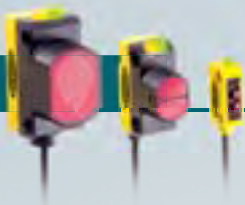


more sensors, more solutions

 **WORLD-BEAM<sup>®</sup>**

*One family. Complete solutions.*



**Replace thousands of sensors with one universal sensor family.**

WORLD-BEAM sets new standards for innovative universal housing designs and sensing modes that fit almost any mounting situation and application. With WORLD-BEAM, you can replace most existing sensors, incorporate the latest sensing technology in your products and take up less space. You'll achieve greater versatility and superior performance.

**Simplify high-performance sensor specifications.**






Achieve the highest possible performance for all your applications with a wide variety of sensing technologies. Choose infrared or easy-to-align visible beams, powerful ranges exceeding 200 m, laser models, ultrasonics or glass and plastic fiber models. Specialized models include both fixed- and adjustable-field background suppression, even models with universal AC/DC voltage inputs. Special features include simple single-button TEACH programming and patented diagnostics that keep you better informed. There's simply no other line of sensors that is this complete and easy to specify.



**Monitor status with 360° visible LEDs.**

Bright green and amber status LEDs on the top of all WORLD-BEAM sensors are visible from the top and all sides. You'll always know the operating status of your sensor from any angle of view.

**Sensing modes, ranges & features that solve most applications.**

Mode/Feature	Range/Performance
 <i>Opposed</i>	<i>Up to 213 m</i>
 <i>Retro</i>	<i>Up to 18 m</i>
 <i>Diffuse</i>	<i>.45 – 1.0 m</i>
 <i>Convergent</i>	<i>16 or 43 mm</i>
 <i>Background Suppression</i>	<i>50 – 600 mm</i>
 <i>Fiber Optic</i>	<i>Glass or Plastic</i>
 <i>Laser</i>	<i>Opposed, Retro, Diffuse &amp; Background Suppression</i>
 <i>Ultrasonic</i>	<i>50 – 500 mm</i>
 <i>TEACH</i>	<i>Push-button Programming</i>
 <i>Universal Voltage</i>	<i>12 – 250V dc 24 – 250V ac</i>





### WORLD-BEAM® Q12

**The ultra-miniature universal sensor, page 4**

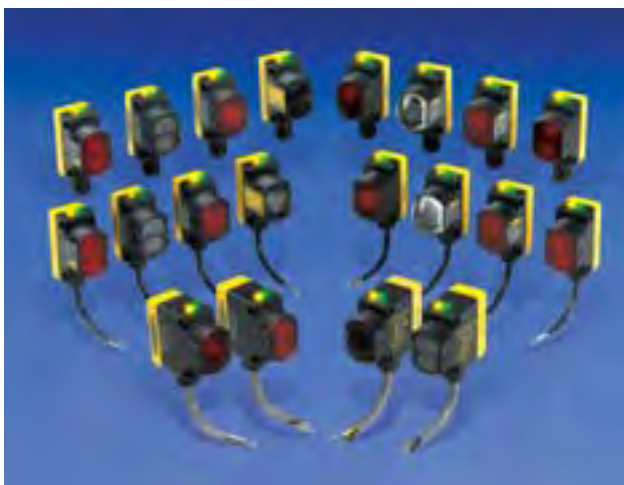
- A new industry standard for ultra-miniature photoelectric sensors.
- Bipolar NPN/PNP outputs in a housing just 22 x 8 x 12 mm.
- Powerful sensing performance for extremely confined areas.
- IP67 rating for use in the widest range of locations and applications.
- Mounting flexibility directly on and inside manufacturing equipment.
- Unique overmolded design for enhanced durability and shielding.
- Robust metal-lined mounting holes in same location on all models.



### WORLD-BEAM® QS18

**The ultimate value, world-standard sensor, page 6**

- Universal photoelectric family with 18 mm threaded lens or side mounts.
- Replacement for hundreds of other sensor styles.
- Rugged housing for harsh environments—IP67 and NEMA 6 standards.
- Opposed, polarized and non-polarized retroreflective, convergent, regular and wide-angle diffuse, laser, plastic or glass fiber optic, fixed- or adjustable-field and ultrasonic sensing modes.
- WORLD-BEAM *Expert*™ QS18E models with easy push-button TEACH-mode setup.
- 360-degree visible multi-function LED indicators.
- Ranges are up to 20 m.



### WORLD-BEAM® QS30

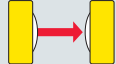

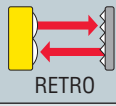





**The new standard for high performance sensing, page 8**

- High power sensing with ranges up to 200 m.
- Diffuse, opposed, retroreflective, fixed- or adjustable-field and laser sensing modes.
- Universal voltage models for 12 to 250V dc or 24 to 250V ac operation, in addition to the widely used standard 10 to 30V dc format.
- Smallest sensor with integrated e/m relay.
- Wide variety of special application sensing modes including; high-gain, laser and ultra-sensitive models.

## WORLD-BEAM® Q12: Ultra-miniature and rugged.

### World standard photoelectric that fits almost anywhere.

About the same height as a US quarter and only 8 mm wide, the Q12 is the smallest WORLD-BEAM. It fits in the most confined spaces and is completely self-contained. With its miniature size and broad range of available operating modes, WORLD-BEAM Q12 Series photoelectric sensors are ideal for a wide variety of applications in the material handling, packaging, semiconductor, pharmaceutical, document handling and assembly industries.

Sensing Mode	Range
 OPPOSED	 2 m
 RETRO	 1.5 m
 POLAR RETRO	 1 m
 FIXED-FIELD	 60 mm 30 mm 15 mm

→ Visible Red LED



### Unbeatable power-to-size ratio.

The Q12 is a powerful performer and is available in opposed, retroreflective, polarized retroreflective and fixed-field modes. Despite its small size, it can sense ranges up to 2 m. All units feature solid-state bipolar outputs: NPN (current sinking) and PNP (current sourcing). Whatever mode and model you choose, you'll get superior performance in a variety of sensing conditions.



### Smallest polarized retroreflective sensor.

The uniquely engineered glass optics in a tiny housing set the Q12 apart from all other polarized retroreflective sensors on the market today. A design using polarized optics allows the sensor to reliably detect shiny objects, even at long range.

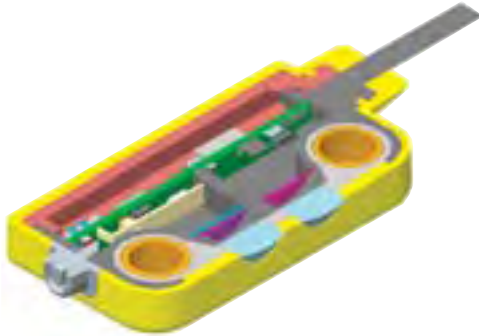




## Q12: Unique overmolded design protects your process and your profits.

### Tiny but rugged, rated IP67.

The Q12 is as rugged as it is small. A unique overmolded design encapsulates the entire sensor to achieve an IP67 environmental protection rating and allows it to withstand the abuses of today's harsh industrial environments.



Bright LED operating status indicators visible from 360°

Rugged, sealed housing

Variety of cable and connector options



### Mounting flexibility.

Installation of the Q12 in confined or otherwise challenging locations is simplified with robust, metal-sleeved side mounting holes consistently located on all models. A large assortment of available brackets allows you to mount the Q12 at almost any angle and in almost any location. See page 20 for available mounting brackets.



## TYPICAL APPLICATIONS



### Part Presence/Absence



**Objective:** To detect the presence of bottle caps.

### Counting



**Objective:** To reliably count metallic rings on a conveyor.

### Counting



**Objective:** To count memory sticks for digital cameras and recorders.

### Part Presence/Absence



**Objective:** To verify the presence of colored caps on bottles of medicine.

### Counting



**Objective:** To detect the presence of IC chips in a confined space.

# WORLD-BEAM® QS18: The affordable, high-performance sensor.

## The world's most universal solution.

The WORLD-BEAM QS18 is easily the most versatile sensor in the world. It is available in all sensing modes, so you can standardize on a single housing style and fulfill hundreds of application requirements with a wide selection of the most advanced sensing technologies and features.

