mount Sensors

- Features EZ-BEAM® technology, with specially designed optics and electronics for reliable sensing without adjustments
- Available in 30 mm plastic threaded barrel sensor in opposed, retroreflective and fixed-field modes
- Completely epoxy-encapsulated to provide superior durability, even in harsh environments
- Uses innovative dual-indicator system to take the guesswork out of monitoring sensor performance
- Available in models for ac or dc power
- Includes advanced diagnostics to warn of marginal sensing conditions or output overload (dc models)

S30 DC Sensors

Opposed, Polarized Retroreflective and Fixed-field Models
Suffix E, R, LP and FF

S30, 10-30V dc

<table>
<thead>
<tr>
<th>Sensing Mode/LED</th>
<th>Range</th>
<th>Connection</th>
<th>Models NPN</th>
<th>Models PNP</th>
<th>Excess Gain</th>
<th>Beam Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPPOSED</td>
<td>60 m</td>
<td>2 m</td>
<td>S306E Emitter</td>
<td>S306EQ Emitter</td>
<td>EGC-1</td>
<td>BP-1 (p. 165)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4-Pin Euro QD</td>
<td>S30SN6R</td>
<td>S30SP6R</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4-Pin Euro QD</td>
<td>S30SN6RQ</td>
<td>S30SP6RQ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>6 m¹</td>
<td>2 m</td>
<td>S30SN6LP</td>
<td>S30SP6LP</td>
<td>EGC-2 (p. 165)</td>
<td>BP-2 (p. 165)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4-Pin Euro QD</td>
<td>S30SN6LPQ</td>
<td>S30SP6LPQ</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Connection options: A model with a QD requires a mating cordset (see page 164).
For 9 m cable, add suffix W/30 to the 2 m model number (example: S30SP6LP W/30).

¹ Retroreflective range is specified using one model BRT-3 retroreflector. Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.
## S30 DC Specifications

<table>
<thead>
<tr>
<th>Sensing Mode/LED</th>
<th>Range</th>
<th>Connection</th>
<th>Models NPN</th>
<th>Models PNP</th>
<th>Excess Gain</th>
<th>Beam Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 - 200 mm Cutoff</td>
<td>2 m</td>
<td>S30SN6FF200</td>
<td>S30SP6FF200</td>
<td>EGC-3 (p. 165)</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4-Pin Euro QD</td>
<td>S30SN6FF200Q</td>
<td>S30SP6FF200Q</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 - 400 mm Cutoff</td>
<td>2 m</td>
<td>S30SN6FF400</td>
<td>S30SP6FF400</td>
<td>EGC-4 (p. 165)</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4-Pin Euro QD</td>
<td>S30SN6FF400Q</td>
<td>S30SP6FF400Q</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0 - 600 mm Cutoff</td>
<td>2 m</td>
<td>S30SN6FF600</td>
<td>S30SP6FF600</td>
<td>EGC-5 (p. 165)</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4-Pin Euro QD</td>
<td>S30SN6FF600Q</td>
<td>S30SP6FF600Q</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### S30, 10-30V dc (cont’d)

**Supply Voltage and Current**
- 10 to 30V dc (10% max. ripple); Supply current (exclusive of load current):
  - Opposed Emitters: 25 mA
  - Opposed Receivers: 20 mA
  - Polarized Retroreflective: 30 mA
  - Fixed-field: 35 mA

**Supply Protection Circuitry**
- Protected against reverse polarity and transient voltages

**Output Configuration**
- Solid-state complementary; choose NPN (current sinking) or PNP (current sourcing) models.
- The Dark Operate (DO) output may be wired as a normally open marginal signal alarm output, depending upon hookup to the power supply.

**Output Rating**
- 150 mA max. (each) in standard hookup; When wired for alarm output, the total load may not exceed 150 mA
  - OFF-state leakage current: less than 1 µA at 30V dc
  - ON-state saturation voltage: less than 1V at 10 mA dc; less than 1.5V at 150 mA dc

**Output Protection Circuitry**
- Protected against false pulse on power-up and continuous overload or short circuit of outputs

**Output Response Time**
- Opposed: 3 milliseconds ON; 1.5 milliseconds OFF
  - Polarized Retroreflective and Fixed-field: 3 milliseconds ON/OFF

**Delay at Power-up**
- 100 milliseconds; outputs are non-conducting during this time

**Repeatability**
- Opposed: 375 microseconds
  - Polarized Retroreflective and Fixed-field: 750 microseconds
  - Repeatability and response are independent of signal strength.

