WORLD-BEAM®
QS18 Right-Angle Barrel- & Side-Mount Sensors

• Replaces hundreds of other sensors with a compact housing
• Meets IP67 and NEMA 6 standards for harsh environments
• Available in opposed, polarized and non-polarized retroreflective, convergent, regular and wide-angle diffuse, laser, ultrasonic (see page 321), plastic or glass fiber optic, fixed-field and adjustable-field sensing modes
• Models for dc or ac/dc universal voltage operation
• Offers easy push-button TEACH-mode setup in Expert™ QS18E and ultrasonic models
• Ranges up to 20 m
• Features bright LED operating status indicators visible from 360°

WORLD-BEAM® QS18 DC Series

Opposed, Retroreflective, Laser Retroreflective, Convergent, Diffuse, Laser Diffuse and Fixed-field Models
Suffix E, R, LV, LP, LLP, CV15, CV45, D, LD, LE and FF

Glass Fiber Models
Suffix F

Plastic Fiber Models
Suffix FP

Opposed, Diffuse and Adjustable-field Models
Suffix EB, RB, DB, W and AF
### Sensing Mode/LED | Range | Connection | Models\* | Excess Gain | Beam Pattern
--- | --- | --- | --- | --- | ---
| **OPPOSED** | 20 m | 2 m | QS186E Emitter | EGC-1 (p. 97) | BP-1 (p. 99)
| | | 4-pin Euro QD | QS186EQ8 Emitter | | |
| | | 2 m | QS18V6N6R | QS18VP6R |
| | | 4-pin Euro QD | QS18V6N6RQ8 | QS18VP6RQ8 |
| | 3 m | 2 m | QS186EB Emitter | EGC-2 (p. 97) | BP-2 (p. 99)
| | | 4-pin Euro QD | QS186EBQ8 Emitter | | |
| | | 2 m | QS18V6N6RB | QS18VP6RB |
| | | 4-pin Euro QD | QS18V6N6RBQ8 | QS18VP6RBQ8 |

**LASER EMITTER**

Class 1

<table>
<thead>
<tr>
<th>Range</th>
<th>Connection</th>
<th>Models*</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 m (4500 X excess gain)</td>
<td>2 m</td>
<td>QS186LE**</td>
</tr>
<tr>
<td></td>
<td>4-pin Euro QD</td>
<td>QS186LEQ8**</td>
</tr>
</tbody>
</table>

See Data sheet for more information.

Class 1

<table>
<thead>
<tr>
<th>Range</th>
<th>Connection</th>
<th>Models*</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 m (7000 X excess gain)</td>
<td>2 m</td>
<td>QS186LE2**</td>
</tr>
<tr>
<td></td>
<td>4-pin Euro QD</td>
<td>QS186LE2Q8**</td>
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See Data sheet for more information.

Class 2

<table>
<thead>
<tr>
<th>Range</th>
<th>Connection</th>
<th>Models*</th>
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</thead>
<tbody>
<tr>
<td>6.5 m*</td>
<td>2 m</td>
<td>QS18V6NLV</td>
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<tr>
<td></td>
<td>4-pin Euro QD</td>
<td>QS18V6NLVQ8</td>
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</tbody>
</table>

For 9 m cable, add suffix W/30 to the 2 m model number (example, QS18V6NLV W/30).

**QD models** (except Laser Emitters): A model with a QD requires a mating cable (see page 96).

- For 4-pin integral Euro-style QD, add suffix Q8 (example, QS18V6NLVQ8).
- For 4-pin integral Pico-style QD, add suffix Q7 (example, QS18V6NLVQ7).
- For 4-pin 150 mm Euro-style pigtail QD, add suffix Q5 (example, QS18V6NLVQ5).
- For 4-pin 150 mm Pico-style pigtail QD, add suffix Q (example, QS18V6NLVQ).

Retroreflective range is specified using one model BRT-84 retroreflector.

Retroreflective range is specified using one model BRT-51X51BM or BRT-TVHG-2X2 retroreflector.

Contact factory at 1-888-373-6767 for Bipolar NPN/PNP output model options.

**Specified with QS18 threaded lens receiver. Not recommended for dusty or dirty environments; the scattered light would greatly reduce excess gain.**

Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.
<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><strong>CONVERGENT</strong></td>
<td>16 mm</td>
<td>2 m</td>
<td>QS18VN6CV15</td>
<td>QS18VP6CV15</td>
<td>EGC-17</td>
<td>BP-16</td>
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<td></td>
<td></td>
<td>4-pin Euro QD</td>
<td>QS18VN6CV15Q8</td>
<td>QS18VP6CV15Q8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>43 mm</td>
<td>2 m</td>
<td>QS18VN6CV45</td>
<td>QS18VP6CV45</td>
<td>EGC-18</td>
<td>BP-17</td>
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<td></td>
<td>4-pin Euro QD</td>
<td>QS18VN6CV45Q8</td>
<td>QS18VP6CV45Q8</td>
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</tr>
<tr>
<td><strong>DIFFUSE</strong></td>
<td>450 mm</td>
<td>2 m</td>
<td>QS18VN6D</td>
<td>QS18VP6D</td>
<td>EGC-7</td>
<td>BP-6</td>
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<td></td>
<td></td>
<td>4-pin Euro QD</td>
<td>QS18VN6DQ8</td>
<td>QS18VP6DQ8</td>
<td>(p. 97)</td>
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<tr>
<td><strong>DIVERGENT</strong></td>
<td>100 mm</td>
<td>2 m</td>
<td>QS18VN6W</td>
<td>QS18VP6W</td>
<td>EGC-9</td>
<td>BP-8</td>
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<tr>
<td><strong>DIFFUSE Laser</strong></td>
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<td>4-pin Euro QD</td>
<td>QS18VN6WQ8</td>
<td>QS18VP6WQ8</td>
<td>(p. 97)</td>
<td></td>
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<tr>
<td><strong>CLASS 1</strong></td>
<td>300 mm</td>
<td>2 m</td>
<td>QS18VN6LD</td>
<td>QS18VP6LD</td>
<td>EGC-10</td>
<td>BP-9</td>
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<td></td>
<td>4-pin Euro QD</td>
<td>QS18VN6LDQ8</td>
<td>QS18VP6LDQ8</td>
<td>(p. 97)</td>
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<tr>
<td>Adjustable between 30-200 mm</td>
<td>2 m</td>
<td>QS18VN6AFF200</td>
<td>QS18VP6AFF200</td>
<td>EGC-24</td>
<td>(p. 98)</td>
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<tr>
<td></td>
<td></td>
<td>4-pin Euro Pigtail QD</td>
<td>QS18AB6AFF200Q5 (Bipolar NPN/PNP)</td>
<td>QS18AB6AFF200Q5 (Bipolar NPN/PNP)</td>
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</tr>
<tr>
<td>Adjustable between 15-40 mm</td>
<td>2 m</td>
<td>QS18VN6AFF40</td>
<td>QS18VP6AFF40</td>
<td>EGC-22</td>
<td>(p. 98)</td>
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<td></td>
<td></td>
<td>4-pin Euro Pigtail QD</td>
<td>QS18AB6AFF40Q5 (Bipolar NPN/PNP)</td>
<td>QS18AB6AFF40Q5 (Bipolar NPN/PNP)</td>
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<td></td>
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<tr>
<td>Adjustable between 30-300 mm</td>
<td>2 m</td>
<td>QS18VN6AF300</td>
<td>QS18VP6AF300</td>
<td>EGC-23</td>
<td>(p. 98)</td>
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<tr>
<td></td>
<td></td>
<td>4-pin Euro Pigtail QD</td>
<td>QS18AB6AF300Q5 (Bipolar NPN/PNP)</td>
<td>QS18AB6AF300Q5 (Bipolar NPN/PNP)</td>
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<td></td>
</tr>
<tr>
<td>Adjustable between 15-40 mm</td>
<td>2 m</td>
<td>QS18VN6AF40</td>
<td>QS18VP6AF40</td>
<td>EGC-21</td>
<td>(p. 98)</td>
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<tr>
<td></td>
<td></td>
<td>4-pin Euro Pigtail QD</td>
<td>QS18AB6AF40Q5 (Bipolar NPN/PNP)</td>
<td>QS18AB6AF40Q5 (Bipolar NPN/PNP)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 mm to cutoff point (adjustable between 20-100 mm)</td>
<td>2 m</td>
<td>QS18VN6AF100</td>
<td>QS18VP6AF100</td>
<td>EGC-25</td>
<td>(p. 98)</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4-pin Euro Pigtail QD</td>
<td>QS18VN6AF100Q5</td>
<td>QS18VP6AF100Q5</td>
<td>(p. 102)</td>
<td>—</td>
</tr>
<tr>
<td>1 mm to cutoff point (adjustable between 30-150 mm)</td>
<td>2 m</td>
<td>QS18VN6LAF</td>
<td>QS18VP6LAF</td>
<td>EGC-26</td>
<td>(p. 98)</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4-pin Euro Pigtail QD</td>
<td>QS18VN6LAFQ5</td>
<td>QS18VP6LAFQ5</td>
<td>(p. 102)</td>
<td>—</td>
</tr>
<tr>
<td>20 mm to cutoff point (adjustable between 50-250 mm)</td>
<td>2 m</td>
<td>QS18VN6LAF250</td>
<td>QS18VP6LAF250</td>
<td>EGC-27</td>
<td>(p. 98)</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4-pin Euro Pigtail QD</td>
<td>QS18VN6LAF250Q5</td>
<td>QS18VP6LAF250Q5</td>
<td>(p. 102)</td>
<td>—</td>
</tr>
</tbody>
</table>

For 9 m cable, add suffix W30 to the 2 m model number (example, QS18VN6W W30).

**QD models** (except Adjustable-Field):
- For 4-pin integral Euro-style QD, add suffix Q (example, QS18VN6Q).
- For 4-pin integral Euro-style QD, add suffix Q5 (example, QS18VN6Q5).
- For 4-pin integral Pico-style QD, add suffix Q (example, QS18VN6Q).
- For 4-pin integral Pico-style QD, add suffix Q5 (example, QS18VN6Q5).
- For 4-pin 150 mm Euro-style pigtail QD, add suffix Q (example, QS18VN6AF).
- For 4-pin 150 mm Euro-style pigtail QD, add suffix Q5 (example, QS18VN6AFQ5).
- For 4-pin 150 mm Pico-style QD, add suffix Q (example, QS18VN6AF).
- For 4-pin 150 mm Pico-style QD, add suffix Q5 (example, QS18VN6AFQ5).

* Contact factory at 1-888-373-6767 for Bipolar NPN/PNP output model options.
## WORLD-BEAM® QS18 DC Specifications

### Sensing Mode/LED

<table>
<thead>
<tr>
<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>0-50 mm Cutoff</td>
<td>2 m</td>
<td>QS18VN6FF50</td>
<td>QS18VP6FF50</td>
<td>EGC-28</td>
<td></td>
</tr>
<tr>
<td>0-100 mm Cutoff</td>
<td>2 m</td>
<td>QS18VN6FF100</td>
<td>QS18VP6FF100</td>
<td>EGC-29</td>
<td></td>
</tr>
<tr>
<td>GLASS FIBER</td>
<td>2 m</td>
<td>QS18VN6F</td>
<td>QS18VP6F</td>
<td>EGC-30</td>
<td>BP-20 &amp; BP-21</td>
</tr>
<tr>
<td>PLASTIC FIBER</td>
<td>2 m</td>
<td>QS18VN6FP</td>
<td>QS18VP6FP</td>
<td>EGC-32</td>
<td>BP-22 &amp; BP-23</td>
</tr>
</tbody>
</table>

* Connection options: A model with a QD requires a mating cordset (see page 96).