## Expert models for difficult applications.

The QS18 *Expert* easily solves difficult applications with an advanced microprocessor that differentiates between two received light levels, for the most precise sensitivity adjustment. Using a single push button in TEACH mode, the WORLD-BEAM *Expert* can “learn” the light and dark conditions required and choose the most accurate setting. It offers increased reliability for sensing transparent materials and is ideal for tough sensing applications, such as color mark detection on a continuous web and sensing clear bottles or wafer cassettes on a moving conveyor.



Sensing Modes	Range
OPPOSED	20 m 3 m
LASER EMITTER	30 m
LASER SPOT	See Datasheet for more information
RETRO	6.5 m
POLAR RETRO	3.5 m
LASER POLAR RETRO	10 m
CONVERGENT	43 mm 16 mm
DIFFUSE	800 mm 500 mm
DIVERGENT DIFFUSE	300 mm
LASER DIFFUSE	300 mm
ADJUSTABLE-FIELD	1 mm to cutoff (20-100 mm)
LASER ADJUSTABLE-FIELD	1 mm to cutoff (30-150 mm)
FIXED-FIELD	100 mm 50 mm
GLASS FIBER	Range varies by mode and fiber optic used
PLASTIC FIBER	Range varies by mode and fiber optic used
ULTRASONIC	50 to 500 mm

## One housing style fulfills all mounting requirements.



Directly replace barrel sensors and eliminate significant required depth.



Using identical mounting holes, replace straight and right-angle sensors, and get increased performance.



Replace larger “mini-style” sensors without sacrificing performance.



Replace low-end economy sensors to increase performance.

Infrared LED   Visible Red LED   Visible Red Laser   Ultrasonic

## Advanced laser models.

QS18 laser sensors feature tightly collimated sensing beams and extended sensing ranges. You can now reliably detect extremely small objects or use it for precise positioning applications. Choose from various models including adjustable field for ignoring background objects immediately behind the set cutoff point.



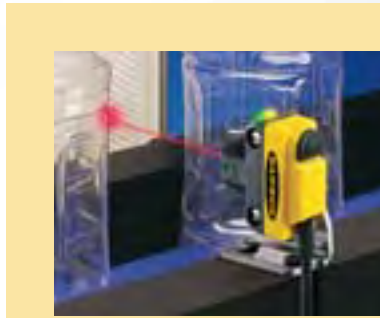


## QS18: More models, sensing modes, features & performance.



### QS18 Standard DC & Fiber Optic (glass & plastic)

- Eight sensing modes.
- High-power visible red and infrared sensing beam.
- Opposed, retroreflective, convergent, diffuse, plastic and glass fiber optic, and fixed- and adjustable-field sensing modes.
- Highly visible diagnostics.
- Smallest available Banner glass fiber optic sensor.



### QS18 Expert™

- Advanced teachable microprocessor.
- Single-button programming.
- Instant learning and self-setting for difficult sensing conditions.
- Reliable detection of transparent and reflective objects.



### QS18 Background Suppression

- Reliably detects objects in defined sensing field while ignoring objects beyond cutoff point.
- Adjustable-field models with cutoff point from 20 to 100 mm or 30 to 150 mm.
- Fixed-field models with sensing range of 50 or 100 mm.
- Visible red LED or laser sensing beam.
- Accurate and reliable, even with low-reflectivity targets.
- Ideal for small, difficult to access areas.



### QS18 Ultrasonic

- Most compact ultrasonic sensor with push-button programming and status-indicating LEDs onboard.
- Highly accurate object detection from 50 to 500 mm.
- Right-angle mounting with 18 mm thread.
- Compensation for variations in temperature.
- Functional in a wide range of temperatures.
- Fast 15 ms response time.

### QS18 Lasers

- Narrow effective beam for small object detection or positioning.
- Excellent optical performance up to 10 m.
- Opposed, polarized retroreflective, diffuse and adjustable-field sensing modes.
- Laser spot models for five unique beam shapes.



## TYPICAL APPLICATIONS

### Letter Sorting



**Objective:** To sort letters from packages.

### Leak Detection



**Objective:** To detect leaks in a sealed chamber.

### Packaging Verification



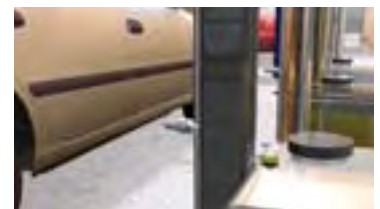
**Objective:** To verify that a box of candy is full.

### Precise Counting



**Objective:** To count the narrow barrels of syringes.

### Level Monitoring



**Objective:** To monitor the level of liquid soap in a car wash.

# WORLD-BEAM® QS30: Ultimate power and performance in a midsize sensor.

## The QS30 is the most powerful WORLD-BEAM.

In the opposed mode, the QS30 can achieve ranges up to 213 m or burn through the heaviest moisture, fog, dust and industrial-process contamination. It provides maximum excess gain for accurate, reliable sensing in all applications. As durable as it is powerful, the QS30 high-power opposed housing is sealed up to a rating of IP69K—a new standard for industrial applications requiring 1200 PSI washdown protection. For added durability in harsh conditions, the internal components are completely epoxy-encapsulated. A unique, impact resistant lens material and design further adds to the exceptional functionality of the QS30 by shedding water and debris to reduce the risk of lens damage or contamination.



Sensing Modes	Range
HIGH-POWER OPPOSED	213 m
OPPOSED	60 m
RETRO	12 m
POLAR RETRO	8 m
LASER POLAR RETRO	18 m
DIFFUSE	1 m
LASER DIFFUSE	800 m
ADJUSTABLE-FIELD	50-300 mm
FIXED-FIELD	600 mm
	400 mm
	200 mm

Infrared LED    Visible Red LED    Visible Red Laser

## A superior design.

The QS30 is unlike other high-power sensors that require massive housings, synchronization wires and a much longer barrel format with fewer mounting options. The compact, self-contained QS30 outperforms larger sensors and features a wide range of convenient mounting options using either the 30 mm barrel, integral side-mounting holes or a series of available brackets (see page 21). Innovative new circuitry results in superior range and immunity to crosstalk, electrical noise and sunlight. In addition to the standard 10 to 30V dc format, the QS30 is available in a universal voltage model with 12 to 250V dc or 24 to 250V ac operation.



## The best diagnostics & programming in the business.

Many models feature simple push-button programming and Banner's 8-segment bargraph display that indicates signal strength relative to the sensing threshold. QS30 sensors can be programmed for normally closed or normally open operation, light or dark operate, an OFF-delay output, low contrast, maximum excess gain, background suppression, object detection, remote programming and lockout, depending on model. Advanced TEACH models also feature push-button static, dynamic and single-point programming and manual fine-tuning of the setting. Amber and green status-indicating LEDs located on the top of the sensor are visible from 360 degrees, providing constant information about operating status, at a glance.







## QS30: Models to solve your challenging applications.



### TYPICAL APPLICATIONS

#### Vehicle Detection



**Objective:** To verify that a vehicle is in position in a car wash.

#### Small Spot Detection



**Objective:** To verify that threads are cut in manifold holes, at a long range.

#### Lumber Inspection



**Objective:** To inspect lumber for warping.

#### Bottle Counting



**Objective:** To count the bottles on a conveyor.

#### Container Detection



**Objective:** To verify the presence of juice cartons.



#### QS30 Standard

- Large, bright output state indicator.
- Power and signal indicators with 360° visibility.
- Precise fixed-field background suppression.
- Configurable for light operate (LO)/dark operate (DO) through hookup.