**Indicators**
- Two LEDs:
  - Green: Power ON
  - Yellow: Light Operate (LO) energized
  - See data sheet for detailed information

**Construction**
- Housings are thermoplastic polyester. Lenses are polycarbonate or acrylic; two jam nuts included.

**Environmental Rating**

**Connections**
- 2 m or 9 m attached cable, or 4-pin Euro-style quick-disconnect fitting. QD cordsets are ordered separately. See page 164.

**Operating Conditions**
- Temperature: -40° to +70° C
  - Relative humidity: 90% at 50° C (non-condensing)

**Vibration and Mechanical Shock**
- All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz, max., double amplitude 0.06-inch acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation)

**Certifications**
- CE, UL, cUL, CSA, ETL

**Hookup Diagrams**
- Emitters: DC02 (p. 744)  
  - NPN Models: DC05 (p. 745)
  - PNP Models: DC06 (p. 745)

*Connection options: A model with a QD requires a mating cordset (see page 164).*

*For 9 m cable, add suffix W/30 to the 2 m model number (example, S30SP6FF W/30).*
# S30 AC Sensors

**Opposed, Polarized Retroreflective and Fixed-field Models**  
Suffix E, R, LP and FF

---

## S30, 20-250V ac

<table>
<thead>
<tr>
<th>Sensing Mode/LED</th>
<th>Range</th>
<th>Connection</th>
<th>Models LO</th>
<th>Models DO</th>
<th>Excess Gain</th>
<th>Beam Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opposed</td>
<td>60 m</td>
<td>2 m</td>
<td>S303E Emitter</td>
<td></td>
<td>EGC-1 (p. 165)</td>
<td>BP-1 (p. 165)</td>
</tr>
<tr>
<td>Opposed</td>
<td>6 m†</td>
<td>2 m</td>
<td>S30AW3LP</td>
<td>S30RW3LP</td>
<td>EGC-2 (p. 165)</td>
<td>BP-2 (p. 165)</td>
</tr>
<tr>
<td>Polar Retro</td>
<td>0 - 200 mm Cutoff</td>
<td>2 m</td>
<td>S30AW3FF200</td>
<td>S30RW3FF200</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Polar Retro</td>
<td>0 - 400 mm Cutoff</td>
<td>2 m</td>
<td>S30AW3FF400</td>
<td>S30RW3FF400</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Polar Retro</td>
<td>0 - 600 mm Cutoff</td>
<td>2 m</td>
<td>S30AW3FF600</td>
<td>S30RW3FF600</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Fixed-field</td>
<td>0 - 200 mm Cutoff</td>
<td>2 m</td>
<td>S30AW3FF200Q1</td>
<td>S30RW3FF200Q1</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Fixed-field</td>
<td>0 - 400 mm Cutoff</td>
<td>2 m</td>
<td>S30AW3FF400Q1</td>
<td>S30RW3FF400Q1</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Fixed-field</td>
<td>0 - 600 mm Cutoff</td>
<td>2 m</td>
<td>S30AW3FF600Q1</td>
<td>S30RW3FF600Q1</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

**Connection options:** A model with a QD requires a mating cordset (see page 164).

For 9 m cable, add suffix W/30 to the 2 m model number (example, S30AW3FF200 W/30).

† Retroreflective range is specified using one model BRT-3 retroreflector. Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.

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## S30 AC Specifications

**Supply Voltage and Current**  
20 to 250V ac (50/60 Hz). **Average current:** 20 mA  
**Peak current:** 200 mA at 20V ac, 500 mA at 120V ac, 750 mA at 250V ac

**Supply Protection Circuitry**  
Protected against transient voltages

**Output Configuration**  
Solid-state ac switch; three-wire hookup; choose light operate (LO) or dark operate (DO) models;  
**Light operate:** Output conducts when the sensor sees its own (or the emitter's) modulated light  
**Dark operate:** Output conducts when sensor sees dark

**Output Rating**  
300 mA max. (continuous) **Fixed-field:** derate 5 mA° C above +50° C  
**Inrush capability:** 1 amp for 20 milliseconds, non-repetitive  
**OFF-state leakage current:** less than 100 µA  
**ON-state voltage drop:** 3V at 300 mA ac; 2V at 15 mA ac
S30 AC Specifications (cont’d)