For 9 m cable, add suffix W30 to the 2 m model number (example, QS18VN6LVW30). QD models:
- For 4-pin integral Euro-style QD, add suffix Q (example, QS18VN6LQQ). * Contact factory at 1-888-373-6767 for Bipolar NPN/PNP output model options.

### Laser Characteristics (Laser models only)

- Wavelength: Class 1: 650 nm visible red
- Class 2: Adjustable-field—658 nm visible red
- Laser Emitter—650 nm visible red

### Supply Voltage and Current

- Retrospective, Diffuse and Adjustable-field Laser: 10 to 30V dc (10% max. ripple) at less than 15 mA, exclusive of load
- Laser Emitters: 10 to 30V dc (10% max. ripple) at less than 35 mA
- Adjustable-field (40, 200 & 300 mm): 10 to 30V dc (10% max. ripple) at less than 27 mA
- All others: 10 to 30V dc (10% max. ripple) at less than 25 mA, exclusive of load

### Supply Protection Circuitry

- Protected against reverse polarity and transient voltages

### Laser Control (Emitters only)

- Apply 0V dc to white wire to enable beam
- Apply +10 to 30V dc to white wire to inhibit beam
- Enable Time: Class 1—240 ms Class 2—8 ms
- Disable Time: Class 1—100 ms Class 2—1 ms

### Output Configuration*

- Solid-state complementary; NPN (current sinking), PNP (current sourcing), or bipolar (both sinking and sourcing depending on model)
- Rating: 100 mA max. each output at 25° C

#### Off-state leakage current:

- Adjustable-field LED (40, 200 & 300 mm), Retrospective, Diffuse and Adjustable-field Laser:
  - NPN: less than 200 µA @ 30V dc (see Application Note 1)
  - PNP: less than 10 µA @ 30V dc
- Fixed-field: less than 200 µA @ 30V dc All others: less than 50 µA @ 30V dc

#### ON-state saturation voltage:

- Adjustable-field LED (40, 200 & 300 mm), Retrospective, Diffuse and Adjustable-field Laser:
  - NPN: less than 1.6V @ 100 mA
  - PNP: less than 3.0V @ 100 mA
- All others: less than 1V @ 10 mA; less than 500 µA @ 100 mA

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

### Output Response Time*

- Opposed: 750 microseconds ON; 375 microseconds OFF
- Retrospective Laser, Diffuse Laser and Adjustable-field (100, 150 & 250 mm): 700 microseconds ON/OFF
- Adjustable-field (40, 200 & 300 mm): 2.5 milliseconds ON/OFF
- Fixed-field: 850 microseconds ON/OFF
- All others: 600 microseconds ON/OFF

### Delay at Power-up

- Laser Emitters: Class 1—250 milliseconds
- Class 2—10 milliseconds
- Adjustable-field LED (40, 200 & 300 mm), Retrospective, Diffuse and Adjustable-field Laser: 200 milliseconds; outputs do not conduct during this time.
- All others: 100 milliseconds; outputs do not conduct during this time.

* Does not apply to laser emitter model.
WORLD-BEAM® QS18 DC Specifications (cont’d)

### Repeatability*
- **Opposed:** 100 microseconds
- **Retroreflective Laser, Diffuse Laser and Adjustable-field Laser:** 130 microseconds
- **Adjustable-field LED (100 mm):** 175 microseconds
- **Adjustable-field LED (40, 200 & 300 mm):** 250 microseconds
- **Fixed-field:** 160 microseconds
- **All others:** 150 microseconds

### Sensing Hysteresis*
- **Retroreflective Laser:** 12% of range typical
- **Diffuse Laser:** 15% of range typical
- **Adjustable-field (100 mm):** 0.5% of range typical at 20 mm cutoff, 1% of range typical at 50 mm cutoff, 3% of range typical at 100 mm cutoff
- **Adjustable-field Laser (Class 1):** 1% range typical at 30 mm cutoff, 2% range typical at 75 mm cutoff, 5% range typical at 150 mm cutoff
- **Adjustable-field Laser (Class 2):** 1% range typical at 50 mm cutoff, 2% range typical at 150 mm cutoff, 5% range typical at 250 mm cutoff

### Adjustments*
- **Retroreflective, Retroreflective Laser, Convergent, Diffuse, Diffuse Laser and Glass & Plastic Fiber Optic:** Single-turn sensitivity (Gain) adjustment potentiometer
- **Adjustable-field:** Five-turn adjustment screw sets cutoff distance between min. and max. position

### Indicators
- **Laser Emitters:**
  - **Green LED:** Power applied
  - **Yellow LED:** Light sensed
  - **Red LED:** Power applied

### Construction
- **ABS housing; acrylic lens cover (Laser Emitter models have PMMA window)**
- **2.5 mm (adjustable-field only) and 3 mm mounting hardware included**

### Environmental Rating
- **Rated IEC IP67; NEMA 6; UL Type 1**

### Connections
- **2 m or 9 m 4-wire PVC cable, or 4-pin 150 mm pigtail Pico-style QD (Q), or 4-pin 150 mm pigtail Euro-style QD (Q5), or 4-pin Integral Pico-style QD (Q7), or 4-pin Integral Euro-style QD (Q8), depending on model. QD cordsets are ordered separately. See page 96.**

### Operating Conditions
- **Laser Classifications** (Laser models only)
  - Class 1 and Class 2 laser product; complies with IEC 60825-1: 2001 and 21 CFR 1040.10, except deviations pursuant to Laser Notice 50, dated 7-26-01.