#### QS30 EX/RX Opposed

- High-power infrared opposed mode.
- Extraordinary immunity to EMI/RFI interference and sunlight.
- Selectable 30 millisecond OFF-delay.
- Up to IP69K rating, 1200 psi washdown protection.



#### QS30 Lasers

- Compact, Class 1 or Class 2 laser sensors.
- Visible laser beam for ease of alignment and long-range sensing.
- Not fooled by diffuse, shiny or limited-contrast targets.
- 8-segment LED display for easy setup.
- Push-button TEACH or SET programming.
- Accuracy for diffuse sensing up to 800 mm.
- Long-range (LLP) or high-sensitivity (LLPC) retroreflective models.

#### QS30 Background Suppression

- Push-button SET adjustable-field background suppression.
- Easy push-button SET options: Background Suppression SET, Object Detection SET and Dynamic SET (using remote wire).
- Preprogrammed fixed-field models for 200, 400 or 600 mm sensing.
- Powerful, highly collimated visible red sensing beam for easy alignment.



#### QS30 Universal Voltage

- Universal voltage for use anywhere without concern for supply voltage.
- Operation from 12 to 250V dc or 24 to 250V ac.
- Convenient SPDT electromechanical relay to switch electrical loads up to 5 A.

# WORLD-BEAM® Q12: Model Selection



## WORLD-BEAM Q12, 10-30V dc

Models	Sensing Mode/LED*	Range	Output	Cable**	Connection Options**	Options**	Data Sheet
					W/30	Q	
Q126E Emitter	 OPPOSED	2 m	—	2 m	•	•	119223
Q12AB6R Receiver			Bipolar NPN/PNP LO		•	•	
Q12RB6R Receiver			Bipolar NPN/PNP DO		•	•	
Q12AB6LV	 RETRO	1.5 m †	Bipolar NPN/PNP LO		•	•	
Q12RB6LV			Bipolar NPN/PNP DO		•	•	
Q12AB6LP	 POLAR RETRO	1 m †	Bipolar NPN/PNP LO		•	•	
Q12RB6LP			Bipolar NPN/PNP DO		•	•	
Q12AB6FF15	 FIXED-FIELD	15 mm cutoff	Bipolar NPN/PNP LO		•	•	
Q12RB6FF15			Bipolar NPN/PNP DO		•	•	
Q12AB6FF30		30 mm cutoff	Bipolar NPN/PNP LO		•	•	
Q12RB6FF30			Bipolar NPN/PNP DO		•	•	
Q12AB6FF50		50 mm cutoff	Bipolar NPN/PNP LO		•	•	
Q12RB6FF50			Bipolar NPN/PNP DO	•	•		

\* Visible Red LED

\*\* Connection Options

**Cabled models:** For 9 m cable, add suffix **W/30** to the 2 m model number (example, **Q126E W/30**).

**QD models** (QD model requires a mating cable, see page 19):

- Add suffix **Q** for 4-pin 150 mm threaded Pico-style pigtail (example, **Q126EQ**).

† Retroreflective range is specified using one model BRT-60X40C retroreflector. Actual sensing range may be more or less, depending upon efficiency and reflective area of the retroreflector(s) in use, see page 21.





## Sensor Specifications

**Supply Voltage and Current** 10 to 30V dc (10% maximum ripple) @ 20 mA max. current

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

**Bipolar Output Configuration** One NPN (current sinking) and one PNP (current sourcing); light operate (LO) or dark operate (DO), depending on model

**Output Rating** 50 mA total across both outputs with overload and short-circuit protection

**OFF-state leakage current:**

NPN: 200  $\mu$ A

PNP: 10  $\mu$ A

**ON-state saturation voltage:**

NPN: 1.25V @ 50 mA

PNP: 1.45V @ 50 mA

**Output Protection Circuitry** Protected against false pulse on power-up; short-circuit protected.

**Output Response Time**

**Opposed:** 1.3 milliseconds ON; 900 microseconds OFF

**All others:** 700 microseconds ON/OFF

**Delay at Power-Up:** 120 milliseconds; outputs do not conduct during this time.

**Repeatability** 175 microseconds

## Indicators

**2 LED indicators:**

**Green ON steady**—Power ON

**Green flashing**—Output overloaded

**Yellow ON steady**—Light sensed

**Yellow flashing**—Marginal signal

## Construction

**Polarized Retroreflective:** Thermoplastic elastomer housing with glass lens

**All others:** Thermoplastic elastomer housing with polycarbonate lens

## Environmental Rating

IEC IP67

**Connections** 2 m or 9 m attached PVC cable or 150 mm pigtail with threaded 4-pin Pico-style quick-disconnect fitting. QD cables are ordered separately. See page 19.

## Operating Conditions

**Operating temperature:** -20° to +55° C

**Storage temperature:** -30° to +75° C

**Relative humidity:** 90% max @ 50° C (non-condensing)

**Certifications** See data sheet

# WORLD-BEAM® QS18: Model Selection



## WORLD-BEAM QS18, 10-30V dc

Models	Sensing Mode/LED*	Range	Output Type	Cable**	Connection Options**					Data Sheet					
					W/30	Q8	Q5	Q7	Q						
QS186E Emitter	 OPPOSED	20 m	—	2 m	•	•	•	•	•	63908					
QS18VN6R Receiver			NPN												
QS18VP6R Receiver			PNP												
QS186EB Emitter		3 m	—												
QS18VN6RB Receiver			NPN												
QS18VP6RB Receiver			PNP												
QS186LE***	 LASER EMITTER	30 m	—		•	•				109415					
QS186LE10***	 LASER SPOT	See data sheet for more information													
QS186LE11***	 LASER SPOT														
QS186LE12***	 LASER SPOT														
QS186LE14***	 LASER SPOT														
QS18VN6LV	 RETRO	6.5 m †	NPN		•	•	•	•	•	63908					
QS18VP6LV			PNP												
QS18VN6LP	 POLAR RETRO	3.5 m †	NPN												
QS18VP6LP			PNP												
QS18VN6LLP	 POLAR RETRO	0.1-10 m ††	NPN	•							•	•	•	•	118900
QS18VP6LLP			PNP												
QS18VN6CV15	 CONVERGENT	16 mm	NPN	•						•	•	•	•	63908	
QS18VP6CV15			PNP												
QS18VN6CV45		43 mm	NPN												
QS18VP6CV45			PNP												





# WORLD-BEAM® QS18: Model Selection

## WORLD-BEAM QS18, 10-30V dc

Models	Sensing Mode/LED*	Range	Output Type	Cable**	Connection Options**					Data Sheet
					W/30	Q8	Q5	Q7	Q	
QS18VN6D	 DIFFUSE	450 mm	NPN	2 m	•	•	•	•	•	63908
QS18VP6D			PNP		•	•	•	•	•	
QS18VN6DB			NPN		•	•	•	•	•	
QS18VP6DB			PNP		•	•	•	•	•	
QS18VN6W	 DIVERGENT DIFFUSE	100 mm	NPN		•	•	•	•	•	63908
QS18VP6W			PNP		•	•	•	•	•	
QS18VN6LD	 LASER DIFFUSE	300 mm	NPN		•	•	•	•	•	118899
QS18VP6LD			PNP		•	•	•	•	•	
QS18VN6AF100	 ADJUSTABLE-FIELD	Cutoff adjustable between 20-100 mm	NPN		•	•	•	•	•	66981
QS18VP6AF100			PNP		•	•	•	•	•	
QS18VN6LAF	 LASER ADJUSTABLE-FIELD	Cutoff adjustable between 30-150 mm	NPN		•	•	•	•	•	66981
QS18VP6LAF			PNP		•	•	•	•	•	
QS18VN6FF50	 FIXED-FIELD	50 mm cutoff	NPN		•	•	•	•	•	63908
QS18VP6FF50			PNP		•	•	•	•	•	
QS18VN6FF100		100 mm cutoff	NPN		•	•	•	•	•	
QS18VP6FF100			PNP		•	•	•	•	•	
QS18VN6F	 GLASS FIBER	Range varies by sensing mode and fiber optic used, see page 23	NPN	•	•	•	•	•	63908	
QS18VP6F			PNP	•	•	•	•	•		
QS18VN6FP	 PLASTIC FIBER	Range varies by sensing mode and fiber optic used, see page 22	NPN	•	•	•	•	•	63908	
QS18VP6FP			PNP	•	•	•	•	•		