<table>
<thead>
<tr>
<th>Output Protection Circuitry</th>
<th>Protected against false pulse on power-up</th>
</tr>
</thead>
</table>
| Output Response Time       | Opposed: 16 milliseconds ON; 8 milliseconds OFF  
Polarized Retroreflective and Fixed-field: 16 milliseconds ON/OFF |
| Delay at Power-up          | 100 milliseconds |
| Repeatability              | Opposed: 2 milliseconds  
Polarized Retroreflective and Fixed-field: 4 milliseconds  
Repeatability and response are independent of signal strength. |
| Indicators                 | Two LEDs:  
Green: Power ON  
Yellow: Light sensed  
See data sheet for detailed information |
| Construction               | Housings are thermoplastic polyester. Lenses are polycarbonate or acrylic; two jam nuts included |
| Connections                | 2 m or 9 m attached cable, or 4-pin Micro-style quick-disconnect fitting.  
QD cordsets are ordered separately. See page 164. |
| Operating Conditions       | Temperature: -40° to +70° C  
Relative humidity: 90% at 50° C (non-condensing) |
| Vibration and Mechanical Shock | All models meet Mil. Std. 202F requirements. Method 201A (Vibration; frequency 10 to 60 Hz, max, double amplitude 0.06-inch acceleration 10G). Method 213B conditions H&I (Shock: 75G with unit operating; 100G for non-operation) |
| Certifications             | |
| Hookup Diagrams            | Cabled Emitters: AC03 (p. 750)  
QD Emitters: AC07 (p. 751)  
Cabled Models: AC05 (p. 751)  
QD Models: AC06 (p. 751) |

Cordsets

<table>
<thead>
<tr>
<th>Euro QD</th>
<th>See page 662</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>4-Pin</td>
</tr>
<tr>
<td>1.83 m</td>
<td>MQDC-406</td>
</tr>
<tr>
<td>4.57 m</td>
<td>MQDC-415</td>
</tr>
<tr>
<td>9.14 m</td>
<td>MQDC-430</td>
</tr>
<tr>
<td>Length</td>
<td>Right-Angle</td>
</tr>
<tr>
<td>1.83 m</td>
<td>MQDC-406RA</td>
</tr>
<tr>
<td>4.57 m</td>
<td>MQDC-415RA</td>
</tr>
<tr>
<td>9.14 m</td>
<td>MQDC-430RA</td>
</tr>
</tbody>
</table>

Micro QD

<table>
<thead>
<tr>
<th>Micro QD</th>
<th>See page 698</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>4-Pin</td>
</tr>
<tr>
<td>1.63 m</td>
<td>MQAC-406</td>
</tr>
<tr>
<td>4.57 m</td>
<td>MQAC-415</td>
</tr>
<tr>
<td>9.14 m</td>
<td>MQAC-430</td>
</tr>
<tr>
<td>Length</td>
<td>Right-Angle</td>
</tr>
<tr>
<td>1.63 m</td>
<td>MQAC-406RA</td>
</tr>
<tr>
<td>4.57 m</td>
<td>MQAC-415RA</td>
</tr>
<tr>
<td>9.14 m</td>
<td>MQAC-430RA</td>
</tr>
</tbody>
</table>

Brackets

<table>
<thead>
<tr>
<th>S30</th>
<th>See page 620</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMB30A</td>
<td>pg. 639</td>
</tr>
<tr>
<td>SMB30FA..</td>
<td>pg. 640</td>
</tr>
<tr>
<td>SMB30SC</td>
<td>pg. 641</td>
</tr>
<tr>
<td>SMBAMS30P</td>
<td>pg. 649</td>
</tr>
</tbody>
</table>

Additional cordset information available. See page 679.

Additional brackets and information available. See page 620.
Excess Gain Curves  (Fixed-field mode performance based on 90% reflectance white test card)

= Infrared LED  = Visible Red LED Polarized

### Opposed Mode S30

<table>
<thead>
<tr>
<th>Range: 60 m</th>
<th>LED:</th>
<th>EGC-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutoff: 400 mm</td>
<td>LED:</td>
<td>EGC-4</td>
</tr>
</tbody>
</table>

### Polarized Retroreflective Mode S30

<table>
<thead>
<tr>
<th>Range: 6 m</th>
<th>LED:</th>
<th>EGC-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutoff: 200 mm</td>
<td>LED:</td>
<td>EGC-5</td>
</tr>
</tbody>
</table>

### Fixed-Field Mode S30

<table>
<thead>
<tr>
<th>Effective Beam: 23 mm</th>
<th>Range: 60 m</th>
<th>LED:</th>
<th>EGC-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutoff: 600 mm</td>
<td>LED:</td>
<td>EGC-2</td>
<td></td>
</tr>
</tbody>
</table>

### Beam Patterns

= Infrared LED  = Visible Red LED Polarized

### Opposed Mode S30

<table>
<thead>
<tr>
<th>Effective Beam: 23 mm</th>
<th>Range: 60 m</th>
<th>LED:</th>
<th>BP-1</th>
</tr>
</thead>
</table>

### Polarized Retroreflective Mode S30

<table>
<thead>
<tr>
<th>Range: 6 m</th>
<th>LED:</th>
<th>BP-2</th>
</tr>
</thead>
</table>

---

Polarized Retroreflective Mode

- Ø 16 mm spot size @ 35 mm focus
- Ø 20 mm spot size @ 200 mm cutoff

Using 18% gray test card: Cutoff distance will be 95% of value shown.
Using 6% black test card: Cutoff distance will be 90% of value shown.