### Certifications
- **CE**
- **UL**
- **CSA**

### Application Notes
1. NPN off-state leakage current is < 200 μA for load resistances > 3 kΩ or optically isolated loads.
   - For load current of 100 mA, leakage is < 1% of load current

### Hookup Diagrams
- **LED Emitters:** DC02 (p. 744)
- **Single output:** DC03 (p. 744)
- **Bipolar:** DC04 (p. 744)
- **Laser Emitters:** DC22 (p. 749)

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**Class 1 Laser Sensors**
Lasers that are safe under reasonably foreseeable conditions of operation, including the use of optical instruments for intrabeam viewing. Reference IEC 60825-1: 2001, section 8.2.

**Class 2 Lasers**
Lasers that emit visible radiation in the wavelength range from 400 nm to 700 nm, where eye protection is normally afforded by aversion responses, including the blink reflex. This reaction may be expected to provide adequate protection under reasonably foreseeable conditions of operation, including the use of optical instruments for intrabeam viewing. Reference IEC 60825-1:2001, section 8.2.

**For safe laser use (Class 1 or Class 2):**
- Do not permit a person to stare at the laser from within the beam.
- Do not point the laser at a person's eye at close range.
- Terminate the beam emitted by a Class 2 laser product at the end of its useful path.
- Locate open laser beam paths either above or below eye level, where practical.
## WORLD-BEAM® QS18, 10-30V dc

<table>
<thead>
<tr>
<th>Sensing Model(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>Polar Retro</td>
<td>3.5 m&lt;sup&gt;†&lt;/sup&gt;</td>
<td>2 m</td>
<td>QS18EN6LP</td>
<td>QS18EP6LP</td>
<td>EGC-6 (p. 97)</td>
<td>BP-5 (p. 99)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4-pin Euro QD</td>
<td>QS18EN6LPQ8</td>
<td>QS18EP6LPQ8</td>
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<tr>
<td></td>
<td>16 mm</td>
<td>2 m</td>
<td>QS18EN6CV15</td>
<td>QS18EP6CV15</td>
<td>EGC-19 (p. 98)</td>
<td>BP-18 (p. 100)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4-pin Euro QD</td>
<td>QS18EN6CV15Q8</td>
<td>QS18EP6CV15Q8</td>
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<td></td>
<td>43 mm</td>
<td>2 m</td>
<td>QS18EN6CV45</td>
<td>QS18EP6CV45</td>
<td>EGC-20 (p. 98)</td>
<td>BP-19 (p. 100)</td>
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<td></td>
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<td>Diffuse</td>
<td>800 mm</td>
<td>2 m</td>
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<td>QS18EP6D</td>
<td>EGC-13 (p. 97)</td>
<td>BP-12 (p. 100)</td>
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<td>4-pin Euro QD</td>
<td>QS18EN6DQ8</td>
<td>QS18EP6DQ8</td>
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<tr>
<td></td>
<td>500 mm</td>
<td>2 m</td>
<td>QS18EN6DB</td>
<td>QS18EP6DB</td>
<td>EGC-14 (p. 97)</td>
<td>BP-13 (p. 100)</td>
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<td>QS18EP6DBQ8</td>
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<tr>
<td>Divergent/Diffuse</td>
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<td>2 m</td>
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<td>QS18EP6W</td>
<td>EGC-15 (p. 97)</td>
<td>BP-14 (p. 100)</td>
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<td></td>
<td>4-pin Euro QD</td>
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<td>QS18EP6WQ8</td>
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<td>Diffuse</td>
<td>600 mm</td>
<td>2 m</td>
<td>QS18EN6DV</td>
<td>QS18EP6DV</td>
<td>EGC-16 (p. 97)</td>
<td>BP-15 (p. 100)</td>
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<td></td>
<td>4-pin Euro QD</td>
<td>QS18EN6DVQ8</td>
<td>QS18EP6DVQ8</td>
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<tr>
<td>Plastic Fiber</td>
<td>Range varies by sensing mode and fiber optics used</td>
<td>2 m</td>
<td>QS18EN6FP</td>
<td>QS18EP6FP</td>
<td>EGC-34 &amp; EGC-35 (p. 99)</td>
<td>BP-24 &amp; BP-25 (p. 100)</td>
</tr>
<tr>
<td></td>
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<td>4-pin Euro QD</td>
<td>QS18EN6FPQ8</td>
<td>QS18EP6FPQ8</td>
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<td></td>
</tr>
</tbody>
</table>

Connection options: A model with a QD requires a mating cordset (see page 96).

For 9 m cable, add suffix W/30 to the 2 m model number (example, QS18EN6LP W/30).

**QD models**
- For 4-pin integral Euro-style QD, add suffix Q8 (example, QS18EN6LPQ8).
- For 4-pin integral Pico-style QD, add suffix Q7 (example, QS18EN6LPQ7).
- For 4-pin integral Pico-style pigtail QD, add suffix Q (example, QS18EN6LPQ).

† Retroreflective range is specified using one model BRT-84 retroreflector.
Actual sensing range may differ, depending on the efficiency and reflective area of the retroreflector used. See Accessories for more information.
WORLD-BEAM® QS18 Ultrasonic, 12-30V 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></td>
<td>50 - 500 mm</td>
<td>2 m</td>
<td>QS18UNA</td>
<td>QS18UPA</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4-pin Euro QD</td>
<td>QS18UNAQ8</td>
<td>QS18UPAQ8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 m</td>
<td>QS18UNAE††</td>
<td>QS18UPAE††</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4-pin Euro QD</td>
<td>QS18UNAEQ8††</td>
<td>QS18UPAEQ8††</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Connection options: A model with a QD requires a mating cordset (see page 96).

For 9 m cable, add suffix W/30 to the 2 m model number (example, QS18UNA W/30).

QD models:
- For 4-pin integral Euro-style QD, add suffix Q8 (example, QS18UNAQ8).
- For 4-pin integral Pico-style QD, add suffix Q7 (example, QS18UNAQ7).