\* Infrared LED Visible Red LED Visible Red Laser

\*\* Connection Options

**Cabled models:** For 9 m cable, add suffix **W/30** to the 2 m model number (example, **QS186E W/30**).

**QD models** (QD model requires a mating cable, see page 19):

- Add suffix **Q8** for 4-pin integral Euro-style (example, **QS186EQ8**).
- Add suffix **Q5** for 4-pin 150 mm Euro-style pigtail (example, **QS186EQ5**).
- Add suffix **Q7** for 4-pin integral Pico-style (example, **QS186EQ7**).
- Add suffix **Q** for 4-pin 150 mm Pico-style pigtail (example, **QS186EQ**).

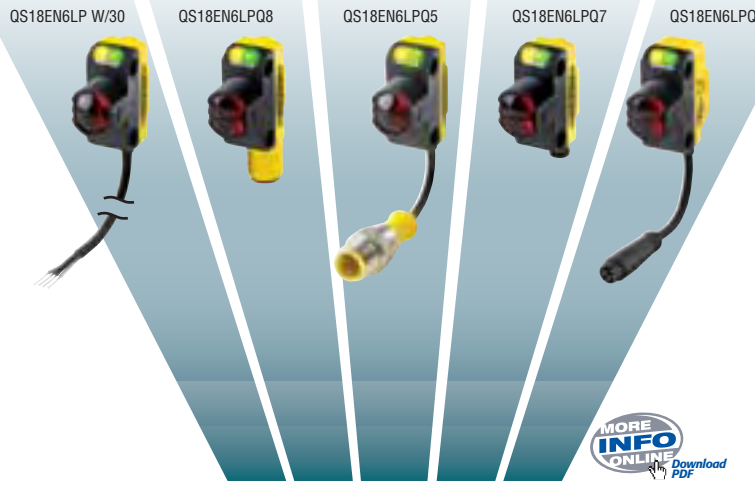
\*\*\* Specified using QS18 threaded lens receiver. Not recommended for dusty or dirty environments; scattered light will greatly reduce excess gain.

† Retroreflective range is specified using one model BRT-84 retroreflector. Actual sensing range may be more or less than specified, depending upon efficiency and reflective area of the retroreflector(s) in use, see page 21.

†† Retroreflective range is specified using one model BRT-51X51BM or BRT-TVHG-2X2 retroreflector. Actual sensing range may be more or less than specified, depending upon efficiency and reflective area of the retroreflector(s) in use, see page 21.



# WORLD-BEAM® QS18 Expert™ & Ultrasonic: Model Selection



## WORLD-BEAM QS18 Expert, 10-30V dc

Models	Sensing Mode/LED*	Range	Output Type	Cable**	Connection Options**					Data Sheet
					W/30	Q8	Q5	Q7	Q	
QS18EN6LP	POLAR RETRO	3.5 m †	NPN	2 m	•	•	•	•	•	69948
QS18EP6LP			PNP		•	•	•	•	•	
QS18EN6CV15	CONVERGENT	16 mm	NPN		•	•	•	•	•	
QS18EP6CV15			PNP		•	•	•	•	•	
QS18EN6CV45		43 mm	NPN		•	•	•	•	•	
QS18EP6CV45			PNP		•	•	•	•	•	
QS18EN6D	DIFFUSE	800 mm	NPN		•	•	•	•	•	
QS18EPN6D			PNP		•	•	•	•	•	
QS18EN6DB		500 mm	NPN		•	•	•	•	•	
QS18EP6DB			PNP		•	•	•	•	•	
QS18EN6W	DIVERGENT DIFFUSE	300 mm	NPN		•	•	•	•	•	
QS18EP6W			PNP		•	•	•	•	•	

## WORLD-BEAM QS18 Ultrasonic, 12-30V dc

QS18UNA	ULTRASONIC	50 to 500 mm	NPN	2 m	•	•	•	•	•	119287
QS18UPA			PNP		•	•	•	•		
QS18UNAE††			NPN		•	•	•	•		
QS18UPAE††			PNP		•	•	•	•		

\* Infrared LED Visible Red LED Ultrasonic

\*\* Connection Options

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

**QD models** (QD model requires a mating cable, see page 19):

- Add suffix **Q8** for 4-pin integral Euro-style (example, **QS18EN6LPQ8**).
- Add suffix **Q5** for 4-pin 150 mm Euro-style pigtail (example, **QS18EN6LPQ5**).
- Add suffix **Q7** for 4-pin integral Pico-style (example, **QS18EN6LPQ7**).
- Add suffix **Q** for 4-pin 150 mm Pico-style pigtail (example, **QS18EN6LPQ**).

† Retroreflective range is specified using one model BRT-84 retroreflector. Actual sensing range may be more or less than specified, depending upon efficiency and reflective area of the retroreflector(s) in use, see page 21.

†† Models are epoxy-encapsulated, DIN 40050, IP69K with remote TEACH programming.





## Sensor Specifications

### Supply Voltage

**Expert:** 10 to 30V dc (10% maximum ripple) @ less than 35 mA, exclusive of load, 10 to 24V dc @ greater than 55° C

**Laser (Adjustable-field, Diffuse and Retroreflective):** 10 to 30V dc (10% maximum ripple) @ less than 15 mA, exclusive of load

**Laser emitters:** 10 to 30V dc (10% maximum ripple) @ less than 35 mA

**Ultrasonic:** 12 to 30V dc (10% maximum ripple); 25 mA max., exclusive of load

**All others:** 10 to 30V dc (10% maximum ripple) @ less than 25 mA, exclusive of load

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

**Ultrasonic Frequency (Ultrasonics only)** 300 kHz, rep. rate 5 milliseconds

**Laser Control (Laser emitter only)** Enable beam by applying 0V dc to white wire; apply +10 to 30V dc to white wire to inhibit (extinguish) beam

### Laser Characteristics (Lasers only)

**Wavelength:** 650 nm visible red Class 1 laser

**Pulse width:** 7 microseconds (**Laser emitters:** 5 microseconds)

**Rep rate:** 130 microseconds (**Laser emitters:** 27 microseconds)

**Average output power:** 0.065 mW (**Laser emitters:** less than 1.9 mW)

### Output Configuration\*

**Expert:** SPST solid-state NPN (current sinking) or PNP (current sourcing), depending on model. Configuration in TEACH sequence for light operate (LO) or dark operate (DO)

**Ultrasonic:** SPST solid-state switch conducts when target is sensed within sensing window; NPN (current sinking) or PNP (current sourcing), depending on model