Fixed-Field Mode

- Ø 17 mm spot size @ 35 mm focus
- Ø 25 mm spot size @ 400 mm cutoff

Using 18% gray test card: Cutoff distance will be 95% of value shown.
Using 6% black test card: Cutoff distance will be 90% of value shown.

- Ø 17 mm spot size @ 35 mm focus
- Ø 30 mm spot size @ 600 mm cutoff

Using 18% gray test card: Cutoff distance will be 85% of value shown.
Using 6% black test card: Cutoff distance will be 75% of value shown.
## DC Hookups

### DC01 Current Sinking (NPN)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
</tr>
<tr>
<td>2</td>
<td>White</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
</tr>
</tbody>
</table>

![Diagram of Current Sinking (NPN)](image)

### DC02 Emitter

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
</tr>
<tr>
<td>2</td>
<td>White</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
</tr>
</tbody>
</table>

![Diagram of Emitter](image)

### DC03 Complementary Current Sinking (NPN)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
</tr>
<tr>
<td>2</td>
<td>White</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
</tr>
</tbody>
</table>

![Diagram of Complementary Current Sinking (NPN)](image)

### DC04 Bipolar (NPN + PNP)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Brown</td>
</tr>
<tr>
<td>2</td>
<td>White</td>
</tr>
<tr>
<td>3</td>
<td>Blue</td>
</tr>
<tr>
<td>4</td>
<td>Black</td>
</tr>
</tbody>
</table>

![Diagram of Bipolar (NPN + PNP)](image)
DC Hookups

DC05  Complementary Current Sinking (NPN) 
Standard Hookup

Key

Current Sinking (NPN) Plus 
Current Sinking Alarm

1 = Brown 
2 = White 
3 = Blue 
4 = Black

4-Pin Pico  |  4-Pin Euro

DC06  Complementary Current Sourcing (PNP) 
Standard Hookup

Key

Current Sourcing (PNP) Plus 
Current Sourcing Alarm

1 = Brown 
2 = White 
3 = Blue 
4 = Black

4-Pin Pico  |  4-Pin Euro

DC07  Current Sinking (NPN)

Key

Current Sourcing (PNP)

1 = Brown 
2 = White 
3 = Blue 
4 = Black

4-Pin Pico  |  4-Pin Euro

DC08  Bipolar (NPN + PNP)

Key

1 = Brown 
2 = White 
3 = Blue 
4 = Black 
5 = Gray 
6 = Pink †

† Not Used

*NOTE: For some QS30 models, gray wire is used for LO/DO Select. See data sheet.
** Bussable Power models are 12-30V dc

More on next page
### AC Hookups

**AC01 2-wire AC**

<table>
<thead>
<tr>
<th>1</th>
<th>24-240V ac</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Load</td>
</tr>
</tbody>
</table>

**Key**

1 = Brown  
3 = Blue  

**AC02 2-wire AC with Quick Disconnect Cable**

<table>
<thead>
<tr>
<th>1</th>
<th>24-240V ac</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Load</td>
</tr>
</tbody>
</table>

**Key**

1 = Green†  
2 = Red/Black  
3 = Red/White  
† Not Used

**AC03 Emitters**

<table>
<thead>
<tr>
<th>1</th>
<th>See Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Key**

1 = Brown  
3 = Blue

**AC04 Emitters with Quick Disconnect Cable**

<table>
<thead>
<tr>
<th>1</th>
<th>See Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

**Key**

1 = Green†  
2 = Red/Black  
3 = Red/White  
† Not Used

---

**NOTE:** Wire a load in series before powering up sensor.
AC Hookups

**AC05 3-wire AC**

Key

1 = Brown
2 = Blue
3 = Black

See Specifications

**AC06 3-wire AC with Quick-Disconnect Cable**

Key

1 = Red/Black
2 = Red/White
3 = Red
4 = Green†

† Not Used

See Specifications

**3-Pin Mini**

1 = Red/Black
2 = Red/White
3 = Red
4 = Green†

† Not Used

**AC07 Emitters with Quick-Disconnect Cable**

Key

1 = Red/Black
2 = Red/White
3 = Red†
4 = Green†

† Not Used

See Specifications

**AC08 SPDT Electromechanical Relay Output**

Key

1 = Brown
2 = White
3 = Blue
4 = Black
5 = Yellow

See Specifications

**4-Pin Micro**

**5-Pin Mini**

More information online at bannerengineering.com