† For complete information see QS18U Ultrasonic Sensors on page 317.

WORLD-BEAM® QS18 Expert™ Specifications

Supply Voltage: 10 to 30V dc (10% max. ripple) at less than 35 mA, exclusive of load; 10 to 24V dc @ greater than 55° C

Supply Protection Circuitry: Protected against reverse polarity and transient voltages

Output Configuration: Solid-state NPN (current sinking) or PNP (current sourcing), depending on model. Light- (LO) or dark-operate (DO) selectable. Selectable 30 millisecond output OFF-delay. Rating: 100 mA max.

OFF-state leakage current: less than 50 µA @ 30V dc

ON-state saturation voltage: less than 1.5V (2 m cable); 1.7V (9 m cable)

Protected against false pulse on power-up and continuous overload or short circuit of output

Output Response Time: 600 microseconds ON/OFF

Delay at Power-up: Momentary delay on power-up; outputs do not conduct during this time

Repeatability: 75 microseconds

Adjustments:
- Thresholds: Push-button/remote-wire configurable
- Five Expert™-style TEACH and SET options
- Light/dark operate: selectable by programming order (load output follows the first taught target condition)
- Push-button enable/disable: (remote wire only)

See data sheet for detailed information.

Indicators: 2 LED indicators:
- Green: RUN mode, output short-circuit
- Yellow: Output ON/marginal, TEACH mode

Construction: ABS housing, PMMA lens rated IEC IP67; NEMA 6

3 mm mounting hardware included

Environmental Rating: Meets NEMA 6; IEC IP67; UL Type 1

Connections: 2 m or 9 m 4-wire PVC cable, or 4-pin 150 mm pigtail Pico-style QD (Q), or 4-pin 150 mm pigtail Euro-style QD (Q5), or 4-pin Integral Pico-style QD (Q7), or 4-pin Integral Euro-style QD (Q8). QD cordsets are ordered separately. See page 96.

Certifications: UL

Hookup Diagrams: DC07 (p. 745)
WORLD-BEAM® QS18 Universal Voltage Sensors

### WORLD-BEAM® QS18 Universal Voltage Specifications

<table>
<thead>
<tr>
<th>Sensing Mode/LED</th>
<th>Range</th>
<th>Output††</th>
<th>Models LO</th>
<th>Models DO</th>
<th>Excess Gain</th>
<th>Beam Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OPPOSED</strong></td>
<td>20 m</td>
<td>N-MOSFET (Sinking)</td>
<td>QS18ANWR</td>
<td>QS18RNWR</td>
<td>EGC-1 (p. 97)</td>
<td>BP-1 (p. 99)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>P-MOSFET (Sourcing)</td>
<td>QS18APWR</td>
<td>QS18RPWR</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Polar Retro</strong></td>
<td>3.5 m†¹</td>
<td>N-MOSFET (Sinking)</td>
<td>QS18ANWLP</td>
<td>QS18RNWLP</td>
<td>EGC-4 (p. 97)</td>
<td>BP-4 (p. 99)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>P-MOSFET (Sourcing)</td>
<td>QS18APWLP</td>
<td>QS18RPWLP</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Retro</strong></td>
<td>6.5 m†¹</td>
<td>N-MOSFET (Sinking)</td>
<td>QS18ANWLV</td>
<td>QS18RNWLV</td>
<td>EGC-3 (p. 97)</td>
<td>BP-3 (p. 99)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>P-MOSFET (Sourcing)</td>
<td>QS18APWLV</td>
<td>QS18RPWLV</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Diffuse</strong></td>
<td>450 mm</td>
<td>N-MOSFET (Sinking)</td>
<td>QS18ANWDL</td>
<td>QS18RNWDL</td>
<td>EGC-11 (p. 97)</td>
<td>BP-10 (p. 100)</td>
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<tr>
<td></td>
<td></td>
<td>P-MOSFET (Sourcing)</td>
<td>QS18APWDL</td>
<td>QS18RPWDL</td>
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<td></td>
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<tr>
<td><strong>Diffuse</strong></td>
<td>1 m</td>
<td>N-MOSFET (Sinking)</td>
<td>QS18ANWDXL</td>
<td>QS18RNWDXL</td>
<td>EGC-12 (p. 97)</td>
<td>BP-11 (p. 100)</td>
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<tr>
<td></td>
<td></td>
<td>P-MOSFET (Sourcing)</td>
<td>QS18APWDXL</td>
<td>QS18RPWDXL</td>
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<td></td>
</tr>
</tbody>
</table>

For 9 m cable, add suffix W/30 to the 2 m model number (example, QS18WE W/30).
- QD models:
  - For 4-pin 150 mm Micro-style pigtail QD, add suffix Q2 to the model number (example, QS18WEQ2).
- 600V cable models: Standard models are supplied with 300V cable. For a 600V cable, add suffix C1 to the 2 m model number (example, QS18WEC1).

† Retroreflective range is specified using one model BRT-84 retroreflector.
†† MOSFET: Metal oxide semiconductor field-effect transistor.

More information online at [bannerengineering.com](http://bannerengineering.com)
## WORLD-BEAM® QS18 Universal Voltage Specifications (cont’d)

### Output Configuration
- Single Discrete Output, 100 mA load rating
- N-MOSFET or P-MOSFET, depending on model number
- Light Operate or Dark Operate, depending on model number

### Output Rating
- **P-MOSFET models**
  - 100 mA with short circuit protection
  - OFF-state leakage current: < 400 μA
  - ON-state saturation voltage: 2.75V
- **N-MOSFET models**
  - 100 mA with short circuit protection
  - OFF-state leakage current: < 400 μA
  - ON-state saturation voltage: 2.5V

### Output Protection Circuitry
- Protected against output short-circuit and false pulse on power up.
- Latching short-circuit protection; reset by cycling power.