**All others:** SPDT solid-state complementary; NPN (current sinking) or PNP (current sourcing), depending on model

**Output Rating\*** 100 mA maximum each output @ 25° C

### OFF-state leakage current:

**Fixed-field:** less than 200 µA @ 30V dc

**Laser (Adjustable-field, Diffuse and Retroreflective):**

**NPN:** less than 200 µA @ 30V dc

**PNP:** less than 10 µA @ 30V dc

**Ultrasonic:** less than 10 µA (sourcing); less than 200 µA (sinking)

**NPN saturation:** less than 1.6V @ 100 mA

**PNP saturation:** less than 2.0V @ 100 mA

**All others:** less than 50 µA @ 30V dc

### ON-state saturation voltage:

**Laser (Adjustable-field, Diffuse and Retroreflective):**

**NPN:** less than 1.6V @ 100 mA

**PNP:** less than 2.0V @ 100 mA

**Expert:** less than 1.5V (2 m cable); 1.7V (9 m cable)

**All others:** less than 1V @ 10 mA; less than 1.5V @ 100 mA

**Output Protection Circuitry** 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

**Adjustable-field, Laser (Adjustable-field, Retroreflective and Diffuse):** 700 microseconds ON/OFF

**Fixed-field:** 800 microseconds ON/OFF

**Ultrasonic:** 15 milliseconds

**All others:** 600 microseconds ON/OFF

### Delay at Power-Up

**Laser (Adjustable-field, Retroreflective and Diffuse):** 200 milliseconds; outputs do not conduct during this time.

**Laser Emitters:** 1.5 seconds

**Expert:** less than 1 second; outputs do not conduct during this time.

**Ultrasonic:** 300 milliseconds

**All others:** 100 milliseconds; outputs do not conduct during this time.

### Temperature Effect (Ultrasonic Only)

**Non-encapsulated models:** ± 0.05% per °C from -20° to +50° C, ± 0.1% per °C from +50° to +60° C

**Encapsulated models:** ± 0.05% per °C from 0° to +60° C, ± 0.1% per °C from -20° to 0° C

### Repeatability\*

**Opposed:** 100 microseconds

**Fixed-field:** 160 microseconds

**Laser:** 130 microseconds

**All others:** 150 microseconds

**Adjustable-field:** 175 microseconds

**Expert:** 75 microseconds

**Ultrasonic:** 0.7 mm

**Minimum Window Size (Ultrasonic only)** 5 mm

### Hysteresis\*

**Adjustable-field:** 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

**Laser Adjustable-field:** 1% of range typical at 30 mm cutoff

2% of range typical at 75 mm cutoff

5% of range typical at 150 mm cutoff

**Laser Diffuse:** 15% of range typical

**Laser Retroreflective:** 12% of range typical

**Ultrasonic:** 1.4 mm

### Adjustments\*

**Glass Fiber Optic, Plastic Fiber Optic, Convergent, Diffuse, Laser Diffuse, Retroreflective and Laser Retroreflective:** Single-turn sensitivity (Gain) adjustment potentiometer

**Adjustable-field and Laser Adjustable-field:** 5-turn adjustment screw sets cutoff distance between 20 and 100 mm (Adjustable-field) or 30 and 150 mm (Laser Adjustable-field), clutched at both ends of travel.

**Expert:** Push button and remote wire

• **Thresholds:** Push-button/remote-wire teachable

• **Light/dark operate:** Selectable by programming order (load output follows the first taught target condition)

• **Push-button lockout** (remote wire only)

**Ultrasonic:** Sensing window limits: TEACH-mode programming of near and far window limits may be set using the push button or remotely via TEACH input.

### Indicators

#### Laser emitter:

**Green**—Power ON

#### Expert

**2 LED indicators:**

**Green**—RUN mode, output short-circuit

**Yellow**—Output ON/marginal, TEACH mode

#### Ultrasonic:

**Range Indicator (Red/Green)**

**Green**—Target is within sensing range

**Red**—Target is outside sensing range

**OFF**—Sensing power is OFF

**Teach/Output Indicator (Yellow/Red)**

**Yellow**—Target is within taught limits

**OFF**—Target is outside taught window limits

**Red**—Sensor is in TEACH mode

#### All others:

**2 LED indicators:**

**Green ON steady**—Power ON

**Green flashing**—Output overloaded

**Yellow\* ON steady**—Light sensed

**Yellow\* flashing**—Marginal excess gain (1.0 to 1.5x excess gain) in the light condition

†NOTE: Prior to date code 0223, the output indicator was red instead of yellow.

### Construction

**Expert and Ultrasonic:** ABS housing and TPE push button

**All others:** Polycarbonate/ABS housing

**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 cables are ordered separately. See page 19.

### Operating Conditions

**Lasers:**

**Adjustable-field:**

**Ultrasonic:**

**All others:**

**Temperature**

-10° to +50° C

0° to +55° C

-20° to +60° C

-20° to +70° C

**Relative Humidity**

90% @ 50° C (non-condensing)

90% @ 50° C (non-condensing)

100% (non-condensing)

90% @ 50° C (non-condensing)

### Environmental Rating

**Ultrasonic:** IEC IP67; NEMA 6P (IP69K per DIN 40050 for models ending in "E")

**All others:** IEC IP67, NEMA 6

### Application Note

**Expert:** The first condition presented during TEACH mode becomes the OUTPUT ON condition.

**Ultrasonic:** Objects passing inside the specified near limit may produce a false response

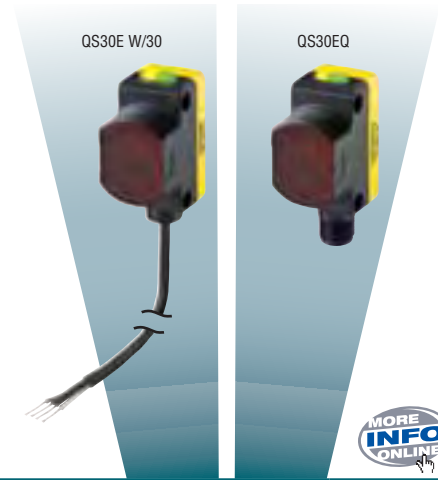
### Certifications

See data sheets

\* Does not apply to Laser Emitter models.



# WORLD-BEAM® QS30: Model Selection



## WORLD-BEAM QS30, 10-30V dc

Models	Sensing Mode/LED*	Range	Output Type	Cable**	Connection Options** W/30	Q	Data Sheet
QS30E Emitter	OPPOSED	60 m	—	2 m	•	•	119165
QS30R Receiver			Bipolar NPN/PNP				
QS30EX Emitter	HIGH-POWERED OPPOSED	213 m	—		•	•	115011
QS30ARX Receiver			Bipolar NPN/PNP LO				
QS30RRX Receiver			Bipolar NPN/PNP DO				
QS30LV	RETRO	12 m †	Bipolar NPN/PNP		•	•	119165
QS30LP	POLAR RETRO	8 m †					
QS30LLP	LASER POLAR RETRO	0.2-18 mm ††	Bipolar NPN/PNP		•	•	112355
QS30LLPC							
QS30D	DIFFUSE	1.0 m	Bipolar NPN/PNP		•	•	119165
QS30LD	LASER DIFFUSE	400 mm	Bipolar NPN/PNP		•	•	109027
QS30LDL		800 mm					
QS30AF	ADJUSTABLE-FIELD	Cutoff adjustable between 50-300 mm	Bipolar NPN/PNP	•	•	111384	
QS30FF200	FIXED-FIELD	200 mm cutoff	Bipolar NPN/PNP	•	•	119165	
QS30FF400		400 mm cutoff					
QS30FF600		600 mm cutoff					

\* Infrared LED Visible Red LED Visible Red Laser

\*\* Connection Options

**Cabled models:** For 9 m cable, add suffix **W/30** to the 2 m model number (example, **QS30E W/30**).

**QD models** (QD model requires a mating cable, see page 19):

- Add suffix **Q** for 5-pin integral Euro-style (example, **QS30EQ**).

† Retroreflective range is specified using one model BRT-84 retroreflector. Actual sensing range may be more or less than specified, depending upon efficiency and reflective area of the retroreflector(s) in use, see page 21.

†† Retroreflective range is specified using one model BRT-36X40BM or BRT-TVHG-2X2 retroreflector. Actual sensing range may be more or less than specified, depending upon efficiency and reflective area of the retroreflector(s) in use, see page 21.



# WORLD-BEAM® QS30: Specifications

## Sensor Specifications

### Beam Size at Aperture

**Laser Polarized Retroreflective:** Approx. 3 mm  
**Laser Diffuse:** Approx. 2 mm

### Supply Voltage

**Emitter (High-Powered):** 10 to 30V dc (10% maximum ripple) @ less than 70 mA  
**Receiver (High-Powered):** 10 to 30V dc (10% maximum ripple) @ less than 22 mA, exclusive of load

**Laser (Polarized Retroreflective and Diffuse):** 10 to 30V dc (10% maximum ripple @ 10% duty cycle) @ 35 mA max current, exclusive of load

**Adjustable-field:** 10 to 30V dc (10% maximum ripple) @ 45 mA max current, exclusive of load

**All others:** 10 to 30V dc (10% maximum ripple) @ less than 40 mA, exclusive of load

**Supply Protection Circuitry** Protected against reverse polarity, over voltage and transient voltages

### Laser Characteristics (Laser only)

#### Wavelength:

**Laser Diffuse (QS30LD) and Laser Retroreflective:** 650 nm visible Class 1 laser

**Laser Diffuse (QS30LDL):** 658 nm visible Class 2 laser

**Pulse width:** 4.5 microseconds

**Rep rate:** 70 microseconds

#### Average output power:

**Laser Diffuse (QS30LD):** 115 µW

**Laser Diffuse (QS30LDL):** 300 µW

**Laser Retroreflective (QS30LD):** 100 µW

### Delay at Power-Up

**Laser (Polarized Retroreflective and Diffuse):** 1 second max.; outputs do not conduct during this time

**Adjustable-field:** 250 milliseconds; outputs do not conduct during this time.

**All other models:** 100 milliseconds; outputs do not conduct during this time (except Opposed High-Power).

**Bipolar Output Configuration** One NPN (current sinking) and one PNP (current sourcing) open-collector transistor; light operate (LO) or dark operate (DO) selectable or configurable, depending on model

### Output Rating

**Opposed High-Power:** 100 mA maximum load

**OFF-state leakage current:** less than 200 µA

**ON-state saturation voltage:** 1.5V @ 100 mA, less than 900 mV @ 10 mA

**Laser (Polarized Retroreflective and Diffuse):** 150 mA maximum load

**OFF-state leakage current:** less than 10 µA @ 30V dc

**ON-state saturation voltage:**

**NPN:** less than 1.0V @ 150 mA load

**PNP:** less than 2.0V @ 150 mA load

**Adjustable-field:** 150 mA maximum load (derate -1 mA/° C above 25° C)

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

**ON-state saturation voltage:**

**NPN:** less than 200 mV @ 10 mA; less than 1V @ 150 mA

**PNP:** less than 1.25V @ 10 mA; less than 2V @ 150 mA

**All other models:** 100 mA maximum each output @ 25° C

**OFF-state leakage current:**

**NPN:** less than 200 µA @ 30V dc

**PNP:** less than 10 mA

**ON-state saturation voltage:**

**NPN:** less than 1.6V @ 100 mA

**PNP:** less than 2.0V @ 100 mA

**Output Protection** Protected against output short-circuit, continuous overload, transient over-voltages and false pulse on power up

### Output Response Time

**Opposed:** 5 milliseconds ON/OFF

**Opposed High-Power:** 30 milliseconds ON/OFF

**Laser (Polarized Retroreflective and Diffuse):** 500 microseconds

**Fixed-field:** 2 milliseconds ON/OFF

**Adjustable-field:** 1 millisecond

**All others:** 2 milliseconds ON/OFF

### Repeatability

**Opposed:** not applicable

**Opposed High-Power:** 5 milliseconds

**Laser (Polarized Retroreflective and Diffuse):** 70 microseconds

**Fixed-field:** 500 microseconds

**Adjustable-field:** 170 microseconds

**All others:** 500 microseconds

## Adjustments

### Opposed High-Power:

**Light Operate/Dark Operate**—dependent on model selected

**Frequency using gray wire**

**A:** Gray (+)

**B:** Gray (-)

**Emitter only: LED inhibit, using white wire**

White (-) turns emitter LED OFF to allow verification of sensor operation.

### Opposed, Retroreflective and Polarized Retroreflective:

Selectable light operate/dark operate is achieved using the gray wire.

**Light Operate**—Low (0 to 3V)\*

**Dark Operate**—High (open or 5 to 30V)\*

### Diffuse and Fixed-field:

Selectable light operate/dark operate is achieved using the gray wire.

**Light Operate**—High (open or 5 to 30V)\*

**Dark Operate**—Low (0 to 3V)\*

\* Input impedance 10 kΩ

### Diffuse, Retroreflective and Polarized Retroreflective:

Single-turn sensitivity (gain) adjustment potentiometer

### Adjustable-field and Laser (Polarized Retroreflective and Diffuse):

**2 push buttons and remote wire:**

- *Expert* TEACH programming for Laser Diffuse models
- Push button SET programming for Adjustable-Field and Laser Retroreflective models
- Manually adjust (+/-) cutoff (push buttons only)
- Normally Open (NO)/Normally closed (NC) or LO/DO and OFF-delay configuration options (push buttons only)
- Push-button lockout (from remote wire only)

## Indicators

### Opposed High-Power\*:

**4-LED Signal Strength light bar**

**Green LED**—Power ON

**Frequency indicator (A or B)**

**Receiver only: Yellow LED**—Output conducting

### Standard Opposed (except emitter), Retroreflective, Polarized

### Retroreflective, Diffuse and Fixed-field:

**Large, oval LED indicator on sensor back**

**Yellow ON steady:** Output conducting

**2 LED indicators on top**

**Green ON steady:** Power ON

**Green flashing:** Output overloaded (except receivers)

**Yellow ON steady:** Light sensed

**Yellow flashing:** Marginal excess gain (1.0 to 1.5x excess gain)

### Adjustable-field and Laser (Polarized Retroreflective and Diffuse)\*:

**8-segment red bargraph:** Distance relative to cutoff point (or switch-point for Diffuse)

**Green LED:** Power ON

**Yellow LED:** Output conducting

\*See data sheets for more detailed information

## Construction

PC/ABS blend plastic housing; acrylic lens cover

## Environmental Rating

**Opposed High Power:** Cabled—IP67; NEMA 6P

QD—IP69K; DIN 40050-9

**All others:** IP67; NEMA 6

## Connections

2 m or 9 m PVC cable or 5-pin integral Euro-style quick-disconnect fitting.

QD cables are ordered separately, see page 19.

## Operating Conditions

**Opposed High-Power:** -20° to +60° C 90% (non-condensing)

**Lasers:** -10° to +50° C 90% (non-condensing)

**Adjustable-field:** -10° to +55° C 90% (non-condensing)

**All others:** -20° to +70° C 90% (non-condensing)

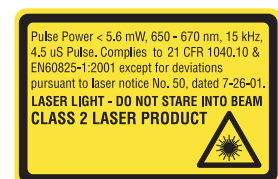
## Vibration and Mechanical Shock

All models (except Opposed High-Power) meet

Mil. Std. 202F requirements. Method 201A (Vibration: 10 to 60Hz max. double amplitude 0.06", maximum acceleration 10G). Also meets IEC 947-5-2 requirements: 30G, 11 ms duration, half sine wave.

## Certifications

See data sheets








# WORLD-BEAM® QS30 Universal Voltage: Model Selection & Specifications



## WORLD-BEAM QS30 Universal Voltage, 12-250V dc or 24-250V dc

Models	Sensing Mode/LED*	Range	Output Type	Cable**	Connection Options** W/30	Data Sheet
QS303E Emitter	 OPPOSED	60 m	SPDT e/m Relay	2 m	•	119166
QS30VR3R Receiver						
QS30VR3LP	 POLAR RETRO	8 m †				
QS30VR3FF200	 FIXED-FIELD	200 mm cutoff				
QS30VR3FF400		400 mm cutoff				
QS30VR3FF600		600 mm cutoff				

\*  Infrared LED  Visible Red LED

\*\* Connection Options

**Cabled models:** For 9 m cable, add suffix **W/30** to the 2 m model number (example, **QS303E W/30**).

**QD models:** Available with modified specification, contact factory at 1-888-373-6767

† Retroreflective range is specified using one model BRT-84 retroreflector. Actual sensing range may be more or less than specified, depending upon efficiency and reflective area of the retroreflector(s) in use, see page 21.