### Delay at Power-up
- 100 milliseconds max. dc, 300 milliseconds max. ac; outputs do not conduct during this time

### Repeatability
- 1.5 milliseconds

### Output Response Time
- Opposed mode: 16.6 milliseconds (1 cycle at 60 Hz)
- All other modes: 8.3 milliseconds (½ cycle at 60 Hz)

### Adjustments
- Diffuse, Retroreflective and Polarized Retroreflective models only: 1-turn potentiometer Sensitivity (Gain) adjustment

### Indicators
- Green: Power ON
- Yellow: Light Sensed

### Construction
- Housing: ABS
- Lenses: PMMA
- Gain Adjuster: acetal

### Environmental Rating
- IEC IP67 (NEMA 6); 1200 PSI washdown NEMA ICS5, Annex F-2002 (PW12); UL Type 1

### Connections
- 2 m 3-conductor, 22 AWG PVC cable (300V ac), or 150 mm pigtail PVC cable with 4-pin threaded Micro-style connector; C1 suffix models: 2 m 3-conductor, 22 AWG PVC cable (600V ac).

### Operating Conditions
- Temperature:
  - Less than 140V ac/dc: −25° to +70° C (N-MOSFET and P-MOSFET models)
  - 140V ac/dc or greater: −25° to +55° C (N-MOSFET models only)
- Max. Relative Humidity: 95% @ 55° C (non-condensing)

### Certifications
- UL 94V-0, CSA 94V-0, RoHS, REACH, WEEE, 2012/19/EU, U.S. DoD, Mexico, other

### Hookup Diagrams
- Cabled Emitters: UN03 (p. 753)
- Other cable models: UN05 (p. 754)
- QD Emitters: UN04 (p. 753)
- Other QD models: UN06 (p. 754)

## Cordsets

### Euro QD
- See page 662

<table>
<thead>
<tr>
<th>Length</th>
<th>Euro QD Straight</th>
<th>Euro QD Right-Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.63 m</td>
<td>MQDC-406</td>
<td>MQDC-406RA</td>
</tr>
<tr>
<td>4.57 m</td>
<td>MQDC-415</td>
<td>MQDC-415RA</td>
</tr>
<tr>
<td>9.14 m</td>
<td>MQDC-430</td>
<td>MQDC-430RA</td>
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</table>

### Euro QD (with Shield)
- See page 663

<table>
<thead>
<tr>
<th>Length</th>
<th>Euro QD (with Shield) Straight</th>
<th>Euro QD (with Shield) Right-Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.63 m</td>
<td>MQDC2-406</td>
<td>MQDC2-406RA</td>
</tr>
<tr>
<td>4.57 m</td>
<td>MQDC2-415</td>
<td>MQDC2-415RA</td>
</tr>
<tr>
<td>9.14 m</td>
<td>MQDC2-430</td>
<td>MQDC2-430RA</td>
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</table>

### Pico QD
- See page 660

<table>
<thead>
<tr>
<th>Length</th>
<th>Pico QD Straight</th>
<th>Pico QD Right-Angle</th>
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</thead>
<tbody>
<tr>
<td>2.00 m</td>
<td>PKG4-2</td>
<td>PKW4Z-2</td>
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</table>

### Pico QD (with Shield)
- See page 681

<table>
<thead>
<tr>
<th>Length</th>
<th>Pico QD (with Shield) Straight</th>
<th>Pico QD (with Shield) Right-Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.00 m</td>
<td>PKG4S-2</td>
<td>PKW4Z-2A</td>
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</tbody>
</table>

### Micro QD
- See page 668

<table>
<thead>
<tr>
<th>Length</th>
<th>Micro QD Straight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.63 m</td>
<td>MGAC-406</td>
</tr>
<tr>
<td>4.57 m</td>
<td>MGAC-415</td>
</tr>
<tr>
<td>9.14 m</td>
<td>MGAC-430</td>
</tr>
</tbody>
</table>

### Additional cordset information available. See page 679.

## Brackets

### QS18
- See page 637
- pg. 638
- pg. 639
- pg. 670
- pg. 638

<table>
<thead>
<tr>
<th>QS18</th>
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<tbody>
<tr>
<td>SMB18A</td>
</tr>
<tr>
<td>SMBQS18A</td>
</tr>
<tr>
<td>SMB18S</td>
</tr>
</tbody>
</table>

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

- = Infrared LED  ● = Visible Red LED  P = Visible Red LED Polarized  LP = Visible Red Laser Polarized

**Opposed Mode**
- **WORLD-BEAM® QS18**
  - EGC-1
  - Range: 20 m
  - LED: ●
  - EGC-2
  - Range: 3 m
  - LED: ●

**Retroreflective Mode**
- **WORLD-BEAM® QS18**
  - EGC-3
  - Range: 6.5 m
  - LED: ●
  - EGC-4
  - Range: 3.5 m
  - LED: P

**Divergent Diffuse Mode**
- **WORLD-BEAM® QS18**
  - EGC-5
  - Range: 10 m
  - LED: LP
  - EGC-6
  - Range: 3.5 m
  - LED: P

**Diffuse Mode**
- **WORLD-BEAM® QS18**
  - EGC-7
  - Range: 450 m
  - LED: ●
  - EGC-8
  - Range: 450 mm
  - LED: ●

**More on next page**
Excess Gain Curves

(Convergent, Diffuse, Adjustable-Field and Fixed-Field mode performance based on 90% reflectance white test card)

○ = Infrared LED  ● = Visible Red LED  ☼ = Visible Red Laser

**Convergent Mode**

WORLD-BEAM® QS18

- Range: 16 mm LED: ●
- Range: 43 mm LED: ●
- Cutoff: 15-40 mm LED: ●
- Cutoff: 20-100 mm LED: ●
- Cutoff: 50-250 mm LED: ●
- Cutoff: 100 mm LED: ●