## WORLD-BEAM® QS30 Universal Voltage Specifications

**Supply Voltage** 24 to 250V ac, 50/60 Hz or 12 to 250V dc (1.0 W max.)

**Supply Protection Voltage** Protected against transient voltages

**Output Configuration** SPDT electromechanical relay output (except emitters)

### Output Rating

**Max. switching power (resistive load):** 150 W, 1250 VA

**Max. switching voltage (resistive load):** 250V ac; 125V dc

**Max. switching current (resistive load):** 5 A @ 250V ac; 5A @ 30V dc derated to 200 mA @ 125V dc

**Min. Voltage and current:** 5V dc, 10 mA

**Mechanical life of relay:** 50 million operations

**Electrical life of relay at full resistive load:** 100,000 operations

**Output Response** 15 milliseconds ON/OFF

**Delay at Power-Up** 100 millisecond; output does not conduct during this time.

### Indicators

**2 LED indicators on sensor top:**

**Green ON steady**—Power ON

**Yellow ON steady**—Light sensed

**Yellow flashing**—Marginal excess gain (1.0 to 1.5x excess gain)

**Large, oval LED indicator on sensor back (except emitters):**

**Yellow ON steady**—Output conducting

**Construction** ABS housing; acrylic lens cover

**Environmental Rating** IEC IP67; NEMA 6

**Connections** 2 m or 9 m 5-wire PVC cable

### Operating Conditions

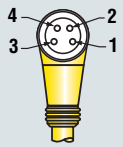
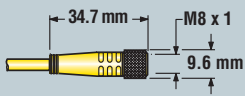
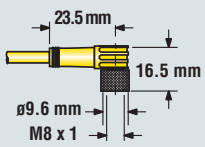
**Temperature:** -40° to +70° C

**Relative humidity:** 90% @ 50° C (non-condensing)

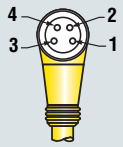
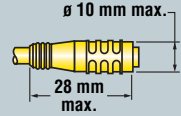
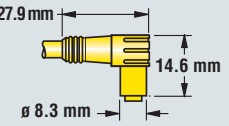
**Certifications** See data sheet



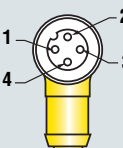
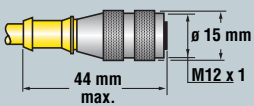
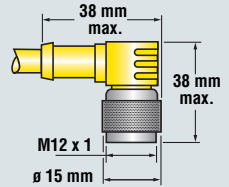
## 4-Pin Threaded Pico-Style Cables

Female Pin-Out	Model	Style	Length	Dimensions	Used With
 <p>1 = Brown 2 = White 3 = Blue 4 = Black</p>	<b>PKG4M-2</b> <b>PKG4M-9</b>	Straight Straight	2 m 9 m		<b>Q12</b>
	<b>PKW4M-2</b> <b>PKW4M-9</b>	Right-Angle Right-Angle	2 m 9 m		

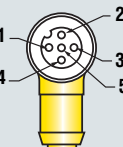
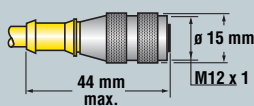
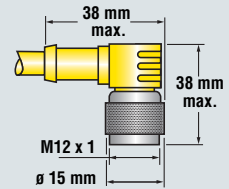
## 4-Pin Snap-On Pico-Style Cables

Female Pin-Out	Model	Style	Length	Dimensions	Used With
 <p>1 = Brown 2 = White 3 = Blue 4 = Black</p>	<b>PKG4-2</b>	Straight	2 m		<b>QS18</b>
	<b>PKW4Z-2</b>	Right-Angle	2 m		

## 4-Pin Euro-Style Cables

Female Pin-Out	Model	Style	Length	Dimensions	Used With
 <p>1 = Brown 2 = White 3 = Blue 4 = Black</p>	<b>MQDC-406</b> <b>MQDC-415</b> <b>MQDC-430</b>	Straight Straight Straight	2 m 5 m 9 m		<b>QS18</b>
	<b>MQDC-406RA</b> <b>MQDC-415RA</b> <b>MQDC-430RA</b>	Right-Angle Right-Angle Right-Angle	2 m 5 m 9 m		

## 5-Pin Euro-Style Cables

Female Pin-Out	Model	Style	Length	Dimensions	Used With
 <p>1 = Brown 2 = White 3 = Blue 4 = Black 5 = Gray</p>	<b>MQDC1-506</b> <b>MQDC1-515</b> <b>MQDC1-530</b>	Straight Straight Straight	2 m 5 m 9 m		<b>QS30</b>
	<b>MQDC1-506RA</b> <b>MQDC1-515RA</b> <b>MQDC1-530RA</b>	Right-Angle Right-Angle Right-Angle	2 m 5 m 9 m		



## WORLD-BEAM Q12 Brackets

SIDE-MOUNT



SMBQ12T



SMBQ12A

## WORLD-BEAM QS18 Brackets

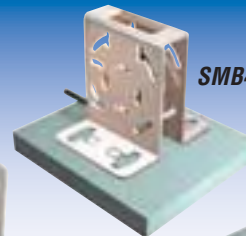
SIDE-MOUNT



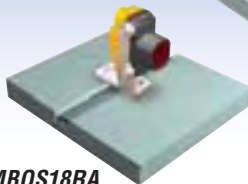
SMB3018SC



SMB312S



SMB46U



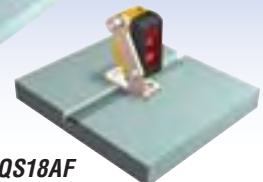
SMBQS18RA



SMB30SUS



SMB46L



SMBQS18AF

BARREL-MOUNT



SMB18A



SMB18Q



SMB18SF



SMB312PD



SMB46A



SMB30SK



SMB18UR



SMBAMS18P



SMBAMS18P  
Shown w/  
SMBAMSBRA\*



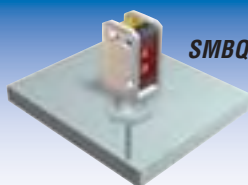
SMBAMS18RA



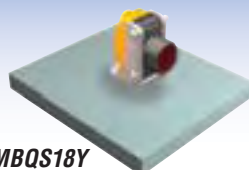
SMBAMS18RA  
Shown w/  
SMBAMSBRA\*

\* Sold separately

SPECIAL



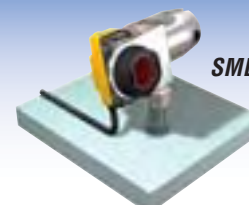
SMBQS18A



SMBQS18Y



SMH241F



SMB18FA

Note: Brackets shown with cabled sensors. Some brackets are incompatible with quick-disconnect (QD) sensors.

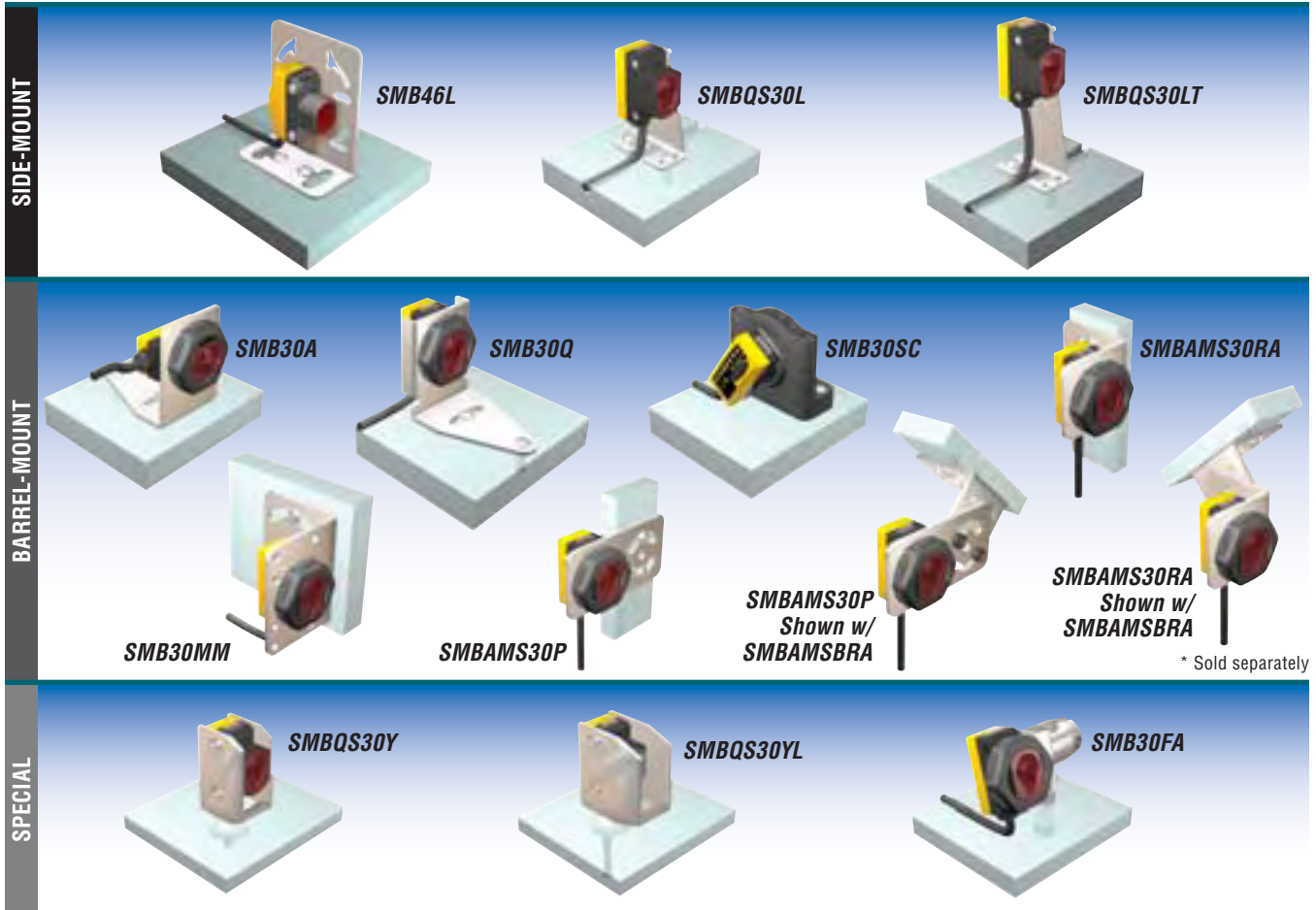




# WORLD-BEAM®: Mounting Brackets & Reflectors



## WORLD-BEAM QS30 Brackets



Note: Brackets shown with cabled sensors. Some brackets are incompatible with quick-disconnect (QD) sensors.

## WORLD-BEAM Reflectors



Model	Description	Reflectivity Factor
BRT-84	Round, acrylic target	1.0
BRT-11X11M	Square, acrylic target with micro-prism geometry	1.2
BRT-11X11MD	Square, acrylic target with micro-prism geometry and mounting stud	1.2
BRT-35X35B	Square, acrylic target	1.3
BRT-35X35BM	Square, acrylic target with micro-prism geometry	1.2
BRT-51X51BM	Square, acrylic target with micro-prism geometry	1.5
BRT-30X20M	Rectangular, acrylic target with micro-prism geometry	1.2
BRT-30X20MT	Rectangular, acrylic target with micro-prism geometry and mounting tape	1.2
BRT-40X19A	Rectangular, acrylic target	1.3
BRT-40X19AM	Rectangular, acrylic target with micro-prism geometry	1.2
BRT-60X40C	Rectangular, acrylic target	1.4
BRT-180X40A	Rectangular, acrylic target	1.4
BRT-TVHG-2X2	Retroreflective tape	0.8



Listed below is a sampling of our extensive offering of Plastic Fiber Optic Assemblies. Please go online to [bannerengineering.com](http://bannerengineering.com) or request our latest Sensors Catalog to view a more comprehensive listing. Typical range is depicted using a QS18VN6FP or QS18VP6FP.

	MODEL NUMBER	DRAWING & DIMENSIONS	CORE DIA. (mm)	MIN. BEND RADIUS (mm)	FEATURES
DIFFUSE	STANDARD	<b>PBT26U</b>  <i>Detailed Dimensions Online</i>	0.5	12	• Thread
		<b>PBT46U</b>  <i>Detailed Dimensions Online</i>	1.0	25	• Thread
		<b>PBT66U</b>  <i>Detailed Dimensions Online</i>	1.5	38	• Thread; long range
DIFFUSE	COAXIAL	<b>PBCT26U</b>  <i>Detailed Dimensions Online</i>	0.5 9X 0.25	12	• Thread
		<b>PBCT46U</b>  <i>Detailed Dimensions Online</i>	1.0 16X 0.265	25	• Thread
		<b>PIT26U</b>  <i>Detailed Dimensions Online</i>	0.5	12	• Thread
OPPOSED	STANDARD	<b>PIT46U</b>  <i>Detailed Dimensions Online</i>	1.0	25	• Thread
		<b>PIT66U</b>  <i>Detailed Dimensions Online</i>	1.5	38	• Thread; long range
		<b>PIRS1X166UMPMAL</b>  <i>Detailed Dimensions Online</i>	16X 0.265	25	• Side exit; 34 mm width

Indicates lens available for model.

Indicates fiber can be free cut using fiber cutter.



Listed below is a sampling of our extensive offering of Glass Fiber Optic Assemblies. Please go online to [bannerengineering.com](http://bannerengineering.com) or request our latest Sensors Catalog to view a more comprehensive listing. Typical range is depicted using a QS18VN6F or QS18VP6F.

	MODEL NUMBER	DRAWING & DIMENSIONS	CORE DIA. (mm)	MIN. BEND RADIUS (mm)	FEATURES
DIFFUSE	STANDARD	<b>BAT23S</b>  <i>Detailed Dimensions Online</i>	3.18	19	• 90° Angle/Thread  
		<b>BMT.442P</b>  <i>Detailed Dimensions Online</i>	0.69	9.5	• Miniature thread
		<b>BT23S</b>  <i>Detailed Dimensions Online</i>	3.18	19	• Thread  
OPPOSED	STANDARD	<b>IAT23S</b>  <i>Detailed Dimensions Online</i>	3.18	19	• 90° Angle/Thread  
		<b>IT23S</b>  <i>Detailed Dimensions Online</i>	3.18	19	• Thread  
		<b>ITA23S</b>  <i>Detailed Dimensions Online</i>	3.18	19	• Thread/90° Angle  
		<b>ITETA1.53S</b>  <i>Detailed Dimensions Online</i>	2.29	19	• Ultra-compact head; thread  
		<b>IR23S</b>  <i>Detailed Dimensions Online</i>	3.18	19	• Straight exit; 10 mm width  

Available 315°C models. Add M600 to end of model number (example, BA23SM600).

Available 480°C models. Add M900 to end of model number (example, BA23SM900).

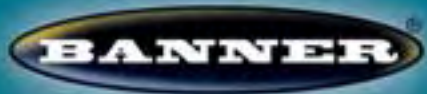
Indicates lens available for model.



## Product Information



## Literature & Resources



more sensors, more solutions

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