**Adjustable-Field Mode**

WORLD-BEAM® QS18

- Background Suppression
- Foreground Suppression

**Fixed-Field Mode**

WORLD-BEAM® QS18

- Range: Varies LED: ○

**Opposed Mode**— Glass Fiber

WORLD-BEAM® QS18

- Range: Varies LED: ○

**Diffuse Mode**— Glass Fiber

WORLD-BEAM® QS18

- Range: Varies LED: ○

More information online at bannerengineering.com

Courtesy of Steven Engineering, Inc.-230 Ryan Way, South San Francisco, CA 94080-6370-Main Office: (650) 588-9200-Outside Local Area: (800) 258-9200-www.stevenengineering.com
**Excess Gain Curves**  (Diffuse mode performance based on 90% reflectance white test card)

- = Visible Red LED

**Beam Patterns**  (Diffuse mode performance based on 90% reflectance white test card)

- = Infrared LED  
- = Visible Red LED  
P = Visible Red LED Polarized

---

**Opposed Mode—Plastic Fiber**  
**WORLD-BEAM® QS18 Expert**

- Effective Beam: 13 mm

**Diffuse Mode—Plastic Fiber**  
**WORLD-BEAM® QS18 Expert**

- Effective Beam: 13 mm

**Retroreflective Mode**  
**WORLD-BEAM® QS18**

- Effective Beam: 13 mm

**Polarized Retroreflective Mode**  
**WORLD-BEAM® QS18**

- Effective Beam: 30 mm

---

**BP-1**

- Range: 20 m
- LED: 

**BP-2**

- Range: 3 m
- LED: 

**BP-3**

- Range: 6.5 m
- LED: 

**BP-4**

- Range: 3.5 m
- LED: 

**BP-5**

- Range: 3.5 m
- LED: P

**BP-6**

- Range: 450 mm
- LED: 

**BP-7**

- Range: 450 mm
- LED: 

**BP-8**

- Range: 100 mm
- LED: 

---

More information online at [bannerengineering.com](http://bannerengineering.com)
Beam Patterns (Diffuse and Convergent mode performance based on 90% reflectance white test card)

○ = Infrared LED  ● = Visible Red LED  ⭐ = Visible Red Laser

**MINIATURE**

- **Diffuse Mode**
  - **WORLD-BEAM® QS18 Class 1 Laser**
  - Range: 300 mm
  - LED: ⭐

- **Diffuse Mode**
  - **WORLD-BEAM® QS18**
  - Range: 450 mm
  - LED: ○

- **Diffuse Mode**
  - **WORLD-BEAM® QS18 Expert**
  - Range: 500 mm
  - LED: ○

- **Convergent Mode**
  - **WORLD-BEAM® QS18**
  - Range: 43 mm
  - LED: ●

- **Diffuse Mode—Glass Fiber**
  - **WORLD-BEAM® QS18**
  - Range: Varies
  - LED: ○

**COMPACT**

- **Diffuse Mode**
  - **WORLD-BEAM® QS18**
  - Range: 1 m
  - LED: ○

- **Diffuse Mode**
  - **WORLD-BEAM® QS18 Expert**
  - Range: 16 mm
  - LED: ●

- **Diffuse Mode—Plastic Fiber**
  - **WORLD-BEAM® QS18**
  - Range: Varies
  - LED: ●

**MIDSIZE**

- **Diffuse Mode**
  - **WORLD-BEAM® QS18 Expert**
  - Range: 800 mm
  - LED: ○

- **Diffuse Mode**
  - **WORLD-BEAM® QS18**
  - Range: 600 mm
  - LED: ●

- **Opposed Mode—Glass Fiber**
  - **WORLD-BEAM® QS18**
  - Range: Varies
  - LED: ○

**FULLSIZE**

- **Diffuse Mode**
  - **WORLD-BEAM® QS18 Expert**
  - Range: 100 m
  - LED: ●

- **Opposed Mode—Plastic Fiber**
  - **WORLD-BEAM® QS18**
  - Range: Varies
  - LED: ●

More information online at bannerengineering.com
Beam Patterns  (Diffuse mode performance based on 90% reflectance white test card)

○ = Visible Red LED

Diffuse Mode—Plastic Fiber WORLD-BEAM® QS18 Expert®

Minimum Separation Distance

WORLD-BEAM® QS18 Adjustable-Field Background Suppression LED (30-300 mm)

WORLD-BEAM® QS18 Adjustable-Field Foreground Suppression LED (30-200 mm)

WORLD-BEAM® QS18 Adjustable-Field Background Suppression LED (15-40 mm)

WORLD-BEAM® QS18 Adjustable-Field Foreground Suppression LED (15-40 mm)
Cutoff Point Deviation

**WORLD-BEAM® QS18 Adjustable-Field Background Suppression LED (20-100 mm)**

![Graph showing percent deviation vs. cutoff setting for different cards.]

**WORLD-BEAM® QS18 Adjustable-Field Background Suppression Class 1 Laser (30-150 mm)**

![Graph showing percent deviation vs. cutoff setting for different cards.]

**WORLD-BEAM® QS18 Adjustable-Field Background Suppression Class 2 Laser (50-250 mm)**

![Graph showing percent deviation vs. cutoff setting for different cards.]

More information online at [bannerengineering.com](http://bannerengineering.com)
DC Hookups

**DC01**

Current Sinking (NPN)

- **Key**
  - 1 = Brown
  - 3 = Blue
  - 4 = Black

Current Sourcing (PNP)

- **10-30V dc**

<table>
<thead>
<tr>
<th>1</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

**Load**

3-Pin Pico

- **1 = Brown**
- **3 = Blue**
- **4 = Black**

**DC02**

Emitter

- **Key**
  - 1 = Brown
  - 2 = White†
  - 3 = Blue
  - 4 = Black†
  - † Not Used

3-Pin Pico 4-Pin Pico 4-Pin Euro 4-Pin Mini

**DC03**

Complementary Current Sinking (NPN)

- **Key**
  - 1 = Brown
  - 2 = White
  - 3 = Blue
  - 4 = Black

Complementary Current Sourcing (PNP)

- **10-30V dc**

<table>
<thead>
<tr>
<th>1</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>-</td>
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</tbody>
</table>

**Load**

4-Pin Pico 4-Pin Euro 4-Pin Mini

**DC04**

Bipolar (NPN + PNP)

- **Key**
  - 1 = Brown
  - 2 = White
  - 3 = Blue
  - 4 = Black

4-Pin Pico 4-Pin Euro 4-Pin Mini

More on next page
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

<table>
<thead>
<tr>
<th>4-Pin Pico</th>
<th>4-Pin Euro</th>
</tr>
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<tr>
<td><img src="image1" alt="4-Pin Pico Diagram" /></td>
<td><img src="image2" alt="4-Pin Euro Diagram" /></td>
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</table>

**DC06** Complementary Current Sourcing (PNP) Standard Hookup

Key

Current Sourcing (PNP) Plus Current Sourcing Alarm

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

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<thead>
<tr>
<th>4-Pin Pico</th>
<th>4-Pin Euro</th>
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<tr>
<td><img src="image3" alt="4-Pin Pico Diagram" /></td>
<td><img src="image4" alt="4-Pin Euro Diagram" /></td>
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</tbody>
</table>

**DC07** Current Sinking (NPN)

Key

Current Sourcing (PNP)

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

<table>
<thead>
<tr>
<th>4-Pin Pico</th>
<th>4-Pin Euro</th>
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<tbody>
<tr>
<td><img src="image5" alt="4-Pin Pico Diagram" /></td>
<td><img src="image6" alt="4-Pin Euro Diagram" /></td>
</tr>
</tbody>
</table>

**DC08** Bipolar (NPN + PNP)

Key

*NOTE: For some QS30 models, gray wire is used for LO/DD Select. See data sheet.

** Bussable Power models are 12-30V dc

<table>
<thead>
<tr>
<th>6-Pin Pico</th>
<th>5-Pin Euro</th>
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<tbody>
<tr>
<td><img src="image7" alt="6-Pin Pico Diagram" /></td>
<td><img src="image8" alt="5-Pin Euro Diagram" /></td>
</tr>
</tbody>
</table>
DC Hookups

**DC21**

**SM30 DC Receivers (PNP) Light Operate**

- **Key**
  - 1 = Brown
  - 2 = White
  - 3 = Blue
  - 4 = Black

**SM30 DC Receivers (PNP) Dark Operate**

- **Key**
  - 1 = Brown
  - 2 = White
  - 3 = Blue
  - 4 = Black

<table>
<thead>
<tr>
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<tbody>
<tr>
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**4-Pin Mini**

<table>
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<tbody>
<tr>
<td>-</td>
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</tr>
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</table>

**DC22**

**Laser Emitter**

- **Key**
  - 1 = Brown
  - 2 = White
  - 3 = Blue
  - 4 = Black

† Not Used

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
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<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>

**4-Pin Pico**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>

**4-Pin Euro**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>
Universal AC/DC Hookups

**UN01** SPDT Electromechanical Relay Output

<table>
<thead>
<tr>
<th>Key</th>
<th>5-Pin Euro</th>
<th>5-Pin Mini</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supply Voltage</strong> (see Specifications)</td>
<td>1 = Brown</td>
<td>1 = Brown</td>
</tr>
<tr>
<td>3 = Blue</td>
<td>2 = White</td>
<td>2 = Blue</td>
</tr>
<tr>
<td>4 = Black</td>
<td>3 = Blue</td>
<td>3 = Black</td>
</tr>
<tr>
<td>5 = Yellow†</td>
<td>4 = Black</td>
<td>5 = Black</td>
</tr>
</tbody>
</table>

**NOTE:** Connection of dc power is without regard to polarity.

**UN02** Emitters

<table>
<thead>
<tr>
<th>Key</th>
<th>3-Pin Mini</th>
<th>4-Pin Mini</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supply Voltage</strong> (see Specifications)</td>
<td>1 = Brown</td>
<td>1 = Red/Black</td>
</tr>
<tr>
<td>3 = Black†</td>
<td>2 = Blue</td>
<td>2 = Red/White</td>
</tr>
<tr>
<td>† Not Used</td>
<td>3 = Red†</td>
<td>3 = Red</td>
</tr>
<tr>
<td>† No Connection</td>
<td>4 = Green†</td>
<td>4 = Green</td>
</tr>
</tbody>
</table>

**UN03** Emitters with Attached Cable

<table>
<thead>
<tr>
<th>Key</th>
<th>4-Pin Micro</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>L1 (DC+)</strong></td>
<td>1 = Brown</td>
</tr>
<tr>
<td><strong>L2 (DC–)</strong></td>
<td>3 = Blue</td>
</tr>
<tr>
<td>† No Connection</td>
<td>4 = Black</td>
</tr>
</tbody>
</table>

**UN04** Emitters with Quick-Disconnect Cable

More on next page
Universal AC/DC Hookups

UN05 P-MOSFET (Sourcing) Receiver—Cabled

Key

1 = Brown
3 = Blue
4 = Black

N-MOSFET (Sinking) Receiver—Cabled

1 = Brown
3 = Blue
4 = Black

UN06 P-MOSFET (Sourcing) Receiver—Quick-Disconnect

Key

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

N-MOSFET (Sinking) Receiver—Quick-Disconnect

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

4-Pin Micro

UN07 SPST Solid-State Relay Output

Key

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

4-Pin Mini

UN08 SPST Electromechanical Relay Output

Key

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

4-Pin Micro